

ANEJO N° 6. ESTRUCTURAS

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1. Cuadro resumen

CUADRO RESUMEN DE ESTRUCTURAS

ESTRUCTURAS			
PASOS SUPERIORES	PASOS INFERIORES	VIADUCTO	PASOS DE FAUNA
P.S.- Nº1 551+3	P.I.-Nº1 558+7	VALDEGRUDAS P.K 556+100	P.F.-Nº1 550+440
P.S.- Nº2 553+2	P.I.-Nº2 562+6		P.F.-Nº2 553+850
P.S.- Nº3 556+9	P.I.-Nº3 562+7		P.F.-Nº3 556+000
P.S.- Nº4 559+6	P.I.-Nº4 564+0		P.F.-Nº4 558+760
P.S.- Nº5 560+9	P.I.-Nº5 568+9		P.F.-Nº5 563+900
P.S.- Nº6 566+3			P.F.-Nº6 565+380
P.S.- Nº7 567+5			P.F.-Nº7 570+840
P.S.- Nº8 570+1			
P.S.- Nº9 571+6			
P.S.- Nº10 572+9			

2. Descripción: Tipología, aparatos de apoyo, juntas, impermeabilización, etc.

**2. DESCRIPCIÓN: TIPOLOGÍA, APARATOS DE APOYO, JUNTAS,
IMPERMEABILIZACIÓN ,ETC.**

ÍNDICE

2.1 APARATOS DE APOYO

2.1.1 VIADUCTO

2.1.2 PI 562+7

2.1.3 PASO SUPERIOR

2.2 IMPERMEABILIZACIONES

2.3 JUNTAS EN PASOS SUPERIORES

2.1.1 VIADUCTO

CONSTRUCTORA
HISPANICA S.A.L.A.V. MADRID - BARCELONA - P. FRANCESA
TRAMO: MADRID - ZARAGOZA.
SUBTRAMO V-b
U.T.E. TORIJACtra. N-II Km 75. Area de servicio Maypa (casetas de obra). Torija. Guadalajara.
Tel.: 949-322-173/-174/-182/-183 Fax: 949-322-175

Empresa destino: EUROESTUDIOS,S.A.

A la atención de : Nicolás Machado

Número de fax : 949-322171

Remitente : Andrés Rodríguez Torre

Fecha : 15/03/00

Nº de páginas (incluida portada) 12

Asunto :

TEXTO

Nicolás, adjunto te envío las características de los materiales de los apoyos de neopreno tipo POT, así como detalles del anclaje y el sistema de colocación de los apoyos.

CONTROL DE DISTRIBUCION			
CÓDIGO DE DISTRIBUCION: 013100V02500			
Nº	DISTRIBUCION	FECHA	RECIBIDA
1	Nicolás	16/03/00	
2	PAULO VILLANA	16/03/00	
3			
4			
5			

Un saludo

FREYSSINET

FPS

Productos y
Servicios S.A.ANEXO

F.P.S. es una empresa del Grupo FREYSSINET, creada en sociedad con Sociedad Española de los procedimientos FIT como fabricante de apoyos y juntas elastoméricas.

Adjunto les enviamos los certificados de registro de empresa actualmente en vigor.

CARACTERÍSTICAS DE LOS MATERIALES:

Nuestros apoyos se pueden fabricar de acuerdo con cualquier norma que se requiera. No obstante, en la generalidad de los casos los apoyos se fabrican de acuerdo a las características siguientes:

* Elastómeros

- Dureza s/ UNE 53549: 60 ± 5 Shore A.
- Resistencia a la tracción s/ UNE 53510: 17 Mpa mín.
- Alargamiento en la rotura s/ UNE 53510: 350 por mín.
- Deformación remanente por compresión s/ UNE 53511 a 100°C durante 24 horas: 25 por 100 máx.
- Sometida a una exposición de 168 horas a 40°C en una atmósfera, conteniendo 50 partes de ozono en 100 millones de partes de aire s/UNE 53558, la mezcla no muestra agrietamiento.
- Después de un envejecimiento acelerado en aire caliente a 100°C durante 70 horas s/UNE 53548, las variaciones máximas con respecto a los valores iniciales son:
 - * Variación de dureza: + 10 Shore A máx.
 - * Variación en carga de rotura: ± 15 por 100 máx.
 - * Variación en alargamiento: -40 por 100 máx.
- Después de una exposición de 24 horas a -25°C s/ UNE 53631, el aumento máximo de dureza es: + 15°C Shore A.
- Adherencia caucho-metal s/UNE 53565: 7 N/mm mín.
- Módulo G de cizalla s/UNE 53630: $1.0 \pm 15\%$

* Chapas de acero

Las chapas de acero utilizadas son de acero dulce, con un espesor mínimo de 3 mm las montadas exteriormente y 2 mm las interiores. Responden a la siguiente caracterización: AE-235B; siendo sus propiedades:

- Límite elástico: 220 Mpa mín.
- Resistencia a la tracción: 360 Mpa mín.
- Alargamiento a la rotura: 24 por 100 mín.

Hoja 2 de 12

telefax

→ **Telefax**

Para: JOE TE BARRON N° Fax:
 De: LUPIA FERNANDEZ N° Fax:
 Fecha: 14/03/00 N° Hojas: 1

Impresos Post-it™ 7669 3M

N. FERNANDEZ

Party name: **FREYSS. ESPAGNE**

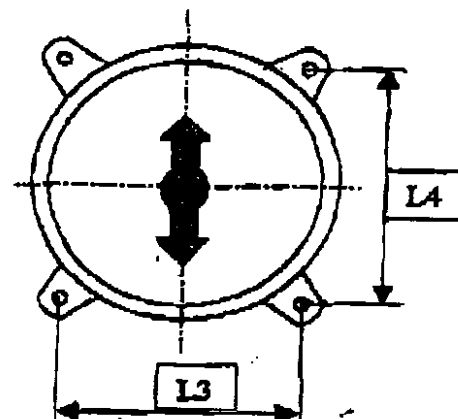
number: **Auto**

el: **AM0477/00/RL** Nbr. page(s): **1**

objet/sujet: **LAV MADRID BARCELONA - SUBTRAMO VB**
Appuis à pot TETRON® CD:

Suite à notre conversation téléphonique en référence, vous trouverez ci-joint les dimensions des vis et douilles de fixations des appareils d'appuis à pot TETRON® CD ainsi que leurs entraxes inférieurs:

Schéma:



Type	L3	L4	Vis	Douilles (mm)	Réservations (mm)
GL3000 100.20	310	310	4u x M12	4u x Ø40 x 100	4u x Ø120 x 150
GL9000 60.20	548	548	4u x M12	4u x Ø40 x 100	4u x Ø120 x 150
GG3000 313 100	328	328	4u x M12	4u x Ø30 x 180	4u x Ø120 x 220
GG9000 939 60	565	565	4u x M16	4u x Ø40 x 200	4u x Ø150 x 250

Sincères Salutations,

R. LAPALU

FPS

Producción y
 Servicios, S.A.

Hoja n.º

APARATO DE APOYO POT
RECOMENDACIONES DE COLOCACION
TETRON CD

NOTA PRELIMINAR

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INDICES DE REVISION

J					
I					
H					
G					
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E					
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C					
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A					
Orig.	15/04/94	Creación	PHS	JSE	PGB
Rev.	Fecha	Modificación	Preparado por	Verificado por	Aprobado por

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Productos y
Servicios, S. A.

Hoja n.º

**APARATO DE APOYO POT
RECOMENDACIONES DE COLOCACION
TETRON CD**

I. GENERALIDADES

I.1. INSTALACION

La colocación correcta de los aparatos de apoyo pot TETRON CD® es una operación minuciosa durante la cual errores o la falta de precisión pueden engendrar en la vida de los trabajos, esfuerzos inútiles y peligrosos para los aparatos de apoyo y, en los casos más graves, pueden incluso alterar la integridad de las estructuras.

I.2. ALMACENAJE

Los aparatos de apoyo pot TETRON CD® están protegidos contra la corrosión según las prescripciones del fascículo nº 56 del C.C.T.G. en condiciones normales de utilización. El almacenaje in situ en un lugar limpio y seco es imperativo para evitar toda contaminación de las superficies funcionales de los aparatos de apoyo.

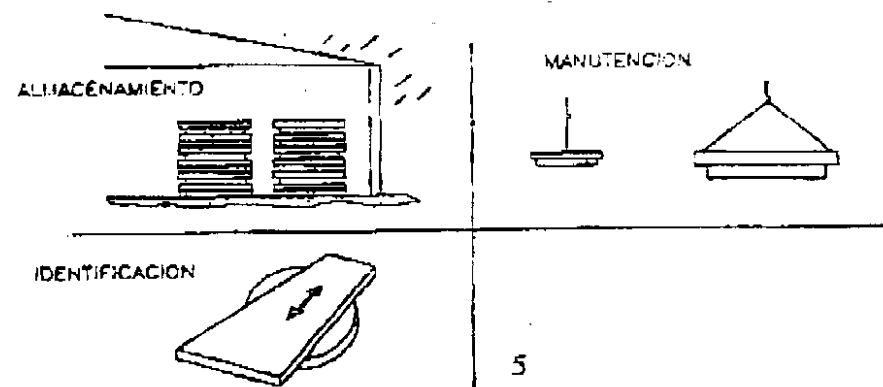
I.3. MANUTENCION

Los aparatos de apoyo TETRON CD® son entregados con bridas laterales o tornillos de transporte que hacen más sólida la pletina superior y la base durante el transporte y la colocación. Estas fijaciones temporales evitan:

- El desarme del aparato.
- La modificación del eventual prerreglaje.
- La intrusión de suciedad en las partes funcionales del apoyo.

I.4. IDENTIFICACION

Cada aparato de apoyo TETRON CD® es identificado por su tipo, su sentido de desplazamiento principal (para los aparatos de apoyo móviles), su capacidad y su posición en la obra.



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Hoja n.º

**APARATO DE APOYO POT
RECOMENDACIONES DE COLOCACION
TETRON CD**

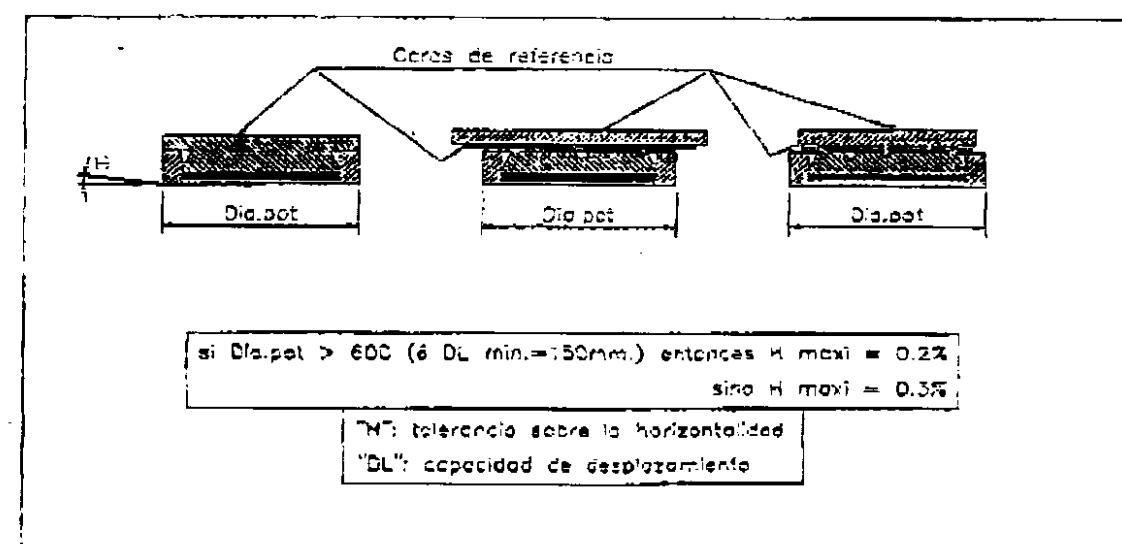
**II. INSTALACION DE LOS APARATOS DE APOYO POT TETRON CD
PARA LAS ESTRUCTURAS HORMIGONADAS IN SITU
TIPO SI**

**II.1. COLOCACION DEL APARATO DE APOYO EN SU SOPORTE
INFERIOR**

La colocación se realiza sobre un dispositivo de regulación adaptado al tamaño del aparato de apoyo, con el fin de asegurar una tolerancia sobre la horizontalidad inferior a 3 ‰.

Esta tolerancia es de 2 ‰ para los aparatos de apoyo de diámetro > 600 mm o los aparatos cuya posibilidad de desplazamiento es > 150 mm.

La superficie de referencia es la parte superior de la pletina superior o el plano de deslizamiento del aparato de apoyo pot.



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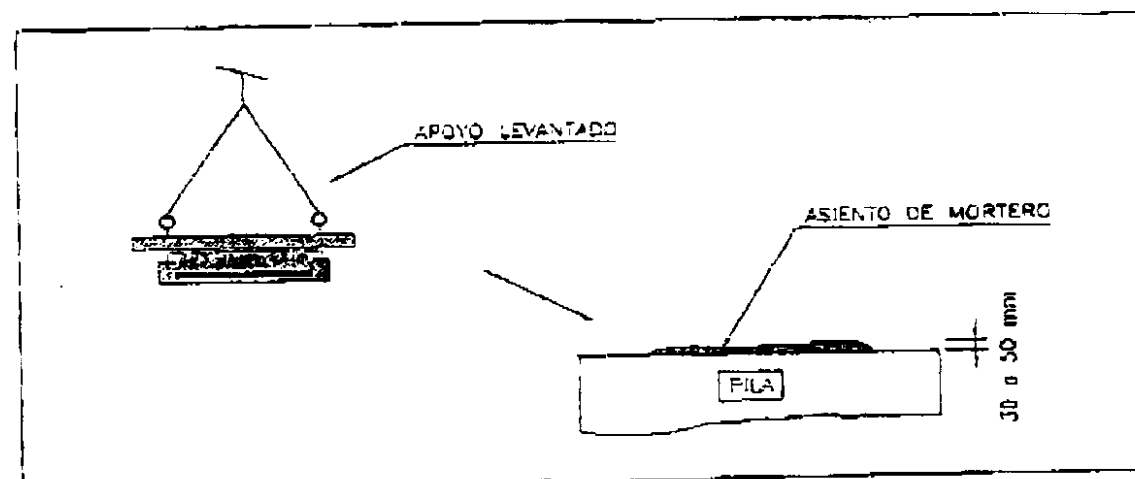
APARATO DE APOYO POT
RECOMENDACIONES DE COLOCACION
TETRON CD

II.1.1. COLOCACION SOBRE BAÑO DE MORTERO

Este método puede ser utilizado para aparatos de apoyo cuyo asiento está inscrito en un cuadrado de 600 mm de lado, y cuando el modo de construcción permite una colocación directa antes de la ejecución del tablero (levantamiento del Aparato de apoyo mediante anillos de izado).

Tras la regulación previa, la colocación se realiza sobre un baño de mortero de altura mínima de 30 mm y máxima de 50 mm. Se tendrá un cuidado especial en mantener el aparato horizontal.

El mortero presenta un sobrespesor en el centro a fin de poder fluir alrededor de todo el aparato de apoyo arrastrando las eventuales burbujas de aire. Se realizará un control externo sistemático de la calidad del contacto después de cada colocación.



II.1.2. INYECCION O RELLENADO POR GRAVEDAD

Es preferida y recomendada la inyección o el hormigonado cuando el espesor y la superficie son importantes.

Primero se coloca el aparato de apoyo sobre tres o cuatro cuñas o cualquier otro dispositivo de regulación previa antes de la introducción del mortero o lechada para el acuífamiento.

Estas cuñas tienen una altura mínima de 30 mm y leves dimensiones en plano. El espesor y las dimensiones en plano están determinadas entre las partes, según las prescripciones del producto utilizado (norma europea: espesor máximo sin ferrallar = 50 mm). Se colocan en la periferia de la pletina inferior del aparato de apoyo y se regulan para asegurar la horizontalidad del aparato de apoyo.

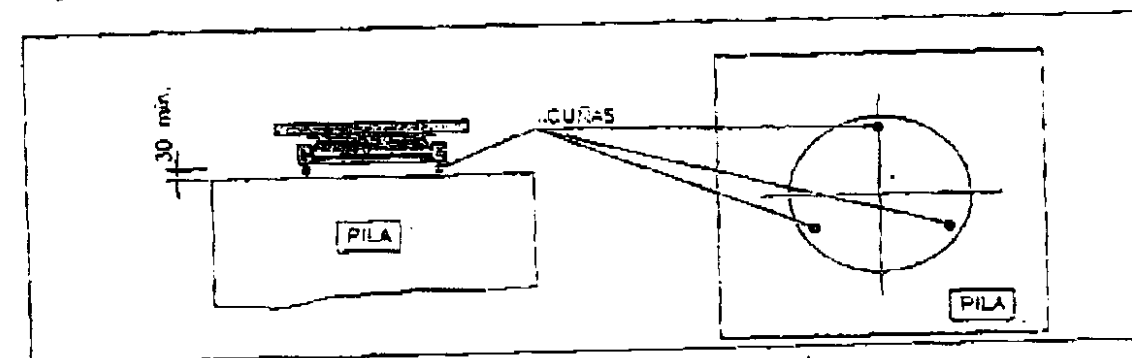
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Servicios S.A.

Hoja n.º

APARATO DE APOYO POT
RECOMENDACIONES DE COLOCACION
TETRON CD

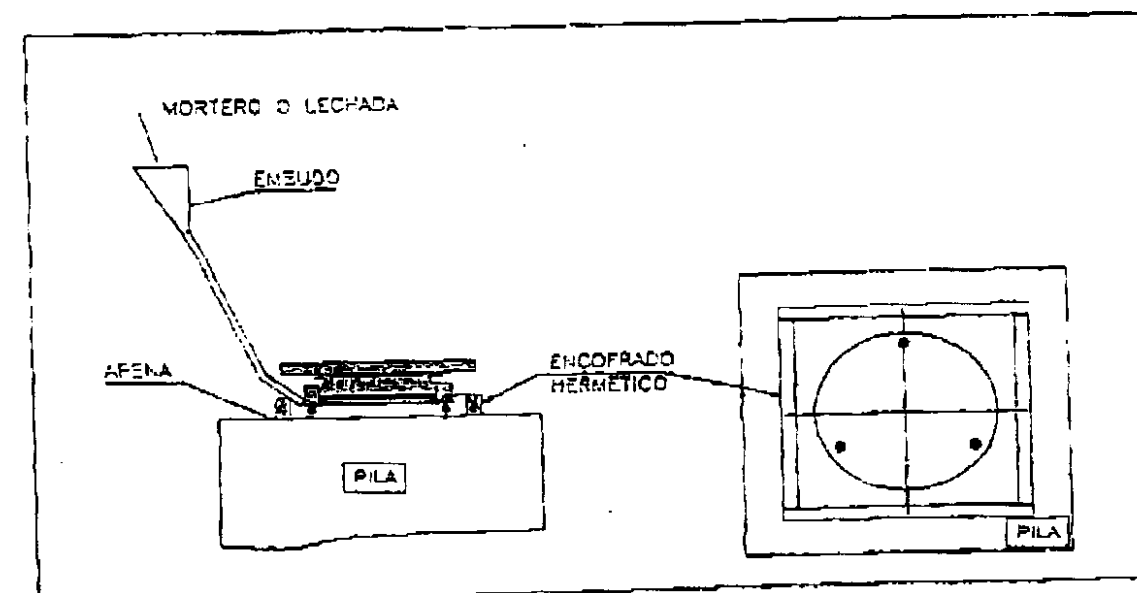
Estas cuñas no deben constituir puntos rígidos que supongan concentraciones de empuje en el mismo aparato de apoyo.



Se coloca un encofrado lateral hermético sobre los cuatro lados de la meseta de apoyo. Este encofrado debe resistir los eventuales efectos de expansión del producto de acuífamiento utilizado.

Entonces, el mortero o la lechada son empleados según las prescripciones del proveedor.

Para los aparatos de apoyo de grandes dimensiones, se puede realizar un ensayo de conveniencia.



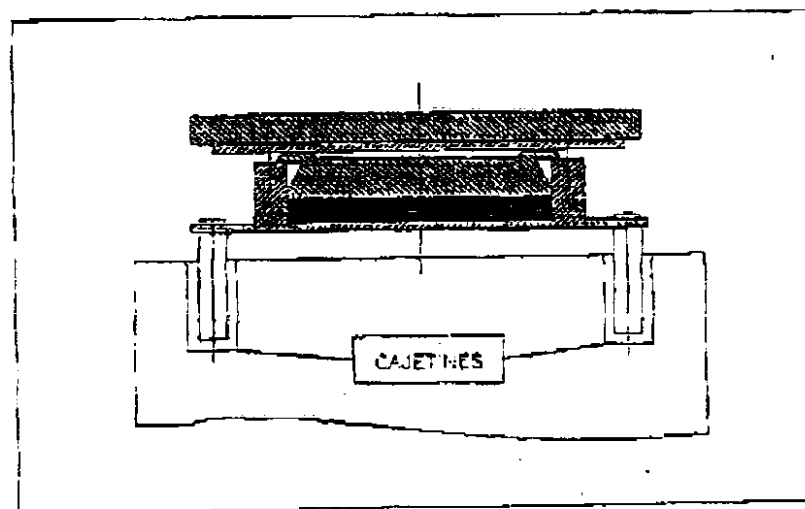
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Productos y
Servicios, S. A.

Hoja n.º

**APARATO DE APOYO POT
RECOMENDACIONES DE COLOCACION
TETRON CD**

Cuando los esfuerzos horizontales no pueden ser recuperados por frotamiento, los aparatos de apoyo están equipados con fijaciones (casquillos de sellado, tornillos, ...). Es pues indispensable prever cajetines en el soporte.



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Servicios, S. A.

Hoja n.º

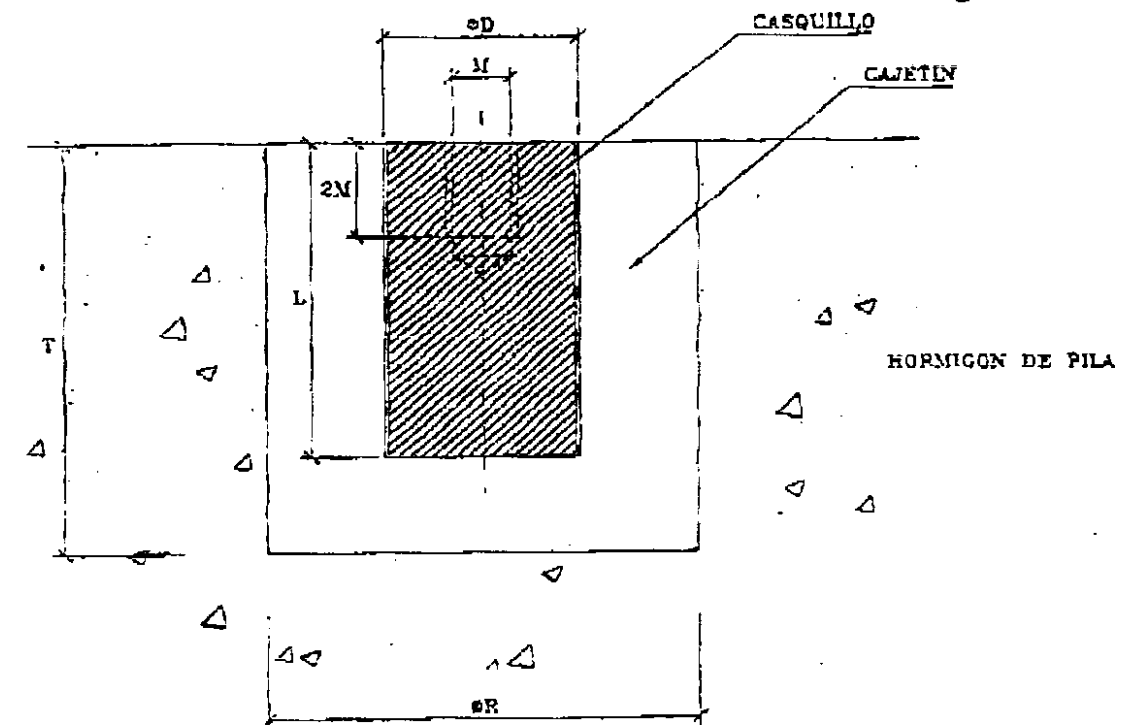
**APARATO DE APOYO POT
RECOMENDACIONES DE COLOCACION
TETRON CD**

II.2. COLOCACION DE LA ESTRUCTURA SOBRE EL APARATO DE APOYO

II.2.1. ESTRUCTURA HORMIGONADA IN SITU

La estructura se hormigona directamente en los aparatos de apoyo definitivos, lo que excluye las mesetas prefabricadas que no aseguran el contacto perfecto en la interfaz. Las pletinas superiores de los aparatos de apoyo y las fijaciones eventuales pueden ser recuperadas en el encofrado del intradós. El encofrado debe de estar perfectamente ajustado a la pletina superior y hermetizado.

AEYOS TETRON CD
DETALLE DE LAS FIJACIONES
SEGUN BS 5400



DIMENSIONES DE LAS FIJACIONES						
	M12	M16	M20	M24	M30	M36
øD	30	40	50	60	80	90
L	180	200	250	300	350	450
øR	150	150	180	180	200	200
T	250	250	300	350	400	500

2.1.2 PASO INFERIOR 562+7



CONSTRUCTORA
HISPANICA S.A.

L.A.V. MADRID - BARCELONA - F. FRANCESA
TRAMO: MADRID - ZARAGOZA.
SUBTRAMO V-b
U.T.E. TORIJA

Ctra. N-II Km 75. Area de servicio Maypa (casetas de obra). Torija. Guadalajara.
Tel.: 949-322-173/-174/-182/-183 Fax: 949-322-175

Empresa destino : EUROESTUDIOS, S. A.

A la atención de : Nicolás Machado

Número de fax : 949-322171

Remitente : Andrés Rodríguez Torre

Fecha : 19/02/01

Nº de páginas (incluida portada) : 5

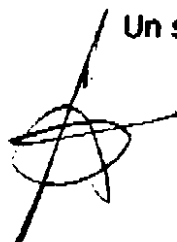
Asunto :

TEXTO

Nicolás, adjunto te envío, más detallada, las características de los apoyos POT del P. I. 562+750.

Si necesitas alguna aclaración, no dudes en llamarme.

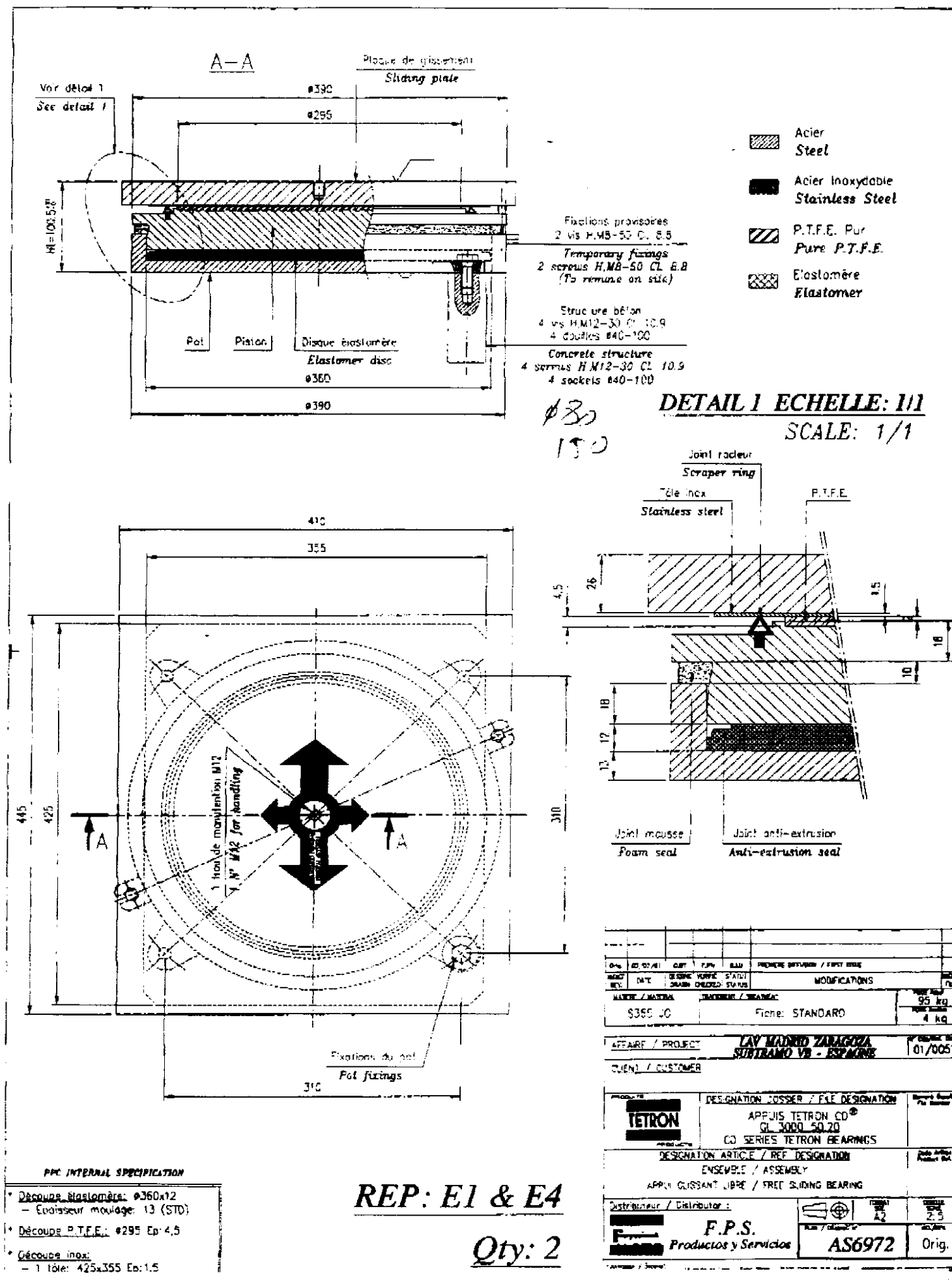
Un saludo



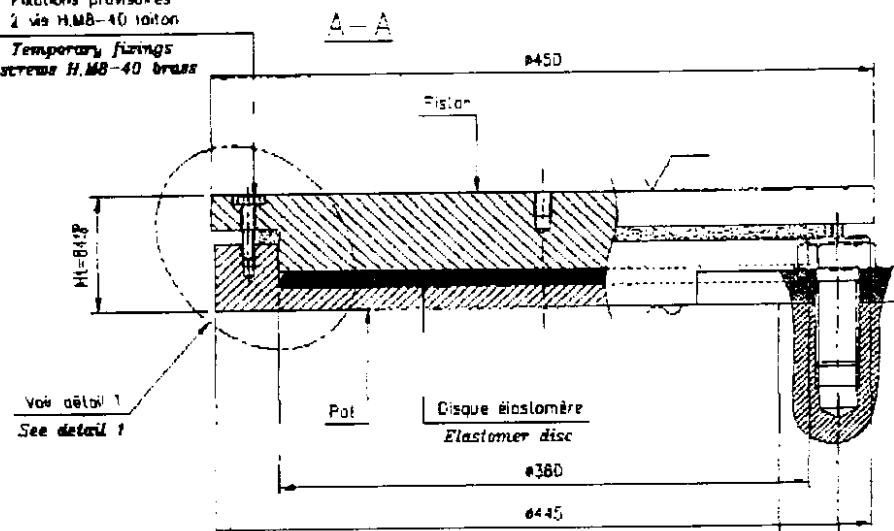
CL 3301 POSIS CC

avocado

19/02/01



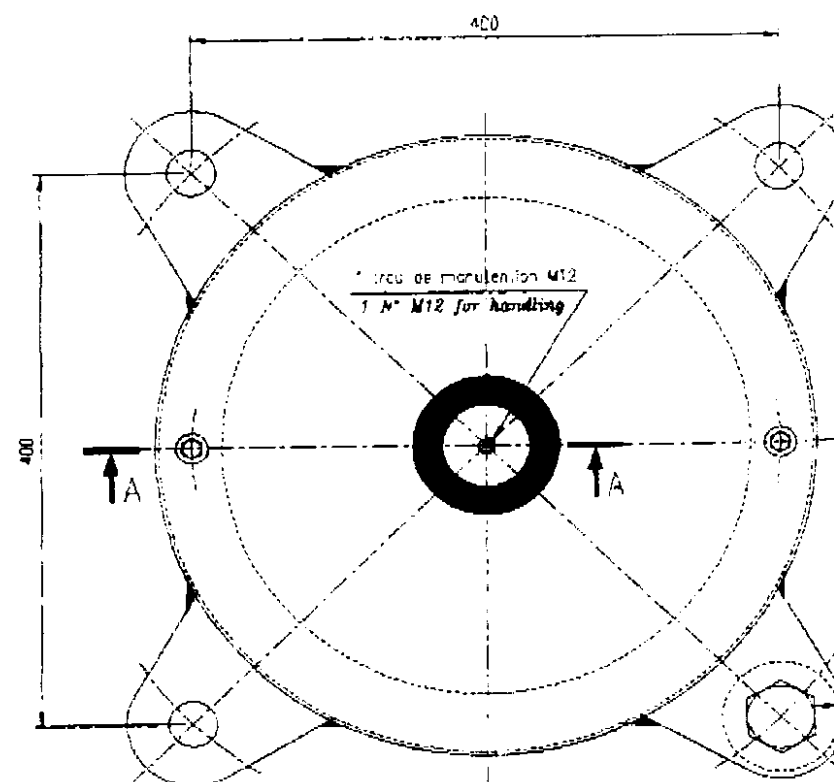
Fixations provisoires
2 vis H.MB-40 10.9
Temporary fixings
2 screws H.MB-40 brass



Voir détail 1
See detail 1

Structure béton
4 vis H.M30-70 Cl. 10.9
4 douilles Ø60-350
Concrete structure
4 screws H.M30-70 Cl. 10.9
4 sockets Ø60-350

φ120
400

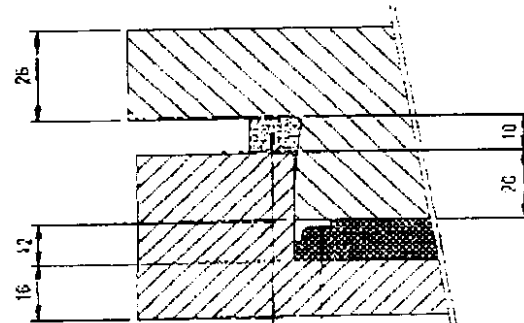


Acier
Steel
Elastomère
Elastomer
Mousse
Foam

REP: E2 & E3

Qty: 2

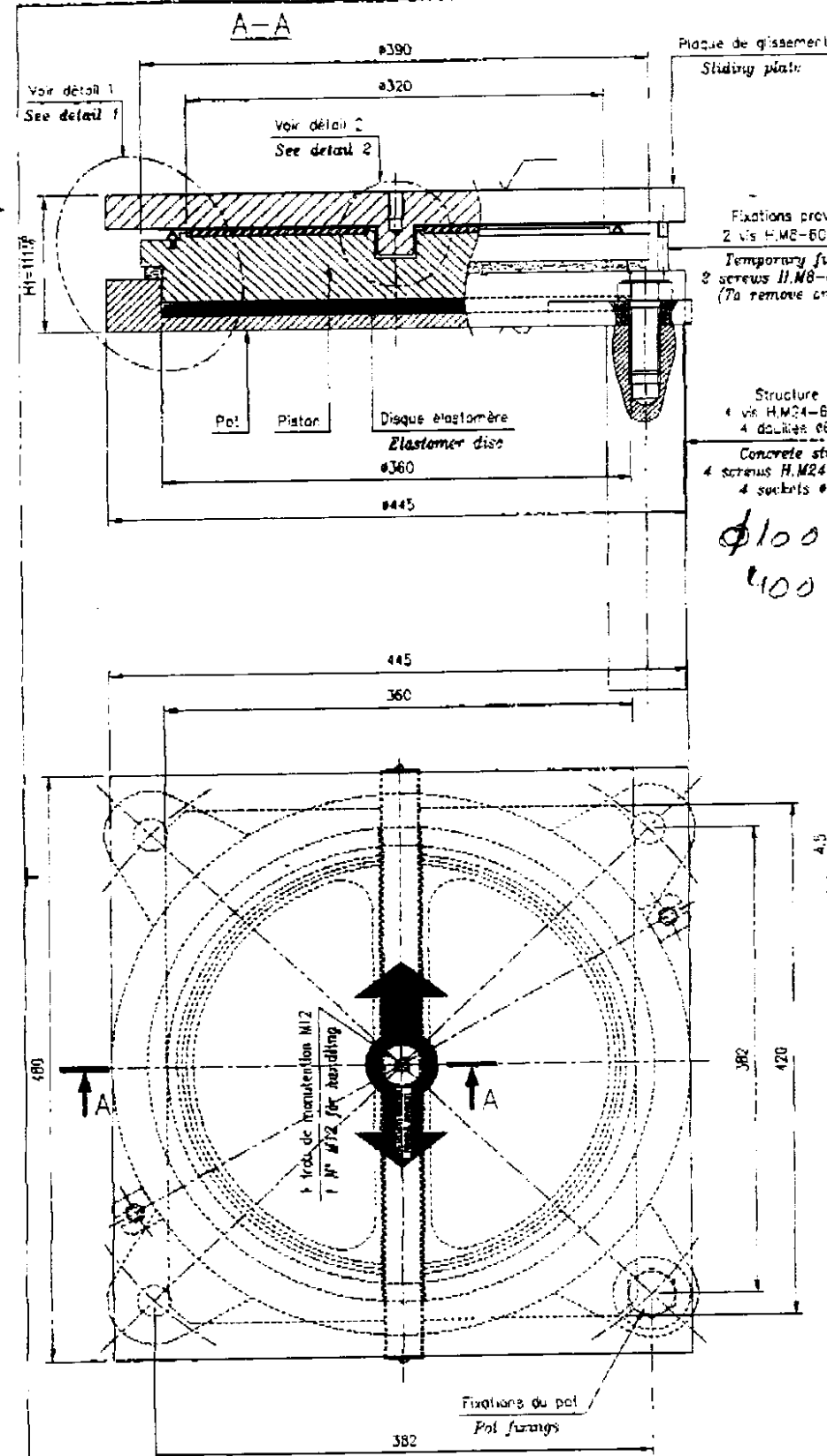
DETAIL 1 ECHELLE: 1/1
SCALE: 1/1



PPC INTERNAL SPECIFICATION

• Découpe Elastomère: Ø360x12

Orig.	31/01/01	REV.	01	PROJ.	DESIGN / FIRST NAME	REV.	01
REV.	01	DESIGN	01	STATUS	MODIFICATIONS	REV.	01
MATER. / MATERIAL		MATER. / MATERIAL		FICHE: STANDARD		REV.	
5355 JO		5355 JO		92 kg		35 kg	
AFFAIRE / PROJECT				LAV MADRID ZARAGOZA			
CLIENT / CUSTOMER				SUBTRAMO VB - ESPAGNE			
DESIGNATION DOSSIER / FILE DESIGNATION				APPUI TETRON CD®			
DESIGNATION ARTICLE / REF. DESIGNATION				EX 3000 700			
ENSEMBLE / ASSEMBLY				CD SERIES TETRON BEARINGS			
APPUI FIXE / FIXED BEARING				ENSEMBLE / ASSEMBLY			
Distributeur / Distributor:				F.P.S. Productos y Servicios			
F.P.S. Productos y Servicios				AS6971			
Orig.				Orig.			



Voir détail 1
See detail 1

Voir détail 2
See detail 2

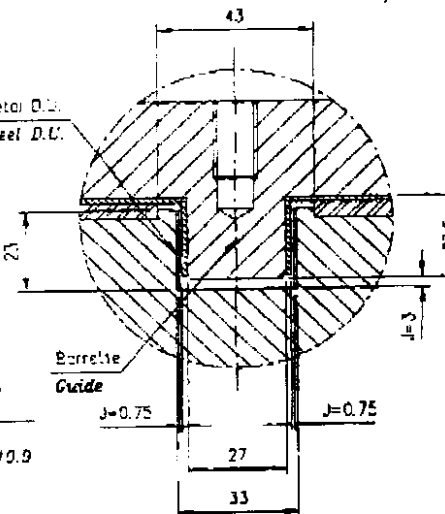
Plaque de glissement
Sliding plate

Fixations provisoires
2 vis H.MB-60 Cl. 8.8
Temporary fixings
2 screws H.MB-60 Cl. 8.8
(To remove on site)

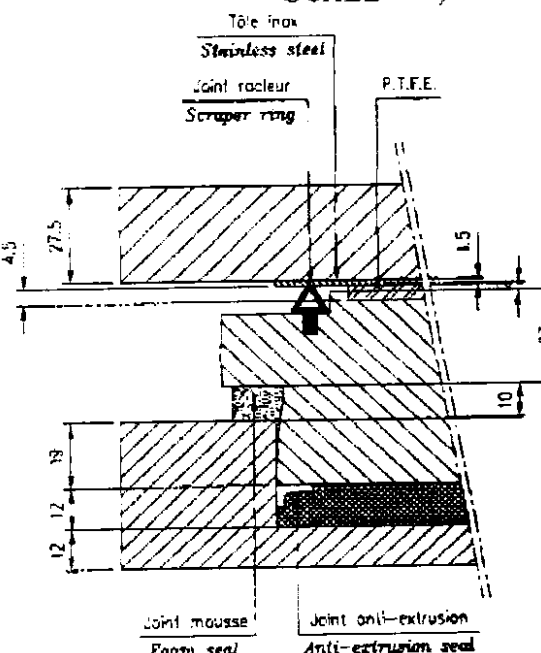
Structure béton
4 vis H.M24-60 Cl. 10.9
4 douilles Ø60-300
Concrete structure
4 screws H.M24-60 Cl. 10.9
4 sockets Ø60-300

φ100
400

DETAIL 2 ECHELLE: 1/1
SCALE: 1/1



DETAIL 1 ECHELLE: 1/1
SCALE: 1/1



REP: E2 & E3

Qty: 2

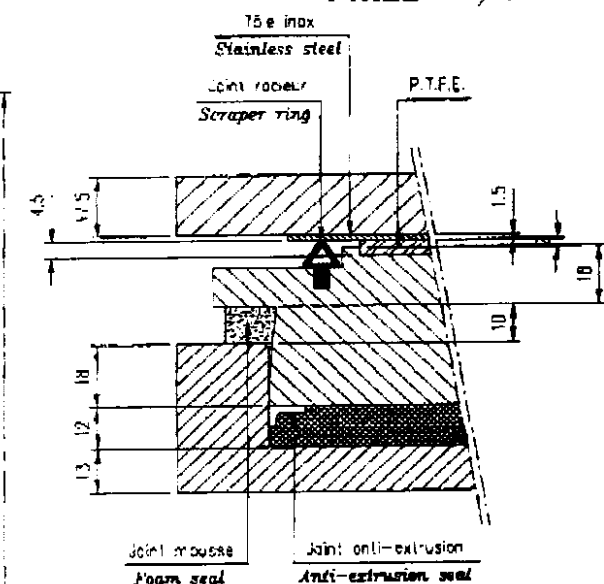
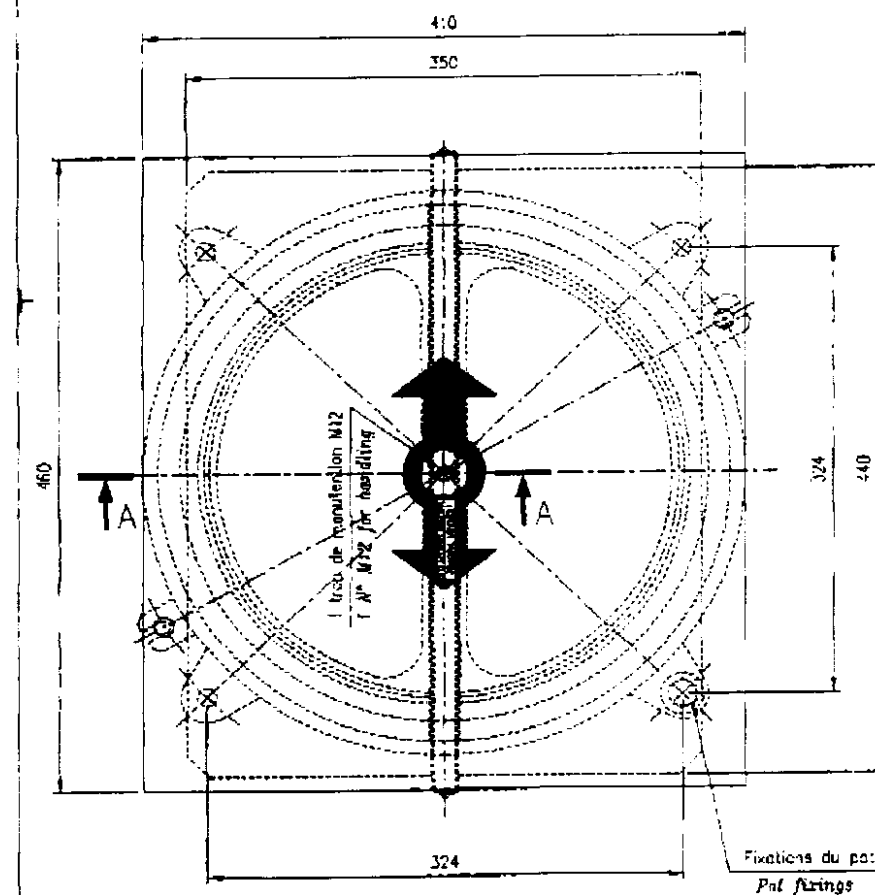
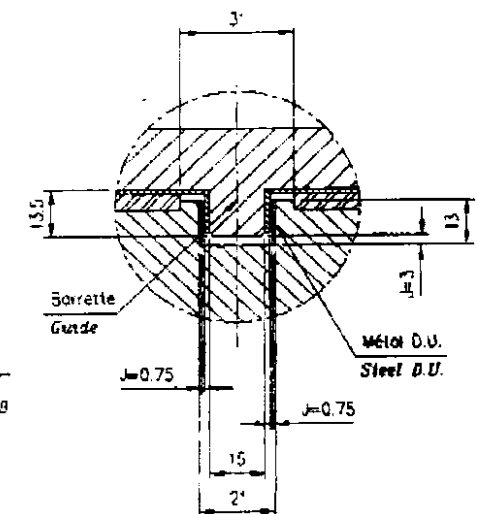
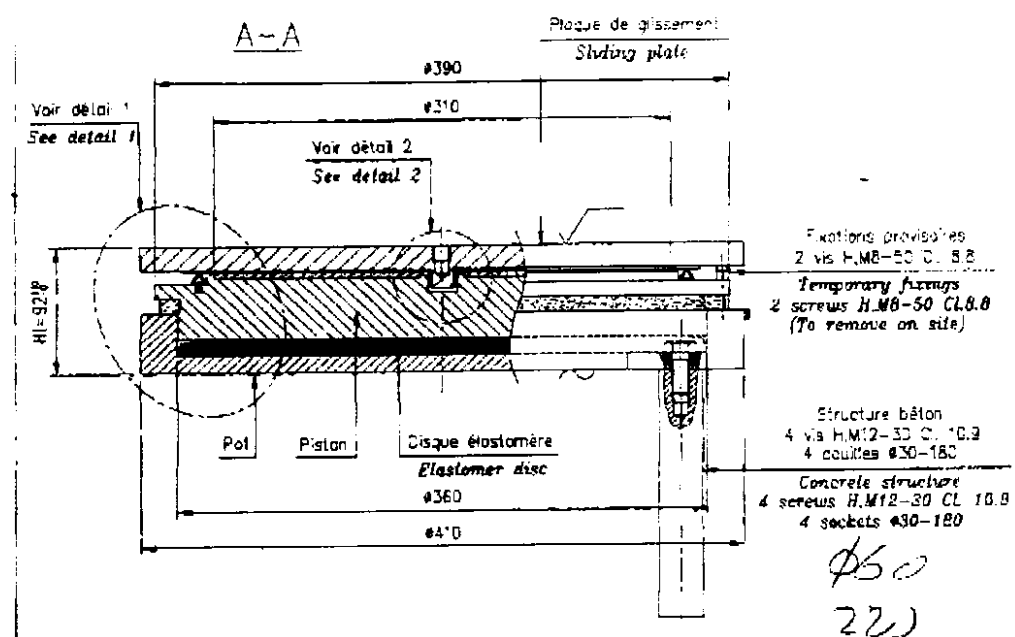
PPC INTERNAL SPECIFICATION

• Découpe Elastomère: Ø360x12
- Epaisseur moulage: 13 (STD)
• Découpe P.T.F.E.: Ø320x38.5 Ep: 4.5
• Découpe inox:
- 2 tôles: 420x185 Ep: 1.5
- 2x2 Chanfreins: 15x15
- 2 tôles: 420x185 Ep: 1.5

Acier
Steel
Acier inoxydable
Stainless Steel

P.T.F.E. Pur
Pure P.T.F.E.
Elastomère
Elastomer

Orig.	01/01/01	REV.	01	PROJ.	DESIGN / FIRST NAME	REV.	01
REV.	01	DESIGN	01	STATUS	MODIFICATIONS	REV.	01
MATER. / MATERIAL		MATER. / MATERIAL		FICHE: STANDARD		REV.	
5355 JO		5355 JO		125 kg		27 kg	
AFFAIRE / PROJECT				LAV MADRID ZARAGOZA			
CLIENT / CUSTOMER				SUBTRAMO VB - ESPAGNE			
DESIGNATION DOSSIER / FILE DESIGNATION				APPUI TETRON CD®			
DESIGNATION ARTICLE / REF. DESIGNATION				EX 3000 660 20			
ENSEMBLE / ASSEMBLY				CD SERIES TETRON BEARINGS			
APPUI GLISSANT GUIDE CENTRAL/CENTRAL SLIDING GUIDED BEARING				ENSEMBLE / ASSEMBLY			
Distributeur / Distributor:				F.P.S. Productos y Servicios			
F.P.S. Productos y Servicios				AS6974			
Orig.				Orig.			



REP: E1 & E4
Qty: 2

PPC INTERNAL SPECIFICATION

- Découpe élastomère: Ø360x12
- Epaisseur moulage: 13 (STD)
- Découpe P.T.F.E.: Ø310x139.5 Ep:4.5
- Découpe inox:
- 2 files: 440x155 Ep:1.5
- 2x2 Châtréins: 15x15
- 2x2 Châtréins: 15x15

- Acier
Steel
- Acier inoxydable
Stainless Steel
- P.T.F.E. Pur
Pure P.T.F.E.
- Elastomère
Elastomer

QTY	DELIV/DEL	DET	FIN	REV	REVISIONS / REVISIONS	REVISIONS
DATE	DATE	DATE	DATE	DATE	MODIFICATIONS	REVISIONS
MATER / MATERIAL		EQUIPEMENT / EQUIPMENT		FICHE: STANDARD		POIDS NET / NET WEIGHT
S355 JD						89 kg
						4 kg
AFFAIRE / PROJECT		LAV MADRID ZARAGOZA		101/0051		
CLIENT / CUSTOMER		SUBTRAMO V8 - ESPAGNE				
PRODUCED BY		DESIGNATION DOSSIER / FILE DESIGNATION		To be filled		
TETRON		APPLIS TETRON CD				
		CC 1000 265 50				
		CD SERIES TETRON BEARINGS				
DESIGNATION ARTICLE / REF. DESIGNATION		ENSEMBLE / ASSEMBLY				
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CERTIFICADO DE CALIDAD

CLIENTE: ANDAMIOS IN, S.A.

Nº DE PEDIDO: D. MANUEL GONZALEZ

Nº DE ALBARÁN: 209/02

INFRAESTRUCTURAS Y ELASTÓMEROS, S.A. certifica que los apoyos elastoméricos que a continuación se relacionan, cumplen con las siguientes características:

CANTIDAD	DIMENSIONES	COMPOSICIÓN
4	300 x 400 x 50 anclados	2 x 20 + 10

CLOROPRENO:

1. DUREZA μ UNE 53130 60 ± 5 ShA
2. MÓDULO DE ELASTICIDAD TRANSVERSAL G, μ ANEXO A.3.
DE LA UNE 53566 - 88 (MELC - 1013) $G = 10 \text{ Kg/cm}^2 \pm 20\%$
3. RESISTENCIA A TRACCIÓN, MÍNIMA μ UNE 53510 $\geq 170 \text{ Kg/cm}^2$
4. ALARGAMIENTO A ROTURA, MÍNIMA μ UNE 53510 $\geq 350\%$
5. RESISTENCIA AL OZONO μ UNE 53-558/1 SIN GRIETAS
6. DEFORMACIÓN REMANENTE POR COMPRESIÓN
 μ UNE 53-511, MÁXIMA $\leq 25\%$
7. ENVEJECIMIENTO TÉRMICO ACELERADO μ UNE 53548 72h. a 100°C :
 - 7.1. Variación de dureza $< 10^\circ\text{ShA}$
 - 7.2. Variación de resistencia a tracción, máximo $< - 15\%$
 - 7.3. Variación de alargamiento a rotura, máximo $< - 30\%$

ACERO AL CARBONO:

1. LIMITE ELÁSTICO Kp/cm^2 μ UNE 36.080 2400 / 2750
2. TENSION ROTURA Kp/cm^2 μ UNE 36.080 4100 / 4700

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Laboratorio, a 11 de mayo de 2000

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JOSE LUIS ALVO

Infraestructuras y Elastómeros, S.A.

c/ San Vicente, 25 - E 01440 Izarra (Alava) - Spain - Tel: 34 945 437 090 - Fax: 34 945 437 050
Internet: www.trelleborg.com - R. Mercantil de Alava. Tomo 771. Folio 108. Hoja VI-5303 Insc. 1ª - C.I.F. A-01241744





264

U. O. CONSTRUCCION
Registro de <i>Estructuras</i>
Nº Reg. <i>2557</i>
Fecha <i>26/12/00</i>

Vb
obra



NOTA INTERNA

DE: Director de Proyectos y Programación

A: Director de Construcción

FECHA: 22 de diciembre de 2000

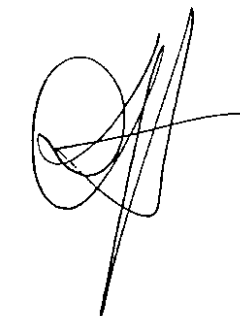
ASUNTO: Proyecto de Montaje de Vía. Tramo Calatayud-Alcolea del Pinar (Subtramos VII, VIII, IX, X, XI y XII.

<i>6º Viaducto</i>	
<i>CEUTETPO549BB</i>	
<i>Nº 00106</i>	<i>13/05/01</i>
<i>PA</i>	

- El proyecto de montaje de vía, contará con que la capa de impermeabilización de los tableros estará realizada, considerando únicamente la ejecución de la capa de aglomerado en aquellos tramos donde no se haya ejecutado aún, o no vaya a serlo antes de la terminación de las obras de plataforma.

Podrás comprender la importancia de que estos temas se realicen correctamente, ya que una deficiente impermeabilización de las estructuras generaría en el futuro mantenimiento de la línea problemas técnicos y soluciones a posteriori de elevado contenido económico, pero además el equipamiento de vía en las zonas donde existe un sustrato rígido, como viaducto y solera de túneles, se ha diseñado de manera que no se produzca la abrasión del balasto y su deterioro prematuro.

Te adjunto una sección esquemática que aclara las capas en cuestión y su cometido de cara al funcionamiento correcto de todos los elementos comprendidos entre el carril y la estructura.



Con motivo de la redacción del proyecto referido en el asunto, se ha analizado la información que me enviaste en la nota de 20 de mayo con los datos de obra realmente ejecutada y se han realizado visitas a las obras recientemente, con todo ello tengo que transmitirtte nuestra inquietud sobre la correcta terminación de las capas de protección sobre las estructuras.

Al respecto te recuerdo que los proyectos constructivos de plataforma de este tramo contienen la unidad de obra:

G 40 G 0001 M² Impermeabilización con membranas adheridas sobre tableros de puentes de ferrocarril, realmente colocada a1219.Ptas/m²

Es necesario destacar que:

- Esta capa, cuyo sentido es la impermeabilización del tablero no debe ser sustituida por la capa de aglomerado bituminoso en caliente, tipo D12 con 3 cm. de espesor, cuya finalidad es **evitar el punzonamiento de la capa impermeable y constituir un soporte mas elástico para el balasto**. Ambas capas son necesarias y deben estar construidas antes de colocar el balasto.

1 3

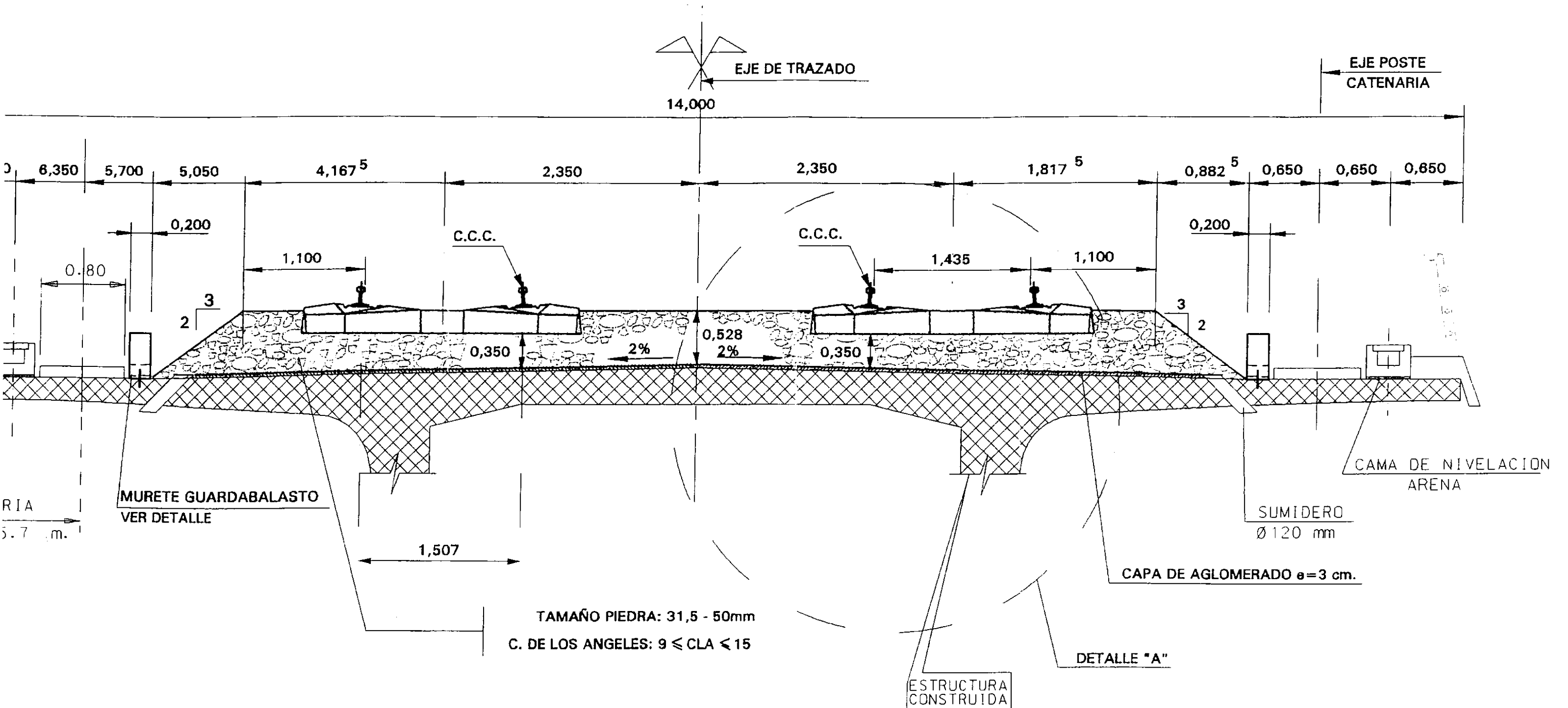
Unidad de Proyectos y Programación (GIF)
SALIDA
Nº <i>181</i>
Fecha <i>22-12-00</i>

2 322

SECCIÓN TIPO VÍA DOBLE EN VIADUCTO

(RECTA)

ESCALA 1:50 (COTAS EN METROS)



DETALLE - A

ESCALA 1:25



DETALLE - B

ESCALA 1:2

AGLOMERADO BITUMINOSO, 3 - 2
EN CALIENTE TIPO D12

Sika S.A.
Dept. Mercados y Sistemas
Grandes Obras

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Grandes Obras



ESTUDIO 044/00/GO
IMPERMEABILIZACIÓN DE TABLEROS
DE PUENTES Y OTROS

TORIJA UTE
Ctra. N II, Km. 75
Torija - Guadalajara

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2. OBJETO
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SIKA S.A.
Departamento Mercados y Sistemas (G.O.)
E.P/Abril 2.000

044/00/GO

Impermeabilización tableros y Otros - Torija UTE

JLR/EP/Sika S.A.

1

Hoja 1 de 23

044/00/GO

Impermeabilización tableros y Otros - Torija UTE

JLR/EP/Sika S.A.

2

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1. INTRODUCCIÓN

Al iniciar un estudio sobre la resolución de problemas de Impermeabilización de Tableros, Canales y Balsas, conviene abordar una serie de cuestiones tales como:

- a) Cualidades de una buena Estanqueidad
- b) Cualidades de los materiales
- c) Normativa
- d) Mano de obra

a) CUALIDADES DE UNA BUENA ESTANQUEIDAD:

La primera cualidad de una buena estanqueidad, es evidentemente no dejar escapar el agua que debe estar retenida.

Pero además de estas funciones existen otras que en algunas ocasiones pueden ser requeridas:

- Resistencia a las aguas agresivas.
- Resistencia a las agresiones químicas.
- Resistencias a la abrasión.
- Resistencia a la fisuración del soporte.
- Resistencia a los rayos ultravioleta.
- Calidad alimentaria.

* IMPERMEABILIDAD - ESTANQUEIDAD

Conviene hacer una distinción entre impermeabilidad y estanqueidad.

La **impermeabilidad**, es la capacidad de un material para impedir que un líquido o un gas lo atraviese.

La **estanqueidad**, es la capacidad de una obra de contener un líquido o un gas.

La impermeabilidad es una cualidad intrínseca de un material. La estanqueidad es una función y el resultado de una o varias operaciones que tienden a oponerse al paso de los líquidos a través de una obra.

La mayor parte de nuestras obras se construyen actualmente en hormigón armado o en hormigón pretensado. La experiencia ha probado desde hace mucho tiempo que un hormigón compactado de espesor suficiente crea una pérdida de carga que impiden que el hormigón lo traspase. Los espesores de hormigón necesario en una obra para resistir los esfuerzos a los que está sometido son generalmente suficientes para conseguir tal fin.

Es necesario que el hormigón sea de buena calidad y que sea compacto.

La compacidad depende de la elección juiciosa de los materiales, de las composiciones granulométricas, las proporciones de sus elementos y del cuidado en la puesta en obra.



b) CUALIDADES DE LOS MATERIALES:

Si el tablero, depósito, balsa, canal, etc. no está calculado para ser estanco por su propia estructura, conviene aplicar sobre las superficies un revestimiento.

Conviene hacer una distinción un poco sutil entre

Revestimiento de impermeabilización y
Revestimiento de estanqueidad.

Esta distinción tiene en cuenta la **fisurabilidad** del soporte.

Un **Revestimiento de impermeabilización** es una pantalla interior que puede realizar la estanqueidad por sí solo, pero que no resiste a las fisuraciones del soporte.

Un **Revestimiento de estanqueidad**, es una pantalla elástica o plástica, aplicada en el interior o en el exterior de la estructura. Este revestimiento no tiene necesariamente que ser adherente y puede adaptarse a las ligeras deformaciones o fisuraciones de la obra.

Revestimientos de impermeabilización o revestimientos rígidos:

Revestimientos a base de mortero de cemento hidrófugo:

Estos revestimientos se aplican a mano o máquina.

Constan de una o varias capas, prestando especial atención a la capa de acabado, teniendo en cuenta las recomendaciones de los fabricantes y aplicadores.

Deben tener un espesor no superior a 3 cm. Deben absorber una fisuración de abertura media inferior a 0,1 mm. El riesgo mayor de un revestimiento rígido es siempre el de la retracción.

El tratamiento de puntos particulares debe ser muy cuidadoso y las fisuras y juntas de hormigonado deben ser tratadas independientemente por sistemas de inyección o colmatado mediante materiales flexibles:

Masticos y Bandas de puenteado.

Revestimientos delgados a base de mortero de cemento hidrófugo.

Existen actualmente morteros hidrófugos predosificados en fábrica, que permiten una aplicación en delgadas capas.

El espesor mínimo de estos revestimientos deber ser de al menos tres veces el diámetro del árido más grueso, con un espesor mínimo de 4 mm.

Estos morteros están generalmente realizados con morteros de cemento hidrófugo listo para el empleo. Suelen estar mejorados con resinas miscibles que incrementen la adherencia, resistencia a la abrasión e impermeabilización del material.



Al igual que en el caso anterior, para la aplicación es necesario seguir las instrucciones que de el fabricante.

Cuando se prevean movimientos en el soporte, importantes y localizados, será necesario colocar juntas juiciosamente colocadas. Es trabajo de los ingenieros especialistas estudiar con anterioridad los problemas de juntas y fisuraciones.

Revestimientos de resinas polimerizables

Una gran parte de los tableros de puente, depósitos de agua, depuradoras, etc. están impermeabilizados mediante revestimientos de resinas, realizados en capas delgadas, armados o no mediante una malla de fibra de vidrio.

Las estanqueidades están realizadas con productos como: Epoxi, poliuretanos, epoxi-poliuretanos, brea-epoxi, brea-epoxi-poliuretanos.

Los epoxi - poliuretanos y los poliuretanos encuentran ciertas dificultades para pasar las pruebas alimenticias.

En la práctica, para los revestimientos rígidos de pequeño espesor, las resinas epoxi son las más utilizadas.

Estas se aplican en sucesivas capas sobre soportes previamente preparados.

Los avances de estos revestimientos residen sobre todo en:

- Posibilidad de coloración del revestimiento.
- Rápida ejecución .
- Buena resistencia química.

Revestimientos de estanqueidad o revestimientos flexibles.

Teniendo en cuenta la posible fisuración del hormigón, una solución lógica consiste en prever un revestimiento de estanqueidad que resista a esta fisuración.

Combinar adherencia y resistencia a la fisuración no es desgraciadamente cosa fácil.

Un revestimiento grueso y flexible podrá no propagar en su espesor la fisura que tenga su origen en la superficie del soporte. Un revestimiento delgado y flexible se despegará del soporte por efecto cizallamiento por efecto de la fisuración y el revestimiento podrá jugar su papel de revestimiento elástico.

Otra solución es la colocación de una membrana semiadherente.



Revestimientos adherentes flexibles:

Dentro de esta categoría se encuentran dos tipos de materiales:

- Los materiales llamados elásticos.
- Los materiales llamados elasto-plásticos.

Dentro de los materiales elásticos se encuentran los epoxi, los epoxi-poliuretanos y los poliuretanos. Dentro de los materiales elasto-plásticos se encuentran los productos bituminosos y asfálticos.

Revestimientos flexibles no adherentes:

Los materiales utilizados son generalmente las láminas de PVC. Estas membranas se sueldan entre ellas al calor y se fijan puntualmente al hormigón. Esta técnica es seductora, pero necesita una excelente calidad del material, una gran profesionalidad en la ejecución y en el tratamiento de los puntos singulares.

NORMATIVA

Los productos para impermeabilización de tableros de puentes Poxitar cumplen con la Normativa internacional para sistemas de alta calidad **-ISO 9001-**, reservada única y exclusivamente para productos de primera calidad con servicios de primera clase.

MANO DE OBRA

Los trabajadores de impermeabilización y/o estanqueidad de tableros de puentes, viaductos, canales, vasos, depósitos, etc. requieren un alto grado de **especialización** debido al binomio **materiales - mano de obra** que exige la combinación de una mano de obra especializada para el uso de unos materiales del alta concepción.



2. OBJETO

El presente Estudio nº 044/00/GO tiene por objeto el definir Sistemas para la Impermeabilización de Tableros de Puentes y Otros en la Obra AVE Subtramo 5/B en Torija – Guadalajara, haciendo hincapié tanto en las características técnicas, como en la definición de las diferentes fases de ejecución a realizar.

Dicho Estudio comporta:

Impermeabilización de Tableros de pasos superiores de carretera
Impermeabilización de Tableros en puentes de ferrocarril
Protección de elementos metálicos de juntas

Este Estudio puede ir acompañado si lo necesitasen por una Oferta de ejecución por parte de Aplicador Especializado Sika



3. SOLUCIONES PROPUESTAS

Impermeabilización de Tableros de pasos superiores de carretera
Impermeabilización de Tableros en puentes de ferrocarril

La solución propuesta para la realización de la impermeabilización de Tableros de pasos superiores y puentes de ferrocarril se basa en el SISTEMA DE IMPERMEABILIZACIÓN POXITAR.

DESCRIPCIÓN DEL SISTEMA:

1. INTRODUCCIÓN

Se entiende por sistema de impermeabilización la combinación en un tablero de puente de los distintos componentes de la membrana impermeable, de la protección, la preparación del soporte y el tratamiento de los puntos singulares.

Los sistemas se pueden clasificar en base al producto que constituye la membrana.

Las fases que constituyen los trabajos son las siguientes:

- Preparación de la superficie
- Imprimación
- Revestimiento
- Protección

2. PREPARACIÓN DE LA SUPERFICIE

La preparación de las superficies y la protección son comunes a todos los sistemas de impermeabilización de tableros de puentes mediante láminas aplicadas "in situ".

La superficie del hormigón debe estar exenta de cualquier líquido de curado, grasas, aceites, lechadas superficiales y de partículas sueltas o mal adheridas que puedan perjudicar la adherencia.

Así mismo en el momento de la aplicación el hormigón debe estar limpio, exento de polvo seco.

En el caso de que la superficie no cumpla las condiciones anteriores se procederá a la preparación de la misma, mediante chorro de arena. Si las irregularidades fueran importantes se procederá a la regularización, ya que si existen puntos angulosos la membrana impermeable se puede deteriorar fácilmente.

3. IMPERMEABILIZACIÓN

En el caso que nos ocupa, la impermeabilización consta de la imprimación y del revestimiento impermeable.



La imprimación, si bien no es necesaria en el caso del hormigón, se recomienda efectuarla mediante una primera mano diluida con un 3% - 5% como máximo en volumen de Diluyente S.

Para el revestimiento impermeable se aplicarán al menos dos capas en total de Poxitar, con un consumo aproximado de 500 – 600 g/m². La aplicación de la segunda capa se realizará una vez que hayan transcurrido entre 15 horas y 3 días.

4. PROTECCIÓN

Cuando el revestimiento impermeable aún esté fresco se deberá espolvorear arena Sikadur 510 cubriendo la superficie totalmente, sin dejar << calvas>>. La arena sobrante se retirará oportunamente mediante barrido o aspiradora mecánica. El consumo aproximado será de 2 a 4 Kg /m².

Los sistemas mixtos a base de epoxi alquitrán, como es el Poxitar, presentan las siguientes ventajas:

- Desaparición del riesgo de fluencia
- Buena estanqueidad
- Excelente adherencia
- Gran resistencia química
- Facilidad de aplicación



Protección de elementos metálicos de juntas

El sistema propuesto según las exigencias indicadas en la norma UNE EN ISO 12944/5 (sistema Sika SP 0) es el siguiente:

PARA ACERO. Sistema SIKA SP 0: ICOSIT STEEL PROTECT:

- Preparación de la superficie hasta grado St 3. Según norma SIS 055900, DIN 55928 parte 4 o similar.

Imprimación: Imprimación anticorrosiva con fosfato de zinc ICOSIT STEEL PROTECT

Densidad mínima de 1,3 Kg/l.

Imprimación exenta de plomo y cromatos según Directiva Europea (sobre protección de las personas y del medio ambiente DCE 91/155 y 93/112), y el R. D. 363/95 y posteriores.

35 micras DFT en una sola capa.

Capa de acabado.

Repintable.

ICOSIT STEEL PROTECT.

35 micras DFT en una sola capa. El color de esta capa será distinto del de la imprimación para distinguir las capas entre sí.

- Espesor Total del sistema recomendado 70 micras.

DESCRIPCIÓN DEL SISTEMA:

ESQUEMA DE RECUBRIMIENTO PROTECTOR ANTICORROSIVO DE JUNTAS.
(según recomendación de la norma)

1. INTRODUCCIÓN. SUPERFICIE DE ACERO (A-42).

1.1. SOLICITACIONES

Evidentemente, la protección del acero al carbono en estructuras y equipos es una medida totalmente necesaria para preservarlo y darle una durabilidad, frente a ataques corrosivos que no mermen, en ningún caso, su vida útil.

Cualquier circunstancia o material que no esté contemplado en los apartados anteriores debe consultarse previamente con este Departamento Técnico.



2. PREPARACIÓN DEL SUSTRATO

Saneado y Limpieza de superficies mediante chorreado abrasivo.

Se realizará sobre las superficies metálicas de hierro o materiales ferrosos una preparación mediante lijado en profundidad hasta grado St 3 según la norma SIS 055900. Esta limpieza debe conseguir la eliminación de grasa, aceite, suciedad visible, cascarilla, óxido, capas de pintura y materias extrañas a simple vista. Al final el aspecto de la superficie será igual al patrón proporcionado por la fotografía St 3 (para cada grado de corrosión: A, B, C y D.).

3. IMPRIMACIÓN

Aplicación de una imprimación.

Se aplicará una capa de ICOSIT STEEL PROTECT con un consumo aproximado de 120 gr/m². para un espesor de película seca de 35 µm. (Se han considerado unas pérdidas del 20 %, debe prestarse especial atención a las irregularidades del soporte que influirán directamente sobre el consumo).

La aplicación podrá realizarse con brocha, rodillo, aerográfica o airless.

consultar hojas técnicas

El tiempo de espera para aplicar la segunda capa es de 15 min. a temperatura de 20°C.

4. CAPAS POSTERIORES DE TERMINACIÓN

Aplicación de una capa de acabado.

Se aplicará una capa de ICOSIT STEEL PROTECT con un consumo aproximado de 120 gr/m². para un espesor de película seca de 35 µm.

La aplicación podrá realizarse con brocha, rodillo, aerográfica o airless.

consultar hojas técnicas



4. DOCUMENTACIÓN TÉCNICA

Se adjuntan Hojas Técnicas de:

- * POXITAR
- * ICOSIT STEEL PROTECT

Se adjunta Pliego de Condiciones de:

- * IMPERMEABILIZACIÓN DE TABLEROS DE PUENTE



aldesa construcciones, s.a.

CONSTRUCTORA
HISPANICA, S.A.L.A.V. MADRID - BARCELONA - F. FRANCESA
TRAMO: MADRID - ZARAGOZA.
SUBTRAMO V-b

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TORIJA U.T.E.

CONTROL DE CALIDAD		CL3200V0443CC
1	N. Colás	27/10/00
2	J. Francisco	27/10/00
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EUROESTUDIOS, S.A.
Enrique Baragaño, 5 - 2º A
19192 - Trijueque
Guadalajara
Atención : Nicolás Machado

Nicolás, adjunto te envío la documentación técnica correspondiente a los productos utilizados en la ejecución de las juntas de tableros de Pasos Superiores.

El proceso de ejecución es el siguiente:

- Apertura de la caja de juntas de 5 cm de alto por 5 cm de ancho.
- Aplicación de **LEGARAN**, puente de unión a base de resinas de epoxi especiales.
- Relleno de los labios de dicha junta con **PAVIMENT SF**, mortero preparado de alta resistencia para reparaciones y pavimentos.
- Colocación de **JEENE 50**, sistema de junta de expansión, hermética, de alto rendimiento, aplicada en frío.
- Posterior pegado al soporte con adhesivo especial.

Si necesitas alguna aclaración, no dudes en llamarme.

Hoja 1 de 9



BETTOR
PRODUCTOS QUÍMICOS
PARA LA CONSTRUCCIÓN

MBT
Master Builders
Technologies

LEGARAN

Puente de unión impermeable al agua y al aceite, para unión de hormigón viejo y nuevo y pavimentos.

Ficha Técnica 2.1.01

LEGARAN LEGARAN PISTOLA

Campo de aplicación

- Unión entre hormigón viejo y nuevo.
- Puente de unión entre hormigón y mortero en reparaciones estructurales.
- Puente de unión para pavimentos y recrecidos de hormigón o mortero.
- Protección frente a la corrosión de las armaduras.
- Puente de unión para morteros o recubrimientos epoxi o a base de poliuretano.

Consultar con el Departamento Técnico cualquier aplicación no prevista en esta relación.



Propiedades

- Excelente adherencia.
- Impermeable al agua, aceites, y otros agentes químicos.
- Impermeable al oxígeno y a los cloruros. Protege las armaduras frente a la corrosión.
- Compatible con la humedad del mortero fresco.
- Tiempo abierto de hasta 4 horas.
- Compatible con morteros hidráulicos y sintéticos.
- Se presenta en dos consistencias:
LEGARAN: para aplicar a brocha.
LEGARAN PISTOLA: para aplicar a pistola.

Base del material

Resina epoxi en dos componentes.

Modo de utilización

(a) **Soporte:** Debe estar seco, limpio, firme. Deben eliminarse restos de aceites, grasas y lechadas de cemento. Las armaduras deben liberarse de óxidos totalmente hasta Grado SA 2 1/2 (DIN 55928, parte 4).

(b) **Mezcla:** Verter el Componente II sobre el Componente I y mezclar intensamente durante un mínimo de 3 minutos con taladro provisto de agitador. No deben realizarse en ningún caso mezclas parciales. LEGARAN está listo para su aplicación cuando el color es uniforme.

(c) **Aplicación como protector de armaduras:** Para ello aplicar LEGARAN con brocha o LEGARAN PISTOLA con pistola air-less de membrana sobre las armaduras cuidando de cubrir bien toda la superficie. Es recomendable para mayor seguridad, aplicar una segunda mano cuando la primera esté seca.

(d) **Aplicación como puente de unión:** Distribuir por toda la superficie (armaduras incluidas) una capa uniforme de LEGARAN o LEGARAN PISTOLA. Colocar el mortero mientras el LEGARAN se mantiene en estado fresco (asegurarse que mancha las yemas de los dedos).

Limpieza de herramientas

LEGARAN puede eliminarse en estado fresco con PREPARACIÓN BETTOR UNIVERSAL, pero una vez endurecido, sólo se elimina mecánicamente.

Consumo

Depende del estado de la superficie de aplicación. Normalmente, son suficientes de 0,5 a 1 Kg/m². Este consumo es teórico y deberá determinarse para cada obra mediante ensayos.

Condiciones de almacenamiento/

Tiempo de conservación

Almacenar en lugar fresco y seco. En estas condiciones puede almacenarse hasta 2 años.

Manipulación y transporte

LEGARAN y LEGARAN PISTOLA Componente I

Clasificación del producto para su manipulación: Irritante.

Hoja 2 de 9³¹

BETTOR
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Frases de Riesgo: Irrita los ojos y la piel. Riesgo de sensibilización en contacto con la piel.
Frases de Seguridad: En caso de contacto con los ojos, lávese inmediata y abundantemente con agua y acúdase a un médico.
En caso de contacto con la piel, lávese inmediata y abundantemente con agua y jabón.
Úsense guantes adecuados y protección para los ojos/la cara.
Evítese su liberación al medio ambiente. Recábense instrucciones específicas de la Hoja de Seguridad del producto.

Clasificación del producto para el transporte por carretera:
Clase 9 cifra 11C. N° UN: 3082 N° de peligro: 90

LEGARAN y LEGARAN PISTOLA Componente II

Clasificación del producto para su manipulación:
Inflamable.

Punto de inflamación: aprox. 40°C.

Frases de Riesgo: Inflamable.

Frases de Seguridad: Conservar alejado de toda llama o fuente de chispas - No fumar.

Evítese la acumulación de cargas electroestáticas. Úsese únicamente en lugares bien ventilados.

Clasificación del producto para el transporte por carretera:
Clase 3 cifra 31C N° UN: 1993 N° de peligro: 30

Datos técnicos

	LEGARAN	LEGARAN PISTOLA
Temperatura de aplicación (soporte y material):	entre +8°C y +30°C.	entre +8°C y +30°C.
Endurecimiento total tras:	aprox. 6 días.	aprox. 6 días.
Resistencia a la temperatura:	de -30°C hasta +70°C.	de -30°C hasta +70°C.
Permeabilidad al agua:	Impermeable.	Impermeable.
Permeabilidad a gases:	Impermeable.	Impermeable.
Los tiempos de endurecimiento están medidos a 20°C y 65 % de H.R. Temperaturas más bajas aumentan estos tiempos y más elevadas los acortan.		

NOTA:

La presente ficha técnica sirve, al igual que todas las demás recomendaciones e información técnica, únicamente para la descripción de las características del producto, forma de empleo y sus aplicaciones. Los datos e informaciones reproducidos, se basan en nuestros conocimientos técnicos obtenidos en la bibliografía, en ensayos de laboratorio y en la práctica.

Los datos sobre consumo y dosificación que figuran en esta ficha técnica, se basan en nuestra propia experiencia, por lo que estos son susceptibles de variaciones debido a las diferentes condiciones de las obras. Los consumos y dosificaciones reales, deberán determinarse en la obra, mediante ensayos previos y son responsabilidad del cliente.

Para un asesoramiento adicional, nuestro Servicio Técnico, está a su disposición.
Bettor MBT, S.A. se reserva el derecho de modificar la composición de los productos, siempre y cuando éstos continúen cumpliendo las características descritas en la ficha técnica.

Otras aplicaciones del producto que no se ajusten a las indicadas, no serán de nuestra responsabilidad.

Otorgamos garantía en caso de defectos en la calidad de fabricación de nuestros productos, quedando excluidas las reclamaciones adicionales, siendo de nuestra responsabilidad tan solo la de reemplazar el valor de la mercancía suministrada.

Debe tenerse en cuenta las eventuales reservas correspondientes a patentes o derechos de terceros.

Edición Junio 1999

La presente ficha técnica pierde su validez con la aparición de una nueva edición.

Especificaciones de venta

LEGARAN

Densidad: 1,6 ± 0,1 g/cm³.
Gel time (20°C): Mínimo 2 horas.
Secado total (20°C): Máx. 24 horas.
Adherencia sobre hormigón: Rotura en hormigón.
Tiempo abierto (20°C): Mínimo 3 horas.

LEGARAN PISTOLA

Densidad: 1,7 ± 0,1 g/cm³.
Gel time (20°C): Mínimo 2 horas.
Secado total (20°C): Máx. 24 horas.
Adherencia sobre hormigón: Rotura en hormigón.
Tiempo abierto (20°C): Mínimo 3 horas.

Presentación

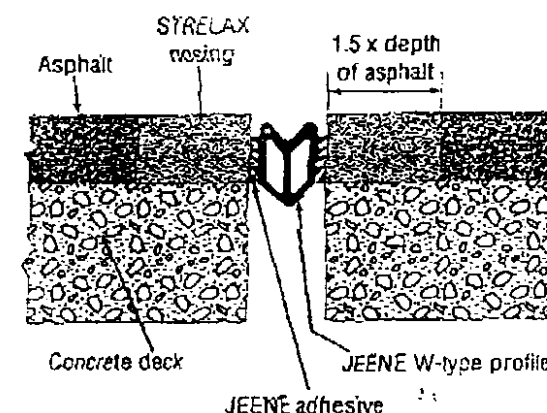
Componente I, rojo; Componente II, negro. Conjuntos de 1 y 5 Kg.

Hay que tener en cuenta

- No aplicar sobre soportes a temperaturas inferiores a +8°C ni superiores a +30°C.
- No deben realizarse mezclas parciales de los contenidos de los envases de ambos componentes.
- No añadir agua, disolventes ni otras sustancias que puedan afectar a las propiedades del material endurecido.
- Comprobar en cualquier caso que el producto aún mancha las yemas de los dedos cuando se coloca el mortero sobre él. En caso contrario aplicar una segunda mano de LEGARAN o LEGARAN PISTOLA.

A section through the W-type profile bonded to STRELAX nosings is shown in Figure 2 (not to scale).

Figure 2: Section through a JEENE W-type profile



Typical physical properties^(a)

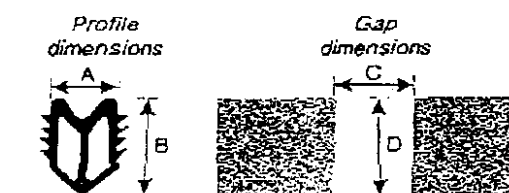
Profile

Tensile strength (min.) (ASTM D412), N/mm² 13.9
Elongation at break (min.) (ASTM D412), % 250

Adhesive

Tensile strength (ASTM D638), N/mm² 13.9
Compressive strength (ASTM D695), N/mm² 34.5

^(a) typical values; all tests carried out at 21°C unless otherwise stated



Key dimensions^(b)

Type	Profile dimensions		Gap dimensions		Joint opening: movement range		
	Width A	Height B	Width C ^(c)	Depth D ^(d)	min.	max.	Total
W25	25	33	25	50	13	38	25
W30	30	43	30	65	15	45	30
W40	40	57	40	70	20	60	40
W50	50	70	50	80	25	75	50
W65	65	87	65	105	33	98	65
W75	75	100	75	135	38	113	75
W100	100	129	100	140	50	150	100
FW25	25	31	25	50	17	34	17
FW30	30	37	30	60	20	40	20
FW40	40	51	40	75	27	53	26
FW50	50	63	50	90	34	67	33
FW65	65	82	65	110	43	86	43
FW75	75	95	75	120	50	100	50
FW100	100	127	100	150	67	133	66

Bettor MBT, S.A.

Bastlers, 13-15

08184 PALAU DE PLEGAMANS (Barcelona)

Tel.: 93 862 00 00 - Fax 93 862 00 20

WaBo[®]WaBo[®]**Hoja de datos del producto****JEENE®**

Sistema de junta de expansión hermética de alto rendimiento

Usos

Los sistemas de junta de expansión JEENE son 100% herméticos, versátiles y simples de aplicar, permiten un sellado efectivo en una amplia gama de aplicaciones, incluyendo puentes de carreteras, estructuras de aparcamientos de vehículos, edificios comerciales, estadios y estructura de suministro de aguas.

Los sistemas de junta de expansión JEENE permiten absorber desplazamientos de hasta 100 mm.

Ventajas

- Fiables y duraderos
 - Al inflarse durante la instalación se asegura un sistema de sellado completamente hermético.
 - Bandas de protección STRELAX® de probada fiabilidad.
- Comportamiento versátil.
 - Puede absorber hasta el 100% del desplazamiento.
 - Absorción del desplazamiento diferencial, de rotación y de rompimiento.
 - Amplia gama de perfiles disponibles para satisfacer los diferentes requerimientos de espacio y desplazamiento.
 - Fabricación en el lugar para adaptarse a las condiciones del emplazamiento de la obra.
 - Se adhiere directamente al hormigón o al acero si se requiere.
- Responsabilidad con el medio ambiente
 - Sistema aplicado en frío.

Descripción

Los sistemas de junta de expansión JEENE comprenden un perfil de neopreno que se fija en su posición con un adhesivo epoxídico de dos partes. El perfil se adhiere con más frecuencia a bandas de protección STRELAX, pero puede fijarse también directamente a substratos apropiados de hormigón o acero.

Se usa un agente acondicionador del perfil y pegamento de perfil para todas las uniones pegadas de neopreno a neopreno. La presión de aire positiva es una característica esencial del sistema y es necesario inflar el perfil durante la instalación a fin de asegurar una adhesión completa del sistema y que resulte completamente hermético.

Información del producto

Se dispone de tres tipos distintos de perfiles de neopreno JEENE y cada uno está disponible a su vez en una gama de tamaños para ajustarse a los requerimientos particulares de los proyectos.

Los perfiles tipo W con capacidad de desplazamiento del 100% se utilizan en obras con desplazamientos dinámicos, por ejemplo en puentes, viaductos, túneles, estructuras de aparcamientos de vehículos y aplicaciones de tratamiento de agua.

Los perfiles del tipo FW se utilizan en obras con aplicaciones de desplazamientos que requieren un sistema de terminación al ras, por ejemplo en áreas de tránsito de peatones, terminales de aeropuertos y estructuras de aparcamiento de vehículos, pero son apropiados para la mayoría de las aplicaciones de perfiles del tipo W.

Los perfiles tipo M se utilizan en obras con aplicaciones de construcción y movimientos, por ejemplo en pistas de aterrizaje de aeródromos, edificios, piscinas.

Los diferentes perfiles se ilustran en la Figura 1.

Figura 1: Perfiles de neopreno JEENE

Tipo W
Tipo FW
Tipo M

La sección transversal del perfil tipo W adherido a bandas de protección STRELAX se muestra en la Figura 2 (no se ilustra a escala).

STRELAX

Asfalto Banda de protección 1,5 x fondo
De asfalto

Base de hormigón Perfil tipo W JEENE
Adhesivo JEENE

Propiedades físicas tipo ^(a)

Perfil
Resistencia a la tensión (mín.) (ASTM D412), N/mm² 13,9
Alargamiento por rotura (mín.) (ASTM D412), % 250

Adhesivo
Resistencia a la tensión (ASTM D638), N/mm² 13,9
Resistencia a la compresión (ASTM D695), N/mm² 34,5

^{a)} Valores típicos obtenidos en todas las pruebas que se han realizado a 21° C a menos que se mencione lo contrario.

Dimensiones del perfil Dimensiones de espacio

Dimensiones ^(b)

Dimensiones de perfil Dimensiones de espacio Abertura de junta:
rango de desplazamiento.

Tipo	Ancho A	Altura B	Ancho C(c)	Fondo D(d)	Mín.	Máx.	Total
W25							
M40							

- b) Dimensiones citadas a los mm más próximos
c) Máximo tiempo de instalación
d) Mínima profundidad recomendada

Pruebas y aprobaciones

Los sistemas de junta de expansión JEENE tienen el Registro SAI del Departamento de Autopistas del Reino Unido. Consulte a su oficina local de HSC para ver los detalles de inscripción correspondientes.

WABe

Embalaje

Los perfiles de neopreno JEENE se ofrecen en longitudes que se adaptan a los requerimientos de cada proyecto y pueden ofrecerse en longitudes continuas de 40 m.

EL adhesivo JEENE viene para utilizarse con clasificación estándar para clima normal o con clasificación para uso a bajas temperaturas y se ofrece preembalado en recipientes de plástico como una unidad completa. La versión para clima frío comprende 0,9 Kg. de Parte 1 (adhesivo base) y 0,9 Kg. de Parte 2 (activador), la clasificación estándar comprende 0,9 Kg. de Parte 1 (base adhesiva) y 0,45 de Parte 2 (activador).

EL pegamento del perfil JEENE se suministra en tubos de plástico de 20 gramos.

El agente de acondicionamiento JEENE se suministra en recipientes de plástico de 1,01 litro.

Almacenamiento

Los perfiles JEENE de neopreno deben almacenarse en forma de rollos sin enroscarse o tenderse a lo largo en tramos sin deformaciones.

Deben mantenerse libre de agentes contaminantes antes de su instalación ya que la contaminación puede perjudicar el rendimiento de los productos de contacto, tales como el adhesivo JEENE y pegamento del perfil.

El adhesivo JEENE, el pegamento de perfil y los agentes condicionantes deben almacenarse a cubierto, protegidos de la luz solar directa y elevados del suelo. Las condiciones de almacenamiento han de ser de sequedad, por encima de los 5°C y debajo de los 28°C. Bajo condiciones de almacenamiento normal, el tiempo de conservación de estos productos sin deteriorarse, del adhesivo JEENE, el pegamento del perfil y los agentes condicionantes, en recipientes sin abrir es de 12 meses.

Instalación

JEENE es una junta de expansión especializada, es un producto que solamente lo han de instalar constructores debidamente capacitados y aprobados por HSC.

Las operaciones típicas que se realizan en la instalación de JEENE son: creación y preparación de una entrada, aplicación de la banda de protección STRELAX, preparación del perfil JEENE (incluyendo bordillos de pie, etc.), desinflar el perfil JEENE, aplicaciones del adhesivo JEENE a la banda de protección preparada, colocación del perfil JEENE, inflar el perfil JEENE, dejar endurecerse el adhesivo y soltar la presión de aire.

Cuando se considera fijar el perfil JEENE directamente a sustratos de hormigón o acero, la condición de tales sustratos es esencial para conseguir un desempeño apropiado del sistema de junta de expansión JEENE. Se recomienda muy especialmente consultar a la oficina de ventas de HSC local para obtener más asesoramiento cuando se considera fijar los perfiles JEENE a otros sustratos que no sean STRELAX.

Seguridad y precauciones sanitarias

Deben seguirse las más estrictas condiciones de seguridad y precauciones sanitarias, las cuales se encuentran en el Folleto Informativo de Material de Seguridad.

Se les recomienda muy seriamente a los usuarios usar guantes y protección de la vista cuando se hace la instalación de JEENE.



BETTOR
PRODUCTOS QUÍMICOS
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PAVIMENT SF

Mortero de alta resistencia para pavimentos.

Ficha Técnica 3.6.03

Campo de aplicación

- Realización de pavimentos con alta resistencia a la abrasión.
- Pavimentos de naves industriales y aceras.
- Pavimentos de alta resistencia a la flexotracción.

Consultar con el Departamento Técnico cualquier aplicación no prevista en esta relación.



Propiedades

- Muy alta resistencia a la abrasión y al impacto.
- Alta resistencia a flexotracción y a compresión.
- Buena impermeabilidad frente aceites y agua.
- Endurecimiento sin fisuración.

Base del material

Mortero a base de cementos especiales, áridos seleccionados, resinas y fibras de acero.

Modo de utilización

(a) **Soporte:** El soporte debe estar firme (resistencia a tracción mínima de 1 N/mm²), y limpio de polvo, aceites, grasas, restos de pinturas antiguas y lechadas de cemento. Si existen armaduras a la vista deberá eliminarse el óxido que pueda haberse formado hasta alcanzar un

grado de desoxidación Sa 2 1/2.

El soporte deberá imprimarse previamente a la aplicación de PAVIMENT SF con LEGARAN (ver ficha técnica nº 2.1.01), o bien con REPAHAFT (ver ficha técnica nº 2.1.02).

(b) **Aplicación:** Verter el contenido del saco sobre el agua de amasado y mezclar con taladro y agitador o bien con mezcladora tipo COLLOMIX hasta obtener un mortero homogéneo y sin grumos. PAVIMENT SF debe aplicarse sobre el puente de unión mientras se mantiene fresco. Una vez mezclado, distribuir sobre la superficie preparada mediante paleta y compactar bien. El mortero es fluido lo que permite su reglado.

(c) **Curado:** El curado del mortero es IMPRESCINDIBLE cualquiera que sean las condiciones ambientales al menos durante las primeras 24 horas.

Limpieza de herramientas

En estado fresco con agua. Una vez endurecido el mortero sólo puede limpiarse mecánicamente.

Consumo

Aproximadamente 2,3 Kg de mortero amasado por m² y m de espesor. Este consumo es teórico y deberá ajustarse en cada obra en particular mediante ensayos representativos.

Condiciones de almacenamiento / Tiempo de conservación

PAVIMENT SF puede almacenarse durante 12 meses en lugar fresco y seco y en sus sacos originales cerrados.

Manipulación y transporte

Este producto contiene cemento.

El cemento reacciona con agua y/o humedad formando productos alcalinos. Salpicaduras de esta mezcla pueden provocar irritaciones en la piel y/o quemaduras en los ojos o mucosas.

Para su manipulación usar protección para los ojos en caso de salpicaduras o si se trabaja a alturas sobre la cabeza.

No es un producto de mercancía peligrosa por carretera.

Presentación



BETTOR
PRODUCTOS QUÍMICOS
PARA LA CONSTRUCCIÓN

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Sacos de 25 Kg.

Especificaciones de venta

Densidad en fresco (UNE 83814-92): $2,2 \pm 0,1$ g/cm³.

Consistencia mesa de sacudidas

(UNE 83811): 14 - 18 cm.

Resistencia a flexotracción /

Compresión (UNE 80101/EN196-4):

tras 24 horas: mínimo 9/45 N/mm².

tras 7 días: mínimo 10/65 N/mm².

tras 28 días: mínimo 11/95 N/mm².

ni superiores a +30°C.

- Evitar trabajar en condiciones de fuerte viento o sol intenso.

- No añadir más agua sobre el mortero que pierda su consistencia ni reamasar.

- No añadir cemento, áridos u otros productos a la mezcla ya que las características pueden variar ostensiblemente.

- Aplicar sobre el puente de unión mientras éste se mantiene en estado fresco.

Hay que tener en cuenta

- No aplicar sobre soportes a temperaturas inferiores a +5°C

Datos técnicos

Agua de amasado:	aprox. 1,9 l/saco.
Tiempo de trabajabilidad:	aprox. 45 minutos.
Transitable tras:	aprox. 5 horas.
Temperatura de aplicación:	de + 5°C hasta +30°C (soporte y material).
Espesores aplicables:	entre 15 y 50 mm.

Los tiempos de endurecimiento están medidos a 20°C y 65% de H.R. Temperaturas superiores acortan estos tiempos inferiores los alargan. Los valores de resistencias mecánicas representan la media de varias fabricaciones.

NOTA:

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Los datos sobre consumo y dosificación que figuran en esta ficha técnica, se basan en nuestra propia experiencia, por lo que estos son susceptibles de variaciones debido a las diferentes condiciones de las obras. Los consumos y dosificaciones reales, deberán determinarse en la obra, mediante ensayos previos y son responsabilidad del cliente.

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Debe tenerse en cuenta las eventuales reservas correspondientes a patentes o derechos de terceros.

Edición Mayo 1998

La presente ficha técnica pierde su validez con la aparición de una nueva edición.

Bettor MBT, S.A.

Bastars, 13-15

08184 PALAU DE PLEGAMANS (Barcelona)

Tel.: 93 862 00 00 - Fax: 93 862 00 20

DOUITS

Freyssinet

PRODUCTS

QUALITE D'ABORD / QUALITY FIRST

18 AVR '00 11:27 PPC JOINT/ APPUIS

P.2/18

Report No. A - 05 / 2000: Proof Tests on bearings
Sliding bearings GL 3700, Fixed bearings GF 2140, GF 4930, GT 5482
Project: TAM KON SHAN Viaduct, Hong Kong

Page 26 / 36

BON DE LIVRAISON / DECLARATION DE CONFORMITE
DELIVERY BILL / DECLARATION OF CONFORMITY

B.L. : 10090558/R

Date : 16/03/00

Folio : 1/06/00

Livraison / Delivery : DHL
Port : PORT PAYE EXPRESS EXONERE TVA
Transporteur / Carrier : Viceute

Client : 621 Livraison/Delivery : 621 / 0

F.P.S.PRODUCTOS Y SERVICIOS,SA

C/ MELCHOR FERNANDEZ

ALMAGRO, 23

28029 MADRID

ESPAGNE

UTE TORTIGA José BARRON

tel. (0034) 949 322 173

AREA DE SERVICIO MAYPA

CARRETERA NII km.75 -TRIJUEQUE

GUADALAJARA

ESPAGNE

Fig Référence UV Q. Dem./Ord. Q. Four./Supp. R.A.L./To Deliver
Désignation N° Lot/Batch Number

Commande / Order N° : 10000455/63 du 16/03/00

Vos références/Your references : FAX 192/00 -15/03/00/ LAV SUB. V B

Désignation de l'affaire : APPUIS TETRON CD - DOUILLES FIX. INF.

1 ZZ0000002 UN 1 1 0
CERTIFICATION

2 AS0000194 UN 16 16 0
DOUILLE FIX.M12 D 40X 100 CD

3 AS0003226 UN 8 8 0
DOUILLE FIX.M12 D 30X 180 CD

4 AS0003227 UN 8 8 0
DOUILLE FIX.M16 D 40X 200 CD

Nous certifions que, sauf exceptions ou dérogations énumérées ci-après, la fourniture citée a été fabriquée conformément aux spécifications techniques du marché, commande ou sous-commande du client et que, toutes opérations de contrôle et essais effectués, elle répond SOUS TOUS SES ASPECTS, aux spécifications particulières y-jointes, aux plans ainsi qu'aux normes et règlements en vigueur s'y rapportant.

OPERATEUR EXPEDITIONS :

Nom : DOREY.Y

Visa:

CONTROLE PPC :

Nom : DOREY.Y

Date : 16.03.2000

Visa:



PPC S.A. AU CAPITAL DE 731 756 €
572 119 592 RCS CHALON-SUR-SAONE
ET 572 119 592 00028 - NAF 281A
TVA : FR 48 572 119 592

18, route de Lyon - SAINT-REMY
B.P. 43 - 71103 CHALON-SUR-SAONE CEDEX - FRANCE
Tél. (33) 03 85 42 15 15 - Fax (33) 03 85 42 15 10

Test Report							
Pot bearing							
Vertical load test							
Project: TAM KON SHAN VIADUCT		N° of client order: 99/0517					
Contract: TSING YI NORTH COSTAL ROAD							
Bearing type: GL 3700		Ref. N°: 11678					
Equipment used: 20 MN servohydraulic testing machine		Calibration certificate N°: 43 7064 2 97-1(MPA. Dortmund)					
Testing procedure: BS 5400, section 9.2							
Test sequences	Vertical load kN	Vertical displacement [mm]					Average
		1	2	3	4		
U P L O A D	1	364	0,00	0,00	0,00	0,00	0,00
	2	695	0,18	0,22	0,17	0,25	0,21
	3	1026	0,27	0,39	0,27	0,46	0,35
	4	1358	0,31	0,51	0,33	0,63	0,45
	5	1690	0,31	0,62	0,37	0,78	0,52
	6	2023	0,30	0,71	0,40	0,92	0,58
	7	2356	0,27	0,78	0,43	1,06	0,64
	8	2697	0,25	0,85	0,46	1,19	0,69
	9	3027	0,22	0,92	0,50	1,32	0,74
	10	3703	0,14	1,05	0,56	1,51	0,84
D O W N L O A D	maintaining 15 min						
	10	3704	0,12	1,07	0,57	1,66	0,86
	9	3046	0,04	1,00	0,50	1,61	0,79
	8	2704	-0,04	0,96	0,46	1,61	0,75
	7	2374	-0,09	0,90	0,43	1,59	0,71
	6	2037	-0,11	0,84	0,39	1,52	0,66
	5	1704	-0,11	0,76	0,36	1,41	0,61
	4	1372	-0,10	0,67	0,33	1,27	0,54
	3	1040	-0,11	0,55	0,29	1,11	0,46
	2	707	-0,15	0,37	0,21	0,86	0,32
1	376	-0,26	0,04	0,03	0,38	0,05	
Remarks: Test without rotation lower bearing							
Condition after testing		Satisfactory ☒		Unsatisfactory ☐			
Quality control							
Operator		Certified by		Independent witness			
Name: R. Bader		Name: Dr. Hanenkamp		Name: RUB/KIB/KON			
Date: 05.01.00		Date: 05.01.00					
Visa:							



CTGL 3700u Prot

Fig. D1: Results table, vertical load test, bearing GL 3700, Ref. N° 11678

RUHR-UNIVERSITÄT BOCHUM (Germany) - Structural Engineering - Structural Testing Laboratory

Report No. A - 05 / 2000: Proof Tests on bearings
Sliding bearings GL 3700, Fixed bearings GF 2140, GF 4930, GT 5482
Project: TAM KON SHAN Viaduct, Hong Kong

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Report No. A - 05 / 2000: Proof Tests on bearings
Sliding bearings GL 3700, Fixed bearings GF 2140, GF 4930, GT 5482
Project: TAM KON SHAN Viaduct, Hong Kong

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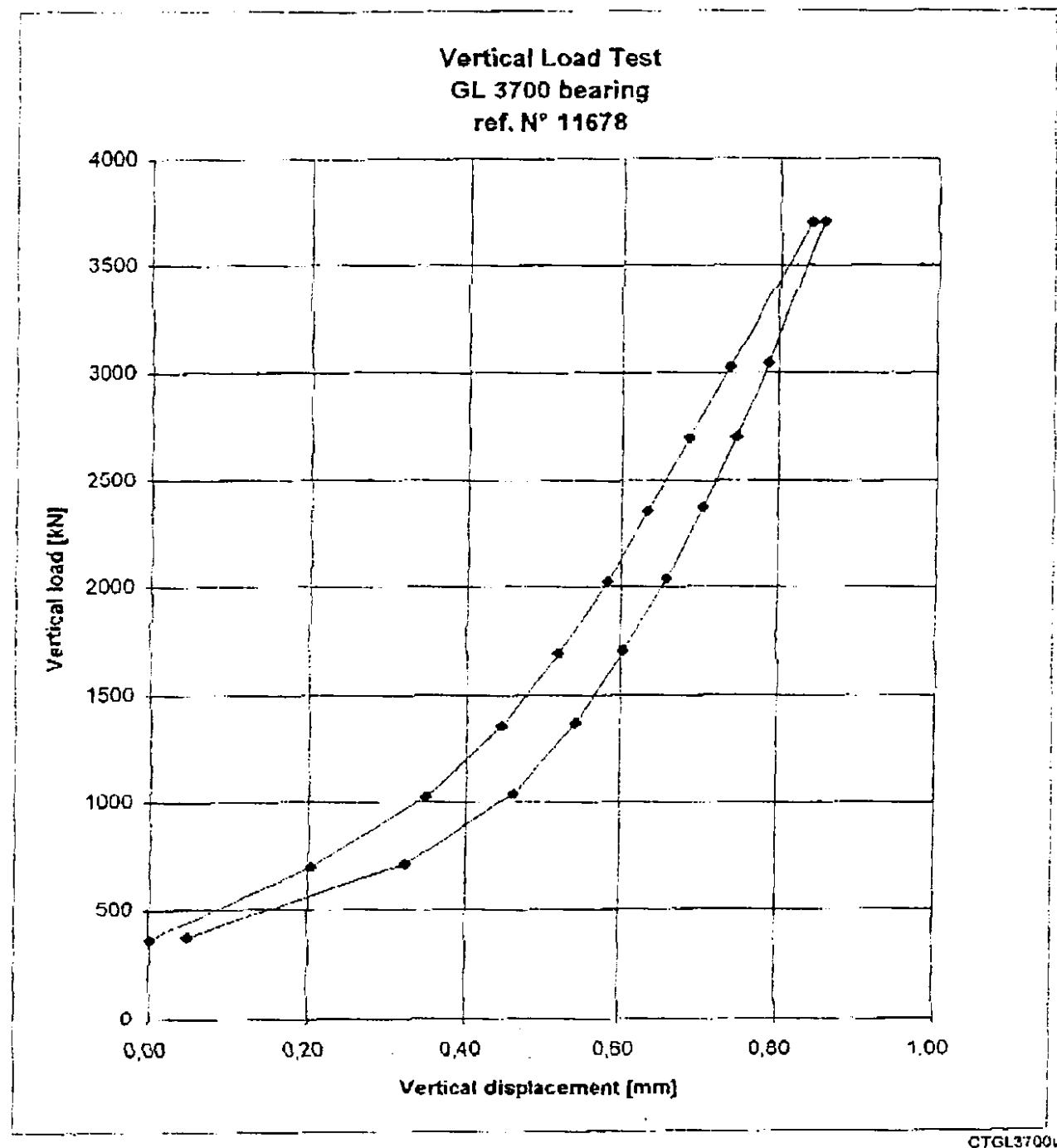


Fig. D2: Load versus displacement, bearing GL 3700, Ref. N° 11678

Test Report							
Pot bearing							
Vertical load test							
Project:		TAM KON SHAN VIADUCT		N° of client order:		99/0517	
Contract:		TSING YI NORTH COSTAL ROAD					
Bearing type:		GL 3700		Ref. N°:		11679	
Equipment used:				Calibration certificate N°:			
Testing machine:				43 7064 2 97-1(MPA, Dortmund)			
20 MN servohydraulic testing machine							
Testing procedure:		BS 5400, section 9.2					
Test sequences		Vertical load	Vertical displacement [mm]				
		kN	1	2	3	4	Average
U P L O A D	1	364	0,00	0,00	0,00	0,00	0,00
	2	695	0,17	0,13	0,20	0,18	0,17
	3	1026	0,36	0,24	0,39	0,29	0,32
	4	1358	0,52	0,32	0,53	0,35	0,43
	5	1690	0,67	0,38	0,65	0,37	0,52
	6	2023	0,82	0,43	0,74	0,37	0,59
	7	2356	0,95	0,47	0,83	0,36	0,65
	8	2697	1,09	0,51	0,90	0,35	0,71
	9	3027	1,22	0,55	0,97	0,33	0,77
	10	3703	1,51	0,62	1,12	0,26	0,88
D O W N L O A D	maintaining 15 min						
	10	3704	1,56	0,63	1,14	0,24	0,89
	9	3046	1,52	0,57	1,07	0,16	0,83
	8	2704	1,53	0,53	1,03	0,08	0,79
	7	2374	1,51	0,50	0,98	0,03	0,76
	6	2037	1,44	0,47	0,91	0,00	0,71
	5	1704	1,33	0,42	0,83	-0,02	0,64
	4	1372	1,18	0,37	0,72	-0,03	0,56
	3	1040	1,01	0,29	0,57	-0,07	0,45
	2	707	0,76	0,18	0,36	-0,15	0,29
	1	376	0,37	0,02	0,03	-0,23	0,05
Remarks: Test without rotation upper bearing							
Condition after testing Satisfactory ☒ Unsatisfactory ☐							
Quality control							
Operator		Certified by		Independent witness			
R. Bader		Dr. Hanenkamp		RUB/KIB/KON			
Date		05.01.00					
Visa							

Fig. D3: Results table, vertical load test, bearing GL 3700, Ref. N° 11679

Report No. A - 05 / 2000: Proof Tests on bearings
Sliding bearings GL 3700, Fixed bearings GF 2140, GF 4930, GT 5482
Project: TAM KON SHAN Viaduct, Hong Kong

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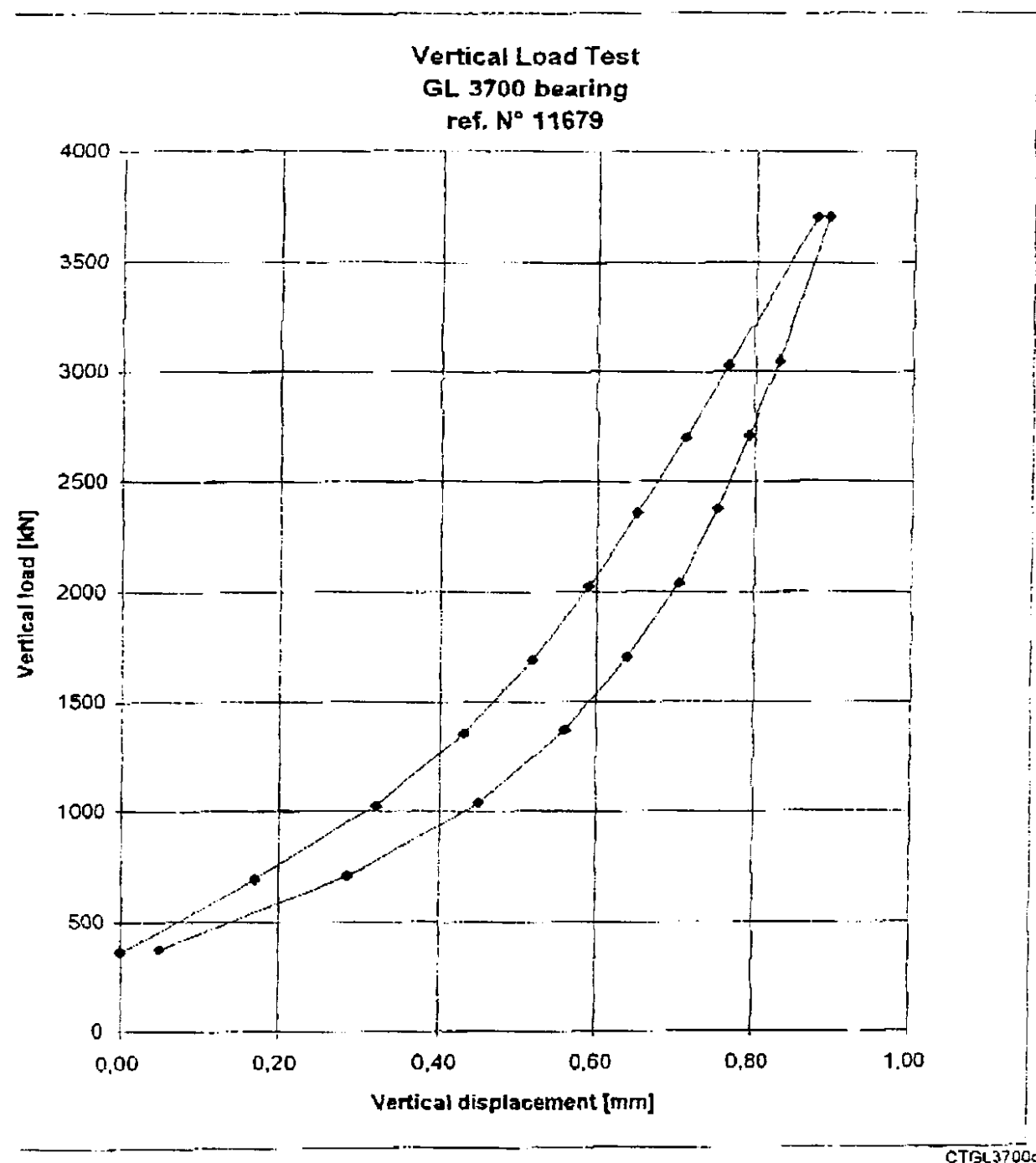


Fig. D4: Load versus displacement , bearing GL 3700, Ref. N° 11679

Test Report							
Pot bearing							
Vertical load test							
Project: TOUCHEN				N° of client order:			
Bearing type: GG 3000				Ref. N°: 11510			
Equipment used:				Calibration certificate N°:			
Testing machine: 20 MN servohydraulic testing machine				43 7064 2 97-1(MPA, Dortmund)			
Testing procedure: AASHTO							
Test sequences	Vertical load kN	Vertical displacement [mm]				Average	
		1	2	3	4		
U P L O A D	1	282	0,00	0,00	0,00	0,00	0,00
	2	730	0,32	0,36	0,28	0,25	0,30
	3	1095	0,53	0,60	0,48	0,42	0,51
	4	1584	0,75	0,83	0,70	0,61	0,72
	5	1943	0,90	1,00	0,88	0,77	0,89
	6	2365	1,05	1,17	1,06	0,93	1,05
	7	2821	1,19	1,32	1,23	1,09	1,21
	8	3258	1,31	1,45	1,38	1,23	1,34
	9	4034	1,53	1,69	1,65	1,50	1,59
	10	4528	1,65	1,81	1,79	1,63	1,72
maintaining 60 min							
D O W N L O A D	10	4519	1,68	1,85	1,84	1,68	1,76
	9	4057	1,63	1,80	1,79	1,63	1,71
	8	3694	1,58	1,74	1,73	1,56	1,65
	7	2798	1,43	1,58	1,56	1,40	1,49
	6	2419	1,35	1,48	1,45	1,29	1,38
	5	1972	1,22	1,35	1,31	1,16	1,26
	4	1601	1,06	1,17	1,11	0,97	1,08
	3	1185	0,84	0,93	0,86	0,74	0,84
	2	732	0,53	0,60	0,55	0,47	0,54
	1	285	0,06	0,06	0,06	0,06	0,06
Remarks: Test with 0,02 rad rotation							
Condition after testing Satisfactory ☒ Unsatisfactory ☐							
Quality control							
	Operator	Certified by		Independent witness			
Name	R. Bader	Dr. Hanenkamp		RUBBOCHUM			
Date	16.11.99	16.11.99					
Visa	Bader	Hanken					

Clgg3000 Prot

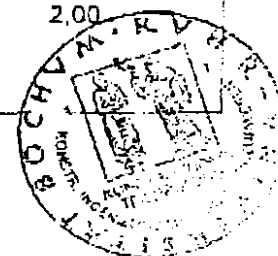
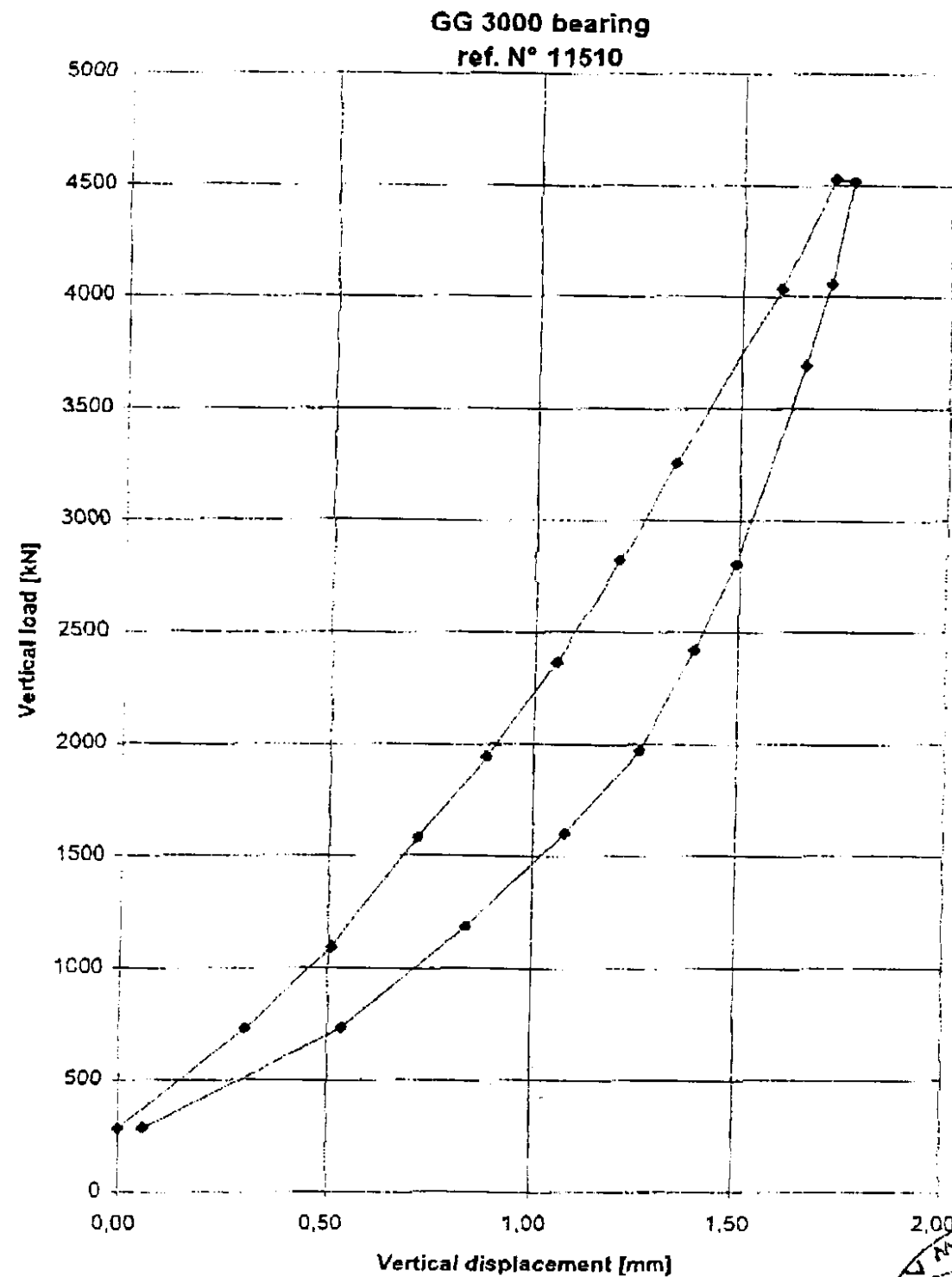
Freyssinet

PRODUITS

TAM KON SHAN VIADUCT
(HONG KONG - P.R. OF CHINA)
TETRON BEARING (GL 8800 - GF 960)

TEST N° 99/119

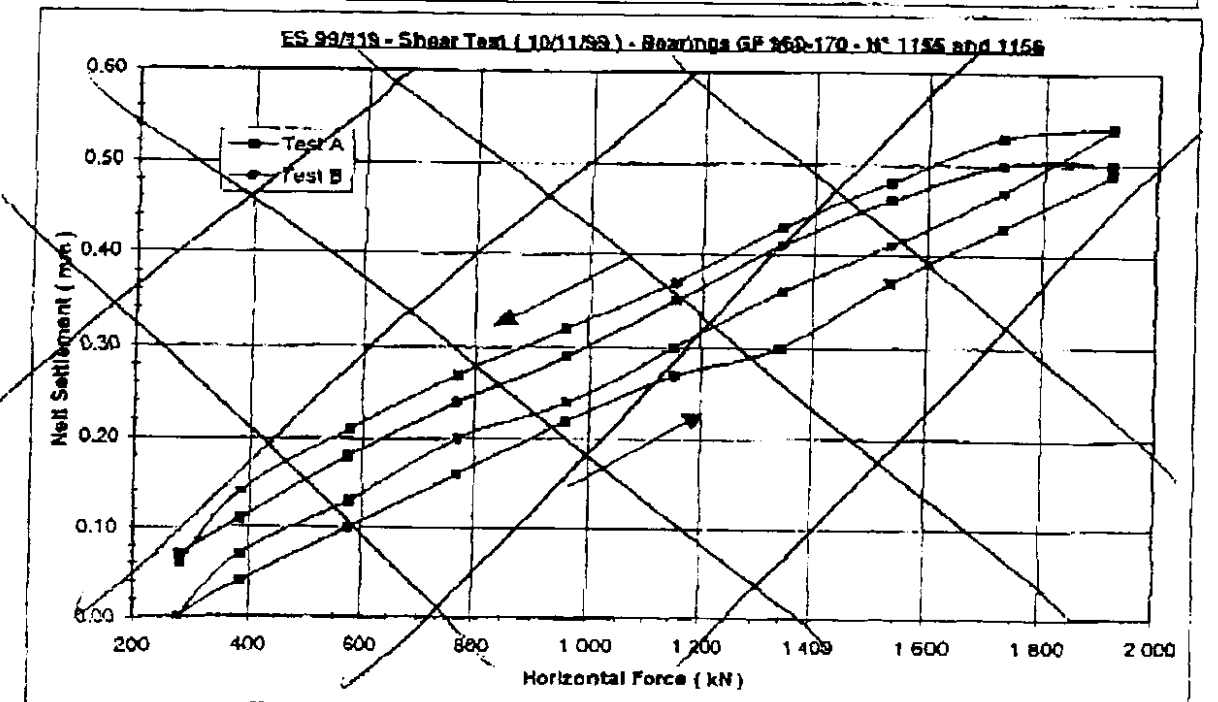
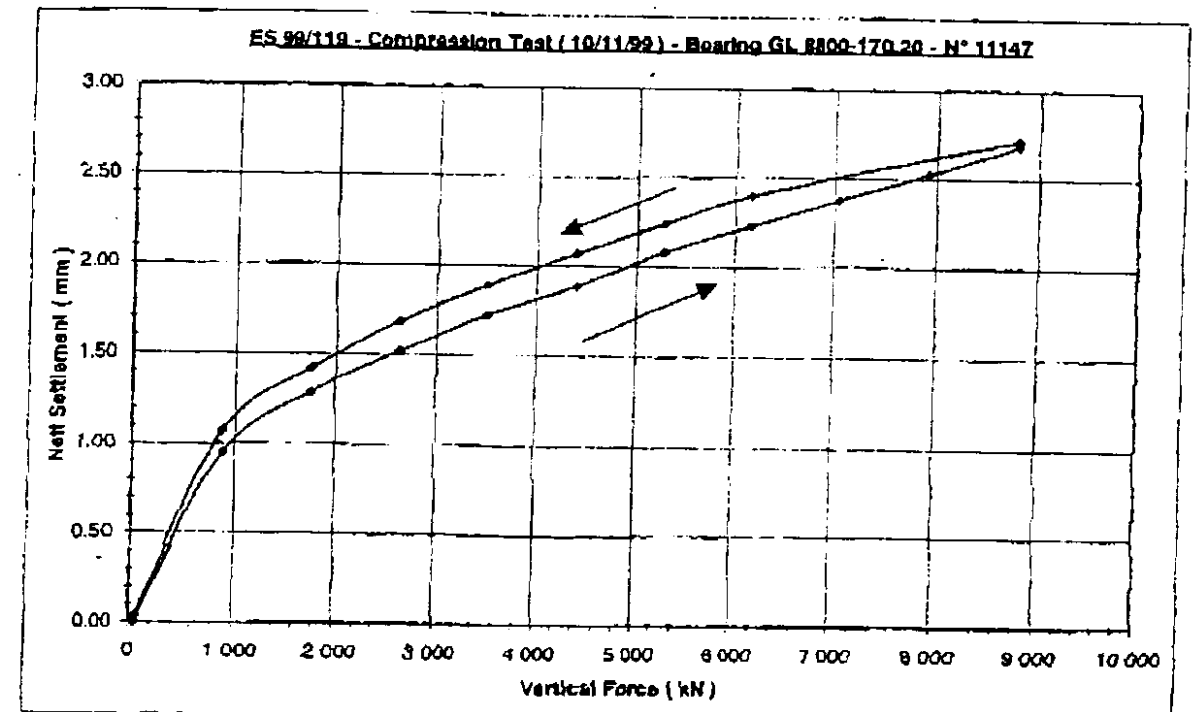
Date : 14/12/99



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- COMPRESSION TEST GL 8800 - 170.20
- SHEAR TEST GF 960-170

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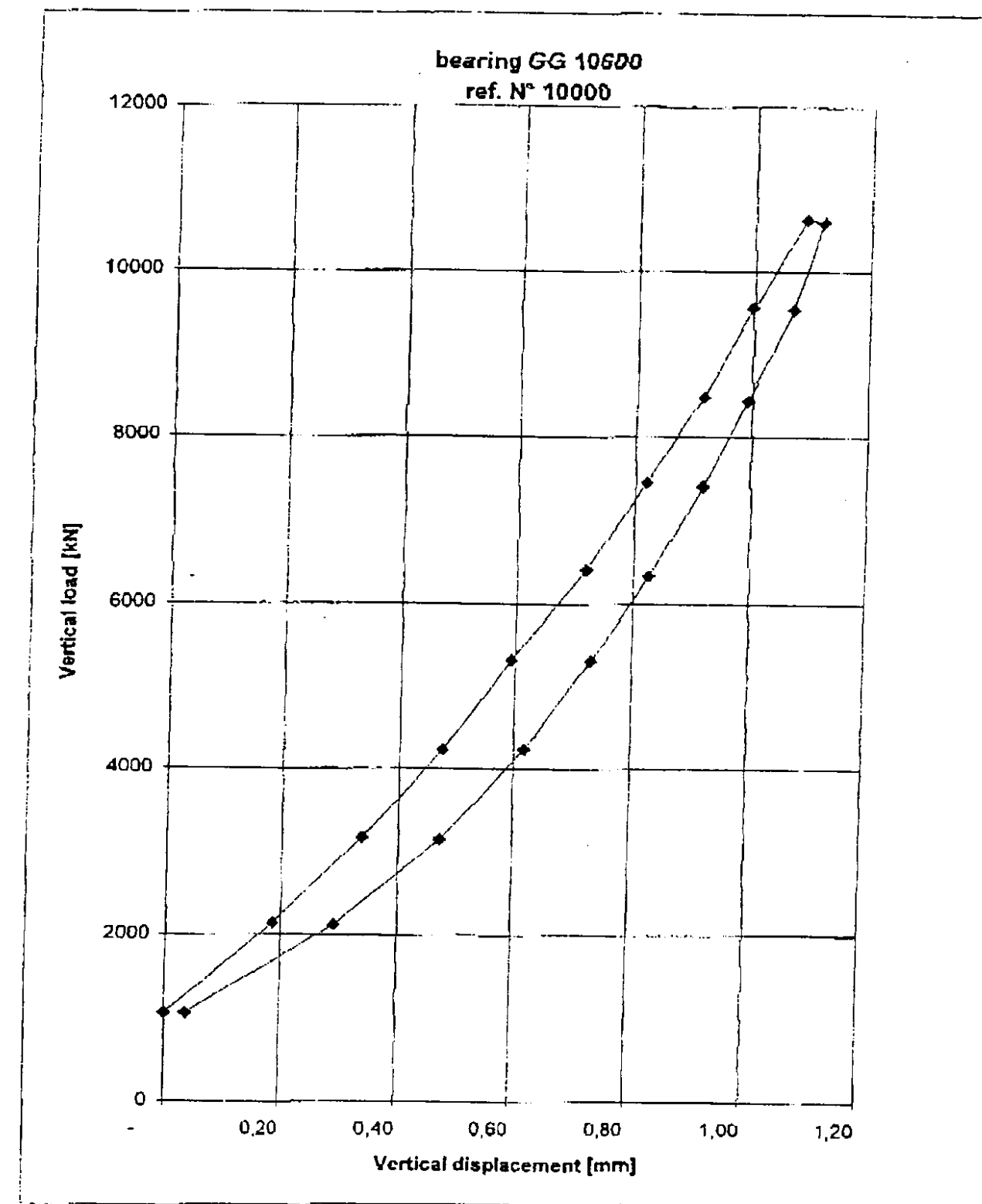
PPC

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Test Report							
Pot bearing							
Vertical load test							
Project:		SUNGAI SITIAWAW / SUNGAI TEBOK SAMALON		N° of client order:			
Bearing type:		GG 10600		Ref. N°: 10000			
Equipment used:							
Testing machine:		20 MN servohydraulic testing machine					
		Calibration certificate N°: 43 7064 2 97-1(MPA. Dortmund)					
Testing procedure:		PC 4100-09 / based on BS 5400, section 9.2					
Test sequences	Vertical load kN	Vertical displacement (mm)					Average
		1	2	3	4		
U P L O A D	1	1058	0,00	0,00	0,00	0,00	0,00
	2	2140	0,18	0,18	0,16	0,22	0,19
	3	3168	0,33	0,34	0,30	0,39	0,34
	4	4228	0,46	0,47	0,43	0,54	0,48
	5	5322	0,58	0,58	0,55	0,66	0,59
	6	6405	0,69	0,69	0,73	0,77	0,72
	7	7445	0,79	0,79	0,83	0,87	0,82
	8	8497	0,89	0,88	0,92	0,97	0,92
	9	9575	0,98	0,97	1,00	1,05	1,00
	10	10623	1,07	1,06	1,08	1,14	1,09
maintaining 15 min							
D O W N L O A D	10	10589	1,10	1,09	1,11	1,17	1,12
	9	9551	1,05	1,04	1,06	1,12	1,07
	8	8450	0,97	0,97	0,99	1,04	0,99
	7	7394	0,89	0,89	0,92	0,97	0,92
	6	6337	0,80	0,80	0,83	0,88	0,83
	5	5307	0,70	0,70	0,74	0,78	0,73
	4	4232	0,59	0,59	0,63	0,66	0,62
	3	3150	0,44	0,45	0,49	0,51	0,47
	2	2118	0,27	0,28	0,31	0,31	0,29
	1	1059	0,01	0,02	0,09	0,02	0,04
Remarks: Test without rotation							
Condition after testing		Satisfactory ☒		Unsatisfactory ☐			
Quality control							
Name	Operator	Certified by		Independent witness			
	E. Schulte	Dr. Hanenkamp		RUB/KIB/KON			
Date	29.07.98	29.07.98					
Visa							



gg10600ct.xls Prot



Report No. A - 05 / 2000: Proof Tests on bearings
Sliding bearings GL 3700, Fixed bearings GF 2140, GF 4930, GT 5482
Project: TAM KON SHAN Viaduct, Hong Kong

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Test Report															
Pot bearing															
Sliding test															
Project: TAM KON SHAN VIADUCT		N° of client order: 99/0517													
Contract: TSING YI NORTH COSTAL ROAD															
Bearing type: GL 3700		Ref. N°: 11678 + 11679													
Equipment used:															
Testing machine:		Calibration certificate N°:													
vertic. load: 20 MN servohydraulic testing machine		43 7064 2 97-1(MPA, Dortmund)													
horiz. load: 1000 kN servohydraulic actuator		43 7158 3 99-21/22 (MPA, Dortmund)													
Testing procedure: BS 5400, Section 9.2															
Coefficient of friction - continuous sliding - (mean value from compr. and tension)		static 1,05% contin. 0,23%													
Remarks: Test without rotation															
Condition after testing		Satisfactory ☒ Unsatisfactory ☐													
<table border="1"> <thead> <tr> <th colspan="2">Quality control</th> <th rowspan="2">Independent witness</th> </tr> <tr> <th>Operator</th> <th>Certified by</th> </tr> </thead> <tbody> <tr> <td>Name R. Bader</td> <td>Dr. Hanenkamp</td> <td rowspan="3">RUB/KIB/KON</td> </tr> <tr> <td>Date 06.01.00</td> <td>06.01.00</td> </tr> <tr> <td>Visa</td> <td></td> </tr> </tbody> </table>				Quality control		Independent witness	Operator	Certified by	Name R. Bader	Dr. Hanenkamp	RUB/KIB/KON	Date 06.01.00	06.01.00	Visa	
Quality control		Independent witness													
Operator	Certified by														
Name R. Bader	Dr. Hanenkamp	RUB/KIB/KON													
Date 06.01.00	06.01.00														
Visa															

GL3700gt Prot

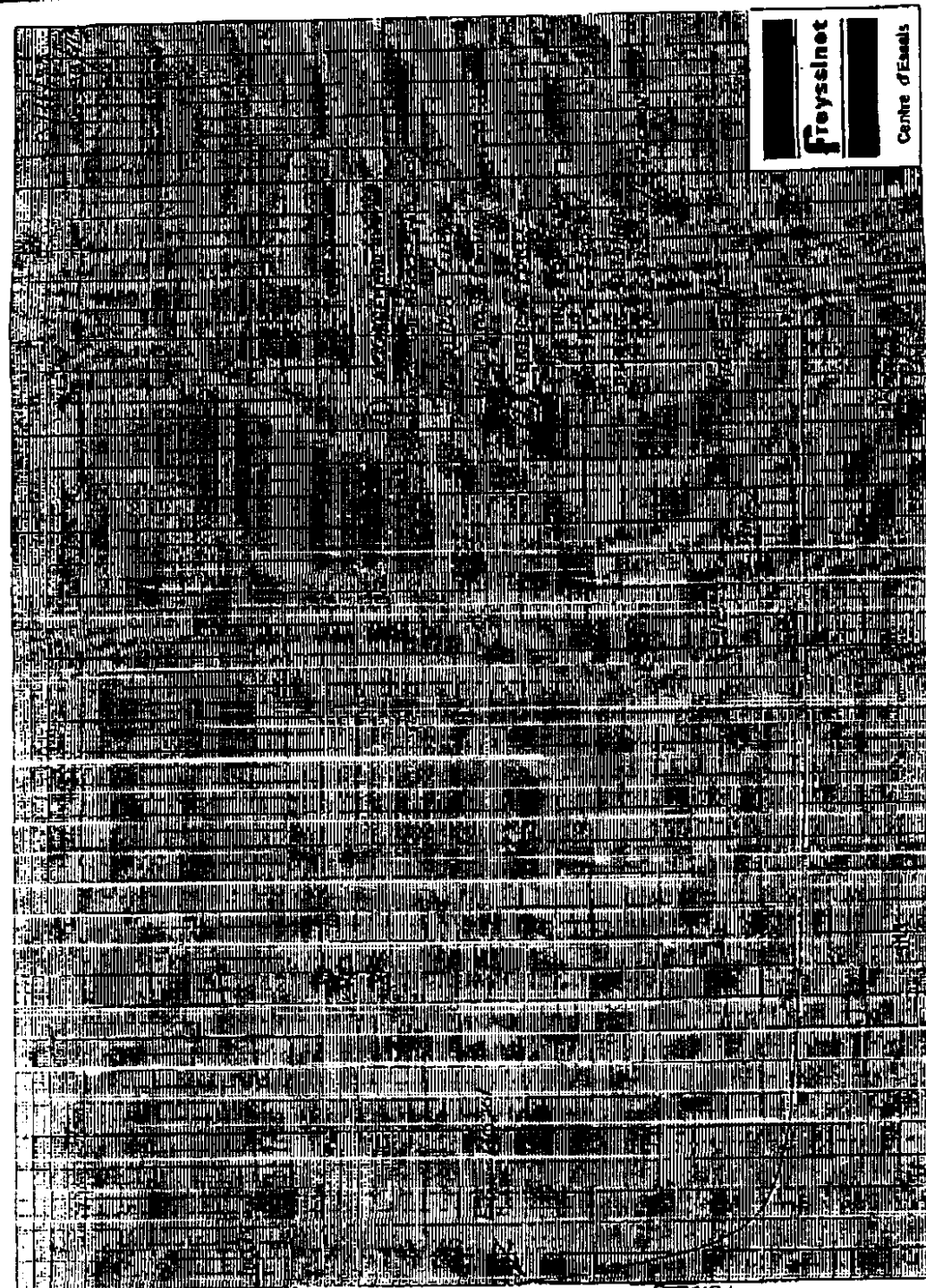
Fig. D5: Results sliding test, bearings GL 3700, Ref. N° 11678 + 11679

Test Report															
Pot bearing															
Sliding test															
Project: TOUCHEN		N° of client order:													
Bearing type: GG 3000		Ref. N°: 11510													
Equipment used:															
Testing machine:		Calibration certificate N°:													
vertic. load: 20 MN servohydraulic testing machine		43 7064 2 97-1(MPA, Dortmund)													
horiz. load: 1000 kN servohydraulic actuator		43 7064 2 97-9(MPA, Dortmund)													
Testing procedure: AASHTO															
Coefficient of friction - continuous sliding - (mean value from compr. and tension)		1. cycle 0,47% 5. cycle 0,57% 50. cycle 0,81%													
Remarks: Test without rotation															
Condition after testing		Satisfactory ☒ Unsatisfactory ☐													
<table border="1"> <thead> <tr> <th colspan="2">Quality control</th> <th rowspan="2">Independent witness</th> </tr> <tr> <th>Operator</th> <th>Certified by</th> </tr> </thead> <tbody> <tr> <td>Name R. Bader</td> <td>Dr. Hanenkamp</td> <td rowspan="3">RUB/KIB/KON</td> </tr> <tr> <td>Date 19.11.99</td> <td>19.11.99</td> </tr> <tr> <td>Visa</td> <td></td> </tr> </tbody> </table>				Quality control		Independent witness	Operator	Certified by	Name R. Bader	Dr. Hanenkamp	RUB/KIB/KON	Date 19.11.99	19.11.99	Visa	
Quality control		Independent witness													
Operator	Certified by														
Name R. Bader	Dr. Hanenkamp	RUB/KIB/KON													
Date 19.11.99	19.11.99														
Visa															

Gigg3000 Prot

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Project: Bridges Sungai Dingding, Malaysia

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1. cycle

HORIZONTAL DISPLACEMENT

PPC

TAM KOI SHAN VIAOUCT
(HONG KONG - P. R. OF CHINA)
TETRON BEARING (GL 8900 - GF 960)

Date : 14/12/99

TEST N° 99/19

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SLIDING TEST GL 8100 - 170.20
HORIZONTAL FORCE VS DISPLACEMENT

Test Report

Pot bearing

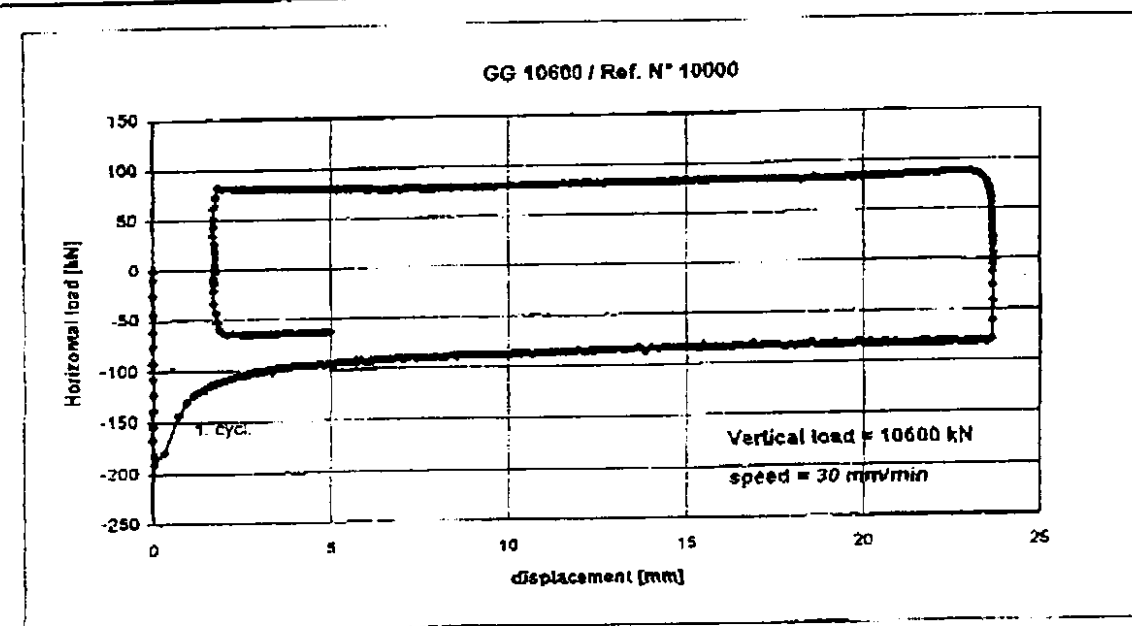
Sliding test

Project: SUNGAI SITIAWAW /
SUNGAI TEBOK SAMALON N° of client order:

Bearing type: GG 10600 Ref. N°: 10000

Equipment used: Calibration certificate N°:
Testing machine: 43 7064 2 97-1(MPA, Dortmund)
vertic. load: 20 MN servohydraulic testing machine
horiz. load: 2500 kN servohydraulic actuator 43 7064 2 97-9(MPA, Dortmund)

Testing procedure: PC 4100-09 / based on BS 5400, section 9.2



Coefficient of friction - continuous sliding -
(mean value from compr. and tension) 1. cycle 0,40%

Remarks: Test without rotation

Condition after testing Satisfactory ☒ Unsatisfactory ☐

Quality control			Independent witness
Name	Operator	Certified by	RUB/KIB/KON
Date	E. Schulte	Dr. Hanenkamp	
Visa	03.08.98	03.08.98	



GG10600gt.xls Prot

RUHR UNIVERSITÄT BOCHUM - Konstruktiver Ingenieurbau - Bereich Konstruktionsteilprüfung(Germany)

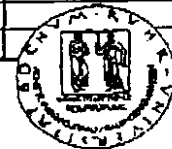
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Project: Bridges Sungai Dingding, Malaysia

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Test Report			
Pot bearing			
Sliding test			
Project:	SUNGAI SITIAWAW / SUNGAI TEBOK SAMALON		N° of client order:
Bearing type:	GG 10600	Ref. N°:	10000
Equipment used:	Calibration certificate N°:		
Testing machine:	43 7064 2 97-1(MPA, Dortmund)		
vertic. load: 20 MN servohydraulic testing machine	43 7064 2 97-9(MPA, Dortmund)		
horiz. load: 2500 kN servohydraulic actuator			
Testing procedure:	PC 4100-09 / based on BS 5400, section 9.2		
Coefficient of friction - continuous sliding - (mean value from compr. and tension) 1. cycle 0,40%			
Remarks: Test without rotation			
Condition after testing Satisfactory ☒ Unsatisfactory ☐			
Quality control			
Name	Operator	Certified by	Independent witness
	E. Schulte	Dr. Hanenkamp	RUB/KIB/KON
Date	03.08.98	03.08.98	
Visa			



GG10600.xls Prot

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Test Report						
Pot bearing						
Horizontal load test						
Project:	SUNGAI SITIAWAW / SUNGAI TEBOK SAMALON		N° of client order:			
Bearing type:	GG 10600	Ref. N°:	10000			
Equipment used:	Calibration certificate N°:					
Loading facilities:	43 7064 2 97-1(MPA, Dortmund)					
vertical load: 20 MN servohydraulic testing machine	43 7064 2 97-9(MPA, Dortmund)					
horiz. load: 2500 kN servohydraulic actuator						
Testing procedure:	PC 4100-09 / based on BS 5400, section 9.2					
Test sequences	Horiz. load	Vertical load	Horizontal displacement [mm]			
	kN	kN	1	2	Average	
U P L O A D	1	73	10588	0,00	0,00	0,00
	2	140	10588	0,00	0,00	0,00
	3	211	10606	0,01	0,00	0,01
	4	282	10584	0,03	0,00	0,02
	5	351	10622	0,07	0,01	0,04
	6	422	10612	0,10	0,04	0,07
	7	493	10604	0,13	0,06	0,09
	8	567	10614	0,16	0,09	0,13
	9	638	10611	0,19	0,11	0,15
	10	700	10628	0,23	0,13	0,18
D O W N L O A D	maintaining 15 min					
	10	701	10631	0,27	0,16	0,22
	9	638	10626	0,27	0,17	0,22
	8	562	10631	0,27	0,17	0,22
	7	489	10590	0,26	0,17	0,22
	6	433	10583	0,25	0,16	0,21
	5	348	10613	0,23	0,15	0,19
	4	284	10623	0,21	0,14	0,18
	3	218	10615	0,19	0,12	0,16
	2	137	10577	0,16	0,09	0,13
1	80	10622	0,12	0,08	0,10	
Remarks: Test without rotation						
Condition after testing Satisfactory ☒ Unsatisfactory ☐						
Quality control						
Name	Operator	Certified by	Independent witness			
	E. Schulte	Dr. Hanenkamp	RUB/KIB/KON			
Date	31.07.98	31.07.98				
Visa						



gg10600.xls Prot

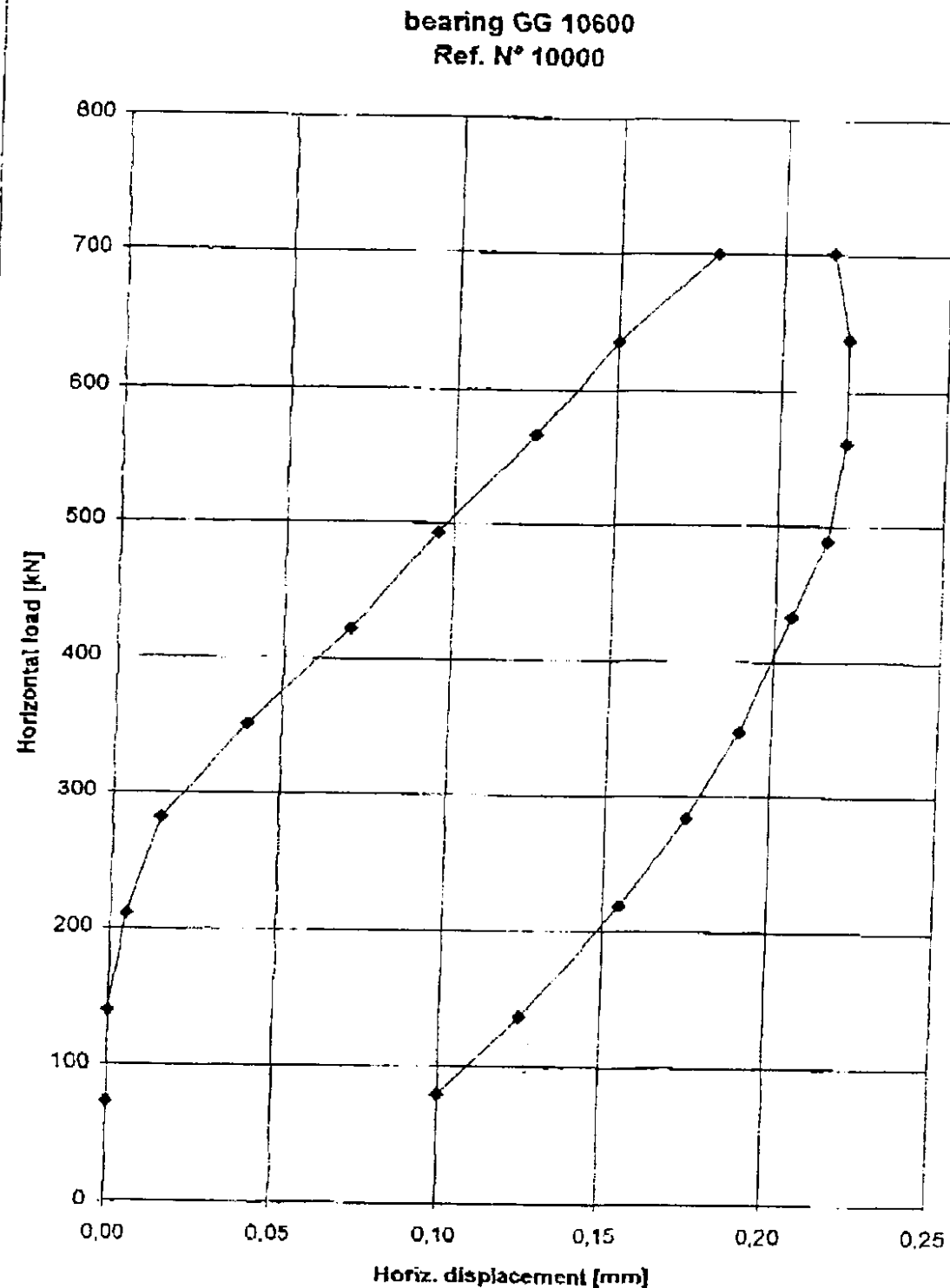
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Proof Tests on pot bearings
Project: Bridges Sungai Dingding, Malaysia

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Report N° A - 51 / 98

Proof Tests on pot bearings
Project: Interchange AT IP-69, Abu Dhabi

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PTFE Cold Flow Test

APPUIS TETRON CD		RAPPORT D'ESSAI	
TETRON CD BEARING		TEST REPORT	
COLD FLOW TEST			
PROJEC	Interchange AT IP69	N° DE COMMANDE C	Contract N° 166
CLIENT		N° DE CLIENT ORDER :	
TYPRE D'APPUI	GG 4420	N° :	10701
BEARING TYPE :		N° :	
MATERIAL UTILISE		EQUIPMENT USED	
VERIN 2500 kN actuator for		CERTIFICAT D'ETALONNAGE	43 7064
JACK N horizontal load		CALIBRATION CERTIFICATE	2 97-9
PRESSE 20 MN servohydraulic testing		CERTIFICAT D'ETALONNAGE	43 7064
PRESS machine for vertical load		CALIBRATION CERTIFICATE	2 97-1
PROCEDURE D'ESSAI N° / TEST PROCEDURE Special procedure for Interchange AT IP69			
GG 4420 / Ref. N° 10701			
coefficient of friction -continuous sliding - (mean value from compr. and tension)			
1. cycle	0.42 %		
50. cycle	0.68 %		
89. cycle	0.72 %		
112. cycle	0.72 %		
125. cycle	0.74 %		
154. cycle	0.74 %		
167. cycle	0.75 %		
191. cycle	0.77 %		
REMARQUES :			
ETAT APRES ESSAI :		SATISFAISANT ☒ NON SATISFAISANT ☐	
CONDITION AFTER TESTING		SATISFACTORY ☒ UNSATISFACTORY ☐	
PTFE-diameter before test: 499.31 mm		after test: 501.56 mm	
increase: 2.25 mm			
ENC : RCR	CONTRÔLE QUALITE	QUALITY CO	ORGANISME DE CONTRÔLE
N° :	OPERATE PERATO	NSABLE CERTIFI	INDEPENDANT WITNESS
NOM RME	R. BADER	DR. HANENKAMP	RUD/KID/KON
DATE DATE	13./18.11.98	18.11.98	
VISA VISA			

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GG-420_2p1.xd

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Project: Interchange AT IP-69, Abu Dhabi

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Metal D.U. Hot Flow Test

APPUIS TETRON CD		RAPPORT D'ESSAI	
TETRON CD BEARING		TEST REPORT	
METAL D.U. HOT FLOW TEST			
PROJEC	Interchange AT IP69	N° DE COMMANDE CL	Contract N° 966
CLIENT		N° OF CLIENT ORDER :	
TYPE D'APPUI	GG 4420	N° :	10702
BEARING TYPE :		N° :	
MATERIEL UTILISE		EQUIPMENT USED	
VERTIN	2500 kN actuator for	CERTIFICAT D'ETALONNAGE	43 7064
JACK	N horizontal load	CALIBRATION CERTIFICATE	2 97-9
PRESS	20 MN servohydraulic testing	CERTIFICAT D'ETALONNAGE	43 7064
PRESS	machine for vertical load	CALIBRATION CERTIFICATE	2 97-1
PROCEDURE D'ESSAI N° / TEST PROCEDURE Special procedure for Interchange AT IP69			
GG 4420 / Ref. N° 10702			
Horizontal load (kN) Horiz. displacement (mm) Vertical load = 3420 kN speed = 1.60 mm/min			
static coefficient of friction -compression -		first cycle	1.30 %
		last 1. cycle	1.15 %
coefficient of friction -continuous sliding -		first 3 cycles	0.54 % (mean value)
(mean value from compr. and tension)		last 3 cycles	0.36 % (mean value)
REMARQUES :			
ETAT APRES ESSAI :		SATISFAISANT ☒	NON SATISFAISANT ☐
CONDITION AFTER TESTING		SATISFACTORY	UNSATISFACTORY
bearing inspection after 100 h with horizontal load = 477 kN and temperature + 49°C: no flow of the metal D.U. was detected			
FNC : NCR	CONTRÔLE QUALITE	QUALITY CO	ORGANISME DE CONTRÔLE
N° :	OPERATE OPERATO	ONSABLE CERTIFIE	INDEPENDANT WITNESS
NOM NAME	A. BADER	DR. HANSENKAMP	RUD/KID/KOM
DATE DATE	20./25.11.98	25.11.98	
VTSA VTSA			

Result Sheet N° 5, Page 1 / 2

GG4420_3.rtf

3. Definición geométrica

3. DEFINICIÓN GEOMÉTRICA

ÍNDICE

- 3.1 VIADUCTO
- 3.2 PASOS SUPERIORES
- 3.3 PASOS INFERIORES

3. DEFINICIÓN GEOMÉTRICA

3.1.- Viaducto

El único viaducto existente en el tramo, la O.F.- 556+1, permite el paso del ferrocarril sobre el pequeño valle por el que discurre la carretera local de Torija a Valdegrudas. El cruce se resuelve mediante una estructura continua de hormigón pretensado con una longitud total de 52 m. y una distribución de luces de 13,50 - 25 - 13,50 m. respectivamente.

El tablero esta constituido por una losa aligerada de 1,65 m. de canto y se apoya en las pilas y en los estribos, a través de aparatos de apoyo deslizantes uni o multidireccionales. En uno de los estribos se establece el punto fijo, mientras que en el otro estribo, extremo móvil del tablero, se dispondrá el correspondiente aparato de dilatación de vía

Las pilas están constituidas por fustes macizos de hormigón armado, de sección rectangular .

Los estribos están constituidos por muros de hormigón armado, con aletas o muros de acompañamiento.

Esta nueva tipología, permite la cimentación directa sobre el substrato rocoso tipo MT 1, por lo que no es necesaria la ejecución de pilotes que propone el Proyecto Constructivo adjudicado.

3.2.- Pasos Superiores

Los pasos superiores se clasifican en pasos superiores de carretera, de los que solo existe en el proyecto el P.S.- 567+5 (carretera local CM-2008 de Utande a Brihuega), y pasos superiores de camino, que son los siguientes:

- P.S.- 551+3 Camino agrícola.
- P.S.- 553+2 Camino agrícola.
- P.S.- 556+9 Camino de Valdegrudas.
- P.S.- 559+6 Cañada Real Galiana.
- P.S.- 560+9 Camino agrícola de Torija a Fuentes de la Alcarria.
- P.S.- 566+3 Camino forestal de Trijueque a Villaviciosa.
- P.S.- 570+1 Camino forestal.
- P.S.- 571+6 Camino agrícola.
- P.S.- 572+9 Camino forestal

El paso superior de carretera y el paso superior tipo de camino están constituidos, cada uno, por una estructura continua de hormigón armado de tres vanos y luces 11-17,10-11 m.

La sección transversal, para el de carreteras, consta de una calzada de 7 m., dos arcenes de 1 m., dos barreras rígidas de 0,50 m. y dos aceras de 1,20 m que totalizan 12,80 m

y para el de caminos, consta de una calzada de 6 m. y dos aceras de 1,40 m, totalizando 8,40 m.

El tablero es una losa maciza de hormigón armado de 1,30 m. de canto constante.

Las pilas se componen de un fuste circular de 1,10 m. de diámetro que se empotran elásticamente en el tablero para los pasos superiores de caminos y pilas de fuste circular de 1.20 m de diámetro para el paso superior de carretera..

Los estribos son muros cerrados de hormigón armado con aletas vueltas paralelas a la calzada.

3.3.- Pasos inferiores y de fauna

- Los pasos inferiores se clasifican en pasos inferiores de carreteras, de los que solo existe en el proyecto el P.I.- 562+7 (carretera local CM-2011 de Torija a Brihuega), pasos inferiores de caminos, de los que solo existen en el Proyecto Constructivo el P.I.- 558+7 (Camino de Valdesaz) y el P.I.- 562+5 (Cañada Real de Merinas) y los siguientes, recogidos en esta Modificación n ° 1, el P.I. 564+020 y el P.I.- 568+9 Cañada Real de Merinas.

. Los pasos de fauna para ungulados, figuran en el anejo de integración ambiental y son los siguientes:

- P.F.- 550+445
- P.F.- 553+850
- P.F.- 556+039
- P.F.- 558+760
- P.F.- 563+860
- P.F.- 565+380
- P.F.- 570+840

El paso inferior de carretera está constituido por una estructura isostática, de un vano de 29 m. de luz.

La sección transversal está constituida por dos vigas prefabricadas pretensadas tipo artesa de 1.75 m. de canto, sobre las que se hormigona "in situ" la losa superior, que tiene 14 m. de anchura y espesor variable, 0.36 m en la sección central y 0.22 m en las alas..

Los estribos son muros de hormigón armado con aletas o muros de acompañamiento.

El paso inferior de camino es un pórtico de hormigón armado de 8 m. de luz entre paramentos y con un espesor de hastiales y dintel de 0,80 m. Las aletas son muros de hormigón armado, y se disponen, en general, a 30°.

El paso para ungulados está constituido por un marco de hormigón armado de 5 m. de luz entre paramentos, con un espesor de solera, hastiales y dintel de 0,50 m. Las aletas son muros de hormigón armado, y se disponen, en general, a 30°.

4. CÁLCULOS

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4. CÁLCULOS

4.1 VIADUCTO

4.2 PASOS SUPERIORES

4.3 PASOS INFERIORES

4.3.1 PASO INFERIOR DE CAMINO PK 558+640

4.3.2 PASO INFERIOR DE CARRETERA PK 562+6

4.3.3 PASO INFERIOR DE CARRETERA PK 562+7

4.3.4 PASO INFERIOR 564+020

4.3.5 PASO INFERIOR 568+9

4.3.6 PASO INFERIOR 572+5

4.4 PASOS DE UNGULADOS

4.4.1 PASOS 550+445, 565+380, 570+840, 553+850

4.4.2 PASO 572+580 (MARCO 3X2,5)

4.4.3 PASO INFERIOR DE FAUNA 550+8

4.4.4 PASO INFERIOR DE FAUNA 553+85

4.4.5 PASO INFERIOR DE FAUNA 559+17

4.4.6 PASO INFERIOR DE FAUNA 563+9

4.4.7 PASO INFERIOR DE FAUNA 565+38

4.4.8 PASO INFERIOR DE FAUNA 568+94

4.4.9 PASO INFERIOR DE FAUNA 570+84

4.4.10 CÁLCULOS ESTRUCTURALES DE LOS PASOS INFERIORES DE FAUNA

4.1 VIADUCTO

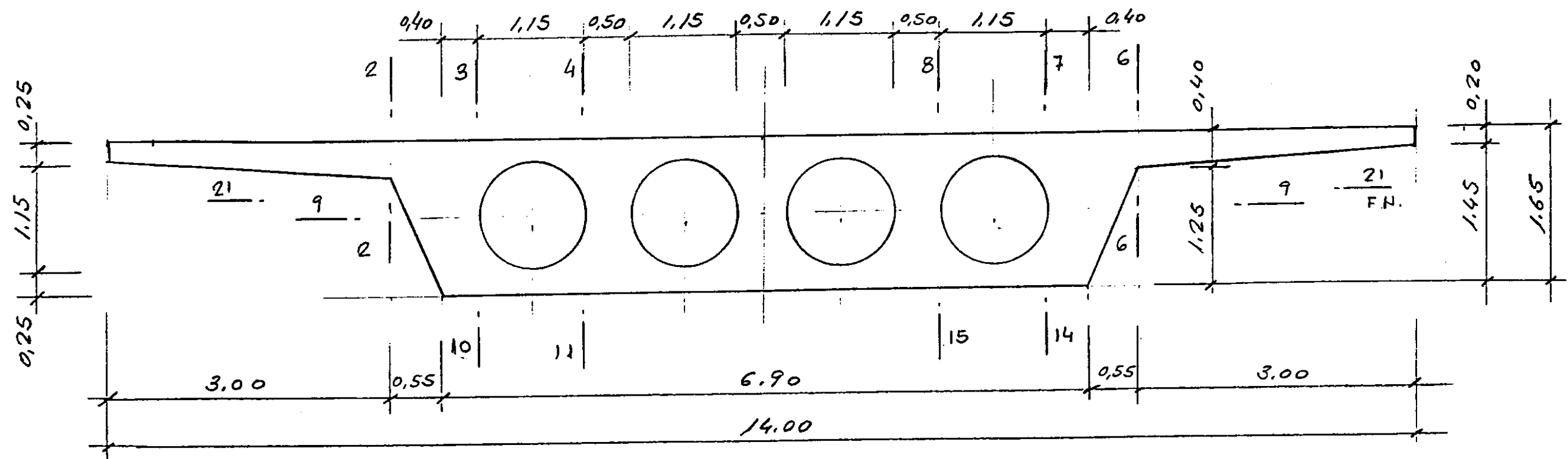
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- CARACTERÍSTICAS MECÁNICAS
- ESQUEMA DE CÁLCULO
- CÁLCULO 1
- ESFUERZOS DE PESO PROPIO, SUPERESTRUCTURAS Y CALENTAMIENTO DIFERENCIAL
- COEFICIENTES DE IMPACTO Y SOBRECARGA
- CÁLCULO DE LOS PERIODOS PROPIOS DE VIBRACIÓN DE LA ESTRUCTURA
- TREN DE CARGAS
- ESFUERZOS DE SOBRECARGA
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- ESTADO TENSIONAL
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- CÁLCULO 2A
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- ESTADO TENSIONAL

Características mecánicas

OBJETO HOJA N° DE
 PROYECTO N°
 CALCULADO POR COMPROBADO POR FECHA

Características mecánicas

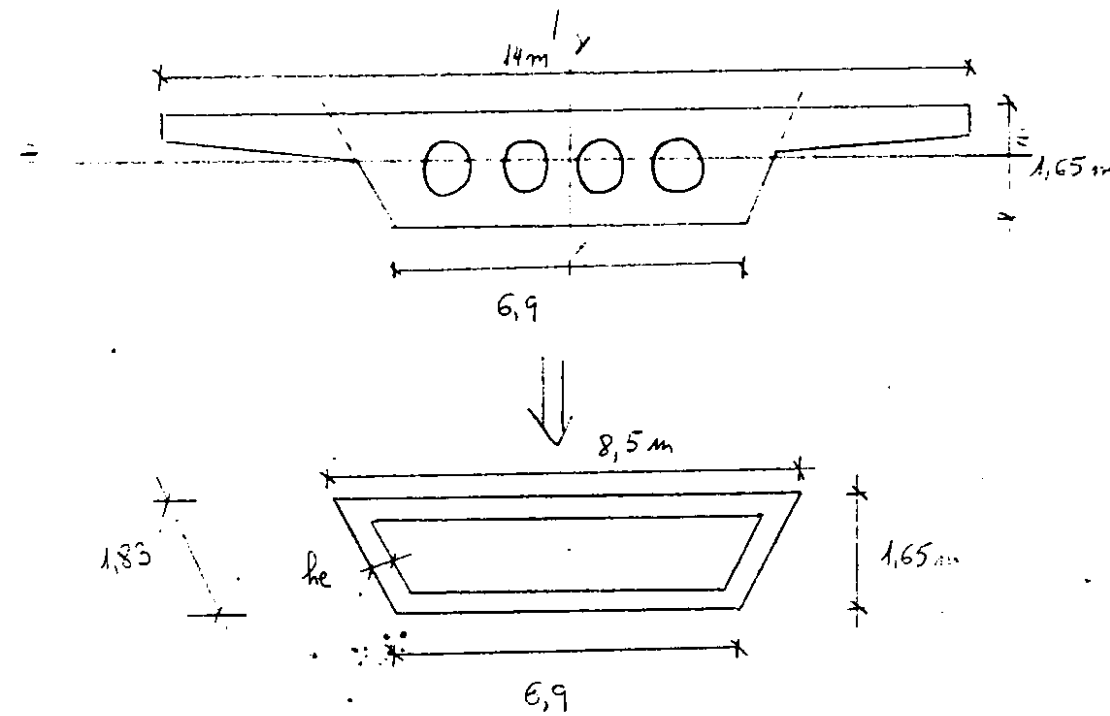


Características Mecánicas de Flexión y Torsión										
nº	X (m)	Area (m²)	Ix (m⁴)	Iy (m⁴)	Iz (m⁴)	Canto (m)	Vs (m)	Vi (m)	Ancho (m)	Izy
1	-0.65	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
2	-0.5	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
3	0	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
4	-0.68	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
5	1.35	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
6	2.03	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
7	2.7	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
8	3.38	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
9	4.05	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
10	4.72	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
11	5.4	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
12	6.07	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
13	6.75	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
14	7.43	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
15	8.1	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
16	8.77	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
17	9.45	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
18	10.13	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
19	10.8	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
20	11.48	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
21	12.15	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
22	12.82	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
23	13.5	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
24	14.75	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
25	16	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
26	17.25	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
27	18.5	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
28	19.75	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
29	21	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
30	22.25	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
31	23.5	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
32	24.75	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
33	26	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
34	27.25	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
35	28.5	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
36	29.75	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
37	31	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
38	32.25	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
39	33.5	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
40	34.75	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
41	36	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
42	37.25	10.174	6.344	98.450	3.086	1.650	0.679	0.971	14.000	no-op
43	38.5	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
44	39.17	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
45	39.85	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
46	40.53	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
47	41.2	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
48	41.88	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
49	42.55	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
50	43.22	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
51	43.9	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
52	44.58	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
53	45.25	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
54	45.92	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
55	46.6	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
56	47.28	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
57	47.95	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
58	48.63	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
59	49.3	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
60	49.97	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op

n°	X (m)	Area (m^2)	Ix (m^4)	Características mecánicas	Características de flexión	Características de torsión	Vs (m)	Vi (m)	Ancho (m)	Izy
61	50.65	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
62	51.33	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
63	52	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
64	52.5	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op
65	52.65	14.313	6.344	112.874	3.489	1.650	0.721	0.929	14.000	no-op

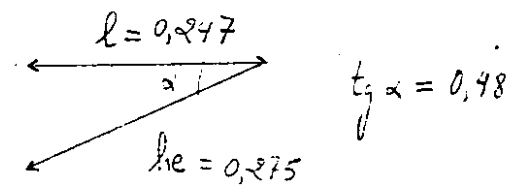
OBJETO HOJA Nº DE
 PROYECTO Nº
 CALCULADO POR COMPROBADO POR FECHA

INERCIA A TORSION



$$h_e = \frac{1.65}{6} = 0.275m$$

$$I_x = \frac{4 \cdot A_m^2}{\oint ds/t} = \frac{4 \cdot 10.209^2}{2 \cdot \frac{1.83}{0.275} + \frac{8.5 - 0.494}{0.275} + \frac{6.9 - 0.494}{0.275}} = 6.344 m^4$$



ESQUEMA DE CALCULO

CALCULO 1.- Cálculo de esfuerzos, pretensado y estado tensional con los trenes de la Instrucción española I.P.F.-75.

CALCULO 2A.- Cálculo de esfuerzos y comprobación de estado tensional para dos trenes (uno por vía) tipo U.I.C.-71.

CALCULO 2B.- Se determinan los máximos esfuerzos en las secciones más desfavorables para los trenes SW-0, SW-2 y trenes tipo 3 y 4 del Eurocódigo.
Se comparan las siguientes combinaciones y se comparan con la 2A para comprobar que no son determinantes:

Tren U.I.C.-71 en una vía y SW-0 en la otra.

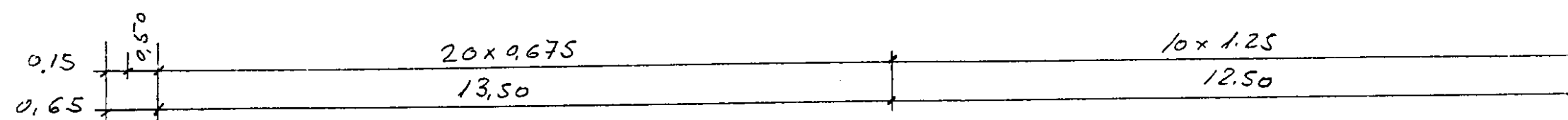
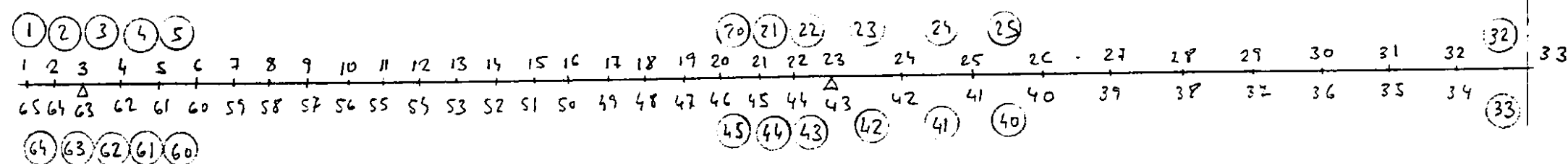
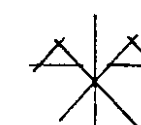
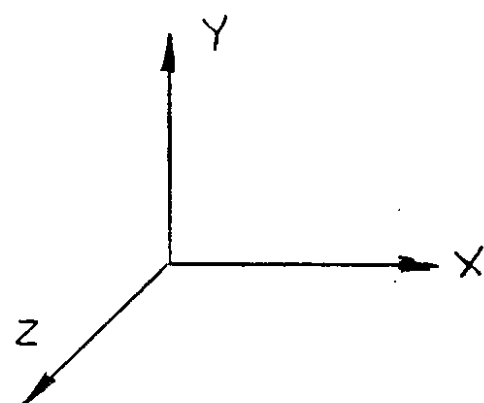
Tren U.I.C.-71 en una vía y SW-2 en la otra.

Trenes tipo 3 del Eurocódigo en ambas vías.

Trenes tipo 4 del Eurocódigo en ambas vías.

ESFUERZOS DE PESO PROPIO, SUPERESTRUCTURA Y CALENTAMIENTO DIFERENCIAL

OBJETO HOJA N° DE
 PROYECTO N°
 CALCULADO POR COMPROBADO POR FECHA



ESQUEMA ESTRUCTURAL

Título: 0 Fecha : 04/11/99
 Descripción de la combinación :
 H001 1

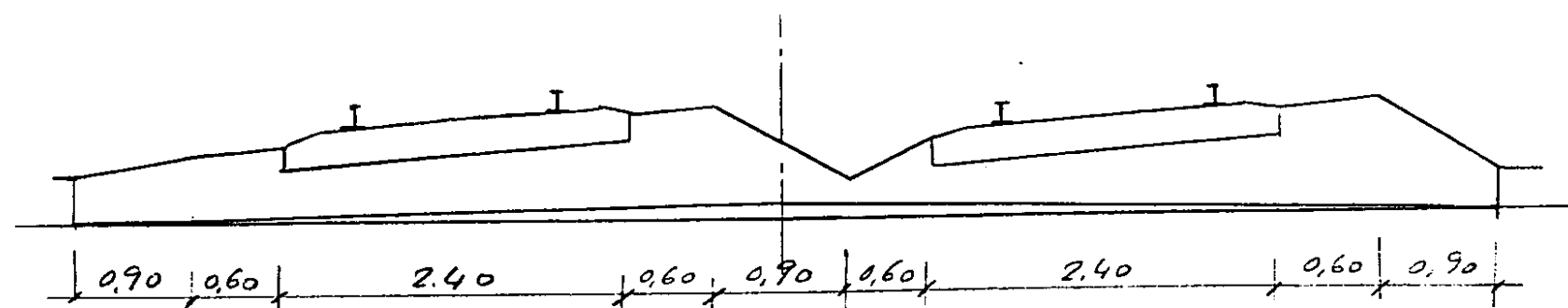
1 * [+ (FPPROP.ANL * 1)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-152.64	0.00	0.00	0.00	-7.56	-1.56	2.01
3	4	0.68	0.00	-128.31	0.00	0.00	0.00	87.96	18.18	-23.41
4	4	0.68	0.00	-128.31	0.00	0.00	0.00	87.96	18.18	-23.41
4	5	1.35	0.00	-104.34	0.00	0.00	0.00	165.90	34.29	-44.16
5	5	1.35	0.00	-104.33	0.00	0.00	0.00	165.89	34.29	-44.16
5	6	2.03	0.00	-80.00	0.00	0.00	0.00	228.57	47.24	-60.84
6	6	2.03	0.00	-80.00	0.00	0.00	0.00	228.57	47.24	-60.84
6	7	2.70	0.00	-56.02	0.00	0.00	0.00	274.14	56.66	-72.97
7	7	2.70	0.00	-56.03	0.00	0.00	0.00	274.14	56.66	-72.97
7	8	3.38	0.00	-31.70	0.00	0.00	0.00	303.97	62.83	-80.91
8	8	3.38	0.00	-31.69	0.00	0.00	0.00	303.97	62.83	-80.91
8	9	4.05	0.00	-7.72	0.00	0.00	0.00	317.17	65.55	-84.43
9	9	4.05	0.00	-7.72	0.00	0.00	0.00	317.17	65.55	-84.43
9	10	4.72	0.00	16.25	0.00	0.00	0.00	314.31	64.96	-83.66
10	10	4.72	0.00	16.25	0.00	0.00	0.00	314.32	64.97	-83.67
10	11	5.40	0.00	40.58	0.00	0.00	0.00	294.99	60.97	-78.52
11	11	5.40	0.00	40.59	0.00	0.00	0.00	294.99	60.97	-78.52
11	12	6.07	0.00	64.56	0.00	0.00	0.00	259.77	53.69	-69.15
12	12	6.07	0.00	64.56	0.00	0.00	0.00	259.77	53.69	-69.15
12	13	6.75	0.00	88.89	0.00	0.00	0.00	207.60	42.91	-55.26
13	13	6.75	0.00	88.89	0.00	0.00	0.00	207.61	42.91	-55.26
13	14	7.43	0.00	113.22	0.00	0.00	0.00	138.89	28.71	-36.97
14	14	7.43	0.00	113.22	0.00	0.00	0.00	138.89	28.71	-36.97
14	15	8.10	0.00	137.19	0.00	0.00	0.00	55.01	11.37	-14.64
15	15	8.10	0.00	137.19	0.00	0.00	0.00	55.00	11.37	-14.64
15	16	8.77	0.00	161.16	0.00	0.00	0.00	-44.94	-9.29	11.96
16	16	8.77	0.00	161.16	0.00	0.00	0.00	-44.94	-9.29	11.96
16	17	9.45	0.00	185.49	0.00	0.00	0.00	-162.81	-33.65	43.34
17	17	9.45	0.00	185.49	0.00	0.00	0.00	-162.81	-33.65	43.34
17	18	10.13	0.00	209.83	0.00	0.00	0.00	-297.21	-61.43	79.11
18	18	10.13	0.00	209.82	0.00	0.00	0.00	-297.22	-61.43	79.12
18	19	10.80	0.00	233.80	0.00	0.00	0.00	-445.83	-92.15	118.67
19	19	10.80	0.00	233.80	0.00	0.00	0.00	-445.83	-92.15	118.67
19	20	11.48	0.00	258.13	0.00	0.00	0.00	-613.08	-126.71	163.19
20	20	11.48	0.00	258.13	0.00	0.00	0.00	-613.09	-126.72	163.19
20	21	12.15	0.00	282.10	0.00	0.00	0.00	-794.06	-164.12	211.37

21	21	12.15	0.00	282.10	0.00	0.00	0.00	-794.06	-164.12	211.37
21	22	12.82	0.00	306.07	0.00	0.00	0.00	-991.10	-204.85	263.82
22	22	12.82	0.00	306.08	0.00	0.00	0.00	-991.10	-204.85	263.82
22	23	13.50	0.00	330.41	0.00	0.00	0.00	-1207.50	-249.57	321.42
23	23	13.50	0.00	-324.41	0.00	0.00	0.00	-1207.50	-249.57	321.42
23	24	14.75	0.00	-286.15	0.00	0.00	0.00	-827.25	-182.01	260.30
24	24	14.75	0.00	-286.15	0.00	0.00	0.00	-827.25	-182.01	260.30
24	25	16.00	0.00	-254.36	0.00	0.00	0.00	-489.43	-107.69	154.01
25	25	16.00	0.00	-254.36	0.00	0.00	0.00	-489.43	-107.69	154.01
25	26	17.25	0.00	-222.57	0.00	0.00	0.00	-191.35	-42.10	60.21
26	26	17.25	0.00	-222.57	0.00	0.00	0.00	-191.35	-42.10	60.21
26	27	18.50	0.00	-190.78	0.00	0.00	0.00	66.99	14.74	-21.08
27	27	18.50	0.00	-190.77	0.00	0.00	0.00	66.99	14.74	-21.08
27	28	19.75	0.00	-158.97	0.00	0.00	0.00	285.58	62.83	-89.86
28	28	19.75	0.00	-158.99	0.00	0.00	0.00	285.57	62.83	-89.86
28	29	21.00	0.00	-127.19	0.00	0.00	0.00	464.44	102.19	-146.14
29	29	21.00	0.00	-127.17	0.00	0.00	0.00	464.43	102.18	-146.14
29	30	22.25	0.00	-95.38	0.00	0.00	0.00	603.53	132.79	-189.91
30	30	22.25	0.00	-95.38	0.00	0.00	0.00	603.54	132.79	-189.91
30	31	23.50	0.00	-63.59	0.00	0.00	0.00	702.88	154.65	-221.17
31	31	23.50	0.00	-63.58	0.00	0.00	0.00	702.88	154.65	-221.17
31	32	24.75	0.00	-31.78	0.00	0.00	0.00	762.50	167.77	-239.93
32	32	24.75	0.00	-31.80	0.00	0.00	0.00	762.50	167.77	-239.93
32	33	26.00	0.00	0.00	0.00	0.00	0.00	782.37	172.14	-246.18
33	33	26.00	0.00	0.00	0.00	0.00	0.00	782.36	172.14	-246.18
33	34	27.25	0.00	31.79	0.00	0.00	0.00	762.51	167.77	-239.93
34	34	27.25	0.00	31.78	0.00	0.00	0.00	762.50	167.77	-239.93
34	35	28.50	0.00	63.58	0.00	0.00	0.00	702.90	154.65	-221.18
35	35	28.50	0.00	63.58	0.00	0.00	0.00	702.89	154.65	-221.17
35	36	29.75	0.00	95.38	0.00	0.00	0.00	603.53	132.79	-189.91
36	36	29.75	0.00	95.38	0.00	0.00	0.00	603.53	132.79	-189.91
36	37	31.00	0.00	127.18	0.00	0.00	0.00	464.43	102.18	-146.14
37	37	31.00	0.00	127.19	0.00	0.00	0.00	464.44	102.19	-146.14
37	38	32.25	0.00	158.99	0.00	0.00	0.00	285.57	62.83	-89.86
38	38	32.25	0.00	158.99	0.00	0.00	0.00	285.58	62.83	-89.86
38	39	33.50	0.00	190.78	0.00	0.00	0.00	66.99	14.74	-21.08
39	39	33.50	0.00	190.76	0.00	0.00	0.00	66.98	14.74	-21.08
39	40	34.75	0.00	222.55	0.00	0.00	0.00	-191.34	-42.10	60.21
40	40	34.75	0.00	222.57	0.00	0.00	0.00	-191.35	-42.10	60.21
40	41	36.00	0.00	254.36	0.00	0.00	0.00	-489.43	-107.69	154.01
41	41	36.00	0.00	254.36	0.00	0.00	0.00	-489.43	-107.69	154.01
41	42	37.25	0.00	286.15	0.00	0.00	0.00	-827.24	-182.01	260.30

42	42	37.25	0.00	286.15	0.00	0.00	0.00	-827.24	-182.01	260.30
42	43	38.50	0.00	324.41	0.00	0.00	0.00	-1207.50	-249.57	321.42
43	43	38.50	0.00	-330.41	0.00	0.00	0.00	-1207.50	-249.57	321.42
43	44	39.17	0.00	-306.43	0.00	0.00	0.00	-994.16	-205.48	264.63
44	44	39.17	0.00	-306.43	0.00	0.00	0.00	-994.16	-205.48	264.63
44	45	39.85	0.00	-282.10	0.00	0.00	0.00	-794.06	-164.12	211.37
45	45	39.85	0.00	-282.10	0.00	0.00	0.00	-794.06	-164.12	211.37
45	46	40.53	0.00	-257.77	0.00	0.00	0.00	-610.51	-126.18	162.51
46	46	40.53	0.00	-257.77	0.00	0.00	0.00	-610.51	-126.18	162.51
46	47	41.20	0.00	-233.80	0.00	0.00	0.00	-445.83	-92.15	118.67
47	47	41.20	0.00	-233.80	0.00	0.00	0.00	-445.83	-92.15	118.67
47	48	41.88	0.00	-209.47	0.00	0.00	0.00	-295.12	-61.00	78.56
48	48	41.88	0.00	-209.47	0.00	0.00	0.00	-295.12	-61.00	78.56
48	49	42.55	0.00	-185.49	0.00	0.00	0.00	-162.81	-33.65	43.34
49	49	42.55	0.00	-185.49	0.00	0.00	0.00	-162.81	-33.65	43.34
49	50	43.22	0.00	-161.52	0.00	0.00	0.00	-46.56	-9.62	12.39
50	50	43.22	0.00	-161.52	0.00	0.00	0.00	-46.56	-9.62	12.39
50	51	43.90	0.00	-137.19	0.00	0.00	0.00	55.01	11.37	-14.64
51	51	43.90	0.00	-137.19	0.00	0.00	0.00	55.01	11.37	-14.64
51	52	44.58	0.00	-112.86	0.00	0.00	0.00	140.02	28.94	-37.27
52	52	44.58	0.00	-112.86	0.00	0.00	0.00	140.02	28.94	-37.27
52	53	45.25	0.00	-88.88	0.00	0.00	0.00	207.60	42.91	-55.26
53	53	45.25	0.00	-88.88	0.00	0.00	0.00	207.61	42.91	-55.26
53	54	45.92	0.00	-64.91	0.00	0.00	0.00	259.13	53.56	-68.98
54	54	45.92	0.00	-64.91	0.00	0.00	0.00	259.13	53.56	-68.98
54	55	46.60	0.00	-40.58	0.00	0.00	0.00	294.99	60.97	-78.52
55	55	46.60	0.00	-40.58	0.00	0.00	0.00	294.99	60.97	-78.52
55	56	47.28	0.00	-16.25	0.00	0.00	0.00	314.32	64.97	-83.67
56	56	47.28	0.00	-16.25	0.00	0.00	0.00	314.32	64.97	-83.67
56	57	47.95	0.00	7.72	0.00	0.00	0.00	317.17	65.55	-84.43
57	57	47.95	0.00	7.72	0.00	0.00	0.00	317.17	65.55	-84.43
57	58	48.63	0.00	32.05	0.00	0.00	0.00	303.65	62.76	-80.83
58	58	48.63	0.00	32.05	0.00	0.00	0.00	303.64	62.76	-80.82
58	59	49.30	0.00	56.02	0.00	0.00	0.00	274.14	56.66	-72.97
59	59	49.30	0.00	56.03	0.00	0.00	0.00	274.14	56.66	-72.97
59	60	49.97	0.00	80.00	0.00	0.00	0.00	228.57	47.24	-60.84
60	60	49.97	0.00	80.00	0.00	0.00	0.00	228.57	47.24	-60.84
60	61	50.65	0.00	104.33	0.00	0.00	0.00	165.89	34.29	-44.16
61	61	50.65	0.00	104.33	0.00	0.00	0.00	165.89	34.29	-44.16
61	62	51.33	0.00	128.66	0.00	0.00	0.00	86.68	17.92	-23.07
62	62	51.33	0.00	128.67	0.00	0.00	0.00	86.68	17.92	-23.07
62	63	52.00	0.00	152.64	0.00	0.00	0.00	-7.56	-1.56	2.01

Superestructura



Balasto

$$\begin{aligned}
 S_0 &= 0.90 \times 0.375 = 0.3375 \text{ m}^2 \\
 0.60 \times 0.475 &= 0.285 \text{ " } \\
 2.40 \times 0.375 &= 0.90 \text{ " } \\
 0.60 \times 0.675 &= 0.405 \text{ " } \\
 0.90 \times 0.425 &= 0.3825 \text{ " } \\
 0.60 \times 0.30 &= 0.18 \text{ " } \\
 2.40 \times 0.36 &= 0.864 \text{ " } \\
 0.60 \times 0.72 &= 0.432 \text{ " } \\
 0.90 \times 0.535 &= 0.4815 \text{ " } \\
 &\underline{4.2675 \text{ "}}
 \end{aligned}$$

$$q_s = 4.2675 \times 1.2 \times 1.6 = 8.19 \text{ t/m}$$

Traviesas y carriles

$$q = 2(0.52 + 0.12) = 1.28 \text{ t/m}$$

Muros de guarda

$$q = 2 \times 0.20 \times 0.50 \times 2.5 = 0.50 \text{ t/m}$$

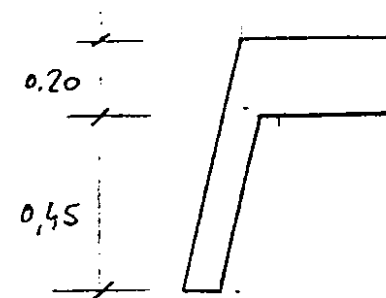
Conductos cables y pasos

$$q = 2(0.30 + 0.50 \times 1.55 \times 0.50) = 1.38 \text{ t/m}$$

Hormigón de forma

$$q = 2(0.50 \times 4.95^2 \times 0.02 \times 2.4) = 1.18 \text{ t/m}$$

Impos tas



$$\begin{aligned}
 S_0 &= 0.20 \times 0.425 = 0.085 \text{ m}^2 \\
 0.45 \times 0.10 &= 0.045 \text{ " } \\
 &\underline{0.130 \text{ "}}
 \end{aligned}$$

$$q = 2 \times 0.13 \times 2.5 = 0.65 \text{ t/m}$$

Barandillas

$$q = 2 \times 0.05 = 0.10 \text{ t/m}$$

$$q_{se} = 8.19 + 1.28 + 0.50 + 1.38 + 1.18 + 0.65 + 0.10 = 13.28 \text{ t/m}$$

Incremento de balasto

$$q = 2.90 \times 0.05 \times 1.2 \times 1.6 = 0.95 \text{ t/m}$$

$$q_{se \text{ total}} = 13.28 + 0.95 = 14.23 \text{ t/m}$$

Título: Fecha : 04/11/99
 Descripción de la combinación :
 H002 1

1 * [+ (FCMUER.ANL * 1)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-48.68	0.00	0.00	0.00	-3.01	-0.62	0.80
3	4	0.68	0.00	-39.00	0.00	0.00	0.00	26.80	5.54	-7.13
4	4	0.68	0.00	-39.00	0.00	0.00	0.00	26.80	5.54	-7.13
4	5	1.35	0.00	-29.47	0.00	0.00	0.00	49.74	10.28	-13.24
5	5	1.35	0.00	-29.47	0.00	0.00	0.00	49.74	10.28	-13.24
5	6	2.03	0.00	-19.79	0.00	0.00	0.00	66.49	13.74	-17.70
6	6	2.03	0.00	-19.79	0.00	0.00	0.00	66.49	13.74	-17.70
6	7	2.70	0.00	-10.26	0.00	0.00	0.00	76.55	15.82	-20.38
7	7	2.70	0.00	-10.26	0.00	0.00	0.00	76.55	15.82	-20.38
7	8	3.38	0.00	-0.58	0.00	0.00	0.00	80.24	16.58	-21.36
8	8	3.38	0.00	-0.58	0.00	0.00	0.00	80.24	16.58	-21.36
8	9	4.05	0.00	8.95	0.00	0.00	0.00	77.43	16.00	-20.61
9	9	4.05	0.00	8.95	0.00	0.00	0.00	77.43	16.00	-20.61
9	10	4.72	0.00	18.49	0.00	0.00	0.00	68.24	14.10	-18.16
10	10	4.72	0.00	18.49	0.00	0.00	0.00	68.24	14.10	-18.16
10	11	5.40	0.00	28.16	0.00	0.00	0.00	52.38	10.83	-13.94
11	11	5.40	0.00	28.16	0.00	0.00	0.00	52.38	10.83	-13.94
11	12	6.07	0.00	37.70	0.00	0.00	0.00	30.31	6.26	-8.07
12	12	6.07	0.00	37.70	0.00	0.00	0.00	30.31	6.26	-8.07
12	13	6.75	0.00	47.37	0.00	0.00	0.00	1.39	0.29	-0.37
13	13	6.75	0.00	47.37	0.00	0.00	0.00	1.39	0.29	-0.37
13	14	7.43	0.00	57.05	0.00	0.00	0.00	-34.12	-7.05	9.08
14	14	7.43	0.00	57.05	0.00	0.00	0.00	-34.12	-7.05	9.08
14	15	8.10	0.00	66.59	0.00	0.00	0.00	-75.54	-15.61	20.11
15	15	8.10	0.00	66.59	0.00	0.00	0.00	-75.54	-15.61	20.11
15	16	8.77	0.00	76.12	0.00	0.00	0.00	-123.34	-25.49	32.83
16	16	8.77	0.00	76.12	0.00	0.00	0.00	-123.34	-25.49	32.83
16	17	9.45	0.00	85.80	0.00	0.00	0.00	-178.39	-36.87	47.48
17	17	9.45	0.00	85.80	0.00	0.00	0.00	-178.39	-36.87	47.48
17	18	10.13	0.00	95.48	0.00	0.00	0.00	-240.03	-49.61	63.89
18	18	10.13	0.00	95.48	0.00	0.00	0.00	-240.03	-49.61	63.89
18	19	10.80	0.00	105.01	0.00	0.00	0.00	-307.19	-63.49	81.77
19	19	10.80	0.00	105.01	0.00	0.00	0.00	-307.19	-63.49	81.77
19	20	11.48	0.00	114.69	0.00	0.00	0.00	-381.88	-78.93	101.65
20	20	11.48	0.00	114.69	0.00	0.00	0.00	-381.88	-78.93	101.65
20	21	12.15	0.00	124.22	0.00	0.00	0.00	-461.91	-95.47	122.95

21	21	12.15	0.00	124.22	0.00	0.00	0.00	-461.91	-95.47	122.95
21	22	12.82	0.00	133.75	0.00	0.00	0.00	-548.33	-113.33	145.96
22	22	12.82	0.00	133.75	0.00	0.00	0.00	-548.33	-113.33	145.96
22	23	13.50	0.00	143.43	0.00	0.00	0.00	-642.57	-132.81	171.04
23	23	13.50	0.00	-177.88	0.00	0.00	0.00	-642.57	-132.81	171.04
23	24	14.75	0.00	-160.09	0.00	0.00	0.00	-431.35	-94.91	135.73
24	24	14.75	0.00	-160.09	0.00	0.00	0.00	-431.35	-94.91	135.73
24	25	16.00	0.00	-142.30	0.00	0.00	0.00	-242.35	-53.32	76.26
25	25	16.00	0.00	-142.30	0.00	0.00	0.00	-242.35	-53.32	76.26
25	26	17.25	0.00	-124.51	0.00	0.00	0.00	-75.59	-16.63	23.79
26	26	17.25	0.00	-124.51	0.00	0.00	0.00	-75.59	-16.63	23.79
26	27	18.50	0.00	-106.73	0.00	0.00	0.00	68.93	15.17	-21.69
27	27	18.50	0.00	-106.73	0.00	0.00	0.00	68.93	15.17	-21.69
27	28	19.75	0.00	-88.95	0.00	0.00	0.00	191.22	42.07	-60.17
28	28	19.75	0.00	-88.94	0.00	0.00	0.00	191.22	42.07	-60.17
28	29	21.00	0.00	-71.15	0.00	0.00	0.00	291.27	64.09	-91.65
29	29	21.00	0.00	-71.15	0.00	0.00	0.00	291.27	64.09	-91.65
29	30	22.25	0.00	-53.37	0.00	0.00	0.00	369.10	81.21	-116.14
30	30	22.25	0.00	-53.37	0.00	0.00	0.00	369.09	81.21	-116.14
30	31	23.50	0.00	-35.58	0.00	0.00	0.00	424.68	93.44	-133.63
31	31	23.50	0.00	-35.57	0.00	0.00	0.00	424.68	93.44	-133.63
31	32	24.75	0.00	-17.79	0.00	0.00	0.00	458.03	100.78	-144.12
32	32	24.75	0.00	-17.79	0.00	0.00	0.00	458.03	100.78	-144.12
32	33	26.00	0.00	0.00	0.00	0.00	0.00	469.15	103.22	-147.62
33	33	26.00	0.00	-0.01	0.00	0.00	0.00	469.15	103.22	-147.62
33	34	27.25	0.00	17.78	0.00	0.00	0.00	458.03	100.78	-144.12
34	34	27.25	0.00	17.77	0.00	0.00	0.00	458.03	100.78	-144.12
34	35	28.50	0.00	35.56	0.00	0.00	0.00	424.68	93.44	-133.63
35	35	28.50	0.00	35.57	0.00	0.00	0.00	424.68	93.44	-133.63
35	36	29.75	0.00	53.36	0.00	0.00	0.00	369.09	81.21	-116.14
36	36	29.75	0.00	53.36	0.00	0.00	0.00	369.09	81.21	-116.14
36	37	31.00	0.00	71.15	0.00	0.00	0.00	291.27	64.09	-91.65
37	37	31.00	0.00	71.15	0.00	0.00	0.00	291.27	64.09	-91.65
37	38	32.25	0.00	88.94	0.00	0.00	0.00	191.22	42.07	-60.17
38	38	32.25	0.00	88.94	0.00	0.00	0.00	191.21	42.07	-60.17
38	39	33.50	0.00	106.73	0.00	0.00	0.00	68.93	15.17	-21.69
39	39	33.50	0.00	106.73	0.00	0.00	0.00	68.93	15.17	-21.69
39	40	34.75	0.00	124.51	0.00	0.00	0.00	-75.60	-16.63	23.79
40	40	34.75	0.00	124.51	0.00	0.00	0.00	-75.59	-16.63	23.79
40	41	36.00	0.00	142.30	0.00	0.00	0.00	-242.36	-53.32	76.26
41	41	36.00	0.00	142.30	0.00	0.00	0.00	-242.35	-53.32	76.26
41	42	37.25	0.00	160.09	0.00	0.00	0.00	-431.34	-94.90	135.73

42	42	37.25	0.00	160.09	0.00	0.00	0.00	-431.34	-94.90	135.73
42	43	38.50	0.00	177.88	0.00	0.00	0.00	-642.57	-132.81	171.04
43	43	38.50	0.00	-143.43	0.00	0.00	0.00	-642.57	-132.81	171.04
43	44	39.17	0.00	-133.90	0.00	0.00	0.00	-549.67	-113.61	146.31
44	44	39.17	0.00	-133.89	0.00	0.00	0.00	-549.67	-113.61	146.31
44	45	39.85	0.00	-124.22	0.00	0.00	0.00	-461.91	-95.47	122.95
45	45	39.85	0.00	-124.21	0.00	0.00	0.00	-461.91	-95.47	122.95
45	46	40.53	0.00	-114.53	0.00	0.00	0.00	-380.74	-78.69	101.35
46	46	40.53	0.00	-114.55	0.00	0.00	0.00	-380.73	-78.69	101.34
46	47	41.20	0.00	-105.01	0.00	0.00	0.00	-307.19	-63.49	81.77
47	47	41.20	0.00	-105.01	0.00	0.00	0.00	-307.19	-63.49	81.77
47	48	41.88	0.00	-95.33	0.00	0.00	0.00	-239.07	-49.41	63.64
48	48	41.88	0.00	-95.33	0.00	0.00	0.00	-239.07	-49.41	63.64
48	49	42.55	0.00	-85.79	0.00	0.00	0.00	-178.39	-36.87	47.48
49	49	42.55	0.00	-85.80	0.00	0.00	0.00	-178.40	-36.87	47.49
49	50	43.22	0.00	-76.26	0.00	0.00	0.00	-124.10	-25.65	33.03
50	50	43.22	0.00	-76.26	0.00	0.00	0.00	-124.11	-25.65	33.04
50	51	43.90	0.00	-66.59	0.00	0.00	0.00	-75.53	-15.61	20.10
51	51	43.90	0.00	-66.59	0.00	0.00	0.00	-75.54	-15.61	20.11
51	52	44.58	0.00	-56.91	0.00	0.00	0.00	-33.55	-6.93	8.93
52	52	44.58	0.00	-56.91	0.00	0.00	0.00	-33.55	-6.93	8.93
52	53	45.25	0.00	-47.38	0.00	0.00	0.00	1.39	0.29	-0.37
53	53	45.25	0.00	-47.37	0.00	0.00	0.00	1.39	0.29	-0.37
53	54	45.92	0.00	-37.84	0.00	0.00	0.00	29.93	6.19	-7.97
54	54	45.92	0.00	-37.84	0.00	0.00	0.00	29.94	6.19	-7.97
54	55	46.60	0.00	-28.17	0.00	0.00	0.00	52.38	10.83	-13.94
55	55	46.60	0.00	-28.17	0.00	0.00	0.00	52.38	10.83	-13.94
55	56	47.28	0.00	-18.49	0.00	0.00	0.00	68.24	14.10	-18.16
56	56	47.28	0.00	-18.49	0.00	0.00	0.00	68.24	14.10	-18.16
56	57	47.95	0.00	-8.96	0.00	0.00	0.00	77.43	16.00	-20.61
57	57	47.95	0.00	-8.95	0.00	0.00	0.00	77.43	16.00	-20.61
57	58	48.63	0.00	0.72	0.00	0.00	0.00	80.23	16.58	-21.36
58	58	48.63	0.00	0.72	0.00	0.00	0.00	80.23	16.58	-21.36
58	59	49.30	0.00	10.26	0.00	0.00	0.00	76.55	15.82	-20.38
59	59	49.30	0.00	10.26	0.00	0.00	0.00	76.55	15.82	-20.38
59	60	49.97	0.00	19.79	0.00	0.00	0.00	66.49	13.74	-17.70
60	60	49.97	0.00	19.79	0.00	0.00	0.00	66.49	13.74	-17.70
60	61	50.65	0.00	29.47	0.00	0.00	0.00	49.74	10.28	-13.24
61	61	50.65	0.00	29.47	0.00	0.00	0.00	49.74	10.28	-13.24
61	62	51.33	0.00	39.14	0.00	0.00	0.00	26.41	5.46	-7.03
62	62	51.33	0.00	39.14	0.00	0.00	0.00	26.41	5.46	-7.03
62	63	52.00	0.00	48.68	0.00	0.00	0.00	-3.01	-0.62	0.80

Título: Fecha : 04/11/99
 Descripción de la combinación :
 H003 1

1 * [+ (FCTEMP.ANL * 1)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-30.89	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-30.89	0.00	0.00	0.00	21.01	4.34	-5.59
4	4	0.68	0.00	-30.89	0.00	0.00	0.00	21.01	4.34	-5.59
4	5	1.35	0.00	-30.89	0.00	0.00	0.00	41.70	8.62	-11.10
5	5	1.35	0.00	-30.89	0.00	0.00	0.00	41.70	8.62	-11.10
5	6	2.03	0.00	-30.89	0.00	0.00	0.00	62.71	12.96	-16.69
6	6	2.03	0.00	-30.90	0.00	0.00	0.00	62.71	12.96	-16.69
6	7	2.70	0.00	-30.90	0.00	0.00	0.00	83.41	17.24	-22.20
7	7	2.70	0.00	-30.88	0.00	0.00	0.00	83.41	17.24	-22.20
7	8	3.38	0.00	-30.88	0.00	0.00	0.00	104.41	21.58	-27.79
8	8	3.38	0.00	-30.87	0.00	0.00	0.00	104.41	21.58	-27.79
8	9	4.05	0.00	-30.87	0.00	0.00	0.00	125.11	25.86	-33.30
9	9	4.05	0.00	-30.89	0.00	0.00	0.00	125.10	25.86	-33.30
9	10	4.72	0.00	-30.89	0.00	0.00	0.00	145.81	30.14	-38.81
10	10	4.72	0.00	-30.89	0.00	0.00	0.00	145.80	30.13	-38.81
10	11	5.40	0.00	-30.89	0.00	0.00	0.00	166.81	34.48	-44.40
11	11	5.40	0.00	-30.89	0.00	0.00	0.00	166.81	34.48	-44.40
11	12	6.07	0.00	-30.89	0.00	0.00	0.00	187.50	38.75	-49.91
12	12	6.07	0.00	-30.88	0.00	0.00	0.00	187.51	38.76	-49.91
12	13	6.75	0.00	-30.88	0.00	0.00	0.00	208.51	43.10	-55.50
13	13	6.75	0.00	-30.89	0.00	0.00	0.00	208.51	43.10	-55.50
13	14	7.43	0.00	-30.89	0.00	0.00	0.00	229.51	47.44	-61.09
14	14	7.43	0.00	-30.89	0.00	0.00	0.00	229.52	47.44	-61.09
14	15	8.10	0.00	-30.89	0.00	0.00	0.00	250.21	51.71	-66.60
15	15	8.10	0.00	-30.89	0.00	0.00	0.00	250.22	51.72	-66.60
15	16	8.77	0.00	-30.89	0.00	0.00	0.00	270.91	55.99	-72.11
16	16	8.77	0.00	-30.89	0.00	0.00	0.00	270.91	55.99	-72.11
16	17	9.45	0.00	-30.89	0.00	0.00	0.00	291.92	60.34	-77.70
17	17	9.45	0.00	-30.89	0.00	0.00	0.00	291.92	60.34	-77.70
17	18	10.13	0.00	-30.89	0.00	0.00	0.00	312.92	64.68	-83.29
18	18	10.13	0.00	-30.89	0.00	0.00	0.00	312.92	64.68	-83.29
18	19	10.80	0.00	-30.89	0.00	0.00	0.00	333.62	68.95	-88.80
19	19	10.80	0.00	-30.89	0.00	0.00	0.00	333.62	68.95	-88.80
19	20	11.48	0.00	-30.89	0.00	0.00	0.00	354.63	73.30	-94.40
20	20	11.48	0.00	-30.89	0.00	0.00	0.00	354.63	73.30	-94.40
20	21	12.15	0.00	-30.89	0.00	0.00	0.00	375.32	77.57	-99.90
21	21	12.15	0.00	-30.89	0.00	0.00	0.00	375.32	77.57	-99.90

21	22	12.82	0.00	-30.89	0.00	0.00	0.00	396.02	81.85	-105.41
22	22	12.82	0.00	-30.89	0.00	0.00	0.00	396.02	81.85	-105.41
22	23	13.50	0.00	-30.89	0.00	0.00	0.00	417.02	86.19	-111.00
23	23	13.50	0.00	0.00	0.00	0.00	0.00	417.02	86.19	-111.00
23	24	14.75	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
24	24	14.75	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
24	25	16.00	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
25	25	16.00	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
25	26	17.25	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
26	26	17.25	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
26	27	18.50	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
27	27	18.50	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
27	28	19.75	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
28	28	19.75	0.00	0.00	0.00	0.00	0.00	417.03	91.76	-131.22
28	29	21.00	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
29	29	21.00	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
29	30	22.25	0.00	0.00	0.00	0.00	0.00	417.03	91.76	-131.22
30	30	22.25	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
30	31	23.50	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
31	31	23.50	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
31	32	24.75	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
32	32	24.75	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
32	33	26.00	0.00	0.00	0.00	0.00	0.00	417.03	91.76	-131.22
33	33	26.00	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
33	34	27.25	0.00	0.00	0.00	0.00	0.00	417.03	91.76	-131.22
34	34	27.25	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
34	35	28.50	0.00	0.00	0.00	0.00	0.00	417.03	91.76	-131.22
35	35	28.50	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
35	36	29.75	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
36	36	29.75	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
36	37	31.00	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
37	37	31.00	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
37	38	32.25	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
38	38	32.25	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
38	39	33.50	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
39	39	33.50	0.00	0.00	0.00	0.00	0.00	417.03	91.76	-131.22
39	40	34.75	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
40	40	34.75	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
40	41	36.00	0.00	0.00	0.00	0.00	0.00	417.03	91.76	-131.22
41	41	36.00	0.00	0.00	0.00	0.00	0.00	417.03	91.76	-131.22
41	42	37.25	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
42	42	37.25	0.00	0.00	0.00	0.00	0.00	417.02	91.75	-131.22
42	43	38.50	0.00	0.00	0.00	0.00	0.00	417.02	86.19	-111.00
43	43	38.50	0.00	30.89	0.00	0.00	0.00	417.02	86.19	-111.00

43	44	39.17	0.00	30.89	0.00	0.00	0.00	396.33	81.92	-105.50
44	44	39.17	0.00	30.89	0.00	0.00	0.00	396.33	81.92	-105.50
44	45	39.85	0.00	30.89	0.00	0.00	0.00	375.32	77.57	-99.90
45	45	39.85	0.00	30.89	0.00	0.00	0.00	375.32	77.57	-99.90
45	46	40.53	0.00	30.89	0.00	0.00	0.00	354.32	73.23	-94.31
46	46	40.53	0.00	30.89	0.00	0.00	0.00	354.32	73.23	-94.31
46	47	41.20	0.00	30.89	0.00	0.00	0.00	333.62	68.95	-88.80
47	47	41.20	0.00	30.89	0.00	0.00	0.00	333.62	68.95	-88.80
47	48	41.88	0.00	30.89	0.00	0.00	0.00	312.61	64.61	-83.21
48	48	41.88	0.00	30.89	0.00	0.00	0.00	312.61	64.61	-83.21
48	49	42.55	0.00	30.89	0.00	0.00	0.00	291.92	60.34	-77.70
49	49	42.55	0.00	30.90	0.00	0.00	0.00	291.92	60.34	-77.70
49	50	43.22	0.00	30.90	0.00	0.00	0.00	271.22	56.06	-72.19
50	50	43.22	0.00	30.89	0.00	0.00	0.00	271.22	56.06	-72.19
50	51	43.90	0.00	30.89	0.00	0.00	0.00	250.22	51.72	-66.60
51	51	43.90	0.00	30.89	0.00	0.00	0.00	250.21	51.71	-66.60
51	52	44.58	0.00	30.89	0.00	0.00	0.00	229.21	47.37	-61.01
52	52	44.58	0.00	30.88	0.00	0.00	0.00	229.21	47.37	-61.01
52	53	45.25	0.00	30.88	0.00	0.00	0.00	208.51	43.10	-55.50
53	53	45.25	0.00	30.90	0.00	0.00	0.00	208.51	43.10	-55.50
53	54	45.92	0.00	30.90	0.00	0.00	0.00	187.81	38.82	-49.99
54	54	45.92	0.00	30.89	0.00	0.00	0.00	187.82	38.82	-49.99
54	55	46.60	0.00	30.89	0.00	0.00	0.00	166.81	34.48	-44.40
55	55	46.60	0.00	30.89	0.00	0.00	0.00	166.81	34.48	-44.40
55	56	47.28	0.00	30.89	0.00	0.00	0.00	145.81	30.14	-38.81
56	56	47.28	0.00	30.89	0.00	0.00	0.00	145.81	30.14	-38.81
56	57	47.95	0.00	30.89	0.00	0.00	0.00	125.11	25.86	-33.30
57	57	47.95	0.00	30.89	0.00	0.00	0.00	125.11	25.86	-33.30
57	58	48.63	0.00	30.89	0.00	0.00	0.00	104.11	21.52	-27.71
58	58	48.63	0.00	30.89	0.00	0.00	0.00	104.10	21.52	-27.71
58	59	49.30	0.00	30.89	0.00	0.00	0.00	83.40	17.24	-22.20
59	59	49.30	0.00	30.89	0.00	0.00	0.00	83.41	17.24	-22.20
59	60	49.97	0.00	30.89	0.00	0.00	0.00	62.71	12.96	-16.69
60	60	49.97	0.00	30.90	0.00	0.00	0.00	62.71	12.96	-16.69
60	61	50.65	0.00	30.90	0.00	0.00	0.00	41.70	8.62	-11.10
61	61	50.65	0.00	30.89	0.00	0.00	0.00	41.70	8.62	-11.10
61	62	51.33	0.00	30.89	0.00	0.00	0.00	20.70	4.28	-5.51
62	62	51.33	0.00	30.89	0.00	0.00	0.00	20.70	4.28	-5.51
62	63	52.00	0.00	30.89	0.00	0.00	0.00	0.00	0.00	0.00

COEFICIENTES DE IMPACTO Y SOBRECARGA

CALCULO DE LOS PERIODOS PROPIOS DE VIBRACION DE LA ESTRUCTURA

OBJETO

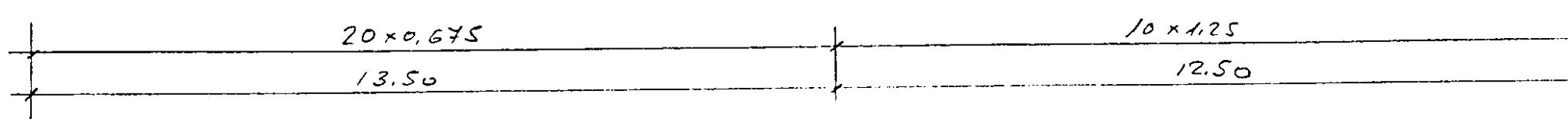
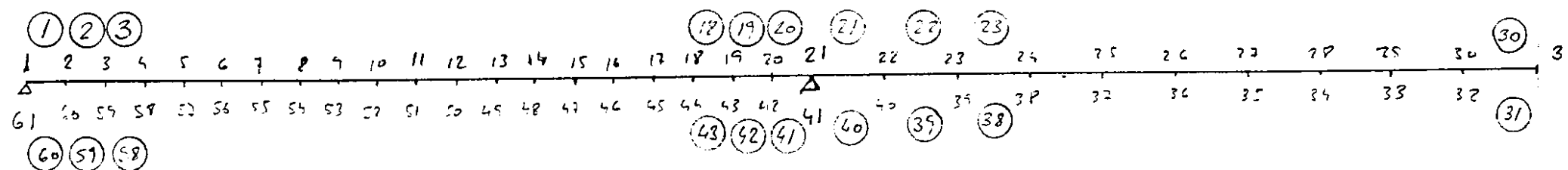
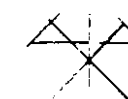
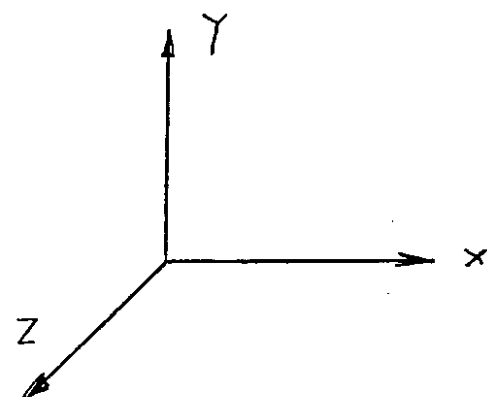
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PROYECTO Nº

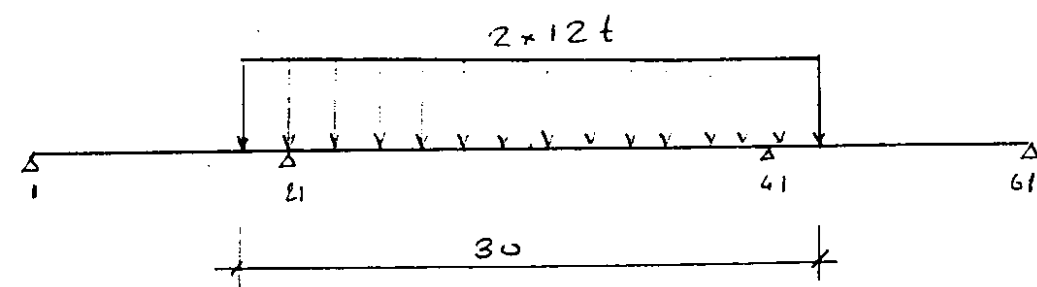
CALCULADO POR

COMPROBADO POR

FECHA



ESQUEMA ESTRUCTURAL

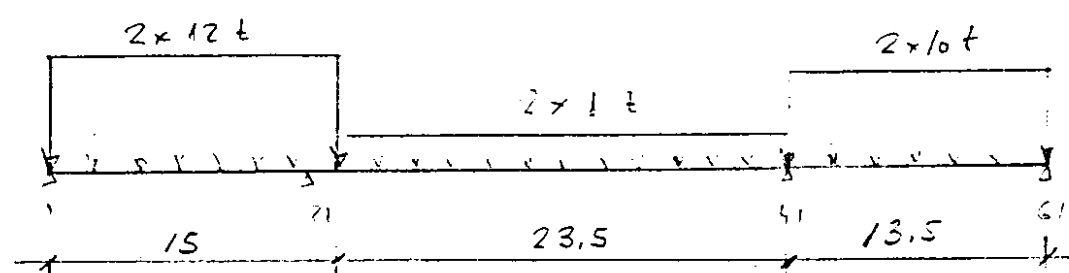
CALCULOS PERIODOS PROPIOS VIBRACIONHipótesis I

Superestructura $q = 14.23 \text{ t/ml}$

Sobrecargas barras 18 a 43 $q = 24 \text{ t/ml}$

Frecuencia natural 5.704 Hz

Periodo natural 0.175 seg

Hipótesis II

Superestructura $q = 14.23 \text{ t/ml}$

Sobrecargas

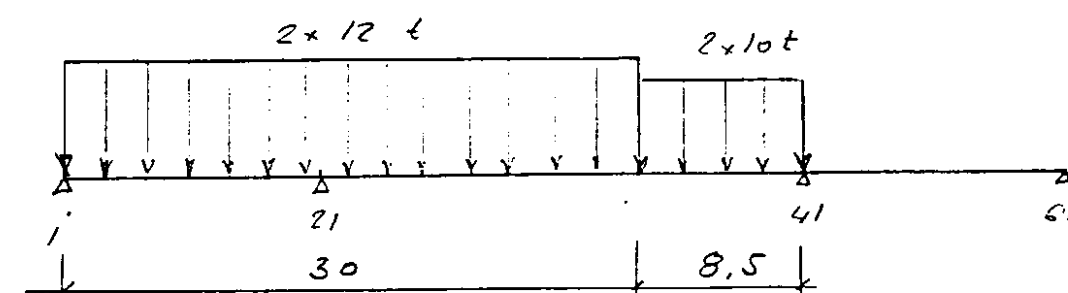
barras 1 a 21 $q = 24 \text{ t/ml}$

" 22 a 40 $q = 2 \text{ t/ml}$

" 41 a 60 $q = 20 \text{ t/ml}$

Frecuencia natural 9.343 Hz

Periodo natural 0.107 seg

Hipótesis III

Superestructura $q = 14.23 \text{ t/ml}$

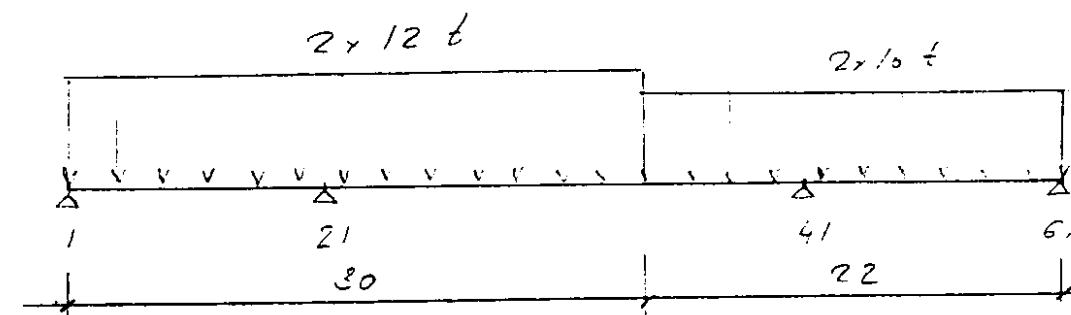
Sobrecargas

barras 1 a 33 $q = 24 \text{ t/ml}$

barras 34 a 40 $q = 20 \text{ t/ml}$

Frecuencia natural 5.981 Hz

Periodo natural 0.167 seg

Hipótesis IV

Superestructura $q = 14.23 \text{ t/ml}$

Sobrecargas

barras 1 a 33 $q = 24 \text{ t/ml}$

barras 34 a 60 $q = 20 \text{ t/ml}$

Frecuencia natural 6.210 Hz

Periodo natural 0.161 seg

```

*****
*
*      S T A A D - III
*      REVISION 10.4a(VERSION 10 LEVEL 4a)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS, INC.
*      DATE=      NOV  2, 1999
*      TIME=      17:51: 9
*
*****

```

```

1. STAAD PLANE PERIODO PROPIO PUENTE HIPOTESIS I
2. UNIT METER MTON
3. JOINT COORDINATES
4.  1      0.000      0.000
5.  2      0.680      0.000
6.  3      1.350      0.000
7.  4      2.030      0.000
8.  5      2.700      0.000
9.  6      3.380      0.000
10. 7      4.050      0.000
11. 8      4.720      0.000
12. 9      5.400      0.000
13. 10     6.070      0.000
14. 11     6.750      0.000
15. 12     7.430      0.000
16. 13     8.100      0.000
17. 14     8.770      0.000
18. 15     9.450      0.000
19. 16     10.130     0.000
20. 17     10.800     0.000
21. 18     11.480     0.000
22. 19     12.150     0.000
23. 20     12.820     0.000
24. 21     13.500     0.000
25. 22     14.750     0.000
26. 23     16.000     0.000
27. 24     17.250     0.000
28. 25     18.500     0.000
29. 26     19.750     0.000
30. 27     21.000     0.000
31. 28     22.250     0.000
32. 29     23.500     0.000
33. 30     24.750     0.000
34. 31     26.000     0.000
35. 32     27.250     0.000
36. 33     28.500     0.000
37. 34     29.750     0.000
38. 35     31.000     0.000
39. 36     32.250     0.000
40. 37     33.500     0.000
41. 38     34.750     0.000
42. 39     36.000     0.000
43. 40     37.250     0.000
44. 41     38.500     0.000
45. 42     39.170     0.000
46. 43     39.850     0.000
47. 44     40.530     0.000

```

```

48. 45     41.200     0.000
49. 46     41.880     0.000
50. 47     42.550     0.000
51. 48     43.220     0.000
52. 49     43.900     0.000
53. 50     44.580     0.000
54. 51     45.250     0.000
55. 52     45.920     0.000
56. 53     46.600     0.000
57. 54     47.280     0.000
58. 55     47.950     0.000
59. 56     48.630     0.000
60. 57     49.300     0.000
61. 58     49.970     0.000
62. 59     50.650     0.000
63. 60     51.330     0.000
64. 61     52.000     0.000
65. MEMBER INCIDENCES
66.  1      1      2      60
67. SUPPORTS
68.  1      PINNED
69. 21      PINNED
70. 41      PINNED
71. 61      PINNED
72. CONSTANTS
73. E 3.8e6 MEMBER 1 TO 60
74. DENSITY 2.5 ALL
75. MEMBER PROPERTIES
76.  1 TO 20 PRISMATIC AX 14.313 IZ 3.489
77. 21 TO 40 PRISMATIC AX 10.174 IZ 3.086
78. 41 TO 60 PRISMATIC AX 14.313 IZ 3.489
79. LOAD 1 PESO PROPIO
80. SELFWEIGHT Y -1.0
81. MEMBER LOAD
82.  1 TO 60 UNI GY -14.23
83. 18 TO 43 UNI GY -24.00
84. CALCULATE NATURAL FREQ
85. PERFORM ANALYSIS

```

```

ORIGINAL BAND-WIDTH = 1
REDUCED  BAND-WIDTH = 1

```

```

++ CHECKING LOAD DATA.
++ PROCESSING SUPPORT CONDITION.
++ PROCESSING AND SETTING UP LOAD VECTOR.

```

```

++ PROCESSING ELEMENT STIFFNESS MATRIX.      17:51:11
++ PROCESSING GLOBAL STIFFNESS MATRIX.      17:51:11
++ PROCESSING TRIANGULAR FACTORIZATION.      17:51:11
++ CALCULATING JOINT DISPLACEMENTS.        17:51:11

```

```
*****
*
* NATURAL FREQUENCY FOR LOADING 1 = 5.70362 CPS
* MAX DEFLECTION = .89570 CM GLO Y, AT JOINT 31
*
*****
++ CALCULATING ELEMENT FORCES. 17:51:11

86. LOAD LIST ALL
87. PRINT SUPPORT REACTIONS ALL
```

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	.00	133.78	.00	.00	.00	.00
21	1	.00	1385.67	.00	.00	.00	.00
41	1	.00	1385.91	.00	.00	.00	.00
61	1	.00	133.80	.00	.00	.00	.00

***** END OF LATEST ANALYSIS RESULT *****

88. FINISH

```

*****
*
*      S T A A D - III
*      REVISION 10.4a(VERSION 10 LEVEL 4a)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS, INC.
*      DATE=      NOV  2, 1999
*      TIME=      17:51:20
*
*****

```

```

1. STAAD PLANE PERIODO PROPIO PUENTE HIPOTESIS II
2. UNIT METER MTON
3. JOINT COORDINATES
4. 1      0.000      0.000
5. 2      0.680      0.000
6. 3      1.350      0.000
7. 4      2.030      0.000
8. 5      2.700      0.000
9. 6      3.380      0.000
10. 7     4.050      0.000
11. 8     4.720      0.000
12. 9     5.400      0.000
13. 10    6.070      0.000
14. 11    6.750      0.000
15. 12    7.430      0.000
16. 13    8.100      0.000
17. 14    8.770      0.000
18. 15    9.450      0.000
19. 16   10.130      0.000
20. 17   10.800      0.000
21. 18   11.480      0.000
22. 19   12.150      0.000
23. 20   12.820      0.000
24. 21   13.500      0.000
25. 22   14.750      0.000
26. 23   16.000      0.000
27. 24   17.250      0.000
28. 25   18.500      0.000
29. 26   19.750      0.000
30. 27   21.000      0.000
31. 28   22.250      0.000
32. 29   23.500      0.000
33. 30   24.750      0.000
34. 31   26.000      0.000
35. 32   27.250      0.000
36. 33   28.500      0.000
37. 34   29.750      0.000
38. 35   31.000      0.000
39. 36   32.250      0.000
40. 37   33.500      0.000
41. 38   34.750      0.000
42. 39   36.000      0.000
43. 40   37.250      0.000
44. 41   38.500      0.000
45. 42   39.170      0.000
46. 43   39.850      0.000
47. 44   40.530      0.000

```

```

48. 45   41.200      0.000
49. 46   41.880      0.000
50. 47   42.550      0.000
51. 48   43.220      0.000
52. 49   43.900      0.000
53. 50   44.580      0.000
54. 51   45.250      0.000
55. 52   45.920      0.000
56. 53   46.600      0.000
57. 54   47.280      0.000
58. 55   47.950      0.000
59. 56   48.630      0.000
60. 57   49.300      0.000
61. 58   49.970      0.000
62. 59   50.650      0.000
63. 60   51.330      0.000
64. 61   52.000      0.000

```

65. MEMBER INCIDENCES

```
66. 1      1      2      60
```

67. SUPPORTS

```
68. 1      PINNED
```

```
69. 21     PINNED
```

```
70. 41     PINNED
```

```
71. 61     PINNED
```

72. CONSTANTS

```
73. E 3.8e6 MEMBER 1 TO 60
```

```
74. DENSITY 2.5 ALL
```

75. MEMBER PROPERTIES

```
76. 1 TO 20-PRISMATIC AX 14.313 IZ 3.489
```

```
77. 21 TO 40 PRISMATIC AX 10.174 IZ 3.086
```

```
78. 41 TO 60 PRISMATIC AX 14.313 IZ 3.489
```

```
79. LOAD 1 PESO PROPIO
```

```
80. SELFWEIGHT Y -1.0
```

81. MEMBER LOAD

```
82. 1 TO 60 UNI GY -14.23
```

```
83. 1 TO 21 UNI GY -24.00
```

```
84. 22 TO 40 UNI GY -2.00
```

```
85. 41 TO 60 UNI GY -20.00
```

```
86. CALCULATE NATURAL FREQ
```

```
87. PERFORM ANALYSIS
```

```
ORIGINAL BAND-WIDTH = 1
```

```
REDUCED BAND-WIDTH = 1
```

```
++ CHECKING LOAD DATA.
```

```
++ PROCESSING SUPPORT CONDITION.
```

```
++ PROCESSING AND SETTING UP LOAD VECTOR.
```

```
++ PROCESSING ELEMENT STIFFNESS MATRIX.
```

```
++ PROCESSING GLOBAL STIFFNESS MATRIX.
```

```
++ PROCESSING TRIANGULAR FACTORIZATION.
```

```
++ CALCULATING JOINT DISPLACEMENTS.
```

```
17:51:22
17:51:22
17:51:22
17:51:22

```



```
*****
*
* NATURAL FREQUENCY FOR LOADING 1 = 9.34273 CPS
* MAX DEFLECTION = .44814 CM GLO Y, AT JOINT 31
*
*****
++ CALCULATING ELEMENT FORCES. 17:51:23
```

```
88. LOAD LIST ALL
89. PRINT SUPPORT REACTIONS ALL
```

```
SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE
-----
JOINT  LOAD  FORCE-X  FORCE-Y  FORCE-Z  MOM-X  MOM-Y  MOM Z
    1     1     .00   345.90    .00    .00    .00    .00
   21     1     .00  1202.99    .00    .00    .00    .00
   41     1     .00  1141.78    .00    .00    .00    .00
   61     1     .00   322.79    .00    .00    .00    .00
```

```
***** END OF LATEST ANALYSIS RESULT *****
```

```
90. FINISH
```

```

*****
*
*      S T A A D - III
*      REVISION 10.4a(VERSION 10 LEVEL 4a)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS, INC.
*      DATE=      NOV  2, 1999
*      TIME=      17:51:30
*
*****

```

```

1. STAAD PLANE PERIODO PROPIO PUENTE HIPOTESIS III
2. UNIT METER MTON
3. JOINT COORDINATES
4.  1      0.000      0.000
5.  2      0.680      0.000
6.  3      1.350      0.000
7.  4      2.030      0.000
8.  5      2.700      0.000
9.  6      3.380      0.000
10. 7      4.050      0.000
11. 8      4.720      0.000
12. 9      5.400      0.000
13. 10     6.070      0.000
14. 11     6.750      0.000
15. 12     7.430      0.000
16. 13     8.100      0.000
17. 14     8.770      0.000
18. 15     9.450      0.000
19. 16    10.130      0.000
20. 17    10.800      0.000
21. 18    11.480      0.000
22. 19    12.150      0.000
23. 20    12.820      0.000
24. 21    13.500      0.000
25. 22    14.750      0.000
26. 23    16.000      0.000
27. 24    17.250      0.000
28. 25    18.500      0.000
29. 26    19.750      0.000
30. 27    21.000      0.000
31. 28    22.250      0.000
32. 29    23.500      0.000
33. 30    24.750      0.000
34. 31    26.000      0.000
35. 32    27.250      0.000
36. 33    28.500      0.000
37. 34    29.750      0.000
38. 35    31.000      0.000
39. 36    32.250      0.000
40. 37    33.500      0.000
41. 38    34.750      0.000
42. 39    36.000      0.000
43. 40    37.250      0.000
44. 41    38.500      0.000
45. 42    39.170      0.000
46. 43    39.850      0.000
47. 44    40.530      0.000

```

```

48. 45    41.200      0.000
49. 46    41.880      0.000
50. 47    42.550      0.000
51. 48    43.220      0.000
52. 49    43.900      0.000
53. 50    44.580      0.000
54. 51    45.250      0.000
55. 52    45.920      0.000
56. 53    46.600      0.000
57. 54    47.280      0.000
58. 55    47.950      0.000
59. 56    48.630      0.000
60. 57    49.300      0.000
61. 58    49.970      0.000
62. 59    50.650      0.000
63. 60    51.330      0.000
64. 61    52.000      0.000
65. MEMBER INCIDENCES
66. 1      1      2      60
67. SUPPORTS
68. 1      PINNED
69. 21     PINNED
70. 41     PINNED
71. 61     PINNED
72. CONSTANTS
73. E      3.8e6 MEMBER 1 TO 60
74. DENSITY 2.5 ALL
75. MEMBER PROPERTIES
76. 1      TO 20 PRISMATIC AX 14.313 IZ 3.489
77. 21     TO 40 PRISMATIC AX 10.174 IZ 3.086
78. 41     TO 60 PRISMATIC AX 14.313 IZ 3.489
79. LOAD 1 PESO PROPIO
80. SELFWEIGHT Y -1.0
81. MEMBER LOAD
82. 1      TO 60 UNI GY -14.23
83. 1      TO 33 UNI GY -24.00
84. 34     TO 40 UNI GY -20.00
85. CALCULATE NATURAL FREQ
86. PERFORM ANALYSIS

ORIGINAL BAND-WIDTH = 1
REDUCED BAND-WIDTH = 1

```

```

++ CHECKING LOAD DATA.
++ PROCESSING SUPPORT CONDITION.
++ PROCESSING AND SETTING UP LOAD VECTOR.

```

```

++ PROCESSING ELEMENT STIFFNESS MATRIX.      17:51:32
++ PROCESSING GLOBAL STIFFNESS MATRIX.      17:51:32
++ PROCESSING TRIANGULAR FACTORIZATION.      17:51:32
++ CALCULATING JOINT DISPLACEMENTS.        17:51:32

```



```
*****
*
* NATURAL FREQUENCY FOR LOADING 1 = 5.98144 CPS
* MAX DEFLECTION = .84131 CM GLO Y, AT JOINT 31
*
*****
++ CALCULATING ELEMENT FORCES. 17:51:33

87. LOAD LIST ALL
88. PRINT SUPPORT REACTIONS ALL
```

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	.00	280.19	.00	.00	.00	.00
21	1	.00	1520.66	.00	.00	.00	.00
41	1	.00	1289.67	.00	.00	.00	.00
61	1	.00	140.43	.00	.00	.00	.00

***** END OF LATEST ANALYSIS RESULT *****

89. FINISH

```

*****
*
*      S T A A D - III
*      REVISION 10.4a(VERSION 10 LEVEL 4a)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS, INC.
*      DATE=      NOV  2, 1999
*      TIME=      17:51:38
*
*****

```

1. STAAD PLANE PERIODO PROPIO PUENTE HIPOTESIS IV

2. UNIT METER MTON

3. JOINT COORDINATES

4.	1	0.000	0.000
5.	2	0.680	0.000
6.	3	1.350	0.000
7.	4	2.030	0.000
8.	5	2.700	0.000
9.	6	3.380	0.000
10.	7	4.050	0.000
11.	8	4.720	0.000
12.	9	5.400	0.000
13.	10	6.070	0.000
14.	11	6.750	0.000
15.	12	7.430	0.000
16.	13	8.100	0.000
17.	14	8.770	0.000
18.	15	9.450	0.000
19.	16	10.130	0.000
20.	17	10.800	0.000
21.	18	11.480	0.000
22.	19	12.150	0.000
23.	20	12.820	0.000
24.	21	13.500	0.000
25.	22	14.750	0.000
26.	23	16.000	0.000
27.	24	17.250	0.000
28.	25	18.500	0.000
29.	26	19.750	0.000
30.	27	21.000	0.000
31.	28	22.250	0.000
32.	29	23.500	0.000
33.	30	24.750	0.000
34.	31	26.000	0.000
35.	32	27.250	0.000
36.	33	28.500	0.000
37.	34	29.750	0.000
38.	35	31.000	0.000
39.	36	32.250	0.000
40.	37	33.500	0.000
41.	38	34.750	0.000
42.	39	36.000	0.000
43.	40	37.250	0.000
44.	41	38.500	0.000
45.	42	39.170	0.000
46.	43	39.850	0.000
47.	44	40.530	0.000

48.	45	41.200	0.000
49.	46	41.880	0.000
50.	47	42.550	0.000
51.	48	43.220	0.000
52.	49	43.900	0.000
53.	50	44.580	0.000
54.	51	45.250	0.000
55.	52	45.920	0.000
56.	53	46.600	0.000
57.	54	47.280	0.000
58.	55	47.950	0.000
59.	56	48.630	0.000
60.	57	49.300	0.000
61.	58	49.970	0.000
62.	59	50.650	0.000
63.	60	51.330	0.000
64.	61	52.000	0.000

65. MEMBER INCIDENCES

66. 1 1 2 60

67. SUPPORTS

68. 1 PINNED

69. 21 PINNED

70. 41 PINNED

71. 61 PINNED

72. CONSTANTS

73. E 3.8e6 MEMBER 1 TO 60

74. DENSITY 2.5 ALL

75. MEMBER PROPERTIES

76. 1 TO 20 PRISMATIC AX 14.313 IZ 3.489

77. 21 TO 40 PRISMATIC AX 10.174 IZ 3.086

78. 41 TO 60 PRISMATIC AX 14.313 IZ 3.489

79. LOAD 1 PESO PROPIO

80. SELFWEIGHT Y -1.0

81. MEMBER LOAD

82. 1 TO 60 UNI GY -14.23

83. 1 TO 33 UNI GY -24.00

84. 34 TO 60 UNI GY -20.00

85. CALCULATE NATURAL FREQ

86. PERFORM ANALYSIS

ORIGINAL BAND-WIDTH = 1

REDUCED BAND-WIDTH = 1

++ CHECKING LOAD.DAT.

++ PROCESSING SUPPORT CONDITION.

++ PROCESSING AND SETTING UP LOAD VECTOR.

++ PROCESSING ELEMENT STIFFNESS MATRIX.

++ PROCESSING GLOBAL STIFFNESS MATRIX.

++ PROCESSING TRIANGULAR FACTORIZATION.

++ CALCULATING JOINT DISPLACEMENTS.

17:51:40

17:51:40

17:51:40

17:51:40

```
*****
*
* NATURAL FREQUENCY FOR LOADING 1 = 6.20974 CPS
* MAX DEFLECTION = .80465 CM GLO Y, AT JOINT 31
*
*****
++ CALCULATING ELEMENT FORCES. 17:51:41
```

```
87. LOAD LIST ALL
88. PRINT SUPPORT REACTIONS ALL
```

```
SUPPORT REACTIONS -UNIT MTON METE    STRUCTURE TYPE = PLANE
-----
JOINT  LOAD  FORCE-X  FORCE-Y  FORCE-Z  MOM-X  MOM-Y  MOM Z
1      1      .00    284.36    .00    .00    .00    .00
21     1      .00   1507.60    .00    .00    .00    .00
41     1      .00   1445.90    .00    .00    .00    .00
61     1      .00    263.11    .00    .00    .00    .00
```

```
***** END OF LATEST ANALYSIS RESULT *****
```

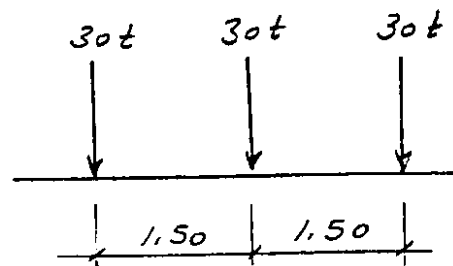
TREN DE CARGAS

Acciones sobre el puente

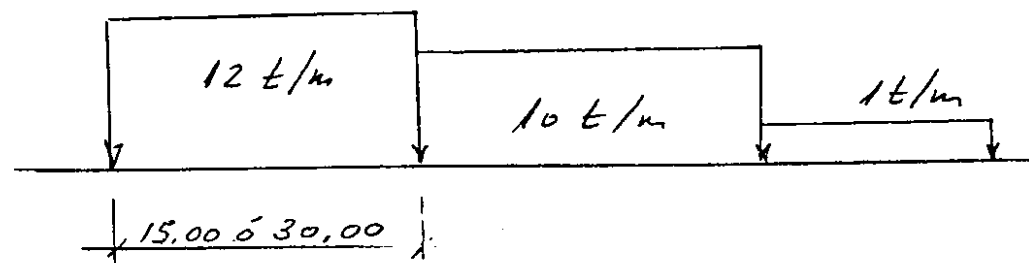
Comprobación I

2 trenes según instrucción española IPF

Tren tipo A



Tren tipo B



Coefficiente de impacto (para 2 trenes)

$$T = 0,175 \text{ seg}$$

$$v = 200 \text{ Km/h} \rightarrow 55,6 \text{ m/seg}$$

$$\mu = \frac{55,6 \times 0,175}{2 \times 25} = 0,195$$

$$I = 0,65 \times \frac{0,195}{1 - 0,195 + 0,195^2} = 0,15$$

ESFUERZOS DE SOBRECARGA

 Título: Fecha : 04/11/99
 Descripción de la combinación :
 H006 1.15

1 * [+ (SOBREC1.ANL * 1.15)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)

3	3	0.00	0.00	81.07	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	81.07	0.00	0.00	0.00	-55.13	-11.39	14.67
4	4	0.68	0.00	81.06	0.00	0.00	0.00	-55.13	-11.39	14.67
4	5	1.35	0.00	81.06	0.00	0.00	0.00	-109.45	-22.62	29.13
5	5	1.35	0.00	81.07	0.00	0.00	0.00	-109.45	-22.62	29.13
5	6	2.03	0.00	81.07	0.00	0.00	0.00	-164.58	-34.02	43.81
6	6	2.03	0.00	81.06	0.00	0.00	0.00	-164.58	-34.02	43.81
6	7	2.70	0.00	81.06	0.00	0.00	0.00	-218.89	-45.24	58.27
7	7	2.70	0.00	81.07	0.00	0.00	0.00	-218.89	-45.24	58.27
7	8	3.38	0.00	81.07	0.00	0.00	0.00	-274.02	-56.64	72.94
8	8	3.38	0.00	81.07	0.00	0.00	0.00	-274.02	-56.64	72.94
8	9	4.05	0.00	81.07	0.00	0.00	0.00	-328.34	-67.86	87.40
9	9	4.05	0.00	81.04	0.00	0.00	0.00	-328.34	-67.86	87.40
9	10	4.72	0.00	81.04	0.00	0.00	0.00	-382.64	-79.09	101.85
10	10	4.72	0.00	81.05	0.00	0.00	0.00	-382.65	-79.09	101.86
10	11	5.40	0.00	81.05	0.00	0.00	0.00	-437.78	-90.48	116.53
11	11	5.40	0.00	81.07	0.00	0.00	0.00	-437.79	-90.49	116.53
11	12	6.07	0.00	81.07	0.00	0.00	0.00	-492.08	-101.71	130.99
12	12	6.07	0.00	81.07	0.00	0.00	0.00	-492.08	-101.71	130.99
12	13	6.75	0.00	81.07	0.00	0.00	0.00	-547.23	-113.10	145.66
13	13	6.75	0.00	81.03	0.00	0.00	0.00	-547.24	-113.11	145.67
13	14	7.43	0.00	81.03	0.00	0.00	0.00	-602.34	-124.49	160.33
14	14	7.43	0.00	81.07	0.00	0.00	0.00	-602.36	-124.50	160.34
14	15	8.10	0.00	81.07	0.00	0.00	0.00	-656.66	-135.72	174.79
15	15	8.10	0.00	81.04	0.00	0.00	0.00	-656.67	-135.72	174.80
15	16	8.77	0.00	81.04	0.00	0.00	0.00	-710.98	-146.95	189.25
16	16	8.77	0.00	81.07	0.00	0.00	0.00	-710.99	-146.95	189.25
16	17	9.45	0.00	81.07	0.00	0.00	0.00	-766.11	-158.34	203.93
17	17	9.45	0.00	81.05	0.00	0.00	0.00	-766.14	-158.35	203.93
17	18	10.13	0.00	81.05	0.00	0.00	0.00	-821.23	-169.74	218.60
18	18	10.13	0.00	81.09	0.00	0.00	0.00	-821.24	-169.74	218.60
18	19	10.80	0.00	81.09	0.00	0.00	0.00	-875.56	-180.97	233.06
19	19	10.80	0.00	81.03	0.00	0.00	0.00	-875.56	-180.97	233.06
19	20	11.48	0.00	81.03	0.00	0.00	0.00	-930.68	-192.36	247.73
20	20	11.48	0.00	81.10	0.00	0.00	0.00	-930.69	-192.36	247.74
20	21	12.15	0.00	81.10	0.00	0.00	0.00	-985.00	-203.58	262.19

21	21	12.15	0.00	81.07	0.00	0.00	0.00	-985.01	-203.59	262.19
21	22	12.82	0.00	81.07	0.00	0.00	0.00	-1039.32	-214.81	276.65
22	22	12.82	0.00	81.07	0.00	0.00	0.00	-1039.32	-214.81	276.65
22	23	13.50	0.00	81.07	0.00	0.00	0.00	-1094.45	-226.21	291.33
23	23	13.50	0.00	-345.00	0.00	0.00	0.00	-1094.45	-226.21	291.33
23	24	14.75	0.00	-310.50	0.00	0.00	0.00	-684.77	-150.66	215.47
24	24	14.75	0.00	-310.50	0.00	0.00	0.00	-684.77	-150.66	215.47
24	25	16.00	0.00	-276.00	0.00	0.00	0.00	-318.21	-70.01	100.13
25	25	16.00	0.00	-276.00	0.00	0.00	0.00	-318.19	-70.01	100.12
25	26	17.25	0.00	-241.50	0.00	0.00	0.00	5.23	1.15	-1.65
26	26	17.25	0.00	-241.50	0.00	0.00	0.00	5.23	1.15	-1.65
26	27	18.50	0.00	-207.00	0.00	0.00	0.00	285.54	62.83	-89.85
27	27	18.50	0.00	-207.01	0.00	0.00	0.00	285.54	62.83	-89.85
27	28	19.75	0.00	-172.51	0.00	0.00	0.00	522.73	115.01	-164.48
28	28	19.75	0.00	-172.50	0.00	0.00	0.00	522.74	115.02	-164.49
28	29	21.00	0.00	-138.00	0.00	0.00	0.00	716.78	157.71	-225.54
29	29	21.00	0.00	-138.00	0.00	0.00	0.00	716.82	157.72	-225.56
29	30	22.25	0.00	-103.50	0.00	0.00	0.00	867.72	190.92	-273.04
30	30	22.25	0.00	-103.51	0.00	0.00	0.00	867.73	190.92	-273.04
30	31	23.50	0.00	-69.01	0.00	0.00	0.00	975.54	214.64	-306.97
31	31	23.50	0.00	-68.99	0.00	0.00	0.00	975.56	214.64	-306.97
31	32	24.75	0.00	-34.49	0.00	0.00	0.00	1040.23	228.87	-327.32
32	32	24.75	0.00	-34.52	0.00	0.00	0.00	1040.23	228.87	-327.32
32	33	26.00	0.00	-0.02	0.00	0.00	0.00	1061.79	233.62	-334.11
33	33	26.00	0.00	-0.01	0.00	0.00	0.00	1061.79	233.62	-334.11
33	34	27.25	0.00	34.49	0.00	0.00	0.00	1040.23	228.87	-327.32
34	34	27.25	0.00	34.51	0.00	0.00	0.00	1040.22	228.87	-327.32
34	35	28.50	0.00	69.01	0.00	0.00	0.00	975.56	214.64	-306.97
35	35	28.50	0.00	68.98	0.00	0.00	0.00	975.54	214.64	-306.97
35	36	29.75	0.00	103.48	0.00	0.00	0.00	867.74	190.92	-273.05
36	36	29.75	0.00	103.50	0.00	0.00	0.00	867.74	190.92	-273.05
36	37	31.00	0.00	138.00	0.00	0.00	0.00	716.79	157.71	-225.55
37	37	31.00	0.00	138.00	0.00	0.00	0.00	716.81	157.71	-225.55
37	38	32.25	0.00	172.50	0.00	0.00	0.00	522.73	115.01	-164.48
38	38	32.25	0.00	172.49	0.00	0.00	0.00	522.73	115.01	-164.48
38	39	33.50	0.00	206.99	0.00	0.00	0.00	285.54	62.83	-89.85
39	39	33.50	0.00	206.99	0.00	0.00	0.00	285.54	62.83	-89.85
39	40	34.75	0.00	241.49	0.00	0.00	0.00	5.24	1.15	-1.65
40	40	34.75	0.00	241.50	0.00	0.00	0.00	5.24	1.15	-1.65
40	41	36.00	0.00	276.00	0.00	0.00	0.00	-318.21	-70.01	100.13
41	41	36.00	0.00	276.00	0.00	0.00	0.00	-318.21	-70.01	100.13
41	42	37.25	0.00	310.50	0.00	0.00	0.00	-684.76	-150.66	215.47

42	42	37.25	0.00	310.50	0.00	0.00	0.00	-684.76	-150.66	215.47
42	43	38.50	0.00	345.00	0.00	0.00	0.00	-1094.45	-226.21	291.33
43	43	38.50	0.00	-81.07	0.00	0.00	0.00	-1094.45	-226.21	291.33
43	44	39.17	0.00	-81.07	0.00	0.00	0.00	-1040.13	-214.98	276.87
44	44	39.17	0.00	-81.07	0.00	0.00	0.00	-1040.13	-214.98	276.87
44	45	39.85	0.00	-81.07	0.00	0.00	0.00	-985.00	-203.58	262.19
45	45	39.85	0.00	-81.04	0.00	0.00	0.00	-985.00	-203.58	262.19
45	46	40.53	0.00	-81.04	0.00	0.00	0.00	-929.88	-192.19	247.52
46	46	40.53	0.00	-81.09	0.00	0.00	0.00	-929.88	-192.19	247.52
46	47	41.20	0.00	-81.09	0.00	0.00	0.00	-875.56	-180.97	233.06
47	47	41.20	0.00	-81.09	0.00	0.00	0.00	-875.56	-180.97	233.06
47	48	41.88	0.00	-81.09	0.00	0.00	0.00	-820.43	-169.57	218.39
48	48	41.88	0.00	-81.09	0.00	0.00	0.00	-820.44	-169.57	218.39
48	49	42.55	0.00	-81.09	0.00	0.00	0.00	-766.11	-158.34	203.93
49	49	42.55	0.00	-81.12	0.00	0.00	0.00	-766.12	-158.35	203.93
49	50	43.22	0.00	-81.12	0.00	0.00	0.00	-711.80	-147.12	189.47
50	50	43.22	0.00	-81.06	0.00	0.00	0.00	-711.80	-147.12	189.47
50	51	43.90	0.00	-81.06	0.00	0.00	0.00	-656.67	-135.72	174.80
51	51	43.90	0.00	-81.01	0.00	0.00	0.00	-656.65	-135.72	174.79
51	52	44.58	0.00	-81.01	0.00	0.00	0.00	-601.55	-124.33	160.12
52	52	44.58	0.00	-81.03	0.00	0.00	0.00	-601.53	-124.33	160.12
52	53	45.25	0.00	-81.03	0.00	0.00	0.00	-547.24	-113.11	145.67
53	53	45.25	0.00	-81.09	0.00	0.00	0.00	-547.22	-113.10	145.66
53	54	45.92	0.00	-81.09	0.00	0.00	0.00	-492.90	-101.88	131.20
54	54	45.92	0.00	-81.06	0.00	0.00	0.00	-492.90	-101.88	131.20
54	55	46.60	0.00	-81.06	0.00	0.00	0.00	-437.77	-90.48	116.53
55	55	46.60	0.00	-81.09	0.00	0.00	0.00	-437.78	-90.48	116.53
55	56	47.28	0.00	-81.09	0.00	0.00	0.00	-382.65	-79.09	101.86
56	56	47.28	0.00	-81.07	0.00	0.00	0.00	-382.65	-79.09	101.86
56	57	47.95	0.00	-81.07	0.00	0.00	0.00	-328.32	-67.86	87.39
57	57	47.95	0.00	-81.10	0.00	0.00	0.00	-328.35	-67.86	87.40
57	58	48.63	0.00	-81.10	0.00	0.00	0.00	-273.21	-56.47	72.72
58	58	48.63	0.00	-81.09	0.00	0.00	0.00	-273.21	-56.47	72.72
58	59	49.30	0.00	-81.09	0.00	0.00	0.00	-218.89	-45.24	58.27
59	59	49.30	0.00	-81.09	0.00	0.00	0.00	-218.89	-45.24	58.27
59	60	49.97	0.00	-81.09	0.00	0.00	0.00	-164.58	-34.02	43.81
60	60	49.97	0.00	-81.06	0.00	0.00	0.00	-164.57	-34.01	43.80
60	61	50.65	0.00	-81.06	0.00	0.00	0.00	-109.45	-22.62	29.13
61	61	50.65	0.00	-81.06	0.00	0.00	0.00	-109.45	-22.62	29.13
61	62	51.33	0.00	-81.06	0.00	0.00	0.00	-54.31	-11.23	14.46
62	62	51.33	0.00	-81.06	0.00	0.00	0.00	-54.31	-11.23	14.46
62	63	52.00	0.00	-81.06	0.00	0.00	0.00	0.00	0.00	0.00

 Titulo: Fecha : 04/11/99
 Descripción de la combinación :
 H007 1.15

1 * [+ (SOBREC2.ANL * 1.15)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)

3	3	0.00	0.00	-167.28	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-148.51	0.00	0.00	0.00	107.36	22.19	-28.58
4	4	0.68	0.00	-148.50	0.00	0.00	0.00	107.36	22.19	-28.58
4	5	1.35	0.00	-130.01	0.00	0.00	0.00	200.66	41.47	-53.41
5	5	1.35	0.00	-130.02	0.00	0.00	0.00	200.66	41.47	-53.41
5	6	2.03	0.00	-111.25	0.00	0.00	0.00	282.69	58.43	-75.25
6	6	2.03	0.00	-111.24	0.00	0.00	0.00	282.69	58.43	-75.25
6	7	2.70	0.00	-92.75	0.00	0.00	0.00	351.04	72.55	-93.44
7	7	2.70	0.00	-92.77	0.00	0.00	0.00	351.04	72.55	-93.44
7	8	3.38	0.00	-74.00	0.00	0.00	0.00	407.72	84.27	-108.53
8	8	3.38	0.00	-73.97	0.00	0.00	0.00	407.73	84.27	-108.53
8	9	4.05	0.00	-55.48	0.00	0.00	0.00	451.09	93.23	-120.07
9	9	4.05	0.00	-55.51	0.00	0.00	0.00	451.10	93.24	-120.08
9	10	4.72	0.00	-37.02	0.00	0.00	0.00	482.08	99.64	-128.32
10	10	4.72	0.00	-37.01	0.00	0.00	0.00	482.08	99.64	-128.32
10	11	5.40	0.00	-18.24	0.00	0.00	0.00	500.87	103.52	-133.32
11	11	5.40	0.00	-18.23	0.00	0.00	0.00	500.86	103.52	-133.32
11	12	6.07	0.00	0.26	0.00	0.00	0.00	506.87	104.76	-134.92
12	12	6.07	0.00	0.26	0.00	0.00	0.00	506.89	104.77	-134.92
12	13	6.75	0.00	19.03	0.00	0.00	0.00	500.33	103.41	-133.18
13	13	6.75	0.00	19.04	0.00	0.00	0.00	500.32	103.41	-133.18
13	14	7.43	0.00	37.81	0.00	0.00	0.00	481.01	99.42	-128.04
14	14	7.43	0.00	37.78	0.00	0.00	0.00	481.00	99.42	-128.03
14	15	8.10	0.00	56.27	0.00	0.00	0.00	449.49	92.90	-119.65
15	15	8.10	0.00	56.28	0.00	0.00	0.00	449.49	92.90	-119.65
15	16	8.77	0.00	74.77	0.00	0.00	0.00	405.58	83.83	-107.96
16	16	8.77	0.00	74.76	0.00	0.00	0.00	405.57	83.83	-107.96
16	17	9.45	0.00	93.53	0.00	0.00	0.00	348.36	72.00	-92.73
17	17	9.45	0.00	93.54	0.00	0.00	0.00	348.35	72.00	-92.72
17	18	10.13	0.00	112.31	0.00	0.00	0.00	278.35	57.53	-74.09
18	18	10.13	0.00	112.32	0.00	0.00	0.00	278.35	57.53	-74.09
18	19	10.80	0.00	130.82	0.00	0.00	0.00	196.91	40.70	-52.42
19	19	10.80	0.00	130.80	0.00	0.00	0.00	196.90	40.70	-52.41
19	20	11.48	0.00	149.57	0.00	0.00	0.00	101.58	20.99	-27.04
20	20	11.48	0.00	149.57	0.00	0.00	0.00	101.58	20.99	-27.04
20	21	12.15	0.00	168.06	0.00	0.00	0.00	-4.83	-1.00	1.29

21	21	12.15	0.00	168.07	0.00	0.00	0.00	-4.83	-1.00	1.29
21	22	12.82	0.00	186.56	0.00	0.00	0.00	-123.64	-25.55	32.91
22	22	12.82	0.00	186.56	0.00	0.00	0.00	-123.64	-25.55	32.91
22	23	13.50	0.00	205.33	0.00	0.00	0.00	-256.88	-53.09	68.38
23	23	13.50	0.00	-30.82	0.00	0.00	0.00	-256.88	-53.09	68.38
23	24	14.75	0.00	-27.94	0.00	0.00	0.00	-220.16	-48.44	69.27
24	24	14.75	0.00	-27.94	0.00	0.00	0.00	-220.16	-48.44	69.27
24	25	16.00	0.00	-25.07	0.00	0.00	0.00	-187.02	-41.15	58.85
25	25	16.00	0.00	-25.07	0.00	0.00	0.00	-187.02	-41.15	58.85
25	26	17.25	0.00	-22.19	0.00	0.00	0.00	-157.49	-34.65	49.56
26	26	17.25	0.00	-22.19	0.00	0.00	0.00	-157.49	-34.65	49.56
26	27	18.50	0.00	-19.32	0.00	0.00	0.00	-131.55	-28.94	41.39
27	27	18.50	0.00	-19.32	0.00	0.00	0.00	-131.55	-28.94	41.39
27	28	19.75	0.00	-16.44	0.00	0.00	0.00	-109.20	-24.03	34.36
28	28	19.75	0.00	-16.44	0.00	0.00	0.00	-109.20	-24.03	34.36
28	29	21.00	0.00	-13.57	0.00	0.00	0.00	-90.45	-19.90	28.46
29	29	21.00	0.00	-13.57	0.00	0.00	0.00	-90.45	-19.90	28.46
29	30	22.25	0.00	-10.69	0.00	0.00	0.00	-75.29	-16.57	23.69
30	30	22.25	0.00	-10.69	0.00	0.00	0.00	-75.29	-16.57	23.69
30	31	23.50	0.00	-7.82	0.00	0.00	0.00	-63.72	-14.02	20.05
31	31	23.50	0.00	-7.82	0.00	0.00	0.00	-63.72	-14.02	20.05
31	32	24.75	0.00	-4.95	0.00	0.00	0.00	-55.75	-12.27	17.54
32	32	24.75	0.00	-4.95	0.00	0.00	0.00	-55.75	-12.27	17.54
32	33	26.00	0.00	-2.07	0.00	0.00	0.00	-51.37	-11.30	16.16
33	33	26.00	0.00	-2.06	0.00	0.00	0.00	-51.37	-11.30	16.16
33	34	27.25	0.00	0.82	0.00	0.00	0.00	-50.59	-11.13	15.92
34	34	27.25	0.00	0.80	0.00	0.00	0.00	-50.59	-11.13	15.92
34	35	28.50	0.00	3.68	0.00	0.00	0.00	-53.39	-11.75	16.80
35	35	28.50	0.00	3.69	0.00	0.00	0.00	-53.39	-11.75	16.80
35	36	29.75	0.00	6.57	0.00	0.00	0.00	-59.80	-13.16	18.82
36	36	29.75	0.00	6.55	0.00	0.00	0.00	-59.80	-13.16	18.82
36	37	31.00	0.00	9.43	0.00	0.00	0.00	-69.79	-15.36	21.96
37	37	31.00	0.00	9.43	0.00	0.00	0.00	-69.79	-15.36	21.96
37	38	32.25	0.00	12.30	0.00	0.00	0.00	-83.39	-18.35	26.24
38	38	32.25	0.00	12.30	0.00	0.00	0.00	-83.39	-18.35	26.24
38	39	33.50	0.00	15.18	0.00	0.00	0.00	-100.57	-22.13	31.64
39	39	33.50	0.00	15.18	0.00	0.00	0.00	-100.57	-22.13	31.64
39	40	34.75	0.00	18.06	0.00	0.00	0.00	-121.35	-26.70	38.18
40	40	34.75	0.00	18.06	0.00	0.00	0.00	-121.35	-26.70	38.18
40	41	36.00	0.00	20.93	0.00	0.00	0.00	-145.72	-32.06	45.85
41	41	36.00	0.00	20.93	0.00	0.00	0.00	-145.72	-32.06	45.85
41	42	37.25	0.00	23.81	0.00	0.00	0.00	-173.68	-38.21	54.65

42	42	37.25	0.00	23.81	0.00	0.00	0.00	-173.68	-38.21	54.65
42	43	38.50	0.00	26.68	0.00	0.00	0.00	-205.24	-42.42	54.63
43	43	38.50	0.00	-170.45	0.00	0.00	0.00	-205.24	-42.42	54.63
43	44	39.17	0.00	-155.04	0.00	0.00	0.00	-96.20	-19.88	25.61
44	44	39.17	0.00	-155.04	0.00	0.00	0.00	-96.20	-19.88	25.61
44	45	39.85	0.00	-139.40	0.00	0.00	0.00	3.91	0.81	-1.04
45	45	39.85	0.00	-139.40	0.00	0.00	0.00	93.39	19.30	-1.04
45	46	40.53	0.00	-123.76	0.00	0.00	0.00	93.39	19.30	-24.86
46	46	40.53	0.00	-123.77	0.00	0.00	0.00	171.15	35.38	-45.56
46	47	41.20	0.00	-108.36	0.00	0.00	0.00	171.14	35.37	-45.56
47	47	41.20	0.00	-108.38	0.00	0.00	0.00	239.51	49.50	-63.75
47	48	41.88	0.00	-92.74	0.00	0.00	0.00	239.51	49.50	-63.75
48	48	41.88	0.00	-92.70	0.00	0.00	0.00	296.47	61.28	-78.92
48	49	42.55	0.00	-77.29	0.00	0.00	0.00	296.47	61.28	-78.92
49	49	42.55	0.00	-77.31	0.00	0.00	0.00	343.09	70.91	-91.33
49	50	43.22	0.00	-61.90	0.00	0.00	0.00	343.09	70.91	-91.33
50	50	43.22	0.00	-61.92	0.00	0.00	0.00	379.88	78.52	-101.12
50	51	43.90	0.00	-46.28	0.00	0.00	0.00	379.87	78.51	-101.11
51	51	43.90	0.00	-46.26	0.00	0.00	0.00	406.01	83.92	-108.07
51	52	44.58	0.00	-30.62	0.00	0.00	0.00	406.00	83.91	-108.07
52	52	44.58	0.00	-30.59	0.00	0.00	0.00	421.35	87.09	-112.16
52	53	45.25	0.00	-15.18	0.00	0.00	0.00	421.36	87.09	-112.16
53	53	45.25	0.00	-15.20	0.00	0.00	0.00	426.36	88.12	-113.49
53	54	45.92	0.00	0.21	0.00	0.00	0.00	426.36	88.12	-113.49
54	54	45.92	0.00	0.22	0.00	0.00	0.00	420.91	87.00	-112.04
54	55	46.60	0.00	15.86	0.00	0.00	0.00	420.91	87.00	-112.04
55	55	46.60	0.00	15.82	0.00	0.00	0.00	404.82	83.67	-107.76
55	56	47.28	0.00	31.46	0.00	0.00	0.00	404.82	83.67	-107.76
56	56	47.28	0.00	31.51	0.00	0.00	0.00	378.57	78.24	-100.77
56	57	47.95	0.00	46.92	0.00	0.00	0.00	378.56	78.24	-100.77
57	57	47.95	0.00	46.89	0.00	0.00	0.00	341.35	70.55	-90.86
57	58	48.63	0.00	62.53	0.00	0.00	0.00	341.35	70.55	-90.86
58	58	48.63	0.00	62.54	0.00	0.00	0.00	294.30	60.83	-78.34
58	59	49.30	0.00	77.95	0.00	0.00	0.00	294.28	60.82	-78.33
59	59	49.30	0.00	77.95	0.00	0.00	0.00	236.91	48.97	-63.06
59	60	49.97	0.00	93.36	0.00	0.00	0.00	236.90	48.96	-63.06
60	60	49.97	0.00	93.37	0.00	0.00	0.00	168.11	34.75	-44.75
60	61	50.65	0.00	109.01	0.00	0.00	0.00	168.11	34.75	-44.75
61	61	50.65	0.00	109.00	0.00	0.00	0.00	88.66	18.33	-23.60
61	62	51.33	0.00	124.64	0.00	0.00	0.00	88.66	18.33	-23.60
62	62	51.33	0.00	124.64	0.00	0.00	0.00	0.00	0.00	0.00
62	63	52.00	0.00	140.05	0.00	0.00	0.00	0.00	0.00	0.00

 Titulo: Fecha : 04/11/99
 Descripción de la combinación :
 H008 1.15

1 * [+ (SOBREC3.ANL * 1.15)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)

3	3	0.00	0.00	-90.49	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-71.73	0.00	0.00	0.00	55.15	11.40	-14.68
4	4	0.68	0.00	-71.73	0.00	0.00	0.00	55.15	11.40	-14.68
4	5	1.35	0.00	-53.23	0.00	0.00	0.00	97.01	20.05	-25.82
5	5	1.35	0.00	-53.23	0.00	0.00	0.00	97.01	20.05	-25.82
5	6	2.03	0.00	-34.47	0.00	0.00	0.00	126.83	26.21	-33.76
6	6	2.03	0.00	-34.47	0.00	0.00	0.00	126.83	26.21	-33.76
6	7	2.70	0.00	-15.97	0.00	0.00	0.00	143.73	29.71	-38.26
7	7	2.70	0.00	-15.97	0.00	0.00	0.00	143.73	29.71	-38.26
7	8	3.38	0.00	2.79	0.00	0.00	0.00	148.21	30.63	-39.45
8	8	3.38	0.00	2.79	0.00	0.00	0.00	148.21	30.63	-39.45
8	9	4.05	0.00	21.29	0.00	0.00	0.00	140.15	28.97	-37.31
9	9	4.05	0.00	21.29	0.00	0.00	0.00	140.15	28.97	-37.31
9	10	4.72	0.00	39.78	0.00	0.00	0.00	119.69	24.74	-31.86
10	10	4.72	0.00	39.78	0.00	0.00	0.00	119.69	24.74	-31.86
10	11	5.40	0.00	58.55	0.00	0.00	0.00	86.26	17.83	-22.96
11	11	5.40	0.00	58.56	0.00	0.00	0.00	86.26	17.83	-22.96
11	12	6.07	0.00	77.05	0.00	0.00	0.00	40.84	8.44	-10.87
12	12	6.07	0.00	77.04	0.00	0.00	0.00	40.84	8.44	-10.87
12	13	6.75	0.00	95.81	0.00	0.00	0.00	-17.93	-3.71	4.77
13	13	6.75	0.00	95.81	0.00	0.00	0.00	-17.93	-3.71	4.77
13	14	7.43	0.00	114.57	0.00	0.00	0.00	-89.46	-18.49	23.81
14	14	7.43	0.00	114.57	0.00	0.00	0.00	-89.46	-18.49	23.81
14	15	8.10	0.00	133.07	0.00	0.00	0.00	-172.42	-35.64	45.90
15	15	8.10	0.00	133.07	0.00	0.00	0.00	-172.42	-35.64	45.90
15	16	8.77	0.00	151.56	0.00	0.00	0.00	-267.77	-55.34	71.28
16	16	8.77	0.00	151.55	0.00	0.00	0.00	-267.77	-55.34	71.28
16	17	9.45	0.00	170.32	0.00	0.00	0.00	-377.21	-77.96	100.41
17	17	9.45	0.00	170.33	0.00	0.00	0.00	-377.21	-77.96	100.41
17	18	10.13	0.00	189.09	0.00	0.00	0.00	-499.41	-103.22	132.94
18	18	10.13	0.00	189.09	0.00	0.00	0.00	-499.41	-103.22	132.94
18	19	10.80	0.00	207.59	0.00	0.00	0.00	-632.29	-130.69	168.31
19	19	10.80	0.00	207.59	0.00	0.00	0.00	-632.29	-130.69	168.31
19	20	11.48	0.00	226.35	0.00	0.00	0.00	-779.84	-161.18	207.58
20	20	11.48	0.00	226.37	0.00	0.00	0.00	-779.84	-161.18	207.58
20	21	12.15	0.00	244.86	0.00	0.00	0.00	-937.70	-193.81	249.60

Loseta 1a
Hipótesis de 1/2 sobrecarga (solo una
vía cargada

Reacción de SC $N = 275.65 \text{ t}$

Ripado + SC

$$M_i = (275.65 + 2 \times 12.39) \times 0.30 + 275.65 \times 2.25 =$$

$$= 710.34 \text{ mt}$$

Resumen de resultados

$$M_A = -9.29 \text{ mt} \quad R = 39.75 \text{ t}$$

$$M_B = 14.82 \text{ mt}$$

$$V_c = 3.90 \text{ t}$$

Cargas canalizadas a través de la loseta

Sobrecarga

$$R = 275.65 - 39.75 = 235.90 \text{ t} \longrightarrow 47.18 \text{ t/movio}$$

Esfuerzos

Sobrecarga

$$M_A = -23.59 \text{ mt} \quad M_B = 96.72 \text{ mt} \quad V_c = 23.59 \text{ t}$$

Esfuerzos totales

Sobrecarga

$$M_A = -32.88 \text{ mt} \quad M_B = 111.54 \text{ mt} \quad V_c = 27.49 \text{ t}$$

Incremento de esfuerzos debido al torsor

Sobrecarga + ripado

$$M_A = -42.48 \text{ mt} \quad V_c = 63.50 \text{ t}$$

Dimensionamiento

$$M_A = -126.43 - 32.88 - 42.48 = -201.79 \text{ mt}$$

$$M_B = 302.69 \text{ mt} \quad U_s = 190.05 \text{ t} \quad A_s = 42.85 \text{ cm}^2$$

$$A_{smin} = 42.85 \left(1.5 - 12.5 \frac{190.05}{8427} \right) = 52.20 \text{ cm}^2$$

$$M_B = 340.71 + 111.54 = 452.25 \text{ mt}$$

Inferior a las vías cargadas

$$V_c = 97.74 + 27.49 + 63.50 = 188.73 \text{ t}$$

$$V_d = 283.10 \text{ t} \quad V_d - V_{c0} = 25.07 \text{ t} \quad A_s = 4.20 \text{ cm}^2$$

cualquiera

$$R = 136.73 + 47.18 = 183.91 \text{ t}$$

$$R_d = 275.87 \text{ t} \quad A_s = 62.20 \text{ cm}^2/\text{movio}$$


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*****
*
*      S T A A D - III
*      REVISION 10.4a (VERSION 10 LEVEL 4a)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS, INC.
*      DATE=      NOV 19, 1998
*      TIME=      13: 1:47
*
*****

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1. STAAD PLANE RIOSTRA DE PILA (1 TREN)
2. UNIT METER MTON
3. JOINT COORDINATES
4.   1 -7.00  0.00  0.00
5.   2 -4.00  0.00  0.00
6.   3 -3.45  0.00  0.00
7.   4 -2.80  0.00  0.00
8.   5 -1.15  0.00  0.00
9.   6  0.00  0.00  0.00
10.  7  1.15  0.00  0.00
11.  8  2.80  0.00  0.00
12.  9  3.45  0.00  0.00
13. 10  4.00  0.00  0.00
14. 11  7.00  0.00  0.00
15. MEMBER INCIDENCES
16.   1   1   2
17.   2   2   3
18.   3   3   4
19.   4   4   5
20.   5   5   6
21.   6   6   7
22.   7   7   8
23.   8   8   9
24.   9   9  10
25.  10  10  11
26. MEMBER PROPERTIES
27. 1 10 PRISMATIC YD 0.30 ZD 3.3
28. 2  9 PRISMATIC YD 1.03 ZD 3.3
29. 3 TO 8 PRISMATIC YD 1.65 ZD 3.3
30. SUPPORTS
31. 4 PINNED
32. 8 PINNED
33. CONSTANTS
34. E 3.5E6 ALL
35. DENSITY 2.5 ALL
36. LOAD 5 SOBRECARGA
37. MEMBER LOAD
38. 2 UNI GY -14.30 0.36 0.55
39. 3 TO 4 UNI GY -14.30
40. 5 UNI GY -14.30 0. 0.29
41. LOAD 6 SOBRECARGA (RIPADO)
42. MEMBER LOAD
43. 2 UNI GY -14.30 0.06 0.55
44. 3 UNI GY -14.30
45. 4 UNI GY -14.30 0. 1.64
46. PERFORM ANALYSIS

```

```

ORIGINAL BAND-WIDTH = 1
REDUCED  BAND-WIDTH = 1

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++ CHECKING LOAD DATA.
++ PROCESSING SUPPORT CONDITION.
++ PROCESSING AND SETTING UP LOAD VECTOR.

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++ PROCESSING ELEMENT STIFFNESS MATRIX.      13: 1:49
++ PROCESSING GLOBAL STIFFNESS MATRIX.      13: 1:49
++ PROCESSING TRIANGULAR FACTORIZATION.      13: 1:49
++ CALCULATING JOINT DISPLACEMENTS.        13: 1:49
++ CALCULATING ELEMENT FORCES.              13: 1:49

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47. PRINT ANALYSIS RESULTS

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JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	5	.00000	.00229	.00000	.00000	.00000	-.00001
	6	.00000	.00047	.00000	.00000	.00000	-.00000
2	5	.00000	.00066	.00000	.00000	.00000	-.00001
	6	.00000	.00016	.00000	.00000	.00000	-.00000
3	5	.00000	.00036	.00000	.00000	.00000	-.00001
	6	.00000	.00010	.00000	.00000	.00000	-.00000
4	5	.00000	.00000	.00000	.00000	.00000	-.00001
	6	.00000	.00000	.00000	.00000	.00000	-.00000
5	5	.00000	-.00080	.00000	.00000	.00000	-.00000
	6	.00000	-.00036	.00000	.00000	.00000	-.00000
6	5	.00000	-.00089	.00000	.00000	.00000	.00000
	6	.00000	-.00040	.00000	.00000	.00000	.00000
7	5	.00000	-.00065	.00000	.00000	.00000	.00000
	6	.00000	-.00029	.00000	.00000	.00000	.00000
8	5	.00000	.00000	.00000	.00000	.00000	.00000
	6	.00000	.00000	.00000	.00000	.00000	.00000
9	5	.00000	.00028	.00000	.00000	.00000	.00000
	6	.00000	.00013	.00000	.00000	.00000	.00000
10	5	.00000	.00052	.00000	.00000	.00000	.00000
	6	.00000	.00024	.00000	.00000	.00000	.00000
11	5	.00000	.00184	.00000	.00000	.00000	.00000
	6	.00000	.00083	.00000	.00000	.00000	.00000

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
4	5	.00	35.85	.00	.00	.00	.00
	6	.00	37.98	.00	.00	.00	.00
8	5	.00	3.90	.00	.00	.00	.00
	6	.00	1.77	.00	.00	.00	.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	5	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
	6	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
2	5	2	.00	.00	.00	.00	.00	.00
		3	.00	2.72	.00	.00	.00	-.26
	6	2	.00	.00	.00	.00	.00	.00
		3	.00	7.01	.00	.00	.00	-1.72
3	5	3	.00	-2.72	.00	.00	.00	.26
		4	.00	12.01	.00	.00	.00	-5.05
	6	3	.00	-7.01	.00	.00	.00	1.72
		4	.00	16.30	.00	.00	.00	-9.29
4	5	4	.00	23.84	.00	.00	.00	5.05
		5	.00	-.24	.00	.00	.00	14.82
	6	4	.00	21.68	.00	.00	.00	9.29
		5	.00	1.77	.00	.00	.00	7.01
5	5	5	.00	.24	.00	.00	.00	-14.82
		6	.00	3.90	.00	.00	.00	10.93
	6	5	.00	-1.77	.00	.00	.00	-7.01
		6	.00	1.77	.00	.00	.00	4.97
6	5	6	.00	-3.90	.00	.00	.00	-10.93
		7	.00	3.90	.00	.00	.00	6.44
	6	6	.00	-1.77	.00	.00	.00	-4.97
		7	.00	1.77	.00	.00	.00	2.93
7	5	7	.00	-3.90	.00	.00	.00	-6.44
		8	.00	3.90	.00	.00	.00	.00
	6	7	.00	-1.77	.00	.00	.00	-2.93
		8	.00	1.77	.00	.00	.00	.00
8	5	8	.00	.00	.00	.00	.00	.00
		9	.00	.00	.00	.00	.00	.00
	6	8	.00	.00	.00	.00	.00	.00
		9	.00	.00	.00	.00	.00	.00
9	5	9	.00	.00	.00	.00	.00	.00
		10	.00	.00	.00	.00	.00	.00
	6	9	.00	.00	.00	.00	.00	.00
		10	.00	.00	.00	.00	.00	.00
10	5	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
6	10		.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00

***** END OF LATEST ANALYSIS RESULT *****

48. PLOT DISPLACEMENT FILE
 49. PLOT BENDING FILE
 50. FINISH

***** END OF STAAD-III *****

***** DATE= NOV 19,1998 TIME= 13: 1:51 *****

 * FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
 * CALL (01) 686-7672, CROYDON, U.K. TLX. 929181 *

Riostra de apoyo en estribos

Reacciones

N

Peso propio 175.90 t

Super estructura 57.93 "

Pre tensionado 30.38 "

264.21 t

Temperatura $N = 30.89 \times 0.6 = 18.53 t$

SC Tren Renfe tipo B $N = 144.69 t$

163.22 t

Travesa + vía $N = 0.64 \times 8.10 = 5.18 t$

Momento transversal $M = 80.72 mt$

Cargas que se transmiten directamente a la riostra

Se consideran que se transmiten directamente a la riostra las cargas situadas a 1.65 m. del eje de apoyo hacia el interior del puente

Peso propio

(Ver esquemas en riostra de pilas)

$$q_1 = 0.20 \times 1.65 \times 2.50 = 0.83 t/m$$

$$q_2 = 0.40 \times 1.65 \times 2.50 = 1.65 "$$

$$q_3 = 1.65 \times 1.65 \times 2.50 = 6.81 "$$

Superestructura

(Ver esquema en riostra de pila)

$$q_1 = 9.14 \times 1.65 / 9.90 = 1.52 t/m$$

$$q_2 = 0.5 \times 1.65 \times 0.5 = 0.41 "$$

$$q_3 = 0.02 \times 2.4 \times 1.65 = 0.079 t$$

$$P_1 = 0.64 \times 1.65 = 1.06 t$$

$$P_2 = 0.25 \times 1.65 = 0.41 "$$

$$P_3 = 0.30 \times 1.65 = 0.50 "$$

$$P_4 = 0.33 \times 1.65 = 0.54 "$$

$$P_5 = 0.05 \times 1.65 = 0.08 "$$

Sobrecarga

$$P_1 = 12 \times 1.65 = 19.80 t$$

ripado 30cm

repart. de sobrecarga y de vía + travesa

$$b = 2.40 + 2 \times 0.45 \cotg 75^\circ = 2.77 m$$

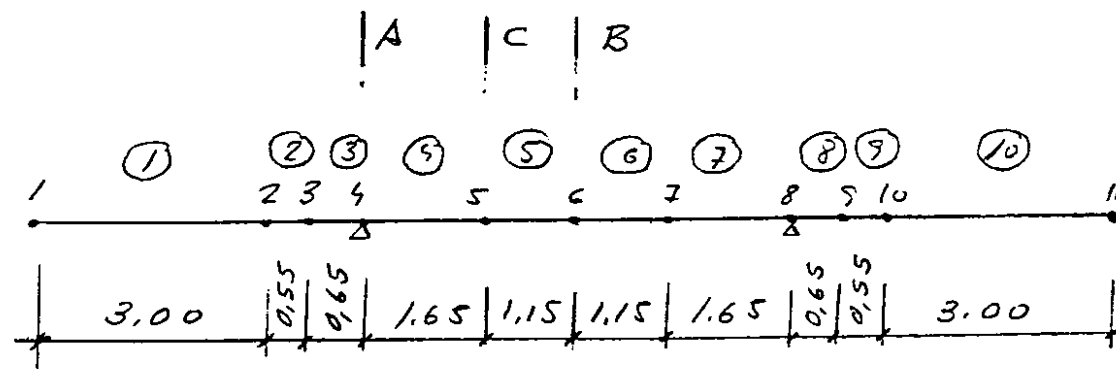
Torsor unitario

$$A = 7.35 \times 1.40 = 10.29 \text{ m}^2$$

$$f = \frac{1}{2A} = 1/2 \times 10.29 = 0.0486 \text{ t}$$

$$m = 0.0486 \times 1.40 = 0.068 \text{ mt/m}$$

Esquema estructural



Resumen de resultados

Peso propio

$$M_A = -12.89 \text{ mt}$$

$$R = 59.08 \text{ t}$$

$$M_B = 13.80 \text{ mt}$$

$$V_c = 7.83 \text{ t}$$

Superestructura

$$M_A = -10.85 - 0.25 = -11.10 \text{ mt} \quad R = 19.80 \text{ t}$$

$$M_B = -4.64 + 0.58 = -4.06 \text{ mt}$$

$$V_c = 1.83 + 0.11 = 1.94 \text{ t}$$

Sobrecarga

$$M_A = -4.65 \text{ mt}$$

$$R = 39.76 \text{ t}$$

$$M_B = 12.14 \text{ mt}$$

$$V_c = 2.13 \text{ t}$$

cargas que se transmiten canalizadas a través de la viga

5 nervios

Peso propio

$$R = 175.70 - 59.08 = 116.82 \text{ t} \rightarrow 23.36 \text{ t}$$

Superestructura

$$R = 57.93 - 19.80 = 38.13 \text{ t} \rightarrow 7.63 \text{ t}$$

Pre tensionado

$$R = 30.38 \text{ t} \rightarrow 6.08 \text{ t}$$

Sobrecarga

$$R = 163.22 - 39.76 = 123.46 \text{ t} \rightarrow 24.69 \text{ t}$$

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*****
*
*      S T A A D - III
*      REVISION 10.4a (VERSION 10 LEVEL 4a)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS, INC.
*      DATE=      NOV 26, 1999
*      TIME=      17:59:40
*
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1. STAAD PLANE RIOSTRA DE ESTRIBO
2. UNIT METER MTON
3. JOINT COORDINATES
4.   1 -7.00  0.00  0.00
5.   2 -4.00  0.00  0.00
6.   3 -3.45  0.00  0.00
7.   4 -2.80  0.00  0.00
8.   5 -1.15  0.00  0.00
9.   6  0.00  0.00  0.00
10.  7  1.15  0.00  0.00
11.  8  2.80  0.00  0.00
12.  9  3.45  0.00  0.00
13. 10  4.00  0.00  0.00
14. 11  7.00  0.00  0.00
15. MEMBER INCIDENCES
16.   1   1   2
17.   2   2   3
18.   3   3   4
19.   4   4   5
20.   5   5   6
21.   6   6   7
22.   7   7   8
23.   8   8   9
24.   9   9  10
25.  10  10  11
26. MEMBER PROPERTIES
27. 1 10 PRISMATIC YD 0.30 ZD 1.65
28. 2  9 PRISMATIC YD 1.03 ZD 1.65
29. 3 TO 8 PRISMATIC YD 1.65 ZD 1.65
30. SUPPORTS
31. 4 PINNED
32. 8 PINNED
33. CONSTANTS
34. E 3.5E6 ALL
35. DENSITY 2.5 ALL
36. LOAD 1 PESO PROPIO
37. MEMBER LOAD
38. 1 TRAP GY -0.83 -1.65
39. 2 TRAP GY -1.65 -6.81
40. 3 TO 8 UNI GY -6.81
41. 9 TRAP GY -6.81 -1.65
42. 10 TRAP GY -1.65 -0.83
43. LOAD 2 SUPERESTRUCTURA
44. MEMBER LOAD
45. 1 UNI GY -1.52 2.05 3.
46. 2 TO 9 UNI GY -1.52
47. 10 UNI GY -1.52 0. 0.95

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48. 1 UNI GY -.41 .3 1.85
49. 10 UNI GY -.41 1.15 2.7
50. 1 TRAP GY -0. -0.02 2.05 3.
51. 2 TRAP GY -0.02 -0.03
52. 3 TRAP GY -0.03 -0.04
53. 4 TRAP GY -0.04 -0.06
54. 5 TRAP GY -0.06 -0.08
55. 6 TRAP GY -0.08 -0.06
56. 7 TRAP GY -0.06 -0.04
57. 8 TRAP GY -0.04 -0.03
58. 9 TRAP GY -0.03 -0.02
59. 10 TRAP GY -0.02 -0. 0. 0.95
60. 1 CON GY -0.08 0.01
61. 1 CON GY -0.54 0.10
62. 1 CON GY -0.50 0.50
63. 1 CON GY -0.41 1.95
64. 10 CON GY -0.41 1.05
65. 10 CON GY -0.50 2.50
66. 10 CON GY -0.54 2.90
67. 10 CON GY -0.08 2.99
68. LOAD 3 TRAVIESA+VIA
69. MEMBER LOAD
70. 2 UNI GY -0.38 0.36 0.55
71. 3 TO 4 UNI GY -0.38
72. 5 UNI GY -0.38 0. 0.29
73. 6 UNI GY -0.38 0.86 1.15
74. 7 TO 8 UNI GY -0.38
75. 9 UNI GY -0.38 0. 0.19
76. LOAD 4 TRAVIESA+VIA (RIPADO)
77. MEMBER LOAD
78. 2 UNI GY -0.38 0.06 0.55
79. 3 UNI GY -0.38
80. 4 UNI GY -0.38 0. 1.64
81. 6 UNI GY -0.38 0.56 1.15
82. 7 UNI GY -0.38
83. 8 UNI GY -0.38 0. 0.54
84. LOAD 5 SOBRECARGA
85. MEMBER LOAD
86. 2 UNI GY -7.15 0.36 0.55
87. 3 TO 4 UNI GY -7.15
88. 5 UNI GY -7.15 0. 0.29
89. 6 UNI GY -7.15 0.86 1.15
90. 7 TO 8 UNI GY -7.15
91. 9 UNI GY -7.15 0. 0.19
92. LOAD 6 SOBRECARGA (RIPADO)
93. MEMBER LOAD
94. 2 UNI GY -7.15 0.06 0.55
95. 3 UNI GY -7.15
96. 4 UNI GY -7.15 0. 1.64
97. 6 UNI GY -7.15 0.56 1.15
98. 7 UNI GY -7.15
99. 8 UNI GY -7.15 0. 0.54
100. LOAD 7 CARGAS UNITARIAS
101. MEMBER LOAD
102. 3 CON GY -1. 0.15
103. 4 CON GY -1. 1.15
104. 6 CON GY -1. 0.001
105. 7 CON GY -1. 0.5
106. 8 CON GY -1. 0.5
107. LOAD 8 TORSOR UNITARIO 100 T.

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108. MEMBER LOAD
 109. 2 UMOM Z 6.8 3.22 3.45
 110. 3 TO 8 UMOM Z 6.8
 111. 9 UMOM Z 6.8 0. 0.23
 112. PERFORM ANALYSIS

ORIGINAL BAND-WIDTH = 1
 REDUCED BAND-WIDTH = 1

++ CHECKING LOAD DATA.
 ++ PROCESSING SUPPORT CONDITION.
 ++ PROCESSING AND SETTING UP LOAD VECTOR.

++ PROCESSING ELEMENT STIFFNESS MATRIX. 17:59:43
 ++ PROCESSING GLOBAL STIFFNESS MATRIX. 17:59:43
 ++ PROCESSING TRIANGULAR FACTORIZATION. 17:59:43
 ++ CALCULATING JOINT DISPLACEMENTS. 17:59:43
 ++ CALCULATING ELEMENT FORCES. 17:59:44

113. PRINT ANALYSIS RESULTS

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	.00000	-.08158	.00000	.00000	.00000	.00036
	2	.00000	-.10520	.00000	.00000	.00000	.00047
	3	.00000	.00022	.00000	.00000	.00000	.00000
	4	.00000	.00017	.00000	.00000	.00000	.00000
	5	.00000	.00412	.00000	.00000	.00000	-.00001
	6	.00000	.00327	.00000	.00000	.00000	-.00001
	7	.00000	.00058	.00000	.00000	.00000	-.00000
	8	.00000	.00268	.00000	.00000	.00000	-.00000
2	1	.00000	.00030	.00000	.00000	.00000	.00000
	2	.00000	-.00149	.00000	.00000	.00000	.00002
	3	.00000	.00006	.00000	.00000	.00000	.00000
	4	.00000	.00005	.00000	.00000	.00000	.00000
	5	.00000	.00118	.00000	.00000	.00000	-.00001
	6	.00000	.00096	.00000	.00000	.00000	-.00001
	7	.00000	.00017	.00000	.00000	.00000	-.00000
	8	.00000	.00122	.00000	.00000	.00000	-.00000
3	1	.00000	.00031	.00000	.00000	.00000	-.00000
	2	.00000	-.00066	.00000	.00000	.00000	.00001
	3	.00000	.00003	.00000	.00000	.00000	.00000
	4	.00000	.00003	.00000	.00000	.00000	.00000
	5	.00000	.00064	.00000	.00000	.00000	-.00001
	6	.00000	.00054	.00000	.00000	.00000	-.00001
	7	.00000	.00009	.00000	.00000	.00000	-.00000
	8	.00000	-.00020	.00000	.00000	.00000	.00000
4	1	.00000	.00000	.00000	.00000	.00000	-.00001
	2	.00000	.00000	.00000	.00000	.00000	.00001
	3	.00000	.00000	.00000	.00000	.00000	.00000
	4	.00000	.00000	.00000	.00000	.00000	.00000
	5	.00000	.00000	.00000	.00000	.00000	-.00001
	6	.00000	.00000	.00000	.00000	.00000	-.00001
	7	.00000	.00000	.00000	.00000	.00000	-.00000
	8	.00000	.00000	.00000	.00000	.00000	.00000
5	1	.00000	-.00130	.00000	.00000	.00000	-.00001
	2	.00000	.00088	.00000	.00000	.00000	.00000
	3	.00000	-.00008	.00000	.00000	.00000	.00000
	4	.00000	-.00007	.00000	.00000	.00000	.00000
	5	.00000	-.00145	.00000	.00000	.00000	-.00001
	6	.00000	-.00135	.00000	.00000	.00000	-.00001
	7	.00000	-.00022	.00000	.00000	.00000	.00000
	8	.00000	.00014	.00000	.00000	.00000	.00000
6	1	.00000	-.00170	.00000	.00000	.00000	.00000
	2	.00000	.00103	.00000	.00000	.00000	.00000
	3	.00000	-.00009	.00000	.00000	.00000	.00000
	4	.00000	-.00009	.00000	.00000	.00000	.00000
	5	.00000	-.00179	.00000	.00000	.00000	.00000
	6	.00000	-.00176	.00000	.00000	.00000	.00000
	7	.00000	-.00028	.00000	.00000	.00000	.00000
	8	.00000	.00000	.00000	.00000	.00000	-.00000

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
7	1	.00000	-.00130	.00000	.00000	.00000	.00001
	2	.00000	.00088	.00000	.00000	.00000	-.00000
	3	.00000	-.00008	.00000	.00000	.00000	.00000
	4	.00000	-.00008	.00000	.00000	.00000	.00000
	5	.00000	-.00145	.00000	.00000	.00000	.00001
	6	.00000	-.00150	.00000	.00000	.00000	.00001
	7	.00000	-.00022	.00000	.00000	.00000	.00000
	8	.00000	-.00014	.00000	.00000	.00000	.00000
8	1	.00000	.00000	.00000	.00000	.00000	.00001
	2	.00000	.00000	.00000	.00000	.00000	-.00001
	3	.00000	.00000	.00000	.00000	.00000	.00000
	4	.00000	.00000	.00000	.00000	.00000	.00000
	5	.00000	.00000	.00000	.00000	.00000	.00001
	6	.00000	.00000	.00000	.00000	.00000	.00001
	7	.00000	.00000	.00000	.00000	.00000	.00000
	8	.00000	.00000	.00000	.00000	.00000	.00000
9	1	.00000	.00031	.00000	.00000	.00000	.00000
	2	.00000	-.00066	.00000	.00000	.00000	-.00001
	3	.00000	.00003	.00000	.00000	.00000	.00000
	4	.00000	.00004	.00000	.00000	.00000	.00000
	5	.00000	.00064	.00000	.00000	.00000	.00001
	6	.00000	.00071	.00000	.00000	.00000	.00001
	7	.00000	.00009	.00000	.00000	.00000	.00000
	8	.00000	.00020	.00000	.00000	.00000	.00000
10	1	.00000	.00030	.00000	.00000	.00000	-.00000
	2	.00000	-.00149	.00000	.00000	.00000	-.00002
	3	.00000	.00006	.00000	.00000	.00000	.00000
	4	.00000	.00007	.00000	.00000	.00000	.00000
	5	.00000	.00118	.00000	.00000	.00000	.00001
	6	.00000	.00131	.00000	.00000	.00000	.00001
	7	.00000	.00017	.00000	.00000	.00000	.00000
	8	.00000	.00040	.00000	.00000	.00000	.00000
11	1	.00000	-.08158	.00000	.00000	.00000	-.00036
	2	.00000	-.10520	.00000	.00000	.00000	-.00047
	3	.00000	.00022	.00000	.00000	.00000	.00000
	4	.00000	.00024	.00000	.00000	.00000	.00000
	5	.00000	.00412	.00000	.00000	.00000	.00001
	6	.00000	.00458	.00000	.00000	.00000	.00001
	7	.00000	.00058	.00000	.00000	.00000	.00000
	8	.00000	.00154	.00000	.00000	.00000	.00000

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
4	1	.00	29.54	.00	.00	.00	.00
	2	.00	9.90	.00	.00	.00	.00
	3	.00	1.06	.00	.00	.00	.00
	4	.00	1.17	.00	.00	.00	.00
	5	.00	19.88	.00	.00	.00	.00
	6	.00	22.01	.00	.00	.00	.00
	7	.00	2.50	.00	.00	.00	.00
	8	.00	8.94	.00	.00	.00	.00
8	1	.00	29.54	.00	.00	.00	.00
	2	.00	9.90	.00	.00	.00	.00
	3	.00	1.06	.00	.00	.00	.00
	4	.00	.94	.00	.00	.00	.00
	5	.00	19.88	.00	.00	.00	.00
	6	.00	17.75	.00	.00	.00	.00
	7	.00	2.50	.00	.00	.00	.00
	8	.00	-8.94	.00	.00	.00	.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	.00	.00	.00	.00	.00	.00
		2	.00	3.72	.00	.00	.00	-4.97
	2	1	.00	.00	.00	.00	.00	.00
		2	.00	3.62	.00	.00	.00	-5.40
	3	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
	4	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
	5	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
	6	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
	7	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
	8	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
2	1	2	.00	-3.72	.00	.00	.00	4.97
		3	.00	6.05	.00	.00	.00	-7.52
	2	2	.00	-3.62	.00	.00	.00	5.40
		3	.00	4.47	.00	.00	.00	-7.62
	3	2	.00	.00	.00	.00	.00	.00
		3	.00	.07	.00	.00	.00	-.01
	4	2	.00	.00	.00	.00	.00	.00
		3	.00	.19	.00	.00	.00	-.05
	5	2	.00	.00	.00	.00	.00	.00
		3	.00	1.36	.00	.00	.00	-.13
	6	2	.00	.00	.00	.00	.00	.00
		3	.00	3.50	.00	.00	.00	-.86
	7	2	.00	.00	.00	.00	.00	.00
		3	.00	.00	.00	.00	.00	.00
	8	2	.00	.00	.00	.00	.00	.00
		3	.00	.00	.00	.00	.00	-1.56
3	1	3	.00	-6.05	.00	.00	.00	7.52
		4	.00	10.47	.00	.00	.00	-12.89
	2	3	.00	-4.47	.00	.00	.00	7.62
		4	.00	5.48	.00	.00	.00	-10.85
	3	3	.00	-.07	.00	.00	.00	.01
		4	.00	.32	.00	.00	.00	-.13
	4	3	.00	-.19	.00	.00	.00	.05
		4	.00	.43	.00	.00	.00	-.25
	5	3	.00	-1.36	.00	.00	.00	.13
		4	.00	6.01	.00	.00	.00	-2.52
	6	3	.00	-3.50	.00	.00	.00	.86
		4	.00	8.15	.00	.00	.00	-4.65
	7	3	.00	.00	.00	.00	.00	.00
		4	.00	1.00	.00	.00	.00	-.50

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	8	3	.00	.00	.00	.00	.00	1.56
		4	.00	.00	.00	.00	.00	-5.98
4	1	4	.00	19.07	.00	.00	.00	12.89
		5	.00	-7.83	.00	.00	.00	9.30
	2	4	.00	4.42	.00	.00	.00	10.85
		5	.00	-1.83	.00	.00	.00	-5.70
	3	4	.00	.74	.00	.00	.00	.13
		5	.00	-.11	.00	.00	.00	.57
	4	4	.00	.74	.00	.00	.00	.25
		5	.00	-.11	.00	.00	.00	.45
	5	4	.00	13.87	.00	.00	.00	2.52
		5	.00	-2.07	.00	.00	.00	10.63
	6	4	.00	13.86	.00	.00	.00	4.65
		5	.00	-2.13	.00	.00	.00	8.48
	7	4	.00	1.50	.00	.00	.00	.50
		5	.00	-.50	.00	.00	.00	1.47
	8	4	.00	8.94	.00	.00	.00	5.98
		5	.00	-8.94	.00	.00	.00	-2.46
5	1	5	.00	7.83	.00	.00	.00	-9.30
		6	.00	.00	.00	.00	.00	13.80
	2	5	.00	1.83	.00	.00	.00	5.70
		6	.00	.00	.00	.00	.00	-4.64
	3	5	.00	.11	.00	.00	.00	-.57
		6	.00	.00	.00	.00	.00	.58
	4	5	.00	.11	.00	.00	.00	-.45
		6	.00	-.11	.00	.00	.00	.58
	5	5	.00	2.07	.00	.00	.00	-10.63
		6	.00	.00	.00	.00	.00	10.93
	6	5	.00	2.13	.00	.00	.00	-8.48
		6	.00	-2.13	.00	.00	.00	10.93
	7	5	.00	.50	.00	.00	.00	-1.47
		6	.00	-.50	.00	.00	.00	2.05
	8	5	.00	8.94	.00	.00	.00	2.46
		6	.00	-8.94	.00	.00	.00	.00
6	1	6	.00	.00	.00	.00	.00	-13.80
		7	.00	7.83	.00	.00	.00	9.30
	2	6	.00	.00	.00	.00	.00	4.64
		7	.00	1.83	.00	.00	.00	-5.70
	3	6	.00	.00	.00	.00	.00	-.58
		7	.00	.11	.00	.00	.00	.57
	4	6	.00	.11	.00	.00	.00	-.58
		7	.00	.11	.00	.00	.00	.65
	5	6	.00	.00	.00	.00	.00	-10.93
		7	.00	2.07	.00	.00	.00	10.63
	6	6	.00	2.13	.00	.00	.00	-10.93
		7	.00	2.09	.00	.00	.00	12.14
	7	6	.00	.50	.00	.00	.00	-2.05
		7	.00	.50	.00	.00	.00	1.48

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	8	6	.00	8.94	.00	.00	.00	.00
		7	.00	-8.94	.00	.00	.00	2.46
7	1	7	.00	-7.83	.00	.00	.00	-9.30
		8	.00	19.07	.00	.00	.00	-12.89
	2	7	.00	-1.83	.00	.00	.00	5.70
		8	.00	4.42	.00	.00	.00	-10.85
	3	7	.00	-.11	.00	.00	.00	-.57
		8	.00	.74	.00	.00	.00	-.13
	4	7	.00	-.11	.00	.00	.00	-.65
		8	.00	.74	.00	.00	.00	-.06
	5	7	.00	-2.07	.00	.00	.00	-10.63
		8	.00	13.87	.00	.00	.00	-2.52
	6	7	.00	-2.09	.00	.00	.00	-12.14
		8	.00	13.89	.00	.00	.00	-1.04
	7	7	.00	-.50	.00	.00	.00	-1.48
		8	.00	1.50	.00	.00	.00	-.50
	8	7	.00	8.94	.00	.00	.00	-2.46
		8	.00	-8.94	.00	.00	.00	5.98
8	1	8	.00	10.47	.00	.00	.00	12.89
		9	.00	-6.05	.00	.00	.00	-7.52
	2	8	.00	5.48	.00	.00	.00	10.85
		9	.00	-4.47	.00	.00	.00	-7.62
	3	8	.00	.32	.00	.00	.00	.13
		9	.00	-.07	.00	.00	.00	-.01
	4	8	.00	.21	.00	.00	.00	.06
		9	.00	.00	.00	.00	.00	.00
	5	8	.00	6.01	.00	.00	.00	2.52
		9	.00	-1.36	.00	.00	.00	-.13
	6	8	.00	3.86	.00	.00	.00	1.04
		9	.00	.00	.00	.00	.00	.00
	7	8	.00	1.00	.00	.00	.00	.50
		9	.00	.00	.00	.00	.00	.00
	8	8	.00	.00	.00	.00	.00	-5.98
		9	.00	.00	.00	.00	.00	1.56
9	1	9	.00	6.05	.00	.00	.00	7.52
		10	.00	-3.72	.00	.00	.00	-4.97
	2	9	.00	4.47	.00	.00	.00	7.62
		10	.00	-3.62	.00	.00	.00	-5.40
	3	9	.00	.07	.00	.00	.00	.01
		10	.00	.00	.00	.00	.00	.00
	4	9	.00	.00	.00	.00	.00	.00
		10	.00	.00	.00	.00	.00	.00
	5	9	.00	1.36	.00	.00	.00	.13
		10	.00	.00	.00	.00	.00	.00
	6	9	.00	.00	.00	.00	.00	.00
		10	.00	.00	.00	.00	.00	.00
	7	9	.00	.00	.00	.00	.00	.00
		10	.00	.00	.00	.00	.00	.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	8	9	.00	.00	.00	.00	.00	-1.56
		10	.00	.00	.00	.00	.00	.00
10	1	10	.00	3.72	.00	.00	.00	4.97
		11	.00	.00	.00	.00	.00	.00
	2	10	.00	3.62	.00	.00	.00	5.40
		11	.00	.00	.00	.00	.00	.00
	3	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00
	4	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00
	5	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00
	6	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00
	7	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00
	8	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00

***** END OF LATEST ANALYSIS RESULT *****

114. PLOT DISPLACEMENT FILE
 115. PLOT BENDING FILE
 116. FINISH

***** END OF STAAD-III *****

***** DATE= NOV 26,1999 TIME= 17:59:46 *****

 * FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
 * CALL (01) 686-7672, CROYDON, U.K. TLX. 929181 *

Esfuerzos

$$M_A = -0,5 \text{ g} \quad M_B = 2,05 \text{ g} \quad V_C = 0,5 \text{ g}$$

	M_A	M_B	V_C
Peso propio	- 11,68 mt	47,89 mt	11,68 t
Superestr.	- 3,82 "	15,64 "	3,82 "
Pretensado	- 3,04 "	12,46 "	3,04 "
Sobrecarga	- 12,35 "	50,61 "	12,35 "

Esfuerzos totales

	M_A	M_B	V_C
Peso propio	- 24,57 mt	61,69 mt	19,51 t
Superestructura	- 14,92 "	11,58 "	5,76 "
Pretensado	- 3,04 "	12,46 "	3,04 "
Sobrecargas	- 17,00 "	62,75 "	14,48 "

Incremento de esfuerzos debido al torsor

$$M_A = -0,0598 \times 80,72 = -4,83 \text{ mt}$$

$$M_B = 0$$

$$V_C = 0,0894 \times 80,72 = 7,22 \text{ t}$$

Dimensionamiento

$$M_A = -24,57 - 14,92 - 3,04 - 17,00 - 4,83 = -64,36 \text{ mt}$$

$$M_d = 96,54 \text{ mt} \quad U_{cd} = \frac{4000}{1,5} \times 1,50 \times 1,58 = 6320 \text{ t}$$

$$U_s = 59,84 \text{ t} \quad 0,04 U_{cd} = 252,8 \text{ t}$$

$$A_s = 13,49 \text{ cm}^2$$

$$A_{smin} = 13,49 \times \left(1,5 - 12,5 \cdot \frac{59,84}{6320}\right) = 18,64 \text{ cm}^2$$

$$M_B = 61,69 + 11,58 + 12,46 + 62,75 = 148,48 \text{ mt}$$

$$M_d = 222,72 \text{ mt} \quad U_s = 139,78 \text{ t} \quad A_s = 31,59 \text{ cm}^2$$

$$A_{smin} = 38,65 \text{ cm}^2$$

$$V_C = 19,51 + 5,76 + 3,04 + 14,48 + 7,22 = 50,01 \text{ t}$$

$$V_{cu} = 5 \sqrt{\frac{400}{1,5}} \times 1,50 \times 1,58 = 193,51 \text{ t}$$

$$V_d = 75,02 \text{ t} < V_{cu}$$

Cuelgue

$$R = 23,36 + 7,63 + 6,08 + 24,69 = 61,76 \text{ t}$$

$$R_d = 92,64 \text{ t} \quad A_s = 20,89 \text{ cm}^2$$

Riostra estriboHipótesis de 1/2 se (Solo una vía cargada)

$$\text{Reacción de S.C. + \Delta t} \quad N = 72.35 + 18.53 = 90.88 \text{ t}$$

$$\text{Momento transversal} \quad M = 213.19 \text{ mt}$$

Resumen de resultados

$$M_A = -4.65 \text{ mt}$$

$$R = 19.88 \text{ t}$$

$$M_B = 7.41 \text{ mt}$$

$$V_C = 1.95 \text{ t}$$

Cargas canalizadas a través de la riostraSobrecarga

$$R = 90.88 - 19.88 = 71.00 \text{ t} \rightarrow 14.20 \text{ t/vía}$$

EsfuerzosSobrecarga

$$M_A = -7.10 \text{ mt} \quad M_B = 29.11 \text{ mt} \quad V_C = 7.10 \text{ t}$$

Esfuerzos totalesSobrecarga

$$M_A = -11.75 \text{ mt} \quad M_B = 36.52 \text{ mt} \quad V_C = 9.05 \text{ t}$$

Incremento de esfuerzos debidos al torzor

$$M_A = -0.0588 \times 213.19 = -12.75 \text{ mt}$$

$$V_C = 0.0894 \times 213.19 = 19.06 \text{ t}$$

Dimensionamiento

$$M_A = -24.57 - 14.92 - 3.04 - 11.75 - 12.75 = -67.03 \text{ mt}$$

$$M_B = 100.55 \text{ mt} \quad U_{cd} = 6320 \text{ t} \quad 0.04 U_{cd} = 252.8 \text{ t}$$

$$U_s = 62.35 \text{ t} \quad A_s = 14.06 \text{ cm}^2$$

$$A_{s \text{ min}} = 14.06 \left(1.5 - 12.5 \frac{62.35}{6320} \right) = 19.36 \text{ cm}^2$$

$$M_B = 61.69 + 11.58 + 12.46 + 36.52 = 122.25 \text{ mt}$$

Inferior a las vías cargadas.

$$V_C = 19.51 + 5.76 + 3.04 + 9.05 + 19.06 = 56.42 \text{ t}$$

$$V_D = 84.63 < V_{cu}$$

Cuelgue

$$R = 23.36 + 7.63 + 6.08 + 14.20 = 51.27 \text{ t}$$

$$R_d = 76.91 \text{ t} \quad A_s = 17.34 \text{ cm}^2$$

```

*****
*
*      S T A A D - III
*      REVISION 10.4a(VERSION 10 LEVEL 4a)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS, INC.
*      DATE=      NOV 26, 1999
*      TIME=      17:59:50
*
*****

```

```

1. STAAD PLANE RIOSTRA DE ESTRIBO (1 TREN)
2. UNIT METER MTON
3. JOINT COORDINATES
4.   1 -7.00  0.00  0.00
5.   2 -4.00  0.00  0.00
6.   3 -3.45  0.00  0.00
7.   4 -2.80  0.00  0.00
8.   5 -1.15  0.00  0.00
9.   6  0.00  0.00  0.00
10.  7  1.15  0.00  0.00
11.  8  2.80  0.00  0.00
12.  9  3.45  0.00  0.00
13. 10  4.00  0.00  0.00
14. 11  7.00  0.00  0.00
15. MEMBER INCIDENCES
16.   1   1   2
17.   2   2   3
18.   3   3   4
19.   4   4   5
20.   5   5   6
21.   6   6   7
22.   7   7   8
23.   8   8   9
24.   9   9  10
25.  10  10  11
26. MEMBER PROPERTIES
27. 1 10 PRISMATIC YD 0.30 ZD 1.65
28. 2 9 PRISMATIC YD 1.03 ZD 1.65
29. 3 TO 8 PRISMATIC YD 1.65 ZD 1.65
30. SUPPORTS
31. 4 PINNED
32. 8 PINNED
33. CONSTANTS
34. E 3.5E6 ALL
35. DENSITY 2.5 ALL
36. LOAD 5 SOBRECARGA
37. MEMBER LOAD
38. 2 UNI GY -7.15 0.36 0.55
39. 3 TO 4 UNI GY -7.15
40. 5 UNI GY -7.15 0. 0.29
41. LOAD 6 SOBRECARGA (RIPADO)
42. MEMBER LOAD
43. 2 UNI GY -7.15 0.06 0.55
44. 3 UNI GY -7.15
45. 4 UNI GY -7.15 0. 1.64
46. PERFORM ANALYSIS

```

```

ORIGINAL BAND-WIDTH = 1
REDUCED BAND-WIDTH = 1

```

```

++ CHECKING LOAD DATA.
++ PROCESSING SUPPORT CONDITION.
++ PROCESSING AND SETTING UP LOAD VECTOR.

```

```

++ PROCESSING ELEMENT STIFFNESS MATRIX.      17:59:52
++ PROCESSING GLOBAL STIFFNESS MATRIX.      17:59:52
++ PROCESSING TRIANGULAR FACTORIZATION.      17:59:52
++ CALCULATING JOINT DISPLACEMENTS.        17:59:52
++ CALCULATING ELEMENT FORCES.               17:59:52

```

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47. PRINT ANALYSIS RESULTS

```

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	5	.00000	.00229	.00000	.00000	.00000	-.00001
	6	.00000	.00047	.00000	.00000	.00000	-.00000
2	5	.00000	.00066	.00000	.00000	.00000	-.00001
	6	.00000	.00016	.00000	.00000	.00000	-.00000
3	5	.00000	.00036	.00000	.00000	.00000	-.00001
	6	.00000	.00010	.00000	.00000	.00000	-.00000
4	5	.00000	.00000	.00000	.00000	.00000	-.00001
	6	.00000	.00000	.00000	.00000	.00000	-.00000
5	5	.00000	-.00080	.00000	.00000	.00000	-.00000
	6	.00000	-.00036	.00000	.00000	.00000	-.00000
6	5	.00000	-.00089	.00000	.00000	.00000	.00000
	6	.00000	-.00040	.00000	.00000	.00000	.00000
7	5	.00000	-.00065	.00000	.00000	.00000	.00000
	6	.00000	-.00029	.00000	.00000	.00000	.00000
8	5	.00000	.00000	.00000	.00000	.00000	.00000
	6	.00000	.00000	.00000	.00000	.00000	.00000
9	5	.00000	.00028	.00000	.00000	.00000	.00000
	6	.00000	.00013	.00000	.00000	.00000	.00000
10	5	.00000	.00052	.00000	.00000	.00000	.00000
	6	.00000	.00024	.00000	.00000	.00000	.00000
11	5	.00000	.00184	.00000	.00000	.00000	.00000
	6	.00000	.00083	.00000	.00000	.00000	.00000

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
4	5	.00	17.92	.00	.00	.00	.00
	6	.00	18.99	.00	.00	.00	.00
8	5	.00	1.95	.00	.00	.00	.00
	6	.00	.89	.00	.00	.00	.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	5	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
	6	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
2	5	2	.00	.00	.00	.00	.00	.00
		3	.00	1.36	.00	.00	.00	-.13
	6	2	.00	.00	.00	.00	.00	.00
		3	.00	3.50	.00	.00	.00	-.86
3	5	3	.00	-1.36	.00	.00	.00	.13
		4	.00	6.01	.00	.00	.00	-2.52
	6	3	.00	-3.50	.00	.00	.00	.86
		4	.00	8.15	.00	.00	.00	-4.65
4	5	4	.00	11.92	.00	.00	.00	2.52
		5	.00	-.12	.00	.00	.00	7.41
	6	4	.00	10.84	.00	.00	.00	4.65
		5	.00	.89	.00	.00	.00	3.51
5	5	5	.00	.12	.00	.00	.00	-7.41
		6	.00	1.95	.00	.00	.00	5.47
	6	5	.00	-.89	.00	.00	.00	-3.51
		6	.00	.89	.00	.00	.00	2.48
6	5	6	.00	-1.95	.00	.00	.00	-5.47
		7	.00	1.95	.00	.00	.00	3.22
	6	6	.00	-.89	.00	.00	.00	-2.48
		7	.00	.89	.00	.00	.00	1.46
7	5	7	.00	-1.95	.00	.00	.00	-3.22
		8	.00	1.95	.00	.00	.00	.00
	6	7	.00	-.89	.00	.00	.00	-1.46
		8	.00	.89	.00	.00	.00	.00
8	5	8	.00	.00	.00	.00	.00	.00
		9	.00	.00	.00	.00	.00	.00
	6	8	.00	.00	.00	.00	.00	.00
		9	.00	.00	.00	.00	.00	.00
9	5	9	.00	.00	.00	.00	.00	.00
		10	.00	.00	.00	.00	.00	.00
	6	9	.00	.00	.00	.00	.00	.00
		10	.00	.00	.00	.00	.00	.00
10	5	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	6	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00

***** END OF LATEST ANALYSIS RESULT *****

48. PLOT DISPLACEMENT FILE
 49. PLOT BENDING FILE
 50. FINISH

***** END OF STAAD-III *****

***** DATE= NOV 26,1999 TIME= 17:59:53 *****

 * FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
 * CALL (01) 686-7672, CROYDON, U.K. TLX. 929181 *

INTRODUCCION DE PRETENSADO

Introducción del pretensado

Armadura vertical

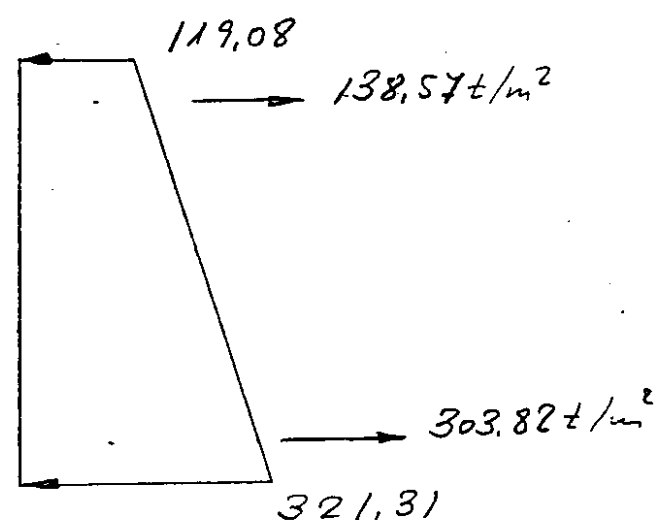
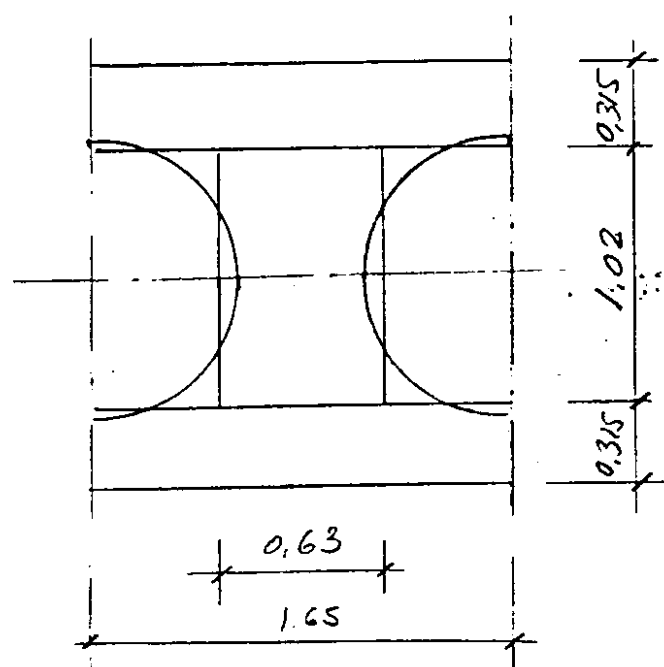
$$F = 2981.96 / 10 = 298.20 \text{ t/tendón}$$

$$2 \text{ tendones } a = 1.03 \text{ m } d = 1.65 \text{ m}$$

$$a/d = 0.642$$

$$U_s = 0.3 \times 298.20 \times (1 - 0.642) = 32.03 \text{ t } A_s = 10.68 \text{ cm}^2$$

Armadura horizontal



Tensiones pretensado final

Introducción de nervios a los superior

$$V = 138.57 \times 1.65 \times 0.315 = 72.02 \text{ t}$$

$$a = 0.63 \text{ m } d = 1.65 \text{ m } a/d = 0.381$$

$$U_s = 0.3 \times 72.02 \times (1 - 0.381) = 13.37 \text{ t } 4.46 \text{ cm}^2$$

Introducción de nervios a los inferior

$$V = 303.82 \times 1.65 \times 0.315 = 157.91 \text{ t } a/d = 0.381$$

$$U_s = 0.3 \times 157.91 \times (1 - 0.381) = 29.32 \text{ t } A_s = 9.77 \text{ cm}^2$$

Introducción en voladizos

$$V = 138.57 \times 0.315 \times 14.00 = 611.09 \text{ t}$$

$$a = 7.45 \text{ m } d = 14.00 \text{ m } a/d = 0.532$$

$$U_s = 0.3 \times 611.09 \times (1 - 0.532) = 85.80 \text{ t}$$

$$A_s = 28.60 \text{ cm}^2 \longrightarrow 2.04 \text{ cm}^2/\text{m en } 14 \text{ m.}$$

COMPROBACION A DESCARRILAMIENTO

1.- DESCARRILAMIENTO EN PUENTES

SE VAN A CONSIDERAR TRES SITUACIONES DE PROYECTO:

- 1.1- Descarrilamiento de locomotora y vagones, quedando dentro de la zona de vía.
- 1.2- Descarrilamiento de locomotora y vagones, quedando los vehículos a una distancia de 1,5s
- 1.3- Descarrilamiento de locomotora y vagones, quedando los vehículos en el borde del talud.

- COEFICIENTE MAYORACION ACCIONES $\gamma = 1,00$, COEFICIENTE MINORACION RESISTENCIA = 1,10

1.1- SITUACION DE PROYECTO 1

Debe prevenerse el colapso de los elementos principales de la estructura.

$$s = 1,40 \text{ m}$$

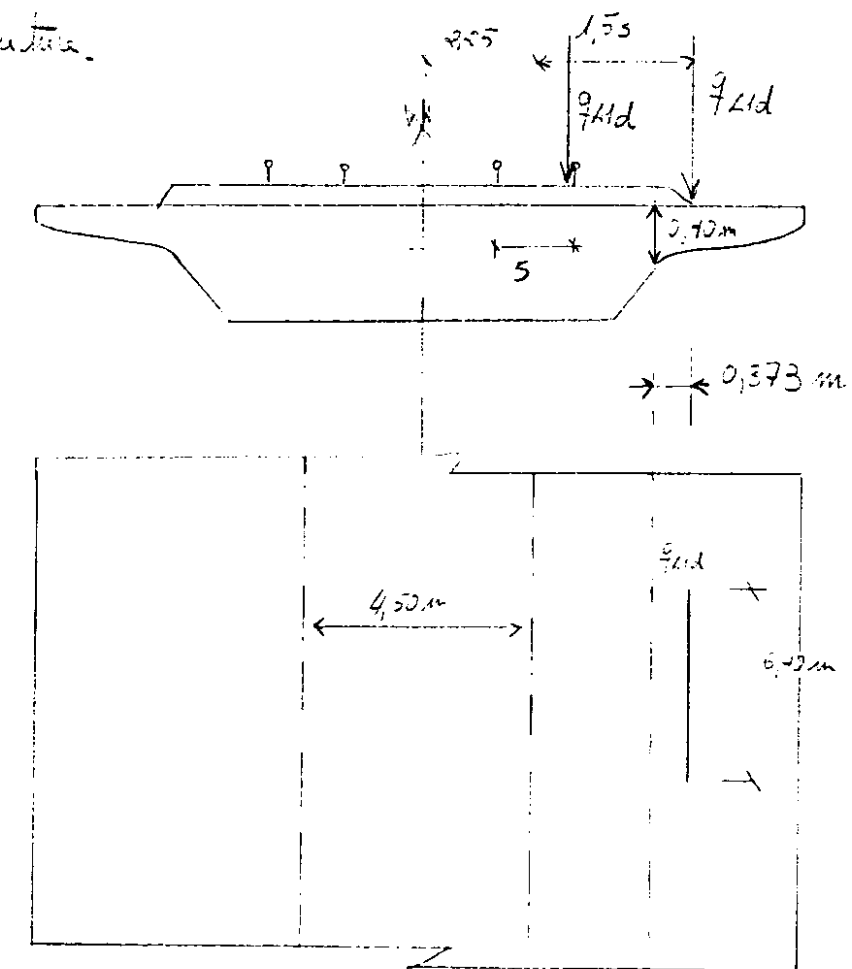
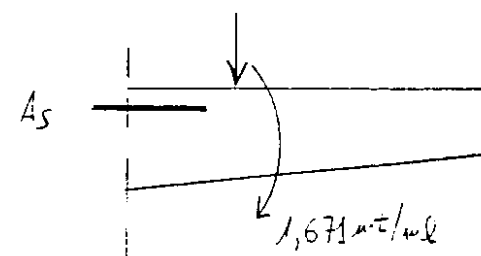
$$\text{separación máxima} = 1,5 \times 1,40 = 2,10 \text{ m}$$

$$q_{k,d} = 5 \text{ t/ml en } 6,40 \text{ m}$$

Suponiendo un reparto a 45°

$$\text{Momento Transversal } M = \frac{5 \times 6,40}{7,14} \times 0,3730 = 1,671 \text{ mt/ml}$$

$$\text{Armadura necesaria } A_s = 1,08 \text{ cm}^2/\text{ml}$$



SECCION
VOLADIZO

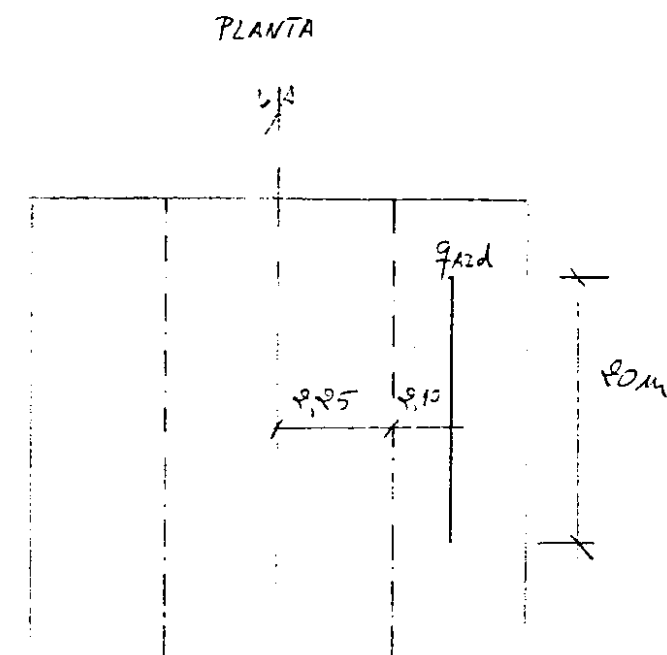
1.2.- SITUACION DE PROYECTO 2

- Debe prevenerse el colapso de la estructura.

$$q_{kd} = 8 \text{ t/ml}$$

$$M = \frac{8 \times 20}{20,74} \times 0,373 = 2,88 \text{ mt/ml}$$

$$A_s = 1,86 \text{ cm}^2/\text{ml}$$



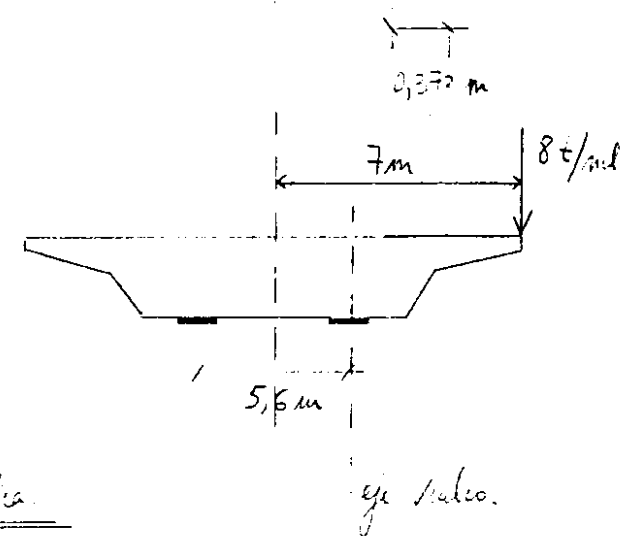
1.3.- SITUACION DE PROYECTO 3

- Debe prevenerse el vuelco de la estructura.

$$\text{Momento Volador} = (8 \times 7 \text{ m}) = 56 \text{ mt/ml}$$

$$\text{Carga Permanente} = 12,5 \text{ t/ml} + (10,16 \text{ m}^2 \times 2,5 \text{ t/m}^3) = 37,9 \text{ t/ml}$$

$$\text{Reacción apoyo} = \frac{37,9}{2} - \frac{56}{20} = 8,95 \text{ t} > 0 \text{ No Vuelco}$$



COMPROBACION A FATIGA

OBJETO

VIADUCTO GIF

HOJA N° 1 DE

FATIGA

PROYECTO N°

CALCULADO POR

COMPROBADO POR

FECHA

1.- COMPROBACION DE SEGURIDAD A FATIGA

- SE HACE LA COMPROBACION SEGUN LA FICHA 774-1(R) DE LA U.I.C.

1.1- COMPROBACION EN HORMIGON

- No es necesario hacer comprobación si se verifica la siguiente condición en servicio: (ART 81 FICHA 774-1)

$$\sigma_{COMPRESION} \leq 0,5 f_{ck} \approx 180 \text{ Kg/cm}^2 \Rightarrow \sigma_c < 180 \text{ Kg/cm}^2$$

- En este caso

$$\sigma_c = 72.6 \text{ Kg/cm}^2 < 180 \text{ Kg/cm}^2$$

1.2.- COMPROBACION EN ACEROS

$$\Delta \sigma_{MAX} \leq \Delta \sigma_{ADM} = \frac{\Delta f_{SK} \times K_A \times K_N}{\gamma_{m,fat} \times \gamma_{f,fat}} \times \frac{1}{K_t \times K_T \times \beta_T}$$

- Δf_{SK} Resistencia característica de acero a fatiga

$$\text{Acero pasivo} = 1800 \text{ kg/cm}^2 \quad (\text{ART 8.3.5})$$

$$\text{Acero activo} = 1850 \text{ kg/cm}^2 \quad (\text{ART 8.3.6})$$

- K_A Coeficiente en función de soldaduras y anclajes (ART 8.3.8)

$$K_A = 1$$

- K_N Coeficiente de reducción para número de ciclos de carga (ART 8.5.1)

$$K_N = 0,9 \quad (\text{Para } 30 \cdot 10^6 \text{ Tensiones máx./año})$$

- $\gamma_{m,fat}$ Coeficiente de seguridad para la resistencia a fatiga del material (ART 8.4.1)

- $\gamma_{f,fat}$ Coeficiente de seguridad para los cargas en el cálculo a fatiga (ART 8.4.2)

$$\gamma_{fat} = \gamma_{m,fat} \times \gamma_{f,fat} = \begin{matrix} 1,41 & \text{para A. Pasivo} \\ 1,78 & \text{para A. Activo} \end{matrix}$$

- K_T Coeficiente que depende de la luz de cálculo (ART 8.5.2)

$$L = 25 \text{ m. Acero activo} \quad K_T = 0,63$$

$$L = 25 \text{ m. Acero pasivo} \quad K_T = 0,63$$

K_T Coeficiente de intensidad de tráfico que para cargas suspensiones a 22,5 t/eje es (ART 8.5.3)

$$K_T = 1,12$$

β_T Coeficiente que tiene en cuenta la influencia de la doble vía. (ART. 8.5.4)

$$\beta_T = 0,78 \quad A. \text{ACTIVO}$$

$$\beta_T = 0,82 \quad A. \text{PASIVO}$$

Por tanto:

$$\Delta \sigma_{ADM, \text{ACTIVO}} = \frac{1800 \times 1 \times 0,9}{1,78} \times \frac{1}{1,12 \times 0,63 \times 0,78} = \underline{\underline{1551 \text{ Kg/cm}^2}}$$

$$\Delta \sigma_{ADM, \text{PASIVO}} = \frac{1800 \times 1 \times 0,90}{1,11} \times \frac{1}{1,12 \times 0,63 \times 0,82} = \underline{\underline{1985 \text{ Kg/cm}^2}}$$

1.2.1. $\Delta\sigma_{MAX}$ EN ACERO PASIVO

$$\Delta\sigma = \frac{5100}{1,5 \times 1,15} \alpha_1 = \underline{\underline{1183 \text{ Kg/cm}^2}} < 1985 \text{ Kg/cm}^2$$

α_1 = Coef. que tiene en cuenta la proporción entre el P.P. y el conjunto P.P. + C.P. + S.C.
 En este caso:

$$\alpha_1 = \frac{S.C.}{P.P. + C.P. + S.C.} = \frac{24 \text{ t/ml}}{25,4 + 14,2 + 24} \approx 0,4$$

1.2.2. $\Delta\sigma_{MAX}$ EN ACERO ACTIVO

Al no haber fisuración el $\Delta\sigma$ debido a la S.C.

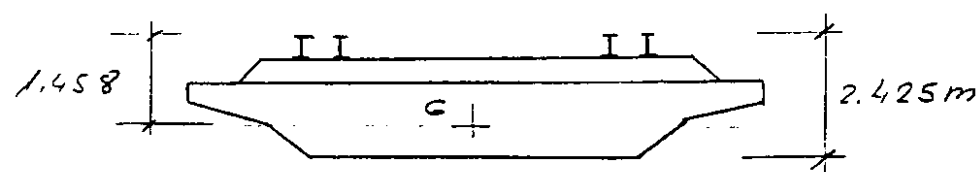
$$\Delta\sigma_{ACTIVO, SC} = \Delta\sigma_{HGBN, SC} \times \frac{E_p}{E_c} = \underline{\underline{\Delta\sigma_{HGBN, SC} \times 6 \ll 1654 \text{ Kg/cm}^2}}$$

ESFUERZOS HORIZONTALESFuerza centrífuga

$$F_{12} = (12 \text{ t/ml} \times \frac{200^2}{127R}) \times 2 = 0,504 \text{ t/ml}$$

$$F_{10} = (10 \text{ t/ml} \times \frac{200^2}{127R}) \times 2 = 0,42 \text{ "}$$

$$F_1 = (1 \text{ t/ml} \times \frac{200^2}{127R}) \times 2 = 0,042 \text{ "}$$



$$M_{12} (\text{mt/ml}) = 0,504 \text{ t/m} \times (1,458 + 1,80) \text{ m} = 1,642 \text{ mt/m}$$

$$M_{10} (\text{mt/ml}) = 0,42 \text{ "} \times (1,458 + 1,80) \text{ "} = 1,368 \text{ "}$$

$$M_1 (\text{mt/ml}) = 0,042 \text{ "} \times (1,458 + 1,80) \text{ "} = 0,1368 \text{ "}$$

Fuerza Lazo

$$F_L = 5 \text{ t}$$

$$M_L = 5 \times 1,458 = 7,29 \text{ mt}$$

Ripado

con SC. Tren tipo B

$$M_{R12} = 2 \times (12 + 0,52 + 0,12) \times 0,3 = 7,584 \text{ mt/m}$$

$$M_{R10} = 2 \times (10 + 0,52 + 0,12) \times 0,3 = 6,384 \text{ "}$$

$$M_{R1} = 2 \times (1 + 0,52 + 0,12) \times 0,3 = 0,6384 \text{ mt/m}$$

Sin SC.

$$M_R = 2 \times (0,52 + 0,12) \times 0,3 = 0,384 \text{ mt/m}$$

$$\text{con } 1/2 \text{ SC } M_R = [2 \times (0,52 + 0,12) + 12] \times 0,3 = 3,984 \text{ mt/m}$$

Viento

con SC. Tren tipo B

$$F_W = 0,2095 \times (2,3 + 3,5 + 0,5) = 1,3199 \text{ t/m}$$

$$M_W = 1,3199 \times [0,6 (2,3 + 3,50)] = 4,593 \text{ mt/m}$$

Sin SC.

$$F_W = 0,2095 \times (2,30 + 1) = 0,6914 \text{ t/m}$$

$$M_W = 0,6914 \times (0,6 \times 2,3) = 0,954 \text{ mt/m}$$

Frenado

Tren IPF

$$F_{FR} = \frac{12}{8} \times 1,9 = 2,85 \text{ t/m}$$

$$F_{FR} = \frac{10}{8} \times 1,9 = 2,375 \text{ t/m}$$

$$F_{R \text{ TOTAL}} = 2,85 \times 30 + 2,375 \times 22 = 140,13 \text{ t}$$

$$\text{ECJ-VIC } F_{FR} = 0,25 \times 8,305 \times 52 = 107,97 \text{ t}$$

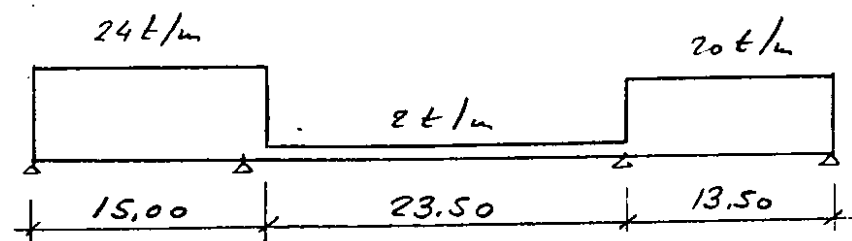
$$F_{ARR} = 100 \text{ t}$$

$$F_{TOTAL} = 207,97 \text{ t}$$

CARGAS SOBRE APOYOS

ESTRIBOS

Hip. Nmax



N.-
 peso propio 175.90 t
 superstr. 57.93 "
 Temperat. 30.89 "
 Sobrecarga 144.69 "
 Pretensado 30.38 "

 439.79 t

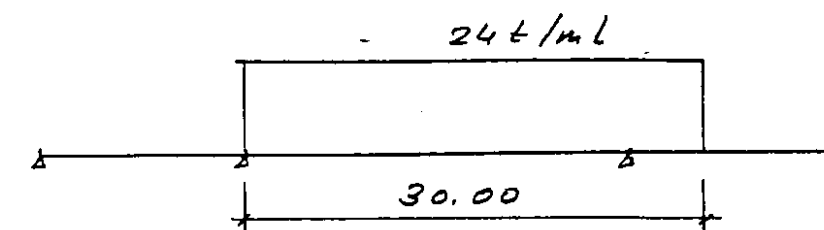
M₁ -

F. centríf. $1.642 \times 13.5 \times 0.5 = 11.08 \text{ mt}$
 F. Lazo = 7.29 "
 Ripado $7.584 \times 13.5 \times 0.5 = 51.19 \text{ "}$
 Viento $4.593 \times 13.5 \times 0.5 \times 0.3 = \frac{9.30 \text{ "}}{78.86 \text{ "}}$

H₇ -

F. centríf. $0.1504 \times 13.5 \times 0.5 = 3.40 \text{ t}$
 F. Lazo = 5.00 "
 Viento $1.32 \times 13.5 \times 0.5 \times 0.3 = \frac{2.67 \text{ "}}{11.07 \text{ "}}$

Hip. Nmin

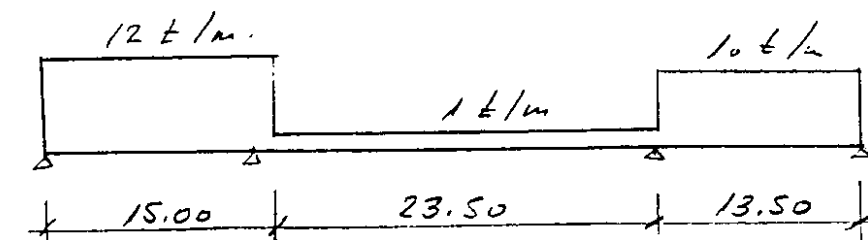


N.-
 peso propio 175.90 t
 superestruct. 57.93 "
 sobrecarga - 68.81 "
 pretensado 30.38 "

 195.40 "

M₇ viento $0.954 \times 13.5 \times 0.5 \times 0.3 = 1.93 \text{ mt}$
 Lazo = 7.29 " } 9.22 mt
 H₇ viento $0.6914 \times 13.5 \times 0.5 \times 0.3 = 1.40 \text{ t}$
 Lazo = 5.00 " } 6.40 t

Hip. T max
N max



N.-
 peso propio 175.90 t
 superestruct. 57.93 "
 Temperat. 30.89 "
 Sobrecarga 41.46 "
 pretensado 30.38 "

 336.56 t

M_T

Sobrecarga	$41.46 \times 4.50 = 186.57$	mt
F. centrífuga	$11.08 \times 0.5 = 5.54$	"
F. Lazo	$= 7.29$	"
Ripado	$51.19 \times 0.5 = 25.60$	"
Viento	$= 9.30$	"
	234.30	"

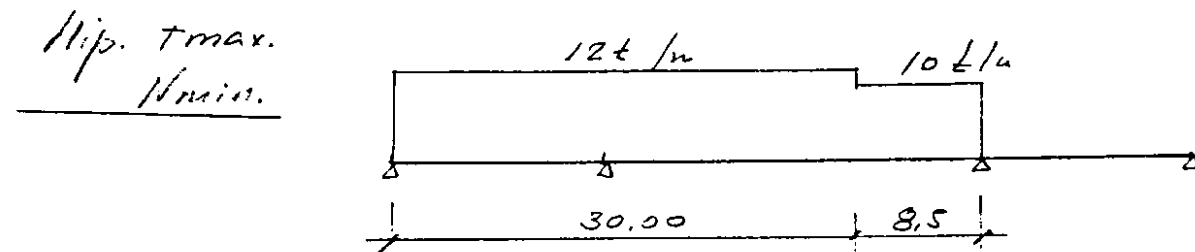
H_T

f. centrífuga	$3.40 \times 0.5 = 1.70$	t
F. lazo	$= 5.00$	"
Viento	$= 2.67$	"
	9.37	"

M_T :

f. centrífuga	$= 5.54$	mt
Lazo	$= 7.29$	"
Ripado	$= 25.60$	"
Viento	$= 9.30$	"
Sobrecarga	$39.35 \times 4.50 = 177.08$	"
Desbalastado	$35.17 \times 4.50 = 158.27$	"
	383.08	"

$H_T = 9.37$ t

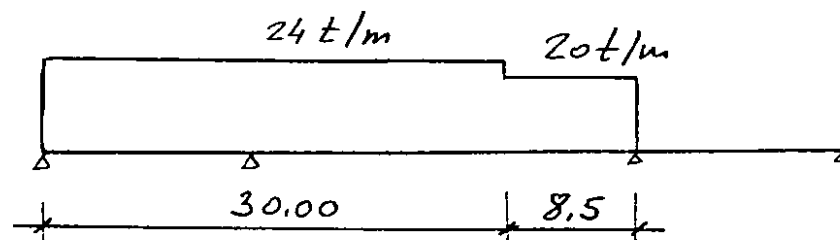


N :

peso propio	175.90	$= 175.90$	t
Superestruct	57.93	$= 57.93$	"
Temperatura	30.85	$= 30.85$	"
Pretensado	30.38	$= 30.38$	"
Sobrecarga	39.55	$= 39.55$	"
Desbalastado	$(-4.57 - 0.64) \times 13.5 \times 0.5 = -35.17$	$= -35.17$	"
		299.28	"

PILAS

Hip. N_{max}



N:

$$\begin{aligned} \text{Peso propio} & 654.82 \text{ t} \\ \text{Superestr.} & 321.31 \text{ ''} \\ \text{Pretensado} & - 30.45 \text{ ''} \\ \text{Sobrecarga} & 551.29 \text{ ''} \\ \hline & 1496.97 \text{ ''} \end{aligned}$$

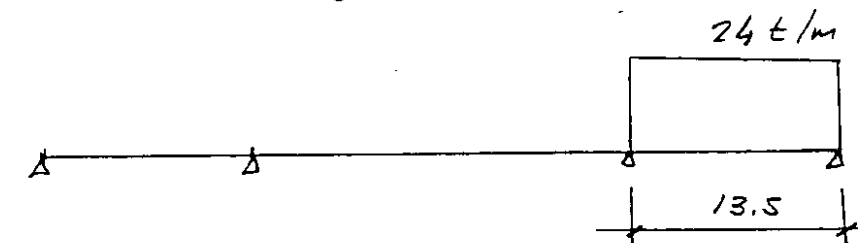
M_T:

$$\begin{aligned} F_{\text{centrif.}} & 1.642 \times 13.5 \times 0.5 + 1.642 \times 16.5 \times 16.75/25 + \\ & + 1.368 \times 8.5 \times 4.25/25 = 31.21 \text{ mt} \\ F_{\text{Lazo}} & = 7.29 \text{ ''} \\ \text{Ripado} & 7.584 \times 13.5 \times 0.5 + 6.384 \times 16.5 \times 16.75/25 + \\ & + 6.384 \times 8.5 \times 4.75/25 = 130.99 \text{ ''} \\ \text{Viento} & 4.593 \times (13.5 + 25.00) \times 0.5 \times 0.3 = 26.52 \text{ ''} \\ \hline & 196.01 \text{ ''} \end{aligned}$$

H_T:

$$\begin{aligned} F_{\text{centrif.}} & 0.504 \times 13.5 \times 0.5 + 0.504 \times 16.5 \times 16.75/25 + \\ & + 0.420 \times 8.5 \times 4.25/25 = 9.58 \text{ t} \\ F_{\text{Lazo}} & = 5.00 \text{ ''} \\ \text{Viento} & 1.32 \times (13.5 + 25.00) \times 0.5 \times 0.3 = 7.62 \text{ ''} \\ \hline & 22.20 \text{ ''} \end{aligned}$$

Hip. N_{min}



N:

$$\begin{aligned} \text{p.p + sup + pret.} & 945.68 \text{ t} \\ \text{Sobrecarga} & - 15.84 \text{ ''} \\ \hline & 929.84 \text{ ''} \end{aligned}$$

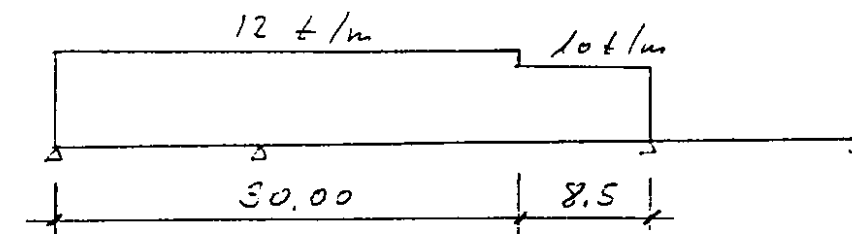
M_T:

$$\begin{aligned} \text{Viento} & 0.954 \times (13.5 + 25) \times 0.5 \times 0.3 = 5.51 \text{ mt} \\ \text{Lazo} & = 7.29 \text{ ''} \\ \hline & 12.80 \text{ ''} \end{aligned}$$

H_T: Viento

$$\begin{aligned} & 0.6914 \times (13.5 + 25) \times 0.5 \times 0.3 = 3.99 \text{ mt} \\ \text{Lazo} & = 5.00 \text{ ''} \\ \hline & 8.99 \text{ ''} \end{aligned}$$

Hip T_{max} I



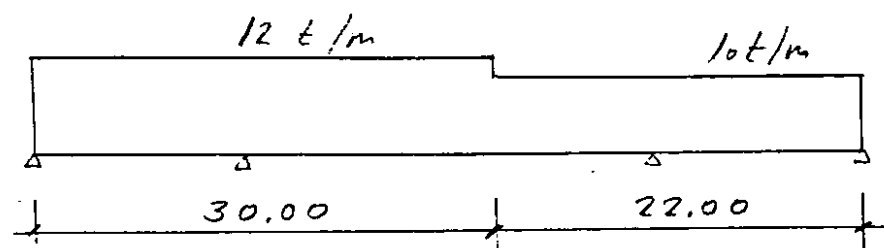
N:

$$\begin{aligned} \text{peso propio} & 654.82 \text{ t} \\ \text{Superestruct.} & 321.31 \text{ ''} \\ \text{Pretensado} & - 30.45 \text{ ''} \\ \text{Sobrecarga} & 275.65 \text{ ''} \\ \hline & 1221.33 \text{ ''} \end{aligned}$$

$$\begin{aligned}
 M_T \\
 F_{\text{centrif.}} & 31,21 \times 0,5 = 15,61 \text{ mt} \\
 F_{\text{lazo}} & = 5,00 \text{ ''} \\
 R_{\text{ripado}} & 130,99 \times 0,5 = 65,50 \text{ ''} \\
 V_{\text{viento}} & = 26,52 \text{ ''} \\
 \text{Sobrecarga} & 275,65 \times 4,5 = 1240,43 \text{ ''} \\
 & \underline{1353,06 \text{ ''}}
 \end{aligned}$$

$$\begin{aligned}
 H_T \\
 F_{\text{centrif.}} & 9,58 \times 0,5 = 4,79 \text{ t} \\
 F_{\text{lazo}} & 5,00 \text{ ''} \\
 V_{\text{viento}} & 7,62 \text{ ''} \\
 & \underline{17,41 \text{ ''}}
 \end{aligned}$$

Hip. T_{max} II



$$\begin{aligned}
 N: \\
 p.p = \text{sup} + \text{pret} & 945,68 = 945,68 \text{ t} \\
 \text{Sobrecarga} & 269,04 = 269,04 \text{ ''} \\
 \text{Desbalastado} & (-4,57 - 0,64) \times 15,00 = -78,15 \text{ ''} \\
 & \underline{1136,57 \text{ ''}}
 \end{aligned}$$

$$\begin{aligned}
 M_T \\
 f_{\text{centrif.}} + f_{\text{lazo}} + r_{\text{ripado}} + v_{\text{viento}} & = 112,63 \text{ mt} \\
 \text{Sobrecarga} & 269,04 \times 4,50 = 1210,68 \text{ ''} \\
 \text{Desbalastado} & 78,15 \times 4,50 = 351,68 \text{ ''} \\
 & \underline{1674,99 \text{ ''}}
 \end{aligned}$$

$$H_T = 17,41 \text{ t}$$

Hip. T_{max} III (T_{max} I + desbalastado)

$$N = 1221,33 - 78,15 = 1143,18 \text{ t}$$

$$H_T = 17,41 \text{ t}$$

$$M_T = 1353,06 + 351,68 = 1704,74 \text{ mt}$$

DIMENSIONAMIENTO APOYOS

Separación entre apoyos 5.60 m

Estribos N_{max}

$$N = 439.79 \text{ t} \quad M_r = 78.86 \text{ mt}$$

$$H_r = 11.07 \text{ t} \quad H_L = 439.79 \times 0.05 = 21.99 \text{ t}$$

$$R = \frac{439.79}{2} \pm \frac{78.86}{5.60} = \begin{cases} 233.98 \text{ t} \\ 205.85 \text{ t} \end{cases}$$

$$Q_T = 24.62 / 2 = 12.31 \text{ t}$$

 N_{min}

$$N = 195.40 \text{ t} \quad M_r = 9.22 \text{ mt}$$

$$H_r = 6.40 \text{ t} \quad H_L = 195.40 \times 0.05 = 9.77 \text{ t}$$

$$R = \frac{195.40}{2} \pm \frac{9.22}{5.60} = \begin{cases} 99.35 \text{ t} \\ 96.05 \text{ t} \end{cases}$$

$$Q_T = 11.68 / 2 = 5.84 \text{ t}$$

 $M_{Tmax} - N_{max}$

$$N = 336.56 \text{ t} \quad M_r = 234.30 \text{ mt}$$

$$H_r = 9.37 \text{ t} \quad H_L = 336.56 \times 0.05 = 16.83 \text{ t}$$

$$R = \frac{336.56}{2} \pm \frac{234.30}{5.60} = \begin{cases} 210.12 \text{ t} \\ 126.47 \text{ t} \end{cases}$$

$$Q_T = 19.26 / 2 = 9.63 \text{ t}$$

 $M_{Tmax} - N_{min}$

$$N = 299.28 \text{ t}$$

$$M_r = 383.08 \text{ mt}$$

$$H_r = 9.37 \text{ t}$$

$$H_L = 299.28 \times 0.05 = 14.96 \text{ t}$$

$$R = \frac{299.28}{2} \pm \frac{383.08}{5.60} = \begin{cases} 218.05 \text{ t} \\ 81.23 \text{ t} \end{cases}$$

$$Q_T = 17.65 / 2 = 8.83 \text{ t}$$

PU 300 (Apoyo guiado)

PL 300 (Apoyo Libre)

$$Q_2 < 30 \text{ t}$$

Pilas N_{max}

$$N = 1496.97 \text{ t}$$

$$M_r = 196.01 \text{ mt}$$

$$H_r = 22.20 \text{ t}$$

$$H_L = 1496.97 \times 0.05 = 74.85 \text{ t}$$

$$R = \frac{1496.97}{2} \pm \frac{196.01}{5.60} = \begin{cases} 783.99 \text{ t} \\ 35.00 \text{ t} \end{cases}$$

$$Q_T = 78.07 \text{ t}$$

 N_{min}

$$N = 929.84 \text{ t}$$

$$M_r = 12.80 \text{ mt}$$

$$H_r = 8.99 \text{ t}$$

$$H_L = 929.84 \times 0.05 = 46.49 \text{ t}$$

$$R = \frac{929.84}{2} \pm \frac{12.80}{5.60} = \begin{cases} 467.21 \text{ t} \\ 462.63 \text{ t} \end{cases}$$

$$Q_T = 47.35 \text{ t}$$

$M_{Tmax} - I$

$$N = 1221,33 \text{ t}$$

$$M_T = 1353,06 \text{ mt}$$

$$H_T = 17,41 \text{ t}$$

$$H_L = 1221,33 \times 0,05 = 61,07 \text{ t}$$

$$R = \frac{1221,33}{2} \pm \frac{1353,06}{5,60} = \begin{matrix} 852,28 \text{ t} \\ 369,05 \text{ t} \end{matrix}$$

$$Q = 63,50 / 2 = 31,75 \text{ t}$$

 $M_{Tmax} - II$

$$N = 1136,54 \text{ t}$$

$$M_T = 971,68 \text{ mt}$$

$$H_T = 17,41 \text{ t}$$

$$H_L = 1136,54 \times 0,05 = 56,83 \text{ t}$$

$$R = \frac{1136,54}{2} \pm \frac{971,68}{5,60} = \begin{matrix} 867,39 \text{ t} \\ 269,18 \text{ t} \end{matrix}$$

$$Q = 59,43 / 2 = 29,71 \text{ t}$$

 $M_{Tmax} - III$

$$N = 1143,16 \text{ t}$$

$$M_T = 1704,47 \text{ mt}$$

$$H_T = 17,41 \text{ t}$$

$$H_L = 1143,16 \times 0,05 = 57,16 \text{ t}$$

$$R = \frac{1143,16}{2} \pm \frac{1704,47}{5,60} = \begin{matrix} 875,96 \text{ t} \\ 267,22 \text{ t} \end{matrix}$$

$$Q = 59,45 / 2 = 29,73 \text{ t}$$

PU 900 (Apoyo guiado)

PL 900 (Apoyo libre)

$$Q_2 < 90 \text{ t}$$

PILAS

PILAS

esfuerzos en cabeza

coeficientes de mayoración

	Favorable	desfavorable
p. propio	1.5	1
superestructura	1.5	1
pretensado	1.1	0.9
temperatura	1.5	0
S.C.	1.5	1

Hip. N_{max}

N.	Características	Mayorados
Peso propio	654.82	982.23
Superestruct	321.31	481.97
Pretensado	-30.45	-27.41
Sobrecarga	551.29	826.94
	<u>1496.97 t</u>	<u>2263.73 t</u>
H _L	43.80 t	73.21
H _T	22.20	33.30 t

Características Mayorados
 M_T 196.01 mt 294.02 mt

Hip. N_{min}

N	Características	Mayorados
Peso propio	654.82	654.82
Superestructura	321.31	321.31
Pretensado	-30.45	-33.50
Sobrecarga	-15.84	-23.76
	<u>929.84 t</u>	<u>918.87 t</u>
H _L	48.80 t	48.80 t
H _T	8.99 t	13.49 t
M _T	12.80 mt	19.20 mt

Hip. T_{max I}

N	Características	Mayorados
peso propio	654.82	982.23
Superestructura	321.31	481.97
Pretensado	-30.45	-27.41
Sobrecarga	275.63	413.45
	<u>1221.33 t</u>	<u>1850.24 t</u>

	característicos	mayorados
H_L	48.80 t	73.21 t
H_T	17.41 t	26.12 t
M_T	1353.06 mt	2029.59 mt

Hip. Tmax II

N	Característico	Mayorados
peso propio	654.82	654.82
Superestruct.	321.31	321.31
pretensado	-30.45	-33.50
Desbalastado	-78.15	-117.23
Sobrecarga	<u>265.04</u>	<u>403.56</u>
	1136.57 t	1228.96 t

H_L	48.80 t	48.80 t
H_T	17.41 t	26.12 t
M_T	1674.99 mt	2512.49 mt

Hip Tmax III

N	Característico	Mayorado
peso propio	654.82 t	654.82 t
Superestructura	321.31 "	321.31 "
pretensado	-30.45 "	-33.50 "
Desbalastado	-78.15 "	-117.23 "
Sobrecarga	<u>275.63 "</u>	<u>413.45 "</u>
	1143.16 t	1238.85 t

H_L	$N \times 0.05$	48.80 t	48.80 t
H_T		17.41 t	26.12 t
M_T		1704.47 mt	2556.71 mt

DIMENSIONAMIENTO DE PILAS INCLUYENDO EFECTOS DE SEGUNDO ORDEN

VIADUCTO OF-556+1 - PILA 1 - PROGRAMA PILA V_1.60 - 11.11.99

MATERIALES:	HORMIGON	ACERO
"RESIST. CARACT. (kp/cm2):"	300	5100
"COEFICIENTE MINOR. GAMMA:"	1.5	1.15

"ALTURA DE LA PILA (m):" 12.50

COEFICIENTES ELASTICOS DE MUELLE EN CABEZA Y EN PIE:

SECCION - MOVIMIENTO	CABEZA-DIR x	CABEZA-DIR y	PIE- GIRO x	PIE- GIRO y
COEFICIENTE (unidades)	Kx (t/m)	Ky (t/m)	Fx (rad/mt)	Fy (rad/mt)
	00	00	1E-6	1E-6

DIMENSIONES Y ARMADURAS DE LAS SECCIONES:

SECCION:	BASE		CABEZA		RECUBR.
DIRECCION R/EJE PUENTE:	LONG. (x)	TRAN. (y)	LONG. (x)	TRAN. (y)	(cm)
"DIMENSION EXTERIOR (cm):"	140	710	140	710	
"ESPESOR DE LA PARED (cm):"	65	350	65	350	
"ARMADURA EXTERIOR (cm2):"	68	324	68	324	5
"ARMADURA INTERIOR (cm2):"	000	000	000	00	5

"NUM. DE HIPOTESIS DE CARGA:" 10

ACCIONES MAYORADAS EN LAS DISTINTAS HIPOTESIS:

HIP.	FUERZAS Y MOMENTOS EN LA CABEZA					FUERZAS EN EL FUSTE (t/m)				COEF.
	FUERZAS (t)		MOMENTOS (mt)			SEC. BASE		SEC. CABEZA		GAMMA
	Fx	Fy	Fz	Mx	My	fx0	fy0	fx1	fy1	PP
1	48.80	22.20	1496.97	531.43	104.79	0	0.10	0	0.10	1.
2	48.80	8.99	929.84	330.10	65.09	0	0.10	0	0.10	1.
3	48.80	17.41	1221.33	1353.06	85.50	0	0.10	0	0.10	1.
4	48.80	17.41	1136.57	1674.99	79.56	0	0.10	0	0.10	1
5	48.80	17.41	1143.16	1704.47	80.03	0	0.10	0	0.10	1
6	73.21	33.30	2263.73	803.63	158.47	0	0.15	0	0.15	1
7	48.80	13.49	918.87	326.20	64.33	0	0.15	0	0.15	1
8	73.21	26.12	1850.24	2029.59	129.52	0	0.15	0	0.15	1
9	48.80	26.12	1228.96	2512.49	86.03	0	0.15	0	0.15	1
10	48.80	26.12	1238.85	2556.71	86.72	0	0.15	0	0.15	1

VIADUCTO OF-556+1 - PILA 1 - PROGRAMA PILA V_1.60 - 11.11.99

HIPOTESIS 1 - TANTEO 1

Fpx = 48.800 t; Fpy = 22.200 t;

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	817.47	715.42	1807.28	0.144	2.842
1	0.001	0.001	786.41	652.46	1776.25	0.158	2.853
2	0.003	0.002	755.54	588.79	1745.22	0.154	2.603
3	0.005	0.003	724.84	524.53	1714.19	0.142	2.254
4	0.007	0.004	694.33	459.80	1683.16	0.128	1.892
5	0.010	0.005	664.01	394.73	1652.13	0.114	1.559
6	0.012	0.007	633.89	329.43	1621.09	0.102	1.262
7	0.016	0.008	603.96	264.00	1590.06	0.094	0.994
8	0.019	0.009	574.24	198.51	1559.03	0.088	0.743
9	0.022	0.010	544.73	133.05	1528.00	0.083	0.498
10	0.025	0.011	515.25	67.28	1496.97	0.079	0.251

Exc. totales result. cabeza 0.04495 0.34420
Exc. reales 1er ord. cabeza 0.07000 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	838.48	763.58	1807.28	0.168	3.318
1	0.001	0.001	807.01	699.63	1776.25	0.163	3.073
2	0.003	0.002	775.69	634.87	1745.22	0.151	2.711
3	0.005	0.003	744.51	569.45	1714.19	0.137	2.332
4	0.008	0.004	713.49	503.47	1683.16	0.122	1.982
5	0.010	0.006	682.63	437.06	1652.13	0.109	1.671
6	0.013	0.007	651.94	370.31	1621.09	0.101	1.393
7	0.017	0.008	621.41	303.32	1590.06	0.095	1.137
8	0.020	0.009	591.06	236.16	1559.03	0.091	0.884
9	0.024	0.010	560.87	168.89	1528.00	0.086	0.632
10	0.027	0.012	531.03	101.96	1496.97	0.081	0.381

Exc. totales result. cabeza 0.06811 0.35473
Exc. reales 1er ord. cabeza 0.07000 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	835.82	759.82	1807.28	0.180	3.530
1	0.001	0.001	804.68	696.57	1776.25	0.168	3.153
2	0.003	0.002	773.68	632.48	1745.22	0.154	2.739
3	0.005	0.003	742.84	567.71	1714.19	0.138	2.343
4	0.008	0.004	712.14	502.39	1683.16	0.124	1.991
5	0.010	0.006	681.61	436.63	1652.13	0.111	1.680
6	0.014	0.007	651.23	370.52	1621.09	0.102	1.401
7	0.017	0.008	621.03	304.16	1590.06	0.095	1.141
8	0.020	0.009	590.99	237.63	1559.03	0.091	0.889
9	0.024	0.010	561.13	170.99	1528.00	0.086	0.639
10	0.028	0.012	531.44	104.33	1496.97	0.081	0.390

Exc. totales result. cabeza 0.06970 0.35501
Exc. reales 1er ord. cabeza 0.07000 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	835.75	760.19	1807.28	0.189	3.713
1	0.001	0.001	804.62	696.96	1776.25	0.172	3.217
2	0.003	0.002	773.63	632.89	1745.22	0.155	2.759
3	0.005	0.003	742.78	568.13	1714.19	0.139	2.352

4	0.008	0.004	712.10	502.81	1683.16	0.124	1.997
5	0.011	0.006	681.57	437.05	1652.13	0.112	1.685
6	0.014	0.007	651.20	370.94	1621.09	0.102	1.403
7	0.017	0.008	621.00	304.59	1590.06	0.095	1.142
8	0.021	0.009	590.97	238.05	1559.03	0.091	0.891
9	0.024	0.010	561.11	171.41	1528.00	0.086	0.641
10	0.028	0.012	531.43	104.73	1496.97	0.081	0.391

Exc. totales result. cabeza 0.06996 0.35500
Exc. reales 1er ord. cabeza 0.07000 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	835.75	760.24	1807.28	0.190	3.726
1	0.001	0.001	804.62	697.01	1776.25	0.172	3.220
2	0.003	0.002	773.63	632.94	1745.22	0.155	2.760
3	0.005	0.003	742.79	568.18	1714.19	0.139	2.352
4	0.008	0.004	712.10	502.85	1683.16	0.124	1.997
5	0.011	0.006	681.57	437.09	1652.13	0.112	1.685
6	0.014	0.007	651.20	370.99	1621.09	0.102	1.403
7	0.017	0.008	621.00	304.63	1590.06	0.095	1.142
8	0.021	0.009	590.97	238.09	1559.03	0.091	0.891
9	0.024	0.010	561.11	171.44	1528.00	0.086	0.641
10	0.028	0.012	531.43	104.76	1496.97	0.081	0.391

Exc. totales result. cabeza 0.06998 0.35500
Exc. reales 1er ord. cabeza 0.07000 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	835.75	760.26	1807.28	0.190	3.732
1	0.001	0.001	804.62	697.04	1776.25	0.172	3.223
2	0.003	0.002	773.63	632.96	1745.22	0.155	2.761
3	0.005	0.003	742.79	568.20	1714.19	0.139	2.353
4	0.008	0.004	712.10	502.87	1683.16	0.124	1.998
5	0.011	0.006	681.57	437.11	1652.13	0.112	1.685
6	0.014	0.007	651.20	371.00	1621.09	0.102	1.403
7	0.017	0.008	621.00	304.64	1590.06	0.095	1.142
8	0.021	0.009	590.97	238.10	1559.03	0.091	0.891
9	0.024	0.010	561.11	171.46	1528.00	0.086	0.641
10	0.028	0.012	531.43	104.77	1496.97	0.081	0.391

Exc. totales result. cabeza 0.06999 0.35500
Exc. reales 1er ord. cabeza 0.07000 0.35500

Convergencia del equilibrio sin agotamiento
Fpx = 48.800 t; Fpy = 22.200 t

VIADUCTO OF-556+1 - PILA 1 - PROGRAMA PILA V_1.60 - 11.11.99

HIPOTESIS 2 - TANTEO 1

Fpx = 48.800 t; Fpy = 8.990 t;

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	450.66	675.65	1240.15	0.091	2.950
1	0.001	0.001	437.26	613.37	1209.12	0.105	3.213
2	0.003	0.001	424.03	550.57	1178.09	0.107	3.057
3	0.005	0.002	410.97	487.32	1147.06	0.102	2.674
4	0.007	0.002	398.09	423.75	1116.03	0.094	2.200
5	0.010	0.003	385.39	359.95	1085.00	0.085	1.721
6	0.013	0.004	372.86	296.05	1053.96	0.074	1.284
7	0.016	0.004	360.52	232.14	1022.93	0.063	0.918
8	0.020	0.005	348.37	168.29	991.90	0.054	0.629
9	0.023	0.006	336.40	104.56	960.87	0.051	0.384
10	0.027	0.006	324.53	40.57	929.84	0.049	0.149

Exc. totales result. cabeza 0.04363 0.34902
Exc. reales 1er ord. cabeza 0.07000 0.35501

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	458.91	711.35	1240.15	0.109	3.680
1	0.001	0.001	445.29	648.09	1209.12	0.111	3.551
2	0.003	0.001	431.83	584.22	1178.09	0.106	3.163
3	0.005	0.002	418.52	519.82	1147.06	0.098	2.663
4	0.008	0.002	405.36	455.04	1116.03	0.088	2.147
5	0.011	0.003	392.37	389.96	1085.00	0.077	1.672
6	0.014	0.004	379.55	324.71	1053.96	0.066	1.275
7	0.017	0.004	366.88	259.36	1022.93	0.057	0.967
8	0.021	0.005	354.39	193.96	991.90	0.053	0.714
9	0.025	0.006	342.07	128.57	960.87	0.051	0.473
10	0.028	0.006	330.01	63.62	929.84	0.050	0.234

Exc. totales result. cabeza 0.06842 0.35491
Exc. reales 1er ord. cabeza 0.07000 0.35501

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	457.29	705.75	1240.15	0.120	4.101
1	0.001	0.001	443.85	643.23	1209.12	0.115	3.715
2	0.003	0.001	430.57	580.05	1178.09	0.108	3.195
3	0.005	0.002	417.44	516.35	1147.06	0.098	2.638
4	0.008	0.002	404.47	452.26	1116.03	0.087	2.107
5	0.011	0.003	391.66	387.89	1085.00	0.076	1.642
6	0.014	0.004	379.01	323.34	1053.96	0.066	1.262
7	0.018	0.004	366.53	258.69	1022.93	0.057	0.966
8	0.021	0.005	354.22	194.00	991.90	0.053	0.714
9	0.025	0.006	342.08	129.31	960.87	0.051	0.475
10	0.029	0.006	330.11	64.68	929.84	0.050	0.238

Exc. totales result. cabeza 0.06957 0.35501
Exc. reales 1er ord. cabeza 0.07000 0.35501

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	457.26	706.45	1240.15	0.131	4.613
1	0.001	0.001	443.83	643.92	1209.12	0.120	3.909
2	0.003	0.001	430.55	580.71	1178.09	0.109	3.236
3	0.005	0.002	417.42	516.96	1147.06	0.097	2.621
4	0.008	0.002	404.45	452.82	1116.03	0.086	2.080

5	0.011	0.003	391.64	388.41	1085.00	0.075	1.626
6	0.015	0.004	379.00	323.83	1053.96	0.065	1.260
7	0.018	0.004	366.52	259.15	1022.93	0.057	0.968
8	0.022	0.005	354.21	194.42	991.90	0.053	0.716
9	0.026	0.006	342.07	129.70	960.87	0.051	0.477
10	0.030	0.006	330.10	65.03	929.84	0.050	0.239

Exc. totales result. cabeza 0.06994 0.35501
Exc. reales 1er ord. cabeza 0.07000 0.35501

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	457.27	706.50	1240.15	0.132	4.637
1	0.001	0.001	443.83	643.98	1209.12	0.120	3.918
2	0.003	0.001	430.55	580.76	1178.09	0.109	3.237
3	0.005	0.002	417.42	517.01	1147.06	0.097	2.621
4	0.008	0.002	404.45	452.87	1116.03	0.086	2.080
5	0.011	0.003	391.64	388.46	1085.00	0.075	1.626
6	0.015	0.004	379.00	323.87	1053.96	0.065	1.261
7	0.018	0.004	366.52	259.18	1022.93	0.057	0.968
8	0.022	0.005	354.21	194.46	991.90	0.053	0.716
9	0.026	0.006	342.07	129.73	960.87	0.051	0.477
10	0.030	0.006	330.10	65.06	929.84	0.050	0.239

Exc. totales result. cabeza 0.06997 0.35501
Exc. reales 1er ord. cabeza 0.07000 0.35501

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	457.27	706.53	1240.15	0.132	4.651
1	0.001	0.001	443.83	644.00	1209.12	0.120	3.923
2	0.003	0.001	430.55	580.78	1178.09	0.109	3.239
3	0.005	0.002	417.42	517.03	1147.06	0.097	2.621
4	0.008	0.002	404.45	452.89	1116.03	0.086	2.080
5	0.011	0.003	391.64	388.48	1085.00	0.075	1.626
6	0.015	0.004	379.00	323.89	1053.96	0.065	1.261
7	0.018	0.004	366.52	259.20	1022.93	0.057	0.968
8	0.022	0.005	354.21	194.47	991.90	0.053	0.716
9	0.026	0.006	342.07	129.75	960.87	0.051	0.477
10	0.030	0.006	330.10	65.07	929.84	0.050	0.239

Exc. totales result. cabeza 0.06998 0.35501
Exc. reales 1er ord. cabeza 0.07000 0.35501

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	457.27	706.55	1240.15	0.132	4.658
1	0.001	0.001	443.83	644.02	1209.12	0.121	3.926
2	0.003	0.001	430.55	580.80	1178.09	0.109	3.240
3	0.005	0.002	417.42	517.05	1147.06	0.097	2.621
4	0.008	0.002	404.45	452.91	1116.03	0.086	2.080
5	0.011	0.003	391.64	388.49	1085.00	0.075	1.626
6	0.015	0.004	379.00	323.90	1053.96	0.065	1.261
7	0.018	0.004	366.52	259.21	1022.93	0.057	0.968
8	0.022	0.005	354.21	194.48	991.90	0.053	0.716
9	0.026	0.006	342.07	129.76	960.87	0.051	0.477
10	0.030	0.006	330.10	65.08	929.84	0.050	0.239

Exc. totales result. cabeza 0.06999 0.35501
Exc. reales 1er ord. cabeza 0.07000 0.35501

Convergencia del equilibrio sin agotamiento
Fpx = 48.800 t; Fpy = 8.990 t

VIADUCTO OF-556+1 - PILA 1 - PROGRAMA PILA V_1.60 - 11.11.99

HIPOTESIS 3 - TANTEO 1

Fpx = 48.800 t; Fpy = 17.410 t;

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1579.86	696.10	1531.64	0.298	2.953
1	0.001	0.002	1553.65	633.47	1500.61	0.347	3.136
2	0.003	0.004	1527.63	570.19	1469.58	0.355	2.961
3	0.005	0.006	1501.82	506.35	1438.55	0.344	2.609
4	0.007	0.008	1476.22	442.07	1407.52	0.323	2.199
5	0.010	0.011	1450.84	377.47	1376.49	0.298	1.794
6	0.013	0.013	1425.69	312.67	1345.45	0.273	1.415
7	0.016	0.015	1400.77	247.78	1314.42	0.250	1.069
8	0.020	0.017	1376.10	182.87	1283.39	0.231	0.755
9	0.023	0.020	1351.68	118.04	1252.36	0.216	0.468
10	0.027	0.022	1327.18	52.92	1221.33	0.205	0.203

Exc. totales result. cabeza 0.04333 1.08667
Exc. reales ler ord. cabeza 0.07001 1.10786

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1615.21	739.98	1531.64	0.357	3.631
1	0.001	0.002	1588.20	676.32	1500.61	0.366	3.479
2	0.003	0.004	1561.33	611.90	1469.58	0.355	3.123
3	0.005	0.006	1534.61	546.83	1438.55	0.333	2.696
4	0.008	0.009	1508.03	481.24	1407.52	0.307	2.267
5	0.011	0.011	1481.61	415.24	1376.49	0.281	1.864
6	0.014	0.013	1455.36	348.94	1345.45	0.258	1.494
7	0.018	0.015	1429.29	282.45	1314.42	0.238	1.158
8	0.021	0.018	1403.40	215.84	1283.39	0.223	0.851
9	0.025	0.020	1377.70	149.18	1252.36	0.212	0.569
10	0.029	0.023	1352.50	82.92	1221.33	0.205	0.309

Exc. totales result. cabeza 0.06789 1.10740
Exc. reales ler ord. cabeza 0.07001 1.10786

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1609.73	735.61	1531.64	0.392	3.985
1	0.001	0.002	1583.37	672.68	1500.61	0.382	3.624
2	0.003	0.004	1557.14	608.94	1469.58	0.362	3.167
3	0.005	0.006	1531.05	544.55	1438.55	0.336	2.696
4	0.008	0.009	1505.11	479.63	1407.52	0.309	2.254
5	0.011	0.011	1479.33	414.30	1376.49	0.282	1.851
6	0.014	0.013	1453.72	348.68	1345.45	0.259	1.487
7	0.018	0.015	1428.27	282.85	1314.42	0.240	1.158
8	0.022	0.018	1403.01	216.90	1283.39	0.225	0.857
9	0.026	0.020	1377.94	150.90	1252.36	0.214	0.579
10	0.030	0.023	1353.06	84.94	1221.33	0.206	0.319

Exc. totales result. cabeza 0.06955 1.10786
Exc. reales ler ord. cabeza 0.07001 1.10786

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1609.67	736.48	1531.64	0.428	4.397
1	0.001	0.002	1583.32	673.56	1500.61	0.398	3.787
2	0.003	0.004	1557.10	609.80	1469.58	0.367	3.219

3	0.005	0.006	1531.01	545.37	1438.55	0.337	2.708
4	0.008	0.009	1505.08	480.41	1407.52	0.308	2.258
5	0.011	0.011	1479.30	415.05	1376.49	0.282	1.854
6	0.015	0.013	1453.69	349.39	1345.45	0.259	1.491
7	0.018	0.015	1428.26	283.52	1314.42	0.240	1.162
8	0.022	0.018	1403.00	217.53	1283.39	0.225	0.862
9	0.026	0.020	1377.94	151.50	1252.36	0.214	0.583
10	0.030	0.023	1353.06	85.47	1221.33	0.206	0.321

Exc. totales result. cabeza 0.06998 1.10786
Exc. reales ler ord. cabeza 0.07001 1.10786

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1609.67	736.51	1531.64	0.429	4.406
1	0.001	0.002	1583.32	673.59	1500.61	0.398	3.790
2	0.003	0.004	1557.10	609.83	1469.58	0.367	3.220
3	0.005	0.006	1531.02	545.40	1438.55	0.337	2.708
4	0.008	0.009	1505.08	480.44	1407.52	0.308	2.258
5	0.011	0.011	1479.31	415.07	1376.49	0.282	1.855
6	0.015	0.013	1453.70	349.41	1345.45	0.259	1.491
7	0.018	0.015	1428.26	283.54	1314.42	0.240	1.163
8	0.022	0.018	1403.01	217.55	1283.39	0.225	0.862
9	0.026	0.020	1377.94	151.51	1252.36	0.214	0.583
10	0.030	0.023	1353.06	85.48	1221.33	0.206	0.321

Exc. totales result. cabeza 0.06999 1.10786
Exc. reales ler ord. cabeza 0.07001 1.10786

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1609.67	736.52	1531.64	0.429	4.410
1	0.001	0.002	1583.32	673.60	1500.61	0.398	3.791
2	0.003	0.004	1557.10	609.85	1469.58	0.367	3.220
3	0.005	0.006	1531.02	545.41	1438.55	0.337	2.709
4	0.008	0.009	1505.08	480.45	1407.52	0.308	2.258
5	0.011	0.011	1479.31	415.08	1376.49	0.282	1.855
6	0.015	0.013	1453.70	349.42	1345.45	0.259	1.492
7	0.018	0.015	1428.26	283.55	1314.42	0.240	1.163
8	0.022	0.018	1403.01	217.56	1283.39	0.225	0.862
9	0.026	0.020	1377.94	151.52	1252.36	0.214	0.583
10	0.030	0.023	1353.06	85.49	1221.33	0.206	0.321

Exc. totales result. cabeza 0.07000 1.10786
Exc. reales ler ord. cabeza 0.07001 1.10786

Convergencia del equilibrio sin agotamiento
Fpx = 48.800 t; Fpy = 17.410 t

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HIPOTESIS 4 - TANTEO 1

Fpx = 48.800 t; Fpy = 17.410 t;

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1902.06	690.15	1446.88	0.369	3.030
1	0.001	0.002	1875.44	627.61	1415.85	0.438	3.301
2	0.003	0.005	1849.03	564.43	1384.82	0.457	3.172
3	0.005	0.007	1822.84	500.69	1353.79	0.450	2.828
4	0.007	0.010	1796.86	436.50	1322.76	0.428	2.404
5	0.010	0.013	1771.12	371.99	1291.73	0.399	1.971
6	0.014	0.015	1745.61	307.27	1260.69	0.368	1.559
7	0.017	0.018	1720.36	242.46	1229.66	0.339	1.177
8	0.021	0.021	1695.37	177.65	1198.63	0.313	0.827
9	0.024	0.024	1670.65	112.91	1167.60	0.291	0.506
10	0.028	0.027	1645.81	47.88	1136.57	0.273	0.208

Exc. totales result. cabeza 0.04212 1.44805
Exc. reales 1er ord. cabeza 0.07000 1.47372

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1942.70	733.61	1446.88	0.450	3.821
1	0.001	0.002	1915.13	670.01	1415.85	0.469	3.725
2	0.003	0.005	1887.70	605.63	1384.82	0.461	3.385
3	0.005	0.008	1860.40	540.60	1353.79	0.438	2.946
4	0.008	0.010	1833.25	475.03	1322.76	0.408	2.491
5	0.011	0.013	1806.26	409.04	1291.73	0.377	2.054
6	0.015	0.016	1779.43	342.75	1260.69	0.347	1.648
7	0.019	0.019	1752.78	276.26	1229.66	0.320	1.273
8	0.023	0.022	1726.32	209.65	1198.63	0.298	0.930
9	0.027	0.025	1700.05	143.01	1167.60	0.279	0.615
10	0.031	0.028	1674.37	76.78	1136.57	0.266	0.323

Exc. totales result. cabeza 0.06755 1.47318
Exc. reales 1er ord. cabeza 0.07000 1.47372

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1936.00	729.22	1446.88	0.500	4.252
1	0.001	0.002	1909.21	666.37	1415.85	0.493	3.909
2	0.003	0.005	1882.56	602.70	1384.82	0.472	3.445
3	0.005	0.008	1856.03	538.35	1353.79	0.443	2.949
4	0.008	0.010	1829.65	473.46	1322.76	0.410	2.473
5	0.012	0.013	1803.42	408.16	1291.73	0.378	2.032
6	0.015	0.016	1777.37	342.55	1260.69	0.348	1.628
7	0.019	0.019	1751.48	276.74	1229.66	0.321	1.260
8	0.023	0.022	1725.78	210.82	1198.63	0.298	0.924
9	0.027	0.025	1700.28	144.84	1167.60	0.280	0.615
10	0.031	0.028	1674.98	78.92	1136.57	0.267	0.329

Exc. totales result. cabeza 0.06943 1.47371
Exc. reales 1er ord. cabeza 0.07000 1.47372

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1935.96	730.29	1446.88	0.553	4.769
1	0.001	0.002	1909.19	667.45	1415.85	0.518	4.127
2	0.003	0.005	1882.53	603.75	1384.82	0.481	3.523
3	0.006	0.008	1856.01	539.35	1353.79	0.445	2.970
4	0.009	0.010	1829.64	474.41	1322.76	0.410	2.477

5	0.012	0.013	1803.42	409.05	1291.73	0.377	2.033
6	0.016	0.016	1777.36	343.39	1260.69	0.346	1.629
7	0.020	0.019	1751.48	277.53	1229.66	0.320	1.263
8	0.024	0.022	1725.79	211.55	1198.63	0.298	0.928
9	0.028	0.025	1700.29	145.52	1167.60	0.280	0.619
10	0.032	0.028	1674.99	79.52	1136.57	0.267	0.332

Exc. totales result. cabeza 0.06996 1.47372
Exc. reales 1er ord. cabeza 0.07000 1.47372

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1935.96	730.33	1446.88	0.554	4.781
1	0.001	0.002	1909.19	667.49	1415.85	0.518	4.132
2	0.003	0.005	1882.54	603.78	1384.82	0.482	3.523
3	0.006	0.008	1856.02	539.38	1353.79	0.445	2.970
4	0.009	0.010	1829.64	474.44	1322.76	0.410	2.477
5	0.012	0.013	1803.42	409.08	1291.73	0.377	2.033
6	0.016	0.016	1777.37	343.42	1260.69	0.346	1.629
7	0.020	0.019	1751.49	277.55	1229.66	0.320	1.263
8	0.024	0.022	1725.79	211.57	1198.63	0.298	0.928
9	0.028	0.025	1700.29	145.55	1167.60	0.281	0.619
10	0.032	0.028	1674.99	79.54	1136.57	0.267	0.332

Exc. totales result. cabeza 0.06998 1.47372
Exc. reales 1er ord. cabeza 0.07000 1.47372

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1935.97	730.35	1446.88	0.554	4.787
1	0.001	0.002	1909.19	667.51	1415.85	0.518	4.132
2	0.003	0.005	1882.54	603.80	1384.82	0.482	3.524
3	0.006	0.008	1856.02	539.40	1353.79	0.445	2.970
4	0.009	0.010	1829.64	474.45	1322.76	0.410	2.477
5	0.012	0.013	1803.42	409.10	1291.73	0.377	2.033
6	0.016	0.016	1777.37	343.43	1260.69	0.346	1.629
7	0.020	0.019	1751.49	277.57	1229.66	0.320	1.263
8	0.024	0.022	1725.80	211.59	1198.63	0.298	0.928
9	0.028	0.025	1700.29	145.56	1167.60	0.281	0.620
10	0.032	0.028	1674.99	79.55	1136.57	0.267	0.332

Exc. totales result. cabeza 0.06999 1.47372
Exc. reales 1er ord. cabeza 0.07000 1.47372

Convergencia del equilibrio sin agotamiento
Fpx = 48.800 t; Fpy = 17.410 t

VIADUCTO OF-556+1 - PILA 1 - PROGRAMA PILA V_1.60 - 11.11.99

HIPOTESIS 5 - TANTEO 1

Fpx = 48.800 t; Fpy = 17.410 t;

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1931.56	690.62	1453.47	0.374	3.033
1	0.001	0.002	1904.88	628.07	1422.44	0.445	3.305
2	0.003	0.005	1878.40	564.88	1391.41	0.464	3.176
3	0.005	0.008	1852.14	501.12	1360.38	0.457	2.833
4	0.007	0.010	1826.10	436.91	1329.35	0.435	2.410
5	0.010	0.013	1800.29	372.38	1298.32	0.406	1.978
6	0.014	0.016	1774.72	307.64	1267.29	0.375	1.566
7	0.017	0.019	1749.40	242.79	1236.25	0.345	1.184
8	0.021	0.021	1724.35	177.95	1205.22	0.319	0.833
9	0.025	0.024	1699.56	113.17	1174.19	0.297	0.511
10	0.028	0.027	1674.65	48.11	1143.16	0.279	0.211

Exc. totales result. cabeza 0.04208 1.46493

Exc. reales 1er ord. cabeza 0.07001 1.49102

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1973.02	734.34	1453.47	0.456	3.826
1	0.001	0.003	1945.37	670.72	1422.44	0.476	3.731
2	0.003	0.005	1917.85	606.34	1391.41	0.469	3.392
3	0.005	0.008	1890.47	541.28	1360.38	0.445	2.955
4	0.008	0.010	1863.23	475.68	1329.35	0.415	2.501
5	0.011	0.013	1836.15	409.66	1298.32	0.384	2.065
6	0.015	0.016	1809.24	343.34	1267.29	0.354	1.658
7	0.019	0.019	1782.50	276.81	1236.25	0.327	1.282
8	0.023	0.022	1755.95	210.16	1205.22	0.304	0.938
9	0.027	0.025	1729.60	143.47	1174.19	0.286	0.621
10	0.031	0.028	1703.84	77.20	1143.16	0.272	0.327

Exc. totales result. cabeza 0.06753 1.49046

Exc. reales 1er ord. cabeza 0.07001 1.49102

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1966.22	730.00	1453.47	0.507	4.257
1	0.001	0.002	1939.37	667.13	1422.44	0.501	3.916
2	0.003	0.005	1912.64	603.44	1391.41	0.480	3.453
3	0.005	0.008	1886.04	539.07	1360.38	0.450	2.959
4	0.008	0.010	1859.58	474.16	1329.35	0.418	2.484
5	0.012	0.013	1833.28	408.83	1298.32	0.385	2.043
6	0.015	0.016	1807.15	343.19	1267.29	0.354	1.638
7	0.019	0.019	1781.19	277.34	1236.25	0.327	1.269
8	0.023	0.022	1755.41	211.37	1205.22	0.305	0.932
9	0.027	0.025	1729.83	145.35	1174.19	0.286	0.622
10	0.031	0.028	1704.45	79.38	1143.16	0.273	0.334

Exc. totales result. cabeza 0.06944 1.49100

Exc. reales 1er ord. cabeza 0.07001 1.49102

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1966.19	731.08	1453.47	0.561	4.775
1	0.001	0.003	1939.34	668.23	1422.44	0.526	4.134
2	0.003	0.005	1912.62	604.51	1391.41	0.489	3.532
3	0.006	0.008	1886.02	540.08	1360.38	0.452	2.980
4	0.009	0.010	1859.57	475.12	1329.35	0.417	2.489

5	0.012	0.013	1833.28	409.73	1298.32	0.384	2.044
6	0.016	0.016	1807.15	344.03	1267.29	0.353	1.639
7	0.020	0.019	1781.19	278.13	1236.25	0.327	1.272
8	0.024	0.022	1755.42	212.11	1205.22	0.305	0.936
9	0.028	0.025	1729.85	146.04	1174.19	0.287	0.626
10	0.032	0.028	1704.47	79.99	1143.16	0.273	0.337

Exc. totales result. cabeza 0.06997 1.49101

Exc. reales 1er ord. cabeza 0.07001 1.49102

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1966.19	731.12	1453.47	0.562	4.786
1	0.001	0.003	1939.35	668.26	1422.44	0.526	4.139
2	0.003	0.005	1912.62	604.54	1391.41	0.489	3.533
3	0.006	0.008	1886.03	540.12	1360.38	0.453	2.980
4	0.009	0.010	1859.57	475.15	1329.35	0.417	2.490
5	0.012	0.013	1833.28	409.76	1298.32	0.384	2.044
6	0.016	0.016	1807.15	344.06	1267.29	0.353	1.640
7	0.020	0.019	1781.20	278.16	1236.25	0.327	1.272
8	0.024	0.022	1755.43	212.13	1205.22	0.305	0.936
9	0.028	0.025	1729.85	146.06	1174.19	0.287	0.626
10	0.032	0.028	1704.47	80.01	1143.16	0.273	0.337

Exc. totales result. cabeza 0.06999 1.49101

Exc. reales 1er ord. cabeza 0.07001 1.49102

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1966.19	731.13	1453.47	0.563	4.792
1	0.001	0.003	1939.35	668.28	1422.44	0.526	4.140
2	0.003	0.005	1912.62	604.56	1391.41	0.489	3.533
3	0.006	0.008	1886.03	540.14	1360.38	0.453	2.982
4	0.009	0.010	1859.58	475.16	1329.35	0.417	2.490
5	0.012	0.013	1833.28	409.77	1298.32	0.384	2.044
6	0.016	0.016	1807.15	344.07	1267.29	0.353	1.640
7	0.020	0.019	1781.20	278.17	1236.25	0.327	1.272
8	0.024	0.022	1755.43	212.14	1205.22	0.305	0.936
9	0.028	0.025	1729.85	146.07	1174.19	0.287	0.626
10	0.032	0.028	1704.47	80.02	1143.16	0.273	0.337

Exc. totales result. cabeza 0.07000 1.49102

Exc. reales 1er ord. cabeza 0.07001 1.49102

Convergencia del equilibrio sin agotamiento

Fpx = 48.800 t; Fpy = 17.410 t

VIADUCTO CF-556+1 - PILA 1 - PROGRAMA PILA V_1.60 - 11.11.99

HIPOTESIS 6 - TANTEO 1

Fpx = 73.210 t; Fpy = 33.300 t;

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1232.73	1074.58	2574.04	0.228	4.422
1	0.002	0.002	1184.94	978.80	2543.01	0.254	4.517
2	0.004	0.003	1137.38	881.36	2511.98	0.248	4.137
3	0.007	0.005	1090.06	782.48	2480.95	0.229	3.560
4	0.011	0.006	1042.98	682.43	2449.92	0.205	2.948
5	0.015	0.008	996.17	581.49	2418.89	0.180	2.384
6	0.019	0.010	949.62	479.93	2387.85	0.158	1.892
7	0.024	0.012	903.36	377.94	2356.82	0.144	1.458
8	0.029	0.013	857.39	275.72	2325.79	0.135	1.057
9	0.034	0.015	811.71	173.42	2294.76	0.127	0.664
10	0.039	0.017	766.08	70.61	2263.73	0.120	0.270

Exc. totales result. cabeza 0.03119 0.33841
Exc. reales 1er ord. cabeza 0.07000 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1277.70	1178.93	2574.04	0.273	5.417
1	0.002	0.002	1229.19	1081.37	2543.01	0.267	5.052
2	0.005	0.003	1180.87	981.88	2511.98	0.247	4.447
3	0.008	0.005	1132.74	880.75	2480.95	0.221	3.790
4	0.012	0.007	1084.81	778.27	2449.92	0.195	3.184
5	0.016	0.008	1037.09	674.72	2418.89	0.172	2.658
6	0.021	0.010	989.61	570.33	2387.85	0.157	2.201
7	0.027	0.012	942.35	465.28	2356.82	0.148	1.786
8	0.032	0.014	895.34	359.77	2325.79	0.141	1.379
9	0.038	0.016	848.56	253.94	2294.76	0.133	0.973
10	0.044	0.018	802.29	148.50	2263.73	0.126	0.568

Exc. totales result. cabeza 0.06560 0.35441
Exc. reales 1er ord. cabeza 0.07000 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1274.42	1179.32	2574.04	0.300	5.947
1	0.002	0.002	1226.41	1082.71	2543.01	0.281	5.314
2	0.005	0.003	1178.58	984.07	2511.98	0.255	4.585
3	0.008	0.005	1130.94	883.73	2480.95	0.228	3.877
4	0.012	0.007	1083.49	782.00	2449.92	0.201	3.249
5	0.017	0.008	1036.25	679.17	2418.89	0.178	2.711
6	0.022	0.010	989.24	575.47	2387.85	0.161	2.241
7	0.027	0.012	942.46	471.10	2356.82	0.149	1.812
8	0.033	0.014	895.91	366.24	2325.79	0.141	1.405
9	0.039	0.016	849.61	261.05	2294.76	0.133	1.000
10	0.045	0.018	803.56	155.74	2263.73	0.126	0.596

Exc. totales result. cabeza 0.06880 0.35497
Exc. reales 1er ord. cabeza 0.07000 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1274.47	1184.07	2574.04	0.329	6.573
1	0.002	0.002	1226.47	1087.46	2543.01	0.295	5.612
2	0.005	0.003	1178.65	988.69	2511.98	0.263	4.735
3	0.008	0.005	1131.01	888.16	2480.95	0.233	3.966
4	0.013	0.007	1083.56	786.21	2449.92	0.205	3.305

5	0.017	0.009	1036.33	683.14	2418.89	0.181	2.747
6	0.023	0.010	989.32	579.19	2387.85	0.162	2.262
7	0.028	0.012	942.53	474.56	2356.82	0.149	1.827
8	0.034	0.014	895.99	369.43	2325.79	0.141	1.417
9	0.040	0.016	849.68	263.97	2294.76	0.133	1.011
10	0.046	0.018	803.62	158.34	2263.73	0.126	0.606

Exc. totales result. cabeza 0.06995 0.35500
Exc. reales 1er ord. cabeza 0.07000 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1274.47	1184.19	2574.04	0.330	6.587
1	0.002	0.002	1226.48	1087.58	2543.01	0.296	5.616
2	0.005	0.003	1178.65	988.80	2511.98	0.263	4.740
3	0.008	0.005	1131.01	888.27	2480.95	0.233	3.968
4	0.013	0.007	1083.57	786.32	2449.92	0.205	3.307
5	0.017	0.009	1036.33	683.24	2418.89	0.181	2.748
6	0.023	0.010	989.32	579.28	2387.85	0.162	2.263
7	0.028	0.012	942.54	474.64	2356.82	0.149	1.827
8	0.034	0.014	895.99	369.51	2325.79	0.141	1.417
9	0.040	0.016	849.69	264.04	2294.76	0.133	1.011
10	0.046	0.018	803.63	158.40	2263.73	0.126	0.606

Exc. totales result. cabeza 0.06997 0.35500
Exc. reales 1er ord. cabeza 0.07000 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	1274.48	1184.26	2574.04	0.330	6.595
1	0.002	0.002	1226.48	1087.64	2543.01	0.296	5.621
2	0.005	0.003	1178.66	988.86	2511.98	0.263	4.741
3	0.008	0.005	1131.01	888.32	2480.95	0.233	3.969
4	0.013	0.007	1083.57	786.37	2449.92	0.205	3.307
5	0.017	0.009	1036.34	683.29	2418.89	0.181	2.748
6	0.023	0.010	989.32	579.32	2387.85	0.162	2.263
7	0.028	0.012	942.54	474.68	2356.82	0.149	1.827
8	0.034	0.014	895.99	369.54	2325.79	0.141	1.417
9	0.040	0.016	849.69	264.07	2294.76	0.133	1.011
10	0.046	0.018	803.63	158.43	2263.73	0.126	0.606

Exc. totales result. cabeza 0.06999 0.35500
Exc. reales 1er ord. cabeza 0.07000 0.35500

Convergencia del equilibrio sin agotamiento
Fpx = 73.210 t; Fpy = 33.300 t

VIADUCTO OF-556+1 - PILA 1 - PROGRAMA PILA V_1.60 - 11.11.99

HIPOTESIS 7 - TANTEO 1

Fpx = 48.800 t; Fpy = 13.490 t;

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	506.97	674.89	1229.18	0.103	2.959
1	0.001	0.001	487.12	612.62	1198.15	0.117	3.232
2	0.003	0.001	467.52	549.83	1167.12	0.118	3.082
3	0.005	0.002	448.18	486.60	1136.09	0.112	2.698
4	0.007	0.003	429.10	423.04	1105.06	0.103	2.220
5	0.010	0.003	410.27	359.27	1074.03	0.091	1.736
6	0.013	0.004	391.71	295.39	1042.99	0.079	1.294
7	0.016	0.005	373.41	231.49	1011.96	0.066	0.922
8	0.020	0.006	355.38	167.66	980.93	0.056	0.628
9	0.023	0.006	337.62	103.95	949.90	0.051	0.382
10	0.027	0.007	320.03	40.00	918.87	0.048	0.147

Exc. totales result. cabeza 0.04353 0.34829
Exc. reales 1er ord. cabeza 0.07001 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	516.14	710.45	1229.18	0.123	3.701
1	0.001	0.001	496.05	647.20	1198.15	0.124	3.578
2	0.003	0.001	476.19	583.34	1167.12	0.118	3.190
3	0.005	0.002	456.56	518.95	1136.09	0.108	2.687
4	0.008	0.003	437.18	454.18	1105.06	0.096	2.165
5	0.011	0.003	418.03	389.12	1074.03	0.083	1.684
6	0.014	0.004	399.13	323.88	1042.99	0.070	1.280
7	0.018	0.005	380.47	258.54	1011.96	0.059	0.966
8	0.021	0.006	362.06	193.16	980.93	0.054	0.711
9	0.025	0.006	343.90	127.79	949.90	0.052	0.470
10	0.029	0.007	326.10	62.87	918.87	0.049	0.231

Exc. totales result. cabeza 0.06842 0.35489
Exc. reales 1er ord. cabeza 0.07001 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	514.32	704.81	1229.18	0.135	4.132
1	0.001	0.001	494.43	642.31	1198.15	0.129	3.747
2	0.003	0.001	474.78	579.14	1167.12	0.120	3.224
3	0.005	0.002	455.36	515.46	1136.09	0.107	2.662
4	0.008	0.003	436.17	451.38	1105.06	0.094	2.124
5	0.011	0.003	417.23	387.02	1074.03	0.082	1.651
6	0.014	0.004	398.53	322.49	1042.99	0.069	1.266
7	0.018	0.005	380.07	257.86	1011.96	0.060	0.965
8	0.021	0.006	361.87	193.18	980.93	0.055	0.711
9	0.025	0.006	343.91	128.52	949.90	0.052	0.472
10	0.029	0.007	326.21	63.92	918.87	0.049	0.235

Exc. totales result. cabeza 0.06956 0.35501
Exc. reales 1er ord. cabeza 0.07001 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	514.30	705.58	1229.18	0.149	4.681
1	0.001	0.001	494.41	643.07	1198.15	0.135	3.956
2	0.003	0.001	474.76	579.86	1167.12	0.121	3.268
3	0.005	0.002	455.34	516.12	1136.09	0.107	2.644
4	0.008	0.003	436.16	451.99	1105.06	0.093	2.094

5	0.011	0.003	417.21	387.60	1074.03	0.080	1.634
6	0.015	0.004	398.51	323.03	1042.99	0.069	1.263
7	0.018	0.005	380.06	258.36	1011.96	0.060	0.967
8	0.022	0.006	361.86	193.65	980.93	0.055	0.713
9	0.026	0.006	343.90	128.95	949.90	0.052	0.474
10	0.030	0.007	326.20	64.30	918.87	0.049	0.236

Exc. totales result. cabeza 0.06997 0.35500
Exc. reales 1er ord. cabeza 0.07001 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	514.30	705.61	1229.18	0.150	4.694
1	0.001	0.001	494.41	643.10	1198.15	0.135	3.961
2	0.003	0.001	474.76	579.89	1167.12	0.121	3.270
3	0.005	0.002	455.34	516.15	1136.09	0.107	2.644
4	0.008	0.003	436.16	452.02	1105.06	0.093	2.094
5	0.011	0.003	417.21	387.62	1074.03	0.080	1.634
6	0.015	0.004	398.51	323.04	1042.99	0.069	1.264
7	0.018	0.005	380.06	258.37	1011.96	0.060	0.967
8	0.022	0.006	361.86	193.66	980.93	0.055	0.713
9	0.026	0.006	343.90	128.96	949.90	0.052	0.474
10	0.030	0.007	326.20	64.31	918.87	0.049	0.236

Exc. totales result. cabeza 0.06999 0.35500
Exc. reales 1er ord. cabeza 0.07001 0.35500

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	514.30	705.63	1229.18	0.150	4.702
1	0.001	0.001	494.41	643.11	1198.15	0.135	3.964
2	0.003	0.001	474.76	579.90	1167.12	0.121	3.270
3	0.005	0.002	455.34	516.16	1136.09	0.107	2.644
4	0.008	0.003	436.16	452.03	1105.06	0.093	2.094
5	0.011	0.003	417.21	387.63	1074.03	0.080	1.635
6	0.015	0.004	398.51	323.06	1042.99	0.069	1.264
7	0.018	0.005	380.06	258.39	1011.96	0.060	0.967
8	0.022	0.006	361.86	193.68	980.93	0.055	0.713
9	0.026	0.006	343.90	128.97	949.90	0.052	0.474
10	0.030	0.007	326.20	64.32	918.87	0.049	0.236

Exc. totales result. cabeza 0.07000 0.35500
Exc. reales 1er ord. cabeza 0.07001 0.35500

Convergencia del equilibrio sin agotamiento
Fpx = 48.800 t; Fpy = 13.490 t

VIADUCTO OF-556+1 - PILA 1 - PROGRAMA PILA V_1.60 - 11.11.99

HIPOTESIS 8 - TANTEO 1

Fpx = 73.210 t; Fpy = 26.120 t;

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2369.95	1045.59	2160.55	0.470	4.609
1	0.002	0.003	2328.73	950.55	2129.52	0.556	5.003
2	0.004	0.006	2287.75	853.99	2098.49	0.573	4.758
3	0.007	0.009	2247.02	756.05	2067.46	0.556	4.180
4	0.011	0.013	2206.53	656.99	2036.43	0.518	3.484
5	0.016	0.016	2166.32	557.09	2005.40	0.472	2.794
6	0.020	0.019	2126.40	456.60	1974.36	0.426	2.158
7	0.026	0.023	2086.80	355.76	1943.33	0.385	1.586
8	0.031	0.026	2047.52	254.76	1912.30	0.351	1.076
9	0.037	0.030	2008.60	153.79	1881.27	0.325	0.620
10	0.042	0.034	1969.53	52.33	1850.24	0.308	0.203

Exc. totales result. cabeza 0.02828 1.06447
Exc. reales 1er ord. cabeza 0.07000 1.09693

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2444.49	1140.43	2160.55	0.580	5.964
1	0.002	0.003	2401.96	1043.57	2129.52	0.599	5.776
2	0.005	0.006	2359.56	944.88	2098.49	0.580	5.189
3	0.008	0.010	2317.31	844.59	2067.46	0.541	4.450
4	0.013	0.013	2275.23	743.01	2036.43	0.493	3.704
5	0.017	0.016	2233.34	640.40	2005.40	0.444	3.010
6	0.023	0.020	2191.65	537.02	1974.36	0.402	2.382
7	0.029	0.023	2150.18	433.10	1943.33	0.367	1.821
8	0.035	0.027	2108.96	328.83	1912.30	0.341	1.320
9	0.041	0.031	2067.98	224.37	1881.27	0.323	0.867
10	0.047	0.035	2027.74	120.44	1850.24	0.314	0.455

Exc. totales result. cabeza 0.06510 1.09594
Exc. reales 1er ord. cabeza 0.07000 1.09693

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2437.22	1139.30	2160.55	0.653	6.768
1	0.002	0.003	2395.67	1043.45	2129.52	0.638	6.175
2	0.005	0.006	2354.24	945.62	2098.49	0.601	5.373
3	0.009	0.010	2312.94	846.14	2067.46	0.554	4.531
4	0.013	0.013	2271.81	745.33	2036.43	0.503	3.738
5	0.018	0.016	2230.85	643.48	2005.40	0.453	3.030
6	0.024	0.020	2190.10	540.86	1974.36	0.409	2.404
7	0.030	0.024	2149.57	437.67	1943.33	0.374	1.849
8	0.036	0.027	2109.27	334.11	1912.30	0.346	1.353
9	0.042	0.031	2069.21	230.35	1881.27	0.327	0.902
10	0.049	0.035	2029.42	126.59	1850.24	0.315	0.484

Exc. totales result. cabeza 0.06842 1.09684
Exc. reales 1er ord. cabeza 0.07000 1.09693

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2437.47	1145.34	2160.55	0.741	7.829
1	0.002	0.003	2395.94	1049.44	2129.52	0.683	6.695
2	0.005	0.006	2354.50	951.39	2098.49	0.624	5.628
3	0.009	0.010	2313.20	851.61	2067.46	0.566	4.662
4	0.014	0.013	2272.06	750.45	2036.43	0.510	3.815

5	0.019	0.016	2231.09	648.24	2005.40	0.458	3.086
6	0.025	0.020	2190.32	545.23	1974.36	0.414	2.448
7	0.031	0.024	2149.78	441.65	1943.33	0.378	1.884
8	0.037	0.027	2109.46	337.69	1912.30	0.349	1.379
9	0.044	0.031	2069.39	233.53	1881.27	0.329	0.920
10	0.051	0.035	2029.57	129.31	1850.24	0.316	0.495

Exc. totales result. cabeza 0.06989 1.09692
Exc. reales 1er ord. cabeza 0.07000 1.09693

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2437.49	1145.55	2160.55	0.743	7.857
1	0.002	0.003	2395.95	1049.64	2129.52	0.684	6.710
2	0.005	0.006	2354.52	951.59	2098.49	0.625	5.636
3	0.009	0.010	2313.22	851.79	2067.46	0.566	4.665
4	0.014	0.013	2272.07	750.62	2036.43	0.510	3.819
5	0.019	0.017	2231.11	648.40	2005.40	0.459	3.088
6	0.025	0.020	2190.34	545.37	1974.36	0.414	2.449
7	0.031	0.024	2149.79	441.78	1943.33	0.378	1.885
8	0.038	0.027	2109.47	337.81	1912.30	0.349	1.380
9	0.044	0.031	2069.40	233.64	1881.27	0.329	0.921
10	0.051	0.035	2029.58	129.40	1850.24	0.316	0.496

Exc. totales result. cabeza 0.06994 1.09693
Exc. reales 1er ord. cabeza 0.07000 1.09693

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2437.50	1145.66	2160.55	0.744	7.873
1	0.002	0.003	2395.96	1049.76	2129.52	0.685	6.718
2	0.005	0.006	2354.53	951.70	2098.49	0.625	5.639
3	0.009	0.010	2313.23	851.90	2067.46	0.567	4.669
4	0.014	0.013	2272.08	750.72	2036.43	0.511	3.820
5	0.019	0.017	2231.11	648.49	2005.40	0.459	3.089
6	0.025	0.020	2190.34	545.46	1974.36	0.414	2.450
7	0.031	0.024	2149.79	441.86	1943.33	0.378	1.886
8	0.038	0.027	2109.48	337.88	1912.30	0.350	1.380
9	0.044	0.031	2069.40	233.70	1881.27	0.329	0.921
10	0.051	0.035	2029.58	129.45	1850.24	0.316	0.496

Exc. totales result. cabeza 0.06997 1.09693
Exc. reales 1er ord. cabeza 0.07000 1.09693

Convergencia del equilibrio sin agotamiento
Fpx = 73.210 t; Fpy = 26.120 t

VIADUCTO OF-556+1 - PILA 1 - PROGRAMA PILA V_1.60 - 11.11.99

HIPOTESIS 9 - TANTEO 1

Fpx = 48.800 t; Fpy = 26.120 t;

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2853.18	696.63	1539.27	0.557	3.194
1	0.001	0.004	2812.91	633.96	1508.24	0.678	3.569
2	0.003	0.007	2772.95	570.54	1477.21	0.724	3.503
3	0.005	0.011	2733.28	506.44	1446.18	0.727	3.189
4	0.008	0.015	2693.93	441.79	1415.15	0.706	2.770
5	0.011	0.019	2654.90	376.70	1384.12	0.674	2.320
6	0.014	0.023	2616.20	311.33	1353.08	0.638	1.873
7	0.018	0.028	2577.87	245.79	1322.05	0.603	1.442
8	0.022	0.032	2539.90	180.20	1291.02	0.570	1.031
9	0.026	0.036	2502.31	114.65	1259.99	0.541	0.642
10	0.031	0.041	2464.52	48.77	1228.96	0.517	0.268

Exc. totales result. cabeza 0.03969 2.00537
Exc. reales 1er ord. cabeza 0.07000 2.04440

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2918.54	746.64	1539.27	0.697	4.166
1	0.001	0.004	2876.81	682.78	1508.24	0.744	4.153
2	0.003	0.008	2835.27	618.01	1477.21	0.746	3.856
3	0.006	0.011	2793.90	552.42	1446.18	0.724	3.432
4	0.009	0.016	2752.74	486.15	1415.15	0.691	2.967
5	0.012	0.020	2711.79	419.34	1384.12	0.654	2.499
6	0.016	0.024	2671.06	352.11	1353.08	0.617	2.046
7	0.020	0.028	2630.58	284.59	1322.05	0.583	1.614
8	0.025	0.033	2590.35	216.89	1291.02	0.553	1.203
9	0.029	0.037	2550.38	149.09	1259.99	0.528	0.812
10	0.034	0.042	2511.28	81.72	1228.96	0.510	0.440

Exc. totales result. cabeza 0.06650 2.04342
Exc. reales 1er ord. cabeza 0.07000 2.04440

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2908.69	743.50	1539.27	0.790	4.681
1	0.001	0.004	2868.15	680.42	1508.24	0.794	4.390
2	0.003	0.008	2827.77	616.35	1477.21	0.772	3.950
3	0.006	0.011	2787.57	551.45	1446.18	0.737	3.460
4	0.009	0.016	2747.56	485.86	1415.15	0.696	2.967
5	0.013	0.020	2707.76	419.72	1384.12	0.655	2.490
6	0.017	0.024	2668.19	353.17	1353.08	0.616	2.037
7	0.021	0.028	2628.85	286.31	1322.05	0.581	1.610
8	0.025	0.033	2589.76	219.26	1291.02	0.551	1.206
9	0.030	0.037	2550.94	152.12	1259.99	0.526	0.823
10	0.035	0.042	2512.40	85.01	1228.96	0.508	0.455

Exc. totales result. cabeza 0.06917 2.04433
Exc. reales 1er ord. cabeza 0.07000 2.04440

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2908.76	745.18	1539.27	0.892	5.306
1	0.001	0.004	2868.23	682.13	1508.24	0.845	4.677
2	0.003	0.008	2827.86	618.03	1477.21	0.796	4.080
3	0.006	0.012	2787.66	553.06	1446.18	0.748	3.519
4	0.009	0.016	2747.65	487.38	1415.15	0.701	2.993

5	0.013	0.020	2707.85	421.16	1384.12	0.656	2.502
6	0.017	0.024	2668.27	354.51	1353.08	0.616	2.044
7	0.022	0.028	2628.94	287.57	1322.05	0.580	1.614
8	0.026	0.033	2589.85	220.44	1291.02	0.549	1.209
9	0.031	0.037	2551.03	153.21	1259.99	0.524	0.826
10	0.036	0.042	2512.48	85.97	1228.96	0.507	0.460

Exc. totales result. cabeza 0.06995 2.04439
Exc. reales 1er ord. cabeza 0.07000 2.04440

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2908.77	745.24	1539.27	0.894	5.319
1	0.001	0.004	2868.24	682.18	1508.24	0.846	4.684
2	0.003	0.008	2827.87	618.08	1477.21	0.797	4.083
3	0.006	0.012	2787.67	553.11	1446.18	0.748	3.520
4	0.009	0.016	2747.66	487.43	1415.15	0.701	2.994
5	0.013	0.020	2707.86	421.20	1384.12	0.656	2.502
6	0.017	0.024	2668.28	354.56	1353.08	0.616	2.044
7	0.022	0.028	2628.94	287.61	1322.05	0.580	1.614
8	0.026	0.033	2589.86	220.47	1291.02	0.549	1.209
9	0.031	0.037	2551.03	153.24	1259.99	0.524	0.827
10	0.036	0.042	2512.48	86.00	1228.96	0.507	0.460

Exc. totales result. cabeza 0.06998 2.04440
Exc. reales 1er ord. cabeza 0.07000 2.04440

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2908.77	745.27	1539.27	0.895	5.326
1	0.001	0.004	2868.25	682.21	1508.24	0.847	4.687
2	0.003	0.008	2827.88	618.11	1477.21	0.797	4.083
3	0.006	0.012	2787.68	553.13	1446.18	0.748	3.520
4	0.009	0.016	2747.67	487.46	1415.15	0.701	2.994
5	0.013	0.020	2707.86	421.23	1384.12	0.656	2.502
6	0.017	0.024	2668.29	354.58	1353.08	0.616	2.044
7	0.022	0.028	2628.95	287.63	1322.05	0.580	1.614
8	0.026	0.033	2589.86	220.49	1291.02	0.549	1.209
9	0.031	0.037	2551.04	153.26	1259.99	0.524	0.827
10	0.036	0.042	2512.49	86.02	1228.96	0.507	0.460

Exc. totales result. cabeza 0.06999 2.04440
Exc. reales 1er ord. cabeza 0.07000 2.04440

Convergencia del equilibrio sin agotamiento
Fpx = 48.800 t; Fpy = 26.120 t

VIADUCTO OF-556+1 - PILA 1 - PROGRAMA PILA V_1.60 - 11.11.99

HIPOTESIS 10 - TANTEO 1

Fpx = 48.800 t; Fpy = 26.120 t;

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2897.44	697.32	1549.16	0.565	3.201
1	0.001	0.004	2857.05	634.64	1518.13	0.688	3.578
2	0.003	0.007	2816.97	571.20	1487.10	0.736	3.513
3	0.005	0.011	2777.18	507.07	1456.07	0.739	3.201
4	0.008	0.015	2737.71	442.38	1425.04	0.719	2.783
5	0.011	0.019	2698.56	377.25	1394.01	0.688	2.333
6	0.014	0.024	2659.74	311.83	1362.97	0.652	1.885
7	0.018	0.028	2621.29	246.24	1331.94	0.617	1.452
8	0.022	0.032	2583.20	180.59	1300.91	0.584	1.040
9	0.027	0.037	2545.49	114.99	1269.88	0.555	0.648
10	0.031	0.042	2507.57	49.05	1238.85	0.531	0.272

Exc. totales result. cabeza 0.03959 2.02411
Exc. reales 1er ord. cabeza 0.07000 2.06378

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2964.25	747.78	1549.16	0.707	4.179
1	0.001	0.004	2922.38	683.91	1518.13	0.756	4.168
2	0.003	0.008	2880.68	619.10	1487.10	0.759	3.873
3	0.006	0.012	2839.17	553.48	1456.07	0.738	3.450
4	0.009	0.016	2797.86	487.16	1425.04	0.705	2.985
5	0.012	0.020	2756.75	420.29	1394.01	0.668	2.517
6	0.016	0.024	2715.87	353.00	1362.97	0.631	2.063
7	0.020	0.029	2675.23	285.41	1331.94	0.597	1.629
8	0.025	0.033	2634.84	217.63	1300.91	0.567	1.216
9	0.030	0.038	2594.71	149.77	1269.88	0.543	0.822
10	0.034	0.043	2555.46	82.31	1238.85	0.524	0.447

Exc. totales result. cabeza 0.06644 2.06277
Exc. reales 1er ord. cabeza 0.07000 2.06378

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2954.27	744.73	1549.16	0.803	4.695
1	0.001	0.004	2913.60	681.63	1518.13	0.808	4.407
2	0.003	0.008	2873.09	617.54	1487.10	0.786	3.969
3	0.006	0.012	2832.76	552.60	1456.07	0.751	3.481
4	0.009	0.016	2792.62	486.96	1425.04	0.711	2.988
5	0.013	0.020	2752.68	420.76	1394.01	0.670	2.510
6	0.017	0.024	2712.97	354.14	1362.97	0.631	2.056
7	0.021	0.029	2673.49	287.21	1331.94	0.595	1.626
8	0.026	0.033	2634.26	220.09	1300.91	0.565	1.220
9	0.030	0.038	2595.30	152.86	1269.88	0.540	0.834
10	0.035	0.043	2556.62	85.67	1238.85	0.523	0.463

Exc. totales result. cabeza 0.06915 2.06370
Exc. reales 1er ord. cabeza 0.07000 2.06378

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2954.34	746.46	1549.16	0.907	5.323
1	0.001	0.004	2913.69	683.39	1518.13	0.860	4.697
2	0.003	0.008	2873.19	619.26	1487.10	0.811	4.101
3	0.006	0.012	2832.86	554.24	1456.07	0.763	3.541
4	0.009	0.016	2792.72	488.52	1425.04	0.715	3.015

5	0.013	0.020	2752.78	422.24	1394.01	0.671	2.522
6	0.017	0.024	2713.07	355.53	1362.97	0.630	2.062
7	0.022	0.029	2673.59	288.51	1331.94	0.594	1.631
8	0.027	0.033	2634.36	221.29	1300.91	0.564	1.224
9	0.031	0.038	2595.39	153.98	1269.88	0.539	0.838
10	0.036	0.043	2556.70	86.66	1238.85	0.522	0.467

Exc. totales result. cabeza 0.06995 2.06377
Exc. reales 1er ord. cabeza 0.07000 2.06378

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2954.35	746.52	1549.16	0.909	5.336
1	0.001	0.004	2913.70	683.45	1518.13	0.861	4.703
2	0.003	0.008	2873.20	619.31	1487.10	0.812	4.104
3	0.006	0.012	2832.87	554.30	1456.07	0.763	3.542
4	0.009	0.016	2792.73	488.57	1425.04	0.715	3.016
5	0.013	0.020	2752.79	422.28	1394.01	0.671	2.522
6	0.017	0.024	2713.07	355.57	1362.97	0.630	2.063
7	0.022	0.029	2673.59	288.55	1331.94	0.594	1.631
8	0.027	0.033	2634.36	221.33	1300.91	0.564	1.224
9	0.031	0.038	2595.40	154.02	1269.88	0.539	0.838
10	0.036	0.043	2556.70	86.69	1238.85	0.522	0.468

Exc. totales result. cabeza 0.06997 2.06377
Exc. reales 1er ord. cabeza 0.07000 2.06378

Sec.	flch.x	flch.y	Mom.x	Mom.y	Axil	curv.x	curv.y
0	0.000	0.000	2954.36	746.55	1549.16	0.910	5.343
1	0.001	0.004	2913.71	683.47	1518.13	0.862	4.707
2	0.003	0.008	2873.21	619.34	1487.10	0.812	4.105
3	0.006	0.012	2832.88	554.32	1456.07	0.763	3.542
4	0.009	0.016	2792.73	488.60	1425.04	0.715	3.016
5	0.013	0.020	2752.79	422.31	1394.01	0.671	2.522
6	0.017	0.024	2713.08	355.59	1362.97	0.630	2.063
7	0.022	0.029	2673.60	288.57	1331.94	0.594	1.631
8	0.027	0.033	2634.37	221.35	1300.91	0.564	1.224
9	0.031	0.038	2595.40	154.03	1269.88	0.539	0.838
10	0.036	0.043	2556.71	86.71	1238.85	0.522	0.468

Exc. totales result. cabeza 0.06999 2.06378
Exc. reales 1er ord. cabeza 0.07000 2.06378

Convergencia del equilibrio sin agotamiento
Fpx = 48.800 t; Fpy = 26.120 t

□

Hipotesis para calculo de cimentaciones de Pila 1

Hipotesis 1

	F_x	F_y	F_z	M_x	M_y
Sección Cabeza	48,80	22,20	1496,97	196,01	0,00
			306,23	277,50	655,47
Sección Base			1803,20	473,51	655,47

(760,26 - 104,79)

Hipotesis 2

	F_x	F_y	F_z	M_x	M_y
Sección cabeza	48,80	8,99	929,84	12,80	0,00
			306,23	112,38	641,56
Sección Base			1236,07	125,18	641,56

(706,65 - 65,09)

Hipotesis 3

	F_x	F_y	F_z	M_x	M_y
Sección Cabeza	48,80	17,41	1221,33	1353,06	0,00
			306,23	217,63	651,02
Sección Base			1527,56	1570,69	651,02

(736,52 - 85,50)

Hipótesis 4

	F_x	F_y	F_z	M_x	M_y	
Sección cabeza	48.80	17.41	1136.57	1674.99	0.00	
			306.23	217.63	650.79	(730.35 - 79.56)
Sección Base			1442.80	1892.62	650.79	

Hipótesis 5

	F_x	F_y	F_z	M_x	M_y	
Sección Cabeza	48.80	17.41	1143.16	1704.47	0.00	
			306.23	217.63	651.10	(731.13 - 80.03)
Sección Base			1449.39	1922.10	651.10	

Hipótesis 6

	F_x	F_y	F_z	M_x	M_y	
Sección Cabeza	73.21	33.30	2263.73	294.02	0.00	
			459.35	416.25	1025.79	(1184.26 - 158.41)
Sección Base			2723.08	710.27	1025.79	

Hipótesis 7

	F_x	F_y	F_z	M_x	M_y	
Sección Cabeza	48.80	13.49	918.87	19.20	0.00	
			306.23	168.63	641.30	(705.63 - 64.33)
Sección Base			1225.10	187.83	641.30	

Hipótesis 8

	F_x	F_y	F_z	M_x	M_y	
Sección Cabeza	73,21	26,12	1850,24	2029,59	0,00	
			459,35	326,50	1016,14	(1145,66 - 129,52)
Sección Base			2309,59	2356,09	1016,14	

Hipótesis 9

	F_x	F_y	F_z	M_x	M_y	
Sección Cabeza	48,80	26,12	1228,96	2512,49	0,00	
			459,35	326,50	659,24	(745,27 - 86,03)
Sección Base			1688,31	2838,99	659,24	

Hipótesis 10

	F_x	F_y	F_z	M_x	M_y	
Sección Cabeza	48,80	26,12	1238,85	2556,71	0,00	
			459,35	326,50	659,83	(746,55 - 86,72)
			1698,20	2883,21	659,83	

OF 556+1 - PILA 1 - CIMENTACION TENSION

ALTURA COEF. SEGUR. MAYOR. MINOR.
0.01 PESO PROPIO 1.00 1.00

Z A P A T A			P L I N T O			P I L A	
LARGO	ANCHO	CANTO	LARGO	ANCHO	CANTO	LARGO	ANCHO
8.000	8.500	2.500	0.000	0.000	0.000	1.400	3.100
HORMIGON		RESIST. CARAC. 250. KG/CM2	COE. MINOR. 1.50	DENSIDAD 2.500 T/M3	SUBPRESION FUSTE 0.0 T.		
ACERO		RESIST. CARAC. 5100. KG/CM2	COE. MINOR. 1.15	RECUBRIM. 0.050 M.	REC/O PI 0.000	REC/O PLI 0.000	

SECCIONES DE CALCULO
0.000 -2.500

CARGAS PERMANENTES

N.	Q L.	Q T.	M L.	M T.	N. FUSTE
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.	0.00 T/M

PRETENSADO

N.	Q L.	Q T.	M L.	M T.
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.

ESFUERZOS REOLOGICOS

N.	Q L.	Q T.	M L.	M T.	G
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.	1.00

CARGAS DE VIENTO

N.	Q L.	Q T.	M L.	M T.	QL.FUSTE
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.	0.00 T/M

SOBRECARGAS

HIP	N.	Q L.	Q T.	M L.	M T.
1	1803.2 T.	48.80 T.	22.20 T.	655.5 MT.	473.5 MT.
2	1236.1 T.	48.80 T.	8.99 T.	641.6 MT.	125.2 MT.
3	1527.6 T.	48.80 T.	17.41 T.	651.0 MT.	1570.7 MT.
4	1442.8 T.	48.80 T.	17.41 T.	650.8 MT.	1892.6 MT.
5	1449.4 T.	48.80 T.	17.41 T.	651.1 MT.	1922.1 MT.

HIPOTESIS 1

1.00 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	1803.20	1803.20	0.00	0.00	1803.20	1622.88
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	655.96	655.96	0.00	0.00	655.96	590.36
MT.	473.73	473.73	0.00	0.00	473.73	426.36
EL	0.364	0.364			0.364	0.364
ET	0.263	0.263			0.263	0.263

1 P.PROP+SOBRECARGA
2 P.PROP+SOBRECARGA MAYORADO
3 P.PROP+VIENTO
4 P.PROP+VIENTO MAYORADO
5 P.PROP+SOBREC+1/2 VIENTO
6 P.PROP+SOBREC+1/2 VIENTO MAYORADO

1

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N

HIPOTESIS	1	2	3	4	5	6
N.	2228.20	2228.20	425.00	425.00	2228.20	2005.38
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	777.96	777.96	0.00	0.00	777.96	700.16
MT.	529.23	529.23	0.00	0.00	529.23	476.31
EL	0.349	0.349	0.000	0.000	0.349	0.349
ET	0.238	0.238	0.000	0.000	0.238	0.238

OF 556+1 - PILA 1 - CIMENTACION TENSION

TENSIONES

SIG1	46.84	46.84	6.25	6.25	46.84	42.16
SIG2	35.85	35.85	6.25	6.25	35.85	32.27
SIG3	29.68	29.68	6.25	6.25	29.68	26.71
SIG4	18.69	18.69	6.25	6.25	18.69	16.82

HIPOTESIS 2

1.00 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	1803.20	1803.20	0.00	0.00	1803.20	1622.88
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	655.96	655.96	0.00	0.00	655.96	590.36
MT.	473.73	473.73	0.00	0.00	473.73	426.36
EL	0.364	0.364			0.364	0.364
ET	0.263	0.263			0.263	0.263

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N

HIPOTESIS	1	2	3	4	5	6
N.	2228.20	2228.20	425.00	425.00	2228.20	2047.88
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	777.96	777.96	0.00	0.00	777.96	700.16
MT.	529.23	529.23	0.00	0.00	529.23	476.31
EL	0.349	0.349	0.000	0.000	0.349	0.342
ET	0.238	0.238	0.000	0.000	0.238	0.233

TENSIONES

SIG1	46.84	46.84	6.25	6.25	46.84	42.78
SIG2	35.85	35.85	6.25	6.25	35.85	32.89
SIG3	29.68	29.68	6.25	6.25	29.68	27.34
SIG4	18.69	18.69	6.25	6.25	18.69	17.45

HIPOTESIS 3

1.00 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	1803.20	1803.20	0.00	0.00	1803.20	1622.88
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	655.96	655.96	0.00	0.00	655.96	590.36
MT.	473.73	473.73	0.00	0.00	473.73	426.36
EL	0.364	0.364			0.364	0.364
ET	0.263	0.263			0.263	0.263

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N

HIPOTESIS	1	2	3	4	5	6
N.	2228.20	2228.20	425.00	425.00	2228.20	2005.38
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	777.96	777.96	0.00	0.00	777.96	700.16
MT.	529.23	529.23	0.00	0.00	529.23	476.31
EL	0.349	0.349	0.000	0.000	0.349	0.349
ET	0.238	0.238	0.000	0.000	0.238	0.238

OF 556+1 - PILA 1 - CIMENTACION TENSION

TENSIONES

SIG1	46.84	46.84	6.25	6.25	46.84	42.16
SIG2	35.85	35.85	6.25	6.25	35.85	32.27
SIG3	29.68	29.68	6.25	6.25	29.68	26.71
SIG4	18.69	18.69	6.25	6.25	18.69	16.82

HIPOTESIS 4

1.00 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	1803.20	1803.20	0.00	0.00	1803.20	1622.88
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	655.96	655.96	0.00	0.00	655.96	590.36
MT.	473.73	473.73	0.00	0.00	473.73	426.36
EL	0.364	0.364			0.364	0.364
ET	0.263	0.263			0.263	0.263

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N

HIPOTESIS	1	2	3	4	5	6
N.	2228.20	2228.20	425.00	425.00	2228.20	2005.38
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	777.96	777.96	0.00	0.00	777.96	700.16
MT.	529.23	529.23	0.00	0.00	529.23	476.31
EL	0.349	0.349	0.000	0.000	0.349	0.349
ET	0.238	0.238	0.000	0.000	0.238	0.238

TENSIONES

SIG1	46.84	46.84	6.25	6.25	46.84	42.16
SIG2	35.85	35.85	6.25	6.25	35.85	32.27
SIG3	29.68	29.68	6.25	6.25	29.68	26.71
SIG4	18.69	18.69	6.25	6.25	18.69	16.82

HIPOTESIS 5

1.00 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	1803.20	1803.20	0.00	0.00	1803.20	1622.88
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	655.96	655.96	0.00	0.00	655.96	590.36
MT.	473.73	473.73	0.00	0.00	473.73	426.36
EL	0.364	0.364			0.364	0.364
ET	0.263	0.263			0.263	0.263

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N

HIPOTESIS	1	2	3	4	5	6
N.	2228.20	2228.20	425.00	425.00	2228.20	2005.38
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	777.96	777.96	0.00	0.00	777.96	700.16
MT.	529.23	529.23	0.00	0.00	529.23	476.31
EL	0.349	0.349	0.000	0.000	0.349	0.349
ET	0.238	0.238	0.000	0.000	0.238	0.238

TENSIONES

SIG1	46.84	46.84	6.25	6.25	46.84	42.16
SIG2	35.85	35.85	6.25	6.25	35.85	32.27
SIG3	29.68	29.68	6.25	6.25	29.68	26.71
SIG4	18.69	18.69	6.25	6.25	18.69	16.82

TENSIONES MAXIMAS EN CIMENTACION

HIPOTESIS DE SERVICIO TENSION MAXIMA 46.84 TENSION MINIMA 6.25

OF 556+1 - PILA 1 - CIMENTACION ARMADURA

ALTURA COEF. SEGUR. MAYOR. MINOR.
0.01 PESO PROPIO 1.50 1.00

Z A P A T A			P L I N T O			P I L A	
LARGO	ANCHO	CANTO	LARGO	ANCHO	CANTO	LARGO	ANCHO
8.000	8.500	2.500	0.000	0.000	0.000	1.400	3.100
HORMIGON	RESIST. CARAC.	COE. MINOR.	DENSIDAD	SUBPRESION FUSTE			
	250. KG/CM2	1.50	2.500 T/M3	0.0 T.			
ACERO	RESIST. CARAC.	COE. MINOR.	RECUBRIM.	REC/0 PI	REC/0 PLI		
	5100. KG/CM2	1.15	0.050 M.	0.000	0.000		

SECCIONES DE CALCULO
0.000 -2.500

CARGAS PERMANENTES

N.	Q L.	Q T.	M L.	M T.	N. FUSTE
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.	0.00 T/M

PRETENSADO

N.	Q L.	Q T.	M L.	M T.
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.

ESFUERZOS REOLOGICOS

N.	Q L.	Q T.	M L.	M T.	G
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.	1.00

CARGAS DE VIENTO

N.	Q L.	Q T.	M L.	M T.	QL.FUSTE
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.	0.00 T/M

SOBRECARGAS

HIP	N.	Q L.	Q T.	M L.	M T.
6	2723.1 T.	73.21 T.	33.30 T.	1025.8 MT.	710.3 MT.
7	1225.1 T.	48.80 T.	13.49 T.	641.3 MT.	187.8 MT.
8	2309.6 T.	73.21 T.	26.12 T.	1016.1 MT.	2356.1 MT.
9	1688.3 T.	48.80 T.	26.12 T.	659.2 MT.	2839.0 MT.
10	1698.2 T.	48.80 T.	26.12 T.	659.8 MT.	2883.2 MT.

HIPOTESIS 6

1.50 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	2723.08	2723.08	0.00	0.00	2723.08	2450.77
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97

ML.	1026.52	1026.52	0.00	0.00	1026.52	923.87
MT.	710.60	710.60	0.00	0.00	710.60	639.54
EL	0.377	0.377			0.377	0.377
ET	0.261	0.261			0.261	0.261

HIPOTESIS 1 P.PROP+SOBRECARGA
2 P.PROP+SOBRECARGA MAYORADO
3 P.PROP+VIENTO
4 P.PROP+VIENTO MAYORADO
5 P.PROP+SOBREC+1/2 VIENTO
6 P.PROP+SOBREC+1/2 VIENTO MAYORADO

HIPOTESIS 6

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N

HIPOTESIS	1	2	3	4	5	6
N.	3148.08	3360.58	425.00	637.50	3148.08	3024.52
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	1209.55	1209.55	0.00	0.00	1209.55	1088.59
MT.	793.85	793.85	0.00	0.00	793.85	714.47
EL	0.384	0.360	0.000	0.000	0.384	0.360
ET	0.252	0.236	0.000	0.000	0.252	0.236

TENSIONES

SIG1	67.88	71.00	6.25	9.37	67.88	63.90
SIG2	51.40	54.52	6.25	9.37	51.40	49.07
SIG3	41.20	44.32	6.25	9.37	41.20	39.89
SIG4	24.71	27.84	6.25	9.37	24.71	25.06

DIMENSIONAMIENTO LONGITUDINAL

MOMENTO	457.23	304.82	0.00	0.00	411.51	274.34
ARM. INF.	42.69	31.39M	0.00M	0.00M	38.25	29.15M
ARM. SUP.	0.00	0.00	7.41	7.41	0.00	0.00
CORTANTE	155.39	103.60	0.00	0.00	139.85	93.24
I CORT.	0.752	0.502	0.000	0.000	0.677	0.451

DIMENSIONAMIENTO TRANSVERSAL

MOMENTO	347.40	231.60	0.00	0.00	312.66	208.44
ARM.INF.	34.16M	25.66M	0.00M	0.00M	31.93M	23.60M
ARM.SUP.	0.00	0.00	6.08	6.08	0.00	0.00
CORTANTE	103.67	69.11	0.00	0.00	93.30	62.20
I CORT.	0.754	0.503	0.000	0.000	0.679	0.453

OF 556+1 - PILA 1 - CIMENTACION ARMADURA

HIPOTESIS 7

1.00 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	2723.08	2723.08	0.00	0.00	2723.08	2450.77
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	1026.52	1026.52	0.00	0.00	1026.52	923.87
MT.	710.60	710.60	0.00	0.00	710.60	639.54
EL	0.377	0.377			0.377	0.377
ET	0.261	0.261			0.261	0.261

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N						
HIPOTESIS	1	2	3	4	5	6
N.	3148.08	3148.08	425.00	425.00	3148.08	2875.77
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	1209.55	1209.55	0.00	0.00	1209.55	1088.59
MT.	793.85	793.85	0.00	0.00	793.85	714.47
EL	0.384	0.384	0.000	0.000	0.384	0.379
ET	0.252	0.252	0.000	0.000	0.252	0.248

TENSIONES

SIG1	67.88	67.88	6.25	6.25	67.88	61.71
SIG2	51.40	51.40	6.25	6.25	51.40	46.88
SIG3	41.20	41.20	6.25	6.25	41.20	37.70
SIG4	24.71	24.71	6.25	6.25	24.71	22.87

DIMENSIONAMIENTO LONGITUDINAL

MOMENTO	304.82	304.82	0.00	0.00	304.82	274.34
ARM.INF.	31.39M	31.39M	0.00M	0.00M	31.39M	29.15M
ARM.SUP.	0.00	0.00	5.01	5.01	0.00	0.00
CORTANTE	103.60	103.60	0.00	0.00	103.60	93.24
I CORT.	0.502	0.502	0.000	0.000	0.502	0.451

DIMENSIONAMIENTO TRANSVERSAL

MOMENTO	231.60	231.60	0.00	0.00	231.60	208.44
ARM.INF.	25.66M	25.66M	0.00M	0.00M	25.66M	23.60M
ARM.SUP.	0.00	0.00	4.10	4.10	0.00	0.00
CORTANTE	69.11	69.11	0.00	0.00	69.11	62.20
I CORT.	0.503	0.503	0.000	0.000	0.503	0.453

HIPOTESIS 8

1.50 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	2723.08	2723.08	0.00	0.00	2723.08	2450.77
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	1026.52	1026.52	0.00	0.00	1026.52	923.87
MT.	710.60	710.60	0.00	0.00	710.60	639.54
EL	0.377	0.377			0.377	0.377
ET	0.261	0.261			0.261	0.261

OF 556+1 - PILA 1 - CIMENTACION ARMADURA

HIPOTESIS 8

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N						
HIPOTESIS	1	2	3	4	5	6
N.	3148.08	3360.58	425.00	637.50	3148.08	3024.52
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	1209.55	1209.55	0.00	0.00	1209.55	1088.59
MT.	793.85	793.85	0.00	0.00	793.85	714.47
EL	0.384	0.360	0.000	0.000	0.384	0.360
ET	0.252	0.236	0.000	0.000	0.252	0.236

TENSIONES

SIG1	67.88	71.00	6.25	9.37	67.88	63.90
SIG2	51.40	54.52	6.25	9.37	51.40	49.07
SIG3	41.20	44.32	6.25	9.37	41.20	39.89
SIG4	24.71	27.84	6.25	9.37	24.71	25.06

DIMENSIONAMIENTO LONGITUDINAL

MOMENTO	457.23	304.82	0.00	0.00	411.51	274.34
ARM.INF.	42.69	31.39M	0.00M	0.00M	38.25	29.15M
ARM.SUP.	0.00	0.00	7.41	7.41	0.00	0.00
CORTANTE	155.39	103.60	0.00	0.00	139.85	93.24
I CORT.	0.752	0.502	0.000	0.000	0.677	0.451

DIMENSIONAMIENTO TRANSVERSAL

MOMENTO	347.40	231.60	0.00	0.00	312.66	208.44
ARM.INF.	34.16M	25.66M	0.00M	0.00M	31.93M	23.60M
ARM.SUP.	0.00	0.00	6.08	6.08	0.00	0.00
CORTANTE	103.67	69.11	0.00	0.00	93.30	62.20
I CORT.	0.754	0.503	0.000	0.000	0.679	0.453

OF 556+1 - PILA 1 - CIMENTACION ARMADURA

HIPOTESIS 9

1.50 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	2723.08	2723.08	0.00	0.00	2723.08	2450.77
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	1026.52	1026.52	0.00	0.00	1026.52	923.87
MT.	710.60	710.60	0.00	0.00	710.60	639.54
EL	0.377	0.377			0.377	0.377
ET	0.261	0.261			0.261	0.261

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N						
HIPOTESIS	1	2	3	4	5	6
N.	3148.08	3360.58	425.00	637.50	3148.08	3024.52
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	1209.55	1209.55	0.00	0.00	1209.55	1088.59
MT.	793.85	793.85	0.00	0.00	793.85	714.47
EL	0.384	0.360	0.000	0.000	0.384	0.360
ET	0.252	0.236	0.000	0.000	0.252	0.236

TENSIONES

SIG1	67.88	71.00	6.25	9.37	67.88	63.90
SIG2	51.40	54.52	6.25	9.37	51.40	49.07
SIG3	41.20	44.32	6.25	9.37	41.20	39.89
SIG4	24.71	27.84	6.25	9.37	24.71	25.06

DIMENSIONAMIENTO LONGITUDINAL

MOMENTO	457.23	304.82	0.00	0.00	411.51	274.34
ARM.INF.	42.69	31.39M	0.00M	0.00M	38.25	29.15M
ARM.SUP.	0.00	0.00	7.41	7.41	0.00	0.00
CORTANTE	155.39	103.60	0.00	0.00	139.85	93.24
I CORT.	0.752	0.502	0.000	0.000	0.677	0.451

DIMENSIONAMIENTO TRANSVERSAL

MOMENTO	347.40	231.60	0.00	0.00	312.66	208.44
ARM.INF.	34.16M	25.66M	0.00M	0.00M	31.93M	23.60M
ARM.SUP.	0.00	0.00	6.08	6.08	0.00	0.00
CORTANTE	103.67	69.11	0.00	0.00	93.30	62.20
I CORT.	0.754	0.503	0.000	0.000	0.679	0.453

OF 556+1 - PILA 1 - CIMENTACION ARMADURA

HIPOTESIS 10

1.50 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	2723.08	2723.08	0.00	0.00	2723.08	2450.77
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	1026.52	1026.52	0.00	0.00	1026.52	923.87
MT.	710.60	710.60	0.00	0.00	710.60	639.54
EL	0.377	0.377			0.377	0.377
ET	0.261	0.261			0.261	0.261

HIPOTESIS 10

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N						
HIPOTESIS	1	2	3	4	5	6
N.	3148.08	3360.58	425.00	637.50	3148.08	3024.52
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	1209.55	1209.55	0.00	0.00	1209.55	1088.59
MT.	793.85	793.85	0.00	0.00	793.85	714.47
EL	0.384	0.360	0.000	0.000	0.384	0.360
ET	0.252	0.236	0.000	0.000	0.252	0.236

TENSIONES

SIG1	67.88	71.00	6.25	9.37	67.88	63.90
SIG2	51.40	54.52	6.25	9.37	51.40	49.07
SIG3	41.20	44.32	6.25	9.37	41.20	39.89
SIG4	24.71	27.84	6.25	9.37	24.71	25.06

DIMENSIONAMIENTO LONGITUDINAL

MOMENTO	457.23	304.82	0.00	0.00	411.51	274.34
ARM.INF.	42.69	31.39M	0.00M	0.00M	38.25	29.15M
ARM.SUP.	0.00	0.00	7.41	7.41	0.00	0.00
CORTANTE	155.39	103.60	0.00	0.00	139.85	93.24
I CORT.	0.752	0.502	0.000	0.000	0.677	0.451

DIMENSIONAMIENTO TRANSVERSAL

MOMENTO	347.40	231.60	0.00	0.00	312.66	208.44
ARM.INF.	34.16M	25.66M	0.00M	0.00M	31.93M	23.60M
ARM.SUP.	0.00	0.00	6.08	6.08	0.00	0.00
CORTANTE	103.67	69.11	0.00	0.00	93.30	62.20
I CORT.	0.754	0.503	0.000	0.000	0.679	0.453

ARMADURA DE ZAPATA LONGITUDINAL 42.69 CM2 TRANSVERSAL 34.16

INDICE DE CORTANTE MAXIMO 0.754

Hipótesis para cálculo de cimentaciones de Pila 2

Hipótesis 1

	F_x	F_y	F_z	M_x	M_y
Sección Cabeza	48,80	22,20	1496,97	196,01	0,00
			171,48	155,40	341,60
Sección Base			1668,45	351,41	341,60

Hipótesis 2

	F_x	F_y	F_z	M_x	M_y
Sección Cabeza	48,80	8,99	929,84	12,20	0,00
			171,48	62,93	341,60
Sección Base			1101,32	75,73	341,60

Hipótesis 3

	F_x	F_y	F_z	M_x	M_y
Sección Cabeza	48,80	17,41	1221,33	1353,06	0,00
			171,48	121,87	341,60
Sección Base			1392,81	1474,93	341,60

Hipótesis 4

	F_x	F_y	F_z	M_x	M_y
Sección Cabeza	48,80	17,41	1135,57	1674,99	0,00
			171,48	121,87	341,60
Sección Base			1308,05	1796,86	341,60

Hipótesis 5

	F_x	F_y	F_z	M_x	M_y
Sección Cabeza	48,80	17,41	1143,16	1704,47	0,00
			171,48	121,87	341,60
Sección Base			1314,64	1826,34	341,60

Hipótesis 6

	F_x	F_y	F_z	M_x	M_y
Sección Cabeza	73,21	33,30	2263,73	294,02	0,00
			257,22	233,10	512,47
Sección Base			2520,95	527,12	512,47

Hipótesis 7

	F_x	F_y	F_z	M_x	M_y
Sección Cabeza	48,80	13,49	918,87	19,20	0,00
			171,48	94,43	341,60
Sección Base			1090,35	113,63	341,60

Hipótesis 8

	F_x	F_y	F_z	M_x	M_y
Sección Cabeza	73,21	26,12	1850,24	2029,59	0,00
			257,22	182,84	512,47
Sección Base			2107,46	2212,43	512,47

OBJETO

HOJA N° DE

PROYECTO N°

CALCULADO POR

COMPROBADO POR

FECHA

Hipótesis 9

	F_x	F_y	F_z	M_x	M_y
Sección Cabeza	48,80	26,12	1228,96	2512,49	0,00
			257,22	182,84	341,60
Sección Base			1486,18	2695,33	341,60

Hipótesis 10

	F_x	F_y	F_z	M_x	M_y
Sección Cabeza	48,80	26,12	1238,85	2556,71	0,00
			257,22	182,84	341,60
Sección Base			1496,07	2739,55	341,60

OF 556+1 - PILA 2 - CIMENTACION TENSION

ALTURA COEF. SEGUR. MAYOR. MINOR.
0.01 PESO PROPIO 1.00 1.00

Z A P A T A

P L I N T O

P I L A

LARGO	ANCHO	CANTO	LARGO	ANCHO	CANTO	LARGO	ANCHO
6.500	8.500	2.300	0.000	0.000	0.000	1.400	3.100

HORMIGON	RESIST. CARAC.	COE. MINOR.	DENSIDAD	SUBPRESION FUSTE
	250. KG/CM2	1.50	2.500 T/M3	0.0 T.

ACERO	RESIST. CARAC.	COE. MINOR.	RECUBRIM.	REC/0 PI	REC/0 PLI
	5100. KG/CM2	1.15	0.050 M.	0.000	0.000

SECCIONES DE CALCULO
0.000 -2.500

CARGAS PERMANENTES

N.	Q L.	Q T.	M L.	M T.	N. FUSTE
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.	0.00 T/M

PRETENSADO

N.	Q L.	Q T.	M L.	M T.
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.

ESFUERZOS REOLOGICOS

N.	Q L.	Q T.	M L.	M T.	G
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.	1.00

CARGAS DE VIENTO

N.	Q L.	Q T.	M L.	M T.	QL.FUSTE
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.	0.00 T/M

SOBRECARGAS

HIP	N.	Q L.	Q T.	M L.	M T.
1	1668.4 T.	48.80 T.	22.20 T.	341.6 MT.	351.4 MT.
2	1101.3 T.	48.80 T.	8.99 T.	341.6 MT.	75.7 MT.
3	1392.8 T.	48.80 T.	17.41 T.	341.6 MT.	1474.9 MT.
4	1308.1 T.	48.80 T.	17.41 T.	341.6 MT.	1796.9 MT.
5	1314.6 T.	48.80 T.	17.41 T.	341.6 MT.	1826.3 MT.

HIPOTESIS 1

1.00 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	1668.45	1668.45	0.00	0.00	1668.45	1501.60

QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	342.09	342.09	0.00	0.00	342.09	307.88
MT.	351.63	351.63	0.00	0.00	351.63	316.47
EL	0.205	0.205			0.205	0.205
ET	0.211	0.211			0.211	0.211

HIPOTESIS 1 P.PROP+SOBRECARGA
2 P.PROP+SOBRECARGA MAYORADO
3 P.PROP+VIENTO
4 P.PROP+VIENTO MAYORADO
5 P.PROP+SOBREC+1/2 VIENTO
6 P.PROP+SOBREC+1/2 VIENTO MAYORADO

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N

HIPOTESIS	1	2	3	4	5	6
N.	1986.14	1986.14	317.69	317.69	1986.14	1787.52
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	464.09	464.09	0.00	0.00	464.09	417.68
MT.	407.13	407.13	0.00	0.00	407.13	366.42
EL	0.234	0.234	0.000	0.000	0.234	0.234
ET	0.205	0.205	0.000	0.000	0.205	0.205

TENSIONES

SIG1	48.90	48.90	5.75	5.75	48.90	44.01
SIG2	38.50	38.50	5.75	5.75	38.50	34.65
SIG3	33.40	33.40	5.75	5.75	33.40	30.06
SIG4	22.99	22.99	5.75	5.75	22.99	20.69

OF 556+1 - PILA 2 - CIMENTACION TENSION

HIPOTESIS 2

1.00 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	1668.45	1668.45	0.00	0.00	1668.45	1501.60
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	342.09	342.09	0.00	0.00	342.09	307.88
MT.	351.63	351.63	0.00	0.00	351.63	316.47
EL	0.205	0.205			0.205	0.205
ET	0.211	0.211			0.211	0.211

HIPOTESIS 2

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N						
HIPOTESIS	1	2	3	4	5	6
N.	1986.14	1986.14	317.69	317.69	1986.14	1819.29
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	464.09	464.09	0.00	0.00	464.09	417.68
MT.	407.13	407.13	0.00	0.00	407.13	366.42
EL	0.234	0.234	0.000	0.000	0.234	0.230
ET	0.205	0.205	0.000	0.000	0.205	0.201

TENSIONES

SIG1	48.90	48.90	5.75	5.75	48.90	44.59
SIG2	38.50	38.50	5.75	5.75	38.50	35.23
SIG3	33.40	33.40	5.75	5.75	33.40	30.63
SIG4	22.99	22.99	5.75	5.75	22.99	21.27

OF 556+1 - PILA 2 - CIMENTACION TENSION

HIPOTESIS 3

1.00 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	1668.45	1668.45	0.00	0.00	1668.45	1501.60
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	342.09	342.09	0.00	0.00	342.09	307.88
MT.	351.63	351.63	0.00	0.00	351.63	316.47
EL	0.205	0.205			0.205	0.205
ET	0.211	0.211			0.211	0.211

HIPOTESIS 3

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N						
HIPOTESIS	1	2	3	4	5	6
N.	1986.14	1986.14	317.69	317.69	1986.14	1787.52
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	464.09	464.09	0.00	0.00	464.09	417.68
MT.	407.13	407.13	0.00	0.00	407.13	366.42
EL	0.234	0.234	0.000	0.000	0.234	0.234
ET	0.205	0.205	0.000	0.000	0.205	0.205

TENSIONES

SIG1	48.90	48.90	5.75	5.75	48.90	44.01
SIG2	38.50	38.50	5.75	5.75	38.50	34.65
SIG3	33.40	33.40	5.75	5.75	33.40	30.06
SIG4	22.99	22.99	5.75	5.75	22.99	20.69

OF 556+1 - PILA 2 - CIMENTACION TENSION

HIPOTESIS 4

1.00 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	1668.45	1668.45	0.00	0.00	1668.45	1501.60
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	342.09	342.09	0.00	0.00	342.09	307.88
MT.	351.63	351.63	0.00	0.00	351.63	316.47
EL	0.205	0.205			0.205	0.205
ET	0.211	0.211			0.211	0.211

HIPOTESIS 4

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N						
HIPOTESIS	1	2	3	4	5	6
N.	1986.14	1986.14	317.69	317.69	1986.14	1787.52
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	464.09	464.09	0.00	0.00	464.09	417.68
MT.	407.13	407.13	0.00	0.00	407.13	366.42
EL	0.234	0.234	0.000	0.000	0.234	0.234
ET	0.205	0.205	0.000	0.000	0.205	0.205

TENSIONES

SIG1	48.90	48.90	5.75	5.75	48.90	44.01
SIG2	38.50	38.50	5.75	5.75	38.50	34.65
SIG3	33.40	33.40	5.75	5.75	33.40	30.06
SIG4	22.99	22.99	5.75	5.75	22.99	20.69

OF 556+1 - PILA 2 - CIMENTACION TENSION

HIPOTESIS 5

1.00 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	1668.45	1668.45	0.00	0.00	1668.45	1501.60
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	342.09	342.09	0.00	0.00	342.09	307.88
MT.	351.63	351.63	0.00	0.00	351.63	316.47
EL	0.205	0.205			0.205	0.205
ET	0.211	0.211			0.211	0.211

HIPOTESIS 5

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N						
HIPOTESIS	1	2	3	4	5	6
N.	1986.14	1986.14	317.69	317.69	1986.14	1787.52
QL.	48.80	48.80	0.00	0.00	48.80	43.92
QT.	22.20	22.20	0.00	0.00	22.20	19.98
ML.	464.09	464.09	0.00	0.00	464.09	417.68
MT.	407.13	407.13	0.00	0.00	407.13	366.42
EL	0.234	0.234	0.000	0.000	0.234	0.234
ET	0.205	0.205	0.000	0.000	0.205	0.205

TENSIONES

SIG1	48.90	48.90	5.75	5.75	48.90	44.01
SIG2	38.50	38.50	5.75	5.75	38.50	34.65
SIG3	33.40	33.40	5.75	5.75	33.40	30.06
SIG4	22.99	22.99	5.75	5.75	22.99	20.69

TENSIONES MAXIMAS EN CIMENTACION

HIPOTESIS DE SERVICIO TENSION MAXIMA 48.90 TENSION MINIMA 5.75

OF 556+1 - PILA 2 - CIMENTACION ARMADURA

ALTURA COEF. SEGUR. MAYOR. MINOR.
0.01 PESO PROPIO 1.50 1.00

Z A P A T A

P L I N T O

P I L A

LARGO	ANCHO	CANTO	LARGO	ANCHO	CANTO	LARGO	ANCHO
6.000	8.500	2.300	0.000	0.000	0.000	1.400	3.100

HORMIGON	RESIST. CARAC.	COE. MINOR.	DENSIDAD	SUBPRESION FUSTE
	250. KG/CM2	1.50	2.500 T/M3	0.0 T.

ACERO	RESIST. CARAC.	COE. MINOR.	RECUBRIM.	REC/O PI	REC/O PLI
	5100. KG/CM2	1.15	0.050 M.	0.000	0.000

SECCIONES DE CALCULO
0.000 -2.500

CARGAS PERMANENTES

N.	Q L.	Q T.	M L.	M T.	N. FUSTE
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.	0.00 T/M

PRETENSADO

N.	Q L.	Q T.	M L.	M T.
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.

ESFUERZOS REOLOGICOS

N.	Q L.	Q T.	M L.	M T.	G
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.	1.00

CARGAS DE VIENTO

N.	Q L.	Q T.	M L.	M T.	QL.FUSTE
0.0 T.	0.00 T.	0.00 T.	0.0 MT.	0.0 MT.	0.00 T/M

SOBRECARGAS

HIP	N.	Q L.	Q T.	M L.	M T.
6	2520.9 T.	73.21 T.	33.30 T.	512.5 MT.	527.1 MT.
7	1090.3 T.	48.80 T.	13.49 T.	341.6 MT.	113.6 MT.
8	2107.5 T.	73.21 T.	26.12 T.	512.5 MT.	2212.4 MT.
9	1486.2 T.	48.80 T.	26.12 T.	341.6 MT.	2695.3 MT.
10	1496.1 T.	48.80 T.	26.12 T.	341.6 MT.	2739.6 MT.

HIPOTESIS 6

1.50 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	2520.95	2520.95	0.00	0.00	2520.95	2268.85
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97

ML.	513.20	513.20	0.00	0.00	513.20	461.88
MT.	527.45	527.45	0.00	0.00	527.45	474.71
EL	0.204	0.204			0.204	0.204
ET	0.209	0.209			0.209	0.209

HIPOTESIS 1 P.PROP+SOBRECARGA
2 P.PROP+SOBRECARGA MAYORADO
3 P.PROP+VIENTO
4 P.PROP+VIENTO MAYORADO
5 P.PROP+SOBREC+1/2 VIENTO
6 P.PROP+SOBREC+1/2 VIENTO MAYORADO

HIPOTESIS 6

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N

HIPOTESIS	1	2	3	4	5	6
N.	2814.20	2960.82	293.25	439.87	2814.20	2664.74
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	696.23	696.23	0.00	0.00	696.23	626.60
MT.	610.70	610.70	0.00	0.00	610.70	549.63
EL	0.247	0.235	0.000	0.000	0.247	0.235
ET	0.217	0.206	0.000	0.000	0.217	0.206

TENSIONES

SIG1	77.28	80.16	5.75	8.62	77.28	72.14
SIG2	60.38	63.25	5.75	8.62	60.38	56.93
SIG3	49.98	52.86	5.75	8.62	49.98	47.57
SIG4	33.08	35.95	5.75	8.62	33.08	32.36

DIMENSIONAMIENTO LONGITUDINAL

MOMENTO	280.08	186.72	0.00	0.00	252.07	168.05
ARM.INF.	30.50M	22.74M	0.00M	0.00M	28.44M	20.89M
ARM.SUP.	0.00	0.00	3.87	3.87	0.00	0.00
CORTANTE	106.47	70.98	0.00	0.00	95.82	63.88
I CORT.	0.743	0.496	0.000	0.000	0.669	0.446

DIMENSIONAMIENTO TRANSVERSAL

MOMENTO	419.11	279.40	0.00	0.00	377.20	251.46
ARM.INF.	42.77	30.45M	0.00M	0.00M	38.31	28.39M
ARM.SUP.	0.00	0.00	6.07	6.07	0.00	0.00
CORTANTE	133.05	88.70	0.00	0.00	119.74	79.83
I CORT.	0.753	0.502	0.000	0.000	0.678	0.452

OF 556+1 - PILA 2 - CIMENTACION ARMADURA

HIPOTESIS 7

1.00 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	2520.95	2520.95	0.00	0.00	2520.95	2268.85
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	513.20	513.20	0.00	0.00	513.20	461.88
MT.	527.45	527.45	0.00	0.00	527.45	474.71
EL	0.204	0.204			0.204	0.204
ET	0.209	0.209			0.209	0.209

HIPOTESIS 7

SECCION 2 ALTURA -2.500 M.

HIPOTESIS	1	2	3	4	5	6
N.	2814.20	2814.20	293.25	293.25	2814.20	2562.10
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	696.23	696.23	0.00	0.00	696.23	626.60
MT.	610.70	610.70	0.00	0.00	610.70	549.63
EL	0.247	0.247	0.000	0.000	0.247	0.245
ET	0.217	0.217	0.000	0.000	0.217	0.215

C I M E N T A C I O N

TENSIONES

SIG1	77.28	77.28	5.75	5.75	77.28	70.13
SIG2	60.38	60.38	5.75	5.75	60.38	54.92
SIG3	49.98	49.98	5.75	5.75	49.98	45.56
SIG4	33.08	33.08	5.75	5.75	33.08	30.34

DIMENSIONAMIENTO LONGITUDINAL

MOMENTO	186.72	186.72	0.00	0.00	186.72	168.05
ARM.INF.	22.74M	22.74M	0.00M	0.00M	22.74M	20.89M
ARM.SUP.	0.00	0.00	2.60	2.60	0.00	0.00
CORTANTE	70.98	70.98	0.00	0.00	70.98	63.88
I CORT.	0.496	0.496	0.000	0.000	0.496	0.446

DIMENSIONAMIENTO TRANSVERSAL

MOMENTO	279.40	279.40	0.00	0.00	279.40	251.46
ARM.INF.	30.45M	30.45M	0.00M	0.00M	30.45M	28.39M
ARM.SUP.	0.00	0.00	4.10	4.10	0.00	0.00
CORTANTE	88.70	88.70	0.00	0.00	88.70	79.83
I CORT.	0.502	0.502	0.000	0.000	0.502	0.452

HIPOTESIS 8

1.50 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	2520.95	2520.95	0.00	0.00	2520.95	2268.85
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	513.20	513.20	0.00	0.00	513.20	461.88
MT.	527.45	527.45	0.00	0.00	527.45	474.71
EL	0.204	0.204			0.204	0.204
ET	0.209	0.209			0.209	0.209

OF 556+1 - PILA 2 - CIMENTACION ARMADURA

HIPOTESIS 8

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N						
HIPOTESIS	1	2	3	4	5	6
N.	2814.20	2960.82	293.25	439.87	2814.20	2664.74
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	696.23	696.23	0.00	0.00	696.23	626.60
MT.	610.70	610.70	0.00	0.00	610.70	549.63
EL	0.247	0.235	0.000	0.000	0.247	0.235
ET	0.217	0.206	0.000	0.000	0.217	0.206

TENSIONES

SIG1	77.28	80.16	5.75	8.62	77.28	72.14
SIG2	60.38	63.25	5.75	8.62	60.38	56.93
SIG3	49.98	52.86	5.75	8.62	49.98	47.57
SIG4	33.08	35.95	5.75	8.62	33.08	32.36

DIMENSIONAMIENTO LONGITUDINAL

MOMENTO	280.08	186.72	0.00	0.00	252.07	168.05
ARM.INF.	30.50M	22.74M	0.00M	0.00M	28.44M	20.89M
ARM.SUP.	0.00	0.00	3.87	3.87	0.00	0.00
CORTANTE	106.47	70.98	0.00	0.00	95.82	63.88
I CORT.	0.743	0.496	0.000	0.000	0.669	0.446

DIMENSIONAMIENTO TRANSVERSAL

MOMENTO	419.11	279.40	0.00	0.00	377.20	251.46
ARM.INF.	42.77	30.45M	0.00M	0.00M	38.31	28.39M
ARM.SUP.	0.00	0.00	6.07	6.07	0.00	0.00
CORTANTE	133.05	88.70	0.00	0.00	119.74	79.83
I CORT.	0.753	0.502	0.000	0.000	0.678	0.452

HIPOTESIS 9

1.50 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	2520.95	2520.95	0.00	0.00	2520.95	2268.85
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	513.20	513.20	0.00	0.00	513.20	461.88
MT.	527.45	527.45	0.00	0.00	527.45	474.71
EL	0.204	0.204			0.204	0.204
ET	0.209	0.209			0.209	0.209

HIPOTESIS 9

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N						
HIPOTESIS	1	2	3	4	5	6
N.	2814.20	2960.82	293.25	439.87	2814.20	2664.74
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	696.23	696.23	0.00	0.00	696.23	626.60
MT.	610.70	610.70	0.00	0.00	610.70	549.63
EL	0.247	0.235	0.000	0.000	0.247	0.235
ET	0.217	0.206	0.000	0.000	0.217	0.206

TENSIONES

SIG1	77.28	80.16	5.75	8.62	77.28	72.14
SIG2	60.38	63.25	5.75	8.62	60.38	56.93
SIG3	49.98	52.86	5.75	8.62	49.98	47.57
SIG4	33.08	35.95	5.75	8.62	33.08	32.36

DIMENSIONAMIENTO LONGITUDINAL

MOMENTO	280.08	186.72	0.00	0.00	252.07	168.05
ARM.INF.	30.50M	22.74M	0.00M	0.00M	28.44M	20.89M
ARM.SUP.	0.00	0.00	3.87	3.87	0.00	0.00
I CORT.	0.743	0.496	0.000	0.000	0.669	0.446

DIMENSIONAMIENTO TRANSVERSAL

MOMENTO	419.11	279.40	0.00	0.00	377.20	251.46
ARM.INF.	42.77	30.45M	0.00M	0.00M	38.31	28.39M
ARM.SUP.	0.00	0.00	6.07	6.07	0.00	0.00
CORTANTE	133.05	88.70	0.00	0.00	119.74	79.83
I CORT.	0.753	0.502	0.000	0.000	0.678	0.452

OF 556+1 - PILA 2 - CIMENTACION ARMADUR

HIPOTESIS 10

1.50 1 1.00

SECCION 1 ALTURA 0.000 M.

HIPOTESIS	1	2	3	4	5	6
N.	2520.95	2520.95	0.00	0.00	2520.95	2268.85
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	513.20	513.20	0.00	0.00	513.20	461.88
MT.	527.45	527.45	0.00	0.00	527.45	474.71
EL	0.204	0.204			0.204	0.204
ET	0.209	0.209			0.209	0.209

HIPOTESIS 10

SECCION 2 ALTURA -2.500 M.

C I M E N T A C I O N

HIPOTESIS	1	2	3	4	5	6
N.	2814.20	2960.82	293.25	439.87	2814.20	2664.74
QL.	73.21	73.21	0.00	0.00	73.21	65.89
QT.	33.30	33.30	0.00	0.00	33.30	29.97
ML.	696.23	696.23	0.00	0.00	696.23	626.60
MT.	610.70	610.70	0.00	0.00	610.70	549.63
EL	0.247	0.235	0.000	0.000	0.247	0.235
ET	0.217	0.206	0.000	0.000	0.217	0.206

TENSIONES

SIG1	77.28	80.16	5.75	8.62	77.28	72.14
SIG2	60.38	63.25	5.75	8.62	60.38	56.93
SIG3	49.98	52.86	5.75	8.62	49.98	47.57
SIG4	33.08	35.95	5.75	8.62	33.08	32.36

DIMENSIONAMIENTO LONGITUDINAL

MOMENTO	280.08	186.72	0.00	0.00	252.07	168.05
ARM.INF.	30.50M	22.74M	0.00M	0.00M	28.44M	20.89M
ARM.SUP.	0.00	0.00	3.87	3.87	0.00	0.00
CORTANTE	106.47	70.98	0.00	0.00	95.82	63.88
I CORT.	0.743	0.496	0.000	0.000	0.669	0.446

DIMENSIONAMIENTO TRANSVERSAL

MOMENTO	419.11	279.40	0.00	0.00	377.20	251.46
ARM.INF.	42.77	30.45M	0.00M	0.00M	38.31	28.39M
ARM.SUP.	0.00	0.00	6.07	6.07	0.00	0.00
CORTANTE	133.05	88.70	0.00	0.00	119.74	79.83
I CORT.	0.753	0.502	0.000	0.000	0.678	0.452

ARMADURA DE ZAPATA LONGITUDINAL 30.50 CM2 TRANSVERSAL 42.77

INDICE DE CORTANTE MAXIMO 0.753

ESTRIBOS

ESTRIBO 1

Cargas procedentes del tablero

Carga permanente

$$N: 175,90 + 57,93 + 30,38 = 264,21 \text{ t} \rightarrow 18,9 \text{ t/m}$$

$$H_L: 0,05 \times 18,9 \approx 1 \text{ t/m}$$

Sobrecarga máxima + 0,6 temperatura

$$N: 144,69 + 0,6 \times 30,89 = 163,22 \text{ t} \rightarrow 11,7 \text{ t/m}$$

$$H_L: 0,05 \times 11,7 = 0,6 \text{ t/m}$$

Sobrecarga mínima

$$N: -68,81 \text{ t} \rightarrow -5 \text{ t/m}$$

Sobrecarga en trasdos

$$3 \text{ t/m}^2$$

VIADUCTO. ESTRIBO MOVIL

DENSIDAD TIERRAS	2.00	T/M3
ANGULO ROZAMIENTO INTERNO	.00	GRAD.
PENDIENTE DEL TERRENO	.00	
INCLINACION TRASDOS	.00	GRAD
COEF. ROZAM. CIMENTACION	.55	
INCLINACION DEL EMPUJE	.00	GRAD
COEFICIENTE DE EMPUJE	.30	
RESIST. CARACTER. HORMIGON	250.00	KG/CM2
DENSIDAD HORMIGON	2.50	T/M3
COEF. MINORACION HORMIGON	1.50	
RESIST. CARACTER. ACERO	5100.00	KG/CM2
COEF. MINORACION ACERO	1.15	
RECUB. ARMADURAS ALZADO	.05	M.
RECUB. ARMADURAS ZAPATA	.05	M.
COEF. MAYORACION CARGAS	1.50	

PARAMETROS VERTICALES

.000 1.700 .000 9.500 2.370 .000

PARAMETROS HORIZONTALES

2.000 1.700 5.300 .000 1.300 .400 .000

SECCIONES DE CALCULO DEL MURO

4.000 2.000 .000

CARGAS ACTUANTES

NUM TIPO VALOR DIST.

1	1	3.000	.000	SOBRECARGA UNIFORME EN
2	2	18.900	1.100	CARGA PERMANENTE TABLER
3	2	11.700	1.100	SOBRECARGA MAX.+GRAD. T
4	2	-5.000	1.100	SOBRECARGA MIN.
5	3	1.600	.000	REOLOGICAS

VIADUCTO. ESTRIBO MOVIL

CP+REOL+SC MIN

1 1.00 2 1.00 4 1.00 5 1.00 0 .00 0 .00 0 .00 0

COEF. DE ESTABILIDAD AL VUELCO 2.93

COEF. DE ESTABILIDAD AL DESLIZAMIENTO 1.60

TENSIONES EN CIMENTACION

ANTERIOR POSTERIOR LONGITUD COMPRIMIDA
40.3 T/M2 8.7 T/M2 9.00 M.

ESFUERZOS Y ARMADURAS EN ZAPATAS

A R M A D U R A S				
	CORTANTE	MOMENTO	TRACCION	COMPRESION
FRONTAL	58.75 T.	127.5 MT.	20.0 CM2	.0 CM2
DORSAL	81.64 T.	292.7 MT.	41.3 CM2	.0 CM2

ESFUERZOS Y ARMADURAS EN ALZADO DEL MURO

A R M A D U R A S					
SECCION	CORTANTE	MOMENTO	AXIL	TRACCION	COMPRESION
4.000	40.90 T.	163.76 MT.	39.64 T.	16.3 CM2	.5 CM2
2.000	59.56 T.	270.84 MT.	48.14 T.	27.4 CM2	.6 CM2
.000	81.83 T.	418.86 MT.	56.64 T.	48.4 CM2	.7 CM2

VIADUCTO. ESTRIBO MOVIL

CP+REOL+SC MAX

1 1.00 2 1.00 3 1.00 5 1.00 0 .00 0 .00 0 .00 0

COEF. DE ESTABILIDAD AL VUELCO 3.04

COEF. DE ESTABILIDAD AL DESLIZAMIENTO 1.72

TENSIONES EN CIMENTACION

ANTERIOR POSTERIOR LONGITUD COMPRIMIDA
44.5 T/M2 8.2 T/M2 9.00 M.

ESFUERZOS Y ARMADURAS EN ZAPATAS

A R M A D U R A S
CORTANTE MOMENTO TRACCION COMPRESION
FRONTAL 65.48 T. 142.1 MT. 21.5 CM2 .0 CM2
DORSAL 77.01 T. 286.4 MT. 40.4 CM2 .0 CM2

ESFUERZOS Y ARMADURAS EN ALZADO DEL MURO

A R M A D U R A S
SECCION CORTANTE MOMENTO AXIL TRACCION COMPRESION
4.000 40.90 T. 182.13 MT. 56.34 T. 15.2 CM2 .7 CM2
2.000 59.56 T. 289.21 MT. 64.84 T. 26.4 CM2 .8 CM2
.000 81.83 T. 437.23 MT. 73.34 T. 47.5 CM2 .9 CM2

ESTRIBO 2

VIADUCTO. ESTRIBO FIJO

DENSIDAD TIERRAS	2.00	T/M3
ANGULO ROZAMIENTO INTERNO	.00	GRAD.
PENDIENTE DEL TERRENO	.00	
INCLINACION TRASDOS	.00	GRAD
COEF. ROZAM. CIMENTACION	.55	
INCLINACION DEL EMPUJE	.00	GRAD
COEFICIENTE DE EMPUJE	.30	
RESIST. CARACTER. HORMIGON	250.00	KG/CM2
DENSIDAD HORMIGON	2.50	T/M3
COEF. MINORACION HORMIGON	1.50	
RESIST. CARACTER. ACERO	5100.00	KG/CM2
COEF. MINORACION ACERO	1.15	
RECUB. ARMADURAS ALZADO	.05	M.
RECUB. ARMADURAS ZAPATA	.05	M.
COEF. MAYORACION CARGAS	1.50	

PARAMETROS VERTICALES

.000 2.400 .000 5.000 2.500 .000

PARAMETROS HORIZONTALES

2.900 3.400 4.700 .000 1.400 2.000 .000

SECCIONES DE CALCULO DEL MURO

.000

CARGAS ACTUANTES

NUM TIPO VALOR DIST.

1	1	3.000	.000	SOBRECARGA UNIFORME EN
2	2	18.900	2.750	CARGA PERMANENTE TABLER
3	2	11.700	2.750	SOBRECARGA MAX.+GRAD. T
4	2	-5.000	2.750	SOBRECARGA MIN.
5	8	8.400	6.000	REOLOGICAS
6	8	14.900	6.000	FRENADO
7	8	9.500	6.000	DILATACION RAILES

VIADUCTO. ESTRIBO FIJO

CP+REOL+SC MIN+FREN+DIL.RAILES

1 1.00 2 1.00 4 1.00 5 1.00 6 1.00 7 .60 0 .00

COEF. DE ESTABILIDAD AL VUELCO 3.70

COEF. DE ESTABILIDAD AL DESLIZAMIENTO 1.53

TENSIONES EN CIMENTACION

ANTERIOR POSTERIOR LONGITUD COMPRIMIDA
26.7 T/M2 10.7 T/M2 11.00 M.

ESFUERZOS Y ARMADURAS EN ZAPATAS

	A R M A D U R A S			
	CORTANTE	MOMENTO	TRACCION	COMPRESION
FRONTAL	49.52 T.	165.7 MT.	20.1 CM2	.0 CM2
DORSAL	53.45 T.	150.4 MT.	18.5 CM2	.0 CM2

ESFUERZOS Y ARMADURAS EN ALZADO DEL MURO

SECCION	A R M A D U R A S			
	CORTANTE	MOMENTO	AXIL	TRACCION COMPRESION
.000	78.94 T.	380.82 MT.	68.90 T.	13.8M CM2 .9 CM2

VIADUCTO. ESTRIBO FIJO

CP+REOL+SC MAX+FREN+DIL.RAILES

1 1.00 2 1.00 3 1.00 5 1.00 6 1.00 7 .60 0 .00 0

COEF. DE ESTABILIDAD AL VUELCO 3.87

COEF. DE ESTABILIDAD AL DESLIZAMIENTO 1.65

TENSIONES EN CIMENTACION

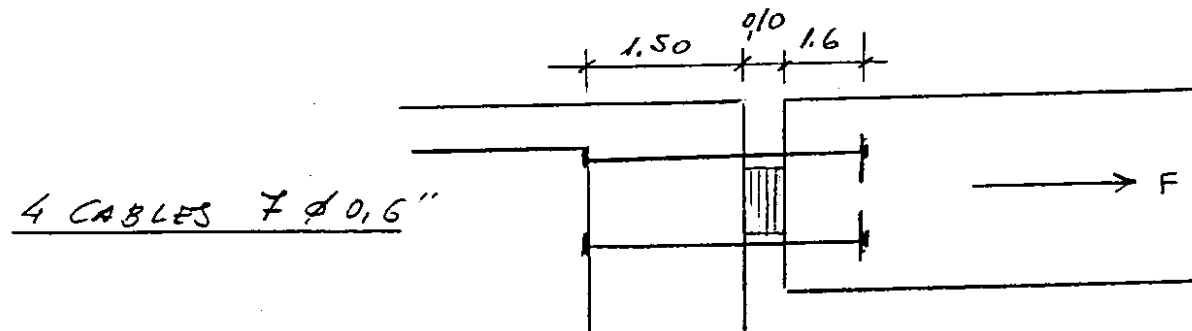
ANTERIOR POSTERIOR LONGITUD COMPRIMIDA
29.8 T/M2 10.6 T/M2 11.00 M.

ESFUERZOS Y ARMADURAS EN ZAPATAS

	A R M A D U R A S			
	CORTANTE	MOMENTO	TRACCION	COMPRESION
FRONTAL	56.87 T.	190.1 MT.	22.5 CM2	.0 CM2
DORSAL	50.66 T.	146.4 MT.	18.1 CM2	.0 CM2

ESFUERZOS Y ARMADURAS EN ALZADO DEL MURO

	A R M A D U R A S				
SECCION	CORTANTE	MOMENTO	AXIL	TRACCION	COMPRESION
.000	78.94 T.	426.75 MT.	85.60 T.	12.9M CM2	1.1 CM2

CABLES COSIDO AL TABLERO

$$\text{Area } 4 \times 9.75 = 39.00 \text{ cm}^2$$

$$E_A = 2 \times 10^6 \text{ Kg/cm}^2$$

$$P_0 = 0.7 \bar{V}_{\text{rot}} A_{\text{cables}} = 2 \times 0.70 \times 1900 \times 9.75 \times 10^{-3} = 518.70 \text{ t}$$

Neoprenos 40 x 55 x 4.9 (6.9)

$$E_{\text{media}} = 6000 \text{ Kg/cm}^2$$

$$A_{\text{neop}} = 2 \times 40 \times 55 = 4400 \text{ cm}^2$$

$$\text{Tensión neoprenos} = \frac{518.70 + 207.97 - 0.5 \times 117.10}{4400 \times 10^{-3}} = 151.85 \text{ Kg/cm}^2$$

Fuerza exterior actuante

$$\text{Frenado} = 207.97 \text{ t}$$

$$\text{Dilatación railes} = (400 + 5 \times 52) \times 2 \times 10^{-1} = 132 \text{ t}$$

$$\begin{aligned} \text{Reológicas} &= 0.05 (14.313 \times 27 \times 2.5 + 10.174 \times 25 \times 2.5 + 14.23 \times 52) \\ &= 117.10 \text{ t} \end{aligned}$$

$$F_{\text{max}} = 207.97 + 132 \times 0.6 + 117.10 = 404.27 \text{ t}$$

$$\bar{F}_{\text{max}} = 1.5 \times 404.27 = 606.41 \text{ t}$$

Reparto de esfuerzosRigidez del conjunto

$$R_T = \frac{E_A A_A}{L_A} + \frac{E_N A_N}{L_N} = \frac{2 \times 10^6 \times 39.0}{320} + \frac{6 \times 10^3 \times 4400}{4.9} = 5.63 \times 10^6 \text{ Kg/cm}$$

Equilibrio

$$\Delta l = \frac{F}{\frac{E_A A_A}{L_A} + \frac{E_N A_N}{L_N}}$$

Pre tensado

$$\Delta l = \frac{518700 \times 4.9}{4400 \times 6000} = 0.0963 \text{ cm}$$

$$\bar{V}_{\text{neop}} = \frac{\Delta l}{l} E = \frac{0.0963 \times 6000}{4.9} = 117.92 \text{ Kg/cm}^2$$

Para $\Delta l > \Delta l_{\text{neop}}$ los neoprenos no tienen tensión

Fuerza exterior mayorada - comprobación en rotura

$$\bar{F}_d = 606.41 \text{ t} \quad \Delta l = 0.0963 = \frac{F}{5.63 \times 10^6} \rightarrow F = 542.17 \text{ t}$$

Para $F > 464 \text{ t}$ solo absorben carga los cables

$$\bar{V}_{\text{cables}} = \frac{0.0963 \times 2 \times 10^6}{320} = 601.88 \text{ Kg/cm}^2$$

$$\begin{aligned} \bar{V}_{\text{total}} &= 0.7 \times 19000 + 601.88 + \frac{(606.41 - 542.17) \times 10^3}{39.00} = 15549.06 \text{ Kg} \\ &= 82\% \bar{V}_{\text{rot}} \end{aligned}$$

Armadura de introducción pretensado estirado

$$F = 518,70 + (606,41 - 542,17) = 582,94 \text{ t}$$

Por grupo $582,94 / 2 = 291,47$

$$A_s = 291,47 \times 0,3 \times \left(\frac{0,55 - 0,70}{0,55} \right) \times \frac{1,15}{5,1} = 12,55 \text{ cm}^2$$

MUROS DE ACOMPAÑAMIENTO

H = 11. M.

DENSIDAD TIERRAS	1.90	T/M3
ANGULO ROZAMIENTO INTERNO	.00	GRAD.
PENDIENTE DEL TERRENO	.00	
INCLINACION TRASDOS	.00	GRAD
COEF. ROZAM. CIMENTACION	.55	
INCLINACION DEL EMPUJE	.00	GRAD
COEFICIENTE DE EMPUJE	.30	
RESIST. CARACTER. HORMIGON	250.00	KG/CM2
DENSIDAD HORMIGON	2.50	T/M3
COEF. MINORACION HORMIGON	1.50	
RESIST. CARACTER. ACERO	5100.00	KG/CM2
COEF. MINORACION ACERO	1.15	
RECUB. ARMADURAS ALZADO	.05	M.
RECUB. ARMADURAS ZAPATA	.05	M.
COEF. MAYORACION CARGAS	1.50	

PARAMETROS VERTICALES

.000	1.700	.000	11.000	.000	11.000
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PARAMETROS HORIZONTALES

2.000	1.200	4.860	.000	.000	1.000	.000
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SECCIONES DE CALCULO DEL MURO

4.000	2.000	.000
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CARGAS ACTUANTES

NUM	TIPO	VALOR	DIST.
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1	1	3.000	.000SOBRECARGA UNIFORME EN T
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H = 11. M.

SERVICIO

1	1.00	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0
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TENSIONES EN CIMENTACION

ANTERIOR	POSTERIOR	LONGITUD COMPRIMIDA
35.0 T/M2	6.9 T/M2	8.06 M.

ESFUERZOS Y ARMADURAS EN ZAPATAS

	A R M A D U R A S			
	CORTANTE	MOMENTO	TRACCION	COMPRESION
FRONTAL	49.54 T.	100.5 MT.	16.7 CM2	.0 CM2
DORSAL	72.26 T.	233.4 MT.	32.5 CM2	.0 CM2

ESFUERZOS Y ARMADURAS EN ALZADO DEL MURO

	A R M A D U R A S				
SECCION	CORTANTE	MOMENTO	AXIL	TRACCION	COMPRESION
4.000	30.40 T.	90.70 MT.	17.50 T.	14.8 CM2	.2 CM2
2.000	46.78 T.	169.81 MT.	22.50 T.	30.0 CM2	.3 CM2
.000	66.58 T.	285.09 MT.	27.50 T.	55.8 CM2	.3 CM2

H = 9.4 M.

DENSIDAD TIERRAS	1.90	T/M3
ANGULO ROZAMIENTO INTERNO	.00	GRAD.
PENDIENTE DEL TERRENO	.00	
INCLINACION TRASDOS	.00	GRAD
COEF. ROZAM. CIMENTACION	.55	
INCLINACION DEL EMPUJE	.00	GRAD
COEFICIENTE DE EMPUJE	.30	
RESIST. CARACTER. HORMIGON	250.00	KG/CM2
DENSIDAD HORMIGON	2.50	T/M3
COEF. MINORACION HORMIGON	1.50	
RESIST. CARACTER. ACERO	5100.00	KG/CM2
COEF. MINORACION ACERO	1.15	
RECUB. ARMADURAS ALZADO	.05	M.
RECUB. ARMADURAS ZAPATA	.05	M.
COEF. MAYORACION CARGAS	1.50	

PARAMETROS VERTICALES

.000	1.100	.000	9.400	.000	9.400
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PARAMETROS HORIZONTALES

1.100	.900	4.500	.000	.000	.900	.000
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SECCIONES DE CALCULO DEL MURO

4.000	2.000	.000
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CARGAS ACTUANTES

NUM	TIPO	VALOR	DIST.
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1	1	3.000	.000SOBRECARGA UNIFORME EN T
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H = 9.4 M.

SERVICIO

1	.90	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0
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COEF. DE ESTABILIDAD AL VUELCO	2.54
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COEF. DE ESTABILIDAD AL DESLIZAMIENTO	1.50
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TENSIONES EN CIMENTACION

ANTERIOR	POSTERIOR	LONGITUD COMPRIMIDA
34.0 T/M2	2.7 T/M2	6.50 M.

ESFUERZOS Y ARMADURAS EN ZAPATAS

	A R M A D U R A S			
	CORTANTE	MOMENTO	TRACCION	COMPRESION
FRONTAL	24.70 T.	33.5 MT.	9.1 CM2	.0 CM2
DORSAL	49.33 T.	164.7 MT.	37.4 CM2	.0 CM2

ESFUERZOS Y ARMADURAS EN ALZADO DEL MURO

	A R M A D U R A S				
SECCION	CORTANTE	MOMENTO	AXIL	TRACCION	COMPRESION
4.000	19.03 T.	45.62 MT.	12.15 T.	10.3 CM2	.2 CM2
2.000	32.40 T.	98.50 MT.	16.65 T.	23.9 CM2	.2 CM2
.000	49.19 T.	181.55 MT.	21.15 T.	49.7 CM2	.3 CM2

H = 7.7 M.

DENSIDAD TIERRAS	1.90	T/M3
ANGULO ROZAMIENTO INTERNO	.00	GRAD.
PENDIENTE DEL TERRENO	.00	
INCLINACION TRASDOS	.00	GRAD
COEF. ROZAM. CIMENTACION	.35	
INCLINACION DEL EMPUJE	.00	GRAD
COEFICIENTE DE EMPUJE	.30	
RESIST. CARACTER. HORMIGON	250.00	KG/CM2
DENSIDAD HORMIGON	2.50	T/M3
COEF. MINORACION HORMIGON	1.50	
RESIST. CARACTER. ACERO	5100.00	KG/CM2
COEF. MINORACION ACERO	1.15	
RECUB. ARMADURAS ALZADO	.05	M.
RECUB. ARMADURAS ZAPATA	.05	M.
COEF. MAYORACION CARGAS	1.50	

PARAMETROS VERTICALES

.000	1.000	.000	7.700	.000	7.700
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PARAMETROS HORIZONTALES

1.000	.800	5.000	.000	.000	.700	.000
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SECCIONES DE CALCULO DEL MURO

.000

CARGAS ACTUANTES

NUM	TIPO	VALOR	DIST.
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1	1	1.000	.000SOBRECARGA UNIFORME EN T
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H = 7.7 M.

SERVICIO

1	.20	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0
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COEF. DE ESTABILIDAD AL VUELCO 5.52

COEF. DE ESTABILIDAD AL DESLIZAMIENTO 1.52

TENSIONES EN CIMENTACION

ANTERIOR	POSTERIOR	LONGITUD COMPRIMIDA
19.4 T/M2	11.7 T/M2	6.80 M.

ESFUERZOS Y ARMADURAS EN ZAPATAS

	A R M A D U R A S			
	CORTANTE	MOMENTO	TRACCION	COMPRESION
FRONTAL	12.45 T.	15.5 MT.	4.9M CM2	.0 CM2
DORSAL	19.73 T.	71.5 MT.	17.3 CM2	.0 CM2

ESFUERZOS Y ARMADURAS EN ALZADO DEL MURO

	A R M A D U R A S				
SECCION	CORTANTE	MOMENTO	AXIL	TRACCION	COMPRESION
.000	26.04 T.	72.44 MT.	13.47 T.	19.9 CM2	.2 CM2

H = 5.7 M.

DENSIDAD TIERRAS	1.90	T/M3
ANGULO ROZAMIENTO INTERNO	.00	GRAD.
PENDIENTE DEL TERRENO	.00	
INCLINACION TRASDOS	.00	GRAD
COEF. ROZAM. CIMENTACION	.35	
INCLINACION DEL EMPUJE	.00	GRAD
COEFICIENTE DE EMPUJE	.30	
RESIST. CARACTER. HORMIGON	250.00	KG/CM2
DENSIDAD HORMIGON	2.50	T/M3
COEF. MINORACION HORMIGON	1.50	
RESIST. CARACTER. ACERO	5100.00	KG/CM2
COEF. MINORACION ACERO	1.15	
RECUB. ARMADURAS ALZADO	.05	M.
RECUB. ARMADURAS ZAPATA	.05	M.
COEF. MAYORACION CARGAS	1.50	

PARAMETROS VERTICALES

.000	.800	.000	5.700	.000	5.700
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PARAMETROS HORIZONTALES

.800	.700	3.600	.000	.000	.700	.000
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SECCIONES DE CALCULO DEL MURO

.000

CARGAS ACTUANTES

NUM	TIPO	VALOR	DIST.
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1	1	1.000	.000SOBRECARGA UNIFORME EN T
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H = 5.7 M.

SERVICIO

1	.20	0	.00	0	.00	0	.00	0	-.00	0	.00	0	.00	0
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COEF. DE ESTABILIDAD AL VUELCO 5.52

COEF. DE ESTABILIDAD AL DESLIZAMIENTO 1.51

TENSIONES EN CIMENTACION

ANTERIOR	POSTERIOR	LONGITUD COMPRIMIDA
14.4 T/M2	8.8 T/M2	5.10 M.

ESFUERZOS Y ARMADURAS EN ZAPATAS

	A R M A D U R A S			
	CORTANTE	MOMENTO	TRACCION	COMPRESION
FRONTAL	7.30 T.	7.4 MT.	3.1M CM2	.0 CM2
DORSAL	11.06 T.	28.4 MT.	9.6 CM2	.0 CM2

ESFUERZOS Y ARMADURAS EN ALZADO DEL MURO

	A R M A D U R A S				
SECCION	CORTANTE	MOMENTO	AXIL	TRACCION	COMPRESION
.000	14.40 T.	31.34 MT.	9.97 T.	8.8 CM2	.1 CM2

H = 3.6 M.

DENSIDAD TIERRAS	1.90	T/M3
ANGULO ROZAMIENTO INTERNO	.00	GRAD.
PENDIENTE DEL TERRENO	.00	
INCLINACION TRASDOS	.00	GRAD
COEF. ROZAM. CIMENTACION	.35	
INCLINACION DEL EMPUJE	.00	GRAD
COEFICIENTE DE EMPUJE	.30	
RESIST. CARACTER. HORMIGON	250.00	KG/CM2
DENSIDAD HORMIGON	2.50	T/M3
COEF. MINORACION HORMIGON	1.50	
RESIST. CARACTER. ACERO	5100.00	KG/CM2
COEF. MINORACION ACERO	1.15	
RECUB. ARMADURAS ALZADO	.05	M.
RECUB. ARMADURAS ZAPATA	.05	M.
COEF. MAYORACION CARGAS	1.50	

PARAMETROS VERTICALES

.000	.600	.000	3.600	.000	3.600
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PARAMETROS HORIZONTALES

.600	.600	2.200	.000	.000	.600	.000
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SECCIONES DE CALCULO DEL MURO

.000

CARGAS ACTUANTES

NUM	TIPO	VALOR	DIST.
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1	1	1.000	.000SOBRECARGA UNIFORME EN T
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H = 3.6 M.

SERVICIO

1	.20	0	.00	0	.00	0	.00	0	-.00	0	.00	0	.00	0
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COEF. DE ESTABILIDAD AL VUELCO 5.78

COEF. DE ESTABILIDAD AL DESLIZAMIENTO 1.54

TENSIONES EN CIMENTACION

ANTERIOR	POSTERIOR	LONGITUD COMPRIMIDA
9.0 T/M2	6.0 T/M2	3.40 M.

ESFUERZOS Y ARMADURAS EN ZAPATAS

	A R M A D U R A S			
	CORTANTE	MOMENTO	TRACCION	COMPRESION
FRONTAL	3.32 T.	2.6 MT.	1.5M CM2	.0 CM2
DORSAL	4.49 T.	6.7 MT.	3.6M CM2	.0 CM2

ESFUERZOS Y ARMADURAS EN ALZADO DEL MURO

	A R M A D U R A S				
SECCION	CORTANTE	MOMENTO	AXIL	TRACCION	COMPRESION
.000	5.86 T.	8.85 MT.	5.40 T.	3.2M CM2	.0 CM2

H = 2.9 M.

DENSIDAD TIERRAS	1.90	T/M3
ANGULO ROZAMIENTO INTERNO	.00	GRAD.
PENDIENTE DEL TERRENO	.00	
INCLINACION TRASDOS	.00	GRAD
COEF. ROZAM. CIMENTACION	.35	
INCLINACION DEL EMPUJE	.00	GRAD
COEFICIENTE DE EMPUJE	.30	
RESIST. CARACTER. HORMIGON	250.00	KG/CM2
DENSIDAD HORMIGON	2.50	T/M3
COEF. MINORACION HORMIGON	1.50	
RESIST. CARACTER. ACERO	5100.00	KG/CM2
COEF. MINORACION ACERO	1.15	
RECUB. ARMADURAS ALZADO	.05	M.
RECUB. ARMADURAS ZAPATA	.05	M.
COEF. MAYORACION CARGAS	1.50	

PARAMETROS VERTICALES

.000 .600 .000 2.900 .000 3.500

PARAMETROS HORIZONTALES

.600 .600 1.700 .000 .000 .600 .000

SECCIONES DE CALCULO DEL MURO

.000

CARGAS ACTUANTES

NUM TIPO VALOR DIST.

1 1 1.000 .000SOBRECARGA UNIFORME EN T

H = 2.9 M.

SERVICIO

1 .20 0 .00 0 .00 0 .00 0 -.00 0 .00 0 .00 0

COEF. DE ESTABILIDAD AL VUELCO 6.02

COEF. DE ESTABILIDAD AL DESLIZAMIENTO 1.55

TENSIONES EN CIMENTACION

ANTERIOR	POSTERIOR	LONGITUD COMPRIMIDA
7.1 T/M2	5.4 T/M2	2.90 M.

ESFUERZOS Y ARMADURAS EN ZAPATAS

	A R M A D U R A S			
	CORTANTE	MOMENTO	TRACCION	COMPRESION
FRONTAL	2.48 T.	1.9 MT.	1.1M CM2	.0 CM2
DORSAL	3.05 T.	3.3 MT.	1.9M CM2	.0 CM2

ESFUERZOS Y ARMADURAS EN ALZADO DEL MURO

	A R M A D U R A S				
SECCION	CORTANTE	MOMENTO	AXIL	TRACCION	COMPRESION
.000	3.86 T.	5.16 MT.	4.35 T.	1.6M CM2	.0 CM2

21	21	12.15	0.00	61.32	0.00	0.00	0.00	-102.49	-21.18	27.28
21	22	12.82	0.00	61.32	0.00	0.00	0.00	-143.57	-29.67	38.22
22	22	12.82	0.00	61.32	0.00	0.00	0.00	-143.57	-29.67	38.22
22	23	13.50	0.00	61.32	0.00	0.00	0.00	-185.28	-38.29	49.32
23	23	13.50	0.00	-32.20	0.00	0.00	0.00	-185.28	-38.29	49.32
23	24	14.75	0.00	-32.20	0.00	0.00	0.00	-145.03	-31.91	45.63
24	24	14.75	0.00	-32.20	0.00	0.00	0.00	-145.03	-31.91	45.63
24	25	16.00	0.00	-32.20	0.00	0.00	0.00	-104.76	-23.05	32.96
25	25	16.00	0.00	-32.20	0.00	0.00	0.00	-104.76	-23.05	32.96
25	26	17.25	0.00	-32.20	0.00	0.00	0.00	-64.51	-14.19	20.30
26	26	17.25	0.00	-32.20	0.00	0.00	0.00	-64.51	-14.19	20.30
26	27	18.50	0.00	-32.20	0.00	0.00	0.00	-24.25	-5.34	7.63
27	27	18.50	0.00	-32.20	0.00	0.00	0.00	-24.25	-5.34	7.63
27	28	19.75	0.00	-32.20	0.00	0.00	0.00	16.00	3.52	-5.04
28	28	19.75	0.00	-32.20	0.00	0.00	0.00	16.00	3.52	-5.04
28	29	21.00	0.00	-32.20	0.00	0.00	0.00	56.27	12.38	-17.70
29	29	21.00	0.00	-32.21	0.00	0.00	0.00	56.27	12.38	-17.70
29	30	22.25	0.00	-32.21	0.00	0.00	0.00	96.52	21.24	-30.37
30	30	22.25	0.00	-32.20	0.00	0.00	0.00	96.52	21.24	-30.37
30	31	23.50	0.00	-8.40	0.00	0.00	0.00	110.60	24.33	-34.80
31	31	23.50	0.00	-8.40	0.00	0.00	0.00	110.60	24.33	-34.80
31	32	24.75	0.00	-8.40	0.00	0.00	0.00	121.10	26.64	-38.11
32	32	24.75	0.00	-8.40	0.00	0.00	0.00	121.10	26.64	-38.11
32	33	26.00	0.00	15.40	0.00	0.00	0.00	117.92	25.95	-37.11
33	33	26.00	0.00	15.40	0.00	0.00	0.00	117.92	25.95	-37.11
33	34	27.25	0.00	15.40	0.00	0.00	0.00	98.69	21.71	-31.05
34	34	27.25	0.00	15.40	0.00	0.00	0.00	98.69	21.71	-31.05
34	35	28.50	0.00	15.40	0.00	0.00	0.00	79.44	17.48	-25.00
35	35	28.50	0.00	15.40	0.00	0.00	0.00	79.44	17.48	-25.00
35	36	29.75	0.00	15.40	0.00	0.00	0.00	60.20	13.25	-18.94
36	36	29.75	0.00	15.40	0.00	0.00	0.00	60.20	13.25	-18.94
36	37	31.00	0.00	15.40	0.00	0.00	0.00	40.95	9.01	-12.89
37	37	31.00	0.00	15.40	0.00	0.00	0.00	40.95	9.01	-12.89
37	38	32.25	0.00	15.40	0.00	0.00	0.00	21.71	4.78	-6.83
38	38	32.25	0.00	15.40	0.00	0.00	0.00	21.71	4.78	-6.83
38	39	33.50	0.00	15.40	0.00	0.00	0.00	2.46	0.54	-0.78
39	39	33.50	0.00	15.40	0.00	0.00	0.00	2.46	0.54	-0.78
39	40	34.75	0.00	15.40	0.00	0.00	0.00	-16.77	-3.69	5.28
40	40	34.75	0.00	15.40	0.00	0.00	0.00	-16.77	-3.69	5.28
40	41	36.00	0.00	15.40	0.00	0.00	0.00	-36.02	-7.93	11.33
41	41	36.00	0.00	15.40	0.00	0.00	0.00	-36.02	-7.93	11.33
41	42	37.25	0.00	15.40	0.00	0.00	0.00	-55.26	-12.16	17.39

42	42	37.25	0.00	15.40	0.00	0.00	0.00	-55.26	-12.16	17.39
42	43	38.50	0.00	15.40	0.00	0.00	0.00	-74.51	-15.40	19.83
43	43	38.50	0.00	-5.52	0.00	0.00	0.00	-74.51	-15.40	19.83
43	44	39.17	0.00	-5.52	0.00	0.00	0.00	-70.81	-14.64	18.85
44	44	39.17	0.00	-5.52	0.00	0.00	0.00	-70.81	-14.64	18.85
44	45	39.85	0.00	-5.52	0.00	0.00	0.00	-67.06	-13.86	17.85
45	45	39.85	0.00	-5.52	0.00	0.00	0.00	-67.06	-13.86	17.85
45	46	40.53	0.00	-5.52	0.00	0.00	0.00	-63.29	-13.08	16.85
46	46	40.53	0.00	-5.52	0.00	0.00	0.00	-63.29	-13.08	16.85
46	47	41.20	0.00	-5.52	0.00	0.00	0.00	-59.60	-12.32	15.86
47	47	41.20	0.00	-5.52	0.00	0.00	0.00	-59.60	-12.32	15.86
47	48	41.88	0.00	-5.52	0.00	0.00	0.00	-55.85	-11.54	14.87
48	48	41.88	0.00	-5.52	0.00	0.00	0.00	-55.85	-11.54	14.87
48	49	42.55	0.00	-5.52	0.00	0.00	0.00	-52.15	-10.78	13.88
49	49	42.55	0.00	-5.52	0.00	0.00	0.00	-52.15	-10.78	13.88
49	50	43.22	0.00	-5.52	0.00	0.00	0.00	-48.45	-10.01	12.90
50	50	43.22	0.00	-5.52	0.00	0.00	0.00	-48.45	-10.01	12.90
50	51	43.90	0.00	-5.52	0.00	0.00	0.00	-44.70	-9.24	11.90
51	51	43.90	0.00	-5.52	0.00	0.00	0.00	-44.70	-9.24	11.90
51	52	44.58	0.00	-5.52	0.00	0.00	0.00	-40.95	-8.46	10.90
52	52	44.58	0.00	-5.52	0.00	0.00	0.00	-40.95	-8.46	10.90
52	53	45.25	0.00	-5.52	0.00	0.00	0.00	-37.25	-7.70	9.92
53	53	45.25	0.00	-5.52	0.00	0.00	0.00	-37.25	-7.70	9.92
53	54	45.92	0.00	-5.52	0.00	0.00	0.00	-33.56	-6.94	8.93
54	54	45.92	0.00	-5.52	0.00	0.00	0.00	-33.56	-6.94	8.93
54	55	46.60	0.00	-5.52	0.00	0.00	0.00	-29.81	-6.16	7.93
55	55	46.60	0.00	-5.52	0.00	0.00	0.00	-29.81	-6.16	7.93
55	56	47.28	0.00	-5.52	0.00	0.00	0.00	-26.05	-5.38	6.94
56	56	47.28	0.00	-5.52	0.00	0.00	0.00	-26.05	-5.38	6.94
56	57	47.95	0.00	-5.52	0.00	0.00	0.00	-22.36	-4.62	5.95
57	57	47.95	0.00	-5.52	0.00	0.00	0.00	-22.36	-4.62	5.95
57	58	48.63	0.00	-5.52	0.00	0.00	0.00	-18.59	-3.84	4.95
58	58	48.63	0.00	-5.52	0.00	0.00	0.00	-18.59	-3.84	4.95
58	59	49.30	0.00	-5.52	0.00	0.00	0.00	-14.90	-3.08	3.97
59	59	49.30	0.00	-5.52	0.00	0.00	0.00	-14.90	-3.08	3.97
59	60	49.97	0.00	-5.52	0.00	0.00	0.00	-11.20	-2.31	2.98
60	60	49.97	0.00	-5.52	0.00	0.00	0.00	-11.20	-2.31	2.98
60	61	50.65	0.00	-5.52	0.00	0.00	0.00	-7.45	-1.54	1.98
61	61	50.65	0.00	-5.52	0.00	0.00	0.00	-7.45	-1.54	1.98
61	62	51.33	0.00	-5.52	0.00	0.00	0.00	-3.70	-0.76	0.98
62	62	51.33	0.00	-5.52	0.00	0.00	0.00	-3.70	-0.76	0.98
62	63	52.00	0.00	-5.52	0.00	0.00	0.00	0.00	0.00	0.00

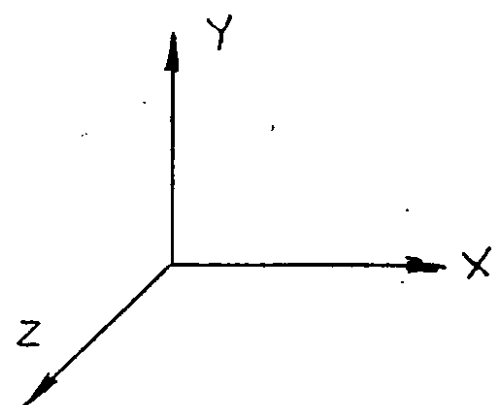
 Título: Fecha : 09/12/99
 Descripción de la combinación :
 H015 1.4

1 * [+ (SOBRECL5.ANL * 1.4)]

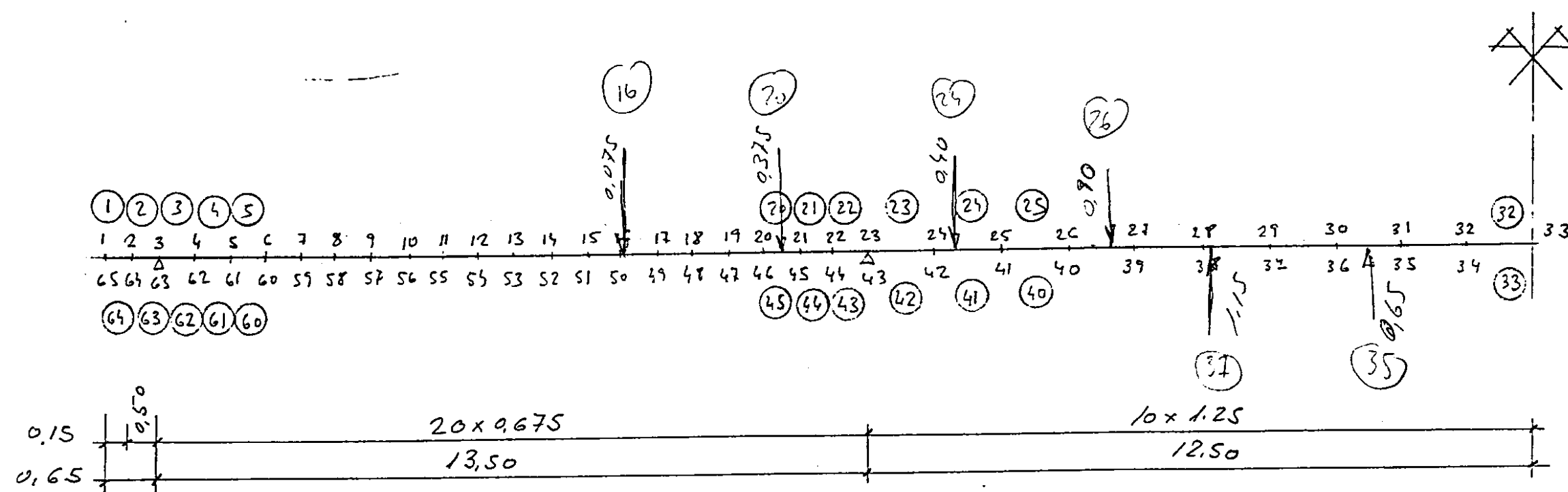
Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	2.04	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	2.04	0.00	0.00	0.00	-1.39	-0.29	0.37
4	4	0.68	0.00	2.04	0.00	0.00	0.00	-1.39	-0.29	0.37
4	5	1.35	0.00	2.04	0.00	0.00	0.00	-2.76	-0.57	0.73
5	5	1.35	0.00	2.04	0.00	0.00	0.00	-2.76	-0.57	0.73
5	6	2.03	0.00	2.04	0.00	0.00	0.00	-4.16	-0.86	1.11
6	6	2.03	0.00	2.04	0.00	0.00	0.00	-4.16	-0.86	1.11
6	7	2.70	0.00	2.04	0.00	0.00	0.00	-5.52	-1.14	1.47
7	7	2.70	0.00	2.04	0.00	0.00	0.00	-5.52	-1.14	1.47
7	8	3.38	0.00	2.04	0.00	0.00	0.00	-6.92	-1.43	1.84
8	8	3.38	0.00	2.04	0.00	0.00	0.00	-6.92	-1.43	1.84
8	9	4.05	0.00	2.04	0.00	0.00	0.00	-8.29	-1.71	2.21
9	9	4.05	0.00	2.04	0.00	0.00	0.00	-8.29	-1.71	2.21
9	10	4.72	0.00	2.04	0.00	0.00	0.00	-9.65	-1.99	2.57
10	10	4.72	0.00	2.04	0.00	0.00	0.00	-9.65	-1.99	2.57
10	11	5.40	0.00	2.04	0.00	0.00	0.00	-11.05	-2.28	2.94
11	11	5.40	0.00	2.04	0.00	0.00	0.00	-11.05	-2.28	2.94
11	12	6.07	0.00	2.04	0.00	0.00	0.00	-12.42	-2.57	3.31
12	12	6.07	0.00	2.04	0.00	0.00	0.00	-12.42	-2.57	3.31
12	13	6.75	0.00	2.04	0.00	0.00	0.00	-13.80	-2.85	3.67
13	13	6.75	0.00	2.04	0.00	0.00	0.00	-13.80	-2.85	3.67
13	14	7.43	0.00	2.04	0.00	0.00	0.00	-15.19	-3.14	4.04
14	14	7.43	0.00	2.04	0.00	0.00	0.00	-15.19	-3.14	4.04
14	15	8.10	0.00	2.04	0.00	0.00	0.00	-16.56	-3.42	4.41
15	15	8.10	0.00	2.04	0.00	0.00	0.00	-16.56	-3.42	4.41
15	16	8.77	0.00	2.04	0.00	0.00	0.00	-17.93	-3.71	4.77
16	16	8.77	0.00	2.04	0.00	0.00	0.00	-17.93	-3.71	4.77
16	17	9.45	0.00	25.84	0.00	0.00	0.00	-33.73	-6.97	8.98
17	17	9.45	0.00	25.84	0.00	0.00	0.00	-33.73	-6.97	8.98
17	18	10.13	0.00	25.84	0.00	0.00	0.00	-51.30	-10.60	13.65
18	18	10.13	0.00	25.84	0.00	0.00	0.00	-51.30	-10.60	13.65
18	19	10.80	0.00	25.84	0.00	0.00	0.00	-68.61	-14.18	18.26
19	19	10.80	0.00	25.84	0.00	0.00	0.00	-68.61	-14.18	18.26
19	20	11.48	0.00	25.84	0.00	0.00	0.00	-86.18	-17.81	22.94
20	20	11.48	0.00	25.84	0.00	0.00	0.00	-86.18	-17.81	22.94
20	21	12.15	0.00	49.64	0.00	0.00	0.00	-110.53	-22.84	29.42

21	21	12.15	0.00	49.64	0.00	0.00	0.00	-110.53	-22.84	29.42
21	22	12.82	0.00	49.64	0.00	0.00	0.00	-143.79	-29.72	38.28
22	22	12.82	0.00	49.64	0.00	0.00	0.00	-143.79	-29.72	38.28
22	23	13.50	0.00	49.64	0.00	0.00	0.00	-177.55	-36.70	47.26
23	23	13.50	0.00	-58.32	0.00	0.00	0.00	-177.55	-36.70	47.26
23	24	14.75	0.00	-58.32	0.00	0.00	0.00	-104.65	-23.03	32.93
24	24	14.75	0.00	-58.32	0.00	0.00	0.00	-104.65	-23.03	32.93
24	25	16.00	0.00	-34.52	0.00	0.00	0.00	-51.98	-11.44	16.36
25	25	16.00	0.00	-34.52	0.00	0.00	0.00	-51.98	-11.44	16.36
25	26	17.25	0.00	-34.52	0.00	0.00	0.00	-8.82	-1.94	2.78
26	26	17.25	0.00	-34.52	0.00	0.00	0.00	-8.82	-1.94	2.78
26	27	18.50	0.00	-10.72	0.00	0.00	0.00	26.00	5.72	-8.18
27	27	18.50	0.00	-10.72	0.00	0.00	0.00	26.00	5.72	-8.18
27	28	19.75	0.00	-10.72	0.00	0.00	0.00	39.40	8.67	-12.40
28	28	19.75	0.00	-10.72	0.00	0.00	0.00	39.40	8.67	-12.40
28	29	21.00	0.00	-10.72	0.00	0.00	0.00	52.79	11.62	-16.61
29	29	21.00	0.00	-10.72	0.00	0.00	0.00	52.79	11.62	-16.61
29	30	22.25	0.00	-10.72	0.00	0.00	0.00	66.19	14.56	-20.83
30	30	22.25	0.00	-10.72	0.00	0.00	0.00	66.19	14.56	-20.83
30	31	23.50	0.00	-10.72	0.00	0.00	0.00	79.60	17.51	-25.05
31	31	23.50	0.00	-10.72	0.00	0.00	0.00	79.60	17.51	-25.05
31	32	24.75	0.00	-10.72	0.00	0.00	0.00	93.00	20.46	-29.26
32	32	24.75	0.00	-10.72	0.00	0.00	0.00	93.00	20.46	-29.26
32	33	26.00	0.00	-10.72	0.00	0.00	0.00	106.40	23.41	-33.48
33	33	26.00	0.00	-10.72	0.00	0.00	0.00	106.40	23.41	-33.48
33	34	27.25	0.00	-10.72	0.00	0.00	0.00	119.80	26.36	-37.70
34	34	27.25	0.00	-10.72	0.00	0.00	0.00	119.80	26.36	-37.70
34	35	28.50	0.00	-10.72	0.00	0.00	0.00	133.20	29.31	-41.91
35	35	28.50	0.00	-10.72	0.00	0.00	0.00	133.21	29.31	-41.92
35	36	29.75	0.00	13.08	0.00	0.00	0.00	132.33	29.12	-41.64
36	36	29.75	0.00	13.08	0.00	0.00	0.00	132.33	29.12	-41.64
36	37	31.00	0.00	13.08	0.00	0.00	0.00	115.98	25.52	-36.49
37	37	31.00	0.00	13.08	0.00	0.00	0.00	115.98	25.52	-36.49
37	38	32.25	0.00	36.88	0.00	0.00	0.00	97.24	21.40	-30.60
38	38	32.25	0.00	36.88	0.00	0.00	0.00	97.24	21.40	-30.60
38	39	33.50	0.00	36.88	0.00	0.00	0.00	51.14	11.25	-16.09
39	39	33.50	0.00	36.88	0.00	0.00	0.00	51.14	11.25	-16.09
39	40	34.75	0.00	36.88	0.00	0.00	0.00	5.04	1.11	-1.59
40	40	34.75	0.00	36.88	0.00	0.00	0.00	5.04	1.11	-1.59
40	41	36.00	0.00	36.88	0.00	0.00	0.00	-41.05	-9.03	12.92
41	41	36.00	0.00	36.88	0.00	0.00	0.00	-41.05	-9.03	12.92
41	42	37.25	0.00	36.88	0.00	0.00	0.00	-87.15	-19.17	27.42

42	42	37.25	0.00	36.88	0.00	0.00	0.00	-87.15	-19.17	27.42
42	43	38.50	0.00	36.88	0.00	0.00	0.00	-133.25	-27.54	35.47
43	43	38.50	0.00	-9.87	0.00	0.00	0.00	-133.25	-27.54	35.47
43	44	39.17	0.00	-9.87	0.00	0.00	0.00	-126.64	-26.18	33.71
44	44	39.17	0.00	-9.87	0.00	0.00	0.00	-126.64	-26.18	33.71
44	45	39.85	0.00	-9.87	0.00	0.00	0.00	-119.92	-24.79	31.92
45	45	39.85	0.00	-9.87	0.00	0.00	0.00	-119.92	-24.79	31.92
45	46	40.53	0.00	-9.87	0.00	0.00	0.00	-113.22	-23.40	30.14
46	46	40.53	0.00	-9.87	0.00	0.00	0.00	-113.22	-23.40	30.14
46	47	41.20	0.00	-9.87	0.00	0.00	0.00	-106.60	-22.03	28.37
47	47	41.20	0.00	-9.87	0.00	0.00	0.00	-106.60	-22.03	28.37
47	48	41.88	0.00	-9.87	0.00	0.00	0.00	-99.89	-20.65	26.59
48	48	41.88	0.00	-9.87	0.00	0.00	0.00	-99.89	-20.65	26.59
48	49	42.55	0.00	-9.87	0.00	0.00	0.00	-93.28	-19.28	24.83
49	49	42.55	0.00	-9.87	0.00	0.00	0.00	-93.28	-19.28	24.83
49	50	43.22	0.00	-9.87	0.00	0.00	0.00	-86.66	-17.91	23.07
50	50	43.22	0.00	-9.87	0.00	0.00	0.00	-86.66	-17.91	23.07
50	51	43.90	0.00	-9.87	0.00	0.00	0.00	-79.95	-16.53	21.28
51	51	43.90	0.00	-9.87	0.00	0.00	0.00	-79.95	-16.53	21.28
51	52	44.58	0.00	-9.87	0.00	0.00	0.00	-73.23	-15.14	19.49
52	52	44.58	0.00	-9.87	0.00	0.00	0.00	-73.23	-15.14	19.49
52	53	45.25	0.00	-9.87	0.00	0.00	0.00	-66.63	-13.77	17.73
53	53	45.25	0.00	-9.87	0.00	0.00	0.00	-66.63	-13.77	17.73
53	54	45.92	0.00	-9.87	0.00	0.00	0.00	-60.02	-12.40	15.98
54	54	45.92	0.00	-9.87	0.00	0.00	0.00	-60.02	-12.40	15.98
54	55	46.60	0.00	-9.87	0.00	0.00	0.00	-53.30	-11.02	14.19
55	55	46.60	0.00	-9.87	0.00	0.00	0.00	-53.30	-11.02	14.19
55	56	47.28	0.00	-9.87	0.00	0.00	0.00	-46.59	-9.63	12.40
56	56	47.28	0.00	-9.87	0.00	0.00	0.00	-46.59	-9.63	12.40
56	57	47.95	0.00	-9.87	0.00	0.00	0.00	-39.97	-8.26	10.64
57	57	47.95	0.00	-9.87	0.00	0.00	0.00	-39.97	-8.26	10.64
57	58	48.63	0.00	-9.87	0.00	0.00	0.00	-33.26	-6.88	8.85
58	58	48.63	0.00	-9.87	0.00	0.00	0.00	-33.26	-6.88	8.85
58	59	49.30	0.00	-9.87	0.00	0.00	0.00	-26.66	-5.51	7.10
59	59	49.30	0.00	-9.87	0.00	0.00	0.00	-26.66	-5.51	7.10
59	60	49.97	0.00	-9.87	0.00	0.00	0.00	-20.03	-4.14	5.33
60	60	49.97	0.00	-9.87	0.00	0.00	0.00	-20.03	-4.14	5.33
60	61	50.65	0.00	-9.87	0.00	0.00	0.00	-13.33	-2.75	3.55
61	61	50.65	0.00	-9.87	0.00	0.00	0.00	-13.33	-2.75	3.55
61	62	51.33	0.00	-9.87	0.00	0.00	0.00	-6.61	-1.37	1.76
62	62	51.33	0.00	-9.87	0.00	0.00	0.00	-6.61	-1.37	1.76
62	63	52.00	0.00	-9.87	0.00	0.00	0.00	0.00	0.00	0.00



15



ESQUEMA ESTRUCTURAL

comparación entre los distintos trenes

Trenes considerados

coef. Impact

- | | |
|---|------|
| a) Trenes IPF en dos vías | 1.15 |
| b) Trenes UIC-71 en dos vías | 1.11 |
| c) Tren UIC-71 en una vía y SWO en otra | 1.11 |
| d) Tren UIC-71 en una vía y SW2 en otra | 1.11 |
| e) Trenes tipo 3 EC-1 en dos vías | 1.40 |
| f) Trenes tipo 4 EC-1 en dos vías | 1.40 |

Momentos flectores en	a)	b)	c)	d)	e)	f)
centro vano 1	506.89	565.53	560.07	595.51	249.28	195.32
Apoyo pila	-1293.38	-1001.94	-971.50	-1053.46	-515.12	-355.05
centro vano 2	1061.79	1123.64	1026.11	1182.23	341.74	425.54

De donde se desprende que los trenes mas desfavorables son los a) b) y d). El estudio de tensiones de los trenes e) y f) se han realizado en los apartados anteriores y el d) se realiza a continuación.

ESTADO TENSIONAL

 Título: 0 Fecha : 09/12/99
 Descripción de la combinación : COMBINACION d)
 H006 0.555 + H009 1.11

1 * [+ (SOBREC1.ANL * 0.555) + (SOBREC7.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	6.86	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	18.18	0.00	0.00	0.00	-8.52	-1.76	2.27
4	4	0.68	0.00	18.19	0.00	0.00	0.00	-8.52	-1.76	2.27
4	5	1.35	0.00	29.35	0.00	0.00	0.00	-24.44	-5.05	6.50
5	5	1.35	0.00	29.35	0.00	0.00	0.00	-24.44	-5.05	6.50
5	6	2.03	0.00	40.68	0.00	0.00	0.00	-48.24	-9.97	12.84
6	6	2.03	0.00	40.66	0.00	0.00	0.00	-48.24	-9.97	12.84
6	7	2.70	0.00	51.81	0.00	0.00	0.00	-79.22	-16.37	21.09
7	7	2.70	0.00	51.83	0.00	0.00	0.00	-79.22	-16.37	21.09
7	8	3.38	0.00	63.15	0.00	0.00	0.00	-118.31	-24.45	31.49
8	8	3.38	0.00	63.15	0.00	0.00	0.00	-118.31	-24.45	31.49
8	9	4.05	0.00	74.30	0.00	0.00	0.00	-164.36	-33.97	43.75
9	9	4.05	0.00	74.29	0.00	0.00	0.00	-164.36	-33.97	43.75
9	10	4.72	0.00	85.44	0.00	0.00	0.00	-217.87	-45.03	57.99
10	10	4.72	0.00	85.45	0.00	0.00	0.00	-217.86	-45.03	57.99
10	11	5.40	0.00	96.77	0.00	0.00	0.00	-279.83	-57.84	74.49
11	11	5.40	0.00	96.78	0.00	0.00	0.00	-279.82	-57.83	74.48
11	12	6.07	0.00	107.93	0.00	0.00	0.00	-348.40	-72.01	92.74
12	12	6.07	0.00	107.92	0.00	0.00	0.00	-348.41	-72.01	92.74
12	13	6.75	0.00	119.24	0.00	0.00	0.00	-425.65	-87.98	113.30
13	13	6.75	0.00	119.27	0.00	0.00	0.00	-425.64	-87.97	113.30
13	14	7.43	0.00	119.27	0.00	0.00	0.00	-506.74	-104.73	134.89
14	14	7.43	0.00	119.25	0.00	0.00	0.00	-506.74	-104.74	134.89
14	15	8.10	0.00	119.25	0.00	0.00	0.00	-586.62	-121.25	156.15
15	15	8.10	0.00	119.23	0.00	0.00	0.00	-586.64	-121.25	156.15
15	16	8.77	0.00	119.23	0.00	0.00	0.00	-666.52	-137.76	177.42
16	16	8.77	0.00	119.24	0.00	0.00	0.00	-666.54	-137.76	177.42
16	17	9.45	0.00	119.24	0.00	0.00	0.00	-747.61	-154.52	199.00
17	17	9.45	0.00	119.24	0.00	0.00	0.00	-747.62	-154.52	199.00
17	18	10.13	0.00	119.24	0.00	0.00	0.00	-828.70	-171.28	220.59
18	18	10.13	0.00	119.24	0.00	0.00	0.00	-828.71	-171.28	220.59
18	19	10.80	0.00	119.24	0.00	0.00	0.00	-908.61	-187.80	241.86
19	19	10.80	0.00	119.25	0.00	0.00	0.00	-908.61	-187.80	241.86
19	20	11.48	0.00	119.25	0.00	0.00	0.00	-989.71	-204.56	263.44
20	20	11.48	0.00	119.23	0.00	0.00	0.00	-989.70	-204.56	263.44
20	21	12.15	0.00	119.23	0.00	0.00	0.00	-1069.60	-221.07	284.71

21	21	12.15	0.00	119.25	0.00	0.00	0.00	-1069.60	-221.07	284.71
21	22	12.82	0.00	119.25	0.00	0.00	0.00	-1149.50	-237.58	305.98
22	22	12.82	0.00	119.26	0.00	0.00	0.00	-1149.50	-237.58	305.98
22	23	13.50	0.00	119.26	0.00	0.00	0.00	-1230.59	-254.34	327.56
23	23	13.50	0.00	-355.70	0.00	0.00	0.00	-1230.58	-254.34	327.56
23	24	14.75	0.00	-323.79	0.00	0.00	0.00	-805.92	-177.32	253.59
24	24	14.75	0.00	-323.79	0.00	0.00	0.00	-805.92	-177.32	253.59
24	25	16.00	0.00	-291.87	0.00	0.00	0.00	-421.13	-92.66	132.52
25	25	16.00	0.00	-291.87	0.00	0.00	0.00	-421.13	-92.66	132.52
25	26	17.25	0.00	-259.96	0.00	0.00	0.00	-76.23	-16.77	23.99
26	26	17.25	0.00	-259.96	0.00	0.00	0.00	-76.24	-16.77	23.99
26	27	18.50	0.00	-228.04	0.00	0.00	0.00	228.76	50.33	-71.98
27	27	18.50	0.00	-228.05	0.00	0.00	0.00	228.76	50.33	-71.98
27	28	19.75	0.00	-196.14	0.00	0.00	0.00	493.87	108.66	-155.40
28	28	19.75	0.00	-196.15	0.00	0.00	0.00	493.88	108.66	-155.40
28	29	21.00	0.00	-164.24	0.00	0.00	0.00	719.10	158.22	-226.27
29	29	21.00	0.00	-164.22	0.00	0.00	0.00	719.11	158.22	-226.28
29	30	22.25	0.00	-132.31	0.00	0.00	0.00	904.42	198.99	-284.59
30	30	22.25	0.00	-132.30	0.00	0.00	0.00	904.44	199.00	-284.59
30	31	23.50	0.00	-100.39	0.00	0.00	0.00	1049.86	230.99	-330.35
31	31	23.50	0.00	-100.38	0.00	0.00	0.00	1049.87	230.99	-330.36
31	32	24.75	0.00	-51.82	0.00	0.00	0.00	1152.64	253.61	-362.69
32	32	24.75	0.00	-51.84	0.00	0.00	0.00	1152.64	253.61	-362.69
32	33	26.00	0.00	-3.28	0.00	0.00	0.00	1182.23	260.12	-372.00
33	33	26.00	0.00	-3.26	0.00	0.00	0.00	1182.23	260.12	-372.00
33	34	27.25	0.00	45.30	0.00	0.00	0.00	1160.83	255.41	-365.27
34	34	27.25	0.00	45.30	0.00	0.00	0.00	1160.83	255.41	-365.27
34	35	28.50	0.00	93.86	0.00	0.00	0.00	1066.21	234.59	-335.50
35	35	28.50	0.00	93.86	0.00	0.00	0.00	1066.22	234.59	-335.50
35	36	29.75	0.00	125.77	0.00	0.00	0.00	928.95	204.39	-292.31
36	36	29.75	0.00	125.78	0.00	0.00	0.00	928.96	204.39	-292.31
36	37	31.00	0.00	157.69	0.00	0.00	0.00	751.81	165.41	-236.57
37	37	31.00	0.00	157.65	0.00	0.00	0.00	751.80	165.41	-236.56
37	38	32.25	0.00	189.57	0.00	0.00	0.00	534.76	117.66	-168.27
38	38	32.25	0.00	189.59	0.00	0.00	0.00	534.75	117.66	-168.27
38	39	33.50	0.00	221.51	0.00	0.00	0.00	277.83	61.13	-87.42
39	39	33.50	0.00	221.50	0.00	0.00	0.00	277.82	61.13	-87.42
39	40	34.75	0.00	253.41	0.00	0.00	0.00	-19.00	-4.18	5.98
40	40	34.75	0.00	253.41	0.00	0.00	0.00	-19.00	-4.18	5.98
40	41	36.00	0.00	285.33	0.00	0.00	0.00	-355.71	-78.26	111.93
41	41	36.00	0.00	285.32	0.00	0.00	0.00	-355.72	-78.27	111.93
41	42	37.25	0.00	317.23	0.00	0.00	0.00	-732.32	-161.13	230.43

42	42	37.25	0.00	317.24	0.00	0.00	0.00	-732.32	-161.13	230.43
42	43	38.50	0.00	349.15	0.00	0.00	0.00	-1148.82	-237.44	305.80
43	43	38.50	0.00	-85.10	0.00	0.00	0.00	-1148.82	-237.44	305.80
43	44	39.17	0.00	-85.10	0.00	0.00	0.00	-1091.80	-225.66	290.62
44	44	39.17	0.00	-85.08	0.00	0.00	0.00	-1091.81	-225.66	290.62
44	45	39.85	0.00	-85.08	0.00	0.00	0.00	-1033.93	-213.70	275.22
45	45	39.85	0.00	-85.09	0.00	0.00	0.00	-1033.94	-213.70	275.22
45	46	40.53	0.00	-85.09	0.00	0.00	0.00	-976.06	-201.74	259.81
46	46	40.53	0.00	-85.09	0.00	0.00	0.00	-976.06	-201.74	259.81
46	47	41.20	0.00	-85.09	0.00	0.00	0.00	-919.05	-189.95	244.64
47	47	41.20	0.00	-85.09	0.00	0.00	0.00	-861.18	-177.99	229.23
47	48	41.88	0.00	-85.09	0.00	0.00	0.00	-861.18	-177.99	229.23
48	48	41.88	0.00	-85.11	0.00	0.00	0.00	-804.16	-166.21	214.06
48	49	42.55	0.00	-85.11	0.00	0.00	0.00	-804.16	-166.21	214.06
49	49	42.55	0.00	-85.10	0.00	0.00	0.00	-747.15	-154.43	198.88
49	50	43.22	0.00	-85.10	0.00	0.00	0.00	-747.15	-154.43	198.88
50	50	43.22	0.00	-85.10	0.00	0.00	0.00	-689.28	-142.46	183.48
50	51	43.90	0.00	-85.10	0.00	0.00	0.00	-689.28	-142.46	183.48
51	51	43.90	0.00	-85.08	0.00	0.00	0.00	-631.42	-130.50	168.07
51	52	44.58	0.00	-85.08	0.00	0.00	0.00	-631.42	-130.50	168.07
52	52	44.58	0.00	-85.14	0.00	0.00	0.00	-574.39	-118.72	152.90
52	53	45.25	0.00	-85.14	0.00	0.00	0.00	-574.39	-118.72	152.90
53	53	45.25	0.00	-85.10	0.00	0.00	0.00	-517.40	-106.94	137.72
53	54	45.92	0.00	-85.10	0.00	0.00	0.00	-517.40	-106.94	137.72
54	54	45.92	0.00	-85.08	0.00	0.00	0.00	-459.53	-94.98	122.32
54	55	46.60	0.00	-85.08	0.00	0.00	0.00	-459.53	-94.98	122.32
55	55	46.60	0.00	-85.10	0.00	0.00	0.00	-401.66	-83.02	106.92
55	56	47.28	0.00	-85.10	0.00	0.00	0.00	-401.66	-83.02	106.92
56	56	47.28	0.00	-85.06	0.00	0.00	0.00	-344.66	-71.24	91.74
56	57	47.95	0.00	-85.06	0.00	0.00	0.00	-344.66	-71.24	91.74
57	57	47.95	0.00	-85.09	0.00	0.00	0.00	-286.79	-59.27	76.34
57	58	48.63	0.00	-85.09	0.00	0.00	0.00	-286.79	-59.27	76.34
58	58	48.63	0.00	-85.10	0.00	0.00	0.00	-229.76	-47.49	61.16
58	59	49.30	0.00	-85.10	0.00	0.00	0.00	-229.76	-47.49	61.16
59	59	49.30	0.00	-85.09	0.00	0.00	0.00	-172.74	-35.70	45.98
59	60	49.97	0.00	-85.09	0.00	0.00	0.00	-172.74	-35.70	45.98
60	60	49.97	0.00	-85.11	0.00	0.00	0.00	-114.88	-23.74	30.58
60	61	50.65	0.00	-85.11	0.00	0.00	0.00	-114.88	-23.74	30.58
61	61	50.65	0.00	-85.09	0.00	0.00	0.00	-57.02	-11.78	15.18
61	62	51.33	0.00	-85.09	0.00	0.00	0.00	-57.02	-11.78	15.18
62	62	51.33	0.00	-85.09	0.00	0.00	0.00	0.00	0.00	0.00
62	63	52.00	0.00	-85.09	0.00	0.00	0.00	0.00	0.00	0.00

Título: Fecha : 09/12/99
Descripción de la combinación : COMBINACION D)
H007 0.555 + H010 1.11

1 * [+ (SOBREC2.ANL * 0.555) + (SOBREC8.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-178.71	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-161.35	0.00	0.00	0.00	115.62	23.90	-30.78
4	4	0.68	0.00	-161.36	0.00	0.00	0.00	115.62	23.90	-30.78
4	5	1.35	0.00	-144.25	0.00	0.00	0.00	217.99	45.06	-58.03
5	5	1.35	0.00	-144.24	0.00	0.00	0.00	217.99	45.06	-58.03
5	6	2.03	0.00	-126.88	0.00	0.00	0.00	310.18	64.11	-82.57
6	6	2.03	0.00	-126.88	0.00	0.00	0.00	310.18	64.11	-82.57
6	7	2.70	0.00	-109.78	0.00	0.00	0.00	389.47	80.50	-103.67
7	7	2.70	0.00	-109.78	0.00	0.00	0.00	389.47	80.50	-103.67
7	8	3.38	0.00	-92.42	0.00	0.00	0.00	458.21	94.71	-121.97
8	8	3.38	0.00	-92.41	0.00	0.00	0.00	458.22	94.71	-121.97
8	9	4.05	0.00	-81.25	0.00	0.00	0.00	516.40	106.73	-137.46
9	9	4.05	0.00	-81.28	0.00	0.00	0.00	516.40	106.73	-137.46
9	10	4.72	0.00	-42.37	0.00	0.00	0.00	556.84	115.09	-148.22
10	10	4.72	0.00	-42.37	0.00	0.00	0.00	556.84	115.09	-148.22
10	11	5.40	0.00	-31.05	0.00	0.00	0.00	581.79	120.25	-154.86
11	11	5.40	0.00	-31.04	0.00	0.00	0.00	581.80	120.25	-154.86
11	12	6.07	0.00	7.86	0.00	0.00	0.00	595.51	123.08	-158.52
12	12	6.07	0.00	7.85	0.00	0.00	0.00	595.51	123.08	-158.52
12	13	6.75	0.00	19.17	0.00	0.00	0.00	586.33	121.19	-156.07
13	13	6.75	0.00	19.19	0.00	0.00	0.00	586.32	121.18	-156.07
13	14	7.43	0.00	30.51	0.00	0.00	0.00	569.42	117.69	-151.57
14	14	7.43	0.00	30.50	0.00	0.00	0.00	569.42	117.69	-151.57
14	15	8.10	0.00	69.40	0.00	0.00	0.00	530.12	109.57	-141.11
15	15	8.10	0.00	69.42	0.00	0.00	0.00	530.12	109.57	-141.11
15	16	8.77	0.00	80.58	0.00	0.00	0.00	479.88	99.18	-127.74
16	16	8.77	0.00	80.57	0.00	0.00	0.00	479.88	99.18	-127.74
16	17	9.45	0.00	119.64	0.00	0.00	0.00	412.76	85.31	-109.87
17	17	9.45	0.00	119.65	0.00	0.00	0.00	412.78	85.31	-109.87
17	18	10.13	0.00	130.97	0.00	0.00	0.00	327.55	67.70	-87.19
18	18	10.13	0.00	130.97	0.00	0.00	0.00	327.56	67.70	-87.19
18	19	10.80	0.00	148.07	0.00	0.00	0.00	234.08	48.38	-62.31
19	19	10.80	0.00	148.07	0.00	0.00	0.00	234.08	48.38	-62.31
19	20	11.48	0.00	165.43	0.00	0.00	0.00	127.48	26.35	-33.93
20	20	11.48	0.00	165.43	0.00	0.00	0.00	127.48	26.35	-33.93
20	21	12.15	0.00	182.54	0.00	0.00	0.00	10.92	2.26	-2.91

21	21	12.15	0.00	182.54	0.00	0.00	0.00	10.92	2.26	-2.91
21	22	12.82	0.00	199.64	0.00	0.00	0.00	-117.12	-24.21	31.17
22	22	12.82	0.00	199.64	0.00	0.00	0.00	-117.12	-24.21	31.17
22	23	13.50	0.00	217.01	0.00	0.00	0.00	-258.77	-53.48	68.88
23	23	13.50	0.00	-13.88	0.00	0.00	0.00	-258.77	-53.48	68.88
23	24	14.75	0.00	-13.88	0.00	0.00	0.00	-241.44	-53.12	75.97
24	24	14.75	0.00	-13.88	0.00	0.00	0.00	-241.44	-53.12	75.97
24	25	16.00	0.00	-13.88	0.00	0.00	0.00	-224.09	-49.31	70.51
25	25	16.00	0.00	-13.88	0.00	0.00	0.00	-224.09	-49.31	70.51
25	26	17.25	0.00	-13.88	0.00	0.00	0.00	-206.75	-45.49	65.06
26	26	17.25	0.00	-13.88	0.00	0.00	0.00	-206.75	-45.49	65.06
26	27	18.50	0.00	-13.88	0.00	0.00	0.00	-189.42	-41.68	59.60
27	27	18.50	0.00	-13.86	0.00	0.00	0.00	-189.42	-41.68	59.60
27	28	19.75	0.00	-13.86	0.00	0.00	0.00	-172.07	-37.86	54.14
28	28	19.75	0.00	-13.88	0.00	0.00	0.00	-172.07	-37.86	54.14
28	29	21.00	0.00	-13.88	0.00	0.00	0.00	-154.73	-34.04	48.69
29	29	21.00	0.00	-13.86	0.00	0.00	0.00	-154.73	-34.04	48.69
29	30	22.25	0.00	-13.86	0.00	0.00	0.00	-137.40	-30.23	43.23
30	30	22.25	0.00	-13.88	0.00	0.00	0.00	-137.41	-30.23	43.24
30	31	23.50	0.00	-13.88	0.00	0.00	0.00	-120.06	-26.42	37.78
31	31	23.50	0.00	-13.86	0.00	0.00	0.00	-120.06	-26.42	37.78
31	32	24.75	0.00	-13.86	0.00	0.00	0.00	-102.72	-22.60	32.32
32	32	24.75	0.00	-13.88	0.00	0.00	0.00	-102.72	-22.60	32.32
32	33	26.00	0.00	-13.88	0.00	0.00	0.00	-85.39	-18.79	26.87
33	33	26.00	0.00	-13.88	0.00	0.00	0.00	-85.39	-18.79	26.87
33	34	27.25	0.00	-13.88	0.00	0.00	0.00	-68.04	-14.97	21.41
34	34	27.25	0.00	-13.88	0.00	0.00	0.00	-68.04	-14.97	21.41
34	35	28.50	0.00	-13.88	0.00	0.00	0.00	-50.70	-11.16	15.95
35	35	28.50	0.00	-13.88	0.00	0.00	0.00	-50.70	-11.16	15.95
35	36	29.75	0.00	-13.88	0.00	0.00	0.00	-33.37	-7.34	10.50
36	36	29.75	0.00	-13.87	0.00	0.00	0.00	-33.37	-7.34	10.50
36	37	31.00	0.00	-13.87	0.00	0.00	0.00	-16.02	-3.53	5.04
37	37	31.00	0.00	-13.88	0.00	0.00	0.00	-16.02	-3.53	5.04
37	38	32.25	0.00	-13.88	0.00	0.00	0.00	1.32	0.29	-0.41
38	38	32.25	0.00	-13.88	0.00	0.00	0.00	1.32	0.29	-0.41
38	39	33.50	0.00	-13.88	0.00	0.00	0.00	18.65	4.10	-5.87
39	39	33.50	0.00	-13.88	0.00	0.00	0.00	18.65	4.10	-5.87
39	40	34.75	0.00	-13.88	0.00	0.00	0.00	36.00	7.92	-11.33
40	40	34.75	0.00	-13.86	0.00	0.00	0.00	36.00	7.92	-11.33
40	41	36.00	0.00	-13.86	0.00	0.00	0.00	53.34	11.73	-16.78
41	41	36.00	0.00	-13.88	0.00	0.00	0.00	53.32	11.73	-16.78
41	42	37.25	0.00	-13.88	0.00	0.00	0.00	70.66	15.55	-22.23

42	42	37.25	0.00	-13.88	0.00	0.00	0.00	70.66	15.55	-22.23
42	43	38.50	0.00	-13.88	0.00	0.00	0.00	88.01	18.19	-23.43
43	43	38.50	0.00	6.53	0.00	0.00	0.00	88.01	18.19	-23.43
43	44	39.17	0.00	6.53	0.00	0.00	0.00	83.64	17.29	-22.26
44	44	39.17	0.00	6.52	0.00	0.00	0.00	83.64	17.29	-22.26
44	45	39.85	0.00	6.52	0.00	0.00	0.00	79.21	16.37	-21.08
45	45	39.85	0.00	6.52	0.00	0.00	0.00	79.21	16.37	-21.08
45	46	40.53	0.00	6.52	0.00	0.00	0.00	74.78	15.45	-19.90
46	46	40.53	0.00	6.52	0.00	0.00	0.00	74.78	15.45	-19.90
46	47	41.20	0.00	6.52	0.00	0.00	0.00	70.41	14.55	-18.74
47	47	41.20	0.00	6.52	0.00	0.00	0.00	70.41	14.55	-18.74
47	48	41.88	0.00	6.52	0.00	0.00	0.00	65.97	13.63	-17.56
48	48	41.88	0.00	6.51	0.00	0.00	0.00	65.97	13.63	-17.56
48	49	42.55	0.00	6.51	0.00	0.00	0.00	61.60	12.73	-16.40
49	49	42.55	0.00	6.52	0.00	0.00	0.00	61.60	12.73	-16.40
49	50	43.22	0.00	6.52	0.00	0.00	0.00	57.24	11.83	-15.24
50	50	43.22	0.00	6.53	0.00	0.00	0.00	57.24	11.83	-15.24
50	51	43.90	0.00	6.53	0.00	0.00	0.00	52.80	10.91	-14.06
51	51	43.90	0.00	6.53	0.00	0.00	0.00	52.80	10.91	-14.06
51	52	44.58	0.00	6.53	0.00	0.00	0.00	48.37	10.00	-12.88
52	52	44.58	0.00	6.53	0.00	0.00	0.00	48.37	10.00	-12.88
52	53	45.25	0.00	6.53	0.00	0.00	0.00	44.01	9.10	-11.71
53	53	45.25	0.00	6.53	0.00	0.00	0.00	44.01	9.10	-11.71
53	54	45.92	0.00	6.53	0.00	0.00	0.00	39.64	8.19	-10.55
54	54	45.92	0.00	6.52	0.00	0.00	0.00	39.64	8.19	-10.55
54	55	46.60	0.00	6.52	0.00	0.00	0.00	35.20	7.27	-9.37
55	55	46.60	0.00	6.53	0.00	0.00	0.00	35.20	7.27	-9.37
55	56	47.28	0.00	6.53	0.00	0.00	0.00	30.77	6.36	-8.19
56	56	47.28	0.00	6.52	0.00	0.00	0.00	30.77	6.36	-8.19
56	57	47.95	0.00	6.52	0.00	0.00	0.00	26.40	5.46	-7.03
57	57	47.95	0.00	6.52	0.00	0.00	0.00	26.40	5.46	-7.03
57	58	48.63	0.00	6.52	0.00	0.00	0.00	21.97	4.54	-5.85
58	58	48.63	0.00	6.52	0.00	0.00	0.00	21.97	4.54	-5.85
58	59	49.30	0.00	6.52	0.00	0.00	0.00	17.60	3.64	-4.69
59	59	49.30	0.00	6.52	0.00	0.00	0.00	17.60	3.64	-4.69
59	60	49.97	0.00	6.52	0.00	0.00	0.00	13.24	2.74	-3.52
60	60	49.97	0.00	6.53	0.00	0.00	0.00	13.24	2.74	-3.52
60	61	50.65	0.00	6.53	0.00	0.00	0.00	8.80	1.82	-2.34
61	61	50.65	0.00	6.53	0.00	0.00	0.00	8.80	1.82	-2.34
61	62	51.33	0.00	6.53	0.00	0.00	0.00	4.37	0.90	-1.16
62	62	51.33	0.00	6.53	0.00	0.00	0.00	4.37	0.90	-1.16
62	63	52.00	0.00	6.53	0.00	0.00	0.00	0.00	0.00	0.00

Título: Fecha : 09/12/99
 Descripción de la combinación : COMBINACION D)
 H008 0.555 + H011 1.11

1 * [+ (SOBREC3.ANL * 0.555) + (SOBREC9.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-89.84	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-83.80	0.00	0.00	0.00	59.04	12.20	-15.71
4	4	0.68	0.00	-83.80	0.00	0.00	0.00	59.04	12.20	-15.71
4	5	1.35	0.00	-66.69	0.00	0.00	0.00	109.44	22.62	-29.13
5	5	1.35	0.00	-66.69	0.00	0.00	0.00	109.45	22.62	-29.13
5	6	2.03	0.00	-49.33	0.00	0.00	0.00	148.90	30.77	-39.63
6	6	2.03	0.00	-49.33	0.00	0.00	0.00	148.90	30.77	-39.63
6	7	2.70	0.00	-32.23	0.00	0.00	0.00	176.22	36.42	-46.91
7	7	2.70	0.00	-32.23	0.00	0.00	0.00	176.22	36.42	-46.91
7	8	3.38	0.00	-14.87	0.00	0.00	0.00	192.22	39.73	-51.17
8	8	3.38	0.00	-14.87	0.00	0.00	0.00	192.22	39.73	-51.17
8	9	4.05	0.00	2.24	0.00	0.00	0.00	196.46	40.61	-52.29
9	9	4.05	0.00	2.25	0.00	0.00	0.00	196.46	40.61	-52.30
9	10	4.72	0.00	19.35	0.00	0.00	0.00	189.22	39.11	-50.37
10	10	4.72	0.00	19.34	0.00	0.00	0.00	189.22	39.11	-50.37
10	11	5.40	0.00	36.70	0.00	0.00	0.00	170.16	35.17	-45.29
11	11	5.40	0.00	36.70	0.00	0.00	0.00	170.16	35.17	-45.29
11	12	6.07	0.00	53.81	0.00	0.00	0.00	139.85	28.90	-37.23
12	12	6.07	0.00	53.81	0.00	0.00	0.00	139.84	28.90	-37.22
12	13	6.75	0.00	71.17	0.00	0.00	0.00	97.35	20.12	-25.91
13	13	6.75	0.00	71.17	0.00	0.00	0.00	97.36	20.12	-25.92
13	14	7.43	0.00	88.53	0.00	0.00	0.00	43.05	8.90	-11.46
14	14	7.43	0.00	88.53	0.00	0.00	0.00	43.05	8.90	-11.46
14	15	8.10	0.00	105.63	0.00	0.00	0.00	-21.99	-4.55	5.85
15	15	8.10	0.00	105.63	0.00	0.00	0.00	-21.99	-4.55	5.85
15	16	8.77	0.00	122.74	0.00	0.00	0.00	-98.50	-20.36	26.22
16	16	8.77	0.00	122.74	0.00	0.00	0.00	-98.50	-20.36	26.22
16	17	9.45	0.00	140.10	0.00	0.00	0.00	-187.86	-38.83	50.01
17	17	9.45	0.00	140.10	0.00	0.00	0.00	-187.87	-38.83	50.01
17	18	10.13	0.00	157.46	0.00	0.00	0.00	-289.04	-59.74	76.94
18	18	10.13	0.00	157.46	0.00	0.00	0.00	-289.04	-59.74	76.94
18	19	10.80	0.00	174.56	0.00	0.00	0.00	-400.27	-82.73	106.54
19	19	10.80	0.00	174.56	0.00	0.00	0.00	-400.27	-82.73	106.54
19	20	11.48	0.00	219.67	0.00	0.00	0.00	-535.43	-110.66	142.52
20	20	11.48	0.00	219.68	0.00	0.00	0.00	-535.43	-110.66	142.52
20	21	12.15	0.00	236.79	0.00	0.00	0.00	-688.34	-142.27	183.22

21	21	12.15	0.00	236.79	0.00	0.00	0.00	-688.33	-142.27	183.22
21	22	12.82	0.00	281.64	0.00	0.00	0.00	-856.04	-176.93	227.87
22	22	12.82	0.00	281.63	0.00	0.00	0.00	-856.04	-176.93	227.87
22	23	13.50	0.00	299.00	0.00	0.00	0.00	-1053.46	-217.73	280.41
23	23	13.50	0.00	-339.94	0.00	0.00	0.00	-1053.46	-217.73	280.41
23	24	14.75	0.00	-280.28	0.00	0.00	0.00	-660.96	-145.43	207.98
24	24	14.75	0.00	-280.28	0.00	0.00	0.00	-660.96	-145.43	207.98
24	25	16.00	0.00	-220.62	0.00	0.00	0.00	-333.32	-73.34	104.88
25	25	16.00	0.00	-220.62	0.00	0.00	0.00	-333.32	-73.34	104.88
25	26	17.25	0.00	-188.71	0.00	0.00	0.00	-77.49	-17.05	24.38
26	26	17.25	0.00	-188.71	0.00	0.00	0.00	-77.49	-17.05	24.38
26	27	18.50	0.00	-156.79	0.00	0.00	0.00	138.45	30.46	-43.57
27	27	18.50	0.00	-156.79	0.00	0.00	0.00	138.45	30.46	-43.57
27	28	19.75	0.00	-124.88	0.00	0.00	0.00	314.50	69.20	-98.96
28	28	19.75	0.00	-124.88	0.00	0.00	0.00	314.50	69.20	-98.96
28	29	21.00	0.00	-92.97	0.00	0.00	0.00	450.67	99.16	-141.81
29	29	21.00	0.00	-92.97	0.00	0.00	0.00	450.67	99.16	-141.81
29	30	22.25	0.00	-61.06	0.00	0.00	0.00	546.93	120.34	-172.10
30	30	22.25	0.00	-61.06	0.00	0.00	0.00	546.94	120.34	-172.10
30	31	23.50	0.00	-29.14	0.00	0.00	0.00	603.31	132.74	-189.84
31	31	23.50	0.00	-29.14	0.00	0.00	0.00	603.31	132.74	-189.84
31	32	24.75	0.00	2.77	0.00	0.00	0.00	619.80	136.37	-195.03
32	32	24.75	0.00	2.76	0.00	0.00	0.00	619.80	136.37	-195.03
32	33	26.00	0.00	34.68	0.00	0.00	0.00	596.40	131.22	-187.66
33	33	26.00	0.00	34.68	0.00	0.00	0.00	596.39	131.22	-187.66
33	34	27.25	0.00	45.78	0.00	0.00	0.00	546.12	120.16	-171.84
34	34	27.25	0.00	45.78	0.00	0.00	0.00	546.11	120.16	-171.84
34	35	28.50	0.00	56.88	0.00	0.00	0.00	481.95	106.04	-151.65
35	35	28.50	0.00	56.87	0.00	0.00	0.00	481.96	106.04	-151.65
35	36	29.75	0.00	67.97	0.00	0.00	0.00	403.92	88.87	-127.10
36	36	29.75	0.00	67.97	0.00	0.00	0.00	403.92	88.87	-127.10
36	37	31.00	0.00	79.07	0.00	0.00	0.00	312.01	68.65	-98.18
37	37	31.00	0.00	79.08	0.00	0.00	0.00	312.02	68.65	-98.18
37	38	32.25	0.00	90.18	0.00	0.00	0.00	206.23	45.38	-64.89
38	38	32.25	0.00	90.18	0.00	0.00	0.00	206.23	45.38	-64.89
38	39	33.50	0.00	101.28	0.00	0.00	0.00	86.56	19.05	-27.24
39	39	33.50	0.00	101.28	0.00	0.00	0.00	86.56	19.05	-27.24
39	40	34.75	0.00	112.38	0.00	0.00	0.00	-46.96	-10.33	14.78
40	40	34.75	0.00	112.38	0.00	0.00	0.00	-46.96	-10.33	14.78
40	41	36.00	0.00	123.48	0.00	0.00	0.00	-194.38	-42.77	61.16
41	41	36.00	0.00	123.48	0.00	0.00	0.00	-194.38	-42.77	61.16
41	42	37.25	0.00	134.58	0.00	0.00	0.00	-355.66	-78.25	111.91

42	42	37.25	0.00	134.58	0.00	0.00	0.00	-355.66	-78.25	111.91
42	43	38.50	0.00	145.68	0.00	0.00	0.00	-530.82	-109.71	141.30
43	43	38.50	0.00	-39.32	0.00	0.00	0.00	-530.82	-109.71	141.30
43	44	39.17	0.00	-39.32	0.00	0.00	0.00	-504.48	-104.27	134.28
44	44	39.17	0.00	-39.32	0.00	0.00	0.00	-504.48	-104.27	134.28
44	45	39.85	0.00	-39.32	0.00	0.00	0.00	-477.73	-98.74	127.16
45	45	39.85	0.00	-39.32	0.00	0.00	0.00	-477.73	-98.74	127.16
45	46	40.53	0.00	-39.32	0.00	0.00	0.00	-451.00	-93.22	120.05
46	46	40.53	0.00	-39.32	0.00	0.00	0.00	-451.00	-93.22	120.05
46	47	41.20	0.00	-39.32	0.00	0.00	0.00	-424.66	-87.77	113.04
47	47	41.20	0.00	-39.32	0.00	0.00	0.00	-424.65	-87.77	113.04
47	48	41.88	0.00	-39.32	0.00	0.00	0.00	-397.92	-82.24	105.92
48	48	41.88	0.00	-39.33	0.00	0.00	0.00	-397.91	-82.24	105.92
48	49	42.55	0.00	-39.33	0.00	0.00	0.00	-371.58	-76.80	98.91
49	49	42.55	0.00	-39.31	0.00	0.00	0.00	-371.58	-76.80	98.91
49	50	43.22	0.00	-39.31	0.00	0.00	0.00	-345.23	-71.35	91.90
50	50	43.22	0.00	-39.32	0.00	0.00	0.00	-345.22	-71.35	91.89
50	51	43.90	0.00	-39.32	0.00	0.00	0.00	-318.49	-65.83	84.78
51	51	43.90	0.00	-39.32	0.00	0.00	0.00	-318.49	-65.83	84.78
51	52	44.58	0.00	-39.32	0.00	0.00	0.00	-291.75	-60.30	77.66
52	52	44.58	0.00	-39.32	0.00	0.00	0.00	-291.76	-60.30	77.66
52	53	45.25	0.00	-39.32	0.00	0.00	0.00	-265.41	-54.86	70.65
53	53	45.25	0.00	-39.33	0.00	0.00	0.00	-265.41	-54.86	70.65
53	54	45.92	0.00	-39.33	0.00	0.00	0.00	-239.06	-49.41	63.63
54	54	45.92	0.00	-39.33	0.00	0.00	0.00	-239.06	-49.41	63.63
54	55	46.60	0.00	-39.33	0.00	0.00	0.00	-212.33	-43.89	56.52
55	55	46.60	0.00	-39.31	0.00	0.00	0.00	-212.33	-43.88	56.52
55	56	47.28	0.00	-39.31	0.00	0.00	0.00	-185.59	-38.36	49.40
56	56	47.28	0.00	-39.33	0.00	0.00	0.00	-185.59	-38.36	49.40
56	57	47.95	0.00	-39.33	0.00	0.00	0.00	-159.25	-32.91	42.39
57	57	47.95	0.00	-39.32	0.00	0.00	0.00	-159.25	-32.91	42.39
57	58	48.63	0.00	-39.32	0.00	0.00	0.00	-132.51	-27.39	35.27
58	58	48.63	0.00	-39.32	0.00	0.00	0.00	-132.51	-27.39	35.27
58	59	49.30	0.00	-39.32	0.00	0.00	0.00	-106.17	-21.94	28.26
59	59	49.30	0.00	-39.32	0.00	0.00	0.00	-106.17	-21.94	28.26
59	60	49.97	0.00	-39.32	0.00	0.00	0.00	-79.82	-16.50	21.25
60	60	49.97	0.00	-39.32	0.00	0.00	0.00	-79.81	-16.50	21.25
60	61	50.65	0.00	-39.32	0.00	0.00	0.00	-53.09	-10.97	14.13
61	61	50.65	0.00	-39.32	0.00	0.00	0.00	-53.09	-10.97	14.13
61	62	51.33	0.00	-39.32	0.00	0.00	0.00	-26.35	-5.45	7.01
62	62	51.33	0.00	-39.32	0.00	0.00	0.00	-26.34	-5.44	7.01
62	63	52.00	0.00	-39.32	0.00	0.00	0.00	0.00	0.00	0.00

Título: Fecha : 09/12/99

Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + TEMPERATURA x 0.6 + SOBRECARGA 1 (UN TREN) + SOBRECARGA 7 + PRETENSADO FINAL x 0.9

H001 1 + H002 1 + H003 0.6 + H005 0.9 + H006 0.555 + H009 1.11

(TENSION MINIMA -244 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
+ (FCTEMP.ANL * 0.6) + (FPREFI.ANL * 0.9)
+ (SOBREC1.ANL * 0.555) + (SOBREC7.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-27.61	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	17.93	0.00	0.00	0.00	-396.44	105.76	293.22
4	4	0.68	2686.40	17.95	0.00	0.00	0.00	-396.44	105.76	293.22
4	5	1.35	2688.98	62.81	0.00	0.00	0.00	-424.05	100.23	300.75
5	5	1.35	2688.97	62.82	0.00	0.00	0.00	-424.07	100.23	300.76
5	6	2.03	2701.57	80.59	0.00	0.00	0.00	-476.90	90.19	315.70
6	6	2.03	2701.58	80.56	0.00	0.00	0.00	-476.91	90.19	315.70
6	7	2.70	2716.13	89.74	0.00	0.00	0.00	-537.12	78.76	332.75
7	7	2.70	2716.13	89.76	0.00	0.00	0.00	-537.13	78.76	332.75
7	8	3.38	2730.15	98.46	0.00	0.00	0.00	-604.95	65.72	351.78
8	8	3.38	2730.15	98.46	0.00	0.00	0.00	-604.93	65.72	351.78
8	9	4.05	2743.20	106.44	0.00	0.00	0.00	-677.70	51.59	372.06
9	9	4.05	2743.20	106.43	0.00	0.00	0.00	-677.70	51.60	372.06
9	10	4.72	2755.47	113.91	0.00	0.00	0.00	-755.71	36.33	393.68
10	10	4.72	2755.48	113.89	0.00	0.00	0.00	-755.69	36.33	393.68
10	11	5.40	2767.11	120.99	0.00	0.00	0.00	-839.75	19.77	416.86
11	11	5.40	2767.10	120.99	0.00	0.00	0.00	-839.76	19.77	416.87
11	12	6.07	2785.45	91.46	0.00	0.00	0.00	-918.66	4.74	439.15
12	12	6.07	2785.44	91.50	0.00	0.00	0.00	-918.66	4.74	439.15
12	13	6.75	2801.89	60.64	0.00	0.00	0.00	-977.02	-6.17	455.83
13	13	6.75	2801.88	60.61	0.00	0.00	0.00	-977.00	-6.17	455.83
13	14	7.43	2816.13	17.73	0.00	0.00	0.00	-1008.89	-11.76	465.31
14	14	7.43	2816.13	17.73	0.00	0.00	0.00	-1008.89	-11.76	465.31
14	15	8.10	2827.99	-25.05	0.00	0.00	0.00	-1010.15	-11.19	466.48
15	15	8.10	2828.00	-25.04	0.00	0.00	0.00	-1010.17	-11.20	466.48
15	16	8.77	2828.28	-66.92	0.00	0.00	0.00	-980.49	-5.04	458.60
16	16	8.77	2828.28	-66.91	0.00	0.00	0.00	-980.51	-5.05	458.61
16	17	9.45	2817.53	-107.65	0.00	0.00	0.00	-921.62	6.37	442.18
17	17	9.45	2817.53	-107.66	0.00	0.00	0.00	-921.62	6.37	442.18
17	18	10.13	2804.93	-147.46	0.00	0.00	0.00	-836.42	23.10	418.62
18	18	10.13	2804.93	-147.48	0.00	0.00	0.00	-836.44	23.10	418.62
18	19	10.80	2790.76	-185.64	0.00	0.00	0.00	-728.05	44.51	388.78
19	19	10.80	2790.77	-185.62	0.00	0.00	0.00	-728.05	44.51	388.78
19	20	11.48	2784.06	0.62	0.00	0.00	0.00	-666.70	56.72	371.98

20	20	11.48	2784.05	0.60	0.00	0.00	0.00	-666.71	56.72	371.99
20	21	12.15	2769.99	184.20	0.00	0.00	0.00	-733.37	41.96	388.75
21	21	12.15	2769.99	184.21	0.00	0.00	0.00	-733.37	41.96	388.75
21	22	12.82	2748.43	366.70	0.00	0.00	0.00	-926.75	0.48	438.72
22	22	12.82	2748.44	366.72	0.00	0.00	0.00	-926.75	0.48	438.72
22	23	13.50	2718.87	549.58	0.00	0.00	0.00	-1251.44	-68.69	523.08
23	23	13.50	2718.87	-855.57	0.00	0.00	0.00	-1251.44	-68.69	523.08
23	24	14.75	2687.22	-650.57	0.00	0.00	0.00	-439.00	167.53	402.26
24	24	14.75	2687.21	-650.57	0.00	0.00	0.00	-439.00	167.53	402.25
24	25	16.00	2650.93	-455.20	0.00	0.00	0.00	239.52	313.25	185.18
25	25	16.00	2650.93	-455.19	0.00	0.00	0.00	239.52	313.25	185.18
25	26	17.25	2610.30	-263.56	0.00	0.00	0.00	679.14	405.98	42.86
26	26	17.25	2610.31	-263.57	0.00	0.00	0.00	679.13	405.98	42.86
26	27	18.50	2565.67	-76.18	0.00	0.00	0.00	888.25	447.60	-27.33
27	27	18.50	2565.67	-76.18	0.00	0.00	0.00	888.25	447.60	-27.33
27	28	19.75	2557.66	-70.37	0.00	0.00	0.00	981.00	467.22	-57.30
28	28	19.75	2557.66	-70.40	0.00	0.00	0.00	980.99	467.22	-57.30
28	29	21.00	2547.66	-64.36	0.00	0.00	0.00	1068.50	485.49	-85.82
29	29	21.00	2547.65	-64.31	0.00	0.00	0.00	1068.47	485.49	-85.81
29	30	22.25	2535.63	-57.87	0.00	0.00	0.00	1150.57	502.37	-112.82
30	30	22.25	2535.64	-57.86	0.00	0.00	0.00	1150.57	502.37	-112.82
30	31	23.50	2521.60	-50.83	0.00	0.00	0.00	1226.70	517.74	-138.16
31	31	23.50	2521.59	-50.80	0.00	0.00	0.00	1226.74	517.75	-138.17
31	32	24.75	2505.55	-26.37	0.00	0.00	0.00	1293.20	530.79	-160.66
32	32	24.75	2505.55	-26.44	0.00	0.00	0.00	1293.21	530.80	-160.66
32	33	26.00	2487.50	-1.08	0.00	0.00	0.00	1318.12	534.50	-170.28
33	33	26.00	2487.50	-1.06	0.00	0.00	0.00	1318.10	534.50	-170.27
33	34	27.25	2504.56	22.91	0.00	0.00	0.00	1297.43	531.63	-162.09
34	34	27.25	2504.56	22.89	0.00	0.00	0.00	1297.42	531.63	-162.09
34	35	28.50	2520.92	45.89	0.00	0.00	0.00	1235.94	519.71	-141.13
35	35	28.50	2520.92	45.91	0.00	0.00	0.00	1235.96	519.71	-141.14
35	36	29.75	2535.17	51.48	0.00	0.00	0.00	1166.67	505.87	-117.93
36	36	29.75	2535.17	51.44	0.00	0.00	0.00	1166.68	505.87	-117.94
36	37	31.00	2547.32	56.41	0.00	0.00	0.00	1093.46	490.95	-93.70
37	37	31.00	2547.32	56.40	0.00	0.00	0.00	1093.43	490.95	-93.69
37	38	32.25	2557.39	60.96	0.00	0.00	0.00	1016.71	475.06	-68.57
38	38	32.25	2557.39	60.99	0.00	0.00	0.00	1016.69	475.05	-68.56
38	39	33.50	2565.38	65.31	0.00	0.00	0.00	936.63	458.22	-42.58
39	39	33.50	2565.38	65.30	0.00	0.00	0.00	936.61	458.22	-42.58
39	40	34.75	2610.96	254.74	0.00	0.00	0.00	739.90	419.42	23.80
40	40	34.75	2610.96	254.76	0.00	0.00	0.00	739.91	419.42	23.80
40	41	36.00	2652.39	448.62	0.00	0.00	0.00	310.18	328.94	163.09
41	41	36.00	2652.40	448.61	0.00	0.00	0.00	310.18	328.94	163.09

41	42	37.25	2689.30	646.36	0.00	0.00	0.00	-361.31	184.83	378.01
42	42	37.25	2689.29	646.36	0.00	0.00	0.00	-361.31	184.82	378.01
42	43	38.50	2721.37	853.86	0.00	0.00	0.00	-1169.79	-51.64	501.52
43	43	38.50	2721.37	-510.77	0.00	0.00	0.00	-1169.79	-51.64	501.52
43	44	39.17	2749.95	-332.85	0.00	0.00	0.00	-874.47	11.40	424.91
44	44	39.17	2749.95	-332.82	0.00	0.00	0.00	-874.47	11.40	424.91
44	45	39.85	2771.52	-149.97	0.00	0.00	0.00	-701.49	48.66	380.37
45	45	39.85	2771.51	-149.98	0.00	0.00	0.00	-701.49	48.65	380.37
45	46	40.53	2785.61	33.97	0.00	0.00	0.00	-657.30	58.77	369.59
46	46	40.53	2785.61	33.97	0.00	0.00	0.00	-657.29	58.77	369.59
46	47	41.20	2791.67	215.02	0.00	0.00	0.00	-739.26	42.26	391.83
47	47	41.20	2791.67	215.03	0.00	0.00	0.00	-739.26	42.26	391.83
47	48	41.88	2805.73	177.40	0.00	0.00	0.00	-869.49	16.32	427.48
48	48	41.88	2805.74	177.37	0.00	0.00	0.00	-869.50	16.32	427.48
48	49	42.55	2817.91	139.31	0.00	0.00	0.00	-974.06	-4.44	456.16
49	49	42.55	2817.91	139.33	0.00	0.00	0.00	-974.08	-4.44	456.17
49	50	43.22	2828.34	100.38	0.00	0.00	0.00	-1053.89	-20.21	478.14
50	50	43.22	2828.34	100.36	0.00	0.00	0.00	-1053.91	-20.21	478.15
50	51	43.90	2828.52	59.15	0.00	0.00	0.00	-1107.02	-31.18	492.30
51	51	43.90	2828.53	59.18	0.00	0.00	0.00	-1107.05	-31.18	492.31
51	52	44.58	2816.64	17.00	0.00	0.00	0.00	-1129.24	-36.60	497.38
52	52	44.58	2816.64	16.96	0.00	0.00	0.00	-1129.24	-36.60	497.38
52	53	45.25	2802.83	-24.09	0.00	0.00	0.00	-1121.78	-36.02	494.43
53	53	45.25	2802.83	-24.07	0.00	0.00	0.00	-1121.79	-36.03	494.43
53	54	45.92	2786.96	-64.47	0.00	0.00	0.00	-1085.79	-29.69	483.74
54	54	45.92	2786.96	-64.47	0.00	0.00	0.00	-1085.75	-29.69	483.73
54	55	46.60	2768.74	-104.63	0.00	0.00	0.00	-1020.64	-17.50	465.13
55	55	46.60	2768.74	-104.62	0.00	0.00	0.00	-1020.64	-17.50	465.13
55	56	47.28	2756.87	-110.12	0.00	0.00	0.00	-943.33	-2.35	443.72
56	56	47.28	2756.87	-110.10	0.00	0.00	0.00	-943.33	-2.35	443.72
56	57	47.95	2744.33	-115.04	0.00	0.00	0.00	-863.58	13.25	421.62
57	57	47.95	2744.33	-115.03	0.00	0.00	0.00	-863.59	13.25	421.62
57	58	48.63	2730.78	-119.50	0.00	0.00	0.00	-779.51	29.68	398.29
58	58	48.63	2730.78	-119.54	0.00	0.00	0.00	-779.52	29.68	398.29
58	59	49.30	2716.63	-123.33	0.00	0.00	0.00	-694.25	46.32	374.61
59	59	49.30	2716.63	-123.29	0.00	0.00	0.00	-694.25	46.32	374.61
59	60	49.97	2701.72	-126.46	0.00	0.00	0.00	-607.27	63.25	350.41
60	60	49.97	2701.72	-126.47	0.00	0.00	0.00	-607.27	63.25	350.41
60	61	50.65	2688.82	-120.93	0.00	0.00	0.00	-518.89	80.62	325.99
61	61	50.65	2688.82	-120.91	0.00	0.00	0.00	-518.88	80.62	325.98
61	62	51.33	2686.20	-86.71	0.00	0.00	0.00	-447.68	95.15	306.85
62	62	51.33	2686.20	-86.72	0.00	0.00	0.00	-447.68	95.15	306.85
62	63	52.00	2683.62	-53.01	0.00	0.00	0.00	-400.43	104.74	294.09

Título: Fecha : 09/12/99

Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + TEMPERATURA x 0.2 + SOBRECARGA 1 (UN TREN) x 0.5 + SOBRECARGA 7 x 0.5 + PRETENSADO FINAL x 0.9

H001 1 + H002 1 + H003 0.2 + H005 0.9 + H006 0.2775 + H009 0.555

(TENSION MINIMA 0 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
+ (FCTEMP.ANL * 0.2) + (FPREFI.ANL * 0.9)
+ (SOBREC1.ANL * 0.2775) + (SOBREC7.ANL * 0.555)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-18.69	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	21.19	0.00	0.00	0.00	-400.58	104.90	294.32
4	4	0.68	2686.40	21.21	0.00	0.00	0.00	-400.58	104.90	294.33
4	5	1.35	2688.98	60.49	0.00	0.00	0.00	-428.52	99.31	301.94
5	5	1.35	2688.97	60.49	0.00	0.00	0.00	-428.54	99.30	301.95
5	6	2.03	2701.57	72.61	0.00	0.00	0.00	-477.86	89.99	315.96
6	6	2.03	2701.58	72.59	0.00	0.00	0.00	-477.87	89.99	315.96
6	7	2.70	2716.13	76.19	0.00	0.00	0.00	-530.87	80.05	331.08
7	7	2.70	2716.13	76.20	0.00	0.00	0.00	-530.88	80.05	331.09
7	8	3.38	2730.15	79.23	0.00	0.00	0.00	-587.56	69.31	347.15
8	8	3.38	2730.15	79.23	0.00	0.00	0.00	-587.54	69.32	347.15
8	9	4.05	2743.20	81.64	0.00	0.00	0.00	-645.56	58.24	363.50
9	9	4.05	2743.20	81.64	0.00	0.00	0.00	-645.56	58.24	363.50
9	10	4.72	2755.47	83.54	0.00	0.00	0.00	-705.10	46.79	380.21
10	10	4.72	2755.48	83.53	0.00	0.00	0.00	-705.08	46.79	380.20
10	11	5.40	2767.11	84.96	0.00	0.00	0.00	-766.56	34.90	397.38
11	11	5.40	2767.10	84.96	0.00	0.00	0.00	-766.57	34.90	397.38
11	12	6.07	2785.45	49.85	0.00	0.00	0.00	-819.46	25.25	412.74
12	12	6.07	2785.44	49.89	0.00	0.00	0.00	-819.46	25.25	412.74
12	13	6.75	2801.89	13.37	0.00	0.00	0.00	-847.60	20.58	421.38
13	13	6.75	2801.88	13.33	0.00	0.00	0.00	-847.59	20.58	421.38
13	14	7.43	2816.13	-29.55	0.00	0.00	0.00	-847.32	21.63	422.30
14	14	7.43	2816.13	-29.53	0.00	0.00	0.00	-847.33	21.63	422.31
14	15	8.10	2827.99	-72.32	0.00	0.00	0.00	-816.93	28.74	415.04
15	15	8.10	2828.00	-72.30	0.00	0.00	0.00	-816.94	28.74	415.05
15	16	8.77	2828.28	-114.17	0.00	0.00	0.00	-755.59	41.44	398.74
16	16	8.77	2828.28	-114.18	0.00	0.00	0.00	-755.61	41.44	398.74
16	17	9.45	2817.53	-154.91	0.00	0.00	0.00	-664.58	59.50	373.76
17	17	9.45	2817.53	-154.92	0.00	0.00	0.00	-664.58	59.50	373.76
17	18	10.13	2804.93	-194.72	0.00	0.00	0.00	-547.24	82.87	341.64
18	18	10.13	2804.93	-194.74	0.00	0.00	0.00	-547.25	82.87	341.65
18	19	10.80	2790.76	-232.91	0.00	0.00	0.00	-407.19	110.83	303.38
19	19	10.80	2790.77	-232.89	0.00	0.00	0.00	-407.20	110.83	303.38
19	20	11.48	2784.06	-46.65	0.00	0.00	0.00	-313.70	129.68	278.02

20	20	11.48	2784.05	-46.66	0.00	0.00	0.00	-313.71	129.68	278.02
20	21	12.15	2769.99	136.94	0.00	0.00	0.00	-348.70	121.46	286.36
21	21	12.15	2769.99	136.94	0.00	0.00	0.00	-348.70	121.46	286.36
21	22	12.82	2748.43	319.43	0.00	0.00	0.00	-510.41	86.54	327.89
22	22	12.82	2748.44	319.45	0.00	0.00	0.00	-510.41	86.54	327.89
22	23	13.50	2718.87	502.31	0.00	0.00	0.00	-802.96	24.01	403.70
23	23	13.50	2718.87	-677.72	0.00	0.00	0.00	-802.95	24.01	403.70
23	24	14.75	2687.22	-488.68	0.00	0.00	0.00	-202.85	219.48	327.95
24	24	14.75	2687.21	-488.68	0.00	0.00	0.00	-202.85	219.48	327.95
24	25	16.00	2650.93	-309.26	0.00	0.00	0.00	283.28	322.88	171.41
25	25	16.00	2650.93	-309.26	0.00	0.00	0.00	283.28	322.88	171.41
25	26	17.25	2610.30	-133.58	0.00	0.00	0.00	550.45	377.67	83.35
26	26	17.25	2610.31	-133.59	0.00	0.00	0.00	550.44	377.67	83.35
26	27	18.50	2565.67	37.84	0.00	0.00	0.00	607.06	385.74	61.15
27	27	18.50	2565.67	37.85	0.00	0.00	0.00	607.06	385.74	61.15
27	28	19.75	2557.66	27.70	0.00	0.00	0.00	567.25	376.19	72.89
28	28	19.75	2557.66	27.67	0.00	0.00	0.00	567.24	376.19	72.89
28	29	21.00	2547.66	17.76	0.00	0.00	0.00	542.14	369.68	79.81
29	29	21.00	2547.65	17.80	0.00	0.00	0.00	542.11	369.68	79.82
29	30	22.25	2535.63	8.28	0.00	0.00	0.00	531.55	366.17	81.96
30	30	22.25	2535.64	8.29	0.00	0.00	0.00	531.54	366.17	81.96
30	31	23.50	2521.60	-0.64	0.00	0.00	0.00	534.96	365.54	79.51
31	31	23.50	2521.59	-0.61	0.00	0.00	0.00	534.99	365.55	79.50
31	32	24.75	2505.55	-0.46	0.00	0.00	0.00	550.07	367.29	73.17
32	32	24.75	2505.55	-0.52	0.00	0.00	0.00	550.09	367.29	73.17
32	33	26.00	2487.50	0.56	0.00	0.00	0.00	560.19	367.74	68.22
33	33	26.00	2487.50	0.57	0.00	0.00	0.00	560.17	367.74	68.22
33	34	27.25	2504.56	0.26	0.00	0.00	0.00	550.21	367.22	73.03
34	34	27.25	2504.56	0.24	0.00	0.00	0.00	550.20	367.22	73.04
34	35	28.50	2520.92	-1.04	0.00	0.00	0.00	536.02	365.71	79.11
35	35	28.50	2520.92	-1.02	0.00	0.00	0.00	536.04	365.71	79.10
35	36	29.75	2535.17	-11.41	0.00	0.00	0.00	535.39	366.97	80.71
36	36	29.75	2535.17	-11.45	0.00	0.00	0.00	535.39	366.97	80.71
36	37	31.00	2547.32	-22.43	0.00	0.00	0.00	550.75	371.54	77.07
37	37	31.00	2547.32	-22.43	0.00	0.00	0.00	550.72	371.54	77.08
37	38	32.25	2557.39	-33.82	0.00	0.00	0.00	582.52	379.52	68.06
38	38	32.25	2557.39	-33.81	0.00	0.00	0.00	582.51	379.52	68.06
38	39	33.50	2565.38	-45.44	0.00	0.00	0.00	630.90	390.95	53.62
39	39	33.50	2565.38	-45.45	0.00	0.00	0.00	630.89	390.95	53.62
39	40	34.75	2610.96	128.03	0.00	0.00	0.00	582.59	384.81	73.30
40	40	34.75	2610.96	128.05	0.00	0.00	0.00	582.60	384.81	73.30
40	41	36.00	2652.39	305.96	0.00	0.00	0.00	321.22	331.37	159.62
41	41	36.00	2652.40	305.95	0.00	0.00	0.00	321.23	331.37	159.62

41	42	37.25	2689.30	487.74	0.00	0.00	0.00	-161.96	228.69	315.28
42	42	37.25	2689.29	487.74	0.00	0.00	0.00	-161.96	228.69	315.28
42	43	38.50	2721.37	679.29	0.00	0.00	0.00	-762.19	32.61	393.02
43	43	38.50	2721.37	-480.58	0.00	0.00	0.00	-762.19	32.61	393.02
43	44	39.17	2749.95	-302.65	0.00	0.00	0.00	-487.10	91.46	321.79
44	44	39.17	2749.95	-302.63	0.00	0.00	0.00	-487.10	91.46	321.79
44	45	39.85	2771.52	-119.79	0.00	0.00	0.00	-334.65	124.48	282.72
45	45	39.85	2771.51	-119.79	0.00	0.00	0.00	-334.65	124.48	282.72
45	46	40.53	2785.61	64.16	0.00	0.00	0.00	-311.00	130.35	277.41
46	46	40.53	2785.61	64.16	0.00	0.00	0.00	-310.99	130.35	277.41
46	47	41.20	2791.67	245.21	0.00	0.00	0.00	-413.18	109.65	305.03
47	47	41.20	2791.67	245.22	0.00	0.00	0.00	-413.18	109.65	305.03
47	48	41.88	2805.73	207.59	0.00	0.00	0.00	-563.94	79.48	346.15
48	48	41.88	2805.74	207.57	0.00	0.00	0.00	-563.95	79.47	346.15
48	49	42.55	2817.91	169.51	0.00	0.00	0.00	-688.75	54.53	380.22
49	49	42.55	2817.91	169.52	0.00	0.00	0.00	-688.76	54.53	380.22
49	50	43.22	2828.34	130.57	0.00	0.00	0.00	-788.80	34.58	407.58
50	50	43.22	2828.34	130.56	0.00	0.00	0.00	-788.82	34.58	407.59
50	51	43.90	2828.52	89.35	0.00	0.00	0.00	-862.47	19.37	427.20
51	51	43.90	2828.53	89.36	0.00	0.00	0.00	-862.49	19.36	427.21
51	52	44.58	2816.64	47.18	0.00	0.00	0.00	-905.21	9.70	437.75
52	52	44.58	2816.64	47.18	0.00	0.00	0.00	-905.20	9.70	437.75
52	53	45.25	2802.83	6.12	0.00	0.00	0.00	-917.99	6.10	440.19
53	53	45.25	2802.83	6.12	0.00	0.00	0.00	-917.99	6.10	440.19
53	54	45.92	2786.96	-34.28	0.00	0.00	0.00	-902.21	8.25	434.88
54	54	45.92	2786.96	-34.29	0.00	0.00	0.00	-902.18	8.25	434.87
54	55	46.60	2768.74	-74.44	0.00	0.00	0.00	-857.60	16.20	421.73
55	55	46.60	2768.74	-74.43	0.00	0.00	0.00	-857.61	16.20	421.73
55	56	47.28	2756.87	-79.92	0.00	0.00	0.00	-800.82	27.10	405.78
56	56	47.28	2756.87	-79.92	0.00	0.00	0.00	-800.82	27.10	405.79
56	57	47.95	2744.33	-84.86	0.00	0.00	0.00	-741.30	38.53	389.06
57	57	47.95	2744.33	-84.85	0.00	0.00	0.00	-741.31	38.53	389.07
57	58	48.63	2730.78	-89.31	0.00	0.00	0.00	-677.76	50.71	371.21
58	58	48.63	2730.78	-89.34	0.00	0.00	0.00	-677.77	50.71	371.21
58	59	49.30	2716.63	-93.14	0.00	0.00	0.00	-612.73	63.17	352.91
59	59	49.30	2716.63	-93.10	0.00	0.00	0.00	-612.73	63.17	352.91
59	60	49.97	2701.72	-96.27	0.00	0.00	0.00	-545.98	75.92	334.10
60	60	49.97	2701.72	-96.27	0.00	0.00	0.00	-545.98	75.92	334.10
60	61	50.65	2688.82	-90.74	0.00	0.00	0.00	-478.13	89.04	315.14
61	61	50.65	2688.82	-90.72	0.00	0.00	0.00	-478.12	89.04	315.13
61	62	51.33	2686.20	-56.52	0.00	0.00	0.00	-427.45	99.33	301.46
62	62	51.33	2686.20	-56.53	0.00	0.00	0.00	-427.45	99.33	301.46
62	63	52.00	2683.62	-22.82	0.00	0.00	0.00	-400.43	104.74	294.09

 Titulo: Fecha : 09/12/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + TEMPERATURA x 0.6 + SOBRECARGA 2 (UN TREN) + SOBRECARGA 8 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H003 0.6 + H005 0.9 + H007 0.555 + H010 1.11

(TENSION MINIMA -244 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FCTEMP.ANL * 0.6) + (FPREFI.ANL * 0.9)
 + (SOBREC2.ANL * 0.555) + (SOBREC8.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-213.18	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	-161.60	0.00	0.00	0.00	-272.30	131.41	260.18
4	4	0.68	2686.40	-161.60	0.00	0.00	0.00	-272.30	131.42	260.18
4	5	1.35	2688.98	-110.79	0.00	0.00	0.00	-181.63	150.34	236.22
5	5	1.35	2688.97	-110.78	0.00	0.00	0.00	-181.64	150.33	236.23
5	6	2.03	2701.57	-86.97	0.00	0.00	0.00	-118.48	164.27	220.29
6	6	2.03	2701.58	-86.99	0.00	0.00	0.00	-118.49	164.27	220.30
6	7	2.70	2716.13	-71.86	0.00	0.00	0.00	-68.43	175.63	207.99
7	7	2.70	2716.13	-71.85	0.00	0.00	0.00	-68.44	175.63	207.99
7	8	3.38	2730.15	-57.12	0.00	0.00	0.00	-28.43	184.88	198.32
8	8	3.38	2730.15	-57.10	0.00	0.00	0.00	-28.40	184.88	198.31
8	9	4.05	2743.20	-49.12	0.00	0.00	0.00	3.06	192.30	190.85
9	9	4.05	2743.20	-49.14	0.00	0.00	0.00	3.06	192.30	190.85
9	10	4.72	2755.47	-13.91	0.00	0.00	0.00	19.00	196.45	187.47
10	10	4.72	2755.48	-13.93	0.00	0.00	0.00	19.00	196.45	187.46
10	11	5.40	2767.11	-6.83	0.00	0.00	0.00	21.87	197.85	187.51
11	11	5.40	2767.10	-6.83	0.00	0.00	0.00	21.85	197.85	187.52
11	12	6.07	2785.45	-8.61	0.00	0.00	0.00	25.25	199.84	187.89
12	12	6.07	2785.44	-8.57	0.00	0.00	0.00	25.26	199.84	187.89
12	13	6.75	2801.89	-39.44	0.00	0.00	0.00	34.96	202.99	186.46
13	13	6.75	2801.88	-39.46	0.00	0.00	0.00	34.95	202.99	186.46
13	14	7.43	2816.13	-71.03	0.00	0.00	0.00	67.27	210.66	178.85
14	14	7.43	2816.13	-71.02	0.00	0.00	0.00	67.27	210.66	178.85
14	15	8.10	2827.99	-74.90	0.00	0.00	0.00	106.59	219.62	169.22
15	15	8.10	2828.00	-74.85	0.00	0.00	0.00	106.59	219.62	169.22
15	16	8.77	2828.28	-105.57	0.00	0.00	0.00	165.91	231.90	153.45
16	16	8.77	2828.28	-105.59	0.00	0.00	0.00	165.91	231.90	153.45
16	17	9.45	2817.53	-107.25	0.00	0.00	0.00	238.75	246.20	133.31
17	17	9.45	2817.53	-107.25	0.00	0.00	0.00	238.77	246.21	133.30
17	18	10.13	2804.93	-135.72	0.00	0.00	0.00	319.83	262.08	110.84
18	18	10.13	2804.93	-135.75	0.00	0.00	0.00	319.82	262.08	110.85
18	19	10.80	2790.76	-156.81	0.00	0.00	0.00	414.64	280.69	84.62
19	19	10.80	2790.77	-156.80	0.00	0.00	0.00	414.64	280.69	84.62
19	20	11.48	2784.06	46.81	0.00	0.00	0.00	450.49	287.63	74.61

20	20	11.48	2784.05	46.81	0.00	0.00	0.00	450.47	287.62	74.61
20	21	12.15	2769.99	247.50	0.00	0.00	0.00	347.14	265.29	101.13
21	21	12.15	2769.99	247.50	0.00	0.00	0.00	347.15	265.29	101.13
21	22	12.82	2748.43	447.10	0.00	0.00	0.00	105.63	213.86	163.91
22	22	12.82	2748.44	447.11	0.00	0.00	0.00	105.63	213.86	163.91
22	23	13.50	2718.87	647.33	0.00	0.00	0.00	-279.63	132.17	264.40
23	23	13.50	2718.87	-513.74	0.00	0.00	0.00	-279.63	132.17	264.40
23	24	14.75	2687.22	-340.66	0.00	0.00	0.00	125.47	291.72	224.64
24	24	14.75	2687.21	-340.66	0.00	0.00	0.00	125.47	291.72	224.63
24	25	16.00	2650.93	-177.20	0.00	0.00	0.00	436.57	356.60	123.18
25	25	16.00	2650.93	-177.20	0.00	0.00	0.00	436.57	356.60	123.18
25	26	17.25	2610.30	-17.48	0.00	0.00	0.00	548.62	377.27	83.93
26	26	17.25	2610.31	-17.49	0.00	0.00	0.00	548.62	377.27	83.93
26	27	18.50	2565.67	137.98	0.00	0.00	0.00	470.07	355.60	104.26
27	27	18.50	2565.67	138.01	0.00	0.00	0.00	470.07	355.60	104.26
27	28	19.75	2557.66	111.91	0.00	0.00	0.00	315.05	320.70	152.25
28	28	19.75	2557.66	111.87	0.00	0.00	0.00	315.04	320.70	152.25
28	29	21.00	2547.66	86.01	0.00	0.00	0.00	194.67	293.23	189.15
29	29	21.00	2547.65	86.05	0.00	0.00	0.00	194.62	293.22	189.16
29	30	22.25	2535.63	60.57	0.00	0.00	0.00	108.75	273.15	215.00
30	30	22.25	2535.64	60.57	0.00	0.00	0.00	108.72	273.14	215.01
30	31	23.50	2521.60	35.68	0.00	0.00	0.00	56.78	260.33	229.97
31	31	23.50	2521.59	35.72	0.00	0.00	0.00	56.80	260.34	229.96
31	32	24.75	2505.55	11.59	0.00	0.00	0.00	37.84	254.59	234.36
32	32	24.75	2505.55	11.52	0.00	0.00	0.00	37.85	254.59	234.35
32	33	26.00	2487.50	-11.67	0.00	0.00	0.00	50.50	255.60	228.60
33	33	26.00	2487.50	-11.67	0.00	0.00	0.00	50.48	255.59	228.60
33	34	27.25	2504.56	-36.27	0.00	0.00	0.00	68.56	261.25	224.59
34	34	27.25	2504.56	-36.29	0.00	0.00	0.00	68.55	261.25	224.60
34	35	28.50	2520.92	-61.85	0.00	0.00	0.00	119.02	273.96	210.32
35	35	28.50	2520.92	-61.83	0.00	0.00	0.00	119.03	273.96	210.32
35	36	29.75	2535.17	-88.17	0.00	0.00	0.00	204.35	294.14	184.87
36	36	29.75	2535.17	-88.21	0.00	0.00	0.00	204.35	294.14	184.87
36	37	31.00	2547.32	-115.15	0.00	0.00	0.00	325.63	322.01	147.91
37	37	31.00	2547.32	-115.13	0.00	0.00	0.00	325.60	322.01	147.91
37	38	32.25	2557.39	-142.48	0.00	0.00	0.00	483.27	357.69	99.29
38	38	32.25	2557.39	-142.48	0.00	0.00	0.00	483.26	357.68	99.29
38	39	33.50	2565.38	-170.07	0.00	0.00	0.00	677.45	401.20	38.97
39	39	33.50	2565.38	-170.08	0.00	0.00	0.00	677.45	401.19	38.98
39	40	34.75	2610.96	-12.55	0.00	0.00	0.00	794.90	431.52	6.50
40	40	34.75	2610.96	-12.52	0.00	0.00	0.00	794.91	431.52	6.49
40	41	36.00	2652.39	149.44	0.00	0.00	0.00	719.23	418.94	34.38
41	41	36.00	2652.40	149.42	0.00	0.00	0.00	719.23	418.94	34.38

41	42	37.25	2689.30	315.25	0.00	0.00	0.00	441.67	361.50	125.34
42	42	37.25	2689.29	315.25	0.00	0.00	0.00	441.67	361.50	125.34
42	43	38.50	2721.37	490.84	0.00	0.00	0.00	67.04	203.99	172.30
43	43	38.50	2721.37	-419.14	0.00	0.00	0.00	67.04	203.99	172.30
43	44	39.17	2749.95	-241.22	0.00	0.00	0.00	300.97	254.34	112.02
44	44	39.17	2749.95	-241.21	0.00	0.00	0.00	300.97	254.34	112.02
44	45	39.85	2771.52	-58.37	0.00	0.00	0.00	411.65	278.73	84.07
45	45	39.85	2771.51	-58.37	0.00	0.00	0.00	411.65	278.73	84.07
45	46	40.53	2785.61	125.58	0.00	0.00	0.00	393.53	275.96	89.88
46	46	40.53	2785.61	125.57	0.00	0.00	0.00	393.54	275.97	89.87
46	47	41.20	2791.67	306.63	0.00	0.00	0.00	250.21	246.77	128.45
47	47	41.20	2791.67	306.64	0.00	0.00	0.00	250.21	246.77	128.45
47	48	41.88	2805.73	269.01	0.00	0.00	0.00	57.66	207.95	180.68
48	48	41.88	2805.74	268.99	0.00	0.00	0.00	57.66	207.95	180.69
48	49	42.55	2817.91	230.93	0.00	0.00	0.00	-108.30	174.50	225.71
49	49	42.55	2817.91	230.95	0.00	0.00	0.00	-108.31	174.50	225.71
49	50	43.22	2828.34	192.00	0.00	0.00	0.00	-249.50	146.05	264.03
50	50	43.22	2828.34	191.99	0.00	0.00	0.00	-249.52	146.04	264.03
50	51	43.90	2828.52	150.78	0.00	0.00	0.00	-364.94	122.20	294.77
51	51	43.90	2828.53	150.78	0.00	0.00	0.00	-364.95	122.20	294.77
51	52	44.58	2816.64	108.60	0.00	0.00	0.00	-449.45	103.90	316.43
52	52	44.58	2816.64	108.63	0.00	0.00	0.00	-449.43	103.91	316.43
52	53	45.25	2802.83	67.57	0.00	0.00	0.00	-503.39	91.79	329.82
53	53	45.25	2802.83	67.56	0.00	0.00	0.00	-503.38	91.79	329.82
53	54	45.92	2786.96	27.16	0.00	0.00	0.00	-528.74	85.44	335.47
54	54	45.92	2786.96	27.12	0.00	0.00	0.00	-528.71	85.44	335.46
54	55	46.60	2768.74	-13.03	0.00	0.00	0.00	-525.91	84.75	333.44
55	55	46.60	2768.74	-13.00	0.00	0.00	0.00	-525.92	84.75	333.44
55	56	47.28	2756.87	-18.49	0.00	0.00	0.00	-510.89	87.03	328.61
56	56	47.28	2756.87	-18.51	0.00	0.00	0.00	-510.90	87.02	328.61
56	57	47.95	2744.33	-23.45	0.00	0.00	0.00	-492.52	89.95	322.84
57	57	47.95	2744.33	-23.42	0.00	0.00	0.00	-492.54	89.94	322.85
57	58	48.63	2730.78	-27.89	0.00	0.00	0.00	-470.75	93.50	316.10
58	58	48.63	2730.78	-27.92	0.00	0.00	0.00	-470.77	93.50	316.11
58	59	49.30	2716.63	-31.71	0.00	0.00	0.00	-446.89	97.44	308.76
59	59	49.30	2716.63	-31.68	0.00	0.00	0.00	-446.88	97.44	308.76
59	60	49.97	2701.72	-34.85	0.00	0.00	0.00	-421.29	101.69	300.91
60	60	49.97	2701.72	-34.83	0.00	0.00	0.00	-421.28	101.69	300.90
60	61	50.65	2688.82	-29.30	0.00	0.00	0.00	-395.21	106.18	293.07
61	61	50.65	2688.82	-29.29	0.00	0.00	0.00	-395.21	106.18	293.06
61	62	51.33	2686.20	4.91	0.00	0.00	0.00	-386.30	107.84	290.51
62	62	51.33	2686.20	4.90	0.00	0.00	0.00	-386.30	107.84	290.51
62	63	52.00	2683.62	38.61	0.00	0.00	0.00	-400.43	104.74	294.09

Título: Fecha : 09/12/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + TEMPERATURA x 0.2 + SOBRECARGA 2 (UN TREN) x 0.5 + SOBRECARGA 8 x 0.5
 H001 1 + H002 1 + H003 0.2 + H005 0.9 + H007 0.2775 + H010 0.555

(TENSION MINIMA 0 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FCTEMP.ANL * 0.2) + (FPREFI.ANL * 0.9)
 + (SOBREC2.ANL * 0.2775) + (SOBREC8.ANL * 0.555)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-111.47	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	-68.57	0.00	0.00	0.00	-338.52	117.73	277.80
4	4	0.68	2686.40	-68.57	0.00	0.00	0.00	-338.52	117.73	277.80
4	5	1.35	2688.98	-26.31	0.00	0.00	0.00	-307.30	124.36	269.68
5	5	1.35	2688.97	-26.30	0.00	0.00	0.00	-307.32	124.36	269.68
5	6	2.03	2701.57	-11.17	0.00	0.00	0.00	-298.65	127.03	268.25
6	6	2.03	2701.58	-11.18	0.00	0.00	0.00	-298.66	127.03	268.26
6	7	2.70	2716.13	-4.61	0.00	0.00	0.00	-296.53	128.48	268.70
7	7	2.70	2716.13	-4.61	0.00	0.00	0.00	-296.54	128.48	268.71
7	8	3.38	2730.15	1.44	0.00	0.00	0.00	-299.30	128.89	270.42
8	8	3.38	2730.15	1.46	0.00	0.00	0.00	-299.28	128.90	270.42
8	9	4.05	2743.20	3.86	0.00	0.00	0.00	-305.19	128.59	272.90
9	9	4.05	2743.20	3.86	0.00	0.00	0.00	-305.18	128.59	272.90
9	10	4.72	2755.47	19.63	0.00	0.00	0.00	-317.75	126.85	277.10
10	10	4.72	2755.48	19.61	0.00	0.00	0.00	-317.74	126.85	277.10
10	11	5.40	2767.11	21.05	0.00	0.00	0.00	-335.75	123.94	282.71
11	11	5.40	2767.10	21.05	0.00	0.00	0.00	-335.77	123.94	282.71
11	12	6.07	2785.45	-0.18	0.00	0.00	0.00	-347.50	122.79	287.12
12	12	6.07	2785.44	-0.14	0.00	0.00	0.00	-347.50	122.79	287.11
12	13	6.75	2801.89	-36.67	0.00	0.00	0.00	-341.61	125.16	286.70
13	13	6.75	2801.88	-36.70	0.00	0.00	0.00	-341.61	125.16	286.70
13	14	7.43	2816.13	-73.93	0.00	0.00	0.00	-309.24	132.84	279.08
14	14	7.43	2816.13	-73.91	0.00	0.00	0.00	-309.25	132.84	279.08
14	15	8.10	2827.99	-97.24	0.00	0.00	0.00	-258.56	144.15	266.41
15	15	8.10	2828.00	-97.20	0.00	0.00	0.00	-258.56	144.15	266.41
15	16	8.77	2828.28	-133.50	0.00	0.00	0.00	-182.39	159.91	246.16
16	16	8.77	2828.28	-133.51	0.00	0.00	0.00	-182.40	159.91	246.16
16	17	9.45	2817.53	-154.71	0.00	0.00	0.00	-84.40	179.41	219.32
17	17	9.45	2817.53	-154.72	0.00	0.00	0.00	-84.38	179.42	219.32
17	18	10.13	2804.93	-188.85	0.00	0.00	0.00	30.88	202.36	187.76
18	18	10.13	2804.93	-188.88	0.00	0.00	0.00	30.88	202.36	187.76
18	19	10.80	2790.76	-218.49	0.00	0.00	0.00	164.16	228.92	151.29
19	19	10.80	2790.77	-218.48	0.00	0.00	0.00	164.15	228.92	151.30
19	20	11.48	2784.06	-23.55	0.00	0.00	0.00	244.90	245.14	129.33

20	20	11.48	2784.05	-23.56	0.00	0.00	0.00	244.88	245.13	129.34
20	21	12.15	2769.99	168.59	0.00	0.00	0.00	191.55	233.13	142.55
21	21	12.15	2769.99	168.59	0.00	0.00	0.00	191.56	233.13	142.55
21	22	12.82	2748.43	359.63	0.00	0.00	0.00	5.78	193.22	190.49
22	22	12.82	2748.44	359.64	0.00	0.00	0.00	5.78	193.23	190.49
22	23	13.50	2718.87	551.18	0.00	0.00	0.00	-317.05	124.44	274.36
23	23	13.50	2718.87	-506.81	0.00	0.00	0.00	-317.05	124.44	274.36
23	24	14.75	2687.22	-333.72	0.00	0.00	0.00	79.38	281.58	239.14
24	24	14.75	2687.21	-333.72	0.00	0.00	0.00	79.38	281.58	239.14
24	25	16.00	2650.93	-170.26	0.00	0.00	0.00	381.80	344.56	140.41
25	25	16.00	2650.93	-170.26	0.00	0.00	0.00	381.80	344.56	140.41
25	26	17.25	2610.30	-10.54	0.00	0.00	0.00	485.19	363.31	103.89
26	26	17.25	2610.31	-10.55	0.00	0.00	0.00	485.19	363.31	103.89
26	27	18.50	2565.67	144.92	0.00	0.00	0.00	397.97	339.73	126.94
27	27	18.50	2565.67	144.94	0.00	0.00	0.00	397.97	339.73	126.94
27	28	19.75	2557.66	118.84	0.00	0.00	0.00	234.28	302.93	177.66
28	28	19.75	2557.66	118.81	0.00	0.00	0.00	234.26	302.93	177.67
28	29	21.00	2547.66	92.95	0.00	0.00	0.00	105.22	273.55	217.29
29	29	21.00	2547.65	92.98	0.00	0.00	0.00	105.18	273.54	217.30
29	30	22.25	2535.63	67.50	0.00	0.00	0.00	10.64	251.56	245.87
30	30	22.25	2535.64	67.50	0.00	0.00	0.00	10.61	251.55	245.88
30	31	23.50	2521.60	42.62	0.00	0.00	0.00	-50.00	236.84	263.57
31	31	23.50	2521.59	42.65	0.00	0.00	0.00	-49.97	236.84	263.56
31	32	24.75	2505.55	18.52	0.00	0.00	0.00	-77.61	229.19	270.68
32	32	24.75	2505.55	18.46	0.00	0.00	0.00	-77.59	229.19	270.68
32	33	26.00	2487.50	-4.73	0.00	0.00	0.00	-73.62	228.29	267.65
33	33	26.00	2487.50	-4.73	0.00	0.00	0.00	-73.64	228.29	267.66
33	34	27.25	2504.56	-29.33	0.00	0.00	0.00	-64.23	232.03	266.37
34	34	27.25	2504.56	-29.35	0.00	0.00	0.00	-64.24	232.03	266.38
34	35	28.50	2520.92	-54.91	0.00	0.00	0.00	-22.44	242.84	254.83
35	35	28.50	2520.92	-54.89	0.00	0.00	0.00	-22.42	242.84	254.83
35	36	29.75	2535.17	-81.24	0.00	0.00	0.00	54.23	261.10	232.11
36	36	29.75	2535.17	-81.28	0.00	0.00	0.00	54.23	261.10	232.11
36	37	31.00	2547.32	-108.21	0.00	0.00	0.00	166.83	287.07	197.87
37	37	31.00	2547.32	-108.19	0.00	0.00	0.00	166.80	287.07	197.88
37	38	32.25	2557.39	-135.54	0.00	0.00	0.00	315.80	320.84	151.99
38	38	32.25	2557.39	-135.54	0.00	0.00	0.00	315.79	320.84	151.99
38	39	33.50	2565.38	-163.14	0.00	0.00	0.00	501.31	362.44	94.40
39	39	33.50	2565.38	-163.14	0.00	0.00	0.00	501.31	362.44	94.40
39	40	34.75	2610.96	-5.61	0.00	0.00	0.00	610.09	390.86	64.65
40	40	34.75	2610.96	-5.59	0.00	0.00	0.00	610.10	390.86	64.65
40	41	36.00	2652.39	156.37	0.00	0.00	0.00	525.75	376.37	95.26
41	41	36.00	2652.40	156.35	0.00	0.00	0.00	525.75	376.37	95.26

41	42	37.25	2689.30	322.19	0.00	0.00	0.00	239.53	317.02	188.95
42	42	37.25	2689.29	322.19	0.00	0.00	0.00	239.53	317.02	188.95
42	43	38.50	2721.37	497.77	0.00	0.00	0.00	-143.77	160.42	228.41
43	43	38.50	2721.37	-434.76	0.00	0.00	0.00	-143.77	160.42	228.41
43	44	39.17	2749.95	-256.84	0.00	0.00	0.00	100.62	212.93	165.35
44	44	39.17	2749.95	-256.83	0.00	0.00	0.00	100.62	212.93	165.35
44	45	39.85	2771.52	-73.99	0.00	0.00	0.00	221.92	239.51	134.57
45	45	39.85	2771.51	-73.98	0.00	0.00	0.00	221.92	239.51	134.57
45	46	40.53	2785.61	109.97	0.00	0.00	0.00	214.42	238.94	137.55
46	46	40.53	2785.61	109.96	0.00	0.00	0.00	214.43	238.95	137.55
46	47	41.20	2791.67	291.01	0.00	0.00	0.00	81.56	211.91	173.34
47	47	41.20	2791.67	291.02	0.00	0.00	0.00	81.56	211.91	173.34
47	48	41.88	2805.73	253.39	0.00	0.00	0.00	-100.37	175.29	222.75
48	48	41.88	2805.74	253.38	0.00	0.00	0.00	-100.37	175.29	222.75
48	49	42.55	2817.91	215.32	0.00	0.00	0.00	-255.87	144.00	264.99
49	49	42.55	2817.91	215.33	0.00	0.00	0.00	-255.88	144.00	265.00
49	50	43.22	2828.34	176.38	0.00	0.00	0.00	-386.61	117.71	300.52
50	50	43.22	2828.34	176.37	0.00	0.00	0.00	-386.63	117.70	300.53
50	51	43.90	2828.52	135.16	0.00	0.00	0.00	-491.43	96.06	328.44
51	51	43.90	2828.53	135.16	0.00	0.00	0.00	-491.44	96.05	328.44
51	52	44.58	2816.64	92.99	0.00	0.00	0.00	-565.32	79.95	347.27
52	52	44.58	2816.64	93.01	0.00	0.00	0.00	-565.30	79.96	347.27
52	53	45.25	2802.83	51.96	0.00	0.00	0.00	-608.79	70.00	357.88
53	53	45.25	2802.83	51.93	0.00	0.00	0.00	-608.78	70.01	357.88
53	54	45.92	2786.96	11.53	0.00	0.00	0.00	-623.69	65.82	360.74
54	54	45.92	2786.96	11.51	0.00	0.00	0.00	-623.66	65.82	360.73
54	55	46.60	2768.74	-28.64	0.00	0.00	0.00	-610.24	67.32	355.88
55	55	46.60	2768.74	-28.62	0.00	0.00	0.00	-610.24	67.32	355.89
55	56	47.28	2756.87	-34.11	0.00	0.00	0.00	-584.60	71.79	348.23
56	56	47.28	2756.87	-34.13	0.00	0.00	0.00	-584.61	71.79	348.23
56	57	47.95	2744.33	-39.07	0.00	0.00	0.00	-555.76	76.88	339.68
57	57	47.95	2744.33	-39.04	0.00	0.00	0.00	-555.78	76.87	339.68
57	58	48.63	2730.78	-43.51	0.00	0.00	0.00	-523.38	82.62	330.11
58	58	48.63	2730.78	-43.53	0.00	0.00	0.00	-523.39	82.62	330.12
58	59	49.30	2716.63	-47.33	0.00	0.00	0.00	-489.05	88.73	319.99
59	59	49.30	2716.63	-47.30	0.00	0.00	0.00	-489.05	88.73	319.99
59	60	49.97	2701.72	-50.46	0.00	0.00	0.00	-452.99	95.14	309.35
60	60	49.97	2701.72	-50.45	0.00	0.00	0.00	-452.98	95.14	309.34
60	61	50.65	2688.82	-44.92	0.00	0.00	0.00	-416.29	101.82	298.68
61	61	50.65	2688.82	-44.91	0.00	0.00	0.00	-416.28	101.83	298.67
61	62	51.33	2686.20	-10.71	0.00	0.00	0.00	-396.76	105.68	293.29
62	62	51.33	2686.20	-10.72	0.00	0.00	0.00	-396.76	105.68	293.29
62	63	52.00	2683.62	22.99	0.00	0.00	0.00	-400.43	104.74	294.09

 Título: Fecha : 09/12/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + SOBRECARGA 3 (UN TREN) + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H005 0.9 + H008 0.555 + H011 1.11

(TENSION MINIMA -244 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FPREFI.ANL * 0.9) + (SOBREC3.ANL * 0.555)
 + (SOBREC9.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-105.78	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	-65.52	0.00	0.00	0.00	-341.49	117.11	278.59
4	4	0.68	2686.40	-65.51	0.00	0.00	0.00	-341.49	117.12	278.60
4	5	1.35	2688.98	-14.70	0.00	0.00	0.00	-315.20	122.73	271.78
5	5	1.35	2688.97	-14.70	0.00	0.00	0.00	-315.21	122.73	271.78
5	6	2.03	2701.57	9.11	0.00	0.00	0.00	-317.39	123.16	273.24
6	6	2.03	2701.58	9.11	0.00	0.00	0.00	-317.40	123.16	273.24
6	7	2.70	2716.13	24.23	0.00	0.00	0.00	-331.73	121.21	278.07
7	7	2.70	2716.13	24.23	0.00	0.00	0.00	-331.74	121.21	278.08
7	8	3.38	2730.15	38.96	0.00	0.00	0.00	-357.06	116.95	285.80
8	8	3.38	2730.15	38.96	0.00	0.00	0.00	-357.05	116.96	285.79
8	9	4.05	2743.20	52.89	0.00	0.00	0.00	-391.95	110.65	295.99
9	9	4.05	2743.20	52.92	0.00	0.00	0.00	-391.93	110.66	295.99
9	10	4.72	2755.47	66.35	0.00	0.00	0.00	-436.11	102.38	308.61
10	10	4.72	2755.48	66.32	0.00	0.00	0.00	-436.09	102.39	308.60
10	11	5.40	2767.11	79.46	0.00	0.00	0.00	-489.85	92.09	323.72
11	11	5.40	2767.10	79.45	0.00	0.00	0.00	-489.86	92.09	323.73
11	12	6.07	2785.45	55.87	0.00	0.00	0.00	-542.91	82.41	339.13
12	12	6.07	2785.44	55.92	0.00	0.00	0.00	-542.92	82.40	339.13
12	13	6.75	2801.89	31.09	0.00	0.00	0.00	-579.12	76.07	349.92
13	13	6.75	2801.88	31.05	0.00	0.00	0.00	-579.12	76.07	349.92
13	14	7.43	2816.13	5.52	0.00	0.00	0.00	-596.80	73.41	355.62
14	14	7.43	2816.13	5.55	0.00	0.00	0.00	-596.81	73.41	355.62
14	15	8.10	2827.99	-20.13	0.00	0.00	0.00	-595.66	74.48	356.14
15	15	8.10	2828.00	-20.10	0.00	0.00	0.00	-595.66	74.48	356.14
15	16	8.77	2828.28	-44.87	0.00	0.00	0.00	-575.01	78.76	350.67
16	16	8.77	2828.28	-44.88	0.00	0.00	0.00	-575.02	78.76	350.67
16	17	9.45	2817.53	-68.26	0.00	0.00	0.00	-537.03	85.86	339.81
17	17	9.45	2817.53	-68.27	0.00	0.00	0.00	-537.02	85.86	339.81
17	18	10.13	2804.93	-90.70	0.00	0.00	0.00	-484.52	95.84	324.95
18	18	10.13	2804.93	-90.72	0.00	0.00	0.00	-484.53	95.83	324.95
18	19	10.80	2790.76	-111.78	0.00	0.00	0.00	-419.88	108.21	306.75
19	19	10.80	2790.77	-111.77	0.00	0.00	0.00	-419.89	108.20	306.76
19	20	11.48	2784.06	119.58	0.00	0.00	0.00	-425.19	106.64	307.70

20	20	11.48	2784.05	119.59	0.00	0.00	0.00	-425.21	106.63	307.70
20	21	12.15	2769.99	320.28	0.00	0.00	0.00	-577.31	74.22	347.21
21	21	12.15	2769.99	320.28	0.00	0.00	0.00	-577.30	74.22	347.21
21	22	12.82	2748.43	547.63	0.00	0.00	0.00	-870.91	12.03	423.85
22	22	12.82	2748.44	547.63	0.00	0.00	0.00	-870.91	12.03	423.85
22	23	13.50	2718.87	747.85	0.00	0.00	0.00	-1324.53	-83.79	542.53
23	23	13.50	2718.87	-839.81	0.00	0.00	0.00	-1324.53	-83.79	542.53
23	24	14.75	2687.22	-607.06	0.00	0.00	0.00	-544.26	144.37	435.38
24	24	14.75	2687.21	-607.06	0.00	0.00	0.00	-544.26	144.37	435.38
24	25	16.00	2650.93	-383.94	0.00	0.00	0.00	77.12	277.52	236.28
25	25	16.00	2650.93	-383.94	0.00	0.00	0.00	77.13	277.52	236.28
25	26	17.25	2610.30	-192.31	0.00	0.00	0.00	427.67	350.65	121.99
26	26	17.25	2610.31	-192.32	0.00	0.00	0.00	427.67	350.66	121.99
26	27	18.50	2565.67	-4.93	0.00	0.00	0.00	547.73	372.68	79.82
27	27	18.50	2565.67	-4.92	0.00	0.00	0.00	547.73	372.68	79.82
27	28	19.75	2557.66	0.89	0.00	0.00	0.00	551.41	372.71	77.87
28	28	19.75	2557.66	0.87	0.00	0.00	0.00	551.40	372.70	77.88
28	29	21.00	2547.66	6.92	0.00	0.00	0.00	549.86	371.38	77.38
29	29	21.00	2547.65	6.94	0.00	0.00	0.00	549.82	371.37	77.39
29	30	22.25	2535.63	13.38	0.00	0.00	0.00	542.86	368.66	78.40
30	30	22.25	2535.64	13.39	0.00	0.00	0.00	542.86	368.66	78.40
30	31	23.50	2521.60	20.41	0.00	0.00	0.00	529.94	364.44	81.09
31	31	23.50	2521.59	20.44	0.00	0.00	0.00	529.97	364.44	81.08
31	32	24.75	2505.55	28.22	0.00	0.00	0.00	510.15	358.51	85.74
32	32	24.75	2505.55	28.16	0.00	0.00	0.00	510.16	358.51	85.73
32	33	26.00	2487.50	36.88	0.00	0.00	0.00	482.07	350.55	92.80
33	33	26.00	2487.50	36.88	0.00	0.00	0.00	482.04	350.55	92.81
33	34	27.25	2504.56	23.38	0.00	0.00	0.00	432.51	341.33	110.07
34	34	27.25	2504.56	23.36	0.00	0.00	0.00	432.49	341.32	110.08
34	35	28.50	2520.92	8.90	0.00	0.00	0.00	401.46	336.10	121.45
35	35	28.50	2520.92	8.92	0.00	0.00	0.00	401.48	336.11	121.44
35	36	29.75	2535.17	-6.33	0.00	0.00	0.00	391.43	335.30	126.00
36	36	29.75	2535.17	-6.37	0.00	0.00	0.00	391.43	335.30	126.00
36	37	31.00	2547.32	-22.21	0.00	0.00	0.00	403.45	339.13	123.42
37	37	31.00	2547.32	-22.18	0.00	0.00	0.00	403.43	339.13	123.42
37	38	32.25	2557.39	-38.43	0.00	0.00	0.00	437.97	347.72	113.54
38	38	32.25	2557.39	-38.42	0.00	0.00	0.00	437.96	347.72	113.55
38	39	33.50	2565.38	-54.92	0.00	0.00	0.00	495.15	361.09	96.34
39	39	33.50	2565.38	-54.92	0.00	0.00	0.00	495.14	361.08	96.34
39	40	34.75	2610.96	113.70	0.00	0.00	0.00	461.73	358.21	111.33
40	40	34.75	2610.96	113.73	0.00	0.00	0.00	461.73	358.21	111.33
40	41	36.00	2652.39	286.78	0.00	0.00	0.00	221.30	309.38	191.06
41	41	36.00	2652.40	286.77	0.00	0.00	0.00	221.31	309.39	191.06

41	42	37.25	2689.30	463.70	0.00	0.00	0.00	-234.86	212.65	338.22
42	42	37.25	2689.29	463.70	0.00	0.00	0.00	-234.86	212.65	338.22
42	43	38.50	2721.37	650.39	0.00	0.00	0.00	-802.00	24.38	403.62
43	43	38.50	2721.37	-483.52	0.00	0.00	0.00	-802.00	24.38	403.62
43	44	39.17	2749.95	-305.60	0.00	0.00	0.00	-524.94	83.64	331.87
44	44	39.17	2749.95	-305.59	0.00	0.00	0.00	-524.94	83.64	331.87
44	45	39.85	2771.52	-122.74	0.00	0.00	0.00	-370.48	117.07	292.26
45	45	39.85	2771.51	-122.73	0.00	0.00	0.00	-370.48	117.07	292.26
45	46	40.53	2785.61	61.22	0.00	0.00	0.00	-344.84	123.35	286.42
46	46	40.53	2785.61	61.20	0.00	0.00	0.00	-344.83	123.36	286.42
46	47	41.20	2791.67	242.26	0.00	0.00	0.00	-445.03	103.07	313.51
47	47	41.20	2791.67	242.27	0.00	0.00	0.00	-445.03	103.07	313.51
47	48	41.88	2805.73	204.64	0.00	0.00	0.00	-593.79	73.31	354.09
48	48	41.88	2805.74	204.62	0.00	0.00	0.00	-593.78	73.31	354.09
48	49	42.55	2817.91	166.55	0.00	0.00	0.00	-716.63	48.77	387.64
49	49	42.55	2817.91	166.58	0.00	0.00	0.00	-716.64	48.77	387.64
49	50	43.22	2828.34	127.63	0.00	0.00	0.00	-814.70	29.23	414.47
50	50	43.22	2828.34	127.62	0.00	0.00	0.00	-814.71	29.23	414.48
50	51	43.90	2828.52	86.40	0.00	0.00	0.00	-886.36	14.43	433.56
51	51	43.90	2828.53	86.40	0.00	0.00	0.00	-886.38	14.43	433.57
51	52	44.58	2816.64	44.22	0.00	0.00	0.00	-927.10	5.18	443.57
52	52	44.58	2816.64	44.25	0.00	0.00	0.00	-927.09	5.18	443.57
52	53	45.25	2802.83	3.20	0.00	0.00	0.00	-937.91	1.98	445.49
53	53	45.25	2802.83	3.16	0.00	0.00	0.00	-937.89	1.98	445.48
53	54	45.92	2786.96	-37.24	0.00	0.00	0.00	-920.13	4.55	439.65
54	54	45.92	2786.96	-37.25	0.00	0.00	0.00	-920.11	4.55	439.64
54	55	46.60	2768.74	-77.41	0.00	0.00	0.00	-873.53	12.90	425.97
55	55	46.60	2768.74	-77.37	0.00	0.00	0.00	-873.53	12.90	425.97
55	56	47.28	2756.87	-82.86	0.00	0.00	0.00	-814.74	24.23	409.49
56	56	47.28	2756.87	-82.90	0.00	0.00	0.00	-814.75	24.22	409.49
56	57	47.95	2744.33	-87.84	0.00	0.00	0.00	-753.23	36.06	392.24
57	57	47.95	2744.33	-87.80	0.00	0.00	0.00	-753.25	36.06	392.25
57	58	48.63	2730.78	-92.26	0.00	0.00	0.00	-687.70	48.66	373.85
58	58	48.63	2730.78	-92.29	0.00	0.00	0.00	-687.71	48.66	373.85
58	59	49.30	2716.63	-96.09	0.00	0.00	0.00	-620.71	61.52	355.03
59	59	49.30	2716.63	-96.05	0.00	0.00	0.00	-620.70	61.52	355.03
59	60	49.97	2701.72	-99.22	0.00	0.00	0.00	-551.97	74.68	335.69
60	60	49.97	2701.72	-99.21	0.00	0.00	0.00	-551.96	74.68	335.69
60	61	50.65	2688.82	-93.68	0.00	0.00	0.00	-482.12	88.22	316.20
61	61	50.65	2688.82	-93.67	0.00	0.00	0.00	-482.11	88.22	316.19
61	62	51.33	2686.20	-59.46	0.00	0.00	0.00	-429.43	98.92	301.99
62	62	51.33	2686.20	-59.48	0.00	0.00	0.00	-429.43	98.93	301.99
62	63	52.00	2683.62	-25.76	0.00	0.00	0.00	-400.43	104.74	294.09

Título: Fecha : 09/12/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + SOBRECARGA 3 (UN TREN) x 0.5 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H005 0.9 + H008 0.2775 + H011 0.555

(TENSION MINIMA 0 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FPREFI.ANL * 0.9) + (SOBREC3.ANL * 0.2775)
 + (SOBREC9.ANL * 0.555)]

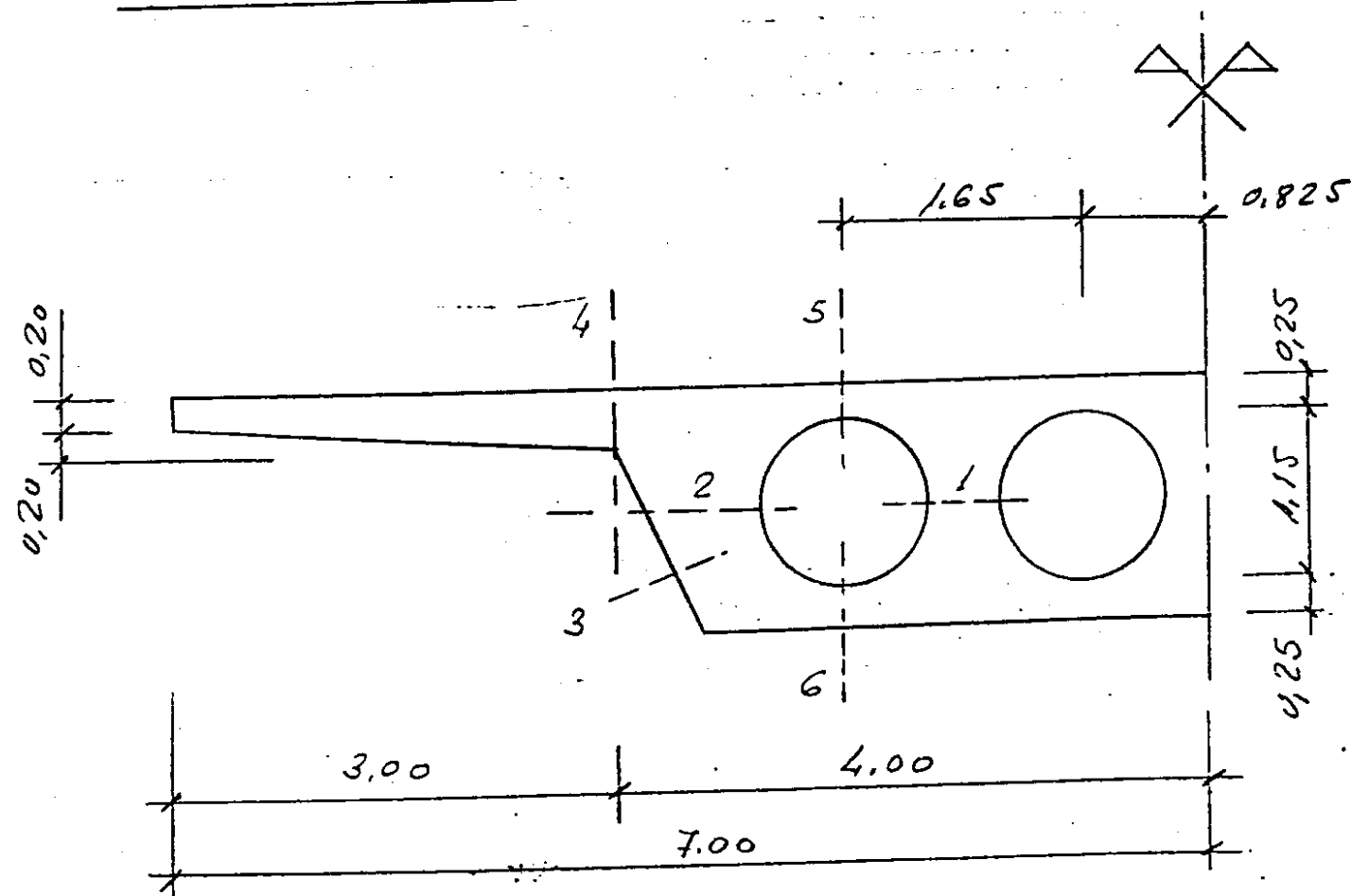
Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-60.86	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	-23.62	0.00	0.00	0.00	-371.01	111.01	286.45
4	4	0.68	2686.40	-23.61	0.00	0.00	0.00	-371.01	111.01	286.45
4	5	1.35	2688.98	18.65	0.00	0.00	0.00	-369.92	111.42	286.34
5	5	1.35	2688.97	18.65	0.00	0.00	0.00	-369.93	111.42	286.35
5	6	2.03	2701.57	33.78	0.00	0.00	0.00	-391.84	107.77	293.06
6	6	2.03	2701.58	33.77	0.00	0.00	0.00	-391.85	107.77	293.06
6	7	2.70	2716.13	40.35	0.00	0.00	0.00	-419.84	103.00	301.53
7	7	2.70	2716.13	40.35	0.00	0.00	0.00	-419.85	103.00	301.53
7	8	3.38	2730.15	46.40	0.00	0.00	0.00	-453.18	97.09	311.38
8	8	3.38	2730.15	46.40	0.00	0.00	0.00	-453.16	97.09	311.38
8	9	4.05	2743.20	51.78	0.00	0.00	0.00	-490.18	90.35	322.14
9	9	4.05	2743.20	51.80	0.00	0.00	0.00	-490.17	90.35	322.14
9	10	4.72	2755.47	56.67	0.00	0.00	0.00	-530.72	82.83	333.79
10	10	4.72	2755.48	56.65	0.00	0.00	0.00	-530.70	82.83	333.79
10	11	5.40	2767.11	61.11	0.00	0.00	0.00	-574.93	74.51	346.37
11	11	5.40	2767.10	61.10	0.00	0.00	0.00	-574.95	74.50	346.38
11	12	6.07	2785.45	28.97	0.00	0.00	0.00	-612.83	67.95	357.74
12	12	6.07	2785.44	29.01	0.00	0.00	0.00	-612.84	67.95	357.74
12	13	6.75	2801.89	-4.49	0.00	0.00	0.00	-627.80	66.01	362.88
13	13	6.75	2801.88	-4.54	0.00	0.00	0.00	-627.79	66.01	362.87
13	14	7.43	2816.13	-38.74	0.00	0.00	0.00	-618.33	68.96	361.35
14	14	7.43	2816.13	-38.72	0.00	0.00	0.00	-618.34	68.96	361.35
14	15	8.10	2827.99	-72.95	0.00	0.00	0.00	-584.66	76.75	353.22
15	15	8.10	2828.00	-72.92	0.00	0.00	0.00	-584.66	76.75	353.22
15	16	8.77	2828.28	-106.24	0.00	0.00	0.00	-525.76	88.94	337.56
16	16	8.77	2828.28	-106.25	0.00	0.00	0.00	-525.77	88.94	337.56
16	17	9.45	2817.53	-138.31	0.00	0.00	0.00	-443.10	105.28	314.80
17	17	9.45	2817.53	-138.32	0.00	0.00	0.00	-443.09	105.28	314.80
17	18	10.13	2804.93	-169.43	0.00	0.00	0.00	-340.00	125.71	286.48
18	18	10.13	2804.93	-169.45	0.00	0.00	0.00	-340.01	125.70	286.48
18	19	10.80	2790.76	-199.07	0.00	0.00	0.00	-219.74	149.57	253.48
19	19	10.80	2790.77	-199.06	0.00	0.00	0.00	-219.75	149.57	253.48
19	20	11.48	2784.06	9.74	0.00	0.00	0.00	-157.48	161.97	236.44

20	20	11.48	2784.05	9.75	0.00	0.00	0.00	-157.50	161.97	236.44
20	21	12.15	2769.99	201.89	0.00	0.00	0.00	-233.14	145.35	255.59
21	21	12.15	2769.99	201.89	0.00	0.00	0.00	-233.14	145.35	255.59
21	22	12.82	2748.43	406.81	0.00	0.00	0.00	-442.89	100.49	309.92
22	22	12.82	2748.44	406.81	0.00	0.00	0.00	-442.89	100.49	309.92
22	23	13.50	2718.87	598.35	0.00	0.00	0.00	-797.80	25.07	402.33
23	23	13.50	2718.87	-669.84	0.00	0.00	0.00	-797.80	25.07	402.33
23	24	14.75	2687.22	-466.92	0.00	0.00	0.00	-213.78	217.08	331.39
24	24	14.75	2687.21	-466.92	0.00	0.00	0.00	-213.78	217.08	331.39
24	25	16.00	2650.93	-273.64	0.00	0.00	0.00	243.78	314.19	183.84
25	25	16.00	2650.93	-273.64	0.00	0.00	0.00	243.79	314.19	183.84
25	26	17.25	2610.30	-97.96	0.00	0.00	0.00	466.41	359.18	109.79
26	26	17.25	2610.31	-97.97	0.00	0.00	0.00	466.42	359.18	109.79
26	27	18.50	2565.67	73.46	0.00	0.00	0.00	478.50	357.45	101.60
27	27	18.50	2565.67	73.47	0.00	0.00	0.00	478.50	357.45	101.60
27	28	19.75	2557.66	63.33	0.00	0.00	0.00	394.16	338.11	127.35
28	28	19.75	2557.66	63.31	0.00	0.00	0.00	394.15	338.10	127.36
28	29	21.00	2547.66	53.40	0.00	0.00	0.00	324.52	321.80	148.29
29	29	21.00	2547.65	53.43	0.00	0.00	0.00	324.49	321.79	148.30
29	30	22.25	2535.63	43.90	0.00	0.00	0.00	269.40	308.49	164.45
30	30	22.25	2535.64	43.91	0.00	0.00	0.00	269.38	308.49	164.45
30	31	23.50	2521.60	34.98	0.00	0.00	0.00	228.28	298.07	176.01
31	31	23.50	2521.59	35.01	0.00	0.00	0.00	228.31	298.07	176.00
31	32	24.75	2505.55	26.84	0.00	0.00	0.00	200.25	290.32	183.25
32	32	24.75	2505.55	26.78	0.00	0.00	0.00	200.26	290.32	183.25
32	33	26.00	2487.50	19.54	0.00	0.00	0.00	183.87	284.94	186.63
33	33	26.00	2487.50	19.54	0.00	0.00	0.00	183.85	284.94	186.64
33	34	27.25	2504.56	0.49	0.00	0.00	0.00	159.45	281.25	195.99
34	34	27.25	2504.56	0.47	0.00	0.00	0.00	159.44	281.24	196.00
34	35	28.50	2520.92	-19.54	0.00	0.00	0.00	160.49	283.08	197.27
35	35	28.50	2520.92	-19.52	0.00	0.00	0.00	160.51	283.09	197.27
35	36	29.75	2535.17	-40.31	0.00	0.00	0.00	189.47	290.86	189.55
36	36	29.75	2535.17	-40.36	0.00	0.00	0.00	189.47	290.86	189.55
36	37	31.00	2547.32	-61.74	0.00	0.00	0.00	247.44	304.81	172.51
37	37	31.00	2547.32	-61.71	0.00	0.00	0.00	247.42	304.81	172.51
37	38	32.25	2557.39	-83.51	0.00	0.00	0.00	334.85	325.03	145.99
38	38	32.25	2557.39	-83.51	0.00	0.00	0.00	334.85	325.03	145.99
38	39	33.50	2565.38	-105.56	0.00	0.00	0.00	451.87	351.56	109.96
39	39	33.50	2565.38	-105.56	0.00	0.00	0.00	451.86	351.56	109.96
39	40	34.75	2610.96	57.51	0.00	0.00	0.00	485.21	363.38	103.95
40	40	34.75	2610.96	57.54	0.00	0.00	0.00	485.22	363.38	103.94
40	41	36.00	2652.39	225.04	0.00	0.00	0.00	318.49	330.77	160.48
41	41	36.00	2652.40	225.03	0.00	0.00	0.00	318.50	330.77	160.48

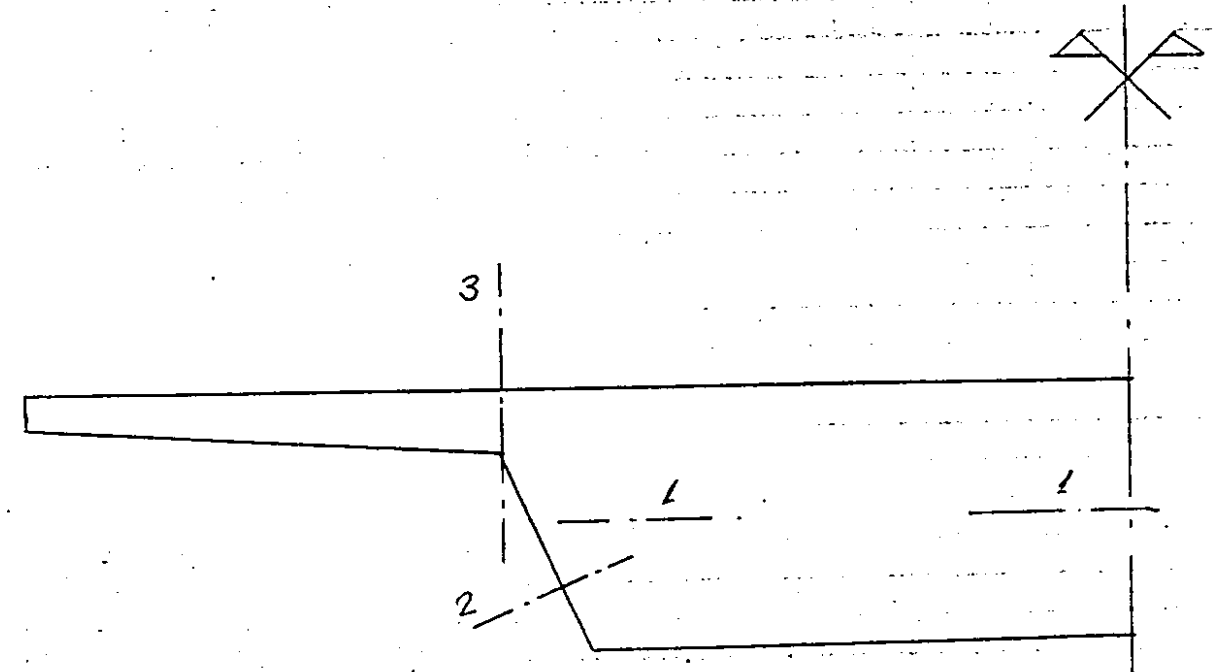
41	42	37.25	2689.30	396.41	0.00	0.00	0.00	-57.03	251.77	282.27
42	42	37.25	2689.29	396.41	0.00	0.00	0.00	-57.03	251.77	282.27
42	43	38.50	2721.37	577.55	0.00	0.00	0.00	-536.59	79.23	332.97
43	43	38.50	2721.37	-463.86	0.00	0.00	0.00	-536.59	79.23	332.97
43	44	39.17	2749.95	-285.94	0.00	0.00	0.00	-272.70	135.77	264.73
44	44	39.17	2749.95	-285.93	0.00	0.00	0.00	-272.70	135.77	264.73
44	45	39.85	2771.52	-103.09	0.00	0.00	0.00	-131.62	166.44	228.68
45	45	39.85	2771.51	-103.08	0.00	0.00	0.00	-131.62	166.44	228.68
45	46	40.53	2785.61	80.87	0.00	0.00	0.00	-119.34	169.96	226.39
46	46	40.53	2785.61	80.86	0.00	0.00	0.00	-119.33	169.96	226.39
46	47	41.20	2791.67	261.92	0.00	0.00	0.00	-232.70	146.95	256.99
47	47	41.20	2791.67	261.93	0.00	0.00	0.00	-232.70	146.95	256.99
47	48	41.88	2805.73	224.30	0.00	0.00	0.00	-394.83	114.43	301.13
48	48	41.88	2805.74	224.28	0.00	0.00	0.00	-394.83	114.43	301.13
48	49	42.55	2817.91	186.22	0.00	0.00	0.00	-530.84	87.17	338.19
49	49	42.55	2817.91	186.23	0.00	0.00	0.00	-530.85	87.17	338.19
49	50	43.22	2828.34	147.29	0.00	0.00	0.00	-642.09	64.90	368.53
50	50	43.22	2828.34	147.27	0.00	0.00	0.00	-642.10	64.90	368.53
50	51	43.90	2828.52	106.06	0.00	0.00	0.00	-727.12	47.34	391.17
51	51	43.90	2828.53	106.06	0.00	0.00	0.00	-727.13	47.34	391.18
51	52	44.58	2816.64	63.88	0.00	0.00	0.00	-781.22	35.33	404.74
52	52	44.58	2816.64	63.91	0.00	0.00	0.00	-781.21	35.33	404.74
52	53	45.25	2802.83	22.86	0.00	0.00	0.00	-805.20	29.41	410.16
53	53	45.25	2802.83	22.83	0.00	0.00	0.00	-805.19	29.41	410.16
53	54	45.92	2786.96	-17.57	0.00	0.00	0.00	-800.60	29.25	407.83
54	54	45.92	2786.96	-17.59	0.00	0.00	0.00	-800.58	29.25	407.82
54	55	46.60	2768.74	-57.74	0.00	0.00	0.00	-767.36	34.85	397.71
55	55	46.60	2768.74	-57.72	0.00	0.00	0.00	-767.37	34.85	397.71
55	56	47.28	2756.87	-63.21	0.00	0.00	0.00	-721.94	43.40	384.79
56	56	47.28	2756.87	-63.23	0.00	0.00	0.00	-721.95	43.40	384.79
56	57	47.95	2744.33	-68.17	0.00	0.00	0.00	-673.61	52.52	371.05
57	57	47.95	2744.33	-68.14	0.00	0.00	0.00	-673.63	52.52	371.05
57	58	48.63	2730.78	-72.60	0.00	0.00	0.00	-621.44	62.35	356.21
58	58	48.63	2730.78	-72.63	0.00	0.00	0.00	-621.45	62.35	356.22
58	59	49.30	2716.63	-76.43	0.00	0.00	0.00	-567.62	72.49	340.90
59	59	49.30	2716.63	-76.39	0.00	0.00	0.00	-567.62	72.49	340.90
59	60	49.97	2701.72	-79.56	0.00	0.00	0.00	-512.06	82.93	325.07
60	60	49.97	2701.72	-79.56	0.00	0.00	0.00	-512.05	82.93	325.07
60	61	50.65	2688.82	-74.02	0.00	0.00	0.00	-455.57	93.71	309.13
61	61	50.65	2688.82	-74.01	0.00	0.00	0.00	-455.56	93.71	309.13
61	62	51.33	2686.20	-39.81	0.00	0.00	0.00	-416.26	101.65	298.48
62	62	51.33	2686.20	-39.82	0.00	0.00	0.00	-416.26	101.65	298.48
62	63	52.00	2683.62	-6.11	0.00	0.00	0.00	-400.43	104.74	294.09

CALCULO A ROTURA Y FISURACION

Secciones de cálculo



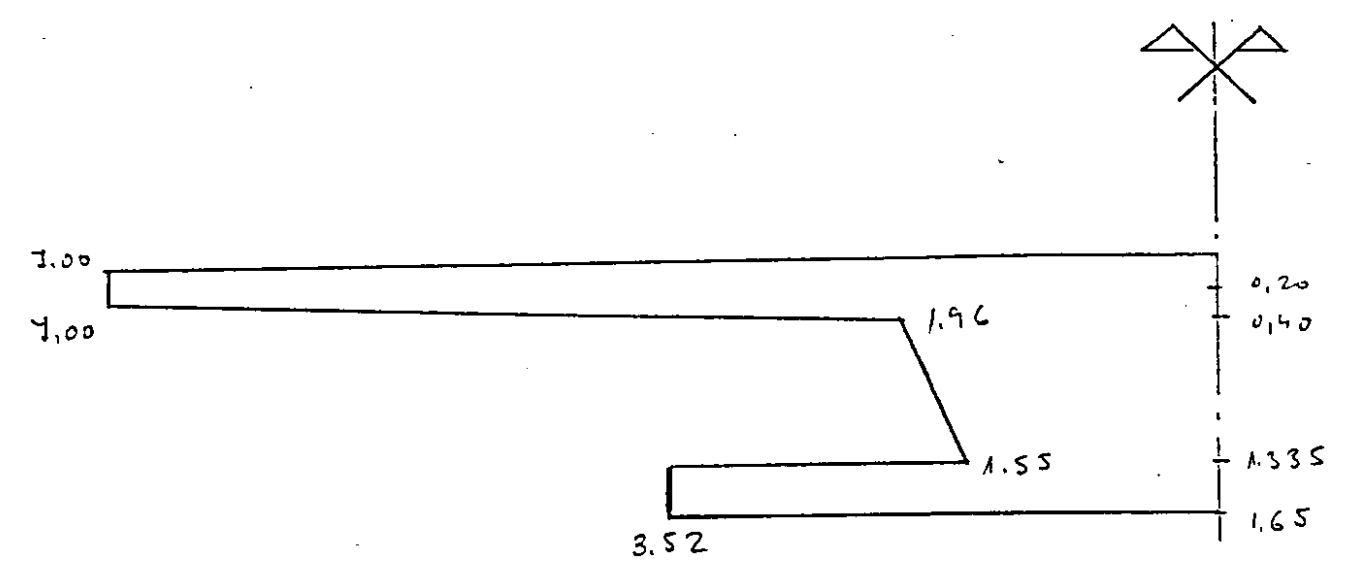
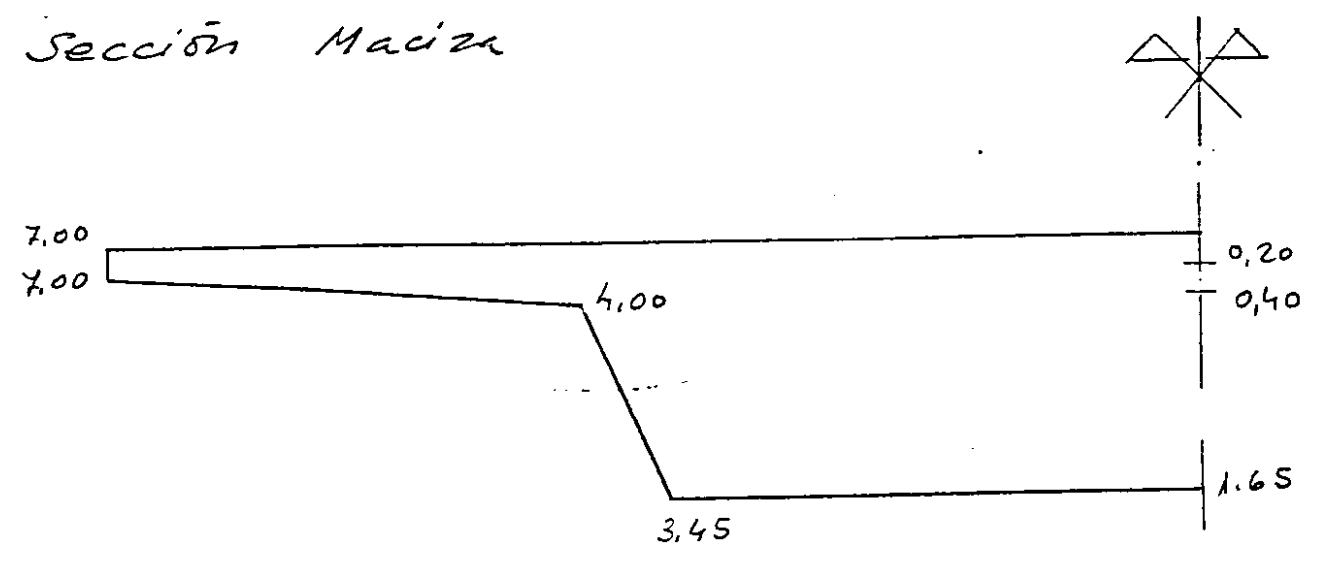
VANO 2



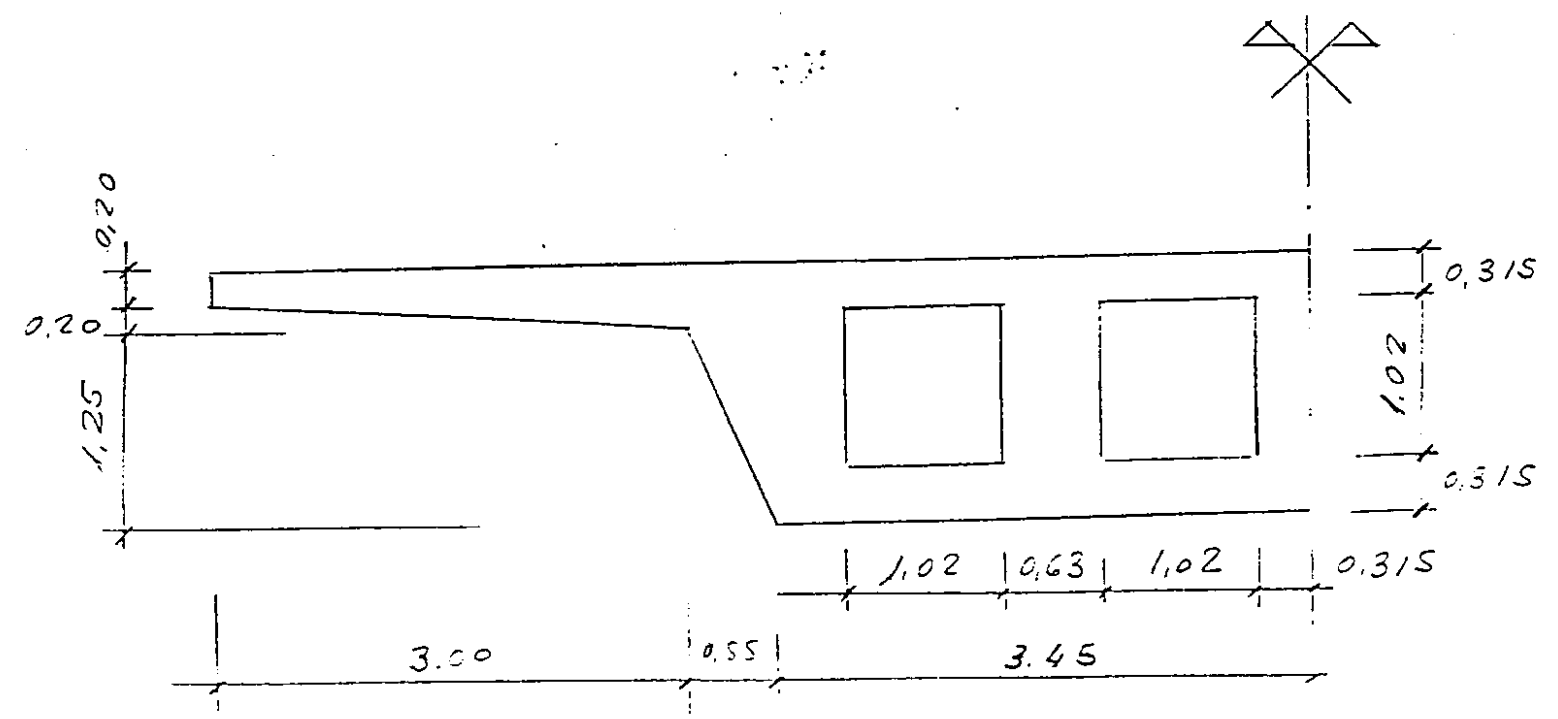
VANOS 1 y 3

COMPROBACION A ROTURA POR FLEXION

Sección Maciza



Sección Aligerada



VIADUCTO
SECCION 04 VANO 1

19 NOV 1999

PROPIEDADES DE LOS HORMIGONES
FCK LOSA KG/CM2 400.00 GHV 1.50

ACERO DE DUREZA NATURAL
FYK ACERO PASIVO (KG/CM2) 5100.00 GS 1.15
MOD. ELASTICIDAD (KG/CM2) 2100000.0

ACERO PRETENSADO, CURVA TENSION-DEFORMACION DE LA INSTRUCCION
FPK (KG/CM2) 17100.0 GSP 1.15
MOD.ELASTIC. 2000000.0 MAX.DEF.ROTURA .0000

CARACTERISTICAS GEOMETRICAS,PARAMETROS

4.0000	.0000	3.0000	.0000	3.4500
.0000	.0000	.0000	.2000	.2000
.0000	1.2500	.0000	.0000	.0000
.0000	.0000	.0300	.0000	.0000

CARACTERISTICAS MECANICAS

T	S	IFR	AREA	WS	WI	VS	VI
A	2	14.313000	4.839000	3.756000	.721000	.929000	

DATOS ARMADURA PASIVA

ORDENADAS M	.050	.000	.000	.000
SECCIONES CM2	.000	.000	.000	.000

DATOS ARMADURA PRETENSADO

ORDENADAS M	.620	.400
SECCIONES CM2	132.40	132.40
FUERZAS TON	1556.440	1518.120

SOLICITACIONES EXTERIORES (M.TON.)
COEFICIENTES DE SEGURIDAD

M.PP.	M.SOBR.	M.SUPER.	M.HIP.PRET.	
294.99	600.96	52.38	166.28	
	GSC		GCP	GPR(FISUR)
	1.50		1.50	.90

TENSIONES ANTERIORES A NEUTRALIZACION KG/CM2

SS	5.53	SI	42.03	C.ROTURA
XS	5.69	XI	36.90	C.FISURACION (PRET.POND.)

DEFORMACIONES TENDONES
ANTERIORES A NEUTRALIZACION INCREMENTO AL NEUTRALIZAR

.005878	.000075
.005733	.000087

FALLO DEL ACERO

ALTURA DE LA FIBRA NEUTRA EN ROTURA 1.425

DEFORMACIONES TOTALES DE LOS TENDONES EN ROTURA

-.1160E-01
-.1301E-01

DEFORMACIONES EN EL HORMIGON EN ROTURA

DS .1576E-02
DI -.1000E-01

RESULTANTE DE TRACCION (TON) -4142.42
RESULTANTE DE COMPRESION (TON) 4143.10

MOMENTO DE ROTURA (M*TON) 4388.20
MOMENTO DE CALCULO (M*TON) 1671.92

DEFORMACIONES TENDONES
ANTERIORES A NEUTRALIZACION INCREMENTO AL NEUTRALIZAR

.005290	.000066
.005160	.000077

VIADUCTO
SECCION PILA 1

19 NOV 1999

PROPIEDADES DE LOS HORMIGONES
FCK LOSA KG/CM2 400.00 GHV 1.50

ACERO DE DUREZA NATURAL
FYK ACERO PASIVO (KG/CM2) 5100.00 GS 1.15
MOD. ELASTICIDAD (KG/CM2) 2100000.0

ACERO PRETENSADO, CURVA TENSION-DEFORMACION DE LA INSTRUCCION
FPK (KG/CM2) 17100.0 GSP 1.15
MOD.ELASTIC. 2000000.0 MAX.DEF.ROTURA .0000

CARACTERISTICAS GEOMETRICAS, PARAMETROS

3.4500	.0000	.0000	.0000	4.0000
.0000	.2000	.0000	.0000	.0000
.0000	1.2500	.0000	.2000	.2000
.0000	.0000	.0300	.0000	.0000

CARACTERISTICAS MECANICAS

T	S	IFR	AREA	WS	WI	VS	VI
A	2	10.158000	3.176000	4.538000	.971000	.679000	

DATOS ARMADURA PASIVA

ORDENADAS M	.050	.000	.000	.000
SECCIONES CM2	.000	.000	.000	.000

DATOS ARMADURA PRETENSADO

ORDENADAS M	.165	.385
SECCIONES CM2	132.40	132.40
FUERZAS TON	1493.330	1527.640

SOLICITACIONES EXTERIORES (M.TON.)
COEFICIENTES DE SEGURIDAD

M.PP.	M.SOBR.	M.SUPER.	M.HIP.PRET.	
1207.50	1293.38	642.57	-415.70	
	GSC		GCP	GPR(FISURA)
	1.50		1.50	.90

TENSIONES ANTERIORES A NEUTRALIZACION KG/CM2

SS	23.65	SI	19.13	C.ROTURA
XS	26.21	XI	13.39	C.FISURACION (PRET.POND.)

DEFORMACIONES TENDONES
ANTERIORES A NEUTRALIZACION INCREMENTO AL NEUTRALIZAR

.005639	.000052
.005769	.000053

FALLO DEL ACERO

ALTURA DE LA FIBRA NEUTRA EN ROTURA 1.299

DEFORMACIONES TOTALES DE LOS TENDONES EN ROTURA

-.1442E-01
-.1286E-01

DEFORMACIONES EN EL HORMIGON EN ROTURA

DS .2702E-02
DI -.1000E-01

RESULTANTE DE TRACCION (TON) -4210.35
RESULTANTE DE COMPRESION (TON) 4210.38

MOMENTO DE ROTURA (M*TON) 5201.87
MOMENTO DE CALCULO (M*TON) 4091.63

DEFORMACIONES TENDONES
ANTERIORES A NEUTRALIZACION INCREMENTO AL NEUTRALIZAR

.005076	.000039
.005192	.000043

INCREMENTO TENSION EN ARMADURA 154.238 KG/CM2
POSICION FIBRA NEUTRA EN SECCION FISURADA .52
RESULTANTE DE TRACCION TON. -2760.72
RESULTANTE DE COMPRESION TON. 2760.72

ABERTURA MAXIMA DE FISURAS
CARGAS NO REPETITIVAS, WMAX -.2458E-01
CARGAS REPETITIVAS , WMAX1 .1542E-01

VIADUCTO
SECCION 05 VANO 2

19 NOV 1999

DEFORMACIONES TENDONES
ANTERIORES A NEUTRALIZACION INCREMENTO AL NEUTRALIZAR
.005159 .000085
.005279 .000090

FALLO DEL ACERO

ALTURA DE LA FIBRA NEUTRA EN ROTURA 1.424

DEFORMACIONES TOTALES DE LOS TENDONES EN ROTURA
-.1254E-01
-.1421E-01

DEFORMACIONES EN EL HORMIGON EN ROTURA
DS .1590E-02
DI -.1000E-01
DSF .1484E-02
DIF .1484E-02

RESULTANTE DE TRACCION (TON) -4197.40
RESULTANTE DE COMPRESION (TON) 4197.46

MOMENTO DE ROTURA (M*TON) 5429.09
MOMENTO DE CALCULO (M*TON) 4468.81

DEFORMACIONES TENDONES
ANTERIORES A NEUTRALIZACION INCREMENTO AL NEUTRALIZAR
.004643 .000070
.004751 .000072

INCREMENTO TENSION EN ARMADURA 225.166 KG/CM2
POSICION FIBRA NEUTRA EN SECCION FISURADA .70
RESULTANTE DE TRACCION TON. -2562.44
RESULTANTE DE COMPRESION TON. 2562.41

ABERTURA MAXIMA DE FISURAS
CARGAS NO REPETITIVAS, WMAX -.1748E-01
CARGAS REPETITIVAS, WMAX1 .2252E-01

PROPIEDADES DE LOS HORMIGONES
FCK LOSA KG/CM2 400.00 GHV 1.50

ACERO DE DUREZA NATURAL
FYK ACERO PASIVO (KG/CM2) 5100.00 GS 1.15
MOD. ELASTICIDAD (KG/CM2) 2100000.0

ACERO PRETENSADO, CURVA TENSION-DEFORMACION DE LA INSTRUCCION
FPK (KG/CM2) 17100.0 GSP 1.15
MOD.ELASTIC. 2000000.0 MAX.DEF.ROTURA .0000

CARACTERISTICAS GEOMETRICAS, PARAMETROS

1.9600	.0000	5.0400	.0000	1.5500
.0000	.0000	1.9700	.2000	.2000
.0000	.9350	.0000	.0000	.3150
.0000	.0000	.0300	.0000	.0000

CARACTERISTICAS MECANICAS
T S IFR AREA WS WI VS VI
A 2 10.158000 4.538000 3.173000 .679000 .971000

DATOS ARMADURA PASIVA
ORDENADAS M .050 .000 .000 .000
SECCIONES CM2 .000 .000 .000 .000

DATOS ARMADURA PRETENSADO
ORDENADAS M .385 .165
SECCIONES CM2 132.40 132.40
FUERZAS TON 1366.090 1397.800

SOLICITACIONES EXTERIORES (M.TON.)
COEFICIENTES DE SEGURIDAD

M.PP.	M.SOBR.	M.SUPER.	M.HIP.PRET.	
782.36	1312.00	469.15	415.70	
	GSC		GCP	GPR(FISUR)
	1.50		1.50	.90

TENSIONES ANTERIORES A NEUTRALIZACION KG/CM2
SS 21.31 SI 35.54 C.ROTURA
XS 21.93 XI 28.05 C.FISURACION (PRET.POND.)

CALCULO A CORTANTE Y TORSION

CARACTERISTICAS MECANICAS - DATOS DE ENTRADA (VANOS EXTREMOS)

SECCION CONSTANTE

PARAMETROS VERTICALES
.200 .200 1.250 .000 .000 .000 .825 .000 .000

SIMETRIA PARAMETROS VERTICALES

PARAMETROS HORIZONTALES
4.525 2.475 .000 3.000 .550 3.450 .000 .000 .000 .000 .000

PARAMETROS HORIZONTALES
99.000 .000 .000 .000 .000 .000 .000 .000 .000 .000

SIMETRIA PARAMETROS HORIZONTALES

CARACTERISTICAS MECANICAS - SALIDA DE RESULTADOS (VANOS EXTREMOS)

CARACTERISTICAS DE FLEXION

SECC.	VANO	AREA	INERCIA	VS	VI	VS/I	VI/I	CS	CI	RENDIM.
.00	1	14.313	3.487	.721	.929	.207	.266	.262	.338	.364

CARACTERISTICA DE CORTANTE (ME/BI)

VANO 1 SEC.LONG. 0.00

S.TRANS.

1	.000
2	.365
3	-.125
4	-.125
5	.000
6	.365
7	-.125
8	-.125
9	.115
10	.022
11	.022
12	.000
13	.000
14	.022
15	.022
16	.000
17	.000
18	.000
19	.000
20	.000
21	.115

ESPESORES (B)

VANO 1 SEC.LONG. 0.00

S.TRANS.

1	.200
2	.400
3	.825
4	.825
5	.200
6	.400
7	.825
8	.825
9	7.626
10	.825
11	.825
12	.000
13	.000
14	.825
15	.825
16	.000
17	.000
18	.000
19	.000
20	.000
21	7.626

CARACTERISTICAS MECANICAS - DATOS DE ENTRADA (VANO CENTRAL)

SECCION CONSTANTE

PARAMETROS VERTICALES
 .200 .200 1.250 4.000 .000 .000 .825 .000 1.150

SIMETRIA PARAMETROS VERTICALES

PARAMETROS HORIZONTALES
 4.525 2.475 .000 3.000 .550 3.450 .000 .000 .000 .000 .000

PARAMETROS HORIZONTALES
 99.000 .000 .000 .000 .000 .000 .000 .000 .000 .000

SIMETRIA PARAMETROS HORIZONTALES

CARACTERISTICAS MECANICAS - SALIDA DE RESULTADOS (VANO CENTRAL)

CARACTERISTICAS DE FLEXION

SECC.	VANO	AREA	INERCIA	VS	VI	VS/I	VI/I	CS	CI	RENDIM.
.00	1	10.158	3.081	.679	.971	.220	.315	.312	.447	.460

CARACTERISTICA DE CORTANTE (ME/BI)

VANO 1 SEC.LONG. 0.00

S.TRANS.

1	.000
2	.382
3	-.065
4	-.328
5	.000
6	.382
7	-.065
8	-.328
9	.268
10	.496
11	.071
12	.000
13	.000
14	.496
15	.071
16	.000
17	.000
18	.000
19	.000
20	.000
21	.268

ESPESORES (B)

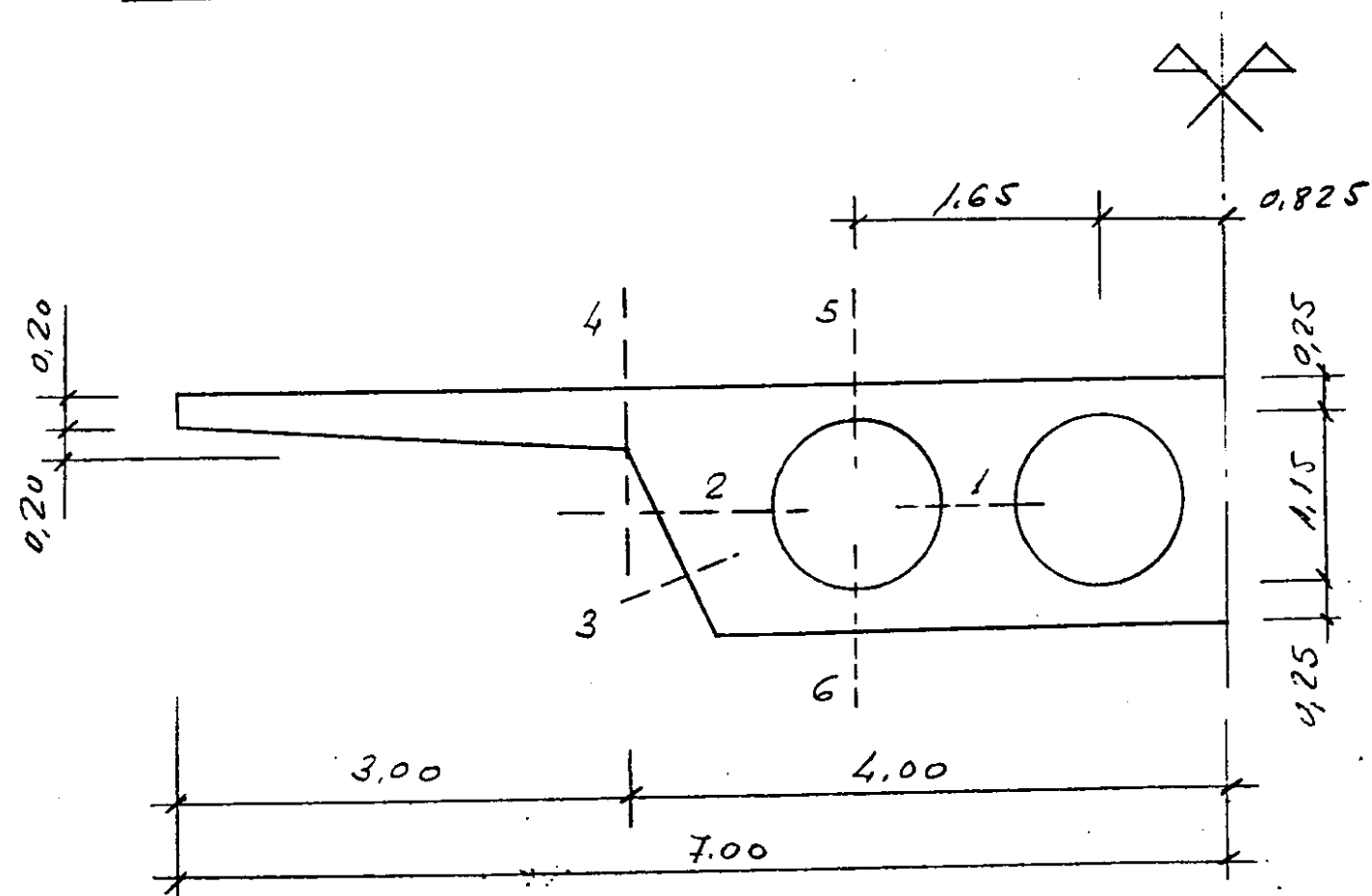
VANO 1 SEC.LONG. 0.00

S.TRANS.

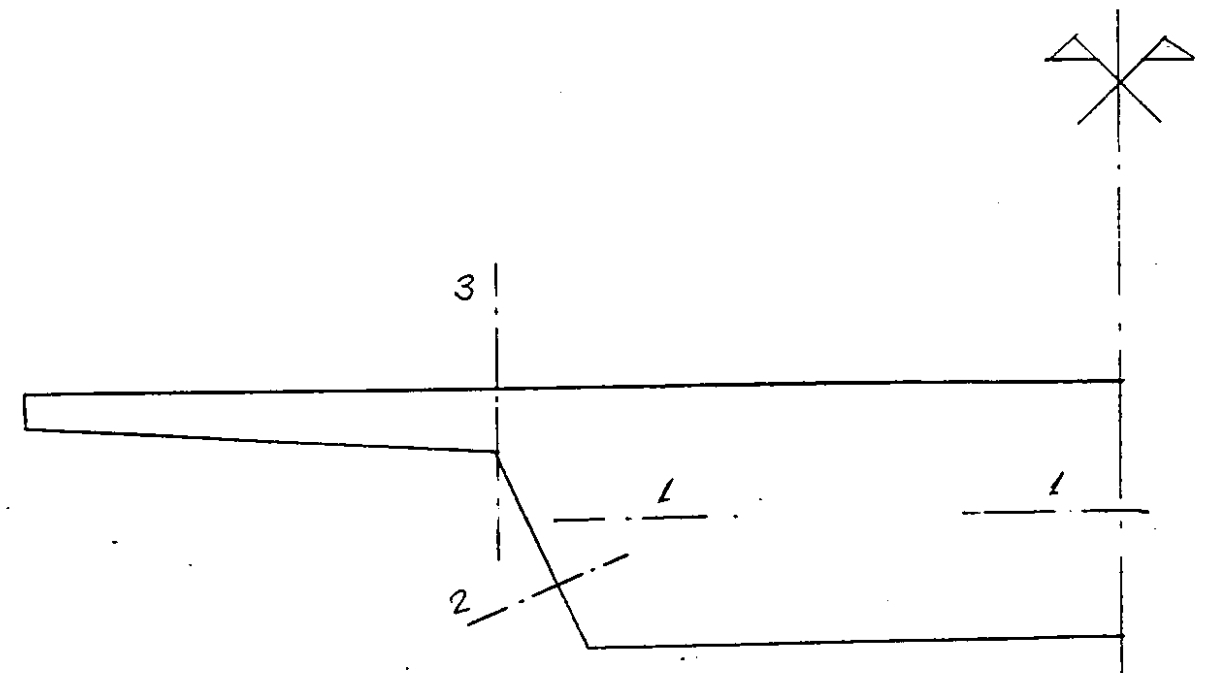
1	.200
2	.400
3	.250
4	.250
5	.200
6	.400
7	.250
8	.250
9	3.026
10	.250
11	.250
12	.000
13	.000
14	.250
15	.250
16	.000
17	.000
18	.000
19	.000
20	.000
21	3.026

OBJETO HOJA Nº DE
 PROYECTO Nº
 CALCULADO POR COMPROBADO POR FECHA

Secciones de cálculo



VANO 2



VANOS 1 Y 3

Torques unitarios

2 frenes:

Fuerza centrífuga $M = 0,504 \times 1,457 = 0,734 \text{ mt/m}$

Viento $M = 1,32 \times 2,329 = 3,074 \text{ ''}$

Ripado $M = \underline{7,58 \text{ ''}}$

Total = 11,388 ''

$M_2 = (0,734 + 7,58) \times 1,15 + 3,074 = 12,635 \text{ mt/m}$

1 tren:

Fuerza centrífuga $M = 0,252 \times 1,457 = 0,367 \text{ mt/m}$

Viento $M = 1,32 \times 2,329 = 3,074 \text{ ''}$

Ripado $M = \underline{3,98 \text{ ''}}$

Total = 7,421 ''

$M_2 = (0,367 + 3,98) \times 1,15 + 3,074 = 8,073 \text{ mt/m}$

Excentricidad

$M = 12 \times 2,25 \times 1,15 = 31,05 \text{ mt/m}$

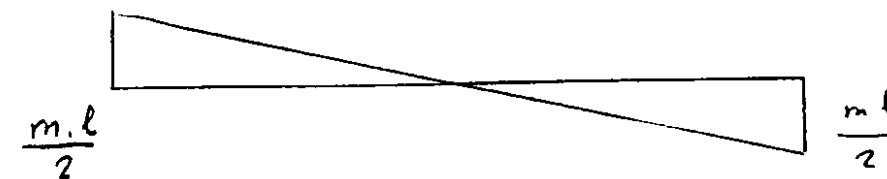
$0,25 \times 1,55 \times 5,925 = 2,30 \text{ ''}$

Total 33,35 mt/m

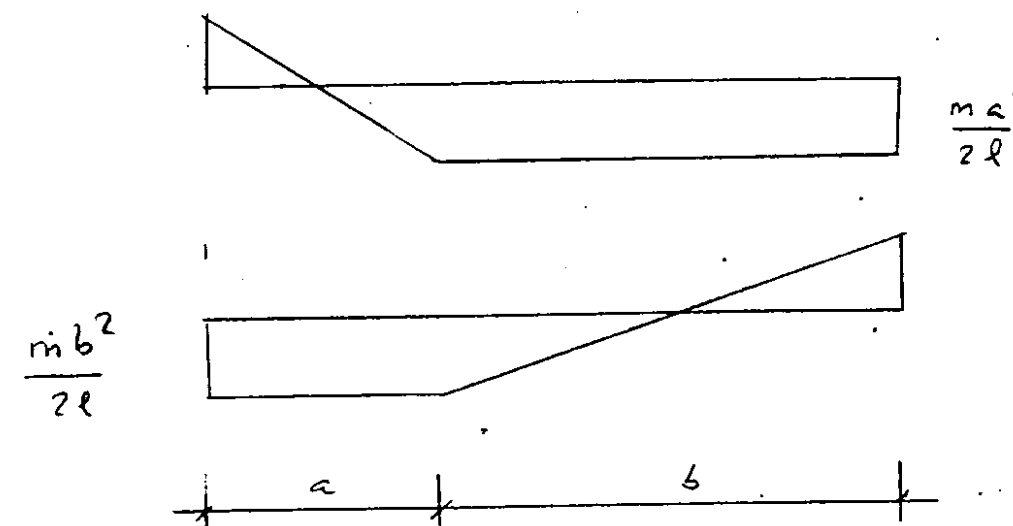
Torsor adicional concentrado

Efecto lazo $5 \times 1,46 \times 1,15 = 8,395 \text{ mt}$

Distribución torques unitarios



Distribución torques de excentricidad



$$M = \frac{m}{2l} (a^2 + b^2)$$

Estas leyes de distribución suponen empotramiento perfecto a torsión en los apoyos.

O.F. 556-1

FCK	FCTK	FYK		GC	GS	GFCP	GFCP2	GFSC
400.	24.	5100.	KG/CM2	1.50	1.15	1.50	.90	1.50

SECCION 00 VANO 1

INERCIA	VI	CANTO
3.4870	.929	1.650

CARACTERISTICAS SECCIONES TRANSVERSALES

ICH	IAL	DI	FV	FT	BV	BT	NTR	NTS
0	1	.929	.1150	.0000	7.080	1.000	.0	.0
0	1	.929	.1150	.1940	.273	.250	.0	.0
0	0	1.450	.3820	.0000	.400	1.000	.0	.0

O.F. 556-1

SECCION 00 VANO 1

ESFUERZOS

				SOBRECARGA			
	P. PROPIO	C. PERMAN.	PRETENSADO	CORT. MAX.	CORT. MIN.	TORSOR MAX.	MOME. MAX.
MOMENTOS	.00	.00	-431.89	.00	.00	.00	.00
CORTANTES	-152.64	-48.68	205.98	81.50	-167.58	-83.64	
TORSORES	.00	.00	.00	89.49	89.49	283.90	

TENSIONES DE PRETENSADO: SUPERIOR 119.08 INFERIOR 323.31 T/M2

HIPOTESIS DE CORTANTE MAXIMO

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.02	.00	.00	134.86	.00 CM2/M	9.91	208.79	-.47 T/M2
2	.08	.00	1.55	5.20	.00 CM2/M	27.27	211.83	-3.51 T/M2
3	.07	.00	.00	7.62	.00 CM2/M	32.91	150.97	-7.18 T/M2

HIPOTESIS DE CORTANTE MINIMO

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.05	.00	.00	134.86	.00 CM2/M	18.74	209.99	-1.67 T/M2
2	.11	.00	1.55	5.20	.00 CM2/M	36.10	214.40	-6.08 T/M2
3	.17	3.86	.00	7.62	.00 CM2/M	62.24	166.99	-23.19 T/M2

HIPOTESIS DE TORSION MAXIMA

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.03	.00	.00	134.86	.00 CM2/M	9.08	208.72	-.40 T/M2
2	.22	.00	4.92	5.20	.00 CM2/M	64.16	226.50	-18.17 T/M2
3	.11	.22	.00	7.62	.00 CM2/M	30.17	149.87	-6.07 T/M2

O.F. 556-1

SECCION 03 VANO 1

ESFUERZOS				SOBRECARGA				
	P. PROPIO	C. PERMAN.	PRETENSADO	CORT. MAX.	CORT. MIN.	TORSOR MAX.	MOME. MAX.	MOME. MIN.
MOMENTOS	317.17	77.43	-1092.23	-101.07	257.71	225.55	451.10	-328.34
CORTANTES	-7.72	8.95	54.92	80.85	-63.65	-27.74		
TORSORES	.00	.00	.00	38.32	38.32	158.31		

TENSIONES DE PRETENSADO: SUPERIOR -12.79 INFERIOR 503.69 T/M2

HIPOTESIS DE CORTANTE MAXIMO

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.03	.00	.00	134.86	.00 CM2/M	15.76	214.06	-1.16 T/M2
2	.05	.00	.66	5.20	.00 CM2/M	23.19	215.39	-2.50 T/M2
3	.09	.00	.00	7.62	.00 CM2/M	52.33	116.97	-23.41 T/M2

HIPOTESIS DE CORTANTE MINIMO

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.00	.00	.00	134.86	.00 CM2/M	.86	212.90	-.00 T/M2
2	.03	.00	.66	5.20	.00 CM2/M	8.30	213.22	-.32 T/M2
3	.02	.00	.00	7.62	.00 CM2/M	2.87	147.22	-.06 T/M2

HIPOTESIS DE TORSION MAXIMA

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.00	.00	.00	134.86	.00 CM2/M	3.27	212.95	-.05 T/M2
2	.10	.00	2.74	5.20	.00 CM2/M	33.98	218.19	-5.29 T/M2
3	.00	.00	.00	7.62	.00 CM2/M	10.85	143.18	-.82 T/M2

O.F. 556-1

SECCION 05 VANO 1

ESFUERZOS				SOBRECARGA				
	P. PROPIO	C. PERMAN.	PRETENSADO	CORT. MAX.	CORT. MIN.	TORSOR MAX.	MOME. MAX.	MOME. MIN.
MOMENTOS	207.61	1.39	-983.86	-171.44	83.41	-8.97	500.33	-547.24
CORTANTES	88.89	47.34	-195.98	118.56	-12.36	47.91		
TORSORES	.00	.00	.00	4.20	4.20	116.76		

TENSIONES DE PRETENSADO: SUPERIOR 14.17 INFERIOR 479.40 T/M2

HIPOTESIS DE CORTANTE MAXIMO

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.03	.00	.00	134.86	.00 CM2/M	6.76	217.67	-.21 T/M2
2	.03	.00	.07	5.20	.00 CM2/M	7.58	217.73	-.26 T/M2
3	.09	.00	.00	7.62	.00 CM2/M	22.47	82.21	-6.14 T/M2

HIPOTESIS DE CORTANTE MINIMO

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.01	.00	.00	134.86	.00 CM2/M	8.29	217.78	-.32 T/M2
2	.02	.00	.07	5.20	.00 CM2/M	9.11	217.84	-.38 T/M2
3	.04	.00	.00	7.62	.00 CM2/M	27.55	120.45	-6.30 T/M2

HIPOTESIS DE TORSION MAXIMA

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.01	.00	.00	134.86	.00 CM2/M	1.36	217.47	-.00 T/M2
2	.09	.00	2.02	5.20	.00 CM2/M	24.01	220.08	-2.62 T/M2
3	.04	.00	.00	7.62	.00 CM2/M	4.52	100.55	-.20 T/M2

O.F. 556-1

SECCION 07 VANO 1

ESFUERZOS			SOBRECARGA					
	P. PROPIO	C. PERMAN.	PRETENSADO	CORT. MAX.	CORT. MIN.	TORSOR MAX.	MOME. MAX.	MOME. MIN.
MOMENTOS	-162.81	-178.39	-8.85	-378.76	-230.74	-188.61	348.36	-766.14
CORTANTES	185.49	85.50	-532.95	170.49	24.40	85.16		
TORSORES	.00	.00	.00	38.32	38.32	158.31		

TENSIONES DE PRETENSADO: SUPERIOR 216.90 INFERIOR 221.09 T/M2

HIPOTESIS DE CORTANTE MAXIMO

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.02	.00	.00	134.86	.00 CM2/M	10.52	219.24	-.50 T/M2
2	.04	.00	.66	5.20	.00 CM2/M	17.95	220.19	-1.46 T/M2
3	.06	.00	.00	7.62	.00 CM2/M	34.94	120.01	-10.17 T/M2

HIPOTESIS DE CORTANTE MINIMO

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.01	.00	.00	134.86	.00 CM2/M	27.32	222.09	-3.36 T/M2
2	.04	.00	.66	5.20	.00 CM2/M	34.75	224.12	-5.39 T/M2
3	.04	.00	.00	7.62	.00 CM2/M	90.75	178.17	-46.22 T/M2

HIPOTESIS DE TORSION MAXIMA

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.00	.00	.00	134.86	.00 CM2/M	20.33	220.60	-1.87 T/M2
2	.10	.00	2.74	5.20	.00 CM2/M	51.04	230.06	-11.33 T/M2
3	.00	.00	.00	7.62	.00 CM2/M	67.54	165.77	-27.52 T/M2

O.F. 556-1

SECCION 10 VANO 1

ESFUERZOS

						SOBRECARGA		

	P. PROPIO	C. PERMAN.	PRETENSADO	CORT. MAX.	CORT. MIN.	TORSOR MAX.	MOME. MAX.	MOME. MIN.
MOMENTOS	-1207.50	-642.57	1754.45	-1293.38	78.63	-646.69	78.63	-1293.38
CORTANTES	330.41	143.43	-27.76	282.11	-5.82	141.06		
TORSORES	.00	.00	.00	89.49	89.49	283.80		

TENSIONES DE PRETENSADO: SUPERIOR 573.69 INFERIOR -255.93 T/M2

HIPOTESIS DE CORTANTE MAXIMO

						ROTURA EN ZONA C		

						ARMADURA TRANSVERSAL		
						ARMADURA		
						TENSIONES EN SERVICIO		
SEC	ROTURA HORMIG.	A.CORT	A.TORS	A.TOTAL	LONGITUDINAL	TANGENCIAL	MAXIMA	MINIMA
1	.17	44.88	.00	134.86	.00 CM2/M	83.74	240.35	-29.18 T/M2
2	.22	1.73	1.55	5.20	.00 CM2/M	101.10	251.77	-40.60 T/M2
3	.66	40.24	.00	40.24	.00 CM2/M	278.17	279.99	-276.36 T/M2

HIPOTESIS DE CORTANTE MINIMO

						ROTURA EN ZONA C		

						ARMADURA TRANSVERSAL		
						ARMADURA		
						TENSIONES EN SERVICIO		
SEC	ROTURA HORMIG.	A.CORT	A.TORS	A.TOTAL	LONGITUDINAL	TANGENCIAL	MAXIMA	MINIMA
1	.06	.00	.00	134.86	.00 CM2/M	50.63	222.68	-11.51 T/M2
2	.12	.00	1.55	5.20	.00 CM2/M	67.99	231.17	-20.00 T/M2
3	.20	4.71	.00	7.62	.00 CM2/M	168.18	302.22	-93.59 T/M2

HIPOTESIS DE TORSION MAXIMA

						ROTURA EN ZONA C		

						ARMADURA TRANSVERSAL		
						ARMADURA		
						TENSIONES EN SERVICIO		
SEC	ROTURA HORMIG.	A.CORT	A.TORS	A.TOTAL	LONGITUDINAL	TANGENCIAL	MAXIMA	MINIMA
1	.13	1.56	.00	134.86	.00 CM2/M	67.52	230.91	-19.74 T/M2
2	.32	.06	4.92	5.20	.00 CM2/M	122.58	267.37	-56.20 T/M2
3	.44	32.55	.00	32.55	.00 CM2/M	224.29	279.95	-179.69 T/M2

O.F. 556-1

FCK	FCTK	FYK	GC	GS	GFCP	GFCP2	GFSC
400.	24.	5100.	KG/CM2	1.50	1.15	1.50	.90 1.50

SECCION 00 VANO 2

INERCIA	VI	CANTO
3.0810	.971	1.650

CARACTERISTICAS SECCIONES TRANSVERSALES

ICH	IAL	DI	FV	FT	BV	BT	NTR	NTS
0	1	.971	.2680	.0000	.500	1.000	.0	.0
0	1	.971	.2680	.0000	.500	1.000	.0	.0
0	1	.971	.2680	.1940	.273	.250	.0	.0
0	0	1.450	.3820	.0000	.400	1.000	.0	.0
0	0	1.550	.1970	.1940	.250	.250	.0	.0
0	0	.100	.2840	.1940	.250	.250	.0	.0

SECCION 00 VANO 2

ESFUERZOS				SOBRECARGA				
	P. PROPIO	C. PERMAN.	PRETENSADO	CORT. MAX.	CORT. MIN.	TORSOR MAX.	MOME. MAX.	MOME. MIN.
MOMENTOS	-1207.50	-642.57	1754.45	78.63	-1293.38	-646.69	78.63	-1293.38
CORTANTES	-324.41	-177.88	2.69	12.39	-351.88	-175.94		
TORSORES	.00	.00	.00	162.14	162.14	521.99		

TENSIONES DE PRETENSADO: SUPERIOR 573.69 INFERIOR -255.93 T/M2

HIPOTESIS DE CORTANTE MAXIMO

ROTURA EN ZONA C

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.15	2.39	.00	9.52	.00 CM2/M	130.57	290.90	-58.61 T/M2
2	.15	2.39	.00	9.52	.00 CM2/M	130.57	290.90	-58.61 T/M2
3	.26	1.31	2.81	5.20	.00 CM2/M	162.03	315.50	-83.21 T/M2
4	.22	5.67	.00	7.62	.00 CM2/M	186.11	333.51	-103.86 T/M2
5	.22	.14	2.81	4.76	.00 CM2/M	127.44	285.90	-56.80 T/M2
6	.26	1.85	2.81	4.76	.00 CM2/M	169.82	325.65	-88.56 T/M2

HIPOTESIS DE CORTANTE MINIMO

ROTURA EN ZONA C

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA		TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL	LONGITUDINAL		TANGENCIAL	MAXIMA	MINIMA
1	.45	25.08	.00	25.08	.00	CM2/M	228.20	372.20	-139.91 T/M2
2	.45	25.08	.00	25.08	.00	CM2/M	228.20	372.20	-139.91 T/M2
3	.56	13.69	2.81	16.50	.00	CM2/M	259.65	400.59	-168.30 T/M2
4	.76	46.52	.00	46.52	.00	CM2/M	325.27	333.54	-317.20 T/M2
5	.50	14.99	2.81	17.80	2.81	CM2/M	199.20	185.34	-214.08 T/M2
6	.67	8.88	2.81	11.69	.00	CM2/M	273.28	727.60	-102.64 T/M2

HIPOTESIS DE TORSION MAXIMA

ROTURA EN ZONA C

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA		TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL	LONGITUDINAL		TANGENCIAL	MAXIMA	MINIMA
1	.36	17.65	.00	17.65	.00	CM2/M	181.04	331.24	-98.95 T/M2
2	.36	17.65	.00	17.65	.00	CM2/M	181.04	331.24	-98.95 T/M2
3	.70	9.64	9.04	18.68	.00	CM2/M	282.31	421.41	-189.12 T/M2
4	.49	36.91	.00	36.91	.00	CM2/M	258.06	323.03	-206.15 T/M2
5	.61	11.90	9.04	20.94	9.04	CM2/M	234.35	285.29	-192.50 T/M2
6	.79	7.33	9.04	16.37	.00	CM2/M	293.12	588.21	-146.07 T/M2

O.F. 556-1

SECCION 03 VANO 2

ESFUERZOS

SOBRECARGA

	P. PROPIO	C. PERMAN.	PRETENSADO	CORT. MAX.	CORT. MIN.	TORSOR MAX.	MOME. MAX.	MOME. MIN.
MOMENTOS	464.44	291.27	-729.50	205.48	333.33	284.73	716.82	-90.45
CORTANTES	-127.19	-71.15	331.37	12.19	-136.55	-72.45		
TORSORES	.00	.00	.00	67.38	67.38	286.35		

TENSIONES DE PRETENSADO: SUPERIOR 117.72 INFERIOR 507.77 T/M2

HIPOTESIS DE CORTANTE MAXIMO

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA		TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL	LONGITUDINAL		TANGENCIAL	MAXIMA	MINIMA
1	.06	.00	.00	9.52	.00	CM2/M	38.92	283.57	-5.34 T/M2
2	.06	.00	.00	9.52	.00	CM2/M	38.92	283.57	-5.34 T/M2
3	.11	.00	1.17	5.20	.00	CM2/M	51.99	287.63	-9.40 T/M2
4	.09	.00	.00	7.62	.00	CM2/M	55.47	323.76	-9.51 T/M2
5	.09	.00	1.17	4.76	.00	CM2/M	41.68	327.08	-5.31 T/M2
6	.11	.00	1.17	4.76	.00	CM2/M	54.31	225.80	-13.06 T/M2

HIPOTESIS DE CORTANTE MINIMO

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA		TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL	LONGITUDINAL		TANGENCIAL	MAXIMA	MINIMA
1	.06	.00	.00	9.52	.00	CM2/M	.94	278.23	-.00 T/M2
2	.06	.00	.00	9.52	.00	CM2/M	.94	278.23	-.00 T/M2
3	.11	.00	1.17	5.20	.00	CM2/M	14.02	278.94	-.70 T/M2
4	.09	.00	.00	7.62	.00	CM2/M	1.34	334.13	-.00 T/M2
5	.09	.00	1.17	4.76	.00	CM2/M	13.77	346.35	-.55 T/M2
6	.10	.00	1.17	4.76	.00	CM2/M	14.07	177.70	-1.11 T/M2

HIPOTESIS DE TORSION MAXIMA

ROTURA EN ZONA AB

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA		TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL	LONGITUDINAL		TANGENCIAL	MAXIMA	MINIMA
1	.03	.00	.00	9.52	.00	CM2/M	16.24	279.18	-.94 T/M2
2	.03	.00	.00	9.52	.00	CM2/M	16.24	279.18	-.94 T/M2
3	.21	.00	4.96	5.20	.00	CM2/M	71.79	295.66	-17.43 T/M2
4	.04	.00	.00	7.62	.00	CM2/M	23.14	328.20	-1.63 T/M2
5	.21	.00	4.96	4.96	.00	CM2/M	67.49	349.69	-13.02 T/M2
6	.21	.00	4.96	4.96	2.38	CM2/M	72.76	214.95	-24.63 T/M2

O.F. 556-1

SECCION 05 VANO 2

ESFUERZOS

SOBRECARGA								
	P. PROPIO	C. PERMAN.	PRETENSADO	CORT. MAX.	CORT. MIN.	TORSOR MAX.	MOME. MAX.	MOME. MIN.
MOMENTOS	782.37	469.15	-1517.62	505.72	505.72	530.90	1061.79	-50.59
CORTANTES	.00	.00	2.46	78.28	-78.28	.00		
TORSORES	.00	.00	.00	4.20	4.20	212.64		

TENSIONES DE PRETENSADO: SUPERIOR -62.26 INFERIOR 749.19 T/M2

HIPOTESIS DE CORTANTE MAXIMO

ROTURA EN ZONA C

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.04	.00	.00	9.52	.00 CM2/M	21.64	273.38	-1.71 T/M2
2	.04	.00	.00	9.52	.00 CM2/M	21.64	273.38	-1.71 T/M2
3	.05	.00	.07	5.20	.00 CM2/M	22.45	273.51	-1.84 T/M2
4	.07	.00	.00	7.62	.00 CM2/M	30.84	311.97	-3.05 T/M2
5	.04	.00	.07	4.76	.00 CM2/M	16.72	317.58	-.88 T/M2
6	.05	2.03	.07	4.76	.07 CM2/M	23.74	206.65	-2.73 T/M2

HIPOTESIS DE CORTANTE MINIMO

ROTURA EN ZONA C

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.04	.00	.00	9.52	.00 CM2/M	20.32	273.18	-1.51 T/M2
2	.04	.00	.00	9.52	.00 CM2/M	20.32	273.18	-1.51 T/M2
3	.04	.00	.07	5.20	.00 CM2/M	21.13	273.30	-1.63 T/M2
4	.06	.00	.00	7.62	.00 CM2/M	28.96	311.61	-2.69 T/M2
5	.04	.00	.07	4.76	.00 CM2/M	15.75	317.48	-.78 T/M2
6	.04	1.94	.07	4.76	.07 CM2/M	22.35	206.34	-2.42 T/M2

HIPOTESIS DE TORSION MAXIMA

ROTURA EN ZONA C

SEC	ROTURA HORMIG.	ARMADURA TRANSVERSAL			ARMADURA LONGITUDINAL	TENSIONES EN SERVICIO		
		A.CORT	A.TORS	A.TOTAL		TANGENCIAL	MAXIMA	MINIMA
1	.00	.00	.00	9.52	.00 CM2/M	.66	271.67	-.00 T/M2
2	.00	.00	.00	9.52	.00 CM2/M	.66	271.67	-.00 T/M2
3	.14	.00	3.68	5.20	.00 CM2/M	41.91	277.98	-6.32 T/M2
4	.00	.00	.00	7.62	.00 CM2/M	.94	312.83	-.00 T/M2
5	.14	.00	3.68	4.76	.00 CM2/M	41.74	326.76	-5.33 T/M2
6	.14	.04	3.68	4.76	3.68 CM2/M	41.95	205.37	-8.57 T/M2

Riostra de apoyo en pilas

Reacciones

	N
Peso propio	654.820 t
Superestructura	321.310 "
Pre tensionado	-30.45 "
	<u>1011.665 t</u>

SC. Tren Renfe tipo B

$$N = 551.29 \text{ t}$$

Traviesa + vía

$$N = 0.64 \times 19.25 = 12.32 \text{ t}$$

Fuerza centrífuga

$$M = 0.5039 \times 3.254 \times 19.25 = 31.59 \text{ mt}$$

Efecto lazo

$$M = 5 \times 1.454 = 7.285 \text{ mt}$$

Viento

$$M = 1.32 \times 2.329 \times 19.25 \times 0.5 \times 0.6 = 17.75 \text{ mt}$$

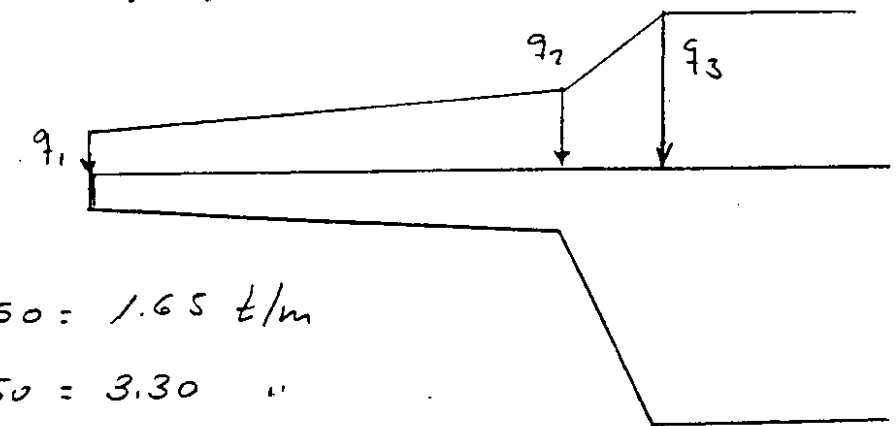
Ripado

$$M = (551.29 + 2 \times 12.32) \times 0.30 = 172.78 \text{ mt}$$

Cargas que se transmiten directamente a la riostra

Se consideran que se transmiten directamente a la riostra las cargas situadas a 1.65m a cada lado del eje de apoyo

Peso propio

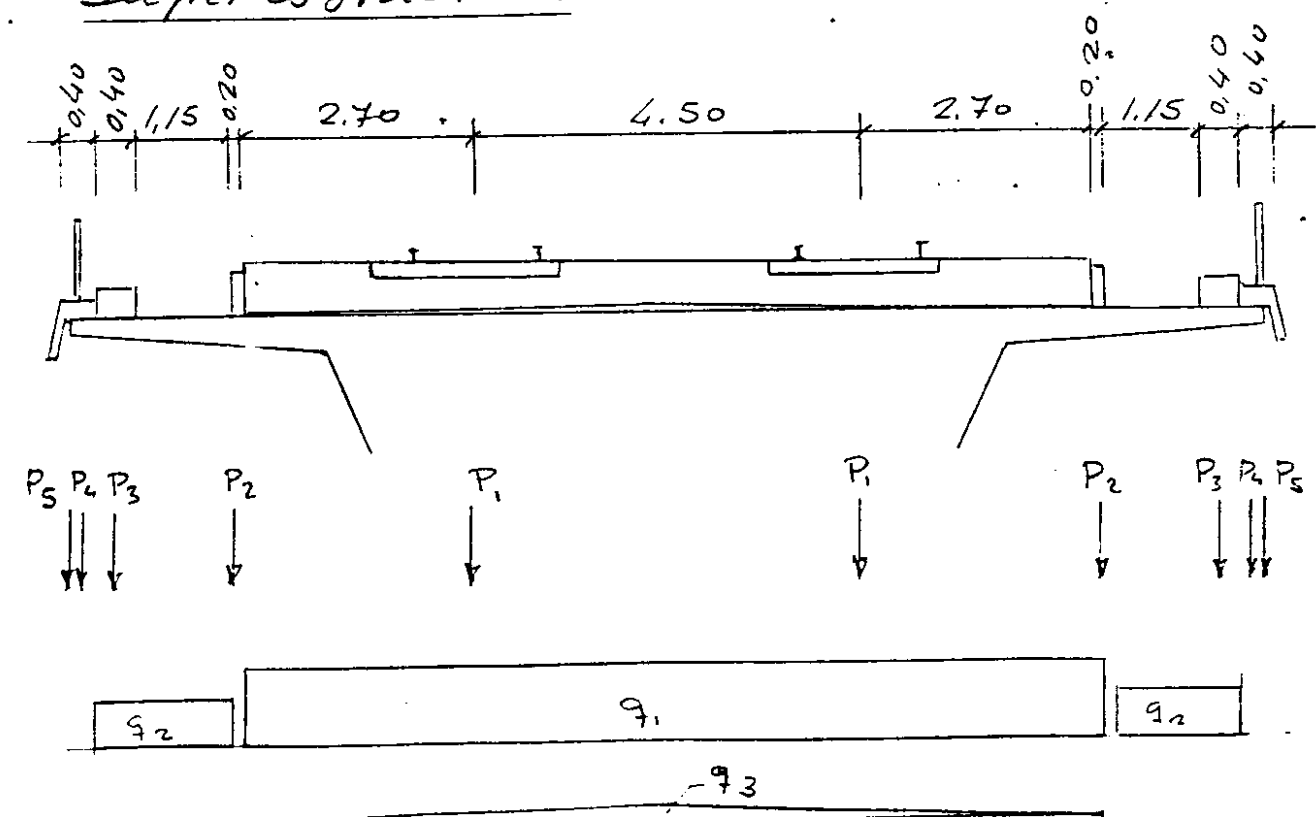


$$q_1 = 0.20 \times 3.30 \times 2.50 = 1.65 \text{ t/m}$$

$$q_2 = 0.40 \times 3.30 \times 2.50 = 3.30 \text{ "}$$

$$q_3 = 1.65 \times 3.30 \times 2.50 = 13.61 \text{ "}$$

Superestructura



$$q_1 = 9,14 \times 3,3 / 9,90 = 3,05 \text{ t/m}$$

$$q_2 = 0,5 \times 3,30 \times 0,50 = 0,83 \text{ t/m}$$

$$q_3 = 0,02 \times 2,4 \times 3,30 = 0,158 \text{ t}$$

$$P_1 = 0,64 \times 3,30 = 2,11 \text{ t}$$

$$P_2 = 0,25 \times 3,30 = 0,83 \text{ ''}$$

$$P_3 = 0,30 \times 3,30 = 0,99 \text{ ''}$$

$$P_4 = 0,33 \times 3,30 = 1,09 \text{ ''}$$

$$P_5 = 0,05 \times 3,30 = 0,17 \text{ ''}$$

Sobrecarga

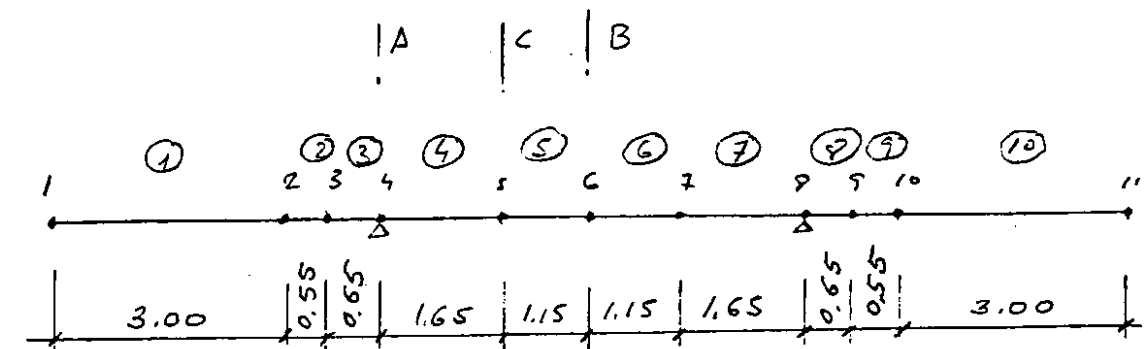
$$P_1 = 12,00 \times 3,30 = 39,60 \text{ t}$$

ripado 30 cm.

reparto de Sobrecarga y de via + traviesa

$$b = 2,40 + 2 \times 0,45 \text{ ctg } 75^\circ = 2,77 \text{ m}$$

Esquema estructural



Torsor unitario

$$A = 1,35 \times 1,40 = 10,29 \text{ m}^2$$

$$f = \frac{1}{2A} = 1 / (2 \times 10,29) = 0,0486 \text{ t}$$

$$m = 0,0486 \times 1,40 = 0,068 \text{ mt/m}$$

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*****
*
*      S T A A D - III
*      REVISION 10.4a (VERSION 10 LEVEL 4a)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS, INC.
*      DATE=      NOV 24, 1999
*      TIME=      16:32: 6
*
*****

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1. STAAD PLANE RIOSTRA DE PILA
2. UNIT METER MTON
3. JOINT COORDINATES
4. 1 -7.00 0.00 0.00
5. 2 -4.00 0.00 0.00
6. 3 -3.45 0.00 0.00
7. 4 -2.80 0.00 0.00
8. 5 -1.15 0.00 0.00
9. 6 0.00 0.00 0.00
10. 7 1.15 0.00 0.00
11. 8 2.80 0.00 0.00
12. 9 3.45 0.00 0.00
13. 10 4.00 0.00 0.00
14. 11 7.00 0.00 0.00
15. MEMBER INCIDENCES
16. 1 1 2
17. 2 2 3
18. 3 3 4
19. 4 4 5
20. 5 5 6
21. 6 6 7
22. 7 7 8
23. 8 8 9
24. 9 9 10
25. 10 10 11
26. MEMBER PROPERTIES
27. 1 10 PRISMATIC YD 0.30 ZD 3.3
28. 2 9 PRISMATIC YD 1.03 ZD 3.3
29. 3 TO 8 PRISMATIC YD 1.65 ZD 3.3
30. SUPPORTS
31. 4 PINNED
32. 8 PINNED
33. CONSTANTS
34. E 3.5E6 ALL
35. DENSITY 2.5 ALL
36. LOAD 1 PESO PROPIO
37. MEMBER LOAD
38. 1 TRAP GY -1.65 -3.3
39. 2 TRAP GY -3.3 -13.61
40. 3 TO 8 UNI GY -13.61
41. 9 TRAP GY -13.61 -3.3
42. 10 TRAP GY -3.3 -1.65
43. LOAD 2 SUPERESTRUCTURA
44. MEMBER LOAD
45. 1 UNI GY -3.05 2.05 3.
46. 2 TO 9 UNI GY -3.05
47. 10 UNI GY -3.05 0. 0.95

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48. 1 UNI GY -.83 .3 1.85
49. 10 UNI GY -.83 1.15 2.7
50. 1 TRAP GY -0. -0.03 2.05 3.
51. 2 TRAP GY -0.03 -0.05
52. 3 TRAP GY -0.05 -0.07
53. 4 TRAP GY -0.07 -0.12
54. 5 TRAP GY -0.12 -0.16
55. 6 TRAP GY -0.16 -0.12
56. 7 TRAP GY -0.12 -0.07
57. 8 TRAP GY -0.07 -0.05
58. 9 TRAP GY -0.05 -0.03
59. 10 TRAP GY -0.03 -0. 0. 0.95
60. 1 CON GY -0.17 0.01
61. 1 CON GY -1.09 0.10
62. 1 CON GY -0.99 0.50
63. 1 CON GY -0.83 1.95
64. 10 CON GY -0.83 1.05
65. 10 CON GY -0.99 2.50
66. 10 CON GY -1.09 2.90
67. 10 CON GY -0.17 2.99
68. LOAD 3 TRAVIESA+VIA
69. MEMBER LOAD
70. 2 UNI GY -0.76 0.36 0.55
71. 3 TO 4 UNI GY -0.76
72. 5 UNI GY -0.76 0. 0.29
73. 6 UNI GY -0.76 0.86 1.15
74. 7 TO 8 UNI GY -0.76
75. 9 UNI GY -0.76 0. 0.19
76. LOAD 4 TRAVIESA+VIA (RIPADO)
77. MEMBER LOAD
78. 2 UNI GY -0.76 0.06 0.55
79. 3 UNI GY -0.76
80. 4 UNI GY -0.76 0. 1.64
81. 6 UNI GY -0.76 0.56 1.15
82. 7 UNI GY -0.76
83. 8 UNI GY -0.76 0. 0.54
84. LOAD 5 SOBRECARGA
85. MEMBER LOAD
86. 2 UNI GY -14.30 0.36 0.55
87. 3 TO 4 UNI GY -14.30
88. 5 UNI GY -14.30 0. 0.29
89. 6 UNI GY -14.30 0.86 1.15
90. 7 TO 8 UNI GY -14.30
91. 9 UNI GY -14.30 0. 0.19
92. LOAD 6 SOBRECARGA (RIPADO)
93. MEMBER LOAD
94. 2 UNI GY -14.30 0.06 0.55
95. 3 UNI GY -14.30
96. 4 UNI GY -14.30 0. 1.64
97. 6 UNI GY -14.30 0.56 1.15
98. 7 UNI GY -14.30
99. 8 UNI GY -14.30 0. 0.54
100. LOAD 7 CARGAS UNITARIAS
101. MEMBER LOAD
102. 3 CON GY -1. 0.15
103. 4 CON GY -1. 1.15
104. 6 CON GY -1. 0.001
105. 7 CON GY -1. 0.5
106. 8 CON GY -1. 0.5
107. LOAD 8 TORSOR UNITARIO 100 T.

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108. MEMBER LOAD
 109. 2 UMOM Z 6.8 3.22 3.45
 110. 3 TO 8 UMOM Z 6.8
 111. 9 UMOM Z 6.8 0. 0.23
 112. PERFORM ANALYSIS

ORIGINAL BAND-WIDTH = 1
 REDUCED BAND-WIDTH = 1

++ CHECKING LOAD DATA.
 ++ PROCESSING SUPPORT CONDITION.
 ++ PROCESSING AND SETTING UP LOAD VECTOR.

++ PROCESSING ELEMENT STIFFNESS MATRIX. 16:32: 9
 ++ PROCESSING GLOBAL STIFFNESS MATRIX. 16:32: 9
 ++ PROCESSING TRIANGULAR FACTORIZATION. 16:32: 9
 ++ CALCULATING JOINT DISPLACEMENTS. 16:32: 9
 ++ CALCULATING ELEMENT FORCES. 16:32: 9

113. PRINT ANALYSIS RESULTS

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	.00000	-.08126	.00000	.00000	.00000	.00036
	2	.00000	-.10600	.00000	.00000	.00000	.00047
	3	.00000	.00022	.00000	.00000	.00000	.00000
	4	.00000	.00017	.00000	.00000	.00000	.00000
	5	.00000	.00412	.00000	.00000	.00000	-.00001
	6	.00000	.00327	.00000	.00000	.00000	-.00001
	7	.00000	.00029	.00000	.00000	.00000	.00000
	8	.00000	.00134	.00000	.00000	.00000	-.00000
2	1	.00000	.00031	.00000	.00000	.00000	.00000
	2	.00000	-.00150	.00000	.00000	.00000	.00002
	3	.00000	.00006	.00000	.00000	.00000	.00000
	4	.00000	.00005	.00000	.00000	.00000	.00000
	5	.00000	.00118	.00000	.00000	.00000	-.00001
	6	.00000	.00096	.00000	.00000	.00000	-.00001
	7	.00000	.00008	.00000	.00000	.00000	.00000
	8	.00000	.00061	.00000	.00000	.00000	-.00000
3	1	.00000	.00031	.00000	.00000	.00000	-.00000
	2	.00000	-.00067	.00000	.00000	.00000	.00001
	3	.00000	.00003	.00000	.00000	.00000	.00000
	4	.00000	.00003	.00000	.00000	.00000	.00000
	5	.00000	.00064	.00000	.00000	.00000	-.00001
	6	.00000	.00054	.00000	.00000	.00000	-.00001
	7	.00000	.00005	.00000	.00000	.00000	.00000
	8	.00000	-.00010	.00000	.00000	.00000	.00000
4	1	.00000	.00000	.00000	.00000	.00000	-.00001
	2	.00000	.00000	.00000	.00000	.00000	.00001
	3	.00000	.00000	.00000	.00000	.00000	.00000
	4	.00000	.00000	.00000	.00000	.00000	.00000
	5	.00000	.00000	.00000	.00000	.00000	-.00001
	6	.00000	.00000	.00000	.00000	.00000	-.00001
	7	.00000	.00000	.00000	.00000	.00000	.00000
	8	.00000	.00000	.00000	.00000	.00000	.00000
5	1	.00000	-.00130	.00000	.00000	.00000	-.00001
	2	.00000	.00089	.00000	.00000	.00000	.00000
	3	.00000	-.00008	.00000	.00000	.00000	.00000
	4	.00000	-.00007	.00000	.00000	.00000	.00000
	5	.00000	-.00145	.00000	.00000	.00000	-.00001
	6	.00000	-.00135	.00000	.00000	.00000	-.00001
	7	.00000	-.00011	.00000	.00000	.00000	.00000
	8	.00000	.00007	.00000	.00000	.00000	.00000
6	1	.00000	-.00170	.00000	.00000	.00000	.00000
	2	.00000	.00104	.00000	.00000	.00000	.00000
	3	.00000	-.00009	.00000	.00000	.00000	.00000
	4	.00000	-.00009	.00000	.00000	.00000	.00000
	5	.00000	-.00179	.00000	.00000	.00000	.00000
	6	.00000	-.00176	.00000	.00000	.00000	.00000
	7	.00000	-.00014	.00000	.00000	.00000	.00000
	8	.00000	.00000	.00000	.00000	.00000	.00000

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
7	1	.00000	-.00130	.00000	.00000	.00000	.00001
	2	.00000	.00089	.00000	.00000	.00000	-.00000
	3	.00000	-.00008	.00000	.00000	.00000	.00000
	4	.00000	-.00008	.00000	.00000	.00000	.00000
	5	.00000	-.00145	.00000	.00000	.00000	.00001
	6	.00000	-.00150	.00000	.00000	.00000	.00001
	7	.00000	-.00011	.00000	.00000	.00000	.00000
	8	.00000	-.00007	.00000	.00000	.00000	.00000
8	1	.00000	.00000	.00000	.00000	.00000	.00001
	2	.00000	.00000	.00000	.00000	.00000	-.00001
	3	.00000	.00000	.00000	.00000	.00000	.00000
	4	.00000	.00000	.00000	.00000	.00000	.00000
	5	.00000	.00000	.00000	.00000	.00000	.00001
	6	.00000	.00000	.00000	.00000	.00000	.00001
	7	.00000	.00000	.00000	.00000	.00000	.00000
	8	.00000	.00000	.00000	.00000	.00000	.00000
9	1	.00000	.00031	.00000	.00000	.00000	.00000
	2	.00000	-.00067	.00000	.00000	.00000	-.00001
	3	.00000	.00003	.00000	.00000	.00000	.00000
	4	.00000	.00004	.00000	.00000	.00000	.00000
	5	.00000	.00064	.00000	.00000	.00000	.00001
	6	.00000	.00071	.00000	.00000	.00000	.00001
	7	.00000	.00005	.00000	.00000	.00000	.00000
	8	.00000	.00010	.00000	.00000	.00000	.00000
10	1	.00000	.00031	.00000	.00000	.00000	-.00000
	2	.00000	-.00150	.00000	.00000	.00000	-.00002
	3	.00000	.00006	.00000	.00000	.00000	.00000
	4	.00000	.00007	.00000	.00000	.00000	.00000
	5	.00000	.00118	.00000	.00000	.00000	.00001
	6	.00000	.00131	.00000	.00000	.00000	.00001
	7	.00000	.00008	.00000	.00000	.00000	.00000
	8	.00000	.00020	.00000	.00000	.00000	.00000
11	1	.00000	-.08126	.00000	.00000	.00000	-.00036
	2	.00000	-.10600	.00000	.00000	.00000	-.00047
	3	.00000	.00022	.00000	.00000	.00000	.00000
	4	.00000	.00024	.00000	.00000	.00000	.00000
	5	.00000	.00412	.00000	.00000	.00000	.00001
	6	.00000	.00458	.00000	.00000	.00000	.00001
	7	.00000	.00029	.00000	.00000	.00000	.00000
	8	.00000	.00077	.00000	.00000	.00000	.00000

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
4	1	.00	59.03	.00	.00	.00	.00
	2	.00	19.86	.00	.00	.00	.00
	3	.00	2.11	.00	.00	.00	.00
	4	.00	2.34	.00	.00	.00	.00
	5	.00	39.75	.00	.00	.00	.00
	6	.00	44.01	.00	.00	.00	.00
	7	.00	2.50	.00	.00	.00	.00
	8	.00	8.94	.00	.00	.00	.00
8	1	.00	59.03	.00	.00	.00	.00
	2	.00	19.86	.00	.00	.00	.00
	3	.00	2.11	.00	.00	.00	.00
	4	.00	1.89	.00	.00	.00	.00
	5	.00	39.75	.00	.00	.00	.00
	6	.00	35.49	.00	.00	.00	.00
	7	.00	2.50	.00	.00	.00	.00
	8	.00	-8.94	.00	.00	.00	.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	.00	.00	.00	.00	.00	.00
		2	.00	7.42	.00	.00	.00	-9.90
	2	1	.00	.00	.00	.00	.00	.00
		2	.00	7.28	.00	.00	.00	-10.87
	3	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
	4	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
	5	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
	6	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
	7	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
	8	1	.00	.00	.00	.00	.00	.00
		2	.00	.00	.00	.00	.00	.00
2	1	2	.00	-7.43	.00	.00	.00	9.90
		3	.00	12.08	.00	.00	.00	-15.00
	2	2	.00	-7.28	.00	.00	.00	10.87
		3	.00	8.98	.00	.00	.00	-15.34
	3	2	.00	.00	.00	.00	.00	.00
		3	.00	.14	.00	.00	.00	-.01
	4	2	.00	.00	.00	.00	.00	.00
		3	.00	.37	.00	.00	.00	-.09
	5	2	.00	.00	.00	.00	.00	.00
		3	.00	2.72	.00	.00	.00	-.26
	6	2	.00	.00	.00	.00	.00	.00
		3	.00	7.01	.00	.00	.00	-1.72
	7	2	.00	.00	.00	.00	.00	.00
		3	.00	.00	.00	.00	.00	.00
	8	2	.00	.00	.00	.00	.00	.00
		3	.00	.00	.00	.00	.00	-1.56
3	1	3	.00	-12.07	.00	.00	.00	15.00
		4	.00	20.92	.00	.00	.00	-25.73
	2	3	.00	-8.98	.00	.00	.00	15.34
		4	.00	11.00	.00	.00	.00	-21.84
	3	3	.00	-.14	.00	.00	.00	.01
		4	.00	.64	.00	.00	.00	-.27
	4	3	.00	-.37	.00	.00	.00	.09
		4	.00	.87	.00	.00	.00	-.49
	5	3	.00	-2.72	.00	.00	.00	.26
		4	.00	12.01	.00	.00	.00	-5.05
	6	3	.00	-7.01	.00	.00	.00	1.72
		4	.00	16.30	.00	.00	.00	-9.29
	7	3	.00	.00	.00	.00	.00	.00
		4	.00	1.00	.00	.00	.00	-.50

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
4	8	3	.00	.00	.00	.00	.00	1.56
		4	.00	.00	.00	.00	.00	-5.98
	1	4	.00	38.11	.00	.00	.00	25.73
		5	.00	-15.65	.00	.00	.00	18.62
	2	4	.00	8.86	.00	.00	.00	21.84
		5	.00	-3.67	.00	.00	.00	-11.49
	3	4	.00	1.47	.00	.00	.00	.27
		5	.00	-.22	.00	.00	.00	1.13
	4	4	.00	1.47	.00	.00	.00	.49
		5	.00	-.23	.00	.00	.00	.90
	5	4	.00	27.74	.00	.00	.00	5.05
		5	.00	-4.15	.00	.00	.00	21.26
	6	4	.00	27.71	.00	.00	.00	9.29
		5	.00	-4.26	.00	.00	.00	16.97
	7	4	.00	1.50	.00	.00	.00	.50
		5	.00	-.50	.00	.00	.00	1.47
5	8	4	.00	8.94	.00	.00	.00	5.98
		5	.00	-8.94	.00	.00	.00	-2.46
	1	5	.00	15.65	.00	.00	.00	-18.62
		6	.00	.00	.00	.00	.00	27.62
	2	5	.00	3.67	.00	.00	.00	11.49
		6	.00	.00	.00	.00	.00	-9.37
	3	5	.00	.22	.00	.00	.00	-1.13
		6	.00	.00	.00	.00	.00	1.16
	4	5	.00	.23	.00	.00	.00	-.90
		6	.00	-.23	.00	.00	.00	1.16
	5	5	.00	4.15	.00	.00	.00	-21.26
		6	.00	.00	.00	.00	.00	21.86
	6	5	.00	4.26	.00	.00	.00	-16.97
		6	.00	-4.26	.00	.00	.00	21.86
	7	5	.00	.50	.00	.00	.00	-1.47
		6	.00	-.50	.00	.00	.00	2.05
6	8	5	.00	8.94	.00	.00	.00	2.46
		6	.00	-8.94	.00	.00	.00	.00
	1	6	.00	.00	.00	.00	.00	-27.62
		7	.00	15.65	.00	.00	.00	18.62
	2	6	.00	.00	.00	.00	.00	9.37
		7	.00	3.67	.00	.00	.00	-11.49
	3	6	.00	.00	.00	.00	.00	-1.16
		7	.00	.22	.00	.00	.00	1.13
	4	6	.00	.23	.00	.00	.00	-1.16
		7	.00	.22	.00	.00	.00	1.29
	5	6	.00	.00	.00	.00	.00	-21.86
		7	.00	4.15	.00	.00	.00	21.26
	6	6	.00	4.26	.00	.00	.00	-21.86
		7	.00	4.18	.00	.00	.00	24.27
	7	6	.00	.50	.00	.00	.00	-2.05
		7	.00	.50	.00	.00	.00	1.48

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	8	6	.00	8.94	.00	.00	.00	.00
		7	.00	-8.94	.00	.00	.00	2.46
7	1	7	.00	-15.65	.00	.00	.00	-18.62
		8	.00	38.11	.00	.00	.00	-25.73
	2	7	.00	-3.67	.00	.00	.00	11.49
		8	.00	8.86	.00	.00	.00	-21.84
	3	7	.00	-.22	.00	.00	.00	-1.13
		8	.00	1.47	.00	.00	.00	-.27
	4	7	.00	-.22	.00	.00	.00	-1.29
		8	.00	1.48	.00	.00	.00	-.11
	5	7	.00	-4.15	.00	.00	.00	-21.26
		8	.00	27.74	.00	.00	.00	-5.05
	6	7	.00	-4.18	.00	.00	.00	-24.27
		8	.00	27.77	.00	.00	.00	-2.08
	7	7	.00	-.50	.00	.00	.00	-1.48
		8	.00	1.50	.00	.00	.00	-.50
	8	7	.00	8.94	.00	.00	.00	-2.46
		8	.00	-8.94	.00	.00	.00	5.98
8	1	8	.00	20.92	.00	.00	.00	25.73
		9	.00	-12.07	.00	.00	.00	-15.00
	2	8	.00	11.00	.00	.00	.00	21.84
		9	.00	-8.98	.00	.00	.00	-15.34
	3	8	.00	.64	.00	.00	.00	.27
		9	.00	-.14	.00	.00	.00	-.01
	4	8	.00	.41	.00	.00	.00	.11
		9	.00	.00	.00	.00	.00	.00
	5	8	.00	12.01	.00	.00	.00	5.05
		9	.00	-2.72	.00	.00	.00	-.26
	6	8	.00	7.72	.00	.00	.00	2.08
		9	.00	.00	.00	.00	.00	.00
	7	8	.00	1.00	.00	.00	.00	.50
		9	.00	.00	.00	.00	.00	.00
	8	8	.00	.00	.00	.00	.00	-5.98
		9	.00	.00	.00	.00	.00	1.56
9	1	9	.00	12.08	.00	.00	.00	15.00
		10	.00	-7.43	.00	.00	.00	-9.90
	2	9	.00	8.98	.00	.00	.00	15.34
		10	.00	-7.28	.00	.00	.00	-10.87
	3	9	.00	.14	.00	.00	.00	.01
		10	.00	.00	.00	.00	.00	.00
	4	9	.00	.00	.00	.00	.00	.00
		10	.00	.00	.00	.00	.00	.00
	5	9	.00	2.72	.00	.00	.00	.26
		10	.00	.00	.00	.00	.00	.00
	6	9	.00	.00	.00	.00	.00	.00
		10	.00	.00	.00	.00	.00	.00
	7	9	.00	.00	.00	.00	.00	.00
		10	.00	.00	.00	.00	.00	.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	8	9	.00	.00	.00	.00	.00	-1.56
		10	.00	.00	.00	.00	.00	.00
10	1	10	.00	7.42	.00	.00	.00	9.90
		11	.00	.00	.00	.00	.00	.00
	2	10	.00	7.28	.00	.00	.00	10.87
		11	.00	.00	.00	.00	.00	.00
	3	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00
	4	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00
	5	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00
	6	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00
	7	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00
	8	10	.00	.00	.00	.00	.00	.00
		11	.00	.00	.00	.00	.00	.00

***** END OF LATEST ANALYSIS RESULT *****

114. PLOT DISPLACEMENT FILE
 115. PLOT BENDING FILE
 116. FINISH

***** END OF STAAD-III *****

***** DATE= NOV 24,1999 TIME= 16:32:11 *****

 * FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
 * CALL (01) 686-7672, CROYDON, U.K. TLX. 929181 *

Resumen de resultados

Peso propio

$$M_A = -25.43 \text{ mt} \quad R = 118.06 \text{ t}$$

$$M_B = 27.62 \text{ mt}$$

$$V_C = 15.65 \text{ t}$$

Superestructura

$$M_A = -21.84 - 0.49 = -22.33 \text{ mt} \quad R = 43.94 \text{ t}$$

$$M_B = -9.37 + 1.16 = -8.21 \text{ mt}$$

$$V_C = 3.67 + 0.23 = 3.90 \text{ t}$$

Sobrecarga

$$M_A = -9.29 \text{ mt} \quad R = 79.50 \text{ t}$$

$$M_B = 24.27 \text{ mt}$$

$$V_C = 4.26 \text{ t}$$

Cargas que se transmiten canalizadas a través de la riostra 5 Nervios

Peso propio

$$R = 654.82 - 118.06 = 536.76 \text{ t} \rightarrow 107.35 \text{ t}$$

Superestructura

$$R = 321.31 - 43.94 = 277.37 \rightarrow 55.47 \text{ t}$$

Pretensado

$$R = -30.45 \text{ t} \rightarrow -6.09 \text{ t}$$

Sobrecarga

$$R = 551.29 - 79.50 = 471.79 \text{ t} \rightarrow 94.36 \text{ t}$$

Esfuerzos

$$M_A = -0,59 \quad M_B = 2,059 \quad V_C = 0,59$$

	M_A	M_B	V_C
Peso propio	- 53,68 mt	220,07 mt	53,68 t
Superestruct.	- 27,74 "	113,71 "	27,74 "
Pretensado	3,05 "	- 12,48 "	- 3,05 "
Sobrecarga	- 47,18 "	193,44 "	47,18 "

Esfuerzos totales

	M_A	M_B	V_C
Peso propio	- 79,41 mt	247,69 mt	69,33 t
Superestruct.	- 50,07 "	105,50 "	31,64 "
Pretensado	3,05 "	- 12,48 "	- 3,05 "
Sobrecargas	- 56,47 "	217,71 "	51,44 "

Incremento de esfuerzos debido al torsor

$$M_A = -0,0598 \text{ m} \quad M_B = 0 \quad V_C = 0,0894 \text{ m}$$

	M_A	V_C
Ripado	- 10,33 mt	15,45 t
Fuerza centríf.	- 1,89 "	2,82 "
Efecto laz	- 0,44 "	0,65 "
Viento	- 1,06 "	1,59 "

Dimensionamiento

$$M_A = -79,41 - 50,07 + 3,05 - 56,47 - 10,33 - 1,89 - 0,44 - 1,06 \times 0,6 = -196,20 \text{ mt}$$

$$M_B = 294,30 \text{ mt}$$

$$U_{cd} = \frac{4000}{1,5} \times 2,00 \times 1,58 = 8427 \text{ t} \quad 0,04 U_{cd} = 337,07 \text{ t}$$

$$U_s = 184,69 \text{ t} \quad A_s = 41,64 \text{ cm}^2 \quad A_{smin} = 51,05 \text{ cm}^2$$

$$M_B = 247,69 + 105,50 - 12,48 + 217,71 = 558,42 \text{ mt}$$

$$M_d = 837,63 \text{ mt} \quad U_s = 546,59 \text{ t} \quad A_s = 123,25 \text{ cm}$$

$$V_C = 69,33 + 31,46 - 3,05 + 51,44 + 15,45 + 2,82 + 0,65 + 0,6 \times 1,59 = 169,05 \text{ t}$$

$$V_d = 253,58 \text{ t}$$

$$V_{cu} = 5 \sqrt{\frac{400}{1,5}} \times 2,00 \times 1,58 = 258,01 \text{ t}$$

OBJETO HOJA Nº DE
..... PROYECTO Nº
CALCULADO POR COMPROBADO POR FECHA

Cuelgue

$$R = 107.35 + 35.47 - 6.09 + 94.36 = 231.09 \text{ t}$$

$$R_d = 346.64 \text{ t} \quad A_s = 78.16 \text{ cm}^2 / \text{hervio}$$

COEFICIENTES DE IMPACTO DE LOS TRENES 3 Y 4 DEL EUROCODIGO

IV. EFECTOS DINAMICOS

(ANEJO A EC1)

- ESTE CALCULO SE PLANTEA PARA $V > 200 \text{ Km/h}$

TRENES DE CARGA 3,4 (ANEJO F.3)

1.) VELOCIDADES DE CALCULO

$$V_{\text{MAX}} = 350 \text{ Km/h} = 97,22 \text{ m/s}$$

$$V_i = n_0 \times \lambda_i$$

n_0 = Frecuencia Natural de estructura bajo P.P + C.P.

$$40 \text{ m/s} < V_i < 1,2 \times 97,22 = 116,67 \text{ m/s}$$

1.1) LONGITUDES DE ONDA

TREN 3 $d_3 = 16,5 \text{ m.}$

$$\lambda_{31} = d_3/1 = 16,5 \text{ m.}$$

$$\lambda_{32} = d_3/2 = 8,25 \text{ m.}$$

$$\lambda_{33} = d_3/3 = 5,50 \text{ m.}$$

$$\lambda_{34} = d_3/4 = 4,13 \text{ m.}$$

TREN 4 $d_4 = 15,7 \text{ m.}$

$$\lambda_{41} = d_4/1 = 15,7 \text{ m.}$$

$$\lambda_{42} = d_4/2 = 7,85 \text{ m.}$$

$$\lambda_{43} = d_4/3 = 5,23 \text{ m.}$$

$$\lambda_{44} = d_4/4 = 3,93 \text{ m.}$$

```

*****
*
*      S T A A D - III
*      REVISION 10.4a (VERSION 10 LEVEL 4a)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS, INC.
*      DATE=    DEC  2, 1999
*      TIME=    11:22:27
*
*****

```

```

1. STAAD PLANE PERIODO PROPIO PUENTE PP + CP
2. UNIT METER MTON
3. JOINT COORDINATES
4.  1      0.000      0.000
5.  2      0.680      0.000
6.  3      1.350      0.000
7.  4      2.030      0.000
8.  5      2.700      0.000
9.  6      3.380      0.000
10. 7      4.050      0.000
11. 8      4.720      0.000
12. 9      5.400      0.000
13. 10     6.070      0.000
14. 11     6.750      0.000
15. 12     7.430      0.000
16. 13     8.100      0.000
17. 14     8.770      0.000
18. 15     9.450      0.000
19. 16    10.130      0.000
20. 17    10.800      0.000
21. 18    11.480      0.000
22. 19    12.150      0.000
23. 20    12.820      0.000
24. 21    13.500      0.000
25. 22    14.750      0.000
26. 23    16.000      0.000
27. 24    17.250      0.000
28. 25    18.500      0.000
29. 26    19.750      0.000
30. 27    21.000      0.000
31. 28    22.250      0.000
32. 29    23.500      0.000
33. 30    24.750      0.000
34. 31    26.000      0.000
35. 32    27.250      0.000
36. 33    28.500      0.000
37. 34    29.750      0.000
38. 35    31.000      0.000
39. 36    32.250      0.000
40. 37    33.500      0.000
41. 38    34.750      0.000
42. 39    36.000      0.000
43. 40    37.250      0.000
44. 41    38.500      0.000
45. 42    39.170      0.000
46. 43    39.850      0.000
47. 44    40.530      0.000

```

```

48. 45    41.200      0.000
49. 46    41.880      0.000
50. 47    42.550      0.000
51. 48    43.220      0.000
52. 49    43.900      0.000
53. 50    44.580      0.000
54. 51    45.250      0.000
55. 52    45.920      0.000
56. 53    46.600      0.000
57. 54    47.280      0.000
58. 55    47.950      0.000
59. 56    48.630      0.000
60. 57    49.300      0.000
61. 58    49.970      0.000
62. 59    50.650      0.000
63. 60    51.330      0.000
64. 61    52.000      0.000

```

65. MEMBER INCIDENCES

```
66. 1      1      2      60
```

67. SUPPORTS

```
68. 1      PINNED
69. 21     PINNED
70. 41     PINNED
71. 61     PINNED

```

72. CONSTANTS

```
73. E 3.8e6 MEMBER 1 TO 60
```

74. DENSITY 2.5 ALL

75. MEMBER PROPERTIES

```
76. 1 TO 20 PRISMATIC AX 14.313 IZ 3.489
77. 21 TO 40 PRISMATIC AX 10.174 IZ 3.086
78. 41 TO 60 PRISMATIC AX 14.313 IZ 3.489

```

79. LOAD 1 PESO PROPIO

```
80. SELFWEIGHT Y -1.0
```

81. MEMBER LOAD

```
82. 1 TO 60 UNI GY -14.23
```

83. CALCULATE NATURAL FREQ

84. PERFORM ANALYSIS

```
ORIGINAL BAND-WIDTH = 1
REDUCED BAND-WIDTH = 1

```

```

++ CHECKING LOAD DATA.
++ PROCESSING SUPPORT CONDITION.
++ PROCESSING AND SETTING UP LOAD VECTOR.

```

```

++ PROCESSING ELEMENT STIFFNESS MATRIX.      11:22:30
++ PROCESSING GLOBAL STIFFNESS MATRIX.      11:22:30
++ PROCESSING TRIANGULAR FACTORIZATION.      11:22:30
++ CALCULATING JOINT DISPLACEMENTS.        11:22:30

```

```

*****
*
* NATURAL FREQUENCY FOR LOADING 1 = 8.07945 CPS
* MAX DEFLECTION = .49316 CM GLO Y, AT JOINT 31
*
*****

```

```

++ CALCULATING ELEMENT FORCES.      11:22:30

```

1.2) - FRECUENCIA PROPIA DE VIBRACION (STAAD III)

$$\eta_0 = 8.079 \text{ c.p.s (Hz)}$$

1.3) - VELOCIDADES DE CALCULO

TREN 3

$$V_{31} = 16,5 \times 8,079 = 133,30 \text{ m/s}$$

$$V_{32} = 8,25 \times 8,079 = 66,65 \text{ m/s} = 239,95 \text{ Km/h}$$

$$V_{33} = 5,50 \times 8,079 = 44,43 \text{ m/s} = 159,96 \text{ Km/h}$$

$$V_{34} = 4,13 \times 8,079 = 33,37 \text{ m/s}$$

TREN 4

$$V_{41} = 15,7 \times 8,079 = 126,84 \text{ m/s}$$

$$V_{42} = 7,85 \times 8,079 = 63,42 \text{ m/s} = 228,31 \text{ Km/h}$$

$$V_{43} = 5,23 \times 8,079 = 42,25 \text{ m/s} = 152,11 \text{ Km/h}$$

$$V_{44} = 3,93 \times 8,079 = 31,75 \text{ m/s}$$

2.-) CALCULO IMPACTO DINAMICO PARA TRENES ACTUALES

(ANEXO A EC1)

$$I = 1 + \varphi' + 0,5 \varphi'' \neq 2,0$$

$$\varphi' = \frac{K}{1-K+K^4} \quad " \quad K = \frac{V}{2 \angle \phi \cdot n_0}$$

n_0 = frecuencia natural bajo P.P + C.P. = 8,079 Hz (STAND II)

$\angle \phi$ = longitud condensada en m. (Pag. 18. TABLA 2. EC1)

$$\angle \phi = K \angle m = 1,3 \times \frac{2 \times 13,5 + 1 \times 25}{3} = 22,53 \text{ m} \neq 25 \text{ m.}$$

V = velocidad de paso . m/s

$$\varphi'' = \frac{\delta}{100} \left[56 e^{-\left(\frac{\angle \phi}{10}\right)^2} + 50 \left(\frac{\angle \phi \cdot n_0}{80} - 1 \right) e^{-\left(\frac{\angle \phi}{20}\right)^2} \right]$$

$$\delta = 1,0 \text{ para } V > 22 \text{ m/s}$$

$$I(V = 152,11 \text{ Km/h}) = I_{43} = 1 + 11,679 \cdot 10^{-2} + \frac{1}{2} 16,09 \cdot 10^{-2} = 1,497$$

$$I(V = 159,96 \text{ Km/h}) = I_{33} = 1 + 12,356 \cdot 10^{-2} + \frac{1}{2} 16,09 \cdot 10^{-2} = 1,204$$

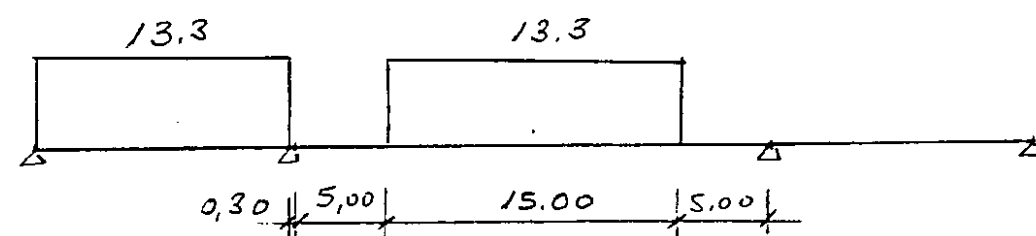
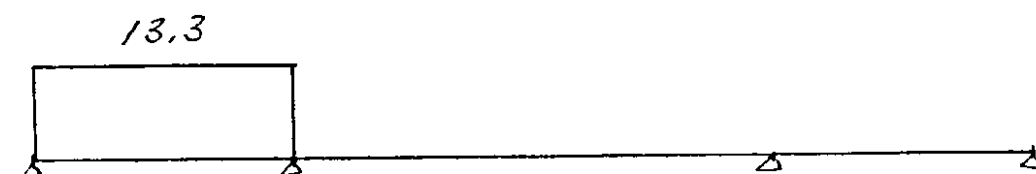
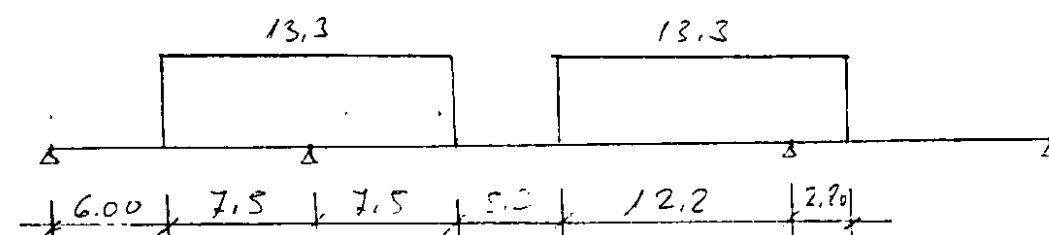
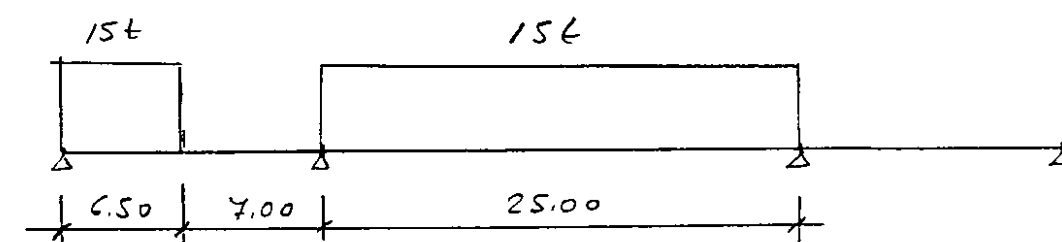
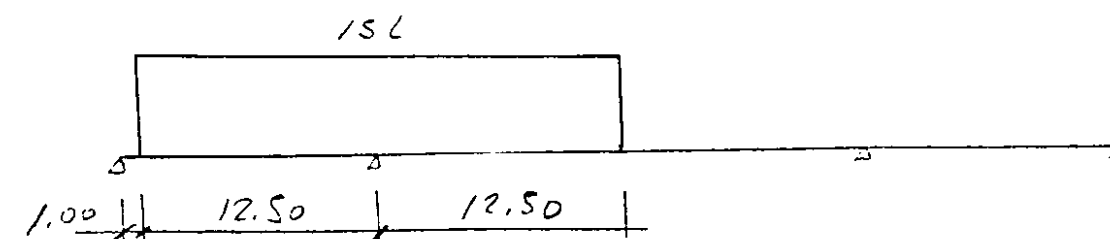
$$I(V = 228,31 \text{ Km/h}) = I_{42} = 1 + 18,611 \cdot 10^{-2} + \frac{1}{2} 16,09 \cdot 10^{-2} = 1,267$$

$$I(V = 239,95 \text{ Km/h}) = I_{32} = 1 + 19,672 \cdot 10^{-2} + \frac{1}{2} 16,09 \cdot 10^{-2} = 1,277$$

$$I(V = V_{\max} = 350 \text{ Km/h}) = 1 + 31,556 \cdot 10^{-2} + \frac{1}{2} 16,09 \cdot 10^{-2} = 1,396 \sim 1,4$$

$$I(V = 350 \text{ Km/h}) = 1 + 20,736 \cdot 10^{-2} + \frac{1}{2} 16,09 \cdot 10^{-2} = 1,288$$

ESFUERZOS DE SOBRECARGA

TREN TIPO SW-0Hipótesis 4Hipótesis 5Hipótesis 6TREN TIPO SW-2Hipótesis 7Hipótesis 8Hipótesis 9

 Título: 0 Fecha : 09/12/99
 Descripción de la combinación :
 H004 1.11

1 * [+ (SOBREC4.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-56.14	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-46.10	0.00	0.00	0.00	34.77	7.19	-9.25
4	4	0.68	0.00	-46.10	0.00	0.00	0.00	34.77	7.19	-9.25
4	5	1.35	0.00	-36.21	0.00	0.00	0.00	62.34	12.88	-16.59
5	5	1.35	0.00	-36.21	0.00	0.00	0.00	62.34	12.88	-16.59
5	6	2.03	0.00	-26.17	0.00	0.00	0.00	83.55	17.27	-22.24
6	6	2.03	0.00	-26.17	0.00	0.00	0.00	83.54	17.27	-22.24
6	7	2.70	0.00	-16.28	0.00	0.00	0.00	97.77	20.21	-26.02
7	7	2.70	0.00	-16.28	0.00	0.00	0.00	97.77	20.21	-26.02
7	8	3.38	0.00	-6.24	0.00	0.00	0.00	105.42	21.79	-28.06
8	8	3.38	0.00	-6.24	0.00	0.00	0.00	105.42	21.79	-28.06
8	9	4.05	0.00	3.65	0.00	0.00	0.00	106.29	21.97	-28.29
9	9	4.05	0.00	3.65	0.00	0.00	0.00	106.29	21.97	-28.29
9	10	4.72	0.00	13.54	0.00	0.00	0.00	100.53	20.78	-26.76
10	10	4.72	0.00	13.54	0.00	0.00	0.00	100.53	20.78	-26.76
10	11	5.40	0.00	23.58	0.00	0.00	0.00	87.91	18.17	-23.40
11	11	5.40	0.00	23.58	0.00	0.00	0.00	87.91	18.17	-23.40
11	12	6.07	0.00	33.48	0.00	0.00	0.00	68.80	14.22	-18.31
12	12	6.07	0.00	33.47	0.00	0.00	0.00	68.80	14.22	-18.31
12	13	6.75	0.00	43.51	0.00	0.00	0.00	42.62	8.81	-11.35
13	13	6.75	0.00	43.51	0.00	0.00	0.00	42.62	8.81	-11.35
13	14	7.43	0.00	53.55	0.00	0.00	0.00	9.62	1.99	-2.56
14	14	7.43	0.00	53.55	0.00	0.00	0.00	9.62	1.99	-2.56
14	15	8.10	0.00	63.44	0.00	0.00	0.00	-29.57	-6.11	7.87
15	15	8.10	0.00	63.44	0.00	0.00	0.00	-29.57	-6.11	7.87
15	16	8.77	0.00	73.33	0.00	0.00	0.00	-75.39	-15.58	20.07
16	16	8.77	0.00	73.34	0.00	0.00	0.00	-75.39	-15.58	20.07
16	17	9.45	0.00	83.37	0.00	0.00	0.00	-128.67	-26.59	34.25
17	17	9.45	0.00	83.37	0.00	0.00	0.00	-128.67	-26.59	34.25
17	18	10.13	0.00	93.42	0.00	0.00	0.00	-188.78	-39.02	50.25
18	18	10.13	0.00	93.41	0.00	0.00	0.00	-188.78	-39.02	50.25
18	19	10.80	0.00	103.30	0.00	0.00	0.00	-254.68	-52.64	67.79
19	19	10.80	0.00	103.31	0.00	0.00	0.00	-254.68	-52.64	67.79
19	20	11.48	0.00	113.34	0.00	0.00	0.00	-328.34	-67.86	87.40
20	20	11.48	0.00	113.34	0.00	0.00	0.00	-328.34	-67.86	87.40
20	21	12.15	0.00	123.23	0.00	0.00	0.00	-407.58	-84.24	108.49

21	21	12.15	0.00	123.23	0.00	0.00	0.00	-407.58	-84.24	108.49
21	22	12.82	0.00	133.12	0.00	0.00	0.00	-493.46	-101.99	131.35
22	22	12.82	0.00	133.12	0.00	0.00	0.00	-493.46	-101.99	131.35
22	23	13.50	0.00	143.16	0.00	0.00	0.00	-587.40	-121.41	156.36
23	23	13.50	0.00	-117.35	0.00	0.00	0.00	-587.40	-121.41	156.36
23	24	14.75	0.00	-117.35	0.00	0.00	0.00	-440.71	-96.97	138.68
24	24	14.75	0.00	-117.35	0.00	0.00	0.00	-440.71	-96.97	138.68
24	25	16.00	0.00	-117.35	0.00	0.00	0.00	-294.02	-64.69	92.52
25	25	16.00	0.00	-117.35	0.00	0.00	0.00	-294.02	-64.69	92.52
25	26	17.25	0.00	-117.35	0.00	0.00	0.00	-147.33	-32.42	46.36
26	26	17.25	0.00	-117.35	0.00	0.00	0.00	-147.33	-32.42	46.36
26	27	18.50	0.00	-117.35	0.00	0.00	0.00	-0.64	-0.14	0.20
27	27	18.50	0.00	-117.36	0.00	0.00	0.00	-0.64	-0.14	0.20
27	28	19.75	0.00	-98.90	0.00	0.00	0.00	134.51	29.60	-42.33
28	28	19.75	0.00	-98.90	0.00	0.00	0.00	134.51	29.60	-42.33
28	29	21.00	0.00	-80.44	0.00	0.00	0.00	246.61	54.26	-77.60
29	29	21.00	0.00	-80.44	0.00	0.00	0.00	246.60	54.26	-77.60
29	30	22.25	0.00	-61.99	0.00	0.00	0.00	335.62	73.84	-105.61
30	30	22.25	0.00	-61.98	0.00	0.00	0.00	335.62	73.84	-105.61
30	31	23.50	0.00	-43.53	0.00	0.00	0.00	401.58	88.36	-126.36
31	31	23.50	0.00	-43.53	0.00	0.00	0.00	401.58	88.36	-126.36
31	32	24.75	0.00	-25.07	0.00	0.00	0.00	444.47	97.79	-139.86
32	32	24.75	0.00	-25.10	0.00	0.00	0.00	444.46	97.79	-139.85
32	33	26.00	0.00	-6.64	0.00	0.00	0.00	464.29	102.15	-146.09
33	33	26.00	0.00	-6.64	0.00	0.00	0.00	464.28	102.15	-146.09
33	34	27.25	0.00	11.82	0.00	0.00	0.00	461.04	101.44	-145.07
34	34	27.25	0.00	11.82	0.00	0.00	0.00	461.03	101.44	-145.07
34	35	28.50	0.00	30.28	0.00	0.00	0.00	434.72	95.65	-136.79
35	35	28.50	0.00	30.27	0.00	0.00	0.00	434.72	95.65	-136.79
35	36	29.75	0.00	48.73	0.00	0.00	0.00	385.34	84.78	-121.25
36	36	29.75	0.00	48.73	0.00	0.00	0.00	385.34	84.78	-121.25
36	37	31.00	0.00	67.19	0.00	0.00	0.00	312.89	68.84	-98.45
37	37	31.00	0.00	67.19	0.00	0.00	0.00	312.90	68.84	-98.46
37	38	32.25	0.00	85.64	0.00	0.00	0.00	217.37	47.83	-68.40
38	38	32.25	0.00	85.64	0.00	0.00	0.00	217.37	47.83	-68.40
38	39	33.50	0.00	104.10	0.00	0.00	0.00	98.79	21.74	-31.09
39	39	33.50	0.00	104.10	0.00	0.00	0.00	98.79	21.74	-31.09
39	40	34.75	0.00	104.10	0.00	0.00	0.00	-31.32	-6.89	9.86
40	40	34.75	0.00	104.10	0.00	0.00	0.00	-31.32	-6.89	9.86
40	41	36.00	0.00	104.10	0.00	0.00	0.00	-161.45	-35.52	50.80
41	41	36.00	0.00	104.10	0.00	0.00	0.00	-161.44	-35.52	50.80
41	42	37.25	0.00	104.10	0.00	0.00	0.00	-291.56	-64.15	91.74

42	42	37.25	0.00	104.10	0.00	0.00	0.00	-291.56	-64.15	91.74
42	43	38.50	0.00	104.10	0.00	0.00	0.00	-421.68	-87.15	112.24
43	43	38.50	0.00	-31.24	0.00	0.00	0.00	-421.68	-87.15	112.24
43	44	39.17	0.00	-31.24	0.00	0.00	0.00	-400.75	-82.83	106.67
44	44	39.17	0.00	-31.24	0.00	0.00	0.00	-400.75	-82.83	106.67
44	45	39.85	0.00	-31.24	0.00	0.00	0.00	-379.51	-78.44	101.02
45	45	39.85	0.00	-31.22	0.00	0.00	0.00	-379.51	-78.44	101.02
45	46	40.53	0.00	-31.22	0.00	0.00	0.00	-358.27	-74.05	95.37
46	46	40.53	0.00	-31.22	0.00	0.00	0.00	-358.26	-74.05	95.36
46	47	41.20	0.00	-31.22	0.00	0.00	0.00	-337.34	-69.72	89.79
47	47	41.20	0.00	-31.25	0.00	0.00	0.00	-337.34	-69.72	89.79
47	48	41.88	0.00	-31.25	0.00	0.00	0.00	-316.09	-65.33	84.14
48	48	41.88	0.00	-31.24	0.00	0.00	0.00	-316.09	-65.33	84.14
48	49	42.55	0.00	-31.24	0.00	0.00	0.00	-295.17	-61.01	78.57
49	49	42.55	0.00	-31.22	0.00	0.00	0.00	-295.17	-61.01	78.57
49	50	43.22	0.00	-31.22	0.00	0.00	0.00	-274.25	-56.68	73.00
50	50	43.22	0.00	-31.25	0.00	0.00	0.00	-274.25	-56.68	73.00
50	51	43.90	0.00	-31.25	0.00	0.00	0.00	-253.00	-52.29	67.35
51	51	43.90	0.00	-31.24	0.00	0.00	0.00	-253.00	-52.29	67.35
51	52	44.58	0.00	-31.24	0.00	0.00	0.00	-231.77	-47.90	61.69
52	52	44.58	0.00	-31.24	0.00	0.00	0.00	-231.77	-47.90	61.69
52	53	45.25	0.00	-31.24	0.00	0.00	0.00	-210.83	-43.58	56.12
53	53	45.25	0.00	-31.25	0.00	0.00	0.00	-210.84	-43.58	56.12
53	54	45.92	0.00	-31.25	0.00	0.00	0.00	-189.91	-39.25	50.55
54	54	45.92	0.00	-31.25	0.00	0.00	0.00	-189.91	-39.25	50.55
54	55	46.60	0.00	-31.25	0.00	0.00	0.00	-168.66	-34.86	44.90
55	55	46.60	0.00	-31.24	0.00	0.00	0.00	-168.66	-34.86	44.90
55	56	47.28	0.00	-31.24	0.00	0.00	0.00	-147.43	-30.47	39.24
56	56	47.28	0.00	-31.24	0.00	0.00	0.00	-147.43	-30.47	39.24
56	57	47.95	0.00	-31.24	0.00	0.00	0.00	-126.51	-26.15	33.67
57	57	47.95	0.00	-31.22	0.00	0.00	0.00	-126.51	-26.15	33.67
57	58	48.63	0.00	-31.22	0.00	0.00	0.00	-105.27	-21.76	28.02
58	58	48.63	0.00	-31.24	0.00	0.00	0.00	-105.26	-21.76	28.02
58	59	49.30	0.00	-31.24	0.00	0.00	0.00	-84.34	-17.43	22.45
59	59	49.30	0.00	-31.22	0.00	0.00	0.00	-84.34	-17.43	22.45
59	60	49.97	0.00	-31.22	0.00	0.00	0.00	-63.40	-13.10	16.88
60	60	49.97	0.00	-31.24	0.00	0.00	0.00	-63.40	-13.10	16.88
60	61	50.65	0.00	-31.24	0.00	0.00	0.00	-42.17	-8.72	11.22
61	61	50.65	0.00	-31.24	0.00	0.00	0.00	-42.17	-8.72	11.22
61	62	51.33	0.00	-31.24	0.00	0.00	0.00	-20.92	-4.32	5.57
62	62	51.33	0.00	-31.24	0.00	0.00	0.00	-20.92	-4.32	5.57
62	63	52.00	0.00	-31.24	0.00	0.00	0.00	0.00	0.00	0.00

 Título: Fecha : 09/12/99
 Descripción de la combinación :
 H005 1.11

1 * [+ (SOBREC5.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-90.49	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-80.45	0.00	0.00	0.00	58.12	12.01	-15.47
4	4	0.68	0.00	-80.45	0.00	0.00	0.00	58.12	12.01	-15.47
4	5	1.35	0.00	-70.56	0.00	0.00	0.00	108.71	22.47	-28.94
5	5	1.35	0.00	-70.56	0.00	0.00	0.00	108.71	22.47	-28.94
5	6	2.03	0.00	-60.53	0.00	0.00	0.00	153.28	31.68	-40.80
6	6	2.03	0.00	-60.52	0.00	0.00	0.00	153.27	31.68	-40.80
6	7	2.70	0.00	-50.63	0.00	0.00	0.00	190.51	39.38	-50.71
7	7	2.70	0.00	-50.62	0.00	0.00	0.00	190.51	39.38	-50.71
7	8	3.38	0.00	-40.58	0.00	0.00	0.00	221.52	45.79	-58.97
8	8	3.38	0.00	-40.58	0.00	0.00	0.00	221.53	45.79	-58.97
8	9	4.05	0.00	-30.69	0.00	0.00	0.00	245.41	50.72	-65.32
9	9	4.05	0.00	-30.71	0.00	0.00	0.00	245.41	50.72	-65.32
9	10	4.72	0.00	-20.82	0.00	0.00	0.00	262.67	54.29	-69.92
10	10	4.72	0.00	-20.80	0.00	0.00	0.00	262.67	54.29	-69.92
10	11	5.40	0.00	-10.76	0.00	0.00	0.00	273.39	56.51	-72.77
11	11	5.40	0.00	-10.77	0.00	0.00	0.00	273.40	56.51	-72.78
11	12	6.07	0.00	-0.88	0.00	0.00	0.00	277.30	57.31	-73.81
12	12	6.07	0.00	-0.88	0.00	0.00	0.00	277.30	57.31	-73.81
12	13	6.75	0.00	9.16	0.00	0.00	0.00	274.49	56.73	-73.07
13	13	6.75	0.00	9.17	0.00	0.00	0.00	274.49	56.73	-73.07
13	14	7.43	0.00	19.20	0.00	0.00	0.00	264.85	54.74	-70.50
14	14	7.43	0.00	19.20	0.00	0.00	0.00	264.85	54.74	-70.50
14	15	8.10	0.00	29.09	0.00	0.00	0.00	248.66	51.39	-66.19
15	15	8.10	0.00	29.08	0.00	0.00	0.00	248.66	51.39	-66.19
15	16	8.77	0.00	38.97	0.00	0.00	0.00	225.86	46.68	-60.12
16	16	8.77	0.00	38.98	0.00	0.00	0.00	225.86	46.68	-60.12
16	17	9.45	0.00	49.02	0.00	0.00	0.00	195.94	40.50	-52.16
17	17	9.45	0.00	49.02	0.00	0.00	0.00	195.95	40.50	-52.16
17	18	10.13	0.00	59.06	0.00	0.00	0.00	159.20	32.90	-42.38
18	18	10.13	0.00	59.06	0.00	0.00	0.00	159.20	32.90	-42.38
18	19	10.80	0.00	68.95	0.00	0.00	0.00	116.32	24.04	-30.96
19	19	10.80	0.00	68.95	0.00	0.00	0.00	116.32	24.04	-30.96
19	20	11.48	0.00	78.99	0.00	0.00	0.00	66.01	13.64	-17.57
20	20	11.48	0.00	78.99	0.00	0.00	0.00	66.01	13.64	-17.57
20	21	12.15	0.00	88.88	0.00	0.00	0.00	9.78	2.02	-2.60

21	21	12.15	0.00	88.89	0.00	0.00	0.00	9.78	2.02	-2.60
21	22	12.82	0.00	98.78	0.00	0.00	0.00	-53.09	-10.97	14.13
22	22	12.82	0.00	98.77	0.00	0.00	0.00	-53.09	-10.97	14.13
22	23	13.50	0.00	108.81	0.00	0.00	0.00	-123.67	-25.56	32.92
23	23	13.50	0.00	-6.63	0.00	0.00	0.00	-123.67	-25.56	32.92
23	24	14.75	0.00	-6.63	0.00	0.00	0.00	-115.37	-25.38	36.30
24	24	14.75	0.00	-6.63	0.00	0.00	0.00	-115.37	-25.38	36.30
24	25	16.00	0.00	-6.63	0.00	0.00	0.00	-107.09	-23.56	33.70
25	25	16.00	0.00	-6.63	0.00	0.00	0.00	-107.09	-23.56	33.70
25	26	17.25	0.00	-6.63	0.00	0.00	0.00	-98.80	-21.74	31.09
26	26	17.25	0.00	-6.63	0.00	0.00	0.00	-98.80	-21.74	31.09
26	27	18.50	0.00	-6.63	0.00	0.00	0.00	-90.52	-19.92	28.48
27	27	18.50	0.00	-6.63	0.00	0.00	0.00	-90.52	-19.92	28.48
27	28	19.75	0.00	-6.63	0.00	0.00	0.00	-82.23	-18.09	25.87
28	28	19.75	0.00	-6.63	0.00	0.00	0.00	-82.23	-18.09	25.87
28	29	21.00	0.00	-6.63	0.00	0.00	0.00	-73.95	-16.27	23.27
29	29	21.00	0.00	-6.63	0.00	0.00	0.00	-73.95	-16.27	23.27
29	30	22.25	0.00	-6.63	0.00	0.00	0.00	-65.67	-14.45	20.66
30	30	22.25	0.00	-6.63	0.00	0.00	0.00	-65.66	-14.45	20.66
30	31	23.50	0.00	-6.63	0.00	0.00	0.00	-57.38	-12.62	18.05
31	31	23.50	0.00	-6.63	0.00	0.00	0.00	-57.38	-12.62	18.05
31	32	24.75	0.00	-6.63	0.00	0.00	0.00	-49.08	-10.80	15.44
32	32	24.75	0.00	-6.63	0.00	0.00	0.00	-49.08	-10.80	15.44
32	33	26.00	0.00	-6.63	0.00	0.00	0.00	-40.80	-8.98	12.84
33	33	26.00	0.00	-6.63	0.00	0.00	0.00	-40.80	-8.98	12.84
33	34	27.25	0.00	-6.63	0.00	0.00	0.00	-32.51	-7.15	10.23
34	34	27.25	0.00	-6.63	0.00	0.00	0.00	-32.51	-7.15	10.23
34	35	28.50	0.00	-6.63	0.00	0.00	0.00	-24.23	-5.33	7.62
35	35	28.50	0.00	-6.63	0.00	0.00	0.00	-24.23	-5.33	7.62
35	36	29.75	0.00	-6.63	0.00	0.00	0.00	-15.94	-3.51	5.02
36	36	29.75	0.00	-6.63	0.00	0.00	0.00	-15.94	-3.51	5.02
36	37	31.00	0.00	-6.63	0.00	0.00	0.00	-7.66	-1.69	2.41
37	37	31.00	0.00	-6.63	0.00	0.00	0.00	-7.66	-1.69	2.41
37	38	32.25	0.00	-6.63	0.00	0.00	0.00	0.63	0.14	-0.20
38	38	32.25	0.00	-6.63	0.00	0.00	0.00	0.63	0.14	-0.20
38	39	33.50	0.00	-6.63	0.00	0.00	0.00	8.91	1.96	-2.80
39	39	33.50	0.00	-6.63	0.00	0.00	0.00	8.91	1.96	-2.80
39	40	34.75	0.00	-6.63	0.00	0.00	0.00	17.20	3.79	-5.41
40	40	34.75	0.00	-6.63	0.00	0.00	0.00	17.20	3.79	-5.41
40	41	36.00	0.00	-6.63	0.00	0.00	0.00	25.49	5.61	-8.02
41	41	36.00	0.00	-6.63	0.00	0.00	0.00	25.49	5.61	-8.02
41	42	37.25	0.00	-6.63	0.00	0.00	0.00	33.78	7.43	-10.63

42	42	37.25	0.00	-6.63	0.00	0.00	0.00	33.78	7.43	-10.63
42	43	38.50	0.00	-6.63	0.00	0.00	0.00	42.06	8.69	-11.20
43	43	38.50	0.00	3.12	0.00	0.00	0.00	42.06	8.69	-11.20
43	44	39.17	0.00	3.12	0.00	0.00	0.00	39.97	8.26	-10.64
44	44	39.17	0.00	3.12	0.00	0.00	0.00	39.97	8.26	-10.64
44	45	39.85	0.00	3.12	0.00	0.00	0.00	37.85	7.82	-10.08
45	45	39.85	0.00	3.12	0.00	0.00	0.00	37.85	7.82	-10.08
45	46	40.53	0.00	3.12	0.00	0.00	0.00	35.73	7.39	-9.51
46	46	40.53	0.00	3.12	0.00	0.00	0.00	35.73	7.39	-9.51
46	47	41.20	0.00	3.12	0.00	0.00	0.00	33.64	6.95	-8.96
47	47	41.20	0.00	3.12	0.00	0.00	0.00	33.64	6.95	-8.96
47	48	41.88	0.00	3.12	0.00	0.00	0.00	31.52	6.52	-8.39
48	48	41.88	0.00	3.12	0.00	0.00	0.00	31.52	6.52	-8.39
48	49	42.55	0.00	3.12	0.00	0.00	0.00	29.44	6.08	-7.84
49	49	42.55	0.00	3.12	0.00	0.00	0.00	29.44	6.08	-7.84
49	50	43.22	0.00	3.12	0.00	0.00	0.00	27.35	5.65	-7.28
50	50	43.22	0.00	3.12	0.00	0.00	0.00	27.35	5.65	-7.28
50	51	43.90	0.00	3.12	0.00	0.00	0.00	25.23	5.21	-6.72
51	51	43.90	0.00	3.12	0.00	0.00	0.00	25.23	5.21	-6.72
51	52	44.58	0.00	3.12	0.00	0.00	0.00	23.12	4.78	-6.15
52	52	44.58	0.00	3.12	0.00	0.00	0.00	23.12	4.78	-6.15
52	53	45.25	0.00	3.12	0.00	0.00	0.00	21.03	4.35	-5.60
53	53	45.25	0.00	3.12	0.00	0.00	0.00	21.03	4.35	-5.60
53	54	45.92	0.00	3.12	0.00	0.00	0.00	18.94	3.91	-5.04
54	54	45.92	0.00	3.12	0.00	0.00	0.00	18.94	3.91	-5.04
54	55	46.60	0.00	3.12	0.00	0.00	0.00	16.83	3.48	-4.48
55	55	46.60	0.00	3.12	0.00	0.00	0.00	16.83	3.48	-4.48
55	56	47.28	0.00	3.12	0.00	0.00	0.00	14.71	3.04	-3.91
56	56	47.28	0.00	3.12	0.00	0.00	0.00	14.71	3.04	-3.91
56	57	47.95	0.00	3.12	0.00	0.00	0.00	12.62	2.61	-3.36
57	57	47.95	0.00	3.12	0.00	0.00	0.00	12.62	2.61	-3.36
57	58	48.63	0.00	3.12	0.00	0.00	0.00	10.50	2.17	-2.80
58	58	48.63	0.00	3.12	0.00	0.00	0.00	10.50	2.17	-2.80
58	59	49.30	0.00	3.12	0.00	0.00	0.00	8.41	1.74	-2.24
59	59	49.30	0.00	3.12	0.00	0.00	0.00	8.41	1.74	-2.24
59	60	49.97	0.00	3.12	0.00	0.00	0.00	6.33	1.31	-1.68
60	60	49.97	0.00	3.12	0.00	0.00	0.00	6.33	1.31	-1.68
60	61	50.65	0.00	3.12	0.00	0.00	0.00	4.21	0.87	-1.12
61	61	50.65	0.00	3.12	0.00	0.00	0.00	4.21	0.87	-1.12
61	62	51.33	0.00	3.12	0.00	0.00	0.00	2.09	0.43	-0.56
62	62	51.33	0.00	3.12	0.00	0.00	0.00	2.09	0.43	-0.56
62	63	52.00	0.00	3.12	0.00	0.00	0.00	0.00	0.00	0.00

Título: Fecha : 09/12/99
 Descripción de la combinación :
 H006 1.11

1 * [+ (SOBREC6.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	4.67	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	4.67	0.00	0.00	0.00	-3.17	-0.66	0.85
4	4	0.68	0.00	4.67	0.00	0.00	0.00	-3.17	-0.66	0.85
4	5	1.35	0.00	4.67	0.00	0.00	0.00	-6.30	-1.30	1.68
5	5	1.35	0.00	4.67	0.00	0.00	0.00	-6.30	-1.30	1.68
5	6	2.03	0.00	4.67	0.00	0.00	0.00	-9.48	-1.96	2.52
6	6	2.03	0.00	4.67	0.00	0.00	0.00	-9.48	-1.96	2.52
6	7	2.70	0.00	4.67	0.00	0.00	0.00	-12.61	-2.61	3.36
7	7	2.70	0.00	4.67	0.00	0.00	0.00	-12.61	-2.61	3.36
7	8	3.38	0.00	4.67	0.00	0.00	0.00	-15.78	-3.26	4.20
8	8	3.38	0.00	4.67	0.00	0.00	0.00	-15.78	-3.26	4.20
8	9	4.05	0.00	4.67	0.00	0.00	0.00	-18.91	-3.91	5.03
9	9	4.05	0.00	4.67	0.00	0.00	0.00	-18.91	-3.91	5.03
9	10	4.72	0.00	4.67	0.00	0.00	0.00	-22.03	-4.55	5.86
10	10	4.72	0.00	4.67	0.00	0.00	0.00	-22.04	-4.56	5.87
10	11	5.40	0.00	4.67	0.00	0.00	0.00	-25.21	-5.21	6.71
11	11	5.40	0.00	4.66	0.00	0.00	0.00	-25.22	-5.21	6.71
11	12	6.07	0.00	4.66	0.00	0.00	0.00	-28.34	-5.86	7.54
12	12	6.07	0.00	4.67	0.00	0.00	0.00	-28.34	-5.86	7.54
12	13	6.75	0.00	14.71	0.00	0.00	0.00	-34.93	-7.22	9.30
13	13	6.75	0.00	14.71	0.00	0.00	0.00	-34.93	-7.22	9.30
13	14	7.43	0.00	24.74	0.00	0.00	0.00	-48.34	-9.99	12.87
14	14	7.43	0.00	24.74	0.00	0.00	0.00	-48.34	-9.99	12.87
14	15	8.10	0.00	34.63	0.00	0.00	0.00	-68.24	-14.10	18.17
15	15	8.10	0.00	34.64	0.00	0.00	0.00	-68.24	-14.10	18.17
15	16	8.77	0.00	44.53	0.00	0.00	0.00	-94.76	-19.59	25.22
16	16	8.77	0.00	44.53	0.00	0.00	0.00	-94.76	-19.59	25.22
16	17	9.45	0.00	54.57	0.00	0.00	0.00	-128.45	-26.55	34.19
17	17	9.45	0.00	54.57	0.00	0.00	0.00	-128.45	-26.55	34.19
17	18	10.13	0.00	64.60	0.00	0.00	0.00	-168.98	-34.92	44.98
18	18	10.13	0.00	64.60	0.00	0.00	0.00	-168.98	-34.92	44.98
18	19	10.80	0.00	74.49	0.00	0.00	0.00	-215.57	-44.56	57.38
19	19	10.80	0.00	74.50	0.00	0.00	0.00	-215.57	-44.56	57.38
19	20	11.48	0.00	84.54	0.00	0.00	0.00	-269.64	-55.73	71.77
20	20	11.48	0.00	84.53	0.00	0.00	0.00	-269.64	-55.73	71.77
20	21	12.15	0.00	94.43	0.00	0.00	0.00	-329.59	-68.12	87.73

21	21	12.15	0.00	94.43	0.00	0.00	0.00	-329.59	-68.12	87.73
21	22	12.82	0.00	104.32	0.00	0.00	0.00	-396.18	-81.88	105.46
22	22	12.82	0.00	104.32	0.00	0.00	0.00	-396.18	-81.88	105.46
22	23	13.50	0.00	114.35	0.00	0.00	0.00	-470.53	-97.25	125.25
23	23	13.50	0.00	-141.86	0.00	0.00	0.00	-470.53	-97.25	125.25
23	24	14.75	0.00	-123.41	0.00	0.00	0.00	-304.74	-67.05	95.89
24	24	14.75	0.00	-123.41	0.00	0.00	0.00	-304.74	-67.05	95.89
24	25	16.00	0.00	-104.95	0.00	0.00	0.00	-162.02	-35.65	50.98
25	25	16.00	0.00	-104.95	0.00	0.00	0.00	-162.02	-35.65	50.98
25	26	17.25	0.00	-86.50	0.00	0.00	0.00	-42.36	-9.32	13.33
26	26	17.25	0.00	-86.50	0.00	0.00	0.00	-42.36	-9.32	13.33
26	27	18.50	0.00	-68.04	0.00	0.00	0.00	54.23	11.93	-17.07
27	27	18.50	0.00	-68.04	0.00	0.00	0.00	54.23	11.93	-17.07
27	28	19.75	0.00	-49.58	0.00	0.00	0.00	127.76	28.11	-40.20
28	28	19.75	0.00	-49.58	0.00	0.00	0.00	127.76	28.11	-40.20
28	29	21.00	0.00	-31.14	0.00	0.00	0.00	178.22	39.21	-56.08
29	29	21.00	0.00	-31.14	0.00	0.00	0.00	178.22	39.21	-56.08
29	30	22.25	0.00	-31.14	0.00	0.00	0.00	217.15	47.78	-68.33
30	30	22.25	0.00	-31.14	0.00	0.00	0.00	217.15	47.78	-68.33
30	31	23.50	0.00	-31.14	0.00	0.00	0.00	256.07	56.34	-80.57
31	31	23.50	0.00	-31.14	0.00	0.00	0.00	256.07	56.34	-80.57
31	32	24.75	0.00	-31.14	0.00	0.00	0.00	294.98	64.90	-92.82
32	32	24.75	0.00	-31.15	0.00	0.00	0.00	294.98	64.90	-92.82
32	33	26.00	0.00	-31.15	0.00	0.00	0.00	333.90	73.47	-105.07
33	33	26.00	0.00	-31.15	0.00	0.00	0.00	333.90	73.47	-105.07
33	34	27.25	0.00	-12.69	0.00	0.00	0.00	361.29	79.49	-113.69
34	34	27.25	0.00	-12.69	0.00	0.00	0.00	361.29	79.49	-113.69
34	35	28.50	0.00	5.76	0.00	0.00	0.00	365.62	80.45	-115.05
35	35	28.50	0.00	5.77	0.00	0.00	0.00	365.62	80.45	-115.05
35	36	29.75	0.00	24.22	0.00	0.00	0.00	346.88	76.32	-109.15
36	36	29.75	0.00	24.23	0.00	0.00	0.00	346.88	76.32	-109.15
36	37	31.00	0.00	42.68	0.00	0.00	0.00	305.06	67.12	-95.99
37	37	31.00	0.00	42.67	0.00	0.00	0.00	305.06	67.12	-95.99
37	38	32.25	0.00	61.12	0.00	0.00	0.00	240.18	52.85	-75.58
38	38	32.25	0.00	61.13	0.00	0.00	0.00	240.18	52.85	-75.58
38	39	33.50	0.00	79.59	0.00	0.00	0.00	152.24	33.50	-47.90
39	39	33.50	0.00	79.59	0.00	0.00	0.00	152.24	33.50	-47.90
39	40	34.75	0.00	98.05	0.00	0.00	0.00	41.23	9.07	-12.97
40	40	34.75	0.00	98.04	0.00	0.00	0.00	41.23	9.07	-12.97
40	41	36.00	0.00	116.49	0.00	0.00	0.00	-92.86	-20.43	29.22
41	41	36.00	0.00	116.49	0.00	0.00	0.00	-92.86	-20.43	29.22
41	42	37.25	0.00	134.94	0.00	0.00	0.00	-250.01	-55.01	78.67

42	42	37.25	0.00	134.94	0.00	0.00	0.00	-250.01	-55.01	78.67
42	43	38.50	0.00	153.40	0.00	0.00	0.00	-430.22	-88.92	114.52
43	43	38.50	0.00	-67.74	0.00	0.00	0.00	-430.22	-88.92	114.52
43	44	39.17	0.00	-57.85	0.00	0.00	0.00	-388.14	-80.22	103.32
44	44	39.17	0.00	-57.85	0.00	0.00	0.00	-388.14	-80.22	103.32
44	45	39.85	0.00	-47.81	0.00	0.00	0.00	-352.23	-72.80	93.76
45	45	39.85	0.00	-47.81	0.00	0.00	0.00	-352.23	-72.80	93.76
45	46	40.53	0.00	-37.77	0.00	0.00	0.00	-323.13	-66.79	86.01
46	46	40.53	0.00	-37.77	0.00	0.00	0.00	-323.12	-66.78	86.01
46	47	41.20	0.00	-27.88	0.00	0.00	0.00	-301.13	-62.24	80.16
47	47	41.20	0.00	-27.89	0.00	0.00	0.00	-301.13	-62.24	80.16
47	48	41.88	0.00	-27.89	0.00	0.00	0.00	-282.16	-58.32	75.11
48	48	41.88	0.00	-27.91	0.00	0.00	0.00	-282.17	-58.32	75.11
48	49	42.55	0.00	-27.91	0.00	0.00	0.00	-263.48	-54.46	70.13
49	49	42.55	0.00	-27.88	0.00	0.00	0.00	-263.49	-54.46	70.14
49	50	43.22	0.00	-27.88	0.00	0.00	0.00	-244.81	-50.60	65.16
50	50	43.22	0.00	-27.89	0.00	0.00	0.00	-244.81	-50.60	65.16
50	51	43.90	0.00	-27.89	0.00	0.00	0.00	-225.85	-46.68	60.12
51	51	43.90	0.00	-27.89	0.00	0.00	0.00	-225.85	-46.68	60.12
51	52	44.58	0.00	-27.89	0.00	0.00	0.00	-206.88	-42.76	55.07
52	52	44.58	0.00	-27.88	0.00	0.00	0.00	-206.89	-42.76	55.07
52	53	45.25	0.00	-27.88	0.00	0.00	0.00	-188.21	-38.90	50.10
53	53	45.25	0.00	-27.88	0.00	0.00	0.00	-188.21	-38.90	50.10
53	54	45.92	0.00	-27.88	0.00	0.00	0.00	-169.53	-35.04	45.13
54	54	45.92	0.00	-27.87	0.00	0.00	0.00	-169.53	-35.04	45.13
54	55	46.60	0.00	-27.87	0.00	0.00	0.00	-150.57	-31.12	40.08
55	55	46.60	0.00	-27.88	0.00	0.00	0.00	-150.57	-31.12	40.08
55	56	47.28	0.00	-27.88	0.00	0.00	0.00	-131.60	-27.20	35.03
56	56	47.28	0.00	-27.87	0.00	0.00	0.00	-131.60	-27.20	35.03
56	57	47.95	0.00	-27.87	0.00	0.00	0.00	-112.92	-23.34	30.06
57	57	47.95	0.00	-27.88	0.00	0.00	0.00	-112.92	-23.34	30.06
57	58	48.63	0.00	-27.88	0.00	0.00	0.00	-93.96	-19.42	25.01
58	58	48.63	0.00	-27.88	0.00	0.00	0.00	-93.96	-19.42	25.01
58	59	49.30	0.00	-27.88	0.00	0.00	0.00	-75.28	-15.56	20.04
59	59	49.30	0.00	-27.88	0.00	0.00	0.00	-75.28	-15.56	20.04
59	60	49.97	0.00	-27.88	0.00	0.00	0.00	-56.60	-11.70	15.07
60	60	49.97	0.00	-27.88	0.00	0.00	0.00	-56.60	-11.70	15.07
60	61	50.65	0.00	-27.88	0.00	0.00	0.00	-37.64	-7.78	10.02
61	61	50.65	0.00	-27.88	0.00	0.00	0.00	-37.64	-7.78	10.02
61	62	51.33	0.00	-27.88	0.00	0.00	0.00	-18.68	-3.86	4.97
62	62	51.33	0.00	-27.88	0.00	0.00	0.00	-18.68	-3.86	4.97
62	63	52.00	0.00	-27.88	0.00	0.00	0.00	0.00	0.00	0.00

 Titulo: Fecha : 09/12/99
 Descripción de la combinación :
 H007 1.11

1 * [+ (SOBREC7.ANL * 1.11)]

Barra	Nudo	X	Axial(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-30.87	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-19.55	0.00	0.00	0.00	17.14	3.54	-4.56
4	4	0.68	0.00	-19.54	0.00	0.00	0.00	17.14	3.54	-4.56
4	5	1.35	0.00	-8.38	0.00	0.00	0.00	26.50	5.48	-7.05
5	5	1.35	0.00	-8.38	0.00	0.00	0.00	26.50	5.48	-7.05
5	6	2.03	0.00	2.94	0.00	0.00	0.00	28.35	5.86	-7.55
6	6	2.03	0.00	2.93	0.00	0.00	0.00	28.35	5.86	-7.55
6	7	2.70	0.00	14.09	0.00	0.00	0.00	22.64	4.68	-6.03
7	7	2.70	0.00	14.10	0.00	0.00	0.00	22.64	4.68	-6.03
7	8	3.38	0.00	25.42	0.00	0.00	0.00	9.21	1.90	-2.45
8	8	3.38	0.00	25.41	0.00	0.00	0.00	9.21	1.90	-2.45
8	9	4.05	0.00	36.56	0.00	0.00	0.00	-11.56	-2.39	3.08
9	9	4.05	0.00	36.56	0.00	0.00	0.00	-11.56	-2.39	3.08
9	10	4.72	0.00	47.72	0.00	0.00	0.00	-39.79	-8.22	10.59
10	10	4.72	0.00	47.73	0.00	0.00	0.00	-39.78	-8.22	10.59
10	11	5.40	0.00	59.05	0.00	0.00	0.00	-76.09	-15.73	20.25
11	11	5.40	0.00	59.04	0.00	0.00	0.00	-76.09	-15.73	20.25
11	12	6.07	0.00	70.20	0.00	0.00	0.00	-119.39	-24.68	31.78
12	12	6.07	0.00	70.21	0.00	0.00	0.00	-119.39	-24.68	31.78
12	13	6.75	0.00	81.53	0.00	0.00	0.00	-170.98	-35.34	45.51
13	13	6.75	0.00	81.53	0.00	0.00	0.00	-170.97	-35.34	45.51
13	14	7.43	0.00	81.53	0.00	0.00	0.00	-226.42	-46.80	60.27
14	14	7.43	0.00	81.53	0.00	0.00	0.00	-226.42	-46.80	60.27
14	15	8.10	0.00	81.53	0.00	0.00	0.00	-281.03	-58.08	74.81
15	15	8.10	0.00	81.52	0.00	0.00	0.00	-281.03	-58.08	74.81
15	16	8.77	0.00	81.52	0.00	0.00	0.00	-335.65	-69.37	89.35
16	16	8.77	0.00	81.52	0.00	0.00	0.00	-335.65	-69.37	89.35
16	17	9.45	0.00	81.52	0.00	0.00	0.00	-391.09	-80.83	104.10
17	17	9.45	0.00	81.52	0.00	0.00	0.00	-391.09	-80.83	104.10
17	18	10.13	0.00	81.52	0.00	0.00	0.00	-446.52	-92.29	118.86
18	18	10.13	0.00	81.52	0.00	0.00	0.00	-446.52	-92.29	118.86
18	19	10.80	0.00	81.52	0.00	0.00	0.00	-501.15	-103.58	133.40
19	19	10.80	0.00	81.53	0.00	0.00	0.00	-501.14	-103.58	133.40
19	20	11.48	0.00	81.53	0.00	0.00	0.00	-556.59	-115.04	148.15
20	20	11.48	0.00	81.51	0.00	0.00	0.00	-556.58	-115.04	148.15
20	21	12.15	0.00	81.51	0.00	0.00	0.00	-611.20	-126.33	162.69

21	21	12.15	0.00	81.52	0.00	0.00	0.00	-611.20	-126.33	162.69
21	22	12.82	0.00	81.52	0.00	0.00	0.00	-665.82	-137.62	177.23
22	22	12.82	0.00	81.53	0.00	0.00	0.00	-665.82	-137.62	177.23
22	23	13.50	0.00	81.53	0.00	0.00	0.00	-721.26	-149.07	191.99
23	23	13.50	0.00	-211.40	0.00	0.00	0.00	-721.26	-149.07	191.99
23	24	14.75	0.00	-190.59	0.00	0.00	0.00	-470.02	-103.41	147.90
24	24	14.75	0.00	-190.59	0.00	0.00	0.00	-470.02	-103.41	147.90
24	25	16.00	0.00	-169.77	0.00	0.00	0.00	-244.80	-53.86	77.03
25	25	16.00	0.00	-169.76	0.00	0.00	0.00	-244.80	-53.86	77.03
25	26	17.25	0.00	-148.95	0.00	0.00	0.00	-45.59	-10.03	14.34
26	26	17.25	0.00	-148.96	0.00	0.00	0.00	-45.60	-10.03	14.35
26	27	18.50	0.00	-128.15	0.00	0.00	0.00	127.59	28.07	-40.15
27	27	18.50	0.00	-128.15	0.00	0.00	0.00	127.59	28.07	-40.15
27	28	19.75	0.00	-107.34	0.00	0.00	0.00	274.77	60.46	-86.46
28	28	19.75	0.00	-107.35	0.00	0.00	0.00	274.77	60.46	-86.46
28	29	21.00	0.00	-86.54	0.00	0.00	0.00	395.93	87.11	-124.58
29	29	21.00	0.00	-86.52	0.00	0.00	0.00	395.94	87.11	-124.59
29	30	22.25	0.00	-65.71	0.00	0.00	0.00	491.06	108.04	-154.52
30	30	22.25	0.00	-65.70	0.00	0.00	0.00	491.08	108.05	-154.52
30	31	23.50	0.00	-44.89	0.00	0.00	0.00	560.19	123.26	-176.27
31	31	23.50	0.00	-44.89	0.00	0.00	0.00	560.21	123.26	-176.28
31	32	24.75	0.00	-24.08	0.00	0.00	0.00	603.31	132.74	-189.84
32	32	24.75	0.00	-24.10	0.00	0.00	0.00	603.31	132.74	-189.84
32	33	26.00	0.00	-3.29	0.00	0.00	0.00	620.41	136.50	-195.22
33	33	26.00	0.00	-3.26	0.00	0.00	0.00	620.41	136.50	-195.22
33	34	27.25	0.00	17.55	0.00	0.00	0.00	611.50	134.54	-192.42
34	34	27.25	0.00	17.54	0.00	0.00	0.00	611.50	134.54	-192.42
34	35	28.50	0.00	38.35	0.00	0.00	0.00	576.55	126.85	-181.42
35	35	28.50	0.00	38.35	0.00	0.00	0.00	576.56	126.86	-181.42
35	36	29.75	0.00	59.16	0.00	0.00	0.00	515.60	113.44	-162.24
36	36	29.75	0.00	59.16	0.00	0.00	0.00	515.60	113.44	-162.24
36	37	31.00	0.00	79.98	0.00	0.00	0.00	428.65	94.31	-134.88
37	37	31.00	0.00	79.96	0.00	0.00	0.00	428.64	94.31	-134.88
37	38	32.25	0.00	100.78	0.00	0.00	0.00	315.66	69.45	-99.33
38	38	32.25	0.00	100.79	0.00	0.00	0.00	315.65	69.45	-99.32
38	39	33.50	0.00	121.60	0.00	0.00	0.00	176.67	38.87	-55.59
39	39	33.50	0.00	121.60	0.00	0.00	0.00	176.66	38.87	-55.59
39	40	34.75	0.00	142.41	0.00	0.00	0.00	11.64	2.56	-3.66
40	40	34.75	0.00	142.41	0.00	0.00	0.00	11.64	2.56	-3.66
40	41	36.00	0.00	163.23	0.00	0.00	0.00	-179.38	-39.47	56.44
41	41	36.00	0.00	163.23	0.00	0.00	0.00	-179.39	-39.47	56.45
41	42	37.25	0.00	184.04	0.00	0.00	0.00	-396.43	-87.22	124.74

42	42	37.25	0.00	184.04	0.00	0.00	0.00	-396.43	-87.22	124.74
42	43	38.50	0.00	204.85	0.00	0.00	0.00	-639.48	-132.17	170.22
43	43	38.50	0.00	-47.37	0.00	0.00	0.00	-639.49	-132.17	170.22
43	44	39.17	0.00	-47.37	0.00	0.00	0.00	-607.75	-125.61	161.77
44	44	39.17	0.00	-47.35	0.00	0.00	0.00	-607.75	-125.61	161.77
44	45	39.85	0.00	-47.35	0.00	0.00	0.00	-575.54	-118.95	153.20
45	45	39.85	0.00	-47.36	0.00	0.00	0.00	-575.54	-118.95	153.20
45	46	40.53	0.00	-47.36	0.00	0.00	0.00	-543.32	-112.30	144.62
46	46	40.53	0.00	-47.36	0.00	0.00	0.00	-543.32	-112.30	144.62
46	47	41.20	0.00	-47.36	0.00	0.00	0.00	-511.59	-105.74	136.18
47	47	41.20	0.00	-47.36	0.00	0.00	0.00	-511.59	-105.74	136.18
47	48	41.88	0.00	-47.36	0.00	0.00	0.00	-479.38	-99.08	127.60
48	48	41.88	0.00	-47.39	0.00	0.00	0.00	-479.39	-99.08	127.61
48	49	42.55	0.00	-47.39	0.00	0.00	0.00	-447.63	-92.52	119.15
49	49	42.55	0.00	-47.37	0.00	0.00	0.00	-447.64	-92.52	119.15
49	50	43.22	0.00	-47.37	0.00	0.00	0.00	-415.89	-85.96	110.70
50	50	43.22	0.00	-47.39	0.00	0.00	0.00	-415.91	-85.96	110.71
50	51	43.90	0.00	-47.39	0.00	0.00	0.00	-383.68	-79.30	102.13
51	51	43.90	0.00	-47.34	0.00	0.00	0.00	-383.69	-79.30	102.13
51	52	44.58	0.00	-47.34	0.00	0.00	0.00	-351.48	-72.65	93.56
52	52	44.58	0.00	-47.39	0.00	0.00	0.00	-351.48	-72.65	93.56
52	53	45.25	0.00	-47.39	0.00	0.00	0.00	-319.74	-66.08	85.11
53	53	45.25	0.00	-47.37	0.00	0.00	0.00	-319.75	-66.09	85.11
53	54	45.92	0.00	-47.37	0.00	0.00	0.00	-288.01	-59.53	76.66
54	54	45.92	0.00	-47.35	0.00	0.00	0.00	-288.00	-59.53	76.66
54	55	46.60	0.00	-47.35	0.00	0.00	0.00	-255.80	-52.87	68.09
55	55	46.60	0.00	-47.36	0.00	0.00	0.00	-255.79	-52.87	68.09
55	56	47.28	0.00	-47.36	0.00	0.00	0.00	-223.59	-46.21	59.52
56	56	47.28	0.00	-47.35	0.00	0.00	0.00	-223.59	-46.21	59.52
56	57	47.95	0.00	-47.35	0.00	0.00	0.00	-191.85	-39.65	51.07
57	57	47.95	0.00	-47.36	0.00	0.00	0.00	-191.85	-39.65	51.07
57	58	48.63	0.00	-47.36	0.00	0.00	0.00	-159.64	-33.00	42.49
58	58	48.63	0.00	-47.37	0.00	0.00	0.00	-159.64	-33.00	42.49
58	59	49.30	0.00	-47.37	0.00	0.00	0.00	-127.89	-26.43	34.04
59	59	49.30	0.00	-47.36	0.00	0.00	0.00	-127.89	-26.43	34.04
59	60	49.97	0.00	-47.36	0.00	0.00	0.00	-96.16	-19.87	25.60
60	60	49.97	0.00	-47.37	0.00	0.00	0.00	-96.16	-19.87	25.60
60	61	50.65	0.00	-47.37	0.00	0.00	0.00	-63.95	-13.22	17.02
61	61	50.65	0.00	-47.36	0.00	0.00	0.00	-63.95	-13.22	17.02
61	62	51.33	0.00	-47.36	0.00	0.00	0.00	-31.73	-6.56	8.45
62	62	51.33	0.00	-47.36	0.00	0.00	0.00	-31.73	-6.56	8.45
62	63	52.00	0.00	-47.36	0.00	0.00	0.00	0.00	0.00	0.00

Título: Fecha : 09/12/99
Descripción de la combinación :
H008 1.11

1 * [+ (SOBREC8.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-102.05	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-90.73	0.00	0.00	0.00	65.55	13.55	-17.45
4	4	0.68	0.00	-90.73	0.00	0.00	0.00	65.55	13.55	-17.45
4	5	1.35	0.00	-79.58	0.00	0.00	0.00	122.60	25.34	-32.63
5	5	1.35	0.00	-79.59	0.00	0.00	0.00	122.60	25.34	-32.63
5	6	2.03	0.00	-68.26	0.00	0.00	0.00	172.87	35.73	-46.02
6	6	2.03	0.00	-68.25	0.00	0.00	0.00	172.87	35.73	-46.02
6	7	2.70	0.00	-57.10	0.00	0.00	0.00	214.86	44.41	-57.19
7	7	2.70	0.00	-57.11	0.00	0.00	0.00	214.86	44.41	-57.19
7	8	3.38	0.00	-45.79	0.00	0.00	0.00	249.85	51.64	-66.51
8	8	3.38	0.00	-45.77	0.00	0.00	0.00	249.85	51.64	-66.51
8	9	4.05	0.00	-34.61	0.00	0.00	0.00	276.78	57.21	-73.67
9	9	4.05	0.00	-34.63	0.00	0.00	0.00	276.78	57.21	-73.67
9	10	4.72	0.00	-23.48	0.00	0.00	0.00	296.24	61.23	-78.85
10	10	4.72	0.00	-23.48	0.00	0.00	0.00	296.24	61.23	-78.85
10	11	5.40	0.00	-12.15	0.00	0.00	0.00	308.35	63.73	-82.08
11	11	5.40	0.00	-12.14	0.00	0.00	0.00	308.35	63.73	-82.08
11	12	6.07	0.00	-0.99	0.00	0.00	0.00	312.74	64.64	-83.25
12	12	6.07	0.00	-1.01	0.00	0.00	0.00	312.74	64.64	-83.25
12	13	6.75	0.00	10.31	0.00	0.00	0.00	309.58	63.99	-82.40
13	13	6.75	0.00	10.32	0.00	0.00	0.00	309.57	63.98	-82.40
13	14	7.43	0.00	21.65	0.00	0.00	0.00	298.70	61.74	-79.51
14	14	7.43	0.00	21.66	0.00	0.00	0.00	298.70	61.74	-79.51
14	15	8.10	0.00	32.81	0.00	0.00	0.00	280.45	57.97	-74.65
15	15	8.10	0.00	32.81	0.00	0.00	0.00	280.45	57.97	-74.65
15	16	8.77	0.00	43.97	0.00	0.00	0.00	254.73	52.65	-67.81
16	16	8.77	0.00	43.97	0.00	0.00	0.00	254.75	52.65	-67.81
16	17	9.45	0.00	55.29	0.00	0.00	0.00	220.99	45.68	-58.82
17	17	9.45	0.00	55.28	0.00	0.00	0.00	220.99	45.68	-58.82
17	18	10.13	0.00	66.60	0.00	0.00	0.00	179.54	37.11	-47.79
18	18	10.13	0.00	66.61	0.00	0.00	0.00	179.54	37.11	-47.79
18	19	10.80	0.00	77.77	0.00	0.00	0.00	131.18	27.11	-34.92
19	19	10.80	0.00	77.77	0.00	0.00	0.00	131.18	27.11	-34.92
19	20	11.48	0.00	89.09	0.00	0.00	0.00	74.45	15.39	-19.82
20	20	11.48	0.00	89.09	0.00	0.00	0.00	74.45	15.39	-19.82
20	21	12.15	0.00	100.24	0.00	0.00	0.00	11.02	2.28	-2.93

21	21	12.15	0.00	100.24	0.00	0.00	0.00	11.03	2.28	-2.94
21	22	12.82	0.00	111.40	0.00	0.00	0.00	-59.87	-12.37	15.94
22	22	12.82	0.00	111.40	0.00	0.00	0.00	-59.87	-12.37	15.94
22	23	13.50	0.00	122.72	0.00	0.00	0.00	-139.47	-28.83	37.13
23	23	13.50	0.00	-7.48	0.00	0.00	0.00	-139.47	-28.83	37.13
23	24	14.75	0.00	-7.48	0.00	0.00	0.00	-130.13	-28.63	40.95
24	24	14.75	0.00	-7.48	0.00	0.00	0.00	-130.13	-28.63	40.95
24	25	16.00	0.00	-7.48	0.00	0.00	0.00	-120.78	-26.57	38.00
25	25	16.00	0.00	-7.48	0.00	0.00	0.00	-120.78	-26.57	38.00
25	26	17.25	0.00	-7.48	0.00	0.00	0.00	-111.43	-24.52	35.06
26	26	17.25	0.00	-7.48	0.00	0.00	0.00	-111.43	-24.52	35.06
26	27	18.50	0.00	-7.48	0.00	0.00	0.00	-102.09	-22.46	32.12
27	27	18.50	0.00	-7.47	0.00	0.00	0.00	-102.09	-22.46	32.12
27	28	19.75	0.00	-7.47	0.00	0.00	0.00	-92.74	-20.40	29.18
28	28	19.75	0.00	-7.48	0.00	0.00	0.00	-92.74	-20.40	29.18
28	29	21.00	0.00	-7.48	0.00	0.00	0.00	-83.39	-18.35	26.24
29	29	21.00	0.00	-7.47	0.00	0.00	0.00	-83.41	-18.35	26.24
29	30	22.25	0.00	-7.47	0.00	0.00	0.00	-74.05	-16.29	23.30
30	30	22.25	0.00	-7.48	0.00	0.00	0.00	-74.06	-16.29	23.30
30	31	23.50	0.00	-7.48	0.00	0.00	0.00	-64.71	-14.24	20.36
31	31	23.50	0.00	-7.47	0.00	0.00	0.00	-64.71	-14.24	20.36
31	32	24.75	0.00	-7.47	0.00	0.00	0.00	-55.37	-12.18	17.42
32	32	24.75	0.00	-7.48	0.00	0.00	0.00	-55.37	-12.18	17.42
32	33	26.00	0.00	-7.48	0.00	0.00	0.00	-46.02	-10.13	14.48
33	33	26.00	0.00	-7.48	0.00	0.00	0.00	-46.02	-10.13	14.48
33	34	27.25	0.00	-7.48	0.00	0.00	0.00	-36.67	-8.07	11.54
34	34	27.25	0.00	-7.48	0.00	0.00	0.00	-36.67	-8.07	11.54
34	35	28.50	0.00	-7.48	0.00	0.00	0.00	-27.33	-6.01	8.60
35	35	28.50	0.00	-7.48	0.00	0.00	0.00	-27.33	-6.01	8.60
35	36	29.75	0.00	-7.48	0.00	0.00	0.00	-17.98	-3.96	5.66
36	36	29.75	0.00	-7.47	0.00	0.00	0.00	-17.98	-3.96	5.66
36	37	31.00	0.00	-7.47	0.00	0.00	0.00	-8.64	-1.90	2.72
37	37	31.00	0.00	-7.48	0.00	0.00	0.00	-8.64	-1.90	2.72
37	38	32.25	0.00	-7.48	0.00	0.00	0.00	0.71	0.16	-0.22
38	38	32.25	0.00	-7.48	0.00	0.00	0.00	0.71	0.16	-0.22
38	39	33.50	0.00	-7.48	0.00	0.00	0.00	10.06	2.21	-3.16
39	39	33.50	0.00	-7.48	0.00	0.00	0.00	10.06	2.21	-3.16
39	40	34.75	0.00	-7.48	0.00	0.00	0.00	19.40	4.27	-6.11
40	40	34.75	0.00	-7.47	0.00	0.00	0.00	19.40	4.27	-6.11
40	41	36.00	0.00	-7.47	0.00	0.00	0.00	28.75	6.33	-9.05
41	41	36.00	0.00	-7.48	0.00	0.00	0.00	28.74	6.32	-9.04
41	42	37.25	0.00	-7.48	0.00	0.00	0.00	38.08	8.38	-11.98

42	42	37.25	0.00	-7.48	0.00	0.00	0.00	38.08	8.38	-11.98
42	43	38.50	0.00	-7.48	0.00	0.00	0.00	47.43	9.80	-12.63
43	43	38.50	0.00	3.52	0.00	0.00	0.00	47.43	9.80	-12.63
43	44	39.17	0.00	3.52	0.00	0.00	0.00	45.08	9.32	-12.00
44	44	39.17	0.00	3.52	0.00	0.00	0.00	45.08	9.32	-12.00
44	45	39.85	0.00	3.52	0.00	0.00	0.00	42.69	8.82	-11.36
45	45	39.85	0.00	3.51	0.00	0.00	0.00	42.69	8.82	-11.36
45	46	40.53	0.00	3.51	0.00	0.00	0.00	40.30	8.33	-10.73
46	46	40.53	0.00	3.51	0.00	0.00	0.00	40.30	8.33	-10.73
46	47	41.20	0.00	3.51	0.00	0.00	0.00	37.95	7.84	-10.10
47	47	41.20	0.00	3.51	0.00	0.00	0.00	37.95	7.84	-10.10
47	48	41.88	0.00	3.51	0.00	0.00	0.00	35.55	7.35	-9.46
48	48	41.88	0.00	3.51	0.00	0.00	0.00	35.55	7.35	-9.46
48	49	42.55	0.00	3.51	0.00	0.00	0.00	33.20	6.86	-8.84
49	49	42.55	0.00	3.51	0.00	0.00	0.00	33.20	6.86	-8.84
49	50	43.22	0.00	3.51	0.00	0.00	0.00	30.85	6.38	-8.21
50	50	43.22	0.00	3.52	0.00	0.00	0.00	30.85	6.38	-8.21
50	51	43.90	0.00	3.52	0.00	0.00	0.00	28.46	5.88	-7.58
51	51	43.90	0.00	3.52	0.00	0.00	0.00	28.46	5.88	-7.58
51	52	44.58	0.00	3.52	0.00	0.00	0.00	26.07	5.39	-6.94
52	52	44.58	0.00	3.52	0.00	0.00	0.00	26.07	5.39	-6.94
52	53	45.25	0.00	3.52	0.00	0.00	0.00	23.72	4.90	-6.31
53	53	45.25	0.00	3.52	0.00	0.00	0.00	23.72	4.90	-6.31
53	54	45.92	0.00	3.52	0.00	0.00	0.00	21.37	4.42	-5.69
54	54	45.92	0.00	3.51	0.00	0.00	0.00	21.37	4.42	-5.69
54	55	46.60	0.00	3.51	0.00	0.00	0.00	18.97	3.92	-5.05
55	55	46.60	0.00	3.52	0.00	0.00	0.00	18.97	3.92	-5.05
55	56	47.28	0.00	3.52	0.00	0.00	0.00	16.58	3.43	-4.41
56	56	47.28	0.00	3.52	0.00	0.00	0.00	16.58	3.43	-4.41
56	57	47.95	0.00	3.52	0.00	0.00	0.00	14.23	2.94	-3.79
57	57	47.95	0.00	3.52	0.00	0.00	0.00	14.23	2.94	-3.79
57	58	48.63	0.00	3.52	0.00	0.00	0.00	11.84	2.45	-3.15
58	58	48.63	0.00	3.52	0.00	0.00	0.00	11.84	2.45	-3.15
58	59	49.30	0.00	3.52	0.00	0.00	0.00	9.49	1.96	-2.53
59	59	49.30	0.00	3.51	0.00	0.00	0.00	9.49	1.96	-2.53
59	60	49.97	0.00	3.51	0.00	0.00	0.00	7.14	1.48	-1.90
60	60	49.97	0.00	3.52	0.00	0.00	0.00	7.14	1.48	-1.90
60	61	50.65	0.00	3.52	0.00	0.00	0.00	4.74	0.98	-1.26
61	61	50.65	0.00	3.52	0.00	0.00	0.00	4.74	0.98	-1.26
61	62	51.33	0.00	3.52	0.00	0.00	0.00	2.35	0.49	-0.63
62	62	51.33	0.00	3.52	0.00	0.00	0.00	2.35	0.49	-0.63
62	63	52.00	0.00	3.52	0.00	0.00	0.00	0.00	0.00	0.00

 Título: Fecha : 09/12/99
 Descripción de la combinación :
 H009 1.11

1 * [+ (SOBREC9.ANL * 1.11)]

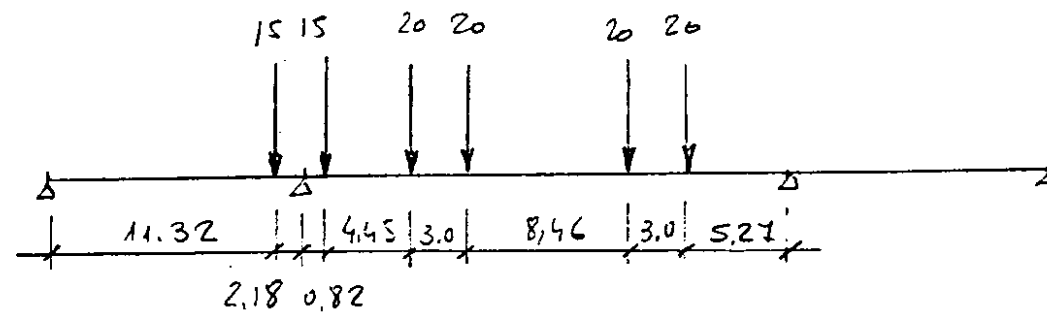
Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-60.43	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-60.43	0.00	0.00	0.00	41.09	8.49	-10.94
4	4	0.68	0.00	-60.43	0.00	0.00	0.00	41.09	8.49	-10.94
4	5	1.35	0.00	-49.27	0.00	0.00	0.00	77.83	16.09	-20.72
5	5	1.35	0.00	-49.27	0.00	0.00	0.00	77.83	16.09	-20.72
5	6	2.03	0.00	-37.95	0.00	0.00	0.00	107.49	22.22	-28.61
6	6	2.03	0.00	-37.95	0.00	0.00	0.00	107.49	22.22	-28.61
6	7	2.70	0.00	-26.80	0.00	0.00	0.00	129.18	26.70	-34.39
7	7	2.70	0.00	-26.80	0.00	0.00	0.00	129.18	26.70	-34.39
7	8	3.38	0.00	-15.47	0.00	0.00	0.00	143.55	29.67	-38.21
8	8	3.38	0.00	-15.47	0.00	0.00	0.00	143.55	29.67	-38.21
8	9	4.05	0.00	-4.32	0.00	0.00	0.00	150.18	31.04	-39.98
9	9	4.05	0.00	-4.31	0.00	0.00	0.00	150.18	31.04	-39.98
9	10	4.72	0.00	6.85	0.00	0.00	0.00	149.33	30.86	-39.75
10	10	4.72	0.00	6.84	0.00	0.00	0.00	149.33	30.86	-39.75
10	11	5.40	0.00	18.16	0.00	0.00	0.00	140.83	29.11	-37.49
11	11	5.40	0.00	18.16	0.00	0.00	0.00	140.83	29.11	-37.49
11	12	6.07	0.00	29.32	0.00	0.00	0.00	124.93	25.82	-33.25
12	12	6.07	0.00	29.32	0.00	0.00	0.00	124.92	25.82	-33.25
12	13	6.75	0.00	40.64	0.00	0.00	0.00	101.14	20.90	-26.92
13	13	6.75	0.00	40.64	0.00	0.00	0.00	101.14	20.90	-26.92
13	14	7.43	0.00	51.96	0.00	0.00	0.00	69.65	14.40	-18.54
14	14	7.43	0.00	51.96	0.00	0.00	0.00	69.65	14.40	-18.54
14	15	8.10	0.00	63.11	0.00	0.00	0.00	31.10	6.43	-8.28
15	15	8.10	0.00	63.11	0.00	0.00	0.00	31.10	6.43	-8.28
15	16	8.77	0.00	74.27	0.00	0.00	0.00	-14.92	-3.08	3.97
16	16	8.77	0.00	74.27	0.00	0.00	0.00	-14.92	-3.08	3.97
16	17	9.45	0.00	85.59	0.00	0.00	0.00	-69.28	-14.32	18.44
17	17	9.45	0.00	85.59	0.00	0.00	0.00	-69.28	-14.32	18.44
17	18	10.13	0.00	96.91	0.00	0.00	0.00	-131.34	-27.15	34.96
18	18	10.13	0.00	96.91	0.00	0.00	0.00	-131.34	-27.15	34.96
18	19	10.80	0.00	108.07	0.00	0.00	0.00	-200.00	-41.34	53.24
19	19	10.80	0.00	108.07	0.00	0.00	0.00	-200.00	-41.34	53.24
19	20	11.48	0.00	119.39	0.00	0.00	0.00	-277.34	-57.32	73.82
20	20	11.48	0.00	119.39	0.00	0.00	0.00	-277.34	-57.32	73.82
20	21	12.15	0.00	130.55	0.00	0.00	0.00	-361.07	-74.63	96.11

21	21	12.15	0.00	130.55	0.00	0.00	0.00	-361.07	-74.63	96.11
21	22	12.82	0.00	141.70	0.00	0.00	0.00	-452.28	-93.48	120.39
22	22	12.82	0.00	141.70	0.00	0.00	0.00	-452.28	-93.48	120.39
22	23	13.50	0.00	153.02	0.00	0.00	0.00	-552.49	-114.19	147.06
23	23	13.50	0.00	-170.22	0.00	0.00	0.00	-552.49	-114.19	147.06
23	24	14.75	0.00	-149.41	0.00	0.00	0.00	-352.72	-77.61	110.99
24	24	14.75	0.00	-149.41	0.00	0.00	0.00	-352.72	-77.61	110.99
24	25	16.00	0.00	-128.59	0.00	0.00	0.00	-178.97	-39.38	56.31
25	25	16.00	0.00	-128.59	0.00	0.00	0.00	-178.97	-39.38	56.31
25	26	17.25	0.00	-107.78	0.00	0.00	0.00	-31.24	-6.87	9.83
26	26	17.25	0.00	-107.78	0.00	0.00	0.00	-31.24	-6.87	9.83
26	27	18.50	0.00	-86.97	0.00	0.00	0.00	90.49	19.91	-28.47
27	27	18.50	0.00	-86.97	0.00	0.00	0.00	90.49	19.91	-28.47
27	28	19.75	0.00	-66.16	0.00	0.00	0.00	186.19	40.97	-58.59
28	28	19.75	0.00	-66.16	0.00	0.00	0.00	186.19	40.97	-58.59
28	29	21.00	0.00	-45.34	0.00	0.00	0.00	255.89	56.30	-80.52
29	29	21.00	0.00	-45.34	0.00	0.00	0.00	255.89	56.30	-80.52
29	30	22.25	0.00	-24.53	0.00	0.00	0.00	299.56	65.91	-94.26
30	30	22.25	0.00	-24.53	0.00	0.00	0.00	299.57	65.91	-94.26
30	31	23.50	0.00	-3.72	0.00	0.00	0.00	317.22	69.79	-99.82
31	31	23.50	0.00	-3.72	0.00	0.00	0.00	317.22	69.79	-99.82
31	32	24.75	0.00	17.09	0.00	0.00	0.00	308.86	67.96	-97.19
32	32	24.75	0.00	17.09	0.00	0.00	0.00	308.86	67.96	-97.19
32	33	26.00	0.00	37.91	0.00	0.00	0.00	274.48	60.39	-86.37
33	33	26.00	0.00	37.91	0.00	0.00	0.00	274.48	60.39	-86.37
33	34	27.25	0.00	37.91	0.00	0.00	0.00	227.11	49.97	-71.46
34	34	27.25	0.00	37.91	0.00	0.00	0.00	227.11	49.97	-71.46
34	35	28.50	0.00	37.91	0.00	0.00	0.00	179.72	39.54	-56.55
35	35	28.50	0.00	37.90	0.00	0.00	0.00	179.72	39.54	-56.55
35	36	29.75	0.00	37.90	0.00	0.00	0.00	132.35	29.12	-41.64
36	36	29.75	0.00	37.90	0.00	0.00	0.00	132.35	29.12	-41.64
36	37	31.00	0.00	37.90	0.00	0.00	0.00	84.96	18.69	-26.73
37	37	31.00	0.00	37.91	0.00	0.00	0.00	84.97	18.70	-26.74
37	38	32.25	0.00	37.91	0.00	0.00	0.00	37.58	8.27	-11.83
38	38	32.25	0.00	37.91	0.00	0.00	0.00	37.58	8.27	-11.83
38	39	33.50	0.00	37.91	0.00	0.00	0.00	-9.80	-2.16	3.08
39	39	33.50	0.00	37.91	0.00	0.00	0.00	-9.80	-2.16	3.08
39	40	34.75	0.00	37.91	0.00	0.00	0.00	-57.18	-12.58	17.99
40	40	34.75	0.00	37.91	0.00	0.00	0.00	-57.18	-12.58	17.99
40	41	36.00	0.00	37.91	0.00	0.00	0.00	-104.56	-23.01	32.90
41	41	36.00	0.00	37.91	0.00	0.00	0.00	-104.56	-23.01	32.90
41	42	37.25	0.00	37.91	0.00	0.00	0.00	-151.94	-33.43	47.81

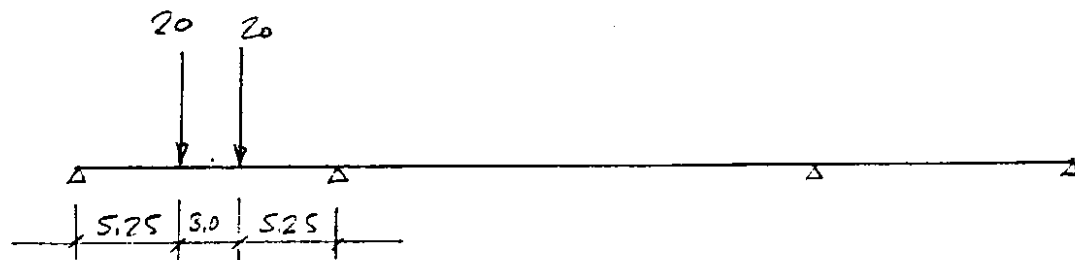
42	42	37.25	0.00	37.91	0.00	0.00	0.00	-151.94	-33.43	47.81
42	43	38.50	0.00	37.91	0.00	0.00	0.00	-199.32	-41.20	53.06
43	43	38.50	0.00	-14.76	0.00	0.00	0.00	-199.32	-41.20	53.06
43	44	39.17	0.00	-14.76	0.00	0.00	0.00	-189.43	-39.15	50.42
44	44	39.17	0.00	-14.76	0.00	0.00	0.00	-189.43	-39.15	50.42
44	45	39.85	0.00	-14.76	0.00	0.00	0.00	-179.39	-37.08	47.75
45	45	39.85	0.00	-14.76	0.00	0.00	0.00	-179.39	-37.08	47.75
45	46	40.53	0.00	-14.76	0.00	0.00	0.00	-169.35	-35.00	45.08
46	46	40.53	0.00	-14.76	0.00	0.00	0.00	-169.35	-35.00	45.08
46	47	41.20	0.00	-14.76	0.00	0.00	0.00	-159.46	-32.96	42.45
47	47	41.20	0.00	-14.76	0.00	0.00	0.00	-159.45	-32.96	42.44
47	48	41.88	0.00	-14.76	0.00	0.00	0.00	-149.42	-30.88	39.77
48	48	41.88	0.00	-14.76	0.00	0.00	0.00	-149.42	-30.88	39.77
48	49	42.55	0.00	-14.76	0.00	0.00	0.00	-139.53	-28.84	37.14
49	49	42.55	0.00	-14.76	0.00	0.00	0.00	-139.53	-28.84	37.14
49	50	43.22	0.00	-14.76	0.00	0.00	0.00	-129.64	-26.79	34.51
50	50	43.22	0.00	-14.76	0.00	0.00	0.00	-129.63	-26.79	34.50
50	51	43.90	0.00	-14.76	0.00	0.00	0.00	-119.59	-24.72	31.83
51	51	43.90	0.00	-14.76	0.00	0.00	0.00	-119.59	-24.72	31.83
51	52	44.58	0.00	-14.76	0.00	0.00	0.00	-109.56	-22.64	29.16
52	52	44.58	0.00	-14.76	0.00	0.00	0.00	-109.56	-22.64	29.16
52	53	45.25	0.00	-14.76	0.00	0.00	0.00	-99.67	-20.60	26.53
53	53	45.25	0.00	-14.75	0.00	0.00	0.00	-99.66	-20.60	26.53
53	54	45.92	0.00	-14.75	0.00	0.00	0.00	-89.77	-18.55	23.89
54	54	45.92	0.00	-14.76	0.00	0.00	0.00	-89.77	-18.55	23.89
54	55	46.60	0.00	-14.76	0.00	0.00	0.00	-79.73	-16.48	21.22
55	55	46.60	0.00	-14.76	0.00	0.00	0.00	-79.73	-16.48	21.22
55	56	47.28	0.00	-14.76	0.00	0.00	0.00	-69.69	-14.40	18.55
56	56	47.28	0.00	-14.76	0.00	0.00	0.00	-69.69	-14.40	18.55
56	57	47.95	0.00	-14.76	0.00	0.00	0.00	-59.80	-12.36	15.92
57	57	47.95	0.00	-14.76	0.00	0.00	0.00	-59.80	-12.36	15.92
57	58	48.63	0.00	-14.76	0.00	0.00	0.00	-49.75	-10.28	13.24
58	58	48.63	0.00	-14.76	0.00	0.00	0.00	-49.76	-10.28	13.25
58	59	49.30	0.00	-14.76	0.00	0.00	0.00	-39.87	-8.24	10.61
59	59	49.30	0.00	-14.77	0.00	0.00	0.00	-39.87	-8.24	10.61
59	60	49.97	0.00	-14.77	0.00	0.00	0.00	-29.97	-6.19	7.98
60	60	49.97	0.00	-14.76	0.00	0.00	0.00	-29.97	-6.19	7.98
60	61	50.65	0.00	-14.76	0.00	0.00	0.00	-19.94	-4.12	5.31
61	61	50.65	0.00	-14.76	0.00	0.00	0.00	-19.94	-4.12	5.31
61	62	51.33	0.00	-14.76	0.00	0.00	0.00	-9.89	-2.04	2.63
62	62	51.33	0.00	-14.76	0.00	0.00	0.00	-9.89	-2.04	2.63
62	63	52.00	0.00	-14.76	0.00	0.00	0.00	0.00	0.00	0.00

TREN TIPO 3

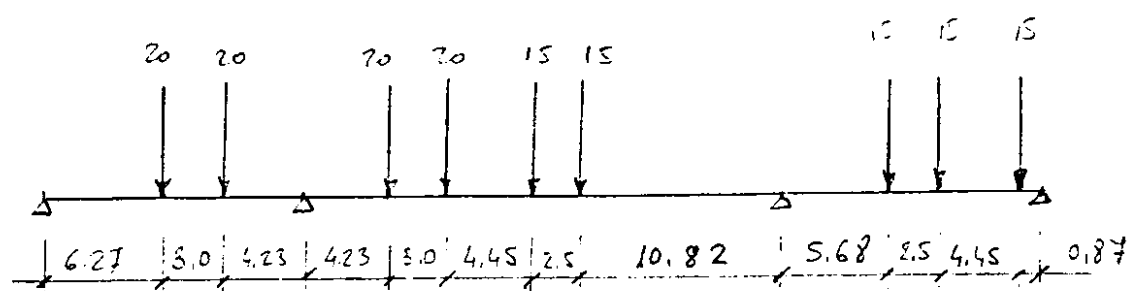
Hipótesis 10



Hipótesis 11

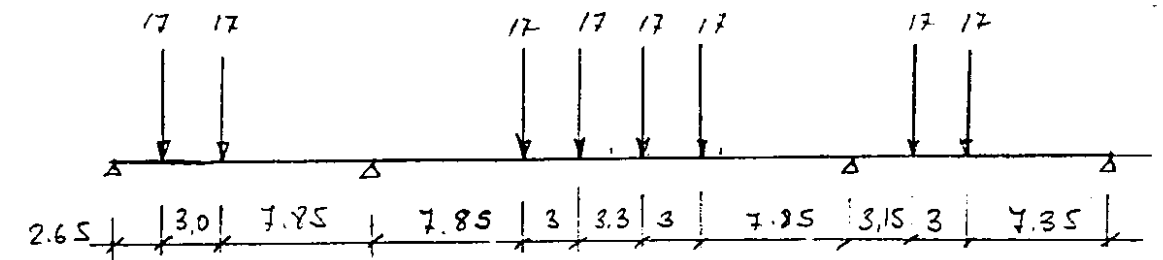


Hipótesis 12

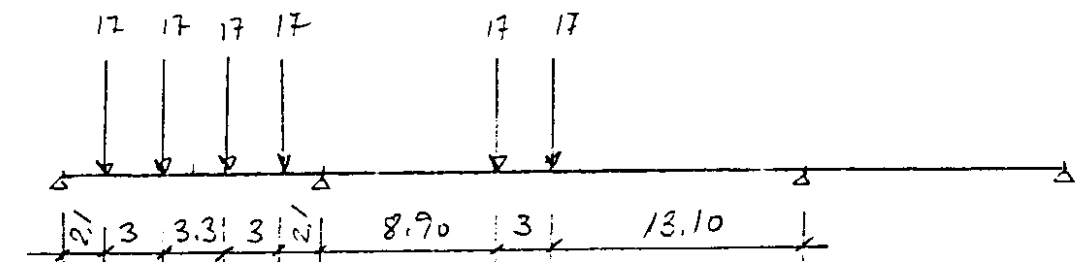


TREN TIPO 4

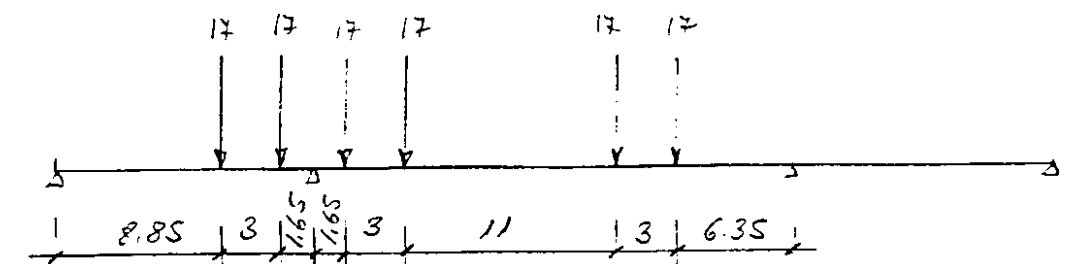
Hipótesis 13



Hipótesis 14



Hipótesis 15



 Titulo: Fecha : 09/12/99
 Descripción de la combinación :
 H010 1.4

1 * [+ (SOBREC10.ANL * 1.4)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	13.64	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	13.64	0.00	0.00	0.00	-9.28	-1.92	2.47
4	4	0.68	0.00	13.64	0.00	0.00	0.00	-9.28	-1.92	2.47
4	5	1.35	0.00	13.64	0.00	0.00	0.00	-18.41	-3.81	4.90
5	5	1.35	0.00	13.64	0.00	0.00	0.00	-18.41	-3.81	4.90
5	6	2.03	0.00	13.64	0.00	0.00	0.00	-27.69	-5.72	7.37
6	6	2.03	0.00	13.64	0.00	0.00	0.00	-27.69	-5.72	7.37
6	7	2.70	0.00	13.64	0.00	0.00	0.00	-36.83	-7.61	9.80
7	7	2.70	0.00	13.65	0.00	0.00	0.00	-36.83	-7.61	9.80
7	8	3.38	0.00	13.65	0.00	0.00	0.00	-46.10	-9.53	12.27
8	8	3.38	0.00	13.65	0.00	0.00	0.00	-46.10	-9.53	12.27
8	9	4.05	0.00	13.65	0.00	0.00	0.00	-55.24	-11.42	14.71
9	9	4.05	0.00	13.64	0.00	0.00	0.00	-55.24	-11.42	14.71
9	10	4.72	0.00	13.64	0.00	0.00	0.00	-64.39	-13.31	17.14
10	10	4.72	0.00	13.64	0.00	0.00	0.00	-64.39	-13.31	17.14
10	11	5.40	0.00	13.64	0.00	0.00	0.00	-73.65	-15.22	19.61
11	11	5.40	0.00	13.64	0.00	0.00	0.00	-73.65	-15.22	19.61
11	12	6.07	0.00	13.64	0.00	0.00	0.00	-82.80	-17.11	22.04
12	12	6.07	0.00	13.64	0.00	0.00	0.00	-82.80	-17.11	22.04
12	13	6.75	0.00	13.64	0.00	0.00	0.00	-92.08	-19.03	24.51
13	13	6.75	0.00	13.65	0.00	0.00	0.00	-92.06	-19.03	24.51
13	14	7.43	0.00	13.65	0.00	0.00	0.00	-101.35	-20.95	26.98
14	14	7.43	0.00	13.64	0.00	0.00	0.00	-101.35	-20.95	26.98
14	15	8.10	0.00	13.64	0.00	0.00	0.00	-110.49	-22.84	29.41
15	15	8.10	0.00	13.64	0.00	0.00	0.00	-110.49	-22.84	29.41
15	16	8.77	0.00	13.64	0.00	0.00	0.00	-119.63	-24.73	31.84
16	16	8.77	0.00	13.65	0.00	0.00	0.00	-119.63	-24.73	31.84
16	17	9.45	0.00	13.65	0.00	0.00	0.00	-128.90	-26.64	34.31
17	17	9.45	0.00	13.64	0.00	0.00	0.00	-128.90	-26.64	34.31
17	18	10.13	0.00	13.64	0.00	0.00	0.00	-138.18	-28.56	36.78
18	18	10.13	0.00	13.64	0.00	0.00	0.00	-138.18	-28.56	36.78
18	19	10.80	0.00	13.64	0.00	0.00	0.00	-147.32	-30.45	39.21
19	19	10.80	0.00	13.64	0.00	0.00	0.00	-147.32	-30.45	39.21
19	20	11.48	0.00	34.64	0.00	0.00	0.00	-159.95	-33.06	42.58
20	20	11.48	0.00	34.64	0.00	0.00	0.00	-159.95	-33.06	42.58
20	21	12.15	0.00	34.64	0.00	0.00	0.00	-183.16	-37.86	48.75

21	21	12.15	0.00	34.64	0.00	0.00	0.00	-183.16	-37.86	48.75
21	22	12.82	0.00	34.64	0.00	0.00	0.00	-206.37	-42.65	54.93
22	22	12.82	0.00	34.64	0.00	0.00	0.00	-206.37	-42.65	54.93
22	23	13.50	0.00	34.64	0.00	0.00	0.00	-229.92	-47.52	61.20
23	23	13.50	0.00	-77.32	0.00	0.00	0.00	-229.92	-47.52	61.20
23	24	14.75	0.00	-56.32	0.00	0.00	0.00	-142.30	-31.31	44.78
24	24	14.75	0.00	-56.32	0.00	0.00	0.00	-142.30	-31.31	44.78
24	25	16.00	0.00	-56.32	0.00	0.00	0.00	-71.89	-15.82	22.62
25	25	16.00	0.00	-56.32	0.00	0.00	0.00	-71.89	-15.82	22.62
25	26	17.25	0.00	-56.32	0.00	0.00	0.00	-1.48	-0.33	0.47
26	26	17.25	0.00	-56.32	0.00	0.00	0.00	-1.48	-0.33	0.47
26	27	18.50	0.00	-56.32	0.00	0.00	0.00	68.92	15.16	-21.69
27	27	18.50	0.00	-56.32	0.00	0.00	0.00	68.91	15.16	-21.68
27	28	19.75	0.00	-28.32	0.00	0.00	0.00	111.89	24.62	-35.21
28	28	19.75	0.00	-28.32	0.00	0.00	0.00	111.87	24.61	-35.20
28	29	21.00	0.00	-28.32	0.00	0.00	0.00	147.29	32.41	-46.35
29	29	21.00	0.00	-28.32	0.00	0.00	0.00	147.28	32.40	-46.34
29	30	22.25	0.00	-0.32	0.00	0.00	0.00	169.26	37.24	-53.26
30	30	22.25	0.00	-0.32	0.00	0.00	0.00	169.25	37.24	-53.26
30	31	23.50	0.00	-0.32	0.00	0.00	0.00	169.65	37.33	-53.38
31	31	23.50	0.00	-0.32	0.00	0.00	0.00	169.65	37.33	-53.38
31	32	24.75	0.00	-0.32	0.00	0.00	0.00	170.06	37.42	-53.51
32	32	24.75	0.00	-0.32	0.00	0.00	0.00	170.07	37.42	-53.52
32	33	26.00	0.00	-0.32	0.00	0.00	0.00	170.46	37.51	-53.64
33	33	26.00	0.00	-0.32	0.00	0.00	0.00	170.46	37.51	-53.64
33	34	27.25	0.00	-0.32	0.00	0.00	0.00	170.87	37.60	-53.77
34	34	27.25	0.00	-0.32	0.00	0.00	0.00	170.87	37.60	-53.77
34	35	28.50	0.00	-0.32	0.00	0.00	0.00	171.28	37.68	-53.89
35	35	28.50	0.00	-0.32	0.00	0.00	0.00	171.28	37.68	-53.89
35	36	29.75	0.00	-0.32	0.00	0.00	0.00	171.68	37.77	-54.02
36	36	29.75	0.00	-0.32	0.00	0.00	0.00	171.68	37.77	-54.02
36	37	31.00	0.00	27.68	0.00	0.00	0.00	150.53	33.12	-47.37
37	37	31.00	0.00	27.68	0.00	0.00	0.00	150.53	33.12	-47.37
37	38	32.25	0.00	27.68	0.00	0.00	0.00	115.93	25.51	-36.48
38	38	32.25	0.00	27.68	0.00	0.00	0.00	115.93	25.51	-36.48
38	39	33.50	0.00	55.68	0.00	0.00	0.00	73.78	16.23	-23.22
39	39	33.50	0.00	55.68	0.00	0.00	0.00	73.78	16.23	-23.22
39	40	34.75	0.00	55.68	0.00	0.00	0.00	4.19	0.92	-1.32
40	40	34.75	0.00	55.68	0.00	0.00	0.00	4.19	0.92	-1.32
40	41	36.00	0.00	55.68	0.00	0.00	0.00	-65.41	-14.39	20.58
41	41	36.00	0.00	55.68	0.00	0.00	0.00	-65.41	-14.39	20.58
41	42	37.25	0.00	55.68	0.00	0.00	0.00	-135.00	-29.70	42.48

42	42	37.25	0.00	55.68	0.00	0.00	0.00	-135.00	-29.70	42.48
42	43	38.50	0.00	55.68	0.00	0.00	0.00	-204.61	-42.29	54.46
43	43	38.50	0.00	-15.16	0.00	0.00	0.00	-204.61	-42.29	54.46
43	44	39.17	0.00	-15.16	0.00	0.00	0.00	-194.45	-40.19	51.76
44	44	39.17	0.00	-15.15	0.00	0.00	0.00	-194.45	-40.19	51.76
44	45	39.85	0.00	-15.15	0.00	0.00	0.00	-184.14	-38.06	49.02
45	45	39.85	0.00	-15.16	0.00	0.00	0.00	-184.14	-38.06	49.02
45	46	40.53	0.00	-15.16	0.00	0.00	0.00	-173.84	-35.93	46.27
46	46	40.53	0.00	-15.15	0.00	0.00	0.00	-173.84	-35.93	46.27
46	47	41.20	0.00	-15.15	0.00	0.00	0.00	-163.69	-33.83	43.57
47	47	41.20	0.00	-15.15	0.00	0.00	0.00	-163.69	-33.83	43.57
47	48	41.88	0.00	-15.15	0.00	0.00	0.00	-153.37	-31.70	40.82
48	48	41.88	0.00	-15.16	0.00	0.00	0.00	-153.38	-31.70	40.83
48	49	42.55	0.00	-15.16	0.00	0.00	0.00	-143.22	-29.60	38.12
49	49	42.55	0.00	-15.15	0.00	0.00	0.00	-143.22	-29.60	38.12
49	50	43.22	0.00	-15.15	0.00	0.00	0.00	-133.07	-27.50	35.42
50	50	43.22	0.00	-15.16	0.00	0.00	0.00	-133.07	-27.50	35.42
50	51	43.90	0.00	-15.16	0.00	0.00	0.00	-122.77	-25.37	32.68
51	51	43.90	0.00	-15.16	0.00	0.00	0.00	-122.77	-25.37	32.68
51	52	44.58	0.00	-15.16	0.00	0.00	0.00	-112.45	-23.24	29.93
52	52	44.58	0.00	-15.15	0.00	0.00	0.00	-112.46	-23.24	29.94
52	53	45.25	0.00	-15.15	0.00	0.00	0.00	-102.30	-21.14	27.23
53	53	45.25	0.00	-15.16	0.00	0.00	0.00	-102.30	-21.14	27.23
53	54	45.92	0.00	-15.16	0.00	0.00	0.00	-92.15	-19.05	24.53
54	54	45.92	0.00	-15.16	0.00	0.00	0.00	-92.15	-19.05	24.53
54	55	46.60	0.00	-15.16	0.00	0.00	0.00	-81.84	-16.92	21.79
55	55	46.60	0.00	-15.15	0.00	0.00	0.00	-81.84	-16.92	21.79
55	56	47.28	0.00	-15.15	0.00	0.00	0.00	-71.54	-14.79	19.04
56	56	47.28	0.00	-15.16	0.00	0.00	0.00	-71.54	-14.79	19.04
56	57	47.95	0.00	-15.16	0.00	0.00	0.00	-61.38	-12.69	16.34
57	57	47.95	0.00	-15.16	0.00	0.00	0.00	-61.38	-12.69	16.34
57	58	48.63	0.00	-15.16	0.00	0.00	0.00	-51.07	-10.56	13.59
58	58	48.63	0.00	-15.16	0.00	0.00	0.00	-51.07	-10.56	13.59
58	59	49.30	0.00	-15.16	0.00	0.00	0.00	-40.92	-8.46	10.89
59	59	49.30	0.00	-15.16	0.00	0.00	0.00	-40.92	-8.46	10.89
59	60	49.97	0.00	-15.16	0.00	0.00	0.00	-30.77	-6.36	8.19
60	60	49.97	0.00	-15.16	0.00	0.00	0.00	-30.77	-6.36	8.19
60	61	50.65	0.00	-15.16	0.00	0.00	0.00	-20.45	-4.23	5.44
61	61	50.65	0.00	-15.16	0.00	0.00	0.00	-20.45	-4.23	5.44
61	62	51.33	0.00	-15.16	0.00	0.00	0.00	-10.15	-2.10	2.70
62	62	51.33	0.00	-15.16	0.00	0.00	0.00	-10.15	-2.10	2.70
62	63	52.00	0.00	-15.16	0.00	0.00	0.00	0.00	0.00	0.00

Título: Fecha : 09/12/99
 Descripción de la combinación :
 H011 1.4

1 * [+ (SOBREC11.ANL * 1.4)]

Barra	Nudo	X	Axial(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-24.35	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-24.35	0.00	0.00	0.00	16.55	3.42	-4.40
4	4	0.68	0.00	-24.35	0.00	0.00	0.00	16.55	3.42	-4.40
4	5	1.35	0.00	-24.35	0.00	0.00	0.00	32.86	6.79	-8.75
5	5	1.35	0.00	-24.35	0.00	0.00	0.00	32.86	6.79	-8.75
5	6	2.03	0.00	-24.35	0.00	0.00	0.00	49.41	10.21	-13.15
6	6	2.03	0.00	-24.35	0.00	0.00	0.00	49.41	10.21	-13.15
6	7	2.70	0.00	-24.35	0.00	0.00	0.00	65.72	13.58	-17.49
7	7	2.70	0.00	-24.33	0.00	0.00	0.00	65.72	13.58	-17.49
7	8	3.38	0.00	-24.33	0.00	0.00	0.00	82.28	17.01	-21.90
8	8	3.38	0.00	-24.35	0.00	0.00	0.00	82.28	17.01	-21.90
8	9	4.05	0.00	-24.35	0.00	0.00	0.00	98.59	20.38	-26.24
9	9	4.05	0.00	-24.35	0.00	0.00	0.00	98.59	20.38	-26.24
9	10	4.72	0.00	-24.35	0.00	0.00	0.00	114.90	23.75	-30.58
10	10	4.72	0.00	-24.35	0.00	0.00	0.00	114.88	23.74	-30.58
10	11	5.40	0.00	3.65	0.00	0.00	0.00	127.11	26.27	-33.83
11	11	5.40	0.00	3.65	0.00	0.00	0.00	127.11	26.27	-33.83
11	12	6.07	0.00	3.65	0.00	0.00	0.00	124.64	25.76	-33.18
12	12	6.07	0.00	3.65	0.00	0.00	0.00	124.66	25.76	-33.18
12	13	6.75	0.00	3.65	0.00	0.00	0.00	122.16	25.25	-32.52
13	13	6.75	0.00	3.67	0.00	0.00	0.00	122.16	25.25	-32.52
13	14	7.43	0.00	3.67	0.00	0.00	0.00	119.67	24.73	-31.85
14	14	7.43	0.00	3.65	0.00	0.00	0.00	119.67	24.73	-31.85
14	15	8.10	0.00	3.65	0.00	0.00	0.00	117.22	24.23	-31.20
15	15	8.10	0.00	3.67	0.00	0.00	0.00	117.22	24.23	-31.20
15	16	8.77	0.00	31.67	0.00	0.00	0.00	100.21	20.71	-26.67
16	16	8.77	0.00	31.65	0.00	0.00	0.00	100.21	20.71	-26.67
16	17	9.45	0.00	31.65	0.00	0.00	0.00	78.68	16.26	-20.94
17	17	9.45	0.00	31.65	0.00	0.00	0.00	78.68	16.26	-20.94
17	18	10.13	0.00	31.65	0.00	0.00	0.00	57.16	11.81	-15.22
18	18	10.13	0.00	31.67	0.00	0.00	0.00	57.16	11.81	-15.22
18	19	10.80	0.00	31.67	0.00	0.00	0.00	35.95	7.43	-9.57
19	19	10.80	0.00	31.65	0.00	0.00	0.00	35.95	7.43	-9.57
19	20	11.48	0.00	31.65	0.00	0.00	0.00	14.42	2.98	-3.84
20	20	11.48	0.00	31.67	0.00	0.00	0.00	14.42	2.98	-3.84
20	21	12.15	0.00	31.67	0.00	0.00	0.00	-6.79	-1.40	1.81

21	21	12.15	0.00	31.65	0.00	0.00	0.00	-6.79	-1.40	1.81
21	22	12.82	0.00	31.65	0.00	0.00	0.00	-28.00	-5.79	7.45
22	22	12.82	0.00	31.65	0.00	0.00	0.00	-28.00	-5.79	7.45
22	23	13.50	0.00	31.65	0.00	0.00	0.00	-49.53	-10.24	13.18
23	23	13.50	0.00	-2.66	0.00	0.00	0.00	-49.53	-10.24	13.18
23	24	14.75	0.00	-2.66	0.00	0.00	0.00	-46.21	-10.17	14.54
24	24	14.75	0.00	-2.66	0.00	0.00	0.00	-46.21	-10.17	14.54
24	25	16.00	0.00	-2.66	0.00	0.00	0.00	-42.90	-9.44	13.50
25	25	16.00	0.00	-2.66	0.00	0.00	0.00	-42.90	-9.44	13.50
25	26	17.25	0.00	-2.66	0.00	0.00	0.00	-39.58	-8.71	12.45
26	26	17.25	0.00	-2.66	0.00	0.00	0.00	-39.58	-8.71	12.45
26	27	18.50	0.00	-2.66	0.00	0.00	0.00	-36.26	-7.98	11.41
27	27	18.50	0.00	-2.66	0.00	0.00	0.00	-36.26	-7.98	11.41
27	28	19.75	0.00	-2.66	0.00	0.00	0.00	-32.94	-7.25	10.37
28	28	19.75	0.00	-2.66	0.00	0.00	0.00	-32.94	-7.25	10.37
28	29	21.00	0.00	-2.66	0.00	0.00	0.00	-29.62	-6.52	9.32
29	29	21.00	0.00	-2.66	0.00	0.00	0.00	-29.62	-6.52	9.32
29	30	22.25	0.00	-2.66	0.00	0.00	0.00	-26.31	-5.79	8.28
30	30	22.25	0.00	-2.66	0.00	0.00	0.00	-26.31	-5.79	8.28
30	31	23.50	0.00	-2.66	0.00	0.00	0.00	-22.99	-5.06	7.23
31	31	23.50	0.00	-2.66	0.00	0.00	0.00	-22.99	-5.06	7.23
31	32	24.75	0.00	-2.66	0.00	0.00	0.00	-19.66	-4.32	6.19
32	32	24.75	0.00	-2.66	0.00	0.00	0.00	-19.66	-4.32	6.19
32	33	26.00	0.00	-2.66	0.00	0.00	0.00	-16.34	-3.59	5.14
33	33	26.00	0.00	-2.66	0.00	0.00	0.00	-16.34	-3.59	5.14
33	34	27.25	0.00	-2.66	0.00	0.00	0.00	-13.02	-2.86	4.10
34	34	27.25	0.00	-2.66	0.00	0.00	0.00	-13.02	-2.86	4.10
34	35	28.50	0.00	-2.66	0.00	0.00	0.00	-9.70	-2.13	3.05
35	35	28.50	0.00	-2.66	0.00	0.00	0.00	-9.70	-2.13	3.05
35	36	29.75	0.00	-2.66	0.00	0.00	0.00	-6.38	-1.40	2.01
36	36	29.75	0.00	-2.66	0.00	0.00	0.00	-6.38	-1.40	2.01
36	37	31.00	0.00	-2.66	0.00	0.00	0.00	-3.07	-0.67	0.96
37	37	31.00	0.00	-2.66	0.00	0.00	0.00	-3.07	-0.67	0.96
37	38	32.25	0.00	-2.66	0.00	0.00	0.00	0.25	0.06	-0.08
38	38	32.25	0.00	-2.66	0.00	0.00	0.00	0.25	0.06	-0.08
38	39	33.50	0.00	-2.66	0.00	0.00	0.00	3.57	0.79	-1.12
39	39	33.50	0.00	-2.66	0.00	0.00	0.00	3.57	0.79	-1.12
39	40	34.75	0.00	-2.66	0.00	0.00	0.00	6.89	1.52	-2.17
40	40	34.75	0.00	-2.66	0.00	0.00	0.00	6.89	1.52	-2.17
40	41	36.00	0.00	-2.66	0.00	0.00	0.00	10.21	2.25	-3.21
41	41	36.00	0.00	-2.66	0.00	0.00	0.00	10.21	2.25	-3.21
41	42	37.25	0.00	-2.66	0.00	0.00	0.00	13.52	2.98	-4.26

42	42	37.25	0.00	-2.66	0.00	0.00	0.00	13.52	2.98	-4.26
42	43	38.50	0.00	-2.66	0.00	0.00	0.00	16.84	3.48	-4.48
43	43	38.50	0.00	1.25	0.00	0.00	0.00	16.84	3.48	-4.48
43	44	39.17	0.00	1.25	0.00	0.00	0.00	16.02	3.31	-4.26
44	44	39.17	0.00	1.25	0.00	0.00	0.00	16.02	3.31	-4.26
44	45	39.85	0.00	1.25	0.00	0.00	0.00	15.16	3.13	-4.04
45	45	39.85	0.00	1.25	0.00	0.00	0.00	15.16	3.13	-4.04
45	46	40.53	0.00	1.25	0.00	0.00	0.00	14.31	2.96	-3.81
46	46	40.53	0.00	1.25	0.00	0.00	0.00	14.31	2.96	-3.81
46	47	41.20	0.00	1.25	0.00	0.00	0.00	13.48	2.79	-3.59
47	47	41.20	0.00	1.25	0.00	0.00	0.00	13.48	2.79	-3.59
47	48	41.88	0.00	1.25	0.00	0.00	0.00	12.63	2.61	-3.36
48	48	41.88	0.00	1.25	0.00	0.00	0.00	12.63	2.61	-3.36
48	49	42.55	0.00	1.25	0.00	0.00	0.00	11.79	2.44	-3.14
49	49	42.55	0.00	1.25	0.00	0.00	0.00	11.79	2.44	-3.14
49	50	43.22	0.00	1.25	0.00	0.00	0.00	10.96	2.27	-2.92
50	50	43.22	0.00	1.25	0.00	0.00	0.00	10.96	2.27	-2.92
50	51	43.90	0.00	1.25	0.00	0.00	0.00	10.11	2.09	-2.69
51	51	43.90	0.00	1.25	0.00	0.00	0.00	10.11	2.09	-2.69
51	52	44.58	0.00	1.25	0.00	0.00	0.00	9.25	1.91	-2.46
52	52	44.58	0.00	1.25	0.00	0.00	0.00	9.25	1.91	-2.46
52	53	45.25	0.00	1.25	0.00	0.00	0.00	8.43	1.74	-2.24
53	53	45.25	0.00	1.25	0.00	0.00	0.00	8.43	1.74	-2.24
53	54	45.92	0.00	1.25	0.00	0.00	0.00	7.59	1.57	-2.02
54	54	45.92	0.00	1.25	0.00	0.00	0.00	7.59	1.57	-2.02
54	55	46.60	0.00	1.25	0.00	0.00	0.00	6.73	1.39	-1.79
55	55	46.60	0.00	1.25	0.00	0.00	0.00	6.73	1.39	-1.79
55	56	47.28	0.00	1.25	0.00	0.00	0.00	5.89	1.22	-1.57
56	56	47.28	0.00	1.25	0.00	0.00	0.00	5.89	1.22	-1.57
56	57	47.95	0.00	1.25	0.00	0.00	0.00	5.05	1.04	-1.35
57	57	47.95	0.00	1.25	0.00	0.00	0.00	5.05	1.04	-1.35
57	58	48.63	0.00	1.25	0.00	0.00	0.00	4.20	0.87	-1.12
58	58	48.63	0.00	1.25	0.00	0.00	0.00	4.20	0.87	-1.12
58	59	49.30	0.00	1.25	0.00	0.00	0.00	3.37	0.70	-0.90
59	59	49.30	0.00	1.25	0.00	0.00	0.00	3.37	0.70	-0.90
59	60	49.97	0.00	1.25	0.00	0.00	0.00	2.53	0.52	-0.67
60	60	49.97	0.00	1.25	0.00	0.00	0.00	2.53	0.52	-0.67
60	61	50.65	0.00	1.25	0.00	0.00	0.00	1.68	0.35	-0.45
61	61	50.65	0.00	1.25	0.00	0.00	0.00	1.68	0.35	-0.45
61	62	51.33	0.00	1.25	0.00	0.00	0.00	0.84	0.17	-0.22
62	62	51.33	0.00	1.25	0.00	0.00	0.00	0.84	0.17	-0.22
62	63	52.00	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00

Título: Fecha : 09/12/99
 Descripción de la combinación :
 H012 1.4

1 * [+ (SOBREC12.ANL * 1.4)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-4.72	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-4.72	0.00	0.00	0.00	3.21	0.66	-0.85
4	4	0.68	0.00	-4.72	0.00	0.00	0.00	3.21	0.66	-0.85
4	5	1.35	0.00	-4.72	0.00	0.00	0.00	6.36	1.31	-1.69
5	5	1.35	0.00	-4.72	0.00	0.00	0.00	6.36	1.31	-1.69
5	6	2.03	0.00	-4.72	0.00	0.00	0.00	9.56	1.98	-2.55
6	6	2.03	0.00	-4.72	0.00	0.00	0.00	9.56	1.98	-2.55
6	7	2.70	0.00	-4.72	0.00	0.00	0.00	12.73	2.63	-3.39
7	7	2.70	0.00	-4.72	0.00	0.00	0.00	12.73	2.63	-3.39
7	8	3.38	0.00	-4.72	0.00	0.00	0.00	15.92	3.29	-4.24
8	8	3.38	0.00	-4.72	0.00	0.00	0.00	15.92	3.29	-4.24
8	9	4.05	0.00	-4.72	0.00	0.00	0.00	19.08	3.94	-5.08
9	9	4.05	0.00	-4.72	0.00	0.00	0.00	19.08	3.94	-5.08
9	10	4.72	0.00	-4.72	0.00	0.00	0.00	22.23	4.60	-5.92
10	10	4.72	0.00	-4.72	0.00	0.00	0.00	22.23	4.60	-5.92
10	11	5.40	0.00	-4.72	0.00	0.00	0.00	25.44	5.26	-6.77
11	11	5.40	0.00	-4.72	0.00	0.00	0.00	25.44	5.26	-6.77
11	12	6.07	0.00	-4.72	0.00	0.00	0.00	28.60	5.91	-7.61
12	12	6.07	0.00	-4.72	0.00	0.00	0.00	28.60	5.91	-7.61
12	13	6.75	0.00	23.28	0.00	0.00	0.00	18.21	3.76	-4.85
13	13	6.75	0.00	23.30	0.00	0.00	0.00	18.23	3.77	-4.85
13	14	7.43	0.00	23.30	0.00	0.00	0.00	2.38	0.49	-0.63
14	14	7.43	0.00	23.28	0.00	0.00	0.00	2.38	0.49	-0.63
14	15	8.10	0.00	23.28	0.00	0.00	0.00	-13.22	-2.73	3.52
15	15	8.10	0.00	23.30	0.00	0.00	0.00	-13.22	-2.73	3.52
15	16	8.77	0.00	23.30	0.00	0.00	0.00	-28.83	-5.96	7.67
16	16	8.77	0.00	23.30	0.00	0.00	0.00	-28.83	-5.96	7.67
16	17	9.45	0.00	51.30	0.00	0.00	0.00	-49.84	-10.30	13.27
17	17	9.45	0.00	51.28	0.00	0.00	0.00	-49.84	-10.30	13.27
17	18	10.13	0.00	51.28	0.00	0.00	0.00	-84.71	-17.51	22.55
18	18	10.13	0.00	51.28	0.00	0.00	0.00	-84.71	-17.51	22.55
18	19	10.80	0.00	51.28	0.00	0.00	0.00	-119.08	-24.61	31.70
19	19	10.80	0.00	51.28	0.00	0.00	0.00	-119.08	-24.61	31.70
19	20	11.48	0.00	51.28	0.00	0.00	0.00	-153.96	-31.82	40.98
20	20	11.48	0.00	51.28	0.00	0.00	0.00	-153.96	-31.82	40.98
20	21	12.15	0.00	51.28	0.00	0.00	0.00	-188.31	-38.92	50.13

21	21	12.15	0.00	51.30	0.00	0.00	0.00	-188.31	-38.92	50.13
21	22	12.82	0.00	51.30	0.00	0.00	0.00	-222.68	-46.03	59.27
22	22	12.82	0.00	51.28	0.00	0.00	0.00	-222.68	-46.03	59.27
22	23	13.50	0.00	51.28	0.00	0.00	0.00	-257.56	-53.23	68.56
23	23	13.50	0.00	-66.28	0.00	0.00	0.00	-257.56	-53.23	68.56
23	24	14.75	0.00	-66.28	0.00	0.00	0.00	-174.72	-38.44	54.98
24	24	14.75	0.00	-66.28	0.00	0.00	0.00	-174.72	-38.44	54.98
24	25	16.00	0.00	-66.28	0.00	0.00	0.00	-91.88	-20.22	28.91
25	25	16.00	0.00	-66.28	0.00	0.00	0.00	-91.88	-20.22	28.91
25	26	17.25	0.00	-66.28	0.00	0.00	0.00	-9.04	-1.99	2.85
26	26	17.25	0.00	-66.26	0.00	0.00	0.00	-9.04	-1.99	2.85
26	27	18.50	0.00	-38.26	0.00	0.00	0.00	52.23	11.49	-16.44
27	27	18.50	0.00	-38.26	0.00	0.00	0.00	52.23	11.49	-16.44
27	28	19.75	0.00	-38.26	0.00	0.00	0.00	100.07	22.02	-31.49
28	28	19.75	0.00	-38.26	0.00	0.00	0.00	100.07	22.02	-31.49
28	29	21.00	0.00	-10.26	0.00	0.00	0.00	140.35	30.88	-44.16
29	29	21.00	0.00	-10.28	0.00	0.00	0.00	140.35	30.88	-44.16
29	30	22.25	0.00	-10.28	0.00	0.00	0.00	153.19	33.70	-48.20
30	30	22.25	0.00	-10.26	0.00	0.00	0.00	153.19	33.70	-48.20
30	31	23.50	0.00	-10.26	0.00	0.00	0.00	166.03	36.53	-52.24
31	31	23.50	0.00	-10.26	0.00	0.00	0.00	166.01	36.53	-52.24
31	32	24.75	0.00	-10.26	0.00	0.00	0.00	178.85	39.35	-56.28
32	32	24.75	0.00	-10.28	0.00	0.00	0.00	178.85	39.35	-56.28
32	33	26.00	0.00	10.72	0.00	0.00	0.00	175.52	38.62	-55.23
33	33	26.00	0.00	10.74	0.00	0.00	0.00	175.52	38.62	-55.23
33	34	27.25	0.00	10.74	0.00	0.00	0.00	162.11	35.67	-51.01
34	34	27.25	0.00	10.72	0.00	0.00	0.00	162.11	35.67	-51.01
34	35	28.50	0.00	31.72	0.00	0.00	0.00	132.52	29.16	-41.70
35	35	28.50	0.00	31.74	0.00	0.00	0.00	132.52	29.16	-41.70
35	36	29.75	0.00	31.74	0.00	0.00	0.00	92.86	20.43	-29.22
36	36	29.75	0.00	31.72	0.00	0.00	0.00	92.86	20.43	-29.22
36	37	31.00	0.00	31.72	0.00	0.00	0.00	53.20	11.71	-16.74
37	37	31.00	0.00	31.74	0.00	0.00	0.00	53.20	11.71	-16.74
37	38	32.25	0.00	31.74	0.00	0.00	0.00	13.54	2.98	-4.26
38	38	32.25	0.00	31.72	0.00	0.00	0.00	13.54	2.98	-4.26
38	39	33.50	0.00	31.72	0.00	0.00	0.00	-26.12	-5.75	8.22
39	39	33.50	0.00	31.72	0.00	0.00	0.00	-26.12	-5.75	8.22
39	40	34.75	0.00	31.72	0.00	0.00	0.00	-65.79	-14.47	20.70
40	40	34.75	0.00	31.72	0.00	0.00	0.00	-65.79	-14.47	20.70
40	41	36.00	0.00	31.72	0.00	0.00	0.00	-105.45	-23.20	33.18
41	41	36.00	0.00	31.72	0.00	0.00	0.00	-105.45	-23.20	33.18
41	42	37.25	0.00	31.72	0.00	0.00	0.00	-145.11	-31.93	45.66

42	42	37.25	0.00	31.72	0.00	0.00	0.00	-145.11	-31.93	45.66
42	43	38.50	0.00	31.72	0.00	0.00	0.00	-184.77	-38.19	49.18
43	43	38.50	0.00	-35.48	0.00	0.00	0.00	-184.77	-38.19	49.18
43	44	39.17	0.00	-35.48	0.00	0.00	0.00	-161.00	-33.28	42.86
44	44	39.17	0.00	-35.48	0.00	0.00	0.00	-161.00	-33.28	42.86
44	45	39.85	0.00	-35.48	0.00	0.00	0.00	-136.88	-28.29	36.43
45	45	39.85	0.00	-35.48	0.00	0.00	0.00	-136.88	-28.29	36.43
45	46	40.53	0.00	-35.48	0.00	0.00	0.00	-112.76	-23.30	30.01
46	46	40.53	0.00	-35.48	0.00	0.00	0.00	-112.76	-23.30	30.01
46	47	41.20	0.00	-35.48	0.00	0.00	0.00	-88.98	-18.39	23.69
47	47	41.20	0.00	-35.48	0.00	0.00	0.00	-88.98	-18.39	23.69
47	48	41.88	0.00	-35.48	0.00	0.00	0.00	-64.85	-13.40	17.26
48	48	41.88	0.00	-35.48	0.00	0.00	0.00	-64.85	-13.40	17.26
48	49	42.55	0.00	-35.48	0.00	0.00	0.00	-41.08	-8.49	10.93
49	49	42.55	0.00	-35.48	0.00	0.00	0.00	-41.08	-8.49	10.93
49	50	43.22	0.00	-35.48	0.00	0.00	0.00	-17.30	-3.58	4.61
50	50	43.22	0.00	-35.48	0.00	0.00	0.00	-17.30	-3.58	4.61
50	51	43.90	0.00	-35.48	0.00	0.00	0.00	6.82	1.41	-1.81
51	51	43.90	0.00	-35.48	0.00	0.00	0.00	6.82	1.41	-1.81
51	52	44.58	0.00	-14.48	0.00	0.00	0.00	22.54	4.66	-6.00
52	52	44.58	0.00	-14.48	0.00	0.00	0.00	22.54	4.66	-6.00
52	53	45.25	0.00	-14.48	0.00	0.00	0.00	32.24	6.66	-8.58
53	53	45.25	0.00	-14.48	0.00	0.00	0.00	32.24	6.66	-8.58
53	54	45.92	0.00	-14.48	0.00	0.00	0.00	41.94	8.67	-11.16
54	54	45.92	0.00	-14.48	0.00	0.00	0.00	41.94	8.67	-11.16
54	55	46.60	0.00	-14.48	0.00	0.00	0.00	51.80	10.71	-13.79
55	55	46.60	0.00	-14.48	0.00	0.00	0.00	51.80	10.71	-13.79
55	56	47.28	0.00	6.52	0.00	0.00	0.00	49.04	10.14	-13.05
56	56	47.28	0.00	6.52	0.00	0.00	0.00	49.04	10.14	-13.05
56	57	47.95	0.00	6.52	0.00	0.00	0.00	44.67	9.23	-11.89
57	57	47.95	0.00	6.52	0.00	0.00	0.00	44.67	9.23	-11.89
57	58	48.63	0.00	6.52	0.00	0.00	0.00	40.24	8.32	-10.71
58	58	48.63	0.00	6.52	0.00	0.00	0.00	40.24	8.32	-10.71
58	59	49.30	0.00	6.52	0.00	0.00	0.00	35.87	7.41	-9.55
59	59	49.30	0.00	6.52	0.00	0.00	0.00	35.87	7.41	-9.55
59	60	49.97	0.00	6.52	0.00	0.00	0.00	31.50	6.51	-8.38
60	60	49.97	0.00	6.52	0.00	0.00	0.00	31.50	6.51	-8.38
60	61	50.65	0.00	6.52	0.00	0.00	0.00	27.08	5.60	-7.21
61	61	50.65	0.00	6.52	0.00	0.00	0.00	27.08	5.60	-7.21
61	62	51.33	0.00	27.52	0.00	0.00	0.00	18.44	3.81	-4.91
62	62	51.33	0.00	27.52	0.00	0.00	0.00	18.44	3.81	-4.91
62	63	52.00	0.00	27.52	0.00	0.00	0.00	0.00	0.00	0.00

Título: Fecha : 09/12/99
 Descripción de la combinación :
 H013 1.4

1 * [+ (SOBREC13.ANL * 1.4)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z (mt)	T.SUP (t/m2)	T.INF (t/m2)
3	3	0.00	0.00	-16.18	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-16.18	0.00	0.00	0.00	11.00	2.27	-2.93
4	4	0.68	0.00	-16.18	0.00	0.00	0.00	11.00	2.27	-2.93
4	5	1.35	0.00	-16.18	0.00	0.00	0.00	21.85	4.52	-5.82
5	5	1.35	0.00	-16.18	0.00	0.00	0.00	21.85	4.52	-5.82
5	6	2.03	0.00	-16.18	0.00	0.00	0.00	32.86	6.79	-8.75
6	6	2.03	0.00	-16.18	0.00	0.00	0.00	32.86	6.79	-8.75
6	7	2.70	0.00	7.62	0.00	0.00	0.00	42.63	8.81	-11.35
7	7	2.70	0.00	7.62	0.00	0.00	0.00	42.63	8.81	-11.35
7	8	3.38	0.00	7.62	0.00	0.00	0.00	37.45	7.74	-9.97
8	8	3.38	0.00	7.62	0.00	0.00	0.00	37.45	7.74	-9.97
8	9	4.05	0.00	7.62	0.00	0.00	0.00	32.35	6.69	-8.61
9	9	4.05	0.00	7.62	0.00	0.00	0.00	32.35	6.69	-8.61
9	10	4.72	0.00	7.62	0.00	0.00	0.00	27.26	5.63	-7.26
10	10	4.72	0.00	7.62	0.00	0.00	0.00	27.26	5.63	-7.26
10	11	5.40	0.00	7.62	0.00	0.00	0.00	22.08	4.56	-5.88
11	11	5.40	0.00	7.62	0.00	0.00	0.00	22.08	4.56	-5.88
11	12	6.07	0.00	31.42	0.00	0.00	0.00	6.99	1.44	-1.86
12	12	6.07	0.00	31.42	0.00	0.00	0.00	6.99	1.44	-1.86
12	13	6.75	0.00	31.42	0.00	0.00	0.00	-14.38	-2.97	3.83
13	13	6.75	0.00	31.42	0.00	0.00	0.00	-14.38	-2.97	3.83
13	14	7.43	0.00	31.42	0.00	0.00	0.00	-35.74	-7.39	9.51
14	14	7.43	0.00	31.42	0.00	0.00	0.00	-35.74	-7.39	9.51
14	15	8.10	0.00	31.42	0.00	0.00	0.00	-56.78	-11.74	15.11
15	15	8.10	0.00	31.42	0.00	0.00	0.00	-56.78	-11.74	15.11
15	16	8.77	0.00	31.42	0.00	0.00	0.00	-77.84	-16.09	20.72
16	16	8.77	0.00	31.42	0.00	0.00	0.00	-77.84	-16.09	20.72
16	17	9.45	0.00	31.42	0.00	0.00	0.00	-99.19	-20.50	26.40
17	17	9.45	0.00	31.42	0.00	0.00	0.00	-99.20	-20.50	26.41
17	18	10.13	0.00	31.42	0.00	0.00	0.00	-120.55	-24.92	32.09
18	18	10.13	0.00	31.42	0.00	0.00	0.00	-120.55	-24.92	32.09
18	19	10.80	0.00	31.42	0.00	0.00	0.00	-141.61	-29.27	37.69
19	19	10.80	0.00	31.42	0.00	0.00	0.00	-141.61	-29.27	37.69
19	20	11.48	0.00	31.42	0.00	0.00	0.00	-162.96	-33.68	43.38
20	20	11.48	0.00	31.42	0.00	0.00	0.00	-162.96	-33.68	43.38
20	21	12.15	0.00	31.42	0.00	0.00	0.00	-184.02	-38.03	48.98

21	21	12.15	0.00	31.42	0.00	0.00	0.00	-184.02	-38.03	48.98
21	22	12.82	0.00	31.42	0.00	0.00	0.00	-205.06	-42.38	54.58
22	22	12.82	0.00	31.42	0.00	0.00	0.00	-205.06	-42.38	54.58
22	23	13.50	0.00	31.42	0.00	0.00	0.00	-226.42	-46.80	60.27
23	23	13.50	0.00	-47.08	0.00	0.00	0.00	-226.42	-46.80	60.27
23	24	14.75	0.00	-47.08	0.00	0.00	0.00	-167.58	-36.87	52.73
24	24	14.75	0.00	-47.08	0.00	0.00	0.00	-167.58	-36.87	52.73
24	25	16.00	0.00	-47.08	0.00	0.00	0.00	-108.72	-23.92	34.21
25	25	16.00	0.00	-47.08	0.00	0.00	0.00	-108.72	-23.92	34.21
25	26	17.25	0.00	-47.08	0.00	0.00	0.00	-49.88	-10.98	15.70
26	26	17.25	0.00	-47.08	0.00	0.00	0.00	-49.88	-10.98	15.70
26	27	18.50	0.00	-47.08	0.00	0.00	0.00	8.97	1.97	-2.82
27	27	18.50	0.00	-47.08	0.00	0.00	0.00	8.97	1.97	-2.82
27	28	19.75	0.00	-47.08	0.00	0.00	0.00	67.82	14.92	-21.34
28	28	19.75	0.00	-47.08	0.00	0.00	0.00	67.82	14.92	-21.34
28	29	21.00	0.00	-47.08	0.00	0.00	0.00	126.67	27.87	-39.86
29	29	21.00	0.00	-47.08	0.00	0.00	0.00	126.67	27.87	-39.86
29	30	22.25	0.00	-23.28	0.00	0.00	0.00	164.09	36.10	-51.63
30	30	22.25	0.00	-23.28	0.00	0.00	0.00	164.09	36.10	-51.63
30	31	23.50	0.00	-23.28	0.00	0.00	0.00	193.19	42.51	-60.79
31	31	23.50	0.00	-23.28	0.00	0.00	0.00	193.19	42.51	-60.79
31	32	24.75	0.00	0.52	0.00	0.00	0.00	212.77	46.81	-66.95
32	32	24.75	0.00	0.52	0.00	0.00	0.00	212.77	46.81	-66.95
32	33	26.00	0.00	0.52	0.00	0.00	0.00	212.11	46.67	-66.74
33	33	26.00	0.00	0.52	0.00	0.00	0.00	212.11	46.67	-66.74
33	34	27.25	0.00	0.52	0.00	0.00	0.00	211.47	46.53	-66.54
34	34	27.25	0.00	0.52	0.00	0.00	0.00	211.46	46.53	-66.54
34	35	28.50	0.00	24.32	0.00	0.00	0.00	190.58	41.93	-59.97
35	35	28.50	0.00	24.32	0.00	0.00	0.00	190.58	41.93	-59.97
35	36	29.75	0.00	24.32	0.00	0.00	0.00	160.17	35.24	-50.40
36	36	29.75	0.00	24.32	0.00	0.00	0.00	160.17	35.24	-50.40
36	37	31.00	0.00	48.12	0.00	0.00	0.00	121.45	26.72	-38.22
37	37	31.00	0.00	48.12	0.00	0.00	0.00	121.45	26.72	-38.22
37	38	32.25	0.00	48.12	0.00	0.00	0.00	61.29	13.49	-19.29
38	38	32.25	0.00	48.12	0.00	0.00	0.00	61.29	13.49	-19.29
38	39	33.50	0.00	48.12	0.00	0.00	0.00	1.15	0.25	-0.36
39	39	33.50	0.00	48.12	0.00	0.00	0.00	1.15	0.25	-0.36
39	40	34.75	0.00	48.12	0.00	0.00	0.00	-59.01	-12.98	18.57
40	40	34.75	0.00	48.12	0.00	0.00	0.00	-59.01	-12.98	18.57
40	41	36.00	0.00	48.12	0.00	0.00	0.00	-119.17	-26.22	37.50
41	41	36.00	0.00	48.12	0.00	0.00	0.00	-119.17	-26.22	37.50
41	42	37.25	0.00	48.12	0.00	0.00	0.00	-179.31	-39.45	56.42

42	42	37.25	0.00	48.12	0.00	0.00	0.00	-179.31	-39.45	56.42
42	43	38.50	0.00	48.12	0.00	0.00	0.00	-239.47	-49.49	63.74
43	43	38.50	0.00	-48.93	0.00	0.00	0.00	-239.47	-49.49	63.74
43	44	39.17	0.00	-48.93	0.00	0.00	0.00	-206.68	-42.72	55.02
44	44	39.17	0.00	-48.93	0.00	0.00	0.00	-206.68	-42.72	55.02
44	45	39.85	0.00	-48.93	0.00	0.00	0.00	-173.40	-35.84	46.16
45	45	39.85	0.00	-48.93	0.00	0.00	0.00	-173.40	-35.84	46.16
45	46	40.53	0.00	-48.93	0.00	0.00	0.00	-140.13	-28.96	37.30
46	46	40.53	0.00	-48.93	0.00	0.00	0.00	-140.13	-28.96	37.30
46	47	41.20	0.00	-48.93	0.00	0.00	0.00	-107.34	-22.19	28.57
47	47	41.20	0.00	-48.93	0.00	0.00	0.00	-107.34	-22.19	28.57
47	48	41.88	0.00	-25.13	0.00	0.00	0.00	-79.55	-16.44	21.17
48	48	41.88	0.00	-25.13	0.00	0.00	0.00	-79.55	-16.44	21.17
48	49	42.55	0.00	-25.13	0.00	0.00	0.00	-62.71	-12.96	16.69
49	49	42.55	0.00	-25.13	0.00	0.00	0.00	-62.71	-12.96	16.69
49	50	43.22	0.00	-25.13	0.00	0.00	0.00	-45.86	-9.48	12.21
50	50	43.22	0.00	-25.13	0.00	0.00	0.00	-45.86	-9.48	12.21
50	51	43.90	0.00	-25.13	0.00	0.00	0.00	-28.77	-5.95	7.66
51	51	43.90	0.00	-25.13	0.00	0.00	0.00	-28.77	-5.95	7.66
51	52	44.58	0.00	-25.13	0.00	0.00	0.00	-11.68	-2.41	3.11
52	52	44.58	0.00	-25.13	0.00	0.00	0.00	-11.68	-2.41	3.11
52	53	45.25	0.00	-1.33	0.00	0.00	0.00	-9.00	-1.86	2.40
53	53	45.25	0.00	-1.33	0.00	0.00	0.00	-9.00	-1.86	2.40
53	54	45.92	0.00	-1.33	0.00	0.00	0.00	-8.11	-1.68	2.16
54	54	45.92	0.00	-1.33	0.00	0.00	0.00	-8.11	-1.68	2.16
54	55	46.60	0.00	-1.33	0.00	0.00	0.00	-7.20	-1.49	1.92
55	55	46.60	0.00	-1.33	0.00	0.00	0.00	-7.20	-1.49	1.92
55	56	47.28	0.00	-1.33	0.00	0.00	0.00	-6.30	-1.30	1.68
56	56	47.28	0.00	-1.33	0.00	0.00	0.00	-6.30	-1.30	1.68
56	57	47.95	0.00	-1.33	0.00	0.00	0.00	-5.40	-1.12	1.44
57	57	47.95	0.00	-1.33	0.00	0.00	0.00	-5.40	-1.12	1.44
57	58	48.63	0.00	-1.33	0.00	0.00	0.00	-4.49	-0.93	1.20
58	58	48.63	0.00	-1.33	0.00	0.00	0.00	-4.49	-0.93	1.20
58	59	49.30	0.00	-1.33	0.00	0.00	0.00	-3.60	-0.74	0.96
59	59	49.30	0.00	-1.33	0.00	0.00	0.00	-3.60	-0.74	0.96
59	60	49.97	0.00	-1.33	0.00	0.00	0.00	-2.70	-0.56	0.72
60	60	49.97	0.00	-1.33	0.00	0.00	0.00	-2.70	-0.56	0.72
60	61	50.65	0.00	-1.33	0.00	0.00	0.00	-1.81	-0.37	0.48
61	61	50.65	0.00	-1.33	0.00	0.00	0.00	-1.81	-0.37	0.48
61	62	51.33	0.00	-1.33	0.00	0.00	0.00	-0.90	-0.19	0.24
62	62	51.33	0.00	-1.33	0.00	0.00	0.00	-0.90	-0.19	0.24
62	63	52.00	0.00	-1.33	0.00	0.00	0.00	0.00	0.00	0.00

 Título: Fecha : 09/12/99
 Descripción de la combinación :
 H014 1.4

1 * [+ (SOBREC14.ANL * 1.4)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-33.88	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-33.88	0.00	0.00	0.00	23.03	4.76	-6.13
4	4	0.68	0.00	-33.88	0.00	0.00	0.00	23.03	4.76	-6.13
4	5	1.35	0.00	-33.88	0.00	0.00	0.00	45.74	9.45	-12.17
5	5	1.35	0.00	-33.88	0.00	0.00	0.00	45.74	9.45	-12.17
5	6	2.03	0.00	-33.88	0.00	0.00	0.00	68.77	14.21	-18.30
6	6	2.03	0.00	-33.88	0.00	0.00	0.00	68.77	14.21	-18.30
6	7	2.70	0.00	-10.08	0.00	0.00	0.00	77.31	15.98	-20.58
7	7	2.70	0.00	-10.08	0.00	0.00	0.00	77.31	15.98	-20.58
7	8	3.38	0.00	-10.08	0.00	0.00	0.00	84.15	17.39	-22.40
8	8	3.38	0.00	-10.08	0.00	0.00	0.00	84.15	17.39	-22.40
8	9	4.05	0.00	-10.08	0.00	0.00	0.00	90.90	18.79	-24.20
9	9	4.05	0.00	-10.08	0.00	0.00	0.00	90.90	18.79	-24.20
9	10	4.72	0.00	-10.08	0.00	0.00	0.00	97.65	20.18	-25.99
10	10	4.72	0.00	-10.07	0.00	0.00	0.00	97.66	20.19	-26.00
10	11	5.40	0.00	13.73	0.00	0.00	0.00	97.24	20.10	-25.88
11	11	5.40	0.00	13.73	0.00	0.00	0.00	97.26	20.10	-25.89
11	12	6.07	0.00	13.73	0.00	0.00	0.00	88.06	18.20	-23.44
12	12	6.07	0.00	13.72	0.00	0.00	0.00	88.06	18.20	-23.44
12	13	6.75	0.00	13.72	0.00	0.00	0.00	78.72	16.27	-20.95
13	13	6.75	0.00	13.72	0.00	0.00	0.00	78.72	16.27	-20.95
13	14	7.43	0.00	13.72	0.00	0.00	0.00	69.38	14.34	-18.47
14	14	7.43	0.00	13.72	0.00	0.00	0.00	69.38	14.34	-18.47
14	15	8.10	0.00	13.72	0.00	0.00	0.00	60.20	12.44	-16.02
15	15	8.10	0.00	13.72	0.00	0.00	0.00	60.20	12.44	-16.02
15	16	8.77	0.00	37.52	0.00	0.00	0.00	42.20	8.72	-11.23
16	16	8.77	0.00	37.52	0.00	0.00	0.00	42.20	8.72	-11.23
16	17	9.45	0.00	37.52	0.00	0.00	0.00	16.67	3.45	-4.44
17	17	9.45	0.00	37.53	0.00	0.00	0.00	16.67	3.45	-4.44
17	18	10.13	0.00	37.53	0.00	0.00	0.00	-8.83	-1.83	2.35
18	18	10.13	0.00	37.52	0.00	0.00	0.00	-8.83	-1.83	2.35
18	19	10.80	0.00	37.52	0.00	0.00	0.00	-33.98	-7.02	9.04
19	19	10.80	0.00	37.52	0.00	0.00	0.00	-33.98	-7.02	9.04
19	20	11.48	0.00	61.32	0.00	0.00	0.00	-61.40	-12.69	16.34
20	20	11.48	0.00	61.32	0.00	0.00	0.00	-61.40	-12.69	16.34
20	21	12.15	0.00	61.32	0.00	0.00	0.00	-102.49	-21.18	27.28

21	21	12.15	0.00	244.85	0.00	0.00	0.00	-937.69	-193.81	249.60
21	22	12.82	0.00	263.34	0.00	0.00	0.00	-1107.93	-228.99	294.91
22	22	12.82	0.00	263.34	0.00	0.00	0.00	-1107.93	-228.99	294.91
22	23	13.50	0.00	282.11	0.00	0.00	0.00	-1293.38	-267.32	344.28
23	23	13.50	0.00	-351.88	0.00	0.00	0.00	-1293.38	-267.32	344.28
23	24	14.75	0.00	-317.38	0.00	0.00	0.00	-875.10	-192.54	275.36
24	24	14.75	0.00	-317.38	0.00	0.00	0.00	-875.09	-192.54	275.36
24	25	16.00	0.00	-282.88	0.00	0.00	0.00	-499.94	-110.00	157.31
25	25	16.00	0.00	-282.88	0.00	0.00	0.00	-499.94	-110.00	157.31
25	26	17.25	0.00	-248.38	0.00	0.00	0.00	-167.90	-36.94	52.83
26	26	17.25	0.00	-248.38	0.00	0.00	0.00	-167.90	-36.94	52.83
26	27	18.50	0.00	-213.88	0.00	0.00	0.00	121.00	26.62	-38.08
27	27	18.50	0.00	-213.89	0.00	0.00	0.00	121.00	26.62	-38.08
27	28	19.75	0.00	-179.39	0.00	0.00	0.00	366.79	80.70	-115.42
28	28	19.75	0.00	-179.39	0.00	0.00	0.00	366.79	80.70	-115.42
28	29	21.00	0.00	-144.89	0.00	0.00	0.00	569.46	125.29	-179.19
29	29	21.00	0.00	-144.89	0.00	0.00	0.00	569.45	125.29	-179.18
29	30	22.25	0.00	-110.39	0.00	0.00	0.00	729.01	160.40	-229.39
30	30	22.25	0.00	-110.39	0.00	0.00	0.00	728.98	160.39	-229.38
30	31	23.50	0.00	-75.89	0.00	0.00	0.00	845.41	186.01	-266.02
31	31	23.50	0.00	-75.87	0.00	0.00	0.00	845.41	186.01	-266.02
31	32	24.75	0.00	-41.37	0.00	0.00	0.00	918.69	202.13	-289.08
32	32	24.75	0.00	-41.39	0.00	0.00	0.00	918.69	202.13	-289.08
32	33	26.00	0.00	-6.89	0.00	0.00	0.00	948.84	208.77	-298.57
33	33	26.00	0.00	-6.87	0.00	0.00	0.00	948.85	208.77	-298.57
33	34	27.25	0.00	27.63	0.00	0.00	0.00	935.89	205.92	-294.49
34	34	27.25	0.00	27.62	0.00	0.00	0.00	935.89	205.92	-294.49
34	35	28.50	0.00	62.12	0.00	0.00	0.00	879.81	193.58	-276.84
35	35	28.50	0.00	62.13	0.00	0.00	0.00	879.81	193.58	-276.84
35	36	29.75	0.00	96.63	0.00	0.00	0.00	780.59	171.75	-245.62
36	36	29.75	0.00	96.61	0.00	0.00	0.00	780.57	171.74	-245.62
36	37	31.00	0.00	125.36	0.00	0.00	0.00	641.85	141.22	-201.97
37	37	31.00	0.00	125.37	0.00	0.00	0.00	641.85	141.22	-201.97
37	38	32.25	0.00	154.12	0.00	0.00	0.00	467.15	102.78	-147.00
38	38	32.25	0.00	154.12	0.00	0.00	0.00	467.15	102.78	-147.00
38	39	33.50	0.00	182.87	0.00	0.00	0.00	256.54	56.44	-80.72
39	39	33.50	0.00	182.86	0.00	0.00	0.00	256.53	56.44	-80.72
39	40	34.75	0.00	211.61	0.00	0.00	0.00	9.98	2.20	-3.14
40	40	34.75	0.00	211.62	0.00	0.00	0.00	9.98	2.20	-3.14
40	41	36.00	0.00	240.37	0.00	0.00	0.00	-272.50	-59.96	85.75
41	41	36.00	0.00	240.37	0.00	0.00	0.00	-272.52	-59.96	85.75
41	42	37.25	0.00	269.12	0.00	0.00	0.00	-590.95	-130.02	185.95

42	42	37.25	0.00	269.12	0.00	0.00	0.00	-590.94	-130.02	185.95
42	43	38.50	0.00	297.87	0.00	0.00	0.00	-945.31	-195.38	251.63
43	43	38.50	0.00	-70.02	0.00	0.00	0.00	-945.32	-195.38	251.63
43	44	39.17	0.00	-70.02	0.00	0.00	0.00	-898.40	-185.69	239.14
44	44	39.17	0.00	-70.02	0.00	0.00	0.00	-898.39	-185.68	239.14
44	45	39.85	0.00	-70.02	0.00	0.00	0.00	-850.78	-175.84	226.46
45	45	39.85	0.00	-70.01	0.00	0.00	0.00	-850.78	-175.84	226.46
45	46	40.53	0.00	-70.01	0.00	0.00	0.00	-803.17	-166.00	213.79
46	46	40.53	0.00	-70.02	0.00	0.00	0.00	-803.17	-166.00	213.79
46	47	41.20	0.00	-70.02	0.00	0.00	0.00	-756.25	-156.31	201.30
47	47	41.20	0.00	-70.04	0.00	0.00	0.00	-756.25	-156.31	201.30
47	48	41.88	0.00	-70.04	0.00	0.00	0.00	-708.64	-146.47	188.63
48	48	41.88	0.00	-70.05	0.00	0.00	0.00	-708.63	-146.46	188.63
48	49	42.55	0.00	-70.05	0.00	0.00	0.00	-661.72	-136.77	176.14
49	49	42.55	0.00	-70.02	0.00	0.00	0.00	-661.72	-136.77	176.14
49	50	43.22	0.00	-70.02	0.00	0.00	0.00	-614.80	-127.07	163.65
50	50	43.22	0.00	-70.02	0.00	0.00	0.00	-614.80	-127.07	163.65
50	51	43.90	0.00	-70.02	0.00	0.00	0.00	-567.18	-117.23	150.97
51	51	43.90	0.00	-70.00	0.00	0.00	0.00	-567.19	-117.23	150.98
51	52	44.58	0.00	-70.00	0.00	0.00	0.00	-519.58	-107.39	138.30
52	52	44.58	0.00	-70.02	0.00	0.00	0.00	-519.58	-107.39	138.30
52	53	45.25	0.00	-70.02	0.00	0.00	0.00	-472.66	-97.69	125.81
53	53	45.25	0.00	-70.00	0.00	0.00	0.00	-472.66	-97.69	125.81
53	54	45.92	0.00	-70.00	0.00	0.00	0.00	-425.74	-87.99	113.33
54	54	45.92	0.00	-70.04	0.00	0.00	0.00	-425.74	-87.99	113.33
54	55	46.60	0.00	-70.04	0.00	0.00	0.00	-378.13	-78.15	100.65
55	55	46.60	0.00	-70.01	0.00	0.00	0.00	-378.12	-78.15	100.65
55	56	47.28	0.00	-70.01	0.00	0.00	0.00	-330.51	-68.31	87.98
56	56	47.28	0.00	-70.04	0.00	0.00	0.00	-330.51	-68.31	87.98
56	57	47.95	0.00	-70.04	0.00	0.00	0.00	-283.59	-58.61	75.49
57	57	47.95	0.00	-70.04	0.00	0.00	0.00	-283.60	-58.62	75.49
57	58	48.63	0.00	-70.04	0.00	0.00	0.00	-235.98	-48.77	62.81
58	58	48.63	0.00	-70.02	0.00	0.00	0.00	-235.98	-48.77	62.81
58	59	49.30	0.00	-70.02	0.00	0.00	0.00	-189.06	-39.08	50.32
59	59	49.30	0.00	-70.02	0.00	0.00	0.00	-189.06	-39.08	50.32
59	60	49.97	0.00	-70.02	0.00	0.00	0.00	-142.15	-29.38	37.84
60	60	49.97	0.00	-70.02	0.00	0.00	0.00	-142.15	-29.38	37.84
60	61	50.65	0.00	-70.02	0.00	0.00	0.00	-94.53	-19.54	25.16
61	61	50.65	0.00	-70.02	0.00	0.00	0.00	-94.53	-19.54	25.16
61	62	51.33	0.00	-70.02	0.00	0.00	0.00	-46.92	-9.70	12.49
62	62	51.33	0.00	-70.02	0.00	0.00	0.00	-46.92	-9.70	12.49
62	63	52.00	0.00	-70.02	0.00	0.00	0.00	0.00	0.00	0.00

ESFUERZOS DE PRETENSADO

Familia de cables n°2

 Tipo de anclaje en origen : A
 Tipo de anclaje en final : A
 Número de tendones : 5
 Área de cada tendón : 2648
 Módulo de elasticidad del acero : 2000000
 Coeficiente de rozamiento vaina-tendón : 0.21
 Coef. rozamiento parásito / coef. rozamiento curva (rad/m) : 0.006
 Tensión de tesado (kg/mm2) : 152
 Tensión de anclaje (kg/mm2) : 133

nudo	X	Y	pend	vs	axil	cort	Mome
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2	-0.500	1.150	0.025	0.721	1760.370	44.009	-754.858
3	0.000	1.163	0.025	0.721	1761.637	44.041	-777.422
4	0.680	1.179	0.025	0.721	1763.359	44.084	-808.159
5	1.350	1.196	0.025	0.721	1765.054	44.126	-838.500
6	2.030	1.212	0.022	0.721	1768.303	38.354	-868.554
7	2.700	1.226	0.018	0.721	1771.899	31.017	-893.585
8	3.380	1.236	0.013	0.721	1775.511	23.539	-913.977
9	4.050	1.243	0.009	0.721	1779.033	16.141	-929.099
10	4.720	1.248	0.005	0.721	1782.518	8.713	-939.256
11	5.400	1.250	0.001	0.721	1786.017	1.145	-944.457
12	6.070	1.241	-0.026	0.721	1798.177	-46.812	-935.592
13	6.750	1.215	-0.053	0.721	1809.113	-96.074	-892.603
14	7.430	1.169	-0.080	0.721	1818.618	-145.813	-814.880
15	8.100	1.107	-0.107	0.721	1826.578	-195.173	-704.003
16	8.770	1.026	-0.134	0.721	1833.148	-244.773	-558.918
17	9.450	0.926	-0.161	0.721	1838.406	-295.245	-376.676
18	10.130	0.808	-0.188	0.721	1842.265	-345.739	-159.322
19	10.800	0.673	-0.214	0.721	1844.727	-395.408	88.904
20	11.480	0.546	-0.160	0.721	1840.367	-294.656	322.997
21	12.150	0.456	-0.107	0.721	1831.064	-195.314	485.005
22	12.820	0.403	-0.053	0.721	1816.793	-96.702	578.540
23	13.500	0.385	0.001	0.721	1797.218	1.818	604.213
24	14.750	0.413	0.045	0.679	1776.318	79.056	471.657
25	16.000	0.496	0.088	0.679	1752.365	154.208	320.173
26	17.250	0.633	0.131	0.679	1725.545	226.899	78.555
27	18.500	0.825	0.175	0.679	1696.088	296.796	-247.675
28	19.750	1.026	0.146	0.679	1690.791	246.843	-586.096
29	21.000	1.190	0.117	0.679	1684.181	197.043	-860.630
30	22.250	1.318	0.088	0.679	1676.244	147.509	-1071.339
31	23.500	1.410	0.059	0.679	1666.975	98.358	-1218.573
32	24.750	1.466	0.030	0.679	1656.380	49.704	-1302.975
33	26.000	1.485	0.001	0.679	1644.473	1.663	-1325.489
34	27.250	1.468	-0.029	0.679	1655.629	-47.449	-1305.872
35	28.500	1.413	-0.058	0.679	1666.456	-97.204	-1223.810
36	29.750	1.322	-0.088	0.679	1675.893	-147.479	-1077.470
37	31.000	1.193	-0.118	0.679	1683.935	-198.149	-866.181
38	32.250	1.028	-0.147	0.679	1690.588	-249.093	-589.588
39	33.500	0.825	-0.177	0.679	1695.867	-300.188	-247.642
40	34.750	0.632	-0.133	0.679	1726.056	-228.712	81.853
41	36.000	0.494	-0.088	0.679	1753.486	-154.307	324.812
42	37.250	0.412	-0.043	0.679	1777.911	-77.329	475.453
43	38.500	0.385	0.001	0.721	1799.133	1.819	604.857
44	39.170	0.403	0.053	0.721	1817.996	97.167	578.030
45	39.850	0.458	0.107	0.721	1832.236	195.438	482.813
46	40.530	0.548	0.160	0.721	1841.546	294.437	318.371
47	41.200	0.673	0.212	0.721	1845.092	391.754	88.922
48	41.880	0.808	0.186	0.721	1842.519	342.265	-160.580
49	42.550	0.924	0.160	0.721	1838.692	293.431	-372.966
50	43.220	1.022	0.133	0.721	1833.554	244.623	-551.898
51	43.900	1.104	0.107	0.721	1826.982	195.217	-699.167

52	44.580	1.168	0.080	0.721	1819.030	146.048	-811.866
53	45.250	1.213	0.054	0.721	1809.842	97.943	-889.254
54	45.920	1.240	0.028	0.721	1799.315	50.281	-933.546
55	46.600	1.250	0.001	0.721	1787.276	2.470	-945.121
56	47.280	1.249	-0.003	0.721	1783.572	-6.050	-941.945
57	47.950	1.245	-0.008	0.721	1779.875	-14.410	-933.142
58	48.630	1.238	-0.013	0.721	1776.076	-22.858	-918.490
59	49.300	1.228	-0.018	0.721	1772.287	-31.146	-898.456
60	49.970	1.215	-0.022	0.721	1768.453	-39.397	-872.903
61	50.650	1.198	-0.026	0.721	1765.009	-45.888	-841.739
62	51.330	1.180	-0.026	0.721	1763.289	-45.843	-809.746
63	52.000	1.163	-0.026	0.721	1761.592	-45.799	-778.282
64	52.500	1.150	-0.026	0.721	1760.325	-45.766	-754.839

Alargamiento 367.5209

Familia de cables n° 1

Tipo de anclaje en origen : A

Tipo de anclaje en final : A

Número de tendones : 5

Área de cada tendón : 2648

Módulo de elasticidad del acero : 2000000

Coeficiente de rozamiento vaina-tendón : 0.21

Coef. rozamiento parásito / coef. rozamiento curva (rad/m) : 0.006

Tensión de tesado (kg/mm²) : 152

Tensión de anclaje (kg/mm²) : 133

nudo	X	Y	pend	vs	axil	cort	Mome
2	-0.500	0.500	0.134	0.721	1745.320	233.873	386.054
3	0.000	0.567	0.134	0.721	1746.577	234.041	269.311
4	0.680	0.658	0.134	0.721	1748.284	234.270	110.271
5	1.350	0.748	0.134	0.721	1749.964	234.495	-46.735
6	2.030	0.834	0.116	0.721	1763.171	204.243	-199.262
7	2.700	0.904	0.093	0.721	1778.597	165.195	-325.366
8	3.380	0.959	0.070	0.721	1793.310	124.775	-427.112
9	4.050	0.998	0.047	0.721	1806.845	84.234	-500.669
10	4.720	1.022	0.024	0.721	1819.397	43.048	-546.983
11	5.400	1.030	0.000	0.721	1831.107	0.657	-565.457
12	6.070	1.021	-0.026	0.721	1842.923	-48.368	-553.125
13	6.750	0.994	-0.053	0.721	1853.488	-98.692	-506.201
14	7.430	0.949	-0.080	0.721	1862.599	-149.469	-424.150
15	8.100	0.886	-0.107	0.721	1870.152	-199.829	-308.652
16	8.770	0.806	-0.133	0.721	1863.944	-248.755	-157.574
17	9.450	0.706	-0.160	0.721	1844.641	-295.986	28.394
18	10.130	0.588	-0.187	0.721	1824.305	-341.981	243.880
19	10.800	0.453	-0.214	0.721	1803.329	-386.025	483.641
20	11.480	0.326	-0.160	0.721	1798.919	-287.768	711.227
21	12.150	0.237	-0.107	0.721	1789.839	-190.916	867.510
22	12.820	0.183	-0.053	0.721	1775.928	-94.775	955.977
23	13.500	0.165	0.001	0.721	1756.860	1.281	977.154
24	14.750	0.193	0.044	0.679	1736.387	77.034	843.519
25	16.000	0.276	0.088	0.679	1712.911	150.736	690.409
26	17.250	0.413	0.132	0.679	1686.615	222.018	448.284
27	18.500	0.605	0.175	0.679	1657.725	290.551	122.627
28	19.750	0.806	0.146	0.679	1652.549	241.570	-209.765
29	21.000	0.970	0.117	0.679	1646.083	192.740	-479.797
30	22.250	1.099	0.088	0.679	1638.311	144.171	-687.533
31	23.500	1.190	0.059	0.679	1629.229	95.977	-833.315
32	24.750	1.246	0.030	0.679	1618.841	48.273	-917.776
33	26.000	1.265	0.001	0.679	1607.163	1.172	-941.841
34	27.250	1.247	-0.029	0.679	1618.312	-46.684	-919.935
35	28.500	1.193	-0.058	0.679	1628.862	-95.164	-837.087
36	29.750	1.101	-0.088	0.679	1638.063	-144.150	-691.909
37	31.000	0.973	-0.118	0.679	1645.909	-193.520	-483.748
38	32.250	0.807	-0.147	0.679	1652.406	-243.156	-212.257
39	33.500	0.605	-0.177	0.679	1657.569	-292.941	122.616
40	34.750	0.412	-0.132	0.679	1686.975	-223.296	450.685
41	36.000	0.274	-0.088	0.679	1713.702	-150.806	693.850
42	37.250	0.192	-0.044	0.679	1737.511	-75.817	846.438
43	38.500	0.165	0.001	0.721	1758.209	1.282	977.905
44	39.170	0.183	0.053	0.721	1776.709	94.708	956.030
45	39.850	0.237	0.107	0.721	1790.665	191.004	866.145
46	40.530	0.328	0.160	0.721	1799.778	288.014	707.356
47	41.200	0.453	0.213	0.721	1804.146	383.569	483.861
48	41.880	0.589	0.186	0.721	1825.112	339.416	242.155
49	42.550	0.704	0.160	0.721	1844.854	294.675	31.124
50	43.220	0.803	0.133	0.721	1863.620	248.767	-151.617

51	43.900	0.884	0.107	0.721	1870.436	199.860	-305.014
52	44.580	0.948	0.080	0.721	1862.855	149.435	-422.262
53	45.250	0.993	0.054	0.721	1853.998	100.071	-503.601
54	45.920	1.020	0.028	0.721	1843.768	51.135	-551.291
55	46.600	1.030	0.001	0.721	1831.995	2.015	-565.731
56	47.280	1.023	-0.023	0.721	1820.180	-41.102	-548.786
57	47.950	1.000	-0.046	0.721	1807.491	-82.990	-503.485
58	48.630	0.960	-0.070	0.721	1793.573	-124.826	-429.168
59	49.300	0.906	-0.093	0.721	1778.867	-165.309	-328.797
60	49.970	0.836	-0.116	0.721	1763.209	-204.995	-202.338
61	50.650	0.749	-0.135	0.721	1749.798	-235.733	-49.063
62	51.330	0.658	-0.135	0.721	1748.092	-235.503	111.128
63	52.000	0.567	-0.135	0.721	1746.411	-235.277	268.656
64	52.500	0.500	-0.135	0.721	1745.154	-235.107	386.016

Alargamiento 360.5573

Título: Fecha : 04/11/99
 Descripción de la combinación :PRETENSADO INICIAL
 H004 1

1 * [+ (FPRETE.ANL * 1)]

Barra	Nudo	X	Axial(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP (t/m2)	T.INF (t/m2)
3	3	0.00	3508.22	242.33	0.00	0.00	0.00	-508.11	140.10	380.37
3	4	0.68	3511.65	242.60	0.00	0.00	0.00	-673.57	106.14	424.65
4	4	0.68	3511.63	242.60	0.00	0.00	0.00	-673.57	106.14	424.65
4	5	1.35	3515.00	242.87	0.00	0.00	0.00	-836.97	72.60	468.38
5	5	1.35	3515.00	242.86	0.00	0.00	0.00	-836.96	72.60	468.37
5	6	2.03	3531.45	206.83	0.00	0.00	0.00	-995.23	41.04	511.65
6	6	2.03	3531.47	206.84	0.00	0.00	0.00	-995.23	41.04	511.65
6	7	2.70	3550.50	160.46	0.00	0.00	0.00	-1122.42	16.08	546.84
7	7	2.70	3550.49	160.44	0.00	0.00	0.00	-1122.42	16.08	546.84
7	8	3.38	3568.81	112.54	0.00	0.00	0.00	-1220.24	-2.86	574.16
8	8	3.38	3568.84	112.52	0.00	0.00	0.00	-1220.24	-2.85	574.16
8	9	4.05	3585.90	64.58	0.00	0.00	0.00	-1284.97	-15.04	592.58
9	9	4.05	3585.90	64.60	0.00	0.00	0.00	-1284.97	-15.04	592.58
9	10	4.72	3601.94	15.99	0.00	0.00	0.00	-1317.47	-20.64	602.35
10	10	4.72	3601.90	16.00	0.00	0.00	0.00	-1317.49	-20.64	602.36
10	11	5.40	3617.11	-33.95	0.00	0.00	0.00	-1316.83	-19.45	603.24
11	11	5.40	3617.12	-33.94	0.00	0.00	0.00	-1316.85	-19.45	603.25
11	12	6.07	3641.10	-130.93	0.00	0.00	0.00	-1271.67	-8.44	592.90
12	12	6.07	3641.10	-130.99	0.00	0.00	0.00	-1271.69	-8.44	592.90
12	13	6.75	3662.60	-230.57	0.00	0.00	0.00	-1157.46	16.67	564.00
13	13	6.75	3662.58	-230.54	0.00	0.00	0.00	-1157.45	16.67	564.00
13	14	7.43	3681.19	-331.06	0.00	0.00	0.00	-973.38	56.02	516.30
14	14	7.43	3681.22	-330.97	0.00	0.00	0.00	-973.37	56.02	516.30
14	15	8.10	3696.73	-430.69	0.00	0.00	0.00	-723.05	108.84	450.75
15	15	8.10	3696.73	-430.74	0.00	0.00	0.00	-723.03	108.85	450.75
15	16	8.77	3697.10	-529.26	0.00	0.00	0.00	-402.94	175.03	365.57
16	16	8.77	3697.10	-529.28	0.00	0.00	0.00	-402.93	175.03	365.57
16	17	9.45	3683.06	-626.98	0.00	0.00	0.00	-10.41	255.18	260.10
17	17	9.45	3683.03	-626.98	0.00	0.00	0.00	-10.41	255.18	260.10
17	18	10.13	3666.55	-723.47	0.00	0.00	0.00	446.75	348.51	137.26
18	18	10.13	3666.59	-723.48	0.00	0.00	0.00	446.75	348.52	137.26
18	19	10.80	3648.08	-817.19	0.00	0.00	0.00	958.69	453.03	-0.30
19	19	10.80	3648.06	-817.19	0.00	0.00	0.00	958.69	453.03	-0.30
19	20	11.48	3639.29	-618.18	0.00	0.00	0.00	1444.68	552.87	-130.28
20	20	11.48	3639.30	-618.18	0.00	0.00	0.00	1444.68	552.87	-130.28
20	21	12.15	3620.91	-421.98	0.00	0.00	0.00	1786.93	622.32	-222.66

21	21	12.15	3620.91	-421.98	0.00	0.00	0.00	1786.93	622.32	-222.66
21	22	12.82	3592.73	-227.23	0.00	0.00	0.00	1992.88	662.92	-279.45
22	22	12.82	3592.74	-227.23	0.00	0.00	0.00	1992.88	662.92	-279.45
22	23	13.50	3554.09	-32.65	0.00	0.00	0.00	2064.05	674.93	-301.10
23	23	13.50	3554.07	3.16	0.00	0.00	0.00	2064.05	674.93	-301.10
23	24	14.75	3512.70	156.15	0.00	0.00	0.00	1797.78	740.80	-220.44
24	24	14.75	3512.71	156.15	0.00	0.00	0.00	1797.78	740.80	-220.44
24	25	16.00	3465.28	305.01	0.00	0.00	0.00	1493.10	669.11	-129.23
25	25	16.00	3465.28	305.00	0.00	0.00	0.00	1493.11	669.11	-129.24
25	26	17.25	3412.16	448.98	0.00	0.00	0.00	1009.29	557.44	17.78
26	26	17.25	3412.16	448.99	0.00	0.00	0.00	1009.29	557.44	17.78
26	27	18.50	3353.82	587.42	0.00	0.00	0.00	357.32	408.25	217.20
27	27	18.50	3353.81	587.42	0.00	0.00	0.00	357.34	408.26	217.19
27	28	19.75	3343.34	488.48	0.00	0.00	0.00	-313.58	259.61	427.28
28	28	19.75	3343.34	488.46	0.00	0.00	0.00	-313.59	259.61	427.28
28	29	21.00	3330.26	389.83	0.00	0.00	0.00	-858.21	138.49	597.37
29	29	21.00	3330.26	389.82	0.00	0.00	0.00	-858.22	138.49	597.37
29	30	22.25	3314.55	291.72	0.00	0.00	0.00	-1276.74	44.86	727.52
30	30	22.25	3314.56	291.73	0.00	0.00	0.00	-1276.73	44.87	727.52
30	31	23.50	3296.21	194.39	0.00	0.00	0.00	-1569.84	-21.43	817.94
31	31	23.50	3296.20	194.38	0.00	0.00	0.00	-1569.84	-21.43	817.94
31	32	24.75	3275.22	98.02	0.00	0.00	0.00	-1738.76	-60.66	869.03
32	32	24.75	3275.22	98.02	0.00	0.00	0.00	-1738.79	-60.66	869.04
32	33	26.00	3251.64	2.88	0.00	0.00	0.00	-1785.42	-73.24	881.40
33	33	26.00	3251.63	2.91	0.00	0.00	0.00	-1785.42	-73.24	881.40
33	34	27.25	3273.94	-94.06	0.00	0.00	0.00	-1743.99	-61.93	870.55
34	34	27.25	3273.94	-94.11	0.00	0.00	0.00	-1744.00	-61.93	870.56
34	35	28.50	3295.32	-192.35	0.00	0.00	0.00	-1579.14	-23.56	820.78
35	35	28.50	3295.31	-192.31	0.00	0.00	0.00	-1579.15	-23.56	820.78
35	36	29.75	3313.95	-291.57	0.00	0.00	0.00	-1287.72	42.39	730.91
36	36	29.75	3313.96	-291.59	0.00	0.00	0.00	-1287.71	42.39	730.91
36	37	31.00	3329.85	-391.63	0.00	0.00	0.00	-868.36	136.22	600.52
37	37	31.00	3329.85	-391.62	0.00	0.00	0.00	-868.35	136.22	600.52
37	38	32.25	3342.99	-492.20	0.00	0.00	0.00	-320.33	258.09	429.37
38	38	32.25	3342.99	-492.18	0.00	0.00	0.00	-320.32	258.09	429.36
38	39	33.50	3353.44	-593.06	0.00	0.00	0.00	356.41	408.02	217.45
39	39	33.50	3353.44	-593.06	0.00	0.00	0.00	356.41	408.02	217.45
39	40	34.75	3413.03	-451.94	0.00	0.00	0.00	1013.90	558.54	16.42
40	40	34.75	3413.03	-451.95	0.00	0.00	0.00	1013.90	558.54	16.42
40	41	36.00	3467.19	-305.05	0.00	0.00	0.00	1499.95	670.80	-131.20
41	41	36.00	3467.19	-305.05	0.00	0.00	0.00	1499.95	670.80	-131.20
41	42	37.25	3515.42	-153.09	0.00	0.00	0.00	1803.10	742.24	-221.85

42	42	37.25	3515.42	-153.09	0.00	0.00	0.00	1803.11	742.24	-221.85
42	43	38.50	3557.34	3.16	0.00	0.00	0.00	2063.91	675.13	-300.83
43	43	38.50	3557.34	38.75	0.00	0.00	0.00	2063.91	675.13	-300.83
43	44	39.17	3594.70	227.52	0.00	0.00	0.00	1991.33	662.74	-278.90
44	44	39.17	3594.70	227.52	0.00	0.00	0.00	1991.33	662.74	-278.90
44	45	39.85	3622.90	422.09	0.00	0.00	0.00	1781.98	621.44	-221.21
45	45	39.85	3622.90	422.09	0.00	0.00	0.00	1781.98	621.44	-221.21
45	46	40.53	3641.32	618.09	0.00	0.00	0.00	1434.52	550.91	-127.43
46	46	40.53	3641.32	618.09	0.00	0.00	0.00	1434.52	550.91	-127.43
46	47	41.20	3649.24	810.96	0.00	0.00	0.00	957.70	452.91	0.04
47	47	41.20	3649.24	810.96	0.00	0.00	0.00	957.70	452.91	0.04
47	48	41.88	3667.63	717.32	0.00	0.00	0.00	442.25	347.66	138.53
48	48	41.88	3667.63	717.32	0.00	0.00	0.00	442.25	347.66	138.53
48	49	42.55	3683.55	623.75	0.00	0.00	0.00	-5.05	256.32	258.71
49	49	42.55	3683.55	623.74	0.00	0.00	0.00	-5.06	256.32	258.71
49	50	43.22	3697.18	529.02	0.00	0.00	0.00	-390.59	177.59	362.29
50	50	43.22	3697.17	529.01	0.00	0.00	0.00	-390.60	177.59	362.29
50	51	43.90	3697.42	430.70	0.00	0.00	0.00	-715.50	110.45	448.79
51	51	43.90	3697.42	430.76	0.00	0.00	0.00	-715.51	110.45	448.79
51	52	44.58	3681.88	331.17	0.00	0.00	0.00	-969.69	56.83	515.37
52	52	44.58	3681.89	331.12	0.00	0.00	0.00	-969.68	56.83	515.36
52	53	45.25	3663.84	233.65	0.00	0.00	0.00	-1152.28	17.83	562.71
53	53	45.25	3663.84	233.64	0.00	0.00	0.00	-1152.31	17.82	562.72
53	54	45.92	3643.09	137.04	0.00	0.00	0.00	-1268.13	-7.56	592.09
54	54	45.92	3643.09	137.02	0.00	0.00	0.00	-1268.16	-7.57	592.10
54	55	46.60	3619.27	40.09	0.00	0.00	0.00	-1318.41	-19.62	603.81
55	55	46.60	3619.27	40.09	0.00	0.00	0.00	-1318.41	-19.62	603.81
55	56	47.28	3603.75	-11.54	0.00	0.00	0.00	-1322.51	-21.55	603.82
56	56	47.28	3603.75	-11.49	0.00	0.00	0.00	-1322.51	-21.55	603.82
56	57	47.95	3587.37	-61.74	0.00	0.00	0.00	-1292.28	-16.45	594.63
57	57	47.95	3587.37	-61.77	0.00	0.00	0.00	-1292.31	-16.46	594.64
57	58	48.63	3569.65	-112.06	0.00	0.00	0.00	-1227.54	-4.31	576.16
58	58	48.63	3569.65	-112.04	0.00	0.00	0.00	-1227.55	-4.31	576.16
58	59	49.30	3551.16	-160.81	0.00	0.00	0.00	-1131.03	14.35	549.18
59	59	49.30	3551.16	-160.80	0.00	0.00	0.00	-1131.02	14.35	549.18
59	60	49.97	3531.66	-208.74	0.00	0.00	0.00	-1002.90	39.47	513.71
60	60	49.97	3531.66	-208.75	0.00	0.00	0.00	-1002.90	39.47	513.71
60	61	50.65	3514.81	-245.98	0.00	0.00	0.00	-842.68	71.41	469.88
61	61	50.65	3514.81	-245.95	0.00	0.00	0.00	-842.68	71.41	469.88
61	62	51.33	3511.38	-245.68	0.00	0.00	0.00	-674.74	105.88	424.94
62	62	51.33	3511.38	-245.70	0.00	0.00	0.00	-674.74	105.88	424.94
62	63	52.00	3508.00	-245.43	0.00	0.00	0.00	-509.63	139.77	380.76

 Titulo: Fecha : 04/11/99
 Descripción de la combinación :PRETENSADO FINAL
 H005 1

1 * [+ (FPREFI.ANL * 1)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2981.96	205.98	0.00	0.00	0.00	-431.89	119.08	323.31
3	4	0.68	2984.88	206.21	0.00	0.00	0.00	-572.54	90.22	360.95
4	4	0.68	2984.89	206.22	0.00	0.00	0.00	-572.54	90.22	360.95
4	5	1.35	2987.76	206.45	0.00	0.00	0.00	-711.42	61.71	398.12
5	5	1.35	2987.75	206.44	0.00	0.00	0.00	-711.43	61.71	398.12
5	6	2.03	3001.74	175.82	0.00	0.00	0.00	-845.94	34.89	434.90
6	6	2.03	3001.76	175.81	0.00	0.00	0.00	-845.95	34.88	434.91
6	7	2.70	3017.92	136.38	0.00	0.00	0.00	-954.04	13.67	464.81
7	7	2.70	3017.92	136.39	0.00	0.00	0.00	-954.05	13.67	464.81
7	8	3.38	3033.50	95.68	0.00	0.00	0.00	-1037.22	-2.43	488.04
8	8	3.38	3033.50	95.67	0.00	0.00	0.00	-1037.20	-2.43	488.03
8	9	4.05	3048.00	54.92	0.00	0.00	0.00	-1092.23	-12.79	503.69
9	9	4.05	3048.00	54.94	0.00	0.00	0.00	-1092.22	-12.78	503.69
9	10	4.72	3061.63	13.62	0.00	0.00	0.00	-1119.87	-17.55	512.00
10	10	4.72	3061.64	13.60	0.00	0.00	0.00	-1119.86	-17.54	512.00
10	11	5.40	3074.57	-28.87	0.00	0.00	0.00	-1119.31	-16.53	512.76
11	11	5.40	3074.56	-28.89	0.00	0.00	0.00	-1119.33	-16.53	512.76
11	12	6.07	3094.94	-111.33	0.00	0.00	0.00	-1080.93	-7.17	503.97
12	12	6.07	3094.93	-111.28	0.00	0.00	0.00	-1080.93	-7.17	503.97
12	13	6.75	3113.21	-195.93	0.00	0.00	0.00	-983.85	14.17	479.40
13	13	6.75	3113.20	-195.98	0.00	0.00	0.00	-983.86	14.17	479.40
13	14	7.43	3129.03	-281.42	0.00	0.00	0.00	-827.36	47.62	438.85
14	14	7.43	3129.03	-281.40	0.00	0.00	0.00	-827.37	47.62	438.85
14	15	8.10	3142.21	-366.16	0.00	0.00	0.00	-614.59	92.52	383.14
15	15	8.10	3142.22	-366.13	0.00	0.00	0.00	-614.59	92.52	383.14
15	16	8.77	3142.53	-449.88	0.00	0.00	0.00	-342.48	148.78	310.73
16	16	8.77	3142.53	-449.89	0.00	0.00	0.00	-342.49	148.78	310.73
16	17	9.45	3130.59	-532.94	0.00	0.00	0.00	-8.85	216.90	221.09
17	17	9.45	3130.59	-532.95	0.00	0.00	0.00	-8.84	216.90	221.08
17	18	10.13	3116.59	-614.97	0.00	0.00	0.00	379.74	296.24	116.67
18	18	10.13	3116.59	-614.97	0.00	0.00	0.00	379.73	296.24	116.67
18	19	10.80	3100.85	-694.62	0.00	0.00	0.00	814.90	385.08	-0.26
19	19	10.80	3100.86	-694.61	0.00	0.00	0.00	814.89	385.08	-0.26
19	20	11.48	3093.40	-525.46	0.00	0.00	0.00	1227.99	469.94	-110.74
20	20	11.48	3093.39	-525.45	0.00	0.00	0.00	1227.98	469.94	-110.74
20	21	12.15	3077.77	-358.69	0.00	0.00	0.00	1518.89	528.97	-189.26

21	21	12.15	3077.77	-358.69	0.00	0.00	0.00	1518.89	528.97	-189.26
21	22	12.82	3053.81	-193.15	0.00	0.00	0.00	1693.96	563.48	-237.54
22	22	12.82	3053.82	-193.15	0.00	0.00	0.00	1693.96	563.48	-237.54
22	23	13.50	3020.97	-27.76	0.00	0.00	0.00	1754.45	573.69	-255.93
23	23	13.50	3020.97	2.69	0.00	0.00	0.00	1754.45	573.69	-255.93
23	24	14.75	2985.80	132.73	0.00	0.00	0.00	1528.11	629.68	-187.38
24	24	14.75	2985.79	132.73	0.00	0.00	0.00	1528.11	629.68	-187.38
24	25	16.00	2945.48	259.26	0.00	0.00	0.00	1269.14	568.74	-109.85
25	25	16.00	2945.48	259.26	0.00	0.00	0.00	1269.14	568.74	-109.85
25	26	17.25	2900.33	381.64	0.00	0.00	0.00	857.89	473.82	15.12
26	26	17.25	2900.34	381.63	0.00	0.00	0.00	857.89	473.82	15.12
26	27	18.50	2850.74	499.30	0.00	0.00	0.00	303.73	347.02	184.62
27	27	18.50	2850.74	499.30	0.00	0.00	0.00	303.73	347.02	184.62
27	28	19.75	2841.84	415.21	0.00	0.00	0.00	-266.54	220.67	363.18
28	28	19.75	2841.84	415.20	0.00	0.00	0.00	-266.55	220.67	363.19
28	29	21.00	2830.73	331.36	0.00	0.00	0.00	-729.47	117.72	507.76
29	29	21.00	2830.72	331.37	0.00	0.00	0.00	-729.50	117.72	507.77
29	30	22.25	2817.37	247.98	0.00	0.00	0.00	-1085.22	38.14	618.39
30	30	22.25	2817.38	247.99	0.00	0.00	0.00	-1085.24	38.13	618.39
30	31	23.50	2801.78	165.25	0.00	0.00	0.00	-1334.37	-18.21	695.25
31	31	23.50	2801.77	165.26	0.00	0.00	0.00	-1334.34	-18.21	695.24
31	32	24.75	2783.94	83.36	0.00	0.00	0.00	-1477.98	-51.56	738.69
32	32	24.75	2783.94	83.32	0.00	0.00	0.00	-1477.96	-51.56	738.68
32	33	26.00	2763.89	2.45	0.00	0.00	0.00	-1517.61	-62.25	749.19
33	33	26.00	2763.89	2.46	0.00	0.00	0.00	-1517.62	-62.26	749.19
33	34	27.25	2782.85	-79.96	0.00	0.00	0.00	-1482.39	-52.64	739.97
34	34	27.25	2782.85	-79.96	0.00	0.00	0.00	-1482.39	-52.64	739.97
34	35	28.50	2801.02	-163.46	0.00	0.00	0.00	-1342.30	-20.03	697.67
35	35	28.50	2801.02	-163.45	0.00	0.00	0.00	-1342.27	-20.03	697.66
35	36	29.75	2816.86	-247.82	0.00	0.00	0.00	-1094.57	36.03	621.28
36	36	29.75	2816.86	-247.87	0.00	0.00	0.00	-1094.57	36.03	621.28
36	37	31.00	2830.36	-332.90	0.00	0.00	0.00	-738.07	115.79	510.43
37	37	31.00	2830.36	-332.88	0.00	0.00	0.00	-738.11	115.79	510.44
37	38	32.25	2841.54	-418.37	0.00	0.00	0.00	-272.28	219.38	364.96
38	38	32.25	2841.54	-418.37	0.00	0.00	0.00	-272.29	219.38	364.96
38	39	33.50	2850.42	-504.12	0.00	0.00	0.00	302.96	346.82	184.83
39	39	33.50	2850.42	-504.10	0.00	0.00	0.00	302.96	346.82	184.83
39	40	34.75	2901.07	-384.15	0.00	0.00	0.00	861.81	474.75	13.96
40	40	34.75	2901.07	-384.15	0.00	0.00	0.00	861.82	474.76	13.95
40	41	36.00	2947.10	-259.29	0.00	0.00	0.00	1274.96	570.18	-111.52
41	41	36.00	2947.11	-259.30	0.00	0.00	0.00	1274.96	570.18	-111.52
41	42	37.25	2988.11	-130.13	0.00	0.00	0.00	1532.64	630.91	-188.57

42	42	37.25	2988.10	-130.13	0.00	0.00	0.00	1532.64	630.90	-188.57
42	43	38.50	3023.74	2.69	0.00	0.00	0.00	1754.32	573.86	-255.71
43	43	38.50	3023.74	32.93	0.00	0.00	0.00	1754.32	573.86	-255.71
43	44	39.17	3055.50	193.39	0.00	0.00	0.00	1692.63	563.33	-237.07
44	44	39.17	3055.50	193.39	0.00	0.00	0.00	1692.63	563.33	-237.07
44	45	39.85	3079.47	358.77	0.00	0.00	0.00	1514.69	528.22	-188.03
45	45	39.85	3079.46	358.77	0.00	0.00	0.00	1514.69	528.22	-188.03
45	46	40.53	3095.12	525.37	0.00	0.00	0.00	1219.35	468.27	-108.32
46	46	40.53	3095.12	525.38	0.00	0.00	0.00	1219.35	468.27	-108.32
46	47	41.20	3101.85	689.32	0.00	0.00	0.00	814.05	384.97	0.04
47	47	41.20	3101.85	689.33	0.00	0.00	0.00	814.05	384.97	0.04
47	48	41.88	3117.48	609.73	0.00	0.00	0.00	375.91	295.51	117.75
48	48	41.88	3117.49	609.72	0.00	0.00	0.00	375.91	295.51	117.75
48	49	42.55	3131.01	530.18	0.00	0.00	0.00	-4.28	217.88	219.90
49	49	42.55	3131.01	530.20	0.00	0.00	0.00	-4.28	217.88	219.90
49	50	43.22	3142.60	449.69	0.00	0.00	0.00	-332.01	150.95	307.95
50	50	43.22	3142.60	449.68	0.00	0.00	0.00	-332.02	150.95	307.95
50	51	43.90	3142.80	366.11	0.00	0.00	0.00	-608.17	93.88	381.47
51	51	43.90	3142.81	366.11	0.00	0.00	0.00	-608.17	93.89	381.47
51	52	44.58	3129.60	281.46	0.00	0.00	0.00	-824.24	48.30	438.06
52	52	44.58	3129.60	281.49	0.00	0.00	0.00	-824.22	48.31	438.06
52	53	45.25	3114.26	198.64	0.00	0.00	0.00	-979.43	15.16	478.30
53	53	45.25	3114.26	198.60	0.00	0.00	0.00	-979.43	15.16	478.30
53	54	45.92	3096.62	116.49	0.00	0.00	0.00	-1077.92	-6.43	503.28
54	54	45.92	3096.62	116.47	0.00	0.00	0.00	-1077.91	-6.43	503.28
54	55	46.60	3076.38	34.08	0.00	0.00	0.00	-1120.63	-16.67	513.24
55	55	46.60	3076.38	34.10	0.00	0.00	0.00	-1120.64	-16.68	513.24
55	56	47.28	3063.19	-9.79	0.00	0.00	0.00	-1124.12	-18.32	513.24
56	56	47.28	3063.19	-9.81	0.00	0.00	0.00	-1124.13	-18.32	513.25
56	57	47.95	3049.26	-52.52	0.00	0.00	0.00	-1098.43	-13.98	505.43
57	57	47.95	3049.26	-52.50	0.00	0.00	0.00	-1098.45	-13.98	505.44
57	58	48.63	3034.20	-95.24	0.00	0.00	0.00	-1043.41	-3.66	489.74
58	58	48.63	3034.20	-95.27	0.00	0.00	0.00	-1043.41	-3.66	489.74
58	59	49.30	3018.48	-136.72	0.00	0.00	0.00	-961.36	12.20	466.80
59	59	49.30	3018.48	-136.69	0.00	0.00	0.00	-961.36	12.20	466.80
59	60	49.97	3001.91	-177.43	0.00	0.00	0.00	-852.46	33.55	436.65
60	60	49.97	3001.91	-177.43	0.00	0.00	0.00	-852.45	33.55	436.65
60	61	50.65	2987.58	-209.07	0.00	0.00	0.00	-716.29	60.69	399.40
61	61	50.65	2987.58	-209.06	0.00	0.00	0.00	-716.28	60.69	399.40
61	62	51.33	2984.67	-208.83	0.00	0.00	0.00	-573.53	90.00	361.20
62	62	51.33	2984.67	-208.86	0.00	0.00	0.00	-573.53	90.00	361.20
62	63	52.00	2981.80	-208.63	0.00	0.00	0.00	-433.18	118.80	323.64

ESTADO TENSIONAL

Título: Fecha : 04/11/99
 Descripción de la combinación : PESO PROPIO + PRETENSADO INICIAL x 1.1 (TENSION MINIMA -244 T/M2)
 H001 1 + H004 1.1

1 * [+ (FPPROP.ANL * 1) + (FPRETE.ANL * 1.1)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	3859.04	113.92	0.00	0.00	0.00	-566.48	152.54	420.42
3	4	0.68	3862.81	138.55	0.00	0.00	0.00	-652.97	134.93	443.70
4	4	0.68	3862.79	138.55	0.00	0.00	0.00	-652.97	134.93	443.70
4	5	1.35	3866.50	162.82	0.00	0.00	0.00	-754.77	114.15	471.06
5	5	1.35	3866.50	162.82	0.00	0.00	0.00	-754.77	114.15	471.06
5	6	2.03	3884.59	147.51	0.00	0.00	0.00	-866.18	92.39	501.98
6	6	2.03	3884.62	147.52	0.00	0.00	0.00	-866.18	92.39	501.98
6	7	2.70	3905.55	120.49	0.00	0.00	0.00	-960.52	74.35	528.55
7	7	2.70	3905.54	120.45	0.00	0.00	0.00	-960.52	74.35	528.55
7	8	3.38	3925.69	92.09	0.00	0.00	0.00	-1038.29	59.68	550.66
8	8	3.38	3925.72	92.08	0.00	0.00	0.00	-1038.29	59.69	550.66
8	9	4.05	3944.49	63.32	0.00	0.00	0.00	-1096.30	49.01	567.41
9	9	4.05	3944.49	63.34	0.00	0.00	0.00	-1096.30	49.01	567.41
9	10	4.72	3962.13	33.84	0.00	0.00	0.00	-1134.91	42.26	578.92
10	10	4.72	3962.09	33.85	0.00	0.00	0.00	-1134.92	42.26	578.92
10	11	5.40	3978.82	3.24	0.00	0.00	0.00	-1153.52	39.58	585.05
11	11	5.40	3978.83	3.26	0.00	0.00	0.00	-1153.55	39.58	585.05
11	12	6.07	4005.21	-79.46	0.00	0.00	0.00	-1139.07	44.41	583.04
12	12	6.07	4005.21	-79.53	0.00	0.00	0.00	-1139.09	44.41	583.05
12	13	6.75	4028.86	-164.74	0.00	0.00	0.00	-1065.61	61.25	565.14
13	13	6.75	4028.84	-164.70	0.00	0.00	0.00	-1065.58	61.25	565.13
13	14	7.43	4049.31	-250.95	0.00	0.00	0.00	-931.83	90.33	530.96
14	14	7.43	4049.34	-250.85	0.00	0.00	0.00	-931.82	90.33	530.96
14	15	8.10	4066.40	-336.57	0.00	0.00	0.00	-740.34	131.10	481.18
15	15	8.10	4066.40	-336.62	0.00	0.00	0.00	-740.33	131.10	481.18
15	16	8.77	4066.81	-421.03	0.00	0.00	0.00	-488.17	183.25	414.09
16	16	8.77	4066.81	-421.05	0.00	0.00	0.00	-488.16	183.25	414.09
16	17	9.45	4051.37	-504.19	0.00	0.00	0.00	-174.26	247.05	329.45
17	17	9.45	4051.33	-504.19	0.00	0.00	0.00	-174.26	247.05	329.45
17	18	10.13	4033.21	-585.99	0.00	0.00	0.00	194.22	321.94	230.10
18	18	10.13	4033.25	-586.01	0.00	0.00	0.00	194.21	321.94	230.10
18	19	10.80	4012.89	-665.11	0.00	0.00	0.00	608.73	406.19	118.34
19	19	10.80	4012.87	-665.11	0.00	0.00	0.00	608.73	406.19	118.34
19	20	11.48	4003.22	-421.87	0.00	0.00	0.00	976.07	481.44	19.89
20	20	11.48	4003.23	-421.87	0.00	0.00	0.00	976.06	481.44	19.89
20	21	12.15	3983.00	-182.08	0.00	0.00	0.00	1171.56	520.43	-33.56

21	21	12.15	3983.00	-182.08	0.00	0.00	0.00	1171.56	520.43	-33.56
21	22	12.82	3952.00	56.12	0.00	0.00	0.00	1201.07	524.37	-43.58
22	22	12.82	3952.01	56.13	0.00	0.00	0.00	1201.07	524.37	-43.58
22	23	13.50	3909.50	294.49	0.00	0.00	0.00	1062.96	492.85	-9.79
23	23	13.50	3909.48	-320.93	0.00	0.00	0.00	1062.96	492.85	-9.79
23	24	14.75	3863.97	-114.38	0.00	0.00	0.00	1150.31	632.87	17.82
24	24	14.75	3863.98	-114.38	0.00	0.00	0.00	1150.31	632.87	17.82
24	25	16.00	3811.81	81.15	0.00	0.00	0.00	1152.98	628.33	11.85
25	25	16.00	3811.81	81.14	0.00	0.00	0.00	1152.99	628.33	11.85
25	26	17.25	3753.38	271.31	0.00	0.00	0.00	918.87	571.08	79.77
26	26	17.25	3753.38	271.32	0.00	0.00	0.00	918.87	571.08	79.77
26	27	18.50	3689.20	455.38	0.00	0.00	0.00	460.04	463.82	217.84
27	27	18.50	3689.19	455.39	0.00	0.00	0.00	460.06	463.82	217.83
27	28	19.75	3677.67	378.36	0.00	0.00	0.00	-59.36	348.41	380.14
28	28	19.75	3677.67	378.32	0.00	0.00	0.00	-59.38	348.40	380.15
28	29	21.00	3663.29	301.62	0.00	0.00	0.00	-479.59	254.53	510.96
29	29	21.00	3663.29	301.63	0.00	0.00	0.00	-479.61	254.53	510.97
29	30	22.25	3646.01	225.51	0.00	0.00	0.00	-800.88	182.14	610.36
30	30	22.25	3646.02	225.52	0.00	0.00	0.00	-800.86	182.15	610.36
30	31	23.50	3625.83	150.24	0.00	0.00	0.00	-1023.94	131.08	678.57
31	31	23.50	3625.82	150.24	0.00	0.00	0.00	-1023.94	131.08	678.57
31	32	24.75	3602.74	76.04	0.00	0.00	0.00	-1150.14	101.05	716.01
32	32	24.75	3602.74	76.02	0.00	0.00	0.00	-1150.17	101.04	716.02
32	33	26.00	3576.80	3.17	0.00	0.00	0.00	-1181.59	91.58	723.35
33	33	26.00	3576.79	3.20	0.00	0.00	0.00	-1181.60	91.57	723.36
33	34	27.25	3601.33	-71.68	0.00	0.00	0.00	-1155.88	99.64	717.67
34	34	27.25	3601.33	-71.74	0.00	0.00	0.00	-1155.90	99.64	717.68
34	35	28.50	3624.85	-148.01	0.00	0.00	0.00	-1034.15	128.74	681.68
35	35	28.50	3624.84	-147.96	0.00	0.00	0.00	-1034.18	128.73	681.69
35	36	29.75	3645.34	-225.35	0.00	0.00	0.00	-812.96	179.42	614.10
36	36	29.75	3645.36	-225.37	0.00	0.00	0.00	-812.95	179.42	614.09
36	37	31.00	3662.84	-303.61	0.00	0.00	0.00	-490.77	252.03	514.43
37	37	31.00	3662.84	-303.59	0.00	0.00	0.00	-490.74	252.03	514.43
37	38	32.25	3677.29	-382.43	0.00	0.00	0.00	-66.79	346.73	382.45
38	38	32.25	3677.29	-382.41	0.00	0.00	0.00	-66.77	346.74	382.44
38	39	33.50	3688.78	-461.59	0.00	0.00	0.00	459.04	463.56	218.11
39	39	33.50	3688.78	-461.61	0.00	0.00	0.00	459.03	463.55	218.12
39	40	34.75	3754.33	-274.58	0.00	0.00	0.00	923.95	572.29	78.27
40	40	34.75	3754.33	-274.58	0.00	0.00	0.00	923.94	572.29	78.27
40	41	36.00	3813.91	-81.19	0.00	0.00	0.00	1160.51	630.19	9.69
41	41	36.00	3813.91	-81.19	0.00	0.00	0.00	1160.51	630.19	9.69
41	42	37.25	3866.96	117.75	0.00	0.00	0.00	1156.17	634.45	16.27

42	42	37.25	3866.96	117.75	0.00	0.00	0.00	1156.18	634.46	16.26
42	43	38.50	3913.07	327.89	0.00	0.00	0.00	1062.80	493.07	-9.50
43	43	38.50	3913.07	-287.79	0.00	0.00	0.00	1062.80	493.07	-9.50
43	44	39.17	3954.17	-56.16	0.00	0.00	0.00	1196.30	523.53	-42.16
44	44	39.17	3954.17	-56.16	0.00	0.00	0.00	1196.30	523.53	-42.16
44	45	39.85	3985.19	182.20	0.00	0.00	0.00	1166.12	519.46	-31.96
45	45	39.85	3985.19	182.20	0.00	0.00	0.00	1166.12	519.46	-31.96
45	46	40.53	4005.45	422.13	0.00	0.00	0.00	967.46	479.82	22.33
46	46	40.53	4005.45	422.13	0.00	0.00	0.00	967.46	479.82	22.33
46	47	41.20	4014.16	658.26	0.00	0.00	0.00	607.64	406.06	118.72
47	47	41.20	4014.16	658.26	0.00	0.00	0.00	607.64	406.06	118.72
47	48	41.88	4034.39	579.58	0.00	0.00	0.00	191.36	321.43	230.94
48	48	41.88	4034.39	579.58	0.00	0.00	0.00	191.36	321.43	230.94
48	49	42.55	4051.91	500.64	0.00	0.00	0.00	-168.36	248.30	327.92
49	49	42.55	4051.91	500.64	0.00	0.00	0.00	-168.36	248.30	327.92
49	50	43.22	4066.90	420.40	0.00	0.00	0.00	-476.21	185.72	410.91
50	50	43.22	4066.90	420.40	0.00	0.00	0.00	-476.21	185.72	410.91
50	51	43.90	4067.16	336.58	0.00	0.00	0.00	-732.04	132.87	479.03
51	51	43.90	4067.16	336.58	0.00	0.00	0.00	-732.04	132.87	479.03
51	52	44.58	4050.07	251.43	0.00	0.00	0.00	-926.64	91.45	529.63
52	52	44.58	4050.07	251.43	0.00	0.00	0.00	-926.64	91.45	529.63
52	53	45.25	4030.22	168.13	0.00	0.00	0.00	-1059.91	62.52	563.72
53	53	45.25	4030.22	168.13	0.00	0.00	0.00	-1059.91	62.52	563.72
53	54	45.92	4007.40	85.83	0.00	0.00	0.00	-1135.81	45.24	582.33
54	54	45.92	4007.40	85.83	0.00	0.00	0.00	-1135.81	45.24	582.33
54	55	46.60	3981.20	3.52	0.00	0.00	0.00	-1155.26	39.39	585.67
55	55	46.60	3981.20	3.52	0.00	0.00	0.00	-1155.26	39.39	585.67
55	56	47.28	3964.13	-28.94	0.00	0.00	0.00	-1140.44	41.26	580.54
56	56	47.28	3964.13	-28.94	0.00	0.00	0.00	-1140.44	41.26	580.54
56	57	47.95	3946.11	-60.19	0.00	0.00	0.00	-1104.34	47.46	569.67
57	57	47.95	3946.11	-60.19	0.00	0.00	0.00	-1104.34	47.46	569.67
57	58	48.63	3926.61	-91.22	0.00	0.00	0.00	-1046.64	58.02	552.95
58	58	48.63	3926.61	-91.22	0.00	0.00	0.00	-1046.64	58.02	552.95
58	59	49.30	3906.28	-120.87	0.00	0.00	0.00	-969.99	72.44	531.12
59	59	49.30	3906.28	-120.87	0.00	0.00	0.00	-969.99	72.44	531.12
59	60	49.97	3884.83	-149.61	0.00	0.00	0.00	-874.62	90.66	504.24
60	60	49.97	3884.83	-149.61	0.00	0.00	0.00	-874.62	90.66	504.24
60	61	50.65	3866.29	-166.25	0.00	0.00	0.00	-761.06	112.83	472.72
61	61	50.65	3866.29	-166.25	0.00	0.00	0.00	-761.06	112.83	472.72
61	62	51.33	3862.52	-141.59	0.00	0.00	0.00	-655.53	134.38	444.36
62	62	51.33	3862.52	-141.59	0.00	0.00	0.00	-655.53	134.38	444.36
62	63	52.00	3858.80	-117.33	0.00	0.00	0.00	-568.15	152.18	420.84

 Título: Fecha : 04/11/99
 Descripción de la combinación : PESO PROPIO + TEMPERATURA + PRETENSADO INICIAL x 1.1
 H001 1 + H003 1 + H004 1.1
 ----- (TENSION MINIMA -244 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCTEMP.ANL * 1)
 + (FPRETE.ANL * 1.1)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	3859.04	83.03	0.00	0.00	0.00	-566.48	152.54	420.42
3	4	0.68	3862.81	107.66	0.00	0.00	0.00	-631.96	139.28	438.11
4	4	0.68	3862.79	107.66	0.00	0.00	0.00	-631.96	139.27	438.11
4	5	1.35	3866.50	131.93	0.00	0.00	0.00	-713.07	122.77	459.96
5	5	1.35	3866.50	131.93	0.00	0.00	0.00	-713.07	122.77	459.96
5	6	2.03	3884.59	116.62	0.00	0.00	0.00	-803.47	105.35	485.28
6	6	2.03	3884.62	116.62	0.00	0.00	0.00	-803.47	105.35	485.29
6	7	2.70	3905.55	89.59	0.00	0.00	0.00	-877.11	91.59	506.35
7	7	2.70	3905.54	89.57	0.00	0.00	0.00	-877.11	91.59	506.35
7	8	3.38	3925.69	61.21	0.00	0.00	0.00	-933.88	81.26	522.87
8	8	3.38	3925.72	61.21	0.00	0.00	0.00	-933.88	81.27	522.87
8	9	4.05	3944.49	32.45	0.00	0.00	0.00	-971.19	74.87	534.11
9	9	4.05	3944.49	32.45	0.00	0.00	0.00	-971.20	74.87	534.11
9	10	4.72	3962.13	2.95	0.00	0.00	0.00	-989.10	72.40	540.11
10	10	4.72	3962.09	2.96	0.00	0.00	0.00	-989.12	72.39	540.11
10	11	5.40	3978.82	-27.65	0.00	0.00	0.00	-986.71	74.06	540.64
11	11	5.40	3978.83	-27.63	0.00	0.00	0.00	-986.74	74.05	540.65
11	12	6.07	4005.21	-110.35	0.00	0.00	0.00	-951.57	83.17	533.13
12	12	6.07	4005.21	-110.41	0.00	0.00	0.00	-951.58	83.16	533.14
12	13	6.75	4028.86	-195.62	0.00	0.00	0.00	-857.10	104.34	509.64
13	13	6.75	4028.84	-195.59	0.00	0.00	0.00	-857.07	104.35	509.63
13	14	7.43	4049.31	-281.84	0.00	0.00	0.00	-702.32	137.76	469.87
14	14	7.43	4049.34	-281.74	0.00	0.00	0.00	-702.30	137.77	469.86
14	15	8.10	4066.40	-367.46	0.00	0.00	0.00	-490.13	182.81	414.58
15	15	8.10	4066.40	-367.51	0.00	0.00	0.00	-490.11	182.82	414.58
15	16	8.77	4066.81	-451.92	0.00	0.00	0.00	-217.26	239.24	341.98
16	16	8.77	4066.81	-451.94	0.00	0.00	0.00	-217.25	239.24	341.97
16	17	9.45	4051.37	-535.08	0.00	0.00	0.00	117.66	307.38	251.75
17	17	9.45	4051.33	-535.08	0.00	0.00	0.00	117.66	307.38	251.74
17	18	10.13	4033.21	-616.88	0.00	0.00	0.00	507.14	386.61	146.80
18	18	10.13	4033.25	-616.90	0.00	0.00	0.00	507.13	386.61	146.81
18	19	10.80	4012.89	-696.00	0.00	0.00	0.00	942.35	475.15	29.54
19	19	10.80	4012.87	-696.00	0.00	0.00	0.00	942.35	475.14	29.54
19	20	11.48	4003.22	-452.76	0.00	0.00	0.00	1330.70	554.74	-74.51
20	20	11.48	4003.23	-452.76	0.00	0.00	0.00	1330.69	554.73	-74.51

20	21	12.15	3983.00	-212.97	0.00	0.00	0.00	1546.88	598.01	-133.47
21	21	12.15	3983.00	-212.97	0.00	0.00	0.00	1546.88	598.01	-133.47
21	22	12.82	3952.00	25.23	0.00	0.00	0.00	1597.09	606.22	-149.00
22	22	12.82	3952.01	25.24	0.00	0.00	0.00	1597.09	606.22	-149.00
22	23	13.50	3909.50	263.61	0.00	0.00	0.00	1479.98	579.04	-120.79
23	23	13.50	3909.48	-320.93	0.00	0.00	0.00	1479.98	579.04	-120.79
23	24	14.75	3863.97	-114.38	0.00	0.00	0.00	1567.33	724.62	-113.40
24	24	14.75	3863.98	-114.38	0.00	0.00	0.00	1567.33	724.62	-113.40
24	25	16.00	3811.81	81.15	0.00	0.00	0.00	1570.00	720.08	-119.37
25	25	16.00	3811.81	81.14	0.00	0.00	0.00	1570.01	720.09	-119.37
25	26	17.25	3753.38	271.31	0.00	0.00	0.00	1335.89	662.83	-51.45
26	26	17.25	3753.38	271.32	0.00	0.00	0.00	1335.89	662.83	-51.45
26	27	18.50	3689.20	455.38	0.00	0.00	0.00	877.06	555.57	86.62
27	27	18.50	3689.19	455.39	0.00	0.00	0.00	877.08	555.58	86.61
27	28	19.75	3677.67	378.36	0.00	0.00	0.00	357.66	440.16	248.92
28	28	19.75	3677.67	378.32	0.00	0.00	0.00	357.65	440.16	248.93
28	29	21.00	3663.29	301.62	0.00	0.00	0.00	-62.57	346.28	379.74
29	29	21.00	3663.29	301.63	0.00	0.00	0.00	-62.59	346.28	379.75
29	30	22.25	3646.01	225.51	0.00	0.00	0.00	-383.85	273.90	479.14
30	30	22.25	3646.02	225.52	0.00	0.00	0.00	-383.84	273.90	479.14
30	31	23.50	3625.83	150.24	0.00	0.00	0.00	-606.92	222.83	547.35
31	31	23.50	3625.82	150.24	0.00	0.00	0.00	-606.92	222.83	547.35
31	32	24.75	3602.74	76.04	0.00	0.00	0.00	-733.12	192.80	584.78
32	32	24.75	3602.74	76.02	0.00	0.00	0.00	-733.15	192.79	584.80
32	33	26.00	3576.80	3.17	0.00	0.00	0.00	-764.56	183.33	592.13
33	33	26.00	3576.79	3.20	0.00	0.00	0.00	-764.58	183.33	592.14
33	34	27.25	3601.33	-71.68	0.00	0.00	0.00	-738.85	191.40	586.45
34	34	27.25	3601.33	-71.74	0.00	0.00	0.00	-738.88	191.39	586.46
34	35	28.50	3624.85	-148.01	0.00	0.00	0.00	-617.12	220.49	550.46
35	35	28.50	3624.84	-147.96	0.00	0.00	0.00	-617.16	220.49	550.47
35	36	29.75	3645.34	-225.35	0.00	0.00	0.00	-395.94	271.17	482.88
36	36	29.75	3645.36	-225.37	0.00	0.00	0.00	-395.93	271.18	482.87
36	37	31.00	3662.84	-303.61	0.00	0.00	0.00	-73.75	343.78	383.21
37	37	31.00	3662.84	-303.59	0.00	0.00	0.00	-73.73	343.79	383.21
37	38	32.25	3677.29	-382.43	0.00	0.00	0.00	350.23	438.49	251.22
38	38	32.25	3677.29	-382.41	0.00	0.00	0.00	350.25	438.49	251.22
38	39	33.50	3688.78	-461.59	0.00	0.00	0.00	876.06	555.31	86.89
39	39	33.50	3688.78	-461.61	0.00	0.00	0.00	876.06	555.31	86.89
39	40	34.75	3754.33	-274.58	0.00	0.00	0.00	1340.97	664.04	-52.95
40	40	34.75	3754.33	-274.58	0.00	0.00	0.00	1340.96	664.04	-52.95
40	41	36.00	3813.91	-81.19	0.00	0.00	0.00	1577.54	721.95	-121.54
41	41	36.00	3813.91	-81.19	0.00	0.00	0.00	1577.54	721.95	-121.54
41	42	37.25	3866.96	117.75	0.00	0.00	0.00	1573.19	726.21	-114.95

42	42	37.25	3866.96	117.75	0.00	0.00	0.00	1573.20	726.21	-114.96
42	43	38.50	3913.07	327.89	0.00	0.00	0.00	1479.82	579.26	-120.50
43	43	38.50	3913.07	-256.90	0.00	0.00	0.00	1479.82	579.26	-120.50
43	44	39.17	3954.17	-25.27	0.00	0.00	0.00	1592.63	605.45	-147.66
44	44	39.17	3954.17	-25.27	0.00	0.00	0.00	1592.63	605.45	-147.66
44	45	39.85	3985.19	213.09	0.00	0.00	0.00	1541.44	597.03	-131.86
45	45	39.85	3985.19	213.09	0.00	0.00	0.00	1541.44	597.03	-131.86
45	46	40.53	4005.45	453.02	0.00	0.00	0.00	1321.78	553.05	-71.98
46	46	40.53	4005.45	453.02	0.00	0.00	0.00	1321.78	553.05	-71.98
46	47	41.20	4014.16	689.15	0.00	0.00	0.00	941.26	475.01	29.92
47	47	41.20	4014.16	689.15	0.00	0.00	0.00	941.26	475.01	29.92
47	48	41.88	4034.39	610.47	0.00	0.00	0.00	503.96	386.04	147.73
48	48	41.88	4034.39	610.48	0.00	0.00	0.00	503.96	386.04	147.73
48	49	42.55	4051.91	531.53	0.00	0.00	0.00	123.56	308.64	250.21
49	49	42.55	4051.91	531.52	0.00	0.00	0.00	123.54	308.64	250.22
49	50	43.22	4066.90	451.30	0.00	0.00	0.00	-204.99	241.78	338.71
50	50	43.22	4066.89	451.28	0.00	0.00	0.00	-205.00	241.78	338.72
50	51	43.90	4067.16	367.47	0.00	0.00	0.00	-481.82	184.58	412.42
51	51	43.90	4067.16	367.54	0.00	0.00	0.00	-481.84	184.58	412.43
51	52	44.58	4050.07	282.32	0.00	0.00	0.00	-697.43	138.83	468.62
52	52	44.58	4050.08	282.25	0.00	0.00	0.00	-697.42	138.83	468.62
52	53	45.25	4030.22	199.01	0.00	0.00	0.00	-851.40	105.62	508.22
53	53	45.25	4030.22	199.02	0.00	0.00	0.00	-851.42	105.61	508.22
53	54	45.92	4007.40	116.73	0.00	0.00	0.00	-948.00	84.06	532.34
54	54	45.92	4007.40	116.70	0.00	0.00	0.00	-948.03	84.05	532.34
54	55	46.60	3981.20	34.41	0.00	0.00	0.00	-988.45	73.86	541.27
55	55	46.60	3981.20	34.41	0.00	0.00	0.00	-988.45	73.86	541.27
55	56	47.28	3964.13	1.95	0.00	0.00	0.00	-994.63	71.39	541.72
56	56	47.28	3964.13	2.00	0.00	0.00	0.00	-994.63	71.39	541.72
56	57	47.95	3946.11	-29.30	0.00	0.00	0.00	-979.23	73.32	536.37
57	57	47.95	3946.11	-29.34	0.00	0.00	0.00	-979.26	73.31	536.37
57	58	48.63	3926.61	-60.33	0.00	0.00	0.00	-942.53	79.54	525.24
58	58	48.63	3926.61	-60.30	0.00	0.00	0.00	-942.57	79.53	525.24
58	59	49.30	3906.28	-89.98	0.00	0.00	0.00	-886.59	89.68	508.92
59	59	49.30	3906.28	-89.96	0.00	0.00	0.00	-886.57	89.69	508.92
59	60	49.97	3884.83	-118.72	0.00	0.00	0.00	-811.91	103.62	487.55
60	60	49.97	3884.83	-118.72	0.00	0.00	0.00	-811.91	103.62	487.55
60	61	50.65	3866.29	-135.35	0.00	0.00	0.00	-719.36	121.45	461.62
61	61	50.65	3866.29	-135.33	0.00	0.00	0.00	-719.36	121.45	461.62
61	62	51.33	3862.52	-110.70	0.00	0.00	0.00	-634.83	138.66	438.85
62	62	51.33	3862.52	-110.71	0.00	0.00	0.00	-634.83	138.66	438.85
62	63	52.00	3858.80	-86.44	0.00	0.00	0.00	-568.15	152.18	420.84

Título: Fecha : 04/11/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + TEMPERATURA x 0.6 + SOBRECARGA 1 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H003 0.6 + H005 0.9 + H006 1.15
 (TENSION MINIMA -244 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FCTEMP.ANL * 0.6) + (FPREFI.ANL * 0.9)
 + (SOBREC1.ANL * 1.15)]

Barra	Nudo	X	Axil (t)	Cort.Y (t)	Cort.Z (t)	Torsor (mt)	Mom-Y (mt)	Mom-Z (mt)	T.SUP (t/m2)	T.INF (t/m2)
3	3	0.00	2683.76	46.60	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	80.82	0.00	0.00	0.00	-443.05	96.12	305.63
4	4	0.68	2686.40	80.82	0.00	0.00	0.00	-443.05	96.12	305.63
4	5	1.35	2688.98	114.52	0.00	0.00	0.00	-509.06	82.66	323.38
5	5	1.35	2688.97	114.54	0.00	0.00	0.00	-509.08	82.66	323.39
5	6	2.03	2701.57	120.99	0.00	0.00	0.00	-593.24	66.14	346.67
6	6	2.03	2701.58	120.96	0.00	0.00	0.00	-593.25	66.14	346.67
6	7	2.70	2716.13	118.99	0.00	0.00	0.00	-676.79	49.89	369.92
7	7	2.70	2716.13	119.01	0.00	0.00	0.00	-676.80	49.89	369.93
7	8	3.38	2730.15	116.38	0.00	0.00	0.00	-760.66	33.54	393.23
8	8	3.38	2730.15	116.39	0.00	0.00	0.00	-760.65	33.54	393.22
8	9	4.05	2743.20	113.21	0.00	0.00	0.00	-841.68	17.70	415.71
9	9	4.05	2743.20	113.18	0.00	0.00	0.00	-841.67	17.70	415.70
9	10	4.72	2755.47	109.50	0.00	0.00	0.00	-920.49	2.27	437.54
10	10	4.72	2755.48	109.50	0.00	0.00	0.00	-920.48	2.27	437.54
10	11	5.40	2767.11	105.28	0.00	0.00	0.00	-997.71	-12.88	458.91
11	11	5.40	2767.10	105.29	0.00	0.00	0.00	-997.73	-12.88	458.92
11	12	6.07	2785.45	64.60	0.00	0.00	0.00	-1062.34	-24.95	477.39
12	12	6.07	2785.44	64.65	0.00	0.00	0.00	-1062.34	-24.95	477.39
12	13	6.75	2801.89	22.47	0.00	0.00	0.00	-1098.60	-31.30	488.19
13	13	6.75	2801.88	22.37	0.00	0.00	0.00	-1098.61	-31.30	488.20
13	14	7.43	2816.13	-20.51	0.00	0.00	0.00	-1104.48	-31.52	490.76
14	14	7.43	2816.13	-20.44	0.00	0.00	0.00	-1104.51	-31.53	490.76
14	15	8.10	2827.99	-63.22	0.00	0.00	0.00	-1080.20	-25.67	485.12
15	15	8.10	2828.00	-63.23	0.00	0.00	0.00	-1080.20	-25.67	485.12
15	16	8.77	2828.28	-105.11	0.00	0.00	0.00	-1024.94	-14.23	470.43
16	16	8.77	2828.28	-105.08	0.00	0.00	0.00	-1024.96	-14.24	470.44
16	17	9.45	2817.53	-145.81	0.00	0.00	0.00	-940.12	2.55	447.10
17	17	9.45	2817.53	-145.85	0.00	0.00	0.00	-940.15	2.54	447.11
17	18	10.13	2804.93	-185.64	0.00	0.00	0.00	-828.95	24.65	416.63
18	18	10.13	2804.93	-185.63	0.00	0.00	0.00	-828.97	24.64	416.64
18	19	10.80	2790.76	-223.80	0.00	0.00	0.00	-695.00	51.34	379.99
19	19	10.80	2790.77	-223.84	0.00	0.00	0.00	-695.01	51.34	379.99
19	20	11.48	2784.06	-37.60	0.00	0.00	0.00	-607.67	68.92	356.27

20	20	11.48	2784.05	-37.53	0.00	0.00	0.00	-607.70	68.92	356.28
20	21	12.15	2769.99	146.06	0.00	0.00	0.00	-648.77	59.44	366.23
21	21	12.15	2769.99	146.04	0.00	0.00	0.00	-648.79	59.44	366.23
21	22	12.82	2748.43	328.53	0.00	0.00	0.00	-816.58	23.26	409.39
22	22	12.82	2748.44	328.54	0.00	0.00	0.00	-816.58	23.26	409.39
22	23	13.50	2718.87	511.40	0.00	0.00	0.00	-1115.31	-40.55	486.84
23	23	13.50	2718.87	-844.87	0.00	0.00	0.00	-1115.31	-40.55	486.84
23	24	14.75	2687.22	-637.28	0.00	0.00	0.00	-317.86	194.18	364.13
24	24	14.75	2687.21	-637.28	0.00	0.00	0.00	-317.86	194.18	364.13
24	25	16.00	2650.93	-439.33	0.00	0.00	0.00	342.45	335.90	152.79
25	25	16.00	2650.93	-439.33	0.00	0.00	0.00	342.46	335.90	152.79
25	26	17.25	2610.30	-245.10	0.00	0.00	0.00	760.61	423.91	17.22
26	26	17.25	2610.31	-245.11	0.00	0.00	0.00	760.61	423.91	17.22
26	27	18.50	2565.67	-55.14	0.00	0.00	0.00	945.03	460.10	-45.20
27	27	18.50	2565.67	-55.14	0.00	0.00	0.00	945.03	460.10	-45.20
27	28	19.75	2557.66	-46.74	0.00	0.00	0.00	1009.86	473.57	-66.38
28	28	19.75	2557.66	-46.75	0.00	0.00	0.00	1009.86	473.57	-66.38
28	29	21.00	2547.66	-38.12	0.00	0.00	0.00	1066.18	484.98	-85.09
29	29	21.00	2547.65	-38.09	0.00	0.00	0.00	1066.18	484.98	-85.09
29	30	22.25	2535.63	-29.07	0.00	0.00	0.00	1113.87	494.29	-101.28
30	30	22.25	2535.64	-29.07	0.00	0.00	0.00	1113.86	494.29	-101.27
30	31	23.50	2521.60	-19.46	0.00	0.00	0.00	1152.38	501.39	-114.77
31	31	23.50	2521.59	-19.40	0.00	0.00	0.00	1152.42	501.40	-114.79
31	32	24.75	2505.55	-9.03	0.00	0.00	0.00	1180.79	506.06	-125.29
32	32	24.75	2505.55	-9.13	0.00	0.00	0.00	1180.81	506.07	-125.30
32	33	26.00	2487.50	2.18	0.00	0.00	0.00	1197.68	508.00	-132.38
33	33	26.00	2487.50	2.19	0.00	0.00	0.00	1197.66	508.00	-132.37
33	34	27.25	2504.56	12.09	0.00	0.00	0.00	1176.84	505.10	-124.14
34	34	27.25	2504.56	12.10	0.00	0.00	0.00	1176.81	505.09	-124.13
34	35	28.50	2520.92	21.04	0.00	0.00	0.00	1145.28	499.76	-112.61
35	35	28.50	2520.92	21.02	0.00	0.00	0.00	1145.28	499.76	-112.61
35	36	29.75	2535.17	29.18	0.00	0.00	0.00	1105.46	492.40	-98.67
36	36	29.75	2535.17	29.16	0.00	0.00	0.00	1105.46	492.40	-98.67
36	37	31.00	2547.32	36.72	0.00	0.00	0.00	1058.44	483.25	-82.69
37	37	31.00	2547.32	36.75	0.00	0.00	0.00	1058.43	483.25	-82.68
37	38	32.25	2557.39	43.90	0.00	0.00	0.00	1004.68	472.41	-64.78
38	38	32.25	2557.39	43.89	0.00	0.00	0.00	1004.67	472.41	-64.78
38	39	33.50	2565.38	50.79	0.00	0.00	0.00	944.34	459.92	-45.01
39	39	33.50	2565.38	50.79	0.00	0.00	0.00	944.34	459.92	-45.01
39	40	34.75	2610.96	242.81	0.00	0.00	0.00	764.15	424.75	16.17
40	40	34.75	2610.96	242.85	0.00	0.00	0.00	764.15	424.75	16.17
40	41	36.00	2652.39	439.30	0.00	0.00	0.00	347.69	337.19	151.29
41	41	36.00	2652.40	439.29	0.00	0.00	0.00	347.70	337.20	151.29

41	42	37.25	2689.30	639.62	0.00	0.00	0.00	-313.75	195.29	363.05
42	42	37.25	2689.29	639.62	0.00	0.00	0.00	-313.75	195.29	363.05
42	43	38.50	2721.37	849.71	0.00	0.00	0.00	-1115.43	-40.40	487.05
43	43	38.50	2721.37	-506.74	0.00	0.00	0.00	-1115.43	-40.40	487.05
43	44	39.17	2749.95	-328.82	0.00	0.00	0.00	-822.79	22.08	411.15
44	44	39.17	2749.95	-328.81	0.00	0.00	0.00	-822.79	22.08	411.15
44	45	39.85	2771.52	-145.97	0.00	0.00	0.00	-652.55	58.77	367.34
45	45	39.85	2771.51	-145.92	0.00	0.00	0.00	-652.55	58.77	367.34
45	46	40.53	2785.61	38.03	0.00	0.00	0.00	-611.12	68.32	357.30
46	46	40.53	2785.61	37.97	0.00	0.00	0.00	-611.11	68.32	357.30
46	47	41.20	2791.67	219.03	0.00	0.00	0.00	-695.77	51.25	380.25
47	47	41.20	2791.67	219.03	0.00	0.00	0.00	-695.77	51.25	380.25
47	48	41.88	2805.73	181.40	0.00	0.00	0.00	-828.74	24.75	416.63
48	48	41.88	2805.74	181.40	0.00	0.00	0.00	-828.75	24.74	416.63
48	49	42.55	2817.91	143.33	0.00	0.00	0.00	-936.01	3.43	446.03
49	49	42.55	2817.91	143.31	0.00	0.00	0.00	-936.03	3.42	446.04
49	50	43.22	2828.34	104.36	0.00	0.00	0.00	-1018.54	-12.90	468.73
50	50	43.22	2828.34	104.40	0.00	0.00	0.00	-1018.56	-12.91	468.74
50	51	43.90	2828.52	63.19	0.00	0.00	0.00	-1074.41	-24.44	483.62
51	51	43.90	2828.53	63.25	0.00	0.00	0.00	-1074.41	-24.44	483.62
51	52	44.58	2816.64	21.07	0.00	0.00	0.00	-1099.37	-30.43	489.43
52	52	44.58	2816.64	21.07	0.00	0.00	0.00	-1099.33	-30.42	489.42
52	53	45.25	2802.83	-19.98	0.00	0.00	0.00	-1094.63	-30.41	487.20
53	53	45.25	2802.83	-20.06	0.00	0.00	0.00	-1094.60	-30.41	487.20
53	54	45.92	2786.96	-60.46	0.00	0.00	0.00	-1061.28	-24.63	477.22
54	54	45.92	2786.96	-60.46	0.00	0.00	0.00	-1061.26	-24.62	477.21
54	55	46.60	2768.74	-100.61	0.00	0.00	0.00	-998.88	-13.00	459.34
55	55	46.60	2768.74	-100.61	0.00	0.00	0.00	-998.90	-13.01	459.34
55	56	47.28	2756.87	-106.10	0.00	0.00	0.00	-924.31	1.58	438.66
56	56	47.28	2756.87	-106.11	0.00	0.00	0.00	-924.32	1.58	438.66
56	57	47.95	2744.33	-111.05	0.00	0.00	0.00	-847.25	16.63	417.27
57	57	47.95	2744.33	-111.04	0.00	0.00	0.00	-847.29	16.62	417.28
57	58	48.63	2730.78	-115.51	0.00	0.00	0.00	-765.93	32.49	394.67
58	58	48.63	2730.78	-115.53	0.00	0.00	0.00	-765.94	32.49	394.68
58	59	49.30	2716.63	-119.32	0.00	0.00	0.00	-683.38	48.56	371.71
59	59	49.30	2716.63	-119.28	0.00	0.00	0.00	-683.38	48.56	371.71
59	60	49.97	2701.72	-122.45	0.00	0.00	0.00	-599.10	64.94	348.24
60	60	49.97	2701.72	-122.42	0.00	0.00	0.00	-599.08	64.94	348.23
60	61	50.65	2688.82	-116.89	0.00	0.00	0.00	-513.46	81.74	324.54
61	61	50.65	2688.82	-116.88	0.00	0.00	0.00	-513.45	81.74	324.54
61	62	51.33	2686.20	-82.68	0.00	0.00	0.00	-444.98	95.71	306.13
62	62	51.33	2686.20	-82.69	0.00	0.00	0.00	-444.98	95.71	306.13
62	63	52.00	2683.62	-48.98	0.00	0.00	0.00	-400.43	104.74	294.09

Título: Fecha : 04/11/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + TEMPERATURA x 0.2 + SOBRECARGA 1 x 0.5 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H003 0.2 + H005 0.9 + H006 0.575
 (TENSION MINIMA 0 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FCTEMP.ANL * 0.2) + (FPREFI.ANL * 0.9)
 + (SOBREC1.ANL * 0.575)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	18.42	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	52.64	0.00	0.00	0.00	-423.89	100.08	300.53
4	4	0.68	2686.40	52.64	0.00	0.00	0.00	-423.89	100.08	300.53
4	5	1.35	2688.98	86.35	0.00	0.00	0.00	-471.02	90.52	313.25
5	5	1.35	2688.97	86.36	0.00	0.00	0.00	-471.04	90.52	313.26
5	6	2.03	2701.57	92.81	0.00	0.00	0.00	-536.03	77.97	331.44
6	6	2.03	2701.58	92.79	0.00	0.00	0.00	-536.04	77.97	331.44
6	7	2.70	2716.13	90.81	0.00	0.00	0.00	-600.71	65.62	349.67
7	7	2.70	2716.13	90.82	0.00	0.00	0.00	-600.72	65.61	349.67
7	8	3.38	2730.15	88.19	0.00	0.00	0.00	-665.42	53.22	367.88
8	8	3.38	2730.15	88.20	0.00	0.00	0.00	-665.40	53.22	367.87
8	9	4.05	2743.20	85.02	0.00	0.00	0.00	-727.55	41.29	385.33
9	9	4.05	2743.20	85.02	0.00	0.00	0.00	-727.55	41.29	385.33
9	10	4.72	2755.47	81.34	0.00	0.00	0.00	-787.49	29.76	402.14
10	10	4.72	2755.48	81.33	0.00	0.00	0.00	-787.48	29.76	402.14
10	11	5.40	2767.11	77.11	0.00	0.00	0.00	-845.54	18.58	418.40
11	11	5.40	2767.10	77.11	0.00	0.00	0.00	-845.56	18.57	418.41
11	12	6.07	2785.45	36.42	0.00	0.00	0.00	-891.30	10.40	431.87
12	12	6.07	2785.44	36.47	0.00	0.00	0.00	-891.30	10.40	431.86
12	13	6.75	2801.89	-5.72	0.00	0.00	0.00	-908.39	8.02	437.56
13	13	6.75	2801.88	-5.79	0.00	0.00	0.00	-908.39	8.01	437.56
13	14	7.43	2816.13	-48.67	0.00	0.00	0.00	-895.12	11.75	435.03
14	14	7.43	2816.13	-48.62	0.00	0.00	0.00	-895.14	11.75	435.03
14	15	8.10	2827.99	-91.40	0.00	0.00	0.00	-851.95	21.50	424.36
15	15	8.10	2828.00	-91.39	0.00	0.00	0.00	-851.95	21.50	424.37
15	16	8.77	2828.28	-133.27	0.00	0.00	0.00	-777.82	36.85	404.65
16	16	8.77	2828.28	-133.26	0.00	0.00	0.00	-777.83	36.84	404.66
16	17	9.45	2817.53	-174.00	0.00	0.00	0.00	-673.83	57.59	376.22
17	17	9.45	2817.53	-174.02	0.00	0.00	0.00	-673.84	57.58	376.22
17	18	10.13	2804.93	-213.81	0.00	0.00	0.00	-543.50	83.64	340.65
18	18	10.13	2804.93	-213.82	0.00	0.00	0.00	-543.52	83.64	340.65
18	19	10.80	2790.76	-251.98	0.00	0.00	0.00	-390.67	114.24	298.98
19	19	10.80	2790.77	-252.00	0.00	0.00	0.00	-390.68	114.24	298.98
19	20	11.48	2784.06	-65.76	0.00	0.00	0.00	-284.18	135.78	270.16

20	20	11.48	2784.05	-65.72	0.00	0.00	0.00	-284.21	135.78	270.17
20	21	12.15	2769.99	117.87	0.00	0.00	0.00	-306.40	130.21	275.10
21	21	12.15	2769.99	117.86	0.00	0.00	0.00	-306.41	130.21	275.10
21	22	12.82	2748.43	300.34	0.00	0.00	0.00	-455.32	97.92	313.23
22	22	12.82	2748.44	300.35	0.00	0.00	0.00	-455.32	97.92	313.23
22	23	13.50	2718.87	483.22	0.00	0.00	0.00	-734.89	38.07	385.58
23	23	13.50	2718.87	-672.37	0.00	0.00	0.00	-734.89	38.07	385.58
23	24	14.75	2687.22	-482.03	0.00	0.00	0.00	-142.28	232.81	308.89
24	24	14.75	2687.21	-482.03	0.00	0.00	0.00	-142.28	232.81	308.89
24	25	16.00	2650.93	-301.33	0.00	0.00	0.00	334.75	334.20	155.22
25	25	16.00	2650.93	-301.33	0.00	0.00	0.00	334.75	334.20	155.22
25	26	17.25	2610.30	-124.35	0.00	0.00	0.00	591.18	386.63	70.53
26	26	17.25	2610.31	-124.36	0.00	0.00	0.00	591.18	386.63	70.54
26	27	18.50	2565.67	48.36	0.00	0.00	0.00	635.45	391.98	52.22
27	27	18.50	2565.67	48.36	0.00	0.00	0.00	635.45	391.98	52.22
27	28	19.75	2557.66	39.51	0.00	0.00	0.00	581.68	379.37	68.35
28	28	19.75	2557.66	39.50	0.00	0.00	0.00	581.67	379.36	68.35
28	29	21.00	2547.66	30.88	0.00	0.00	0.00	540.98	369.43	80.17
29	29	21.00	2547.65	30.91	0.00	0.00	0.00	540.96	369.42	80.18
29	30	22.25	2535.63	22.68	0.00	0.00	0.00	513.20	362.13	87.73
30	30	22.25	2535.64	22.69	0.00	0.00	0.00	513.18	362.13	87.74
30	31	23.50	2521.60	15.05	0.00	0.00	0.00	497.80	357.37	91.20
31	31	23.50	2521.59	15.09	0.00	0.00	0.00	497.84	357.37	91.19
31	32	24.75	2505.55	8.21	0.00	0.00	0.00	493.87	354.92	90.86
32	32	24.75	2505.55	8.14	0.00	0.00	0.00	493.89	354.93	90.85
32	33	26.00	2487.50	2.19	0.00	0.00	0.00	499.97	354.49	87.16
33	33	26.00	2487.50	2.20	0.00	0.00	0.00	499.95	354.49	87.17
33	34	27.25	2504.56	-5.15	0.00	0.00	0.00	489.91	353.96	92.01
34	34	27.25	2504.56	-5.16	0.00	0.00	0.00	489.89	353.95	92.01
34	35	28.50	2520.92	-13.47	0.00	0.00	0.00	490.69	355.74	93.37
35	35	28.50	2520.92	-13.47	0.00	0.00	0.00	490.70	355.74	93.37
35	36	29.75	2535.17	-22.56	0.00	0.00	0.00	504.78	360.24	90.34
36	36	29.75	2535.17	-22.59	0.00	0.00	0.00	504.78	360.24	90.34
36	37	31.00	2547.32	-32.28	0.00	0.00	0.00	533.24	367.69	82.58
37	37	31.00	2547.32	-32.25	0.00	0.00	0.00	533.22	367.69	82.58
37	38	32.25	2557.39	-42.35	0.00	0.00	0.00	576.51	378.20	69.95
38	38	32.25	2557.39	-42.36	0.00	0.00	0.00	576.50	378.20	69.95
38	39	33.50	2565.38	-52.70	0.00	0.00	0.00	634.76	391.80	52.41
39	39	33.50	2565.38	-52.71	0.00	0.00	0.00	634.75	391.80	52.41
39	40	34.75	2610.96	122.07	0.00	0.00	0.00	594.71	387.47	69.49
40	40	34.75	2610.96	122.10	0.00	0.00	0.00	594.72	387.47	69.48
40	41	36.00	2652.39	301.30	0.00	0.00	0.00	339.98	335.50	153.72
41	41	36.00	2652.40	301.29	0.00	0.00	0.00	339.99	335.50	153.71

41	42	37.25	2689.30	484.37	0.00	0.00	0.00	-138.18	233.92	307.80
42	42	37.25	2689.29	484.37	0.00	0.00	0.00	-138.18	233.92	307.80
42	43	38.50	2721.37	677.21	0.00	0.00	0.00	-735.01	38.22	385.79
43	43	38.50	2721.37	-478.56	0.00	0.00	0.00	-735.01	38.22	385.79
43	44	39.17	2749.95	-300.64	0.00	0.00	0.00	-461.26	96.80	314.92
44	44	39.17	2749.95	-300.63	0.00	0.00	0.00	-461.26	96.80	314.92
44	45	39.85	2771.52	-117.79	0.00	0.00	0.00	-310.18	129.53	276.21
45	45	39.85	2771.51	-117.76	0.00	0.00	0.00	-310.18	129.53	276.21
45	46	40.53	2785.61	66.19	0.00	0.00	0.00	-287.91	135.12	271.26
46	46	40.53	2785.61	66.16	0.00	0.00	0.00	-287.90	135.12	271.26
46	47	41.20	2791.67	247.21	0.00	0.00	0.00	-391.43	114.15	299.24
47	47	41.20	2791.67	247.22	0.00	0.00	0.00	-391.43	114.15	299.24
47	48	41.88	2805.73	209.59	0.00	0.00	0.00	-543.57	83.69	340.72
48	48	41.88	2805.74	209.58	0.00	0.00	0.00	-543.57	83.69	340.72
48	49	42.55	2817.91	171.52	0.00	0.00	0.00	-669.72	58.46	375.15
49	49	42.55	2817.91	171.51	0.00	0.00	0.00	-669.74	58.46	375.16
49	50	43.22	2828.34	132.56	0.00	0.00	0.00	-771.13	38.23	402.87
50	50	43.22	2828.34	132.58	0.00	0.00	0.00	-771.15	38.23	402.88
50	51	43.90	2828.52	91.37	0.00	0.00	0.00	-846.17	22.74	422.86
51	51	43.90	2828.53	91.39	0.00	0.00	0.00	-846.17	22.74	422.86
51	52	44.58	2816.64	49.22	0.00	0.00	0.00	-890.28	12.79	433.77
52	52	44.58	2816.64	49.23	0.00	0.00	0.00	-890.25	12.79	433.77
52	53	45.25	2802.83	8.18	0.00	0.00	0.00	-904.41	8.90	436.57
53	53	45.25	2802.83	8.13	0.00	0.00	0.00	-904.39	8.91	436.57
53	54	45.92	2786.96	-32.27	0.00	0.00	0.00	-889.96	10.78	431.61
54	54	45.92	2786.96	-32.28	0.00	0.00	0.00	-889.94	10.79	431.61
54	55	46.60	2768.74	-72.43	0.00	0.00	0.00	-846.72	18.44	418.83
55	55	46.60	2768.74	-72.43	0.00	0.00	0.00	-846.73	18.44	418.84
55	56	47.28	2756.87	-77.92	0.00	0.00	0.00	-791.31	29.07	403.25
56	56	47.28	2756.87	-77.93	0.00	0.00	0.00	-791.32	29.07	403.26
56	57	47.95	2744.33	-82.87	0.00	0.00	0.00	-733.13	40.22	386.89
57	57	47.95	2744.33	-82.85	0.00	0.00	0.00	-733.16	40.21	386.90
57	58	48.63	2730.78	-87.32	0.00	0.00	0.00	-670.97	52.12	369.40
58	58	48.63	2730.78	-87.34	0.00	0.00	0.00	-670.98	52.12	369.40
58	59	49.30	2716.63	-91.13	0.00	0.00	0.00	-607.30	64.29	351.46
59	59	49.30	2716.63	-91.10	0.00	0.00	0.00	-607.30	64.29	351.46
59	60	49.97	2701.72	-94.26	0.00	0.00	0.00	-541.90	76.76	333.01
60	60	49.97	2701.72	-94.25	0.00	0.00	0.00	-541.89	76.77	333.01
60	61	50.65	2688.82	-88.71	0.00	0.00	0.00	-475.41	89.60	314.41
61	61	50.65	2688.82	-88.71	0.00	0.00	0.00	-475.40	89.61	314.41
61	62	51.33	2686.20	-54.50	0.00	0.00	0.00	-426.10	99.61	301.10
62	62	51.33	2686.20	-54.52	0.00	0.00	0.00	-426.10	99.61	301.10
62	63	52.00	2683.62	-20.80	0.00	0.00	0.00	-400.43	104.74	294.09

Título: Fecha : 04/11/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + TEMPERATURA x 0.6 + SOBRECARGA 2 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H003 0.6 + H005 0.9 + H007 1.15
 (TENSION MINIMA -244 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FCTEMP.ANL * 0.6) + (FPREFI.ANL * 0.9)
 + (SOBREC2.ANL * 1.15)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-201.75	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	-148.77	0.00	0.00	0.00	-280.56	129.71	262.38
4	4	0.68	2686.40	-148.75	0.00	0.00	0.00	-280.56	129.71	262.38
4	5	1.35	2688.98	-96.55	0.00	0.00	0.00	-198.95	146.76	240.84
5	5	1.35	2688.97	-96.56	0.00	0.00	0.00	-198.97	146.75	240.84
5	6	2.03	2701.57	-71.34	0.00	0.00	0.00	-145.97	158.59	227.61
6	6	2.03	2701.58	-71.34	0.00	0.00	0.00	-145.98	158.59	227.61
6	7	2.70	2716.13	-54.83	0.00	0.00	0.00	-106.86	167.69	218.22
7	7	2.70	2716.13	-54.84	0.00	0.00	0.00	-106.87	167.68	218.22
7	8	3.38	2730.15	-38.70	0.00	0.00	0.00	-78.92	174.44	211.76
8	8	3.38	2730.15	-38.66	0.00	0.00	0.00	-78.89	174.45	211.75
8	9	4.05	2743.20	-23.34	0.00	0.00	0.00	-62.25	178.80	208.24
9	9	4.05	2743.20	-23.37	0.00	0.00	0.00	-62.24	178.80	208.23
9	10	4.72	2755.47	-8.55	0.00	0.00	0.00	-55.77	181.00	207.37
10	10	4.72	2755.48	-8.56	0.00	0.00	0.00	-55.75	181.00	207.36
10	11	5.40	2767.11	5.98	0.00	0.00	0.00	-59.05	181.13	209.05
11	11	5.40	2767.10	5.99	0.00	0.00	0.00	-59.08	181.12	209.06
11	12	6.07	2785.45	-16.21	0.00	0.00	0.00	-63.38	181.52	211.49
12	12	6.07	2785.44	-16.16	0.00	0.00	0.00	-63.37	181.52	211.48
12	13	6.75	2801.89	-39.57	0.00	0.00	0.00	-51.04	185.22	209.35
13	13	6.75	2801.88	-39.61	0.00	0.00	0.00	-51.05	185.21	209.35
13	14	7.43	2816.13	-63.73	0.00	0.00	0.00	-21.14	192.39	202.39
14	14	7.43	2816.13	-63.74	0.00	0.00	0.00	-21.15	192.39	202.39
14	15	8.10	2827.99	-88.03	0.00	0.00	0.00	25.95	202.95	190.68
15	15	8.10	2828.00	-87.99	0.00	0.00	0.00	25.96	202.95	190.68
15	16	8.77	2828.28	-111.37	0.00	0.00	0.00	91.62	216.54	173.22
16	16	8.77	2828.28	-111.39	0.00	0.00	0.00	91.60	216.54	173.23
16	17	9.45	2817.53	-133.36	0.00	0.00	0.00	174.35	232.89	150.45
17	17	9.45	2817.53	-133.36	0.00	0.00	0.00	174.34	232.89	150.45
17	18	10.13	2804.93	-154.39	0.00	0.00	0.00	270.62	251.91	123.94
18	18	10.13	2804.93	-154.40	0.00	0.00	0.00	270.61	251.91	123.94
18	19	10.80	2790.76	-174.06	0.00	0.00	0.00	377.48	273.01	94.51
19	19	10.80	2790.77	-174.07	0.00	0.00	0.00	377.46	273.00	94.52
19	20	11.48	2784.06	30.94	0.00	0.00	0.00	424.59	282.28	81.50

20	20	11.48	2784.05	30.94	0.00	0.00	0.00	424.57	282.27	81.51
20	21	12.15	2769.99	233.03	0.00	0.00	0.00	331.39	262.03	105.33
21	21	12.15	2769.99	233.04	0.00	0.00	0.00	331.39	262.03	105.33
21	22	12.82	2748.43	434.02	0.00	0.00	0.00	99.11	212.51	165.65
22	22	12.82	2748.44	434.03	0.00	0.00	0.00	99.11	212.52	165.65
22	23	13.50	2718.87	635.65	0.00	0.00	0.00	-277.73	132.56	263.89
23	23	13.50	2718.87	-530.69	0.00	0.00	0.00	-277.73	132.56	263.89
23	24	14.75	2687.22	-354.73	0.00	0.00	0.00	146.76	296.41	217.94
24	24	14.75	2687.21	-354.73	0.00	0.00	0.00	146.76	296.41	217.94
24	25	16.00	2650.93	-188.40	0.00	0.00	0.00	473.63	364.76	111.52
25	25	16.00	2650.93	-188.40	0.00	0.00	0.00	473.63	364.76	111.52
25	26	17.25	2610.30	-25.80	0.00	0.00	0.00	597.88	388.10	68.43
26	26	17.25	2610.31	-25.81	0.00	0.00	0.00	597.88	388.10	68.43
26	27	18.50	2565.67	132.54	0.00	0.00	0.00	527.94	368.33	86.05
27	27	18.50	2565.67	132.55	0.00	0.00	0.00	527.94	368.33	86.05
27	28	19.75	2557.66	109.32	0.00	0.00	0.00	377.92	334.53	132.47
28	28	19.75	2557.66	109.30	0.00	0.00	0.00	377.91	334.53	132.47
28	29	21.00	2547.66	86.31	0.00	0.00	0.00	258.95	307.38	168.92
29	29	21.00	2547.65	86.34	0.00	0.00	0.00	258.91	307.37	168.93
29	30	22.25	2535.63	63.74	0.00	0.00	0.00	170.86	286.81	195.46
30	30	22.25	2535.64	63.75	0.00	0.00	0.00	170.84	286.81	195.46
30	31	23.50	2521.60	41.73	0.00	0.00	0.00	113.12	272.73	212.25
31	31	23.50	2521.59	41.76	0.00	0.00	0.00	113.14	272.73	212.24
31	32	24.75	2505.55	20.51	0.00	0.00	0.00	84.81	264.92	219.58
32	32	24.75	2505.55	20.45	0.00	0.00	0.00	84.83	264.92	219.57
32	33	26.00	2487.50	0.13	0.00	0.00	0.00	84.52	263.08	217.89
33	33	26.00	2487.50	0.15	0.00	0.00	0.00	84.49	263.08	217.90
33	34	27.25	2504.56	-21.58	0.00	0.00	0.00	86.02	265.09	219.10
34	34	27.25	2504.56	-21.61	0.00	0.00	0.00	86.00	265.09	219.10
34	35	28.50	2520.92	-44.29	0.00	0.00	0.00	116.33	273.37	211.17
35	35	28.50	2520.92	-44.26	0.00	0.00	0.00	116.34	273.37	211.16
35	36	29.75	2535.17	-67.73	0.00	0.00	0.00	177.92	288.32	193.19
36	36	29.75	2535.17	-67.79	0.00	0.00	0.00	177.92	288.32	193.19
36	37	31.00	2547.32	-91.85	0.00	0.00	0.00	271.86	310.18	164.82
37	37	31.00	2547.32	-91.82	0.00	0.00	0.00	271.83	310.18	164.83
37	38	32.25	2557.39	-116.30	0.00	0.00	0.00	398.56	339.05	125.94
38	38	32.25	2557.39	-116.30	0.00	0.00	0.00	398.55	339.05	125.95
38	39	33.50	2565.38	-141.02	0.00	0.00	0.00	558.23	374.96	76.49
39	39	33.50	2565.38	-141.02	0.00	0.00	0.00	558.22	374.96	76.49
39	40	34.75	2610.96	19.38	0.00	0.00	0.00	637.55	396.90	56.01
40	40	34.75	2610.96	19.40	0.00	0.00	0.00	637.56	396.90	56.01
40	41	36.00	2652.39	184.23	0.00	0.00	0.00	520.18	375.14	97.01
41	41	36.00	2652.40	184.22	0.00	0.00	0.00	520.19	375.15	97.01

41	42	37.25	2689.30	352.93	0.00	0.00	0.00	197.32	307.74	202.23
42	42	37.25	2689.29	352.93	0.00	0.00	0.00	197.32	307.74	202.23
42	43	38.50	2721.37	531.39	0.00	0.00	0.00	-226.21	143.38	250.35
43	43	38.50	2721.37	-596.12	0.00	0.00	0.00	-226.21	143.38	250.35
43	44	39.17	2749.95	-402.79	0.00	0.00	0.00	121.14	217.17	159.89
44	44	39.17	2749.95	-402.78	0.00	0.00	0.00	121.14	217.17	159.89
44	45	39.85	2771.52	-204.30	0.00	0.00	0.00	336.35	263.16	104.11
45	45	39.85	2771.51	-204.29	0.00	0.00	0.00	336.35	263.16	104.11
45	46	40.53	2785.61	-4.70	0.00	0.00	0.00	412.15	279.81	84.92
46	46	40.53	2785.61	-4.72	0.00	0.00	0.00	412.16	279.81	84.92
46	47	41.20	2791.67	191.75	0.00	0.00	0.00	350.95	267.59	101.63
47	47	41.20	2791.67	191.74	0.00	0.00	0.00	350.94	267.58	101.64
47	48	41.88	2805.73	169.75	0.00	0.00	0.00	231.21	243.82	134.49
48	48	41.88	2805.74	169.78	0.00	0.00	0.00	231.21	243.82	134.49
48	49	42.55	2817.91	147.12	0.00	0.00	0.00	126.57	223.04	163.19
49	49	42.55	2817.91	147.12	0.00	0.00	0.00	126.56	223.04	163.20
49	50	43.22	2828.34	123.58	0.00	0.00	0.00	36.35	205.13	187.94
50	50	43.22	2828.34	123.55	0.00	0.00	0.00	36.34	205.12	187.94
50	51	43.90	2828.52	97.98	0.00	0.00	0.00	-37.86	189.80	207.70
51	51	43.90	2828.53	97.99	0.00	0.00	0.00	-37.89	189.80	207.71
51	52	44.58	2816.64	71.45	0.00	0.00	0.00	-91.81	177.82	221.23
52	52	44.58	2816.64	71.51	0.00	0.00	0.00	-91.81	177.82	221.23
52	53	45.25	2802.83	45.86	0.00	0.00	0.00	-126.04	169.78	229.38
53	53	45.25	2802.83	45.83	0.00	0.00	0.00	-126.02	169.78	229.38
53	54	45.92	2786.96	20.84	0.00	0.00	0.00	-142.02	165.37	232.53
54	54	45.92	2786.96	20.83	0.00	0.00	0.00	-141.99	165.37	232.52
54	55	46.60	2768.74	-3.69	0.00	0.00	0.00	-140.20	164.47	230.77
55	55	46.60	2768.74	-3.70	0.00	0.00	0.00	-140.21	164.47	230.77
55	56	47.28	2756.87	6.45	0.00	0.00	0.00	-136.84	164.34	229.04
56	56	47.28	2756.87	6.48	0.00	0.00	0.00	-136.85	164.34	229.05
56	57	47.95	2744.33	16.95	0.00	0.00	0.00	-140.35	162.74	229.10
57	57	47.95	2744.33	16.94	0.00	0.00	0.00	-140.38	162.73	229.11
57	58	48.63	2730.78	28.11	0.00	0.00	0.00	-151.37	159.51	231.09
58	58	48.63	2730.78	28.10	0.00	0.00	0.00	-151.38	159.51	231.09
58	59	49.30	2716.63	39.71	0.00	0.00	0.00	-170.20	154.63	235.11
59	59	49.30	2716.63	39.75	0.00	0.00	0.00	-170.20	154.63	235.11
59	60	49.97	2701.72	51.99	0.00	0.00	0.00	-197.62	147.92	241.37
60	60	49.97	2701.72	52.01	0.00	0.00	0.00	-197.62	147.92	241.37
60	61	50.65	2688.82	73.19	0.00	0.00	0.00	-235.90	139.11	250.66
61	61	50.65	2688.82	73.18	0.00	0.00	0.00	-235.90	139.11	250.66
61	62	51.33	2686.20	123.02	0.00	0.00	0.00	-302.00	125.26	268.07
62	62	51.33	2686.20	123.01	0.00	0.00	0.00	-302.00	125.26	268.07
62	63	52.00	2683.62	172.13	0.00	0.00	0.00	-400.43	104.74	294.09

Título: Fecha : 04/11/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + TEMPERATURA x 0.2 + SOBRECARGA 2 X 0.5 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H003 0.2 + H005 0.9 + H007 0.575

(TENSION MINIMA 0 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FCTEMP.ANL * 0.2) + (FPREFI.ANL * 0.9)
 + (SOBREC2.ANL * 0.575)]

Barra	Nudo	X	Axil (t)	Cort.Y (t)	Cort.Z (t)	Torsor (mt)	Mom-Y (mt)	Mom-Z (mt)	T.SUP (t/m2)	T.INF (t/m2)
3	3	0.00	2683.76	-105.76	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	-62.15	0.00	0.00	0.00	-342.64	116.88	278.90
4	4	0.68	2686.40	-62.14	0.00	0.00	0.00	-342.64	116.88	278.90
4	5	1.35	2688.98	-19.19	0.00	0.00	0.00	-315.97	122.57	271.98
5	5	1.35	2688.97	-19.19	0.00	0.00	0.00	-315.99	122.57	271.99
5	6	2.03	2701.57	-3.36	0.00	0.00	0.00	-312.40	124.19	271.91
6	6	2.03	2701.58	-3.36	0.00	0.00	0.00	-312.41	124.19	271.91
6	7	2.70	2716.13	3.91	0.00	0.00	0.00	-315.75	124.51	273.82
7	7	2.70	2716.13	3.90	0.00	0.00	0.00	-315.75	124.51	273.82
7	8	3.38	2730.15	10.65	0.00	0.00	0.00	-324.55	123.67	277.14
8	8	3.38	2730.15	10.67	0.00	0.00	0.00	-324.52	123.68	277.14
8	9	4.05	2743.20	16.75	0.00	0.00	0.00	-337.84	121.84	281.59
9	9	4.05	2743.20	16.74	0.00	0.00	0.00	-337.83	121.84	281.59
9	10	4.72	2755.47	22.31	0.00	0.00	0.00	-355.13	119.12	287.05
10	10	4.72	2755.48	22.30	0.00	0.00	0.00	-355.11	119.13	287.05
10	11	5.40	2767.11	27.46	0.00	0.00	0.00	-376.21	115.58	293.48
11	11	5.40	2767.10	27.46	0.00	0.00	0.00	-376.24	115.57	293.48
11	12	6.07	2785.45	-3.98	0.00	0.00	0.00	-391.82	113.63	298.91
12	12	6.07	2785.44	-3.94	0.00	0.00	0.00	-391.81	113.63	298.91
12	13	6.75	2801.89	-36.74	0.00	0.00	0.00	-384.61	116.27	298.14
13	13	6.75	2801.88	-36.78	0.00	0.00	0.00	-384.61	116.27	298.14
13	14	7.43	2816.13	-70.28	0.00	0.00	0.00	-353.45	123.71	290.84
14	14	7.43	2816.13	-70.27	0.00	0.00	0.00	-353.46	123.71	290.85
14	15	8.10	2827.99	-103.81	0.00	0.00	0.00	-298.87	135.82	277.14
15	15	8.10	2828.00	-103.77	0.00	0.00	0.00	-298.87	135.82	277.14
15	16	8.77	2828.28	-136.40	0.00	0.00	0.00	-219.54	152.23	256.05
16	16	8.77	2828.28	-136.42	0.00	0.00	0.00	-219.55	152.23	256.05
16	17	9.45	2817.53	-167.77	0.00	0.00	0.00	-116.60	172.76	227.90
17	17	9.45	2817.53	-167.77	0.00	0.00	0.00	-116.60	172.76	227.89
17	18	10.13	2804.93	-198.19	0.00	0.00	0.00	6.28	197.29	194.31
18	18	10.13	2804.93	-198.20	0.00	0.00	0.00	6.27	197.27	194.31
18	19	10.80	2790.76	-227.11	0.00	0.00	0.00	145.57	225.08	156.24
19	19	10.80	2790.77	-227.12	0.00	0.00	0.00	145.56	225.07	156.24
19	20	11.48	2784.06	-31.49	0.00	0.00	0.00	231.95	242.46	132.78

20	20	11.48	2784.05	-31.49	0.00	0.00	0.00	231.93	242.45	132.78
20	21	12.15	2769.99	161.35	0.00	0.00	0.00	183.68	231.50	144.64
21	21	12.15	2769.99	161.36	0.00	0.00	0.00	183.68	231.50	144.64
21	22	12.82	2748.43	353.09	0.00	0.00	0.00	2.52	192.55	191.36
22	22	12.82	2748.44	353.10	0.00	0.00	0.00	2.52	192.55	191.36
22	23	13.50	2718.87	545.34	0.00	0.00	0.00	-316.10	124.63	274.11
23	23	13.50	2718.87	-515.28	0.00	0.00	0.00	-316.10	124.63	274.11
23	24	14.75	2687.22	-340.76	0.00	0.00	0.00	90.03	283.92	235.79
24	24	14.75	2687.21	-340.76	0.00	0.00	0.00	90.03	283.92	235.79
24	25	16.00	2650.93	-175.86	0.00	0.00	0.00	400.34	348.63	134.58
25	25	16.00	2650.93	-175.86	0.00	0.00	0.00	400.34	348.63	134.58
25	26	17.25	2610.30	-14.70	0.00	0.00	0.00	509.82	368.73	96.14
26	26	17.25	2610.31	-14.71	0.00	0.00	0.00	509.82	368.73	96.14
26	27	18.50	2565.67	142.20	0.00	0.00	0.00	426.91	346.10	117.84
27	27	18.50	2565.67	142.21	0.00	0.00	0.00	426.91	346.10	117.84
27	28	19.75	2557.66	117.55	0.00	0.00	0.00	265.72	309.85	167.77
28	28	19.75	2557.66	117.53	0.00	0.00	0.00	265.70	309.84	167.78
28	29	21.00	2547.66	93.10	0.00	0.00	0.00	137.37	280.62	207.18
29	29	21.00	2547.65	93.13	0.00	0.00	0.00	137.33	280.62	207.19
29	30	22.25	2535.63	69.08	0.00	0.00	0.00	41.69	258.39	236.10
30	30	22.25	2535.64	69.09	0.00	0.00	0.00	41.67	258.39	236.11
30	31	23.50	2521.60	45.64	0.00	0.00	0.00	-21.83	243.04	254.71
31	31	23.50	2521.59	45.67	0.00	0.00	0.00	-21.80	243.04	254.70
31	32	24.75	2505.55	22.98	0.00	0.00	0.00	-54.12	234.35	263.29
32	32	24.75	2505.55	22.93	0.00	0.00	0.00	-54.11	234.36	263.29
32	33	26.00	2487.50	1.17	0.00	0.00	0.00	-56.61	232.03	262.30
33	33	26.00	2487.50	1.17	0.00	0.00	0.00	-56.63	232.03	262.31
33	34	27.25	2504.56	-21.99	0.00	0.00	0.00	-55.50	233.95	263.63
34	34	27.25	2504.56	-22.01	0.00	0.00	0.00	-55.51	233.95	263.63
34	35	28.50	2520.92	-46.13	0.00	0.00	0.00	-23.78	242.54	255.26
35	35	28.50	2520.92	-46.11	0.00	0.00	0.00	-23.77	242.54	255.25
35	36	29.75	2535.17	-71.01	0.00	0.00	0.00	41.01	258.20	236.27
36	36	29.75	2535.17	-71.07	0.00	0.00	0.00	41.01	258.20	236.27
36	37	31.00	2547.32	-96.56	0.00	0.00	0.00	139.94	281.16	206.33
37	37	31.00	2547.32	-96.54	0.00	0.00	0.00	139.92	281.15	206.34
37	38	32.25	2557.39	-122.45	0.00	0.00	0.00	273.45	311.52	165.31
38	38	32.25	2557.39	-122.45	0.00	0.00	0.00	273.44	311.52	165.32
38	39	33.50	2565.38	-148.61	0.00	0.00	0.00	441.70	349.33	113.15
39	39	33.50	2565.38	-148.61	0.00	0.00	0.00	441.70	349.32	113.16
39	40	34.75	2610.96	10.35	0.00	0.00	0.00	531.42	373.55	89.40
40	40	34.75	2610.96	10.37	0.00	0.00	0.00	531.43	373.55	89.40
40	41	36.00	2652.39	173.76	0.00	0.00	0.00	426.22	354.47	126.58
41	41	36.00	2652.40	173.76	0.00	0.00	0.00	426.23	354.48	126.58

41	42	37.25	2689.30	341.03	0.00	0.00	0.00	117.36	290.14	227.39
42	42	37.25	2689.29	341.03	0.00	0.00	0.00	117.36	290.14	227.39
42	43	38.50	2721.37	518.05	0.00	0.00	0.00	-290.40	130.12	267.44
43	43	38.50	2721.37	-523.25	0.00	0.00	0.00	-290.40	130.12	267.44
43	44	39.17	2749.95	-337.62	0.00	0.00	0.00	10.70	194.35	189.29
44	44	39.17	2749.95	-337.61	0.00	0.00	0.00	10.70	194.35	189.29
44	45	39.85	2771.52	-146.95	0.00	0.00	0.00	184.27	231.73	144.59
45	45	39.85	2771.51	-146.94	0.00	0.00	0.00	184.27	231.73	144.59
45	46	40.53	2785.61	44.83	0.00	0.00	0.00	223.72	240.87	135.08
46	46	40.53	2785.61	44.81	0.00	0.00	0.00	223.73	240.87	135.07
46	47	41.20	2791.67	233.57	0.00	0.00	0.00	131.93	222.32	159.93
47	47	41.20	2791.67	233.58	0.00	0.00	0.00	131.92	222.32	159.94
47	48	41.88	2805.73	203.77	0.00	0.00	0.00	-13.59	193.22	199.65
48	48	41.88	2805.74	203.78	0.00	0.00	0.00	-13.59	193.22	199.65
48	49	42.55	2817.91	173.41	0.00	0.00	0.00	-138.43	168.27	233.73
49	49	42.55	2817.91	173.41	0.00	0.00	0.00	-138.44	168.27	233.74
49	50	43.22	2828.34	142.17	0.00	0.00	0.00	-243.68	147.25	262.48
50	50	43.22	2828.34	142.15	0.00	0.00	0.00	-243.70	147.24	262.48
50	51	43.90	2828.52	108.76	0.00	0.00	0.00	-327.89	129.86	284.90
51	51	43.90	2828.53	108.76	0.00	0.00	0.00	-327.91	129.85	284.91
51	52	44.58	2816.64	74.41	0.00	0.00	0.00	-386.50	116.91	299.68
52	52	44.58	2816.64	74.45	0.00	0.00	0.00	-386.49	116.91	299.67
52	53	45.25	2802.83	41.10	0.00	0.00	0.00	-420.12	109.00	307.66
53	53	45.25	2802.83	41.07	0.00	0.00	0.00	-420.11	109.00	307.66
53	54	45.92	2786.96	8.37	0.00	0.00	0.00	-430.32	105.78	309.27
54	54	45.92	2786.96	8.36	0.00	0.00	0.00	-430.30	105.78	309.26
54	55	46.60	2768.74	-23.97	0.00	0.00	0.00	-417.38	107.18	304.55
55	55	46.60	2768.74	-23.97	0.00	0.00	0.00	-417.39	107.18	304.55
55	56	47.28	2756.87	-21.64	0.00	0.00	0.00	-397.57	110.45	298.45
56	56	47.28	2756.87	-21.64	0.00	0.00	0.00	-397.58	110.45	298.45
56	57	47.95	2744.33	-18.87	0.00	0.00	0.00	-379.68	113.27	292.81
57	57	47.95	2744.33	-18.86	0.00	0.00	0.00	-379.70	113.26	292.82
57	58	48.63	2730.78	-15.51	0.00	0.00	0.00	-363.69	115.63	287.61
58	58	48.63	2730.78	-15.53	0.00	0.00	0.00	-363.70	115.63	287.61
58	59	49.30	2716.63	-11.62	0.00	0.00	0.00	-350.71	117.32	283.16
59	59	49.30	2716.63	-11.58	0.00	0.00	0.00	-350.71	117.32	283.16
59	60	49.97	2701.72	-7.04	0.00	0.00	0.00	-341.16	118.25	279.58
60	60	49.97	2701.72	-7.03	0.00	0.00	0.00	-341.15	118.26	279.58
60	61	50.65	2688.82	6.32	0.00	0.00	0.00	-336.64	118.29	277.47
61	61	50.65	2688.82	6.32	0.00	0.00	0.00	-336.63	118.29	277.47
61	62	51.33	2686.20	48.35	0.00	0.00	0.00	-354.61	114.39	282.08
62	62	51.33	2686.20	48.33	0.00	0.00	0.00	-354.61	114.39	282.08
62	63	52.00	2683.62	89.75	0.00	0.00	0.00	-400.43	104.74	294.09

Título: Fecha : 04/11/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + SOBRECARGA 3 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H005 0.9 + H008 1.15

(TENSION MINIMA -244 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FPREFI.ANL * 0.9) + (SOBREC3.ANL * 1.15)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-106.43	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	-53.45	0.00	0.00	0.00	-345.37	116.31	279.63
4	4	0.68	2686.40	-53.44	0.00	0.00	0.00	-345.37	116.31	279.63
4	5	1.35	2688.98	-1.24	0.00	0.00	0.00	-327.62	120.16	275.08
5	5	1.35	2688.97	-1.24	0.00	0.00	0.00	-327.64	120.16	275.09
5	6	2.03	2701.57	23.98	0.00	0.00	0.00	-339.45	118.60	279.11
6	6	2.03	2701.58	23.97	0.00	0.00	0.00	-339.46	118.60	279.12
6	7	2.70	2716.13	40.49	0.00	0.00	0.00	-364.22	114.49	286.72
7	7	2.70	2716.13	40.49	0.00	0.00	0.00	-364.23	114.49	286.72
7	8	3.38	2730.15	56.63	0.00	0.00	0.00	-401.08	107.86	297.51
8	8	3.38	2730.15	56.63	0.00	0.00	0.00	-401.06	107.86	297.51
8	9	4.05	2743.20	71.94	0.00	0.00	0.00	-448.26	99.02	310.98
9	9	4.05	2743.20	71.96	0.00	0.00	0.00	-448.25	99.02	310.98
9	10	4.72	2755.47	86.78	0.00	0.00	0.00	-505.64	88.01	327.12
10	10	4.72	2755.48	86.76	0.00	0.00	0.00	-505.62	88.02	327.11
10	11	5.40	2767.11	101.30	0.00	0.00	0.00	-573.75	74.75	346.06
11	11	5.40	2767.10	101.31	0.00	0.00	0.00	-573.77	74.75	346.06
11	12	6.07	2785.45	79.11	0.00	0.00	0.00	-641.92	61.94	365.49
12	12	6.07	2785.44	79.15	0.00	0.00	0.00	-641.92	61.94	365.48
12	13	6.75	2801.89	55.73	0.00	0.00	0.00	-694.40	52.24	380.60
13	13	6.75	2801.88	55.68	0.00	0.00	0.00	-694.40	52.24	380.60
13	14	7.43	2816.13	31.57	0.00	0.00	0.00	-729.31	46.02	390.89
14	14	7.43	2816.13	31.59	0.00	0.00	0.00	-729.32	46.02	390.89
14	15	8.10	2827.99	7.30	0.00	0.00	0.00	-746.08	43.39	396.18
15	15	8.10	2828.00	7.33	0.00	0.00	0.00	-746.08	43.39	396.18
15	16	8.77	2828.28	-16.05	0.00	0.00	0.00	-744.28	43.78	395.72
16	16	8.77	2828.28	-16.07	0.00	0.00	0.00	-744.29	43.78	395.73
16	17	9.45	2817.53	-38.04	0.00	0.00	0.00	-726.38	46.73	390.21
17	17	9.45	2817.53	-38.04	0.00	0.00	0.00	-726.37	46.73	390.21
17	18	10.13	2804.93	-59.07	0.00	0.00	0.00	-694.88	52.36	380.94
18	18	10.13	2804.93	-59.09	0.00	0.00	0.00	-694.89	52.35	380.95
18	19	10.80	2790.76	-78.76	0.00	0.00	0.00	-651.90	60.25	368.51
19	19	10.80	2790.77	-78.75	0.00	0.00	0.00	-651.91	60.25	368.52
19	20	11.48	2784.06	126.26	0.00	0.00	0.00	-669.61	56.12	372.76
20	20	11.48	2784.05	126.27	0.00	0.00	0.00	-669.63	56.12	372.76

20	21	12.15	2769.99	328.36	0.00	0.00	0.00	-826.67	22.68	413.58
21	21	12.15	2769.99	328.35	0.00	0.00	0.00	-826.66	22.68	413.58
21	22	12.82	2748.43	529.32	0.00	0.00	0.00	-1122.80	-40.04	490.90
22	22	12.82	2748.44	529.33	0.00	0.00	0.00	-1122.80	-40.04	490.90
22	23	13.50	2718.87	730.96	0.00	0.00	0.00	-1564.45	-133.38	606.40
23	23	13.50	2718.87	-851.75	0.00	0.00	0.00	-1564.45	-133.38	606.40
23	24	14.75	2687.22	-644.16	0.00	0.00	0.00	-758.41	97.25	502.76
24	24	14.75	2687.21	-644.16	0.00	0.00	0.00	-758.39	97.25	502.75
24	25	16.00	2650.93	-446.20	0.00	0.00	0.00	-89.49	240.86	288.71
25	25	16.00	2650.93	-446.20	0.00	0.00	0.00	-89.49	240.86	288.71
25	26	17.25	2610.30	-251.98	0.00	0.00	0.00	337.26	330.76	150.43
26	26	17.25	2610.31	-251.99	0.00	0.00	0.00	337.26	330.76	150.43
26	27	18.50	2565.67	-62.02	0.00	0.00	0.00	530.28	368.84	85.31
27	27	18.50	2565.67	-62.02	0.00	0.00	0.00	530.28	368.84	85.31
27	28	19.75	2557.66	-53.62	0.00	0.00	0.00	603.71	384.21	61.42
28	28	19.75	2557.66	-53.64	0.00	0.00	0.00	603.69	384.21	61.43
28	29	21.00	2547.66	-45.00	0.00	0.00	0.00	668.64	397.52	40.00
29	29	21.00	2547.65	-44.98	0.00	0.00	0.00	668.60	397.51	40.02
29	30	22.25	2535.63	-35.96	0.00	0.00	0.00	724.94	408.72	21.11
30	30	22.25	2535.64	-35.95	0.00	0.00	0.00	724.90	408.71	21.12
30	31	23.50	2521.60	-26.33	0.00	0.00	0.00	772.04	417.70	4.91
31	31	23.50	2521.59	-26.28	0.00	0.00	0.00	772.07	417.71	4.90
31	32	24.75	2505.55	-15.91	0.00	0.00	0.00	809.04	424.27	-8.31
32	32	24.75	2505.55	-15.99	0.00	0.00	0.00	809.06	424.27	-8.32
32	33	26.00	2487.50	-4.68	0.00	0.00	0.00	834.51	428.10	-18.10
33	33	26.00	2487.50	-4.66	0.00	0.00	0.00	834.51	428.10	-18.10
33	34	27.25	2504.56	5.24	0.00	0.00	0.00	822.28	427.09	-12.58
34	34	27.25	2504.56	5.21	0.00	0.00	0.00	822.27	427.08	-12.57
34	35	28.50	2520.92	14.15	0.00	0.00	0.00	799.32	423.64	-3.74
35	35	28.50	2520.92	14.18	0.00	0.00	0.00	799.33	423.64	-3.75
35	36	29.75	2535.17	22.34	0.00	0.00	0.00	768.09	418.17	7.48
36	36	29.75	2535.17	22.27	0.00	0.00	0.00	768.08	418.17	7.49
36	37	31.00	2547.32	24.08	0.00	0.00	0.00	733.29	411.71	19.63
37	37	31.00	2547.32	24.12	0.00	0.00	0.00	733.26	411.70	19.64
37	38	32.25	2557.39	25.52	0.00	0.00	0.00	698.89	405.13	31.44
38	38	32.25	2557.39	25.52	0.00	0.00	0.00	698.88	405.13	31.44
38	39	33.50	2565.38	26.68	0.00	0.00	0.00	665.13	398.48	42.85
39	39	33.50	2565.38	26.66	0.00	0.00	0.00	665.10	398.48	42.86
39	40	34.75	2610.96	212.94	0.00	0.00	0.00	518.67	370.74	93.42
40	40	34.75	2610.96	212.97	0.00	0.00	0.00	518.68	370.74	93.41
40	41	36.00	2652.39	403.67	0.00	0.00	0.00	143.17	292.19	215.64
41	41	36.00	2652.40	403.66	0.00	0.00	0.00	143.17	292.20	215.65
41	42	37.25	2689.30	598.25	0.00	0.00	0.00	-470.15	160.88	412.26

42	42	37.25	2689.29	598.25	0.00	0.00	0.00	-470.14	160.88	412.26
42	43	38.50	2721.37	802.58	0.00	0.00	0.00	-1216.49	-61.29	513.95
43	43	38.50	2721.37	-514.23	0.00	0.00	0.00	-1216.51	-61.29	513.95
43	44	39.17	2749.95	-336.30	0.00	0.00	0.00	-918.87	2.22	436.72
44	44	39.17	2749.95	-336.29	0.00	0.00	0.00	-918.85	2.22	436.72
44	45	39.85	2771.52	-153.45	0.00	0.00	0.00	-743.53	39.97	391.56
45	45	39.85	2771.51	-153.43	0.00	0.00	0.00	-743.53	39.97	391.56
45	46	40.53	2785.61	30.52	0.00	0.00	0.00	-697.01	50.57	380.16
46	46	40.53	2785.61	30.50	0.00	0.00	0.00	-697.00	50.57	380.16
46	47	41.20	2791.67	211.55	0.00	0.00	0.00	-776.63	34.53	401.78
47	47	41.20	2791.67	211.55	0.00	0.00	0.00	-776.63	34.53	401.78
47	48	41.88	2805.73	173.92	0.00	0.00	0.00	-904.51	9.08	436.80
48	48	41.88	2805.74	173.90	0.00	0.00	0.00	-904.50	9.09	436.80
48	49	42.55	2817.91	135.84	0.00	0.00	0.00	-1006.77	-11.20	464.87
49	49	42.55	2817.91	135.87	0.00	0.00	0.00	-1006.78	-11.20	464.87
49	50	43.22	2828.34	96.92	0.00	0.00	0.00	-1084.27	-26.49	486.23
50	50	43.22	2828.34	96.91	0.00	0.00	0.00	-1084.29	-26.49	486.23
50	51	43.90	2828.52	55.70	0.00	0.00	0.00	-1135.05	-36.97	499.76
51	51	43.90	2828.53	55.72	0.00	0.00	0.00	-1135.07	-36.98	499.77
51	52	44.58	2816.64	13.54	0.00	0.00	0.00	-1154.93	-41.91	504.22
52	52	44.58	2816.64	13.55	0.00	0.00	0.00	-1154.91	-41.91	504.21
52	53	45.25	2802.83	-27.51	0.00	0.00	0.00	-1145.16	-40.86	500.65
53	53	45.25	2802.83	-27.51	0.00	0.00	0.00	-1145.15	-40.85	500.65
53	54	45.92	2786.96	-67.91	0.00	0.00	0.00	-1106.81	-34.04	489.34
54	54	45.92	2786.96	-67.96	0.00	0.00	0.00	-1106.79	-34.03	489.33
54	55	46.60	2768.74	-108.11	0.00	0.00	0.00	-1039.33	-21.36	470.10
55	55	46.60	2768.74	-108.07	0.00	0.00	0.00	-1039.33	-21.36	470.10
55	56	47.28	2756.87	-113.56	0.00	0.00	0.00	-959.66	-5.73	448.07
56	56	47.28	2756.87	-113.60	0.00	0.00	0.00	-959.67	-5.73	448.07
56	57	47.95	2744.33	-118.54	0.00	0.00	0.00	-877.58	10.36	425.34
57	57	47.95	2744.33	-118.51	0.00	0.00	0.00	-877.61	10.36	425.35
57	58	48.63	2730.78	-122.98	0.00	0.00	0.00	-791.17	27.27	401.39
58	58	48.63	2730.78	-123.00	0.00	0.00	0.00	-791.18	27.27	401.40
58	59	49.30	2716.63	-126.79	0.00	0.00	0.00	-703.59	44.39	377.09
59	59	49.30	2716.63	-126.75	0.00	0.00	0.00	-703.59	44.39	377.09
59	60	49.97	2701.72	-129.92	0.00	0.00	0.00	-614.31	61.80	352.28
60	60	49.97	2701.72	-129.92	0.00	0.00	0.00	-614.30	61.80	352.28
60	61	50.65	2688.82	-124.39	0.00	0.00	0.00	-523.56	79.65	327.23
61	61	50.65	2688.82	-124.38	0.00	0.00	0.00	-523.55	79.65	327.23
61	62	51.33	2686.20	-90.17	0.00	0.00	0.00	-450.01	94.67	307.47
62	62	51.33	2686.20	-90.19	0.00	0.00	0.00	-450.01	94.67	307.47
62	63	52.00	2683.62	-56.47	0.00	0.00	0.00	-400.43	104.74	294.09

 Titulo: Fecha : 04/11/99
 Descripción de la combinación : PESO PREPIO + SUPERESTRUCTURA + SOBRECARGA 3 x 0.5 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H005 0.9 + H008 0.575

(TENSION MINIMA 0 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FPREFI.ANL * 0.9) + (SOBREC3.ANL * 0.575)]

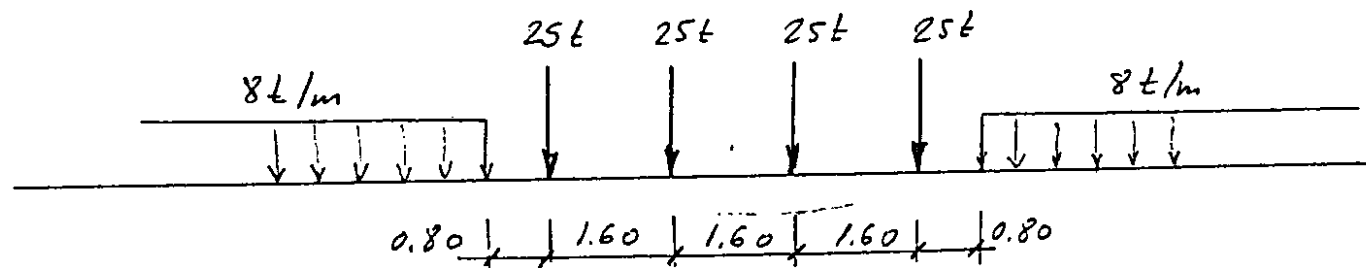
Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-61.18	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	-17.58	0.00	0.00	0.00	-372.95	110.61	286.97
4	4	0.68	2686.40	-17.57	0.00	0.00	0.00	-372.95	110.61	286.97
4	5	1.35	2688.98	25.38	0.00	0.00	0.00	-376.13	110.14	288.00
5	5	1.35	2688.97	25.38	0.00	0.00	0.00	-376.15	110.13	288.00
5	6	2.03	2701.57	41.22	0.00	0.00	0.00	-402.87	105.49	295.99
6	6	2.03	2701.58	41.21	0.00	0.00	0.00	-402.88	105.49	296.00
6	7	2.70	2716.13	48.48	0.00	0.00	0.00	-436.08	99.64	305.85
7	7	2.70	2716.13	48.47	0.00	0.00	0.00	-436.09	99.64	305.85
7	8	3.38	2730.15	55.23	0.00	0.00	0.00	-475.18	92.54	317.24
8	8	3.38	2730.15	55.23	0.00	0.00	0.00	-475.16	92.54	317.23
8	9	4.05	2743.20	61.30	0.00	0.00	0.00	-518.33	84.53	329.64
9	9	4.05	2743.20	61.32	0.00	0.00	0.00	-518.32	84.54	329.63
9	10	4.72	2755.47	66.89	0.00	0.00	0.00	-565.49	75.64	343.05
10	10	4.72	2755.48	66.87	0.00	0.00	0.00	-565.47	75.65	343.04
10	11	5.40	2767.11	72.03	0.00	0.00	0.00	-616.88	65.84	357.54
11	11	5.40	2767.10	72.03	0.00	0.00	0.00	-616.90	65.83	357.54
11	12	6.07	2785.45	40.59	0.00	0.00	0.00	-662.34	57.72	370.92
12	12	6.07	2785.44	40.63	0.00	0.00	0.00	-662.34	57.72	370.92
12	13	6.75	2801.89	7.83	0.00	0.00	0.00	-685.44	54.10	378.22
13	13	6.75	2801.88	7.78	0.00	0.00	0.00	-685.44	54.09	378.22
13	14	7.43	2816.13	-25.72	0.00	0.00	0.00	-684.58	55.27	378.99
14	14	7.43	2816.13	-25.69	0.00	0.00	0.00	-684.59	55.27	378.99
14	15	8.10	2827.99	-59.23	0.00	0.00	0.00	-659.87	61.20	373.24
15	15	8.10	2828.00	-59.20	0.00	0.00	0.00	-659.87	61.20	373.24
15	16	8.77	2828.28	-91.83	0.00	0.00	0.00	-610.40	71.45	360.09
16	16	8.77	2828.28	-91.85	0.00	0.00	0.00	-610.40	71.45	360.09
16	17	9.45	2817.53	-123.20	0.00	0.00	0.00	-537.77	85.71	340.00
17	17	9.45	2817.53	-123.20	0.00	0.00	0.00	-537.76	85.71	340.00
17	18	10.13	2804.93	-153.62	0.00	0.00	0.00	-445.18	103.97	314.48
18	18	10.13	2804.93	-153.64	0.00	0.00	0.00	-445.19	103.96	314.48
18	19	10.80	2790.76	-182.55	0.00	0.00	0.00	-335.76	125.59	284.36
19	19	10.80	2790.77	-182.55	0.00	0.00	0.00	-335.77	125.59	284.36
19	20	11.48	2784.06	13.08	0.00	0.00	0.00	-279.69	136.71	268.97
20	20	11.48	2784.05	13.09	0.00	0.00	0.00	-279.71	136.71	268.97

20	21	12.15	2769.99	205.93	0.00	0.00	0.00	-357.82	119.58	288.78
21	21	12.15	2769.99	205.92	0.00	0.00	0.00	-357.81	119.58	288.78
21	22	12.82	2748.43	397.65	0.00	0.00	0.00	-568.83	74.46	343.44
22	22	12.82	2748.44	397.66	0.00	0.00	0.00	-568.83	74.46	343.44
22	23	13.50	2718.87	589.91	0.00	0.00	0.00	-917.76	0.28	434.26
23	23	13.50	2718.87	-675.81	0.00	0.00	0.00	-917.76	0.28	434.26
23	24	14.75	2687.22	-485.47	0.00	0.00	0.00	-320.85	193.52	365.08
24	24	14.75	2687.21	-485.47	0.00	0.00	0.00	-320.85	193.52	365.08
24	25	16.00	2650.93	-304.76	0.00	0.00	0.00	160.48	295.86	210.05
25	25	16.00	2650.93	-304.76	0.00	0.00	0.00	160.48	295.86	210.05
25	26	17.25	2610.30	-127.79	0.00	0.00	0.00	421.21	349.23	124.02
26	26	17.25	2610.31	-127.80	0.00	0.00	0.00	421.21	349.23	124.02
26	27	18.50	2565.67	44.92	0.00	0.00	0.00	469.78	355.53	104.35
27	27	18.50	2565.67	44.93	0.00	0.00	0.00	469.78	355.53	104.35
27	28	19.75	2557.66	36.07	0.00	0.00	0.00	420.31	343.86	119.13
28	28	19.75	2557.66	36.06	0.00	0.00	0.00	420.29	343.86	119.13
28	29	21.00	2547.66	27.44	0.00	0.00	0.00	383.92	334.87	129.60
29	29	21.00	2547.65	27.47	0.00	0.00	0.00	383.87	334.86	129.61
29	30	22.25	2535.63	19.24	0.00	0.00	0.00	360.44	328.52	135.80
30	30	22.25	2535.64	19.25	0.00	0.00	0.00	360.41	328.52	135.81
30	31	23.50	2521.60	11.61	0.00	0.00	0.00	349.33	324.70	137.92
31	31	23.50	2521.59	11.65	0.00	0.00	0.00	349.36	324.71	137.91
31	32	24.75	2505.55	4.77	0.00	0.00	0.00	349.69	323.20	136.23
32	32	24.75	2505.55	4.70	0.00	0.00	0.00	349.71	323.21	136.22
32	33	26.00	2487.50	-1.24	0.00	0.00	0.00	360.09	323.72	131.18
33	33	26.00	2487.50	-1.23	0.00	0.00	0.00	360.08	323.71	131.18
33	34	27.25	2504.56	-8.58	0.00	0.00	0.00	354.34	324.13	134.67
34	34	27.25	2504.56	-8.60	0.00	0.00	0.00	354.33	324.12	134.67
34	35	28.50	2520.92	-16.91	0.00	0.00	0.00	359.41	326.85	134.68
35	35	28.50	2520.92	-16.89	0.00	0.00	0.00	359.43	326.85	134.67
35	36	29.75	2535.17	-25.98	0.00	0.00	0.00	377.80	332.30	130.29
36	36	29.75	2535.17	-26.04	0.00	0.00	0.00	377.79	332.30	130.30
36	37	31.00	2547.32	-38.60	0.00	0.00	0.00	412.36	341.10	120.61
37	37	31.00	2547.32	-38.57	0.00	0.00	0.00	412.34	341.09	120.62
37	38	32.25	2557.39	-51.54	0.00	0.00	0.00	465.31	353.74	104.94
38	38	32.25	2557.39	-51.54	0.00	0.00	0.00	465.31	353.73	104.94
38	39	33.50	2565.38	-64.76	0.00	0.00	0.00	536.85	370.26	83.21
39	39	33.50	2565.38	-64.77	0.00	0.00	0.00	536.84	370.26	83.22
39	40	34.75	2610.96	107.13	0.00	0.00	0.00	513.68	369.64	94.99
40	40	34.75	2610.96	107.16	0.00	0.00	0.00	513.69	369.65	94.98
40	41	36.00	2652.39	283.49	0.00	0.00	0.00	279.42	322.17	172.77
41	41	36.00	2652.40	283.48	0.00	0.00	0.00	279.43	322.17	172.77
41	42	37.25	2689.30	463.68	0.00	0.00	0.00	-174.68	225.69	319.29

42	42	37.25	2689.29	463.68	0.00	0.00	0.00	-174.67	225.89	319.28
42	43	38.50	2721.37	653.65	0.00	0.00	0.00	-743.84	36.40	388.14
43	43	38.50	2721.37	-479.21	0.00	0.00	0.00	-743.84	36.40	388.14
43	44	39.17	2749.95	-301.29	0.00	0.00	0.00	-469.66	95.06	317.15
44	44	39.17	2749.95	-301.28	0.00	0.00	0.00	-469.66	95.06	317.15
44	45	39.85	2771.52	-118.44	0.00	0.00	0.00	-318.14	127.89	278.33
45	45	39.85	2771.51	-118.42	0.00	0.00	0.00	-318.14	127.89	278.33
45	46	40.53	2785.61	65.53	0.00	0.00	0.00	-295.42	133.57	273.26
46	46	40.53	2785.61	65.51	0.00	0.00	0.00	-295.41	133.57	273.26
46	47	41.20	2791.67	246.57	0.00	0.00	0.00	-398.50	112.69	301.13
47	47	41.20	2791.67	246.57	0.00	0.00	0.00	-398.50	112.69	301.13
47	48	41.88	2805.73	208.94	0.00	0.00	0.00	-550.19	82.32	342.49
48	48	41.88	2805.74	208.92	0.00	0.00	0.00	-550.19	82.32	342.49
48	49	42.55	2817.91	170.86	0.00	0.00	0.00	-675.91	57.18	376.80
49	49	42.55	2817.91	170.88	0.00	0.00	0.00	-675.92	57.18	376.80
49	50	43.22	2828.34	131.93	0.00	0.00	0.00	-776.87	37.05	404.40
50	50	43.22	2828.34	131.92	0.00	0.00	0.00	-776.89	37.04	404.41
50	51	43.90	2828.52	90.71	0.00	0.00	0.00	-851.46	21.64	424.27
51	51	43.90	2828.53	90.72	0.00	0.00	0.00	-851.48	21.64	424.28
51	52	44.58	2816.64	48.54	0.00	0.00	0.00	-895.14	11.78	435.07
52	52	44.58	2816.64	48.56	0.00	0.00	0.00	-895.12	11.79	435.06
52	53	45.25	2802.83	7.50	0.00	0.00	0.00	-908.83	7.99	437.75
53	53	45.25	2802.83	7.49	0.00	0.00	0.00	-908.82	7.99	437.74
53	54	45.92	2786.96	-32.91	0.00	0.00	0.00	-893.94	9.96	432.67
54	54	45.92	2786.96	-32.94	0.00	0.00	0.00	-893.92	9.96	432.67
54	55	46.60	2768.74	-73.10	0.00	0.00	0.00	-850.26	17.71	419.78
55	55	46.60	2768.74	-73.07	0.00	0.00	0.00	-850.27	17.71	419.78
55	56	47.28	2756.87	-78.56	0.00	0.00	0.00	-794.40	28.43	404.08
56	56	47.28	2756.87	-78.59	0.00	0.00	0.00	-794.41	28.43	404.08
56	57	47.95	2744.33	-83.53	0.00	0.00	0.00	-735.78	39.67	387.60
57	57	47.95	2744.33	-83.50	0.00	0.00	0.00	-735.81	39.66	387.60
57	58	48.63	2730.78	-87.96	0.00	0.00	0.00	-673.18	51.66	369.99
58	58	48.63	2730.78	-87.98	0.00	0.00	0.00	-673.19	51.66	369.99
58	59	49.30	2716.63	-91.78	0.00	0.00	0.00	-609.06	63.92	351.93
59	59	49.30	2716.63	-91.74	0.00	0.00	0.00	-609.06	63.92	351.93
59	60	49.97	2701.72	-94.91	0.00	0.00	0.00	-543.23	76.49	333.37
60	60	49.97	2701.72	-94.91	0.00	0.00	0.00	-543.22	76.49	333.36
60	61	50.65	2688.82	-89.37	0.00	0.00	0.00	-476.30	89.42	314.65
61	61	50.65	2688.82	-89.37	0.00	0.00	0.00	-476.29	89.42	314.65
61	62	51.33	2686.20	-55.16	0.00	0.00	0.00	-426.55	99.52	301.22
62	62	51.33	2686.20	-55.18	0.00	0.00	0.00	-426.55	99.52	301.22
62	63	52.00	2683.62	-21.46	0.00	0.00	0.00	-400.43	104.74	294.09

COEFICIENTES DE IMPACTO Y ESFUERZOS DE SOBRECARGA

Tren de carga según U.I.C.-71



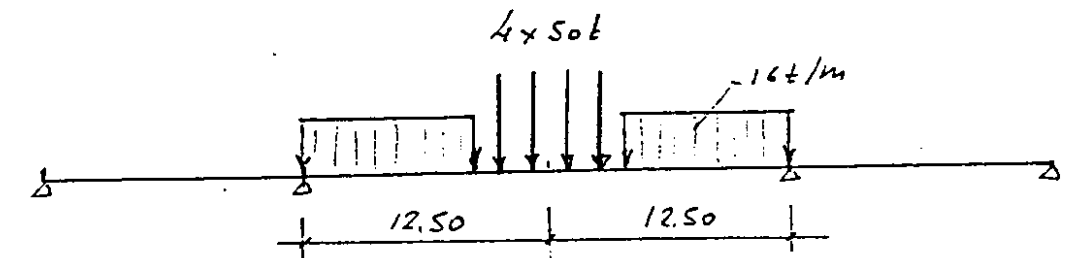
Coefficiente de impacto

$$L_m = 52.00 / 3 = 17.33 \text{ m}$$

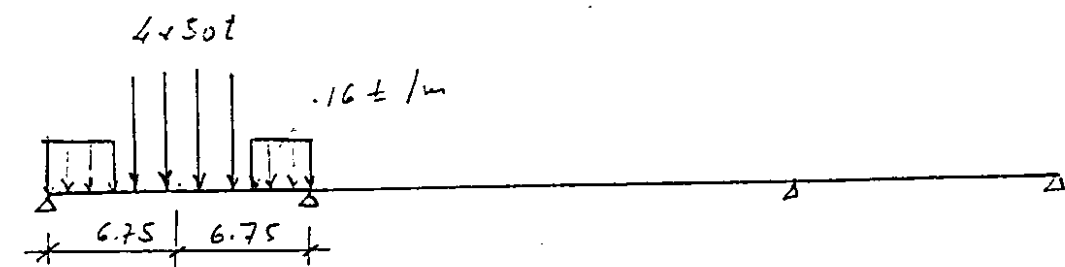
$$L_\phi = 17.33 \times 1.5 = 26.00 \text{ m}$$

$$\phi_2 = \frac{1.44}{\sqrt{26.00 - 0.2}} + 0.82 = 1.11$$

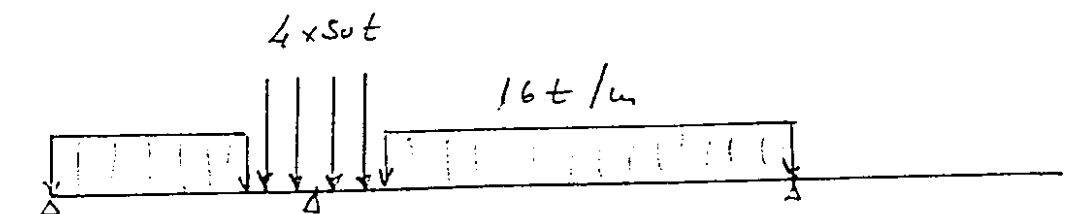
Sobrecarga 1



Sobrecarga 2



Sobrecarga 3



 Titulo: 0 Fecha : 01/12/99
 Descripción de la combinación :
 H009 1.11

1 * [+ (SOBREC1.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	75.46	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	75.46	0.00	0.00	0.00	-51.32	-10.61	13.66
4	4	0.68	0.00	75.46	0.00	0.00	0.00	-51.32	-10.61	13.66
4	5	1.35	0.00	75.46	0.00	0.00	0.00	-101.86	-21.05	27.11
5	5	1.35	0.00	75.47	0.00	0.00	0.00	-101.86	-21.05	27.11
5	6	2.03	0.00	75.47	0.00	0.00	0.00	-153.18	-31.66	40.77
6	6	2.03	0.00	75.46	0.00	0.00	0.00	-153.18	-31.66	40.77
6	7	2.70	0.00	75.46	0.00	0.00	0.00	-203.73	-42.11	54.23
7	7	2.70	0.00	75.47	0.00	0.00	0.00	-203.73	-42.11	54.23
7	8	3.38	0.00	75.47	0.00	0.00	0.00	-255.04	-52.71	67.89
8	8	3.38	0.00	75.48	0.00	0.00	0.00	-255.04	-52.71	67.89
8	9	4.05	0.00	75.48	0.00	0.00	0.00	-305.61	-63.16	81.35
9	9	4.05	0.00	75.45	0.00	0.00	0.00	-305.61	-63.16	81.35
9	10	4.72	0.00	75.45	0.00	0.00	0.00	-356.14	-73.61	94.80
10	10	4.72	0.00	75.44	0.00	0.00	0.00	-356.15	-73.61	94.80
10	11	5.40	0.00	75.44	0.00	0.00	0.00	-407.47	-84.22	108.46
11	11	5.40	0.00	75.47	0.00	0.00	0.00	-407.46	-84.22	108.46
11	12	6.07	0.00	75.47	0.00	0.00	0.00	-458.02	-94.67	121.92
12	12	6.07	0.00	75.42	0.00	0.00	0.00	-458.03	-94.67	121.92
12	13	6.75	0.00	75.42	0.00	0.00	0.00	-509.33	-105.27	135.58
13	13	6.75	0.00	75.48	0.00	0.00	0.00	-509.32	-105.27	135.57
13	14	7.43	0.00	75.48	0.00	0.00	0.00	-560.64	-115.88	149.23
14	14	7.43	0.00	75.44	0.00	0.00	0.00	-560.65	-115.88	149.24
14	15	8.10	0.00	75.44	0.00	0.00	0.00	-611.18	-126.32	162.69
15	15	8.10	0.00	75.42	0.00	0.00	0.00	-611.22	-126.33	162.70
15	16	8.77	0.00	75.42	0.00	0.00	0.00	-661.74	-136.77	176.14
16	16	8.77	0.00	75.45	0.00	0.00	0.00	-661.77	-136.78	176.15
16	17	9.45	0.00	75.45	0.00	0.00	0.00	-713.04	-147.37	189.80
17	17	9.45	0.00	75.44	0.00	0.00	0.00	-713.06	-147.38	189.81
17	18	10.13	0.00	75.44	0.00	0.00	0.00	-764.36	-157.98	203.46
18	18	10.13	0.00	75.45	0.00	0.00	0.00	-764.38	-157.99	203.47
18	19	10.80	0.00	75.45	0.00	0.00	0.00	-814.92	-168.43	216.92
19	19	10.80	0.00	75.45	0.00	0.00	0.00	-814.93	-168.43	216.92
19	20	11.48	0.00	75.45	0.00	0.00	0.00	-866.24	-179.04	230.58
20	20	11.48	0.00	75.45	0.00	0.00	0.00	-866.24	-179.04	230.58
20	21	12.15	0.00	75.45	0.00	0.00	0.00	-916.79	-189.49	244.04

21	21	12.15	0.00	75.46	0.00	0.00	0.00	-916.79	-189.49	244.04
21	22	12.82	0.00	75.46	0.00	0.00	0.00	-967.35	-199.94	257.49
22	22	12.82	0.00	75.46	0.00	0.00	0.00	-967.35	-199.94	257.49
22	23	13.50	0.00	75.46	0.00	0.00	0.00	-1018.67	-210.54	271.15
23	23	13.50	0.00	-288.60	0.00	0.00	0.00	-1018.66	-210.54	271.15
23	24	14.75	0.00	-266.40	0.00	0.00	0.00	-671.79	-147.81	211.39
24	24	14.75	0.00	-266.40	0.00	0.00	0.00	-671.79	-147.81	211.39
24	25	16.00	0.00	-244.20	0.00	0.00	0.00	-352.67	-77.60	110.97
25	25	16.00	0.00	-244.21	0.00	0.00	0.00	-352.67	-77.60	110.97
25	26	17.25	0.00	-222.01	0.00	0.00	0.00	-61.28	-13.48	19.28
26	26	17.25	0.00	-221.99	0.00	0.00	0.00	-61.28	-13.48	19.28
26	27	18.50	0.00	-199.79	0.00	0.00	0.00	202.33	44.52	-63.67
27	27	18.50	0.00	-199.80	0.00	0.00	0.00	202.33	44.52	-63.67
27	28	19.75	0.00	-177.60	0.00	0.00	0.00	438.21	96.41	-137.89
28	28	19.75	0.00	-177.61	0.00	0.00	0.00	438.22	96.42	-137.89
28	29	21.00	0.00	-155.41	0.00	0.00	0.00	646.34	142.21	-203.38
29	29	21.00	0.00	-155.39	0.00	0.00	0.00	646.34	142.21	-203.38
29	30	22.25	0.00	-133.19	0.00	0.00	0.00	826.72	181.90	-260.14
30	30	22.25	0.00	-133.20	0.00	0.00	0.00	826.73	181.90	-260.14
30	31	23.50	0.00	-111.00	0.00	0.00	0.00	979.33	215.47	-308.16
31	31	23.50	0.00	-110.99	0.00	0.00	0.00	979.33	215.47	-308.16
31	32	24.75	0.00	-55.49	0.00	0.00	0.00	1098.66	241.73	-345.71
32	32	24.75	0.00	-55.49	0.00	0.00	0.00	1098.66	241.73	-345.71
32	33	26.00	0.00	0.01	0.00	0.00	0.00	1123.64	247.23	-353.57
33	33	26.00	0.00	0.00	0.00	0.00	0.00	1123.64	247.23	-353.57
33	34	27.25	0.00	55.50	0.00	0.00	0.00	1098.66	241.73	-345.71
34	34	27.25	0.00	55.52	0.00	0.00	0.00	1098.67	241.73	-345.71
34	35	28.50	0.00	111.02	0.00	0.00	0.00	979.33	215.47	-308.16
35	35	28.50	0.00	111.02	0.00	0.00	0.00	979.33	215.47	-308.16
35	36	29.75	0.00	133.22	0.00	0.00	0.00	826.71	181.89	-260.13
36	36	29.75	0.00	133.23	0.00	0.00	0.00	826.73	181.90	-260.14
36	37	31.00	0.00	155.43	0.00	0.00	0.00	646.32	142.20	-203.37
37	37	31.00	0.00	155.38	0.00	0.00	0.00	646.33	142.21	-203.38
37	38	32.25	0.00	177.58	0.00	0.00	0.00	438.21	96.41	-137.89
38	38	32.25	0.00	177.61	0.00	0.00	0.00	438.21	96.41	-137.89
38	39	33.50	0.00	199.81	0.00	0.00	0.00	202.33	44.52	-63.67
39	39	33.50	0.00	199.80	0.00	0.00	0.00	202.33	44.52	-63.67
39	40	34.75	0.00	222.00	0.00	0.00	0.00	-61.28	-13.48	19.28
40	40	34.75	0.00	222.00	0.00	0.00	0.00	-61.28	-13.48	19.28
40	41	36.00	0.00	244.20	0.00	0.00	0.00	-352.67	-77.60	110.97
41	41	36.00	0.00	244.19	0.00	0.00	0.00	-352.67	-77.60	110.97
41	42	37.25	0.00	266.39	0.00	0.00	0.00	-671.78	-147.81	211.38

42	42	37.25	0.00	266.40	0.00	0.00	0.00	-671.78	-147.81	211.38
42	43	38.50	0.00	288.60	0.00	0.00	0.00	-1018.67	-210.54	271.15
43	43	38.50	0.00	-75.46	0.00	0.00	0.00	-1018.66	-210.54	271.15
43	44	39.17	0.00	-75.46	0.00	0.00	0.00	-968.11	-200.09	257.70
44	44	39.17	0.00	-75.46	0.00	0.00	0.00	-968.12	-200.10	257.70
44	45	39.85	0.00	-75.46	0.00	0.00	0.00	-916.79	-189.49	244.04
45	45	39.85	0.00	-75.46	0.00	0.00	0.00	-916.80	-189.49	244.04
45	46	40.53	0.00	-75.46	0.00	0.00	0.00	-865.48	-178.88	230.38
46	46	40.53	0.00	-75.45	0.00	0.00	0.00	-865.48	-178.88	230.38
46	47	41.20	0.00	-75.45	0.00	0.00	0.00	-814.94	-168.44	216.92
47	47	41.20	0.00	-75.46	0.00	0.00	0.00	-814.93	-168.43	216.92
47	48	41.88	0.00	-75.46	0.00	0.00	0.00	-763.61	-157.83	203.26
48	48	41.88	0.00	-75.45	0.00	0.00	0.00	-763.62	-157.83	203.26
48	49	42.55	0.00	-75.45	0.00	0.00	0.00	-713.06	-147.38	189.81
49	49	42.55	0.00	-75.45	0.00	0.00	0.00	-713.06	-147.38	189.81
49	50	43.22	0.00	-75.45	0.00	0.00	0.00	-662.51	-136.93	176.35
50	50	43.22	0.00	-75.44	0.00	0.00	0.00	-662.50	-136.93	176.35
50	51	43.90	0.00	-75.44	0.00	0.00	0.00	-611.20	-126.33	162.69
51	51	43.90	0.00	-75.47	0.00	0.00	0.00	-611.20	-126.33	162.69
51	52	44.58	0.00	-75.47	0.00	0.00	0.00	-559.87	-115.72	149.03
52	52	44.58	0.00	-75.50	0.00	0.00	0.00	-559.91	-115.72	149.04
52	53	45.25	0.00	-75.50	0.00	0.00	0.00	-509.31	-105.27	135.57
53	53	45.25	0.00	-75.45	0.00	0.00	0.00	-509.32	-105.27	135.57
53	54	45.92	0.00	-75.45	0.00	0.00	0.00	-458.79	-94.82	122.12
54	54	45.92	0.00	-75.46	0.00	0.00	0.00	-458.79	-94.82	122.12
54	55	46.60	0.00	-75.46	0.00	0.00	0.00	-407.46	-84.22	108.46
55	55	46.60	0.00	-75.47	0.00	0.00	0.00	-407.47	-84.22	108.46
55	56	47.28	0.00	-75.47	0.00	0.00	0.00	-356.15	-73.61	94.80
56	56	47.28	0.00	-75.42	0.00	0.00	0.00	-356.14	-73.61	94.80
56	57	47.95	0.00	-75.42	0.00	0.00	0.00	-305.62	-63.17	81.35
57	57	47.95	0.00	-75.45	0.00	0.00	0.00	-305.61	-63.16	81.35
57	58	48.63	0.00	-75.45	0.00	0.00	0.00	-254.29	-52.56	67.69
58	58	48.63	0.00	-75.45	0.00	0.00	0.00	-254.29	-52.56	67.69
58	59	49.30	0.00	-75.45	0.00	0.00	0.00	-203.73	-42.11	54.23
59	59	49.30	0.00	-75.46	0.00	0.00	0.00	-203.74	-42.11	54.23
59	60	49.97	0.00	-75.46	0.00	0.00	0.00	-153.17	-31.66	40.77
60	60	49.97	0.00	-75.47	0.00	0.00	0.00	-153.18	-31.66	40.77
60	61	50.65	0.00	-75.47	0.00	0.00	0.00	-101.86	-21.05	27.11
61	61	50.65	0.00	-75.46	0.00	0.00	0.00	-101.86	-21.05	27.11
61	62	51.33	0.00	-75.46	0.00	0.00	0.00	-50.56	-10.45	13.46
62	62	51.33	0.00	-75.46	0.00	0.00	0.00	-50.56	-10.45	13.46
62	63	52.00	0.00	-75.46	0.00	0.00	0.00	0.00	0.00	0.00

Título: Fecha : 01/12/99
 Descripción de la combinación :
 H010 1.11

1 * [+ (SOBREC2.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-153.31	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-141.24	0.00	0.00	0.00	100.14	20.70	-26.66
4	4	0.68	0.00	-141.25	0.00	0.00	0.00	100.14	20.70	-26.66
4	5	1.35	0.00	-129.35	0.00	0.00	0.00	190.79	39.43	-50.78
5	5	1.35	0.00	-129.32	0.00	0.00	0.00	190.79	39.43	-50.78
5	6	2.03	0.00	-117.24	0.00	0.00	0.00	274.63	56.76	-73.10
6	6	2.03	0.00	-117.26	0.00	0.00	0.00	274.63	56.76	-73.10
6	7	2.70	0.00	-105.36	0.00	0.00	0.00	349.21	72.18	-92.95
7	7	2.70	0.00	-105.35	0.00	0.00	0.00	349.21	72.18	-92.95
7	8	3.38	0.00	-93.27	0.00	0.00	0.00	416.73	86.13	-110.93
8	8	3.38	0.00	-93.28	0.00	0.00	0.00	416.74	86.13	-110.93
8	9	4.05	0.00	-93.28	0.00	0.00	0.00	479.24	99.05	-127.57
9	9	4.05	0.00	-93.30	0.00	0.00	0.00	479.24	99.05	-127.57
9	10	4.72	0.00	-37.80	0.00	0.00	0.00	521.21	107.73	-138.74
10	10	4.72	0.00	-37.80	0.00	0.00	0.00	521.20	107.72	-138.74
10	11	5.40	0.00	-37.80	0.00	0.00	0.00	546.89	113.03	-145.57
11	11	5.40	0.00	-37.80	0.00	0.00	0.00	546.90	113.04	-145.58
11	12	6.07	0.00	17.70	0.00	0.00	0.00	565.53	116.89	-150.54
12	12	6.07	0.00	17.72	0.00	0.00	0.00	565.53	116.89	-150.54
12	13	6.75	0.00	17.72	0.00	0.00	0.00	553.50	114.40	-147.33
13	13	6.75	0.00	17.74	0.00	0.00	0.00	553.50	114.40	-147.33
13	14	7.43	0.00	17.74	0.00	0.00	0.00	541.44	111.91	-144.12
14	14	7.43	0.00	17.68	0.00	0.00	0.00	541.44	111.91	-144.12
14	15	8.10	0.00	73.18	0.00	0.00	0.00	499.34	103.21	-132.92
15	15	8.10	0.00	73.23	0.00	0.00	0.00	499.33	103.20	-132.91
15	16	8.77	0.00	73.23	0.00	0.00	0.00	450.28	93.07	-119.86
16	16	8.77	0.00	73.20	0.00	0.00	0.00	450.27	93.06	-119.86
16	17	9.45	0.00	128.70	0.00	0.00	0.00	383.55	79.27	-102.09
17	17	9.45	0.00	128.75	0.00	0.00	0.00	383.57	79.28	-102.10
17	18	10.13	0.00	128.75	0.00	0.00	0.00	296.01	61.18	-78.79
18	18	10.13	0.00	128.72	0.00	0.00	0.00	296.03	61.18	-78.80
18	19	10.80	0.00	140.61	0.00	0.00	0.00	205.81	42.54	-54.78
19	19	10.80	0.00	140.61	0.00	0.00	0.00	205.81	42.54	-54.78
19	20	11.48	0.00	152.69	0.00	0.00	0.00	106.07	21.92	-28.23
20	20	11.48	0.00	152.69	0.00	0.00	0.00	106.07	21.92	-28.23
20	21	12.15	0.00	164.59	0.00	0.00	0.00	-0.21	-0.04	0.06

21	21	12.15	0.00	164.59	0.00	0.00	0.00	-0.22	-0.05	0.06
21	22	12.82	0.00	176.49	0.00	0.00	0.00	-114.49	-23.66	30.47
22	22	12.82	0.00	176.49	0.00	0.00	0.00	-114.49	-23.66	30.47
22	23	13.50	0.00	188.57	0.00	0.00	0.00	-238.61	-49.32	63.51
23	23	13.50	0.00	-12.79	0.00	0.00	0.00	-238.61	-49.32	63.51
23	24	14.75	0.00	-12.79	0.00	0.00	0.00	-222.62	-48.98	70.05
24	24	14.75	0.00	-12.79	0.00	0.00	0.00	-222.62	-48.98	70.05
24	25	16.00	0.00	-12.79	0.00	0.00	0.00	-206.63	-45.46	65.02
25	25	16.00	0.00	-12.79	0.00	0.00	0.00	-206.63	-45.46	65.02
25	26	17.25	0.00	-12.79	0.00	0.00	0.00	-190.64	-41.95	59.99
26	26	17.25	0.00	-12.79	0.00	0.00	0.00	-190.64	-41.95	59.99
26	27	18.50	0.00	-12.79	0.00	0.00	0.00	-174.66	-38.43	54.96
27	27	18.50	0.00	-12.79	0.00	0.00	0.00	-174.66	-38.43	54.96
27	28	19.75	0.00	-12.79	0.00	0.00	0.00	-158.66	-34.91	49.93
28	28	19.75	0.00	-12.79	0.00	0.00	0.00	-158.66	-34.91	49.93
28	29	21.00	0.00	-12.79	0.00	0.00	0.00	-142.68	-31.39	44.90
29	29	21.00	0.00	-12.79	0.00	0.00	0.00	-142.68	-31.39	44.90
29	30	22.25	0.00	-12.79	0.00	0.00	0.00	-126.70	-27.88	39.87
30	30	22.25	0.00	-12.79	0.00	0.00	0.00	-126.70	-27.88	39.87
30	31	23.50	0.00	-12.79	0.00	0.00	0.00	-110.70	-24.36	34.83
31	31	23.50	0.00	-12.79	0.00	0.00	0.00	-110.70	-24.36	34.83
31	32	24.75	0.00	-12.79	0.00	0.00	0.00	-94.72	-20.84	29.80
32	32	24.75	0.00	-12.79	0.00	0.00	0.00	-94.72	-20.84	29.80
32	33	26.00	0.00	-12.79	0.00	0.00	0.00	-78.73	-17.32	24.77
33	33	26.00	0.00	-12.79	0.00	0.00	0.00	-78.73	-17.32	24.77
33	34	27.25	0.00	-12.79	0.00	0.00	0.00	-62.74	-13.80	19.74
34	34	27.25	0.00	-12.79	0.00	0.00	0.00	-62.74	-13.80	19.74
34	35	28.50	0.00	-12.79	0.00	0.00	0.00	-46.75	-10.29	14.71
35	35	28.50	0.00	-12.79	0.00	0.00	0.00	-46.75	-10.29	14.71
35	36	29.75	0.00	-12.79	0.00	0.00	0.00	-30.77	-6.77	9.68
36	36	29.75	0.00	-12.80	0.00	0.00	0.00	-30.77	-6.77	9.68
36	37	31.00	0.00	-12.80	0.00	0.00	0.00	-14.77	-3.25	4.65
37	37	31.00	0.00	-12.79	0.00	0.00	0.00	-14.77	-3.25	4.65
37	38	32.25	0.00	-12.79	0.00	0.00	0.00	1.21	0.27	-0.38
38	38	32.25	0.00	-12.79	0.00	0.00	0.00	1.21	0.27	-0.38
38	39	33.50	0.00	-12.79	0.00	0.00	0.00	17.19	3.78	-5.41
39	39	33.50	0.00	-12.79	0.00	0.00	0.00	17.19	3.78	-5.41
39	40	34.75	0.00	-12.79	0.00	0.00	0.00	33.19	7.30	-10.44
40	40	34.75	0.00	-12.79	0.00	0.00	0.00	33.19	7.30	-10.44
40	41	36.00	0.00	-12.79	0.00	0.00	0.00	49.17	10.82	-15.47
41	41	36.00	0.00	-12.79	0.00	0.00	0.00	49.17	10.82	-15.47
41	42	37.25	0.00	-12.79	0.00	0.00	0.00	65.16	14.34	-20.50

42	42	37.25	0.00	-12.79	0.00	0.00	0.00	65.16	14.34	-20.50
42	43	38.50	0.00	-12.79	0.00	0.00	0.00	81.15	16.77	-21.60
43	43	38.50	0.00	6.02	0.00	0.00	0.00	81.15	16.77	-21.60
43	44	39.17	0.00	6.02	0.00	0.00	0.00	77.12	15.94	-20.53
44	44	39.17	0.00	6.01	0.00	0.00	0.00	77.12	15.94	-20.53
44	45	39.85	0.00	6.01	0.00	0.00	0.00	73.04	15.10	-19.44
45	45	39.85	0.00	6.02	0.00	0.00	0.00	73.04	15.10	-19.44
45	46	40.53	0.00	6.02	0.00	0.00	0.00	68.94	14.25	-18.35
46	46	40.53	0.00	6.02	0.00	0.00	0.00	68.94	14.25	-18.35
46	47	41.20	0.00	6.02	0.00	0.00	0.00	64.92	13.42	-17.28
47	47	41.20	0.00	6.02	0.00	0.00	0.00	64.92	13.42	-17.28
47	48	41.88	0.00	6.02	0.00	0.00	0.00	60.83	12.57	-16.19
48	48	41.88	0.00	6.01	0.00	0.00	0.00	60.83	12.57	-16.19
48	49	42.55	0.00	6.01	0.00	0.00	0.00	56.81	11.74	-15.12
49	49	42.55	0.00	6.02	0.00	0.00	0.00	56.80	11.74	-15.12
49	50	43.22	0.00	6.02	0.00	0.00	0.00	52.78	10.91	-14.05
50	50	43.22	0.00	6.02	0.00	0.00	0.00	52.78	10.91	-14.05
50	51	43.90	0.00	6.02	0.00	0.00	0.00	48.68	10.06	-12.96
51	51	43.90	0.00	6.02	0.00	0.00	0.00	48.68	10.06	-12.96
51	52	44.58	0.00	6.02	0.00	0.00	0.00	44.60	9.22	-11.87
52	52	44.58	0.00	6.02	0.00	0.00	0.00	44.60	9.22	-11.87
52	53	45.25	0.00	6.02	0.00	0.00	0.00	40.57	8.39	-10.80
53	53	45.25	0.00	6.02	0.00	0.00	0.00	40.57	8.39	-10.80
53	54	45.92	0.00	6.02	0.00	0.00	0.00	36.54	7.55	-9.73
54	54	45.92	0.00	6.02	0.00	0.00	0.00	36.55	7.55	-9.73
54	55	46.60	0.00	6.02	0.00	0.00	0.00	32.46	6.71	-8.64
55	55	46.60	0.00	6.02	0.00	0.00	0.00	32.46	6.71	-8.64
55	56	47.28	0.00	6.02	0.00	0.00	0.00	28.37	5.86	-7.55
56	56	47.28	0.00	6.01	0.00	0.00	0.00	28.37	5.86	-7.55
56	57	47.95	0.00	6.01	0.00	0.00	0.00	24.34	5.03	-6.48
57	57	47.95	0.00	6.01	0.00	0.00	0.00	24.34	5.03	-6.48
57	58	48.63	0.00	6.01	0.00	0.00	0.00	20.26	4.19	-5.39
58	58	48.63	0.00	6.01	0.00	0.00	0.00	20.26	4.19	-5.39
58	59	49.30	0.00	6.01	0.00	0.00	0.00	16.23	3.35	-4.32
59	59	49.30	0.00	6.02	0.00	0.00	0.00	16.23	3.35	-4.32
59	60	49.97	0.00	6.02	0.00	0.00	0.00	12.20	2.52	-3.25
60	60	49.97	0.00	6.02	0.00	0.00	0.00	12.20	2.52	-3.25
60	61	50.65	0.00	6.02	0.00	0.00	0.00	8.11	1.68	-2.16
61	61	50.65	0.00	6.02	0.00	0.00	0.00	8.11	1.68	-2.16
61	62	51.33	0.00	6.02	0.00	0.00	0.00	4.03	0.83	-1.07
62	62	51.33	0.00	6.02	0.00	0.00	0.00	4.03	0.83	-1.07
62	63	52.00	0.00	6.02	0.00	0.00	0.00	0.00	0.00	0.00

Título: Fecha : 01/12/99
 Descripción de la combinación :
 H011 1.11

1 * [+ (SOBREC3.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	0.00	-58.82	0.00	0.00	0.00	0.00	0.00	0.00
3	4	0.68	0.00	-46.74	0.00	0.00	0.00	35.89	7.42	-9.55
4	4	0.68	0.00	-46.74	0.00	0.00	0.00	35.89	7.42	-9.55
4	5	1.35	0.00	-34.84	0.00	0.00	0.00	63.21	13.07	-16.83
5	5	1.35	0.00	-34.84	0.00	0.00	0.00	63.23	13.07	-16.83
5	6	2.03	0.00	-22.77	0.00	0.00	0.00	82.81	17.11	-22.04
6	6	2.03	0.00	-22.77	0.00	0.00	0.00	82.81	17.11	-22.04
6	7	2.70	0.00	-10.87	0.00	0.00	0.00	94.07	19.44	-25.04
7	7	2.70	0.00	-10.87	0.00	0.00	0.00	94.07	19.44	-25.04
7	8	3.38	0.00	1.21	0.00	0.00	0.00	97.36	20.12	-25.92
8	8	3.38	0.00	1.21	0.00	0.00	0.00	97.36	20.12	-25.92
8	9	4.05	0.00	13.11	0.00	0.00	0.00	92.55	19.13	-24.64
9	9	4.05	0.00	13.11	0.00	0.00	0.00	92.56	19.13	-24.64
9	10	4.72	0.00	25.01	0.00	0.00	0.00	79.79	16.49	-21.24
10	10	4.72	0.00	25.01	0.00	0.00	0.00	79.79	16.49	-21.24
10	11	5.40	0.00	37.09	0.00	0.00	0.00	58.67	12.13	-15.62
11	11	5.40	0.00	37.09	0.00	0.00	0.00	58.67	12.13	-15.62
11	12	6.07	0.00	48.98	0.00	0.00	0.00	29.84	6.17	-7.94
12	12	6.07	0.00	48.98	0.00	0.00	0.00	29.84	6.17	-7.94
12	13	6.75	0.00	61.06	0.00	0.00	0.00	-7.58	-1.57	2.02
13	13	6.75	0.00	61.06	0.00	0.00	0.00	-7.57	-1.56	2.02
13	14	7.43	0.00	73.14	0.00	0.00	0.00	-53.20	-11.00	14.16
14	14	7.43	0.00	73.14	0.00	0.00	0.00	-53.20	-11.00	14.16
14	15	8.10	0.00	85.04	0.00	0.00	0.00	-106.19	-21.95	28.27
15	15	8.10	0.00	85.04	0.00	0.00	0.00	-106.19	-21.95	28.27
15	16	8.77	0.00	96.94	0.00	0.00	0.00	-167.15	-34.55	44.49
16	16	8.77	0.00	96.94	0.00	0.00	0.00	-167.15	-34.55	44.49
16	17	9.45	0.00	109.01	0.00	0.00	0.00	-237.17	-49.02	63.13
17	17	9.45	0.00	109.01	0.00	0.00	0.00	-237.18	-49.02	63.13
17	18	10.13	0.00	121.09	0.00	0.00	0.00	-315.42	-65.19	83.96
18	18	10.13	0.00	121.09	0.00	0.00	0.00	-315.42	-65.19	83.96
18	19	10.80	0.00	132.99	0.00	0.00	0.00	-400.53	-82.78	106.62
19	19	10.80	0.00	132.99	0.00	0.00	0.00	-400.53	-82.78	106.62
19	20	11.48	0.00	200.57	0.00	0.00	0.00	-516.16	-106.68	137.39
20	20	11.48	0.00	200.58	0.00	0.00	0.00	-516.16	-106.68	137.39
20	21	12.15	0.00	212.48	0.00	0.00	0.00	-654.53	-135.28	174.23

21	21	12.15	0.00	212.48	0.00	0.00	0.00	-654.52	-135.28	174.22
21	22	12.82	0.00	279.88	0.00	0.00	0.00	-807.53	-166.90	214.95
22	22	12.82	0.00	279.86	0.00	0.00	0.00	-807.53	-166.90	214.95
22	23	13.50	0.00	291.94	0.00	0.00	0.00	-1001.94	-207.09	266.70
23	23	13.50	0.00	-339.45	0.00	0.00	0.00	-1001.94	-207.09	266.70
23	24	14.75	0.00	-261.75	0.00	0.00	0.00	-616.47	-135.64	193.98
24	24	14.75	0.00	-261.75	0.00	0.00	0.00	-616.47	-135.64	193.98
24	25	16.00	0.00	-184.05	0.00	0.00	0.00	-308.71	-67.92	97.14
25	25	16.00	0.00	-184.05	0.00	0.00	0.00	-308.70	-67.92	97.14
25	26	17.25	0.00	-161.85	0.00	0.00	0.00	-92.52	-20.36	29.11
26	26	17.25	0.00	-161.85	0.00	0.00	0.00	-92.51	-20.35	29.11
26	27	18.50	0.00	-139.65	0.00	0.00	0.00	95.93	21.11	-30.18
27	27	18.50	0.00	-139.65	0.00	0.00	0.00	95.93	21.11	-30.18
27	28	19.75	0.00	-117.45	0.00	0.00	0.00	256.61	56.46	-80.75
28	28	19.75	0.00	-117.45	0.00	0.00	0.00	256.62	56.46	-80.75
28	29	21.00	0.00	-95.25	0.00	0.00	0.00	389.57	85.71	-122.58
29	29	21.00	0.00	-95.25	0.00	0.00	0.00	389.57	85.71	-122.58
29	30	22.25	0.00	-73.05	0.00	0.00	0.00	494.75	108.86	-155.68
30	30	22.25	0.00	-73.05	0.00	0.00	0.00	494.75	108.86	-155.68
30	31	23.50	0.00	-50.85	0.00	0.00	0.00	572.19	125.90	-180.05
31	31	23.50	0.00	-50.85	0.00	0.00	0.00	572.19	125.90	-180.05
31	32	24.75	0.00	-28.65	0.00	0.00	0.00	621.89	136.83	-195.69
32	32	24.75	0.00	-28.66	0.00	0.00	0.00	621.88	136.83	-195.68
32	33	26.00	0.00	-6.46	0.00	0.00	0.00	643.83	141.66	-202.59
33	33	26.00	0.00	-6.46	0.00	0.00	0.00	643.82	141.66	-202.59
33	34	27.25	0.00	15.74	0.00	0.00	0.00	638.03	140.38	-200.76
34	34	27.25	0.00	15.74	0.00	0.00	0.00	638.02	140.38	-200.76
34	35	28.50	0.00	37.94	0.00	0.00	0.00	604.46	132.99	-190.20
35	35	28.50	0.00	37.95	0.00	0.00	0.00	604.47	133.00	-190.20
35	36	29.75	0.00	60.15	0.00	0.00	0.00	543.16	119.51	-170.91
36	36	29.75	0.00	60.15	0.00	0.00	0.00	543.16	119.51	-170.91
36	37	31.00	0.00	82.35	0.00	0.00	0.00	454.10	99.91	-142.89
37	37	31.00	0.00	82.34	0.00	0.00	0.00	454.10	99.91	-142.89
37	38	32.25	0.00	104.54	0.00	0.00	0.00	337.30	74.21	-106.13
38	38	32.25	0.00	104.55	0.00	0.00	0.00	337.30	74.21	-106.13
38	39	33.50	0.00	126.75	0.00	0.00	0.00	192.73	42.40	-60.64
39	39	33.50	0.00	126.74	0.00	0.00	0.00	192.73	42.40	-60.64
39	40	34.75	0.00	148.94	0.00	0.00	0.00	20.44	4.50	-6.43
40	40	34.75	0.00	148.95	0.00	0.00	0.00	20.42	4.49	-6.43
40	41	36.00	0.00	171.15	0.00	0.00	0.00	-179.63	-39.52	56.52
41	41	36.00	0.00	171.14	0.00	0.00	0.00	-179.63	-39.52	56.52
41	42	37.25	0.00	193.34	0.00	0.00	0.00	-407.44	-89.65	128.21

42	42	37.25	0.00	193.35	0.00	0.00	0.00	-407.44	-89.65	128.21
42	43	38.50	0.00	215.55	0.00	0.00	0.00	-662.99	-137.03	176.48
43	43	38.50	0.00	-49.11	0.00	0.00	0.00	-662.99	-137.03	176.48
43	44	39.17	0.00	-49.11	0.00	0.00	0.00	-630.09	-130.23	167.72
44	44	39.17	0.00	-49.11	0.00	0.00	0.00	-630.09	-130.23	167.72
44	45	39.85	0.00	-49.11	0.00	0.00	0.00	-596.69	-123.33	158.83
45	45	39.85	0.00	-49.11	0.00	0.00	0.00	-596.69	-123.33	158.83
45	46	40.53	0.00	-49.11	0.00	0.00	0.00	-563.30	-116.43	149.94
46	46	40.53	0.00	-49.12	0.00	0.00	0.00	-563.30	-116.43	149.94
46	47	41.20	0.00	-49.12	0.00	0.00	0.00	-530.39	-109.62	141.18
47	47	41.20	0.00	-49.11	0.00	0.00	0.00	-530.40	-109.63	141.18
47	48	41.88	0.00	-49.11	0.00	0.00	0.00	-497.00	-102.72	132.29
48	48	41.88	0.00	-49.13	0.00	0.00	0.00	-496.99	-102.72	132.29
48	49	42.55	0.00	-49.13	0.00	0.00	0.00	-464.10	-95.92	123.54
49	49	42.55	0.00	-49.10	0.00	0.00	0.00	-464.10	-95.92	123.54
49	50	43.22	0.00	-49.10	0.00	0.00	0.00	-431.19	-89.12	114.78
50	50	43.22	0.00	-49.11	0.00	0.00	0.00	-431.19	-89.12	114.78
50	51	43.90	0.00	-49.11	0.00	0.00	0.00	-397.79	-82.22	105.89
51	51	43.90	0.00	-49.12	0.00	0.00	0.00	-397.80	-82.22	105.89
51	52	44.58	0.00	-49.12	0.00	0.00	0.00	-364.39	-75.31	97.00
52	52	44.58	0.00	-49.11	0.00	0.00	0.00	-364.40	-75.32	97.00
52	53	45.25	0.00	-49.11	0.00	0.00	0.00	-331.49	-68.51	88.24
53	53	45.25	0.00	-49.15	0.00	0.00	0.00	-331.50	-68.52	88.24
53	54	45.92	0.00	-49.15	0.00	0.00	0.00	-298.59	-61.71	79.48
54	54	45.92	0.00	-49.13	0.00	0.00	0.00	-298.59	-61.71	79.48
54	55	46.60	0.00	-49.13	0.00	0.00	0.00	-265.20	-54.81	70.59
55	55	46.60	0.00	-49.10	0.00	0.00	0.00	-265.19	-54.81	70.59
55	56	47.28	0.00	-49.10	0.00	0.00	0.00	-231.81	-47.91	61.70
56	56	47.28	0.00	-49.13	0.00	0.00	0.00	-231.81	-47.91	61.70
56	57	47.95	0.00	-49.13	0.00	0.00	0.00	-198.90	-41.11	52.94
57	57	47.95	0.00	-49.11	0.00	0.00	0.00	-198.90	-41.11	52.94
57	58	48.63	0.00	-49.11	0.00	0.00	0.00	-165.51	-34.21	44.06
58	58	48.63	0.00	-49.12	0.00	0.00	0.00	-165.50	-34.21	44.05
58	59	49.30	0.00	-49.12	0.00	0.00	0.00	-132.60	-27.41	35.30
59	59	49.30	0.00	-49.10	0.00	0.00	0.00	-132.59	-27.40	35.29
59	60	49.97	0.00	-49.10	0.00	0.00	0.00	-99.70	-20.61	26.54
60	60	49.97	0.00	-49.11	0.00	0.00	0.00	-99.69	-20.60	26.54
60	61	50.65	0.00	-49.11	0.00	0.00	0.00	-66.30	-13.70	17.65
61	61	50.65	0.00	-49.11	0.00	0.00	0.00	-66.30	-13.70	17.65
61	62	51.33	0.00	-49.11	0.00	0.00	0.00	-32.91	-6.80	8.76
62	62	51.33	0.00	-49.11	0.00	0.00	0.00	-32.90	-6.80	8.76
62	63	52.00	0.00	-49.11	0.00	0.00	0.00	0.00	0.00	0.00

 Titulo: Fecha : 01/12/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + TEMPERATURA X 0.6 + SOBRECARGA1 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H003 0.6 + H005 0.9 + H006 1.11

(TENSION MINIMA -244 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FCTEMP.ANL * 0.6) + (FPREFI.ANL * 0.9)
 + (SOBREC1.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	40.99	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	75.20	0.00	0.00	0.00	-439.24	96.91	304.61
4	4	0.68	2686.40	75.21	0.00	0.00	0.00	-439.24	96.91	304.61
4	5	1.35	2688.98	108.92	0.00	0.00	0.00	-501.48	84.23	321.36
5	5	1.35	2688.97	108.93	0.00	0.00	0.00	-501.50	84.22	321.37
5	6	2.03	2701.57	115.38	0.00	0.00	0.00	-581.84	68.50	343.63
6	6	2.03	2701.58	115.36	0.00	0.00	0.00	-581.85	68.50	343.64
6	7	2.70	2716.13	113.38	0.00	0.00	0.00	-661.63	53.02	365.89
7	7	2.70	2716.13	113.40	0.00	0.00	0.00	-661.64	53.02	365.89
7	8	3.38	2730.15	110.77	0.00	0.00	0.00	-741.69	37.46	388.18
8	8	3.38	2730.15	110.79	0.00	0.00	0.00	-741.67	37.46	388.17
8	9	4.05	2743.20	107.62	0.00	0.00	0.00	-818.95	22.40	409.65
9	9	4.05	2743.20	107.59	0.00	0.00	0.00	-818.94	22.40	409.65
9	10	4.72	2755.47	103.91	0.00	0.00	0.00	-893.99	7.75	430.49
10	10	4.72	2755.48	103.88	0.00	0.00	0.00	-893.99	7.75	430.49
10	11	5.40	2767.11	99.66	0.00	0.00	0.00	-967.39	-6.61	450.84
11	11	5.40	2767.10	99.68	0.00	0.00	0.00	-967.40	-6.61	450.84
11	12	6.07	2785.45	59.00	0.00	0.00	0.00	-1028.28	-17.91	468.33
12	12	6.07	2785.44	59.00	0.00	0.00	0.00	-1028.28	-17.91	468.33
12	13	6.75	2801.89	16.82	0.00	0.00	0.00	-1060.70	-23.47	478.11
13	13	6.75	2801.88	16.82	0.00	0.00	0.00	-1060.69	-23.46	478.10
13	14	7.43	2816.13	-26.06	0.00	0.00	0.00	-1062.79	-22.90	479.66
14	14	7.43	2816.13	-26.08	0.00	0.00	0.00	-1062.80	-22.90	479.66
14	15	8.10	2827.99	-68.86	0.00	0.00	0.00	-1034.71	-16.27	473.01
15	15	8.10	2828.00	-68.85	0.00	0.00	0.00	-1034.75	-16.28	473.02
15	16	8.77	2828.28	-110.72	0.00	0.00	0.00	-975.70	-4.05	457.33
16	16	8.77	2828.28	-110.71	0.00	0.00	0.00	-975.75	-4.06	457.34
16	17	9.45	2817.53	-151.44	0.00	0.00	0.00	-887.05	13.52	432.98
17	17	9.45	2817.53	-151.46	0.00	0.00	0.00	-887.07	13.51	432.98
17	18	10.13	2804.93	-191.26	0.00	0.00	0.00	-772.08	36.40	401.49
18	18	10.13	2804.93	-191.27	0.00	0.00	0.00	-772.11	36.39	401.50
18	19	10.80	2790.76	-229.44	0.00	0.00	0.00	-634.36	63.88	363.84
19	19	10.80	2790.77	-229.43	0.00	0.00	0.00	-634.38	63.87	363.85
19	20	11.48	2784.06	-43.18	0.00	0.00	0.00	-543.24	82.24	339.12

20	20	11.48	2784.05	-43.18	0.00	0.00	0.00	-543.25	82.24	339.12
20	21	12.15	2769.99	140.41	0.00	0.00	0.00	-580.57	73.54	348.08
21	21	12.15	2769.99	140.42	0.00	0.00	0.00	-580.57	73.54	348.08
21	22	12.82	2748.43	322.91	0.00	0.00	0.00	-744.61	38.13	390.23
22	22	12.82	2748.44	322.92	0.00	0.00	0.00	-744.61	38.13	390.23
22	23	13.50	2718.87	505.78	0.00	0.00	0.00	-1039.52	-24.89	466.67
23	23	13.50	2718.87	-788.47	0.00	0.00	0.00	-1039.51	-24.89	466.67
23	24	14.75	2687.22	-593.18	0.00	0.00	0.00	-304.88	197.04	360.05
24	24	14.75	2687.21	-593.18	0.00	0.00	0.00	-304.88	197.04	360.05
24	25	16.00	2650.93	-407.53	0.00	0.00	0.00	307.99	328.32	163.64
25	25	16.00	2650.93	-407.54	0.00	0.00	0.00	307.99	328.32	163.64
25	26	17.25	2610.30	-225.62	0.00	0.00	0.00	694.09	409.27	38.15
26	26	17.25	2610.31	-225.60	0.00	0.00	0.00	694.09	409.27	38.15
26	27	18.50	2565.67	-47.93	0.00	0.00	0.00	861.82	441.79	-19.01
27	27	18.50	2565.67	-47.93	0.00	0.00	0.00	861.82	441.79	-19.01
27	28	19.75	2557.66	-51.83	0.00	0.00	0.00	925.33	454.98	-39.78
28	28	19.75	2557.66	-51.86	0.00	0.00	0.00	925.33	454.98	-39.78
28	29	21.00	2547.66	-55.53	0.00	0.00	0.00	995.74	469.49	-62.92
29	29	21.00	2547.65	-55.48	0.00	0.00	0.00	995.70	469.48	-62.91
29	30	22.25	2535.63	-58.76	0.00	0.00	0.00	1072.87	485.27	-88.37
30	30	22.25	2535.64	-58.76	0.00	0.00	0.00	1072.85	485.27	-88.37
30	31	23.50	2521.60	-61.45	0.00	0.00	0.00	1156.17	502.22	-115.96
31	31	23.50	2521.59	-61.40	0.00	0.00	0.00	1156.20	502.23	-115.97
31	32	24.75	2505.55	-30.03	0.00	0.00	0.00	1239.22	518.92	-143.67
32	32	24.75	2505.55	-30.09	0.00	0.00	0.00	1239.23	518.92	-143.68
32	33	26.00	2487.50	2.22	0.00	0.00	0.00	1259.53	521.61	-151.84
33	33	26.00	2487.50	2.20	0.00	0.00	0.00	1259.51	521.61	-151.83
33	34	27.25	2504.56	33.11	0.00	0.00	0.00	1235.26	517.95	-142.53
34	34	27.25	2504.56	33.11	0.00	0.00	0.00	1235.26	517.95	-142.52
34	35	28.50	2520.92	63.05	0.00	0.00	0.00	1149.06	500.59	-113.79
35	35	28.50	2520.92	63.07	0.00	0.00	0.00	1149.07	500.59	-113.80
35	36	29.75	2535.17	58.92	0.00	0.00	0.00	1064.43	483.37	-85.76
36	36	29.75	2535.17	58.89	0.00	0.00	0.00	1064.45	483.38	-85.77
36	37	31.00	2547.32	54.15	0.00	0.00	0.00	987.97	467.74	-60.51
37	37	31.00	2547.32	54.13	0.00	0.00	0.00	987.95	467.74	-60.50
37	38	32.25	2557.39	48.97	0.00	0.00	0.00	920.16	453.81	-38.18
38	38	32.25	2557.39	49.01	0.00	0.00	0.00	920.15	453.81	-38.18
38	39	33.50	2565.38	43.61	0.00	0.00	0.00	861.13	441.61	-18.82
39	39	33.50	2565.38	43.60	0.00	0.00	0.00	861.12	441.61	-18.82
39	40	34.75	2610.96	223.33	0.00	0.00	0.00	697.62	410.11	37.11
40	40	34.75	2610.96	223.35	0.00	0.00	0.00	697.63	410.12	37.11
40	41	36.00	2652.39	407.50	0.00	0.00	0.00	313.22	329.61	162.13
41	41	36.00	2652.40	407.48	0.00	0.00	0.00	313.23	329.61	162.13

41	42	37.25	2689.30	595.51	0.00	0.00	0.00	-300.78	198.14	358.96
42	42	37.25	2689.29	595.52	0.00	0.00	0.00	-300.78	198.14	358.96
42	43	38.50	2721.37	793.31	0.00	0.00	0.00	-1039.64	-24.74	466.87
43	43	38.50	2721.37	-501.13	0.00	0.00	0.00	-1039.63	-24.74	466.87
43	44	39.17	2749.95	-323.20	0.00	0.00	0.00	-750.77	36.96	391.98
44	44	39.17	2749.95	-323.19	0.00	0.00	0.00	-750.78	36.96	391.98
44	45	39.85	2771.52	-140.35	0.00	0.00	0.00	-584.35	72.87	349.19
45	45	39.85	2771.51	-140.34	0.00	0.00	0.00	-584.36	72.86	349.19
45	46	40.53	2785.61	43.61	0.00	0.00	0.00	-546.72	81.63	340.16
46	46	40.53	2785.61	43.61	0.00	0.00	0.00	-546.71	81.63	340.15
46	47	41.20	2791.67	224.67	0.00	0.00	0.00	-635.14	63.78	364.12
47	47	41.20	2791.67	224.66	0.00	0.00	0.00	-635.13	63.78	364.11
47	48	41.88	2805.73	187.03	0.00	0.00	0.00	-771.92	36.49	401.51
48	48	41.88	2805.74	187.04	0.00	0.00	0.00	-771.93	36.49	401.51
48	49	42.55	2817.91	148.97	0.00	0.00	0.00	-882.96	14.39	431.92
49	49	42.55	2817.91	148.98	0.00	0.00	0.00	-882.97	14.39	431.92
49	50	43.22	2828.34	110.03	0.00	0.00	0.00	-969.25	-2.72	455.61
50	50	43.22	2828.34	110.03	0.00	0.00	0.00	-969.26	-2.72	455.61
50	51	43.90	2828.52	68.82	0.00	0.00	0.00	-1028.94	-15.04	471.51
51	51	43.90	2828.53	68.78	0.00	0.00	0.00	-1028.96	-15.04	471.52
51	52	44.58	2816.64	26.61	0.00	0.00	0.00	-1057.69	-21.81	478.34
52	52	44.58	2816.64	26.60	0.00	0.00	0.00	-1057.71	-21.82	478.34
52	53	45.25	2802.83	-14.46	0.00	0.00	0.00	-1056.70	-22.57	477.11
53	53	45.25	2802.83	-14.42	0.00	0.00	0.00	-1056.70	-22.57	477.11
53	54	45.92	2786.96	-54.82	0.00	0.00	0.00	-1027.17	-17.58	468.14
54	54	45.92	2786.96	-54.85	0.00	0.00	0.00	-1027.14	-17.57	468.13
54	55	46.60	2768.74	-95.00	0.00	0.00	0.00	-968.57	-6.74	451.27
55	55	46.60	2768.74	-94.99	0.00	0.00	0.00	-968.59	-6.74	451.27
55	56	47.28	2756.87	-100.49	0.00	0.00	0.00	-897.82	7.05	431.60
56	56	47.28	2756.87	-100.46	0.00	0.00	0.00	-897.81	7.06	431.60
56	57	47.95	2744.33	-105.40	0.00	0.00	0.00	-824.54	21.32	411.22
57	57	47.95	2744.33	-105.39	0.00	0.00	0.00	-824.54	21.32	411.22
57	58	48.63	2730.78	-109.86	0.00	0.00	0.00	-747.01	36.40	389.64
58	58	48.63	2730.78	-109.89	0.00	0.00	0.00	-747.03	36.40	389.64
58	59	49.30	2716.63	-113.68	0.00	0.00	0.00	-668.22	51.70	367.68
59	59	49.30	2716.63	-113.65	0.00	0.00	0.00	-668.23	51.70	367.68
59	60	49.97	2701.72	-116.82	0.00	0.00	0.00	-587.70	67.30	345.20
60	60	49.97	2701.72	-116.83	0.00	0.00	0.00	-587.70	67.30	345.20
60	61	50.65	2688.82	-111.29	0.00	0.00	0.00	-505.88	83.31	322.52
61	61	50.65	2688.82	-111.28	0.00	0.00	0.00	-505.87	83.31	322.52
61	62	51.33	2686.20	-77.07	0.00	0.00	0.00	-441.23	96.49	305.13
62	62	51.33	2686.20	-77.09	0.00	0.00	0.00	-441.23	96.49	305.13
62	63	52.00	2683.62	-43.37	0.00	0.00	0.00	-400.43	104.74	294.09

Título: Fecha : 01/12/99

Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + TEMPERATURA x 0.2 + SOBRECARGA 1 x 0.5 + PRETENSADO FINAL X 0.9

H001 1 + H002 1 + H003 0.2 + H005 0.9 + H006 0.555

(TENSION MINIMA 0. T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
+ (FCTEMP.ANL * 0.2) + (FPREFI.ANL * 0.9)
+ (SOBRECL.ANL * 0.555)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	15.61	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	49.83	0.00	0.00	0.00	-421.98	100.48	300.02
4	4	0.68	2686.40	49.84	0.00	0.00	0.00	-421.98	100.48	300.02
4	5	1.35	2688.98	83.55	0.00	0.00	0.00	-467.23	91.31	312.25
5	5	1.35	2688.97	83.55	0.00	0.00	0.00	-467.25	91.30	312.25
5	6	2.03	2701.57	90.00	0.00	0.00	0.00	-530.33	79.14	329.92
6	6	2.03	2701.58	89.99	0.00	0.00	0.00	-530.34	79.14	329.93
6	7	2.70	2716.13	88.01	0.00	0.00	0.00	-593.13	67.18	347.65
7	7	2.70	2716.13	88.02	0.00	0.00	0.00	-593.14	67.18	347.66
7	8	3.38	2730.15	85.39	0.00	0.00	0.00	-655.93	55.18	365.35
8	8	3.38	2730.15	85.40	0.00	0.00	0.00	-655.91	55.19	365.35
8	9	4.05	2743.20	82.22	0.00	0.00	0.00	-716.19	43.64	382.30
9	9	4.05	2743.20	82.22	0.00	0.00	0.00	-716.18	43.64	382.30
9	10	4.72	2755.47	78.54	0.00	0.00	0.00	-774.24	32.50	398.61
10	10	4.72	2755.48	78.52	0.00	0.00	0.00	-774.23	32.50	398.61
10	11	5.40	2767.11	74.30	0.00	0.00	0.00	-830.38	21.71	414.37
11	11	5.40	2767.10	74.31	0.00	0.00	0.00	-830.39	21.70	414.37
11	12	6.07	2785.45	33.62	0.00	0.00	0.00	-874.27	13.92	427.33
12	12	6.07	2785.44	33.64	0.00	0.00	0.00	-874.27	13.92	427.33
12	13	6.75	2801.89	-8.54	0.00	0.00	0.00	-889.44	11.93	432.52
13	13	6.75	2801.88	-8.56	0.00	0.00	0.00	-889.43	11.93	432.52
13	14	7.43	2816.13	-51.45	0.00	0.00	0.00	-874.27	16.06	429.48
14	14	7.43	2816.13	-51.44	0.00	0.00	0.00	-874.28	16.06	429.48
14	15	8.10	2827.99	-94.22	0.00	0.00	0.00	-829.21	26.20	418.31
15	15	8.10	2828.00	-94.20	0.00	0.00	0.00	-829.23	26.20	418.32
15	16	8.77	2828.28	-136.08	0.00	0.00	0.00	-753.20	41.93	398.10
16	16	8.77	2828.28	-136.08	0.00	0.00	0.00	-753.22	41.93	398.11
16	17	9.45	2817.53	-176.81	0.00	0.00	0.00	-647.30	63.07	369.16
17	17	9.45	2817.53	-176.83	0.00	0.00	0.00	-647.30	63.07	369.16
17	18	10.13	2804.93	-216.62	0.00	0.00	0.00	-515.07	89.52	333.08
18	18	10.13	2804.93	-216.64	0.00	0.00	0.00	-515.09	89.52	333.09
18	19	10.80	2790.76	-254.80	0.00	0.00	0.00	-360.34	120.51	290.91
19	19	10.80	2790.77	-254.79	0.00	0.00	0.00	-360.36	120.51	290.91
19	20	11.48	2784.06	-68.55	0.00	0.00	0.00	-251.97	142.44	261.59

20	20	11.48	2784.05	-68.55	0.00	0.00	0.00	-251.98	142.44	261.59
20	21	12.15	2769.99	115.04	0.00	0.00	0.00	-272.30	137.26	266.02
21	21	12.15	2769.99	115.05	0.00	0.00	0.00	-272.30	137.26	266.02
21	22	12.82	2748.43	297.54	0.00	0.00	0.00	-419.34	105.36	303.65
22	22	12.82	2748.44	297.55	0.00	0.00	0.00	-419.34	105.36	303.65
22	23	13.50	2718.87	480.41	0.00	0.00	0.00	-697.00	45.91	375.49
23	23	13.50	2718.87	-644.17	0.00	0.00	0.00	-696.99	45.91	375.49
23	24	14.75	2687.22	-459.98	0.00	0.00	0.00	-135.79	234.24	306.85
24	24	14.75	2687.21	-459.98	0.00	0.00	0.00	-135.79	234.24	306.85
24	25	16.00	2650.93	-285.43	0.00	0.00	0.00	317.52	330.41	160.64
25	25	16.00	2650.93	-285.43	0.00	0.00	0.00	317.52	330.41	160.64
25	26	17.25	2610.30	-114.61	0.00	0.00	0.00	557.92	379.31	81.00
26	26	17.25	2610.31	-114.61	0.00	0.00	0.00	557.92	379.31	81.00
26	27	18.50	2565.67	51.97	0.00	0.00	0.00	593.85	382.83	65.31
27	27	18.50	2565.67	51.97	0.00	0.00	0.00	593.85	382.83	65.31
27	28	19.75	2557.66	36.97	0.00	0.00	0.00	539.42	370.07	81.65
28	28	19.75	2557.66	36.94	0.00	0.00	0.00	539.41	370.07	81.65
28	29	21.00	2547.66	22.18	0.00	0.00	0.00	505.76	361.68	91.26
29	29	21.00	2547.65	22.22	0.00	0.00	0.00	505.72	361.67	91.27
29	30	22.25	2535.63	7.84	0.00	0.00	0.00	492.70	357.62	94.19
30	30	22.25	2535.64	7.84	0.00	0.00	0.00	492.68	357.62	94.19
30	31	23.50	2521.60	-5.95	0.00	0.00	0.00	499.70	357.78	90.60
31	31	23.50	2521.59	-5.91	0.00	0.00	0.00	499.72	357.79	90.59
31	32	24.75	2505.55	-2.29	0.00	0.00	0.00	523.08	361.35	81.67
32	32	24.75	2505.55	-2.35	0.00	0.00	0.00	523.10	361.35	81.66
32	33	26.00	2487.50	2.21	0.00	0.00	0.00	530.90	361.30	77.43
33	33	26.00	2487.50	2.20	0.00	0.00	0.00	530.88	361.29	77.44
33	34	27.25	2504.56	5.36	0.00	0.00	0.00	519.12	360.38	82.82
34	34	27.25	2504.56	5.35	0.00	0.00	0.00	519.12	360.38	82.82
34	35	28.50	2520.92	7.54	0.00	0.00	0.00	492.58	356.15	92.78
35	35	28.50	2520.92	7.56	0.00	0.00	0.00	492.60	356.15	92.77
35	36	29.75	2535.17	-7.69	0.00	0.00	0.00	484.26	355.72	96.79
36	36	29.75	2535.17	-7.73	0.00	0.00	0.00	484.28	355.72	96.79
36	37	31.00	2547.32	-23.56	0.00	0.00	0.00	498.00	359.94	93.67
37	37	31.00	2547.32	-23.56	0.00	0.00	0.00	497.98	359.93	93.67
37	38	32.25	2557.39	-39.81	0.00	0.00	0.00	534.24	368.90	83.25
38	38	32.25	2557.39	-39.80	0.00	0.00	0.00	534.24	368.90	83.25
38	39	33.50	2565.38	-56.29	0.00	0.00	0.00	593.15	382.65	65.50
39	39	33.50	2565.38	-56.30	0.00	0.00	0.00	593.15	382.65	65.50
39	40	34.75	2610.96	112.33	0.00	0.00	0.00	561.45	380.15	79.95
40	40	34.75	2610.96	112.35	0.00	0.00	0.00	561.46	380.16	79.95
40	41	36.00	2652.39	285.40	0.00	0.00	0.00	322.75	331.71	159.14
41	41	36.00	2652.40	285.38	0.00	0.00	0.00	322.76	331.71	159.14

41	42	37.25	2689.30	462.32	0.00	0.00	0.00	-131.69	235.35	305.76
42	42	37.25	2689.29	462.32	0.00	0.00	0.00	-131.69	235.35	305.76
42	43	38.50	2721.37	649.01	0.00	0.00	0.00	-697.11	46.06	375.70
43	43	38.50	2721.37	-475.75	0.00	0.00	0.00	-697.11	46.06	375.70
43	44	39.17	2749.95	-297.83	0.00	0.00	0.00	-425.25	104.24	305.33
44	44	39.17	2749.95	-297.82	0.00	0.00	0.00	-425.26	104.24	305.33
44	45	39.85	2771.52	-114.98	0.00	0.00	0.00	-276.08	136.58	267.13
45	45	39.85	2771.51	-114.97	0.00	0.00	0.00	-276.09	136.58	267.13
45	46	40.53	2785.61	68.98	0.00	0.00	0.00	-255.71	141.78	262.69
46	46	40.53	2785.61	68.98	0.00	0.00	0.00	-255.70	141.78	262.69
46	47	41.20	2791.67	250.03	0.00	0.00	0.00	-361.12	120.41	291.18
47	47	41.20	2791.67	250.04	0.00	0.00	0.00	-361.12	120.41	291.17
47	48	41.88	2805.73	212.41	0.00	0.00	0.00	-515.16	89.56	333.16
48	48	41.88	2805.74	212.40	0.00	0.00	0.00	-515.16	89.56	333.16
48	49	42.55	2817.91	174.34	0.00	0.00	0.00	-643.20	63.94	368.09
49	49	42.55	2817.91	174.35	0.00	0.00	0.00	-643.21	63.94	368.10
49	50	43.22	2828.34	135.40	0.00	0.00	0.00	-746.48	43.33	396.31
50	50	43.22	2828.34	135.39	0.00	0.00	0.00	-746.50	43.32	396.32
50	51	43.90	2828.52	94.18	0.00	0.00	0.00	-823.43	27.44	416.81
51	51	43.90	2828.53	94.16	0.00	0.00	0.00	-823.44	27.43	416.81
51	52	44.58	2816.64	51.99	0.00	0.00	0.00	-869.44	17.10	428.23
52	52	44.58	2816.64	52.00	0.00	0.00	0.00	-869.44	17.10	428.23
52	53	45.25	2802.83	10.94	0.00	0.00	0.00	-885.45	12.82	431.52
53	53	45.25	2802.83	10.95	0.00	0.00	0.00	-885.45	12.82	431.52
53	54	45.92	2786.96	-29.45	0.00	0.00	0.00	-872.90	14.31	427.07
54	54	45.92	2786.96	-29.48	0.00	0.00	0.00	-872.88	14.31	427.07
54	55	46.60	2768.74	-69.63	0.00	0.00	0.00	-831.56	21.58	414.80
55	55	46.60	2768.74	-69.62	0.00	0.00	0.00	-831.58	21.57	414.80
55	56	47.28	2756.87	-75.11	0.00	0.00	0.00	-778.06	31.81	399.73
56	56	47.28	2756.87	-75.10	0.00	0.00	0.00	-778.07	31.81	399.73
56	57	47.95	2744.33	-80.04	0.00	0.00	0.00	-721.77	42.56	383.87
57	57	47.95	2744.33	-80.03	0.00	0.00	0.00	-721.79	42.56	383.87
57	58	48.63	2730.78	-84.49	0.00	0.00	0.00	-661.51	54.07	366.88
58	58	48.63	2730.78	-84.52	0.00	0.00	0.00	-661.52	54.07	366.88
58	59	49.30	2716.63	-88.31	0.00	0.00	0.00	-599.72	65.86	349.44
59	59	49.30	2716.63	-88.28	0.00	0.00	0.00	-599.72	65.85	349.44
59	60	49.97	2701.72	-91.45	0.00	0.00	0.00	-536.20	77.94	331.49
60	60	49.97	2701.72	-91.45	0.00	0.00	0.00	-536.19	77.94	331.49
60	61	50.65	2688.82	-85.92	0.00	0.00	0.00	-471.62	90.39	313.40
61	61	50.65	2688.82	-85.90	0.00	0.00	0.00	-471.61	90.39	313.40
61	62	51.33	2686.20	-51.70	0.00	0.00	0.00	-424.23	100.00	300.60
62	62	51.33	2686.20	-51.71	0.00	0.00	0.00	-424.23	100.00	300.60
62	63	52.00	2683.62	-18.00	0.00	0.00	0.00	-400.43	104.74	294.09

Título: Fecha : 01/12/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + TEMPERATURA x 0.6 + SOBRECARGA 2 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H003 0.6 + H005 0.9 + H007 1.11

(TENSION MINIMA -244 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FCTEMP.ANL * 0.6) + (FPREFI.ANL * 0.9)
 + (SOBREC2.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-187.79	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	-141.49	0.00	0.00	0.00	-287.78	128.22	264.30
4	4	0.68	2686.40	-141.49	0.00	0.00	0.00	-287.78	128.22	264.30
4	5	1.35	2688.98	-95.89	0.00	0.00	0.00	-208.83	144.71	243.46
5	5	1.35	2688.97	-95.85	0.00	0.00	0.00	-208.85	144.71	243.47
5	6	2.03	2701.57	-77.32	0.00	0.00	0.00	-154.03	156.92	229.76
6	6	2.03	2701.58	-77.36	0.00	0.00	0.00	-154.04	156.92	229.76
6	7	2.70	2716.13	-67.44	0.00	0.00	0.00	-108.69	167.31	218.71
7	7	2.70	2716.13	-67.42	0.00	0.00	0.00	-108.70	167.31	218.71
7	8	3.38	2730.15	-57.97	0.00	0.00	0.00	-69.91	176.30	209.36
8	8	3.38	2730.15	-57.97	0.00	0.00	0.00	-69.89	176.31	209.36
8	9	4.05	2743.20	-61.15	0.00	0.00	0.00	-34.10	184.62	200.74
9	9	4.05	2743.20	-61.15	0.00	0.00	0.00	-34.10	184.62	200.74
9	10	4.72	2755.47	-9.33	0.00	0.00	0.00	-16.64	189.08	196.95
10	10	4.72	2755.48	-9.35	0.00	0.00	0.00	-16.63	189.08	196.95
10	11	5.40	2767.11	-13.57	0.00	0.00	0.00	-13.04	190.64	196.81
11	11	5.40	2767.10	-13.58	0.00	0.00	0.00	-13.04	190.64	196.81
11	12	6.07	2785.45	1.23	0.00	0.00	0.00	-4.72	193.64	195.87
12	12	6.07	2785.44	1.30	0.00	0.00	0.00	-4.72	193.64	195.87
12	13	6.75	2801.89	-40.89	0.00	0.00	0.00	2.13	196.21	195.20
13	13	6.75	2801.88	-40.92	0.00	0.00	0.00	2.13	196.21	195.20
13	14	7.43	2816.13	-83.80	0.00	0.00	0.00	39.29	204.88	186.30
14	14	7.43	2816.13	-83.83	0.00	0.00	0.00	39.28	204.88	186.30
14	15	8.10	2827.99	-71.12	0.00	0.00	0.00	75.81	213.26	177.41
15	15	8.10	2828.00	-71.04	0.00	0.00	0.00	75.80	213.26	177.41
15	16	8.77	2828.28	-112.92	0.00	0.00	0.00	136.32	225.78	161.32
16	16	8.77	2828.28	-112.95	0.00	0.00	0.00	136.30	225.78	161.33
16	17	9.45	2817.53	-98.19	0.00	0.00	0.00	209.54	240.17	141.08
17	17	9.45	2817.53	-98.15	0.00	0.00	0.00	209.57	240.17	141.07
17	18	10.13	2804.93	-137.95	0.00	0.00	0.00	288.29	255.56	119.24
18	18	10.13	2804.93	-138.00	0.00	0.00	0.00	288.29	255.56	119.24
18	19	10.80	2790.76	-164.27	0.00	0.00	0.00	386.37	274.84	92.14
19	19	10.80	2790.77	-164.26	0.00	0.00	0.00	386.36	274.84	92.15
19	20	11.48	2784.06	34.06	0.00	0.00	0.00	429.08	283.20	80.31

20	20	11.48	2784.05	34.06	0.00	0.00	0.00	429.06	283.20	80.31
20	21	12.15	2769.99	229.56	0.00	0.00	0.00	336.01	262.99	104.10
21	21	12.15	2769.99	229.56	0.00	0.00	0.00	336.00	262.98	104.10
21	22	12.82	2748.43	423.94	0.00	0.00	0.00	108.26	214.41	163.21
22	22	12.82	2748.44	423.95	0.00	0.00	0.00	108.26	214.41	163.21
22	23	13.50	2718.87	618.89	0.00	0.00	0.00	-259.46	136.34	259.03
23	23	13.50	2718.87	-512.66	0.00	0.00	0.00	-259.46	136.34	259.03
23	24	14.75	2687.22	-339.57	0.00	0.00	0.00	144.29	295.86	218.71
24	24	14.75	2687.21	-339.57	0.00	0.00	0.00	144.29	295.86	218.71
24	25	16.00	2650.93	-176.11	0.00	0.00	0.00	454.03	360.45	117.68
25	25	16.00	2650.93	-176.11	0.00	0.00	0.00	454.03	360.45	117.68
25	26	17.25	2610.30	-16.39	0.00	0.00	0.00	564.73	380.81	78.86
26	26	17.25	2610.31	-16.40	0.00	0.00	0.00	564.73	380.81	78.86
26	27	18.50	2565.67	139.07	0.00	0.00	0.00	484.83	358.84	99.61
27	27	18.50	2565.67	139.08	0.00	0.00	0.00	484.83	358.84	99.61
27	28	19.75	2557.66	112.98	0.00	0.00	0.00	328.46	323.65	148.03
28	28	19.75	2557.66	112.96	0.00	0.00	0.00	328.45	323.65	148.03
28	29	21.00	2547.66	87.10	0.00	0.00	0.00	206.72	295.88	185.35
29	29	21.00	2547.65	87.13	0.00	0.00	0.00	206.68	295.87	185.36
29	30	22.25	2535.63	61.64	0.00	0.00	0.00	119.45	275.50	211.63
30	30	22.25	2535.64	61.65	0.00	0.00	0.00	119.43	275.50	211.64
30	31	23.50	2521.60	36.77	0.00	0.00	0.00	66.14	262.39	227.03
31	31	23.50	2521.59	36.80	0.00	0.00	0.00	66.17	262.40	227.02
31	32	24.75	2505.55	12.67	0.00	0.00	0.00	45.84	256.35	231.84
32	32	24.75	2505.55	12.61	0.00	0.00	0.00	45.86	256.35	231.83
32	33	26.00	2487.50	-10.58	0.00	0.00	0.00	57.16	257.06	226.50
33	33	26.00	2487.50	-10.58	0.00	0.00	0.00	57.13	257.06	226.51
33	34	27.25	2504.56	-35.18	0.00	0.00	0.00	73.87	262.42	222.92
34	34	27.25	2504.56	-35.20	0.00	0.00	0.00	73.85	262.41	222.93
34	35	28.50	2520.92	-60.76	0.00	0.00	0.00	122.97	274.83	209.08
35	35	28.50	2520.92	-60.74	0.00	0.00	0.00	122.99	274.83	209.07
35	36	29.75	2535.17	-87.09	0.00	0.00	0.00	206.95	294.71	184.05
36	36	29.75	2535.17	-87.14	0.00	0.00	0.00	206.95	294.71	184.05
36	37	31.00	2547.32	-114.08	0.00	0.00	0.00	326.87	322.29	147.51
37	37	31.00	2547.32	-114.04	0.00	0.00	0.00	326.85	322.28	147.52
37	38	32.25	2557.39	-141.39	0.00	0.00	0.00	483.16	357.66	99.32
38	38	32.25	2557.39	-141.39	0.00	0.00	0.00	483.15	357.66	99.33
38	39	33.50	2565.38	-168.99	0.00	0.00	0.00	675.99	400.87	39.43
39	39	33.50	2565.38	-168.99	0.00	0.00	0.00	675.99	400.87	39.43
39	40	34.75	2610.96	-11.46	0.00	0.00	0.00	792.09	430.90	7.38
40	40	34.75	2610.96	-11.44	0.00	0.00	0.00	792.10	430.90	7.38
40	41	36.00	2652.39	150.51	0.00	0.00	0.00	715.07	418.02	35.69
41	41	36.00	2652.40	150.50	0.00	0.00	0.00	715.07	418.03	35.69

41	42	37.25	2689.30	316.34	0.00	0.00	0.00	436.17	360.29	127.08
42	42	37.25	2689.29	316.34	0.00	0.00	0.00	436.17	360.29	127.08
42	43	38.50	2721.37	491.92	0.00	0.00	0.00	60.18	202.58	174.12
43	43	38.50	2721.37	-419.65	0.00	0.00	0.00	60.18	202.58	174.12
43	44	39.17	2749.95	-241.73	0.00	0.00	0.00	294.46	253.00	113.76
44	44	39.17	2749.95	-241.73	0.00	0.00	0.00	294.46	253.00	113.76
44	45	39.85	2771.52	-58.89	0.00	0.00	0.00	405.48	277.45	85.71
45	45	39.85	2771.51	-58.87	0.00	0.00	0.00	405.48	277.45	85.71
45	46	40.53	2785.61	125.08	0.00	0.00	0.00	387.70	274.76	91.43
46	46	40.53	2785.61	125.07	0.00	0.00	0.00	387.71	274.76	91.43
46	47	41.20	2791.67	306.13	0.00	0.00	0.00	244.72	245.63	129.91
47	47	41.20	2791.67	306.14	0.00	0.00	0.00	244.72	245.63	129.91
47	48	41.88	2805.73	268.51	0.00	0.00	0.00	52.52	206.89	182.05
48	48	41.88	2805.74	268.49	0.00	0.00	0.00	52.52	206.89	182.05
48	49	42.55	2817.91	230.42	0.00	0.00	0.00	-113.09	173.51	226.99
49	49	42.55	2817.91	230.45	0.00	0.00	0.00	-113.11	173.51	226.99
49	50	43.22	2828.34	191.50	0.00	0.00	0.00	-253.96	145.12	265.21
50	50	43.22	2828.34	191.48	0.00	0.00	0.00	-253.98	145.12	265.22
50	51	43.90	2828.52	150.27	0.00	0.00	0.00	-369.06	121.35	295.86
51	51	43.90	2828.53	150.27	0.00	0.00	0.00	-369.07	121.34	295.87
51	52	44.58	2816.64	108.09	0.00	0.00	0.00	-453.22	103.12	317.44
52	52	44.58	2816.64	108.12	0.00	0.00	0.00	-453.20	103.13	317.43
52	53	45.25	2802.83	67.06	0.00	0.00	0.00	-506.82	91.08	330.74
53	53	45.25	2802.83	67.05	0.00	0.00	0.00	-506.81	91.08	330.74
53	54	45.92	2786.96	26.65	0.00	0.00	0.00	-531.84	84.80	336.29
54	54	45.92	2786.96	26.62	0.00	0.00	0.00	-531.80	84.81	336.28
54	55	46.60	2768.74	-13.53	0.00	0.00	0.00	-528.65	84.18	334.17
55	55	46.60	2768.74	-13.51	0.00	0.00	0.00	-528.66	84.18	334.17
55	56	47.28	2756.87	-19.00	0.00	0.00	0.00	-513.29	86.53	329.25
56	56	47.28	2756.87	-19.03	0.00	0.00	0.00	-513.30	86.53	329.25
56	57	47.95	2744.33	-23.97	0.00	0.00	0.00	-494.58	89.52	323.39
57	57	47.95	2744.33	-23.94	0.00	0.00	0.00	-494.60	89.52	323.40
57	58	48.63	2730.78	-28.41	0.00	0.00	0.00	-472.47	93.15	316.56
58	58	48.63	2730.78	-28.43	0.00	0.00	0.00	-472.48	93.14	316.56
58	59	49.30	2716.63	-32.23	0.00	0.00	0.00	-448.27	97.16	309.13
59	59	49.30	2716.63	-32.18	0.00	0.00	0.00	-448.26	97.16	309.13
59	60	49.97	2701.72	-35.35	0.00	0.00	0.00	-422.33	101.48	301.18
60	60	49.97	2701.72	-35.34	0.00	0.00	0.00	-422.32	101.48	301.18
60	61	50.65	2688.82	-29.81	0.00	0.00	0.00	-395.90	106.04	293.25
61	61	50.65	2688.82	-29.80	0.00	0.00	0.00	-395.89	106.04	293.24
61	62	51.33	2686.20	4.40	0.00	0.00	0.00	-386.64	107.77	290.60
62	62	51.33	2686.20	4.39	0.00	0.00	0.00	-386.64	107.77	290.60
62	63	52.00	2683.62	38.10	0.00	0.00	0.00	-400.43	104.74	294.09

Título: Fecha : 01/12/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + TEMPERATURA x 0.2 + SOBRECARGA 2 x 0.5 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H003 0.2 + H005 0.9 + H007 0.555

(TENSION MINIMA 0 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FCTEMP.ANL * 0.2) + (FPREFI.ANL * 0.9)
 + (SOBREC2.ANL * 0.555)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-98.77	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	-58.52	0.00	0.00	0.00	-346.25	116.13	279.86
4	4	0.68	2686.40	-58.51	0.00	0.00	0.00	-346.25	116.13	279.86
4	5	1.35	2688.98	-18.86	0.00	0.00	0.00	-320.90	121.55	273.30
5	5	1.35	2688.97	-18.84	0.00	0.00	0.00	-320.92	121.55	273.30
5	6	2.03	2701.57	-6.35	0.00	0.00	0.00	-316.43	123.35	272.98
6	6	2.03	2701.58	-6.37	0.00	0.00	0.00	-316.44	123.35	272.99
6	7	2.70	2716.13	-2.40	0.00	0.00	0.00	-316.66	124.32	274.06
7	7	2.70	2716.13	-2.39	0.00	0.00	0.00	-316.67	124.32	274.07
7	8	3.38	2730.15	1.02	0.00	0.00	0.00	-320.04	124.60	275.94
8	8	3.38	2730.15	1.02	0.00	0.00	0.00	-320.02	124.61	275.94
8	9	4.05	2743.20	-2.16	0.00	0.00	0.00	-323.76	124.75	277.85
9	9	4.05	2743.20	-2.15	0.00	0.00	0.00	-323.76	124.75	277.84
9	10	4.72	2755.47	21.92	0.00	0.00	0.00	-335.57	123.17	281.84
10	10	4.72	2755.48	21.90	0.00	0.00	0.00	-335.55	123.17	281.84
10	11	5.40	2767.11	17.68	0.00	0.00	0.00	-353.20	120.33	287.35
11	11	5.40	2767.10	17.67	0.00	0.00	0.00	-353.22	120.33	287.36
11	12	6.07	2785.45	4.74	0.00	0.00	0.00	-362.49	119.70	291.11
12	12	6.07	2785.44	4.79	0.00	0.00	0.00	-362.49	119.69	291.10
12	13	6.75	2801.89	-37.40	0.00	0.00	0.00	-358.02	121.77	291.06
13	13	6.75	2801.88	-37.43	0.00	0.00	0.00	-358.02	121.77	291.06
13	14	7.43	2816.13	-80.32	0.00	0.00	0.00	-323.23	129.95	282.80
14	14	7.43	2816.13	-80.32	0.00	0.00	0.00	-323.24	129.95	282.80
14	15	8.10	2827.99	-95.35	0.00	0.00	0.00	-273.95	140.97	270.51
15	15	8.10	2828.00	-95.30	0.00	0.00	0.00	-273.95	140.97	270.51
15	16	8.77	2828.28	-137.18	0.00	0.00	0.00	-197.19	156.85	250.10
16	16	8.77	2828.28	-137.20	0.00	0.00	0.00	-197.20	156.85	250.10
16	17	9.45	2817.53	-150.18	0.00	0.00	0.00	-99.01	176.39	223.21
17	17	9.45	2817.53	-150.17	0.00	0.00	0.00	-98.99	176.40	223.21
17	18	10.13	2804.93	-189.97	0.00	0.00	0.00	15.12	199.10	191.95
18	18	10.13	2804.93	-190.00	0.00	0.00	0.00	15.11	199.10	191.95
18	19	10.80	2790.76	-222.22	0.00	0.00	0.00	150.02	225.99	155.06
19	19	10.80	2790.77	-222.21	0.00	0.00	0.00	150.01	225.99	155.06
19	20	11.48	2784.06	-29.93	0.00	0.00	0.00	234.19	242.92	132.18

20	20	11.48	2784.05	-29.93	0.00	0.00	0.00	234.17	242.92	132.19
20	21	12.15	2769.99	159.62	0.00	0.00	0.00	185.99	231.98	144.03
21	21	12.15	2769.99	159.62	0.00	0.00	0.00	185.98	231.98	144.03
21	22	12.82	2748.43	348.05	0.00	0.00	0.00	7.10	193.50	190.14
22	22	12.82	2748.44	348.06	0.00	0.00	0.00	7.10	193.50	190.14
22	23	13.50	2718.87	536.96	0.00	0.00	0.00	-306.96	126.52	271.67
23	23	13.50	2718.87	-506.26	0.00	0.00	0.00	-306.96	126.52	271.67
23	24	14.75	2687.22	-333.18	0.00	0.00	0.00	88.79	283.65	236.18
24	24	14.75	2687.21	-333.18	0.00	0.00	0.00	88.79	283.65	236.18
24	25	16.00	2650.93	-169.72	0.00	0.00	0.00	390.54	346.48	137.66
25	25	16.00	2650.93	-169.72	0.00	0.00	0.00	390.54	346.48	137.66
25	26	17.25	2610.30	-10.00	0.00	0.00	0.00	493.24	365.08	101.35
26	26	17.25	2610.31	-10.01	0.00	0.00	0.00	493.24	365.08	101.35
26	27	18.50	2565.67	145.47	0.00	0.00	0.00	405.35	341.36	124.62
27	27	18.50	2565.67	145.48	0.00	0.00	0.00	405.35	341.36	124.62
27	28	19.75	2557.66	119.38	0.00	0.00	0.00	240.99	304.41	175.55
28	28	19.75	2557.66	119.36	0.00	0.00	0.00	240.97	304.40	175.56
28	29	21.00	2547.66	93.49	0.00	0.00	0.00	111.25	274.88	215.39
29	29	21.00	2547.65	93.52	0.00	0.00	0.00	111.21	274.87	215.40
29	30	22.25	2535.63	68.04	0.00	0.00	0.00	15.99	252.74	244.19
30	30	22.25	2535.64	68.05	0.00	0.00	0.00	15.97	252.73	244.19
30	31	23.50	2521.60	43.16	0.00	0.00	0.00	-45.32	237.87	262.10
31	31	23.50	2521.59	43.19	0.00	0.00	0.00	-45.29	237.87	262.09
31	32	24.75	2505.55	19.06	0.00	0.00	0.00	-73.61	230.07	269.42
32	32	24.75	2505.55	19.00	0.00	0.00	0.00	-73.59	230.07	269.42
32	33	26.00	2487.50	-4.19	0.00	0.00	0.00	-70.29	229.02	266.61
33	33	26.00	2487.50	-4.19	0.00	0.00	0.00	-70.31	229.02	266.61
33	34	27.25	2504.56	-28.79	0.00	0.00	0.00	-61.57	232.62	265.54
34	34	27.25	2504.56	-28.81	0.00	0.00	0.00	-61.59	232.61	265.54
34	35	28.50	2520.92	-54.37	0.00	0.00	0.00	-20.46	243.27	254.21
35	35	28.50	2520.92	-54.35	0.00	0.00	0.00	-20.45	243.27	254.21
35	36	29.75	2535.17	-80.69	0.00	0.00	0.00	55.53	261.39	231.70
36	36	29.75	2535.17	-80.74	0.00	0.00	0.00	55.53	261.39	231.70
36	37	31.00	2547.32	-107.68	0.00	0.00	0.00	167.45	287.21	197.68
37	37	31.00	2547.32	-107.65	0.00	0.00	0.00	167.43	287.21	197.68
37	38	32.25	2557.39	-135.00	0.00	0.00	0.00	315.75	320.83	152.00
38	38	32.25	2557.39	-135.00	0.00	0.00	0.00	315.74	320.83	152.01
38	39	33.50	2565.38	-162.59	0.00	0.00	0.00	500.58	362.28	94.63
39	39	33.50	2565.38	-162.59	0.00	0.00	0.00	500.58	362.28	94.63
39	40	34.75	2610.96	-5.07	0.00	0.00	0.00	608.69	390.55	65.09
40	40	34.75	2610.96	-5.05	0.00	0.00	0.00	608.70	390.55	65.09
40	41	36.00	2652.39	156.91	0.00	0.00	0.00	523.67	375.91	95.92
41	41	36.00	2652.40	156.90	0.00	0.00	0.00	523.68	375.92	95.91

41	42	37.25	2689.30	322.73	0.00	0.00	0.00	236.78	316.42	189.82
42	42	37.25	2689.29	322.73	0.00	0.00	0.00	236.78	316.42	189.82
42	43	38.50	2721.37	498.32	0.00	0.00	0.00	-147.20	159.71	229.32
43	43	38.50	2721.37	-435.02	0.00	0.00	0.00	-147.20	159.71	229.32
43	44	39.17	2749.95	-257.09	0.00	0.00	0.00	97.36	212.26	166.22
44	44	39.17	2749.95	-257.09	0.00	0.00	0.00	97.36	212.26	166.22
44	45	39.85	2771.52	-74.25	0.00	0.00	0.00	218.83	238.87	135.39
45	45	39.85	2771.51	-74.23	0.00	0.00	0.00	218.83	238.87	135.39
45	46	40.53	2785.61	109.72	0.00	0.00	0.00	211.50	238.34	138.33
46	46	40.53	2785.61	109.71	0.00	0.00	0.00	211.51	238.34	138.33
46	47	41.20	2791.67	290.76	0.00	0.00	0.00	78.81	211.34	174.07
47	47	41.20	2791.67	290.77	0.00	0.00	0.00	78.81	211.34	174.07
47	48	41.88	2805.73	253.14	0.00	0.00	0.00	-102.93	174.76	223.43
48	48	41.88	2805.74	253.13	0.00	0.00	0.00	-102.93	174.76	223.43
48	49	42.55	2817.91	215.06	0.00	0.00	0.00	-258.26	143.51	265.63
49	49	42.55	2817.91	215.08	0.00	0.00	0.00	-258.28	143.50	265.63
49	50	43.22	2828.34	176.13	0.00	0.00	0.00	-388.83	117.25	301.11
50	50	43.22	2828.34	176.12	0.00	0.00	0.00	-388.85	117.24	301.12
50	51	43.90	2828.52	134.91	0.00	0.00	0.00	-493.49	95.63	328.98
51	51	43.90	2828.53	134.91	0.00	0.00	0.00	-493.50	95.63	328.99
51	52	44.58	2816.64	92.73	0.00	0.00	0.00	-567.20	79.56	347.78
52	52	44.58	2816.64	92.76	0.00	0.00	0.00	-567.19	79.57	347.77
52	53	45.25	2802.83	51.70	0.00	0.00	0.00	-610.51	69.65	358.34
53	53	45.25	2802.83	51.68	0.00	0.00	0.00	-610.50	69.65	358.34
53	54	45.92	2786.96	11.28	0.00	0.00	0.00	-625.24	65.50	361.15
54	54	45.92	2786.96	11.26	0.00	0.00	0.00	-625.21	65.50	361.14
54	55	46.60	2768.74	-28.89	0.00	0.00	0.00	-611.61	67.04	356.25
55	55	46.60	2768.74	-28.87	0.00	0.00	0.00	-611.62	67.04	356.25
55	56	47.28	2756.87	-34.36	0.00	0.00	0.00	-585.80	71.54	348.55
56	56	47.28	2756.87	-34.39	0.00	0.00	0.00	-585.81	71.54	348.55
56	57	47.95	2744.33	-39.33	0.00	0.00	0.00	-556.79	76.66	339.95
57	57	47.95	2744.33	-39.30	0.00	0.00	0.00	-556.81	76.66	339.96
57	58	48.63	2730.78	-43.77	0.00	0.00	0.00	-524.24	82.44	330.34
58	58	48.63	2730.78	-43.79	0.00	0.00	0.00	-524.25	82.44	330.34
58	59	49.30	2716.63	-47.59	0.00	0.00	0.00	-489.74	88.59	320.17
59	59	49.30	2716.63	-47.54	0.00	0.00	0.00	-489.74	88.59	320.17
59	60	49.97	2701.72	-50.71	0.00	0.00	0.00	-453.51	95.03	309.48
60	60	49.97	2701.72	-50.71	0.00	0.00	0.00	-453.50	95.03	309.48
60	61	50.65	2688.82	-45.17	0.00	0.00	0.00	-416.63	101.75	298.77
61	61	50.65	2688.82	-45.17	0.00	0.00	0.00	-416.63	101.76	298.76
61	62	51.33	2686.20	-10.96	0.00	0.00	0.00	-396.93	105.64	293.34
62	62	51.33	2686.20	-10.98	0.00	0.00	0.00	-396.93	105.64	293.34
62	63	52.00	2683.62	22.74	0.00	0.00	0.00	-400.43	104.74	294.09

Titulo: Fecha : 01/12/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + SOBRECARGA 3 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H005 0.9 + H008 1.11

(TENSION MINIMA -244 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FPREFI.ANL * 0.9) + (SOBREC3.ANL * 1.11)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-74.76	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	-28.46	0.00	0.00	0.00	-364.64	112.33	284.76
4	4	0.68	2686.40	-28.45	0.00	0.00	0.00	-364.64	112.33	284.76
4	5	1.35	2688.98	17.15	0.00	0.00	0.00	-361.42	113.18	284.08
5	5	1.35	2688.97	17.15	0.00	0.00	0.00	-361.43	113.17	284.08
5	6	2.03	2701.57	35.68	0.00	0.00	0.00	-383.48	109.50	290.83
6	6	2.03	2701.58	35.67	0.00	0.00	0.00	-383.49	109.50	290.84
6	7	2.70	2716.13	45.60	0.00	0.00	0.00	-413.87	104.23	299.94
7	7	2.70	2716.13	45.59	0.00	0.00	0.00	-413.88	104.23	299.94
7	8	3.38	2730.15	55.04	0.00	0.00	0.00	-451.93	97.35	311.05
8	8	3.38	2730.15	55.04	0.00	0.00	0.00	-451.91	97.35	311.04
8	9	4.05	2743.20	63.77	0.00	0.00	0.00	-495.86	89.18	323.65
9	9	4.05	2743.20	63.79	0.00	0.00	0.00	-495.84	89.18	323.65
9	10	4.72	2755.47	72.01	0.00	0.00	0.00	-545.55	79.77	337.74
10	10	4.72	2755.48	71.99	0.00	0.00	0.00	-545.53	79.77	337.73
10	11	5.40	2767.11	79.84	0.00	0.00	0.00	-601.33	69.05	353.40
11	11	5.40	2767.10	79.83	0.00	0.00	0.00	-601.35	69.04	353.41
11	12	6.07	2785.45	51.05	0.00	0.00	0.00	-652.92	59.67	368.41
12	12	6.07	2785.44	51.09	0.00	0.00	0.00	-652.92	59.67	368.41
12	13	6.75	2801.89	20.98	0.00	0.00	0.00	-684.06	54.38	377.85
13	13	6.75	2801.88	20.94	0.00	0.00	0.00	-684.04	54.38	377.85
13	14	7.43	2816.13	-9.87	0.00	0.00	0.00	-693.06	53.52	381.24
14	14	7.43	2816.13	-9.84	0.00	0.00	0.00	-693.07	53.51	381.24
14	15	8.10	2827.99	-40.73	0.00	0.00	0.00	-679.85	57.07	378.56
15	15	8.10	2828.00	-40.70	0.00	0.00	0.00	-679.85	57.07	378.56
15	16	8.77	2828.28	-70.68	0.00	0.00	0.00	-643.67	64.57	368.94
16	16	8.77	2828.28	-70.68	0.00	0.00	0.00	-643.68	64.57	368.95
16	17	9.45	2817.53	-99.34	0.00	0.00	0.00	-586.34	75.67	352.93
17	17	9.45	2817.53	-99.35	0.00	0.00	0.00	-586.34	75.67	352.93
17	18	10.13	2804.93	-127.07	0.00	0.00	0.00	-510.89	90.38	331.97
18	18	10.13	2804.93	-127.09	0.00	0.00	0.00	-510.90	90.38	331.97
18	19	10.80	2790.76	-153.36	0.00	0.00	0.00	-420.14	108.15	306.82
19	19	10.80	2790.77	-153.35	0.00	0.00	0.00	-420.15	108.15	306.83
19	20	11.48	2784.06	100.47	0.00	0.00	0.00	-405.93	110.62	302.57
20	20	11.48	2784.05	100.48	0.00	0.00	0.00	-405.95	110.62	302.58

20	21	12.15	2769.99	295.98	0.00	0.00	0.00	-543.50	81.20	338.21
21	21	12.15	2769.99	295.98	0.00	0.00	0.00	-543.49	81.21	338.21
21	22	12.82	2748.43	545.86	0.00	0.00	0.00	-822.39	22.05	410.94
22	22	12.82	2748.44	545.86	0.00	0.00	0.00	-822.39	22.05	410.94
22	23	13.50	2718.87	740.80	0.00	0.00	0.00	-1273.01	-73.15	528.82
23	23	13.50	2718.87	-839.32	0.00	0.00	0.00	-1273.01	-73.15	528.82
23	24	14.75	2687.22	-588.53	0.00	0.00	0.00	-499.77	154.16	421.38
24	24	14.75	2687.21	-588.53	0.00	0.00	0.00	-499.77	154.16	421.38
24	25	16.00	2650.93	-347.38	0.00	0.00	0.00	101.73	282.93	228.54
25	25	16.00	2650.93	-347.38	0.00	0.00	0.00	101.74	282.94	228.54
25	26	17.25	2610.30	-165.45	0.00	0.00	0.00	412.64	347.35	126.71
26	26	17.25	2610.31	-165.46	0.00	0.00	0.00	412.65	347.35	126.71
26	27	18.50	2565.67	12.21	0.00	0.00	0.00	505.20	363.33	93.20
27	27	18.50	2565.67	12.22	0.00	0.00	0.00	505.20	363.33	93.20
27	28	19.75	2557.66	8.32	0.00	0.00	0.00	493.52	359.97	96.09
28	28	19.75	2557.66	8.30	0.00	0.00	0.00	493.52	359.97	96.09
28	29	21.00	2547.66	4.63	0.00	0.00	0.00	488.75	357.94	96.61
29	29	21.00	2547.65	4.66	0.00	0.00	0.00	488.72	357.93	96.62
29	30	22.25	2535.63	1.38	0.00	0.00	0.00	490.68	357.18	94.82
30	30	22.25	2535.64	1.39	0.00	0.00	0.00	490.66	357.18	94.83
30	31	23.50	2521.60	-1.29	0.00	0.00	0.00	498.82	357.59	90.88
31	31	23.50	2521.59	-1.27	0.00	0.00	0.00	498.85	357.60	90.87
31	32	24.75	2505.55	-3.20	0.00	0.00	0.00	512.24	358.96	85.08
32	32	24.75	2505.55	-3.26	0.00	0.00	0.00	512.24	358.97	85.08
32	33	26.00	2487.50	-4.26	0.00	0.00	0.00	529.50	360.99	77.87
33	33	26.00	2487.50	-4.26	0.00	0.00	0.00	529.47	360.98	77.88
33	34	27.25	2504.56	-6.65	0.00	0.00	0.00	524.42	361.55	81.15
34	34	27.25	2504.56	-6.67	0.00	0.00	0.00	524.40	361.54	81.16
34	35	28.50	2520.92	-10.03	0.00	0.00	0.00	523.97	363.06	82.90
35	35	28.50	2520.92	-10.00	0.00	0.00	0.00	524.00	363.06	82.89
35	36	29.75	2535.17	-14.15	0.00	0.00	0.00	530.66	365.93	82.19
36	36	29.75	2535.17	-14.19	0.00	0.00	0.00	530.66	365.93	82.19
36	37	31.00	2547.32	-18.93	0.00	0.00	0.00	545.54	370.40	78.71
37	37	31.00	2547.32	-18.91	0.00	0.00	0.00	545.51	370.39	78.72
37	38	32.25	2557.39	-24.06	0.00	0.00	0.00	569.03	376.56	72.30
38	38	32.25	2557.39	-24.05	0.00	0.00	0.00	569.02	376.55	72.31
38	39	33.50	2565.38	-29.45	0.00	0.00	0.00	601.31	384.44	62.93
39	39	33.50	2565.38	-29.46	0.00	0.00	0.00	601.30	384.44	62.93
39	40	34.75	2610.96	150.26	0.00	0.00	0.00	529.12	373.04	90.13
40	40	34.75	2610.96	150.30	0.00	0.00	0.00	529.12	373.04	90.13
40	41	36.00	2652.39	334.45	0.00	0.00	0.00	236.04	312.63	186.42
41	41	36.00	2652.40	334.43	0.00	0.00	0.00	236.05	312.63	186.42
41	42	37.25	2689.30	522.46	0.00	0.00	0.00	-286.64	201.25	354.52

42	42	37.25	2689.29	522.47	0.00	0.00	0.00	-286.64	201.25	354.52
42	43	38.50	2721.37	720.26	0.00	0.00	0.00	-934.17	-2.94	438.80
43	43	38.50	2721.37	-493.31	0.00	0.00	0.00	-934.17	-2.94	438.80
43	44	39.17	2749.95	-315.39	0.00	0.00	0.00	-650.55	57.68	365.30
44	44	39.17	2749.95	-315.38	0.00	0.00	0.00	-650.55	57.68	365.30
44	45	39.85	2771.52	-132.53	0.00	0.00	0.00	-489.44	92.48	323.92
45	45	39.85	2771.51	-132.52	0.00	0.00	0.00	-489.44	92.48	323.92
45	46	40.53	2785.61	51.43	0.00	0.00	0.00	-457.14	100.14	316.31
46	46	40.53	2785.61	51.40	0.00	0.00	0.00	-457.13	100.15	316.31
46	47	41.20	2791.67	232.46	0.00	0.00	0.00	-550.77	81.22	341.66
47	47	41.20	2791.67	232.48	0.00	0.00	0.00	-550.78	81.21	341.66
47	48	41.88	2805.73	194.85	0.00	0.00	0.00	-692.87	52.83	380.47
48	48	41.88	2805.74	194.82	0.00	0.00	0.00	-692.86	52.83	380.46
48	49	42.55	2817.91	156.75	0.00	0.00	0.00	-809.15	29.64	412.27
49	49	42.55	2817.91	156.79	0.00	0.00	0.00	-809.16	29.64	412.27
49	50	43.22	2828.34	117.85	0.00	0.00	0.00	-900.66	11.46	437.35
50	50	43.22	2828.34	117.83	0.00	0.00	0.00	-900.68	11.46	437.36
50	51	43.90	2828.52	76.61	0.00	0.00	0.00	-965.66	-1.96	454.67
51	51	43.90	2828.53	76.60	0.00	0.00	0.00	-965.68	-1.97	454.68
51	52	44.58	2816.64	34.43	0.00	0.00	0.00	-999.74	-9.83	462.91
52	52	44.58	2816.64	34.46	0.00	0.00	0.00	-999.73	-9.83	462.91
52	53	45.25	2802.83	-6.59	0.00	0.00	0.00	-1003.99	-11.68	463.08
53	53	45.25	2802.83	-6.66	0.00	0.00	0.00	-1003.99	-11.68	463.08
53	54	45.92	2786.96	-47.06	0.00	0.00	0.00	-979.66	-7.76	455.49
54	54	45.92	2786.96	-47.06	0.00	0.00	0.00	-979.64	-7.75	455.49
54	55	46.60	2768.74	-87.21	0.00	0.00	0.00	-926.40	1.98	440.04
55	55	46.60	2768.74	-87.16	0.00	0.00	0.00	-926.40	1.98	440.04
55	56	47.28	2756.87	-92.65	0.00	0.00	0.00	-860.96	14.67	421.79
56	56	47.28	2756.87	-92.70	0.00	0.00	0.00	-860.97	14.67	421.80
56	57	47.95	2744.33	-97.64	0.00	0.00	0.00	-792.89	27.87	402.80
57	57	47.95	2744.33	-97.59	0.00	0.00	0.00	-792.91	27.86	402.80
57	58	48.63	2730.78	-102.05	0.00	0.00	0.00	-720.70	41.84	382.64
58	58	48.63	2730.78	-102.09	0.00	0.00	0.00	-720.70	41.84	382.64
58	59	49.30	2716.63	-105.89	0.00	0.00	0.00	-647.13	56.06	362.07
59	59	49.30	2716.63	-105.83	0.00	0.00	0.00	-647.12	56.06	362.06
59	60	49.97	2701.72	-108.99	0.00	0.00	0.00	-571.85	70.57	340.98
60	60	49.97	2701.72	-109.00	0.00	0.00	0.00	-571.83	70.58	340.98
60	61	50.65	2688.82	-103.47	0.00	0.00	0.00	-495.33	85.49	319.71
61	61	50.65	2688.82	-103.46	0.00	0.00	0.00	-495.32	85.49	319.71
61	62	51.33	2686.20	-69.25	0.00	0.00	0.00	-436.00	97.57	303.74
62	62	51.33	2686.20	-69.27	0.00	0.00	0.00	-435.99	97.57	303.74
62	63	52.00	2683.62	-35.55	0.00	0.00	0.00	-400.43	104.74	294.09

Título: Fecha : 01/12/99
 Descripción de la combinación : PESO PROPIO + SUPERESTRUCTURA + SOBRECARGA 3 x 0.5 + PRETENSADO FINAL x 0.9
 H001 1 + H002 1 + H005 0.9 + H008 0.555

(TENSION MINIMA 0 T/M2)

1 * [+ (FPPROP.ANL * 1) + (FCMUER.ANL * 1)
 + (FPREFI.ANL * 0.9) + (SOBREC3.ANL * 0.555)]

Barra	Nudo	X	Axil(t)	Cort.Y(t)	Cort.Z(t)	Torsor(mt)	Mom-Y(mt)	Mom-Z(mt)	T.SUP(t/m2)	T.INF(t/m2)
3	3	0.00	2683.76	-45.35	0.00	0.00	0.00	-399.27	104.99	293.79
3	4	0.68	2686.39	-5.09	0.00	0.00	0.00	-382.58	108.62	289.53
4	4	0.68	2686.40	-5.08	0.00	0.00	0.00	-382.58	108.62	289.53
4	5	1.35	2688.98	34.57	0.00	0.00	0.00	-393.03	106.64	292.50
5	5	1.35	2688.97	34.57	0.00	0.00	0.00	-393.04	106.64	292.50
5	6	2.03	2701.57	47.06	0.00	0.00	0.00	-424.88	100.94	301.85
6	6	2.03	2701.58	47.06	0.00	0.00	0.00	-424.89	100.94	301.86
6	7	2.70	2716.13	51.03	0.00	0.00	0.00	-460.91	94.51	312.46
7	7	2.70	2716.13	51.03	0.00	0.00	0.00	-460.92	94.51	312.46
7	8	3.38	2730.15	54.44	0.00	0.00	0.00	-500.61	87.28	324.01
8	8	3.38	2730.15	54.44	0.00	0.00	0.00	-500.59	87.29	324.00
8	9	4.05	2743.20	57.21	0.00	0.00	0.00	-542.13	79.61	335.97
9	9	4.05	2743.20	57.23	0.00	0.00	0.00	-542.12	79.62	335.97
9	10	4.72	2755.47	59.50	0.00	0.00	0.00	-585.44	71.52	348.36
10	10	4.72	2755.48	59.48	0.00	0.00	0.00	-585.42	71.52	348.35
10	11	5.40	2767.11	61.30	0.00	0.00	0.00	-630.67	62.99	361.21
11	11	5.40	2767.10	61.29	0.00	0.00	0.00	-630.69	62.98	361.21
11	12	6.07	2785.45	26.56	0.00	0.00	0.00	-667.84	56.58	372.38
12	12	6.07	2785.44	26.60	0.00	0.00	0.00	-667.84	56.58	372.38
12	13	6.75	2801.89	-9.55	0.00	0.00	0.00	-680.27	55.16	376.84
13	13	6.75	2801.88	-9.59	0.00	0.00	0.00	-680.26	55.17	376.84
13	14	7.43	2816.13	-46.44	0.00	0.00	0.00	-666.46	59.01	374.16
14	14	7.43	2816.13	-46.41	0.00	0.00	0.00	-666.46	59.01	374.16
14	15	8.10	2827.99	-83.25	0.00	0.00	0.00	-626.76	68.05	364.42
15	15	8.10	2828.00	-83.22	0.00	0.00	0.00	-626.76	68.05	364.42
15	16	8.77	2828.28	-119.14	0.00	0.00	0.00	-560.09	81.85	346.70
16	16	8.77	2828.28	-119.15	0.00	0.00	0.00	-560.10	81.84	346.70
16	17	9.45	2817.53	-153.85	0.00	0.00	0.00	-467.75	100.18	321.37
17	17	9.45	2817.53	-153.86	0.00	0.00	0.00	-467.75	100.18	321.37
17	18	10.13	2804.93	-187.62	0.00	0.00	0.00	-353.18	122.98	289.99
18	18	10.13	2804.93	-187.64	0.00	0.00	0.00	-353.19	122.98	289.99
18	19	10.80	2790.76	-219.85	0.00	0.00	0.00	-219.88	149.54	253.52
19	19	10.80	2790.77	-219.84	0.00	0.00	0.00	-219.89	149.54	253.52
19	20	11.48	2784.06	0.19	0.00	0.00	0.00	-147.85	163.96	233.87
20	20	11.48	2784.05	0.19	0.00	0.00	0.00	-147.87	163.96	233.88

20	21	12.15	2769.99	189.74	0.00	0.00	0.00	-216.24	148.84	251.10
21	21	12.15	2769.99	189.74	0.00	0.00	0.00	-216.23	148.85	251.09
21	22	12.82	2748.43	405.92	0.00	0.00	0.00	-418.63	105.51	303.46
22	22	12.82	2748.44	405.93	0.00	0.00	0.00	-418.63	105.51	303.46
22	23	13.50	2718.87	594.83	0.00	0.00	0.00	-772.04	30.40	395.47
23	23	13.50	2718.87	-669.59	0.00	0.00	0.00	-772.04	30.40	395.47
23	24	14.75	2687.22	-457.66	0.00	0.00	0.00	-191.54	221.98	324.39
24	24	14.75	2687.21	-457.66	0.00	0.00	0.00	-191.54	221.97	324.39
24	25	16.00	2650.93	-255.35	0.00	0.00	0.00	256.09	316.90	179.97
25	25	16.00	2650.93	-255.35	0.00	0.00	0.00	256.09	316.90	179.97
25	26	17.25	2610.30	-84.53	0.00	0.00	0.00	458.90	357.53	112.16
26	26	17.25	2610.31	-84.54	0.00	0.00	0.00	458.91	357.53	112.16
26	27	18.50	2565.67	82.04	0.00	0.00	0.00	457.24	352.77	108.29
27	27	18.50	2565.67	82.05	0.00	0.00	0.00	457.24	352.77	108.29
27	28	19.75	2557.66	67.04	0.00	0.00	0.00	365.22	331.74	136.46
28	28	19.75	2557.66	67.03	0.00	0.00	0.00	365.21	331.74	136.47
28	29	21.00	2547.66	52.26	0.00	0.00	0.00	293.97	315.08	157.90
29	29	21.00	2547.65	52.29	0.00	0.00	0.00	293.93	315.07	157.91
29	30	22.25	2535.63	37.91	0.00	0.00	0.00	243.31	302.75	172.66
30	30	22.25	2535.64	37.92	0.00	0.00	0.00	243.29	302.75	172.67
30	31	23.50	2521.60	24.13	0.00	0.00	0.00	212.72	294.64	180.90
31	31	23.50	2521.59	24.16	0.00	0.00	0.00	212.75	294.65	180.89
31	32	24.75	2505.55	11.13	0.00	0.00	0.00	201.29	290.55	182.92
32	32	24.75	2505.55	11.07	0.00	0.00	0.00	201.30	290.55	182.92
32	33	26.00	2487.50	-1.03	0.00	0.00	0.00	207.59	290.16	179.17
33	33	26.00	2487.50	-1.03	0.00	0.00	0.00	207.56	290.16	179.18
33	34	27.25	2504.56	-14.52	0.00	0.00	0.00	205.40	291.36	181.53
34	34	27.25	2504.56	-14.54	0.00	0.00	0.00	205.39	291.35	181.54
34	35	28.50	2520.92	-29.00	0.00	0.00	0.00	221.74	296.56	178.00
35	35	28.50	2520.92	-28.98	0.00	0.00	0.00	221.76	296.57	177.99
35	36	29.75	2535.17	-44.22	0.00	0.00	0.00	259.09	306.18	167.65
36	36	29.75	2535.17	-44.27	0.00	0.00	0.00	259.09	306.18	167.65
36	37	31.00	2547.32	-60.10	0.00	0.00	0.00	318.49	320.44	150.15
37	37	31.00	2547.32	-60.08	0.00	0.00	0.00	318.46	320.44	150.16
37	38	32.25	2557.39	-76.33	0.00	0.00	0.00	400.39	339.45	125.37
38	38	32.25	2557.39	-76.33	0.00	0.00	0.00	400.38	339.45	125.37
38	39	33.50	2565.38	-92.82	0.00	0.00	0.00	504.95	363.24	93.25
39	39	33.50	2565.38	-92.83	0.00	0.00	0.00	504.94	363.24	93.26
39	40	34.75	2610.96	75.79	0.00	0.00	0.00	518.91	370.79	93.34
40	40	34.75	2610.96	75.82	0.00	0.00	0.00	518.91	370.79	93.34
40	41	36.00	2652.39	248.87	0.00	0.00	0.00	325.86	332.39	158.16
41	41	36.00	2652.40	248.86	0.00	0.00	0.00	325.87	332.39	158.16
41	42	37.25	2689.30	425.79	0.00	0.00	0.00	-82.92	246.08	290.41

42	42	37.25	2689.29	425.80	0.00	0.00	0.00	-82.92	246.08	290.41
42	43	38.50	2721.37	612.49	0.00	0.00	0.00	-602.68	65.57	350.56
43	43	38.50	2721.37	-468.76	0.00	0.00	0.00	-602.68	65.57	350.56
43	44	39.17	2749.95	-290.83	0.00	0.00	0.00	-335.51	122.79	281.44
44	44	39.17	2749.95	-290.82	0.00	0.00	0.00	-335.51	122.79	281.44
44	45	39.85	2771.52	-107.98	0.00	0.00	0.00	-191.09	154.15	244.51
45	45	39.85	2771.51	-107.97	0.00	0.00	0.00	-191.09	154.15	244.51
45	46	40.53	2785.61	75.98	0.00	0.00	0.00	-175.49	158.36	241.34
46	46	40.53	2785.61	75.96	0.00	0.00	0.00	-175.48	158.36	241.34
46	47	41.20	2791.67	257.02	0.00	0.00	0.00	-285.57	136.03	271.07
47	47	41.20	2791.67	257.03	0.00	0.00	0.00	-285.58	136.03	271.07
47	48	41.88	2805.73	219.40	0.00	0.00	0.00	-444.37	104.19	314.32
48	48	41.88	2805.74	219.38	0.00	0.00	0.00	-444.37	104.19	314.32
48	49	42.55	2817.91	181.32	0.00	0.00	0.00	-577.10	77.61	350.50
49	49	42.55	2817.91	181.34	0.00	0.00	0.00	-577.11	77.60	350.50
49	50	43.22	2828.34	142.39	0.00	0.00	0.00	-685.06	56.02	379.97
50	50	43.22	2828.34	142.38	0.00	0.00	0.00	-685.08	56.02	379.97
50	51	43.90	2828.52	101.17	0.00	0.00	0.00	-766.77	39.15	401.73
51	51	43.90	2828.53	101.16	0.00	0.00	0.00	-766.78	39.14	401.73
51	52	44.58	2816.64	58.99	0.00	0.00	0.00	-817.54	27.82	414.41
52	52	44.58	2816.64	59.02	0.00	0.00	0.00	-817.53	27.82	414.41
52	53	45.25	2802.83	17.96	0.00	0.00	0.00	-838.24	22.58	418.96
53	53	45.25	2802.83	17.91	0.00	0.00	0.00	-838.24	22.58	418.96
53	54	45.92	2786.96	-22.48	0.00	0.00	0.00	-830.36	23.10	415.75
54	54	45.92	2786.96	-22.49	0.00	0.00	0.00	-830.34	23.10	415.75
54	55	46.60	2768.74	-62.64	0.00	0.00	0.00	-793.80	29.38	404.75
55	55	46.60	2768.74	-62.61	0.00	0.00	0.00	-793.80	29.38	404.75
55	56	47.28	2756.87	-68.10	0.00	0.00	0.00	-745.05	38.63	390.94
56	56	47.28	2756.87	-68.13	0.00	0.00	0.00	-745.06	38.63	390.94
56	57	47.95	2744.33	-73.07	0.00	0.00	0.00	-693.44	48.42	376.33
57	57	47.95	2744.33	-73.03	0.00	0.00	0.00	-693.46	48.42	376.33
57	58	48.63	2730.78	-77.50	0.00	0.00	0.00	-637.95	58.94	360.61
58	58	48.63	2730.78	-77.53	0.00	0.00	0.00	-637.95	58.94	360.61
58	59	49.30	2716.63	-81.33	0.00	0.00	0.00	-580.83	69.76	344.42
59	59	49.30	2716.63	-81.28	0.00	0.00	0.00	-580.83	69.76	344.42
59	60	49.97	2701.72	-84.44	0.00	0.00	0.00	-522.00	80.88	327.72
60	60	49.97	2701.72	-84.45	0.00	0.00	0.00	-521.99	80.88	327.71
60	61	50.65	2688.82	-78.92	0.00	0.00	0.00	-462.18	92.34	310.89
61	61	50.65	2688.82	-78.91	0.00	0.00	0.00	-462.17	92.34	310.89
61	62	51.33	2686.20	-44.70	0.00	0.00	0.00	-419.54	100.97	299.36
62	62	51.33	2686.20	-44.72	0.00	0.00	0.00	-419.54	100.97	299.36
62	63	52.00	2683.62	-11.00	0.00	0.00	0.00	-400.43	104.74	294.09

4.2 Pasos superiores

Para la ejecución de los pasos superiores, son válidos los cálculos iniciales del Proyecto Constructivo.

4.3 Pasos inferiores

4.3 PASOS INFERIORES

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4.3.1 PASO INFERIOR DE CAMINO PK 558+640

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 - COMPROBACIÓN A CORTANTE
 - DIMENSIONAMIENTO DE LA CIMENTACIÓN
 - DIMENSIONAMIENTO DE LAS ALETAS



aldesa construcciones, s.a.



CONSTRUCTORA
HISPANICA, S.A.

L.A.V. MADRID - BARCELONA - F. FRANCESA
TRAMO: MADRID - ZARAGOZA.
SUBTRAMO V-b

TORIJA U.T.E.

PASO INFERIOR P.K. 558+640

ANEJO DE CÁLCULO

ALHOSA		PASO
PREFABRICADOS DE HORMIGÓN		800 x 580; HT = 183 PI 558+640
Oferta:	99/519	
Obra:	TORIJA - GUADALAJARA	
Empresa:	TORIJA UTE	
Fecha:	Noviembre de 2.000	

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1. Generalidades

En la presente memoria se muestran los cálculos realizados para justificar el paso inferior de hormigón de dimensiones 800 x 580 cm x cm. (Horizontal-Vertical).

2. Descripción

El paso inferior se salva con un marco de hormigón compuesto por dos muros y un tablero prefabricados, una capa de compresión sobre el tablero y la solera in situ.

Las dimensiones libres interiores del marco son de 800 centímetros en horizontal por 580 centímetros en vertical. El espesor de los elementos del marco es: solera de 80 centímetros, dos hastiales de 40 centímetros, un tablero prefabricado de 40 centímetros y una capa de compresión de 40 cm.

La altura de tierras para la que está calculado el marco alcanza 183 centímetros por encima del dintel.

3. Instrucciones aplicadas

Para el cálculo de los marcos, de acuerdo con la normativa vigente, se han utilizado las siguientes Instrucciones y Normas:

* Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril, de 25 de Junio de 1.975.

* Instrucción para el Proyecto y Ejecución de Obras de Hormigón en Masa o Armado EH-91.

* Norma Básica de la Edificación. NBE-AE/88 Acciones en la edificación.

4. Características de los materiales*** Hormigones:**

Hormigón en piezas prefabricadas	H-300
Hormigón in situ	H-250

*** Acero:**

Acero para armar corrugado

B-500 S

5. Control de calidad

El control de calidad se atenderá a lo especificado en la EH-91, habiéndose seleccionado los siguientes niveles:

Elementos prefabricados:**a) Materiales:**

- | | |
|-------------------|-----------------|
| - Hormigón | Control Intenso |
| - Armadura pasiva | Control Intenso |

b) Ejecución:

- | | |
|-------------------|-----------------|
| - En toda la obra | Control Intenso |
|-------------------|-----------------|

Obra in situ:**a) Materiales:**

- | | |
|-------------------|----------------|
| - Hormigón | Control Normal |
| - Armadura pasiva | Control Normal |

b) Ejecución:

- | | |
|-------------------|----------------|
| - En toda la obra | Control Normal |
|-------------------|----------------|

6. Coeficientes de seguridad

De acuerdo con los niveles de control de calidad definidos, se adoptan los siguientes coeficientes de seguridad:

- Estados límites últimos:**Elementos prefabricados:****- Coeficientes de minoración de resistencias:**

Acero pasivo

$\gamma_s = 1,10$

Hormigón

$\gamma_c = 1,40$

- Coeficientes de ponderación de acciones:

$\gamma_f = 1,50$

Obra in situ:**- Coeficientes de minoración de resistencias:**

Acero pasivo

$\gamma_s = 1,15$

Hormigón

$\gamma_c = 1,50$

- Coeficientes de ponderación de acciones:

$\gamma_f = 1,50$

7. Parámetros del terreno**7.1 Características del relleno superior y lateral**

En los cálculos se ha considerado un relleno de material granular en el trasdos de los hastiales y dintel con las siguientes características:

Peso específico	2,0 ton/m ³
Ángulo de rozamiento interno	35grados
Ángulo de rozamiento con el muro	0 grados
Coefficiente de empuje	0,42

8. Acciones consideradas

Se han considerado en el cálculo, las acciones descritas en la Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril. Las cuales consisten en:

8.1 Cargas permanentes

Peso propio del paso (dintel, hastiales y solera)

8.2 Empuje por efecto de las tierras

Se considera un empuje de las tierras con un coeficiente de 0,42.

8.3 Sobrecargas por efecto del tráfico

Uniforme en toda la plataforma

400 Kg/m²

Vehículo de 90 ton. con la disposición de cargas indicadas en la Instrucción.

8.4 Acciones por temperatura

No se consideran variaciones de temperatura, ya que el incremento de longitud de los miembros para un cambio de 30 grados centígrados es de escasa magnitud, desplazamiento que no alcanza a producir el empuje pasivo en el terreno.

9. Programa de cálculo

Este es un programa de cálculo matricial para ordenadores personales que permite realizar el cálculo integral de marcos de hormigón armado bajo seis hipótesis de carga distintas, formadas por distintas combinaciones de un total de ocho casos de carga, proporcionando los valores de los esfuerzos axiales, cortantes y flectores para cada hipótesis además de las armaduras de flexión y cortante necesarias en cada sección del marco.

El programa resuelve el cálculo de los esfuerzos en un marco de hormigón armado aplicando el método directo de la rigidez a una modelización plana de la estructura mediante barras que representan un metro de la profundidad del marco.

Para cada barra se proporcionan resultados en once puntos equidistantes a lo largo de la longitud de la misma.

El marco se considera apoyado sobre un terreno elástico cuya rigidez es directamente proporcional al coeficiente de balasto de suelo.

Las fuerzas de empotramiento que actúan sobre cada nudo se calculan aplicando la teoría de cálculo elástico de Euler-Bernoulli-Navier a una barra biempotrada sometidas a las cargas contempladas en las distintas hipótesis.

9.1 Casos de carga

El programa considera siete (7) casos de carga, los que enunciamos a continuación.

9.1.1 Peso propio del paso

El programa considera de forma automática el peso propio del marco en función, de la densidad del hormigón y de las dimensiones de sus elementos (dintel, solera y hastiales).

9.1.2 Empuje por efecto de las tierras

Calculado según las indicaciones del capítulo 9º de la norma NBE-AE-88, siendo la carga directamente proporcional al peso específico de las tierras y la altura de tierras en el dintel, mientras que en los hastiales varía con la profundidad y es función de coeficiente de empuje horizontal.

9.1.3 Sobrecargas de construcción

Se considera el efecto de un compactador de dos ejes actuando en el dintel, así como el relleno de las tierras hasta el nivel del dintel.

9.1.4 Sobrecarga uniforme 0,40 ton/m² sobre la plataforma.

Produce una carga uniforme sobre el dintel de 400 kp/m² y dos cargas uniformes sobre los hastiales que son el producto de la carga sobre el dintel por el coeficiente de empuje horizontal

9.1.5 Vehículo de 90 ton. (Repartido)

Reparto local de cargas a 45,0° en el relleno existente sobre el dintel, con un coeficiente de impacto de 1,8.
(Para un ángulo de reparto de 0,0° tenemos cargas puntuales)

9.1.6 Vehículo de 90 ton. (Flexión)

Vehículo de 90 ton. concentrado con segundo eje en el centro del dintel, de forma que produzca la máxima flexión en el dintel. Con el coeficiente de impacto considerado.
(Solo en el caso de un ángulo de reparto de 0,0°)

9.1.7 Vehículo de 90 ton. (Cortante)

Vehículo de 90 ton. concentrado con primer eje situado a una distancia de un canto útil del eje del dintel, de forma que produzca el máximo esfuerzo cortante. Con el coeficiente de impacto considerado.
(Solo en el caso de un ángulo de reparto de 0,0°)

9.1.8 Tablero biapoyado.

Ademas se considera el tablero biapoyado resistiendo el peso propio, el peso de la capa de compresión y una sobrecarga de 100 Kg/m²

9.2 Hipótesis de cálculo

Con el objeto de obtener las sollicitaciones pésimas se consideran en el cálculo del marco, las siguientes hipótesis:

HIPÓTESIS I:

- Peso propio
- Cargas de construcción
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (3)}]$

HIPÓTESIS II y III:

- Peso propio
 - Empuje de las tierras
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)}]$

HIPÓTESIS IV:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m².
- Carro repartido en profundidad

Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)} + \text{Caso (4)} + \text{Caso (5)}]$

HIPÓTESIS V:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m².
- Carro concentrado máxima flexión

Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)} + \text{Caso (4)} + \text{Caso (6)}]$

HIPÓTESIS VI:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m².
- Carro concentrado máxima cortante.

Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)} + \text{Caso (4)} + \text{Caso (7)}]$

10. Resultados de cálculo

Como instrucción de los resultados de cálculo, se presentan los datos introducidos, tales como:

- Datos del terraplén: densidad, ángulo de rozamiento interno, coeficiente de empuje empleado en el cálculo.

- Datos de los materiales que se prevé emplear en la construcción del marco tales como: resistencia característica del hormigón, tipos de acero empleados, recubrimiento.

- Tipos del control de calidad y coeficientes empleados en el cálculo.

- Geometría del marco: dimensiones internas libres y espesor de cada uno de sus elementos (dintel, solera y hastiales).

- Sobrecargas que se han considerado en el cálculo.

Una vez calculado el marco, se obtienen:

- Las solicitaciones pésimas de las hipótesis consideradas, es decir, envolvente de esfuerzos.

- Las áreas de acero requeridas por cortante y por flexión, ésta última tanto para la cara interior como la exterior, todo ello según la Norma EH-91.

- Todos los datos y resultados están referidos a una longitud de paso de 100 cm.

TIPO DE TERRENO DE CIMENTACIÓN: Se considera un terreno de cimentación con un coeficiente de balasto de 5,0 kg/cm³ que correspondería a un suelo con una resistencia nominal de 2,0 kg/cm².

NOTA: El marco ha sido calculado con los coeficientes de seguridad correspondientes a Control intenso y Control normal para cada uno de los elementos que compone el marco:

Hastiales:	Control intenso	H-300
Tablero:	Control intenso	H-300
Obra in situ:	Control normal	H-250

10.1 Tablero autoportante.

DATOS GEOMETRICOS:

Longitud: 826 Cm
 Canto Total: 40,0 cm.
 Ancho: 100,0 cm.
 Recubrimiento: 4,0 cm.
 Dist. Apoyo: 13,0 cm.
 Luz / Apoyos: 800,0 cm.
 Canto Util: 36 Cm

MATERIALES:

Fck: 300 Kg/cm²
 Fyk: 5.100 Kg/cm²
 Gf (p)= 1,40
 Gf (v) = 1,40
 Gc = 1,50
 Gs = 1,10
 Dens. Hgón: 2.500 Kg/m³

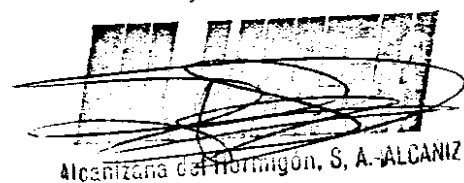
ACCIONES:

Peso Propio: 1.000 Kg/ml
 Sobrec. Unif. 1.100 Kg/ml

SOLICITACIONES:

Nd 0 Kg
 Md (cto) 2.349.51 Kgxc
 6
 Md (apoy) -2.484 Kgxc
 Vd 12.142 Kg
 Vcu 25.857 Kg
 As mín 0,00 cm²/ml
 Nd . e 2.349.51 Kgxc
 6
 Mc 9.072.00 Kgxc
 0
 As2 mín 6,21 cm²
 As2 2,50 cm²
 Us2 11.591 Kg
 As1 mín 14,78 cm²
 As1 45,96 cm²
 Us1 213.087 Kg

ALCAÑIZ, Noviembre de 2000



Alcanizana de Hormigón, S. A. - ALCANIZ

Dpto. Técnico de ALHOSA

#####

ALHOSA

pag. 1

MARCOS 1.0

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GEOMETRIA DEL MARCO

=====

LUZ = 800.00 cm

GALIBO = 580.00 cm

ESPESOR DE LOS HASTIALES = 40.00 cm

ESPESOR DEL DINTEL = 80.00 cm

ESPESOR DE LA SOLERA = 80.00 cm

RECUBRIMIENTO DE LAS ARMADURAS = 4.00 cm

ALTURA DE TIERRAS = 183.00 cm

MATERIALES

=====

TIPO DE HORMIGON = H-250

COEFICIENTE DE MINORACION DEL HORMIGON = 1.50

TIPO DE ACERO = AEH-500

COEFICIENTE DE MINORACION DEL ACERO = 1.15

TERRENO

=====

COEFICIENTE DE BALASTO = 5.00 kp/cm³

ANGULO DE ROZAMIENTO INTERNO = 35.00

PESO ESPECIFICO = 0.0020 kp/cm³

ANGULO DE ROZAMIENTO TERRENO-MURO = 0.00

COEFICIENTE DE EMPUJE = 0.42

CARGAS

=====

COEFICIENTE DE MAYORACION DE CARGAS = 1.50

CARGA 1er EJE COMPACTADOR = 2500.00 kp

CARGA 2o EJE COMPACTADOR = 2500.00 kp

SEPARACION ENTRE EJES DEL COMPACTADOR = 200.00 cm

TREN DE CARGAS (0:CARRETERA, 1:FFCC RENFE, 2:FFCC METRICA, 3:FFCC UIC) = 1

ANGULO DE REPARTO DEL TREN DE CARGAS = 45.00

REPARTO AUTOMATICO DEL TREN DE CARGAS = 0.00

COEFICIENTE DE IMPACTO = 1.80

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ALHOSA pag. 2 MARCOS 1.0

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CARGAS QUE ACTUAN SOBRE LA ESTRUCTURA

PESO PROPIO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
1	0.00	-20.00
2	0.00	-20.00
3	0.00	-20.00
4	0.00	-20.00
5	0.00	-20.00
6	0.00	-20.00
7	0.00	-20.00
8	0.00	-20.00
9	0.00	-20.00
10	0.00	-20.00
11	-10.00	0.00
12	0.00	20.00
13	10.00	0.00

EMPUJE DEL TERRENO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
12	0.00	36.60

-Cargas trapezoidales sobre las barras

Barra	Carga inicial (kp/cm)	Carga final (kp/cm)
11	70.81	15.37
13	15.37	70.81

SOBRECARGAS DE CONSTRUCCION

-Cargas trapezoidales sobre las barras

Barra	Carga inicial (kp/cm)	Carga final (kp/cm)
11	55.44	0.00
13	0.00	55.44

-Trenes de carga sobre las barras

Barra	Carga 1er Eje (kp)	Carga 2o Eje (kp)	Separacion (cm)
12	4500.00	4500.00	200.00

SOBRECARGA UNIFORME DE 0.4 t/m2

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	1.68
12	0.00	4.00
13	0.00	1.68

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SOBRECARGA UNIFORME DE 1 t/m2

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	0.00
12	0.00	0.00
13	0.00	0.00

VEHICULO REPARTIDO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	19.17
12	0.00	45.65
13	0.00	19.17

VEHICULO EN POSICION DE MAXIMA FLEXION

-Trenes de carga sobre las barras

Barra	Carga (kp)	Pos.EjeCentral (cm)
12	7377.05	420.00

VEHICULO EN POSICION DE MAXIMO CORTANTE

-Trenes de carga sobre las barras

Barra	Carga (kp)	Pos.EjeCentral (cm)
12	7377.05	246.00

COEFICIENTES DE MAYORACION DE ACCIONES

HIPOT.	P.PROPIO	TERRENO	S.CONST.	S.UNIF.4	TR.DIST.	V.REPT.	V.C.FX.	V.C.CT.
1	1.5	0.0	1.5	0.0	0.0	0.0	0.0	0.0
2	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
3	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
4	1.5	1.5	0.0	1.5	0.0	1.5	0.0	0.0
5	1.5	1.5	0.0	1.5	0.0	0.0	0.0	0.0
6	1.5	1.5	0.0	1.5	0.0	0.0	0.0	0.0

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ENVOLVENTES DE MOMENTOS FLECTORES

	X (cm)	FLECTOR POS. (mkp)	HIPOTESIS	FLECTOR NEG. (mkp)	HIPOTESIS
Solera	0.00	0.00	1	-43380.79	4
	84.00	9903.42	4	0.00	1
	168.00	45153.62	4	0.00	1
	252.00	66727.84	4	0.00	1
	336.00	78154.87	4	0.00	1
	420.00	81703.81	4	0.00	1
	504.00	78154.87	4	0.00	1
	588.00	66727.84	4	0.00	1
	672.00	45153.62	4	0.00	1
	756.00	9903.42	4	0.00	1
	840.00	0.00	1	-43380.79	4
Hastial dcho	0.00	0.00	1	-43380.79	4
	66.00	0.00	1	-22217.67	4
	132.00	0.00	1	-6681.80	4
	198.00	3871.89	2	0.00	1
	264.00	8957.17	4	0.00	1
	330.00	9784.77	4	0.00	1
	396.00	6434.09	4	0.00	1
	462.00	729.84	2	-732.61	4
	528.00	0.00	1	-11353.10	4
	594.00	0.00	1	-25065.11	4
	660.00	0.00	1	-41506.42	4
Dintel	0.00	0.00	1	-41506.42	4
	84.00	9100.12	4	0.00	1
	168.00	48460.77	4	0.00	1
	252.00	76575.51	4	0.00	1
	336.00	93444.36	4	0.00	1
	420.00	99067.31	4	0.00	1
	504.00	93444.36	4	0.00	1
	588.00	76575.51	4	0.00	1
	672.00	48460.77	4	0.00	1
	756.00	9100.12	4	0.00	1
	840.00	0.00	1	-41506.42	4
Hastial izdo	0.00	0.00	1	-41506.42	4
	66.00	0.00	1	-25065.11	4
	132.00	0.00	1	-11353.10	4
	198.00	729.84	2	-732.61	4
	264.00	6434.09	4	0.00	1
	330.00	9784.77	4	0.00	1
	396.00	8957.17	4	0.00	1
	462.00	3871.89	2	0.00	1
	528.00	0.00	1	-6681.80	4
	594.00	0.00	1	-22217.67	4
	660.00	0.00	1	-43380.79	4

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ENVOLVENTE DE CORTANTES Y ESFUERZOS CONCOMITANTES

	X (cm)	CORTANTE (kp)	HIPOTESIS	AXIL (kp)	FLECTOR (mkp)
Solera	0.00	-76839.87	4	36511.35	-43380.79
	84.00	-51716.55	4	36511.35	9903.42
	168.00	-33143.24	4	36511.35	45153.62
	252.00	-19108.75	4	36511.35	66727.84
	336.00	-8639.93	4	36511.35	78154.87
	420.00	-0.00	1	19040.52	29043.12
	504.00	8639.93	4	36511.35	78154.87
	588.00	19108.75	4	36511.35	66727.84
	672.00	33143.24	4	36511.35	45153.62
	756.00	51716.55	4	36511.35	9903.42
	840.00	76839.87	4	36511.35	-43380.79
Hastial dcho	0.00	-36511.35	4	76839.87	-43380.79
	66.00	-27710.79	4	75849.87	-22217.67
	132.00	-19459.08	4	74859.87	-6681.80
	198.00	-11756.23	4	73869.87	3589.07
	264.00	-4602.24	4	72879.87	8957.17
	330.00	2002.90	4	71889.87	9784.77
	396.00	8059.19	4	70899.87	6434.09
	462.00	13566.62	4	69909.87	-732.61
	528.00	18525.19	4	68919.87	-11353.10
	594.00	22934.90	4	67929.87	-25065.11
	660.00	26795.76	4	66939.87	-41506.42
Dintel	0.00	-66939.87	4	26795.76	-41506.42
	84.00	-53551.90	4	26795.76	9100.12
	168.00	-40163.92	4	26795.76	48460.77
	252.00	-26775.95	4	26795.76	76575.51
	336.00	-13387.97	4	26795.76	93444.36
	420.00	-0.00	2	16025.91	50030.26
	504.00	13387.97	4	26795.76	93444.36
	588.00	26775.95	4	26795.76	76575.51
	672.00	40163.92	4	26795.76	48460.77
	756.00	53551.90	4	26795.76	9100.12
	840.00	66939.87	4	26795.76	-41506.42
Hastial izdo	0.00	-26795.76	4	66939.87	-41506.42
	66.00	-22934.90	4	67929.87	-25065.11
	132.00	-18525.19	4	68919.87	-11353.10
	198.00	-13566.62	4	69909.87	-732.61
	264.00	-8059.19	4	70899.87	6434.09
	330.00	-2002.90	4	71889.87	9784.77
	396.00	4602.24	4	72879.87	8957.17
	462.00	11756.23	4	73869.87	3589.07
	528.00	19459.08	4	74859.87	-6681.80
	594.00	27710.79	4	75849.87	-22217.67
	660.00	36511.35	4	76839.87	-43380.79

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ENVOLVENTE DE AXILES Y ESFUERZOS CONCOMITANTES

=====

	X (cm)	AXIL (kp)	HIPOTESIS	CORTANTE (kp)	FLECTOR (mkp)
Solera	0.00	36511.35	4	-76839.87	-43380.79
	84.00	36511.35	4	-51716.55	9903.42
	168.00	36511.35	4	-33143.24	45153.62
	252.00	36511.35	4	-19108.75	66727.84
	336.00	36511.35	4	-8639.93	78154.87
	420.00	36511.35	4	-0.00	81703.81
	504.00	36511.35	4	8639.93	78154.87
	588.00	36511.35	4	19108.75	66727.84
	672.00	36511.35	4	33143.24	45153.62
	756.00	36511.35	4	51716.55	9903.42
	840.00	36511.35	4	76839.87	-43380.79
Hastial dcho	0.00	76839.87	4	-36511.35	-43380.79
	66.00	75849.87	4	-27710.79	-22217.67
	132.00	74859.87	4	-19459.08	-6681.80
	198.00	73869.87	4	-11756.23	3589.07
	264.00	72879.87	4	-4602.24	8957.17
	330.00	71889.87	4	2002.90	9784.77
	396.00	70899.87	4	8059.19	6434.09
	462.00	69909.87	4	13566.62	-732.61
	528.00	68919.87	4	18525.19	-11353.10
	594.00	67929.87	4	22934.90	-25065.11
	660.00	66939.87	4	26795.76	-41506.42
Dintel	0.00	26795.76	4	-66939.87	-41506.42
	84.00	26795.76	4	-53551.90	9100.12
	168.00	26795.76	4	-40163.92	48460.77
	252.00	26795.76	4	-26775.95	76575.51
	336.00	26795.76	4	-13387.97	93444.36
	420.00	26795.76	4	-0.00	99067.31
	504.00	26795.76	4	13387.97	93444.36
	588.00	26795.76	4	26775.95	76575.51
	672.00	26795.76	4	40163.92	48460.77
	756.00	26795.76	4	53551.90	9100.12
	840.00	26795.76	4	66939.87	-41506.42
Hastial izdo	0.00	66939.87	4	-26795.76	-41506.42
	66.00	67929.87	4	-22934.90	-25065.11
	132.00	68919.87	4	-18525.19	-11353.10
	198.00	69909.87	4	-13566.62	-732.61
	264.00	70899.87	4	-8059.19	6434.09
	330.00	71889.87	4	-2002.90	9784.77
	396.00	72879.87	4	4602.24	8957.17
	462.00	73869.87	4	11756.23	3589.07
	528.00	74859.87	4	19459.08	-6681.80
	594.00	75849.87	4	27710.79	-22217.67
	660.00	76839.87	4	36511.35	-43380.79

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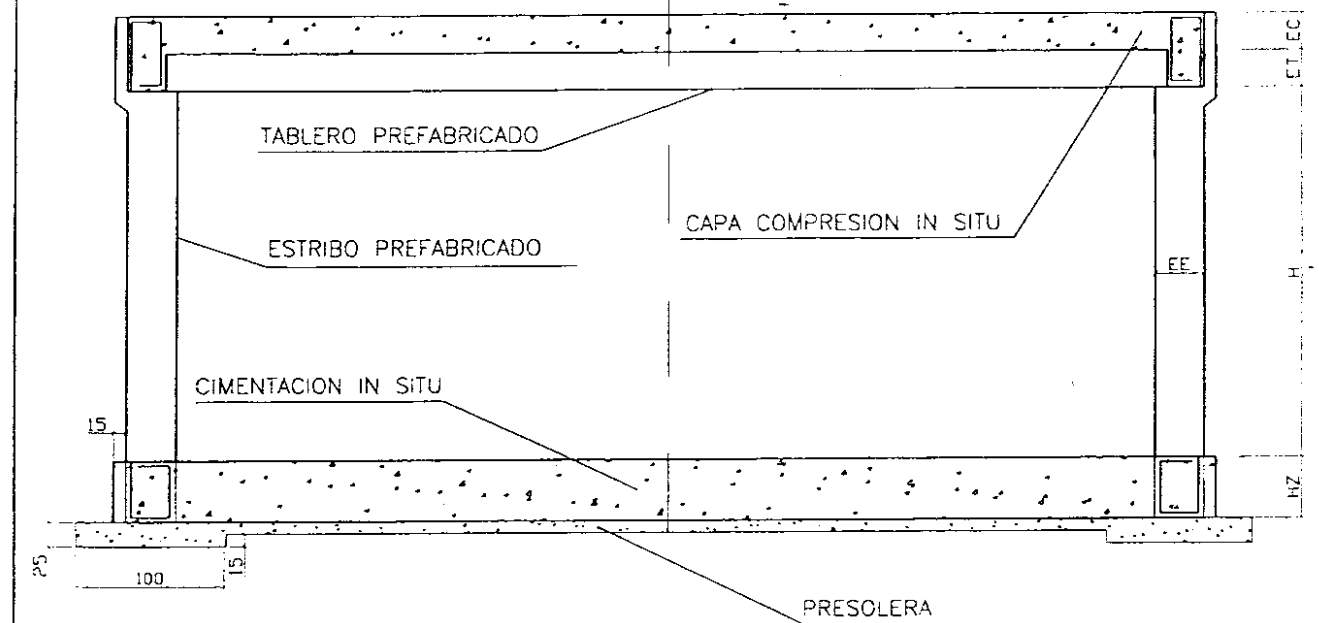
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ARMADURAS

=====

	X (cm)	AR. ESTRIBOS (cm2/m)	ARM. FLEX. EXT. (cm2)	ARM. FLEX. INT. (cm2)
Solera	0.00	9.67	9.06	0.00
	84.00	0.93	0.00	0.00
	168.00	0.00	0.00	9.62
	252.00	0.00	0.00	16.52
	336.00	0.00	0.00	20.26
	420.00	0.00	0.00	21.43
	504.00	0.00	0.00	20.26
	588.00	0.00	0.00	16.52
	672.00	0.00	0.00	9.62
	756.00	0.93	0.00	0.00
	840.00	9.67	9.06	0.00
Hastial dcho	0.00	9.75	23.56	0.00
	66.00	3.29	6.41	0.00
	132.00	0.00	0.00	0.00
	198.00	0.00	0.00	0.00
	264.00	0.00	0.00	0.00
	330.00	0.00	0.00	0.00
	396.00	0.00	0.00	0.00
	462.00	0.00	0.00	0.00
	528.00	0.00	0.00	0.00
	594.00	0.00	9.39	0.00
	660.00	2.61	22.79	0.00
Dintel	0.00	6.22	9.56	0.00
	84.00	1.56	0.00	0.00
	168.00	0.00	0.00	11.75
	252.00	0.00	0.00	20.79
	336.00	0.00	0.00	26.36
	420.00	0.00	0.00	28.25
	504.00	0.00	0.00	26.36
	588.00	0.00	0.00	20.79
	672.00	0.00	0.00	11.75
	756.00	1.56	0.00	0.00
	840.00	6.22	9.56	0.00
Hastial izdo	0.00	2.61	22.79	0.00
	66.00	0.00	9.39	0.00
	132.00	0.00	0.00	0.00
	198.00	0.00	0.00	0.00
	264.00	0.00	0.00	0.00
	330.00	0.00	0.00	0.00
	396.00	0.00	0.00	0.00
	462.00	0.00	0.00	0.00
	528.00	0.00	0.00	0.00
	594.00	3.29	6.41	0.00
	660.00	9.75	23.56	0.00

11. Planos



A	H	ET	EC	EE	HZ	MOD	Esv.	HT(m)
800	580	40	40	40	80	240	90°	1.83

COTAS EN CM

CONTROL DE CALIDAD	
HORMIGON PREFAB.	H-300
HORMIGON IN SITU	H-250
ACERO	B-500
EH-91	

RECUBRIMIENTO =	25 MM
TREN DE CARGAS =	90 T.

EL MARCO HA SIDO CALCULADO CON UNA RESISTENCIA NOMINAL DEL SUELO DE 2 KG/CM2

- COMPACTAR LA PRIMERA CAPA DE RELLENO SOBRE EL MARCO Y LATERALES CON RODILLOS PEQUEÑOS O COMPACTADORES MANUALES. NO UTILIZAR VIBRADORES.

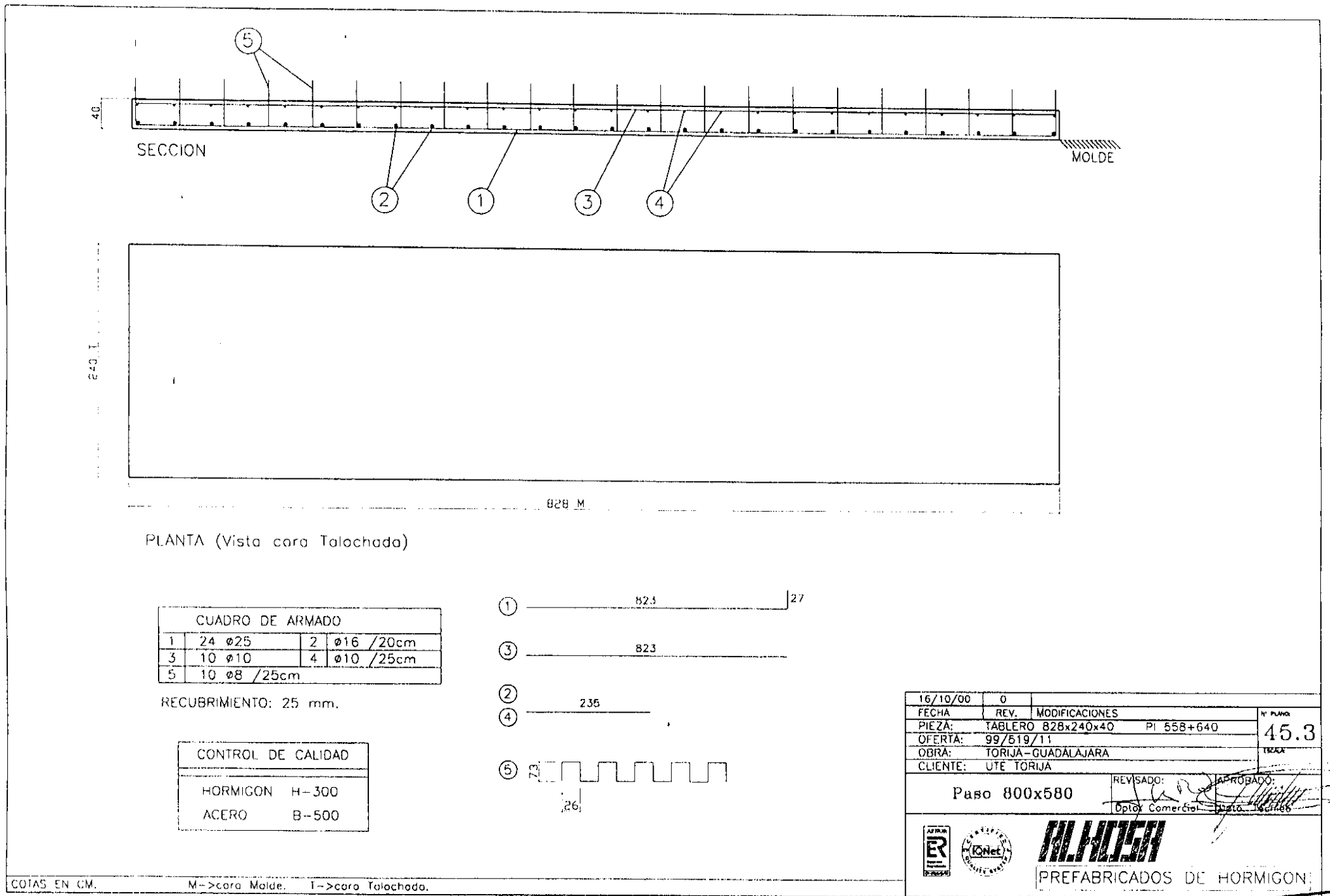
- PARA RECUBRIMIENTOS DE TIERRAS SUPERIORES A 2.00 M SE PODRÁN UTILIZAR COMPACTADORES VIBRANTES, SIEMPRE QUE LA CARGA NO EXCEDA DE LA PREVISTA EN EL CÁLCULO (CARGA MÓVIL DE 90 Tn. EQUIVALENTE A TRES EJES DE 30 Tn.)

- EL RELLENO LATERAL SE REALIZARÁ DESPUES DE HORMIGONADA LA SOLERA Y CAPA DE COMPRESION.

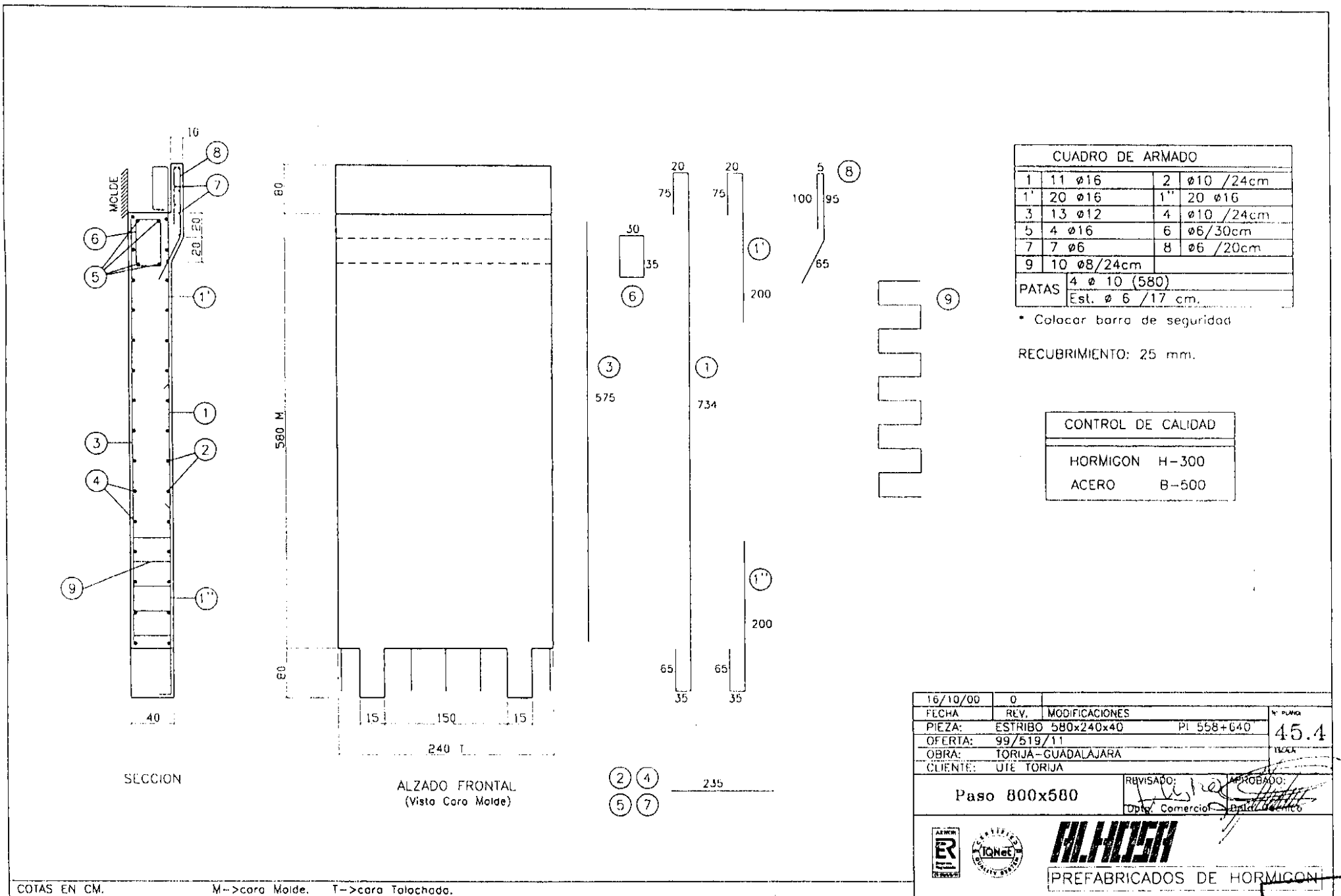
COTAS EN CM.

16/10/00	0		
FECHA	REV.	MODIFICACIONES	N.º PLANO
PIEZA:	PASO 800x580		45.0
OFERTA:	99/519		
OBRA:	TORJA-GUADALAJARA		
CLIENTE:	UTE TORJA		
PASO DE ESTRIBOS Y TABLERO		REVISADO:	APROBADO:
		DBA Comercial	

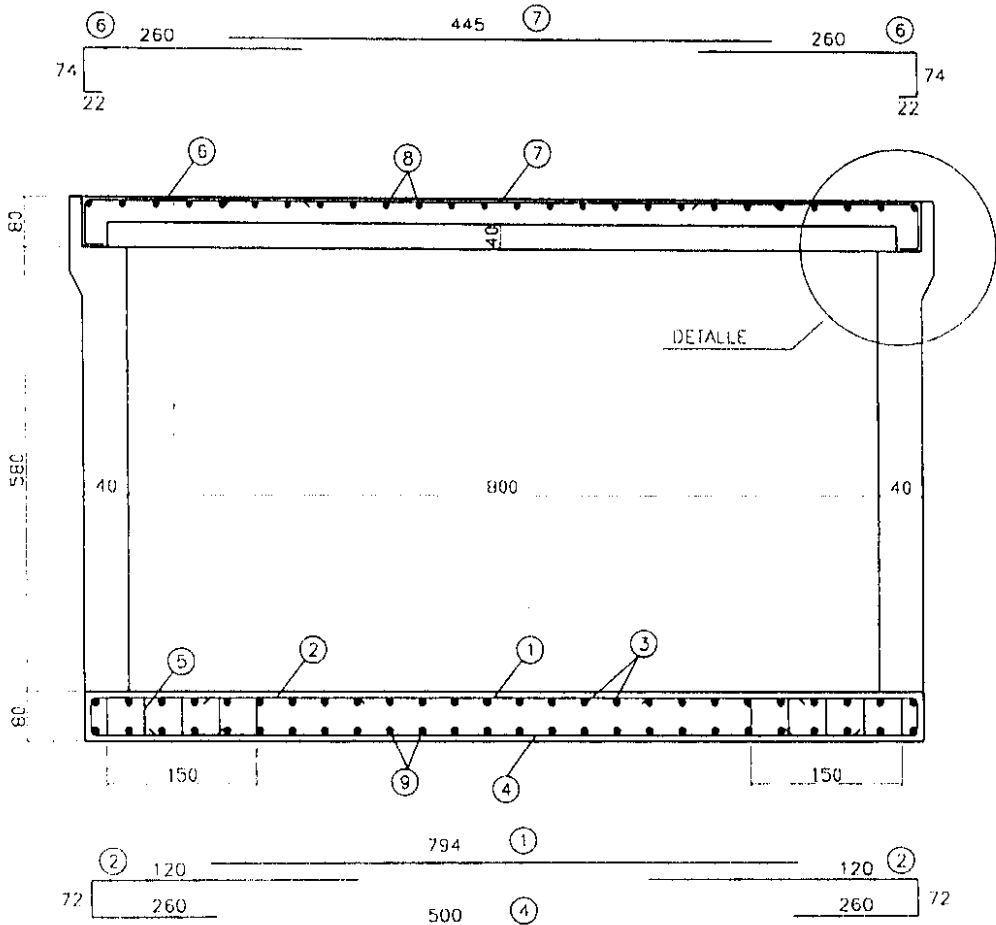
ALHOSA PREFABRICADOS DE HORMIGÓN



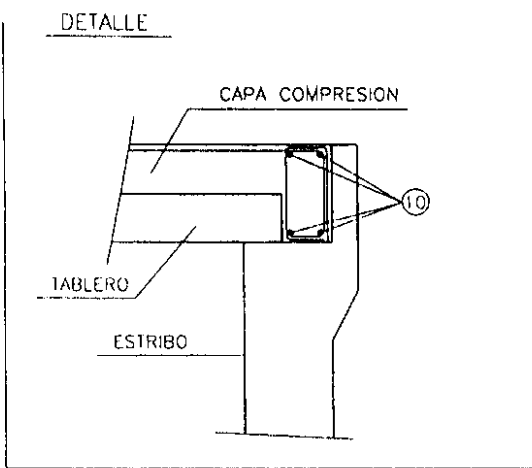
Hoja 2 de 72



Hoja 3 de 74



CUADRO DE ARMADO	
TIPO	SOLERA
1	Ø20 /14 cm.
2	Ø16 /20cm.
3	Ø12 /25 cm.
4	Ø10 /20 cm.
5	3Ø6/ml. cada 30cm en 150cm
9	Ø10 /20 cm.



CUADRO DE ARMADO	
TIPO	CAPA COMPRESION
6	Ø16 /20 cm.
7	Ø10 /20cm.
8	Ø10 /20cm.
10	4 Ø16

CONTROL DE CALIDAD	
HORMIGON:	H-250
ACERO:	B-500
CONTROL NORMAL	

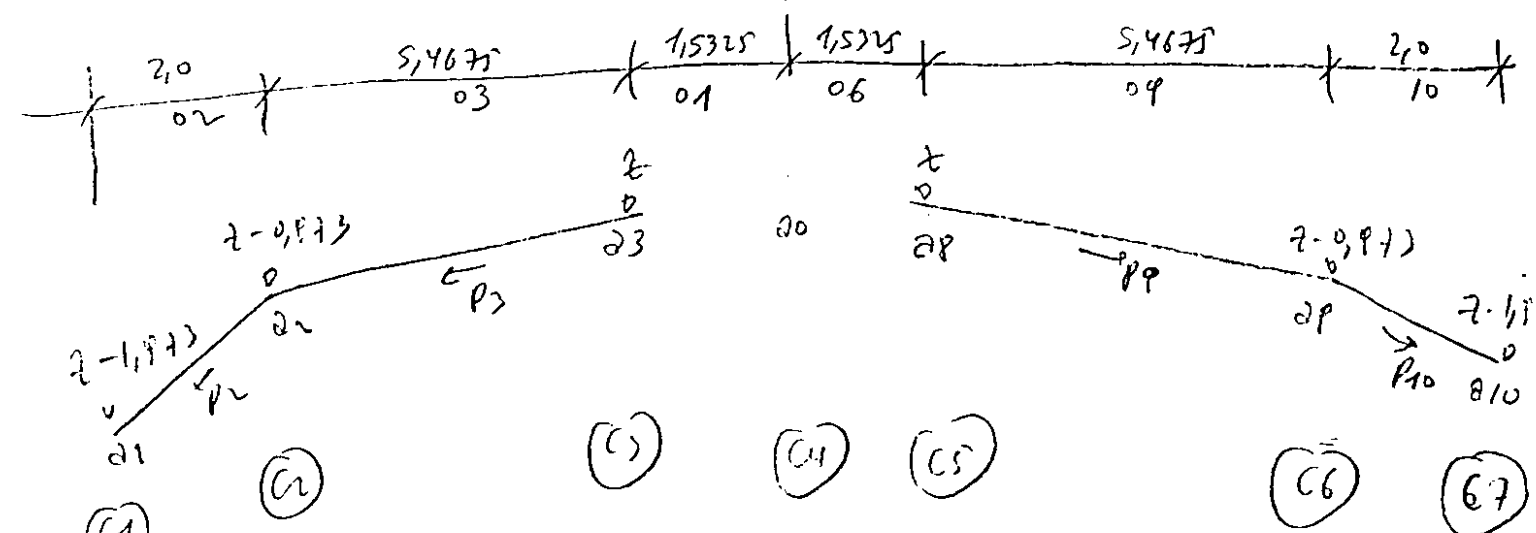
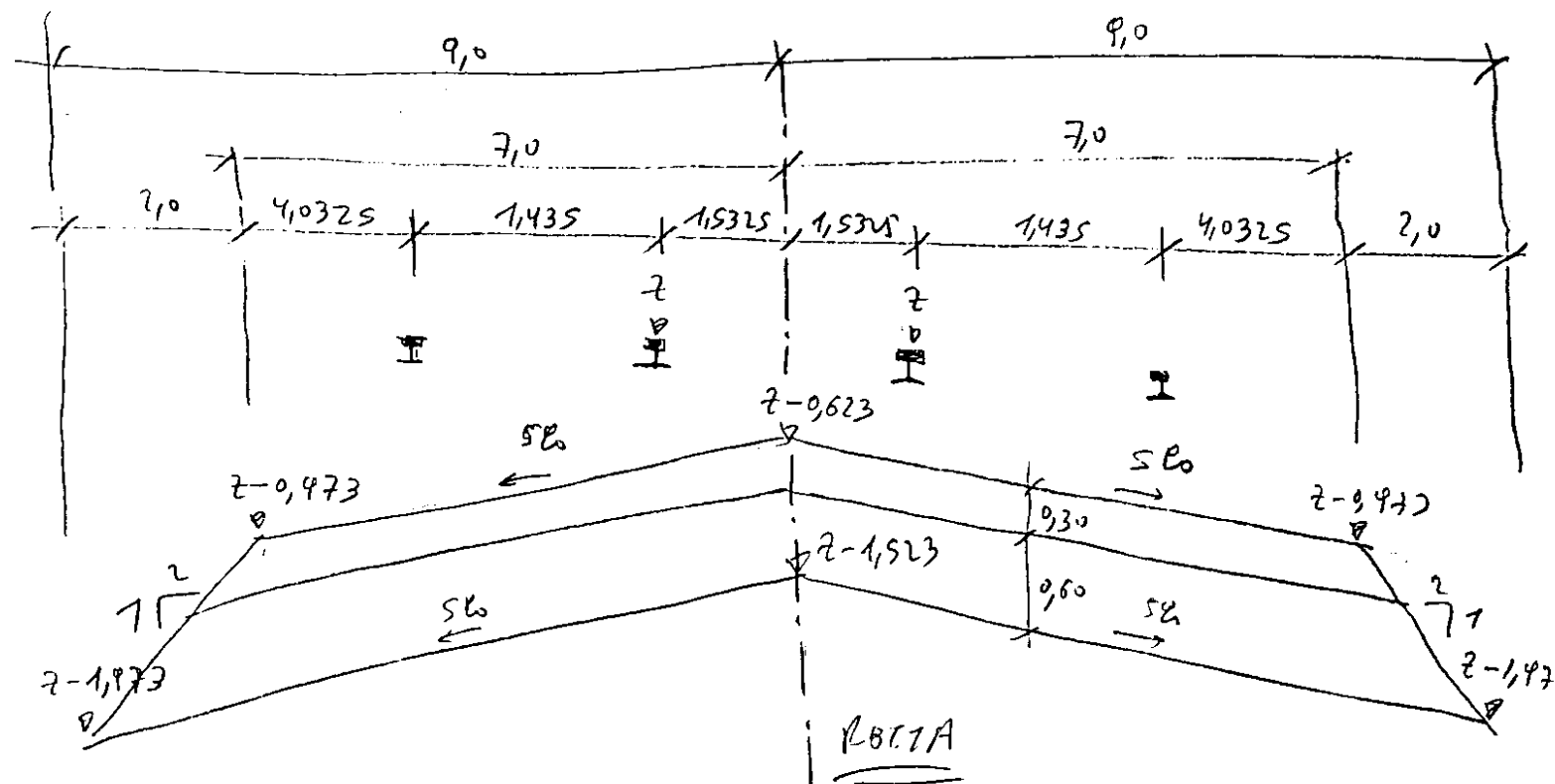
16/10/00	0		
FECHA	REV.	MODIFICACIONES	Nº PLANO
PILZA	ARMADO IN SITU PASO 800x580 pk 568+640		45.5
Nº OFERTA	99/519/11		
OBRA	TORIJA-GUADALAJARA		
CUENIE	UTE TORIJA		
ARMADO IN SITU PASO 800x580		REVISADO: C	APROBADO:
		Dep. Comercial	Dep. Técnico

Hoja 24 de 74

DEFINICION GEOMETRICA

DATOS GENERALES DEL TRAZADO

PI 552+7



$(1) \quad p_2 = -0.5$
 $p_3 = -\frac{0.973}{5.4675} = -0.177967$
 $p_9 = 0.177967$
 $p_{10} = 0.5$

REPLANTEO DE LOS BORDES DEL F.F.C.C.

Q.F.-P.I. 558+700
 557700.0 499007.904509301.706 58.2170 1001 EJE DEL TRONCO DEL EFCC
 1560029.927 -2559026.88245000. -1.00479921 1
 2 558000. 1.5325 2. 5.4675 1.5325 5.4675 2.
 559000. 1.5325 2. 5.4675 1.5325 5.4675 2.
 2 558000. -0.5 -.17796 0.177960.5
 559000. -0.5 -.17796 0.177960.5
 7 1 0. 2 0. 3 0. 0 0. 8 0. 9 0. 10 0.
 VTE V-558+7
 848.903 499722.354509997.827 66.8340 3 925.667 971.516 -0.006 4
 2 963.739 80. 2 967.667 7000.
 1 1032.644 1 1038.393
 -2 1160.376 80. -2 1140.993 1800.
 1 1161.309
 2 800 1. 3.00 3.00 1.
 2000. 1. 3.00 3.00 1.
 2 800. 0.02 0.02
 2000. 0.02 0.02
 5 1 0. 2 0. 0 0. 9 0. 10 0.
 1 40 3
 2 0 558710. 1. 558810. 70 10 20 30 40 50 60 7
 3 920.0 1. 1050. 53 13 23 33 43 5
 0
 0
 0
 0
 /*
 /R

0 558713.000 -41.783000 .792240 -.610210
1

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TITULO DEL TRABAJO O.F.-P.I.558+700

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
AZ.E	AZ.3								
4	0	3	3	558760.000	1000.000	499847.678	509948.529	980.837	970.750
58.217000	158.217585								

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	558710.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	0	558710.000	499802.574	509925.148	978.847
1	1	2	0	558710.000	499803.795	509923.564	979.847
1	1	3	0	558710.000	499807.131	509919.232	980.820
1	1	4	0	558710.000	499808.066	509918.018	980.820
1	1	5	0	558710.000	499809.001	509916.804	980.820
1	1	6	0	558710.000	499812.337	509912.473	979.847
1	1	7	0	558710.000	499813.558	509910.888	978.847

EJE	P.K.	AZIMUT	COS A	SEN A
0	558711.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	0	558711.000	499803.366	509925.759	978.847
1	2	2	0	558711.000	499801.587	509924.174	979.847
1	2	3	0	558711.000	499807.923	509919.843	980.819
1	2	4	0	558711.000	499808.858	509918.628	980.819
1	2	5	0	558711.000	499809.793	509917.414	980.819
1	2	6	0	558711.000	499813.130	509913.083	979.847
1	2	7	0	558711.000	499814.350	509911.498	978.847

EJE	P.K.	AZIMUT	COS A	SEN A
0	558712.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	0	558712.000	499804.159	509926.369	978.846
1	3	2	0	558712.000	499805.379	509924.784	979.846
1	3	3	0	558712.000	499808.715	509920.453	980.819
1	3	4	0	558712.000	499809.650	509919.239	980.819
1	3	5	0	558712.000	499810.586	509918.025	980.819
1	3	6	0	558712.000	499813.922	509913.693	979.846
1	3	7	0	558712.000	499815.142	509912.109	978.846

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	0	558713.000	499804.951	509926.979	978.846
1	4	2	0	558713.000	499806.171	509925.395	979.846
1	4	3	0	558713.000	499809.508	509921.063	980.819
1	4	4	0	558713.000	499810.443	509919.849	980.819
1	4	5	0	558713.000	499811.378	509918.635	980.819
1	4	6	0	558713.000	499814.714	509914.303	979.846
1	4	7	0	558713.000	499815.935	509912.719	978.846

EJE	P.K.	AZIMUT	COS A	SEN A
0	558714.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	5	1	0	558714.000	499805.743	509927.589	978.846
1	5	2	0	558714.000	499806.963	509926.005	979.846
1	5	3	0	558714.000	499810.300	509921.673	980.819
1	5	4	0	558714.000	499811.235	509920.459	980.819
1	5	5	0	558714.000	499812.170	509919.245	980.819
1	5	6	0	558714.000	499815.506	509914.913	979.846
1	5	7	0	558714.000	499816.727	509913.329	978.846

EJE	P.K.	AZIMUT	COS A	SEN A
0	558715.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	6	1	0	558715.000	499806.535	509928.199	978.846
1	6	2	0	558715.000	499807.756	509926.615	979.846
1	6	3	0	558715.000	499811.092	509922.283	980.819
1	6	4	0	558715.000	499812.027	509921.069	980.819
1	6	5	0	558715.000	499812.962	509919.855	980.819
1	6	6	0	558715.000	499816.299	509915.524	979.846
1	6	7	0	558715.000	499817.519	509913.939	978.846

EJE	P.K.	AZIMUT	COS A	SEN A
0	558716.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	7	1	0	558716.000	499807.328	509928.810	978.846
1	7	2	0	558716.000	499808.548	509927.225	979.846
1	7	3	0	558716.000	499811.884	509922.894	980.819
1	7	4	0	558716.000	499812.819	509921.680	980.819
1	7	5	0	558716.000	499813.755	509920.465	980.819
1	7	6	0	558716.000	499817.091	509916.134	979.846
1	7	7	0	558716.000	499818.311	509914.549	978.846

EJE	P.K.	AZIMUT	COS A	SEN A
0	558717.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	8	1	0	558717.000	499808.120	509929.420	978.846
1	8	2	0	558717.000	499809.340	509927.835	979.846
1	8	3	0	558717.000	499812.677	509923.504	980.819
1	8	4	0	558717.000	499813.612	509922.290	980.819
1	8	5	0	558717.000	499814.547	509921.076	980.819
1	8	6	0	558717.000	499817.883	509916.744	979.846
1	8	7	0	558717.000	499819.104	509915.160	978.846

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EJE	P.K.	AZIMUT	COS A	SEN A			
0	558718.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	9	1	0	558718.000	499808.912	509930.030	978.846
1	9	2	0	558718.000	499810.132	509928.446	979.846
1	9	3	0	558718.000	499813.469	509924.114	980.819
1	9	4	0	558718.000	499814.404	509922.900	980.819
1	9	5	0	558718.000	499815.339	509921.686	980.819
1	9	6	0	558718.000	499818.675	509917.354	979.846
1	9	7	0	558718.000	499819.896	509915.770	978.846

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558719.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	10	1	0	558719.000	499809.764	509930.640	978.846
1	10	2	0	558719.000	499810.925	509929.056	979.846
1	10	3	0	558719.000	499814.261	509924.724	980.819
1	10	4	0	558719.000	499815.196	509923.510	980.819
1	10	5	0	558719.000	499816.131	509922.296	980.819
1	10	6	0	558719.000	499819.468	509917.964	979.846
1	10	7	0	558719.000	499820.688	509916.380	978.846

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558720.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	11	1	0	558720.000	499810.496	509931.251	978.846
1	11	2	0	558720.000	499811.717	509929.666	979.846
1	11	3	0	558720.000	499815.053	509925.334	980.819
1	11	4	0	558720.000	499815.988	509924.120	980.819
1	11	5	0	558720.000	499816.924	509922.906	980.819
1	11	6	0	558720.000	499820.260	509918.575	979.846
1	11	7	0	558720.000	499821.480	509916.990	978.846

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558721.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	12	1	0	558721.000	499811.289	509931.861	978.846
1	12	2	0	558721.000	499812.509	509930.276	979.846
1	12	3	0	558721.000	499815.845	509925.945	980.819
1	12	4	0	558721.000	499816.781	509924.731	980.819
1	12	5	0	558721.000	499817.716	509923.516	980.819
1	12	6	0	558721.000	499821.052	509919.185	979.846
1	12	7	0	558721.000	499822.273	509917.600	978.846

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558722.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	13	1	0	558722.000	499812.081	509932.471	978.846
1	13	2	0	558722.000	499813.301	509930.886	979.846
1	13	3	0	558722.000	499816.638	509926.555	980.819
1	13	4	0	558722.000	499817.573	509925.341	980.819
1	13	5	0	558722.000	499818.508	509924.127	980.819
1	13	6	0	558722.000	499821.844	509919.795	979.846
1	13	7	0	558722.000	499823.065	509918.211	978.846

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558723.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	14	1	0	558723.000	499812.873	509933.081	978.846
1	14	2	0	558723.000	499814.094	509931.497	979.846
1	14	3	0	558723.000	499817.430	509927.165	980.819
1	14	4	0	558723.000	499818.365	509925.951	980.819
1	14	5	0	558723.000	499819.300	509924.737	980.819
1	14	6	0	558723.000	499822.637	509920.405	979.846
1	14	7	0	558723.000	499823.857	509918.821	978.846

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558724.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	15	1	0	558724.000	499813.665	509933.691	978.846
1	15	2	0	558724.000	499814.886	509932.107	979.846
1	15	3	0	558724.000	499818.222	509927.775	980.819
1	15	4	0	558724.000	499819.157	509926.561	980.819
1	15	5	0	558724.000	499820.092	509925.347	980.819
1	15	6	0	558724.000	499823.429	509921.016	979.846
1	15	7	0	558724.000	499824.649	509919.431	978.846

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558725.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	16	1	0	558725.000	499814.458	509934.302	978.846
1	16	2	0	558725.000	499815.678	509932.717	979.846
1	16	3	0	558725.000	499819.014	509928.386	980.819
1	16	4	0	558725.000	499819.950	509927.171	980.819
1	16	5	0	558725.000	499820.885	509925.957	980.819
1	16	6	0	558725.000	499824.221	509921.626	979.846
1	16	7	0	558725.000	499825.441	509920.041	978.846

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558726.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	17	1	0	558726.000	499815.250	509934.912	978.846
1	17	2	0	558726.000	499816.470	509933.327	979.846
1	17	3	0	558726.000	499819.807	509928.996	980.819
1	17	4	0	558726.000	499820.742	509927.782	980.819
1	17	5	0	558726.000	499821.677	509926.568	980.819
1	17	6	0	558726.000	499825.013	509922.236	979.846
1	17	7	0	558726.000	499826.234	509920.651	978.846

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558727.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	18	1	0	558727.000	499816.042	509935.522	978.846
1	18	2	0	558727.000	499817.263	509933.938	979.846
1	18	3	0	558727.000	499820.599	509929.606	980.819
1	18	4	0	558727.000	499821.534	509928.392	980.819
1	18	5	0	558727.000	499822.469	509927.178	980.819
1	18	6	0	558727.000	499825.806	509922.846	979.846
1	18	7	0	558727.000	499827.026	509921.262	978.846

EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	19	1	0	558728.000	499816.834	509936.132	978.847
1	19	2	0	558728.000	499818.055	509934.548	979.847
1	19	3	0	558728.000	499821.391	509930.216	980.820
1	19	4	0	558728.000	499822.326	509929.002	980.820
1	19	5	0	558728.000	499823.261	509927.788	980.820
1	19	6	0	558728.000	499826.598	509923.456	979.847
1	19	7	0	558728.000	499827.818	509921.872	978.847

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558729.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	20	1	0	558729.000	499817.627	509936.742	978.847
1	20	2	0	558729.000	499818.847	509935.158	979.847
1	20	3	0	558729.000	499822.183	509930.826	980.820
1	20	4	0	558729.000	499823.119	509929.612	980.820
1	20	5	0	558729.000	499824.054	509928.398	980.820
1	20	6	0	558729.000	499827.390	509924.067	979.847
1	20	7	0	558729.000	499828.610	509922.482	978.847

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558730.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	21	1	0	558730.000	499818.419	509937.353	978.847
1	21	2	0	558730.000	499819.639	509935.768	979.847
1	21	3	0	558730.000	499822.976	509931.437	980.820
1	21	4	0	558730.000	499823.911	509930.222	980.820
1	21	5	0	558730.000	499824.846	509929.008	980.820
1	21	6	0	558730.000	499828.182	509924.677	979.847
1	21	7	0	558730.000	499829.403	509923.092	978.847

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558731.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	22	1	0	558731.000	499819.211	509937.963	978.847
1	22	2	0	558731.000	499820.432	509936.378	979.847
1	22	3	0	558731.000	499823.768	509932.047	980.820
1	22	4	0	558731.000	499824.703	509930.833	980.820
1	22	5	0	558731.000	499825.638	509929.619	980.820
1	22	6	0	558731.000	499828.974	509925.287	979.847
1	22	7	0	558731.000	499830.195	509923.703	978.847

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EJE	P.K.	AZIMUT	COS A	SEN A
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0	558732.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	23	1	0	558732.000	499820.003	509938.573	978.848
1	23	2	0	558732.000	499821.224	509936.989	979.848
1	23	3	0	558732.000	499824.560	509932.657	980.821
1	23	4	0	558732.000	499825.495	509931.443	980.821
1	23	5	0	558732.000	499826.430	509930.229	980.821
1	23	6	0	558732.000	499829.767	509925.897	979.848
1	23	7	0	558732.000	499830.987	509924.313	978.848

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558733.000	-41.783000	.792240	-.610210
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1	24	1	0	558733.000	499820.795	509939.183	978.848
1	24	2	0	558733.000	499822.016	509937.599	979.848
1	24	3	0	558733.000	499825.352	509933.267	980.821
1	24	4	0	558733.000	499826.287	509932.053	980.821
1	24	5	0	558733.000	499827.223	509930.839	980.821
1	24	6	0	558733.000	499830.559	509926.507	979.848
1	24	7	0	558733.000	499831.779	509924.923	978.848

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558734.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	25	1	0	558734.000	499821.588	509939.793	978.848
1	25	2	0	558734.000	499822.808	509938.209	979.848
1	25	3	0	558734.000	499826.145	509933.877	980.821
1	25	4	0	558734.000	499827.080	509932.663	980.821
1	25	5	0	558734.000	499828.015	509931.449	980.821
1	25	6	0	558734.000	499831.351	509927.118	979.848
1	25	7	0	558734.000	499832.572	509925.533	978.848

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558735.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	26	1	0	558735.000	499822.380	509940.404	978.849
1	26	2	0	558735.000	499823.601	509938.819	979.849
1	26	3	0	558735.000	499826.937	509934.488	980.822
1	26	4	0	558735.000	499827.872	509933.274	980.822
1	26	5	0	558735.000	499828.807	509932.059	980.822
1	26	6	0	558735.000	499832.143	509927.728	979.849
1	26	7	0	558735.000	499833.364	509926.143	978.849

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558736.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	27	1	0	558736.000	499823.172	509941.014	978.849
1	27	2	0	558736.000	499824.393	509939.429	979.849
1	27	3	0	558736.000	499827.729	509935.098	980.822
1	27	4	0	558736.000	499828.664	509933.884	980.822

1

1	27	5	0	558736.000	499829.599	509932.670	980.822
1	27	6	0	558736.000	499832.936	509928.338	979.849
1	27	7	0	558736.000	499834.156	509926.754	978.849

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558737.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	28	1	0	558737.000	499823.965	509941.624	978.849
1	28	2	0	558737.000	499825.185	509940.040	979.849
1	28	3	0	558737.000	499828.521	509935.708	980.822
1	28	4	0	558737.000	499829.456	509934.494	980.822
1	28	5	0	558737.000	499830.392	509933.280	980.822
1	28	6	0	558737.000	499833.728	509928.948	979.849
1	28	7	0	558737.000	499834.948	509927.364	978.849

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558738.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	29	1	0	558738.000	499824.757	509942.234	978.850

1	29	4	0	558738.000	499830.219	509935.104	980.823
1	29	5	0	558738.000	499831.184	509933.890	980.823
1	29	6	0	558738.000	499834.520	509929.558	979.850
1	29	7	0	558738.000	499835.741	509927.974	978.850

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558739.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	30	1	0	558739.000	499825.549	509942.845	978.850
1	30	2	0	558739.000	499826.769	509941.260	979.850
1	30	3	0	558739.000	499830.106	509936.928	980.823
1	30	4	0	558739.000	499831.041	509935.714	980.823
1	30	5	0	558739.000	499831.976	509934.500	980.823
1	30	6	0	558739.000	499835.312	509930.169	979.850
1	30	7	0	558739.000	499836.533	509928.584	978.850

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558740.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	31	1	0	558740.000	499826.341	509943.455	978.851
1	31	2	0	558740.000	499827.562	509941.870	979.851
1	31	3	0	558740.000	499830.898	509937.539	980.824
1	31	4	0	558740.000	499831.833	509936.325	980.824
1	31	5	0	558740.000	499832.768	509935.110	980.824
1	31	6	0	558740.000	499836.105	509930.779	979.851
1	31	7	0	558740.000	499837.325	509929.194	978.851

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558741.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	32	1	0	558741.000	499827.134	509944.065	978.851
1	32	2	0	558741.000	499828.354	509942.480	979.851
1	32	3	0	558741.000	499831.690	509938.149	980.824
1	32	4	0	558741.000	499832.625	509936.935	980.824
1	32	5	0	558741.000	499833.561	509935.721	980.824
1	32	6	0	558741.000	499836.897	509931.389	979.851
1	32	7	0	558741.000	499838.117	509929.805	978.851

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558742.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	33	1	0	558742.000	499827.926	509944.675	978.852
1	33	2	0	558742.000	499829.146	509943.091	979.852
1	33	3	0	558742.000	499832.483	509938.759	980.825
1	33	4	0	558742.000	499833.418	509937.545	980.825
1	33	5	0	558742.000	499834.353	509936.331	980.825
1	33	6	0	558742.000	499837.689	509931.999	979.852
1	33	7	0	558742.000	499838.910	509930.415	978.852

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558743.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	34	1	0	558743.000	499828.718	509945.285	978.852
1	34	2	0	558743.000	499829.938	509943.701	979.852
1	34	3	0	558743.000	499833.275	509939.369	980.825

1	34	6	0	558743.000	499838.481	509932.610	979.852
1	34	7	0	558743.000	499839.702	509931.025	978.852

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558744.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	35	1	0	558744.000	499829.510	509945.896	978.853
1	35	2	0	558744.000	499830.731	509944.311	979.853
1	35	3	0	558744.000	499834.067	509939.980	980.826
1	35	4	0	558744.000	499835.002	509938.765	980.826
1	35	5	0	558744.000	499835.937	509937.551	980.826
1	35	6	0	558744.000	499839.274	509933.220	979.853
1	35	7	0	558744.000	499840.494	509931.635	978.853

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558745.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	36	1	0	558745.000	499830.302	509946.506	978.853
1	36	2	0	558745.000	499831.523	509944.921	979.853
1	36	3	0	558745.000	499834.859	509940.590	980.826
1	36	4	0	558745.000	499835.794	509939.376	980.826
1	36	5	0	558745.000	499836.730	509938.162	980.826
1	36	6	0	558745.000	499840.066	509933.830	979.853
1	36	7	0	558745.000	499841.286	509932.245	978.853

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558746.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	37	1	0	558746.000	499831.095	509947.116	978.854
1	37	2	0	558746.000	499832.315	509945.531	979.854
1	37	3	0	558746.000	499835.651	509941.200	980.827
1	37	4	0	558746.000	499836.587	509939.986	980.827
1	37	5	0	558746.000	499837.522	509938.772	980.827
1	37	6	0	558746.000	499840.858	509934.440	979.854
1	37	7	0	558746.000	499842.079	509932.856	978.854

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558747.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	38	1	0	558747.000	499831.887	509947.726	978.854
1	38	2	0	558747.000	499833.107	509946.142	979.854
1	38	3	0	558747.000	499836.444	509941.810	980.827
1	38	4	0	558747.000	499837.379	509940.596	980.827
1	38	5	0	558747.000	499838.314	509939.382	980.827
1	38	6	0	558747.000	499841.650	509935.050	979.854
1	38	7	0	558747.000	499842.871	509933.466	978.854

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558748.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	39	1	0	558748.000	499832.679	509948.336	978.855
1	39	2	0	558748.000	499833.900	509946.752	979.855
1	39	3	0	558748.000	499837.236	509942.420	980.828
1	39	4	0	558748.000	499838.171	509941.206	980.828
1	39	5	0	558748.000	499839.106	509939.992	980.828

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558749.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	40	1	0	558749.000	499833.471	509948.947	978.856
1	40	2	0	558749.000	499834.692	509947.362	979.856
1	40	3	0	558749.000	499838.028	509943.031	980.829
1	40	4	0	558749.000	499838.963	509941.816	980.829
1	40	5	0	558749.000	499839.898	509940.602	980.829
1	40	6	0	558749.000	499843.235	509936.271	979.856
1	40	7	0	558749.000	499844.455	509934.686	978.856

EJE	P.K.	AZIMUT	COS A	SEN A
0	558750.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	41	1	0	558750.000	499834.264	509949.557	978.856
1	41	2	0	558750.000	499835.484	509947.972	979.856
1	41	3	0	558750.000	499838.820	509943.641	980.829
1	41	4	0	558750.000	499839.756	509942.427	980.829

1	41	5	0	558750.000	499840.691	509941.213	980.829
1	41	6	0	558750.000	499844.027	509936.881	979.856
1	41	7	0	558750.000	499845.247	509935.297	978.856

EJE	P.K.	AZIMUT	COS A	SEN A
0	558751.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	42	1	0	558751.000	499835.056	509950.167	978.857
1	42	2	0	558751.000	499836.276	509948.583	979.857
1	42	3	0	558751.000	499839.613	509944.251	980.830
1	42	4	0	558751.000	499840.548	509943.037	980.830
1	42	5	0	558751.000	499841.483	509941.823	980.830
1	42	6	0	558751.000	499844.819	509937.491	979.857
1	42	7	0	558751.000	499846.040	509935.967	978.857

EJE	P.K.	AZIMUT	COS A	SEN A
0	558752.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	43	1	0	558752.000	499835.848	509950.777	978.858
1	43	2	0	558752.000	499837.069	509949.193	979.858
1	43	3	0	558752.000	499840.405	509944.861	980.831
1	43	4	0	558752.000	499841.340	509943.647	980.831
1	43	5	0	558752.000	499842.275	509942.433	980.831
1	43	6	0	558752.000	499845.612	509938.101	979.858
1	43	7	0	558752.000	499846.832	509936.517	978.858

EJE	P.K.	AZIMUT	COS A	SEN A
0	558753.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	44	1	0	558753.000	499836.640	509951.387	978.859
1	44	2	0	558753.000	499837.861	509949.803	979.859
1	44	3	0	558753.000	499841.197	509945.471	980.832
1	44	4	0	558753.000	499842.132	509944.257	980.832
1	44	5	0	558753.000	499843.067	509943.043	980.832
1	44	6	0	558753.000	499846.404	509938.712	979.859
1	44	7	0	558753.000	499847.624	509937.127	978.859

0	558754.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	45	1	0	558754.000	499837.433	509951.998	978.859
1	45	2	0	558754.000	499838.653	509950.413	979.859
1	45	3	0	558754.000	499841.989	509946.082	980.832
1	45	4	0	558754.000	499842.925	509944.868	980.832
1	45	5	0	558754.000	499843.860	509943.653	980.832
1	45	6	0	558754.000	499847.196	509939.322	979.859
1	45	7	0	558754.000	499848.416	509937.737	978.859

EJE	P.K.	AZIMUT	COS A	SEN A
0	558755.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	46	1	0	558755.000	499838.225	509952.608	978.860
1	46	2	0	558755.000	499839.445	509951.023	979.860
1	46	3	0	558755.000	499842.782	509946.692	980.833
1	46	4	0	558755.000	499843.717	509945.478	980.833
1	46	5	0	558755.000	499844.652	509944.264	980.833
1	46	6	0	558755.000	499847.988	509939.932	979.860
1	46	7	0	558755.000	499849.209	509938.348	978.860

EJE	P.K.	AZIMUT	COS A	SEN A
0	558756.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	47	1	0	558756.000	499839.017	509953.218	978.861
1	47	2	0	558756.000	499840.238	509951.631	979.861
1	47	3	0	558756.000	499843.574	509947.302	980.834
1	47	4	0	558756.000	499844.509	509946.088	980.834
1	47	5	0	558756.000	499845.444	509944.874	980.834
1	47	6	0	558756.000	499848.780	509940.542	979.861
1	47	7	0	558756.000	499850.001	509938.958	978.861

EJE	P.K.	AZIMUT	COS A	SEN A
0	558757.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	48	1	0	558757.000	499839.809	509953.828	978.862
1	48	2	0	558757.000	499841.030	509952.244	979.862
1	48	3	0	558757.000	499844.366	509947.912	980.835
1	48	4	0	558757.000	499845.301	509946.698	980.835
1	48	5	0	558757.000	499846.236	509945.484	980.835
1	48	6	0	558757.000	499849.573	509941.152	979.862
1	48	7	0	558757.000	499850.793	509939.568	978.862

EJE	P.K.	AZIMUT	COS A	SEN A
0	558758.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	49	1	0	558758.000	499840.602	509954.438	978.863
1	49	2	0	558758.000	499841.822	509952.854	979.863
1	49	3	0	558758.000	499845.158	509948.522	980.836
1	49	4	0	558758.000	499846.093	509947.308	980.836
1	49	5	0	558758.000	499847.029	509946.094	980.836
1	49	6	0	558758.000	499850.365	509941.763	979.863
1	49	7	0	558758.000	499851.585	509940.178	978.863

EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	50	1	0	558759.000	499841.394	509955.049	978.863
1	50	2	0	558759.000	499842.614	509953.464	979.863
1	50	3	0	558759.000	499845.951	509949.133	980.836
1	50	4	0	558759.000	499846.886	509947.919	980.836
1	50	5	0	558759.000	499847.821	509946.704	980.836
1	50	6	0	558759.000	499851.157	509942.373	979.863
1	50	7	0	558759.000	499852.378	509940.788	978.863

EJE	P.K.	AZIMUT	COS A	SEN A
0	558760.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	51	1	0	558760.000	499842.186	509955.659	978.864
1	51	2	0	558760.000	499843.406	509954.074	979.864
1	51	3	0	558760.000	499846.743	509949.743	980.837
1	51	4	0	558760.000	499847.678	509948.529	980.837
1	51	5	0	558760.000	499848.613	509947.315	980.837
1	51	6	0	558760.000	499851.949	509942.983	979.864
1	51	7	0	558760.000	499853.170	509941.399	978.864

EJE	P.K.	AZIMUT	COS A	SEN A
0	558761.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	52	1	0	558761.000	499842.978	509956.269	978.865
1	52	2	0	558761.000	499844.199	509954.685	979.865
1	52	3	0	558761.000	499847.535	509950.353	980.838
1	52	4	0	558761.000	499848.470	509949.139	980.838
1	52	5	0	558761.000	499849.405	509947.925	980.838
1	52	6	0	558761.000	499852.742	509943.593	979.865
1	52	7	0	558761.000	499853.962	509942.009	978.865

EJE	P.K.	AZIMUT	COS A	SEN A
0	558762.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	53	1	0	558762.000	499843.771	509956.879	978.866
1	53	2	0	558762.000	499844.991	509955.295	979.866
1	53	3	0	558762.000	499848.327	509950.963	980.839
1	53	4	0	558762.000	499849.262	509949.749	980.839
1	53	5	0	558762.000	499850.198	509948.535	980.839
1	53	6	0	558762.000	499853.534	509944.201	979.866
1	53	7	0	558762.000	499854.754	509942.619	978.866

EJE	P.K.	AZIMUT	COS A	SEN A
0	558763.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	54	1	0	558763.000	499844.563	509957.490	978.867
1	54	2	0	558763.000	499845.783	509955.905	979.867
1	54	3	0	558763.000	499849.120	509951.574	980.840
1	54	4	0	558763.000	499850.055	509950.359	980.840
1	54	5	0	558763.000	499850.990	509949.145	980.840
1	54	6	0	558763.000	499854.326	509944.814	979.867
1	54	7	0	558763.000	499855.547	509943.229	978.867

EJE	P.K.	AZIMUT	COS A	SEN A
0	558764.000	-41.783000	.792240	-.610210

1	55	1	0	558764.000	499845.355	509958.100	978.868
1	55	2	0	558764.000	499846.575	509956.515	979.868
1	55	3	0	558764.000	499849.912	509952.184	980.841
1	55	4	0	558764.000	499850.847	509950.970	980.841

1	55	5	0	558764.000	499851.782	509949.755	980.841
1	55	6	0	558764.000	499855.118	509945.424	979.868
1	55	7	0	558764.000	499856.339	509943.839	978.868

EJE	P.K.	AZIMUT	COS A	SEN A
0	558765.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	56	1	0	558765.000	499846.147	509958.710	978.869
1	56	2	0	558765.000	499847.368	509957.125	979.869
1	56	3	0	558765.000	499850.704	509952.794	980.842
1	56	4	0	558765.000	499851.639	509951.580	980.842
1	56	5	0	558765.000	499852.574	509950.366	980.842
1	56	6	0	558765.000	499855.911	509946.034	979.869
1	56	7	0	558765.000	499857.131	509944.450	978.869

EJE	P.K.	AZIMUT	COS A	SEN A
0	558766.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	57	1	0	558766.000	499846.940	509959.320	978.870
1	57	2	0	558766.000	499848.160	509957.736	979.870
1	57	3	0	558766.000	499851.496	509953.404	980.843
1	57	4	0	558766.000	499852.431	509952.190	980.843
1	57	5	0	558766.000	499853.367	509950.976	980.843
1	57	6	0	558766.000	499856.703	509946.644	979.870
1	57	7	0	558766.000	499857.923	509945.060	978.870

EJE	P.K.	AZIMUT	COS A	SEN A
0	558767.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	58	1	0	558767.000	499847.732	509959.930	978.871
1	58	2	0	558767.000	499848.952	509958.346	979.871
1	58	3	0	558767.000	499852.288	509954.014	980.844
1	58	4	0	558767.000	499853.224	509952.800	980.844
1	58	5	0	558767.000	499854.159	509951.586	980.844
1	58	6	0	558767.000	499857.495	509947.255	979.871
1	58	7	0	558767.000	499858.716	509945.670	978.871

EJE	P.K.	AZIMUT	COS A	SEN A
0	558768.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	59	1	0	558768.000	499848.524	509960.541	978.872
1	59	2	0	558768.000	499849.744	509958.956	979.872
1	59	3	0	558768.000	499853.081	509954.625	980.845
1	59	4	0	558768.000	499854.016	509953.410	980.845
1	59	5	0	558768.000	499854.951	509952.196	980.845
1	59	6	0	558768.000	499858.287	509947.865	979.872
1	59	7	0	558768.000	499859.508	509946.280	978.872

EJE	P.K.	AZIMUT	COS A	SEN A
0	558769.000	-41.783000	.792240	-.610210

1

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	60	1	0	558769.000	499849.316	509961.151	978.873
1	60	2	0	558769.000	499850.537	509959.566	979.873
1	60	3	0	558769.000	499853.873	509955.235	980.846
1	60	4	0	558769.000	499854.808	509954.021	980.846
1	60	5	0	558769.000	499855.743	509952.807	980.846
1	60	6	0	558769.000	499859.080	509948.475	979.873
1	60	7	0	558769.000	499860.300	509946.890	978.873

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558770.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	61	1	0	558770.000	499850.108	509961.761	978.875
1	61	2	0	558770.000	499851.329	509960.177	979.875
1	61	3	0	558770.000	499854.665	509955.845	980.848
1	61	4	0	558770.000	499855.600	509954.631	980.818
1	61	5	0	558770.000	499856.536	509953.417	980.818
1	61	6	0	558770.000	499859.872	509949.085	979.875
1	61	7	0	558770.000	499861.092	509947.501	978.875

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558771.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	62	1	0	558771.000	499850.901	509962.371	978.876
1	62	2	0	558771.000	499852.121	509960.787	979.876
1	62	3	0	558771.000	499855.457	509956.455	980.849
1	62	4	0	558771.000	499856.393	509955.241	980.849
1	62	5	0	558771.000	499857.328	509954.027	980.849
1	62	6	0	558771.000	499860.664	509949.695	979.876
1	62	7	0	558771.000	499861.884	509948.111	978.876

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558772.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	63	1	0	558772.000	499851.693	509962.981	978.877
1	63	2	0	558772.000	499852.913	509961.397	979.877
1	63	3	0	558772.000	499856.250	509957.065	980.850
1	63	4	0	558772.000	499857.185	509955.851	980.850
1	63	5	0	558772.000	499858.120	509954.637	980.850
1	63	6	0	558772.000	499861.456	509950.306	979.877
1	63	7	0	558772.000	499862.677	509948.721	978.877

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558773.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	64	1	0	558773.000	499852.485	509963.592	978.878
1	64	2	0	558773.000	499853.706	509962.007	979.878
1	64	3	0	558773.000	499857.042	509957.676	980.851
1	64	4	0	558773.000	499857.977	509956.461	980.851
1	64	5	0	558773.000	499858.912	509955.247	980.851
1	64	6	0	558773.000	499862.249	509950.916	979.878
1	64	7	0	558773.000	499863.469	509949.331	978.878

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558774.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	65	2	0	558774.000	499854.498	509962.617	979.879
1	65	3	0	558774.000	499857.834	509958.286	980.852
1	65	4	0	558774.000	499858.769	509957.072	980.852
1	65	5	0	558774.000	499859.704	509955.858	980.852
1	65	6	0	558774.000	499863.041	509951.526	979.879
1	65	7	0	558774.000	499864.261	509949.942	978.879

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558775.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	66	1	0	558775.000	499854.070	509964.812	978.881
1	66	2	0	558775.000	499855.290	509963.228	979.881
1	66	3	0	558775.000	499858.626	509958.896	980.854
1	66	4	0	558775.000	499859.562	509957.682	980.854
1	66	5	0	558775.000	499860.497	509956.468	980.854
1	66	6	0	558775.000	499863.833	509952.136	979.881
1	66	7	0	558775.000	499865.053	509950.552	978.881

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558776.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	67	1	0	558776.000	499854.862	509965.422	978.882
1	67	2	0	558776.000	499856.082	509963.838	979.882
1	67	3	0	558776.000	499859.419	509959.506	980.855
1	67	4	0	558776.000	499860.354	509958.292	980.855
1	67	5	0	558776.000	499861.289	509957.078	980.855
1	67	6	0	558776.000	499864.625	509952.746	979.882
1	67	7	0	558776.000	499865.846	509951.162	978.882

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558777.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	68	1	0	558777.000	499855.654	509966.032	978.883
1	68	2	0	558777.000	499856.875	509964.448	979.883
1	68	3	0	558777.000	499860.211	509960.116	980.856
1	68	4	0	558777.000	499861.146	509958.902	980.856
1	68	5	0	558777.000	499862.081	509957.688	980.856
1	68	6	0	558777.000	499865.418	509953.357	979.883
1	68	7	0	558777.000	499866.638	509951.772	978.883

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558778.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	69	1	0	558778.000	499856.446	509966.643	978.884
1	69	2	0	558778.000	499857.667	509965.058	979.884
1	69	3	0	558778.000	499861.003	509960.727	980.857
1	69	4	0	558778.000	499861.938	509959.513	980.857

1	69	5	0	558778.000	499862.873	509958.298	980.857
1	69	6	0	558778.000	499866.210	509953.967	979.884
1	69	7	0	558778.000	499867.430	509952.382	978.884

EJE	P.K.	AZIMUT	COS A	SEN A
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0	558779.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	70	1	0	558779.000	499857.239	509967.253	978.886

1	70	4	0	558779.000	499862.721	509960.122	980.859
1	70	5	0	558779.000	499863.666	509958.909	980.859
1	70	6	0	558779.000	499867.002	509954.577	979.886
1	70	7	0	558779.000	499868.222	509952.993	978.886

EJE	P.K.	AZIMUT	COS A	SEN A
0	558780.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	71	1	0	558780.000	499858.031	509967.863	978.887
1	71	2	0	558780.000	499859.251	509966.279	979.887
1	71	3	0	558780.000	499862.588	509961.947	980.860
1	71	4	0	558780.000	499863.523	509960.733	980.860
1	71	5	0	558780.000	499864.458	509959.519	980.860
1	71	6	0	558780.000	499867.794	509955.187	979.887
1	71	7	0	558780.000	499869.015	509953.603	978.887

EJE	P.F.	AZIMUT	COS A	SEN A
0	558781.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.F.	X	Y	Z
1	72	1	0	558781.000	499858.823	509968.473	978.888
1	72	2	0	558781.000	499860.044	509966.889	979.888
1	72	3	0	558781.000	499863.380	509962.557	980.861
1	72	4	0	558781.000	499864.315	509961.343	980.861
1	72	5	0	558781.000	499865.250	509960.129	980.861
1	72	6	0	558781.000	499868.586	509955.797	979.888
1	72	7	0	558781.000	499869.807	509954.213	978.888

EJE	P.K.	AZIMUT	COS A	SEN A
0	558782.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	73	1	0	558782.000	499859.615	509969.084	978.890
1	73	2	0	558782.000	499860.836	509967.499	979.890
1	73	3	0	558782.000	499864.172	509963.167	980.863
1	73	4	0	558782.000	499865.107	509961.953	980.863
1	73	5	0	558782.000	499866.042	509960.739	980.863
1	73	6	0	558782.000	499869.379	509956.408	979.890
1	73	7	0	558782.000	499870.599	509954.823	978.890

EJE	P.K.	AZIMUT	COS A	SEN A
0	558783.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	74	1	0	558783.000	499860.408	509969.694	978.891
1	74	2	0	558783.000	499861.628	509968.109	979.891
1	74	3	0	558783.000	499864.964	509963.778	980.864
1	74	4	0	558783.000	499865.899	509962.564	980.864
1	74	5	0	558783.000	499866.835	509961.349	980.864
1	74	6	0	558783.000	499870.171	509957.018	979.891
1	74	7	0	558783.000	499871.391	509955.433	978.891

EJE	P.K.	AZIMUT	COS A	SEN A
0	558784.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	75	1	0	558784.000	499861.200	509970.304	978.893
1	75	2	0	558784.000	499862.420	509968.719	979.893
1	75	3	0	558784.000	499865.757	509964.388	980.866

1	75	6	0	558784.000	499870.963	509957.628	979.893
1	75	7	0	558784.000	499872.184	509956.044	978.893

EJE	P.K.	AZIMUT	COS A	SEN A
0	558785.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	76	1	0	558785.000	499861.992	509970.914	978.894
1	76	2	0	558785.000	499863.212	509969.330	979.894
1	76	3	0	558785.000	499866.549	509964.998	980.867
1	76	4	0	558785.000	499867.484	509963.784	980.867
1	76	5	0	558785.000	499868.419	509962.570	980.867
1	76	6	0	558785.000	499871.755	509958.238	979.894
1	76	7	0	558785.000	499872.976	509956.654	978.894

EJE	P.K.	AZIMUT	COS A	SEN A
0	558786.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	77	1	0	558786.000	499862.784	509971.524	978.896
1	77	2	0	558786.000	499864.005	509969.940	979.896
1	77	3	0	558786.000	499867.341	509965.608	980.869
1	77	4	0	558786.000	499868.276	509964.394	980.869
1	77	5	0	558786.000	499869.211	509963.180	980.869
1	77	6	0	558786.000	499872.548	509958.849	979.896
1	77	7	0	558786.000	499873.768	509957.264	978.896

EJE	P.K.	AZIMUT	COS A	SEN A
0	558787.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	78	1	0	558787.000	499863.577	509972.135	978.897
1	78	2	0	558787.000	499864.797	509970.550	979.897
1	78	3	0	558787.000	499868.133	509966.219	980.870
1	78	4	0	558787.000	499869.068	509965.004	980.870
1	78	5	0	558787.000	499870.004	509963.790	980.870
1	78	6	0	558787.000	499873.340	509959.459	979.897
1	78	7	0	558787.000	499874.560	509957.874	978.897

EJE	P.K.	AZIMUT	COS A	SEN A
0	558788.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	79	1	0	558788.000	499864.369	509972.745	978.899
1	79	2	0	558788.000	499865.589	509971.160	979.899
1	79	3	0	558788.000	499868.926	509966.829	980.872
1	79	4	0	558788.000	499869.861	509965.615	980.872
1	79	5	0	558788.000	499870.796	509964.401	980.872
1	79	6	0	558788.000	499874.132	509960.069	979.899
1	79	7	0	558788.000	499875.353	509958.484	978.899

EJE	P.K.	AZIMUT	COS A	SEN A
0	558789.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	80	1	0	558789.000	499865.161	509973.355	978.900
1	80	2	0	558789.000	499866.381	509971.771	979.900
1	80	3	0	558789.000	499869.718	509967.439	980.873
1	80	4	0	558789.000	499870.653	509966.225	980.873
1	80	5	0	558789.000	499871.588	509965.011	980.873

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558790.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	81	1	0	558790.000	499865.953	509973.965	978.902
1	81	2	0	558790.000	499867.174	509972.381	979.902
1	81	3	0	558790.000	499870.510	509968.049	980.875
1	81	4	0	558790.000	499871.445	509966.835	980.875
1	81	5	0	558790.000	499872.380	509965.621	980.875
1	81	6	0	558790.000	499875.717	509961.289	979.902
1	81	7	0	558790.000	499876.937	509959.705	978.902

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558791.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	82	1	0	558791.000	499866.746	509974.575	978.903
1	82	2	0	558791.000	499867.966	509972.991	979.903
1	82	3	0	558791.000	499871.302	509968.659	980.876
1	82	4	0	558791.000	499872.237	509967.445	980.876
1	82	5	0	558791.000	499873.173	509966.231	980.876
1	82	6	0	558791.000	499876.509	509961.900	979.903
1	82	7	0	558791.000	499877.729	509960.315	978.903

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558792.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	83	1	0	558792.000	499867.538	509975.186	978.905
1	83	2	0	558792.000	499868.758	509973.601	979.905
1	83	3	0	558792.000	499872.094	509969.270	980.878
1	83	4	0	558792.000	499873.030	509968.055	980.878
1	83	5	0	558792.000	499873.965	509966.841	980.878
1	83	6	0	558792.000	499877.301	509962.510	979.905
1	83	7	0	558792.000	499878.522	509960.925	978.905

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558793.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	84	1	0	558793.000	499868.330	509975.796	978.906
1	84	2	0	558793.000	499869.550	509974.211	979.906
1	84	3	0	558793.000	499872.887	509969.880	980.879
1	84	4	0	558793.000	499873.822	509968.666	980.879
1	84	5	0	558793.000	499874.757	509967.452	980.879
1	84	6	0	558793.000	499878.093	509963.120	979.906
1	84	7	0	558793.000	499879.314	509961.536	978.906

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558794.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	85	1	0	558794.000	499869.122	509976.406	978.908
1	85	2	0	558794.000	499870.343	509971.822	979.908
1	85	3	0	558794.000	499873.679	509970.490	980.881
1	85	4	0	558794.000	499874.614	509969.276	980.881
1	85	5	0	558794.000	499875.549	509968.062	980.881
1	85	6	0	558794.000	499878.886	509963.730	979.908
1	85	7	0	558794.000	499880.106	509962.146	978.908

0	558795.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	86	1	0	558795.000	499869.914	509977.016	978.910
1	86	2	0	558795.000	499871.135	509975.432	979.910
1	86	3	0	558795.000	499874.471	509971.100	980.883
1	86	4	0	558795.000	499875.406	509969.886	980.883
1	86	5	0	558795.000	499876.341	509968.672	980.883
1	86	6	0	558795.000	499879.678	509964.340	979.910
1	86	7	0	558795.000	499880.898	509962.756	978.910

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558796.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	87	1	0	558796.000	499870.707	509977.626	978.912
1	87	2	0	558796.000	499871.927	509976.042	979.912
1	87	3	0	558796.000	499875.263	509971.710	980.885
1	87	4	0	558796.000	499876.199	509970.496	980.885
1	87	5	0	558796.000	499877.134	509969.282	980.885
1	87	6	0	558796.000	499880.470	509964.951	979.912
1	87	7	0	558796.000	499881.690	509963.366	978.912

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558797.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	88	1	0	558797.000	499871.499	509978.237	978.913
1	88	2	0	558797.000	499872.719	509976.652	979.913
1	88	3	0	558797.000	499876.056	509972.321	980.886
1	88	4	0	558797.000	499876.991	509971.107	980.886
1	88	5	0	558797.000	499877.926	509969.892	980.886
1	88	6	0	558797.000	499881.262	509965.561	979.913
1	88	7	0	558797.000	499882.483	509963.976	978.913

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558798.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	89	1	0	558798.000	499872.291	509978.847	978.915
1	89	2	0	558798.000	499873.512	509977.262	979.915
1	89	3	0	558798.000	499876.848	509972.931	980.888
1	89	4	0	558798.000	499877.783	509971.717	980.888
1	89	5	0	558798.000	499878.718	509970.503	980.888
1	89	6	0	558798.000	499882.055	509966.171	979.915
1	89	7	0	558798.000	499883.275	509964.587	978.915

EJE	P.K.	AZIMUT	COS A	SEN A			
0	558799.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	90	1	0	558799.000	499873.083	509979.457	978.917
1	90	2	0	558799.000	499874.304	509977.873	979.917
1	90	3	0	558799.000	499877.640	509973.541	980.890
1	90	4	0	558799.000	499878.575	509972.327	980.890
1	90	5	0	558799.000	499879.510	509971.113	980.890
1	90	6	0	558799.000	499882.847	509966.781	979.917
1	90	7	0	558799.000	499884.067	509965.197	978.917

EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	91	1	0	558800.000	499873.876	509980.067	978.919
1	91	2	0	558800.000	499875.096	509978.483	979.919
1	91	3	0	558800.000	499878.432	509974.151	980.892
1	91	4	0	558800.000	499879.368	509972.937	980.892
1	91	5	0	558800.000	499880.303	509971.723	980.892
1	91	6	0	558800.000	499883.639	509967.391	979.919
1	91	7	0	558800.000	499884.859	509965.807	978.919

EJE P.K. AZINUT COS A SEN A

0 558801.000 -41.783000 .792240 -.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	92	1	0	558801.000	499874.668	509980.678	978.920
1	92	2	0	558801.000	499875.888	509979.093	979.920
1	92	3	0	558801.000	499879.225	509974.761	980.893
1	92	4	0	558801.000	499880.160	509973.547	980.893
1	92	5	0	558801.000	499881.095	509972.333	980.893
1	92	6	0	558801.000	499884.431	509968.002	979.920
1	92	7	0	558801.000	499885.652	509966.417	978.920

EJE P.K. AZINUT COS A SEN A

0 558802.000 -41.783000 .792240 -.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	93	1	0	558802.000	499875.460	509981.288	978.922
1	93	2	0	558802.000	499876.681	509979.703	979.922
1	93	3	0	558802.000	499880.017	509975.372	980.895
1	93	4	0	558802.000	499880.952	509974.158	980.895
1	93	5	0	558802.000	499881.887	509972.943	980.895
1	93	6	0	558802.000	499885.223	509968.612	979.922
1	93	7	0	558802.000	499886.444	509967.027	978.922

EJE P.K. AZINUT COS A SEN A

0 558803.000 -41.783000 .792240 -.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	94	1	0	558803.000	499876.252	509981.898	978.924
1	94	2	0	558803.000	499877.473	509980.313	979.924
1	94	3	0	558803.000	499880.809	509975.982	980.897
1	94	4	0	558803.000	499881.744	509974.768	980.897
1	94	5	0	558803.000	499882.679	509973.554	980.897
1	94	6	0	558803.000	499886.016	509969.222	979.924
1	94	7	0	558803.000	499887.236	509967.638	978.924

EJE P.K. AZINUT COS A SEN A

0 558804.000 -41.783000 .792240 -.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	95	1	0	558804.000	499877.045	509982.508	978.926
1	95	2	0	558804.000	499878.265	509980.924	979.926
1	95	3	0	558804.000	499881.601	509976.592	980.899
1	95	4	0	558804.000	499882.537	509975.378	980.899
1	95	5	0	558804.000	499883.472	509974.164	980.899
1	95	6	0	558804.000	499886.808	509969.832	979.926
1	95	7	0	558804.000	499888.028	509968.248	978.926

EJE P.K. AZINUT COS A SEN A

0 558805.000 -41.783000 .792240 -.610210

1	96	1	0	558805.000	499877.837	509983.118	978.928
1	96	2	0	558805.000	499879.057	509981.534	979.928
1	96	3	0	558805.000	499882.394	509977.202	980.901
1	96	4	0	558805.000	499883.329	509975.988	980.901
1	96	5	0	558805.000	499884.264	509974.774	980.901
1	96	6	0	558805.000	499887.600	509970.443	979.928
1	96	7	0	558805.000	499888.821	509968.858	978.928

EJE P.K. AZINUT COS A SEN A

0 558806.000 -41.783000 .792240 -.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	97	1	0	558806.000	499878.629	509983.729	978.930
1	97	2	0	558806.000	499879.850	509982.144	979.930
1	97	3	0	558806.000	499883.186	509977.813	980.903
1	97	4	0	558806.000	499884.121	509976.598	980.903

1	97	5	0	558806.000	499885.056	509975.384	980.903
1	97	6	0	558806.000	499888.392	509971.053	979.930
1	97	7	0	558806.000	499889.613	509969.468	978.930

EJE P.K. AZINUT COS A SEN A

0 558807.000 -41.783000 .792240 -.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	98	1	0	558807.000	499879.421	509984.339	978.932
1	98	2	0	558807.000	499880.642	509982.754	979.932
1	98	3	0	558807.000	499883.978	509978.423	980.905
1	98	4	0	558807.000	499884.913	509977.209	980.905
1	98	5	0	558807.000	499885.848	509975.995	980.905
1	98	6	0	558807.000	499889.185	509971.663	979.932
1	98	7	0	558807.000	499890.405	509970.078	978.932

EJE P.K. AZINUT COS A SEN A

0 558808.000 -41.783000 .792240 -.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	99	1	0	558808.000	499880.214	509984.949	978.934
1	99	2	0	558808.000	499881.434	509983.365	979.934
1	99	3	0	558808.000	499884.770	509979.033	980.907
1	99	4	0	558808.000	499885.705	509977.819	980.907
1	99	5	0	558808.000	499886.641	509976.605	980.907
1	99	6	0	558808.000	499889.977	509972.273	979.934
1	99	7	0	558808.000	499891.197	509970.689	978.934

EJE P.K. AZINUT COS A SEN A

0 558809.000 -41.783000 .792240 -.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	100	1	0	558809.000	499881.006	509985.559	978.936
1	100	2	0	558809.000	499882.226	509983.975	979.936
1	100	3	0	558809.000	499885.563	509979.643	980.909
1	100	4	0	558809.000	499886.498	509978.429	980.909
1	100	5	0	558809.000	499887.433	509977.215	980.909
1	100	6	0	558809.000	499890.769	509972.883	979.936
1	100	7	0	558809.000	499891.990	509971.299	978.936

EJE P.K. AZINUT COS A SEN A

0 558810.000 -41.783000 .792240 -.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
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1	101	3	0	558810.000	499886.355	509980.253	980.911
1	101	4	0	558810.000	499887.290	509979.039	980.911
1	101	5	0	558810.000	499888.225	509977.825	980.911
1	101	6	0	558810.000	499891.561	509973.494	979.938
1	101	7	0	558810.000	499892.782	509971.909	978.938

EJE	P.K.	AZIMUT	COS A	SEN A
3	920.000	23.411195	.933141	.359509

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	1	1	3	920.000	499792.371	510006.824	971.608
2	1	2	3	920.000	499792.011	510005.891	971.608
2	1	3	3	920.000	499790.933	510003.091	971.548
2	1	4	3	920.000	499789.854	510000.292	971.488
2	1	5	3	920.000	499789.494	509999.359	971.488

EJE	P.K.	AZIMUT	COS A	SEN A
3	921.000	24.206970	.928575	.371145

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	2	1	3	921.000	499793.348	510006.110	971.602
2	2	2	3	921.000	499792.977	510005.512	971.602
2	2	3	3	921.000	499791.863	510002.726	971.512
2	2	4	3	921.000	499790.750	509999.940	971.482
2	2	5	3	921.000	499790.379	509999.012	971.482

EJE	P.K.	AZIMUT	COS A	SEN A
3	922.000	25.002744	.923863	.382723

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	3	1	3	922.000	499794.321	510006.045	971.597
2	3	2	3	922.000	499793.938	510005.121	971.597
2	3	3	3	922.000	499792.790	510002.349	971.537
2	3	4	3	922.000	499791.641	509999.578	971.477
2	3	5	3	922.000	499791.259	509998.654	971.477

EJE	P.K.	AZIMUT	COS A	SEN A
3	923.000	25.798519	.919007	.394241

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	4	1	3	923.000	499795.288	510005.637	971.591
2	4	2	3	923.000	499794.894	510004.718	971.591
2	4	3	3	923.000	499793.711	510001.961	971.531
2	4	4	3	923.000	499792.528	509999.204	971.471
2	4	5	3	923.000	499792.134	509998.285	971.471

EJE	P.K.	AZIMUT	COS A	SEN A
3	924.000	26.594294	.914007	.405698

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	5	1	3	924.000	499796.250	510005.217	971.586
2	5	2	3	924.000	499795.845	510004.303	971.586
2	5	3	3	924.000	499794.628	510001.561	971.526
2	5	4	3	924.000	499793.410	509998.819	971.466
2	5	5	3	924.000	499793.005	509997.905	971.466

EJE	P.K.	AZIMUT	COS A	SEN A
3	925.000	27.390069	.908865	.417091

2	6	2	3	925.000	499797.287	510004.785	971.589
2	6	3	3	925.000	499796.790	510003.876	971.580
2	6	4	3	925.000	499795.539	510001.149	971.520
2	6	5	3	925.000	499794.288	509998.423	971.460
1	6	5	3	925.000	499793.871	509997.514	971.460

EJE	P.K.	AZIMUT	COS A	SEN A
3	926.000	28.185843	.903580	.428419

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	7	1	3	926.000	499798.159	510004.341	971.574
2	7	2	3	926.000	499797.731	510003.437	971.574
2	7	3	3	926.000	499796.445	510000.726	971.514
2	7	4	3	926.000	499795.160	509998.016	971.454
2	7	5	3	926.000	499794.732	509997.112	971.454

EJE	P.K.	AZIMUT	COS A	SEN A
3	927.000	28.981618	.898155	.439680

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	8	1	3	927.000	499799.105	510003.885	971.568
2	8	2	3	927.000	499798.665	510002.987	971.568
2	8	3	3	927.000	499797.346	510000.292	971.508
2	8	4	3	927.000	499796.027	509997.598	971.448
2	8	5	3	927.000	499795.587	509996.700	971.448

EJE	P.K.	AZIMUT	COS A	SEN A
3	928.000	29.777393	.892589	.450872

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	9	1	3	928.000	499800.045	510003.418	971.562
2	9	2	3	928.000	499799.594	510002.525	971.562
2	9	3	3	928.000	499798.242	509999.847	971.502
2	9	4	3	928.000	499796.889	509997.169	971.442
2	9	5	3	928.000	499796.438	509996.277	971.442

EJE	P.K.	AZIMUT	COS A	SEN A
3	929.000	30.573167	.886883	.461994

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	10	1	3	929.000	499800.979	510002.938	971.555
2	10	2	3	929.000	499800.517	510002.051	971.555
2	10	3	3	929.000	499799.131	509999.391	971.495
2	10	4	3	929.000	499797.745	509996.730	971.435
2	10	5	3	929.000	499797.283	509995.843	971.435

EJE	P.K.	AZIMUT	COS A	SEN A
3	930.000	31.368942	.881039	.473044

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	11	1	3	930.000	499801.907	510002.447	971.549
2	11	2	3	930.000	499801.434	510001.566	971.549
2	11	3	3	930.000	499800.015	509998.923	971.489
2	11	4	3	930.000	499798.596	509996.280	971.429
2	11	5	3	930.000	499798.123	509995.399	971.429

EJE	P.K.	AZIMUT	COS A	SEN A
3	931.000	32.164717	.875057	.484019

1

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	12	1	3	931.000	499802.629	510001.945	971.542
2	12	2	3	931.000	499802.345	510001.070	971.542
2	12	3	3	931.000	499800.893	509998.445	971.482
2	12	4	3	931.000	499799.441	509995.819	971.422
2	12	5	3	931.000	499798.957	509994.944	971.422

EJE	P.K.	AZIMUT	COS A	SEN A
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3	932.000	32.960492	.868939	.494920
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	13	1	3	932.000	499803.745	510001.431	971.535
2	13	2	3	932.000	499803.250	510000.562	971.535
2	13	3	3	932.000	499801.765	509997.955	971.475
2	13	4	3	932.000	499800.281	509995.348	971.415
2	13	5	3	932.000	499799.786	509994.479	971.415

EJE	P.K.	AZIMUT	COS A	SEN A
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3	933.000	33.756266	.862685	.505742
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	14	1	3	933.000	499804.654	510000.906	971.528
2	14	2	3	933.000	499804.148	510000.043	971.528
2	14	3	3	933.000	499802.631	509997.455	971.468
2	14	4	3	933.000	499801.114	509994.867	971.408
2	14	5	3	933.000	499800.608	509991.004	971.408

EJE	P.K.	AZIMUT	COS A	SEN A
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3	934.000	34.552041	.856296	.516486
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	15	1	3	934.000	499805.557	510000.369	971.521
2	15	2	3	934.000	499805.040	509999.513	971.521
2	15	3	3	934.000	499803.491	509996.944	971.461
2	15	4	3	934.000	499801.911	509994.375	971.401
2	15	5	3	934.000	499801.425	509993.519	971.401

EJE	P.K.	AZIMUT	COS A	SEN A
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3	935.000	35.347816	.849773	.527119
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	16	1	3	935.000	499806.152	509999.821	971.514
2	16	2	3	935.000	499805.925	509998.971	971.514
2	16	3	3	935.000	499804.311	509996.122	971.451
2	16	4	3	935.000	499802.762	509993.873	971.394
2	16	5	3	935.000	499802.235	509993.023	971.394

EJE	P.K.	AZIMUT	COS A	SEN A
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3	936.000	36.143590	.843117	.537730
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	17	1	3	936.000	499807.341	509999.262	971.506
2	17	2	3	936.000	499806.803	509998.419	971.506
2	17	3	3	936.000	499805.190	509995.889	971.446
2	17	4	3	936.000	499803.577	509993.360	971.386
2	17	5	3	936.000	499803.039	509992.517	971.386

EJE	P.K.	AZIMUT	COS A	SEN A
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3	937.000	36.939365	.836330	.548227
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2	18	1	3	937.000	499805.223	509998.092	971.499
2	18	2	3	937.000	499807.675	509997.855	971.499
2	18	3	3	937.000	499806.030	509995.346	971.439
2	18	4	3	937.000	499804.385	509992.837	971.379
2	18	5	3	937.000	499803.837	509992.001	971.379

EJE	P.K.	AZIMUT	COS A	SEN A
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3	938.000	37.735140	.829412	.558638
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	19	1	3	938.000	499809.097	509998.111	971.491
2	19	2	3	938.000	499808.539	509997.281	971.491
2	19	3	3	938.000	499806.863	509994.793	971.431
2	19	4	3	938.000	499805.187	509992.305	971.371
2	19	5	3	938.000	499804.628	509991.475	971.371

EJE	P.K.	AZIMUT	COS A	SEN A
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3	939.000	38.530915	.822364	.568961
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	20	1	3	939.000	499809.965	509997.519	971.483
2	20	2	3	939.000	499809.396	509996.696	971.483
2	20	3	3	939.000	499807.689	509994.229	971.423
2	20	4	3	939.000	499805.982	509991.762	971.363
2	20	5	3	939.000	499805.413	509990.940	971.363

EJE	P.K.	AZIMUT	COS A	SEN A
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3	940.000	39.326689	.815188	.579196
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	21	1	3	940.000	499810.824	509996.916	971.475
2	21	2	3	940.000	499810.245	509996.101	971.475
2	21	3	3	940.000	499808.507	509993.655	971.415
2	21	4	3	940.000	499806.770	509991.210	971.355
2	21	5	3	940.000	499806.191	509990.394	971.355

EJE	P.K.	AZIMUT	COS A	SEN A
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3	941.000	40.122464	.807885	.589340
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	22	1	3	941.000	499811.676	509996.302	971.467
2	22	2	3	941.000	499811.087	509995.495	971.467
2	22	3	3	941.000	499809.319	509993.071	971.407
2	22	4	3	941.000	499807.551	509990.647	971.347
2	22	5	3	941.000	499806.962	509989.839	971.347

EJE	P.K.	AZIMUT	COS A	SEN A
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3	942.000	40.918239	.800455	.599393
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	23	1	3	942.000	499812.521	509995.678	971.459
2	23	2	3	942.000	499811.921	509994.878	971.459
2	23	3	3	942.000	499810.123	509992.476	971.399
2	23	4	3	942.000	499808.325	509990.075	971.339
2	23	5	3	942.000	499807.726	509989.275	971.339

EJE	P.K.	AZIMUT	COS A	SEN A
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3	943.000	41.714013	.792900	.609351
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2	24	3	3	943.000	499810.920	509991.872	971.391
2	24	4	3	943.000	499809.092	509989.493	971.331
2	24	5	3	943.000	499808.482	509988.700	971.331

EJE	P.K.	AZIMUT	COS A	SEN A
3	944.000	42.509788	.785222	.619215

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	25	1	3	944.000	499814.186	509994.399	971.442
2	25	2	3	944.000	499813.567	509993.613	971.442
2	25	3	3	944.000	499811.709	509991.258	971.382
2	25	4	3	944.000	499809.851	509988.902	971.322
2	25	5	3	944.000	499809.232	509988.117	971.322

EJE	P.K.	AZIMUT	COS A	SEN A
3	945.000	43.305563	.777420	.628981

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	26	1	3	945.000	499815.006	509993.743	971.433
2	26	2	3	945.000	499814.377	509992.966	971.433
2	26	3	3	945.000	499812.490	509990.634	971.373
2	26	4	3	945.000	499810.603	509988.301	971.313
2	26	5	3	945.000	499809.974	509987.524	971.313

EJE	P.K.	AZIMUT	COS A	SEN A
3	946.000	44.101338	.769498	.638650

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	27	1	3	946.000	499815.818	509993.078	971.424
2	27	2	3	946.000	499815.180	509992.308	971.424
2	27	3	3	946.000	499813.264	509990.000	971.364
2	27	4	3	946.000	499811.348	509987.691	971.304
2	27	5	3	946.000	499810.709	509986.922	971.304

EJE	P.K.	AZIMUT	COS A	SEN A
3	947.000	44.897112	.761455	.648218

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	28	1	3	947.000	499816.622	509992.402	971.415
2	28	2	3	947.000	499815.974	509991.641	971.415
2	28	3	3	947.000	499814.029	509989.356	971.355
2	28	4	3	947.000	499812.085	509987.072	971.295
2	28	5	3	947.000	499811.436	509986.311	971.295

EJE	P.K.	AZIMUT	COS A	SEN A
3	948.000	45.692887	.753293	.657686

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	29	1	3	948.000	499817.417	509991.717	971.406
2	29	2	3	948.000	499816.760	509990.963	971.406
2	29	3	3	948.000	499814.787	509988.703	971.346
2	29	4	3	948.000	499812.814	509986.444	971.286
2	29	5	3	948.000	499812.156	509985.690	971.286

EJE	P.K.	AZIMUT	COS A	SEN A
3	949.000	46.488662	.745013	.667050

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
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2	30	3	3	949.000	499815.536	509988.041	971.337
2	30	4	3	949.000	499813.535	509985.806	971.277
2	30	5	3	949.000	499812.868	509985.061	971.277

EJE	P.K.	AZIMUT	COS A	SEN A
3	950.000	47.284436	.736617	.676310

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	31	1	3	950.000	499818.982	509990.316	971.388
2	31	2	3	950.000	499818.306	509989.579	971.388
2	31	3	3	950.000	499816.277	509987.369	971.328
2	31	4	3	950.000	499814.248	509985.160	971.268
2	31	5	3	950.000	499813.571	509984.423	971.268

EJE	P.K.	AZIMUT	COS A	SEN A
3	951.000	48.080211	.728106	.685465

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	32	1	3	951.000	499819.751	509989.601	971.378
2	32	2	3	951.000	499819.065	509988.873	971.378
2	32	3	3	951.000	499817.009	509986.689	971.318
2	32	4	3	951.000	499814.953	509984.504	971.258
2	32	5	3	951.000	499814.267	509983.776	971.258

EJE	P.K.	AZIMUT	COS A	SEN A
3	952.000	48.875986	.719481	.694513

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	33	1	3	952.000	499820.511	509988.876	971.368
2	33	2	3	952.000	499819.816	509988.157	971.368
2	33	3	3	952.000	499817.733	509985.999	971.308
2	33	4	3	952.000	499815.649	509983.840	971.248
2	33	5	3	952.000	499814.955	509983.121	971.248

EJE	P.K.	AZIMUT	COS A	SEN A
3	953.000	49.671761	.710743	.703452

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	34	1	3	953.000	499821.262	509988.142	971.359
2	34	2	3	953.000	499820.558	509987.432	971.359
2	34	3	3	953.000	499818.448	509985.300	971.299
2	34	4	3	953.000	499816.338	509983.167	971.239
2	34	5	3	953.000	499815.634	509982.457	971.239

EJE	P.K.	AZIMUT	COS A	SEN A
3	954.000	50.467535	.701895	.712281

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	35	1	3	954.000	499822.003	509987.399	971.349
2	35	2	3	954.000	499821.291	509986.697	971.349
2	35	3	3	954.000	499819.154	509984.592	971.289
2	35	4	3	954.000	499817.017	509982.486	971.229
2	35	5	3	954.000	499816.305	509981.784	971.229

EJE	P.K.	AZIMUT	COS A	SEN A
3	955.000	51.263310	.692937	.720998

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	36	1	3	955.000	499822.736	509986.647	971.339

2	36	4	3	955.000	499817.689	509981.796	971.219
2	36	5	3	955.000	499816.968	509981.103	971.219

EJE	P.K.	AZIMUT	COS A	SEN A
3	956.000	52.059085	.683870	.729604

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	37	1	3	956.000	499823.458	509985.885	971.328
2	37	2	3	956.000	499822.729	509985.201	971.328
2	37	3	3	956.000	499820.540	509983.150	971.268
2	37	4	3	956.000	499818.351	509981.098	971.208
2	37	5	3	956.000	499817.622	509980.411	971.208

EJE	P.K.	AZIMUT	COS A	SEN A
3	957.000	52.854859	.674697	.738095

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	38	1	3	957.000	499824.172	509985.115	971.318
2	38	2	3	957.000	499823.434	509984.440	971.318
2	38	3	3	957.000	499821.219	509982.416	971.258
2	38	4	3	957.000	499819.005	509980.392	971.198
2	38	5	3	957.000	499818.267	509979.717	971.198

EJE	P.K.	AZIMUT	COS A	SEN A
3	958.000	53.650634	.665418	.746471

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	39	1	3	958.000	499824.875	509984.335	971.307
2	39	2	3	958.000	499824.129	509983.670	971.307
2	39	3	3	958.000	499821.889	509981.674	971.247
2	39	4	3	958.000	499819.650	509979.677	971.187
2	39	5	3	958.000	499818.904	509979.012	971.187

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EJE	P.K.	AZIMUT	COS A	SEN A
3	959.000	54.446109	.656036	.751730

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	40	1	3	959.000	499825.569	509983.547	971.297
2	40	2	3	959.000	499824.814	509982.891	971.297
2	40	3	3	959.000	499822.550	509980.923	971.237
2	40	4	3	959.000	499820.286	509978.955	971.177
2	40	5	3	959.000	499819.531	509978.299	971.177

EJE	P.K.	AZIMUT	COS A	SEN A
3	960.000	55.242184	.646551	.762971

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	41	1	3	960.000	499826.253	509982.750	971.286
2	41	2	3	960.000	499825.490	509982.104	971.286
2	41	3	3	960.000	499823.201	509980.164	971.226
2	41	4	3	960.000	499820.913	509978.224	971.166
2	41	5	3	960.000	499820.150	509977.578	971.166

EJE	P.K.	AZIMUT	COS A	SEN A
3	961.000	56.037958	.636964	.770893

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	42	1	3	961.000	499826.927	509981.945	971.275
2	42	2	3	961.000	499826.156	509981.308	971.275

2	42	3	3	961.000	499821.331	509977.486	971.155
2	42	5	3	961.000	499820.700	509976.849	971.155

EJE	P.K.	AZIMUT	COS A	SEN A
3	962.000	56.833733	.627279	.778795

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	43	1	3	962.000	499827.591	509981.131	971.264
2	43	2	3	962.000	499826.812	509980.504	971.264
2	43	3	3	962.000	499824.475	509978.622	971.204
2	43	4	3	962.000	499822.139	509976.741	971.144
2	43	5	3	962.000	499821.360	509976.113	971.144

EJE	P.K.	AZIMUT	COS A	SEN A
3	963.000	57.629508	.617495	.786575

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	44	1	3	963.000	499828.244	509980.310	971.252
2	44	2	3	963.000	499827.457	509979.692	971.252
2	44	3	3	963.000	499825.098	509977.840	971.192
2	44	4	3	963.000	499822.738	509975.987	971.132
2	44	5	3	963.000	499821.951	509975.370	971.132

EJE	P.K.	AZIMUT	COS A	SEN A
3	964.000	58.217585	.610203	.792245

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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	45	1	3	964.000	499828.880	509979.490	971.241
2	45	2	3	964.000	499828.087	509978.880	971.241
2	45	3	3	964.000	499825.711	509977.050	971.181
2	45	4	3	964.000	499823.334	509975.219	971.121
2	45	5	3	964.000	499822.542	509974.609	971.121

EJE	P.K.	AZIMUT	COS A	SEN A
3	965.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	46	1	3	965.000	499829.490	509978.698	971.229
2	46	2	3	965.000	499828.698	509978.088	971.229
2	46	3	3	965.000	499826.321	509976.257	971.169
2	46	4	3	965.000	499823.944	509974.427	971.109
2	46	5	3	965.000	499823.152	509973.816	971.109

EJE	P.K.	AZIMUT	COS A	SEN A
3	966.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	47	1	3	966.000	499830.100	509977.906	971.218
2	47	2	3	966.000	499829.308	509977.296	971.218
2	47	3	3	966.000	499826.931	509975.465	971.158
2	47	4	3	966.000	499824.554	509973.634	971.098
2	47	5	3	966.000	499823.762	509973.024	971.098

EJE	P.K.	AZIMUT	COS A	SEN A
3	967.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	48	1	3	967.000	499830.710	509977.114	971.206
2	48	2	3	967.000	499829.918	509976.503	971.206
2	48	3	3	967.000	499827.541	509974.673	971.146

EJE	P.K.	AZIMUT	COS A	SEN A
3	968.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	49	1	3	968.000	499831.320	509976.321	971.194
2	49	2	3	968.000	499830.528	509975.711	971.194
2	49	3	3	968.000	499828.151	509973.881	971.134
2	49	4	3	968.000	499825.775	509972.050	971.074
2	49	5	3	968.000	499824.982	509971.440	971.074

EJE	P.K.	AZIMUT	COS A	SEN A
3	969.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	50	1	3	969.000	499831.931	509975.529	971.182
2	50	2	3	969.000	499831.138	509974.919	971.182
2	50	3	3	969.000	499828.762	509973.088	971.122
2	50	4	3	969.000	499826.385	509971.258	971.062
2	50	5	3	969.000	499825.593	509970.617	971.062

EJE	P.F.	AZIMUT	COS A	SEN A
3	970.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	51	1	3	970.000	499832.541	509974.737	971.170
2	51	2	3	970.000	499831.749	509974.127	971.170
2	51	3	3	970.000	499829.372	509972.296	971.110
2	51	4	3	970.000	499826.995	509970.465	971.050
2	51	5	3	970.000	499826.203	509969.855	971.050

EJE	P.K.	AZIMUT	COS A	SEN A
3	971.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	52	1	3	971.000	499833.151	509973.945	971.158
2	52	2	3	971.000	499832.359	509973.334	971.158
2	52	3	3	971.000	499829.982	509971.504	971.098
2	52	4	3	971.000	499827.605	509969.673	971.038
2	52	5	3	971.000	499826.813	509969.063	971.038

EJE	P.K.	AZIMUT	COS A	SEN A
3	972.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	53	1	3	972.000	499833.761	509973.152	971.146
2	53	2	3	972.000	499832.969	509972.542	971.146
2	53	3	3	972.000	499830.592	509970.712	971.086
2	53	4	3	972.000	499828.216	509968.881	971.026
2	53	5	3	972.000	499827.423	509968.271	971.026

EJE	P.K.	AZIMUT	COS A	SEN A
3	973.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	54	1	3	973.000	499834.371	509972.360	971.134
2	54	2	3	973.000	499833.579	509971.750	971.134
2	54	3	3	973.000	499831.202	509969.919	971.074
2	54	4	3	973.000	499828.826	509968.089	971.014

EJE	P.K.	AZIMUT	COS A	SEN A
3	974.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	55	1	3	974.000	499834.982	509971.568	971.122
2	55	2	3	974.000	499834.189	509970.958	971.122
2	55	3	3	974.000	499831.813	509969.127	971.062
2	55	4	3	974.000	499829.436	509967.296	971.002
2	55	5	3	974.000	499828.644	509966.686	971.002

EJE	P.K.	AZIMUT	COS A	SEN A
3	975.000	58.217585	.610203	.792245

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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	56	1	3	975.000	499835.592	509970.776	971.110
2	56	2	3	975.000	499834.800	509970.165	971.110
2	56	3	3	975.000	499832.423	509968.335	971.050
2	56	4	3	975.000	499830.046	509966.504	970.990
2	56	5	3	975.000	499829.254	509965.894	970.990

EJE	P.K.	AZIMUT	COS A	SEN A
3	976.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	57	1	3	976.000	499836.202	509969.983	971.098
2	57	2	3	976.000	499835.410	509969.373	971.098
2	57	3	3	976.000	499833.033	509967.543	971.038
2	57	4	3	976.000	499830.656	509965.712	970.978
2	57	5	3	976.000	499829.864	509965.102	970.978

EJE	P.K.	AZIMUT	COS A	SEN A
3	977.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	58	1	3	977.000	499836.812	509969.191	971.086
2	58	2	3	977.000	499836.020	509968.581	971.086
2	58	3	3	977.000	499833.643	509966.750	971.026
2	58	4	3	977.000	499831.267	509964.920	970.966
2	58	5	3	977.000	499830.474	509964.310	970.966

EJE	P.K.	AZIMUT	COS A	SEN A
3	978.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	59	1	3	978.000	499837.422	509968.399	971.074
2	59	2	3	978.000	499836.630	509967.789	971.074
2	59	3	3	978.000	499834.253	509965.958	971.014
2	59	4	3	978.000	499831.877	509964.127	970.954
2	59	5	3	978.000	499831.084	509963.517	970.954

EJE	P.K.	AZIMUT	COS A	SEN A			
3	979.000	58.217585	.610203	.792245			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	60	1	3	979.000	499838.033	509967.607	971.062
2	60	2	3	979.000	499837.240	509966.996	971.062
2	60	3	3	979.000	499834.864	509965.166	971.002
2	60	4	3	979.000	499832.487	509963.335	970.942
2	60	5	3	979.000	499831.695	509962.725	970.942

3 980.000 58.217585 .610203 .792245

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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	61	1	3	980.000	499838.643	509966.814	971.050
2	61	2	3	980.000	499837.851	509966.204	971.050
2	61	3	3	980.000	499835.474	509964.374	970.990
2	61	4	3	980.000	499833.097	509962.543	970.930
2	61	5	3	980.000	499832.305	509961.933	970.930

EJE	P.K.	AZIMUT	COS A	SEN A
3	981.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	62	1	3	981.000	499839.253	509966.022	971.038
2	62	2	3	981.000	499838.461	509965.412	971.038
2	62	3	3	981.000	499836.084	509963.581	970.978
2	62	4	3	981.000	499833.707	509961.751	970.918
2	62	5	3	981.000	499832.915	509961.141	970.918

EJE	P.K.	AZIMUT	COS A	SEN A
3	982.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	63	1	3	982.000	499839.863	509965.230	971.026
2	63	2	3	982.000	499839.071	509964.620	971.026
2	63	3	3	982.000	499836.694	509962.789	970.966
2	63	4	3	982.000	499834.318	509960.958	970.906
2	63	5	3	982.000	499833.525	509960.348	970.906

EJE	P.K.	AZIMUT	COS A	SEN A
3	983.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	64	1	3	983.000	499840.473	509964.438	971.014
2	64	2	3	983.000	499839.681	509963.827	971.014
2	64	3	3	983.000	499837.304	509961.997	970.951
2	64	4	3	983.000	499834.928	509960.166	970.891
2	64	5	3	983.000	499834.136	509959.556	970.891

EJE	P.K.	AZIMUT	COS A	SEN A
3	984.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	65	1	3	984.000	499841.084	509963.615	971.002
2	65	2	3	984.000	499840.291	509963.035	971.002
2	65	3	3	984.000	499837.915	509961.205	970.912
2	65	4	3	984.000	499835.538	509959.374	970.882
2	65	5	3	984.000	499834.746	509958.764	970.882

EJE	P.K.	AZIMUT	COS A	SEN A
3	985.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	66	1	3	985.000	499841.694	509962.853	970.990
2	66	2	3	985.000	499840.902	509962.243	970.990
2	66	3	3	985.000	499838.525	509960.412	970.930
2	66	4	3	985.000	499836.148	509958.582	970.870
2	66	5	3	985.000	499835.356	509957.972	970.870

EJE	P.K.	AZIMUT	COS A	SEN A
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3 986.000 58.217585 .610203 .792245

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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	67	1	3	986.000	499842.304	509962.061	970.978
2	67	2	3	986.000	499841.512	509961.451	970.978
2	67	3	3	986.000	499839.135	509959.620	970.918
2	67	4	3	986.000	499836.758	509957.790	970.858
2	67	5	3	986.000	499835.966	509957.179	970.858

EJE	P.K.	AZIMUT	COS A	SEN A
3	987.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	68	1	3	987.000	499842.914	509961.269	970.966
2	68	2	3	987.000	499842.122	509960.658	970.966
2	68	3	3	987.000	499839.745	509958.828	970.906
2	68	4	3	987.000	499837.369	509956.997	970.846
2	68	5	3	987.000	499836.576	509956.387	970.846

EJE	P.K.	AZIMUT	COS A	SEN A
3	988.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	69	1	3	988.000	499843.524	509960.476	970.954
2	69	2	3	988.000	499842.732	509959.866	970.954
2	69	3	3	988.000	499840.356	509958.036	970.894
2	69	4	3	988.000	499837.979	509956.205	970.834
2	69	5	3	988.000	499837.187	509955.595	970.834

EJE	P.K.	AZIMUT	COS A	SEN A
3	989.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	70	1	3	989.000	499844.135	509959.684	970.912
2	70	2	3	989.000	499843.342	509959.074	970.912
2	70	3	3	989.000	499840.966	509957.243	970.882
2	70	4	3	989.000	499838.589	509955.413	970.822
2	70	5	3	989.000	499837.797	509954.803	970.822

EJE	P.K.	AZIMUT	COS A	SEN A
3	990.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	71	1	3	990.000	499844.745	509958.892	970.930
2	71	2	3	990.000	499843.953	509958.282	970.930
2	71	3	3	990.000	499841.576	509956.451	970.870
2	71	4	3	990.000	499839.199	509954.621	970.810
2	71	5	3	990.000	499838.407	509954.010	970.810

EJE	P.K.	AZIMUT	COS A	SEN A
3	991.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	72	1	3	991.000	499845.355	509958.100	970.918
2	72	2	3	991.000	499844.563	509957.490	970.918
2	72	3	3	991.000	499842.186	509955.659	970.858
2	72	4	3	991.000	499839.809	509953.828	970.798
2	72	5	3	991.000	499839.017	509953.218	970.798

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EJL	P.R.	AZIMUT	COS A	SEN A			
3	992.000	58.217585	.610203	.792245			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	73	1	3	992.000	499845.965	509957.307	970.906
2	73	2	3	992.000	499845.173	509956.697	970.906
2	73	3	3	992.000	499842.796	509954.867	970.846
2	73	4	3	992.000	499840.420	509953.036	970.786
2	73	5	3	992.000	499839.627	509952.426	970.786

EJE	P.K.	AZIMUT	COS A	SEN A			
3	993.000	58.217585	.610203	.792245			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	74	1	3	993.000	499846.575	509956.515	970.894
2	74	2	3	993.000	499845.783	509955.905	970.894
2	74	3	3	993.000	499843.107	509954.074	970.834
2	74	4	3	993.000	499841.030	509952.244	970.774
2	74	5	3	993.000	499840.238	509951.631	970.774

EJE	P.K.	AZIMUT	COS A	SEN A
3	994.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	75	1	3	994.000	499817.186	509955.723	970.882
2	75	2	3	994.000	499846.393	509955.113	970.882
2	75	3	3	994.000	499844.017	509953.282	970.822
2	75	4	3	994.000	499841.640	509951.452	970.762
2	75	5	3	994.000	499840.848	509950.841	970.762

EJE	P.F.	AZIMUT	COS A	SEN A			
3	995.000	58.217585	.610203	.792245			
GPO.	RTA.	CVA.	EJE	P.F.	X	Y	Z
2	76	1	3	995.000	499847.796	509954.931	970.870
2	76	2	3	995.000	499847.004	509954.321	970.870
2	76	3	3	995.000	499844.627	509952.490	970.810
2	76	4	3	995.000	499842.250	509950.659	970.750
2	76	5	3	995.000	499841.458	509950.049	970.750

EJE	P.K.	AZIMUT	COS A	SEN A
3	996.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	77	1	3	996.000	499848.406	509954.138	970.858
2	77	2	3	996.000	499847.614	509953.528	970.858
2	77	3	3	996.000	499845.237	509951.698	970.798
2	77	4	3	996.000	499842.860	509949.867	970.738
2	77	5	3	996.000	499842.068	509949.257	970.738

EJE	P.K.	AZIMUT	COS A	SEN A
3	997.000	58.217585	.610203	.792245

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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	78	1	3	997.000	499849.016	509953.346	970.846
2	78	2	3	997.000	499848.224	509952.736	970.846
2	78	3	3	997.000	499845.847	509950.905	970.786
2	78	4	3	997.000	499843.471	509949.075	970.726
2	78	5	3	997.000	499842.678	509948.465	970.726

EJE	P.K.	AZIMUT	COS A	SEN A			
3	998.000	58.217585	.610203	.792245			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	79	1	3	998.000	499849.627	509952.554	970.834
2	79	2	3	998.000	499848.834	509951.944	970.834
2	79	3	3	998.000	499846.458	509950.113	970.774
2	79	4	3	998.000	499844.081	509948.283	970.714
2	79	5	3	998.000	499843.289	509947.672	970.714

EJE	P.K.	AZIMUT	COS A	SEN A
3	999.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	80	1	3	999.000	499850.237	509951.762	970.822
2	80	2	3	999.000	499849.444	509951.152	970.822
2	80	3	3	999.000	499847.068	509949.321	970.762
2	80	4	3	999.000	499844.691	509947.490	970.702
2	80	5	3	999.000	499843.899	509946.880	970.702

EJE	P.K.	AZIMUT	COS A	SEN A			
3	1000.000	58.217585	.610203	.792245			
GPO.	ETA.	CVA.	EJE	P.K	X	Y	Z
2	81	1	3	1000.000	499850.847	509950.970	970.810
2	81	2	3	1000.000	499850.055	509950.359	970.810
2	81	3	3	1000.000	499847.678	509948.529	970.750
2	81	4	3	1000.000	499845.301	509946.698	970.690
2	81	5	3	1000.000	499844.509	509946.088	970.690

EJE	P.K.	AZIMUT	COS A	SEN A			
3	1001.000	58.217585	.610203	.792245			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	82	1	3	1001.000	499851.457	509950.177	970.798
2	82	2	3	1001.000	499850.665	509949.567	970.798
2	82	3	3	1001.000	499848.288	509947.736	970.738
2	82	4	3	1001.000	499845.911	509945.906	970.678
2	82	5	3	1001.000	499845.119	509945.296	970.678

EJE	P.K.	AZIMUT	COS A	SEN A
3	1002.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	83	1	3	1002.000	499852.067	509949.385	970.786
2	83	2	3	1002.000	499851.275	509948.775	970.786
2	83	3	3	1002.000	499848.898	509946.944	970.726
2	83	4	3	1002.000	499846.522	509945.114	970.666
2	83	5	3	1002.000	499845.729	509944.503	970.666

EJE	P.K.	AZIMUT	COS A	SEN A
3	1003.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	84	1	3	1003.000	499852.678	509948.593	970.774
2	84	2	3	1003.000	499851.885	509947.983	970.774
2	84	3	3	1003.000	499849.509	509946.152	970.714
2	84	4	3	1003.000	499847.132	509944.321	970.654
2	84	5	3	1003.000	499846.340	509943.711	970.654

3	1001.000	58.217585	.610203	.792245			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	85	1	3	1004.000	499853.288	509947.801	970.762
2	85	2	3	1004.000	499852.495	509947.190	970.762
2	85	3	3	1004.000	499850.119	509945.360	970.702
2	85	4	3	1004.000	499847.742	509943.529	970.642
2	85	5	3	1004.000	499846.950	509942.919	970.642

EJE P.K. AZIMUT COS A SEN A

3 1005.000 58.217585 .610203 .792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	86	1	3	1005.000	499853.898	509947.008	970.750
2	86	2	3	1005.000	499853.106	509946.398	970.750
2	86	3	3	1005.000	499850.729	509944.567	970.690
2	86	4	3	1005.000	499848.352	509942.737	970.630
2	86	5	3	1005.000	499847.560	509942.127	970.630

EJE P.K. AZIMUT COS A SEN A

3 1006.000 58.217585 .610203 .792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	87	1	3	1006.000	499854.508	509946.216	970.738
2	87	2	3	1006.000	499853.716	509945.606	970.738
2	87	3	3	1006.000	499851.339	509943.775	970.678
2	87	4	3	1006.000	499848.962	509941.945	970.618
2	87	5	3	1006.000	499848.170	509941.334	970.618

EJE P.K. AZIMUT COS A SEN A

3 1007.000 58.217585 .610203 .792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	88	1	3	1007.000	499855.118	509945.424	970.726
2	88	2	3	1007.000	499854.326	509944.814	970.726
2	88	3	3	1007.000	499851.919	509942.983	970.666
2	88	4	3	1007.000	499849.573	509941.152	970.606
2	88	5	3	1007.000	499848.780	509940.542	970.606

EJE P.K. AZIMUT COS A SEN A

3 1008.000 58.217585 .610203 .792245

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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	89	1	3	1008.000	499855.729	509944.632	970.714
2	89	2	3	1008.000	499851.936	509944.021	970.714
2	89	3	3	1008.000	499852.560	509942.191	970.651
2	89	4	3	1008.000	499850.183	509940.360	970.594
2	89	5	3	1008.000	499849.391	509939.750	970.594

EJE P.K. AZIMUT COS A SEN A

3 1009.000 58.217585 .610203 .792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	90	1	3	1009.000	499856.339	509943.839	970.702
2	90	2	3	1009.000	499855.547	509943.229	970.702
2	90	3	3	1009.000	499853.170	509941.398	970.642
2	90	4	3	1009.000	499850.793	509939.568	970.582
2	90	5	3	1009.000	499850.001	509938.958	970.582

EJE P.K. AZIMUT COS A SEN A

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	91	1	3	1010.000	499856.949	509943.047	970.690
2	91	2	3	1010.000	499856.157	509942.437	970.690
2	91	3	3	1010.000	499853.780	509940.606	970.630
2	91	4	3	1010.000	499851.403	509938.776	970.570
2	91	5	3	1010.000	499850.611	509938.165	970.570

EJE P.K. AZIMUT COS A SEN A

3 1011.000 58.217585 .610203 .792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	92	1	3	1011.000	499857.559	509942.255	970.678
2	92	2	3	1011.000	499856.767	509941.645	970.678
2	92	3	3	1011.000	499854.390	509939.814	970.618
2	92	4	3	1011.000	499852.013	509937.983	970.558
2	92	5	3	1011.000	499851.221	509937.373	970.558

EJE P.K. AZIMUT COS A SEN A

3 1012.000 58.217585 .610203 .792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	93	1	3	1012.000	499858.169	509941.463	970.666
2	93	2	3	1012.000	499857.377	509940.852	970.666
2	93	3	3	1012.000	499855.000	509939.022	970.606
2	93	4	3	1012.000	499852.624	509937.191	970.546
2	93	5	3	1012.000	499851.831	509936.581	970.546

EJE P.K. AZIMUT COS A SEN A

3 1013.000 58.217585 .610203 .792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	94	1	3	1013.000	499858.780	509940.670	970.654
2	94	2	3	1013.000	499857.987	509940.060	970.654
2	94	3	3	1013.000	499855.611	509938.230	970.594
2	94	4	3	1013.000	499853.234	509936.399	970.534
2	94	5	3	1013.000	499852.442	509935.789	970.534

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EJE P.K. AZIMUT COS A SEN A

3 1014.000 58.217585 .610203 .792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	95	1	3	1014.000	499859.390	509939.878	970.642
2	95	2	3	1014.000	499858.598	509939.268	970.642
2	95	3	3	1014.000	499856.221	509937.437	970.582
2	95	4	3	1014.000	499853.844	509935.607	970.522
2	95	5	3	1014.000	499853.052	509934.996	970.522

EJE P.K. AZIMUT COS A SEN A

3 1015.000 58.217585 .610203 .792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	96	1	3	1015.000	499860.000	509939.086	970.630
2	96	2	3	1015.000	499859.208	509938.476	970.630
2	96	3	3	1015.000	499856.831	509936.645	970.570
2	96	4	3	1015.000	499854.454	509934.814	970.510
2	96	5	3	1015.000	499853.662	509934.204	970.510

EJE P.K. AZIMUT COS A SEN A

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	97	1	3	1016.000	499860.610	509938.294	970.618
2	97	2	3	1016.000	499859.818	509937.683	970.618
2	97	3	3	1016.000	499857.441	509935.853	970.558
2	97	4	3	1016.000	499855.064	509934.022	970.498
2	97	5	3	1016.000	499854.272	509933.412	970.498

EJE	P.K.	AZIMUT	COS A	SEN A
3	1017.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	98	1	3	1017.000	499861.220	509937.501	970.606
2	98	2	3	1017.000	499860.428	509936.891	970.606
2	98	3	3	1017.000	499858.051	509935.061	970.546
2	98	4	3	1017.000	499855.675	509933.230	970.486
2	98	5	3	1017.000	499854.882	509932.620	970.486

EJE	P.K.	AZIMUT	COS A	SEN A
3	1018.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	99	1	3	1018.000	499861.831	509936.709	970.594
2	99	2	3	1018.000	499861.038	509936.099	970.594
2	99	3	3	1018.000	499858.662	509934.268	970.534
2	99	4	3	1018.000	499856.285	509932.438	970.474
2	99	5	3	1018.000	499855.493	509931.827	970.474

EJE	P.K.	AZIMUT	COS A	SEN A
3	1019.000	58.217585	.610203	.792245

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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	100	1	3	1019.000	499862.441	509935.917	970.582
2	100	2	3	1019.000	499861.649	509935.307	970.582
2	100	3	3	1019.000	499859.272	509933.476	970.522
2	100	4	3	1019.000	499856.895	509931.645	970.462
2	100	5	3	1019.000	499856.103	509931.035	970.462

EJE	P.K.	AZIMUT	COS A	SEN A
3	1020.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	101	1	3	1020.000	499863.051	509935.125	970.570
2	101	2	3	1020.000	499862.259	509931.514	970.570
2	101	3	3	1020.000	499859.882	509932.684	970.510
2	101	4	3	1020.000	499857.505	509930.853	970.450
2	101	5	3	1020.000	499856.713	509930.243	970.450

EJE	P.K.	AZIMUT	COS A	SEN A
3	1021.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	102	1	3	1021.000	499863.661	509934.332	970.558
2	102	2	3	1021.000	499862.869	509933.722	970.558
2	102	3	3	1021.000	499860.492	509931.892	970.498
2	102	4	3	1021.000	499858.115	509930.061	970.438
2	102	5	3	1021.000	499857.323	509929.451	970.438

EJE	P.K.	AZIMUT	COS A	SEN A
3	1022.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	103	1	3	1022.000	499864.271	509933.540	970.546
2	103	2	3	1022.000	499863.479	509932.930	970.546
2	103	3	3	1022.000	499861.102	509931.099	970.486
2	103	4	3	1022.000	499858.726	509929.269	970.426
2	103	5	3	1022.000	499857.933	509928.658	970.426

EJE	P.K.	AZIMUT	COS A	SEN A
3	1023.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	104	1	3	1023.000	499864.882	509932.748	970.534
2	104	2	3	1023.000	499864.089	509932.138	970.534
2	104	3	3	1023.000	499861.713	509930.307	970.474
2	104	4	3	1023.000	499859.336	509928.476	970.414
2	104	5	3	1023.000	499858.544	509927.866	970.414

EJE	P.K.	AZIMUT	COS A	SEN A
3	1024.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	105	1	3	1024.000	499865.492	509931.956	970.522
2	105	2	3	1024.000	499864.700	509931.345	970.522
2	105	3	3	1024.000	499862.323	509929.515	970.462
2	105	4	3	1024.000	499859.946	509927.684	970.402
2	105	5	3	1024.000	499859.154	509927.074	970.402

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EJE	P.K.	AZIMUT	COS A	SEN A
3	1025.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	106	1	3	1025.000	499866.102	509931.163	970.510
2	106	2	3	1025.000	499865.310	509930.553	970.510
2	106	3	3	1025.000	499862.933	509928.723	970.450
2	106	4	3	1025.000	499860.556	509926.892	970.390
2	106	5	3	1025.000	499859.764	509926.282	970.390

EJE	P.K.	AZIMUT	COS A	SEN A
3	1026.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	107	1	3	1026.000	499866.712	509930.371	970.498
2	107	2	3	1026.000	499865.920	509929.761	970.498
2	107	3	3	1026.000	499863.543	509927.930	970.438
2	107	4	3	1026.000	499861.166	509926.100	970.378
2	107	5	3	1026.000	499860.374	509925.490	970.378

EJE	P.K.	AZIMUT	COS A	SEN A
3	1027.000	58.217585	.610203	.792245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	108	1	3	1027.000	499867.322	509929.579	970.486
2	108	2	3	1027.000	499866.530	509928.969	970.486
2	108	3	3	1027.000	499864.153	509927.138	970.426
2	108	4	3	1027.000	499861.777	509925.307	970.366
2	108	5	3	1027.000	499860.984	509924.697	970.366

EJE	P.K.	AZIMUT	COS A	SEN A
3	1028.000	58.217585	.610203	.792245

2	109	2	3	1028.000	499867.140	509923.177	970.474
2	109	3	3	1028.000	499864.764	509926.346	970.414
2	109	4	3	1028.000	499862.387	509924.515	970.354
2	109	5	3	1028.000	499861.595	509923.905	970.354

EJE P.K. AZIMUT COS A SEN A

3 1029.000 58.217585 .610203 .792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	110	1	3	1029.000	499868.543	509927.994	970.462
2	110	2	3	1029.000	499867.751	509927.384	970.462
2	110	3	3	1029.000	499865.374	509925.554	970.402
2	110	4	3	1029.000	499862.997	509923.723	970.342
2	110	5	3	1029.000	499862.205	509923.113	970.342

EJE P.K. AZIMUT COS A SEN A

3 1030.000 58.217585 .610203 .792245

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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	111	1	3	1030.000	499869.153	509927.202	970.450
2	111	2	3	1030.000	499868.361	509926.592	970.450
2	111	3	3	1030.000	499865.984	509924.761	970.390
2	111	4	3	1030.000	499863.607	509922.931	970.330
2	111	5	3	1030.000	499862.815	509922.321	970.330

EJE P.K. AZIMUT COS A SEN A

3 1031.000 58.217585 .610203 .792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	112	1	3	1031.000	499869.763	509926.410	970.438
2	112	2	3	1031.000	499868.971	509925.800	970.438
2	112	3	3	1031.000	499866.594	509923.969	970.378
2	112	4	3	1031.000	499864.217	509922.138	970.318
2	112	5	3	1031.000	499863.425	509921.528	970.318

EJE P.K. AZIMUT COS A SEN A

3 1032.000 58.217585 .610203 .792245

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	113	1	3	1032.000	499870.373	509925.618	970.426
2	113	2	3	1032.000	499869.581	509925.007	970.426
2	113	3	3	1032.000	499867.204	509923.177	970.366
2	113	4	3	1032.000	499864.828	509921.346	970.306
2	113	5	3	1032.000	499864.035	509920.736	970.306

EJE P.K. AZIMUT COS A SEN A

3 1033.000 57.934289 .613722 .789522

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	114	1	3	1033.000	499870.973	509924.840	970.414
2	114	2	3	1033.000	499870.184	509924.226	970.414
2	114	3	3	1033.000	499867.815	509922.385	970.354
2	114	4	3	1033.000	499865.447	509920.544	970.294
2	114	5	3	1033.000	499864.657	509919.930	970.294

EJE P.K. AZIMUT COS A SEN A

3 1034.000 57.138515 .623543 .781789

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
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2	115	3	3	1034.000	499868.434	509921.599	970.342
2	115	4	3	1034.000	499866.089	509919.729	970.282
2	115	5	3	1034.000	499865.307	509919.105	970.282

EJE P.K. AZIMUT COS A SEN A

3 1035.000 56.342740 .633267 .773934

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	116	1	3	1035.000	499872.158	509923.355	970.390
2	116	2	3	1035.000	499871.384	509922.721	970.390
2	116	3	3	1035.000	499869.062	509920.822	970.330
2	116	4	3	1035.000	499866.741	509918.922	970.270
2	116	5	3	1035.000	499865.967	509918.288	970.270

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EJE P.K. AZIMUT COS A SEN A

3 1036.000 55.546965 .642891 .765958

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	117	1	3	1036.000	499872.764	509922.623	970.378
2	117	2	3	1036.000	499871.998	509921.980	970.378
2	117	3	3	1036.000	499869.700	509920.052	970.318
2	117	4	3	1036.000	499867.403	509918.123	970.258
2	117	5	3	1036.000	499866.637	509917.480	970.258

EJE P.K. AZIMUT COS A SEN A

3 1037.000 54.751191 .652415 .757862

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	118	1	3	1037.000	499873.380	509921.899	970.366
2	118	2	3	1037.000	499872.622	509921.247	970.366
2	118	3	3	1037.000	499870.348	509919.290	970.306
2	118	4	3	1037.000	499868.074	509917.332	970.246
2	118	5	3	1037.000	499867.317	509916.680	970.246

EJE P.K. AZIMUT COS A SEN A

3 1038.000 53.955416 .661837 .749648

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	119	1	3	1038.000	499874.004	509921.183	970.354
2	119	2	3	1038.000	499873.254	509920.521	970.354
2	119	3	3	1038.000	499871.005	509918.536	970.294
2	119	4	3	1038.000	499868.756	509916.550	970.234
2	119	5	3	1038.000	499868.007	509915.889	970.234

EJE P.K. AZIMUT COS A SEN A

3 1039.000 53.159641 .671156 .741316

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	120	1	3	1039.000	499874.637	509920.475	970.342
2	120	2	3	1039.000	499873.896	509919.804	970.342
2	120	3	3	1039.000	499871.672	509917.790	970.282
2	120	4	3	1039.000	499869.448	509915.777	970.222
2	120	5	3	1039.000	499868.706	509915.106	970.222

EJE P.K. AZIMUT COS A SEN A

3 1040.000 52.363866 .680369 .732869

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	121	1	3	1040.000	499875.279	509919.775	970.321

2	121	4	3	1040.000	499870.149	509915.012	970.211
2	121	5	3	1040.000	499869.416	509914.332	970.211

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1041.000	51.568092	.689477	.724308
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	122	1	3	1041.000	499875.930	509919.083	970.320
2	122	2	3	1041.000	499875.205	509918.393	970.320
2	122	3	3	1041.000	499873.032	509916.325	970.260
2	122	4	3	1041.000	499870.859	509914.256	970.200
2	122	5	3	1041.000	499870.135	509913.567	970.200

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1042.000	50.772317	.698477	.715633
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	123	1	3	1042.000	499876.589	509918.399	970.310
2	123	2	3	1042.000	499875.873	509917.700	970.310
2	123	3	3	1042.000	499873.726	509915.605	970.250
2	123	4	3	1042.000	499871.579	509913.509	970.190
2	123	5	3	1042.000	499870.864	509912.811	970.190

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1043.000	49.976542	.707367	.706846
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	124	1	3	1043.000	499877.257	509917.723	970.300
2	124	2	3	1043.000	499876.550	509917.016	970.300
2	124	3	3	1043.000	499874.429	509914.893	970.210
2	124	4	3	1043.000	499872.309	509912.771	970.180
2	124	5	3	1043.000	499871.602	509912.064	970.180

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1044.000	49.180768	.716147	.697949
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	125	1	3	1044.000	499877.933	509917.056	970.291
2	125	2	3	1044.000	499877.235	509916.340	970.291
2	125	3	3	1044.000	499875.141	509914.191	970.231
2	125	4	3	1044.000	499873.047	509912.043	970.171
2	125	5	3	1044.000	499872.349	509911.326	970.171

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1045.000	48.384993	.724816	.688943
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	126	1	3	1045.000	499878.617	509916.397	970.282
2	126	2	3	1045.000	499877.928	509915.672	970.282
2	126	3	3	1045.000	499875.862	509913.498	970.222
2	126	4	3	1045.000	499873.795	509911.323	970.162
2	126	5	3	1045.000	499873.106	509910.598	970.162

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1046.000	47.589218	.733370	.679829
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	127	1	3	1046.000	499879.310	509915.747	970.274
2	127	2	3	1046.000	499878.630	509915.013	970.274

2	127	4	3	1046.000	499874.551	509910.613	970.154
2	127	5	3	1046.000	499873.871	509909.880	970.154

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1047.000	46.793443	.741811	.670609
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	128	1	3	1047.000	499880.011	509915.105	970.267
2	128	2	3	1047.000	499879.340	509914.363	970.267
2	128	3	3	1047.000	499877.328	509912.138	970.207
2	128	4	3	1047.000	499875.316	509909.913	970.147
2	128	5	3	1047.000	499874.646	509909.171	970.147

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1048.000	45.997669	.750135	.661284
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	129	1	3	1048.000	499880.719	509914.473	970.260
2	129	2	3	1048.000	499880.058	509913.722	970.260
2	129	3	3	1048.000	499878.074	509911.472	970.200
2	129	4	3	1048.000	499876.090	509909.222	970.140
2	129	5	3	1048.000	499875.429	509908.472	970.140

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1049.000	45.201894	.758343	.651856
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	130	1	3	1049.000	499881.436	509913.849	970.253
2	130	2	3	1049.000	499880.784	509913.090	970.253
2	130	3	3	1049.000	499878.829	509910.815	970.193
2	130	4	3	1049.000	499876.873	509908.540	970.133
2	130	5	3	1049.000	499876.221	509907.782	970.133

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1050.000	44.406119	.766431	.642326
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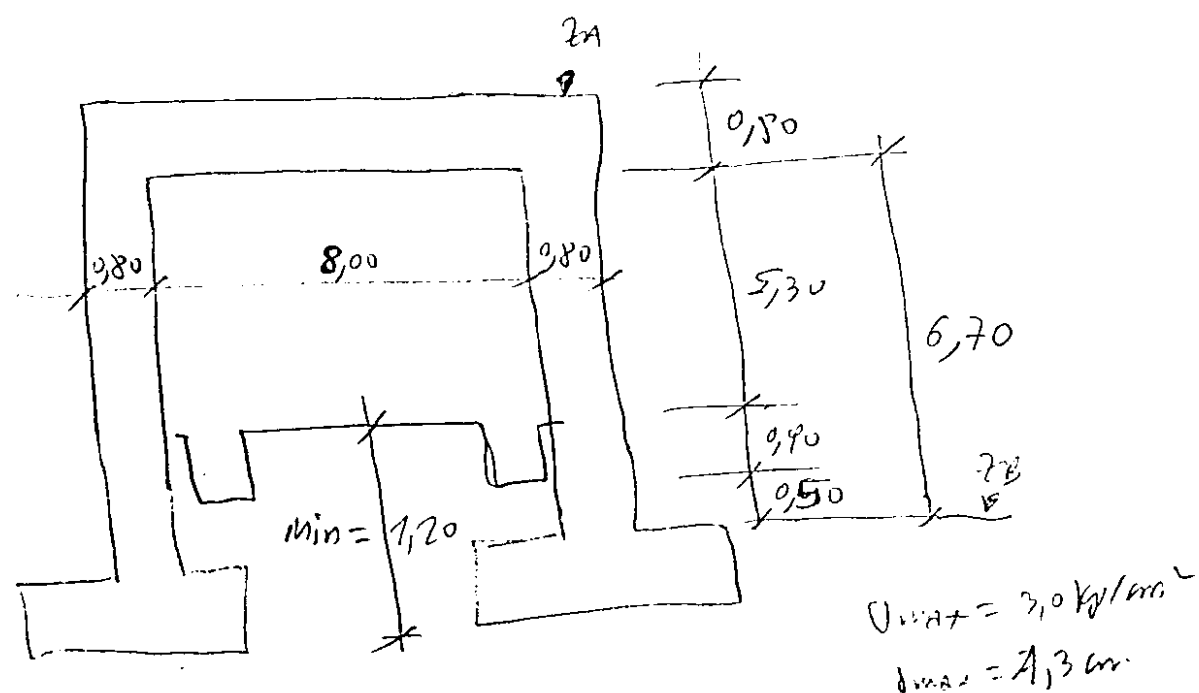
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	131	1	3	1050.000	499882.160	509913.234	970.247
2	131	2	3	1050.000	499881.518	509912.468	970.247
2	131	3	3	1050.000	499879.591	509910.168	970.187
2	131	4	3	1050.000	499877.664	509907.869	970.127
2	131	5	3	1050.000	499877.022	509907.103	970.127

1

REPLANTEO DEL PORTICO

PI 558+7

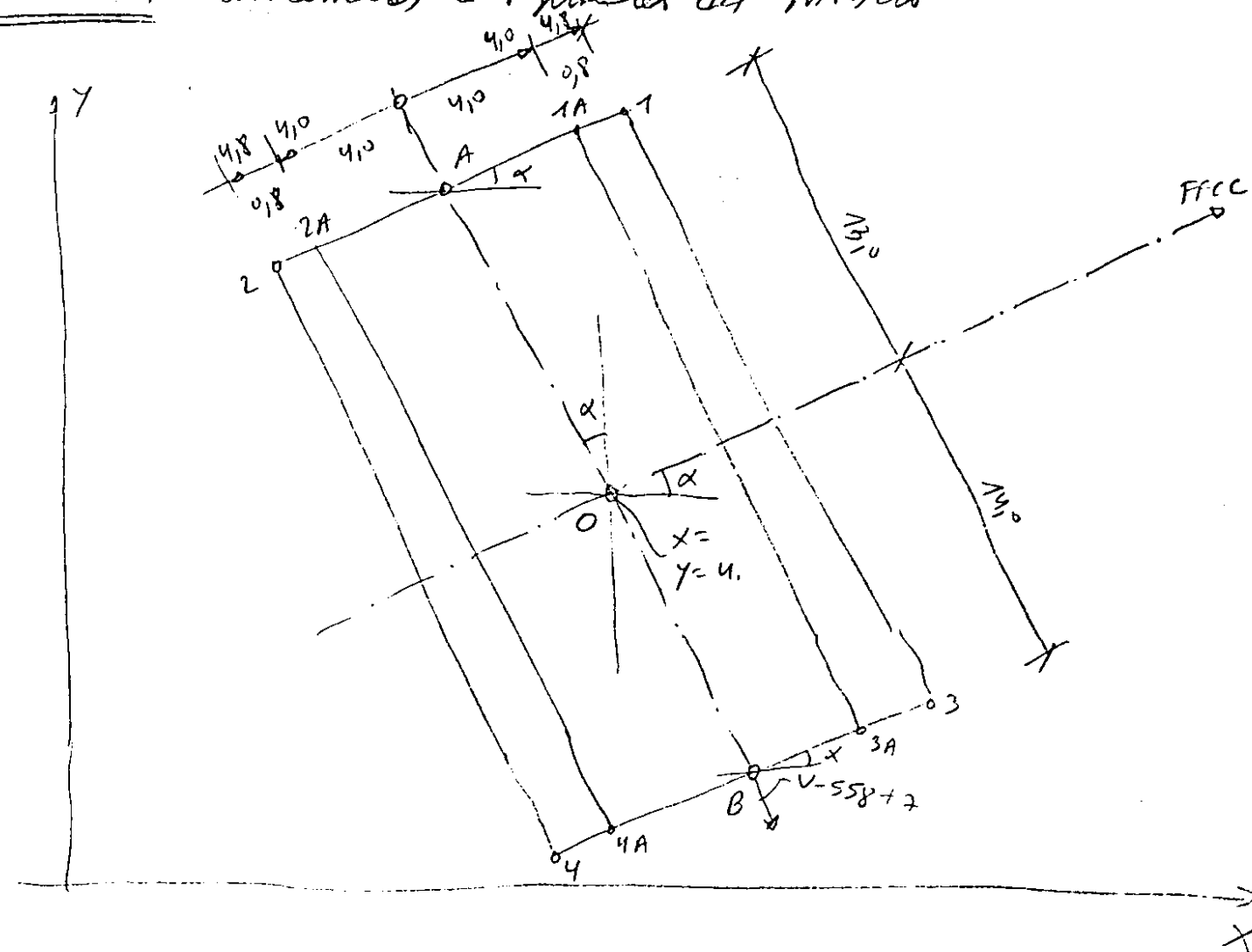
Altura de flechas sobre el dintel = $979,88 - 977,0 = 2,88 \text{ m}$.



$$7,50 = 7,50$$

PI 558+7

Coordenadas de replanteo del inicio



Punto O : $X = 499.847,678$
 $Y = 4.509.948,524$

Eje FFC : $PK = 558+760,00$
 $AZ = 58,217^\circ$
 $\theta = 980,832$

Eje Vtr V-558+7 $PK = 1000,0$
 $AZ = 158,217585^\circ$
 $\theta = 970,750$

$$\alpha = 100 - 58,217 = 41,783^\circ$$

Punto A : $\Delta x = -13,0 \times \sin \alpha = -7,932.727.448$
 $\Delta y = 13,0 \times \cos \alpha = 10,244.114.67$

Punto B : $\Delta x = 14,0 \times \sin \alpha = 8,542.442.152$
 $\Delta y = -14,0 \times \cos \alpha = -11,091.354.26$

exterior del hotel:

$$Ox = 4,80 \times \cos \alpha = 3,802,750.033$$

$$Oy = 4,80 \times \sin \alpha = 2,929.008.728$$

Interior del hotel:

$$Dx = 4,0 \times \cos \alpha = 3,168.458.367$$

$$Dy = 4,0 \times \sin \alpha = 2,440.840.615$$

Punto A: $x = 499.847,678 - 7,932.721.998 = 499.839,745$
 $y = 4,509.948,528 + 10,299.114.67 = 4,509.958,828$

Punto 1: $x = x_A + 3,802.750.033 = 499.843,598$
 $y = y_A + 2,929.008.728 = 4,509.961,757$

Punto 2: $x = x_A - 3,802.750.033 = 499.835,942$
 $y = y_A - 2,929.008.728 = 4,509.955,899$

Punto 1A: $x = x_A + 3,168.458.367 = 499.842,914$
 $y = y_A + 2,440.840.615 = 4,509.961,269$

Punto 2A: $x = x_A - 3,168.458.367 = 499.836,576$
 $y = y_A - 2,440.840.615 = 4,509.956,387$

Punto 3: $x = x_B + 3,802.750.033 = 499.860,024$
 $y = y_B + 2,929.008.728 = 4,509.940,367$

Punto 4: $x = x_B - 3,802.750.033 = 499.852,418$
 $y = y_B - 2,929.008.728 = 4,509.934,509$

Punto 3A: $x = x_B + 3,168.458.367 = 499.859,380$
 $y = y_B + 2,440.840.615 = 4,509.939,878$

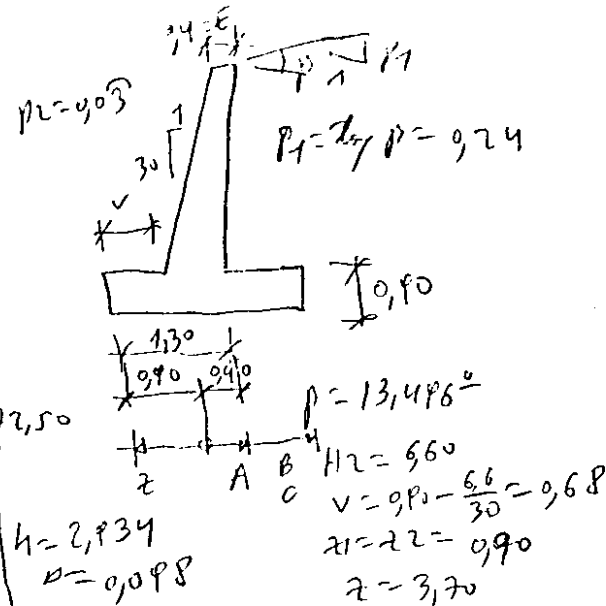
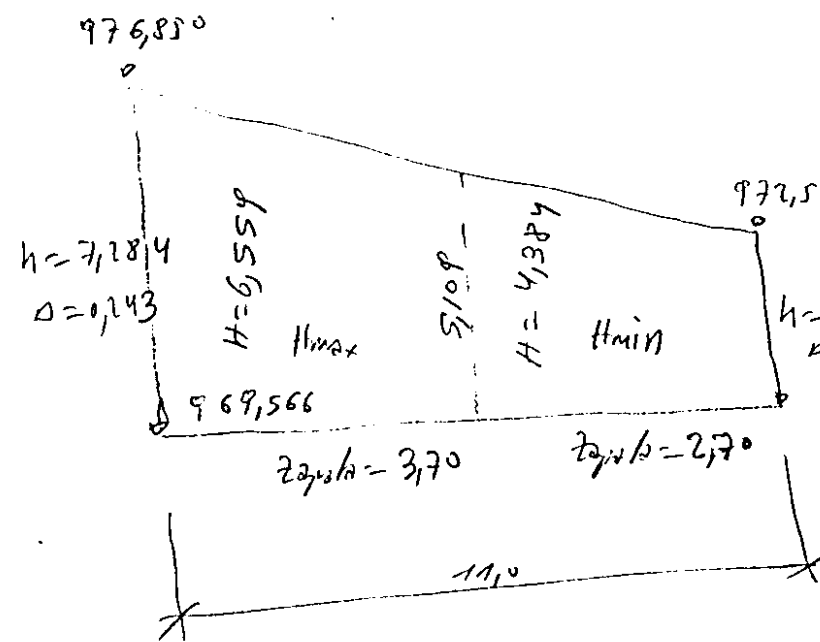
Punto 4A: $x = x_B - 3,168.458.367 = 499.853,052$
 $y = y_B - 2,440.840.615 = 4,509.934,997$

Punto B: $x_B = 499.847,678 + 5,542.441.152 = 499.856,227$
 $y_B = 4,509.948,528 - 11,091.354.26 = 4,509.937,438$

REPLANTEO DE LAS ALETAS

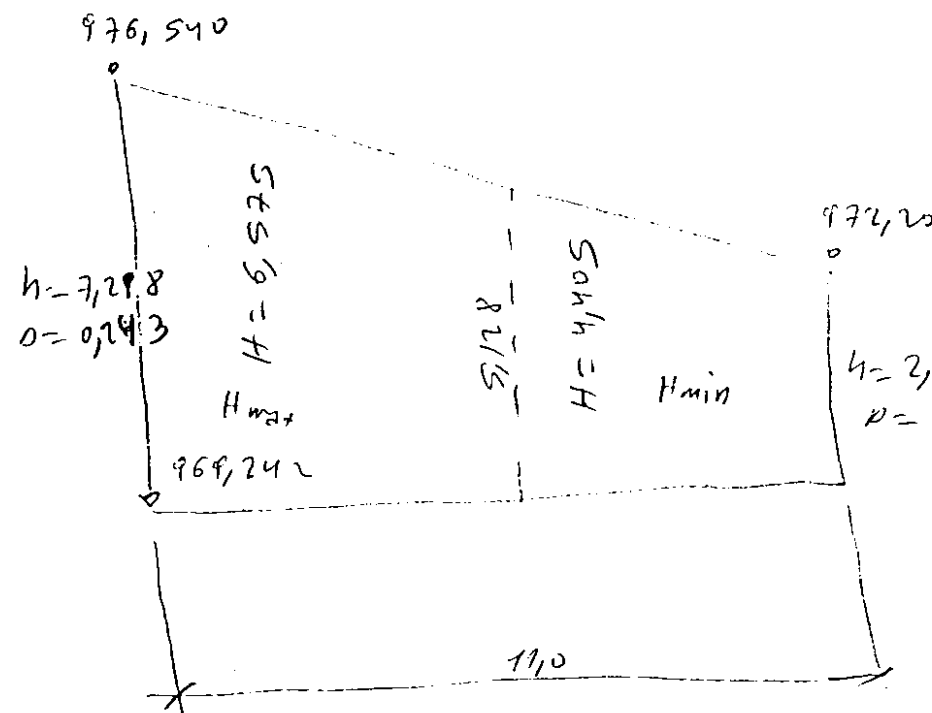
PI-558+7

Alto A1 y A2



$$Q_{max} = 20 \times 1.5 = 30 \text{ m}^3/\text{m}$$

Alto A3 y A4



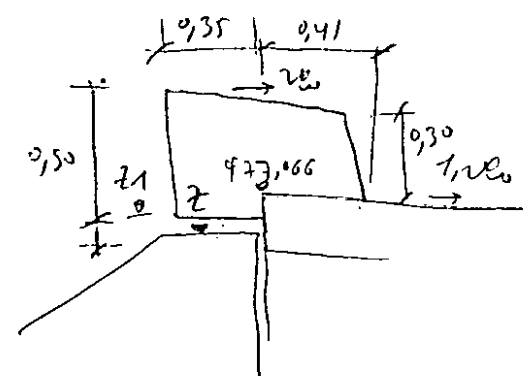
$$\beta = 13.486^\circ$$

Gras de curvatura de las curvas

PI-558+7

1- Alto A1 y A2

$l = 11.0 \text{ m}$



$$z_1 = 977.066 - 0.41 \times 0.12 + 0.20 + 0.76 - 0.52 - 0.50 = 976.876 \checkmark$$

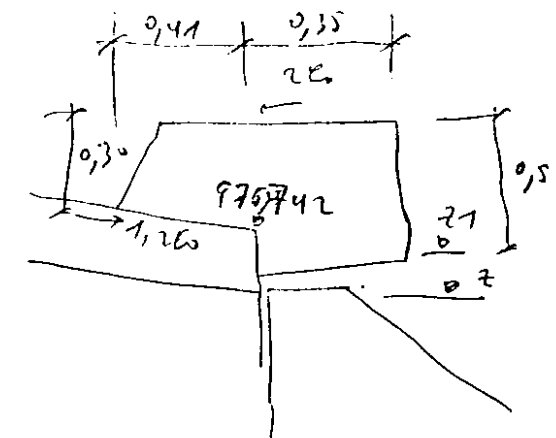
$$z_2 = 976.876 - 0.026 = 976.85 \checkmark$$

$$z_{topo} = 977.066 - 7.50 = 969.566 \checkmark$$

2- Alto A3 y A4

$l = 11.0 \text{ m}$

$$977.066 - 976.876 = 0.190$$



$$z_1 = 976.742 + 0.41 \times 0.12 + 0.30 + 0.75 - 0.52 - 0.50 = 976.562$$

$$z_2 = 976.562 - 0.022 = 976.540 \checkmark$$

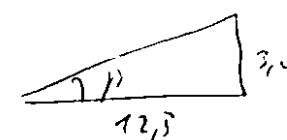
$$976.742 - 976.551 = 0.190$$

$$z_{topo} = 976.742 - 7.50 = 969.242$$

Transición de aliter (A1) (A2)

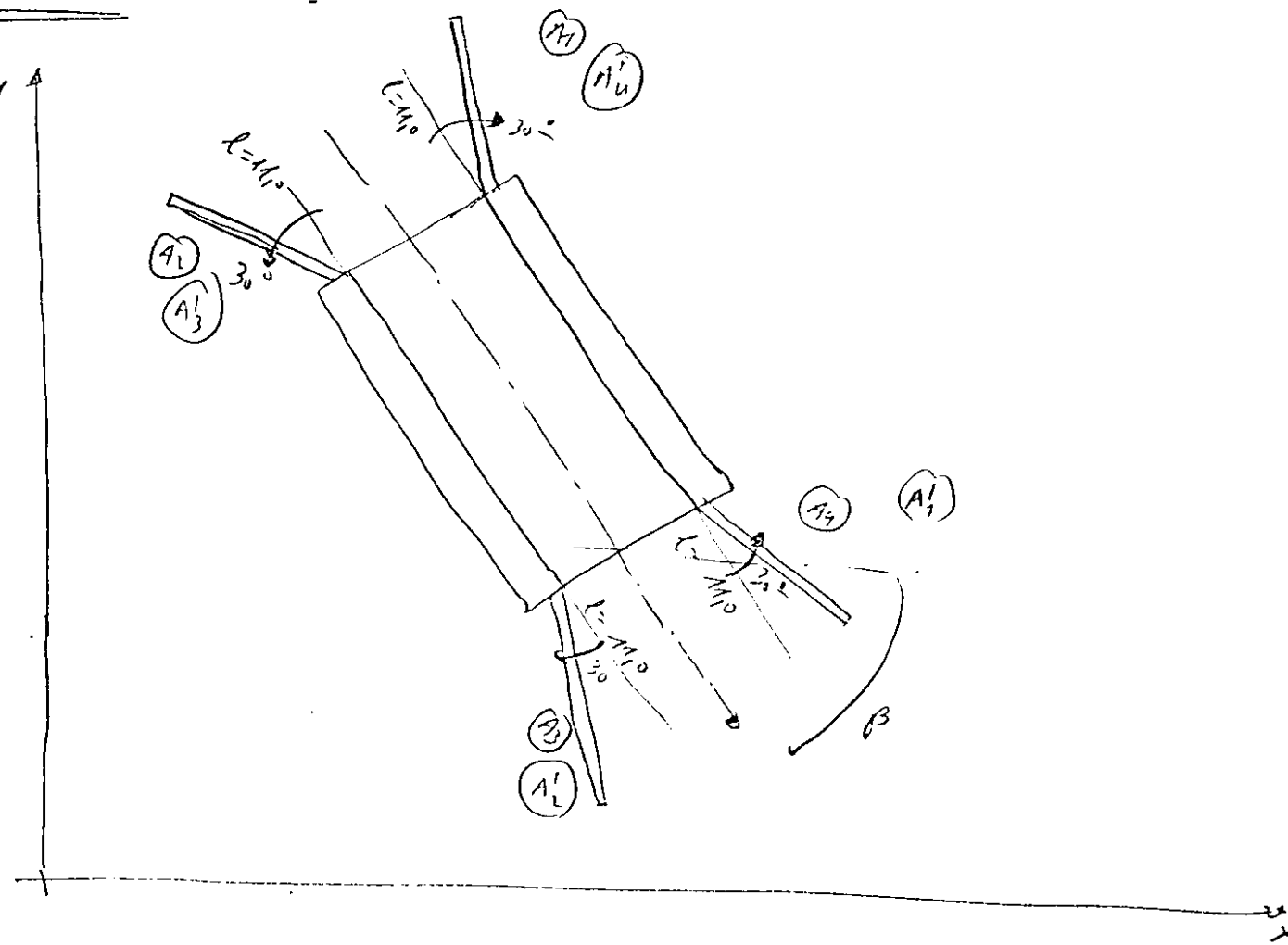
$$\Rightarrow 972.50 \checkmark$$

$$(A3) (A4) \rightarrow z = 972.20 \checkmark$$



$$\beta = \arctan \frac{3.0}{12.5} = 13.486^\circ$$

PI 558+7



$\beta = -58,217.5853$

Distancia = 902

	A'1	A'2	A'3	A'4
XAR	499.859,390	499.853,052	499.836,576	499.842,914
YAR	4,509.939,878	4,509.934,997	4,509.956,387	4,509.961,269
ALF	30	30	30	30
ALB	11,0	11,0	11,0	11,0
DIM1	0,243	0,243	0,243	0,243
EFIN	9,99	9,99	9,98	9,98
ANCHO	9,40	9,40	9,40	9,40
BZAP	1,80	1,80	1,80	1,80
CZAP	2,80	2,80	2,80	2,80
ZZAP	9,90	9,90	9,90	9,90

TITULO : FFCC MADRID-BARCELONA. PI-558+7

ANGULO DEL EJE OX CON EL EJE DEL PORTICO. BETA = -58.217585000 g
 ANCHO DE LA JUNTA ENTRE LOS HASTIALES DEL PORTICO Y LAS ALETAS = .020000 m

ALETA NUMERO = 4 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 499859.390000
 YA = 4509939.878000

INCLINACION RESPECTO DEL EJE OX = 30.000000 g
 LONGITUD DE LA ALETA = 11.000000 m
 ESPESOR DEL TALUD. ZONA INICIAL = .243000 m
 ZONA FINAL = .099000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
 ZAPATA. ANCHO DEL 1º TACON TRASERO = 1.800 m
 ANCHO DEL 2º TACON TRASERO = 2.800 m
 ANCHO DEL TACON DELANTERO = .900 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 499869.244
 YI = 4509934.951
 PUNTO C : XC = 499869.559
 YC = 4509935.687
 PUNTO D : XD = 499869.598
 YD = 4509935.778
 PUNTO E : XE = 499869.755
 YE = 4509936.116
 PUNTO G : XG = 499870.306
 YG = 4509937.433
 PUNTO H : XH = 499870.699
 YH = 4509938.353
 PUNTO J : XJ = 499858.816
 YJ = 4509939.411
 PUNTO AP: XAP = 499859.411
 YAP = 4509939.869
 PUNTO B : XB = 499859.612
 YB = 4509940.049
 PUNTO BP: XBP = 499859.633
 YBP = 4509940.010

PUNTO H : XH = 499861.268
YH = 4509941.299

PUNTO P : XP = 499862.176
YP = 4509941.998

PUNTO B : XB = 499852.830
YB = 4509934.826

PUNTO BP: XBP = 499852.833
YBP = 4509934.803

PUNTO F : XF = 499852.470
YF = 4509934.523

PUNTO H : XH = 499851.199
YH = 4509933.544

PUNTO P : XP = 499850.291
YP = 4509932.845

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I Y J = 11.342 m 21

LA = 976,540 B = 10,500
LB = 976,100 A = 0,114
LC = 969,242 C = 4,777
LD = 7,118 D = 4,500
LE = 2,158 E = 1,400
LF = 1,000
LG = 3,200

ALETA NUMERO = 3 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 499853.052000
YA = 4509934.997000

INCLINACION RESPECTO DEL EJE OX = 30.000000 °
LONGITUD DE LA ALETA = 11.000000 m
ESPESOR DEL TALUD. ZONA INICIAL = .243000 m
ZONA FINAL = .099000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1º TACON TRASERO = 1.800 m
ANCHO DEL 2º TACON TRASERO = 2.800 m
ANCHO DEL TACON DELANTERO = .900 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 499855.300
YI = 4509924.212

PUNTO C : XC = 499851.507
YC = 4509924.095

PUNTO D : XD = 499851.409
YD = 4509924.081

PUNTO E : XE = 499851.014
YE = 4509924.022

PUNTO G : XG = 499852.629
YG = 4509923.819

PUNTO K : XK = 499851.639
YK = 4509923.673

PUNTO J : XJ = 499853.650
YJ = 4509935.432

PUNTO AP: XAP = 499853.055
YAP = 4509934.997

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I Y J = 11.342 m 21

LA = 976,540 B = 10,500
LB = 976,100 A = 0,114
LC = 969,242 C = 4,777
LD = 7,118 D = 4,500
LE = 2,158 E = 1,400
LF = 1,000
LG = 3,200

ALETA NUMERO = 2 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 499836.576000
YA = 4509956.387000

INCLINACION RESPECTO DEL EJE OX = 30.000000 °
LONGITUD DE LA ALETA = 11.000000 m
ESPESOR DEL TALUD. ZONA INICIAL = .243000 m
ZONA FINAL = .098000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1º TACON TRASERO = 1.800 m
ANCHO DEL 2º TACON TRASERO = 2.800 m
ANCHO DEL TACON DELANTERO = .900 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 499826.722
YI = 4509961.315

PUNTO C : XC = 499826.407
YC = 4509960.578

PUNTO D : XD = 499826.368
YD = 4509960.487

PUNTO E : XE = 499826.211
YE = 4509960.120

PUNTO G : XG = 499825.660
YG = 4509958.832

PUNTO J : XJ = 499837.150
YJ = 4509956.854

PUNTO AP: XAP = 499836.555
YAP = 4509956.396

PUNTO B : XB = 499836.351
YB = 4509956.216

PUNTO BP: XBP = 499836.333
YBP = 4509956.225

PUNTO F : XF = 499835.969
YF = 4509955.945 *p2*

PUNTO H : XH = 499834.698
YH = 4509954.966

PUNTO P : XP = 499833.791
YP = 4509954.267

PUNTO E : XE = 499841.981
YE = 4509972.243 *p1*

PUNTO G : XG = 499843.336
YG = 4509972.447

PUNTO K : XK = 499844.326
YK = 4509972.593

PUNTO J : XJ = 499842.316
YJ = 4509960.834

PUNTO AP: XAP = 499842.911
YAP = 4509961.292

PUNTO B : XB = 499843.136
YB = 4509961.440

PUNTO BP: XBP = 499843.133
YBP = 4509961.463

PUNTO F : XF = 499843.496
YF = 4509961.743 *p2*

PUNTO H : XH = 499844.767
YH = 4509962.722

PUNTO P : XP = 499845.675
YP = 4509963.421

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I Y J = 11.341 m *21*

C Y A = 10.999 m

C Y AP = 10.976 m

D Y BP = 10.838 m *D*

E Y F = 10.614 m *C*

G Y H = 9.830 m

K Y P = 9.271 m *20 21*

LA = 976,550 *LE = 10,50*

LC = 976,500 *AL = 0,114*

LC = 969,566 *EL = 4,741*

HL = 7,184 *EL = 4,50*

HL = 7,184 *E = 9,40*

HL = 7,184 *F = 1,0*

HL = 7,184 *F = 3,20*

ALFA NUMERO = 1 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 499842.914000
YA = 4509961.269000

INCLINACION RESPECTO DEL EJE OX = 30.000000 °

LONGITUD DE LA ALFA = 11.000000 m

ESPESOR DEL TALUD. ZONA INICIAL = .213000 m

ZONA FINAL = .098000 m

ANCHO DE LA CORONACION DE LA ALFA = .100 m

ZAPATA. ANCHO DEL 1º TACON TRASERO = 1.800 m

ANCHO DEL 2º TACON TRASERO = 2.800 m

ANCHO DEL TACON DELANTERO = .900 m

COORDENADAS DE LOS PUNTOS DE LA ALFA

PUNTO I : XI = 499840.665
YI = 4509972.054

PUNTO C : XC = 499841.459
YC = 4509972.171

PUNTO D : XD = 499841.556
YD = 4509972.185

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I Y J = 11.341 m *21*

C Y A = 10.999 m

C Y AP = 10.976 m

D Y BP = 10.838 m *D*

E Y F = 10.614 m *C*

G Y H = 9.830 m

K Y P = 9.271 m *20 21*

LA = 976,550 *LE = 10,50*

LC = 976,500 *AL = 0,114*

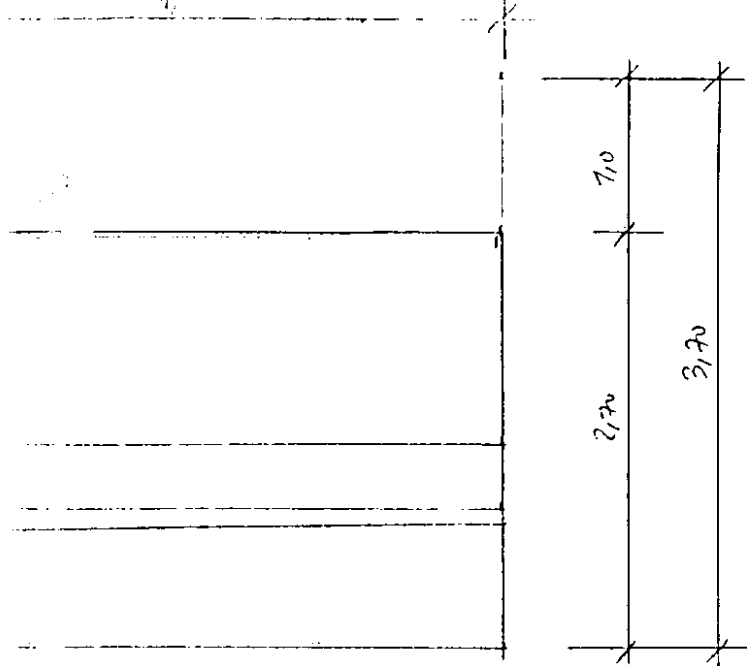
LC = 969,566 *EL = 4,741*

HL = 7,184 *EL = 4,50*

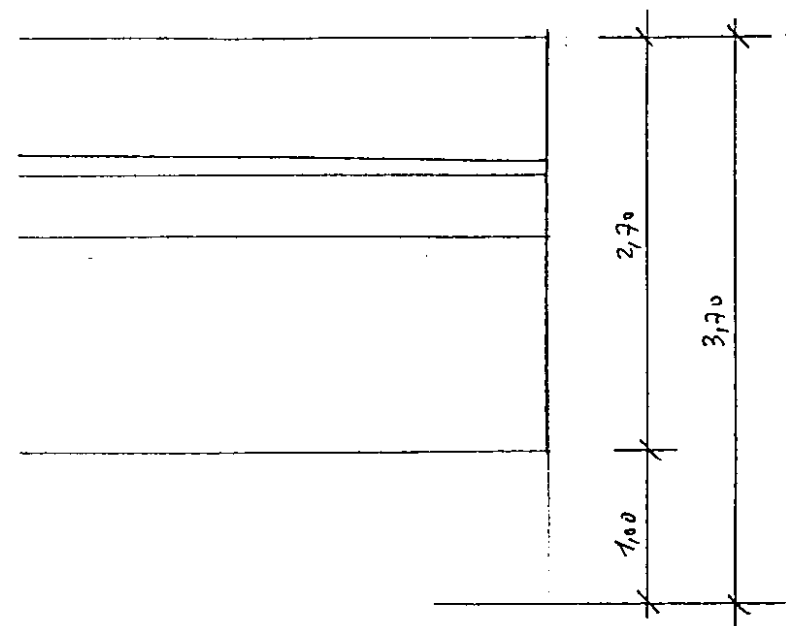
HL = 7,184 *E = 9,40*

HL = 7,184 *F = 1,0*

HL = 7,184 *F = 3,20*



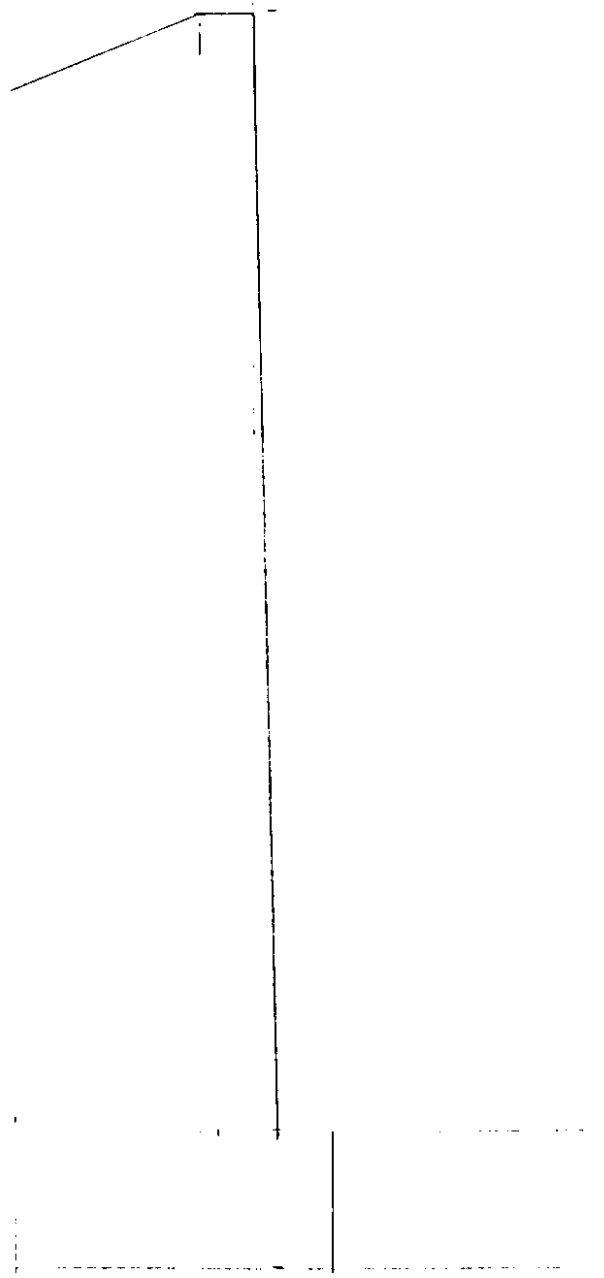
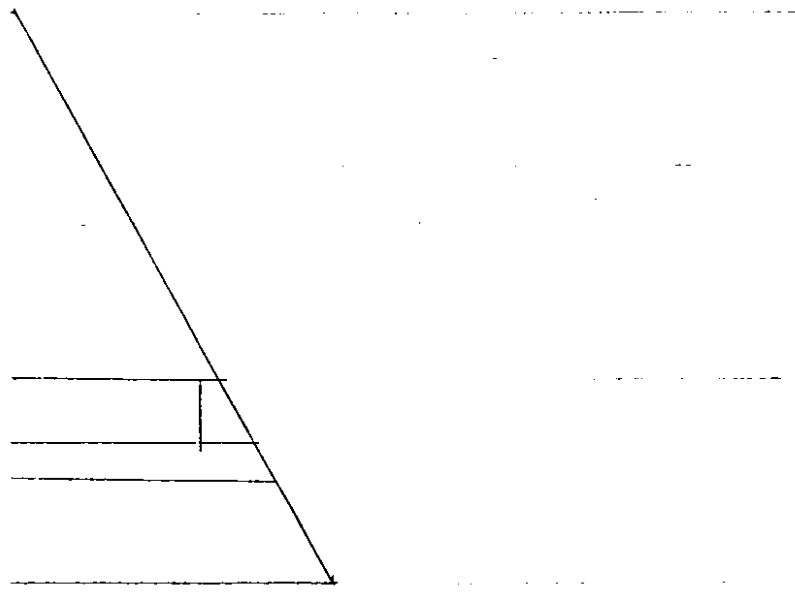
PI 558+7
 1150
 (A1)



PI 558+7
 (A2)

PI 558+7

(A3)



CALCULO DEL PORTICO

CALCULO DE SOBRECARGAS EN PASOS INFERIORES DE CAMINO

P.I. 5581700

Ceficiente de Impacto:

a) Instrucción española:

$$I = \frac{114 \times \sqrt{860}}{3'10 - 1'76 \sqrt{860} + 3'60} = 51, \quad I = 1'51$$

b) Eurocódigo

$$L_m = \frac{1}{3} \cdot (7'00 + 8'60 + 7'00) = 7'5 \text{ m.}$$

$$L_\phi = 1'4 \times 7'5 = 10'5 \text{ m.}$$

$$\phi_2 = \frac{1'44}{\sqrt{10'5} - 0'2} + 0'32 = 1'3$$

c) Reducción del coeficiente de impacto de la instrucción española

$$I = 1'66 - \frac{(3'66 - 1)}{10} = 1'41$$

d) Reducción del coeficiente de impacto del Eurocódigo

$$I = 1'3 - \frac{(3'10 - 1)}{10} = 1'05$$

Sobrecargas de tráfico:

a) Tren A instrucción española

$$\frac{20 \times 2 \times 1'41}{13 \times 10} = 1'95 \text{ t/m}^2$$

b) Tren B instrucción española

$$\frac{12 \times 2 \times 1'41}{13} = 2'60 \text{ t/m}^2$$

g) Tren Eurocódigo

$$\frac{2 \times 8 \times 1'05}{13} + \frac{4 \times 12'2 \times 2 \times 1'05}{13 \times 11'8} = 1'96 \text{ t/m}^2$$

P.I. 562+600

Ceficiente de impacto

a) Instrucción española: $I = 1'51$

b) Eurocódigo: $I = 1'3$

c) Reducción del coeficiente de impacto de la instrucción española

$$I = 1'51 - \frac{(1'51 - 1)}{10} = 1'46$$

d) Reducción del coeficiente de impacto del Eurocódigo

$$I = 1'3 - \frac{(1'3 - 1)}{10} = 1'25$$

Sobrecargas de tráfico

a) Tren A instrucción española

$$\frac{20 \times 2 \times 1'46}{9 \times 6} = 4'9 \text{ t/m}^2$$

b) Tren B instrucción española

$$\frac{12 \times 2 \times 1'46}{9} = 3'9 \text{ t/m}^2$$

c) Tren Eurocódigo

$$\frac{2 \times 8 \times 1'25}{9} + \frac{4 \times 12'2 \times 2 \times 1'25}{9 \times 7'8} = 3'9 \text{ t/m}^2$$

VI 558+7

$$L_{hierar} = 979,864 - (977,056 - \frac{7,066 - 6,742}{77} \cdot 13,51) + 0,35/2 = 2,86 + 0,35/2 = 3,15 \text{ m.}$$

$$Q_{JC} = 2,60 \text{ T/m}$$

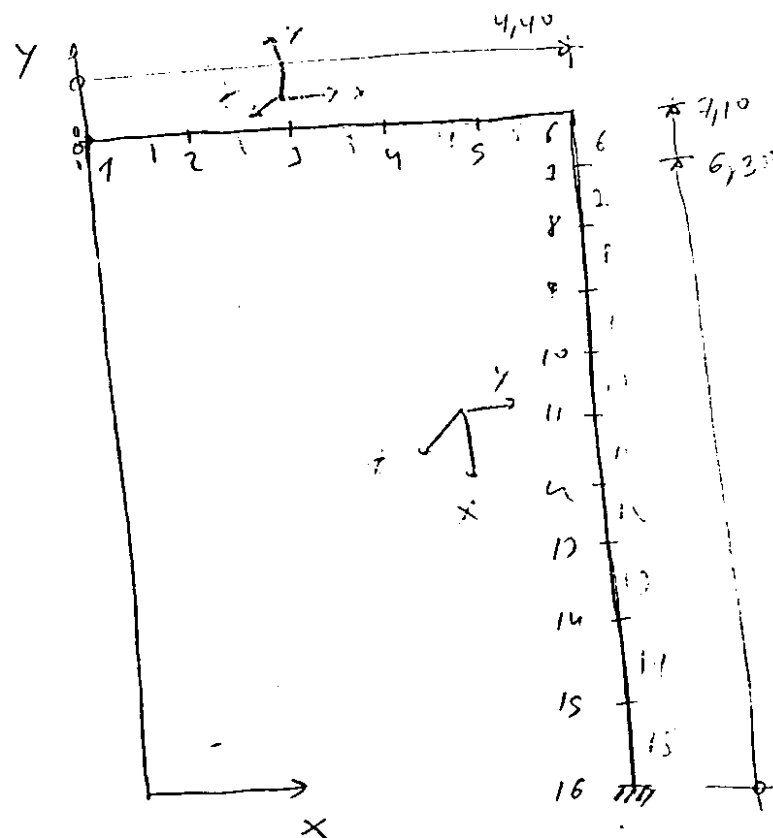
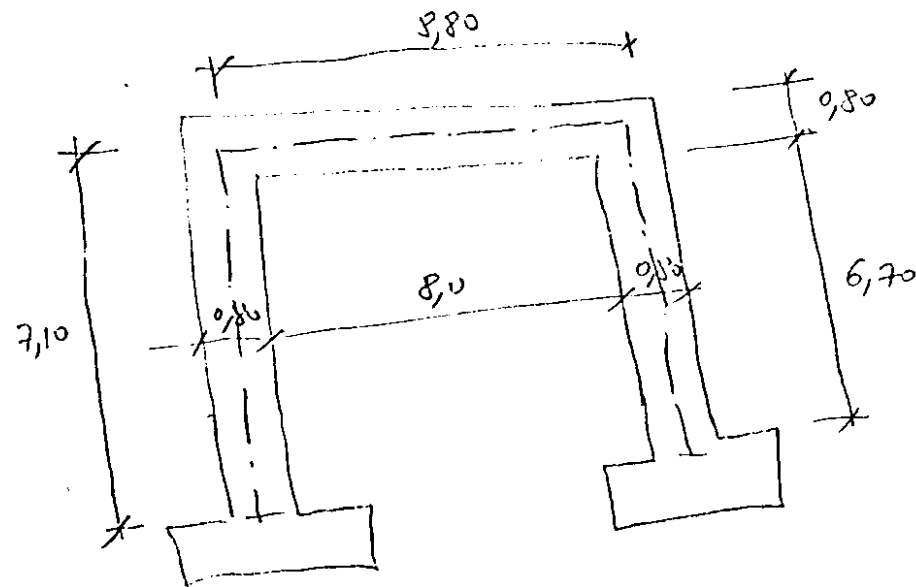
$$K_{en \text{ hierar}} = 3,15 \cdot 2,0 = 6,30 \text{ T/m}$$

$$K_{en \text{ balasto}} = 1,0$$

$$Q_{punta} = 7,30 \text{ T/m}$$

$$q = 35^\circ \quad K_a = \tan^2(45 - \frac{35}{2}) = 0,277$$

$$K_r = 1 - \tan 25 = 0,426$$



$$\gamma_D = 0,8$$

$$\gamma_H = 1,0$$

$$E_D = 140.000 \sqrt{250} = 3.000.000 \text{ T/m}$$

$$E_H = 140.000 \sqrt{0,8 \cdot 250} = 2.850.000 \text{ T/m}$$

VI - 558+7

HIPOTETICO I - Pórtico en construcción

$$\text{Carga sobre dintel} = 0,80 \times 2,5 = 2,0 \text{ T/m.}$$

$$\text{Carga vertical sobre mallas} = 2,0 \text{ T/m.}$$



$$q = (0,5 + 0,80/2) \times 2,0 \times 0,426 = 0,767 \quad \text{y} \quad 5,816$$

$$r = 2,0 \times 2,10 \times 0,426 = 1,767$$

$$e_6 = 0,767$$

$$e_7 = 1,372$$

$$e_8 = 1,977$$

$$e_9 = 2,582$$

$$e_{10} = 3,187$$

$$e_{11} = 3,792$$

$$e_{12} = 4,397$$

$$e_{13} = 5,001$$

$$e_{14} = 5,606$$

$$e_{15} = 6,211$$

$$e_{16} = 6,816$$

$$H = \frac{0,767 + 6,816}{2} \times 2,10 = 76,920$$

$$N = 2 \times 4,40 + 2 \times 7,10 = 23,0 \times$$

HIPOTETICO II : Pórtico de carga

$$\text{Carga sobre dintel} = 0,80 \times 2,5 + 7,70 = 9,30 \text{ T/m.}$$

$$\text{Carga vertical sobre mallas} = 2,0 \text{ T/m.}$$

$$q = \left[3,0 + (3,15 + 0,80/2) \times 2,0 + 1,0 \right] \times 0,426 = 4,728 \quad \text{y} \quad 10,778$$

$$r = 6,049$$

$$e_6 = 4,748$$

$$e_7 = 5,334$$

$$e_8 = 5,939$$

$$e_9 = 6,544$$

$$e_{10} = 7,149$$

$$e_{11} = 7,754$$

$$e_{12} = 8,358$$

$$e_{13} = 8,963$$

$$e_{14} = 9,568$$

$$e_{15} = 10,173$$

$$e_{16} = 10,778$$

$$H = \frac{4,728 + 10,778}{2} \times 2,10 = 55,050$$

$$N = 9,30 \times 4,40 + 2,0 \times 7,10 = 55,120 \times$$

$$H-1 \quad H = 9,06 + 17,86 = 26,92 \times$$

$$H-2 \quad H = 27,58 + 27,47 = 55,05 \times$$

$$H-3 \quad H = 20,88 + 8,32 = 29,20 \times$$

$$H-4 \quad H = 29,06 + 25,99 = 55,05 \times$$

Hipotesis III Portico en carga con empuje activo

$$\text{Carga sobre dintel} = 2,60 + 9,8 \times 2,5 + 7,30 = 11,90 \text{ T/m.}$$

$$\text{" " hastial} = 9,8 \times 2,5 = 2,0$$

$$q = (7,30 + 9,8 \times 2,5) \times 0,271 = 2,195 \quad \left\{ \begin{array}{l} 6,043 \\ 3,848 \end{array} \right.$$

$$r = 2,0 \times 7,10 \times 0,271 = 3,848$$

$$e_6 = 2,195$$

$$e_7 = 2,580$$

$$e_8 = 2,965$$

$$e_9 = 3,349$$

$$e_{10} = 3,734$$

$$e_{11} = 4,119$$

$$e_{12} = 4,504$$

$$e_{13} = 4,889$$

$$e_{14} = 5,274$$

$$e_{15} = 5,658$$

$$e_{16} = 6,043$$

$$H = \frac{2,195 + 6,043}{2} \times 7,10 = 28,245$$

$$N = 11,90 \times 4,40 + 7,0 \times 7,10 = 66,560 \times$$

Hipotesis IV Portico en carga con empuje en vacio

$$\text{Carga sobre dintel} = 11,90 \text{ T/m.}$$

$$\text{" " hastial} = 2,0$$

$$q = (7,30 + 9,8 \times 2,0 + 3,0) \times 0,426 = 4,729 \quad \left\{ \begin{array}{l} 10,778 \\ 6,049 \end{array} \right.$$

$$r = 2,0 \times 7,10 \times 0,426 = 6,049$$

$$e_6 = 4,729$$

$$e_7 = 5,114$$

$$e_8 = 5,499$$

$$e_9 = 5,884$$

$$e_{10} = 6,269$$

$$e_{11} = 7,754$$

$$e_{12} = 8,139$$

$$e_{13} = 8,524$$

$$e_{14} = 8,909$$

$$e_{15} = 9,294$$

$$e_{16} = 9,679$$

$$H = \frac{4,729 + 10,778}{2} \times 7,10 = 55,050$$

$$N = 11,90 \times 4,40 + 7,0 \times 7,10 = 66,560 \times$$

```
*****
*
*      S T A A D - III
*      REVISION 10.2b (VERSION 10 LEVEL 2)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS, INC.
*      DATE=      NOV  6, 1998
*      TIME=      17:56:41
*
*****
```

1. STAAD PLANE EFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-558+700
2. UNIT ME MT
3. OUTP WIDT 72
4. PAGE EJECT
5. INPUT NO

*** THIS RUN WILL ALLOW ANALYSIS ONLY AND NO DESIGN ***

6. JOIN COOP
7. 1 0. 7.1 0. 6 4.40 7.1 0.
8. 7 4.4 6.39 0. 16 4.4 0. 0.
9. MEMB INCT
10. 1 1 2 15
11. MEMB PROP
12. 1 TO 15 PRIS YD 0.8 ZD 1.0
13. CONST
14. E 3000000. MEMB 1 TO 5
15. E 2850000. MEMB 6 TO 15
16. SUPP
17. 1 FIXED BUT FY
18. 16 FIXED
19. *
20. LOAD 1 PORTICO EN CONSTRUCCION
21. MEMB LOAD
22. 1 TO 15 UNI GY -2.
23. 6 LIN Y -0.767 -1.372
24. 7 LIN Y -1.372 -1.977
25. 8 LIN Y -1.977 -2.582
26. 9 LIN Y -2.582 -3.187
27. 10 LIN Y -3.187 -3.792
28. 11 LIN Y -3.792 -4.397
29. 12 LIN Y -4.397 -5.001
30. 13 LIN Y -5.001 -5.606
31. 14 LIN Y -5.606 -6.211
32. 15 LIN Y -6.211 -6.816
33. *
34. LOAD 2 PORTICO DESCARGADO
35. MEMB LOAD
36. 1 TO 5 UNI GY -9.3
37. 6 TO 15 UNI GY -2.
38. 6 LIN Y -4.729 -5.334
39. 7 LIN Y -5.334 -5.939
40. 8 LIN Y -5.939 -6.544
41. 9 LIN Y -6.544 -7.149
42. 10 LIN Y -7.149 -7.754
43. 11 LIN Y -7.754 -8.358
44. 12 LIN Y -8.358 -8.963

46. 14 LIN Y -9.568 -10.173
 47. 15 LIN Y -10.173 -10.778
 48. *
 49. LOAD 3 PORTICO EN CARGA CON EMPUJE ACTIVO
 50. MEMB LOAD
 51. 1 TO 5 UNI GY -11.9
 52. 6 TO 15 UNI GY -2.
 53. 6 LIN Y -2.195 -2.580
 54. 7 LIN Y -2.580 -2.965
 55. 8 LIN Y -2.965 -3.349
 56. 9 LIN Y -3.349 -3.734
 57. 10 LIN Y -3.734 -4.119
 58. 11 LIN Y -4.119 -4.504
 59. 12 LIN Y -4.504 -4.889
 60. 13 LIN Y -4.889 -5.274
 61. 14 LIN Y -5.274 -5.658
 62. 15 LIN Y -5.658 -6.043
 63. *
 64. LOAD 4 PORTICO EN CARGA CON EMPUJE EN REPOSO
 65. MEMB LOAD
 66. 1 TO 5 UNI GY -11.9
 67. 6 TO 15 UNI GY -2.
 68. 6 LIN Y -4.729 -5.334
 69. 7 LIN Y -5.334 -5.939
 70. 8 LIN Y -5.939 -6.544
 71. 9 LIN Y -6.544 -7.149
 72. 10 LIN Y -7.149 -7.754
 73. 11 LIN Y -7.754 -8.358
 74. 12 LIN Y -8.358 -8.963
 75. 13 LIN Y -8.963 -9.568
 76. 14 LIN Y -9.568 -10.173
 77. 15 LIN Y -10.173 -10.778
 78. *
 79. PERF AN

** PROCESSING MEMBER/ELEMENT INFORMATION.

** PERFORMING BANDWIDTH REDUCTION.

ORIGINAL BANDWIDTH = 1
 REDUCED BANDWIDTH = 1

CHECKING LOAD DATA.
 ** PROCESSING SUPPORT CONDITION.
 ** PROCESSING AND SETTING UP LOAD VECTOR.

** PROCESSING ELEMENT STIFFNESS MATRIX. 17:56:46
 ** PROCESSING GLOBAL STIFFNESS MATRIX. 17:56:46
 ** PROCESSING TRIANGULAR FACTORIZATION. 17:56:48
 ** CALCULATING JOINT DISPLACEMENT. 17:56:49
 ** CALCULATING ELEMENT FORCES. 17:56:49

80. PRINT ANAL RESU

FFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-558+700 -- PAGE NO. 3

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE							
JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	0.00000	-0.02881	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.19766	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.30270	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.27092	0.00000	0.00000	0.00000	0.00000

3	3	-0.00077	-0.28576	0.00000	0.00000	0.00000	0.00038
	4	-0.00110	-0.25525	0.00000	0.00000	0.00000	0.00035
	1	-0.00066	-0.02171	0.00000	0.00000	0.00000	0.00007
	2	-0.00202	-0.15318	0.00000	0.00000	0.00000	0.00047
4	3	-0.00153	-0.23772	0.00000	0.00000	0.00000	0.00070
	4	-0.00220	-0.21102	0.00000	0.00000	0.00000	0.00064
	1	-0.00100	-0.01460	0.00000	0.00000	0.00000	0.00008
	2	-0.00303	-0.10574	0.00000	0.00000	0.00000	0.00058
5	3	-0.00230	-0.16694	0.00000	0.00000	0.00000	0.00089
	4	-0.00331	-0.14660	0.00000	0.00000	0.00000	0.00080
	1	-0.00133	-0.00792	0.00000	0.00000	0.00000	0.00006
	2	-0.00405	-0.05459	0.00000	0.00000	0.00000	0.00055
6	3	-0.00306	-0.08737	0.00000	0.00000	0.00000	0.00089
	4	-0.00441	-0.07593	0.00000	0.00000	0.00000	0.00077
	1	-0.00166	-0.00495	0.00000	0.00000	0.00000	0.00000
	2	-0.00506	-0.01495	0.00000	0.00000	0.00000	0.00031
7	3	-0.00383	-0.01852	0.00000	0.00000	0.00000	0.00063
	4	-0.00551	-0.01852	0.00000	0.00000	0.00000	0.00049
	1	-0.00409	-0.00466	0.00000	0.00000	0.00000	-0.00006
	2	0.00806	-0.01366	0.00000	0.00000	0.00000	0.00007
8	3	0.02993	-0.01686	0.00000	0.00000	0.00000	0.00033
	4	0.01754	-0.01686	0.00000	0.00000	0.00000	0.00018
	1	-0.00936	-0.00431	0.00000	0.00000	0.00000	-0.00008
	2	0.00760	-0.01232	0.00000	0.00000	0.00000	-0.00007
9	3	0.04532	-0.01517	0.00000	0.00000	0.00000	0.00011
	4	0.02288	-0.01517	0.00000	0.00000	0.00000	-0.00001
	1	-0.01519	-0.00393	0.00000	0.00000	0.00000	-0.00008
	2	0.00004	-0.01093	0.00000	0.00000	0.00000	-0.00013
10	3	0.04771	-0.01343	0.00000	0.00000	0.00000	-0.00003
	4	0.01770	-0.01343	0.00000	0.00000	0.00000	-0.00012
	1	-0.01974	-0.00350	0.00000	0.00000	0.00000	-0.00005
	2	-0.00938	-0.00950	0.00000	0.00000	0.00000	-0.00013
11	3	0.04184	-0.01164	0.00000	0.00000	0.00000	-0.00012
	4	0.00797	-0.01164	0.00000	0.00000	0.00000	-0.00015
	1	-0.02168	-0.00303	0.00000	0.00000	0.00000	-0.00001
	2	-0.01679	-0.00803	0.00000	0.00000	0.00000	-0.00003
12	3	0.03174	-0.00981	0.00000	0.00000	0.00000	-0.00016
	4	-0.00170	-0.00981	0.00000	0.00000	0.00000	-0.00012
	1	-0.02038	-0.00251	0.00000	0.00000	0.00000	0.00004
	2	-0.01982	-0.00651	0.00000	0.00000	0.00000	-0.00001
	3	0.02067	-0.00794	0.00000	0.00000	0.00000	-0.00015
	4	-0.00822	-0.00794	0.00000	0.00000	0.00000	-0.00006

FFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-558+700 -- PAGE NO.

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE							
JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
13	1	-0.01596	-0.00195	0.00000	0.00000	0.00000	0.00008
	2	-0.01772	-0.00495	0.00000	0.00000	0.00000	0.00006
	3	0.01103	-0.00602	0.00000	0.00000	0.00000	-0.00012
	4	-0.01009	-0.00602	0.00000	0.00000	0.00000	0.00001
14	1	-0.00949	-0.00134	0.00000	0.00000	0.00000	0.00010
	2	-0.01117	-0.00334	0.00000	0.00000	0.00000	0.00011
	3	0.00426	-0.00406	0.00000	0.00000	0.00000	-0.00007
	4	-0.00759	-0.00406	0.00000	0.00000	0.00000	0.00006
15	1	-0.00308	-0.00069	0.00000	0.00000	0.00000	0.00008
	2	-0.00394	-0.00169	0.00000	0.00000	0.00000	0.00009
	3	0.00081	-0.00205	0.00000	0.00000	0.00000	-0.00003
	4	-0.00285	-0.00205	0.00000	0.00000	0.00000	0.00007
16	1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

FFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-558+700 -- PAGE NO. 64

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
1	1	9.06	0.00	0.00	0.00	0.00	-6.38
	2	27.58	0.00	0.00	0.00	0.00	-39.16
	3	20.88	0.00	0.00	0.00	0.00	-56.78
	4	30.06	0.00	0.00	0.00	0.00	-52.57
16	1	17.86	23.00	0.00	0.00	0.00	-18.79
	2	27.47	55.12	0.00	0.00	0.00	-25.06
	3	8.37	66.56	0.00	0.00	0.00	2.17
	4	24.99	66.56	0.00	0.00	0.00	-19.22

FFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-558+700

-- PAGE NO. 6

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	2	6	40.92	27.58	0.00	0.00	0.00	50.86
		7	-42.34	-24.01	0.00	0.00	0.00	-32.52
	3	6	52.36	20.88	0.00	0.00	0.00	58.42
		7	-53.78	-19.18	0.00	0.00	0.00	-44.18
	4	6	52.36	30.06	0.00	0.00	0.00	62.62
		7	-53.78	-26.49	0.00	0.00	0.00	-42.52
7	1	7	10.22	8.30	0.00	0.00	0.00	6.79
		8	-11.64	-7.11	0.00	0.00	0.00	-1.29
	2	7	42.34	24.01	0.00	0.00	0.00	32.52
		8	-43.76	-20.01	0.00	0.00	0.00	-16.87
	3	7	53.78	19.18	0.00	0.00	0.00	44.18
		8	-55.20	-17.22	0.00	0.00	0.00	-31.24
	4	7	53.78	26.49	0.00	0.00	0.00	42.52
		8	-55.20	-22.48	0.00	0.00	0.00	-25.11
8	1	8	11.64	7.11	0.00	0.00	0.00	1.29
		9	-13.06	-5.50	0.00	0.00	0.00	3.21
	2	8	43.76	20.01	0.00	0.00	0.00	16.87
		9	-45.18	-15.57	0.00	0.00	0.00	-4.22
	3	8	55.20	17.22	0.00	0.00	0.00	31.24
		9	-56.62	-14.97	0.00	0.00	0.00	-19.80
	4	8	55.20	22.48	0.00	0.00	0.00	25.11
		9	-56.62	-18.05	0.00	0.00	0.00	-10.69
9	1	9	13.06	5.50	0.00	0.00	0.00	-3.21
		10	-14.48	-3.45	0.00	0.00	0.00	6.41
	2	9	45.18	15.57	0.00	0.00	0.00	4.22
		10	-46.60	-10.71	0.00	0.00	0.00	5.14
	3	9	56.62	14.97	0.00	0.00	0.00	19.80
		10	-58.04	-12.46	0.00	0.00	0.00	-10.04
	4	9	56.62	18.05	0.00	0.00	0.00	10.69
		10	-58.04	-13.19	0.00	0.00	0.00	0.43
10	1	10	14.48	3.45	0.00	0.00	0.00	-6.41
		11	-15.90	-0.97	0.00	0.00	0.00	8.01
	2	10	46.60	10.71	0.00	0.00	0.00	-5.14
		11	-48.02	-5.42	0.00	0.00	0.00	10.90
	3	10	58.04	12.46	0.00	0.00	0.00	10.04
		11	-59.46	-9.67	0.00	0.00	0.00	-2.17
	4	10	58.04	13.19	0.00	0.00	0.00	-0.43
		11	-59.46	-7.90	0.00	0.00	0.00	7.94
11	1	11	15.90	0.97	0.00	0.00	0.00	-8.01
		12	-17.32	1.94	0.00	0.00	0.00	7.69
	2	11	48.02	5.42	0.00	0.00	0.00	-10.90
		12	-49.44	0.30	0.00	0.00	0.00	12.74
	3	11	59.46	9.67	0.00	0.00	0.00	2.17
		12	-60.88	-6.61	0.00	0.00	0.00	3.63
	4	11	59.46	7.90	0.00	0.00	0.00	-7.94
		12	-60.88	-2.18	0.00	0.00	0.00	11.54

FFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-558+700

-- PAGE NO.

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	9.06	0.00	0.00	0.00	0.00	-6.38
		2	-9.06	1.76	0.00	0.00	0.00	5.61
	2	1	27.58	0.00	0.00	0.00	0.00	-39.16
		2	-27.58	8.18	0.00	0.00	0.00	35.56
	3	1	20.88	0.00	0.00	0.00	0.00	-56.78
		2	-20.88	10.47	0.00	0.00	0.00	52.17
	4	1	30.06	0.00	0.00	0.00	0.00	-52.57
		2	-30.06	10.47	0.00	0.00	0.00	47.97
2	1	2	9.06	-1.76	0.00	0.00	0.00	-5.61
		3	-9.06	3.52	0.00	0.00	0.00	3.28
	2	2	27.58	-8.18	0.00	0.00	0.00	-35.56
		3	-27.58	16.37	0.00	0.00	0.00	24.76
	3	2	20.88	-10.47	0.00	0.00	0.00	-52.17
		3	-20.88	20.94	0.00	0.00	0.00	38.35
	4	2	30.06	-10.47	0.00	0.00	0.00	-47.97
		3	-30.06	20.94	0.00	0.00	0.00	34.14
3	1	3	9.06	-3.52	0.00	0.00	0.00	-3.28
		4	-9.06	5.28	0.00	0.00	0.00	-0.59
	2	3	27.58	-16.37	0.00	0.00	0.00	-24.76
		4	-27.58	24.55	0.00	0.00	0.00	6.76
	3	3	20.88	-20.94	0.00	0.00	0.00	-38.35
		4	-20.88	31.42	0.00	0.00	0.00	15.31
	4	3	30.06	-20.94	0.00	0.00	0.00	-34.14
		4	-30.06	31.42	0.00	0.00	0.00	11.10
4	1	4	9.06	-5.28	0.00	0.00	0.00	-0.59
		5	-9.06	7.04	0.00	0.00	0.00	-6.01
	2	4	27.58	-24.55	0.00	0.00	0.00	-6.76
		5	-27.58	32.74	0.00	0.00	0.00	-18.45
	3	4	20.88	-31.42	0.00	0.00	0.00	-15.31
		5	-20.88	41.89	0.00	0.00	0.00	-16.95
	4	4	30.06	-31.42	0.00	0.00	0.00	-11.10
		5	-30.06	41.89	0.00	0.00	0.00	-21.15
5	1	5	9.06	-7.04	0.00	0.00	0.00	6.01
		6	-9.06	8.80	0.00	0.00	0.00	-12.98
	2	5	27.58	-32.74	0.00	0.00	0.00	18.45
		6	-27.58	40.92	0.00	0.00	0.00	-50.86
	3	5	20.88	-41.89	0.00	0.00	0.00	16.95
		6	-20.88	52.36	0.00	0.00	0.00	-58.42
	4	5	30.06	-41.89	0.00	0.00	0.00	21.15
		6	-30.06	52.36	0.00	0.00	0.00	-21.15

MEMBER END FORCES STRUCTURE TYPE = PLANE

MEMB	LOAD	J1	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOI-Y	MOI-Z
12	1	12	17.32	-1.94	0.00	0.00	0.00	-7.69
		13	-18.74	5.27	0.00	0.00	0.00	5.15
	2	12	49.44	-0.30	0.00	0.00	0.00	-12.74
		13	-50.86	6.45	0.00	0.00	0.00	10.37
	3	12	60.88	6.61	0.00	0.00	0.00	-3.63
		13	-62.30	-3.28	0.00	0.00	0.00	7.15
	4	12	60.88	2.18	0.00	0.00	0.00	-11.54
		13	-62.30	3.97	0.00	0.00	0.00	10.94
13	1	13	18.74	-5.27	0.00	0.00	0.00	-5.15
		14	-20.16	9.04	0.00	0.00	0.00	0.10
	2	13	50.86	-6.45	0.00	0.00	0.00	-10.37
		11	-52.28	13.02	0.00	0.00	0.00	3.48
	3	13	62.30	3.28	0.00	0.00	0.00	-7.15
		11	-63.72	0.33	0.00	0.00	0.00	8.21
	4	13	62.30	-3.97	0.00	0.00	0.00	-10.94
		14	-63.72	10.55	0.00	0.00	0.00	5.81
14	1	14	20.16	-9.04	0.00	0.00	0.00	-0.10
		15	-21.58	13.23	0.00	0.00	0.00	-7.78
	2	14	52.28	-13.02	0.00	0.00	0.00	-3.48
		15	-53.70	20.03	0.00	0.00	0.00	-8.23
	3	14	63.72	-0.33	0.00	0.00	0.00	-8.21
		15	-65.14	4.21	0.00	0.00	0.00	6.62
	4	14	63.72	-10.55	0.00	0.00	0.00	-5.81
		15	-65.14	17.55	0.00	0.00	0.00	-4.14
15	1	15	21.58	-13.23	0.00	0.00	0.00	7.78
		16	-23.00	17.86	0.00	0.00	0.00	-18.79
	2	15	53.70	-20.03	0.00	0.00	0.00	8.23
		16	-55.12	27.47	0.00	0.00	0.00	-25.06
	3	15	65.14	-4.21	0.00	0.00	0.00	-6.62
		16	-66.56	8.37	0.00	0.00	0.00	2.17
	4	15	65.14	-17.55	0.00	0.00	0.00	-4.14
		16	-66.56	24.99	0.00	0.00	0.00	-19.22

***** END OF LATEST ANALYSIS RESULT *****

81. FINISH

***** END OF STAAD-III *****

***** DATE= NOV 6, 1998 TIME= 17:56:50 *****

 * FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
 * CALL (01) 686-7682, CROYDON, U.K. TEL. 929181 *

ANALYSIS FOR DYNAMIC

PT-558+700

H=250

b=1.0

h=0.80

d=0.75

$$U_{c,d} = \frac{2500}{1.5} \times 1.0 \times 0.75^2 = 937.5 \text{ m}^2$$

$$U = 0.97 \frac{1.5 \times M}{0.75} \left(1 + \frac{1.5M}{937.5} \right) = 1.94M \left(1 + \frac{M}{625} \right)$$

Node 1:

$$M = -36.78$$

$$U_I = 120.07$$

2

$$M = -52.17$$

$$U_I = 109.66$$

3

$$M = -38.31$$

$$U_I = 78.96$$

4

$$M = -15.31$$

$$U_I = 30.43$$

5

$$M = 21.15$$

$$U_I = 42.42$$

6

$$M = -62.62$$

$$U_I = 133.65$$

ANALYSIS FOR HORIZONTAL

Node 6

$$M = 62.62$$

$$U_E = 135.07$$

7

$$M = 44.18$$

$$U_E = 92.44$$

8

$$M = 31.24$$

$$U_E = 63.97$$

9

$$M = 19.80$$

$$U_E = 39.76$$

$$-3.27$$

$$U_I = 6.26$$

10

$$M = 10.04$$

$$U_E = 19.83$$

$$-6.41$$

$$U_I = 12.58$$

11

$$M = 21.17$$

$$U_E = 41.23$$

$$-10.80$$

$$U_I = 21.56$$

12

$$M = -12.74$$

$$U_I = 25.28$$

13

$$M = -10.84$$

$$U_I = 21.64$$

14

$$M = -8.21$$

$$U_I = 16.16$$

15

$$M = -6.62$$

$$U_I = 13.0$$

$$8.20$$

$$U_E = 16.20$$

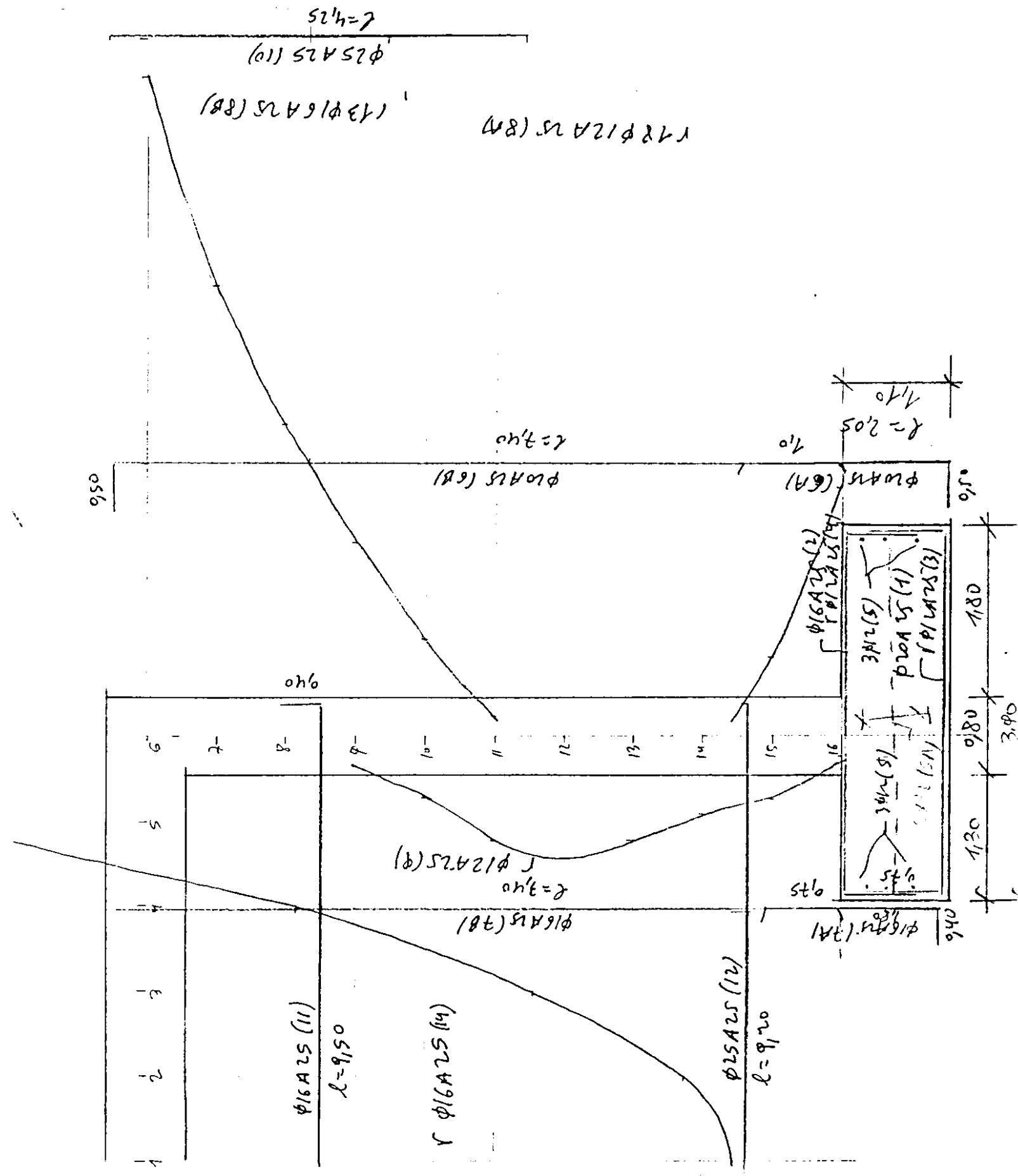
16

$$M = 21.17$$

$$U_I = 41.23$$

$$25.06$$

$$U_E = 50.78$$



COMPROBACION A CORTANTE

PI 5587700

CONTINENTE EN EL HORIZONTAL

Encuentro con la tapa: $Q = 27,47$

$\phi 20 \text{ A } 25 \quad w = 12,57 \text{ cm}^2/\text{m}$

$\xi = 1,6 - 0,75 = 0,85 \Rightarrow \xi = 1$

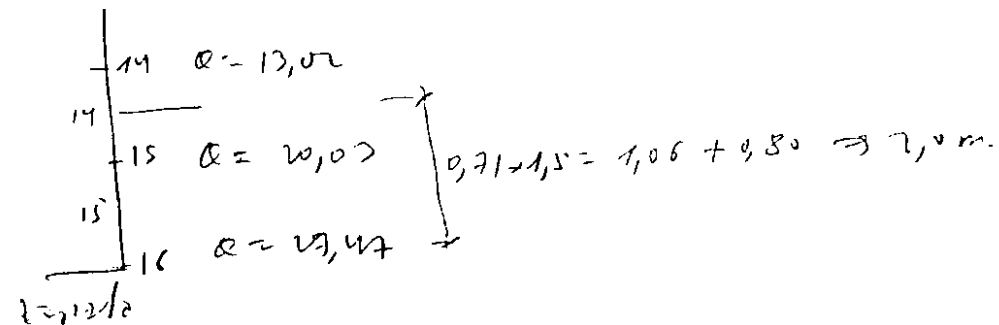
$\rho = 12,57 / 100 \times 75 = 0,168 \times 10^{-2}$

$f_{cr} = 5 \sqrt{250 \times 0,9 / 1,5} = 61,24 \text{ T/m}$

$V_{cr} = 61,24 \times 1,0 \times 0,75 = 45,93 \text{ T}$

$V_{u2,d} = 0,50 \times 45,93 \times 1,0 \times (1 + 50 \times 0,168 \times 10^{-2}) = 24,89 \text{ T}$

$Q_{max} = 24,89 / 1,5 = 16,60 \text{ T}$



$V_{u1,d} = 27,47 \times 1,5 = 41,21 \text{ T}$

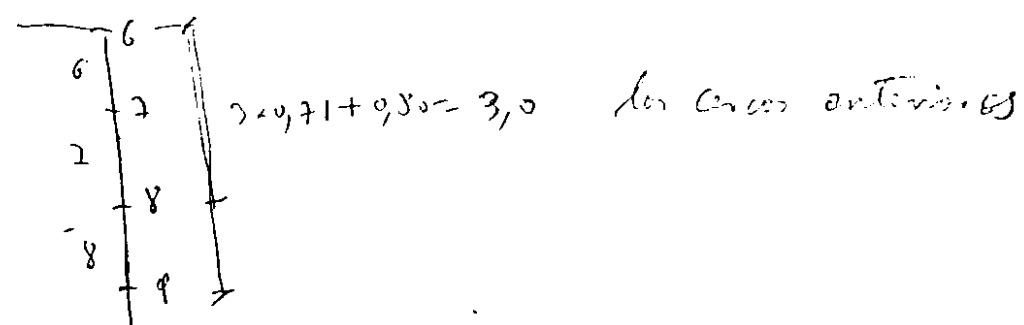
C $\phi 12$ a 0,30 en ambas direcciones

$V_{u2,d} = \frac{3 \times 1,13}{0,30} \times 4,2 \times 0,9 \times 0,75 = 32,04 \text{ T} > 16,31 \text{ T}$

Encuentro con el dintel $\phi 20 \text{ A } 25 \quad w = 2 \times 12,57 = 25,14 \text{ cm}^2$

$V_{u2,d} = 0,50 \times 45,93 \times 1,0 \times (1 + 50 \times 2 \times 0,168 \times 10^{-2}) = 26,82 \text{ T}$

$Q_{max} = 26,82 / 1,5 = 17,88 \text{ T}$



CONTINENTE EN EL VERTICAL

$Q_{max} = 17,88 \text{ T} \Rightarrow \text{Halla Dato 3}$

Unidad de la barra 5: $Q = (41,89 + 52,36) / 2 = 47,125 \text{ T}$

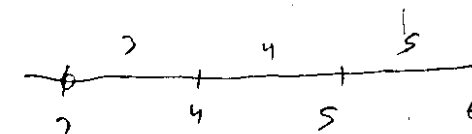
$V_{u1} = 1,5 \times 47,125 = 70,69 \text{ T}$

Cercos $\phi 12$ a 0,25

$V_{u2,d} = \frac{4 \times 1,13}{0,25} \times 4,2 \times 0,9 \times 0,75 = 51,26 \text{ T}$

Cercos $\phi 12$ a 0,25 en una direcci3n y a 0,30 en la otra

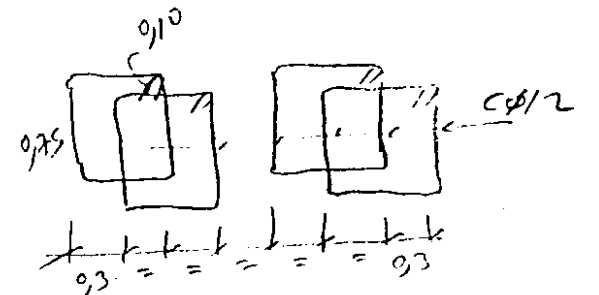
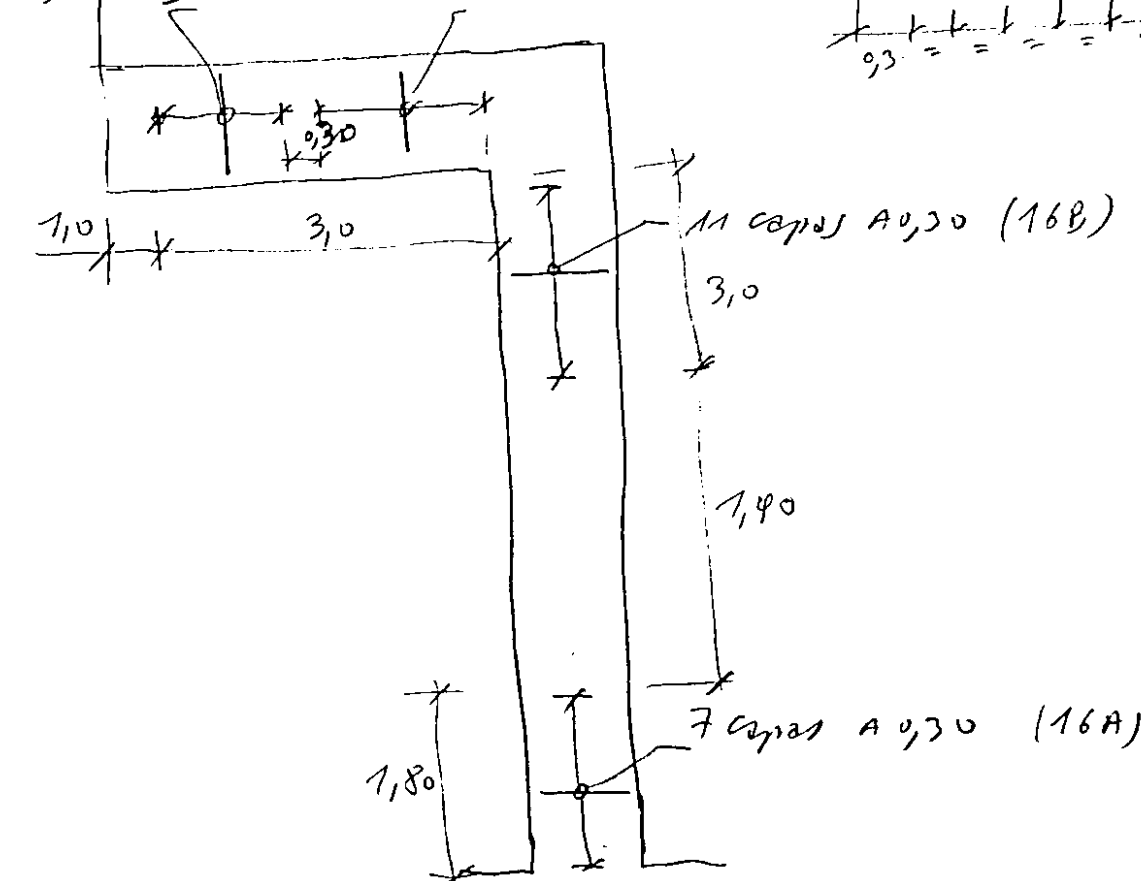
$V_{u2,d} = \frac{4 \times 1,13}{0,30} \times 4,2 \times 0,9 \times 0,75 = 42,71 \text{ T} \approx V_{u1}$



$l = \frac{4,4}{5} \times 2,5 + 0,75 \approx 3,0 \text{ m}$

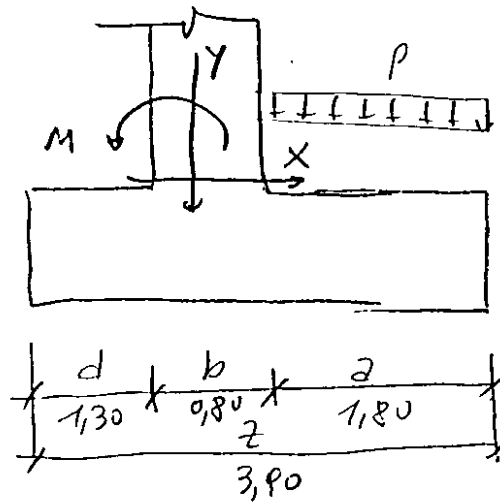
Disposici3n de una capa de cercos:

5 capas A 0,30 (160) 7 capas A 0,25 (160)



DIMENSIONAMIENTO DE LA CIMENTACION

PI 558+700 Cálculo de la cimentación



$$q_{adm} = 30 \text{ T/m}^2$$

$$q_{punta} = 30 \times 1.25 = 37.5 \text{ T/m}^2$$

$$\mu = 0.55$$

Valores de las cargas

Hipótesis I: $p = (7.10 + 9.40 + 9.50) \times 2.0 = 16.0 \text{ T/m}$
 $x = -17.86$
 $y = 23.0$
 $m = 18.79$

Hipótesis II: $p = 3.0 + 1.0 + (3.15 + 0.40 + 7.10) \times 2.0 = 25.30 \text{ T/m}$
 $x = -27.47$
 $y = 55.12$
 $m = 25.06$

Hipótesis III: $p = 7.30 + (0.40 + 7.10) \times 2.0 = 22.30 \text{ T/m}$
 $x = -8.37$
 $y = 66.56$
 $m = -2.17$

Hipótesis IV: $p = 7.30 + 3.0 + (0.40 + 7.10) \times 2.0 = 25.30 \text{ T/m}$
 $x = -24.99$
 $y = 66.56$
 $m = 19.22$

3

Tramo 1

$$\begin{aligned} d &= 1.50 \\ b &= 0.80 \\ d &= 1.30 \\ c &= 1.0 \\ z &= 3.60 \end{aligned}$$

H-I: $N_T = 56.0$
 $M_T = 13.75$
 $e = 0.146$
 $z/r = 0.600$
 $\sigma_A = 21.921$
 $\sigma_B = 9.190$

H-II: $N_T = 102.070$
 $M_T = 18.195$
 $e = 0.178$
 $z/r = 0.60$
 $\sigma_A = 36.776$
 $\sigma_B = 19.929$

H-III: $N_T = 109.010$
 $M_T = -27.267$
 $e = 0.204$
 $z/r = 0.60$
 $\sigma_A = 19.972$
 $\sigma_B = 40.589$

H-IV: $N_T = 113.510$
 $M_T = 11.019$
 $e = 0.097$
 $z/r = 0.60$
 $\sigma_A = 36.632$
 $\sigma_B = 76.429$

Tramo 2

$$\begin{aligned} d &= 1.70 \\ b &= 0.80 \\ d &= 1.30 \\ c &= 1.10 \\ z &= 3.80 \end{aligned}$$

Tramo 3

$$\begin{aligned} d &= 1.60 \\ b &= 0.80 \\ d &= 1.40 \\ c &= 1.10 \\ z &= 3.80 \end{aligned}$$

$N_T = 114.420$
 $M_T = -19.457$
 $e = 0.169$
 $z/r = 0.633$
 $\sigma_A = 22.158$
 $\sigma_B = 38.327$

$N_T = 112.690$
 $M_T = -25.555$
 $e = 0.227$
 $z/r = 0.633$
 $\sigma_A = 19.037$
 $\sigma_B = 40.274$

TANZO 4

$$\begin{aligned} a &= 1,80 \Rightarrow \text{vibro} \\ b &= 0,80 \\ d &= 1,30 \\ c &= 1,10 \\ t &= 3,90 \end{aligned}$$

$$\begin{aligned} \text{H-I: } N_T &= 62,525 \\ M_T &= 13,946 \\ e &= 0,223 \\ z/b &= 0,650 \\ \sigma_A &= 21,533 \\ \sigma_B &= 10,531 \end{aligned}$$

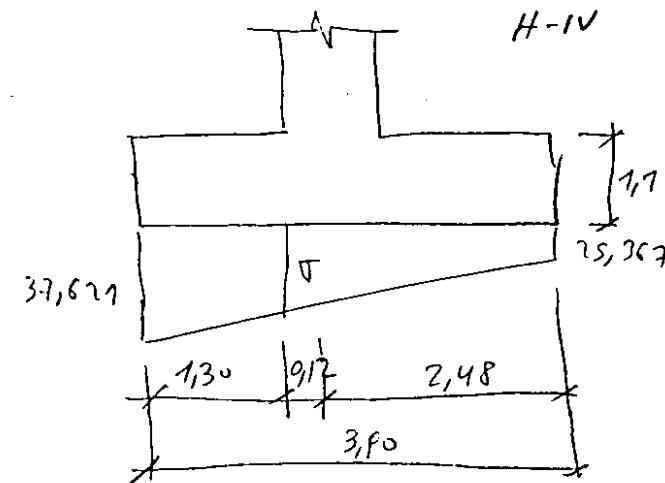
$$\begin{aligned} \text{H-II: } N_T &= 111,385 \\ M_T &= 21,240 \\ e &= 0,191 \\ z/b &= 0,650 \\ \sigma_A &= 36,434 \\ \sigma_B &= 20,182 \end{aligned}$$

$$\begin{aligned} \text{H-III: } N_T &= 117,425 \\ M_T &= -18,470 \\ e &= 0,157 \\ z/b &= 0,650 \\ \sigma_A &= 22,823 \\ \sigma_B &= 37,395 \end{aligned}$$

$$\begin{aligned} \text{H-IV: } N_T &= 122,825 \\ M_T &= 15,532 \\ e &= 0,126 \\ z/b &= 0,650 \\ \sigma_A &= 37,621 \\ \sigma_B &= 25,367 \end{aligned}$$

DIMENSIONAMIENTO DE LA ZAPATA

Zalón delantero. Armadura inferior



$$\sigma = 37,621 - \frac{27,621 - 25,367}{3,90} \times 1,30 = 33,536$$

$$\Delta\sigma = 37,621 - 33,536 = 4,085$$

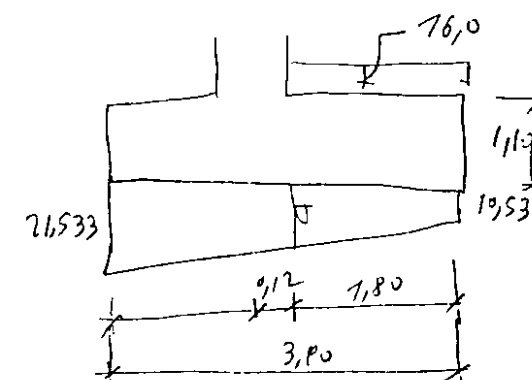
$$\begin{aligned} M &= (33,536 - 1,10 \times 2,5) \times 1,30 \times (0,12 + 1,30/2) + \\ &\quad \frac{1}{2} \times 1,30 \times 4,085 \times (0,12 + 2 \times 1,30/3) = \\ &= 3,817 + 2,520 = 33,437 \text{ mT} \end{aligned}$$

$$M_d = 1,5 \times 33,437 = 50,155$$

$$U_c \cdot d = \frac{2500}{1,5} \times 1,0 \times 1,05^2 = 1837,5$$

$$U_{sup} = 0,87 \times \frac{50,155}{1,05} \left(1 + \frac{50,155}{1837,5} \right) = 47,60 \text{ T/m} \Rightarrow \phi 20 \text{ A } 25$$

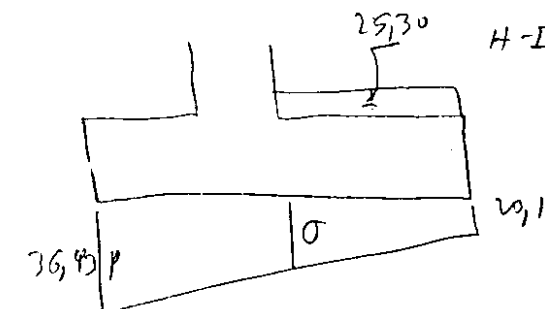
Zalón trasero: Armadura superior



$$\sigma = 10,531 + \frac{21,533 - 14,527}{3,90} \times 1,80 = 15,604$$

$$\Delta\sigma = 15,604 - 10,531 = 5,078$$

$$\begin{aligned} M &= (16,00 + 1,10 \times 2,5 - 10,531) \times 1,80 \times (0,12 + 0,80) - \\ &\quad - \frac{1}{2} \times 1,80 \times 5,078 \times (0,12 + 1,80/3) = \\ &= 15,090 - 3,291 = 11,800 \text{ mT} \end{aligned}$$



$$\sigma = 20,182 + \frac{25,434 - 20,182}{3,90} \times 1,80 = 27,416$$

$$\Delta\sigma = 7,724$$

$$\begin{aligned} M &= (25,30 + 1,10 \times 2,5 - 20,182) \times 1,80 \times (0,12 + 0,80) - \\ &\quad - \frac{1}{2} \times 1,80 \times 7,724 \times (0,12 + 1,80/3) = \\ &= 14,446 - 5,011 = 9,434 \text{ mT} \end{aligned}$$

$$M_d = 1,5 \times 11,800 = 17,700 \text{ mT}$$

$$U_{sup} = 0,87 \times \frac{17,700}{1,05} \left(1 + \frac{17,700}{1837,5} \right) = 16,51 \text{ T/m} \Rightarrow \phi 16 \text{ A } 25$$

DIMENSIONAMIENTO DE LAS ALETAS

" " " " " INFERIADA SUPERIOR	=	.000000
" " " " " INFERIOR	=	.000000
DEL RELLENO CONSIGO MISMO	=	13.496000

COEFICIENTES DE EMPUJE

ZONA DEL RELLENO. COMPONENTE	HORIZONTAL	KH=	.283365
"	VERTICAL	KV=	.068009
ZONA VERTICAL DEL MURO. COMP	HORIZONTAL	KH=	.312646
"	VERTICAL	KV=	.000000
ZONA INCLINADA SUPERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000
ZONA INCLINADA INFERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000

TITULO :FFCC MADRID-BARCELONA. PT 558+7 MINIMA ALTURA

DIMENSIONES GEOMETRICAS DEL MURO

ANCHO DE LA CORONACION	=	4.00 M
PROFUNDIDAD DEL PARAMENTO VERTICAL DEL INTERADOS	=	1.000 M
" " " " " TRASDOS	=	4.400 M
PROFUNDIDAD DE LOS PARAMENTOS INCLINADOS EN EL TRASDOS		
	ZONA SUPERIOR	= 1.000 M
	ZONA INFERIOR	= 1.000 M
PROFUNDIDAD DEL TALUD DE TIERRAS EN EL TRASDOS	=	1.000 M

PENDIENTE DEL TALUD DE TIERRAS	=	.24000000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333330
" " " SUPERIOR DEL TRASDOS	=	.00000000
" " " INFERIOR " "	=	.00000000

DIMENSIONES DE LA ZAPATA

VUELO DELANTERO	=	.753 M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQUIERDO	=	.900 M
" " " " " " " " DCHO	=	.900 M
LONGITUD TOTAL DE LA ZAPATA	=	2.700 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000

SITUACION DE LA CARGA CONCENTRADA EXTERIOR. DISTANCIA= .000 M
 PROFUNDIDAD= .000 M

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA	=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	=	.07000	M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	=	2250.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	=	.08000	M
PESO ESPECIFICO DEL HORMIGON	=	2.50000	T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	=	2.00000	T/M3

HIPOTESIS = 1

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 °
SOBRECARGA UMR SOBRE EL RELLENO	=	.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T
COF. MINORACION DE CARGAS FAVORABLES PARA LA COMPROBACION DE LAS ESTABILIDADES	=	1.100

ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASTOS
EN LA ZONA VERTICAL

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TPASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	ARMAD. NECESARIA MOMENTO MT	NECESARIA TRACCION T	CORTANTE COMPRES T	CORTANTE VOL T
.489	.416	.499	.075	.010	.000	.000	20.7
.978	.433	1.018	.299	.089	.000	.000	21.0
1.467	.449	1.556	.673	.310	.000	.000	22.7
1.956	.465	2.115	1.196	.746	.872	.159	23.9
2.444	.481	2.693	1.868	1.469	2.824	.202	24.4
2.933	.498	3.292	2.690	2.553	5.840	.247	25.1
3.422	.514	3.910	3.662	4.070	10.083	.293	26.7
3.911	.530	4.548	4.782	6.094	15.713	.341	27.7
4.400	.547	5.207	6.053	8.696	22.888	.390	28.7

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND	CANTO	ESFUERZOS MAYORADOS			ARMAD. NECESARIA	CORTA	
SECCION	SECCION	ANIL	CORTANTE	MOMENTO	TRACCION	COMPRES	VCC
M	M	T	T	MT	T	T	T
.489	.416	.499	.112	.016	.000	.000	20.6
.978	.433	1.018	.448	.138	.000	.000	21.6
1.467	.449	1.556	1.009	.475	.286	.078	22.5
1.956	.465	2.115	1.793	1.135	1.519	.106	23.1
2.444	.481	2.693	2.802	2.230	3.650	.135	24.1
2.933	.498	3.292	4.035	3.868	6.851	.165	25.1
3.422	.514	3.910	5.492	6.159	11.283	.196	26.1
3.911	.530	4.548	7.174	9.211	17.104	.227	27.1
4.400	.547	5.207	9.079	13.135	24.472	.260	28.2

$$\phi(16): \psi \in \Lambda, (\psi\psi)^{\dagger}$$

CALCULO DE LA ZAPATA

$$0.55 + 0.65 = 1.20$$

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 9.001 T
 " " " NORMALES " " " = 24.047 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.469
 MOMENTO DE VUELCO = 16.910 MT
 MOMENTO DE ESTABILIDAD = 41.670 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 2.464

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 9.001 T
 " " " NORMALES " " " = 26.236 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = 7.075 MT
 LONGITUD TOTAL DE LA ZAPATA = 2.700 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .270 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPEZIAL
 TENSION EN EL VERTICE DELANTERO = 15.540 T/M2
 TENSION EN EL VERTICE TRASERO = 3.894 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.417	.900	.000	5.173	1.106	1.941	.000	53.576
.835	.900	.000	9.593	4.214	7.429	.000	53.576

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.467	.900	.000	5.292	1.780	3.128	.000	53.576
.934	.900	.000	7.380	4.778	8.428	.000	53.576
1.400	.900	.000	8.423	8.507	15.078	.000	53.576

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 13.502 T
 " " " NORMALES " " " = 25.127 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.024
 MOMENTO DE VUELCO = 25.366 MT
 MOMENTO DE ESTABILIDAD = 44.587 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.758

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 13.502 T
 " " " NORMALES " " " = 27.316 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = 14.072 MT
 LONGITUD TOTAL DE LA ZAPATA = 2.700 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .515 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 2.505 M
 TENSION EN EL VERTICE DELANTERO = 21.813 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.417	.900	.000	7.408	1.599	1.872	.000	53.5
.835	.900	.000	13.299	5.975	7.019	.000	53.5

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.467	.900	.000	7.259	2.248	2.633	.000	53.5
.934	.900	.000	10.522	6.476	7.611	.000	53.5
1.400	.900	.000	11.783	11.760	13.884	.000	53.5

DEL RELLENO CONSIGO MISMO = 13.496000 °

COEFICIENTES DE EMPUJE

ZONA DEL RELLENO. COMPONENTE	HORIZONTAL	KH=	.283365
"	VERTICAL	KV=	.068009
ZONA VERTICAL DEL MURO. COMP	HORIZONTAL	KH=	.312646
"	VERTICAL	KV=	.000000
ZONA INCLINADA SUPERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000
ZONA INCLINADA INFERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000

TITULO :FFCC MADRID-BARCELONA. PI 558+7 MAXIMA ALTURA

DIMENSIONES GEOMETRICAS DEL MURO

ANCHO DE LA CORONACION	=	.400 M
PROFUNDIDAD DEL PARAMENTO VERTICAL DEL ENTRADOS	=	.600 M
" " " " TRASDOS	=	6.600 M
PROFUNDIDAD DE LOS PARAMENTOS INCLINADOS EN EL TRASDOS		
ZONA SUPERIOR	=	.000 M
ZONA INFERIOR	=	.000 M
PROFUNDIDAD DEL TALUD DE TIERRAS EN EL TRASDOS	=	.000 M

PENDIENTE DEL TALUD DE TIERRAS	=	.24000000
" DE LA ZONA INFERIOR DEL ENTRADOS	=	.03333330
" " " SUPERIOR DEL TRASDOS	=	.00000000
" " " INFERIOR " "	=	.00000000

DIMENSIONES DE LA ZAPATA

VUELO DELANTERO	=	.680 M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.900 M
" " " " " " DCHO	=	.900 M
LONGITUD TOTAL DE LA ZAPATA	=	3.700 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000

SITUACION DE LA CARGA CONCENTRADA EXTERIOR. DISTANCIA= .000 M
 PROFUNDIDAD= .000 M

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	=	1.07000 M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	=	2250.00 T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	=	1.06000 M
PESO ESPECIFICO DEL HORMIGON	=	2.50000 T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	=	2.00000 T/M3

$$\text{HTFOIESIS} = 1$$

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500	
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000	º
SOBRECARGA UMR SOBRE EL RELLENO	=	1.000	T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	1.000	T
" " VERTICAL " " " "	=	1.000	T
COE. MINORACION DE CARGAS FAVORABLES PARA LA COMPROBACION DE LAS ESTABILIDADES	=	1.100	

ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASDOS
EN LA ZONA VERTICAL = 0.000000 2

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	ARMAD. NECESARIA MOMENTO MT	TRACCION T	NECESARIA COMPRES T	CORTAN VCF T
.471	.416	.481	.069	.009	.000	.000	20.0
.943	.431	.980	.278	.080	.000	.000	21.5
1.414	.447	1.498	.625	.277	.000	.000	22.4
1.896	.463	2.034	1.112	.668	.670	.153	23.4
2.357	.479	2.589	1.737	1.316	2.402	.194	24.3
2.829	.491	3.162	2.501	2.287	5.096	.237	25.2
3.300	.510	3.754	3.405	3.646	8.899	.282	26.1
3.771	.526	4.364	4.447	5.460	13.954	.327	27.0
4.243	.541	4.993	5.628	7.792	20.403	.374	27.9
4.714	.557	5.640	6.948	10.709	28.391	.423	28.8
5.186	.573	6.306	8.408	14.277	38.066	.473	29.7
5.657	.589	6.991	10.006	18.559	49.578	.524	30.7
6.129	.604	7.694	11.743	23.623	63.085	.577	31.6
6.600	.620	8.415	13.619	29.532	78.749	.631	32.5

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND	CANTO	ESFUERZOS MAYORADOS			ARMAD. NECESARIA		CORTA
SECCION	SECCION	ANIL	CORIANTE	MOMENTO	TRACCION	COMPRES	VCU
M	M	T	T	MT	T	T	T
.471	.416	.481	.104	.015	.000	.000	20.6
.943	.431	.980	.417	.123	.000	.000	21.5
1.414	.447	1.498	.938	.425	.199	.075	22.4
1.886	.463	2.034	1.668	1.017	1.292	.102	23.4
2.357	.479	2.589	2.606	1.998	3.196	.129	24.3
2.829	.494	3.162	3.752	3.466	6.067	.158	25.2
3.300	.510	3.754	5.107	5.519	10.051	.188	26.1
3.771	.526	4.364	6.670	8.255	15.290	.218	27.0
4.243	.541	4.993	8.442	11.772	21.925	.250	27.9
4.714	.557	5.640	10.422	16.160	29.100	.282	28.8

6.129 604 7.617 20.423 44.513 81.199 1421 32.533

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 18.482 T
" " " NORMALES " " " = 49.711 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.479
MOMENTO DE VUELCO = 49.752 MT
MOMENTO DE ESTABILIDAD = 114.022 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 2.292
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 18.482 T
" " " NORMALES " " " = 54.238 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 26.310 MT
LONGITUD TOTAL DE LA ZAPATA = 3.700 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .485 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPEZIAL
TENSION EN EL VERTICE DELANTERO = 26.190 T/M2
TENSION EN EL VERTICE TRASERO = 3.128 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION	CANTO SECCION	ESFUERZOS CARACTERISTICOS	ARMAD. NECESARIA	CORTANTE
M	M	AXIL T	CORTANTE T	VCU T
.386	.900	.000	8.787	1.728
.773	.900	.000	16.643	6.673

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION	CANTO SECCION	ESFUERZOS CARACTERISTICOS	ARMAD. NECESARIA	CORTANTE
M	M	AXIL T	CORTANTE T	VCU T
.480	.900	.000	10.130	3.558
.960	.900	.000	14.278	9.477
1.440	.900	.000	16.878	17.017

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 27.722 T
" " " NORMALES " " " = 51.928 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.030
MOMENTO DE VUELCO = 74.629 MT
MOMENTO DE ESTABILIDAD = 122.228 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.638

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 27.722 T
" " " NORMALES " " " = 56.456 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 47.083 MT
LONGITUD TOTAL DE LA ZAPATA = 3.700 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .834 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 3.048 M
TENSION EN EL VERTICE DELANTERO = 37.044 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION	CANTO SECCION	ESFUERZOS MAYORADOS	ARMAD. NECESARIA	CORTANTE
M	M	AXIL T	CORTANTE T	VCU T
.386	.900	.000	12.540	2.482
.773	.900	.000	23.265	9.460

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION	CANTO SECCION	ESFUERZOS MAYORADOS	ARMAD. NECESARIA	CORTANTE
M	M	AXIL T	CORTANTE T	VCU T
.480	.900	.000	12.349	4.033
.960	.900	.000	19.576	11.778
1.440	.900	.000	24.071	22.370
1.920	.900	.000	25.656	34.421
2.400	.900	.000	24.330	46.534

4.3.2 Paso inferior de carretera PK 562+600

4.3.2 PASO INFERIOR DE CARRETERA PK 562+600

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- ANEJO DE CÁLCULO
- DEFINICIÓN GEOMÉTRICA:
 - DATOS GENERALES DEL TRAZADO
 - REPLANTEO DE LOS BORDES DEL FFCC.
 - REPLANTEO DEL PÓRTICO
 - REPLANTEO DE LAS ALETAS
- CÁLCULOS ESTRUCTURALES
 - CÁLCULO DEL PÓRTICO
 - COMPROBACIÓN A CORTANTE
 - DIMENSIONAMIENTO DE LA CIMENTACIÓN
 - DIMENSIONAMIENTO DE LAS ALETAS



aldesa construcciones, s.a.



CONSTRUCTORA
HISPANICA, S.A.

L.A.V. MADRID - BARCELONA - F. FRANCESA
TRAMO: MADRID - ZARAGOZA.
SUBTRAMO V-b

TORIJA U.T.E.

PASO INFERIOR P.K. 562+600

ANEJO DE CÁLCULO

ALHOSA PREFABRICADOS DE HORMIGÓN		PASO 800 x 580; HT = 330 PI 562+640
Oferta:	99/519	
Obra:	TORIJA - GUADALAJARA	
Empresa:	TORIJA UTE	
Fecha:	Noviembre de 2.000	

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ÍNDICE

- 1.- Generalidades.
- 2.- Descripción
- 3.- Instrucciones aplicadas
- 4.- Características de los materiales
- 5.- Control de calidad
- 6.- Coeficientes de seguridad
- 7.- Parámetros del terreno.
- 8.- Acciones consideradas
- 9.- Programa de cálculo
- 10.- Resultados del cálculo
- 11.- Planos

1. Generalidades

En la presente memoria se muestran los cálculos realizados para justificar el paso inferior de hormigón de dimensiones 800 x 580 cm x cm. (Horizontal-Vertical).

2. Descripción

El paso inferior se salva con un marco de hormigón compuesto por dos muros y un tablero prefabricados, una capa de compresión sobre el tablero y la solera in situ.

Las dimensiones libres interiores del marco son de 800 centímetros en horizontal por 580 centímetros en vertical. El espesor de los elementos del marco es: solera de 80 centímetros, dos hastiales de 40 centímetros, un tablero prefabricado de 40 centímetros y una capa de compresión de 40 cm.

La altura de tierras para la que está calculado el marco alcanza 330 centímetros por encima del dintel.

3. Instrucciones aplicadas

Para el cálculo de los marcos, de acuerdo con la normativa vigente, se han utilizado las siguientes Instrucciones y Normas:

* Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril, de 25 de Junio de 1.975.

* Instrucción para el Proyecto y Ejecución de Obras de Hormigón en Masa o Armado EH-91.

* Norma Básica de la Edificación. NBE-AE/88 Acciones en la edificación.

4. Características de los materiales*** Hormigones:**

Hormigón en piezas prefabricadas	H-300
Hormigón in situ	H-250

*** Acero:**

Acero para armar corrugado

B-500 S

5. Control de calidad

El control de calidad se atenderá a lo especificado en la EH-91, habiéndose seleccionado los siguientes niveles:

Elementos prefabricados:

a) Materiales:

- | | |
|-------------------|-----------------|
| - Hormigón | Control Intenso |
| - Armadura pasiva | Control Intenso |

b) Ejecución:

- | | |
|-------------------|-----------------|
| - En toda la obra | Control Intenso |
|-------------------|-----------------|

Obra in situ:

a) Materiales:

- | | |
|-------------------|----------------|
| - Hormigón | Control Normal |
| - Armadura pasiva | Control Normal |

b) Ejecución:

- | | |
|-------------------|----------------|
| - En toda la obra | Control Normal |
|-------------------|----------------|

6. Coeficientes de seguridad

De acuerdo con los niveles de control de calidad definidos, se adoptan los siguientes coeficientes de seguridad:

- Estados límites últimos:

Elementos prefabricados:

- Coeficientes de minoración de resistencias:

Acero pasivo

$$\gamma_s = 1,10$$

Hormigón

$$\gamma_c = 1,40$$

- Coeficientes de ponderación de acciones:

$$\gamma_f = 1,50$$

Obra in situ:

- Coeficientes de minoración de resistencias:

Acero pasivo

$$\gamma_s = 1,15$$

Hormigón

$$\gamma_c = 1,50$$

- Coeficientes de ponderación de acciones:

$$\gamma_f = 1,50$$

7. Parámetros del terreno

7.1 Características del relleno superior y lateral

En los cálculos se ha considerado un relleno de material granular en el trasdos de los hastiales y dintel con las siguientes características:

Peso específico	2,0 ton/m ³
Ángulo de rozamiento interno	35grados
Ángulo de rozamiento con el muro	0 grados
Coefficiente de empuje	0,42

8. Acciones consideradas

Se han considerado en el cálculo, las acciones descritas en la Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril. Las cuales consisten en:

8.1 Cargas permanentes

Peso propio del paso (dintel, hastiales y solera)

8.2 Empuje por efecto de las tierras

Se considera un empuje de las tierras con un coeficiente de 0,42.

8.3 Sobrecargas por efecto del tráfico

Uniforme en toda la plataforma	400 Kg/m ²
Vehículo de 90 ton. con la disposición de cargas indicadas en la Instrucción.	

8.4 Acciones por temperatura

No se consideran variaciones de temperatura, ya que el incremento de longitud de los miembros para un cambio de 30 grados centígrados es de escasa magnitud, desplazamiento que no alcanza a producir el empuje pasivo en el terreno.

9. Programa de cálculo

Este es un programa de cálculo matricial para ordenadores personales que permite realizar el cálculo integral de marcos de hormigón armado bajo seis hipótesis de carga distintas, formadas por distintas combinaciones de un total de ocho casos de carga, proporcionando los valores de los esfuerzos axiales, cortantes y flectores para cada hipótesis además de las armaduras de flexión y cortante necesarias en cada sección del marco.

El programa resuelve el cálculo de los esfuerzos en un marco de hormigón armado aplicando el método directo de la rigidez a una modelización plana de la estructura mediante barras que representan un metro de la profundidad del marco.

Para cada barra se proporcionan resultados en once puntos equidistantes a lo largo de la longitud de la misma.

El marco se considera apoyado sobre un terreno elástico cuya rigidez es directamente proporcional al coeficiente de balasto de suelo.

Las fuerzas de empotramiento que actúan sobre cada nudo se calculan aplicando la teoría de cálculo elástico de Euler-Bernoulli-Navier a una barra biempotrada sometidas a las cargas contempladas en las distintas hipótesis.

9.1 Casos de carga

El programa considera siete (7) casos de carga, los que enunciamos a continuación.

9.1.1 Peso propio del paso

El programa considera de forma automática el peso propio del marco en función, de la densidad del hormigón y de las dimensiones de sus elementos (dintel, solera y hastiales).

9.1.2 Empuje por efecto de las tierras

Calculado según las indicaciones del capítulo 9º de la norma NBE-AE-88. siendo la carga directamente proporcional al peso específico de las tierras y la altura de tierras en el dintel, mientras que en los hastiales varía con la profundidad y es función de coeficiente de empuje horizontal.

9.1.3 Sobrecargas de construcción

Se considera el efecto de un compactador de dos ejes actuando en el dintel, así como el relleno de las tierras hasta el nivel del dintel.

9.1.4 Sobrecarga uniforme 0,40 ton/m² sobre la plataforma.

Produce una carga uniforme sobre el dintel de 400 kp/m² y dos cargas uniformes sobre los hastiales que son el producto de la carga sobre el dintel por el coeficiente de empuje horizontal

9.1.5 Vehículo de 90 ton. (Repartido)

Reparto local de cargas a 45,0° en el relleno existente sobre el dintel, con un coeficiente de impacto de 1,8.
(Para un ángulo de reparto de 0,0° tenemos cargas puntuales)

9.1.6 Vehículo de 90 ton. (Flexión)

Vehículo de 90 ton. concentrado con segundo eje en el centro del dintel, de forma que produzca la máxima flexión en el dintel. Con el coeficiente de impacto considerado.
(Solo en el caso de un ángulo de reparto de 0,0°)

9.1.7 Vehículo de 90 ton. (Cortante)

Vehículo de 90 ton. concentrado con primer eje situado a una distancia de un canto útil del eje del dintel, de forma que produzca el máximo esfuerzo cortante. Con el coeficiente de impacto considerado.
(Solo en el caso de un ángulo de reparto de 0,0°)

9.1.8 Tablero biapoyado.

Además se considera el tablero biapoyado resistiendo el peso propio, el peso de la capa de compresión y una sobrecarga de 100 Kg/m²

9.2 Hipótesis de cálculo

Con el objeto de obtener las sollicitaciones pésimas se consideran en el cálculo del marco, las siguientes hipótesis:

HIPÓTESIS I:

- Peso propio
- Cargas de construcción
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (3)}]$

HIPÓTESIS II y III:

- Peso propio
- Empuje de las tierras
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)}]$

HIPÓTESIS IV:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m².
- Carro repartido en profundidad

Combinación: 1,5 * [Caso (1) + Caso (2) + Caso (4) + Caso (5)]

HIPÓTESIS V:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m².
- Carro concentrado máxima flexión

Combinación: 1,5 * [Caso (1) + Caso (2) + Caso (4) + Caso (6)]

HIPÓTESIS VI:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m².
- Carro concentrado máxima cortante.

Combinación: 1,5 * [Caso (1) + Caso (2) + Caso (4) + Caso (7)]

10. Resultados de cálculo

Como instrucción de los resultados de cálculo, se presentan los datos introducidos, tales como:

- Datos del terraplén: densidad, ángulo de rozamiento interno, coeficiente de empuje empleado en el cálculo.
- Datos de los materiales que se prevé emplear en la construcción del marco tales como: resistencia característica del hormigón, tipos de acero empleados, recubrimiento.
- Tipos del control de calidad y coeficientes empleados en el cálculo.
- Geometría del marco: dimensiones internas libres y espesor de cada uno de sus elementos (dintel, solera y hastiales).

- Sobrecargas que se han considerado en el cálculo.

Una vez calculado el marco, se obtienen:

- Las solicitaciones pésimas de las hipótesis consideradas, es decir, envolvente de esfuerzos.
- Las áreas de acero requeridas por cortante y por flexión, ésta última tanto para la cara interior como la exterior, todo ello según la Norma EH-91.

- Todos los datos y resultados están referidos a una longitud de paso de 100 cm.

TIPO DE TERRENO DE CIMENTACIÓN: Se considera un terreno de cimentación con un coeficiente de balasto de 5,0 kg/cm³ que correspondería a un suelo con una resistencia nominal de 2,0 kg/cm².

NOTA: El marco ha sido calculado con los coeficientes de seguridad correspondientes a Control intenso y Control normal para cada uno de los elementos que compone el marco:

Hastiales:	Control intenso	H-300
Tablero:	Control intenso	H-300
Obra in situ:	Control normal	H-250

10.1 Tablero autoportante.

DATOS GEOMETRICOS:

Longitud: 826 Cm
 Canto Total: 40,0 cm.
 Ancho: 100,0 cm.
 Recubrimiento: 4,0 cm.
 Dist. Apoyo: 13,0 cm.
 Luz / Apoyos: 800,0 cm.
 Canto Util: 36 Cm

MATERIALES:

Fck: 300 Kg/cm2
 Fyk: 5.100 Kg/cm2
 Gf (p)= 1,40
 Gf (v) = 1,40
 Gc = 1,50
 Gs = 1,10
 Dens. Hgón: 2.500 Kg/m3

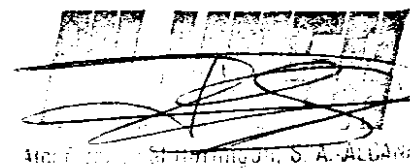
ACCIONES:

Peso Propio: 1.000 Kg/ml
 Sobrec. Unif. 1.100 Kg/ml

SOLICITACIONES:

Nd 0 Kg
 Md (cto) 2.349.51 Kgxc
 6
 Md (apoyo) -2.484 Kgxc
 Vd 12.142 Kg
 Vcu 25.857 Kg
 As mín 0,00 cm2/ml
 Nd . e 2.349.51 Kgxc
 6
 Mc 9.072.00 Kgxc
 0
 As2 mín 6,21 cm2
 As2 2,50 cm2
 Us2 11.591 Kg
 As1 mín 14,78 cm2
 As1 45,96 cm2
 Us1 213.087 Kg

ALCAÑIZ, Noviembre de 2000



Dpto. Técnico de ALHOSA

ALHOSA

pag. 1

MARCOS 1.0

11/08/00

11:04:24

GEOMETRIA DEL MARCO

LUZ = 800.00 cm
 GALIBO = 580.00 cm
 ESPESOR DE LOS HASTIALES = 40.00 cm
 ESPESOR DEL DINTEL = 80.00 cm
 ESPESOR DE LA SOLERA = 80.00 cm
 RECUBRIMIENTO DE LAS ARMADURAS = 4.00 cm
 ALTURA DE TIERRAS = 330.00 cm

MATERIALES

TIPO DE HORMIGON = H-250
 COEFICIENTE DE MINORACION DEL HORMIGON = 1.50
 TIPO DE ACERO = AEH-500
 COEFICIENTE DE MINORACION DEL ACERO = 1.15

TERRENO

COEFICIENTE DE BALASTO = 5.00 kp/cm3
 ANGULO DE ROZAMIENTO INTERNO = 35.00
 PESO ESPECIFICO = 0.0020 kp/cm3
 ANGULO DE ROZAMIENTO TERRENO-MURO = 0.00
 COEFICIENTE DE EMPUJE = 0.42

CARGAS

COEFICIENTE DE MAYORACION DE CARGAS = 1.50
 CARGA 1er EJE COMPACTADOR = 2500.00 kp
 CARGA 2o EJE COMPACTADOR = 2500.00 kp
 SEPARACION ENTRE EJES DEL COMPACTADOR = 200.00 cm
 TREN DE CARGAS (0:CARRETERA, 1:FFCC RENFE, 2:FFCC METRICA, 3:FFCC UIC) = 1
 ANGULO DE REPARTO DEL TREN DE CARGAS = 45.00
 REPARTO AUTOMATICO DEL TREN DE CARGAS = 0.00
 COEFICIENTE DE IMPACTO = 1.80

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ALHOSA pag. 2 MARCOS 1.0

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CARGAS QUE ACTUAN SOBRE LA ESTRUCTURA

PESO PROPIO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
1	0.00	-20.00
2	0.00	-20.00
3	0.00	-20.00
4	0.00	-20.00
5	0.00	-20.00
6	0.00	-20.00
7	0.00	-20.00
8	0.00	-20.00
9	0.00	-20.00
10	0.00	-20.00
11	-10.00	0.00
12	0.00	20.00
13	10.00	0.00

EMPUJE DEL TERRENO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
12	0.00	66.00

-Cargas trapezoidales sobre las barras

Barra	Carga inicial (kp/cm)	Carga final (kp/cm)
11	83.16	27.72
13	27.72	83.16

SOBRECARGAS DE CONSTRUCCION

-Cargas trapezoidales sobre las barras

Barra	Carga inicial (kp/cm)	Carga final (kp/cm)
11	55.44	0.00
13	0.00	55.44

-Trenes de carga sobre las barras

Barra	Carga 1er Eje (kp)	Carga 2o Eje (kp)	Separacion (cm)
12	4500.00	4500.00	200.00

SOBRECARGA UNIFORME DE 0.4 t/m2

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	1.68
12	0.00	4.00
13	0.00	1.68

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ALHOSA pag. 3 MARCOS 1.0

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SOBRECARGA UNIFORME DE 1 t/m2

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	0.00
12	0.00	0.00
13	0.00	0.00

VEHICULO REPARTIDO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	8.57
12	0.00	20.41
13	0.00	8.57

VEHICULO EN POSICION DE MAXIMA FLEXION

-Trenes de carga sobre las barras

Barra	Carga (kp)	Pos.EjeCentral(cm)
12	4090.91	420.00

VEHICULO EN POSICION DE MAXIMO CORTANTE

-Trenes de carga sobre las barras

Barra	Carga (kp)	Pos.EjeCentral(cm)
12	4090.91	246.00

COEFICIENTES DE MAYORACION DE ACCIONES

HIPOT.	P.PROPIO	TERRENO	S.CONST.	S.UNIF.4	TR.DIST.	V.REPT.	V.C.FX.	V.C.CT.
1	1.5	0.0	1.5	0.0	0.0	0.0	0.0	0.0
2	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
3	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
4	1.5	1.5	0.0	1.5	0.0	1.5	0.0	0.0
5	1.5	1.5	0.0	1.5	0.0	0.0	0.0	0.0
6	1.5	1.5	0.0	1.5	0.0	0.0	0.0	0.0

ALHOSA pag. 4 MARCOS 1.0
11/08/00 11:04:28

ENVOLVENTES DE MOMENTOS FLECTORES

	X (cm)	FLECTOR POS. (mkp)	HIPOTESIS	FLECTOR NEG. (mkp)	HIPOTESIS
Solera	0.00	0.00	1	-44528.03	4
	84.00	10552.14	4	0.00	1
	168.00	46966.83	4	0.00	1
	252.00	69239.09	4	0.00	1
	336.00	81029.03	4	0.00	1
	420.00	84689.40	4	0.00	1
	504.00	81029.03	4	0.00	1
	588.00	69239.09	4	0.00	1
	672.00	46966.83	4	0.00	1
	756.00	10552.14	4	0.00	1
	840.00	0.00	1	-44528.03	4
Hastial dcho	0.00	0.00	1	-44528.03	4
	66.00	0.00	1	-22876.33	4
	132.00	0.00	1	-6965.94	4
	198.00	3704.43	2	0.00	1
	264.00	9079.90	4	0.00	1
	330.00	9939.84	4	0.00	1
	396.00	6507.45	4	0.00	1
	462.00	0.00	1	-855.03	4
	528.00	0.00	1	-11785.34	4
	594.00	0.00	1	-25921.25	4
	660.00	0.00	1	-42900.51	4
Dintel	0.00	0.00	1	-42900.51	4
	84.00	9685.57	4	0.00	1
	168.00	50585.86	4	0.00	1
	252.00	79800.35	4	0.00	1
	336.00	97329.04	4	0.00	1
	420.00	103171.94	4	0.00	1
	504.00	97329.04	4	0.00	1
	588.00	79800.35	4	0.00	1
	672.00	50585.86	4	0.00	1
	756.00	9685.57	4	0.00	1
	840.00	0.00	1	-42900.51	4
Hastial izdo	0.00	0.00	1	-42900.51	4
	66.00	0.00	1	-25921.25	4
	132.00	0.00	1	-11785.34	4
	198.00	0.00	1	-855.03	4
	264.00	6507.45	4	0.00	1
	330.00	9939.84	4	0.00	1
	396.00	9079.90	4	0.00	1
	462.00	3704.43	2	0.00	1
	528.00	0.00	1	-6965.94	4
	594.00	0.00	1	-22876.33	4
	660.00	0.00	1	-44528.03	4

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ENVOLVENTE DE CORTANTES Y ESFUERZOS CONCOMITANTES

	X (cm)	CORTANTE (kp)	HIPOTESIS	AXIL (kp)	FLECTOR (mkp)
Solera	0.00	-79458.31	4	37338.04	-44528.03
	84.00	-53440.73	4	37338.04	10552.14
	168.00	-34226.47	4	37338.04	46966.83
	252.00	-19720.45	4	37338.04	69239.09
	336.00	-8912.21	4	37338.04	81029.03
	420.00	-0.00	5	33278.46	70028.14
	504.00	8912.21	4	37338.04	81029.03
	588.00	19720.45	4	37338.04	69239.09
	672.00	34226.47	4	37338.04	46966.83
	756.00	53440.73	4	37338.04	10552.14
	840.00	79458.31	4	37338.04	-44528.03
Hastial dcho	0.00	-37338.04	4	79458.31	-44528.03
	66.00	-28364.66	4	78468.31	-22876.33
	132.00	-19940.13	4	77478.31	-6965.94
	198.00	-12064.46	4	76488.31	3565.39
	264.00	-4737.65	4	75498.31	9079.90
	330.00	2040.31	4	74508.31	9939.84
	396.00	8269.41	4	73518.31	6507.45
	462.00	13949.65	4	72528.31	-855.03
	528.00	19081.04	4	71538.31	-11785.34
	594.00	23663.57	4	70548.31	-25921.25
	660.00	27697.25	4	69558.31	-42900.51
Dintel	0.00	-69558.31	4	27697.25	-42900.51
	84.00	-55646.65	4	27697.25	9685.57
	168.00	-41734.99	4	27697.25	50585.86
	252.00	-27823.32	4	27697.25	79800.35
	336.00	-13911.66	4	27697.25	97329.04
	420.00	-0.00	2	22402.74	79065.11
	504.00	13911.66	4	27697.25	97329.04
	588.00	27823.32	4	27697.25	79800.35
	672.00	41734.99	4	27697.25	50585.86
	756.00	55646.65	4	27697.25	9685.57
	840.00	69558.31	4	27697.25	-42900.51
Hastial izdo	0.00	-27697.25	4	69558.31	-42900.51
	66.00	-23663.57	4	70548.31	-25921.25
	132.00	-19081.04	4	71538.31	-11785.34
	198.00	-13949.65	4	72528.31	-855.03
	264.00	-8269.41	4	73518.31	6507.45
	330.00	-2040.31	4	74508.31	9939.84
	396.00	4737.65	4	75498.31	9079.90
	462.00	12064.46	4	76488.31	3565.39
	528.00	19940.13	4	77478.31	-6965.94
	594.00	28364.66	4	78468.31	-22876.33
	660.00	37338.04	4	79458.31	-44528.03

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ENVOLVENTE DE AXILES Y ESFUERZOS CONCOMITANTES

	X (cm)	AXIL (kp)	HIPOTESIS	CORTANTE (kp)	FLECTOR (mkp)
Solera					
	0.00	37338.04	4	-79458.31	-44528.03
	84.00	37338.04	4	-53440.73	10552.14
	168.00	37338.04	4	-34226.47	46966.83
	252.00	37338.04	4	-19720.45	69239.09
	336.00	37338.04	4	-8912.21	81029.03
	420.00	37338.04	4	0.00	84689.40
	504.00	37338.04	4	8912.21	81029.03
	588.00	37338.04	4	19720.45	69239.09
	672.00	37338.04	4	34226.47	46966.83
	756.00	37338.04	4	53440.73	10552.14
	840.00	37338.04	4	79458.31	-44528.03
Hastial dcho					
	0.00	79458.31	4	-37338.04	-44528.03
	66.00	78468.31	4	-28364.66	-22876.33
	132.00	77478.31	4	-19940.13	-6965.94
	198.00	76488.31	4	-12064.46	3565.39
	264.00	75498.31	4	-4737.65	9079.90
	330.00	74508.31	4	2040.31	9939.84
	396.00	73518.31	4	8269.41	6507.45
	462.00	72528.31	4	13949.65	-855.03
	528.00	71538.31	4	19081.04	-11785.34
	594.00	70548.31	4	23663.57	-25921.25
	660.00	69558.31	4	27697.25	-42900.51
Dintel					
	0.00	27697.25	4	-69558.31	-42900.51
	84.00	27697.25	4	-55646.65	9685.57
	168.00	27697.25	4	-41734.99	50585.86
	252.00	27697.25	4	-27823.32	79800.35
	336.00	27697.25	4	-13911.66	97329.04
	420.00	27697.25	4	0.00	103171.94
	504.00	27697.25	4	13911.66	97329.04
	588.00	27697.25	4	27823.32	79800.35
	672.00	27697.25	4	41734.99	50585.86
	756.00	27697.25	4	55646.65	9685.57
	840.00	27697.25	4	69558.31	-42900.51
Hastial izdo					
	0.00	69558.31	4	-27697.25	-42900.51
	66.00	70548.31	4	-23663.57	-25921.25
	132.00	71538.31	4	-19081.04	-11785.34
	198.00	72528.31	4	-13949.65	-855.03
	264.00	73518.31	4	-8269.41	6507.45
	330.00	74508.31	4	-2040.31	9939.84
	396.00	75498.31	4	4737.65	9079.90
	462.00	76488.31	4	12064.46	3565.39
	528.00	77478.31	4	19940.13	-6965.94
	594.00	78468.31	4	28364.66	-22876.33
	660.00	79458.31	4	37338.04	-44528.03

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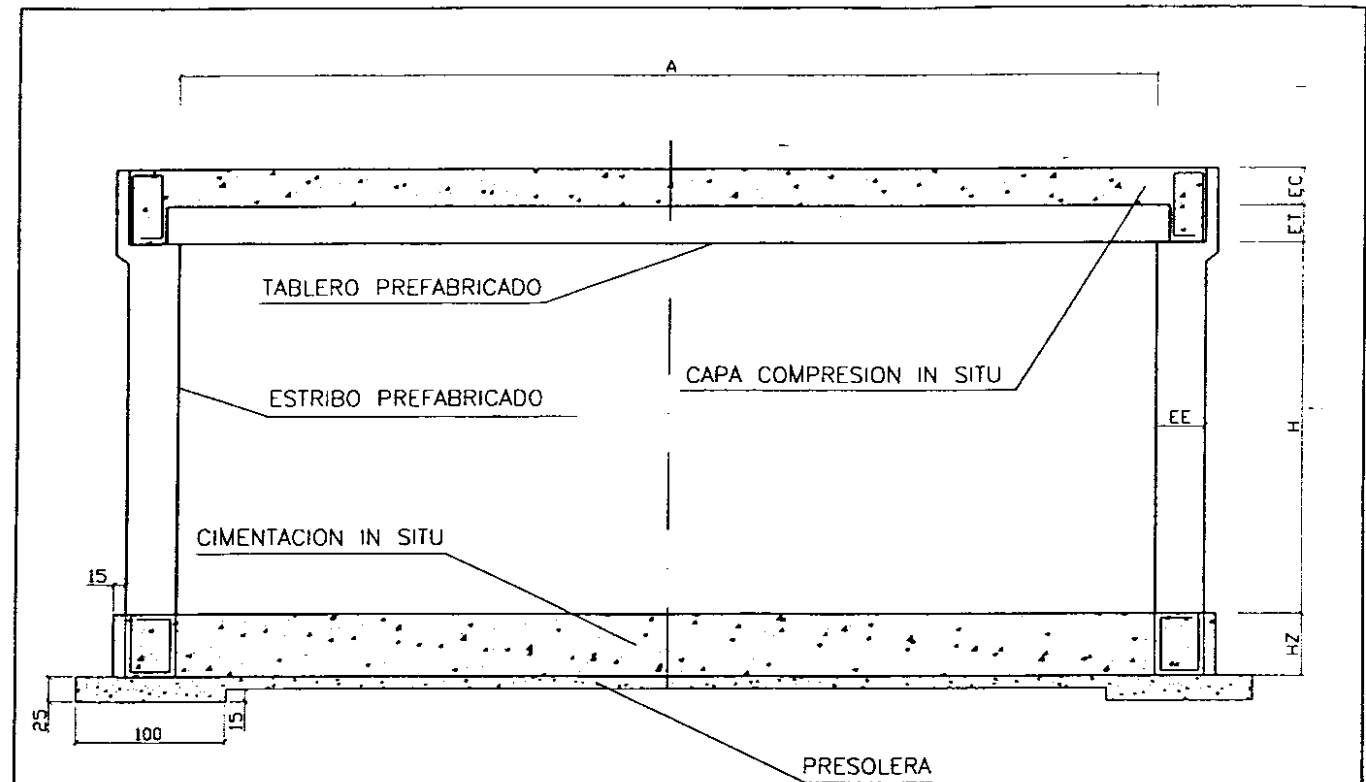
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ARMADURAS

	X (cm)	AR. ESTRIBOS (cm2/m)	ARM. FLEX. EXT. (cm2)	ARM. FLEX. INT. (cm2)
Solera				
	0.00	10.58	9.33	0.00
	84.00	1.53	0.00	0.00
	168.00	0.00	0.00	10.10
	252.00	0.00	0.00	17.25
	336.00	0.00	0.00	21.12
	420.00	0.00	0.00	22.33
	504.00	0.00	0.00	21.12
	588.00	0.00	0.00	17.25
	672.00	0.00	0.00	10.10
	756.00	1.53	0.00	0.00
	840.00	10.58	9.33	0.00
Hastial dcho				
	0.00	10.36	24.37	0.00
	66.00	3.77	6.63	0.00
	132.00	0.00	0.00	0.00
	198.00	0.00	0.00	0.00
	264.00	0.00	0.00	0.00
	330.00	0.00	0.00	0.00
	396.00	0.00	0.00	0.00
	462.00	0.00	0.00	0.00
	528.00	0.00	0.00	0.00
	594.00	0.31	9.78	0.00
	660.00	3.28	23.77	0.00
Dintel				
	0.00	7.14	9.90	0.00
	84.00	2.29	0.00	0.00
	168.00	0.00	0.00	12.32
	252.00	0.00	0.00	21.75
	336.00	0.00	0.00	27.57
	420.00	0.00	0.00	29.54
	504.00	0.00	0.00	27.57
	588.00	0.00	0.00	21.75
	672.00	0.00	0.00	12.32
	756.00	2.29	0.00	0.00
	840.00	7.14	9.90	0.00
Hastial izdo				
	0.00	3.28	23.77	0.00
	66.00	0.31	9.78	0.00
	132.00	0.00	0.00	0.00
	198.00	0.00	0.00	0.00
	264.00	0.00	0.00	0.00
	330.00	0.00	0.00	0.00
	396.00	0.00	0.00	0.00
	462.00	0.00	0.00	0.00
	528.00	0.00	0.00	0.00
	594.00	3.77	6.63	0.00
	660.00	10.36	24.37	0.00

11. Planos



A	H	ET	EC	EE	HZ	MOD	Esv.	HT(m)
800	580	40	40	40	80	240	90'	3.30

COTAS EN CM

CONTROL DE CALIDAD

HORMIGON PREFAB. H-300
HORMIGON IN SITU H-250
ACERO B-500
EH-91

RECUBRIMIENTO = 25 MM

TREN DE CARGAS = 90 T.

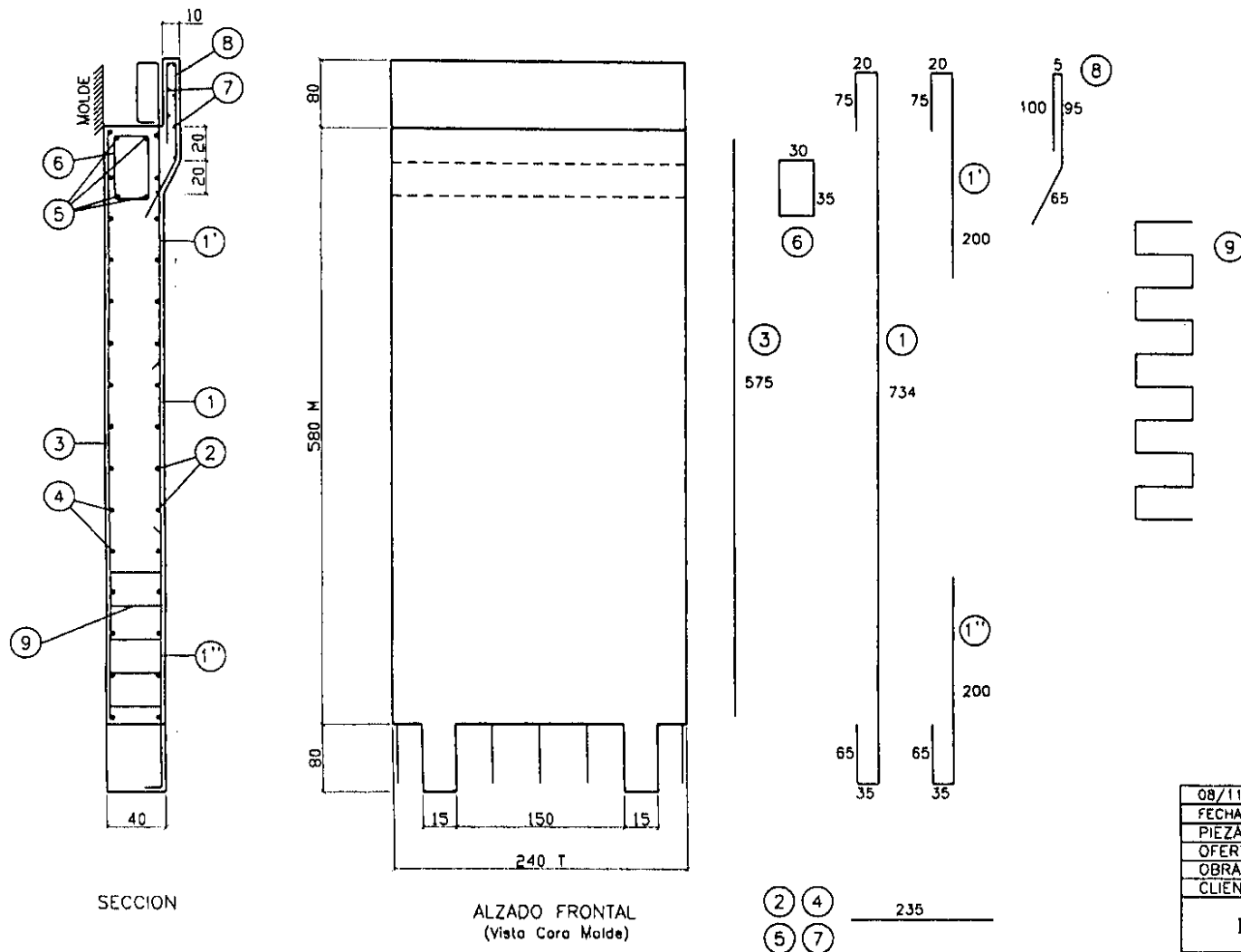
EL MARCO HA SIDO CALCULADO CON UNA RESISTENCIA NOMINAL DEL SUELO DE 2 KG/CM2

- COMPACTAR LA PRIMERA CAPAS DE RELLENO SOBRE EL MARCO Y LATERALES CON RODILLOS PEQUEÑOS O COMPACTADORES MANUALES. NO UTILIZAR VIBRADORES.

- PARA RECUBRIMIENTOS DE TIERRAS SUPERIORES A 2.00 M SE PODRAN UTILIZAR COMPACTADORES VIBRANTES, SIEMPRE QUE LA CARGA NO EXCEDA DE LA PREVISTA EN EL CALCULO (CARGA MOVIL DE 90 Tn. EQUIVALENTE A TRES EJES DE 30 Tn.)

- EL RELLENO LATERAL SE REALIZARA DESPUES DE HORMIGONADA LA SOLERA Y CAPA DE COMPRESION.

08/11/00	0	MODIFICACIONES	
FECHA	REV.	MODIFICACIONES	
PIEZA:	PASO 800x580		46.0
OFERTA:	99/519		
OBRA:	TORJA-GUADALAJARA		
CLIENTE:	UTE TORJA		
PASO DE ESTRIBOS Y TABLERO		REVISADO:	46.0
		Opto. Comercial	Opto. TECNICO
COTAS EN CM.		PREFABRICADOS DE HORMIGON	



CUADRO DE ARMADO				
1	12	Ø 16	2	Ø 10 / 24cm
1'	22	Ø 16	1''	22 Ø 16
3	13	Ø 12	4	Ø 10 / 24cm
5	4	Ø 16	6	Ø 6 / 30cm
7	7	Ø 6	8	Ø 6 / 20cm
9	10	Ø 8 / 24cm		
PATAS	4 Ø 10 (580)			
	Est. Ø 6 / 17 cm.			

* Colocar barra de seguridad

RECUBRIMIENTO: 25 mm.

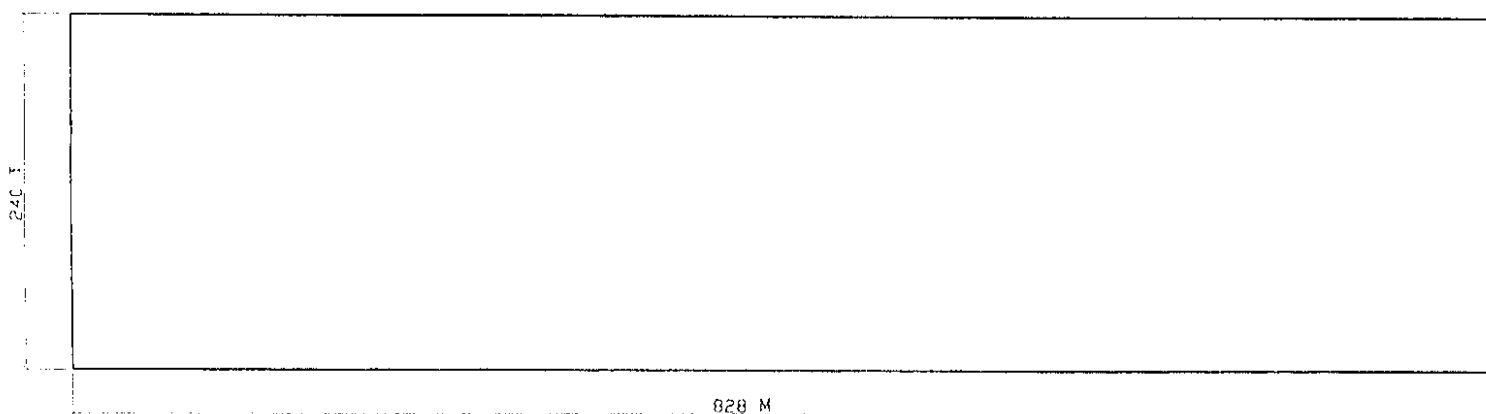
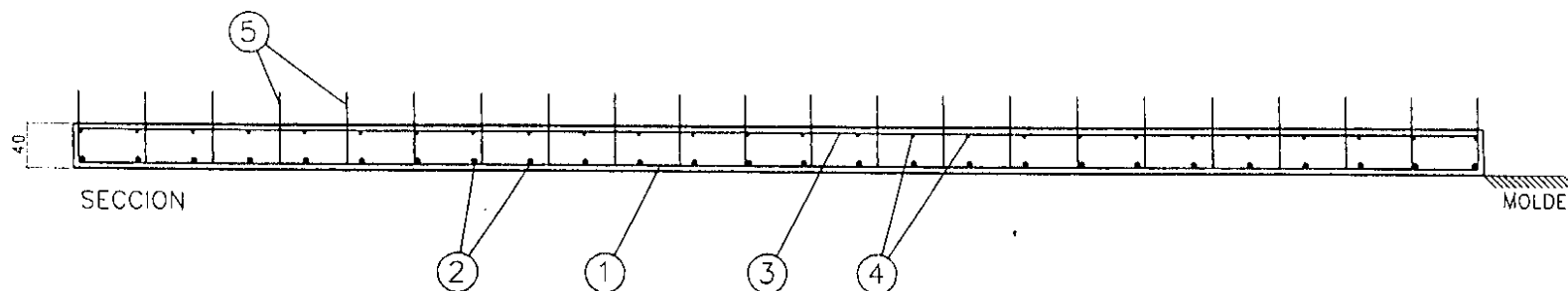
CONTROL DE CALIDAD

HORMIGON H-300
ACERO B-500

08/11/00	0		
FECHA	REV.	MODIFICACIONES	Nº PLANO
PIEZA:	ESTRIBO 580x240x40	PI 562+640	46.4
OFERTA:	99/519/11		
OBRA:	TORIJA-GUADALAJARA		
CLIENTE:	UTE TORIJA		
Paso 800x580			REVISADO: [Signature] Dpto. Comercial
[Logo]			APROBADO: [Signature] Dpto. Técnico
AL-HOSH PREFABRICADOS DE HORMIGON			

COTAS EN CM. M->cara Molde. T->cara Talochada.

Hoja 45 de 74

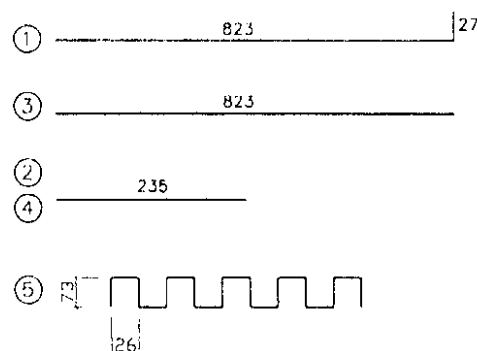


PLANTA (Vista cara Talochada)

CUADRO DE ARMADO			
1	25 Ø25	2	Ø16 /20cm
3	10 Ø10	4	Ø10 /25cm
5	10 Ø8 /25cm		

RECUBRIMIENTO: 25 mm.

CONTROL DE CALIDAD	
HORMIGON	H-300
ACERO	B-500



08/11/00	0		
FECHA	REV.	MODIFICACIONES	Nº PLANO
PIEZA:	TABLERO 828x240x40	PI 562+640	46.3
OFERTA:	99/519/11		
OBRA:	TORIJA-GUADALAJARA		
CLIENTE:	UTE TORIJA		
Paso 800x580			REVISADO: [Signature] Dpto. Comercial
[Logo]			APROBADO: [Signature] Dpto. Técnico
AL-HOSH PREFABRICADOS DE HORMIGON			

COTAS EN CM. M->cara Molde. T->cara Talochada.

Hoja 46 de 74

DEFINICION GEOMETICA

DATOS GENERALES DEL TRAZADO

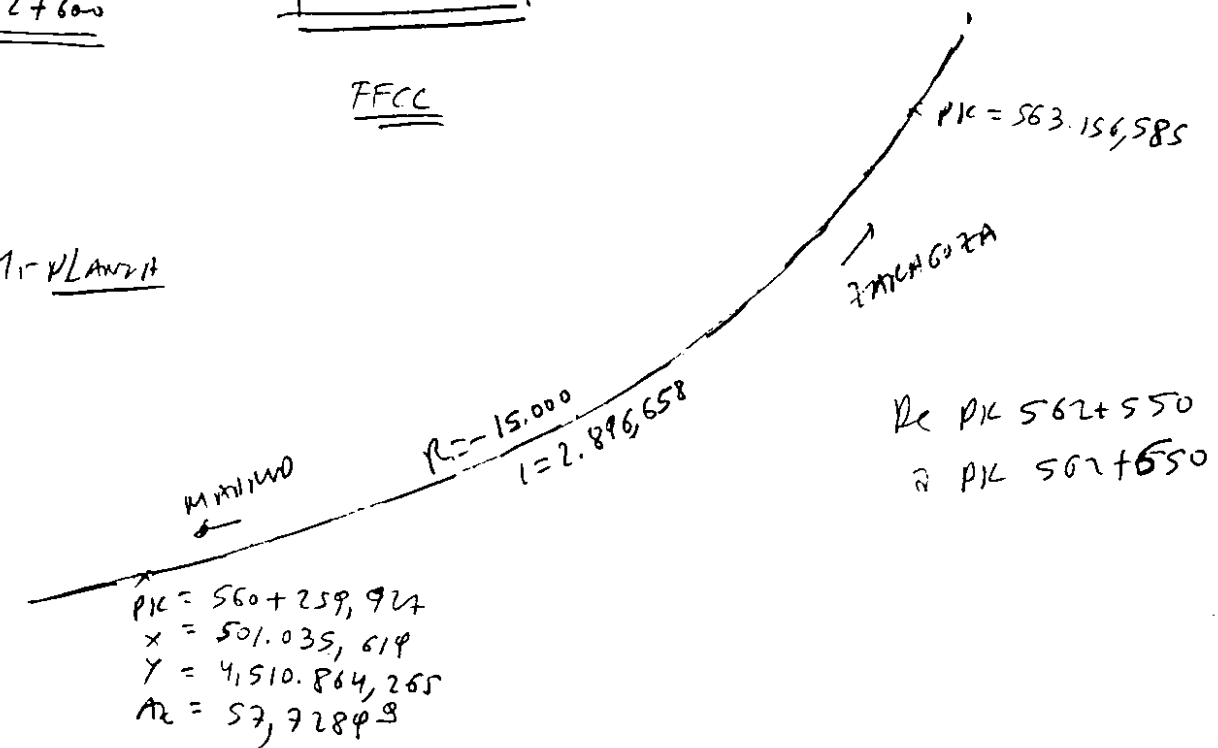
P.I - 562+600

PI 562600

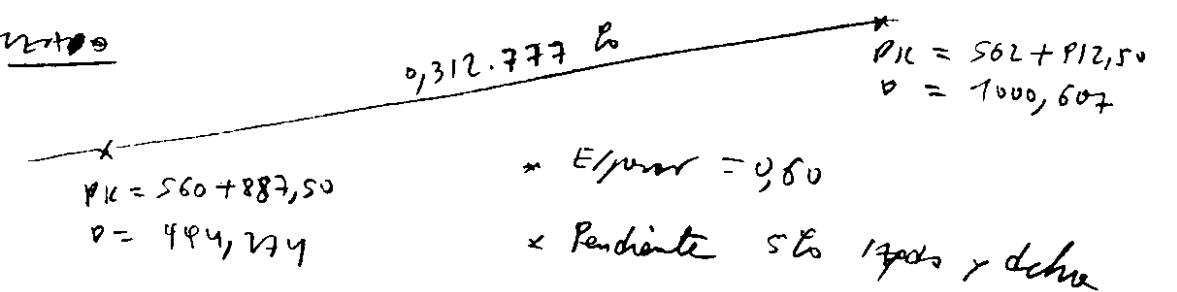
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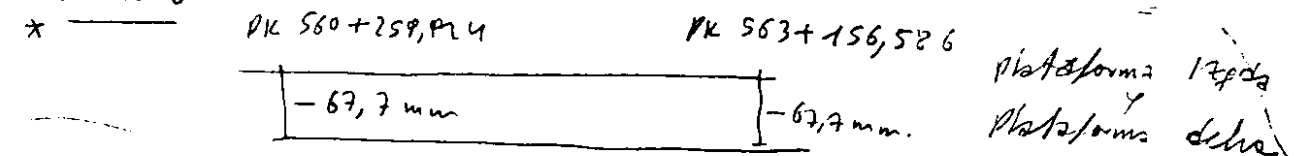
1.- PLANETA



2.- PLANETA



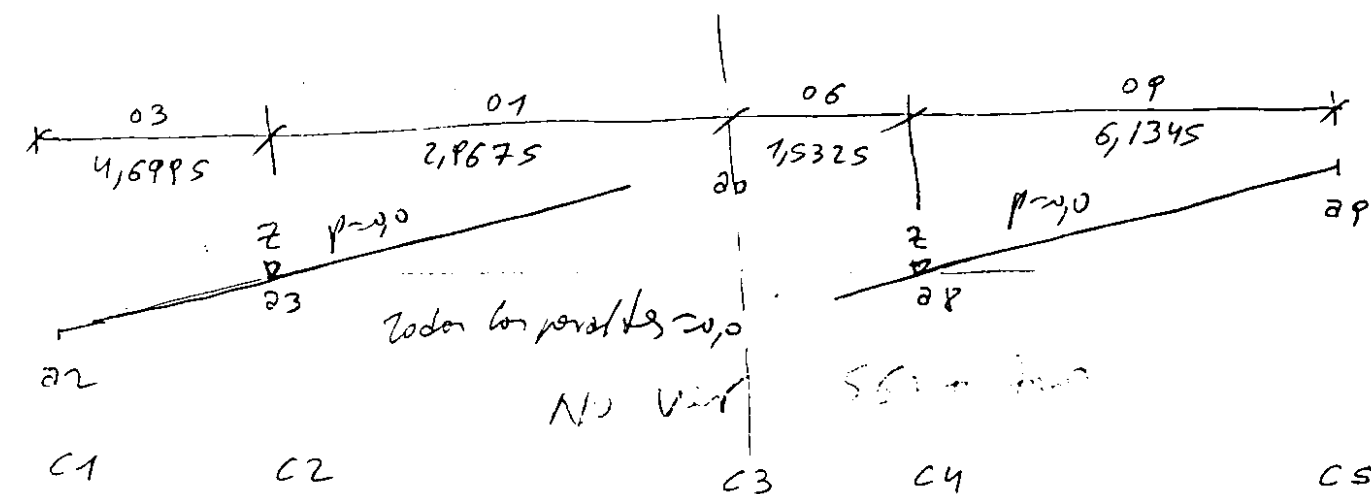
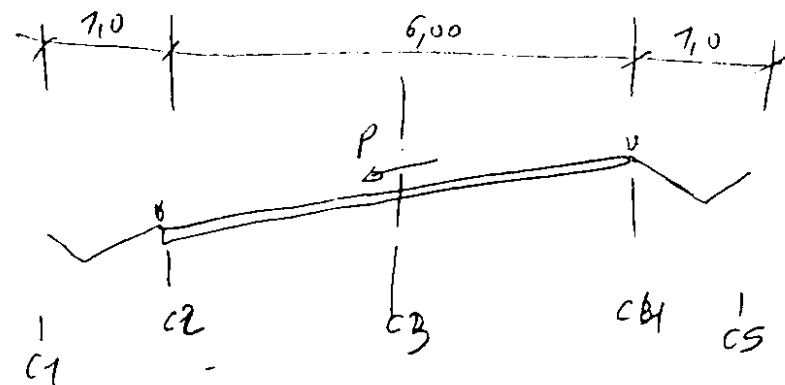
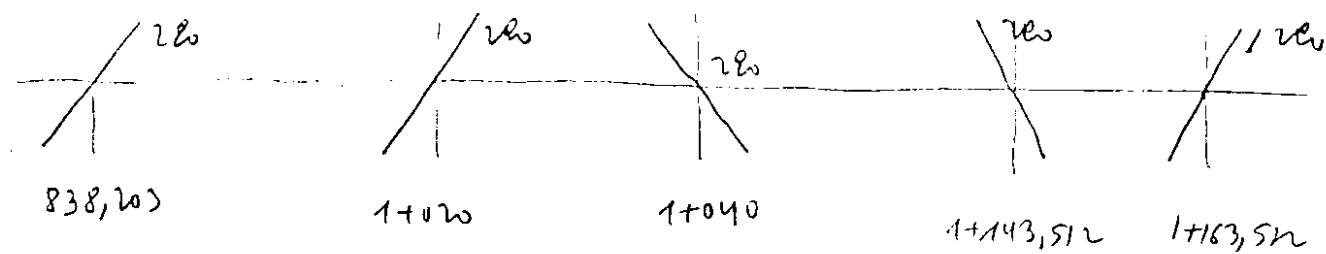
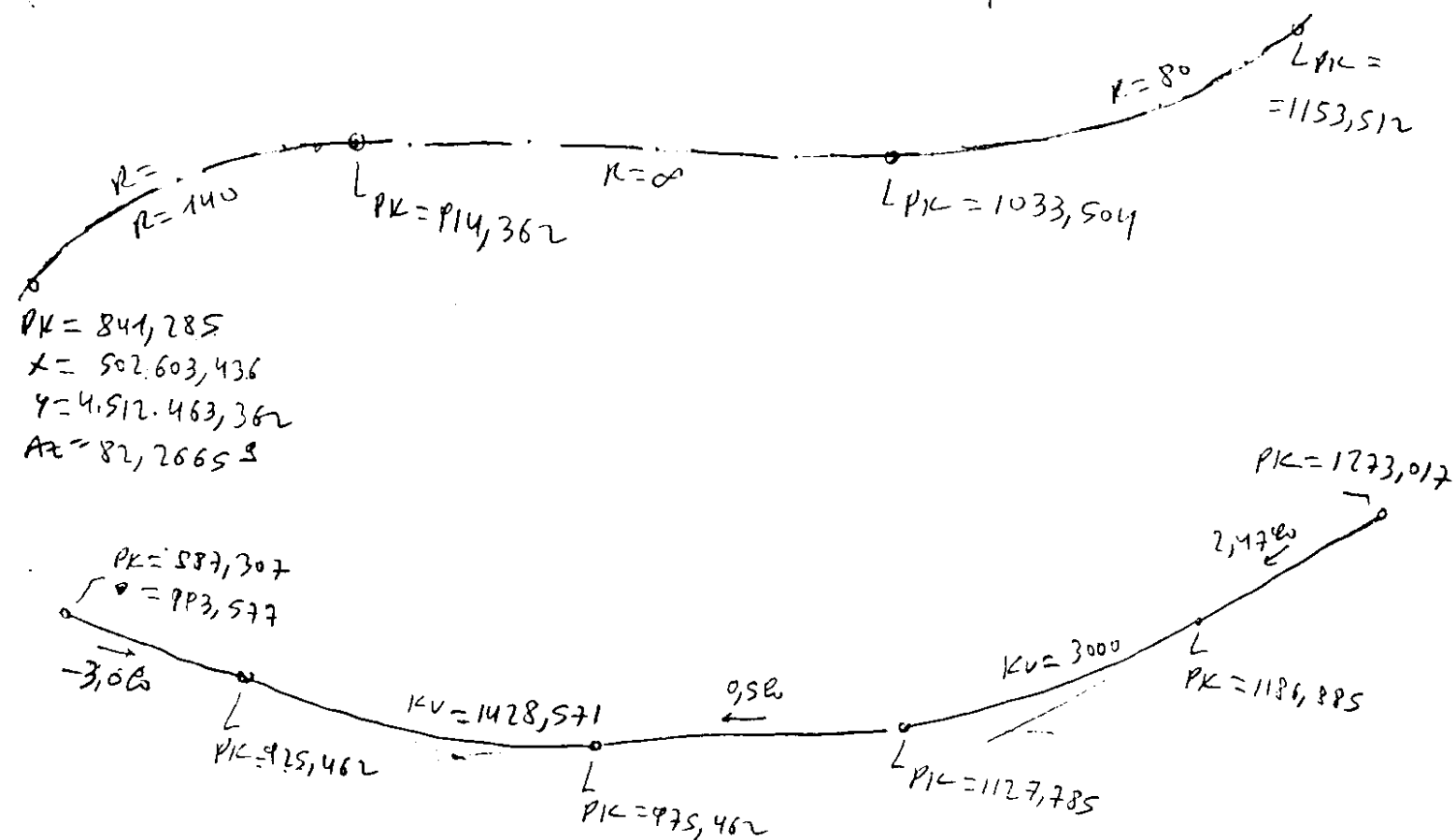
3.- PLANETA



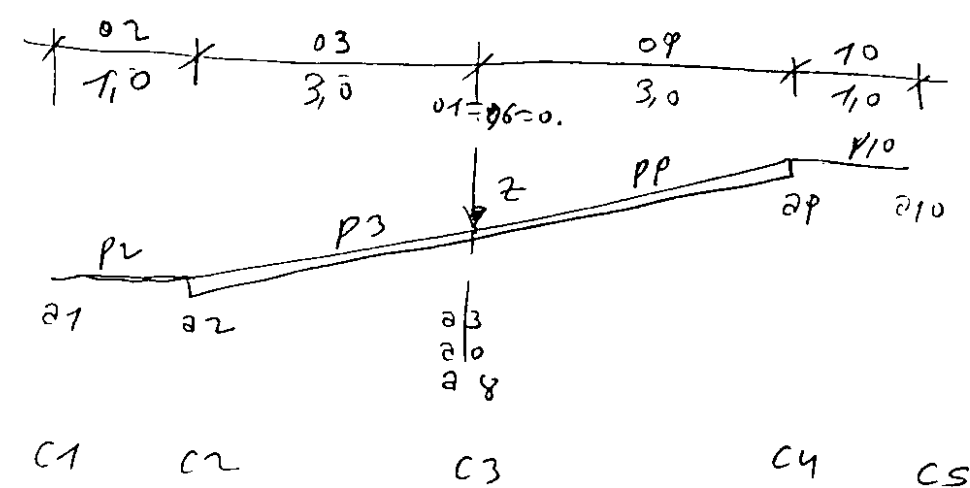
De PK 0+P40
A PK 1+080

DEFINITION DE CURVAS UTN VA SECCION TRANSVERSAL DE FFCC

PI 562+6



Camino



REPLANTEO DE LOS BORDES DEL FERROCARRIL

O.F.-P.I.562+600
560259.927501035.619510864.265 57.7289¹⁰⁰¹ EJE DEL TRONCO DEL FECC
-2563156.585 15000. 1562912.5

2 560200. 2.96752. 4.03252.9674 1.5325 5.4675 2.
563000. 2.96752. 4.03252.9674 1.5325 5.4675 2.
2 560200. -0.5 -.24129-.20994 0.177960.5
563000. -0.5 -.24129-.20994 0.177960.5
7 1 0. 2 0. 3 0. 4 0. 8 0. 9 0. 10 0.

841.285 502603.436512463.362 82.2665 3 887.307 993.577 -0.030 5
2 914.362 140. 1 925.462
1 1033.504 -2 975.462 1428.571
-2 1153.512 80. 1 1127.785
-2 1186.885 3000.
1 1273.017

2.840. 1.00 3.00 3.00 1.00
1300. 1.00 3.00 3.00 1.00
5 838.203 0.02 0.02
1020. 0.02 0.02
1040. -0.02 -0.02
1143.512 -0.02 -0.02
1163.512 0.02 0.02

5 1 0. 2 0. 3 0. 9 0. 10 0.
1 40 3
2 0 562500. 1. 562650. 70 10 20 30 40 50 60 7
3 940.0 1. 1080. 53 13 23 33 43 5

0
0
0
0
/*
/R

1

TITULO DEL TRABAJO O.F.-P.I.562+600

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
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AZ.E	AZ.3								
4	0	3	3	562600.000	1000.001	502758.789	512443.990	999.630	991.93
47.797320 115.496688									

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
-----	------	--------	-------	-------

0	562500.000	-51.778265	.687082	-.726580			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	0	562500.000	502683.784	512377.287	997.345
1	1	2	0	562500.000	502685.237	512375.913	998.345
1	1	3	0	562500.000	502688.167	512373.142	999.318
1	1	4	0	562500.000	502690.323	512371.103	999.318
1	1	5	0	562500.000	502691.437	512370.050	999.318
1	1	6	0	562500.000	502695.409	512366.294	998.345
1	1	7	0	562500.000	502696.863	512364.920	997.345

EJE	P.K.	AZIMUT	COS A	SEN A
-----	------	--------	-------	-------

0	562501.000	-51.782509	.687034	-.726626			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	0	562501.000	502684.471	512378.013	997.348
1	2	2	0	562501.000	502685.924	512376.639	998.348
1	2	3	0	562501.000	502688.854	512373.869	999.321
1	2	4	0	562501.000	502691.010	512371.830	999.321
1	2	5	0	562501.000	502692.124	512370.777	999.321
1	2	6	0	562501.000	502696.097	512367.021	998.348
1	2	7	0	562501.000	502697.550	512365.647	997.348

EJE	P.K.	AZIMUT	COS A	SEN A
-----	------	--------	-------	-------

0	562502.000	-51.786753	.686985	-.726672			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	0	562502.000	502685.157	512378.739	997.351
1	3	2	0	562502.000	502686.611	512377.365	998.351
1	3	3	0	562502.000	502689.541	512374.595	999.324
1	3	4	0	562502.000	502691.697	512372.557	999.324

1 3 7 0 562502.000 502688.257 512388.374 997.351

EJE P.K. AZIMUT COS A SEN A

0 562503.000 -51.790997 .686937 -.726717

1

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	4	1	0	562503.000	502685.844	512379.466	997.354
1	4	2	0	562503.000	502687.297	512378.092	998.354
1	4	3	0	562503.000	502690.228	512375.322	999.327
1	4	4	0	562503.000	502692.384	512373.283	999.327
1	4	5	0	562503.000	502693.498	512372.231	999.327
1	4	6	0	562503.000	502697.471	512368.475	998.354
1	4	7	0	562503.000	502698.925	512367.101	997.354

EJE P.K. AZIMUT COS A SEN A

0 562504.000 -51.795242 .686888 -.726763

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	5	1	0	562504.000	502686.530	512380.192	997.357
1	5	2	0	562504.000	502687.984	512378.818	998.357
1	5	3	0	562504.000	502690.915	512376.048	999.330
1	5	4	0	562504.000	502693.071	512374.010	999.330
1	5	5	0	562504.000	502694.185	512372.957	999.330
1	5	6	0	562504.000	502698.159	512369.202	998.357
1	5	7	0	562504.000	502699.612	512367.828	997.357

EJE P.K. AZIMUT COS A SEN A

0 562505.000 -51.799486 .686840 -.726809

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	6	1	0	562505.000	502687.217	512380.918	997.360
1	6	2	0	562505.000	502688.671	512379.545	998.360
1	6	3	0	562505.000	502691.601	512376.775	999.333
1	6	4	0	562505.000	502693.758	512374.737	999.333
1	6	5	0	562505.000	502694.872	512373.684	999.333
1	6	6	0	562505.000	502698.846	512369.929	998.360
1	6	7	0	562505.000	502700.299	512368.555	997.360

EJE P.K. AZIMUT COS A SEN A

0 562506.000 -51.803730 .686791 -.726855

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	7	1	0	562506.000	502687.903	512381.645	997.363
1	7	2	0	562506.000	502689.357	512380.271	998.363
1	7	3	0	562506.000	502692.288	512377.502	999.336
1	7	4	0	562506.000	502694.445	512375.464	999.336
1	7	5	0	562506.000	502695.559	512374.411	999.336
1	7	6	0	562506.000	502699.533	512370.656	998.363
1	7	7	0	562506.000	502700.987	512369.282	997.363

EJE P.K. AZIMUT COS A SEN A

0 562507.000 -51.807974 .686743 -.726900

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	8	1	0	562507.000	502688.590	512382.371	997.366
1	8	2	0	562507.000	502690.043	512380.998	998.366
1	8	3	0	562507.000	502692.975	512378.228	999.339
1	8	4	0	562507.000	502695.132	512376.191	999.339
1	8	5	0	562507.000	502696.246	512375.138	999.339
1	8	6	0	562507.000	502700.220	512371.383	998.366
1	8	7	0	562507.000	502701.674	512370.010	997.366

EJE P.K. AZIMUT COS A SEN A

0 562508.000 -51.812218 .686694 -.726946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	9	1	0	562508.000	502689.276	512383.098	997.370
1	9	2	0	562508.000	502690.730	512381.724	998.370
1	9	3	0	562508.000	502693.661	512378.955	999.343
1	9	4	0	562508.000	502695.818	512376.917	999.343
1	9	5	0	562508.000	502696.933	512375.865	999.343
1	9	6	0	562508.000	502700.907	512372.111	998.370
1	9	7	0	562508.000	502702.361	512370.737	997.370

EJE P.K. AZIMUT COS A SEN A

0 562509.000 -51.816462 .686646 -.726992

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	10	1	0	562509.000	502689.962	512383.824	997.373
1	10	2	0	562509.000	502691.416	512382.451	998.373
1	10	3	0	562509.000	502694.348	512379.682	999.346
1	10	4	0	562509.000	502696.505	512377.644	999.346
1	10	5	0	562509.000	502697.619	512376.592	999.346
1	10	6	0	562509.000	502701.594	512372.838	998.373
1	10	7	0	562509.000	502703.048	512371.465	997.373

EJE P.K. AZIMUT COS A SEN A

0 562510.000 -51.820706 .686597 -.727038

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	11	1	0	562510.000	502690.648	512384.551	997.376
1	11	2	0	562510.000	502692.103	512383.178	998.376
1	11	3	0	562510.000	502695.034	512380.409	999.349
1	11	4	0	562510.000	502697.192	512378.371	999.349
1	11	5	0	562510.000	502698.306	512377.319	999.349
1	11	6	0	562510.000	502702.281	512373.565	998.376
1	11	7	0	562510.000	502703.735	512372.192	997.376

EJE P.K. AZIMUT COS A SEN A

0 562511.000 -51.824951 .686549 -.727084

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	12	1	0	562511.000	502691.335	512385.277	997.379
1	12	2	0	562511.000	502692.789	512383.904	998.379
1	12	3	0	562511.000	502695.721	512381.136	999.352
1	12	4	0	562511.000	502697.878	512379.099	999.352
1	12	5	0	562511.000	502698.993	512378.046	999.352
1	12	6	0	562511.000	502702.968	512374.293	998.379
1	12	7	0	562511.000	502704.422	512372.919	997.379

EJE P.K. AZIMUT COS A SEN A

0 562512.000 -51.829195 .686500 -.727129

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	13	1	0	562512.000	502692.021	512386.004	997.382
1	13	2	0	562512.000	502693.475	512384.631	998.382
1	13	3	0	562512.000	502696.407	512381.863	999.355
1	13	4	0	562512.000	502698.565	512379.826	999.355

1

1 13 5 0 562512.000 502699.679 512378.773 999.355

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562513.000	-51.833439	.686452	-.727175			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	14	1	0	562513.000	502692.707	512386.731	997.385
1	14	2	0	562513.000	502694.161	512385.358	998.385
1	14	3	0	562513.000	502697.093	512382.590	999.358
1	14	4	0	562513.000	502699.251	512380.553	999.358
1	14	5	0	562513.000	502700.366	512379.501	999.358
1	14	6	0	562513.000	502704.342	512375.748	998.385
1	14	7	0	562513.000	502705.796	512374.375	997.385

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562514.000	-51.837683	.686404	-.727221			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	15	1	0	562514.000	502693.393	512387.458	997.388
1	15	2	0	562514.000	502694.847	512386.085	998.388
1	15	3	0	562514.000	502697.780	512383.317	999.361
1	15	4	0	562514.000	502699.938	512381.280	999.361
1	15	5	0	562514.000	502701.052	512380.228	999.361
1	15	6	0	562514.000	502705.028	512376.475	998.388
1	15	7	0	562514.000	502706.483	512375.102	997.388

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562515.000	-51.841927	.686355	-.727267			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	16	1	0	562515.000	502694.079	512388.184	997.391
1	16	2	0	562515.000	502695.533	512386.812	998.391
1	16	3	0	562515.000	502698.466	512384.044	999.364
1	16	4	0	562515.000	502700.624	512382.007	999.364
1	16	5	0	562515.000	502701.739	512380.955	999.364
1	16	6	0	562515.000	502705.715	512377.203	998.391
1	16	7	0	562515.000	502707.170	512375.830	997.391

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562516.000	-51.846171	.686307	-.727312			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	17	1	0	562516.000	502694.765	512388.911	997.395
1	17	2	0	562516.000	502696.219	512387.539	998.395
1	17	3	0	562516.000	502699.152	512384.771	999.368
1	17	4	0	562516.000	502701.310	512382.734	999.368
1	17	5	0	562516.000	502702.425	512381.683	999.368
1	17	6	0	562516.000	502706.402	512377.930	998.395
1	17	7	0	562516.000	502707.856	512376.558	997.395

EJE	P.K.	AZIMUT	COS A	SEN A
0	562517.000	-51.850415	.686258	-.727358

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	18	1	0	562517.000	502695.451	512389.638	997.398
1	18	2	0	562517.000	502696.905	512388.266	998.398
1	18	3	0	562517.000	502699.838	512385.498	999.371
1	18	4	0	562517.000	502701.997	512383.462	999.371
1	18	5	0	562517.000	502703.111	512382.410	999.371
1	18	6	0	562517.000	502707.088	512378.658	998.398
1	18	7	0	562517.000	502708.543	512377.285	997.398

0	562518.000	-51.854659	.686210	-.727404
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	19	1	0	562518.000	502696.136	512390.365	997.401
1	19	2	0	562518.000	502697.591	512388.993	998.401
1	19	3	0	562518.000	502700.524	512386.225	999.374
1	19	4	0	562518.000	502702.683	512384.189	999.374
1	19	5	0	562518.000	502703.798	512383.138	999.374
1	19	6	0	562518.000	502707.775	512379.386	998.401
1	19	7	0	562518.000	502709.230	512378.013	997.401

EJE	P.K.	AZIMUT	COS A	SEN A
0	562519.000	-51.858904	.686161	-.727450

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	20	1	0	562519.000	502696.822	512391.092	997.404
1	20	2	0	562519.000	502698.277	512389.720	998.404
1	20	3	0	562519.000	502701.210	512386.953	999.377
1	20	4	0	562519.000	502703.369	512384.917	999.377
1	20	5	0	562519.000	502704.484	512383.865	999.377
1	20	6	0	562519.000	502708.461	512380.113	998.404
1	20	7	0	562519.000	502709.916	512378.741	997.404

EJE	P.K.	AZIMUT	COS A	SEN A
0	562520.000	-51.863148	.686113	-.727495

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	21	1	0	562520.000	502697.508	512391.819	997.407
1	21	2	0	562520.000	502698.963	512390.447	998.407
1	21	3	0	562520.000	502701.896	512387.680	999.380
1	21	4	0	562520.000	502704.055	512385.644	999.380
1	21	5	0	562520.000	502705.170	512384.593	999.380
1	21	6	0	562520.000	502709.148	512380.841	998.407
1	21	7	0	562520.000	502710.603	512379.469	997.407

EJE	P.K.	AZIMUT	COS A	SEN A
0	562521.000	-51.867392	.686064	-.727541

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	22	1	0	562521.000	502698.194	512392.546	997.410
1	22	2	0	562521.000	502699.649	512391.174	998.410
1	22	3	0	562521.000	502702.582	512388.407	999.383
1	22	4	0	562521.000	502704.741	512386.372	999.383
1	22	5	0	562521.000	502705.856	512385.320	999.383
1	22	6	0	562521.000	502709.834	512381.569	998.410
1	22	7	0	562521.000	502711.289	512380.197	997.410

EJE	P.K.	AZIMUT	COS A	SEN A
0	562522.000	-51.871636	.686016	-.727587

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	23	1	0	562522.000	502698.879	512393.273	997.413
1	23	2	0	562522.000	502700.334	512391.901	998.413
1	23	3	0	562522.000	502703.268	512389.135	999.386
1	23	4	0	562522.000	502705.427	512387.099	999.386
1	23	5	0	562522.000	502706.542	512386.048	999.386
1	23	6	0	562522.000	502710.521	512382.297	998.413
1	23	7	0	562522.000	502711.976	512380.925	997.413

EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	24	1	0	562523.000	502699.565	512394.000	997.416
1	24	2	0	562523.000	502701.020	512392.629	998.416
1	24	3	0	562523.000	502703.954	512389.862	999.389
1	24	4	0	562523.000	502706.113	512387.827	999.389
1	24	5	0	562523.000	502707.229	512386.775	999.389
1	24	6	0	562523.000	502711.207	512383.025	998.416
1	24	7	0	562523.000	502712.662	512381.653	997.416

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562524.000	-51.880124	.685919	-.727678
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	25	1	0	562524.000	502700.250	512394.728	997.420
1	25	2	0	562524.000	502701.706	512393.356	998.420
1	25	3	0	562524.000	502704.640	512390.590	999.393
1	25	4	0	562524.000	502706.799	512388.554	999.393
1	25	5	0	562524.000	502707.915	512387.503	999.393
1	25	6	0	562524.000	502711.893	512383.753	998.420
1	25	7	0	562524.000	502713.348	512382.381	997.420

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562525.000	-51.884368	.685870	-.727724
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	26	1	0	562525.000	502700.936	512395.455	997.423
1	26	2	0	562525.000	502702.391	512394.083	998.423
1	26	3	0	562525.000	502705.326	512391.317	999.396
1	26	4	0	562525.000	502707.485	512389.282	999.396
1	26	5	0	562525.000	502708.601	512388.231	999.396
1	26	6	0	562525.000	502712.579	512384.481	998.423
1	26	7	0	562525.000	502714.035	512383.109	997.423

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562526.000	-51.888613	.685822	-.727770
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	27	1	0	562526.000	502701.621	512396.182	997.426
1	27	2	0	562526.000	502703.077	512394.811	998.426
1	27	3	0	562526.000	502706.011	512392.045	999.399
1	27	4	0	562526.000	502708.171	512390.010	999.399

1

1	27	5	0	562526.000	502709.286	512388.959	999.399
1	27	6	0	562526.000	502713.266	512385.209	998.426
1	27	7	0	562526.000	502714.721	512383.837	997.426

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562527.000	-51.892857	.685773	-.727816
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	28	1	0	562527.000	502702.307	512396.910	997.429
1	28	2	0	562527.000	502703.762	512395.538	998.429
1	28	3	0	562527.000	502706.697	512392.773	999.402
1	28	4	0	562527.000	502708.857	512390.738	999.402
1	28	5	0	562527.000	502709.972	512389.687	999.402
1	28	6	0	562527.000	502713.952	512385.937	998.429
1	28	7	0	562527.000	502715.407	512384.566	997.429

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562528.000	-51.897101	.685724	-.727861
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1	29	1	0	562528.000	502702.992	512397.637	997.432
1	29	2	0	562528.000	502704.448	512396.266	998.432
1	29	3	0	562528.000	502707.383	512393.500	999.405
1	29	4	0	562528.000	502709.543	512391.466	999.405
1	29	5	0	562528.000	502710.658	512390.415	999.405
1	29	6	0	562528.000	502714.638	512386.665	998.432
1	29	7	0	562528.000	502716.093	512385.294	997.432

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562529.000	-51.901345	.685676	-.727907
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	30	1	0	562529.000	502703.677	512398.364	997.435
1	30	2	0	562529.000	502705.133	512396.993	998.435
1	30	3	0	562529.000	502708.068	512394.228	999.408
1	30	4	0	562529.000	502710.228	512392.193	999.408
1	30	5	0	562529.000	502711.344	512391.143	999.408
1	30	6	0	562529.000	502715.324	512387.394	998.435
1	30	7	0	562529.000	502716.780	512386.022	997.435

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562530.000	-51.905589	.685627	-.727953
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	31	1	0	562530.000	502704.362	512399.092	997.438
1	31	2	0	562530.000	502705.818	512397.721	998.438
1	31	3	0	562530.000	502708.754	512394.956	999.411
1	31	4	0	562530.000	502710.914	512392.921	999.411
1	31	5	0	562530.000	502712.030	512391.871	999.411
1	31	6	0	562530.000	502716.010	512388.122	998.438
1	31	7	0	562530.000	502717.466	512386.751	997.438

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562531.000	-51.909833	.685579	-.727998
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1

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	32	1	0	562531.000	502705.048	512399.819	997.441
1	32	2	0	562531.000	502706.504	512398.448	998.441
1	32	3	0	562531.000	502709.439	512395.684	999.414
1	32	4	0	562531.000	502711.600	512393.649	999.414
1	32	5	0	562531.000	502712.715	512392.599	999.414
1	32	6	0	562531.000	502716.696	512388.850	998.441
1	32	7	0	562531.000	502718.152	512387.479	997.441

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562532.000	-51.914077	.685530	-.728044
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	33	1	0	562532.000	502705.733	512400.547	997.445
1	33	2	0	562532.000	502707.189	512399.176	998.445
1	33	3	0	562532.000	502710.125	512396.412	999.418
1	33	4	0	562532.000	502712.285	512394.377	999.418
1	33	5	0	562532.000	502713.401	512393.327	999.418
1	33	6	0	562532.000	502717.381	512389.579	998.445
1	33	7	0	562532.000	502718.838	512388.208	997.445

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562533.000	-51.918321	.685482	-.728090
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
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1	34	3	0	562533.000	502710.810	512397.140	999.421
1	34	4	0	562533.000	502712.971	512395.105	999.421
1	34	5	0	562533.000	502714.086	512394.055	999.421
1	34	6	0	562533.000	502718.067	512390.307	998.448
1	34	7	0	562533.000	502719.523	512388.936	997.448

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562534.000	-51.922566	.685433	-.728135
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	35	1	0	562534.000	502707.103	512402.002	997.451
1	35	2	0	562534.000	502708.559	512400.631	998.451
1	35	3	0	562534.000	502711.495	512397.867	999.424
1	35	4	0	562534.000	502713.656	512395.834	999.424
1	35	5	0	562534.000	502714.772	512394.783	999.424
1	35	6	0	562534.000	502718.753	512391.035	998.451
1	35	7	0	562534.000	502720.209	512389.665	997.451

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562535.000	-51.926810	.685385	-.728181
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	36	1	0	562535.000	502707.788	512402.730	997.454
1	36	2	0	562535.000	502709.244	512401.359	998.454
1	36	3	0	562535.000	502712.181	512398.595	999.427
1	36	4	0	562535.000	502714.341	512396.562	999.427
1	36	5	0	562535.000	502715.457	512395.511	999.427
1	36	6	0	562535.000	502719.439	512391.764	998.454
1	36	7	0	562535.000	502720.895	512390.393	997.454

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EJE	P.K.	AZIMUT	COS A	SEN A
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0	562536.000	-51.931054	.685336	-.728227
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	37	1	0	562536.000	502708.473	512403.458	997.457
1	37	2	0	562536.000	502709.929	512402.087	998.457
1	37	3	0	562536.000	502712.866	512399.324	999.430
1	37	4	0	562536.000	502715.027	512397.290	999.430
1	37	5	0	562536.000	502716.143	512396.240	999.430
1	37	6	0	562536.000	502720.125	512392.492	998.457
1	37	7	0	562536.000	502721.581	512391.122	997.457

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562537.000	-51.935298	.685288	-.728273
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	38	1	0	562537.000	502709.158	512404.186	997.460
1	38	2	0	562537.000	502710.614	512402.815	998.460
1	38	3	0	562537.000	502713.551	512400.052	999.433
1	38	4	0	562537.000	502715.712	512398.018	999.433
1	38	5	0	562537.000	502716.828	512396.968	999.433
1	38	6	0	562537.000	502720.810	512393.221	998.460
1	38	7	0	562537.000	502722.267	512391.850	997.460

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562538.000	-51.939542	.685239	-.728318
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	39	1	0	562538.000	502709.843	512404.914	997.463
1	39	2	0	562538.000	502711.299	512403.543	998.463

1	39	5	0	562538.000	502717.514	512397.696	999.436
1	39	6	0	562538.000	502721.496	512393.950	998.463
1	39	7	0	562538.000	502722.952	512392.579	997.463

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562539.000	-51.943786	.685191	-.728364
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	40	1	0	562539.000	502710.527	512405.641	997.467
1	40	2	0	562539.000	502711.984	512404.271	998.467
1	40	3	0	562539.000	502714.921	512401.508	999.440
1	40	4	0	562539.000	502717.083	512399.475	999.440
1	40	5	0	562539.000	502718.199	512398.425	999.440
1	40	6	0	562539.000	502722.181	512394.678	998.467
1	40	7	0	562539.000	502723.638	512393.308	997.467

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562540.000	-51.948030	.685142	-.728410
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	41	1	0	562540.000	502711.212	512406.369	997.470
1	41	2	0	562540.000	502712.669	512404.999	998.470
1	41	3	0	562540.000	502715.606	512402.236	999.443
1	41	4	0	562540.000	502717.768	512400.203	999.443

1

1	41	5	0	562540.000	502718.884	512399.153	999.443
1	41	6	0	562540.000	502722.867	512395.407	998.470
1	41	7	0	562540.000	502724.324	512394.037	997.470

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562541.000	-51.952274	.685093	-.728455
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	42	1	0	562541.000	502711.897	512407.097	997.473
1	42	2	0	562541.000	502713.354	512405.727	998.473
1	42	3	0	562541.000	502716.291	512402.965	999.446
1	42	4	0	562541.000	502718.453	512400.932	999.446
1	42	5	0	562541.000	502719.569	512399.882	999.446
1	42	6	0	562541.000	502723.552	512396.136	998.473
1	42	7	0	562541.000	502725.009	512394.766	997.473

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562542.000	-51.956519	.685045	-.728501
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	43	1	0	562542.000	502712.582	512407.825	997.476
1	43	2	0	562542.000	502714.039	512406.455	998.476
1	43	3	0	562542.000	502716.976	512403.693	999.449
1	43	4	0	562542.000	502719.138	512401.660	999.449
1	43	5	0	562542.000	502720.254	512400.610	999.449
1	43	6	0	562542.000	502724.238	512396.865	998.476
1	43	7	0	562542.000	502725.695	512395.495	997.476

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562543.000	-51.960763	.684996	-.728547
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	44	1	0	562543.000	502713.266	512408.553	997.479
1	44	2	0	562543.000	502714.723	512407.184	998.479
1	44	3	0	562543.000	502717.661	512404.421	999.452
1	44	4	0	562543.000	502719.823	512402.389	999.452

1 44 0 0 562543.000 502726.380 512396.224 997.479
1 44 7 0 562543.000 502726.380 512396.224 997.479

EJE P.K. AZIMUT COS A SEN A

0 562544.000 -51.965007 .684948 -.728592

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	45	1	0	562544.000	502713.951	512409.282	997.482
1	45	2	0	562544.000	502715.408	512407.912	998.482
1	45	3	0	562544.000	502718.346	512405.150	999.455
1	45	4	0	562544.000	502720.508	512403.117	999.455
1	45	5	0	562544.000	502721.625	512402.067	999.455
1	45	6	0	562544.000	502725.608	512398.322	998.482
1	45	7	0	562544.000	502727.065	512396.953	997.482

EJE P.K. AZIMUT COS A SEN A

0 562545.000 -51.969251 .684899 -.728638

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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	46	1	0	562545.000	502714.635	512410.010	997.485
1	46	2	0	562545.000	502716.093	512408.640	998.485
1	46	3	0	562545.000	502719.031	512405.878	999.458
1	46	4	0	562545.000	502721.193	512403.846	999.458
1	46	5	0	562545.000	502722.310	512402.796	999.458
1	46	6	0	562545.000	502726.293	512399.051	998.485
1	46	7	0	562545.000	502727.751	512397.682	997.485

EJE P.K. AZIMUT COS A SEN A

0 562546.000 -51.973495 .684851 -.728684

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	47	1	0	562546.000	502715.320	512410.738	997.488
1	47	2	0	562546.000	502716.777	512409.368	998.488
1	47	3	0	562546.000	502719.715	512406.607	999.461
1	47	4	0	562546.000	502721.878	512404.574	999.461
1	47	5	0	562546.000	502722.995	512403.525	999.461
1	47	6	0	562546.000	502726.979	512399.780	998.488
1	47	7	0	562546.000	502728.436	512398.411	997.488

EJE P.K. AZIMUT COS A SEN A

0 562547.000 -51.977739 .684802 -.728729

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	48	1	0	562547.000	502716.004	512411.466	997.492
1	48	2	0	562547.000	502717.462	512410.097	998.492
1	48	3	0	562547.000	502720.400	512407.335	999.465
1	48	4	0	562547.000	502722.563	512405.303	999.465
1	48	5	0	562547.000	502723.679	512404.254	999.465
1	48	6	0	562547.000	502727.664	512400.509	998.492
1	48	7	0	562547.000	502729.121	512399.140	997.492

EJE P.K. AZIMUT COS A SEN A

0 562548.000 -51.981983 .684753 -.728775

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	49	1	0	562548.000	502716.688	512412.195	997.495
1	49	2	0	562548.000	502718.146	512410.825	998.495
1	49	3	0	562548.000	502721.085	512408.064	999.468
1	49	4	0	562548.000	502723.247	512406.032	999.468
1	49	5	0	562548.000	502724.364	512404.982	999.468
1	49	6	0	562548.000	502728.349	512401.239	998.495

EJE P.K. AZIMUT COS A SEN A

0 562549.000 -51.986228 .684705 -.728821

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	50	1	0	562549.000	502717.373	512412.923	997.498
1	50	2	0	562549.000	502718.830	512411.554	998.498
1	50	3	0	562549.000	502721.769	512408.792	999.471
1	50	4	0	562549.000	502723.932	512406.761	999.471
1	50	5	0	562549.000	502725.049	512405.711	999.471
1	50	6	0	562549.000	502729.034	512401.968	998.498
1	50	7	0	562549.000	502730.492	512400.598	997.498

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EJE P.K. AZIMUT COS A SEN A

0 562550.000 -51.990472 .684656 -.728866

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	51	1	0	562550.000	502718.057	512413.651	997.501
1	51	2	0	562550.000	502719.515	512412.282	998.501
1	51	3	0	562550.000	502722.454	512409.521	999.474
1	51	4	0	562550.000	502724.617	512407.490	999.474
1	51	5	0	562550.000	502725.734	512406.440	999.474
1	51	6	0	562550.000	502729.719	512402.697	998.501
1	51	7	0	562550.000	502731.177	512401.328	997.501

EJE P.K. AZIMUT COS A SEN A

0 562551.000 -51.994716 .684608 -.728912

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	52	1	0	562551.000	502718.741	512414.380	997.504
1	52	2	0	562551.000	502720.199	512413.011	998.504
1	52	3	0	562551.000	502723.138	512410.250	999.477
1	52	4	0	562551.000	502725.301	512408.218	999.477
1	52	5	0	562551.000	502726.419	512407.169	999.477
1	52	6	0	562551.000	502730.404	512403.426	998.504
1	52	7	0	562551.000	502731.862	512402.057	997.504

EJE P.K. AZIMUT COS A SEN A

0 562552.000 -51.998960 .684559 -.728957

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	53	1	0	562552.000	502719.425	512415.108	997.507
1	53	2	0	562552.000	502720.883	512413.739	998.507
1	53	3	0	562552.000	502723.823	512410.979	999.480
1	53	4	0	562552.000	502725.986	512408.947	999.480
1	53	5	0	562552.000	502727.103	512407.898	999.480
1	53	6	0	562552.000	502731.089	512404.155	998.507
1	53	7	0	562552.000	502732.547	512402.786	997.507

EJE P.K. AZIMUT COS A SEN A

0 562553.000 -52.003204 .684510 -.729003

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	54	1	0	562553.000	502720.110	512415.837	997.510
1	54	2	0	562553.000	502721.568	512414.468	998.510
1	54	3	0	562553.000	502724.507	512411.708	999.483
1	54	4	0	562553.000	502726.671	512409.676	999.483
1	54	5	0	562553.000	502727.788	512408.627	999.483
1	54	6	0	562553.000	502731.774	512404.885	998.510
1	54	7	0	562553.000	502733.232	512403.516	997.510

0 562554.000 -52.007448 .684462 -.729049

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	55	1	0	562554.000	502720.794	512416.565	997.513
1	55	2	0	562554.000	502722.252	512415.197	998.513
1	55	3	0	562554.000	502725.192	512412.436	999.486
1	55	4	0	562554.000	502727.355	512410.405	999.486
1	55	5	0	562554.000	502728.472	512409.356	999.486
1	55	6	0	562554.000	502732.458	512405.614	998.513
1	55	7	0	562554.000	502733.917	512404.245	997.513

EJE P.K. AZIMUT COS A SEN A

0 562555.000 -52.011692 .684413 -.729094

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	56	1	0	562555.000	502721.478	512417.294	997.517
1	56	2	0	562555.000	502722.936	512415.925	998.517
1	56	3	0	562555.000	502725.876	512413.165	999.490
1	56	4	0	562555.000	502728.039	512411.134	999.490
1	56	5	0	562555.000	502729.157	512410.086	999.490
1	56	6	0	562555.000	502733.143	512406.343	998.517
1	56	7	0	562555.000	502734.601	512404.975	997.517

EJE P.K. AZIMUT COS A SEN A

0 562556.000 -52.015936 .684365 -.729140

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	57	1	0	562556.000	502722.162	512418.023	997.520
1	57	2	0	562556.000	502723.620	512416.654	998.520
1	57	3	0	562556.000	502726.560	512413.894	999.493
1	57	4	0	562556.000	502728.724	512411.864	999.493
1	57	5	0	562556.000	502729.841	512410.815	999.493
1	57	6	0	562556.000	502733.828	512407.073	998.520
1	57	7	0	562556.000	502735.286	512405.704	997.520

EJE P.K. AZIMUT COS A SEN A

0 562557.000 -52.020181 .684316 -.729186

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	58	1	0	562557.000	502722.846	512418.751	997.523
1	58	2	0	562557.000	502724.304	512417.383	998.523
1	58	3	0	562557.000	502727.244	512414.623	999.496
1	58	4	0	562557.000	502729.408	512412.593	999.496
1	58	5	0	562557.000	502730.526	512411.544	999.496
1	58	6	0	562557.000	502734.513	512407.802	998.523
1	58	7	0	562557.000	502735.971	512406.434	997.523

EJE P.K. AZIMUT COS A SEN A

0 562558.000 -52.024425 .684267 -.729231

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	59	1	0	562558.000	502723.529	512419.480	997.526
1	59	2	0	562558.000	502724.988	512418.112	998.526
1	59	3	0	562558.000	502727.929	512415.352	999.499
1	59	4	0	562558.000	502730.092	512413.322	999.499
1	59	-5	0	562558.000	502731.210	512412.273	999.499
1	59	6	0	562558.000	502735.197	512408.532	998.526
1	59	7	0	562558.000	502736.656	512407.163	997.526

EJE P.K. AZIMUT COS A SEN A

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	60	1	0	562559.000	502724.213	512420.209	997.529
1	60	2	0	562559.000	502725.672	512418.841	998.529
1	60	3	0	562559.000	502728.613	512416.082	999.502
1	60	4	0	562559.000	502730.777	512414.051	999.502
1	60	5	0	562559.000	502731.894	512413.003	999.502
1	60	6	0	562559.000	502735.882	512409.262	998.529
1	60	7	0	562559.000	502737.340	512407.893	997.529

EJE P.K. AZIMUT COS A SEN A

0 562560.000 -52.032913 .684170 -.729322

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	61	1	0	562560.000	502724.897	512420.938	997.532
1	61	2	0	562560.000	502726.356	512419.570	998.532
1	61	3	0	562560.000	502729.297	512416.811	999.505
1	61	4	0	562560.000	502731.461	512414.780	999.505
1	61	5	0	562560.000	502732.579	512413.732	999.505
1	61	6	0	562560.000	502736.566	512409.991	998.532
1	61	7	0	562560.000	502738.025	512408.623	997.532

EJE P.K. AZIMUT COS A SEN A

0 562561.000 -52.037157 .684122 -.729368

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	62	1	0	562561.000	502725.581	512421.667	997.535
1	62	2	0	562561.000	502727.040	512420.299	998.535
1	62	3	0	562561.000	502729.981	512417.540	999.508
1	62	4	0	562561.000	502732.145	512415.510	999.508
1	62	5	0	562561.000	502733.263	512414.461	999.508
1	62	6	0	562561.000	502737.251	512410.721	998.535
1	62	7	0	562561.000	502738.709	512409.353	997.535

EJE P.K. AZIMUT COS A SEN A

0 562562.000 -52.041401 .684073 -.729414

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	63	1	0	562562.000	502726.265	512422.396	997.538
1	63	2	0	562562.000	502727.723	512421.028	998.538
1	63	3	0	562562.000	502730.665	512418.269	999.511
1	63	4	0	562562.000	502732.829	512416.239	999.511
1	63	5	0	562562.000	502733.947	512415.191	999.511
1	63	6	0	562562.000	502737.935	512411.451	998.538
1	63	7	0	562562.000	502739.394	512410.082	997.538

EJE P.K. AZIMUT COS A SEN A

0 562563.000 -52.045645 .684024 -.729459

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	64	1	0	562563.000	502726.948	512423.125	997.542
1	64	2	0	562563.000	502728.407	512421.757	998.542
1	64	3	0	562563.000	502731.349	512418.998	999.515
1	64	4	0	562563.000	502733.513	512416.969	999.515
1	64	5	0	562563.000	502734.631	512415.920	999.515
1	64	6	0	562563.000	502738.620	512412.180	998.542
1	64	7	0	562563.000	502740.078	512410.812	997.542

EJE P.K. AZIMUT COS A SEN A

0 562564.000 -52.07330 .683370 -.729300

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	65	1	0	562564.000	502727.632	512423.854	997.545
1	65	2	0	562564.000	502729.091	512422.486	998.545
1	65	3	0	562564.000	502732.032	512419.728	999.518
1	65	4	0	562564.000	502734.197	512417.698	999.518
1	65	5	0	562564.000	502735.315	512416.650	999.518
1	65	6	0	562564.000	502739.304	512412.910	998.545
1	65	7	0	562564.000	502740.763	512411.542	997.545

EJE P.K. AZIMUT COS A SEN A

0 562565.000 -52.054134 .683927 -.729550

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	66	1	0	562565.000	502728.315	512424.583	997.548
1	66	2	0	562565.000	502729.774	512423.215	998.548
1	66	3	0	562565.000	502732.716	512420.457	999.521
1	66	4	0	562565.000	502734.881	512418.428	999.521
1	66	5	0	562565.000	502735.999	512417.379	999.521
1	66	6	0	562565.000	502739.988	512413.640	998.548
1	66	7	0	562565.000	502741.447	512412.272	997.548

EJE P.K. AZIMUT COS A SEN A

0 562566.000 -52.058378 .683878 -.729596

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	67	1	0	562566.000	502728.999	512425.312	997.551
1	67	2	0	562566.000	502730.458	512423.944	998.551
1	67	3	0	562566.000	502733.400	512421.187	999.524
1	67	4	0	562566.000	502735.565	512419.157	999.524
1	67	5	0	562566.000	502736.683	512418.109	999.524
1	67	6	0	562566.000	502740.672	512414.370	998.551
1	67	7	0	562566.000	502742.132	512413.002	997.551

EJE P.K. AZIMUT COS A SEN A

0 562567.000 -52.062622 .683830 -.729642

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	68	1	0	562567.000	502729.682	512426.041	997.554
1	68	2	0	562567.000	502731.142	512424.674	998.554
1	68	3	0	562567.000	502734.084	512421.916	999.527
1	68	4	0	562567.000	502736.249	512419.887	999.527
1	68	5	0	562567.000	502737.367	512418.839	999.527
1	68	6	0	562567.000	502741.356	512415.100	998.554
1	68	7	0	562567.000	502742.816	512413.732	997.554

EJE P.K. AZIMUT COS A SEN A

0 562568.000 -52.066866 .683781 -.729687

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	69	1	0	562568.000	502730.366	512426.770	997.557
1	69	2	0	562568.000	502731.825	512425.403	998.557
1	69	3	0	562568.000	502734.767	512422.646	999.530
1	69	4	0	562568.000	502736.933	512420.617	999.530

1	69	5	0	562568.000	502738.051	512419.569	999.530
1	69	6	0	562568.000	502742.041	512415.830	998.557
1	69	7	0	562568.000	502743.500	512414.462	997.557

EJE P.K. AZIMUT COS A SEN A

0 562569.000 -52.071110 .683732 -.729733

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	70	1	0	562569.000	502731.049	512427.560	997.560
1	70	2	0	562569.000	502732.508	512426.132	998.560
1	70	3	0	562569.000	502735.451	512423.375	999.533
1	70	4	0	562569.000	502737.616	512421.346	999.533
1	70	5	0	562569.000	502738.735	512420.298	999.533
1	70	6	0	562569.000	502742.725	512416.560	998.560
1	70	7	0	562569.000	502744.184	512415.193	997.560

EJE P.K. AZIMUT COS A SEN A

0 562570.000 -52.075354 .683684 -.729778

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	71	1	0	562570.000	502731.732	512428.229	997.563
1	71	2	0	562570.000	502733.192	512426.862	998.563
1	71	3	0	562570.000	502736.135	512424.105	999.536
1	71	4	0	562570.000	502738.300	512422.076	999.536
1	71	5	0	562570.000	502739.419	512421.028	999.536
1	71	6	0	562570.000	502743.409	512417.290	998.563
1	71	7	0	562570.000	502744.868	512415.923	997.563

EJE P.K. AZIMUT COS A SEN A

0 562571.000 -52.079598 .683635 -.729824

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	72	1	0	562571.000	502732.416	512428.958	997.567
1	72	2	0	562571.000	502733.875	512427.591	998.567
1	72	3	0	562571.000	502736.818	512424.834	999.540
1	72	4	0	562571.000	502738.984	512422.806	999.540
1	72	5	0	562571.000	502740.102	512421.758	999.540
1	72	6	0	562571.000	502744.093	512418.020	998.567
1	72	7	0	562571.000	502745.552	512416.653	997.567

EJE P.K. AZIMUT COS A SEN A

0 562572.000 -52.083843 .683586 -.729870

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	73	1	0	562572.000	502733.099	512429.688	997.570
1	73	2	0	562572.000	502734.558	512428.321	998.570
1	73	3	0	562572.000	502737.502	512425.564	999.543
1	73	4	0	562572.000	502739.667	512423.536	999.543
1	73	5	0	562572.000	502740.786	512422.488	999.543
1	73	6	0	562572.000	502744.777	512418.750	998.570
1	73	7	0	562572.000	502746.236	512417.383	997.570

EJE P.K. AZIMUT COS A SEN A

0 562573.000 -52.088087 .683538 -.729915

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	74	1	0	562573.000	502733.782	512430.417	997.573
1	74	2	0	562573.000	502735.242	512429.050	998.573
1	74	3	0	562573.000	502738.185	512426.294	999.546
1	74	4	0	562573.000	502740.351	512424.266	999.546
1	74	5	0	562573.000	502741.470	512423.218	999.546
1	74	6	0	562573.000	502745.461	512419.481	998.573
1	74	7	0	562573.000	502746.920	512418.114	997.573

EJE P.K. AZIMUT COS A SEN A

0 562574.000 -52.092331 .683489 -.729961

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
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1	75	3	0	562574.000	502738.868	512427.021	999.549
1	75	4	0	562574.000	502741.035	512424.995	999.549
1	75	5	0	562574.000	502742.153	512423.948	999.549
1	75	6	0	562574.000	502746.144	512420.211	998.576
1	75	7	0	562574.000	502747.604	512418.844	997.576

EJE P.K. AZIMUT COS A SEN A

0 562575.000 -52.096575 .683440 -.730006

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	76	1	0	562575.000	502735.148	512431.876	997.579
1	76	2	0	562575.000	502736.608	512430.509	998.579
1	76	3	0	562575.000	502739.552	512427.753	999.552
1	76	4	0	562575.000	502741.718	512425.725	999.552
1	76	5	0	562575.000	502742.837	512424.678	999.552
1	76	6	0	562575.000	502746.828	512420.941	998.579
1	76	7	0	562575.000	502748.288	512419.574	997.579

EJE P.K. AZIMUT COS A SEN A

0 562576.000 -52.100819 .683392 -.730052

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	77	1	0	562576.000	502735.831	512432.606	997.582
1	77	2	0	562576.000	502737.291	512431.239	998.582
1	77	3	0	562576.000	502740.235	512428.483	999.555
1	77	4	0	562576.000	502742.401	512426.455	999.555
1	77	5	0	562576.000	502743.520	512425.408	999.555
1	77	6	0	562576.000	502747.512	512421.672	998.582
1	77	7	0	562576.000	502748.972	512420.305	997.582

EJE P.K. AZIMUT COS A SEN A

0 562577.000 -52.105063 .683343 -.730097

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	78	1	0	562577.000	502736.514	512433.336	997.585
1	78	2	0	562577.000	502737.974	512431.969	998.585
1	78	3	0	562577.000	502740.918	512429.213	999.558
1	78	4	0	562577.000	502743.085	512427.186	999.558
1	78	5	0	562577.000	502744.204	512426.138	999.558
1	78	6	0	562577.000	502748.196	512422.402	998.585
1	78	7	0	562577.000	502749.656	512421.035	997.585

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EJE P.K. AZIMUT COS A SEN A

0 562578.000 -52.109307 .683294 -.730143

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	79	1	0	562578.000	502737.197	512434.065	997.588
1	79	2	0	562578.000	502738.657	512432.699	998.588
1	79	3	0	562578.000	502741.601	512429.943	999.561
1	79	4	0	562578.000	502743.768	512427.916	999.561
1	79	5	0	562578.000	502744.887	512426.868	999.561
1	79	6	0	562578.000	502748.879	512423.133	998.588
1	79	7	0	562578.000	502750.339	512421.766	997.588

EJE P.K. AZIMUT COS A SEN A

0 562579.000 -52.113552 .683246 -.730188

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	80	1	0	562579.000	502737.880	512434.795	997.592
1	80	2	0	562579.000	502739.340	512433.428	998.592

1	80	5	0	562579.000	502745.570	512427.599	999.565
1	80	6	0	562579.000	502749.563	512423.863	998.592
1	80	7	0	562579.000	502751.023	512422.497	997.592

EJE P.K. AZIMUT COS A SEN A

0 562580.000 -52.117796 .683197 -.730234

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	81	1	0	562580.000	502738.563	512435.525	997.595
1	81	2	0	562580.000	502740.023	512434.158	998.595
1	81	3	0	562580.000	502742.968	512431.403	999.568
1	81	4	0	562580.000	502745.135	512429.376	999.568
1	81	5	0	562580.000	502746.254	512428.329	999.568
1	81	6	0	562580.000	502750.246	512424.594	998.595
1	81	7	0	562580.000	502751.707	512423.227	997.595

EJE P.K. AZIMUT COS A SEN A

0 562581.000 -52.122040 .683148 -.730280

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	82	1	0	562581.000	502739.245	512436.255	997.598
1	82	2	0	562581.000	502740.706	512434.888	998.598
1	82	3	0	562581.000	502743.651	512432.133	999.571
1	82	4	0	562581.000	502745.818	512430.106	999.571
1	82	5	0	562581.000	502746.937	512429.059	999.571
1	82	6	0	562581.000	502750.930	512425.324	998.598
1	82	7	0	562581.000	502752.390	512423.958	997.598

EJE P.K. AZIMUT COS A SEN A

0 562582.000 -52.126284 .683100 -.730325

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	83	1	0	562582.000	502739.928	512436.984	997.601
1	83	2	0	562582.000	502741.389	512435.618	998.601
1	83	3	0	562582.000	502744.334	512432.864	999.574
1	83	4	0	562582.000	502746.501	512430.837	999.574

1

1	83	5	0	562582.000	502747.620	512429.790	999.574
1	83	6	0	562582.000	502751.613	512426.055	998.601
1	83	7	0	562582.000	502753.074	512424.689	997.601

EJE P.K. AZIMUT COS A SEN A

0 562583.000 -52.130528 .683051 -.730371

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	84	1	0	562583.000	502740.611	512437.714	997.604
1	84	2	0	562583.000	502742.071	512436.348	998.604
1	84	3	0	562583.000	502745.017	512433.594	999.577
1	84	4	0	562583.000	502747.184	512431.567	999.577
1	84	5	0	562583.000	502748.303	512430.520	999.577
1	84	6	0	562583.000	502752.297	512426.786	998.604
1	84	7	0	562583.000	502753.757	512425.419	997.604

EJE P.K. AZIMUT COS A SEN A

0 562584.000 -52.134772 .683002 -.730416

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	85	1	0	562584.000	502741.293	512438.444	997.607
1	85	2	0	562584.000	502742.754	512437.078	998.607
1	85	3	0	562584.000	502745.700	512434.324	999.580
1	85	4	0	562584.000	502747.867	512432.297	999.580

1 85 7 0 562584.000 502754.441 512426.150 997.607

EJE P.K. AZIMUT COS A SEN A

0 562585.000 -52.139016 .682954 -.730462

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	86	1	0	562585.000	502741.976	512439.174	997.610
1	86	2	0	562585.000	502743.437	512437.808	998.610
1	86	3	0	562585.000	502746.382	512435.054	999.583
1	86	4	0	562585.000	502748.550	512433.028	999.583
1	86	5	0	562585.000	502749.669	512431.981	999.583
1	86	6	0	562585.000	502753.663	512428.247	998.610
1	86	7	0	562585.000	502755.124	512426.881	997.610

EJE P.K. AZIMUT COS A SEN A

0 562586.000 -52.143260 .682905 -.730507

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	87	1	0	562586.000	502742.658	512439.904	997.614
1	87	2	0	562586.000	502744.119	512438.539	998.614
1	87	3	0	562586.000	502747.065	512435.785	999.587
1	87	4	0	562586.000	502749.233	512433.758	999.587
1	87	5	0	562586.000	502750.352	512432.712	999.587
1	87	6	0	562586.000	502754.347	512428.978	998.614
1	87	7	0	562586.000	502755.808	512427.612	997.614

EJE P.K. AZIMUT COS A SEN A

0 562587.000 -52.147505 .682856 -.730553

1

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	88	1	0	562587.000	502743.341	512440.634	997.617
1	88	2	0	562587.000	502744.802	512439.269	998.617
1	88	3	0	562587.000	502747.748	512436.515	999.590
1	88	4	0	562587.000	502749.916	512434.489	999.590
1	88	5	0	562587.000	502751.035	512433.442	999.590
1	88	6	0	562587.000	502755.030	512429.709	998.617
1	88	7	0	562587.000	502756.491	512428.343	997.617

EJE P.K. AZIMUT COS A SEN A

0 562588.000 -52.151749 .682808 -.730598

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	89	1	0	562588.000	502744.023	512441.365	997.620
1	89	2	0	562588.000	502745.485	512439.999	998.620
1	89	3	0	562588.000	502748.431	512437.246	999.593
1	89	4	0	562588.000	502750.599	512435.219	999.593
1	89	5	0	562588.000	502751.718	512434.173	999.593
1	89	6	0	562588.000	502755.713	512430.440	998.620
1	89	7	0	562588.000	502757.174	512429.074	997.620

EJE P.K. AZIMUT COS A SEN A

0 562589.000 -52.155993 .682759 -.730644

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	90	1	0	562589.000	502744.706	512442.095	997.623
1	90	2	0	562589.000	502746.167	512440.729	998.623
1	90	3	0	562589.000	502749.113	512437.976	999.596
1	90	4	0	562589.000	502751.281	512435.950	999.596
1	90	5	0	562589.000	502752.401	512434.904	999.596
1	90	6	0	562589.000	502756.396	512431.171	998.623

EJE P.K. AZIMUT COS A SEN A

0 562590.000 -52.160237 .682710 -.730689

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	91	1	0	562590.000	502745.388	512442.825	997.626
1	91	2	0	562590.000	502746.849	512441.460	998.626
1	91	3	0	562590.000	502749.796	512438.707	999.599
1	91	4	0	562590.000	502751.964	512436.681	999.599
1	91	5	0	562590.000	502753.084	512435.634	999.599
1	91	6	0	562590.000	502757.079	512431.902	998.626
1	91	7	0	562590.000	502758.540	512430.536	997.626

EJE P.K. AZIMUT COS A SEN A

0 562591.000 -52.164481 .682661 -.730735

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	92	1	0	562591.000	502746.070	512443.555	997.629
1	92	2	0	562591.000	502747.532	512442.190	998.629
1	92	3	0	562591.000	502750.478	512439.437	999.602
1	92	4	0	562591.000	502752.647	512437.411	999.602
1	92	5	0	562591.000	502753.767	512436.365	999.602
1	92	6	0	562591.000	502757.762	512432.633	998.629
1	92	7	0	562591.000	502759.224	512431.267	997.629

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EJE P.K. AZIMUT COS A SEN A

0 562592.000 -52.168725 .682613 -.730780

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	93	1	0	562592.000	502746.753	512444.286	997.632
1	93	2	0	562592.000	502748.214	512442.920	998.632
1	93	3	0	562592.000	502751.161	512440.168	999.605
1	93	4	0	562592.000	502753.329	512438.142	999.605
1	93	5	0	562592.000	502754.449	512437.096	999.605
1	93	6	0	562592.000	502758.445	512433.364	998.632
1	93	7	0	562592.000	502759.907	512431.999	997.632

EJE P.K. AZIMUT COS A SEN A

0 562593.000 -52.172969 .682564 -.730826

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	94	1	0	562593.000	502747.435	512445.016	997.635
1	94	2	0	562593.000	502748.896	512443.651	998.635
1	94	3	0	562593.000	502751.843	512440.898	999.608
1	94	4	0	562593.000	502754.012	512438.873	999.608
1	94	5	0	562593.000	502755.132	512437.827	999.608
1	94	6	0	562593.000	502759.128	512434.095	998.635
1	94	7	0	562593.000	502760.590	512432.730	997.635

EJE P.K. AZIMUT COS A SEN A

0 562594.000 -52.177213 .682515 -.730871

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	95	1	0	562594.000	502748.117	512445.746	997.639
1	95	2	0	562594.000	502749.579	512444.381	998.639
1	95	3	0	562594.000	502752.526	512441.629	999.612
1	95	4	0	562594.000	502754.695	512439.604	999.612
1	95	5	0	562594.000	502755.815	512438.558	999.612
1	95	6	0	562594.000	502759.811	512434.826	998.639
1	95	7	0	562594.000	502761.273	512433.461	997.639

0 562595.000 -52.181458 .682467 -.730917

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	96	1	0	562595.000	502748.799	512446.477	997.642
1	96	2	0	562595.000	502750.261	512445.112	998.642
1	96	3	0	562595.000	502753.208	512442.360	999.615
1	96	4	0	562595.000	502755.377	512440.335	999.615
1	96	5	0	562595.000	502756.497	512439.289	999.615
1	96	6	0	562595.000	502760.494	512435.557	998.642
1	96	7	0	562595.000	502761.955	512434.192	997.642

EJE P.K. AZIMUT COS A SEN A

0 562596.000 -52.185702 .682418 -.730962

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	97	1	0	562596.000	502749.481	512447.207	997.645
1	97	2	0	562596.000	502750.943	512445.842	998.645
1	97	3	0	562596.000	502753.890	512443.091	999.618
1	97	4	0	562596.000	502756.060	512441.066	999.618

1

1	97	5	0	562596.000	502757.180	512440.020	999.618
1	97	6	0	562596.000	502761.176	512436.289	998.645
1	97	7	0	562596.000	502762.638	512434.924	997.645

EJE P.K. AZIMUT COS A SEN A

0 562597.000 -52.189946 .682369 -.731008

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	98	1	0	562597.000	502750.163	512447.938	997.648
1	98	2	0	562597.000	502751.625	512446.573	998.648
1	98	3	0	562597.000	502754.573	512443.821	999.621
1	98	4	0	562597.000	502756.742	512441.797	999.621
1	98	5	0	562597.000	502757.862	512440.751	999.621
1	98	6	0	562597.000	502761.859	512437.020	998.648
1	98	7	0	562597.000	502763.321	512435.655	997.648

EJE P.K. AZIMUT COS A SEN A

0 562598.000 -52.194190 .682320 -.731053

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	99	1	0	562598.000	502750.845	512448.668	997.651
1	99	2	0	562598.000	502752.307	512447.304	998.651
1	99	3	0	562598.000	502755.255	512444.552	999.624
1	99	4	0	562598.000	502757.424	512442.528	999.624
1	99	5	0	562598.000	502758.545	512441.482	999.624
1	99	6	0	562598.000	502762.542	512437.751	998.651
1	99	7	0	562598.000	502764.004	512436.387	997.651

EJE P.K. AZIMUT COS A SEN A

0 562599.000 -52.198434 .682272 -.731099

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	100	1	0	562599.000	502751.527	512449.399	997.654
1	100	2	0	562599.000	502752.989	512448.035	998.654
1	100	3	0	562599.000	502755.937	512445.283	999.627
1	100	4	0	562599.000	502758.107	512443.259	999.627
1	100	5	0	562599.000	502759.227	512442.213	999.627
1	100	6	0	562599.000	502763.224	512438.483	998.654
1	100	7	0	562599.000	502764.687	512437.118	997.654

EJE P.K. AZIMUT COS A SEN A

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	101	1	0	562600.000	502752.209	512450.130	997.657
1	101	2	0	562600.000	502753.671	512448.765	998.657
1	101	3	0	562600.000	502756.619	512446.014	999.630
1	101	4	0	562600.000	502758.789	512443.990	999.630
1	101	5	0	562600.000	502759.909	512442.944	999.630
1	101	6	0	562600.000	502763.907	512439.214	998.657
1	101	7	0	562600.000	502765.369	512437.850	997.657

EJE P.K. AZIMUT COS A SEN A

0 562601.000 -52.206922 .682174 -.731190

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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	102	1	0	562601.000	502752.890	512450.861	997.660
1	102	2	0	562601.000	502754.353	512449.496	998.660
1	102	3	0	562601.000	502757.301	512446.745	999.633
1	102	4	0	562601.000	502759.471	512444.721	999.633
1	102	5	0	562601.000	502760.592	512443.676	999.633
1	102	6	0	562601.000	502764.589	512439.946	998.660
1	102	7	0	562601.000	502766.052	512438.581	997.660

EJE P.K. AZIMUT COS A SEN A

0 562602.000 -52.211167 .682125 -.731235

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	103	1	0	562602.000	502753.572	512451.591	997.664
1	103	2	0	562602.000	502755.035	512450.227	998.664
1	103	3	0	562602.000	502757.983	512447.476	999.637
1	103	4	0	562602.000	502760.153	512445.452	999.637
1	103	5	0	562602.000	502761.274	512444.407	999.637
1	103	6	0	562602.000	502765.272	512440.677	998.664
1	103	7	0	562602.000	502766.734	512439.313	997.664

EJE P.K. AZIMUT COS A SEN A

0 562603.000 -52.215411 .682077 -.731281

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	104	1	0	562603.000	502754.254	512452.322	997.667
1	104	2	0	562603.000	502755.716	512450.958	998.667
1	104	3	0	562603.000	502758.665	512448.207	999.640
1	104	4	0	562603.000	502760.835	512446.183	999.640
1	104	5	0	562603.000	502761.956	512445.138	999.640
1	104	6	0	562603.000	502765.954	512441.409	998.667
1	104	7	0	562603.000	502767.417	512440.045	997.667

EJE P.K. AZIMUT COS A SEN A

0 562604.000 -52.219655 .682028 -.731326

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	105	1	0	562604.000	502754.935	512453.053	997.670
1	105	2	0	562604.000	502756.398	512451.689	998.670
1	105	3	0	562604.000	502759.347	512448.939	999.643
1	105	4	0	562604.000	502761.517	512446.915	999.643
1	105	5	0	562604.000	502762.638	512445.869	999.643
1	105	6	0	562604.000	502766.637	512442.141	998.670
1	105	7	0	562604.000	502768.099	512440.776	997.670

EJE P.K. AZIMUT COS A SEN A

0 562605.000 -52.223899 .681979 -.731372

1	106	2	0	562605.000	502757.080	512452.420	998.673
1	106	3	0	562605.000	502760.029	512449.670	999.646
1	106	4	0	562605.000	502762.199	512447.646	999.646
1	106	5	0	562605.000	502763.320	512446.601	999.646
1	106	6	0	562605.000	502767.319	512442.872	998.673
1	106	7	0	562605.000	502768.782	512441.508	997.673

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EJE	P.K.	AZIMUT	COS A	SEN A
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0	562606.000	-52.228143	.681930	-.731417
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	107	1	0	562606.000	502756.299	512454.515	997.676
1	107	2	0	562606.000	502757.761	512453.151	998.676
1	107	3	0	562606.000	502760.711	512450.401	999.649
1	107	4	0	562606.000	502762.881	512448.378	999.649
1	107	5	0	562606.000	502764.002	512447.332	999.649
1	107	6	0	562606.000	502768.001	512443.604	998.676
1	107	7	0	562606.000	502769.464	512442.240	997.676

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562607.000	-52.232387	.681882	-.731463
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	108	1	0	562607.000	502756.980	512455.246	997.679
1	108	2	0	562607.000	502758.443	512453.882	998.679
1	108	3	0	562607.000	502761.393	512451.132	999.652
1	108	4	0	562607.000	502763.563	512449.109	999.652
1	108	5	0	562607.000	502764.684	512448.064	999.652
1	108	6	0	562607.000	502768.683	512444.336	998.679
1	108	7	0	562607.000	502770.146	512442.972	997.679

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562608.000	-52.236631	.681833	-.731508
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	109	1	0	562608.000	502757.662	512455.977	997.682
1	109	2	0	562608.000	502759.125	512454.613	998.682
1	109	3	0	562608.000	502762.074	512451.864	999.655
1	109	4	0	562608.000	502764.245	512449.840	999.655
1	109	5	0	562608.000	502765.366	512448.795	999.655
1	109	6	0	562608.000	502769.366	512445.068	998.682
1	109	7	0	562608.000	502770.829	512443.704	997.682

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562609.000	-52.240875	.681784	-.731553
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	110	1	0	562609.000	502758.343	512456.708	997.685
1	110	2	0	562609.000	502759.806	512455.344	998.685
1	110	3	0	562609.000	502762.756	512452.595	999.658
1	110	4	0	562609.000	502764.927	512450.572	999.658
1	110	5	0	562609.000	502766.048	512449.527	999.658
1	110	6	0	562609.000	502770.048	512445.799	998.685
1	110	7	0	562609.000	502771.511	512444.436	997.685

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562610.000	-52.245120	.681735	-.731599
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	111	1	0	562610.000	502759.024	512457.439	997.689

1	111	4	0	562610.000	502765.609	512451.364	999.662
1	111	5	0	562610.000	502766.730	512450.259	999.662
1	111	6	0	562610.000	502770.730	512446.531	998.689
1	111	7	0	562610.000	502772.193	512445.168	997.689

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562611.000	-52.249364	.681686	-.731644
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	112	1	0	562611.000	502759.706	512458.170	997.692
1	112	2	0	562611.000	502761.169	512456.807	998.692
1	112	3	0	562611.000	502764.119	512454.058	999.665
1	112	4	0	562611.000	502766.290	512452.035	999.665
1	112	5	0	562611.000	502767.412	512450.990	999.665
1	112	6	0	562611.000	502771.412	512447.263	998.692
1	112	7	0	562611.000	502772.875	512445.900	997.692

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562612.000	-52.253608	.681638	-.731690
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	113	1	0	562612.000	502760.387	512458.902	997.695
1	113	2	0	562612.000	502761.850	512457.538	998.695
1	113	3	0	562612.000	502764.801	512454.790	999.668
1	113	4	0	562612.000	502766.972	512452.767	999.668
1	113	5	0	562612.000	502768.093	512451.722	999.668
1	113	6	0	562612.000	502772.094	512447.995	998.695
1	113	7	0	562612.000	502773.557	512446.632	997.695

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562613.000	-52.257852	.681589	-.731735
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	114	1	0	562613.000	502761.068	512459.633	997.698
1	114	2	0	562613.000	502762.532	512458.270	998.698
1	114	3	0	562613.000	502765.482	512455.521	999.671
1	114	4	0	562613.000	502767.654	512453.499	999.671
1	114	5	0	562613.000	502768.775	512452.454	999.671
1	114	6	0	562613.000	502772.776	512448.727	998.698
1	114	7	0	562613.000	502774.239	512447.364	997.698

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562614.000	-52.262096	.681540	-.731781
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	115	1	0	562614.000	502761.749	512460.364	997.701
1	115	2	0	562614.000	502763.213	512459.001	998.701
1	115	3	0	562614.000	502766.164	512456.253	999.674
1	115	4	0	562614.000	502768.335	512454.230	999.674
1	115	5	0	562614.000	502769.457	512453.186	999.674
1	115	6	0	562614.000	502773.458	512449.459	998.701
1	115	7	0	562614.000	502774.921	512448.096	997.701

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562615.000	-52.266340	.681491	-.731826
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
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1	116	3	0	562615.000	502766.845	512456.984	999.677
1	116	4	0	562615.000	502769.017	512454.962	999.677
1	116	5	0	562615.000	502770.138	512453.918	999.677
1	116	6	0	562615.000	502774.140	512450.192	998.704
1	116	7	0	562615.000	502775.603	512448.829	997.704

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562616.000	-52.270584	.681443	-.731872
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	117	1	0	562616.000	502763.111	512461.827	997.707
1	117	2	0	562616.000	502764.575	512460.464	998.707
1	117	3	0	562616.000	502767.526	512457.716	999.680
1	117	4	0	562616.000	502769.698	512455.694	999.680
1	117	5	0	562616.000	502770.820	512454.650	999.680
1	117	6	0	562616.000	502774.821	512450.924	998.707
1	117	7	0	562616.000	502776.285	512449.561	997.707

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562617.000	-52.274829	.681394	-.731917
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	118	1	0	562617.000	502763.792	512462.558	997.710
1	118	2	0	562617.000	502765.256	512461.196	998.710
1	118	3	0	562617.000	502768.208	512458.448	999.683
1	118	4	0	562617.000	502770.380	512456.426	999.683
1	118	5	0	562617.000	502771.501	512455.382	999.683
1	118	6	0	562617.000	502775.503	512451.656	998.710
1	118	7	0	562617.000	502776.967	512450.293	997.710

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562618.000	-52.279073	.681345	-.731962
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	119	1	0	562618.000	502764.473	512463.290	997.714
1	119	2	0	562618.000	502765.937	512461.927	998.714
1	119	3	0	562618.000	502768.889	512459.180	999.687
1	119	4	0	562618.000	502771.061	512457.158	999.687
1	119	5	0	562618.000	502772.183	512456.114	999.687
1	119	6	0	562618.000	502776.185	512452.388	998.714
1	119	7	0	562618.000	502777.649	512451.026	997.714

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562619.000	-52.283317	.681296	-.732008
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	120	1	0	562619.000	502765.154	512464.021	997.717
1	120	2	0	562619.000	502766.618	512462.659	998.717
1	120	3	0	562619.000	502769.570	512459.911	999.690
1	120	4	0	562619.000	502771.742	512457.890	999.690
1	120	5	0	562619.000	502772.864	512456.846	999.690
1	120	6	0	562619.000	502776.866	512453.121	998.717
1	120	7	0	562619.000	502778.330	512451.758	997.717

1

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562620.000	-52.287561	.681247	-.732053
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	121	1	0	562620.000	502765.835	512464.753	997.720
1	121	2	0	562620.000	502767.299	512463.390	998.720

1	121	5	0	562620.000	502773.545	512457.578	999.693
1	121	6	0	562620.000	502777.548	512453.853	998.720
1	121	7	0	562620.000	502779.012	512452.491	997.720

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562621.000	-52.291805	.681199	-.732099
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	122	1	0	562621.000	502766.516	512465.485	997.723
1	122	2	0	562621.000	502767.980	512464.122	998.723
1	122	3	0	562621.000	502770.932	512461.375	999.696
1	122	4	0	562621.000	502773.105	512459.354	999.696
1	122	5	0	562621.000	502774.227	512458.310	999.696
1	122	6	0	562621.000	502778.229	512454.585	998.723
1	122	7	0	562621.000	502779.694	512453.223	997.723

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562622.000	-52.296049	.681150	-.732144
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	123	1	0	562622.000	502767.197	512466.216	997.726
1	123	2	0	562622.000	502768.661	512464.854	998.726
1	123	3	0	562622.000	502771.613	512462.107	999.699
1	123	4	0	562622.000	502773.786	512460.086	999.699
1	123	5	0	562622.000	502774.908	512459.042	999.699
1	123	6	0	562622.000	502778.911	512455.318	998.726
1	123	7	0	562622.000	502780.375	512453.956	997.726

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562623.000	-52.300293	.681101	-.732190
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	124	1	0	562623.000	502767.877	512466.948	997.729
1	124	2	0	562623.000	502769.342	512465.586	998.729
1	124	3	0	562623.000	502772.294	512462.839	999.702
1	124	4	0	562623.000	502774.467	512460.818	999.702
1	124	5	0	562623.000	502775.589	512459.774	999.702
1	124	6	0	562623.000	502779.592	512456.050	998.729
1	124	7	0	562623.000	502781.057	512454.688	997.729

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562624.000	-52.304537	.681052	-.732235
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	125	1	0	562624.000	502768.558	512467.680	997.732
1	125	2	0	562624.000	502770.023	512466.318	998.732
1	125	3	0	562624.000	502772.975	512463.571	999.705
1	125	4	0	562624.000	502775.148	512461.550	999.705

1

1	125	5	0	562624.000	502776.270	512460.507	999.705
1	125	6	0	562624.000	502780.274	512456.783	998.732
1	125	7	0	562624.000	502781.738	512455.421	997.732

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562625.000	-52.308782	.681003	-.732280
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	126	1	0	562625.000	502769.239	512468.412	997.735
1	126	2	0	562625.000	502770.703	512467.050	998.735
1	126	3	0	562625.000	502773.656	512464.303	999.709
1	126	4	0	562625.000	502775.829	512462.283	999.709

1 126 0 0 562625.000 502782.420 512456.154 997.736

EJE P.K. AZIMUT COS A SEN A

0 562626.000 -52.313026 .680955 -.732326

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	127	1	0	562626.000	502769.919	512469.143	997.739
1	127	2	0	562626.000	502771.384	512467.782	998.739
1	127	3	0	562626.000	502774.337	512465.036	999.712
1	127	4	0	562626.000	502776.510	512463.015	999.712
1	127	5	0	562626.000	502777.632	512461.971	999.712
1	127	6	0	562626.000	502781.636	512458.248	998.739
1	127	7	0	562626.000	502783.101	512456.886	997.739

EJE P.K. AZIMUT COS A SEN A

0 562627.000 -52.317270 .680906 -.732371

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	128	1	0	562627.000	502770.600	512469.875	997.742
1	128	2	0	562627.000	502772.065	512468.514	998.742
1	128	3	0	562627.000	502775.018	512465.768	999.715
1	128	4	0	562627.000	502777.191	512463.747	999.715
1	128	5	0	562627.000	502778.313	512462.704	999.715
1	128	6	0	562627.000	502782.318	512458.981	998.742
1	128	7	0	562627.000	502783.782	512457.619	997.742

EJE P.K. AZIMUT COS A SEN A

0 562628.000 -52.321514 .680857 -.732417

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	129	1	0	562628.000	502771.280	512470.607	997.745
1	129	2	0	562628.000	502772.745	512469.246	998.745
1	129	3	0	562628.000	502775.699	512466.500	999.718
1	129	4	0	562628.000	502777.872	512464.480	999.718
1	129	5	0	562628.000	502778.994	512463.436	999.718
1	129	6	0	562628.000	502782.999	512459.714	998.745
1	129	7	0	562628.000	502784.464	512458.352	997.745

EJE P.K. AZIMUT COS A SEN A

0 562629.000 -52.325758 .680808 -.732462

1

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	130	1	0	562629.000	502771.961	512471.339	997.748
1	130	2	0	562629.000	502773.426	512469.978	998.748
1	130	3	0	562629.000	502776.379	512467.232	999.721
1	130	4	0	562629.000	502778.553	512465.212	999.721
1	130	5	0	562629.000	502779.675	512464.169	999.721
1	130	6	0	562629.000	502783.680	512460.446	998.748
1	130	7	0	562629.000	502785.145	512459.085	997.748

EJE P.K. AZIMUT COS A SEN A

0 562630.000 -52.330002 .680759 -.732507

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	131	1	0	562630.000	502772.641	512472.071	997.751
1	131	2	0	562630.000	502774.106	512470.710	998.751
1	131	3	0	562630.000	502777.060	512467.965	999.724
1	131	4	0	562630.000	502779.234	512465.945	999.724
1	131	5	0	562630.000	502780.356	512464.901	999.724
1	131	6	0	562630.000	502784.361	512461.179	998.751

EJE P.K. AZIMUT COS A SEN A

0 562631.000 -52.334246 .680710 -.732553

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	132	1	0	562631.000	502773.321	512472.803	997.754
1	132	2	0	562631.000	502774.786	512471.442	998.754
1	132	3	0	562631.000	502777.740	512468.697	999.727
1	132	4	0	562631.000	502779.914	512466.677	999.727
1	132	5	0	562631.000	502781.037	512465.634	999.727
1	132	6	0	562631.000	502785.042	512461.912	998.754
1	132	7	0	562631.000	502786.507	512460.551	997.754

EJE P.K. AZIMUT COS A SEN A

0 562632.000 -52.338490 .680662 -.732598

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	133	1	0	562632.000	502774.002	512473.536	997.757
1	133	2	0	562632.000	502775.467	512472.174	998.757
1	133	3	0	562632.000	502778.421	512469.430	999.730
1	133	4	0	562632.000	502780.595	512467.410	999.730
1	133	5	0	562632.000	502781.718	512466.367	999.730
1	133	6	0	562632.000	502785.723	512462.645	998.757
1	133	7	0	562632.000	502787.188	512461.284	997.757

EJE P.K. AZIMUT COS A SEN A

0 562633.000 -52.342735 .680613 -.732643

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	134	1	0	562633.000	502774.682	512474.268	997.761
1	134	2	0	562633.000	502776.147	512472.907	998.761
1	134	3	0	562633.000	502779.102	512470.162	999.734
1	134	4	0	562633.000	502781.276	512468.142	999.734
1	134	5	0	562633.000	502782.398	512467.099	999.734
1	134	6	0	562633.000	502786.404	512463.378	998.761
1	134	7	0	562633.000	502787.869	512462.017	997.761

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EJE P.K. AZIMUT COS A SEN A

0 562634.000 -52.346979 .680564 -.732689

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	135	1	0	562634.000	502775.362	512475.000	997.764
1	135	2	0	562634.000	502776.827	512473.639	998.764
1	135	3	0	562634.000	502779.782	512470.895	999.737
1	135	4	0	562634.000	502781.956	512468.875	999.737
1	135	5	0	562634.000	502783.079	512467.832	999.737
1	135	6	0	562634.000	502787.085	512464.111	998.764
1	135	7	0	562634.000	502788.550	512462.750	997.764

EJE P.K. AZIMUT COS A SEN A

0 562635.000 -52.351223 .680515 -.732734

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	136	1	0	562635.000	502776.042	512475.732	997.767
1	136	2	0	562635.000	502777.508	512474.371	998.767
1	136	3	0	562635.000	502780.462	512471.627	999.740
1	136	4	0	562635.000	502782.637	512469.608	999.740
1	136	5	0	562635.000	502783.760	512468.565	999.740
1	136	6	0	562635.000	502787.766	512464.844	998.767
1	136	7	0	562635.000	502789.231	512463.483	997.767

0 562636.000 -52.355467 .660466 -.732780

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	137	1	0	562636.000	502776.722	512476.465	997.770
1	137	2	0	562636.000	502778.188	512475.104	998.770
1	137	3	0	562636.000	502781.143	512472.360	999.743
1	137	4	0	562636.000	502783.317	512470.340	999.743
1	137	5	0	562636.000	502784.440	512469.298	999.743
1	137	6	0	562636.000	502788.447	512465.577	998.770
1	137	7	0	562636.000	502789.912	512464.216	997.770

EJE P.K. AZIMUT COS A SEN A

0 562637.000 -52.359711 .680417 -.732825

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	138	1	0	562637.000	502777.402	512477.07	997.773
1	138	2	0	562637.000	502778.868	512475.836	998.773
1	138	3	0	562637.000	502781.823	512473.092	999.746
1	138	4	0	562637.000	502783.998	512471.073	999.746
1	138	5	0	562637.000	502785.121	512470.030	999.746
1	138	6	0	562637.000	502789.128	512466.310	998.773
1	138	7	0	562637.000	502790.593	512464.949	997.773

EJE P.K. AZIMUT COS A SEN A

0 562638.000 -52.363955 .680368 -.732870

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	139	1	0	562638.000	502778.082	512477.929	997.776
1	139	2	0	562638.000	502779.548	512476.569	998.776
1	139	3	0	562638.000	502782.503	512473.825	999.749
1	139	4	0	562638.000	502784.678	512471.806	999.749

1	139	5	0	562638.000	502785.801	512470.763	999.749
1	139	6	0	562638.000	502789.808	512467.043	998.776
1	139	7	0	562638.000	502791.274	512465.683	997.776

EJE P.K. AZIMUT COS A SEN A

0 562639.000 -52.368199 .680320 -.732916

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	140	1	0	562639.000	502778.762	512478.662	997.779
1	140	2	0	562639.000	502780.228	512477.301	998.779
1	140	3	0	562639.000	502783.184	512474.558	999.752
1	140	4	0	562639.000	502785.358	512472.539	999.752
1	140	5	0	562639.000	502786.482	512471.496	999.752
1	140	6	0	562639.000	502790.489	512467.777	998.779
1	140	7	0	562639.000	502791.955	512466.416	997.779

EJE P.K. AZIMUT COS A SEN A

0 562640.000 -52.372444 .680271 -.732961

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	141	1	0	562640.000	502779.442	512479.394	997.782
1	141	2	0	562640.000	502780.908	512478.034	998.782
1	141	3	0	562640.000	502783.864	512475.291	999.755
1	141	4	0	562640.000	502786.039	512473.272	999.755
1	141	5	0	562640.000	502787.162	512472.229	999.755
1	141	6	0	562640.000	502791.169	512468.510	998.782
1	141	7	0	562640.000	502792.635	512467.149	997.782

EJE P.K. AZIMUT COS A SEN A

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	142	1	0	562641.000	502780.122	512480.127	997.786
1	142	2	0	562641.000	502781.588	512478.766	998.786
1	142	3	0	562641.000	502784.544	512476.023	999.759
1	142	4	0	562641.000	502786.719	512474.005	999.759
1	142	5	0	562641.000	502787.842	512472.962	999.759
1	142	6	0	562641.000	502791.850	512469.243	998.786
1	142	7	0	562641.000	502793.316	512467.883	997.786

EJE P.K. AZIMUT COS A SEN A

0 562642.000 -52.380932 .680173 -.733052

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	143	1	0	562642.000	502780.802	512480.859	997.789
1	143	2	0	562642.000	502782.268	512479.499	998.789
1	143	3	0	562642.000	502785.224	512476.756	999.762
1	143	4	0	562642.000	502787.399	512474.738	999.762
1	143	5	0	562642.000	502788.523	512473.696	999.762
1	143	6	0	562642.000	502792.531	512469.977	998.789
1	143	7	0	562642.000	502793.997	512468.616	997.789

EJE P.K. AZIMUT COS A SEN A

0 562643.000 -52.385176 .680124 -.733097

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	144	1	0	562643.000	502781.481	512481.592	997.792
1	144	2	0	562643.000	502782.948	512480.232	998.792
1	144	3	0	562643.000	502785.904	512477.489	999.765
1	144	4	0	562643.000	502788.079	512475.471	999.765
1	144	5	0	562643.000	502789.203	512474.429	999.765
1	144	6	0	562643.000	502793.211	512470.710	998.792
1	144	7	0	562643.000	502794.677	512469.350	997.792

EJE P.K. AZIMUT COS A SEN A

0 562644.000 -52.389420 .680075 -.733142

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	145	1	0	562644.000	502782.161	512482.325	997.795
1	145	2	0	562644.000	502783.627	512480.965	998.795
1	145	3	0	562644.000	502786.584	512478.222	999.768
1	145	4	0	562644.000	502788.759	512476.204	999.768
1	145	5	0	562644.000	502789.883	512475.162	999.768
1	145	6	0	562644.000	502793.891	512471.444	998.795
1	145	7	0	562644.000	502795.358	512470.083	997.795

EJE P.K. AZIMUT COS A SEN A

0 562645.000 -52.393664 .680026 -.733188

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	146	1	0	562645.000	502782.841	512483.057	997.798
1	146	2	0	562645.000	502784.307	512481.697	998.798
1	146	3	0	562645.000	502787.264	512478.955	999.771
1	146	4	0	562645.000	502789.439	512476.937	999.771
1	146	5	0	562645.000	502790.563	512475.895	999.771
1	146	6	0	562645.000	502794.572	512472.177	998.798
1	146	7	0	562645.000	502796.038	512470.817	997.798

EJE P.K. AZIMUT COS A SEN A

0 562646.000 -52.397908 .679977 -.733233

1	147	2	0	562646.000	502784.987	512482.430	998.801
1	147	3	0	562646.000	502787.944	512479.688	999.774
1	147	4	0	562646.000	502790.119	512477.671	999.774
1	147	5	0	562646.000	502791.243	512476.628	999.774
1	147	6	0	562646.000	502795.252	512472.911	998.801
1	147	7	0	562646.000	502796.719	512471.551	997.801

EJE	P.K.	AZIMUT	COS A	SEN A
0	562647.000	-52.402152	.679929	-.733278

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	148	1	0	562647.000	502784.200	512484.523	997.804
1	148	2	0	562647.000	502785.667	512483.163	998.804
1	148	3	0	562647.000	502788.623	512480.421	999.777
1	148	4	0	562647.000	502790.799	512478.404	999.777
1	148	5	0	562647.000	502791.923	512477.362	999.777
1	148	6	0	562647.000	502795.932	512473.644	998.804
1	148	7	0	562647.000	502797.399	512472.284	997.804

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EJE	P.K.	AZIMUT	COS A	SEN A
0	562648.000	-52.406397	.679880	-.733324

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	149	1	0	562648.000	502784.879	512485.256	997.807
1	149	2	0	562648.000	502786.346	512483.896	998.807
1	149	3	0	562648.000	502789.303	512481.155	999.780
1	149	4	0	562648.000	502791.479	512479.137	999.780
1	149	5	0	562648.000	502792.603	512478.095	999.780
1	149	6	0	562648.000	502796.613	512474.378	998.807
1	149	7	0	562648.000	502798.079	512473.018	997.807

EJE	P.K.	AZIMUT	COS A	SEN A
0	562649.000	-52.410641	.679831	-.733369

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	150	1	0	562649.000	502785.559	512485.989	997.811
1	150	2	0	562649.000	502787.026	512484.629	998.811
1	150	3	0	562649.000	502789.983	512481.888	999.784
1	150	4	0	562649.000	502792.159	512479.870	999.784
1	150	5	0	562649.000	502793.283	512478.829	999.784
1	150	6	0	562649.000	502797.293	512475.112	998.811
1	150	7	0	562649.000	502798.760	512473.752	997.811

EJE	P.K.	AZIMUT	COS A	SEN A
0	562650.000	-52.414885	.679782	-.733414

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	151	1	0	562650.000	502786.238	512486.722	997.814
1	151	2	0	562650.000	502787.705	512485.362	998.814
1	151	3	0	562650.000	502790.663	512482.621	999.787
1	151	4	0	562650.000	502792.839	512480.604	999.787
1	151	5	0	562650.000	502793.963	512479.562	999.787
1	151	6	0	562650.000	502797.973	512475.845	998.814
1	151	7	0	562650.000	502799.440	512474.486	997.814

EJE	P.K.	AZIMUT	COS A	SEN A
3	940.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	1	1	3	940.000	502701.521	512462.334	992.130
2	1	2	3	940.000	502701.380	512461.202	992.130

2	1	4	3	940.000	502699.834	512455.510	992.010
2	1	5	3	940.000	502699.593	512454.570	992.010

EJE	P.K.	AZIMUT	COS A	SEN A
3	941.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	2	1	3	941.000	502702.492	512462.093	992.111
2	2	2	3	941.000	502702.251	512461.122	992.111
2	2	3	3	941.000	502701.528	512458.211	992.051
2	2	4	3	941.000	502700.805	512455.299	991.991
2	2	5	3	941.000	502700.564	512454.329	991.991

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EJE	P.K.	AZIMUT	COS A	SEN A
3	942.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	3	1	3	942.000	502703.462	512461.852	992.092
2	3	2	3	942.000	502703.221	512460.881	992.092
2	3	3	3	942.000	502702.498	512457.970	992.032
2	3	4	3	942.000	502701.775	512455.058	991.972
2	3	5	3	942.000	502701.534	512454.088	991.972

EJE	P.K.	AZIMUT	COS A	SEN A
3	943.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	4	1	3	943.000	502704.433	512461.611	992.074
2	4	2	3	943.000	502704.192	512460.640	992.074
2	4	3	3	943.000	502703.469	512457.729	992.014
2	4	4	3	943.000	502702.746	512454.817	991.954
2	4	5	3	943.000	502702.505	512453.847	991.954

EJE	P.K.	AZIMUT	COS A	SEN A
3	944.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	5	1	3	944.000	502705.403	512461.370	992.056
2	5	2	3	944.000	502705.162	512460.399	992.056
2	5	3	3	944.000	502704.439	512457.488	991.996
2	5	4	3	944.000	502703.716	512454.576	991.936
2	5	5	3	944.000	502703.475	512453.606	991.936

EJE	P.K.	AZIMUT	COS A	SEN A
3	945.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	6	1	3	945.000	502706.374	512461.129	992.040
2	6	2	3	945.000	502706.133	512460.158	992.040
2	6	3	3	945.000	502705.410	512457.247	991.980
2	6	4	3	945.000	502704.687	512454.335	991.920
2	6	5	3	945.000	502704.446	512453.365	991.920

EJE	P.K.	AZIMUT	COS A	SEN A
3	946.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	7	1	3	946.000	502707.344	512460.888	992.024
2	7	2	3	946.000	502707.103	512459.917	992.024

2 7 5 3 946.000 502705.416 512453.124 991.904

EJE P.K. AZIMUT COS A SEN A

3 947.000 15.496688 .970519 .241025

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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	8	1	3	947.000	502708.315	512460.647	992.009
2	8	2	3	947.000	502708.074	512459.676	992.009
2	8	3	3	947.000	502707.351	512456.765	991.949
2	8	4	3	947.000	502706.628	512453.853	991.889
2	8	5	3	947.000	502706.387	512452.883	991.889

EJE P.K. AZIMUT COS A SEN A

3 948.000 15.496688 .970519 .241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	9	1	3	948.000	502709.285	512460.406	991.994
2	9	2	3	948.000	502709.044	512459.135	991.994
2	9	3	3	948.000	502708.321	512456.524	991.934
2	9	4	3	948.000	502707.598	512453.612	991.874
2	9	5	3	948.000	502707.357	512452.642	991.874

EJE P.K. AZIMUT COS A SEN A

3 949.000 15.496688 .970519 .241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	10	1	3	949.000	502710.256	512460.165	991.980
2	10	2	3	949.000	502710.015	512459.194	991.980
2	10	3	3	949.000	502709.292	512456.283	991.920
2	10	4	3	949.000	502708.569	512453.371	991.860
2	10	5	3	949.000	502708.328	512452.401	991.860

EJE P.K. AZIMUT COS A SEN A

3 950.000 15.496688 .970519 .241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	11	1	3	950.000	502711.227	512459.924	991.967
2	11	2	3	950.000	502710.985	512458.953	991.967
2	11	3	3	950.000	502710.262	512456.042	991.907
2	11	4	3	950.000	502709.539	512453.130	991.847
2	11	5	3	950.000	502709.298	512452.160	991.847

EJE P.K. AZIMUT COS A SEN A

3 951.000 15.496688 .970519 .241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	12	1	3	951.000	502712.197	512459.683	991.954
2	12	2	3	951.000	502711.956	512458.712	991.954
2	12	3	3	951.000	502711.233	512455.801	991.894
2	12	4	3	951.000	502710.510	512452.889	991.834
2	12	5	3	951.000	502710.269	512451.918	991.834

EJE P.K. AZIMUT COS A SEN A

3 952.000 15.496688 .970519 .241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	13	1	3	952.000	502713.168	512459.442	991.943
2	13	2	3	952.000	502712.927	512458.471	991.943
2	13	3	3	952.000	502712.203	512455.560	991.883

1 953.000 15.496688 .970519 .241025

EJE P.K. AZIMUT COS A SEN A

3 953.000 15.496688 .970519 .241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	14	1	3	953.000	502714.138	512459.201	991.932
2	14	2	3	953.000	502713.897	512458.230	991.932
2	14	3	3	953.000	502713.174	512455.319	991.872
2	14	4	3	953.000	502712.451	512452.407	991.812
2	14	5	3	953.000	502712.210	512451.436	991.812

EJE P.K. AZIMUT COS A SEN A

3 954.000 15.496688 .970519 .241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	15	1	3	954.000	502715.109	512458.960	991.921
2	15	2	3	954.000	502714.868	512457.989	991.921
2	15	3	3	954.000	502714.144	512455.077	991.861
2	15	4	3	954.000	502713.421	512452.166	991.801
2	15	5	3	954.000	502713.180	512451.195	991.801

EJE P.K. AZIMUT COS A SEN A

3 955.000 15.496688 .970519 .241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	16	1	3	955.000	502716.079	512458.719	991.912
2	16	2	3	955.000	502715.838	512457.748	991.912
2	16	3	3	955.000	502715.115	512454.836	991.852
2	16	4	3	955.000	502714.392	512451.925	991.792
2	16	5	3	955.000	502714.151	512450.954	991.792

EJE P.K. AZIMUT COS A SEN A

3 956.000 15.496688 .970519 .241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	17	1	3	956.000	502717.050	512458.478	991.903
2	17	2	3	956.000	502716.809	512457.507	991.903
2	17	3	3	956.000	502716.086	512454.595	991.843
2	17	4	3	956.000	502715.362	512451.684	991.783
2	17	5	3	956.000	502715.121	512450.713	991.783

EJE P.K. AZIMUT COS A SEN A

3 957.000 15.496688 .970519 .241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	18	1	3	957.000	502718.020	512458.236	991.894
2	18	2	3	957.000	502717.779	512457.266	991.894
2	18	3	3	957.000	502717.056	512454.354	991.834
2	18	4	3	957.000	502716.333	512451.443	991.774
2	18	5	3	957.000	502716.092	512450.472	991.774

EJE P.K. AZIMUT COS A SEN A

3 958.000 15.496688 .970519 .241025

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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	19	1	3	958.000	502718.991	512457.995	991.887

2	19	3	3	958.000	502717.062	512450.231	991.767
2	19	4	3	958.000	502717.303	512451.202	991.767
2	19	5	3	958.000	502717.062	512450.231	991.767

EJE	P.K.	AZIMUT	COS A	SEN A
3	959.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	20	1	3	959.000	502719.961	512457.754	991.880
2	20	2	3	959.000	502719.720	512456.784	991.880
2	20	3	3	959.000	502718.997	512453.872	991.820
2	20	4	3	959.000	502718.274	512450.961	991.760
2	20	5	3	959.000	502718.033	512449.990	991.760

EJE	P.K.	AZIMUT	COS A	SEN A
3	960.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	21	1	3	960.000	502720.932	512457.513	991.874
2	21	2	3	960.000	502720.691	512456.543	991.874
2	21	3	3	960.000	502719.968	512453.631	991.814
2	21	4	3	960.000	502719.245	512450.720	991.754
2	21	5	3	960.000	502719.004	512449.749	991.754

EJE	P.K.	AZIMUT	COS A	SEN A
3	961.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	22	1	3	961.000	502721.902	512457.272	991.868
2	22	2	3	961.000	502721.661	512456.302	991.868
2	22	3	3	961.000	502720.938	512453.390	991.808
2	22	4	3	961.000	502720.215	512450.479	991.748
2	22	5	3	961.000	502719.974	512449.508	991.748

EJE	P.K.	AZIMUT	COS A	SEN A
3	962.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	23	1	3	962.000	502722.873	512457.031	991.863
2	23	2	3	962.000	502722.632	512456.061	991.863
2	23	3	3	962.000	502721.909	512453.149	991.803
2	23	4	3	962.000	502721.186	512450.238	991.743
2	23	5	3	962.000	502720.945	512449.267	991.743

EJE	P.K.	AZIMUT	COS A	SEN A
3	963.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	24	1	3	963.000	502723.843	512456.790	991.859
2	24	2	3	963.000	502723.602	512455.820	991.859
2	24	3	3	963.000	502722.879	512452.908	991.799
2	24	4	3	963.000	502722.156	512449.997	991.739
2	24	5	3	963.000	502721.915	512449.026	991.739

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EJE	P.K.	AZIMUT	COS A	SEN A
3	964.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	25	1	3	964.000	502724.814	512456.549	991.856
2	25	2	3	964.000	502724.573	512455.579	991.856

2	25	5	3	964.000	502722.886	512448.785	991.736
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EJE	P.K.	AZIMUT	COS A	SEN A
3	965.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	26	1	3	965.000	502725.784	512456.308	991.853
2	26	2	3	965.000	502725.543	512455.338	991.853
2	26	3	3	965.000	502724.820	512452.426	991.793
2	26	4	3	965.000	502724.097	512449.515	991.733
2	26	5	3	965.000	502723.856	512448.544	991.733

EJE	P.K.	AZIMUT	COS A	SEN A
3	966.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	27	1	3	966.000	502726.755	512456.067	991.851
2	27	2	3	966.000	502726.514	512455.097	991.851
2	27	3	3	966.000	502725.791	512452.185	991.791
2	27	4	3	966.000	502725.068	512449.274	991.731
2	27	5	3	966.000	502724.827	512448.303	991.731

EJE	P.K.	AZIMUT	COS A	SEN A
3	967.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	28	1	3	967.000	502727.725	512455.826	991.850
2	28	2	3	967.000	502727.484	512454.856	991.850
2	28	3	3	967.000	502726.761	512451.944	991.790
2	28	4	3	967.000	502726.038	512449.033	991.730
2	28	5	3	967.000	502725.797	512448.062	991.730

EJE	P.K.	AZIMUT	COS A	SEN A
3	968.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	29	1	3	968.000	502728.696	512455.585	991.850
2	29	2	3	968.000	502728.455	512454.615	991.850
2	29	3	3	968.000	502727.732	512451.703	991.790
2	29	4	3	968.000	502727.009	512448.792	991.730
2	29	5	3	968.000	502726.768	512447.821	991.730

EJE	P.K.	AZIMUT	COS A	SEN A
3	969.000	15.496688	.970519	.241025

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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	30	1	3	969.000	502729.666	512455.344	991.850
2	30	2	3	969.000	502729.425	512454.374	991.850
2	30	3	3	969.000	502728.702	512451.462	991.790
2	30	4	3	969.000	502727.979	512448.551	991.730
2	30	5	3	969.000	502727.738	512447.580	991.730

EJE	P.K.	AZIMUT	COS A	SEN A
3	970.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	31	1	3	970.000	502730.637	512455.103	991.850
2	31	2	3	970.000	502730.396	512454.133	991.850
2	31	3	3	970.000	502729.673	512451.221	991.790

EJE	P.K.	AZIMUT	COS A	SEN A
3	971.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	32	1	3	971.000	502731.607	512454.862	991.852
2	32	2	3	971.000	502731.366	512453.892	991.852
2	32	3	3	971.000	502730.643	512450.980	991.792
2	32	4	3	971.000	502729.920	512448.069	991.732
2	32	5	3	971.000	502729.679	512447.098	991.732

EJE	P.K.	AZIMUT	COS A	SEN A
3	972.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	33	1	3	972.000	502732.578	512454.621	991.854
2	33	2	3	972.000	502732.337	512453.651	991.854
2	33	3	3	972.000	502731.614	512450.739	991.794
2	33	4	3	972.000	502730.891	512447.827	991.734
2	33	5	3	972.000	502730.650	512446.857	991.734

EJE	P.K.	AZIMUT	COS A	SEN A
3	973.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	34	1	3	973.000	502733.548	512454.380	991.857
2	34	2	3	973.000	502733.307	512453.410	991.857
2	34	3	3	973.000	502732.584	512450.498	991.797
2	34	4	3	973.000	502731.861	512447.586	991.737
2	34	5	3	973.000	502731.620	512446.616	991.737

EJE	P.K.	AZIMUT	COS A	SEN A
3	974.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	35	1	3	974.000	502734.519	512454.139	991.861
2	35	2	3	974.000	502734.278	512453.169	991.861
2	35	3	3	974.000	502733.555	512450.257	991.801
2	35	4	3	974.000	502732.832	512447.345	991.741
2	35	5	3	974.000	502732.591	512446.375	991.741

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EJE	P.K.	AZIMUT	COS A	SEN A
3	975.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	36	1	3	975.000	502735.489	512453.898	991.865
2	36	2	3	975.000	502735.248	512452.928	991.865
2	36	3	3	975.000	502734.525	512450.016	991.805
2	36	4	3	975.000	502733.802	512447.104	991.745
2	36	5	3	975.000	502733.561	512446.134	991.745

EJE	P.K.	AZIMUT	COS A	SEN A
3	976.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	37	1	3	976.000	502736.460	512453.657	991.870
2	37	2	3	976.000	502736.219	512452.687	991.870
2	37	3	3	976.000	502735.496	512449.775	991.810
2	37	4	3	976.000	502734.773	512446.863	991.750
2	37	5	3	976.000	502734.532	512445.892	991.750

EJE	P.K.	AZIMUT	COS A	SEN A
3	977.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	38	1	3	977.000	502737.431	512453.416	991.875
2	38	2	3	977.000	502737.190	512452.445	991.875
2	38	3	3	977.000	502736.466	512449.534	991.815
2	38	4	3	977.000	502735.743	512446.622	991.755
2	38	5	3	977.000	502735.502	512445.652	991.755

EJE	P.K.	AZIMUT	COS A	SEN A
3	978.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	39	1	3	978.000	502738.401	512453.175	991.880
2	39	2	3	978.000	502738.160	512452.204	991.880
2	39	3	3	978.000	502737.437	512449.293	991.820
2	39	4	3	978.000	502736.714	512446.381	991.760
2	39	5	3	978.000	502736.473	512445.411	991.760

EJE	P.K.	AZIMUT	COS A	SEN A
3	979.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	40	1	3	979.000	502739.372	512452.934	991.885
2	40	2	3	979.000	502739.131	512451.963	991.885
2	40	3	3	979.000	502738.407	512449.052	991.825
2	40	4	3	979.000	502737.684	512446.140	991.765
2	40	5	3	979.000	502737.443	512445.170	991.765

EJE	P.K.	AZIMUT	COS A	SEN A
3	980.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	41	1	3	980.000	502740.342	512452.693	991.890
2	41	2	3	980.000	502740.101	512451.722	991.890
2	41	3	3	980.000	502739.378	512448.811	991.830
2	41	4	3	980.000	502738.655	512445.899	991.770
2	41	5	3	980.000	502738.414	512444.929	991.770

EJE	P.K.	AZIMUT	COS A	SEN A
3	981.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	42	1	3	981.000	502741.313	512452.452	991.895
2	42	2	3	981.000	502741.072	512451.481	991.895
2	42	3	3	981.000	502740.349	512448.570	991.835
2	42	4	3	981.000	502739.625	512445.658	991.775
2	42	5	3	981.000	502739.384	512444.688	991.775

EJE	P.K.	AZIMUT	COS A	SEN A
3	982.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	43	1	3	982.000	502742.283	512452.211	991.900
2	43	2	3	982.000	502742.042	512451.240	991.900
2	43	3	3	982.000	502741.319	512448.329	991.840
2	43	4	3	982.000	502740.596	512445.417	991.780
2	43	5	3	982.000	502740.355	512444.447	991.780

EJE	P.K.	AZIMUT	COS A	SEN A			
3	983.000	15.496688	.970519	.241025			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	44	1	3	983.000	502743.254	512451.970	991.905
2	44	2	3	983.000	502743.013	512450.999	991.905
2	44	3	3	983.000	502742.290	512448.088	991.845
2	44	4	3	983.000	502741.566	512445.176	991.785
2	44	5	3	983.000	502741.325	512444.206	991.785

EJE	P.K.	AZIMUT	COS A	SEN A			
3	984.000	15.496688	.970519	.241025			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	45	1	3	984.000	502744.224	512451.729	991.910
2	45	2	3	984.000	502743.983	512450.758	991.910
2	45	3	3	984.000	502743.260	512447.847	991.850
2	45	4	3	984.000	502742.537	512444.935	991.790
2	45	5	3	984.000	502742.296	512443.965	991.790

EJE	P.K.	AZIMUT	COS A	SEN A			
3	985.000	15.496688	.970519	.241025			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	46	1	3	985.000	502745.195	512451.488	991.915
2	46	2	3	985.000	502744.954	512450.517	991.915
2	46	3	3	985.000	502744.231	512447.606	991.855
2	46	4	3	985.000	502743.508	512444.694	991.795
2	46	5	3	985.000	502743.266	512443.724	991.795

EJE	P.K.	AZIMUT	COS A	SEN A			
3	986.000	15.496688	.970519	.241025			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	47	1	3	986.000	502746.165	512451.247	991.920
2	47	2	3	986.000	502745.924	512450.276	991.920
2	47	3	3	986.000	502745.201	512447.365	991.860
2	47	4	3	986.000	502744.478	512444.453	991.800
2	47	5	3	986.000	502744.237	512443.483	991.800

EJE	P.K.	AZIMUT	COS A	SEN A			
3	987.000	15.496688	.970519	.241025			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	48	1	3	987.000	502747.136	512451.006	991.925
2	48	2	3	987.000	502746.895	512450.035	991.925
2	48	3	3	987.000	502746.172	512447.124	991.865
2	48	4	3	987.000	502745.449	512444.212	991.805
2	48	5	3	987.000	502745.208	512443.242	991.805

EJE	P.K.	AZIMUT	COS A	SEN A			
3	988.000	15.496688	.970519	.241025			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	49	1	3	988.000	502748.106	512450.765	991.930
2	49	2	3	988.000	502747.865	512449.794	991.930
2	49	3	3	988.000	502747.142	512446.883	991.870
2	49	4	3	988.000	502746.419	512443.971	991.810
2	49	5	3	988.000	502746.178	512443.001	991.810

3	989.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	50	1	3	989.000	502749.077	512450.524	991.935
2	50	2	3	989.000	502748.836	512449.553	991.935
2	50	3	3	989.000	502748.113	512446.642	991.875
2	50	4	3	989.000	502747.390	512443.730	991.815
2	50	5	3	989.000	502747.149	512442.760	991.815

EJE	P.K.	AZIMUT	COS A	SEN A
3	990.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	51	1	3	990.000	502750.047	512450.283	991.940
2	51	2	3	990.000	502749.806	512449.312	991.940
2	51	3	3	990.000	502749.083	512446.401	991.880
2	51	4	3	990.000	502748.360	512443.489	991.820
2	51	5	3	990.000	502748.119	512442.519	991.820

EJE	P.K.	AZIMUT	COS A	SEN A
3	991.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	52	1	3	991.000	502751.018	512450.042	991.945
2	52	2	3	991.000	502750.777	512449.071	991.945
2	52	3	3	991.000	502750.054	512446.160	991.885
2	52	4	3	991.000	502749.331	512443.248	991.825
2	52	5	3	991.000	502749.090	512442.278	991.825

EJE	P.K.	AZIMUT	COS A	SEN A
3	992.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	53	1	3	992.000	502751.988	512449.801	991.950
2	53	2	3	992.000	502751.747	512448.830	991.950
2	53	3	3	992.000	502751.024	512445.919	991.890
2	53	4	3	992.000	502750.301	512443.007	991.830
2	53	5	3	992.000	502750.060	512442.036	991.830

EJE	P.K.	AZIMUT	COS A	SEN A
3	993.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	54	1	3	993.000	502752.959	512449.560	991.955
2	54	2	3	993.000	502752.718	512448.589	991.955
2	54	3	3	993.000	502751.995	512445.678	991.895
2	54	4	3	993.000	502751.272	512442.766	991.835
2	54	5	3	993.000	502751.031	512441.795	991.835

EJE	P.K.	AZIMUT	COS A	SEN A
3	994.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	55	1	3	994.000	502753.929	512449.319	991.960
2	55	2	3	994.000	502753.688	512448.348	991.960
2	55	3	3	994.000	502752.965	512445.437	991.900
2	55	4	3	994.000	502752.242	512442.525	991.840
2	55	5	3	994.000	502752.001	512441.554	991.840

EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	56	1	3	995.000	502754.900	512449.078	991.965
2	56	2	3	995.000	502754.659	512448.107	991.965
2	56	3	3	995.000	502753.936	512445.195	991.905
2	56	4	3	995.000	502753.213	512442.284	991.845
2	56	5	3	995.000	502752.972	512441.313	991.845

EJE	P.K.	AZIMUT	COS A	SEN A
3	996.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	57	1	3	996.000	502755.870	512448.837	991.970
2	57	2	3	996.000	502755.629	512447.866	991.970
2	57	3	3	996.000	502754.906	512444.954	991.910
2	57	4	3	996.000	502754.183	512442.043	991.850
2	57	5	3	996.000	502753.942	512441.072	991.850

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EJE	P.K.	AZIMUT	COS A	SEN A
3	997.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	58	1	3	997.000	502756.841	512448.596	991.975
2	58	2	3	997.000	502756.600	512447.625	991.975
2	58	3	3	997.000	502755.877	512444.713	991.915
2	58	4	3	997.000	502755.154	512441.802	991.855
2	58	5	3	997.000	502754.913	512440.831	991.855

EJE	P.K.	AZIMUT	COS A	SEN A
3	998.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	59	1	3	998.000	502757.811	512448.354	991.980
2	59	2	3	998.000	502757.570	512447.384	991.980
2	59	3	3	998.000	502756.847	512444.472	991.920
2	59	4	3	998.000	502756.124	512441.561	991.860
2	59	5	3	998.000	502755.883	512440.590	991.860

EJE	P.K.	AZIMUT	COS A	SEN A
3	999.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	60	1	3	999.000	502758.782	512448.113	991.985
2	60	2	3	999.000	502758.541	512447.143	991.985
2	60	3	3	999.000	502757.818	512444.231	991.925
2	60	4	3	999.000	502757.095	512441.320	991.865
2	60	5	3	999.000	502756.854	512440.349	991.865

EJE	P.K.	AZIMUT	COS A	SEN A
3	1000.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	61	1	3	1000.000	502759.752	512447.872	991.990
2	61	2	3	1000.000	502759.511	512446.902	991.990
2	61	3	3	1000.000	502758.788	512443.990	991.930
2	61	4	3	1000.000	502758.065	512441.079	991.870
2	61	5	3	1000.000	502757.824	512440.108	991.870

EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	62	1	3	1001.000	502760.723	512447.631	991.995
2	62	2	3	1001.000	502760.482	512446.661	991.995
2	62	3	3	1001.000	502759.759	512443.749	991.935
2	62	4	3	1001.000	502759.036	512440.838	991.875
2	62	5	3	1001.000	502758.795	512439.867	991.875

EJE	P.K.	AZIMUT	COS A	SEN A
3	1002.000	15.496688	.970519	.241025

1

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	63	1	3	1002.000	502761.694	512447.390	992.000
2	63	2	3	1002.000	502761.452	512446.420	992.000
2	63	3	3	1002.000	502760.729	512443.508	991.940
2	63	4	3	1002.000	502760.006	512440.597	991.880
2	63	5	3	1002.000	502759.765	512439.626	991.880

EJE	P.K.	AZIMUT	COS A	SEN A
3	1003.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	64	1	3	1003.000	502762.664	512447.149	992.005
2	64	2	3	1003.000	502762.423	512446.179	992.005
2	64	3	3	1003.000	502761.700	512443.267	991.945
2	64	4	3	1003.000	502760.977	512440.356	991.885
2	64	5	3	1003.000	502760.736	512439.385	991.885

EJE	P.K.	AZIMUT	COS A	SEN A
3	1004.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	65	1	3	1004.000	502763.635	512446.908	992.010
2	65	2	3	1004.000	502763.394	512445.938	992.010
2	65	3	3	1004.000	502762.670	512443.026	991.950
2	65	4	3	1004.000	502761.947	512440.115	991.890
2	65	5	3	1004.000	502761.706	512439.144	991.890

EJE	P.K.	AZIMUT	COS A	SEN A
3	1005.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	66	1	3	1005.000	502764.605	512446.667	992.015
2	66	2	3	1005.000	502764.364	512445.697	992.015
2	66	3	3	1005.000	502763.641	512442.785	991.955
2	66	4	3	1005.000	502762.918	512439.874	991.895
2	66	5	3	1005.000	502762.677	512438.903	991.895

EJE	P.K.	AZIMUT	COS A	SEN A
3	1006.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	67	1	3	1006.000	502765.576	512446.426	992.020
2	67	2	3	1006.000	502765.335	512445.456	992.020
2	67	3	3	1006.000	502764.611	512442.544	991.960
2	67	4	3	1006.000	502763.888	512439.633	991.900
2	67	5	3	1006.000	502763.647	512438.662	991.900

EJE	P.K.	AZIMUT	COS A	SEN A
3	1007.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	68	1	3	1007.000	502766.546	512446.185	992.025
2	68	2	3	1007.000	502766.305	512445.215	992.025
2	68	3	3	1007.000	502765.582	512442.303	991.965
2	68	4	3	1007.000	502764.859	512439.392	991.905
2	68	5	3	1007.000	502764.618	512438.421	991.905

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EJE	P.K.	AZIMUT	COS A	SEN A
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3	1008.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	69	1	3	1008.000	502767.517	512445.944	992.030
2	69	2	3	1008.000	502767.276	512444.974	992.030
2	69	3	3	1008.000	502766.553	512442.062	991.970
2	69	4	3	1008.000	502765.829	512439.151	991.910
2	69	5	3	1008.000	502765.588	512438.180	991.910

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1009.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	70	1	3	1009.000	502768.487	512445.703	992.035
2	70	2	3	1009.000	502768.246	512444.733	992.035
2	70	3	3	1009.000	502767.523	512441.821	991.975
2	70	4	3	1009.000	502766.800	512438.910	991.915
2	70	5	3	1009.000	502766.559	512437.939	991.915

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1010.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	71	1	3	1010.000	502769.458	512445.462	992.040
2	71	2	3	1010.000	502769.217	512444.492	992.040
2	71	3	3	1010.000	502768.494	512441.580	991.980
2	71	4	3	1010.000	502767.770	512438.669	991.920
2	71	5	3	1010.000	502767.529	512437.698	991.920

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1011.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	72	1	3	1011.000	502770.428	512445.221	992.045
2	72	2	3	1011.000	502770.187	512444.251	992.045
2	72	3	3	1011.000	502769.464	512441.339	991.985
2	72	4	3	1011.000	502768.741	512438.428	991.925
2	72	5	3	1011.000	502768.500	512437.457	991.925

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1012.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	73	1	3	1012.000	502771.399	512444.980	992.050
2	73	2	3	1012.000	502771.158	512444.010	992.050
2	73	3	3	1012.000	502770.435	512441.098	991.990
2	73	4	3	1012.000	502769.712	512438.187	991.930
2	73	5	3	1012.000	502769.470	512437.216	991.930

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1013.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	74	1	3	1013.000	502772.369	512444.739	992.055
2	74	2	3	1013.000	502772.128	512443.769	992.055
2	74	3	3	1013.000	502771.405	512440.857	991.995
2	74	4	3	1013.000	502770.682	512437.945	991.935
2	74	5	3	1013.000	502770.441	512436.975	991.935

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1014.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	75	1	3	1014.000	502773.340	512444.498	992.060
2	75	2	3	1014.000	502773.099	512443.528	992.060
2	75	3	3	1014.000	502772.376	512440.616	992.000
2	75	4	3	1014.000	502771.653	512437.704	991.940
2	75	5	3	1014.000	502771.412	512436.734	991.940

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1015.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	76	1	3	1015.000	502774.310	512444.257	992.065
2	76	2	3	1015.000	502774.069	512443.287	992.065
2	76	3	3	1015.000	502773.346	512440.375	992.005
2	76	4	3	1015.000	502772.623	512437.463	991.945
2	76	5	3	1015.000	502772.382	512436.493	991.945

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1016.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	77	1	3	1016.000	502775.281	512444.016	992.070
2	77	2	3	1016.000	502775.040	512443.046	992.070
2	77	3	3	1016.000	502774.317	512440.134	992.010
2	77	4	3	1016.000	502773.594	512437.222	991.950
2	77	5	3	1016.000	502773.353	512436.252	991.950

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1017.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	78	1	3	1017.000	502776.251	512443.775	992.075
2	78	2	3	1017.000	502776.010	512442.804	992.075
2	78	3	3	1017.000	502775.287	512439.893	992.015
2	78	4	3	1017.000	502774.564	512436.981	991.955
2	78	5	3	1017.000	502774.323	512436.011	991.955

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1018.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	79	1	3	1018.000	502777.222	512443.534	992.080
2	79	2	3	1018.000	502776.981	512442.563	992.080
2	79	3	3	1018.000	502776.258	512439.652	992.020
2	79	4	3	1018.000	502775.535	512436.740	991.960
2	79	5	3	1018.000	502775.294	512435.770	991.960

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EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	80	1	3	1019.000	502778.192	512443.293	992.085
2	80	2	3	1019.000	502777.951	512442.322	992.085
2	80	3	3	1019.000	502777.228	512439.411	992.025
2	80	4	3	1019.000	502776.505	512436.499	991.965
2	80	5	3	1019.000	502776.264	512435.529	991.965

EJE	P.K.	AZIMUT	COS A	SEN A
3	1020.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	81	1	3	1020.000	502779.163	512443.052	992.090
2	81	2	3	1020.000	502778.922	512442.081	992.090
2	81	3	3	1020.000	502778.199	512439.170	992.030
2	81	4	3	1020.000	502777.476	512436.258	991.970
2	81	5	3	1020.000	502777.235	512435.288	991.970

EJE	P.K.	AZIMUT	COS A	SEN A
3	1021.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	82	1	3	1021.000	502780.133	512442.811	992.089
2	82	2	3	1021.000	502779.892	512441.840	992.089
2	82	3	3	1021.000	502779.169	512438.929	992.035
2	82	4	3	1021.000	502778.446	512436.017	991.981
2	82	5	3	1021.000	502778.205	512435.047	991.981

EJE	P.K.	AZIMUT	COS A	SEN A
3	1022.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	83	1	3	1022.000	502781.104	512442.570	992.088
2	83	2	3	1022.000	502780.863	512441.599	992.088
2	83	3	3	1022.000	502780.140	512438.688	992.040
2	83	4	3	1022.000	502779.417	512435.776	991.992
2	83	5	3	1022.000	502779.176	512434.806	991.992

EJE	P.K.	AZIMUT	COS A	SEN A
3	1023.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	84	1	3	1023.000	502782.074	512442.329	992.087
2	84	2	3	1023.000	502781.833	512441.358	992.087
2	84	3	3	1023.000	502781.110	512438.447	992.045
2	84	4	3	1023.000	502780.387	512435.535	992.003
2	84	5	3	1023.000	502780.146	512434.565	992.003

EJE	P.K.	AZIMUT	COS A	SEN A
3	1024.000	15.496688	.970519	.241025

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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	85	1	3	1024.000	502783.045	512442.088	992.086
2	85	2	3	1024.000	502782.804	512441.117	992.086
2	85	3	3	1024.000	502782.081	512438.206	992.050
2	85	4	3	1024.000	502781.358	512435.294	992.014
2	85	5	3	1024.000	502781.117	512434.324	992.014

EJE	P.K.	AZIMUT	COS A	SEN A
3	1025.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	86	1	3	1025.000	502784.015	512441.847	992.085
2	86	2	3	1025.000	502783.774	512440.876	992.085
2	86	3	3	1025.000	502783.051	512437.965	992.055
2	86	4	3	1025.000	502782.328	512435.053	992.025
2	86	5	3	1025.000	502782.087	512434.083	992.025

EJE	P.K.	AZIMUT	COS A	SEN A
3	1026.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	87	1	3	1026.000	502784.986	512441.606	992.084
2	87	2	3	1026.000	502784.745	512440.635	992.084
2	87	3	3	1026.000	502784.022	512437.724	992.060
2	87	4	3	1026.000	502783.299	512434.812	992.036
2	87	5	3	1026.000	502783.058	512433.842	992.036

EJE	P.K.	AZIMUT	COS A	SEN A
3	1027.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	88	1	3	1027.000	502785.956	512441.365	992.083
2	88	2	3	1027.000	502785.715	512440.394	992.083
2	88	3	3	1027.000	502784.992	512437.483	992.065
2	88	4	3	1027.000	502784.269	512434.571	992.047
2	88	5	3	1027.000	502784.028	512433.601	992.047

EJE	P.K.	AZIMUT	COS A	SEN A
3	1028.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	89	1	3	1028.000	502786.927	512441.124	992.082
2	89	2	3	1028.000	502786.686	512440.153	992.082
2	89	3	3	1028.000	502785.963	512437.242	992.070
2	89	4	3	1028.000	502785.240	512434.330	992.058
2	89	5	3	1028.000	502784.999	512433.360	992.058

EJE	P.K.	AZIMUT	COS A	SEN A
3	1029.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	90	1	3	1029.000	502787.898	512440.883	992.081
2	90	2	3	1029.000	502787.656	512439.912	992.081
2	90	3	3	1029.000	502786.933	512437.001	992.075
2	90	4	3	1029.000	502786.210	512434.089	992.069
2	90	5	3	1029.000	502785.969	512433.119	992.069

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EJE	P.K.	AZIMUT	COS A	SEN A
3	1030.000	15.496688	.970519	.241025

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	91	1	3	1030.000	502788.868	512440.642	992.080
2	91	2	3	1030.000	502788.627	512439.671	992.080
2	91	3	3	1030.000	502787.904	512436.760	992.080
2	91	4	3	1030.000	502787.181	512433.848	992.080
2	91	5	3	1030.000	502786.940	512432.878	992.080

EJE	P.K.	AZIMUT	COS A	SEN A
3	1031.000	15.496688	.970519	.241025

2	92	1	3	1031.000	502789.809	512439.430	992.079
2	92	2	3	1031.000	502789.598	512439.430	992.079
2	92	3	3	1031.000	502788.874	512436.519	992.085
2	92	4	3	1031.000	502788.151	512433.607	992.091
2	92	5	3	1031.000	502787.910	512432.637	992.091

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1032.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	93	1	3	1032.000	502790.809	512440.160	992.078
2	93	2	3	1032.000	502790.568	512439.189	992.078
2	93	3	3	1032.000	502789.845	512436.278	992.090
2	93	4	3	1032.000	502789.122	512433.366	992.102
2	93	5	3	1032.000	502788.881	512432.395	992.102

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1033.000	15.496688	.970519	.241025
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	94	1	3	1033.000	502791.780	512439.919	992.077
2	94	2	3	1033.000	502791.539	512438.948	992.077
2	94	3	3	1033.000	502790.815	512436.037	992.095
2	94	4	3	1033.000	502790.092	512433.125	992.113
2	94	5	3	1033.000	502789.851	512432.154	992.113

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1034.000	15.101984	.971995	.235003
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	95	1	3	1034.000	502792.726	512439.685	992.076
2	95	2	3	1034.000	502792.491	512438.713	992.076
2	95	3	3	1034.000	502791.786	512435.797	992.100
2	95	4	3	1034.000	502791.081	512432.881	992.124
2	95	5	3	1034.000	502790.846	512431.909	992.124

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1035.000	14.306209	.974856	.222835
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	96	1	3	1035.000	502793.651	512439.468	992.075
2	96	2	3	1035.000	502793.428	512438.493	992.075
2	96	3	3	1035.000	502792.760	512435.568	992.105
2	96	4	3	1035.000	502792.091	512432.644	992.135
2	96	5	3	1035.000	502791.868	512431.669	992.135

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1036.000	13.510434	.977565	.210632
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	97	1	3	1036.000	502794.579	512439.262	992.074
2	97	2	3	1036.000	502794.368	512438.284	992.074
2	97	3	3	1036.000	502793.736	512435.351	992.110
2	97	4	3	1036.000	502793.104	512432.419	992.146
2	97	5	3	1036.000	502792.894	512431.441	992.146

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1037.000	12.714660	.980122	.198396
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
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2	98	2	3	1037.000	502793.310	512438.087	992.073
2	98	3	3	1037.000	502794.715	512435.147	992.115
2	98	4	3	1037.000	502794.120	512432.206	992.157
2	98	5	3	1037.000	502793.921	512431.226	992.157

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1038.000	11.918885	.982525	.186130
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	99	1	3	1038.000	502796.441	512438.885	992.072
2	99	2	3	1038.000	502796.255	512437.902	992.072
2	99	3	3	1038.000	502795.696	512434.955	992.120
2	99	4	3	1038.000	502795.138	512432.007	992.168
2	99	5	3	1038.000	502794.952	512431.024	992.168

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1039.000	11.123110	.984775	.173834
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	100	1	3	1039.000	502797.375	512438.714	992.071
2	100	2	3	1039.000	502797.201	512437.729	992.071
2	100	3	3	1039.000	502796.680	512434.775	992.125
2	100	4	3	1039.000	502796.158	512431.820	992.179
2	100	5	3	1039.000	502795.985	512430.835	992.179

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1040.000	10.327335	.986871	.161511
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	101	1	3	1040.000	502798.312	512438.554	992.070
2	101	2	3	1040.000	502798.150	512437.568	992.070
2	101	3	3	1040.000	502797.666	512434.607	992.130
2	101	4	3	1040.000	502797.181	512431.646	992.190
2	101	5	3	1040.000	502797.020	512430.659	992.190

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EJE	P.K.	AZIMUT	COS A	SEN A
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3	1041.000	9.531561	.988813	.149163
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	102	1	3	1041.000	502799.250	512438.407	992.075
2	102	2	3	1041.000	502799.101	512437.418	992.075
2	102	3	3	1041.000	502798.654	512434.452	992.135
2	102	4	3	1041.000	502798.206	512431.485	992.195
2	102	5	3	1041.000	502798.057	512430.496	992.195

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1042.000	8.735786	.990600	.136791
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	103	1	3	1042.000	502800.190	512438.271	992.080
2	103	2	3	1042.000	502800.054	512437.280	992.080
2	103	3	3	1042.000	502799.643	512434.309	992.140
2	103	4	3	1042.000	502799.233	512431.337	992.200
2	103	5	3	1042.000	502799.096	512430.346	992.200

EJE	P.K.	AZIMUT	COS A	SEN A
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3	1043.000	7.940011	.992232	.124398
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	104	1	3	1043.000	502801.132	512438.147	992.085

2	104	3	3	1043.000	502800.635	512434.178	992.195
2	104	4	3	1043.000	502800.262	512431.201	992.205
2	104	5	3	1043.000	502800.137	512430.209	992.205

EJE	P.K.	AZIMUT	COS A	SEN A
3	1044.000	7.144237	.993710	.111986

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	105	1	3	1044.000	502802.076	512438.035	992.090
2	105	2	3	1044.000	502801.964	512437.041	992.090
2	105	3	3	1044.000	502801.628	512434.060	992.150
2	105	4	3	1044.000	502801.292	512431.079	992.210
2	105	5	3	1044.000	502801.180	512430.085	992.210

EJE	P.K.	AZIMUT	COS A	SEN A
3	1045.000	6.348462	.995032	.099556

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	106	1	3	1045.000	502803.020	512437.934	992.095
2	106	2	3	1045.000	502802.921	512436.939	992.095
2	106	3	3	1045.000	502802.622	512433.954	992.155
2	106	4	3	1045.000	502802.323	512430.969	992.215
2	106	5	3	1045.000	502802.224	512429.974	992.215

EJE	P.K.	AZIMUT	COS A	SEN A
3	1046.000	5.552687	.996199	.087111

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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	107	1	3	1046.000	502803.966	512437.845	992.100
2	107	2	3	1046.000	502803.879	512436.849	992.100
2	107	3	3	1046.000	502803.618	512433.861	992.160
2	107	4	3	1046.000	502803.356	512430.872	992.220
2	107	5	3	1046.000	502803.269	512429.876	992.220

EJE	P.K.	AZIMUT	COS A	SEN A
3	1047.000	4.756912	.997210	.074652

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	108	1	3	1047.000	502804.913	512437.769	992.105
2	108	2	3	1047.000	502804.838	512436.771	992.105
2	108	3	3	1047.000	502804.614	512433.780	992.165
2	108	4	3	1047.000	502804.390	512430.788	992.225
2	108	5	3	1047.000	502804.316	512429.791	992.225

EJE	P.K.	AZIMUT	COS A	SEN A
3	1048.000	3.961138	.998065	.062181

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	109	1	3	1048.000	502805.861	512437.704	992.110
2	109	2	3	1048.000	502805.799	512436.706	992.110
2	109	3	3	1048.000	502805.612	512433.711	992.170
2	109	4	3	1048.000	502805.426	512430.717	992.230
2	109	5	3	1048.000	502805.363	512429.719	992.230

EJE	P.K.	AZIMUT	COS A	SEN A
3	1049.000	3.165363	.998764	.049701

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	110	1	3	1049.000	502806.809	512437.651	992.115
2	110	2	3	1049.000	502806.760	512436.652	992.115

2	110	4	3	1049.000	502806.401	512430.637	992.235
2	110	5	3	1049.000	502806.412	512429.660	992.235

EJE	P.K.	AZIMUT	COS A	SEN A
3	1050.000	2.369588	.999307	.037213

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	111	1	3	1050.000	502807.758	512437.609	992.120
2	111	2	3	1050.000	502807.721	512436.610	992.120
2	111	3	3	1050.000	502807.610	512433.612	992.180
2	111	4	3	1050.000	502807.498	512430.614	992.240
2	111	5	3	1050.000	502807.461	512429.615	992.240

EJE	P.K.	AZIMUT	COS A	SEN A
3	1051.000	1.573814	.999694	.024719

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	112	1	3	1051.000	502808.708	512437.580	992.125
2	112	2	3	1051.000	502808.683	512436.580	992.125
2	112	3	3	1051.000	502808.609	512433.581	992.185
2	112	4	3	1051.000	502808.535	512430.582	992.245
2	112	5	3	1051.000	502808.510	512429.582	992.245

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EJE	P.K.	AZIMUT	COS A	SEN A
3	1052.000	.778039	.999925	.012221

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	113	1	3	1052.000	502809.658	512437.562	992.130
2	113	2	3	1052.000	502809.646	512436.562	992.130
2	113	3	3	1052.000	502809.609	512433.563	992.190
2	113	4	3	1052.000	502809.572	512430.563	992.250
2	113	5	3	1052.000	502809.560	512429.563	992.250

EJE	P.K.	AZIMUT	COS A	SEN A
3	1053.000	-.017736	1.000000	-.000279

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	114	1	3	1053.000	502810.608	512437.557	992.135
2	114	2	3	1053.000	502810.608	512436.557	992.135
2	114	3	3	1053.000	502810.609	512433.557	992.195
2	114	4	3	1053.000	502810.610	512430.557	992.255
2	114	5	3	1053.000	502810.610	512429.557	992.255

EJE	P.K.	AZIMUT	COS A	SEN A
3	1054.000	-.813511	.999918	-.012778

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	115	1	3	1054.000	502811.558	512437.563	992.140
2	115	2	3	1054.000	502811.571	512436.563	992.140
2	115	3	3	1054.000	502811.609	512433.563	992.200
2	115	4	3	1054.000	502811.647	512430.563	992.260
2	115	5	3	1054.000	502811.660	512429.563	992.260

EJE	P.K.	AZIMUT	COS A	SEN A
3	1055.000	-1.609285	.999681	-.025276

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	116	1	3	1055.000	502812.508	512437.581	992.145
2	116	2	3	1055.000	502812.533	512436.581	992.145
2	116	3	3	1055.000	502812.609	512433.582	992.205

2 116 5 3 1055.000 502812.710 512429.617 992.200

EJE P.K. AZIMUT COS A SEN A

3 1056.000 -2.405060 .999286 -.037770

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	117	1	3	1056.000	502813.457	512437.611	992.150
2	117	2	3	1056.000	502813.495	512436.612	992.150
2	117	3	3	1056.000	502813.608	512433.614	992.210
2	117	4	3	1056.000	502813.721	512430.616	992.270
2	117	5	3	1056.000	502813.759	512429.617	992.270

EJE P.K. AZIMUT COS A SEN A

3 1057.000 -3.200835 .998736 -.050257

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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	118	1	3	1057.000	502814.406	512437.653	992.155
2	118	2	3	1057.000	502814.456	512436.654	992.155
2	118	3	3	1057.000	502814.607	512433.658	992.215
2	118	4	3	1057.000	502814.758	512430.661	992.275
2	118	5	3	1057.000	502814.808	512429.663	992.275

EJE P.K. AZIMUT COS A SEN A

3 1058.000 -3.996609 .998030 -.062737

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	119	1	3	1058.000	502815.355	512437.706	992.160
2	119	2	3	1058.000	502815.417	512436.708	992.160
2	119	3	3	1058.000	502815.606	512433.714	992.220
2	119	4	3	1058.000	502815.794	512430.720	992.280
2	119	5	3	1058.000	502815.857	512429.722	992.280

EJE P.K. AZIMUT COS A SEN A

3 1059.000 -4.792384 .997168 -.075208

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	120	1	3	1059.000	502816.302	512437.772	992.165
2	120	2	3	1059.000	502816.378	512436.775	992.165
2	120	3	3	1059.000	502816.603	512433.783	992.225
2	120	4	3	1059.000	502816.829	512430.792	992.285
2	120	5	3	1059.000	502816.904	512429.794	992.285

EJE P.K. AZIMUT COS A SEN A

3 1060.000 -5.588159 .996150 -.087666

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	121	1	3	1060.000	502817.249	512437.849	992.170
2	121	2	3	1060.000	502817.337	512436.853	992.170
2	121	3	3	1060.000	502817.600	512433.865	992.230
2	121	4	3	1060.000	502817.863	512430.876	992.290
2	121	5	3	1060.000	502817.951	512429.880	992.290

EJE P.K. AZIMUT COS A SEN A

3 1061.000 -6.383934 .994976 -.100111

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	122	1	3	1061.000	502818.195	512437.938	992.175
2	122	2	3	1061.000	502818.295	512436.943	992.175
2	122	3	3	1061.000	502818.595	512433.958	992.235
2	122	4	3	1061.000	502818.896	512430.974	992.295

EJE P.K. AZIMUT COS A SEN A

3 1062.000 -7.179708 .993647 -.112540

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	123	1	3	1062.000	502819.140	512438.039	992.180
2	123	2	3	1062.000	502819.252	512437.046	992.180
2	123	3	3	1062.000	502819.590	512434.065	992.240
2	123	4	3	1062.000	502819.927	512431.084	992.300
2	123	5	3	1062.000	502820.040	512430.090	992.300

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EJE P.K. AZIMUT COS A SEN A

3 1063.000 -7.975483 .992163 -.124951

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	124	1	3	1063.000	502820.083	512438.152	992.185
2	124	2	3	1063.000	502820.208	512437.160	992.185
2	124	3	3	1063.000	502820.583	512434.184	992.245
2	124	4	3	1063.000	502820.958	512431.207	992.305
2	124	5	3	1063.000	502821.082	512430.215	992.305

EJE P.K. AZIMUT COS A SEN A

3 1064.000 -8.771258 .990524 -.137343

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	125	1	3	1064.000	502821.025	512438.277	992.190
2	125	2	3	1064.000	502821.162	512437.286	992.190
2	125	3	3	1064.000	502821.574	512434.315	992.250
2	125	4	3	1064.000	502821.986	512431.343	992.310
2	125	5	3	1064.000	502822.123	512430.353	992.310

EJE P.K. AZIMUT COS A SEN A

3 1065.000 -9.567033 .988729 -.149714

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	126	1	3	1065.000	502821.965	512438.413	992.195
2	126	2	3	1065.000	502822.115	512437.424	992.195
2	126	3	3	1065.000	502822.564	512434.458	992.255
2	126	4	3	1065.000	502823.013	512431.492	992.315
2	126	5	3	1065.000	502823.163	512430.503	992.315

EJE P.K. AZIMUT COS A SEN A

3 1066.000 -10.362807 .986781 -.162061

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	127	1	3	1066.000	502822.903	512438.561	992.200
2	127	2	3	1066.000	502823.065	512437.574	992.200
2	127	3	3	1066.000	502823.551	512434.614	992.260
2	127	4	3	1066.000	502824.038	512431.654	992.320
2	127	5	3	1066.000	502824.200	512430.667	992.320

EJE P.K. AZIMUT COS A SEN A

3 1067.000 -11.158582 .984678 -.174382

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	128	1	3	1067.000	502823.840	512438.721	992.205
2	128	2	3	1067.000	502824.014	512437.736	992.205
2	128	3	3	1067.000	502824.537	512434.782	992.265
2	128	4	3	1067.000	502825.060	512431.828	992.325
2	128	5	3	1067.000	502825.235	512430.844	992.325

3 1068.000 -11.954357 .982421 -.186677
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	129	1	3	1068.000	502824.774	512438.893	992.210
2	129	2	3	1068.000	502824.961	512437.910	992.210
2	129	3	3	1068.000	502825.521	512434.963	992.270
2	129	4	3	1068.000	502826.081	512432.016	992.330
2	129	5	3	1068.000	502826.267	512431.033	992.330

EJE	P.K.	AZIMUT	COS A	SEN A
3	1069.000	-12.750131	.980011	-.198942

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	130	1	3	1069.000	502825.706	512439.076	992.215
2	130	2	3	1069.000	502825.905	512438.096	992.215
2	130	3	3	1069.000	502826.502	512435.156	992.275
2	130	4	3	1069.000	502827.099	512432.216	992.335
2	130	5	3	1069.000	502827.298	512431.236	992.335

EJE	P.K.	AZIMUT	COS A	SEN A
3	1070.000	-13.545906	.977448	-.211177

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	131	1	3	1070.000	502826.636	512439.271	992.220
2	131	2	3	1070.000	502826.847	512438.293	992.220
2	131	3	3	1070.000	502827.481	512435.361	992.280
2	131	4	3	1070.000	502828.114	512432.428	992.340
2	131	5	3	1070.000	502828.325	512431.451	992.340

EJE	P.K.	AZIMUT	COS A	SEN A
3	1071.000	-14.341681	.974732	-.223378

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	132	1	3	1071.000	502827.563	512439.477	992.225
2	132	2	3	1071.000	502827.787	512438.502	992.225
2	132	3	3	1071.000	502828.457	512435.578	992.285
2	132	4	3	1071.000	502829.127	512432.654	992.345
2	132	5	3	1071.000	502829.350	512431.679	992.345

EJE	P.K.	AZIMUT	COS A	SEN A
3	1072.000	-15.137456	.971864	-.235544

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	133	1	3	1072.000	502828.488	512439.695	992.230
2	133	2	3	1072.000	502828.724	512438.723	992.230
2	133	3	3	1072.000	502829.430	512435.808	992.290
2	133	4	3	1072.000	502830.137	512432.892	992.350
2	133	5	3	1072.000	502830.372	512431.920	992.350

EJE	P.K.	AZIMUT	COS A	SEN A
3	1073.000	-15.933230	.968843	-.247674

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	134	1	3	1073.000	502829.410	512439.924	992.235
2	134	2	3	1073.000	502829.657	512438.956	992.235
2	134	3	3	1073.000	502830.401	512436.049	992.295
2	134	4	3	1073.000	502831.144	512433.143	992.355
2	134	5	3	1073.000	502831.391	512432.174	992.355

EJE	P.K.	AZIMUT	COS A	SEN A
3	1074.000	-16.729005	.965672	-.259765

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	135	1	3	1074.000	502830.329	512440.166	992.240
2	135	2	3	1074.000	502830.588	512439.200	992.240
2	135	3	3	1074.000	502831.368	512436.303	992.300
2	135	4	3	1074.000	502832.147	512433.406	992.360
2	135	5	3	1074.000	502832.407	512432.440	992.360

EJE	P.K.	AZIMUT	COS A	SEN A
3	1075.000	-17.524780	.962350	-.271815

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	136	1	3	1075.000	502831.245	512440.418	992.245
2	136	2	3	1075.000	502831.516	512439.456	992.245
2	136	3	3	1075.000	502832.332	512436.569	992.305
2	136	4	3	1075.000	502833.147	512433.682	992.365
2	136	5	3	1075.000	502833.419	512432.719	992.365

EJE	P.K.	AZIMUT	COS A	SEN A
3	1076.000	-18.320554	.958877	-.283823

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	137	1	3	1076.000	502832.157	512440.682	992.250
2	137	2	3	1076.000	502832.441	512439.723	992.250
2	137	3	3	1076.000	502833.292	512436.846	992.310
2	137	4	3	1076.000	502834.144	512433.970	992.370
2	137	5	3	1076.000	502834.428	512433.011	992.370

EJE	P.K.	AZIMUT	COS A	SEN A
3	1077.000	-19.116329	.955254	-.295786

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	138	1	3	1077.000	502833.066	512440.957	992.255
2	138	2	3	1077.000	502833.362	512440.002	992.255
2	138	3	3	1077.000	502834.250	512437.136	992.315
2	138	4	3	1077.000	502835.137	512434.270	992.375
2	138	5	3	1077.000	502835.433	512433.315	992.375

EJE	P.K.	AZIMUT	COS A	SEN A
3	1078.000	-19.912104	.951482	-.307704

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	139	1	3	1078.000	502833.972	512441.244	992.260
2	139	2	3	1078.000	502834.280	512440.292	992.260
2	139	3	3	1078.000	502835.203	512437.438	992.320
2	139	4	3	1078.000	502836.126	512434.584	992.380
2	139	5	3	1078.000	502836.434	512433.632	992.380

EJE	P.K.	AZIMUT	COS A	SEN A
3	1079.000	-20.707879	.947562	-.319573

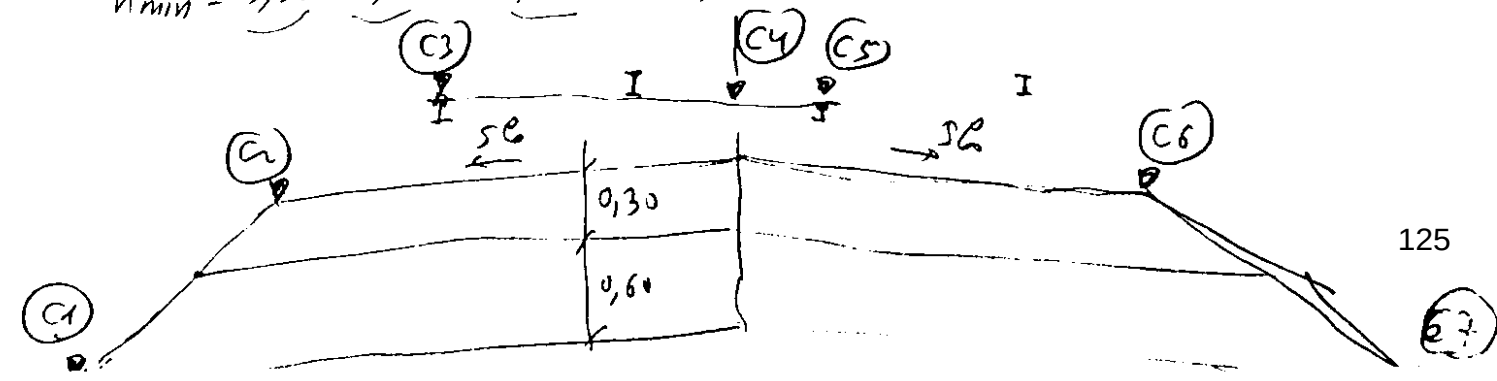
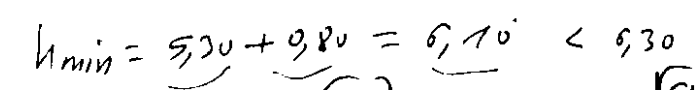
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	140	1	3	1079.000	502834.874	512441.542	992.265
2	140	2	3	1079.000	502835.194	512440.594	992.265
2	140	3	3	1079.000	502836.152	512437.752	992.325
2	140	4	3	1079.000	502837.111	512434.909	992.385

EJE	P.K.	AZIMUT	COS A	SEN A
3	1080.000	-21.503653	.943493	-.331392

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
2	141	1	3	1080.000	502835.772	512441.851	992.270
2	141	2	3	1080.000	502836.104	512440.908	992.270
2	141	3	3	1080.000	502837.098	512438.077	992.330
2	141	4	3	1080.000	502838.092	512435.247	992.390
2	141	5	3	1080.000	502838.424	512434.303	992.390

1

Here 0



0.562+600
 560259.927501035.619510864.265 57.7289 1001 EJE DEL TRONCO DEL FECC 1560887.50 994.274 .00312777 1
 -2563156.585 15000. 1562912.5
 2 560200. 2.96752. 4.03252.9674 1.5325 5.4675 2.
 563000. 2.96752. 4.03252.9674 1.5325 5.4675 2.
 2 560200. -0.5 -.24129-.20994 0.177960.5
 563000. -0.5 -.24129-.20994 0.177960.5
 7 1 0. 2 0. 3 0. 4 0. 8 0. 9 0. 10 0.
 VTE V-562+6
 841.285 502603.436512463.362 82.2665 3 887.307 993.577 -0.030 5
 2 914.362 140. 1 925.462
 1 1033.504 -2 975.462 1428.571
 -2 1153.512 80. 1 1127.785
 -2 1186.885 3000.
 1 1273.017
 2 840. 1.00 3.00 3.00 1.00
 1200. 1.00 3.00 3.00 1.00
 5 838.203 0.02 0.02
 1020. 0.02 0.02
 1040. -0.02 -0.02
 1143.512 -0.02 -0.02
 1163.512 0.02 0.02
 5 1 0. 2 0. 3 0. 9 0. 10 0.
 25 10 1 20 1 40 1 60 1 70 1 10 2 20 2 40 2 60 2 70 2 10 3 20 3 40 3 60 3
 70 3 10 4 20 4 40 4 60 4 70 4 10 5 20 5 40 5 60 5 70 5
 0
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 /R

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TITULO DEL TRABAJO O.F.-P.I.562+600

SENTA PARTE = INTERSECCION DE EJES

CVA. EJE	CVA. EJE	PK.E	PK.3	X	Y	ZE	Z3	AZ.E	AZ.3
1	0	1	3 562599.574	991.927	502751.918	512449.818	997.656	991.950	47.793132 115.496688
2	0	1	3 562600.686	994.216	502754.139	512449.267	998.659	991.961	47.794411 115.496688
4	0	1	3 562604.577	1002.224	502761.911	512447.336	999.645	992.001	47.777898 115.496688
6	0	1	3 562608.463	1010.231	502769.682	512445.407	998.684	992.041	47.761403 115.496688
7	0	1	3 562609.573	1012.518	502771.902	512444.855	997.687	992.053	47.756693 115.496688
1	0	2	3 562598.429	991.371	502751.137	512448.982	997.652	991.947	47.803991 115.496688
2	0	2	3 562599.541	993.660	502753.358	512448.430	998.656	991.958	47.799269 115.496688
4	0	2	3 562603.433	1001.668	502761.130	512446.500	999.641	991.998	47.782753 115.496688
6	0	2	3 562607.320	1009.676	502768.902	512444.570	998.680	992.038	47.766255 115.496688
7	0	2	3 562608.430	1011.963	502771.122	512444.018	997.684	992.050	47.761544 115.496688
1	0	3	3 562594.994	989.703	502748.795	512446.472	997.642	991.879	47.818569 115.496688
2	0	3	3 562596.107	991.991	502751.016	512445.921	998.645	991.890	47.813844 115.496688
4	0	3	3 562600.000	1000.001	502758.789	512443.990	999.630	991.930	47.797320 115.496688
6	0	3	3 562603.890	1008.009	502766.562	512442.060	998.669	991.970	47.780813 115.496688
7	0	3	3 562605.000	1010.297	502768.782	512441.508	997.673	991.982	47.776100 115.496688
1	0	4	3 562591.558	988.033	502746.451	512443.963	997.631	991.810	47.833149 115.496688
2	0	4	3 562592.672	990.322	502748.673	512443.411	998.634	991.822	47.828422 115.496688
4	0	4	3 562596.568	998.333	502756.447	512441.481	999.620	991.862	47.811888 115.496688
6	0	4	3 562600.459	1006.342	502764.220	512439.550	998.659	991.902	47.795372 115.496688
7	0	4	3 562601.570	1008.630	502766.441	512438.999	997.662	991.913	47.790657 115.496688
→ 1	0	5	3 562590.413	987.476	502745.670	512443.127	997.627	991.807	47.838009 115.496688
2	0	5	3 562591.527	989.766	502747.892	512442.575	998.631	991.819	47.833281 115.496688
4	0	5	3 562595.424	997.776	502755.666	512440.644	999.616	991.859	47.816745 115.496688
6	0	5	3 562599.316	1005.786	502763.440	512438.714	998.655	991.899	47.800226 115.496688
7	0	5	3 562600.427	1008.074	502765.661	512438.162	997.659	991.910	47.795510 115.496688

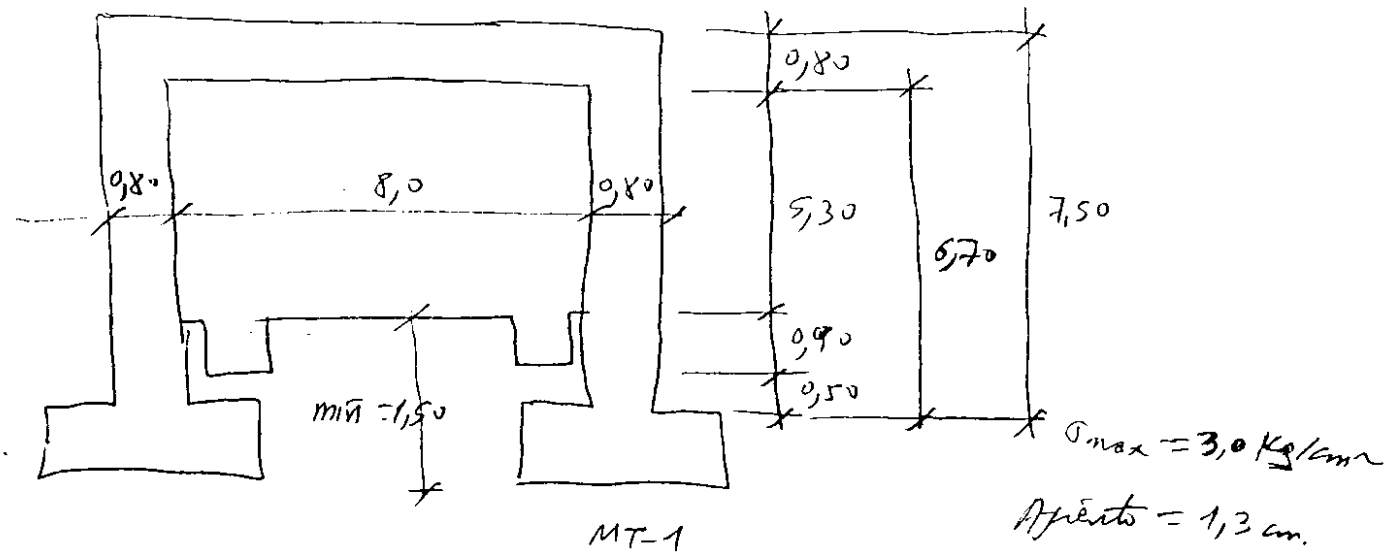
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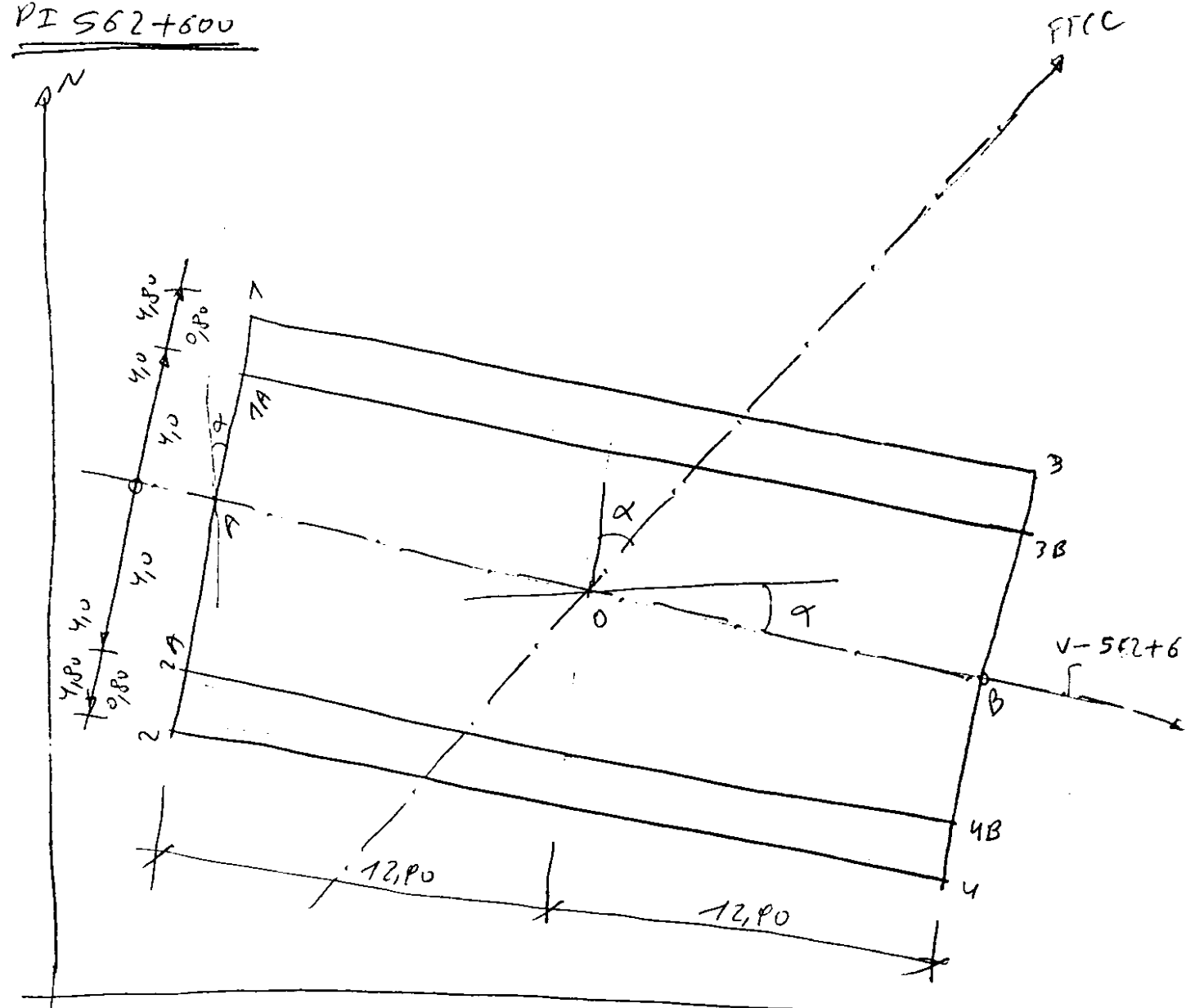
REPLANTEO DEL PORTICO

VI 562+500

Altura de la base sobre el dintel = $998,70 - 998,0 = 0,70 \text{ m.}$



PI 562+600



Punto O: $X = 502.758,789$
 $Y = 4.512.443,990$
 Eje FFCC: PK = 562+600,00
 $AZ = 47,797.320^\circ$
 $\Delta = 998,630$

115
 47
 68

Eje Vte. V-562+6 PK = 1000,0
 $AZ = 115,496.688^\circ$
 $\Delta = 991,930$

$\alpha = 15,496.688^\circ$

Puntos A, B: $OX = 12,90 \times \cos \alpha = 12,519.695,28$
 $OY = 12,90 \times \sin \alpha = 3,109.216.954$

Exterior del hospital: $0x = 4,80 \Rightarrow \tan \alpha = 1,156.917.926$
 $0y = 4,80 \Rightarrow \cos \alpha = 4,658.491.267$

Interior del hospital: $0x = 4,0 \Rightarrow \tan \alpha = 0,964.098.280$
 $0y = 4,0 \Rightarrow \cos \alpha = 3,882.076.056$

Punto A:
 $x = 502.758,789 - 12,519.695,28 = 502.746,269$
 $y = 4,512.443,990 + 3,109.216.954 = 4,512.447,099$

Punto 1: $x = x_A + 1,156.917.926 = 502.747,426$
 $y = y_A + 4,658.491.267 = 4,512.451,758$

Punto 2: $x = x_A - 1,156.917.926 = 502.745,112$
 $y = y_A - 4,658.491.267 = 4,512.442,441$

Punto 1A: $x = x_A + 0,964.098.280 = 502.747,233$
 $y = y_A + 3,882.076.056 = 4,512.450,987$

Punto 2A: $x = x_A - 0,964.098.280 = 502.745,305$
 $y = y_A - 3,882.076.056 = 4,512.443,217$

$z_A = 99,904$

Punto B:
 $x = 502.758,789 + 12,519.695,28 = 502.771,308.695$
 $y = 4,512.443,990 - 3,109.216.954 = 4,512.440,887$

Punto 3: $x = x_B + 1,156.917.926 = 502.772,466$
 $y = y_B + 4,658.491.267 = 4,512.445,539$

Punto 4: $x = x_B - 1,156.917.926 = 502.770,152$
 $y = y_B - 4,658.491.267 = 4,512.436,222$

$z_A = 998,156$

Punto 3B: $x = x_B + 0,964.098.280 = 502.772,273$
 $y = y_B + 3,882.076.056 = 4,512.444,763$

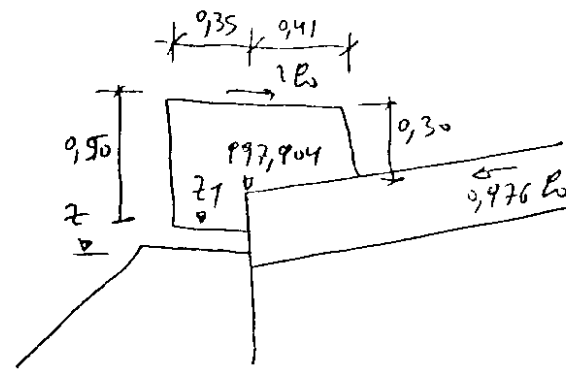
Punto 4B: $x = x_B - 0,964.098.280 = 502.770,345$
 $y = y_B - 3,882.076.056 = 4,512.436,999$

REPLANTEO DE LAS ALETAS

PI 562+600

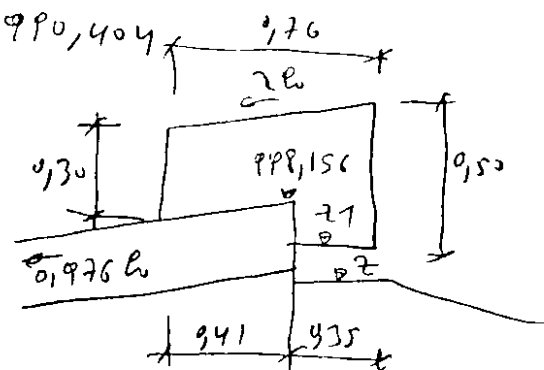
Aleta A1 → l = 14,0 m. ✓

Aleta A2 → l = 14,0 ✓



$$\begin{aligned} \text{Z1} &= 997,904 + 9,41 \times 0,00976 + 0,30 + 9,76 \times 0,02 - 9,50 = 997,722 \\ \text{Z} &= 997,722 - 0,023 = 997,700 \checkmark \end{aligned}$$

$$\text{Zapata} = 997,904 - 7,50 = 990,404$$



Aleta A3 → l = 14,0 m. ✓

Aleta A4 → l = 12,0 m. ✓

$$\begin{aligned} \text{Z1} &= 998,156 - 9,41 \times 0,00976 + 0,30 + 9,76 \times 0,02 - 9,50 = 997,962 \\ \text{Z} &= 997,962 - 0,027 = 997,940 \end{aligned}$$

$$\text{Zapata} = 998,156 - 7,50 = 990,656$$

Notas de coronación en la terminación de las alas:

(A1) 992,90

(A2) 992,90

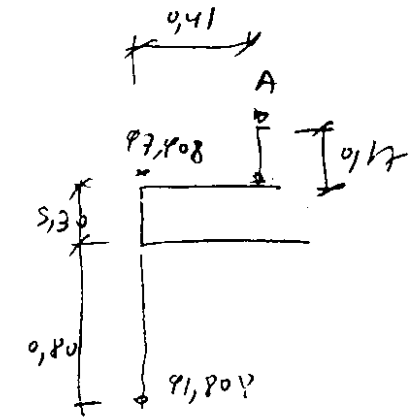
(A3) 992,90

(A4) 993,50

Zona inferior de la

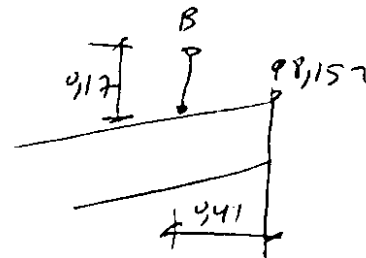
PI 562+600

$$\begin{aligned} 91,77 + (91,82 - 91,77) \times 7,5/10 &= 91,808 \\ 5,30 \\ 9,80 \\ \hline 97,908 \end{aligned}$$



Zona superior 12,0 m

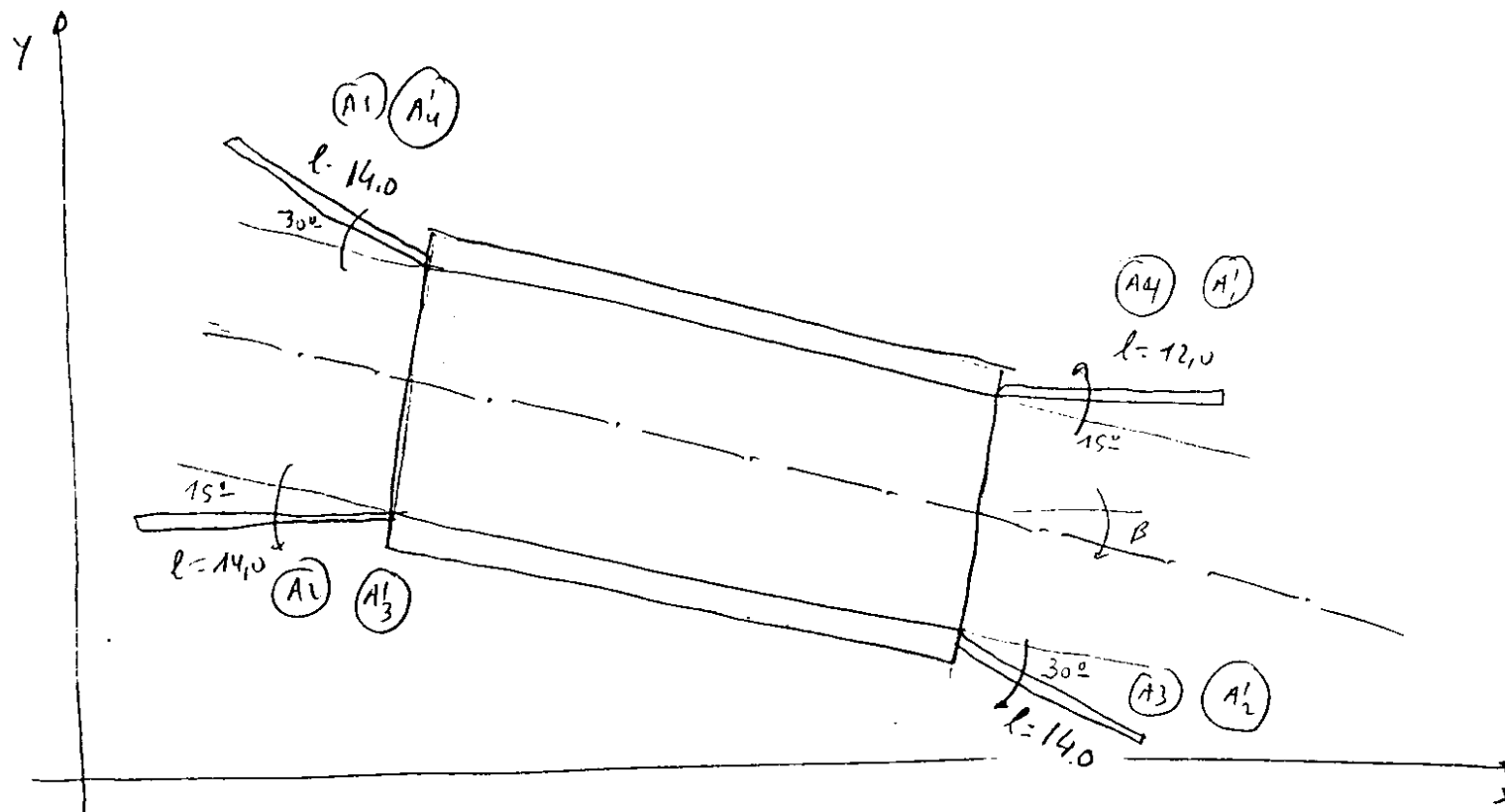
$$\begin{aligned} 92,040 + (92,060 - 92,040) \times 2,0/10 &= 92,052 \\ 5,30 \\ 9,80 \\ \hline 98,152 \end{aligned}$$



$$\text{Pendiente del perfil} = \frac{98,152 - 97,908}{25,0} \times 100 = 0,976 \%$$

$$\begin{aligned} \text{A} &= 97,908 + 9,41 \times 0,00976 + 0,17 = 98,082 - 98,126 = -0,044 \\ \text{B} &= 98,152 - 9,41 \times 0,00976 + 0,17 = 98,318 - 98,188 = 0,130 \end{aligned}$$

PI 562+600



$$\beta = -15.4966888^\circ$$

$$\text{JUNTA} = 9.02$$

	A ₁	A ₂	A ₃	A ₄
X _{AL}	502.772,273	502.770,345	502.745,305	502.747,233
Y _{AL}	4.512.444,763	4.512.436,999	4.512.443,217	4.512.450,981
ALF	15°	30°	15°	30°
ALONG	12.0	14.0	14.0	14.0
DIMI	0.243	0.243	0.243	0.243
EFIN	0.095	0.161	0.083	0.163
ACABE	0.40	0.40	0.40	0.40
BZAP	2.10	2.30	2.10	2.30
CTAP	3.10	2.80	3.10	2.80
ZTAP	0.90	0.90	0.90	0.90

TITULO : FFCC MADRID-BARCELONA. PI-562.6

ANGULO DEL EJE OX CON EL EJE DEL PORTICO. BETA = -15.496688000 g
 ANCHO DE LA JUNTA ENTRE LOS HASTIALES DEL PORTICO Y LAS ALETAS = .020000 m

ALETA NUMERO = 4 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 502772.273000
 YA = 4512444.763000

INCLINACION RESPECTO DEL EJE OX = 15.000000 g
 LONGITUD DE LA ALETA = 12.000000 m
 ESPESOR DEL TALUD. ZONA INICIAL = .243000 m
 ZONA FINAL = .095000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
 ZAPATA. ANCHO DEL 1º TACON TRASERO = 2.100 m
 ANCHO DEL 2º TACON TRASERO = 3.100 m
 ANCHO DEL TACON DELANTERO = .900 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 502784.275
 YI = 4512444.179

PUNTO C : XC = 502784.270
 YC = 4512444.984

PUNTO D : XD = 502784.269
 YD = 4512445.079

PUNTO E : XE = 502784.267
 YE = 4512445.479 p1

PUNTO G : XG = 502784.257
 YG = 4512447.178

PUNTO K : XK = 502784.251
 YK = 4512448.178

PUNTO J : XJ = 502772.130
 YJ = 4512444.106

PUNTO AP: XAP = 502772.294
 YAP = 4512444.763

PUNTO B : XB = 502772.334
 YB = 4512445.007

PUNTO BP: XBP = 502772.354
 YBP = 4512445.007

PUNTO H : XH = 502772.877
YH = 4512447.110

PUNTO P : XP = 502773.125
YP = 4512448.112

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I Y J = 12.144 m 27
C Y A = 11.999 m
C Y AP = 11.978 m
D Y BP = 11.915 m D
E Y F = 11.813 m C
G Y H = 11.380 m
K Y P = 11.126 m 22, 23

2A = 997, 740 B = 11, 200
2B = 993, 500 A = 9, 113
2C = 990, 656 2L = 5, 626
H1 = 7, 284 23 = 5, 50
H2 = 2, 844 E = 1, 70
F = 0, 50
Z = 3, 70

ALETA NUMERO = 3 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 502770.345000
YA = 4512436.999000

INCLINACION RESPECTO DEL EJE OX = 30.000000 °
LONGITUD DE LA ALETA = 14.000000 m
ESPESOR DEL TALUD. ZONA INICIAL = .243000 m
ZONA FINAL = .161000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1° TACON TRASERO = 2.300 m
ANCHO DEL 2° TACON TRASERO = 2.800 m
ANCHO DEL TACON DELANTERO = .900 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 502780.934
YI = 4512427.819

PUNTO C : XC = 502780.424
YC = 4512427.284

PUNTO D : XD = 502780.313
YD = 4512427.167

PUNTO E : XE = 502780.037
YE = 4512426.878 P1

PUNTO G : XG = 502778.727
YG = 4512425.502

PUNTO K : XK = 502778.382
YK = 4512425.140

PUNTO J : XJ = 502770.544
YJ = 4512437.716

PUNTO AP: XAP = 502770.362
YAP = 4512436.983

PUNTO B : XB = 502770.277
YB = 4512436.727

PUNTO BP: XBP = 502770.294
YBP = 4512436.711

PUNTO F : XF = 502770.183
YF = 4512436.264 P2

PUNTO H : XH = 502769.656
YH = 4512434.142

PUNTO P : XP = 502769.517
YP = 4512433.584

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I Y J = 14.349 m 27
C Y A = 13.999 m
C Y AP = 13.976 m
D Y BP = 13.837 m D
E Y F = 13.609 m C
G Y H = 12.527 m
K Y P = 12.242 m 22, 23

2A = 997, 740 B = 11, 200
2B = 993, 500 A = 9, 113
2C = 990, 656 2L = 6, 242
H1 = 7, 284 23 = 5, 50
H2 = 2, 844 E = 1, 70
F = 0, 50
Z = 3, 70

ALETA NUMERO = 2 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 502745.305000
YA = 4512443.217000

INCLINACION RESPECTO DEL EJE OX = 15.000000 °
LONGITUD DE LA ALETA = 14.000000 m
ESPESOR DEL TALUD. ZONA INICIAL = .243000 m
ZONA FINAL = .083000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1° TACON TRASERO = 2.100 m
ANCHO DEL 2° TACON TRASERO = 3.100 m
ANCHO DEL TACON DELANTERO = .900 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 502731.303
YI = 4512443.777

PUNTO C : XC = 502731.308
YC = 4512442.960

PUNTO D : XD = 502731.309
YD = 4512442.877

PUNTO E : XE = 502731.312
YE = 4512442.477 P1

PUNTO G : XG = 502731.323
YG = 4512440.777

PUNTO K : XK = 502731.330

PUNTO J : XJ = 502745.448
YJ = 4512443.871

PUNTO AP: XAP = 502745.284
YAP = 4512443.217

PUNTO B : XB = 502745.244
YB = 4512442.973

PUNTO BP: XBP = 502745.224
YBP = 4512442.973

PUNTO F : XF = 502745.124 p2
YF = 4512442.572

PUNTO H : XH = 502744.701
YH = 4512440.869

PUNTO P : XP = 502744.453
YP = 4512439.867

YE = 4512461.104 p1

PUNTO G : XG = 502738.853
YG = 4512462.479

PUNTO K : XK = 502739.198
YK = 4512462.841

PUNTO J : XJ = 502747.034
YJ = 4512450.264

PUNTO AP: XAP = 502747.216
YAP = 4512450.997

PUNTO B : XB = 502747.301
YB = 4512451.253

PUNTO BP: XBP = 502747.284
YBP = 4512451.269

PUNTO F : XF = 502747.395 p2
YF = 4512451.716

PUNTO H : XH = 502747.922
YH = 4512453.838

PUNTO P : XP = 502748.061
YP = 4512454.397

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I y J = 14.145 m z1
C y A = 13.999 m
C y AP = 13.978 m
D y BP = 13.915 m D
E y F = 13.813 m C
G y H = 13.378 m
K y P = 13.123 m z2, z3

2A = 997,700 B = 13,700
2B = 992,900 A = 9,113
2C = 990,404 2L = 6,613
H1 = 7,296 23 = 6,500
H2 = 2,496 E = 1,700
F = 1,00
z = 4,00

ALETA NUMERO = 1 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 502747.233000
YA = 4512450.981000

INCLINACION RESPECTO DEL EJE OX = 30.000000 °
LONGITUD DE LA ALETA = 14.000000 m
ESPESOR DEL TALUD. ZONA INICIAL = .243000 m
ZONA FINAL = .163000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1º TACON TRASERO = 2.300 m
ANCHO DEL 2º TACON TRASERO = 2.800 m
ANCHO DEL TACON DELANTERO = .900 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 502736.646
YI = 4512460.163

PUNTO C : XC = 502737.154
YC = 4512460.696

PUNTO D : XD = 502737.266
YD = 4512460.814

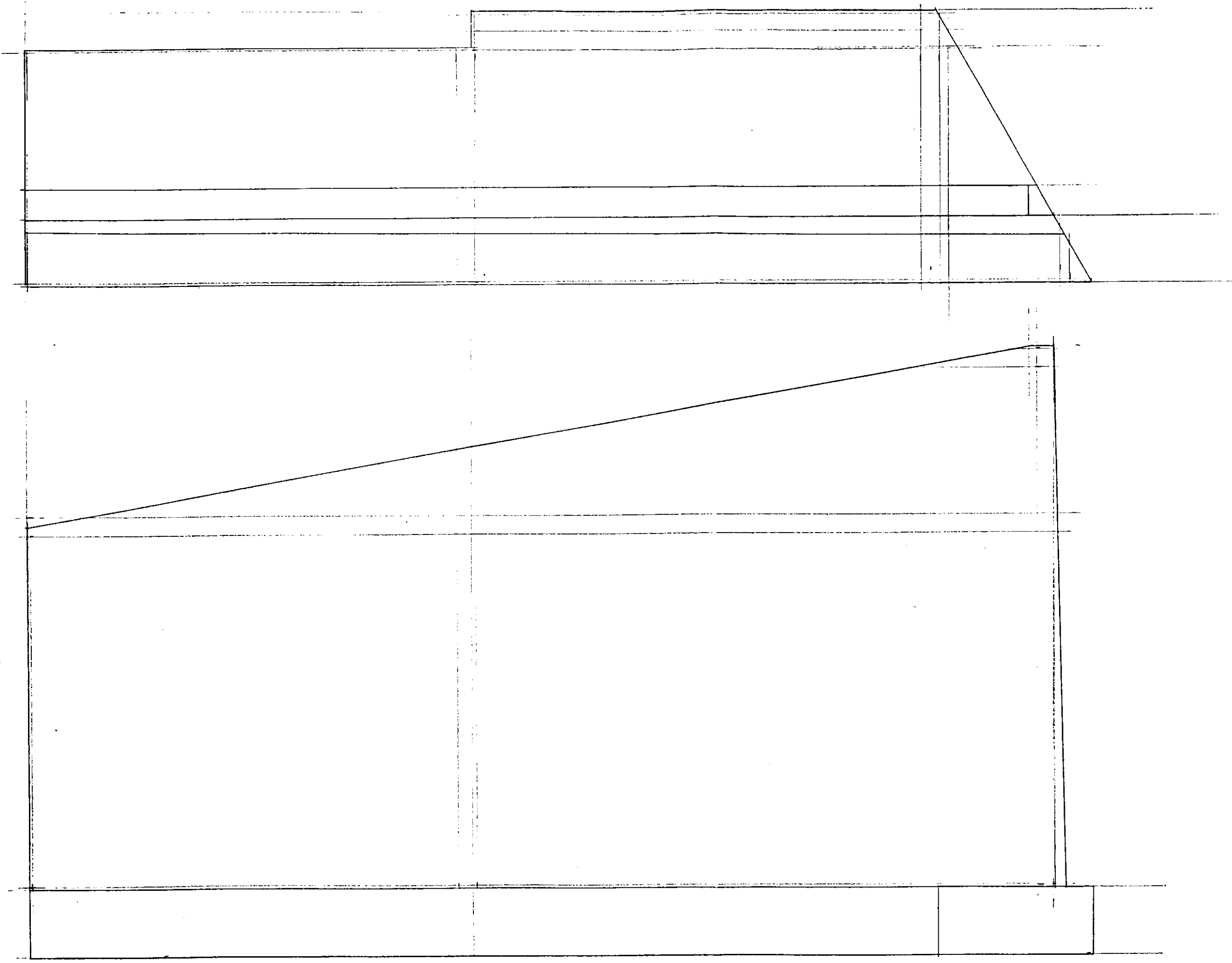
LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I y J = 14.350 m z1
C y A = 13.999 m
C y AP = 13.976 m
D y BP = 13.837 m D
E y F = 13.609 m C
G y H = 12.527 m
K y P = 12.242 m z2, z3

2A = 997,700 B = 13,500
2B = 995,300 A = 9,109
2C = 990,404 22 = 6,242
H1 = 7,296 23 = 6,00
H2 = 4,896 E = 1,90
F = 0,50
z = 3,70

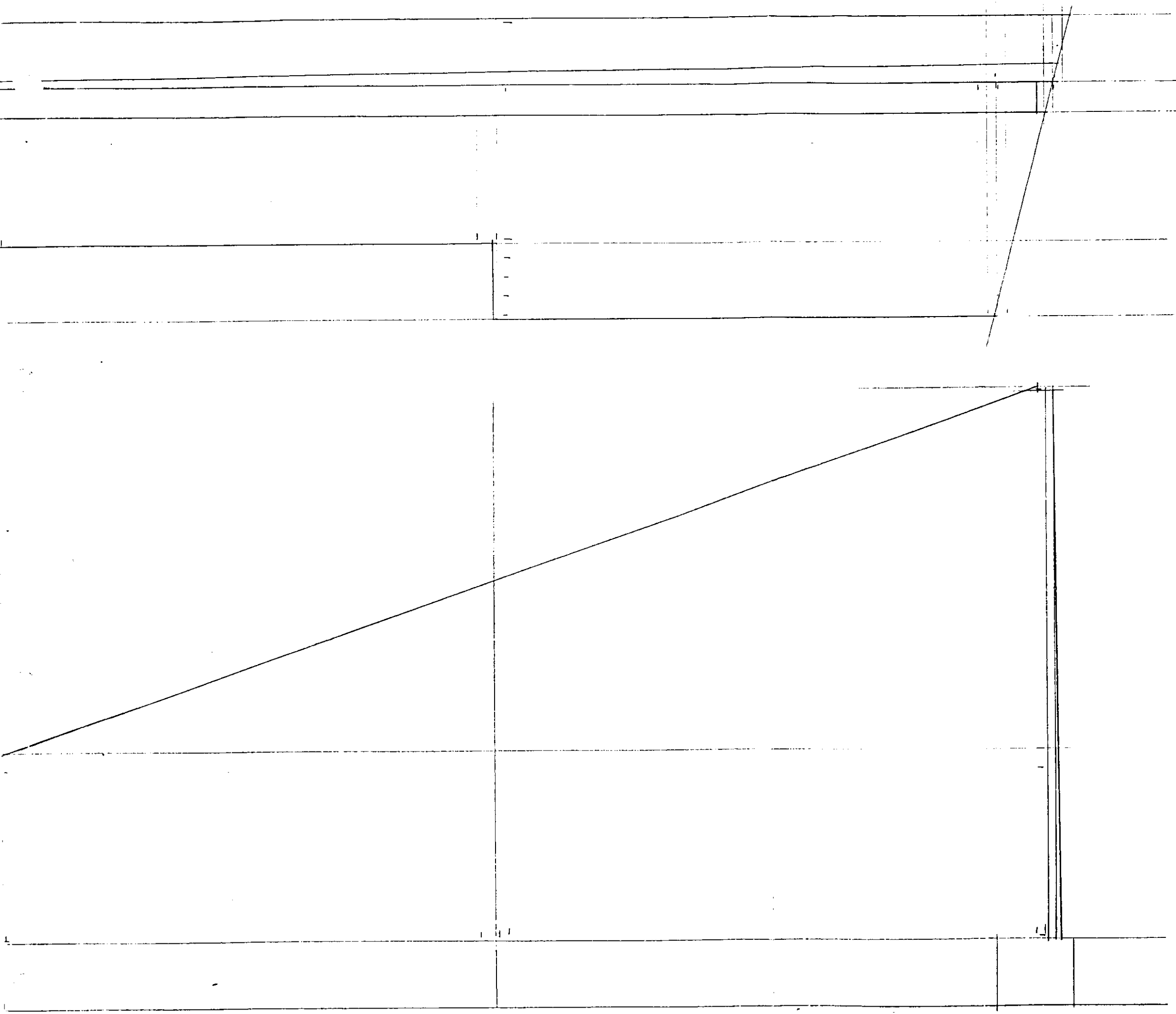
PI 562+600

A1, A3



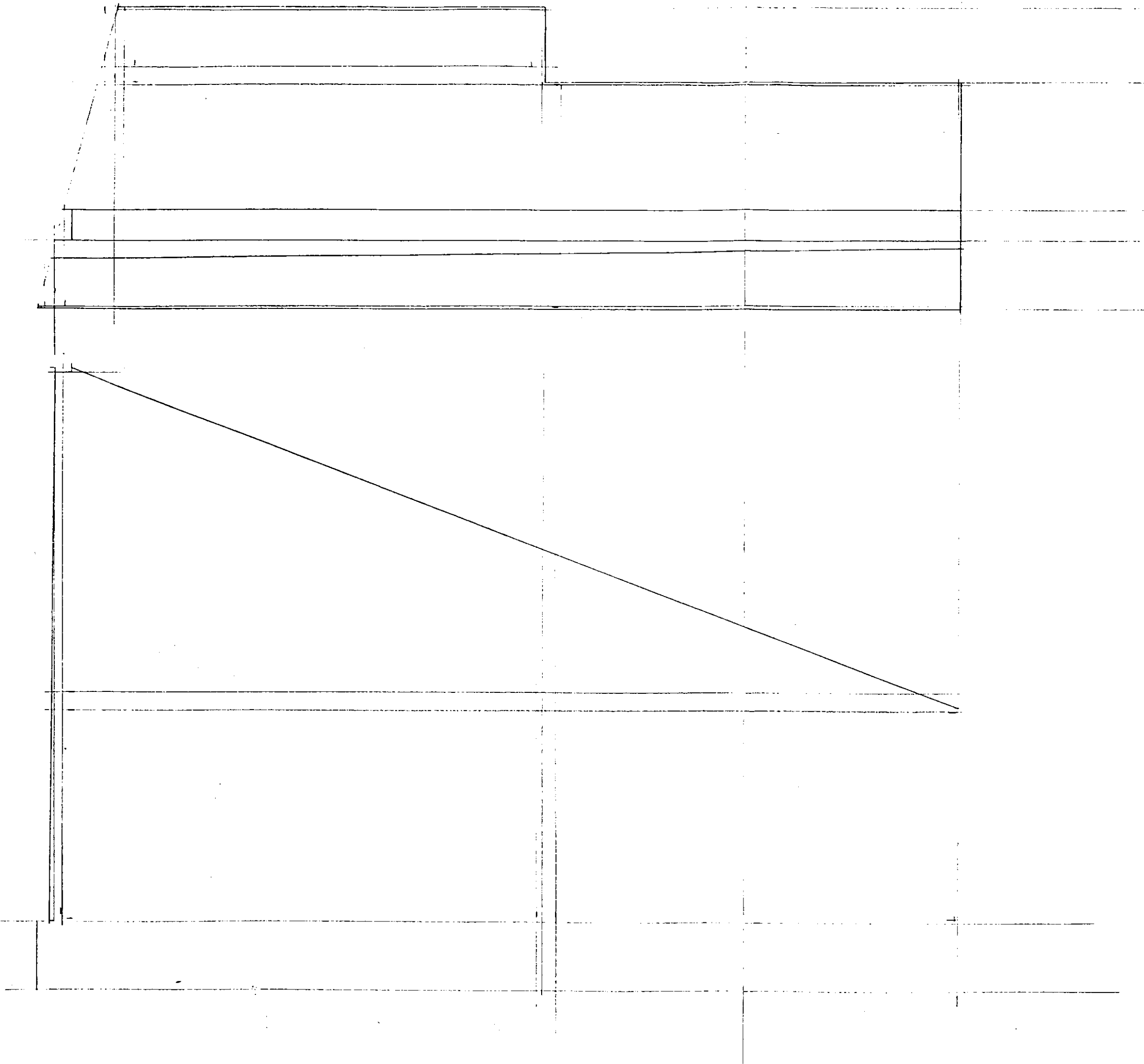
PI 562+6

A2



PI 562+6

A4



CALCULO DEL PORTICO

CALCULO DE SOBRECARGAS EN PASOS INFERIORES DE CAMINO

P.I. 558+700

Ceficiente de Impacto:

a) Instrucción española:

$$I = \frac{114 \times \sqrt{8'60}}{3'10 - 1'76 \sqrt{8'60} + 3'60} = 1'51$$

b) Eurocódigo

$$L_m = \frac{1}{3} \cdot (7'00 + 8'60 + 7'00) = 7'5 \text{ m.}$$

$$L_\phi = 1'4 \times 7'5 = 10'5 \text{ m.}$$

$$\phi_2 = \frac{1'44}{\sqrt{10'5} - 0'2} + 0'32 = 1'3$$

c) Reducción del coeficiente de impacto de la instrucción española

$$I = 1'66 - \frac{(3'55 - 1)}{10} = 1'41$$

d) Reducción del coeficiente de impacto del Eurocódigo

$$I = 1'3 - \frac{(3'50 - 1)}{10} = 1'05$$

Sobrecargas de tráfico:

a) Tren A instrucción española

$$\frac{20 \times 2 \times 1'41}{13 \times 10} = 1'95 \text{ t/m}^2$$

b) Tren B instrucción española

$$\frac{12 \times 2 \times 1'41}{13} = 2'60 \text{ t/m}^2$$

c) Tren Eurocódigo

$$\frac{2 \times 8 \times 1'05}{13} + \frac{4 \times 12'2 \times 2 \times 1'05}{13 \times 11'8} = 1'76 \text{ t/m}^2$$

P.I. 562+600

Ceficiente de impacto

a) Instrucción española: $I = 1'51$

b) Eurocódigo: $I = 1'3$

c) Reducción del coeficiente de impacto de la instrucción española

$$I = 1'51 - \frac{(1'51 - 1)}{10} = 1'46$$

d) Reducción del coeficiente de impacto del Eurocódigo

$$I = 1'3 - \frac{(1'51 - 1)}{10} = 1'25$$

Sobrecargas de tráfico

a) Tren A instrucción española

$$\frac{20 \times 2 \times 1'46}{9 \times 6} = 4'9 \text{ t/m}^2$$

b) Tren B instrucción española

$$\frac{12 \times 2 \times 1'46}{9} = 3'9 \text{ t/m}^2$$

c) Tren Eurocódigo

$$\frac{2 \times 3 \times 1'25}{9} + \frac{4 \times 12'2 \times 2 \times 1'25}{9 \times 7'8} = 3'9 \text{ t/m}^2$$

PI 562+600

$$h_{\text{terraz}} = 998,657 - \frac{997,804 + 998,151}{2} + 335/2 = 9,802 \text{ m.}$$

$$Q_{JC} = 4,9 \text{ T/m} \sim$$

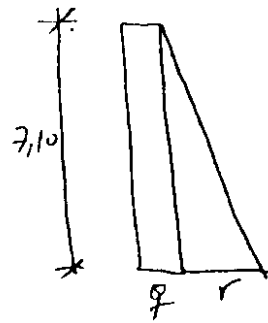
$$\begin{aligned} \text{Peso de tierras} &= 9,802 \times 2,0 = 1,601 \text{ T/m} \sim \\ \text{Peso de balasto y frenos} &= \frac{1,0}{1,0} \end{aligned}$$

$$Q_{\text{permite}} = 2,50 \text{ T/m} \sim$$

FILE P15626

HIPOTESIS I :- Vértice en construcción

$$\text{Peso, moño dintel y balasto} = 9,80 \times 2,5 = 2,0 \text{ T/m.}$$



$$\begin{aligned} q &= (950 + 9,80/2) \times 2,0 \times 9,426 = 9,767 \text{ T/m.} \quad \left\{ \begin{array}{l} 9,816 \\ 6,049 \end{array} \right. \\ r &= 2,0 \times 7,10 \times 9,426 \end{aligned}$$

$$\begin{aligned} e_6 &= 9,767 \\ e_7 &= 1,372 \\ e_8 &= 1,977 \\ e_9 &= 2,582 \\ e_{10} &= 3,187 \end{aligned}$$

$$\begin{aligned} e_{11} &= 3,792 & H &= \frac{9,767 + 6,816}{2} \times 7,10 = 26,92 \\ e_{12} &= 4,397 \\ e_{13} &= 5,001 & N &= 2,0 \times (4,4 + 7,10) = 23,0 \checkmark \\ e_{14} &= 5,606 \\ e_{15} &= 6,211 \\ e_{16} &= 6,816 \end{aligned}$$

HIPOTESIS II :- Pórtico descargado

$$\begin{aligned} \text{Peso dintel} &= 2,0 + 2,60 = 4,60 \\ \text{Peso balasto} &= 2,0 \end{aligned}$$

$$\begin{aligned} q &= (3,0 + 2,60 + 0,40 \times 2,0) \times 9,426 = 2,726 \quad \left\{ \begin{array}{l} 8,775 \\ 6,049 \end{array} \right. \\ r &= 6,049 \end{aligned}$$

$$\begin{aligned} e_6 &= 2,726 \\ e_7 &= 3,331 \\ e_8 &= 3,936 \\ e_9 &= 4,541 \\ e_{10} &= 5,146 \end{aligned}$$

$$\begin{aligned} e_{11} &= 5,751 & H &= \frac{2,726 + 8,775}{2} \times 7,10 = 40,829 \\ e_{12} &= 6,355 \\ e_{13} &= 6,960 & N &= 4,60 + 4,40 + 2,0 \times 7,10 = \\ & & &= 24,44 \checkmark \\ e_{14} &= 7,565 \\ e_{15} &= 8,170 \\ e_{16} &= 8,775 \end{aligned}$$

HIPOTESIS III :- Pórtico en carga con empuje activo

$$\begin{aligned} \text{Carga dintel} &= 4,9 + 2,60 + 0,80 \times 2,5 = 9,5 \text{ T/m.} \\ \text{Peso balasto} &= 2,0 \end{aligned}$$

$$\begin{aligned} q &= (2,60 + 0,40 \times 2,0) \times 9,271 = 9,921 \quad \left\{ \begin{array}{l} 4,921 \\ 3,848 \end{array} \right. \quad \left\{ \begin{array}{l} 4,77 \\ 4,77 \end{array} \right. \\ r &= 2,0 \times 7,10 \times 9,271 \end{aligned}$$

$$\begin{aligned} e_6 &= 9,921 \\ e_7 &= 1,306 \\ e_8 &= 1,691 \\ e_9 &= 2,075 \\ e_{10} &= 2,460 \end{aligned}$$

$$\begin{aligned} e_{11} &= 2,845 & H &= \frac{9,921 + 4,77}{2} \times 7,10 = 20,203 \\ e_{12} &= 3,230 \\ e_{13} &= 3,615 & N &= 9,5 \times 4,40 + 2,0 \times 7,10 = 56,00 - \\ e_{14} &= 3,999 \\ e_{15} &= 4,384 \\ e_{16} &= 4,769 \end{aligned}$$

HIPOTESIS IV :- Pórtico en carga con empuje en reposo

$$\begin{aligned} \text{Carga dintel} &= 9,5 \text{ T/m.} \\ \text{Carga balasto} &= 2,0 \end{aligned}$$

$$\begin{aligned} \text{Empujes} : \quad q &= 2,726 \quad \left\{ \begin{array}{l} 8,775 \\ 6,049 \end{array} \right. \end{aligned}$$

$$\begin{aligned} e_6 &= 2,726 \\ e_7 &= 3,331 \\ e_8 &= 3,936 \\ e_9 &= 4,541 \\ e_{10} &= 5,146 \end{aligned}$$

$$\begin{aligned} e_{11} &= 5,751 \\ e_{12} &= 6,355 \\ e_{13} &= 6,960 \\ e_{14} &= 7,565 \\ e_{15} &= 8,170 \\ e_{16} &= 8,775 \end{aligned}$$

$$\begin{aligned} H &= \frac{2,726 + 8,775}{2} \times 7,10 = 40,829 \\ N &= 9,5 \times 4,40 + 2,0 \times 7,10 = 56,00 - \end{aligned}$$

$$\begin{aligned} H1 &= 9,06 + 17,86 = 26,92 - \\ H2 &= 17,26 + 23,57 = 40,83 - \\ H3 &= 14,87 + 5,33 = 20,20 - \\ H4 &= 21,93 + 18,90 = 40,83 - \end{aligned}$$

PAGE NO. 1

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*****
*
*          S T A A D - III
*      REVISION 10.2b (VERSION 10 LEVEL 2)
*  PROPRIETARY PROGRAM OF
*  RESEARCH ENGINEERS, INC.
*      DATE=      NOV  6, 1998
*      TIME=      20:27: 4
*
*****

```

```

1. STAAD PLANE FFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-562+600
2. UNIT ME MT
3. OUTP WIDT 72
4. PAGE EJECT
5. INPUT NO

```

*** THIS RUN WILL ALLOW ANALYSIS ONLY AND NO DESIGN ***

```

6. JOIN COOR
7. 1 0. 7.1 0. 6 4.40 7.1 0.
8. 7 4.4 6.39 0. 16 4.4 0. 0.
9. MEMB INCI
10. 1 1 2 15
11. MEMB PROP
12. 1 TO 15 PRIS YD 0.8 ZD 1.0
13. CONST
14. E 3000000. MEMB 1 TO 5
15. E 2850000. MEMB 6 TO 15
16. SUPP
17. 1 FIXED BUT FY
18. 16 FIXED
19. *
20. LOAD 1 PORTICO EN CONSTRUCCION
21. MEMB LOAD
22. 1 TO 15 UNI GY -2.
23. 6 LIN Y -0.767 -1.372
24. 7 LIN Y -1.372 -1.977
25. 8 LIN Y -1.977 -2.582
26. 9 LIN Y -2.582 -3.187
27. 10 LIN Y -3.187 -3.792
28. 11 LIN Y -3.792 -4.397
29. 12 LIN Y -4.397 -5.001
30. 13 LIN Y -5.001 -5.606
31. 14 LIN Y -5.606 -6.211
32. 15 LIN Y -6.211 -6.816
33. *
34. LOAD 2 PORTICO DESCARGADO
35. MEMB LOAD
36. 1 TO 5 UNI GY -4.6
37. 6 TO 15 UNI GY -2.
38. 6 LIN Y -2.726 -3.331
39. 7 LIN Y -3.331 -3.936
40. 8 LIN Y -3.936 -4.541
41. 9 LIN Y -4.541 -5.146
42. 10 LIN Y -5.146 -5.751
43. 11 LIN Y -5.751 -6.355
44. 12 LIN Y -6.355 -6.960

```

```

46. 14 LIN Y -7.565 -8.170
47. 15 LIN Y -8.170 -8.775
48. *
49. LOAD 3 PORTICO EN CARGA CON EMPUJE ACTIVO
50. MEMB LOAD
51. 1 TO 5 UNI GY -9.5
52. 6 TO 15 UNI GY -2.
53. 6 LIN Y -0.921 -1.306
54. 7 LIN Y -1.306 -1.691
55. 8 LIN Y -1.691 -2.075
56. 9 LIN Y -2.075 -2.460
57. 10 LIN Y -2.460 -2.845
58. 11 LIN Y -2.845 -3.230
59. 12 LIN Y -3.230 -3.615
60. 13 LIN Y -3.615 -3.999
61. 14 LIN Y -3.999 -4.384
62. 15 LIN Y -4.384 -4.769
63. *
64. LOAD 4 PORTICO EN CARGA CON EMPUJE EN REPOSO
65. MEMB LOAD
66. 1 TO 5 UNI GY -9.5
67. 6 TO 15 UNI GY -2.
68. 6 LIN Y -2.726 -3.331
69. 7 LIN Y -3.331 -3.936
70. 8 LIN Y -3.936 -4.541
71. 9 LIN Y -4.541 -5.146
72. 10 LIN Y -5.146 -5.751
73. 11 LIN Y -5.751 -6.355
74. 12 LIN Y -6.355 -6.960
75. 13 LIN Y -6.960 -7.565
76. 14 LIN Y -7.565 -8.170
77. 15 LIN Y -8.170 -8.775
78. *
79. PERF AN

```

** PROCESSING MEMBER/ELEMENT INFORMATION.

** PERFORMING BANDWIDTH REDUCTION.

```

ORIGINAL BANDWIDTH = 1
REDUCED BANDWIDTH = 1

```

** CHECKING LOAD DATA.

** PROCESSING SUPPORT CONDITION.

** PROCESSING AND SETTING UP LOAD VECTOR.

** PROCESSING ELEMENT STIFFNESS MATRIX.

20:27:10

** PROCESSING GLOBAL STIFFNESS MATRIX.

20:27:11

** PROCESSING TRIANGULAR FACTORIZATION.

20:27:11

** CALCULATING JOINT DISPLACEMENT.

20:27:12

** CALCULATING ELEMENT FORCES.

20:27:12

80. PRINT ANAL RESU

FFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-562+600

-- PAGE NO.

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	0.00000	-0.02881	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.08386	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.24692	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.22191	0.00000	0.00000	0.00000	0.00000

	2	-0.00063	-0.07869	0.00000	0.00000	0.00000	0.00012
	3	-0.00055	-0.23320	0.00000	0.00000	0.00000	0.00031
	4	-0.00080	-0.20920	0.00000	0.00000	0.00000	0.00028
3	1	-0.00066	-0.02171	0.00000	0.00000	0.00000	0.00007
	2	-0.00127	-0.06426	0.00000	0.00000	0.00000	0.00021
	3	-0.00109	-0.19427	0.00000	0.00000	0.00000	0.00056
	4	-0.00161	-0.17327	0.00000	0.00000	0.00000	0.00052
4	1	-0.00100	-0.01460	0.00000	0.00000	0.00000	0.00008
	2	-0.00190	-0.04380	0.00000	0.00000	0.00000	0.00025
	3	-0.00164	-0.13681	0.00000	0.00000	0.00000	0.00072
	4	-0.00241	-0.12080	0.00000	0.00000	0.00000	0.00065
5	1	-0.00133	-0.00792	0.00000	0.00000	0.00000	0.00006
	2	-0.00253	-0.02271	0.00000	0.00000	0.00000	0.00022
	3	-0.00218	-0.07193	0.00000	0.00000	0.00000	0.00072
	4	-0.00322	-0.06293	0.00000	0.00000	0.00000	0.00063
6	1	-0.00166	-0.00495	0.00000	0.00000	0.00000	0.00000
	2	-0.00316	-0.00851	0.00000	0.00000	0.00000	0.00009
	3	-0.00273	-0.01523	0.00000	0.00000	0.00000	0.00053
	4	-0.00402	-0.01523	0.00000	0.00000	0.00000	0.00041
7	1	-0.00409	-0.00466	0.00000	0.00000	0.00000	-0.00006
	2	-0.00177	-0.00786	0.00000	0.00000	0.00000	-0.00004
	3	0.02583	-0.01390	0.00000	0.00000	0.00000	0.00029
	4	0.01611	-0.01390	0.00000	0.00000	0.00000	0.00017
8	1	-0.00936	-0.00431	0.00000	0.00000	0.00000	-0.00008
	2	-0.00690	-0.00716	0.00000	0.00000	0.00000	-0.00010
	3	0.03956	-0.01254	0.00000	0.00000	0.00000	0.00011
	4	0.02189	-0.01254	0.00000	0.00000	0.00000	0.00001
9	1	-0.01519	-0.00393	0.00000	0.00000	0.00000	-0.00008
	2	-0.01451	-0.00642	0.00000	0.00000	0.00000	-0.00011
	3	0.04246	-0.01112	0.00000	0.00000	0.00000	-0.00002
	4	0.01876	-0.01112	0.00000	0.00000	0.00000	-0.00008
10	1	-0.01974	-0.00350	0.00000	0.00000	0.00000	-0.00005
	2	-0.02135	-0.00564	0.00000	0.00000	0.00000	-0.00008
	3	0.03816	-0.00967	0.00000	0.00000	0.00000	-0.00010
	4	0.01135	-0.00967	0.00000	0.00000	0.00000	-0.00012
11	1	-0.02168	-0.00303	0.00000	0.00000	0.00000	-0.00001
	2	-0.02512	-0.00481	0.00000	0.00000	0.00000	-0.00002
	3	0.02986	-0.00817	0.00000	0.00000	0.00000	-0.00013
	4	0.00332	-0.00817	0.00000	0.00000	0.00000	-0.00010
12	1	-0.02038	-0.00251	0.00000	0.00000	0.00000	0.00004
	2	-0.02461	-0.00394	0.00000	0.00000	0.00000	0.00004
	3	0.02026	-0.00662	0.00000	0.00000	0.00000	-0.00013
	4	-0.00274	-0.00662	0.00000	0.00000	0.00000	-0.00006
FFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-562+600							

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	9.06	0.00	0.00	0.00	0.00	-6.38
	2	17.26	0.00	0.00	0.00	0.00	-17.38
	3	14.87	0.00	0.00	0.00	0.00	-45.96
	4	21.93	0.00	0.00	0.00	0.00	-42.66
16	1	17.86	23.00	0.00	0.00	0.00	-18.79
	2	23.57	34.44	0.00	0.00	0.00	-24.16
	3	5.33	56.00	0.00	0.00	0.00	4.07
	4	18.90	56.00	0.00	0.00	0.00	-13.15
FFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-562+600							

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	9.06	0.00	0.00	0.00	0.00	-6.38 *
		2	-9.06	1.76	0.00	0.00	0.00	5.61
		1	17.26	0.00	0.00	0.00	0.00	-17.38 *
		2	-17.26	4.05	0.00	0.00	0.00	15.60
	3	1	14.87	0.00	0.00	0.00	0.00	-45.96 ⊕
		2	-14.87	8.36	0.00	0.00	0.00	42.29
		1	21.93	0.00	0.00	0.00	0.00	-42.66 *
		2	-21.93	8.36	0.00	0.00	0.00	38.98
2	1	2	9.06	-1.76	0.00	0.00	0.00	-5.61 *
		3	-9.06	3.52	0.00	0.00	0.00	3.28
		2	17.26	-4.05	0.00	0.00	0.00	-15.60 *
		3	-17.26	8.10	0.00	0.00	0.00	10.26
	3	2	14.87	-8.36	0.00	0.00	0.00	-42.29 ⊕
		3	-14.87	16.72	0.00	0.00	0.00	31.25
		4	21.93	-8.36	0.00	0.00	0.00	-38.98 *
		3	-21.93	16.72	0.00	0.00	0.00	27.94
3	1	3	9.06	-3.52	0.00	0.00	0.00	-3.28 *
		4	-9.06	5.28	0.00	0.00	0.00	-0.59
		2	17.26	-8.10	0.00	0.00	0.00	-10.26 *
		4	-17.26	12.14	0.00	0.00	0.00	1.35
	3	3	14.87	-16.72	0.00	0.00	0.00	-31.25 ⊕
		4	-14.87	25.08	0.00	0.00	0.00	12.86
		4	21.93	-16.72 *	0.00	0.00	0.00	-27.94 *
		4	-21.93	25.08	0.00	0.00	0.00	9.55
4	1	4	9.06	-5.28	0.00	0.00	0.00	0.59 *
		5	-9.06	7.04	0.00	0.00	0.00	-6.01
		2	17.26	-12.14	0.00	0.00	0.00	-1.35 *
		5	-17.26	16.19	0.00	0.00	0.00	-11.11
	3	4	14.87	-25.08	0.00	0.00	0.00	-12.86 ⊕
		5	-14.87	33.44	0.00	0.00	0.00	-12.89
		4	21.93	-25.08 *	0.00	0.00	0.00	-9.55 *
		5	-21.93	33.44 *	0.00	0.00	0.00	-16.20
5	1	5	9.06	-7.04	0.00	0.00	0.00	6.01 *
		6	-9.06	8.80	0.00	0.00	0.00	-12.98 *
		2	17.26	-16.19	0.00	0.00	0.00	11.11 *
		6	-17.26	20.24	0.00	0.00	0.00	-27.14
	3	5	14.87	-33.44	0.00	0.00	0.00	12.89 *
		6	-14.87	41.80	0.00	0.00	0.00	-46.00
		5	21.93	-22.11	0.00	0.00	0.00	16.20
		6	-21.93	22.11	0.00	0.00	0.00	-16.20

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
13	1	-0.01596	-0.00195	0.00000	0.00000	0.00000	0.00008
	2	-0.01979	-0.00302	0.00000	0.00000	0.00000	0.00009
	3	0.01144	-0.00503	0.00000	0.00000	0.00000	-0.00011
	4	-0.00542	-0.00503	0.00000	0.00000	0.00000	-0.00001
14	1	-0.00949	-0.00134	0.00000	0.00000	0.00000	0.00010
	2	-0.01197	-0.00206	0.00000	0.00000	0.00000	0.00012
	3	0.00482	-0.00340	0.00000	0.00000	0.00000	-0.00007
	4	-0.00467	-0.00340	0.00000	0.00000	0.00000	0.00003
15	1	-0.00308	-0.00069	0.00000	0.00000	0.00000	0.00008
	2	-0.00393	-0.00105	0.00000	0.00000	0.00000	0.00010
	3	0.00106	-0.00172	0.00000	0.00000	0.00000	-0.00003
	4	-0.00187	-0.00172	0.00000	0.00000	0.00000	0.00004
16	1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
FFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-562+600							

6 1 6 8.80 9.06 0.00 0.00 0.00 12.98
7 -10.22 -8.30 0.00 0.00 0.00 -6.79
FFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-562+600
-- PAGE NO. 7

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
2	6	7	20.24	17.26	0.00	0.00	0.00	27.14
	7	7	-21.66	-15.11	0.00	0.00	0.00	-15.63
3	6	7	41.80	14.87	0.00	0.00	0.00	46.00
	7	7	-43.22	-14.08	0.00	0.00	0.00	-35.70
4	6	7	41.80	21.93	0.00	0.00	0.00	49.30
	7	7	-43.22	-19.78	0.00	0.00	0.00	-34.47
7	1	7	10.22	8.30	0.00	0.00	0.00	6.79
	8	7	-11.64	-7.11	0.00	0.00	0.00	-1.29
2	7	8	21.66	15.11	0.00	0.00	0.00	15.63
	8	8	-23.08	-12.53	0.00	0.00	0.00	-5.80
3	7	8	43.22	14.08	0.00	0.00	0.00	35.70
	8	8	-44.64	-13.02	0.00	0.00	0.00	-26.06
4	7	8	43.22	19.78	0.00	0.00	0.00	34.47
	8	8	-44.64	-17.20	0.00	0.00	0.00	-21.32
8	1	8	11.64	7.11	0.00	0.00	0.00	1.29
	9	8	-13.06	-5.50	0.00	0.00	0.00	3.21
2	8	9	23.08	12.53	0.00	0.00	0.00	5.80
	9	9	-24.50	-9.52	0.00	0.00	0.00	2.05
3	8	9	44.64	13.02	0.00	0.00	0.00	26.06
	9	9	-46.06	-11.68	0.00	0.00	0.00	-17.28
4	8	9	44.64	17.20	0.00	0.00	0.00	21.32
	9	9	-46.06	-14.19	0.00	0.00	0.00	-10.15
9	1	9	13.06	5.50	0.00	0.00	0.00	-3.21
	10	9	-14.48	-3.45	0.00	0.00	0.00	6.41
2	9	10	24.50	9.52	0.00	0.00	0.00	-2.05
	10	10	-25.92	-6.08	0.00	0.00	0.00	7.62
3	9	10	46.06	11.68	0.00	0.00	0.00	17.28
	10	10	-47.48	-10.07	0.00	0.00	0.00	-9.54
4	9	10	46.06	14.19	0.00	0.00	0.00	10.15
	10	10	-47.48	-10.75	0.00	0.00	0.00	-1.27
10	1	10	14.48	3.45	0.00	0.00	0.00	-6.41
	11	10	-15.90	-0.97	0.00	0.00	0.00	8.01
2	10	11	25.92	6.08	0.00	0.00	0.00	-7.62
	11	11	-27.34	-2.21	0.00	0.00	0.00	10.58
3	10	11	47.48	10.07	0.00	0.00	0.00	9.54
	11	11	-48.90	-8.19	0.00	0.00	0.00	-3.04
4	10	11	47.48	10.75	0.00	0.00	0.00	1.27
	11	11	-48.90	-6.88	0.00	0.00	0.00	5.01
11	1	11	15.90	0.97	0.00	0.00	0.00	-8.01
	12	11	-17.32	1.94	0.00	0.00	0.00	7.69
2	11	12	27.34	2.21	0.00	0.00	0.00	-10.58
	12	12	-28.76	2.09	0.00	0.00	0.00	10.65
3	11	12	48.90	8.19	0.00	0.00	0.00	3.04
	12	12	-50.32	-6.03	0.00	0.00	0.00	2.03
4	11	12	48.90	6.88	0.00	0.00	0.00	-5.01
	12	12	-50.32	-2.58	0.00	0.00	0.00	8.40

FFCC ALTA VELOCIDAD MADRID-BARCELONA. PI-562+600

-- PAGE NO. 8

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
12	1	12	17.32	-1.94	0.00	0.00	0.00	-7.69
		13	-18.74	5.27	0.00	0.00	0.00	5.15
	2	12	28.76	-2.09	0.00	0.00	0.00	-10.65
		13	-30.18	6.82	0.00	0.00	0.00	7.51
	3	12	50.32	6.03	0.00	0.00	0.00	-2.03
		13	-51.74	-3.60	0.00	0.00	0.00	5.46
	4	12	50.32	2.58	0.00	0.00	0.00	-8.40
		13	-51.74	2.14	0.00	0.00	0.00	8.58
13	1	13	18.74	-5.27	0.00	0.00	0.00	-5.15
		14	-20.16	9.04	0.00	0.00	0.00	0.10
	2	13	30.18	-6.82	0.00	0.00	0.00	-7.51
		14	-31.60	11.97	0.00	0.00	0.00	0.87
	3	13	51.74	3.60	0.00	0.00	0.00	-5.46
		14	-53.16	-0.90	0.00	0.00	0.00	7.08
	4	13	51.74	-2.14	0.00	0.00	0.00	-8.58
		14	-53.16	7.30	0.00	0.00	0.00	5.25
14	1	14	20.16	-9.04	0.00	0.00	0.00	-0.10
		15	-21.58	13.23	0.00	0.00	0.00	-7.78
	2	14	31.60	-11.97	0.00	0.00	0.00	-0.87
		15	-33.02	17.56	0.00	0.00	0.00	-9.59
	3	14	53.16	0.90	0.00	0.00	0.00	-7.08
		15	-54.58	2.08	0.00	0.00	0.00	6.68
	4	14	53.16	-7.30	0.00	0.00	0.00	-5.25
		15	-54.58	12.89	0.00	0.00	0.00	-1.89
15	1	15	21.58	-13.23	0.00	0.00	0.00	7.78
		16	-23.00	17.86	0.00	0.00	0.00	-18.79
	2	15	33.02	-17.56	0.00	0.00	0.00	9.59
		16	-34.44	23.57	0.00	0.00	0.00	-24.16
	3	15	54.58	-2.08	0.00	0.00	0.00	-6.68
		16	-56.00	5.33	0.00	0.00	0.00	4.07
	4	15	54.58	-12.89	0.00	0.00	0.00	1.89
		16	-56.00	18.90	0.00	0.00	0.00	-13.15

***** END OF LATEST ANALYSIS RESULT *****

81. FINISH

***** END OF STAAD-III *****

***** DATE= NOV 6,1998 TIME= 20:27:14 *****

* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* CALL (01) 686-7682, CROYDON, U.K. TLX. 929181 *

PI - 562+600

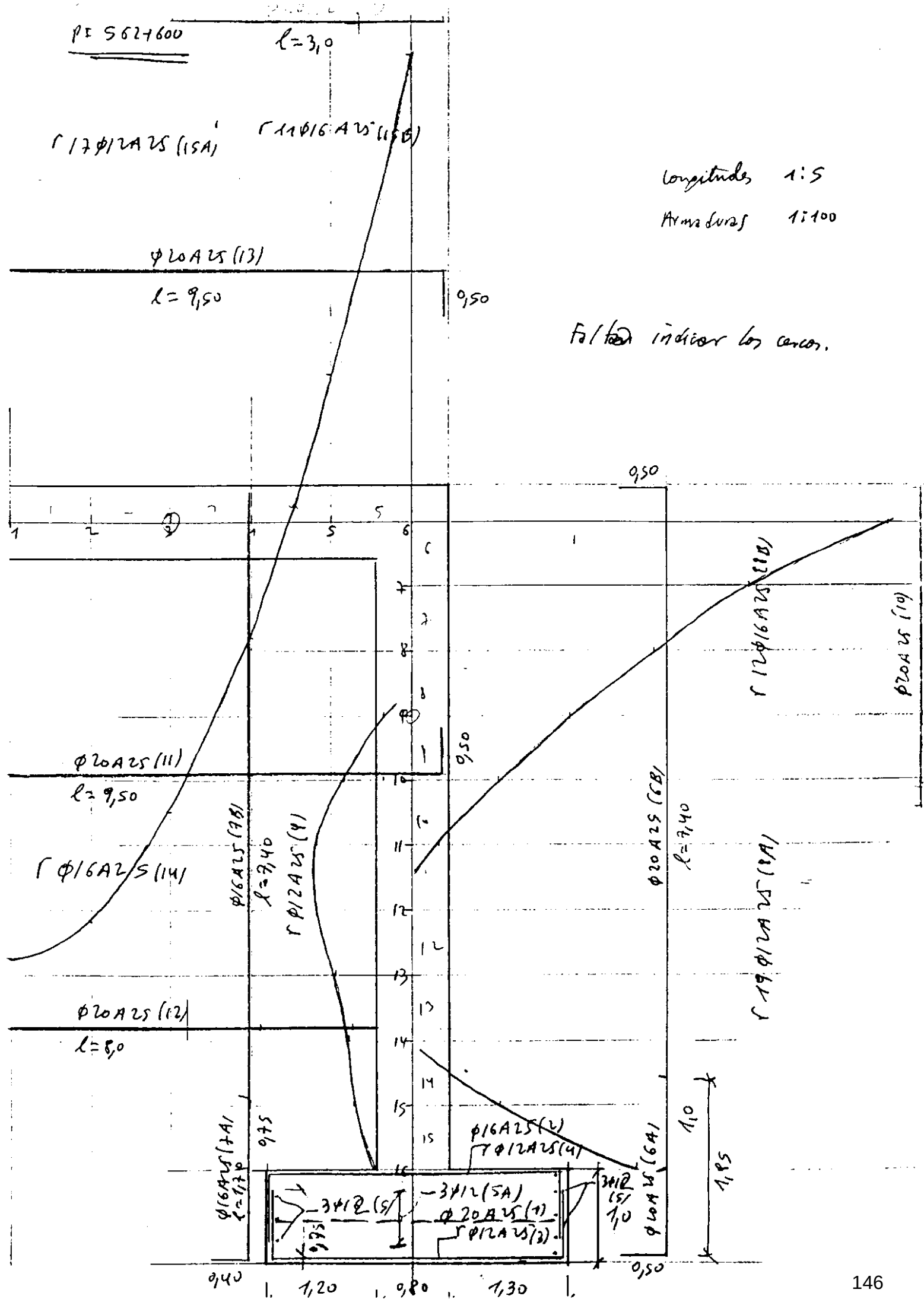
ARMADURA DEL VINCULO

Nudo 1	$m = -45,96$	$U_I = 95,72$
2	$m = -42,29$	$U_I = 87,59$
3	$m = -31,75$	$U_I = 63,66$
4	$m = -12,88$	$U_I = 25,46$
5	$m = 16,20$	$U_I = 32,24$
6	$m = -49,30$	$U_I = 103,19$

ARMADURA DEL HASTIAL

$$U_{r,d} = \frac{2500 \times 0,9}{1,5} \times 1,0 \times 0,75^2 = 843,75 ; U = 1,14 m \left(1 + \frac{m}{562,5} \right)$$

Nudo 6	$m = 49,30$	$U_E = 104,02$
7	$m = 35,70$	$U_E = 73,65$
8	$m = 26,06$	$U_E = 52,90$
9	$m = 17,28$	$U_E = 34,55$
	$m = -3,21$	$U_I = 6,26$
10	$m = 9,54$	$U_E = 18,82$
	$m = -3,62$	$U_I = 14,88$
11	$m = 3,04$	$U_E = 5,93$
	$m = -10,58$	$U_I = 20,97$
12	$m = -10,65$	$U_I = 21,05$
13	$m = -8,58$	$U_I = 16,90$
14	$m = -7,08$	$U_I = 13,91$
15	$m = -6,68$	$U_I = 13,11$
	$m = 9,59$	$U_E = 18,92$
16	$m = 4,07$	$U_I = 7,95$
	$m = -24,16$	$U_E = 48,88$



COMPROBACION A CORTANTE

PI 562+600

Corrimos en el HASTIAL

Encuentro con la zapata: $Q = 23,57 \text{ T}$

$\phi 20 \text{ A } 15 \Rightarrow w = 17,57 \text{ cm}$

$$\xi = 1,6 - 0,75 = 0,85 \Rightarrow \xi = 1,0$$

$$\rho_t = 17,57 / 100 \times 75 = 0,168 \times 10^{-2}$$

$$f_w = 5 \sqrt{250 \times 0,9 / 1,5} = 61,24 \text{ T/mm}$$

$$V_{cu} = 61,24 \times 1,0 \times 0,75 = 45,93$$

$$V_{u2,d} = 0,50 \times 45,93 \times 1,0 \times (1 + 50 \times 0,168 \times 10^{-2}) = 24,89 \text{ T}$$

$$Q_{max} = 24,89 / 1,5 = 16,60 \text{ T}$$

$\phi 10 \text{ A } 30$ en la otra direccin

$$V_{fu} = \frac{3,30 \times 0,79}{0,30} \times 4,2 \times 0,9 \times 0,75 = 24,86 \text{ T}$$

$$Q_{dmax} = 24,86 + 24,84 = 49,70$$

$$Q_d = 1,5 \times 23,57 = 35,35 \text{ T}$$

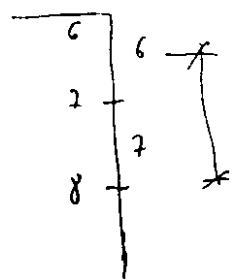
$$11,87 + \frac{17,57 - 11,87}{0,71} \times x = 16,60 \quad x = 0,60$$

$$l = 0,71 + 0,11 + 0,75 = 1,50$$

Encuentro con el dintel $\rho_t = 2 \times 0,168 \times 10^{-2}$

$$V_{u2,d} = 0,50 \times 45,93 \times 1,0 \times (1 + 2 \times 50 \times 0,168 \times 10^{-2}) = 26,82 \text{ T}$$

$$Q_{max} = 26,82 / 1,5 = 17,88$$



$$l = 0,71 \times 1,5 + 0,75 = 1,80 \text{ m}$$

Corrimos en el DINTIL

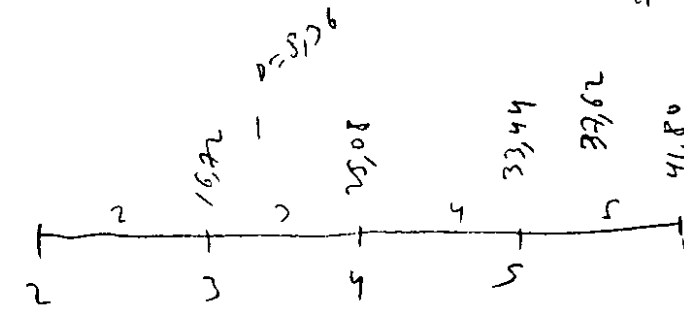
$$\rho_t = 2 \times 0,163 \times 10^{-2}$$

$$f_w = 5 \sqrt{250 / 1,5} = 64,55 \text{ T/mm}$$

$$V_{cu} = 64,55 \times 1,0 \times 0,75 = 48,41 \text{ T}$$

$$V_{u2,d} = 0,50 \times 48,41 \times 1,0 \times (1 + 50 \times 2 \times 0,163 \times 10^{-2}) = 28,27 \text{ T}$$

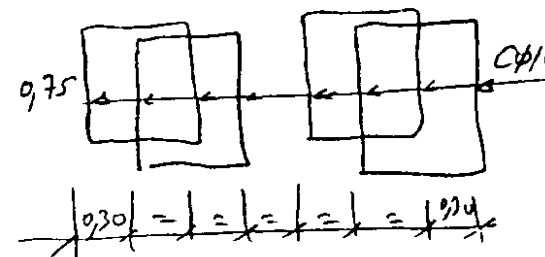
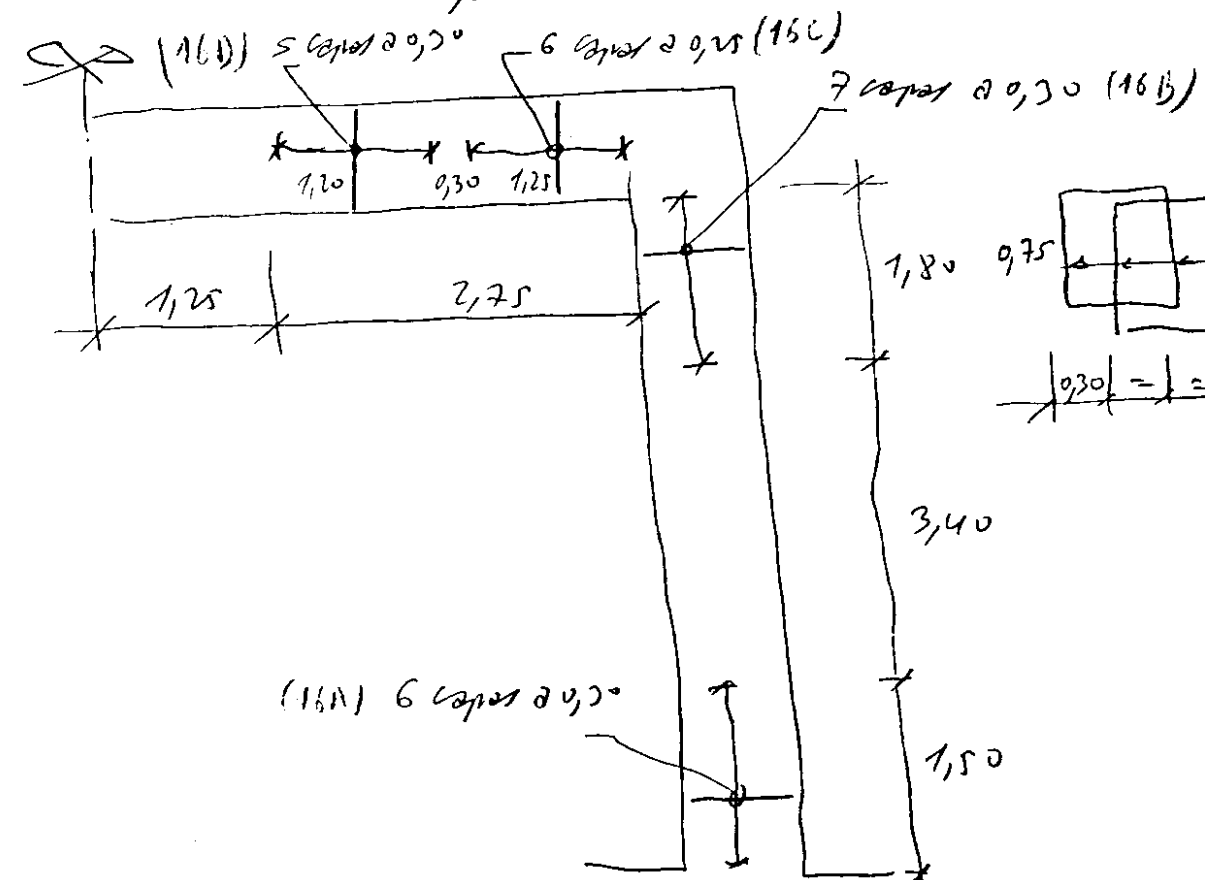
$$Q_{max} = 28,27 / 1,5 = 18,85 \text{ T}$$



$$V_d = 37,62 \times 1,5 - 28,27 = 28,16 \text{ T}$$

$\phi 10 \text{ A } 30$ en la direccin 7 a 9 y en la otra

$$V_{fu} = \frac{4 \times 0,79}{0,30} \times 4,2 \times 0,9 \times 0,75 = 29,86 \text{ T} > 28,16$$



Tanulo 1

$$\begin{aligned}a &= 0,8 \\b &= 0,8 \\d &= 1,00 \\c &= 0,80 \\z &= 2,60\end{aligned}$$

H-I : $N_T = 41,00$
 $M_T = 19,258$
 $e = 0,470$
 $z/6 = 0,433$
 $l = 2,491$
 $\sigma_{max} = 32,92 \text{ T/m}$

H-II : $N_T = 56,120$
 $M_T = 24,740$
 $e = 0,441$
 $z/6 = 0,433$
 $l = 2,577$
 $\sigma_{max} = 43,546 \text{ T/m}$

H-III : $N_T = 75,28$
 $M_T = -18,078$
 $e = 0,240$
 $z/6 = 0,433$
 $\sigma_A = 12,91$
 $\sigma_B = 45,0$

H-IV : $N_T = 77,680$
 $M_T = 7,838$
 $e = 0,101$
 $z/6 = 0,422$
 $\sigma_A = 36,83$
 $\sigma_B = 22,92$

Tanulo 3

$$\begin{aligned}a &= 1,20 \\b &= 0,80 \\d &= 1,20 \\c &= 1,00 \\z &= 3,20\end{aligned}$$

H-I : $N_T = 59,20$
 $M_T = 17,45$
 $e = 0,348$
 $z/6 = 0,533$
 $\sigma_A = 25,912$
 $\sigma_B = 5,463$

H-II : $N_T = 67,16$
 $M_T = 23,010$
 $e = 0,343$
 $z/6 = 0,533$
 $\sigma_A = 34,470$
 $\sigma_B = 7,505$

H-III : $N_T = 85,12$
 $M_T = -19,860$
 $e = 0,233$
 $z/6 = 0,533$
 $\sigma_A = 14,960$
 $\sigma_B = 38,207$

H-IV : $N_T = 88,720$
 $M_T = 7,330$
 $e = 0,083$
 $z/6 = 0,533$
 $\sigma_A = 32,02$
 $\sigma_B = 23,43$

Tanulo 2

$$\begin{aligned}a &= 1,0 \\b &= 0,80 \\d &= 1,20 \\c &= 0,80 \\z &= 3,0\end{aligned}$$

H-I : $N_T = 45,00$ T
 $M_T = 14,778$ mT
 $e = 0,328$ m.
 $z/6 = 0,5$
 $\sigma_A = 24,852$ T/m
 $\sigma_B = 5,148$

H-II : $N_T = 61,040$
 $M_T = 18,972$
 $e = 0,311$
 $z/6 = 0,500$
 $\sigma_A = 32,995$ T/m
 $\sigma_B = 7,699$ "

H-III : $N_T = 79,60$
 $M_T = -23,006$
 $e = 0,289$
 $z/6 = 0,50$
 $\sigma_B = 11,196$
 $\sigma_A = 41,87$

H-IV : $N_T = 82,60$
 $M_T = 2,07$
 $e = 0,025$
 $z/6 = 0,50$
 $\sigma_A = 28,91$
 $\sigma_B = 26,15$

Tanulo 4

$$\begin{aligned}a &= 1,30 \\b &= 0,80 \\d &= 1,20 \\c &= 1,00 \\z &= 3,30\end{aligned}$$

H-I : $N_T = 52,05$
 $M_T = 17,0$
 $e = 0,327$ $C_D = \frac{52,05 \times 0,55}{17,81} = 1,60$
 $z/6 = 0,55$
 $\sigma_A = 25,139$
 $\sigma_B = 6,406$

H-II : $N_T = 69,47$
 $M_T = 22,672$
 $e = 0,326$ $C_D = \frac{69,47 \times 0,55}{23,57} = 1,627$
 $z/6 = 0,55$
 $\sigma_A = 33,543$
 $\sigma_B = 8,560$

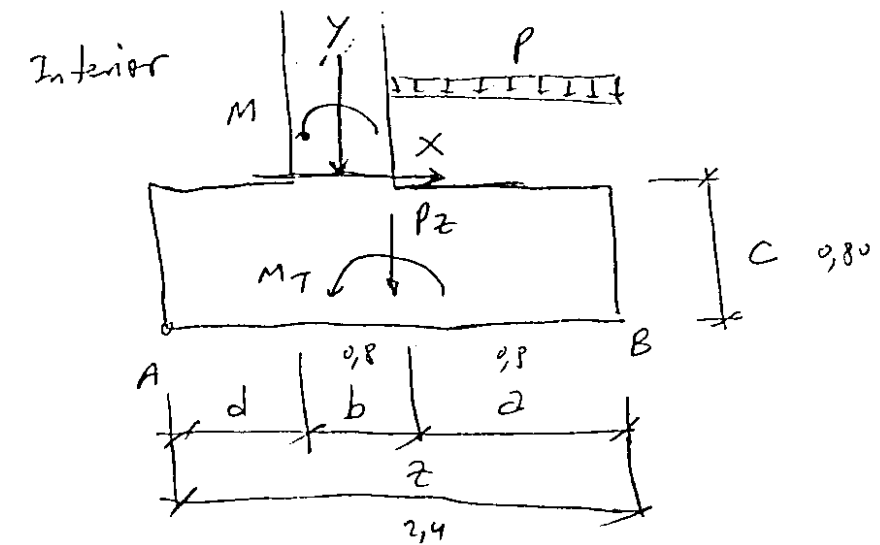
H-III : $N_T = 87,13$
 $M_T = -18,820$
 $e = 0,216$
 $z/6 = 0,550$
 $\sigma_A = 16,034$
 $\sigma_B = 36,772$

H-IV : $N_T = 91,030$
 $M_T = 8,070$
 $e = 0,089$
 $z/6 = 0,550$
 $\sigma_A = 32,031$
 $\sigma_B = 23,139$

VALIDO

DIMENSIONAMIENTO DE LA CIMENTACION

PI 562+600 - CARGAS DE LA CIMENTACIÓN



$$\sigma_{adm} = 30 \text{ T/m}^2$$

$$\sigma_{permiso} = 30 \cdot 1,25 = 37,5 \text{ T/m}^2$$

$$\mu = 0,55$$

Valores de las cargas:

Hipótesis I: $p = (7,10 + 0,40 + 0,50) \cdot 2,0 = 16,0 \text{ T/m}$

$$x = -17,86$$

$$y = 23,0$$

$$M = 18,79$$

Hipótesis II: $p = 3,0 + 2,60 + (0,40 + 7,10) \cdot 2 = 20,6$

$$x = -23,57$$

$$y = 34,44$$

$$M = 24,16$$

Hipótesis III: $p = 2,6 + (0,4 + 7,10) \cdot 2 = 17,60$

$$x = -9,33$$

$$y = 56,0$$

$$M = -4,07$$

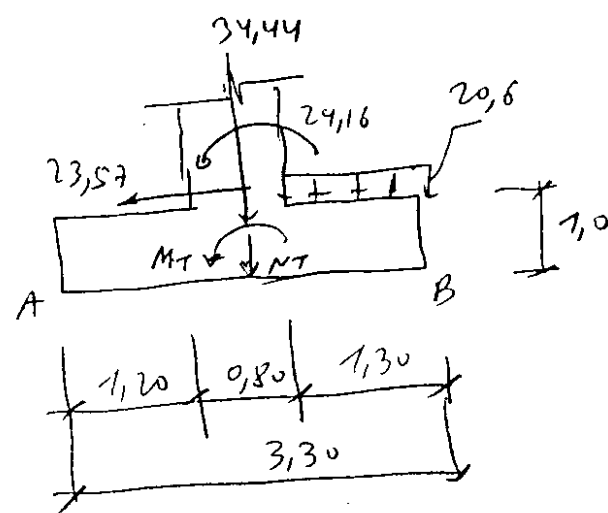
Hipótesis IV: $p = 20,6$

$$x = -15,90$$

$$y = 56,0$$

$$M = 13,15$$

Comprobación de la hipótesis II



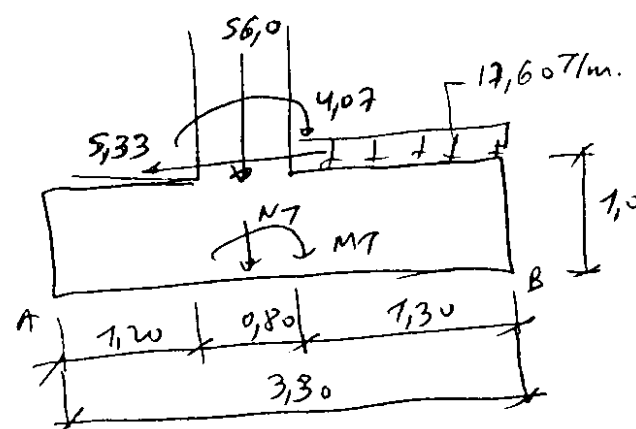
$$N_T = 34,44 + 20,6 \times 1,30 + 3,30 \times 1,0 \times 2,50 = 69,47$$

$$M_T = 23,57 \times 1,0 + 24,16 + 34,44 \times (1,65 - 1,20 - 0,40) - 20,6 \times 1,30 \times (1,65 - 0,65) = 22,67 \text{ mT}$$

$$e = 22,67 / 69,47 = 0,326$$

$$\sigma_{A/B} = \frac{69,47}{3,30} \left(1 \pm \frac{6 \times 0,326}{3,30} \right) = \frac{33,543}{8,560} \Rightarrow \text{bien}$$

Comprobación de la hipótesis III



$$N_T = 56,0 + 3,30 \times 1,0 \times 2,50 + 17,60 \times 1,30 = 87,13 \text{ T}$$

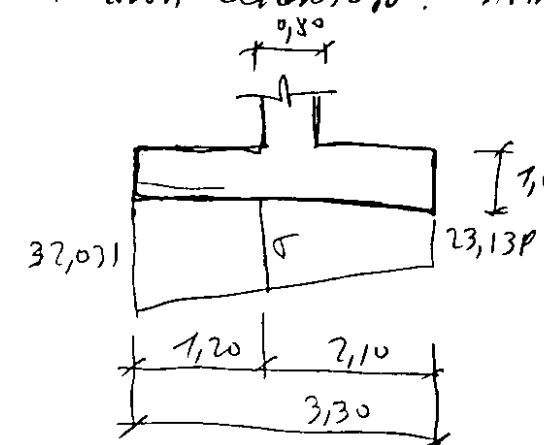
$$M_T = 5,33 - 4,07 + 56,0 \times (1,65 - 1,20 - 0,40) - 17,60 \times 1,30 \times (1,65 - 0,65) = -18,820 \text{ mT}$$

$$e = 18,820 / 87,13 = 0,216$$

$$\sigma_{B/A} = \frac{87,13}{3,30} \left(1 \pm \frac{6 \times 0,216}{3,30} \right) = \frac{36,77}{16,024} \Rightarrow \text{bien}$$

Dimensionamiento de la zapata

1.- Talón delantero: Armadura inferior



H-IV

$$\sigma = 32,031 - \frac{32,031 - 23,139}{3,30} \times 1,20 = 28,748 \text{ T/m}$$

$$e = 1,20 + 0,15 \times 0,80 = 1,20 + 0,12 = 1,32 \text{ m}$$

$$M = 28,748 \times 1,20 \times (0,12 + 0,60) + \frac{1}{2} \times 32,031 \times 1,20 \times (0,12 + 2 \times 1,20/3) - 1,0 \times 2,5 \times 1,20 \times (0,12 + 0,60) = 24,506 \text{ mT}$$

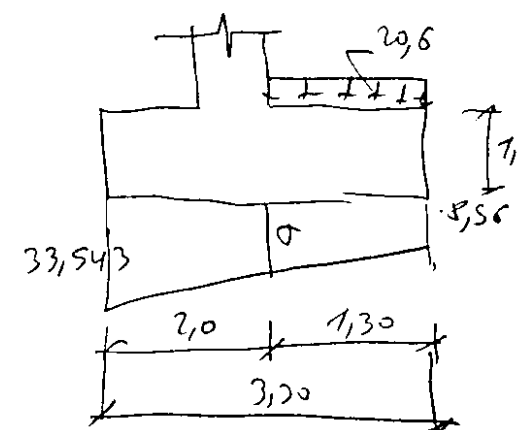
$$M_d = 1,5 \times 24,506 = 36,759 \text{ mT}$$

$$b = 1,0 \text{ m} \quad d = 0,95 \text{ m} \quad V_c \cdot d = \frac{2500}{1,5} \times 1,0 \times 0,95 = 1504$$

$$V = 38,45 \text{ T/m} \Rightarrow \text{bien}$$

V < 12 AJS

2.- Talón trasero: Armadura superior



H-II

$$\sigma = 8,56 + \frac{33,543 - 8,56}{3,30} \times 1,20 = 18,402 \text{ T/m}$$

$$\sigma T = 18,402 - 8,56 = 9,842$$

$$M = (2,0 + 2,5 - 8,56) \times 1,30 \times (0,12 + 0,65) - \frac{1}{2} \times 9,842 \times 1,30 \times (0,12 + 1,30/3) = 14,555 - 3,540 = 11,015 \text{ mT}$$

$$M_d = 1,5 \times 11,015 = 16,522 \text{ mT}$$

$$V_{\text{zap}} = 17,06 \text{ T/m} \Rightarrow \text{bien}$$

V < 12 AJS

DIMENSIONAMIENTO DE LAS ALETAS

COEFICIENTES DE EMPUJE

TITULO :FFCC MADRID-BARCELONA. PI 562+6 ALETA A1A

DIMENSIONES GEOMETRICAS DEL MURO

ANCHO DE LA CORONACION	=	.400 M
PROFUNDIDAD DEL PARAMENTO VERTICAL DEL INTRADOS	=	.000 M
" " " " TRASDOS	=	6.900 M
PROFUNDIDAD DE LOS PARAMENTOS INCLINADOS EN EL TRASDOS		
ZONA SUPERIOR	=	.000 M
ZONA INFERIOR	=	.000 M
PROFUNDIDAD DEL TALUD DE TIERRAS EN EL TRASDOS	=	.000 M

PENDIENTE DEL TALUD DE TIERRAS	=	.00000000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333330
" " " SUPERIOR DEL TRASDOS	=	.00000000
" " " INFERIOR " "	=	.00000000

DIMENSIONES DE LA ZAPATA

VUELO DELANTERO	=	.670	M
ESPEJOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.900	M
" " " " " " DCHO	=	.900	M
LONGITUD TOTAL DE LA ZAPATA	=	3.700	M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000	

SITUACION DE LA CARGA CONCENTRADA EXTERIOR. DISTANCIA=.000 M
PROFUNDIDAD=.000 M

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	=	.07000 M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	=	2250.00 T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	=	.06000 M
PESO ESPECIFICO DEL HORMIGON	=	2.50000 T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	=	2.00000 T/M3

HIPOTESIS = 1

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 °
SOBRECARGA UMR SOBRE EL RELLENO	=	.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T
COF. MINÓRACION DE CARGAS FAVORABLES PARA LA COMPROBACION DE LAS ESTABILIDADES	=	1.100

ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASDOS		
EN LA ZONA VERTICAL	=	.000000 °
" " " ENCLINADA SUPERIOR	=	.000000 °

ZONA DEL RELLENO. COMPONENTE	HORIZONTAL	KH=	.270990
"	VERTICAL	KV=	.000000
ZONA VERTICAL DEL MURO. COMP	HORIZONTAL	KH=	.270990
"	VERTICAL	KV=	.000000
ZONA INCLINADA SUPERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000
ZONA INCLINADA INFERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND	CANTO	ESFUERZOS CARACTERISTICOS			ARMAD. NECESARIA		CORTA
SECCION	SECCION	AXIL	CORTANTE	MOMENTO	TRACCION	COMPRES	VCU
M	M	T	T	MT	T	T	T
.493	.416	.503	.066	.009	.000	.000	20.
.986	.433	1.026	.263	.078	.000	.000	21.
1.479	.449	1.570	.592	.273	.000	.000	22.
1.971	.466	2.133	1.053	.658	.534	.160	23.
2.464	.482	2.717	1.646	1.298	2.192	.204	24.
2.957	.499	3.322	2.370	2.257	4.785	.249	25.
3.450	.515	3.946	3.225	3.601	8.452	.296	26.
3.943	.531	4.591	4.213	5.393	13.328	.344	27.
4.436	.548	5.256	5.332	7.699	19.548	.394	28.
4.929	.564	5.941	6.583	10.584	27.246	.446	29.
5.421	.581	6.646	7.965	14.112	36.559	.498	30.
5.914	.597	7.372	9.479	18.348	47.626	.553	31.
6.407	.614	8.118	11.125	23.356	60.592	.609	32.
6.900	.630	8.884	12.902	29.201	75.605	.666	33.

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTA VCU T
.493	.416	.503	.099	.014	.000	.000	20.7
.986	.433	1.026	.395	.121	.000	.000	21.0
1.479	.449	1.570	.889	.419	.138	.078	22.6
1.971	.466	2.133	1.580	1.004	1.186	.107	23.5
2.464	.482	2.717	2.468	1.971	3.027	.136	24.5
2.957	.499	3.322	3.555	3.425	5.807	.166	25.5
3.450	.515	3.946	4.838	5.455	9.666	.197	26.4
3.943	.531	4.591	6.319	8.162	14.738	.230	27.5
4.436	.548	5.256	7.998	11.641	21.156	.263	28.5
4.929	.564	5.941	9.874	15.991	29.054	.297	29.5
5.421	.581	6.616	11.817	21.300	38.567	.332	30.5

6.407 6.630 8.884 19.353 44.009 78.210 1441 33.114

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 16.487 T
" " " NORMALES " " " = 45.753 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.526
MOMENTO DE VUELCO = 42.866 MT
MOMENTO DE ESTABILIDAD = 97.659 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 2.278
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 16.487 T
" " " NORMALES " " " = 50.329 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 28.550 MT
LONGITUD TOTAL DE LA ZAPATA = 3.700 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .567 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPECIAL
TENSION EN EL VERTICE DELANTERO = 26.115 T/M2
TENSION EN EL VERTICE TRASERO = 1.090 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.382	.900	.000	8.628	1.681	2.953	.000	53.576
.764	.900	.000	16.268	6.470	11.439	.000	53.576

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.480	.900	.000	6.402	1.599	2.809	.000	53.576
.960	.900	.000	11.245	5.896	10.416	.000	53.576
1.440	.900	.000	14.530	12.145	21.628	.000	53.576
1.920	.900	.000	16.257	19.506	35.232	.000	53.576

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 24.731 T
" " " NORMALES " " " = 45.753 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.018
MOMENTO DE VUELCO = 64.299 MT
MOMENTO DE ESTABILIDAD = 97.659 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.519
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 24.731 T
" " " NORMALES " " " = 50.329 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 49.983 MT
LONGITUD TOTAL DE LA ZAPATA = 3.700 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .993 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 2.571 M
TENSION EN EL VERTICE DELANTERO = 39.157 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.382	.900	.000	12.995	2.555	2.992	.000	53.576
.764	.900	.000	23.764	9.651	11.374	.000	53.576

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.480	.900	.000	7.704	1.849	2.164	.000	53.576
.960	.900	.000	15.408	7.396	8.699	.000	53.576
1.440	.900	.000	22.377	16.565	19.638	.000	53.576
1.920	.900	.000	26.055	28.329	33.924	.000	53.576
2.400	.900	.000	26.224	41.016	49.647	.000	53.576

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 11.804 T
 " " " " NORMALES " " " = 32.649 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.521
 MOMENTO DE VUELCO = 35.970 MT
 MOMENTO DE ESTABILIDAD = 61.507 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 2.368
 RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 11.804 T
 " " " " NORMALES " " " = 35.914 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 15.774 MT
 LONGITUD TOTAL DE LA ZAPATA = 3.200 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .439 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPEZIAL
 TENSION EN EL VERTICE DELANTERO = 20.466 T/M2
 TENSION EN EL VERTICE TRASERO = 1.981 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.399	.900	.000	6.812	1.391	2.442	.000	53.576
.798	.900	.000	12.704	5.317	9.385	.000	53.576

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.475	.900	.000	4.891	1.213	2.130	.000	53.576
.950	.900	.000	8.479	4.440	7.829	.000	53.576
1.425	.900	.000	10.764	9.062	16.074	.000	53.576
1.900	.900	.000	11.745	14.460	25.827	.000	53.576

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 17.706 T
 " " " " NORMALES " " " = 32.649 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.014
 MOMENTO DE VUELCO = 38.954 MT
 MOMENTO DE ESTABILIDAD = 61.507 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.579
 RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 17.706 T
 " " " " NORMALES " " " = 35.914 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 28.759 MT
 LONGITUD TOTAL DE LA ZAPATA = 3.200 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .801 M

EL DIAGRAMA DE PRESTIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 2.398 M
 TENSION EN EL VERTICE DELANTERO = 29.957 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.399	.900	.000	10.066	2.076	2.430	.000	53.576
.798	.900	.000	18.141	7.773	9.145	.000	53.576

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.475	.900	.000	6.484	1.540	1.802	.000	53.576
.950	.900	.000	12.831	6.153	7.229	.000	53.576
1.425	.900	.000	17.029	13.356	15.791	.000	53.576
1.900	.900	.000	18.408	21.884	26.063	.000	53.576

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1.243	.541	4.993	9.133	12.749	21.059	.250	27.963
4.714	.557	5.640	11.275	17.509	32.996	.282	28.881
5.186	.573	6.306	13.643	23.326	43.785	.315	29.794
5.657	.589	6.991	16.236	30.303	56.598	.350	30.707
6.129	.604	7.694	19.055	38.560	71.614	.385	31.620
6.600	.620	8.415	22.099	48.189	89.018	.421	32.533

CALCULO DE LA ZAPATA

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MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 21.226 T
 " " " " NORMALES " " " = 57.841 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.499
 MOMENTO DE VUELCO = 59.655 MT
 MOMENTO DE ESTABILIDAD = 146.567 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 2.457
 RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 21.226 T
 " " " " NORMALES " " " = 62.893 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 27.147 MT
 LONGITUD TOTAL DE LA ZAPATA = 4.000 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .432 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPEZIAL
 TENSION EN EL VERTICE DELANTERO = 25.903 T/M2
 TENSION EN EL VERTICE TRASERO = 5.543 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.386	.900	.000	8.762	1.718	3.018	.000	53.576
.773	.900	.000	16.763	6.675	11.803	.000	53.576

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
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.900	.900	.000	15.575	10.655	18.938	.000	53.576
1.350	.900	.000	17.945	18.241	32.738	.000	53.576
1.800	.900	.000	19.145	26.630	48.307	.000	53.576
2.250	.900	.000	19.174	35.296	64.727	.000	53.576
2.700	.900	.000	18.033	43.711	81.002	.000	53.576

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 31.839 T
 " " " " NORMALES " " " = 61.502 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.062
 MOMENTO DE VUELCO = 89.483 MT
 MOMENTO DE ESTABILIDAD = 161.212 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.802

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 31.839 T
 " " " " NORMALES " " " = 66.554 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 49.652 MT
 LONGITUD TOTAL DE LA ZAPATA = 4.000 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .746 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 3.762 M
 TENSION EN EL VERTICE DELANTERO = 35.383 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.386	.900	.000	12.104	2.384	2.792	.000	53.576
.773	.900	.000	22.802	9.175	10.808	.000	53.576

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.450	.900	.000	14.833	5.023	5.896	.000	53.576
.900	.900	.000	20.565	13.064	15.441	.000	53.576
1.350	.900	.000	24.252	23.224	27.691	.000	53.576
1.800	.900	.000	25.896	34.584	41.635	.000	53.576
2.250	.900	.000	25.495	46.224	56.195	.000	53.576
2.700	.900	.000	23.049	57.223	70.208	.000	53.576

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION
SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS
LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO
TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 10.346 T
" " " " NORMALES " " " = 28.949 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.539
MOMENTO DE VUELCO = 20.302 MT
MOMENTO DE ESTABILIDAD = 56.385 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 2.777
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 10.346 T
" " " " NORMALES " " " = 31.486 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = 6.578 MT
LONGITUD TOTAL DE LA ZAPATA = 3.000 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
CENTRO DE LA ZAPATA = .309 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPECIAL
TENSION EN EL VERTICE DELANTERO = 14.881 T/M2
TENSION EN EL VERTICE TRASERO = 6.110 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.417	.900	.000	5.019	1.065	1.870	.000	53.576
.835	.900	.000	9.528	4.120	7.261	.000	53.576

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.425	.900	.000	5.842	2.023	3.556	.000	53.576
.850	.900	.000	7.461	4.874	8.598	.000	53.576
1.275	.900	.000	8.427	8.274	14.661	.000	53.576
1.700	.900	.000	8.740	11.946	21.268	.000	53.576

NORMALES = 30.733 1
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.089
MOMENTO DE VUELCO = 30.453 MT
MOMENTO DE ESTABILIDAD = 61.739 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 2.027

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 15.520 T
" " " " NORMALES " " " = 33.271 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = 14.052 MT
LONGITUD TOTAL DE LA ZAPATA = 3.000 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
CENTRO DE LA ZAPATA = .422 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPECIAL
TENSION EN EL VERTICE DELANTERO = 20.459 T/M2
TENSION EN EL VERTICE TRASERO = 1.722 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.417	.900	.000	7.058	1.511	1.768	.000	53.5
.835	.900	.000	13.027	5.742	6.744	.000	53.5

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.425	.900	.000	7.407	2.377	2.784	.000	53.5
.850	.900	.000	9.991	6.119	7.190	.000	53.5
1.275	.900	.000	11.321	10.693	12.613	.000	53.5
1.700	.900	.000	11.399	15.567	18.439	.000	53.5

Plan (A) 1/10/2017

Plan (A) 1/10/2017

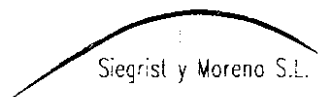
LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA
ZAPATA QUE A CONTINUACION SE DEFINEN, SE
CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

4.3.3 Paso inferior de carretera PK 562+7

4.3.3 PASO INFERIOR DE CARRETERA PK 562+7

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EUROESTUDIOS, S.A.

Ingenieros de consulta

Proyecto para obra

L.A.V. MADRID-BARCELONA.

U.T.E. TORIJA

ANEJO DE CÁLCULO DE ESTRIBOS

P.I. 562+7

U.T.E.-TORIJA

Marzo 2001

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1.- CÁLCULO DE APOYOS

PROYECTO: L.A.V. MADRID - BARCELONA

FECHA:

PI. 562+7

HOJA N.º

1

CONDICIONES HORIZONTALES

- DEFORMACIONES DISTORSION

Los efectos de tracción transversal en el eje de la viga

horizontal debido a deformación de columna.

Reacción en el eje.

	<u>Ap. exterior</u>	<u>Ap. interior</u>
P propio	75	67
c. muerta L	54	40
c. muerta T	49	33

$$R_{total} = 75 + 67 + 49 = 258 \text{ t}$$

$$R_H = 0.95 \cdot 258 = 12.50 \text{ t} \quad (\text{a aplicar en los extremos 2,3 y 4})$$

- FRENOS Y ARRANQUE

$$\text{TRAV. REVERTE: } F_L = \frac{1}{8} (30 \times 12) = 450 \text{ t}$$

$$\text{TRAV. MOD. 71: } \begin{cases} \text{FRENADO: } 20 \times 30 = 600 \text{ kN} = 61,16 \text{ t} \\ \text{ARRANQUE: } 33 \times 30 = 990 \text{ kN} = 100,72 \text{ t} \end{cases}$$

$$\text{TRAV. SW/2: } F = 35 - 25 = 875 \text{ kN} = 89,20 \text{ t}$$

Por lo tanto, la más desfavorable es el arranque, para el tramo MOD. 71 (coeficiente de adherencia $\mu = 1.0$).

Coefficiente por no ir sobre balda, y suponiendo un punto de dilatación de la vía en un extremo: ± 0.60 .

$$F_L = 0.60 \times 100,72 = 60,43 \text{ t} \quad (\text{a aplicar en los extremos 2,3 y 4})$$

PROYECTO:

FECHA:

HOJA N.º

2

- INTERACCION CARRO - TRILAS

Se supone que hay un punto de dilatación de la vía, adyacente al grupo móvil, y que la vía es continua sobre el grupo fijo.

$$F_L = \pm (400 \pm 5L_T) = \pm (400 \pm 5 \times 30) = \pm 550 \text{ kN} = \pm 56,07 \text{ t}$$

Por tanto, la fuerza longitudinal total a considerar en los extremos 2,3 y 4 es:

$$F_L = 12,50 + 60,43 + 56,07 = 129,00 \text{ t}$$

- VIENTOS

Por no ser presente de viento de 40 m de longitud, y de presión de 10 m de altura, se puede hacer el cálculo simplificado.

Entorno tipo II (zona marítima plana, sin obstáculos).

$$\text{Empuje sobre tablero: } 1,94 \text{ kN/m}^2 = 0,20 \text{ t/m}^2 \quad (v_{ref} = 24 \text{ m/s})$$

$$(\text{coeficiente de corrección del tablero: } \frac{B}{h} = \frac{7,00}{2,00} = 3,50 \rightarrow C_0 = 1,2 < 1,8)$$

$$\text{Viento sin sobrecarga: } p = 0,20 (2,87 + 0,50) = 0,674 \text{ t/m}$$

$$\text{Viento con sobrecarga: } p = 0,20 (2,87 + 4,00) = 1,374 \text{ t/m}$$

Fuerza sobre estribos:

$$\text{sin sobrecarga: } F_T = \frac{1}{2} 30,00 = 0,674 \times 10,11 \text{ t}$$

$$M_T = 18,55 \text{ mt}$$

$$\text{con sobrecarga: } F_T = \frac{1}{2} \times \frac{1}{2} \times 30,00 = 1,374 \times 10,39 \text{ t}$$

$$M_T = 36,93 \text{ mt}$$

PROYECTO.....

FECHA.....

HOJA N.º 3

EFFECTO LAZO

$$F_T = 10t \text{ (por estaca)}$$

FUERZA CENTRIFUGA

TREN IPF-75 $V = 220 \text{ km/h} = 61.11 \text{ m/s}$

$$P_H = q \times \frac{V^2}{127 \cdot r} = f = \frac{220^2}{127 \cdot 1000} = 0.021417$$

TREN MWD 71

$$P_H = f \times \frac{V^2}{127 \cdot r} = f$$

$$V = 120 \text{ km/h} \rightarrow f = 1 \rightarrow P_H = 0.0026 f$$

$$V = 300 \text{ km/h} \rightarrow f = \left[1 - \frac{300-120}{1000} \left(\frac{814}{300} + 1.75 \right) \left(1 - \sqrt{\frac{2.88}{30}} \right) \right]$$

$$= 0.446 \rightarrow P_H = 0.0286 f > P_H$$

TREN MWD SW2 $(V = 80 \text{ km/h}) \quad f = 1$

$$P_H = 0.00336 f$$

Fuerzas transmitidas:

TREN IPF-75: $F_{T1} = 0.02141 \times \frac{12 \times 30}{2} = 4.58 t$

TREN MWD 71: $F_{T2} = 0.0286 \left[25 \left(\frac{29 + 27.40 + 24.80 + 24.25}{29} \right) + 8 \frac{23.60 + 11.20}{29} \right] = 4.79 t$

TREN MWD SW2: $F_{T3} = 0.00336 \times 15 \times 25 \times \frac{12.50}{29} = 0.55 t$

Por tanto, $F_T = 4.79 t$

PROYECTO.....

FECHA.....

HOJA N.º 4

ESTRIBO 2 (Fijo)

$$N_{ppmp} = (95 + 54) + (67 + 46) = 149.0 + 109.0 = 258.0 t$$

$$M_T = 149.0 (3.95 - 3.50) + 109.0 (1.45 - 3.50) = -156.40 \text{ m t}$$

$$N_{submarina} = 59 + 183 = 242.0 t$$

$$M_T = 59 (3.95 - 3.50) + 183 (1.45 - 3.50) = -348.80 \text{ m t}$$

$$F_L = 129.52 t$$

$$F_T = 10.30 + 10.00 + 4.79 = 25.09 t$$

ESTRIBO 1 (Móvil)

CARRAJ VERTICALES = ESTRIBO 2

$$F_L = 129.0 t$$

$$F_T = 25.09 t$$

PROYECTO PI-16212

FECHA

HOJA N.º

<u>APUNTES</u>	<u>E-1 y E-4</u>		<u>E-2 y E-3</u>	
	<u>LIBRE</u>	<u>F-2 TRUNC</u>	<u>F-1</u>	<u>F-2 WNC</u>
Ruiz v	240	292	292	240
Ruiz H _L	—	—	64,76	64,76
Ruiz H _T	—	2490	2490	—
Desplazamiento (mm):	+30 mm -10 mm	+30 mm -10 mm	—	—

2.- CÁLCULO DE ESTRIBOS 1 Y 4

2.1.- CÁLCULO DE CIMENTACIONES

 Siegrist y Moreno S.L.	PROYECTO <u>VIA RURAL DE LA...</u>	FECHA <u>15-11-95</u>
	<u>ESTADO DE...</u>	
	HOJA N.º <u>8</u>	

COMBINACION E-1 y E-4

ESFUERZOS EN BASE DE PIVOTE

- PIVOTE EN LA BASE

$$N = 2,5 [4,294 \times 6,445 - 1,55 + 3,80 \times 8,628 \times 1,00 + 2,80 \times 8,628 \times 1,00 + \frac{1}{2} 0,649 \times (1,55 + 0,50) \times 6,445 + 4,943 \times 2,253 \times 0,50 + \frac{1}{2} 3,313 \times 2,447 \times 0,31] = 107,24 + 81,97 + 56,08 + 10,72 + 13,92 + 2,63 = 272,56 t$$

$$M_L = 107,24 (4,025 - 2,275) + 81,97 (4,025 - 4,210) + 56,08 (4,025 - 6,960) + 10,72 (4,025 - 2,025) + 13,92 (4,025 - 2,800) + 2,63 (4,025 - 3,654) = 47,37 mt$$

$$M_T = 107,24 (5,85 - 6,843) + 81,97 (5,85 - 3,448) + 56,08 (5,85 - 1,967) + 10,72 (5,85 - 4,426) + 13,92 (5,85 - 6,518) + 2,63 (5,85 - 3,365) = 320,65 mt$$

- PIVOTE EN LA BASE TABLA 1

$$N = 258,0 t$$

$$M_L = 258,0 (4,025 - 2,00) = 522,45 mt$$

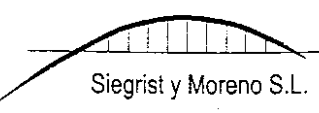
$$M_T = 258,0 [5,85 - 6,30] = -116,10 mt$$

- PIVOTE EN LA BASE TABLA 2

$$N = 242,0 t$$

$$M_L = 242,0 (4,025 - 2,00) = 490,05 mt$$

$$M_T = 242,0 (5,85 - 6,30 + 0,38) = -200,86 mt$$

 Siegrist y Moreno S.L.	PROYECTO <u>...</u>	FECHA <u>...</u>
	<u>...</u>	
	HOJA N.º <u>9</u>	

- PIVOTE EN LA BASE

$$F_L = 0$$

$$M_L = 0$$

- DEFLEXION EN LA BASE

$$F_L = 12,90 t$$

$$M_L = 12,90 \times 8,445 = 108,94 mt$$

- INTERACCION PIVOTE - TABLA 1

$$F_L = 0$$

$$M_L = 0$$

- VIGAS

$$F_T = 10,30 \div 2 + 0,20 \times 6,55 = 8,63 = 10,30 + 11,31 = 21,61 t$$

$$M_T = 10,30 \times 11,57 + 11,31 \times 6,32 = 190,62 mt$$

- EFECTO VIGAS

$$F_T = 10 t$$

$$M_T = 10 (8,64 + 8,445) = 170,85 mt$$

- PIVOTE EN LA BASE

$$F_T = 4,79 t$$

$$M_T = 4,79 (1,80 + 3,64 + 8,445) = 46,51 mt$$

- EFECTO DE LA BASE

$$F_L = 0,333 (3 + 1 + 2,00) = 1,11 t$$

$$F_{L,23} = 0,333 (3 + 8,73 - 2,00) = 6,82 t$$

	PROYECTO	FECHA
	HOJA N.º 10	

$$F_L = \frac{1.00 + 6.82}{2} \times 8.73 \times 8.00 = 273.08 t$$

$$F_T = \frac{1.00 + 6.82}{2} \times 8.73 \times 6.55 = 223.58 t$$

$$M_L = 273.08 \left[\frac{2.00 + 6.82}{1.00 + 6.82} \times \frac{8.73}{3} + 2.00 \right] = 1442.41 m t$$

$$M_T = 223.58 \left[\frac{2.00 + 6.82}{1.00 + 6.82} \times \frac{8.73}{3} + 2.00 \right] = 1180.98 m t$$

- PESO DE TIERRAS:

$$N = (2.10 \times 8.73 + 3.00) (1.71 \times 8.05 + 5.086 \times 5.00 + \frac{5.00 + 1.72}{2} \times 2.03 + \frac{1}{2} \times 1.72 \times 0.784) = 281.64 + 520.30 + 139.55 + 13.80 = 955.29 t$$

$$M_L = 281.64 \times 0 + 520.30 (4.025 - 5.55) + 139.55 (4.025 - 4.69) + 13.80 (4.025 - 2.613) = -933.84 m t$$

$$M_T = 281.64 (5.85 - 10.845) + 520.30 (5.85 - 7.443) + 139.55 (5.85 - 4.014) + 13.80 (5.85 - 2.613) = -1942.43 m t$$

- PESO DE ZAPATA

$$N = 11.70 \times 8.05 \times 2.00 \times 2.5 = 470.93 t$$

DETERMINACIÓN DE LAS FUERZAS TRANSFERIDAS

$$N = 277.56 + 258.00 + 242.00 + 955.29 + 470.93 = 2198.78 t$$

$$F_L = 0 + 12.90 + 0 + 273.08 = 285.98 t$$

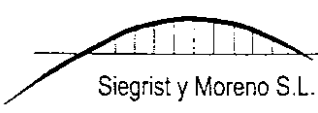
$$F_T = 21.61 + 10.00 + 4.77 + 223.58 = 259.98 t$$

$$M_L = 471.37 + 522.45 + 490.05 + 108.94 + 1442.41 - 933.84 = 1672.38 m t$$

$$(R_L = 0.763 m)$$

$$M_T = 320.65 - 116.10 - 205.86 - 190.62 - 120.85 - 66.51 + 1180.98 - 1942.43 = -1135.74 m t$$

$$(R_T = 0.517 m)$$

	PROYECTO	FECHA
	HOJA N.º 11	

$$\sigma_w = \frac{2198.78}{4 (4.025 - 0.763) (5.850 - 0.517)} = 31.60 t/m^2$$

$$\sigma_{w_{eq}} = \frac{2198.78}{8.05 \times 11.70} \pm \frac{1672.38 \times 4.025}{508.62} \pm \frac{1135.74 \times 5.850}{1074.42} = 23.35 \pm 13.27 \pm 6.18 = 3.89 t/m^2$$

Con puente cargado:

Seguridad al deslizamiento:

$$T_d = \frac{2198.78 \times 0.55}{\sqrt{285.98^2 + 259.98^2}} = \frac{1209.33}{386.49} = 3.13 > 1.50$$

Seguridad al vuelco:

$$T_v = \frac{M_o}{M_v} = \frac{272.56 \times 3.525 - 47.37 + 500.0 \times 1.50 + 955.29 \times 3.525 + 933.84 + 470.93 \times 3.525}{108.54 + \sqrt{1442.41^2 + 1180.98^2}} = \frac{7624.67}{1864.21} = 4.09 > 2.00$$

Sin puente vacío:

$$T_d = \frac{(2198.78 - 242.00) \times 0.55}{\sqrt{285.98^2 + 245.19^2}} = \frac{1076.23}{376.70} = 2.86 > 1.50$$

$$T_v = \frac{272.56 \times 3.525 - 47.37 + 258.00 \times 1.50 + 815.22 \times 3.525 + 796.71 + 470.93 \times 3.525}{1864.21} = \frac{6631.00}{1864.21} = 3.56 > 2.00$$



PROYECTO.....

FECHA.....

HOJA N.º 12

REACCIONES CON CARGAS MAYORADAS

$$N_d = 1,35(272,56 + 258,00 + 470,93) + 1,50(242,00 + 955,29) = 3147,95 \text{ t}$$

$$M_{Ld} = 1,35(47,37 + 522,45 + 1089,4 - 933,84) + 1,50(490,05 + 1442,61) =$$

$$= 2554,33 \text{ mt} \quad (e_L = 0,812 \text{ m})$$

$$M_{Td} = 1,35(320,65 - 116,10) + 1,50(-200,86 - 170,62 - 120,85 - 66,54 + 1180,98 - 1942,43) = -1734,30 \text{ mt} \quad (e_e = 0,551 \text{ m})$$

$$\sigma_{den} = \frac{3147,95}{4(4,025 - 0,812)(5,85 - 0,551)} = 45,22 \text{ t/m}^2$$

$$\sigma_{duby} = \frac{3147,95}{8,05 \times 11,70} \pm \frac{2554,33 \times 4,025}{508,62} \pm \frac{1734,30 \times 5,850}{1074,42} =$$

$$= 33,42 \pm 20,22 \pm 9,44 = \begin{matrix} 63,08 \text{ t/m}^2 \\ 3,77 \text{ t/m}^2 \end{matrix}$$



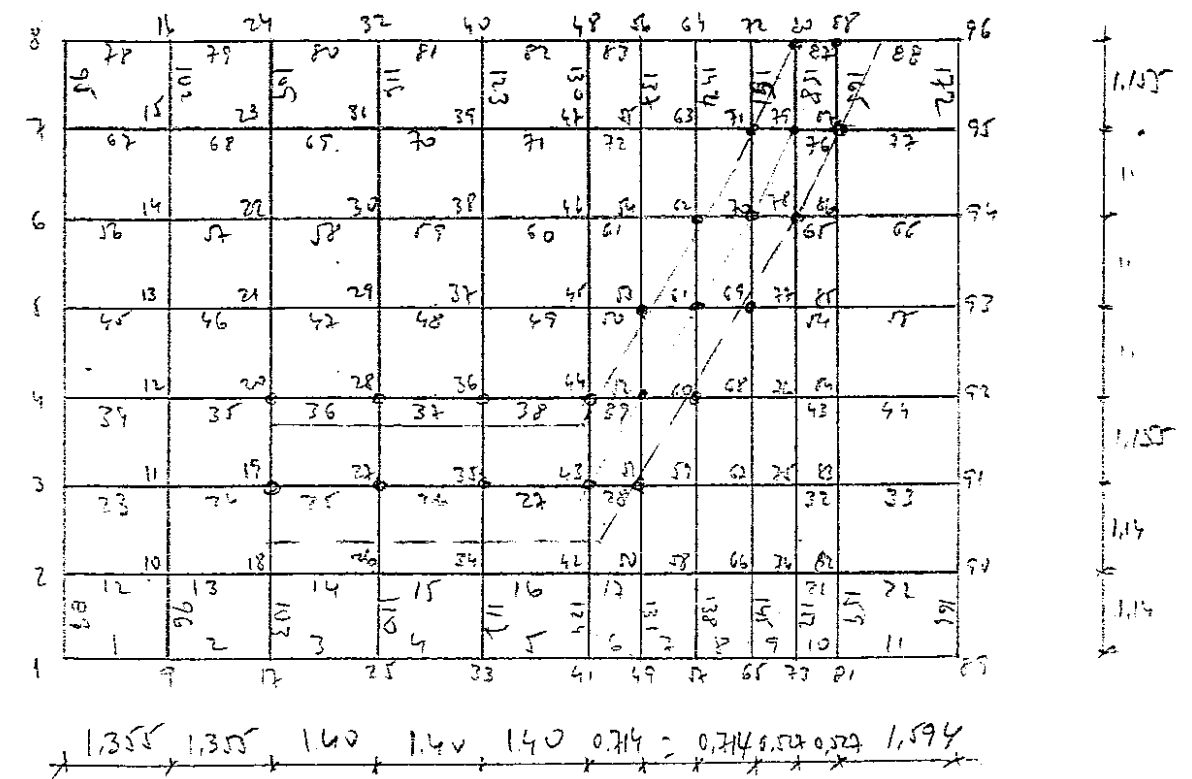
PROYECTO.....

FECHA.....

HOJA N.º 13

ARMADURA DE ZAPATA

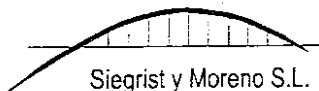
EMPARRILLADO



CONDICIONES DE BARRAS

$$I = \frac{a \times 2 \cdot m^3}{12} \quad J = 2I$$

BARRAS:	a	I	J	BARRAS	a	I	J
1 a 11	0,570	0,380000	0,760000	110 a 123	1,400	0,933333	1,866666
12 a 22	1,140	0,760000	1,520000	124 a 130	1,057	0,204667	1,409333
23 a 77	1,155	0,770000	1,540000	131 a 144	0,714	0,476000	0,952000
78 a 88	0,578	0,385333	0,770666	145 a 151	0,620	0,413333	0,826666
89 a 95	0,678	0,452000	0,904000	152 a 158	0,522	0,351333	0,702666
96 a 102	1,355	0,903333	1,806666	159 a 165	1,064	0,207222	1,414444
103 a 109	1,378	0,918667	1,837333	166 a 172	0,797	0,531333	1,062666



Siegrist y Moreno S.L.

PROYECTO.....

FECHA.....

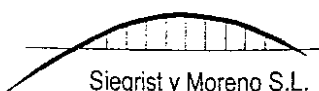
HOJA N.º 14

HIPOTETICA DE CARGA

$$P_1 = 1.5 \times (2.0 \times 8.73 + 3.04) - 46.22 = -15.53 \text{ t/m}^2$$

$$P_2 = -46.22 \text{ t/m}^2$$

BARRAS	P_1	P_2	a	$\bar{z}$
17-2	15.53	-	0.570	8.852
3-11	-	46.22	0.570	26.345
12-13	15.53	-	1.140	17.704
14-22	-	46.22	1.140	52.690
23-24	15.53	-	1.148	17.821
28-33	-	46.22	1.148	53.037
34-39 } 45-51 } 56-63 } 67-75 }	15.53	-	1.155	17.937
40-44 } 52-55 } 64-66 } 76-77 }	-	46.22	1.155	53.384
78-87	15.53	-	0.578	8.969
88	-	46.22	0.578	26.692



Siegrist y Moreno S.L.

PROYECTO.....

FECHA.....

HOJA N.º 15

ARMADURAS - FLEXION

$$M_d^* = (M_d + T_d) / \alpha_{cw} \quad (T_d \text{ igual a } M_d)$$

$$U_c = \frac{0.85 \times 2500}{1.5} = 1.00 \times 1.90 = 2691.7 \text{ t/m}^2$$

$$A = U_c \left[1 - \sqrt{1 - \frac{2 M_d^*}{U_c \times 1.90}} \right] \times \frac{1.15}{51} \text{ cm}^2/\text{m}$$

Diseño horizontal

junta 51: $M_d^* = (-345.26 - 91.28) / 1.155 = -369.30 \text{ m.tn}$

$$A_{inf} = 45.54 \text{ cm}^2/\text{m}$$

junta 60: $M_d^* = (-227.72 - 107.45) / 1.155 = -333.07 \text{ m.tn}$

$$A_{inf} = 40.91 \text{ cm}^2/\text{m}$$

junta 69: $M_d^* = (-257.29 - 80.40) / 1.155 = -292.31 \text{ m.tn}$

$$A_{inf} = 35.75 \text{ cm}^2/\text{m}$$

junta 19: $M_d^* = (-113.24 - 29.53) / 1.155 = -122.77 \text{ m.tn}$

$$A_{inf} = 14.75 \text{ cm}^2/\text{m}$$

junta 20: $M_d^* = (-163.13 - 18.29) / 1.155 = -157.02 \text{ m.tn}$

$$A_{inf} = 18.54 \text{ cm}^2/\text{m}$$

junta 62: $M_d^* = (-98.68 - 35.31) / 1.155 = -116.00 \text{ m.tn}$

$$A_{inf} = 13.53 \text{ cm}^2/\text{m}$$

junta 74: $M_d^* = (-109.48 - 33.14) / 1.155 = -123.48 \text{ m.tn}$

$$A_{inf} = 14.84 \text{ cm}^2/\text{m}$$

	PROYECTO	FECHA
	HOJA N.º 16	

Dirección vertical

punto 20: $M_d^* = (-236,59 - 21,38)/1,378 = -187,21 \text{ mtn}$
 $A_{inf} = 22,64 \text{ m}^2/\text{m}$

punto 35: $M_d^* = (-159,77 - 14,25)/1,40 = -124,30 \text{ mtn}$
 $A_{inf} = 14,94 \text{ m}^2/\text{m}$

punto 43: $M_d^* = (-185,26 - 57,14)/1,057 = -229,34 \text{ mtn}$
 $A_{inf} = 27,86 \text{ m}^2/\text{m}$

punto 51: $M_d^* = (-212,36 - 40,14)/0,714 = -353,64 \text{ mtn}$
 $A_{inf} = 43,53 \text{ m}^2/\text{m}$

punto 59: $M_d^* = (-115,78 - 78,16)/0,714 = -271,62 \text{ mtn}$
 $A_{inf} = 33,14 \text{ m}^2/\text{m}$

punto 69: $M_d^* = (-86,45 - 58,01)/0,620 = -184,60 \text{ mtn}$
 $A_{inf} = 22,32 \text{ m}^2/\text{m}$

punto 85: $M_d^* = (-71,71 - 64,81)/1,061 = -128,67 \text{ mtn}$
 $A_{inf} = 15,47 \text{ m}^2/\text{m}$

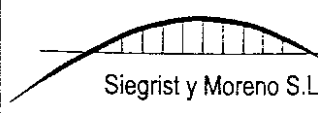
$A_{min} = 24,28 \text{ m}^2/\text{m}$

CORRIENTE

$V_{cu} = \left[0,40 \times 1,324 (100 \times 0,0012 \times 25)^{1/3} - 0,15 \times 0 \right] \times 1000 \times 1900 \times 2 =$
 $= 364340 \text{ N} = 37,14 \text{ tm}$; $A_{inf} = \frac{V_d - V_{cu}}{0,9 \times 1,94 \times 4,0} \text{ m}^2/\text{m}$

Dirección horizontal

punto 58: $V_d = 114,43/1,140 = 100,38 \text{ tm}$
 $A_{inf} = 9,25 \text{ m}^2/\text{m}$

	PROYECTO	FECHA
	HOJA N.º 17	

punto 51: $V_d = 364,13/1,155 = 315,26 \text{ tm}$
 $A_{inf} = 39,4 \text{ m}^2/\text{m}$

punto 60: $V_d = 195,32/1,155 = 169,11 \text{ tm}$
 $A_{inf} = 18,03 \text{ m}^2/\text{m}$

punto 69: $V_d = 222,60/1,155 = 192,73 \text{ tm}$
 $A_{inf} = 21,48 \text{ m}^2/\text{m}$

punto 78: $V_d = 153,47/1,155 = 132,87 \text{ tm}$
 $A_{inf} = 12,73 \text{ m}^2/\text{m}$

punto 84: $V_d = 144,69/1,155 = 125,27 \text{ tm}$
 $A_{inf} = 11,24 \text{ m}^2/\text{m}$

punto 53: $V_d = 112,42/1,155 = 97,33 \text{ tm}$
 $A_{inf} = 7,54 \text{ m}^2/\text{m}$

Dirección vertical

punto 19: $V_d = 110,18/1,378 = 79,96 \text{ tm}$
 $A_{inf} = 6,26 \text{ m}^2/\text{m}$

punto 20: $V_d = 187,12/1,378 = 135,89 \text{ tm}$
 $A_{inf} = 14,43 \text{ m}^2/\text{m}$

punto 43: $V_d = 78,89/1,057 = 74,64 \text{ tm}$
 $A_{inf} = 5,68 \text{ m}^2/\text{m}$

punto 51: $V_d = 185,62/0,714 = 259,97 \text{ tm}$
 $A_{inf} = 31,31 \text{ m}^2/\text{m}$

2.2.- CÁLCULO DE ALZADOS

PROYECTO

FECHA

PI-562+2

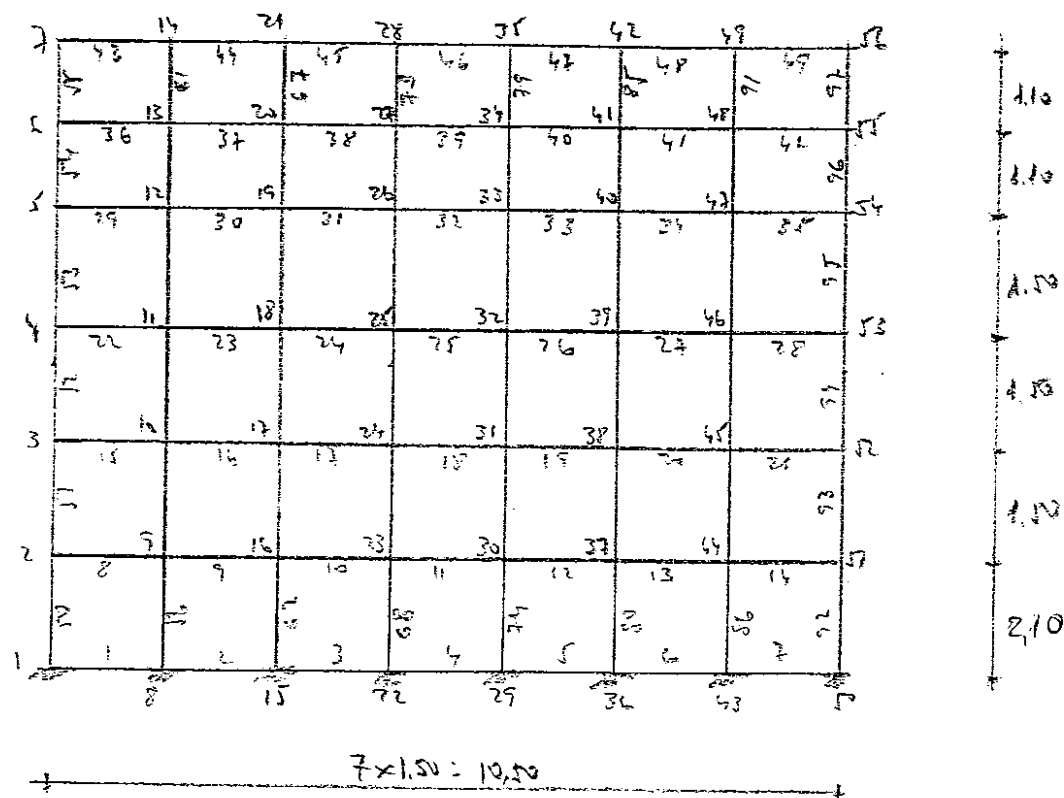
HOJA N.º

3

ARMADURAS DE MUROS ESTABILIZADOS 1 y 4

EMPARRILLADO

$$e = 1.55 \quad \leftarrow \rightarrow \quad e = 1.00$$



CARACTERÍSTICAS DE BARRAS

$$I = \frac{ab^3}{12}$$

$$J = 2I$$

BARRAS	a	b	I	J	TIPO
1 a 7, 50 a 53	0.75	1.55	0.232742	0.465484	1
8 a 10, 15 a 17, 22 a 24	1.50	1.55	0.465484	0.930968	2
11 a 14, 18 a 21, 25 a 28	1.50	1.00	0.125000	0.250000	3
29 a 31	1.30	1.025	0.116663	0.233326	4
32 a 35	1.30	1.00	0.108333	0.216666	5
36 a 38	1.10	0.50	0.01458	0.02916	6
39 a 42	1.10	1.00	0.0916667	0.1833334	7
43 a 45	0.55	0.50	0.005729	0.011458	8
46 a 49	0.55	1.00	0.045833	0.091666	9

PROYECTO

FECHA

PI-562+2

HOJA N.º

9

BARRAS

a

b

I

J

TIPO

54 a 57	0.75	0.50	0.047812	0.095624	10
58 a 59, 62 a 65	1.50	1.55	0.465484	0.930968	2
60 a 61, 66 a 67	1.50	0.50	0.015625	0.031250	11
68 a 71	1.50	1.275	0.259084	0.518168	12
72 a 73	1.50	0.75	0.052734	0.105469	13
74 a 91	1.50	1.00	0.125000	0.250000	3
92 a 97	0.75	1.00	0.062500	0.125000	14

H-1 FUERZA LONGITUDINAL + EMP. TIERRAS MUROS TRANSV.

NÚDOS 12 y 26: $F_2 = \frac{1}{2} \times 12.90 = 6.45 \text{ t}$

BARRAS

P

BARRAS

P1

P2

a

8 a 10	8.71	50, 68	5.15	4.48	0.75
15 a 17	6.71	13, 62	10.30	8.96	0.75
22 a 24	5.21				
29 a 31	3.30				
36 a 38	1.90				
43 a 45	0.65				

H-2 EMP. TIERRAS MUROS LONGIT.

BARRAS

P

BARRAS

P1

P2

a

11 a 14	8.71	68, 92	5.15	4.48	0.75
18 a 21	6.71	74, 83, 86	10.30	8.96	0.75
25 a 28	5.21				
32 a 35	3.30				
39 a 42	1.90				
46 a 49	0.65				

PROYECTO.....
PI-562+7

FECHA.....
E-1/4
HOJA N.º 10

ARMADURA.

$$M_d^* = (M_d + T_d) / \text{anchura barra.}$$

(T_d con el mismo signo de M_d)

$$U_c = \frac{0.85 \times 2500}{1.5} \times 1.00 \times d = 1417 d \text{ kg}$$

$$A = U_c \left[1 - \sqrt{1 - \frac{2M_d^*}{U_c d}} \right] \times \frac{1.15}{\text{anchura barra.}}$$

$$A_{min} h = \frac{1.6}{1000} \times 1000 \times h = 0.16 h \text{ cm}^2$$

h = 0.50 → 8.0 cm²
h = 1.00 → 16.0 cm²
h = 1.50 → 24.0 cm²

DIRECCION	NUDO	ANCHO d	M _d	T _d	M _d [*]	ARMADURA (cm ²)	
						A _{ext.}	A _{int.}
HORIZONTAL	2-23	1.50 1.45	3.38 -21.34	42.18 -42.18	30.33 -42.35	4.75	6.64
	3-24	1.50 1.45	7.29 -25.29	12.83 -47.39	13.42 -48.46	2.09	7.60
	4-25	1.50 1.45	12.85 -41.90	11.81 -46.89	16.44 -59.06	2.57	9.28
	5-26	1.34 0.93	0.23 -33.27	7.52 -16.83	7.50 -38.54	1.83	9.50
	6-27	1.10 0.44	0.22 -2.44	1.26 -1.62	1.39 -3.69	0.72	1.91
	7-28	0.55 0.44	1.31 -7.24	0.63 -0.75	3.52 -5.44	1.82	2.82
	23-24	1.50 0.90	1.85 -6.86	18.96 -18.91	13.88 -16.65	3.50	4.20
	24-25	1.50 0.90	2.04 -17.20	20.67 -19.23	15.14 -24.69	3.82	6.26
	25-26	1.50 0.90	7.62 -27.44	17.67 -18.94	16.26 -30.92	4.26	7.86
	26-27	1.34 0.90	5.72 -28.09	15.05 -15.05	15.95 -33.19	4.03	8.44
	27-28	1.10 0.90	7.59 -6.30	4.86 -5.02	11.32 -10.29	2.85	2.59
	28-29	0.55 0.70	6.03 -2.55	2.18 -2.00	14.93 -8.28	3.77	2.08

PROYECTO.....
PI-562+7

FECHA.....
E-1/4
HOJA N.º 11

ARMADURA.

$$M_d^* = (M_d + T_d) / \text{anchura barra.}$$

(T_d con el mismo signo de M_d)

$$U_c = \frac{0.85 \times 2500}{1.5} \times 1.00 \times d = 1417 d \text{ kg}$$

$$A = U_c \left[1 - \sqrt{1 - \frac{2M_d^*}{U_c d}} \right] \times \frac{1.15}{\text{anchura barra.}}$$

$$A_{min} v = \frac{0.9}{1000} \times 1000 \times h = 0.09 h \text{ cm}^2$$

h = 0.50 → 4.5 cm² (5.3)
h = 1.00 → 9.0 cm² (11.5)
h = 1.50 → 14.0 cm² (18.6)

DIRECCION	NUDO	ANCHO d	M _d	T _d	M _d [*]	ARMADURA (cm ²)	
						A _{ext.}	A _{int.}
VERTICAL	1-5	0.75 1.45	-120.34 -10.36	-10.36	-240.93	-	37.12
	5-7	0.75 0.44	-8.52 -2.49	-2.49	-21.35	-	11.40
	8-12	1.50 1.45	-399.38 -20.53	-20.53	-279.94	-	45.80
	12-14	1.50 0.44	-11.42 -12.58	-12.58	-19.33	-	10.29
	15-19	1.50 1.45	-451.62 -24.06	-24.06	-317.12	-	52.26
	19-21	1.50 0.44	-8.55 -1.14	-1.14	-6.46	-	3.35
	22-26	1.50 1.18	-292.93 -15.54	-15.54	-205.65	-	41.60
	26-28	1.50 0.65	-15.12 -8.46	-8.46	-15.72	-	5.53
	29-35	1.50 0.90	-160.23 -8.38	-8.38	-112.41	-	29.70
	36-42	1.50 0.90	-177.58 -7.95	-7.95	-123.69	-	32.87
	43-49	1.50 0.90	-194.67 -7.53	-7.53	-134.80	-	36.03
	50-56	0.75 0.90	-107.25 -3.42	-3.42	-147.56	-	37.21

CONSTANTE

$$V_{cu} = [0.10 - \xi (100 \rho_L \cdot f_{cr})^{1/3} - 0.15 \sigma'_{cd}] \cdot b_0 \cdot d \cdot \beta$$

$$\xi = 1 + \sqrt{\frac{200}{d}} \quad (d \text{ en mm})$$

$$\rho_L = \frac{A}{b \times h} \neq 0.0200$$

$$f_{cr} = 25 \text{ N/mm}^2$$

$$\sigma'_{cd} = 0$$

$$b = b_0 = 1.0 \text{ m} = 1000 \text{ mm} \quad \beta = 1$$

$$d \text{ (en mm)}$$

$$A_{st} = \frac{V_d - V_{cu}}{0.9 \cdot d = 41/115} \text{ cm}^2/\text{m} \quad (V_d = \frac{V_{dmax}}{\text{anchos}})$$

DIRECCION	NÚM.	ANCHO	d	V _{dmax}	V _d	ρ _L	V _{cu}	A _{st}
HORIZONTAL	2-23	1.50	1.45	21.61	14.41	0.0016	32.18	—
	3-24	1.50	1.45	11.55	7.20	0.0016	32.18	—
	4-25	1.50	1.45	12.19	8.06	0.0016	32.18	—
	5-26	1.30	0.93	24.81	19.09	0.0016	22.03	—
	6-27	0.55	0.44	2.75	5.00	0.0016	11.92	—
	23-31	1.50	0.90	16.70	9.20	0.0016	21.43	—
	24-32	1.50	0.90	17.03	11.36	0.0016	21.43	—
	25-33	1.50	0.90	21.92	15.32	0.0016	21.43	—
	26-34	1.30	0.90	26.75	20.19	0.0016	21.43	—
	27-35	0.55	0.90	8.31	15.14	0.0016	21.43	—

CONSTANTE

$$V_{cu} = [0.10 - \xi (100 \rho_L \cdot f_{cr})^{1/3} - 0.15 \sigma'_{cd}] \cdot b_0 \cdot d \cdot \beta$$

$$\xi = 1 + \sqrt{\frac{200}{d}} \quad (d \text{ en mm})$$

$$\rho_L = \frac{A}{b \times h} \neq 0.0200$$

$$f_{cr} = 25 \text{ N/mm}^2$$

$$\sigma'_{cd} = 0$$

$$b = b_0 = 1.0 \text{ m} = 1000 \text{ mm} \quad \beta = 1$$

$$d \text{ (en mm)}$$

$$A_{st} = \frac{V_d - V_{cu}}{0.9 \cdot d = 41/115} \text{ cm}^2/\text{m} \quad (V_d = \frac{V_{dmax}}{\text{anchos}})$$

DIRECCION	NÚM.	ANCHO	d	V _{dmax}	V _d	ρ _L	V _{cu}	A _{st}
VERTICAL	1-5	0.75	1.45	45.47	60.63	0.0021	35.23	5.46
	5-7	0.75	0.44	3.00	4.00	0.0009	9.84	—
	8-12	1.50	1.45	91.32	60.88	0.0025	37.24	5.06
	12-14	1.50	0.44	28.80	19.20	0.0009	9.84	6.63
	15-19	1.50	1.45	116.50	77.67	0.0028	38.78	8.36
	19-21	1.50	0.44	24.89	16.60	0.0009	9.84	4.79
	29-35	1.50	0.90	58.10	38.73	0.0024	24.53	4.72
	36-42	1.50	0.90	64.51	43.01	0.0027	25.51	6.06
	43-49	1.50	0.90	71.61	42.74	0.0030	26.42	7.38
	50-55	0.75	0.90	43.26	57.68	0.0018	27.28	10.53

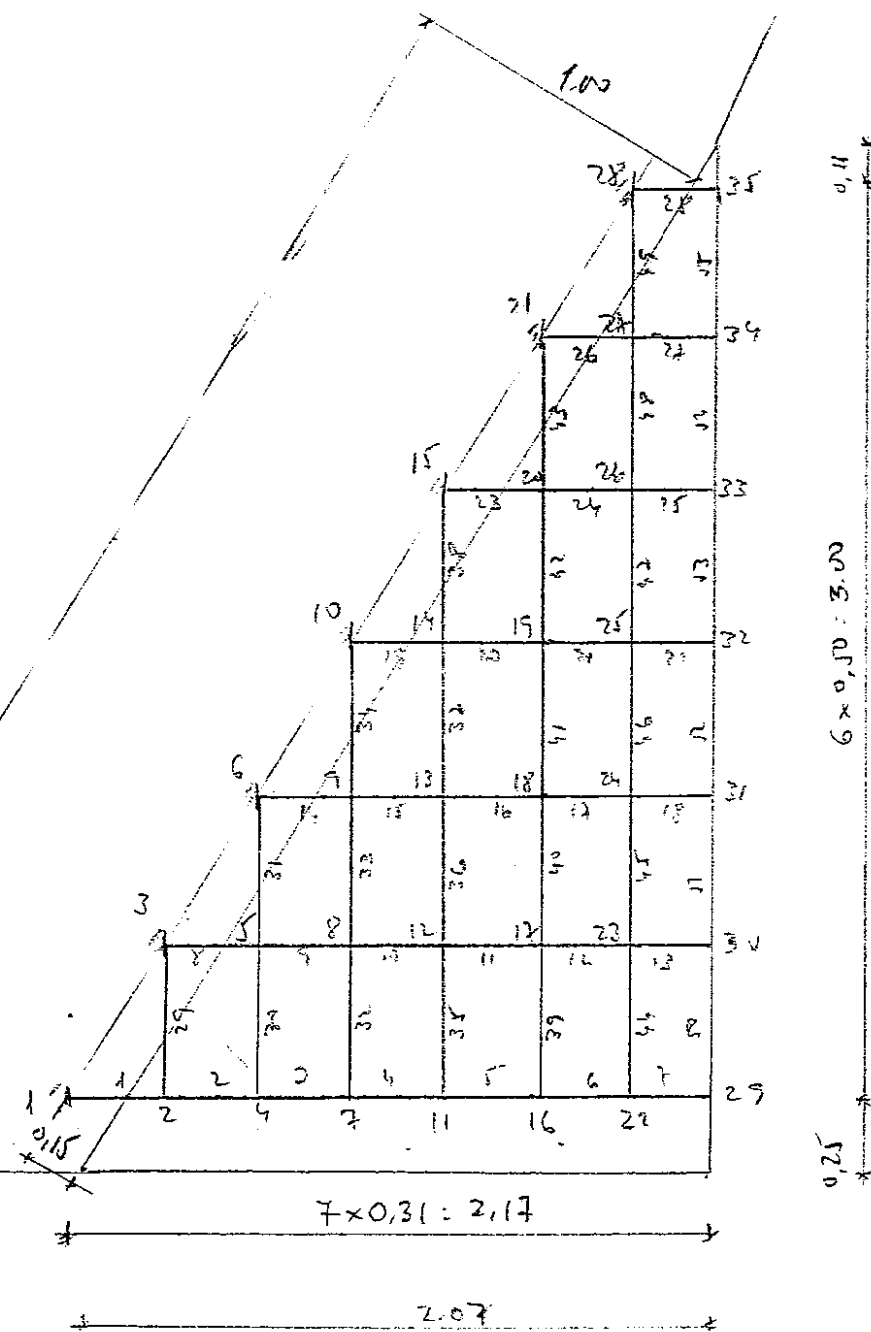
2.3.- CÁLCULO DE VOLADIZOS

PROYECTO.....

FECHA.....

PT-36217

HOJA N.º 1

VOLEADO EN ESTRIB. 1 y 4CALCULO DE BARRAS

$$I = \frac{ab^3}{12}$$

$$J = 2I$$

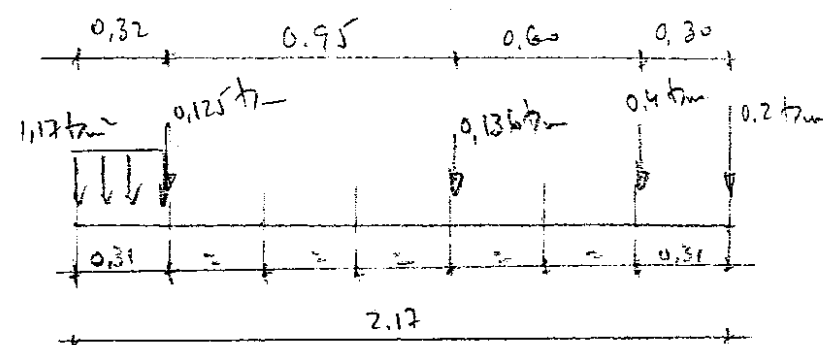
BARRA	a	b	I	J	Tip
1	0,50	0,260	0,001932	0,001464	1
2 y 8	0,50	0,254	0,001683	0,001366	2
3, 9, 14	0,50	0,248	0,001636	0,001272	3
4, 10, 15, 19	0,50	0,242	0,001591	0,001182	4
5, 11, 16, 20, 23	0,50	0,235	0,001541	0,001082	5
6, 12, 17, 21, 24, 26	0,50	0,229	0,001500	0,001000	6
7, 13, 18, 22, 25, 27, 28	0,50	0,223	0,001462	0,000924	7
29	0,31	0,257	0,001439	0,000878	8
30, 31	0,31	0,251	0,001408	0,000816	9
32 = 34	0,31	0,245	0,001380	0,000760	10
35 = 38	0,31	0,239	0,001353	0,000706	11
39 = 43	0,31	0,232	0,001323	0,000646	12
44 = 49	0,31	0,226	0,001298	0,000596	13
50 = 55	0,155	0,222	0,001283	0,000581	14

HISTOGRAMA DE CARGA

H-1 Det. p. l. s. u.

BARRAS	P	BARRAS	P
1	0,225	5, 11, 16, 20, 23	0,294
2 y 8	0,318	6, 12, 17, 21, 24, 26	0,286
3, 9, 14	0,310	7, 13, 18, 22, 25, 27, 28	0,279
4, 10, 15, 19	0,303		

H-2 CARGA PERMANENTE



Barra	P	Barra	P
29	0.710	44 y 49	0.400
35 y 38	0.136	50 y 55	0.200

H-3 EN LA CARGA DE PUNTO

Barra	P
29 y 49	0.155
50 y 55	0.078

H-4 DESVARIAMIENTOS.

Barra	P
50 y 55	8.00

HIPOTESIS COMBINADAS

H-1: $1.35 \times (\text{PERMANENTE} + \text{C. PERMANENTE}) + 1.5 \times \text{ACCIDENTAL}$

H-2: $\text{PERMANENTE} + \text{C. PERMANENTE} + \text{DESVARIAMIENTOS}$

ARMADURA

- FLEXION.

- DIRECCION TRANSVERSAL:

$$M_{d_{min}} = -(3.72 + 1.56) / 0.50 = -10.50 \text{ m} \cdot \text{t} \quad (\text{modo 10})$$

$$V_c = \frac{0.85 \times 2100}{1.5} \times 1.01 \times 0.19 = 269.2 \text{ t}$$

$$A_s = V_c \left[1 - \sqrt{1 - \frac{2 \times 10.50}{V_c \times 0.19}} \right] \times \frac{1.15}{5.1} = 14.19 \text{ cm}^2 \quad (\text{exp})$$

$$M_{d_{max}} = (0.01 + 0.94) / 0.50 = 1.90 \text{ m} \cdot \text{t} \quad (\text{modo 34})$$

$$V_c = \frac{0.85 \times 2100}{1.5} \times 1.01 \times 0.17 = 240.8 \text{ t}$$

$$A_s = V_c \left[1 - \sqrt{1 - \frac{2 \times 1.90}{V_c \times 0.17}} \right] \times \frac{1.15}{5.1} = 2.58 \text{ cm}^2 \quad (\text{exp})$$

- DIRECCION LONGITUDINAL:

$$M_{d_{min}} = -(0.99 + 1.02) / 0.31 = -6.49 \text{ m} \cdot \text{t} \quad (\text{modo 15})$$

$$V_c = 267.2 \text{ t}$$

$$A_s = V_c \left[1 - \sqrt{1 - \frac{2 \times 6.49}{V_c \times 0.19}} \right] \times \frac{1.15}{5.1} = 8.27 \text{ cm}^2 \quad (\text{modo 15})$$

$$M_{d_{min}} = (-1.05 - 0.59) / 0.155 = -10.58 \text{ m} \cdot \text{t} \quad (\text{modo 35})$$

$$V_c = 240.8 \text{ t} \rightarrow A_s = 16.56 \text{ cm}^2$$

$$M_{d_{max}} = (0.39 + 0.38) / 0.155 = 4.55 \text{ m} \cdot \text{t} \quad (\text{modo 31})$$

$$V_c = 240.8 \text{ t} \rightarrow A_s = 6.59 \text{ cm}^2$$

- CAPOTRASE.

- DIRECCION TRANSVERSAL.

$$Q_{dmax} = 5.89/0.5 = 11.78 \text{ t/m (modo 15)}.$$

$$V_{ed} = [0.10 \cdot 3 (100 \rho_L \times f_{ck})^{1/3} - 0.15 \sigma_{ed}] = b_0 \cdot d \cdot \beta.$$

$$\beta = 1 + \sqrt{\frac{200}{190}} = 2.026.$$

$$\rho_L = \frac{14.19}{100 \times 24} = 0.0059 \neq 0.0200$$

$$f_{ck} = 25 \text{ N/mm}^2$$

$$\sigma'_{ed} = 0 \quad \beta = 1$$

$$b_0 = 100 \text{ mm} \quad d = 190 \text{ mm}.$$

$$V_{ed} = 94470 \text{ N/m} = 9.63 \text{ t/m} \rightarrow A_{st} = \frac{11.78 - 9.63}{0.9 \times 0.19 \times 4} = 3.14 \text{ cm}^2/\text{m}$$

- DIRECCION LONGITUDINAL.

$$Q_{dmax} = (4.32 + 1.29)/0.465 = 12.07 \text{ t/m (modo 27, 34)}$$

$$\beta = 1 + \sqrt{\frac{200}{120}} = 2.085$$

$$\rho_L = \frac{16.56}{100 \times 22} = 0.0075 \neq 0.0200$$

$$V_{ed} = 74283 \text{ N/m} = 7.61 \text{ t/m} \rightarrow A_{st} = \frac{12.07 - 7.61}{0.9 \times 0.22 \times 4} = 26.02 \text{ cm}^2/\text{m}$$

3.- CÁLCULO DE ESTRIBOS 2 Y 3

3.1.- CÁLCULO DE CIMENTACIONES

	PROYECTO	U.A.V. HACRID-BAJO DEL MONTE	FECHA	15-XII-80
		PE. 532+3		
		(CURVA)	HOJA N.º	1

CIMENTACION E-2, E-3

EFUERZOS EN BASE DE ZAPATA.

- PESO PROPIO ESTRIBOS.

$$N = 2,5 \left[5,895 \times 6,407 \times 2,05 + 2,70 \times 7,241 \times 1,05 + \frac{2,70 \times 9,79}{2} \times 0,955 \times 1,05 + \frac{1}{2} \times 1,101 \times (2,05 + 0,275) \times 6,407 + 6,79 \times 2,25 \times 1,00 + 8,10 \times 8,75 \times 1,00 \right] = 193,39 + 51,52 + 4,37 + 20,50 + 39,39 + 177,18 = 486,16 \text{ t}$$

$$M_L = 193,39 [4,575 - 3,025] + 51,52 [4,575 - 2,525] + 4,37 [4,575 - 2,525] + 20,50 [4,575 - 3,162] + 39,39 [4,575 - 3,550] + 177,18 [4,575 - 8,100] = -141,29 \text{ mt}$$

$$M_T = 193,39 [5,85 - 6,052] + 51,52 [5,85 - 10,35] + 4,37 [5,85 - 10,827] + 20,50 [5,85 - 2,000] + 39,39 [5,85 - 5,505] + 177,18 [5,85 - 2,517] = 392,51 \text{ mt}$$

- PESO PROPIO + C. PERM. TABLEROS.

$$N = 258,0 \text{ t}$$

$$M_L = 258,0 (4,575 - 2,50) = 535,35 \text{ mt}$$

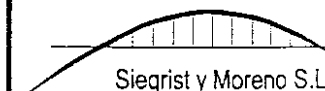
$$M_T = 258,0 (5,85 - 4,70) = 296,70 \text{ mt}$$

- SUBCARGA TABLEROS.

$$N = 242,0 \text{ t}$$

$$M_L = 242,0 (4,575 - 2,50) = 502,15 \text{ mt}$$

$$M_T = 242,0 (5,85 - 4,70 + 0,38) = 370,26 \text{ mt}$$

	PROYECTO		FECHA	
			HOJA N.º	2

- FUERZAS, ARRASTRES

$$F_L = 60,5 \text{ t}$$

$$M_L = 60,5 \times 8,407 = 509,04 \text{ mt}$$

- DEFORMACIONES DE FUERZAS

$$F_L = 12,90 \text{ t}$$

$$M_L = 12,90 \times 8,407 = 108,45 \text{ mt}$$

- INTERSECCION CORRAL-TABLEROS

$$F_L = 56,07 \text{ t}$$

$$M_L = 56,07 \times 8,407 = 471,38 \text{ mt}$$

- VIENTO.

$$F_T = 10,30 \text{ t} + 0,20 \times 10,15 \times 8,73 = 10,30 + 17,72 = 28,02 \text{ t}$$

$$M_T = 36,93 + 10,30 \times 8,407 + 17,72 \times 6,365 = 236,31 \text{ mt}$$

- EFECTO UZOS.

$$F_T = 10 \text{ t}$$

$$M_T = 10 (3,64 + 8,407) = 120,42 \text{ mt}$$

- FUERZAS CONSTRUCCION

$$F_T = 4,29 \text{ t}$$

$$M_T = 4,29 (1,80 + 3,64 + 8,407) = 66,33 \text{ mt}$$

- EMPUJE DE PUENTES.

$$E_0 = 0,333 (3 + 1 \times 2,0) = 1,00 \text{ t}$$

$$E_{8,66} = 0,333 (3 + 8,66 \times 2,0) = 6,78 \text{ t}$$

 Siegrist y Moreno S.L.	PROYECTO	FECHA
		
	HOJA N.º 3.	

$$F_L = \frac{1.00 + 6.78}{2} \times 8.66 \times 9.69 = 326.43 \text{ t}$$

$$F_T = \frac{1.00 + 6.78}{2} \times 8.66 \times 9.10 = 306.56 \text{ t}$$

$$M_L = 326.43 \left[\frac{2.00 + 6.78}{1.00 + 6.78} \times \frac{8.66}{3} + 2.00 \right] = 1716.27 \text{ mt}$$

$$M_T = 306.56 \left[\frac{2.00 + 6.78}{1.00 + 6.78} \times \frac{8.66}{3} + 2.00 \right] = 1611.49 \text{ mt}$$

— PERU DE TIERRAS

$$N = (2.00 \times 8.66 + 3.00) 8.69 \times 5.10 + (2.00 \times 7.24 + 3.00) 2.70 \times 1.00 = 900.56 + 47.20 = 947.76 \text{ t}$$

$$M_L = 900.56 (4.575 - 6.600) + 47.20 (4.575 - 3.000) = -1725.26 \text{ mt}$$

$$M_T = 900.56 (5.85 - 7.335) + 47.20 (5.85 - 10.35) = -1567.75 \text{ mt}$$

— PERU DE ZAPATA

$$N = 11.70 \times 9.15 \times 2.00 \times 2.5 = 535.28 \text{ t}$$

DETERMINO MAXIMAS SOBRE TERRAZA

$$N = 486.16 + 258.00 + 242.00 + 947.76 + 535.28 = 2469.20 \text{ t}$$

$$F_L = 60.55 + 12.90 + 56.07 + 326.43 = 455.95 \text{ t}$$

$$F_T = 28.02 + 10.00 + 4.79 + 306.56 = 349.37 \text{ t}$$

$$M_L = -141.29 + 535.35 + 502.15 + 509.04 + 108.45 + 471.38 + 1716.27 - 1725.26 = 1926.09 \text{ mt} \quad (e_L = 0.750 \text{ m})$$

$$M_T = 392.51 + 296.20 + 320.26 + 236.31 + 120.47 + 66.33 + 1611.49 - 1567.75 = 1526.32 \text{ mt} \quad (e_T = 0.618 \text{ m})$$

 Siegrist y Moreno S.L.	PROYECTO	FECHA
		
	HOJA N.º 4	

$$\sigma_w = \frac{2469.20}{4 (4.575 - 0.380) (5.850 - 0.618)} = 31.09 \text{ t/m}^2$$

$$\sigma_{w\pm} = \frac{2469.20}{9.15 \times 11.70} \pm \frac{1926.09 \times 4.575}{746.91} \pm \frac{1526.32 \times 5.850}{1221.23} = 23.07 \pm 11.80 \pm 7.31 = 3.96 \text{ t/m}^2$$

Con puente cargado:

Seguridad al deslizamiento:

$$I_d = \frac{2469.20 \times 0.55}{\sqrt{455.95^2 + 349.37^2}} = \frac{1358.06}{574.41} = 2.36 > 1.50$$

Seguridad al vuelco:

$$\gamma_v = \frac{M_e}{M_v} = \frac{486.16 \times 4.075 + 141.29 + (258.00 + 242.00) \times 2.00 + 947.76 \times 4.075 + 1725.26 + 535.28 \times 4.075}{509.04 + 108.45 + 471.38 + 1716.27} = \frac{7094.04}{2805.14} = 2.53 > 2.00$$

Con puente vacío:

$$I_d = \frac{(2469.20 - 242.00) \times 0.55}{\sqrt{395.40^2 + 334.58^2}} = \frac{1224.96}{517.96} = 2.37 > 1.50$$

$$\gamma_v = \frac{486.16 \times 4.075 + 141.29 + 258.00 \times 2.00 + 767.60 \times 6.10 + 39.10 \times 3.05 + 535.28 \times 4.075}{108.45 + 471.38 + 1716.27} = \frac{9621.27}{2296.10} = 4.19 > 2.00$$

DESARROLLOS CON CARGAS MAYORADAS

$$N_d = 1.35(486.16 + 258.00 + 535.28) + 1.50(242.00 + 947.26) = 3511.89 \text{ t}$$

$$M_{Ld} = 1.35(-141.29 + 535.35 + 108.24) + 1.50(802.15 + 509.04 + 471.38 + 1716.27) - 1.35 \times 1775.26 = 3080.17 \text{ mt} \quad (e_L = 0.877 \text{ m})$$

$$M_{Td} = 1.35(392.51 + 296.70 - 1567.75) + 1.50(370.26 + 236.31 + 120.47 + 66.33 + 1611.49) = 2421.26 \text{ mt} \quad (e_T = 0.689 \text{ m})$$

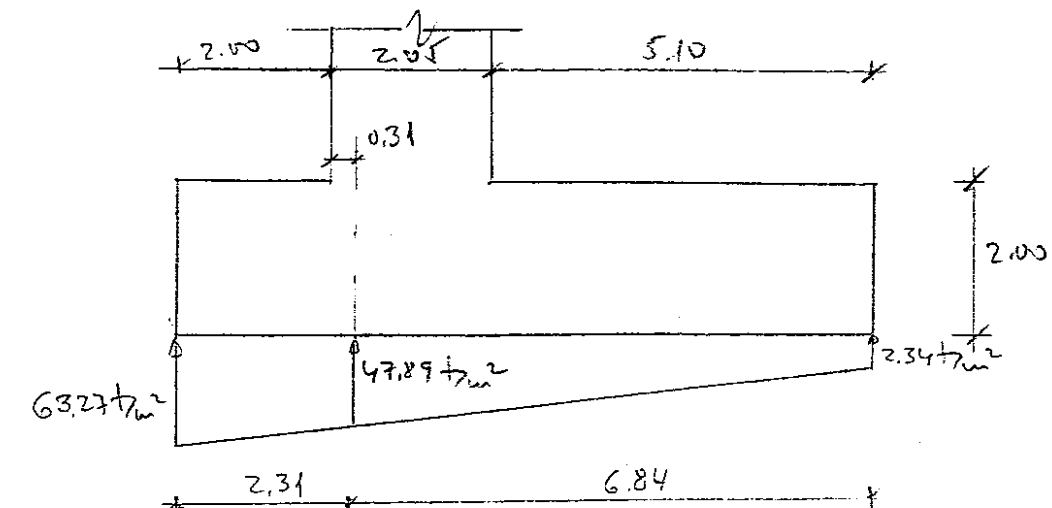
$$\sigma_{c0} = \frac{3511.89}{4(4.575 - 0.877)(5.85 - 0.689)} = 46.01 \text{ t/m}^2$$

$$\sigma_{d\text{w\acute{o}r} = \frac{3511.89}{9.15 - 11.70} \pm \frac{3080.17 \times 4.575}{746.91} \pm \frac{2421.26 \times 5.850}{1221.23} =$$

$$= 32.81 \pm 18.87 \pm 11.60 = \begin{cases} 63.27 \text{ t/m}^2 \\ 23.4 \text{ t/m}^2 \end{cases}$$

ARMADURA DE ZAPATA

- DIRECCION LONGITUDINAL
- TRONC DEBILITADA

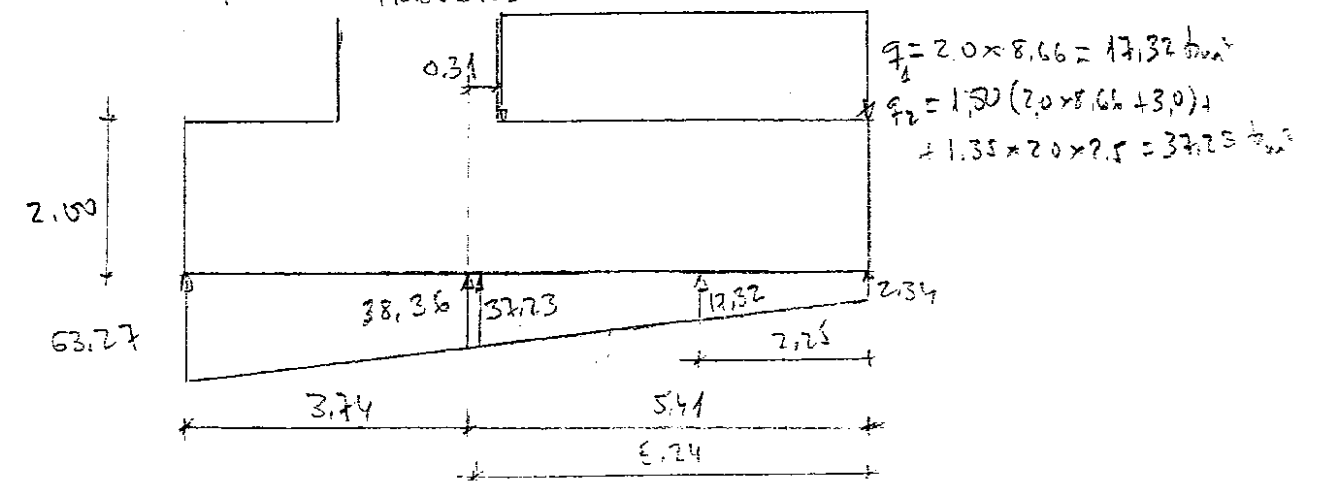


$$M_d = \frac{1}{2} \times 47.89 \times 2.31^2 + \frac{1}{3} \times 15.38 \times 2.31^2 = 155.13 \text{ mtm}$$

$$U_c = \frac{0.85 \times 2500}{1.5} \times 1.00 \times 1.90 = 2691.7 \text{ t/m}$$

$$A_s = U_c \left[1 - \sqrt{1 - \frac{2 \times 155.13}{U_c \times 1.90}} \right] \times \frac{1.15}{5.1} = 18.70 \text{ cm}^2/\text{m}$$

- TRONC TRANSVERSO



$$M_{12} = -1/2 \times 14.98 \times 2.25 \times 4.66 + \frac{1}{2} \times 21.04 \times 3.16 \times \frac{1}{3} \times 3.16 =$$

$$= -78.53 + 35.02 = -43.52 \text{ mtn}$$

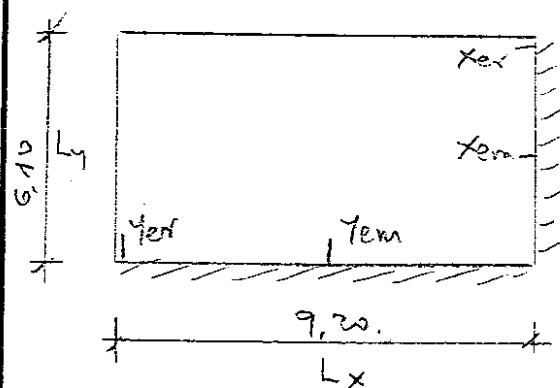
$$M_{21} = -\frac{1}{2} \times 34.89 \times 5.24 \left(\frac{2}{3} \times 5.24 + 0.17 \right) = -334.87 \text{ mtn}$$

$$A_{sup} = 41.14 \text{ cm}^2/\text{m} \quad (\phi 25/0.125)$$

- DIRECCION TRANSVERSAL

Se calcula como una placa empotrada en los bordes.

$$q_1 = 30.48 - 46.01 = -15.53 \text{ kN/m}^2 \text{ (hacia arriba)}. \quad \frac{L_y}{L_x} =$$



$$K = 15.53 \times 9.20 \times 6.10 = 871.55 \text{ t}$$

$$M_{Xer} = \frac{871.55}{3.23} = 269.83 \text{ mtn}$$

$$M_{Xem} = \frac{871.55}{7.37} = 118.90 \text{ mtn}$$

$$M_{Yem} = \frac{871.55}{7.37} = 118.90 \text{ mtn}$$

$$M_{Yer} = \frac{1}{2} \times 15.53 \times 6.10^2 = 288.94 \text{ mtn}$$

$$A_{Xer} = 32.92 \text{ cm}^2/\text{m}$$

$$A_{Xem} = A_{Yem} = 14.28 \text{ cm}^2/\text{m}$$

$$A_{Yer} = 35.32 \text{ cm}^2/\text{m}$$

$$A_{min} = 0.04 V_c = \frac{1.15}{5.1} = 24.28 \text{ cm}^2/\text{m} \quad (\phi 25/0.20)$$

3.2.- CÁLCULO DE ALZADOS

PROYECTO L.A.T. MADRUGA BARRAS

FECHA

10/03/00

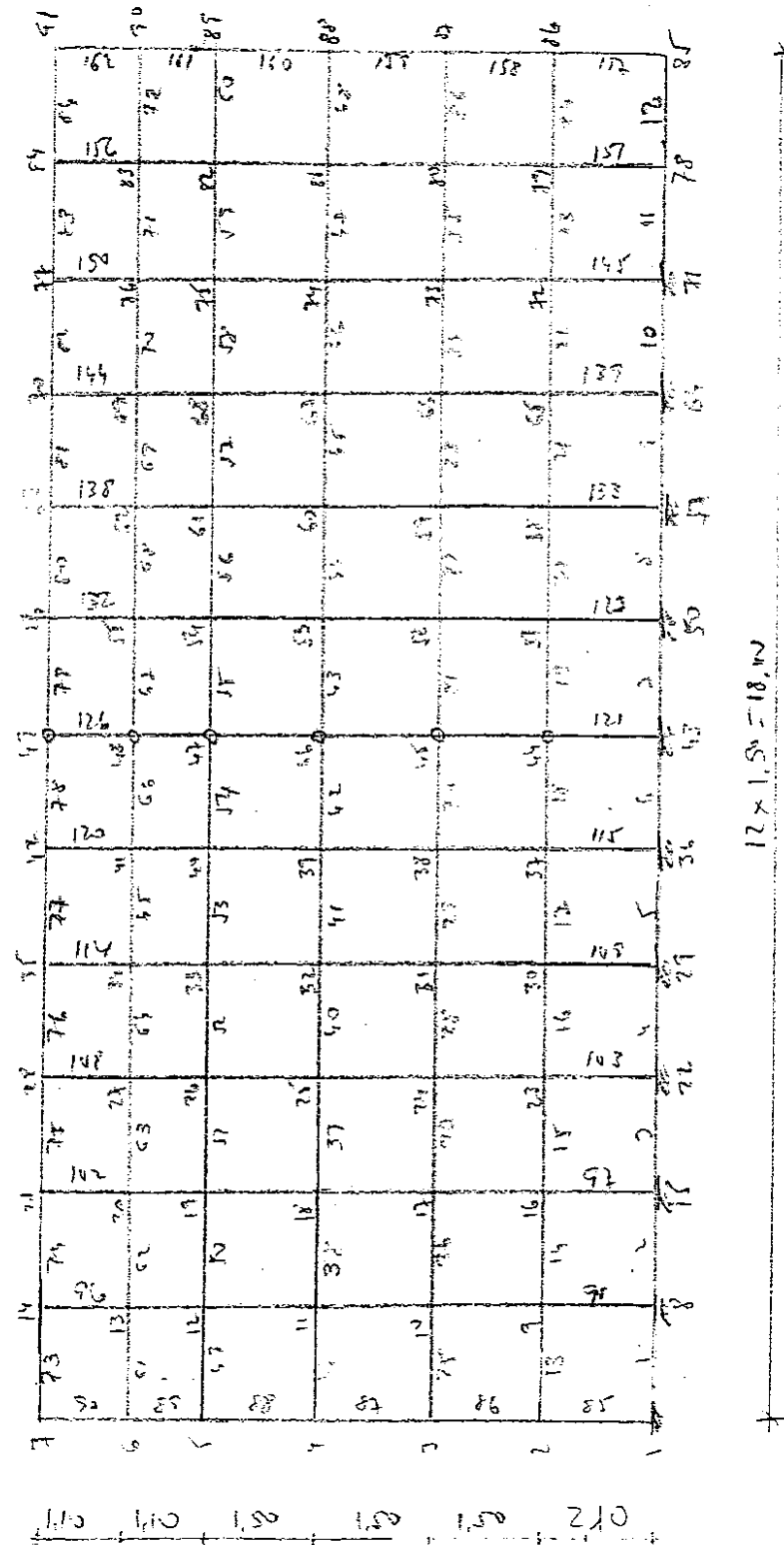
P.I. 56242

HOJA N.º

1

ARMADURA DE MUROS, ESTRIBOS 2 Y 3

EMPAREJADO



PROYECTO

FECHA

PI-56242

HOJA N.º

2

DETERMINACION DE BARRAS

$$I = \frac{a \cdot b^3}{12}$$

$$J = 2I$$

BARRAS	a	b	I	J	TIPO
1 a 12	0.750	1.000	0.062500	0.125000	1
13, 14, 25, 26, 37, 38, 91 a 96	1.500	1.050	0.144703	0.289406	2
15 a 18, 27 a 30, 39 a 42 103 a 106, 109 a 112, 115 a 118	1.500	2.050	1.076890	2.153780	3
19 a 24, 31 a 36, 43 a 48 107, 108, 113, 114, 119, 120	1.500	1.000	0.125000	0.250000	4
49, 50	1.300	1.050	0.125409	0.250818	5
51 a 54	1.300	1.525	0.384213	0.768426	6
55 a 60	1.300	1.000	0.108233	0.216466	7
61, 62	1.100	1.050	0.106116	0.212232	8
63 a 72	1.100	1.000	0.091667	0.183334	9
73, 74	0.550	1.050	0.053058	0.106116	10
75 a 84	0.550	1.000	0.045833	0.091666	11
85 a 90	0.750	1.050	0.072352	0.144704	12
97 a 100	1.500	1.550	0.465484	0.930968	13
101, 102	1.500	1.025	0.134611	0.269222	14
121 a 124	1.500	1.525	0.443321	0.886644	15
125 a 156	1.500	1.000	0.125000	0.250000	4
157 a 162	0.750	1.000	0.062500	0.125000	1

PROYECTO.....	FECHA.....
PI-562+7	HOJA N.º 3

H-1 FUERZA LONGITUDINAL + EMP. DE TIERRAS MUR DE FRENTE

MUR 26 y 40: $F_z = 69.76 \text{ t}$

$e = 0.33 (3.0 + 2 \times 2.0)$

z	e	BARRAS	p
0	1.00	13 a 18	8.21
1.10	1.73	25 a 30	6.71
2.20	2.47	37 a 42	5.21
3.70	3.47	49 a 54	3.30
5.20	4.47	61 a 66	1.90
6.70	5.47	73 a 78	0.65
8.80	6.87		

Barras 85; 91; 97; 103; 109; 115: $p_1 = 6.87 \times 1.50 = 10.30$; $p_2 = 5.97 \times 1.50 = 8.96$

Barras 121: $p_1 = 5.15$; $p_2 = 4.48$; $a = 1.35$

H-2 EMP. DE TIERRAS MUR LATERAL

BARRAS	p	BARRAS	p_1	p_2	a
19 a 24	8.21	121; 127	5.15	4.48	1.35
31 a 36	6.71	127; 133; 139; 145; 151	10.30	8.96	1.35
43 a 48	5.21				
55 a 60	3.30				
67 a 72	1.90				
79 a 84	0.65				

PROYECTO.....	FECHA.....
PI-562+7	HOJA N.º 4

ARMADURA

$$M_d^* = (M_d + T_d) / \text{número barras}$$

(T_d con el mismo signo de M_d)

$$U_c = \frac{0.85 \times 2500}{1.5} \times 1.00 \times d = 1417 d \text{ t/m}$$

$$A = U_c \left[1 - \sqrt{1 - \frac{2M_d^*}{U_c d}} \right] \times \frac{1.15}{5.4} \text{ cm}^2/\text{m}$$

$$A_{\min} h = \frac{1.6}{1000} \times 100 = h = 0.16 h \text{ cm}^2/\text{m}$$

$h = 1.00 \rightarrow 16.0 \text{ cm}^2/\text{m}$
 $h = 1.05 \rightarrow 16.8 \text{ cm}^2/\text{m}$
 $h = 2.05 \rightarrow 32.8 \text{ cm}^2/\text{m}$

DIRECCION	MUR	ANCHO d	Md	Td	Md*	ARMADURA (cm ² /m)	
						Aext.	Int.
+AL - 0 2 - 2 0 +	2-16 3-12 4-18	1.50 0.95	0.84	14.46	10.70	2.43	-
	2-16 3-12 4-18	1.50 0.95	-12.60	-13.85	-17.64	-	4.22
	5-19	1.30 0.95	3.66	6.64	7.93	1.89	-
	5-19	1.30 0.95	-12.23	-6.16	-14.18	-	3.39
	6-20 7-21	0.55 0.95	2.24	4.62	12.47	2.98	-
	6-20 7-21	0.55 0.95	-1.78	-4.63	-11.66	-	2.78
	16-44 17-45 18-46	1.50 1.95	37.59	127.86	110.30	12.89	-
	16-44 17-45 18-46	1.50 1.95	-136.01	-69.71	-137.15	-	16.07
	20-48 21-49	0.55 0.90	9.14	12.41	39.15	9.99	-
	20-48 21-49	0.55 0.90	-42.84	-0.24	-28.33	-	20.35
	44-86 45-87 46-88	1.50 0.90	3.12	1.92	3.36	0.84	-
	44-86 45-87 46-88	1.50 0.90	-114.63	-2.98	-81.74	-	21.27
	47-89	1.30 0.90	0.96	12.25	10.55	2.66	-
	47-89	1.30 0.90	-123.44	-10.13	-105.83	-	22.82
	48-90 49-91	0.55 0.90	4.65	13.60	35.15	2.44	49.19
48-90 49-91	0.55 0.90	-82.42	-10.72	-129.53	-		

PROYECTO.....

FECHA.....

PI-56217

E-2/3

HOJA N.º

5

ARMADURA.

$$M_d^* = (M_d + T_d) / \text{anchura barra}$$

(T_d con el mismo signo de M_d)

$$U_c = \frac{0,85 \times 2500}{1,5} \times 1,00 \times d = 1417 d \text{ kg}$$

$$A = U_c \left[1 - \sqrt{1 - \frac{2M_d^*}{U_c d}} \right] \times \frac{1,15}{5,1} \text{ cm}^2/\text{m}$$

$$A_{\text{mín}} = \frac{0,9}{1000} \times 100 \times h = 0,09 h \text{ cm}^2/\text{m}$$

$$\begin{aligned} h &= 1,00 \rightarrow 9,0 \text{ cm}^2/\text{m} & (11,5) \\ h &= 1,05 \rightarrow 9,5 \text{ cm}^2/\text{m} & (12,2) \\ h &= 2,05 \rightarrow 18,5 \text{ cm}^2/\text{m} & (24,9) \end{aligned}$$

DIRECCION	NUDOS	ANCHO d	M _d	T _d	M _d [*]	ARMADURA (cm ² /m)	
						A _{expt.}	A _{mín.}
VERTICAL	1-7 8-16	0,75 0,75	5,75	11,15	22,54	5,40	-
	1-7 8-14	0,75 0,95	-100,31	-10,29	-142,47	-	37,30
	22-26 29-33 36-40	1,50 1,95	15,75	90,99	71,16	8,29	-
	22-26 29-33 36-40	1,50 1,95	-370,14	-64,44	-289,70	-	34,45
	26-28 33-35 40-42	1,50 0,90	36,21	16,09	34,87	8,88	-
	26-28 33-35 40-42	1,50 0,90	-8,74	-16,09	-16,56	-	4,18
	50-63	1,50 0,90	6,00	36,18	28,12	7,14	-
	50-63	1,50 0,90	-65,53	-22,40	-58,62	-	15,08
	64-77	1,50 0,90	32,12	55,41	58,36	15,01	-
	64-77	1,50 0,90	-256,79	-57,98	-209,85	-	58,53
	78-84	1,50 0,90	28,32	9,84	75,44	6,45	-
	78-84	1,50 0,90	-45,65	-14,09	-39,83	-	10,16
	85-91	0,75 0,90	14,44	4,47	25,21	6,39	-
	85-91	0,75 0,90	-10,61	-3,12	-18,31	-	4,63

PROYECTO.....

FECHA.....

PI 56217

E-2/3

HOJA N.º

6

CONSTANTE

$$V_{cu} = \left[0,10 - \frac{1}{3} (100 \rho_L \cdot f_{ck})^{1/3} - 0,15 \sigma'_{cd} \right] \cdot b_0 \cdot d \cdot \beta$$

$$\xi = 1 + \sqrt{\frac{200}{d}} \quad (d \text{ en mm})$$

$$\rho_L = \frac{A}{b \times h} \neq 0,0200$$

$$f_{ck} = 25 \text{ N/mm}^2$$

$$\sigma'_{cd} = 0$$

$$b = b_0 = 1,00 \text{ m} = 1000 \text{ mm} \quad \beta = 1$$

$$d \text{ (en mm)}$$

$$A_{it} = \frac{V_d - V_{cu}}{0,9 \cdot d \cdot \frac{1}{1,15}} \text{ cm}^2/\text{m} \quad (V_d = \frac{V_{Ludo}}{\text{anchura}})$$

DIRECCION	NUDOS	ANCHO d	V _d Ludo	V _d	ρ _L	V _{cu}	A _{it}
HORIZONTAL	2-16 3-13 4-18	1,50	16,51	11,01	0,0016	22,42	-
	5-19	1,30	13,85	10,65	0,0016	22,42	-
	6-20 7-21	0,55	4,36	7,93	0,0016	22,42	-
	16-44 17-45 18-46	1,50	62,21	41,47	0,0016	44,66	-
	20-48 21-49	1,10	50,47	45,89	0,0016	21,43	8,47
	44-86 45-87 46-88	1,50	63,06	42,04	0,0016	21,43	7,14
	47-89	1,30	50,31	38,70	0,0021	23,46	5,28
	48-90	1,10	24,53	22,30	0,0021	23,46	-
	49-91	0,55	22,09	40,16	0,0021	23,46	5,28

PROYECTO.....

FECHA.....

PI-562+2

E-2/3

HOJA N.º

7

CONSTANTE

$$V_{cu} = [0.10 - \xi (100 \rho_L \cdot f_{cr})^{1/3} - 0.15 \sigma'_{cd}] \cdot b_0 \cdot d \cdot \beta$$

$$\xi = 1 + \sqrt{\frac{200}{d}} \quad (d \text{ en mm})$$

$$\rho_L = \frac{A}{b \cdot h} \neq 0.0200$$

$$f_{cr} = 25 \text{ N/mm}^2$$

$$\sigma'_{cd} = 0$$

$$b = b_0 = 1.00 \text{ m} = 1000 \text{ mm} \quad \beta = 1$$

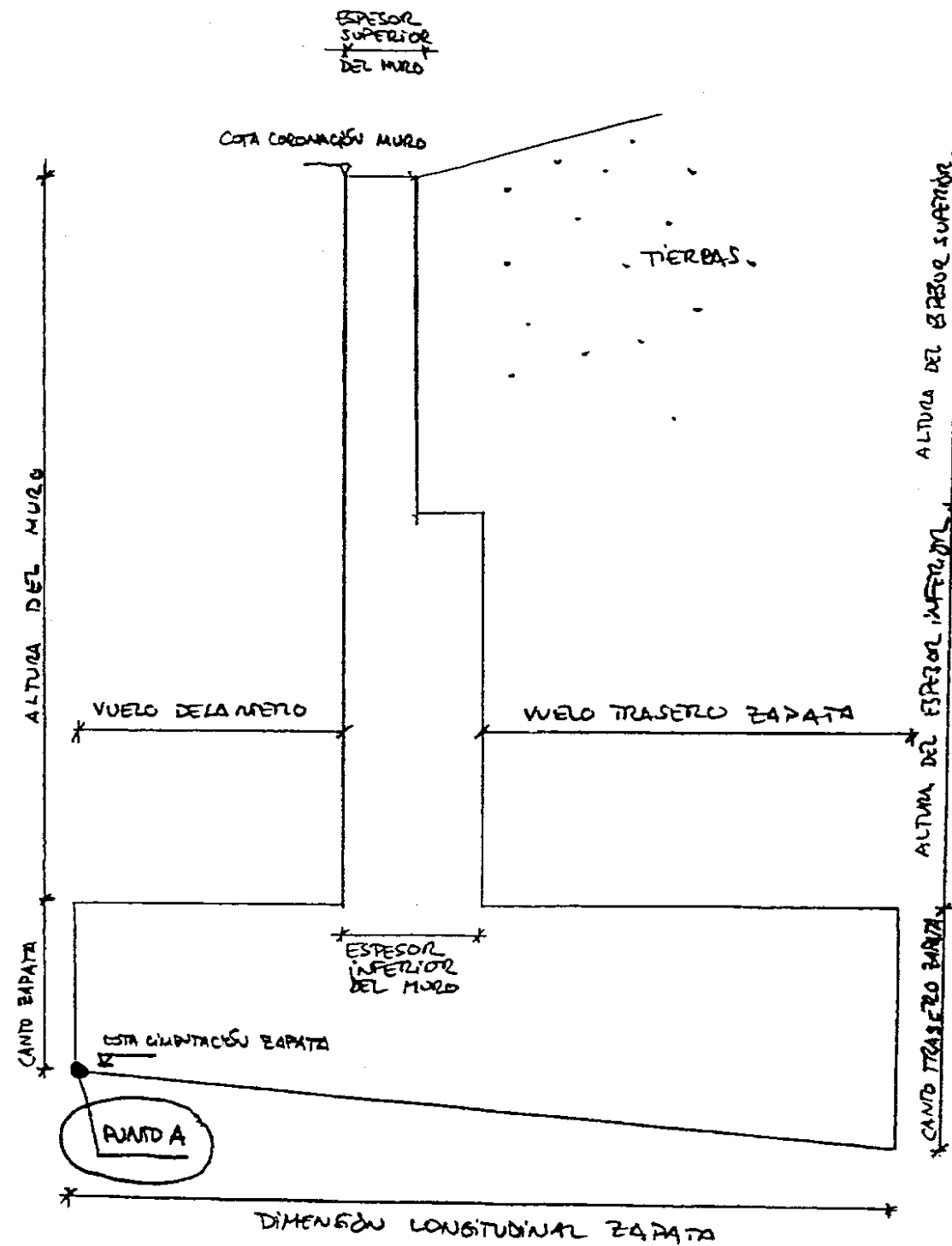
$$d \text{ (en mm)}$$

$$A_{st} = \frac{V_d - V_{cu}}{0.9 - d = 4.1/115} \text{ cm}^2/\text{m}/\text{m} \quad (V_d^* = \frac{V_{d_{max}}}{\text{anchura}})$$

DIRECCION	NUDO	ANCHO	d	V _{d_{max}}	V _d	ρ_L	V _{cu}	A _{st}
VERTICAL	1-7	0.75	0.75	43.59	58.12	0.0018	23.32	1.42
	8-14	1.50	0.75	53.76	35.84	0.0018	23.32	4.14
	22-26 29-33 36-40	1.50	1.95	135.08	90.05	0.0015	40.77	7.88
	26-28 33-35 40-42	1.50	0.90	40.88	27.25	0.0011	18.91	2.89
	50-52	1.50	0.90	19.88	13.25	0.0011	18.91	-
	57-63	1.50	0.90	33.65	22.43	0.0011	18.91	1.22
	64-70	1.50	0.90	57.24	38.16	0.0020	23.08	5.22
	71-77	1.50	0.90	148.62	99.08	0.0054	29.25	20.55
	78-84	1.50	0.90	30.02	20.01	0.0020	23.08	-
	85-91	0.75	0.70	10.14	13.52	0.0020	23.08	-

4.- CÁLCULO DE MUROS EXENTOS

CÁLCULO DE MUROS EXENTOS: ESQUEMA GEOMÉTRICO



CÁLCULO DE MUROS EXENTOS: ENCAJE GEOMÉTRICO

SECCIÓN - 0

1.- ACCIONES VERTICALES MÁXIMAS EN CABEZA DE MURO

SOPORTE	Acciones pp	Acciones cp	Sobrecargas máximas	Sobrecargas mínimas
MURO 1	0.00 t	0.00 t	0.00 t	0.00 t
MURO 2	0.00 t	0.00 t	0.00 t	0.00 t

Cargas verticales extremas sin mayorar en cabeza de muro:

Acción vertical (máx): 0.00 t Acción vertical (mín): 0.00 t

Cargas verticales extremas mayoradas en cabeza de muro:

Acción vertical (máx): 0.00 t

2.- ACCIONES LONGITUDINALES MÁXIMAS EN CABEZA DE MURO

Se recogen acciones tipo anclajes en cabeza de muro.

APOYO	Anclaje 1	Anclaje 2	Anclaje 3	Anclaje 4
Muro 1	0.00 t	0.00 t	0.00 t	0.00 t

3.- EMPUJE DE TIERRAS EN TRASDÓS

$$e_{\text{Sup}} (\text{t/m}^2): 0.990 \text{ t/m}^2$$

$$e_{\text{Inf}} (\text{t/m}^2): 6.171 \text{ t/m}^2$$

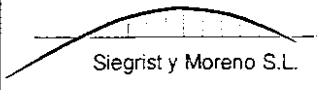
$$e (\text{t/m}^2) = k_a (p_{sc} + \gamma_i \cdot z)$$

$$e_{\text{Inf, zap}} (\text{t/m}^2): 7.392 \text{ t/m}^2$$

Coefficiente de Empuje Activo: $k_a = 0.330$

Sobrecarga sobre el terraplén: $p_{sc} = 3.00 \text{ t/m}^2$

Peso específico del relleno: $\gamma_i = 2.00 \text{ t/m}^3$



PROYECTO: L.A.V. MADRID-BARCELONA
P.I. 562+7 (TORIJA)

FECHA: 22/12/00
HOJA Nº: 2/6

4.- CARACTERÍSTICAS DEL MURO: ALZADO ESCALONADO.

Cota de coronación muro: 9.050 m
Cota de cimentación zapata: 0.000 m
Canto zapata: 1.200 m
Altura del muro: 7.850 m

Ancho muro: 1.000 m
Tensión máx. admisible: 3.0 kp/cm2

Espesor superior del muro: 0.500 m
Espesor inferior del muro: 1.000 m

Altura de espesor superior: 3.250 m
Altura de espesor inferior: 4.600 m

$f_{ck,Alzados+Zapata}$ (N/mm²): 25.00
 $f_{yk,Acero}$ (N/mm²): 510.00
 $E_{Estribo}$ (N/mm²): 27264

γ_c = 1.50
 γ_s = 1.15

Vuelo delantero zapata: 1.200 m
Vuelo trasero zapata: 3.200 m
Ancho zapata: 1.000 m

Canto trasero de zapata: 1.850 m
Dim.Long. zapata: 5.400 m
Dim.Trans. zapata: 1.000 m

6.- ACCIONES RESPECTO DEL PUNTO A

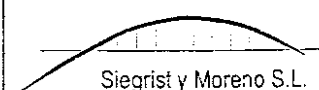
Coef.Rozamiento: 0.6204

	N (t)	M _A (mt)	H _L (t)
Zapata	21	60	0
Cuerpo Muro	16	25	0
Peso de Tierras traseras	64	237	0
Acciones en cabeza (N)	0	0	0
Acciones en cabeza (H _L)	0	0	0
Empuje Tierras	0	-117	28

Acciones Totales

N (t) = 100
M (mt) = 204
H (t) = 28

e_A (m) = 2.037 m
 e_C (m) = 0.663 m
M_C (mt) = 66.46 mt/m



PROYECTO: L.A.V. MADRID-BARCELONA
P.I. 562+7 (TORIJA)

FECHA: 22/12/00
HOJA Nº: 3/6

Tensiones Máximas

σ_{med} (t/m²) = 18.6
 σ_{co} (t/m²) = 24.6
 $\sigma_{máx}$ (t/m²) = 32.2
 $\sigma_{mín}$ (t/m²) = 4.9

(menor que la tensión máxima admisible)
(menor que la máxima admisible)
(mayor o igual que 0 t/m2)

Seguridad al deslizamiento

En servicio con sobrecarga total:

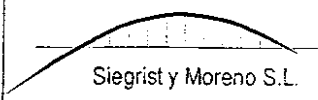
$\gamma_d = k \cdot N / F_L = 2.2$

Seguridad al vuelco

En servicio con sobrecarga total:

$\gamma_v = M_{estabil} / M_{vuelco} = 2.74$

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PROYECTO:
L.A.V. MADRID-BARCELONA

P.I. 562+7 (TORIJA)

FECHA: 22/12/00

HOJA Nº: 4/6

CÁLCULO DE MURO EXENTO: ARMADURA
SECCIÓN - 0

1.- ARMADURA DEL CUERPO PRINCIPAL DEL MURO A FLEXIÓN Y CORTANTE

Características del estribo a flexión:

Espesor superior del muro:	0.500 m
Ancho del muro:	1.000 m
Altura del muro:	7.850 m
Resistencia característica del hormigón:	25 N/mm2
Resistencia característica del acero:	510 N/mm2

$$U_{cd}/d = 1417 \text{ t}$$

Cálculo a flexión del muro a diversas alturas
z = profundidad desde sección superior

z	e _{inf}	d	M _d	U _c	A _{s,nec}	A _{s,min,v} *	A _{s,min,h} **
0.000 m	0.99 t/m2	0.450 m	0.00 mt	637.50 t	0.0 cm2	4.5 cm2	8.0 cm2
0.785 m	1.51 t/m2	0.450 m	0.54 mt	637.50 t	0.3 cm2	4.5 cm2	8.0 cm2
1.570 m	2.03 t/m2	0.450 m	2.47 mt	637.50 t	1.2 cm2	4.5 cm2	8.0 cm2
2.355 m	2.54 t/m2	0.450 m	6.27 mt	637.50 t	3.2 cm2	4.5 cm2	8.0 cm2
3.140 m	3.06 t/m2	0.450 m	12.43 mt	637.50 t	6.4 cm2	4.5 cm2	8.0 cm2
3.925 m	3.58 t/m2	0.950 m	21.42 mt	1345.83 t	5.1 cm2	9.0 cm2	16.0 cm2
4.710 m	4.10 t/m2	0.950 m	33.71 mt	1345.83 t	8.1 cm2	9.0 cm2	16.0 cm2
5.495 m	4.62 t/m2	0.950 m	49.80 mt	1345.83 t	12.1 cm2	9.0 cm2	16.0 cm2
6.280 m	5.13 t/m2	0.950 m	70.15 mt	1345.83 t	17.1 cm2	9.0 cm2	16.0 cm2
7.065 m	5.65 t/m2	0.950 m	95.25 mt	1345.83 t	23.5 cm2	9.0 cm2	16.0 cm2
7.850 m	6.17 t/m2	0.950 m	125.57 mt	1345.83 t	31.4 cm2	9.0 cm2	16.0 cm2

* 0.9 por mil
** 3.2/2 por mil

Cálculo del muro a cortante:

Esfuerzo cortante de agotamiento por compresión oblicua del alma, Vu1:

$$k = 1$$

$$f_{cd} = 10.00 \text{ N/mm2}$$

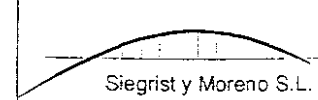
$$b_0 = 1.000 \text{ m}$$

$$\theta = (\text{Ángulo de las bielas comprimidas de hormigón})$$

$$\alpha = 90^\circ \quad (\text{Ángulo de las armaduras con el eje de la pieza})$$

$$V_{u1} = k \cdot b_0 \cdot f_{cd} \cdot 10^3 \cdot d \cdot 10^3 \cdot (1/\text{TAN}(\theta) + 1/\text{TAN}(\alpha)) / (1 + (1/\text{TAN}(\theta))^2) / (10000)$$

$$\alpha = 90^\circ \quad (\text{Ángulo de las armaduras con el eje de la pieza})$$



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Esfuerzo cortante de agotamiento por tracción en el alma, Vu2: Piezas SIN armadura de cortante:

$$\xi = 1 + \text{raiz}(200/d) \quad (d \text{ en mm})$$

$$\rho_L = A/(b \cdot h) \quad (\text{cuantía geométrica de la armadura longitudinal traccionada, no mayor de 0.020})$$

$$V_{u2} = (0.12 \cdot \xi \cdot (100 \rho_L f_{ck})^{1/3}) b_0 d$$

$$f_{ck} = 25 \text{ N/mm2}$$

$$\sigma_{cd} = \text{Tensión axil efectiva en la sección (tracción positiva)}$$

Cálculo a cortante del muro a diversas alturas

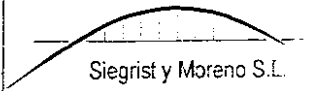
z = profundidad desde sección superior

z	e _{inf}	d	V _d	σ _{cd}	cotgθ	V _{u1}	Conclusión
0.000 m	0.99 t/m2	0.450 m	1.49 t	0.00 t/m2	1.000	225.00 t	Cumple
0.785 m	1.51 t/m2	0.450 m	1.47 t	-1.96 t/m2	1.004	225.00 t	Cumple
1.570 m	2.03 t/m2	0.450 m	3.55 t	-3.93 t/m2	1.008	224.99 t	Cumple
2.355 m	2.54 t/m2	0.450 m	6.24 t	-5.89 t/m2	1.011	224.99 t	Cumple
3.140 m	3.06 t/m2	0.450 m	9.54 t	-7.85 t/m2	1.015	224.97 t	Cumple
3.925 m	3.58 t/m2	0.950 m	13.45 t	-9.81 t/m2	1.019	474.92 t	Cumple
4.710 m	4.10 t/m2	0.950 m	17.98 t	-11.78 t/m2	1.023	474.88 t	Cumple
5.495 m	4.62 t/m2	0.950 m	23.11 t	-13.74 t/m2	1.026	474.84 t	Cumple
6.280 m	5.13 t/m2	0.950 m	28.85 t	-15.70 t/m2	1.030	474.79 t	Cumple
7.065 m	5.65 t/m2	0.950 m	35.20 t	-17.66 t/m2	1.034	474.74 t	Cumple
7.850 m	6.17 t/m2	0.950 m	42.16 t	-19.63 t/m2	1.038	474.68 t	Cumple

ξ	ρ _L	σ _{cd}	V _{u2,sin Ast}	V _{cu}	Conclusión
1.667	0.0009	0.00 t/m2	11.79 t	9.83 t	No necesaria armadura de cortante
1.667	0.0009	-1.96 t/m2	11.93 t	9.96 t	No necesaria armadura de cortante
1.667	0.0009	-3.93 t/m2	12.06 t	10.09 t	No necesaria armadura de cortante
1.667	0.0009	-5.89 t/m2	12.19 t	10.23 t	No necesaria armadura de cortante
1.667	0.0013	-7.85 t/m2	13.77 t	11.56 t	No necesaria armadura de cortante
1.459	0.0009	-9.81 t/m2	23.19 t	19.56 t	No necesaria armadura de cortante
1.459	0.0009	-11.78 t/m2	23.47 t	19.84 t	No necesaria armadura de cortante
1.459	0.0012	-13.74 t/m2	25.98 t	21.98 t	No necesaria armadura de cortante
1.459	0.0017	-15.70 t/m2	29.25 t	24.74 t	No necesaria armadura de cortante
1.459	0.0024	-17.66 t/m2	32.53 t	27.53 t	Es necesaria armadura de cortante
1.459	0.0031	-19.63 t/m2	35.86 t	30.35 t	Es necesaria armadura de cortante

Esfuerzo cortante de agotamiento por tracción en el alma, Vu2: Piezas CON armadura de cortante:

A _{st,nec}	A _{st,min}	A _{st}	s	Conclusión
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
2.20 cm2	8.33 cm2	8.33 cm2	0.300 m	1 cercos de 12 mm a s metros
3.38 cm2	8.33 cm2	8.33 cm2	0.300 m	1 cercos de 12 mm a s metros

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2.- ARMADURA DE LA ZAPATA DE MURO

Se calcula la zapata como "zapata flexible" según la norma EHE-98.

Armadura longitudinal inferior:

$\sigma_{1d} = 32.24 \text{ t/m}^2$
 $\sigma_{2d} = 4.89 \text{ t/m}^2$

$L_{zap} = 5.400 \text{ m}$
 $Esp_{-Muro} = 1.000 \text{ m}$

$a/4 = 0.250 \text{ m}$
 $d = 1.100 \text{ m}$

Vuelo trasero zapata = 3.200 m
Vuelo delantero zapata = 1.200 m

$0.85 \cdot d = 0.935 \text{ m}$
 $0.15 \cdot a = 0.150 \text{ m}$

$\sigma_{s,i} = 25.40 \text{ t/m}^2$
 $M_{11d} = 40.95 \text{ mt}$

$\sigma_{s,s} = 21.10 \text{ t/m}^2$

$U_{cd} = 1833.33 \text{ t}$
 $A_{s,inf} = 8.5 \text{ cm}^2/\text{m}$

2.7 redondos de 20 mm por metro

Armadura longitudinal superior:

$M_d = 97.83 \text{ mt/m}$
 $A_{s,sup} = 20.6 \text{ cm}^2/\text{m}$

$U_{cd} = 1833.3 \text{ t/m}$
6.5 redondos de 20 mm por metro

Armaduras mínimas de zapata:

Mínima en zapata:

$12.00 \text{ cm}^2/\text{m}$
 $\alpha_{inf} = 1.244$
 $A_{s,inf} = 13.3 \text{ cm}^2/\text{m}$

3.8 redondos de 20 mm por metro
 $\alpha_{sup} = 0.878$
 $A_{s,sup} = 20.6 \text{ cm}^2/\text{m}$

Armadura de cortante:

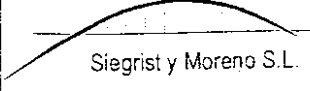
$V_{u1} = 550 \text{ t}$
 $V_d = 32 \text{ t}$
 $V_{u2} = 35 \text{ t}$
 $\xi = 1.426$
 $V_{cu} = 29 \text{ t}$

El hormigón resiste adecuadamente a compresión oblicua

No es necesaria armadura de cortante.

$\rho_L = 0.003$
 $A_{st} = 0.68 \text{ cm}^2/\text{m}$
 $A_{st,min} = 8.33 \text{ cm}^2/\text{m}$

$f_{ck} = 25 \text{ N/mm}^2$
0.3 cercos de 12 mm
3.7 cercos de 12 mm

 Siegrist y Moreno S.L.	PROYECTO: L.A.V. MADRID-BARCELONA P.I. 562+7 (TORIJA)	FECHA: 22/12/00 HOJA Nº: 1/6
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CÁLCULO DE MUROS EXENTOS: ENCAJE GEOMÉTRICO

SECCIÓN - 1

1.- ACCIONES VERTICALES MÁXIMAS EN CABEZA DE MURO

SOPORTE	Acciones pp	Acciones cp	Sobrecargas máximas	Sobrecargas mínimas
MURO 1	0.00 t	0.00 t	0.00 t	0.00 t
MURO 2	0.00 t	0.00 t	0.00 t	0.00 t

Cargas verticales extremas sin mayorar en cabeza de muro:

Acción vertical (máx): 0.00 t

Acción vertical (mín): 0.00 t

Cargas verticales extremas mayoradas en cabeza de muro:

Acción vertical (máx): 0.00 t

2.- ACCIONES LONGITUDINALES MÁXIMAS EN CABEZA DE MURO

Se recogen acciones tipo anclajes en cabeza de muro.

APOYO	Anclaje 1	Anclaje 2	Anclaje 3	Anclaje 4
Muro 1	0.00 t	0.00 t	0.00 t	0.00 t

3.- EMPUJE DE TIERRAS EN TRASDÓS

$e_{sup} (\text{t/m}^2): 0.990 \text{ t/m}^2$
 $e (\text{t/m}^2) = k_a (p_{sc} + \gamma_t \cdot z)$
Coeficiente de Empuje Activo: $k_a = 0.330$
Sobrecarga sobre el terraplén: $p_{sc} = 3.00 \text{ t/m}^2$
Peso específico del relleno: $\gamma_t = 2.00 \text{ t/m}^3$

$e_{inf} (\text{t/m}^2): 4.686 \text{ t/m}^2$
 $e_{inf,zap} (\text{t/m}^2): 5.676 \text{ t/m}^2$

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4.- CARACTERÍSTICAS DEL MURO: ALZADO ESCALONADO.

Cota de coronación muro:	6.600 m	Ancho muro:	1.000 m
Cota de cimentación zapata:	0.000 m		
Canto zapata:	1.000 m		
Altura del muro:	5.600 m	Tensión máx. admisible:	3.0 kp/cm2
Espesor superior del muro:	0.500 m	Altura de espesor superior:	2.900 m
Espesor inferior del muro:	0.800 m	Altura de espesor inferior:	2.700 m
$f_{ck,Alzados+Zapata}$ (N/mm ²):	25.00	γ_c =	1.50
$f_{yk,Acero}$ (N/mm ²):	510.00	γ_s =	1.15
$E_{estribo}$ (N/mm ²):	27264		
Vuelo delantero zapata:	0.750 m	Canto trasero de zapata:	1.500 m
Vuelo trasero zapata:	2.500 m	Dim.Long. zapata:	4.050 m
Ancho zapata:	1.000 m	Dim.Trans. zapata:	1.000 m

6.- ACCIONES RESPECTO DEL PUNTO A Coef.Rozamiento: 0.6235

	N (t)	M _A (mt)	H _L (t)
Zapata	13	27	0
Cuerpo Muro	9	10	0
Peso de Tierras traseras	38	103	0
Acciones en cabeza (N)	0	0	0
Acciones en cabeza (H _L)	0	0	0
Empuje Tierras	0	-51	16

Acciones Totales

N (t) =	60	e _A (m) =	1.504 m
M (mt) =	90	e _C (m) =	0.521 m
H (t) =	16	M _C (mt) =	31.00 mt/m

Tensiones Máximas

σ_{med} (t/m ²) =	14.7	
σ_{co} (t/m ²) =	19.8	(menor que la tensión máxima admisible)
$\sigma_{máx}$ (t/m ²) =	26.0	(menor que la máxima admisible)
σ_{min} (t/m ²) =	3.4	(mayor o igual que 0 t/m2)

Seguridad al deslizamiento

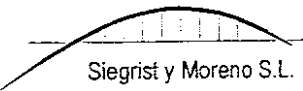
En servicio con sobrecarga total:

$$\gamma_d = k \cdot N / F_L = 2.3$$

Seguridad al vuelco

En servicio con sobrecarga total:

$$\gamma_v = M_{estabil} / M_{vuelco} = 2.76$$



PROYECTO: L.A.V. MADRID-BARCELONA
P.I. 562+7 (TORIJA)

FECHA: 22/12/00
HOJA Nº: 4/6

CÁLCULO DE MURO EXENTO: ARMADURA

SECCIÓN - 1

1.- ARMADURA DEL CUERPO PRINCIPAL DEL MURO A FLEXIÓN Y CORTANTE

Características del estribo a flexión:

Espesor superior del muro: 0.500 m

Ancho del muro: 1.000 m

Altura del muro: 5.600 m

Resistencia característica del hormigón: 25 N/mm2

Resistencia característica del acero: 510 N/mm2

U_{cd}/d = 1417 t

Cálculo a flexión del muro a diversas alturas

z = profundidad desde sección superior

z	e _{inf}	d	M _d	U _c	A _{s,nec}	A _{s,min,v}	A _{s,min,h}
0.000 m	0.99 t/m2	0.450 m	0.00 mt	637.50 t	0.0 cm2	4.5 cm2	8.0 cm2
0.560 m	1.36 t/m2	0.450 m	0.26 mt	637.50 t	0.1 cm2	4.5 cm2	8.0 cm2
1.120 m	1.73 t/m2	0.450 m	1.16 mt	637.50 t	0.6 cm2	4.5 cm2	8.0 cm2
1.680 m	2.10 t/m2	0.450 m	2.88 mt	637.50 t	1.4 cm2	4.5 cm2	8.0 cm2
2.240 m	2.47 t/m2	0.450 m	5.58 mt	637.50 t	2.8 cm2	4.5 cm2	8.0 cm2
2.800 m	2.84 t/m2	0.450 m	9.44 mt	637.50 t	4.8 cm2	4.5 cm2	8.0 cm2
3.360 m	3.21 t/m2	0.750 m	14.64 mt	1062.50 t	4.4 cm2	7.2 cm2	12.8 cm2
3.920 m	3.58 t/m2	0.750 m	21.35 mt	1062.50 t	6.5 cm2	7.2 cm2	12.8 cm2
4.480 m	3.95 t/m2	0.750 m	29.74 mt	1062.50 t	9.1 cm2	7.2 cm2	12.8 cm2
5.040 m	4.32 t/m2	0.750 m	39.98 mt	1062.50 t	12.3 cm2	7.2 cm2	12.8 cm2
5.600 m	4.69 t/m2	0.750 m	52.26 mt	1062.50 t	16.3 cm2	7.2 cm2	12.8 cm2

* 0.9 por mil

** 3.2/2 por mil

Cálculo del muro a cortante:

Esfuerzo cortante de agotamiento por compresión oblicua del alma, Vu1:

k = 1

f_{cd} = 10.00 N/mm2

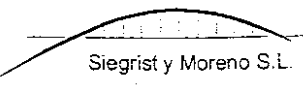
b₀ = 1.000 m

θ = (Ángulo de las bielas comprimidas de hormigón)

α = 90 ° (Ángulo de las armaduras con el eje de la pieza)

V_{u1} = k*b₀*f_{cd}*10^3*d*10^3*(1/TAN(θ)+1/TAN(α))/(1+(1/TAN(θ))^2)/(10000)

α = 90 ° (Ángulo de las armaduras con el eje de la pieza)



PROYECTO: L.A.V. MADRID-BARCELONA
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Esfuerzo cortante de agotamiento por tracción en el alma, Vu2: Piezas SIN armadura de cortante:

ξ = 1+raiz(200/d) (d en mm)

ρ_L = A/(b*h) (cuantía geométrica de la armadura longitudinal traccionada, no mayor de 0.020)

V_{u2} = (0.12*ξ(100ρ_Lf_{ck})^(1/3))b₀d

f_{ck} = 25 N/mm2

σ_{cd} = Tensión axil efectiva en la sección (tracción positiva)

Cálculo a cortante del muro a diversas alturas

z = profundidad desde sección superior

z	e _{inf}	d	V _d	σ _{cd}	cotgθ	V _{u1}	Conclusión
0.000 m	0.99 t/m2	0.450 m	1.49 t	0.00 t/m2	1.000	225.00 t	Cumple
0.560 m	1.36 t/m2	0.450 m	0.99 t	-1.40 t/m2	1.003	225.00 t	Cumple
1.120 m	1.73 t/m2	0.450 m	2.28 t	-2.80 t/m2	1.005	225.00 t	Cumple
1.680 m	2.10 t/m2	0.450 m	3.89 t	-4.20 t/m2	1.008	224.99 t	Cumple
2.240 m	2.47 t/m2	0.450 m	5.81 t	-5.60 t/m2	1.011	224.99 t	Cumple
2.800 m	2.84 t/m2	0.450 m	8.04 t	-7.00 t/m2	1.014	224.98 t	Cumple
3.360 m	3.21 t/m2	0.750 m	10.58 t	-8.40 t/m2	1.016	374.95 t	Cumple
3.920 m	3.58 t/m2	0.750 m	13.43 t	-9.80 t/m2	1.019	374.93 t	Cumple
4.480 m	3.95 t/m2	0.750 m	16.59 t	-11.20 t/m2	1.022	374.91 t	Cumple
5.040 m	4.32 t/m2	0.750 m	20.06 t	-12.60 t/m2	1.024	374.89 t	Cumple
5.600 m	4.69 t/m2	0.750 m	23.84 t	-14.00 t/m2	1.027	374.87 t	Cumple

ξ	ρ _L	σ _{cd}	V _{u2,sin Ast}	V _{cu}	Conclusión
1.667	0.0009	0.00 t/m2	11.79 t	9.83 t	No necesaria armadura de cortante
1.667	0.0009	-1.40 t/m2	11.89 t	9.92 t	No necesaria armadura de cortante
1.667	0.0009	-2.80 t/m2	11.98 t	10.02 t	No necesaria armadura de cortante
1.667	0.0009	-4.20 t/m2	12.08 t	10.11 t	No necesaria armadura de cortante
1.667	0.0009	-5.60 t/m2	12.17 t	10.21 t	No necesaria armadura de cortante
1.667	0.0010	-7.00 t/m2	12.53 t	10.52 t	No necesaria armadura de cortante
1.516	0.0009	-8.40 t/m2	18.83 t	15.85 t	No necesaria armadura de cortante
1.516	0.0009	-9.80 t/m2	18.99 t	16.01 t	No necesaria armadura de cortante
1.516	0.0011	-11.20 t/m2	20.61 t	17.38 t	No necesaria armadura de cortante
1.516	0.0015	-12.60 t/m2	22.82 t	19.25 t	No necesaria armadura de cortante
1.516	0.0020	-14.00 t/m2	25.04 t	21.13 t	No necesaria armadura de cortante

Esfuerzo cortante de agotamiento por tracción en el alma, Vu2: Piezas CON armadura de cortante:

A _{st,nec}	A _{st,min}	A _{st}	s	Conclusión
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria

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HC. n° 2 Esfuerzos Cortantes mínimos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.74	-1.85	0.09
	2	0.12	-1.85	-0.01
2	2	0.11	-0.34	0.37
	4	0.11	-0.24	0.28
3	4	0.09	-0.31	0.46
	7	0.09	-0.18	0.36
4	7	0.07	-0.22	0.45
	11	0.07	-0.11	0.35
5	11	0.05	-0.14	0.38
	16	0.05	-0.04	0.29
6	16	0.03	-0.06	0.29
	22	0.03	0.02	0.21
7	22	0.02	-0.01	0.11
	29	0.02	0.02	0.02
8	3	0.16	-0.42	0.49
	5	0.16	-0.29	0.39
9	5	0.11	-0.34	0.42
	8	0.11	-0.22	0.32
10	8	0.08	-0.26	0.42
	12	0.08	-0.14	0.32
11	12	0.06	-0.15	0.33
	17	0.06	-0.06	0.24
12	17	0.04	-0.08	0.32
	23	0.04	0.01	0.23
13	23	0.04	-0.01	0.09
	30	0.04	0.01	0.01
14	6	0.18	-0.46	0.65
	9	0.18	-0.29	0.55
15	9	0.14	-0.32	0.53
	13	0.14	-0.18	0.44
16	13	0.10	-0.20	0.42
	18	0.10	-0.08	0.33
17	18	0.06	-0.10	0.37
	24	0.06	0.00	0.28
18	24	0.05	-0.01	0.13
	31	0.05	0.01	0.04
19	10	0.19	-0.45	0.74
	14	0.19	-0.24	0.64
20	14	0.13	-0.27	0.52
	19	0.13	-0.12	0.43
21	19	0.09	-0.14	0.45
	25	0.09	-0.02	0.36
22	25	0.07	-0.03	0.16
	32	0.07	0.01	0.08
23	15	0.16	-0.38	0.69
	20	0.16	-0.18	0.60
24	20	0.12	-0.19	0.52
	26	0.12	-0.04	0.43
25	26	0.08	-0.05	0.20
	33	0.08	0.00	0.12
26	21	0.11	-0.28	0.67
	27	0.11	-0.09	0.58

27	27	0.08	-0.08	0.29
	34	0.08	0.00	0.21
28	28	0.08	-0.10	0.22
	35	0.08	-0.05	0.13
29	2	-0.60	0.02	-1.20
	3	-0.09	-0.68	-1.56
30	4	-0.49	0.10	-0.93
	5	-0.07	-0.36	-0.93
31	5	-0.81	-0.12	-1.39
	6	-0.11	-0.81	-1.39
32	7	-0.39	0.13	-0.55
	8	-0.05	-0.14	-0.55
33	8	-0.61	0.08	-1.23
	9	-0.08	-0.54	-1.23
34	9	-0.96	-0.21	-1.47
	10	-0.12	-0.95	-1.47
35	11	-0.29	0.15	-0.26
	12	-0.04	-0.01	-0.33
36	12	-0.46	0.17	-0.85
	13	-0.06	-0.26	-0.91
37	13	-0.70	0.01	-1.37
	14	-0.08	-0.69	-1.44
38	14	-1.02	-0.33	-1.29
	15	-0.11	-0.99	-1.36
39	16	-0.19	0.15	-0.08
	17	-0.03	0.11	-0.08
40	17	-0.33	0.26	-0.61
	18	-0.04	-0.05	-0.61
41	18	-0.53	0.12	-1.06
	19	-0.06	-0.40	-1.06
42	19	-0.73	-0.12	-1.32
	20	-0.07	-0.78	-1.32
43	20	-0.96	-0.43	-0.94
	21	-0.09	-0.89	-0.94
44	22	-0.02	0.01	0.10
	23	-0.02	0.01	-0.10
45	23	-0.27	0.32	-0.39
	24	-0.04	0.08	-0.59
46	24	-0.42	0.23	-0.85
	25	-0.04	-0.25	-1.05
47	25	-0.57	0.00	-1.09
	26	-0.05	-0.61	-1.29
48	26	-0.70	-0.25	-1.09
	27	-0.07	-0.84	-1.29
49	27	-0.76	-0.44	-0.41
	28	-0.06	-0.70	-0.61
50	29	-0.02	0.02	0.02
	30	-0.02	0.12	-1.92
51	30	-0.02	0.05	-0.07
	31	-0.02	-0.10	-2.97
52	31	-0.04	0.03	-0.13
	32	-0.04	-0.50	-3.73
53	32	-0.05	0.01	-0.16
	33	-0.05	-0.91	-4.23
54	33	-0.58	-0.08	-0.22
	34	-0.05	-1.21	-4.32
55	34	-0.05	-0.03	-0.03
	35	-0.05	-1.05	-3.58

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

HC. n° 2 Esfuerzos Cortantes máximos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.12	-0.34	0.38
	2	0.12	-0.25	0.28
2	2	0.72	-2.45	1.18
	4	0.72	-2.10	1.09
3	4	0.62	-2.59	2.02
	7	0.62	-1.97	1.92
4	7	0.49	-2.35	2.45
	11	0.49	-1.62	2.35
5	11	0.34	-1.90	2.64
	16	0.34	-1.10	2.55
6	16	0.18	-1.29	2.60
	22	0.18	-0.49	2.52
7	22	0.05	-0.61	2.27
	29	0.05	0.09	2.18
8	3	1.11	-2.63	0.97
	5	1.11	-2.36	0.87
9	5	0.87	-2.68	1.33
	8	0.87	-2.28	1.23
10	8	0.66	-2.51	1.92
	12	0.66	-1.92	1.82
11	12	0.48	-2.08	2.33
	17	0.48	-1.37	2.24
12	17	0.33	-1.51	2.78
	23	0.33	-0.66	2.69
13	23	0.24	-0.82	3.14
	30	0.24	0.15	3.06
14	6	1.38	-3.31	2.40
	9	1.38	-2.59	2.30
15	9	1.07	-2.93	2.53
	13	1.07	-2.17	2.44
16	13	0.80	-2.42	2.90
	18	0.80	-1.53	2.81
17	18	0.60	-1.73	3.25
	24	0.60	-0.73	3.16
18	24	0.45	-0.89	3.43
	31	0.45	0.15	3.34
19	10	1.56	-3.72	3.81
	14	1.56	-2.56	3.71
20	14	1.19	-2.88	3.56
	19	1.19	-1.78	3.47
21	19	0.90	-2.00	3.75
	25	0.90	-0.85	3.66
22	25	0.67	-1.01	3.69
	32	0.67	0.13	3.61
23	15	1.55	-3.69	4.85
	20	1.55	-2.20	4.76
24	20	1.19	-2.41	4.38
	26	1.19	-1.07	4.29
25	26	0.84	-1.18	4.09
	33	0.84	0.07	4.01
26	21	1.33	-3.25	5.89
	27	1.33	-1.44	5.80

27	27	0.94	-1.51	4.92
	34	0.94	0.01	4.84
28	28	1.05	-1.71	3.67
	35	1.05	-0.59	3.58
29	2	-0.09	0.01	-0.10
	3	-0.09	-0.14	-0.46
30	4	-0.07	0.02	-0.18
	5	-0.07	-0.07	-0.18
31	5	-0.11	-0.02	-0.21
	6	-0.11	-0.12	-0.21
32	7	-0.05	0.02	-0.10
	8	-0.05	-0.03	-0.10
33	8	-0.08	0.01	-0.19
	9	-0.08	-0.09	-0.19
34	9	-0.12	-0.03	-0.18
	10	-0.12	-0.12	-0.18
35	11	-0.04	0.02	-0.01
	12	-0.04	-0.01	-0.08
36	12	-0.06	0.01	-0.10
	13	-0.06	-0.05	-0.16
37	13	-0.08	-0.01	-0.14
	14	-0.08	-0.10	-0.21
38	14	-0.11	-0.05	-0.09
	15	-0.11	-0.11	-0.16
39	16	-0.03	0.02	-0.02
	17	-0.03	0.01	-0.02
40	17	-0.04	0.03	-0.09
	18	-0.04	-0.02	-0.09
41	18	-0.06	0.00	-0.13
	19	-0.06	-0.06	-0.13
42	19	-0.07	-0.03	-0.13
	20	-0.07	-0.09	-0.13
43	20	-0.09	-0.06	-0.06
	21	-0.09	-0.08	-0.06
44	22	-0.11	0.14	0.26
	23	-0.11	0.22	0.06
45	23	-0.04	0.02	0.03
	24	-0.04	-0.01	-0.17
46	24	-0.04	0.00	-0.01
	25	-0.04	-0.06	-0.21
47	25	-0.05	-0.02	-0.02
	26	-0.05	-0.09	-0.22
48	26	-0.07	-0.05	0.01
	27	-0.07	-0.09	-0.19
49	27	-0.06	-0.05	0.10
	28	-0.06	-0.06	-0.10
50	29	-0.09	0.05	2.18
	30	-0.02	0.01	-0.08
51	30	-0.22	0.35	1.13
	31	-0.02	-0.01	-0.17
52	31	-0.38	0.34	0.37
	32	-0.04	-0.06	-0.23
53	32	-0.51	0.17	-0.13
	33	-0.05	-0.09	-0.26
54	33	-0.05	-0.02	-0.14
	34	-0.05	-0.11	-0.24
55	34	-0.59	-0.27	0.52
	35	-0.05	-0.08	-0.13

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

HC. n° 2 Momentos Flectores mínimos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.74	-1.85	0.09
	2	0.74	-1.85	-0.01
2	2	0.72	-2.45	1.18
	4	0.72	-2.10	1.09
3	4	0.62	-2.59	2.02
	7	0.62	-1.97	1.92
4	7	0.49	-2.35	2.45
	11	0.49	-1.62	2.35
5	11	0.34	-1.90	2.64
	16	0.34	-1.10	2.55
6	16	0.18	-1.29	2.60
	22	0.18	-0.49	2.52
7	22	0.05	-0.61	2.27
	29	0.02	0.02	0.02
8	3	1.11	-2.63	0.97
	5	1.11	-2.36	0.87
9	5	0.87	-2.68	1.33
	8	0.87	-2.28	1.23
10	8	0.66	-2.51	1.92
	12	0.66	-1.92	1.82
11	12	0.48	-2.08	2.33
	17	0.48	-1.37	2.24
12	17	0.33	-1.51	2.78
	23	0.33	-0.66	2.69
13	23	0.24	-0.82	3.14
	30	0.04	0.01	0.01
14	6	1.38	-3.31	2.40
	9	1.38	-2.59	2.30
15	9	1.07	-2.93	2.53
	13	1.07	-2.17	2.44
16	13	0.80	-2.42	2.90
	18	0.80	-1.53	2.81
17	18	0.60	-1.73	3.25
	24	0.60	-0.73	3.16
18	24	0.45	-0.89	3.43
	31	0.05	0.01	0.04
19	10	1.56	-3.72	3.81
	14	1.56	-2.56	3.71
20	14	1.19	-2.88	3.56
	19	1.19	-1.78	3.47
21	19	0.90	-2.00	3.75
	25	0.90	-0.85	3.66
22	25	0.67	-1.01	3.69
	32	0.07	0.01	0.08
23	15	1.55	-3.69	4.85
	20	1.55	-2.20	4.76
24	20	1.19	-2.41	4.38
	26	1.19	-1.07	4.29
25	26	0.84	-1.18	4.09
	33	0.08	0.00	0.12
26	21	1.33	-3.25	5.89
	27	1.33	-1.44	5.80

27	27	0.94	-1.51	4.92
	34	0.08	0.00	0.21
28	28	1.05	-1.71	3.67
	35	1.05	-0.59	3.58
29	2	-0.09	0.01	-0.10
	3	-0.60	-0.68	-1.56
30	4	-0.07	0.02	-0.18
	5	-0.49	-0.36	-0.93
31	5	-0.81	-0.12	-1.39
	6	-0.81	-0.81	-1.39
32	7	-0.05	0.02	-0.10
	8	-0.39	-0.14	-0.55
33	8	-0.08	0.01	-0.19
	9	-0.61	-0.54	-1.23
34	9	-0.96	-0.21	-1.47
	10	-0.96	-0.95	-1.47
35	11	-0.04	0.02	-0.01
	12	-0.04	-0.01	-0.08
36	12	-0.06	0.01	-0.10
	13	-0.46	-0.26	-0.91
37	13	-0.08	-0.01	-0.14
	14	-0.70	-0.69	-1.44
38	14	-1.02	-0.33	-1.29
	15	-1.02	-0.99	-1.36
39	16	-0.03	0.02	-0.02
	17	-0.03	0.01	-0.02
40	17	-0.04	0.03	-0.09
	18	-0.33	-0.05	-0.61
41	18	-0.06	0.00	-0.13
	19	-0.53	-0.40	-1.06
42	19	-0.73	-0.12	-1.32
	20	-0.73	-0.78	-1.32
43	20	-0.96	-0.43	-0.94
	21	-0.96	-0.89	-0.94
44	22	-0.02	0.01	0.10
	23	-0.02	0.01	-0.10
45	23	-0.04	0.02	0.03
	24	-0.04	-0.01	-0.17
46	24	-0.04	0.00	-0.01
	25	-0.42	-0.25	-1.05
47	25	-0.05	-0.02	-0.02
	26	-0.57	-0.61	-1.29
48	26	-0.70	-0.25	-1.09
	27	-0.70	-0.84	-1.29
49	27	-0.76	-0.44	-0.41
	28	-0.76	-0.70	-0.61
50	29	-0.02	0.02	0.02
	30	-0.02	0.01	-0.08
51	30	-0.02	0.05	-0.07
	31	-0.22	-0.10	-2.97
52	31	-0.04	0.03	-0.13
	32	-0.38	-0.50	-3.73
53	32	-0.05	0.01	-0.16
	33	-0.51	-0.91	-4.23
54	33	-0.58	-0.08	-0.22
	34	-0.58	-1.21	-4.32
55	34	-0.59	-0.27	0.52
	35	-0.59	-1.05	-3.58

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

HC. n° 2 Esfuerzos Torsores mínimos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.12	-0.34	0.38
	2	0.12	-0.25	0.28
2	2	0.11	-0.34	0.37
	4	0.11	-0.24	0.28
3	4	0.09	-0.31	0.46
	7	0.09	-0.18	0.36
4	7	0.07	-0.22	0.45
	11	0.07	-0.11	0.35
5	11	0.05	-0.14	0.38
	16	0.05	-0.04	0.29
6	16	0.03	-0.06	0.29
	22	0.03	0.02	0.21
7	22	0.02	-0.01	0.11
	29	0.02	0.02	0.02
8	3	0.16	-0.42	0.49
	5	0.16	-0.29	0.39
9	5	0.11	-0.34	0.42
	8	0.11	-0.22	0.32
10	8	0.08	-0.26	0.42
	12	0.08	-0.14	0.32
11	12	0.06	-0.15	0.33
	17	0.06	-0.06	0.24
12	17	0.04	-0.08	0.32
	23	0.04	0.01	0.23
13	23	0.04	-0.01	0.09
	30	0.04	0.01	0.01
14	6	0.18	-0.46	0.65
	9	0.18	-0.29	0.55
15	9	0.14	-0.32	0.53
	13	0.14	-0.18	0.44
16	13	0.10	-0.20	0.42
	18	0.10	-0.08	0.33
17	18	0.06	-0.10	0.37
	24	0.06	0.00	0.28
18	24	0.05	-0.01	0.13
	31	0.05	0.01	0.04
19	10	0.19	-0.45	0.74
	14	0.19	-0.24	0.64
20	14	0.13	-0.27	0.52
	19	0.13	-0.12	0.43
21	19	0.09	-0.14	0.45
	25	0.09	-0.02	0.36
22	25	0.07	-0.03	0.16
	32	0.07	0.01	0.08
23	15	0.16	-0.38	0.69
	20	0.16	-0.18	0.60
24	20	0.12	-0.19	0.52
	26	0.12	-0.04	0.43
25	26	0.08	-0.05	0.20
	33	0.08	0.00	0.12
26	21	0.11	-0.28	0.67
	27	0.11	-0.09	0.58

27	27	0.08	-0.08	0.29
	34	0.08	0.00	0.21
28	28	0.08	-0.10	0.22
	35	0.08	-0.05	0.13
29	2	-0.60	0.02	-1.20
	3	-0.60	-0.68	-1.56
30	4	-0.49	0.10	-0.93
	5	-0.49	-0.36	-0.93
31	5	-0.81	-0.12	-1.39
	6	-0.81	-0.81	-1.39
32	7	-0.39	0.13	-0.55
	8	-0.39	-0.14	-0.55
33	8	-0.61	0.08	-1.23
	9	-0.61	-0.54	-1.23
34	9	-0.96	-0.21	-1.47
	10	-0.96	-0.95	-1.47
35	11	-0.29	0.15	-0.26
	12	-0.29	-0.01	-0.33
36	12	-0.46	0.17	-0.85
	13	-0.46	-0.26	-0.91
37	13	-0.70	0.01	-1.37
	14	-0.70	-0.69	-1.44
38	14	-1.02	-0.33	-1.29
	15	-1.02	-0.99	-1.36
39	16	-0.19	0.15	-0.08
	17	-0.19	0.11	-0.08
40	17	-0.33	0.26	-0.61
	18	-0.33	-0.05	-0.61
41	18	-0.53	0.12	-1.06
	19	-0.53	-0.40	-1.06
42	19	-0.73	-0.12	-1.32
	20	-0.73	-0.78	-1.32
43	20	-0.96	-0.43	-0.94
	21	-0.96	-0.89	-0.94
44	22	-0.11	0.14	0.26
	23	-0.11	0.22	0.06
45	23	-0.27	0.32	-0.39
	24	-0.27	0.08	-0.59
46	24	-0.42	0.23	-0.85
	25	-0.42	-0.25	-1.05
47	25	-0.57	0.00	-1.09
	26	-0.57	-0.61	-1.29
48	26	-0.70	-0.25	-1.09
	27	-0.70	-0.84	-1.29
49	27	-0.76	-0.44	-0.41
	28	-0.76	-0.70	-0.61
50	29	-0.09	0.05	2.18
	30	-0.09	0.12	-1.92
51	30	-0.22	0.35	1.13
	31	-0.22	-0.10	-2.97
52	31	-0.38	0.34	0.37
	32	-0.38	-0.50	-3.73
53	32	-0.51	0.17	-0.13
	33	-0.51	-0.91	-4.23
54	33	-0.58	-0.08	-0.22
	34	-0.58	-1.21	-4.32
55	34	-0.59	-0.27	0.52
	35	-0.59	-1.05	-3.58

LAV MADRID-BARCELONA.PI 562-7.VOLADIZO ESTRIBOS 1 Y 4.

HC. n° 2 Esfuerzos Torsores máximos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.74	-1.85	0.09
	2	0.74	-1.85	-0.01
2	2	0.72	-2.45	1.18
	4	0.72	-2.10	1.09
3	4	0.62	-2.59	2.02
	7	0.62	-1.97	1.92
4	7	0.49	-2.35	2.45
	11	0.49	-1.62	2.35
5	11	0.34	-1.90	2.64
	16	0.34	-1.10	2.55
6	16	0.18	-1.29	2.60
	22	0.18	-0.49	2.52
7	22	0.05	-0.61	2.27
	29	0.05	0.09	2.18
8	3	1.11	-2.63	0.97
	5	1.11	-2.36	0.87
9	5	0.87	-2.68	1.33
	8	0.87	-2.28	1.23
10	8	0.66	-2.51	1.92
	12	0.66	-1.92	1.82
11	12	0.48	-2.08	2.33
	17	0.48	-1.37	2.24
12	17	0.33	-1.51	2.78
	23	0.33	-0.66	2.69
13	23	0.24	-0.82	3.14
	30	0.24	0.15	3.06
14	6	1.38	-3.31	2.40
	9	1.38	-2.59	2.30
15	9	1.07	-2.93	2.53
	13	1.07	-2.17	2.44
16	13	0.80	-2.42	2.90
	18	0.80	-1.53	2.81
17	18	0.60	-1.73	3.25
	24	0.60	-0.73	3.16
18	24	0.45	-0.89	3.43
	31	0.45	0.15	3.34
19	10	1.56	-3.72	3.81
	14	1.56	-2.56	3.71
20	14	1.19	-2.88	3.56
	19	1.19	-1.78	3.47
21	19	0.90	-2.00	3.75
	25	0.90	-0.85	3.66
22	25	0.67	-1.01	3.69
	32	0.67	0.13	3.61
23	15	1.55	-3.69	4.85
	20	1.55	-2.20	4.76
24	20	1.19	-2.41	4.38
	26	1.19	-1.07	4.29
25	26	0.84	-1.18	4.09
	33	0.84	0.07	4.01
26	21	1.33	-3.25	5.89
	27	1.33	-1.44	5.80

27	27	0.94	-1.51	4.92
	34	0.94	0.01	4.84
28	28	1.05	-1.71	3.67
	35	1.05	-0.59	3.58
29	2	-0.09	0.01	-0.10
	3	-0.09	-0.14	-0.46
30	4	-0.07	0.02	-0.18
	5	-0.07	-0.07	-0.18
31	5	-0.11	-0.02	-0.21
	6	-0.11	-0.12	-0.21
32	7	-0.05	0.02	-0.10
	8	-0.05	-0.03	-0.10
33	8	-0.08	0.01	-0.19
	9	-0.08	-0.09	-0.19
34	9	-0.12	-0.03	-0.18
	10	-0.12	-0.12	-0.18
35	11	-0.04	0.02	-0.01
	12	-0.04	-0.01	-0.08
36	12	-0.06	0.01	-0.10
	13	-0.06	-0.05	-0.16
37	13	-0.08	-0.01	-0.14
	14	-0.08	-0.10	-0.21
38	14	-0.11	-0.05	-0.09
	15	-0.11	-0.11	-0.16
39	16	-0.03	0.02	-0.02
	17	-0.03	0.01	-0.02
40	17	-0.04	0.03	-0.09
	18	-0.04	-0.02	-0.09
41	18	-0.06	0.00	-0.13
	19	-0.06	-0.06	-0.13
42	19	-0.07	-0.03	-0.13
	20	-0.07	-0.09	-0.13
43	20	-0.09	-0.06	-0.06
	21	-0.09	-0.08	-0.06
44	22	-0.02	0.01	0.10
	23	-0.02	0.01	-0.10
45	23	-0.04	0.02	0.03
	24	-0.04	-0.01	-0.17
46	24	-0.04	0.00	-0.01
	25	-0.04	-0.06	-0.21
47	25	-0.05	-0.02	-0.02
	26	-0.05	-0.09	-0.22
48	26	-0.07	-0.05	0.01
	27	-0.07	-0.09	-0.19
49	27	-0.06	-0.05	0.10
	28	-0.06	-0.06	-0.10
50	29	-0.02	0.02	0.02
	30	-0.02	0.01	-0.08
51	30	-0.02	0.05	-0.07
	31	-0.02	-0.01	-0.17
52	31	-0.04	0.03	-0.13
	32	-0.04	-0.06	-0.23
53	32	-0.05	0.01	-0.16
	33	-0.05	-0.09	-0.26
54	33	-0.05	-0.02	-0.14
	34	-0.05	-0.11	-0.24
55	34	-0.05	-0.03	-0.03
	35	-0.05	-0.08	-0.13

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

HC. n° 1 Esfuerzos Cortantes mínimos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.16	-0.46	0.51
	2	0.16	-0.34	0.38
2	2	0.15	-0.46	0.50
	4	0.15	-0.32	0.38
3	4	0.12	-0.42	0.62
	7	0.12	-0.24	0.49
4	7	0.09	-0.30	0.61
	11	0.09	-0.15	0.47
5	11	0.07	-0.19	0.51
	16	0.07	-0.05	0.39
6	16	0.04	-0.08	0.39
	22	0.04	0.03	0.28
7	22	0.03	-0.01	0.15
	29	0.03	0.03	0.03
8	3	0.22	-0.57	0.66
	5	0.22	-0.39	0.53
9	5	0.15	-0.46	0.57
	8	0.15	-0.30	0.43
10	8	0.11	-0.35	0.57
	12	0.11	-0.19	0.43
11	12	0.08	-0.20	0.45
	17	0.08	-0.08	0.32
12	17	0.05	-0.11	0.43
	23	0.05	0.01	0.31
13	23	0.05	-0.01	0.12
	30	0.05	0.01	0.01
14	6	0.24	-0.62	0.88
	9	0.24	-0.39	0.74
15	9	0.19	-0.43	0.72
	13	0.19	-0.24	0.59
16	13	0.14	-0.27	0.57
	18	0.14	-0.11	0.45
17	18	0.08	-0.14	0.50
	24	0.08	0.00	0.38
18	24	0.07	-0.01	0.18
	31	0.07	0.01	0.05
19	10	0.26	-0.61	1.00
	14	0.26	-0.32	0.86
20	14	0.18	-0.36	0.70
	19	0.18	-0.16	0.58
21	19	0.12	-0.19	0.61
	25	0.12	-0.03	0.49
22	25	0.09	-0.04	0.22
	32	0.09	0.01	0.11
23	15	0.22	-0.51	0.93
	20	0.22	-0.24	0.81
24	20	0.16	-0.26	0.70
	26	0.16	-0.05	0.58
25	26	0.11	-0.07	0.27
	33	0.11	0.00	0.16
26	21	0.15	-0.38	0.90
	27	0.15	-0.12	0.78

27	27	0.11	-0.11	0.39
	34	0.11	0.00	0.28
28	28	0.11	-0.14	0.30
	35	0.11	-0.07	0.18
29	2	-0.17	0.03	-0.23
	3	-0.17	-0.25	-0.82
30	4	-0.12	0.04	-0.27
	5	-0.12	-0.12	-0.39
31	5	-0.21	-0.03	-0.36
	6	-0.21	-0.24	-0.48
32	7	-0.07	0.03	-0.14
	8	-0.08	-0.06	-0.23
33	8	-0.14	0.03	-0.32
	9	-0.14	-0.17	-0.44
34	9	-0.22	-0.06	-0.29
	10	-0.22	-0.24	-0.41
35	11	-0.05	0.03	-0.01
	12	-0.07	-0.01	-0.18
36	12	-0.11	0.03	-0.15
	13	-0.11	-0.10	-0.35
37	13	-0.15	-0.01	-0.23
	14	-0.15	-0.20	-0.45
38	14	-0.21	-0.10	-0.14
	15	-0.21	-0.21	-0.34
39	16	-0.04	0.03	-0.03
	17	-0.06	0.01	-0.09
40	17	-0.05	0.04	-0.12
	18	-0.07	-0.04	-0.23
41	18	-0.11	0.00	-0.19
	19	-0.11	-0.11	-0.31
42	19	-0.12	-0.06	-0.19
	20	-0.12	-0.18	-0.31
43	20	-0.12	-0.08	-0.08
	21	-0.17	-0.15	-0.16
44	22	-0.03	0.01	0.14
	23	-0.04	0.03	-0.18
45	23	-0.05	0.03	0.04
	24	-0.07	-0.01	-0.32
46	24	-0.05	0.00	-0.01
	25	-0.07	-0.11	-0.40
47	25	-0.07	-0.03	-0.03
	26	-0.10	-0.17	-0.42
48	26	-0.09	-0.07	0.01
	27	-0.12	-0.17	-0.36
49	27	-0.08	-0.07	0.14
	28	-0.11	-0.11	-0.18
50	29	-0.03	0.03	0.03
	30	-0.04	0.03	-0.14
51	30	-0.04	0.10	-0.12
	31	-0.04	-0.01	-0.32
52	31	-0.07	0.06	-0.24
	32	-0.07	-0.11	-0.43
53	32	-0.08	0.01	-0.29
	33	-0.08	-0.17	-0.49
54	33	-0.10	-0.04	-0.25
	34	-0.10	-0.21	-0.44
55	34	-0.07	-0.04	-0.04
	35	-0.08	-0.14	-0.24

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

HC. nº 1 Esfuerzos Cortantes máximos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.22	-0.62	0.62
	2	0.22	-0.47	0.48
2	2	0.19	-0.64	0.69
	4	0.19	-0.44	0.57
3	4	0.15	-0.57	0.85
	7	0.15	-0.32	0.71
4	7	0.12	-0.40	0.80
	11	0.12	-0.19	0.67
5	11	0.08	-0.25	0.66
	16	0.08	-0.05	0.54
6	16	0.06	-0.10	0.48
	22	0.06	0.04	0.37
7	22	0.04	-0.01	0.18
	29	0.04	0.04	0.06
8	3	0.31	-0.81	0.96
	5	0.31	-0.53	0.83
9	5	0.21	-0.62	0.81
	8	0.21	-0.40	0.67
10	8	0.14	-0.47	0.76
	12	0.14	-0.23	0.63
11	12	0.11	-0.26	0.60
	17	0.11	-0.10	0.47
12	17	0.07	-0.12	0.52
	23	0.07	0.01	0.40
13	23	0.07	-0.01	0.14
	30	0.07	0.01	0.03
14	6	0.33	-0.88	1.30
	9	0.33	-0.53	1.16
15	9	0.25	-0.60	1.00
	13	0.25	-0.32	0.88
16	13	0.18	-0.36	0.78
	18	0.18	-0.12	0.66
17	18	0.11	-0.17	0.62
	24	0.11	0.00	0.50
18	24	0.08	-0.01	0.21
	31	0.08	0.01	0.08
19	10	0.35	-0.85	1.43
	14	0.35	-0.43	1.30
20	14	0.24	-0.48	0.97
	19	0.24	-0.21	0.85
21	19	0.17	-0.23	0.77
	25	0.17	-0.03	0.65
22	25	0.12	-0.06	0.26
	32	0.12	0.01	0.15
23	15	0.29	-0.71	1.31
	20	0.29	-0.32	1.19
24	20	0.22	-0.33	0.91
	26	0.22	-0.07	0.79
25	26	0.14	-0.08	0.34
	33	0.14	0.00	0.24
26	21	0.21	-0.50	1.19
	27	0.21	-0.17	1.07

27	27	0.14	-0.15	0.51
	34	0.14	0.00	0.40
28	28	0.14	-0.18	0.36
	35	0.14	-0.08	0.24
29	2	-0.12	0.01	-0.14
	3	-0.12	-0.19	-0.62
30	4	-0.09	0.03	-0.24
	5	-0.09	-0.09	-0.24
31	5	-0.15	-0.03	-0.28
	6	-0.15	-0.16	-0.28
32	7	-0.08	0.04	-0.12
	8	-0.07	-0.04	-0.14
33	8	-0.11	0.01	-0.26
	9	-0.11	-0.12	-0.26
34	9	-0.16	-0.04	-0.24
	10	-0.16	-0.16	-0.24
35	11	-0.07	0.03	0.03
	12	-0.05	-0.01	-0.11
36	12	-0.08	0.01	-0.14
	13	-0.08	-0.07	-0.22
37	13	-0.11	-0.01	-0.19
	14	-0.11	-0.14	-0.28
38	14	-0.15	-0.07	-0.12
	15	-0.15	-0.15	-0.22
39	16	-0.06	0.03	0.03
	17	-0.04	0.01	-0.03
40	17	-0.07	0.06	-0.11
	18	-0.05	-0.03	-0.12
41	18	-0.08	0.00	-0.18
	19	-0.08	-0.08	-0.18
42	19	-0.09	-0.04	-0.18
	20	-0.09	-0.12	-0.18
43	20	-0.17	-0.11	-0.05
	21	-0.12	-0.11	-0.08
44	22	-0.04	0.01	0.20
	23	-0.03	0.01	-0.14
45	23	-0.07	0.04	0.07
	24	-0.05	-0.01	-0.23
46	24	-0.05	0.00	-0.01
	25	-0.05	-0.08	-0.28
47	25	-0.07	-0.03	-0.03
	26	-0.07	-0.12	-0.30
48	26	-0.12	-0.10	0.03
	27	-0.09	-0.12	-0.26
49	27	-0.11	-0.10	0.20
	28	-0.08	-0.08	-0.14
50	29	-0.04	0.04	0.06
	30	-0.03	0.01	-0.11
51	30	-0.03	0.07	-0.09
	31	-0.03	-0.01	-0.23
52	31	-0.05	0.04	-0.18
	32	-0.05	-0.08	-0.31
53	32	-0.07	0.01	-0.22
	33	-0.07	-0.12	-0.35
54	33	-0.07	-0.03	-0.19
	34	-0.07	-0.15	-0.32
55	34	-0.07	-0.04	-0.04
	35	-0.07	-0.11	-0.18

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

HC. n° 1 Momentos Flectores mínimos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.22	-0.62	0.62
	2	0.22	-0.47	0.48
2	2	0.19	-0.64	0.69
	4	0.19	-0.44	0.57
3	4	0.15	-0.57	0.85
	7	0.15	-0.32	0.71
4	7	0.12	-0.40	0.80
	11	0.12	-0.19	0.67
5	11	0.08	-0.25	0.66
	16	0.07	-0.05	0.39
6	16	0.06	-0.10	0.48
	22	0.04	0.03	0.28
7	22	0.03	-0.01	0.15
	29	0.03	0.03	0.03
8	3	0.31	-0.81	0.96
	5	0.31	-0.53	0.83
9	5	0.21	-0.62	0.81
	8	0.21	-0.40	0.67
10	8	0.14	-0.47	0.76
	12	0.14	-0.23	0.63
11	12	0.11	-0.26	0.60
	17	0.11	-0.10	0.47
12	17	0.07	-0.12	0.52
	23	0.05	0.01	0.31
13	23	0.05	-0.01	0.12
	30	0.05	0.01	0.01
14	6	0.33	-0.88	1.30
	9	0.33	-0.53	1.16
15	9	0.25	-0.60	1.00
	13	0.25	-0.32	0.88
16	13	0.18	-0.36	0.78
	18	0.18	-0.12	0.66
17	18	0.11	-0.17	0.62
	24	0.08	0.00	0.38
18	24	0.07	-0.01	0.18
	31	0.07	0.01	0.05
19	10	0.35	-0.85	1.43
	14	0.35	-0.43	1.30
20	14	0.24	-0.48	0.97
	19	0.24	-0.21	0.85
21	19	0.17	-0.23	0.77
	25	0.12	-0.03	0.49
22	25	0.12	-0.06	0.26
	32	0.09	0.01	0.11
23	15	0.29	-0.71	1.31
	20	0.29	-0.32	1.19
24	20	0.22	-0.33	0.91
	26	0.22	-0.07	0.79
25	26	0.14	-0.08	0.34
	33	0.11	0.00	0.16
26	21	0.21	-0.50	1.19
	27	0.21	-0.17	1.07

27	27	0.14	-0.15	0.51
	34	0.11	0.00	0.28
28	28	0.14	-0.18	0.36
	35	0.14	-0.08	0.24
29	2	-0.12	0.01	-0.14
	3	-0.17	-0.25	-0.82
30	4	-0.09	0.03	-0.24
	5	-0.12	-0.12	-0.39
31	5	-0.15	-0.03	-0.28
	6	-0.21	-0.24	-0.48
32	7	-0.07	0.03	-0.14
	8	-0.08	-0.06	-0.23
33	8	-0.11	0.01	-0.26
	9	-0.14	-0.17	-0.44
34	9	-0.22	-0.06	-0.29
	10	-0.22	-0.24	-0.41
35	11	-0.05	0.03	-0.01
	12	-0.05	-0.01	-0.11
36	12	-0.08	0.01	-0.14
	13	-0.11	-0.10	-0.35
37	13	-0.11	-0.01	-0.19
	14	-0.15	-0.20	-0.45
38	14	-0.21	-0.10	-0.14
	15	-0.21	-0.21	-0.34
39	16	-0.04	0.03	-0.03
	17	-0.04	0.01	-0.03
40	17	-0.05	0.04	-0.12
	18	-0.07	-0.04	-0.23
41	18	-0.08	0.00	-0.18
	19	-0.11	-0.11	-0.31
42	19	-0.12	-0.06	-0.19
	20	-0.12	-0.18	-0.31
43	20	-0.17	-0.11	-0.05
	21	-0.17	-0.15	-0.16
44	22	-0.03	0.01	0.14
	23	-0.03	0.01	-0.14
45	23	-0.05	0.03	0.04
	24	-0.05	-0.01	-0.23
46	24	-0.05	0.00	-0.01
	25	-0.07	-0.11	-0.40
47	25	-0.10	-0.04	-0.03
	26	-0.10	-0.17	-0.42
48	26	-0.12	-0.10	0.03
	27	-0.12	-0.17	-0.36
49	27	-0.11	-0.10	0.20
	28	-0.11	-0.11	-0.18
50	29	-0.03	0.03	0.03
	30	-0.03	0.01	-0.11
51	30	-0.03	0.07	-0.09
	31	-0.03	-0.01	-0.23
52	31	-0.05	0.04	-0.18
	32	-0.07	-0.11	-0.43
53	32	-0.07	0.01	-0.22
	33	-0.08	-0.17	-0.49
54	33	-0.10	-0.04	-0.25
	34	-0.10	-0.21	-0.44
55	34	-0.08	-0.06	-0.04
	35	-0.08	-0.14	-0.24

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

HC. n° 1 Momentos Flectores máximos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.16	-0.46	0.51
	2	0.16	-0.34	0.38
2	2	0.15	-0.46	0.50
	4	0.15	-0.32	0.38
3	4	0.12	-0.42	0.62
	7	0.12	-0.24	0.49
4	7	0.09	-0.30	0.61
	11	0.09	-0.15	0.47
5	11	0.07	-0.19	0.51
	16	0.07	-0.05	0.39
6	16	0.04	-0.08	0.39
	22	0.06	0.04	0.37
7	22	0.03	-0.01	0.15
	29	0.04	0.04	0.06
8	3	0.22	-0.57	0.66
	5	0.22	-0.39	0.53
9	5	0.15	-0.46	0.57
	8	0.15	-0.30	0.43
10	8	0.11	-0.35	0.57
	12	0.11	-0.19	0.43
11	12	0.08	-0.20	0.45
	17	0.08	-0.08	0.32
12	17	0.05	-0.11	0.43
	23	0.05	0.01	0.31
13	23	0.05	-0.01	0.12
	30	0.05	0.01	0.01
14	6	0.24	-0.62	0.88
	9	0.24	-0.39	0.74
15	9	0.19	-0.43	0.72
	13	0.19	-0.24	0.59
16	13	0.14	-0.27	0.57
	18	0.14	-0.11	0.45
17	18	0.08	-0.14	0.50
	24	0.08	0.00	0.38
18	24	0.07	-0.01	0.18
	31	0.07	0.01	0.05
19	10	0.26	-0.61	1.00
	14	0.26	-0.32	0.86
20	14	0.18	-0.36	0.70
	19	0.18	-0.16	0.58
21	19	0.12	-0.19	0.61
	25	0.12	-0.03	0.49
22	25	0.09	-0.04	0.22
	32	0.09	0.01	0.11
23	15	0.22	-0.51	0.93
	20	0.22	-0.24	0.81
24	20	0.16	-0.26	0.70
	26	0.16	-0.05	0.58
25	26	0.11	-0.07	0.27
	33	0.11	0.00	0.16
26	21	0.15	-0.38	0.90
	27	0.15	-0.12	0.78

27	27	0.11	-0.11	0.39
	34	0.11	0.00	0.28
28	28	0.11	-0.14	0.30
	35	0.11	-0.07	0.18
29	2	-0.17	0.03	-0.23
	3	-0.12	-0.19	-0.62
30	4	-0.12	0.04	-0.27
	5	-0.09	-0.09	-0.24
31	5	-0.15	-0.03	-0.28
	6	-0.15	-0.16	-0.28
32	7	-0.08	0.04	-0.12
	8	-0.07	-0.04	-0.14
33	8	-0.14	0.03	-0.32
	9	-0.11	-0.12	-0.26
34	9	-0.16	-0.04	-0.24
	10	-0.16	-0.16	-0.24
35	11	-0.05	0.03	-0.01
	12	-0.05	-0.01	-0.11
36	12	-0.11	0.03	-0.15
	13	-0.08	-0.07	-0.22
37	13	-0.11	-0.01	-0.19
	14	-0.11	-0.14	-0.28
38	14	-0.15	-0.07	-0.12
	15	-0.15	-0.15	-0.22
39	16	-0.04	0.03	-0.03
	17	-0.04	0.01	-0.03
40	17	-0.07	0.06	-0.11
	18	-0.05	-0.03	-0.12
41	18	-0.08	0.00	-0.18
	19	-0.08	-0.08	-0.18
42	19	-0.09	-0.04	-0.18
	20	-0.09	-0.12	-0.18
43	20	-0.12	-0.08	-0.08
	21	-0.12	-0.11	-0.08
44	22	-0.03	0.01	0.14
	23	-0.04	0.03	-0.18
45	23	-0.07	0.04	0.07
	24	-0.05	-0.01	-0.23
46	24	-0.05	0.00	-0.01
	25	-0.05	-0.08	-0.28
47	25	-0.07	-0.03	-0.03
	26	-0.07	-0.12	-0.30
48	26	-0.09	-0.07	0.01
	27	-0.09	-0.12	-0.26
49	27	-0.08	-0.07	0.14
	28	-0.08	-0.08	-0.14
50	29	-0.04	0.04	0.06
	30	-0.04	0.03	-0.14
51	30	-0.04	0.10	-0.12
	31	-0.03	-0.01	-0.23
52	31	-0.07	0.06	-0.24
	32	-0.05	-0.08	-0.31
53	32	-0.07	0.01	-0.22
	33	-0.07	-0.12	-0.35
54	33	-0.07	-0.03	-0.19
	34	-0.07	-0.15	-0.32
55	34	-0.07	-0.04	-0.04
	35	-0.07	-0.11	-0.18

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

HC. n° 1 Esfuerzos Torsores mínimos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.16	-0.46	0.51
	2	0.16	-0.34	0.38
2	2	0.15	-0.46	0.50
	4	0.15	-0.32	0.38
3	4	0.12	-0.42	0.62
	7	0.12	-0.24	0.49
4	7	0.09	-0.30	0.61
	11	0.09	-0.15	0.47
5	11	0.07	-0.19	0.51
	16	0.07	-0.05	0.39
6	16	0.04	-0.08	0.39
	22	0.04	0.03	0.28
7	22	0.03	-0.01	0.15
	29	0.03	0.03	0.03
8	3	0.22	-0.57	0.66
	5	0.22	-0.39	0.53
9	5	0.15	-0.46	0.57
	8	0.15	-0.30	0.43
10	8	0.11	-0.35	0.57
	12	0.11	-0.19	0.43
11	12	0.08	-0.20	0.45
	17	0.08	-0.08	0.32
12	17	0.05	-0.11	0.43
	23	0.05	0.01	0.31
13	23	0.05	-0.01	0.12
	30	0.05	0.01	0.01
14	6	0.24	-0.62	0.88
	9	0.24	-0.39	0.74
15	9	0.19	-0.43	0.72
	13	0.19	-0.24	0.59
16	13	0.14	-0.27	0.57
	18	0.14	-0.11	0.45
17	18	0.08	-0.14	0.50
	24	0.08	0.00	0.38
18	24	0.07	-0.01	0.18
	31	0.07	0.01	0.05
19	10	0.26	-0.61	1.00
	14	0.26	-0.32	0.86
20	14	0.18	-0.36	0.70
	19	0.18	-0.16	0.58
21	19	0.12	-0.19	0.61
	25	0.12	-0.03	0.49
22	25	0.09	-0.04	0.22
	32	0.09	0.01	0.11
23	15	0.22	-0.51	0.93
	20	0.22	-0.24	0.81
24	20	0.16	-0.26	0.70
	26	0.16	-0.05	0.58
25	26	0.11	-0.07	0.27
	33	0.11	0.00	0.16
26	21	0.15	-0.38	0.90
	27	0.15	-0.12	0.78

27	27	0.11	-0.11	0.39
	34	0.11	0.00	0.28
28	28	0.11	-0.14	0.30
	35	0.11	-0.07	0.18
29	2	-0.17	0.03	-0.23
	3	-0.17	-0.25	-0.82
30	4	-0.12	0.04	-0.27
	5	-0.12	-0.12	-0.39
31	5	-0.21	-0.03	-0.36
	6	-0.21	-0.24	-0.48
32	7	-0.08	0.04	-0.12
	8	-0.08	-0.06	-0.23
33	8	-0.14	0.03	-0.32
	9	-0.14	-0.17	-0.44
34	9	-0.22	-0.06	-0.29
	10	-0.22	-0.24	-0.41
35	11	-0.07	0.03	0.03
	12	-0.07	-0.01	-0.18
36	12	-0.11	0.03	-0.15
	13	-0.11	-0.10	-0.35
37	13	-0.15	-0.01	-0.23
	14	-0.15	-0.20	-0.45
38	14	-0.21	-0.10	-0.14
	15	-0.21	-0.21	-0.34
39	16	-0.06	0.03	0.03
	17	-0.06	0.01	-0.09
40	17	-0.07	0.06	-0.11
	18	-0.07	-0.04	-0.23
41	18	-0.11	0.00	-0.19
	19	-0.11	-0.11	-0.31
42	19	-0.12	-0.06	-0.19
	20	-0.12	-0.18	-0.31
43	20	-0.17	-0.11	-0.05
	21	-0.17	-0.15	-0.16
44	22	-0.04	0.01	0.20
	23	-0.04	0.03	-0.18
45	23	-0.07	0.04	0.07
	24	-0.07	-0.01	-0.32
46	24	-0.07	0.00	-0.01
	25	-0.07	-0.11	-0.40
47	25	-0.10	-0.04	-0.03
	26	-0.10	-0.17	-0.42
48	26	-0.12	-0.10	0.03
	27	-0.12	-0.17	-0.36
49	27	-0.11	-0.10	0.20
	28	-0.11	-0.11	-0.18
50	29	-0.04	0.04	0.06
	30	-0.04	0.03	-0.14
51	30	-0.04	0.10	-0.12
	31	-0.04	-0.01	-0.32
52	31	-0.07	0.06	-0.24
	32	-0.07	-0.11	-0.43
53	32	-0.08	0.01	-0.29
	33	-0.08	-0.17	-0.49
54	33	-0.10	-0.04	-0.25
	34	-0.10	-0.21	-0.44
55	34	-0.08	-0.06	-0.04
	35	-0.08	-0.14	-0.24

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

HC. n° 1 Esfuerzos Torsores máximos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.22	-0.62	0.62
	2	0.22	-0.47	0.48
2	2	0.19	-0.64	0.69
	4	0.19	-0.44	0.57
3	4	0.15	-0.57	0.85
	7	0.15	-0.32	0.71
4	7	0.12	-0.40	0.80
	11	0.12	-0.19	0.67
5	11	0.08	-0.25	0.66
	16	0.08	-0.05	0.54
6	16	0.06	-0.10	0.48
	22	0.06	0.04	0.37
7	22	0.04	-0.01	0.18
	29	0.04	0.04	0.06
8	3	0.31	-0.81	0.96
	5	0.31	-0.53	0.83
9	5	0.21	-0.62	0.81
	8	0.21	-0.40	0.67
10	8	0.14	-0.47	0.76
	12	0.14	-0.23	0.63
11	12	0.11	-0.26	0.60
	17	0.11	-0.10	0.47
12	17	0.07	-0.12	0.52
	23	0.07	0.01	0.40
13	23	0.07	-0.01	0.14
	30	0.07	0.01	0.03
14	6	0.33	-0.88	1.30
	9	0.33	-0.53	1.16
15	9	0.25	-0.60	1.00
	13	0.25	-0.32	0.88
16	13	0.18	-0.36	0.78
	18	0.18	-0.12	0.66
17	18	0.11	-0.17	0.62
	24	0.11	0.00	0.50
18	24	0.08	-0.01	0.21
	31	0.08	0.01	0.08
19	10	0.35	-0.85	1.43
	14	0.35	-0.43	1.30
20	14	0.24	-0.48	0.97
	19	0.24	-0.21	0.85
21	19	0.17	-0.23	0.77
	25	0.17	-0.03	0.65
22	25	0.12	-0.06	0.26
	32	0.12	0.01	0.15
23	15	0.29	-0.71	1.31
	20	0.29	-0.32	1.19
24	20	0.22	-0.33	0.91
	26	0.22	-0.07	0.79
25	26	0.14	-0.08	0.34
	33	0.14	0.00	0.24
26	21	0.21	-0.50	1.19
	27	0.21	-0.17	1.07

27	27	0.14	-0.15	0.51
	34	0.14	0.00	0.40
28	28	0.14	-0.18	0.36
	35	0.14	-0.08	0.24
29	2	-0.12	0.01	-0.14
	3	-0.12	-0.19	-0.62
30	4	-0.09	0.03	-0.24
	5	-0.09	-0.09	-0.24
31	5	-0.15	-0.03	-0.28
	6	-0.15	-0.16	-0.28
32	7	-0.07	0.03	-0.14
	8	-0.07	-0.04	-0.14
33	8	-0.11	0.01	-0.26
	9	-0.11	-0.12	-0.26
34	9	-0.16	-0.04	-0.24
	10	-0.16	-0.16	-0.24
35	11	-0.05	0.03	-0.01
	12	-0.05	-0.01	-0.11
36	12	-0.08	0.01	-0.14
	13	-0.08	-0.07	-0.22
37	13	-0.11	-0.01	-0.19
	14	-0.11	-0.14	-0.28
38	14	-0.15	-0.07	-0.12
	15	-0.15	-0.15	-0.22
39	16	-0.04	0.03	-0.03
	17	-0.04	0.01	-0.03
40	17	-0.05	0.04	-0.12
	18	-0.05	-0.03	-0.12
41	18	-0.08	0.00	-0.18
	19	-0.08	-0.08	-0.18
42	19	-0.09	-0.04	-0.18
	20	-0.09	-0.12	-0.18
43	20	-0.12	-0.08	-0.08
	21	-0.12	-0.11	-0.08
44	22	-0.03	0.01	0.14
	23	-0.03	0.01	-0.14
45	23	-0.05	0.03	0.04
	24	-0.05	-0.01	-0.23
46	24	-0.05	0.00	-0.01
	25	-0.05	-0.08	-0.28
47	25	-0.07	-0.03	-0.03
	26	-0.07	-0.12	-0.30
48	26	-0.09	-0.07	0.01
	27	-0.09	-0.12	-0.26
49	27	-0.08	-0.07	0.14
	28	-0.08	-0.08	-0.14
50	29	-0.03	0.03	0.03
	30	-0.03	0.01	-0.11
51	30	-0.03	0.07	-0.09
	31	-0.03	-0.01	-0.23
52	31	-0.05	0.04	-0.18
	32	-0.05	-0.08	-0.31
53	32	-0.07	0.01	-0.22
	33	-0.07	-0.12	-0.35
54	33	-0.07	-0.03	-0.19
	34	-0.07	-0.15	-0.32
55	34	-0.07	-0.04	-0.04
	35	-0.07	-0.11	-0.18

2	2	0.61	-2.11	0.81
	4	0.61	-1.86	0.81
3	4	0.53	-2.28	1.56
	7	0.53	-1.79	1.56
4	7	0.42	-2.13	2.00
	11	0.42	-1.51	2.00
5	11	0.29	-1.76	2.26
	16	0.29	-1.06	2.26
6	16	0.15	-1.23	2.31
	22	0.15	-0.51	2.31
7	22	0.03	-0.60	2.16
	29	0.03	0.07	2.16
8	3	0.95	-2.21	0.48
	5	0.95	-2.07	0.48
9	5	0.76	-2.34	0.91
	8	0.76	-2.06	0.91
10	8	0.58	-2.25	1.50
	12	0.58	-1.78	1.50
11	12	0.42	-1.93	2.00
	17	0.42	-1.31	2.00
12	17	0.29	-1.43	2.46
	23	0.29	-0.67	2.46
13	23	0.20	-0.81	3.05
	30	0.20	0.14	3.05
14	6	1.20	-2.85	1.75
	9	1.20	-2.30	1.75
15	9	0.93	-2.61	2.00
	13	0.93	-1.99	2.00
16	13	0.70	-2.22	2.48
	18	0.70	-1.45	2.48
17	18	0.54	-1.63	2.88
	24	0.54	-0.73	2.88
18	24	0.40	-0.88	3.30
	31	0.40	0.14	3.30
19	10	1.37	-3.27	3.07
	14	1.37	-2.32	3.07
20	14	1.06	-2.61	3.04
	19	1.06	-1.66	3.04
21	19	0.81	-1.86	3.30
	25	0.81	-0.83	3.30
22	25	0.60	-0.98	3.53
	32	0.60	0.12	3.53
23	15	1.39	-3.31	4.16
	20	1.39	-2.02	4.16
24	20	1.07	-2.22	3.86
	26	1.07	-1.03	3.86
25	26	0.76	-1.13	3.89
	33	0.76	0.07	3.89
26	21	1.22	-2.97	5.22
	27	1.22	-1.35	5.22
27	27	0.86	-1.43	4.63
	34	0.86	0.01	4.63
28	28	0.97	-1.61	3.45
	35	0.97	-0.54	3.45
29	2	-0.51	0.01	-1.10
	3	-0.51	-0.54	-1.10
30	4	-0.42	0.08	-0.75
	5	-0.42	-0.29	-0.75
31	5	-0.70	-0.10	-1.18

	6	-0.70	-0.69	-1.18
32	7	-0.34	0.11	-0.45
	8	-0.34	-0.11	-0.45
33	8	-0.53	0.07	-1.04
	9	-0.53	-0.45	-1.04
34	9	-0.84	-0.18	-1.29
	10	-0.84	-0.83	-1.29
35	11	-0.25	0.13	-0.25
	12	-0.25	0.00	-0.25
36	12	-0.40	0.16	-0.75
	13	-0.40	-0.21	-0.75
37	13	-0.62	0.02	-1.23
	14	-0.62	-0.59	-1.23
38	14	-0.91	-0.28	-1.20
	15	-0.91	-0.88	-1.20
39	16	-0.16	0.13	-0.06
	17	-0.16	0.10	-0.06
40	17	-0.29	0.23	-0.52
	18	-0.29	-0.03	-0.52
41	18	-0.47	0.12	-0.93
	19	-0.47	-0.34	-0.93
42	19	-0.66	-0.09	-1.19
	20	-0.66	-0.69	-1.19
43	20	-0.87	-0.37	-0.88
	21	-0.87	-0.81	-0.88
44	22	-0.09	0.13	0.16
	23	-0.09	0.21	0.16
45	23	-0.23	0.30	-0.42
	24	-0.23	0.09	-0.42
46	24	-0.38	0.23	-0.84
	25	-0.38	-0.19	-0.84
47	25	-0.52	0.02	-1.07
	26	-0.52	-0.52	-1.07
48	26	-0.63	-0.20	-1.10
	27	-0.63	-0.75	-1.10
49	27	-0.70	-0.39	-0.51
	28	-0.70	-0.64	-0.51
50	29	-0.07	0.03	2.16
	30	-0.07	0.11	-1.84
51	30	-0.20	0.30	1.20
	31	-0.20	-0.09	-2.80
52	31	-0.34	0.31	0.50
	32	-0.34	-0.44	-3.50
53	32	-0.46	0.16	0.03
	33	-0.46	-0.82	-3.97
54	33	-0.53	-0.06	-0.08
	34	-0.53	-1.10	-4.08
55	34	-0.54	-0.24	0.55
	35	-0.54	-0.97	-3.45

	6	-0.04	-0.05	-0.13
32	7	-0.01	0.01	0.01
	8	-0.01	-0.01	-0.06
33	8	-0.02	0.01	-0.04
	9	-0.02	-0.03	-0.12
34	9	-0.04	-0.01	-0.03
	10	-0.04	-0.05	-0.11
35	11	-0.01	0.00	0.03
	12	-0.01	0.00	-0.05
36	12	-0.02	0.01	-0.01
	13	-0.02	-0.02	-0.09
37	13	-0.03	-0.00	-0.03
	14	-0.03	-0.04	-0.11
38	14	-0.04	-0.02	-0.01
	15	-0.04	-0.04	-0.08
39	16	-0.01	0.00	0.04
	17	-0.01	0.00	-0.04
40	17	-0.01	0.01	0.01
	18	-0.01	-0.01	-0.07
41	18	-0.02	0.00	-0.01
	19	-0.02	-0.02	-0.09
42	19	-0.02	-0.01	-0.01
	20	-0.02	-0.04	-0.09
43	20	-0.03	-0.02	0.02
	21	-0.03	-0.03	-0.05
44	22	-0.01	0.00	0.04
	23	-0.01	0.01	-0.03
45	23	-0.01	0.01	0.02
	24	-0.01	-0.00	-0.06
46	24	-0.01	0.00	-0.00
	25	-0.01	-0.02	-0.08
47	25	-0.02	-0.01	-0.00
	26	-0.02	-0.03	-0.08
48	26	-0.02	-0.02	0.01
	27	-0.02	-0.03	-0.07
49	27	-0.02	-0.02	0.04
	28	-0.02	-0.02	-0.03
50	29	-0.01	0.01	0.02
	30	-0.01	0.01	-0.02
51	30	-0.01	0.02	-0.02
	31	-0.01	-0.00	-0.06
52	31	-0.01	0.01	-0.04
	32	-0.01	-0.02	-0.08
53	32	-0.01	0.00	-0.05
	33	-0.01	-0.03	-0.09
54	33	-0.02	-0.01	-0.04
	34	-0.02	-0.04	-0.08
55	34	-0.01	-0.01	-0.00
	35	-0.01	-0.02	-0.04

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

Hip. nº 4 H-4 DESCARRILAMIENTO

Desplazamientos de nudos

Nudo	Giro x	Giro y	Dpl. z
1	0.000000	0.000000	-0.000000
2	0.000120	0.000263	0.000040
3	0.000000	0.000000	0.000000
4	0.000246	0.000623	0.000179
5	0.000195	0.000388	0.000061
6	0.000000	0.000000	0.000000
7	0.000364	0.001020	0.000436
8	0.000364	0.000817	0.000249
9	0.000265	0.000502	0.000081
10	0.000000	0.000000	0.000000
11	0.000463	0.001402	0.000815
12	0.000502	0.001240	0.000571
13	0.000488	0.000985	0.000314
14	0.000327	0.000586	0.000096
15	0.000000	0.000000	0.000000
16	0.000537	0.001727	0.001304
17	0.000610	0.001611	0.001016
18	0.000670	0.001406	0.000690
19	0.000604	0.001076	0.000359
20	0.000363	0.000610	0.000102
21	0.000000	0.000000	0.000000
22	0.000581	0.001942	0.001877
23	0.000693	0.001872	0.001561
24	0.000822	0.001699	0.001177
25	0.000833	0.001410	0.000751
26	0.000666	0.001013	0.000361
27	0.000345	0.000536	0.000093
28	0.000000	0.000000	0.000000
29	0.000589	0.002015	0.002495
30	0.000753	0.001962	0.002162
31	0.000945	0.001799	0.001726
32	0.001016	0.001525	0.001213
33	0.000899	0.001155	0.000706
34	0.000606	0.000726	0.000299
35	0.000295	0.000289	0.000052

Reacciones en apoyos

Nudo	Mto. x	Mto. y	Fza. z
1	-0.62	-1.51	-0.29
3	-1.48	-2.72	1.58
6	-1.89	-3.54	2.93
10	-2.20	-4.11	4.36
15	-2.27	-4.22	5.36
21	-2.03	-3.84	6.10
28	-1.61	-2.31	3.96

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.62	-1.51	-0.29
	2	0.62	-1.60	-0.29

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

Hip. n° 3 H-3 SOBRECARGA DE PASEOS

Desplazamientos de nudos

Nudo	Giro x	Giro y	Dpl. z
1	0.000000	0.000000	0.000000
2	0.000007	0.000016	0.000003
3	0.000000	0.000000	0.000000
4	0.000013	0.000034	0.000011
5	0.000011	0.000023	0.000004
6	0.000000	0.000000	0.000000
7	0.000018	0.000049	0.000024
8	0.000020	0.000040	0.000014
9	0.000014	0.000025	0.000004
10	0.000000	0.000000	0.000000
11	0.000022	0.000058	0.000040
12	0.000026	0.000052	0.000028
13	0.000025	0.000041	0.000015
14	0.000015	0.000025	0.000004
15	0.000000	0.000000	0.000000
16	0.000026	0.000063	0.000059
17	0.000030	0.000058	0.000045
18	0.000032	0.000050	0.000029
19	0.000026	0.000037	0.000014
20	0.000014	0.000020	0.000004
21	0.000000	0.000000	0.000000
22	0.000029	0.000063	0.000079
23	0.000034	0.000059	0.000064
24	0.000038	0.000052	0.000045
25	0.000035	0.000042	0.000027
26	0.000024	0.000029	0.000011
27	0.000010	0.000014	0.000002
28	0.000000	0.000000	0.000000
29	0.000031	0.000063	0.000099
30	0.000037	0.000058	0.000082
31	0.000042	0.000052	0.000061
32	0.000041	0.000042	0.000040
33	0.000032	0.000030	0.000021
34	0.000018	0.000017	0.000007
35	0.000007	0.000006	0.000001

Reacciones en apoyos

Nudo	Mto. x	Mto. y	Fza. z
1	-0.04	-0.11	0.07
3	-0.10	-0.19	0.33
6	-0.11	-0.21	0.41
10	-0.11	-0.20	0.40
15	-0.09	-0.17	0.33
21	-0.07	-0.11	0.24
28	-0.04	-0.05	0.08

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.04	-0.11	0.07
	2	0.04	-0.09	0.07

2	2	0.03	-0.12	0.13
	4	0.03	-0.08	0.13
3	4	0.02	-0.10	0.15
	7	0.02	-0.05	0.15
4	7	0.02	-0.07	0.13
	11	0.02	-0.03	0.13
5	11	0.01	-0.04	0.10
	16	0.01	-0.00	0.10
6	16	0.01	-0.01	0.06
	22	0.01	0.01	0.06
7	22	0.01	0.00	0.02
	29	0.01	0.01	0.02
8	3	0.06	-0.16	0.20
	5	0.06	-0.09	0.20
9	5	0.04	-0.11	0.16
	8	0.04	-0.07	0.16
10	8	0.02	-0.08	0.13
	12	0.02	-0.03	0.13
11	12	0.02	-0.04	0.10
	17	0.02	-0.01	0.10
12	17	0.01	-0.01	0.06
	23	0.01	0.00	0.06
13	23	0.01	0.00	0.01
	30	0.01	0.00	0.01
14	6	0.06	-0.17	0.28
	9	0.06	-0.09	0.28
15	9	0.04	-0.11	0.19
	13	0.04	-0.05	0.19
16	13	0.03	-0.06	0.14
	18	0.03	-0.01	0.14
17	18	0.02	-0.02	0.08
	24	0.02	0.00	0.08
18	24	0.01	-0.00	0.02
	31	0.01	0.00	0.02
19	10	0.06	-0.16	0.29
	14	0.06	-0.07	0.29
20	14	0.04	-0.08	0.18
	19	0.04	-0.03	0.18
21	19	0.03	-0.03	0.11
	25	0.03	-0.00	0.11
22	25	0.02	-0.01	0.03
	32	0.02	0.00	0.03
23	15	0.05	-0.13	0.25
	20	0.05	-0.05	0.25
24	20	0.04	-0.05	0.14
	26	0.04	-0.01	0.14
25	26	0.02	-0.01	0.05
	33	0.02	0.00	0.05
26	21	0.04	-0.08	0.19
	27	0.04	-0.03	0.19
27	27	0.02	-0.03	0.08
	34	0.02	-0.00	0.08
28	28	0.02	-0.03	0.04
	35	0.02	-0.01	0.04
29	2	-0.03	0.01	-0.06
	3	-0.03	-0.04	-0.13
30	4	-0.02	0.01	-0.02
	5	-0.02	-0.02	-0.10
31	5	-0.04	-0.00	-0.05

2	2	0.05	-0.15	0.07
	4	0.05	-0.13	0.07
3	4	0.04	-0.16	0.15
	7	0.04	-0.11	0.15
4	7	0.03	-0.13	0.18
	11	0.03	-0.08	0.18
5	11	0.02	-0.09	0.17
	16	0.02	-0.04	0.17
6	16	0.01	-0.05	0.16
	22	0.01	-0.00	0.16
7	22	0.01	-0.01	0.05
	29	0.01	0.01	0.05
8	3	0.07	-0.18	0.11
	5	0.07	-0.15	0.11
9	5	0.05	-0.17	0.13
	8	0.05	-0.13	0.13
10	8	0.04	-0.15	0.18
	12	0.04	-0.09	0.18
11	12	0.03	-0.10	0.15
	17	0.03	-0.05	0.15
12	17	0.02	-0.06	0.20
	23	0.02	0.00	0.20
13	23	0.02	-0.01	0.04
	30	0.02	0.01	0.04
14	6	0.09	-0.22	0.22
	9	0.09	-0.16	0.22
15	9	0.07	-0.18	0.23
	13	0.07	-0.11	0.23
16	13	0.05	-0.12	0.20
	18	0.05	-0.06	0.20
17	18	0.03	-0.07	0.23
	24	0.03	-0.00	0.23
18	24	0.03	-0.01	0.06
	31	0.03	0.01	0.06
19	10	0.10	-0.24	0.33
	14	0.10	-0.14	0.33
20	14	0.07	-0.16	0.25
	19	0.07	-0.08	0.25
21	19	0.05	-0.09	0.27
	25	0.05	-0.01	0.27
22	25	0.04	-0.02	0.08
	32	0.04	0.01	0.08
23	15	0.09	-0.22	0.35
	20	0.09	-0.11	0.35
24	20	0.07	-0.12	0.31
	26	0.07	-0.02	0.31
25	26	0.05	-0.03	0.10
	33	0.05	0.00	0.10
26	21	0.07	-0.18	0.41
	27	0.07	-0.05	0.41
27	27	0.05	-0.05	0.16
	34	0.05	-0.00	0.16
28	28	0.05	-0.06	0.11
	35	0.05	-0.03	0.11
29	2	-0.04	-0.00	0.05
	3	-0.04	-0.07	-0.31
30	4	-0.03	0.01	-0.08
	5	-0.03	-0.03	-0.08
31	5	-0.05	-0.01	-0.10

	6	-0.05	-0.05	-0.10
32	7	-0.02	0.01	-0.04
	8	-0.02	-0.01	-0.04
33	8	-0.04	0.01	-0.09
	9	-0.04	-0.04	-0.09
34	9	-0.06	-0.01	-0.10
	10	-0.06	-0.06	-0.10
35	11	-0.02	0.01	0.02
	12	-0.02	-0.00	-0.05
36	12	-0.03	0.01	-0.03
	13	-0.03	-0.02	-0.09
37	13	-0.04	-0.00	-0.06
	14	-0.04	-0.05	-0.13
38	14	-0.06	-0.02	-0.05
	15	-0.06	-0.06	-0.12
39	16	-0.01	0.01	0.00
	17	-0.01	0.01	0.00
40	17	-0.02	0.02	-0.04
	18	-0.02	-0.00	-0.04
41	18	-0.03	0.01	-0.07
	19	-0.03	-0.03	-0.07
42	19	-0.04	-0.01	-0.08
	20	-0.04	-0.05	-0.08
43	20	-0.05	-0.03	-0.05
	21	-0.05	-0.05	-0.05
44	22	-0.01	0.00	0.11
	23	-0.01	0.01	-0.09
45	23	-0.02	0.01	0.07
	24	-0.02	-0.00	-0.13
46	24	-0.02	0.00	0.04
	25	-0.02	-0.03	-0.16
47	25	-0.03	-0.01	0.03
	26	-0.03	-0.05	-0.17
48	26	-0.04	-0.03	0.04
	27	-0.04	-0.06	-0.16
49	27	-0.04	-0.03	0.09
	28	-0.04	-0.04	-0.11
50	29	-0.01	0.01	0.05
	30	-0.01	0.01	-0.05
51	30	-0.01	0.03	-0.01
	31	-0.01	-0.00	-0.11
52	31	-0.02	0.02	-0.05
	32	-0.02	-0.03	-0.15
53	32	-0.03	0.01	-0.07
	33	-0.03	-0.05	-0.17
54	33	-0.03	-0.01	-0.07
	34	-0.03	-0.06	-0.17
55	34	-0.03	-0.02	-0.01
	35	-0.03	-0.05	-0.11

	6	-3.06	-0.07	-0.11
32	7	-3.03	0.01	-0.06
	8	-0.03	-0.02	-0.06
33	8	-0.04	0.00	-0.10
	9	-0.04	-0.05	-0.10
34	9	-0.06	-0.02	-0.08
	10	-0.06	-0.06	-0.08
35	11	-0.02	0.01	-0.03
	12	-0.02	-0.01	-0.03
36	12	-0.03	0.00	-0.07
	13	-0.03	-0.03	-0.07
37	13	-0.04	-0.01	-0.08
	14	-0.04	-0.05	-0.08
38	14	-0.05	-0.03	-0.04
	15	-0.05	-0.05	-0.04
39	16	-0.02	0.01	-0.02
	17	-0.02	-0.00	-0.02
40	17	-0.02	0.01	-0.05
	18	-0.02	-0.02	-0.05
41	18	-0.03	-0.01	-0.06
	19	-0.03	-0.03	-0.06
42	19	-0.03	-0.02	-0.05
	20	-0.03	-0.04	-0.05
43	20	-0.04	-0.03	-0.01
	21	-0.04	-0.03	-0.01
44	22	-0.01	0.01	-0.01
	23	-0.01	0.00	-0.01
45	23	-0.02	0.01	-0.04
	24	-0.02	-0.01	-0.04
46	24	-0.02	-0.00	-0.05
	25	-0.02	-0.03	-0.05
47	25	-0.02	-0.01	-0.05
	26	-0.02	-0.04	-0.05
48	26	-0.03	-0.02	-0.03
	27	-0.03	-0.03	-0.03
49	27	-0.02	-0.02	0.01
	28	-0.02	-0.02	0.01
50	29	-0.01	0.01	-0.03
	30	-0.01	-0.00	-0.03
51	30	-0.01	0.02	-0.06
	31	-0.01	-0.01	-0.06
52	31	-0.02	0.01	-0.08
	32	-0.02	-0.03	-0.08
53	32	-0.02	-0.00	-0.09
	33	-0.02	-0.04	-0.09
54	33	-0.02	-0.01	-0.07
	34	-0.02	-0.05	-0.07
55	34	-0.02	-0.01	-0.02
	35	-0.02	-0.03	-0.02

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

Hip. n° 2 H-2 CARGA PERMANENTE

Desplazamientos de nudos

Nudo	Giro x	Giro y	Dpl. z
1	0.000000	0.000000	0.000000
2	0.000009	0.000021	0.000003
3	0.000000	0.000000	0.000000
4	0.000019	0.000046	0.000014
5	0.000015	0.000030	0.000005
6	0.000000	0.000000	0.000000
7	0.000027	0.000072	0.000033
8	0.000027	0.000059	0.000019
9	0.000020	0.000037	0.000006
10	0.000000	0.000000	0.000000
11	0.000033	0.000094	0.000059
12	0.000036	0.000084	0.000041
13	0.000035	0.000067	0.000023
14	0.000023	0.000040	0.000007
15	0.000000	0.000000	0.000000
16	0.000038	0.000109	0.000091
17	0.000044	0.000102	0.000070
18	0.000048	0.000088	0.000047
19	0.000041	0.000067	0.000024
20	0.000023	0.000038	0.000006
21	0.000000	0.000000	0.000000
22	0.000041	0.000116	0.000126
23	0.000049	0.000109	0.000103
24	0.000057	0.000098	0.000076
25	0.000056	0.000080	0.000047
26	0.000042	0.000056	0.000022
27	0.000020	0.000028	0.000005
28	0.000000	0.000000	0.000000
29	0.000044	0.000116	0.000162
30	0.000054	0.000109	0.000137
31	0.000065	0.000098	0.000107
32	0.000067	0.000081	0.000072
33	0.000056	0.000059	0.000040
34	0.000034	0.000035	0.000015
35	0.000015	0.000012	0.000002

Reacciones en apoyos

Nudo	Mto. x	Mto. y	Fza. z
1	-0.05	-0.14	0.12
3	-0.14	-0.22	0.42
6	-0.14	-0.28	0.31
10	-0.16	-0.30	0.44
15	-0.15	-0.28	0.47
21	-0.12	-0.23	0.45
28	-0.09	-0.10	0.22

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.05	-0.14	0.12
	2	0.05	-0.11	0.12

LAV MADRID-BARCELONA.PI 562+7.VOLADIZO ESTRIBOS 1 Y 4.

Rip. n° 1 H-1 PESO PROPIO

Desplazamientos de nudos

Nudo	Giro x	Giro y	Dpl. z
1	0.000000	0.000000	0.000000
2	0.000013	0.000028	0.000005
3	0.000000	0.000000	0.000000
4	0.000025	0.000055	0.000018
5	0.000019	0.000035	0.000006
6	0.000000	0.000000	0.000000
7	0.000035	0.000075	0.000038
8	0.000033	0.000059	0.000021
9	0.000021	0.000035	0.000006
10	0.000000	0.000000	0.000000
11	0.000044	0.000088	0.000064
12	0.000044	0.000075	0.000042
13	0.000037	0.000057	0.000021
14	0.000020	0.000032	0.000006
15	0.000000	0.000000	0.000000
16	0.000051	0.000092	0.000092
17	0.000052	0.000081	0.000066
18	0.000049	0.000068	0.000040
19	0.000036	0.000049	0.000019
20	0.000017	0.000025	0.000004
21	0.000000	0.000000	0.000000
22	0.000056	0.000091	0.000121
23	0.000059	0.000082	0.000092
24	0.000058	0.000070	0.000062
25	0.000048	0.000054	0.000035
26	0.000031	0.000036	0.000014
27	0.000012	0.000016	0.000003
28	0.000000	0.000000	0.000000
29	0.000060	0.000088	0.000149
30	0.000065	0.000081	0.000117
31	0.000065	0.000069	0.000084
32	0.000058	0.000055	0.000052
33	0.000041	0.000038	0.000026
34	0.000022	0.000021	0.000009
35	0.000008	0.000007	0.000001

Reacciones en apoyos

Nudo	Mto. x	Mto. y	Fza. z
1	-0.07	-0.20	0.26
3	-0.16	-0.30	0.53
6	-0.16	-0.30	0.53
10	-0.14	-0.27	0.48
15	-0.11	-0.21	0.39
21	-0.07	-0.14	0.27
28	-0.04	-0.06	0.10

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.07	-0.20	0.26
	2	0.07	-0.14	0.16

2	2	0.06	-0.19	0.30
	4	0.06	-0.11	0.21
3	4	0.05	-0.15	0.31
	7	0.05	-0.07	0.21
4	7	0.04	-0.09	0.27
	11	0.04	-0.03	0.17
5	11	0.03	-0.05	0.21
	16	0.03	0.00	0.12
6	16	0.02	-0.01	0.13
	22	0.02	0.02	0.05
7	22	0.01	0.00	0.06
	29	0.01	0.01	-0.03
8	3	0.09	-0.24	0.38
	5	0.09	-0.14	0.28
9	5	0.06	-0.17	0.29
	8	0.06	-0.09	0.19
10	8	0.04	-0.11	0.24
	12	0.04	-0.05	0.14
11	12	0.03	-0.05	0.18
	17	0.03	-0.01	0.09
12	17	0.02	-0.02	0.12
	23	0.02	0.01	0.03
13	23	0.02	0.00	0.05
	30	0.02	0.00	-0.03
14	6	0.09	-0.24	0.43
	9	0.09	-0.13	0.33
15	9	0.07	-0.14	0.30
	13	0.07	-0.07	0.21
16	13	0.05	-0.08	0.22
	18	0.05	-0.02	0.13
17	18	0.03	-0.03	0.14
	24	0.03	0.00	0.05
18	24	0.02	-0.00	0.07
	31	0.02	0.00	-0.02
19	10	0.09	-0.21	0.41
	14	0.09	-0.10	0.31
20	14	0.06	-0.11	0.27
	19	0.06	-0.04	0.18
21	19	0.04	-0.05	0.18
	25	0.04	-0.01	0.09
22	25	0.03	-0.01	0.08
	32	0.03	0.00	-0.00
23	15	0.07	-0.16	0.34
	20	0.07	-0.07	0.25
24	20	0.05	-0.07	0.21
	26	0.05	-0.02	0.12
25	26	0.03	-0.02	0.10
	33	0.03	-0.00	0.02
26	21	0.04	-0.10	0.26
	27	0.04	-0.04	0.17
27	27	0.03	-0.03	0.13
	34	0.03	-0.00	0.05
28	28	0.03	-0.04	0.11
	35	0.03	-0.02	0.02
29	2	-0.05	0.01	-0.15
	3	-0.05	-0.07	-0.15
30	4	-0.04	0.01	-0.10
	5	-0.04	-0.04	-0.10
31	5	-0.06	-0.01	-0.11

3	1.000	1.000	1.000
6	1.000	1.000	1.000
10	1.000	1.000	1.000
15	1.000	1.000	1.000
21	1.000	1.000	1.000
28	1.000	1.000	1.000

CARGAS

H-1 PESO PROPIO

0			
28			
1	3	0.325	0.325
2	3	0.318	0.318
8	3	0.318	0.318
3	3	0.310	0.310
9	3	0.310	0.310
14	3	0.310	0.310
4	3	0.303	0.303
10	3	0.303	0.303
15	3	0.303	0.303
19	3	0.303	0.303
5	3	0.294	0.294
11	3	0.294	0.294
16	3	0.294	0.294
20	3	0.294	0.294
23	3	0.294	0.294
6	3	0.286	0.286
12	3	0.286	0.286
17	3	0.286	0.286
21	3	0.286	0.286
24	3	0.286	0.286
26	3	0.286	0.286
7	3	0.279	0.279
13	3	0.279	0.279
18	3	0.279	0.279
22	3	0.279	0.279
25	3	0.279	0.279
27	3	0.279	0.279
28	3	0.279	0.279

H-2 CARGA PERMANENTE

0			
17			
29	3	0.710	0.710
35	3	0.136	0.136
36	3	0.136	0.136
37	3	0.136	0.136
38	3	0.136	0.136
44	3	0.400	0.400
45	3	0.400	0.400
46	3	0.400	0.400
47	3	0.400	0.400
48	3	0.400	0.400
49	3	0.400	0.400
50	3	0.200	0.200
51	3	0.200	0.200
52	3	0.200	0.200
53	3	0.200	0.200
54	3	0.200	0.200
55	3	0.200	0.200

H-3 SOBRECARGA DE PASEOS

0			
27			
29	3	0.155	0.155
30	3	0.155	0.155
31	3	0.155	0.155
32	3	0.155	0.155
33	3	0.155	0.155
34	3	0.155	0.155
35	3	0.155	0.155
36	3	0.155	0.155
37	3	0.155	0.155
38	3	0.155	0.155
39	3	0.155	0.155
40	3	0.155	0.155
41	3	0.155	0.155
42	3	0.155	0.155
43	3	0.155	0.155
44	3	0.155	0.155
45	3	0.155	0.155
46	3	0.155	0.155
47	3	0.155	0.155
48	3	0.155	0.155
49	3	0.155	0.155
50	3	0.078	0.078
51	3	0.078	0.078
52	3	0.078	0.078
53	3	0.078	0.078
54	3	0.078	0.078
55	3	0.078	0.078

H-4 DESCARRILAMIENTO

0			
6			
50	3	8.000	8.000
51	3	8.000	8.000
52	3	8.000	8.000
53	3	8.000	8.000
54	3	8.000	8.000
55	3	8.000	8.000

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CONTROL

35 55 7 4

NUDOS

1	0.000	0.000
2	0.310	0.000
3	0.310	0.500
4	0.620	0.000
5	0.620	0.500
6	0.620	1.000
7	0.930	0.000
8	0.930	0.500
9	0.930	1.000
10	0.930	1.500
11	1.240	0.000
12	1.240	0.500
13	1.240	1.000
14	1.240	1.500
15	1.240	2.000
16	1.550	0.000
17	1.550	0.500
18	1.550	1.000
19	1.550	1.500
20	1.550	2.000
21	1.550	2.500
22	1.860	0.000
23	1.860	0.500
24	1.860	1.000
25	1.860	1.500
26	1.860	2.000
27	1.860	2.500
28	1.860	3.000
29	2.170	0.000
30	2.170	0.500
31	2.170	1.000
32	2.170	1.500
33	2.170	2.000
34	2.170	2.500
35	2.170	3.000

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S. LIONES

14

0.000732	0.001464	2500000	1100000
0.000683	0.001366	2500000	1100000
0.000636	0.001272	2500000	1100000
0.000591	0.001182	2500000	1100000
0.000541	0.001082	2500000	1100000
0.000500	0.001000	2500000	1100000
0.000462	0.000924	2500000	1100000
0.000439	0.000878	2500000	1100000
0.000408	0.000816	2500000	1100000
0.000380	0.000760	2500000	1100000
0.000353	0.000706	2500000	1100000
0.000323	0.000646	2500000	1100000
0.000298	0.000596	2500000	1100000
0.000283	0.000566	2500000	1100000

:
BARRAS

1	1	2	1
2	2	4	2
3	4	7	3
4	7	11	4
5	11	16	5
6	16	22	6
7	22	29	7
8	3	5	2
9	5	8	3
10	8	12	4
11	12	17	5
12	17	23	6
13	23	30	7
14	6	9	3
15	9	13	4
16	13	18	5
17	18	24	6
18	24	31	7
19	10	14	4
20	14	19	5
21	19	25	6
22	25	32	7
23	15	20	5
24	20	26	6
25	26	33	7
26	21	27	6
27	27	34	7
28	28	35	7
29	2	3	8
30	4	5	9
31	5	6	9
32	7	8	10
33	8	9	10
34	9	10	10
35	11	12	11
36	12	13	11
37	13	14	11
38	14	15	11
39	16	17	12
40	17	18	12
41	18	19	12
42	19	20	12
43	20	21	12
44	22	23	13
45	23	24	13
46	24	25	13
47	25	26	13
48	26	27	13
49	27	28	13
50	29	30	14
51	30	31	14
52	31	32	14
53	32	33	14
54	33	34	14
55	34	35	14

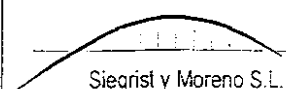
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APOYOS

7

1	1.000	1.000	1.000
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5.- CÁLCULOS MECANIZADOS

5.1.- CÁLCULO DE CIMENTACIONES

 Siegrist y Moreno S.L.	PROYECTO: L.A.V. MADRID-BARCELONA P.I. 562+7 (TORIJA)	FECHA: 22/12/00 HOJA Nº: 6/6
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2.- ARMADURA DE LA ZAPATA DE MURO

Se calcula la zapata como "zapata flexible" según la norma EHE-98.

Armadura longitudinal inferior:

$\sigma_{1d} = 15.63 \text{ t/m}^2$	$L_{zap} = 2.800 \text{ m}$	$a/4 = 0.125 \text{ m}$
$\sigma_{2d} = 4.18 \text{ t/m}^2$	$Esp_{-Muro} = 0.500 \text{ m}$	$d = 0.700 \text{ m}$
	Vuelo trasero zapata = 1.800 m	$0.85 \cdot d = 0.595 \text{ m}$
	Vuelo delantero zapata = 0.500 m	$0.15 \cdot a = 0.075 \text{ m}$
$\sigma_{s,i} = 13.28 \text{ t/m}^2$	$\sigma_{s,s} = 11.54 \text{ t/m}^2$	
$M_{11d} = 3.68 \text{ mt}$		
$U_{cd} = 1166.67 \text{ t}$		
$A_{s,inf} = 1.2 \text{ cm}^2/\text{m}$	0.4 redondos de 20 mm por metro	

Armadura longitudinal superior:

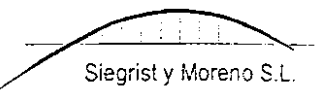
$M_d = 11.57 \text{ mt/m}$	$U_{cd} = 1166.7 \text{ t/m}$
$A_{s,sup} = 3.8 \text{ cm}^2/\text{m}$	1.2 redondos de 20 mm por metro

Armaduras mínimas de zapata:

Mínima en zapata:	8.00 cm ² /m	2.5 redondos de 20 mm por metro
	$\alpha_{inf} = 1.444$	$\alpha_{sup} = 1.322$
	$A_{s,inf} = 7.3 \text{ cm}^2/\text{m}$	$A_{s,sup} = 8.0 \text{ cm}^2/\text{m}$

Armadura de cortante:

$V_{u1} = 350 \text{ t}$		
$V_d = 6 \text{ t}$	El hormigón resiste adecuadamente a compresión oblicua	
$V_{u2} = 16 \text{ t}$	No es necesaria armadura de cortante.	
$\xi = 1.535$	$\rho_L = 0.001$	
	$f_{ck} = 25 \text{ N/mm}^2$	
$V_{cu} = 13 \text{ t}$	$A_{st} = -2.63 \text{ cm}^2/\text{m}$	-1.2 cercos de 12 mm
	$A_{st,min} = 8.33 \text{ cm}^2/\text{m}$	3.7 cercos de 12 mm



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P.I. 562+7 (TORIJA)

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CÁLCULO DE MURO EXENTO: ARMADURA

SECCIÓN - 2

1.- ARMADURA DEL CUERPO PRINCIPAL DEL MURO A FLEXIÓN Y CORTANTE

Características del estribo a flexión:

Espesor superior del muro:

0.500 m

Ancho del muro:

1.000 m

Altura del muro:

3.200 m

Resistencia característica del hormigón:

25 N/mm2

Resistencia característica del acero:

510 N/mm2

$U_{cd}/d = 1417 \text{ t}$

Cálculo a flexión del muro a diversas alturas

z = profundidad desde sección superior

z	e _{inf}	d	M _d	U _c	A _{s,nec}	A _{s,min,v}	A _{s,min,h}
0.000 m	0.99 t/m2	0.450 m	0.00 mt	637.50 t	0.0 cm2	4.5 cm2	8.0 cm2
0.320 m	1.20 t/m2	0.450 m	0.08 mt	637.50 t	0.0 cm2	4.5 cm2	8.0 cm2
0.640 m	1.41 t/m2	0.450 m	0.35 mt	637.50 t	0.2 cm2	4.5 cm2	8.0 cm2
0.960 m	1.62 t/m2	0.450 m	0.83 mt	637.50 t	0.4 cm2	4.5 cm2	8.0 cm2
1.280 m	1.83 t/m2	0.450 m	1.56 mt	637.50 t	0.8 cm2	4.5 cm2	8.0 cm2
1.600 m	2.05 t/m2	0.450 m	2.58 mt	637.50 t	1.3 cm2	4.5 cm2	8.0 cm2
1.920 m	2.26 t/m2	0.450 m	3.91 mt	637.50 t	2.0 cm2	4.5 cm2	8.0 cm2
2.240 m	2.47 t/m2	0.450 m	5.58 mt	637.50 t	2.8 cm2	4.5 cm2	8.0 cm2
2.560 m	2.68 t/m2	0.450 m	7.63 mt	637.50 t	3.9 cm2	4.5 cm2	8.0 cm2
2.880 m	2.89 t/m2	0.450 m	10.10 mt	637.50 t	5.2 cm2	4.5 cm2	8.0 cm2
3.200 m	3.10 t/m2	0.450 m	13.01 mt	637.50 t	6.7 cm2	4.5 cm2	8.0 cm2

* 0.9 por mil

** 3.2/2 por mil

Cálculo del muro a cortante:

Esfuerzo cortante de agotamiento por compresión oblicua del alma, Vu1:

k = 1

$f_{icd} = 10.00 \text{ N/mm2}$

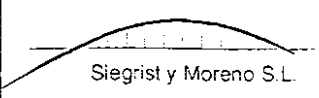
$b_0 = 1.000 \text{ m}$

$\theta = (\text{Ángulo de las bielas comprimidas de hormigón})$

$\alpha = 90^\circ$ (Ángulo de las armaduras con el eje de la pieza)

$V_{u1} = k \cdot b_0 \cdot f_{icd} \cdot 10^3 \cdot d \cdot 10^3 \cdot (1/\text{TAN}(\theta) + 1/\text{TAN}(\alpha)) / (1 + (1/\text{TAN}(\theta))^2) \cdot (10000)$

$\alpha = 90^\circ$ (Ángulo de las armaduras con el eje de la pieza)



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FECHA: 22/12/00
HOJA Nº: 5/6

Esfuerzo cortante de agotamiento por tracción en el alma, Vu2: Piezas SIN armadura de cortante:

$\xi = 1 + \text{raiz}(200/d)$ (d en mm)

$\rho_L = A/(b \cdot h)$ (cuantía geométrica de la armadura longitudinal traccionada, no mayor de 0.020)

$V_{u2} = (0.12 \cdot \xi \cdot (100 \rho_L f_{ck})^{1/3}) \cdot b_0 \cdot d$

$f_{ck} = 25 \text{ N/mm2}$

$\sigma_{cd} = \text{Tensión axil efectiva en la sección (tracción positiva)}$

Cálculo a cortante del muro a diversas alturas

z = profundidad desde sección superior

z	e _{inf}	d	V _d	σ_{cd}	cotgθ	V _{u1}	Conclusión
0.000 m	0.99 t/m2	0.450 m	1.49 t	0.00 t/m2	1.000	225.00 t	Cumple
0.320 m	1.20 t/m2	0.450 m	0.53 t	-0.80 t/m2	1.002	225.00 t	Cumple
0.640 m	1.41 t/m2	0.450 m	1.15 t	-1.60 t/m2	1.003	225.00 t	Cumple
0.960 m	1.62 t/m2	0.450 m	1.88 t	-2.40 t/m2	1.005	225.00 t	Cumple
1.280 m	1.83 t/m2	0.450 m	2.71 t	-3.20 t/m2	1.006	225.00 t	Cumple
1.600 m	2.05 t/m2	0.450 m	3.64 t	-4.00 t/m2	1.008	224.99 t	Cumple
1.920 m	2.26 t/m2	0.450 m	4.68 t	-4.80 t/m2	1.009	224.99 t	Cumple
2.240 m	2.47 t/m2	0.450 m	5.81 t	-5.60 t/m2	1.011	224.99 t	Cumple
2.560 m	2.68 t/m2	0.450 m	7.05 t	-6.40 t/m2	1.012	224.98 t	Cumple
2.880 m	2.89 t/m2	0.450 m	8.38 t	-7.20 t/m2	1.014	224.98 t	Cumple
3.200 m	3.10 t/m2	0.450 m	9.82 t	-8.00 t/m2	1.015	224.97 t	Cumple

ξ	ρ _L	σ_{cd}	V _{u2,sin Ast}	V _{cu}	Conclusión
1.667	0.0009	0.00 t/m2	11.79 t	9.83 t	No necesaria armadura de cortante
1.667	0.0009	-0.80 t/m2	11.85 t	9.88 t	No necesaria armadura de cortante
1.667	0.0009	-1.60 t/m2	11.90 t	9.94 t	No necesaria armadura de cortante
1.667	0.0009	-2.40 t/m2	11.96 t	9.99 t	No necesaria armadura de cortante
1.667	0.0009	-3.20 t/m2	12.01 t	10.04 t	No necesaria armadura de cortante
1.667	0.0009	-4.00 t/m2	12.06 t	10.10 t	No necesaria armadura de cortante
1.667	0.0009	-4.80 t/m2	12.12 t	10.15 t	No necesaria armadura de cortante
1.667	0.0009	-5.60 t/m2	12.17 t	10.21 t	No necesaria armadura de cortante
1.667	0.0009	-6.40 t/m2	12.23 t	10.26 t	No necesaria armadura de cortante
1.667	0.0010	-7.20 t/m2	12.82 t	10.77 t	No necesaria armadura de cortante
1.667	0.0013	-8.00 t/m2	13.99 t	11.75 t	No necesaria armadura de cortante

Esfuerzo cortante de agotamiento por tracción en el alma, Vu2: Piezas CON armadura de cortante:

A _{st,nec}	A _{st,min}	A _{st}	s	Conclusión
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria
-	-	-	-	No necesaria

4.- CARACTERÍSTICAS DEL MURO: ALZADO ESCALONADO.

Cota de coronación muro:	4.000 m	Ancho muro:	1.000 m
Cota de cimentación zapata:	0.000 m		
Canto zapata:	0.800 m		
Altura del muro:	3.200 m	Tensión máx. admisible:	3.0 kp/cm2
Espesor superior del muro:	0.500 m	Altura de espesor superior:	3.200 m
Espesor inferior del muro:	0.500 m	Altura de espesor inferior:	0.000 m
$f_{ck,Alzados+Zapata}$ (N/mm ²):	25.00	γ_c =	1.50
$f_{yk,Acero}$ (N/mm ²):	510.00	γ_s =	1.15
$E_{Estribo}$ (N/mm ²):	27264		
Vuelo delantero zapata:	0.500 m	Canto trasero de zapata:	1.150 m
Vuelo trasero zapata:	1.800 m	Dim.Long. zapata:	2.800 m
Ancho zapata:	1.000 m	Dim.Trans. zapata:	1.000 m

6.- ACCIONES RESPECTO DEL PUNTO A Coef.Rozamiento: 0.6250

	N (t)	M _A (mt)	H _L (t)
Zapata	7	10	0
Cuerpo Muro	4	3	0
Peso de Tierras traseras	17	32	0
Acciones en cabeza (N)	0	0	0
Acciones en cabeza (H _L)	0	0	0
Empuje Tierras	0	-14	7

Acciones Totales

N (t) =	28	e_A (m) =	1.130 m
M (mt) =	31	e_C (m) =	0.270 m
H (t) =	7	M _C (mt) =	7.48 mt/m

Tensiones Máximas

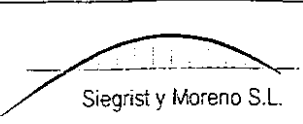
σ_{med} (t/m ²) =	9.9	
σ_{co} (t/m ²) =	12.3	(menor que la tensión máxima admisible)
$\sigma_{máx}$ (t/m ²) =	15.6	(menor que la máxima admisible)
σ_{min} (t/m ²) =	4.2	(mayor o igual que 0 t/m2)

Seguridad al deslizamiento

En servicio con sobrecarga total:	$\gamma_d = k \cdot N / F_L = 2.6$
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Seguridad al vuelco

En servicio con sobrecarga total:	$\gamma_v = M_{estabil} / M_{vuelco} = 3.25$
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	PROYECTO: L.A.V. MADRID-BARCELONA P.I. 562+7 (TORIJA)	FECHA: 22/12/00 HOJA Nº: 6/6
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2.- ARMADURA DE LA ZAPATA DE MURO

Se calcula la zapata como "zapata flexible" según la norma EHE-98.

Armadura longitudinal inferior:

$\sigma_{1d} = 26.03 \text{ t/m}^2$
 $\sigma_{2d} = 3.36 \text{ t/m}^2$

$L_{zap} = 4.050 \text{ m}$
Esp. Muro = 0.800 m

$a/4 = 0.200 \text{ m}$
 $d = 0.900 \text{ m}$

Vuelo trasero zapata = 2.500 m
Vuelo delantero zapata = 0.750 m

$0.85 \cdot d = 0.765 \text{ m}$
 $0.15 \cdot a = 0.120 \text{ m}$

$\sigma_{s,i} = 21.16 \text{ t/m}^2$
 $M_{11d} = 13.86 \text{ mt}$

$\sigma_{s,s} = 17.36 \text{ t/m}^2$

$U_{cd} = 1500.00 \text{ t}$
 $A_{s,inf} = 3.5 \text{ cm}^2/\text{m}$

1.1 redondos de 20 mm por metro

Armadura longitudinal superior:

$M_d = 45.05 \text{ mt/m}$
 $A_{s,sup} = 11.5 \text{ cm}^2/\text{m}$

$U_{cd} = 1500.0 \text{ t/m}$
3.7 redondos de 20 mm por metro

Armaduras mínimas de zapata:

Minima en zapata: 10.00 cm²/m

3.2 redondos de 20 mm por metro

$\alpha_{inf} = 1.371$
 $A_{s,inf} = 9.9 \text{ cm}^2/\text{m}$

$\alpha_{sup} = 1.076$
 $A_{s,sup} = 12.6 \text{ cm}^2/\text{m}$

Armadura de cortante:

$V_{u1} = 450 \text{ t}$
 $V_d = 18 \text{ t}$
 $V_{u2} = 26 \text{ t}$

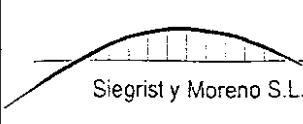
El hormigón resiste adecuadamente a compresión oblicua

No es necesaria armadura de cortante.

$\xi = 1.471$
 $V_{cu} = 21 \text{ t}$

$\rho_L = 0.002$
 $A_{st} = -0.96 \text{ cm}^2/\text{m}$
 $A_{st,min} = 8.33 \text{ cm}^2/\text{m}$

$f_{ck} = 25 \text{ N/mm}^2$
-0.4 cercos de 12 mm
-3.7 cercos de 12 mm

	PROYECTO: L.A.V. MADRID-BARCELONA P.I. 562+7 (TORIJA)	FECHA: 22/12/00 HOJA Nº: 1/6
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CÁLCULO DE MUROS EXENTOS: ENCAJE GEOMÉTRICO

SECCIÓN - 2

1.- ACCIONES VERTICALES MÁXIMAS EN CABEZA DE MURO

SOPORTE	Acciones pp	Acciones cp	Sobrecargas máximas	Sobrecargas mínimas
MURO 1	0.00 t	0.00 t	0.00 t	0.00 t
MURO 2	0.00 t	0.00 t	0.00 t	0.00 t

Cargas verticales extremas sin mayorar en cabeza de muro:

Acción vertical (máx): 0.00 t

Acción vertical (mín): 0.00 t

Cargas verticales extremas mayoradas en cabeza de muro:

Acción vertical (máx): 0.00 t

2.- ACCIONES LONGITUDINALES MÁXIMAS EN CABEZA DE MURO

Se recogen acciones tipo anclajes en cabeza de muro.

APOYO	Anclaje 1	Anclaje 2	Anclaje 3	Anclaje 4
Muro 1	0.00 t	0.00 t	0.00 t	0.00 t

3.- EMPUJE DE TIERRAS EN TRASDÓS

$e_{sup} \text{ (t/m}^2\text{): } 0.990 \text{ t/m}^2$
 $e \text{ (t/m}^2\text{) = } k_a \cdot (p_{sc} + \gamma_t \cdot z)$

$e_{inf} \text{ (t/m}^2\text{): } 3.102 \text{ t/m}^2$
 $e_{inf,zap} \text{ (t/m}^2\text{): } 3.861 \text{ t/m}^2$

Coficiente de Empuje Activo: $k_a = 0.330$
Sobrecarga sobre el terraplén: $p_{sc} = 3.00 \text{ t/m}^2$
Peso específico del relleno: $\gamma_t = 2.00 \text{ t/m}^3$

CÁLCULO DEL TABLERO

U.T.E. TORIJA

L.A.V. MADRID-BARCELONA. Subtramo V

P.K. 562+7 (Guadalajara)

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1-DESARROLLO DEL CÁLCULO

Para realizar el cálculo del tablero se ha procedido a realizar diversos modelos de cálculo que permitan la obtención de los esfuerzos existentes en la estructura de una forma que refleje lo más aproximadamente posible la realidad.

1.1-CÁLCULO DEL PESO PROPIO DEL TABLERO.

Al ser la estructura isostática se obtiene directamente el valor de los esfuerzos derivados del peso propio de la viga

En este caso concreto existirá también un esfuerzo torsor derivado de la excentricidad de la carga del peso propio de la losa respecto al centro de gravedad de la viga; para su cálculo se hace uso ya de un *modelo de emparrillado plano*, con las características mecánicas de la sección inicial del tablero.

Posteriormente, se realiza un resumen de esfuerzos (cortante y flector) que actúan sobre las distintas secciones de la estructura, distinguiendo además si lo hacen sobre sección final, intermedia e inicial para un correcto dimensionamiento de la misma.

1.2-CÁLCULO DE LA ESTRUCTURA SOMETIDA AL RESTO DE CARGAS

En cuanto a las sobrecargas ferroviarias se ha seguido el siguiente procedimiento:

- Se han considerado los trenes estipulados para la sobrecarga ferroviaria tanto por la Norma IPF-75 como por el EC-3
- Dado el gran número de hipótesis de carga que en principio se han de considerar según las normas anteriores se ha optado por realizar en primer lugar un *modelo de viga continua* en el que se introdujeron diferentes tipos de trenes, preseleccionados mediante líneas de influencia de acuerdo a las hipótesis pésimas desde el punto de vista de reacciones y esfuerzos longitudinales
- En segundo lugar, de los casos de carga calculados se escogieron los peores desde el punto de vista de los esfuerzos de dimensionamiento para utilizarlos en un *modelo de emparrillado plano*, que dada la memoria que requiere, mucho mayor que la del modelo anterior, no se podía considerar con el número de hipótesis de carga establecido al principio¹.

En cuanto a las cargas muertas se han aplicado tanto en el modelo de emparrillado plano.

Las sobrecargas de paseos se han considerado conjuntamente con la sobrecarga ferroviaria según las hipótesis pésimas de reacciones y esfuerzos en el modelo de emparrillado plano.

¹ En realidad se realizaron hasta tres modelos de emparrillado; un con las vías centradas, otro con éstas ripadas 30 cm hacia el exterior del tablero y otra con el mismo ripado pero hacia el interior.

1.3-MODELOS DE CÁLCULO EMPLEADOS

Los modelos empleados para el cálculo del tablero, según se ha podido comprobar en las páginas anteriores, son:

- *Modelo de viga continua.*
- *Modelo de emparrillado plano.*

De esta forma, al utilizar el modelo del emparrillado plano, se ha podido considerar el efecto que sobre la flexión longitudinal produce el esfuerzo torsor, cargando un alma de la viga cajón más que la otra; se adoptarán por tanto para el dimensionamiento los pésimos esfuerzos existentes en cada caso por alma

2-CARGAS APLICADAS

Las acciones aplicadas para el cálculo del tablero en los modelos de cálculo empleados son las siguientes:

PESO PROPIO

El correspondiente a considerar una densidad del hormigón de 2.5 t/m^3 .

CARGAS MUERTAS

Los tipos de carga a considerar serán los siguientes:

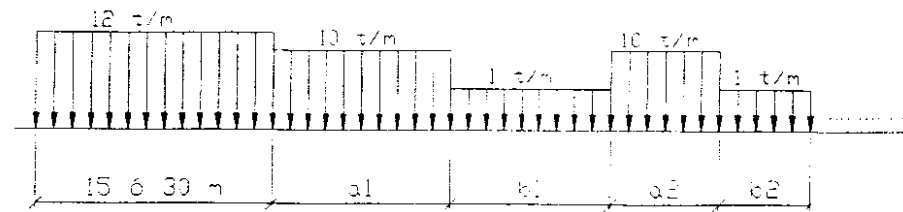
- *Balasto* ($\gamma = 1.6 \text{ t/m}^3$) $\Rightarrow 4.10 \text{ t/m}$
 $\Rightarrow 4.92 \text{ t/m}$, balasto mayorado
- *Traviesas* $\Rightarrow 0.52 \text{ t/m}$
- *Carriles* $\Rightarrow 0.12 \text{ t/m}$
- *Conductos + cables* $\Rightarrow 0.30 \text{ t/m}$
- *Paseos* (ancho $\approx 1 \text{ m}$) $\Rightarrow 0.50 \text{ t/m}$ (0.50 t/m^2)
- *Barandillas* $\Rightarrow 0.05 \text{ t/m}$
- (carga de balasto sin mayorar) **5.59 t/m** por vía de circulación
- (carga de balasto mayorada) **6.41 t/m** por vía de circulación

SOBRECARGA DE PASEOS

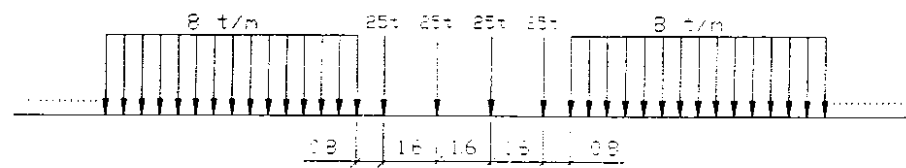
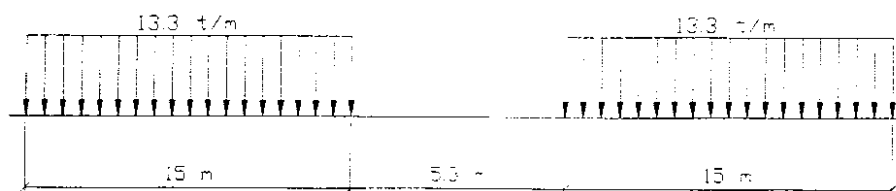
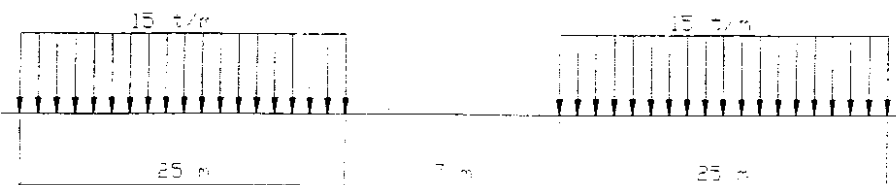
Su valor es igual a 0.50 t/m^2 , aunque al combinarse con la sobrecarga ferroviaria queda reducido a la mitad

SOBRECARGA FERROVIARIA. TRENES DE CARGA

Se han considerado los trenes fijados por la instrucción I.P.F.-75 y por el EC-3 (aunque en el caso de la I.P.F el tren tipo A no se tomado en cuenta dado que es claramente peor el tipo B). Son los que se indican en la página siguiente:

I.P.F.-75; Tren B

ai, bi: Según hipótesis pésimas

EC-3; Tren Load Model 71**EC-3; Load Model SW/0****EC-3; Load² Model SW/2**□ **I.P.F.-75;**

$$I = 65 \cdot \frac{\mu}{1 - \mu + \mu^2} \quad \text{con } \mu = v \cdot T / 2L, \text{ siendo } v \leq 200 \text{ km/h (55,55}$$

m/s),

$$T = 1/f_n; \text{ con } f_n = c \cdot \sqrt{\frac{E \cdot I}{m \cdot L^4}}$$

Sustituyendo los valores de $E = \sqrt[3]{f_{cm}} \cdot 10000 = 397900 \text{ kg/cm}^2$, $I = 2.92 \text{ cm}^2$, $m \approx 26 \text{ t/m}$ (peso propio (8.83 t/m) + carga muerta + sobrecarga), $L = 35 \text{ m}$ (peor de los casos) y $c \approx 1.57$ para las longitudes de vanos existentes (cuadros de FREBERG Y KLEMBER) tendremos que:

$$\mu = 0.30 \Rightarrow I = 1.247$$

□ **EC-3;**

a) Flexión. Mantenimiento riguroso:

$$\phi_2 = \frac{1.44}{\sqrt{L_\phi - 0.2}} + 0.82 = 1.056$$

b) Cortante:

$$\phi_3 = \frac{0.96}{\sqrt{L_\phi - 0.2}} + 0.88 = 1.084$$

en donde $L_\phi = 32 \text{ m}$ (tabla 6.2, caso 5)

Se considerarán además posibles *ripados de las vías de 30 cm* hacia cada lado del eje de las mismas

² Hay que precisar que este tren se ve afectado por un coeficiente de minoración = 0.8 en los E.L.U.

ESFUERZOS HORIZONTALES

Se consideran en este apartado los esfuerzos derivados de:

- **Frenado y arranque:** Según la IPF-75 se supone para el frenado una fuerza horizontal aplicada equivalente a 1/8 del peso del tren tipo aplicado ó 1/8 del peso de la máquina para el arranque.
En cuanto al EC-3 el frenado máximo es igual a un 25 % del peso del tren considerado
- **Viento transversal:** Se calculará según el modelo propuesto por la I.A.P. para puentes de carretera
- **Interacción carril-estructura:** Se calcula de acuerdo al borrador de la nueva instrucción de la IPF.

3-VALORES DE CÁLCULO DE ACCIONES. HIPÓTESIS EMPLEADAS

E.L.U

Las hipótesis empleadas son las prescritas por las normas EHE y EC-3. Los coeficientes de mayoración de cargas empleados para el cálculo del tablero son también los recomendados por dichas instrucciones.

Tipo de sollicitación	Coeficientes de mayoración	
Cargas permanentes	Acción favorable	$\gamma_{cp} = 1.00$
	Acción desfavorable	$\gamma_{cp} = 1.35$
Sobrecargas de uso	Acción favorable	$\gamma_s = 0.00$
	Acción desfavorable	$\gamma_s = 1.50$

Los valores de los coeficientes de minoración de las resistencias de los materiales son:

- **Hormigón:** $\gamma = 1.5$
- **Acero:** $\gamma = 1.15$

E.L.S

Las hipótesis consideradas son las que indican las instrucciones EHE y el EC-3. Los coeficientes que afectan a cada uno de los tipos indicados de cargas según el tipo de hipótesis considerada (característica, frecuente y cuasipermanente) son los que se reflejan en el borrador de la nueva instrucción IPF.

	ψ_0	ψ_1	ψ_2
Cargas del Tráfico	0.8	0.6	0.0
Viento	0.6	0.5	0.2
Temperatura	0.6	0.5	0.2

ARMADO SEGÚN LA EHE

DATOS GENERALES	
OBRA :	U.T.E. TORIJA
TIPO VIGA (N/H/F/C):	C
MODELO :	C-175AA-25
LUZ (M):	29
ANCHO (M) :	7
Nº SECCIONES :	5
INTEREJE (M):	7
ESPESOR LOSA (M):	0.29
ENTREGA (M) :	0.5
ACERA IZQ (M) :	0
ACERA DCH. (M) :	0
ESPESOR PAV (M) :	0
Nº APOYOS A DIMENSIONAR :	1
Nº CORTES FLEX. TRANSV:	1
SECCIONES DISTINTAS (S/N):	N
TIPO ESTRUCT. (P/N)	P
AMBIENTE (I o II o III):	II

GEOMETRÍA VIGA						
Modelo :	C-175AA-25					
CARACTERÍSTICAS BRUTAS						
Área (m²) :	1.702976					
Inercia (m ⁴) :	0.578716					
Via (m) :	1.123584					
Vib (m) :	0.626416					
Canto (m) :	1.750000					
Fondo (m) :	3.200					
Peso (t/m) :	4.25744					
Alma (m) :	0.500					
Perímetro (m) :	10.01					
Ancho sup. (m):	4.500					
Ancho inf. int.(m):	2.804					
Ancho sup.int.(m):	3.511					
Espesor fondo(m):	0.250					
Nº filas/cables						
1	8	0.6				

CARACTERÍSTICAS DE LOS MATERIALES Y COEFICIENTES DE MINORACIÓN			
HORMIGÓN VIGA			
Resistencia a los 28 días (t/m2) :	6000	Resistencia a tracción (t/m2):	321.85
Módulo elasticidad 28 días (t/m2) :	35000000	Tensión máx. admisible compresión (t/m2):	3750
Coefficiente de minoración en rotura γ _{ov} :	1.5	Resistencia hormigón al destesar (t/m2) :	3500
		Resistencia hormigón al postesar (t/m2) :	4000
HORMIGÓN LOSA			
Resistencia a los 28 días (t/m2) :	2500	Resistencia a tracción (t/m2):	179.55
Módulo elasticidad 28 días (t/m2) :	3207534	Tensión máx. admisible compresión (t/m2):	1562.5
Coefficiente de minoración en rotura γ _d :	1.5		
ACERO ACTIVO PRETESO VIGA			
Resistencia máxima (t/m2) :	190000		
Límite elástico (t/m2) :	171000		
Módulo de elasticidad (t/m2) :	20000000		
Coefficiente de minoración en rotura γ _p :	1.15		
Relajación clase acero 0.7f _{máx} :	2		
Tensión de tesado (t/m2) :	140000		
ACERO PASIVO VIGA			
Resistencia característica (t/m2) :	51000		
Módulo de elasticidad (t/m2) :	21000000		
Coefficiente de minoración en rotura γ _s :	1.15		
ACERO PASIVO LOSA			
Resistencia característica (t/m2) :	51000		
Módulo de elasticidad (t/m2) :	21000000		
Coefficiente de minoración en rotura γ _s :	1.15		
ACERO ACTIVO POSTESO VIGA			
Resistencia máxima (t/m2) :	190000		
Límite elástico (t/m2) :	171000		
Módulo de elasticidad (t/m2) :	20000000		
Coefficiente de minoración en rotura γ _p :	1.15		
Relajación clase acero 0.7f _{máx} :	2		
Tensión tras pérdidas instantáneas (t/m2)	130000		

ESFUERZOS CARACTERÍSTICOS				
SECCIÓN :	1	X(m) :	14.50	
ACCIÓN	FLECTOR	CORTANTE	TORSOR	AXIL
Peso Propio	452.00	0.00	0.00	0.00
P.P. Losa	599.00	0.00	0.00	0.00
Cargas muertas	593.00	0.00	0.00	0.00
Variable 1	1629.00	53.00	0.00	0.00
Variable 2	0.00	0.00	0.00	0.00
Variable 3				
Accidental				

SECCIÓN :	2	X(m) :	9.50	
ACCIÓN	FLECTOR	CORTANTE	TORSOR	AXIL
Peso Propio	390.00	26.00	0.00	0.00
P.P. Losa	515.00	39.00	0.00	0.00
Cargas muertas	502.00	38.00	4.00	0.00
Variable 1	1397.00	103.00	3.00	0.00
Variable 2	0.00	0.00	0.00	0.00
Variable 3				
Accidental				

SECCIÓN :	3	X(m) :	6.50	
ACCIÓN	FLECTOR	CORTANTE	TORSOR	AXIL
Peso Propio	299.00	32.00	0.00	0.00
P.P. Losa	394.00	50.00	0.00	0.00
Cargas muertas	391.00	46.00	6.00	0.00
Variable 1	1101.00	133.00	4.00	0.00
Variable 2	0.00	0.00	0.00	0.00
Variable 3				
Accidental				

SECCIÓN :	4	X(m) :	3.50	
ACCIÓN	FLECTOR	CORTANTE	TORSOR	AXIL
Peso Propio	176.00	46.00	0.00	0.00
P.P. Losa	231.00	71.00	0.00	0.00
Cargas muertas	230.00	65.00	7.00	0.00
Variable 1	640.00	172.00	5.00	0.00
Variable 2	0.00	0.00	0.00	0.00
Variable 3				
Accidental				

SECCIÓN :	5	X(m) :	0.00	
ACCIÓN	FLECTOR	CORTANTE	TORSOR	AXIL
Peso Propio	0.00	62.00	0.00	0.00
P.P. Losa	0.00	92.00	0.00	0.00
Cargas muertas	0.00	79.00	7.00	0.00
Variable 1	0.00	227.00	5.00	0.00
Variable 2	0.00	0.00	0.00	0.00
Variable 3				
Accidental				

ARMADURAS ACTIVA Y PASIVA						
SECCIÓN :	1	X :	14.50			
ARM. PRETESA VIGA						
Nº filas :	1					
Fila	Nº cables	Diámetro (")	Cota (m)	Tensión tesado(t/m2)	Sb (t/m2) :	-2417.358
1	8	0.60	1.71	140000	Vb(m):	1.152 Sección final
					l(m4):	1.871 Sección final
					N(t) :	2122.379
					Delta (m) :	0.201
					0.95 Pa (t/m2) :	-407.566
					0.8 Pb (t/m2) :	1639.917

ARMADURA POSTESA VIGA				
Nº fases:	1			
Fase	1	Nº filas :	1.00	
Fila	Área(m2)	Área vainas(m2)	Cota(m)	Tensión tesado(t/m2)
1	0.01680	0.05600	0.10	130000

ARMADURAS ACTIVA Y PASIVA						
SECCIÓN :	2	X :	9.50			
ARM. PRETESA VIGA						
Nº filas :	1					
Fila	Nº cables	Diámetro (")	Cota (m)	Tensión tesado(t/m2)	Sb (t/m2) :	-2072.725
1	8	0.60	1.71	140000	Vb(m):	1.152 Sección final
					l(m4):	1.871 Sección final
					N(t) :	2122.379
					Delta (m) :	0.201
					0.95 Pa (t/m2) :	-407.566
					0.8 Pb (t/m2) :	1639.917

ARMADURA POSTESA VIGA				
Nº fases:	1			
Fase	1	Nº filas :	1.00	
Fila	Área(m2)	Área vainas(m2)	Cota(m)	Tensión tesado(t/m2)
1	0.01680	0.05600	0.10	130000

ARMADURAS ACTIVA Y PASIVA						
SECCIÓN :	3	X :	6.50			
ARM. PRETESA VIGA						
Nº filas :	1					
Fila	Nº cables	Diámetro (")	Cota (m)	Tensión tesado(t/m2)	Sb (t/m2) :	-1610.490
1	8	0.60	1.71	140000	Vb(m):	1.152 Sección final
					l(m4):	1.871 Sección final
					N(t) :	1724.579
					Delta (m) :	0.224
					0.95 Pa (t/m2) :	-258.393
					0.8 Pb (t/m2) :	1300.107

[illegible]

ARMADURAS ACTIVA Y PASIVA								
SECCIÓN :	4	X :	3.50					
ARM. PRETESA VIGA								
Nº filas :	1							
Fila	Nº cables	Diámetro (")	Cota (m)	Tensión tesado(t/m2)		Sb (t/m2) :	-941.992	
1	8	0.60	1.71	140000		Vb(m):	1.152	Sección final
						l(m4):	1.871	Sección final
						N(t) :	940.679	
						Delta (m) :	0.331	
						0.95 Pa (t/m2) :	38.333	
						0.8 Pb (t/m2) :	629.247	

ARMADURA POSTESA VIGA				
Nº fases:	1			
Fase	1	Nº filas :	1.00	
Fila	Área(m2)	Área vainas(m2)	Cota(m)	Tensión tesado(t/m2)
1	0.00670	0.02300	0.10	130000

ARMADURAS ACTIVA Y PASIVA					
SECCIÓN :	5 X :	0.00			
ARM. PRETESA VIGA					
Nº filas :	1				
Fila	Nº cables	Diámetro (")	Cota (m)	Tensión tesado(t/m2)	
1	8	0.60	1.71	140000	
					Sb (t/m2) : 0.000
					Vb(m): 1.152 Sección final
					l(m4): 1.871 Sección final
					N(t) : 940.679
					Delta (m) : 0.502
					0.95 Pa (t/m2) : 327.085
					0.8 Pb (t/m2) : 500.551

ARMADURA POSTESA VIGA				
Nº fases:	1	Nº filas :	1.00	
Fase	1	Nº filas :	1.00	
Fila	Área(m2)	Área vainas(m2)	Cota(m)	Tensión tesado(t/m2)
1	0.00670	0.02300	0.30	130000

fck(t/m2) :	321.85																		
fctm(t/m2) :	459.79																		
Amin (cm2/m) :	10.00																		
ji:	1.34																		
SECCIÓN	X(m)	fn (m)	d(m)	axd(t/m2)	ctgEP93	ctgd	Vd(t)	Vv(t)	Back	Rhol	Vch(t)	Wch(t)	Apob-ax(cm2/m)	Adi-ax(cm2/m)	T(t)	Wch(N/mm2)			
1	14.50	1.24	1.94	1117.60	1.85	2.11	1.85	79.50	973.84	1.00	0.02	212.14	-132.84	10.00	19.03	289.76	5.92	-1508.50	
2	9.50	1.24	1.94	1035.93	1.80	2.05	1.80	293.55	986.30	1.00	0.02	211.89	81.66	10.11	19.03	454.90	2.71	-926.72	
3	6.50	1.24	1.94	851.55	1.69	1.91	1.69	372.30	1020.28	1.00	0.02	181.57	190.73	16.33	30.33	468.02	2.19	-293.04	VER PLANOS
4	3.50	1.24	1.94	552.57	1.48	1.65	1.48	503.70	1079.94	1.00	0.02	122.26	381.44	37.14	45.20	463.21	1.61	156.14	
5	0.00	1.24	1.74	283.47	1.27	1.37	1.27	655.05	1014.87	1.00	0.02	110.65	544.40	68.71	76.20	486.22	1.16	243.68	

[illegible]

CALCULO A ROTURA

Pasiva de Tracción [Tn] = 190
M [Tn] = 2801.632
ZONA [Tn] = 1
Armadura Compresión [Tn] = 0
Recub. armadura compresión.... [m] = .04
Ancho eficaz [cm] = 700
Capa de compresión [cm] = 29
Profundidad de compresiones [cm] = 28.25
Dis. CDG Compr. Fibra Superior [cm] = 14.13
Dis. CDG Tracc. Fibra Inferior [cm] = 9.59
Canto Resistente [cm] = 180.281
Momentos [MR+] [MTn] = 5050.81

[Coeficiente de seguridad a rotura 1.54 (admisible)]

M 1... [MTn] = 452.00
M 2... [MTn] = 599.00
M 3... [MTn] = 593.00
M 5... [MTn] = 58.00
M [MTn] = 1571.20
M al [MTn] = 3273.20

VOLUMEN DE TRACCIONES

SA [MTn] = 1876.49658
SB [MTn] = -522.03394
X ...[m] = 0.38088

ANCHO CABEZA INFERIOR [cm] 320.0000
VOLUMEN DE TRACCIONES [Tn] 318.1341

U.T.E. TORIJA

Tension de calculo acero (t/cm2)		2.50
ARMADURA DE ANCLAJE INFERIOR		
Total (t) :	448.76	
Armadura (cm2) :	7.18	
ARMADURA DE ANCLAJE SUPERIOR		
Total (t) :	77.87	
Armadura (cm2) :	1.25	
ARMADURA DE EXFOLIACIÓN		
Volúmenes de traccion		
a 1(t):	158.83	
a 2(t):	305.09	
a 3(t):	83.74	
uerza transversal de tracción (t) :	91.53	
rmadura (cm2) :	36.61	
OMPROBACIÓN EN UN CANTO		
stricta (cm2):		
nclaje:	36.61	
ortante:	85.89	
OTAL	122.50	
otal dispuesta (cm2):		
nclaje:	72.36	
ortante:	93.17	
OTAL	165.53	

ESTADO LÍMITE DE SERVICIO.
EVOLUCIÓN DE TENSIONES Y
CÁLCULO DE FLECHAS

Comprobació. de tensiones en servic 3 (um2)

Sección: 14.5

Tensiones parciales

	Fases de ejecución										
	P. Propio	Transferencia	Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga
Fibra inferior viga	-514.50	-93.51	2686.89	-79.90	-89.36	-629.57	112.93	-374.44	-221.72	-12.93	-1031.52
Fibra superior viga	874.60	411.96	-1007.96	32.14	30.94	1144.02	-486.78	155.45	-38.60	-0.87	414.74
Fibra inferior losa	0.00	0.00	0.00	0.00	0.00	0.00	62.39	117.99	57.63	-59.92	325.92
Fibra superior losa	0.00	0.00	0.00	0.00	0.00	0.00	82.94	184.64	-63.24	41.63	514.26

Pretensado y postesado sin minorar ni mayorar

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

Fases de ejecución									
	P. Propio + Transferencia + Postesado	Inyección	.....			1ª Fase			
			.....	.....	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga
Fibra inferior viga	2078.89	1998.98	1909.62	1280.05	1392.98	1018.54	796.82	783.89	164.98
Fibra superior viga	278.60	310.74	341.68	1485.70	998.93	1154.37	1115.77	1114.90	1363.75
Fibra inferior losa	0.00	0.00	0.00	0.00	62.39	180.37	238.01	178.08	373.63
Fibra superior losa	0.00	0.00	0.00	0.00	82.94	267.58	204.35	245.98	554.53

Tensiones acumuladas. Combinación cuasipermanente (0,0Scferroviaria)

Fases de ejecución										
	P. Propio + Transferencia + Postesado	Inyección	1ª Fase				C. Muertas	10000 días	T. Infinito	Sobrecarga
										
Fibra inferior viga	2078.89	1998.98	1909.62	1280.05	1392.98	1018.54	796.82	783.89	783.89	
Fibra superior viga	278.60	310.74	341.68	1485.70	998.93	1154.37	1115.77	1114.90	1114.90	
Fibra inferior losa	0.00	0.00	0.00	0.00	62.39	180.37	238.01	178.08	178.08	
Fibra superior losa	0.00	0.00	0.00	0.00	82.94	267.58	204.35	245.98	245.98	

Pretensado y postesado minorado (0,95 pret; 1,10post.)

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

	Fases de ejecución		1ª Fase		C. Muertas		10000 días		T. Infinito		Sobrecarga
	P. Propio + Transferencia + Postesado	Inyección	.....	.....	.....	.....	.....	.....	.....	.....	
Fibra inferior viga	1814.87	1734.97	1645.61	1016.04	1128.97	754.52	532.81	519.88	-99.03		
Fibra superior viga	358.80	390.94	421.88	1565.90	1079.12	1234.57	1195.97	1195.10	1443.95		
Fibra inferior losa	0.00	0.00	0.00	0.00	62.39	180.37	238.01	178.08	373.63		
Fibra superior losa	0.00	0.00	0.00	0.00	82.94	267.58	204.35	245.98	554.53		

Pretensado y postesado mayorado (1.05pret; 1.10post.)

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

	Fases de ejecución		1ª Fase		C. Muertas		10000 días		T. Infinito		Sobrecarga
	P. Propio + Transferencia + Postesado	Inyección	.....	.....	.....	.....	.....	.....	.....	.....	
Fibra inferior viga	2342.90	2263.00	2173.64	1544.07	1656.99	1282.55	1060.83	1047.90	428.99		
Fibra superior viga	198.40	230.54	261.49	1405.51	918.73	1074.17	1035.57	1034.70	1283.55		
Fibra inferior losa	0.00	0.00	0.00	0.00	62.39	180.37	238.01	178.08	373.63		
Fibra superior losa	0.00	0.00	0.00	0.00	82.94	267.58	204.35	245.98	554.53		

Comprobación de tensiones en servicio (mm²)

Sección: 9.5

Tensiones parciales

	Fases de ejecución		1ª Fase		C. Muertas		10000 días		T. Infinito		Sobrecarga
	P. Propio	Transferencia	Postesado	Inyección	.....	.....	.....	.....	.....	.....	
Fibra inferior viga	-443.92	-93.51	2686.70	-80.05	-90.96	-541.28	84.01	-316.98	-265.00	3.01	-884.61
Fibra superior viga	754.63	411.96	-1007.15	32.24	31.95	983.59	-389.96	131.59	76.83	-58.40	355.68
Fibra inferior losa	0.00	0.00	0.00	0.00	0.00	0.00	50.91	99.88	42.79	-51.54	279.50
Fibra superior losa	0.00	0.00	0.00	0.00	0.00	0.00	65.40	156.31	-80.04	51.53	441.02

Pretensado y postesado sin minorar ni mayorar

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

	Fases de ejecución		1ª Fase		C. Muertas		10000 días		T. Infinito		Sobrecarga
	P. Propio + Transferencia + Postesado	Inyección	.....	.....	.....	.....	.....	.....	.....	.....	
Fibra inferior viga	2149.27	2069.22	1978.26	1436.98	1520.99	1204.01	939.01	942.02	411.25		
Fibra superior viga	159.44	191.68	223.63	1207.22	817.26	948.85	1025.68	967.28	1180.69		
Fibra inferior losa	0.00	0.00	0.00	0.00	50.91	150.79	193.58	142.04	309.74		
Fibra superior losa	0.00	0.00	0.00	0.00	65.40	221.71	141.68	193.21	457.82		

Tensiones acumuladas. Combinación cuasipermanente (0,0Scferroviaria)

	Fases de ejecución		1ª Fase		C. Muertas		10000 días		T. Infinito		Sobrecarga
	P. Propio + Transferencia + Postesado	Inyección	.....	.....	.....	.....	.....	.....	.....	.....	
Fibra inferior viga	2149.27	2069.22	1978.26	1436.98	1520.99	1204.01	939.01	942.02	942.02		
Fibra superior viga	159.44	191.68	223.63	1207.22	817.26	948.85	1025.68	967.28	967.28		
Fibra inferior losa	0.00	0.00	0.00	0.00	50.91	150.79	193.58	142.04	142.04		
Fibra superior losa	0.00	0.00	0.00	0.00	65.40	221.71	141.68	193.21	193.21		

Pretensado y postesado minorado (0.9pret; 0.9post.)

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

	Fases de ejecución									
	P. Propio + Transferencia + Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga	
Fibra inferior viga	1885.28	1805.22	1714.26	1172.98	1256.99	940.01	675.01	678.02	147.26	
Fibra superior viga	239.56	271.79	303.74	1287.33	897.38	1028.97	1105.80	1047.40	1260.81	
Fibra inferior losa	0.00	0.00	0.00	0.00	50.91	150.79	193.58	142.04	309.74	
Fibra superior losa	0.00	0.00	0.00	0.00	65.40	221.71	141.68	193.21	457.82	

Pretensado y postesado mayorado (1.05pret; 1.10post.)

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

	Fases de ejecución									
	P. Propio + Transferencia + Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga	
Fibra inferior viga	2413.27	2333.22	2242.25	1700.97	1784.98	1468.00	1203.00	1206.01	675.25	
Fibra superior viga	79.32	111.56	143.51	1127.10	737.14	868.73	945.56	887.17	1100.57	
Fibra inferior losa	0.00	0.00	0.00	0.00	50.91	150.79	193.58	142.04	309.74	
Fibra superior losa	0.00	0.00	0.00	0.00	65.40	221.71	141.68	193.21	457.82	

Comprobación de tensiones en servicio (um2)

Sección: 6.5

Tensiones parciales

	Fases de ejecución										
	P. Propio	Transferencia	Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga
Fibra inferior viga	-336.50	-92.64	2116.76	-54.84	-61.44	-416.32	59.55	-248.05	-201.43	3.31	-699.64
Fibra superior viga	577.12	411.64	-794.23	22.27	20.72	753.32	-280.01	102.48	78.09	-57.78	280.27
Fibra inferior losa	0.00	0.00	0.00	0.00	0.00	0.00	33.59	77.78	20.42	-35.11	220.24
Fibra superior losa	0.00	0.00	0.00	0.00	0.00	0.00	47.53	121.87	-68.61	39.52	347.85

Pretensado y postesado sin minorar ni mayorar

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

	Fases de ejecución									
	P. Propio + Transferencia + Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga	
Fibra inferior viga	1687.61	1632.78	1571.33	1155.01	1214.56	966.51	765.08	768.38	348.60	
Fibra superior viga	194.53	216.81	237.52	990.84	710.83	813.31	891.40	833.62	1001.78	
Fibra inferior losa	0.00	0.00	0.00	0.00	33.59	111.37	131.79	96.68	228.83	
Fibra superior losa	0.00	0.00	0.00	0.00	47.53	169.40	100.79	140.31	349.02	

Tensiones acumuladas. Combinación cuasipermanente (0,0Scferroviaria)

	Fases de ejecución									
	P. Propio + Transferencia + Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga	
Fibra inferior viga	1687.61	1632.78	1571.33	1155.01	1214.56	966.51	765.08	768.38	768.38	
Fibra superior viga	194.53	216.81	237.52	990.84	710.83	813.31	891.40	833.62	833.62	
Fibra inferior losa	0.00	0.00	0.00	0.00	33.59	111.37	131.79	96.68	96.68	
Fibra superior losa	0.00	0.00	0.00	0.00	47.53	169.40	100.79	140.31	140.31	

Pretensado y postesado minorado (0.95pret; 1.90post.)

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

Fases de ejecución

	P. Propio + Transferencia + Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga
Fibra inferior viga	1480.57	1425.73	1364.29	947.97	1007.52	759.46	558.03	561.34	141.55
Fibra superior viga	253.37	275.65	296.36	1049.68	769.67	872.15	950.24	892.46	1060.62
Fibra inferior losa	0.00	0.00	0.00	0.00	33.59	111.37	131.79	96.68	228.83
Fibra superior losa	0.00	0.00	0.00	0.00	47.53	169.40	100.79	140.31	349.02

Pretensado y postesado mayorado (1.05pret; 1.10post.)

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

Fases de ejecución

	P. Propio + Transferencia + Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga
Fibra inferior viga	1894.66	1839.82	1778.38	1362.06	1421.60	1173.55	972.12	975.43	555.64
Fibra superior viga	135.69	157.96	178.68	932.00	651.99	754.46	832.56	774.78	942.94
Fibra inferior losa	0.00	0.00	0.00	0.00	33.59	111.37	131.79	96.68	228.83
Fibra superior losa	0.00	0.00	0.00	0.00	47.53	169.40	100.79	140.31	349.02

Comprobación de tensiones en servicio (UNE)

Sección: 3.5

Tensiones parciales

Fases de ejecución

	P. Propio	Transferencia	Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga
Fibra inferior viga	-193.71	-90.98	1033.51	-18.64	-18.97	-246.61	35.46	-147.23	-66.19	-6.75	-409.43
Fibra superior viga	338.09	411.02	-390.18	7.67	4.07	442.60	-152.86	60.26	-20.85	-5.69	162.86
Fibra inferior losa	0.00	0.00	0.00	0.00	0.00	0.00	9.88	45.74	-10.30	-9.97	127.98
Fibra superior losa	0.00	0.00	0.00	0.00	0.00	0.00	28.92	71.84	-28.11	6.60	202.51

Pretensado y postesado sin minorar ni mayorar

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

Fases de ejecución

	P. Propio + Transferencia + Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga
Fibra inferior viga	748.82	730.18	711.22	464.61	500.07	352.84	286.65	279.90	34.24
Fibra superior viga	358.94	366.61	370.69	813.29	660.43	720.68	699.84	694.15	791.87
Fibra inferior losa	0.00	0.00	0.00	0.00	9.88	55.62	45.32	35.35	112.14
Fibra superior losa	0.00	0.00	0.00	0.00	28.92	100.76	72.65	79.25	200.76

Tensiones acumuladas. Combinación cuasipermanente (0,0Scferroviaria)

Fases de ejecución

	P. Propio + Transferencia + Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga
Fibra inferior viga	748.82	730.18	711.22	464.61	500.07	352.84	286.65	279.90	279.90
Fibra superior viga	358.94	366.61	370.69	813.29	660.43	720.68	699.84	694.15	694.15
Fibra inferior losa	0.00	0.00	0.00	0.00	9.88	55.62	45.32	35.35	35.35
Fibra superior losa	0.00	0.00	0.00	0.00	28.92	100.76	72.65	79.25	79.25

Pretensado postesado minorado (0.95 pret; 1.10 post.)

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

	Fases de ejecución									
	P. Propio + Transferencia + Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga	
Fibra inferior viga	650.02	631.38	612.41	365.81	401.27	254.03	187.84	181.09	-64.57	
Fibra superior viga	377.41	385.08	389.15	831.76	678.89	739.15	718.30	712.61	810.33	
Fibra inferior losa	0.00	0.00	0.00	0.00	9.88	55.62	45.32	35.35	112.14	
Fibra superior losa	0.00	0.00	0.00	0.00	28.92	100.76	72.65	79.25	200.76	

Pretensado y postesado mayorado (1.05pret; 1.10post.)

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

	Fases de ejecución									
	P. Propio + Transferencia + Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga	
Fibra inferior viga	847.62	828.99	810.02	563.41	598.87	451.64	385.45	378.70	133.04	
Fibra superior viga	340.48	348.15	352.22	794.82	641.96	702.22	681.37	675.68	773.40	
Fibra inferior losa	0.00	0.00	0.00	0.00	9.88	55.62	45.32	35.35	112.14	
Fibra superior losa	0.00	0.00	0.00	0.00	28.92	100.76	72.65	79.25	200.76	

Comprobación de tensiones en servicio (una)

Sección: 0

Tensiones parciales

	Fases de ejecución										
	P. Propio	Transferencia	Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga
Fibra inferior viga	0.00	-89.41	834.89	-13.19	-14.25	0.00	-23.75	0.00	-88.35	4.50	0.00
Fibra superior viga	0.00	410.41	-45.36	0.40	-2.92	0.00	65.20	0.00	61.30	-46.34	0.00
Fibra inferior losa	0.00	0.00	0.00	0.00	0.00	0.00	-16.17	0.00	-27.09	-1.01	0.00
Fibra superior losa	0.00	0.00	0.00	0.00	0.00	0.00	-11.78	0.00	-39.53	10.72	0.00

Pretensado y postesado sin minorar ni mayorar

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

	Fases de ejecución									
	P. Propio + Transferencia + Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga	
Fibra inferior viga	745.48	732.30	718.04	718.04	694.29	694.29	605.94	610.44	610.44	
Fibra superior viga	365.05	365.45	362.53	362.53	427.73	427.73	489.03	442.70	442.70	
Fibra inferior losa	0.00	0.00	0.00	0.00	-16.17	-16.17	-43.26	-44.27	-44.27	
Fibra superior losa	0.00	0.00	0.00	0.00	-11.78	-11.78	-51.31	-40.59	-40.59	

Tensiones acumuladas. Combinación cuasipermanente (0,0Scferroviaria)

	Fases de ejecución									
	P. Propio + Transferencia + Postesado	Inyección	.....	1ª Fase	.....	C. Muertas	10000 días	T. Infinito	Sobrecarga	
Fibra inferior viga	745.48	732.30	718.04	718.04	694.29	694.29	605.94	610.44	610.44	
Fibra superior viga	365.05	365.45	362.53	362.53	427.73	427.73	489.03	442.70	442.70	
Fibra inferior losa	0.00	0.00	0.00	0.00	-16.17	-16.17	-43.26	-44.27	-44.27	
Fibra superior losa	0.00	0.00	0.00	0.00	-11.78	-11.78	-51.31	-40.59	-40.59	

Pretensado y postesado minorado (0.95 pret; 1.10 post.)

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

Fases de ejecución									
P. Propio + Transferencia + Postesado	1ª Fase				C. Muertas				Sobrecarga
	Inyección	.....	639.02	639.02	615.27	615.27	411.74	411.74	
Fibra inferior viga	666.46	653.28	349.07	346.55	0.00	0.00	0.00	0.00	531.42
Fibra superior viga									426.71
Fibra inferior losa	0.00	0.00	0.00	0.00	0.00	0.00	-16.17	-16.17	-44.27
Fibra superior losa	0.00	0.00	0.00	0.00	0.00	0.00	-11.78	-11.78	-40.59

Pretensado y postesado mayorado (1.05pret; 1.10post.)

Tensiones acumuladas. Combinación frecuente (0,6Scferroviaria)

Fases de ejecución									
P. Propio + Transferencia + Postesado	1ª Fase				C. Muertas				Sobrecarga
	Inyección	.....	797.06	797.06	773.31	773.31	443.71	443.71	
Fibra inferior viga	824.50	811.31	381.04	378.52	0.00	0.00	0.00	0.00	689.46
Fibra superior viga									458.68
Fibra inferior losa	0.00	0.00	0.00	0.00	0.00	0.00	-16.17	-16.17	-44.27
Fibra superior losa	0.00	0.00	0.00	0.00	0.00	0.00	-11.78	-11.78	-40.59

Flechas instantáneas en servicio (cm)

Flechas parciales instantáneas

Fases de ejecución		
P. Propio + Pretensado + Postesado (flecha inicial)	1ª Fase	Balasto
-2.3	2.2	0.6

a flecha diferida que se producirá hasta la colocación del balasto depende del tiempo que se tarde en cerrar la sección de la viga con el hormigonado de la losa; atendiendo a esta consideración los valores oscilarán proximadamente entre 1,2 veces la flecha inicial (caso a) hasta 2 veces la misma (caso b, en el que transcurre mucho tiempo entre el hormigonado de la viga y el de la losa). De esta forma los valores estimados de la contraflecha se encontrarán comprendidos entre -2.8 cm y -4.6 cm

Flechas acumuladas

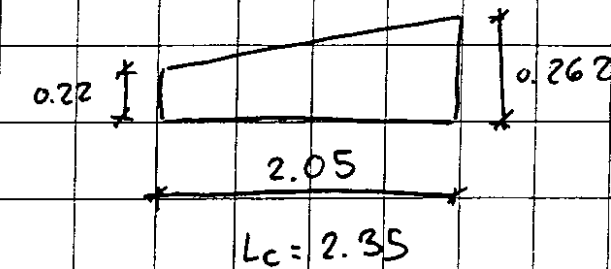
Fases de ejecución				
P. Propio + Pretensado + Postesado	Flecha diferida	1ª Fase	Fl. diferida	Balasto
-2.3	-	2.2	-	0
				-1.8
				caso a
				caso b

NOTA: Las contraflechas se indican con signo negativo

FLEXIÓN TRANSVERSAL

FLEXIÓN TRANSVERSAL

Flexión negativa



pp (peso propio):

$$M = (0.22 \cdot 2.35^2 / 2 + (0.262 - 0.22) \cdot 2.35^2 / 6) \cdot 2.5 = 1.6 \text{ m} \cdot \text{t/m}$$

Cargas muertas

Balasto, traviesas, carriles $\Rightarrow M \approx 0$

Paseos + Barandillas $\approx 1 \text{ t}$ en el extremo

$$M = 1 \cdot 2.35 = 2.35 \text{ m} \cdot \text{t/m}$$

Sobrecargas

$$S_{\text{paseos}} \approx 0.5 \text{ t/m}^2$$

$$M \approx 0.5 \cdot 2.35 \approx 1.18 \text{ m} \cdot \text{t/m}$$

$$M_d = 1.35 \cdot (1.6 + 2.35) + 1.5 \cdot 1.18 = 7.1 \text{ m} \cdot \text{t/m}$$

(Según tablas del emparrillado, que incluyen además el efecto de la flexión general $\Rightarrow M_d \approx 10 \text{ m} \cdot \text{t/m}$)

27 t

$$M_d = 10 \text{ m} \cdot \text{t}$$

$$A_{EH-500}$$

$$H-250$$

$$W_{est} \approx 15.3 \text{ cm}^2/\text{m}$$

Dispersas

$$W_i = 8.2 \text{ m} \cdot \text{t} = 25.12 \text{ cm}^2/\text{m}$$

5.2.- ALZADOS ESTRIBOS 2 Y 3

141	60	-31.09	-85.45	113.66
	61	-31.09	45.84	113.66
142	61	-4.97	12.59	-38.10
	62	-4.97	-31.41	-38.10
143	62	-25.23	-13.78	1.93
	63	-25.23	-11.55	1.93
144	63	-18.23	-11.16	10.40
	64	-18.23	0.85	10.40
145	65	-4.56	2.63	-16.32
	66	-4.56	-15.97	-16.32
146	66	-13.50	-15.83	-35.04
	67	-13.50	-55.77	-35.04
147	67	-43.11	-39.54	-17.80
	68	-43.11	-60.10	-17.80
148	68	-58.01	-39.99	0.24
	69	-58.01	-39.71	0.24
149	69	-22.76	-73.18	93.46
	70	-22.76	34.77	93.46
150	70	-4.24	13.97	-33.13
	71	-4.24	-24.30	-33.13
151	71	-19.07	-8.86	6.42
	72	-19.07	-1.45	6.42
152	73	-3.70	0.44	-9.51
	74	-3.70	-10.40	-9.51
153	74	-11.35	-11.80	-17.07
	75	-11.35	-31.26	-17.07
154	75	-26.96	-22.22	-19.07
	76	-26.96	-44.24	-19.07
155	76	-35.66	-24.18	-19.44
	77	-35.66	-46.64	-19.44
156	77	-41.28	-42.58	28.29
	78	-41.28	-9.90	28.29
157	78	-11.49	-32.92	40.89
	79	-11.49	14.31	40.89
158	79	-6.21	7.97	-16.98
	80	-6.21	-11.64	-16.98
159	81	-8.57	-0.55	-12.20
	82	-8.57	-14.46	-12.20
160	82	-22.16	-15.65	-26.02
	83	-22.16	-45.31	-26.02
161	83	-42.39	-34.18	-33.96
	84	-42.39	-73.40	-33.96
162	84	-57.02	-50.12	-28.81
	85	-57.02	-83.39	-28.81
163	85	-64.81	-60.02	0.21
	86	-64.81	-59.78	0.21
164	86	-56.90	-48.38	20.43
	87	-56.90	-24.78	20.43
165	87	-4.95	-34.70	38.16
	88	-4.95	9.38	38.16
166	89	-6.87	4.22	-7.13
	90	-6.87	-3.91	-7.13
167	90	-14.50	9.76	-29.72
	91	-14.50	-24.12	-29.72
168	91	-23.05	4.05	-48.20
	92	-23.05	-51.62	-48.20
169	92	-30.43	-8.08	-55.17
	93	-30.43	-71.79	-55.17
170	93	-32.14	-18.83	-50.68

	94	-32.14	-77.36	-50.68
171	94	-26.49	-27.26	-30.65
	95	-26.49	-62.66	-30.65
172	95	-21.47	-28.71	14.48
	96	-21.47	-11.98	14.48

82	40	16.98	17.92	-26.55
	48	16.98	-28.03	-39.10
83	48	15.04	-1.72	-35.97
	56	15.04	-29.69	-42.38
84	56	14.84	-11.83	-36.72
	64	14.84	-40.33	-43.12
85	64	15.69	-22.10	-32.72
	72	15.69	-47.75	-39.12
86	72	14.24	-28.68	-32.70
	80	14.24	-47.16	-37.43
87	80	2.60	-40.95	9.38
	88	2.60	-37.25	4.66
88	88	11.98	-32.29	28.06
	96	11.98	-21.47	-14.48
89	1	-9.67	-8.49	-6.23
	2	-9.67	-15.59	-6.23
90	2	-12.84	-36.84	1.01
	3	-12.84	-35.69	1.01
91	3	-8.60	-58.00	8.62
	4	-8.60	-48.04	8.62
92	4	-0.84	-54.87	11.73
	5	-0.84	-41.33	11.73
93	5	2.41	-36.34	16.95
	6	2.41	-16.76	16.95
94	6	0.43	-15.26	13.99
	7	0.43	0.90	13.99
95	7	-1.40	-2.61	4.50
	8	-1.40	2.59	4.50
96	9	-22.84	-1.04	-28.40
	10	-22.84	-33.41	-28.40
97	10	-34.61	-36.34	-61.26
	11	-34.61	-106.18	-61.26
98	11	-25.13	-112.43	-30.71
	12	-25.13	-147.90	-30.71
99	12	5.54	-149.95	61.17
	13	5.54	-79.29	61.17
100	13	4.45	-82.69	60.76
	14	4.45	-12.52	60.76
101	14	-4.69	-23.93	30.17
	15	-4.69	10.91	30.17
102	15	-8.02	0.42	3.75
	16	-8.02	4.75	3.75
103	17	-15.46	2.75	-20.89
	18	-15.46	-21.07	-20.89
104	18	-16.83	-3.13	-110.18
	19	-16.83	-128.73	-110.18
105	19	-15.80	-95.44	-118.14
	20	-15.80	-231.89	-118.14
106	20	-21.38	-241.29	187.12
	21	-21.38	-25.17	187.12
107	21	-24.79	-67.12	64.09
	22	-24.79	6.90	64.09
108	22	-24.98	-15.63	26.84
	23	-24.98	15.38	26.84
109	23	-20.75	1.84	3.25
	24	-20.75	5.59	3.25
110	25	-11.19	-4.02	-31.30
	26	-11.19	-39.71	-31.30
111	26	-0.64	-50.29	-62.09

	27	-0.64	-121.07	-62.09
112	27	-0.38	-126.42	-2.47
	28	-0.38	-129.27	-2.47
113	28	-39.75	-121.10	39.13
	29	-39.75	-75.90	39.13
114	29	-50.76	-73.13	50.78
	30	-50.76	-14.48	50.78
115	30	-44.17	-23.06	25.52
	31	-44.17	6.41	25.52
116	31	-32.46	-1.64	4.49
	32	-32.46	3.55	4.49
117	33	-28.04	-9.44	-36.21
	34	-28.04	-50.72	-36.21
118	34	-14.25	-71.74	-73.19
	35	-14.25	-155.18	-73.19
119	35	-8.04	-164.35	90.68
	36	-8.04	-59.61	90.68
120	36	-31.01	-61.39	15.15
	37	-31.01	-43.89	15.15
121	37	-46.66	-45.47	12.80
	38	-46.66	-30.68	12.80
122	38	-45.36	-26.56	15.88
	39	-45.36	-8.23	15.88
123	39	-35.64	-7.45	6.87
	40	-35.64	0.49	6.87
124	41	-39.86	2.82	-50.82
	42	-39.86	-55.11	-50.82
125	42	-57.16	-77.18	-78.89
	43	-57.16	-167.11	-78.89
126	43	10.31	-203.40	210.44
	44	10.31	39.66	210.44
127	44	-29.95	37.11	-73.58
	45	-29.95	-47.87	-73.58
128	45	-30.56	-37.95	11.01
	46	-30.56	-25.24	11.01
129	46	-30.42	-23.43	13.26
	47	-30.42	-8.12	13.26
130	47	-26.32	-5.55	3.13
	48	-26.32	-1.93	3.13
131	49	-22.74	4.39	-19.08
	50	-22.74	-17.37	-19.08
132	50	-40.14	16.86	-185.62
	51	-40.14	-194.75	-185.62
133	51	-37.80	-229.97	278.66
	52	-37.80	91.89	278.66
134	52	-1.43	40.61	-65.48
	53	-1.43	-35.02	-65.48
135	53	-23.51	-19.46	1.15
	54	-23.51	-18.13	1.15
136	54	-20.83	-18.34	11.16
	55	-20.83	-5.45	11.16
137	55	-17.86	-6.74	5.66
	56	-17.86	-0.20	5.66
138	57	-10.31	6.29	-22.73
	58	-10.31	-19.62	-22.73
139	58	-16.38	-5.14	-104.38
	59	-16.38	-124.13	-104.38
140	59	-78.16	-107.42	54.76
	60	-78.16	-44.17	54.76

23	3	22.31	4.24	-7.61
	11	22.31	-22.44	-31.76
24	11	28.56	-12.95	-62.32
	19	28.56	-113.75	-86.47
25	19	-4.73	-112.73	104.38
	27	-4.73	33.41	104.38
26	27	0.62	33.67	-39.35
	35	0.62	-21.43	-39.35
27	35	9.78	-15.21	39.16
	43	9.78	39.61	39.16
28	43	46.07	107.08	-616.24
	51	46.07	-346.43	-654.10
29	51	81.28	-344.08	364.13
	59	81.28	-97.61	326.26
30	59	64.57	-159.38	167.12
	67	64.57	-53.58	129.25
31	67	48.35	-83.19	112.01
	75	48.35	-31.53	84.06
32	75	39.30	-47.13	86.07
	83	39.30	-9.14	58.12
33	83	28.17	-29.37	66.06
	91	28.17	8.55	-18.48
34	4	6.83	7.77	-3.10
	12	6.83	-12.90	-27.41
35	12	8.88	17.76	-119.29
	20	8.88	-160.33	-143.59
36	20	18.29	-165.92	171.42
	28	18.29	56.49	146.31
37	28	10.12	17.13	1.10
	36	10.12	1.09	-24.01
38	36	11.90	-21.88	33.10
	44	11.90	6.87	7.99
39	44	14.44	-33.39	141.69
	52	14.44	63.21	128.88
40	52	65.72	99.57	-542.31
	60	65.72	-301.25	-580.43
41	60	107.00	-254.19	195.32
	68	107.00	-128.34	157.21
42	68	86.89	-143.23	139.17
	76	86.89	-77.30	111.03
43	76	66.82	-86.00	111.41
	84	66.82	-34.70	83.28
44	84	43.54	-49.33	78.12
	92	43.54	7.38	-6.97
45	5	-4.99	3.25	-5.22
	13	-4.99	-20.29	-29.53
46	13	-1.59	-21.39	-29.11
	21	-1.59	-77.31	-53.42
47	21	40.36	-80.71	69.61
	29	40.36	-0.83	44.50
48	29	37.59	-11.85	32.85
	37	37.59	16.56	7.74
49	37	39.16	0.92	10.09
	45	39.16	-2.53	-15.02
50	45	29.24	-3.14	-99.61
	53	29.24	-78.84	-112.42
51	53	13.69	-100.91	257.85
	61	13.69	78.62	245.05
52	61	46.93	104.74	-512.67

	69	46.93	-274.91	-550.79
53	69	80.40	-239.67	222.60
	77	80.40	-129.77	194.47
54	77	76.34	-135.39	146.73
	85	76.34	-65.47	118.60
55	85	52.97	-73.26	89.58
	93	52.97	1.71	4.49
56	6	-1.50	-1.98	2.95
	14	-1.50	-14.45	-21.35
57	14	9.91	-23.58	9.24
	22	9.91	-27.53	-15.07
58	22	32.45	-27.72	22.18
	30	32.45	-14.25	-2.93
59	30	41.02	-7.66	22.32
	38	41.02	6.02	-2.79
60	38	36.90	7.31	-5.87
	46	36.90	-18.48	-30.98
61	46	35.10	-18.34	-33.23
	54	35.10	-46.63	-46.04
62	54	35.31	-43.96	-56.04
	62	35.31	-88.55	-68.85
63	62	17.67	-108.80	253.99
	70	17.67	67.97	241.18
64	70	38.48	86.49	-560.95
	78	38.48	-216.54	-589.08
65	78	61.50	-186.76	153.47
	86	61.50	-113.29	125.34
66	86	50.10	-105.39	105.12
	94	50.10	-5.65	20.02
67	7	3.51	-1.83	9.49
	15	3.51	-5.44	-14.82
68	15	14.00	-8.78	11.61
	23	14.00	-9.52	-12.70
69	23	27.54	-5.29	10.90
	31	27.54	-7.60	-14.21
70	31	35.59	4.11	6.82
	39	35.59	-3.92	-18.30
71	39	34.81	5.80	-9.29
	47	34.81	-24.79	-34.41
72	47	32.24	-20.69	-24.28
	55	32.24	-42.59	-37.09
73	55	33.53	-39.62	-31.58
	63	33.53	-66.75	-44.39
74	63	33.14	-59.75	-52.86
	71	33.14	-102.06	-65.67
75	71	17.70	-116.89	367.95
	79	17.70	74.53	358.50
76	79	24.04	79.81	-510.70
	87	24.04	-196.74	-538.84
77	87	33.95	-144.79	130.23
	95	33.95	-5.02	45.14
78	8	2.59	1.40	4.51
	16	2.59	-0.73	-7.65
79	16	7.35	7.30	-3.89
	24	7.35	-6.22	-16.05
80	24	12.93	14.53	-12.80
	32	12.93	-12.18	-25.36
81	32	16.48	20.28	-20.87
	40	16.48	-17.72	-33.42

53	-0.000005	-0.000007	0.000000
54	-0.000023	-0.000033	0.000016
55	-0.000035	-0.000056	0.000051
56	-0.000038	-0.000076	0.000093
57	0.000162	0.000146	0.000397
58	0.000156	0.000135	0.000213
59	0.000094	0.000117	0.000060
60	0.000020	0.000031	0.000000
61	0.000001	-0.000004	-0.000000
62	-0.000008	-0.000009	0.000000
63	-0.000020	-0.000037	0.000017
64	-0.000025	-0.000057	0.000044
65	0.000168	0.000178	0.000513
66	0.000161	0.000172	0.000324
67	0.000121	0.000156	0.000160
68	0.000065	0.000101	0.000050
69	0.000021	0.000027	0.000000
70	-0.000001	-0.000002	-0.000000
71	-0.000006	-0.000007	0.000000
72	-0.000012	-0.000031	0.000012
73	0.000170	0.000193	0.000612
74	0.000164	0.000188	0.000420
75	0.000136	0.000171	0.000246
76	0.000092	0.000131	0.000111
77	0.000046	0.000077	0.000029
78	0.000011	0.000016	0.000000
79	-0.000001	-0.000002	-0.000000
80	-0.000003	-0.000011	0.000000
81	0.000173	0.000201	0.000716
82	0.000168	0.000194	0.000521
83	0.000148	0.000178	0.000339
84	0.000113	0.000147	0.000185
85	0.000070	0.000104	0.000078
86	0.000030	0.000056	0.000020
87	0.000007	0.000014	0.000000
88	-0.000002	0.000010	-0.000000
89	0.000181	0.000198	0.001039
90	0.000181	0.000192	0.000832
91	0.000175	0.000178	0.000626
92	0.000154	0.000155	0.000432
93	0.000119	0.000125	0.000269
94	0.000078	0.000093	0.000150
95	0.000038	0.000067	0.000080
96	0.000021	0.000046	0.000047

Reacciones en apoyos

Nudo	Mto. x	Mto. y	Fza. z
19	0.00	-0.00	182.88
20	-0.00	0.00	620.27
27	-0.00	-0.00	-84.11
28	-0.00	-0.00	-103.61
35	-0.00	0.00	242.39
36	-0.00	0.00	-18.43
43	0.00	-0.00	-366.06
44	0.00	0.00	-150.32
51	-0.00	0.00	1482.52
52	0.00	-0.00	-1015.33
53	0.00	0.00	436.90

50	0.00	-0.00	834.65
61	0.00	-0.00	-909.48
62	-0.00	-0.00	362.87
69	-0.00	-0.00	866.61
70	0.00	0.00	-928.72
71	0.00	-0.00	473.17
78	-0.00	-0.00	755.15
79	0.00	0.00	-927.07
80	-0.00	0.00	63.80
87	0.00	-0.00	686.80
88	0.00	-0.00	-14.75

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	8.49	-9.67	6.23
	9	8.49	-9.36	-5.77
2	9	9.53	-32.20	22.63
	17	9.53	-9.67	10.63
3	17	6.78	-25.13	31.52
	25	6.78	-6.82	-5.36
4	25	10.81	-18.01	25.94
	33	10.81	-7.51	-10.94
5	33	20.25	-35.54	25.26
	41	20.25	-25.99	-11.62
6	41	17.43	-65.85	39.20
	49	17.43	-44.58	20.39
7	49	13.04	-67.32	39.47
	57	13.04	-45.85	20.66
8	57	6.75	-56.16	43.39
	65	6.75	-31.89	24.58
9	65	4.12	-36.45	40.90
	73	4.12	-18.56	27.02
10	73	3.67	-22.25	36.54
	81	3.67	-6.66	22.65
11	81	4.22	-15.23	34.86
	89	4.22	6.87	-7.13
12	2	21.25	-3.17	-7.24
	10	21.25	-29.23	-31.23
13	10	24.18	-41.00	1.64
	18	24.18	-55.03	-22.35
14	18	6.24	-56.39	66.94
	26	6.24	-14.32	-6.83
15	26	16.82	-3.77	23.96
	34	16.82	-21.86	-49.81
16	34	37.85	-8.08	-12.82
	42	37.85	-77.67	-86.59
17	42	59.92	-94.97	-58.52
	50	59.92	-150.18	-96.14
18	50	25.69	-167.58	70.40
	58	25.69	-130.75	32.78
19	58	11.22	-136.83	114.43
	66	11.22	-68.56	76.81
20	66	11.07	-77.49	95.53
	74	11.07	-34.47	67.76
21	74	12.48	-42.12	75.35
	82	12.48	-9.73	47.58
22	82	13.66	-23.32	61.40
	90	13.66	7.62	-22.58

36	3	17.937	17.937
37	3	17.937	17.937
38	3	17.937	17.937
39	3	17.937	17.937
45	3	17.937	17.937
46	3	17.937	17.937
47	3	17.937	17.937
48	3	17.937	17.937
49	3	17.937	17.937
50	3	17.937	17.937
51	3	17.937	17.937
56	3	17.937	17.937
57	3	17.937	17.937
58	3	17.937	17.937
59	3	17.937	17.937
60	3	17.937	17.937
61	3	17.937	17.937
62	3	17.937	17.937
63	3	17.937	17.937
67	3	17.937	17.937
68	3	17.937	17.937
69	3	17.937	17.937
70	3	17.937	17.937
71	3	17.937	17.937
72	3	17.937	17.937
73	3	17.937	17.937
74	3	17.937	17.937
75	3	17.937	17.937
40	3	53.384	53.384
41	3	53.384	53.384
42	3	53.384	53.384
43	3	53.384	53.384
44	3	53.384	53.384
52	3	53.384	53.384
53	3	53.384	53.384
54	3	53.384	53.384
55	3	53.384	53.384
64	3	53.384	53.384
65	3	53.384	53.384
66	3	53.384	53.384
76	3	53.384	53.384
77	3	53.384	53.384
78	3	8.969	8.969
79	3	8.969	8.969
80	3	8.969	8.969
81	3	8.969	8.969
82	3	8.969	8.969
83	3	8.969	8.969
84	3	8.969	8.969
85	3	8.969	8.969
86	3	8.969	8.969
87	3	8.969	8.969
88	3	26.692	26.692

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Hip. n° 1 H-1 REACCION DEL TERRENO

Desplazamientos de nudos

Nudo	Giro x	Giro y	Dpl. z
1	0.000043	-0.000045	0.000221
2	0.000031	-0.000056	0.000178
3	-0.000005	-0.000070	0.000163
4	-0.000059	-0.000080	0.000201
5	-0.000109	-0.000081	0.000300
6	-0.000136	-0.000079	0.000443
7	-0.000143	-0.000078	0.000605
8	-0.000143	-0.000080	0.000771
9	0.000057	-0.000033	0.000169
10	0.000049	-0.000046	0.000107
11	0.000013	-0.000066	0.000068
12	-0.000054	-0.000081	0.000091
13	-0.000113	-0.000077	0.000190
14	-0.000137	-0.000075	0.000338
15	-0.000140	-0.000077	0.000500
16	-0.000139	-0.000082	0.000661
17	0.000073	-0.000005	0.000146
18	0.000068	-0.000014	0.000065
19	0.000035	-0.000023	0.000000
20	-0.000047	-0.000032	0.000000
21	-0.000114	-0.000045	0.000103
22	-0.000129	-0.000059	0.000247
23	-0.000129	-0.000073	0.000398
24	-0.000127	-0.000085	0.000546
25	0.000084	0.000012	0.000154
26	0.000073	0.000006	0.000063
27	0.000032	0.000006	-0.000000
28	-0.000032	0.000005	-0.000000
29	-0.000081	-0.000017	0.000067
30	-0.000102	-0.000046	0.000175
31	-0.000106	-0.000070	0.000297
32	-0.000106	-0.000089	0.000420
33	0.000102	0.000025	0.000182
34	0.000087	0.000009	0.000072
35	0.000032	0.000001	0.000000
36	-0.000023	-0.000003	-0.000000
37	-0.000049	-0.000021	0.000043
38	-0.000068	-0.000047	0.000112
39	-0.000077	-0.000073	0.000196
40	-0.000079	-0.000093	0.000287
41	0.000136	0.000064	0.000245
42	0.000119	0.000034	0.000096
43	0.000040	-0.000008	-0.000000
44	-0.000014	-0.000000	-0.000000
45	-0.000017	-0.000022	0.000012
46	-0.000038	-0.000045	0.000045
47	-0.000048	-0.000068	0.000095
48	-0.000051	-0.000087	0.000153
49	0.000151	0.000104	0.000306
50	0.000145	0.000079	0.000136
51	0.000060	0.000036	0.000000
52	-0.000007	-0.000006	-0.000000

117	33	34	8
118	34	35	8
119	35	36	8
120	36	37	8
121	37	38	8
122	38	39	8
123	39	40	8
124	41	42	9
125	42	43	9
126	43	44	9
127	44	45	9
128	45	46	9
129	46	47	9
130	47	48	9
131	49	50	10
132	50	51	10
133	51	52	10
134	52	53	10
135	53	54	10
136	54	55	10
137	55	56	10
138	57	58	10
139	58	59	10
140	59	60	10
141	60	61	10
142	61	62	10
143	62	63	10
144	63	64	10
145	65	66	11
146	66	67	11
147	67	68	11
148	68	69	11
149	69	70	11
150	70	71	11
151	71	72	11
152	73	74	12
153	74	75	12
154	75	76	12
155	76	77	12
156	77	78	12
157	78	79	12
158	79	80	12
159	81	82	13
160	82	83	13
161	83	84	13
162	84	85	13
163	85	86	13
164	86	87	13
165	87	88	13
166	89	90	14
167	90	91	14
168	91	92	14
169	92	93	14
170	93	94	14
171	94	95	14
172	95	96	14

APOYOS

19	0.000	0.000	1.000
20	0.000	0.000	1.000
27	0.000	0.000	1.000
28	0.000	0.000	1.000
35	0.000	0.000	1.000
36	0.000	0.000	1.000
43	0.000	0.000	1.000
44	0.000	0.000	1.000
51	0.000	0.000	1.000
52	0.000	0.000	1.000
53	0.000	0.000	1.000
60	0.000	0.000	1.000
61	0.000	0.000	1.000
62	0.000	0.000	1.000
69	0.000	0.000	1.000
70	0.000	0.000	1.000
71	0.000	0.000	1.000
78	0.000	0.000	1.000
79	0.000	0.000	1.000
80	0.000	0.000	1.000
87	0.000	0.000	1.000
88	0.000	0.000	1.000

CARGAS

H-1 REACCION DEL TERRENO

0			
85			
1	3	8.852	8.852
2	3	8.852	8.852
3	3	26.345	26.345
4	3	26.345	26.345
5	3	26.345	26.345
6	3	26.345	26.345
7	3	26.345	26.345
8	3	26.345	26.345
9	3	26.345	26.345
10	3	26.345	26.345
11	3	26.345	26.345
12	3	17.704	17.704
13	3	17.704	17.704
14	3	52.690	52.690
15	3	52.690	52.690
16	3	52.690	52.690
17	3	52.690	52.690
18	3	52.690	52.690
19	3	52.690	52.690
20	3	52.690	52.690
21	3	52.690	52.690
22	3	52.690	52.690
23	3	17.821	17.821
24	3	17.821	17.821
28	3	53.037	53.037
29	3	53.037	53.037
30	3	53.037	53.037
31	3	53.037	53.037
32	3	53.037	53.037
33	3	53.037	53.037
34	3	17.937	17.937
35	3	17.937	17.937

BARRAS

1	1	9	1
2	9	17	1
3	17	25	1
4	25	33	1
5	33	41	1
6	41	49	1
7	49	57	1
8	57	65	1
9	65	73	1
10	73	81	1
11	81	89	1
12	2	10	2
13	10	18	2
14	18	26	2
15	26	34	2
16	34	42	2
17	42	50	2
18	50	58	2
19	58	66	2
20	66	74	2
21	74	82	2
22	82	90	2
23	3	11	3
24	11	19	3
25	19	27	3
26	27	35	3
27	35	43	3
28	43	51	3
29	51	59	3
30	59	67	3
31	67	75	3
32	75	83	3
33	83	91	3
34	4	12	3
35	12	20	3
36	20	28	3
37	28	36	3
38	36	44	3
39	44	52	3
40	52	60	3
41	60	68	3
42	68	76	3
43	76	84	3
44	84	92	3
45	5	13	3
46	13	21	3
47	21	29	3
48	29	37	3
49	37	45	3
50	45	53	3
51	53	61	3
52	61	69	3
53	69	77	3
54	77	85	3
55	85	93	3
56	6	14	3
57	14	22	3

58	22	30	3
59	30	38	3
60	38	46	3
61	46	54	3
62	54	62	3
63	62	70	3
64	70	78	3
65	78	86	3
66	86	94	3
67	7	15	3
68	15	23	3
69	23	31	3
70	31	39	3
71	39	47	3
72	47	55	3
73	55	63	3
74	63	71	3
75	71	79	3
76	79	87	3
77	87	95	3
78	8	16	4
79	16	24	4
80	24	32	4
81	32	40	4
82	40	48	4
83	48	56	4
84	56	64	4
85	64	72	4
86	72	80	4
87	80	88	4
88	88	96	4
89	1	2	5
90	2	3	5
91	3	4	5
92	4	5	5
93	5	6	5
94	6	7	5
95	7	8	5
96	9	10	6
97	10	11	6
98	11	12	6
99	12	13	6
100	13	14	6
101	14	15	6
102	15	16	6
103	17	18	7
104	18	19	7
105	19	20	7
106	20	21	7
107	21	22	7
108	22	23	7
109	23	24	7
110	25	26	8
111	26	27	8
112	27	28	8
113	28	29	8
114	29	30	8
115	30	31	8
116	31	32	8

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CONTROL

96 172 8 1

NUDOS

1	0.000	0.000
2	0.000	1.140
3	0.000	2.280
4	0.000	3.435
5	0.000	4.590
6	0.000	5.745
7	0.000	6.900
8	0.000	8.055
9	1.355	0.000
10	1.355	1.140
11	1.355	2.280
12	1.355	3.435
13	1.355	4.590
14	1.355	5.745
15	1.355	6.900
16	1.355	8.055
17	2.710	0.000
18	2.710	1.140
19	2.710	2.280
20	2.710	3.435
21	2.710	4.590
22	2.710	5.745
23	2.710	6.900
24	2.710	8.055
25	4.110	0.000
26	4.110	1.140
27	4.110	2.280
28	4.110	3.435
29	4.110	4.590
30	4.110	5.745
31	4.110	6.900
32	4.110	8.055
33	5.510	0.000
34	5.510	1.140
35	5.510	2.280
36	5.510	3.435
37	5.510	4.590
38	5.510	5.745
39	5.510	6.900
40	5.510	8.055
41	6.910	0.000
42	6.910	1.140
43	6.910	2.280
44	6.910	3.435
45	6.910	4.590
46	6.910	5.745
47	6.910	6.900
48	6.910	8.055
49	7.624	0.000
50	7.624	1.140
51	7.624	2.280
52	7.624	3.435
53	7.624	4.590
54	7.624	5.745

55	7.624	6.900
56	7.624	8.055
57	8.338	0.000
58	8.338	1.140
59	8.338	2.280
60	8.338	3.435
61	8.338	4.590
62	8.338	5.745
63	8.338	6.900
64	8.338	8.055
65	9.052	0.000
66	9.052	1.140
67	9.052	2.280
68	9.052	3.435
69	9.052	4.590
70	9.052	5.745
71	9.052	6.900
72	9.052	8.055
73	9.579	0.000
74	9.579	1.140
75	9.579	2.280
76	9.579	3.435
77	9.579	4.590
78	9.579	5.745
79	9.579	6.900
80	9.579	8.055
81	10.106	0.000
82	10.106	1.140
83	10.106	2.280
84	10.106	3.435
85	10.106	4.590
86	10.106	5.745
87	10.106	6.900
88	10.106	8.055
89	11.700	0.000
90	11.700	1.140
91	11.700	2.280
92	11.700	3.435
93	11.700	4.590
94	11.700	5.745
95	11.700	6.900
96	11.700	8.055

SECCIONES
14

0.380000	0.760000	2500000	1100000
0.760000	1.520000	2500000	1100000
0.770000	1.540000	2500000	1100000
0.385333	0.770666	2500000	1100000
0.452000	0.904000	2500000	1100000
0.903333	1.806666	2500000	1100000
0.918667	1.837334	2500000	1100000
0.933333	1.866666	2500000	1100000
0.704667	1.409334	2500000	1100000
0.476000	0.952000	2500000	1100000
0.413333	0.826666	2500000	1100000
0.351333	0.702666	2500000	1100000
0.707333	1.414666	2500000	1100000
0.531333	1.062666	2500000	1100000

5.3.- ALZADOS ESTRIBOS 1 Y 4

145	71	-2.57	25.71	-10.07
	72	-2.57	4.57	-10.07
146	72	-0.64	6.87	-3.62
	73	-0.64	1.44	-3.62
147	73	-0.79	2.76	-2.47
	74	-0.79	-0.94	-2.47
148	74	18.30	19.08	-1.53
	75	18.30	16.77	-1.53
149	75	15.06	12.38	-4.05
	76	15.06	7.94	-4.05
150	76	12.73	5.63	-3.42
	77	12.73	1.86	-3.42
151	78	0.00	0.00	0.00
	79	0.00	0.00	0.00
152	79	0.16	6.49	-2.43
	80	0.16	2.85	-2.43
153	80	-0.04	3.09	-2.06
	81	-0.04	0.01	-2.06
154	81	-0.51	0.50	-1.19
	82	-0.51	-1.29	-1.19
155	82	9.94	15.57	-5.03
	83	9.94	10.05	-5.03
156	83	8.06	7.26	-4.74
	84	8.06	2.04	-4.74
157	85	0.00	0.00	0.00
	86	0.00	0.00	0.00
158	86	-0.06	2.40	-0.45
	87	-0.06	1.71	-0.45
159	87	0.01	1.56	-0.81
	88	0.01	0.36	-0.81
160	88	-0.15	0.54	-0.74
	89	-0.15	-0.57	-0.74
161	89	-0.23	-0.14	-0.45
	90	-0.23	-0.62	-0.45
162	90	2.65	3.21	-0.78
	91	2.65	2.37	-0.78

86	2	0.06	3.06	-1.25
	3	0.06	1.19	-1.25
87	3	0.18	1.46	-0.90
	4	0.18	0.09	-0.90
88	4	0.24	0.56	-0.54
	5	0.24	-0.25	-0.54
89	5	0.16	0.12	-0.24
	6	0.16	-0.15	-0.24
90	6	-1.33	1.26	-0.11
	7	-1.33	1.16	-0.11
91	8	-0.06	12.57	-3.35
	9	-0.06	5.53	-3.35
92	9	0.21	5.87	-2.54
	10	0.21	2.07	-2.54
93	10	0.45	2.41	-1.44
	11	0.45	0.27	-1.44
94	11	0.58	0.52	-0.24
	12	0.58	0.16	-0.24
95	12	0.00	0.00	0.00
	13	0.00	0.00	0.00
96	13	-3.54	2.12	-0.72
	14	-3.54	1.34	-0.72
97	15	1.19	41.13	-12.38
	16	1.19	15.15	-12.38
98	16	2.24	19.97	-10.77
	17	2.24	3.80	-10.77
99	17	2.28	9.59	-7.55
	18	2.28	-1.72	-7.55
100	18	1.41	2.91	-1.63
	19	1.41	0.47	-1.63
101	19	-0.11	1.53	-0.78
	20	-0.11	0.67	-0.78
102	20	-7.41	2.69	-0.92
	21	-7.41	1.70	-0.92
103	22	4.23	87.54	-25.38
	23	4.23	34.26	-25.38
104	23	8.17	40.32	-18.97
	24	8.17	11.86	-18.97
105	24	8.23	19.49	-12.27
	25	8.23	1.10	-12.27
106	25	5.65	8.04	-4.01
	26	5.65	2.03	-4.01
107	26	-13.11	10.34	-5.41
	27	-13.11	4.36	-5.41
108	27	-10.43	2.87	-1.77
	28	-10.43	0.91	-1.77
109	29	8.70	77.75	-24.74
	30	8.70	25.80	-24.74
110	30	17.57	37.32	-19.20
	31	17.57	8.52	-19.20
111	31	18.24	24.19	-15.91
	32	18.24	0.31	-15.91
112	32	12.39	16.26	-9.11
	33	12.39	2.60	-9.11
113	33	0.54	7.71	-6.89
	34	0.54	0.14	-6.89
114	34	-12.30	5.31	-5.14
	35	-12.30	-0.34	-5.14
115	36	18.70	53.56	-19.32

	37	18.70	13.01	-19.32
116	37	35.78	26.59	-15.39
	38	35.78	3.51	-15.39
117	38	42.06	23.74	-13.11
	39	42.06	4.08	-13.11
118	39	33.56	33.99	-24.41
	40	33.56	-2.63	-24.41
119	40	-16.09	36.21	-40.88
	41	-16.09	-8.74	-40.88
120	41	-7.74	3.10	-7.32
	42	-7.74	-4.95	-7.32
121	43	-24.01	9.39	-9.69
	44	-24.01	-24.84	-19.44
122	44	-47.81	48.82	-64.90
	45	-47.81	-48.54	-64.90
123	45	-58.08	54.87	-77.57
	46	-58.08	-61.49	-77.57
124	46	-53.25	52.47	-59.52
	47	-53.25	-36.82	-59.52
125	47	21.94	6.00	-10.02
	48	21.94	-5.03	-10.02
126	48	9.21	4.45	-8.49
	49	9.21	-4.88	-8.49
127	50	-4.14	11.88	-4.71
	51	-4.14	1.98	-4.71
128	51	20.21	8.18	-11.25
	52	20.21	-8.72	-11.25
129	52	20.23	11.06	-14.48
	53	20.23	-10.65	-14.48
130	53	17.43	5.09	-10.73
	54	17.43	-10.99	-10.73
131	54	0.00	0.00	0.00
	55	0.00	0.00	0.00
132	55	17.84	1.19	-0.97
	56	17.84	0.11	-0.97
133	57	-2.03	17.01	-5.51
	58	-2.03	5.45	-5.51
134	58	-4.08	7.85	-4.93
	59	-4.08	0.45	-4.93
135	59	-4.56	3.45	-4.24
	60	-4.56	-2.91	-4.24
136	60	24.28	7.45	-4.95
	61	24.28	0.05	-4.95
137	61	18.48	2.66	-3.54
	62	18.48	-1.25	-3.54
138	62	17.58	1.46	-1.00
	63	17.58	0.34	-1.00
139	64	-1.46	19.72	-5.85
	65	-1.46	7.44	-5.85
140	65	-2.25	8.43	-4.95
	66	-2.25	1.00	-4.95
141	66	-2.37	2.99	-3.29
	67	-2.37	-1.93	-3.29
142	67	24.14	13.95	-2.64
	68	24.14	9.99	-2.64
143	68	18.81	8.09	-3.78
	69	18.81	3.91	-3.78
144	69	16.29	3.80	-2.46
	70	16.29	1.10	-2.46

27	17	-6.40	-2.28	-4.68
	24	77.50	-18.15	-14.13
28	24	-14.03	-9.23	-11.39
	31	-14.03	-26.30	-11.39
29	31	-29.70	-25.62	-14.66
	38	-29.70	-47.61	-14.66
30	38	-49.94	-41.32	-16.92
	45	66.54	-69.30	-23.44
31	45	0.00	0.00	0.00
	52	0.00	0.00	0.00
32	52	0.00	0.00	0.00
	59	-34.69	-18.72	-0.70
33	59	0.00	0.00	0.00
	66	-39.57	-22.50	-8.70
34	66	0.00	0.00	0.00
	73	-32.11	-25.47	-4.20
35	73	0.00	0.00	0.00
	80	-15.24	-20.28	-0.23
36	80	-0.15	0.47	-0.36
	87	-0.15	-0.08	-0.36
37	4	-0.45	0.06	-0.38
	11	8.51	-1.44	-7.92
38	11	10.81	1.78	-4.78
	18	10.81	-14.19	-16.51
39	18	-5.36	-3.57	-7.45
	25	-5.36	-14.76	-7.45
40	25	-12.30	-17.34	-15.72
	32	94.63	-16.58	-25.49
41	32	98.11	-9.78	-24.14
	39	98.11	-54.77	-35.85
42	39	69.71	-51.49	-50.49
	46	69.71	-136.01	-62.21
43	46	0.00	0.00	0.00
	53	0.00	0.00	0.00
44	53	0.00	0.00	0.00
	60	0.00	0.00	0.00
45	60	0.00	0.00	0.00
	67	0.00	0.00	0.00
46	67	0.00	0.00	0.00
	74	0.00	0.00	0.00
47	74	0.00	0.00	0.00
	81	-16.44	-7.56	-2.03
48	81	0.00	0.00	0.00
	88	-8.63	-1.42	-3.07
49	5	-0.38	-0.08	-0.28
	12	4.62	-0.35	-4.96
50	12	6.16	2.93	-6.42
	19	6.16	-12.27	-13.85
51	19	-1.56	-3.15	-1.46
	26	23.88	-0.40	-7.07
52	26	36.27	58.19	-64.88
	33	36.27	-44.69	-72.30
53	33	38.70	29.49	-52.10
	40	38.70	-54.23	-59.52
54	40	22.89	19.56	-111.33
	47	22.89	-153.00	-118.75
55	47	0.00	0.00	0.00
	54	0.00	0.00	0.00
56	54	0.00	0.00	0.00

	61	0.00	0.00	0.00
57	61	0.00	0.00	0.00
	68	0.00	0.00	0.00
58	68	0.00	0.00	0.00
	75	0.00	0.00	0.00
59	75	0.00	0.00	0.00
	82	-12.75	0.96	-1.00
60	82	0.00	0.00	0.00
	89	-7.97	0.42	-3.33
61	6	-0.15	-0.09	-0.21
	13	2.61	0.44	-2.52
62	13	4.63	1.55	-0.09
	20	4.63	-1.78	-4.36
63	20	0.18	-0.86	-0.44
	27	0.18	-1.53	-0.44
64	27	9.87	7.41	-3.03
	34	9.87	-0.33	-7.31
65	34	11.04	4.20	-8.37
	41	11.04	-11.58	-12.65
66	41	-0.81	-3.22	-46.20
	48	-0.81	-75.74	-50.47
67	48	0.00	0.00	0.00
	55	0.00	0.00	0.00
68	55	0.00	0.00	0.00
	62	0.00	0.00	0.00
69	62	0.00	0.00	0.00
	69	0.00	0.00	0.00
70	69	0.00	0.00	0.00
	76	0.00	0.00	0.00
71	76	0.00	0.00	0.00
	83	0.00	0.00	0.00
72	83	0.00	0.00	0.00
	90	-5.82	1.19	-3.18
73	7	1.16	1.33	-0.11
	14	1.16	0.09	-1.56
74	14	2.46	3.64	-2.28
	21	2.46	-0.88	-3.75
75	21	4.15	6.53	-4.65
	28	4.15	-1.53	-6.11
76	28	5.07	8.90	-7.89
	35	5.07	-4.03	-9.36
77	35	4.72	8.25	-14.49
	42	4.72	-14.58	-15.94
78	42	-0.24	-6.83	-23.26
	49	-0.24	-42.84	-24.74
79	49	2.93	-9.84	-1.32
	56	2.93	-11.84	-1.32
80	56	2.31	-5.99	-1.13
	63	2.31	-7.68	-1.13
81	63	1.61	-3.42	-0.70
	70	1.61	-4.47	-0.70
82	70	0.99	-1.75	-0.41
	77	0.99	-2.36	-0.41
83	77	0.54	-0.79	-0.16
	84	0.54	-1.05	-0.16
84	84	0.00	0.00	0.00
	91	0.00	0.00	0.00
85	1	-0.04	6.05	-1.44
	2	-0.04	3.03	-1.44

145	71	57.98	-256.79	148.62
	72	57.98	27.54	129.12
146	72	28.78	-10.71	28.11
	73	28.78	31.45	28.11
147	73	23.01	14.58	9.05
	74	23.01	28.16	9.05
148	74	0.00	0.00	0.00
	75	0.00	0.00	0.00
149	75	0.00	0.00	0.00
	76	0.00	0.00	0.00
150	76	-1.56	-0.70	0.23
	77	-1.56	-0.45	0.23
151	78	11.96	-41.49	30.02
	79	11.96	-6.25	10.52
152	79	4.20	-18.67	27.33
	80	4.20	22.31	27.33
153	80	9.89	11.68	11.09
	81	9.89	28.31	11.09
154	81	11.84	20.51	0.42
	82	11.84	21.12	0.42
155	82	0.00	0.00	0.00
	83	0.00	0.00	0.00
156	83	-0.75	-0.56	0.23
	84	-0.75	-0.30	0.23
157	85	2.41	-9.12	10.14
	86	2.41	-1.71	0.39
158	86	1.14	-6.27	7.97
	87	1.14	5.67	7.97
159	87	3.05	1.05	8.88
	88	3.05	14.37	8.88
160	88	4.47	5.74	5.79
	89	4.47	14.44	5.79
161	89	4.05	6.48	2.47
	90	4.05	9.19	2.47
162	90	0.00	0.00	0.00
	91	0.00	0.00	0.00

LAV MADRID-BARCELONA.PI 562+7.ESTRIBOS 2 Y 3.

HC. n° 1 Esfuerzos Cortantes mínimos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	0.00
	8	0.00	0.00	0.00
2	8	0.00	0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	0.00
	22	0.00	0.00	0.00
4	22	0.00	0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	0.00
	50	0.00	0.00	0.00
8	50	0.00	0.00	0.00
	57	0.00	0.00	0.00
9	57	0.00	0.00	0.00
	64	0.00	0.00	0.00
10	64	0.00	0.00	0.00
	71	0.00	0.00	0.00
11	71	0.00	0.00	0.00
	78	0.00	0.00	0.00
12	78	0.00	0.00	0.00
	85	0.00	0.00	0.00
13	2	-0.03	0.11	-0.19
	9	11.81	-1.98	-9.65
14	9	-0.38	0.08	-1.00
	16	15.66	-4.02	-8.49
15	16	-5.18	-0.39	-2.61
	23	76.83	-10.73	-7.32
16	23	-11.23	-0.34	-9.00
	30	-11.23	-13.86	-9.00
17	30	-22.77	-4.99	-14.55
	37	-22.77	-26.82	-14.55
18	37	-36.36	-9.75	-18.48
	44	-36.36	-37.47	-18.48
19	44	0.00	0.00	0.00
	51	-18.84	-18.05	-4.24
20	51	0.00	0.00	0.00
	58	-31.40	-18.03	-16.92
21	58	-40.94	-2.19	-11.07
	65	-40.94	-32.65	-29.55
22	65	-45.94	-22.24	-19.49
	72	-45.94	-65.32	-37.95
23	72	-0.38	5.04	-4.61
	79	-0.38	-1.88	-4.61
24	79	0.34	0.42	-0.72
	86	0.34	-0.66	-0.72
25	3	-0.27	0.12	-0.34
	10	11.09	-1.65	-9.20
26	10	-0.62	-0.15	-1.44
	17	13.85	-12.60	-16.40

86	2	-6.42	-15.54	15.06
	3	-6.42	7.05	15.06
87	3	-5.72	-4.30	8.82
	4	-5.72	8.91	8.82
88	4	-4.13	-0.03	4.65
	5	-4.13	6.93	4.65
89	5	-2.52	1.93	1.89
	6	-2.52	4.02	1.89
90	6	0.00	0.00	0.00
	7	0.00	0.00	0.00
91	8	-10.29	-100.31	53.76
	9	-10.29	-15.21	34.26
92	9	-13.69	-19.40	13.83
	10	-13.69	1.34	13.83
93	10	-11.60	-1.77	4.83
	11	-11.60	5.48	4.83
94	11	-8.51	2.88	0.51
	12	-8.51	3.64	0.51
95	12	-4.66	2.25	1.73
	13	-4.66	4.14	1.73
96	13	0.00	0.00	0.00
	14	0.00	0.00	0.00
97	15	-29.90	-244.92	117.36
	16	-29.90	-26.25	97.86
98	16	-40.51	-92.22	76.62
	17	-40.51	22.71	76.62
99	17	-36.26	-46.72	56.01
	18	-36.26	37.29	56.01
100	18	-28.09	-21.83	24.21
	19	-28.09	14.49	24.21
101	19	-9.69	-4.30	9.14
	20	-9.69	5.74	9.14
102	20	0.00	0.00	0.00
	21	0.00	0.00	0.00
103	22	-64.44	-370.11	135.08
	23	-64.44	-114.24	115.58
104	23	-95.43	-127.08	65.15
	24	-95.43	-29.37	65.15
105	24	-94.40	-52.00	34.72
	25	-94.40	0.09	34.72
106	25	-77.37	-36.18	37.90
	26	-77.37	20.68	37.90
107	26	0.00	0.00	0.00
	27	0.00	0.00	0.00
108	27	0.00	0.00	0.00
	28	0.00	0.00	0.00
109	29	-59.58	-236.01	80.67
	30	-59.58	-94.38	61.17
110	30	-105.88	-96.71	42.38
	31	-105.88	-33.15	42.38
111	31	-116.04	-48.96	31.26
	32	-116.04	-2.07	31.26
112	32	-103.38	-21.49	23.10
	33	-103.38	13.16	23.10
113	33	-17.35	5.61	0.67
	34	-17.35	6.35	0.67
114	34	0.00	0.00	0.00
	35	0.00	0.00	0.00
115	36	-60.17	-116.22	41.70

	37	-60.17	-55.44	22.20
116	37	-114.83	-43.51	9.63
	38	-114.83	-29.07	9.63
117	38	-135.19	-23.17	2.94
	39	-135.19	-18.78	2.94
118	39	-123.43	-20.28	28.86
	40	-123.43	23.01	28.86
119	40	0.00	0.00	0.00
	41	0.00	0.00	0.00
120	41	0.00	0.00	0.00
	42	0.00	0.00	0.00
121	43	13.82	-5.41	11.46
	44	13.82	4.76	1.71
122	44	25.74	-12.75	16.80
	45	25.74	12.45	16.80
123	45	33.07	-15.90	23.70
	46	33.07	19.65	23.70
124	46	49.64	-16.62	17.63
	47	49.64	9.83	17.63
125	47	0.00	0.00	0.00
	48	0.00	0.00	0.00
126	48	0.00	0.00	0.00
	49	0.00	0.00	0.00
127	50	16.14	-25.59	19.88
	51	16.14	-11.64	0.38
128	51	0.00	0.00	0.00
	52	0.00	0.00	0.00
129	52	0.00	0.00	0.00
	53	0.00	0.00	0.00
130	53	0.00	0.00	0.00
	54	0.00	0.00	0.00
131	54	12.87	-5.64	4.56
	55	12.87	-0.64	4.56
132	55	-5.85	-0.83	0.19
	56	-5.85	-0.62	0.19
133	57	22.40	-65.53	33.65
	58	22.40	-22.66	14.15
134	58	38.24	-13.13	8.30
	59	38.24	-0.67	8.30
135	59	36.18	4.20	1.20
	60	36.18	6.00	1.20
136	60	0.00	0.00	0.00
	61	0.00	0.00	0.00
137	61	0.00	0.00	0.00
	62	0.00	0.00	0.00
138	62	-4.26	-1.17	0.42
	63	-4.26	-0.70	0.42
139	64	31.91	-123.52	57.24
	65	31.91	-31.13	37.74
140	65	42.31	-26.10	27.68
	66	42.31	15.42	27.68
141	66	34.32	7.97	8.07
	67	34.32	20.09	8.07
142	67	0.00	0.00	0.00
	68	0.00	0.00	0.00
143	68	0.00	0.00	0.00
	69	0.00	0.00	0.00
144	69	-2.71	-0.94	0.30
	70	-2.71	-0.62	0.30

27	17	83.91	-6.02	5.65
	24	0.00	0.00	0.00
28	24	106.54	-7.82	20.97
	31	106.54	12.30	5.87
29	31	122.35	2.14	16.97
	38	122.35	16.28	1.88
30	38	116.48	-4.11	8.57
	45	0.00	0.00	0.00
31	45	-8.50	-72.24	29.78
	52	-8.50	-38.90	14.69
32	52	-28.29	-38.85	17.90
	59	6.40	-4.61	3.51
33	59	-36.16	-25.86	9.24
	66	3.40	-0.84	2.84
34	66	-30.69	-31.47	12.07
	73	1.42	0.79	1.17
35	73	-15.15	-30.61	14.89
	80	0.09	0.67	0.03
36	80	-4.62	-14.59	16.02
	87	-4.62	-1.89	0.92
37	4	8.95	1.59	4.17
	11	0.00	0.00	0.00
38	11	0.00	0.00	0.00
	18	0.00	0.00	0.00
39	18	70.67	-3.33	16.86
	25	70.67	13.17	5.13
40	25	106.93	30.19	1.96
	32	0.00	0.00	0.00
41	32	0.00	0.00	0.00
	39	0.00	0.00	0.00
42	39	0.00	0.00	0.00
	46	0.00	0.00	0.00
43	46	-7.98	-114.63	43.83
	53	-7.98	-57.67	32.11
44	53	-23.73	-60.47	28.36
	60	-23.73	-26.73	16.64
45	60	-28.09	-34.06	18.54
	67	-28.09	-15.05	6.81
46	67	-23.91	-22.86	14.25
	74	-23.91	-10.29	2.52
47	74	-15.78	-14.20	10.63
	81	0.66	0.51	0.93
48	81	-8.44	-5.55	8.72
	88	0.18	0.16	0.08
49	5	4.99	1.61	2.75
	12	0.00	0.00	0.00
50	12	0.00	0.00	0.00
	19	0.00	0.00	0.00
51	19	25.44	7.78	1.82
	26	0.00	0.00	0.00
52	26	0.00	0.00	0.00
	33	0.00	0.00	0.00
53	33	0.00	0.00	0.00
	40	0.00	0.00	0.00
54	40	0.00	0.00	0.00
	47	0.00	0.00	0.00
55	47	-10.13	-127.44	50.31
	54	-10.13	-57.56	42.88
56	54	-15.45	-62.11	27.60

	61	-15.45	-26.28	20.17
57	61	-18.06	-32.08	18.78
	68	-18.06	-9.51	11.36
58	68	-16.18	-14.85	12.49
	75	-16.18	-1.68	5.07
59	75	-11.77	-4.90	7.58
	82	0.97	-0.08	1.15
60	82	-7.53	-0.50	4.38
	89	0.44	0.09	0.28
61	6	2.76	1.11	1.96
	13	0.00	0.00	0.00
62	13	0.00	0.00	0.00
	20	0.00	0.00	0.00
63	20	8.20	1.44	5.34
	27	8.20	6.26	1.06
64	27	0.00	0.00	0.00
	34	0.00	0.00	0.00
65	34	0.00	0.00	0.00
	41	0.00	0.00	0.00
66	41	0.00	0.00	0.00
	48	0.00	0.00	0.00
67	48	-10.27	-88.47	23.47
	55	-10.27	-56.47	19.20
68	55	-11.26	-57.36	24.53
	62	-11.26	-23.78	20.25
69	62	-12.78	-28.92	17.31
	69	-12.78	-6.18	13.03
70	69	-11.71	-11.40	11.40
	76	-11.71	2.49	7.13
71	76	-8.72	-1.39	6.27
	83	-8.72	4.78	2.00
72	83	-5.37	2.16	1.49
	90	0.45	-0.01	0.39
73	7	0.00	0.00	0.00
	14	0.00	0.00	0.00
74	14	0.00	0.00	0.00
	21	0.00	0.00	0.00
75	21	0.00	0.00	0.00
	28	0.00	0.00	0.00
76	28	0.00	0.00	0.00
	35	0.00	0.00	0.00
77	35	0.00	0.00	0.00
	42	0.00	0.00	0.00
78	42	0.00	0.00	0.00
	49	0.00	0.00	0.00
79	49	-8.02	-42.19	22.09
	56	-8.02	-10.14	20.64
80	56	-7.92	-27.97	19.66
	63	-7.92	0.42	18.19
81	63	-7.59	-17.16	17.19
	70	-7.59	7.53	15.72
82	70	-6.49	-8.76	13.26
	77	-6.49	10.03	11.79
83	77	-4.63	-2.70	8.39
	84	-4.63	8.76	6.91
84	84	-2.37	0.40	2.24
	91	-2.37	2.65	0.76
85	1	-4.93	-67.43	43.59
	2	-4.93	-3.69	24.09

145	71	57.98	-256.79	148.62
	72	0.00	0.00	0.00
146	72	28.78	-10.71	28.11
	73	0.00	0.00	0.00
147	73	0.00	0.00	0.00
	74	-0.79	-0.94	-2.47
148	74	0.00	0.00	0.00
	75	-1.29	-2.03	-1.46
149	75	-1.68	-1.05	-0.48
	76	-1.68	-1.57	-0.48
150	76	-1.56	-0.70	0.23
	77	-1.56	-0.45	0.23
151	78	14.09	-45.65	28.56
	79	14.09	-13.47	9.06
152	79	4.20	-18.67	27.33
	80	0.00	0.00	0.00
153	80	0.00	0.00	0.00
	81	0.00	0.00	0.00
154	81	0.00	0.00	0.00
	82	-0.51	-1.29	-1.19
155	82	-0.78	-0.75	-0.33
	83	-0.78	-1.11	-0.33
156	83	-0.75	-0.56	0.23
	84	-0.75	-0.30	0.23
157	85	3.12	-10.61	9.87
	86	3.12	-3.76	0.12
158	86	1.14	-6.27	7.97
	87	0.00	0.00	0.00
159	87	0.00	0.00	0.00
	88	0.00	0.00	0.00
160	88	0.00	0.00	0.00
	89	-0.15	-0.57	-0.74
161	89	-0.23	-0.14	-0.45
	90	-0.23	-0.62	-0.45
162	90	-0.21	-0.16	-0.06
	91	-0.21	-0.23	-0.06

LAV MADRID-BARCELONA.PI 562+7.ESTRIBOS 2 Y 3.

HC. n° 1 Esfuerzos Cortantes máximos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	0.00
	8	0.00	0.00	0.00
2	8	0.00	0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	0.00
	22	0.00	0.00	0.00
4	22	0.00	0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	0.00
	50	0.00	0.00	0.00
8	50	0.00	0.00	0.00
	57	0.00	0.00	0.00
9	57	0.00	0.00	0.00
	64	0.00	0.00	0.00
10	64	0.00	0.00	0.00
	71	0.00	0.00	0.00
11	71	-50.61	-89.79	40.16
	78	-50.61	-29.57	40.16
12	78	-9.12	-17.59	10.14
	85	-9.12	-2.41	10.14
13	2	11.84	-1.49	9.03
	9	0.00	0.00	0.00
14	9	16.03	-5.20	10.98
	16	0.00	0.00	0.00
15	16	82.00	-13.20	13.76
	23	0.00	0.00	0.00
16	23	94.85	-37.41	45.72
	30	94.85	17.31	27.24
17	30	97.15	-28.98	46.05
	37	97.15	26.24	27.57
18	37	84.23	-28.41	40.14
	44	84.23	17.95	21.67
19	44	-8.26	-31.37	16.44
	51	10.58	-2.54	2.20
20	51	-26.10	-12.38	4.88
	58	5.30	-0.88	3.32
21	58	2.91	-2.94	2.75
	65	2.91	1.17	2.75
22	65	1.92	0.38	1.83
	72	1.92	3.12	1.83
23	72	-7.71	-94.50	63.06
	79	-7.71	-13.77	44.58
24	79	-2.49	-23.66	26.31
	86	-2.49	1.96	7.85
25	3	11.36	0.70	6.24
	10	0.00	0.00	0.00
26	10	14.46	0.84	0.14
	17	0.00	0.00	0.00

86	2	-6.42	-15.54	15.06
	3	0.00	0.00	0.00
87	3	-5.72	-4.30	8.82
	4	0.00	0.00	0.00
88	4	-4.13	-0.03	4.65
	5	0.24	-0.25	-0.54
89	5	0.00	0.00	0.00
	6	0.16	-0.15	-0.24
90	6	0.00	0.00	0.00
	7	0.08	-0.03	-0.03
91	8	-10.29	-100.31	53.76
	9	-10.29	-15.21	34.26
92	9	-13.69	-19.40	13.83
	10	0.00	0.00	0.00
93	10	-11.60	-1.77	4.83
	11	0.00	0.00	0.00
94	11	0.00	0.00	0.00
	12	0.00	0.00	0.00
95	12	0.00	0.00	0.00
	13	0.00	0.00	0.00
96	13	0.00	0.00	0.00
	14	0.00	0.00	0.00
97	15	-29.90	-244.92	117.36
	16	-29.90	-26.25	97.86
98	16	-40.51	-92.22	76.62
	17	0.00	0.00	0.00
99	17	-36.26	-46.72	56.01
	18	2.28	-1.72	-7.55
100	18	-28.09	-21.83	24.21
	19	0.00	0.00	0.00
101	19	-9.69	-4.30	9.14
	20	0.00	0.00	0.00
102	20	0.00	0.00	0.00
	21	0.00	0.00	0.00
103	22	-64.44	-370.11	135.08
	23	-64.44	-114.24	115.58
104	23	-95.43	-127.08	65.15
	24	-95.43	-29.37	65.15
105	24	-94.40	-52.00	34.72
	25	0.00	0.00	0.00
106	25	-77.37	-36.18	37.90
	26	0.00	0.00	0.00
107	26	0.00	0.00	0.00
	27	0.00	0.00	0.00
108	27	0.00	0.00	0.00
	28	-0.23	-0.11	-0.96
109	29	-59.58	-236.01	80.67
	30	-59.58	-94.38	61.17
110	30	-105.88	-96.71	42.38
	31	-105.88	-33.15	42.38
111	31	-116.04	-48.96	31.26
	32	-116.04	-2.07	31.26
112	32	-103.38	-21.49	23.10
	33	0.00	0.00	0.00
113	33	0.00	0.00	0.00
	34	0.00	0.00	0.00
114	34	0.00	0.00	0.00
	35	0.33	-1.05	-2.41
115	36	-60.17	-116.22	41.70

	37	-60.17	-56.44	22.20
116	37	-114.83	-43.51	9.63
	38	-114.83	-29.07	9.63
117	38	-135.19	-23.17	2.94
	39	-135.19	-18.78	2.94
118	39	-123.43	-20.28	28.86
	40	33.56	-2.63	-24.41
119	40	0.00	0.00	0.00
	41	-16.09	-8.74	-40.88
120	41	0.00	0.00	0.00
	42	-7.74	-4.95	-7.32
121	43	13.82	-5.41	11.46
	44	-24.01	-24.84	-19.44
122	44	25.74	-12.75	16.80
	45	-47.81	-48.54	-64.90
123	45	33.07	-15.90	23.70
	46	-58.08	-61.49	-77.57
124	46	49.64	-16.62	17.63
	47	-53.25	-36.82	-59.52
125	47	0.00	0.00	0.00
	48	21.94	-5.03	-10.02
126	48	0.00	0.00	0.00
	49	9.21	-4.88	-8.49
127	50	16.14	-25.59	19.88
	51	16.14	-11.64	0.38
128	51	0.00	0.00	0.00
	52	20.21	-8.72	-11.25
129	52	0.00	0.00	0.00
	53	20.23	-10.65	-14.48
130	53	0.00	0.00	0.00
	54	17.43	-10.99	-10.73
131	54	12.87	-5.64	4.56
	55	-7.89	-2.10	0.08
132	55	-5.85	-0.83	0.19
	56	-5.85	-0.62	0.19
133	57	22.40	-65.53	33.65
	58	22.40	-22.66	14.15
134	58	38.24	-13.13	8.30
	59	38.24	-0.67	8.30
135	59	0.00	0.00	0.00
	60	-4.56	-2.91	-4.24
136	60	0.00	0.00	0.00
	61	-4.83	-3.88	-2.65
137	61	-5.02	-1.71	-0.96
	62	-5.02	-2.76	-0.96
138	62	-4.26	-1.17	0.42
	63	-4.26	-0.70	0.42
139	64	31.91	-123.52	57.24
	65	31.91	-31.13	37.74
140	65	42.31	-26.10	27.68
	66	0.00	0.00	0.00
141	66	0.00	0.00	0.00
	67	-2.37	-1.93	-3.29
142	67	-2.73	-0.08	-1.90
	68	-2.73	-2.93	-1.90
143	68	-3.06	-1.44	-0.66
	69	-3.06	-2.18	-0.66
144	69	-2.71	-0.94	0.30
	70	-2.71	-0.62	0.30

27	17	77.50	-8.30	0.97
	24	77.50	-18.15	-14.13
28	24	92.52	-17.04	9.58
	31	-14.03	-25.30	-11.39
29	31	-29.70	-25.62	-14.66
	38	-29.70	-47.61	-14.66
30	38	66.54	-45.43	-8.35
	45	66.54	-69.30	-23.44
31	45	-8.50	-72.24	29.78
	52	-8.50	-38.90	14.69
32	52	-28.29	-38.85	17.90
	59	-28.29	-23.32	2.80
33	59	-36.16	-25.86	9.24
	66	-36.16	-23.34	-5.87
34	66	-30.69	-31.47	12.07
	73	-32.11	-25.47	-4.20
35	73	-15.24	-31.26	14.86
	80	-15.24	-20.28	-0.23
36	80	-4.62	-14.59	16.02
	87	-4.77	-1.97	0.56
37	4	0.00	0.00	0.00
	11	8.51	-1.44	-7.92
38	11	-0.72	-0.36	-1.56
	18	10.81	-14.19	-16.51
39	18	65.31	-6.90	9.41
	25	-5.36	-14.76	-7.45
40	25	-12.30	-17.34	-15.72
	32	-12.30	-40.92	-15.72
41	32	-28.24	-46.77	-22.55
	39	-28.24	-80.58	-22.55
42	39	-58.15	-89.08	-11.25
	46	69.71	-136.01	-62.21
43	46	-7.98	-114.63	43.83
	53	-7.98	-57.67	32.11
44	53	-23.73	-60.47	28.36
	60	-23.73	-26.73	16.64
45	60	-28.09	-34.06	18.54
	67	-28.09	-15.05	6.81
46	67	-23.91	-22.86	14.25
	74	-23.91	-10.29	2.52
47	74	-15.78	-14.20	10.63
	81	-16.44	-7.56	-2.03
48	81	-8.63	-5.60	8.64
	88	-8.63	-1.42	-3.07
49	5	-0.38	-0.08	-0.28
	12	-0.38	-0.51	-0.28
50	12	-0.48	-0.74	-0.60
	19	6.16	-12.27	-13.85
51	19	-1.56	-3.15	-1.46
	26	-1.56	-5.34	-1.46
52	26	-3.00	-10.80	-3.11
	33	36.27	-44.69	-72.30
53	33	-8.11	-27.30	-5.32
	40	38.70	-54.23	-59.52
54	40	-28.26	-64.68	-7.18
	47	22.89	-153.00	-118.75
55	47	-10.13	-127.44	50.31
	54	-10.13	-57.56	42.88
56	54	-15.45	-62.11	27.60

	61	-15.45	-26.28	20.17
57	61	-18.06	-32.08	18.78
	68	-18.06	-9.51	11.36
58	68	-16.18	-14.85	12.49
	75	-16.18	-1.68	5.07
59	75	-11.77	-4.90	7.58
	82	0.97	-0.08	1.15
60	82	-7.53	-0.50	4.38
	89	0.00	0.00	0.00
61	6	-0.15	-0.09	-0.21
	13	-0.15	-0.42	-0.21
62	13	0.01	-0.69	-0.06
	20	4.63	-1.78	-4.36
63	20	0.18	-0.86	-0.44
	27	0.18	-1.53	-0.44
64	27	0.11	-1.96	-1.85
	34	0.11	-4.73	-1.85
65	34	-1.37	-4.93	-6.32
	41	-1.37	-14.41	-6.32
66	41	-9.61	-13.82	-24.85
	48	-0.81	-75.74	-50.47
67	48	-10.27	-88.47	23.47
	55	-10.27	-56.47	19.20
68	55	-11.26	-57.36	24.53
	62	-11.26	-23.78	20.25
69	62	-12.78	-28.92	17.31
	69	-12.78	-6.18	13.03
70	69	-11.71	-11.40	11.40
	76	1.89	-2.16	1.65
71	76	1.00	-2.04	0.94
	83	1.00	-0.63	0.94
72	83	0.45	-0.60	0.39
	90	0.45	-0.01	0.39
73	7	-0.03	-0.08	-0.03
	14	-0.03	-0.12	-0.03
74	14	0.04	-0.19	-0.12
	21	2.46	-0.88	-3.75
75	21	0.12	-0.19	-0.51
	28	4.15	-1.53	-6.11
76	28	0.01	-0.74	-1.49
	35	5.07	-4.03	-9.36
77	35	-1.03	-3.29	-3.88
	42	4.72	-14.58	-15.94
78	42	-4.47	-13.88	-7.89
	49	-0.24	-42.84	-24.74
79	49	-5.10	-52.03	20.77
	56	-5.10	-21.98	19.32
80	56	-5.61	-33.96	18.54
	63	2.31	-7.68	-1.13
81	63	-5.98	-20.58	16.49
	70	1.61	-4.47	-0.70
82	70	-5.51	-10.52	12.86
	77	0.99	-2.36	-0.41
83	77	-4.09	-3.49	8.22
	84	0.54	-1.05	-0.16
84	84	0.23	-0.30	0.06
	91	0.23	-0.21	0.06
85	1	-4.93	-67.43	43.59
	2	-4.93	-3.69	24.09

145	71	-2.57	25.71	-10.07
	72	55.41	32.12	119.06
146	72	-0.64	6.87	-3.62
	73	28.14	32.90	24.49
147	73	22.22	17.34	6.57
	74	23.01	28.16	9.05
148	74	18.30	19.08	-1.53
	75	19.59	18.80	-0.08
149	75	16.74	13.42	-3.57
	76	16.74	9.51	-3.57
150	76	12.73	5.63	-3.42
	77	12.73	1.86	-3.42
151	78	-2.13	4.15	1.46
	79	-2.13	7.22	1.46
152	79	0.16	6.49	-2.43
	80	4.36	25.15	24.90
153	80	9.84	14.77	9.03
	81	9.84	28.32	9.03
154	81	11.32	21.00	-0.77
	82	11.84	21.12	0.42
155	82	10.73	16.32	-4.70
	83	10.73	11.16	-4.70
156	83	8.06	7.26	-4.74
	84	8.06	2.04	-4.74
157	85	-0.70	1.49	0.27
	86	-0.70	2.06	0.27
158	86	-0.06	2.40	-0.45
	87	1.08	7.38	7.51
159	87	3.06	2.61	8.07
	88	3.06	14.73	8.07
160	88	4.32	6.28	5.05
	89	4.47	14.44	5.79
161	89	4.05	6.48	2.47
	90	4.05	9.19	2.47
162	90	2.87	3.38	-0.72
	91	2.87	2.60	-0.72

LAV MADRID-BARCELONA.PI 562+7.ESTRIBOS 2 Y 3.

HC. n° 1 Momentos Flectores mínimos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	0.00
	8	0.00	0.00	0.00
2	8	0.00	0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	0.00
	22	0.00	0.00	0.00
4	22	0.00	0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	0.00
	50	0.00	0.00	0.00
8	50	0.00	0.00	0.00
	57	0.00	0.00	0.00
9	57	0.00	0.00	0.00
	64	0.00	0.00	0.00
10	64	0.00	0.00	0.00
	71	0.00	0.00	0.00
11	71	-50.61	-89.79	40.16
	78	-56.25	-31.99	38.43
12	78	-10.61	-17.91	9.87
	85	-10.61	-3.12	9.87
13	2	11.84	-1.49	9.03
	9	11.81	-1.98	-9.65
14	9	16.03	-5.20	10.98
	16	15.66	-4.02	-8.49
15	16	76.83	-13.59	11.15
	23	76.83	-10.73	-7.32
16	23	83.61	-37.76	36.72
	30	-11.23	-13.86	-9.00
17	30	74.38	-33.97	31.50
	37	-22.77	-26.82	-14.55
18	37	47.87	-38.16	21.66
	44	-36.36	-37.47	-18.48
19	44	-8.26	-31.37	16.44
	51	-8.26	-20.58	-2.04
20	51	-26.10	-12.38	4.88
	58	-26.10	-18.92	-13.60
21	58	-38.03	-5.13	-8.32
	65	-40.94	-32.65	-29.55
22	65	-45.94	-22.24	-19.49
	72	-45.94	-65.32	-37.95
23	72	-7.71	-94.50	63.06
	79	-8.09	-15.65	39.97
24	79	-2.49	-23.66	26.31
	86	0.34	-0.66	-0.72
25	3	0.00	0.00	0.00
	10	11.09	-1.65	-9.20
26	10	-0.62	-0.15	-1.44
	17	13.85	-12.60	-16.40

86	2	0.06	3.06	-1.25
	3	-6.36	8.23	13.81
87	3	0.18	1.46	-0.90
	4	-5.54	9.00	7.92
88	4	0.24	0.56	-0.54
	5	-4.13	6.93	4.65
89	5	-2.36	2.05	1.65
	6	-2.52	4.02	1.89
90	6	-1.41	1.26	-0.08
	7	-1.41	1.19	-0.08
91	8	-0.06	12.57	-3.35
	9	-0.06	5.53	-3.35
92	9	0.21	5.87	-2.54
	10	-13.48	3.40	11.30
93	10	0.45	2.41	-1.44
	11	-11.15	5.75	3.39
94	11	-7.92	3.40	0.27
	12	-7.92	3.81	0.27
95	12	-4.66	2.25	1.73
	13	-4.66	4.14	1.73
96	13	-3.54	2.12	-0.72
	14	-3.54	1.34	-0.72
97	15	1.19	41.13	-12.38
	16	1.19	15.15	-12.38
98	16	2.24	19.97	-10.77
	17	-38.28	26.51	65.85
99	17	2.28	9.59	-7.55
	18	-36.26	37.29	56.01
100	18	1.41	2.91	-1.63
	19	-26.68	14.95	22.57
101	19	-0.11	1.53	-0.78
	20	-9.80	6.42	8.36
102	20	-7.41	2.69	-0.92
	21	-7.41	1.70	-0.92
103	22	4.23	87.54	-25.38
	23	4.23	34.26	-25.38
104	23	8.17	40.32	-18.97
	24	8.17	11.86	-18.97
105	24	8.23	19.49	-12.27
	25	-86.16	1.19	22.45
106	25	5.65	8.04	-4.01
	26	-71.72	22.71	33.90
107	26	-13.11	10.34	-5.41
	27	-13.11	4.36	-5.41
108	27	-10.43	2.87	-1.77
	28	-10.20	1.02	-0.81
109	29	8.70	77.75	-24.74
	30	8.70	25.80	-24.74
110	30	17.57	37.32	-19.20
	31	17.57	8.52	-19.20
111	31	18.24	24.19	-15.91
	32	18.24	0.31	-15.91
112	32	12.39	16.26	-9.11
	33	-90.99	15.75	13.99
113	33	-16.81	13.32	-6.21
	34	-16.81	6.48	-6.21
114	34	-12.30	5.31	-5.14
	35	-12.63	0.70	-2.73
115	36	18.70	53.56	-19.32

	37	18.70	13.01	-19.32
116	37	35.78	26.59	-15.39
	38	35.78	3.51	-15.39
117	38	42.06	23.74	-13.11
	39	42.06	4.08	-13.11
118	39	33.56	33.99	-24.41
	40	-123.43	23.01	28.86
119	40	-16.09	36.21	-40.88
	41	0.00	0.00	0.00
120	41	-7.74	3.10	-7.32
	42	0.00	0.00	0.00
121	43	-24.01	9.39	-9.69
	44	13.82	4.76	1.71
122	44	-47.81	48.82	-64.90
	45	25.74	12.45	16.80
123	45	-58.08	54.87	-77.57
	46	33.07	19.65	23.70
124	46	-53.25	52.47	-59.52
	47	49.64	9.83	17.63
125	47	21.94	6.00	-10.02
	48	0.00	0.00	0.00
126	48	9.21	4.45	-8.49
	49	0.00	0.00	0.00
127	50	-4.14	11.88	-4.71
	51	-4.14	1.98	-4.71
128	51	20.21	8.18	-11.25
	52	0.00	0.00	0.00
129	52	20.23	11.06	-14.48
	53	0.00	0.00	0.00
130	53	17.43	5.09	-10.73
	54	0.00	0.00	0.00
131	54	0.00	0.00	0.00
	55	20.76	1.46	4.49
132	55	17.84	1.19	-0.97
	56	17.84	0.11	-0.97
133	57	-2.03	17.01	-5.51
	58	-2.03	5.45	-5.51
134	58	-4.08	7.85	-4.93
	59	-4.08	0.45	-4.93
135	59	31.62	7.65	-3.04
	60	36.18	6.00	1.20
136	60	24.28	7.45	-4.95
	61	29.11	3.93	-2.30
137	61	23.51	4.37	-2.58
	62	23.51	1.51	-2.58
138	62	17.58	1.46	-1.00
	63	17.58	0.34	-1.00
139	64	-1.46	19.72	-5.85
	65	-1.46	7.44	-5.85
140	65	-2.25	8.43	-4.95
	66	40.06	16.42	22.73
141	66	31.95	10.95	4.78
	67	34.32	20.09	8.07
142	67	26.86	14.03	-0.74
	68	26.86	12.91	-0.74
143	68	21.87	9.52	-3.12
	69	21.87	6.09	-3.12
144	69	16.29	3.80	-2.46
	70	16.29	1.10	-2.46

27	17	0.00	0.00	0.00
	24	0.00	0.00	0.00
28	24	0.00	0.00	0.00
	31	106.54	12.30	5.87
29	31	122.35	2.14	16.97
	38	122.35	16.28	1.88
30	38	0.00	0.00	0.00
	45	0.00	0.00	0.00
31	45	0.00	0.00	0.00
	52	0.00	0.00	0.00
32	52	0.00	0.00	0.00
	59	0.00	0.00	0.00
33	59	0.00	0.00	0.00
	66	0.00	0.00	0.00
34	66	0.00	0.00	0.00
	73	1.42	0.79	1.17
35	73	0.09	0.64	0.03
	80	0.09	0.67	0.03
36	80	-0.15	0.47	-0.36
	87	0.00	0.00	0.00
37	4	8.51	1.65	3.80
	11	0.00	0.00	0.00
38	11	11.53	2.14	-3.23
	18	0.00	0.00	0.00
39	18	0.00	0.00	0.00
	25	70.67	13.17	5.13
40	25	106.93	30.19	1.96
	32	106.93	24.34	-9.77
41	32	126.36	36.99	-1.59
	39	126.36	25.81	-13.31
42	39	127.86	37.59	-39.24
	46	0.00	0.00	0.00
43	46	0.00	0.00	0.00
	53	0.00	0.00	0.00
44	53	0.00	0.00	0.00
	60	0.00	0.00	0.00
45	60	0.00	0.00	0.00
	67	0.00	0.00	0.00
46	67	0.00	0.00	0.00
	74	0.00	0.00	0.00
47	74	0.00	0.00	0.00
	81	0.66	0.51	0.93
48	81	0.18	0.04	0.08
	88	0.18	0.16	0.08
49	5	4.99	1.61	2.75
	12	4.99	0.16	-4.68
50	12	6.64	3.66	-5.82
	19	0.00	0.00	0.00
51	19	25.44	7.78	1.82
	26	25.44	4.93	-5.61
52	26	39.27	68.99	-61.77
	33	0.00	0.00	0.00
53	33	46.81	56.79	-46.77
	40	0.00	0.00	0.00
54	40	51.15	84.24	-104.15
	47	0.00	0.00	0.00
55	47	0.00	0.00	0.00
	54	0.00	0.00	0.00
56	54	0.00	0.00	0.00

	61	0.00	3.00	0.00
57	61	0.00	3.00	0.00
	68	0.00	0.00	0.00
58	68	0.00	0.00	0.00
	75	0.00	0.00	0.00
59	75	0.00	0.00	0.00
	82	-12.75	0.96	-1.00
60	82	0.00	0.00	0.00
	89	-7.53	0.51	-3.05
61	6	2.76	1.11	1.96
	13	2.76	0.86	-2.31
62	13	4.62	2.24	-0.03
	20	0.00	0.00	0.00
63	20	8.20	1.44	5.34
	27	8.20	6.26	1.06
64	27	9.77	9.38	-1.19
	34	9.77	4.39	-5.46
65	34	12.41	9.14	-2.06
	41	12.41	2.84	-6.33
66	41	8.81	10.59	-21.34
	48	0.00	0.00	0.00
67	48	0.00	0.00	0.00
	55	0.00	0.00	0.00
68	55	0.00	0.00	0.00
	62	0.00	0.00	0.00
69	62	0.00	0.00	0.00
	69	0.00	0.00	0.00
70	69	0.00	0.00	0.00
	76	-13.60	4.65	5.48
71	76	-9.72	0.64	5.32
	83	-9.72	5.41	1.05
72	83	-5.82	2.76	1.10
	90	-5.82	1.19	-3.18
73	7	1.19	1.41	-0.08
	14	1.19	0.21	-1.53
74	14	2.41	3.84	-2.16
	21	0.00	0.00	0.00
75	21	4.03	6.72	-4.14
	28	0.00	0.00	0.00
76	28	5.05	9.63	-6.40
	35	0.00	0.00	0.00
77	35	5.76	11.53	-10.61
	42	0.00	0.00	0.00
78	42	4.23	7.05	-15.38
	49	0.00	0.00	0.00
79	49	0.00	0.00	0.00
	56	0.00	0.00	0.00
80	56	0.00	0.00	0.00
	63	-7.92	0.42	18.19
81	63	0.00	0.00	0.00
	70	-7.59	7.53	15.72
82	70	0.00	0.00	0.00
	77	-6.49	10.03	11.79
83	77	0.00	0.00	0.00
	84	-4.63	8.76	6.91
84	84	-2.60	0.70	2.18
	91	-2.60	2.87	0.70
85	1	-0.04	6.05	-1.44
	2	-0.04	3.03	-1.44

145	71	-2.57	25.71	-10.07
	72	-2.57	4.57	-10.07
146	72	-0.64	6.87	-3.62
	73	-0.64	1.44	-3.62
147	73	-0.79	2.76	-2.47
	74	-0.79	-0.94	-2.47
148	74	-1.29	0.15	-1.46
	75	-1.29	-2.03	-1.46
149	75	-1.68	-1.05	-0.48
	76	-1.68	-1.57	-0.48
150	76	-1.56	-0.70	0.23
	77	-1.56	-0.45	0.23
151	78	-2.13	4.15	1.46
	79	-2.13	7.22	1.46
152	79	0.00	0.00	0.00
	80	0.00	0.00	0.00
153	80	-0.04	3.09	-2.06
	81	-0.04	0.01	-2.06
154	81	-0.51	0.50	-1.19
	82	-0.51	-1.29	-1.19
155	82	-0.78	-0.75	-0.33
	83	-0.78	-1.11	-0.33
156	83	-0.75	-0.56	0.23
	84	-0.75	-0.30	0.23
157	85	-0.70	1.49	0.27
	86	-0.70	2.06	0.27
158	86	-0.06	2.40	-0.45
	87	-0.06	1.71	-0.45
159	87	0.00	0.00	0.00
	88	0.00	0.00	0.00
160	88	-0.15	0.54	-0.74
	89	-0.15	-0.57	-0.74
161	89	-0.23	-0.14	-0.45
	90	-0.23	-0.62	-0.45
162	90	-0.21	-0.16	-0.06
	91	-0.21	-0.23	-0.06

LAV MADRID-BARCELONA.PI 562+7.ESTRIBOS 2 Y 3.

HC. n° 1 Momentos Flectores máximos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	0.00
	8	0.00	0.00	0.00
2	8	0.00	0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	0.00
	22	0.00	0.00	0.00
4	22	0.00	0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	0.00
	50	0.00	0.00	0.00
8	50	0.00	0.00	0.00
	57	0.00	0.00	0.00
9	57	0.00	0.00	0.00
	64	0.00	0.00	0.00
10	64	0.00	0.00	0.00
	71	0.00	0.00	0.00
11	71	0.00	0.00	0.00
	78	5.64	2.43	1.72
12	78	1.49	0.31	0.27
	85	1.49	0.70	0.27
13	2	-0.03	0.11	-0.19
	9	0.00	0.00	0.00
14	9	-0.38	0.08	-1.00
	16	0.00	0.00	0.00
15	16	0.00	0.00	0.00
	23	0.00	0.00	0.00
16	23	0.00	0.00	0.00
	30	94.85	17.31	27.24
17	30	0.00	0.00	0.00
	37	97.15	26.24	27.57
18	37	0.00	0.00	0.00
	44	84.23	17.95	21.67
19	44	0.00	0.00	0.00
	51	0.00	0.00	0.00
20	51	0.00	0.00	0.00
	58	0.00	0.00	0.00
21	58	0.00	0.00	0.00
	65	2.91	1.17	2.75
22	65	1.92	0.38	1.83
	72	1.92	3.12	1.83
23	72	-0.38	5.04	-4.61
	79	0.00	0.00	0.00
24	79	0.34	0.42	-0.72
	86	-2.49	1.96	7.85
25	3	11.09	0.82	5.89
	10	0.00	0.00	0.00
26	10	14.46	0.84	0.14
	17	0.00	0.00	0.00

27	17	-6.40	-2.28	-4.68
	24	-6.40	-9.28	-4.68
28	24	-14.03	-9.23	-11.39
	31	-14.03	-26.30	-11.39
29	31	-29.70	-25.62	-14.66
	38	-29.70	-47.61	-14.66
30	38	-49.94	-41.32	-16.92
	45	-49.94	-66.72	-16.92
31	45	-21.57	-59.39	27.30
	52	-21.57	-29.74	12.21
32	52	-34.69	-28.98	14.39
	59	-34.69	-18.72	-0.70
33	59	-39.57	-20.78	6.40
	66	-39.57	-22.50	-8.70
34	66	-32.11	-30.51	10.90
	73	-32.11	-25.47	-4.20
35	73	-15.24	-31.26	14.86
	80	-15.24	-20.28	-0.23
36	80	-4.77	-14.13	15.66
	87	-4.77	-1.97	0.56
37	4	-0.45	0.06	-0.38
	11	-0.45	-0.50	-0.38
38	11	-0.72	-0.36	-1.56
	18	-0.72	-2.70	-1.56
39	18	-5.36	-3.57	-7.45
	25	-5.36	-14.76	-7.45
40	25	-12.30	-17.34	-15.72
	32	-12.30	-40.92	-15.72
41	32	-28.24	-46.77	-22.55
	39	-28.24	-80.58	-22.55
42	39	-58.15	-89.08	-11.25
	46	-58.15	-105.94	-11.25
43	46	-21.89	-89.39	37.22
	53	-21.89	-42.35	25.50
44	53	-30.36	-45.40	23.44
	60	-30.36	-19.03	11.72
45	60	-31.72	-26.10	15.21
	67	-31.72	-12.09	3.48
46	67	-25.67	-19.55	12.30
	74	-25.67	-9.90	0.57
47	74	-16.44	-13.32	9.70
	81	-16.44	-7.56	-2.03
48	81	-8.63	-5.60	8.64
	88	-8.63	-1.42	-3.07
49	5	-0.38	-0.08	-0.28
	12	-0.38	-0.51	-0.28
50	12	-0.48	-0.74	-0.60
	19	-0.48	-1.63	-0.60
51	19	-1.56	-3.15	-1.46
	26	-1.56	-5.34	-1.46
52	26	-3.00	-10.80	-3.11
	33	-3.00	-15.45	-3.11
53	33	-8.11	-27.30	-5.32
	40	-8.11	-35.30	-5.32
54	40	-28.26	-64.68	-7.18
	47	-28.26	-75.45	-7.18
55	47	-19.17	-95.16	39.99
	54	-19.17	-40.76	32.56
56	54	-21.08	-45.38	22.53

	61	-21.08	-17.15	15.10
57	61	-21.51	-22.76	15.41
	68	-21.51	-5.24	7.98
58	68	-18.14	-10.23	10.36
	75	-18.14	-0.25	2.94
59	75	-12.75	-3.11	6.42
	82	-12.75	0.96	-1.00
60	82	-7.97	-0.15	4.10
	89	-7.97	0.42	-3.33
61	6	-0.15	-0.09	-0.21
	13	-0.15	-0.42	-0.21
62	13	0.00	0.00	0.00
	20	0.00	0.00	0.00
63	20	0.00	0.00	0.00
	27	0.00	0.00	0.00
64	27	0.00	0.00	0.00
	34	0.00	0.00	0.00
65	34	-1.37	-4.93	-6.32
	41	-1.37	-14.41	-6.32
66	41	-9.61	-13.82	-24.85
	48	-9.61	-51.10	-24.85
67	48	-16.24	-64.56	19.35
	55	-16.24	-38.74	15.08
68	55	-15.97	-41.67	20.52
	62	-15.97	-14.09	16.24
69	62	-15.90	-19.99	14.68
	69	-15.90	-1.19	10.41
70	69	-13.60	-6.77	9.75
	76	-13.60	4.65	5.48
71	76	-9.72	0.64	5.32
	83	-9.72	5.41	1.05
72	83	-5.82	2.76	1.10
	90	-5.82	1.19	-3.18
73	7	-0.03	-0.08	-0.03
	14	-0.03	-0.12	-0.03
74	14	0.00	0.00	0.00
	21	0.00	0.00	0.00
75	21	0.00	0.00	0.00
	28	0.00	0.00	0.00
76	28	0.00	0.00	0.00
	35	0.00	0.00	0.00
77	35	-1.03	-3.29	-3.88
	42	-1.03	-9.12	-3.88
78	42	-4.47	-13.88	-7.89
	49	-4.47	-25.72	-7.89
79	49	-8.02	-42.19	22.09
	56	-8.02	-10.14	20.64
80	56	-7.92	-27.97	19.66
	63	-7.92	0.42	18.19
81	63	-7.59	-17.16	17.19
	70	-7.59	7.53	15.72
82	70	-6.49	-8.76	13.26
	77	-6.49	10.03	11.79
83	77	-4.63	-2.70	8.39
	84	-4.63	8.76	6.91
84	84	-2.60	0.70	2.18
	91	-2.60	2.87	0.70
85	1	-4.98	-61.38	42.15
	2	-4.98	-0.66	22.65

86	2	-6.42	-15.54	15.06
	3	-6.42	7.05	15.06
87	3	-5.72	-4.30	8.82
	4	-5.72	8.91	8.82
88	4	-4.13	-0.03	4.65
	5	-4.13	6.93	4.65
89	5	-2.52	1.93	1.89
	6	-2.52	4.02	1.89
90	6	-1.41	1.26	-0.08
	7	-1.41	1.19	-0.08
91	8	-10.35	-87.74	50.42
	9	-10.35	-9.68	30.92
92	9	-13.69	-19.40	13.83
	10	-13.69	1.34	13.83
93	10	-11.60	-1.77	4.83
	11	-11.60	5.48	4.83
94	11	-8.51	2.88	0.51
	12	-8.51	3.64	0.51
95	12	-5.01	1.98	1.65
	13	-5.01	3.80	1.65
96	13	-3.62	1.93	-0.63
	14	-3.62	1.25	-0.63
97	15	-29.90	-244.92	117.36
	16	-29.90	-26.25	97.86
98	16	-40.51	-92.22	76.62
	17	-40.51	22.71	76.62
99	17	-36.26	-46.72	56.01
	18	-36.26	37.29	56.01
100	18	-28.09	-21.83	24.21
	19	-28.09	14.49	24.21
101	19	-9.80	-2.77	8.36
	20	-9.80	6.42	8.36
102	20	-7.41	2.69	-0.92
	21	-7.41	1.70	-0.92
103	22	-64.44	-370.11	135.08
	23	-64.44	-114.24	115.58
104	23	-95.43	-127.08	65.15
	24	-95.43	-29.37	65.15
105	24	-94.40	-52.00	34.72
	25	-94.40	0.09	34.72
106	25	-77.37	-36.18	37.90
	26	-77.37	20.68	37.90
107	26	-13.32	6.86	-3.06
	27	-13.32	3.48	-3.06
108	27	-10.43	2.87	-1.77
	28	-10.43	0.91	-1.77
109	29	-59.58	-236.01	80.67
	30	-59.58	-94.38	61.17
110	30	-105.88	-96.71	42.38
	31	-105.88	-33.15	42.38
111	31	-116.04	-48.96	31.26
	32	-116.04	-2.07	31.26
112	32	-103.38	-21.49	23.10
	33	-103.38	13.16	23.10
113	33	-17.35	5.61	0.67
	34	-17.35	6.35	0.67
114	34	-12.63	3.70	-2.73
	35	-12.63	0.70	-2.73
115	36	-60.17	-116.22	41.70

	37	-60.17	-56.44	22.20
116	37	-114.83	-43.51	9.63
	38	-114.83	-29.07	9.63
117	38	-135.19	-23.17	2.94
	39	-135.19	-18.78	2.94
118	39	-123.43	-20.28	28.86
	40	-123.43	23.01	28.86
119	40	-20.26	18.67	-18.33
	41	-20.26	-1.47	-18.33
120	41	-12.51	2.13	-3.32
	42	-12.51	-1.53	-3.32
121	43	-24.01	9.39	-9.69
	44	-24.01	-24.84	-19.44
122	44	-47.81	48.82	-64.90
	45	-47.81	-48.54	-64.90
123	45	-58.08	54.87	-77.57
	46	-58.08	-61.49	-77.57
124	46	-53.25	52.47	-59.52
	47	-53.25	-36.82	-59.52
125	47	-7.98	5.28	-6.99
	48	-7.98	-2.41	-6.99
126	48	-7.26	0.44	-1.59
	49	-7.26	-1.31	-1.59
127	50	-4.14	11.88	-4.71
	51	-4.14	1.98	-4.71
128	51	-7.47	7.26	-5.82
	52	-7.47	-1.49	-5.82
129	52	-8.20	5.18	-6.87
	53	-8.20	-5.13	-6.87
130	53	-7.95	2.14	-5.18
	54	-7.95	-5.61	-5.18
131	54	-7.89	-2.18	0.08
	55	-7.89	-2.10	0.08
132	55	-5.85	-0.83	0.19
	56	-5.85	-0.62	0.19
133	57	-2.03	17.01	-5.51
	58	-2.03	5.45	-5.51
134	58	-4.08	7.85	-4.93
	59	-4.08	0.45	-4.93
135	59	-4.56	3.45	-4.24
	60	-4.56	-2.91	-4.24
136	60	-4.83	0.11	-2.65
	61	-4.83	-3.88	-2.65
137	61	-5.02	-1.71	-0.96
	62	-5.02	-2.76	-0.96
138	62	-4.26	-1.17	0.42
	63	-4.26	-0.70	0.42
139	64	-1.46	19.72	-5.85
	65	-1.46	7.44	-5.85
140	65	-2.25	8.43	-4.95
	66	-2.25	1.00	-4.95
141	66	-2.37	2.99	-3.29
	67	-2.37	-1.93	-3.29
142	67	-2.73	-0.08	-1.90
	68	-2.73	-2.93	-1.90
143	68	-3.06	-1.44	-0.66
	69	-3.06	-2.18	-0.66
144	69	-2.71	-0.94	0.30
	70	-2.71	-0.62	0.30

145	71	57.98	-256.79	148.62
	72	57.98	27.54	129.12
146	72	28.78	-10.71	28.11
	73	28.78	31.45	28.11
147	73	23.01	14.58	9.05
	74	23.01	28.16	9.05
148	74	19.59	18.93	-0.08
	75	19.59	18.80	-0.08
149	75	16.74	13.42	-3.57
	76	16.74	9.51	-3.57
150	76	12.73	5.63	-3.42
	77	12.73	1.86	-3.42
151	78	14.09	-45.65	28.56
	79	14.09	-13.47	9.06
152	79	4.36	-12.18	24.90
	80	4.36	25.15	24.90
153	80	9.89	11.68	11.09
	81	9.89	28.31	11.09
154	81	11.84	20.51	0.42
	82	11.84	21.12	0.42
155	82	10.73	16.32	-4.70
	83	10.73	11.16	-4.70
156	83	8.06	7.26	-4.74
	84	8.06	2.04	-4.74
157	85	3.12	-10.61	9.87
	86	3.12	-3.76	0.12
158	86	1.14	-6.27	7.97
	87	1.14	5.67	7.97
159	87	3.06	2.61	8.07
	88	3.06	14.73	8.07
160	88	4.47	5.74	5.79
	89	4.47	14.44	5.79
161	89	4.05	6.48	2.47
	90	4.05	9.19	2.47
162	90	2.87	3.38	-0.72
	91	2.87	2.60	-0.72

LAV MADRID-BARCELONA.PI 562+7.ESTRIBOS 2 Y 3.

HC. n° 1 Esfuerzos Torsores mínimos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	0.00
	8	0.00	0.00	0.00
2	8	0.00	0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	0.00
	22	0.00	0.00	0.00
4	22	0.00	0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	0.00
	50	0.00	0.00	0.00
8	50	0.00	0.00	0.00
	57	0.00	0.00	0.00
9	57	0.00	0.00	0.00
	64	0.00	0.00	0.00
10	64	0.00	0.00	0.00
	71	0.00	0.00	0.00
11	71	-56.25	-89.64	38.43
	78	-56.25	-31.99	38.43
12	78	-10.61	-17.91	9.87
	85	-10.61	-3.12	9.87
13	2	-0.03	0.11	-0.19
	9	-0.03	-0.18	-0.19
14	9	-0.38	0.08	-1.00
	16	-0.38	-1.44	-1.00
15	16	-5.18	-0.39	-2.61
	23	-5.18	-4.30	-2.61
16	23	-11.23	-0.34	-9.00
	30	-11.23	-13.86	-9.00
17	30	-22.77	-4.99	-14.55
	37	-22.77	-26.82	-14.55
18	37	-36.36	-9.75	-18.48
	44	-36.36	-37.47	-18.48
19	44	-18.84	-25.53	14.23
	51	-18.84	-18.05	-4.24
20	51	-31.40	-6.51	1.56
	58	-31.40	-18.03	-16.92
21	58	-40.94	-2.19	-11.07
	65	-40.94	-32.65	-29.55
22	65	-45.94	-22.24	-19.49
	72	-45.94	-65.32	-37.95
23	72	-8.09	-89.46	58.46
	79	-8.09	-15.65	39.97
24	79	-2.49	-23.66	26.31
	86	-2.49	1.96	7.85
25	3	-0.27	0.12	-0.34
	10	-0.27	-0.39	-0.34
26	10	-0.62	-0.15	-1.44
	17	-0.62	-2.32	-1.44

86	2	0.06	3.06	-1.25
	3	0.06	1.19	-1.25
87	3	0.18	1.46	-0.90
	4	0.18	0.09	-0.90
88	4	0.24	0.56	-0.54
	5	0.24	-0.25	-0.54
89	5	0.16	0.12	-0.24
	6	0.16	-0.15	-0.24
90	6	0.08	0.00	-0.03
	7	0.08	-0.03	-0.03
91	8	0.00	0.00	0.00
	9	0.00	0.00	0.00
92	9	0.21	5.87	-2.54
	10	0.21	2.07	-2.54
93	10	0.45	2.41	-1.44
	11	0.45	0.27	-1.44
94	11	0.58	0.52	-0.24
	12	0.58	0.16	-0.24
95	12	0.34	0.27	0.08
	13	0.34	0.34	0.08
96	13	0.08	0.18	-0.09
	14	0.08	0.09	-0.09
97	15	1.19	41.13	-12.38
	16	1.19	15.15	-12.38
98	16	2.24	19.97	-10.77
	17	2.24	3.80	-10.77
99	17	2.28	9.59	-7.55
	18	2.28	-1.72	-7.55
100	18	1.41	2.91	-1.63
	19	1.41	0.47	-1.63
101	19	0.00	0.00	0.00
	20	0.00	0.00	0.00
102	20	0.00	0.00	0.00
	21	0.00	0.00	0.00
103	22	4.23	87.54	-25.38
	23	4.23	34.26	-25.38
104	23	8.17	40.32	-18.97
	24	8.17	11.86	-18.97
105	24	8.23	19.49	-12.27
	25	8.23	1.10	-12.27
106	25	5.65	8.04	-4.01
	26	5.65	2.03	-4.01
107	26	0.21	3.48	-2.36
	27	0.21	0.88	-2.36
108	27	0.00	0.00	0.00
	28	0.00	0.00	0.00
109	29	8.70	77.75	-24.74
	30	8.70	25.80	-24.74
110	30	17.57	37.32	-19.20
	31	17.57	8.52	-19.20
111	31	18.24	24.19	-15.91
	32	18.24	0.31	-15.91
112	32	12.39	16.26	-9.11
	33	12.39	2.60	-9.11
113	33	0.54	7.71	-6.89
	34	0.54	0.14	-6.89
114	34	0.33	1.61	-2.41
	35	0.33	-1.05	-2.41
115	36	18.70	53.56	-19.32

	37	18.70	13.01	-19.32
116	37	35.78	26.59	-15.39
	38	35.78	3.51	-15.39
117	38	42.06	23.74	-13.11
	39	42.06	4.08	-13.11
118	39	33.56	33.99	-24.41
	40	33.56	-2.63	-24.41
119	40	4.17	17.53	-22.55
	41	4.17	-7.27	-22.55
120	41	4.77	0.97	-4.01
	42	4.77	-3.42	-4.01
121	43	13.82	-5.41	11.46
	44	13.82	4.76	1.71
122	44	25.74	-12.75	16.80
	45	25.74	12.45	16.80
123	45	33.07	-15.90	23.70
	46	33.07	19.65	23.70
124	46	49.64	-16.62	17.63
	47	49.64	9.83	17.63
125	47	29.93	0.72	-3.03
	48	29.93	-2.61	-3.03
126	48	16.47	4.02	-6.90
	49	16.47	-3.57	-6.90
127	50	16.14	-25.59	19.88
	51	16.14	-11.64	0.38
128	51	27.68	0.92	-5.43
	52	27.68	-7.23	-5.43
129	52	28.44	5.88	-7.61
	53	28.44	-5.52	-7.61
130	53	25.38	2.94	-5.55
	54	25.38	-5.38	-5.55
131	54	20.76	-3.46	4.49
	55	20.76	1.46	4.49
132	55	17.84	1.19	-0.97
	56	17.84	0.11	-0.97
133	57	22.40	-65.53	33.65
	58	22.40	-22.66	14.15
134	58	38.24	-13.13	8.30
	59	38.24	-0.67	8.30
135	59	36.18	4.20	1.20
	60	36.18	6.00	1.20
136	60	29.11	7.35	-2.30
	61	29.11	3.93	-2.30
137	61	23.51	4.37	-2.58
	62	23.51	1.51	-2.58
138	62	17.58	1.46	-1.00
	63	17.58	0.34	-1.00
139	64	31.91	-123.52	57.24
	65	31.91	-31.13	37.74
140	65	42.31	-26.10	27.68
	66	42.31	15.42	27.68
141	66	34.32	7.97	8.07
	67	34.32	20.09	8.07
142	67	26.86	14.03	-0.74
	68	26.86	12.91	-0.74
143	68	21.87	9.52	-3.12
	69	21.87	6.09	-3.12
144	69	16.29	3.80	-2.46
	70	16.29	1.10	-2.46

27	17	83.91	-6.02	5.65
	24	83.91	-8.86	-9.45
28	24	106.54	-7.82	20.97
	31	106.54	12.30	5.87
29	31	122.35	2.14	16.97
	38	122.35	16.28	1.88
30	38	116.48	-4.11	8.57
	45	116.48	-2.58	-6.52
31	45	13.07	-12.85	2.47
	52	13.07	-9.15	2.47
32	52	6.40	-9.87	3.51
	59	6.40	-4.61	3.51
33	59	3.40	-5.09	2.84
	66	3.40	-0.84	2.84
34	66	1.42	-0.96	1.17
	73	1.42	0.79	1.17
35	73	0.09	0.64	0.03
	80	0.09	0.67	0.03
36	80	0.00	0.00	0.00
	87	0.00	0.00	0.00
37	4	8.95	1.59	4.17
	11	8.95	-0.94	-7.55
38	11	11.53	2.14	-3.23
	18	11.53	-11.49	-14.95
39	18	70.67	-3.33	16.86
	25	70.67	13.17	5.13
40	25	106.93	30.19	1.96
	32	106.93	24.34	-9.77
41	32	126.36	36.99	-1.59
	39	126.36	25.81	-13.31
42	39	127.86	37.59	-39.24
	46	127.86	-30.06	-50.96
43	46	13.91	-25.24	6.61
	53	13.91	-15.33	6.61
44	53	6.63	-15.06	4.92
	60	6.63	-7.70	4.92
45	60	3.63	-7.97	3.33
	67	3.63	-2.95	3.33
46	67	1.75	-3.32	1.95
	74	1.75	-0.39	1.95
47	74	0.66	-0.88	0.93
	81	0.66	0.51	0.93
48	81	0.18	0.04	0.08
	88	0.18	0.16	0.08
49	5	4.99	1.61	2.75
	12	4.99	0.16	-4.68
50	12	6.64	3.66	-5.82
	19	6.64	-10.64	-13.24
51	19	25.44	7.78	1.82
	26	25.44	4.93	-5.61
52	26	39.27	68.99	-61.77
	33	39.27	-29.24	-69.19
53	33	46.81	56.79	-46.77
	40	46.81	-18.93	-54.19
54	40	51.15	84.24	-104.15
	47	51.15	-77.55	-111.57
55	47	9.05	-32.28	10.32
	54	9.05	-16.80	10.32
56	54	5.63	-16.74	5.07

	61	5.63	-9.14	5.07
57	61	3.45	-9.33	3.38
	68	3.45	-4.27	3.38
58	68	1.95	-4.62	2.13
	75	1.95	-1.42	2.13
59	75	0.97	-1.80	1.15
	82	0.97	-0.08	1.15
60	82	0.44	-0.34	0.28
	89	0.44	0.09	0.28
61	6	2.76	1.11	1.96
	13	2.76	0.86	-2.31
62	13	4.63	1.55	-0.09
	20	4.63	-1.78	-4.36
63	20	8.39	0.58	4.91
	27	8.39	4.73	0.63
64	27	9.87	7.41	-3.03
	34	9.87	-0.33	-7.31
65	34	12.41	9.14	-2.06
	41	12.41	2.84	-6.33
66	41	8.81	10.59	-21.34
	48	8.81	-24.63	-25.62
67	48	5.97	-23.91	4.13
	55	5.97	-17.73	4.13
68	55	4.71	-15.69	4.01
	62	4.71	-9.69	4.01
69	62	3.12	-8.92	2.63
	69	3.12	-4.99	2.63
70	69	1.89	-4.63	1.65
	76	1.89	-2.16	1.65
71	76	1.00	-2.04	0.94
	83	1.00	-0.63	0.94
72	83	0.45	-0.60	0.39
	90	0.45	-0.01	0.39
73	7	1.19	1.41	-0.08
	14	1.19	0.21	-1.53
74	14	2.46	3.64	-2.28
	21	2.46	-0.88	-3.75
75	21	4.15	6.53	-4.65
	28	4.15	-1.53	-6.11
76	28	5.07	8.90	-7.89
	35	5.07	-4.03	-9.36
77	35	5.76	11.53	-10.61
	42	5.76	-5.46	-12.06
78	42	4.23	7.05	-15.38
	49	4.23	-17.11	-16.84
79	49	2.93	-9.84	-1.32
	56	2.93	-11.84	-1.32
80	56	2.31	-5.99	-1.13
	63	2.31	-7.68	-1.13
81	63	1.61	-3.42	-0.70
	70	1.61	-4.47	-0.70
82	70	0.99	-1.75	-0.41
	77	0.99	-2.36	-0.41
83	77	0.54	-0.79	-0.16
	84	0.54	-1.05	-0.16
84	84	0.23	-0.30	0.06
	91	0.23	-0.21	0.06
85	1	0.00	0.00	0.00
	2	0.00	0.00	0.00

146	72	19.19	-7.14	18.74
	73	19.19	20.97	18.74
147	73	15.34	9.72	6.03
	74	15.34	18.77	6.03
148	74	13.06	12.62	-0.05
	75	13.06	12.53	-0.05
149	75	11.16	8.95	-2.38
	76	11.16	6.34	-2.38
150	76	8.49	3.75	-2.28
	77	8.49	1.24	-2.28
151	78	9.39	-30.43	19.04
	79	9.39	-8.98	6.04
152	79	2.80	-12.45	18.22
	80	2.80	14.87	18.22
153	80	6.59	7.79	7.39
	81	6.59	18.87	7.39
154	81	7.89	13.67	0.28
	82	7.89	14.08	0.28
155	82	7.15	10.88	-3.13
	83	7.15	7.44	-3.13
156	83	5.37	4.84	-3.16
	84	5.37	1.36	-3.16
157	85	2.08	-7.07	6.58
	86	2.08	-2.51	0.08
158	86	0.76	-4.18	5.31
	87	0.76	3.78	5.31
159	87	2.03	0.70	5.92
	88	2.03	9.58	5.92
160	88	2.98	3.83	3.86
	89	2.98	9.63	3.86
161	89	2.70	4.32	1.65
	90	2.70	6.13	1.65
162	90	1.91	2.25	-0.48
	91	1.91	1.73	-0.48

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HC. n° 1 Esfuerzos Torsores máximos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	0.00
	8	0.00	0.00	0.00
2	8	0.00	0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	0.00
	22	0.00	0.00	0.00
4	22	0.00	0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	0.00
	50	0.00	0.00	0.00
8	50	0.00	0.00	0.00
	57	0.00	0.00	0.00
9	57	0.00	0.00	0.00
	64	0.00	0.00	0.00
10	64	0.00	0.00	0.00
	71	0.00	0.00	0.00
11	71	5.64	-0.15	1.72
	78	5.64	2.43	1.72
12	78	1.49	0.31	0.27
	85	1.49	0.70	0.27
13	2	11.84	-1.49	9.03
	9	11.84	-1.80	-9.45
14	9	16.03	-5.20	10.98
	16	16.03	-2.58	-7.48
15	16	82.00	-13.20	13.76
	23	82.00	-6.42	-4.71
16	23	94.85	-37.41	45.72
	30	94.85	17.31	27.24
17	30	97.15	-28.98	46.05
	37	97.15	26.24	27.57
18	37	84.23	-28.41	40.14
	44	84.23	17.95	21.67
19	44	10.58	-5.84	2.20
	51	10.58	-2.54	2.20
20	51	5.30	-5.87	3.32
	58	5.30	-0.88	3.32
21	58	2.91	-2.94	2.75
	65	2.91	1.17	2.75
22	65	1.92	0.38	1.83
	72	1.92	3.12	1.83
23	72	0.00	0.00	0.00
	79	0.00	0.00	0.00
24	79	0.34	0.42	-0.72
	86	0.34	-0.66	-0.72
25	3	11.36	0.70	6.24
	10	11.36	-1.26	-8.85
26	10	14.46	0.84	0.14
	17	14.46	-10.27	-14.95

87	3	0.12	0.97	-0.60
	4	0.12	0.06	-0.60
88	4	0.16	0.37	-0.36
	5	0.16	-0.17	-0.36
89	5	0.11	0.08	-0.16
	6	0.11	-0.10	-0.16
90	6	0.05	-0.00	-0.02
	7	0.05	-0.02	-0.02
91	8	-0.04	8.38	-2.23
	9	-0.04	3.69	-2.23
92	9	0.14	3.91	-1.69
	10	0.14	1.38	-1.69
93	10	0.30	1.61	-0.96
	11	0.30	0.18	-0.96
94	11	0.39	0.35	-0.16
	12	0.39	0.11	-0.16
95	12	0.23	0.18	0.05
	13	0.23	0.23	0.05
96	13	0.05	0.12	-0.06
	14	0.05	0.06	-0.06
97	15	0.79	27.42	-8.25
	16	0.79	10.10	-8.25
98	16	1.49	13.31	-7.18
	17	1.49	2.53	-7.18
99	17	1.52	6.39	-5.03
	18	1.52	-1.15	-5.03
100	18	0.94	1.94	-1.09
	19	0.94	0.31	-1.09
101	19	-0.07	1.02	-0.52
	20	-0.07	0.45	-0.52
102	20	-0.12	0.34	-0.27
	21	-0.12	0.05	-0.27
103	22	2.82	58.36	-16.92
	23	2.82	22.84	-16.92
104	23	5.45	26.88	-12.65
	24	5.45	7.91	-12.65
105	24	5.49	12.99	-8.18
	25	5.49	0.73	-8.18
106	25	3.77	5.36	-2.67
	26	3.77	1.35	-2.67
107	26	0.14	2.32	-1.57
	27	0.14	0.59	-1.57
108	27	-0.15	0.63	-0.64
	28	-0.15	-0.07	-0.64
109	29	5.80	51.83	-16.49
	30	5.80	17.20	-16.49
110	30	11.71	24.88	-12.80
	31	11.71	5.68	-12.80
111	31	12.16	16.13	-10.61
	32	12.16	0.21	-10.61
112	32	8.26	10.84	-6.07
	33	8.26	1.73	-6.07
113	33	0.36	5.14	-4.59
	34	0.36	0.09	-4.59
114	34	0.22	1.07	-1.61
	35	0.22	-0.70	-1.61
115	36	12.47	35.71	-12.88
	37	12.47	8.67	-12.88
116	37	23.85	17.73	-10.26

	38	23.85	2.34	-10.26
117	38	28.04	15.83	-8.74
	39	28.04	2.72	-8.74
118	39	22.37	22.66	-16.27
	40	22.37	-1.75	-16.27
119	40	2.78	11.69	-15.03
	41	2.78	-4.85	-15.03
120	41	3.18	0.65	-2.67
	42	3.18	-2.28	-2.67
121	43	9.21	-3.61	7.64
	44	9.21	3.17	1.14
122	44	17.16	-8.50	11.20
	45	17.16	8.30	11.20
123	45	22.05	-10.60	15.80
	46	22.05	13.10	15.80
124	46	33.09	-11.08	11.75
	47	33.09	6.55	11.75
125	47	19.95	0.48	-2.02
	48	19.95	-1.74	-2.02
126	48	10.98	2.68	-4.60
	49	10.98	-2.38	-4.60
127	50	10.76	-17.06	13.25
	51	10.76	-7.76	0.25
128	51	18.45	0.61	-3.62
	52	18.45	-4.82	-3.62
129	52	18.96	3.92	-5.07
	53	18.96	-3.68	-5.07
130	53	16.92	1.96	-3.70
	54	16.92	-3.59	-3.70
131	54	13.84	-2.31	2.99
	55	13.84	0.97	2.99
132	55	11.89	0.79	-0.65
	56	11.89	0.07	-0.65
133	57	14.93	-43.69	22.43
	58	14.93	-15.11	9.43
134	58	25.49	-8.75	5.53
	59	25.49	-0.45	5.53
135	59	24.12	2.80	0.80
	60	24.12	4.00	0.80
136	60	19.41	4.90	-1.53
	61	19.41	2.62	-1.53
137	61	15.67	2.91	-1.72
	62	15.67	1.01	-1.72
138	62	11.72	0.97	-0.67
	63	11.72	0.23	-0.67
139	64	21.27	-82.35	38.16
	65	21.27	-20.75	25.16
140	65	28.21	-17.40	18.45
	66	28.21	10.28	18.45
141	66	22.88	5.31	5.38
	67	22.88	13.39	5.38
142	67	17.91	9.35	-0.49
	68	17.91	8.61	-0.49
143	68	14.58	6.35	-2.08
	69	14.58	4.06	-2.08
144	69	10.86	2.53	-1.64
	70	10.86	0.73	-1.64
145	71	38.65	-171.19	99.08
	72	38.65	18.36	86.08

28	24	-9.35	-6.15	-7.59
	31	-9.35	-17.53	-7.59
29	31	-19.80	-17.08	-9.77
	38	-19.80	-31.74	-9.77
30	38	-33.29	-27.55	-11.28
	45	-33.29	-44.48	-11.28
31	45	-14.38	-39.59	18.20
	52	-14.38	-19.83	8.14
32	52	-23.13	-19.32	9.59
	59	-23.13	-12.48	-0.47
33	59	-26.38	-13.85	4.27
	66	-26.38	-15.00	-5.80
34	66	-21.41	-20.34	7.27
	73	-21.41	-16.98	-2.80
35	73	-10.16	-20.84	9.91
	80	-10.16	-13.52	-0.15
36	80	-3.08	-9.73	10.68
	87	-3.08	-1.26	0.61
37	4	-0.30	0.04	-0.25
	11	-0.30	-0.33	-0.25
38	11	-0.48	-0.24	-1.04
	18	-0.48	-1.80	-1.04
39	18	-3.57	-2.38	-4.97
	25	-3.57	-9.84	-4.97
40	25	-8.20	-11.56	-10.48
	32	-8.20	-27.28	-10.48
41	32	-18.83	-31.18	-15.03
	39	-18.83	-53.72	-15.03
42	39	-38.77	-59.39	-7.50
	46	-38.77	-70.63	-7.50
43	46	-14.59	-59.59	24.81
	53	-14.59	-28.23	17.00
44	53	-20.24	-30.27	15.63
	60	-20.24	-12.69	7.81
45	60	-21.15	-17.40	10.14
	67	-21.15	-8.06	2.32
46	67	-17.11	-13.03	8.20
	74	-17.11	-6.60	0.38
47	74	-10.96	-8.88	6.47
	81	-10.96	-5.04	-1.35
48	81	-5.75	-3.73	5.76
	88	-5.75	-0.95	-2.05
49	5	-0.25	-0.05	-0.19
	12	-0.25	-0.34	-0.19
50	12	-0.32	-0.49	-0.40
	19	-0.32	-1.09	-0.40
51	19	-1.04	-2.10	-0.97
	26	-1.04	-3.56	-0.97
52	26	-2.00	-7.20	-2.07
	33	-2.00	-10.30	-2.07
53	33	-5.41	-18.20	-3.55
	40	-5.41	-23.53	-3.55
54	40	-18.84	-43.12	-4.79
	47	-18.84	-50.30	-4.79
55	47	-12.78	-63.44	26.66
	54	-12.78	-27.17	21.71
56	54	-14.05	-30.25	15.02
	61	-14.05	-11.43	10.07
57	61	-14.34	-15.17	10.27

	68	-14.34	-3.49	5.32
58	68	-12.09	-6.82	6.91
	75	-12.09	-0.17	1.96
59	75	-8.50	-2.07	4.28
	82	-8.50	0.64	-0.67
60	82	-5.31	-0.10	2.73
	89	-5.31	0.28	-2.22
61	6	-0.10	-0.06	-0.14
	13	-0.10	-0.28	-0.14
62	13	0.01	-0.46	-0.04
	20	0.01	-0.52	-0.04
63	20	0.12	-0.57	-0.29
	27	0.12	-1.02	-0.29
64	27	0.07	-1.31	-1.23
	34	0.07	-3.15	-1.23
65	34	-0.91	-3.29	-4.21
	41	-0.91	-9.61	-4.21
66	41	-6.41	-9.21	-16.57
	48	-6.41	-34.07	-16.57
67	48	-10.83	-43.04	12.90
	55	-10.83	-25.83	10.05
68	55	-10.65	-27.78	13.68
	62	-10.65	-9.39	10.83
69	62	-10.60	-13.33	9.79
	69	-10.60	-0.79	6.94
70	69	-9.07	-4.51	6.50
	76	-9.07	3.10	3.65
71	76	-6.48	0.43	3.55
	83	-6.48	3.61	0.70
72	83	-3.88	1.84	0.73
	90	-3.88	0.79	-2.12
73	7	-0.02	-0.05	-0.02
	14	-0.02	-0.08	-0.02
74	14	0.03	-0.13	-0.08
	21	0.03	-0.25	-0.08
75	21	0.08	-0.13	-0.34
	28	0.08	-0.64	-0.34
76	28	0.01	-0.49	-0.99
	35	0.01	-1.97	-0.99
77	35	-0.69	-2.19	-2.59
	42	-0.69	-6.08	-2.59
78	42	-2.98	-9.25	-5.26
	49	-2.98	-17.15	-5.26
79	49	-5.35	-28.13	14.73
	56	-5.35	-6.76	13.76
80	56	-5.28	-18.65	13.11
	63	-5.28	0.28	12.13
81	63	-5.06	-11.44	11.46
	70	-5.06	5.02	10.48
82	70	-4.33	-5.84	8.84
	77	-4.33	6.69	7.86
83	77	-3.09	-1.80	5.59
	84	-3.09	5.84	4.61
84	84	-1.73	0.47	1.45
	91	-1.73	1.91	0.47
85	1	-0.03	4.03	-0.96
	2	-0.03	2.02	-0.96
86	2	0.04	2.04	-0.83
	3	0.04	0.79	-0.83

53	-0.000076	0.000286	0.000294
54	-0.000080	0.000379	0.000407
55	-0.000082	0.000434	0.000498
56	-0.000081	0.000481	0.000587
57	-0.000000	0.000000	0.000000
58	-0.000181	0.000114	0.000222
59	-0.000203	0.000253	0.000515
60	-0.000186	0.000385	0.000807
61	-0.000168	0.000490	0.001072
62	-0.000162	0.000553	0.001253
63	-0.000159	0.000600	0.001429
64	-0.000000	0.000000	0.000000
65	-0.000330	0.000162	0.000417
66	-0.000347	0.000316	0.000941
67	-0.000302	0.000441	0.001432
68	-0.000259	0.000539	0.001852
69	-0.000240	0.000597	0.002126
70	-0.000235	0.000640	0.002386
71	-0.000000	0.000000	0.000000
72	-0.000497	0.000295	0.000743
73	-0.000463	0.000400	0.001480
74	-0.000395	0.000483	0.002129
75	-0.000335	0.000555	0.002677
76	-0.000308	0.000599	0.003029
77	-0.000299	0.000633	0.003362
78	-0.000409	0.000389	0.000338
79	-0.000525	0.000461	0.001342
80	-0.000519	0.000476	0.002141
81	-0.000455	0.000512	0.002878
82	-0.000388	0.000555	0.003511
83	-0.000356	0.000584	0.003919
84	-0.000345	0.000605	0.004304
85	-0.000486	0.000457	0.000984
86	-0.000534	0.000488	0.002065
87	-0.000536	0.000497	0.002876
88	-0.000486	0.000519	0.003653
89	-0.000422	0.000551	0.004341
90	-0.000385	0.000573	0.004786
91	-0.000371	0.000588	0.005201

Reacciones en apoyos

Nudo	Mto. x	Mto. y	Fza. z
1	-4.03	0.03	-0.96
8	-8.38	0.04	-2.23
15	-27.42	-0.79	-8.25
22	-58.36	-2.82	-16.92
29	-51.83	-5.80	-16.49
36	-35.71	-12.47	-12.88
43	3.61	-9.21	7.64
50	17.06	-10.76	13.25
57	43.69	-14.93	22.43
64	82.35	-21.27	38.16
71	208.69	-98.41	124.70
44	0.00	0.00	31.87
45	0.00	-0.00	34.09
46	0.00	-0.00	28.26
47	0.00	0.00	17.68
48	-0.00	-0.00	26.88

49 0.00 0.00 24.60

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	-0.00
	8	0.00	-0.00	-0.00
2	8	0.00	0.00	-0.00
	15	0.00	-0.00	-0.00
3	15	0.00	0.00	-0.00
	22	0.00	-0.00	-0.00
4	22	-0.00	0.00	-0.00
	29	-0.00	-0.00	-0.00
5	29	-0.00	0.00	-0.00
	36	-0.00	-0.00	-0.00
6	36	-0.00	-0.00	0.00
	43	-0.00	0.00	0.00
7	43	-0.00	0.00	-0.00
	50	-0.00	-0.00	-0.00
8	50	-0.00	0.00	-0.00
	57	-0.00	-0.00	-0.00
9	57	-0.00	0.00	-0.00
	64	-0.00	-0.00	-0.00
10	64	-0.00	-0.00	-0.00
	71	-0.00	-0.00	-0.00
11	71	-37.50	-59.76	25.62
	78	-37.50	-21.33	25.62
12	78	-7.07	-11.94	6.58
	85	-7.07	-2.08	6.58
13	2	-0.02	0.07	-0.13
	9	-0.02	-0.12	-0.13
14	9	-0.25	0.05	-0.67
	16	-0.25	-0.96	-0.67
15	16	-3.45	-0.26	-1.74
	23	-3.45	-2.87	-1.74
16	23	-7.49	-0.23	-6.00
	30	-7.49	-9.24	-6.00
17	30	-15.18	-3.33	-9.70
	37	-15.18	-17.88	-9.70
18	37	-24.24	-6.50	-12.32
	44	-24.24	-24.98	-12.32
19	44	-12.56	-17.02	9.49
	51	-12.56	-12.03	-2.83
20	51	-20.93	-4.34	1.04
	58	-20.93	-12.02	-11.28
21	58	-27.29	-1.46	-7.38
	65	-27.29	-21.77	-19.70
22	65	-30.63	-14.83	-12.99
	72	-30.63	-43.55	-25.30
23	72	-5.14	-63.00	42.04
	79	-5.14	-9.18	29.72
24	79	-1.66	-15.77	17.54
	86	-1.66	1.31	5.23
25	3	-0.18	0.08	-0.23
	10	-0.18	-0.26	-0.23
26	10	-0.41	-0.10	-0.96
	17	-0.41	-1.55	-0.96
27	17	-4.27	-1.52	-3.12
	24	-4.27	-6.19	-3.12

146	72	-0.43	4.58	-2.41
	73	-0.43	0.96	-2.41
147	73	-0.53	1.84	-1.65
	74	-0.53	-0.63	-1.65
148	74	-0.86	0.10	-0.97
	75	-0.86	-1.35	-0.97
149	75	-1.12	-0.70	-0.32
	76	-1.12	-1.05	-0.32
150	76	-1.04	-0.47	0.15
	77	-1.04	-0.30	0.15
151	78	-1.42	2.77	0.97
	79	-1.42	4.81	0.97
152	79	0.11	4.33	-1.62
	80	0.11	1.90	-1.62
153	80	-0.03	2.06	-1.37
	81	-0.03	0.01	-1.37
154	81	-0.34	0.33	-0.79
	82	-0.34	-0.86	-0.79
155	82	-0.52	-0.50	-0.22
	83	-0.52	-0.74	-0.22
156	83	-0.50	-0.37	0.15
	84	-0.50	-0.20	0.15
157	85	-0.47	0.99	0.18
	86	-0.47	1.37	0.18
158	86	-0.04	1.60	-0.30
	87	-0.04	1.14	-0.30
159	87	0.01	1.04	-0.54
	88	0.01	0.24	-0.54
160	88	-0.10	0.36	-0.49
	89	-0.10	-0.38	-0.49
161	89	-0.15	-0.09	-0.30
	90	-0.15	-0.41	-0.30
162	90	-0.14	-0.11	-0.04
	91	-0.14	-0.15	-0.04

LAV MADRID-BARCELONA.PI 562+7.ESTRIBOS 2 Y 3.

Hip. n° 2 H-2 EMPUJE DE TIERRAS MURO LATERAL

Desplazamientos de nudos

Nudo	Giro x	Giro y	Dpl. z
1	0.000000	-0.000000	-0.000000
2	0.000035	-0.000000	-0.000041
3	0.000047	0.000000	-0.000104
4	0.000051	0.000001	-0.000178
5	0.000052	0.000003	-0.000256
6	0.000052	0.000003	-0.000313
7	0.000052	0.000004	-0.000370
8	0.000000	-0.000000	-0.000000
9	0.000035	-0.000000	-0.000042
10	0.000046	0.000000	-0.000104
11	0.000050	0.000002	-0.000176
12	0.000051	0.000004	-0.000251
13	0.000051	0.000004	-0.000307
14	0.000052	0.000005	-0.000364
15	0.000000	0.000000	-0.000000
16	0.000034	0.000002	-0.000041
17	0.000044	0.000004	-0.000101
18	0.000047	0.000006	-0.000171
19	0.000049	0.000007	-0.000244
20	0.000051	0.000007	-0.000299
21	0.000052	0.000007	-0.000356
22	0.000000	0.000000	-0.000000
23	0.000032	0.000003	-0.000038
24	0.000041	0.000006	-0.000094
25	0.000045	0.000009	-0.000160
26	0.000047	0.000012	-0.000229
27	0.000052	0.000012	-0.000285
28	0.000053	0.000012	-0.000343
29	0.000000	0.000000	-0.000000
30	0.000027	0.000005	-0.000033
31	0.000035	0.000013	-0.000081
32	0.000040	0.000020	-0.000139
33	0.000043	0.000025	-0.000202
34	0.000053	0.000027	-0.000257
35	0.000053	0.000028	-0.000315
36	0.000000	0.000000	-0.000000
37	0.000017	0.000011	-0.000022
38	0.000023	0.000026	-0.000053
39	0.000028	0.000044	-0.000092
40	0.000034	0.000058	-0.000140
41	0.000046	0.000069	-0.000190
42	0.000043	0.000082	-0.000240
43	-0.000000	0.000000	0.000000
44	0.000002	0.000020	0.000000
45	0.000002	0.000046	0.000000
46	0.000004	0.000080	0.000000
47	0.000000	0.000131	0.000000
48	-0.000002	0.000211	0.000000
49	-0.000001	0.000255	0.000000
50	-0.000000	0.000000	0.000000
51	-0.000067	0.000082	0.000079
52	-0.000077	0.000183	0.000184

87	3	-3.81	-2.87	5.88
	4	-3.81	5.94	5.88
88	4	-2.75	-0.02	3.10
	5	-2.75	4.62	3.10
89	5	-1.68	1.29	1.26
	6	-1.68	2.68	1.26
90	6	-0.94	0.84	-0.05
	7	-0.94	0.79	-0.05
91	8	-6.86	-66.87	35.84
	9	-6.86	-10.14	22.84
92	9	-9.13	-12.93	9.22
	10	-9.13	0.89	9.22
93	10	-7.73	-1.18	3.22
	11	-7.73	3.65	3.22
94	11	-5.67	1.92	0.34
	12	-5.67	2.43	0.34
95	12	-3.34	1.32	1.10
	13	-3.34	2.53	1.10
96	13	-2.41	1.29	-0.42
	14	-2.41	0.83	-0.42
97	15	-19.93	-163.28	78.24
	16	-19.93	-17.50	65.24
98	16	-27.01	-61.48	51.08
	17	-27.01	15.14	51.08
99	17	-24.17	-31.15	37.34
	18	-24.17	24.86	37.34
100	18	-18.73	-14.55	16.14
	19	-18.73	9.66	16.14
101	19	-6.46	-2.87	6.09
	20	-6.46	3.83	6.09
102	20	-4.82	1.45	-0.34
	21	-4.82	1.08	-0.34
103	22	-42.96	-246.74	90.05
	23	-42.96	-76.16	77.05
104	23	-63.62	-84.72	43.43
	24	-63.62	-19.58	43.43
105	24	-62.93	-34.67	23.15
	25	-62.93	0.06	23.15
106	25	-51.58	-24.12	25.27
	26	-51.58	13.79	25.27
107	26	-8.88	4.57	-2.04
	27	-8.88	2.32	-2.04
108	27	-6.80	1.28	-0.54
	28	-6.80	0.68	-0.54
109	29	-39.72	-157.34	53.78
	30	-39.72	-62.92	40.78
110	30	-70.59	-64.47	28.25
	31	-70.59	-22.10	28.25
111	31	-77.36	-32.64	20.84
	32	-77.36	-1.38	20.84
112	32	-68.92	-14.33	15.40
	33	-68.92	8.77	15.40
113	33	-11.57	3.74	0.45
	34	-11.57	4.23	0.45
114	34	-8.42	2.47	-1.82
	35	-8.42	0.47	-1.82
115	36	-40.11	-77.48	27.80
	37	-40.11	-37.63	14.80
116	37	-76.55	-29.01	6.42

	38	-76.55	-19.38	6.42
117	38	-90.13	-15.45	1.96
	39	-90.13	-12.52	1.96
118	39	-82.29	-13.52	19.24
	40	-82.29	15.34	19.24
119	40	-13.51	12.45	-12.22
	41	-13.51	-0.98	-12.22
120	41	-8.34	1.42	-2.21
	42	-8.34	-1.02	-2.21
121	43	-16.01	6.26	-6.46
	44	-16.01	-16.56	-12.96
122	44	-31.87	32.55	-43.27
	45	-31.87	-32.36	-43.27
123	45	-38.72	36.58	-51.71
	46	-38.72	-40.99	-51.71
124	46	-35.50	34.98	-39.68
	47	-35.50	-24.55	-39.68
125	47	-5.32	3.52	-4.66
	48	-5.32	-1.61	-4.66
126	48	-4.84	0.29	-1.06
	49	-4.84	-0.87	-1.06
127	50	-2.76	7.92	-3.14
	51	-2.76	1.32	-3.14
128	51	-4.98	4.84	-3.88
	52	-4.98	-0.99	-3.88
129	52	-5.47	3.45	-4.58
	53	-5.47	-3.42	-4.58
130	53	-5.30	1.43	-3.45
	54	-5.30	-3.74	-3.45
131	54	-5.26	-1.45	0.05
	55	-5.26	-1.40	0.05
132	55	-3.90	-0.55	0.13
	56	-3.90	-0.41	0.13
133	57	-1.35	11.34	-3.67
	58	-1.35	3.63	-3.67
134	58	-2.72	5.23	-3.29
	59	-2.72	0.30	-3.29
135	59	-3.04	2.30	-2.83
	60	-3.04	-1.94	-2.83
136	60	-3.22	0.07	-1.77
	61	-3.22	-2.59	-1.77
137	61	-3.35	-1.14	-0.64
	62	-3.35	-1.84	-0.64
138	62	-2.84	-0.78	0.28
	63	-2.84	-0.47	0.28
139	64	-0.97	13.15	-3.90
	65	-0.97	4.96	-3.90
140	65	-1.50	5.62	-3.30
	66	-1.50	0.67	-3.30
141	66	-1.58	1.99	-2.19
	67	-1.58	-1.29	-2.19
142	67	-1.82	-0.05	-1.27
	68	-1.82	-1.95	-1.27
143	68	-2.04	-0.96	-0.44
	69	-2.04	-1.45	-0.44
144	69	-1.81	-0.63	0.20
	70	-1.81	-0.41	0.20
145	71	-1.71	17.14	-6.71
	72	-1.71	3.05	-6.71

28	24	71.03	-5.21	13.98
	31	71.03	8.20	3.91
29	31	81.57	1.43	11.31
	38	81.57	10.85	1.25
30	38	77.65	-2.74	5.71
	45	77.65	-1.72	-4.35
31	45	8.71	-8.57	1.65
	52	8.71	-6.10	1.65
32	52	4.27	-6.58	2.34
	59	4.27	-3.07	2.34
33	59	2.27	-3.39	1.89
	66	2.27	-0.56	1.89
34	66	0.95	-0.64	0.78
	73	0.95	0.53	0.78
35	73	0.06	0.43	0.02
	80	0.06	0.45	0.02
36	80	-0.10	0.31	-0.24
	87	-0.10	-0.05	-0.24
37	4	5.97	1.06	2.78
	11	5.97	-0.63	-5.03
38	11	7.69	1.43	-2.15
	18	7.69	-7.66	-9.97
39	18	47.11	-2.22	11.24
	25	47.11	8.78	3.42
40	25	71.29	20.13	1.31
	32	71.29	16.23	-6.51
41	32	84.24	24.66	-1.06
	39	84.24	17.21	-8.87
42	39	85.24	25.06	-26.16
	46	85.24	-20.04	-33.97
43	46	9.27	-16.83	4.41
	53	9.27	-10.22	4.41
44	53	4.42	-10.04	3.28
	60	4.42	-5.13	3.28
45	60	2.42	-5.31	2.22
	67	2.42	-1.97	2.22
46	67	1.17	-2.21	1.30
	74	1.17	-0.26	1.30
47	74	0.44	-0.59	0.62
	81	0.44	0.34	0.62
48	81	0.12	0.03	0.05
	88	0.12	0.11	0.05
49	5	3.33	1.07	1.83
	12	3.33	0.11	-3.12
50	12	4.43	2.44	-3.88
	19	4.43	-7.09	-8.83
51	19	16.96	5.19	1.21
	26	16.96	3.29	-3.74
52	26	26.18	45.99	-41.18
	33	26.18	-19.49	-46.13
53	33	31.21	37.86	-31.18
	40	31.21	-12.62	-36.13
54	40	34.10	56.16	-69.43
	47	34.10	-51.70	-74.38
55	47	6.03	-21.52	6.88
	54	6.03	-11.20	6.88
56	54	3.75	-11.16	3.38
	61	3.75	-6.09	3.38
57	61	2.30	-6.22	2.25

	68	2.30	-2.85	2.25
58	68	1.30	-3.08	1.42
	75	1.30	-0.95	1.42
59	75	0.65	-1.20	0.77
	82	0.65	-0.05	0.77
60	82	0.29	-0.23	0.19
	89	0.29	0.06	0.19
61	6	1.84	0.74	1.31
	13	1.84	0.57	-1.54
62	13	3.08	1.49	-0.02
	20	3.08	-0.67	-2.87
63	20	5.47	0.96	3.56
	27	5.47	4.17	0.71
64	27	6.51	6.25	-0.79
	34	6.51	2.93	-3.64
65	34	8.27	6.09	-1.37
	41	8.27	1.89	-4.22
66	41	5.87	7.06	-14.23
	48	5.87	-16.42	-17.08
67	48	3.98	-15.94	2.75
	55	3.98	-11.82	2.75
68	55	3.14	-10.46	2.67
	62	3.14	-6.46	2.67
69	62	2.08	-5.95	1.75
	69	2.08	-3.33	1.75
70	69	1.26	-3.09	1.10
	76	1.26	-1.44	1.10
71	76	0.67	-1.36	0.63
	83	0.67	-0.42	0.63
72	83	0.30	-0.40	0.26
	90	0.30	-0.01	0.26
73	7	0.79	0.94	-0.05
	14	0.79	0.14	-1.02
74	14	1.61	2.56	-1.44
	21	1.61	-0.34	-2.42
75	21	2.69	4.48	-2.76
	28	2.69	-0.38	-3.73
76	28	3.37	6.42	-4.27
	35	3.37	-0.72	-5.25
77	35	3.84	7.69	-7.07
	42	3.84	-3.64	-8.04
78	42	2.82	4.70	-10.25
	49	2.82	-11.41	-11.23
79	49	1.95	-6.56	-0.88
	56	1.95	-7.89	-0.88
80	56	1.54	-3.99	-0.75
	63	1.54	-5.12	-0.75
81	63	1.07	-2.28	-0.47
	70	1.07	-2.98	-0.47
82	70	0.66	-1.17	-0.27
	77	0.66	-1.57	-0.27
83	77	0.36	-0.53	-0.11
	84	0.36	-0.70	-0.11
84	84	0.15	-0.20	0.04
	91	0.15	-0.14	0.04
85	1	-3.29	-44.95	29.06
	2	-3.29	-2.46	16.06
86	2	-4.28	-10.36	10.04
	3	-4.28	4.70	10.04

53	0.000040	-0.000078	-0.000162
54	0.000035	-0.000107	-0.000221
55	0.000030	-0.000128	-0.000257
56	0.000028	-0.000144	-0.000289
57	0.000000	-0.000000	-0.000000
58	0.000050	-0.000010	-0.000062
59	0.000064	-0.000025	-0.000150
60	0.000064	-0.000042	-0.000249
61	0.000058	-0.000059	-0.000343
62	0.000053	-0.000073	-0.000404
63	0.000051	-0.000084	-0.000461
64	0.000000	-0.000000	-0.000000
65	0.000061	-0.000007	-0.000074
66	0.000076	-0.000016	-0.000179
67	0.000078	-0.000024	-0.000296
68	0.000073	-0.000034	-0.000410
69	0.000069	-0.000042	-0.000488
70	0.000067	-0.000050	-0.000563
71	0.000000	-0.000000	-0.000000
72	0.000068	-0.000013	-0.000088
73	0.000081	-0.000015	-0.000202
74	0.000084	-0.000018	-0.000327
75	0.000081	-0.000023	-0.000452
76	0.000078	-0.000027	-0.000539
77	0.000077	-0.000032	-0.000624
78	0.000041	-0.000007	-0.000003
79	0.000066	-0.000018	-0.000114
80	0.000081	-0.000018	-0.000226
81	0.000086	-0.000018	-0.000353
82	0.000085	-0.000020	-0.000483
83	0.000083	-0.000022	-0.000575
84	0.000082	-0.000024	-0.000666
85	0.000052	-0.000011	-0.000016
86	0.000068	-0.000018	-0.000141
87	0.000081	-0.000018	-0.000253
88	0.000087	-0.000018	-0.000380
89	0.000087	-0.000019	-0.000512
90	0.000085	-0.000020	-0.000606
91	0.000084	-0.000021	-0.000700

Reacciones en apoyos

Nudo	Mto. x	Mto. y	Fza. z
1	44.95	3.29	29.06
8	66.87	6.86	35.84
15	163.28	19.93	78.24
22	246.74	42.96	90.05
29	157.34	39.72	53.78
36	77.48	40.11	27.80
43	-6.26	16.01	-6.46
50	-7.92	2.76	-3.14
57	-11.34	1.35	-3.67
64	-13.15	0.97	-3.90
71	-20.90	1.61	-5.56
44	0.00	-0.00	-43.29
45	0.00	0.00	-2.44
46	0.00	0.00	50.41
47	0.00	0.00	116.29
48	0.00	0.00	23.43

49 -0.00 -0.00 11.40

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	-0.00	-0.00	0.00
	8	-0.00	0.00	0.00
2	8	-0.00	-0.00	0.00
	15	-0.00	0.00	0.00
3	15	-0.00	-0.00	0.00
	22	-0.00	0.00	0.00
4	22	0.00	-0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	-0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	-0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	-0.00	0.00
	50	0.00	0.00	0.00
8	50	0.00	-0.00	0.00
	57	0.00	0.00	0.00
9	57	0.00	-0.00	0.00
	64	0.00	0.00	0.00
10	64	0.00	-0.00	0.00
	71	0.00	0.00	0.00
11	71	3.76	-0.10	1.15
	78	3.76	1.62	1.15
12	78	0.99	0.21	0.18
	85	0.99	0.47	0.18
13	2	7.89	-0.99	6.02
	9	7.89	-1.20	-6.30
14	9	10.69	-3.47	7.32
	16	10.69	-1.72	-4.99
15	16	54.67	-8.80	9.17
	23	54.67	-4.28	-3.14
16	23	63.23	-24.94	30.48
	30	63.23	11.54	18.16
17	30	64.77	-19.32	30.70
	37	64.77	17.49	18.38
18	37	56.15	-18.94	26.76
	44	56.15	11.97	14.45
19	44	7.05	-3.89	1.47
	51	7.05	-1.69	1.47
20	51	3.53	-3.91	2.21
	58	3.53	-0.59	2.21
21	58	1.94	-1.96	1.83
	65	1.94	0.78	1.83
22	65	1.28	0.25	1.22
	72	1.28	2.08	1.22
23	72	-0.25	3.36	-3.07
	79	-0.25	-1.25	-3.07
24	79	0.23	0.28	-0.48
	86	0.23	-0.44	-0.48
25	3	7.57	0.47	4.16
	10	7.57	-0.84	-5.90
26	10	9.64	0.56	0.09
	17	9.64	-6.85	-9.97
27	17	55.94	-4.01	3.77
	24	55.94	-5.91	-6.30

22	3	8.210	8.210	
23	3	8.210	8.210	
24	3	8.210	8.210	
31	3	6.710	6.710	
32	3	6.710	6.710	
33	3	6.710	6.710	
34	3	6.710	6.710	
35	3	6.710	6.710	
36	3	6.710	6.710	
43	3	5.210	5.210	
44	3	5.210	5.210	
45	3	5.210	5.210	
46	3	5.210	5.210	
47	3	5.210	5.210	
48	3	5.210	5.210	
55	3	3.300	3.300	
56	3	3.300	3.300	
57	3	3.300	3.300	
58	3	3.300	3.300	
59	3	3.300	3.300	
60	3	3.300	3.300	
67	3	1.900	1.900	
68	3	1.900	1.900	
69	3	1.900	1.900	
70	3	1.900	1.900	
71	3	1.900	1.900	
72	3	1.900	1.900	
79	3	0.650	0.650	
80	3	0.650	0.650	
81	3	0.650	0.650	
82	3	0.650	0.650	
83	3	0.650	0.650	
84	3	0.650	0.650	
127	2	9.630	0.000	1.350
133	2	9.630	0.000	1.350
139	2	9.630	0.000	1.350
145	2	9.630	0.000	1.350
151	2	9.630	0.000	1.350
121	2	4.815	0.000	1.350
157	2	4.815	0.000	1.350

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Hip. n° 1 H-1 F.HORIZONTAL+EMP.TIERRAS MURO FRONTAL

Desplazamientos de nudos

Nudo	Giro x	Giro y	Dpl. z
1	-0.000000	-0.000000	0.000000
2	-0.000246	-0.000043	0.000342
3	-0.000270	-0.000084	0.000745
4	-0.000257	-0.000120	0.001149
5	-0.000238	-0.000146	0.001525
6	-0.000226	-0.000157	0.001780
7	-0.000221	-0.000164	0.002026
8	-0.000000	-0.000000	0.000000
9	-0.000209	-0.000045	0.000276
10	-0.000234	-0.000088	0.000615
11	-0.000229	-0.000125	0.000965
12	-0.000220	-0.000151	0.001301
13	-0.000214	-0.000163	0.001540
14	-0.000211	-0.000171	0.001774
15	-0.000000	-0.000000	0.000000
16	-0.000159	-0.000041	0.000212
17	-0.000188	-0.000080	0.000485
18	-0.000193	-0.000116	0.000780
19	-0.000196	-0.000143	0.001075
20	-0.000194	-0.000167	0.001291
21	-0.000190	-0.000185	0.001502
22	-0.000000	-0.000000	0.000000
23	-0.000124	-0.000038	0.000153
24	-0.000153	-0.000078	0.000366
25	-0.000163	-0.000118	0.000605
26	-0.000166	-0.000151	0.000854
27	-0.000153	-0.000186	0.001028
28	-0.000150	-0.000214	0.001195
29	-0.000000	-0.000000	0.000000
30	-0.000084	-0.000035	0.000101
31	-0.000108	-0.000080	0.000248
32	-0.000118	-0.000129	0.000419
33	-0.000119	-0.000173	0.000598
34	-0.000105	-0.000219	0.000722
35	-0.000100	-0.000252	0.000834
36	-0.000000	-0.000000	0.000000
37	-0.000043	-0.000036	0.000050
38	-0.000056	-0.000084	0.000126
39	-0.000064	-0.000141	0.000216
40	-0.000064	-0.000193	0.000314
41	-0.000044	-0.000247	0.000369
42	-0.000043	-0.000281	0.000416
43	0.000000	-0.000000	-0.000000
44	-0.000007	-0.000034	-0.000000
45	-0.000007	-0.000083	-0.000000
46	-0.000010	-0.000143	0.000000
47	-0.000003	-0.000198	0.000000
48	0.000000	-0.000219	0.000000
49	-0.000001	-0.000238	0.000000
50	0.000000	-0.000000	-0.000000
51	0.000031	-0.000021	-0.000040
52	0.000040	-0.000048	-0.000097

121	43	44	15
122	44	45	15
123	45	46	15
124	46	47	15
125	47	48	4
126	48	49	4
127	50	51	4
128	51	52	4
129	52	53	4
130	53	54	4
131	54	55	4
132	55	56	4
133	57	58	4
134	58	59	4
135	59	60	4
136	60	61	4
137	61	62	4
138	62	63	4
139	64	65	4
140	65	66	4
141	66	67	4
142	67	68	4
43	68	69	4
144	69	70	4
145	71	72	4
146	72	73	4
147	73	74	4
148	74	75	4
149	75	76	4
150	76	77	4
151	78	79	4
152	79	80	4
153	80	81	4
154	81	82	4
155	82	83	4
156	83	84	4
157	85	86	1
158	86	87	1
159	87	88	1
160	88	89	1
161	89	90	1
2	90	91	1

APOYOS

17			
1	1.000	1.000	1.000
8	1.000	1.000	1.000
15	1.000	1.000	1.000
22	1.000	1.000	1.000
29	1.000	1.000	1.000
36	1.000	1.000	1.000
43	1.000	1.000	1.000
50	1.000	1.000	1.000
57	1.000	1.000	1.000
64	1.000	1.000	1.000
71	1.000	1.000	1.000
44	0.000	0.000	1.000
45	0.000	0.000	1.000
46	0.000	0.000	1.000

47	0.000	0.000	1.000
48	0.000	0.000	1.000
49	0.000	0.000	1.000

CARGAS

H-1 F.HORIZONTAL+EMP.TIERRAS MURO FRONTAL

2			
26	0.000	0.000	64.760
40	0.000	0.000	64.760
43			
13	3	8.210	8.210
14	3	8.210	8.210
15	3	8.210	8.210
16	3	8.210	8.210
17	3	8.210	8.210
18	3	8.210	8.210
25	3	6.710	6.710
26	3	6.710	6.710
27	3	6.710	6.710
28	3	6.710	6.710
29	3	6.710	6.710
30	3	6.710	6.710
37	3	5.210	5.210
38	3	5.210	5.210
39	3	5.210	5.210
40	3	5.210	5.210
41	3	5.210	5.210
42	3	5.210	5.210
49	3	3.300	3.300
50	3	3.300	3.300
51	3	3.300	3.300
52	3	3.300	3.300
53	3	3.300	3.300
54	3	3.300	3.300
61	3	1.900	1.900
62	3	1.900	1.900
63	3	1.900	1.900
64	3	1.900	1.900
65	3	1.900	1.900
66	3	1.900	1.900
73	3	0.650	0.650
74	3	0.650	0.650
75	3	0.650	0.650
76	3	0.650	0.650
77	3	0.650	0.650
78	3	0.650	0.650
85	2	9.630	0.000
91	2	9.630	0.000
97	2	9.630	0.000
103	2	9.630	0.000
109	2	9.630	0.000
115	2	9.630	0.000
121	2	4.815	0.000

H-2 EMPUJE DE TIERRAS MURO LATERAL

0			
43			
19	3	8.210	8.210
20	3	8.210	8.210
21	3	8.210	8.210

3	15	22	1
4	22	29	1
5	29	36	1
6	36	43	1
7	43	50	1
8	50	57	1
9	57	64	1
10	64	71	1
11	71	78	1
12	78	85	1
13	2	9	2
14	9	16	2
15	16	23	3
16	23	30	3
17	30	37	3
18	37	44	3
19	44	51	4
20	51	58	4
21	58	65	4
22	65	72	4
23	72	79	4
24	79	86	4
25	3	10	2
26	10	17	2
27	17	24	3
28	24	31	3
29	31	38	3
30	38	45	3
31	45	52	4
32	52	59	4
33	59	66	4
34	66	73	4
35	73	80	4
36	80	87	4
37	4	11	2
38	11	18	2
39	18	25	3
40	25	32	3
41	32	39	3
42	39	46	3
43	46	53	4
44	53	60	4
45	60	67	4
46	67	74	4
47	74	81	4
48	81	88	4
49	5	12	5
50	12	19	5
51	19	26	6
52	26	33	6
53	33	40	6
54	40	47	6
55	47	54	7
56	54	61	7
57	61	68	7
58	68	75	7
59	75	82	7
60	82	89	7
61	6	13	8

62	13	20	8
63	20	27	9
64	27	34	9
65	34	41	9
66	41	48	9
67	48	55	9
68	55	62	9
69	62	69	9
70	69	76	9
71	76	83	9
72	83	90	9
73	7	14	10
74	14	21	10
75	21	28	11
76	28	35	11
77	35	42	11
78	42	49	11
79	49	56	11
80	56	63	11
81	63	70	11
82	70	77	11
83	77	84	11
84	84	91	11
85	1	2	12
86	2	3	12
87	3	4	12
88	4	5	12
89	5	6	12
90	6	7	12
91	8	9	2
92	9	10	2
93	10	11	2
94	11	12	2
95	12	13	2
96	13	14	2
97	15	16	13
98	16	17	13
99	17	18	13
100	18	19	13
101	19	20	14
102	20	21	14
103	22	23	3
104	23	24	3
105	24	25	3
106	25	26	3
107	26	27	4
108	27	28	4
109	29	30	3
110	30	31	3
111	31	32	3
112	32	33	3
113	33	34	4
114	34	35	4
115	36	37	3
116	37	38	3
117	38	39	3
118	39	40	3
119	40	41	4
120	41	42	4

LAV MADRID-BARCELONA.PI 562+7.ESTRIBOS 2 Y 3.

CONTROL

91 162 7 2

NUDOS

1	0.000	-0.600
2	0.000	1.500
3	0.000	3.000
4	0.000	4.500
5	0.000	6.000
6	0.000	7.100
7	0.000	8.200
8	1.500	-0.600
9	1.500	1.500
10	1.500	3.000
11	1.500	4.500
12	1.500	6.000
13	1.500	7.100
14	1.500	8.200
15	3.000	-0.600
16	3.000	1.500
17	3.000	3.000
18	3.000	4.500
19	3.000	6.000
20	3.000	7.100
21	3.000	8.200
22	4.500	-0.600
23	4.500	1.500
24	4.500	3.000
25	4.500	4.500
26	4.500	6.000
27	4.500	7.100
28	4.500	8.200
29	6.000	-0.600
30	6.000	1.500
31	6.000	3.000
32	6.000	4.500
33	6.000	6.000
34	6.000	7.100
35	6.000	8.200
36	7.500	-0.600
37	7.500	1.500
38	7.500	3.000
39	7.500	4.500
40	7.500	6.000
41	7.500	7.100
42	7.500	8.200
43	9.000	-0.600
44	9.000	1.500
45	9.000	3.000
46	9.000	4.500
47	9.000	6.000
48	9.000	7.100
49	9.000	8.200
50	10.500	-0.600
51	10.500	1.500
52	10.500	3.000
53	10.500	4.500
54	10.500	6.000

55	10.500	7.100
56	10.500	8.200
57	12.000	-0.600
58	12.000	1.500
59	12.000	3.000
60	12.000	4.500
61	12.000	6.000
62	12.000	7.100
63	12.000	8.200
64	13.500	-0.600
65	13.500	1.500
66	13.500	3.000
67	13.500	4.500
68	13.500	6.000
69	13.500	7.100
70	13.500	8.200
71	15.000	-0.600
72	15.000	1.500
73	15.000	3.000
74	15.000	4.500
75	15.000	6.000
76	15.000	7.100
77	15.000	8.200
78	16.500	-0.600
79	16.500	1.500
80	16.500	3.000
81	16.500	4.500
82	16.500	6.000
83	16.500	7.100
84	16.500	8.200
85	18.000	-0.600
86	18.000	1.500
87	18.000	3.000
88	18.000	4.500
89	18.000	6.000
90	18.000	7.100
91	18.000	8.200

SECCIONES

15

0.062500	0.125000	2500000	1100000
0.144703	0.289406	2500000	1100000
1.076890	2.153780	2500000	1100000
0.125000	0.250000	2500000	1100000
0.125409	0.250818	2500000	1100000
0.384213	0.768426	2500000	1100000
0.108333	0.216666	2500000	1100000
0.106116	0.212232	2500000	1100000
0.091667	0.183334	2500000	1100000
0.053058	0.106116	2500000	1100000
0.045833	0.091666	2500000	1100000
0.072352	0.144704	2500000	1100000
0.465484	0.930968	2500000	1100000
0.134611	0.269222	2500000	1100000
0.443322	0.886644	2500000	1100000

BARRAS

1	1	8	1
2	8	15	1

5.4.- VOLADIZOS ESTRIBOS 1 Y 4

86	43	0.00	0.00	0.00
	44	0.00	0.00	0.00
87	44	0.00	0.00	0.00
	45	0.00	0.00	0.00
88	45	0.00	0.00	0.00
	46	0.00	0.00	0.00
89	46	0.00	0.00	0.00
	47	0.00	0.00	0.00
90	47	8.23	4.53	-1.13
	48	8.23	3.29	-1.13
91	48	4.99	2.43	-1.79
	49	4.99	0.48	-1.79
92	50	-1.93	-12.05	-1.54
	51	-1.93	-15.28	-1.54
93	51	-2.60	-10.64	-0.87
	52	-2.60	-11.94	-0.87
94	52	-2.44	-7.15	-0.69
	53	-2.44	-8.19	-0.69
95	53	-1.92	-4.14	-0.44
	54	-1.92	-4.78	-0.44
96	54	-1.28	-2.25	-0.16
	55	-1.28	-2.43	-0.16
97	55	2.25	1.79	-0.08
	56	2.25	1.69	-0.08

27	39	5.09	-0.86	-0.84
	46	-10.39	4.45	-4.24
28	46	0.00	0.00	0.00
	53	-12.39	1.57	-6.69
29	5	0.00	0.00	0.00
	12	1.02	1.77	-3.27
30	12	2.58	6.81	-1.88
	19	2.58	-1.57	-9.30
31	19	0.00	0.00	0.00
	26	3.74	4.99	-4.13
32	26	4.50	11.23	-8.01
	33	4.50	-0.76	-8.01
33	33	3.42	1.11	-2.47
	40	3.42	-2.61	-2.47
34	40	3.06	-1.25	-0.70
	47	-5.92	5.10	-2.33
35	47	0.00	0.00	0.00
	54	-7.64	2.01	-4.61
36	6	-0.86	-0.15	-0.70
	13	-0.48	-1.10	-2.68
37	13	-1.34	-1.53	-0.19
	20	-0.48	-1.50	-2.17
38	20	0.00	0.00	0.00
	27	1.26	-0.24	-2.47
39	27	3.29	1.50	-1.05
	34	3.29	-0.06	-1.05
40	34	2.16	0.70	-1.95
	41	2.16	-2.22	-1.95
41	41	1.93	-1.19	-0.72
	48	-3.27	4.91	-0.76
42	48	0.00	0.00	0.00
	55	-4.35	1.65	-3.64
43	7	0.00	0.00	0.00
	14	0.23	0.15	-0.76
44	14	0.00	0.00	0.00
	21	0.50	-0.06	-1.34
45	21	0.63	1.31	-1.17
	28	0.63	-1.54	-2.63
46	28	1.46	0.70	-1.56
	35	1.46	-1.65	-1.56
47	35	1.02	0.97	-2.00
	42	1.02	-2.01	-2.00
48	42	0.86	0.15	-1.49
	49	0.86	-2.09	-1.49
49	49	0.60	-0.30	-0.30
	56	0.60	-0.75	-0.30
50	1	12.80	-31.65	-18.33
	2	12.80	-70.14	-18.33
51	2	16.38	-38.81	-11.28
	3	16.38	-55.73	-11.28
52	3	13.88	-25.99	-5.87
	4	13.88	-34.81	-5.87
53	4	0.00	0.00	0.00
	5	0.00	0.00	0.00
54	5	0.58	-0.48	-0.70
	6	0.58	-1.26	-0.70
55	6	0.00	0.00	0.00
	7	0.00	0.00	0.00
56	8	0.00	0.00	0.00

	9	0.00	0.00	0.00
57	9	0.00	0.00	0.00
	10	0.00	0.00	0.00
58	10	0.00	0.00	0.00
	11	0.00	0.00	0.00
59	11	0.00	0.00	0.00
	12	0.00	0.00	0.00
60	12	0.00	0.00	0.00
	13	0.00	0.00	0.00
61	13	0.00	0.00	0.00
	14	0.00	0.00	0.00
62	15	0.00	0.00	0.00
	16	0.00	0.00	0.00
63	16	0.00	0.00	0.00
	17	0.00	0.00	0.00
64	17	0.00	0.00	0.00
	18	0.00	0.00	0.00
65	18	0.00	0.00	0.00
	19	0.00	0.00	0.00
66	19	0.00	0.00	0.00
	20	0.00	0.00	0.00
67	20	0.00	0.00	0.00
	21	0.00	0.00	0.00
68	22	0.00	0.00	0.00
	23	0.00	0.00	0.00
69	23	0.00	0.00	0.00
	24	0.00	0.00	0.00
70	24	0.00	0.00	0.00
	25	0.00	0.00	0.00
71	25	0.00	0.00	0.00
	26	0.00	0.00	0.00
72	26	0.00	0.00	0.00
	27	0.00	0.00	0.00
73	27	0.00	0.00	0.00
	28	0.00	0.00	0.00
74	29	0.00	0.00	0.00
	30	0.00	0.00	0.00
75	30	0.00	0.00	0.00
	31	0.00	0.00	0.00
76	31	0.00	0.00	0.00
	32	0.00	0.00	0.00
77	32	0.00	0.00	0.00
	33	0.00	0.00	0.00
78	33	-3.39	0.38	-1.34
	34	-3.39	-1.10	-1.34
79	34	-2.63	0.03	-0.44
	35	-2.63	-0.44	-0.44
80	36	0.00	0.00	0.00
	37	0.00	0.00	0.00
81	37	0.00	0.00	0.00
	38	0.00	0.00	0.00
82	38	0.00	0.00	0.00
	39	0.00	0.00	0.00
83	39	0.00	0.00	0.00
	40	0.00	0.00	0.00
84	40	0.00	0.00	0.00
	41	0.00	0.00	0.00
85	41	0.00	0.00	0.00
	42	0.00	0.00	0.00

86	43	7.53	-194.67	71.61
	44	7.53	-72.07	52.11
87	44	11.31	-74.79	30.78
	45	11.31	-28.63	30.78
88	45	10.74	-31.47	16.18
	46	10.74	-7.18	16.18
89	46	8.19	-9.26	6.66
	47	8.19	0.75	6.66
90	47	-2.82	-4.61	2.37
	48	-2.82	-2.00	2.37
91	48	-1.80	-1.56	1.19
	49	-1.80	-0.25	1.19
92	50	5.36	-95.21	43.26
	51	5.36	-18.24	33.51
93	51	7.77	-32.04	22.83
	52	7.77	2.20	22.83
94	52	7.48	-12.33	14.86
	53	7.48	9.98	14.86
95	53	5.91	-2.41	8.17
	54	5.91	9.86	8.17
96	54	3.90	2.22	3.57
	55	3.90	6.14	3.57
97	55	-0.75	-0.93	0.30
	56	-0.75	-0.60	0.30

LAV MADRID-BARCELONA.PI 562+7.ESTRIBOS 1 Y 4.

HC. n° 1 Esfuerzos Cortantes mínimos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	0.00
	8	0.00	0.00	0.00
2	8	0.00	0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	0.00
	22	0.00	0.00	0.00
4	22	0.00	0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	0.00
	50	0.00	0.00	0.00
8	2	-31.35	3.59	-7.05
	9	-24.38	-6.42	-15.12
9	9	-42.18	3.38	-16.49
	16	-31.80	-17.16	-21.61
10	16	-46.32	-7.78	-3.52
	23	-33.81	-9.72	-10.92
11	23	0.00	0.00	0.00
	30	-18.91	-6.06	-10.83
12	30	0.00	0.00	0.00
	37	-18.96	-5.31	-13.99
13	37	0.00	0.00	0.00
	44	-17.58	-5.84	-14.70
14	44	0.00	0.00	0.00
	51	-13.80	-2.43	-10.68
15	3	-29.73	-2.50	-5.41
	10	-22.93	-7.81	-11.55
16	10	-40.78	-14.79	-5.65
	17	-30.71	-16.73	-11.34
17	17	0.00	0.00	0.00
	24	12.83	5.74	-8.58
18	24	5.91	5.61	-2.95
	31	5.91	1.17	-2.95
19	31	6.55	1.10	-1.22
	38	-14.11	1.31	-5.19
20	38	6.08	-0.52	-0.14
	45	-12.60	1.07	-7.26
21	45	0.00	0.00	0.00
	52	-14.55	0.28	-7.97
22	4	-23.22	-5.20	-9.56
	11	-18.42	-12.81	-12.09
23	11	-36.54	-29.13	-3.21
	18	-27.44	-23.73	-8.09
24	18	0.00	0.00	0.00
	25	11.81	11.57	-6.72
25	25	5.80	10.10	-5.93
	32	5.80	1.22	-5.93
26	32	5.73	2.16	-2.95
	39	5.73	-2.28	-2.95

27	39	-15.48	2.87	8.33
	46	0.00	0.00	0.00
28	46	-8.33	1.90	5.28
	53	4.07	-0.52	0.25
29	5	-4.55	-6.97	8.55
	12	-5.57	-1.49	4.39
30	12	-9.52	-23.24	15.65
	19	-9.52	0.23	15.65
31	19	-13.10	-27.65	24.81
	26	-16.83	-1.00	21.51
32	26	-15.05	-28.09	26.25
	33	-15.05	5.72	18.83
33	33	-10.07	-1.92	11.04
	40	-10.07	9.08	3.62
34	40	-8.98	4.26	5.80
	47	0.00	0.00	0.00
35	47	-5.10	2.31	3.09
	54	2.54	-0.64	0.27
36	6	0.38	-0.12	2.30
	13	0.00	0.00	0.00
37	13	0.86	0.09	2.30
	20	0.00	0.00	0.00
38	20	-0.36	-2.17	2.75
	27	-1.62	-1.03	0.94
39	27	-5.02	-6.30	7.76
	34	-5.02	2.13	3.48
40	34	-4.86	-1.65	8.31
	41	-4.86	7.59	4.03
41	41	-5.20	4.02	4.23
	48	0.00	0.00	0.00
42	48	-2.85	2.70	1.10
	55	1.50	-0.52	0.47
43	7	0.23	0.19	0.70
	14	0.00	0.00	0.00
44	14	-0.20	-0.80	0.95
	21	-0.69	-0.42	0.81
45	21	-0.75	-2.24	2.18
	28	-0.75	1.02	2.18
46	28	-1.93	-2.18	3.55
	35	-1.93	2.07	2.10
47	35	-2.00	-2.55	5.93
	42	-2.00	5.25	4.47
48	42	-2.18	-0.06	4.78
	49	-2.18	6.03	3.33
49	49	-1.69	1.03	1.54
	56	-1.69	2.25	0.08
50	1	-2.43	-138.69	45.47
	2	-2.43	-57.12	35.72
51	2	-3.62	-64.08	25.31
	3	-3.62	-26.13	25.31
52	3	-2.94	-32.93	16.35
	4	-2.94	-8.41	16.35
53	4	7.49	-24.78	10.84
	5	7.49	-8.52	10.84
54	5	-0.08	-3.48	3.00
	6	-0.08	-0.18	3.00
55	6	-0.19	-0.56	0.70
	7	-0.19	0.23	0.70
56	8	20.53	-399.38	91.32

	9	20.53	-235.40	71.82
57	9	28.37	-227.97	59.83
	10	28.37	-138.21	59.83
58	10	25.17	-130.44	44.55
	11	25.17	-63.61	44.55
59	11	17.58	-54.63	28.80
	12	17.58	-11.42	28.80
60	12	0.87	-9.01	6.48
	13	0.87	-1.89	6.48
61	13	0.51	-1.88	1.71
	14	0.51	-0.01	1.71
62	15	24.06	-451.62	116.50
	16	24.06	-234.75	97.00
63	16	34.01	-232.73	67.83
	17	34.01	-130.96	67.83
64	17	32.73	-127.13	45.08
	18	32.73	-59.52	45.08
65	18	27.41	-52.05	24.89
	19	27.41	-14.70	24.89
66	19	1.14	-8.55	6.45
	20	1.14	-1.47	6.45
67	20	0.47	-1.59	1.53
	21	0.47	0.09	1.53
68	22	15.54	-292.93	94.15
	23	15.54	-122.99	74.65
69	23	22.40	-143.42	55.65
	24	22.40	-59.96	55.65
70	24	22.97	-80.60	37.90
	25	22.97	-23.72	37.90
71	25	25.33	-45.48	21.23
	26	25.33	-13.65	21.23
72	26	4.47	-16.17	10.68
	27	4.47	-4.44	10.68
73	27	0.95	-3.04	2.44
	28	0.95	-0.36	2.44
74	29	8.38	-160.23	58.10
	30	8.38	-66.04	38.60
75	30	13.82	-66.38	22.26
	31	13.82	-32.99	22.26
76	31	13.41	-32.78	11.32
	32	13.41	-15.78	11.32
77	32	10.74	-16.98	5.08
	33	10.74	-9.35	5.08
78	33	8.39	-13.65	8.67
	34	8.39	-4.13	8.67
79	34	4.61	-4.29	3.84
	35	4.61	-0.06	3.84
80	36	7.95	-177.58	64.51
	37	7.95	-69.87	45.01
81	37	13.14	-71.06	26.91
	38	13.14	-30.72	26.91
82	38	12.45	-32.22	13.88
	39	12.45	-11.41	13.88
83	39	9.14	-12.98	6.22
	40	9.14	-3.62	6.22
84	40	5.70	-4.32	2.28
	41	5.70	-1.83	2.28
85	41	3.16	-1.25	0.84
	42	3.16	-0.34	0.84

86	43	7.53	-194.67	71.61
	44	7.53	-72.07	52.11
87	44	11.31	-74.79	30.78
	45	11.31	-28.63	30.78
88	45	10.74	-31.47	16.18
	46	-5.26	-11.17	4.44
89	46	-4.08	-10.15	3.35
	47	-4.08	-5.13	3.35
90	47	-2.82	-4.61	2.37
	48	-2.82	-2.00	2.37
91	48	-1.80	-1.56	1.19
	49	-1.80	-0.25	1.19
92	50	3.42	-107.25	41.72
	51	3.42	-33.53	31.97
93	51	5.17	-42.68	21.96
	52	-2.60	-11.94	-0.87
94	52	5.04	-19.49	14.18
	53	-2.44	-8.19	-0.69
95	53	3.99	-6.55	7.74
	54	-1.92	-4.78	-0.44
96	54	-1.28	-2.25	-0.16
	55	-1.28	-2.43	-0.16
97	55	-0.75	-0.93	0.30
	56	-0.75	-0.60	0.30

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HC. n° 1 Esfuerzos Cortantes máximos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	0.00
	8	0.00	0.00	0.00
2	8	0.00	0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	0.00
	22	0.00	0.00	0.00
4	22	0.00	0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	0.00
	50	0.00	0.00	0.00
8	2	6.98	-1.19	10.41
	9	0.00	0.00	0.00
9	9	10.38	-1.98	13.35
	16	0.00	0.00	0.00
10	16	12.51	0.57	11.09
	23	0.00	0.00	0.00
11	23	-13.38	-2.87	8.10
	30	5.53	1.49	0.45
12	30	-13.05	0.84	5.94
	37	5.91	1.22	1.47
13	37	-11.86	1.10	5.60
	44	5.72	1.46	1.83
14	44	-9.14	-0.60	8.46
	51	4.66	0.66	0.67
15	3	6.80	0.67	8.95
	10	0.00	0.00	0.00
16	10	10.08	3.76	9.40
	17	0.00	0.00	0.00
17	17	-34.56	-18.00	11.41
	24	-47.39	-17.94	4.90
18	24	-19.83	-17.20	17.03
	31	-19.83	-3.00	1.92
19	31	-20.67	-3.30	11.11
	38	0.00	0.00	0.00
20	38	-18.67	1.17	7.97
	45	0.00	0.00	0.00
21	45	-9.76	0.50	7.32
	52	4.78	-0.15	0.18
22	4	4.80	1.74	9.18
	11	0.00	0.00	0.00
23	11	9.11	8.74	6.84
	18	0.00	0.00	0.00
24	18	-34.89	-29.04	12.09
	25	-46.69	-31.26	7.10
25	25	-18.94	-27.44	22.98
	32	-18.94	-1.77	11.25
26	32	-17.67	-5.38	14.53
	39	-17.67	7.62	2.81

27	39	5.09	-0.86	-0.84
	46	5.09	-2.10	-0.84
28	46	4.07	-0.92	0.25
	53	4.07	-0.52	0.25
29	5	-5.57	-8.09	4.39
	12	-5.57	-1.49	4.39
30	12	-9.52	-23.24	15.65
	19	2.58	-1.57	-9.30
31	19	-16.83	-33.27	21.51
	26	-16.83	-1.00	21.51
32	26	-15.05	-28.09	26.25
	33	4.50	-0.76	-8.01
33	33	-10.07	-1.92	11.04
	40	3.42	-2.61	-2.47
34	40	3.06	-1.25	-0.70
	47	3.06	-2.30	-0.70
35	47	2.54	-1.05	0.27
	54	2.54	-0.64	0.27
36	6	-0.48	-0.27	1.59
	13	-0.86	-1.22	-0.70
37	13	-1.34	-1.53	-0.19
	20	-1.34	-1.83	-0.19
38	20	-1.62	-2.44	0.94
	27	-0.36	-1.27	-1.53
39	27	-5.02	-6.30	7.76
	34	3.29	-0.06	-1.05
40	34	-4.86	-1.65	8.31
	41	2.16	-2.22	-1.95
41	41	1.93	-1.19	-0.72
	48	1.93	-2.26	-0.72
42	48	1.50	-1.23	0.47
	55	1.50	-0.52	0.47
43	7	-0.41	-0.44	0.00
	14	-0.41	-0.44	0.00
44	14	-0.69	-1.63	0.81
	21	-0.20	-0.48	-0.52
45	21	-0.75	-2.24	2.18
	28	0.63	-1.54	-2.63
46	28	-1.93	-2.18	3.55
	35	1.46	-1.65	-1.56
47	35	-2.00	-2.55	5.93
	42	1.02	-2.01	-2.00
48	42	-2.18	-0.06	4.78
	49	0.86	-2.09	-1.49
49	49	0.60	-0.30	-0.30
	56	0.60	-0.75	-0.30
50	1	10.36	-170.34	27.14
	2	10.36	-127.26	17.39
51	2	12.76	-102.89	14.03
	3	12.76	-81.86	14.03
52	3	10.93	-58.92	10.48
	4	10.93	-43.23	10.48
53	4	7.49	-24.78	10.84
	5	7.49	-8.52	10.84
54	5	0.51	-3.96	2.30
	6	0.51	-1.44	2.30
55	6	0.24	0.96	0.70
	7	0.44	-0.41	0.00
56	8	20.53	-399.38	91.32

	9	20.53	-235.40	71.82
57	9	28.37	-227.97	59.83
	10	28.37	-138.21	59.83
58	10	25.17	-130.44	44.55
	11	25.17	-63.61	44.55
59	11	17.58	-54.63	28.80
	12	17.58	-11.42	28.80
60	12	0.87	-9.01	6.48
	13	0.87	-1.89	6.48
61	13	0.51	-1.88	1.71
	14	1.20	-0.28	0.81
62	15	24.06	-451.62	116.50
	16	24.06	-234.75	97.00
63	16	34.01	-232.73	67.83
	17	34.01	-130.96	67.83
64	17	32.73	-127.13	45.08
	18	32.73	-59.52	45.08
65	18	27.41	-52.05	24.89
	19	27.41	-14.70	24.89
66	19	1.14	-8.55	6.45
	20	2.43	-1.85	2.50
67	20	0.47	-1.59	1.53
	21	1.82	-0.06	1.37
68	22	15.54	-292.93	94.15
	23	15.54	-122.99	74.65
69	23	22.40	-143.42	55.65
	24	22.40	-59.96	55.65
70	24	22.97	-80.60	37.90
	25	22.97	-23.72	37.90
71	25	25.33	-45.48	21.23
	26	25.33	-13.65	21.23
72	26	4.47	-16.17	10.68
	27	8.46	-6.12	8.19
73	27	0.95	-3.04	2.44
	28	3.20	-1.19	1.38
74	29	8.38	-160.23	58.10
	30	8.38	-66.04	38.60
75	30	13.82	-66.38	22.26
	31	13.82	-32.99	22.26
76	31	13.41	-32.78	11.32
	32	13.41	-15.78	11.32
77	32	10.74	-16.98	5.08
	33	10.74	-9.35	5.08
78	33	8.39	-13.65	8.67
	34	5.00	-5.22	7.34
79	34	4.61	-4.29	3.84
	35	1.98	-0.50	3.40
80	36	7.95	-177.58	64.51
	37	7.95	-69.87	45.01
81	37	13.14	-71.06	26.91
	38	13.14	-30.72	26.91
82	38	12.45	-32.22	13.88
	39	12.45	-11.41	13.88
83	39	9.14	-12.98	6.22
	40	9.14	-3.62	6.22
84	40	5.70	-4.32	2.28
	41	5.70	-1.83	2.28
85	41	3.16	-1.25	0.84
	42	3.16	-0.34	0.84

86	43	0.00	0.00	0.00
	44	0.00	0.00	0.00
87	44	0.00	0.00	0.00
	45	0.00	0.00	0.00
88	45	0.00	0.00	0.00
	46	16.01	3.99	11.74
89	46	12.27	0.90	3.32
	47	12.27	5.86	3.32
90	47	8.23	4.53	-1.13
	48	8.23	3.29	-1.13
91	48	4.99	2.43	-1.79
	49	4.99	0.48	-1.79
92	50	0.00	0.00	0.00
	51	0.00	0.00	0.00
93	51	0.00	0.00	0.00
	52	7.77	2.20	22.83
94	52	0.00	0.00	0.00
	53	7.48	9.98	14.86
95	53	0.00	0.00	0.00
	54	5.91	9.86	8.17
96	54	3.90	2.22	3.57
	55	3.90	6.14	3.57
97	55	2.25	1.79	-0.08
	56	2.25	1.69	-0.08

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HC. n° 1 Momentos Flectores mínimos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	0.00
	8	0.00	0.00	0.00
2	8	0.00	0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	0.00
	22	0.00	0.00	0.00
4	22	0.00	0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	0.00
	50	0.00	0.00	0.00
8	2	6.98	-1.19	10.41
	9	-31.35	-6.99	-7.05
9	9	10.38	-1.98	13.35
	16	-42.18	-21.34	-16.49
10	16	-46.32	-7.78	-3.52
	23	-46.32	-13.07	-3.52
11	23	-18.91	-3.68	7.65
	30	-18.91	-6.06	-10.83
12	30	5.91	-1.00	1.47
	37	-18.96	-5.31	-13.99
13	37	5.72	-1.28	1.83
	44	-17.58	-5.84	-14.70
14	44	-9.14	-0.60	8.46
	51	-13.80	-2.43	-10.68
15	3	-29.73	-2.50	-5.41
	10	-29.73	-10.62	-5.41
16	10	-40.78	-14.79	-5.65
	17	-40.78	-23.28	-5.65
17	17	-47.39	-25.29	4.90
	24	-47.39	-17.94	4.90
18	24	-19.83	-17.20	17.03
	31	-19.83	-3.00	1.92
19	31	-20.67	-3.30	11.11
	38	6.55	-0.74	-1.22
20	38	6.08	-0.52	-0.14
	45	6.08	-0.74	-0.14
21	45	4.78	-0.42	0.18
	52	4.78	-0.15	0.18
22	4	-23.22	-5.20	-9.56
	11	-23.22	-19.55	-9.56
23	11	-36.54	-29.13	-3.21
	18	-36.54	-33.94	-3.21
24	18	-46.69	-41.90	7.10
	25	-46.69	-31.26	7.10
25	25	-18.94	-27.44	22.98
	32	-18.94	-1.77	11.25
26	32	-17.67	-5.38	14.53
	39	5.73	-2.28	-2.95

27	39	-15.48	2.87	8.33
	46	-15.48	5.55	-3.40
28	46	-12.39	2.82	5.02
	53	-12.39	1.57	-6.69
29	5	1.02	1.11	4.15
	12	1.02	1.77	-3.27
30	12	2.58	6.81	-1.88
	19	-9.52	0.23	15.65
31	19	3.74	5.63	3.30
	26	3.74	4.99	-4.13
32	26	4.50	11.23	-8.01
	33	-15.05	5.72	18.83
33	33	3.42	1.11	-2.47
	40	-10.07	9.08	3.62
34	40	-8.98	4.26	5.80
	47	-8.98	7.39	-1.62
35	47	-7.64	3.36	2.82
	54	-7.64	2.01	-4.61
36	6	0.00	0.00	0.00
	13	0.38	0.12	-1.98
37	13	0.86	0.09	2.30
	20	0.86	0.33	-1.98
38	20	1.26	0.27	1.80
	27	0.00	0.00	0.00
39	27	3.29	1.50	-1.05
	34	-5.02	2.13	3.48
40	34	2.16	0.70	-1.95
	41	-4.86	7.59	4.03
41	41	-5.20	4.02	4.23
	48	-5.20	7.17	-0.04
42	48	-4.35	3.93	0.63
	55	-4.35	1.65	-3.64
43	7	0.23	0.19	0.70
	14	0.23	0.15	-0.76
44	14	0.50	0.84	0.14
	21	0.00	0.00	0.00
45	21	0.63	1.31	-1.17
	28	-0.75	1.02	2.18
46	28	1.46	0.70	-1.56
	35	-1.93	2.07	2.10
47	35	1.02	0.97	-2.00
	42	-2.00	5.25	4.47
48	42	0.86	0.15	-1.49
	49	-2.18	6.03	3.33
49	49	-1.69	1.03	1.54
	56	-1.69	2.25	0.08
50	1	0.00	0.00	0.00
	2	0.00	0.00	0.00
51	2	0.00	0.00	0.00
	3	0.00	0.00	0.00
52	3	0.00	0.00	0.00
	4	0.00	0.00	0.00
53	4	0.00	0.00	0.00
	5	0.00	0.00	0.00
54	5	0.00	0.00	0.00
	6	0.00	0.00	0.00
55	6	0.00	0.00	0.00
	7	-0.19	0.23	0.70
56	8	0.00	0.00	0.00

	9	0.00	0.00	0.00
57	9	0.00	0.00	0.00
	10	0.00	0.00	0.00
58	10	0.00	0.00	0.00
	11	0.00	0.00	0.00
59	11	0.00	0.00	0.00
	12	0.00	0.00	0.00
60	12	0.00	0.00	0.00
	13	0.00	0.00	0.00
61	13	0.00	0.00	0.00
	14	-0.69	0.27	0.90
62	15	0.00	0.00	0.00
	16	0.00	0.00	0.00
63	16	0.00	0.00	0.00
	17	0.00	0.00	0.00
64	17	0.00	0.00	0.00
	18	0.00	0.00	0.00
65	18	0.00	0.00	0.00
	19	0.00	0.00	0.00
66	19	0.00	0.00	0.00
	20	-1.29	0.38	3.95
67	20	0.00	0.00	0.00
	21	-1.35	0.15	0.16
68	22	0.00	0.00	0.00
	23	0.00	0.00	0.00
69	23	0.00	0.00	0.00
	24	0.00	0.00	0.00
70	24	0.00	0.00	0.00
	25	0.00	0.00	0.00
71	25	0.00	0.00	0.00
	26	0.00	0.00	0.00
72	26	0.00	0.00	0.00
	27	-3.99	1.68	2.49
73	27	0.00	0.00	0.00
	28	-2.25	0.83	1.06
74	29	0.00	0.00	0.00
	30	0.00	0.00	0.00
75	30	0.00	0.00	0.00
	31	0.00	0.00	0.00
76	31	0.00	0.00	0.00
	32	0.00	0.00	0.00
77	32	0.00	0.00	0.00
	33	0.00	0.00	0.00
78	33	-3.39	0.38	-1.34
	34	0.00	0.00	0.00
79	34	-2.63	0.03	-0.44
	35	0.00	0.00	0.00
80	36	0.00	0.00	0.00
	37	0.00	0.00	0.00
81	37	0.00	0.00	0.00
	38	0.00	0.00	0.00
82	38	0.00	0.00	0.00
	39	0.00	0.00	0.00
83	39	0.00	0.00	0.00
	40	0.00	0.00	0.00
84	40	0.00	0.00	0.00
	41	0.00	0.00	0.00
85	41	0.00	0.00	0.00
	42	0.00	0.00	0.00

86	43	-3.78	-34.92	3.60
	44	-3.78	-27.34	3.60
87	44	-5.58	-26.28	4.77
	45	-5.58	-19.14	4.77
88	45	-5.26	-17.85	4.44
	46	-5.26	-11.17	4.44
89	46	-4.08	-10.15	3.35
	47	-4.08	-5.13	3.35
90	47	-2.82	-4.61	2.37
	48	-2.82	-2.00	2.37
91	48	-1.80	-1.56	1.19
	49	-1.80	-0.25	1.19
92	50	-1.93	-12.05	-1.54
	51	-1.93	-15.28	-1.54
93	51	-2.60	-10.64	-0.87
	52	-2.60	-11.94	-0.87
94	52	-2.44	-7.15	-0.69
	53	-2.44	-8.19	-0.69
95	53	-1.92	-4.14	-0.44
	54	-1.92	-4.78	-0.44
96	54	-1.28	-2.25	-0.16
	55	-1.28	-2.43	-0.16
97	55	-0.75	-0.93	0.30
	56	-0.75	-0.60	0.30

LAV MADRID-BARCELONA.PI 562+7. ESTRIBOS 1 Y 4.

HC. n° 1 Momentos Flectores máximos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	0.00
	8	0.00	0.00	0.00
2	8	0.00	0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	0.00
	22	0.00	0.00	0.00
4	22	0.00	0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	0.00
	50	0.00	0.00	0.00
8	2	-31.35	3.59	-7.05
	9	6.98	0.57	-8.07
9	9	-42.18	3.38	-16.49
	16	10.38	4.18	-5.13
10	16	12.51	0.57	11.09
	23	12.51	3.35	-7.39
11	23	5.53	0.81	0.45
	30	5.53	1.49	0.45
12	30	-18.96	1.85	4.47
	37	5.91	1.22	1.47
13	37	-17.58	2.37	3.76
	44	5.72	1.46	1.83
14	44	0.00	0.00	0.00
	51	4.66	0.66	0.67
15	3	6.80	0.67	8.95
	10	6.80	2.81	-6.14
16	10	10.08	3.76	9.40
	17	10.08	6.55	-5.68
17	17	12.83	7.29	6.51
	24	12.83	5.74	-8.58
18	24	5.91	5.61	-2.95
	31	5.91	1.17	-2.95
19	31	6.55	1.10	-1.22
	38	-20.67	2.04	-3.98
20	38	-18.67	1.17	7.97
	45	-18.67	1.80	-7.13
21	45	-14.55	0.92	7.14
	52	-14.55	0.28	-7.97
22	4	4.80	1.74	9.18
	11	4.80	6.73	-2.54
23	11	9.11	8.74	6.84
	18	9.11	10.22	-4.88
24	18	11.81	12.85	4.99
	25	11.81	11.57	-6.72
25	25	5.80	10.10	-5.93
	32	5.80	1.22	-5.93
26	32	5.73	2.16	-2.95
	39	-17.67	7.62	2.81

27	39	-15.48	2.87	8.33
	46	-15.48	6.55	-3.40
28	46	-12.39	2.82	5.02
	53	-12.39	1.57	-6.69
29	5	-5.57	-8.09	4.39
	12	-5.57	-1.49	4.39
30	12	-9.52	-23.24	15.65
	19	-9.52	0.23	15.65
31	19	-16.83	-33.27	21.51
	26	-16.83	-1.00	21.51
32	26	-15.05	-28.09	26.25
	33	-15.05	5.72	18.83
33	33	-10.07	-1.92	11.04
	40	-10.07	9.08	3.62
34	40	-8.98	4.26	5.80
	47	-8.98	7.39	-1.62
35	47	-7.64	3.36	2.82
	54	-7.64	2.01	-4.61
36	6	-0.86	-0.15	-0.70
	13	-0.86	-1.22	-0.70
37	13	-1.34	-1.53	-0.19
	20	-1.34	-1.83	-0.19
38	20	-1.62	-2.44	0.94
	27	-1.62	-1.03	0.94
39	27	-5.02	-6.30	7.76
	34	-5.02	2.13	3.48
40	34	-4.86	-1.65	8.31
	41	-4.86	7.59	4.03
41	41	-5.20	4.02	4.23
	48	-5.20	7.17	-0.04
42	48	-4.35	3.93	0.63
	55	-4.35	1.65	-3.64
43	7	-0.41	-0.44	0.00
	14	-0.41	-0.44	0.00
44	14	-0.69	-1.63	0.81
	21	-0.69	-0.42	0.81
45	21	-0.75	-2.24	2.18
	28	-0.75	1.02	2.18
46	28	-1.93	-2.18	3.55
	35	-1.93	2.07	2.10
47	35	-2.00	-2.55	5.93
	42	-2.00	5.25	4.47
48	42	-2.18	-0.06	4.78
	49	-2.18	6.03	3.33
49	49	-1.69	1.03	1.54
	56	-1.69	2.25	0.08
50	1	-2.43	-138.69	45.47
	2	-2.43	-57.12	35.72
51	2	-3.62	-64.08	25.31
	3	-3.62	-26.13	25.31
52	3	-2.94	-32.93	16.35
	4	-2.94	-8.41	16.35
53	4	-1.19	-13.20	7.15
	5	-1.19	-2.47	7.15
54	5	-0.08	-3.48	3.00
	6	-0.08	-0.18	3.00
55	6	-0.19	-0.56	0.70
	7	-0.19	0.23	0.70
56	8	-6.12	-262.44	82.08

	9	-6.12	-117.87	62.58
57	9	-8.67	-121.27	41.16
	10	-8.67	-59.53	41.16
58	10	-7.70	-62.82	25.62
	11	-7.70	-24.39	25.62
59	11	-5.68	-28.71	16.23
	12	-5.68	-4.35	16.23
60	12	-0.64	-5.91	5.16
	13	-0.64	-0.24	5.16
61	13	-0.69	-0.70	0.90
	14	-0.69	0.27	0.90
62	15	-8.25	-245.87	74.32
	16	-8.25	-117.58	54.82
63	16	-11.86	-119.70	38.61
	17	-11.86	-61.78	38.61
64	17	-11.13	-64.53	26.42
	18	-11.13	-24.92	26.42
65	18	-8.51	-27.61	16.53
	19	-8.51	-2.81	16.53
66	19	-1.29	-3.96	3.95
	20	-1.29	0.38	3.95
67	20	-1.35	-0.03	0.16
	21	-1.35	0.15	0.16
68	22	-6.09	-122.26	32.31
	23	-6.09	-68.31	22.56
69	23	-8.63	-61.33	14.72
	24	-8.63	-39.27	14.72
70	24	-8.77	-32.35	9.09
	25	-8.77	-18.72	9.09
71	25	-10.23	-12.72	8.28
	26	-10.23	-0.30	8.28
72	26	-3.99	-1.05	2.49
	27	-3.99	1.68	2.49
73	27	-2.25	-0.34	1.06
	28	-2.25	0.83	1.06
74	29	-3.66	-50.99	9.93
	30	-3.66	-30.15	9.93
75	30	-6.14	-30.53	8.89
	31	-6.14	-17.17	8.89
76	31	-6.23	-17.81	7.15
	32	-6.23	-7.07	7.15
77	32	-5.28	-6.99	4.20
	33	-5.28	-0.69	4.20
78	33	-3.39	0.38	-1.34
	34	-3.39	-1.10	-1.34
79	34	-2.63	0.03	-0.44
	35	-2.63	-0.44	-0.44
80	36	-3.72	-43.19	7.07
	37	-3.72	-28.35	7.07
81	37	-6.21	-28.16	6.72
	38	-6.21	-18.09	6.72
82	38	-6.02	-17.61	5.64
	39	-6.02	-9.15	5.64
83	39	-4.57	-8.51	3.51
	40	-4.57	-3.23	3.51
84	40	-3.20	-2.87	1.74
	41	-3.20	-0.96	1.74
85	41	-2.16	-0.72	0.51
	42	-2.16	-0.16	0.51

86	43	11.31	-159.75	68.01
	44	11.31	-44.73	48.51
87	44	16.89	-48.51	26.01
	45	16.89	-9.49	26.01
88	45	16.01	-13.62	11.74
	46	16.01	3.99	11.74
89	46	12.27	0.90	3.32
	47	12.27	5.88	3.32
90	47	8.23	4.53	-1.13
	48	8.23	3.29	-1.13
91	48	4.99	2.43	-1.79
	49	4.99	0.48	-1.79
92	50	5.36	-95.21	43.26
	51	5.36	-18.24	33.51
93	51	7.77	-32.04	22.83
	52	7.77	2.20	22.83
94	52	7.48	-12.33	14.86
	53	7.48	9.98	14.86
95	53	5.91	-2.41	8.17
	54	5.91	9.86	8.17
96	54	3.90	2.22	3.57
	55	3.90	6.14	3.57
97	55	2.25	1.79	-0.08
	56	2.25	1.69	-0.08

LAV MADRID-BARCELONA.PI 562+7.ESTRIBOS 1 Y 4.

HC. n° 1 Esfuerzos Torsores mínimos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	0.00
	8	0.00	0.00	0.00
2	8	0.00	0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	0.00
	22	0.00	0.00	0.00
4	22	0.00	0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	0.00
	50	0.00	0.00	0.00
8	2	-31.35	3.59	-7.05
	9	-31.35	-6.99	-7.05
9	9	-42.18	3.38	-16.49
	16	-42.18	-21.34	-16.49
10	16	-46.32	-7.78	-3.52
	23	-46.32	-13.07	-3.52
11	23	-18.91	-3.68	7.65
	30	-18.91	-6.06	-10.83
12	30	-18.96	1.85	4.47
	37	-18.96	-5.31	-13.99
13	37	-17.58	2.37	3.76
	44	-17.58	-5.84	-14.70
14	44	-13.80	-0.25	7.78
	51	-13.80	-2.43	-10.68
15	3	-29.73	-2.50	-5.41
	10	-29.73	-10.62	-5.41
16	10	-40.78	-14.79	-5.65
	17	-40.78	-23.28	-5.65
17	17	-47.39	-25.29	4.90
	24	-47.39	-17.94	4.90
18	24	-19.83	-17.20	17.03
	31	-19.83	-3.00	1.92
19	31	-20.67	-3.30	11.11
	38	-20.67	2.04	-3.98
20	38	-18.67	1.17	7.97
	45	-18.67	1.80	-7.13
21	45	-14.55	0.92	7.14
	52	-14.55	0.28	-7.97
22	4	-23.22	-5.20	-9.56
	11	-23.22	-19.55	-9.56
23	11	-36.54	-29.13	-3.21
	18	-36.54	-33.94	-3.21
24	18	-46.69	-41.90	7.10
	25	-46.69	-31.26	7.10
25	25	-18.94	-27.44	22.98
	32	-18.94	-1.77	11.25
26	32	-17.67	-5.38	14.53
	39	-17.67	7.62	2.81

27	39	5.09	-0.86	-0.84
	46	5.09	-2.10	-0.84
28	46	4.07	-0.92	0.25
	53	4.07	-0.52	0.25
29	5	1.02	1.11	4.15
	12	1.02	1.77	-3.27
30	12	2.58	6.81	-1.88
	19	2.58	-1.57	-9.30
31	19	3.74	5.63	3.30
	26	3.74	4.99	-4.13
32	26	4.50	11.23	-8.01
	33	4.50	-0.76	-8.01
33	33	3.42	1.11	-2.47
	40	3.42	-2.61	-2.47
34	40	3.06	-1.25	-0.70
	47	3.06	-2.30	-0.70
35	47	2.54	-1.05	0.27
	54	2.54	-0.64	0.27
36	6	0.38	-0.12	2.30
	13	0.38	0.12	-1.98
37	13	0.86	0.09	2.30
	20	0.86	0.33	-1.98
38	20	1.26	0.27	1.80
	27	1.26	-0.24	-2.47
39	27	3.29	1.50	-1.05
	34	3.29	-0.06	-1.05
40	34	2.16	0.70	-1.95
	41	2.16	-2.22	-1.95
41	41	1.93	-1.19	-0.72
	48	1.93	-2.26	-0.72
42	48	1.50	-1.23	0.47
	55	1.50	-0.52	0.47
43	7	0.23	0.19	0.70
	14	0.23	0.15	-0.76
44	14	0.50	0.84	0.14
	21	0.50	-0.06	-1.34
45	21	0.63	1.31	-1.17
	28	0.63	-1.54	-2.63
46	28	1.46	0.70	-1.56
	35	1.46	-1.65	-1.56
47	35	1.02	0.97	-2.00
	42	1.02	-2.01	-2.00
48	42	0.86	0.15	-1.49
	49	0.86	-2.09	-1.49
49	49	0.60	-0.30	-0.30
	56	0.60	-0.75	-0.30
50	1	12.80	-31.65	-18.33
	2	12.80	-70.14	-18.33
51	2	16.38	-38.81	-11.28
	3	16.38	-55.73	-11.28
52	3	13.88	-25.99	-5.87
	4	13.88	-34.81	-5.87
53	4	8.67	-11.58	3.69
	5	8.67	-6.05	3.69
54	5	0.58	-0.48	-0.70
	6	0.58	-1.26	-0.70
55	6	0.44	-0.41	0.00
	7	0.44	-0.41	0.00
56	8	26.66	-136.93	9.24

	9	26.66	-117.52	9.24
57	9	37.03	-106.69	18.67
	10	37.03	-78.68	18.67
58	10	32.86	-67.62	18.93
	11	32.86	-39.22	18.93
59	11	23.26	-25.92	12.57
	12	23.26	-7.07	12.57
60	12	1.51	-3.11	1.32
	13	1.51	-1.65	1.32
61	13	1.20	-1.17	0.81
	14	1.20	-0.28	0.81
62	15	32.31	-205.76	42.18
	16	32.31	-117.17	42.18
63	16	45.87	-113.02	29.22
	17	45.87	-69.18	29.22
64	17	43.86	-62.60	18.66
	18	43.86	-34.60	18.66
65	18	35.91	-24.44	8.36
	19	35.91	-11.89	8.36
66	19	2.43	-4.59	2.50
	20	2.43	-1.85	2.50
67	20	1.82	-1.56	1.37
	21	1.82	-0.06	1.37
68	22	21.63	-170.67	61.85
	23	21.63	-54.68	52.10
69	23	31.02	-82.08	40.94
	24	31.02	-20.68	40.94
70	24	31.74	-48.24	28.81
	25	31.74	-4.99	28.81
71	25	35.56	-32.76	12.94
	26	35.56	-13.35	12.94
72	26	8.46	-15.12	8.19
	27	8.46	-6.12	8.19
73	27	3.20	-2.70	1.38
	28	3.20	-1.19	1.38
74	29	12.05	-109.25	48.17
	30	12.05	-35.90	28.67
75	30	19.95	-35.85	13.36
	31	19.95	-15.81	13.36
76	31	19.64	-14.97	4.17
	32	19.64	-8.72	4.17
77	32	16.02	-9.99	0.88
	33	16.02	-8.65	0.88
78	33	8.39	-13.65	8.67
	34	8.39	-4.13	8.67
79	34	4.61	-4.29	3.84
	35	4.61	-0.06	3.84
80	36	11.67	-134.40	57.45
	37	11.67	-41.52	37.95
81	37	19.35	-42.90	20.19
	38	19.35	-12.63	20.19
82	38	18.47	-14.61	8.23
	39	18.47	-2.26	8.23
83	39	13.71	-4.47	2.71
	40	13.71	-0.39	2.71
84	40	8.89	-1.46	0.54
	41	8.89	-0.87	0.54
85	41	5.32	-0.52	0.33
	42	5.32	-0.18	0.33

	35	3.07	-0.04	2.56
80	36	7.78	-89.60	38.30
	37	7.78	-27.68	25.30
81	37	12.90	-28.60	13.46
	38	12.90	-8.42	13.46
82	38	12.31	-9.74	5.49
	39	12.31	-1.51	5.49
83	39	9.14	-2.98	1.81
	40	9.14	-0.26	1.81
84	40	5.93	-0.97	0.36
	41	5.93	-0.58	0.36
85	41	3.55	-0.35	0.22
	42	3.55	-0.12	0.22
86	43	7.54	-106.50	45.34
	44	7.54	-29.82	32.34
87	44	11.26	-32.34	17.34
	45	11.26	-6.33	17.34
88	45	10.67	-9.08	7.83
	46	10.67	2.66	7.83
89	46	8.18	0.60	2.21
	47	8.18	3.92	2.21
90	47	5.49	3.02	-0.75
	48	5.49	2.19	-0.75
91	48	3.33	1.62	-1.19
	49	3.33	0.32	-1.19
92	50	3.57	-63.47	28.84
	51	3.57	-12.16	22.34
93	51	5.18	-21.36	15.22
	52	5.18	1.47	15.22
94	52	4.99	-8.22	9.91
	53	4.99	6.65	9.91
95	53	3.94	-1.61	5.45
	54	3.94	6.57	5.45
96	54	2.60	1.48	2.38
	55	2.60	4.09	2.38
97	55	1.50	1.19	-0.05
	56	1.50	1.13	-0.05

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HC. n° 1 Esfuerzos Torsores máximos.

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	0.00	0.00	0.00
	8	0.00	0.00	0.00
2	8	0.00	0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	0.00
	22	0.00	0.00	0.00
4	22	0.00	0.00	0.00
	29	0.00	0.00	0.00
5	29	0.00	0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	0.00
	50	0.00	0.00	0.00
8	2	6.98	-1.19	10.41
	9	6.98	0.57	-8.07
9	9	10.38	-1.98	13.35
	16	10.38	4.18	-5.13
10	16	12.51	0.57	11.09
	23	12.51	3.35	-7.39
11	23	5.53	0.81	0.45
	30	5.53	1.49	0.45
12	30	5.91	-1.00	1.47
	37	5.91	1.22	1.47
13	37	5.72	-1.28	1.83
	44	5.72	1.46	1.83
14	44	4.66	-0.34	0.67
	51	4.66	0.66	0.67
15	3	6.80	0.67	8.95
	10	6.80	2.81	-6.14
16	10	10.08	3.76	9.40
	17	10.08	6.55	-5.68
17	17	12.83	7.29	6.51
	24	12.83	5.74	-8.58
18	24	5.91	5.61	-2.95
	31	5.91	1.17	-2.95
19	31	6.55	1.10	-1.22
	38	6.55	-0.74	-1.22
20	38	6.08	-0.52	-0.14
	45	6.08	-0.74	-0.14
21	45	4.78	-0.42	0.18
	52	4.78	-0.15	0.18
22	4	4.80	1.74	9.18
	11	4.80	6.73	-2.54
23	11	9.11	8.74	6.84
	18	9.11	10.22	-4.88
24	18	11.81	12.85	4.99
	25	11.81	11.57	-6.72
25	25	5.80	10.10	-5.93
	32	5.80	1.22	-5.93
26	32	5.73	2.16	-2.95
	39	5.73	-2.28	-2.95

	45	-12.45	1.20	-4.75
21	45	-9.70	0.61	4.76
	52	-9.70	0.19	-5.31
22	4	-15.48	-3.47	-6.37
	11	-15.48	-13.03	-6.37
23	11	-24.36	-19.42	-2.14
	18	-24.36	-22.63	-2.14
24	18	-31.13	-27.93	4.73
	25	-31.13	-20.84	4.73
25	25	-12.63	-18.29	15.32
	32	-12.63	-1.18	7.50
26	32	-11.78	-3.59	9.69
	39	-11.78	5.08	1.87
27	39	-10.32	1.91	5.55
	46	-10.32	4.37	-2.27
28	46	-8.26	1.88	3.35
	53	-8.26	1.05	-4.46
29	5	-3.71	-5.39	2.93
	12	-3.71	-0.99	2.93
30	12	-6.35	-15.49	10.43
	19	-6.35	0.15	10.43
31	19	-11.22	-22.18	14.34
	26	-11.22	-0.67	14.34
32	26	-10.03	-18.73	17.50
	33	-10.03	3.81	12.55
33	33	-6.71	-1.28	7.36
	40	-6.71	6.05	2.41
34	40	-5.99	2.84	3.87
	47	-5.99	4.93	-1.08
35	47	-5.09	2.24	1.88
	54	-5.09	1.34	-3.07
36	6	-0.57	-0.10	-0.47
	13	-0.57	-0.81	-0.47
37	13	-0.89	-1.02	-0.13
	20	-0.89	-1.22	-0.13
38	20	-1.08	-1.63	0.63
	27	-1.08	-0.69	0.63
39	27	-3.35	-4.20	5.17
	34	-3.35	1.42	2.32
40	34	-3.24	-1.10	5.54
	41	-3.24	5.06	2.69
41	41	-3.47	2.68	2.82
	48	-3.47	4.78	-0.03
42	48	-2.90	2.62	0.42
	55	-2.90	1.10	-2.43
43	7	-0.27	-0.29	-0.00
	14	-0.27	-0.29	-0.00
44	14	-0.46	-1.09	0.54
	21	-0.46	-0.28	0.54
45	21	-0.50	-1.49	1.45
	28	-0.50	0.68	1.45
46	28	-1.29	-1.45	2.37
	35	-1.29	1.38	1.40
47	35	-1.33	-1.70	3.95
	42	-1.33	3.50	2.98
48	42	-1.45	-0.04	3.19
	49	-1.45	4.02	2.22
49	49	-1.13	0.69	1.03
	56	-1.13	1.50	0.05

50	1	8.53	-21.10	-12.22
	2	8.53	-46.76	-12.22
51	2	10.92	-25.87	-7.52
	3	10.92	-37.15	-7.52
52	3	9.25	-17.33	-3.91
	4	9.25	-23.21	-3.91
53	4	5.78	-7.72	2.46
	5	5.78	-4.03	2.46
54	5	0.39	-0.32	-0.47
	6	0.39	-0.84	-0.47
55	6	0.29	-0.27	-0.00
	7	0.29	-0.27	-0.00
56	8	17.77	-91.29	6.16
	9	17.77	-78.35	6.16
57	9	24.69	-71.13	12.45
	10	24.69	-52.45	12.45
58	10	21.91	-45.08	12.62
	11	21.91	-26.15	12.62
59	11	15.51	-17.28	8.38
	12	15.51	-4.71	8.38
60	12	1.01	-2.07	0.88
	13	1.01	-1.10	0.88
61	13	0.80	-0.78	0.54
	14	0.80	-0.19	0.54
62	15	21.54	-137.17	28.12
	16	21.54	-78.11	28.12
63	16	30.58	-75.35	19.48
	17	30.58	-46.12	19.48
64	17	29.24	-41.73	12.44
	18	29.24	-23.07	12.44
65	18	23.94	-16.29	5.57
	19	23.94	-7.93	5.57
66	19	1.62	-3.06	1.67
	20	1.62	-1.23	1.67
67	20	1.21	-1.04	0.91
	21	1.21	-0.04	0.91
68	22	14.42	-113.78	41.23
	23	14.42	-36.45	34.73
69	23	20.68	-54.72	27.29
	24	20.68	-13.79	27.29
70	24	21.16	-32.16	19.21
	25	21.16	-3.33	19.21
71	25	23.71	-21.84	8.63
	26	23.71	-8.90	8.63
72	26	5.64	-10.08	5.46
	27	5.64	-4.08	5.46
73	27	2.13	-1.80	0.92
	28	2.13	-0.79	0.92
74	29	8.03	-72.83	32.11
	30	8.03	-23.93	19.11
75	30	13.30	-23.90	8.91
	31	13.30	-10.54	8.91
76	31	13.09	-9.98	2.78
	32	13.09	-5.81	2.78
77	32	10.68	-6.66	0.59
	33	10.68	-5.77	0.59
78	33	5.59	-9.10	5.78
	34	5.59	-2.75	5.78
79	34	3.07	-2.86	2.56

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Hip. n° 2 H-2 EMPUJE DE TIERRAS MURO LATERAL

Desplazamientos de nudos

Nudo	Giro x	Giro y	Dpl. z
1	-0.000000	0.000000	-0.000000
2	-0.000122	0.000035	0.000112
3	-0.000204	0.000067	0.000353
4	-0.000256	0.000094	0.000696
5	-0.000271	0.000111	0.001093
6	-0.000304	0.000136	0.001406
7	-0.000319	0.000155	0.001749
8	-0.000000	0.000000	0.000000
9	-0.000153	0.000036	0.000165
10	-0.000233	0.000073	0.000457
11	-0.000279	0.000105	0.000844
12	-0.000293	0.000127	0.001274
13	-0.000337	0.000160	0.001623
14	-0.000351	0.000185	0.002004
15	-0.000000	0.000000	0.000000
16	-0.000194	0.000044	0.000223
17	-0.000273	0.000089	0.000577
18	-0.000314	0.000132	0.001021
19	-0.000330	0.000167	0.001505
20	-0.000390	0.000219	0.001906
21	-0.000406	0.000257	0.002346
22	-0.000000	0.000000	0.000000
23	-0.000239	0.000053	0.000295
24	-0.000319	0.000108	0.000726
25	-0.000360	0.000163	0.001243
26	-0.000395	0.000226	0.001813
27	-0.000455	0.000279	0.002285
28	-0.000465	0.000299	0.002792
29	-0.000000	0.000000	0.000000
30	-0.000308	0.000061	0.000380
31	-0.000391	0.000134	0.000912
32	-0.000429	0.000205	0.001530
33	-0.000459	0.000264	0.002196
34	-0.000479	0.000286	0.002714
35	-0.000485	0.000298	0.003245
36	-0.000000	0.000000	0.000000
37	-0.000377	0.000059	0.000468
38	-0.000466	0.000130	0.001112
39	-0.000493	0.000197	0.001836
40	-0.000501	0.000247	0.002584
41	-0.000504	0.000271	0.003136
42	-0.000504	0.000285	0.003691
43	-0.000000	0.000000	0.000000
44	-0.000441	0.000058	0.000552
45	-0.000534	0.000119	0.001299
46	-0.000549	0.000177	0.002119
47	-0.000539	0.000222	0.002936
48	-0.000529	0.000244	0.003524
49	-0.000526	0.000257	0.004104
50	-0.000000	0.000000	0.000000
51	-0.000491	0.000055	0.000635
52	-0.000587	0.000111	0.001471

53	-0.000594	0.000166	0.002375
54	-0.000571	0.000209	0.003259
55	-0.000551	0.000229	0.003877
56	-0.000543	0.000241	0.004479

Reacciones en apoyos

Nudo	Mto. x	Mto. y	Fza. z
1	21.10	-8.53	-12.22
8	91.29	-17.77	6.16
15	137.17	-21.54	28.12
22	113.78	-14.42	41.23
29	72.83	-8.03	32.11
36	89.60	-7.78	38.30
43	106.50	-7.54	45.34
50	63.47	-3.57	28.84

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	-0.00	-0.00	-0.00
	8	-0.00	-0.00	-0.00
2	8	-0.00	0.00	-0.00
	15	-0.00	-0.00	-0.00
3	15	0.00	0.00	-0.00
	22	0.00	-0.00	-0.00
4	22	0.00	0.00	-0.00
	29	0.00	-0.00	-0.00
5	29	-0.00	0.00	-0.00
	36	-0.00	-0.00	-0.00
6	36	-0.00	0.00	-0.00
	43	-0.00	-0.00	-0.00
7	43	0.00	0.00	-0.00
	50	0.00	-0.00	-0.00
8	2	-20.90	2.39	-4.70
	9	-20.90	-4.66	-4.70
9	9	-28.12	2.25	-10.99
	16	-28.12	-14.23	-10.99
10	16	-30.88	-5.19	-2.35
	23	-30.88	-8.71	-2.35
11	23	-12.61	-2.45	5.10
	30	-12.61	-4.04	-7.22
12	30	-12.64	1.23	2.98
	37	-12.64	-3.54	-9.33
13	37	-11.72	1.58	2.51
	44	-11.72	-3.89	-9.80
14	44	-9.20	-0.17	5.19
	51	-9.20	-1.62	-7.12
15	3	-19.82	-1.67	-3.61
	10	-19.82	-7.08	-3.61
16	10	-27.19	-9.86	-3.77
	17	-27.19	-15.52	-3.77
17	17	-31.59	-16.86	3.27
	24	-31.59	-11.96	3.27
18	24	-13.22	-11.47	11.35
	31	-13.22	-2.00	1.28
19	31	-13.78	-2.20	7.41
	38	-13.78	1.36	-2.65
20	38	-12.45	0.78	5.31

50	1	-1.62	-92.46	30.31
	2	-1.62	-38.08	23.81
51	2	-2.41	-42.72	16.87
	3	-2.41	-17.42	16.87
52	3	-1.96	-21.95	10.90
	4	-1.96	-5.61	10.90
53	4	-0.79	-8.80	4.77
	5	-0.79	-1.65	4.77
54	5	-0.05	-2.32	2.00
	6	-0.05	-0.12	2.00
55	6	-0.13	-0.37	0.47
	7	-0.13	0.15	0.47
56	8	-4.08	-174.96	54.72
	9	-4.08	-78.58	41.72
57	9	-5.78	-80.85	27.44
	10	-5.78	-39.69	27.44
58	10	-5.13	-41.88	17.08
	11	-5.13	-16.26	17.08
59	11	-3.79	-19.14	10.82
	12	-3.79	-2.90	10.82
60	12	-0.43	-3.94	3.44
	13	-0.43	-0.16	3.44
61	13	-0.46	-0.47	0.60
	14	-0.46	0.18	0.60
62	15	-5.50	-163.91	49.55
	16	-5.50	-78.39	36.55
63	16	-7.91	-79.80	25.74
	17	-7.91	-41.19	25.74
64	17	-7.42	-43.02	17.61
	18	-7.42	-16.61	17.61
65	18	-5.67	-18.41	11.02
	19	-5.67	-1.87	11.02
66	19	-0.86	-2.64	2.63
	20	-0.86	0.25	2.63
67	20	-0.90	-0.02	0.11
	21	-0.90	0.10	0.11
68	22	-4.06	-81.51	21.54
	23	-4.06	-45.54	15.04
69	23	-5.75	-40.89	9.81
	24	-5.75	-26.18	9.81
70	24	-5.85	-21.57	6.06
	25	-5.85	-12.48	6.06
71	25	-6.82	-8.48	5.52
	26	-6.82	-0.20	5.52
72	26	-2.66	-0.70	1.66
	27	-2.66	1.12	1.66
73	27	-1.50	-0.23	0.71
	28	-1.50	0.55	0.71
74	29	-2.44	-33.99	6.62
	30	-2.44	-20.10	6.62
75	30	-4.09	-20.35	5.93
	31	-4.09	-11.45	5.93
76	31	-4.15	-11.87	4.77
	32	-4.15	-4.71	4.77
77	32	-3.52	-4.66	2.80
	33	-3.52	-0.46	2.80
78	33	-2.26	0.25	-0.89
	34	-2.26	-0.73	-0.89
79	34	-1.75	0.02	-0.29

	35	-1.75	-0.29	-0.29
80	36	-2.48	-28.79	4.71
	37	-2.48	-18.90	4.71
81	37	-4.14	-18.77	4.48
	38	-4.14	-12.06	4.48
82	38	-4.01	-11.74	3.76
	39	-4.01	-6.10	3.76
83	39	-3.05	-5.67	2.34
	40	-3.05	-2.15	2.34
84	40	-2.13	-1.91	1.16
	41	-2.13	-0.64	1.16
85	41	-1.44	-0.48	0.34
	42	-1.44	-0.11	0.34
86	43	-2.52	-23.28	2.40
	44	-2.52	-18.23	2.40
87	44	-3.72	-17.52	3.18
	45	-3.72	-12.76	3.18
88	45	-3.51	-11.90	2.96
	46	-3.51	-7.45	2.96
89	46	-2.72	-6.77	2.23
	47	-2.72	-3.42	2.23
90	47	-1.88	-3.07	1.58
	48	-1.88	-1.33	1.58
91	48	-1.20	-1.04	0.79
	49	-1.20	-0.17	0.79
92	50	-1.29	-8.03	-1.03
	51	-1.29	-10.19	-1.03
93	51	-1.73	-7.09	-0.58
	52	-1.73	-7.96	-0.58
94	52	-1.63	-4.77	-0.46
	53	-1.63	-5.46	-0.46
95	53	-1.28	-2.76	-0.29
	54	-1.28	-3.19	-0.29
96	54	-0.85	-1.50	-0.11
	55	-0.85	-1.62	-0.11
97	55	-0.50	-0.62	0.20
	56	-0.50	-0.40	0.20

53	-0.000244	-0.000056	0.000688
54	-0.000272	-0.000070	0.001075
55	-0.000283	-0.000077	0.001381
56	-0.000287	-0.000081	0.001694

Reacciones en apoyos

Nudo	Mto. x	Mto. y	Fza. z
1	92.46	1.62	30.31
8	174.96	4.08	54.72
15	163.91	5.50	49.55
22	81.51	4.06	21.54
29	33.99	2.44	6.62
36	28.79	2.48	4.71
43	23.28	2.52	2.40
50	8.03	1.29	-1.03

Esfuerzos en extremos de barras

Barra	Ext.	Torsor	Flector	Cortante
1	1	-0.00	-0.00	0.00
	8	-0.00	0.00	0.00
2	8	0.00	-0.00	0.00
	15	0.00	0.00	0.00
3	15	0.00	0.00	-0.00
	22	0.00	-0.00	-0.00
4	22	0.00	0.00	-0.00
	29	0.00	-0.00	-0.00
5	29	0.00	-0.00	0.00
	36	0.00	0.00	0.00
6	36	0.00	-0.00	0.00
	43	0.00	0.00	0.00
7	43	0.00	0.00	-0.00
	50	0.00	-0.00	-0.00
8	2	4.65	-0.79	6.94
	9	4.65	0.38	-5.38
9	9	6.92	-1.32	8.90
	16	6.92	2.79	-3.42
10	16	8.34	0.38	7.39
	23	8.34	2.23	-4.93
11	23	3.69	0.54	0.30
	30	3.69	0.99	0.30
12	30	3.94	-0.67	0.98
	37	3.94	0.81	0.98
13	37	3.81	-0.85	1.22
	44	3.81	0.97	1.22
14	44	3.11	-0.23	0.45
	51	3.11	0.44	0.45
15	3	4.53	0.45	5.97
	10	4.53	1.87	-4.09
16	10	6.72	2.51	6.27
	17	6.72	4.37	-3.79
17	17	8.55	4.86	4.34
	24	8.55	3.83	-5.72
18	24	3.94	3.74	-1.97
	31	3.94	0.78	-1.97
19	31	4.37	-0.73	-0.81
	38	4.37	-0.49	-0.81
20	38	4.05	-0.35	-0.09

	45	4.05	-0.49	-0.09
21	45	3.19	-0.28	0.12
	52	3.19	-0.10	0.12
22	4	3.20	1.16	6.12
	11	3.20	4.49	-1.69
23	11	6.07	5.83	4.56
	18	6.07	6.81	-3.25
24	18	7.87	8.57	3.33
	25	7.87	7.71	-4.48
25	25	3.87	6.73	-3.95
	32	3.87	0.81	-3.95
26	32	3.82	1.44	-1.97
	39	3.82	-1.52	-1.97
27	39	3.39	-0.57	-0.56
	46	3.39	-1.40	-0.56
28	46	2.71	-0.61	0.17
	53	2.71	-0.35	0.17
29	5	0.68	0.74	2.77
	12	0.68	1.18	-2.18
30	12	1.72	4.54	-1.25
	19	1.72	-1.05	-6.20
31	19	2.49	3.75	2.20
	26	2.49	3.33	-2.75
32	26	3.00	7.49	-5.34
	33	3.00	-0.51	-5.34
33	33	2.28	0.74	-1.65
	40	2.28	-1.74	-1.65
34	40	2.04	-0.83	-0.47
	47	2.04	-1.53	-0.47
35	47	1.69	-0.70	0.18
	54	1.69	-0.43	0.18
36	6	0.25	-0.08	1.53
	13	0.25	0.08	-1.32
37	13	0.57	0.06	1.53
	20	0.57	0.22	-1.32
38	20	0.84	0.18	1.20
	27	0.84	-0.16	-1.65
39	27	2.19	1.00	-0.70
	34	2.19	-0.04	-0.70
40	34	1.44	0.47	-1.30
	41	1.44	-1.48	-1.30
41	41	1.29	-0.79	-0.48
	48	1.29	-1.51	-0.48
42	48	1.00	-0.82	0.31
	55	1.00	-0.35	0.31
43	7	0.15	0.13	0.47
	14	0.15	0.10	-0.51
44	14	0.33	0.56	0.09
	21	0.33	-0.04	-0.89
45	21	0.42	0.87	-0.78
	28	0.42	-1.03	-1.75
46	28	0.97	0.47	-1.04
	35	0.97	-1.10	-1.04
47	35	0.68	0.65	-1.33
	42	0.68	-1.34	-1.33
48	42	0.57	0.10	-0.99
	49	0.57	-1.39	-0.99
49	49	0.40	-0.20	-0.20
	56	0.40	-0.50	-0.20

39	3	1.900	1.900	
40	3	1.900	1.900	
41	3	1.900	1.900	
42	3	1.900	1.900	
46	3	0.650	0.650	
47	3	0.650	0.650	
48	3	0.650	0.650	
49	3	0.650	0.650	
68	2	4.815	0.000	1.350
92	2	4.815	0.000	1.350
74	2	9.630	0.000	1.350
80	2	9.630	0.000	1.350
86	2	9.630	0.000	1.350

LAV MADRID-BARCELONA.PI 562+7.ESTRIBOS 1 Y 4.

Hip. n° 1 H-1 F.HORIZONTAL+EMP.TIERRAS MURO FRONTAL

Desplazamientos de nudos

Nudo	Giro x	Giro y	Dpl. z
1	-0.000000	-0.000000	0.000000
2	-0.000231	-0.000007	0.000277
3	-0.000309	-0.000014	0.000689
4	-0.000344	-0.000019	0.001184
5	-0.000358	-0.000022	0.001713
6	-0.000426	-0.000025	0.002155
7	-0.000433	-0.000033	0.002630
8	-0.000000	-0.000000	0.000000
9	-0.000224	-0.000008	0.000266
10	-0.000302	-0.000017	0.000667
11	-0.000339	-0.000024	0.001152
12	-0.000354	-0.000030	0.001674
13	-0.000411	-0.000044	0.002105
14	-0.000415	-0.000058	0.002561
15	-0.000000	-0.000000	0.000000
16	-0.000214	-0.000011	0.000251
17	-0.000292	-0.000023	0.000637
18	-0.000330	-0.000034	0.001108
19	-0.000344	-0.000042	0.001617
20	-0.000377	-0.000070	0.002021
21	-0.000376	-0.000099	0.002435
22	-0.000000	-0.000000	0.000000
23	-0.000202	-0.000015	0.000232
24	-0.000280	-0.000030	0.000597
25	-0.000319	-0.000045	0.001049
26	-0.000329	-0.000063	0.001537
27	-0.000327	-0.000089	0.001900
28	-0.000326	-0.000103	0.002260
29	-0.000000	-0.000000	0.000000
30	-0.000182	-0.000019	0.000207
31	-0.000258	-0.000041	0.000542
32	-0.000298	-0.000064	0.000964
33	-0.000310	-0.000083	0.001422
34	-0.000311	-0.000092	0.001763
35	-0.000311	-0.000099	0.002106
36	-0.000000	-0.000000	0.000000
37	-0.000160	-0.000019	0.000180
38	-0.000234	-0.000042	0.000480
39	-0.000277	-0.000063	0.000867
40	-0.000296	-0.000080	0.001298
41	-0.000300	-0.000089	0.001627
42	-0.000301	-0.000094	0.001958
43	-0.000000	-0.000000	0.000000
44	-0.000139	-0.000019	0.000152
45	-0.000212	-0.000040	0.000419
46	-0.000259	-0.000059	0.000775
47	-0.000283	-0.000073	0.001183
48	-0.000291	-0.000081	0.001499
49	-0.000293	-0.000086	0.001820
50	-0.000000	-0.000000	-0.000000
51	-0.000122	-0.000020	0.000124
52	-0.000195	-0.000039	0.000360

39	27	34	7
40	34	41	7
41	41	48	7
42	48	55	7
43	7	14	8
44	14	21	8
45	21	28	8
46	28	35	9
47	35	42	9
48	42	49	9
49	49	56	9
50	1	2	1
51	2	3	1
52	3	4	1
53	4	5	1
54	5	6	10
55	6	7	10
56	8	9	2
57	9	10	2
58	10	11	2
59	11	12	2
60	12	13	11
61	13	14	11
62	15	16	2
63	16	17	2
64	17	18	2
65	18	19	2
66	19	20	11
67	20	21	11
68	22	23	12
69	23	24	12
70	24	25	12
71	25	26	12
72	26	27	13
73	27	28	13
74	29	30	3
75	30	31	3
76	31	32	3
77	32	33	3
78	33	34	3
79	34	35	3
80	36	37	3
81	37	38	3
82	38	39	3
83	39	40	3
84	40	41	3
85	41	42	3
86	43	44	3
87	44	45	3
88	45	46	3
89	46	47	3
90	47	48	3
91	48	49	3
92	50	51	14
93	51	52	14
94	52	53	14
95	53	54	14
96	54	55	14
97	55	56	14

:				
APOYOS				
8				
1	1.000	1.000	1.000	
8	1.000	1.000	1.000	
15	1.000	1.000	1.000	
22	1.000	1.000	1.000	
29	1.000	1.000	1.000	
36	1.000	1.000	1.000	
43	1.000	1.000	1.000	
50	1.000	1.000	1.000	
:				
CARGAS				
H-1 F.HORIZONTAL+EMP.TIERRAS MURO FRONTAL				
2				
12	0.000	0.000	6.450	
26	0.000	0.000	6.450	
22				
8	3	8.210	8.210	
9	3	8.210	8.210	
10	3	8.210	8.210	
15	3	6.710	6.710	
16	3	6.710	6.710	
17	3	6.710	6.710	
22	3	5.210	5.210	
23	3	5.210	5.210	
24	3	5.210	5.210	
29	3	3.300	3.300	
30	3	3.300	3.300	
31	3	3.300	3.300	
36	3	1.900	1.900	
37	3	1.900	1.900	
38	3	1.900	1.900	
43	3	0.650	0.650	
44	3	0.650	0.650	
45	3	0.650	0.650	
50	2	4.815	0.000	1.350
68	2	4.815	0.000	1.350
56	2	9.630	0.000	1.350
62	2	9.630	0.000	1.350
H-2 EMPUJE DE TIERRAS MURO LATERAL				
0				
29				
11	3	8.210	8.210	
12	3	8.210	8.210	
13	3	8.210	8.210	
14	3	8.210	8.210	
18	3	6.710	6.710	
19	3	6.710	6.710	
20	3	6.710	6.710	
21	3	6.710	6.710	
25	3	5.210	5.210	
26	3	5.210	5.210	
27	3	5.210	5.210	
28	3	5.210	5.210	
32	3	3.300	3.300	
33	3	3.300	3.300	
34	3	3.300	3.300	
35	3	3.300	3.300	

LAV MADRID-BARCELONA.PI 562+7.ESTRIBOS 1 Y 4.
CONTROL

56 97 7 2

NUDOS

1	0.000	-0.600
2	0.000	1.500
3	0.000	3.000
4	0.000	4.500
5	0.000	6.000
6	0.000	7.100
7	0.000	8.200
8	1.500	-0.600
9	1.500	1.500
10	1.500	3.000
11	1.500	4.500
12	1.500	6.000
13	1.500	7.100
14	1.500	8.200
15	3.000	-0.600
16	3.000	1.500
17	3.000	3.000
18	3.000	4.500
19	3.000	6.000
20	3.000	7.100
21	3.000	8.200
22	4.500	-0.600
23	4.500	1.500
24	4.500	3.000
25	4.500	4.500
26	4.500	6.000
27	4.500	7.100
28	4.500	8.200
29	6.000	-0.600
30	6.000	1.500
31	6.000	3.000
32	6.000	4.500
33	6.000	6.000
34	6.000	7.100
35	6.000	8.200
36	7.500	-0.600
7	7.500	1.500
38	7.500	3.000
39	7.500	4.500
40	7.500	6.000
41	7.500	7.100
42	7.500	8.200
43	9.000	-0.600
44	9.000	1.500
45	9.000	3.000
46	9.000	4.500
47	9.000	6.000
48	9.000	7.100
49	9.000	8.200
50	10.500	-0.600
51	10.500	1.500
52	10.500	3.000
53	10.500	4.500
54	10.500	6.000

55 10.500 7.100
56 10.500 8.200

SECCIONES

14	0.232742	0.465484	2500000	1100000
	0.465484	0.930968	2500000	1100000
	0.125000	0.250000	2500000	1100000
	0.116663	0.233326	2500000	1100000
	0.108333	0.216666	2500000	1100000
	0.011458	0.022916	2500000	1100000
	0.091667	0.183334	2500000	1100000
	0.005729	0.011458	2500000	1100000
	0.045833	0.091666	2500000	1100000
	0.007812	0.015624	2500000	1100000
	0.015625	0.031250	2500000	1100000
	0.259084	0.518168	2500000	1100000
	0.052734	0.105468	2500000	1100000
	0.062500	0.125000	2500000	1100000

BARRAS

1	1	8	1
2	8	15	1
3	15	22	1
4	22	29	1
5	29	36	1
6	36	43	1
7	43	50	1
8	2	9	2
9	9	16	2
10	16	23	2
11	23	30	3
12	30	37	3
13	37	44	3
14	44	51	3
15	3	10	2
16	10	17	2
17	17	24	2
18	24	31	3
19	31	38	3
20	38	45	3
21	45	52	3
22	4	11	2
23	11	18	2
24	18	25	2
25	25	32	3
26	32	39	3
27	39	46	3
28	46	53	3
29	5	12	4
30	12	19	4
31	19	26	4
32	26	33	5
33	33	40	5
34	40	47	5
35	47	54	5
36	6	13	6
37	13	20	6
38	20	27	6

DEFINICION GEOMETRICA

DATOS GENERALES DEL TRAZADO

PI-562+7

de PIC 562 + 650

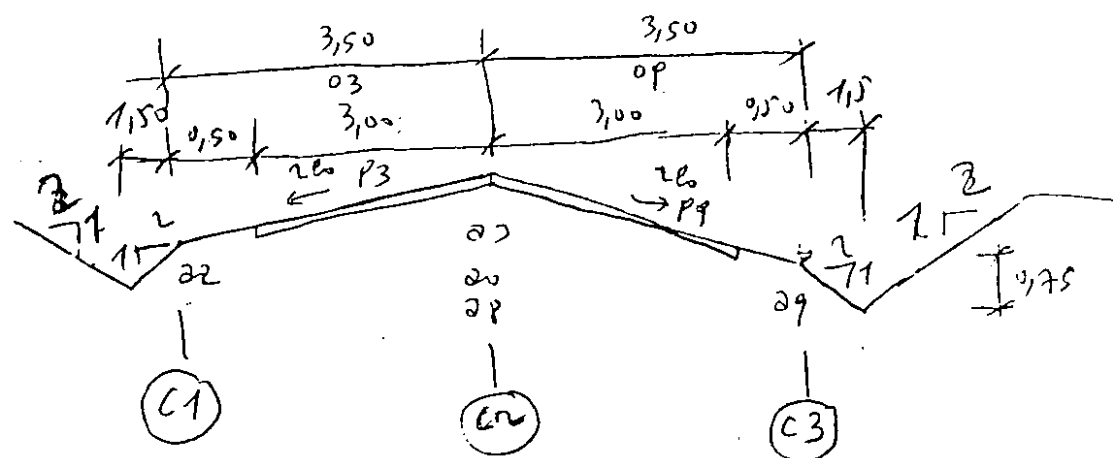
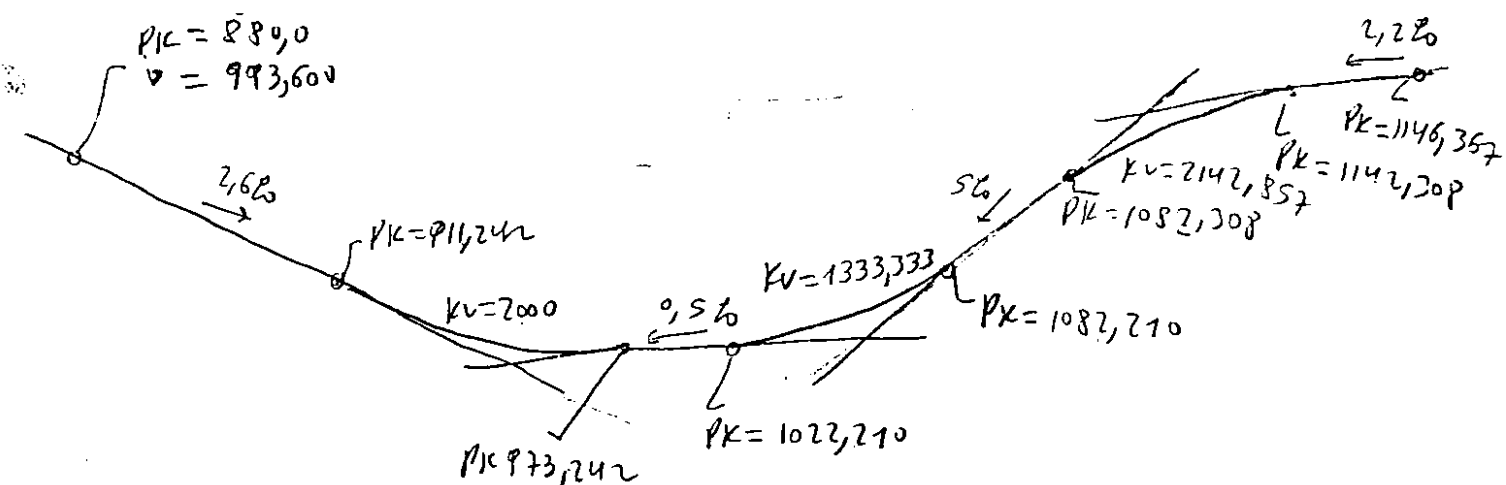
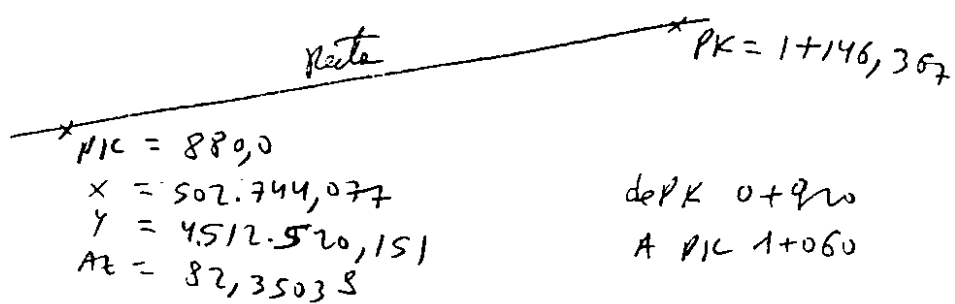
$$561 + 820$$

Peralte = - 67,7 mm.

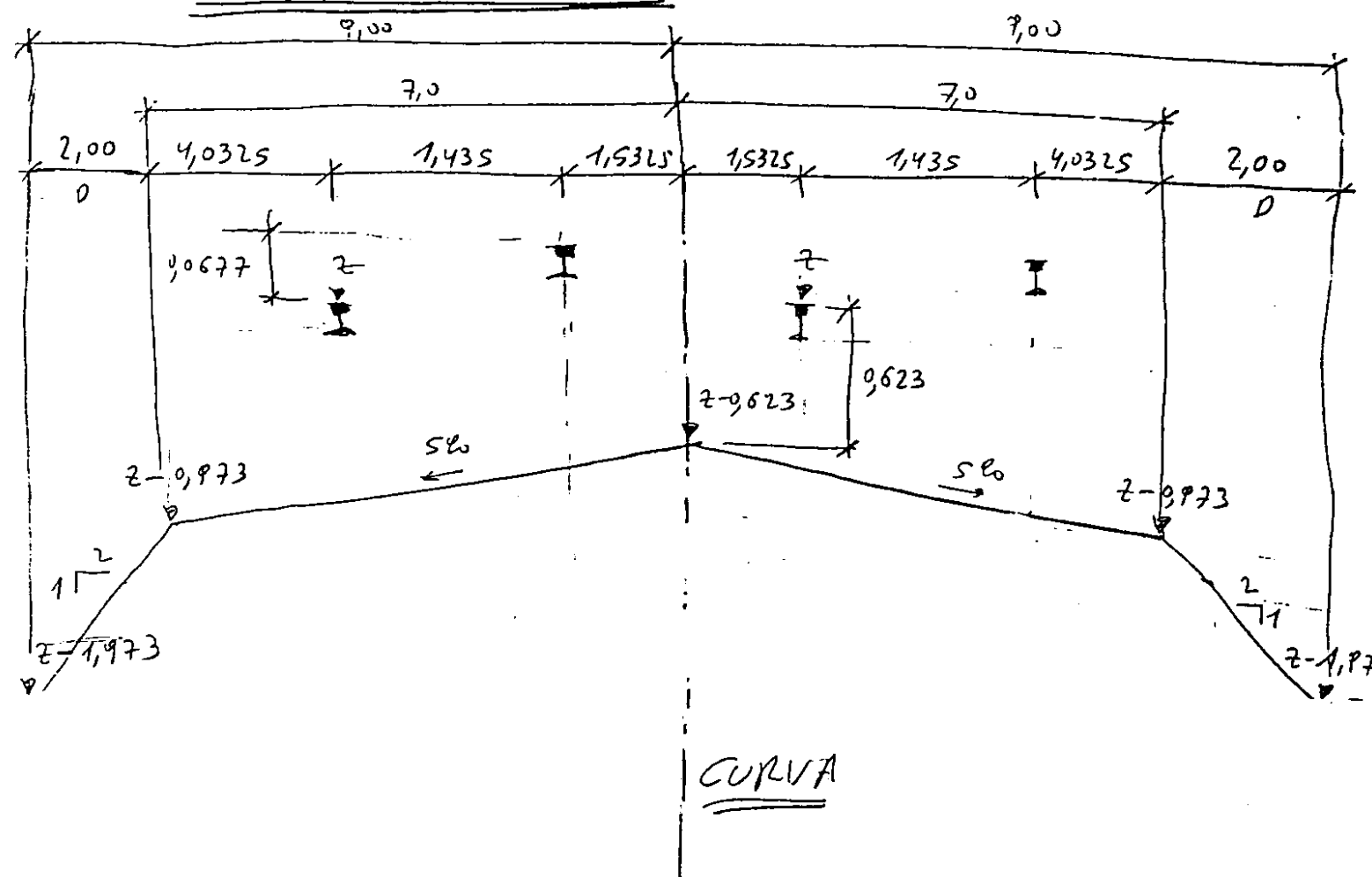
Height = 2.60 m.

Alindante = 50 I_{fda} y d_{fda} .

TE C-56277



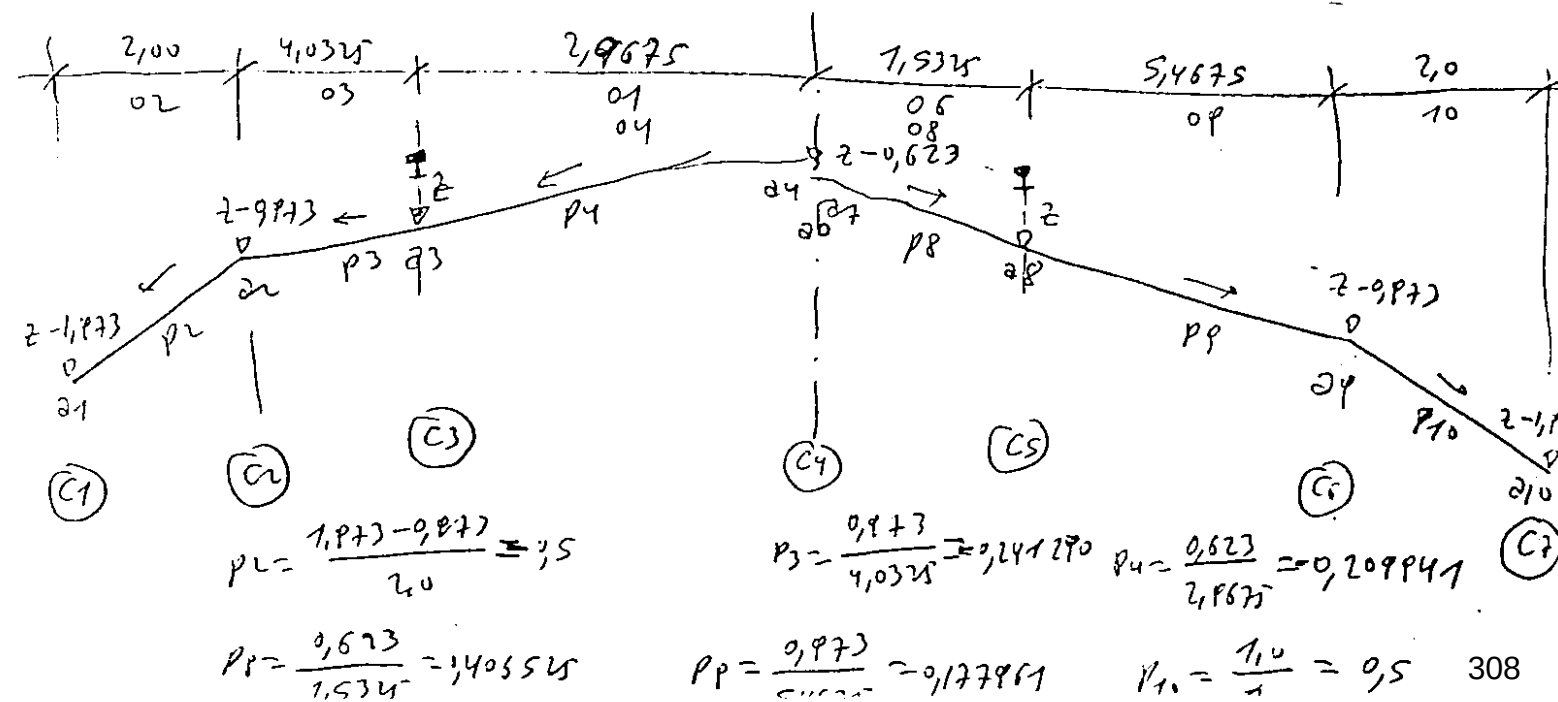
PI 562+6 7 PI 562+7



$$2 - 0,973 - 0,50 = 2 - 1,523 - 0,50 = (7 + 0)$$

$$-0,473 - 4,50 = -1,523 - 0,35 - 4,050 \quad ; \quad 0,450 = 0,90 \quad ; \quad 0 = 2,0$$

FFCC



REPLANTEO DE LOS BORDES DEL F.F.C.C.

[illegible]

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	0	562662.000	502794.387	512495.521	997.851
1	3	2	0	562662.000	502795.855	512494.162	998.851
1	3	3	0	562662.000	502798.815	512491.424	999.824
1	3	4	0	562662.000	502800.993	512489.408	999.824
1	3	5	0	562662.000	502802.118	512488.367	999.824
1	3	6	0	562662.000	502806.131	512484.654	998.851
1	3	7	0	562662.000	502807.500	512482.205	997.851

0 562663.000 -52.470059 .679146 -.734003
1

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	4	1	0	562663.000	502795.066	512496.254	997.854
1	4	2	0	562663.000	502796.534	512494.896	998.854
1	4	3	0	562663.000	502799.494	512492.157	999.827
1	4	4	0	562663.000	502801.672	512490.142	999.827
1	4	5	0	562663.000	502802.797	512489.101	999.827
1	4	6	0	562663.000	502806.810	512485.388	998.854
1	4	7	0	562663.000	502808.278	512484.030	997.854

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562664.000 -52.474303 .679097 -.734048

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	5	1	0	562664.000	502795.745	512496.988	997.857
1	5	2	0	562664.000	502797.213	512495.630	998.857
1	5	3	0	562664.000	502800.173	512492.891	999.830
1	5	4	0	562664.000	502802.351	512490.876	999.830
1	5	5	0	562664.000	502803.476	512489.835	999.830
1	5	6	0	562664.000	502807.490	512486.122	998.857
1	5	7	0	562664.000	502808.958	512484.764	997.857

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562665.000 -52.478547 .679048 -.734094

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	6	1	0	562665.000	502796.423	512497.722	997.861
1	6	2	0	562665.000	502797.892	512496.363	998.861
1	6	3	0	562665.000	502800.852	512493.625	999.834
1	6	4	0	562665.000	502803.030	512491.610	999.834
1	6	5	0	562665.000	502804.155	512490.569	999.834
1	6	6	0	562665.000	502808.169	512486.857	998.861
1	6	7	0	562665.000	502809.637	512485.499	997.861

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562666.000 -52.482791 .678999 -.734139

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	7	1	0	562666.000	502797.102	512498.455	997.864
1	7	2	0	562666.000	502798.570	512497.097	998.864
1	7	3	0	562666.000	502801.531	512494.359	999.837
1	7	4	0	562666.000	502803.709	512492.344	999.837
1	7	5	0	562666.000	502804.834	512491.304	999.837
1	7	6	0	562666.000	502808.848	512487.591	998.864
1	7	7	0	562666.000	502810.317	512486.233	997.864

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562667.000 -52.487035 .678950 -.734184

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	8	1	0	562667.000	502797.781	512499.189	997.867
1	8	2	0	562667.000	502799.249	512497.831	998.867
1	8	3	0	562667.000	502802.210	512495.093	999.840
1	8	4	0	562667.000	502804.388	512493.078	999.840
1	8	5	0	562667.000	502805.513	512492.038	999.840
1	8	6	0	562667.000	502809.528	512488.326	998.867
1	8	7	0	562667.000	502810.996	512486.968	997.867

1

0 562668.000 -52.491279 .678901 -.734230

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	9	1	0	562668.000	502798.459	512499.923	997.870
1	9	2	0	562668.000	502799.928	512498.565	998.870
1	9	3	0	562668.000	502802.888	512495.827	999.843
1	9	4	0	562668.000	502805.067	512493.813	999.843
1	9	5	0	562668.000	502806.192	512492.772	999.843
1	9	6	0	562668.000	502810.207	512489.060	998.870
1	9	7	0	562668.000	502811.675	512487.702	997.870

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562669.000 -52.495523 .678852 -.734275

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	10	1	0	562669.000	502799.138	512500.656	997.873
1	10	2	0	562669.000	502800.606	512499.299	998.873
1	10	3	0	562669.000	502803.567	512496.561	999.846
1	10	4	0	562669.000	502805.746	512494.547	999.846
1	10	5	0	562669.000	502806.871	512493.506	999.846
1	10	6	0	562669.000	502810.886	512489.795	998.873
1	10	7	0	562669.000	502812.355	512488.437	997.873

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562670.000 -52.499767 .678803 -.734320

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	11	1	0	562670.000	502799.816	512501.390	997.876
1	11	2	0	562670.000	502801.285	512500.033	998.876
1	11	3	0	562670.000	502804.246	512497.295	999.849
1	11	4	0	562670.000	502806.425	512495.281	999.849
1	11	5	0	562670.000	502807.550	512494.241	999.849
1	11	6	0	562670.000	502811.565	512490.529	998.876
1	11	7	0	562670.000	502813.034	512489.172	997.876

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562671.000 -52.504012 .678754 -.734365

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	12	1	0	562671.000	502800.494	512502.124	997.879
1	12	2	0	562671.000	502801.963	512500.767	998.879
1	12	3	0	562671.000	502804.924	512498.030	999.852
1	12	4	0	562671.000	502807.104	512496.015	999.852
1	12	5	0	562671.000	502808.229	512494.975	999.852
1	12	6	0	562671.000	502812.244	512491.264	998.879
1	12	7	0	562671.000	502813.713	512489.907	997.879

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562672.000 -52.508256 .678706 -.734411

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	13	1	0	562672.000	502801.173	512502.858	997.883
1	13	2	0	562672.000	502802.642	512501.501	998.883
1	13	3	0	562672.000	502805.603	512498.764	999.856
1	13	4	0	562672.000	502807.782	512496.750	999.856

1

1	13	5	0	562672.000	502808.908	512495.710	999.856
1	13	6	0	562672.000	502812.923	512491.999	998.883
1	13	7	0	562672.000	502814.392	512490.641	997.883

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	14	1	0	562673.000	502801.851	512503.592	997.886
1	14	2	0	562673.000	502803.320	512502.235	998.886
1	14	3	0	562673.000	502806.282	512499.498	999.859
1	14	4	0	562673.000	502808.461	512497.484	999.859
1	14	5	0	562673.000	502809.587	512496.444	999.859
1	14	6	0	562673.000	502813.602	512492.734	998.886
1	14	7	0	562673.000	502815.071	512491.376	997.886

EJE	P.K.	AZIMUT	COS A	SEN A
0	562674.000	-52.516744	.678608	-.734501

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	15	1	0	562674.000	502802.529	512504.326	997.889
1	15	2	0	562674.000	502803.998	512502.969	998.889
1	15	3	0	562674.000	502806.960	512500.233	999.862
1	15	4	0	562674.000	502809.140	512498.219	999.862
1	15	5	0	562674.000	502810.265	512497.179	999.862
1	15	6	0	562674.000	502814.281	512493.469	998.889
1	15	7	0	562674.000	502815.750	512492.111	997.889

EJE	P.K.	AZIMUT	COS A	SEN A
0	562675.000	-52.520988	.678559	-.734546

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	16	1	0	562675.000	502803.207	512505.060	997.892
1	16	2	0	562675.000	502804.676	512503.703	998.892
1	16	3	0	562675.000	502807.639	512500.967	999.865
1	16	4	0	562675.000	502809.818	512498.953	999.865
1	16	5	0	562675.000	502810.944	512497.913	999.865
1	16	6	0	562675.000	502814.960	512494.203	998.892
1	16	7	0	562675.000	502816.429	512492.846	997.892

EJE	P.K.	AZIMUT	COS A	SEN A
0	562676.000	-52.525232	.678510	-.734591

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	17	1	0	562676.000	502803.885	512505.794	997.895
1	17	2	0	562676.000	502805.355	512504.437	998.895
1	17	3	0	562676.000	502808.317	512501.701	999.868
1	17	4	0	562676.000	502810.497	512499.688	999.868
1	17	5	0	562676.000	502811.623	512498.648	999.868
1	17	6	0	562676.000	502815.639	512494.938	998.895
1	17	7	0	562676.000	502817.108	512493.581	997.895

EJE	P.K.	AZIMUT	COS A	SEN A
0	562677.000	-52.529476	.678461	-.734637

1

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	18	1	0	562677.000	502804.564	512506.529	997.898
1	18	2	0	562677.000	502806.033	512505.172	998.898
1	18	3	0	562677.000	502808.995	512502.436	999.871
1	18	4	0	562677.000	502811.175	512500.422	999.871
1	18	5	0	562677.000	502812.301	512499.383	999.871
1	18	6	0	562677.000	502816.318	512495.673	998.898
1	18	7	0	562677.000	502817.787	512494.316	997.898

EJE	P.K.	AZIMUT	COS A	SEN A
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1	19	1	0	562678.000	502805.242	512507.263	997.901
1	19	2	0	562678.000	502806.711	512505.906	998.901
1	19	3	0	562678.000	502809.674	512503.170	999.874
1	19	4	0	562678.000	502811.854	512501.157	999.874
1	19	5	0	562678.000	502812.980	512500.117	999.874
1	19	6	0	562678.000	502816.997	512496.408	998.901
1	19	7	0	562678.000	502818.466	512495.051	997.901

EJE	P.K.	AZIMUT	COS A	SEN A
0	562679.000	-52.537965	.678363	-.734727

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	20	1	0	562679.000	502805.920	512507.997	997.904
1	20	2	0	562679.000	502807.389	512506.640	998.904
1	20	3	0	562679.000	502810.352	512503.905	999.877
1	20	4	0	562679.000	502812.532	512501.892	999.877
1	20	5	0	562679.000	502813.658	512500.852	999.877
1	20	6	0	562679.000	502817.675	512497.143	998.904
1	20	7	0	562679.000	502819.145	512495.787	997.904

EJE	P.K.	AZIMUT	COS A	SEN A
0	562680.000	-52.542209	.678314	-.734772

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	21	1	0	562680.000	502806.598	512508.731	997.908
1	21	2	0	562680.000	502808.067	512507.375	998.908
1	21	3	0	562680.000	502811.030	512504.639	999.891
1	21	4	0	562680.000	502813.210	512502.627	999.881
1	21	5	0	562680.000	502814.337	512501.587	999.881
1	21	6	0	562680.000	502818.354	512497.878	998.908
1	21	7	0	562680.000	502819.823	512496.522	997.908

EJE	P.K.	AZIMUT	COS A	SEN A
0	562681.000	-52.546453	.678265	-.734818

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	22	1	0	562681.000	502807.275	512509.466	997.911
1	22	2	0	562681.000	502808.745	512508.109	998.911
1	22	3	0	562681.000	502811.708	512505.374	999.884
1	22	4	0	562681.000	502813.889	512503.361	999.884
1	22	5	0	562681.000	502815.015	512502.322	999.884
1	22	6	0	562681.000	502819.032	512498.614	998.911
1	22	7	0	562681.000	502820.502	512497.257	997.911

1

EJE	P.K.	AZIMUT	COS A	SEN A
0	562682.000	-52.550697	.678216	-.734863

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	23	1	0	562682.000	502807.953	512510.200	997.914
1	23	2	0	562682.000	502809.423	512508.844	998.914
1	23	3	0	562682.000	502812.386	512506.109	999.887
1	23	4	0	562682.000	502814.567	512504.096	999.887
1	23	5	0	562682.000	502815.693	512503.057	999.887
1	23	6	0	562682.000	502819.711	512499.349	998.914
1	23	7	0	562682.000	502821.181	512497.992	997.914

EJE	P.K.	AZIMUT	COS A	SEN A
0	562683.000	-52.554941	.678167	-.734908

1	24	3	0	562683.000	502813.064	512506.844	999.890
1	24	4	0	562683.000	502815.245	512504.831	999.890
1	24	5	0	562683.000	502816.371	512503.792	999.890
1	24	6	0	562683.000	502820.390	512500.084	998.917
1	24	7	0	562683.000	502821.859	512498.728	997.917

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562684.000	-52.559185	.678118	-.734953
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	25	1	0	562684.000	502809.309	512511.669	997.920
1	25	2	0	562684.000	502810.779	512510.313	998.920
1	25	3	0	562684.000	502813.742	512507.578	999.893
1	25	4	0	562684.000	502815.923	512505.566	999.893
1	25	5	0	562684.000	502817.050	512504.527	999.893
1	25	6	0	562684.000	502821.068	512500.819	998.920
1	25	7	0	562684.000	502822.538	512499.463	997.920

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562685.000	-52.563429	.678069	-.734998
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	26	1	0	562685.000	502809.986	512512.404	997.923
1	26	2	0	562685.000	502811.456	512511.047	998.923
1	26	3	0	562685.000	502814.420	512508.313	999.896
1	26	4	0	562685.000	502816.601	512506.301	999.896
1	26	5	0	562685.000	502817.728	512505.262	999.896
1	26	6	0	562685.000	502821.746	512501.555	998.923
1	26	7	0	562685.000	502823.216	512500.198	997.923

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562686.000	-52.567674	.678020	-.735044
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	27	1	0	562686.000	502810.664	512513.138	997.926
1	27	2	0	562686.000	502812.134	512511.782	998.926
1	27	3	0	562686.000	502815.098	512509.048	999.899
1	27	4	0	562686.000	502817.279	512507.036	999.899

1	27	5	0	562686.000	502818.406	512505.997	999.899
1	27	6	0	562686.000	502822.425	512502.290	998.926
1	27	7	0	562686.000	502823.895	512500.934	997.926

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562687.000	-52.571918	.677971	-.735089
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	28	1	0	562687.000	502811.342	512513.873	997.929
1	28	2	0	562687.000	502812.812	512512.517	998.929
1	28	3	0	562687.000	502815.776	512509.783	999.902
1	28	4	0	562687.000	502817.957	512507.771	999.902
1	28	5	0	562687.000	502819.084	512506.732	999.902
1	28	6	0	562687.000	502823.103	512503.025	998.929
1	28	7	0	562687.000	502824.573	512501.669	997.929

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562688.000	-52.576162	.677922	-.735134
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	29	1	0	562688.000	502812.019	512514.607	997.933

1	29	5	0	562688.000	502819.762	512507.467	999.906
1	29	6	0	562688.000	502823.781	512503.761	998.933
1	29	7	0	562688.000	502825.252	512502.405	997.933

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562689.000	-52.580406	.677873	-.735179
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	30	1	0	562689.000	502812.697	512515.342	997.936
1	30	2	0	562689.000	502814.167	512513.986	998.936
1	30	3	0	562689.000	502817.132	512511.253	999.909
1	30	4	0	562689.000	502819.313	512509.241	999.909
1	30	5	0	562689.000	502820.440	512508.203	999.909
1	30	6	0	562689.000	502824.460	512504.496	998.936
1	30	7	0	562689.000	502825.930	512503.141	997.936

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562690.000	-52.584650	.677824	-.735224
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	31	1	0	562690.000	502813.374	512516.077	997.939
1	31	2	0	562690.000	502814.845	512514.721	998.939
1	31	3	0	562690.000	502817.809	512511.988	999.912
1	31	4	0	562690.000	502819.991	512509.977	999.912
1	31	5	0	562690.000	502821.118	512508.938	999.912
1	31	6	0	562690.000	502825.138	512505.232	998.939
1	31	7	0	562690.000	502826.608	512503.876	997.939

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562691.000	-52.588894	.677775	-.735270
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	32	1	0	562691.000	502814.052	512516.812	997.942
1	32	2	0	562691.000	502815.522	512515.456	998.942
1	32	3	0	562691.000	502818.487	512512.723	999.915
1	32	4	0	562691.000	502820.669	512510.712	999.915
1	32	5	0	562691.000	502821.796	512509.673	999.915
1	32	6	0	562691.000	502825.816	512505.967	998.942
1	32	7	0	562691.000	502827.286	512504.612	997.942

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562692.000	-52.593138	.677726	-.735315
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	33	1	0	562692.000	502814.729	512517.547	997.945
1	33	2	0	562692.000	502816.199	512516.191	998.945
1	33	3	0	562692.000	502819.165	512513.458	999.918
1	33	4	0	562692.000	502821.347	512511.447	999.918
1	33	5	0	562692.000	502822.474	512510.408	999.918
1	33	6	0	562692.000	502826.494	512506.703	998.945
1	33	7	0	562692.000	502827.965	512505.348	997.945

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562693.000	-52.597383	.677677	-.735360
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	34	1	0	562693.000	502815.406	512518.282	997.948
1	34	2	0	562693.000	502816.877	512516.926	998.948

1 34 7 0 562693.000 502828.643 512506.083 997.948

EJE P.K. AZIMUT COS A SEN A

0 562694.000 -52.601627 .677628 -.735405

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	35	1	0	562694.000	502816.083	512519.016	997.951
1	35	2	0	562694.000	502817.554	512517.661	998.951
1	35	3	0	562694.000	502820.520	512514.929	999.924
1	35	4	0	562694.000	502822.702	512512.918	999.924
1	35	5	0	562694.000	502823.829	512511.879	999.924
1	35	6	0	562694.000	502827.850	512508.174	998.951
1	35	7	0	562694.000	502829.321	512506.819	997.951

EJE P.K. AZIMUT COS A SEN A

0 562695.000 -52.605871 .677579 -.735450

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	36	1	0	562695.000	502816.761	512519.751	997.954
1	36	2	0	562695.000	502818.232	512518.396	998.954
1	36	3	0	562695.000	502821.197	512515.664	999.927
1	36	4	0	562695.000	502823.380	512513.653	999.927
1	36	5	0	562695.000	502824.507	512512.615	999.927
1	36	6	0	562695.000	502828.528	512508.910	998.954
1	36	7	0	562695.000	502829.999	512507.555	997.954

EJE P.K. AZIMUT COS A SEN A

0 562696.000 -52.610115 .677530 -.735496

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	37	1	0	562696.000	502817.438	512520.486	997.958
1	37	2	0	562696.000	502818.909	512519.131	998.958
1	37	3	0	562696.000	502821.875	512516.399	999.931
1	37	4	0	562696.000	502824.057	512514.389	999.931
1	37	5	0	562696.000	502825.184	512513.350	999.931
1	37	6	0	562696.000	502829.206	512509.646	998.958
1	37	7	0	562696.000	502830.677	512508.291	997.958

EJE P.K. AZIMUT COS A SEN A

0 562697.000 -52.614359 .677481 -.735541

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	38	1	0	562697.000	502818.115	512521.222	997.961
1	38	2	0	562697.000	502819.586	512519.867	998.961
1	38	3	0	562697.000	502822.552	512517.135	999.934
1	38	4	0	562697.000	502824.735	512515.124	999.934
1	38	5	0	562697.000	502825.862	512514.086	999.934
1	38	6	0	562697.000	502829.884	512510.382	998.961
1	38	7	0	562697.000	502831.355	512509.027	997.961

EJE P.K. AZIMUT COS A SEN A

0 562698.000 -52.618603 .677432 -.735586

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	39	1	0	562698.000	502818.792	512521.957	997.964
1	39	2	0	562698.000	502820.263	512520.602	998.964
1	39	3	0	562698.000	502823.229	512517.870	999.937
1	39	4	0	562698.000	502825.412	512515.860	999.937
1	39	5	0	562698.000	502826.539	512514.822	999.937

EJE P.K. AZIMUT COS A SEN A

0 562699.000 -52.622847 .677382 -.735631

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	40	1	0	562699.000	502819.469	512522.692	997.967
1	40	2	0	562699.000	502820.940	512521.337	998.967
1	40	3	0	562699.000	502823.907	512518.606	999.940
1	40	4	0	562699.000	502826.090	512516.595	999.940
1	40	5	0	562699.000	502827.217	512515.557	999.940
1	40	6	0	562699.000	502831.239	512511.854	998.967
1	40	7	0	562699.000	502832.710	512510.499	997.967

EJE P.K. AZIMUT COS A SEN A

0 562700.000 -52.627091 .677333 -.735676

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	41	1	0	562700.000	502820.146	512523.427	997.970
1	41	2	0	562700.000	502821.617	512522.072	998.970
1	41	3	0	562700.000	502824.584	512519.341	999.943
1	41	4	0	562700.000	502826.767	512517.331	999.943

1	41	5	0	562700.000	502827.894	512516.293	999.943
1	41	6	0	562700.000	502831.917	512512.590	998.970
1	41	7	0	562700.000	502833.388	512511.235	997.970

EJE P.K. AZIMUT COS A SEN A

0 562701.000 -52.631336 .677284 -.735721

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	42	1	0	562701.000	502820.823	512524.162	997.973
1	42	2	0	562701.000	502822.294	512522.808	998.973
1	42	3	0	562701.000	502825.261	512520.077	999.946
1	42	4	0	562701.000	502827.444	512518.067	999.946
1	42	5	0	562701.000	502828.572	512517.029	999.946
1	42	6	0	562701.000	502832.594	512513.326	998.973
1	42	7	0	562701.000	502834.066	512511.971	997.973

EJE P.K. AZIMUT COS A SEN A

0 562702.000 -52.635580 .677235 -.735766

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	43	1	0	562702.000	502821.500	512524.898	997.976
1	43	2	0	562702.000	502822.971	512523.543	998.976
1	43	3	0	562702.000	502825.938	512520.812	999.949
1	43	4	0	562702.000	502828.122	512518.803	999.949
1	43	5	0	562702.000	502829.249	512517.765	999.949
1	43	6	0	562702.000	502833.272	512514.062	998.976
1	43	7	0	562702.000	502834.743	512512.707	997.976

EJE P.K. AZIMUT COS A SEN A

0 562703.000 -52.639824 .677186 -.735812

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	44	1	0	562703.000	502822.176	512525.633	997.979
1	44	2	0	562703.000	502823.648	512524.279	998.979
1	44	3	0	562703.000	502826.615	512521.548	999.952
1	44	4	0	562703.000	502828.799	512519.538	999.952
1	44	5	0	562703.000	502829.926	512518.501	999.952
1	44	6	0	562703.000	502833.949	512514.798	998.979
1	44	7	0	562703.000	502835.421	512513.444	997.979

362704.000 -52.644005 .677137 -.735537

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	45	1	0	562704.000	502822.853	512526.368	997.983
1	45	2	0	562704.000	502824.325	512525.014	998.983
1	45	3	0	562704.000	502827.292	512522.284	999.956
1	45	4	0	562704.000	502829.476	512520.274	999.956
1	45	5	0	562704.000	502830.604	512519.236	999.956
1	45	6	0	562704.000	502834.627	512515.534	998.983
1	45	7	0	562704.000	502836.099	512514.180	997.983

EJE	P.K.	AZIMUT	COS A	SEN A
0	562705.000	-52.648312	.677088	-.735902

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	46	1	0	562705.000	502823.530	512527.104	997.986
1	46	2	0	562705.000	502825.002	512525.750	998.986
1	46	3	0	562705.000	502827.969	512523.019	999.959
1	46	4	0	562705.000	502830.153	512521.010	999.959
1	46	5	0	562705.000	502831.281	512519.972	999.959
1	46	6	0	562705.000	502835.304	512516.270	998.986
1	46	7	0	562705.000	502836.776	512514.916	997.986

EJE	P.K.	AZIMUT	COS A	SEN A
0	562706.000	-52.652556	.677039	-.735947

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	47	1	0	562706.000	502824.207	512527.839	997.989
1	47	2	0	562706.000	502825.678	512526.485	998.989
1	47	3	0	562706.000	502828.646	512523.755	999.962
1	47	4	0	562706.000	502830.830	512521.746	999.962
1	47	5	0	562706.000	502831.958	512520.708	999.962
1	47	6	0	562706.000	502835.982	512517.007	998.989
1	47	7	0	562706.000	502837.454	512515.653	997.989

EJE	P.K.	AZIMUT	COS A	SEN A
0	562707.000	-52.656800	.676990	-.735992

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	48	1	0	562707.000	502824.883	512528.575	997.992
1	48	2	0	562707.000	502826.355	512527.221	998.992
1	48	3	0	562707.000	502829.323	512524.491	999.965
1	48	4	0	562707.000	502831.507	512522.482	999.965
1	48	5	0	562707.000	502832.635	512521.444	999.965
1	48	6	0	562707.000	502836.659	512517.743	998.992
1	48	7	0	562707.000	502838.131	512516.389	997.992

EJE	P.K.	AZIMUT	COS A	SEN A
0	562708.000	-52.661045	.676941	-.736037

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	49	1	0	562708.000	502825.560	512529.310	997.995
1	49	2	0	562708.000	502827.032	512527.957	998.995
1	49	3	0	562708.000	502830.000	512525.227	999.968
1	49	4	0	562708.000	502832.184	512523.218	999.968
1	49	5	0	562708.000	502833.312	512522.181	999.968
1	49	6	0	562708.000	502837.336	512518.479	998.995
1	49	7	0	562708.000	502838.808	512517.125	997.995

EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	50	1	0	562709.000	502826.236	512530.046	997.998
1	50	2	0	562709.000	502827.708	512528.692	998.998
1	50	3	0	562709.000	502830.677	512525.963	999.971
1	50	4	0	562709.000	502832.861	512523.954	999.971
1	50	5	0	562709.000	502833.989	512522.917	999.971
1	50	6	0	562709.000	502838.014	512519.216	998.998
1	50	7	0	562709.000	502839.486	512517.862	997.998

EJE	P.K.	AZIMUT	COS A	SEN A
0	562710.000	-52.669533	.676843	-.736128

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	51	1	0	562710.000	502826.913	512530.782	998.001
1	51	2	0	562710.000	502828.385	512529.428	999.001
1	51	3	0	562710.000	502831.353	512526.699	999.974
1	51	4	0	562710.000	502833.538	512524.690	999.974
1	51	5	0	562710.000	502834.666	512523.653	999.974
1	51	6	0	562710.000	502838.691	512519.952	999.001
1	51	7	0	562710.000	502840.163	512518.598	998.001

EJE	P.K.	AZIMUT	COS A	SEN A
0	562711.000	-52.673777	.676794	-.736173

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	52	1	0	562711.000	502827.589	512531.517	998.004
1	52	2	0	562711.000	502829.061	512530.164	999.004
1	52	3	0	562711.000	502832.030	512527.435	999.977
1	52	4	0	562711.000	502834.215	512525.426	999.977
1	52	5	0	562711.000	502835.343	512524.389	999.977
1	52	6	0	562711.000	502839.368	512520.689	999.004
1	52	7	0	562711.000	502840.840	512519.335	998.004

EJE	P.K.	AZIMUT	COS A	SEN A
0	562712.000	-52.678021	.676745	-.736218

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	53	1	0	562712.000	502828.265	512532.253	998.008
1	53	2	0	562712.000	502829.738	512530.900	999.008
1	53	3	0	562712.000	502832.707	512528.171	999.981
1	53	4	0	562712.000	502834.891	512526.162	999.981
1	53	5	0	562712.000	502836.020	512525.125	999.981
1	53	6	0	562712.000	502840.045	512521.425	999.008
1	53	7	0	562712.000	502841.517	512520.072	998.008

EJE	P.K.	AZIMUT	COS A	SEN A
0	562713.000	-52.682265	.676696	-.736263

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	54	1	0	562713.000	502828.942	512532.989	998.011
1	54	2	0	562713.000	502830.414	512531.636	999.011
1	54	3	0	562713.000	502833.383	512528.907	999.984
1	54	4	0	562713.000	502835.568	512526.899	999.984
1	54	5	0	562713.000	502836.696	512525.862	999.984
1	54	6	0	562713.000	502840.722	512522.162	999.011
1	54	7	0	562713.000	502842.194	512520.808	998.011

EJE	P.K.	AZIMUT	COS A	SEN A
0	562714.000	-52.686509	.676647	-.736308

1 55 2 0 562714.000 502831.091 512532.371 999.014
1 55 3 0 562714.000 502834.060 512529.643 999.987
1 55 4 0 562714.000 502836.245 512527.635 999.987

1 55 5 0 562714.000 502837.373 512526.598 999.987
1 55 6 0 562714.000 502841.399 512522.898 999.014
1 55 7 0 562714.000 502842.872 512521.545 998.014

EJE P.K. AZIMUT COS A SEN A
0 562715.000 -52.690753 .676597 -.736353

GPO. RTA. CVA. EJE P.K. X Y Z
1 56 1 0 562715.000 502830.294 512534.461 998.017
1 56 2 0 562715.000 502831.767 512533.107 999.017
1 56 3 0 562715.000 502834.736 512530.379 999.990
1 56 4 0 562715.000 502836.921 512528.371 999.990
1 56 5 0 562715.000 502838.050 512527.334 999.990
1 56 6 0 562715.000 502842.076 512523.635 999.017
1 56 7 0 562715.000 502843.549 512522.282 998.017

EJE P.K. AZIMUT COS A SEN A
0 562716.000 -52.694998 .676548 -.736398

GPO. RTA. CVA. EJE P.K. X Y Z
1 57 1 0 562716.000 502830.970 512535.197 998.020
1 57 2 0 562716.000 502832.443 512533.843 999.020
1 57 3 0 562716.000 502835.413 512531.115 999.993
1 57 4 0 562716.000 502837.598 512529.108 999.993
1 57 5 0 562716.000 502838.727 512528.071 999.993
1 57 6 0 562716.000 502842.753 512524.372 999.020
1 57 7 0 562716.000 502844.226 512523.019 998.020

EJE P.K. AZIMUT COS A SEN A
0 562717.000 -52.699242 .676499 -.736443

GPO. RTA. CVA. EJE P.K. X Y Z
1 58 1 0 562717.000 502831.647 512535.933 998.023
1 58 2 0 562717.000 502833.119 512534.580 999.023
1 58 3 0 562717.000 502836.089 512531.852 999.996
1 58 4 0 562717.000 502838.275 512529.844 999.996
1 58 5 0 562717.000 502839.403 512528.807 999.996
1 58 6 0 562717.000 502843.430 512525.109 999.023
1 58 7 0 562717.000 502844.903 512523.756 998.023

EJE P.K. AZIMUT COS A SEN A
0 562718.000 -52.703486 .676450 -.736488

GPO. RTA. CVA. EJE P.K. X Y Z
1 59 1 0 562718.000 502832.323 512536.669 998.026
1 59 2 0 562718.000 502833.796 512535.316 999.026
1 59 3 0 562718.000 502836.765 512532.588 999.999
1 59 4 0 562718.000 502838.951 512530.581 999.999
1 59 5 0 562718.000 502840.080 512529.544 999.999
1 59 6 0 562718.000 502844.106 512525.845 999.026
1 59 7 0 562718.000 502845.579 512524.492 998.026

EJE P.K. AZIMUT COS A SEN A
0 562719.000 -52.707730 .676401 -.736534

1 60 1 0 562719.000 502832.999 512537.405 998.030
1 60 2 0 562719.000 502834.472 512536.052 999.030
1 60 3 0 562719.000 502837.442 512533.324 1000.003
1 60 4 0 562719.000 502839.627 512531.317 1000.003
1 60 5 0 562719.000 502840.756 512530.280 1000.003
1 60 6 0 562719.000 502844.783 512526.582 999.030
1 60 7 0 562719.000 502846.256 512525.229 998.030

EJE P.K. AZIMUT COS A SEN A
0 562720.000 -52.711974 .676352 -.736579

GPO. RTA. CVA. EJE P.K. X Y Z
1 61 1 0 562720.000 502833.675 512538.141 998.033
1 61 2 0 562720.000 502835.148 512536.788 999.033
1 61 3 0 562720.000 502838.118 512534.061 1000.006
1 61 4 0 562720.000 502840.304 512532.054 1000.006
1 61 5 0 562720.000 502841.433 512531.017 1000.006
1 61 6 0 562720.000 502845.460 512527.319 999.033
1 61 7 0 562720.000 502846.933 512525.966 998.033

EJE P.K. AZIMUT COS A SEN A
0 562721.000 -52.716218 .676303 -.736624

GPO. RTA. CVA. EJE P.K. X Y Z
1 62 1 0 562721.000 502834.351 512538.877 998.036
1 62 2 0 562721.000 502835.824 512537.524 999.036
1 62 3 0 562721.000 502838.794 512534.797 1000.009
1 62 4 0 562721.000 502840.980 512532.790 1000.009
1 62 5 0 562721.000 502842.109 512531.754 1000.009
1 62 6 0 562721.000 502846.136 512528.056 999.036
1 62 7 0 562721.000 502847.610 512526.703 998.036

EJE P.K. AZIMUT COS A SEN A
0 562722.000 -52.720462 .676254 -.736669

GPO. RTA. CVA. EJE P.K. X Y Z
1 63 1 0 562722.000 502835.026 512539.613 998.039
1 63 2 0 562722.000 502836.500 512538.261 999.039
1 63 3 0 562722.000 502839.470 512535.534 1000.012
1 63 4 0 562722.000 502841.656 512533.527 1000.012
1 63 5 0 562722.000 502842.785 512532.491 1000.012
1 63 6 0 562722.000 502846.813 512528.793 999.039
1 63 7 0 562722.000 502848.286 512527.441 998.039

EJE P.K. AZIMUT COS A SEN A
0 562723.000 -52.724706 .676205 -.736714

GPO. RTA. CVA. EJE P.K. X Y Z
1 64 1 0 562723.000 502835.702 512540.349 998.042
1 64 2 0 562723.000 502837.176 512538.997 999.042
1 64 3 0 562723.000 502840.146 512536.270 1000.015
1 64 4 0 562723.000 502842.333 512534.264 1000.015
1 64 5 0 562723.000 502843.462 512533.227 1000.015
1 64 6 0 562723.000 502847.490 512529.530 999.042
1 64 7 0 562723.000 502848.963 512528.178 998.042

EJE P.K. AZIMUT COS A SEN A
0 562724.000 -52.728951 .676155 -.736759

1	65	3	0	562724.000	502840.822	512537.007	1000.018
1	65	4	0	562724.000	502843.009	512535.000	1000.018
1	65	5	0	562724.000	502844.138	512533.964	1000.018
1	65	6	0	562724.000	502848.166	512530.267	999.045
1	65	7	0	562724.000	502849.640	512528.915	998.045

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562725.000	-52.733195	.676106	-.736804
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	66	1	0	562725.000	502837.054	512541.822	998.048
1	66	2	0	562725.000	502838.527	512540.470	999.048
1	66	3	0	562725.000	502841.498	512537.743	1000.021
1	66	4	0	562725.000	502843.685	512535.737	1000.021
1	66	5	0	562725.000	502844.814	512534.701	1000.021
1	66	6	0	562725.000	502848.843	512531.004	999.048
1	66	7	0	562725.000	502850.316	512529.652	998.048

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562726.000	-52.737439	.676057	-.736849
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	67	1	0	562726.000	502837.729	512542.558	998.051
1	67	2	0	562726.000	502839.203	512541.206	999.051
1	67	3	0	562726.000	502842.174	512538.480	1000.024
1	67	4	0	562726.000	502844.361	512536.474	1000.024
1	67	5	0	562726.000	502845.490	512535.438	1000.024
1	67	6	0	562726.000	502849.519	512531.741	999.051
1	67	7	0	562726.000	502850.993	512530.389	998.051

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562727.000	-52.741683	.676008	-.736894
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	68	1	0	562727.000	502838.405	512543.295	998.055
1	68	2	0	562727.000	502839.879	512541.943	999.055
1	68	3	0	562727.000	502842.850	512539.217	1000.028
1	68	4	0	562727.000	502845.037	512537.211	1000.028
1	68	5	0	562727.000	502846.166	512536.175	1000.028
1	68	6	0	562727.000	502850.195	512532.479	999.055
1	68	7	0	562727.000	502851.669	512531.127	998.055

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562728.000	-52.745927	.675959	-.736939
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	69	1	0	562728.000	502839.081	512544.031	998.058
1	69	2	0	562728.000	502840.554	512542.679	999.058
1	69	3	0	562728.000	502843.526	512539.954	1000.031
1	69	4	0	562728.000	502845.713	512537.948	1000.031

1	69	5	0	562728.000	502846.842	512536.912	1000.031
1	69	6	0	562728.000	502850.872	512533.216	999.058
1	69	7	0	562728.000	502852.345	512531.864	998.058

P.K.	AZIMUT	COS A	SEN A
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0	562729.000	-52.750171	.675910	-.736984
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	70	1	0	562729.000	502839.756	512544.768	998.061

1	70	5	0	562729.000	502847.518	512537.649	1000.034
1	70	6	0	562729.000	502851.548	512533.953	999.061
1	70	7	0	562729.000	502853.022	512532.601	998.061

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562730.000	-52.754415	.675861	-.737029
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	71	1	0	562730.000	502840.432	512545.504	998.064
1	71	2	0	562730.000	502841.906	512544.153	999.064
1	71	3	0	562730.000	502844.878	512541.427	1000.037
1	71	4	0	562730.000	502847.065	512539.422	1000.037
1	71	5	0	562730.000	502848.194	512538.386	1000.037
1	71	6	0	562730.000	502852.224	512534.691	999.064
1	71	7	0	562730.000	502853.698	512533.339	998.064

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562731.000	-52.758660	.675812	-.737074
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	72	1	0	562731.000	502841.107	512546.241	998.067
1	72	2	0	562731.000	502842.581	512544.889	999.067
1	72	3	0	562731.000	502845.553	512542.164	1000.040
1	72	4	0	562731.000	502847.741	512540.159	1000.040
1	72	5	0	562731.000	502848.870	512539.123	1000.040
1	72	6	0	562731.000	502852.900	512535.428	999.067
1	72	7	0	562731.000	502854.374	512534.076	998.067

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562732.000	-52.762904	.675762	-.737119
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	73	1	0	562732.000	502841.782	512546.978	998.070
1	73	2	0	562732.000	502843.257	512545.626	999.070
1	73	3	0	562732.000	502846.229	512542.901	1000.043
1	73	4	0	562732.000	502848.416	512540.896	1000.043
1	73	5	0	562732.000	502849.546	512539.860	1000.043
1	73	6	0	562732.000	502853.576	512536.165	999.070
1	73	7	0	562732.000	502855.051	512534.814	998.070

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562733.000	-52.767148	.675713	-.737165
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	74	1	0	562733.000	502842.458	512547.714	998.073
1	74	2	0	562733.000	502843.932	512546.363	999.073
1	74	3	0	562733.000	502846.905	512543.638	1000.046
1	74	4	0	562733.000	502849.092	512541.633	1000.046
1	74	5	0	562733.000	502850.222	512540.597	1000.046
1	74	6	0	562733.000	502854.252	512536.903	999.073
1	74	7	0	562733.000	502855.727	512535.552	998.073

EJE	P.K.	AZIMUT	COS A	SEN A
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0	562734.000	-52.771392	.675664	-.737210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	75	1	0	562734.000	502843.133	512548.451	998.076
1	75	2	0	562734.000	502844.607	512547.100	999.076
1	75	3	0	562734.000	502847.580	512544.375	1000.079

1 75 7 0 562734.000 502856.103 512536.289 998.076

EJE P.K. AZIMUT COS A SEN A

0 562735.000 -52.775636 .675615 -.737255

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	76	1	0	562735.000	502843.808	512549.188	998.080
1	76	2	0	562735.000	502845.283	512547.837	999.080
1	76	3	0	562735.000	502848.256	512545.112	1000.053
1	76	4	0	562735.000	502850.444	512543.107	1000.053
1	76	5	0	562735.000	502851.573	512542.072	1000.053
1	76	6	0	562735.000	502855.604	512538.378	999.080
1	76	7	0	562735.000	502857.079	512537.027	998.080

EJE P.K. AZIMUT COS A SEN A

0 562736.000 -52.779880 .675566 -.737300

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	77	1	0	562736.000	502844.483	512549.925	998.083
1	77	2	0	562736.000	502845.958	512548.574	999.083
1	77	3	0	562736.000	502848.931	512545.849	1000.056
1	77	4	0	562736.000	502851.119	512543.845	1000.056
1	77	5	0	562736.000	502852.249	512542.809	1000.056
1	77	6	0	562736.000	502856.280	512539.116	999.083
1	77	7	0	562736.000	502857.755	512537.765	998.083

EJE P.K. AZIMUT COS A SEN A

0 562737.000 -52.784124 .675517 -.737345

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	78	1	0	562737.000	502845.159	512550.662	998.086
1	78	2	0	562737.000	502846.633	512549.311	999.086
1	78	3	0	562737.000	502849.607	512546.587	1000.059
1	78	4	0	562737.000	502851.795	512544.582	1000.059
1	78	5	0	562737.000	502852.925	512543.547	1000.059
1	78	6	0	562737.000	502856.956	512539.853	999.086
1	78	7	0	562737.000	502858.431	512538.502	998.086

EJE P.K. AZIMUT COS A SEN A

0 562738.000 -52.788368 .675468 -.737390

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	79	1	0	562738.000	502845.834	512551.399	998.089
1	79	2	0	562738.000	502847.308	512550.048	999.089
1	79	3	0	562738.000	502850.282	512547.324	1000.062
1	79	4	0	562738.000	502852.470	512545.319	1000.062
1	79	5	0	562738.000	502853.600	512544.284	1000.062
1	79	6	0	562738.000	502857.632	512540.591	999.089
1	79	7	0	562738.000	502859.107	512539.240	998.089

EJE P.K. AZIMUT COS A SEN A

0 562739.000 -52.792613 .675418 -.737435

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	80	1	0	562739.000	502846.509	512552.136	998.092
1	80	2	0	562739.000	502847.984	512550.785	999.092
1	80	3	0	562739.000	502850.957	512548.061	1000.065
1	80	4	0	562739.000	502853.146	512546.057	1000.065
1	80	5	0	562739.000	502854.276	512545.022	1000.065

EJE P.K. AZIMUT COS A SEN A

0 562740.000 -52.796857 .675369 -.737480

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	81	1	0	562740.000	502847.184	512552.873	998.095
1	81	2	0	562740.000	502848.659	512551.522	999.095
1	81	3	0	562740.000	502851.633	512548.798	1000.068
1	81	4	0	562740.000	502853.821	512546.794	1000.068
1	81	5	0	562740.000	502854.951	512545.759	1000.068
1	81	6	0	562740.000	502858.983	512542.067	999.095
1	81	7	0	562740.000	502860.458	512540.716	998.095

EJE P.K. AZIMUT COS A SEN A

0 562741.000 -52.801101 .675320 -.737525

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	82	1	0	562741.000	502847.859	512553.610	998.098
1	82	2	0	562741.000	502849.334	512552.259	999.098
1	82	3	0	562741.000	502852.308	512549.536	1000.071
1	82	4	0	562741.000	502854.496	512547.532	1000.071
1	82	5	0	562741.000	502855.627	512546.497	1000.071
1	82	6	0	562741.000	502859.659	512542.804	999.098
1	82	7	0	562741.000	502861.134	512541.454	998.098

EJE P.K. AZIMUT COS A SEN A

0 562742.000 -52.805345 .675271 -.737570

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	83	1	0	562742.000	502848.534	512554.347	998.101
1	83	2	0	562742.000	502850.009	512552.996	999.101
1	83	3	0	562742.000	502852.983	512550.273	1000.074
1	83	4	0	562742.000	502855.172	512548.269	1000.074

1	83	5	0	562742.000	502856.302	512547.234	1000.074
1	83	6	0	562742.000	502860.335	512543.542	999.101
1	83	7	0	562742.000	502861.810	512542.192	998.101

EJE P.K. AZIMUT COS A SEN A

0 562743.000 -52.809589 .675222 -.737615

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	84	1	0	562743.000	502849.208	512555.084	998.105
1	84	2	0	562743.000	502850.684	512553.733	999.105
1	84	3	0	562743.000	502853.658	512551.011	1000.078
1	84	4	0	562743.000	502855.847	512549.007	1000.078
1	84	5	0	562743.000	502856.977	512547.972	1000.078
1	84	6	0	562743.000	502861.010	512544.280	999.105
1	84	7	0	562743.000	502862.485	512542.930	998.105

EJE P.K. AZIMUT COS A SEN A

0 562744.000 -52.813833 .675173 -.737660

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	85	1	0	562744.000	502849.883	512555.821	998.108
1	85	2	0	562744.000	502851.358	512554.471	999.108
1	85	3	0	562744.000	502854.333	512551.748	1000.081
1	85	4	0	562744.000	502856.522	512549.744	1000.081
1	85	5	0	562744.000	502857.653	512548.710	1000.081
1	85	6	0	562744.000	502861.686	512545.018	999.108
1	85	7	0	562744.000	502863.161	512543.668	998.108

0 562745.000 -52.818077 .675123 -.737755

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	86	1	0	562745.000	502850.558	512556.558	998.111
1	86	2	0	562745.000	502852.033	512555.208	999.111
1	86	3	0	562745.000	502855.008	512552.486	1000.084
1	86	4	0	562745.000	502857.197	512550.482	1000.084
1	86	5	0	562745.000	502858.328	512549.448	1000.084
1	86	6	0	562745.000	502862.361	512545.756	999.111
1	86	7	0	562745.000	502863.837	512544.406	998.111

EJE P.K. AZIMUT COS A SEN A

0 562746.000 -52.822322 .675074 -.737750

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	87	1	0	562746.000	502851.233	512557.296	998.114
1	87	2	0	562746.000	502852.708	512555.945	999.114
1	87	3	0	562746.000	502855.683	512553.223	1000.087
1	87	4	0	562746.000	502857.872	512551.220	1000.087
1	87	5	0	562746.000	502859.003	512550.185	1000.087
1	87	6	0	562746.000	502863.037	512546.494	999.114
1	87	7	0	562746.000	502864.512	512545.144	998.114

EJE P.K. AZIMUT COS A SEN A

0 562747.000 -52.826566 .675025 -.737795

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	88	1	0	562747.000	502851.907	512558.033	998.117
1	88	2	0	562747.000	502853.383	512556.683	999.117
1	88	3	0	562747.000	502856.358	512553.961	1000.090
1	88	4	0	562747.000	502858.547	512551.958	1000.090
1	88	5	0	562747.000	502859.678	512550.923	1000.090
1	88	6	0	562747.000	502863.712	512547.232	999.117
1	88	7	0	562747.000	502865.188	512545.882	998.117

EJE P.K. AZIMUT COS A SEN A

0 562748.000 -52.830810 .674976 -.737840

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	89	1	0	562748.000	502852.582	512558.770	998.120
1	89	2	0	562748.000	502854.058	512557.420	999.120
1	89	3	0	562748.000	502857.033	512554.698	1000.093
1	89	4	0	562748.000	502859.222	512552.695	1000.093
1	89	5	0	562748.000	502860.353	512551.661	1000.093
1	89	6	0	562748.000	502864.387	512547.971	999.120
1	89	7	0	562748.000	502865.863	512546.621	998.120

EJE P.K. AZIMUT COS A SEN A

0 562749.000 -52.835054 .674927 -.737885

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	90	1	0	562749.000	502853.256	512559.508	998.123
1	90	2	0	562749.000	502854.732	512558.158	999.123
1	90	3	0	562749.000	502857.708	512555.436	1000.096
1	90	4	0	562749.000	502859.897	512553.433	1000.096
1	90	5	0	562749.000	502861.028	512552.399	1000.096
1	90	6	0	562749.000	502865.063	512548.709	999.123
1	90	7	0	562749.000	502866.538	512547.359	998.123

EJE P.K. AZIMUT COS A SEN A

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	91	1	0	562750.000	502853.931	512560.245	998.126
1	91	2	0	562750.000	502855.407	512558.895	999.126
1	91	3	0	562750.000	502858.382	512556.174	1000.099
1	91	4	0	562750.000	502860.572	512554.171	1000.099
1	91	5	0	562750.000	502861.703	512553.137	1000.099
1	91	6	0	562750.000	502865.738	512549.447	999.126
1	91	7	0	562750.000	502867.214	512548.097	998.126

EJE P.K. AZIMUT COS A SEN A

0 562751.000 -52.843542 .674828 -.737975

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	92	1	0	562751.000	502854.605	512560.983	998.130
1	92	2	0	562751.000	502856.081	512559.633	999.130
1	92	3	0	562751.000	502859.057	512556.912	1000.103
1	92	4	0	562751.000	502861.247	512554.909	1000.103
1	92	5	0	562751.000	502862.378	512553.875	1000.103
1	92	6	0	562751.000	502866.413	512550.185	999.130
1	92	7	0	562751.000	502867.889	512548.836	998.130

EJE P.K. AZIMUT COS A SEN A

0 562752.000 -52.847786 .674779 -.738020

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	93	1	0	562752.000	502855.280	512561.720	998.133
1	93	2	0	562752.000	502856.756	512560.371	999.133
1	93	3	0	562752.000	502859.732	512557.650	1000.106
1	93	4	0	562752.000	502861.922	512555.647	1000.106
1	93	5	0	562752.000	502863.053	512554.613	1000.106
1	93	6	0	562752.000	502867.088	512550.924	999.133
1	93	7	0	562752.000	502868.564	512549.574	998.133

EJE P.K. AZIMUT COS A SEN A

0 562753.000 -52.852030 .674730 -.738065

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	94	1	0	562753.000	502855.954	512562.458	998.136
1	94	2	0	562753.000	502857.430	512561.108	999.136
1	94	3	0	562753.000	502860.406	512558.387	1000.109
1	94	4	0	562753.000	502862.597	512556.385	1000.109
1	94	5	0	562753.000	502863.728	512555.351	1000.109
1	94	6	0	562753.000	502867.763	512551.662	999.136
1	94	7	0	562753.000	502869.239	512550.313	998.136

EJE P.K. AZIMUT COS A SEN A

0 562754.000 -52.856275 .674681 -.738110

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	95	1	0	562754.000	502856.628	512563.195	998.139
1	95	2	0	562754.000	502858.105	512561.846	999.139
1	95	3	0	562754.000	502861.081	512559.125	1000.112
1	95	4	0	562754.000	502863.271	512557.123	1000.112
1	95	5	0	562754.000	502864.403	512556.089	1000.112
1	95	6	0	562754.000	502868.438	512552.401	999.139
1	95	7	0	562754.000	502869.914	512551.051	998.139

EJE P.K. AZIMUT COS A SEN A

0 562755.000 -52.860519 .674631 -.738155

1	96	2	0	562755.000	502858.779	512562.584	999.142
1	96	3	0	562755.000	502861.756	512559.863	1000.115
1	96	4	0	562755.000	502863.946	512557.861	1000.115
1	96	5	0	562755.000	502865.077	512556.828	1000.115
1	96	6	0	562755.000	502869.113	512553.139	999.142
1	96	7	0	562755.000	502870.589	512551.790	998.142

EJE P.K. AZIMUT COS A SEN A
0 562756.000 -52.864763 .674582 -.738200

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	97	1	0	562756.000	502857.977	512564.671	998.145
1	97	2	0	562756.000	502859.453	512563.322	999.145
1	97	3	0	562756.000	502862.430	512560.601	1000.118
1	97	4	0	562756.000	502864.621	512558.600	1000.118

1	97	5	0	562756.000	502865.752	512557.566	1000.118
1	97	6	0	562756.000	502869.788	512553.878	999.145
1	97	7	0	562756.000	502871.264	512552.528	998.145

EJE P.K. AZIMUT COS A SEN A
0 562757.000 -52.869007 .674533 -.738245

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	98	1	0	562757.000	502858.651	512565.409	998.148
1	98	2	0	562757.000	502860.127	512564.060	999.148
1	98	3	0	562757.000	502863.104	512561.340	1000.121
1	98	4	0	562757.000	502865.295	512559.338	1000.121
1	98	5	0	562757.000	502866.427	512558.304	1000.121
1	98	6	0	562757.000	502870.463	512554.616	999.148
1	98	7	0	562757.000	502871.939	512553.267	998.148

EJE P.K. AZIMUT COS A SEN A
0 562758.000 -52.873251 .674484 -.738290

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	99	1	0	562758.000	502859.325	512566.146	998.151
1	99	2	0	562758.000	502860.802	512564.798	999.151
1	99	3	0	562758.000	502863.779	512562.078	1000.124
1	99	4	0	562758.000	502865.970	512560.076	1000.124
1	99	5	0	562758.000	502867.101	512559.042	1000.124
1	99	6	0	562758.000	502871.138	512555.355	999.151
1	99	7	0	562758.000	502872.614	512554.006	998.151

EJE P.K. AZIMUT COS A SEN A
0 562759.000 -52.877495 .674435 -.738335

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	100	1	0	562759.000	502859.999	512566.884	998.155
1	100	2	0	562759.000	502861.476	512565.535	999.155
1	100	3	0	562759.000	502864.453	512562.816	1000.128
1	100	4	0	562759.000	502866.644	512560.814	1000.128
1	100	5	0	562759.000	502867.776	512559.781	1000.128
1	100	6	0	562759.000	502871.812	512556.093	999.155
1	100	7	0	562759.000	502873.289	512554.745	998.155

EJE P.K. AZIMUT COS A SEN A
0 562760.000 -52.881739 .674385 -.738380

GPO. RTA. CVA. EJE P.K X Y Z

1	101	4	0	562760.000	502867.319	512561.553	1000.131
1	101	5	0	562760.000	502868.450	512560.519	1000.131
1	101	6	0	562760.000	502872.487	512556.832	999.158
1	101	7	0	562760.000	502873.964	512555.483	998.158

EJE P.K. AZIMUT COS A SEN A
0 562761.000 -52.885983 .674336 -.738425

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	102	1	0	562761.000	502861.347	512568.360	998.161
1	102	2	0	562761.000	502862.824	512567.012	999.161
1	102	3	0	562761.000	502865.802	512564.292	1000.134
1	102	4	0	562761.000	502867.993	512562.291	1000.134
1	102	5	0	562761.000	502869.125	512561.258	1000.134
1	102	6	0	562761.000	502873.162	512557.571	999.161
1	102	7	0	562761.000	502874.639	512556.222	998.161

EJE P.K. AZIMUT COS A SEN A
0 562762.000 -52.890228 .674287 -.738470

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	103	1	0	562762.000	502862.021	512569.098	998.164
1	103	2	0	562762.000	502863.498	512567.750	999.164
1	103	3	0	562762.000	502866.476	512565.031	1000.137
1	103	4	0	562762.000	502868.667	512563.030	1000.137
1	103	5	0	562762.000	502869.799	512561.996	1000.137
1	103	6	0	562762.000	502873.837	512558.310	999.164
1	103	7	0	562762.000	502875.313	512556.961	998.164

EJE P.K. AZIMUT COS A SEN A
0 562763.000 -52.894472 .674238 -.738514

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	104	1	0	562763.000	502862.695	512569.836	998.167
1	104	2	0	562763.000	502864.172	512568.488	999.167
1	104	3	0	562763.000	502867.150	512565.769	1000.140
1	104	4	0	562763.000	502869.341	512563.768	1000.140
1	104	5	0	562763.000	502870.473	512562.735	1000.140
1	104	6	0	562763.000	502874.511	512559.048	999.167
1	104	7	0	562763.000	502875.988	512557.700	998.167

EJE P.K. AZIMUT COS A SEN A
0 562764.000 -52.898716 .674188 -.738559

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	105	1	0	562764.000	502863.369	512570.574	998.170
1	105	2	0	562764.000	502864.846	512569.226	999.170
1	105	3	0	562764.000	502867.824	512566.507	1000.143
1	105	4	0	562764.000	502870.016	512564.507	1000.143
1	105	5	0	562764.000	502871.148	512563.473	1000.143
1	105	6	0	562764.000	502875.186	512559.787	999.170
1	105	7	0	562764.000	502876.663	512558.439	998.170

EJE P.K. AZIMUT COS A SEN A
0 562765.000 -52.902960 .674139 -.738604

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	106	1	0	562765.000	502864.042	512571.313	998.173
1	106	2	0	562765.000	502865.519	512569.965	999.173

1 106 6 0 562765.000 502875.860 512560.526 999.173
1 106 7 0 562765.000 502877.337 512559.178 998.173
1

EJE P.K. AZIMUT COS A SEN A
0 562766.000 -52.907204 .674090 -.738649

GPO. RTA. CVA. EJE P.K. X Y Z
1 107 1 0 562766.000 502864.716 512572.051 998.177
1 107 2 0 562766.000 502866.193 512570.703 999.177
1 107 3 0 562766.000 502869.172 512567.984 1000.150
1 107 4 0 562766.000 502871.364 512565.984 1000.150
1 107 5 0 562766.000 502872.496 512564.951 1000.150
1 107 6 0 562766.000 502876.535 512561.265 999.177
1 107 7 0 562766.000 502878.012 512559.917 998.177

EJE P.K. AZIMUT COS A SEN A
0 562767.000 -52.911448 .674041 -.738694

GPO. RTA. CVA. EJE P.K. X Y Z
1 108 1 0 562767.000 502865.390 512572.789 998.180
1 108 2 0 562767.000 502866.867 512571.441 999.180
1 108 3 0 562767.000 502869.846 512568.723 1000.153
1 108 4 0 562767.000 502872.038 512566.723 1000.153
1 108 5 0 562767.000 502873.170 512565.690 1000.153
~~1 108 6 0 562767.000 502877.209 512562.004 999.180~~
1 108 7 0 562767.000 502878.686 512560.656 998.180

EJE P.K. AZIMUT COS A SEN A
0 562768.000 -52.915692 .673991 -.738739

GPO. RTA. CVA. EJE P.K. X Y Z
1 109 1 0 562768.000 502866.063 512573.527 998.183
1 109 2 0 562768.000 502867.541 512572.179 999.183
1 109 3 0 562768.000 502870.520 512569.461 1000.156
1 109 4 0 562768.000 502872.712 512567.461 1000.156
1 109 5 0 562768.000 502873.844 512566.428 1000.156
1 109 6 0 562768.000 502877.883 512562.743 999.183
1 109 7 0 562768.000 502879.361 512561.395 998.183

EJE P.K. AZIMUT COS A SEN A
0 562769.000 -52.919937 .673942 -.738784

GPO. RTA. CVA. EJE P.K. X Y Z
1 110 1 0 562769.000 502866.737 512574.266 998.186
1 110 2 0 562769.000 502868.215 512572.918 999.186
1 110 3 0 562769.000 502871.194 512570.200 1000.159
1 110 4 0 562769.000 502873.386 512568.200 1000.159
1 110 5 0 562769.000 502874.518 512567.167 1000.159
1 110 6 0 562769.000 502878.558 512563.482 999.186
1 110 7 0 562769.000 502880.035 512562.135 998.186

EJE P.K. AZIMUT COS A SEN A
0 562770.000 -52.924181 .673893 -.738829

GPO. RTA. CVA. EJE P.K. X Y Z
1 111 1 0 562770.000 502867.410 512575.004 998.189
1 111 2 0 562770.000 502868.888 512573.656 999.189
1 111 3 0 562770.000 502871.867 512570.939 1000.162
1 111 4 0 562770.000 502874.060 512568.939 1000.162

1 111 5 0 562770.000 502875.192 512567.906 1000.162
1 111 6 0 562770.000 502879.232 512564.222 999.189
1 111 7 0 562770.000 502880.709 512562.874 998.189

EJE P.K. AZIMUT COS A SEN A
0 562771.000 -52.928425 .673844 -.738874

GPO. RTA. CVA. EJE P.K. X Y Z
1 112 1 0 562771.000 502868.084 512575.742 998.192
1 112 2 0 562771.000 502869.562 512574.395 999.192
1 112 3 0 562771.000 502872.541 512571.677 1000.165
1 112 4 0 562771.000 502874.734 512569.678 1000.165
1 112 5 0 562771.000 502875.866 512568.645 1000.165
1 112 6 0 562771.000 502879.906 512564.961 999.192
1 112 7 0 562771.000 502881.384 512563.613 998.192

EJE P.K. AZIMUT COS A SEN A
0 562772.000 -52.932669 .673794 -.738919

GPO. RTA. CVA. EJE P.K. X Y Z
1 113 1 0 562772.000 502868.757 512576.481 998.195
1 113 2 0 562772.000 502870.235 512575.133 999.195
1 113 3 0 562772.000 502873.215 512572.416 1000.168
1 113 4 0 562772.000 502875.408 512570.417 1000.168
1 113 5 0 562772.000 502876.540 512569.384 1000.168
1 113 6 0 562772.000 502880.580 512565.700 999.195
1 113 7 0 562772.000 502882.058 512564.352 998.195

EJE P.K. AZIMUT COS A SEN A
0 562773.000 -52.936913 .673745 -.738964

GPO. RTA. CVA. EJE P.K. X Y Z
1 114 1 0 562773.000 502869.431 512577.219 998.198
1 114 2 0 562773.000 502870.909 512575.872 999.198
1 114 3 0 562773.000 502873.889 512573.155 1000.171
1 114 4 0 562773.000 502876.081 512571.156 1000.171
1 114 5 0 562773.000 502877.214 512570.123 1000.171
1 114 6 0 562773.000 502881.254 512566.439 999.198
1 114 7 0 562773.000 502882.732 512565.092 998.198

EJE P.K. AZIMUT COS A SEN A
0 562774.000 -52.941157 .673696 -.739009

GPO. RTA. CVA. EJE P.K. X Y Z
1 115 1 0 562774.000 502870.104 512577.958 998.202
1 115 2 0 562774.000 502871.582 512576.610 999.202
1 115 3 0 562774.000 502874.562 512573.894 1000.175
1 115 4 0 562774.000 502876.755 512571.895 1000.175
1 115 5 0 562774.000 502877.888 512570.862 1000.175
1 115 6 0 562774.000 502881.928 512567.179 999.202
1 115 7 0 562774.000 502883.406 512565.831 998.202

EJE P.K. AZIMUT COS A SEN A
0 562775.000 -52.945401 .673647 -.739054

1

GPO. RTA. CVA. EJE P.K. X Y Z
1 116 1 0 562775.000 502870.777 512578.696 998.205
1 116 2 0 562775.000 502872.255 512577.349 999.205
1 116 3 0 562775.000 502875.236 512574.633 1000.179

1 116 7 0 562775.000 502884.080 512566.371 998.205

EJE P.K. AZIMUT COS A SEN A

0 562776.000 -52.949645 .673597 -.739099

G.O.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	117	1	0	562776.000	502871.451	512579.435	998.208
1	117	2	0	562776.000	502872.929	512578.088	999.205
1	117	3	0	562776.000	502875.909	512575.372	1000.181
1	117	4	0	562776.000	502878.102	512573.373	1000.181
1	117	5	0	562776.000	502879.235	512572.340	1000.181
1	117	6	0	562776.000	502883.276	512568.657	999.208
1	117	7	0	562776.000	502884.754	512567.310	998.208

EJE P.K. AZIMUT COS A SEN A

0 562777.000 -52.953890 .673548 -.739143

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	118	1	0	562777.000	502872.124	512580.174	998.211
1	118	2	0	562777.000	502873.602	512578.827	999.211
1	118	3	0	562777.000	502876.583	512576.110	1000.184
1	118	4	0	562777.000	502878.776	512574.112	1000.184
1	118	5	0	562777.000	502879.909	512573.080	1000.184
1	118	6	0	562777.000	502883.950	512569.397	999.211
1	118	7	0	562777.000	502885.428	512568.050	998.211

EJE P.K. AZIMUT COS A SEN A

0 562778.000 -52.958134 .673499 -.739188

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	119	1	0	562778.000	502872.797	512580.912	998.214
1	119	2	0	562778.000	502874.275	512579.565	999.214
1	119	3	0	562778.000	502877.256	512576.850	1000.187
1	119	4	0	562778.000	502879.450	512574.851	1000.187
1	119	5	0	562778.000	502880.582	512573.819	1000.187
1	119	6	0	562778.000	502884.624	512570.136	999.214
1	119	7	0	562778.000	502886.102	512568.789	998.214

EJE P.K. AZIMUT COS A SEN A

0 562779.000 -52.962378 .673449 -.739233

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	120	1	0	562779.000	502873.470	512581.651	998.217
1	120	2	0	562779.000	502874.948	512580.304	999.217
1	120	3	0	562779.000	502877.929	512577.589	1000.190
1	120	4	0	562779.000	502880.123	512575.590	1000.190
1	120	5	0	562779.000	502881.256	512574.558	1000.190
1	120	6	0	562779.000	502885.298	512570.876	999.217
1	120	7	0	562779.000	502886.776	512569.529	998.217

EJE P.K. AZIMUT COS A SEN A

0 562780.000 -52.966622 .673400 -.739278

G.O.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	121	1	0	562780.000	502874.143	512582.390	998.220
1	121	2	0	562780.000	502875.621	512581.043	999.220
1	121	3	0	562780.000	502878.603	512578.328	1000.193
1	121	4	0	562780.000	502880.796	512576.329	1000.193
1	121	5	0	562780.000	502881.929	512575.297	1000.193

EJE P.K. AZIMUT COS A SEN A

0 562781.000 -52.970866 .673351 -.739323

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	122	1	0	562781.000	502874.816	512583.129	998.223
1	122	2	0	562781.000	502876.295	512581.782	999.223
1	122	3	0	562781.000	502879.276	512579.067	1000.196
1	122	4	0	562781.000	502881.470	512577.069	1000.196
1	122	5	0	562781.000	502882.603	512576.037	1000.196
1	122	6	0	562781.000	502886.645	512572.355	999.223
1	122	7	0	562781.000	502888.124	512571.009	998.223

EJE P.K. AZIMUT COS A SEN A

0 562782.000 -52.975110 .673302 -.739368

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	123	1	0	562782.000	502875.489	512583.868	998.227
1	123	2	0	562782.000	502876.968	512582.521	999.227
1	123	3	0	562782.000	502879.949	512579.806	1000.200
1	123	4	0	562782.000	502882.143	512577.808	1000.200
1	123	5	0	562782.000	502883.276	512576.776	1000.200
1	123	6	0	562782.000	502887.319	512573.095	999.227
1	123	7	0	562782.000	502888.797	512571.748	998.227

EJE P.K. AZIMUT COS A SEN A

0 562783.000 -52.979354 .673252 -.739413

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	124	1	0	562783.000	502876.162	512584.607	998.230
1	124	2	0	562783.000	502877.641	512583.260	999.230
1	124	3	0	562783.000	502880.622	512580.545	1000.203
1	124	4	0	562783.000	502882.816	512578.547	1000.203
1	124	5	0	562783.000	502883.950	512577.516	1000.203
1	124	6	0	562783.000	502887.992	512573.835	999.230
1	124	7	0	562783.000	502889.471	512572.488	998.230

EJE P.K. AZIMUT COS A SEN A

0 562784.000 -52.983599 .673203 -.739458

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	125	1	0	562784.000	502876.834	512585.346	998.233
1	125	2	0	562784.000	502878.313	512583.999	999.233
1	125	3	0	562784.000	502881.295	512581.285	1000.206
1	125	4	0	562784.000	502883.490	512579.287	1000.206

1	125	5	0	562784.000	502884.623	512578.255	1000.206
1	125	6	0	562784.000	502888.666	512574.574	999.233
1	125	7	0	562784.000	502890.145	512573.228	998.233

EJE P.K. AZIMUT COS A SEN A

0 562785.000 -52.987843 .673154 -.739503

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	126	1	0	562785.000	502877.507	512586.085	998.236
1	126	2	0	562785.000	502878.986	512584.738	999.236
1	126	3	0	562785.000	502881.968	512582.024	1000.209
1	126	4	0	562785.000	502884.163	512580.026	1000.209
1	126	5	0	562785.000	502885.296	512578.995	1000.209
1	126	6	0	562785.000	502889.339	512575.314	999.236
1	126	7	0	562785.000	502890.818	512573.987	998.236

0	562786.000	-52.992087	.673104	-.739547			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	127	1	0	562786.000	502878.180	512586.824	998.239
1	127	2	0	562786.000	502879.659	512585.478	999.239
1	127	3	0	562786.000	502882.641	512582.763	1000.212
1	127	4	0	562786.000	502884.836	512580.766	1000.212
1	127	5	0	562786.000	502885.969	512579.734	1000.212
1	127	6	0	562786.000	502890.013	512576.054	999.239
1	127	7	0	562786.000	502891.492	512574.708	998.239

EJE P.K. AZIMUT COS A SEN A

0 562787.000 -52.996331 .673055 -.739592

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	128	1	0	562787.000	502878.853	512587.563	998.242
1	128	2	0	562787.000	502880.332	512586.217	999.242
1	128	3	0	562787.000	502883.314	512583.503	1000.215
1	128	4	0	562787.000	502885.509	512581.505	1000.215
1	128	5	0	562787.000	502886.642	512580.474	1000.215
1	128	6	0	562787.000	502890.686	512576.794	999.242
1	128	7	0	562787.000	502892.165	512575.448	998.242

E P.K. AZIMUT COS A SEN A

0 562788.000 -53.000575 .673006 -.739637

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	129	1	0	562788.000	502879.525	512588.302	998.245
1	129	2	0	562788.000	502881.005	512586.956	999.245
1	129	3	0	562788.000	502883.987	512584.242	1000.218
1	129	4	0	562788.000	502886.182	512582.245	1000.218
1	129	5	0	562788.000	502887.316	512581.214	1000.218
1	129	6	0	562788.000	502891.359	512577.534	999.245
1	129	7	0	562788.000	502892.839	512576.188	998.245

EJE P.K. AZIMUT COS A SEN A

0 562789.000 -53.004819 .672957 -.739682

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	130	1	0	562789.000	502880.198	512589.041	998.248
1	130	2	0	562789.000	502881.677	512587.695	999.248
1	130	3	0	562789.000	502884.660	512584.982	1000.221
1	130	4	0	562789.000	502886.855	512582.985	1000.221
1	130	5	0	562789.000	502887.989	512581.953	1000.221
1	130	6	0	562789.000	502892.033	512578.274	999.248
1	130	7	0	562789.000	502893.512	512576.928	998.248

EJE P.K. AZIMUT COS A SEN A

0 562790.000 -53.009063 .672907 -.739727

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	131	1	0	562790.000	502880.870	512589.781	998.252
1	131	2	0	562790.000	502882.350	512588.435	999.252
1	131	3	0	562790.000	502885.333	512585.721	1000.225
1	131	4	0	562790.000	502887.528	512583.724	1000.225
1	131	5	0	562790.000	502888.662	512582.693	1000.225
1	131	6	0	562790.000	502892.706	512579.014	999.252
1	131	7	0	562790.000	502894.185	512577.668	998.252

EJE P.K. AZIMUT COS A SEN A

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	132	1	0	562791.000	502881.543	512590.520	998.255
1	132	2	0	562791.000	502883.022	512589.174	999.255
1	132	3	0	562791.000	502886.006	512586.461	1000.228
1	132	4	0	562791.000	502888.201	512584.464	1000.228
1	132	5	0	562791.000	502889.335	512583.433	1000.228
1	132	6	0	562791.000	502893.379	512579.754	999.255
1	132	7	0	562791.000	502894.859	512578.408	998.255

EJE P.K. AZIMUT COS A SEN A

0 562792.000 -53.017552 .672809 -.739817

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	133	1	0	562792.000	502882.215	512591.259	998.258
1	133	2	0	562792.000	502883.695	512589.914	999.258
1	133	3	0	562792.000	502886.678	512587.201	1000.231
1	133	4	0	562792.000	502888.874	512585.204	1000.231
1	133	5	0	562792.000	502890.007	512584.173	1000.231
1	133	6	0	562792.000	502894.052	512580.494	999.258
1	133	7	0	562792.000	502895.532	512579.149	998.258

EJE P.K. AZIMUT COS A SEN A

0 562793.000 -53.021796 .672759 -.739861

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	134	1	0	562793.000	502882.888	512591.999	998.261
1	134	2	0	562793.000	502884.367	512590.653	999.261
1	134	3	0	562793.000	502887.351	512587.940	1000.234
1	134	4	0	562793.000	502889.546	512585.944	1000.234
1	134	5	0	562793.000	502890.680	512584.913	1000.234
1	134	6	0	562793.000	502894.725	512581.234	999.261
1	134	7	0	562793.000	502896.205	512579.889	998.261

1

EJE P.K. AZIMUT COS A SEN A

0 562794.000 -53.026040 .672710 -.739906

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	135	1	0	562794.000	502883.560	512592.738	998.264
1	135	2	0	562794.000	502885.040	512591.393	999.264
1	135	3	0	562794.000	502888.024	512588.680	1000.237
1	135	4	0	562794.000	502890.219	512586.684	1000.237
1	135	5	0	562794.000	502891.353	512585.653	1000.237
1	135	6	0	562794.000	502895.399	512581.975	999.264
1	135	7	0	562794.000	502896.878	512580.629	998.264

EJE P.K. AZIMUT COS A SEN A

0 562795.000 -53.030284 .672661 -.739951

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	136	1	0	562795.000	502884.232	512593.478	998.267
1	136	2	0	562795.000	502885.712	512592.132	999.267
1	136	3	0	562795.000	502888.696	512589.420	1000.240
1	136	4	0	562795.000	502890.892	512587.424	1000.240
1	136	5	0	562795.000	502892.026	512586.393	1000.240
1	136	6	0	562795.000	502896.072	512582.715	999.267
1	136	7	0	562795.000	502897.551	512581.370	998.267

EJE P.K. AZIMUT COS A SEN A

0 562796.000 -53.034528 .672612 -.739996

1	137	2	0	562796.000	502886.385	512592.872	999.270
1	137	3	0	562796.000	502889.369	512590.160	1000.243
1	137	4	0	562796.000	502891.565	512588.164	1000.243
1	137	5	0	562796.000	502892.699	512587.133	1000.243
1	137	6	0	562796.000	502896.744	512583.455	999.270
1	137	7	0	562796.000	502898.224	512582.110	998.270

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562797.000	-53.038772	.672562	-.740041			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	138	1	0	562797.000	502885.577	512594.957	998.273
1	138	2	0	562797.000	502887.057	512593.612	999.273
1	138	3	0	562797.000	502890.041	512590.899	1000.246
1	138	4	0	562797.000	502892.237	512588.904	1000.246
1	138	5	0	562797.000	502893.371	512587.873	1000.246
1	138	6	0	562797.000	502897.417	512584.196	999.273
1	138	7	0	562797.000	502898.897	512582.851	998.273

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562798.000	-53.043016	.672513	-.740086			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	139	1	0	562798.000	502886.249	512595.696	998.277
1	139	2	0	562798.000	502887.729	512594.351	999.277
1	139	3	0	562798.000	502890.713	512591.639	1000.250
1	139	4	0	562798.000	502892.910	512589.644	1000.250
1	139	5	0	562798.000	502894.044	512588.613	1000.250
1	139	6	0	562798.000	502898.090	512584.936	999.277
1	139	7	0	562798.000	502899.570	512583.591	998.277

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562799.000	-53.047261	.672463	-.740131			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	140	1	0	562799.000	502886.921	512596.436	998.280
1	140	2	0	562799.000	502888.401	512595.091	999.280
1	140	3	0	562799.000	502891.386	512592.379	1000.253
1	140	4	0	562799.000	502893.582	512590.384	1000.253
1	140	5	0	562799.000	502894.716	512589.353	1000.253
1	140	6	0	562799.000	502898.763	512585.677	999.280
1	140	7	0	562799.000	502900.243	512584.332	998.280

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562800.000	-53.051505	.672414	-.740175			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	141	1	0	562800.000	502887.593	512597.176	998.283
1	141	2	0	562800.000	502889.073	512595.831	999.283
1	141	3	0	562800.000	502892.058	512593.119	1000.256
1	141	4	0	562800.000	502894.255	512591.124	1000.256
1	141	5	0	562800.000	502895.389	512590.093	1000.256
1	141	6	0	562800.000	502899.436	512586.417	999.283
1	141	7	0	562800.000	502900.916	512585.072	998.283

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562801.000	-53.055749	.672365	-.740220			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z

1	142	4	0	562801.000	502894.927	512591.864	1000.259
1	142	5	0	562801.000	502896.061	512590.834	1000.259
1	142	6	0	562801.000	502900.108	512587.158	999.286
1	142	7	0	562801.000	502901.589	512585.813	998.286

EJE	P.K.	AZIMUT	COS A	SEN A
0	562802.000	-53.059993	.672315	-.740265

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	143	1	0	562802.000	502888.937	512598.655	998.289
1	143	2	0	562802.000	502890.417	512597.311	999.289
1	143	3	0	562802.000	502893.403	512594.599	1000.262
1	143	4	0	562802.000	502895.599	512592.604	1000.262
1	143	5	0	562802.000	502896.734	512591.574	1000.262
1	143	6	0	562802.000	502900.781	512587.898	999.289
1	143	7	0	562802.000	502902.262	512586.554	998.289

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562803.000	-53.064237	.672266	-.740310			
1							
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	144	1	0	562803.000	502889.609	512599.395	998.292
1	144	2	0	562803.000	502891.089	512598.050	999.292
1	144	3	0	562803.000	502894.075	512595.340	1000.265
1	144	4	0	562803.000	502896.272	512593.345	1000.265
1	144	5	0	562803.000	502897.406	512592.314	1000.265
1	144	6	0	562803.000	502901.454	512588.639	999.292
1	144	7	0	562803.000	502902.934	512587.294	998.292

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562804.000	-53.068481	.672217	-.740355			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	145	1	0	562804.000	502890.281	512600.135	998.295
1	145	2	0	562804.000	502891.761	512598.790	999.295
1	145	3	0	562804.000	502894.747	512596.080	1000.268
1	145	4	0	562804.000	502896.944	512594.085	1000.268
1	145	5	0	562804.000	502898.078	512593.055	1000.268
1	145	6	0	562804.000	502902.126	512589.379	999.295
1	145	7	0	562804.000	502903.607	512588.035	998.295

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562805.000	-53.072725	.672167	-.740399			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	146	1	0	562805.000	502890.952	512600.875	998.298
1	146	2	0	562805.000	502892.433	512599.531	999.298
1	146	3	0	562805.000	502895.419	512596.820	1000.271
1	146	4	0	562805.000	502897.616	512594.825	1000.271
1	146	5	0	562805.000	502898.751	512593.795	1000.271
1	146	6	0	562805.000	502902.799	512590.120	999.299
1	146	7	0	562805.000	502904.280	512588.776	998.299

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562806.000	-53.076969	.672118	-.740444			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	147	1	0	562806.000	502891.624	512601.615	998.302
1	147	2	0	562806.000	502893.105	512600.271	999.302

1 147 7 0 562806.000 502904.952 512589.517 998.302

EJE P.K. AZIMUT COS A SEN A

0 562807.000 -53.081214 .672068 -.740489

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	148	1	0	562807.000	502892.296	512602.355	998.305
1	148	2	0	562807.000	502893.777	512601.011	999.305
1	148	3	0	562807.000	502896.763	512598.301	1000.278
1	148	4	0	562807.000	502898.960	512596.306	1000.278
1	148	5	0	562807.000	502900.095	512595.276	1000.278
1	148	6	0	562807.000	502904.144	512591.602	999.305
1	148	7	0	562807.000	502905.625	512590.258	998.305

EJE P.K. AZIMUT COS A SEN A

0 562808.000 -53.085458 .672019 -.740534

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	149	1	0	562808.000	502892.967	512603.095	998.308
1	149	2	0	562808.000	502894.449	512601.751	999.308
1	149	3	0	562808.000	502897.435	512599.041	1000.281
1	149	4	0	562808.000	502899.632	512597.047	1000.281
1	149	5	0	562808.000	502900.767	512596.017	1000.281
1	149	6	0	562808.000	502904.816	512592.343	999.308
1	149	7	0	562808.000	502906.297	512590.999	998.308

EJE P.K. AZIMUT COS A SEN A

0 562809.000 -53.089702 .671970 -.740579

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	150	1	0	562809.000	502893.639	512603.835	998.311
1	150	2	0	562809.000	502895.120	512602.491	999.311
1	150	3	0	562809.000	502898.107	512599.781	1000.284
1	150	4	0	562809.000	502900.304	512597.787	1000.284
1	150	5	0	562809.000	502901.439	512596.758	1000.284
1	150	6	0	562809.000	502905.488	512593.084	999.311
1	150	7	0	562809.000	502906.969	512591.740	998.311

EJE P.K. AZIMUT COS A SEN A

0 562810.000 -53.093946 .671920 -.740623

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	151	1	0	562810.000	502894.311	512604.575	998.314
1	151	2	0	562810.000	502895.792	512603.231	999.314
1	151	3	0	562810.000	502898.778	512600.522	1000.287
1	151	4	0	562810.000	502900.976	512598.528	1000.287
1	151	5	0	562810.000	502902.111	512597.498	1000.287
1	151	6	0	562810.000	502906.161	512593.824	999.314
1	151	7	0	562810.000	502907.642	512592.481	998.314

EJE P.K. AZIMUT COS A SEN A

0 562811.000 -53.098190 .671871 -.740668

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	152	1	0	562811.000	502894.982	512605.315	998.317
1	152	2	0	562811.000	502896.463	512603.972	999.317
1	152	3	0	562811.000	502899.450	512601.262	1000.290
1	152	4	0	562811.000	502901.648	512599.269	1000.290

EJE P.K. AZIMUT COS A SEN A

0 562812.000 -53.102434 .671822 -.740713

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	153	1	0	562812.000	502895.654	512606.056	998.320
1	153	2	0	562812.000	502897.135	512604.712	999.320
1	153	3	0	562812.000	502900.122	512602.003	1000.293
1	153	4	0	562812.000	502902.320	512600.009	1000.293

1	153	5	0	562812.000	502903.455	512598.980	1000.293
1	153	6	0	562812.000	502907.505	512595.306	999.320
1	153	7	0	562812.000	502908.986	512593.963	998.320

EJE P.K. AZIMUT COS A SEN A

0 562813.000 -53.106678 .671772 -.740758

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	154	1	0	562813.000	502896.325	512606.796	998.324
1	154	2	0	562813.000	502897.806	512605.452	999.324
1	154	3	0	562813.000	502900.794	512602.743	1000.297
1	154	4	0	562813.000	502902.992	512600.750	1000.297
1	154	5	0	562813.000	502904.127	512599.720	1000.297
1	154	6	0	562813.000	502908.177	512596.048	999.324
1	154	7	0	562813.000	502909.659	512594.704	998.324

EJE P.K. AZIMUT COS A SEN A

0 562814.000 -53.110922 .671723 -.740803

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	155	1	0	562814.000	502896.996	512607.536	998.327
1	155	2	0	562814.000	502898.478	512606.193	999.327
1	155	3	0	562814.000	502901.465	512603.484	1000.300
1	155	4	0	562814.000	502903.664	512601.491	1000.300
1	155	5	0	562814.000	502904.799	512600.461	1000.300
1	155	6	0	562814.000	502908.849	512596.789	999.327
1	155	7	0	562814.000	502910.331	512595.445	998.327

EJE P.K. AZIMUT COS A SEN A

0 562815.000 -53.115167 .671673 -.740847

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	156	1	0	562815.000	502897.668	512608.277	998.330
1	156	2	0	562815.000	502899.149	512606.933	999.330
1	156	3	0	562815.000	502902.137	512604.225	1000.303
1	156	4	0	562815.000	502904.335	512602.232	1000.303
1	156	5	0	562815.000	502905.471	512601.202	1000.303
1	156	6	0	562815.000	502909.521	512597.530	999.330
1	156	7	0	562815.000	502911.003	512596.187	998.330

EJE P.K. AZIMUT COS A SEN A

0 562816.000 -53.119411 .671624 -.740892

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	157	1	0	562816.000	502898.339	512609.017	998.333
1	157	2	0	562816.000	502899.821	512607.674	999.333
1	157	3	0	562816.000	502902.808	512604.965	1000.306
1	157	4	0	562816.000	502905.007	512602.972	1000.306
1	157	5	0	562816.000	502906.142	512601.943	1000.306

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
0	562817.000	-53.123655		.671575		-.740937	
1	158	1	0	562817.000	502899.010	512609.758	998.336
1	158	2	0	562817.000	502900.492	512608.414	999.336
1	158	3	0	562817.000	502903.480	512605.706	1000.309
1	158	4	0	562817.000	502905.678	512603.713	1000.309
1	158	5	0	562817.000	502906.814	512602.684	1000.309
1	158	6	0	562817.000	502910.865	512599.012	999.336
1	158	7	0	562817.000	502912.347	512597.669	998.336
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562818.000	-53.127899		.671525		-.740982	
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	159	1	0	562818.000	502899.681	512610.498	998.339
1	159	2	0	562818.000	502901.163	512609.155	999.339
1	159	3	0	562818.000	502904.151	512606.447	1000.312
1	159	4	0	562818.000	502906.350	512604.454	1000.312
1	159	5	0	562818.000	502907.486	512603.425	1000.312
1	159	6	0	562818.000	502911.537	512599.754	999.339
1	159	7	0	562818.000	502913.019	512598.411	998.339
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562819.000	-53.132143		.671476		-.741026	
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	160	1	0	562819.000	502900.352	512611.239	998.342
1	160	2	0	562819.000	502901.834	512609.896	999.342
1	160	3	0	562819.000	502904.823	512607.188	1000.315
1	160	4	0	562819.000	502907.022	512605.195	1000.315
1	160	5	0	562819.000	502908.157	512604.166	1000.315
1	160	6	0	562819.000	502912.209	512600.495	999.342
1	160	7	0	562819.000	502913.691	512599.152	998.342
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562820.000	-53.136387		.671426		-.741071	
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	161	1	0	562820.000	502901.023	512611.979	998.345
1	161	2	0	562820.000	502902.505	512610.636	999.345
1	161	3	0	562820.000	502905.494	512607.929	1000.318
1	161	4	0	562820.000	502907.693	512605.936	1000.318
1	161	5	0	562820.000	502908.829	512604.907	1000.318
1	161	6	0	562820.000	502912.880	512601.236	999.345
1	161	7	0	562820.000	502914.363	512599.894	998.345
EJE	P.K.	AZIMUT	COS A	SEN A			
3	920.000	-17.649700		.961814		-.273703	
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	1	1	3	920.000	502781.592	512534.465	992.509
2	1	2	3	920.000	502782.550	512531.099	992.579
2	1	3	3	920.000	502783.508	512527.733	992.509
EJE	P.K.	AZIMUT	COS A	SEN A			
3	921.000	-17.649700		.961814		-.273703	

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	2	1	3	921.000	502782.553	512534.739	992.488
2	2	2	3	921.000	502783.511	512531.373	992.558
2	2	3	3	921.000	502784.469	512528.006	992.488
EJE	P.K.	AZIMUT	COS A	SEN A			
3	922.000	-17.649700		.961814		-.273703	
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	3	1	3	922.000	502783.515	512535.013	992.467
2	3	2	3	922.000	502784.473	512531.647	992.537
2	3	3	3	922.000	502785.431	512528.280	992.467
EJE	P.K.	AZIMUT	COS A	SEN A			
3	923.000	-17.649700		.961814		-.273703	
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	4	1	3	923.000	502784.477	512535.287	992.447
2	4	2	3	923.000	502785.435	512531.920	992.517
2	4	3	3	923.000	502786.393	512528.554	992.447
EJE	P.K.	AZIMUT	COS A	SEN A			
3	924.000	-17.649700		.961814		-.273703	
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	5	1	3	924.000	502785.439	512535.560	992.427
2	5	2	3	924.000	502786.397	512532.194	992.497
2	5	3	3	924.000	502787.355	512528.828	992.427
EJE	P.K.	AZIMUT	COS A	SEN A			
3	925.000	-17.649700		.961814		-.273703	
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	6	1	3	925.000	502786.401	512535.834	992.407
2	6	2	3	925.000	502787.359	512532.468	992.477
2	6	3	3	925.000	502788.317	512529.101	992.407
EJE	P.K.	AZIMUT	COS A	SEN A			
3	926.000	-17.649700		.961814		-.273703	
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	7	1	3	926.000	502787.362	512536.108	992.388
2	7	2	3	926.000	502788.320	512532.741	992.458
2	7	3	3	926.000	502789.278	512529.375	992.388
EJE	P.K.	AZIMUT	COS A	SEN A			
3	927.000	-17.649700		.961814		-.273703	
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	8	1	3	927.000	502788.324	512536.381	992.370
2	8	2	3	927.000	502789.282	512533.015	992.440
2	8	3	3	927.000	502790.240	512529.649	992.370
EJE	P.K.	AZIMUT	COS A	SEN A			
3	928.000	-17.649700		.961814		-.273703	

EJE	P.K.	AZIMUT	COS A	SEN A
3	929.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	10	1	3	929.000	502790.248	512536.929	992.335
2	10	2	3	929.000	502791.206	512533.562	992.405
2	10	3	3	929.000	502792.164	512530.196	992.335

EJE	P.K.	AZIMUT	COS A	SEN A
3	930.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	11	1	3	930.000	502791.210	512537.202	992.318
2	11	2	3	930.000	502792.168	512533.836	992.388
2	11	3	3	930.000	502793.126	512530.470	992.318

EJE	P.K.	AZIMUT	COS A	SEN A
3	931.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	12	1	3	931.000	502792.172	512537.476	992.302
2	12	2	3	931.000	502793.130	512534.110	992.372
2	12	3	3	931.000	502794.087	512530.743	992.302

EJE	P.K.	AZIMUT	COS A	SEN A
3	932.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	13	1	3	932.000	502793.133	512537.750	992.286
2	13	2	3	932.000	502794.091	512534.384	992.356
2	13	3	3	932.000	502795.049	512531.017	992.286

EJE	P.K.	AZIMUT	COS A	SEN A
3	933.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	14	1	3	933.000	502794.095	512538.024	992.270
2	14	2	3	933.000	502795.053	512534.657	992.340
2	14	3	3	933.000	502796.011	512531.291	992.270

EJE	P.K.	AZIMUT	COS A	SEN A
3	934.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	15	1	3	934.000	502795.057	512538.297	992.255
2	15	2	3	934.000	502796.015	512534.931	992.325

EJE	P.K.	AZIMUT	COS A	SEN A
3	935.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	16	1	3	935.000	502796.019	512538.571	992.241
2	16	2	3	935.000	502796.977	512535.205	992.311
2	16	3	3	935.000	502797.935	512531.838	992.241

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	17	1	3	936.000	502796.981	512538.845	992.227
2	17	2	3	936.000	502797.939	512535.478	992.297
2	17	3	3	936.000	502798.897	512532.112	992.227

EJE	P.K.	AZIMUT	COS A	SEN A
3	937.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	18	1	3	937.000	502797.942	512539.118	992.214
2	18	2	3	937.000	502798.900	512535.752	992.284
2	18	3	3	937.000	502799.858	512532.386	992.214

EJE	P.K.	AZIMUT	COS A	SEN A
3	938.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	19	1	3	938.000	502798.904	512539.392	992.201
2	19	2	3	938.000	502799.862	512536.026	992.271
2	19	3	3	938.000	502800.820	512532.659	992.201

EJE	P.K.	AZIMUT	COS A	SEN A
3	939.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	20	1	3	939.000	502799.866	512539.666	992.189
2	20	2	3	939.000	502800.824	512536.299	992.259
2	20	3	3	939.000	502801.782	512532.933	992.189

EJE	P.K.	AZIMUT	COS A	SEN A
3	940.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	21	1	3	940.000	502800.828	512539.940	992.177
2	21	2	3	940.000	502801.786	512536.573	992.247
2	21	3	3	940.000	502802.744	512533.207	992.177

EJE	P.K.	AZIMUT	COS A	SEN A
3	941.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	22	1	3	941.000	502801.790	512540.213	992.165
2	22	2	3	941.000	502802.748	512536.847	992.235
2	22	3	3	941.000	502803.706	512533.481	992.165

EJE	P.K.	AZIMUT	COS A	SEN A
3	942.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	23	1	3	942.000	502802.752	512540.487	992.155
2	23	2	3	942.000	502803.709	512537.121	992.225
2	23	3	3	942.000	502804.667	512533.754	992.155

EJE	P.K.	AZIMUT	COS A	SEN A
3	943.000	-17.649700	.961814	-.273703

2 24 3 3 943.000 502805.629 512534.028 992.144

EJE P.K. AZIMUT COS A SEN A

3 944.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 25 1 3 944.000 502804.675 512541.034 992.134
2 25 2 3 944.000 502805.633 512537.668 992.204
2 25 3 3 944.000 502806.591 512534.302 992.134

EJE P.K. AZIMUT COS A SEN A

3 945.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 26 1 3 945.000 502805.637 512541.308 992.125
2 26 2 3 945.000 502806.595 512537.942 992.195
2 26 3 3 945.000 502807.553 512534.575 992.125

EJE P.K. AZIMUT COS A SEN A

3 946.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 27 1 3 946.000 502806.599 512541.582 992.116
2 27 2 3 946.000 502807.557 512538.215 992.186
2 27 3 3 946.000 502808.515 512534.849 992.116

EJE P.K. AZIMUT COS A SEN A

3 947.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 28 1 3 947.000 502807.561 512541.855 992.108
2 28 2 3 947.000 502808.519 512538.489 992.178
2 28 3 3 947.000 502809.477 512535.123 992.108

EJE P.K. AZIMUT COS A SEN A

3 948.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 29 1 3 948.000 502808.522 512542.129 992.100
2 29 2 3 948.000 502809.480 512538.763 992.170
2 29 3 3 948.000 502810.438 512535.396 992.100

EJE P.K. AZIMUT COS A SEN A

3 949.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 30 1 3 949.000 502809.484 512542.403 992.092
2 30 2 3 949.000 502810.442 512539.036 992.162
2 30 3 3 949.000 502811.400 512535.670 992.092

EJE P.K. AZIMUT COS A SEN A

3 950.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 31 1 3 950.000 502810.446 512542.677 992.086
2 31 2 3 950.000 502811.404 512539.310 992.156
2 31 3 3 950.000 502812.362 512535.944 992.086

3 951.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 32 1 3 951.000 502811.408 512542.950 992.079
2 32 2 3 951.000 502812.366 512539.584 992.149
2 32 3 3 951.000 502813.324 512536.218 992.079

EJE P.K. AZIMUT COS A SEN A

3 952.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 33 1 3 952.000 502812.370 512543.224 992.073
2 33 2 3 952.000 502813.328 512539.858 992.143
2 33 3 3 952.000 502814.286 512536.491 992.073

EJE P.K. AZIMUT COS A SEN A

3 953.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 34 1 3 953.000 502813.331 512543.498 992.068
2 34 2 3 953.000 502814.289 512540.131 992.138
2 34 3 3 953.000 502815.247 512536.765 992.068

EJE P.K. AZIMUT COS A SEN A

3 954.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 35 1 3 954.000 502814.293 512543.771 992.063
2 35 2 3 954.000 502815.251 512540.405 992.133

2 35 3 3 954.000 502816.209 512537.039 992.063

EJE P.K. AZIMUT COS A SEN A

3 955.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 36 1 3 955.000 502815.255 512544.045 992.059
2 36 2 3 955.000 502816.213 512540.679 992.129
2 36 3 3 955.000 502817.171 512537.312 992.059

EJE P.K. AZIMUT COS A SEN A

3 956.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 37 1 3 956.000 502816.217 512544.319 992.055
2 37 2 3 956.000 502817.175 512540.952 992.125
2 37 3 3 956.000 502818.133 512537.586 992.055

EJE P.K. AZIMUT COS A SEN A

3 957.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 38 1 3 957.000 502817.179 512544.592 992.051
2 38 2 3 957.000 502818.137 512541.226 992.121
2 38 3 3 957.000 502819.095 512537.860 992.051

EJE P.K. AZIMUT COS A SEN A

2	39	2	3	958.000	502819.099	512541.500	992.119
2	39	3	3	958.000	502820.056	512538.133	992.049

EJE	P.K.	AZIMUT	COS A	SEN A
	959.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	40	1	3	959.000	502819.102	512545.140	992.046
2	40	2	3	959.000	502820.060	512541.774	992.116
2	40	3	3	959.000	502821.018	512538.407	992.046

EJE	P.K.	AZIMUT	COS A	SEN A
3	960.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	41	1	3	960.000	502820.064	512545.414	992.044
2	41	2	3	960.000	502821.022	512542.047	992.114
2	41	3	3	960.000	502821.980	512538.681	992.044

EJE	P.K.	AZIMUT	COS A	SEN A
3	961.000	-17.649700	.961814	-.273703

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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	42	1	3	961.000	502821.026	512545.687	992.043
2	42	2	3	961.000	502821.984	512542.321	992.113
2	42	3	3	961.000	502822.942	512538.955	992.043

EJE	P.K.	AZIMUT	COS A	SEN A
3	962.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	43	1	3	962.000	502821.988	512545.961	992.042
2	43	2	3	962.000	502822.946	512542.595	992.112
2	43	3	3	962.000	502823.904	512539.228	992.042

EJE	P.K.	AZIMUT	COS A	SEN A
3	963.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	44	1	3	963.000	502822.950	512546.235	992.042
2	44	2	3	963.000	502823.908	512542.868	992.112
2	44	3	3	963.000	502824.866	512539.502	992.042

EJE	P.K.	AZIMUT	COS A	SEN A
3	964.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	45	1	3	964.000	502823.911	512546.508	992.042
2	45	2	3	964.000	502824.869	512543.142	992.112
2	45	3	3	964.000	502825.827	512539.776	992.042

EJE	P.K.	AZIMUT	COS A	SEN A
3	965.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	46	1	3	965.000	502824.873	512546.782	992.042
2	46	2	3	965.000	502825.831	512543.416	992.112

3	966.000	-17.649700	.961814	-.273703
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	47	1	3	966.000	502825.835	512547.056	992.044
2	47	2	3	966.000	502826.793	512543.689	992.114
2	47	3	3	966.000	502827.751	512540.323	992.044

EJE	P.K.	AZIMUT	COS A	SEN A
3	967.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	48	1	3	967.000	502826.797	512547.330	992.045
2	48	2	3	967.000	502827.755	512543.963	992.115
2	48	3	3	967.000	502828.713	512540.597	992.045

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EJE	P.K.	AZIMUT	COS A	SEN A
3	968.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	49	1	3	968.000	502827.759	512547.603	992.047
2	49	2	3	968.000	502828.717	512544.237	992.117
2	49	3	3	968.000	502829.675	512540.871	992.047

EJE	P.K.	AZIMUT	COS A	SEN A
3	969.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	50	1	3	969.000	502828.721	512547.877	992.050
2	50	2	3	969.000	502829.678	512544.511	992.120
2	50	3	3	969.000	502830.636	512541.144	992.050

EJE	P.K.	AZIMUT	COS A	SEN A
3	970.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	51	1	3	970.000	502829.682	512548.151	992.053
2	51	2	3	970.000	502830.640	512544.784	992.123
2	51	3	3	970.000	502831.598	512541.418	992.053

EJE	P.K.	AZIMUT	COS A	SEN A
3	971.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	52	1	3	971.000	502830.644	512548.424	992.057
2	52	2	3	971.000	502831.602	512545.058	992.127
2	52	3	3	971.000	502832.560	512541.692	992.057

EJE	P.K.	AZIMUT	COS A	SEN A
3	972.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	53	1	3	972.000	502831.606	512548.698	992.061
2	53	2	3	972.000	502832.564	512545.332	992.131
2	53	3	3	972.000	502833.522	512541.965	992.061

EJE	P.K.	AZIMUT	COS A	SEN A
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				P.K.			
2	54	1	3	973.000	502832.568	512548.972	992.066
2	54	2	3	973.000	502833.526	512545.605	992.136
2	54	3	3	973.000	502834.484	512542.239	992.066

EJE	P.K.	AZIMUT	COS A	SEN A
	974.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	55	1	3	974.000	502833.530	512549.245	992.070
2	55	2	3	974.000	502834.488	512545.879	992.140

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2	55	3	3	974.000	502835.446	512542.513	992.070
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EJE	P.K.	AZIMUT	COS A	SEN A
3	975.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	56	1	3	975.000	502834.491	512549.519	992.075
2	56	2	3	975.000	502835.449	512546.153	992.145
2	56	3	3	975.000	502836.407	512542.786	992.075

EJE	P.K.	AZIMUT	COS A	SEN A
3	976.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	57	1	3	976.000	502835.453	512549.793	992.080
2	57	2	3	976.000	502836.411	512546.426	992.150
2	57	3	3	976.000	502837.369	512543.060	992.080

EJE	P.K.	AZIMUT	COS A	SEN A
3	977.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	58	1	3	977.000	502836.415	512550.067	992.085
2	58	2	3	977.000	502837.373	512546.700	992.155
2	58	3	3	977.000	502838.331	512543.334	992.085

EJE	P.K.	AZIMUT	COS A	SEN A
3	978.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	59	1	3	978.000	502837.377	512550.340	992.090
2	59	2	3	978.000	502838.335	512546.974	992.160
2	59	3	3	978.000	502839.293	512543.608	992.090

EJE	P.K.	AZIMUT	COS A	SEN A
3	979.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	60	1	3	979.000	502838.339	512550.614	992.095
2	60	2	3	979.000	502839.297	512547.248	992.165
2	60	3	3	979.000	502840.255	512543.881	992.095

EJE	P.K.	AZIMUT	COS A	SEN A
3	980.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	61	1	3	980.000	502839.300	512550.888	992.100

EJE	P.K.	AZIMUT	COS A	SEN A
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3	981.000	-17.649700	.961814	-.273703
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	62	1	3	981.000	502840.262	512551.161	992.105
2	62	2	3	981.000	502841.220	512547.795	992.175
2	62	3	3	981.000	502842.178	512544.429	992.105

EJE	P.K.	AZIMUT	COS A	SEN A
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3	982.000	-17.649700	.961814	-.273703
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	63	1	3	982.000	502841.224	512551.435	992.110
2	63	2	3	982.000	502842.182	512548.069	992.180
2	63	3	3	982.000	502843.140	512544.702	992.110

EJE	P.K.	AZIMUT	COS A	SEN A
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3	983.000	-17.649700	.961814	-.273703
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	64	1	3	983.000	502842.186	512551.709	992.115
2	64	2	3	983.000	502843.144	512548.342	992.185
2	64	3	3	983.000	502844.102	512544.976	992.115

EJE	P.K.	AZIMUT	COS A	SEN A
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3	984.000	-17.649700	.961814	-.273703
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	65	1	3	984.000	502843.148	512551.982	992.120
2	65	2	3	984.000	502844.106	512548.616	992.190
2	65	3	3	984.000	502845.064	512545.250	992.120

EJE	P.K.	AZIMUT	COS A	SEN A
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3	985.000	-17.649700	.961814	-.273703
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	66	1	3	985.000	502844.110	512552.256	992.125
2	66	2	3	985.000	502845.068	512548.890	992.195
2	66	3	3	985.000	502846.025	512545.523	992.125

EJE	P.K.	AZIMUT	COS A	SEN A
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3	986.000	-17.649700	.961814	-.273703
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	67	1	3	986.000	502845.071	512552.530	992.130
2	67	2	3	986.000	502846.029	512549.164	992.200
2	67	3	3	986.000	502846.987	512545.797	992.130

EJE	P.K.	AZIMUT	COS A	SEN A
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3	987.000	-17.649700	.961814	-.273703
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	68	1	3	987.000	502846.033	512552.804	992.135
2	68	2	3	987.000	502846.991	512549.437	992.205
2	68	3	3	987.000	502847.949	512546.071	992.135

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3	988.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	69	1	3	988.000	502846.995	512553.077	992.140
2	69	2	3	988.000	502847.953	512549.711	992.210
2	69	3	3	988.000	502848.911	512546.345	992.140

EJE	P.K.	AZIMUT	COS A	SEN A
3	989.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	70	1	3	989.000	502847.957	512553.351	992.145
2	70	2	3	989.000	502848.915	512549.985	992.215
2	70	3	3	989.000	502849.873	512546.618	992.145

EJE	P.K.	AZIMUT	COS A	SEN A
3	990.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	71	1	3	990.000	502848.919	512553.625	992.150
2	71	2	3	990.000	502849.877	512550.258	992.220
2	71	3	3	990.000	502850.835	512546.892	992.150

EJE	P.K.	AZIMUT	COS A	SEN A
3	991.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	72	1	3	991.000	502849.880	512553.898	992.155
2	72	2	3	991.000	502850.838	512550.532	992.225
2	72	3	3	991.000	502851.796	512547.166	992.155

EJE	P.K.	AZIMUT	COS A	SEN A
3	992.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	73	1	3	992.000	502850.842	512554.172	992.160
2	73	2	3	992.000	502851.800	512550.806	992.230
2	73	3	3	992.000	502852.758	512547.439	992.160

EJE	P.K.	AZIMUT	COS A	SEN A
3	993.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	74	1	3	993.000	502851.804	512554.446	992.165
2	74	2	3	993.000	502852.762	512551.079	992.235
2	74	3	3	993.000	502853.720	512547.713	992.165

EJE	P.K.	AZIMUT	COS A	SEN A
3	994.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	75	1	3	994.000	502852.766	512554.719	992.170
2	75	2	3	994.000	502853.724	512551.353	992.240

EJE	P.K.	AZIMUT	COS A	SEN A
3	995.000	-17.649700	.961814	-.273703

EJE	P.K.	AZIMUT	COS A	SEN A
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2	76	1	3	995.000	502853.728	512554.993	992.175
2	76	2	3	995.000	502854.686	512551.627	992.245
2	76	3	3	995.000	502855.644	512548.260	992.175

EJE	P.K.	AZIMUT	COS A	SEN A
3	996.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	77	1	3	996.000	502854.689	512555.267	992.180
2	77	2	3	996.000	502855.647	512551.901	992.250
2	77	3	3	996.000	502856.605	512548.534	992.180

EJE	P.K.	AZIMUT	COS A	SEN A
3	997.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	78	1	3	997.000	502855.651	512555.541	992.185
2	78	2	3	997.000	502856.609	512552.174	992.255
2	78	3	3	997.000	502857.567	512548.808	992.185

EJE	P.K.	AZIMUT	COS A	SEN A
3	998.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	79	1	3	998.000	502856.613	512555.814	992.190
2	79	2	3	998.000	502857.571	512552.448	992.260
2	79	3	3	998.000	502858.529	512549.082	992.190

EJE	P.K.	AZIMUT	COS A	SEN A
3	999.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	80	1	3	999.000	502857.575	512556.088	992.195
2	80	2	3	999.000	502858.533	512552.722	992.265
2	80	3	3	999.000	502859.491	512549.355	992.195

EJE	P.K.	AZIMUT	COS A	SEN A
3	1000.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	81	1	3	1000.000	502858.537	512556.362	992.200
2	81	2	3	1000.000	502859.495	512552.995	992.270
2	81	3	3	1000.000	502860.453	512549.629	992.200

EJE	P.K.	AZIMUT	COS A	SEN A
3	1001.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	82	1	3	1001.000	502859.499	512556.635	992.205
2	82	2	3	1001.000	502860.457	512553.269	992.275
2	82	3	3	1001.000	502861.414	512549.903	992.205

EJE	P.K.	AZIMUT	COS A	SEN A
3	1002.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	83	1	3	1002.000	502860.460	512556.909	992.210

EJE	P.K.	AZIMUT	COS A	SEN A			
3	1003.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
84	1	3	1003.000	502861.422	512557.183	992.215	
81	2	3	1003.000	502862.380	512553.816	992.285	
2	84	3	3	1003.000	502863.338	512550.450	992.215
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1004.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	85	1	3	1004.000	502862.384	512557.457	992.220
2	85	2	3	1004.000	502863.342	512554.090	992.290
2	85	3	3	1004.000	502864.300	512550.724	992.220
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1005.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
86	1	3	1005.000	502863.346	512557.730	992.225	
86	2	3	1005.000	502864.304	512554.364	992.295	
2	86	3	3	1005.000	502865.262	512550.998	992.225
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1006.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	87	1	3	1006.000	502864.308	512558.004	992.230
2	87	2	3	1006.000	502865.266	512554.638	992.300
2	87	3	3	1006.000	502866.224	512551.271	992.230
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1007.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	88	1	3	1007.000	502865.269	512558.278	992.235
88	2	3	1007.000	502866.227	512554.911	992.305	
88	3	3	1007.000	502867.185	512551.545	992.235	
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1008.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	89	1	3	1008.000	502866.231	512558.551	992.240
2	89	2	3	1008.000	502867.189	512555.185	992.310
2	89	3	3	1008.000	502868.147	512551.819	992.240
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1009.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	90	1	3	1009.000	502867.193	512558.825	992.245
2	90	2	3	1009.000	502868.151	512555.459	992.315
2	90	3	3	1009.000	502869.109	512552.092	992.245
EJE	P.K.	AZIMUT	COS A	SEN A			

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	91	1	3	1010.000	502868.155	512559.099	992.250
2	91	2	3	1010.000	502869.113	512555.732	992.320
2	91	3	3	1010.000	502870.071	512552.366	992.250
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1011.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	92	1	3	1011.000	502869.117	512559.372	992.255
2	92	2	3	1011.000	502870.075	512556.006	992.325
2	92	3	3	1011.000	502871.033	512552.640	992.255
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1012.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	93	1	3	1012.000	502870.079	512559.646	992.260
2	93	2	3	1012.000	502871.036	512556.280	992.330
2	93	3	3	1012.000	502871.994	512552.913	992.260
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1013.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	94	1	3	1013.000	502871.040	512559.920	992.265
2	94	2	3	1013.000	502871.998	512556.553	992.335
2	94	3	3	1013.000	502872.956	512553.187	992.265
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1014.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	95	1	3	1014.000	502872.002	512560.194	992.270
2	95	2	3	1014.000	502872.960	512556.827	992.310
2	95	3	3	1014.000	502873.918	512553.461	992.270
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1015.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	96	1	3	1015.000	502872.964	512560.467	992.275
2	96	2	3	1015.000	502873.922	512557.101	992.345
2	96	3	3	1015.000	502874.880	512553.735	992.275
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1016.000	-17.649700	.961814	-.273703			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	97	1	3	1016.000	502873.926	512560.741	992.280
2	97	2	3	1016.000	502874.884	512557.375	992.350
2	97	3	3	1016.000	502875.842	512554.008	992.280
EJE	P.K.	AZIMUT	COS A	SEN A			
3	1017.000	-17.649700	.961814	-.273703			

EJE	P.K.	AZIMUT	COS A	SEN A
3	1018.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
99	1	3	1018.000	502875.849	512561.288	992.290	
2	99	2	3	1018.000	502876.807	512557.922	992.360
2	99	3	3	1018.000	502877.765	512554.556	992.290

EJE	P.K.	AZIMUT	COS A	SEN A
3	1019.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	100	1	3	1019.000	502876.811	512561.562	992.295
2	100	2	3	1019.000	502877.769	512558.196	992.365
2	100	3	3	1019.000	502878.727	512554.829	992.295

EJE	P.K.	AZIMUT	COS A	SEN A
3	1020.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
101	1	3	1020.000	502877.773	512561.836	992.300	
2	101	2	3	1020.000	502878.731	512558.469	992.370
2	101	3	3	1020.000	502879.689	512555.103	992.300

EJE	P.K.	AZIMUT	COS A	SEN A
3	1021.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	102	1	3	1021.000	502878.735	512562.109	992.305
2	102	2	3	1021.000	502879.693	512558.743	992.375
2	102	3	3	1021.000	502880.651	512555.377	992.305

EJE	P.K.	AZIMUT	COS A	SEN A
3	1022.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	103	1	3	1022.000	502879.697	512562.383	992.310
2	103	2	3	1022.000	502880.655	512559.017	992.380
2	103	3	3	1022.000	502881.613	512555.650	992.310

EJE	P.K.	AZIMUT	COS A	SEN A
3	1023.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	104	1	3	1023.000	502880.658	512562.657	992.316
2	104	2	3	1023.000	502881.616	512559.291	992.386
2	104	3	3	1023.000	502882.574	512555.924	992.316

EJE	P.K.	AZIMUT	COS A	SEN A
3	1024.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	105	1	3	1024.000	502881.620	512562.931	992.322
2	105	2	3	1024.000	502882.578	512559.564	992.392
2	105	3	3	1024.000	502883.536	512556.198	992.322

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	106	1	3	1025.000	502882.582	512563.204	992.328
2	106	2	3	1025.000	502883.540	512559.838	992.398
2	106	3	3	1025.000	502884.498	512556.472	992.328

EJE	P.K.	AZIMUT	COS A	SEN A
3	1026.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	107	1	3	1026.000	502883.544	512563.478	992.336
2	107	2	3	1026.000	502884.502	512560.112	992.406
2	107	3	3	1026.000	502885.460	512556.745	992.336

EJE	P.K.	AZIMUT	COS A	SEN A
3	1027.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	108	1	3	1027.000	502884.506	512563.752	992.344
2	108	2	3	1027.000	502885.464	512560.385	992.414
2	108	3	3	1027.000	502886.422	512557.019	992.344

EJE	P.K.	AZIMUT	COS A	SEN A
3	1028.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	109	1	3	1028.000	502885.468	512564.025	992.353
2	109	2	3	1028.000	502886.426	512560.659	992.423
2	109	3	3	1028.000	502887.383	512557.293	992.353

EJE	P.K.	AZIMUT	COS A	SEN A
3	1029.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	110	1	3	1029.000	502886.429	512564.299	992.353
2	110	2	3	1029.000	502887.387	512560.933	992.433
2	110	3	3	1029.000	502888.345	512557.566	992.363

EJE	P.K.	AZIMUT	COS A	SEN A
3	1030.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	111	1	3	1030.000	502887.391	512564.573	992.373
2	111	2	3	1030.000	502888.349	512561.206	992.443
2	111	3	3	1030.000	502889.307	512557.840	992.373

EJE	P.K.	AZIMUT	COS A	SEN A
3	1031.000	-17.649700	.961814	-.273703

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	112	1	3	1031.000	502888.353	512564.846	992.384
2	112	2	3	1031.000	502889.311	512561.480	992.454
2	112	3	3	1031.000	502890.269	512558.114	992.384

EJE	P.K.	AZIMUT	COS A	SEN A
3	1032.000	-17.649700	.961814	-.273703

2 113 3 3 1032.000 502891.231 512558.367 992.396

EJE P.K. AZIMUT COS A SEN A

3 1033.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 114 1 3 1033.000 502890.277 512565.394 992.409
2 114 2 3 1033.000 502891.235 512562.028 992.479
2 114 3 3 1033.000 502892.193 512558.661 992.409

EJE P.K. AZIMUT COS A SEN A

3 1034.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 115 1 3 1034.000 502891.238 512565.668 992.423
2 115 2 3 1034.000 502892.196 512562.301 992.493

2 115 3 3 1034.000 502893.154 512558.935 992.423

EJE P.K. AZIMUT COS A SEN A

3 1035.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 116 1 3 1035.000 502892.200 512565.941 992.437
2 116 2 3 1035.000 502893.158 512562.575 992.507
2 116 3 3 1035.000 502894.116 512559.209 992.437

EJE P.K. AZIMUT COS A SEN A

3 1036.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 117 1 3 1036.000 502893.162 512566.215 992.452
2 117 2 3 1036.000 502894.120 512562.849 992.522
2 117 3 3 1036.000 502895.078 512559.482 992.452

EJE P.K. AZIMUT COS A SEN A

3 1037.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 118 1 3 1037.000 502894.124 512566.489 992.468
2 118 2 3 1037.000 502895.082 512563.122 992.538
2 118 3 3 1037.000 502896.040 512559.756 992.468

EJE P.K. AZIMUT COS A SEN A

3 1038.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 119 1 3 1038.000 502895.086 512566.762 992.484
2 119 2 3 1038.000 502896.044 512563.396 992.554
2 119 3 3 1038.000 502897.002 512560.030 992.484

EJE P.K. AZIMUT COS A SEN A

3 1039.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 120 1 3 1039.000 502896.048 512567.036 992.501
2 120 2 3 1039.000 502897.005 512563.670 992.571
2 120 3 3 1039.000 502897.963 512560.303 992.501

3 1040.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 121 1 3 1040.000 502897.009 512567.310 992.519
2 121 2 3 1040.000 502897.967 512563.943 992.589
2 121 3 3 1040.000 502898.925 512560.577 992.519

EJE P.K. AZIMUT COS A SEN A

3 1041.000 -17.649700 .961814 -.273703
1

GPO. RTA. CVA. EJE P.K. X Y Z
2 122 1 3 1041.000 502897.971 512567.584 992.538
2 122 2 3 1041.000 502898.929 512564.217 992.608
2 122 3 3 1041.000 502899.887 512560.851 992.538

EJE P.K. AZIMUT COS A SEN A

3 1042.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 123 1 3 1042.000 502898.933 512567.857 992.557
2 123 2 3 1042.000 502899.891 512564.491 992.627
2 123 3 3 1042.000 502900.849 512561.125 992.557

EJE P.K. AZIMUT COS A SEN A

3 1043.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 124 1 3 1043.000 502899.895 512568.131 992.578
2 124 2 3 1043.000 502900.853 512564.765 992.648
2 124 3 3 1043.000 502901.811 512561.398 992.578

EJE P.K. AZIMUT COS A SEN A

3 1044.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 125 1 3 1044.000 502900.857 512568.405 992.599
2 125 2 3 1044.000 502901.815 512565.038 992.669
2 125 3 3 1044.000 502902.773 512561.672 992.599

EJE P.K. AZIMUT COS A SEN A

3 1045.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 126 1 3 1045.000 502901.818 512568.678 992.620
2 126 2 3 1045.000 502902.776 512565.312 992.690
2 126 3 3 1045.000 502903.734 512561.946 992.620

EJE P.K. AZIMUT COS A SEN A

3 1046.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 127 1 3 1046.000 502902.780 512568.952 992.643
2 127 2 3 1046.000 502903.738 512565.586 992.713
2 127 3 3 1046.000 502904.696 512562.219 992.643

EJE P.K. AZIMUT COS A SEN A

3 1047.000 -17.649700 .961814 -.273703

2 128 3 3 1047.000 502905.658 512562.493 992.666

1

E P.K. AZIMUT COS A SEN A
3 1048.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 129 1 3 1048.000 502904.704 512569.499 992.690
2 129 2 3 1048.000 502905.662 512566.133 992.760
2 129 3 3 1048.000 502906.620 512562.767 992.690

EJE P.K. AZIMUT COS A SEN A
3 1049.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 130 1 3 1049.000 502905.666 512569.773 992.715
2 130 2 3 1049.000 502906.624 512566.407 992.785
2 130 3 3 1049.000 502907.582 512563.040 992.715

E P.K. AZIMUT COS A SEN A
3 1050.000 -17.649700 .961814 -.273703

CPO. RTA. CVA. EJE P.K. X Y Z
2 131 1 3 1050.000 502906.627 512570.047 992.740
2 131 2 3 1050.000 502907.585 512566.680 992.810
2 131 3 3 1050.000 502908.543 512563.314 992.740

EJE P.K. AZIMUT COS A SEN A
3 1051.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 132 1 3 1051.000 502907.589 512570.321 992.766
2 132 2 3 1051.000 502908.547 512566.954 992.836
2 132 3 3 1051.000 502909.505 512563.588 992.766

E P.K. AZIMUT COS A SEN A
3 1052.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 133 1 3 1052.000 502908.551 512570.594 992.793
2 133 2 3 1052.000 502909.509 512567.228 992.863
2 133 3 3 1052.000 502910.467 512563.862 992.793

EJE P.K. AZIMUT COS A SEN A
3 1053.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 134 1 3 1053.000 502909.513 512570.868 992.821
2 134 2 3 1053.000 502910.471 512567.502 992.891
2 134 3 3 1053.000 502911.429 512564.135 992.821

EJE P.K. AZIMUT COS A SEN A
3 1054.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 135 1 3 1054.000 502910.475 512571.142 992.849
2 135 2 3 1054.000 502911.433 512567.775 992.919

2 135 3 3 1054.000 502912.391 512564.409 992.849

EJE P.K. AZIMUT COS A SEN A
3 1055.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 136 1 3 1055.000 502911.437 512571.415 992.879
2 136 2 3 1055.000 502912.395 512568.049 992.949
2 136 3 3 1055.000 502913.352 512564.683 992.879

EJE P.K. AZIMUT COS A SEN A
3 1056.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 137 1 3 1056.000 502912.398 512571.689 992.909
2 137 2 3 1056.000 502913.356 512568.323 992.979
2 137 3 3 1056.000 502914.314 512564.956 992.909

EJE P.K. AZIMUT COS A SEN A
3 1057.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 138 1 3 1057.000 502913.360 512571.963 992.939
2 138 2 3 1057.000 502914.318 512568.596 993.009
2 138 3 3 1057.000 502915.276 512565.230 992.939

EJE P.K. AZIMUT COS A SEN A
3 1058.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 139 1 3 1058.000 502914.322 512572.236 992.971
2 139 2 3 1058.000 502915.280 512568.870 993.041
2 139 3 3 1058.000 502916.238 512565.504 992.971

EJE P.K. AZIMUT COS A SEN A
3 1059.000 -17.649700 .961814 -.273703

GPO. RTA. CVA. EJE P.K. X Y Z
2 140 1 3 1059.000 502915.284 512572.510 993.003
2 140 2 3 1059.000 502916.242 512569.144 993.073
2 140 3 3 1059.000 502917.200 512565.777 993.003

EJE P.K. AZIMUT COS A SEN A
3 1060.000 -17.649700 .961814 -.273703

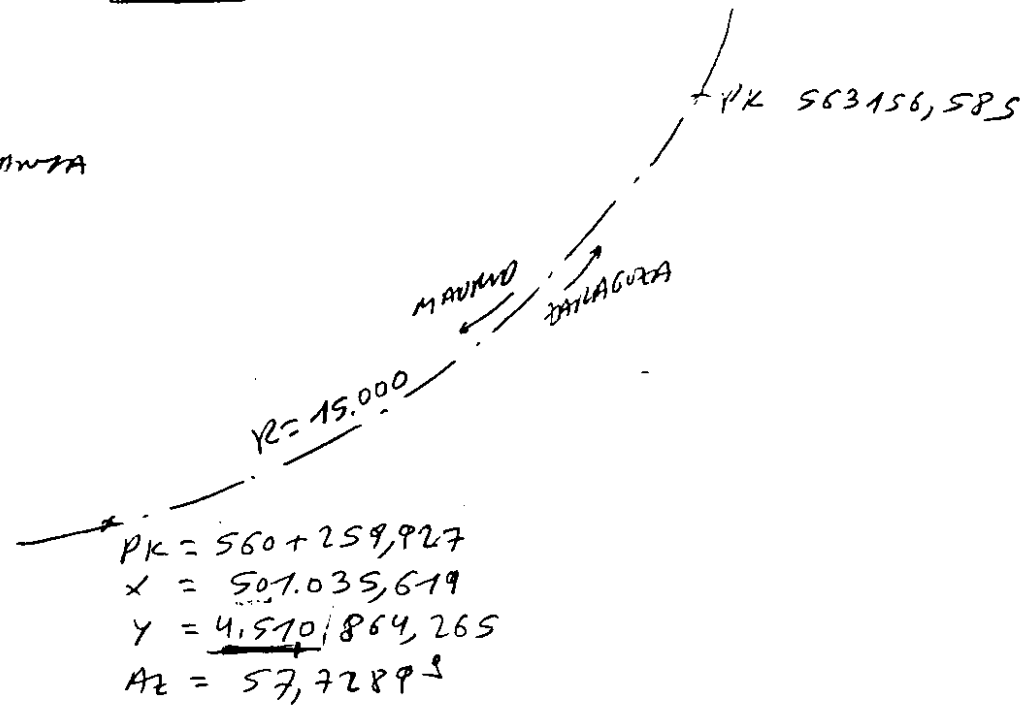
GPO. RTA. CVA. EJE P.K. X Y Z
2 141 1 3 1060.000 502916.246 512572.784 993.036
2 141 2 3 1060.000 502917.204 512569.418 993.106
2 141 3 3 1060.000 502918.162 512566.051 993.036

1

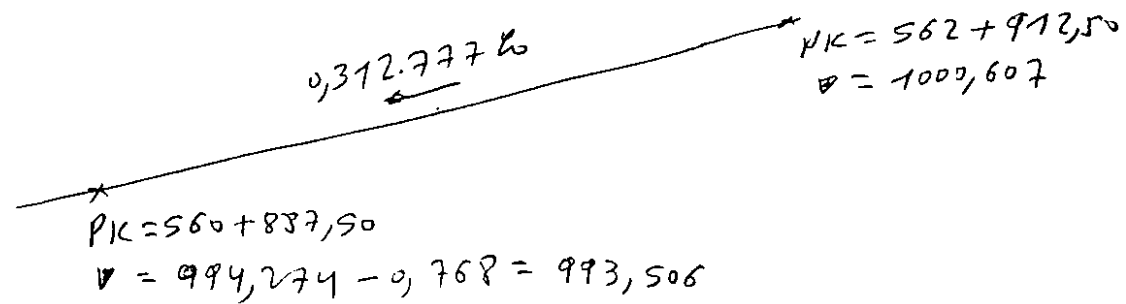
REPLANTEO DE LOS ESTRIBOS

PI 562+7 FFCC

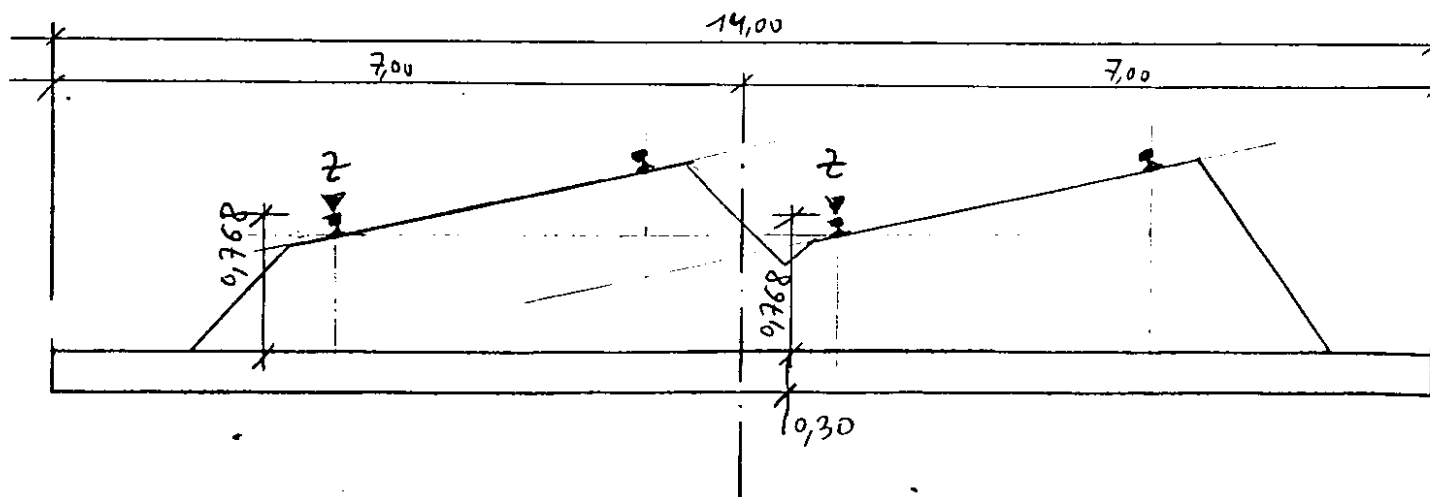
1. PLANTA



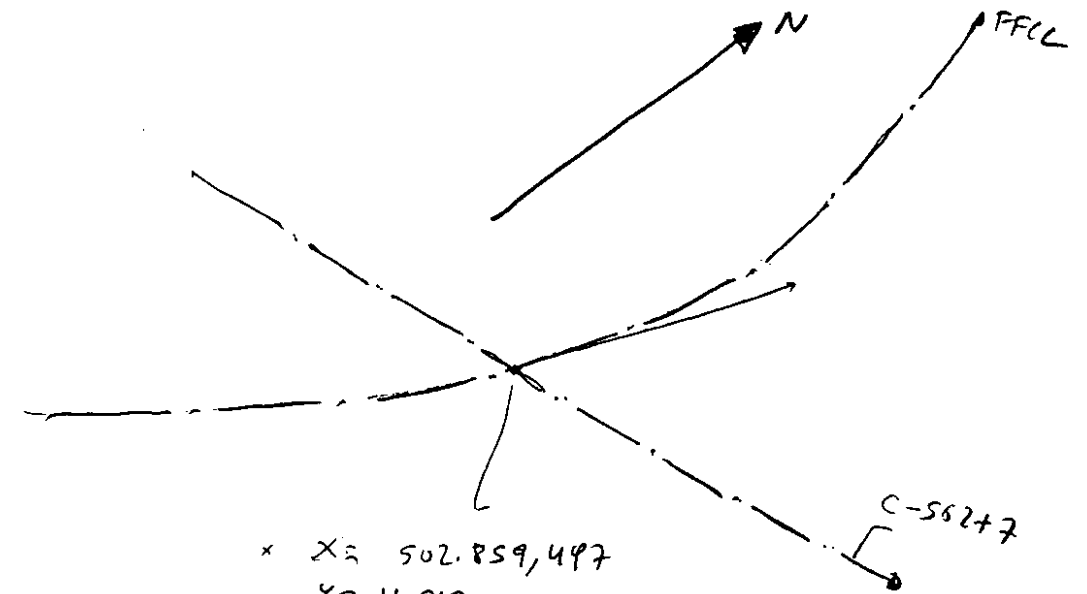
2. ALZADO



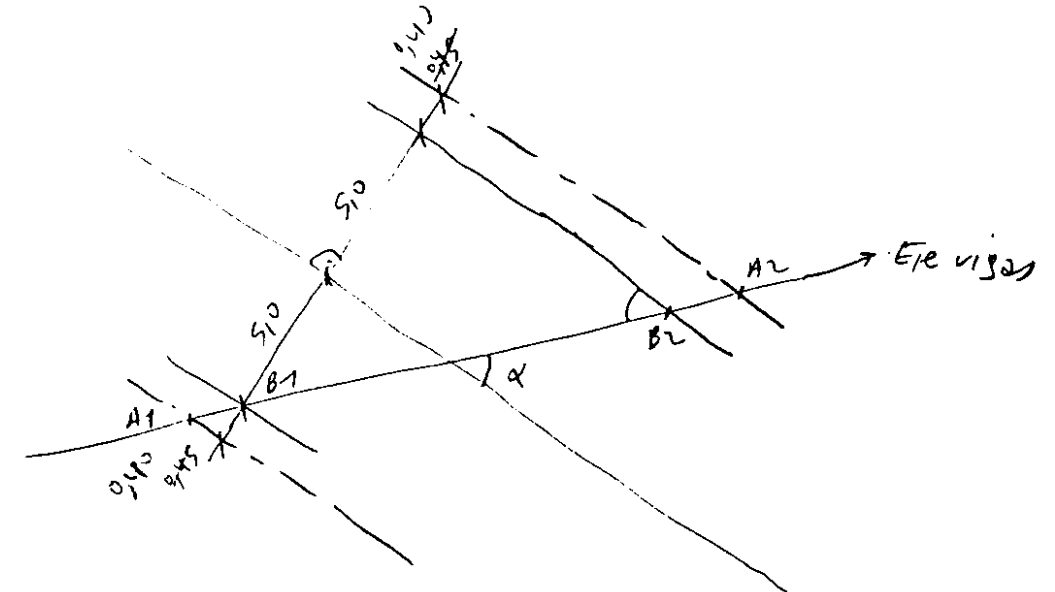
3. PONTILLO - 63,7 mm



PROYECTO DE OBRAS DE RECONSTRUCCION



- * $X = 502.859,497$
- * $Y = 4.512.552,996$
- * $PK_{FFCC} = 562 + 748,407$
- * $Az_{FFCC} = 47,167.461^\circ$
- * $\nabla_{FFCC} = 1000,094$
- * $PK_{VTE} = 1000,003$
- * $Az_{VTE} = 82,350.300^\circ$
- * $\nabla_{VTE} = 992,271$

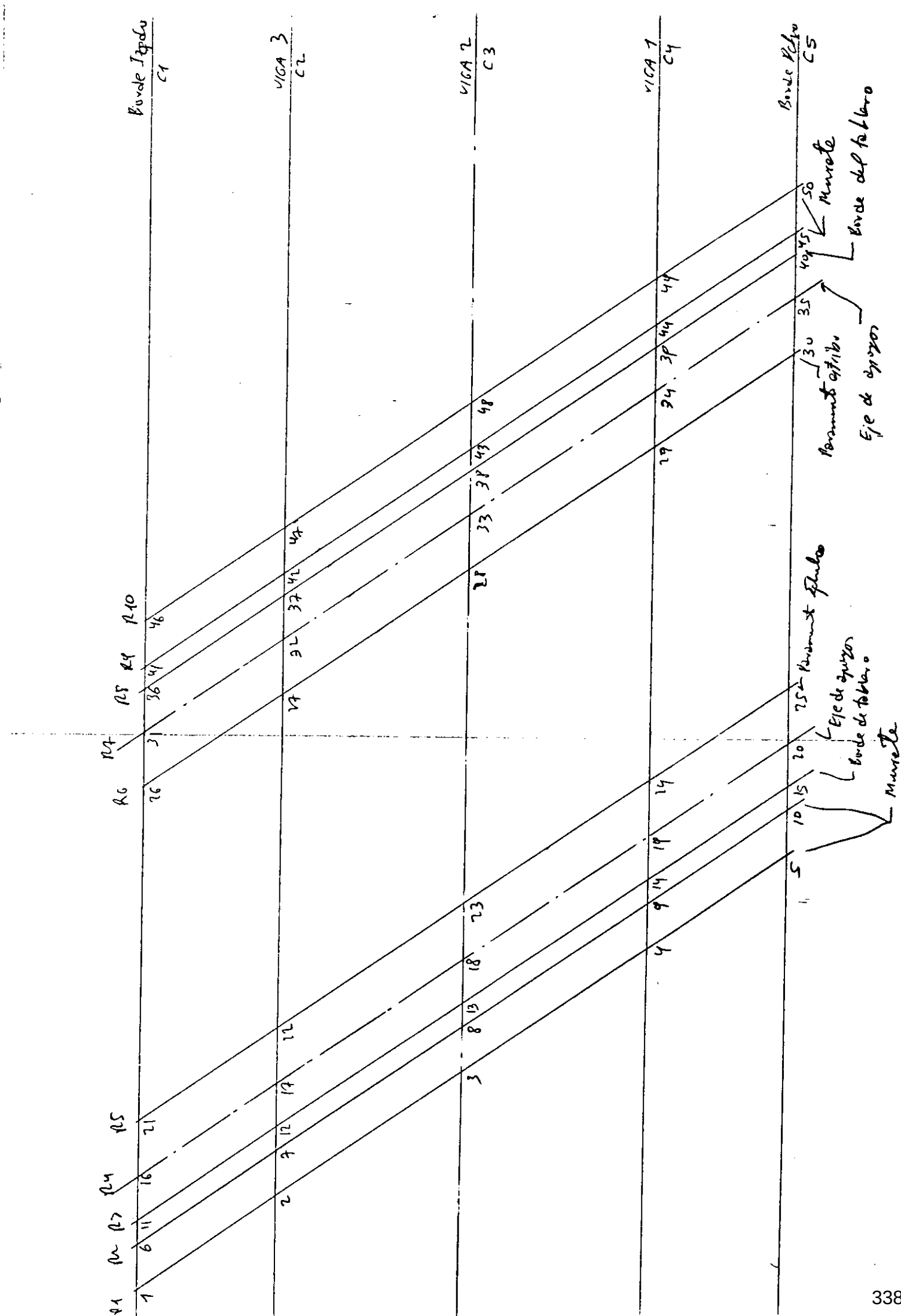


$$\alpha = 82,350.300 - 47,167.461 = 35,182.839^\circ$$

3

$$l = 2 \times (0,40 + 5,0) / \text{len} d = \underline{\underline{20,574 \text{ m.}}}$$

$$V = d / \ln 2 = 0,40 / \ln 2 = 0,762$$



5

TITULO DEL TRABAJO O.F.-P.I.562+700. REPLANTEO ESTRIBOS

CUARTA PARTE =SECCIONES OBLICUAS

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	0	562725.302	502838.732	512540.692	999.254 1
1	1	2	0	562730.590	502844.699	512542.391	999.271 2
1	1	3	0	562736.684	502851.581	512544.349	999.290 3
1	1	4	0	562742.771	502858.459	512546.306	999.309 4
1	1	5	0	562748.041	502864.415	512548.001	999.325 5
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	0	562725.875	502839.119	512541.115	999.256 6
1	2	2	0	562731.162	502845.086	512542.813	999.273 7
1	2	3	0	562737.256	502851.968	512544.771	999.292 8
1	2	4	0	562743.343	502858.845	512546.728	999.311 9
1	2	5	0	562748.613	502864.801	512548.423	999.327 10
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	0	562725.971	502839.183	512541.185	999.256 11
1	3	2	0	562731.258	502845.151	512542.883	999.273 12 Borde
1	3	3	0	562737.352	502852.032	512544.841	999.292 13 Tablero
1	3	4	0	562743.438	502858.909	512546.798	999.311 14
1	3	5	0	562748.708	502864.865	512548.493	999.327 15
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	0	562726.735	502839.700	512541.748	999.259 16 6,204
1	4	2	0	562732.021	502845.667	512543.446	999.275 17 Eje de 7,154
1	4	3	0	562738.114	502852.548	512545.404	999.294 18 7,154
1	4	4	0	562744.200	502859.424	512547.361	999.313 19 7,149
1	4	5	0	562749.469	502865.379	512549.055	999.330 20 6,191
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	5	1	0	562727.499	502840.216	512542.310	999.261 21
1	5	2	0	562732.785	502846.183	512544.008	999.278 22 Asamblado
1	5	3	0	562738.877	502853.063	512545.966	999.297 23 Alabado
1	5	4	0	562744.963	502859.938	512547.923	999.316 24
1	5	5	0	562750.231	502865.894	512549.618	999.332 25
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	6	1	0	562746.581	502853.100	512556.374	999.321 26
1	6	2	0	562751.852	502859.054	512558.068	999.337 27
1	6	3	0	562757.927	502865.920	512560.022	999.356 28 Asamblado
1	6	4	0	562763.995	502872.782	512561.975	999.375 29 del estubo
1	6	5	0	562769.248	502878.725	512563.666	999.392 30
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	7	1	0	562747.344	502853.615	512556.936	999.323 31 6,189
1	7	2	0	562752.614	502859.568	512558.630	999.340 32 Eje de 7,139
1	7	3	0	562758.688	502866.434	512560.584	999.359 33 7,134
1	7	4	0	562764.755	502873.295	512562.537	999.378 34 6,178
1	7	5	0	562770.008	502879.237	512564.228	999.394 35

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	8	1	0	562748.106	502854.129	512557.498	999.326 36
1	8	2	0	562753.376	502860.082	512559.193	999.342 37 Borde
1	8	3	0	562759.449	502866.947	512561.146	999.361 38 Tablero
1	8	4	0	562765.516	502873.807	512563.098	999.380 39
1	8	5	0	562770.768	502879.750	512564.789	999.396 40

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	9	1	0	562748.201	502854.193	512557.569	999.326 41
1	9	2	0	562753.471	502860.146	512559.263	999.342 42
1	9	3	0	562759.544	502867.011	512561.216	999.361 43
1	9	4	0	562765.611	502873.872	512563.169	999.380 44
1	9	5	0	562770.863	502879.814	512564.859	999.397 45

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	10	1	0	562748.773	502854.579	512557.990	999.328 46
1	10	2	0	562754.042	502860.532	512559.684	999.344 47
1	10	3	0	562760.115	502867.396	512561.638	999.363 48
1	10	4	0	562766.181	502874.256	512563.590	999.382 49
1	10	5	0	562771.433	502880.198	512565.281	999.399 50

E2

E1

REPLANTEO DE LAS VIGAS Y DEL TABLERO

NV = número de vigas. Tipo = 1

NT = N° de trabes = 1

RAV = espesor de pavimento = 0,0

FOR = " mínimo del forjado = 0,30

ENC = " encofrado = 0,0

CCV = Contr mínimo entre alba requeros = 0,0

CMO = espesor mínimo mortero de ancha = 0,025

VN = número de tipo de viga = 1

EV = Entree de al = 0,60

LV = luz de viga = 24,574

EF = Entree lateral = 0,60

CVD = Contr Jorsey

CVF = " Contr

BS = Ancho del ala superior = 3,0

Av = longitud del viga = 0,7

BN = Ancho del viga = 0,50

NP = número de juntas por viga = 10

Compuertas - Tablones

NVI = N° de vigas = 3

VT = N° de tipo de viga = 1

X = 865,748 X = 878,237

Y = 544,055 Y = 564,228

AX = 281,350 AX = 281,350

CND = 0,068 CND = 0,068

DD = 14,0 DF = 14,0

O.F. - P.I. 562+700. REPLANTEO DE VIGAS 1000 EJE DEL TRONCO DEL FECC
560259.927 1035.619 864.265 57.7289 1560887.50 993.506 .00312777 1
-2563156.585 15000. 1562912.5
2 560200. 3.25 3.75 - 3.75 3.25
563000. 3.25 3.75 3.75 3.25
2 560200.
563000.
5 1 0. 2 0. 0 0. 9 0. 10 0.
1 1 0. 0.3 0. 0. 0.025
1 0.60 20.574 0.60 1.10 1.10 3.0 0.7 0.5 10
TABLERO 3 12865.3792549.055282.3503.069 14. 2879.2372564.228282.3503.069 14.
1 5 16.191 7.149 7.154
6.178 7.134 7.139

TITULO DEL TRABAJO O.F.-P.I.562+700. REPLANTEO DE VIGAS

ESPESORES Y COTAS DE FORJADO

TABLERO	VIGA	XD	YD	ZD	ZDO	XF	YF	ZF	ZFO	TGA	LUZ
ABLERO	1	2859.424	2547.361	997.913	997.843	2873.295	2562.537	997.978	997.908	0.0031	20.560
SECCION	1	2	3	4	5	6	7	8	9	10	11
U	0.000	2.177	4.355	6.532	8.710	10.887	13.064	15.242	17.419	19.597	21.774
ESP DER	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
ESP IZQ	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
Z FORJ.	999.311	999.318	999.325	999.332	999.339	999.345	999.352	999.359	999.366	999.373	999.380

TABLERO	VIGA	XD	YD	ZD	ZDO	XF	YF	ZF	ZFO	TGA	LUZ
ABLERO	2	2852.548	2545.404	997.894	997.824	2866.433	2560.584	997.959	997.889	0.0031	20.573
SECCION	1	2	3	4	5	6	7	8	9	10	11
U	0.000	2.177	4.355	6.532	8.710	10.887	13.064	15.242	17.419	19.597	21.774
ESP DER	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
ESP IZQ	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
Z FORJ.	999.292	999.299	999.306	999.313	999.320	999.326	999.333	999.340	999.347	999.354	999.361

TABLERO	VIGA	XD	YD	ZD	ZDO	XF	YF	ZF	ZFO	TGA	LUZ
ABLERO	3	2845.668	2543.446	997.875	997.805	2859.567	2558.631	997.940	997.870	0.0031	20.586
SECCION	1	2	3	4	5	6	7	8	9	10	11
U	0.000	2.177	4.355	6.532	8.710	10.887	13.064	15.242	17.419	19.597	21.774
ESP DER	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
ESP IZQ	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
Z FORJ.	999.273	999.280	999.287	999.294	999.301	999.307	999.314	999.321	999.328	999.335	999.341

TITULO DEL TRABAJO O.F.-P.I.562+700. REPLANTEO DE VIGAS

REPLANTEO DE LOS BORDES DEL FORJADO RESPECTO DEL ALA DE LA VIGA EXTREMA

TABLEROTABLERO

SECCION	1	2	3	4	5	6	7	8	9	10	11
U	0.000	2.177	4.355	6.532	8.710	10.887	13.064	15.242	17.419	19.597	21.774
DIST DER	1.749	1.751	1.752	1.753	1.753	1.753	1.753	1.753	1.752	1.751	1.750
COTA DER	999.311	999.318	999.325	999.332	999.339	999.345	999.352	999.359	999.366	999.373	999.380
DIST IZQ	1.751	1.749	1.748	1.747	1.747	1.746	1.746	1.747	1.747	1.748	1.749
COTA IZQ	999.273	999.280	999.287	999.294	999.301	999.307	999.314	999.321	999.328	999.335	999.341

TABLEROTABLERO EXTREMOS DE EJES DE APOYO

	X1	Y1	Z1	X2	Y2	Z2
APOYO DORSAL	2865.379	2549.055	997.834	2851.914	2545.223	997.797
APOYO FRONTAL	2879.237	2564.228	997.898	2865.772	2560.396	997.861

REPLANTEO DE LAS ALETAS

TITULO DEL TRABAJO O.F.-P.I.562+700. REPLANTEO ALETAS

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A			
0	562692.000	-52.593138	.677726	-.735315			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	0	562692.000	502816.199	512516.191	999.150	
1	5	0	562692.000	502826.494	512506.703	999.150	
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562692.500	-52.595260	.677701	-.735337			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	2	1	0	562692.500	502816.538	512516.559	999.152
1	2	5	0	562692.500	502826.833	512507.071	999.152
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562693.000	-52.597383	.677677	-.735360			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	3	1	0	562693.000	502816.877	512516.926	999.153
1	3	5	0	562693.000	502827.172	512507.439	999.153
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562693.500	-52.599505	.677652	-.735383			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	4	1	0	562693.500	502817.216	512517.294	999.155
1	4	5	0	562693.500	502827.511	512507.807	999.155
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562694.000	-52.601627	.677628	-.735405			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	5	1	0	562694.000	502817.554	512517.661	999.156
1	5	5	0	562694.000	502827.850	512508.174	999.156
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562694.500	-52.603749	.677603	-.735428			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	6	1	0	562694.500	502817.893	512518.029	999.158
1	6	5	0	562694.500	502828.189	512508.542	999.158
EJE	P.K.	AZIMUT	COS A	SEN A			

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	7	1	0	562695.000	502818.232	512518.396	999.159
1	7	5	0	562695.000	502828.528	512508.910	999.159

EJE	P.K.	AZIMUT	COS A	SEN A
0	562695.500	-52.607993	.677554	-.735473

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	8	1	0	562695.500	502818.570	512518.764	999.161
1	8	5	0	562695.500	502828.867	512509.278	999.161

EJE	P.K.	AZIMUT	COS A	SEN A
0	562696.000	-52.610115	.677530	-.735496

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	9	1	0	562696.000	502818.909	512519.131	999.163 (3)
1	9	5	0	562696.000	502829.206	512509.646	999.163

EJE	P.K.	AZIMUT	COS A	SEN A
0	562696.500	-52.612237	.677505	-.735518

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	10	1	0	562696.500	502819.247	512519.499	999.164
1	10	5	0	562696.500	502829.545	512510.014	999.164

EJE	P.K.	AZIMUT	COS A	SEN A
0	562697.000	-52.614359	.677481	-.735541

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	11	1	0	562697.000	502819.586	512519.867	999.166
1	11	5	0	562697.000	502829.884	512510.382	999.166

EJE	P.K.	AZIMUT	COS A	SEN A
0	562697.500	-52.616481	.677456	-.735563

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	12	1	0	562697.500	502819.925	512520.234	999.167
1	12	5	0	562697.500	502830.222	512510.750	999.167

EJE	P.K.	AZIMUT	COS A	SEN A
0	562698.000	-52.618603	.677432	-.735586

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	13	1	0	562698.000	502820.263	512520.602	999.169 (4)
1	13	5	0	562698.000	502830.561	512511.118	999.169

EJE	P.K.	AZIMUT	COS A	SEN A
0	562698.500	-52.620725	.677407	-.735608

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	14	1	0	562698.500	502820.602	512520.969	999.170
1	14	5	0	562698.500	502830.900	512511.486	999.170

EJE	P.K.	AZIMUT	COS A	SEN A
0	562699.000	-52.622847	.677382	-.735631

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	15	1	0	562699.000	502820.940	512521.337	999.172
1	15	5	0	562699.000	502831.239	512511.854	999.172

0 562699.500 -52.624505 .677338 .735634

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	16	1	0	562699.500	502821.279	512521.705	999.174
1	16	5	0	562699.500	502831.578	512512.222	999.174

E	P.K.	AZIMUT	COS A	SEN A
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0 562700.000 -52.627091 .677333 -.735676

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	17	1	0	562700.000	502821.617	512522.072	999.175 (5)
1	17	5	0	562700.000	502831.917	512512.590	999.175

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562700.500 -52.629214 .677309 -.735699

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	18	1	0	562700.500	502821.956	512522.440	999.177
1	18	5	0	562700.500	502832.255	512512.958	999.177

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562701.000 -52.631336 .677284 -.735721

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	19	1	0	562701.000	502822.294	512522.808	999.178
1	19	5	0	562701.000	502832.594	512513.226	999.178

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562701.500 -52.633458 .677260 -.735744

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	20	1	0	562701.500	502822.633	512523.175	999.180
1	20	5	0	562701.500	502832.933	512513.694	999.180

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562702.000 -52.635580 .677235 -.735766

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	21	1	0	562702.000	502822.971	512523.543	999.181 (6)
1	21	5	0	562702.000	502833.272	512514.062	999.181

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562702.500 -52.637702 .677211 -.735789

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	22	1	0	562702.500	502823.310	512523.911	999.183
1	22	5	0	562702.500	502833.611	512514.430	999.183

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562703.000 -52.639824 .677186 -.735812

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	23	1	0	562703.000	502823.648	512524.279	999.184
1	23	5	0	562703.000	502833.949	512514.798	999.184

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562703.500 -52.641946 .677162 -.735834

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
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EJE	P.K.	AZIMUT	COS A	SEN A
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0 562704.000 -52.644068 .677137 -.735857

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	25	1	0	562704.000	502824.325	512525.014	999.188 (7)
1	25	5	0	562704.000	502834.627	512515.534	999.188

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562704.500 -52.646190 .677113 -.735879

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	26	1	0	562704.500	502824.663	512525.382	999.189
1	26	5	0	562704.500	502834.966	512515.902	999.189

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562705.000 -52.648312 .677088 -.735902

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	27	1	0	562705.000	502825.002	512525.750	999.191
1	27	5	0	562705.000	502835.304	512516.270	999.191

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562705.500 -52.650434 .677064 -.735924

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	28	1	0	562705.500	502825.340	512526.117	999.192
1	28	5	0	562705.500	502835.643	512516.639	999.192

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562706.000 -52.652556 .677039 -.735947

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	29	1	0	562706.000	502825.678	512526.485	999.194 (8)
1	29	5	0	562706.000	502835.982	512517.007	999.194

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562706.500 -52.654678 .677015 -.735970

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	30	1	0	562706.500	502826.017	512526.853	999.195
1	30	5	0	562706.500	502836.320	512517.375	999.195

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562707.000 -52.656800 .676990 -.735992

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	31	1	0	562707.000	502826.355	512527.221	999.197
1	31	5	0	562707.000	502836.659	512517.743	999.197

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562707.500 -52.658922 .676966 -.736015

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	32	1	0	562707.500	502826.693	512527.589	999.199
1	32	5	0	562707.500	502836.998	512518.111	999.199

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562708.000 -52.661045 .676941 -.736037

1 33 5 0 562708.000 502837.336 512518.479 999.200

EJE P.K. AZIMUT COS A SEN A

0 562708.500 -52.663167 .676916 -.736060

GPO. RTA. CVA. EJE P.K. X Y Z
1 34 1 0 562708.500 502827.370 512528.324 999.202
1 34 5 0 562708.500 502837.675 512518.848 999.202

EJE P.K. AZIMUT COS A SEN A

0 562709.000 -52.665289 .676892 -.736082

GPO. RTA. CVA. EJE P.K. X Y Z
1 35 1 0 562709.000 502827.708 512528.692 999.203
1 35 5 0 562709.000 502838.014 512519.216 999.203

EJE P.K. AZIMUT COS A SEN A

0 562709.500 -52.667411 .676867 -.736105

GPO. RTA. CVA. EJE P.K. X Y Z
1 36 1 0 562709.500 502828.047 512529.060 999.205
1 36 5 0 562709.500 502838.352 512519.584 999.205

EJE P.K. AZIMUT COS A SEN A

0 562710.000 -52.669533 .676843 -.736128

GPO. RTA. CVA. EJE P.K. X Y Z
1 37 1 0 562710.000 502828.385 512529.428 999.206 (10)
1 37 5 0 562710.000 502838.691 512519.952 999.206

EJE P.K. AZIMUT COS A SEN A

0 562710.500 -52.671655 .676818 -.736150

GPO. RTA. CVA. EJE P.K. X Y Z
1 38 1 0 562710.500 502828.723 512529.796 999.208
1 38 5 0 562710.500 502839.029 512520.320 999.208

EJE P.K. AZIMUT COS A SEN A

0 562711.000 -52.673777 .676794 -.736173

GPO. RTA. CVA. EJE P.K. X Y Z
1 39 1 0 562711.000 502829.061 512530.164 999.209
1 39 5 0 562711.000 502839.368 512520.689 999.209

EJE P.K. AZIMUT COS A SEN A

0 562711.500 -52.675899 .676769 -.736195

GPO. RTA. CVA. EJE P.K. X Y Z
1 40 1 0 562711.500 502829.400 512530.532 999.211
1 40 5 0 562711.500 502839.706 512521.057 999.211

EJE P.K. AZIMUT COS A SEN A

0 562712.000 -52.678021 .676745 -.736218

GPO. RTA. CVA. EJE P.K. X Y Z
1 41 1 0 562712.000 502829.738 512530.900 999.213 (11)
1 41 5 0 562712.000 502840.045 512521.425 999.213

EJE P.K. AZIMUT COS A SEN A

GPO. RTA. CVA. EJE P.K. X Y Z
1 42 1 0 562712.500 502830.076 512531.268 999.214
1 42 5 0 562712.500 502840.383 512521.793 999.214

EJE P.K. AZIMUT COS A SEN A

0 562713.000 -52.682265 .676696 -.736263

GPO. RTA. CVA. EJE P.K. X Y Z
1 43 1 0 562713.000 502830.414 512531.636 999.216
1 43 5 0 562713.000 502840.722 512522.162 999.216

EJE P.K. AZIMUT COS A SEN A

0 562713.500 -52.684387 .676671 -.736285

GPO. RTA. CVA. EJE P.K. X Y Z
1 44 1 0 562713.500 502830.752 512532.004 999.217
1 44 5 0 562713.500 502841.060 512522.530 999.217

EJE P.K. AZIMUT COS A SEN A

0 562714.000 -52.686509 .676647 -.736308

GPO. RTA. CVA. EJE P.K. X Y Z
1 45 1 0 562714.000 502831.091 512532.371 999.219 (12)
1 45 5 0 562714.000 502841.399 512522.898 999.219

EJE P.K. AZIMUT COS A SEN A

0 562714.500 -52.688631 .676622 -.736331

GPO. RTA. CVA. EJE P.K. X Y Z
1 46 1 0 562714.500 502831.429 512532.739 999.220
1 46 5 0 562714.500 502841.737 512523.267 999.220

EJE P.K. AZIMUT COS A SEN A

0 562715.000 -52.690753 .676597 -.736353

GPO. RTA. CVA. EJE P.K. X Y Z
1 47 1 0 562715.000 502831.767 512533.107 999.222
1 47 5 0 562715.000 502842.076 512523.635 999.222

EJE P.K. AZIMUT COS A SEN A

0 562715.500 -52.692875 .676573 -.736376

GPO. RTA. CVA. EJE P.K. X Y Z
1 48 1 0 562715.500 502832.105 512533.475 999.224
1 48 5 0 562715.500 502842.414 512524.003 999.224

EJE P.K. AZIMUT COS A SEN A

0 562716.000 -52.694998 .676548 -.736398

GPO. RTA. CVA. EJE P.K. X Y Z
1 49 1 0 562716.000 502832.443 512533.843 999.225 (13)
1 49 5 0 562716.000 502842.753 512524.372 999.225

EJE P.K. AZIMUT COS A SEN A

0 562716.500 -52.697120 .676524 -.736421

GPO. RTA. CVA. EJE P.K. X Y Z
1 50 1 0 562716.500 502832.781 512534.212 999.227
1 50 5 0 562716.500 502843.090 512524.740 999.227

0 562717.000 -52.699242 .676499 -.736443

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	51	1	0	562717.000	502833.119	512534.580	999.228
1	51	5	0	562717.000	502843.430	512525.109	999.228

E	P.K.	AZIMUT	COS A	SEN A
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0 562717.500 -52.701364 .676475 -.736466

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	52	1	0	562717.500	502833.457	512534.948	999.230
1	52	5	0	562717.500	502843.768	512525.477	999.230

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562718.000 -52.703486 .676450 -.736488

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	53	1	0	562718.000	502833.796	512535.316	999.231 (14)
1	53	5	0	562718.000	502844.106	512525.845	999.231

EJE	P.K.	AZIMUT	COS A	SEN A
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562718.500 -52.705608 .676426 -.736511

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	54	1	0	562718.500	502834.134	512535.684	999.233
1	54	5	0	562718.500	502844.445	512526.214	999.233

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562719.000 -52.707730 .676401 -.736534

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	55	1	0	562719.000	502834.472	512536.052	999.235
1	55	5	0	562719.000	502844.783	512526.582	999.235

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562719.500 -52.709852 .676376 -.736556

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	56	1	0	562719.500	502834.810	512536.420	999.236
1	56	5	0	562719.500	502845.122	512526.951	999.236

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562720.000 -52.711974 .676352 -.736579

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	57	1	0	562720.000	502835.148	512536.788	999.238
1	57	5	0	562720.000	502845.460	512527.319	999.238

FIN
(15) 562720.000
= 1

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562720.500 -52.714096 .676327 -.736601

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	58	1	0	562720.500	502835.486	512537.156	999.239
1	58	5	0	562720.500	502845.798	512527.688	999.239

E	P.K.	AZIMUT	COS A	SEN A
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0 562721.000 -52.716218 .676303 -.736624

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
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EJE	P.K.	AZIMUT	COS A	SEN A
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0 562721.500 -52.718340 .676278 -.736646

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	60	1	0	562721.500	502836.162	512537.892	999.242
1	60	5	0	562721.500	502846.475	512528.425	999.242

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562722.000 -52.720462 .676254 -.736669

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	61	1	0	562722.000	502836.500	512538.261	999.244 (16)
1	61	5	0	562722.000	502846.813	512528.793	999.244

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562722.500 -52.722584 .676229 -.736691

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	62	1	0	562722.500	502836.838	512538.629	999.245
1	62	5	0	562722.500	502847.151	512529.162	999.245

EJE	P.K.	AZIMUT	COS A	SEN A
-----	------	--------	-------	-------

0 562723.000 -52.724706 .676205 -.736714

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	63	1	0	562723.000	502837.176	512538.997	999.247
1	63	5	0	562723.000	502847.490	512529.530	999.247

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562723.500 -52.726829 .676180 -.736736

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	64	1	0	562723.500	502837.514	512539.365	999.249
1	64	5	0	562723.500	502847.828	512529.899	999.249

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562724.000 -52.728951 .676155 -.736759

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	65	1	0	562724.000	502837.851	512539.733	999.250 (17)
1	65	5	0	562724.000	502848.166	512530.267	999.250

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562724.500 -52.731073 .676131 -.736781

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	66	1	0	562724.500	502838.189	512540.102	999.252
1	66	5	0	562724.500	502848.504	512530.636	999.252

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562725.000 -52.733195 .676106 -.736804

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	67	1	0	562725.000	502838.527	512540.470	999.253
1	67	5	0	562725.000	502848.843	512531.004	999.253

EJE	P.K.	AZIMUT	COS A	SEN A
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0 562725.500 -52.735317 .676082 -.736827

1 68 5 0 562725.500 502849.181 512531.373 999.255

EJE P.K. AZIMUT COS A SEN A

0 562726.000 -52.737439 .676057 -.736849

GPO. RTA. CVA. EJE P.K. X Y Z
1 69 1 0 562726.000 502839.203 512541.206 999.256
1 69 5 0 562726.000 502849.519 512531.741 999.256

EJE P.K. AZIMUT COS A SEN A

0 562726.500 -52.739561 .676033 -.736872

GPO. RTA. CVA. EJE P.K. X Y Z
1 70 1 0 562726.500 502839.541 512541.575 999.258
1 70 5 0 562726.500 502849.857 512532.110 999.258

EJE P.K. AZIMUT COS A SEN A

0 562727.000 -52.741683 .676008 -.736894

GPO. RTA. CVA. EJE P.K. X Y Z
1 71 1 0 562727.000 502839.879 512541.943 999.260
1 71 5 0 562727.000 502850.195 512532.479 999.260

EJE P.K. AZIMUT COS A SEN A

0 562727.500 -52.743805 .675984 -.736917

GPO. RTA. CVA. EJE P.K. X Y Z
1 72 1 0 562727.500 502840.217 512542.311 999.261
1 72 5 0 562727.500 502850.533 512532.847 999.261

EJE P.K. AZIMUT COS A SEN A

0 562728.000 -52.745927 .675959 -.736939

GPO. RTA. CVA. EJE P.K. X Y Z
1 73 1 0 562728.000 502840.554 512542.679 999.263
1 73 5 0 562728.000 502850.872 512533.216 999.263

EJE P.K. AZIMUT COS A SEN A

0 562728.500 -52.748049 .675934 -.736962

GPO. RTA. CVA. EJE P.K. X Y Z
1 74 1 0 562728.500 502840.892 512543.048 999.264
1 74 5 0 562728.500 502851.210 512533.585 999.264

EJE P.K. AZIMUT COS A SEN A

0 562729.000 -52.750171 .675910 -.736984

GPO. RTA. CVA. EJE P.K. X Y Z
1 75 1 0 562729.000 502841.230 512543.416 999.266
1 75 5 0 562729.000 502851.548 512533.953 999.266

EJE P.K. AZIMUT COS A SEN A

0 562729.500 -52.752293 .675885 -.737007

GPO. RTA. CVA. EJE P.K. X Y Z
1 76 1 0 562729.500 502841.568 512543.784 999.267
1 76 5 0 562729.500 502851.886 512534.322 999.267

EJE P.K. AZIMUT COS A SEN A

GPO. RTA. CVA. EJE P.K. X Y Z
1 77 1 0 562730.000 502841.906 512544.153 999.269
1 77 5 0 562730.000 502852.224 512534.691 999.269

EJE P.K. AZIMUT COS A SEN A

0 562730.500 -52.756537 .675836 -.737052

GPO. RTA. CVA. EJE P.K. X Y Z
1 78 1 0 562730.500 502842.243 512544.521 999.270
1 78 5 0 562730.500 502852.562 512535.059 999.270

EJE P.K. AZIMUT COS A SEN A

0 562731.000 -52.758660 .675812 -.737074

GPO. RTA. CVA. EJE P.K. X Y Z
1 79 1 0 562731.000 502842.581 512544.889 999.272
1 79 5 0 562731.000 502852.900 512535.428 999.272

EJE P.K. AZIMUT COS A SEN A

0 562731.500 -52.760782 .675787 -.737097

GPO. RTA. CVA. EJE P.K. X Y Z
1 80 1 0 562731.500 502842.919 512545.258 999.274
1 80 5 0 562731.500 502853.238 512535.797 999.274

EJE P.K. AZIMUT COS A SEN A

0 562732.000 -52.762904 .675762 -.737119

GPO. RTA. CVA. EJE P.K. X Y Z
1 81 1 0 562732.000 502843.257 512545.626 999.275
1 81 5 0 562732.000 502853.576 512536.165 999.275

EJE P.K. AZIMUT COS A SEN A

0 562732.500 -52.765026 .675738 -.737142

GPO. RTA. CVA. EJE P.K. X Y Z
1 82 1 0 562732.500 502843.594 512545.995 999.277
1 82 5 0 562732.500 502853.914 512536.534 999.277

EJE P.K. AZIMUT COS A SEN A

0 562733.000 -52.767148 .675713 -.737165

GPO. RTA. CVA. EJE P.K. X Y Z
1 83 1 0 562733.000 502843.932 512546.363 999.278
1 83 5 0 562733.000 502854.252 512536.903 999.278

EJE P.K. AZIMUT COS A SEN A

0 562733.500 -52.769270 .675689 -.737187

GPO. RTA. CVA. EJE P.K. X Y Z
1 84 1 0 562733.500 502844.270 512546.731 999.280
1 84 5 0 562733.500 502854.590 512537.272 999.280

EJE P.K. AZIMUT COS A SEN A

0 562734.000 -52.771392 .675664 -.737210

GPO. RTA. CVA. EJE P.K. X Y Z
1 85 1 0 562734.000 502844.607 512547.100 999.281
1 85 5 0 562734.000 502854.927 512537.610 999.281

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
0	562734.500	-52.773514	.675640	-.737232			
1	86	1	0	562734.500	502844.945	512547.468	999.283
1	86	5	0	562734.500	502855.266	512538.009	999.283
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562735.000	-52.775636	.675615	-.737255			
1	87	1	0	562735.000	502845.283	512547.837	999.285
1	87	5	0	562735.000	502855.604	512538.378	999.285
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562735.500	-52.777758	.675590	-.737277			
1	88	1	0	562735.500	502845.620	512548.205	999.286
1	88	5	0	562735.500	502855.942	512538.747	999.286 (21)
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562736.000	-52.779880	.675566	-.737300			
1	89	1	0	562736.000	502845.958	512548.574	999.288
1	89	5	0	562736.000	502856.280	512539.116	999.288
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562736.500	-52.782002	.675541	-.737322			
1	90	1	0	562736.500	502846.296	512548.942	999.289
1	90	5	0	562736.500	502856.618	512539.485	999.289
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562737.000	-52.784124	.675517	-.737345			
1	91	1	0	562737.000	502846.633	512549.311	999.291
1	91	5	0	562737.000	502856.956	512539.853	999.291
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562737.500	-52.786246	.675492	-.737367			
1	92	1	0	562737.500	502846.971	512549.679	999.292
1	92	5	0	562737.500	502857.294	512540.222	999.292 (22)
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562738.000	-52.788368	.675468	-.737390			
1	93	1	0	562738.000	502847.308	512550.048	999.294
1	93	5	0	562738.000	502857.632	512540.591	999.294
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562738.500	-52.790491	.675443	-.737412			
1	94	1	0	562738.500	502847.631	512550.380	999.295
1	94	5	0	562738.500	502857.954	512540.883	999.295
EJE	P.K.	AZIMUT	COS A	SEN A			

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
0	562739.000	-52.792613	.675418	-.737435			
1	95	1	0	562739.000	502847.984	512550.785	999.297
1	95	5	0	562739.000	502858.308	512541.329	999.297
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562739.500	-52.794735	.675394	-.737457			
1	96	1	0	562739.500	502848.321	512551.153	999.299
1	96	5	0	562739.500	502858.646	512541.698	999.299 (23)
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562740.000	-52.796857	.675369	-.737480			
1	97	1	0	562740.000	502848.659	512551.522	999.300
1	97	5	0	562740.000	502858.983	512542.067	999.300
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562740.500	-52.798979	.675345	-.737502			
1	98	1	0	562740.500	502848.996	512551.890	999.302
1	98	5	0	562740.500	502859.321	512542.436	999.302
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562741.000	-52.801101	.675320	-.737525			
1	99	1	0	562741.000	502849.334	512552.259	999.303
1	99	5	0	562741.000	502859.659	512542.804	999.303
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562741.500	-52.803223	.675295	-.737547			
1	100	1	0	562741.500	502849.671	512552.628	999.305
1	100	5	0	562741.500	502859.997	512543.173	999.305 (24)
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562742.000	-52.805345	.675271	-.737570			
1	101	1	0	562742.000	502850.009	512552.996	999.306
1	101	5	0	562742.000	502860.335	512543.542	999.306
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562742.500	-52.807467	.675246	-.737592			
1	102	1	0	562742.500	502850.346	512553.365	999.308
1	102	5	0	562742.500	502860.672	512543.911	999.308
EJE	P.K.	AZIMUT	COS A	SEN A			

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	103	5	0	562743.000	502861.010	512544.280	999.310
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562743.500	-52.811711	.675197	-.737637			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	104	1	0	562743.500	502851.021	512554.102	999.311
1	104	5	0	562743.500	502861.348	512544.649	999.311 (25)
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562744.000	-52.813833	.675173	-.737660			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	105	1	0	562744.000	502851.358	512554.471	999.313
1	105	5	0	562744.000	502861.686	512545.018	999.313 B
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562744.500	-52.815955	.675148	-.737682			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	106	1	0	562744.500	502851.696	512554.839	999.314
1	106	5	0	562744.500	502862.023	512545.387	999.314
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562745.000	-52.818077	.675123	-.737705			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	107	1	0	562745.000	502852.033	512555.208	999.316
1	107	5	0	562745.000	502862.361	512545.756	999.316
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562745.500	-52.820199	.675099	-.737727			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	108	1	0	562745.500	502852.371	512555.577	999.317
1	108	5	0	562745.500	502862.699	512546.125	999.317 (26)
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562746.000	-52.822322	.675074	-.737750			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	109	1	0	562746.000	502852.708	512555.945	999.319
1	109	5	0	562746.000	502863.037	512546.494	999.319 A
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562746.500	-52.824444	.675050	-.737772			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	110	1	0	562746.500	502853.045	512556.314	999.321
1	110	5	0	562746.500	502863.374	512546.863	999.321
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562747.000	-52.826566	.675025	-.737795			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	111	1	0	562747.000	502853.383	512556.683	999.322
1	111	5	0	562747.000	502863.712	512547.232	999.322
EJE	P.K.	AZIMUT	COS A	SEN A			

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	112	1	0	562747.500	502853.720	512557.052	999.324
1	112	5	0	562747.500	502864.050	512547.602	999.324 (27)
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562748.000	-52.830810	.674976	-.737840			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	113	1	0	562748.000	502854.058	512557.420	999.325 (28)
1	113	5	0	562748.000	502864.387	512547.971	999.325
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562748.500	-52.832932	.674951	-.737862			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	114	1	0	562748.500	502854.395	512557.789	999.327
1	114	5	0	562748.500	502864.725	512548.340	999.327
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562749.000	-52.835054	.674927	-.737885			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	115	1	0	562749.000	502854.732	512558.158	999.328
1	115	5	0	562749.000	502865.063	512548.709	999.328
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562749.500	-52.837176	.674902	-.737907			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	116	1	0	562749.500	502855.069	512558.527	999.330
1	116	5	0	562749.500	502865.400	512549.078	999.330 (29)
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562750.000	-52.839298	.674877	-.737930			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	117	1	0	562750.000	502855.407	512558.895	999.331 H (30)
1	117	5	0	562750.000	502865.738	512549.447	999.331
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562750.500	-52.841420	.674853	-.737952			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	118	1	0	562750.500	502855.744	512559.264	999.333
1	118	5	0	562750.500	502866.075	512549.816	999.333
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562751.000	-52.843542	.674828	-.737975			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	119	1	0	562751.000	502856.081	512559.633	999.335
1	119	5	0	562751.000	502866.413	512550.185	999.335
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562751.500	-52.845664	.674804	-.737997			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	120	1	0	562751.500	502856.419	512560.002	999.336
1	120	5	0	562751.500	502866.750	512550.554	999.336
EJE	P.K.	AZIMUT	COS A	SEN A			

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
0	562752.000	-52.847786	.674779	-.738020			
1	121	1	0	562752.000	502856.756	512560.371	999.338
1	121	5	0	562752.000	502867.088	512550.924	999.338
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562752.500	-52.849908	.674754	-.738042			
1	122	1	0	562752.500	502857.093	512560.739	999.339
1	122	5	0	562752.500	502867.426	512551.293	999.339
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562753.000	-52.852030	.674730	-.738065			
1	123	1	0	562753.000	502857.430	512561.108	999.341
1	123	5	0	562753.000	502867.763	512551.662	999.341
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562753.500	-52.854153	.674705	-.738087			
1	124	1	0	562753.500	502857.767	512561.477	999.342
1	124	5	0	562753.500	502868.101	512552.031	999.342
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562754.000	-52.856275	.674681	-.738110			
1	125	1	0	562754.000	502858.105	512561.846	999.344
1	125	5	0	562754.000	502868.438	512552.401	999.344
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562754.500	-52.858397	.674656	-.738132			
1	126	1	0	562754.500	502858.442	512562.215	999.346
1	126	5	0	562754.500	502868.776	512552.770	999.346
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562755.000	-52.860519	.674631	-.738155			
1	127	1	0	562755.000	502858.779	512562.584	999.347
1	127	5	0	562755.000	502869.113	512553.139	999.347
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562755.500	-52.862641	.674607	-.738177			
1	128	1	0	562755.500	502859.116	512562.953	999.349
1	128	5	0	562755.500	502869.451	512553.508	999.349
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562756.000	-52.864763	.674582	-.738200			

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
0	562756.500	-52.866885	.674558	-.738222			
1	130	1	0	562756.500	502859.790	512563.691	999.352
1	130	5	0	562756.500	502870.125	512554.247	999.352
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562757.000	-52.869007	.674533	-.738245			
1	131	1	0	562757.000	502860.127	512564.060	999.353
1	131	5	0	562757.000	502870.463	512554.616	999.353
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562757.500	-52.871129	.674508	-.738267			
1	132	1	0	562757.500	502860.465	512564.429	999.355
1	132	5	0	562757.500	502870.800	512554.985	999.355
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562758.000	-52.873251	.674484	-.738290			
1	133	1	0	562758.000	502860.802	512564.798	999.356
1	133	5	0	562758.000	502871.138	512555.355	999.356
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562758.500	-52.875373	.674459	-.738312			
1	134	1	0	562758.500	502861.139	512565.166	999.358
1	134	5	0	562758.500	502871.475	512555.724	999.358
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562759.000	-52.877495	.674435	-.738335			
1	135	1	0	562759.000	502861.476	512565.535	999.360
1	135	5	0	562759.000	502871.812	512556.093	999.360
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562759.500	-52.879617	.674410	-.738357			
1	136	1	0	562759.500	502861.813	512565.904	999.361
1	136	5	0	562759.500	502872.150	512556.463	999.361
EJE	P.K.	AZIMUT	COS A	SEN A			
0	562760.000	-52.881739	.674385	-.738380			
1	137	1	0	562760.000	502862.150	512566.273	999.363
1	137	5	0	562760.000	502872.487	512556.832	999.363
EJE	P.K.	AZIMUT	COS A	SEN A			

1 138 5 0 562760.500 502872.825 512557.201 999.364

EJE P.K. AZIMUT COS A SEN A

0 562761.000 -52.885983 .674336 -.738425

GPO. RTA. CVA. EJE P.K. X Y Z
1 139 1 0 562761.000 502862.824 512567.012 999.366
1 139 5 0 562761.000 502873.162 512557.571 999.366

EJE P.K. AZIMUT COS A SEN A

0 562761.500 -52.888106 .674311 -.738447

GPO. RTA. CVA. EJE P.K. X Y Z
1 140 1 0 562761.500 502863.161 512567.381 999.367
1 140 5 0 562761.500 502873.499 512557.940 999.367

EJE P.K. AZIMUT COS A SEN A

0 562762.000 -52.890228 .674287 -.738470

GPO. RTA. CVA. EJE P.K. X Y Z
1 141 1 0 562762.000 502863.498 512567.750 999.369 (36)
1 141 5 0 562762.000 502873.837 512558.310 999.369

EJE P.K. AZIMUT COS A SEN A

0 562762.500 -52.892350 .674262 -.738492

GPO. RTA. CVA. EJE P.K. X Y Z
1 142 1 0 562762.500 502863.835 512568.119 999.371
1 142 5 0 562762.500 502874.174 512558.679 999.371

EJE P.K. AZIMUT COS A SEN A

0 562763.000 -52.894472 .674238 -.738514

GPO. RTA. CVA. EJE P.K. X Y Z
1 143 1 0 562763.000 502864.172 512568.488 999.372
1 143 5 0 562763.000 502874.511 512559.048 999.372

EJE P.K. AZIMUT COS A SEN A

0 562763.500 -52.896594 .674213 -.738537

GPO. RTA. CVA. EJE P.K. X Y Z
1 144 1 0 562763.500 502864.509 512568.857 999.374
1 144 5 0 562763.500 502874.848 512559.418 999.374

EJE P.K. AZIMUT COS A SEN A

0 562764.000 -52.898716 .674188 -.738559

GPO. RTA. CVA. EJE P.K. X Y Z
1 145 1 0 562764.000 502864.846 512569.226 999.375 (37) FIAH
1 145 5 0 562764.000 502875.186 512559.787 999.375 MEHREKUH

EJE P.K. AZIMUT COS A SEN A

0 562764.500 -52.900838 .674164 -.738582

GPO. RTA. CVA. EJE P.K. X Y Z
1 146 1 0 562764.500 502865.183 512569.595 999.377
1 146 5 0 562764.500 502875.523 512560.157 999.377

EJE P.K. AZIMUT COS A SEN A

GPO. RTA. CVA. EJE P.K. X Y Z
1 147 1 0 562765.000 502865.520 512569.964 999.378
1 147 5 0 562765.000 502875.860 512560.526 999.378

EJE P.K. AZIMUT COS A SEN A

0 562765.500 -52.905082 .674115 -.738627

GPO. RTA. CVA. EJE P.K. X Y Z
1 148 1 0 562765.500 502865.857 512570.333 999.380
1 148 5 0 562765.500 502876.197 512560.896 999.380

EJE P.K. AZIMUT COS A SEN A

0 562766.000 -52.907204 .674090 -.738649

GPO. RTA. CVA. EJE P.K. X Y Z
1 149 1 0 562766.000 502866.193 512570.703 999.382
1 149 5 0 562766.000 502876.535 512561.265 999.382

EJE P.K. AZIMUT COS A SEN A

0 562766.500 -52.909326 .674065 -.738672

GPO. RTA. CVA. EJE P.K. X Y Z
1 150 1 0 562766.500 502866.530 512571.072 999.383
1 150 5 0 562766.500 502876.872 512561.635 999.383

EJE P.K. AZIMUT COS A SEN A

0 562767.000 -52.911448 .674041 -.738694

GPO. RTA. CVA. EJE P.K. X Y Z
1 151 1 0 562767.000 502866.867 512571.441 999.385
1 151 5 0 562767.000 502877.209 512562.004 999.385

EJE P.K. AZIMUT COS A SEN A

0 562767.500 -52.913570 .674016 -.738717

GPO. RTA. CVA. EJE P.K. X Y Z
1 152 1 0 562767.500 502867.204 512571.810 999.386
1 152 5 0 562767.500 502877.546 512562.374 999.386

EJE P.K. AZIMUT COS A SEN A

0 562768.000 -52.915692 .673991 -.738739

GPO. RTA. CVA. EJE P.K. X Y Z
1 153 1 0 562768.000 502867.541 512572.179 999.388
1 153 5 0 562768.000 502877.883 512562.743 999.388

EJE P.K. AZIMUT COS A SEN A

0 562768.500 -52.917814 .673967 -.738762

GPO. RTA. CVA. EJE P.K. X Y Z
1 154 1 0 562768.500 502867.878 512572.548 999.389
1 154 5 0 562768.500 502878.220 512563.113 999.389

EJE P.K. AZIMUT COS A SEN A

0 562769.000 -52.919937 .673942 -.738784

GPO. RTA. CVA. EJE P.K. X Y Z
1 155 1 0 562769.000 502868.215 512572.918 999.391
1 155 5 0 562769.000 502878.557 512563.482 999.391

0 562769.500 -52.922059 .673918 -.738807

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	156	1	0	562769.500	502868.551	512573.287	999.392
1	156	5	0	562769.500	502878.895	512563.852	999.392

EJE P.K. AZIMUT COS A SEN A

0 562770.000 -52.924181 .673893 -.738829

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	157	1	0	562770.000	502868.888	512573.656	999.394
1	157	5	0	562770.000	502879.232	512564.222	999.394

EJE P.K. AZIMUT COS A SEN A

0 562770.500 -52.926303 .673868 -.738851

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	158	1	0	562770.500	502869.225	512574.025	999.396
1	158	5	0	562770.500	502879.569	512564.591	999.396

EJE P.K. AZIMUT COS A SEN A

0 562771.000 -52.928425 .673844 -.738874

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	159	1	0	562771.000	502869.562	512574.395	999.397
1	159	5	0	562771.000	502879.906	512564.961	999.397

EJE P.K. AZIMUT COS A SEN A

0 562771.500 -52.930547 .673819 -.738896

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	160	1	0	562771.500	502869.898	512574.764	999.399
1	160	5	0	562771.500	502880.243	512565.330	999.399

EJE P.K. AZIMUT COS A SEN A

0 562772.000 -52.932669 .673794 -.738919

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	161	1	0	562772.000	502870.235	512575.133	999.400
1	161	5	0	562772.000	502880.580	512565.700	999.400

EJE P.K. AZIMUT COS A SEN A

0 562772.500 -52.934791 .673770 -.738941

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	162	1	0	562772.500	502870.572	512575.502	999.402
1	162	5	0	562772.500	502880.917	512566.070	999.402

EJE P.K. AZIMUT COS A SEN A

0 562773.000 -52.936913 .673745 -.738964

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	163	1	0	562773.000	502870.909	512575.872	999.403
1	163	5	0	562773.000	502881.254	512566.439	999.403

EJE P.K. AZIMUT COS A SEN A

0 562773.500 -52.939035 .673721 -.738986

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
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EJE P.K. AZIMUT COS A SEN A

0 562774.000 -52.941157 .673696 -.739009

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	165	1	0	562774.000	502871.582	512576.610	999.407
1	165	5	0	562774.000	502881.928	512567.179	999.407

EJE P.K. AZIMUT COS A SEN A

0 562774.500 -52.943279 .673671 -.739031

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	166	1	0	562774.500	502871.919	512576.980	999.408
1	166	5	0	562774.500	502882.265	512567.548	999.408

EJE P.K. AZIMUT COS A SEN A

0 562775.000 -52.945401 .673647 -.739054

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	167	1	0	562775.000	502872.255	512577.349	999.410
1	167	5	0	562775.000	502882.602	512567.918	999.410

EJE P.K. AZIMUT COS A SEN A

0 562775.500 -52.947523 .673622 -.739076

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	168	1	0	562775.500	502872.592	512577.718	999.411
1	168	5	0	562775.500	502882.939	512568.288	999.411

EJE P.K. AZIMUT COS A SEN A

0 562776.000 -52.949645 .673597 -.739099

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	169	1	0	562776.000	502872.929	512578.088	999.413
1	169	5	0	562776.000	502883.276	512568.657	999.413

EJE P.K. AZIMUT COS A SEN A

0 562776.500 -52.951768 .673573 -.739121

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	170	1	0	562776.500	502873.265	512578.457	999.414
1	170	5	0	562776.500	502883.613	512569.027	999.414

EJE P.K. AZIMUT COS A SEN A

0 562777.000 -52.953890 .673548 -.739143

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	171	1	0	562777.000	502873.602	512578.827	999.416
1	171	5	0	562777.000	502883.950	512569.397	999.416

EJE P.K. AZIMUT COS A SEN A

0 562777.500 -52.956012 .673523 -.739166

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	172	1	0	562777.500	502873.939	512579.196	999.417
1	172	5	0	562777.500	502884.287	512569.767	999.417

EJE P.K. AZIMUT COS A SEN A

0 562778.000 -52.958134 .673498 -.739188

1 173 5 0 562778.000 502884.624 512570.156 999.419

EJE P.K. AZIMUT COS A SEN A

0 562778.500 -52.960256 .673474 -.739211

GPO. RTA. CVA. EJE P.K. X Y Z
1 174 1 0 562778.500 502874.612 512579.935 999.421
1 174 5 0 562778.500 502884.961 512570.506 999.421

EJE P.K. AZIMUT COS A SEN A

0 562779.000 -52.962378 .673449 -.739233

GPO. RTA. CVA. EJE P.K. X Y Z
1 175 1 0 562779.000 502874.948 512580.304 999.422
1 175 5 0 562779.000 502885.298 512570.876 999.422

EJE P.K. AZIMUT COS A SEN A

0 562779.500 -52.964500 .673425 -.739256

GPO. RTA. CVA. EJE P.K. X Y Z
1 176 1 0 562779.500 502875.285 512580.674 999.424
1 176 5 0 562779.500 502885.634 512571.246 999.424 (43)

EJE P.K. AZIMUT COS A SEN A

0 562780.000 -52.966622 .673400 -.739278

GPO. RTA. CVA. EJE P.K. X Y Z
1 177 1 0 562780.000 502875.621 512581.043 999.425
1 177 5 0 562780.000 502885.971 512571.616 999.425

EJE P.K. AZIMUT COS A SEN A

0 562780.500 -52.968744 .673376 -.739301

GPO. RTA. CVA. EJE P.K. X Y Z
1 178 1 0 562780.500 502875.958 512581.413 999.427
1 178 5 0 562780.500 502886.308 512571.985 999.427

EJE P.K. AZIMUT COS A SEN A

0 562781.000 -52.970866 .673351 -.739323

GPO. RTA. CVA. EJE P.K. X Y Z
1 179 1 0 562781.000 502876.295 512581.782 999.428
1 179 5 0 562781.000 502886.645 512572.355 999.428

EJE P.K. AZIMUT COS A SEN A

0 562781.500 -52.972988 .673326 -.739345

GPO. RTA. CVA. EJE P.K. X Y Z
1 180 1 0 562781.500 502876.631 512582.152 999.430
1 180 5 0 562781.500 502886.982 512572.725 999.430 (44)

EJE P.K. AZIMUT COS A SEN A

0 562782.000 -52.975110 .673302 -.739368

GPO. RTA. CVA. EJE P.K. X Y Z
1 181 1 0 562782.000 502876.968 512582.521 999.432
1 181 5 0 562782.000 502887.319 512573.095 999.432

EJE P.K. AZIMUT COS A SEN A

GPO. RTA. CVA. EJE P.K. X Y Z
1 182 1 0 562782.500 502877.304 512582.891 999.433
1 182 5 0 562782.500 502887.655 512573.465 999.433

EJE P.K. AZIMUT COS A SEN A

0 562783.000 -52.979354 .673252 -.739413

GPO. RTA. CVA. EJE P.K. X Y Z
1 183 1 0 562783.000 502877.641 512583.260 999.435
1 183 5 0 562783.000 502887.992 512573.835 999.435

EJE P.K. AZIMUT COS A SEN A

0 562783.500 -52.981476 .673228 -.739435

GPO. RTA. CVA. EJE P.K. X Y Z
1 184 1 0 562783.500 502877.977 512583.630 999.436
1 184 5 0 562783.500 502888.329 512574.205 999.436 (45)

EJE P.K. AZIMUT COS A SEN A

0 562784.000 -52.983599 .673203 -.739458

GPO. RTA. CVA. EJE P.K. X Y Z
1 185 1 0 562784.000 502878.313 512583.999 999.438
1 185 5 0 562784.000 502888.666 512574.574 999.438

EJE P.K. AZIMUT COS A SEN A

0 562784.500 -52.985721 .673178 -.739480

GPO. RTA. CVA. EJE P.K. X Y Z
1 186 1 0 562784.500 502878.650 512584.369 999.439
1 186 5 0 562784.500 502889.003 512574.944 999.439

EJE P.K. AZIMUT COS A SEN A

0 562785.000 -52.987843 .673154 -.739503

GPO. RTA. CVA. EJE P.K. X Y Z
1 187 1 0 562785.000 502878.986 512584.738 999.441
1 187 5 0 562785.000 502889.339 512575.314 999.441

EJE P.K. AZIMUT COS A SEN A

0 562785.500 -52.989965 .673129 -.739525

GPO. RTA. CVA. EJE P.K. X Y Z
1 188 1 0 562785.500 502879.323 512585.108 999.443
1 188 5 0 562785.500 502889.676 512575.684 999.443 (46)

EJE P.K. AZIMUT COS A SEN A

0 562786.000 -52.992087 .673104 -.739547

GPO. RTA. CVA. EJE P.K. X Y Z
1 189 1 0 562786.000 502879.659 512585.478 999.444
1 189 5 0 562786.000 502890.013 512576.054 999.444

EJE P.K. AZIMUT COS A SEN A

0 562786.500 -52.994209 .673080 -.739570

GPO. RTA. CVA. EJE P.K. X Y Z
1 190 1 0 562786.500 502879.995 512585.847 999.446
1 190 5 0 562786.500 502890.348 512576.429 999.446

0 562787.000 -52.996331 .673055 -.739592

GPO. RTA. CVA. EJE P.K X Y Z
1 191 1 0 562787.000 502880.332 512586.217 999.447
1 191 5 0 562787.000 502890.686 512576.794 999.447

EJE P.K. AZIMUT COS A SEN A

0 562787.500 -52.998453 .673030 -.739615

GPO. RTA. CVA. EJE P.K X Y Z
1 192 1 0 562787.500 502880.668 512586.586 999.449
1 192 5 0 562787.500 502891.023 512577.164 999.449 (47)

EJE P.K. AZIMUT COS A SEN A

0 562788.000 -53.000575 .673006 -.739637

GPO. RTA. CVA. EJE P.K X Y Z
1 193 1 0 562788.000 502881.005 512586.956 999.450
1 193 5 0 562788.000 502891.359 512577.534 999.450

EJE P.K. AZIMUT COS A SEN A

562788.500 -53.002697 .672981 -.739660

GPO. RTA. CVA. EJE P.K X Y Z
1 194 1 0 562788.500 502881.341 512587.326 999.452
1 194 5 0 562788.500 502891.696 512577.904 999.452

EJE P.K. AZIMUT COS A SEN A

0 562789.000 -53.004819 .672957 -.739682

GPO. RTA. CVA. EJE P.K X Y Z
1 195 1 0 562789.000 502881.677 512587.695 999.453
1 195 5 0 562789.000 502892.033 512578.274 999.453

EJE P.K. AZIMUT COS A SEN A

0 562789.500 -53.006941 .672932 -.739704

GPO. RTA. CVA. EJE P.K X Y Z
1 196 1 0 562789.500 502882.014 512588.065 999.455
1 196 5 0 562789.500 502892.369 512578.644 999.455 (48)

EJE P.K. AZIMUT COS A SEN A

0 562790.000 -53.009063 .672907 -.739727

GPO. RTA. CVA. EJE P.K X Y Z
1 197 1 0 562790.000 502882.350 512588.435 999.457
1 197 5 0 562790.000 502892.706 512579.014 999.457

EJE P.K. AZIMUT COS A SEN A

0 562790.500 -53.011185 .672883 -.739749

GPO. RTA. CVA. EJE P.K X Y Z
1 198 1 0 562790.500 502882.686 512588.804 999.458
1 198 5 0 562790.500 502893.043 512579.384 999.458

EJE P.K. AZIMUT COS A SEN A

0 562791.000 -53.013307 .672858 -.739772

GPO. RTA. CVA. EJE P.K X Y Z

EJE P.K. AZIMUT COS A SEN A

0 562791.500 -53.015430 .672833 -.739794

GPO. RTA. CVA. EJE P.K X Y Z
1 200 1 0 562791.500 502883.359 512589.544 999.461
1 200 5 0 562791.500 502893.716 512580.124 999.461 (49)

EJE P.K. AZIMUT COS A SEN A

0 562792.000 -53.017552 .672809 -.739817

GPO. RTA. CVA. EJE P.K X Y Z
1 201 1 0 562792.000 502883.695 512589.914 999.463
1 201 5 0 562792.000 502894.052 512580.494 999.463

EJE P.K. AZIMUT COS A SEN A

0 562792.500 -53.019674 .672784 -.739839

GPO. RTA. CVA. EJE P.K X Y Z
1 202 1 0 562792.500 502884.031 512590.283 999.464
1 202 5 0 562792.500 502894.389 512580.864 999.464

EJE P.K. AZIMUT COS A SEN A

0 562793.000 -53.021796 .672759 -.739861

GPO. RTA. CVA. EJE P.K X Y Z
1 203 1 0 562793.000 502884.367 512590.653 999.466
1 203 5 0 562793.000 502894.725 512581.234 999.466

EJE P.K. AZIMUT COS A SEN A

0 562793.500 -53.023918 .672735 -.739884

GPO. RTA. CVA. EJE P.K X Y Z
1 204 1 0 562793.500 502884.704 512591.023 999.468
1 204 5 0 562793.500 502895.062 512581.605 999.468 (50)

EJE P.K. AZIMUT COS A SEN A

0 562794.000 -53.026040 .672710 -.739906

GPO. RTA. CVA. EJE P.K X Y Z
1 205 1 0 562794.000 502885.040 512591.393 999.469
1 205 5 0 562794.000 502895.399 512581.975 999.469

EJE P.K. AZIMUT COS A SEN A

0 562794.500 -53.028162 .672685 -.739929

GPO. RTA. CVA. EJE P.K X Y Z
1 206 1 0 562794.500 502885.376 512591.762 999.471
1 206 5 0 562794.500 502895.735 512582.345 999.471

EJE P.K. AZIMUT COS A SEN A

0 562795.000 -53.030284 .672661 -.739951

GPO. RTA. CVA. EJE P.K X Y Z
1 207 1 0 562795.000 502885.712 512592.132 999.472
1 207 5 0 562795.000 502896.072 512582.715 999.472

EJE P.K. AZIMUT COS A SEN A

0 562795.500 -53.032406 .672636 -.739974

1 208 5 0 562795.500 502896.408 512583.085 999.474 (51)

EJE P.K. AZIMUT COS A SEN A

0 562796.000 -53.034528 .672611 -.739996

GPO. RTA. CVA. EJE P.K. X Y Z
1 209 1 0 562796.000 502886.385 512592.872 999.475
1 209 5 0 562796.000 502896.744 512583.455 999.475

EJE P.K. AZIMUT COS A SEN A

0 562796.500 -53.036650 .672587 -.740018

GPO. RTA. CVA. EJE P.K. X Y Z
1 210 1 0 562796.500 502886.721 512593.242 999.477
1 210 5 0 562796.500 502897.081 512583.825 999.477

EJE P.K. AZIMUT COS A SEN A

0 562797.000 -53.038772 .672562 -.740041

GPO. RTA. CVA. EJE P.K. X Y Z
1 211 1 0 562797.000 502887.057 512593.612 999.478
1 211 5 0 562797.000 502897.417 512584.196 999.478

EJE P.K. AZIMUT COS A SEN A

0 562797.500 -53.040894 .672537 -.740063

GPO. RTA. CVA. EJE P.K. X Y Z
1 212 1 0 562797.500 502887.393 512593.981 999.480
1 212 5 0 562797.500 502897.754 512584.566 999.480

EJE P.K. AZIMUT COS A SEN A

0 562798.000 -53.043016 .672513 -.740086

GPO. RTA. CVA. EJE P.K. X Y Z
1 213 1 0 562798.000 502887.729 512594.351 999.482
1 213 5 0 562798.000 502898.090 512584.936 999.482

EJE P.K. AZIMUT COS A SEN A

0 562798.500 -53.045138 .672488 -.740108

GPO. RTA. CVA. EJE P.K. X Y Z
1 214 1 0 562798.500 502888.065 512594.721 999.483
1 214 5 0 562798.500 502898.427 512585.306 999.483

(52) FIN
MAY 1977 00.18

CALCULO DEL COEFICIENTE DE IMPACTO DINAMICO

OBJETO: GIF (PASO CARRETERA)

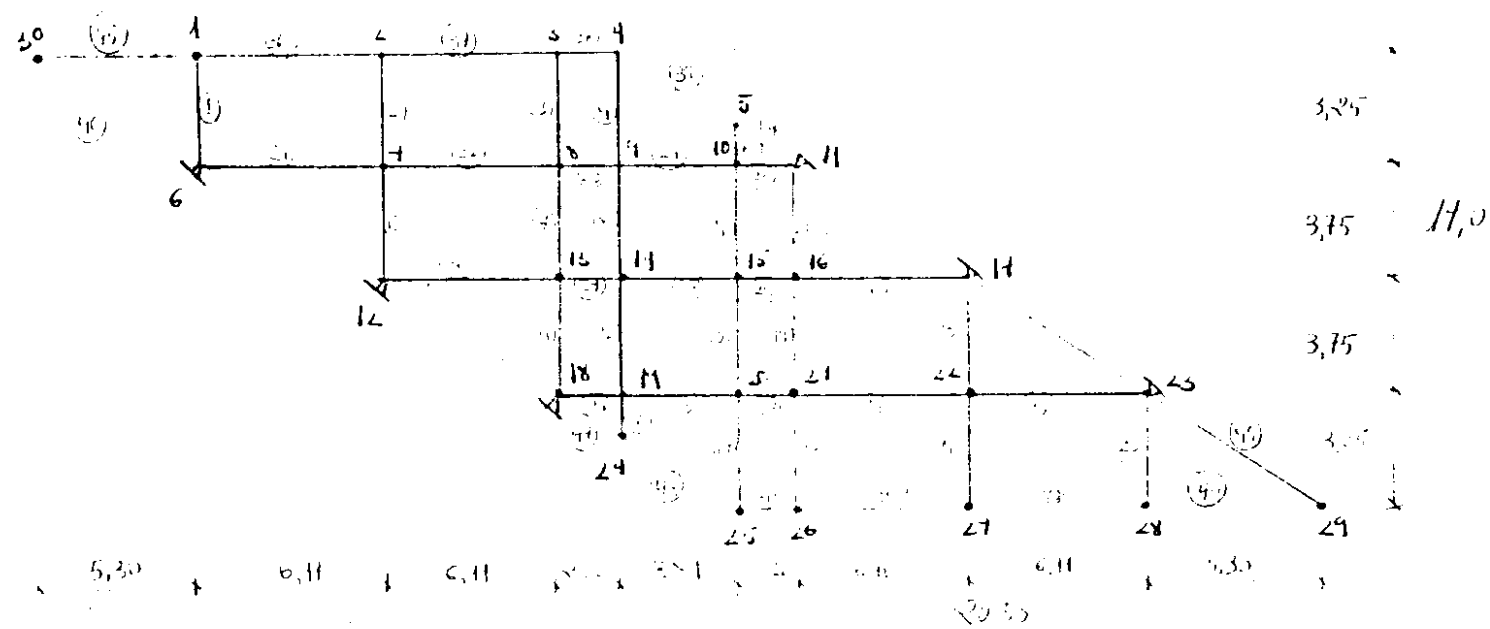
PROYECTO Nº

CALCULADO POR COMPROBADO POR FECHA

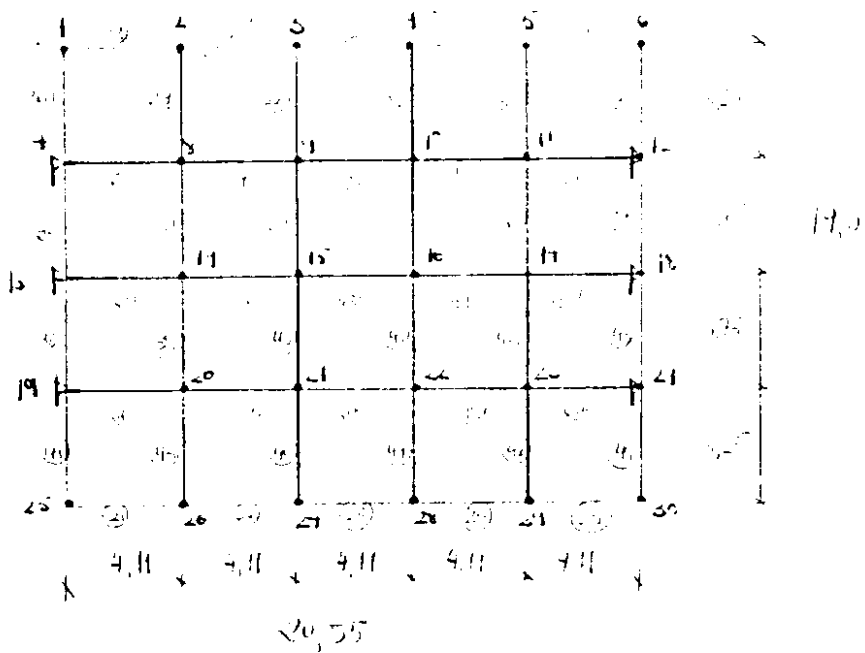
FECHA

CALCULO DEL IMPACTO DINAMICO

1.- How do we ENPACK?



Phạm Đức Cảnh



OBJETO: G.F. (PASO CARRETERA)

HOJA Nº 2 DE

PROYECTO Nº

CALCULADO POR COMPROBADO POR

FECHA

1. CARACTERÍSTICAS BARRAS

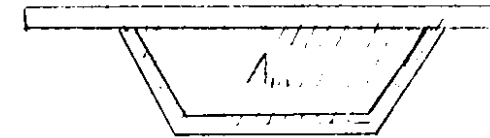
1.1) LONGITUDINALES

- AREA: $A_{\text{area}} = A_{\text{teja}} + A_{\text{losa}}$

- INERCIAS

- Flexión: $I_{\text{flexión}} = I_{\text{teja}} + I_{\text{losa}} \text{ (Steiner)}$

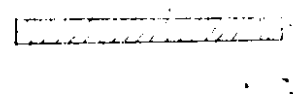
- Torsión: $I_x = 0,5 \frac{4A_{\text{teja}}^2}{\sum d/c}$ Se desprecia la inercia a torsión de los voladizos.
El otro 55% más la inercia a torsión transversal



1.2) TRANSVERSALES

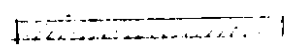
1.2.1) INTERIORES (BARRAS 6-15)

- AREA



± 0,33

$A_{\text{total}} = A_{\text{sup}} + A_{\text{inf}}$



± 0,25

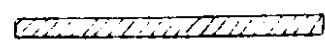
- INERCIA

- Flexión: $I_{\text{flexión}} = I_{\text{teja sup}} + I_{\text{teja inf}} \text{ (Steiner)}$

- Torsión: $I_x = 0,5 (I_{\text{longitudinal}}) \cdot f$ $f = \frac{\text{Ancho losa de cada viga}}{\text{Canto c/pila}}$

1.2.2) EXTERIORES (BARRAS 1-5, 16-20)

- AREA



± 0,33

- INERCIA

- Flexión: $I_{\text{flexión}} = I_{\text{losa}}$

- Torsión: $I_x = I_{\text{losa}} = \frac{1}{3} b d^3$

CARACTERISTICAS BARRAS DEL EMPARRILLADO PUENTE ESVIADO

BARRAS LONGITUDINALES											
BARRAS	LONG LOSA	A ARTESA	A LOSA	Y g ARTESA	Yg LOSA	Yg TOTAL	IzARTESA	Iz LOSA	Iz TOTAL	A media	Ix (torsion)
1	3.5	0.8855	1.155	0.992	0.165	0.523886792	0.1267	0.010481625	0.479984906	2.166	0.365
2	3.75	0.8855	1.2375	0.992	0.165	0.509940415	0.1267	0.011230313	0.490946644	2.166	0.365
3	3.5	0.8855	1.155	0.992	0.165	0.523886792	0.1267	0.010481625	0.479984906	2.166	0.365
4	1.625	0	0.53625	0	0.165	0.165	0	0.004866469	0.004866469	0	0.0097329
BARRAS TRANSVERSALES											
BARRAS INTERIORES											
	BARRAS	ANCHO LOS	AREA SUP	AREA INF	AREA TOTAL	Yg TOTAL	Iz SUP	Iz INF	Iz TOTAL	IX TORSION	
	1	6.11	2.0163	1.5275	3.5438	0.621896552	0.018297923	0.007955729	0.409313676	2.02740909	
	2	4.165	1.37445	1.04125	2.4157	0.621896552	0.012473134	0.005423177	0.279016605	1.38202273	
	3	3.055	1.00815	0.76375	1.7719	0.621896552	0.009148961	0.003977865	0.204656838	1.01370455	
BARRAS EXTERIORES											
	BARRAS	ANCHO LOSA	AREA TOTAL	Yg TOTAL	Iz TOTAL	IX TORSION					
	1	5.705	1.88265	0.165	0.017085049	0.034170098					
	2	6.11	2.0163	0.165	0.018297923	0.036595845					
	3	4.165	1.37445	0.165	0.012473134	0.024946268					
	4	3.055	1.00815	0.165	0.009148961	0.018297923					

CARACTERISTICAS BARRAS DEL EMPARRILLADO PUENTE RECTO

BARRAS LONGITUDINALES											
BARRAS	LONG LOSA	A ARTESA	A LOSA	Y g ARTESA	Yg LOSA	Yg TOTAL	IzARTESA	Iz LOSA	Iz TOTAL	A media	Ix (torsion)
1	3.5	0.8855	1.155	0.992	0.165	0.523886792	0.1267	0.010481625	0.479984906	2.166	0.365
2	3.75	0.8855	1.2375	0.992	0.165	0.509940415	0.1267	0.011230313	0.490946644	2.166	0.365
3	3.5	0.8855	1.155	0.992	0.165	0.523886792	0.1267	0.010481625	0.479984906	2.166	0.365
4	1.625	0	0.53625	0	0.165	0.165	0	0.004866469	0.004866469	0	0.0097329
BARRAS TRANSVERSALES											
BARRAS INTERIORES											
	BARRAS	ANCHO LOS	AREA SUP	AREA INF	AREA TOTAL	Yg TOTAL	Iz SUP	Iz INF	Iz TOTAL	IX TORSION	
	1	4.11	1.3563	1.0275	2.3838	0.621896552	0.012308423	0.005351563	0.275332112	1.363772727	
	2	2.055	0.67815	0.51375	1.1919	0.621896552	0.006154211	0.002675781	0.137666056	0.681886364	
BARRAS EXTERIORES											
		BARRAS	ANCHO LOSA	AREA TOTAL	Yg TOTAL	Iz TOTAL	IX TORSION				
		1	4.11	1.3563	0.165	0.012308423	0.024616845				
		2	2.055	0.67815	0.165	0.006154211	0.012308423				

3.-) ESPECIES DE CARGAS

Para cada modo i de las cargas longitudinales el espectro es el que aparece en la página siguiente

Se ha ampliado un tramo con 2 locomotoras y 2 vagones

El espectro de cargas viene con la velocidad

La carga central recibe la carga de dos coches y las extremas de un solo coche.

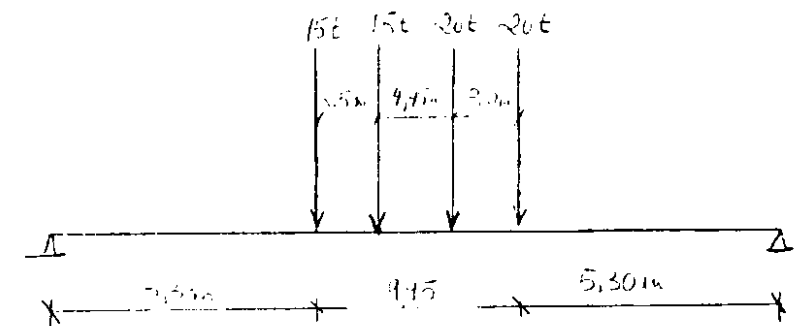
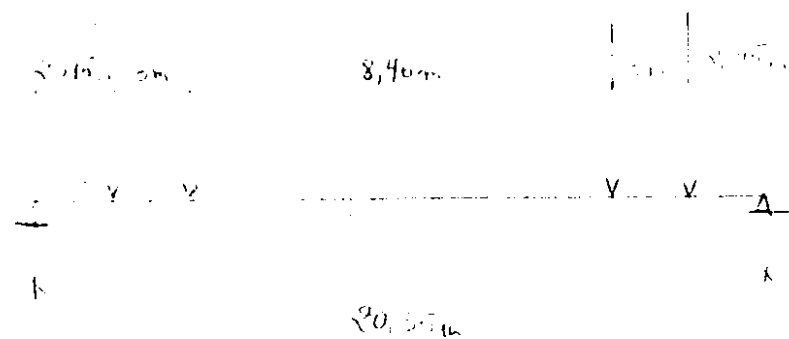
3.1) RETARDO R_i

$$R_i = \frac{X_i (m)}{V (m/s)} \quad \text{Tiempo que tarda el tren de cargas en llegar a modo } i$$

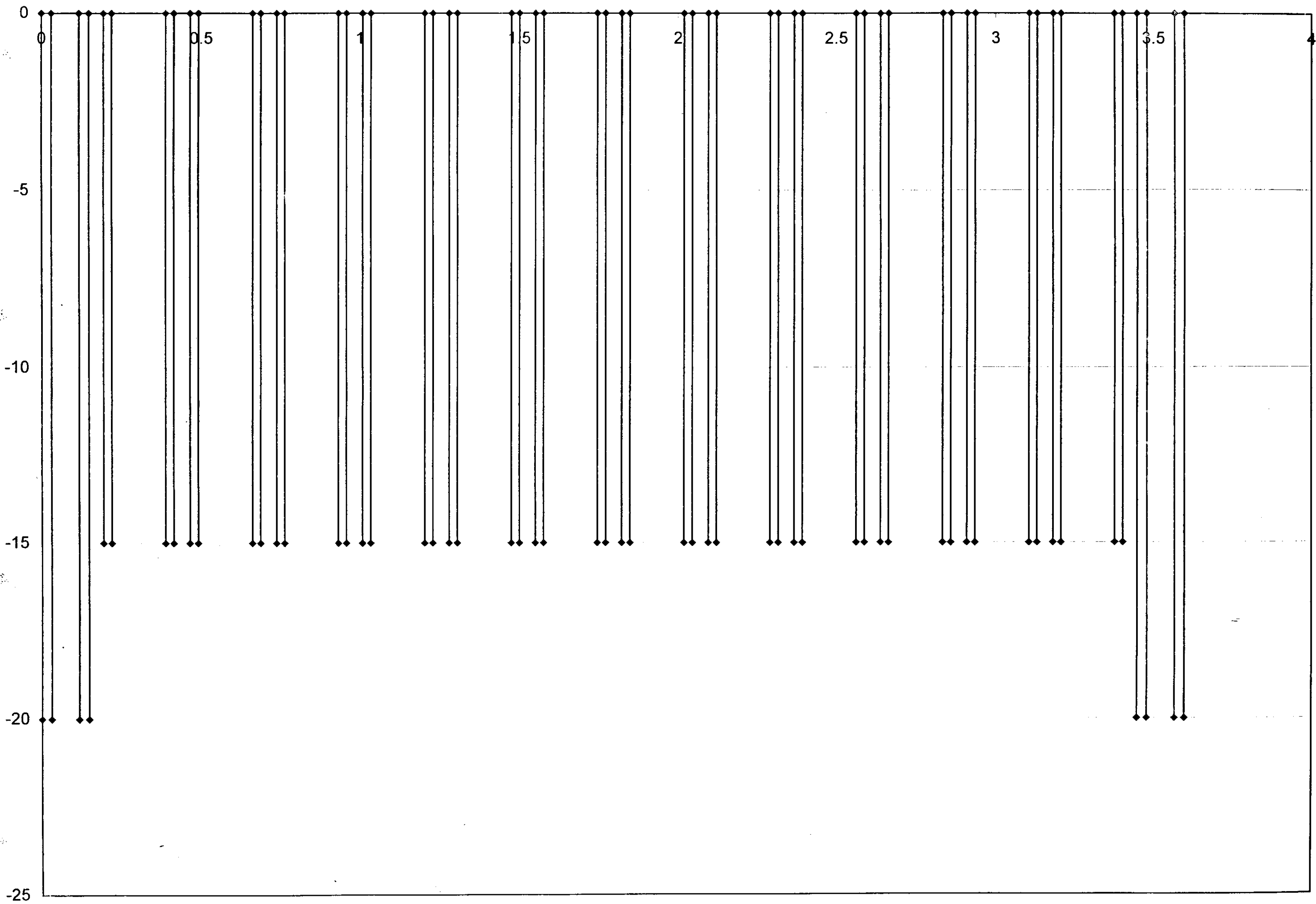
$$R_i = R_{i+6} \quad (\text{p.e. } R_7 = R_{13} = R_{19}) \quad \text{La penúltima carga de los dos trenes avanza con el mismo avance que el puente}$$

4.-) CARGA ESTADICA

Para obtener la carga estática máxima se debe aplicar las locomotoras en la posición más desfavorable y con sólo 1 en el centro



N.B. Para los modos centrales resulta ligeramente más desfavorable el caso segundo.



5.-) CARGA PERMANENTE Y PESO PROPIO

- Se ha calculado la carga permanente y peso propio de los elementos.
- Se ha calculado la carga permanente y peso propio de los elementos.
- Se ha calculado la carga permanente y peso propio de los elementos.
- Se ha calculado la carga permanente y peso propio de los elementos.
- Se ha calculado la carga permanente y peso propio de los elementos.

$$\bullet \text{ PAVIMENTO + TACAPL + CARRIL} = 13,10 \text{ t/m}$$

$$\bullet \text{ IMPUESTA + BARRANDILLO} = 0,75 \text{ t/m}$$

- VIGA EXTERIOR LONGITUDINAL

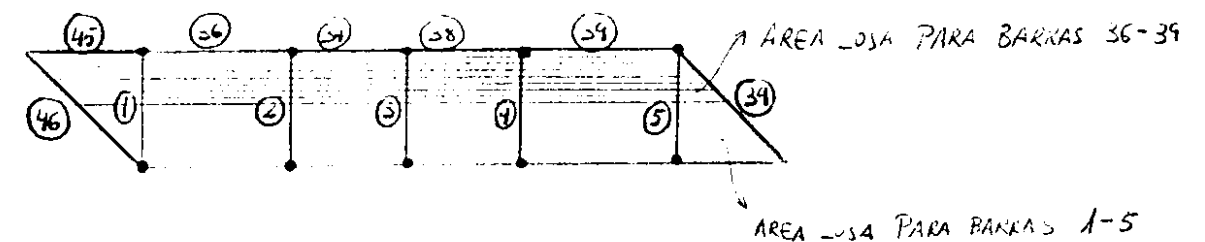
$$\bullet \text{ CARGA PERMANENTE} = 3,42 \text{ t/m}$$

- VIGA EXTERIOR LONGITUDINAL

$$\bullet \text{ CARGA PERMANENTE} = 6,85 \text{ t/m}$$

- Para no olvidar el peso propio de los elementos longitudinales se ha calculado el peso propio de los elementos longitudinales.

$$C_{\text{prop}} = \frac{\text{Area Total} \times 8,5}{\text{Area Total}} \quad \text{Total de los elementos longitudinales, excepto los elementos longitudinales 36-43}$$



OBJETO GIF (PASO CARRETERAS) HOJA Nº DE
 PROYECTO Nº
 CALCULADO POR COMPROBADO POR FECHA

COMPARACION COEFICIENTES IMPACTO DINAMICO

1.-) NORMATIVA JPF PARA FERROVIARIAS

$$I(\%) = \frac{114 \sqrt{L}}{3,10 - 1,16 \sqrt{L} + L} = 32,13\%$$

$$L = 20,55 \text{ m}$$

$$I = 1,3298$$

2.-) ECI (3453) - UIC PARA TRENESES UIC-11 / 5000

$$\phi = \frac{1,14}{\sqrt{L_p} - 0,2} + 0,82 = 1,152$$

3.-) ECI (ANEXO B) PARA TRENESES ACTUALES

$$I = 1,4251$$

4.-) ECI (ANEXO B) PARA TRENESES ACTUALES

$$I_{\text{MAX CDV}} = 2,050$$

6.-) COEFICIENTE IMPACTO SEGUN ANEXO A (EC1)

$$V = 350 \text{ km/h}$$

$$I = 1 + \psi' + 0,5 \psi''$$

$$N_b = 12,98 \text{ Hz}$$

$$\psi' = 0,222$$

$$\psi'' = 6,4062$$

$$I(V = 350 \text{ km/h}) = \underline{\underline{1,4251}}$$

$$I(V = 380 \text{ km/h}) = \underline{\underline{1,456}}$$

CR - PUNTE RECTO CONVEXO $N_b = 4,250$

$$V = 380 \text{ km/h} \rightarrow \left. \begin{array}{l} \psi' = 1,174 \\ \psi'' = 2,527 \cdot 10^{-2} \end{array} \right\} I(380) = 2,186$$

$$V = 350 \text{ km/h} \rightarrow \left. \begin{array}{l} \psi' = 1,120 \\ \psi'' = 2,527 \cdot 10^{-2} \end{array} \right\} I(350) = 2,130$$

CR - VIGA RECTA CON CONVEXO $N_b = 4,438$

$$V = 380 \text{ km/h} \rightarrow \left. \begin{array}{l} \psi' = 1,124 \\ \psi'' = 3,243 \cdot 10^{-2} \end{array} \right\} I(380) = 2,130$$

$$V = 350 \text{ km/h} \rightarrow \left. \begin{array}{l} \psi' = 0,9731 \\ \psi'' = 3,243 \cdot 10^{-2} \end{array} \right\} I(350) = 1,970$$

```

*****
*                               *
*      S T A A D - III         *
*      Revision 22.3           *
*      Proprietary Program of  *
*      Research Engineers, Inc. *
*      Date=   OCT 29, 1998     *
*      Time=   16:32:39        *
*                               *
*      USER ID: EUROESTUDIOS,S.A. *
*****

```

1. STAAD PLANE PASO CARRETERA V 194

2. INPUT WIDTH 79

3. *

4. UNIT METER MTON

5. JOINT COORDINATES

6.	1	5.300	.000	.000
7.	2	11.410	.000	.000
8.	3	17.520	.000	.000
9.	4	19.740	.000	.000
10.	5	23.630	.000	.000
11.	6	5.300	.000	3.250
12.	7	11.410	.000	3.250
13.	8	17.520	.000	3.250
14.	9	19.740	.000	3.250
15.	10	23.630	.000	3.250
16.	11	25.850	.000	3.250
17.	12	11.410	.000	7.000
18.	13	17.520	.000	7.000
19.	14	19.740	.000	7.000
20.	15	23.630	.000	7.000
21.	16	25.850	.000	7.000
22.	17	31.960	.000	7.000
23.	18	17.520	.000	10.750
24.	19	19.740	.000	10.750
25.	20	23.630	.000	10.750
26.	21	25.850	.000	10.750
27.	22	31.960	.000	10.750
28.	23	38.070	.000	10.750
29.	24	19.740	.000	14.000
30.	25	23.630	.000	14.000
31.	26	25.850	.000	14.000
32.	27	31.960	.000	14.000
33.	28	38.070	.000	14.000
34.	29	43.370	.000	14.000
35.	30	.000	.000	.000

36. MEMBER INCIDENCES

37.	1	1	6
38.	2	2	7
39.	3	3	8
40.	4	4	9
41.	5	5	10

PASO CARRETERA V 194

42.	6	7	12
43.	7	8	13

-- PAGE NO. 2

44.	8	9	14
45.	9	10	15
46.	10	11	16
47.	11	13	18
48.	12	14	19
49.	13	15	20
50.	14	16	21
51.	15	17	22
52.	16	19	24
53.	17	20	25
54.	18	21	26
55.	19	22	27
56.	20	23	28
57.	21	6	7
58.	22	7	8
59.	23	8	9
60.	24	9	10
61.	25	10	11
62.	26	12	13
63.	27	13	14
64.	28	14	15
65.	29	15	16
66.	30	16	17
67.	31	18	19
68.	32	19	20
69.	33	20	21
70.	34	21	22
71.	35	22	23
72.	36	1	2
73.	37	2	3
74.	38	3	4
75.	39	4	5
76.	40	5	11
77.	41	25	26
78.	42	26	27
79.	43	27	28
80.	44	28	29
81.	45	1	30
82.	46	6	30
83.	47	18	24
84.	48	24	25
85.	49	23	29

86. MEMBER PROPERTY AMERICAN

87. 21 TO 25 31 TO 35 PRI AX 2.045 IX .365 IZ .48
 88. 26 TO 30 PRI AX 2.123 IX .365 IZ .491
 89. 36 TO 38 41 TO 45 PRI AX .536 IX .01 IZ .005
 90. 1 20 PRI AX 1.883 IX .034 IZ .017
 91. 2 19 PRI AX 2.016 IX .037 IZ .018
 92. 3 18 PRI AX 1.37445 IX .025 IZ .0125
 93. 4 5 16 17 PRI AX 1.0082 IX .01830 IZ .0091
 94. 6 15 PRI AX 2.016 IX 2.027 IZ .409
 95. 7 10 11 14 PRI AX 1.3745 IX 1.382 IZ .279
 96. 8 9 12 13 PRI AX 1.0082 IX 1.014 IZ .2047
 97. 39 40 47 48 PRI AX 1.0082 IX .009 IZ .0045

PASO CARRETERA V 194

98. 46 49 PRI AX 1.883 IX .017 IZ .0085
 99. CONSTANT
 100. E 3E6 MEMB 1 TO 49
 101. DENSITY 2.5 MEMB 6 TO 15 36 TO 38 41 TO 45
 102. DENSITY 1.125 MEMB 1 TO 5 16 TO 20
 103. DENSITY 1.085 MEMB 21 TO 25 31 TO 35
 104. DENSITY 1.043 MEMB 26 TO 30

-- PAGE NO. 3

105. DENSITY 0.000 MEMB 39 40 46 TO 49
 106. SUPPORT
 107. 11 12 17 18 PINNED
 108. 6 23 FIXED BUT MX MZ
 109. DEFINE TIME HISTORY
 110. TYPE 1 FORCE
 111. READ VEXT194G.PRN
 112. TYPE 2 FORCE
 113. READ VEXT194P.PRN
 114. TYPE 3 FORCE
 115. READ VCEN388G.PRN
 116. TYPE 4 FORCE
 117. READ VCEN388P.PRN
 118. ARRIVAL TIME
 119. 0.0000
 120. 0.1134
 121. 0.2268
 122. 0.2680
 123. 0.3401
 124. 0.3813
 125. 0.0000
 126. 0.1134
 127. 0.2268
 128. 0.2680
 129. 0.3401
 130. 0.3813
 131. 0.0000
 132. 0.1134
 133. 0.2268
 134. 0.2680
 135. 0.3401
 136. 0.3813
 137. CUT OFF MODE SHAPE 20
 138. LOAD 1 ESTATICA
 139. MEMBER LOAD
 140. 22 CON GY -10. 2.665
 141. 22 CON GY -10. 5.665
 142. 28 CON GY -20. 0.445
 143. 28 CON GY -20. 3.445
 144. 34 CON GY -10. .445
 145. 34 CON GY -10. 3.445
 146. LOAD 2 DINAMICA
 147. SELFWEIGHT Y -1.
 148. MEMBER LOAD
 149. 21 TO 25 UNI GY -3.425
 150. 26 TO 30 UNI GY -6.85
 151. 31 TO 35 UNI GY -3.425
 152. 36 TO 38 41 TO 45 UNI GY -.375
 153. TIME LOAD

PASO CARRETERA V 194

-- PAGE NO. 4

154. 6 FY 1 1
 155. 7 FY 1 2
 156. 8 FY 1 3
 157. 9 FY 2 4
 158. 10 FY 1 5
 159. 11 FY 2 6
 160. 12 FY 3 7
 161. 13 FY 3 8
 162. 14 FY 4 9
 163. 15 FY 3 10
 164. 16 FY 4 11
 165. 17 FY 3 12

166. 18 FY 2 13
 167. 19 FY 2 14
 168. 20 FY 1 15
 169. 21 FY 2 16
 170. 22 FY 1 17
 171. 23 FY 3 18
 172. PERFORM ANALYSIS

PROBLEM STATISTICS

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 30/ 49/ 6
 ORIGINAL/FINAL BAND-WIDTH = 29/ 5
 TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 78
 SIZE OF STIFFNESS MATRIX = 1248 DOUBLE PREC. WORDS
 REQD/AVAIL. DISK SPACE = 12.11/ 1514.6 MB, EXMEM = 1964.3 MB

++ Processing Element Stiffness Matrix. 16:32:39
 ++ Processing Global Stiffness Matrix. 16:32:39
 ++ Processing Triangular Factorization. 16:32:39
 ++ Calculating Joint Displacements. 16:32:40
 ++ Calculating Eigensolution. 16:32:40

PASO CARRETERA V 194

-- PAGE NO. 5

CALCULATED FREQUENCIES FOR LOAD CASE 2

MODE	FREQUENCY (CYCLES/SEC)	PERIOD (SEC)
1	5.758	.17366
2	5.758	.17366
3	16.843	.05937
4	17.757	.05632
5	18.183	.05500
6	18.959	.05274
7	19.187	.05212
8	19.570	.05110
9	23.113	.04327
10	30.405	.03289
11	34.691	.02883
12	34.774	.02876
13	42.478	.02354
14	43.976	.02274
15	45.167	.02214
16	45.237	.02211
17	56.246	.01778
18	57.454	.01741
19	62.325	.01604
20	81.596	.01226

++ Performing Time History Analysis. 16:32:40
 ++ Calculating Member Forces. 16:33:18

173. LOAD LIST ALL
174. PRINT JOINT DISPLACEMENTS ALL

PASO CARRETERA V 194

-- PAGE NO. 6

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE							
JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	.0000	.0001	.0000	.0000	.0000	.0000
	2	.0000	.0072	.0000	.0000	.0000	.0000
2	1	.0000	-.0039	.0000	.0000	.0000	.0000
	2	.0000	-.0362	.0000	.0000	.0000	-.0001
3	1	.0000	-.0164	.0000	.0000	.0000	.0000
	2	.0000	-.0747	.0000	.0000	.0000	-.0001
4	1	.0000	-.0173	.0000	.0000	.0000	.0000
	2	.0000	-.0583	.0000	.0000	.0000	.0001
5	1	.0000	-.0095	.0000	.0000	.0000	.0000
	2	.0000	-.0248	.0000	.0000	.0000	.0001
6	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0000
7	1	.0000	-.0037	.0000	.0000	.0000	.0000
	2	.0000	-.0111	.0000	.0000	.0000	.0000
8	1	.0000	-.0165	.0000	.0000	.0000	.0000
	2	.0000	-.0326	.0000	.0000	.0000	.0000
9	1	.0000	-.0175	.0000	.0000	.0000	.0000
	2	.0000	-.0354	.0000	.0000	.0000	.0000
10	1	.0000	-.0097	.0000	.0000	.0000	.0000
	2	.0000	-.0190	.0000	.0000	.0000	.0001
11	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0001
12	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0000
13	1	.0000	-.0112	.0000	.0000	.0000	.0000
	2	.0000	-.0266	.0000	.0000	.0000	.0000
14	1	.0000	-.0173	.0000	.0000	.0000	.0000
	2	.0000	-.0341	.0000	.0000	.0000	.0000
15	1	.0000	-.0173	.0000	.0000	.0000	.0000
	2	.0000	-.0313	.0000	.0000	.0000	.0000
16	1	.0000	-.0112	.0000	.0000	.0000	.0000
	2	.0000	-.0243	.0000	.0000	.0000	.0001
17	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0000
18	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	-.0001
19	1	.0000	-.0097	.0000	.0000	.0000	.0000
	2	.0000	-.0203	.0000	.0000	.0000	-.0001
20	1	.0000	-.0175	.0000	.0000	.0000	.0000
	2	.0000	-.0354	.0000	.0000	.0000	.0000
21	1	.0000	-.0165	.0000	.0000	.0000	.0000
	2	.0000	-.0324	.0000	.0000	.0000	.0000
22	1	.0000	-.0037	.0000	.0000	.0000	.0000
	2	.0000	-.0101	.0000	.0000	.0000	.0000
23	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0000
24	1	.0000	-.0095	.0000	.0000	.0000	.0000
	2	.0000	-.0275	.0000	.0000	.0000	-.0001

PASO CARRETERA V 194

-- PAGE NO. 7

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
25	1	.0000	-.0173	.0000	.0000	.0000	.0000
	2	.0000	-.0604	.0000	.0000	.0000	-.0001
26	1	.0000	-.0164	.0000	.0000	.0000	.0000
	2	.0000	-.0696	.0000	.0000	.0000	.0001
27	1	.0000	-.0039	.0000	.0000	.0000	.0000
	2	.0000	-.0225	.0000	.0000	.0000	.0001
28	1	.0000	.0001	.0000	.0000	.0000	.0000
	2	.0000	-.0056	.0000	.0000	.0000	.0000
29	1	.0000	-.0006	.0000	.0000	.0000	.0000
	2	.0000	.0193	.0000	.0000	.0000	.0001
30	1	.0000	-.0006	.0000	.0000	.0000	.0000
	2	.0000	.0176	.0000	.0000	.0000	.0000

***** END OF LATEST ANALYSIS RESULT *****

175. PRINT SUPPORT REACTIONS

PASO CARRETERA V 194

-- PAGE NO. 8

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
11	1	.00	33.19	.00	-40.05	.00	.00
	2	.00	74.38	.00	86.36	.00	.00
12	1	.00	8.56	.00	19.37	.00	.00
	2	.00	27.14	.00	-58.12	.00	.00
17	1	.00	8.56	.00	-19.37	.00	.00
	2	.00	23.33	.00	52.83	.00	.00
18	1	.00	33.19	.00	40.05	.00	.00
	2	.00	83.62	.00	-94.52	.00	.00
6	1	.00	-1.75	.00	-.02	.00	.00
	2	.00	2.68	.00	1.69	.00	.00
23	1	.00	-1.75	.00	.02	.00	.00
	2	.00	-2.14	.00	1.24	.00	.00

***** END OF LATEST ANALYSIS RESULT *****

176. PRINT ALL

PASO CARRETERA V 194

-- PAGE NO. 9


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*****
*
*      S T A A D - III
*      Revision 22.3
*      Proprietary Program of
*      Research Engineers, Inc.
*      Date=   OCT 29, 1998
*      Time=   16:16:42
*
*      USER ID: EUROESTUDIOS,S.A.
*****

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1. STAAD PLANE PASO CARRETERA V 259
2. INPUT WIDTH 79
3. *
4. UNIT METER MTON
5. JOINT COORDINATES
6.   1      5.300      .000      .000
7.   2      11.410     .000      .000
8.   3      17.520     .000      .000
9.   4      19.740     .000      .000
10.  5      23.630     .000      .000
11.  6      5.300      .000      3.250
12.  7      11.410     .000      3.250
13.  8      17.520     .000      3.250
14.  9      19.740     .000      3.250
15. 10      23.630     .000      3.250
16. 11      25.850     .000      3.250
17. 12      11.410     .000      7.000
18. 13      17.520     .000      7.000
19. 14      19.740     .000      7.000
20. 15      23.630     .000      7.000
21. 16      25.850     .000      7.000
22. 17      31.960     .000      7.000
23. 18      17.520     .000     10.750
24. 19      19.740     .000     10.750
25. 20      23.630     .000     10.750
26. 21      25.850     .000     10.750
27. 22      31.960     .000     10.750
28. 23      38.070     .000     10.750
29. 24      19.740     .000     14.000
30. 25      23.630     .000     14.000
31. 26      25.850     .000     14.000
32. 27      31.960     .000     14.000
33. 28      38.070     .000     14.000
34. 29      43.370     .000     14.000
35. 30      .000      .000      .000
36. MEMBER INCIDENCES
37.   1      1      6
38.   2      2      7
39.   3      3      8
40.   4      4      9
41.   5      5     10

```

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42.   6      7     12
43.   7      8     13
44.   8      9     14
45.   9     10     15
46.  10     11     16
47.  11     13     18
48.  12     14     19
49.  13     15     20
50.  14     16     21
51.  15     17     22
52.  16     19     24
53.  17     20     25
54.  18     21     26
55.  19     22     27
56.  20     23     28
57.  21      6      7
58.  22      7      8
59.  23      8      9
60.  24      9     10
61.  25     10     11
62.  26     12     13
63.  27     13     14
64.  28     14     15
65.  29     15     16
66.  30     16     17
67.  31     18     19
68.  32     19     20
69.  33     20     21
70.  34     21     22
71.  35     22     23
72.  36      1      2
73.  37      2      3
74.  38      3      4
75.  39      4      5
76.  40      5     11
77.  41     25     26
78.  42     26     27
79.  43     27     28
80.  44     28     29
81.  45      1     30
82.  46      6     30
83.  47     18     24
84.  48     24     25
85.  49     23     29
86. MEMBER PROPERTY AMERICAN
87. 21 TO 25 31 TO 35 PRI AX 2.045 IX .365 IZ .48
88. 26 TO 30 PRI AX 2.123 IX .365 IZ .491
89. 36 TO 38 41 TO 45 PRI AX .536 IX .01 IZ .005
90. 1 20 PRI AX 1.883 IX .034 IZ .017
91. 2 19 PRI AX 2.016 IX .037 IZ .018
92. 3 18 PRI AX 1.37445 IX .025 IZ .0125
93. 4 5 16 17 PRI AX 1.0082 IX .01830 IZ .0091
94. 6 15 PRI AX 2.016 IX 2.027 IZ .409
95. 7 10 11 14 PRI AX 1.3745 IX 1.382 IZ .279
96. 8 9 12 13 PRI AX 1.0082 IX 1.014 IZ .2047
97. 39 40 47 48 PRI AX 1.0082 IX .009 IZ .0045

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108. LOAD 1 CARGADO ENTERO
 109. MEMBER LOAD
 110. 21 CON GY -24.0 2.19
 111. 22 CON GY -2.00 1.68
 112. 23 CON GY -8.00 0.095
 113. 24 CON GY -2.00 3.475
 114. 26 CON GY -4.00 1.68
 115. 27 CON GY -16.00 0.095
 116. 28 CON GY -4.00 3.475
 117. 30 CON GY -24.00 1.89
 118. 26 CON GY -24.00 4.22
 119. 28 CON GY -4.00 1.49
 120. 29 CON GY -16.00 2.125
 121. 30 CON GY -4.00 5.505
 122. 26 CON GY -24.00 0.15
 123. 26 CON GY -6.00 5.75
 124. 28 CON GY -24.00 1.945
 125. 30 CON GY -6.00 1.435
 126. 30 CON GY -24.00 5.96
 127. 32 CON GY -2.00 1.49
 128. 33 CON GY -8.00 2.125
 129. 34 CON GY -2.00 5.505
 130. 35 CON GY -24.00 3.92
 131. LOAD 2 CARGADO MEDIO TABLERO
 132. MEMBER LOAD
 133. 21 CON GY -22.4 2.60
 134. 22 CON GY -2.24 2.08
 135. 23 CON GY -8.96 0.495
 136. 25 CON GY -2.24 3.388
 137. 26 CON GY -3.36 2.08
 138. 27 CON GY -13.44 0.495
 139. 28 CON GY -3.36 3.388
 140. 30 CON GY -22.4 2.29
 141. *LOAD 3 TREN B IPF-75
 142. *MEMBER LOAD
 143. *21 TO 25 31 TO 35 UNI GY -6
 144. *26 TO 30 UNI GY -12
 145. PERFORM ANALYSIS

ORIGINAL BAND-WIDTH = 29
 REDUCED BAND-WIDTH = 5

++ CHECKING LOAD DATA.
 ++ PROCESSING SUPPORT CONDITION.
 ++ PROCESSING AND SETTING UP LOAD VECTOR.

++ PROCESSING ELEMENT STIFFNESS MATRIX. 11:14:58
 ++ PROCESSING GLOBAL STIFFNESS MATRIX. 11:14:58
 ++ PROCESSING TRIANGULAR FACTORIZATION. 11:14:58
 ++ CALCULATING JOINT DISPLACEMENTS. 11:14:58
 ++ CALCULATING ELEMENT FORCES. 11:14:58

146. LOAD LIST ALL
 147. PRINT JOINT DISPLACEMENTS ALL

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = FLOOR

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	.00000	-.07769	.00000	-.00024	.00000	-.00019
	2	.00000	-.06181	.00000	-.00019	.00000	-.00016
2	1	.00000	-.16511	.00000	-.00020	.00000	-.00008
	2	.00000	-.12974	.00000	-.00017	.00000	-.00005
3	1	.00000	-.13679	.00000	-.00004	.00000	.00010
	2	.00000	-.10437	.00000	-.00009	.00000	.00008
4	1	.00000	-.10184	.00000	.00002	.00000	.00019
	2	.00000	-.08052	.00000	-.00006	.00000	.00012
5	1	.00000	.00029	.00000	.00011	.00000	.00026
	2	.00000	-.02179	.00000	-.00001	.00000	.00014
6	1	.00000	.00000	.00000	-.00024	.00000	-.00020
	2	.00000	.00000	.00000	-.00019	.00000	-.00017
7	1	.00000	-.09464	.00000	-.00024	.00000	-.00011
	2	.00000	-.07286	.00000	-.00019	.00000	-.00006
8	1	.00000	-.12168	.00000	-.00006	.00000	.00002
	2	.00000	-.07567	.00000	-.00009	.00000	.00004
9	1	.00000	-.10789	.00000	.00001	.00000	.00010
	2	.00000	-.06235	.00000	-.00006	.00000	.00008
10	1	.00000	-.04308	.00000	.00017	.00000	.00019
	2	.00000	-.02234	.00000	.00002	.00000	.00010
11	1	.00000	.00000	.00000	.00024	.00000	.00018
	2	.00000	.00000	.00000	.00006	.00000	.00009
12	1	.00000	.00000	.00000	-.00025	.00000	-.00015
	2	.00000	.00000	.00000	-.00019	.00000	-.00008
13	1	.00000	-.08497	.00000	-.00016	.00000	-.00008
	2	.00000	-.03869	.00000	-.00010	.00000	-.00001
14	1	.00000	-.09902	.00000	-.00009	.00000	-.00005
	2	.00000	-.03831	.00000	-.00007	.00000	.00002
15	1	.00000	-.09923	.00000	.00009	.00000	.00005
	2	.00000	-.02725	.00000	-.00001	.00000	.00004
16	1	.00000	-.08513	.00000	.00016	.00000	.00008
	2	.00000	-.01962	.00000	.00002	.00000	.00003
17	1	.00000	.00000	.00000	.00025	.00000	.00015
	2	.00000	.00000	.00000	.00002	.00000	.00003
18	1	.00000	.00000	.00000	-.00024	.00000	-.00018
	2	.00000	.00000	.00000	-.00010	.00000	-.00003
19	1	.00000	-.04322	.00000	-.00017	.00000	-.00019
	2	.00000	-.00707	.00000	-.00008	.00000	-.00003
20	1	.00000	-.10840	.00000	-.00001	.00000	-.00010
	2	.00000	-.01608	.00000	-.00004	.00000	-.00001
21	1	.00000	-.12219	.00000	.00006	.00000	-.00002
	2	.00000	-.01611	.00000	-.00003	.00000	.00001
22	1	.00000	-.09532	.00000	.00024	.00000	.00011
	2	.00000	-.00704	.00000	.00001	.00000	.00002
23	1	.00000	.00000	.00000	.00024	.00000	.00020
	2	.00000	.00000	.00000	.00001	.00000	.00001
24	1	.00000	-.00013	.00000	-.00011	.00000	-.00026
	2	.00000	.01707	.00000	-.00007	.00000	-.00005

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = FLOOR

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
25	1	.00000	-.10261	.00000	-.00002	.00000	-.00019
	2	.00000	-.00139	.00000	-.00005	.00000	-.00003
26	1	.00000	-.13768	.00000	.00004	.00000	-.00010
	2	.00000	-.00658	.00000	-.00003	.00000	-.00001
27	1	.00000	-.16632	.00000	.00020	.00000	.00008
	2	.00000	-.01048	.00000	.00001	.00000	.00001
28	1	.00000	-.07829	.00000	.00024	.00000	.00019
	2	.00000	-.00466	.00000	.00001	.00000	.00001
29	1	.00000	.02546	.00000	.00024	.00000	.00020
	2	.00000	-.00104	.00000	.00001	.00000	.00001
30	1	.00000	.02515	.00000	-.00024	.00000	-.00019
	2	.00000	.02576	.00000	-.00019	.00000	-.00017

***** END OF LATEST ANALYSIS RESULT *****

148. PRINT SUPPORT REACTIONS

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = FLOOR

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
6	1	.00	16.39	.00	.00	.00	.00
	2	.00	15.89	.00	.00	.00	.00
11	1	.00	59.02	.00	.00	.00	.00
	2	.00	29.73	.00	.00	.00	.00
12	1	.00	49.80	.00	.00	.00	.00
	2	.00	15.27	.00	.00	.00	.00
17	1	.00	51.39	.00	.00	.00	.00
	2	.00	7.73	.00	.00	.00	.00
18	1	.00	58.87	.00	.00	.00	.00
	2	.00	10.92	.00	.00	.00	.00
23	1	.00	16.54	.00	.00	.00	.00
	2	.00	-1.14	.00	.00	.00	.00

***** END OF LATEST ANALYSIS RESULT *****

149. PRINT MAXFORCE ENVELOPE ALL

98. 46 49 PRI AX 1.883 IX .017 IZ .0085
 99. CONSTANT
 100. E 3E6 MEMB 1 TO 49
 101. DENSITY 2.5 MEMB 6 TO 15 36 TO 38 41 TO 45
 102. DENSITY 1.125 MEMB 1 TO 5 16 TO 20
 103. DENSITY 1.085 MEMB 21 TO 25 31 TO 35
 104. DENSITY 1.043 MEMB 26 TO 30
 105. DENSITY 0.000 MEMB 39 40 46 TO 49
 106. SUPPORT
 107. 11 12 17 18 PINNED
 108. 6 23 FIXED BUT MX MZ
 109. DEFINE TIME HISTORY
 110. TYPE 1 FORCE
 111. READ VEXT259G.PRN
 112. TYPE 2 FORCE
 113. READ VEXT259P.PRN
 114. TYPE 3 FORCE
 115. READ VCEN259G.PRN
 116. TYPE 4 FORCE
 117. READ VCEN259P.PRN
 118. ARRIVAL TIME
 119. 0.0000
 120. 0.0849
 121. 0.1699
 122. 0.2007
 123. 0.2548
 124. 0.2856
 125. 0.0000
 126. 0.0849
 127. 0.1699
 128. 0.2007
 129. 0.2548
 130. 0.2856
 131. 0.0000
 132. 0.0849
 133. 0.1699
 134. 0.2007
 135. 0.2548
 136. 0.2856
 137. CUT OFF MODE SHAPE 20
 138. LOAD 1 ESTATICA
 139. MEMBER LOAD
 140. 22 CON GY -10. 2.665
 141. 22 CON GY -10. 5.665
 142. 28 CON GY -20. 0.445
 143. 28 CON GY -20. 3.445
 144. 34 CON GY -10. .445
 145. 34 CON GY -10. 3.445
 146. LOAD 2 DINAMICA
 147. SELFWEIGHT Y -1.
 148. MEMBER LOAD
 149. 21 TO 25 UNI GY -3.425
 150. 26 TO 30 UNI GY -6.85
 151. 31 TO 35 UNI GY -3.425
 152. 36 TO 38 41 TO 45 UNI GY -.375
 153. TIME LOAD

154. 6 FY 1 1
 155. 7 FY 1 2
 156. 8 FY 1 3
 157. 9 FY 2 4
 158. 10 FY 1 5
 159. 11 FY 2 6
 160. 12 FY 3 7
 161. 13 FY 3 8
 162. 14 FY 4 9
 163. 15 FY 3 10
 164. 16 FY 4 11
 165. 17 FY 3 12
 166. 18 FY 2 13
 167. 19 FY 2 14
 168. 20 FY 1 15
 169. 21 FY 2 16
 170. 22 FY 1 17
 171. 23 FY 3 18
 172. PERFORM ANALYSIS

PROBLEM STATISTICS

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 30/ 49/ 6
 ORIGINAL/FINAL BAND-WIDTH = 29/ 5
 TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 78
 SIZE OF STIFFNESS MATRIX = 1248 DOUBLE PREC. WORDS
 REQD/AVAIL. DISK SPACE = 12.11/ 1523.0 MB, EXMEM = 1964.3 MB

++ Processing Element Stiffness Matrix. 16:16:43
 ++ Processing Global Stiffness Matrix. 16:16:43
 ++ Processing Triangular Factorization. 16:16:43
 ++ Calculating Joint Displacements. 16:16:43
 ++ Calculating Eigensolution. 16:16:43

CALCULATED FREQUENCIES FOR LOAD CASE 2

MODE	FREQUENCY (CYCLES/SEC)	PERIOD (SEC)
1	5.758	.17366
2	5.758	.17366
3	16.843	.05937
4	17.757	.05632
5	18.183	.05500
6	18.959	.05274
7	19.187	.05212
8	19.570	.05110
9	23.113	.04327
10	30.405	.03289
11	34.691	.02883
12	34.774	.02876
13	42.478	.02354
14	43.976	.02274
15	45.167	.02214
16	45.237	.02211
17	56.246	.01778
18	57.454	.01741
19	62.325	.01604
20	81.596	.01226

++ Performing Time History Analysis.
 ++ Calculating Member Forces.

16:16:44
 16:17:13

173. LOAD LIST ALL
 174. PRINT JOINT DISPLACEMENTS ALL

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	.0000	.0001	.0000	.0000	.0000	.0000
	2	.0000	.0058	.0000	.0000	.0000	.0000
2	1	.0000	-.0039	.0000	.0000	.0000	.0000
	2	.0000	-.0219	.0000	.0000	.0000	-.0001
3	1	.0000	-.0164	.0000	.0000	.0000	.0000
	2	.0000	-.0617	.0000	.0000	.0000	-.0001
4	1	.0000	-.0173	.0000	.0000	.0000	.0000
	2	.0000	-.0518	.0000	.0000	.0000	-.0001
5	1	.0000	-.0095	.0000	.0000	.0000	.0000
	2	.0000	-.0272	.0000	.0000	.0000	.0001
6	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0000
7	1	.0000	-.0037	.0000	.0000	.0000	.0000
	2	.0000	-.0122	.0000	.0000	.0000	.0000
8	1	.0000	-.0165	.0000	.0000	.0000	.0000
	2	.0000	-.0343	.0000	.0000	.0000	.0000
9	1	.0000	-.0175	.0000	.0000	.0000	.0000
	2	.0000	-.0391	.0000	.0000	.0000	.0000
10	1	.0000	-.0097	.0000	.0000	.0000	.0000
	2	.0000	-.0216	.0000	.0000	.0000	.0001
11	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0001
12	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0000
13	1	.0000	-.0112	.0000	.0000	.0000	.0000
	2	.0000	-.0267	.0000	.0000	.0000	-.0001
14	1	.0000	-.0173	.0000	.0000	.0000	.0000
	2	.0000	-.0329	.0000	.0000	.0000	.0000
15	1	.0000	-.0173	.0000	.0000	.0000	.0000
	2	.0000	-.0314	.0000	.0000	.0000	.0000
16	1	.0000	-.0112	.0000	.0000	.0000	.0000
	2	.0000	-.0211	.0000	.0000	.0000	.0001
17	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0000
18	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	-.0001
19	1	.0000	-.0097	.0000	.0000	.0000	.0000
	2	.0000	-.0191	.0000	.0000	.0000	-.0001
20	1	.0000	-.0175	.0000	.0000	.0000	.0000
	2	.0000	-.0320	.0000	.0000	.0000	.0000
21	1	.0000	-.0165	.0000	.0000	.0000	.0000
	2	.0000	-.0271	.0000	.0000	.0000	.0000
22	1	.0000	-.0037	.0000	.0000	.0000	.0000
	2	.0000	-.0119	.0000	.0000	.0000	.0000
23	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0000
24	1	.0000	-.0095	.0000	.0000	.0000	.0000
	2	.0000	-.0269	.0000	.0000	.0000	-.0001

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
25	1	.0000	-.0173	.0000	.0000	.0000	.0000
	2	.0000	-.0476	.0000	.0000	.0000	.0001
26	1	.0000	-.0164	.0000	.0000	.0000	.0000
	2	.0000	.0641	.0000	.0000	.0000	.0001
27	1	.0000	-.0039	.0000	.0000	.0000	.0000
	2	.0000	.0142	.0000	.0000	.0000	-.0001
28	1	.0000	.0001	.0000	.0000	.0000	.0000
	2	.0000	.0039	.0000	.0000	.0000	.0000
29	1	.0000	-.0006	.0000	.0000	.0000	.0000
	2	.0000	.0125	.0000	.0000	.0000	.0000
30	1	.0000	-.0006	.0000	.0000	.0000	.0000
	2	.0000	.0121	.0000	.0000	.0000	.0000

***** END OF LATEST ANALYSIS RESULT *****

175. PRINT SUPPORT REACTIONS

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
11	1	.00	33.19	.00	-40.05	.00	.00
	2	.00	69.44	.00	75.73	.00	.00
12	1	.00	8.56	.00	19.37	.00	.00
	2	.00	29.59	.00	-63.70	.00	.00
17	1	.00	8.56	.00	-19.37	.00	.00
	2	.00	29.06	.00	62.07	.00	.00
18	1	.00	33.19	.00	40.05	.00	.00
	2	.00	82.15	.00	-95.83	.00	.00
6	1	.00	-1.75	.00	-.02	.00	.00
	2	.00	-3.96	.00	1.43	.00	.00
23	1	.00	-1.75	.00	.02	.00	.00
	2	.00	-3.42	.00	-1.40	.00	.00

***** END OF LATEST ANALYSIS RESULT *****

176. PRINT ALL


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*****
*
*      S T A A D - III
*      Revision 22.3
*      Proprietary Program of
*      Research Engineers, Inc.
*      Date=   OCT 29, 1998
*      Time=   13:22:35
*
*      USER ID: EUROESTUDIOS,S.A.
*****

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1. STAAD PLANE PASO CARRETERA V 388
2. INPUT WIDTH 79
3. *
4. UNIT METER MTON
5. JOINT COORDINATES
6.   1      5.300      .000      .000
7.   2      11.410     .000      .000
8.   3      17.520     .000      .000
9.   4      19.740     .000      .000
10.  5      23.630     .000      .000
11.  6      5.300      .000      3.250
12.  7      11.410     .000      3.250
13.  8      17.520     .000      3.250
14.  9      19.740     .000      3.250
15. 10      23.630     .000      3.250
16. 11      25.850     .000      3.250
17. 12      11.410     .000      7.000
18. 13      17.520     .000      7.000
19. 14      19.740     .000      7.000
20. 15      23.630     .000      7.000
21. 16      25.850     .000      7.000
22. 17      31.960     .000      7.000
23. 18      17.520     .000      10.750
24. 19      19.740     .000      10.750
25. 20      23.630     .000      10.750
26. 21      25.850     .000      10.750
27. 22      31.960     .000      10.750
28. 23      38.070     .000      10.750
29. 24      19.740     .000      14.000
30. 25      23.630     .000      14.000
31. 26      25.850     .000      14.000
32. 27      31.960     .000      14.000
33. 28      38.070     .000      14.000
34. 29      43.370     .000      14.000
35. 30      .000       .000      .000
36. MEMBER INCIDENCES
37.   1      1      6
38.   2      2      7
39.   3      3      8
40.   4      4      9
41.   5      5     10

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42.   6      7     12
43.   7      8     13
44.   8      9     14
45.   9     10     15
46.  10     11     16
47.  11     13     18
48.  12     14     19
49.  13     15     20
50.  14     16     21
51.  15     17     22
52.  16     19     24
53.  17     20     25
54.  18     21     26
55.  19     22     27
56.  20     23     28
57.  21      6      7
58.  22      7      8
59.  23      8      9
60.  24      9     10
61.  25     10     11
62.  26     12     13
63.  27     13     14
64.  28     14     15
65.  29     15     16
66.  30     16     17
67.  31     18     19
68.  32     19     20
69.  33     20     21
70.  34     21     22
71.  35     22     23
72.  36      1      2
73.  37      2      3
74.  38      3      4
75.  39      4      5
76.  40      5     11
77.  41     25     26
78.  42     26     27
79.  43     27     28
80.  44     28     29
81.  45      1     30
82.  46      6     30
83.  47     18     24
84.  48     24     25
85.  49     23     29
86. MEMBER PROPERTY AMERICAN
87. 21 TO 25 31 TO 35 PRI AX 2.045 IX .365 IZ .48
88. 26 TO 30 PRI AX 2.123 IX .365 IZ .491
89. 36 TO 38 41 TO 45 PRI AX .536 IX .01 IZ .005
90. 1 20 PRI AX 1.883 IX .034 IZ .017
91. 2 19 PRI AX 2.016 IX .037 IZ .018
92. 3 18 PRI AX 1.37445 IX .025 IZ .0125
93. 4 5 16 17 PRI AX 1.0082 IX .01830 IZ .0091
94. 6 15 PRI AX 2.016 IX 2.027 IZ .409
95. 7 10 11 14 PRI AX 1.3745 IX 1.382 IZ .279
96. 8 9 12 13 PRI AX 1.0082 IX 1.014 IZ .2047
97. 39 40 47 48 PRI AX 1.0082 IX .009 IZ .0045

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98. 46 49 PRI AX 1.883 IX .017 IZ .0085
 99. CONSTANT
 100. E 3E6 MEMB 1 TO 49
 101. DENSITY 2.5 MEMB 6 TO 15 36 TO 38 41 TO 45
 102. DENSITY 1.125 MEMB 1 TO 5 16 TO 20
 103. DENSITY 1.085 MEMB 21 TO 25 31 TO 35
 104. DENSITY 1.043 MEMB 26 TO 30
 105. DENSITY 0.000 MEMB 39 40 46 TO 49
 106. SUPPORT
 107. 11 12 17 18 PINNED
 108. 6 23 FIXED BUT MX MZ
 109. DEFINE TIME HISTORY
 110. TYPE 1 FORCE
 111. READ VEXT388G.PRN
 112. TYPE 2 FORCE
 113. READ VEXT388P.PRN
 114. TYPE 3 FORCE
 115. READ VCEN388G.PRN
 116. TYPE 4 FORCE
 117. READ VCEN388P.PRN
 118. ARRIVAL TIME
 119. 0.0000
 120. 0.0567
 121. 0.1134
 122. 0.1340
 123. 0.1701
 124. 0.1907
 125. 0.0000
 126. 0.0567
 127. 0.1134
 128. 0.1340
 129. 0.1701
 130. 0.1907
 131. 0.0000
 132. 0.0567
 133. 0.1134
 134. 0.1340
 135. 0.1701
 136. 0.1907
 137. CUT OFF MODE SHAPE 20
 138. LOAD 1 ESTATICA
 139. MEMBER LOAD
 140. 22 CON GY -10. 2.665
 141. 22 CON GY -10. 5.665
 142. 28 CON GY -20. 0.445
 143. 28 CON GY -20. 3.445
 144. 34 CON GY -10. .445
 145. 34 CON GY -10. 3.445
 146. LOAD 2 DINAMICA
 147. SELFWEIGHT Y -1.
 148. MEMBER LOAD
 149. 21 TO 25 UNI GY -3.425
 150. 26 TO 30 UNI GY -6.85
 151. 31 TO 35 UNI GY -3.425
 152. 36 TO 38 41 TO 45 UNI GY -.375
 153. TIME LOAD

154. 6 FY 1 1
 155. 7 FY 1 2
 156. 8 FY 1 3
 157. 9 FY 2 4
 158. 10 FY 1 5
 159. 11 FY 2 6
 160. 12 FY 3 7
 161. 13 FY 3 8
 162. 14 FY 4 9
 163. 15 FY 3 10
 164. 16 FY 4 11
 165. 17 FY 3 12
 166. 18 FY 2 13
 167. 19 FY 2 14
 168. 20 FY 1 15
 169. 21 FY 2 16
 170. 22 FY 1 17
 171. 23 FY 3 18
 172. PERFORM ANALYSIS

PROBLEM STATISTICS

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 30/ 49/ 6
 ORIGINAL/FINAL BAND-WIDTH = 29/ 5
 TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 78
 SIZE OF STIFFNESS MATRIX = 1248 DOUBLE PREC. WORDS
 REQRD/AVAIL. DISK SPACE = 12.11/ 1498.9 MB, EXMEM = 1959.9 MB

++ Processing Element Stiffness Matrix. 13:22:36
 ++ Processing Global Stiffness Matrix. 13:22:36
 ++ Processing Triangular Factorization. 13:22:36
 ++ Calculating Joint Displacements. 13:22:36
 ++ Calculating Eigensolution. 13:22:36

CALCULATED FREQUENCIES FOR LOAD CASE 2

MODE	FREQUENCY (CYCLES/SEC)	PERIOD (SEC)
1	5.758	.17366
2	5.758	.17366
3	16.843	.05937
4	17.757	.05632
5	18.183	.05500
6	18.959	.05274
7	19.187	.05212
8	19.570	.05110
9	23.113	.04327
10	30.405	.03289
11	34.691	.02883
12	34.774	.02876
13	42.478	.02354
14	43.976	.02274
15	45.167	.02214
16	45.237	.02211
17	56.246	.01778
18	57.454	.01741
19	62.325	.01604
20	81.596	.01226

++ Performing Time History Analysis.
 ++ Calculating Member Forces.

13:22:37
 13:22:57

173. LOAD LIST ALL
 174. PRINT JOINT DISPLACEMENTS ALL

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	.0000	.0001	.0000	.0000	.0000	.0000
	2	.0000	.0051	.0000	.0000	.0000	.0000
2	1	.0000	-.0039	.0000	.0000	.0000	.0000
	2	.0000	-.0438	.0000	.0000	.0000	-.0001
3	1	.0000	-.0164	.0000	.0000	.0000	.0000
	2	.0000	-.1158	.0000	.0000	.0000	-.0001
4	1	.0000	-.0173	.0000	.0000	.0000	.0000
	2	.0000	-.0981	.0000	.0000	.0000	-.0002
5	1	.0000	-.0095	.0000	.0000	.0000	.0000
	2	.0000	-.0384	.0000	.0000	.0000	.0002
6	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0000
7	1	.0000	-.0037	.0000	.0000	.0000	.0000
	2	.0000	-.0128	.0000	.0000	.0000	.0000
8	1	.0000	-.0165	.0000	.0000	.0000	.0000
	2	.0000	-.0454	.0000	.0000	.0000	-.0001
9	1	.0000	-.0175	.0000	.0000	.0000	.0000
	2	.0000	-.0516	.0000	.0000	.0000	.0000
10	1	.0000	-.0097	.0000	.0000	.0000	.0000
	2	.0000	-.0291	.0000	.0000	.0000	.0001
11	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0001
12	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0000
13	1	.0000	-.0112	.0000	.0000	.0000	.0000
	2	.0000	-.0336	.0000	.0000	.0000	-.0001
14	1	.0000	-.0173	.0000	.0000	.0000	.0000
	2	.0000	-.0446	.0000	.0000	.0000	-.0001
15	1	.0000	-.0173	.0000	.0000	.0000	.0000
	2	.0000	-.0456	.0000	.0000	.0000	.0001
16	1	.0000	-.0112	.0000	.0000	.0000	.0000
	2	.0000	-.0329	.0000	.0000	.0000	.0001
17	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0000
18	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	-.0001
19	1	.0000	-.0097	.0000	.0000	.0000	.0000
	2	.0000	-.0279	.0000	.0000	.0000	-.0001
20	1	.0000	-.0175	.0000	.0000	.0000	.0000
	2	.0000	-.0505	.0000	.0000	.0000	.0000
21	1	.0000	-.0165	.0000	.0000	.0000	.0000
	2	.0000	-.0439	.0000	.0000	.0000	.0001
22	1	.0000	-.0037	.0000	.0000	.0000	.0000
	2	.0000	-.0088	.0000	.0000	.0000	.0000
23	1	.0000	.0000	.0000	.0000	.0000	.0000
	2	.0000	.0000	.0000	.0000	.0000	.0000
24	1	.0000	-.0095	.0000	.0000	.0000	.0000
	2	.0000	-.0368	.0000	.0000	.0000	-.0002

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
25	1	.0000	-.0173	.0000	.0000	.0000	.0000
	2	.0000	-.1012	.0000	.0000	.0000	-.0002
26	1	.0000	-.0164	.0000	.0000	.0000	.0000
	2	.0000	-.1308	.0000	.0000	.0000	.0001
27	1	.0000	-.0039	.0000	.0000	.0000	.0000
	2	.0000	-.0432	.0000	.0000	.0000	.0001
28	1	.0000	.0001	.0000	.0000	.0000	.0000
	2	.0000	-.0081	.0000	.0000	.0000	.0000
29	1	.0000	-.0006	.0000	.0000	.0000	.0000
	2	.0000	.0055	.0000	.0000	.0000	.0000
30	1	.0000	-.0006	.0000	.0000	.0000	.0000
	2	.0000	.0056	.0000	.0000	.0000	.0000

***** END OF LATEST ANALYSIS RESULT *****

175. PRINT SUPPORT REACTIONS

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
11	1	.00	33.19	.00	-40.05	.00	.00
	2	.00	103.33	.00	116.98	.00	.00
12	1	.00	8.56	.00	19.37	.00	.00
	2	.00	40.24	.00	-67.21	.00	.00
17	1	.00	8.56	.00	-19.37	.00	.00
	2	.00	19.68	.00	45.83	.00	.00
18	1	.00	33.19	.00	40.05	.00	.00
	2	.00	106.31	.00	-119.45	.00	.00
6	1	.00	-1.75	.00	-.02	.00	.00
	2	.00	-4.91	.00	1.70	.00	.00
23	1	.00	-1.75	.00	.02	.00	.00
	2	.00	-2.94	.00	2.60	.00	.00

***** END OF LATEST ANALYSIS RESULT *****

176. PRINT ALL

COEFICIENTES DE IMPACTO SEGÚN ANEJO B (EC-1) .TREN 3

PUENTE ESVIADO

	NODO	FLECHA ESTATICA (CM)	FLECHA DINAMICA (CM)			COEFICIENTE IMPACTO		
			194 km/h	259 km/h	388 km/h	194 km/h	259 km/h	388 km/h
c. d. v. Artesa 1	9	-0.02517	-0.0354	-0.0391	-0.0516	1.406	1.553	2.050
c. d. v. Artesa 2	14	-0.02286	-0.0341	-0.0329	-0.0446	1.492	1.439	1.951
c. d. v. Artesa 3	20	-0.02513	-0.0354	-0.032	-0.0505	1.409	1.273	2.010
esquinas obtusas	4	-0.02461	-0.0583	-0.0518	-0.0981	2.369	2.105	3.986
esquinas obtusas	25	-0.02459	-0.0604	-0.0476	-0.1012	2.456	1.936	4.115
esquinas agudas	29	-0.00334	-0.0164	-0.0109	-0.0046	4.910	3.263	1.377
esquinas agudas	30	-0.00221	-0.0157	-0.0117	-0.0053	7.104	5.294	2.398

PUENTE RECTO EQUIVALENTE

	NODO	FLECHA ESTATICA (CM)	FLECHA DINAMICA (CM)			COEFICIENTE IMPACTO		
			194 km/h	259 km/h	388 km/h	194 km/h	259 km/h	388 km/h
c. d. v. Artesa 1	10	-0.4514	-0.2601	-0.4891	-0.7688	0.576	1.084	1.703
c. d. v. Artesa 2	16	-0.4574	-0.2602	-0.4979	-0.7645	0.569	1.089	1.671
c. d. v. Artesa 3	21	-0.4514	-0.2601	-0.4891	-0.7688	0.576	1.084	1.703
esquinas obtusas	1	-0.0058	-0.0683	-0.0756	-0.0913	11.776	13.034	15.741
esquinas obtusas	6	-0.0060	-0.0900	-0.0831	-0.0779	15.000	13.850	12.983
esquinas agudas	25	-0.0058	-0.0683	-0.0756	-0.0913	11.776	13.034	15.741
esquinas agudas	30	-0.0060	-0.0900	-0.0831	-0.0779	15.000	13.850	12.983

PUENTE VIGA EQUIVALENTE

	NODO	FLECHA ESTATICA (CM)	FLECHA DINAMICA (CM)			COEFICIENTE IMPACTO		
			194 km/h	263 km/h	388 km/h	194 km/h	263 km/h	388 km/h
c. d. v.	11	-0.4393	-0.7171	-0.8706	-1.0333	1.632	1.982	2.352

HIPOTESIS DE CALCULO PARA REACCION MAXIMA EN APOYO

1- DIMENSIONAMIENTO SEGUN I.P.F.

1.1- Fuerzas Verticales

- F.P. Reparto vertical en cada viga
- C.H. Llena Reparto vertical en cada viga
- Peso C.H. Reparto por malla empalme
- C.C. 244/m Reparto por malla empalme
- C.C. 244/m Reparto por malla empalme

1.2- Fuerzas Horizontales

- CENTRIFUGA

$$F_c = \frac{v^2}{R} = \frac{17,4^2}{20,15} = 14,556 \text{ t}$$

$$H_c = 17,350 \text{ t} \times (2,1431 + 1,50) \text{ m} = 40,843 \text{ mt}$$

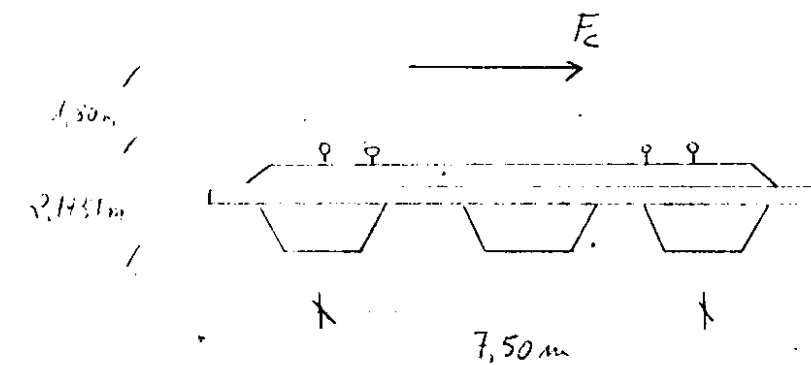
$$\Delta F_{\text{VIGAS EXTERIORES}} = \frac{40,843 \text{ mt}}{1,50 \text{ m}} = \pm 27,229 \text{ t}$$

- FUERZA DE VIENTO

$$F_v = 5 \text{ t}$$

$$H_v = 5 \text{ t} \times 2,1431 \text{ m} = 10,716 \text{ mt}$$

$$\Delta F_{\text{VIGAS EXTERIORES}} = \pm 1,4273 \text{ t}$$



2.- DISEÑONAMIENTO SEGUN ECI-UI

2.1.- FUERZAS VERTICALES

- P.P. Reparto asfalto a cada apoyo
- C.H. Losa Reparto asfalto a cada apoyo
- Resto C.H. Reparto por método empírico $q = 15 \text{ t/m}^2$ $q_1 = 15 \text{ t/m}^2$ $q_2 = 15 \text{ t/m}^2$
- S.C.
 - UIC 71 + S12 (UIC 71 200 kg/l + S12)
 - TREN 3
 - TREN 4

2.2.- FUERZAS HORIZONTALES

- CENTRIFUGA

• UIC 71 120 kg/l $F_c = \frac{W_{UR} \cdot V^2}{127R} = \frac{15 \text{ t/m} \times 20,55 \times \frac{80^2}{127 \times 15,000}} = 1,036 \text{ t}$ " $M_c = 4,084 \text{ mt}$ " $\Delta F = \pm 0,5446 \text{ t}$

• UIC 71 120 kg/l $F_c = \frac{W_{UR} \cdot V^2}{127R} = \frac{15 \text{ t/m} \times 20,55 \times \frac{80^2}{127 \times 15,000}} = 1,036 \text{ t}$ " $M_c = 6,356 \text{ mt}$ " $\Delta F = \pm 0,8475 \text{ t}$

• UIC 71 200 kg/l $F_c = \frac{W_{UR} \cdot V^2}{127R} = \frac{15 \text{ t/m} \times 20,55 \times \frac{80^2}{127 \times 15,000}} = 1,726 \text{ t}$ " $M_c = 12,5124 \text{ mt}$ " $\Delta F = \pm 1,6683 \text{ t}$

• TREND 3 350 kg/l $F_c = \frac{W_{UR} \cdot V^2}{127R} = \frac{15 \text{ t/m} \times 20,55 \times \frac{80^2}{127 \times 15,000}} = 1,726 \text{ t}$ " $M_c = 17,748 \text{ mt}$ " $\Delta F = \pm 2,366 \text{ t}$

TREN 4 $F_c = 4,37 \text{ t}$ " $M_c = 17,246 \text{ mt}$ " $\Delta F = \pm 2,299 \text{ t}$

- F.LA20

• $F_L = 10 \text{ t}$

$M_L = 10 \text{ t} \times 2,1439 = 21,439 \text{ mt}$

• $\Delta F = \pm 2,8585 \text{ t}$

3- EFECTOS DE VIENTO SEGUN IPF Y ECH-010

- Presión básica = $0,197 \text{ t/m}^2$
- Superficie Expuesta = $1,22 \text{ m} \times L (\text{m})$ con sobrecarga $+ 3,50'' + 4,00$
- Punto aplicación $y_0 = 0,6 \times 2,0 = 1,20 \text{ m}$ respecto a cara sup. apoyo
- Punto aplicación con sobrecarga

$$\text{Rancho } y_0 = 0,6 \times (2,0 + 3,5) = 3,3 \text{ m}$$

$$\text{Ech-010 } y_0 = 0,6 \times (2,0 + 4,0) = 3,6 \text{ m}$$

- Enfite sobre el edificio

$$\text{Enfite } = 0,197 \times [(1,22 + 2,50 + 0,50) \times 20,0] = 84,797 \text{ t}$$

$$\text{Enfite } = 84,797 \text{ t} \times 3,33 = 283,1 \text{ m}$$

3.1 IPF

$$F_v = 0,197 \times [(1,22 + 2,50 + 0,50) \times 20,0] = 84,797 \text{ t}$$

$$H_v = 84,797 \text{ t} \times 3,33 = 283,1 \text{ m}$$

$$\Delta F = \pm 10,911 \text{ t}$$

3.2 Ech-010

$$F_v = 0,197 \times [(1,22 + 4,0 + 0,5) \times 20,0] = 26,711 \text{ t}$$

$$H_v = 26,711 \times 3,6 = 96,446 \text{ m}$$

$$\Delta F = \pm 12,86 \text{ t}$$

3.3 Terceros

$$F_v = 0,197 \times [(1,22 + 1,0) \times 20,0] = 11,837 \text{ t} \quad H_v = 11,837 \times 1,80 = 21,307 \text{ m}$$

$$\Delta F = \pm 2,054 \text{ t}$$

4.- FUERZA DE FRENO

4.1- IPP

- Se calcula la fuerza de frenado por eje
- Frenado en P_1 $P_1 = P_2 = 100 \text{ kN}$
- Frenado en P_2 $P_2 = 100 \text{ kN}$
- Frenado en P_3 $P_3 = 100 \text{ kN}$
- Frenado en P_4 $P_4 = 100 \text{ kN}$

4.2- Frenado

En el eje

$$\text{Veh. II} \quad F_{f1} = 100 \times 0.15 = 15 \text{ kN}$$

$$\text{Veh. I} \quad F_{f2} = 100 \times 0.15 = 15 \text{ kN}$$

Arrendador

$$\text{Veh. II} \quad F_{f3} = 100 \times 0.15 = 15 \text{ kN}$$

$$\text{Veh. I} \quad F_{f4} = 100 \times 0.15 = 15 \text{ kN}$$

En el eje de frenado

$$\text{Veh. II} \quad F_{f5} = 100 \times (0.15 + 0.15) = 30 \text{ kN}$$

$$\text{Veh. I} \quad F_{f6} = 100 \text{ kN}$$

$$\text{Veh. II} \quad F_{f7} = 100 \times (0.15 + 0.15) = 30 \text{ kN}$$

$$\text{Veh. I} \quad F_{f8} = 100 \text{ kN}$$

$$\text{HIDRÓLICO PAS. DEMONSTRACION} = F_{f3} + F_{f4} + F_{f5} + F_{f6} + F_{f7} + F_{f8} = 15 + 15 + 15 + 15 + 15 + 15 = 90 \text{ kN} = \underline{\underline{90 \text{ kN}}}$$

En el eje de frenado

5. FUERZA DUEÑA AL RAPIDO

5.1. I.P.F.

TRENA $M_{RAPIDO} = [0,4/m + 0,12 \text{ y/m} + 0,12 \text{ y/m}] \times 0,50 = 0,16 \text{ m}^2/\text{m}$

$$\Delta F = \frac{1,11}{7,50} = \pm 0,148 \text{ t/m}$$

TREDA $M_{RAPIDO} = [0,4 \text{ y/m} + 0,12 \text{ y/m} + 0,12 \text{ y/m}] \times 0,50 = 0,16 \text{ m}^2/\text{m}$

5.2. C.C.T. - C.C.

5.2.1

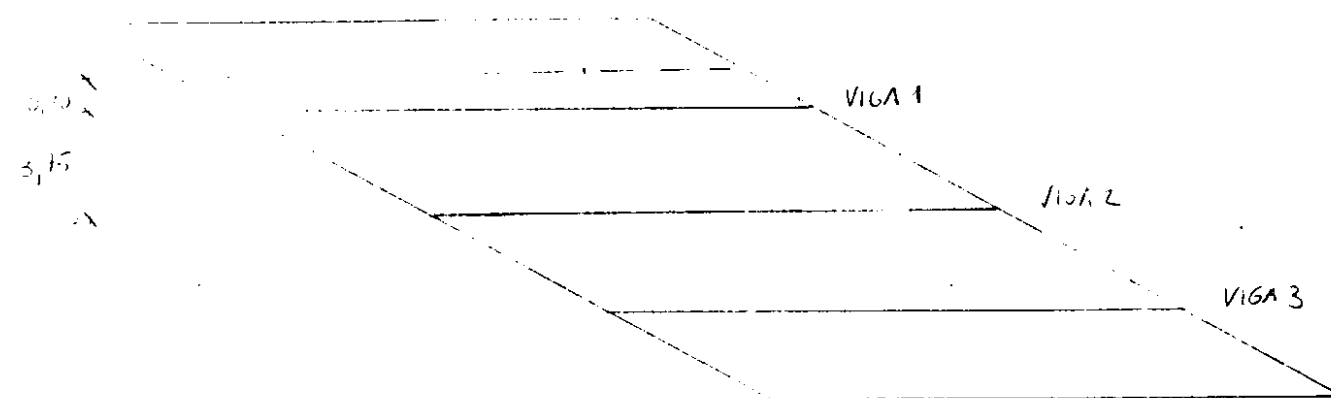
$$M_{RAPIDO} = [0,4 \text{ y/m} + 0,12 \text{ y/m} + 0,12 \text{ y/m}] \times 0,50 = 0,16 \text{ m}^2/\text{m}$$

$$\Delta F = \frac{2,11}{7,50} = \pm 0,281 \text{ t/m}$$

TREDA 3

$$M_{RAPIDO} = [0,4 \text{ y/m} + 0,12 \text{ y/m} + 0,12 \text{ y/m}] \times 0,50 = 0,16 \text{ m}^2/\text{m}$$

$$\Delta F = \frac{0,16}{7,50} = 0,021 \text{ t/m}$$



6.-) HIPOTESIS DE CALCULO PARA RENDIMIENTO DEL CABLE

- Los factores de seguridad son los de las normas aplicables (Apéndice 11, 18)
- La tensión tipo de RENDIMIENTO se define como la tensión que se tiene en el cable
- La tensión máxima se define como la tensión máxima que se tiene en el cable
- El cable se define por sus propiedades físicas y químicas de acuerdo a las especificaciones de la S.C.

$$1.- P.P. + C.P. + S.C. (T.M.P.) + F.L. (V.M.P.) + 0,5 \times 0,5 F_{MAX} + F_{LADO} + F_{RIPADO}$$

$$2.- P.P. + C.P. + S.C. (V.M.P.) + F.L. (V.M.P.) + 0,5 \times 0,5 F_{MAX} + F_{LADO} + F_{RIPADO}$$

$$3.- P.P. + C.P. + S.C. (V.M.P.) + F.L. (V.M.P.) + 0,5 \times 0,5 F_{MAX} + F_{LADO} + F_{RIPADO}$$

$$4.- P.P. + C.P. + S.C. (V.M.P.) + F.L. (V.M.P.) + 0,5 \times 0,5 F_{MAX} + F_{LADO} + F_{RIPADO}$$

La tensión máxima se define como la tensión máxima que se tiene en el cable

$$1.- P.P. + C.P. + S.C. (T.M.P.) + F.L. (V.M.P.) + 0,5 \times 0,5 F_{MAX} + F_{LADO} + F_{RIPADO}$$

$$2.- P.P. + C.P. + S.C. (V.M.P.) + F.L. (V.M.P.) + 0,5 \times 0,5 F_{MAX} + F_{LADO} + F_{RIPADO}$$

$$3.- P.P. + C.P. + S.C. (V.M.P.) + F.L. (V.M.P.) + 0,5 \times 0,5 F_{MAX} + F_{LADO} + F_{RIPADO}$$

$$4.- P.P. + C.P. + S.C. (V.M.P.) + F.L. (V.M.P.) + 0,5 \times 0,5 F_{MAX} + F_{LADO} + F_{RIPADO}$$

La tensión máxima se define como la tensión máxima que se tiene en el cable

HIPOTESIS DE CALCULO PARA REACCION MINIMA EN APOYO

7-) HERRAJES DE ACERO PARA SOSTENIMIENTO DE LA PARRILLA

$$1.- P.P. + C.P. + S.C. (TRONCA) + F.L. (REBAR) + 0.3 \cdot V + F.L.R = P.P. + C.P. + S.C. (TRONCA) \pm 0.4357 \text{ Tm}$$

$$2.- P.P. + C.P. + S.C. (TRONCA) + F.L. (REBAR) + 0.3 \cdot V + F.L.R = P.P. + C.P. + S.C. (TRONCA) \pm 0.6503 \text{ Tm}$$

$$3.- P.P. + C.P. + F.W. (SOSTENIMIENTO) = P.P. + C.P. \pm 0.12 \text{ Tm}$$

8-) CIMENTACIÓN DE LA PARRILLA

$$1.- \text{TRONCA DE ACERO}$$

$$2.- \text{TRONCA DE ACERO (SOSTENIMIENTO) + F.L. (REBAR)}$$

$$3.- \text{TRONCA DE ACERO (SOSTENIMIENTO)}$$

$$4.- \text{TRONCA DE ACERO (SOSTENIMIENTO) + F.L. (REBAR) + 0.3 \cdot V}$$

$$5.- \text{TRONCA DE ACERO (SOSTENIMIENTO) + F.L. (REBAR) + 0.3 \cdot V}$$

$$6.- \text{TRONCA DE ACERO (SOSTENIMIENTO) + F.L. (REBAR) + 0.3 \cdot V}$$

$$7.- \text{TRONCA DE ACERO (SOSTENIMIENTO) + F.L. (REBAR) + 0.3 \cdot V}$$

9-) HERRAJES DE ACERO PARA SOSTENIMIENTO DE LA PARRILLA

91) SOSTENIMIENTO DE LA PARRILLA

$$F.L. (REBAR) = 1.2 \text{ Tm}$$

$$F.L. (REBAR) = 1.2 \text{ Tm}$$

$$F.L. (REBAR) = 1.2 \text{ Tm}$$

LL: I.P.F.

$$T_{\text{eff}} = \frac{h \nu_0}{k_B} \times f = 4.7 \times 10^4 \text{ K}$$

$$L_{\text{eff}} = \sqrt{\frac{4}{\pi} \ln \left(\frac{R}{r_0} \right)} = 7.13 \text{ cm} > L = 6.8 \text{ cm}$$

$$F_{\text{max}} = 10,7 \cdot 10^6 = 1,726 \text{ t}$$

$$\Gamma_{\text{photo}} = \frac{dN_{\text{photo}}}{dt} = \frac{I_{\text{photo}}}{h\nu} = \frac{P_{\text{photo}}}{h\nu}$$

$$\text{Flow} = 0.5 / 0.0001 = 0.0005 \text{ m}^3/\text{s}$$

— 11 —

$$F_j = \left(\frac{1}{\sqrt{\pi}} e^{-x^2} + \frac{1}{\sqrt{\pi}} e^{-(x-1)^2} + \dots + \frac{1}{\sqrt{\pi}} e^{-(x-j+1)^2} \right) A_j(x), \quad j=1, \dots, n$$

$$\Gamma_{\text{th}} = \Gamma_{\text{c}} + \Gamma_{\text{sc}} = 40.5 \text{ d}B \leq 40 \text{ d}B \leq 42.5 \text{ d}B \quad 8-77 \text{ c}$$

102 - 201 - 110

1844 = 4.4.4

$$\Gamma_{\text{eff}} = 26.711 \text{ eV} = 1.0 \times 10^{-3} \text{ eV} \cdot 3 \times 10^{15}$$

$$F_{\text{max}} = 1.05 \times 10^4 \text{ N} \quad \text{and} \quad F_{\text{min}} = 0.15 \times 10^4 \text{ N}$$

$$| \text{Tr}(\omega_{\text{eff}}) | = | \text{Tr}(\omega_{\text{eff}} - \omega_{\text{eff}}^{\text{min}} + \omega_{\text{eff}}^{\text{min}}) | \leq | \text{Tr}(\omega_{\text{eff}} - \omega_{\text{eff}}^{\text{min}}) | + | \text{Tr}(\omega_{\text{eff}}^{\text{min}}) |$$

1. How many times have you been to the park in the last year?

ST. = 17.01.2

$$J = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \quad \text{and} \quad (A, B, C, D) = (0, 0, 0, 0)$$

$$f_{\text{H}\alpha} = 4.1 \times 10^{-14} \text{ W m}^{-2} \text{ nm}^{-1} \quad f_{\text{H}\beta} = 0.876 \times 10^{-14} \text{ W m}^{-2} \text{ nm}^{-1}$$

OBJETO GR
 (Cálculo de la estructura)
 CALCULADO POR COMPROBADO POR
 HOJA N° 9 DE
 PROYECTO N°
 FECHA

10.3. = 510.000.000

$$F_{\text{requisito}} = 4,53 \text{ t}$$

$$F_{\text{requisito}} = R_{\text{requisito}} = 2,139 \text{ t}$$

$$21,1 = 5,01 \text{ t}$$

$$F_v = 510.000.000 = 10.3 \text{ t}$$

$$F_v = 10.3 \text{ t} = 10.3 \times 10.3 = 25.89 \text{ t}$$

$$F_v = 25.89 \text{ t} \quad F_{\text{requisito}} = 4,53 \text{ t} \quad F_v > F_{\text{requisito}} \quad \text{se requiere de un refuerzo}$$


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*****
*
*      S T A A D - III
*      REVISION 10.4a(VERSION 10 LEVEL 4a)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS, INC.
*      DATE=      NOV 16, 1998
*      TIME=      8:53:10
*
*****

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1. STAAD FLOOR PASO CARRETERA REACCIONES VERTICALES CON F. HORIZONTALES
2. INPUT WIDTH 79
3. *
4. UNIT METER MTON
5. JOINT COORDINATES
6.      1      5.300      .000      .000
7.      2      11.410     .000      .000
8.      3      17.520     .000      .000
9.      4      19.740     .000      .000
10.     5      23.630     .000      .000
11.     6       5.300     .000      3.250
12.     7      11.410     .000      3.250
13.     8      17.520     .000      3.250
14.     9      19.740     .000      3.250
15.    10      23.630     .000      3.250
16.    11      25.850     .000      3.250
17.    12      11.410     .000      7.000
18.    13      17.520     .000      7.000
19.    14      19.740     .000      7.000
20.    15      23.630     .000      7.000
21.    16      25.850     .000      7.000
22.    17      31.960     .000      7.000
23.    18      17.520     .000     10.750
24.    19      19.740     .000     10.750
25.    20      23.630     .000     10.750
26.    21      25.850     .000     10.750
27.    22      31.960     .000     10.750
28.    23      38.070     .000     10.750
29.    24      19.740     .000     14.000
30.    25      23.630     .000     14.000
31.    26      25.850     .000     14.000
32.    27      31.960     .000     14.000
33.    28      38.070     .000     14.000
34.    29      43.370     .000     14.000
35.    30       .000      .000      .000
36. MEMBER INCIDENCES
37.      1      1      6
38.      2      2      7
39.      3      3      8
40.      4      4      9
41.      5      5     10
42.      6      7     12
43.      7      8     13
44.      8      9     14
45.      9     10     15
46.     10     11     16
47.     11     13     18

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48.      12      14      19
49.      13      15      20
50.      14      16      21
51.      15      17      22
52.      16      19      24
53.      17      20      25
54.      18      21      26
55.      19      22      27
56.      20      23      28
57.      21       6       7
58.      22       7       8
59.      23       8       9
60.      24       9      10
61.      25      10      11
62.      26      12      13
63.      27      13      14
64.      28      14      15
65.      29      15      16
66.      30      16      17
67.      31      18      19
68.      32      19      20
69.      33      20      21
70.      34      21      22
71.      35      22      23
72.      36       1       2
73.      37       2       3
74.      38       3       4
75.      39       4       5
76.      40       5      11
77.      41      25      26
78.      42      26      27
79.      43      27      28
80.      44      28      29
81.      45       1      30
82.      46       6      30
83.      47      18      24
84.      48      24      25
85.      49      23      29
86. MEMBER PROPERTY AMERICAN
87. 21 TO 25 31 TO 35 PRI AX 2.045 IX .365 IZ .48
88. 26 TO 30 PRI AX 2.123 IX .365 IZ .491
89. 36 TO 38 41 TO 45 PRI AX .536 IX .01 IZ .005
90. 1 20 PRI AX 1.883 IX .034 IZ .017
91. 2 19 PRI AX 2.016 IX .037 IZ .018
92. 3 18 PRI AX 1.37445 IX .025 IZ .0125
93. 4 5 16 17 PRI AX 1.0082 IX .01830 IZ .0091
94. 6 15 PRI AX 2.016 IX 2.027 IZ .409
95. 7 10 11 14 PRI AX 1.3745 IX 1.382 IZ .279
96. 8 9 12 13 PRI AX 1.0082 IX 1.014 IZ .2047
97. 39 40 47 48 PRI AX 1.0082 IX .009 IZ .0045
98. 46 49 PRI AX 1.883 IX .017 IZ .0085
99. CONSTANT
100. E 3E6 MEMB 1 TO 49
101. DENSITY 2.5 MEMB 6 TO 15 36 TO 38 41 TO 45
102. DENSITY 1.125 MEMB 1 TO 5 16 TO 20
103. DENSITY 1.085 MEMB 21 TO 25 31 TO 35
104. DENSITY 1.043 MEMB 26 TO 30
105. DENSITY 0.000 MEMB 39 40 46 TO 49
106. SUPPORT
107. 6 11 12 17 18 23 FIXED BUT MX MZ

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108. LOAD 1 C.M. CON 0.5 PASEOS
 109. MEMBER LOAD
 110. 21 TO 25 UNI GY -3.425
 111. 26 TO 30 UNI GY -6.850
 112. 31 TO 35 UNI GY -3.425
 113. 36 TO 38 41 TO 45 UNI GY -.375
 114. LOAD 11 C.M. SIN S.C. PASEOS
 115. MEMBER LOAD
 116. 21 TO 25 UNI GY -3.125
 117. 26 TO 30 UNI GY -6.250
 118. 31 TO 35 UNI GY -3.125
 119. 36 TO 38 41 TO 45 UNI GY -.375
 120. LOAD 21 TREN TIPO A 1PF
 121. MEMBER LOAD
 122. 22 CON GY -15.0 2.665
 123. 22 CON GY -15.0 4.165
 124. 22 CON GY -15.0 5.665
 125. 28 CON GY -30.0 0.445
 126. 28 CON GY -30.0 1.945
 127. 28 CON GY -30.0 3.445
 128. 34 CON GY -15.0 .445
 129. 34 CON GY -15.0 1.945
 130. 34 CON GY -15.0 3.445
 131. 21 TO 25 UNI GY +0.4387
 132. 31 TO 35 UNI GY -0.4387
 133. LOAD 22 TREN TIPO B 1PF
 134. MEMBER LOAD
 135. 21 TO 25 UNI GY -6.0
 136. 26 TO 30 UNI GY -12.0
 137. 31 TO 35 UNI GY -6.0
 138. 21 TO 25 UNI GY +0.7594
 139. 31 TO 35 UNI GY -0.7594
 140. LOAD 31 TREN UIC 71/SW2
 141. MEMBER LOAD
 142. *21 TO 30 UNI GY -4.
 143. 21 24 25 26 30 UNI GY -4.
 144. 22 27 UNI GY -4. 0.0 0.965
 145. 23 29 UNI GY -4. 1.255 2.22
 146. 22 27 CON GY -12.5 1.765
 147. 22 CON GY -12.5 3.365
 148. 22 CON GY -12.5 4.965
 149. 23 29 CON GY -12.5 0.455
 150. 28 CON GY -12.5 1.145
 151. 28 CON GY -12.5 2.745
 152. 26 TO 35 UNI GY -7.50
 153. 21 TO 25 UNI GY +0.7202
 154. 31 TO 35 UNI GY -0.7202
 155. LOAD 32 TREN 3 EC1
 156. MEMBER LOAD
 157. 21 CON GY -7.5 5.30
 158. 22 CON GY -7.5 1.69
 159. 23 CON GY -10.00 0.03
 160. 24 CON GY -10.00 0.81
 161. 26 CON GY -15.0 5.30
 162. 27 CON GY -15.0 1.69
 163. 29 CON GY -20.00 0.03
 164. 30 CON GY -20.00 0.81
 165. 32 CON GY -7.5 3.08
 166. 33 CON GY -7.5 1.69
 167. 34 CON GY -10.00 3.92

168. 35 CON GY -10.00 0.81
 169. 21 TO 25 UNI GY +0.6508
 170. 31 TO 35 UNI GY -0.6508
 171. LOAD 4 TABLERO SIN S.C.
 172. MEMBER LOAD
 173. 21 TO 25 UNI GY +0.1
 174. 31 TO 35 UNI GY -0.1
 175. PERFORM ANALYSIS

ORIGINAL BAND-WIDTH = 29
 REDUCED BAND-WIDTH = 5

++ CHECKING LOAD DATA.
 ++ PROCESSING SUPPORT CONDITION.
 ++ PROCESSING AND SETTING UP LOAD VECTOR.

++ PROCESSING ELEMENT STIFFNESS MATRIX.	8:53:13
++ PROCESSING GLOBAL STIFFNESS MATRIX.	8:53:13
++ PROCESSING TRIANGULAR FACTORIZATION.	8:53:14
++ CALCULATING JOINT DISPLACEMENTS.	8:53:14
++ CALCULATING ELEMENT FORCES.	8:53:14

176. LOAD LIST ALL
 177. *PRINT JOINT DISPLACEMENTS ALL
 178. PRINT SUPPORT REACTIONS

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = FLOOR

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
6	1	.00	22.03	.00	.00	.00	.00
	11	.00	20.65	.00	.00	.00	.00
	21	.00	2.09	.00	.00	.00	.00
	22	.00	23.19	.00	.00	.00	.00
	31	.00	15.75	.00	.00	.00	.00
	32	.00	1.03	.00	.00	.00	.00
	4	.00	-.57	.00	.00	.00	.00
11	1	.00	90.03	.00	.00	.00	.00
	11	.00	82.49	.00	.00	.00	.00
	21	.00	65.62	.00	.00	.00	.00
	22	.00	139.58	.00	.00	.00	.00
	31	.00	137.33	.00	.00	.00	.00
	32	.00	41.73	.00	.00	.00	.00
	4	.00	-1.48	.00	.00	.00	.00
12	1	.00	36.11	.00	.00	.00	.00
	11	.00	32.70	.00	.00	.00	.00
	21	.00	9.26	.00	.00	.00	.00
	22	.00	61.28	.00	.00	.00	.00
	31	.00	54.42	.00	.00	.00	.00
	32	.00	6.30	.00	.00	.00	.00
	4	.00	-.91	.00	.00	.00	.00
17	1	.00	36.11	.00	.00	.00	.00
	11	.00	32.70	.00	.00	.00	.00
	21	.00	17.28	.00	.00	.00	.00
	22	.00	75.16	.00	.00	.00	.00
	31	.00	83.74	.00	.00	.00	.00
	32	.00	21.42	.00	.00	.00	.00
	4	.00	.91	.00	.00	.00	.00
18	1	.00	90.03	.00	.00	.00	.00
	11	.00	82.49	.00	.00	.00	.00
	21	.00	78.65	.00	.00	.00	.00
	22	.00	162.13	.00	.00	.00	.00
	31	.00	190.55	.00	.00	.00	.00
	32	.00	60.02	.00	.00	.00	.00
	4	.00	1.48	.00	.00	.00	.00
23	1	.00	22.03	.00	.00	.00	.00
	11	.00	20.65	.00	.00	.00	.00
	21	.00	7.10	.00	.00	.00	.00
	22	.00	31.85	.00	.00	.00	.00
	31	.00	39.66	.00	.00	.00	.00
	32	.00	9.50	.00	.00	.00	.00
	4	.00	.57	.00	.00	.00	.00

***** END OF LATEST ANALYSIS RESULT *****

179. *PLOT DISPLACEMENT FILE
 180. *PLOT BENDING FILE
 181. FINISH

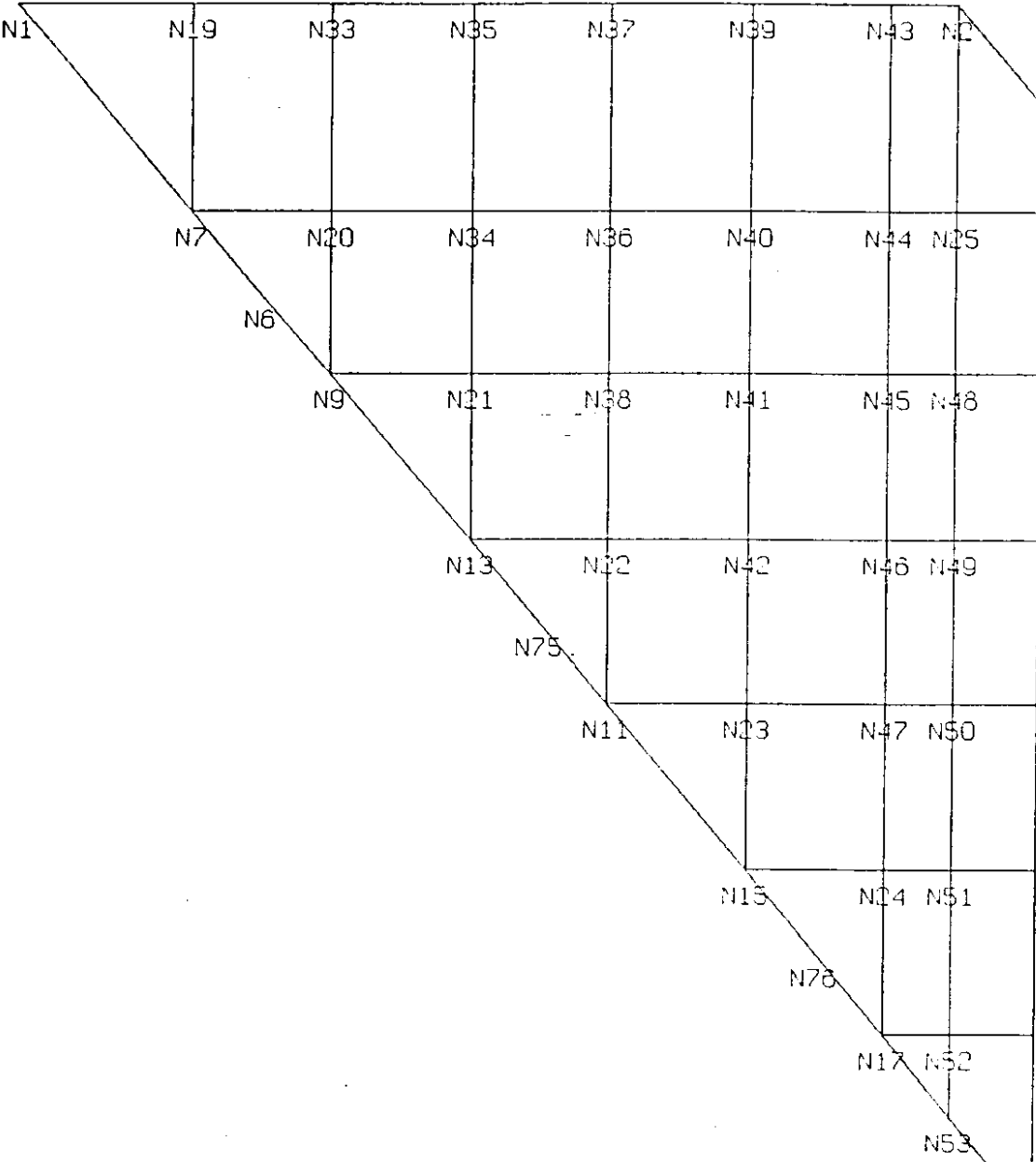
***** END OF STAAD-III *****

***** DATE= NOV 16,1998 TIME= 8:53:16 *****

 * FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
 * CALL (01) 686-7672, CROYDON, U.K. TLX. 929181 *

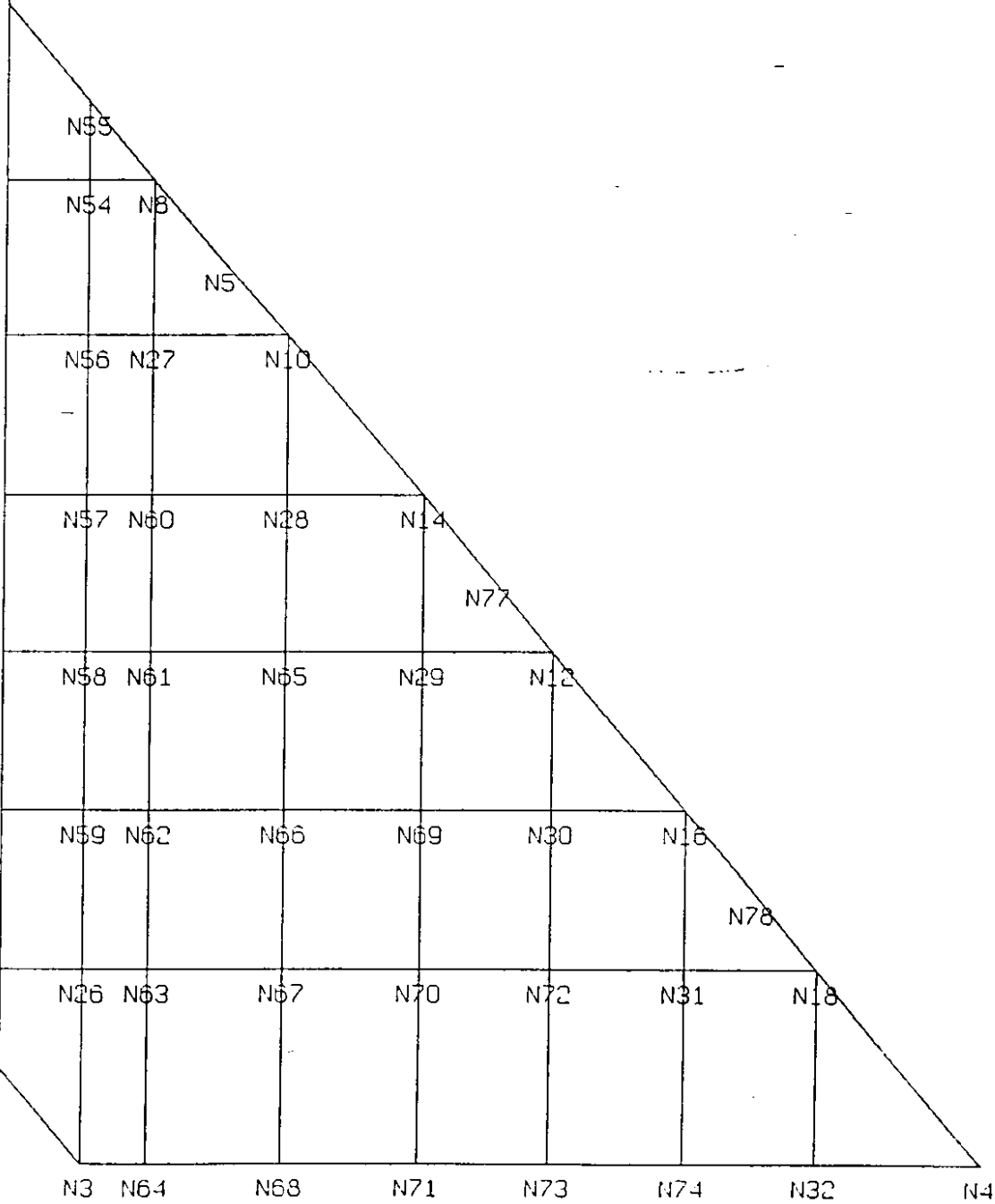
CALCULO REACCIONES EN APOYOS ESVIADO						SECCION NEOPRENO		COMENTARIOS
REACCIONES MAXIMAS						45	60	
APOYO	P.P	C.P.	S.C. IPF	S.C.EC1-UIC	MAXIMOS	TENSION		
6	69.75	22.09	31.85	39.66	131.50	48.704		TREN UIC71(120 km/h)-SW2(80 km/h)
11	69.75	90.27	162.13	190.55	350.57	129.841		TREN UIC71(120 km/h)-SW2(80 km/h)
12	69.75	36.75	75.16	83.74	190.24	70.459		TREN UIC71(120 km/h)-SW2(80 km/h)
17	69.75	36.75	75.16	83.74	190.24	70.459		TREN UIC71(120 km/h)-SW2(80 km/h)
18	69.75	90.27	162.13	190.55	350.57	129.841		TREN UIC71(120 km/h)-SW2(80 km/h)
23	69.75	22.09	31.85	39.66	131.50	48.704		TREN UIC71(120 km/h)-SW2(80 km/h)
REACCIONES MINIMAS						45	60	
APOYO	P.P	C.P.	S.C. IPF	SOLO TABLERO	MINIMAS	TENSION		
6	69.75	20.65	2.09	-0.57	89.83	33.270		TRE3 EC1-UIC 350 km/h
11	69.75	82.49	65.62	-1.48	150.76	55.837		TRE3 EC1-UIC 350 km/h
12	69.75	32.70	9.26	-0.91	101.54	37.607		TRE3 EC1-UIC 350 km/h
17	69.75	32.70	9.26	-0.91	101.54	37.607		TRE3 EC1-UIC 350 km/h
18	69.75	82.49	65.62	-1.48	150.76	55.837		TRE3 EC1-UIC 350 km/h
23	69.75	20.65	2.09	-0.57	89.83	33.270		TRE3 EC1-UIC 350 km/h

NUDOS



Arch: EUROEMP.AVD
Tipo: Grid X-Z
Carga SOBRECARGA ACERAS
Solucion Primer-orden

AVANSSE

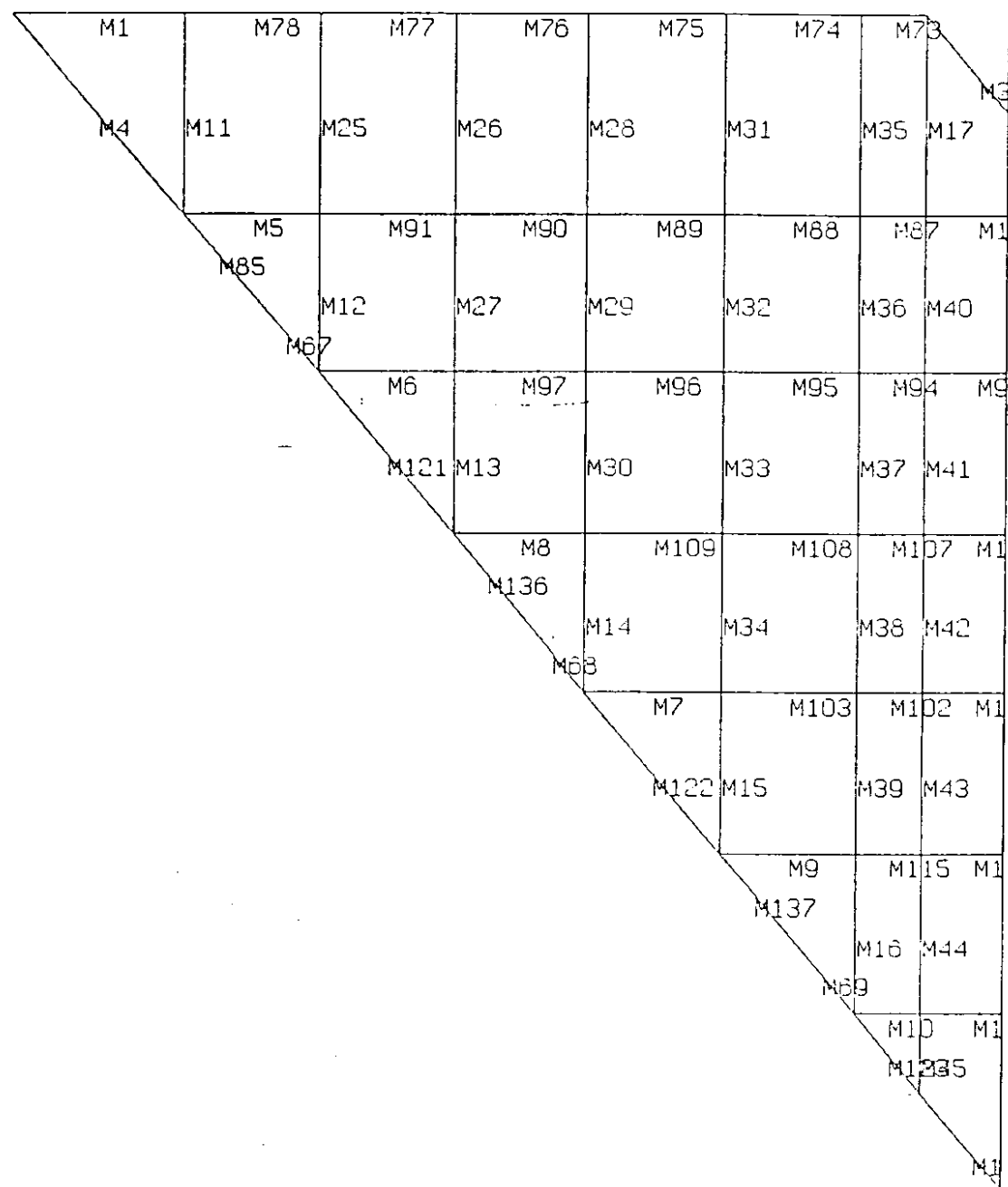


Arch: EUROEMP.AVD
Tipo: Grid X-Z
Carga SOBRECARGA ACERAS
Solucion Primer-orden

AVANSSE



BARRAS



Arch: EUROEMP.AVD
Tipo: Grid X-Z
Carga SOBRECARGA ACERAS
Solucion Primer-orden

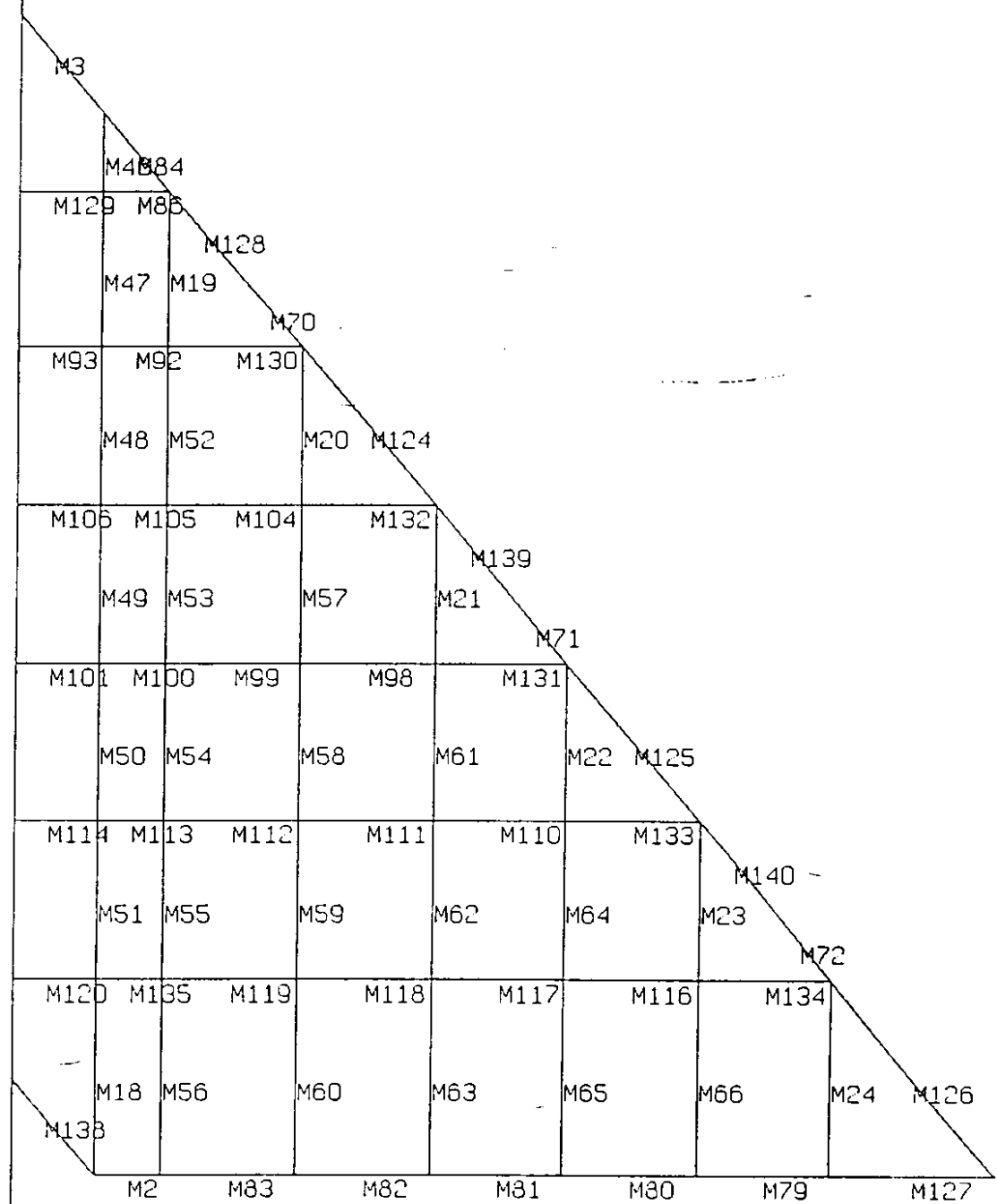
AVANSSE

5

Z
Y
X

6

Z
Y
X



Arch: EUROEMP.AVD
Tipo: Grid X-Z
Carga SOBRECARGA ACERAS
Solucion Primer-orden

AVANSSE

AVANSSE Datos de estructura Pg. 1
EURODAT

Información :

Tipo de estructura: Grid X-E
Sistema unidades: TON-M
g.d.l. por nudo: 3
Archivo : EUROEMP.AVD
Tamaño :
Nudos: 78
Materiales: 1
Tipos de sección: 15
Vigas elementos: 140

GEOMETRIA

Coordenadas nudo:

Nudo	X (M)	Z (M)	Piso rígido
1	4.48800	5.62870	---
2	25.03800	5.62870	---
3	27.33400	-8.37130	---
4	47.88400	-8.37130	---
5	30.34160	2.37870	---
6	9.79160	2.37870	---
7	9.27290	3.30930	---
8	28.82290	3.30930	---
9	11.31020	1.44800	---
10	31.86020	1.44800	---
11	17.42970	-2.30200	---
12	37.97970	-2.30200	---
13	14.39230	-0.44070	---
14	34.94230	-0.44070	---
15	20.51180	-4.19070	---
16	41.06180	-4.19070	---
17	23.54910	-6.05200	---
18	44.09910	-6.05200	---
19	8.27290	5.62870	---
20	11.31020	3.30930	---
21	14.39230	1.44800	---
22	17.42970	-0.44070	---
23	20.51180	-2.30200	---
24	23.54910	-4.19070	---
25	25.03800	3.30930	---
26	27.33400	-6.05200	---
27	28.82290	1.44800	---
28	31.86020	-0.44070	---

AVANSSE Datos EURODAT

Pg. 2

Coordenadas nudo (continuación)

Nudo	X (M)	Z (M)	Piso rígido
29	34.94230	-2.30200	---
30	37.97970	-4.19070	---
31	41.06180	-6.05200	---
32	44.09910	-8.37130	---
33	11.31020	5.62870	---
34	14.39230	3.30930	---
35	14.39230	5.62870	---
36	17.42970	3.30930	---
37	17.42970	5.62870	---
38	17.42970	1.44800	---
39	20.51180	5.62870	---
40	20.51180	3.30930	---
41	20.51180	1.44800	---
42	20.51180	-0.44070	---
43	23.54910	5.62870	---
44	23.54910	3.30930	---
45	23.54910	1.44800	---
46	23.54910	-0.44070	---
47	23.54910	-2.30200	---
48	25.03800	1.44800	---
49	25.03800	-0.44070	---
50	25.03800	-2.30200	---
51	25.03800	-4.19070	---
52	25.03800	-6.05200	---
53	25.03800	-6.96440	---
54	27.33400	3.30930	---
55	27.33400	4.22170	---
56	27.33400	1.44800	---
57	27.33400	-0.44070	---
58	27.33400	-2.30200	---
59	27.33400	-4.19070	---
60	28.82290	-0.44070	---
61	28.82290	-2.30200	---
62	28.82290	-4.19070	---
63	28.82290	-6.05200	---
64	28.82290	-8.37130	---
65	31.86020	-2.30200	---
66	31.86020	-4.19070	---
67	31.86020	-6.05200	---
68	31.86020	-8.37130	---
69	34.94230	-4.19070	---
70	34.94230	-6.05200	---
71	34.94230	-8.37130	---
72	37.97970	-6.05200	---
73	37.97970	-8.37130	---
74	41.06180	-8.37130	---
75	15.91100	-1.37130	---
76	22.03040	-5.12130	---

Coordenadas nudo (continuación)

Nudo	X [M]	Z [M]	Piso rígido
77	36.46100	-1.37130	---
78	42.59040	-5.12130	---

Restricciones (Traslaciones y rotaciones):

Restringido: [X] No restringido: ---

Nudo	Y trasl.	X rotac.	Z rotac.
5	[X]	---	---
6	[X]	---	---
75	[X]	---	---
76	[X]	---	---
77	[X]	---	---
78	[X]	---	---

Propiedades materiales:

Material No.	Módulo E Ton/M2	Poisson's coef.	Peso espec. Ton/M3	Coef. termico 1/°C
1	3.00000E+06	0.25000	2.50000E+06	0.00000E-00

Tipos de sección:

Notas:-

- * Propiedades están dadas en relación a ejes principales
- * Angulo Off es el ángulo entre ejes principales y locales
- * Regla de la mano derecha (apuntando a 1) da el signo del ángulo
- * Ejes principales son representados por 2' y 3'

Tipo secc. Nro. 1

Sección: 1 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :

Area [M2]	I3'3' [M4]	I2'2' [M4]	Torsion J [M4]	Factor corte 2'	Factor corte 3'	Off angle [°]
0.194595	0.028943	1.000E-06	8.910E-04	0.00	0.00	0.00

G E O M E T R I A (M) :

GENÉRICO Líneas dib: (x1,y1, x2,y2, color)

Tipo secc. Nro. 2

Sección: 2 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :

Area [M2]	I3'3' [M4]	I2'2' [M4]	Torsion J [M4]	Factor corte 2'	Factor corte 3'	Off angle [°]
0.904575	0.21934	1.000E-06	0.070583	0.00	0.00	0.00

G E O M E T R I A (M) :

GENÉRICO Líneas dib: (x1,y1, x2,y2, color)

Tipos de sección (continuación):

Tipo secc. Nro. 3

Sección: 3 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :

Area [M2]	I3'3' [M4]	I2'2' [M4]	Torsion J [M4]	Factor corte 2'	Factor corte 3'	Off angle [°]
0.842804	0.207882	1.000E-06	0.070583	0.00	0.00	0.00

G E O M E T R I A (M) :

GENÉRICO Líneas dib: (x1,y1, x2,y2, color)

Tipo secc. Nro. 4

Sección: 4 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :

Area [M2]	I3'3' [M4]	I2'2' [M4]	Torsion J [M4]	Factor corte 2'	Factor corte 3'	Off angle [°]
0.106065	9.000E-04	1.000E-06	9.000E-04	0.00	0.00	0.00

G E O M E T R I A (M) :

GENÉRICO Líneas dib: (x1,y1, x2,y2, color)

Tipo secc. Nro. 5

Sección: 5 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :

Area [M2]	I3'3' [M4]	I2'2' [M4]	Torsion J [M4]	Factor corte 2'	Factor corte 3'	Off angle [°]
0.602997	3.553E-03	1.000E-06	3.553E-03	0.00	0.00	0.00

G E O M E T R I A (M) :

GENÉRICO Líneas dib: (x1,y1, x2,y2, color)

Tipo secc. Nro. 6

Sección: 6 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :

Area [M2]	I3'3' [M4]	I2'2' [M4]	Torsion J [M4]	Factor corte 2'	Factor corte 3'	Off angle [°]
0.540837	3.197E-03	1.000E-06	3.187E-03	0.00	0.00	0.00

G E O M E T R I A (M) :

GENÉRICO Líneas dib: (x1,y1, x2,y2, color)

Tipo secc. Nro. 7

Sección: 7 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :

Area [M2]	I3'3' [M4]	I2'2' [M4]	Torsion J [M4]	Factor corte 2'	Factor corte 3'	Off angle [°]
0.400068	2.357E-03	1.000E-06	2.357E-03	0.00	0.00	0.00

G E O M E T R I A (M) :

GENÉRICO Líneas dib: (x1,y1, x2,y2, color)

Tipo secc. Nro. 8

Sección: 8 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :

Area [M2]	I3'3' [M4]	I2'2' [M4]	Torsion J [M4]	Factor corte 2'	Factor corte 3'	Off angle [°]
0.334529	1.971E-03	1.000E-06	1.971E-03	0.00	0.00	0.00

G E O M E T R I A (M) :

GENÉRICO Líneas dib: (x1,y1, x2,y2, color)

AVANSSE (Datos) EURCIAT Pg. 5

Tipos de sección (continuación):

Tipo secc. Nro. 9 =====
Sección: 9 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :
Area I3'3' I2'2' Torsion J Factor Factor Off angle
[M2] [M4] [M4] [M4] corte 2' corte 3' [z]
0.649065 5.503E-03 1.000E-06 5.503E-03 0.00 0.00 0.00

G E O M E T R I A (M) :
GENERIC Linesa dib: (x1,y1, x2,y2, color)

Tipo secc. Nro. 10 =====
Sección: 10 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :
Area I3'3' I2'2' Torsion J Factor Factor Off angle
[M2] [M4] [M4] [M4] corte 2' corte 3' [z]
0.480082 4.074E-03 1.000E-06 4.074E-03 0.00 0.00 0.00

G E O M E T R I A (M) :
GENERIC Linesa dib: (x1,y1, x2,y2, color)

Tipo secc. Nro. 11 =====
Sección: 11 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :
Area I3'3' I2'2' Torsion J Factor Factor Off angle
[M2] [M4] [M4] [M4] corte 2' corte 3' [z]
0.401435 3.406E-03 1.000E-06 3.406E-03 0.00 0.00 0.00

G E O M E T R I A (M) :
GENERIC Linesa dib: (x1,y1, x2,y2, color)

Tipo secc. Nro. 12 =====
Sección: 12 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :
Area I3'3' I2'2' Torsion J Factor Factor Off angle
[M2] [M4] [M4] [M4] corte 2' corte 3' [z]
1.744058 0.533936 1.000E-06 0.333967 0.00 0.00 0.00

G E O M E T R I A (M) :
GENERIC Linesa dib: (x1,y1, x2,y2, color)

Tipo secc. Nro. 13 =====
Sección: 13 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :
Area I3'3' I2'2' Torsion J Factor Factor Off angle
[M2] [M4] [M4] [M4] corte 2' corte 3' [z]
1.289996 0.333625 1.000E-06 0.234002 0.00 0.00 0.00

G E O M E T R I A (M) :
GENERIC Linesa dib: (x1,y1, x2,y2, color)

Tipo secc. Nro. 14 =====
Sección: 14 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :
Area I3'3' I2'2' Torsion J Factor Factor Off angle
[M2] [M4] [M4] [M4] corte 2' corte 3' [z]
1.078663 0.333322 1.000E-06 0.237477 0.00 0.00 0.00

G E O M E T R I A (M) :
GENERIC Linesa dib: (x1,y1, x2,y2, color)

AVANSSE (Datos) EURCIAT Pg. 6

Tipos de sección (continuación):

Tipo secc. Nro. 15 =====
Sección: 15 Peso lineal: 1.000E-06 Ton/M

P R O P I E D A D E S :
Area I3'3' I2'2' Torsion J Factor Factor Off angle
[M2] [M4] [M4] [M4] corte 2' corte 3' [z]
0.486 0.103422 1.000E-06 0.062745 0.00 0.00 0.00

G E O M E T R I A (M) :
GENERIC Linesa dib: (x1,y1, x2,y2, color)

Elementos :

Notas.-

- * DEFAULT: Eje 3 pertenece al plano X-Z
- * EJE n = ndo1-ndo2: Eje n es paralelo al vector ndo1 -> ndo2
- * EJE n = x: EJE n es paralelo al eje global x
- * ROTAC x: Ejes 2 & 3 son rotados alrededor del eje 1 en un ngulo x
- * Signo de ROTACiön est dado por "Regla de la mano derecha"
- * 1-2, 1-3 Liberaciones en el Plano 1-2 y Plano 1-3
- * H:Articulado S:liberaciön al corte A:axial T:torsiön

							Trecho rígido					
Planos							Jx	Jy	Jz	Kx	Ky	Kz
Miem	Nudo	Nudo	Tipo	Mat	Dirección							
1-2	1-3											
No.	J	K	No.	No.	Eje local		[M]			[M]		
J K	J K	A T										
1	1	19	1	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
2	3	64	1	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
3	2	55	4	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
4	1	7	4	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
5	7	20	2	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
6	9	21	3	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
7	11	23	3	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
8	13	22	3	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
9	15	24	3	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
10	17	52	2	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
11	7	19	5	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
12	9	20	12	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
13	13	21	9	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
14	11	22	12	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
15	15	23	9	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
16	17	24	13	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
17	2	25	3	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00

18	8	26	9	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
19	9	27	13	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
20	10	28	9	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
21	14	29	12	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
22	12	30	9	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
23	16	31	12	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
24	13	32	5	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
25	20	33	6	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
26	34	35	6	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
27	21	34	12	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
28	36	37	6	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
29	33	36	12	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
30	22	38	9	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
31	40	39	6	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
32	41	40	12	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
33	42	41	9	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
34	23	42	12	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
35	44	43	7	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
36	45	44	13	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
37	46	45	10	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
38	47	46	13	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
39	24	47	10	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
40	25	48	14	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
41	43	49	11	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
42	49	50	14	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
43	50	51	11	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
44	51	52	14	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
45	52	53	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
46	54	55	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
47	56	54	14	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
48	57	56	11	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
49	55	57	14	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
50	59	58	11	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
51	26	59	14	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00

52	27	60	11	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
53	60	61	13	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
54	61	62	10	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
55	62	63	13	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
56	63	64	7	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
57	28	65	12	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
58	65	66	9	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
59	66	67	12	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
60	67	68	6	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
61	29	69	9	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
62	69	70	12	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
63	70	71	6	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
64	30	72	12	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
65	72	73	6	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
66	31	74	6	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
67	6	9	15	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
68	75	11	15	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
69	76	17	15	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
70	5	10	15	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
71	77	12	15	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
72	73	13	15	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
73	43	2	1	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
74	39	43	1	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
75	37	39	1	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
76	35	37	1	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
77	33	35	1	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
78	13	33	1	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
79	74	32	1	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
80	73	74	1	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
81	71	73	1	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
82	68	71	1	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
83	64	68	1	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
84	55	3	4	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
85	7	6	15	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00

84	84	8	2	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
87	44	25	2	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
88	40	44	2	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
89	36	40	2	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
90	34	36	2	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
91	28	34	2	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
92	56	27	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
93	48	56	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
94	45	48	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
95	41	45	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
96	38	41	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
97	21	39	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
98	65	29	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
99	61	65	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
100	53	61	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
101	50	59	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
102	47	50	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
103	23	47	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
104	60	28	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
105	57	60	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
106	49	57	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
107	46	49	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
108	42	46	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
109	22	42	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
110	69	30	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
111	66	69	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
112	62	66	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
113	59	62	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
114	51	59	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
115	24	51	3	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
116	72	31	2	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
117	70	72	2	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00
118	67	70	2	1	DEFAULT	0.00	0.00	0.00	0.00	0.00	0.00

ADVANCE Data: EURODAT

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Elementos de vigas (continuación):

Planos							Trecho rígido					
Miem	Nudo	Nudo	Tipo	Mat	Dirección		Jx	Jy	Jz	Kx	Ky	Kz
1-2	1-3						[M]			[M]		
No.	J	K	No.	No.	Eje local							
J K	J K	A T										
119	63	67	2	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
120	52	26	2	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
121	9	13	4	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
122	11	15	4	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
123	17	53	4	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
124	10	14	4	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
125	12	16	4	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
126	18	4	4	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
127	32	4	1	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
128	8	5	15	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
129	25	54	2	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
130	27	10	3	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
131	29	12	3	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
132	28	14	3	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
133	30	16	3	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
134	31	13	2	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
135	26	63	2	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
136	13	75	15	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
137	15	76	15	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
138	53	3	4	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
139	14	77	15	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00
140	16	78	15	1	DEFAULT		0.00	0.00	0.00	0.00	0.00	0.00

COMBINACIONES DE CARGA

Combinaciones de carga:

Nombre de la combinación: SOBRECARGA 1

Carga b sica	Multiplicador
TREN NORMA ESP VIA 1	1.00000
TREN NORMA ESP VIA 2	1.00000

Nombre de la combinación: SOBRECARGA 2

Carga b sica	Multiplicador
TREN UIC VIA 1	1.00000
TREN UIC VIA 2	1.00000

Nombre de la combinación: SOBRECARGA 3

Carga b sica	Multiplicador
TREN UIC VIA 1	1.00000
TREN SW/2 VIA 2	1.00000

CONDICIONES DE CARGA

ESTADOS: CARGAS MUERTAS

Patrones de cargas para vigas y barras:

Notas:-

- * Distancias medidas desde el nudo J (nudo Origen)
- * Distancias porcentuales relativas a la longitud del elemento's longit
- * Distrib: Significa fuerza distribuida lineal
- * Fuerzas distribuidas tienen Magnitud/Distancia inicial y final

Patrón carga No. 1 =====

Distrib: Dir Y: 1.7Ton/M@0.0CM & 1.7Ton/M@100%

Patrón carga No. 2 =====

Distrib: Dir Y: 0.25Ton/M@0.0CM & 0.25Ton/M@100%

Patrón carga No. 3 =====

Distrib: Dir Y: 3.105Ton/M@0.0CM & 3.105Ton/M@100%

Patrón carga No. 4 =====

Distrib: Dir Y: 2.297Ton/M@0.0CM & 2.297Ton/M@100%

Patrón carga No. 5 =====

Distrib: Dir Y: 1.92Ton/M@0.0CM & 1.92Ton/M@100%

Cargas sobre vigas:

Elemento viga No.	Patrón carga No.
-------------------	------------------

1	1
2	1
3	2
10	2
12	3
13	3
14	3
15	3
16	4
19	4
20	3
21	3

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Cargas sobre vigas (continuación):

Elemento viga No.	Patrón carga No.
-------------------	------------------

22	3
23	3
27	3
29	3
30	3
32	3
33	3
34	3
36	4
37	4
38	4
39	4
40	5
41	5
42	5
43	5
44	5
47	5
48	5
49	5
50	5
51	5
52	4
53	4
54	4
55	4
57	3
58	3
59	3
61	3
62	3
64	3
73	1
74	1
75	1
76	1
77	1
78	1
79	1
80	1
81	1
82	1
83	1
86	2
87	2
88	2
89	2
90	2

Cargas sobre vigas (continuación):

Elemento viga No.	Patrón carga No.
91	2
116	2
117	2
118	2
119	2
120	2
127	1
129	2
134	2
135	2

ESTADOS: SOBRECARGA ACERAS

Patrones de cargas para vigas y barras:

Notas.-

- * Distancias medidas desde el nudo J (Nudo Origen)
- * Distancias porcentuales relativas a la longitud del elemento's longit
- * Distrib: Significa fuerza distribuida lineal
- * Fuerzas distribuidas tienen Magnitud/Distancia inicial y final

Patrón carga No. 1	=====
Distrib: Dir Y: 1.364Ton/M@0.00M & 1.364Ton/M@100%	
Patrón carga No. 2	=====
Distrib: Dir Y: 1.224Ton/M@0.00M & 1.224Ton/M@100%	
Patrón carga No. 3	=====
Distrib: Dir Y: 0.905Ton/M@0.00M & 0.905Ton/M@100%	
Patrón carga No. 4	=====
Distrib: Dir Y: 0.757Ton/M@0.00M & 0.757Ton/M@100%	

Cargas sobre vigas:

Elemento viga No.	Patrón carga No.
11	1
17	4
18	4
24	1
25	2
26	2
29	2
31	2
35	3
45	4
46	4
56	3
63	2
63	2

Cargas sobre vigas (continuación):

Elemento viga No.	Patrón carga No.
65	2
66	2

ESTADOS: TREN NORMA ESP VIA 1

Patrones de cargas para vigas y barras:

Notas.-

- * Distancias medidas desde el nudo J (nudo Origen)
- * Distancias porcentuales relativas a la longitud del elemento's longit
- * Distrib: Significa fuerza distribuida lineal
- * Fuerzas distribuidas tienen Magnitud/Distancia inicial y final

Patrón carga No. 1	=====
Distrib: Dir Y: 7.98Ton/M@0.00M & 7.98Ton/M@100%	
Patrón carga No. 2	=====
Fuerza : Direccion: Y Magnitud : 8.375 Ton A 2.46187M	
Patrón carga No. 3	=====
Fuerza : Direccion: Y Magnitud : 20.494 Ton A 1.2863M	
Patrón carga No. 4	=====
Fuerza : Direccion: Y Magnitud : 19.06 Ton A 1.2863M	
Patrón carga No. 5	=====
Fuerza : Direccion: Y Magnitud : 15.101 Ton A 0.6024M	
Patrón carga No. 6	=====
Fuerza : Direccion: Y Magnitud : 18.06 Ton A 0.6024M	
Patrón carga No. 7	=====
Fuerza : Direccion: Y Magnitud : 24.42 Ton A 0.6024M	
Patrón carga No. 8	=====
Fuerza : Direccion: Y Magnitud : 16.041 Ton A 0.6024M	
Patrón carga No. 9	=====
Fuerza : Direccion: Y Magnitud : 3.922 Ton A 2.46187M	
Patrón carga No. 10	=====
Fuerza : Direccion: Y Magnitud : 15.101 Ton A 1.2863M	

Cargas sobre vigas:

Elemento viga No.	Patrón carga No.
6	1
13	8
20	3
30	7
33	7
37	6
41	10
43	5
52	4
52	1

Patrones de carga para vigas/barras (continuación):

93	1
94	1
95	1
96	1
97	1
121	9
124	2
130	1

ESTADOS: TREN NORMA ESP VIA 2

Patrones de cargas para vigas y barras:

Notas.-

- * Distancias medidas desde el nudo J (nudo Origen)
- * Distancias porcentuales relativas a la longitud del elemento's longit
- * Distrib: Significa fuerza distribuida lineal
- * Fuerzas distribuidas tienen Magnitud/Distancia inicial y final

Patrón carga No. 1	Distrib: Dir Y: 7.96Ton/M@0.00M & 7.96Ton/M@100%
Patrón carga No. 2	Fuerza : Direccion: Y Magnitud : 3.375 Ton A 1.1529M
Patrón carga No. 3	Fuerza : Direccion: Y Magnitud : 20.494 Ton A 1.2863M
Patrón carga No. 4	Fuerza : Direccion: Y Magnitud : 13.06 Ton A 1.2863M
Patrón carga No. 5	Fuerza : Direccion: Y Magnitud : 15.101 Ton A 0.6024M
Patrón carga No. 6	Fuerza : Direccion: Y Magnitud : 13.06 Ton A 0.6024M
Patrón carga No. 7	Fuerza : Direccion: Y Magnitud : 24.42 Ton A 0.6024M
Patrón carga No. 8	Fuerza : Direccion: Y Magnitud : 16.041 Ton A 0.6024M
Patrón carga No. 9	Fuerza : Direccion: Y Magnitud : 3.922 Ton A 1.1529M
Patrón carga No. 10	Fuerza : Direccion: Y Magnitud : 15.101 Ton A 1.2863M

Cargas sobre vigas:

Elemento viga No. Patrón carga No.

9	1
15	3
22	8
39	4
43	5
50	10
54	6
59	7
61	7
110	1
111	1
112	1
113	1
114	1
115	1
122	2
125	9
133	1

ESTADOS: TREN SW/2 VIA 2

Patrones de cargas para vigas y barras:

Notas.-

- * Distancias medidas desde el nudo J (nudo Origen)
- * Distancias porcentuales relativas a la longitud del elemento's longit
- * Distrib: Significa fuerza distribuida lineal
- * Fuerzas distribuidas tienen Magnitud/Distancia inicial y final

Patrón carga No. 1	Distrib: Dir Y: 8.625Ton/M@0.00M & 8.625Ton/M@100%
Patrón carga No. 2	Fuerza : Direccion: Y Magnitud : 9.0523 Ton A 1.1529M
Patrón carga No. 3	Fuerza : Direccion: Y Magnitud : 22.1511 Ton A 1.2863M
Patrón carga No. 4	Fuerza : Direccion: Y Magnitud : 19.519 Ton A 1.2863M
Patrón carga No. 5	Fuerza : Direccion: Y Magnitud : 16.322 Ton A 0.6024M
Patrón carga No. 6	Fuerza : Direccion: Y Magnitud : 19.519 Ton A 0.6024M
Patrón carga No. 7	Fuerza : Direccion: Y Magnitud : 26.39 Ton A 0.6024M
Patrón carga No. 8	Fuerza : Direccion: Y Magnitud : 17.339 Ton A 0.6024M
Patrón carga No. 9	Fuerza : Direccion: Y Magnitud : 4.239 Ton A 1.1529M
Patrón carga No. 10	Fuerza : Direccion: Y Magnitud : 16.322 Ton A 1.2863M

Cargas sobre vigas:

Elemento viga No. Patrón carga No.

9	1
15	3
22	8
39	4
43	5
50	10
54	6
59	7
61	7
110	1
111	1
112	1
113	1
114	1
115	1
122	2
125	9
133	1

AVANCESE Datos EUPDIAT

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ESTADOS: TREN UIC VIA 1

Patrones de cargas para vigas y barras:

Notas.-

- Distancias medidas desde el nudo J (nudo Origen)
- Distancias porcentuales relativas a la longitud del elemento's longit
- Distrib: Significa fuerza distribuida lineal
- Fuerzas distribuidas tienen Magnitud/Distancia inicial y final

Patron carga No. 1 =====
 Distrib: Dir Y: 4.6Ton/M@0.00M & 4.6Ton/M@100%
 Patron carga No. 2 =====
 Distrib: Dir Y: 4.6Ton/M@1.2364M & 4.6Ton/M@100%
 Fuerza : Direccion: Y Magnitud : 14.375 Ton A 0.436M
 Patron carga No. 3 =====
 Fuerza : Direccion: Y Magnitud : 14.375 Ton A 1.8734M
 Fuerza : Direccion: Y Magnitud : 14.375 Ton A 0.2734M
 Patron carga No. 4 =====
 Distrib: Dir Y: 4.6Ton/M@0.00M & 4.6Ton/M@0.9555M
 Fuerza : Direccion: Y Magnitud : 14.375 Ton A 1.75554M
 Patron carga No. 5 =====
 Fuerza : Direccion: Y Magnitud : 2.567 Ton A 2.46137M
 Patron carga No. 6 =====
 Fuerza : Direccion: Y Magnitud : 14.075 Ton A 1.2863M
 Patron carga No. 7 =====
 Fuerza : Direccion: Y Magnitud : 10.41 Ton A 1.2863M
 Patron carga No. 8 =====
 Fuerza : Direccion: Y Magnitud : 8.705 Ton A 0.6024M
 Patron carga No. 9 =====
 Fuerza : Direccion: Y Magnitud : 6.44 Ton A 1.2863M
 Patron carga No. 10 =====
 Fuerza : Direccion: Y Magnitud : 23.75 Ton A 0.6024M
 Patron carga No. 11 =====
 Fuerza : Direccion: Y Magnitud : 11.38155 Ton A 0.6024M
 Patron carga No. 12 =====
 Fuerza : Direccion: Y Magnitud : 9.245 Ton A 0.6024M
 Patron carga No. 13 =====
 Fuerza : Direccion: Y Magnitud : 2.2609 Ton A 2.46137M

Cargas sobre vigas:

Elemento viga No. Patron carga No.

6	1
13	12
20	6
30	11
33	10
37	10
41	9
46	3
52	7
92	1

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Cargas sobre vigas (continuación):

Elemento viga No. Patron carga No.

93	1
94	2
95	3
96	4
97	1
121	13
124	5
130	1

ESTADOS: TREN UIC VIA 2

Patrones de cargas para vigas y barras:

Notas.-

- Distancias medidas desde el nudo J (nudo Origen)
- Distancias porcentuales relativas a la longitud del elemento's longit
- Distrib: Significa fuerza distribuida lineal
- Fuerzas distribuidas tienen Magnitud/Distancia inicial y final

Patron carga No. 1 =====
 Distrib: Dir Y: 4.6Ton/M@0.00M & 4.6Ton/M@100%
 Patron carga No. 2 =====
 Distrib: Dir Y: 4.6Ton/M@0.00M & 4.6Ton/M@0.2525M
 Fuerza : Direccion: Y Magnitud : 14.375 Ton A 1.0523M
 Patron carga No. 3 =====
 Fuerza : Direccion: Y Magnitud : 14.375 Ton A 1.164M
 Fuerza : Direccion: Y Magnitud : 14.375 Ton A 2.764M
 Patron carga No. 4 =====
 Distrib: Dir Y: 4.6Ton/M@2.1266M & 4.6Ton/M@100%
 Fuerza : Direccion: Y Magnitud : 14.375 Ton A 1.32556M
 Patron carga No. 5 =====
 Fuerza : Direccion: Y Magnitud : 2.567 Ton A 1.1523M
 Patron carga No. 6 =====
 Fuerza : Direccion: Y Magnitud : 14.075 Ton A 1.2863M
 Patron carga No. 7 =====
 Fuerza : Direccion: Y Magnitud : 10.41 Ton A 1.2863M
 Patron carga No. 8 =====
 Fuerza : Direccion: Y Magnitud : 8.705 Ton A 0.6024M
 Patron carga No. 9 =====
 Fuerza : Direccion: Y Magnitud : 6.44 Ton A 1.2863M
 Patron carga No. 10 =====
 Fuerza : Direccion: Y Magnitud : 23.75 Ton A 0.6024M
 Patron carga No. 11 =====
 Fuerza : Direccion: Y Magnitud : 11.38155 Ton A 0.6024M
 Patron carga No. 12 =====
 Fuerza : Direccion: Y Magnitud : 9.245 Ton A 0.6024M

Patrones de carga para vigas/barras (continuación):

Patrón carga No. 13 =====
 Fuerza : Dirección: Y Magnitud : 2.2609 Ton A 1.1529M

Cargas sobre vigas:

Elemento viga No. Patrón carga No.

9	1
15	6
22	12
39	7
43	8
50	9
54	10
58	10
61	11
110	1
111	4
112	3
113	2
114	1
115	1
122	5
125	13
133	1

ESTADOS: VIA 1 DESBALASTADA

Patrones de cargas para vigas y barras:

Notas.-

- * Distancias medidas desde el nudo J (nudo Origen)
- * Distancias porcentuales relativas a la longitud del elemento's longit
- * Distrib: Significa fuerza distribuida lineal
- * Fuerzas distribuidas tienen Magnitud/Distancia inicial y final

Patrón carga No. 1 =====
 Distrib: Dir Y: 1.7Ton/M@0.00M & 1.7Ton/M@100%
 Patrón carga No. 2 =====
 Distrib: Dir Y: 0.25Ton/M@0.00M & 0.25Ton/M@100%
 Patrón carga No. 3 =====
 Distrib: Dir Y: 3.105Ton/M@0.00M & 3.105Ton/M@100%
 Patrón carga No. 4 =====
 Distrib: Dir Y: 2.297Ton/M@0.00M & 2.297Ton/M@100%
 Patrón carga No. 5 =====
 Distrib: Dir Y: 1.92Ton/M@0.00M & 1.92Ton/M@100%
 Patrón carga No. 6 =====
 Distrib: Dir Y: 3.105Ton/M@50% & 3.105Ton/M@100%

Patrones de carga para vigas/barras (continuación):

Patrón carga No. 7 =====
 Distrib: Dir Y: 2.297Ton/M@50% & 2.297Ton/M@50%

Patrón carga No. 8 =====
 Distrib: Dir Y: 1.92Ton/M@50% & 1.92Ton/M@100%

Patrón carga No. 9 =====
 Distrib: Dir Y: 3.105Ton/M@0.00M & 3.105Ton/M@50%

Patrón carga No. 10 =====
 Distrib: Dir Y: 2.297Ton/M@0.00M & 2.297Ton/M@50%

Patrón carga No. 11 =====
 Distrib: Dir Y: 1.92Ton/M@0.00M & 1.92Ton/M@50%

Cargas sobre vigas:

Elemento viga No. Patrón carga No.

1	1
2	1
5	2
10	2
14	9
15	3
16	4
21	6
22	3
23	3
34	9
38	10
39	4
42	8
43	5
44	5
49	11
50	5
51	5
53	7
54	4
55	4
57	6
58	3
59	3
61	3
62	3
64	3
73	1
74	1
75	1
76	1
77	1
78	1
79	1

ARMADO VIGA CAJON

Pag. 21

Cargas sobre vigas (continuación):

Elemento viga No. Patrón carga No.

80	1
81	1
82	1
83	1
86	2
87	2
88	2
89	2
90	2
91	2
116	2
117	2
118	2
119	2
120	2
127	1
129	2
134	2
135	2

ARMADO VIGA CAJON

(c) Oficina Técnica

Cliente : EUROESTUDIOS

Lugar de la Obra : L.A.V

Fecha del Estudio : 17/11/98

DATOS GEOMETRICOS

Solucion	:	3 C - 110
Ancho del Tablero	[m] :	14
Luz de Calculo	[m] :	20.55
Intereje	[m] :	3.75
Espesor de la Losa	[m] :	.3
Canto Total [Viga + Losa]..	[m] :	1.4
Espesor del Fondo del Cajon..	[m] :	.25
Recubrimiento	[m] :	.045
Espesor del Pavimento	[m] :	.08
Espesor placa encofrado perd.	[m] :	.065
Ancho cabeza superior viga ..	[m] :	2.7934
Lado medio MAYOR	[m] :	1.8613
Lado medio MENOR	[m] :	1.5713
Diam. mayor circun. inscrita	[m] :	1.4
Dis. arm. act. para. mas prox	[m] :	.075
Distan. X donde tomamos datos	[m] :	6.05

CARACTERISTICAS MECANICAS

INICIALES

Via [m]	=	0.666810
Vib [m]	=	0.433190
Area .. [m2]	=	0.890821
Inercia [m4]	=	0.129854
Peso .. [Tn]	=	2.106304
Alma ... [m]	=	0.440000

FINALES

Vfa [m]	=	0.223720
Vfb [m]	=	0.876280
Vfc [m]	=	0.523720
Inercia [m4]	=	0.461741

RESISTENCIAS MATERIALES

Fck del cajon [Tn/m2]. :	5000
Fck de la Losa [Tn/m2]. :	2500
Fyk [Tn/m2]. :	51000
Mod. Elasticidad Hormi. :	3000000

CORTANTES [Tn.]

DEBIDO a	En el EXTREMO	En X
Peso Propio ...	21.64	8.899
Peso Losa	37.11	15.26
Pavimento	92.849	66.204
Aceras	20.433	14.243
Sobrecargas ...	0	0
Carro	133.864	93.39

PG. RES [MTn.]

DEBIDO a	En el EXTREMO	En X
Pavimento	24.418	26.341
Aceras	6.223	5.132
Sobrecargas ...	0	0
Carro	23.854	39.355

FLECTORES [MTn.]

DEBIDO a	En X	En el CENTRO
Peso Propio ...	92.3877	111.187
Peso Losa	158.431	190.669
Pavimento	202.358	254.501
Aceras	38.324	49.907
Sobrecargas ...	0	0
Carro	406.956	430.759

TENSIONES

Tensiones debidas a la Flexion en cada fase y seccion
En las fibras [A-B-C] de la losa

A 6.05 m. del Apoyo

Sa = 474.41776	Sb =-308.20334	Sc = 0
Sa = 813.55504	Sb =-528.52228	Sc = 0
Sa = 98.04528999999999	Sb =-384.02972	Sc = 229.5203
Sa = 18.56851	Sb =-72.7303	Sc = 43.46819
Sa = 0	Sb = 0	Sc = 0
Sa = 197.1759	Sb =-772.3104	Sc = 461.58128
TOTALES		
Sa = 1601.7624	Sb =-2065.79616	Sc = 734.56976

En el Centro de la Viga

Sa = 570.95356	Sb =-370.91736	Sc = 0
Sa = 979.0996	Sb =-636.06756	Sc = 0
Sa = 123.30931	Sb =-482.98536	Sc = 288.66242
Sa = 24.18064	Sb =-94.71221	Sc = 56.60597
Sa = 0	Sb = 0	Sc = 0
Sa = 208.70878	Sb =-817.4832	Sc = 488.57936
TOTALES		
Sa = 1906.252	Sb =-2402.1656	Sc = 833.84768

ARMADO DE CAJONES
(c) Oficina Técnica

PRETENSADO

CENTRO DE VIGA

FILA	CABLES	TIPO	COTA
1	33	0.6	4
2	28	0.6	9
3	6	0.6	106

Valor N [Tn] : 1313.2
Excentricidad [m] : .2809

TENSIONES DE PRETENSADO ... [Tn/m2]
Iniciales

Pa = -399.395
Pb = 2569.691

Finales

Pa = -336.333
Pb = 2163.95

a 6.05 m. Apoyo

FILA	CABLES	TIPO	COTA
1	33	0.6	4
2	26	0.6	9
3	6	0.6	106

Valor N [Tn] : 1274
Excentricidad [m] : .279

TENSIONES DE PRETENSADO ... [Tn/m2]
Iniciales

Pa = -375.571
Pb = 2485.252

Finales

Pa = -316.27
Pb = 2092.844

EN EL EXTREMO

FILA	CABLES	TIPO	COTA
1	33	0.6	4
2	16	0.6	9
3	6	0.6	106

Valor N [Tn] : 1078
Excentricidad [m] : .2673

TENSIONES DE PRETENSADO ... [Tn/m2]
Iniciales

Pa = -256.45
Pb = 2063.056

Finales

Pa = -215.958
Pb = 1737.31

ARMADO DE CAJONES
(c) Oficina Técnica

RESUMEN DE TENSIONES

CENTRO DE LA VIGA

FABRICACION Y MONTAJE
Sa = 171.5592
Sb = 2198.774

TOTAL PERMANENTES
Sa = 1361.211
Sb = 579.2683

TOTAL SOBRECARGA
Sa = 1569.92
Sb = -238.2149

a 6.05 m. del APOYO

FABRICACION Y MONTAJE
Sa = 98.8472
Sb = 2177.049

TOTAL PERMANENTES
Sa = 1088.317
Sb = 799.3585

TOTAL SOBRECARGA
Sa = 1285.493
Sb = 27.048

EN EL EXTREMO

FABRICACION Y MONTAJE
Sa = -256.4494
Sb = 2063.056

SERVICIO
Sa = -215.9574
Sb = 1737.311

COMPROBACION ESTADOS LIMITE

Traccion Maxima en Fibra Inferior Viga
Sb = -238.2149 [Admisible]
Compresion Maxima en Fibra Superior Viga
Sa = 1569.92
Compresion Maxima en Fibra Superior Losa
Sc = 833.8477 Fck 28 >= 133.4 [Kg/cm2]
Compresion Maxima en Fase de Fabricacion
Sb = 2063.056

RESISTENCIAS HORMIGON [Kg/cm2]

Fase de Fabricacion : Fck = 309.4
A 28 dias : Fck = 500 >= 235.35
En la Losa Reparto : Fck = 250 >= 133.4

ARMADO DE CAJONES
(c) Oficina Técnica

ARMADURAS DE CORTANTE [EP-93]

Acero FY [Kg/cm2] >= 5100

A 6.05 m. del APOYO

Espesor del Alma.. [cm] : 44
Act'k [Tn] : 283.4823
/cuo [Tn] : 55.08832
Armadura Minima [cm/ml] : 5.238095

[ALMAS]
..... [Tn] : 197.996
RD [Tn] : 296.994
Sigma CL'D [Tn/m2] : 1005.85
Sigma XD [Tn/m2] : -1457.472
otagente : 2.478168
Compresion Oblicua Valida]
ona C
/cu [Tn] : -87.81938
90 [cm2/ml por Alma] : 14.8245

[FONDO]
90 [cm2/ml] : 24.32307

EXTREMO DE LA VIGA

Espesor del Alma.. [cm] : 44
Act'k [Tn] : 283.4823
/cuo [Tn] : 55.08832
Armadura Minima [cm/ml] : 5.238095

[ALMAS]
..... [Tn] : 305.896
RL [Tn] : 458.844
igma CL'D [Tn/m2] : 0
igma XD [Tn/m2] : -181.3018
otagente : 1.28045
Compresion Oblicua Valida]
ona AB
90 [cm2/ml por Alma] : 31.47881

[FONDO]
90 [cm2/ml] : 12.07237

ARMADO DE CAJONES
(c) Oficina Técnica

TORSION

EXTREMO

AE .. [m2] = 2.00235
HE ... [m] = .22
COEFICIENTE DE FLEXO-TORSION .963309 [Seccion Valida]

ARMADURA TRANSVERSAL Y LONGITUDINAL
4.859914 [cm2/ml]

A 6.05 m. del APOYO

AE .. [m2] = 2.00235
HE ... [m] = .22
COEFICIENTE DE FLEXO-TORSION .9530406 [Seccion Valida]

ARMADURA TRANSVERSAL Y LONGITUDINAL
6.316507 [cm2/ml]

DISTRIBUCION DE ESTRIBOS Y BARRAS LONGITUDINALES

EXTREMO

[ALMAS]
Estribos S= 36.3387 cm2/ml
*** Se dispone ϕ 12 c/ .05 m. [45.2 cm2/ml] ***
Barras S'= 4.8599 cm2/ml
*** Se dispone ϕ 10 c/ .325 m. [4.861539 cm2/ml] ***

[FONDO]
Estribos F = 16.9322 cm2/ml
*** Se dispone ϕ 12 c/ .1 m. [22.6 cm2/ml] ***
Barras S'= 4.8599 cm2/ml
*** Se dispone ϕ 10 c/ .325 m. [4.861539 cm2/ml] ***

A 6.05 m. del Apoyo

[ALMAS]
Estribos S= 21.141 cm2/ml
*** Se dispone ϕ 12 c/ .1 m. [22.6 cm2/ml] ***
Barras S'= 6.3165 cm2/ml
*** Se dispone ϕ 10 c/ .25 m. [6.32 cm2/ml] ***

[FONDO]
Estribos F = 30.6395 cm2/ml
*** Se dispone ϕ 12 c/ .05 m. [45.2 cm2/ml] ***
Barras S'= 6.3165 cm2/ml
*** Se dispone ϕ 10 c/ .25 m. [6.32 cm2/ml] ***

CALCULO DE LA ARMADURA TRANSVERSAL DE LA LOSA

ARMADO DE CAJONES

(c) Oficina Técnica

CALCULO A ROTURA

Pasiva de Tracción [Tn] = 0
I [Tn] = 1327.58
ZONA = I
Armadura Compresión [Tn] = 0
Recub. armadura compresión..... [m] = 0
Ancho eficaz [cm] = 512.5
Capa de compresión [cm] = 30
Profundidad de compresiones [cm] = 18.29
Dis. CDG Compr. Fibra Superior [cm] = 9.14
Dis. CDG Tracc. Fibra Inferior [cm] = 6.3
Canto Resistente [cm] = 124.5623
Momentos [MR+] [MTn] = 1653.66

[Coeficiente de seguridad a rotura 1.59 (admisible)]

I 1... [MTn] = 111.19
I 2... [MTn] = 190.67
I 3... [MTn] = 254.50
I 4... [MTn] = 49.91
I 6... [MTn] = 430.76
I total [MTn] = 1037.02

VOLUMEN DE TRACCIONES

SA [MTn] = 1569.91992
SB [MTn] = -238.21484
C ...[m] = 0.14492

ANCHO CABEZA INFERIOR [cm] 170.0000
VOLUMEN DE TRACCIONES [Tn] 29.3439

**ARMADURA
TRANSVERSAL
DE LA LOSA**

ARMADO TRANSVERSAL LOSA

ARMADURA CARA SUPERIOR:
ZONA ESVAJE

	M (Tn x m / ml)
CARGAS MUERTAS	-2,610
SOBRECARGA ACERAS	-0,086
TRENES DE CARGA	-15,022

TOTAL -17,718

MAYORADO -26,577

ARMADURA
POR METRO 9 Ø 20

ARMADURA CARA SUPERIOR:
ZONA CENTRO

	M (Tn x m / ml)
CARGAS MUERTAS	-2,462
SOBRECARGA ACERAS	-0,634
TRENES DE CARGA	-7,710

TOTAL -10,806

MAYORADO -16,210

ARMADURA
POR METRO 9 Ø 16

ARMADURA CARA INFERIOR:

	M (Tn x m / ml)
PESO PROPIO	0,416
CARGAS MUERTAS	2,525
SOBRECARGA ACERAS	0,000
TRENES DE CARGA	6,024

TOTAL 8,965

MAYORADO 13,448

ARMADURA
POR METRO 9 Ø 16

Obra : L.A.V.
Fecha: 17/11/1998
Hora : 13:42

CALCULO DE SECCIONES RECTANGULARES A FLEXION SIMPLE

1. Datos

- Materiales

f_{ck} [kp/cm²] = 250
 f_{yk} [kp/cm²] = 5100
 τ_c = 1.50
 τ_s = 1.15

- Sección

b [cm] = 100.0
 h [cm] = 30.0
 r [cm] = 4.0

2. Dimensionamiento

M_d [m·Mp] = 26.58

Plano de deformación de agotamiento

x [cm] = 10.8
 $1/r$ [1/m] · 1.E-3 = 32.36
 ϵ_s · 1.E-3 = 3.50
 ϵ_i · 1.E-3 = -6.21

Deformación y tensión de armaduras

Profundidad [cm]	Armadura [cm ²]	Deformación · 1.E-3	Tensión [kp/cm ²]
26.0	27.64	-4.91	-4434.8

A_{t_est} [cm²] = 27.64

ϕ [mm]	12	16	20	25
n° ϕ	25	14	9	6
n° capas	1	1	1	1
A_t [cm ²]	28.26	28.13	28.26	29.44
wk	0.17	0.20	0.22	0.25

Obra : L.A.V.
 Fecha: 17/11/1998
 Hora : 13:59

CALCULO DE SECCIONES RECTANGULARES A FLEXION SIMPLE

1. Datos

- Materiales

f_{ck} [kp/cm²] = 250
 f_{yk} [kp/cm²] = 5100
 r_c = 1.50
 r_s = 1.15

- Sección

b [cm] = 100.0
 h [cm] = 24.0
 r [cm] = 3.0

2. Dimensionamiento

M_d [m·Mp] = 13.45

Plano de deformación de agotamiento

x [cm] = 6.4
 $1/r$ [1/m] · 1.E-3 = 54.29
 ϵ_s · 1.E-3 = 3.50
 ϵ_i · 1.E-3 = -9.53

Deformación y tensión de armaduras

Profundidad [cm]	Armadura [cm ²]	Deformación · 1.E-3	Tensión [kp/cm ²]
21.0	16.47	-7.90	-4434.8

A_{t_est} [cm²] = 16.47

ϕ [mm]	12	16	20	25
$n^\circ \phi$	15	9	6	4
n° capas	1	1	1	1
A_t [cm ²]	16.96	18.09	18.84	19.62
w_k	0.17	0.19	0.21	0.25

Obra : L.A.V.
 Fecha: 17/11/1998
 Hora : 13:43

CALCULO DE SECCIONES RECTANGULARES A FLEXION SIMPLE

1. Datos

- Materiales

f_{ck} [kp/cm²] = 250
 f_{yk} [kp/cm²] = 5100
 r_c = 1.50
 r_s = 1.15

- Sección

b [cm] = 100.0
 h [cm] = 30.0
 r [cm] = 4.0

2. Dimensionamiento

M_d [m·Mp] = 16.21

Plano de deformación de agotamiento

x [cm] = 6.1
 $1/r$ [1/m] · 1.E-3 = 50.16
 ϵ_s · 1.E-3 = 3.04
 ϵ_i · 1.E-3 = -12.01

Deformación y tensión de armaduras

Profundidad [cm]	Armadura [cm ²]	Deformación · 1.E-3	Tensión [kp/cm ²]
26.0	15.50	-10.00	-4434.8

A_{t_est} [cm²] = 15.50

ϕ [mm]	12	16	20	25
$n^\circ \phi$	14	8	5	4
n° capas	1	1	1	1
A_t [cm ²]	15.83	16.08	15.70	19.62
w_k	0.21	0.26	0.33	0.28

CALCULO DE LOS NEOPRENOS

Dimensionamiento de neoprenos para puentes de vigas ferrocarril

IPF

ENTRADAS DE DATOS	SOLUCION 3 C-110	SALIDA DE DATOS
-------------------	------------------	-----------------

Luz vano	Ancho tablero	R máx.(ton)	R mín.(ton)	Nº Vigas	Nº Vanos	Vel. (km/h)	Radio (m)	sismo Lon (ton)	Hsismo tr.(ton)	Hviento(ton)
20.55	14.20	322.150	92.490	3	1	200	15000	0.000	0.000	24.797

Hfren tot (ton)	Hcentrif (ton)	Hlazo (ton)	a (cm)	b (cm)	An (cm2)	σ máx (kg/cm2)	σ mín (kg/cm2)	e mín(mm)	e máx(mm)
61.650	10.356	5.000	45	60	2700	119.315	34.256	45	90

e n (mm)	f1	Deslizamiento	δ reol.(mm)	δ fren.(mm)	δ centrif (mm)	δ lazo (mm)	δ sismo lon.(mm)	δ sismo tr.(mm)	δ viento(mm)	δ total.(mm)
49	0.275	NO	8.22	13.32	2.24	1.08	0.00	0.00	5.36	23.22

COMPROBACIONES

Reológica	r+0.5fr+c	reol+viento	r+0.5fr+c+0.3 v	r+s+0.3 v
Cumple	Cumple	Cumple	Cumple	Cumple

EC1-UIC

ENTRADAS DE DATOS	SOLUCION 3 C-110	SALIDA DE DATOS
-------------------	------------------	-----------------

Luz vano	Ancho tablero	R máx.(ton)	R mín.(ton)	Nº Vigas	Nº Vanos	Vel. (km/h)	Radio (m)	sismo Lon (ton)	Hsismo tr.(ton)	Hviento(ton)
20.55	14.20	350.570	89.830	3	1	200	15000	0.000	0.000	26.791

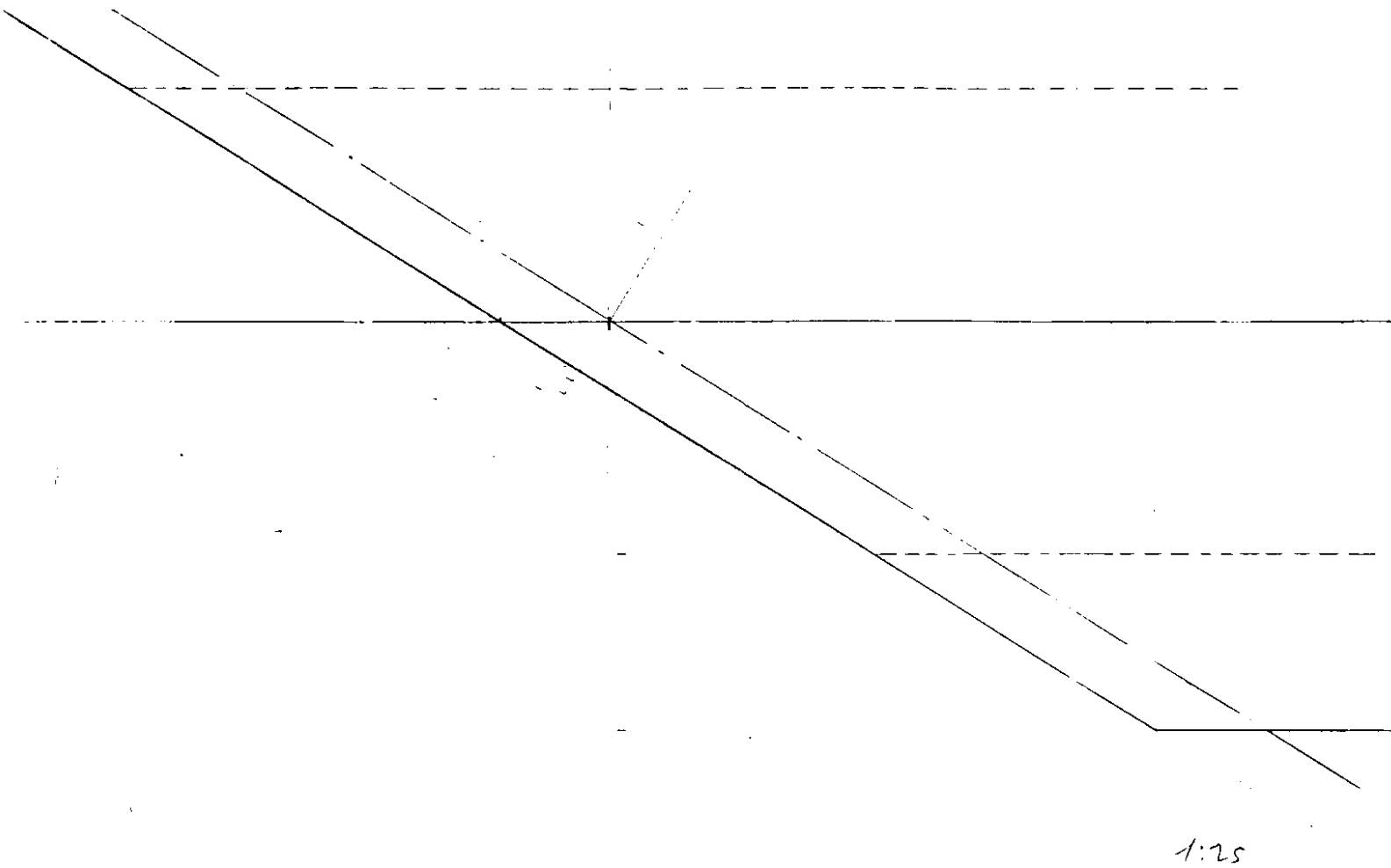
Hfren tot (ton)	Hcentrif (ton)	Hlazo (ton)	a (cm)	b (cm)	An (cm2)	σ máx (kg/cm2)	σ mín (kg/cm2)	e mín(mm)	e máx(mm)
144.880	4.209	10.000	45	60	2700	129.841	33.270	45	90

e n (mm)	f1	Deslizamiento	δ reol.(mm)	δ fren.(mm)	δ centrif (mm)	δ lazo (mm)	δ sismo lon.(mm)	δ sismo tr.(mm)	δ viento(mm)	δ total.(mm)
49	0.280	NO	8.22	31.30	0.91	2.16	0.00	0.00	5.79	40.50

COMPROBACIONES

Reológica	r+0.5fr+c	reol+viento	r+0.5fr+c+0.3 v	r+s+0.3 v
Cumple	Cumple	Cumple	Cumple	Cumple

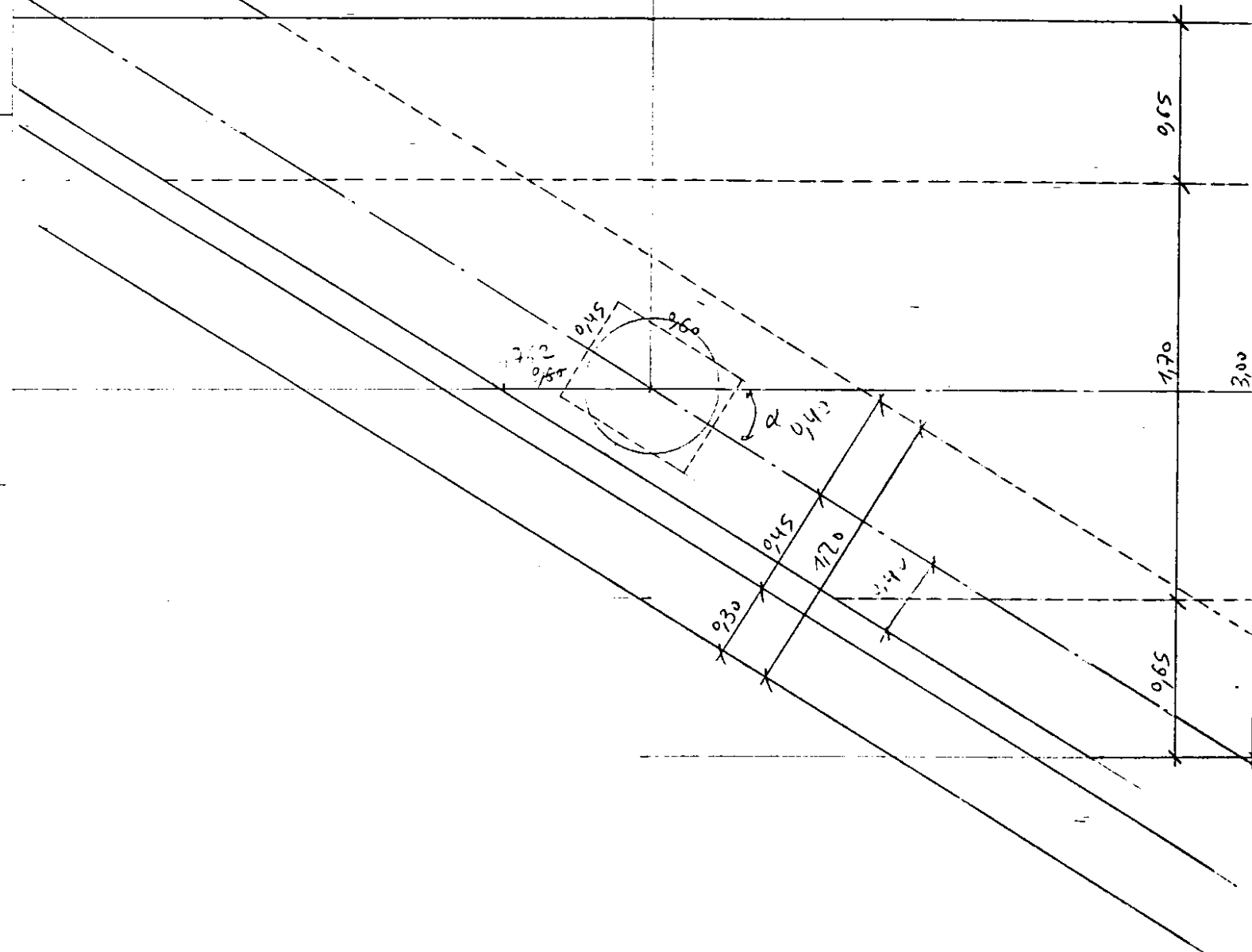
Fuerzas sobre los Apoyos



COORDENADAS BASE LOS Muros

$$R = 139,57 \text{ T.}$$

$$U_T = 0,30 \times 139,57 \times 1,60 \times \left(1 - \frac{0,45}{2 \times 0,40}\right) = 27,41 \text{ T.} \Rightarrow 5 \phi 16^{AIS} / \text{Armadura} \dots \dots$$

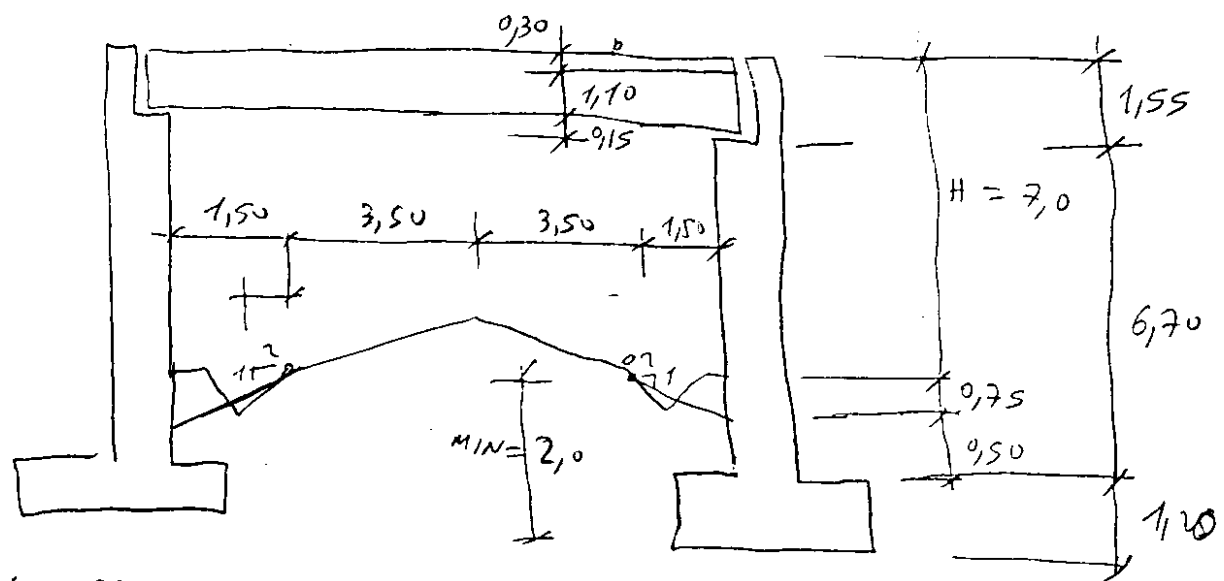


E=1:25

CALCULO DE LOS ESTRIBOS

PI-562+7

$$H = 999,75 - 992,75 = 7,0$$



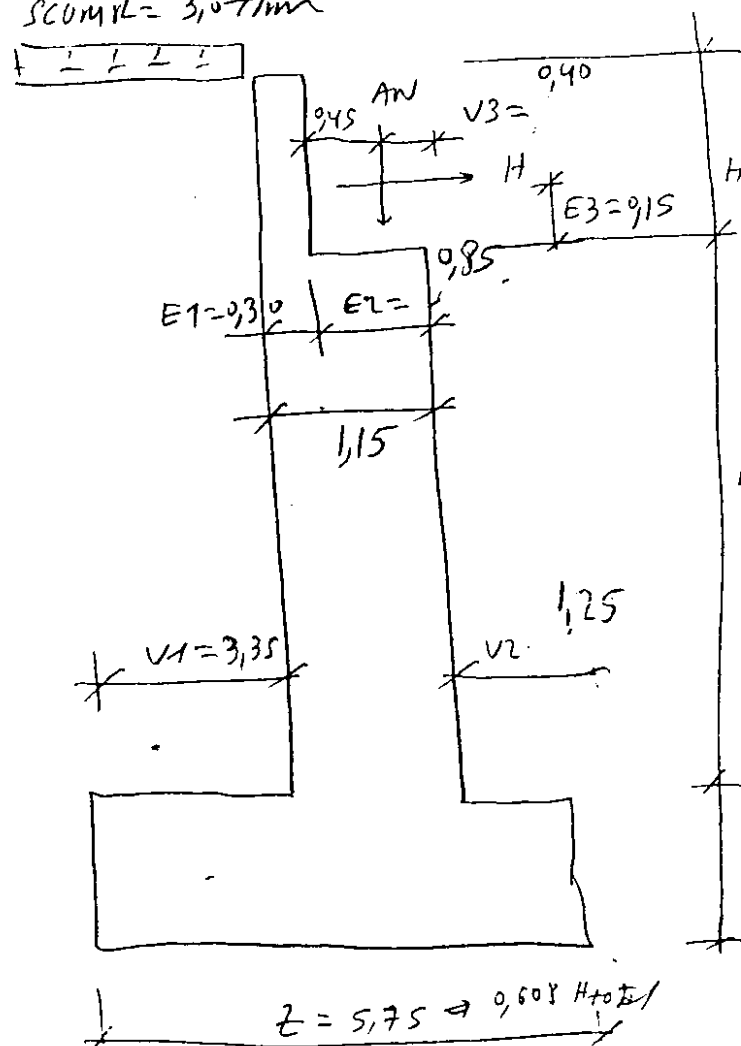
$$v_3 = \log(45 - \frac{35}{2}) = 0,271$$

Chengren = 49 mm 600 x 450

$t_{1/2} = 67 \text{ min}$

$$600 \times 450 \times 60 \text{ (ен-4р, 4 сери)}$$

$SCOMPL = 3,07 \text{ mm}$



H 2	H 3	
40,61	41,88	
39,07	40,27	2,0
27,27	28,50	2,25
26,45	27,86	2,15

$$t = 3, 4, 4, 4, \dots$$

$$= 5,65$$

7-575

$$H_2 = 6,70$$

$$= 37,5 \text{ T/m}$$

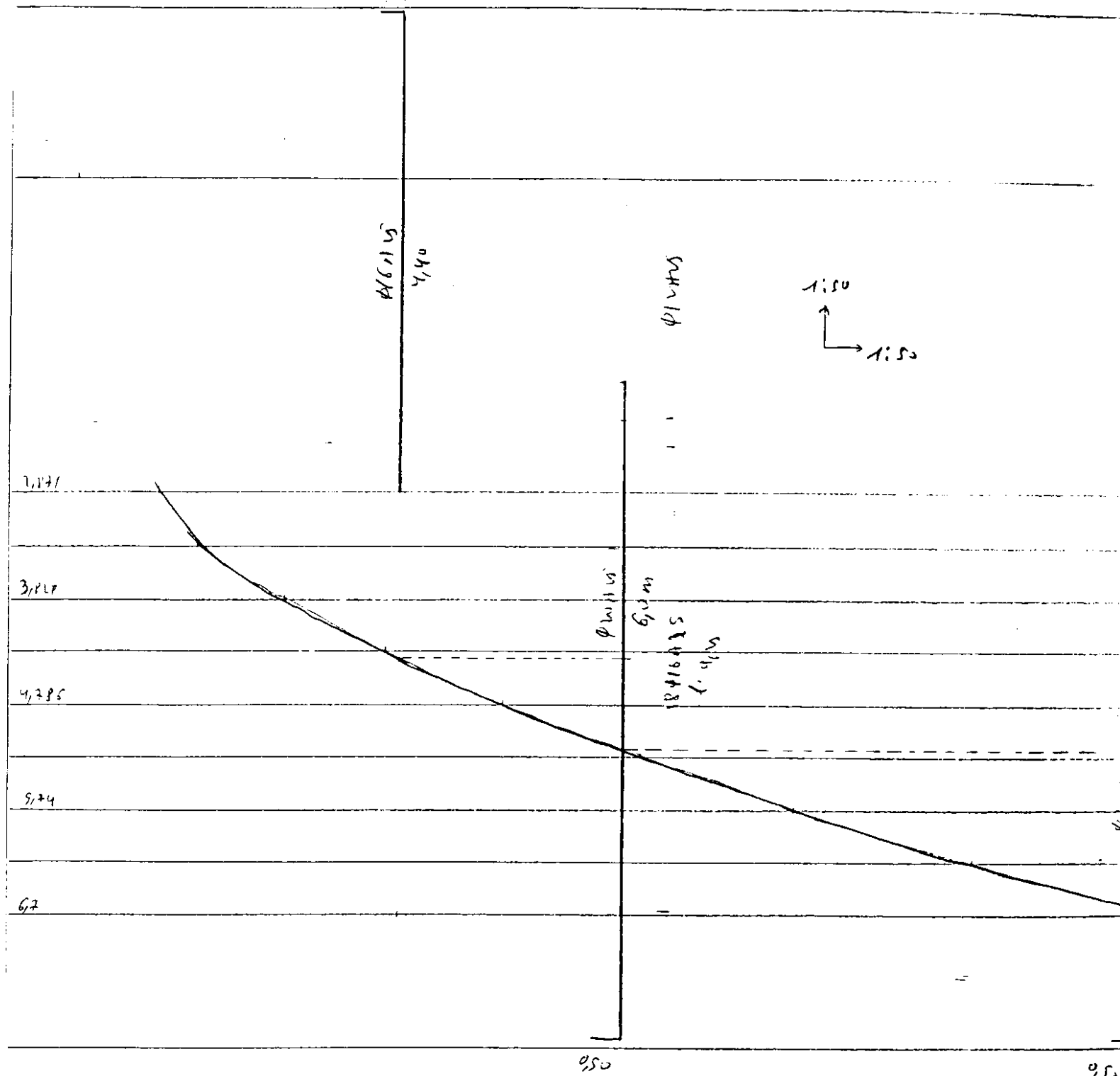
H7 - 9,45

$$H_3 = 1, 20$$

$$Z = 5,75 \Rightarrow \underline{0,608 \text{ H}_2\text{O}} /$$

5

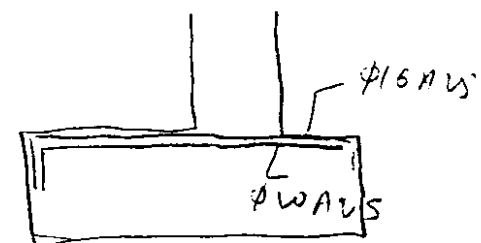
ETTRING MUMADURAS



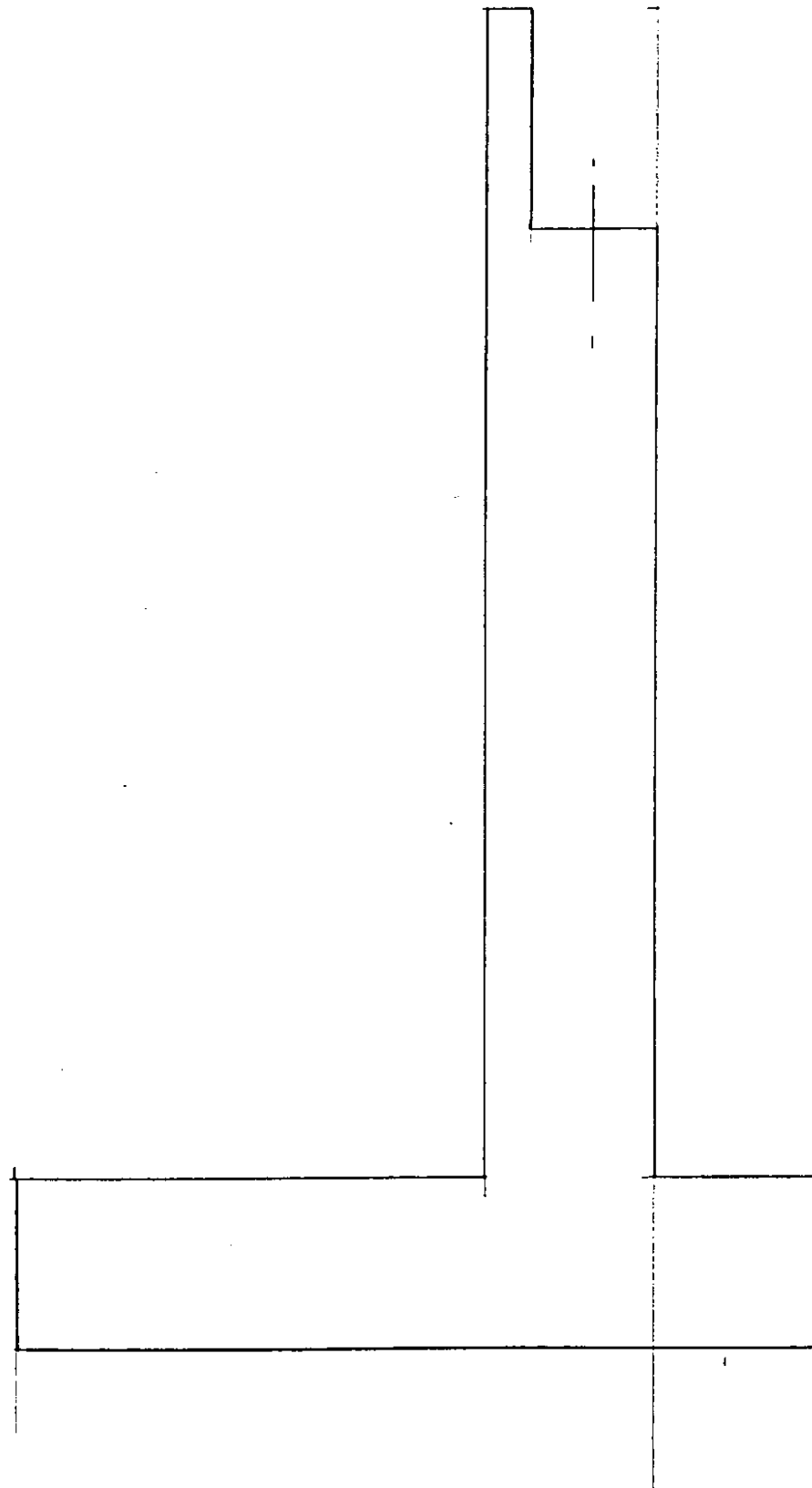
17th Nov

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TITULO : FFCC MADRID-BARCELONA. ESTRIBO DEL PI-562+700
=====

DIMENSIONES GEOMETRICAS DEL ESTRIBO

ALTURA DEL MURETE = 1.550 M
" DE LA PARED DEL ESTRIBO = 6.700 M
CANTO DE LA ZAPATA = 1.200 M

ESPESOR DEL MURETE DEL TRASDOS = .300 M
ANCHO DE LA MESETA DE APOYO = .850 M
ALTURA DEL DADO DE APOYO = .150 M

VUELO TRASERO DE LA ZAPATA = 3.350 M
" DELANTERO " " = 1.250 M
SITUACION DE LA REACCION DEL TABLERO = .400 M
COEFICIENTE DE ROZAMIENTO ENTRE LA ZAPATA Y EL TERRENO= .550

CARACTERISTICAS DE LOS MATERIALES

RESIST CARACTERIST HORMIGON ZAPATA = 2500.000 T/M2
" " " ALZADO = 2250.000 T/M2

RECUBRIMIENTO ARMADURA DE LA ZAPATA= .070 M
" " DEL ALZADO = .060 M

PESO ESPECIFICO DEL HORMIGON = 2.500 T/M3
" " DE LAS TIERRAS = 2.000 T/M3

HIPOTESIS DE CALCULO = 1
=====

COEFICIENTE DE MAYORACION DE CARGAS = 1.500
COEFICIENTE DE EMPUJE DE LAS TIERRAS= .271
SOBRECARGA DE TRAFICO EN CORONACION = 1.000 T/M2
FUERZA VERTICAL APLICADA EN EL EJE DE APOYO = .000 T
FUERZA HORIZONTAL APLICADA EN EL EJE DE APOYO= .000 T

ESFUERZOS Y ARMADURAS DEL MURETE DEL TRASDOS (TRASDOS)

PROFUND	ESFUERZOS CARACTERISTICOS	ARMADURA NECESARIA
SECCION	AXII	TRACCION COMPRESION

.388	.291	.146	.026	.000	.000
.775	.581	.373	.123	.209	.044
1.163	.872	.681	.325	1.175	.065
1.550	1.163	1.071	.662	2.994	.087

ESFUERZOS Y ARMADURAS DEL CUERPO DEL ESTRIBO (TRASDOS)

PROFUND SECCION	ESFUERZOS AXIL	CARACTERISTICOS CORTANTE	MOMENTO	ARMADURA NECESARIA TRACCION	COMPRESION
M	T	T	MT	T	T
.479	2.538	1.665	.818	.000	.000
.957	3.914	2.383	1.781	.000	.000
1.436	5.290	3.225	3.118	.000	.000
1.914	6.666	4.191	4.888	1.229	.500
2.393	8.042	5.282	7.150	3.207	.603
2.871	9.418	6.496	9.963	5.962	.706
3.350	10.794	7.835	13.387	9.589	.810
3.829	12.170	9.297	17.481	14.190	.913
4.307	13.546	10.884	22.306	19.873	1.016
4.786	14.921	12.595	27.919	26.752	1.119
5.264	16.297	14.430	34.381	34.949	1.222
5.743	17.673	16.390	41.751	44.595	1.325
6.221	19.049	18.473	50.088	55.835	1.429
6.700	20.425	20.681	59.452	68.821	1.532

DIMENSIONAMIENTO DE LA ZAPATA

RESULTANTE DE LAS FUERZAS HORIZONTALES	=	26.762 T
" " " " VERTICALES	=	96.300 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO=		1.979
MOMENTO DE VUELCO	=	88.334 MT
" " ESTABILIDAD	=	326.260 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO	=	3.694
MOMENTO RESPECTO DEL CENTRO DE LA ZAPATA	=	38.936 MT
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA=		.404 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPECIAL
TENSION EN EL VERTICE DELANTERO = 23.814 T/M2
" " " " TRASERO = 9.682 T/M2

ARMADURA DEL VUELO DELANTERO (INFERIOR)

DISTANC AL BORDE	ESFUERZOS CORTANTE	CARACTER MOMENTO	ARMADURA NECESARIA TRACCION	COMPRESION
M	T	MT	T	T
.474	9.593	2.296	2.961	.000

ARMADURA DEL VUELO TRASERO (SUPERIOR)

DISTANC AL BORDE	ESFUERZOS CORTANTE	CARACTER MOMENTO	ARMADURA NECESARIA TRACCION	COMPRESION
M	T	MT	T	T
.479	4.896	1.194	1.539	.000
.957	9.229	4.596	5.937	.000
1.436	12.999	9.937	12.885	.000
1.914	16.206	16.948	22.083	.000
2.393	18.850	25.359	33.236	.000
2.871	20.931	34.900	46.043	.000
3.350	22.450	45.303	60.195	.000

HIPOTESIS DE CALCULO = 2
=====

COEFICIENTE DE MAYORACION DE CARGAS = 1.500
COEFICIENTE DE EMPUJE DE LAS TIERRAS= .271
SOBRECARGA DE TRAFICO EN CORONACION = 3.000 T/M2
FUERZA VERTICAL APLICADA EN EL EJE DE APOYO = 17.176 T
FUERZA HORIZONTAL APLICADA EN EL EJE DE APOYO= 1.125 T

ESFUERZOS Y ARMADURAS DEL MURETE DEL TRASDOS (TRASDOS)

PROFUND SECCION	ESFUERZOS AXIL	CARACTERISTICOS CORTANTE	MOMENTO	ARMADURA NECESARIA TRACCION	COMPRESION
M	T	T	MT	T	T
.388	.291	.356	.066	.131	.022
.775	.581	.793	.286	1.205	.044
1.163	.872	1.311	.691	3.444	.065
1.550	1.163	1.911	1.313	7.106	.087

ESFUERZOS Y ARMADURAS DEL CUERPO DEL ESTRIBO (TRASDOS)

PROFUND SECCION	ESFUERZOS AXIL	CARACTERISTICOS CORTANTE	MOMENTO	ARMADURA NECESARIA TRACCION	COMPRESION
M	T	T	MT	T	T
.479	19.714	2.764	5.646	.000	.000
.957	21.090	3.742	7.736	.000	.000
1.436	22.466	4.843	10.324	.000	.000
1.914	23.842	6.069	13.468	.000	.000
2.393	25.218	7.419	17.229	3.709	1.891
2.871	26.594	8.892	21.665	8.920	1.995
3.350	27.970	10.490	26.837	15.249	2.098
3.829	29.346	12.213	32.803	22.814	2.201

5.284	33.473	18.134	58.052	54.211	2.819
5.743	34.849	20.342	65.799	68.119	2.614
6.221	36.225	22.685	76.629	83.975	2.717
6.700	37.601	25.152	88.609	102.000	2.820

COEFICIENTE DE EMPUJE DE LAS TIERRAS= 3.271
 SOBRECARGA DE TRAFICO EN CORONACION = 3.000 T/M2
 FUERZA VERTICAL APLICADA EN EL EJE DE APOYO = 18.269 T
 FUERZA HORIZONTAL APLICADA EN EL EJE DE APOYO= 1.586 T

ESFUERZOS Y ARMADURAS DEL MURETE DEL TRASDOS (TRASDOS)

PROFUND SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MOMENTO MT	ARMADURA NECESARIA TRACCION T	COMPRESION T
.388	.291	.356	.066	.131	.022
.775	.581	.793	.286	1.205	.044
1.163	.872	1.311	.691	3.444	.065
1.550	1.163	1.911	1.313	7.106	.087

ESFUERZOS Y ARMADURAS DEL CUERPO DEL ESTRIBO (TRASDOS)

PROFUND SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MOMENTO MT	ARMADURA NECESARIA TRACCION T	COMPRESION T
.479	20.807	2.764	6.127	.000	.000
.957	22.183	3.742	8.438	.000	.000
1.436	23.559	4.843	11.246	.000	.000
1.914	24.935	6.069	14.611	.254	1.870
2.393	26.311	7.419	18.593	4.788	1.973
2.871	27.687	8.892	23.250	10.337	2.077
3.350	29.063	10.490	28.642	17.014	2.180
3.829	30.439	12.213	34.828	24.938	2.283
4.307	31.815	14.059	41.869	34.238	2.386
4.786	33.190	16.029	49.822	45.053	2.489
5.264	34.566	18.124	58.749	57.530	2.592
5.743	35.942	20.342	68.707	71.832	2.696
6.221	37.318	22.685	79.757	88.135	2.799
6.700	38.694	25.152	91.958	106.629	2.902

DIMENSIONAMIENTO DE LA ZAPATA

RESULTANTE DE LAS FUERZAS HORIZONTALES = 33.470 T
 " " " " VERTICALES = 121.269 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO= 1.993
 MOMENTO DE VUELCO = 125.302 MT
 " " ESTABILIDAD = 383.707 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 3.062
 MOMENTO RESPECTO DEL CENTRO DE LA ZAPATA = 90.244 MT
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO
 DEL CENTRO DE LA ZAPATA= .744 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPEZIAL

DIMENSIONAMIENTO DE LA ZAPATA

RESULTANTE DE LAS FUERZAS HORIZONTALES = 33.009 T
 " " " " VERTICALES = 120.176 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO= 2.002
 MOMENTO DE VUELCO = 121.591 MT
 " " ESTABILIDAD = 381.903 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 3.141
 MOMENTO RESPECTO DEL CENTRO DE LA ZAPATA = 85.194 MT
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO
 DEL CENTRO DE LA ZAPATA= .709 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPEZIAL
 TENSION EN EL VERTICE DELANTERO = 36.361 T/M2
 " " " " TRASERO = 5.440 T/M2

ARMADURA DEL VUELO DELANTERO (INFERIOR)

DISTANC AL BORDE M	ESFUERZOS CORTANTE T	CARACTER MOMENTO MT	ARMADURA NECESARIA TRACCION T	COMPRESION T
.474	15.214	3.655	4.718	.000
.948	29.219	14.237	18.515	.000
1.423	42.015	31.173	41.020	.000

ARMADURA DEL VUELO TRASERO (SUPERIOR)

DISTANC AL BORDE M	ESFUERZOS CORTANTE T	CARACTER MOMENTO MT	ARMADURA NECESARIA TRACCION T	COMPRESION T
.479	7.549	1.855	2.392	.000
.957	13.866	7.029	9.095	.000
1.436	18.951	14.931	19.427	.000
1.914	22.805	24.971	32.719	.000
2.393	25.428	36.562	48.291	.000
2.871	26.818	49.113	65.427	.000
3.350	26.977	62.034	83.369	.000

HIPOTESIS DE CALCULO = 3

ARMADURA DEL VUELO DELANTERO (INFERIOR)

DISTANC AL BORDE	ESFUERZOS CORTANTE	CARACTER MOMENTO	ARMADURA NECESARIA TRACCION	NECESARIA COMPRESION
M	T	MT	T	T
.474	15.703	3.773	4.872	.000
.948	30.125	14.689	19.110	.000
1.423	43.266	32.140	42.321	.000

ARMADURA DEL VUELO TRASERO (SUPERIOR)

DISTANC AL BORDE	ESFUERZOS CORTANTE	CARACTER MOMENTO	ARMADURA NECESARIA TRACCION	NECESARIA COMPRESION
M	T	MT	T	T
.479	7.860	1.933	2.492	.000
.957	14.415	7.315	9.467	.000
1.436	19.666	15.522	20.205	.000
1.914	23.612	25.930	33.997	.000
2.393	26.253	37.914	50.122	.000
2.871	27.590	50.849	67.821	.000
3.350	27.622	64.113	86.283	.000

HIPOTESIS DE CALCULO = 4

COEFICIENTE DE MAYORACION DE CARGAS = 1.500
 COEFICIENTE DE EMPUJE DE LAS TIERRAS = .271
 SOBRECARGA DE TRAFICO EN CORONACION = 3.000 T/M2
 FUERZA VERTICAL APLICADA EN EL EJE DE APOYO = 12.718 T
 FUERZA HORIZONTAL APLICADA EN EL EJE DE APOYO = .548 T

ESFUERZOS Y ARMADURAS DEL MURETE DEL TRASDOS (TRASDOS)

PROFUND SECCION	ESFUERZOS AXIL	CARACTERISTICOS CORTANTE	MOMENTO	ARMADURA NECESARIA TRACCION	NECESARIA COMPRESION
M	T	T	MT	T	T
.388	.291	.356	.066	.131	.022
.775	.581	.793	.286	1.205	.044
1.163	.872	1.311	.691	3.444	.065
1.550	1.163	1.911	1.313	7.106	.087

ESFUERZOS Y ARMADURAS DEL CUERPO DEL ESTRIBO (TRASDOS)

M	T	T	MT	T	T
.479	15.256	2.764	4.503	.000	.000
.957	16.632	3.742	6.317	.000	.000
1.436	18.008	4.843	8.629	.000	.000
1.914	19.384	6.069	11.497	.241	1.454
2.393	20.760	7.419	14.982	4.016	1.557
2.871	22.136	8.892	19.142	8.783	1.660
3.350	23.512	10.490	24.037	14.653	1.763
3.829	24.888	12.213	29.727	21.740	1.867
4.307	26.264	14.059	36.271	30.170	1.970
4.786	27.639	16.029	43.728	40.076	2.073
5.264	29.015	18.124	52.157	51.601	2.176
5.743	30.391	20.342	61.619	64.904	2.279
6.221	31.767	22.685	72.172	80.153	2.383
6.700	33.143	25.152	83.876	97.535	2.486

DIMENSIONAMIENTO DE LA ZAPATA

RESULTANTE DE LAS FUERZAS HORIZONTALES = 32.432 T
 " " " VERTICALES = 115.718 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.962
 MOMENTO DE VUELCO = 116.946 MT
 " " ESTABILIDAD = 374.548 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 3.203
 MOMENTO RESPECTO DEL CENTRO DE LA ZAPATA = 75.088 MT
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO
 DEL CENTRO DE LA ZAPATA = .649 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPECIAL
 TENSION EN EL VERTICE DELANTERO = 33.751 T/M2
 " " " " TRASERO = 6.498 T/M2

ARMADURA DEL VUELO DELANTERO (INFERIOR)

DISTANC AL BORDE	ESFUERZOS CORTANTE	CARACTER MOMENTO	ARMADURA NECESARIA TRACCION	NECESARIA COMPRESION
M	T	MT	T	T
.474	14.048	3.373	4.353	.000
.948	27.031	13.154	17.095	.000
1.423	38.948	28.839	37.888	.000

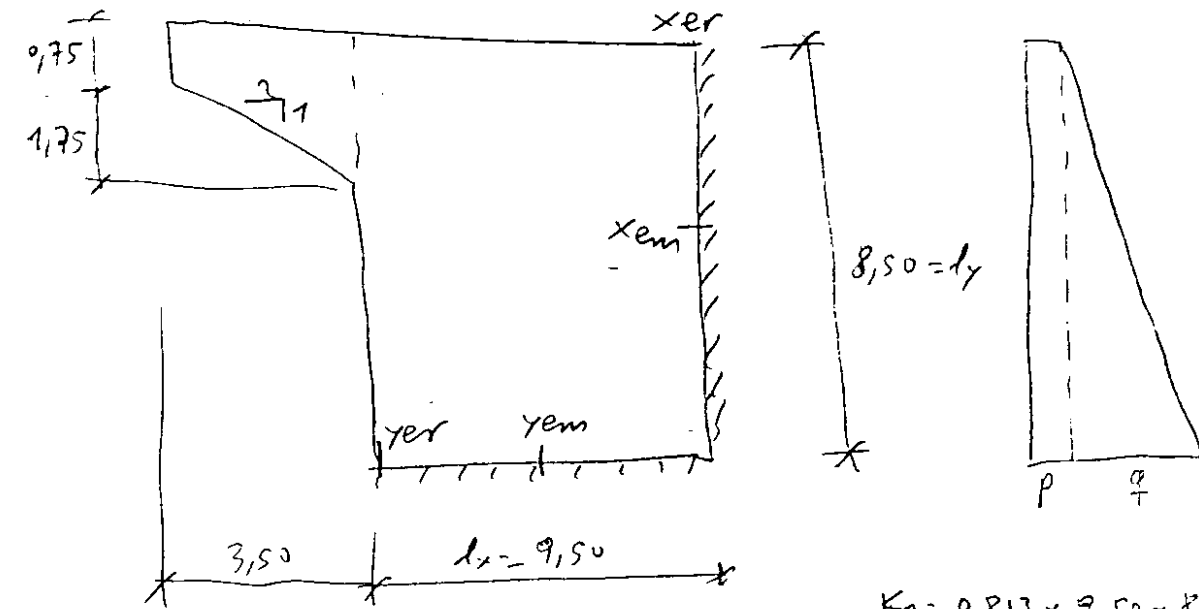
ARMADURA DEL VUELO TRASERO (SUPERIOR)

DISTANC AL BORDE	ESFUERZOS CORTANTE	CARACTER MOMENTO	ARMADURA NECESARIA TRACCION	NECESARIA COMPRESION
M	T	MT	T	T

1.136	13.089	14.154	18.157	.000
1.914	21.947	23.778	31.129	.000
2.393	24.721	34.988	46.162	.000
2.871	26.408	47.265	62.887	.000
3.350	27.010	60.091	80.651	.000

MAXIMOS CORTANTES CARACTERISTICOS SOPORTADOS POR LAS SECCIONES

SECCION DEL MURETE DEL TRASDOS =	9.798T
" " ALZADO DEL ESTRIBO =	44.499 T
" DE LA ZAPATA =	49.058 T



$$k_a = \tan^2\left(45^\circ - \frac{35^\circ}{2}\right) = 0.271$$

$$p = 3.0 \times 0.271 = 0.813$$

$$q = 0.271 \times 2.0 \times 8.50 = 4.607$$

$$K_p = 0.813 \times 9.50 \times 8.50 = 65.650$$

$$K_q = \frac{1}{2} \times 4.607 \times 9.50 \times 8.50 = 186.008$$

$$\frac{b_y}{b_x} = \frac{8.50}{9.50} = 0.895$$

$$\begin{aligned} x_{er} &= -65.65/3.23 - 186.008/6.60 = -20.325 - 28.182 = -48.508 \\ x_{em} &= - / 7.33 - / 9.40 = -8.956 - 19.788 = -28.744 \\ y_{er} &= - / 3.23 - / 4.11 = -20.325 - 45.257 = -65.582 \\ y_{em} &= - / 7.33 - / 7.74 = -8.956 - 24.032 = -32.988 \end{aligned}$$

$$\begin{aligned} b &= 1 \\ h &= 0.8 \\ d &= 0.75 \\ H &= 250 \end{aligned} \left\{ \begin{aligned} u.c.d &= \frac{0.8 \times 2500}{1.5} \times 1.0 \times 0.75^2 = 843.75 \text{ m} \\ u &= 0.87 \frac{1.5M}{4.75} \left(1 + \frac{1.5M}{843.75}\right) = 1.94 + M \times (1 + M/562.5) \end{aligned} \right.$$

$$U_{xer} = 102.22 \text{ } \phi w \text{ m/s} + \phi w \text{ m/s}$$

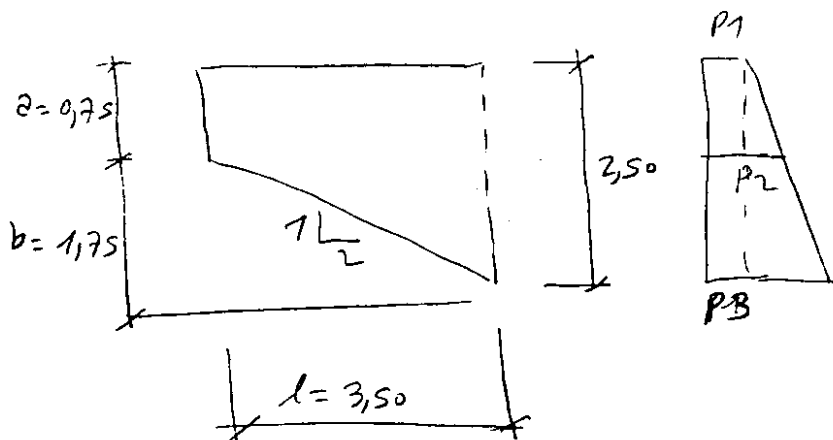
$$U_{xem} = 58.61 \text{ } \phi w \text{ m/s}$$

$$U_{yer} = 142.06 \Rightarrow \phi w \text{ m/s} + \phi w \text{ m/s}$$

$$U_{yem} = 67.75 \Rightarrow \phi w \text{ m/s}$$

CALCULO DE LAS ALETAS

CALCULO DEL VOLADIZO DE LA ALFALFA



$$P_1 = 0,271 \times 3,0 = 0,813$$

$$P_2 = 0,813 + 0,271 \times 7,0 \times 0,75 = 1,220$$

$$P_3 = 0,813 + 0,271 \times 7,0 \times 2,50 = 2,168$$

$$P = P_2 - P_1 = 0,407$$

$$Q = P_3 - P_1 = 1,355$$

$$V_1 = 0,75 \times 3,50 \times 0,813 = 2,104$$

$$x_1 = 3,50 / 2 = 1,75$$

$$V_2 = \frac{1,75 \times 3,50}{2} \times 0,813 = 2,480$$

$$x_2 = 3,50 / 3 = 1,167$$

$$V_3 = \frac{0,75 \times 3,50}{2} \times 0,407 = 0,534$$

$$x_3 = 3,50 / 2 = 1,75$$

$$V_4 = \frac{1,75 \times 3,50}{2} (2 \times 0,407 + 1,355) = 2,214$$

$$x_4 = \frac{3,50^2}{4} \frac{2 \times 0,407 + 1,355}{2 \times 0,407 + 1,355} = 1,039$$

$$M = 2,104 \times 1,75 + 2,480 \times 1,167 + 0,534 \times 1,75 + 2,214 \times 1,039 =$$

$$= 3,725 + 2,886 + 0,935 + 2,292 = 9,838 \text{ mT}$$

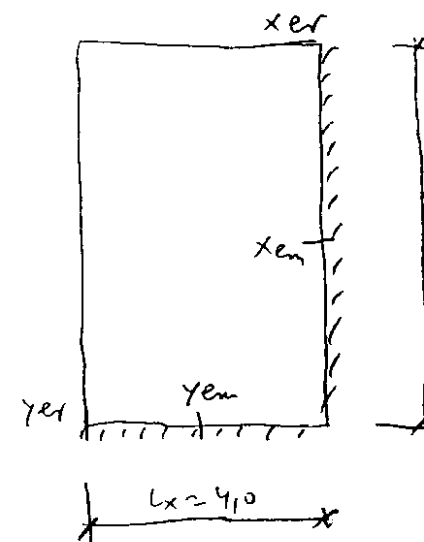
$$M = 9,838 / 2,50 = 3,935 \text{ mT/m}$$

$$M_d = 1,50 \times 2,950 = 4,425 \text{ mT/m}$$

centro medio = 4,50 m

$$b = 1,0 \quad h = 0,50 \quad d = 0,45 \quad V_{cd} = \frac{2500 \times 0,25}{1,5} \times 1,0 \times 0,45^2 = 303,75$$

$$V = 387 \frac{5,825}{0,45} \left(1 + \frac{5,825}{203,75} \right) = 13,02 \text{ T/m}$$



$$\frac{L_y}{L_x} = 2,125$$

$$K_p = 0,813 \times 4,0 \times 8,50 = 27,604$$

$$K_q = \frac{1}{2} 4,607 \times 4,0 \times 8,50 = 78,319$$

$$K_m = 3,950 \times 2,50 = 9,875$$

$$x_{er} = -27,604 / 4,18 - 78,319 / 1,720 - 9,875 / 2,26 = -6,613 - 45,504 - 4,369 = -56,986$$

$$x_{em} = -5,80 - 6,76 = -12,56$$

$$y_{er} = -4,88 - 4,75 = -9,63$$

$$y_{em} = -1,44 - 1,44 = -2,88$$

$$U_{xer} = 37,25 \text{ T/m}$$

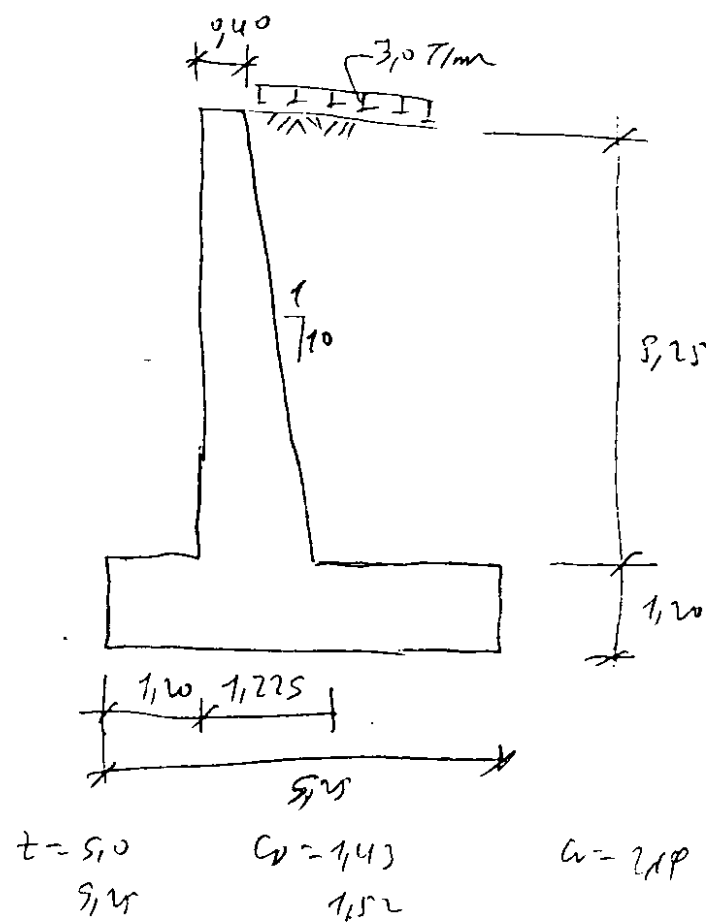
$$U_{xem} = 38,01$$

$$y_{er} = 56,98$$

$$y_{em} = 21,96$$

→ p.w.a.s

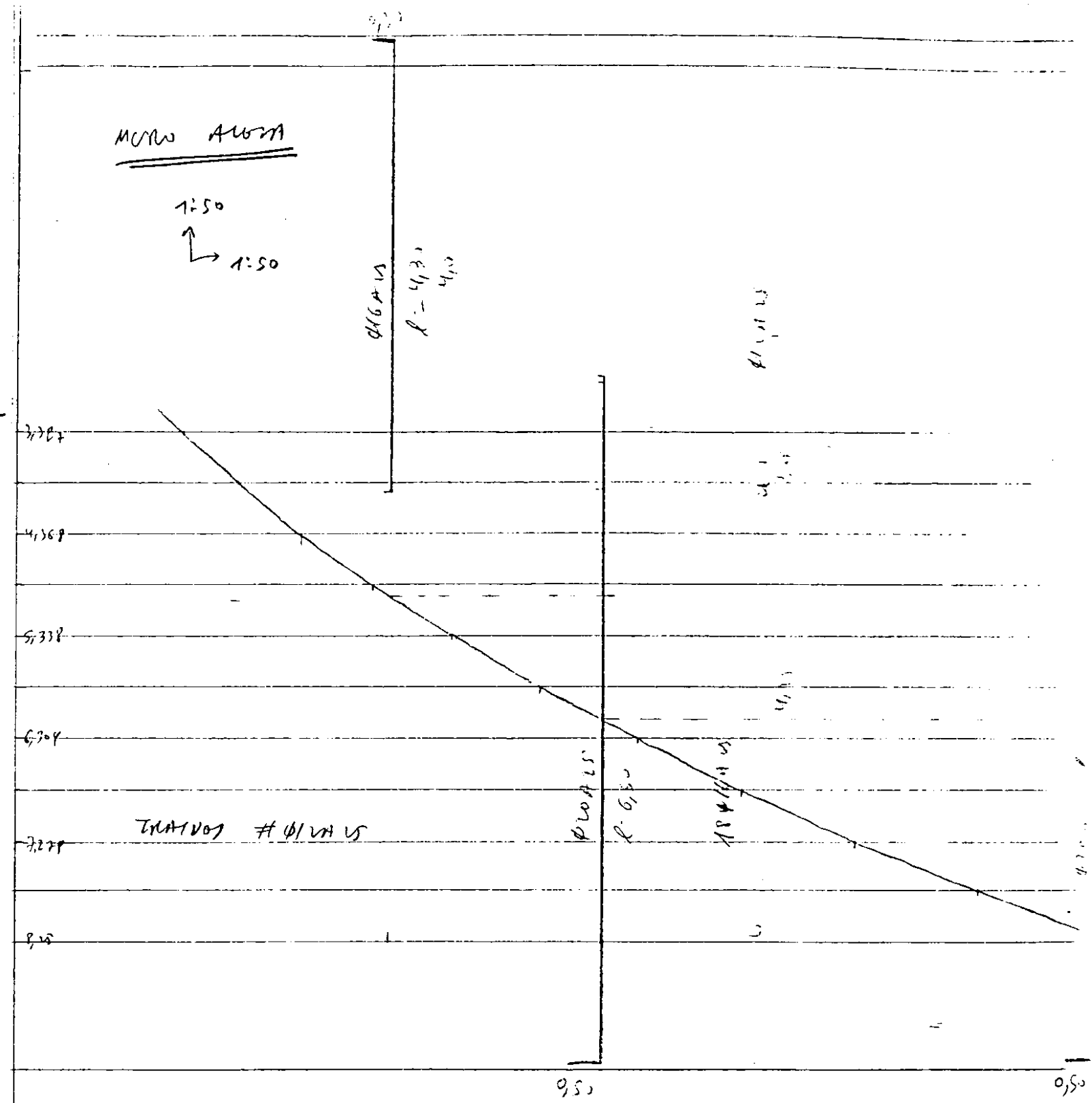
CALCULO DE LOS MUROS

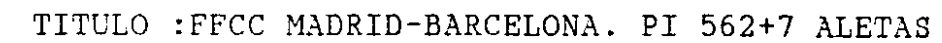


$$\sigma_{max, punta} = 30 \times 1.15 = 34.57 \text{ MPa}$$

$$t = 5.0$$

$$\sigma_{max} = 24.85$$





DIMENSIONES GEOMETRICAS DEL MURO

ANCHO DE LA CORONACION	=	.400 M
PROFUNDIDAD DEL PARAMENTO VERTICAL DEL INTRADOS	=	.000 M
" " " " " TRASDOS	=	.000 M
PROFUNDIDAD DE LOS PARAMENTOS INCLINADOS EN EL TRASDOS		
	ZONA SUPERIOR =	8.250 M
	ZONA INFERIOR =	.000 M
PROFUNDIDAD DEL TALUD DE TIERRAS EN EL TRASDOS	=	.000 M

PENDIENTE DEL TALUD DE TIERRAS	=	.00000000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.00000000
" " " SUPERIOR DEL TRASDOS	=	.10000000
" " " INFERIOR " "	=	.00000000

DIMENSIONES DE LA ZAPATA

VUELO DELANTERO	=	1.200 M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	1.200 M
" " " " " " " DCHO	=	1.200 M
LONGITUD TOTAL DE LA ZAPATA	=	5.250 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000

SITUACION DE LA CARGA CONCENTRADA EXTERIOR. DISTANCIA= .000 M
PROFUNDIDAD= .000 M

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	= .07000	M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	= 2250.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	= .06000	M
PESO ESPECIFICO DEL HORMIGON	= 2.50000	T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	= 2.00000	T/M3

HIPOTESIS = 1

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 °
SOBRECARGA UMR SOBRE EL RELLENO	=	3.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T

ANGULOS DE ROTAMIENTO DEL RELLENO CON EL TRASDOS
 EN LA ZONA VERTICAL = .000000 °
 " " " INCLINADA SUPERIOR = .000000 °
 " " " " INFERIOR = .000000 °
 DEL RELLENO CONSIGO MISMO = .000000 °

COEFICIENTES DE EMPUJE

ZONA DEL RELLENO. COMPONENTE HORIZONTAL KH= .270990
 " VERTICAL KV= .000000
 ZONA VERTICAL DEL MURO. COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000
 ZONA INCLINADA SUPERIOR.COMP HORIZONTAL KH= .309143
 " VERTICAL KV= .030914
 ZONA INCLINADA INFERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION N	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.485	.449	.736	.523	.083	.000	.000	22.572
.971	.497	1.593	1.191	.454	.150	.119	25.391
1.456	.546	2.570	2.005	1.184	1.399	.193	28.210
1.941	.594	3.668	2.965	2.343	3.393	.275	31.029
2.426	.643	4.886	4.071	4.003	6.121	.366	33.849
2.912	.691	6.225	5.321	6.234	9.584	.467	36.668
3.397	.740	7.684	6.718	9.107	13.782	.576	39.487
3.882	.788	9.264	8.260	12.691	18.723	.695	42.307
4.368	.837	10.965	9.948	17.058	24.415	.822	45.126
4.853	.885	12.786	11.781	22.278	30.867	.959	47.945
5.338	.934	14.728	13.760	28.422	38.090	1.105	50.765
5.824	.982	16.790	15.885	35.561	46.097	1.259	53.584
6.309	1.031	18.972	18.155	43.764	54.898	1.423	56.403
6.794	1.079	21.275	20.571	53.103	64.508	1.596	59.222
7.279	1.128	23.699	23.133	63.649	74.938	1.777	62.042
7.765	1.176	26.243	25.840	75.471	86.203	1.968	64.861
8.250	1.225	26.804	28.692	88.641	99.787	2.010	67.680

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.485	.449	.762	.784	.138	.000	.000	22.572
.971	.497	1.652	1.787	.707	.530	.083	25.391

2.912	.691	6.491	7.982	9.412	11.211	.325	36.668
3.397	.740	8.020	10.077	13.725	15.742	.401	39.487
3.882	.788	9.677	12.390	19.103	21.029	.484	42.307
4.368	.837	11.462	14.922	25.653	27.083	.573	45.126
4.853	.885	13.375	17.672	33.480	33.912	.669	47.945
5.338	.934	15.416	20.641	42.691	41.527	.771	50.765
5.824	.982	17.584	23.828	53.390	49.939	.879	53.584
6.309	1.031	19.880	27.233	65.684	59.159	.994	56.403
6.794	1.079	22.304	30.857	79.678	69.200	1.115	59.222
7.279	1.128	24.856	34.699	95.479	80.072	1.243	62.042
7.765	1.176	27.535	38.760	113.191	91.790	1.377	64.861
8.250	1.225	27.187	43.039	132.921	105.846	1.359	67.680

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION
 SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS
 LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO
 TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 31.883 T
 " " " " NORMALES " " " = 88.070 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.519
 MOMENTO DE VUELCO = 112.530 MT
 MOMENTO DE ESTABILIDAD = 272.599 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 2.422
 RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 31.883 T
 " " " " NORMALES " " " = 96.877 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 66.973 MT
 LONGITUD TOTAL DE LA ZAPATA = 5.250 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
 CENTRO DE LA ZAPATA = .691 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPEZIAL
 TENSION EN EL VERTICE DELANTERO = 33.032 T/M2
 TENSION EN EL VERTICE TRASERO = 3.874 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.461	1.200	.000	13.261	3.104	4.005	.000	72.94
.923	1.200	.000	25.341	12.052	15.650	.000	72.94
1.384	1.200	.000	36.239	26.299	34.491	.000	72.94

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	ARMAD. NECESARIA MOMENTO TRACCION MT	COMPRES T	CORTANTE VCU T
.471	1.200	.000	8.154	1.968	2.538	.000
.942	1.200	.000	15.077	7.485	9.689	.000
1.413	1.200	.000	20.769	15.973	20.798	.000
1.883	1.200	.000	25.230	26.850	35.227	.000
2.354	1.200	.000	28.459	39.538	52.328	.000
2.825	1.200	.000	30.458	53.456	71.424	.000

1.413	1.200	.000	31.494	22.424	19.452	.000	72.941
1.883	1.200	.000	39.559	39.254	34.317	.000	72.941
2.354	1.200	.000	45.017	59.266	52.291	.000	72.941
2.825	1.200	.000	47.867	81.235	72.394	.000	72.941

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA
ZAPATA QUE A CONTINUACION SE DEFINEN, SE
CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 47.824 T
" " " " NORMALES " " " = 88.070 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.013

MOMENTO DE VUELCO = 168.796 MT
MOMENTO DE ESTABILIDAD = 272.599 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.615

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 47.824 T
" " " " NORMALES " " " = 96.877 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 123.238 MT
LONGITUD TOTAL DE LA ZAPATA = 5.250 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
CENTRO DE LA ZAPATA = 1.272 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 4.059 M
TENSION EN EL VERTICE DELANTERO = 47.738 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	ARMAD. NECESARIA MOMENTO TRACCION MT	COMPRES T	CORTANTE VCU T
.461	1.200	.000	19.384	4.567	3.928	.000
.923	1.200	.000	36.266	17.497	15.143	.000
1.384	1.200	.000	50.646	37.638	32.880	.000

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	ARMAD. NECESARIA MOMENTO TRACCION MT	COMPRES T	CORTANTE VCU T
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PRUEBA DE CARGA

1.1.- Objeto de la prueba de carga.

La prueba de carga de una estructura, es un proceso que pretende, mediante la reproducción de un estado de carga sobre la misma parecido al de explotación, obtener datos suficientes de su respuesta frente a dicho estado.

1.2.- Magnitudes a medir.

Las magnitudes a medir serán las flechas verticales producidas en las secciones indicadas para diversos estados de carga.

Las flechas se medirán respecto de puntos fijos independientes de la estructura de la obra de fábrica.

En los planos adjuntos se ve la posición exacta de los puntos donde colocar los aparatos de medida.

1.3.- Aparatos de medida.

Los aparatos de medida que se utilicen deberán estar sancionados por la experiencia en pruebas similares y deberán garantizar una apreciación mínima del orden de un 5 % de los valores máximos esperados de las magnitudes que se vayan a medir.

Dichos aparatos deberán estar convenientemente protegidos frente a la insolación, vibraciones, etc.

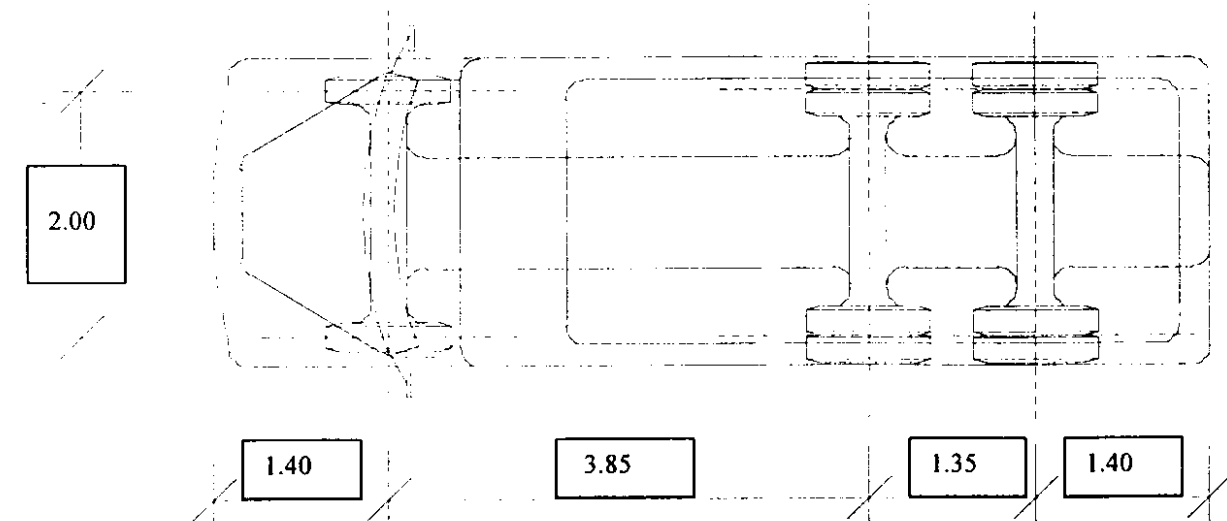
1.4.- Tren de cargas.

Dada la dificultad practica de materializar el tren de cargas de la Instrucción de Acciones en Puentes de Carreteras, se emplea un tren de cargas constituido por camiones como el del esquema adjunto. En los planos adjuntos se ve la colocación exacta de cada camión sobre el tablero para cada hipótesis de carga.

En el momento de realizar la prueba de carga se comprobará el peso real de cada camión, debiendo quedar garantizado que su valor se ha obtenido con una precisión no inferior al 5 % y que se mantiene sensiblemente constante durante el ensayo.

1.5.- Camión tipo

El camión tipo a utilizar es el del esquema adjunto, con unas cargas de cálculo de 6.0 T en el eje delantero y 12.0 T en cada eje trasero, totalizando un peso de 30 T



CAMION TIPO A UTILIZAR

1.6.- Hipótesis de carga.

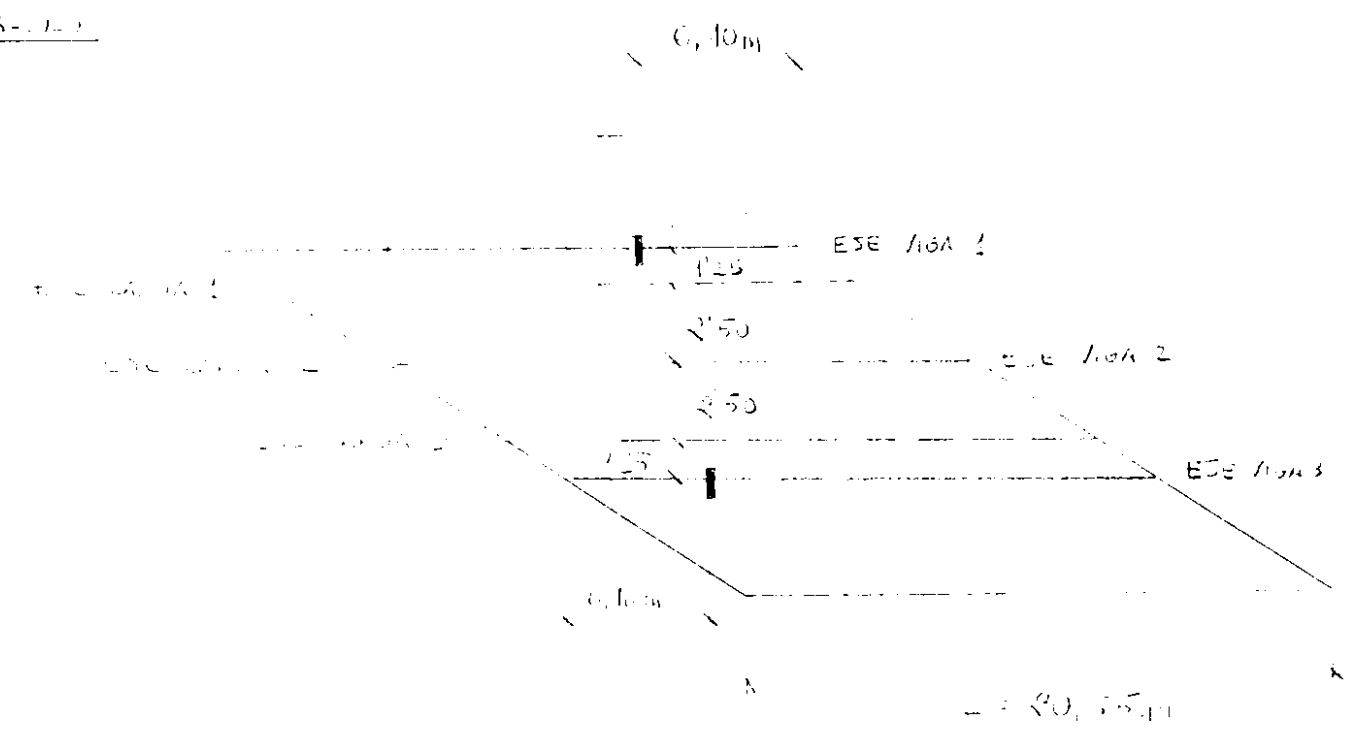
Se realizarán dos hipótesis de carga, consistentes en la colocación de los camiones y medida de las deformaciones en las posiciones y puntos indicados en los correspondientes planos adjuntos.

1.7.- Normativa.

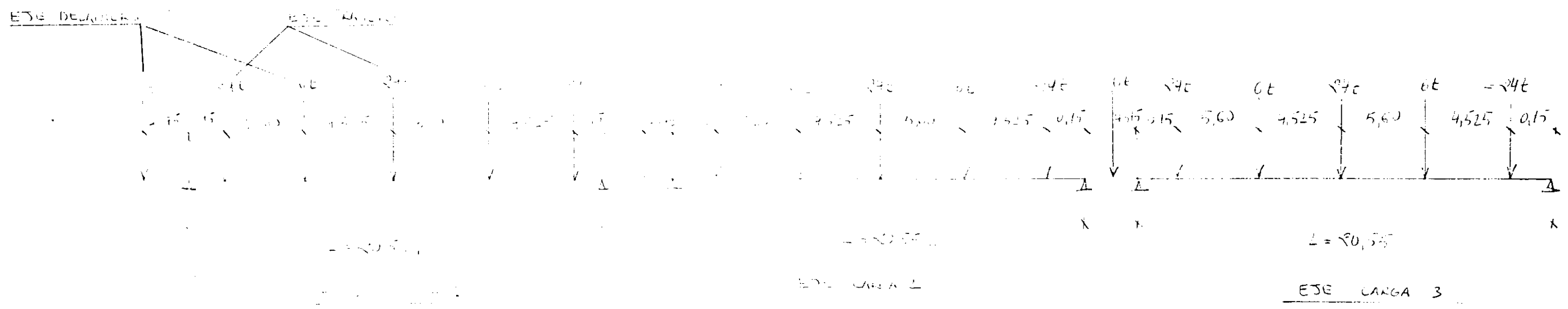
En la ejecución de las pruebas de carga se seguirán las "Recomendaciones para el proyecto y ejecución de las pruebas de carga en puentes de carretera" de Marzo de 1988.

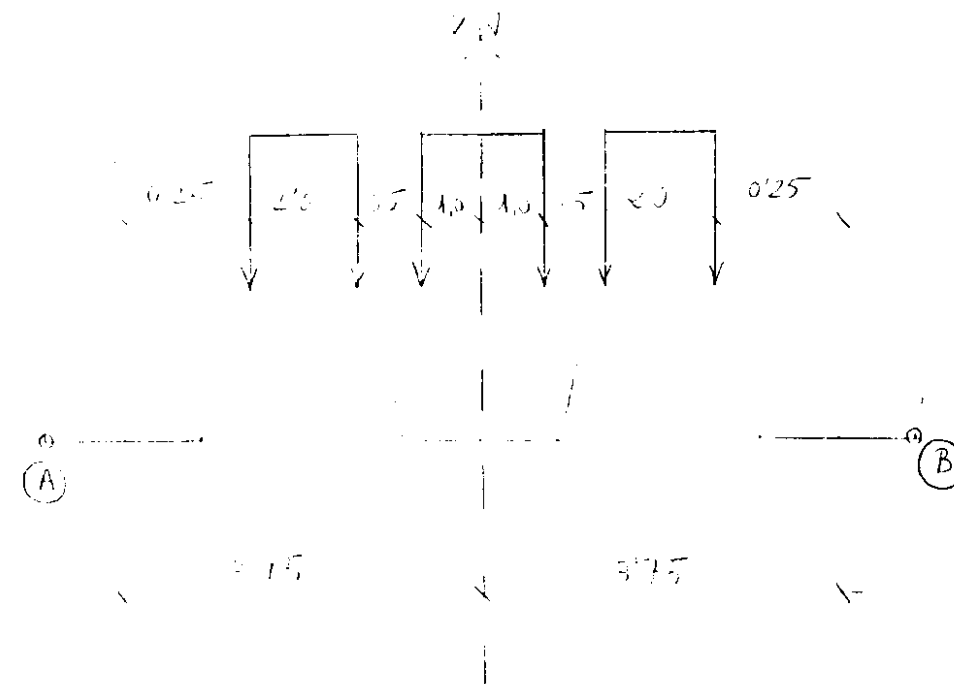
1- PROYECTO DE CARGA

SECCION A-A



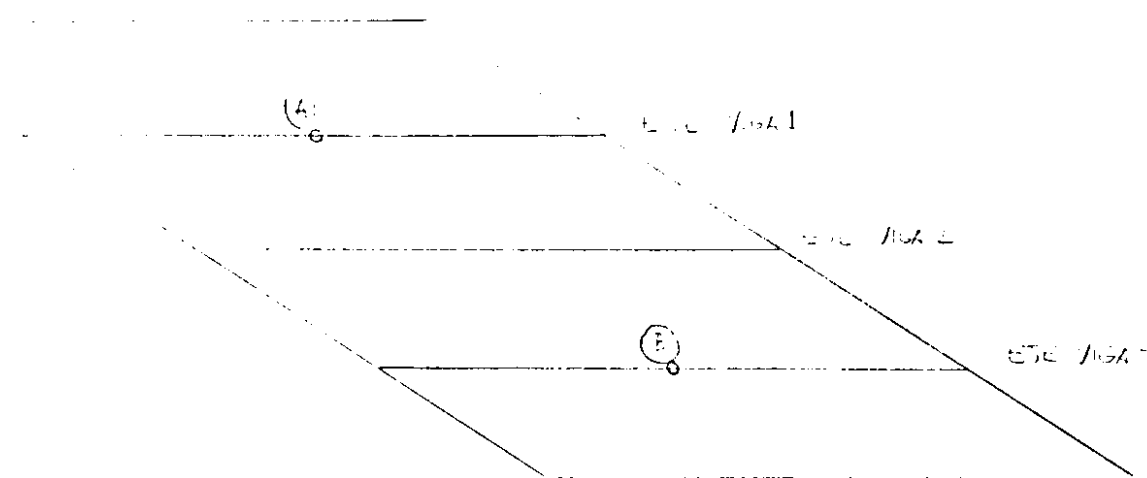
3'25
 3'75
 3'25





Puntos de apoyo

Los puntos de apoyo se encuentran en los extremos del tubo y en el centro del tubo. Los puntos de apoyo se encuentran en los extremos del tubo y en el centro del tubo.



CUADRO RESUMEN DE ESFUERZOS

HIPOTESIS	SECCION	M. PRUEBA	M. CALCULO	%
I	S32	-87.49	-323.88	27


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*
*      S T A A D - III
*      REVISION 10.4a(VERSION 10 LEVEL 4a)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS, INC.
*      DATE=      DEC  9, 1998
*      TIME=      11:14:56
*
*****

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1. STAAD FLOOR PASO CARRETERA PRUEBA CARGA
2. INPUT WIDTH 79
3. *
4. UNIT METER MTON
5. JOINT COORDINATES
6.      1      5.300      .000      .000
7.      2      11.410     .000      .000
8.      3      17.520     .000      .000
9.      4      19.740     .000      .000
10.     5      23.630     .000      .000
11.     6       5.300     .000      3.250
12.     7      11.410     .000      3.250
13.     8      17.520     .000      3.250
14.     9      19.740     .000      3.250
15.    10      23.630     .000      3.250
16.    11      25.850     .000      3.250
17.    12      11.410     .000      7.000
18.    13      17.520     .000      7.000
19.    14      19.740     .000      7.000
20.    15      23.630     .000      7.000
21.    16      25.850     .000      7.000
22.    17      31.960     .000      7.000
23.    18      17.520     .000     10.750
24.    19      19.740     .000     10.750
25.    20      23.630     .000     10.750
26.    21      25.850     .000     10.750
27.    22      31.960     .000     10.750
28.    23      38.070     .000     10.750
29.    24      19.740     .000     14.000
30.    25      23.630     .000     14.000
31.    26      25.850     .000     14.000
32.    27      31.960     .000     14.000
33.    28      38.070     .000     14.000
34.    29      43.370     .000     14.000
35.    30       .000      .000      .000
36. MEMBER INCIDENCES
37.      1      1      6
38.      2      2      7
39.      3      3      8
40.      4      4      9
41.      5      5     10
42.      6      7     12
43.      7      8     13
44.      8      9     14
45.      9     10     15
46.     10     11     16
47.     11     13     18

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48.      12      14      19
49.      13      15      20
50.      14      16      21
51.      15      17      22
52.      16      19      24
53.      17      20      25
54.      18      21      26
55.      19      22      27
56.      20      23      28
57.      21       6       7
58.      22       7       8
59.      23       8       9
60.      24       9      10
61.      25      10      11
62.      26      12      13
63.      27      13      14
64.      28      14      15
65.      29      15      16
66.      30      16      17
67.      31      18      19
68.      32      19      20
69.      33      20      21
70.      34      21      22
71.      35      22      23
72.      36       1       2
73.      37       2       3
74.      38       3       4
75.      39       4       5
76.      40       5      11
77.      41      25      26
78.      42      26      27
79.      43      27      28
80.      44      28      29
81.      45       1      30
82.      46       6      30
83.      47      18      24
84.      48      24      25
85.      49      23      29
86. MEMBER PROPERTY AMERICAN
87. 21 TO 25 31 TO 35 PRI AX 2.045 IX .365 IZ .48
88. 26 TO 30 PRI AX 2.123 IX .365 IZ .491
89. 36 TO 38 41 TO 45 PRI AX .536 IX .01 IZ .005
90. 1 20 PRI AX 1.883 IX .034 IZ .017
91. 2 19 PRI AX 2.016 IX .037 IZ .018
92. 3 18 PRI AX 1.37445 IX .025 IZ .0125
93. 4 5 16 17 PRI AX 1.0082 IX .01830 IZ .0091
94. 6 15 PRI AX 2.016 IX 2.027 IZ .409
95. 7 10 11 14 PRI AX 1.3745 IX 1.382 IZ .279
96. 8 9 12 13 PRI AX 1.0082 IX 1.014 IZ .2047
97. 39 40 47 48 PRI AX 1.0082 IX .009 IZ .0045
98. 46 49 PRI AX 1.883 IX .017 IZ .0085
99. CONSTANT
100. E 3E6 MEMB 1 TO 49
101. DENSITY 2.5 MEMB 6 TO 15 36 TO 38 41 TO 45
102. DENSITY 1.125 MEMB 1 TO 5 16 TO 20
103. DENSITY 1.085 MEMB 21 TO 25 31 TO 35
104. DENSITY 1.043 MEMB 26 TO 30
105. DENSITY 0.000 MEMB 39 40 46 TO 49
106. SUPPORT
107. 6 11 12 17 18 23 FIXED BUT MX MZ

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MEMBER FORCE ENVELOPE

ALL UNITS ARE MTON METE

MAX AND MIN FORCE VALUES AMONGST ALL SECTION LOCATIONS

MEMB	FY/ FZ	DIST DIST	LD LD	MZ/ MY	DIST DIST	LD LD	FX	DIST
LD								
1 MAX	-.03	.00	1	.04	3.25	2		
	.00	.00	1	.00	.00	1	.00	.00
1 MIN	-.03	3.25	2	-.08	.00	1		
	.00	3.25	2	.00	3.25	2	.00	3.25
2 MAX	.20	.00	1	-.14	.00	2		
	.00	.00	1	.00	.00	1	.00	.00
1 MIN	.15	3.25	2	-.97	3.25	1		
	.00	3.25	2	.00	3.25	2	.00	3.25
2 MAX	.17	.00	1	.01	.00	1		
	.00	.00	1	.00	.00	1	.00	.00
1 MIN	.07	3.25	2	-.55	3.25	1		
	.00	3.25	2	.00	3.25	2	.00	3.25
2 MAX	.08	.00	1	.08	.00	1		
	.00	.00	1	.00	.00	1	.00	.00
1 MIN	.02	3.25	2	-.17	3.25	1		
	.00	3.25	2	.00	3.25	2	.00	3.25
2 MAX	-.10	.00	2	.85	3.25	1		
	.00	.00	1	.00	.00	1	.00	.00
1 MIN	-.20	3.25	1	.11	.00	2		
	.00	3.25	2	.00	3.25	2	.00	3.25
2 MAX	-4.50	.00	2	8.12	3.75	1		
	.00	.00	1	.00	.00	1	.00	.00
1 MIN	-6.65	3.75	1	-16.82	.00	1		
	.00	3.75	2	.00	3.75	2	.00	3.75
2 MAX	10.15	.00	1	-1.19	.00	2		
	.00	.00	1	.00	.00	1	.00	.00
1 MIN	.34	3.75	2	-41.33	3.75	1		
	.00	3.75	2	.00	3.75	2	.00	3.75
2								

8 MAX	6.61	.00	1	-1.55	.00	2		
	.00	.00	1	.00	.00	1	.00	.00
1 MIN	.65	3.75	2	-28.62	3.75	1		
	.00	3.75	2	.00	3.75	2	.00	3.75
2 MAX	10.81	.00	1	6.37	.00	1		
	.00	.00	1	.00	.00	1	.00	.00
1 MIN	3.71	3.75	2	-34.16	3.75	1		
	.00	3.75	2	.00	3.75	2	.00	3.75
2								

PASO CARRETERA PRUEBA CARGA

-- PAGE NO. 8

1	10	MAX	18.49	.00	1	17.56	.00	1	.00	.00
			.00	.00	1	.00	.00	1		
2		MIN	9.58	3.75	2	-51.78	3.75	1	.00	3.75
			.00	3.75	2	.00	3.75	2		
1	11	MAX	-1.51	.00	2	17.66	3.75	1	.00	.00
			.00	.00	1	.00	.00	1		
2		MIN	-18.58	3.75	1	-52.02	.00	1	.00	3.75
			.00	3.75	2	.00	3.75	2		
1	12	MAX	-2.24	.00	2	6.28	3.75	1	.00	.00
			.00	.00	1	.00	.00	1		
2		MIN	-10.77	3.75	1	-34.09	.00	1	.00	3.75
			.00	3.75	2	.00	3.75	2		
1	13	MAX	-2.15	.00	2	-1.57	3.75	2	.00	.00
			.00	.00	1	.00	.00	1		
2		MIN	-6.63	3.75	1	-28.66	.00	1	.00	3.75
			.00	3.75	2	.00	3.75	2		
1	14	MAX	-4.91	.00	2	-.90	3.75	2	.00	.00
			.00	.00	1	.00	.00	1		
2		MIN	-10.12	3.75	1	-41.21	.00	1	.00	3.75
			.00	3.75	2	.00	3.75	2		
1	15	MAX	6.69	.00	1	8.21	.00	1	.00	.00
			.00	.00	1	.00	.00	1		
2		MIN	1.02	3.75	2	-16.89	3.75	1	.00	3.75
			.00	3.75	2	.00	3.75	2		
1	16	MAX	.20	.00	1	.85	.00	1	.00	.00
			.00	.00	1	.00	.00	1		
2		MIN	.06	3.25	2	.04	3.25	2	.00	3.25
			.00	3.25	2	.00	3.25	2		
1	17	MAX	-.03	.00	2	.08	3.25	1	.00	.00
			.00	.00	1	.00	.00	1		
2		MIN	-.08	3.25	1	-.18	.00	1	.00	3.25
			.00	3.25	2	.00	3.25	2		
1	18	MAX	-.04	.00	2	.01	3.25	1	.00	.00
			.00	.00	1	.00	.00	1		
		MIN	-.17	3.25	1	-.54	.00	1		

2			.00	3.25	2	.00	3.25	2	.00	3.25
1	19	MAX	-.03	.00	2	-.08	3.25	2	.00	.00
			.00	.00	1	.00	.00	1		
2		MIN	-.21	3.25	1	-.98	.00	1	.00	3.25
			.00	3.25	2	.00	3.25	2		
1	20	MAX	.03	.00	1	.01	.00	1	.00	.00
			.00	.00	1	.00	.00	1		
2		MIN	.00	3.25	2	-.08	3.25	1	.00	3.25
			.00	3.25	2	.00	3.25	2		
1	21	MAX	16.35	.00	1	.17	.00	2	.00	.00
			.00	.00	1	.00	.00	1		

.00	.00	1	.00	.00	1	.00	.00
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1									
	MIN	-44.69	6.11	1	-44.63	1.83	1		
		.00	6.11	2	.00	6.11	2	.00	6.11
2									
	31 MAX	40.07	.00	1	52.52	.00	1		
		.00	.00	1	.00	.00	1	.00	.00
1									
	MIN	9.37	2.22	2	-36.43	2.22	1		
		.00	2.22	2	.00	2.22	2	.00	2.22
2									
	32 MAX	29.10	.00	1	20.93	.00	1		
		.00	.00	1	.00	.00	1	.00	.00
1									
	MIN	7.07	3.89	2	-87.49	3.89	1		
		.00	3.89	2	.00	3.89	2	.00	3.89
2									

PASO CARRETERA PRUEBA CARGA

-- PAGE NO. 10

2

.00	2.22	2
-----	------	---

.00	2.22	2
-----	------	---

.00 2.22

1	33	MAX	20.56	.00	1	-4.18	.00	2	
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	4.95	2.22	2	-75.00	2.22	1	
			.00	2.22	2	.00	2.22	2	.00	2.22
1	34	MAX	2.60	.00	1	-2.70	.00	2	
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	.09	6.11	2	-37.41	6.11	1	
			.00	6.11	2	.00	6.11	2	.00	6.11
1	35	MAX	7.50	.00	1	6.94	.00	2	
			.00	.00	1	.00	.00	1	.00
2		MIN	-16.50	5.50	1	-34.07	3.67	1	
			.00	6.11	2	.00	6.11	2	.00	6.11
1	36	MAX	.04	.00	2	-.16	.00	1	
			.00	.00	1	.00	.00	1	.00
2		MIN	.04	6.11	1	-.40	6.11	2	
			.00	6.11	2	.00	6.11	2	.00	6.11
1	37	MAX	-.11	.00	2	.05	6.11	1	
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	-.17	6.11	1	-.96	.00	1	
			.00	6.11	2	.00	6.11	2	.00	6.11
1	38	MAX	-.19	.00	2	-.08	2.22	2	
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	-.34	2.22	1	-.97	.00	1	
			.00	2.22	2	.00	2.22	2	.00	2.22
1	39	MAX	-.21	.00	2	.59	3.89	1	
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	-.42	3.89	1	-1.03	.00	1	
			.00	3.89	2	.00	3.89	2	.00	3.89
1	40	MAX	-.11	.00	2	.96	3.94	1	
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	-.22	3.94	1	.07	.00	2	
			.00	3.94	2	.00	3.94	2	.00	3.94
1	41	MAX	.34	.00	1	-.04	.00	2	
			.00	.00	1	.00	.00	1	.00
2		MIN	.07	2.22	2	-.97	2.22	1	

2

1	42	MAX	.17	.00	1	.06	.00	1		
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	.03	6.11	2	-.97	6.11	1		
			.00	6.11	2	.00	6.11	2	.00	6.11
1	43	MAX	.00	.00	2	.01	6.11	2		
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	-.04	6.11	1	-.39	.00	1		
			.00	6.11	2	.00	6.11	2	.00	6.11
1	44	MAX	.00	.00	2	.01	5.30	1		
			.00	.00	1	.00	.00	1	.00	.00

2		MIN	-.01	5.30	1	-.04	.00	1		
			.00	5.30	2	.00	5.30	2	.00	5.30
1	45	MAX	-.01	.00	1	.02	5.30	2		
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	-.01	5.30	2	-.04	.00	2		
			.00	5.30	2	.00	5.30	2	.00	5.30
1	46	MAX	.01	.00	2	.05	.00	2		
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	.01	6.22	1	-.02	6.22	2		
			.00	6.22	2	.00	6.22	2	.00	6.22
1	47	MAX	.22	.00	1	.96	.00	1		
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	.04	3.94	2	.03	3.94	2		
			.00	3.94	2	.00	3.94	2	.00	3.94
1	48	MAX	.42	.00	1	.59	.00	1		
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	.10	3.89	2	-1.03	3.89	1		
			.00	3.89	2	.00	3.89	2	.00	3.89
1	49	MAX	.01	.00	1	.04	.00	1		
			.00	.00	1	.00	.00	1	.00	.00
2		MIN	-.00	6.22	2	-.02	6.22	1		
			.00	6.22	2	.00	6.22	2	.00	6.22

***** END OF FORCE ENVELOPE FROM INTERNAL STORAGE *****

150. PLOT DISPLACEMENT FILE

151. PLOT BENDING FILE

152. FINISH

***** END OF STAAD-III *****

***** DATE= DEC 9,1998 TIME= 11:15: 2 *****

* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* CALL (01) 686-7672, CROYDON, U.K. TLX. 929181 *

4.3.4 Paso inferior PK 564+020



aldesa construcciones, s.a.



CONSTRUCTORA
HISPANICA S.A.

L.A.V. MADRID - BARCELONA - F. FRANCESA
TRAMO: MADRID - ZARAGOZA
SUBTRAMO V-b

TORIJA U.T.E.

PASO INFERIOR P.K. 564+020

ANEJO DE CÁLCULO

ALHOSA PREFABRICADOS DE HORMIGÓN	PASO 800 x 500; HT = 167 PI 564+020
Oferta:	99/519
Obra:	TORIJA - GUADALAJARA
Empresa:	TORIJA UTE
Fecha:	Noviembre de 2.000

1. Generalidades

En la presente memoria se muestran los cálculos realizados para justificar el paso inferior de hormigón de dimensiones 800 x 500 cm x cm. (Horizontal-Vertical).

2. Descripción

El paso inferior se salva con un marco de hormigón compuesto por dos muros y un tablero prefabricados, una capa de compresión sobre el tablero y la solera in situ.

Las dimensiones libres interiores del marco son de 800 centímetros en horizontal por 500 centímetros en vertical. El espesor de los elementos del marco es: solera de 80 centímetros, dos hastiales de 40 centímetros, un tablero prefabricado de 40 centímetros y una capa de compresión de 40 cm.

La altura de tierras para la que está calculado el marco alcanza 167 centímetros por encima del dintel.

3. Instrucciones aplicadas

Para el cálculo de los marcos, de acuerdo con la normativa vigente, se han utilizado las siguientes Instrucciones y Normas:

* Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril, de 25 de Junio de 1.975.

* Instrucción para el Proyecto y Ejecución de Obras de Hormigón en Masa o Armado EH-91.

* Norma Básica de la Edificación. NBE-AE/88 Acciones en la edificación.

4. Características de los materiales

* Hormigones:

Hormigón en piezas prefabricadas	H-300
Hormigón in situ	H-250

* Acero:

Acero para armar corrugado

B-500 S

5. Control de calidad

El control de calidad se atenderá a lo especificado en la EH-91, habiéndose seleccionado los siguientes niveles:

Elementos prefabricados:

a) Materiales:

- Hormigón	Control Intenso
- Armadura pasiva	Control Intenso

b) Ejecución:

- En toda la obra	Control Intenso
-------------------	-----------------

Obra in situ:

a) Materiales:

- Hormigón	Control Normal
- Armadura pasiva	Control Normal

b) Ejecución:

- En toda la obra	Control Normal
-------------------	----------------

6. Coeficientes de seguridad

De acuerdo con los niveles de control de calidad definidos, se adoptan los siguientes coeficientes de seguridad:

- Estados límites últimos:

Elementos prefabricados:

- Coeficientes de minoración de resistencias:

Acero pasivo	$\gamma_s = 1,10$
--------------	-------------------

Hormigón	$\gamma_c = 1,40$
----------	-------------------

- Coeficientes de ponderación de acciones:	$\gamma_f = 1,50$
--	-------------------

Obra in situ:

- Coeficientes de minoración de resistencias:

Acero pasivo	$\gamma_s = 1,15$
--------------	-------------------

Hormigón	$\gamma_c = 1,50$
----------	-------------------

- Coeficientes de ponderación de acciones:	$\gamma_f = 1,50$
--	-------------------

7. Parámetros del terreno

7.1 Características del relleno superior y lateral

En los cálculos se ha considerado un relleno de material granular en el trasdos de los hastiales y dintel con las siguientes características:

Peso específico	2,0 ton/m ³
Ángulo de rozamiento interno	35grados
Ángulo de rozamiento con el muro	0 grados
Coefficiente de empuje	0,42

8. Acciones consideradas

Se han considerado en el cálculo, las acciones descritas en la Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril. Las cuales consisten en:

8.1 Cargas permanentes

Peso propio del paso (dintel, hastiales y solera)

8.2 Empuje por efecto de las tierras

Se considera un empuje de las tierras con un coeficiente de 0,42.

8.3 Sobrecargas por efecto del tráfico

Uniforme en toda la plataforma 400 Kg/m²
Vehículo de 90 ton. con la disposición de cargas indicadas en la Instrucción.

8.4 Acciones por temperatura

No se consideran variaciones de temperatura, ya que el incremento de longitud de los miembros para un cambio de 30 grados centígrados es de escasa magnitud, desplazamiento que no alcanza a producir el empuje pasivo en el terreno.

9. Programa de cálculo

Este es un programa de cálculo matricial para ordenadores personales que permite realizar el cálculo integral de marcos de hormigón armado bajo seis hipótesis de carga distintas, formadas por distintas combinaciones de un total de ocho casos de carga, proporcionando los valores de los esfuerzos axiales, cortantes y flectores para cada hipótesis además de las armaduras de flexión y cortante necesarias en cada sección del marco.

El programa resuelve el cálculo de los esfuerzos en un marco de hormigón armado aplicando el método directo de la rigidez a una modelización plana de la estructura mediante barras que representan un metro de la profundidad del marco.

Para cada barra se proporcionan resultados en once puntos equidistantes a lo largo de la longitud de la misma.

El marco se considera apoyado sobre un terreno elástico cuya rigidez es directamente proporcional al coeficiente de balasto de suelo.

Las fuerzas de empotramiento que actúan sobre cada nudo se calculan aplicando la teoría de cálculo elástico de Euler-Bernoulli-Navier a una barra biempotrada sometidas a las cargas contempladas en las distintas hipótesis.

9.1 Casos de carga

El programa considera siete (7) casos de carga, los que enunciamos a continuación.

9.1.1 Peso propio del paso

El programa considera de forma automática el peso propio del marco en función, de la densidad del hormigón y de las dimensiones de sus elementos (dintel, solera y hastiales).

9.1.2 Empuje por efecto de las tierras

Calculado según las indicaciones del capítulo 9º de la norma NBE-AE-88. siendo la carga directamente proporcional al peso específico de las tierras y la altura de tierras en el dintel, mientras que en los hastiales varía con la profundidad y es función de coeficiente de empuje horizontal.

9.1.3 Sobrecargas de construcción

Se considera el efecto de un compactador de dos ejes actuando en el dintel, así como el relleno de las tierras hasta el nivel del dintel.

9.1.4 Sobrecarga uniforme 0,40 ton/m2 sobre la plataforma.

Produce una carga uniforme sobre el dintel de 400 kp/m2 y dos cargas uniformes sobre los hastiales que son el producto de la carga sobre el dintel por el coeficiente de empuje horizontal

9.1.5 Vehículo de 90 ton. (Repartido)

Reparto local de cargas a 45,0° en el relleno existente sobre el dintel, con un coeficiente de impacto de 1,8.

(Para un ángulo de reparto de 0,0° tenemos cargas puntuales)

9.1.6 Vehículo de 90 ton. (Flexión)

Vehículo de 90 ton. concentrado con segundo eje en el centro del dintel, de forma que produzca la máxima flexión en el dintel. Con el coeficiente de impacto considerado.

(Solo en el caso de un ángulo de reparto de 0,0°)

9.1.7 Vehículo de 90 ton. (Cortante)

Vehículo de 90 ton. concentrado con primer eje situado a una distancia de un canto útil del eje del dintel, de forma que produzca el máximo esfuerzo cortante. Con el coeficiente de impacto considerado.

(Solo en el caso de un ángulo de reparto de 0,0°)

9.1.8 Tablero biapoyado.

Ademas se considera el tablero biapoyado resistiendo el peso propio, el peso de la capa de compresión y una sobrecarga de 100 Kg/m2

9.2 Hipótesis de cálculo

Con el objeto de obtener las solicitaciones pésimas se consideran en el cálculo del marco, las siguientes hipótesis:

HIPÓTESIS I:

- Peso propio
 - Cargas de construcción
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (3)}]$

HIPÓTESIS II y III:

- Peso propio
 - Empuje de las tierras
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)}]$

HIPÓTESIS IV:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m2.
- Carro repartido en profundidad

Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)} + \text{Caso (4)} + \text{Caso (5)}]$

HIPÓTESIS V:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m2.
- Carro concentrado máxima flexión

Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)} + \text{Caso (4)} + \text{Caso (6)}]$

HIPÓTESIS VI:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m2.
- Carro concentrado máxima cortante.

Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)} + \text{Caso (4)} + \text{Caso (7)}]$

10. Resultados de cálculo

Como instrucción de los resultados de cálculo, se presentan los datos introducidos, tales como:

- Datos del terraplén: densidad, ángulo de rozamiento interno, coeficiente de empuje empleado en el cálculo.
- Datos de los materiales que se prevé emplear en la construcción del marco tales como: resistencia característica del hormigón, tipos de acero empleados, recubrimiento.
- Tipos del control de calidad y coeficientes empleados en el cálculo.
- Geometría del marco: dimensiones internas libres y espesor de cada uno de sus elementos (dintel, solera y hastiales).

- Sobrecargas que se han considerado en el cálculo.

Una vez calculado el marco, se obtienen:

- Las solicitaciones píasimas de las hipótesis consideradas, es decir, envolvente de esfuerzos.
- Las áreas de acero requeridas por cortante y por flexión, ésta última tanto para la cara interior como la exterior, todo ello según la Norma EH-91.

- Todos los datos y resultados están referidos a una longitud de paso de 100 cm.

TIPO DE TERRENO DE CIMENTACIÓN: Se considera un terreno de cimentación con un coeficiente de balasto de $5,0 \text{ kg/cm}^3$ que correspondería a un suelo con una resistencia nominal de $2,0 \text{ kg/cm}^2$.

NOTA: El marco ha sido calculado con los coeficientes de seguridad correspondientes a Control intenso y Control normal para cada uno de los elementos que compone el marco:

Hastiales:	Control intenso	H-300
Tablero:	Control intenso	H-300
Obra in situ:	Control normal	H-250

10.1 Tablero autoportante.

DATOS GEOMETRICOS:

Longitud:	826	Cm
Canto Total:	40,0	cm.
Ancho:	100,0	cm.
Recubrimiento:	4,0	cm.
Dist. Apoyo:	13,0	cm.
Luz / Apoyos:	800,0	cm.
Canto Util:	36	Cm

MATERIALES:

Fck:	300	Kg/cm ²
Fyk:	5.100	Kg/cm ²
Gf (p) =	1,40	
Gf (v) =	1,40	
Gc =	1,50	
Gs =	1,10	
Dens. Hgón:	2.500	Kg/m ³

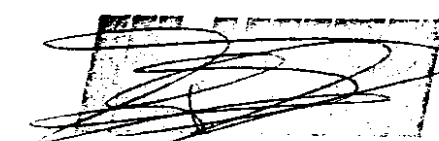
ACCIONES:

Peso Propio:	1.000	Kg/ml
Sobrec. Unif.	1.100	Kg/ml

SOLICITACIONES:

Nd	0	Kg
Md (cto)	2.349.51	Kgxc
	6	
Md (apyo)	-2.484	Kgxc
Vd	12.142	Kg
Vcu	25.857	Kg
As mín	0,00	cm ² /ml
Nd . e	2.349.51	Kgxc
	6	
Mc	9.072.00	Kgxc
	0	
As2 mín	6,21	cm ²
As2	2,50	cm ²
Us2	11.591	Kg
As1 mín	14,78	cm ²
As1	45,96	cm ²
Us1	213.087	Kg

ALCAÑIZ, Noviembre de 2000


Alcañiza del Hormigón, S. A.-ALCAÑIZ
Dpto. Técnico de ALHOSA

#####

ALHOSA pag. 1 MARCOS 1.0

11/08/00 11:04:16

#####

GEOMETRIA DEL MARCO

LUZ = 800.00 cm

GALIBO = 500.00 cm

ESPESOR DE LOS HASTIALES = 40.00 cm

ESPESOR DEL DINTEL = 80.00 cm

ESPESOR DE LA SOLERA = 80.00 cm

RECUBRIMIENTO DE LAS ARMADURAS = 4.00 cm

ALTURA DE TIERRAS = 167.00 cm

MATERIALES

TIPO DE HORMIGON = H-250

COEFICIENTE DE MINORACION DEL HORMIGON = 1.50

TIPO DE ACERO = AEH-500

COEFICIENTE DE MINORACION DEL ACERO = 1.15

TERRENO

COEFICIENTE DE BALASTO = 5.00 kp/cm³

ANGULO DE ROZAMIENTO INTERNO = 35.00

PESO ESPECIFICO = 0.0020 kp/cm³

ANGULO DE ROZAMIENTO TERRENO-MURO = 0.00

COEFICIENTE DE EMPUJE = 0.42

CARGAS

COEFICIENTE DE MAYORACION DE CARGAS = 1.50

CARGA 1er EJE COMPACTADOR = 2500.00 kp

CARGA 2o EJE COMPACTADOR = 2500.00 kp

SEPARACION ENTRE EJES DEL COMPACTADOR = 200.00 cm

TREN DE CARGAS (0:CARRETERA, 1:FFCC RENFE, 2:FFCC METRICA, 3:FFCC UIC) = 1

ANGULO DE REPARTO DEL TREN DE CARGAS = 45.00

REPARTO AUTOMATICO DEL TREN DE CARGAS = 0.00

COEFICIENTE DE IMPACTO = 1.80

#####

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#####

CARGAS QUE ACTUAN SOBRE LA ESTRUCTURA

PESO PROPIO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
1	0.00	-20.00
2	0.00	-20.00
3	0.00	-20.00
4	0.00	-20.00
5	0.00	-20.00
6	0.00	-20.00
7	0.00	-20.00
8	0.00	-20.00
9	0.00	-20.00
10	0.00	-20.00
11	-10.00	0.00
12	0.00	20.00
13	10.00	0.00

EMPUJE DEL TERRENO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
12	0.00	33.40

-Cargas trapezoidales sobre las barras

Barra	Carga inicial (kp/cm)	Carga final (kp/cm)
11	62.75	14.03
13	14.03	62.75

SOBRECARGAS DE CONSTRUCCION

-Cargas trapezoidales sobre las barras

Barra	Carga inicial (kp/cm)	Carga final (kp/cm)
11	48.72	0.00
13	0.00	48.72

-Trenes de carga sobre las barras

Barra	Carga 1er Eje (kp)	Carga 2o Eje (kp)	Separacion (cm)
12	4500.00	4500.00	200.00

SOBRECARGA UNIFORME DE 0.4 t/m²

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	1.68
12	0.00	4.00
13	0.00	1.68

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11/08/00 11:04:16

SOBRECARGA UNIFORME DE 1 t/m2

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	0.00
12	0.00	0.00
13	0.00	0.00

VEHICULO REPARTIDO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	21.43
12	0.00	51.02
13	0.00	21.43

VEHICULO EN POSICION DE MAXIMA FLEXION

-Trenes de carga sobre las barras

Barra	Carga (kp)	Pos.EjeCentral(cm)
12	8083.83	420.00

VEHICULO EN POSICION DE MAXIMO CORTANTE

-Trenes de carga sobre las barras

Barra	Carga (kp)	Pos.EjeCentral(cm)
12	8083.83	246.00

COEFICIENTES DE MAYORACION DE ACCIONES

HIPOT.	P.PROPIO	TERRENO	S.CONST.	S.UNIF.4	TR.DIST.	V.REPT.	V.C.FX.	V.C.CT.
1	1.5	0.0	1.5	0.0	0.0	0.0	0.0	0.0
2	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
3	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
4	1.5	1.5	0.0	1.5	0.0	1.5	0.0	0.0
5	1.5	1.5	0.0	1.5	0.0	0.0	0.0	0.0
6	1.5	1.5	0.0	1.5	0.0	0.0	0.0	0.0

ALHOSA pag. 4 MARCOS 1.0
11/08/00 11:04:20

ENVOLVENTES DE MOMENTOS FLECTORES

	X (cm)	FLECTOR POS. (mkp)	HIPOTESIS	FLECTOR NEG. (mkp)	HIPOTESIS
Solera	0.00	0.00	1	-35299.24	4
	84.00	17620.39	4	0.00	1
	168.00	52056.13	4	0.00	1
	252.00	72776.19	4	0.00	1
	336.00	83585.63	4	0.00	1
	420.00	86911.62	4	0.00	1
	504.00	83585.63	4	0.00	1
	588.00	72776.19	4	0.00	1
	672.00	52056.13	4	0.00	1
	756.00	17620.39	4	0.00	1
	840.00	0.00	1	-35299.24	4
Hastial dcho	0.00	0.00	1	-35299.24	4
	58.00	0.00	1	-19955.58	4
	116.00	0.00	1	-8698.44	4
	174.00	612.54	1	-1281.98	4
	232.00	3029.41	2	0.00	1
	290.00	3290.96	2	0.00	1
	348.00	1615.45	2	0.00	1
	406.00	0.00	1	-5106.18	4
	464.00	0.00	1	-13205.53	4
	522.00	0.00	1	-23670.51	4
	580.00	0.00	1	-36255.29	4
Dintel	0.00	0.00	1	-36255.29	4
	84.00	15384.16	4	0.00	1
	168.00	55548.18	4	0.00	1
	252.00	84236.76	4	0.00	1
	336.00	101449.91	4	0.00	1
	420.00	107187.63	4	0.00	1
	504.00	101449.91	4	0.00	1
	588.00	84236.76	4	0.00	1
	672.00	55548.18	4	0.00	1
	756.00	15384.16	4	0.00	1
	840.00	0.00	1	-36255.29	4
Hastial izdo	0.00	0.00	1	-36255.29	4
	58.00	0.00	1	-23670.51	4
	116.00	0.00	1	-13205.53	4
	174.00	0.00	1	-5106.18	4
	232.00	1615.45	2	0.00	1
	290.00	3290.96	2	0.00	1
	348.00	3029.41	2	0.00	1
	406.00	612.54	1	-1281.98	4
	464.00	0.00	1	-8698.44	4
	522.00	0.00	1	-19955.58	4
	580.00	0.00	1	-35299.24	4

ALHOSA pag. 5 MARCOS 1.0
11/08/00 11:04:20

ENVOLVENTE DE CORTANTES Y ESFUERZOS CONCOMITANTES

	X (cm)	CORTANTE (kp)	HIPOTESIS	AXIL (kp)	FLECTOR (mkp)
Solera	0.00	-77006.15	4	30118.75	-35299.24
	84.00	-50902.98	4	30118.75	17620.39
	168.00	-32094.90	4	30118.75	52056.13
	252.00	-18193.02	4	30118.75	72776.19
	336.00	-8121.42	4	30118.75	83585.63
	420.00	-0.00	2	20707.50	46037.61
	504.00	8121.42	4	30118.75	83585.63
	588.00	18193.02	4	30118.75	72776.19
	672.00	32094.90	4	30118.75	52056.13
	756.00	50902.98	4	30118.75	17620.39
	840.00	77006.15	4	30118.75	-35299.24
Hastial dcho	0.00	-30118.75	4	77006.15	-35299.24
	58.00	-22861.08	4	76136.15	-19955.58
	116.00	-16027.28	4	75266.15	-8698.44
	174.00	-9617.35	4	74396.15	-1281.98
	232.00	-3631.27	4	73526.15	2539.63
	290.00	1930.94	4	72656.15	3012.24
	348.00	7069.28	4	71786.15	381.69
	406.00	11783.76	4	70916.15	-5106.18
	464.00	16074.38	4	70046.15	-13205.53
	522.00	19941.13	4	69176.15	-23670.51
	580.00	23384.02	4	68306.15	-36255.29
Dintel	0.00	-68306.15	4	23384.02	-36255.29
	84.00	-54644.92	4	23384.02	15384.16
	168.00	-40983.69	4	23384.02	55548.18
	252.00	-27322.46	4	23384.02	84236.76
	336.00	-13661.23	4	23384.02	101449.91
	420.00	-0.00	4	23384.02	107187.63
	504.00	13661.23	4	23384.02	101449.91
	588.00	27322.46	4	23384.02	84236.76
	672.00	40983.69	4	23384.02	55548.18
	756.00	54644.92	4	23384.02	15384.16
	840.00	68306.15	4	23384.02	-36255.29
Hastial izdo	0.00	-23384.02	4	68306.15	-36255.29
	58.00	-19941.13	4	69176.15	-23670.51
	116.00	-16074.38	4	70046.15	-13205.53
	174.00	-11783.76	4	70916.15	-5106.18
	232.00	-7069.28	4	71786.15	381.69
	290.00	-1930.94	4	72656.15	3012.24
	348.00	3631.27	4	73526.15	2539.63
	406.00	9617.35	4	74396.15	-1281.98
	464.00	16027.28	4	75266.15	-8698.44
	522.00	22861.08	4	76136.15	-19955.58
	580.00	30118.75	4	77006.15	-35299.24

ALHOSA pag. 6 MARCOS 1.0
11/08/00 11:04:20

ENVOLVENTE DE AXILES Y ESFUERZOS CONCOMITANTES

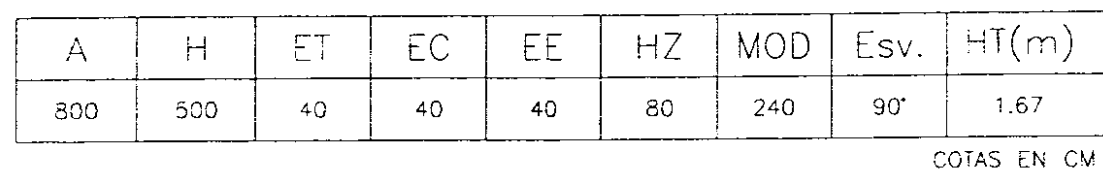
	X (cm)	AXIL (kp)	HIPOTESIS	CORTANTE (kp)	FLECTOR (mkp)
Solera	0.00	30118.75	4	-77006.15	-35299.24
	84.00	30118.75	4	-50902.98	17620.39
	168.00	30118.75	4	-32094.90	52056.13
	252.00	30118.75	4	-18193.02	72776.19
	336.00	30118.75	4	-8121.42	83585.63
	420.00	30118.75	4	-0.00	86911.62
	504.00	30118.75	4	8121.42	83585.63
	588.00	30118.75	4	18193.02	72776.19
	672.00	30118.75	4	32094.90	52056.13
	756.00	30118.75	4	50902.98	17620.39
	840.00	30118.75	4	77006.15	-35299.24
Hastial dcho	0.00	77006.15	4	-30118.75	-35299.24
	58.00	76136.15	4	-22861.08	-19955.58
	116.00	75266.15	4	-16027.28	-8698.44
	174.00	74396.15	4	-9617.35	-1281.98
	232.00	73526.15	4	-3631.27	2539.63
	290.00	72656.15	4	1930.94	3012.24
	348.00	71786.15	4	7069.28	381.69
	406.00	70916.15	4	11783.76	-5106.18
	464.00	70046.15	4	16074.38	-13205.53
	522.00	69176.15	4	19941.13	-23670.51
	580.00	68306.15	4	23384.02	-36255.29
Dintel	0.00	23384.02	4	-68306.15	-36255.29
	84.00	23384.02	4	-54644.92	15384.16
	168.00	23384.02	4	-40983.69	55548.18
	252.00	23384.02	4	-27322.46	84236.76
	336.00	23384.02	4	-13661.23	101449.91
	420.00	23384.02	4	-0.00	107187.63
	504.00	23384.02	4	13661.23	101449.91
	588.00	23384.02	4	27322.46	84236.76
	672.00	23384.02	4	40983.69	55548.18
	756.00	23384.02	4	54644.92	15384.16
	840.00	23384.02	4	68306.15	-36255.29
Hastial izdo	0.00	68306.15	4	-23384.02	-36255.29
	58.00	69176.15	4	-19941.13	-23670.51
	116.00	70046.15	4	-16074.38	-13205.53
	174.00	70916.15	4	-11783.76	-5106.18
	232.00	71786.15	4	-7069.28	381.69
	290.00	72656.15	4	-1930.94	3012.24
	348.00	73526.15	4	3631.27	2539.63
	406.00	74396.15	4	9617.35	-1281.98
	464.00	75266.15	4	16027.28	-8698.44
	522.00	76136.15	4	22861.08	-19955.58
	580.00	77006.15	4	30118.75	-35299.24

ALHOSA pag. 7 MARCOS 1.0
11/08/00 11:04:20
#####

ARMADURAS

	X (cm)	AR. ESTIBOS (cm2/m)	ARM. FLEX. EXT. (cm2)	ARM. FLEX. INT. (cm2)
Solera	0.00	9.73	7.25	0.00
	84.00	0.64	0.00	1.79
	168.00	0.00	0.00	12.52
	252.00	0.00	0.00	19.19
	336.00	0.00	0.00	22.73
	420.00	0.00	0.00	23.84
	504.00	0.00	0.00	22.73
	588.00	0.00	0.00	19.19
	672.00	0.00	0.00	12.52
	756.00	0.64	0.00	1.79
	840.00	9.73	7.25	0.00
Hastial dcho	0.00	5.06	16.61	0.00
	58.00	0.00	4.69	0.00
	116.00	0.00	0.00	0.00
	174.00	0.00	0.00	0.00
	232.00	0.00	0.00	0.00
	290.00	0.00	0.00	0.00
	348.00	0.00	0.00	0.00
	406.00	0.00	0.00	0.00
	464.00	0.00	0.47	0.00
	522.00	0.00	8.21	0.00
	580.00	0.11	18.23	0.00
Dintel	0.00	6.70	8.31	0.00
	84.00	1.94	0.00	1.89
	168.00	0.00	0.00	14.38
	252.00	0.00	0.00	23.67
	336.00	0.00	0.00	29.41
	420.00	0.00	0.00	31.36
	504.00	0.00	0.00	29.41
	588.00	0.00	0.00	23.67
	672.00	0.00	0.00	14.38
	756.00	1.94	0.00	1.89
	840.00	6.70	8.31	0.00
Hastial izdo	0.00	0.11	18.23	0.00
	58.00	0.00	8.21	0.00
	116.00	0.00	0.47	0.00
	174.00	0.00	0.00	0.00
	232.00	0.00	0.00	0.00
	290.00	0.00	0.00	0.00
	348.00	0.00	0.00	0.00
	406.00	0.00	0.00	0.00
	464.00	0.00	0.00	0.00
	522.00	0.00	4.69	0.00
	580.00	5.06	16.61	0.00

11. Planos



CONTROL DE CALIDAD	
HORMIGON PREFAB.	H-300
HORMIGON IN SITU	H-250
ACERO	B-500
EH-91	

RECUBRIMIENTO = 25 MM
TREN DE CARGAS = 90 T.

EL MARCO HA SIDO CALCULADO CON UNA RESISTENCIA NOMINAL DEL SUELO DE 2 KG/CM²

- COMPACTAR LA PRIMERAS CAPAS DE RELLENO SOBRE EL MARCO Y LATERALES CON RODILLOS PEQUEÑOS O COMPACTADORES MANUALES. NO UTILIZAR VIBRADORES.

- PARA RECUBRIMIENTOS DE TIERRAS SUPERIORES A 2,00 M SE PODRÁN UTILIZAR COMPACTADORES VIBRANTES, SIEMPRE QUE LA CARGA NO EXCEDA DE LA PREVISTA EN EL CÁLCULO (CARGA MÓVIL DE 90 Tn. EQUIVALENTE A TRES EJES DE 30 Tn.)

- EL RELLENO LATERAL SE REALIZARA DESPUES DE HORMIGONADA LA SOLERA Y CAPA DE COMPRESION.

COTAS EN CM.

08/11/00	0		
FECHA	REV.	MODIFICACIONES	N° PLANO
PIEZA:	PASO 800x500		44.0
OFERTA:	99/519		ESCALA
OBRA:	TORIJA - GUADALAJARA		
CLIENTE:	UTE TORIJA		

PASO DE

ESTRIBOS Y TABLERO

REVISADO: *[Signature]* **RECORRIDO:** *[Signature]*

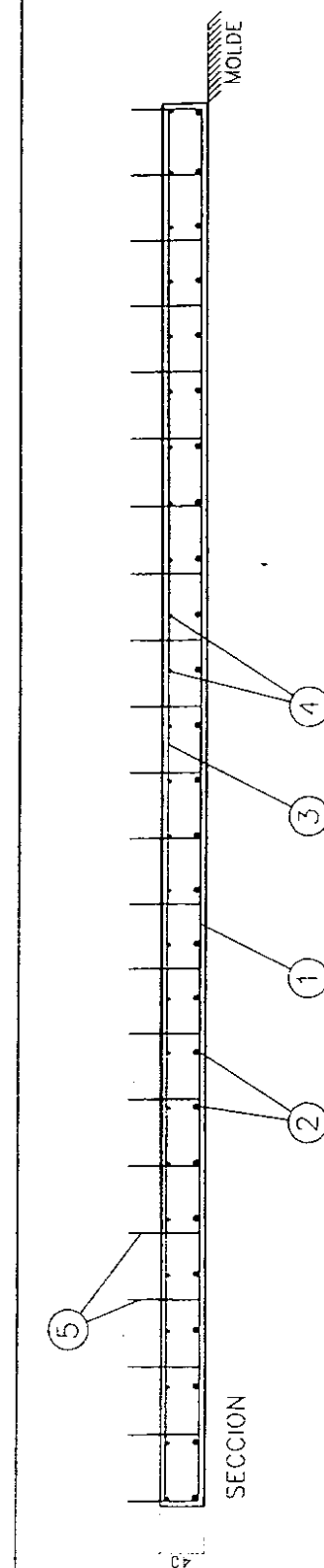
Sold. Comercial: *[Signature]* **OBRA: Técnica**






PREFABRICADOS DE HORMIGÓN

Hoja 67 de 74



028 M

PLANTA (Vista cara Tolochoda)

CUADRO DE ARMADO			
1	27 Ø25	2	Ø16 / 20cm
3	10 Ø10	4	Ø10 / 25cm
5	10 Ø8		25cm

RECUBRIMIENTO: 25 mm.

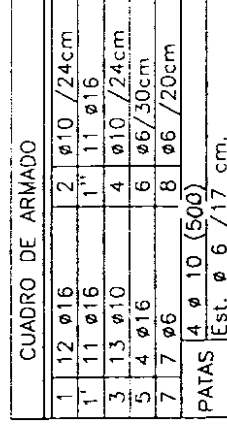
CONTROL DE CALIDAD	HORMIGON	H-300	ACERO	B-500
--------------------	----------	-------	-------	-------

08/11/00	0	REV.	MODIFICACIONES	1° PLANO	44.3
FECHA	REV.	MODIFICACIONES	PIEZA: TABLERO 828x240x40	PI 564+020	TOTA
OFERTA: 99/5/19/11			OBRA: TORIUA-GUADALAJARA		
CLIENTE: UTE TORUA					
Papel 800x500			REVISADO:  APROBADO:  Dibujo Comercial Impor. 12. 1999		

COTAS EN CM. $M_{100} > \text{cero Molde. } T_{100} > \text{cero Tolochado.}$

106

Hoja 68 de 74



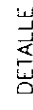
RECUBRIMIENTO: 25 mm.

CONTROL DE CALIDAD	
HORMICON	H-300
ACERO	B-500

08/11/00	0	MODIFICACIONES	4º PAGO
FECHA:	REV.	PIEZA: ESTRIBO 500x240x40	44.4
OFERTA: 99/5/19/11			44.4
OBRA: TORNA-CUADRALARA			1224
CLIENTE: UTE TORUJA			
Paso 800x500		REVISTADO: <i>AB</i>	REPOBANDO: <i>AB</i>
		Don. Comercial	Don. Técnica

PREFABRICADOS DE HORMIGÓN

Hoja 69 de 72



CAPA COMPRESSION

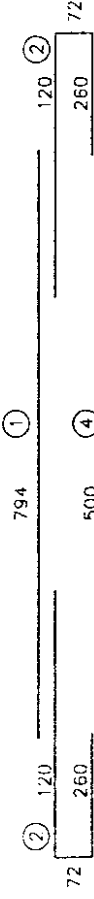
DETAILED

ESTRIBO

ESTRIBO

CUADRO DE ARMADO	
TIPO	CAPA COMPRESION
6	ø 16 /22 cm.
7	ø 10 /20cm.
8	ø 10 /20cm.
10	4 ø 16

CONTROL DE CALIDAD	HORMIGON: H-250 ACERO: B-500 CONTROL NORMAL
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CUADRO DE ARMADO	
TIPO	SOLERA
1	ø20 /12 cm.
2	ø16 /22cm.
3	ø12 /25 cm.
4	ø10 /20 cm.
5	3ø6/ml. cada 30cm en 150cm
9	ø10 /20 cm.

[illegible]


PRFABRICADOS DE FORMICON

Hoja 70 de 72



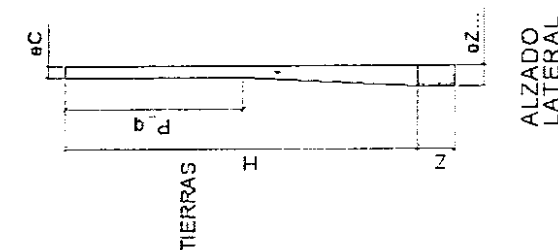
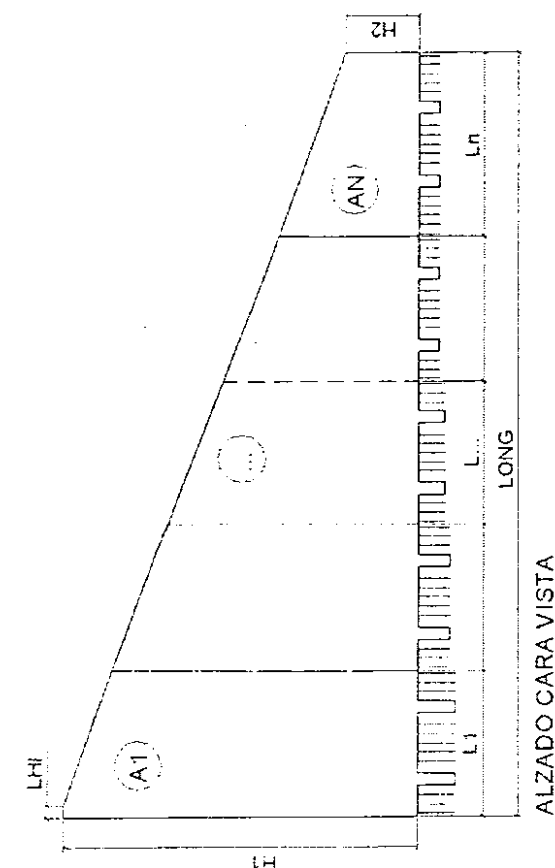
L.A.V. MADRID - BARCELONA - F. FRANCESA
TRAMO: MADRID - ZARAGOZA. .
SUBTRAMO V-b .

TORIJA U.T.E.

PLANOS ALETAS

- ❑ **PASO FAUNA 565+380**
- ❑ **PASO INFERIOR P.K. 558+640**
- ❑ **PASO INFERIOR P.K. 562+600**
- ❑ **PASO INFERIOR P.K. 564+020**

Hoja 71 de 72

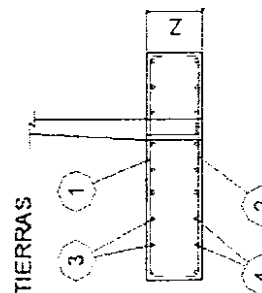


Pza	H	L	eZ	Z	1	2	3	4
1	580,0	240	34,0	60	Ø20 /20cm	Ø12 /20cm	Ø12 /20cm	Ø12 /20cm
2	485,5	240	29,3	60	Ø20 /20cm	Ø12 /20cm	Ø12 /20cm	Ø12 /20cm
3	382,4	240	24,1	60	Ø20 /20cm	Ø12 /20cm	Ø12 /20cm	Ø12 /20cm
4	279,2	240	20,0	40	Ø10 /20cm	Ø10 /20cm	Ø10 /20cm	Ø10 /20cm
5	176,1	240	20,0	40	Ø10 /20cm	Ø10 /20cm	Ø10 /20cm	Ø10 /20cm

 $\alpha = 30^\circ$

H1=	580 cm	eC=	20 cm	P1=	100 cm
H2=	73 cm	P _{-q} =	300 cm	T1=	250 cm
LONG=	1200 cm			Pn=	35 cm

ARMADO CIMENTACION



Obra In Situ

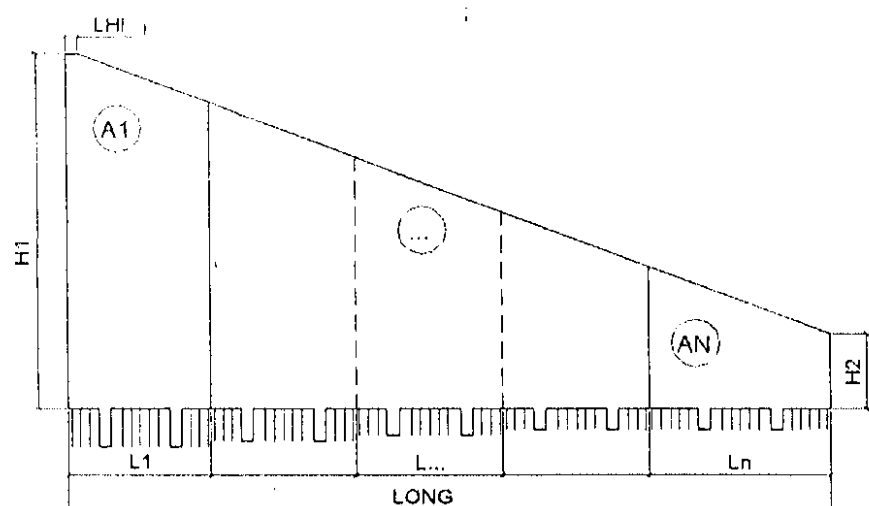
Obra in Situ	
Hormigón:	M-200 16,27 m3
Acero:	B-500 886 Kg

09/11/00	0	
Fecha:	rev	Modificaciones
Pieza:	Aleta 1200x(580/73)	
Oferta:	99/519	
Obra:	Torija-Guadalaajara	
Cliente:	UTE-Torija	
Aleta 1200x(580/73)		50 N° Plano Opto. Comercial - Gato Técnico

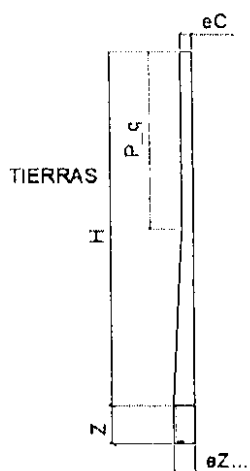


PREFABRICADOS DE HORMIGÓN

Hoja 72 de 74

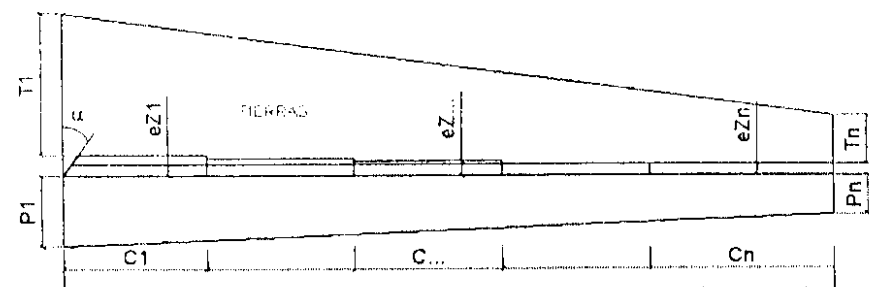


ALZADO CARA VISTA



ALZADO LATERAL

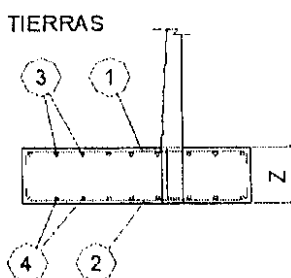
Pza	H	L	eZ	Z	1	2	3	4
1	660,0	240	41,0	60	Ø20 /15cm	Ø16 /20cm	Ø12 /20cm	Ø12 /20cm
2	565,5	240	35,5	60	Ø20 /15cm	Ø16 /20cm	Ø12 /20cm	Ø12 /20cm
3	462,4	240	29,5	60	Ø20 /15cm	Ø16 /20cm	Ø12 /20cm	Ø12 /20cm
4	359,2	240	23,5	40	Ø12 /17cm	Ø10 /20cm	Ø10 /20cm	Ø10 /20cm
5	256,1	240	20,0	40	Ø12 /17cm	Ø10 /20cm	Ø10 /20cm	Ø10 /20cm



PLANTA

$\alpha = 30^\circ$

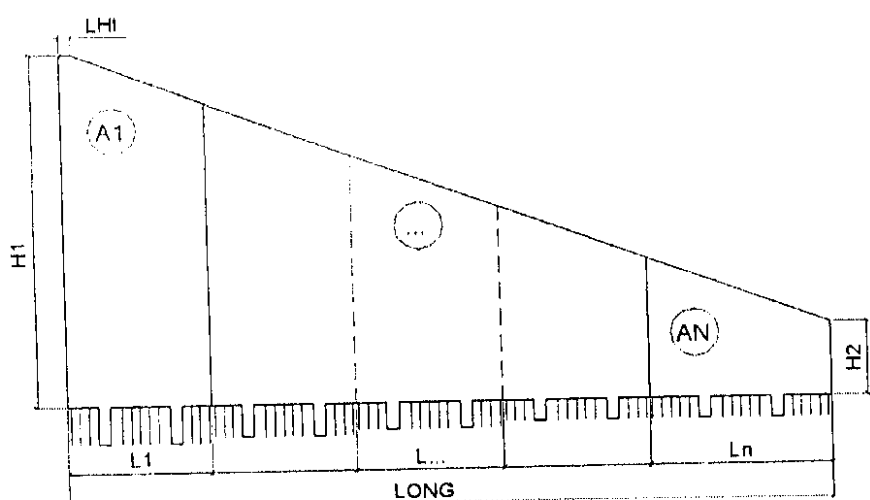
ARMADO CIMENTACION



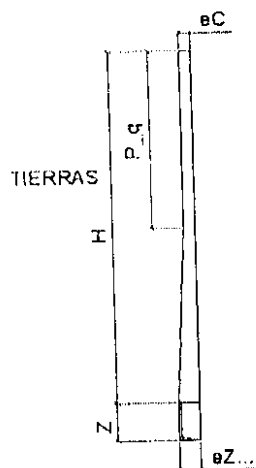
Obra In Situ		
Hormigón:	H-200	16,57 m3
Acero:	B-500	1142 Kg.

08/11/00	0	
Fecha:	rev	Modificaciones
Pieza:	Aleta 1200x(660/153)	
Oferta:	99/519	
Obra:	Torija-Guadalajara	
Cliente:	UTE Torija	
Aleta 1200x(660/153)		
Dpto. Comercial		
Dpto. Técnico		
48		
R		
R		
ALTEA		
PREFABRICADOS DE HORMIGON		

Hoja 3 de 72

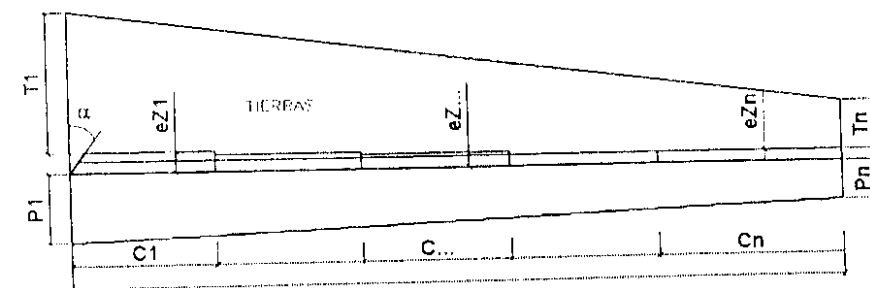


ALZADO CARA VISTA



ALZADO LATERAL

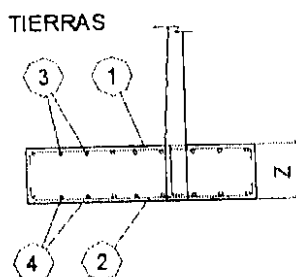
Pza	H	L	eZ	Z	1	2	3	4
1	380,0	240	24,0	40	Ø12 /15cm	Ø10 /25cm	Ø10 /25cm	Ø10 /25cm
2	248,0	305	20,0	40	Ø10 /25cm	Ø10 /25cm	Ø10 /25cm	Ø10 /25cm



PLANTA

$\alpha = 30^\circ$

ARMADO CIMENTACION



Obra In Situ		
Hormigón:	H-200	3,53 m3
Acero:	B-500	144 Kg.

07/11/00	0	
Fecha:	rev	Modificaciones
Pieza:	Aleta 545x(380/65)	
Oferta:	99/519	
Obra:	Torija - Guadalajara	
Cliente:	UTE Torija	
Aleta 545x(380/65)		
Dpto. Comercial		
Dpto. Técnico		
49		
R		
R		
ALTEA		
PREFABRICADOS DE HORMIGON		

Hoja 2 de 72

4.3.5 Paso inferior PK 568+9

SUSTITUYE A
2.9.16 pcy 1-2
Fecha: 18-8-99

ÍNDICE

- 1.- Generalidades.
- 2.- Descripción
- 3.- Instrucciones aplicadas
- 4.- Características de los materiales
- 5.- Control de calidad
- 6.- Coeficientes de seguridad
- 7.- Parámetros del terreno.
- 8.- Acciones consideradas
- 9.- Programa de cálculo
- 10.- Resultados del cálculo
- 11.- Planos

ALHOSA PREFABRICADOS DE HORMIGÓN		PASO 800 x 580; HT = 160 P.I. 568+9
Oferta:	99/519	
Obra:	TORIJA - GUADALAJARA	
Empresa:	TORIJA UTE	
Fecha:	Agosto de 1.999	

CONTROL DE DISTRIBUCIÓN			
Nº DE IDENTIFICACIÓN: C05510B0064BB			
Nº DE TRABAJO:			
Nº	DISTRIBUIDOR	FECHA	RECIBO
1	Nicolas	18-08-99	
2			
3			
4			
5			

1. Generalidades

En la presente memoria se muestran los cálculos realizados para justificar el paso inferior de hormigón de dimensiones 800 x 580 cm x cm. (Horizontal-Vertical).

2. Descripción

El paso inferior se salva con un marco de hormigón compuesto por dos muros y un tablero prefabricados, una capa de compresión sobre el tablero y la solera in situ.

Las dimensiones libres interiores del marco son de 800 centímetros en horizontal por 580 centímetros en vertical. El espesor de los elementos del marco es: solera de 80 centímetros, dos hastiales de 40 centímetros, un tablero prefabricado de 40 centímetros y una capa de compresión de 40 cm.

La altura de tierras para la que está calculado el marco alcanza 160 centímetros por encima del dintel.

3. Instrucciones aplicadas

Para el cálculo de los marcos, de acuerdo con la normativa vigente, se han utilizado las siguientes Instrucciones y Normas:

* Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril, de 25 de Junio de 1.975.

* Instrucción para el Proyecto y Ejecución de Obras de Hormigón en Masa o Armado EH-91.

* Norma Básica de la Edificación. NBE-AE/88 Acciones en la edificación.

4. Características de los materiales

* Hormigones:

Hormigón en piezas prefabricadas	H-300
Hormigón in situ	H-250

* Acero:

Acero para armar corrugado - B-500 S

5. Control de calidad

El control de calidad se atenderá a lo especificado en la EH-91, habiéndose seleccionado los siguientes niveles:

Elementos prefabricados:

a) Materiales:

- Hormigón	Control Intenso
- Armadura pasiva	Control Intenso

b) Ejecución:

- En toda la obra	Control Intenso
-------------------	-----------------

Obra in situ:

a) Materiales:

- Hormigón	Control Normal
- Armadura pasiva	Control Normal

b) Ejecución:

- En toda la obra	Control Normal
-------------------	----------------

6. Coeficientes de seguridad

De acuerdo con los niveles de control de calidad definidos, se adoptan los siguientes coeficientes de seguridad:

- Estados límites últimos:

Elementos prefabricados:

- Coeficientes de minoración de resistencias:

Acero pasivo	$\gamma_s = 1,10$
Hormigón	$\gamma_c = 1,40$

- Coeficientes de ponderación de acciones:

$\gamma_f = 1,50$

Obra in situ:

- Coeficientes de minoración de resistencias:

Acero pasivo	$\gamma_s = 1,15$
Hormigón	$\gamma_c = 1,50$

- Coeficientes de ponderación de acciones:

$\gamma_f = 1,50$

7. Parámetros del terreno

7.1 Características del relleno superior y lateral

En los cálculos se ha considerado un relleno de material granular en el trasdos de los hastiales y dintel con las siguientes características:

Peso específico	2,0 ton/m ³
Ángulo de rozamiento interno	35grados
Ángulo de rozamiento con el muro	0 grados
Coefficiente de empuje	0,42

8. Acciones consideradas

Se han considerado en el cálculo, las acciones descritas en la Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril. Las cuales consisten en:

8.1 Cargas permanentes

Peso propio del paso (dintel, hastiales y solera)

8.2 Empuje por efecto de las tierras

Se considera un empuje de las tierras con un coeficiente de 0,42.

8.3 Sobrecargas por efecto del tráfico

Uniforme en toda la plataforma 400 Kg/m²
Vehículo de 90 ton. con la disposición de cargas indicadas en la Instrucción.

8.4 Acciones por temperatura

No se consideran variaciones de temperatura, ya que el incremento de longitud de los miembros para un cambio de 30 grados centígrados es de escasa magnitud, desplazamiento que no alcanza a producir el empuje pasivo en el terreno.

9. Programa de cálculo

Este es un programa de cálculo matricial para ordenadores personales que permite realizar el cálculo integral de marcos de hormigón armado bajo seis hipótesis de carga distintas, formadas por distintas combinaciones de un total de ocho casos de carga, proporcionando los valores de los esfuerzos axiales, cortantes y flectores para cada hipótesis además de las armaduras de flexión y cortante necesarias en cada sección del marco.

El programa resuelve el cálculo de los esfuerzos en un marco de hormigón armado aplicando el método directo de la rigidez a una modelización plana de la estructura mediante barras que representan un metro de la profundidad del marco.

Para cada barra se proporcionan resultados en once puntos equidistantes a lo largo de la longitud de la misma.

El marco se considera apoyado sobre un terreno elástico cuya rigidez es directamente proporcional al coeficiente de balasto de suelo.

Las fuerzas de empotramiento que actúan sobre cada nudo se calculan aplicando la teoría de cálculo elástico de Euler-Bernoulli-Navier a una barra biempotrada sometidas a las cargas contempladas en las distintas hipótesis.

9.1 Casos de carga

El programa considera siete (7) casos de carga, los que enunciamos a continuación.

9.1.1 Peso propio del paso

El programa considera de forma automática el peso propio del marco en función, de la densidad del hormigón y de las dimensiones de sus elementos (dintel, solera y hastiales).

9.1.2 Empuje por efecto de las tierras

Calculado según las indicaciones del capítulo 9º de la norma NBE-AE-88. siendo la carga directamente proporcional al peso específico de las tierras y la altura de tierras en el dintel, mientras que en los hastiales varía con la profundidad y es función de coeficiente de empuje horizontal.

9.1.3 Sobrecargas de construcción

Se considera el efecto de un compactador de dos ejes actuando en el dintel, así como el relleno de las tierras hasta el nivel del dintel.

9.1.4 Sobrecarga uniforme 0,40 ton/m² sobre la plataforma.

Produce una carga uniforme sobre el dintel de 400 kp/m² y dos cargas uniformes sobre los hastiales que son el producto de la carga sobre el dintel por el coeficiente de empuje horizontal

9.1.5 Vehículo de 90 ton. (Repartido)

Reparto local de cargas a 45,0° en el relleno existente sobre el dintel, con un coeficiente de impacto de 1,8.
(Para un ángulo de reparto de 0,0° tenemos cargas puntuales)

9.1.6 Vehículo de 90 ton. (Flexión)

Vehículo de 90 ton. concentrado con segundo eje en el centro del dintel, de forma que produzca la máxima flexión en el dintel. Con el coeficiente de impacto considerado.
(Solo en el caso de un ángulo de reparto de 0,0°)

9.1.7 Vehículo de 90 ton. (Cortante)

Vehículo de 90 ton. concentrado con primer eje situado a una distancia de un canto útil del eje del dintel, de forma que produzca el máximo esfuerzo cortante. Con el coeficiente de impacto considerado.
(Solo en el caso de un ángulo de reparto de 0,0°)

9.1.8 Tablero biapoyado.

Ademas se considera el tablero biapoyado resistiendo el peso propio, el peso de la capa de compresión y una sobrecarga de 100 Kg/m²

9.2 Hipótesis de cálculo

Con el objeto de obtener las sollicitaciones pésimas se consideran en el cálculo del marco, las siguientes hipótesis:

HIPÓTESIS I:

- Peso propio
 - Cargas de construcción
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (3)}]$

HIPÓTESIS II y III:

- Peso propio
 - Empuje de las tierras
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)}]$

HIPÓTESIS IV:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m².
- Carro repartido en profundidad

Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)} + \text{Caso (4)} + \text{Caso (5)}]$

HIPÓTESIS V:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m².
- Carro concentrado máxima flexión

Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)} + \text{Caso (4)} + \text{Caso (6)}]$

HIPÓTESIS VI:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m².
- Carro concentrado máxima cortante.

Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)} + \text{Caso (4)} + \text{Caso (7)}]$

10. Resultados de cálculo

Como instrucción de los resultados de cálculo, se presentan los datos introducidos, tales como:

- Datos del terrapién: densidad, ángulo de rozamiento interno, coeficiente de empuje empleado en el cálculo.

- Datos de los materiales que se prevé emplear en la construcción del marco tales como: resistencia característica del hormigón, tipos de acero empleados, recubrimiento.

- Tipos del control de calidad y coeficientes empleados en el cálculo.

- Geometría del marco: dimensiones internas libres y espesor de cada uno de sus elementos (dintel, solera y hastiales).

- Sobrecargas que se han considerado en el cálculo.

Una vez calculado el marco, se obtienen:

- Las solicitaciones pías de las hipótesis consideradas, es decir, envolvente de esfuerzos.

- Las áreas de acero requeridas por cortante y por flexión, ésta última tanto para la cara interior como la exterior, todo ello según la Norma EH-91.

- Todos los datos y resultados están referidos a una longitud de paso de 100 cm.

TIPO DE TERRENO DE CIMENTACIÓN: Se considera un terreno de cimentación con un coeficiente de balasto de $5,0 \text{ kg/cm}^3$ que correspondería a un suelo con una resistencia nominal de $2,0 \text{ kg/cm}^2$.

NOTA: El marco ha sido calculado con los coeficientes de seguridad correspondientes a Control intenso y Control normal para cada uno de los elementos que compone el marco:

Hastiales:	Control intenso	H-300
Tablero:	Control intenso	H-300
Obra in situ:	Control normal	H-250

10.1 Tablero autoportante.

DATOS GEOMETRICOS:

Longitud:	826	cm
Canto Total:	40,0	cm.
Ancho:	100,0	cm.
Recubrimiento:	4,0	cm.
Dist. Apoyo:	13,0	cm.
Luz / Apoyos:	800,0	cm.
Canto Util:	36	cm

MATERIALES:

Fck:	300	Kg/cm2
Fyk:	5.100	Kg/cm2
Gf (p)=	1,40	
Gf (v)=	1,40	
Gc =	1,50	
Gs =	1,10	
Dens. Hgón:	2.500	Kg/m3

ACCIONES:

Peso Propio:	1.000	Kg/ml
Sobrec. Unif.	1.100	Kg/ml

SOLICITACIONES:

Nd	0	Kg
Md (cto)	2.349.51	Kgxcn
	6	
Md (apoy)	-2.484	Kgxcn
Vd	12.142	Kg
Vcu	25.857	Kg
As mín	0,00	cm2/ml
Nd . e	2.349.51	Kgxcn
	6	
Mc	9.072.00	Kgxcn
	0	
As2 mín	6,21	cm2
As2	2,50	cm2
Us2	11.591	Kg
As1 mín	14,78	cm2
As1	45,96	cm2
Us1	213.087	Kg

ALCAÑIZ, Agosto de 1.999

ALHOSA
Alcañizana del Hormigón, S. A. -ALCAÑIZ
Dpto. Técnico de ALHOSA

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GEOMETRIA DEL MARCO

LUZ = 800.00 cm
GALIBO = 580.00 cm
ESPESOR DE LOS HASTIALES = 40.00 cm
ESPESOR DEL DINTEL = 80.00 cm
ESPESOR DE LA SOLERA = 80.00 cm
RECUBRIMIENTO DE LAS ARMADURAS = 4.00 cm
ALTURA DE TIERRAS = 160.00 cm

MATERIALES

TIPO DE HORMIGON = H250
COEFICIENTE DE MINORACION DEL HORMIGON = 1.50
TIPO DE ACERO = AEM500
COEFICIENTE DE MINORACION DEL ACERO = 1.15

TERRENO

COEFICIENTE DE BALASTO = 5.00 kp/cm³
ANGULO DE ROZAMIENTO INTERNO = 35.00
PESO ESPECIFICO = 0.0020 kp/cm³
ANGULO DE ROZAMIENTO TERRENO-MURO = 0.00
COEFICIENTE DE EMPUJE = 0.42

CARGAS

COEFICIENTE DE MAYORACION DE CARGAS = 1.50
CARGA 1er EJE COMPACTADOR = 2500.00 kp
CARGA 2o EJE COMPACTADOR = 2500.00 kp
SEPARACION ENTRE EJES DEL COMPACTADOR = 200.00 cm
TREN DE CARGAS (0:CARRETERA, 1:FFCC RENFE, 2:FFCC METRICA, 3:FFCC UIC) = 1
ANGULO DE REPARTO DEL TREN DE CARGAS = 45.00
REPARTO AUTOMATICO DEL TREN DE CARGAS = 0.00
COEFICIENTE DE IMPACTO = 1.80

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CARGAS QUE ACTUAN SOBRE LA ESTRUCTURA

PESO PROPIO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
1	0.00	-20.00
2	0.00	-20.00
3	0.00	-20.00
4	0.00	-20.00
5	0.00	-20.00
6	0.00	-20.00
7	0.00	-20.00
8	0.00	-20.00
9	0.00	-20.00
10	0.00	-20.00
11	-10.00	0.00
12	0.00	20.00
13	10.00	0.00

EMPUJE DEL TERRENO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
12	0.00	32.00

-Cargas trapezoidales sobre las barras

Barra	Carga inicial (kp/cm)	Carga final (kp/cm)
11	68.88	13.44
13	13.44	68.88

SOBRECARGAS DE CONSTRUCCION

-Cargas trapezoidales sobre las barras

Barra	Carga inicial (kp/cm)	Carga final (kp/cm)
11	55.44	0.00
13	0.00	55.44

-Trenes de carga sobre las barras

Barra	Carga 1er Eje (kp)	Carga 2o Eje (kp)	Separacion (cm)
12	4500.00	4500.00	200.00

SOBRECARGA UNIFORME DE 0.4 t/m²

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	1.68
12	0.00	4.00
13	0.00	1.68

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SOBRECARGA UNIFORME DE 1 t/m²

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	0.00
12	0.00	0.00
13	0.00	0.00

VEHICULO REPARTIDO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	22.54
12	0.00	53.68
13	0.00	22.54

VEHICULO EN POSICION DE MAXIMA FLEXION

-Trenes de carga sobre las barras

Barra	Carga (kp)	Pos.EjeCentral(cm)
12	8437.50	420.00

VEHICULO EN POSICION DE MAXIMO CORTANTE

-Trenes de carga sobre las barras

Barra	Carga (kp)	Pos.EjeCentral(cm)
12	8437.50	246.00

COEFICIENTES DE MAYORACION DE ACCIONES

HIPOT.	P.PROPIO	TERRENO	S.CONST.	S.UNIF.	4 TR.DIST.	V.REPT.	V.C.FX.	V.C.CT.
1	1.5	0.0	1.5	0.0	0.0	0.0	0.0	0.0
2	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
3	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
4	1.5	1.5	0.0	1.5	0.0	1.5	0.0	0.0
5	1.5	1.5	0.0	1.5	0.0	0.0	0.0	0.0
6	1.5	1.5	0.0	1.5	0.0	0.0	0.0	0.0

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ENVOLVENTES DE MOMENTOS FLECTORES

	X (cm)	FLECTOR POS. (mkp)	HIPOTESIS	FLECTOR NEG. (mkp)	HIPOTESIS
Solera	0.00	0.00	1	-44325.17	4
	84.00	10437.43	4	0.00	1
	168.00	46646.21	4	0.00	1
	252.00	68795.04	4	0.00	1
	336.00	80520.81	4	0.00	1
	420.00	84161.47	4	0.00	1
	504.00	80520.81	4	0.00	1
	588.00	68795.04	4	0.00	1
	672.00	46646.21	4	0.00	1
	756.00	10437.43	4	0.00	1
	840.00	0.00	1	-44325.17	4
Hastial dcho	0.00	0.00	1	-44325.17	4
	66.00	0.00	1	-22759.86	4
	132.00	0.00	1	-6915.69	4
	198.00	3898.09	2	0.00	1
	264.00	9058.20	4	0.00	1
	330.00	9912.42	4	0.00	1
	396.00	6494.48	4	0.00	1
	462.00	865.33	2	-833.38	4
	528.00	0.00	1	-11708.91	4
	594.00	0.00	1	-25769.86	4
	660.00	0.00	1	-42654.00	4
Dintel	0.00	0.00	1	-42654.00	4
	84.00	9582.05	4	0.00	1
	168.00	50210.09	4	0.00	1
	252.00	79230.12	4	0.00	1
	336.00	96642.14	4	0.00	1
	420.00	102446.14	4	0.00	1
	504.00	96642.14	4	0.00	1
	588.00	79230.12	4	0.00	1
	672.00	50210.09	4	0.00	1
	756.00	9582.05	4	0.00	1
	840.00	0.00	1	-42654.00	4
Hastial izdo	0.00	0.00	1	-42654.00	4
	66.00	0.00	1	-25769.86	4
	132.00	0.00	1	-11708.91	4
	198.00	865.33	2	-833.38	4
	264.00	6494.48	4	0.00	1
	330.00	9912.42	4	0.00	1
	396.00	9058.20	4	0.00	1
	462.00	3898.09	2	0.00	1
	528.00	0.00	1	-6915.69	4
	594.00	0.00	1	-22759.86	4
	660.00	0.00	1	-44325.17	4

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ENVOLVENTE DE CORTANTES Y ESFUERZOS CONCOMITANTES

	X (cm)	CORTANTE (kp)	HIPOTESIS	AXIL (kp)	FLECTOR (mkp)
Solera	0.00	-78995.30	4	37191.86	-44325.17
	84.00	-53135.85	4	37191.86	10437.43
	168.00	-34034.93	4	37191.86	46646.21
	252.00	-19612.29	4	37191.86	68795.04
	336.00	-8864.06	4	37191.86	80520.81
	420.00	-0.00	4	37191.86	84161.47
	504.00	8864.06	4	37191.86	80520.81
	588.00	19612.29	4	37191.86	68795.04
	672.00	34034.93	4	37191.86	46646.21
	756.00	53135.85	4	37191.86	10437.43
	840.00	78995.30	4	37191.86	-44325.17
Hastial dcho	0.00	-37191.86	4	78995.30	-44325.17
	66.00	-28249.04	4	78005.30	-22759.86
	132.00	-19855.07	4	77015.30	-6915.69
	198.00	-12009.96	4	76025.30	3569.58
	264.00	-4713.71	4	75035.30	9058.20
	330.00	2033.69	4	74045.30	9912.42
	396.00	8232.23	4	73055.30	6494.48
	462.00	13881.92	4	72065.30	-833.38
	528.00	18982.75	4	71075.30	-11708.91
	594.00	23534.72	4	70085.30	-25769.86
	660.00	27537.84	4	69095.30	-42654.00
Dintel	0.00	-69095.30	4	27537.84	-42654.00
	84.00	-55276.24	4	27537.84	9582.05
	168.00	-41457.18	4	27537.84	50210.09
	252.00	-27638.12	4	27537.84	79230.12
	336.00	-13819.06	4	27537.84	96642.14
	420.00	0.00	4	27537.84	102446.14
	504.00	13819.06	4	27537.84	96642.14
	588.00	27638.12	4	27537.84	79230.12
	672.00	41457.18	4	27537.84	50210.09
	756.00	55276.24	4	27537.84	9582.05
	840.00	69095.30	4	27537.84	-42654.00
Hastial izdo	0.00	-27537.84	4	69095.30	-42654.00
	66.00	-23534.72	4	70085.30	-25769.86
	132.00	-18982.75	4	71075.30	-11708.91
	198.00	-13881.92	4	72065.30	-833.38
	264.00	-8232.23	4	73055.30	6494.48
	330.00	-2033.69	4	74045.30	9912.42
	396.00	4713.71	4	75035.30	9058.20
	462.00	12009.96	4	76025.30	3569.58
	528.00	19855.07	4	77015.30	-6915.69
	594.00	28249.04	4	78005.30	-22759.86
	660.00	37191.86	4	78995.30	-44325.17

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ENVOLVENTE DE AXILES Y ESFUERZOS CONCOMITANTES

	X (cm)	AXIL (kp)	HIPOTESIS	CORTANTE (kp)	FLECTOR (mkp)
Solera	0.00	37191.86	4	-78995.30	-44325.17
	84.00	37191.86	4	-53135.85	10437.43
	168.00	37191.86	4	-34034.93	46646.21
	252.00	37191.86	4	-19612.29	68795.04
	336.00	37191.86	4	-8864.06	80520.81
	420.00	37191.86	4	-0.00	84161.47
	504.00	37191.86	4	8864.06	80520.81
	588.00	37191.86	4	19612.29	68795.04
	672.00	37191.86	4	34034.93	46646.21
	756.00	37191.86	4	53135.85	10437.43
	840.00	37191.86	4	78995.30	-44325.17
Hastial dcho	0.00	78995.30	4	-37191.86	-44325.17
	66.00	78005.30	4	-28249.04	-22759.86
	132.00	77015.30	4	-19855.07	-6915.69
	198.00	76025.30	4	-12009.96	3569.58
	264.00	75035.30	4	-4713.71	9058.20
	330.00	74045.30	4	2033.69	9912.42
	396.00	73055.30	4	8232.23	6494.48
	462.00	72065.30	4	13881.92	-833.38
	528.00	71075.30	4	18982.75	-11708.91
	594.00	70085.30	4	23534.72	-25769.86
	660.00	69095.30	4	27537.84	-42654.00
Dintel	0.00	27537.84	4	-69095.30	-42654.00
	84.00	27537.84	4	-55276.24	9582.05
	168.00	27537.84	4	-41457.18	50210.09
	252.00	27537.84	4	-27638.12	79230.12
	336.00	27537.84	4	-13819.06	96642.14
	420.00	27537.84	4	0.00	102446.14
	504.00	27537.84	4	13819.06	96642.14
	588.00	27537.84	4	27638.12	79230.12
	672.00	27537.84	4	41457.18	50210.09
	756.00	27537.84	4	55276.24	9582.05
	840.00	27537.84	4	69095.30	-42654.00
Hastial izdo	0.00	69095.30	4	-27537.84	-42654.00
	66.00	70085.30	4	-23534.72	-25769.86
	132.00	71075.30	4	-18982.75	-11708.91
	198.00	72065.30	4	-13881.92	-833.38
	264.00	73055.30	4	-8232.23	6494.48
	330.00	74045.30	4	-2033.69	9912.42
	396.00	75035.30	4	4713.71	9058.20
	462.00	76025.30	4	12009.96	3569.58
	528.00	77015.30	4	19855.07	-6915.69
	594.00	78005.30	4	28249.04	-22759.86
	660.00	78995.30	4	37191.86	-44325.17

ALHOSA

pag. 7

MARCOS 1.0

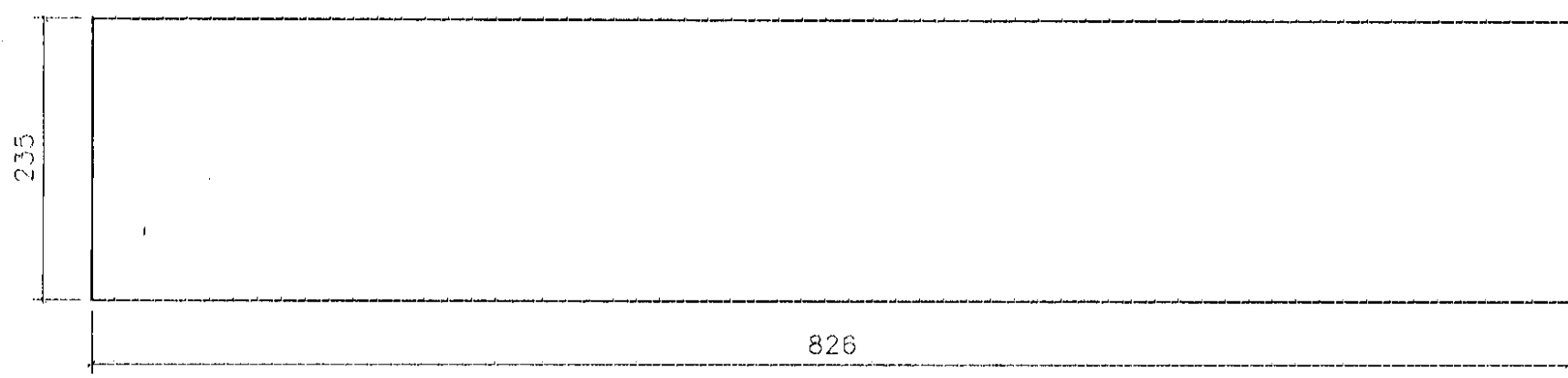
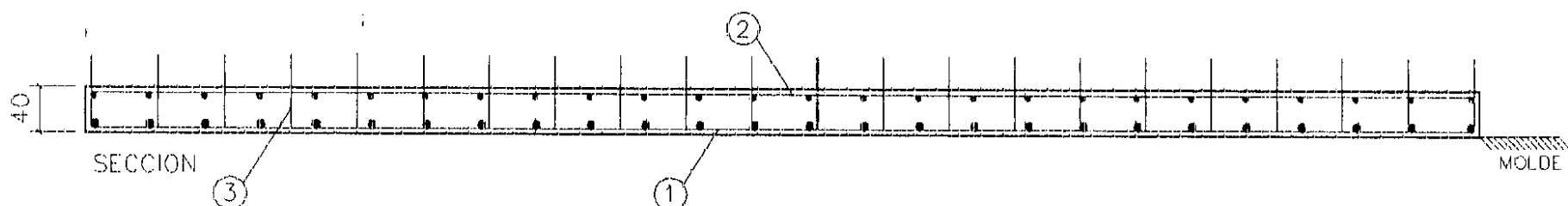
08/04/99

12:24:23

ARMADURAS

	X (cm)	AR. ESTRIBOS (cm2/m)	ARM. FLEX. EXT. (cm2)	ARM. FLEX. INT. (cm2)
Solera				
	0.00	10.42	9.28	0.00
	84.00	1.42	0.00	0.00
	168.00	0.00	0.00	10.01
	252.00	0.00	0.00	17.12
	336.00	0.00	0.00	20.96
	420.00	0.00	0.00	22.17
	504.00	0.00	0.00	20.96
	588.00	0.00	0.00	17.12
	672.00	0.00	0.00	10.01
	756.00	1.42	0.00	0.00
	840.00	10.42	9.28	0.00
Hastial dcho				
	0.00	10.25	24.22	0.00
	66.00	3.68	6.59	0.00
	132.00	0.00	0.00	0.00
	198.00	0.00	0.00	0.00
	264.00	0.00	0.00	0.00
	330.00	0.00	0.00	0.00
	396.00	0.00	0.00	0.00
	462.00	0.00	0.00	0.00
	528.00	0.00	0.00	0.00
	594.00	0.22	9.71	0.00
	660.00	3.16	23.60	0.00
Dintel				
	0.00	6.97	9.84	0.00
	84.00	2.16	0.00	0.00
	168.00	0.00	0.00	12.22
	252.00	0.00	0.00	21.58
	336.00	0.00	0.00	27.36
	420.00	0.00	0.00	29.31
	504.00	0.00	0.00	27.36
	588.00	0.00	0.00	21.58
	672.00	0.00	0.00	12.22
	756.00	2.16	0.00	0.00
	840.00	6.97	9.84	0.00
Hastial izdo				
	0.00	3.16	23.60	0.00
	66.00	0.22	9.71	0.00
	132.00	0.00	0.00	0.00
	198.00	0.00	0.00	0.00
	264.00	0.00	0.00	0.00
	330.00	0.00	0.00	0.00
	396.00	0.00	0.00	0.00
	462.00	0.00	0.00	0.00
	528.00	0.00	0.00	0.00
	594.00	3.68	6.59	0.00
	660.00	10.25	24.22	0.00

11. Planos

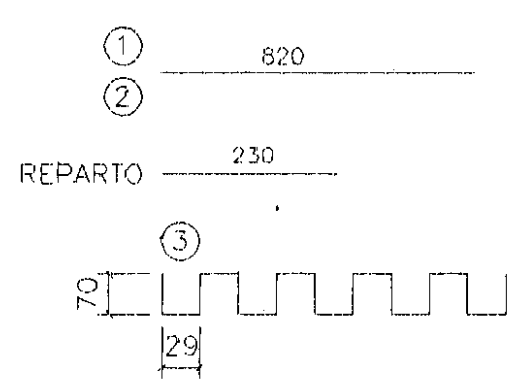


PLANTA
(Vista Cara Talochada)

CUADRO DE ARMADO		
	PRINCIPAL	REPARTO
1	23 $\phi 25$	$\phi 16 / 20$ cm.
2	8 $\phi 20$	$\phi 8 / 20$ cm.
3	9 $\phi 6 / 30$ cm	

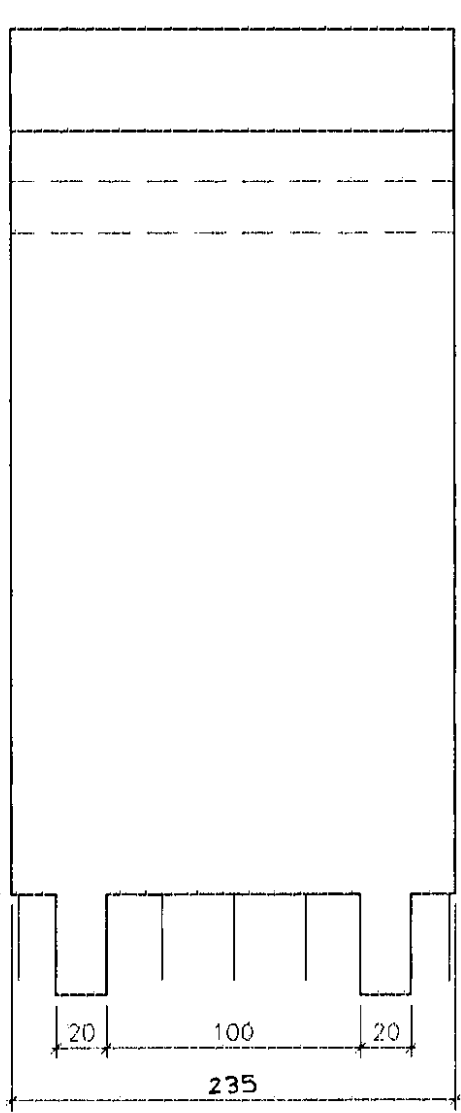
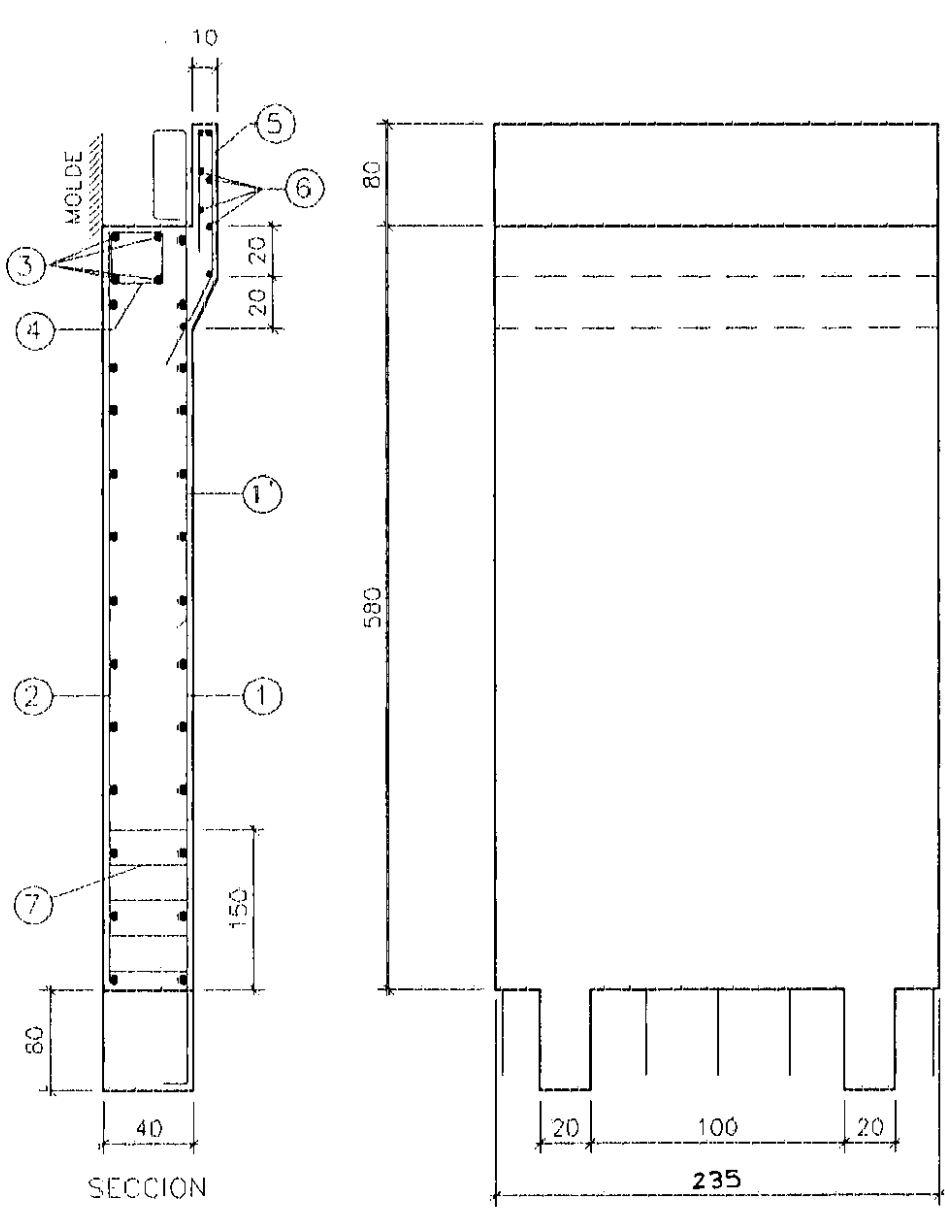
RECUBRIMIENTO: 25 mm.

CONTROL DE CALIDAD	
HORMIGON	H-300
ACERO	B-500

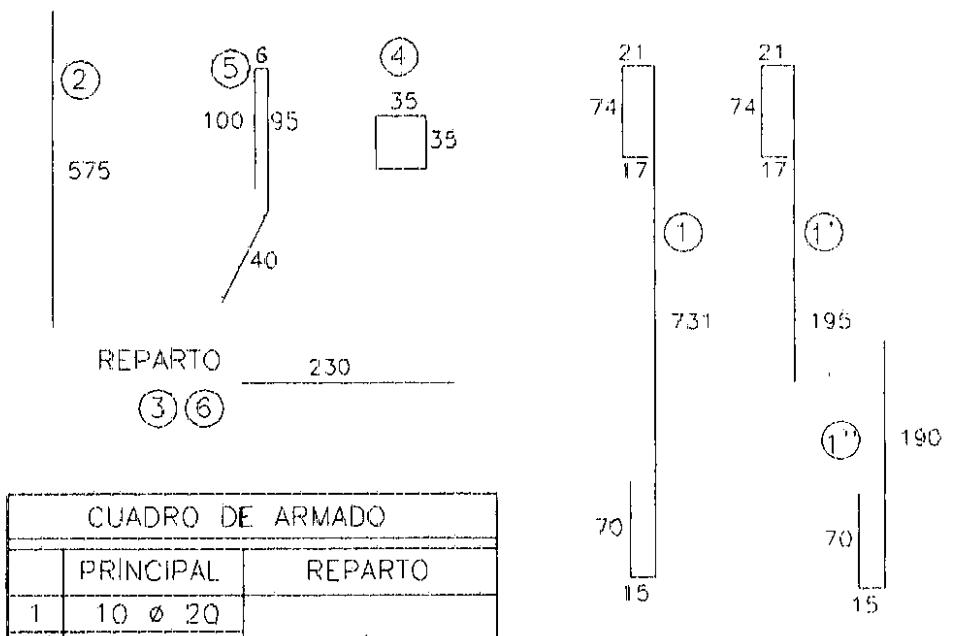


04/08/99	0	
FECHA	REV.	MODIFICACIONES
PIEZA	TABLERO PASO 800x580 HT160	
Nº OFERTA	99/519	
OBRA	TORILIA - GUADALAJARA	
CLIENTE	TORILIA UTE	
TABLERO PASO 800x580 HT160 PREFABRICADOS DE HORMIGON		

Hoja 19 de 22



ALZADO FRONTAL
(Vista Cara Molde)



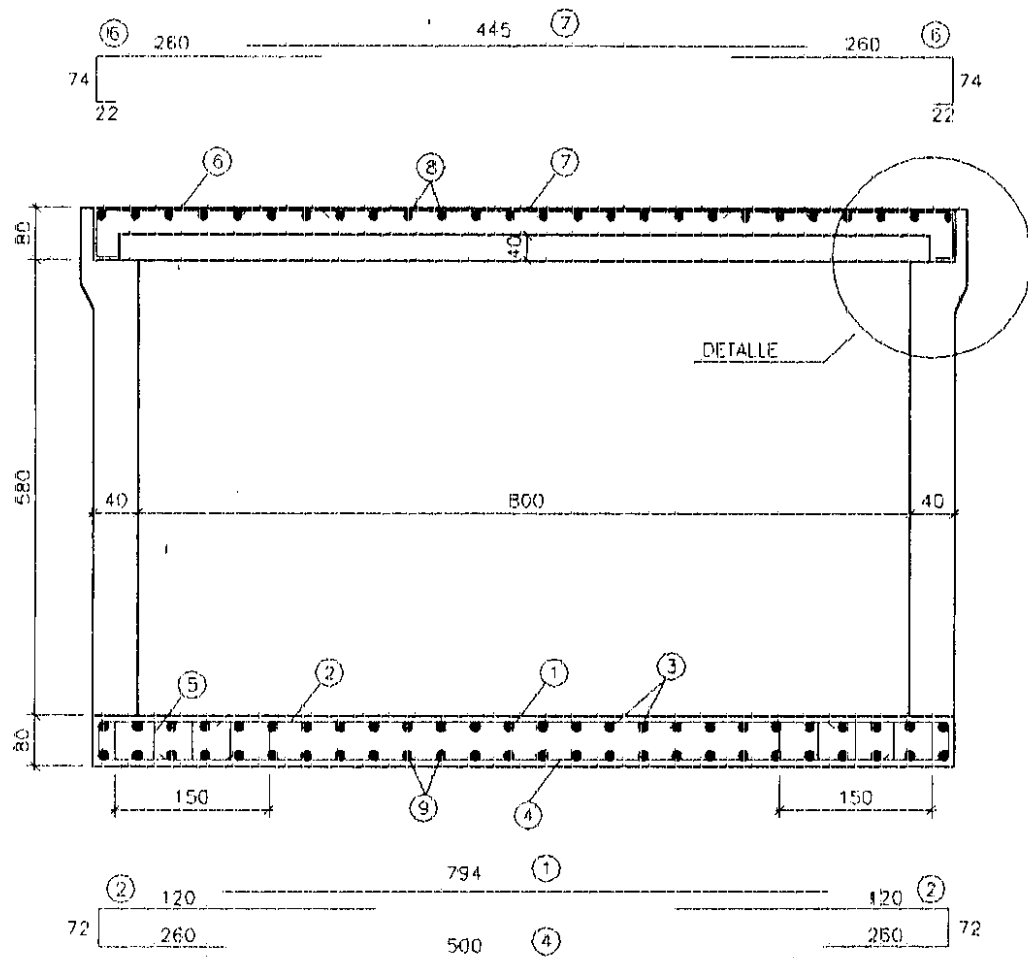
CUADRO DE ARMADO		
	PRINCIPAL	REPARTO
1	10 $\phi 20$	
1'	8 $\phi 20$	$\phi 10 / 24$ cm.
1''	8 $\phi 20$	
2	11 $\phi 10$	$\phi 10 / 24$ cm.
3	4 $\phi 16$	
4	$\phi 6 / 20$ cm.	
5	$\phi 6 / 15$ cm.	
6	11 $\phi 6$	
7	7 $\phi 6 / 30$ cm en 150 cm	
PATAS	4 $\phi 10$ (150)	
	Est. $\phi 6 / 17$ cm.	

CONTROL DE CALIDAD	
HORMIGON	H-300
ACERO	B-500

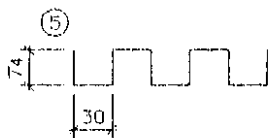
RECUBRIMIENTO: 25 mm.

04/08/99	0	
FECHA	REV.	MODIFICACIONES
PIEZA	ESTRIBO PASO 800x580 HT160	
Nº OFERTA	99/519	
OBRA	TORILIA - GUADALAJARA	
CLIENTE	TORILIA UTE	
ESTRIBO PASO 800x580 HT160 PREFABRICADOS DE HORMIGON		

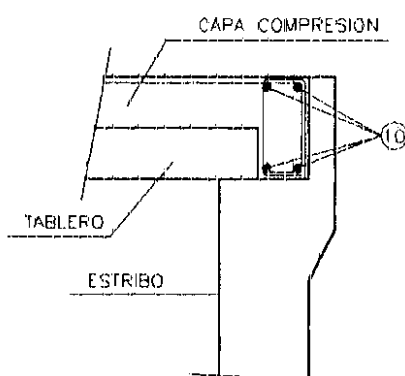
Hoja 20 de 22



CUADRO DE ARMADO	
TIPO	SOLERA
1	Ø20 /14 cm.
2	Ø16 /20cm.
3	Ø12 /25 cm.
4	Ø10 /20 cm.
5	3Ø6/ml. cada 30cm eh 150cm
9	Ø10 /20 cm.



DETALLE



CUADRO DE ARMADO	
TIPO	CAPA COMPRESION
6	Ø16 /20 cm.
7	Ø10 /20cm.
8	Ø10 /20cm.
10	4 Ø16

CONTROL DE CALIDAD

HORMIGON: H-250
ACERO: B-500
CONTROL NORMAL

04/08/99	0	MODIFICACIONES	Nº PLANO:
FECHA	REV.		11
PIEZA	ARMADO IN SITU PASO 800x580 HT160		
Nº OFERTA	98/488		
OBRA	SANTA COLOMA DE GUERALT		
CLIENTE	A. C. S.		
ARMADO IN SITU PASO 800x580 HT160			
RESERVA		APROBADO	
Dpto. Comercial		Dpto. Comercial	
			
PREFABRICADOS DE HORMIGON			

Hoja 21 de 22

4.3.6 Paso inferior 572+5

25

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- 1.- Generalidades
- 2.- Descripción
- 3.- Instrucciones aplicadas
- 4.- Características de los materiales
- 5.- Control de calidad
- 6.- Coeficientes de seguridad
- 7.- Parámetros del terreno
- 8.- Acciones consideradas
- 9.- Hipótesis de cálculo
- 10.- Cálculos
- 11.- Cimentaciones
- 12.- Planos

SUSTITUYEA
2.9.15 17 3
2.9.16 17 3
Fecha: 17-8-99

ALHOSA PREFABRICADOS DE HORMIGÓN	ALETA PASO 1440 x 660
Oferta: 99/519 Obra: TORIJA - GUADALAJARA Empresa: TORIJA UTE Fecha: Agosto de 1.999	

CONTROL DE DISTRIBUCIÓN			
Nº DE IDENTIFICACIÓN: C055108006588			
Nº DE TRABAJO			
N	DISTRIBUIDO A	FECHA	RECIBE
1	M. C. C. C.	18-08-99	[Firma]
2			
3			
4			
5			

Hoja 1 de 18

Generalidades

En la presente memoria se muestran los cálculos realizados para justificar las Aletas Prefabricadas de hormigón que sostienen el terraplen.

Descripción

El sostenimiento de las tierras que forman el terraplen en las entradas de las obras de fábrica se realiza con aletas prefabricadas de hormigón.

El espesor de los muros que forman las aletas es de 20cm. hasta los 3,00 m. de profundidad y luego aumenta a razón de 5 cm./m. como se muestra en los planos adjuntos.

La cimentación se realiza con hormigón vertido in situ

Instrucciones aplicadas

Para el cálculo de las Aletas, de acuerdo con la normativa vigente, se han utilizado las siguientes Instrucciones y Normas:

* Instrucción para el Proyecto y Ejecución de Obras de Hormigón en Masa o Armado EH-91.

* Norma básica de la edificación NBE - AE/88 Acciones en la edificación.

Características de los materiales

* Hormigones:

Hormigón en elemento prefabricado	H-300
Hormigón en obra in situ	H-200

* Acero:

Acero para armar corrugado	B-500 S
----------------------------	---------

Control de calidad

El control de calidad se atenderá a lo especificado en la EH-91, habiéndose seleccionado los siguientes niveles:

Elementos prefabricados:

a) Materiales:

- Hormigón	Control Intenso
- Armadura pasiva	Control Intenso

b) Ejecución:

- En toda la obra	Control Intenso
-------------------	-----------------

Obra in situ:

a) Materiales:

- Hormigón	Control Normal
- Armadura pasiva	Control Normal

b) Ejecución:

- En toda la obra	Control Normal
-------------------	----------------

Coefficientes de seguridad

De acuerdo con los niveles de control de calidad definidos, se adoptan los siguientes coeficientes de seguridad:

- Estados límites últimos:

Elementos prefabricados:

- Coeficientes de minoración de resistencias:

Acero pasivo	$\gamma_s = 1,10$
Hormigón	$\gamma_c = 1,40$

- Coeficientes de ponderación de acciones:

$$\gamma_f = 1,50$$

Obra in situ:

- Coeficientes de minoración de resistencias:

Acero pasivo	$\gamma_s = 1,15$
Hormigón	$\gamma_c = 1,50$

- Coeficientes de ponderación de acciones:

$$\gamma_f = 1,60$$

Parámetros del terreno

Características del relleno lateral

En los cálculos se ha considerado un relleno de material granular en el trasdós de los hastiales y dintel con las siguientes características:

Peso específico	2,00 ton/m ³
Coefficiente de empuje al reposo	0,33

Acciones consideradas

Se han considerado en el cálculo, las acciones descritas en la Norma básica de la edificación NBE-AE/88 Acciones en la edificación. Las cuales consisten en:

Empuje por efecto de las tierras

Se considera el empuje de las tierras que se encuentran en el trasdós de la Aleta con un coeficiente de empuje de 0,33.

Sobrecargas de uso

Se considera una sobrecarga de 1000 Kg/m² sobre el terraplen.

Acciones por temperatura

No se consideran variaciones de temperatura, ya que el incremento de longitud de los miembros para un cambio de 30 grados centígrados y dadas las dimensiones de la pieza es de escasa magnitud, desplazamiento que no alcanza a producir el empuje pasivo en el terreno.

Hipótesis de cálculo.

HIPÓTESIS I:

- Empuje de las tierras
 - Sobrecarga de uso
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)}]$

Cálculos.

En la siguiente página se encuentra un cuadro en el que se muestran los esfuerzos sobre el muro a distintas profundidades.

Cada pieza se ha armado para su altura media.

En Alcañiz, a Agosto de 1.999

ALHOSA
Alcañizana del Hormigón, S. A.-ALCAÑIZ
Dpto. Técnico ALHOSA

DATOS GENERALES:

Obra: TORIJA - GUADALAJARA
 Cliente: TORIJA UTE
 N° Oferta: 99/519
 Pieza: Aleta 1440x660

TERRENO

Densidad terreno: 0,0020 Kg/cm³
 Angulo rozamiento interno: 30,0 °
 Angulo rozamiento terreno muro: 0,0 °
 Angulo de Talud: 0,0 °
 Coeficiente de rozamiento: 0,57
 Tensión Admisible: 2,00 Kg/cm²
 Coeficiente Empuje Hztal: 0,333

DATOS DEL MURO:

Altura del Muro: cm
 Altura tierras: cm
 Sobrecarga: 0,1000 Kg/cm²
 Longitud Muro: 100 cm

MURO

Fcd = 214,3 Kg/cm² Mayoración Cargas: 1,50
 Fyd = 4.636,4 Kg/cm² Recubrimiento: 4,0 cm.

Z (cm)	Canto (cm)	Eh (Kg)	Ms (Kg x cm)	Md (Kg x cm)	Us (Kg)	As (cm ²)
0	20,0	0	0	0	0	0,00
10	20,0	37	178	267	17	0,00
20	20,0	80	756	1.133	71	0,02
30	20,0	130	1.800	2.700	169	0,04
40	20,0	187	3.378	5.067	317	0,07
50	20,0	250	5.556	8.333	521	0,11
60	20,0	320	8.400	12.600	788	0,17
70	20,0	397	11.978	17.967	1.125	0,24
80	20,0	480	16.356	24.533	1.537	0,33
90	20,0	570	21.600	32.400	2.031	0,44
100	20,0	667	27.778	41.667	2.614	0,56
110	20,0	770	34.956	52.433	3.293	0,71
120	20,0	880	43.200	64.800	4.074	0,88
130	20,0	997	52.578	78.867	4.965	1,07
140	20,0	1.120	63.156	94.733	5.973	1,29
150	20,0	1.250	75.000	112.500	7.105	1,53
160	20,0	1.387	88.178	132.267	8.369	1,81
170	20,0	1.530	102.756	154.133	9.773	2,11
180	20,0	1.680	118.800	178.200	11.325	2,44
190	20,0	1.837	136.378	204.567	13.033	2,81
200	20,0	2.000	155.556	233.333	14.907	3,22

Z (cm)	Canto (cm)	Eh (Kg)	Ms (Kg x cm)	Md (Kg x cm)	Us (Kg)	As (cm ²)
210	20,0	2.170	176.400	264.600	16.957	3,66
220	20,0	2.347	198.978	298.467	19.191	4,14
230	20,0	2.530	223.356	335.033	21.621	4,66
240	20,0	2.720	249.600	374.400	24.258	5,23
250	20,0	2.917	277.778	416.667	27.114	5,85
260	20,0	3.120	307.956	461.933	30.201	6,51
270	20,0	3.330	340.200	510.300	33.534	7,23
280	20,0	3.547	374.578	561.867	37.127	8,01
290	20,0	3.770	411.156	616.733	40.997	8,84
300	20,0	4.000	450.000	675.000	45.162	9,74
310	20,5	4.237	491.178	736.767	47.897	10,33
320	21,0	4.480	534.756	802.133	50.714	10,94
330	21,5	4.730	580.800	871.200	53.616	11,56
340	22,0	4.987	629.378	944.067	56.601	12,21
350	22,5	5.250	680.556	1.020.833	59.671	12,87
360	23,0	5.520	734.400	1.101.600	62.826	13,55
370	23,5	5.797	790.978	1.186.467	66.067	14,25
380	24,0	6.080	850.356	1.275.533	69.395	14,97
390	24,5	6.370	912.600	1.368.900	72.810	15,70
400	25,0	6.667	977.778	1.466.667	76.312	16,46
410	25,5	6.970	1.045.956	1.568.933	79.902	17,23
420	26,0	7.280	1.117.200	1.675.800	83.582	18,03
430	26,5	7.597	1.191.578	1.787.367	87.351	18,84
440	27,0	7.920	1.269.156	1.903.733	91.211	19,67
450	27,5	8.250	1.350.000	2.025.000	95.162	20,53
460	28,0	8.587	1.434.178	2.151.267	99.204	21,40
470	28,5	8.930	1.521.756	2.282.633	103.339	22,29
480	29,0	9.280	1.612.800	2.419.200	107.567	23,20
490	29,5	9.637	1.707.378	2.561.067	111.890	24,13
500	30,0	10.000	1.805.556	2.708.333	116.306	25,09
510	30,5	10.370	1.907.400	2.861.100	120.819	26,06
520	31,0	10.747	2.012.978	3.019.467	125.428	27,05
530	31,5	11.130	2.122.356	3.183.533	130.134	28,07
540	32,0	11.520	2.235.600	3.353.400	134.938	29,10
550	32,5	11.917	2.352.778	3.529.167	139.841	30,16
560	33,0	12.320	2.473.956	3.710.933	144.843	31,24
570	33,5	12.730	2.599.200	3.898.800	149.947	32,34
580	34,0	13.147	2.728.578	4.092.867	155.152	33,46
590	34,5	13.570	2.862.156	4.293.233	160.459	34,61
600	35,0	14.000	3.000.000	4.500.000	165.870	35,78
610	35,5	14.437	3.142.178	4.713.267	171.385	36,97

CIMENTACIONES

DATOS GENERALES:

Obra: TORIJA - GUADALAJARA
 Cliente: TORIJA UTE
 N° Oferta: 99/519
 Pieza: Aleta 1440x660

MATERIALES:

Densidad terreno: 0,00200 Kg/cm³
 Angulo rozamiento interno: 30,0 °
 Angulo rozamiento terreno muro: 0,0 °
 Angulo de Talud: 0,0 °
 Coeficiente de rozamiento: 0,57
 Tensión Admisible: 2,00 Kg/cm²
 Densidad del hormigón: 0,0025

DATOS DEL MURO:

Altura del Muro: 610 cm
 Altura tierras: 610 cm
 Sobrecarga: 0,1000 Kg/cm²
 Longitud Muro: 100 cm
 Peso del Muro: 3.970 Kg/ml

RESISTENCIAS:

Hormigon: 200 Kg/cm² (1,50)
 Acero: 5.100 Kg/cm² (1,15)
 Acciones: (1,60)

DATOS DE LA ZAPATA:

Vuelo Puntera: 100 cm
 Vuelo del Talon: 250 cm
 Canto de la Zapata: 60 cm
 Canto del cordón de cimentación: 20 cm

COMPROBACION DE ESTABILIDAD:

Coeficiente Empuje Activo: 0,33 Hgón
 Base de la Zapata: 370 cm 2.220 Litros

	Fh	Fv	e	Mv	Mr
Muro:		-3.970	-75,0		-436.700
Tierras:	-12.403	-30.500	60,0	3.266.211	-7.472.500
Sobrecarga:	-2.033	-2.500	60,0	742.167	-612.500
Zapata:		-5.550	0,0		-1.026.750
	-14.437	-42.520		4.008.378	-9.548.450

Csd = 1,68 Csv = 2,38 e = -54,7 cm.

TENSION DEL TERRENO

1,66 < 2,00 (Servicio)
 2,56 < 4,00 (Empuje mayorado)

Distribucion Trapezoidal

SP= 216,87 ST= 12,97 Le= 370,0 qt= -132,00
 (Kg/cm) (Kg/cm) (cm) (Kg/cm)

DATOS GENERALES:

Obra: TORIJA - GUADALAJARA
 Cliente: TORIJA UTE
 N° Oferta: 99/519
 Pieza: Aleta 1440x660

MATERIALES:

Densidad terreno:	0,00200 Kg/cm3
Angulo rozamiento interno:	30,0 °
Angulo rozamiento terreno muro:	0,0 °
Angulo de Talud:	0,0 °
Coefficiente de rozamiento:	0,57
Tensión Admisible:	2,00 Kg/cm2
Densidad del hormigón:	0,0025

DATOS DEL MURO:

Altura del Muro:	355 cm
Altura tierras:	355 cm
Sobrecarga:	0,1000 Kg/cm2
Longitud Muro:	100 cm
Peso del Muro:	1.948 Kg/ml

RESISTENCIAS:

Hormigon:	200 Kg/cm2	(1,50)
Acero:	5.100 Kg/cm2	(1,15)
Acciones:		(1,60)

DATOS DE LA ZAPATA:

Vuelo Puntera:	60 cm
Vuelo del Talon:	135 cm
Canto de la Zapata:	40 cm
Canto del cordon de cimentacion:	20 cm

COMPROBACION DE ESTABILIDAD:

Coeficiente Empuje Activo:	0,33	Hgón
Base de la Zapata:	215 cm	860 Litros

	Fh	Fv	e	Mv	Mr
Muro:		-1.948	-37,5		-136.360
Tierras:	-4.201	-9.585	40,0	665.132	-1.413.788
Sobrecarga:	-1.183	-1.350	40,0	257.375	-199.125
Zapata:		-2.150	0,0		-231.125
	-5.384	-15.033		922.507	-1.980.398

Csd = 1,59 Csv = 2,15 e = -37,1 cm.

TENSION DEL TERRENO

<u>TENSION DEL TERRENO</u>	1.07	<	2.00	(Servicio)
	1.89	<	4.00	(Empuje mayorado)

Distribucion Triangular

SP= 142,42	ST= 0,00	Le= 211,1	qt= -81,00
(Kg/cm)	(Kg/cm)	(cm)	(Kg/cm)

PLANOS

Fcd =	133,3 Kg/cm2	Mayoración Cargas:	1,60
Fyd =	4.434,8 Kg/cm2	Recubrimiento:	6,0 cm.

CÁLCULO ZAPATA:

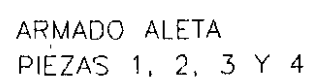
S1= 252,52 SPf= 118,90 STf= 144,76 S2= 0,00

Puntera:	VPf= 63,0	MP= 412.735	Us= 12.337	2,78
Talón:	VTf= 138,0	MT= -800.110	Us= 24.299	5,48
		(Kgxcn)	(Kg)	(cm2)

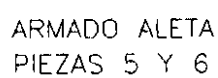
VTc= 115,0	STc= 119,93	VT= -2.652
VPc= 40,0	SPc= 184,69	VP= 6.956
(cm)	(Kg/cm)	Vuc= 19.630
		(Kg)

<u>Armado Superior:</u>	<u>Armado Inferior:</u>
Perpendicular Muro: Ø 12 / 17 cm	Perpendicular Muro: Ø 10 / 20 cm
Paralelo Muro: Ø 10 / 20 cm	Paralelo Muro: Ø 10 / 20 cm

Armado a cortante: No necesario.



PIEZA	1	1'	L1	2	3	4	4'	L4
1	ø25/25cm	ø25/12,5cm	326	ø8/25cm	ø10/20cm	ø8/25cm	ø10/20cm	360
2	ø20/22cm	ø20/11cm	244	ø8/30cm	ø10/20cm	ø8/25cm	ø10/20cm	286
3	ø16/30cm	ø16/10cm	240	ø8/30cm	ø8/20cm	ø8/25cm	ø10/25cm	163
4	ø12/30cm	ø12/10cm	170	ø8/30cm	ø8/25cm	ø8/20cm	---	—



PIEZA	1	1'	L1	2	3	4
5	Ø10/30cm	Ø10/15cm	105	Ø8/30cm	Ø8/25cm	Ø8/25cm
6	Ø8/30cm	---	-	Ø8/30cm	Ø8/25cm	Ø8/25cm

04/08/99		0		
FECHA	REV.	MODIFICACIONES		Nº PLANO
PILA:	ALETA 1440x660		3.3	
OFERTA:	99/519		TOTAL:	
OBRA:	TORIJA - GUADALAJARA		1/50	
CLIENTE:	TORIJA UTE			
ALETA 1440x660			REVISADO: Pa	APROBADO: [Signature]
			Oplo. Comercial	REP. [Signature]

4.4 Pasos de ungulados

4.4 PASOS DE UNGULADOS

ÍNDICE

4.4.1 PASOS 550+445, 565+380, 570+840, 553+850

4.4.2 PASO PK 572+580 (MARCO 3X2,5)

4.4.3 PASO INFERIOR DE FAUNA PK 550+8

4.4.4 PASO INFERIOR DE FAUNA PK 553+85

4.4.5 PASO INFERIOR DE FAUNA PK 559+17

4.4.6 PASO INFERIOR DE FAUNA PK 563+9

4.4.7 PASO INFERIOR DE FAUNA PK 565+38

4.4.8 PASO INFERIOR DE FAUNA PK 568+94

4.4.9 PASO INFERIOR DE FAUNA PK 570+84

4.4.10 CÁLCULOS ESTRUCTURALES DE LOS PASOS INFERIORES DE FAUNA

4.4 PASOS DE UNGULADOS

Los siguientes pasos inferiores de fauna 4.4.3 Paso inferior de fauna 550+80, 4.4.5 Paso inferior 559+17, 4.4.6 Paso inferior 563+9 y 4.4.8 Paso inferior 568+940, están considerados en el anejo N° 5. Hidrología y drenaje como Obras de drenaje.

4.4.1 Pasos 550+445, 565+380, 570+840, 553+850.

(16)

CONTROL DE DISTRIBUCION			
N° DE IDENTIFICACION		C05500/B005A/B3	
N° DE TRABAJO			
N°	DISTRIBUIDO A	FECHA	RECIBE
1	Nicolus	11-08-99	<i>[Signature]</i>
2			
3			
4			
5			

INDICE

- 1.- Generalidades
- 2.- Descripción
- 3.- Instrucciones aplicadas
- 4.- Características de los materiales
- 5.- Control de calidad
- 6.- Coeficientes de seguridad
- 7.- Parámetros del terreno.
- 8.- Acciones consideradas
- 9.- Programa de cálculo
- 10.- Resultados del cálculo
- 11.- Planos

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2.12.2.3 18 1-3
Fecha: 11-8-99

ALHOSA PREFABRICADOS DE HORMIGON	MARCO UNICELULAR: 500 x 350; HT = 180
Oferta: 99/519 Obra: TORRIJA-GUADALAJARA Empresa: UTE TORIJA Fecha: Julio 1.999	

1. Generalidades

En la presente memoria se muestran los cálculos realizados para justificar el marco de hormigón prefabricado de dimensiones 500 x 350 cm x cm. (Horizontal-Vertical).

2. Descripción

El paso inferior se salva con un marco unicelular de hormigón prefabricado.

Las dimensiones libres interiores del marco son de 500 centímetros en horizontal por 350 centímetros en vertical. El espesor de los elementos del marco es: solera de 30 centímetros, dos hastiales de 25 centímetros y un dintel de 30 centímetros.

La altura de tierras para la que está calculado el marco unicelular alcanza 180 centímetros por encima del dintel. (Terraplen + Balasto)

3. Instrucciones aplicadas

Para el cálculo de los marcos, de acuerdo con la normativa vigente, se han utilizado las siguientes Instrucciones y Normas:

* Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril, de 25 de Junio de 1.975.

* Instrucción para el Proyecto y Ejecución de Obras de Hormigón en Masa o Armado EH-91.

* Norma Básica de la Edificación. NBE-AE/88 Acciones en la edificación.

4. Características de los materiales

* Hormigones:

Hormigón en marco H-300

* Acero:

Acero para armar corrugado B500 S

5. Control de calidad

El control de calidad se atenderá a lo especificado en la EH-91, habiéndose seleccionado los siguientes niveles:

a) Materiales:

- Hormigón	Control Intenso
- Armadura pasiva	Control Intenso

b) Ejecución:

- En toda la obra	Control Intenso
-------------------	-----------------

6. Coeficientes de seguridad

De acuerdo con los niveles de control de calidad definidos, se adoptan los siguientes coeficientes de seguridad:

- Estados límites últimos:

- Coeficientes de minoración de resistencias:

Acero pasivo	$\gamma_s = 1,10$
Hormigón	$\gamma_c = 1,40$

- Coeficientes de ponderación de acciones: $\gamma_f = 1,50$

7. Parámetros del terreno

7.1 Características del relleno superior y lateral

En los cálculos se ha considerado un relleno de material granular en el trasdos de los hastiales y sobre el dintel con las siguientes características:

Peso específico	2,0 ton/m ³
Angulo de rozamiento interno	35 grados
Angulo de rozamiento con el muro	0 grados
Coefficiente de empuje Horizontal	0,42

8. Acciones consideradas

Se han considerado en el cálculo, las acciones descritas en la Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril. Las cuales consisten en:

8.1 Cargas permanentes

Peso propio del marco (dintel, hastiales y solera)

8.2 Empuje por efecto de las tierras

Se considera un empuje de las tierras en estado de reposo, es decir, con un coeficiente de 0,33.

8.3 Sobrecargas por efecto del tráfico

Uniforme en toda la plataforma 400 Kg/m²
Vehículo de 90 ton. con la disposición de cargas indicadas en la Instrucción

8.4 Acciones por temperatura

No se consideran variaciones de temperatura, ya que el incremento de longitud de los miembros para un cambio de 30 grados centígrados es de escasa magnitud, desplazamiento que no alcanza a producir el empuje pasivo en el terreno.

9. Programa de cálculo

Este es un programa de cálculo matricial para ordenadores personales que permite realizar el cálculo integral de marcos de hormigón armado bajo seis hipótesis de carga distintas, formadas por distintas combinaciones de un total de ocho casos de carga, proporcionando los valores de los esfuerzos axiles, cortantes y flectores para cada hipótesis además de las armaduras de flexión y cortante necesarias en cada sección del marco.

El programa resuelve el cálculo de los esfuerzos en un marco de hormigón armado aplicando el método directo de la rigidez a una modelización plana de la estructura mediante barras que representan un metro de la profundidad del marco.

Para cada barra se proporcionan resultados en once puntos equidistantes a lo largo de la longitud de la misma.

El marco se considera apoyado sobre un terreno elástico cuya rigidez es directamente proporcional al coeficiente de balasto de suelo.

Las fuerzas de empotramiento que actúan sobre cada nudo se calculan aplicando la teoría de cálculo elástico de Euler-Bernoulli-Navier a una barra biempotrada sometidas a las cargas contempladas en las distintas hipótesis.

9.1 Casos de carga

El programa considera siete (7) casos de carga, los que enunciamos a continuación.

9.1.1 Peso propio del marco

El programa considera de forma automática el peso propio del marco en función, de la densidad del hormigón y de las dimensiones de sus elementos (dintel, solera y hastiales).

9.1.2 Empuje por efecto de las tierras

Calculado según las indicaciones del capítulo 9º de la norma NBE-AE-88, siendo la carga directamente proporcional al peso específico de las tierras y la altura de tierras en el dintel, mientras que en los hastiales varía con la profundidad y es función de coeficiente de empuje horizontal.

9.1.3 Sobrecargas de construcción

Se considera el efecto de un compactador de dos ejes actuando en el dintel, así como el relleno de las tierras hasta el nivel del dintel.

9.1.4 Sobrecarga uniforme 0,40 ton/m² sobre la plataforma.

Produce una carga uniforme sobre el dintel de 400 kp/m² y dos cargas uniformes sobre los hastiales que son el producto de la carga sobre el dintel por el coeficiente de empuje horizontal

9.1.5 Vehículo de 90 ton. (Repartido)

Reparto local de cargas a 45° en el relleno existente sobre el dintel, con un coeficiente de impacto de 1,8.
(Para un ángulo de reparto de 0,0° tenemos cargas puntuales)

9.1.6 Vehículo de 90 ton. (Flexión)

Vehículo de 90 ton. concentrado con segundo eje en el centro del dintel, de forma que produzca la máxima flexión en el dintel. Con el coeficiente de impacto considerado.

9.1.7 Vehículo de 90 ton. (Cortante)

Vehículo de 90 ton. concentrado con primer eje situado a una distancia de un canto útil del eje del dintel, de forma que produzca el máximo esfuerzo cortante. Con el coeficiente de impacto considerado.

9.2 Hipótesis de cálculo

Con el objeto de obtener las solicitaciones pésimas se consideran en el cálculo del marco, las siguientes hipótesis:

HIPOTESIS I:

- Peso propio
- Cargas de construcción
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (3)}]$

HIPOTESIS II y III:

- Peso propio
- Empuje de las tierras
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)}]$

HIPOTESIS IV:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m².
- Carro repartido en profundidad
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)} + \text{Caso (4)} + \text{Caso (5)}]$

HIPOTESIS V:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m².
- Carro concentrado máxima flexión
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)} + \text{Caso (4)} + \text{Caso (6)}]$

HIPOTESIS VI:

- Peso propio
- Empuje de las tierras
- Sobrecarga uniforme 0,4 ton/m².
- Carro concentrado máxima cortante.
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)} + \text{Caso (4)} + \text{Caso (7)}]$

10. Resultados de cálculo

Como instrucción de los resultados de cálculo, se presentan los datos introducidos, tales como:

- Datos del terraplén: densidad, ángulo de rozamiento interno, coeficiente de empuje empleado en el cálculo.

- Datos de los materiales que se prevé emplear en la construcción del marco tales como: resistencia característica del hormigón, tipos de acero empleados, recubrimiento.

- Tipos del control de calidad y coeficientes empleados en el cálculo.

- Geometría del marco: dimensiones internas libres y espesor de cada uno de sus elementos (dintel, solera y hastiales).

- Sobrecargas que se han considerado en el cálculo.

Una vez calculado el marco, se obtienen:

- Las solicitaciones pésimas de las hipótesis consideradas, es decir, envolvente de esfuerzos.

- Las áreas de acero requeridas por cortante y por flexión, ésta última tanto para la cara interior como la exterior, todo ello según la Norma EH-91.

- Todos los resultados están referidos a una longitud de marco de 100 cm.

TIPO DE TERRENO DE CIMENTACION: Se considera un terreno de cimentación con un coeficiente de balasto de 5,0 kg/cm² que correspondería a un suelo con una resistencia nominal de 2,0 kg/cm².

Sobre el terreno en el que se colocará el marco unicelular se extenderá una capa de mortero seco de nivelación de 2 cm. que garantice un asiento uniforme.

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GEOMETRIA DEL MARCO =====

LUZ = 500.00 cm
 GALIBO = 350.00 cm
 ESPESOR DE LOS HASTIALES = 25.00 cm
 ESPESOR DEL DINTEL = 30.00 cm
 ESPESOR DE LA SOLERA = 30.00 cm
 RECUBRIMIENTO DE LAS ARMADURAS = 4.00 cm
 ALTURA DE TIERRAS = 180.00 cm

MATERIALES =====

TIPO DE HORMIGON = H300
 COEFICIENTE DE MINORACION DEL HORMIGON = 1.40
 TIPO DE ACERO = AEH500
 COEFICIENTE DE MINORACION DEL ACERO = 1.10

TERRENO =====

COEFICIENTE DE BALASTO = 5.00 kp/cm³
 ANGULO DE ROZAMIENTO INTERNO = 35.00
 PESO ESPECIFICO = 0.0020 kp/cm³
 ANGULO DE ROZAMIENTO TERRENO-MURO = 0.00
 COEFICIENTE DE EMPUJE = 0.42

CARGAS =====

COEFICIENTE DE MAYORACION DE CARGAS = 1.50
 CARGA 1er EJE COMPACTADOR = 2500.00 kp
 CARGA 2o EJE COMPACTADOR = 2500.00 kp
 SEPARACION ENTRE EJES DEL COMPACTADOR = 200.00 cm
 TREN DE CARGAS (0:CARRETERA, 1:FFCC RENFE, 2:FFCC METRICA, 3:FFCC UIC) = 1
 ANGULO DE REPARTO DEL TREN DE CARGAS = 45.00
 REPARTO AUTOMATICO DEL TREN DE CARGAS = 0.00
 COEFICIENTE DE IMPACTO = 1.80

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CARGAS QUE ACTUAN SOBRE LA ESTRUCTURA =====

PESO PROPIO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
1	0.00	-7.50
2	0.00	-7.50
3	0.00	-7.50
4	0.00	-7.50
5	0.00	-7.50
6	0.00	-7.50
7	0.00	-7.50
8	0.00	-7.50
9	0.00	-7.50
10	0.00	-7.50
11	-6.25	0.00
12	0.00	7.50
13	6.25	0.00

EMPUJE DEL TERRENO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
12	0.00	36.00

-Cargas trapezoidales sobre las barras

Barra	Carga inicial (kp/cm)	Carga final (kp/cm)
11	47.04	15.12
13	15.12	47.04

SOBRECARGAS DE CONSTRUCCION

-Cargas trapezoidales sobre las barras

Barra	Carga inicial (kp/cm)	Carga final (kp/cm)
11	31.92	0.00
13	0.00	31.92

-Trenes de carga sobre las barras

Barra	Carga 1er Eje (kp)	Carga 2o Eje (kp)	Separacion (cm)
12	4500.00	4500.00	200.00

SOBRECARGA UNIFORME DE 0.4 t/m²

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	1.68
12	0.00	4.00
13	0.00	1.68

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SOBRECARGA UNIFORME DE 1 t/m2

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	0.00
12	0.00	0.00
13	0.00	0.00

VEHICULO REPARTIDO

-Cargas distribuidas sobre las barras

Barra	Carga X (kp/cm)	Carga Y (kp/cm)
11	0.00	19.57
12	0.00	46.59
13	0.00	19.57

VEHICULO EN POSICION DE MAXIMA FLEXION

-Trenes de carga sobre las barras

Barra	Carga (kp)	Pos.EjeCentral(cm)
12	7500.00	262.50

VEHICULO EN POSICION DE MAXIMO CORTANTE

-Trenes de carga sobre las barras

Barra	Carga (kp)	Pos.EjeCentral(cm)
12	7500.00	188.50

COEFICIENTES DE MAYORACION DE ACCIONES

HIPOT.	P.PROPIO	TERRENO	S.CONST.	S.UNIF.4	TR.DIST.	V.REPT.	V.C.FX.	V.C.CT.
1	1.5	0.0	1.5	0.0	0.0	0.0	0.0	0.0
2	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
3	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
4	1.5	1.5	0.0	1.5	0.0	1.5	0.0	0.0
5	1.5	1.5	0.0	1.5	0.0	0.0	0.0	0.0
6	1.5	1.5	0.0	1.5	0.0	0.0	0.0	0.0

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ENVOLVENTES DE MOMENTOS FLECTORES

	X (cm)	FLECTOR POS. (mkp)	HIPOTESIS	FLECTOR NEG. (mkp)	HIPOTESIS
Solera	0.00	0.00	1	-14981.05	4
	52.50	1437.93	4	-82.88	2
	105.00	10610.38	4	0.00	1
	157.50	15083.75	4	0.00	1
	210.00	16902.69	4	0.00	1
	262.50	17362.09	4	0.00	1
	315.00	16902.69	4	0.00	1
	367.50	15083.75	4	0.00	1
	420.00	10610.38	4	0.00	1
	472.50	1437.93	4	-82.88	2
	525.00	0.00	1	-14981.05	4
Hastial dcho	0.00	0.00	1	-14981.05	4
	38.00	0.00	1	-10025.90	4
	76.00	0.00	1	-6480.76	4
	114.00	0.00	1	-4276.48	4
	152.00	0.00	1	-3343.94	4
	190.00	0.00	1	-3613.99	4
	228.00	0.00	1	-5017.48	4
	266.00	0.00	1	-7485.30	4
	304.00	0.00	1	-10948.28	4
	342.00	0.00	1	-15337.30	4
	380.00	0.00	1	-20583.22	4
Dintel	0.00	0.00	1	-20583.22	4
	52.50	0.00	1	-3077.42	4
	105.00	10538.20	4	0.00	1
	157.50	20263.65	4	0.00	1
	210.00	26098.91	4	0.00	1
	262.50	28044.00	4	0.00	1
	315.00	26098.91	4	0.00	1
	367.50	20263.65	4	0.00	1
	420.00	10538.20	4	0.00	1
	472.50	0.00	1	-3077.42	4
	525.00	0.00	1	-20583.22	4
Hastial izdo	0.00	0.00	1	-20583.22	4
	38.00	0.00	1	-15337.30	4
	76.00	0.00	1	-10948.28	4
	114.00	0.00	1	-7485.30	4
	152.00	0.00	1	-5017.48	4
	190.00	0.00	1	-3613.99	4
	228.00	0.00	1	-3343.94	4
	266.00	0.00	1	-4276.48	4
	304.00	0.00	1	-6480.76	4
	342.00	0.00	1	-10025.90	4
	380.00	0.00	1	-14981.05	4

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ENVOLVENTE DE CORTANTES Y ESFUERZOS CONCOMITANTES

=====

	X (cm)	CORTANTE (kp)	HIPOTESIS	AXIL (kp)	FLECTOR (mkp)
Solera	0.00	-40611.81	4	14955.78	-14981.05
	52.50	-23467.55	4	14955.78	1437.93
	105.00	-12358.16	4	14955.78	10610.38
	157.50	-5501.16	4	14955.78	15083.75
	210.00	-1920.97	4	14955.78	16902.69
	262.50	-0.00	4	14955.78	17362.09
	315.00	1920.97	4	14955.78	16902.69
	367.50	5501.16	4	14955.78	15083.75
	420.00	12358.16	4	14955.78	10610.38
	472.50	23467.55	4	14955.78	1437.93
	525.00	40611.81	4	14955.78	-14981.05
Hastial dcho	0.00	-14955.78	4	40611.81	-14981.05
	38.00	-11154.27	4	40255.56	-10025.90
	76.00	-7534.70	4	39899.31	-6480.76
	114.00	-4097.07	4	39543.06	-4276.48
	152.00	-841.38	4	39186.81	-3343.94
	190.00	2232.36	4	38830.56	-3613.99
	228.00	5124.15	4	38474.31	-5017.48
	266.00	7834.01	4	38118.06	-7485.30
	304.00	10361.91	4	37761.81	-10948.28
	342.00	12707.88	4	37405.56	-15337.30
	380.00	14871.90	4	37049.31	-20583.22
Dintel	0.00	-37049.31	4	14871.90	-20583.22
	52.50	-29639.45	4	14871.90	-3077.42
	105.00	-22229.59	4	14871.90	10538.20
	157.50	-14819.73	4	14871.90	20263.65
	210.00	-7409.86	4	14871.90	26098.91
	262.50	-0.00	4	14871.90	28044.00
	315.00	7409.86	4	14871.90	26098.91
	367.50	14819.73	4	14871.90	20263.65
	420.00	22229.59	4	14871.90	10538.20
	472.50	29639.45	4	14871.90	-3077.42
	525.00	37049.31	4	14871.90	-20583.22
Hastial izdo	0.00	-14871.90	4	37049.31	-20583.22
	38.00	-12707.88	4	37405.56	-15337.30
	76.00	-10361.91	4	37761.81	-10948.28
	114.00	-7834.01	4	38118.06	-7485.30
	152.00	-5124.15	4	38474.31	-5017.48
	190.00	-2232.36	4	38830.56	-3613.99
	228.00	841.38	4	39186.81	-3343.94
	266.00	4097.07	4	39543.06	-4276.48
	304.00	7534.70	4	39899.31	-6480.76
	342.00	11154.27	4	40255.56	-10025.90
	380.00	14955.78	4	40611.81	-14981.05

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ENVOLVENTE DE AXILES Y ESFUERZOS CONCOMITANTES

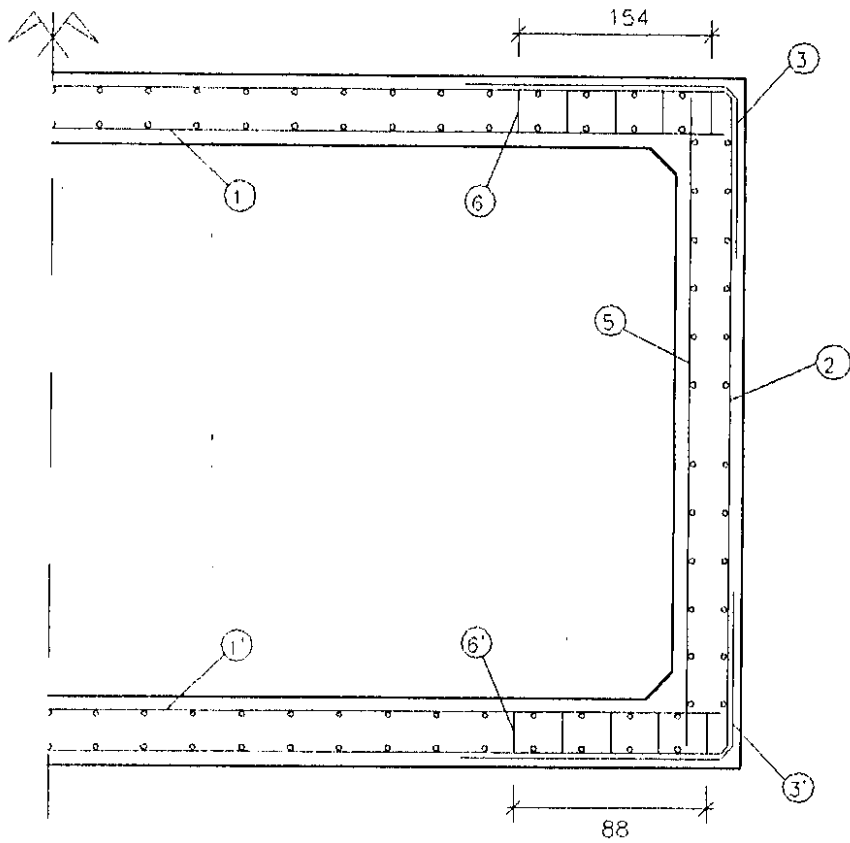
=====

	X (cm)	AXIL (kp)	HIPOTESIS	CORTANTE (kp)	FLECTOR (mkp)
Solera	0.00	14955.78	4	-40611.81	-14981.05
	52.50	14955.78	4	-23467.55	1437.93
	105.00	14955.78	4	-12358.16	10610.38
	157.50	14955.78	4	-5501.16	15083.75
	210.00	14955.78	4	-1920.97	16902.69
	262.50	14955.78	4	-0.00	17362.09
	315.00	14955.78	4	1920.97	16902.69
	367.50	14955.78	4	5501.16	15083.75
	420.00	14955.78	4	12358.16	10610.38
	472.50	14955.78	4	23467.55	1437.93
	525.00	14955.78	4	40611.81	-14981.05
Hastial dcho	0.00	40611.81	4	-14955.78	-14981.05
	38.00	40255.56	4	-11154.27	-10025.90
	76.00	39899.31	4	-7534.70	-6480.76
	114.00	39543.06	4	-4097.07	-4276.48
	152.00	39186.81	4	-841.38	-3343.94
	190.00	38830.56	4	2232.36	-3613.99
	228.00	38474.31	4	5124.15	-5017.48
	266.00	38118.06	4	7834.01	-7485.30
	304.00	37761.81	4	10361.91	-10948.28
	342.00	37405.56	4	12707.88	-15337.30
	380.00	37049.31	4	14871.90	-20583.22
Dintel	0.00	14871.90	4	-37049.31	-20583.22
	52.50	14871.90	4	-29639.45	-3077.42
	105.00	14871.90	4	-22229.59	10538.20
	157.50	14871.90	4	-14819.73	20263.65
	210.00	14871.90	4	-7409.86	26098.91
	262.50	14871.90	4	-0.00	28044.00
	315.00	14871.90	4	7409.86	26098.91
	367.50	14871.90	4	14819.73	20263.65
	420.00	14871.90	4	22229.59	10538.20
	472.50	14871.90	4	29639.45	-3077.42
	525.00	14871.90	4	37049.31	-20583.22
Hastial izdo	0.00	37049.31	4	-14871.90	-20583.22
	38.00	37405.56	4	-12707.88	-15337.30
	76.00	37761.81	4	-10361.91	-10948.28
	114.00	38118.06	4	-7834.01	-7485.30
	152.00	38474.31	4	-5124.15	-5017.48
	190.00	38830.56	4	-2232.36	-3613.99
	228.00	39186.81	4	841.38	-3343.94
	266.00	39543.06	4	4097.07	-4276.48
	304.00	39899.31	4	7534.70	-6480.76
	342.00	40255.56	4	11154.27	-10025.90
	380.00	40611.81	4	14955.78	-14981.05

11. Planos

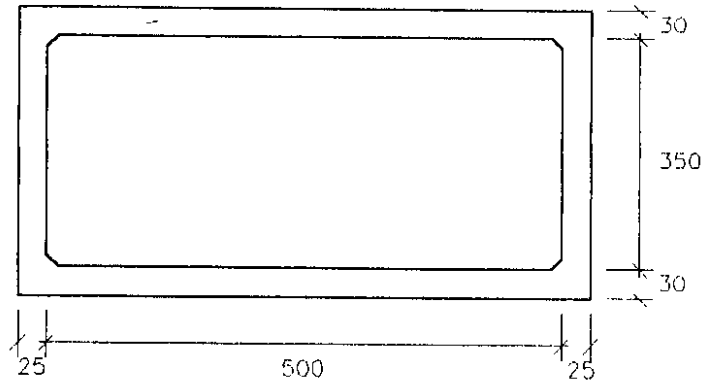
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#####

ARMADURAS =====				
	X (cm)	AR. ESTRIBOS (cm2/m)	ARM. FLEX. EXT. (cm2)	ARM. FLEX. INT. (cm2)
Solera	0.00	21.96	11.47	0.00
	52.50	4.52	0.00	0.00
	105.00	0.00	0.00	7.42
	157.50	0.00	0.00	11.57
	210.00	0.00	0.00	13.30
	262.50	0.00	0.00	13.74
	315.00	0.00	0.00	13.30
	367.50	0.00	0.00	11.57
	420.00	0.00	0.00	7.42
	472.50	4.52	0.00	0.00
	525.00	21.96	11.47	0.00
Hastial dcho	0.00	0.00	12.49	0.00
	38.00	0.00	6.30	0.00
	76.00	0.00	2.17	0.00
	114.00	0.00	0.00	0.00
	152.00	0.00	0.00	0.00
	190.00	0.00	0.00	0.00
	228.00	0.00	0.67	0.00
	266.00	0.00	3.54	0.00
	304.00	0.00	7.70	0.00
	342.00	0.00	13.29	0.00
	380.00	0.00	20.54	0.00
Dintel	0.00	18.33	16.91	0.00
	52.50	10.80	0.79	0.00
	105.00	3.26	0.00	7.37
	157.50	0.00	0.00	16.59
	210.00	0.00	0.00	22.55
	262.50	0.00	0.00	24.62
	315.00	0.00	0.00	22.55
	367.50	0.00	0.00	16.59
	420.00	3.26	0.00	7.37
	472.50	10.80	0.79	0.00
	525.00	18.33	16.91	0.00
Hastial izdo	0.00	0.00	20.54	0.00
	38.00	0.00	13.29	0.00
	76.00	0.00	7.70	0.00
	114.00	0.00	3.54	0.00
	152.00	0.00	0.67	0.00
	190.00	0.00	0.00	0.00
	228.00	0.00	0.00	0.00
	266.00	0.00	0.00	0.00
	304.00	0.00	2.17	0.00
	342.00	0.00	6.30	0.00
	380.00	0.00	12.49	0.00



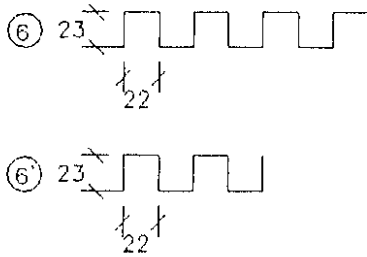
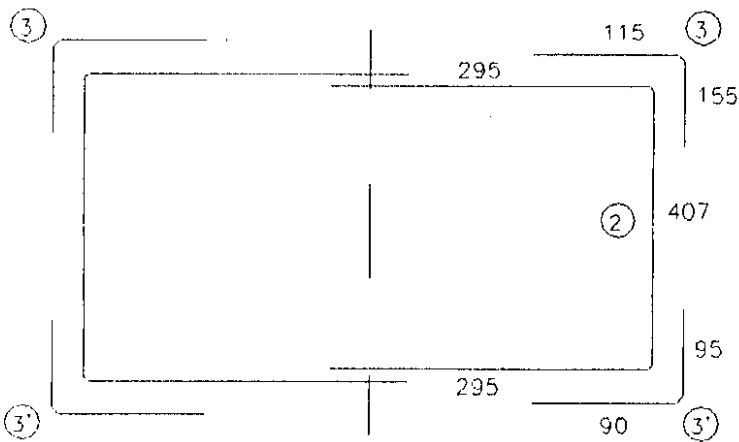
CONTROL DE CALIDAD	
HORMIGON:	H-300
ACERO:	B-500
CONTROL INTENSO	

RECUBRIMIENTO:	2.5 cm.
ALTURA TERRAPLEN:	1.80 m
TREN DE CARGAS:	90 Tn
LONGITUD MARCO:	100 cm



CUADRO DE ARMADO		
TIPO	PRINCIPAL	REPARTO
1	9 Ø20	Ø12 /25cm
1'	7 Ø16	Ø10 /25cm
2	7 Ø12	Ø8 /20cm
3	7 Ø16	
3'	6 Ø10	
5	6 Ø8	Ø8 /25cm
6	4 Ø10/22cm en 154cm	
6'	5 Ø8/22cm en 88cm	

①	540
①'	
⑤	400
REPARTO	95



28/07/99	0		
FECHA	REV.	MODIFICACIONES	Nº PLANO
PIEZA	MARCO 500x350 HT180 (FFCC)		5
Nº OFERTA	99/519		ESCALA
OBRA	TORRIJA - GUADALAJARA		
CLIENTE	UTE TORRIJA		
MARCO 500x350		REVISADO: P.O.	APROBADO:
		Dpto. Comercial	Dpto. Técnico



PREFABRICADOS DE HORMIGON

Hoja 12 de 18

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- 2.- Descripción
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- 4.- Características de los materiales
- 5.- Control de calidad
- 6.- Coeficientes de seguridad
- 7.- Parámetros del terreno
- 8.- Acciones consideradas
- 9.- Hipótesis de cálculo
- 10.- Cálculos
- 11.- Cimentaciones
- 12.- Planos

2.12.2.1 13/3
2.12.2.2 13/3
2.12.2.3 11-8-99

ALHOSA PREFABRICADOS DE HORMIGÓN	ALETA MARCO 5x3,50 720 x 380
Oferta: 99/519 Obra: TORIJA - GUADALAJARA Empresa: TORIJA UTE Fecha: Agosto de 1.999	

CONTROLES INSTRUCCIONES			
C055103006688			
NÚMERO			
Nº	DISTRIBUIDORA	FECHA	FECHA
1	Nicolas	18-08-99	
2			
3			
4			
5			

Generalidades

En la presente memoria se muestran los cálculos realizados para justificar las Aletas Prefabricadas de hormigón que sostienen el terraplen.

Descripción

El sostenimiento de las tierras que forman el terraplen en las entradas de las obras de fábrica se realiza con aletas prefabricadas de hormigón.

El espesor de los muros que forman las aletas es de 20cm. hasta los 3,00 m. de profundidad y luego aumenta a razón de 5 cm./m. como se muestra en los planos adjuntos.

La cimentación se realiza con hormigón vertido in situ

Instrucciones aplicadas

Para el cálculo de las Aletas, de acuerdo con la normativa vigente, se han utilizado las siguientes Instrucciones y Normas:

* Instrucción para el Proyecto y Ejecución de Obras de Hormigón en Masa o Armado EH-91.

* Norma básica de la edificación NBE - AE/88 Acciones en la edificación.

Características de los materiales

* Hormigones:

Hormigón en elemento prefabricado	H-300
Hormigón en obra in situ	H-200

* Acero:

Acero para armar corrugado	B-500 S
----------------------------	---------

Control de calidad

El control de calidad se atendrá a lo especificado en la EH-91, habiéndose seleccionado los siguientes niveles:

Elementos prefabricados:

a) Materiales:

- Hormigón	Control Intenso
- Armadura pasiva	Control Intenso

b) Ejecución:

- En toda la obra	Control Intenso
-------------------	-----------------

Obra in situ:

a) Materiales:

- Hormigón	Control Normal
- Armadura pasiva	Control Normal

b) Ejecución:

- En toda la obra	Control Normal
-------------------	----------------

Coefficientes de seguridad

De acuerdo con los niveles de control de calidad definidos, se adoptan los siguientes coeficientes de seguridad:

- Estados límites últimos:

Elementos prefabricados:

- Coeficientes de minoración de resistencias:

Acero pasivo	$\gamma_s = 1,10$
Hormigón	$\gamma_c = 1,40$

- Coeficientes de ponderación de acciones:

$$\gamma_f = 1,50$$

Obra in situ:

- Coeficientes de minoración de resistencias:

Acero pasivo	$\gamma_s = 1,15$
Hormigón	$\gamma_c = 1,50$

- Coeficientes de ponderación de acciones:

$$\gamma_f = 1,60$$

Parámetros del terreno

Características del relleno lateral

En los cálculos se ha considerado un relleno de material granular en el trasdós de los hastiales y dintel con las siguientes características:

Peso específico	2,00 ton/m ³
Coefficiente de empuje al reposo	0,33

Acciones consideradas

Se han considerado en el cálculo, las acciones descritas en la Norma básica de la edificación NBE-AE/88 Acciones en la edificación. Las cuales consisten en:

Empuje por efecto de las tierras

Se considera el empuje de las tierras que se encuentran en el trasdós de la Aleta con un coeficiente de empuje de 0,33.

Sobrecargas de uso

Se considera una sobrecarga de 1000 Kg/m² sobre el terraplen.

Acciones por temperatura

No se consideran variaciones de temperatura, ya que el incremento de longitud de los miembros para un cambio de 30 grados centígrados y dadas las dimensiones de la pieza es de escasa magnitud, desplazamiento que no alcanza a producir el empuje pasivo en el terreno.

Hipótesis de cálculo.

HIPÓTESIS I:

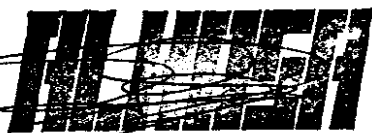
- Empuje de las tierras
 - Sobrecarga de uso
- Combinación: $1,5 * [\text{Caso (1)} + \text{Caso (2)}]$

Cálculos.

En la siguiente página se encuentra un cuadro en el que se muestran los esfuerzos sobre el muro a distintas profundidades.

Cada aleta se ha armado para su altura media.

En Alcañiz, a Agosto de 1.999


Alcañizana del Hormigón, S.A. ~~ALCAÑIZ~~
Dpto. Técnico ALHOSA

DATOS GENERALES:

Obra: TORIJA - GUADALAJARA
Cliente: TORIJA UTE
Nº Oferta: 99/519
Pieza: Aleta 720x380

TERRENO

Densidad terreno: 0,0020 Kg/cm3
Angulo rozamiento interno: 30,0 °
Angulo rozamiento terreno muro: 0,0 °
Angulo de Talud: 0,0 °
Coeficiente de rozamiento: 0,57
Tensión Admisible: 2,00 Kg/cm2

Coeficiente Empuje Hztal: 0,333

DATOS DEL MURÓ:

Altura del Muro: cm
Altura tierras: cm
Sobrecarga: 0,1000 Kg/cm2
Longitud Muro: 100 cm

MURO

Fcd = 214,3 Kg/cm2 Mayoración Cargas: 1,50
Fyd = 4.636,4 Kg/cm2 Recubrimiento: 4,0 cm.

Z (cm)	Canto (cm)	Eh (Kg)	Ms (Kg x cm)	Md (Kg x cm)	Us (Kg)	As (cm2)
0	20,0	0	0	0	0	0,00
10	20,0	37	178	267	17	0,00
20	20,0	80	756	1.133	71	0,02
30	20,0	130	1.800	2.700	169	0,04
40	20,0	187	3.378	5.067	317	0,07
50	20,0	250	5.556	8.333	521	0,11
60	20,0	320	8.400	12.600	788	0,17
70	20,0	397	11.978	17.967	1.125	0,24
80	20,0	480	16.356	24.533	1.537	0,33
90	20,0	570	21.600	32.400	2.031	0,44
100	20,0	667	27.778	41.667	2.614	0,56
110	20,0	770	34.956	52.433	3.293	0,71
120	20,0	880	43.200	64.800	4.074	0,88
130	20,0	997	52.578	78.867	4.965	1,07
140	20,0	1.120	63.156	94.733	5.973	1,29
150	20,0	1.250	75.000	112.500	7.105	1,53
160	20,0	1.387	88.178	132.267	8.369	1,81
170	20,0	1.530	102.756	154.133	9.773	2,11
180	20,0	1.680	118.800	178.200	11.325	2,44
190	20,0	1.837	136.378	204.567	13.033	2,81
200	20,0	2.000	155.556	233.333	14.907	3,22

Z (cm)	Canto (cm)	Eh (Kg)	Ms (Kg x cm)	Md (Kg x cm)	Us (Kg)	As (cm2)
210	20,0	2.170	176.400	264.600	16.957	3,66
220	20,0	2.347	198.978	298.467	19.191	4,14
230	20,0	2.530	223.356	335.033	21.621	4,66
240	20,0	2.720	249.600	374.400	24.258	5,23
250	20,0	2.917	277.778	416.667	27.114	5,85
260	20,0	3.120	307.956	461.933	30.201	6,51
270	20,0	3.330	340.200	510.300	33.534	7,23
280	20,0	3.547	374.578	561.867	37.127	8,01
290	20,0	3.770	411.156	616.733	40.997	8,84
300	20,0	4.000	450.000	675.000	45.162	9,74
310	20,5	4.237	491.178	736.767	47.897	10,33
320	21,0	4.480	534.756	802.133	50.714	10,94
330	21,5	4.730	580.800	871.200	53.616	11,56
340	22,0	4.987	629.378	944.067	56.601	12,21

CIMENTACIONES

DATOS GENERALES:

Obra: TORIJA - GUADALAJARA
 Cliente: TORIJA U.T.E.
 N° Oferta: 99/519
 Pieza:

MATERIALES:

Densidad terreno: 0,00200 Kg/cm³
 Angulo rozamiento interno: 30,0 °
 Angulo rozamiento terreno muro: 0,0 °
 Angulo de Talud: 0,0 °
 Coeficiente de rozamiento: 0,57
 Tensión Admisible: 2,00 Kg/cm²
 Densidad del hormigón: 0,0025

DATOS DEL MURO:

Altura del Muro: 340 cm
 Altura tierras: 340 cm
 Sobrecarga: 0,1000 Kg/cm²
 Longitud Muro: 100 cm
 Peso del Muro: 1.701 Kg/ml

RESISTENCIAS:

Hormigón: 200 Kg/cm² (1,50)
 Acero: 5.100 Kg/cm² (1,15)
 Acciones: (1,60)

DATOS DE LA ZAPATA:

Vuelo Puntera: 40 cm
 Vuelo del Talon: 140 cm
 Canto de la Zapata: 35 cm
 Canto del cordón de cimentación: 20 cm

COMPROBACION DE ESTABILIDAD:

Coeficiente Empuje Activo: 0,33 Hgón
 Coeficiente Empuje en Reposo: 0,50
 Base de la Zapata: 200 cm 700 Litros

	Fh	Fv	e	Mv	Mr
Muro:		-1.701	-50,0		-85.050
Tierras:	-3.853	-9.520	30,0	571.578	-1.237.600
Sobrecarga:	-1.133	-1.400	30,0	232.333	-182.000
Zapata:		-1.750	0,0		-175.000
	-4.987	-14.371		803.911	-1.679.650

Csd = 1,64 Csv = 2,09 e = -39,1 cm.

TENSION DEL TERRENO

1,18 < 2,00 (Servicio)
 2,18 < 4,00 (Empuje mayorado)

Distribucion Triangular

SP= 157,22 ST= 0,00 Le= 182,8 qt= -78,00
 (Kg/cm) (Kg/cm) (cm) (Kg/cm)

DATOS GENERALES:

$\bar{F}_{cd} =$	133,3 Kg/cm ²	Mayoración Cargas:	1,60
$F_{yd} =$	4.434,8 Kg/cm ²	Recubrimiento:	6,0 cm.

CÁLCULO ZAPATA:

S1= 290,60	SPf= 164,26	STf= 173,12	S2= 0,00		
Puntera:	VPf= 43,0	MP= 229.729	Us= 8.020	1,81	
Talón:	VTf= 143,0	MT= -819.295	Us= 29.583	6,67	
		(Kgxcn)	(Kg)	(cm2)	

$$A_{s,min}= 6,30 \text{ cm}^2$$

Cortante:			
VTc= 122,5	STc= 144,91	VT=	-1.924
VPc= 22,5	SPc= 220,59	VP=	4.460
(cm)	(Kg/cm)	Vuc=	16.743
			(Kg)

<u>Armado Superior:</u>		<u>Armado Inferior:</u>	
Perpendicular Muro:	Ø / cm	Perpendicular Muro:	Ø / cm
Paralelo Muro:	Ø / cm	Paralelo Muro:	Ø / cm

Armado a cortante: No necesario.

Òbra: TORIJA - GUADALAJARA
 Cliente: TORIJA U.T.E.
 N° Oferta: 99/519
 Pieza:

MATERIALES:

Densidad terreno:	0,00200 Kg/cm3
Angulo rozamiento interno:	30,0 °
Angulo rozamiento terreno muro:	0,0 °
Angulo de Talud:	0,0 °
Coefficiente de rozamiento:	0,57
Tensión Admisible:	2,00 Kg/cm2
Densidad del hormigón:	0,0025

DATOS DEL MURO:

Altura del Muro:	240 cm
Altura tierras:	240 cm
Sobrecarga:	0,1000 Kg/cm2
Longitud Muro:	100 cm
Peso del Muro:	1.200 Kg/ml

RESISTENCIAS:

Hormigon:	200 Kg/cm ²	(1,50)
Acero:	5.100 Kg/cm ²	(1,15)
Acciones:		(1,60)

DATOS DE LA ZAPATA:

Vuelo Puntera:	30 cm
Vuelo del Talon:	100 cm
Canto de la Zapata:	30 cm
Canto del cordón de cimentación:	20 cm

COMPROBACION DE ESTABILIDAD:

Coeficiente Empuje Activo:	0,33	Hgón
Base de la Zapata:	150 cm	450 Litros

	Fh	Fv	e	Mv	Mr
Muro:		-1.200	-35,0		-48.000
Tierras:	-1.920	-4.800	25,0	211.200	-480.000
Sobrecarga:	-800	-1.000	25,0	120.000	-100.000
Zapata:		-1.125	0,0		-84.375
	-2.720	-8.125		331.200	-712.375

Csd = 1,70 Csv = 2,15 e = -28,1 cm.

TENSION DEL TERRENO

0,87	<	2,00	(Servicio)
1,53	<	4,00	(Empuje mayorado)

Distribucion Triangular

SP= 115,46 ST= 0,00 Le= 140,7 qt= -58,00
(Kg/cm) (Kg/cm) (cm) (Kg/cm)

CIMENTACIÓN

Fcd =

133,3 Kg/cm²

Fyd =

4.434,8 Kg/cm²

Mayoración Cargas:

1,60

Recubrimiento:

6,0 cm.

CÁLCULO ZAPATA:

S1= 204,15

SPf= 119,51

STf= 123,04

S2= 0,00

Puntera:

VPf= 33,0

MP= 95.800

Us= 4.021

0,91

Talón:

VTf= 103,0

MT= -312.050

Us= 13.329

3,01

(Kgxcn)

(Kg)

(cn2)

As,min= 5,40 cn2

Cortante:

VTc= 85,0

STc= 99,42

VT= -1.165

VPc= 15,0

SPc= 165,05

VP= 2.131

(cn)

(Kg/cn)

Vuc= 13.856

(Kg)

Armado Superior:

Perpendicular Muro: Ø / cn

Paralelo Muro: Ø / cn

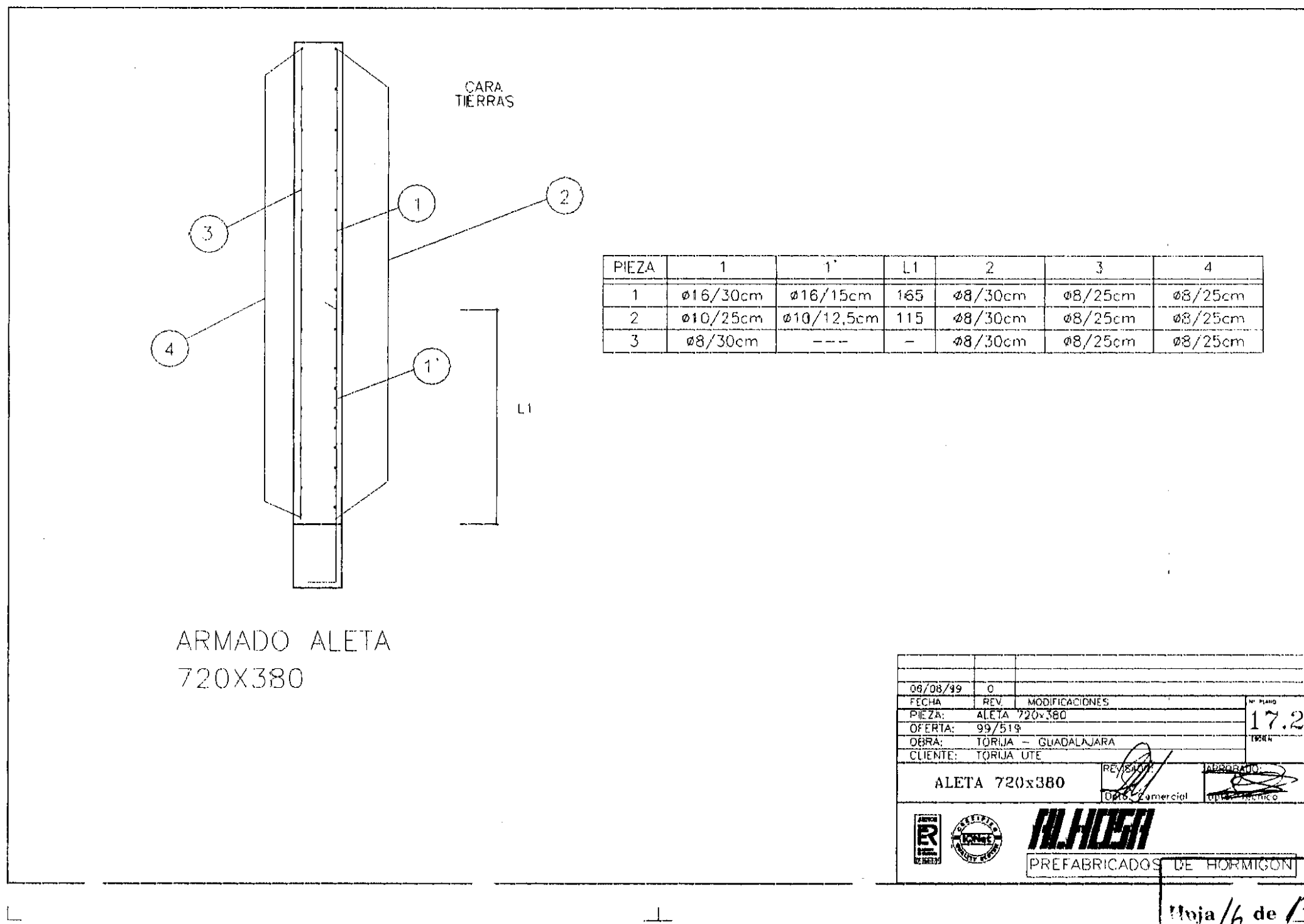
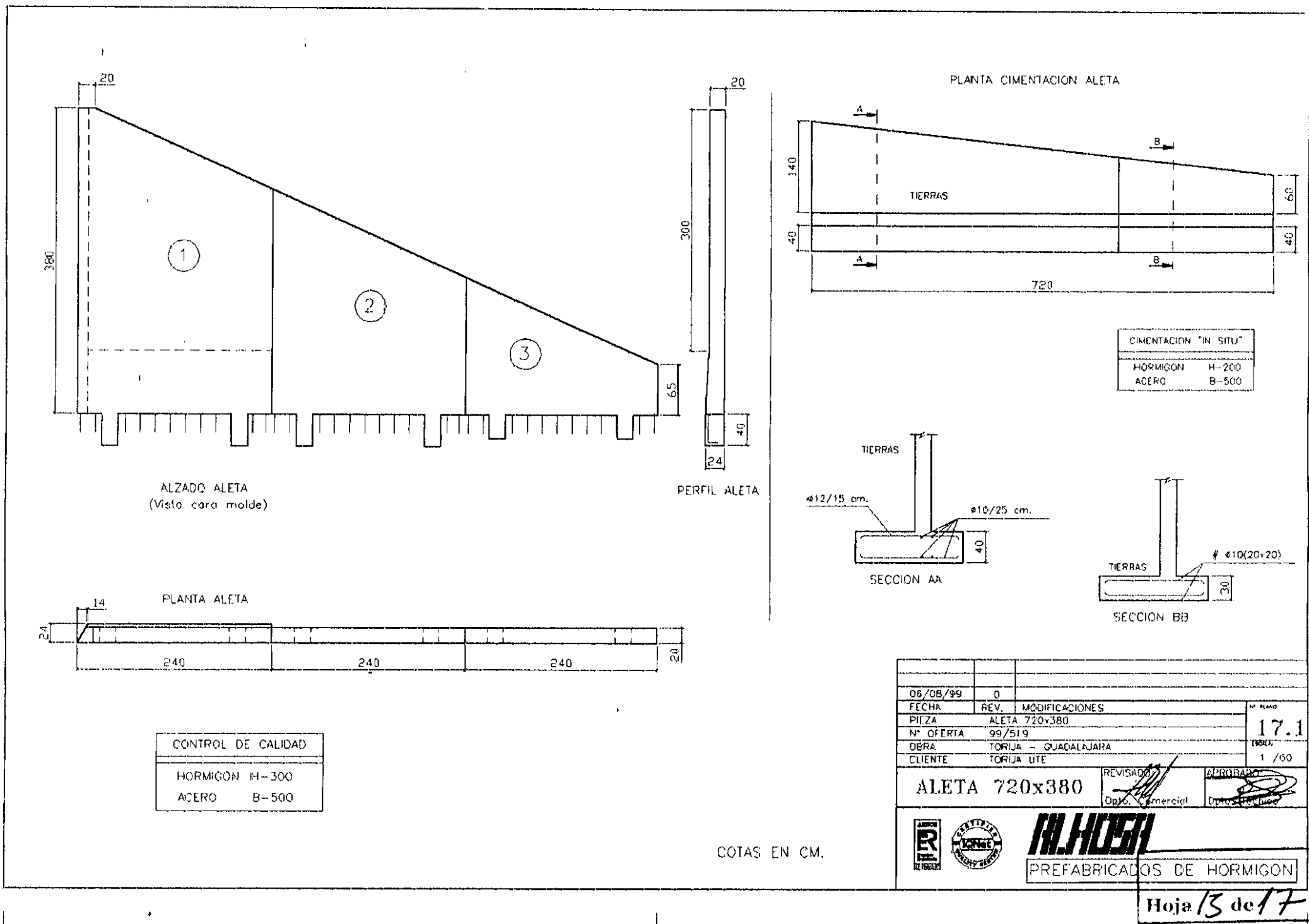
Armado Inferior:

Perpendicular Muro: Ø / cn

Paralelo Muro: Ø / cn

Armado a cortante: No necesario.

PLANOS



4.4.2 Paso 572+580 (Marco 3x2,5)

CO 2000130187		(72)
Nº	FECHA	RECIBI
1	28-10-99	
2		
3		
4		
5		

CÁLCULO DE MARCOS PREFABRICADOS

DEL PROYECTO DE

LÍNEA DE ALTA VELOCIDAD
MADRID-BARCELONA-
FRONTERA FRANCESA,
TRAMO MADRID - ZARAGOZA
SUBTRAMO V b

SUSTITUYEA
NUEVO INCLUIR EN
PK 572+480
Fecha: 28-10-99

foprar s.l.

Fomento de Prefabricados Aragón S.L.

OFICINAS:

Laguna de Rins, nº 2, 5º Dcha Pta 1
50.005 ZARAGOZA

PLANTA:

Ctra. Artasona s/n.
ALMUDÉVAR (Huesca)

26 de octubre de 1999

Hoja 1 de 19

FOMENTO DE PREFABRICADOS ARAGON S.L

L.A.V. MADRID-BARCELONA- FRONTERA FRANCESA
TRAMO MADRID - ZARAGOZA. SUBTRAMO V b.

1.

MEMORIA TÉCNICA

2

Hoja 2 de 19

1.1. - OBJETO:

El objeto del presente estudio es el cálculo de los marcos prefabricados de hormigón armado que van a instalarse en la obra objeto del Proyecto constructivo de la Línea de Alta Velocidad Madrid - Barcelona - Frontera Francesa, tramo Madrid - Zaragoza, Subtramo V b, de acuerdo al proyecto del Ministerio de Obras Públicas, Transportes y Medio Ambiente, Gestión de Infraestructuras Ferroviarias.

Para calcular la armadura que deben llevar los marcos descritos en dicho proyecto, se han seguido las siguientes Normas:

- Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril (I.P.F. 75).
- Recomendaciones de la Unión International de Chemins de fer (U.I.C.), en cuanto se refiere a las sobrecargas móviles de uso para los ferrocarriles de vía de ancho internacional.
- Instrucción de hormigón estructural (EHE)
- Norma Básica de la Edificación, Acciones en la Edificación (NBE-AE-88)

y de acuerdo a ellas se han tenido en cuenta las siguientes acciones gravitatorias:

- Peso propio de las tierras.....	1.800 kg/m ³
- Peso propio de balasto y sub-balasto.....	2.000 kg/m ³
- Peso propio del hormigón en masa.....	2.400 kg/m ³
- Peso propio del acero corrugado	7.850 kg/m ³
- Peso propio del agua	1.000 kg/m ³
- Sobrecarga de tráfico:	

El tren de cargas considerado es el del tren tipo A de RENFE, con tres ejes de 30 T. cada uno, con una carga por rueda de 15 T. La separación entre ejes será de 1,50 m., y entre ruedas del mismo eje 1,668 m., es decir, el ancho de vía. Igualmente se ha tenido en cuenta una separación entre varias vías de 3,066 m.

Esta separación es la correspondiente al ancho de vía internacional (1,435 m.), que es la que se va a realizar, ya que, aunque puedan circular por estas vías trenes tipo A de RENFE, (en caso de ejecutarse las vías de 1,668 m. para que puedan circular los trenes convencionales) la separación de las mismas está prevista para la posterior circulación del tren de alta velocidad.

Para tener en cuenta este nuevo tipo de tren, la Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril (I.P.F. 75) nos indica que pueden emplearse las Recomendaciones de la Unión International de Chemins de fer (U.I.C.), en cuanto se refiere a las sobrecargas móviles de uso para los ferrocarriles de vía de ancho internacional.

Por ello, se ha comprobado también cada uno de los elementos prefabricados con el tren de cargas correspondiente a este nuevo tipo de tren, es decir, cuatro ejes de 25 T. cada uno, con una carga por rueda de 12,5 T. La separación entre ejes será de 1,60 m., y entre ruedas del mismo eje 1,435 m., es decir, el ancho de vía. Igualmente se ha tenido en cuenta una separación de vías de 3,066 m.

El coeficiente de impacto para este último caso no está especificado en la I.P.F. 75, ya que, para elementos de luces menores de 6,00 m. (como es el caso de todos los elementos en estudio) éste viene dado por la expresión $I = 33 \cdot 10^{-2} \cdot v$ siendo v la velocidad de paso del tren expresada en km/h, válida únicamente para los casos en que ésta sea menor de 200 km/h.

Para el tren de cargas correspondiente a L.A.V. con una velocidad de 350 km/h., se ha mantenido el máximo correspondiente a la expresión anterior, es decir, 1,66 ya que es un valor superior a la mayoría de los empleados en los distintos países donde existe este ancho de vía, en cada uno de los cuales se calcula con una expresión diferente, como son: la recomendada por la propio U.I.C., la empleada por la SNCB, la de la JNR, SBB, etc., así como las fórmulas de STOKES (recomendada para puentes cortos), BLEICH, BRESSE-RENAUDOT (para cargas repartidas), e incluso la de WINAND, tenida en cuenta ya por RENFE para el anteproyecto de su línea de Alta Velocidad Madrid - Barcelona - Port Bou, en la que el cálculo de los coeficientes dinámicos se ha realizado considerando tramos continuos cargados con fuerzas de intensidad constante y con cargas oscilantes de la forma $P = P_0 (1 + \theta \cos \Omega t)$ con velocidad constante. En este caso, el coeficiente de impacto máximo es de 1,346. Por ello, creemos que este coeficiente de 1,66 cubre una gran mayoría de las diferentes teorías expuestas, con gran disparidad entre algunas de ellas, fundamentalmente debida a que algunas lo hacen variar únicamente con una variable (por ejemplo la velocidad) y otras tienen en cuenta muchas más (la velocidad, la longitud del elemento, la frecuencia propia de oscilación del tablero, la conservación de la vía, la altura de relleno, si existe ó no balasto, la rigidez del tablero, etc.). No obstante, este valor suele variar entre 1,20 (para los casos más favorables) y 1,80 (para los más críticos), según se puede observar en el gráfico de la página siguiente.

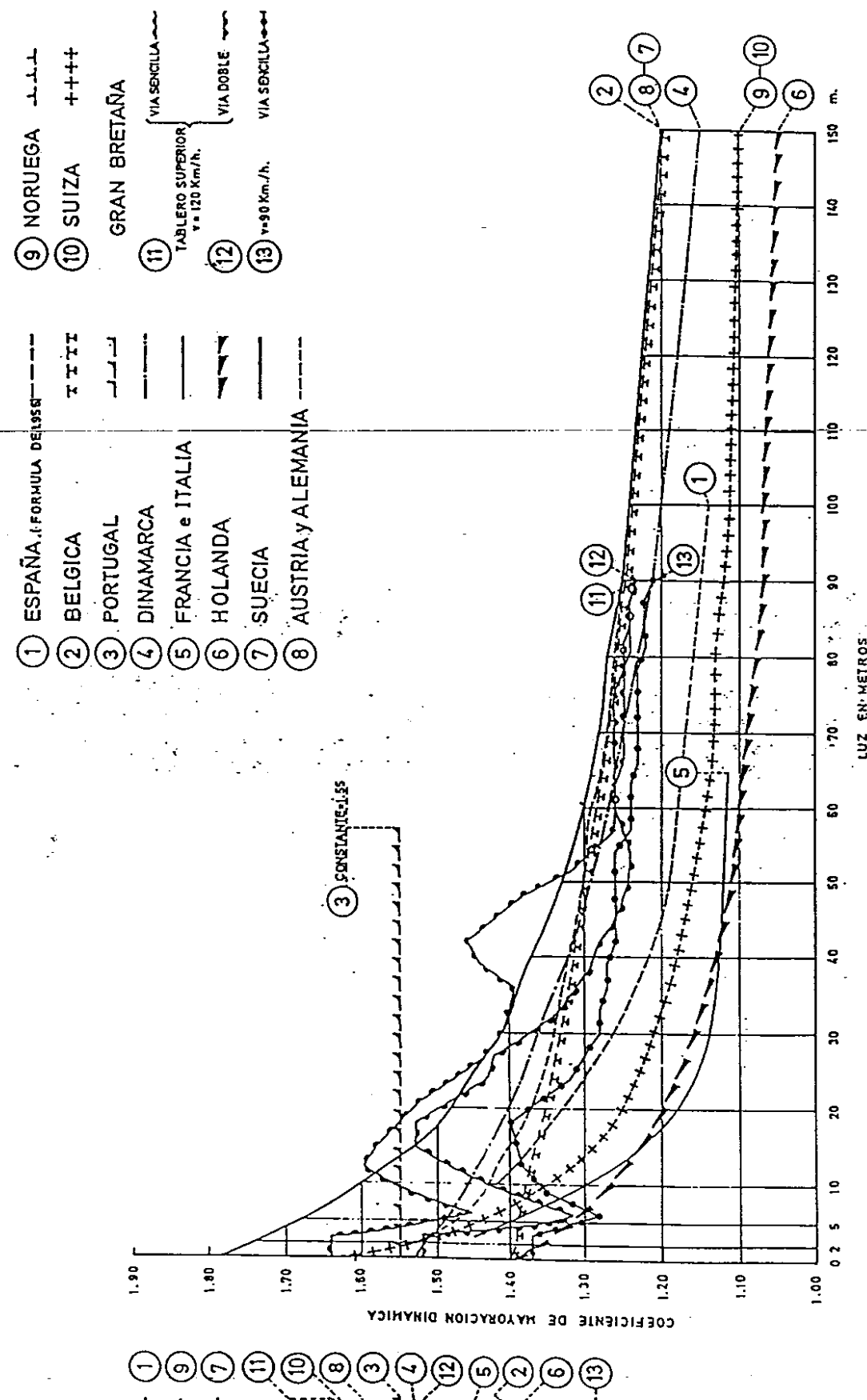
Para la transmisión de la carga del tren al elemento prefabricado, igualmente existen muchas teorías, siendo especialmente importante la de BOUSSINESQ, a partir de la cual han ido sucediéndose otras muchas. La I.P.F. 75 nos indica una distribución desde la cara inferior de la traviesa hasta la cara superior de la losa con un ángulo de 75°. No obstante, debido a que sobre el elemento prefabricado va a existir un relleno perfectamente compactado, se cree más ajustado a la realidad realizar esta transmisión según un ángulo de 35° respecto a la vertical, como recomienda la Norma UNE 127-010. Cabe citar a este respecto la teoría de Protodyakonov, según la cual para una altura de tierras aproximadamente superiores a 4,50 m. ya no estarían afectados por la sobrecarga del ferrocarril, ó si acaso, de una forma mínima, ó como indica la propia UNE 127 010, según la cual, para una profundidad mayor de 4,00 m. no se considerarán sobrecargas de tráfico. No obstante, en el presente estudio no se ha tenido en cuenta ninguna de estas limitaciones, calculando la carga estimada que le llega al marco, para cualquier profundidad a la cual se encuentre, teniendo en cuenta la distribución de cargas ya explicada.

COEFICIENTE DE MAYORACIÓN PARA ACCIONES DINAMICAS

SEGUN LAS FORMULAS ACTUALES.

SEGUN LAS FORMULAS ACTUALES.

PUENTES F.F.C.C. EN HORMIGON ARMADO (CON 40 cm. DE BALASTO), JUNTAS DE CARRIL SUPRIMIDAS



En todos los casos se ha tenido en cuenta una carga correspondiente a la altura de balasto + sub-balasto de 1,00 m., que es el relleno que existe por encima de ellas, formado por 40 cm. de zahorras naturales (capa de forma) + 30 cm. de zahorras artificiales (sub-balasto) + 30 cm. de balasto.

Como no se dispone de estudio geotécnico del terreno actuante, se ha considerado como genérico un coeficiente de empuje activo horizontal del terreno de 0,33 (utilizado normalmente en estos casos), correspondiente a un ángulo de rozamiento interno del terreno (ϕ) = 30° y a un ángulo de rozamiento entre terreno y muro (δ) de 0°, tomando el caso más desfavorable según el artículo 9.2 (Rozamiento entre terreno y muro) de la Norma NBE AE-88, así como un coeficiente de empuje estático con un valor de 0,50, aunque, si según un estudio geotécnico, un laboratorio oficial ó la Dirección Técnica de la obra diese valores que repercutiesen desfavorablemente en cualquier apartado del cálculo de los elementos resistentes, se volverían a calcular éstos con los nuevos valores aconsejados por la Dirección Técnica de la obra.

Teniendo en cuenta todo lo expuesto anteriormente, se llega a una distribución de cargas sobre el marco, especificadas en la hoja de cálculo del anexo.

Con cada una de las acciones anteriores, cuyo valor estará en función de la cota a la que se encuentre con respecto a la cota del rail (dato dado en el proyecto citado), se han calculado los esfuerzos en cada sección del marco, con los cuales, mediante los métodos indicados por la Norma EHE, se han dimensionado las armaduras correspondientes, teniendo en cuenta los coeficientes de mayoración de acciones y de minoración de resistencias del hormigón y del acero corrugado de acuerdo al nivel de control exigido para este proyecto.

Los marcos estudiados son de dimensiones interiores 3,00 x 2,50 m. calculados con las cargas de tierra que soportan y con la sobrecarga de tráfico ya especificada anteriormente.

Los espesores de dichos marcos se ejecutarán de acuerdo a las características del molde, teniendo en cuenta siempre que, en el caso de que este espesor fuese insuficiente para soportar el esfuerzo cortante que deba soportar el marco, se le pondrían estribos en la zona necesaria. Estos marcos de dimensiones 3,00 x 2,50 m. se fabricarán con 20 cm. de espesor tanto en las losas horizontales como en los hastiales, todo ello de acuerdo a los datos de la tabla de la siguiente página y con los armados longitudinales y transversales especificados en los esquemas de armado.

SECTOR	DIMENSIONES INTERIORES Y ESPESORES	LONGIT. DE CADA PIEZA m	SECCIÓN HUECA m ²	ALTURA TIERRAS m.	LONGITUD TEÓRICA m.	UNIDADES PREVISTAS
—	3,00x2,50x20x20	2,00	7,22	0,75	18	9

NOTA: La cota correspondiente a la columna “alturas de tierras” especificadas en la tabla anterior está medida desde la cota superior del marco hasta la cota inferior del sub-balasto, es decir, la pieza soportará una carga correspondiente a dicha altura más 1,00 m. correspondiente al paquete de vía.

1.2. - MATERIALES Y EJECUCIÓN:

Los materiales que se han tenido en cuenta, de acuerdo al citado proyecto han sido:

- Hormigón..... HA-35
- Acero corrugado..... B-500

cuya resistencia característica y límite elástico son 350 kg/cm^2 (35 N/mm^2), y 5.100 kg/cm^2 (500 N/mm^2) respectivamente, Los coeficientes de minoración de estos materiales serán:

- Hormigón..... 1,50
- Acero corrugado..... 1,15

El nivel de control del citado proyecto está previsto que sea NORMAL, con lo que, según el artº 95 de la Norma EHE, el coeficiente de seguridad aplicado es 1,50 para los pesos propios y 1,60 para las sobrecargas. El recubrimiento exigido para las armaduras es 3 cm.

Al ser elementos prefabricados, la consistencia del hormigón es seca, y la dosificación del mismo es la adecuada para que, según certificaciones de laboratorios homologados su resistencia sea mayor que la exigida en este proyecto.

Si en la redacción de proyecto se exigiese cemento sulforresistente, todos estos elementos prefabricados se fabricarían con cemento sulforresistente CEM I 42,5 SR. Si no es necesario se ejecutarían con cemento CEM I 52,5. Este dato deberá especificarse en el pedido correspondiente.

1.3. - CLASIFICACIÓN Y MARCADO DE MARCOS:

Para la buena organización y colocación de los marcos en la obra, éstos se marcarán interiormente con las siguientes siglas:

- * FOPRAR..... como fabricante
- * MR HA..... Marco de hormigón armado
- * HT Z..... siendo Z = altura máxima de tierras que puede soportar (en m.)
- * 300 x 250..... Anchura interior x Altura interior del marco (en cm.)
- * dd/mm/aa..... Fecha de fabricación.

1.4.- INSTALACIÓN DE LOS MARCOS:

Los marcos se instalarán en un terreno cuya tensión admisible se desconoce mientras se hace este estudio, por lo que, como suponemos será una instalación en terraplén ó zanja de una anchura muy grande, si la Dirección Técnica de la Obra lo considera adecuado, se propone la instalación de los marcos, siguiendo los siguientes pasos:

1. - Rellenar la zona de apoyo de los marcos (excavando si es necesario) con zahorras compactadas al 98% del P.N. en la profundidad que se estime necesaria para que la capacidad portante de este terreno sea superior a la calculada que debe soportar, de acuerdo a la altura de tierras y sobrecarga que lleve cada uno de los marcos. La altura necesaria de este relleno se calculará para que la tensión que este terreno de relleno transmita al existente sea menor de la tensión admisible del mismo.
2. - La colocación de los marcos se realizará sobre una solera de 10 cm. de hormigón HA-15 perfectamente rasanteada con la pendiente exacta dada por el proyecto, la cual se ejecutará sobre el terreno perfectamente compactado citado en el apartado 1. Es imprescindible la perfecta ejecución de la solera para que los marcos asienten con toda su superficie en ella y consiguiendo así una perfecta homogeneidad de colocación a lo largo de la obra, haciendo especial hincapié en este apartado ya que, si al instalar el macho de un marco sobre la hembra del anterior no queda su base totalmente apoyada en la solera, podría darse en caso de que el macho de dicho marco soportase toda la carga que recibe el marco entero (al quedar en falso su apoyo), pudiendo existir alguna lesión en el mismo al descender hasta encontrar el asiento total en la solera irregular, aunque por supuesto sin ningún riesgo estructural.
3. - Como mínimo, en los 50 cm. alrededor de las paredes laterales del marco, se compactará al 95 % del P.N. en tongadas alternativas a cada lado del mismo, con vibradores de pequeña energía. En los 100 cm. por encima del marco se rellenará utilizando vibradores de baja energía, pudiendo utilizar rodillo sin vibrador en el resto del relleno de tierras por encima del marco.

Todo ello queda resumido en el esquema de colocación del anexo 1.

1.5. - OTRAS CONSIDERACIONES:

Los pesos específicos de los materiales relacionados en apartados anteriores han sido:

- Hormigón en masa 2.400 kg/m³
(valor contrastado con la densidad del mismo
según ensayo de laboratorio homologado.)
- Acero corrugado..... 7.850 kg/m³

Todos los redondos colocados en la parte exterior de los marcos (cara pegada a las tierras ó a solera) se prolongarán una longitud correspondiente al solape de cada uno de los redondos de acuerdo con el artº 66 de la Norma EHE, según el esquema de la armadura de cada uno de los elementos. Los colocados en la parte interior podrán terminarse sin prolongación pues no existe ningún caso en el cual el momento flector negativo sea mayor que el momento límite de la sección correspondiente, y por lo tanto no es necesaria armadura de compresión.

Para el cálculo de marcos, se ha partido de las cargas actuantes en cada una en barras (verticales y horizontales), distribuyendo estas acciones a lo largo de las mismas según lo anteriormente explicado, y con ellas se obtienen los esfuerzos en cada una de sus secciones transversales, tanto horizontales como verticales, es decir, la compresión, el esfuerzo cortante y el momento flector, obteniendo posteriormente la capacidad mecánica necesaria siguiendo los métodos de la Norma EHE.

Zaragoza, 26 de octubre de 1999
Departamento Técnico de FOPRAR S.L.

CONFORME
Departamento Técnico de
UTE TORIJA



Luis Forcano.

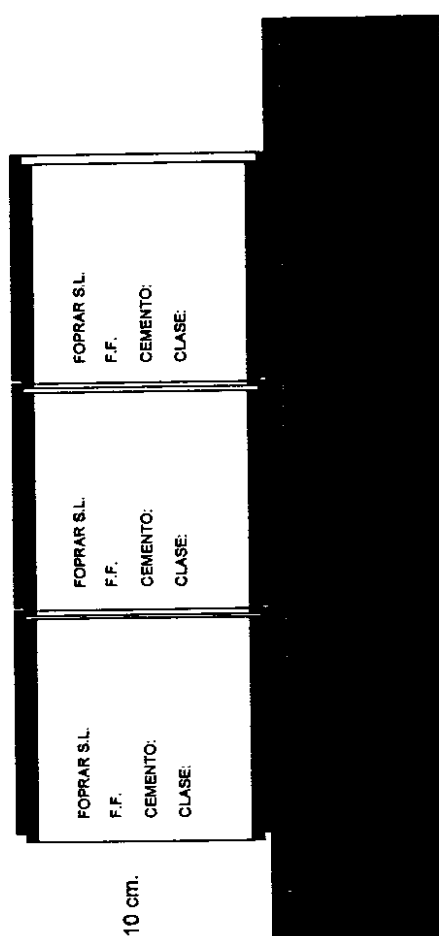
Anexo 1:

ESQUEMAS

DE COLOCACIÓN

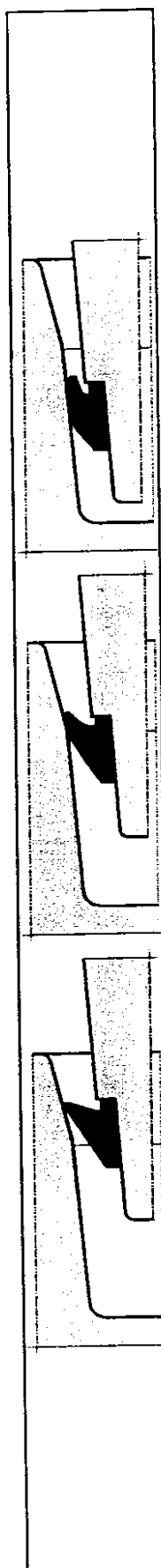
PUESTA EN OBRA DE LOS MARCOS

SECCIÓN



ALZADO

Montaje con junta de goma

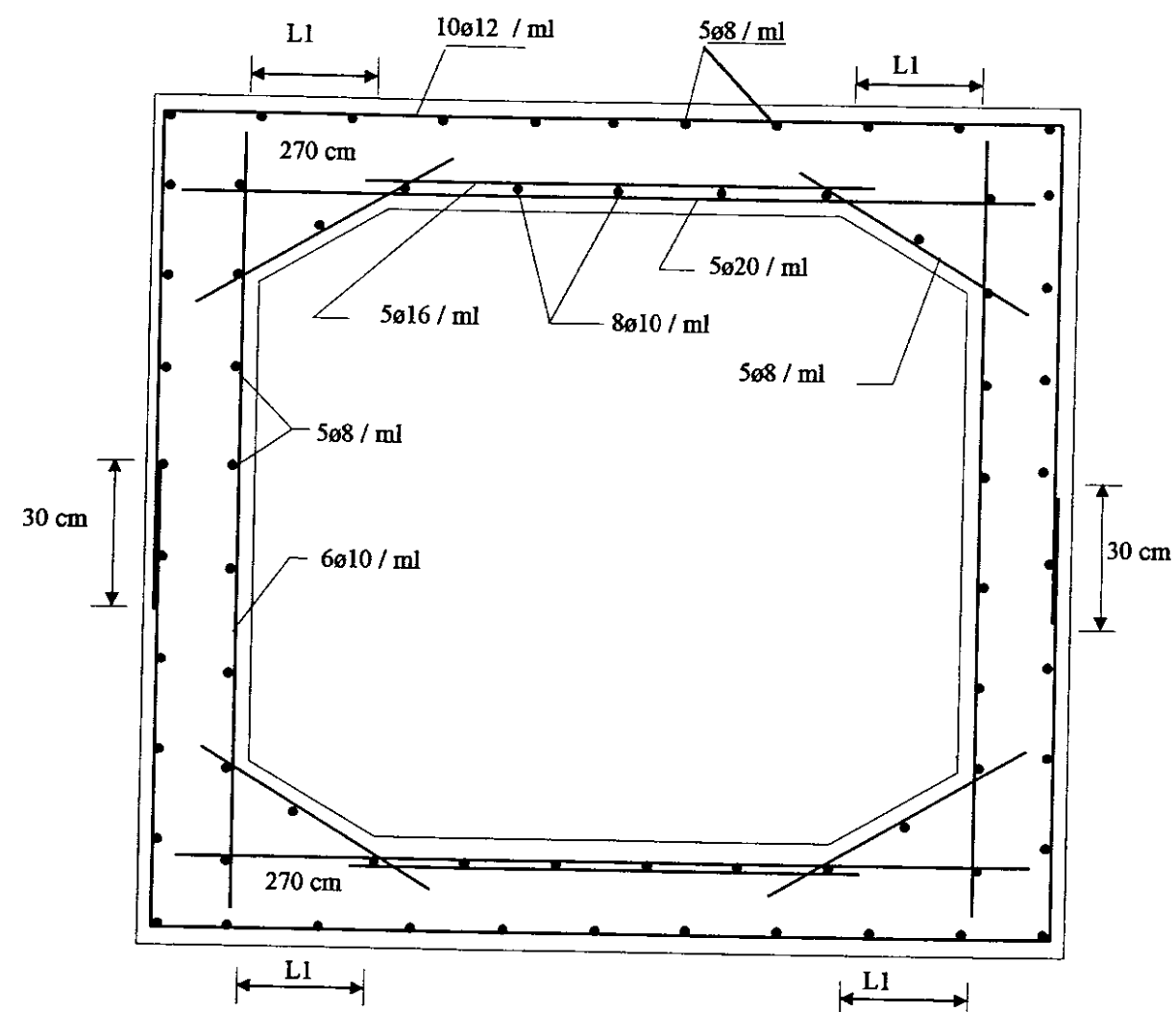
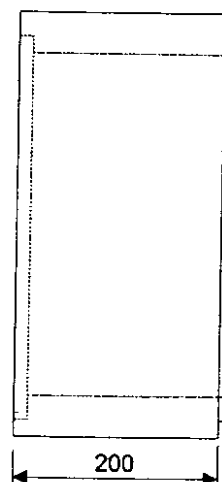
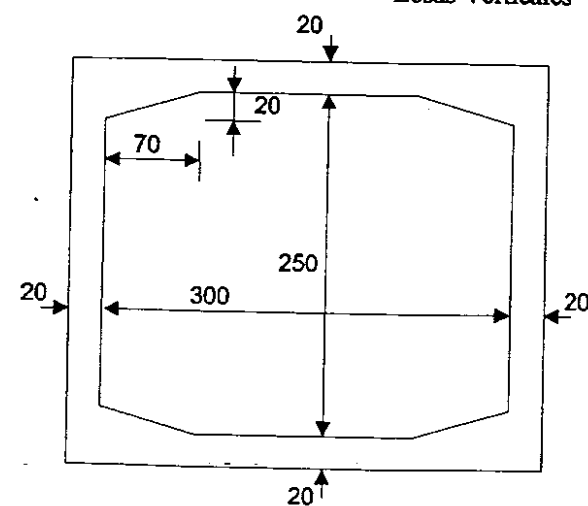


Hoja 11 de 12

Anexo 2:

ESQUEMAS

DE ARMADO

M 300x250**0,75 m. + BALASTO****HORMIGÓN..... H-350****ACEROAEH-500****ESTRIBOS:**Losas Horizontales
Losas Verticales5R6 c/ 10 cm. L1 = 100 cm.
No hace falta

Anexo 3:

CÁLCULOS

UTE TORIJA

MARCO 300 x 250 x 20 x 20 ALTURA DE TIERRAS .75 m.
+ BALASTO 1 m.

HORMIGON HA - 35
NIVEL DE CONTROL NORMAL

ACERO B-500
RECUBRIMIENTO 3 cm.

HIPOTESIS 1: CARGA VERTICAL MAYORADA / CARGA HORIZONTAL MAYORADA

LONGITUD HORIZONTAL HUECO 300 cm.
ESPESOR LOSA HORIZONTAL 20 cm.
LONGITUD VERTICAL HUECO 250 cm.
ESPESOR LOSA VERTICAL 20 cm.
LONGITUD CARTELA 70 cm.
CANTO CARTELA 20 cm.

PESO PROPIO TIERRAS 1800 kg/m3
PESO PROPIO BALASTO 2000 kg/m3
SOBRECARGA MINIMA 3000 kg/m2
VELOCIDAD MAXIMA 350 km/h
CARGA MAXIMA POR RUEDA 15000 kg.

ANCHO DE VIAS 1,668 m.
SEPARACION RUEDAS LONGITUDINALES 1,500 m.
ANCHO DE VIAS 3,066 m.

COEFICIENTE DE EMPUJE EN REPOSO 0,50

CARGAS MAYORADAS (kg/m)

CARGA VERTICAL SOBRE EL MARCO

CARGA MAXIMA Q1C = 19557
CARGA MINIMA Q1E = 14953

CARGA HORIZONTAL SOBRE EL MARCO

EMPUJE EN COTA SUPERIOR Q3 = 9418
EMPUJE EN COTA INFERIOR Q4 = 10461

MOMENTOS MAYORADOS EN LOS NUDOS (mkg/m)

MOMENTOS VANO HORIZ. M IZQ = -10185 M DCH = -10185
MOMENTOS VANO VERTI. M ARR = -10185 M ABA = -10201

UTE TORIJA

MARCO 300 x 250 x 20 x 20 ALTURA DE TIERRAS .75 m.
+ BALASTO 1 m.

VANO HORIZONTAL

ESF CORTANTE QUE ABSORBE EL MARCO SIN CARTELA (kg) 14836
ESF CORTANTE MAX EXISTENTE EN ZONA SIN CARTELA (kg) 10721
NO HACEN FALTA ESTRIBOS EN VANO
ESF CORTANTE QUE ABSORBE EL MARCO CON CARTELA (kg) 13839
ESF CORTANTE MAX EXISTENTE EN ZONA CON CARTELA (kg) 21188
5 ESTRIBOS R 6 c/ 10 cm. EN CARTELA

X = 0,00	M = -10185	N = 13179	US1 = 21826	US2 = 18666
X = 0,10	M = -7752	N = 13179	US1 = 18666	US2 = 18666
X = 0,20	M = -5469	N = 13179	US1 = 18666	US2 = 18666
X = 0,30	M = -3335	N = 13179	US1 = 18666	US2 = 18666
X = 0,40	M = -1351	N = 13179	US1 = 18666	US2 = 18666
X = 0,50	M = 484	N = 13179	US1 = 18666	US2 = 18666
X = 0,60	M = 2169	N = 13179	US1 = 18666	US2 = 18666
X = 0,70	M = 3705	N = 13179	US1 = 18666	US2 = 18666
X = 0,80	M = 5091	N = 13179	US1 = 20533	US2 = 18666
X = 0,90	M = 6328	N = 13179	US1 = 34967	US2 = 18666
X = 1,00	M = 7415	N = 13179	US1 = 43099	US2 = 18666
X = 1,10	M = 8352	N = 13179	US1 = 50322	US2 = 18666
X = 1,20	M = 9140	N = 13179	US1 = 56556	US2 = 18666
X = 1,30	M = 9779	N = 13179	US1 = 61725	US2 = 18666
X = 1,40	M = 10262	N = 13179	US1 = 65710	US2 = 18666
X = 1,50	M = 10556	N = 13179	US1 = 68163	US2 = 18666
X = 1,60	M = 10653	N = 13179	US1 = 68986	US2 = 18666
ARMADURA TRANSVERSAL			US1 = 13797	US2 = 7982

VANO VERTICAL

ESF CORTANTE QUE ABSORBE EL MARCO SIN CARTELA (kg) 11532
ESF CORTANTE MAX EXISTENTE EN ZONA SIN CARTELA (kg) 8846
NO HACEN FALTA ESTRIBOS EN VANO
ESF CORTANTE QUE ABSORBE EL MARCO CON CARTELA (kg) 21897
ESF CORTANTE MAX EXISTENTE EN ZONA CON CARTELA (kg) 10730
NO HACEN FALTA ESTRIBOS EN CARTELA

X = 0,00	M = -10185	N = 25076	US1 = 18666	US2 = 18666
X = 0,10	M = -8914	N = 25076	US1 = 18666	US2 = 18666
X = 0,20	M = -7738	N = 25076	US1 = 18666	US2 = 18666
X = 0,30	M = -6657	N = 25076	US1 = 30859	US2 = 18666
X = 0,30	M = -6657	N = 25076	US1 = 30859	US2 = 18666
X = 0,40	M = -5671	N = 25076	US1 = 23483	US2 = 18666
X = 0,50	M = -4781	N = 25076	US1 = 18666	US2 = 18666
X = 0,60	M = -3987	N = 25076	US1 = 18666	US2 = 18666
X = 0,70	M = -3289	N = 25076	US1 = 18666	US2 = 18666
X = 0,80	M = -2689	N = 25076	US1 = 18666	US2 = 18666
X = 0,90	M = -2186	N = 25076	US1 = 18666	US2 = 18666
X = 1,00	M = -1780	N = 25076	US1 = 18666	US2 = 18666
X = 1,10	M = -1472	N = 25076	US1 = 18666	US2 = 18666
X = 1,20	M = -1263	N = 25076	US1 = 18666	US2 = 18666
X = 1,30	M = -1153	N = 25076	US1 = 18666	US2 = 18666
X = 1,35	M = -1135	N = 25076	US1 = 18666	US2 = 18666
ARMADURA TRANSVERSAL			US1 = 7982	US2 = 7982

UTE TORIJA

MARCO 300 x 250 x 20 x 20 ALTURA DE TIERRAS .75 m.
+ BALASTO 1 m.

VANO HORIZONTAL

ESF CORTANTE QUE ABSORBE EL MARCO SIN CARTELA (kg) 14914
ESF CORTANTE MAX EXISTENTE EN ZONA SIN CARTELA (kg) 10721
NO HACEN FALTA ESTRIBOS EN VANO
ESF CORTANTE QUE ABSORBE EL MARCO CON CARTELA (kg) 13172
ESF CORTANTE MAX EXISTENTE EN ZONA CON CARTELA (kg) 21188
5 ESTRIBOS R 6 c/ 10 cm. EN CARTELA

X = 0,00	M= -9160	N= 8239	US1= 21482	US2= 18666
X = 0,10	M= -6727	N= 8239	US1= 18666	US2= 18666
X = 0,20	M= -4443	N= 8239	US1= 18666	US2= 18666
X = 0,30	M= -2309	N= 8239	US1= 18666	US2= 18666
X = 0,40	M= -325	N= 8239	US1= 18666	US2= 18666
X = 0,50	M= 1510	N= 8239	US1= 18666	US2= 18666
X = 0,60	M= 3195	N= 8239	US1= 18666	US2= 18666
X = 0,70	M= 4731	N= 8239	US1= 21258	US2= 18666
X = 0,80	M= 6117	N= 8239	US1= 29333	US2= 18666
X = 0,90	M= 7353	N= 8239	US1= 45333	US2= 18666
X = 1,00	M= 8440	N= 8239	US1= 53638	US2= 18666
X = 1,10	M= 9378	N= 8239	US1= 61024	US2= 18666
X = 1,20	M= 10166	N= 8239	US1= 67407	US2= 18666
X = 1,30	M= 10804	N= 8239	US1= 72704	US2= 18666
X = 1,40	M= 11288	N= 8239	US1= 76794	US2= 18666
X = 1,50	M= 11581	N= 8239	US1= 79312	US2= 18666
X = 1,60	M= 11679	N= 8239	US1= 80158	US2= 18666
ARMADURA TRANSVERSAL			US1= 16031	US2= 7982

VANO VERTICAL

ESF CORTANTE QUE ABSORBE EL MARCO SIN CARTELA (kg) 11532
ESF CORTANTE MAX EXISTENTE EN ZONA SIN CARTELA (kg) 5532
NO HACEN FALTA ESTRIBOS EN VANO
ESF CORTANTE QUE ABSORBE EL MARCO CON CARTELA (kg) 21897
ESF CORTANTE MAX EXISTENTE EN ZONA CON CARTELA (kg) 6709
NO HACEN FALTA ESTRIBOS EN CARTELA

X = 0,00	M= -9160	N= 25076	US1= 18666	US2= 18666
X = 0,10	M= -8365	N= 25076	US1= 18666	US2= 18666
X = 0,20	M= -7630	N= 25076	US1= 18666	US2= 18666
X = 0,30	M= -6954	N= 25076	US1= 33120	US2= 18666
X = 0,30	M= -6954	N= 25076	US1= 33120	US2= 18666
X = 0,40	M= -6337	N= 25076	US1= 28444	US2= 18666
X = 0,50	M= -5780	N= 25076	US1= 24292	US2= 18666
X = 0,60	M= -5284	N= 25076	US1= 20641	US2= 18666
X = 0,70	M= -4848	N= 25076	US1= 18666	US2= 18666
X = 0,80	M= -4472	N= 25076	US1= 18666	US2= 18666
X = 0,90	M= -4157	N= 25076	US1= 18666	US2= 18666
X = 1,00	M= -3903	N= 25076	US1= 18666	US2= 18666
X = 1,10	M= -3711	N= 25076	US1= 18666	US2= 18666
X = 1,20	M= -3580	N= 25076	US1= 18666	US2= 18666
X = 1,30	M= -3510	N= 25076	US1= 18666	US2= 18666
X = 1,35	M= -3499	N= 25076	US1= 18666	US2= 18666
ARMADURA TRANSVERSAL			US1= 7982	US2= 7982

UTE TORIJA

MARCO 300 x 250 x 20 x 20 ALTURA DE TIERRAS .75 m.
+ BALASTO 1 m.

HORMIGON HA - 35
NIVEL DE CONTROL NORMAL

ACERO B-500
RECUBRIMIENTO 3 cm.

HIPOTESIS 2: CARGA VERTICAL MAYORADA / CARGA HORIZONTAL SIN MAYORAR

LONGITUD HORIZONTAL HUECO	300 cm.
ESPESOR LOSA HORIZONTAL	20 cm.
LONGITUD VERTICAL HUECO	250 cm.
ESPESOR LOSA VERTICAL	20 cm.
LONGITUD CARTELA	70 cm.
CANTO CARTELA	20 cm.
PESO PROPIO TIERRAS	1800 kg/m3
PESO PROPIO BALASTO	2000 kg/m3
SOBRECARGA MINIMA	3000 kg/m2
VELOCIDAD MAXIMA	350 km/h
CARGA MAXIMA POR RUEDA	15000 kg.

ANCHO DE VIAS	1,668 m.
SEPARACION RUEDAS LONGITUDINALES	1,500 m.
ANCHO DE VIAS	3,066 m.

COEFICIENTE DE EMPUJE EN REPOSO..... 0,50

CARGAS MAYORADAS (kg/m)

CARGA VERTICAL SOBRE EL MARCO

CARGA MAXIMA	Q1C = 19557
CARGA MINIMA	Q1E = 14953

CARGA HORIZONTAL SOBRE EL MARCO

EMPUJE EN COTA SUPERIOR	Q3 = 5886
EMPUJE EN COTA INFERIOR	Q4 = 6538

MOMENTOS MAYORADOS EN LOS NUDOS (mkg/m)

MOMENTOS VANO HORIZ.	M IZQ = -9160	M DCH = -9160
MOMENTOS VANO VERTI.	M ARR = -9160	M ABA = -9161

4.4.3 Paso inferior de fauna PK 550+8

4.4.3 PASO INFERIOR DE FAUNA PK 550+8

ÍNDICE

- DEFINICIÓN GEOMÉTRICA
 - DATOS GENERALES DEL TRAZADO
 - REPLANTEO DE LOS BORDES DEL FFCC
 - REPLANTEO DEL PÓRTICO
 - REPLANTEO DE LAS ALETAS

DEFINICION GEOMETICA P.F. 550+8

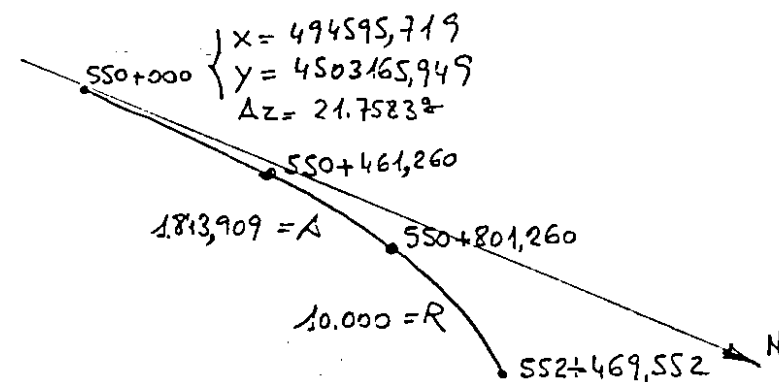
DATOS GENERALES DEL TRAZADO

P.I. - 550+800

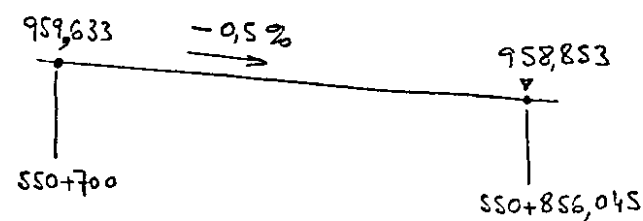
(1)

550+800

(2)



PLANTA



ALZADO

$$P_2 = \frac{1,973 - 0,973}{2} = -0,5$$

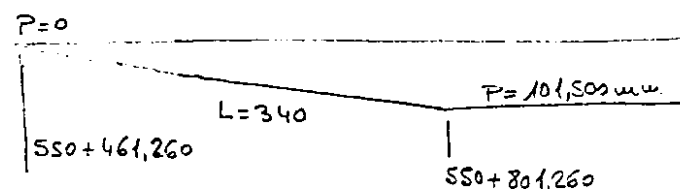
$$P_3 = \frac{-0,973}{5,4675} = -0,177961$$

$$P_4 = \frac{0,623}{1,5325} = 0,406525$$

$$P_8 = \frac{-0,623}{2,965} = -0,209941$$

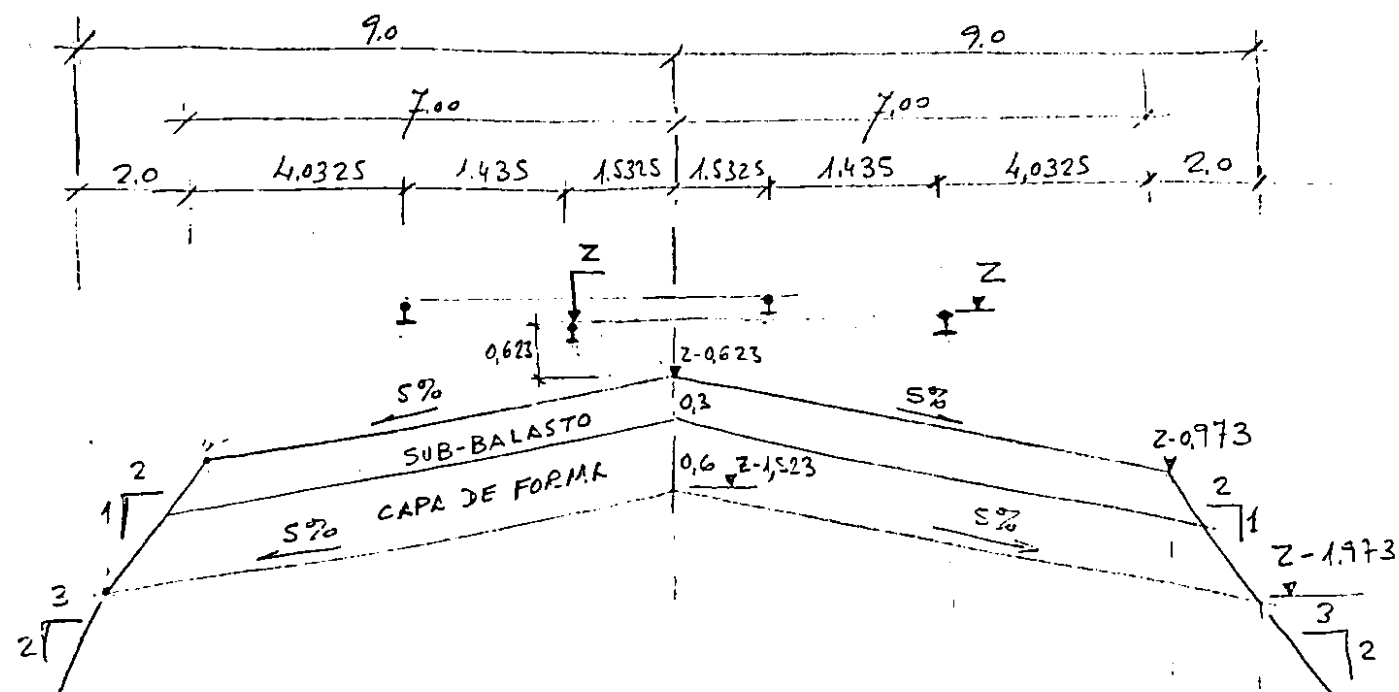
$$P_9 = \frac{0,973}{4,0325} = 0,241290$$

$$P_{10} = \frac{1}{2} = 0,5$$

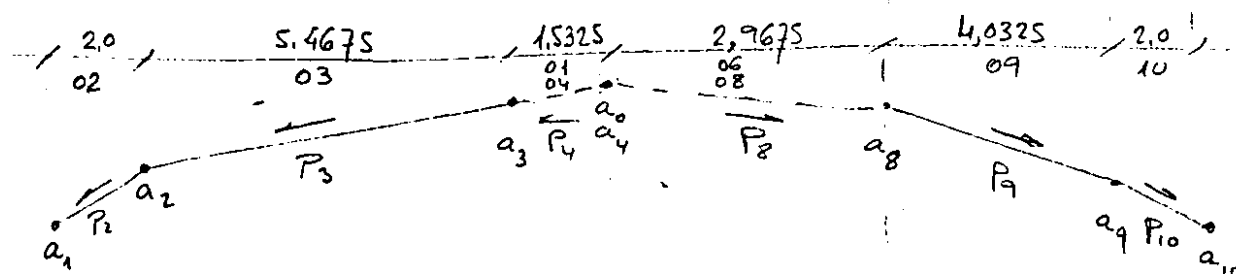


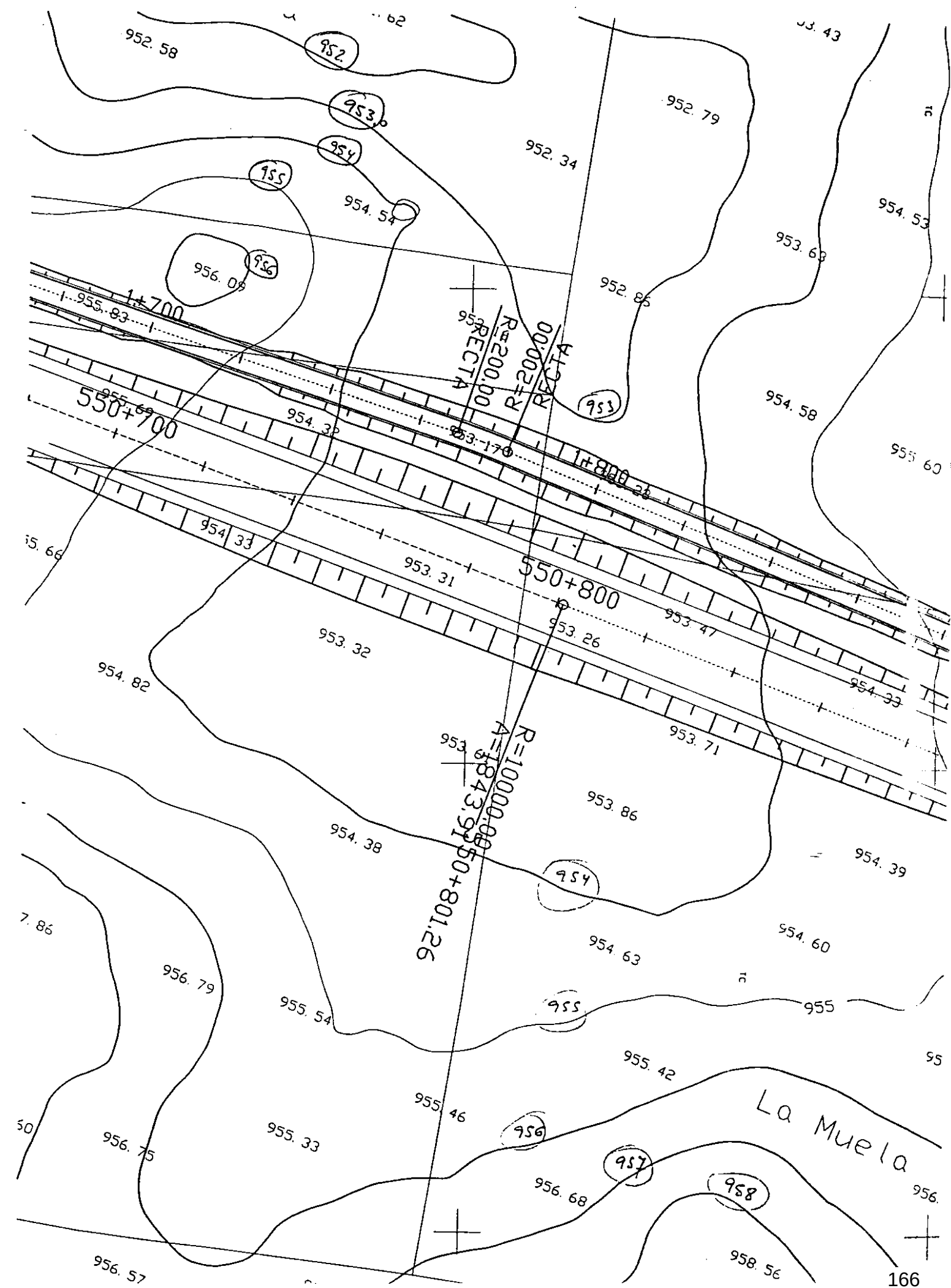
PERALTES

$$P = 101,5 - \frac{101,5}{340} \cdot 1,26 = 101,124 \text{ mm}$$



$$P = \frac{101,5}{1435} = 0,07073 \rightarrow 7,073\%$$





REPLANTEO DE LOS BORDES DEL FERROCARRIL

PI-550+800 PASO FAUNA 1000FERROCARRIL

0.	595.719	3165.949	21.7583	3 700.	959.633	-.005
1 461.26				1 550.856		
3 801.26	0.	10000.	1843.909			
2 2469.552	10000.					
2 700.	1.5325	2. 5.46751.5325	0. 2.9675	0. 2.96754.0325	2.	
900.	1.5325	2. 5.46751.5325	0. 2.9675	0. 2.96754.0325	2.	
2 700.	-.5	-.17796.406525	0. 0.	-.20994.24129	.5	
900.	-.5	-.17796.406525	0. 0.	-.20994.24129	.5	
7 1 0.	2 0.	3 0.	0 0.	8 0.	9 0.	10 0.
1 0 770.	1.	830.	70 10 20 30 40 50 60 7			

0
0
0
0
/*
/R

TITULO DEL TRABAJO PI-550+800 PASO FAUNA

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	770.000	-77.349305	.348337	-.937369

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	0	770.000	846.716	3894.058	957.310
1	1	2	0	770.000	848.590	3893.361	958.310
1	1	3	0	770.000	853.715	3891.457	959.283
1	1	4	0	770.000	855.152	3890.923	959.283
1	1	5	0	770.000	855.152	3890.923	959.283
1	1	6	0	770.000	858.932	3889.518	958.310
1	1	7	0	770.000	860.807	3888.822	957.310

EJE	P.K.	AZIMUT	COS A	SEN A
0	771.000	-77.343515	.348422	-.937338

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	0	771.000	847.064	3894.996	957.305
1	2	2	0	771.000	848.939	3894.299	958.305
1	2	3	0	771.000	854.064	3892.394	959.278
1	2	4	0	771.000	855.500	3891.860	959.278
1	2	5	0	771.000	855.500	3891.860	959.278
1	2	6	0	771.000	859.280	3890.455	958.305
1	2	7	0	771.000	861.155	3889.759	957.305

EJE	P.K.	AZIMUT	COS A	SEN A
0	772.000	-77.337706	.348508	-.937306

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	0	772.000	847.413	3895.934	957.300
1	3	2	0	772.000	849.288	3895.237	958.300
1	3	3	0	772.000	854.412	3893.332	959.273
1	3	4	0	772.000	855.849	3892.798	959.273
1	3	5	0	772.000	855.849	3892.798	959.273
1	3	6	0	772.000	859.628	3891.392	958.300
1	3	7	0	772.000	861.503	3890.695	957.300

EJE	P.K.	AZIMUT	COS A	SEN A
0	773.000	-77.331878	.348593	-.937274

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	0	773.000	847.762	3896.872	957.295
1	4	2	0	773.000	849.636	3896.175	958.295
1	4	3	0	773.000	854.761	3894.269	959.268
1	4	4	0	773.000	856.197	3893.735	959.268
1	4	5	0	773.000	856.197	3893.735	959.268
1	4	6	0	773.000	859.977	3892.329	958.295
1	4	7	0	773.000	861.851	3891.632	957.295

EJE	P.K.	AZIMUT	COS A	SEN A
0	774.000	-77.326032	.348680	-.937242

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	5	1	0	774.000	848.111	3897.810	957.290
1	5	2	0	774.000	849.985	3897.113	958.290
1	5	3	0	774.000	855.110	3895.207	959.263
1	5	4	0	774.000	856.546	3894.672	959.263
1	5	5	0	774.000	856.546	3894.672	959.263
1	5	6	0	774.000	860.325	3893.266	958.290
1	5	7	0	774.000	862.200	3892.569	957.290

EJE	P.K.	AZIMUT	COS A	SEN A
0	775.000	-77.320167	.348766	-.937210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	6	1	0	775.000	848.460	3898.748	957.285
1	6	2	0	775.000	850.334	3898.051	958.285
1	6	3	0	775.000	855.458	3896.144	959.258
1	6	4	0	775.000	856.895	3895.609	959.258
1	6	5	0	775.000	856.895	3895.609	959.258
1	6	6	0	775.000	860.674	3894.203	958.285
1	6	7	0	775.000	862.548	3893.506	957.285

EJE	P.K.	AZIMUT	COS A	SEN A
0	776.000	-77.314283	.348853	-.937178

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	7	1	0	776.000	848.809	3899.686	957.280
1	7	2	0	776.000	850.683	3898.989	958.280
1	7	3	0	776.000	855.807	3897.081	959.253
1	7	4	0	776.000	857.243	3896.547	959.253
1	7	5	0	776.000	857.243	3896.547	959.253
1	7	6	0	776.000	861.023	3895.140	958.280
1	7	7	0	776.000	862.897	3894.442	957.280

EJE	P.K.	AZIMUT	COS A	SEN A
0	777.000	-77.308380	.348939	-.937145

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	8	1	0	777.000	849.158	3900.624	957.275
1	8	2	0	777.000	851.032	3899.926	958.275
1	8	3	0	777.000	856.156	3898.019	959.248
1	8	4	0	777.000	857.592	3897.484	959.248
1	8	5	0	777.000	857.592	3897.484	959.248
1	8	6	0	777.000	861.371	3896.077	958.275
1	8	7	0	777.000	863.246	3895.379	957.275

EJE	P.K.	AZIMUT	COS A	SEN A
0	778.000	-77.302459	.349027	-.937113

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	9	1	0	778.000	849.507	3901.562	957.270
1	9	2	0	778.000	851.382	3900.864	958.270
1	9	3	0	778.000	856.505	3898.956	959.243

1	9	4	0	778.000	857.941	3898.421	959.243
1	9	5	0	778.000	857.941	3898.421	959.243
1	9	6	0	778.000	861.720	3897.013	958.270
1	9	7	0	778.000	863.594	3896.315	957.270

EJE	P.K.	AZIMUT	COS A	SEN A
0	779.000	-77.296519	.349114	-.937080

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	10	1	0	779.000	849.857	3902.500	957.265
1	10	2	0	779.000	851.731	3901.802	958.265
1	10	3	0	779.000	856.854	3899.893	959.238
1	10	4	0	779.000	858.290	3899.358	959.238
1	10	5	0	779.000	858.290	3899.358	959.238
1	10	6	0	779.000	862.069	3897.950	958.265
1	10	7	0	779.000	863.943	3897.252	957.265

EJE	P.K.	AZIMUT	COS A	SEN A
0	780.000	-77.290560	.349202	-.937048

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	11	1	0	780.000	850.206	3903.438	957.260
1	11	2	0	780.000	852.080	3902.740	958.260
1	11	3	0	780.000	857.204	3900.830	959.233
1	11	4	0	780.000	858.640	3900.295	959.233
1	11	5	0	780.000	858.640	3900.295	959.233
1	11	6	0	780.000	862.418	3898.887	958.260
1	11	7	0	780.000	864.292	3898.189	957.260

EJE	P.K.	AZIMUT	COS A	SEN A
0	781.000	-77.284583	.349290	-.937015

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	12	1	0	781.000	850.556	3904.376	957.255
1	12	2	0	781.000	852.430	3903.677	958.255
1	12	3	0	781.000	857.553	3901.767	959.228
1	12	4	0	781.000	858.989	3901.232	959.228
1	12	5	0	781.000	858.989	3901.232	959.228
1	12	6	0	781.000	862.767	3899.824	958.255
1	12	7	0	781.000	864.641	3899.125	957.255

EJE	P.K.	AZIMUT	COS A	SEN A
0	782.000	-77.278587	.349378	-.936982

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	13	1	0	782.000	850.905	3905.314	957.250
1	13	2	0	782.000	852.779	3904.615	958.250
1	13	3	0	782.000	857.902	3902.705	959.223
1	13	4	0	782.000	859.338	3902.169	959.223
1	13	5	0	782.000	859.338	3902.169	959.223
1	13	6	0	782.000	863.117	3900.760	958.250
1	13	7	0	782.000	864.990	3900.062	957.250

EJE	P.K.	AZIMUT	COS A	SEN A
0	783.000	-77.272572	.349466	-.936949

1 18 7 0 787.000 866.737 3904.743 957.225

EJE P.K. AZIMUT COS A SEN A

0 788.000 -77.242216 .349913 -.936782

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	0	788.000	853.005	3910.940	957.220
1	19	2	0	788.000	854.879	3910.240	958.220
1	19	3	0	788.000	860.000	3908.327	959.193
1	19	4	0	788.000	861.436	3907.790	959.193
1	19	5	0	788.000	861.436	3907.790	959.193
1	19	6	0	788.000	865.214	3906.379	958.220
1	19	7	0	788.000	867.087	3905.680	957.220

EJE P.K. AZIMUT COS A SEN A

0 789.000 -77.236089 .350003 -.936748

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	0	789.000	853.355	3911.877	957.215
1	20	2	0	789.000	855.229	3911.177	958.215
1	20	3	0	789.000	860.350	3909.264	959.188
1	20	4	0	789.000	861.786	3908.727	959.188
1	20	5	0	789.000	861.786	3908.727	959.188
1	20	6	0	789.000	865.563	3907.316	958.215
1	20	7	0	789.000	867.437	3906.616	957.215

EJE P.K. AZIMUT COS A SEN A

0 790.000 -77.229943 .350094 -.936715

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	0	790.000	853.706	3912.815	957.210
1	21	2	0	790.000	855.579	3912.115	958.210
1	21	3	0	790.000	860.700	3910.200	959.183
1	21	4	0	790.000	862.136	3909.664	959.183
1	21	5	0	790.000	862.136	3909.664	959.183
1	21	6	0	790.000	865.913	3908.252	958.210
1	21	7	0	790.000	867.787	3907.552	957.210

EJE P.K. AZIMUT COS A SEN A

0 791.000 -77.223778 .350184 -.936681

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	0	791.000	854.056	3913.752	957.205
1	22	2	0	791.000	855.929	3913.052	958.205
1	22	3	0	791.000	861.051	3911.137	959.178
1	22	4	0	791.000	862.486	3910.601	959.178
1	22	5	0	791.000	862.486	3910.601	959.178
1	22	6	0	791.000	866.263	3909.189	958.205
1	22	7	0	791.000	868.137	3908.488	957.205

EJE P.K. AZIMUT COS A SEN A

0 792.000 -77.217595 .350275 -.936647

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	0	792.000	854.407	3914.690	957.200

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	14	1	0	783.000	851.255	3906.251	957.245
1	14	2	0	783.000	853.129	3905.552	958.245
1	14	3	0	783.000	858.252	3903.642	959.218
1	14	4	0	783.000	859.688	3903.106	959.218
1	14	5	0	783.000	859.688	3903.106	959.218
1	14	6	0	783.000	863.466	3901.697	958.245
1	14	7	0	783.000	865.340	3900.998	957.245

EJE P.K. AZIMUT COS A SEN A

0 784.000 -77.266538 .349555 -.936916

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	0	784.000	851.605	3907.189	957.240
1	15	2	0	784.000	853.479	3906.490	958.240
1	15	3	0	784.000	858.601	3904.579	959.213
1	15	4	0	784.000	860.037	3904.043	959.213
1	15	5	0	784.000	860.037	3904.043	959.213
1	15	6	0	784.000	863.815	3902.633	958.240
1	15	7	0	784.000	865.689	3901.934	957.240

EJE P.K. AZIMUT COS A SEN A

0 785.000 -77.260486 .349644 -.936883

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	0	785.000	851.955	3908.127	957.235
1	16	2	0	785.000	853.828	3907.427	958.235
1	16	3	0	785.000	858.951	3905.516	959.208
1	16	4	0	785.000	860.387	3904.980	959.208
1	16	5	0	785.000	860.387	3904.980	959.208
1	16	6	0	785.000	864.165	3903.570	958.235
1	16	7	0	785.000	866.038	3902.871	957.235

EJE P.K. AZIMUT COS A SEN A

0 786.000 -77.254415 .349734 -.936849

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	0	786.000	852.305	3909.064	957.230
1	17	2	0	786.000	854.178	3908.365	958.230
1	17	3	0	786.000	859.301	3906.453	959.203
1	17	4	0	786.000	860.736	3905.917	959.203
1	17	5	0	786.000	860.736	3905.917	959.203
1	17	6	0	786.000	864.514	3904.506	958.230
1	17	7	0	786.000	866.388	3903.807	957.230

EJE P.K. AZIMUT COS A SEN A

0 787.000 -77.248325 .349823 -.936816

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	0	787.000	852.655	3910.002	957.225
1	18	2	0	787.000	854.528	3909.302	958.225
1	18	3	0	787.000	859.650	3907.390	959.198
1	18	4	0	787.000	861.086	3906.854	959.198
1	18	5	0	787.000	861.086	3906.854	959.198
1	18	6	0	787.000	864.864	3905.443	958.225

1	23	2	0	792.000	856.280	3913.989	958.200
1	23	3	0	792.000	861.401	3912.074	959.173
1	23	4	0	792.000	862.836	3911.537	959.173
1	23	5	0	792.000	862.836	3911.537	959.173
1	23	6	0	792.000	866.613	3910.125	958.200
1	23	7	0	792.000	868.487	3909.424	957.200

EJE	P.K.	AZIMUT	COS A	SEN A
0	793.000	-77.211393	.350367	-.936613

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	24	1	0	793.000	854.757	3915.627	957.195
1	24	2	0	793.000	856.630	3914.926	958.195
1	24	3	0	793.000	861.751	3913.011	959.168
1	24	4	0	793.000	863.187	3912.474	959.168
1	24	5	0	793.000	863.187	3912.474	959.168
1	24	6	0	793.000	866.964	3911.061	958.195
1	24	7	0	793.000	868.837	3910.360	957.195

EJE	P.K.	AZIMUT	COS A	SEN A
0	794.000	-77.205172	.350458	-.936578

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	25	1	0	794.000	855.108	3916.565	957.190
1	25	2	0	794.000	856.981	3915.864	958.190
1	25	3	0	794.000	862.102	3913.948	959.163
1	25	4	0	794.000	863.537	3913.411	959.163
1	25	5	0	794.000	863.537	3913.411	959.163
1	25	6	0	794.000	867.314	3911.997	958.190
1	25	7	0	794.000	869.187	3911.296	957.190

EJE	P.K.	AZIMUT	COS A	SEN A
0	795.000	-77.198932	.350550	-.936544

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	26	1	0	795.000	855.459	3917.502	957.185
1	26	2	0	795.000	857.332	3916.801	958.185
1	26	3	0	795.000	862.452	3914.884	959.158
1	26	4	0	795.000	863.888	3914.347	959.158
1	26	5	0	795.000	863.888	3914.347	959.158
1	26	6	0	795.000	867.664	3912.933	958.185
1	26	7	0	795.000	869.537	3912.232	957.185

EJE	P.K.	AZIMUT	COS A	SEN A
0	796.000	-77.192674	.350642	-.936510

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	27	1	0	796.000	855.810	3918.439	957.180
1	27	2	0	796.000	857.683	3917.738	958.180
1	27	3	0	796.000	862.803	3915.821	959.153
1	27	4	0	796.000	864.238	3915.284	959.153
1	27	5	0	796.000	864.238	3915.284	959.153
1	27	6	0	796.000	868.015	3913.870	958.180
1	27	7	0	796.000	869.888	3913.168	957.180

EJE	P.K.	AZIMUT	COS A	SEN A
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0	797.000	-77.186397	.350734	-.936475
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	28	1	0	797.000	856.161	3919.377	957.175
1	28	2	0	797.000	858.034	3918.675	958.175
1	28	3	0	797.000	863.154	3916.758	959.148
1	28	4	0	797.000	864.589	3916.220	959.148
1	28	5	0	797.000	864.589	3916.220	959.148
1	28	6	0	797.000	868.365	3914.806	958.175
1	28	7	0	797.000	870.238	3914.104	957.175

EJE	P.K.	AZIMUT	COS A	SEN A
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0	798.000	-77.180101	.350827	-.936440
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	29	1	0	798.000	856.512	3920.314	957.170
1	29	2	0	798.000	858.385	3919.612	958.170
1	29	3	0	798.000	863.505	3917.694	959.143
1	29	4	0	798.000	864.940	3917.157	959.143
1	29	5	0	798.000	864.940	3917.157	959.143
1	29	6	0	798.000	868.716	3915.742	958.170
1	29	7	0	798.000	870.589	3915.040	957.170

EJE	P.K.	AZIMUT	COS A	SEN A
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0	799.000	-77.173786	.350920	-.936405
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	30	1	0	799.000	856.863	3921.251	957.165
1	30	2	0	799.000	858.736	3920.549	958.165
1	30	3	0	799.000	863.856	3918.631	959.138
1	30	4	0	799.000	865.291	3918.093	959.138
1	30	5	0	799.000	865.291	3918.093	959.138
1	30	6	0	799.000	869.067	3916.678	958.165
1	30	7	0	799.000	870.939	3915.976	957.165

EJE	P.K.	AZIMUT	COS A	SEN A
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0	800.000	-77.167453	.351013	-.936371
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	31	1	0	800.000	857.214	3922.188	957.160
1	31	2	0	800.000	859.087	3921.486	958.160
1	31	3	0	800.000	864.207	3919.567	959.133
1	31	4	0	800.000	865.642	3919.029	959.133
1	31	5	0	800.000	865.642	3919.029	959.133
1	31	6	0	800.000	869.417	3917.614	958.160
1	31	7	0	800.000	871.290	3916.912	957.160

EJE	P.K.	AZIMUT	COS A	SEN A
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0	801.000	-77.161101	.351107	-.936336
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	32	1	0	801.000	857.566	3923.126	957.155
1	32	2	0	801.000	859.438	3922.423	958.155
1	32	3	0	801.000	864.558	3920.504	959.128
1	32	4	0	801.000	865.993	3919.966	959.128

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1	32	5	0	801.000	865.993	3919.966	959.128
1	32	6	0	801.000	869.768	3918.550	958.155
1	32	7	0	801.000	871.641	3917.848	957.155

EJE	P.K.	AZIMUT	COS A	SEN A
0	802.000	-77.154736	.351200	-.936300

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	33	1	0	802.000	857.917	3924.063	957.150
1	33	2	0	802.000	859.790	3923.360	958.150
1	33	3	0	802.000	864.909	3921.440	959.123
1	33	4	0	802.000	866.344	3920.902	959.123
1	33	5	0	802.000	866.344	3920.902	959.123
1	33	6	0	802.000	870.119	3919.486	958.150
1	33	7	0	802.000	871.992	3918.783	957.150

EJE	P.K.	AZIMUT	COS A	SEN A
0	803.000	-77.148369	.351294	-.936265

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	34	1	0	803.000	858.269	3925.000	957.145
1	34	2	0	803.000	860.141	3924.297	958.145
1	34	3	0	803.000	865.260	3922.377	959.118
1	34	4	0	803.000	866.695	3921.838	959.118
1	34	5	0	803.000	866.695	3921.838	959.118
1	34	6	0	803.000	870.470	3920.422	958.145
1	34	7	0	803.000	872.343	3919.719	957.145

EJE	P.K.	AZIMUT	COS A	SEN A
0	804.000	-77.142003	.351387	-.936230

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	35	1	0	804.000	858.620	3925.937	957.140
1	35	2	0	804.000	860.493	3925.234	958.140
1	35	3	0	804.000	865.612	3923.313	959.113
1	35	4	0	804.000	867.046	3922.775	959.113
1	35	5	0	804.000	867.046	3922.775	959.113
1	35	6	0	804.000	870.822	3921.358	958.140
1	35	7	0	804.000	872.694	3920.655	957.140

EJE	P.K.	AZIMUT	COS A	SEN A
0	805.000	-77.135637	.351481	-.936195

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	36	1	0	805.000	858.972	3926.874	957.135
1	36	2	0	805.000	860.844	3926.171	958.135
1	36	3	0	805.000	865.963	3924.249	959.108
1	36	4	0	805.000	867.398	3923.711	959.108
1	36	5	0	805.000	867.398	3923.711	959.108
1	36	6	0	805.000	871.173	3922.293	958.135
1	36	7	0	805.000	873.045	3921.590	957.135

EJE	P.K.	AZIMUT	COS A	SEN A
0	806.000	-77.129271	.351575	-.936160

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	37	1	0	806.000	859.324	3927.811	957.130
1	37	2	0	806.000	861.196	3927.108	958.130
1	37	3	0	806.000	866.315	3925.186	959.103
1	37	4	0	806.000	867.749	3924.647	959.103
1	37	5	0	806.000	867.749	3924.647	959.103
1	37	6	0	806.000	871.524	3923.229	958.130
1	37	7	0	806.000	873.397	3922.526	957.130

EJE	P.K.	AZIMUT	COS A	SEN A
0	807.000	-77.122905	.351668	-.936125

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	38	1	0	807.000	859.676	3928.748	957.125
1	38	2	0	807.000	861.548	3928.045	958.125
1	38	3	0	807.000	866.666	3926.122	959.098
1	38	4	0	807.000	868.101	3925.583	959.098
1	38	5	0	807.000	868.101	3925.583	959.098
1	38	6	0	807.000	871.876	3924.165	958.125
1	38	7	0	807.000	873.748	3923.462	957.125

JE	P.K.	AZIMUT	COS A	SEN A
0	808.000	-77.116538	.351762	-.936090

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	39	1	0	808.000	860.028	3929.685	957.120
1	39	2	0	808.000	861.900	3928.982	958.120
1	39	3	0	808.000	867.018	3927.058	959.093
1	39	4	0	808.000	868.453	3926.519	959.093
1	39	5	0	808.000	868.453	3926.519	959.093
1	39	6	0	808.000	872.227	3925.101	958.120
1	39	7	0	808.000	874.100	3924.397	957.120

EJE	P.K.	AZIMUT	COS A	SEN A
0	809.000	-77.110172	.351855	-.936054

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	40	1	0	809.000	860.380	3930.622	957.115
1	40	2	0	809.000	862.252	3929.918	958.115
1	40	3	0	809.000	867.370	3927.994	959.088
1	40	4	0	809.000	868.804	3927.455	959.088
1	40	5	0	809.000	868.804	3927.455	959.088
1	40	6	0	809.000	872.579	3926.036	958.115
1	40	7	0	809.000	874.451	3925.333	957.115

EJE	P.K.	AZIMUT	COS A	SEN A
0	810.000	-77.103806	.351949	-.936019

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	41	1	0	810.000	860.732	3931.559	957.110
1	41	2	0	810.000	862.604	3930.855	958.110
1	41	3	0	810.000	867.722	3928.931	959.083
1	41	4	0	810.000	869.156	3928.391	959.083
1	41	5	0	810.000	869.156	3928.391	959.083
1	41	6	0	810.000	872.931	3926.972	958.110
1	41	7	0	810.000	874.803	3926.268	957.110

EJE	P.K.	AZIMUT	COS A	SEN A
0	811.000	-77.097440	.352043	-.935984

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	42	1	0	811.000	861.084	3932.496	957.105
1	42	2	0	811.000	862.956	3931.792	958.105
1	42	3	0	811.000	868.074	3929.867	959.078
1	42	4	0	811.000	869.508	3929.327	959.078
1	42	5	0	811.000	869.508	3929.327	959.078
1	42	6	0	811.000	873.283	3927.908	958.105
1	42	7	0	811.000	875.155	3927.204	957.105

EJE	P.K.	AZIMUT	COS A	SEN A
0	812.000	-77.091074	.352136	-.935949

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	43	1	0	812.000	861.437	3933.433	957.100
1	43	2	0	812.000	863.309	3932.728	958.100
1	43	3	0	812.000	868.426	3930.803	959.073
1	43	4	0	812.000	869.860	3930.263	959.073
1	43	5	0	812.000	869.860	3930.263	959.073
1	43	6	0	812.000	873.635	3928.843	958.100
1	43	7	0	812.000	875.507	3928.139	957.100

EJE	P.K.	AZIMUT	COS A	SEN A
0	813.000	-77.084707	.352230	-.935914

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	44	1	0	813.000	861.789	3934.369	957.095
1	44	2	0	813.000	863.661	3933.665	958.095
1	44	3	0	813.000	868.778	3931.739	959.068
1	44	4	0	813.000	870.213	3931.199	959.068
1	44	5	0	813.000	870.213	3931.199	959.068
1	44	6	0	813.000	873.987	3929.779	958.095
1	44	7	0	813.000	875.858	3929.074	957.095

EJE	P.K.	AZIMUT	COS A	SEN A
0	814.000	-77.078341	.352323	-.935878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	45	1	0	814.000	862.142	3935.306	957.090
1	45	2	0	814.000	864.014	3934.601	958.090
1	45	3	0	814.000	869.131	3932.675	959.063
1	45	4	0	814.000	870.565	3932.135	959.063
1	45	5	0	814.000	870.565	3932.135	959.063
1	45	6	0	814.000	874.339	3930.714	958.090
1	45	7	0	814.000	876.211	3930.010	957.090

EJE	P.K.	AZIMUT	COS A	SEN A
0	815.000	-77.071975	.352417	-.935843

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	46	1	0	815.000	862.495	3936.243	957.085
1	46	2	0	815.000	864.366	3935.538	958.085

1	46	3	0	815.000	869.483	3933.611	959.058
1	46	4	0	815.000	870.917	3933.071	959.058
1	46	5	0	815.000	870.917	3933.071	959.058
1	46	6	0	815.000	874.691	3931.650	958.085
1	46	7	0	815.000	876.563	3930.945	957.085

EJE	P.K.	AZIMUT	COS A	SEN A
0	816.000	-77.065609	.352511	-.935808

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	47	1	0	816.000	862.847	3937.179	957.080
1	47	2	0	816.000	864.719	3936.474	958.080
1	47	3	0	816.000	869.836	3934.547	959.053
1	47	4	0	816.000	871.270	3934.007	959.053
1	47	5	0	816.000	871.270	3934.007	959.053
1	47	6	0	816.000	875.043	3932.585	958.080
1	47	7	0	816.000	876.915	3931.880	957.080

EJE	P.K.	AZIMUT	COS A	SEN A
0	817.000	-77.059243	.352604	-.935773

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	48	1	0	817.000	863.200	3938.116	957.075
1	48	2	0	817.000	865.072	3937.411	958.075
1	48	3	0	817.000	870.188	3935.483	959.048
1	48	4	0	817.000	871.622	3934.943	959.048
1	48	5	0	817.000	871.622	3934.943	959.048
1	48	6	0	817.000	875.396	3933.521	958.075
1	48	7	0	817.000	877.267	3932.816	957.075

EJE	P.K.	AZIMUT	COS A	SEN A
0	818.000	-77.052876	.352698	-.935737

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	49	1	0	818.000	863.553	3939.053	957.070
1	49	2	0	818.000	865.425	3938.347	958.070
1	49	3	0	818.000	870.541	3936.419	959.043
1	49	4	0	818.000	871.975	3935.878	959.043
1	49	5	0	818.000	871.975	3935.878	959.043
1	49	6	0	818.000	875.748	3934.456	958.070
1	49	7	0	818.000	877.620	3933.751	957.070

EJE	P.K.	AZIMUT	COS A	SEN A
0	819.000	-77.046510	.352791	-.935702

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	50	1	0	819.000	863.906	3939.989	957.065
1	50	2	0	819.000	865.778	3939.284	958.065
1	50	3	0	819.000	870.894	3937.355	959.038
1	50	4	0	819.000	872.328	3936.814	959.038
1	50	5	0	819.000	872.328	3936.814	959.038
1	50	6	0	819.000	876.101	3935.391	958.065
1	50	7	0	819.000	877.972	3934.686	957.065

EJE	P.K.	AZIMUT	COS A	SEN A
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0 820.000 -77.040144 .352885 -.935667

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	51	1	0	820.000	864.259	3940.926	957.060
1	51	2	0	820.000	866.131	3940.220	958.060
1	51	3	0	820.000	871.247	3938.291	959.033
1	51	4	0	820.000	872.680	3937.750	959.033
1	51	5	0	820.000	872.680	3937.750	959.033
1	51	6	0	820.000	876.454	3936.327	958.060
1	51	7	0	820.000	878.325	3935.621	957.060

EJE P.K. AZIMUT COS A SEN A

0 821.000 -77.033778 .352978 -.935631

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	52	1	0	821.000	864.613	3941.862	957.055
1	52	2	0	821.000	866.484	3941.156	958.055
1	52	3	0	821.000	871.600	3939.226	959.028
1	52	4	0	821.000	873.033	3938.685	959.028
1	52	5	0	821.000	873.033	3938.685	959.028
1	52	6	0	821.000	876.806	3937.262	958.055
1	52	7	0	821.000	878.678	3936.556	957.055

EJE P.K. AZIMUT COS A SEN A

0 822.000 -77.027412 .353072 -.935596

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	53	1	0	822.000	864.966	3942.799	957.050
1	53	2	0	822.000	866.837	3942.093	958.050
1	53	3	0	822.000	871.953	3940.162	959.023
1	53	4	0	822.000	873.386	3939.621	959.023
1	53	5	0	822.000	873.386	3939.621	959.023
1	53	6	0	822.000	877.159	3938.197	958.050
1	53	7	0	822.000	879.030	3937.491	957.050

EJE P.K. AZIMUT COS A SEN A

0 823.000 -77.021045 .353166 -.935561

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	54	1	0	823.000	865.320	3943.735	957.045
1	54	2	0	823.000	867.191	3943.029	958.045
1	54	3	0	823.000	872.306	3941.098	959.018
1	54	4	0	823.000	873.740	3940.557	959.018
1	54	5	0	823.000	873.740	3940.557	959.018
1	54	6	0	823.000	877.512	3939.132	958.045
1	54	7	0	823.000	879.383	3938.426	957.045

EJE P.K. AZIMUT COS A SEN A

0 824.000 -77.014679 .353259 -.935526

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	55	1	0	824.000	865.673	3944.671	957.040
1	55	2	0	824.000	867.544	3943.965	958.040
1	55	3	0	824.000	872.659	3942.033	959.013
1	55	4	0	824.000	874.093	3941.492	959.013
1	55	5	0	824.000	874.093	3941.492	959.013

1	55	6	0	824.000	877.865	3940.068	958.040
1	55	7	0	824.000	879.736	3939.361	957.040

EJE P.K. AZIMUT COS A SEN A

0 825.000 -77.008313 .353353 -.935490

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	56	1	0	825.000	866.027	3945.608	957.035
1	56	2	0	825.000	867.898	3944.901	958.035
1	56	3	0	825.000	873.012	3942.969	959.008
1	56	4	0	825.000	874.446	3942.428	959.008
1	56	5	0	825.000	874.446	3942.428	959.008
1	56	6	0	825.000	878.218	3941.003	958.035
1	56	7	0	825.000	880.089	3940.296	957.035

EJE P.K. AZIMUT COS A SEN A

0 826.000 -77.001947 .353446 -.935455

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	57	1	0	826.000	866.380	3946.544	957.030
1	57	2	0	826.000	868.251	3945.837	958.030
1	57	3	0	826.000	873.366	3943.905	959.003
1	57	4	0	826.000	874.799	3943.363	959.003
1	57	5	0	826.000	874.799	3943.363	959.003
1	57	6	0	826.000	878.572	3941.938	958.030
1	57	7	0	826.000	880.443	3941.231	957.030

EJE P.K. AZIMUT COS A SEN A

0 827.000 -76.995581 .353540 -.935419

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	58	1	0	827.000	866.734	3947.480	957.025
1	58	2	0	827.000	868.605	3946.773	958.025
1	58	3	0	827.000	873.719	3944.840	958.998
1	58	4	0	827.000	875.153	3944.299	958.998
1	58	5	0	827.000	875.153	3944.299	958.998
1	58	6	0	827.000	878.925	3942.873	958.025
1	58	7	0	827.000	880.796	3942.166	957.025

EJE P.K. AZIMUT COS A SEN A

0 828.000 -76.989214 .353633 -.935384

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	59	1	0	828.000	867.088	3948.417	957.020
1	59	2	0	828.000	868.959	3947.709	958.020
1	59	3	0	828.000	874.073	3945.776	958.993
1	59	4	0	828.000	875.507	3945.234	958.993
1	59	5	0	828.000	875.507	3945.234	958.993
1	59	6	0	828.000	879.279	3943.808	958.020
1	59	7	0	828.000	881.149	3943.101	957.020

EJE P.K. AZIMUT COS A SEN A

0 829.000 -76.982848 .353727 -.935349

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
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1	60	1	0	829.000	867.442	3949.353	957.015
1	60	2	0	829.000	869.313	3948.645	958.015
1	60	3	0	829.000	874.427	3946.711	958.988
1	60	4	0	829.000	875.860	3946.169	958.988
1	60	5	0	829.000	875.860	3946.169	958.988
1	60	6	0	829.000	879.632	3944.743	958.015
1	60	7	0	829.000	881.503	3944.035	957.015

EJE	P.K.	AZIMUT	COS A	SEN A
0	830.000	-76.976482	.353820	-.935313

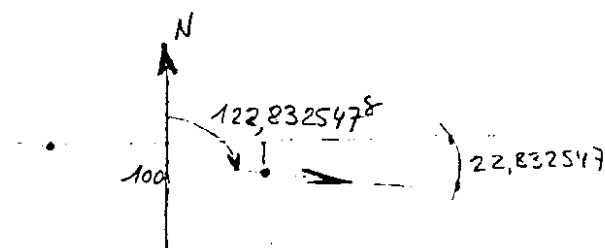
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	61	1	0	830.000	867.796	3950.289	957.010
1	61	2	0	830.000	869.667	3949.581	958.010
1	61	3	0	830.000	874.781	3947.647	958.983
1	61	4	0	830.000	876.214	3947.105	958.983
1	61	5	0	830.000	876.214	3947.105	958.983
1	61	6	0	830.000	879.986	3945.678	958.010
1	61	7	0	830.000	881.856	3944.970	957.010

Definición P.I - 550 + 800

— Eje transversal al ferrocarril. Paso FKUNA

P.K. 100

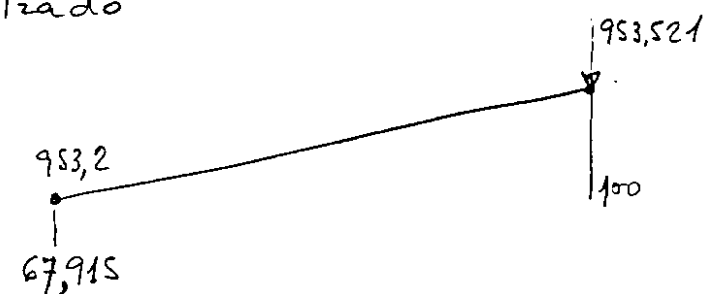
$$\begin{cases} x = 494.865,642 \\ y = 4.503.919,029 \\ Az = 122,832547^\circ \end{cases}$$



$$X_1 = 494.865,642 - 100 \times \cos 22,832547 = 494.772,005$$

$$Y_1 = 4.503.919,029 + 100 \times \sin 22,832547 = 4.503.954,130$$

Alzado



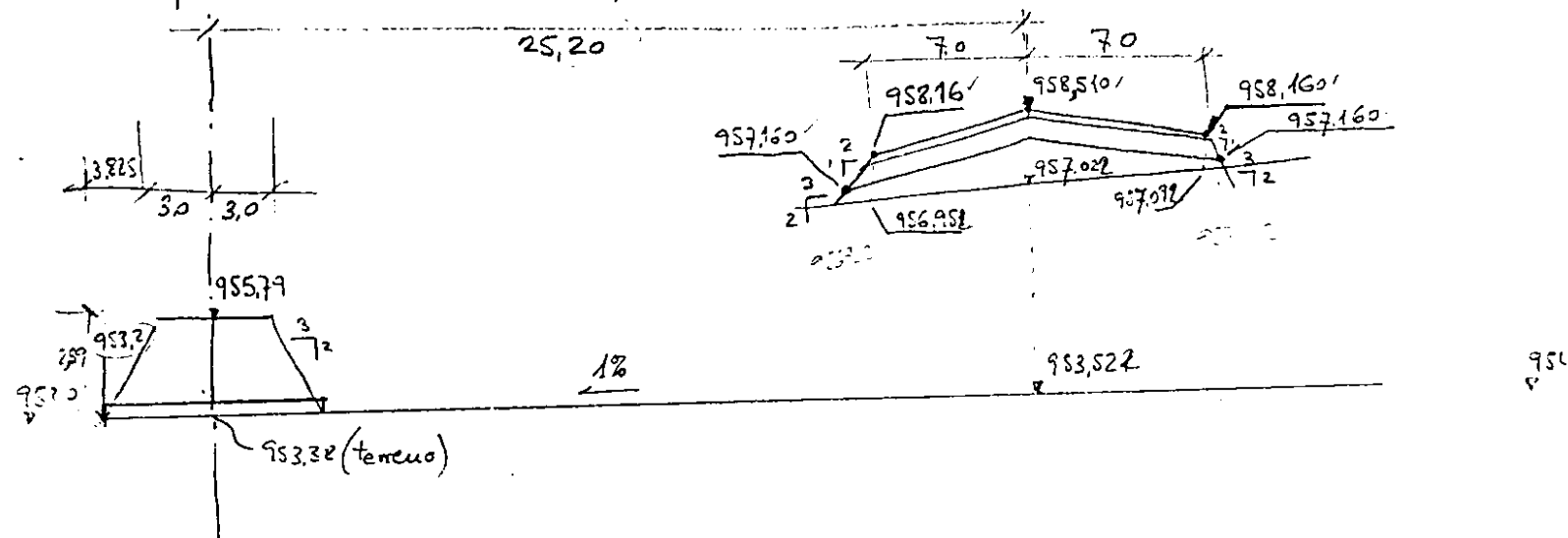
REPLANTEO DEL PORTICO

T.E. 500+800

Cota Ferrocarril $\rightarrow$ 959,133
Cota terreno $\rightarrow$ 953,27

550+800

CAMINO { Cota del camino en PK- 1+801 $\rightarrow$ 955,78 + 1 x 0,01 = 955,790
Cota terreno = 953,38



Fijando la cota de salida de los tubos de drenaje ϕ 0,80 en 953,20 y subiendo con el 1% hacia el F.C.

$$953,2 + (3,885 + 3 + 25,2) \times 0,01 = 953,521 \text{ en eje del F.C.}$$

$$953,2 + (3 + 25,2) \times 0,01 = 953,521$$

Cota superior del pórtico en el eje del F.C.

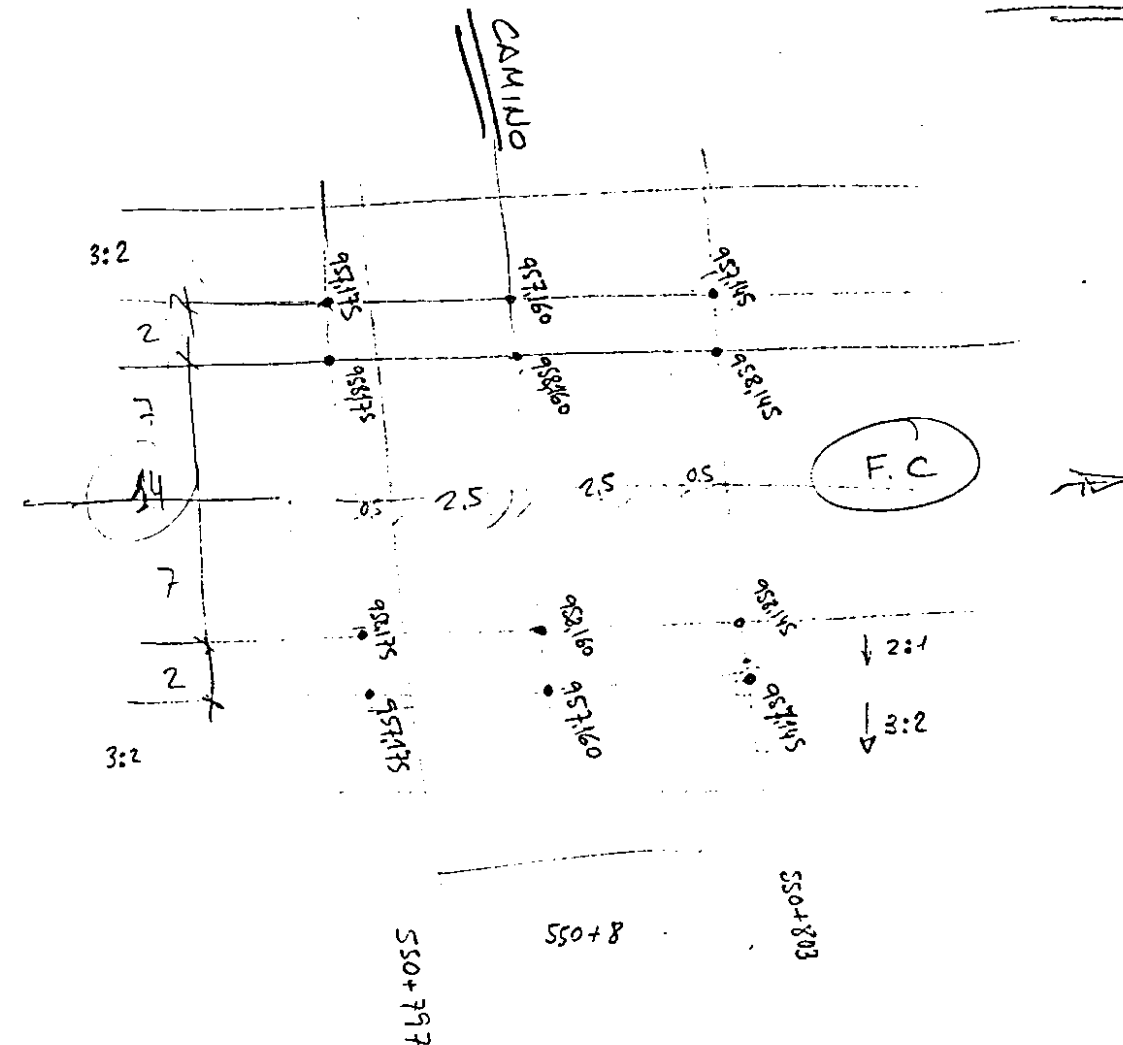
$$953,521 + 3,5 = 957,021$$

Cotas bajo los extremos del terraplén ($\pm 7,0$ m)

$$Z_{izq} = 957,021 - 7 \times 0,01 = 956,951$$

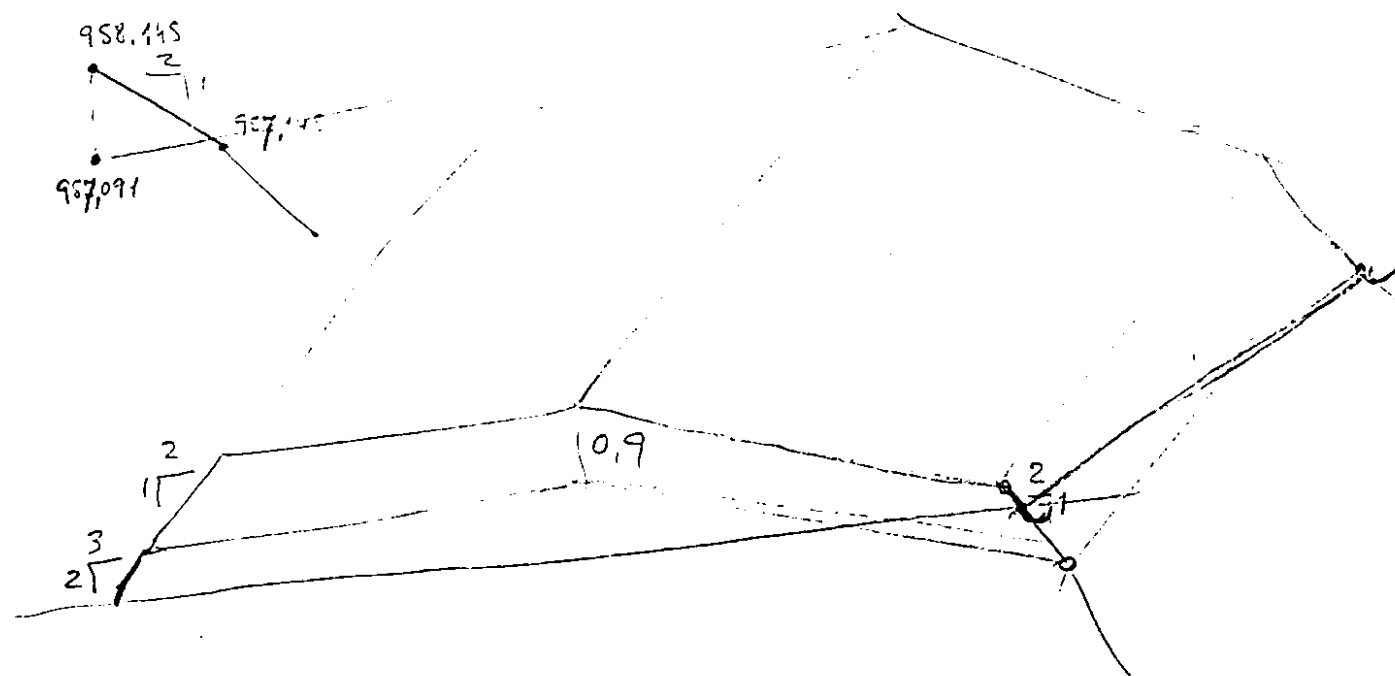
$$Z_{dcha} = 957,021 + 7 \times 0,01 = 957,091$$

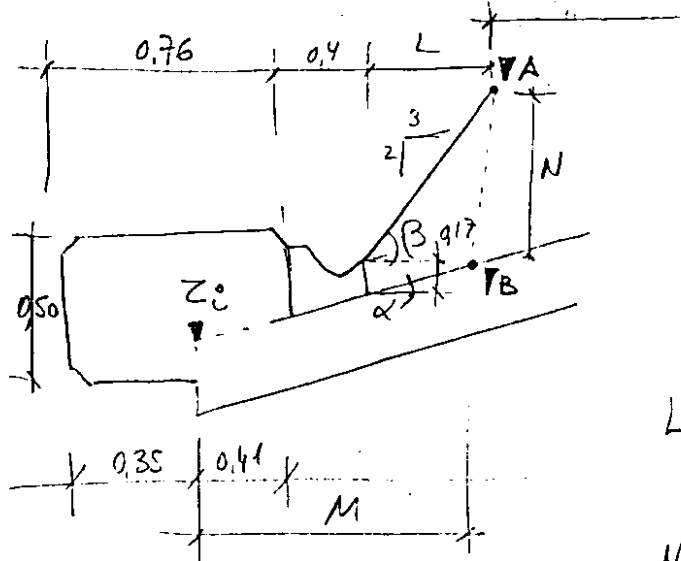
Cota de terraplén en borde extremo de paramentos del pórtico PK 550+797 $\rightarrow$ 957,175



$$\frac{3}{45} \text{ m.m.}$$

$$0,005 \times 6 = 0,03$$





$$B = 957,021 - 9 \times 0,01 = 956,931$$

$$\tan \beta = -\frac{2}{3} = 0,667$$

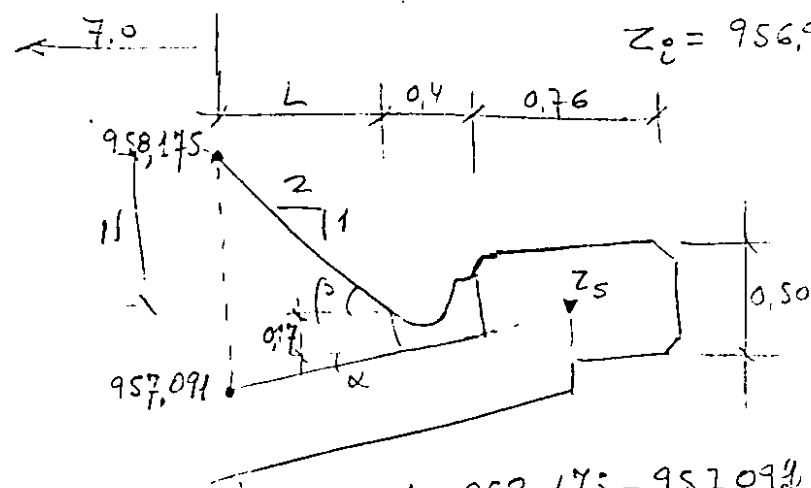
$$\tan \alpha = \frac{1}{100} = 0,01$$

$$N = 957,145 - 956,931 - 0,17 = 0,043$$

$$L = \frac{N}{\tan \beta - \tan \alpha} = \frac{0,043}{0,667 - 0,01} = 0,1115$$

$$M = L + 0,4 = 0,41 = 0,92 \text{ m.}$$

$$Z_c = 956,931 - 0,92 \times 0,01 = 956,922$$



$$\tan \beta = \frac{1}{2} = 0,5$$

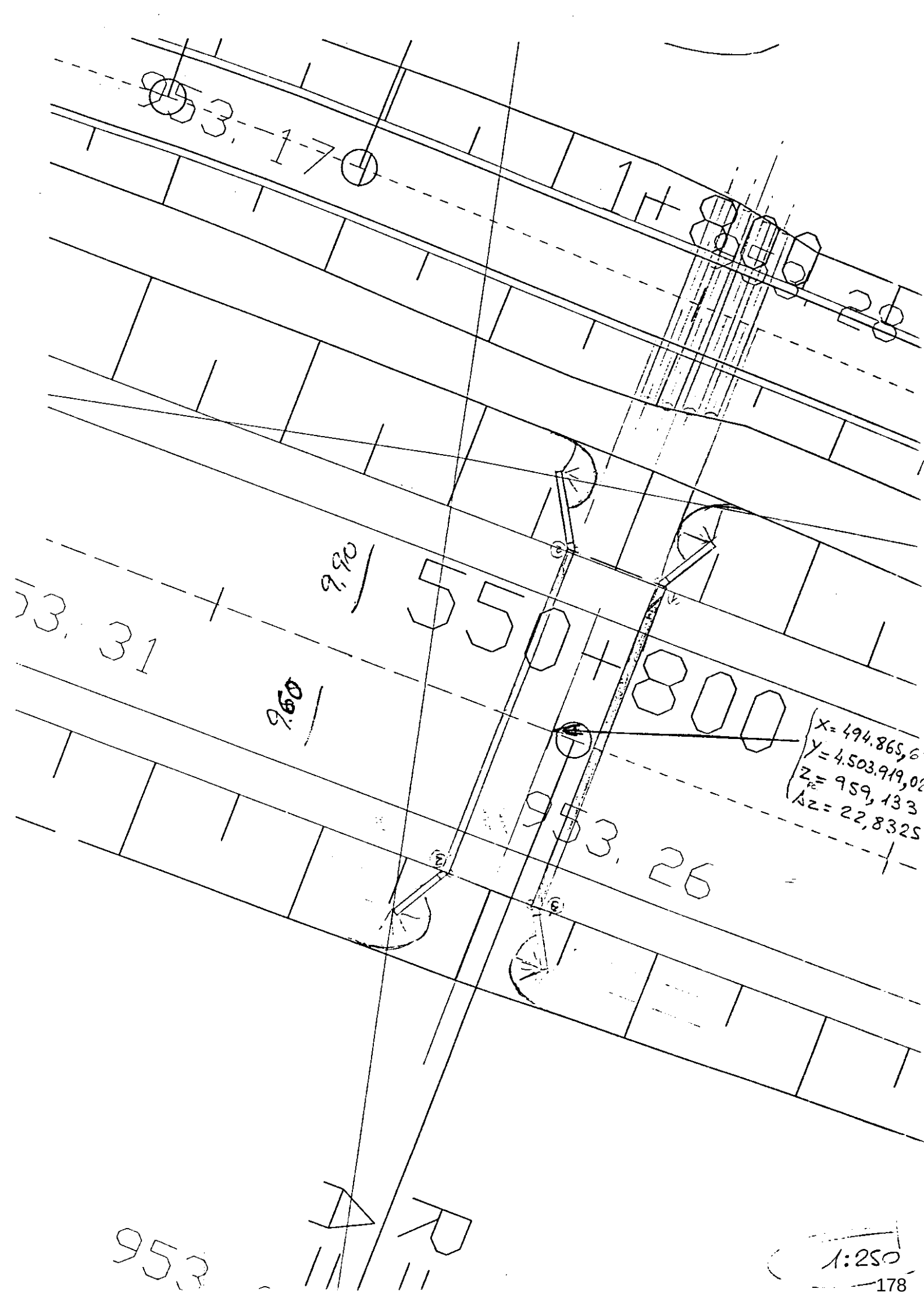
$$\tan \alpha = \frac{1}{100} = 0,01$$

$$N = 958,175 - 957,091 - 0,17 = 0,915$$

$$L = \frac{N}{\tan \beta + \tan \alpha} = \frac{0,915}{0,5 + 0,01} = 1,792$$

$$M = L + 0,4 + 0,11 = 2,602$$

$$Z_s = 957,091 + 2,602 \times 0,01 = 957,117$$



$$x = 494,865,6$$

$$y = 4,503,919,02$$

$$Z_c = 959,133$$

$$\Delta z = 22,8325$$

PI-550+800 PASO FAUNA 1001FERROCARRIL

0. 595.719 3165.949 21.7583 3 700. 959.633 -.005 1

1 461.26 1 550.856

3 801.26 0. 10000. 1843.909

2 2469.552 10000.

2 700. 1.5325 2. 5.46751.5325 0. 2.9675 0. 2.96754.0325 2.

900. 1.5325 2. 5.46751.5325 0. 2.9675 0. 2.96754.0325 2.

2 700. -.5 -.17796.406525 0. 0. -.20994.24129 .5

900. -.5 -.17796.406525 0. 0. -.20994.24129 .5

7 1 0. 2 0. 3 0. 0 0. 8 0. 9 0. 10 0.

PASO FAUNA

0. 772.005 3954.13 122.832547 1 0. 952.521 0.01 1

1 150. 1 150.

2 0. 0.5 2.5 2.5 0.5

150. 0.5 2.5 2.5 0.5

2 0.

150.

5 1 0. 2 0. 3 0. 9 0. 10 0.

1 40 3

1 3 85. 1. 115. 53 13 23 33 43 5

0

0

0

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/R

TITULO DEL TRABAJO PI-550+800 PASO FAUNA

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
4	0	3	3	800.000	99.999	865.641	3919.029	959.133	953.521
				AZ.E	AZ.3				
				22.832544	122.832547				

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	85.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	3	85.000	852.650	3927.103	953.371
1	1	2	3	85.000	852.474	3926.635	953.371
1	1	3	3	85.000	851.596	3924.294	953.371
1	1	4	3	85.000	850.719	3921.953	953.371
1	1	5	3	85.000	850.543	3921.485	953.371

EJE	P.K.	AZIMUT	COS A	SEN A
3	86.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	3	86.000	853.586	3926.752	953.381
1	2	2	3	86.000	853.410	3926.284	953.381
1	2	3	3	86.000	852.533	3923.943	953.381
1	2	4	3	86.000	851.655	3921.602	953.381
1	2	5	3	86.000	851.480	3921.134	953.381

JE	P.K.	AZIMUT	COS A	SEN A
3	87.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	3	87.000	854.522	3926.401	953.391
1	3	2	3	87.000	854.347	3925.933	953.391
1	3	3	3	87.000	853.469	3923.592	953.391
1	3	4	3	87.000	852.592	3921.251	953.391
1	3	5	3	87.000	852.416	3920.783	953.391

EJE	P.K.	AZIMUT	COS A	SEN A
3	88.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	3	88.000	855.459	3926.050	953.401
1	4	2	3	88.000	855.283	3925.582	953.401
1	4	3	3	88.000	854.406	3923.241	953.401

1	4	4	3	88.000	853.528	3920.900	953.401
1	4	5	3	88.000	853.353	3920.432	953.401

EJE	P.K.	AZIMUT	COS A	SEN A
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3	89.000	22.832547	.936371	.351013
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	5	1	3	89.000	856.395	3925.699	953.411
1	5	2	3	89.000	856.220	3925.231	953.411
1	5	3	3	89.000	855.342	3922.890	953.411
1	5	4	3	89.000	854.464	3920.549	953.411
1	5	5	3	89.000	854.289	3920.081	953.411

EJE	P.K.	AZIMUT	COS A	SEN A
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3	90.000	22.832547	.936371	.351013
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	6	1	3	90.000	857.331	3925.348	953.421
1	6	2	3	90.000	857.156	3924.880	953.421
1	6	3	3	90.000	856.278	3922.539	953.421
1	6	4	3	90.000	855.401	3920.198	953.421
1	6	5	3	90.000	855.225	3919.730	953.421

EJE	P.K.	AZIMUT	COS A	SEN A
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3	91.000	22.832547	.936371	.351013
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	7	1	3	91.000	858.268	3924.997	953.431
1	7	2	3	91.000	858.092	3924.529	953.431
1	7	3	3	91.000	857.215	3922.188	953.431
1	7	4	3	91.000	856.337	3919.847	953.431
1	7	5	3	91.000	856.162	3919.379	953.431

EJE	P.K.	AZIMUT	COS A	SEN A
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3	92.000	22.832547	.936371	.351013
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	8	1	3	92.000	859.204	3924.646	953.441
1	8	2	3	92.000	859.029	3924.178	953.441
1	8	3	3	92.000	858.151	3921.837	953.441
1	8	4	3	92.000	857.274	3919.496	953.441
1	8	5	3	92.000	857.098	3919.028	953.441

EJE	P.K.	AZIMUT	COS A	SEN A
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3	93.000	22.832547	.936371	.351013
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	9	1	3	93.000	860.141	3924.295	953.451
1	9	2	3	93.000	859.965	3923.827	953.451
1	9	3	3	93.000	859.087	3921.486	953.451
1	9	4	3	93.000	858.210	3919.145	953.451
1	9	5	3	93.000	858.034	3918.677	953.451

EJE	P.K.	AZIMUT	COS A	SEN A
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3	94.000	22.832547	.936371	.351013
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	10	1	3	94.000	861.077	3923.944	953.461
1	10	2	3	94.000	860.901	3923.476	953.461
1	10	3	3	94.000	860.024	3921.135	953.461
1	10	4	3	94.000	859.146	3918.794	953.461
1	10	5	3	94.000	858.971	3918.326	953.461

EJE	P.K.	AZIMUT	COS A	SEN A
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3	95.000	22.832547	.936371	.351013
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	11	1	3	95.000	862.013	3923.593	953.471
1	11	2	3	95.000	861.838	3923.125	953.471
1	11	3	3	95.000	860.960	3920.784	953.471
1	11	4	3	95.000	860.083	3918.443	953.471
1	11	5	3	95.000	859.907	3917.975	953.471

EJE	P.K.	AZIMUT	COS A	SEN A
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3	96.000	22.832547	.936371	.351013
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	12	1	3	96.000	862.950	3923.242	953.481
1	12	2	3	96.000	862.774	3922.774	953.481
1	12	3	3	96.000	861.897	3920.433	953.481
1	12	4	3	96.000	861.019	3918.092	953.481
1	12	5	3	96.000	860.844	3917.624	953.481

EJE	P.K.	AZIMUT	COS A	SEN A
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3	97.000	22.832547	.936371	.351013
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	13	1	3	97.000	863.886	3922.891	953.491
1	13	2	3	97.000	863.710	3922.423	953.491
1	13	3	3	97.000	862.833	3920.082	953.491
1	13	4	3	97.000	861.955	3917.741	953.491
1	13	5	3	97.000	861.780	3917.273	953.491

EJE	P.K.	AZIMUT	COS A	SEN A
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3	98.000	22.832547	.936371	.351013
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	14	1	3	98.000	864.822	3922.540	953.501
1	14	2	3	98.000	864.647	3922.072	953.501
1	14	3	3	98.000	863.769	3919.731	953.501
1	14	4	3	98.000	862.892	3917.390	953.501
1	14	5	3	98.000	862.716	3916.922	953.501

EJE	P.K.	AZIMUT	COS A	SEN A
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3	99.000	22.832547	.936371	.351013
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	3	99.000	865.759	3922.189	953.511
1	15	2	3	99.000	865.583	3921.721	953.511

EJE	P.K.	AZIMUT	COS A	SEN A
1	15	3	3	99.000 864.706 3919.380 953.511
1	15	4	3	99.000 863.828 3917.039 953.511
1	15	5	3	99.000 863.653 3916.571 953.511
3	100.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	3	100.000	866.695	3921.838	953.521
1	16	2	3	100.000	866.520	3921.370	953.521
1	16	3	3	100.000	865.642	3919.029	953.521
1	16	4	3	100.000	864.765	3916.688	953.521
1	16	5	3	100.000	864.589	3916.220	953.521

EJE	P.K.	AZIMUT	COS A	SEN A
3	101.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	3	101.000	867.631	3921.487	953.531
1	17	2	3	101.000	867.456	3921.019	953.531
1	17	3	3	101.000	866.578	3918.678	953.531
1	17	4	3	101.000	865.701	3916.337	953.531
1	17	5	3	101.000	865.525	3915.869	953.531

EJE	P.K.	AZIMUT	COS A	SEN A
3	102.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	3	102.000	868.568	3921.136	953.541
1	18	2	3	102.000	868.392	3920.668	953.541
1	18	3	3	102.000	867.515	3918.327	953.541
1	18	4	3	102.000	866.637	3915.986	953.541
1	18	5	3	102.000	866.462	3915.518	953.541

EJE	P.K.	AZIMUT	COS A	SEN A
3	103.000	22.832547	.936371	.351013

PO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	3	103.000	869.504	3920.785	953.551
1	19	2	3	103.000	869.329	3920.317	953.551
1	19	3	3	103.000	868.451	3917.976	953.551
1	19	4	3	103.000	867.574	3915.635	953.551
1	19	5	3	103.000	867.398	3915.167	953.551

EJE	P.K.	AZIMUT	COS A	SEN A
3	104.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	3	104.000	870.441	3920.434	953.561
1	20	2	3	104.000	870.265	3919.966	953.561
1	20	3	3	104.000	869.388	3917.625	953.561
1	20	4	3	104.000	868.510	3915.284	953.561
1	20	5	3	104.000	868.334	3914.816	953.561

EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
3	105.000	22.832547	.936371	.351013			

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	3	105.000	871.377	3920.083	953.571
1	21	2	3	105.000	871.201	3919.615	953.571
1	21	3	3	105.000	870.324	3917.274	953.571
1	21	4	3	105.000	869.446	3914.933	953.571
1	21	5	3	105.000	869.271	3914.465	953.571

EJE	P.K.	AZIMUT	COS A	SEN A
3	106.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	3	106.000	872.313	3919.732	953.581
1	22	2	3	106.000	872.138	3919.264	953.581
1	22	3	3	106.000	871.260	3916.923	953.581
1	22	4	3	106.000	870.383	3914.582	953.581
1	22	5	3	106.000	870.207	3914.114	953.581

EJE	P.K.	AZIMUT	COS A	SEN A
3	107.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	3	107.000	873.250	3919.381	953.591
1	23	2	3	107.000	873.074	3918.913	953.591
1	23	3	3	107.000	872.197	3916.572	953.591
1	23	4	3	107.000	871.319	3914.231	953.591
1	23	5	3	107.000	871.144	3913.762	953.591

EJE	P.K.	AZIMUT	COS A	SEN A
3	108.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	24	1	3	108.000	874.186	3919.030	953.601
1	24	2	3	108.000	874.011	3918.562	953.601
1	24	3	3	108.000	873.133	3916.221	953.601
1	24	4	3	108.000	872.255	3913.880	953.601
1	24	5	3	108.000	872.080	3913.411	953.601

EJE	P.K.	AZIMUT	COS A	SEN A
3	109.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	25	1	3	109.000	875.122	3918.679	953.611
1	25	2	3	109.000	874.947	3918.211	953.611
1	25	3	3	109.000	874.069	3915.870	953.611
1	25	4	3	109.000	873.192	3913.529	953.611
1	25	5	3	109.000	873.016	3913.060	953.611

EJE	P.K.	AZIMUT	COS A	SEN A
3	110.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	26	1	3	110.000	876.059	3918.328	953.621

1	26	2	3	110.000	875.883	3917.859	953.621
1	26	3	3	110.000	875.006	3915.519	953.621
1	26	4	3	110.000	874.128	3913.178	953.621
1	26	5	3	110.000	873.953	3912.709	953.621

EJE	P.K.	AZIMUT	COS A	SEN A
3	111.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	27	1	3	111.000	876.995	3917.977	953.631
1	27	2	3	111.000	876.820	3917.508	953.631
1	27	3	3	111.000	875.942	3915.168	953.631
1	27	4	3	111.000	875.065	3912.827	953.631
1	27	5	3	111.000	874.889	3912.358	953.631

EJE	P.K.	AZIMUT	COS A	SEN A
3	112.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	28	1	3	112.000	877.932	3917.626	953.641
1	28	2	3	112.000	877.756	3917.157	953.641
1	28	3	3	112.000	876.879	3914.817	953.641
1	28	4	3	112.000	876.001	3912.476	953.641
1	28	5	3	112.000	875.825	3912.007	953.641

EJE	P.K.	AZIMUT	COS A	SEN A
3	113.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	29	1	3	113.000	878.868	3917.275	953.651
1	29	2	3	113.000	878.692	3916.806	953.651
1	29	3	3	113.000	877.815	3914.466	953.651
1	29	4	3	113.000	876.937	3912.125	953.651
1	29	5	3	113.000	876.762	3911.656	953.651

EJE	P.K.	AZIMUT	COS A	SEN A
3	114.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	30	1	3	114.000	879.804	3916.924	953.661
1	30	2	3	114.000	879.629	3916.455	953.661
1	30	3	3	114.000	878.751	3914.115	953.661
1	30	4	3	114.000	877.874	3911.774	953.661
1	30	5	3	114.000	877.698	3911.305	953.661

EJE	P.K.	AZIMUT	COS A	SEN A
3	115.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	31	1	3	115.000	880.741	3916.573	953.671
1	31	2	3	115.000	880.565	3916.104	953.671
1	31	3	3	115.000	879.688	3913.763	953.671
1	31	4	3	115.000	878.810	3911.423	953.671
1	31	5	3	115.000	878.635	3910.954	953.671

SEGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	90.123	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	3	90.123	857.447	3925.305	953.422
1	1	2	3	90.123	857.271	3924.837	953.422
1	1	3	3	90.123	856.394	3922.496	953.422
1	1	4	3	90.123	855.516	3920.155	953.422
1	1	5	3	90.123	855.340	3919.687	953.422

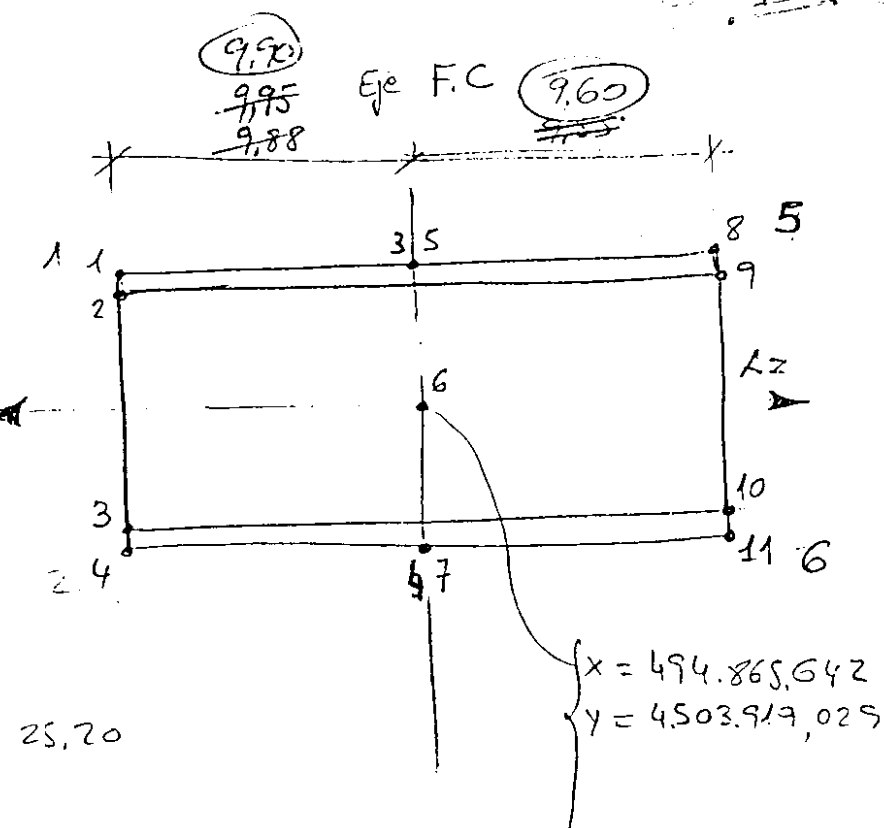
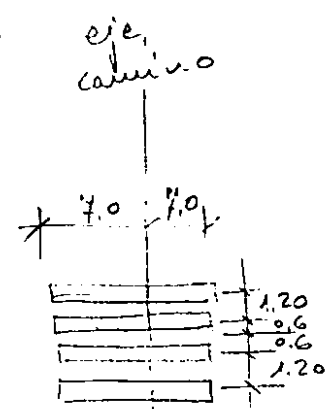
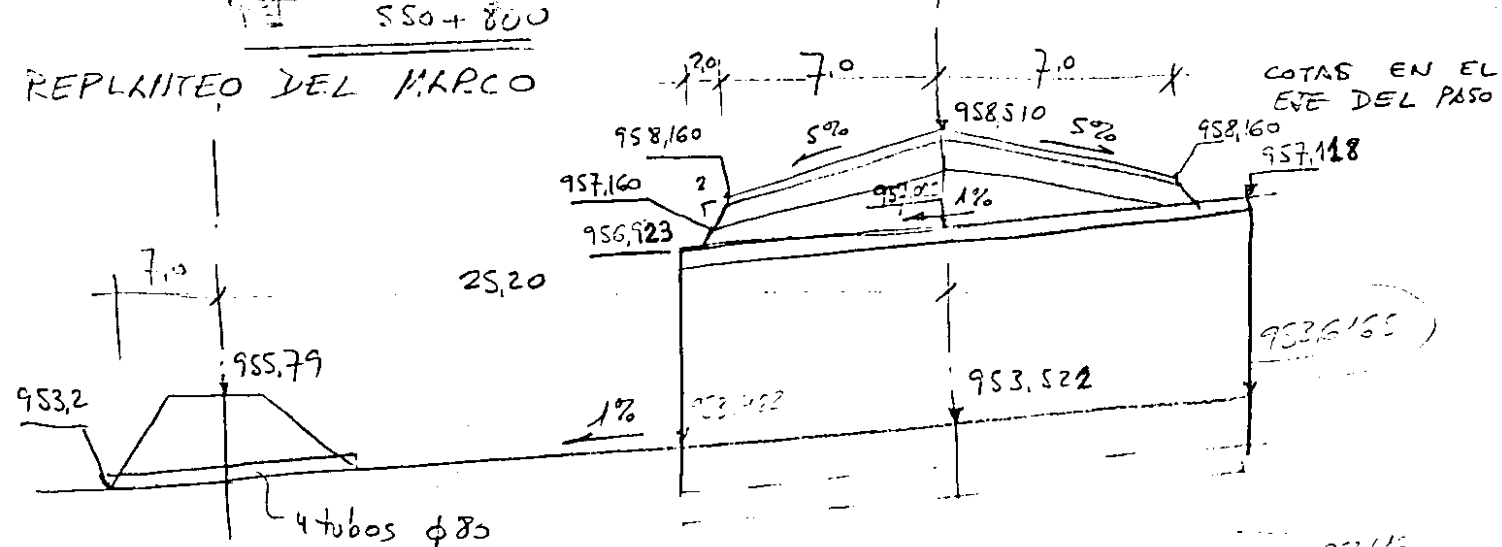
EJE	P.K.	AZIMUT	COS A	SEN A
3	100.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	3	100.000	866.695	3921.838	953.521
1	2	2	3	100.000	866.520	3921.370	953.521
1	2	3	3	100.000	865.642	3919.029	953.521
1	2	4	3	100.000	864.765	3916.688	953.521
1	2	5	3	100.000	864.589	3916.220	953.521

EJE	P.K.	AZIMUT	COS A	SEN A
3	109.543	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	3	109.543	875.631	3918.488	953.616
1	3	2	3	109.543	875.455	3918.020	953.616
1	3	3	3	109.543	874.578	3915.679	953.616
1	3	4	3	109.543	873.700	3913.338	953.616
1	3	5	3	109.543	873.525	3912.870	953.616

REPLANTEO DEL MARCO



TITULO DEL TRABAJO PI-550+800 PASO FAUNA

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
4	0	3	3	800.000	99.999	865.641	3919.029	959.133	953.521
				AZ.E	AZ.3				
				22.832544	122.832547				

SEGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	90.100	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	1	3	90.100	857.425	3925.313	953.422 - 1
1	1	2	3	90.100	857.250	3924.845	953.422 - 2
1	1	3	3	90.100	856.372	3922.504	953.422
1	1	4	3	90.100	855.494	3920.163	953.422 - 3
1	1	5	3	90.100	855.319	3919.695	953.422 - 4

EJE	P.K.	AZIMUT	COS A	SEN A
3	100.000	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	2	1	3	100.000	866.695	3921.838	953.521 - 5
1	2	2	3	100.000	866.520	3921.370	953.521
1	2	3	3	100.000	865.642	3919.029	953.521 - 6
1	2	4	3	100.000	864.765	3916.688	953.521
1	2	5	3	100.000	864.589	3916.220	953.521 - 7

EJE	P.K.	AZIMUT	COS A	SEN A
3	109.600	22.832547	.936371	.351013

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	3	1	3	109.600	875.684	3918.468	953.617 - 8
1	3	2	3	109.600	875.509	3918.000	953.617 - 9
1	3	3	3	109.600	874.631	3915.659	953.617
1	3	4	3	109.600	873.754	3913.318	953.617 - 10
1	3	5	3	109.600	873.578	3912.850	953.617 - 11

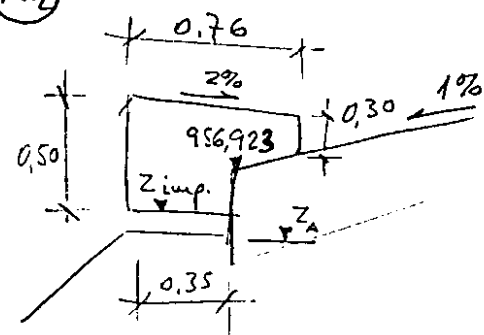
PI-550+800 PASO FAUNA										1001FERROCARRIL									
0.	595.719	3165.949	21.7583	3	700.	959.633	-.005		1										
1	461.26					1	550.856												
3	801.26	0.	10000.	1843.909															
2	2469.552	10000.																	
2	700.	1.5325	2.	5.4675	1.5325	0.	2.9675	0.	2.9675	4.0325	2.								
	900.	1.5325	2.	5.4675	1.5325	0.	2.9675	0.	2.9675	4.0325	2.								
2	700.	-.5	-.17796	.406525	0.	0.	-.20994	.24129	.5										
	900.	-.5	-.17796	.406525	0.	0.	-.20994	.24129	.5										
7	1	0.	2	0.	3	0.	0	0.	8	0.	9	0.	10	0.					
										PASO FAUNA									
0.	772.005	3954.13	122.8325	47	1	0.	952.521	0.01											1
1	150.					1	150.												
2	0.	0.5	2.5						2.5	0.5									
	150.	0.5	2.5						2.5	0.5									
2	0.																		
	150.																		
5	1	0.	2	0.	3	0.	9	0.	10	0.									
	1	40	3																
0																			
1	3	3	90.1	100.	109.6		53	13	23	33	43	5							
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REPLANTEO DE LAS ALETAS

PI 550+800

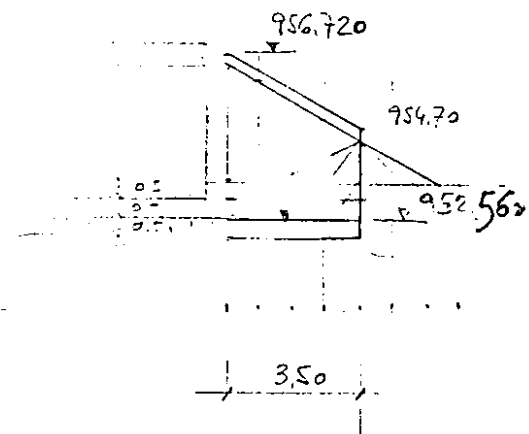
DEFINICION DE ALETAS

A₁ y A₂

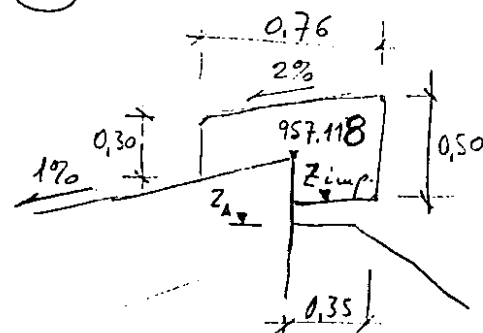


$$Z_{imp} = 956.923 + 0.41 \times 0.01 + 0.3 + 0.76 \times 0.02 - 0.5 = 956.742$$

$$Z_A = 956.742 - 0.022 = 956.720$$

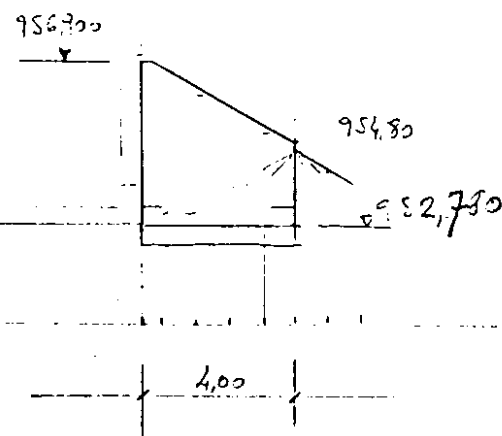


A₃ y A₄



$$Z_{imp} = 957.118 - 0.41 \times 0.01 + 0.3 + 0.76 \times 0.02 - 0.5 = 956.929$$

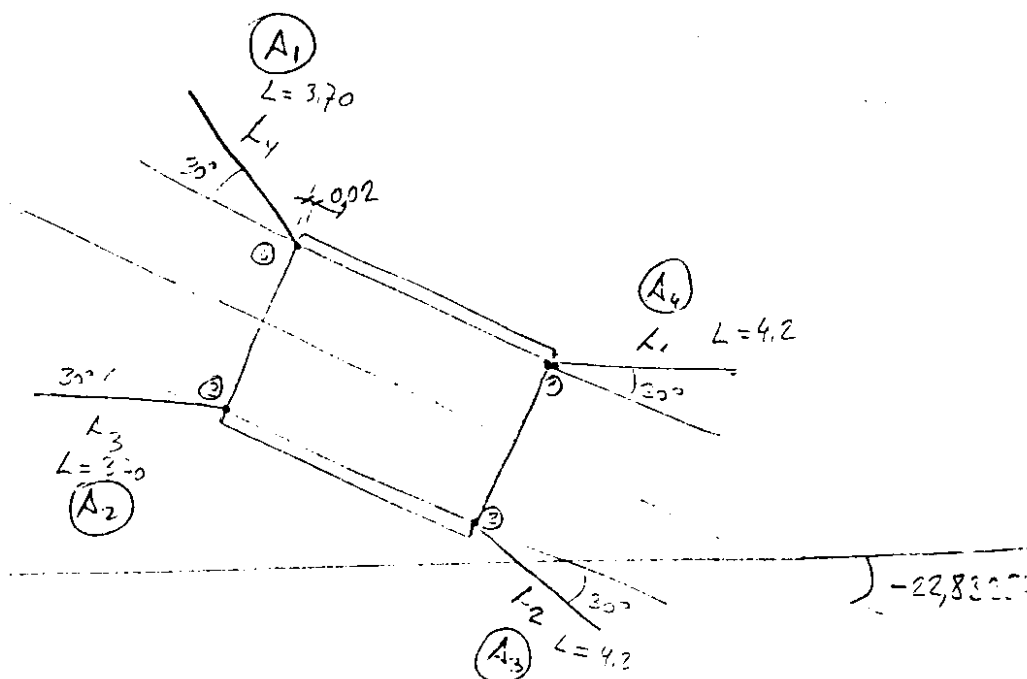
$$Z_A = 956.929 - 0.029 = 956.90$$



PI 550+800

REPLANTEO DE ALETAS

Taludes 2:2
α = 30°



ALETA 1	ALETA 2	ALETA 3	ALETA 4
194.875,509	194.873,754	496.855,494	494.857,250
4.503.918,000	4.503.913,315	4.503.920,163	4.503.924,845
30	30	30	30
4.2	4.2	3.7	3.7
0.1513	0.1513	0.1453	0.1453
0.0813	0.0813	0.078	0.078
0.4	0.4	0.3	0.3
2.45	2.45	2.45	2.45
2.45	2.45	2.45	2.45
0.3	0.3	0.3	0.3

TITULO :REPLANTEO ALETAS P.I. 550+800. PASO DE FAUNA

ANGULO DEL EJE OX CON EL EJE DEL PORTICO. BETA = -22.832547000 g
ANCHO DE LA JUNTA ENTRE LOS HASTIALES DEL
PORTICO Y LAS ALETAS = .020000 m

ALETA NUMERO = 4 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 494875.509000
YA = 4503918.000000
INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 4.200000 m
ESPESOR DEL TALUD. ZONA INICIAL = .151333 m
ZONA FINAL = .081333 m
ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 2.450 m
ANCHO DEL 2' TACON TRASERO = 2.450 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 494879.683
YI = 4503918.473
PUNTO C : XC = 494879.651
YC = 4503918.689
PUNTO D : XD = 494879.639
YD = 4503918.770
PUNTO E : XE = 494879.580
YE = 4503919.165
PUNTO G : XG = 494879.278
YG = 4503921.193
PUNTO K : XK = 494879.278
YK = 4503921.193
PUNTO J : XJ = 494875.473
YJ = 4503917.846
PUNTO AP: XAP = 494875.532
YAP = 4503918.004
PUNTO B : XB = 494875.570
YB = 4503918.164

PUNTO BP: XBP = 494875.593
YBP = 4503918.167

PUNTO F : XF = 494875.754
YF = 4503918.595

PUNTO H : XH = 494876.576
YH = 4503920.791

PUNTO P : XP = 494876.576
YP = 4503920.791

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I y J = 4.257 m Z_1
C y A = 4.199 m
C y AP = 4.176 m
D y BP = 4.090 m D
E y F = 3.868 m C
G y H = 2.731 m
K y P = 2.731 m Z_2, Z_3
 $Z_A = 956,900$ $B = 3,700$
 $Z_B = 954,800$ $A = 0,168$
 $Z_C = 952,360$ $Z_2 = 2,731$
 $H_1 = 4,540$ $Z_3 = \text{---}$
 $H_2 = 2,440$ $E = 2,05$
 $F = \text{---}$
 $Z = 2,75$

ALETA NUMERO = 3 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 494873.754000
YA = 4503913.318000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 4.200000 m
ESPESOR DEL TALUD. ZONA INICIAL = .151333 m
ZONA FINAL = .081333 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 2.450 m
ANCHO DEL 2' TACON TRASERO = 2.450 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 494876.588
YI = 4503910.218

PUNTO C : XC = 494876.422
YC = 4503910.076

PUNTO D : XD = 494876.360
YD = 4503910.023

PUNTO E : XE = 494876.055

YE =4503909.764 } (P₁)

PUNTO G : XG = 494874.495
YG =4503908.434

PUNTO K : XK = 494874.495
YK =4503908.434

PUNTO J : XJ = 494873.828
YJ =4503913.458

PUNTO AP: XAP = 494873.769
YAP =4503913.300

PUNTO B : XB = 494873.693
YB =4503913.154

PUNTO BP: XBP = 494873.707
YBP =4503913.137

PUNTO F : XF = 494873.547 (P₂)
YF =4503912.709

PUNTO H : XH = 494872.724
YH =4503910.513

PUNTO P : XP = 494872.724
YP =4503910.513

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS		I y J = 4.257 m Z ₁
Z _A = 956.900	B = 3.700	C y A = 4.199 m
Z _B = 954.800	A = 0.168	C y AP = 4.176 m
Z _C = 952.360	Z ₂ = 2.731	D y BP = 4.090 m D
H ₁ = 4.540	Z ₃ = —	E y F = 3.868 m C
H ₂ = 2.440	E = 2.05	G y H = 2.731 m
	F = —	K y P = 2.731 m Z ₂ , Z ₃
	Z = 2.75	

ALETA NUMERO = 2 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 494855.494000
YA = 4503920.163000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 3.700000 m
ESPESOR DEL TALUD. ZONA INICIAL = .145330 m
ZONA FINAL = .078000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 2.450 m

ANCHO DEL 2' TACON TRASERO = 2.450 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 494851.813
YI =4503919.775

PUNTO C : XC = 494851.846
YC =4503919.556

PUNTO D : XD = 494851.857
YD =4503919.479

PUNTO E : XE = 494851.915 (P₁)
YE =4503919.083

PUNTO G : XG = 494852.214
YG =4503917.055

PUNTO K : XK = 494852.214
YK =4503917.055

PUNTO J : XJ = 494855.533
YJ =4503920.324

PUNTO AP: XAP = 494855.471
YAP =4503920.159

PUNTO B : XB = 494855.435
YB =4503920.006

PUNTO BP: XBP = 494855.412
YBP =4503920.003

PUNTO F : XF = 494855.252 (P₂)
YF =4503919.575

PUNTO H : XH = 494854.430
YH =4503917.381

PUNTO P : XP = 494854.430
YP =4503917.381

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS		I y J = 3.760 m Z ₁
Z _A = 956.720	B = 3.200	C y A = 3.699 m
Z _B = 954.700	A = 0.173	C y AP = 3.675 m
Z _C = 952.360	Z ₂ = 2.240	D y BP = 3.594 m D
H ₁ = 4.360	Z ₃ = —	E y F = 3.373 m C
H ₂ = 2.340	E = 2.05	G y H = 2.240 m
	F = —	K y P = 2.240 m Z ₂ , Z ₃
	Z = 2.75	

PUNTO P : XP = 494858.277
YP = 4503927.641

ALETA NUMERO = 1 DATOS DE ENTRADA Y SALIDA
=====

COORDENADAS DEL PUNTO A : XA = 494857.250000
YA = 4503924.845000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 3.700000 m
ESPESOR DEL TALUD. ZONA INICIAL = .145330 m
ZONA FINAL = .078000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 2.450 m
ANCHO DEL 2' TACON TRASERO = 2.450 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA
=====

PUNTO I : XI = 494854.731
YI = 4503927.557

PUNTO C : XC = 494854.900
YC = 4503927.701

PUNTO D : XD = 494854.959
YD = 4503927.752

PUNTO E : XE = 494855.263
YE = 4503928.011

PUNTO G : XG = 494856.822
YG = 4503929.343

PUNTO K : XK = 494856.822
YK = 4503929.343

PUNTO J : XJ = 494857.174
YJ = 4503924.699

PUNTO AP: XAP = 494857.235
YAP = 4503924.863

PUNTO B : XB = 494857.309
YB = 4503925.002

PUNTO BP: XBP = 494857.294
YBP = 4503925.020

PUNTO F : XF = 494857.454
YF = 4503925.447

PUNTO H : XH = 494858.277
YH = 4503927.641

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA
=====

DISTANCIA ENTRE LOS PUNTOS I y J = 3.760 m Z_1
C y A = 3.699 m
C y AP = 3.675 m
D y BP = 3.594 m D
E y F = 3.373 m C
G y H = 2.240 m
K y P = 2.240 m Z_2, Z_3

$Z_A = 956.720$ $B = 3.200$
 $Z_B = 954.700$ $A = 0.173$
 $Z_C = 952.360$ $Z_2 = 2.240$
 $H_1 = 4.360$ $Z_3 = \text{---}$
 $H_2 = 2.340$ $E = 2.05$
 $F = \text{---}$
 $Z = 2.75$

REPLANTEO ALETAS P.I. 550+800. PASO DE FAUNA

-22.832547

.02

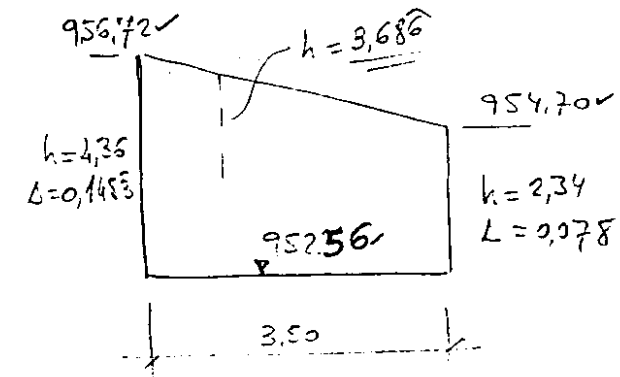
494875.509	494873.754	494855.494	494857.25
4503918.	4503913.318	4503920.163	4503924.845
30.	30.	30.	30.
4.2	4.2	3.7	3.7
.151333	.151333	.14533	.14533
.081333	.081333	.078	.078
.4	.4	.4	.4
2.45	2.45	2.45	2.45
2.45	2.45	2.45	2.45
.3	.3	.3	.3

PI 550+800

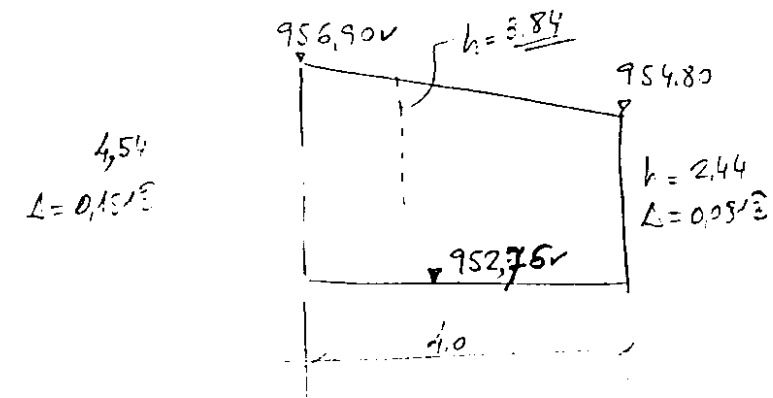
11T-2 — 0.45

ALETAS (A₁) y (A₂)

Talud 3:2 30°
P₁ = 0.233
β = 18.43495



ALETAS (A₃) y (A₄)



4.4.4 Paso inferior de fauna PK 553+85

4.4.4 PASO INFERIOR DE FAUNA PK 553+85

ÍNDICE

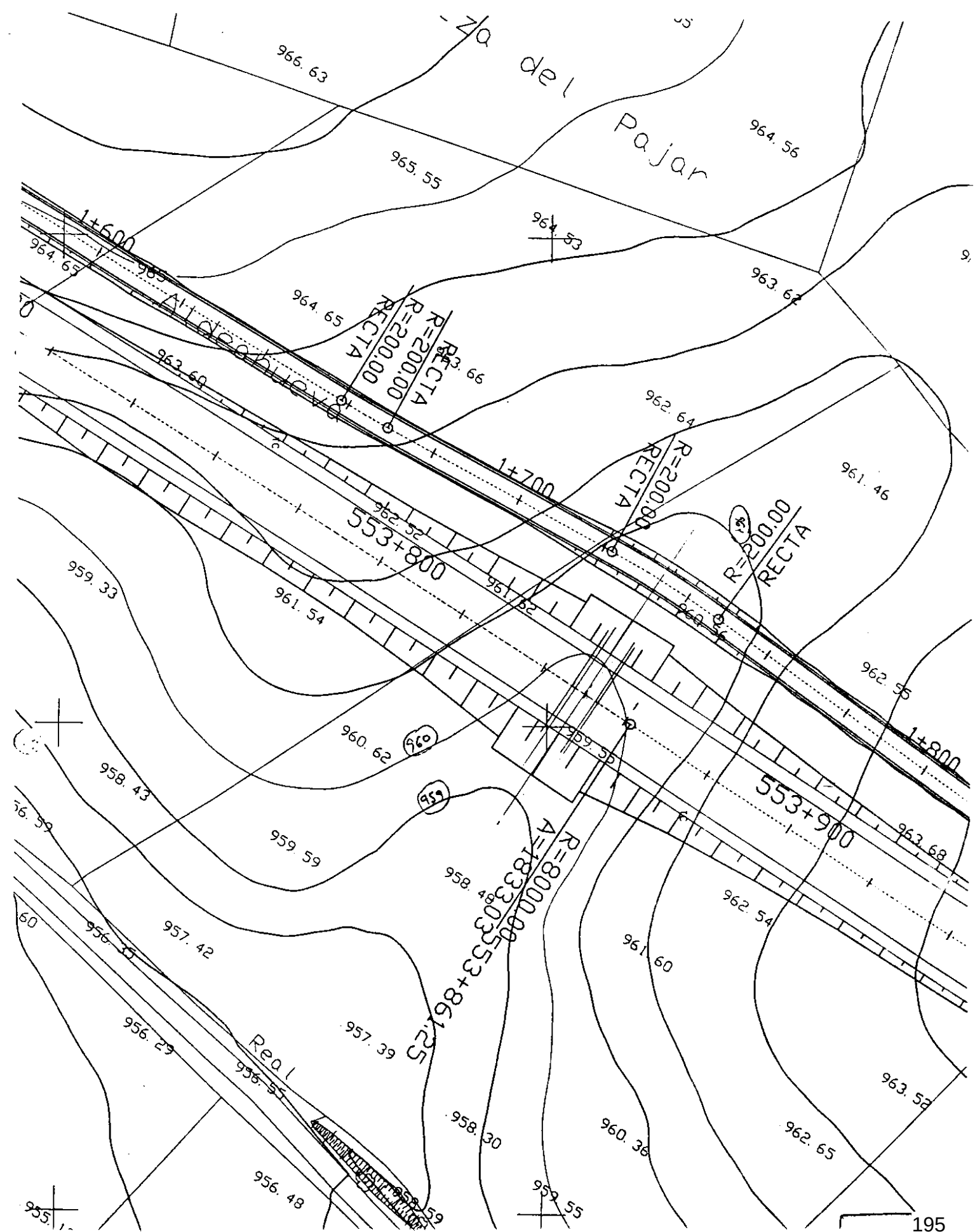
- DEFINICIÓN GEOMÉTRICA
 - DATOS GENERALES DEL TRAZADO
 - REPLANTEO DE LOS BORDES DEL FFCC
 - REPLANTEO DEL PÓRTICO
 - REPLANTEO DE LAS ALETAS

DEFINICION GEOMETRICA P.F. 553+85

DATOS GENERALES DEL TRAZADO

PLANTS, DWG.

Sección transversal idéntica a la de la estructura PI 550+800



REPLANTEO DE LOS BORDES DEL FERROCARRIL

PI-553+850 PASO FAUNA 1000 FERROCARRIL
 2809.552 5753.07 5718.439 34.5435 3 3600. 965.502 .00424 1
 1 3441.249 1 4000.
 3 3861.249 0. 8000. 1833.03
 2 6416.142 8000.
 2 3600. 1.5325 2. 5.46751.5325 0. 2.9675 0. 2.96754.0325 2.
 4000. 1.5325 2. 5.46751.5325 0. 2.9675 0. 2.96754.0325 2.
 2 3600. -.5 -.17796.406525 0. 0. -.20994.24129 .5
 4000. -.5 -.17796.406525 0. 0. -.20994.24129 .5
 7 1 0. 2 0. 3 0. 0 0. 8 0. 9 0. 10 0.
 1 0 3820. 1. 3880. 70 10 20 30 40 50 60 7
 0
 0
 0
 0
 /*
 /R

TITULO DEL TRABAJO PI-553+850 PASO FAUNA

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	3820.000	-64.097503	.534533	-.845148

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	1	0	3820.000	6269.529	6587.156	964.462
1	1	2	0	3820.000	6271.219	6586.087	965.462
1	1	3	0	3820.000	6275.840	6583.164	966.435
1	1	4	0	3820.000	6277.135	6582.345	966.435
1	1	5	0	3820.000	6279.643	6580.759	966.435
1	1	6	0	3820.000	6283.051	6578.603	965.462
1	1	7	0	3820.000	6284.742	6577.534	964.462

EJE	P.K.	AZIMUT	COS A	SEN A
0	3821.000	-64.090317	.534628	-.845087

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	2	1	0	3821.000	6270.064	6588.002	964.466
1	2	2	0	3821.000	6271.754	6586.932	965.466
1	2	3	0	3821.000	6276.375	6584.009	966.439
1	2	4	0	3821.000	6277.670	6583.190	966.439
1	2	5	0	3821.000	6280.178	6581.603	966.439
1	2	6	0	3821.000	6283.585	6579.448	965.466
1	2	7	0	3821.000	6285.276	6578.378	964.466

EJE	P.K.	AZIMUT	COS A	SEN A
0	3822.000	-64.083113	.534724	-.845027

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	3	1	0	3822.000	6270.599	6588.847	964.470
1	3	2	0	3822.000	6272.289	6587.778	965.470
1	3	3	0	3822.000	6276.909	6584.854	966.443
1	3	4	0	3822.000	6278.204	6584.035	966.443
1	3	5	0	3822.000	6280.712	6582.448	966.443
1	3	6	0	3822.000	6284.120	6580.292	965.470
1	3	7	0	3822.000	6285.810	6579.222	964.470

EJE	P.K.	AZIMUT	COS A	SEN A
0	3823.000	-64.075889	.534820	-.844966

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	4	1	0	3823.000	6271.135	6589.693	964.475
1	4	2	0	3823.000	6272.824	6588.624	965.475
1	4	3	0	3823.000	6277.444	6585.700	966.448
1	4	4	0	3823.000	6278.739	6584.880	966.448
1	4	5	0	3823.000	6281.247	6583.293	966.448
1	4	6	0	3823.000	6284.654	6581.136	965.475
1	4	7	0	3823.000	6286.344	6580.067	964.475

EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
0	3824.000	-64.068646	.534916	-.844905			
1	5	1	0	3824.000	6271.670	6590.539	964.479
1	5	2	0	3824.000	6273.360	6589.469	965.479
1	5	3	0	3824.000	6277.979	6586.545	966.452
1	5	4	0	3824.000	6279.274	6585.725	966.452
1	5	5	0	3824.000	6281.781	6584.138	966.452
1	5	6	0	3824.000	6285.188	6581.980	965.479
1	5	7	0	3824.000	6286.878	6580.911	964.479
EJE	P.K.	AZIMUT	COS A	SEN A			
0	3825.000	-64.061385	.535012	-.844844			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	6	1	0	3825.000	6272.205	6591.385	964.483
1	6	2	0	3825.000	6273.895	6590.315	965.483
1	6	3	0	3825.000	6278.514	6587.390	966.456
1	6	4	0	3825.000	6279.809	6586.570	966.456
1	6	5	0	3825.000	6282.316	6584.982	966.456
1	6	6	0	3825.000	6285.723	6582.825	965.483
1	6	7	0	3825.000	6287.413	6581.755	964.483
EJE	P.K.	AZIMUT	COS A	SEN A			
0	3826.000	-64.054105	.535109	-.844783			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	7	1	0	3826.000	6272.741	6592.231	964.487
1	7	2	0	3826.000	6274.431	6591.160	965.487
1	7	3	0	3826.000	6279.049	6588.235	966.460
1	7	4	0	3826.000	6280.344	6587.415	966.460
1	7	5	0	3826.000	6282.851	6585.827	966.460
1	7	6	0	3826.000	6286.258	6583.669	965.487
1	7	7	0	3826.000	6287.947	6582.599	964.487
EJE	P.K.	AZIMUT	COS A	SEN A			
0	3827.000	-64.046805	.535206	-.844722			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	8	1	0	3827.000	6273.277	6593.076	964.491
1	8	2	0	3827.000	6274.966	6592.006	965.491
1	8	3	0	3827.000	6279.585	6589.080	966.464
1	8	4	0	3827.000	6280.879	6588.259	966.464
1	8	5	0	3827.000	6283.386	6586.671	966.464
1	8	6	0	3827.000	6286.792	6584.513	965.491
1	8	7	0	3827.000	6288.482	6583.442	964.491
EJE	P.K.	AZIMUT	COS A	SEN A			
0	3828.000	-64.039487	.535303	-.844660			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	9	1	0	3828.000	6273.813	6593.922	964.496
1	9	2	0	3828.000	6275.502	6592.851	965.496
1	9	3	0	3828.000	6280.120	6589.924	966.469
1	9	4	0	3828.000	6281.415	6589.104	966.469

1	9	5	0	3828.000	6283.921	6587.516	966.469
1	9	6	0	3828.000	6287.327	6585.357	965.496
1	9	7	0	3828.000	6289.016	6584.286	964.496
EJE	P.K.	AZIMUT	COS A	SEN A			
0	3829.000	-64.032150	.535400	-.844598			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	10	1	0	3829.000	6274.348	6594.767	964.500
1	10	2	0	3829.000	6276.038	6593.696	965.500
1	10	3	0	3829.000	6280.656	6590.769	966.473
1	10	4	0	3829.000	6281.950	6589.949	966.473
1	10	5	0	3829.000	6284.456	6588.360	966.473
1	10	6	0	3829.000	6287.862	6586.201	965.500
1	10	7	0	3829.000	6289.551	6585.130	964.500
EJE	P.K.	AZIMUT	COS A	SEN A			
0	3830.000	-64.024793	.535498	-.844537			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	11	1	0	3830.000	6274.885	6595.613	964.504
1	11	2	0	3830.000	6276.574	6594.542	965.504
1	11	3	0	3830.000	6281.191	6591.614	966.477
1	11	4	0	3830.000	6282.485	6590.793	966.477
1	11	5	0	3830.000	6284.991	6589.204	966.477
1	11	6	0	3830.000	6288.397	6587.045	965.504
1	11	7	0	3830.000	6290.086	6585.974	964.504
EJE	P.K.	AZIMUT	COS A	SEN A			
0	3831.000	-64.017418	.535596	-.844474			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	12	1	0	3831.000	6275.421	6596.458	964.508
1	12	2	0	3831.000	6277.110	6595.387	965.508
1	12	3	0	3831.000	6281.727	6592.459	966.481
1	12	4	0	3831.000	6283.021	6591.638	966.481
1	12	5	0	3831.000	6285.527	6590.048	966.481
1	12	6	0	3831.000	6288.932	6587.889	965.508
1	12	7	0	3831.000	6290.621	6586.817	964.508
EJE	P.K.	AZIMUT	COS A	SEN A			
0	3832.000	-64.010024	.535694	-.844412			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	13	1	0	3832.000	6275.957	6597.303	964.513
1	13	2	0	3832.000	6277.646	6596.232	965.513
1	13	3	0	3832.000	6282.262	6593.303	966.486
1	13	4	0	3832.000	6283.557	6592.482	966.486
1	13	5	0	3832.000	6286.062	6590.893	966.486
1	13	6	0	3832.000	6289.467	6588.732	965.513
1	13	7	0	3832.000	6291.156	6587.661	964.513
EJE	P.K.	AZIMUT	COS A	SEN A			
0	3833.000	-64.002611	.535792	-.844350			

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	14	1	0	3833.000	6276.493	6598.149	964.517
1	14	2	0	3833.000	6278.182	6597.077	965.517
1	14	3	0	3833.000	6282.798	6594.148	966.490
1	14	4	0	3833.000	6284.092	6593.327	966.490
1	14	5	0	3833.000	6286.598	6591.737	966.490
1	14	6	0	3833.000	6290.003	6589.576	965.517
1	14	7	0	3833.000	6291.691	6588.504	964.517

EJE	P.K.	AZIMUT	COS A	SEN A
0	3834.000	-63.995179	.535891	-.844287

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	0	3834.000	6277.030	6598.994	964.521
1	15	2	0	3834.000	6278.718	6597.922	965.521
1	15	3	0	3834.000	6283.334	6594.992	966.494
1	15	4	0	3834.000	6284.628	6594.171	966.494
1	15	5	0	3834.000	6287.134	6592.581	966.494
1	15	6	0	3834.000	6290.538	6590.420	965.521
1	15	7	0	3834.000	6292.227	6589.348	964.521

JE	P.K.	AZIMUT	COS A	SEN A
0	3835.000	-63.987728	.535990	-.844225

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	0	3835.000	6277.566	6599.839	964.525
1	16	2	0	3835.000	6279.254	6598.767	965.525
1	16	3	0	3835.000	6283.870	6595.837	966.498
1	16	4	0	3835.000	6285.164	6595.015	966.498
1	16	5	0	3835.000	6287.669	6593.425	966.498
1	16	6	0	3835.000	6291.074	6591.263	965.525
1	16	7	0	3835.000	6292.762	6590.191	964.525

EJE	P.K.	AZIMUT	COS A	SEN A
0	3836.000	-63.980258	.536089	-.844162

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	0	3836.000	6278.103	6600.684	964.530
1	17	2	0	3836.000	6279.791	6599.612	965.530
1	17	3	0	3836.000	6284.406	6596.681	966.503
1	17	4	0	3836.000	6285.700	6595.859	966.503
1	17	5	0	3836.000	6288.205	6594.268	966.503
1	17	6	0	3836.000	6291.609	6592.107	965.530
1	17	7	0	3836.000	6293.298	6591.035	964.530

EJE	P.K.	AZIMUT	COS A	SEN A
0	3837.000	-63.972770	.536188	-.844099

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	0	3837.000	6278.639	6601.529	964.534
1	18	2	0	3837.000	6280.328	6600.457	965.534
1	18	3	0	3837.000	6284.943	6597.525	966.507
1	18	4	0	3837.000	6286.236	6596.703	966.507
1	18	5	0	3837.000	6288.741	6595.112	966.507
1	18	6	0	3837.000	6292.145	6592.950	965.534
1	18	7	0	3837.000	6293.833	6591.878	964.534

EJE	P.K.	AZIMUT	COS A	SEN A
0	3838.000	-63.965262	.536287	-.844035

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	0	3838.000	6279.176	6602.374	964.538
1	19	2	0	3838.000	6280.864	6601.302	965.538
1	19	3	0	3838.000	6285.479	6598.369	966.511
1	19	4	0	3838.000	6286.772	6597.548	966.511
1	19	5	0	3838.000	6289.277	6595.956	966.511
1	19	6	0	3838.000	6292.681	6593.794	965.538
1	19	7	0	3838.000	6294.369	6592.721	964.538

EJE	P.K.	AZIMUT	COS A	SEN A
0	3839.000	-63.957735	.536387	-.843972

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	0	3839.000	6279.713	6603.219	964.542
1	20	2	0	3839.000	6281.401	6602.146	965.542
1	20	3	0	3839.000	6286.015	6599.214	966.515
1	20	4	0	3839.000	6287.309	6598.392	966.515
1	20	5	0	3839.000	6289.813	6596.800	966.515
1	20	6	0	3839.000	6293.217	6594.637	965.542
1	20	7	0	3839.000	6294.905	6593.564	964.542

EJE	P.K.	AZIMUT	COS A	SEN A
0	3840.000	-63.950189	.536487	-.843908

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	0	3840.000	6280.250	6604.064	964.547
1	21	2	0	3840.000	6281.938	6602.991	965.547
1	21	3	0	3840.000	6286.552	6600.058	966.520
1	21	4	0	3840.000	6287.845	6599.235	966.520
1	21	5	0	3840.000	6290.350	6597.643	966.520
1	21	6	0	3840.000	6293.753	6595.480	965.547
1	21	7	0	3840.000	6295.440	6594.407	964.547

EJE	P.K.	AZIMUT	COS A	SEN A
0	3841.000	-63.942625	.536588	-.843845

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	0	3841.000	6280.787	6604.909	964.551
1	22	2	0	3841.000	6282.475	6603.835	965.551
1	22	3	0	3841.000	6287.089	6600.902	966.524
1	22	4	0	3841.000	6288.382	6600.079	966.524
1	22	5	0	3841.000	6290.886	6598.487	966.524
1	22	6	0	3841.000	6294.289	6596.323	965.551
1	22	7	0	3841.000	6295.976	6595.250	964.551

EJE	P.K.	AZIMUT	COS A	SEN A
0	3842.000	-63.935041	.536688	-.843781

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	0	3842.000	6281.324	6605.753	964.555
1	23	2	0	3842.000	6283.012	6604.680	965.555

1	23	3	0	3842.000	6287.625	6601.746	966.528
1	23	4	0	3842.000	6288.918	6600.923	966.528
1	23	5	0	3842.000	6291.422	6599.331	966.528
1	23	6	0	3842.000	6294.825	6597.166	965.555
1	23	7	0	3842.000	6296.512	6596.093	964.555

EJE	P.K.	AZIMUT	COS A	SEN A
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0	3843.000	-63.927439	.536789	-.843717
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	24	1	0	3843.000	6281.862	6606.598	964.559
1	24	2	0	3843.000	6283.549	6605.524	965.559
1	24	3	0	3843.000	6288.162	6602.590	966.532
1	24	4	0	3843.000	6289.455	6601.767	966.532
1	24	5	0	3843.000	6291.959	6600.174	966.532
1	24	6	0	3843.000	6295.361	6598.009	965.559
1	24	7	0	3843.000	6297.049	6596.936	964.559

EJE	P.K.	AZIMUT	COS A	SEN A
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0	3844.000	-63.919817	.536890	-.843652
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	25	1	0	3844.000	6282.399	6607.443	964.564
1	25	2	0	3844.000	6284.086	6606.369	965.564
1	25	3	0	3844.000	6288.699	6603.433	966.537
1	25	4	0	3844.000	6289.992	6602.611	966.537
1	25	5	0	3844.000	6292.496	6601.017	966.537
1	25	6	0	3844.000	6295.898	6598.852	965.564
1	25	7	0	3844.000	6297.585	6597.779	964.564

EJE	P.K.	AZIMUT	COS A	SEN A
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0	3845.000	-63.912177	.536991	-.843588
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	26	1	0	3845.000	6282.937	6608.287	964.568
1	26	2	0	3845.000	6284.624	6607.213	965.568
1	26	3	0	3845.000	6289.236	6604.277	966.541
1	26	4	0	3845.000	6290.529	6603.454	966.541
1	26	5	0	3845.000	6293.032	6601.861	966.541
1	26	6	0	3845.000	6296.434	6599.695	965.568
1	26	7	0	3845.000	6298.121	6598.621	964.568

EJE	P.K.	AZIMUT	COS A	SEN A
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0	3846.000	-63.904517	.537093	-.843523
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	27	1	0	3846.000	6283.474	6609.132	964.572
1	27	2	0	3846.000	6285.161	6608.057	965.572
1	27	3	0	3846.000	6289.773	6605.121	966.545
1	27	4	0	3846.000	6291.066	6604.298	966.545
1	27	5	0	3846.000	6293.569	6602.704	966.545
1	27	6	0	3846.000	6296.971	6600.538	965.572
1	27	7	0	3846.000	6298.658	6599.464	964.572

EJE	P.K.	AZIMUT	COS A	SEN A
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0	3847.000	-63.896839	.537194	-.843459
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	28	1	0	3847.000	6284.012	6609.976	964.576
1	28	2	0	3847.000	6285.699	6608.902	965.576
1	28	3	0	3847.000	6290.311	6605.965	966.549
1	28	4	0	3847.000	6291.603	6605.141	966.549
1	28	5	0	3847.000	6294.106	6603.547	966.549
1	28	6	0	3847.000	6297.507	6601.381	965.576
1	28	7	0	3847.000	6299.194	6600.307	964.576

EJE	P.K.	AZIMUT	COS A	SEN A
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0	3848.000	-63.889142	.537296	-.843394
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	29	1	0	3848.000	6284.550	6610.820	964.581
1	29	2	0	3848.000	6286.237	6609.746	965.581
1	29	3	0	3848.000	6290.848	6606.808	966.554
1	29	4	0	3848.000	6292.140	6605.985	966.554
1	29	5	0	3848.000	6294.643	6604.390	966.554
1	29	6	0	3848.000	6298.044	6602.224	965.581
1	29	7	0	3848.000	6299.731	6601.149	964.581

EJE	P.K.	AZIMUT	COS A	SEN A
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0	3849.000	-63.881426	.537398	-.843328
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	30	1	0	3849.000	6285.088	6611.665	964.585
1	30	2	0	3849.000	6286.774	6610.590	965.585
1	30	3	0	3849.000	6291.385	6607.652	966.558
1	30	4	0	3849.000	6292.678	6606.828	966.558
1	30	5	0	3849.000	6295.180	6605.233	966.558
1	30	6	0	3849.000	6298.581	6603.066	965.585
1	30	7	0	3849.000	6300.268	6601.991	964.585

EJE	P.K.	AZIMUT	COS A	SEN A
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0	3850.000	-63.873691	.537501	-.843263
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	31	1	0	3850.000	6285.626	6612.509	964.589
1	31	2	0	3850.000	6287.312	6611.434	965.589
1	31	3	0	3850.000	6291.923	6608.495	966.562
1	31	4	0	3850.000	6293.215	6607.671	966.562
1	31	5	0	3850.000	6295.718	6606.076	966.562
1	31	6	0	3850.000	6299.118	6603.909	965.589
1	31	7	0	3850.000	6300.805	6602.834	964.589

EJE	P.K.	AZIMUT	COS A	SEN A
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0	3851.000	-63.865936	.537604	-.843198
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	32	1	0	3851.000	6286.164	6613.353	964.593
1	32	2	0	3851.000	6287.850	6612.278	965.593
1	32	3	0	3851.000	6292.461	6609.338	966.566
1	32	4	0	3851.000	6293.753	6608.515	966.566
1	32	5	0	3851.000	6296.255	6606.919	966.566

1	32	6	0	3851.000	6299.655	6604.751	965.593
1	32	7	0	3851.000	6301.341	6603.676	964.593

EJE	P.K.	AZIMUT	COS A	SEN A
0	3852.000	-63.858163	.537707	-.843132

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	33	1	0	3852.000	6286.702	6614.197	964.597
1	33	2	0	3852.000	6288.388	6613.122	965.597
1	33	3	0	3852.000	6292.998	6610.182	966.570
1	33	4	0	3852.000	6294.290	6609.358	966.570
1	33	5	0	3852.000	6296.792	6607.762	966.570
1	33	6	0	3852.000	6300.192	6605.594	965.597
1	33	7	0	3852.000	6301.879	6604.518	964.597

EJE	P.K.	AZIMUT	COS A	SEN A
0	3853.000	-63.850371	.537810	-.843066

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	34	1	0	3853.000	6287.241	6615.041	964.602
1	34	2	0	3853.000	6288.927	6613.965	965.602
1	34	3	0	3853.000	6293.536	6611.025	966.575
1	34	4	0	3853.000	6294.828	6610.201	966.575
1	34	5	0	3853.000	6297.330	6608.605	966.575
1	34	6	0	3853.000	6300.730	6606.436	965.602
1	34	7	0	3853.000	6302.416	6605.361	964.602

EJE	P.K.	AZIMUT	COS A	SEN A
0	3854.000	-63.842561	.537913	-.843000

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	35	1	0	3854.000	6287.779	6615.885	964.606
1	35	2	0	3854.000	6289.465	6614.809	965.606
1	35	3	0	3854.000	6294.074	6611.868	966.579
1	35	4	0	3854.000	6295.366	6611.044	966.579
1	35	5	0	3854.000	6297.868	6609.448	966.579
1	35	6	0	3854.000	6301.267	6607.278	965.606
1	35	7	0	3854.000	6302.953	6606.203	964.606

EJE	P.K.	AZIMUT	COS A	SEN A
0	3855.000	-63.834731	.538017	-.842934

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	36	1	0	3855.000	6288.318	6616.729	964.610
1	36	2	0	3855.000	6290.003	6615.653	965.610
1	36	3	0	3855.000	6294.612	6612.711	966.583
1	36	4	0	3855.000	6295.904	6611.887	966.583
1	36	5	0	3855.000	6298.405	6610.290	966.583
1	36	6	0	3855.000	6301.804	6608.121	965.610
1	36	7	0	3855.000	6303.490	6607.045	964.610

EJE	P.K.	AZIMUT	COS A	SEN A
0	3856.000	-63.826882	.538121	-.842868

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
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1	37	1	0	3856.000	6288.856	6617.573	964.614
1	37	2	0	3856.000	6290.542	6616.497	965.614
1	37	3	0	3856.000	6295.150	6613.554	966.587
1	37	4	0	3856.000	6296.442	6612.730	966.587
1	37	5	0	3856.000	6298.943	6611.133	966.587
1	37	6	0	3856.000	6302.342	6608.963	965.614
1	37	7	0	3856.000	6304.028	6607.887	964.614

EJE	P.K.	AZIMUT	COS A	SEN A
0	3857.000	-63.819014	.538225	-.842801

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	38	1	0	3857.000	6289.395	6618.417	964.619
1	38	2	0	3857.000	6291.081	6617.340	965.619
1	38	3	0	3857.000	6295.689	6614.397	966.592
1	38	4	0	3857.000	6296.980	6613.573	966.592
1	38	5	0	3857.000	6299.481	6611.975	966.592
1	38	6	0	3857.000	6302.880	6609.805	965.619
1	38	7	0	3857.000	6304.565	6608.729	964.619

EJE	P.K.	AZIMUT	COS A	SEN A
0	3858.000	-63.811127	.538329	-.842735

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	39	1	0	3858.000	6289.934	6619.260	964.623
1	39	2	0	3858.000	6291.619	6618.184	965.623
1	39	3	0	3858.000	6296.227	6615.240	966.596
1	39	4	0	3858.000	6297.518	6614.415	966.596
1	39	5	0	3858.000	6300.019	6612.818	966.596
1	39	6	0	3858.000	6303.418	6610.647	965.623
1	39	7	0	3858.000	6305.103	6609.570	964.623

EJE	P.K.	AZIMUT	COS A	SEN A
0	3859.000	-63.803222	.538434	-.842668

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	40	1	0	3859.000	6290.473	6620.104	964.627
1	40	2	0	3859.000	6292.158	6619.027	965.627
1	40	3	0	3859.000	6296.765	6616.083	966.600
1	40	4	0	3859.000	6298.057	6615.258	966.600
1	40	5	0	3859.000	6300.557	6613.660	966.600
1	40	6	0	3859.000	6303.956	6611.489	965.627
1	40	7	0	3859.000	6305.641	6610.412	964.627

EJE	P.K.	AZIMUT	COS A	SEN A
0	3860.000	-63.795297	.538539	-.842601

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	41	1	0	3860.000	6291.012	6620.948	964.631
1	41	2	0	3860.000	6292.697	6619.870	965.631
1	41	3	0	3860.000	6297.304	6616.926	966.604
1	41	4	0	3860.000	6298.595	6616.101	966.604
1	41	5	0	3860.000	6301.096	6614.503	966.604
1	41	6	0	3860.000	6304.494	6612.331	965.631
1	41	7	0	3860.000	6306.179	6611.254	964.631

EJE	P.K.	AZIMUT	COS A	SEN A
0	3861.000	-63.787353	.538644	-.842533

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	42	1	0	3861.000	6291.551	6621.791	964.636
1	42	2	0	3861.000	6293.236	6620.714	965.636
1	42	3	0	3861.000	6297.843	6617.769	966.609
1	42	4	0	3861.000	6299.134	6616.943	966.609
1	42	5	0	3861.000	6301.634	6615.345	966.609
1	42	6	0	3861.000	6305.032	6613.173	965.636
1	42	7	0	3861.000	6306.717	6612.095	964.636

EJE	P.K.	AZIMUT	COS A	SEN A
0	3862.000	-63.779396	.538749	-.842466

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	43	1	0	3862.000	6292.090	6622.634	964.640
1	43	2	0	3862.000	6293.775	6621.557	965.640
1	43	3	0	3862.000	6298.382	6618.611	966.613
1	43	4	0	3862.000	6299.673	6617.786	966.613
1	43	5	0	3862.000	6302.173	6616.187	966.613
1	43	6	0	3862.000	6305.570	6614.014	965.640
1	43	7	0	3862.000	6307.255	6612.937	964.640

EJE	P.K.	AZIMUT	COS A	SEN A
0	3863.000	-63.771439	.538855	-.842399

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	44	1	0	3863.000	6292.630	6623.478	964.644
1	44	2	0	3863.000	6294.315	6622.400	965.644
1	44	3	0	3863.000	6298.920	6619.454	966.617
1	44	4	0	3863.000	6300.211	6618.628	966.617
1	44	5	0	3863.000	6302.711	6617.029	966.617
1	44	6	0	3863.000	6306.108	6614.856	965.644
1	44	7	0	3863.000	6307.793	6613.778	964.644

EJE	P.K.	AZIMUT	COS A	SEN A
0	3864.000	-63.763481	.538960	-.842331

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	45	1	0	3864.000	6293.169	6624.321	964.648
1	45	2	0	3864.000	6294.854	6623.243	965.648
1	45	3	0	3864.000	6299.459	6620.296	966.621
1	45	4	0	3864.000	6300.750	6619.471	966.621
1	45	5	0	3864.000	6303.250	6617.871	966.621
1	45	6	0	3864.000	6306.647	6615.698	965.648
1	45	7	0	3864.000	6308.331	6614.620	964.648

EJE	P.K.	AZIMUT	COS A	SEN A
0	3865.000	-63.755523	.539065	-.842264

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	46	1	0	3865.000	6293.709	6625.164	964.653
1	46	2	0	3865.000	6295.393	6624.086	965.653
1	46	3	0	3865.000	6299.999	6621.139	966.626

1	46	4	0	3865.000	6301.289	6620.313	966.626
1	46	5	0	3865.000	6303.789	6618.713	966.626
1	46	6	0	3865.000	6307.185	6616.539	965.653
1	46	7	0	3865.000	6308.870	6615.461	964.653

EJE	P.K.	AZIMUT	COS A	SEN A
0	3866.000	-63.747565	.539171	-.842197

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	47	1	0	3866.000	6294.249	6626.008	964.657
1	47	2	0	3866.000	6295.933	6624.929	965.657
1	47	3	0	3866.000	6300.538	6621.981	966.630
1	47	4	0	3866.000	6301.828	6621.155	966.630
1	47	5	0	3866.000	6304.328	6619.555	966.630
1	47	6	0	3866.000	6307.724	6617.381	965.657
1	47	7	0	3866.000	6309.408	6616.303	964.657

EJE	P.K.	AZIMUT	COS A	SEN A
0	3867.000	-63.739608	.539276	-.842129

PO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	48	1	0	3867.000	6294.789	6626.851	964.661
1	48	2	0	3867.000	6296.473	6625.772	965.661
1	48	3	0	3867.000	6301.077	6622.824	966.634
1	48	4	0	3867.000	6302.368	6621.997	966.634
1	48	5	0	3867.000	6304.867	6620.397	966.634
1	48	6	0	3867.000	6308.263	6618.222	965.661
1	48	7	0	3867.000	6309.947	6617.144	964.661

EJE	P.K.	AZIMUT	COS A	SEN A
0	3868.000	-63.731650	.539381	-.842062

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	49	1	0	3868.000	6295.328	6627.694	964.665
1	49	2	0	3868.000	6297.013	6626.615	965.665
1	49	3	0	3868.000	6301.617	6623.666	966.638
1	49	4	0	3868.000	6302.907	6622.839	966.638
1	49	5	0	3868.000	6305.406	6621.239	966.638
1	49	6	0	3868.000	6308.801	6619.064	965.665
1	49	7	0	3868.000	6310.486	6617.985	964.665

EJE	P.K.	AZIMUT	COS A	SEN A
0	3869.000	-63.723692	.539486	-.841994

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	50	1	0	3869.000	6295.869	6628.537	964.670
1	50	2	0	3869.000	6297.552	6627.458	965.670
1	50	3	0	3869.000	6302.156	6624.508	966.643
1	50	4	0	3869.000	6303.446	6623.681	966.643
1	50	5	0	3869.000	6305.945	6622.080	966.643
1	50	6	0	3869.000	6309.340	6619.905	965.670
1	50	7	0	3869.000	6311.024	6618.826	964.670

EJE	P.K.	AZIMUT	COS A	SEN A
0	3870.000	-63.715734	.539592	-.841927

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	51	1	0	3870.000	6296.409	6629.380	964.674
1	51	2	0	3870.000	6298.093	6628.300	965.674
1	51	3	0	3870.000	6302.696	6625.350	966.647
1	51	4	0	3870.000	6303.986	6624.523	966.647
1	51	5	0	3870.000	6306.484	6622.922	966.647
1	51	6	0	3870.000	6309.879	6620.746	965.674
1	51	7	0	3870.000	6311.563	6619.667	964.674

EJE	P.K.	AZIMUT	COS A	SEN A
0	3871.000	-63.707777	.539697	-.841859

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	52	1	0	3871.000	6296.949	6630.222	964.678
1	52	2	0	3871.000	6298.633	6629.143	965.678
1	52	3	0	3871.000	6303.235	6626.192	966.651
1	52	4	0	3871.000	6304.526	6625.365	966.651
1	52	5	0	3871.000	6307.024	6623.764	966.651
1	52	6	0	3871.000	6310.419	6621.587	965.678
1	52	7	0	3871.000	6312.102	6620.508	964.678

EJE	P.K.	AZIMUT	COS A	SEN A
0	3872.000	-63.699819	.539802	-.841792

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	53	1	0	3872.000	6297.489	6631.065	964.682
1	53	2	0	3872.000	6299.173	6629.986	965.682
1	53	3	0	3872.000	6303.775	6627.034	966.655
1	53	4	0	3872.000	6305.065	6626.207	966.655
1	53	5	0	3872.000	6307.563	6624.605	966.655
1	53	6	0	3872.000	6310.958	6622.428	965.682
1	53	7	0	3872.000	6312.642	6621.349	964.682

EJE	P.K.	AZIMUT	COS A	SEN A
0	3873.000	-63.691861	.539907	-.841725

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	54	1	0	3873.000	6298.030	6631.908	964.687
1	54	2	0	3873.000	6299.713	6630.828	965.687
1	54	3	0	3873.000	6304.315	6627.876	966.660
1	54	4	0	3873.000	6305.605	6627.049	966.660
1	54	5	0	3873.000	6308.103	6625.447	966.660
1	54	6	0	3873.000	6311.497	6623.269	965.687
1	54	7	0	3873.000	6313.181	6622.190	964.687

EJE	P.K.	AZIMUT	COS A	SEN A
0	3874.000	-63.683903	.540012	-.841657

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	55	1	0	3874.000	6298.570	6632.751	964.691
1	55	2	0	3874.000	6300.254	6631.671	965.691
1	55	3	0	3874.000	6304.855	6628.718	966.664
1	55	4	0	3874.000	6306.145	6627.890	966.664
1	55	5	0	3874.000	6308.643	6626.288	966.664
1	55	6	0	3874.000	6312.037	6624.110	965.691

1	55	7	0	3874.000	6313.720	6623.030	964.691
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EJE	P.K.	AZIMUT	COS A	SEN A
0	3875.000	-63.675946	.540118	-.841590

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	56	1	0	3875.000	6299.111	6633.593	964.695
1	56	2	0	3875.000	6300.794	6632.513	965.695
1	56	3	0	3875.000	6305.396	6629.560	966.668
1	56	4	0	3875.000	6306.685	6628.732	966.668
1	56	5	0	3875.000	6309.183	6627.129	966.668
1	56	6	0	3875.000	6312.576	6624.951	965.695
1	56	7	0	3875.000	6314.260	6623.871	964.695

EJE	P.K.	AZIMUT	COS A	SEN A
0	3876.000	-63.667988	.540223	-.841522

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	57	1	0	3876.000	6299.652	6634.436	964.699
1	57	2	0	3876.000	6301.335	6633.355	965.699
1	57	3	0	3876.000	6305.936	6630.402	966.672
1	57	4	0	3876.000	6307.225	6629.574	966.672
1	57	5	0	3876.000	6309.723	6627.971	966.672
1	57	6	0	3876.000	6313.116	6625.792	965.699
1	57	7	0	3876.000	6314.799	6624.712	964.699

EJE	P.K.	AZIMUT	COS A	SEN A
0	3877.000	-63.660030	.540328	-.841454

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	58	1	0	3877.000	6300.193	6635.278	964.703
1	58	2	0	3877.000	6301.876	6634.197	965.703
1	58	3	0	3877.000	6306.476	6631.243	966.676
1	58	4	0	3877.000	6307.766	6630.415	966.676
1	58	5	0	3877.000	6310.263	6628.812	966.676
1	58	6	0	3877.000	6313.656	6626.633	965.703
1	58	7	0	3877.000	6315.339	6625.552	964.703

EJE	P.K.	AZIMUT	COS A	SEN A
0	3878.000	-63.652072	.540433	-.841387

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	59	1	0	3878.000	6300.734	6636.120	964.708
1	59	2	0	3878.000	6302.416	6635.040	965.708
1	59	3	0	3878.000	6307.017	6632.085	966.681
1	59	4	0	3878.000	6308.306	6631.257	966.681
1	59	5	0	3878.000	6310.803	6629.653	966.681
1	59	6	0	3878.000	6314.196	6627.474	965.708
1	59	7	0	3878.000	6315.879	6626.393	964.708

EJE	P.K.	AZIMUT	COS A	SEN A
0	3879.000	-63.644115	.540538	-.841319

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	60	1	0	3879.000	6301.275	6636.963	964.712

1	60	2	0	3879.000	6302.957	6635.882	965.712
1	60	3	0	3879.000	6307.557	6632.926	966.685
1	60	4	0	3879.000	6308.847	6632.098	966.685
1	60	5	0	3879.000	6311.343	6630.494	966.685
1	60	6	0	3879.000	6314.736	6628.314	965.712
1	60	7	0	3879.000	6316.418	6627.233	964.712

EJE	P.K.	AZIMUT	COS A	SEN A
0	3880.000	-63.636157	.540644	-.841252

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	61	1	0	3880.000	6301.816	6637.805	964.716
1	61	2	0	3880.000	6303.498	6636.724	965.716
1	61	3	0	3880.000	6308.098	6633.768	966.689
1	61	4	0	3880.000	6309.387	6632.939	966.689
1	61	5	0	3880.000	6311.884	6631.335	966.689
1	61	6	0	3880.000	6315.276	6629.155	965.716
1	61	7	0	3880.000	6316.958	6628.073	964.716

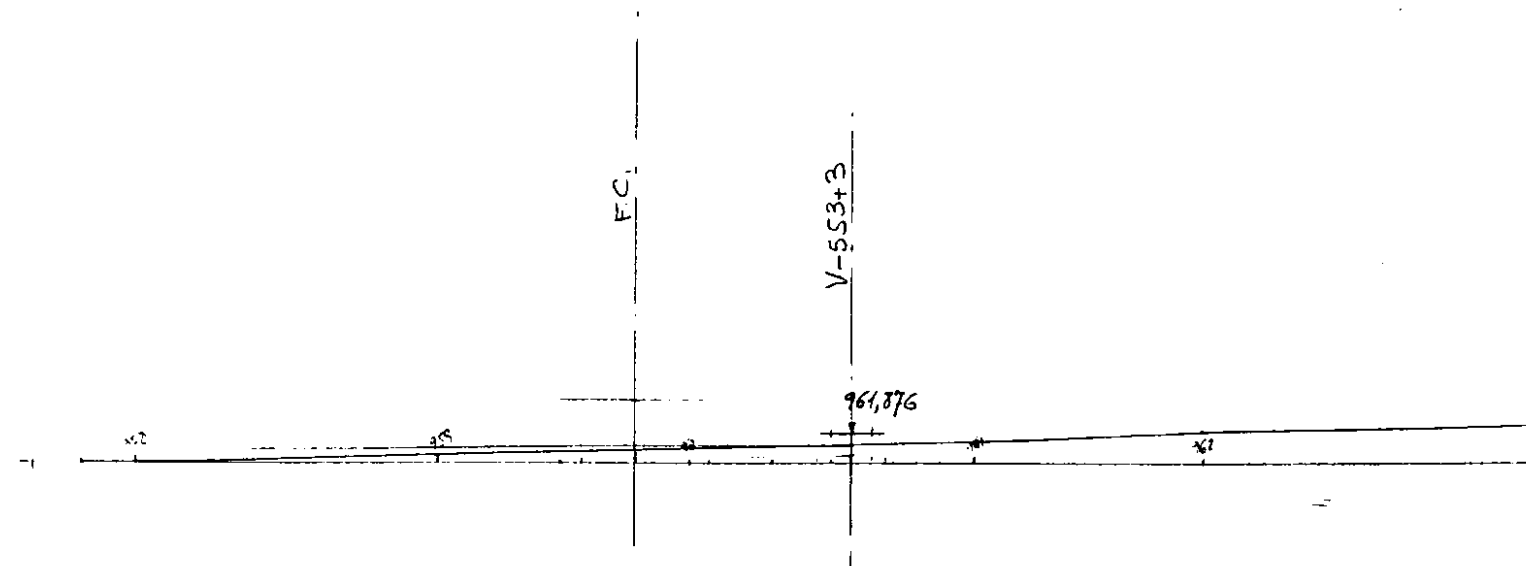
REPLANTEO DEL PORTICO

P.I - 553+850

{ Cota Ferrocarril $\longrightarrow$ 966,562 m. cota Sub-balasto 965,939
Cota terreno $\longrightarrow$ 959,8 m.

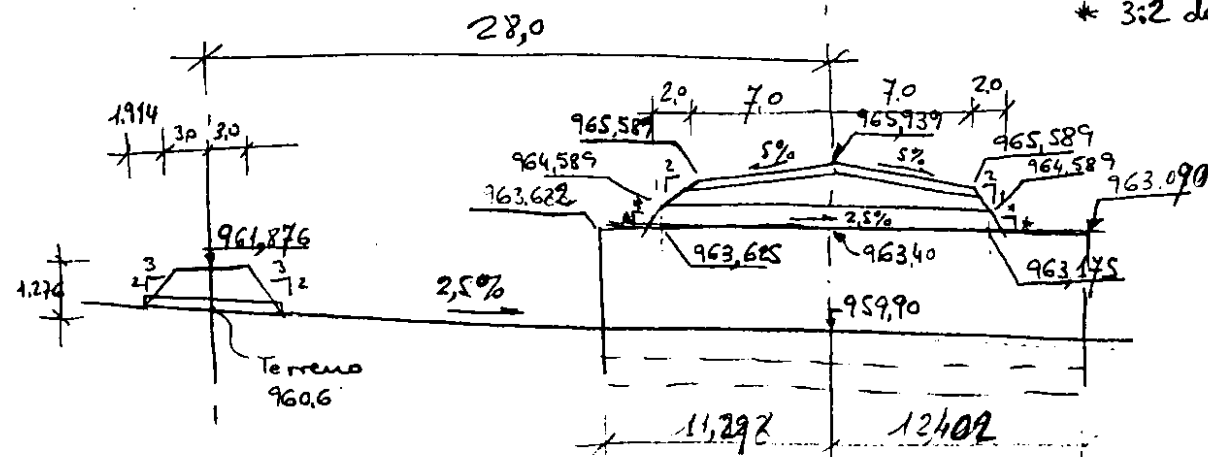
{ Cota del camino en PK- 1+733
V-553+3
 $963,134 - 0,03 \times (1,733 - 1,718,865) + \frac{(1,733 - 1,718,865)^2}{2 \times 600} = 961,876$
Cota del terreno $\approx$ 960,6

Distancia entre ejes 28,0 m.



$$Z - 0,623 = 966,562 - 0,623 = 965,939$$

- * 2:1 hasta 553,860
- * 3:2 desde "



Cota de calculo en PK. 553+847 $966,562 - 3,0 \times 0,00424 = 966,549$
 Extremo izquierdo del dintel $(\Delta = -0,013)$

$$t_{\beta} = \frac{1}{2} = 0.5$$

$$964,589 - 0,013 = 964,576$$

$$t_g \alpha = \frac{2,5}{100} = 0,025$$

$$N = 964,576 - 963,625 - 0,17 = 0,781$$

$$L = \frac{N}{t_{\beta} + t_{\alpha}} = \frac{0,781}{0,5 + 0,025} = 1,488$$

$$M = 1,488 + 0,4 + 0,41 = 2,298$$

$$z_s = 963,625 + 2,298 \times 0,025 = \underline{\underline{963,682}}$$

Extremo dcho del diintel

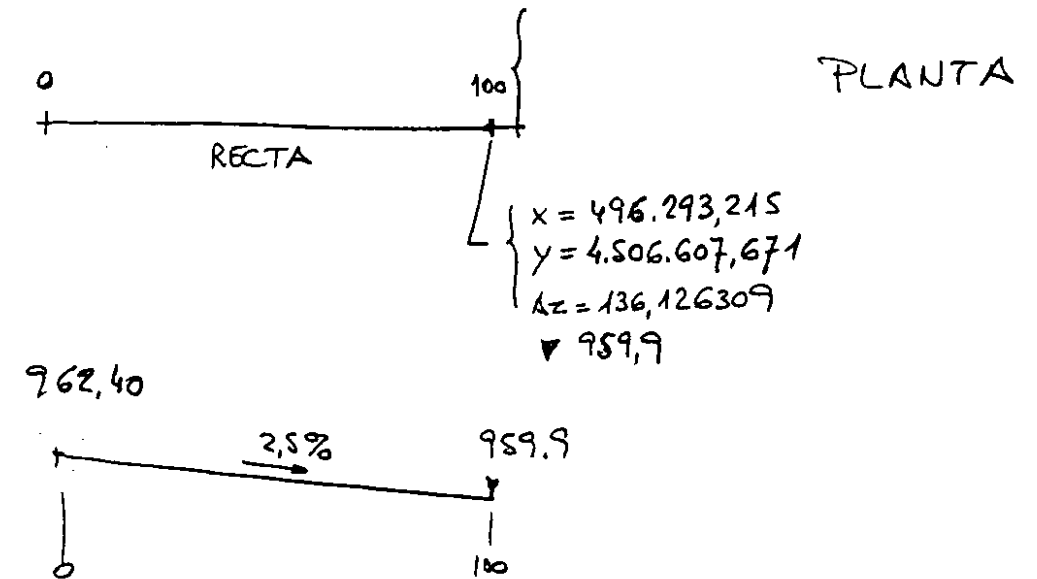
$$N = 964,576 - 963,175 - 0,17 = 1,231$$

$$L = \frac{N}{t_{\beta} - t_{\alpha}} = \frac{1.231}{0.5 - 0.025} = 2,5916$$

$$M = 2,5916 + 0,4 + 0,41 = 3,402$$

$$Z_2 = 963,175 - 3,402 \times 0,025 = \underline{963,090}$$

PASO FAUNA

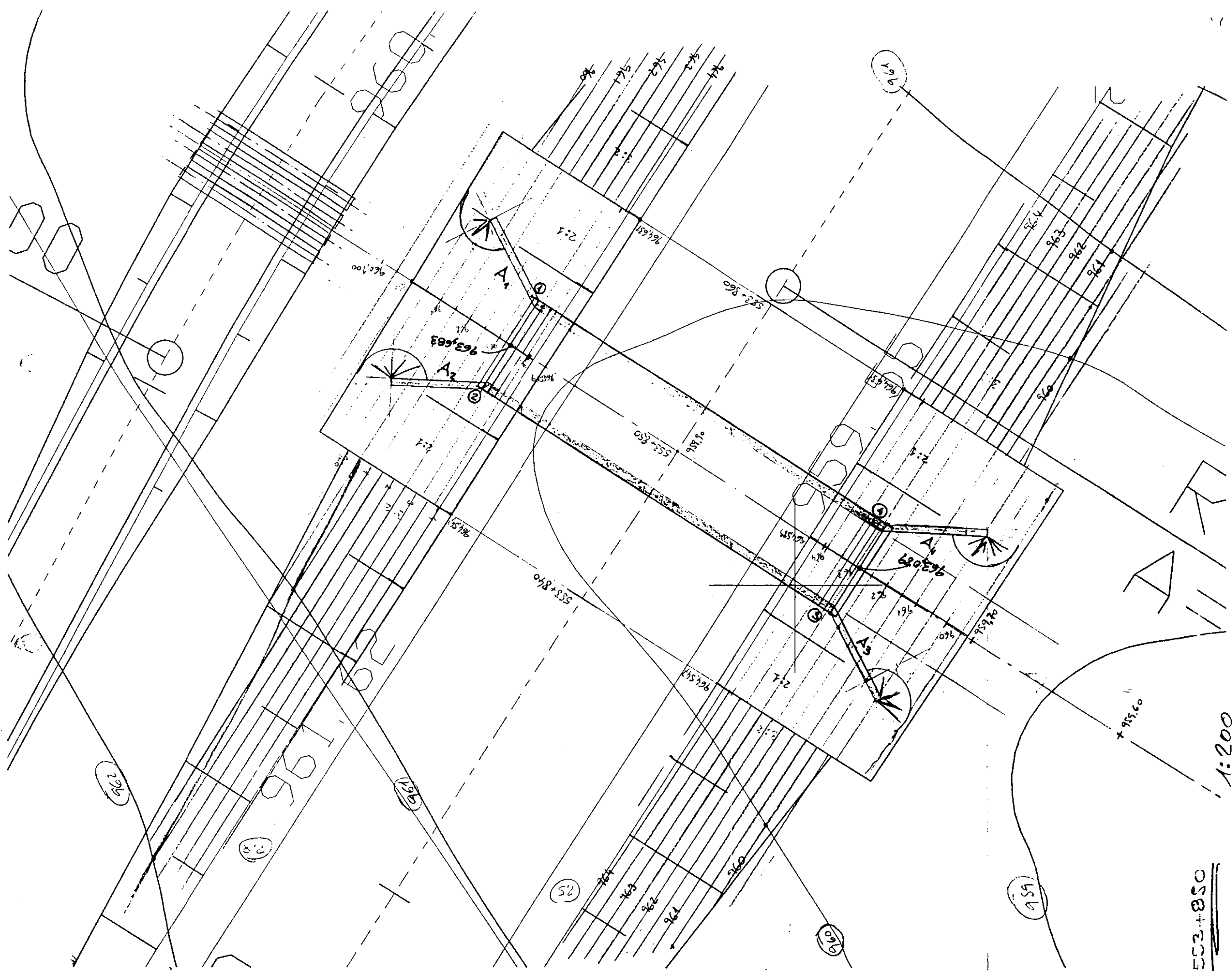


$$x_0 = 496.293,215 - 100 \times \ln 36,126309^{\frac{1}{2}} = 496.208,889$$

$$Y_0 = 4.506.607,671 + 100 \times \tan 36,126309^\circ = 4.506.661,421$$

$$100 - 11,322 = 88,678$$

$$100 + 12,429 = 112,429$$



553+850

PI-553+850 PASO FAUNA 1001 FERROCARRIL

2809.552	5753.07	5718.439	34.5435	3	3600.	965.502	.00424	1
1 3441.249				1	4000.			
3 3861.249	0.	8000.	1833.03					
2 6416.142	8000.							
2 3600.	1.5325	2.	5.46751.5325	0.	2.9675	0.	2.96754.0325	2.
4000.	1.5325	2.	5.46751.5325	0.	2.9675	0.	2.96754.0325	2.
2 3600.	-.5	-.17796.406525	0.	0.	-.20994.24129	.5		
4000.	-.5	-.17796.406525	0.	0.	-.20994.24129	.5		
7 1 0.	2 0.	3 0.	0 0.	8 0.	9 0.	10 0.		
PASO FAUNA								
0.	6208.889	6661.421	136.126309	1	0.	962.4	-.025	1
1 150.				1	150.			
2 0.		0.5	2.5			2.5	0.5	
150.		0.5	2.5			2.5	0.5	
2 0.								
150.								
5 1 0.	2 0.	3 0.	9 0.	10 0.				
1 40 3								
1 3 85.	1.	115.	53 13 23 33 43 5					
0								
0								
0								
/*								
/R								

TITULO DEL TRABAJO PI-553+850 PASO FAUNA

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
4	0	3	3	3850.000	99.999	6293.215	6607.671	966.562	959.900
				AZ.E	AZ.3				
				36.126307	136.126309				

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	85.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	3	85.000	6282.179	6618.263	960.275
1	1	2	3	85.000	6281.910	6617.842	960.275
1	1	3	3	85.000	6280.566	6615.733	960.275
1	1	4	3	85.000	6279.223	6613.625	960.275
1	1	5	3	85.000	6278.954	6613.204	960.275

EJE	P.K.	AZIMUT	COS A	SEN A
3	86.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	3	86.000	6283.022	6617.726	960.250
1	2	2	3	86.000	6282.753	6617.304	960.250
1	2	3	3	86.000	6281.410	6615.196	960.250
1	2	4	3	86.000	6280.066	6613.088	960.250
1	2	5	3	86.000	6279.797	6612.666	960.250

EJE	P.K.	AZIMUT	COS A	SEN A
3	87.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	3	87.000	6283.865	6617.188	960.225
1	3	2	3	87.000	6283.597	6616.767	960.225
1	3	3	3	87.000	6282.253	6614.658	960.225
1	3	4	3	87.000	6280.909	6612.550	960.225
1	3	5	3	87.000	6280.640	6612.129	960.225

EJE	P.K.	AZIMUT	COS A	SEN A
3	88.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	3	88.000	6284.709	6616.651	960.200
1	4	2	3	88.000	6284.440	6616.229	960.200
1	4	3	3	88.000	6283.096	6614.121	960.200

1	4	4	3	88.000	6281.752	6612.013	960.200
1	4	5	3	88.000	6281.484	6611.591	960.200

EJE	P.K.	AZIMUT	COS A	SEN A
3	89.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	5	1	3	89.000	6285.552	6616.113	960.175
1	5	2	3	89.000	6285.283	6615.692	960.175
1	5	3	3	89.000	6283.939	6613.583	960.175
1	5	4	3	89.000	6282.596	6611.475	960.175
1	5	5	3	89.000	6282.327	6611.054	960.175

EJE	P.K.	AZIMUT	COS A	SEN A
3	90.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	6	1	3	90.000	6286.395	6615.576	960.150
1	6	2	3	90.000	6286.126	6615.154	960.150
1	6	3	3	90.000	6284.783	6613.046	960.150
1	6	4	3	90.000	6283.439	6610.938	960.150
1	6	5	3	90.000	6283.170	6610.516	960.150

EJE	P.K.	AZIMUT	COS A	SEN A
3	91.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	7	1	3	91.000	6287.238	6615.038	960.125
1	7	2	3	91.000	6286.970	6614.617	960.125
1	7	3	3	91.000	6285.626	6612.508	960.125
1	7	4	3	91.000	6284.282	6610.400	960.125
1	7	5	3	91.000	6284.013	6609.979	960.125

EJE	P.K.	AZIMUT	COS A	SEN A
3	92.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	8	1	3	92.000	6288.082	6614.501	960.100
1	8	2	3	92.000	6287.813	6614.079	960.100
1	8	3	3	92.000	6286.469	6611.971	960.100
1	8	4	3	92.000	6285.125	6609.863	960.100
1	8	5	3	92.000	6284.857	6609.441	960.100

EJE	P.K.	AZIMUT	COS A	SEN A
3	93.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	9	1	3	93.000	6288.925	6613.963	960.075
1	9	2	3	93.000	6288.656	6613.542	960.075
1	9	3	3	93.000	6287.312	6611.433	960.075
1	9	4	3	93.000	6285.969	6609.325	960.075
1	9	5	3	93.000	6285.700	6608.904	960.075

EJE	P.K.	AZIMUT	COS A	SEN A
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3	94.000	36.126309	.843263	.537501
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	10	1	3	94.000	6289.768	6613.426	960.050
1	10	2	3	94.000	6289.499	6613.004	960.050
1	10	3	3	94.000	6288.156	6610.896	960.050
1	10	4	3	94.000	6286.812	6608.788	960.050
1	10	5	3	94.000	6286.543	6608.366	960.050

EJE	P.K.	AZIMUT	COS A	SEN A
3	95.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	11	1	3	95.000	6290.612	6612.888	960.025
1	11	2	3	95.000	6290.343	6612.467	960.025
1	11	3	3	95.000	6288.999	6610.358	960.025
1	11	4	3	95.000	6287.655	6608.250	960.025
1	11	5	3	95.000	6287.386	6607.829	960.025

EJE	P.K.	AZIMUT	COS A	SEN A
3	96.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	12	1	3	96.000	6291.455	6612.351	960.000
1	12	2	3	96.000	6291.186	6611.929	960.000
1	12	3	3	96.000	6289.842	6609.821	960.000
1	12	4	3	96.000	6288.499	6607.713	960.000
1	12	5	3	96.000	6288.230	6607.291	960.000

EJE	P.K.	AZIMUT	COS A	SEN A
3	97.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	13	1	3	97.000	6292.298	6611.813	959.975
1	13	2	3	97.000	6292.029	6611.392	959.975
1	13	3	3	97.000	6290.686	6609.283	959.975
1	13	4	3	97.000	6289.342	6607.175	959.975
1	13	5	3	97.000	6289.073	6606.754	959.975

EJE	P.K.	AZIMUT	COS A	SEN A
3	98.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	14	1	3	98.000	6293.141	6611.276	959.950
1	14	2	3	98.000	6292.873	6610.854	959.950
1	14	3	3	98.000	6291.529	6608.746	959.950
1	14	4	3	98.000	6290.185	6606.638	959.950
1	14	5	3	98.000	6289.916	6606.216	959.950

EJE	P.K.	AZIMUT	COS A	SEN A
3	99.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	3	99.000	6293.985	6610.738	959.925
1	15	2	3	99.000	6293.716	6610.317	959.925

1	15	3	3	99.000	6292.372	6608.208	959.925
1	15	4	3	99.000	6291.028	6606.100	959.925
1	15	5	3	99.000	6290.760	6605.679	959.925

EJE	P.K.	AZIMUT	COS A	SEN A
3	100.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	3	100.000	6294.828	6610.201	959.900
1	16	2	3	100.000	6294.559	6609.779	959.900
1	16	3	3	100.000	6293.215	6607.671	959.900
1	16	4	3	100.000	6291.872	6605.563	959.900
1	16	5	3	100.000	6291.603	6605.141	959.900

EJE	P.K.	AZIMUT	COS A	SEN A
3	101.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	3	101.000	6295.671	6609.663	959.875
1	17	2	3	101.000	6295.402	6609.242	959.875
1	17	3	3	101.000	6294.059	6607.133	959.875
1	17	4	3	101.000	6292.715	6605.025	959.875
1	17	5	3	101.000	6292.446	6604.604	959.875

EJE	P.K.	AZIMUT	COS A	SEN A
3	102.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	3	102.000	6296.514	6609.126	959.850
1	18	2	3	102.000	6296.246	6608.704	959.850
1	18	3	3	102.000	6294.902	6606.596	959.850
1	18	4	3	102.000	6293.558	6604.488	959.850
1	18	5	3	102.000	6293.289	6604.066	959.850

EJE	P.K.	AZIMUT	COS A	SEN A
3	103.000	36.126309	.843263	.537501

PO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	3	103.000	6297.358	6608.588	959.825
1	19	2	3	103.000	6297.089	6608.167	959.825
1	19	3	3	103.000	6295.745	6606.058	959.825
1	19	4	3	103.000	6294.401	6603.950	959.825
1	19	5	3	103.000	6294.133	6603.529	959.825

EJE	P.K.	AZIMUT	COS A	SEN A
3	104.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	3	104.000	6298.201	6608.051	959.800
1	20	2	3	104.000	6297.932	6607.629	959.800
1	20	3	3	104.000	6296.588	6605.521	959.800
1	20	4	3	104.000	6295.245	6603.413	959.800
1	20	5	3	104.000	6294.976	6602.991	959.800

EJE	P.K.	AZIMUT	COS A	SEN A
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3	105.000	36.126309	.843263	.537501
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	3	105.000	6299.044	6607.513	959.775
1	21	2	3	105.000	6298.775	6607.092	959.775
1	21	3	3	105.000	6297.432	6604.983	959.775
1	21	4	3	105.000	6296.088	6602.875	959.775
1	21	5	3	105.000	6295.819	6602.454	959.775

EJE	P.K.	AZIMUT	COS A	SEN A
3	106.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	3	106.000	6299.887	6606.976	959.750
1	22	2	3	106.000	6299.619	6606.554	959.750
1	22	3	3	106.000	6298.275	6604.446	959.750
1	22	4	3	106.000	6296.931	6602.338	959.750
1	22	5	3	106.000	6296.662	6601.916	959.750

EJE	P.K.	AZIMUT	COS A	SEN A
3	107.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	3	107.000	6300.731	6606.438	959.725
1	23	2	3	107.000	6300.462	6606.017	959.725
1	23	3	3	107.000	6299.118	6603.908	959.725
1	23	4	3	107.000	6297.774	6601.800	959.725
1	23	5	3	107.000	6297.506	6601.379	959.725

EJE	P.K.	AZIMUT	COS A	SEN A
3	108.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	24	1	3	108.000	6301.574	6605.901	959.700
1	24	2	3	108.000	6301.305	6605.479	959.700
1	24	3	3	108.000	6299.961	6603.371	959.700
1	24	4	3	108.000	6298.618	6601.263	959.700
1	24	5	3	108.000	6298.349	6600.841	959.700

EJE	P.K.	AZIMUT	COS A	SEN A
3	109.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	25	1	3	109.000	6302.417	6605.363	959.675
1	25	2	3	109.000	6302.148	6604.942	959.675
1	25	3	3	109.000	6300.805	6602.833	959.675
1	25	4	3	109.000	6299.461	6600.725	959.675
1	25	5	3	109.000	6299.192	6600.304	959.675

EJE	P.K.	AZIMUT	COS A	SEN A
3	110.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	26	1	3	110.000	6303.260	6604.826	959.650

1	26	2	3	110.000	6302.992	6604.404	959.650
1	26	3	3	110.000	6301.648	6602.296	959.650
1	26	4	3	110.000	6300.304	6600.188	959.650
1	26	5	3	110.000	6300.035	6599.766	959.650

EJE	P.K.	AZIMUT	COS A	SEN A
3	111.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	27	1	3	111.000	6304.104	6604.288	959.625
1	27	2	3	111.000	6303.835	6603.867	959.625
1	27	3	3	111.000	6302.491	6601.758	959.625
1	27	4	3	111.000	6301.147	6599.650	959.625
1	27	5	3	111.000	6300.879	6599.229	959.625

EJE	P.K.	AZIMUT	COS A	SEN A
3	112.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	28	1	3	112.000	6304.947	6603.751	959.600
1	28	2	3	112.000	6304.678	6603.329	959.600
1	28	3	3	112.000	6303.334	6601.221	959.600
1	28	4	3	112.000	6301.991	6599.113	959.600
1	28	5	3	112.000	6301.722	6598.691	959.600

EJE	P.K.	AZIMUT	COS A	SEN A
3	113.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	29	1	3	113.000	6305.790	6603.213	959.575
1	29	2	3	113.000	6305.521	6602.792	959.575
1	29	3	3	113.000	6304.178	6600.683	959.575
1	29	4	3	113.000	6302.834	6598.575	959.575
1	29	5	3	113.000	6302.565	6598.154	959.575

EJE	P.K.	AZIMUT	COS A	SEN A
3	114.000	36.126309	.843263	.537501

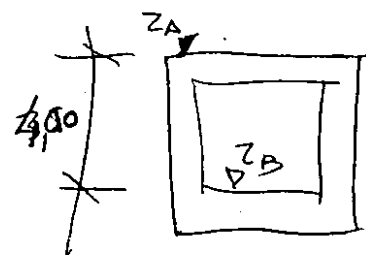
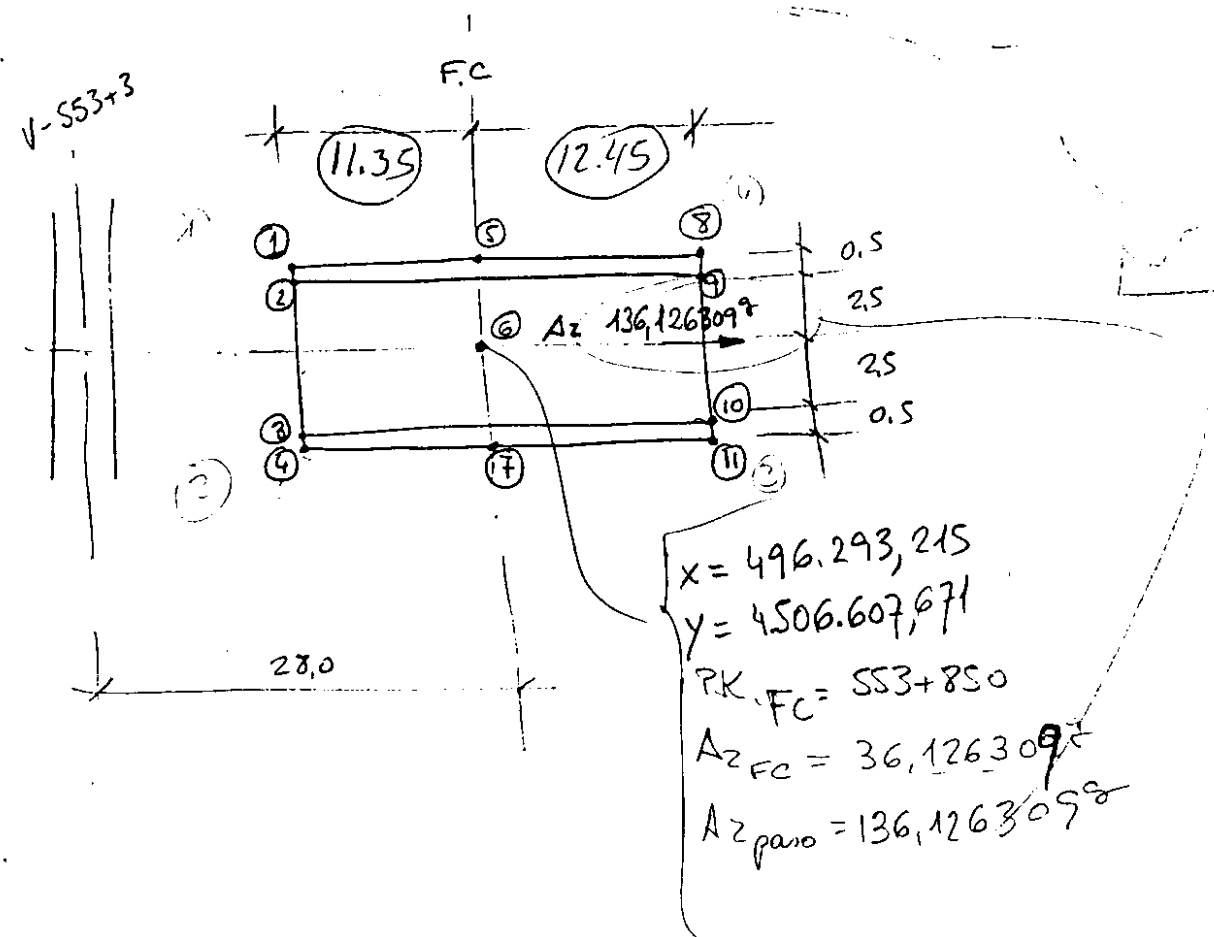
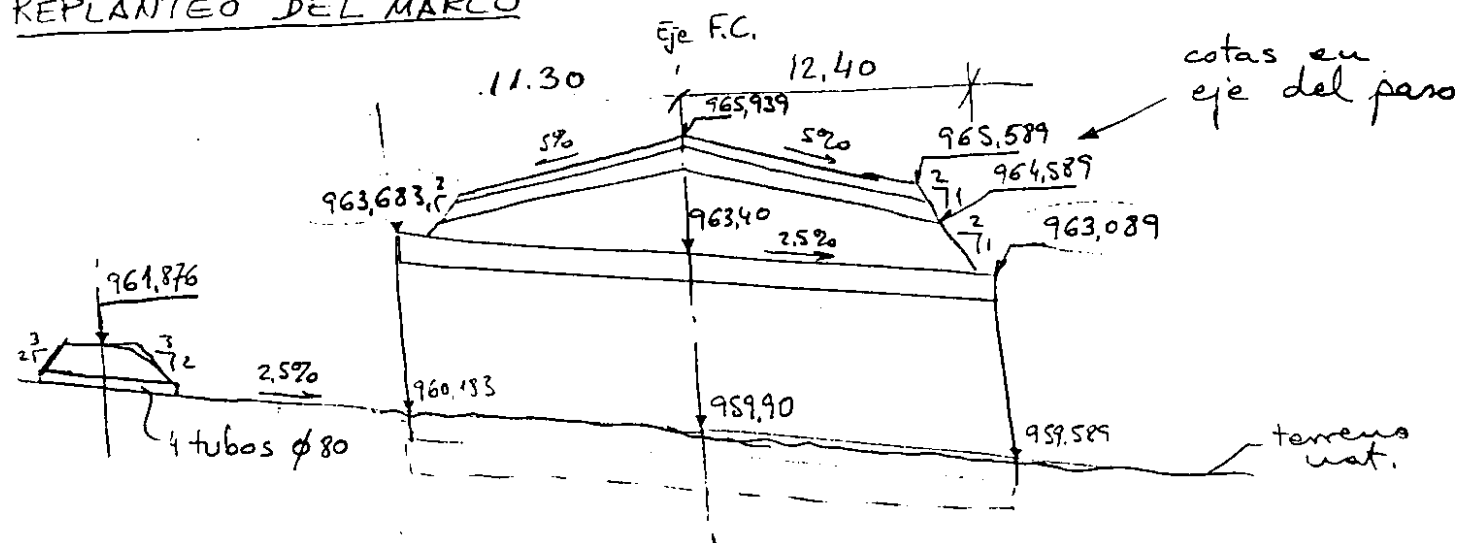
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	30	1	3	114.000	6306.634	6602.676	959.550
1	30	2	3	114.000	6306.365	6602.254	959.550
1	30	3	3	114.000	6305.021	6600.146	959.550
1	30	4	3	114.000	6303.677	6598.038	959.550
1	30	5	3	114.000	6303.408	6597.616	959.550

EJE	P.K.	AZIMUT	COS A	SEN A
3	115.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	31	1	3	115.000	6307.477	6602.138	959.525
1	31	2	3	115.000	6307.208	6601.717	959.525
1	31	3	3	115.000	6305.864	6599.608	959.525
1	31	4	3	115.000	6304.521	6597.500	959.525
1	31	5	3	115.000	6304.252	6597.079	959.525

PI 553+850

REPLANTEO DEL MARCO



TITULO DEL TRABAJO PI-553+850 PASO FAUNA

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
4	0	3	3	3850.000	99.999	6293.215	6607.671	966.562	959.900
				AZ.E	AZ.3				
				36.126307	136.126309				

SEGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	88.650	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	1	3	88.650	6285.257	6616.301	960.184 — ①
1	1	2	3	88.650	6284.988	6615.880	960.184 — ②
1	1	3	3	88.650	6283.644	6613.772	960.184 — ③
1	1	4	3	88.650	6282.301	6611.663	960.184 — ④
1	1	5	3	88.650	6282.032	6611.242	960.184 — ⑤

EJE	P.K.	AZIMUT	COS A	SEN A
3	100.000	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	2	1	3	100.000	6294.828	6610.201	959.900 — ⑥
1	2	2	3	100.000	6294.559	6609.779	959.900 — ⑦
1	2	3	3	100.000	6293.215	6607.671	959.900 — ⑧
1	2	4	3	100.000	6291.872	6605.563	959.900 — ⑨
1	2	5	3	100.000	6291.603	6605.141	959.900 — ⑩

EJE	P.K.	AZIMUT	COS A	SEN A
3	112.450	36.126309	.843263	.537501

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	3	1	3	112.450	6305.326	6603.509	959.589 — ⑪
1	3	2	3	112.450	6305.058	6603.087	959.589 — ⑫
1	3	3	3	112.450	6303.714	6600.979	959.589 — ⑬
1	3	4	3	112.450	6302.370	6598.871	959.589 — ⑭
1	3	5	3	112.450	6302.101	6598.449	959.589 — ⑮

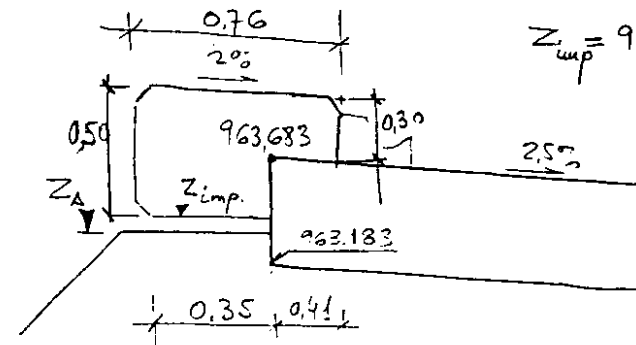
PI-553+850 PASO FAUNA										1001 FERROCARRIL									
2809.552	5753.07	5718.439	34.5435	3	3600.	965.502	.00424	1											
1	3441.249					1	4000.												
3	3861.249	0.	8000.	1833.03															
2	6416.142	8000.																	
2	3600.	1.5325	2.	5.4675	1.5325	0.	2.9675	0.	2.9675	4.0325	2.								
	4000.	1.5325	2.	5.4675	1.5325	0.	2.9675	0.	2.9675	4.0325	2.								
2	3600.	-.5	-.17796	4.06525	0.	0.	-.20994	2.4129	.5										
	4000.	-.5	-.17796	4.06525	0.	0.	-.20994	2.4129	.5										
7	1	0.	2	0.	3	0.	0	0.	8	0.	9	0.	10	0.					
										PASO FAUNA									
0.	6208.889	6661.421	136.126	309	1	0.	962.4	-.025	1										
1	150.					1	150.												
2	0.	0.5	2.5					2.5	0.5										
	150.	0.5	2.5					2.5	0.5										
2	0.																		
	150.																		
5	1	0.	2	0.	3	0.	9	0.	10	0.									
	1	40	3																
0																			
1	3	3	88.65	100.	112.45			53	13	23	33	43	5						
n																			
0																			
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REPLANTEO DE LAS ALETAS

PI 553+850

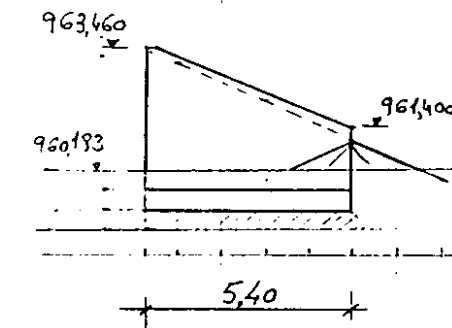
DEFINICION ALETAS

① y ②



$$Z_{imp} = 963.683 - 0.41 \times 0.025 + 0.3 + 0.76 \times 0.02 - 0.5 = 963.488$$

$$Z_A = 963.488 - 0.028 = \underline{963.460}$$



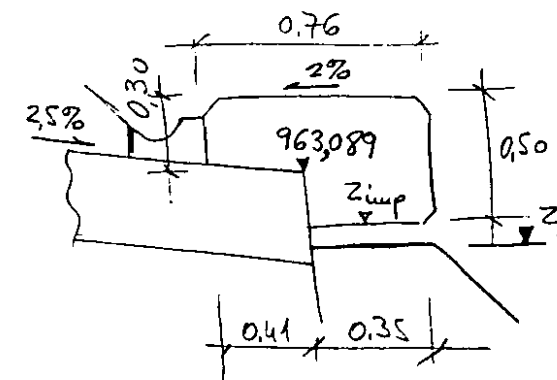
$$\text{terreno} \approx 960.1$$

$$\text{Apoyo zapata } 960.1 + 1.5 = 958.6$$

$$\text{Cara sup. } 958.6 + 0.6 = \underline{959.20}$$

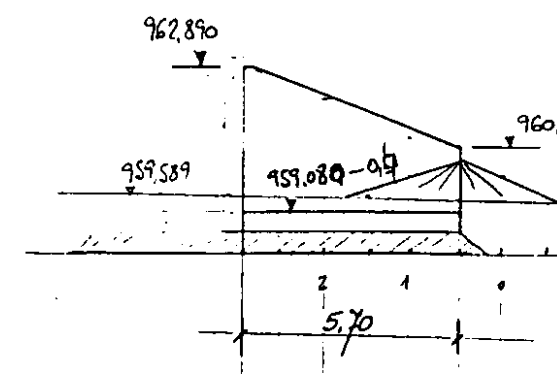
$$959.680 - 0.4 = 959.280$$

③ y ④



$$Z_{imp} = 963.089 + 0.41 \times 0.025 + 0.3 + 0.76 \times 0.02 - 0.5 = 962.914$$

$$Z_A = 962.914 - 0.024 = \underline{962.890}$$



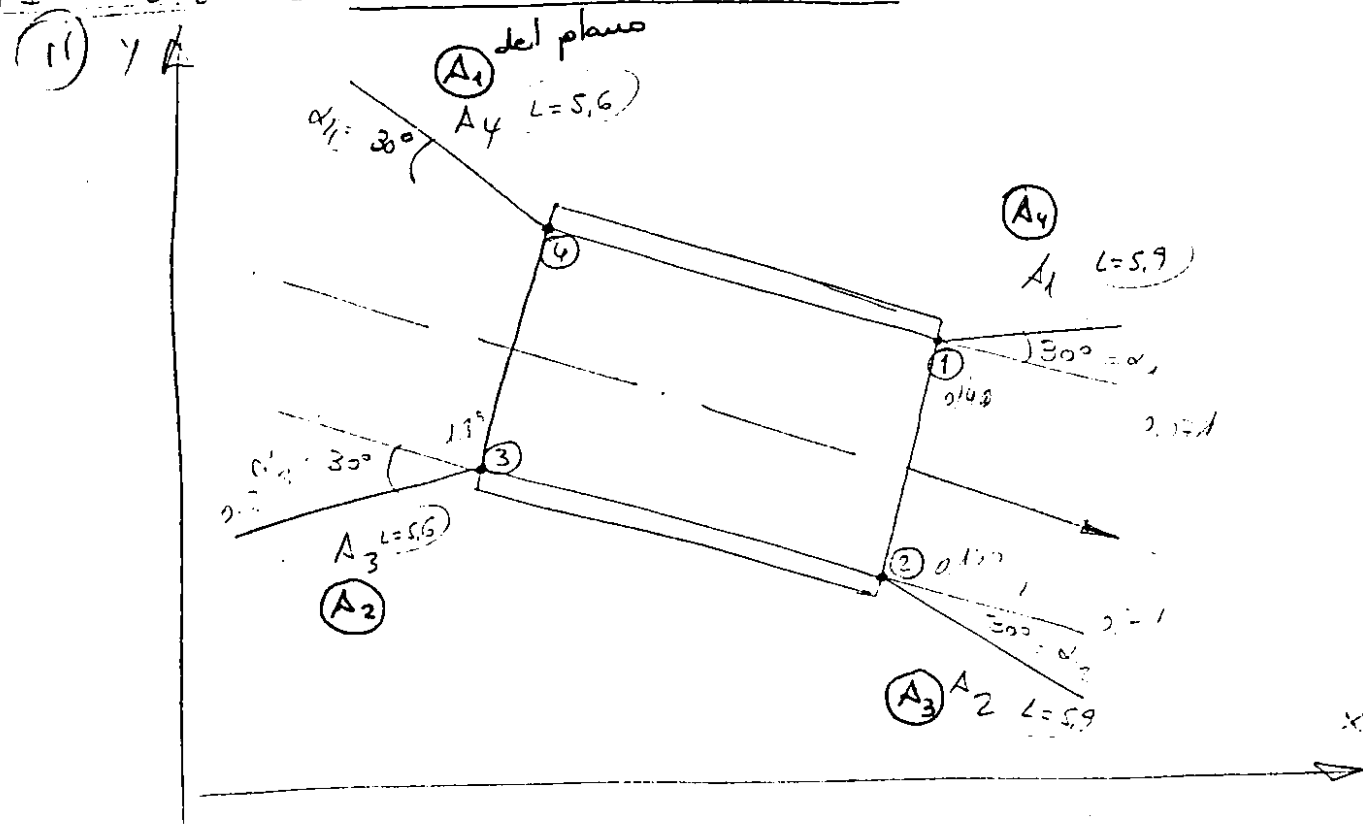
$$\text{Terreno} \approx 959.5$$

$$\text{Apoyo zapata } 958.0$$

$$\text{Cara sup zapata } \underline{958.6}$$

$$958.680 - 0.4 = 958.280$$

PI 553+850 - REPLANTEO DE ALETAS



REPLANTEO ALETAS P.I. 553+850. PASO DE FAUNA

-36.126309

.02

496305.058

496302.37

496282.301

496284.988

4506603.087

4506598.871

4506611.663

4506615.88

30.

30.

30.

30.

5.9

5.9

5.6

5.6

.1403

.1403

.1393

.1393

.071

.071

.071

.071

.4

.4

.4

.4

1.55

1.55

1.55

1.55

1.55

1.55

1.55

1.55

.3

.3

.3

.3

① 496305,058
4506603,087

③ 496282,301
4506611,663

② 496302,370
4506598,871

④ 496284,988
4506615,880

	ALETA 1	ALETA 2	ALETA 3	ALETA 4
	496305,058 ^{15 16}	496302,370 ^{30 31}	496282,301 ^{45 46}	496284,988 ⁶⁰
	4506603,087	4506598,871	4506611,663	4506615,880
	30.	30.	30.	30.
	5.9	5.9	5.6	5.6
	0.1403	0.1403	0.1393	0.1393
	0.071	0.071	0.071	0.071
	0.4	0.4	0.4	0.4
	1.55	1.55	1.55	1.55
	1.55	1.55	1.55	1.55
	0.3	0.3	0.3	0.3



TITULO :REPLANTEO ALETAS P.I. 553+850. PASO DE FAUNA

ANGULO DEL EJE OX CON EL EJE DEL PORTICO. BETA = -36.126309000 g
ANCHO DE LA JUNTA ENTRE LOS HASTIALES DEL
PORTICO Y LAS ALETAS = .020000 m

ALETA NUMERO = 4 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 496305.058000
YA = 4506603.087000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 5.900000 m
ESPESOR DEL TALUD. ZONA INICIAL = .140300 m
ZONA FINAL = .071000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.550 m
ANCHO DEL 2' TACON TRASERO = 1.550 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 496310.939
YI = 4506602.600

PUNTO C : XC = 496310.951
YC = 4506602.828

PUNTO D : XD = 496310.955
YD = 4506602.899

PUNTO E : XE = 496310.978
YE = 4506603.299

PUNTO G : XG = 496311.042
YG = 4506604.447

PUNTO K : XK = 496311.042
YK = 4506604.447

PUNTO J : XJ = 496304.983
YJ = 4506602.932

PUNTO AP: XAP = 496305.081
YAP = 4506603.086

PUNTO B : XB = 496305.145
YB = 4506603.224

PUNTO BP: XBP = 496305.168
YBP = 4506603.222

PUNTO F : XF = 496305.415
YF = 4506603.609

PUNTO H : XH = 496306.123
YH = 4506604.721

PUNTO P : XP = 496306.123
YP = 4506604.721

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I y J = 5.965 m 21
C y A = 5.899 m
C y AP = 5.876 m
D y BP = 5.796 m D
E y F = 5.572 m C
G y H = 4.926 m
K y P = 4.926 m 21, 23

21 = 962.890 B = 5.400
22 = 960.800 A = 3.172
23 = 958.630 21 = 4.726
H1 = 4.210 23 = -
H2 = 2.120 E = 1.15
F = -
21 = 1.55

ALETA NUMERO = 3 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 496302.370000
YA = 4506598.871000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 5.900000 m
ESPESOR DEL TALUD. ZONA INICIAL = .140300 m
ZONA FINAL = .071000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.550 m
ANCHO DEL 2' TACON TRASERO = 1.550 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 496305.295
YI = 4506593.746

PUNTO C : XC = 496305.093
YC = 4506593.638

PUNTO D : XD = 496305.030
YD = 4506593.604

PUNTO E : XE = 496304.677

YE = 4506593.415 } (P₁)

PUNTO G : XG = 496303.664
YG = 4506592.873

PUNTO K : XK = 496303.664
YK = 4506592.873

PUNTO J : XJ = 496302.479
YJ = 4506599.004

PUNTO AP: XAP = 496302.381
YAP = 4506598.851

PUNTO B : XB = 496302.283
YB = 4506598.734

PUNTO BP: XBP = 496302.294
YBP = 4506598.714

PUNTO F : XF = 496302.047
YF = 4506598.327 (P₂)

PUNTO H : XH = 496301.338
YH = 4506597.215

PUNTO P : XP = 496301.338
YP = 4506597.215

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS		I y J = 5.965 m	Z ₁
Z _A = 962,890	B = 5,400	C y A = 5.899 m	
Z _B = 960,800	A = 2,172	C y AP = 5.876 m	
Z _C = 958,680	Z ₂ = 4,926	D y BP = 5.796 m	D
H ₁ = 4,210	Z ₃ = —	E y F = 5.572 m	C
H ₂ = 2,120	E = 1,15	G y H = 4.926 m	
	F = —	K y P = 4.926 m	Z ₂ , Z ₃
	Z = 1,85		

ALETA NUMERO = 2 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 496282.301000
YA = 4506611.663000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 5.600000 m
ESPESOR DEL TALUD. ZONA INICIAL = .139300 m
ZONA FINAL = .071000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.550 m

ANCHO DEL 2' TACON TRASERO = 1.550 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 496276.720
YI = 4506612.137

PUNTO C : XC = 496276.707
YC = 4506611.909

PUNTO D : XD = 496276.703
YD = 4506611.838

PUNTO E : XE = 496276.681
YE = 4506611.438 (P₁)

PUNTO G : XG = 496276.616
YG = 4506610.290

PUNTO K : XK = 496276.616
YK = 4506610.290

PUNTO J : XJ = 496282.377
YJ = 4506611.819

PUNTO AP: XAP = 496282.278
YAP = 4506611.664

PUNTO B : XB = 496282.215
YB = 4506611.527

PUNTO BP: XBP = 496282.192
YBP = 4506611.529

PUNTO F : XF = 496281.945
YF = 4506611.142 (P₂)

PUNTO H : XH = 496281.236
YH = 4506610.030

PUNTO P : XP = 496281.236
YP = 4506610.030

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS		I y J = 5.665 m	Z ₁
Z _A = 963,460	B = 5,100	C y A = 5.599 m	
Z _B = 961,400	A = 0,173	C y AP = 5.576 m	
Z _C = 959,280	Z ₂ = 4,628	D y BP = 5.497 m	D
H ₁ = 4,180	Z ₃ = —	E y F = 5.273 m	C
H ₂ = 2,120	E = 1,15	G y H = 4.628 m	
	F = —	K y P = 4.628 m	Z ₂ , Z ₃
	Z = 1,85		

PUNTO P : XP = 496286.019
YP = 4506617.535

ALETA NUMERO = 1 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 496284.988000
YA = 4506615.880000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 5.600000 m
ESPESOR DEL TALUD. ZONA INICIAL = .139300 m
ZONA FINAL = .071000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.550 m
ANCHO DEL 2' TACON TRASERO = 1.550 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 496282.202
YI = 4506620.739

PUNTO C : XC = 496282.404
YC = 4506620.847

PUNTO D : XD = 496282.466
YD = 4506620.881

PUNTO E : XE = 496282.819
YE = 4506621.070

PUNTO G : XG = 496283.832
YG = 4506621.613

PUNTO K : XK = 496283.832
YK = 4506621.613

PUNTO J : XJ = 496284.879
YJ = 4506615.746

PUNTO AP: XAP = 496284.977
YAP = 4506615.900

PUNTO B : XB = 496285.074
YB = 4506616.016

PUNTO BP: XBP = 496285.064
YBP = 4506616.036

PUNTO F : XF = 496285.310
YF = 4506616.423

PUNTO H : XH = 496286.019
YH = 4506617.535

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS

I y J = 5.665 m Z_1
C y A = 5.599 m
C y AP = 5.576 m
D y BP = 5.497 m D
E y F = 5.273 m C
G y H = 4.628 m
K y P = 4.628 m Z_2, Z_3

$Z_A = 963.460$
 $Z_B = 961.400$
 $Z_C = 959.280$
 $H_1 = 4.180$
 $H_2 = 2.120$

$B = 5.100$
 $A = 0.173$
 $Z_2 = 4.628$
 $Z_3 =$
 $E = 1.15$
 $F =$
 $Z = 1.85$

4.4.5 Paso inferior de fauna 559+17

4.4.5 PASO INFERIOR DE FAUNA PK 559+17

ÍNDICE

- DEFINICIÓN GEOMÉTRICA:
 - DATOS GENERALES DEL TRAZADO
 - REPLANTEO DE LOS BORDES DEL FFCC.
 - REPLANTEO DEL PÓRTICO
 - REPLANTEO DE LAS ALETAS

. DEFINICION GEOMETICA P.F. 559+17

. DATOS GENERALES DEL TRAZADO

PI 559+170

$$\begin{cases} x=499007,904 \\ y=4509,301,706 \\ Az=58,2170 \end{cases}$$

557700

Recta

TRAMO II

560.029,927

A=1857,418

561.00

Recta

563.386,585

A=1857,418

563.165,585

R=15000

560.259,927

PLANTA

TITULO DEL TRABAJO PI-559+170 PASO FAUNA

Puntos característicos en planta
Tramo II

SEGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	59170.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	4	0	59170.000	10172.496	10198.715	982.850

EJE	P.K.	AZIMUT	COS A	SEN A
0	60029.927	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
2	4	0	0	60029.927	10853.764	10723.451	938.732

EJE	P.K.	AZIMUT	COS A	SEN A
0	60259.927	-42.271075	.787538	-.616266

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	3	4	0	60259.927	11035.620	10864.264	990.305

EJE	P.K.	AZIMUT	COS A	SEN A
0	63156.585	-54.564873	.654630	-.755949

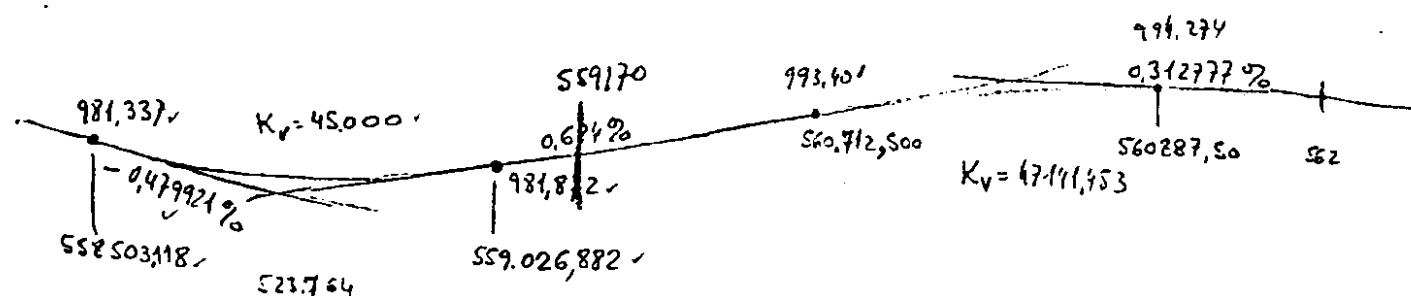
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	4	4	0	63156.585	13130.869	12857.883	1001.123

EJE	P.K.	AZIMUT	COS A	SEN A
0	63386.585	-55.052949	.648815	-.760946

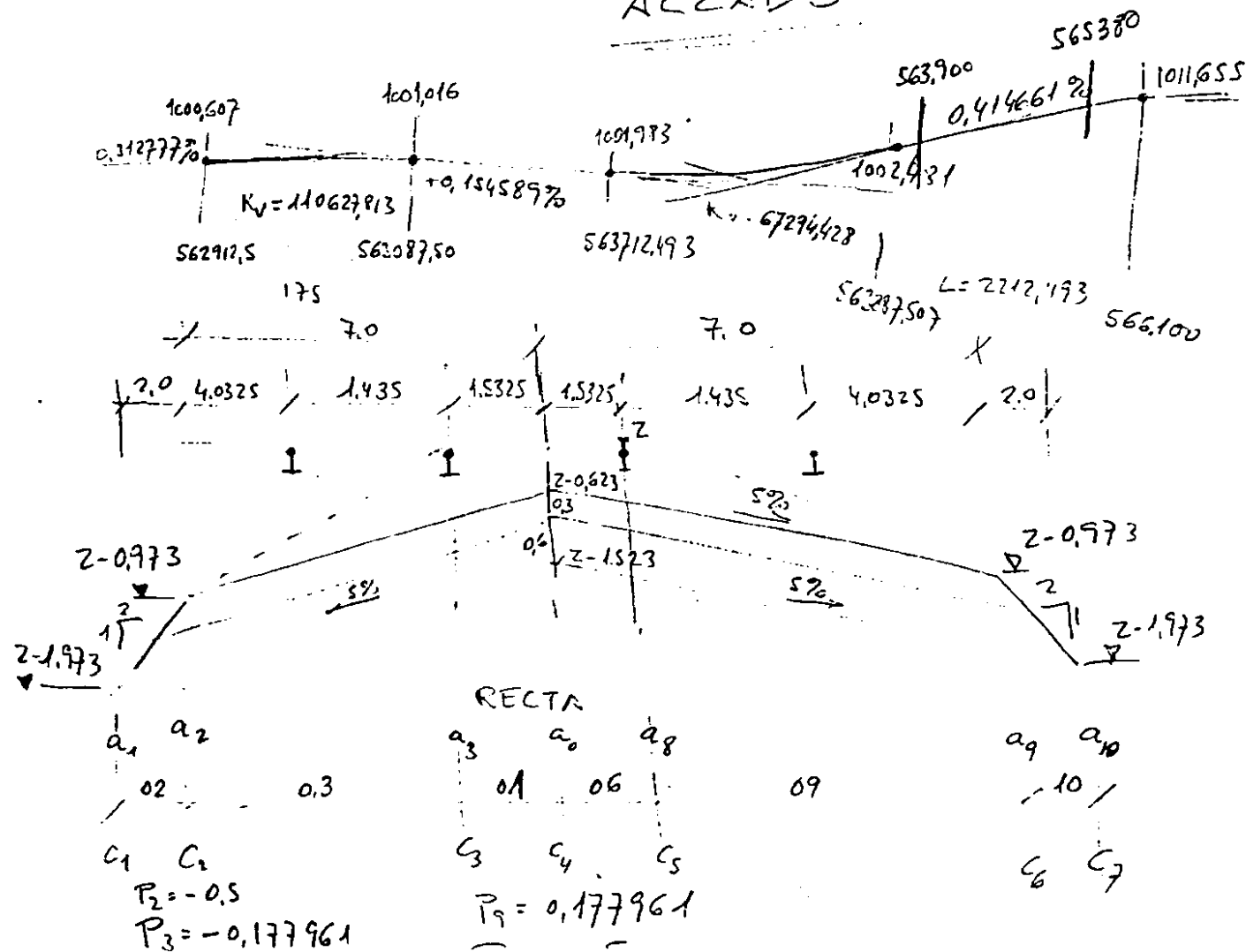
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	5	4	0	63386.585	13280.543	13032.518	1001.478

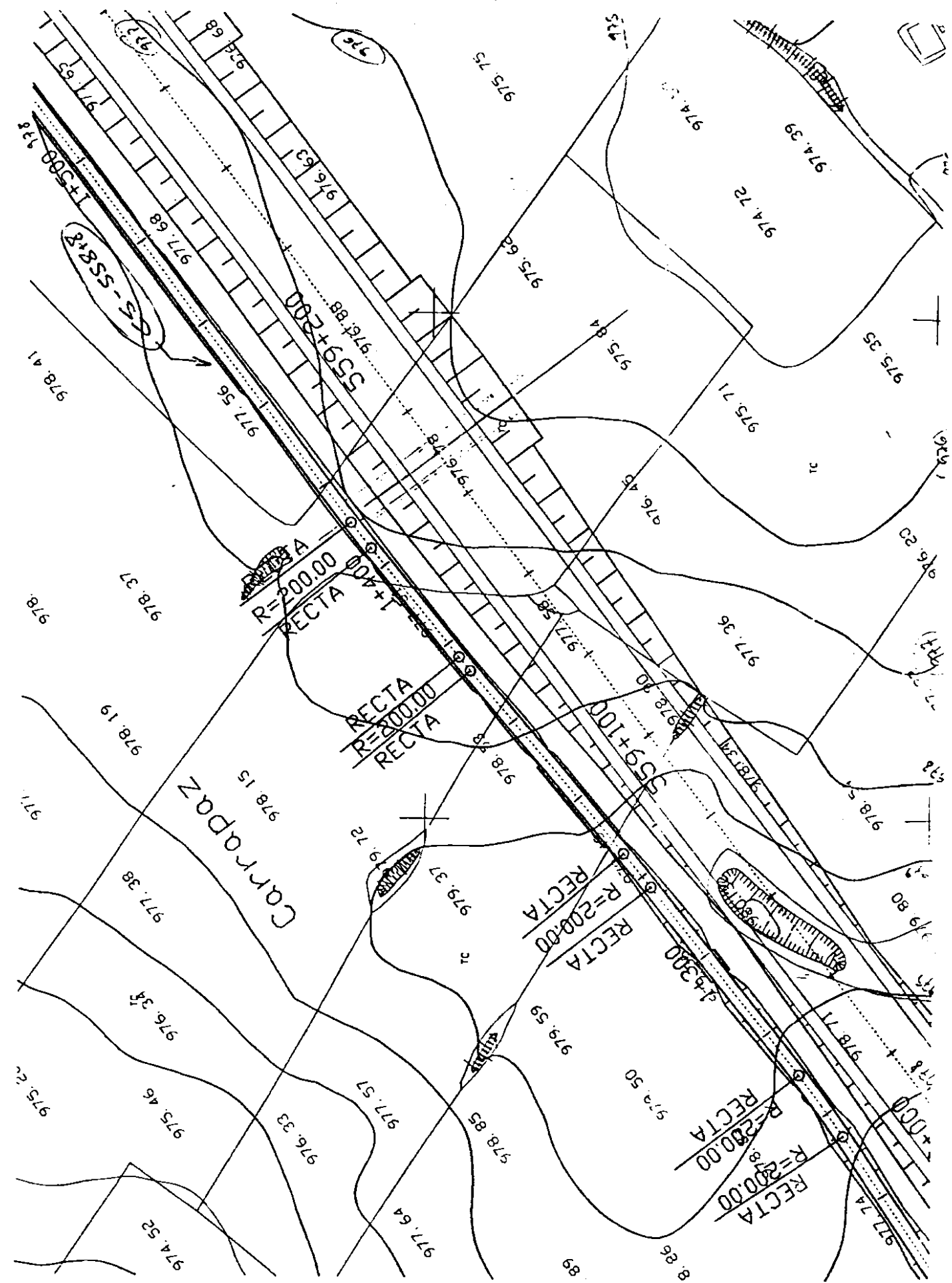
EJE	P.K.	AZIMUT	COS A	SEN A
0	66100.000	-55.052949	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	6	4	0	66100.000	15041.049	15097.280	1011.654



ALZADO





REPLANTEO DE LOS BORDES DEL FERROCARRIL

PI-559+170 PASO FAUNA
 57700. 9007.904 9301.706 58.217 1 59026.882 981.872 .00684 1
 1 60029.927 1 60712.5
 2 57700. 1.5325 2. 5.46751.5325 0. 1.5325 0. 1.53255.4675 2.
 60029.9271.5325 2. 5.46751.5325 0. 1.5325 0. 1.53255.4675 2.
 2 57700. -.5 -.17796 .17796 .5
 60029.927 -.5 -.17796 .17796 .5
 7 1 0. 2 0. 3 0. 0 0. 8 0. 9 0. 10 0.
 1 0 59140. 1. 59200. 70 10 20 30 40 50 60 7
 1 0 1 59170. 10 4
 0
 0
 0
 /*
 /R

TITULO DEL TRABAJO PI-559+170 PASO FAUNA

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A			
0	59140.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	1	0	59140.000	10143.237	10187.539	980.673
1	1	2	0	59140.000	10144.458	10185.954	981.673
1	1	3	0	59140.000	10147.794	10181.623	982.646
1	1	4	0	59140.000	10148.729	10180.409	982.646
1	1	5	0	59140.000	10149.664	10179.195	982.646
1	1	6	0	59140.000	10153.000	10174.863	981.673
1	1	7	0	59140.000	10154.221	10173.278	980.673

EJE	P.K.	AZIMUT	COS A	SEN A			
0	59141.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	0	59141.000	10144.029	10188.149	980.680
1	2	2	0	59141.000	10145.250	10186.565	981.680
1	2	3	0	59141.000	10148.586	10182.233	982.653
1	2	4	0	59141.000	10149.521	10181.019	982.653
1	2	5	0	59141.000	10150.456	10179.805	982.653
1	2	6	0	59141.000	10153.793	10175.473	981.680
1	2	7	0	59141.000	10155.013	10173.889	980.680

EJE	P.K.	AZIMUT	COS A	SEN A			
0	59142.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	0	59142.000	10144.822	10188.759	980.686
1	3	2	0	59142.000	10146.042	10187.175	981.686
1	3	3	0	59142.000	10149.378	10182.843	982.659
.	3	4	0	59142.000	10150.313	10181.629	982.659
1	3	5	0	59142.000	10151.249	10180.415	982.659
1	3	6	0	59142.000	10154.585	10176.083	981.686
1	3	7	0	59142.000	10155.805	10174.499	980.686

EJE	P.K.		AZIMUT		COS A	SEN A	
0	59143.000		-41.783000		.792240	-.610210	
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	0	59143.000	10145.614	10189.369	980.693
1	4	2	0	59143.000	10146.834	10187.785	981.693
1	4	3	0	59143.000	10150.171	10183.453	982.666
1	4	4	0	59143.000	10151.106	10182.239	982.666
1	4	5	0	59143.000	10152.041	10181.025	982.666
1	4	6	0	59143.000	10155.377	10176.694	981.693
1	4	7	0	59143.000	10156.598	10175.109	980.693

EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
0	59144.000	-41.783000	.792240	-.610210			
1	5	1	0	59144.000	10146.406	10189.980	980.700
1	5	2	0	59144.000	10147.626	10188.395	981.700
1	5	3	0	59144.000	10150.963	10184.064	982.673
1	5	4	0	59144.000	10151.898	10182.849	982.673
1	5	5	0	59144.000	10152.833	10181.635	982.673
1	5	6	0	59144.000	10156.169	10177.304	981.700
1	5	7	0	59144.000	10157.390	10175.719	980.700

EJE	P.K.	AZIMUT	COS A	SEN A
0	59145.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	6	1	0	59145.000	10147.198	10190.590	980.707
1	6	2	0	59145.000	10148.419	10189.005	981.707
1	6	3	0	59145.000	10151.755	10184.674	982.680
1	6	4	0	59145.000	10152.690	10183.460	982.680
1	6	5	0	59145.000	10153.625	10182.246	982.680
1	6	6	0	59145.000	10156.962	10177.914	981.707
1	6	7	0	59145.000	10158.182	10176.330	980.707

EJE	P.K.	AZIMUT	COS A	SEN A
0	59146.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	7	1	0	59146.000	10147.991	10191.200	980.714
1	7	2	0	59146.000	10149.211	10189.616	981.714
1	7	3	0	59146.000	10152.547	10185.284	982.687
1	7	4	0	59146.000	10153.482	10184.070	982.687
1	7	5	0	59146.000	10154.418	10182.856	982.687
1	7	6	0	59146.000	10157.754	10178.524	981.714
1	7	7	0	59146.000	10158.974	10176.940	980.714

EJE	P.K.	AZIMUT	COS A	SEN A
0	59147.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	8	1	0	59147.000	10148.783	10191.810	980.721
1	8	2	0	59147.000	10150.003	10190.226	981.721
1	8	3	0	59147.000	10153.340	10185.894	982.694
1	8	4	0	59147.000	10154.275	10184.680	982.694
1	8	5	0	59147.000	10155.210	10183.466	982.694
1	8	6	0	59147.000	10158.546	10179.134	981.721
1	8	7	0	59147.000	10159.767	10177.550	980.721

EJE	P.K.	AZIMUT	COS A	SEN A
0	59148.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	9	1	0	59148.000	10149.575	10192.420	980.727
1	9	2	0	59148.000	10150.795	10190.836	981.727
1	9	3	0	59148.000	10154.132	10186.504	982.700
1	9	4	0	59148.000	10155.067	10185.290	982.700

1	9	5	0	59148.000	10156.002	10184.076	982.700
1	9	6	0	59148.000	10159.338	10179.745	981.727
1	9	7	0	59148.000	10160.559	10178.160	980.727

EJE	P.K.	AZIMUT	COS A	SEN A
0	59149.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	10	1	0	59149.000	10150.367	10193.031	980.734
1	10	2	0	59149.000	10151.588	10191.446	981.734
1	10	3	0	59149.000	10154.924	10187.115	982.707
1	10	4	0	59149.000	10155.859	10185.901	982.707
1	10	5	0	59149.000	10156.794	10184.686	982.707
1	10	6	0	59149.000	10160.131	10180.355	981.734
1	10	7	0	59149.000	10161.351	10178.770	980.734

EJE	P.K.	AZIMUT	COS A	SEN A
0	59150.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	11	1	0	59150.000	10151.160	10193.641	980.741
1	11	2	0	59150.000	10152.380	10192.056	981.741
1	11	3	0	59150.000	10155.716	10187.725	982.714
1	11	4	0	59150.000	10156.651	10186.511	982.714
1	11	5	0	59150.000	10157.587	10185.297	982.714
1	11	6	0	59150.000	10160.923	10180.965	981.741
1	11	7	0	59150.000	10162.143	10179.381	980.741

EJE	P.K.	AZIMUT	COS A	SEN A
0	59151.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	12	1	0	59151.000	10151.952	10194.251	980.748
1	12	2	0	59151.000	10153.172	10192.667	981.748
1	12	3	0	59151.000	10156.508	10188.335	982.721
1	12	4	0	59151.000	10157.444	10187.121	982.721
1	12	5	0	59151.000	10158.379	10185.907	982.721
1	12	6	0	59151.000	10161.715	10181.575	981.748
1	12	7	0	59151.000	10162.936	10179.991	980.748

EJE	P.K.	AZIMUT	COS A	SEN A
0	59152.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	13	1	0	59152.000	10152.744	10194.861	980.755
1	13	2	0	59152.000	10153.964	10193.277	981.755
1	13	3	0	59152.000	10157.301	10188.945	982.728
1	13	4	0	59152.000	10158.236	10187.731	982.728
1	13	5	0	59152.000	10159.171	10186.517	982.728
1	13	6	0	59152.000	10162.507	10182.185	981.755
1	13	7	0	59152.000	10163.728	10180.601	980.755

EJE	P.K.	AZIMUT	COS A	SEN A
0	59153.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	14	1	0	59153.000	10153.536	10195.472	980.762
1	14	2	0	59153.000	10154.757	10193.887	981.762
1	14	3	0	59153.000	10158.093	10189.555	982.735
1	14	4	0	59153.000	10159.028	10188.341	982.735
1	14	5	0	59153.000	10159.963	10187.127	982.735
1	14	6	0	59153.000	10163.300	10182.796	981.762
1	14	7	0	59153.000	10164.520	10181.211	980.762

EJE	P.K.	AZIMUT	COS A	SEN A
0	59154.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	15	1	0	59154.000	10154.328	10196.082	980.768
1	15	2	0	59154.000	10155.549	10194.497	981.768
1	15	3	0	59154.000	10158.885	10190.166	982.741
1	15	4	0	59154.000	10159.820	10188.952	982.741
1	15	5	0	59154.000	10160.756	10187.737	982.741
1	15	6	0	59154.000	10164.092	10183.406	981.768
1	15	7	0	59154.000	10165.312	10181.821	980.768

JE	P.K.	AZIMUT	COS A	SEN A
0	59155.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	16	1	0	59155.000	10155.121	10196.692	980.775
1	16	2	0	59155.000	10156.341	10195.107	981.775
1	16	3	0	59155.000	10159.677	10190.776	982.748
1	16	4	0	59155.000	10160.613	10189.562	982.748
1	16	5	0	59155.000	10161.548	10188.348	982.748
1	16	6	0	59155.000	10164.884	10184.016	981.775
1	16	7	0	59155.000	10166.104	10182.432	980.775

EJE	P.K.	AZIMUT	COS A	SEN A
0	59156.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	17	1	0	59156.000	10155.913	10197.302	980.782
1	17	2	0	59156.000	10157.133	10195.718	981.782
1	17	3	0	59156.000	10160.470	10191.386	982.755
1	17	4	0	59156.000	10161.405	10190.172	982.755
1	17	5	0	59156.000	10162.340	10188.958	982.755
1	17	6	0	59156.000	10165.676	10184.626	981.782
1	17	7	0	59156.000	10166.897	10183.042	980.782

EJE	P.K.	AZIMUT	COS A	SEN A
0	59157.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	18	1	0	59157.000	10156.705	10197.912	980.789
1	18	2	0	59157.000	10157.926	10196.328	981.789
1	18	3	0	59157.000	10161.262	10191.996	982.762
1	18	4	0	59157.000	10162.197	10190.782	982.762
1	18	5	0	59157.000	10163.132	10189.568	982.762
1	18	6	0	59157.000	10166.469	10185.237	981.789
1	18	7	0	59157.000	10167.689	10183.652	980.789

EJE	P.K.	AZIMUT	COS A	SEN A
0	59158.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	19	1	0	59158.000	10157.497	10198.523	980.796
1	19	2	0	59158.000	10158.718	10196.938	981.796
1	19	3	0	59158.000	10162.054	10192.607	982.769
1	19	4	0	59158.000	10162.989	10191.392	982.769
1	19	5	0	59158.000	10163.924	10190.178	982.769
1	19	6	0	59158.000	10167.261	10185.847	981.796
1	19	7	0	59158.000	10168.481	10184.262	980.796

EJE	P.K.	AZIMUT	COS A	SEN A
0	59159.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	20	1	0	59159.000	10158.290	10199.133	980.803
1	20	2	0	59159.000	10159.510	10197.548	981.803
1	20	3	0	59159.000	10162.846	10193.217	982.776
1	20	4	0	59159.000	10163.782	10192.003	982.776
1	20	5	0	59159.000	10164.717	10190.789	982.776
1	20	6	0	59159.000	10168.053	10186.457	981.803
1	20	7	0	59159.000	10169.273	10184.872	980.803

EJE	P.K.	AZIMUT	COS A	SEN A
0	59160.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	21	1	0	59160.000	10159.082	10199.743	980.810
1	21	2	0	59160.000	10160.302	10198.159	981.810
1	21	3	0	59160.000	10163.639	10193.827	982.783
1	21	4	0	59160.000	10164.574	10192.613	982.783
1	21	5	0	59160.000	10165.509	10191.399	982.783
1	21	6	0	59160.000	10168.845	10187.067	981.810
1	21	7	0	59160.000	10170.066	10185.483	980.810

EJE	P.K.	AZIMUT	COS A	SEN A
0	59161.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	22	1	0	59161.000	10159.874	10200.353	980.816
1	22	2	0	59161.000	10161.095	10198.769	981.816
1	22	3	0	59161.000	10164.431	10194.437	982.789
1	22	4	0	59161.000	10165.366	10193.223	982.789
1	22	5	0	59161.000	10166.301	10192.009	982.789
1	22	6	0	59161.000	10169.638	10187.677	981.816
1	22	7	0	59161.000	10170.858	10186.093	980.816

EJE	P.K.	AZIMUT	COS A	SEN A
0	59162.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	23	1	0	59162.000	10160.666	10200.963	980.823
1	23	2	0	59162.000	10161.887	10199.379	981.823

1	23	3	0	59162.000	10165.223	10195.047	982.796
1	23	4	0	59162.000	10166.158	10193.833	982.796
1	23	5	0	59162.000	10167.093	10192.619	982.796
1	23	6	0	59162.000	10170.430	10188.288	981.823
1	23	7	0	59162.000	10171.650	10186.703	980.823

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59163.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	24	1	0	59163.000	10161.459	10201.574	980.830
1	24	2	0	59163.000	10162.679	10199.989	981.830
1	24	3	0	59163.000	10166.015	10195.658	982.803
1	24	4	0	59163.000	10166.951	10194.443	982.803
1	24	5	0	59163.000	10167.886	10193.229	982.803
1	24	6	0	59163.000	10171.222	10188.898	981.830
1	24	7	0	59163.000	10172.442	10187.313	980.830

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59164.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	25	1	0	59164.000	10162.251	10202.184	980.837
1	25	2	0	59164.000	10163.471	10200.599	981.837
1	25	3	0	59164.000	10166.808	10196.268	982.810
1	25	4	0	59164.000	10167.743	10195.054	982.810
1	25	5	0	59164.000	10168.678	10193.840	982.810
1	25	6	0	59164.000	10172.014	10189.508	981.837
1	25	7	0	59164.000	10173.235	10187.924	980.837

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59165.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	26	1	0	59165.000	10163.043	10202.794	980.844
1	26	2	0	59165.000	10164.264	10201.210	981.844
1	26	3	0	59165.000	10167.600	10196.878	982.817
1	26	4	0	59165.000	10168.535	10195.664	982.817
1	26	5	0	59165.000	10169.470	10194.450	982.817
1	26	6	0	59165.000	10172.806	10190.118	981.844
1	26	7	0	59165.000	10174.027	10188.534	980.844

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59166.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	27	1	0	59166.000	10163.835	10203.404	980.851
1	27	2	0	59166.000	10165.056	10201.820	981.851
1	27	3	0	59166.000	10168.392	10197.488	982.824
1	27	4	0	59166.000	10169.327	10196.274	982.824
1	27	5	0	59166.000	10170.262	10195.060	982.824
1	27	6	0	59166.000	10173.599	10190.728	981.851
1	27	7	0	59166.000	10174.819	10189.144	980.851

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59167.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	28	1	0	59167.000	10164.628	10204.014	980.857
1	28	2	0	59167.000	10165.848	10202.430	981.857
1	28	3	0	59167.000	10169.184	10198.098	982.830
1	28	4	0	59167.000	10170.119	10196.884	982.330
1	28	5	0	59167.000	10171.055	10195.670	982.830
1	28	6	0	59167.000	10174.391	10191.339	981.857
1	28	7	0	59167.000	10175.611	10189.754	980.857

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59168.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	29	1	0	59168.000	10165.420	10204.625	980.864
1	29	2	0	59168.000	10166.640	10203.040	981.864
1	29	3	0	59168.000	10169.977	10198.709	982.837
1	29	4	0	59168.000	10170.912	10197.495	982.837
1	29	5	0	59168.000	10171.847	10196.280	982.837
1	29	6	0	59168.000	10175.183	10191.949	981.864
1	29	7	0	59168.000	10176.404	10190.364	980.864

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59169.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	30	1	0	59169.000	10166.212	10205.235	980.871
1	30	2	0	59169.000	10167.432	10203.650	981.871
1	30	3	0	59169.000	10170.769	10199.319	982.844
1	30	4	0	59169.000	10171.704	10198.105	982.844
1	30	5	0	59169.000	10172.639	10196.891	982.844
1	30	6	0	59169.000	10175.975	10192.559	981.871
1	30	7	0	59169.000	10177.196	10190.975	980.871

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59170.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	31	1	0	59170.000	10167.004	10205.845	980.878
1	31	2	0	59170.000	10168.225	10204.261	981.878
1	31	3	0	59170.000	10171.561	10199.929	982.851
1	31	4	0	59170.000	10172.496	10198.715	982.851
1	31	5	0	59170.000	10173.431	10197.501	982.851
1	31	6	0	59170.000	10176.768	10193.169	981.878
1	31	7	0	59170.000	10177.988	10191.585	980.878

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59171.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	32	1	0	59171.000	10167.797	10206.455	980.885
1	32	2	0	59171.000	10169.017	10204.871	981.885
1	32	3	0	59171.000	10172.353	10200.539	982.858
1	32	4	0	59171.000	10173.288	10199.325	982.858
1	32	5	0	59171.000	10174.224	10198.111	982.858

1	32	6	0	59171.000	10177.560	10193.779	981.885
1	32	7	0	59171.000	10178.780	10192.195	980.885
EJE	P.K.	AZIMUT	COS A	SEN A			
0	59172.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	33	1	0	59172.000	10168.589	10207.066	980.892
1	33	2	0	59172.000	10169.809	10205.481	981.892
1	33	3	0	59172.000	10173.146	10201.149	982.865
1	33	4	0	59172.000	10174.081	10199.935	982.865
1	33	5	0	59172.000	10175.016	10198.721	982.865
1	33	6	0	59172.000	10178.352	10194.390	981.892
1	33	7	0	59172.000	10179.573	10192.805	980.892
EJE	P.K.	AZIMUT	COS A	SEN A			
0	59173.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	34	1	0	59173.000	10169.381	10207.676	980.898
1	34	2	0	59173.000	10170.601	10206.091	981.898
1	34	3	0	59173.000	10173.938	10201.760	982.871
1	34	4	0	59173.000	10174.873	10200.546	982.871
1	34	5	0	59173.000	10175.808	10199.331	982.871
1	34	6	0	59173.000	10179.144	10195.000	981.898
1	34	7	0	59173.000	10180.365	10193.415	980.898
EJE	P.K.	AZIMUT	COS A	SEN A			
0	59174.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	35	1	0	59174.000	10170.173	10208.286	980.905
1	35	2	0	59174.000	10171.394	10206.701	981.905
1	35	3	0	59174.000	10174.730	10202.370	982.878
1	35	4	0	59174.000	10175.665	10201.156	982.878
1	35	5	0	59174.000	10176.600	10199.942	982.878
1	35	6	0	59174.000	10179.937	10195.610	981.905
1	35	7	0	59174.000	10181.157	10194.026	980.905
EJE	P.K.	AZIMUT	COS A	SEN A			
0	59175.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	36	1	0	59175.000	10170.966	10208.896	980.912
1	36	2	0	59175.000	10172.186	10207.312	981.912
1	36	3	0	59175.000	10175.522	10202.980	982.885
1	36	4	0	59175.000	10176.457	10201.766	982.885
1	36	5	0	59175.000	10177.393	10200.552	982.885
1	36	6	0	59175.000	10180.729	10196.220	981.912
1	36	7	0	59175.000	10181.949	10194.636	980.912
EJE	P.K.	AZIMUT	COS A	SEN A			
0	59176.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z

1	37	1	0	59176.000	10171.758	10209.506	980.919
1	37	2	0	59176.000	10172.978	10207.922	981.919
1	37	3	0	59176.000	10176.314	10203.590	982.892
1	37	4	0	59176.000	10177.250	10202.376	982.892
1	37	5	0	59176.000	10178.185	10201.162	982.892
1	37	6	0	59176.000	10181.521	10196.831	981.919
1	37	7	0	59176.000	10182.742	10195.246	980.919
EJE	P.K.	AZIMUT	COS A	SEN A			
0	59177.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	38	1	0	59177.000	10172.550	10210.117	980.926
1	38	2	0	59177.000	10173.770	10208.532	981.926
1	38	3	0	59177.000	10177.107	10204.201	982.899
1	38	4	0	59177.000	10178.042	10202.986	982.899
1	38	5	0	59177.000	10178.977	10201.772	982.899
1	38	6	0	59177.000	10182.313	10197.441	981.926
1	38	7	0	59177.000	10183.534	10195.856	980.926
EJE	P.K.	AZIMUT	COS A	SEN A			
0	59178.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	39	1	0	59178.000	10173.342	10210.727	980.933
1	39	2	0	59178.000	10174.563	10209.142	981.933
1	39	3	0	59178.000	10177.899	10204.811	982.906
1	39	4	0	59178.000	10178.834	10203.597	982.906
1	39	5	0	59178.000	10179.769	10202.383	982.906
1	39	6	0	59178.000	10183.106	10198.051	981.933
1	39	7	0	59178.000	10184.326	10196.466	980.933
EJE	P.K.	AZIMUT	COS A	SEN A			
0	59179.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	40	1	0	59179.000	10174.134	10211.337	980.939
1	40	2	0	59179.000	10175.355	10209.752	981.939
1	40	3	0	59179.000	10178.691	10205.421	982.912
1	40	4	0	59179.000	10179.626	10204.207	982.912
1	40	5	0	59179.000	10180.562	10202.993	982.912
1	40	6	0	59179.000	10183.898	10198.661	981.939
1	40	7	0	59179.000	10185.118	10197.077	980.939
EJE	P.K.	AZIMUT	COS A	SEN A			
0	59180.000	-41.783000	.792240	-.610210			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	41	1	0	59180.000	10174.927	10211.947	980.946
1	41	2	0	59180.000	10176.147	10210.363	981.946
1	41	3	0	59180.000	10179.483	10206.031	982.919
1	41	4	0	59180.000	10180.419	10204.817	982.919
1	41	5	0	59180.000	10181.354	10203.603	982.919
1	41	6	0	59180.000	10184.690	10199.271	981.946
1	41	7	0	59180.000	10185.910	10197.687	980.946

EJE	P.K.	AZIMUT	COS A	SEN A
0	59181.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	42	1	0	59181.000	10175.719	10212.557	980.953
1	42	2	0	59181.000	10176.939	10210.973	981.953
1	42	3	0	59181.000	10180.276	10206.641	982.926
1	42	4	0	59181.000	10181.211	10205.427	982.926
1	42	5	0	59181.000	10182.146	10204.213	982.926
1	42	6	0	59181.000	10185.482	10199.882	981.953
1	42	7	0	59181.000	10186.703	10198.297	980.953

EJE	P.K.	AZIMUT	COS A	SEN A
0	59182.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	43	1	0	59182.000	10176.511	10213.168	980.960
1	43	2	0	59182.000	10177.732	10211.583	981.960
1	43	3	0	59182.000	10181.068	10207.252	982.933
1	43	4	0	59182.000	10182.003	10206.037	982.933
1	43	5	0	59182.000	10182.938	10204.823	982.933
1	43	6	0	59182.000	10186.275	10200.492	981.960
1	43	7	0	59182.000	10187.495	10198.907	980.960

EJE	P.K.	AZIMUT	COS A	SEN A
0	59183.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	44	1	0	59183.000	10177.303	10213.778	980.967
1	44	2	0	59183.000	10178.524	10212.193	981.967
1	44	3	0	59183.000	10181.860	10207.862	982.940
1	44	4	0	59183.000	10182.795	10206.648	982.940
1	44	5	0	59183.000	10183.730	10205.434	982.940
1	44	6	0	59183.000	10187.067	10201.102	981.967
1	44	7	0	59183.000	10188.287	10199.518	980.967

EJE	P.K.	AZIMUT	COS A	SEN A
0	59184.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	45	1	0	59184.000	10178.096	10214.388	980.974
1	45	2	0	59184.000	10179.316	10212.804	981.974
1	45	3	0	59184.000	10182.652	10208.472	982.947
1	45	4	0	59184.000	10183.588	10207.258	982.947
1	45	5	0	59184.000	10184.523	10206.044	982.947
1	45	6	0	59184.000	10187.859	10201.712	981.974
1	45	7	0	59184.000	10189.079	10200.128	980.974

EJE	P.K.	AZIMUT	COS A	SEN A
0	59185.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	46	1	0	59185.000	10178.888	10214.998	980.981
1	46	2	0	59185.000	10180.108	10213.414	981.981
1	46	3	0	59185.000	10183.445	10209.082	982.954

1	46	4	0	59185.000	10184.380	10207.868	982.954
1	46	5	0	59185.000	10185.315	10206.654	982.954
1	46	6	0	59185.000	10188.651	10202.322	981.981
1	46	7	0	59185.000	10189.872	10200.738	980.981

EJE	P.K.	AZIMUT	COS A	SEN A
0	59186.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	47	1	0	59186.000	10179.680	10215.608	980.987
1	47	2	0	59186.000	10180.901	10214.024	981.987
1	47	3	0	59186.000	10184.237	10209.692	982.960
1	47	4	0	59186.000	10185.172	10208.478	982.960
1	47	5	0	59186.000	10186.107	10207.264	982.960
1	47	6	0	59186.000	10189.444	10202.933	981.987
1	47	7	0	59186.000	10190.664	10201.348	980.987

EJE	P.K.	AZIMUT	COS A	SEN A
0	59187.000	-41.783000	.792240	-.610210

PO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	48	1	0	59187.000	10180.472	10216.219	980.994
1	48	2	0	59187.000	10181.693	10214.634	981.994
1	48	3	0	59187.000	10185.029	10210.303	982.967
1	48	4	0	59187.000	10185.964	10209.088	982.967
1	48	5	0	59187.000	10186.899	10207.874	982.967
1	48	6	0	59187.000	10190.236	10203.543	981.994
1	48	7	0	59187.000	10191.456	10201.958	980.994

EJE	P.K.	AZIMUT	COS A	SEN A
0	59188.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	49	1	0	59188.000	10181.265	10216.829	981.001
1	49	2	0	59188.000	10182.485	10215.244	982.001
1	49	3	0	59188.000	10185.821	10210.913	982.974
1	49	4	0	59188.000	10186.757	10209.699	982.974
1	49	5	0	59188.000	10187.692	10208.485	982.974
1	49	6	0	59188.000	10191.028	10204.153	982.001
1	49	7	0	59188.000	10192.248	10202.569	981.001

EJE	P.K.	AZIMUT	COS A	SEN A
0	59189.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	50	1	0	59189.000	10182.057	10217.439	981.008
1	50	2	0	59189.000	10183.277	10215.855	982.008
1	50	3	0	59189.000	10186.614	10211.523	982.981
1	50	4	0	59189.000	10187.549	10210.309	982.981
1	50	5	0	59189.000	10188.484	10209.095	982.981
1	50	6	0	59189.000	10191.820	10204.763	982.008
1	50	7	0	59189.000	10193.041	10203.179	981.008

EJE	P.K.	AZIMUT	COS A	SEN A
0	59190.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	51	1	0	59190.000	10182.849	10218.049	981.015
1	51	2	0	59190.000	10184.070	10216.465	982.015
1	51	3	0	59190.000	10187.406	10212.133	982.988
1	51	4	0	59190.000	10188.341	10210.919	982.988
1	51	5	0	59190.000	10189.276	10209.705	982.988
1	51	6	0	59190.000	10192.612	10205.373	982.015
1	51	7	0	59190.000	10193.833	10203.789	981.015

EJE	P.K.	AZIMUT	COS A	SEN A
0	59191.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	52	1	0	59191.000	10183.641	10218.659	981.022
1	52	2	0	59191.000	10184.862	10217.075	982.022
1	52	3	0	59191.000	10188.198	10212.743	982.995
1	52	4	0	59191.000	10189.133	10211.529	982.995
1	52	5	0	59191.000	10190.068	10210.315	982.995
1	52	6	0	59191.000	10193.405	10205.984	982.022
1	52	7	0	59191.000	10194.625	10204.399	981.022

EJE	P.K.	AZIMUT	COS A	SEN A
0	59192.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	53	1	0	59192.000	10184.434	10219.270	981.028
1	53	2	0	59192.000	10185.654	10217.685	982.028
1	53	3	0	59192.000	10188.990	10213.354	983.001
1	53	4	0	59192.000	10189.925	10212.140	983.001
1	53	5	0	59192.000	10190.861	10210.925	983.001
1	53	6	0	59192.000	10194.197	10206.594	982.028
1	53	7	0	59192.000	10195.417	10205.009	981.028

EJE	P.K.	AZIMUT	COS A	SEN A
0	59193.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	54	1	0	59193.000	10185.226	10219.880	981.035
1	54	2	0	59193.000	10186.446	10218.295	982.035
1	54	3	0	59193.000	10189.783	10213.964	983.008
1	54	4	0	59193.000	10190.718	10212.750	983.008
1	54	5	0	59193.000	10191.653	10211.536	983.008
1	54	6	0	59193.000	10194.989	10207.204	982.035
1	54	7	0	59193.000	10196.210	10205.620	981.035

EJE	P.K.	AZIMUT	COS A	SEN A
0	59194.000	-41.783000	.792240	-.610210

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	55	1	0	59194.000	10186.018	10220.490	981.042
1	55	2	0	59194.000	10187.238	10218.906	982.042
1	55	3	0	59194.000	10190.575	10214.574	983.015
1	55	4	0	59194.000	10191.510	10213.360	983.015
1	55	5	0	59194.000	10192.445	10212.146	983.015
1	55	6	0	59194.000	10195.781	10207.814	982.042

1	55	7	0	59194.000	10197.002	10206.230	981.042
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EJE	P.K.	AZIMUT	COS A	SEN A
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0	59195.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	56	1	0	59195.000	10186.810	10221.100	981.049
1	56	2	0	59195.000	10188.031	10219.516	982.049
1	56	3	0	59195.000	10191.367	10215.184	983.022
1	56	4	0	59195.000	10192.302	10213.970	983.022
1	56	5	0	59195.000	10193.237	10212.756	983.022
1	56	6	0	59195.000	10196.574	10208.425	982.049
1	56	7	0	59195.000	10197.794	10206.840	981.049

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59196.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	57	1	0	59196.000	10187.603	10221.711	981.056
1	57	2	0	59196.000	10188.823	10220.126	982.056
1	57	3	0	59196.000	10192.159	10215.794	983.029
1	57	4	0	59196.000	10193.094	10214.580	983.029
1	57	5	0	59196.000	10194.030	10213.366	983.029
1	57	6	0	59196.000	10197.366	10209.035	982.056
1	57	7	0	59196.000	10198.586	10207.450	981.056

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59197.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	58	1	0	59197.000	10188.395	10222.321	981.063
1	58	2	0	59197.000	10189.615	10220.736	982.063
1	58	3	0	59197.000	10192.952	10216.405	983.036
1	58	4	0	59197.000	10193.887	10215.191	983.036
1	58	5	0	59197.000	10194.822	10213.976	983.036
1	58	6	0	59197.000	10198.158	10209.645	982.063
1	58	7	0	59197.000	10199.379	10208.060	981.063

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59198.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	59	1	0	59198.000	10189.187	10222.931	981.069
1	59	2	0	59198.000	10190.407	10221.346	982.069
1	59	3	0	59198.000	10193.744	10217.015	983.042
1	59	4	0	59198.000	10194.679	10215.801	983.042
1	59	5	0	59198.000	10195.614	10214.587	983.042
1	59	6	0	59198.000	10198.950	10210.255	982.069
1	59	7	0	59198.000	10200.171	10208.671	981.069

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59199.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	60	1	0	59199.000	10189.979	10223.541	981.076

1	60	2	0	59199.000	10191.200	10221.957	982.076
1	60	3	0	59199.000	10194.536	10217.625	983.049
1	60	4	0	59199.000	10195.471	10216.411	983.049
1	60	5	0	59199.000	10196.406	10215.197	983.049
1	60	6	0	59199.000	10199.743	10210.865	982.076
1	60	7	0	59199.000	10200.963	10209.281	981.076

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59200.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	61	1	0	59200.000	10190.771	10224.151	981.083
1	61	2	0	59200.000	10191.992	10222.567	982.083
1	61	3	0	59200.000	10195.328	10218.235	983.056
1	61	4	0	59200.000	10196.263	10217.021	983.056
1	61	5	0	59200.000	10197.199	10215.807	983.056
1	61	6	0	59200.000	10200.535	10211.476	982.083
1	61	7	0	59200.000	10201.755	10209.891	981.083

EGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
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0	59170.000	-41.783000	.792240	-.610210
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	4	0	59170.000	10172.496	10198.715	982.851

REPLANTEO DEL PORTICO

P.I. 559+170

Cota Ferrocarril $\rightarrow 982,851$ Sub-balasto
 $982,850 - 0,623 = 982,228$
 Cota terreno $\approx 976,98$

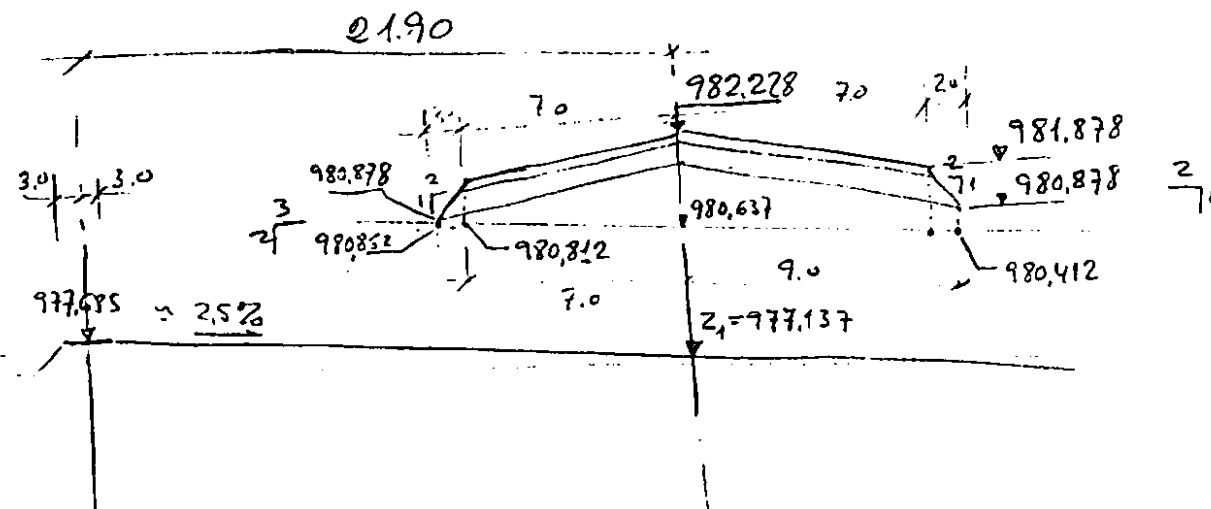
Cota Variante CS-558+8 (PK ≈ 1412)

$z = 977,655 + (1412 - 1406) \times 0,005 = 977,685$
 Cota terreno $\approx 977,10$

Distancia entre ejes 21,9 m.

Terreno natural $\approx 3\%$

Realizaremos el paso con 2,5%



$$z_1 = 977,685 - 21,9 \times 0,025 = 977,137$$

Cota en clave

$$977,137 + 3,5 = 980,637$$

Cota de cálculo Extremo superior $982,851 - 0,623 - 7 \times 0,05 = 981,878$
 $\rightarrow altura < 0,9$

$$\tan \beta = \frac{1}{2} = 0,5$$

$$\tan \alpha = \frac{2,5}{1000} = 0,025$$

$$N = 981,878 - 980,812 - 0,17 = 0,916$$

$$L = \frac{N}{\tan \beta + \tan \alpha} = \frac{0,916}{0,5 + 0,025} = 1,74476$$

$$M = 1,745 \times 0,4 + 0,41 = 2,555$$

$$z_s = 980,812 + 2,555 \times 0,025 = 980,876$$

Extremo inferior

$$\tan \beta = \frac{1}{2} = 0,5$$

$$N = 980,878 - 980,412 - 0,17 = 0,316$$

$$L = \frac{N}{\tan \beta - \tan \alpha} = \frac{0,316}{0,5 - 0,025} = 0,6653$$

$$M = 0,665 \times 0,4 + 0,41 = 1,4753$$

$$z_o = 980,412 - 1,4753 \times 0,025 = 980,375$$

559+170
 EJE PASO FAUNA

499007,904

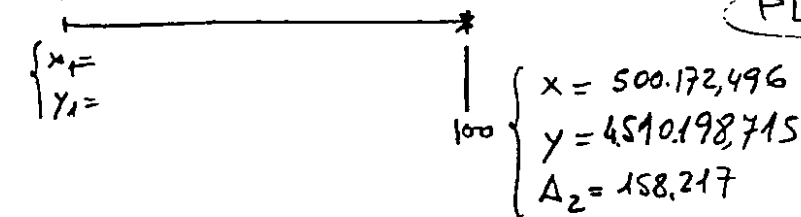
9

49 0000
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 500172,496

4509301,705

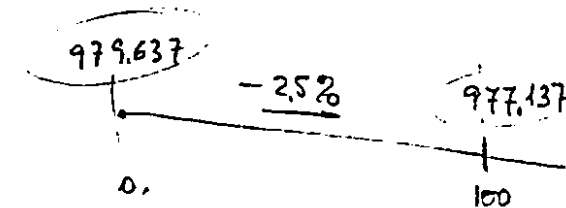
4,500000
 10172,496

PLANTA

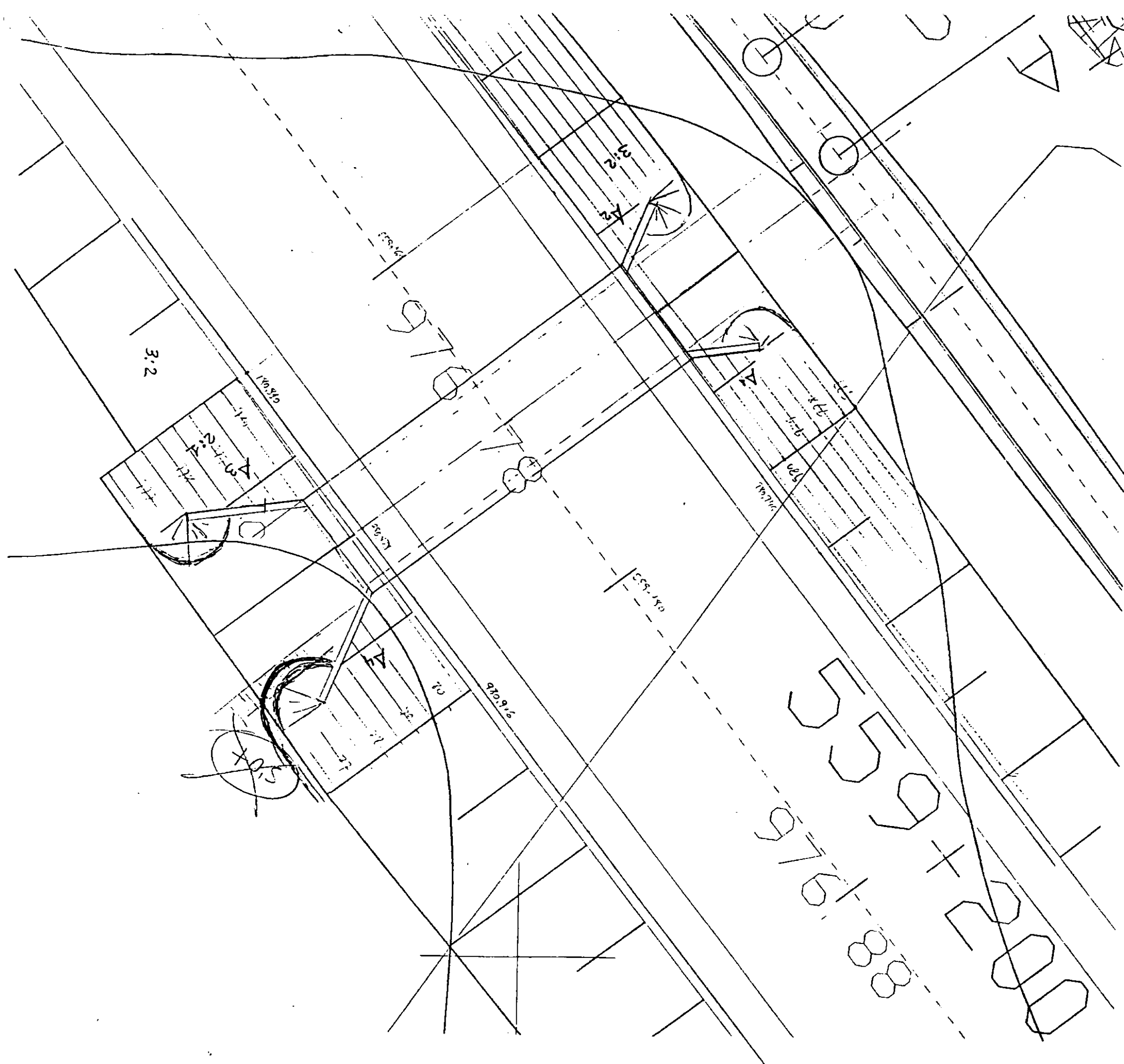


$$x_1 = 10,172,496 - 100 \times \cos 58,217^\circ = 10,111,475$$

$$y_1 = 10,198,715 + 100 \times \sin 58,217^\circ = 10,277,939$$



ALZADO



PI-559+170 PASO FAUNA 1001 FERROCARRIL

57700. 9007.904 9301.706 58.217 1 59026.882 981.872 .00684

1 60029.927 1 60712.5

2 57700. 1.5325 2. 5.46751.5325 0. 1.5325 0. 1.53255.4675 2.

60029.9271.5325 2. 5.46751.5325 0. 1.5325 0. 1.53255.4675 2.

2 57700. -.5 -.17796 .17796 .5

60029.927 -.5 -.17796 .17796 .5

7 1 0. 2 0. 3 0. 0 0. 8 0. 9 0. 10 0.

PASO FAUNA

0. 10111.475 10277.939 158.217 1 0. 979.637 -.025

1 150. 1 150.

2 0. 0.5 2.5 2.5 0.5

150. 0.5 2.5 2.5 0.5

2 0. 150.

5 1 0. 2 0. 3 0. 9 0. 10 0.

1 40 3

1 3 85. 1. 115. 53 13 23 33 43 5

0

0

0

0

/R

TITULO DEL TRABAJO PI-559+170 PASO FAUNA

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
4	0	3	3	59170.000	100.000	10172.496	10198.715	982.851	977.137
				AZ.E	AZ.3				
				58.217000	158.217000				

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	85.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	3	85.000	10165.720	10212.429	977.512
1	1	2	3	85.000	10165.323	10212.124	977.512
1	1	3	3	85.000	10163.343	10210.599	977.512
1	1	4	3	85.000	10161.362	10209.073	977.512
1	1	5	3	85.000	10160.966	10208.768	977.512

EJE	P.K.	AZIMUT	COS A	SEN A
3	86.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	3	86.000	10166.330	10211.637	977.487
1	2	2	3	86.000	10165.934	10211.332	977.487
1	2	3	3	86.000	10163.953	10209.806	977.487
1	2	4	3	86.000	10161.972	10208.281	977.487
1	2	5	3	86.000	10161.576	10207.976	977.487

EJE	P.K.	AZIMUT	COS A	SEN A
3	87.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	3	87.000	10166.940	10210.845	977.462
1	3	2	3	87.000	10166.544	10210.540	977.462
1	3	3	3	87.000	10164.563	10209.014	977.462
1	3	4	3	87.000	10162.583	10207.489	977.462
1	3	5	3	87.000	10162.187	10207.184	977.462

EJE	P.K.	AZIMUT	COS A	SEN A
3	88.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	3	88.000	10167.550	10210.053	977.437
1	4	2	3	88.000	10167.154	10209.747	977.437
1	4	3	3	88.000	10165.173	10208.222	977.437
1	4	4	3	88.000	10163.193	10206.696	977.437
1	4	5	3	88.000	10162.797	10206.391	977.437

EJE	P.K.	AZIMUT	COS A	SEN A
3	89.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	5	1	3	89.000	10168.160	10209.260	977.412
1	5	2	3	89.000	10167.764	10208.955	977.412
1	5	3	3	89.000	10165.784	10207.430	977.412
1	5	4	3	89.000	10163.803	10205.904	977.412
1	5	5	3	89.000	10163.407	10205.599	977.412

EJE	P.K.	AZIMUT	COS A	SEN A
3	90.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	6	1	3	90.000	10168.771	10208.468	977.387
1	6	2	3	90.000	10168.375	10208.163	977.387
1	6	3	3	90.000	10166.394	10206.637	977.387
1	6	4	3	90.000	10164.413	10205.112	977.387
1	6	5	3	90.000	10164.017	10204.807	977.387

EJE	P.K.	AZIMUT	COS A	SEN A
3	91.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	7	1	3	91.000	10169.381	10207.676	977.362
1	7	2	3	91.000	10168.985	10207.371	977.362
1	7	3	3	91.000	10167.004	10205.845	977.362
1	7	4	3	91.000	10165.024	10204.320	977.362
1	7	5	3	91.000	10164.627	10204.015	977.362

EJE	P.K.	AZIMUT	COS A	SEN A
3	92.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	8	1	3	92.000	10169.991	10206.884	977.337
1	8	2	3	92.000	10169.595	10206.578	977.337
1	8	3	3	92.000	10167.614	10205.053	977.337
1	8	4	3	92.000	10165.634	10203.527	977.337
1	8	5	3	92.000	10165.238	10203.222	977.337

EJE	P.K.	AZIMUT	COS A	SEN A
3	93.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	9	1	3	93.000	10170.601	10206.091	977.312
1	9	2	3	93.000	10170.205	10205.786	977.312
1	9	3	3	93.000	10168.225	10204.261	977.312
1	9	4	3	93.000	10166.244	10202.735	977.312
1	9	5	3	93.000	10165.848	10202.430	977.312

EJE	P.K.	AZIMUT	COS A	SEN A
3	94.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	10	1	3	94.000	10171.211	10205.299	977.287
1	10	2	3	94.000	10170.815	10204.994	977.287
1	10	3	3	94.000	10168.835	10203.468	977.287
1	10	4	3	94.000	10166.854	10201.943	977.287
1	10	5	3	94.000	10166.458	10201.638	977.287

EJE	P.K.	AZIMUT	COS A	SEN A
3	95.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	11	1	3	95.000	10171.822	10204.507	977.262
1	11	2	3	95.000	10171.426	10204.202	977.262
1	11	3	3	95.000	10169.445	10202.676	977.262
1	11	4	3	95.000	10167.464	10201.151	977.262
1	11	5	3	95.000	10167.068	10200.846	977.262

EJE	P.K.	AZIMUT	COS A	SEN A
3	96.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	12	1	3	96.000	10172.432	10203.715	977.237
1	12	2	3	96.000	10172.036	10203.410	977.237
1	12	3	3	96.000	10170.055	10201.884	977.237
1	12	4	3	96.000	10168.075	10200.358	977.237
1	12	5	3	96.000	10167.678	10200.053	977.237

EJE	P.K.	AZIMUT	COS A	SEN A
3	97.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	13	1	3	97.000	10173.042	10202.922	977.212
1	13	2	3	97.000	10172.646	10202.617	977.212
1	13	3	3	97.000	10170.665	10201.092	977.212
1	13	4	3	97.000	10168.685	10199.566	977.212
1	13	5	3	97.000	10168.289	10199.261	977.212

EJE	P.K.	AZIMUT	COS A	SEN A
3	98.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	14	1	3	98.000	10173.652	10202.130	977.187
1	14	2	3	98.000	10173.256	10201.825	977.187
1	14	3	3	98.000	10171.276	10200.300	977.187
1	14	4	3	98.000	10169.295	10198.774	977.187
1	14	5	3	98.000	10168.899	10198.469	977.187

EJE	P.K.	AZIMUT	COS A	SEN A
3	99.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	3	99.000	10174.263	10201.338	977.162
1	15	2	3	99.000	10173.866	10201.033	977.162
1	15	3	3	99.000	10171.886	10199.507	977.162
1	15	4	3	99.000	10169.905	10197.982	977.162

1 15 5 3 99.000 10169.509 10197.677 977.162

EJE P.K. AZIMUT COS A SEN A

3 100.000 58.217000 .610210 .792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	3	100.000	10174.873	10200.546	977.137
1	16	2	3	100.000	10174.477	10200.241	977.137
1	16	3	3	100.000	10172.496	10198.715	977.137
1	16	4	3	100.000	10170.515	10197.190	977.137
1	16	5	3	100.000	10170.119	10196.884	977.137

EJE P.K. AZIMUT COS A SEN A

3 101.000 58.217000 .610210 .792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	3	101.000	10175.483	10199.753	977.112
1	17	2	3	101.000	10175.087	10199.448	977.112
1	17	3	3	101.000	10173.106	10197.923	977.112
1	17	4	3	101.000	10171.126	10196.397	977.112
1	17	5	3	101.000	10170.730	10196.092	977.112

EJE P.K. AZIMUT COS A SEN A

3 102.000 58.217000 .610210 .792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	3	102.000	10176.093	10198.961	977.087
1	18	2	3	102.000	10175.697	10198.656	977.087
1	18	3	3	102.000	10173.716	10197.131	977.087
1	18	4	3	102.000	10171.736	10195.605	977.087
1	18	5	3	102.000	10171.340	10195.300	977.087

EJE P.K. AZIMUT COS A SEN A

3 103.000 58.217000 .610210 .792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	3	103.000	10176.703	10198.169	977.062
1	19	2	3	103.000	10176.307	10197.864	977.062
1	19	3	3	103.000	10174.327	10196.338	977.062
1	19	4	3	103.000	10172.346	10194.813	977.062
1	19	5	3	103.000	10171.950	10194.508	977.062

EJE P.K. AZIMUT COS A SEN A

3 104.000 58.217000 .610210 .792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	3	104.000	10177.314	10197.377	977.037
1	20	2	3	104.000	10176.917	10197.072	977.037
1	20	3	3	104.000	10174.937	10195.546	977.037
1	20	4	3	104.000	10172.956	10194.021	977.037
1	20	5	3	104.000	10172.560	10193.715	977.037

EJE P.K. AZIMUT COS A SEN A

3 105.000 58.217000 .610210 .792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	3	105.000	10177.924	10196.584	977.012
1	21	2	3	105.000	10177.528	10196.279	977.012
1	21	3	3	105.000	10175.547	10194.754	977.012
1	21	4	3	105.000	10173.566	10193.228	977.012
1	21	5	3	105.000	10173.170	10192.923	977.012

EJE P.K. AZIMUT COS A SEN A

3 106.000 58.217000 .610210 .792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	3	106.000	10178.534	10195.792	976.987
1	22	2	3	106.000	10178.138	10195.487	976.987
1	22	3	3	106.000	10176.157	10193.962	976.987
1	22	4	3	106.000	10174.177	10192.436	976.987
1	22	5	3	106.000	10173.781	10192.131	976.987

EJE P.K. AZIMUT COS A SEN A

3 107.000 58.217000 .610210 .792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	3	107.000	10179.144	10195.000	976.962
1	23	2	3	107.000	10178.748	10194.695	976.962
1	23	3	3	107.000	10176.767	10193.169	976.962
1	23	4	3	107.000	10174.787	10191.644	976.962
1	23	5	3	107.000	10174.391	10191.339	976.962

EJE P.K. AZIMUT COS A SEN A

3 108.000 58.217000 .610210 .792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	24	1	3	108.000	10179.754	10194.208	976.937
1	24	2	3	108.000	10179.358	10193.903	976.937
1	24	3	3	108.000	10177.378	10192.377	976.937
1	24	4	3	108.000	10175.397	10190.852	976.937
1	24	5	3	108.000	10175.001	10190.546	976.937

JE P.K. AZIMUT COS A SEN A

3 109.000 58.217000 .610210 .792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	25	1	3	109.000	10180.365	10193.416	976.912
1	25	2	3	109.000	10179.969	10193.110	976.912
1	25	3	3	109.000	10177.988	10191.585	976.912
1	25	4	3	109.000	10176.007	10190.059	976.912
1	25	5	3	109.000	10175.611	10189.754	976.912

EJE P.K. AZIMUT COS A SEN A

3 110.000 58.217000 .610210 .792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	26	1	3	110.000	10180.975	10192.623	976.887
1	26	2	3	110.000	10180.579	10192.318	976.887
1	26	3	3	110.000	10178.598	10190.793	976.887

1	26	4	3	110.000	10176.618	10189.267	976.887
1	26	5	3	110.000	10176.221	10188.962	976.887

EJE	P.K.	AZIMUT	COS A	SEN A
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3	111.000	58.217000	.610210	.792240
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	27	1	3	111.000	10181.585	10191.831	976.862
1	27	2	3	111.000	10181.189	10191.526	976.862
1	27	3	3	111.000	10179.208	10190.000	976.862
1	27	4	3	111.000	10177.228	10188.475	976.862
1	27	5	3	111.000	10176.832	10188.170	976.862

EJE	P.K.	AZIMUT	COS A	SEN A
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3	112.000	58.217000	.610210	.792240
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	28	1	3	112.000	10182.195	10191.039	976.837
1	28	2	3	112.000	10181.799	10190.734	976.837
1	28	3	3	112.000	10179.819	10189.208	976.837
1	28	4	3	112.000	10177.838	10187.683	976.837
1	28	5	3	112.000	10177.442	10187.378	976.837

EJE	P.K.	AZIMUT	COS A	SEN A
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3	113.000	58.217000	.610210	.792240
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	29	1	3	113.000	10182.805	10190.247	976.812
1	29	2	3	113.000	10182.409	10189.941	976.812
1	29	3	3	113.000	10180.429	10188.416	976.812
1	29	4	3	113.000	10178.448	10186.890	976.812
1	29	5	3	113.000	10178.052	10186.585	976.812

EJE	P.K.	AZIMUT	COS A	SEN A
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3	114.000	58.217000	.610210	.792240
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	30	1	3	114.000	10183.416	10189.454	976.787
1	30	2	3	114.000	10183.020	10189.149	976.787
1	30	3	3	114.000	10181.039	10187.624	976.787
1	30	4	3	114.000	10179.058	10186.098	976.787
1	30	5	3	114.000	10178.662	10185.793	976.787

EJE	P.K.	AZIMUT	COS A	SEN A
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3	115.000	58.217000	.610210	.792240
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	31	1	3	115.000	10184.026	10188.662	976.762
1	31	2	3	115.000	10183.630	10188.357	976.762
1	31	3	3	115.000	10181.649	10186.831	976.762
1	31	4	3	115.000	10179.669	10185.306	976.762
1	31	5	3	115.000	10179.272	10185.001	976.762

PI-559+170 PASO FAUNA 1001 FERROCARRIL

57700. 9007.904 9301.706 58.217 1 59026.882 981.872 .00684 1

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TITULO DEL TRABAJO PI-559+170 PASO FAUNA

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
4	0	3	3	59170.000	100.000	10172.496	10198.715	982.851	977.13
				AZ.E	AZ.3				
				58.217000	158.217000				

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	85.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	3	85.000	10165.720	10212.429	977.512
1	1	2	3	85.000	10165.323	10212.124	977.512
1	1	3	3	85.000	10163.343	10210.599	977.512
1	1	4	3	85.000	10161.362	10209.073	977.512
1	1	5	3	85.000	10160.966	10208.768	977.512

EJE	P.K.	AZIMUT	COS A	SEN A
3	86.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	3	86.000	10166.330	10211.637	977.487
1	2	2	3	86.000	10165.934	10211.332	977.487
1	2	3	3	86.000	10163.953	10209.806	977.487
1	2	4	3	86.000	10161.972	10208.281	977.487
1	2	5	3	86.000	10161.576	10207.976	977.487

EJE	P.K.	AZIMUT	COS A	SEN A
3	87.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	3	87.000	10166.940	10210.845	977.462
1	3	2	3	87.000	10166.544	10210.540	977.462
1	3	3	3	87.000	10164.563	10209.014	977.462
1	3	4	3	87.000	10162.583	10207.489	977.462
1	3	5	3	87.000	10162.187	10207.184	977.462

EJE	P.K.	AZIMUT	COS A	SEN A
3	88.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	3	88.000	10167.550	10210.053	977.437
1	4	2	3	88.000	10167.154	10209.747	977.437
1	4	3	3	88.000	10165.173	10208.222	977.437
1	4	4	3	88.000	10163.193	10206.696	977.437
1	4	5	3	88.000	10162.797	10206.391	977.437

EJE	P.K.	AZIMUT	COS A	SEN A
3	89.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	5	1	3	89.000	10168.160	10209.260	977.412
1	5	2	3	89.000	10167.764	10208.955	977.412
1	5	3	3	89.000	10165.784	10207.430	977.412
1	5	4	3	89.000	10163.803	10205.904	977.412
1	5	5	3	89.000	10163.407	10205.599	977.412

EJE	P.K.	AZIMUT	COS A	SEN A
3	90.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	6	1	3	90.000	10168.771	10208.468	977.387
1	6	2	3	90.000	10168.375	10208.163	977.387
1	6	3	3	90.000	10166.394	10206.637	977.387
1	6	4	3	90.000	10164.413	10205.112	977.387
1	6	5	3	90.000	10164.017	10204.807	977.387

EJE	P.K.	AZIMUT	COS A	SEN A
3	91.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	7	1	3	91.000	10169.381	10207.676	977.362
1	7	2	3	91.000	10168.985	10207.371	977.362
1	7	3	3	91.000	10167.004	10205.845	977.362
1	7	4	3	91.000	10165.024	10204.320	977.362
1	7	5	3	91.000	10164.627	10204.015	977.362

EJE	P.K.	AZIMUT	COS A	SEN A
3	92.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	8	1	3	92.000	10169.991	10206.884	977.337
1	8	2	3	92.000	10169.595	10206.578	977.337
1	8	3	3	92.000	10167.614	10205.053	977.337
1	8	4	3	92.000	10165.634	10203.527	977.337
1	8	5	3	92.000	10165.238	10203.222	977.337

EJE	P.K.	AZIMUT	COS A	SEN A
3	93.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	9	1	3	93.000	10170.601	10206.091	977.312
1	9	2	3	93.000	10170.205	10205.786	977.312
1	9	3	3	93.000	10168.225	10204.261	977.312
1	9	4	3	93.000	10166.244	10202.735	977.312
1	9	5	3	93.000	10165.848	10202.430	977.312

EJE	P.K.	AZIMUT	COS A	SEN A
3	94.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	10	1	3	94.000	10171.211	10205.299	977.287
1	10	2	3	94.000	10170.815	10204.994	977.287
1	10	3	3	94.000	10168.835	10203.468	977.287
1	10	4	3	94.000	10166.854	10201.943	977.287
1	10	5	3	94.000	10166.458	10201.638	977.287

EJE	P.K.	AZIMUT	COS A	SEN A
3	95.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	11	1	3	95.000	10171.822	10204.507	977.262
1	11	2	3	95.000	10171.426	10204.202	977.262
1	11	3	3	95.000	10169.445	10202.676	977.262
1	11	4	3	95.000	10167.464	10201.151	977.262
1	11	5	3	95.000	10167.068	10200.846	977.262

EJE	P.K.	AZIMUT	COS A	SEN A
3	96.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	12	1	3	96.000	10172.432	10203.715	977.237
1	12	2	3	96.000	10172.036	10203.410	977.237
1	12	3	3	96.000	10170.055	10201.884	977.237
1	12	4	3	96.000	10168.075	10200.358	977.237
1	12	5	3	96.000	10167.678	10200.053	977.237

EJE	P.K.	AZIMUT	COS A	SEN A
3	97.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	13	1	3	97.000	10173.042	10202.922	977.212
1	13	2	3	97.000	10172.646	10202.617	977.212
1	13	3	3	97.000	10170.665	10201.092	977.212
1	13	4	3	97.000	10168.685	10199.566	977.212
1	13	5	3	97.000	10168.289	10199.261	977.212

EJE	P.K.	AZIMUT	COS A	SEN A
3	98.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	14	1	3	98.000	10173.652	10202.130	977.187
1	14	2	3	98.000	10173.256	10201.825	977.187
1	14	3	3	98.000	10171.276	10200.300	977.187
1	14	4	3	98.000	10169.295	10198.774	977.187
1	14	5	3	98.000	10168.899	10198.469	977.187

EJE	P.K.	AZIMUT	COS A	SEN A
3	99.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	15	1	3	99.000	10174.263	10201.338	977.162
1	15	2	3	99.000	10173.866	10201.033	977.162
1	15	3	3	99.000	10171.886	10199.507	977.162
1	15	4	3	99.000	10169.905	10197.982	977.162

1	15	5	3	99.000	10169.509	10197.677	977.162
EJE	P.K.	AZIMUT	COS A	SEN A			
3	100.000	58.217000	.610210	.792240			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	3	100.000	10174.873	10200.546	977.137
1	16	2	3	100.000	10174.477	10200.241	977.137
1	16	3	3	100.000	10172.496	10198.715	977.137
1	16	4	3	100.000	10170.515	10197.190	977.137
1	16	5	3	100.000	10170.119	10196.884	977.137
EJE	P.K.	AZIMUT	COS A	SEN A			
3	101.000	58.217000	.610210	.792240			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	3	101.000	10175.483	10199.753	977.112
1	17	2	3	101.000	10175.087	10199.448	977.112
1	17	3	3	101.000	10173.106	10197.923	977.112
1	17	4	3	101.000	10171.126	10196.397	977.112
1	17	5	3	101.000	10170.730	10196.092	977.112
EJE	P.K.	AZIMUT	COS A	SEN A			
3	102.000	58.217000	.610210	.792240			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	3	102.000	10176.093	10198.961	977.087
1	18	2	3	102.000	10175.697	10198.656	977.087
1	18	3	3	102.000	10173.716	10197.131	977.087
1	18	4	3	102.000	10171.736	10195.605	977.087
1	18	5	3	102.000	10171.340	10195.300	977.087
EJE	P.K.	AZIMUT	COS A	SEN A			
3	103.000	58.217000	.610210	.792240			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	3	103.000	10176.703	10198.169	977.062
1	19	2	3	103.000	10176.307	10197.864	977.062
1	19	3	3	103.000	10174.327	10196.338	977.062
1	19	4	3	103.000	10172.346	10194.813	977.062
1	19	5	3	103.000	10171.950	10194.508	977.062
EJE	P.K.	AZIMUT	COS A	SEN A			
3	104.000	58.217000	.610210	.792240			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	3	104.000	10177.314	10197.377	977.037
1	20	2	3	104.000	10176.917	10197.072	977.037
1	20	3	3	104.000	10174.937	10195.546	977.037
1	20	4	3	104.000	10172.956	10194.021	977.037
1	20	5	3	104.000	10172.560	10193.715	977.037
EJE	P.K.	AZIMUT	COS A	SEN A			
3	105.000	58.217000	.610210	.792240			

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	3	105.000	10177.924	10196.584	977.012
1	21	2	3	105.000	10177.528	10196.279	977.012
1	21	3	3	105.000	10175.547	10194.754	977.012
1	21	4	3	105.000	10173.566	10193.228	977.012
1	21	5	3	105.000	10173.170	10192.923	977.012
EJE	P.K.	AZIMUT	COS A	SEN A			
3	106.000	58.217000	.610210	.792240			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	3	106.000	10178.534	10195.792	976.987
1	22	2	3	106.000	10178.138	10195.487	976.987
1	22	3	3	106.000	10176.157	10193.962	976.987
1	22	4	3	106.000	10174.177	10192.436	976.987
1	22	5	3	106.000	10173.781	10192.131	976.987
EJE	P.K.	AZIMUT	COS A	SEN A			
3	107.000	58.217000	.610210	.792240			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	3	107.000	10179.144	10195.000	976.962
1	23	2	3	107.000	10178.748	10194.695	976.962
1	23	3	3	107.000	10176.767	10193.169	976.962
1	23	4	3	107.000	10174.787	10191.644	976.962
1	23	5	3	107.000	10174.391	10191.339	976.962
EJE	P.K.	AZIMUT	COS A	SEN A			
3	108.000	58.217000	.610210	.792240			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	24	1	3	108.000	10179.754	10194.208	976.937
1	24	2	3	108.000	10179.358	10193.903	976.937
1	24	3	3	108.000	10177.378	10192.377	976.937
1	24	4	3	108.000	10175.397	10190.852	976.937
1	24	5	3	108.000	10175.001	10190.546	976.937
EJE	P.K.	AZIMUT	COS A	SEN A			
3	109.000	58.217000	.610210	.792240			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	25	1	3	109.000	10180.365	10193.416	976.912
1	25	2	3	109.000	10179.969	10193.110	976.912
1	25	3	3	109.000	10177.988	10191.585	976.912
1	25	4	3	109.000	10176.007	10190.059	976.912
1	25	5	3	109.000	10175.611	10189.754	976.912
EJE	P.K.	AZIMUT	COS A	SEN A			
3	110.000	58.217000	.610210	.792240			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	26	1	3	110.000	10180.975	10192.623	976.887
1	26	2	3	110.000	10180.579	10192.318	976.887
1	26	3	3	110.000	10178.598	10190.793	976.887

1	26	4	3	110.000	10176.618	10189.267	976.887
1	26	5	3	110.000	10176.221	10188.962	976.887

EJE	P.K.	AZIMUT	COS A	SEN A
-----	------	--------	-------	-------

3	111.000	58.217000	.610210	.792240
---	---------	-----------	---------	---------

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	27	1	3	111.000	10181.585	10191.831	976.862
1	27	2	3	111.000	10181.189	10191.526	976.862
1	27	3	3	111.000	10179.208	10190.000	976.862
1	27	4	3	111.000	10177.228	10188.475	976.862
1	27	5	3	111.000	10176.832	10188.170	976.862

EJE	P.K.	AZIMUT	COS A	SEN A
-----	------	--------	-------	-------

3	112.000	58.217000	.610210	.792240
---	---------	-----------	---------	---------

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	28	1	3	112.000	10182.195	10191.039	976.837
1	28	2	3	112.000	10181.799	10190.734	976.837
1	28	3	3	112.000	10179.819	10189.208	976.837
1	28	4	3	112.000	10177.838	10187.683	976.837
1	28	5	3	112.000	10177.442	10187.378	976.837

EJE	P.K.	AZIMUT	COS A	SEN A
-----	------	--------	-------	-------

3	113.000	58.217000	.610210	.792240
---	---------	-----------	---------	---------

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	29	1	3	113.000	10182.805	10190.247	976.812
1	29	2	3	113.000	10182.409	10189.941	976.812
1	29	3	3	113.000	10180.429	10188.416	976.812
1	29	4	3	113.000	10178.448	10186.890	976.812
1	29	5	3	113.000	10178.052	10186.585	976.812

EJE	P.K.	AZIMUT	COS A	SEN A
-----	------	--------	-------	-------

3	114.000	58.217000	.610210	.792240
---	---------	-----------	---------	---------

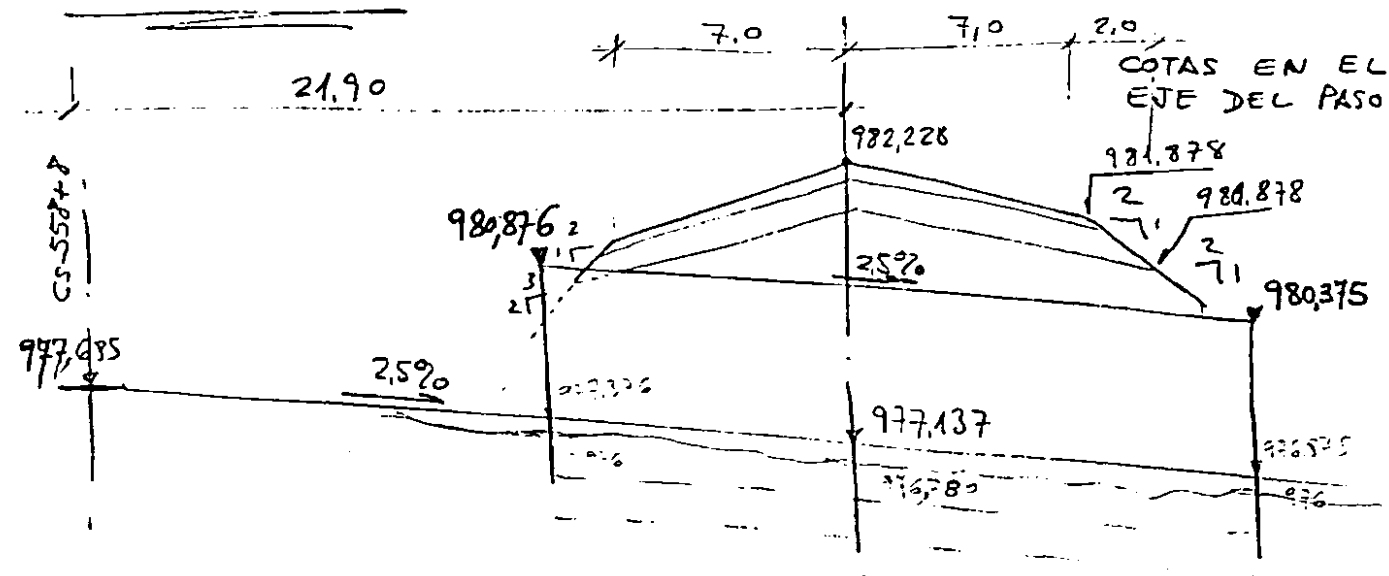
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	30	1	3	114.000	10183.416	10189.454	976.787
1	30	2	3	114.000	10183.020	10189.149	976.787
1	30	3	3	114.000	10181.039	10187.624	976.787
1	30	4	3	114.000	10179.058	10186.098	976.787
1	30	5	3	114.000	10178.662	10185.793	976.787

EJE	P.K.	AZIMUT	COS A	SEN A
-----	------	--------	-------	-------

3	115.000	58.217000	.610210	.792240
---	---------	-----------	---------	---------

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	31	1	3	115.000	10184.026	10188.662	976.762
1	31	2	3	115.000	10183.630	10188.357	976.762
1	31	3	3	115.000	10181.649	10186.831	976.762
1	31	4	3	115.000	10179.669	10185.306	976.762
1	31	5	3	115.000	10179.272	10185.001	976.762

FD 559+170



TITULO DEL TRABAJO PI-559+170 PASO FAUNA

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
4	0	3	3	59170.000	100.000	10172.496	10198.715	982.851	977.137
				AZ.E	AZ.3				
				58.217000	158.217000				

SEGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	90.400	58.217000	.610210	.792240

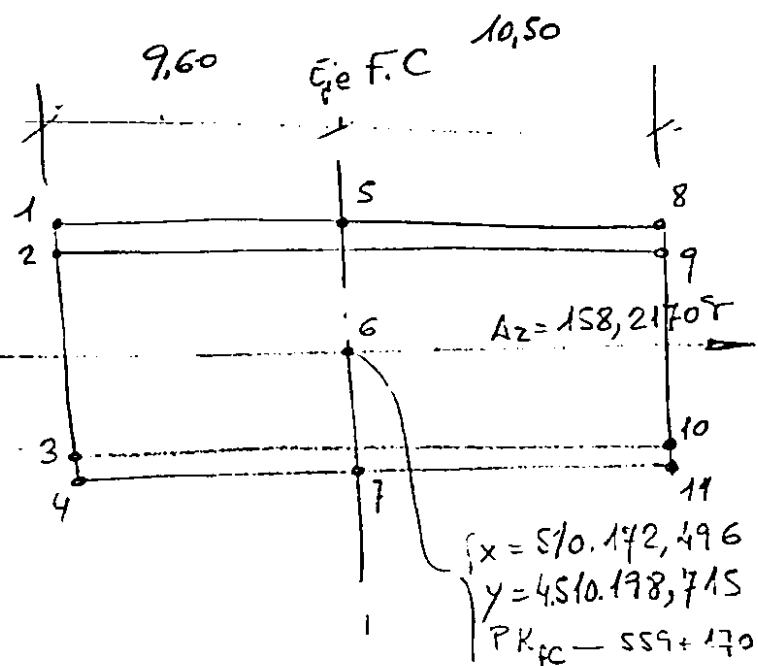
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	1	3	90.400	510169.015	4510208.151	977.377 - 1
1	1	2	3	90.400	10168.619	10207.846	977.377 - 2
1	1	3	3	90.400	10166.638	10206.321	977.377
1	1	4	3	90.400	10164.657	10204.795	977.377 - 3
1	1	5	3	90.400	510164.261	4510204.490	977.377 - 4

EJE	P.K.	AZIMUT	COS A	SEN A
3	100.000	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	2	1	3	100.000	10174.873	10200.546	977.137 - 5
1	2	2	3	100.000	10174.477	10200.241	977.137
1	2	3	3	100.000	10172.496	10198.715	977.137 - 6
1	2	4	3	100.000	10170.515	10197.190	977.137
1	2	5	3	100.000	10170.119	10196.884	977.137 - 7

EJE	P.K.	AZIMUT	COS A	SEN A
3	110.500	58.217000	.610210	.792240

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	3	1	3	110.500	510181.280	4510192.227	976.875 - 8
1	3	2	3	110.500	10180.884	10191.922	976.875 - 9
1	3	3	3	110.500	10178.903	10190.397	976.875
1	3	4	3	110.500	10176.923	10188.871	976.874 - 10
1	3	5	3	110.500	510176.527	4510188.566	976.874 - 11

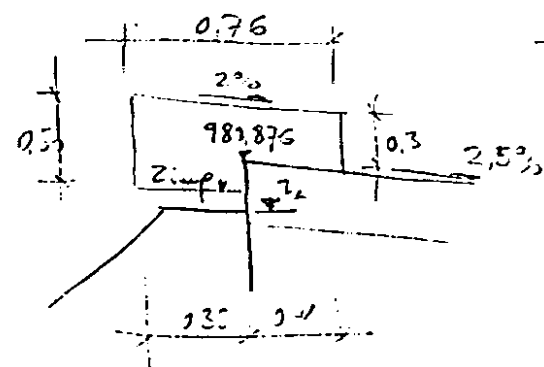


21.90

PI-559+170 PASO FAUNA										1001 FERROCARRIL									
57700.	9007.904	9301.706	58.217	1	59026.882	981.872	.00684		1										
1	60029.927				1	60712.5													
2	57700.	1.5325	2.	5.4675	1.5325	0.	1.5325	0.	1.5325	5.4675	2.								
	60029.927	1.5325	2.	5.4675	1.5325	0.	1.5325	0.	1.5325	5.4675	2.								
2	57700.	-.5	-.17796							.17796	.5								
	60029.927	-.5	-.17796							.17796	.5								
7	1	0.	2	0.	3	0.	0	0.	8	0.	9	0.	10	0.					
									PASO FAUNA										
	0.	10111.475	10277.939	158.217	1	0.	979.637	-.025									1		
1	150.					1	150.												
2	0.		0.5	2.5							2.5	0.5							
	150.		0.5	2.5							2.5	0.5							
2	0.																		
	150.																		
5	1	0.	2	0.	3	0.	9	0.	10	0.									
	1	40	3																
0																			
1	3	3	90.4	100.	110.5				53	13	23	33	43	5					
0																			
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REPLANTEO DE LAS ALETAS

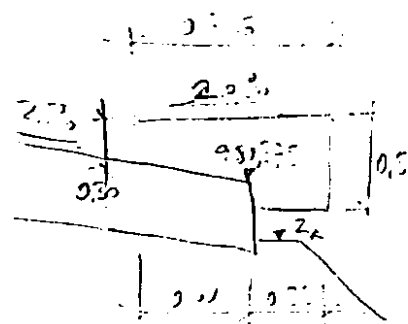
Alasan (A₁) : L₂



$$Z_{\text{imp}} = 982,876 - 0,41 \times 0,025 \div 0,3 + 0,76 \times 0,02 - 0, \\ 982,632$$

$$Z_L = 982,632 - 0,021 = 982,611$$

Alasan L₂ : L₁

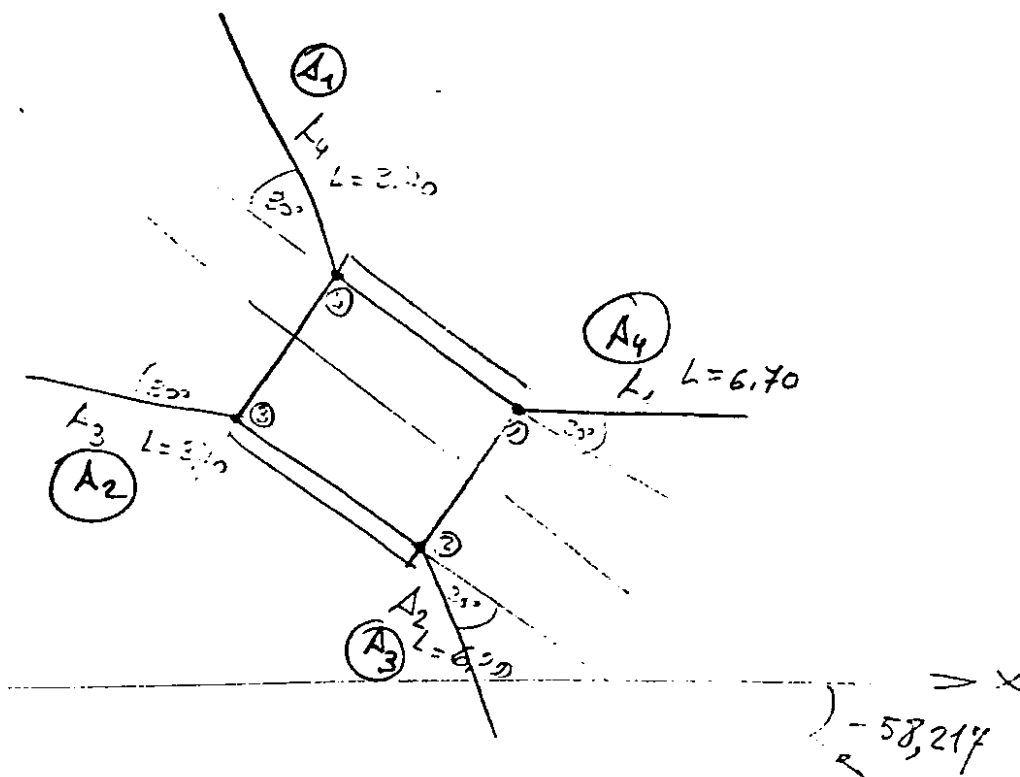


$$Z_{\text{imp}} = 982,876 + 0,41 \times 0,025 \div 0,3 + 0,76 \times 0,02 - 0, \\ 982,632$$

$$Z_L = 982,632 - 0,021 = 982,611$$

PA 557+170

(N) AY



LLETAK 1	LLETAK 2	LLETAK 3	LLETAK 4
500.182,854	500.176,923	500.164,657	500.162,610
4.510.171,922	4.510.155,871	4.510.504,425	4.510.507,816
30.	30	30	30
6.70	6.20 ✓	3.70 ✓	3.70 ✓
0,16933	0,16933	0,1553	0,1553
0,07	0,086	0,093	0,093
0,1	0,1	0,1	0,1
1.90	1.90	1.90	1.90
1.90	1.90	1.90	1.90
0.3	0.3	0.3	0.3

TITULO :REPLANTEO ALETAS P.I. 559+170. PASO DE FAUNA

ANGULO DEL EJE OX CON EL EJE DEL PORTICO. BETA = -58.217000000 g
ANCHO DE LA JUNTA ENTRE LOS HASTIALES DEL
PORTICO Y LAS ALETAS = .020000 m

ALETA NUMERO = 4 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 500180.884000
YA = 4510191.922000
INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 6.700000 m
ESPESOR DEL TALUD. ZONA INICIAL = .169333 m
ZONA FINAL = .070000 m
ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.900 m
ANCHO DEL 2' TACON TRASERO = 1.900 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 500186.987
YI = 4510189.158
PUNTO C : XC = 500187.078
YC = 4510189.370
PUNTO D : XD = 500187.105
YD = 4510189.434
PUNTO E : XE = 500187.263
YE = 4510189.802
PUNTO G : XG = 500187.856
YG = 4510191.180
PUNTO K : XK = 500187.856
YK = 4510191.180
PUNTO J : XJ = 500180.788
YJ = 4510191.823
PUNTO AP: XAP = 500180.905
YAP = 4510191.913
PUNTO B : XB = 500181.039
YB = 4510192.041

PUNTO BP: XBP = 500181.060
YBP = 4510192.032

PUNTO F : XF = 500181.423
YF = 4510192.312

PUNTO H : XH = 500182.783
YH = 4510193.360

PUNTO P : XP = 500182.783
YP = 4510193.360

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I y J = 6.747 m Z_1
C y A = 6.699 m
C y AP = 6.676 m
D y BP = 6.580 m D
E y F = 6.357 m C
G y H = 5.521 m
K y P = 5.521 m Z_2, Z_3
 $Z_A = 980,180$ $B = 6,200$
 $Z_B = 977,200$ $A = 0,157$
 $Z_C = 975,100$ $Z_2 = 5,521$
 $H_1 = 5,080$ $Z_3 = \text{---}$
 $H_2 = 2,100$ $E = 1,50$
 $F = \text{---}$
 $Z = 2,20$

ALETA NUMERO = 3 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 500176.923000
YA = 4510188.871000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 6.200000 m
ESPESOR DEL TALUD. ZONA INICIAL = .169333 m
ZONA FINAL = .086667 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.900 m
ANCHO DEL 2' TACON TRASERO = 1.900 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 500177.954
YI = 4510182.758
PUNTO C : XC = 500177.743
YC = 4510182.727
PUNTO D : XD = 500177.658
YD = 4510182.714
PUNTO E : XE = 500177.262

YE = 4510182.656 } (P₁)

PUNTO G : XG = 500175.778
YG = 4510182.437

PUNTO K : XK = 500175.778
YK = 4510182.437

PUNTO J : XJ = 500177.044
YJ = 4510188.939

PUNTO AP: XAP = 500176.926
YAP = 4510188.848

PUNTO B : XB = 500176.768
YB = 4510188.752

PUNTO BP: XBP = 500176.771
YBP = 4510188.729

PUNTO F : XF = 500176.408
YF = 4510188.449 (P₂)

PUNTO H : XH = 500175.047
YH = 4510187.401

PUNTO P : XP = 500175.047
YP = 4510187.401

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS

I y J = 6.248 m Z₁

C y A = 6.199 m

C y AP = 6.176 m

D y BP = 6.080 m D

E y F = 5.856 m C

G y H = 5.017 m

K y P = 5.017 m Z₂, Z₃

Z_A = 980,180 B = 5,700

Z_B = 977,700 A = 0,156

Z_C = 975,100 Z₂ = 5,017

H₁ = 5,080 Z₃ = —

H₂ = 2,60 E = 1,80

F = —

Z = 2,20

ALETA NUMERO = 2 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 500164.657000
YA = 4510204.795000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '

LONGITUD DE LA ALETA = 3.700000 m

ESPESOR DEL TALUD. ZONA INICIAL = .155330 m

ZONA FINAL = .093330 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m

ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.900 m

ANCHO DEL 2' TACON TRASERO = 1.900 m

ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 500161.320
YI = 4510206.394

PUNTO C : XC = 500161.238
YC = 4510206.204

PUNTO D : XD = 500161.201
YD = 4510206.118

PUNTO E : XE = 500161.042 (P₁)
YE = 4510205.751

PUNTO G : XG = 500160.447
YG = 4510204.374

PUNTO K : XK = 500160.447
YK = 4510204.374

PUNTO J : XJ = 500164.766
YJ = 4510204.904

PUNTO AP: XAP = 500164.636
YAP = 4510204.804

PUNTO B : XB = 500164.515
YB = 4510204.686

PUNTO BP: XBP = 500164.494
YBP = 4510204.695

PUNTO F : XF = 500164.132 (P₂)
YF = 4510204.416

PUNTO H : XH = 500162.773
YH = 4510203.369

PUNTO P : XP = 500162.773
YP = 4510203.369

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS

I y J = 3.754 m Z₁

C y A = 3.698 m

C y AP = 3.675 m

D y BP = 3.588 m D

E y F = 3.366 m C

G y H = 2.534 m

K y P = 2.534 m Z₂, Z₃

Z_A = 980,660 B = 3,200

Z_B = 978,800 A = 0,166

Z_C = 976,00 Z₂ = 2,534

H₁ = 4,660 Z₃ = —

H₂ = 2,800 E = 1,85

F = —

Z = 2,20

PUNTO P : XP = 500170.479
YP = 4510209.304

ALETA NUMERO = 4 DATOS DE ENTRADA Y SALIDA
=====

COORDENADAS DEL PUNTO A : XA = 500168.619000
YA = 4510207.846000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 3.700000 m
ESPESOR DEL TALUD. ZONA INICIAL = .155330 m
ZONA FINAL = .093330 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.900 m
ANCHO DEL 2' TACON TRASERO = 1.900 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA
=====

PUNTO I : XI = 500167.925
YI = 4510211.481

PUNTO C : XC = 500168.130
YC = 4510211.512

PUNTO D : XD = 500168.222
YD = 4510211.526

PUNTO E : XE = 500168.617
YE = 4510211.586

PUNTO G : XG = 500170.101
YG = 4510211.810

PUNTO K : XK = 500170.101
YK = 4510211.810

PUNTO J : XJ = 500168.486
YJ = 4510207.769

PUNTO AP: XAP = 500168.616
YAP = 4510207.869

PUNTO B : XB = 500168.761
YB = 4510207.955

PUNTO BP: XBP = 500168.758
YBP = 4510207.978

PUNTO F : XF = 500169.120
YF = 4510208.257

PUNTO H : XH = 500170.479
YH = 4510209.304

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA
=====

DISTANCIA ENTRE LOS PUNTOS I y J = 3.754 m Z_1
C y A = 3.698 m
C y AP = 3.675 m
D y BP = 3.588 m D
E y F = 3.366 m C
G y H = 2.534 m
K y P = 2.534 m Z_2, Z_3

$Z_A = 980,660$ $B = 3,200$
 $Z_B = 978,800$ $A = 0,166$
 $Z_C = 976,000$ $Z_2 = 2,534$
 $H_1 = 4,660$ $Z_3 = \text{---}$
 $H_2 = 2,800$ $E = 1,85$
 $F = \text{---}$
 $Z = 2,20$

REPLANTEO ALETAS P.I. 559+170. PASO DE FAUNA

-58.217

.02

500180.884

500176.923

500164.657

500168.619

4510191.922

4510188.871

4510204.795

4510207.846

30.

30.

30.

30.

6.7

6.2

3.7

3.7

.169333

.169333

.15533

.15533

.07

.086667

.09333

.09333

.4

.4

.4

.4

1.9

1.9

1.9

1.9

1.9

1.9

1.9

1.9

.3

.3

.3

.3

4.4.6 Paso inferior de fauna PK 563+9

4.4.6 PASO INFERIOR DE FAUNA PK 563+9

ÍNDICE

- DEFINICIÓN GEOMÉTRICA:
 - DATOS GENERALES DEL TRAZADO
 - REPLANTEO DE LOS BORDES DEL FFCC.
 - REPLANTEO DEL PÓRTICO
 - REPLANTEO DE LAS ALETAS

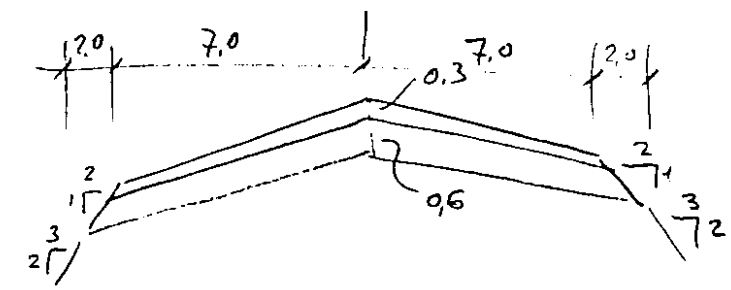
DEFINICION GEOMETICA P.F. 563+9

DATOS GENERALES DEL TRAZADO

PI-563+900

RECTA
 $X = 503280,541$
 $Y = 4513032,521$
 $Az = 44,9470$

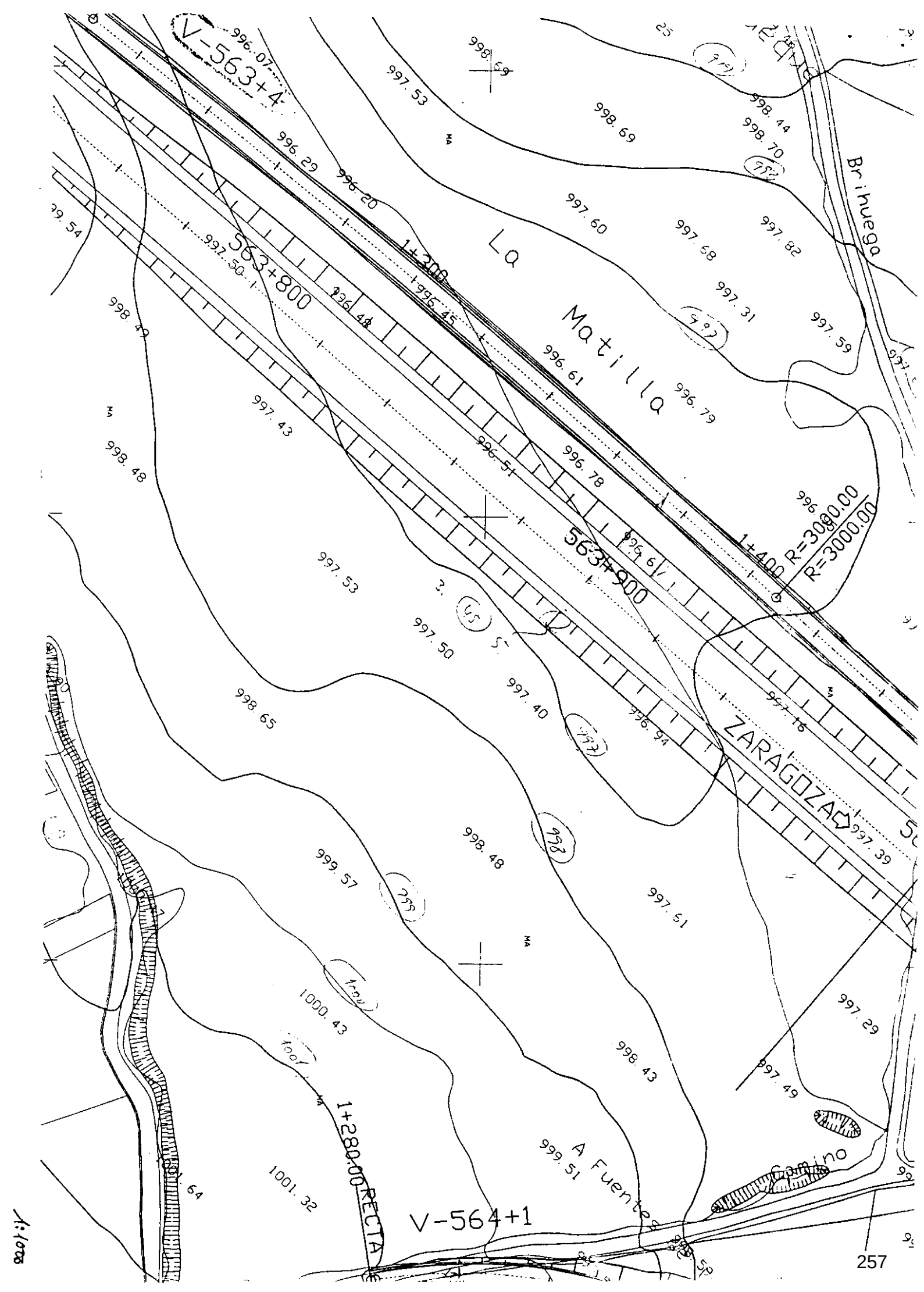
$K_v = 67294,428$
 $1001,983$ $1002,471$ $1011,655$
 $S63+712,493$ $S63+827,507$ $S66+100$



PLANTA

ALZADO

SECCION



REPLANTEO DE LOS BORDES DEL FERROCARRIL

PI-563+900 PASO FAUNA 1000 FERROCARRIL
63386.585 3280.541 13032.521 44.947 1 63712.493 1001.983 .00154589 2
66100. -2 63887.507 67294.428
1 66100.
2 63386.585 1.5325 2. 5.4675 1.5325 0. 1.5325 0. 1.5325 5.4675 2.
66100. 1.5325 2. 5.4675 1.5325 0. 1.5325 0. 1.5325 5.4675 2.
2 63386.585 -.5 -.17796 .17796 .5
66100. -.5 -.17796 .17796 .5
7 1 0. 2 0. 3 0. 0 0. 8 0. 9 0. 10 0.
1 0 63870. 1. 63930. 70 10 20 30 40 50 60 7
1 0 1 63900. 10 4

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TITULO DEL TRABAJO PI-563+900 PASO FAUNA

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	63870.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	1	0	63870.000	3587.339	13406.213	1000.438
1	1	2	0	63870.000	3588.861	13404.916	1001.438
1	1	3	0	63870.000	3593.022	13401.368	1002.411
1	1	4	0	63870.000	3594.188	13400.374	1002.411
1	1	5	0	63870.000	3595.354	13399.380	1002.411
1	1	6	0	63870.000	3599.514	13395.832	1001.438
1	1	7	0	63870.000	3601.036	13394.535	1000.438

EJE	P.K.	AZIMUT	COS A	SEN A
0	63871.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	2	1	0	63871.000	3587.988	13406.974	1000.442
1	2	2	0	63871.000	3589.510	13405.677	1001.442
1	2	3	0	63871.000	3593.670	13402.129	1002.415
1	2	4	0	63871.000	3594.837	13401.135	1002.415
1	2	5	0	63871.000	3596.003	13400.141	1002.415
1	2	6	0	63871.000	3600.163	13396.593	1001.442
1	2	7	0	63871.000	3601.685	13395.296	1000.442

EJE	P.K.	AZIMUT	COS A	SEN A
0	63872.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	3	1	0	63872.000	3588.637	13407.735	1000.446
1	3	2	0	63872.000	3590.159	13406.437	1001.446
1	3	3	0	63872.000	3594.319	13402.890	1002.419
1	3	4	0	63872.000	3595.485	13401.896	1002.419
1	3	5	0	63872.000	3596.652	13400.901	1002.419
1	3	6	0	63872.000	3600.812	13397.354	1001.446
1	3	7	0	63872.000	3602.334	13396.056	1000.446

EJE	P.K.	AZIMUT	COS A	SEN A
0	63873.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	4	1	0	63873.000	3589.286	13408.496	1000.450
1	4	2	0	63873.000	3590.808	13407.198	1001.450
1	4	3	0	63873.000	3594.968	13403.651	1002.423
1	4	4	0	63873.000	3596.134	13402.657	1002.423
1	4	5	0	63873.000	3597.300	13401.662	1002.423
1	4	6	0	63873.000	3601.461	13398.115	1001.450
1	4	7	0	63873.000	3602.983	13396.817	1000.450

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63874.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	5	1	0	63874.000	3589.935	13409.257	1000.453
1	5	2	0	63874.000	3591.456	13407.959	1001.453
1	5	3	0	63874.000	3595.617	13404.412	1002.426
1	5	4	0	63874.000	3596.783	13403.418	1002.426
1	5	5	0	63874.000	3597.949	13402.423	1002.426
1	5	6	0	63874.000	3602.110	13398.876	1001.453
1	5	7	0	63874.000	3603.632	13397.578	1000.453

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63875.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	6	1	0	63875.000	3590.583	13410.018	1000.457
1	6	2	0	63875.000	3592.105	13408.720	1001.457
1	6	3	0	63875.000	3596.266	13405.173	1002.430
1	6	4	0	63875.000	3597.432	13404.179	1002.430
1	6	5	0	63875.000	3598.598	13403.184	1002.430
1	6	6	0	63875.000	3602.758	13399.637	1001.457
1	6	7	0	63875.000	3604.280	13398.339	1000.457

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63876.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	7	1	0	63876.000	3591.232	13410.779	1000.461
1	7	2	0	63876.000	3592.754	13409.481	1001.461
1	7	3	0	63876.000	3596.915	13405.934	1002.434
1	7	4	0	63876.000	3598.081	13404.940	1002.434
1	7	5	0	63876.000	3599.247	13403.945	1002.434
1	7	6	0	63876.000	3603.407	13400.398	1001.461
1	7	7	0	63876.000	3604.929	13399.100	1000.461

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63877.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	8	1	0	63877.000	3591.881	13411.540	1000.465
1	8	2	0	63877.000	3593.403	13410.242	1001.465
1	8	3	0	63877.000	3597.563	13406.695	1002.438
1	8	4	0	63877.000	3598.729	13405.701	1002.438
1	8	5	0	63877.000	3599.896	13404.706	1002.438
1	8	6	0	63877.000	3604.056	13401.159	1001.465
1	8	7	0	63877.000	3605.578	13399.861	1000.465

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63878.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	9	1	0	63878.000	3592.530	13412.301	1000.469
1	9	2	0	63878.000	3594.052	13411.003	1001.469
1	9	3	0	63878.000	3598.212	13407.456	1002.442
1	9	4	0	63878.000	3599.378	13406.461	1002.442

1	9	5	0	63878.000	3600.544	13405.467	1002.442
1	9	6	0	63878.000	3604.705	13401.920	1001.469
1	9	7	0	63878.000	3606.227	13400.622	1000.469

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63879.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	10	1	0	63879.000	3593.179	13413.062	1000.473
1	10	2	0	63879.000	3594.700	13411.764	1001.473
1	10	3	0	63879.000	3598.861	13408.217	1002.446
1	10	4	0	63879.000	3600.027	13407.222	1002.446
1	10	5	0	63879.000	3601.193	13406.228	1002.446
1	10	6	0	63879.000	3605.354	13402.681	1001.473
1	10	7	0	63879.000	3606.876	13401.383	1000.473

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63880.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	11	1	0	63880.000	3593.827	13413.823	1000.477
1	11	2	0	63880.000	3595.349	13412.525	1001.477
1	11	3	0	63880.000	3599.510	13408.978	1002.450
1	11	4	0	63880.000	3600.676	13407.983	1002.450
1	11	5	0	63880.000	3601.842	13406.989	1002.450
1	11	6	0	63880.000	3606.003	13403.442	1001.477
1	11	7	0	63880.000	3607.524	13402.144	1000.477

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63881.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	12	1	0	63881.000	3594.476	13414.584	1000.481
1	12	2	0	63881.000	3595.998	13413.286	1001.481
1	12	3	0	63881.000	3600.159	13409.739	1002.454
1	12	4	0	63881.000	3601.325	13408.744	1002.454
1	12	5	0	63881.000	3602.491	13407.750	1002.454
1	12	6	0	63881.000	3606.651	13404.203	1001.481
1	12	7	0	63881.000	3608.173	13402.905	1000.481

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63882.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	13	1	0	63882.000	3595.125	13415.345	1000.486
1	13	2	0	63882.000	3596.647	13414.047	1001.486
1	13	3	0	63882.000	3600.807	13410.500	1002.459
1	13	4	0	63882.000	3601.974	13409.505	1002.459
1	13	5	0	63882.000	3603.140	13408.511	1002.459
1	13	6	0	63882.000	3607.300	13404.964	1001.486
1	13	7	0	63882.000	3608.822	13403.666	1000.486

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63883.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	14	1	0	63883.000	3595.774	13416.106	1000.490
1	14	2	0	63883.000	3597.296	13414.808	1001.490
1	14	3	0	63883.000	3601.456	13411.261	1002.463
1	14	4	0	63883.000	3602.622	13410.266	1002.463
1	14	5	0	63883.000	3603.789	13409.272	1002.463
1	14	6	0	63883.000	3607.949	13405.724	1001.490
1	14	7	0	63883.000	3609.471	13404.427	1000.490

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63884.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	0	63884.000	3596.423	13416.866	1000.494
1	15	2	0	63884.000	3597.945	13415.569	1001.494
1	15	3	0	63884.000	3602.105	13412.021	1002.467
1	15	4	0	63884.000	3603.271	13411.027	1002.467
1	15	5	0	63884.000	3604.437	13410.033	1002.467
1	15	6	0	63884.000	3608.598	13406.485	1001.494
1	15	7	0	63884.000	3610.120	13405.188	1000.494

JE	P.K.	AZIMUT	COS A	SEN A
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0	63885.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	0	63885.000	3597.071	13417.627	1000.498
1	16	2	0	63885.000	3598.593	13416.330	1001.498
1	16	3	0	63885.000	3602.754	13412.782	1002.471
1	16	4	0	63885.000	3603.920	13411.788	1002.471
1	16	5	0	63885.000	3605.086	13410.794	1002.471
1	16	6	0	63885.000	3609.247	13407.246	1001.498
1	16	7	0	63885.000	3610.769	13405.949	1000.498

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63886.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	0	63886.000	3597.720	13418.388	1000.502
1	17	2	0	63886.000	3599.242	13417.091	1001.502
1	17	3	0	63886.000	3603.403	13413.543	1002.475
1	17	4	0	63886.000	3604.569	13412.549	1002.475
1	17	5	0	63886.000	3605.735	13411.555	1002.475
1	17	6	0	63886.000	3609.895	13408.007	1001.502
1	17	7	0	63886.000	3611.417	13406.710	1000.502

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63887.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	0	63887.000	3598.369	13419.149	1000.506
1	18	2	0	63887.000	3599.891	13417.852	1001.506
1	18	3	0	63887.000	3604.051	13414.304	1002.479
1	18	4	0	63887.000	3605.218	13413.310	1002.479
1	18	5	0	63887.000	3606.384	13412.316	1002.479
1	18	6	0	63887.000	3610.544	13408.768	1001.506
1	18	7	0	63887.000	3612.066	13407.471	1000.506

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63888.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	0	63888.000	3599.018	13419.910	1000.510
1	19	2	0	63888.000	3600.540	13418.613	1001.510
1	19	3	0	63888.000	3604.700	13415.065	1002.483
1	19	4	0	63888.000	3605.866	13414.071	1002.483
1	19	5	0	63888.000	3607.033	13413.077	1002.483
1	19	6	0	63888.000	3611.193	13409.529	1001.510
1	19	7	0	63888.000	3612.715	13408.232	1000.510

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63889.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	0	63889.000	3599.667	13420.671	1000.514
1	20	2	0	63889.000	3601.189	13419.374	1001.514
1	20	3	0	63889.000	3605.349	13415.826	1002.487
1	20	4	0	63889.000	3606.515	13414.832	1002.487
1	20	5	0	63889.000	3607.681	13413.838	1002.487
1	20	6	0	63889.000	3611.842	13410.290	1001.514
1	20	7	0	63889.000	3613.364	13408.993	1000.514

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63890.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	0	63890.000	3600.316	13421.432	1000.518
1	21	2	0	63890.000	3601.837	13420.135	1001.518
1	21	3	0	63890.000	3605.998	13416.587	1002.491
1	21	4	0	63890.000	3607.164	13415.593	1002.491
1	21	5	0	63890.000	3608.330	13414.599	1002.491
1	21	6	0	63890.000	3612.491	13411.051	1001.518
1	21	7	0	63890.000	3614.013	13409.753	1000.518

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63891.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	0	63891.000	3600.964	13422.193	1000.523
1	22	2	0	63891.000	3602.486	13420.895	1001.523
1	22	3	0	63891.000	3606.647	13417.348	1002.496
1	22	4	0	63891.000	3607.813	13416.354	1002.496
1	22	5	0	63891.000	3608.979	13415.359	1002.496
1	22	6	0	63891.000	3613.140	13411.812	1001.523
1	22	7	0	63891.000	3614.661	13410.514	1000.523

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63892.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	0	63892.000	3601.613	13422.954	1000.527
1	23	2	0	63892.000	3603.135	13421.656	1001.527

1	23	3	0	63892.000	3607.296	13418.109	1002.500
1	23	4	0	63892.000	3608.462	13417.115	1002.500
1	23	5	0	63892.000	3609.628	13416.120	1002.500
1	23	6	0	63892.000	3613.788	13412.573	1001.527
1	23	7	0	63892.000	3615.310	13411.275	1000.527

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63893.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	24	1	0	63893.000	3602.262	13423.715	1000.531
1	24	2	0	63893.000	3603.784	13422.417	1001.531
1	24	3	0	63893.000	3607.944	13418.870	1002.504
1	24	4	0	63893.000	3609.111	13417.876	1002.504
1	24	5	0	63893.000	3610.277	13416.881	1002.504
1	24	6	0	63893.000	3614.437	13413.334	1001.531
1	24	7	0	63893.000	3615.959	13412.036	1000.531

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63894.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	25	1	0	63894.000	3602.911	13424.476	1000.535
1	25	2	0	63894.000	3604.433	13423.178	1001.535
1	25	3	0	63894.000	3608.593	13419.631	1002.508
1	25	4	0	63894.000	3609.759	13418.637	1002.508
1	25	5	0	63894.000	3610.925	13417.642	1002.508
1	25	6	0	63894.000	3615.086	13414.095	1001.535
1	25	7	0	63894.000	3616.608	13412.797	1000.535

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63895.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	26	1	0	63895.000	3603.560	13425.237	1000.539
1	26	2	0	63895.000	3605.082	13423.939	1001.539
1	26	3	0	63895.000	3609.242	13420.392	1002.512
1	26	4	0	63895.000	3610.408	13419.398	1002.512
1	26	5	0	63895.000	3611.574	13418.403	1002.512
1	26	6	0	63895.000	3615.735	13414.856	1001.539
1	26	7	0	63895.000	3617.257	13413.558	1000.539

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63896.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	27	1	0	63896.000	3604.208	13425.998	1000.543
1	27	2	0	63896.000	3605.730	13424.700	1001.543
1	27	3	0	63896.000	3609.891	13421.153	1002.516
1	27	4	0	63896.000	3611.057	13420.159	1002.516
1	27	5	0	63896.000	3612.223	13419.164	1002.516
1	27	6	0	63896.000	3616.384	13415.617	1001.543
1	27	7	0	63896.000	3617.905	13414.319	1000.543

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63897.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	28	1	0	63897.000	3604.857	13426.759	1000.548
1	28	2	0	63897.000	3606.379	13425.461	1001.548
1	28	3	0	63897.000	3610.540	13421.914	1002.520
1	28	4	0	63897.000	3611.706	13420.919	1002.520
1	28	5	0	63897.000	3612.872	13419.925	1002.520
1	28	6	0	63897.000	3617.032	13416.378	1001.548
1	28	7	0	63897.000	3618.554	13415.080	1000.548

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63898.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	29	1	0	63898.000	3605.506	13427.520	1000.552
1	29	2	0	63898.000	3607.028	13426.222	1001.552
1	29	3	0	63898.000	3611.188	13422.675	1002.525
1	29	4	0	63898.000	3612.355	13421.680	1002.525
1	29	5	0	63898.000	3613.521	13420.686	1002.525
1	29	6	0	63898.000	3617.681	13417.139	1001.552
1	29	7	0	63898.000	3619.203	13415.841	1000.552

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63899.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	30	1	0	63899.000	3606.155	13428.281	1000.556
1	30	2	0	63899.000	3607.677	13426.983	1001.556
1	30	3	0	63899.000	3611.837	13423.436	1002.529
1	30	4	0	63899.000	3613.003	13422.441	1002.529
1	30	5	0	63899.000	3614.170	13421.447	1002.529
1	30	6	0	63899.000	3618.330	13417.900	1001.556
1	30	7	0	63899.000	3619.852	13416.602	1000.556

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63900.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	31	1	0	63900.000	3606.804	13429.042	1000.560
1	31	2	0	63900.000	3608.326	13427.744	1001.560
1	31	3	0	63900.000	3612.486	13424.197	1002.533
1	31	4	0	63900.000	3613.652	13423.202	1002.533
1	31	5	0	63900.000	3614.818	13422.208	1002.533
1	31	6	0	63900.000	3618.979	13418.661	1001.560
1	31	7	0	63900.000	3620.501	13417.363	1000.560

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63901.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	32	1	0	63901.000	3607.453	13429.803	1000.564
1	32	2	0	63901.000	3608.974	13428.505	1001.564
1	32	3	0	63901.000	3613.135	13424.958	1002.537
1	32	4	0	63901.000	3614.301	13423.963	1002.537
1	32	5	0	63901.000	3615.467	13422.969	1002.537

1	32	6	0	63901.000	3619.628	13419.422	1001.564
1	32	7	0	63901.000	3621.150	13418.124	1000.564

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63902.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	33	1	0	63902.000	3608.101	13430.564	1000.568
1	33	2	0	63902.000	3609.623	13429.266	1001.568
1	33	3	0	63902.000	3613.784	13425.718	1002.541
1	33	4	0	63902.000	3614.950	13424.724	1002.541
1	33	5	0	63902.000	3616.116	13423.730	1002.541
1	33	6	0	63902.000	3620.276	13420.182	1001.568
1	33	7	0	63902.000	3621.798	13418.885	1000.568

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63903.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	34	1	0	63903.000	3608.750	13431.324	1000.572
1	34	2	0	63903.000	3610.272	13430.027	1001.572
1	34	3	0	63903.000	3614.433	13426.479	1002.545
1	34	4	0	63903.000	3615.599	13425.485	1002.545
1	34	5	0	63903.000	3616.765	13424.491	1002.545
1	34	6	0	63903.000	3620.925	13420.943	1001.572
1	34	7	0	63903.000	3622.447	13419.646	1000.572

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63904.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	35	1	0	63904.000	3609.399	13432.085	1000.577
1	35	2	0	63904.000	3610.921	13430.788	1001.577
1	35	3	0	63904.000	3615.081	13427.240	1002.550
1	35	4	0	63904.000	3616.247	13426.246	1002.550
1	35	5	0	63904.000	3617.414	13425.252	1002.550
1	35	6	0	63904.000	3621.574	13421.704	1001.577
1	35	7	0	63904.000	3623.096	13420.407	1000.577

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63905.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	36	1	0	63905.000	3610.048	13432.846	1000.581
1	36	2	0	63905.000	3611.570	13431.549	1001.581
1	36	3	0	63905.000	3615.730	13428.001	1002.554
1	36	4	0	63905.000	3616.896	13427.007	1002.554
1	36	5	0	63905.000	3618.062	13426.013	1002.554
1	36	6	0	63905.000	3622.223	13422.465	1001.581
1	36	7	0	63905.000	3623.745	13421.168	1000.581

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63906.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
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1	37	1	0	63906.000	3610.697	13433.607	1000.585
1	37	2	0	63906.000	3612.218	13432.310	1001.585
1	37	3	0	63906.000	3616.379	13428.762	1002.558
1	37	4	0	63906.000	3617.545	13427.768	1002.558
1	37	5	0	63906.000	3618.711	13426.774	1002.558
1	37	6	0	63906.000	3622.872	13423.226	1001.585
1	37	7	0	63906.000	3624.394	13421.929	1000.585

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63907.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	38	1	0	63907.000	3611.345	13434.368	1000.589
1	38	2	0	63907.000	3612.867	13433.071	1001.589
1	38	3	0	63907.000	3617.028	13429.523	1002.562
1	38	4	0	63907.000	3618.194	13428.529	1002.562
1	38	5	0	63907.000	3619.360	13427.535	1002.562
1	38	6	0	63907.000	3623.521	13423.987	1001.589
1	38	7	0	63907.000	3625.042	13422.690	1000.589

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63908.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	39	1	0	63908.000	3611.994	13435.129	1000.593
1	39	2	0	63908.000	3613.516	13433.832	1001.593
1	39	3	0	63908.000	3617.677	13430.284	1002.566
1	39	4	0	63908.000	3618.843	13429.290	1002.566
1	39	5	0	63908.000	3620.009	13428.296	1002.566
1	39	6	0	63908.000	3624.169	13424.748	1001.593
1	39	7	0	63908.000	3625.691	13423.451	1000.593

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63909.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	40	1	0	63909.000	3612.643	13435.890	1000.597
1	40	2	0	63909.000	3614.165	13434.593	1001.597
1	40	3	0	63909.000	3618.325	13431.045	1002.570
1	40	4	0	63909.000	3619.492	13430.051	1002.570
1	40	5	0	63909.000	3620.658	13429.056	1002.570
1	40	6	0	63909.000	3624.818	13425.509	1001.597
1	40	7	0	63909.000	3626.340	13424.211	1000.597

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63910.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	41	1	0	63910.000	3613.292	13436.651	1000.601
1	41	2	0	63910.000	3614.814	13435.353	1001.601
1	41	3	0	63910.000	3618.974	13431.806	1002.574
1	41	4	0	63910.000	3620.140	13430.812	1002.574
1	41	5	0	63910.000	3621.307	13429.817	1002.574
1	41	6	0	63910.000	3625.467	13426.270	1001.601
1	41	7	0	63910.000	3626.989	13424.972	1000.601

EJE	P.K.	AZIMUT	COS A	SEN A
0	63911.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	42	1	0	63911.000	3613.941	13437.412	1000.606
1	42	2	0	63911.000	3615.463	13436.114	1001.606
1	42	3	0	63911.000	3619.623	13432.567	1002.579
1	42	4	0	63911.000	3620.789	13431.573	1002.579
1	42	5	0	63911.000	3621.955	13430.578	1002.579
1	42	6	0	63911.000	3626.116	13427.031	1001.606
1	42	7	0	63911.000	3627.638	13425.733	1000.606

EJE	P.K.	AZIMUT	COS A	SEN A
0	63912.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	43	1	0	63912.000	3614.589	13438.173	1000.610
1	43	2	0	63912.000	3616.111	13436.875	1001.610
1	43	3	0	63912.000	3620.272	13433.328	1002.583
1	43	4	0	63912.000	3621.438	13432.334	1002.583
1	43	5	0	63912.000	3622.604	13431.339	1002.583
1	43	6	0	63912.000	3626.765	13427.792	1001.610
1	43	7	0	63912.000	3628.287	13426.494	1000.610

EJE	P.K.	AZIMUT	COS A	SEN A
0	63913.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	44	1	0	63913.000	3615.238	13438.934	1000.614
1	44	2	0	63913.000	3616.760	13437.636	1001.614
1	44	3	0	63913.000	3620.921	13434.089	1002.587
1	44	4	0	63913.000	3622.087	13433.095	1002.587
1	44	5	0	63913.000	3623.253	13432.100	1002.587
1	44	6	0	63913.000	3627.413	13428.553	1001.614
1	44	7	0	63913.000	3628.935	13427.255	1000.614

EJE	P.K.	AZIMUT	COS A	SEN A
0	63914.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	45	1	0	63914.000	3615.887	13439.695	1000.618
1	45	2	0	63914.000	3617.409	13438.397	1001.618
1	45	3	0	63914.000	3621.569	13434.850	1002.591
1	45	4	0	63914.000	3622.736	13433.856	1002.591
1	45	5	0	63914.000	3623.902	13432.861	1002.591
1	45	6	0	63914.000	3628.062	13429.314	1001.618
1	45	7	0	63914.000	3629.584	13428.016	1000.618

EJE	P.K.	AZIMUT	COS A	SEN A
0	63915.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	46	1	0	63915.000	3616.536	13440.456	1000.622
1	46	2	0	63915.000	3618.058	13439.158	1001.622
1	46	3	0	63915.000	3622.218	13435.611	1002.595

1	46	4	0	63915.000	3623.384	13434.616	1002.595
1	46	5	0	63915.000	3624.551	13433.622	1002.595
1	46	6	0	63915.000	3628.711	13430.075	1001.622
1	46	7	0	63915.000	3630.233	13428.777	1000.622

EJE	P.K.	AZIMUT	COS A	SEN A
0	63916.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	47	1	0	63916.000	3617.185	13441.217	1000.626
1	47	2	0	63916.000	3618.707	13439.919	1001.626
1	47	3	0	63916.000	3622.867	13436.372	1002.599
1	47	4	0	63916.000	3624.033	13435.377	1002.599
1	47	5	0	63916.000	3625.199	13434.383	1002.599
1	47	6	0	63916.000	3629.360	13430.836	1001.626
1	47	7	0	63916.000	3630.882	13429.538	1000.626

EJE	P.K.	AZIMUT	COS A	SEN A
0	63917.000	-55.053000	.648815	-.760946

PO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	48	1	0	63917.000	3617.834	13441.978	1000.630
1	48	2	0	63917.000	3619.355	13440.680	1001.630
1	48	3	0	63917.000	3623.516	13437.133	1002.603
1	48	4	0	63917.000	3624.682	13436.138	1002.603
1	48	5	0	63917.000	3625.848	13435.144	1002.603
1	48	6	0	63917.000	3630.009	13431.597	1001.630
1	48	7	0	63917.000	3631.531	13430.299	1000.630

EJE	P.K.	AZIMUT	COS A	SEN A
0	63918.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	49	1	0	63918.000	3618.482	13442.739	1000.635
1	49	2	0	63918.000	3620.004	13441.441	1001.635
1	49	3	0	63918.000	3624.165	13437.894	1002.608
1	49	4	0	63918.000	3625.331	13436.899	1002.608
1	49	5	0	63918.000	3626.497	13435.905	1002.608
1	49	6	0	63918.000	3630.658	13432.358	1001.635
1	49	7	0	63918.000	3632.179	13431.060	1000.635

EJE	P.K.	AZIMUT	COS A	SEN A
0	63919.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	50	1	0	63919.000	3619.131	13443.500	1000.639
1	50	2	0	63919.000	3620.653	13442.202	1001.639
1	50	3	0	63919.000	3624.814	13438.655	1002.612
1	50	4	0	63919.000	3625.980	13437.660	1002.612
1	50	5	0	63919.000	3627.146	13436.666	1002.612
1	50	6	0	63919.000	3631.306	13433.119	1001.639
1	50	7	0	63919.000	3632.828	13431.821	1000.639

EJE	P.K.	AZIMUT	COS A	SEN A
0	63920.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	51	1	0	63920.000	3619.780	13444.261	1000.643
1	51	2	0	63920.000	3621.302	13442.963	1001.643
1	51	3	0	63920.000	3625.462	13439.416	1002.616
1	51	4	0	63920.000	3626.629	13438.421	1002.616
1	51	5	0	63920.000	3627.795	13437.427	1002.616
1	51	6	0	63920.000	3631.955	13433.880	1001.643
1	51	7	0	63920.000	3633.477	13432.582	1000.643

EJE	P.K.	AZIMUT	COS A	SEN A
0	63921.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	52	1	0	63921.000	3620.429	13445.021	1000.647
1	52	2	0	63921.000	3621.951	13443.724	1001.647
1	52	3	0	63921.000	3626.111	13440.176	1002.620
1	52	4	0	63921.000	3627.277	13439.182	1002.620
1	52	5	0	63921.000	3628.443	13438.188	1002.620
1	52	6	0	63921.000	3632.604	13434.640	1001.647
1	52	7	0	63921.000	3634.126	13433.343	1000.647

EJE	P.K.	AZIMUT	COS A	SEN A
0	63922.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	53	1	0	63922.000	3621.078	13445.782	1000.651
1	53	2	0	63922.000	3622.600	13444.485	1001.651
1	53	3	0	63922.000	3626.760	13440.937	1002.624
1	53	4	0	63922.000	3627.926	13439.943	1002.624
1	53	5	0	63922.000	3629.092	13438.949	1002.624
1	53	6	0	63922.000	3633.253	13435.401	1001.651
1	53	7	0	63922.000	3634.775	13434.104	1000.651

EJE	P.K.	AZIMUT	COS A	SEN A
0	63923.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	54	1	0	63923.000	3621.726	13446.543	1000.655
1	54	2	0	63923.000	3623.248	13445.246	1001.655
1	54	3	0	63923.000	3627.409	13441.698	1002.628
1	54	4	0	63923.000	3628.575	13440.704	1002.628
1	54	5	0	63923.000	3629.741	13439.710	1002.628
1	54	6	0	63923.000	3633.902	13436.162	1001.655
1	54	7	0	63923.000	3635.423	13434.865	1000.655

EJE	P.K.	AZIMUT	COS A	SEN A
0	63924.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	55	1	0	63924.000	3622.375	13447.304	1000.659
1	55	2	0	63924.000	3623.897	13446.007	1001.659
1	55	3	0	63924.000	3628.058	13442.459	1002.632
1	55	4	0	63924.000	3629.224	13441.465	1002.632
1	55	5	0	63924.000	3630.390	13440.471	1002.632
1	55	6	0	63924.000	3634.550	13436.923	1001.659

1	55	7	0	63924.000	3636.072	13435.626	1000.659
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EJE	P.K.	AZIMUT	COS A	SEN A
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0	63925.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	56	1	0	63925.000	3623.024	13448.065	1000.664
1	56	2	0	63925.000	3624.546	13446.768	1001.664
1	56	3	0	63925.000	3628.706	13443.220	1002.637
1	56	4	0	63925.000	3629.873	13442.226	1002.637
1	56	5	0	63925.000	3631.039	13441.232	1002.637
1	56	6	0	63925.000	3635.199	13437.684	1001.664
1	56	7	0	63925.000	3636.721	13436.387	1000.664

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63926.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	57	1	0	63926.000	3623.673	13448.826	1000.668
1	57	2	0	63926.000	3625.195	13447.529	1001.668
1	57	3	0	63926.000	3629.355	13443.981	1002.641
1	57	4	0	63926.000	3630.521	13442.987	1002.641
1	57	5	0	63926.000	3631.688	13441.993	1002.641
1	57	6	0	63926.000	3635.848	13438.445	1001.668
1	57	7	0	63926.000	3637.370	13437.148	1000.668

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63927.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	58	1	0	63927.000	3624.322	13449.587	1000.672
1	58	2	0	63927.000	3625.844	13448.290	1001.672
1	58	3	0	63927.000	3630.004	13444.742	1002.645
1	58	4	0	63927.000	3631.170	13443.748	1002.645
1	58	5	0	63927.000	3632.336	13442.754	1002.645
1	58	6	0	63927.000	3636.497	13439.206	1001.672
1	58	7	0	63927.000	3638.019	13437.909	1000.672

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63928.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	59	1	0	63928.000	3624.971	13450.348	1000.676
1	59	2	0	63928.000	3626.492	13449.050	1001.676
1	59	3	0	63928.000	3630.653	13445.503	1002.649
1	59	4	0	63928.000	3631.819	13444.509	1002.649
1	59	5	0	63928.000	3632.985	13443.514	1002.649
1	59	6	0	63928.000	3637.146	13439.967	1001.676
1	59	7	0	63928.000	3638.668	13438.669	1000.676

EJE	P.K.	AZIMUT	COS A	SEN A
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0	63929.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	60	1	0	63929.000	3625.619	13451.109	1000.680

1	60	2	0	63929.000	3627.141	13449.811	1001.680
1	60	3	0	63929.000	3631.302	13446.264	1002.653
1	60	4	0	63929.000	3632.468	13445.270	1002.653
1	60	5	0	63929.000	3633.634	13444.275	1002.653
1	60	6	0	63929.000	3637.794	13440.728	1001.680
1	60	7	0	63929.000	3639.316	13439.430	1000.680

EJE	P.K.	AZIMUT	COS A	SEN A
0	63930.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	61	1	0	63930.000	3626.268	13451.870	1000.684
1	61	2	0	63930.000	3627.790	13450.572	1001.684
1	61	3	0	63930.000	3631.951	13447.025	1002.657
1	61	4	0	63930.000	3633.117	13446.031	1002.657
1	61	5	0	63930.000	3634.283	13445.036	1002.657
1	61	6	0	63930.000	3638.443	13441.489	1001.684
1	61	7	0	63930.000	3639.965	13440.191	1000.684

EGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	63900.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	4	0	63900.000	3613.652	13423.202	1002.533

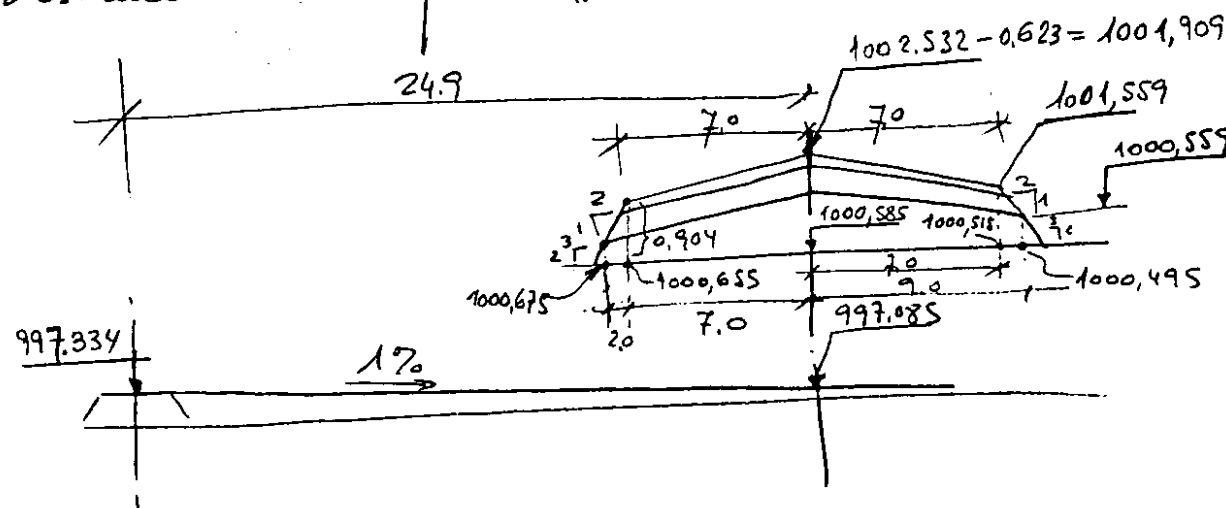
REPLANTEO DEL PORTICO

P.I. 563+900

{ Cota Ferrocarril $\rightarrow$ 1002,532
Cota terreno $\rightarrow$ 996,950 (Aprox horizontal)

Cota camino V-563+4 en PK = 1373+6 $\rightarrow$ $997,130 + (1373,6 - 1360) \times 0,015 = 997,334$

Distancia entre ejes. 24,9 m.



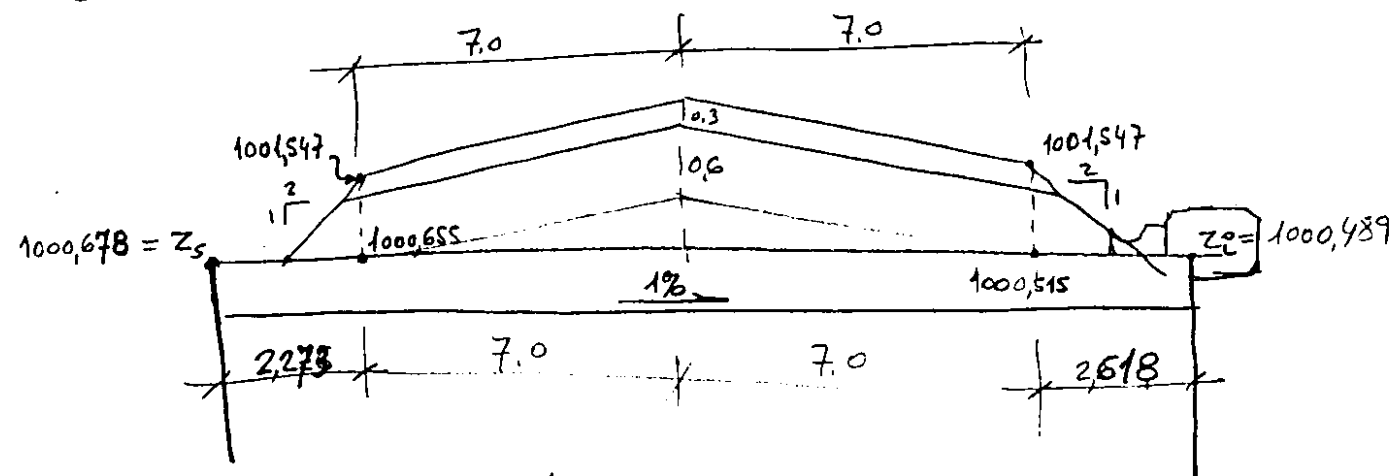
Cota de paso de fauna en eje del ferrocarril

$$997,334 - 24,9 \times 0,01 = 997,085$$

en la clave

$$997,085 + 3,5 = 1000,585$$

$$\text{Cota de diseño } 1001,559 + 3,0 \times 0,00415 = 1001,571$$



$$t_{\beta} = \frac{1}{2} = 0,5 \quad t_{\alpha} = \frac{1}{100} = 0,01$$

Cota superior

$$N = 1001,571 - 1000,655 - 0,17 = 0,746$$

$$L = \frac{N}{t_{\beta} + t_{\alpha}} = \frac{0,746}{0,5 + 0,01} = 1,4627$$

$$M = L + 0,4 + 0,41 = 2,2727$$

$$Z_s = 1000,655 + 2,2727 \times 0,01 = 1000,6777$$

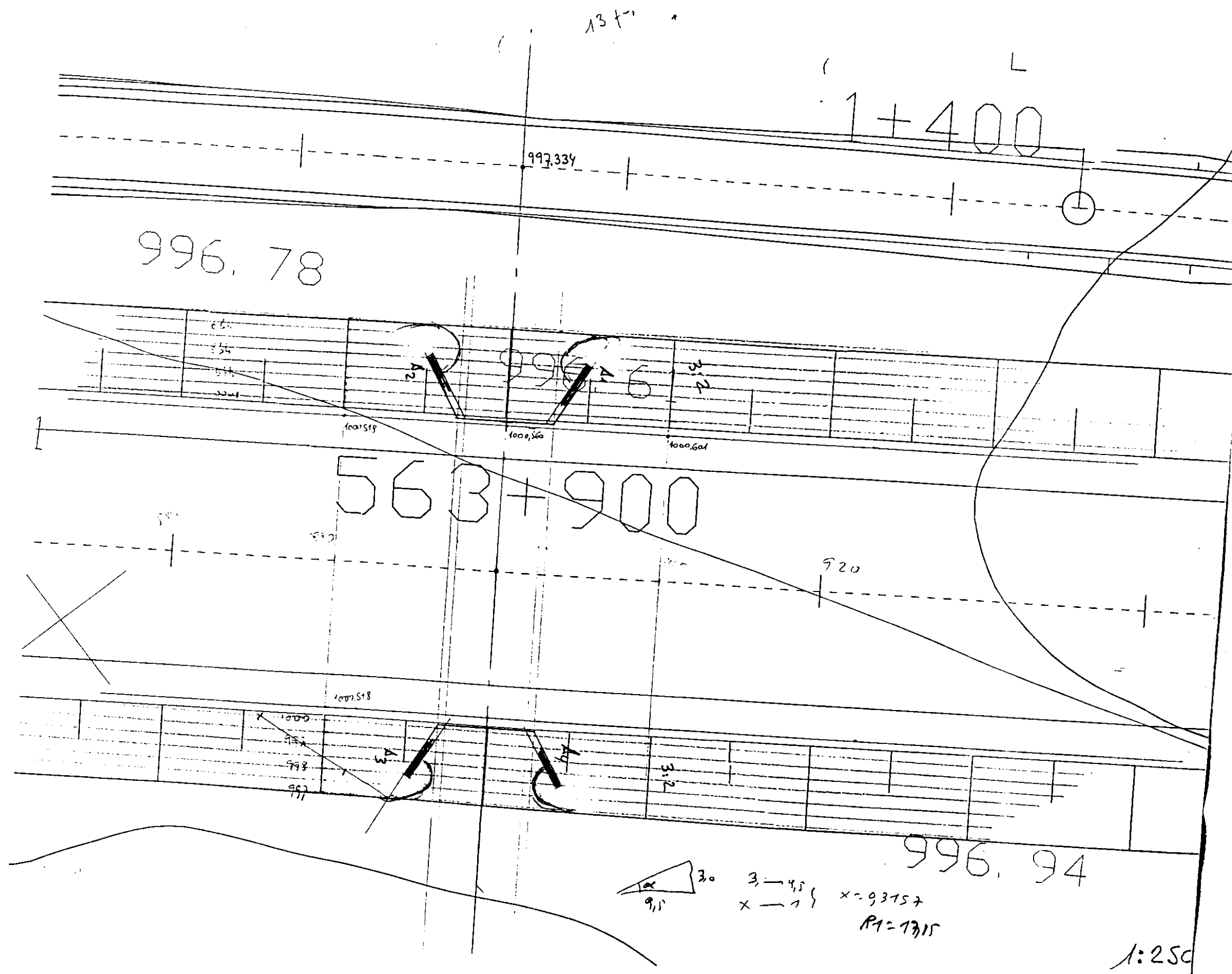
Cota inferior

$$N = 1001,571 - 1000,515 - 0,17 = 0,886$$

$$L = \frac{N}{t_{\beta} - t_{\alpha}} = \frac{0,886}{0,5 - 0,01} = 1,8032$$

$$M = 1,8032 + 0,4 + 0,41 = 2,6182$$

$$Z_c = 1000,515 - 2,6182 \times 0,01 = 1000,4888$$

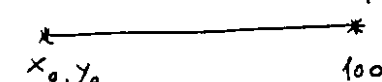


$$P1 - 563 + 900$$

$$\begin{array}{r} 490.000 \\ 13.613,655 \\ \hline 503.613,655 \end{array}$$

$$\begin{array}{r} 4.501.000 \\ 13.423,179 \end{array}$$

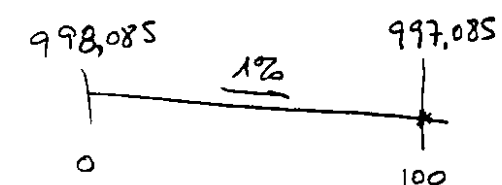
PASO FAUNA

$$\begin{cases} x = 503613,652 \\ y = 4.513.423,202 \\ A_2 = 144,947 \end{cases}$$


$$x_0 = 503.613,652 - 100 \times \cos 44,947 = 503.537,557$$

$$y_0 = 4.513.423,202 + 100 \times \sen 44,947 = 4.513.488,083$$

ALZADO



PI-563+900 PASO FAUNA 1001 FERROCARRIL
63386.585 3280.541 13032.521 44.947 1 63712.493 1001.983 .00154589 2
1 66100. -2 63887.507 67294.428
1 66100.
2 63386.585 1.5325 2. 5.4675 1.5325 0. 1.5325 0. 1.5325 5.4675 2.
66100. 1.5325 2. 5.4675 1.5325 0. 1.5325 0. 1.5325 5.4675 2.
2 63386.585 -.5 -.17796 .17796 .5
66100. -.5 -.17796 .17796 .5
7 1 0. 2 0. 3 0. 0 0. 8 0. 9 0. 10 0.
PASO FAUNA
0. 3537.557 13488.083 144.947 1 0. 998.085 -.01 1
1 150. 1 150.
2 0. 0.5 2.5 2.5 0.5
150. 0.5 2.5 2.5 0.5
2 0.
150.
5 1 0. 2 0. 3 0. 9 0. 10 0.
1 40 3
1 3 85. 1. 115. 53 13 23 33 43 5
0
0
0
/*
/R

TITULO DEL TRABAJO PI-563+900 PASO FAUNA

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
4	0	3	3	63899.999	100.000	3613.652	13423.202	1002.533	997.085
				AZ.E	AZ.3				
				44.947000	144.947000				

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	85.000	44.947000	.760946	.648815

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	3	85.000	3604.184	13435.217	997.235
1	1	2	3	85.000	3603.859	13434.836	997.235
1	1	3	3	85.000	3602.237	13432.934	997.235
1	1	4	3	85.000	3600.615	13431.031	997.235
1	1	5	3	85.000	3600.291	13430.651	997.235

EJE	P.K.	AZIMUT	COS A	SEN A
3	86.000	44.947000	.760946	.648815

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	3	86.000	3604.945	13434.568	997.225
1	2	2	3	86.000	3604.620	13434.187	997.225
1	2	3	3	86.000	3602.998	13432.285	997.225
1	2	4	3	86.000	3601.376	13430.383	997.225
1	2	5	3	86.000	3601.052	13430.002	997.225

EJE	P.K.	AZIMUT	COS A	SEN A
3	87.000	44.947000	.760946	.648815

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	3	87.000	3605.706	13433.919	997.215
1	3	2	3	87.000	3605.381	13433.538	997.215
1	3	3	3	87.000	3603.759	13431.636	997.215
1	3	4	3	87.000	3602.137	13429.734	997.215
1	3	5	3	87.000	3601.813	13429.353	997.215

EJE	P.K.	AZIMUT	COS A	SEN A
3	88.000	44.947000	.760946	.648815

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	3	88.000	3606.467	13433.270	997.205
1	4	2	3	88.000	3606.142	13432.890	997.205
1	4	3	3	88.000	3604.520	13430.987	997.205

1	4	4	3	88.000	3602.898	13429.085	997.205
1	4	5	3	88.000	3602.574	13428.704	997.205

EJE	P.K.	AZIMUT	COS A	SEN A
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3	89.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	5	1	3	89.000	3607.228	13432.621	997.195
1	5	2	3	89.000	3606.903	13432.241	997.195
1	5	3	3	89.000	3605.281	13430.338	997.195
1	5	4	3	89.000	3603.659	13428.436	997.195
1	5	5	3	89.000	3603.335	13428.056	997.195

EJE	P.K.	AZIMUT	COS A	SEN A
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3	90.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	6	1	3	90.000	3607.989	13431.973	997.185
1	6	2	3	90.000	3607.664	13431.592	997.185
1	6	3	3	90.000	3606.042	13429.690	997.185
1	6	4	3	90.000	3604.420	13427.787	997.185
1	6	5	3	90.000	3604.096	13427.407	997.185

EJE	P.K.	AZIMUT	COS A	SEN A
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3	91.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	7	1	3	91.000	3608.750	13431.324	997.175
1	7	2	3	91.000	3608.425	13430.943	997.175
1	7	3	3	91.000	3606.803	13429.041	997.175
1	7	4	3	91.000	3605.181	13427.138	997.175
1	7	5	3	91.000	3604.857	13426.758	997.175

EJE	P.K.	AZIMUT	COS A	SEN A
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3	92.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	8	1	3	92.000	3609.511	13430.675	997.165
1	8	2	3	92.000	3609.186	13430.294	997.165
1	8	3	3	92.000	3607.564	13428.392	997.165
1	8	4	3	92.000	3605.942	13426.490	997.165
1	8	5	3	92.000	3605.618	13426.109	997.165

EJE	P.K.	AZIMUT	COS A	SEN A
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3	93.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	9	1	3	93.000	3610.271	13430.026	997.155
1	9	2	3	93.000	3609.947	13429.646	997.155
1	9	3	3	93.000	3608.325	13427.743	997.155
1	9	4	3	93.000	3606.703	13425.841	997.155
1	9	5	3	93.000	3606.379	13425.460	997.155

EJE	P.K.	AZIMUT	COS A	SEN A
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3	94.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	10	1	3	94.000	3611.032	13429.377	997.145
1	10	2	3	94.000	3610.708	13428.997	997.145
1	10	3	3	94.000	3609.086	13427.094	997.145
1	10	4	3	94.000	3607.464	13425.192	997.145
1	10	5	3	94.000	3607.140	13424.812	997.145

EJE	P.K.	AZIMUT	COS A	SEN A
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3	95.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	11	1	3	95.000	3611.793	13428.728	997.135
1	11	2	3	95.000	3611.469	13428.348	997.135
1	11	3	3	95.000	3609.847	13426.446	997.135
1	11	4	3	95.000	3608.225	13424.543	997.135
1	11	5	3	95.000	3607.900	13424.163	997.135

EJE	P.K.	AZIMUT	COS A	SEN A
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3	96.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	12	1	3	96.000	3612.554	13428.080	997.125
1	12	2	3	96.000	3612.230	13427.699	997.125
1	12	3	3	96.000	3610.608	13425.797	997.125
1	12	4	3	96.000	3608.986	13423.894	997.125
1	12	5	3	96.000	3608.661	13423.514	997.125

EJE	P.K.	AZIMUT	COS A	SEN A
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3	97.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	13	1	3	97.000	3613.315	13427.431	997.115
1	13	2	3	97.000	3612.991	13427.050	997.115
1	13	3	3	97.000	3611.369	13425.148	997.115
1	13	4	3	97.000	3609.747	13423.246	997.115
1	13	5	3	97.000	3609.422	13422.865	997.115

EJE	P.K.	AZIMUT	COS A	SEN A
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3	98.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	14	1	3	98.000	3614.076	13426.782	997.105
1	14	2	3	98.000	3613.752	13426.402	997.105
1	14	3	3	98.000	3612.130	13424.499	997.105
1	14	4	3	98.000	3610.508	13422.597	997.105
1	14	5	3	98.000	3610.183	13422.216	997.105

EJE	P.K.	AZIMUT	COS A	SEN A
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3	99.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	3	99.000	3614.837	13426.133	997.095
1	15	2	3	99.000	3614.513	13425.753	997.095

1	15	3	3	99.000	3612.891	13423.850	997.095
1	15	4	3	99.000	3611.269	13421.948	997.095
1	15	5	3	99.000	3610.944	13421.567	997.095

EJE	P.K.	AZIMUT	COS A	SEN A
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3	100.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	3	100.000	3615.598	13425.484	997.085
1	16	2	3	100.000	3615.274	13425.104	997.085
1	16	3	3	100.000	3613.652	13423.202	997.085
1	16	4	3	100.000	3612.030	13421.299	997.085
1	16	5	3	100.000	3611.705	13420.919	997.085

EJE	P.K.	AZIMUT	COS A	SEN A
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3	101.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	3	101.000	3616.359	13424.836	997.075
1	17	2	3	101.000	3616.035	13424.455	997.075
1	17	3	3	101.000	3614.413	13422.553	997.075
1	17	4	3	101.000	3612.791	13420.650	997.075
1	17	5	3	101.000	3612.466	13420.270	997.075

EJE	P.K.	AZIMUT	COS A	SEN A
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3	102.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	3	102.000	3617.120	13424.187	997.065
1	18	2	3	102.000	3616.796	13423.806	997.065
1	18	3	3	102.000	3615.174	13421.904	997.065
1	18	4	3	102.000	3613.551	13420.002	997.065
1	18	5	3	102.000	3613.227	13419.621	997.065

EJE	P.K.	AZIMUT	COS A	SEN A
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3	103.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	3	103.000	3617.881	13423.538	997.055
1	19	2	3	103.000	3617.557	13423.157	997.055
1	19	3	3	103.000	3615.934	13421.255	997.055
1	19	4	3	103.000	3614.312	13419.353	997.055
1	19	5	3	103.000	3613.988	13418.972	997.055

EJE	P.K.	AZIMUT	COS A	SEN A
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3	104.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	3	104.000	3618.642	13422.889	997.045
1	20	2	3	104.000	3618.317	13422.509	997.045
1	20	3	3	104.000	3616.695	13420.606	997.045
1	20	4	3	104.000	3615.073	13418.704	997.045
1	20	5	3	104.000	3614.749	13418.323	997.045

EJE	P.K.	AZIMUT	COS A	SEN A
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3	105.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	3	105.000	3619.403	13422.240	997.035
1	21	2	3	105.000	3619.078	13421.860	997.035
1	21	3	3	105.000	3617.456	13419.957	997.035
1	21	4	3	105.000	3615.834	13418.055	997.035
1	21	5	3	105.000	3615.510	13417.675	997.035

EJE	P.K.	AZIMUT	COS A	SEN A
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3	106.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	3	106.000	3620.164	13421.591	997.025
1	22	2	3	106.000	3619.839	13421.211	997.025
1	22	3	3	106.000	3618.217	13419.309	997.025
1	22	4	3	106.000	3616.595	13417.406	997.025
1	22	5	3	106.000	3616.271	13417.026	997.025

EJE	P.K.	AZIMUT	COS A	SEN A
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3	107.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	3	107.000	3620.925	13420.943	997.015
1	23	2	3	107.000	3620.600	13420.562	997.015
1	23	3	3	107.000	3618.978	13418.660	997.015
1	23	4	3	107.000	3617.356	13416.757	997.015
1	23	5	3	107.000	3617.032	13416.377	997.015

EJE	P.K.	AZIMUT	COS A	SEN A
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3	108.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	24	1	3	108.000	3621.686	13420.294	997.005
1	24	2	3	108.000	3621.361	13419.913	997.005
1	24	3	3	108.000	3619.739	13418.011	997.005
1	24	4	3	108.000	3618.117	13416.109	997.005
1	24	5	3	108.000	3617.793	13415.728	997.005

EJE	P.K.	AZIMUT	COS A	SEN A
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3	109.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	25	1	3	109.000	3622.447	13419.645	996.995
1	25	2	3	109.000	3622.122	13419.265	996.995
1	25	3	3	109.000	3620.500	13417.362	996.995
1	25	4	3	109.000	3618.878	13415.460	996.995
1	25	5	3	109.000	3618.554	13415.079	996.995

EJE	P.K.	AZIMUT	COS A	SEN A
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3	110.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	26	1	3	110.000	3623.208	13418.996	996.985

1	26	2	3	110.000	3622.883	13418.616	996.985
1	26	3	3	110.000	3621.261	13416.713	996.985
1	26	4	3	110.000	3619.639	13414.811	996.985
1	26	5	3	110.000	3619.315	13414.431	996.985

EJE	P.K.	AZIMUT	COS A	SEN A
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3	111.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	27	1	3	111.000	3623.968	13418.347	996.975
1	27	2	3	111.000	3623.644	13417.967	996.975
1	27	3	3	111.000	3622.022	13416.065	996.975
1	27	4	3	111.000	3620.400	13414.162	996.975
1	27	5	3	111.000	3620.076	13413.782	996.975

EJE	P.K.	AZIMUT	COS A	SEN A
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3	112.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	28	1	3	112.000	3624.729	13417.699	996.965
1	28	2	3	112.000	3624.405	13417.318	996.965
1	28	3	3	112.000	3622.783	13415.416	996.965
1	28	4	3	112.000	3621.161	13413.513	996.965
1	28	5	3	112.000	3620.837	13413.133	996.965

EJE	P.K.	AZIMUT	COS A	SEN A
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3	113.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	29	1	3	113.000	3625.490	13417.050	996.955
1	29	2	3	113.000	3625.166	13416.669	996.955
1	29	3	3	113.000	3623.544	13414.767	996.955
1	29	4	3	113.000	3621.922	13412.865	996.955
1	29	5	3	113.000	3621.597	13412.484	996.955

EJE	P.K.	AZIMUT	COS A	SEN A
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3	114.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	30	1	3	114.000	3626.251	13416.401	996.945
1	30	2	3	114.000	3625.927	13416.020	996.945
1	30	3	3	114.000	3624.305	13414.118	996.945
1	30	4	3	114.000	3622.683	13412.216	996.945
1	30	5	3	114.000	3622.358	13411.835	996.945

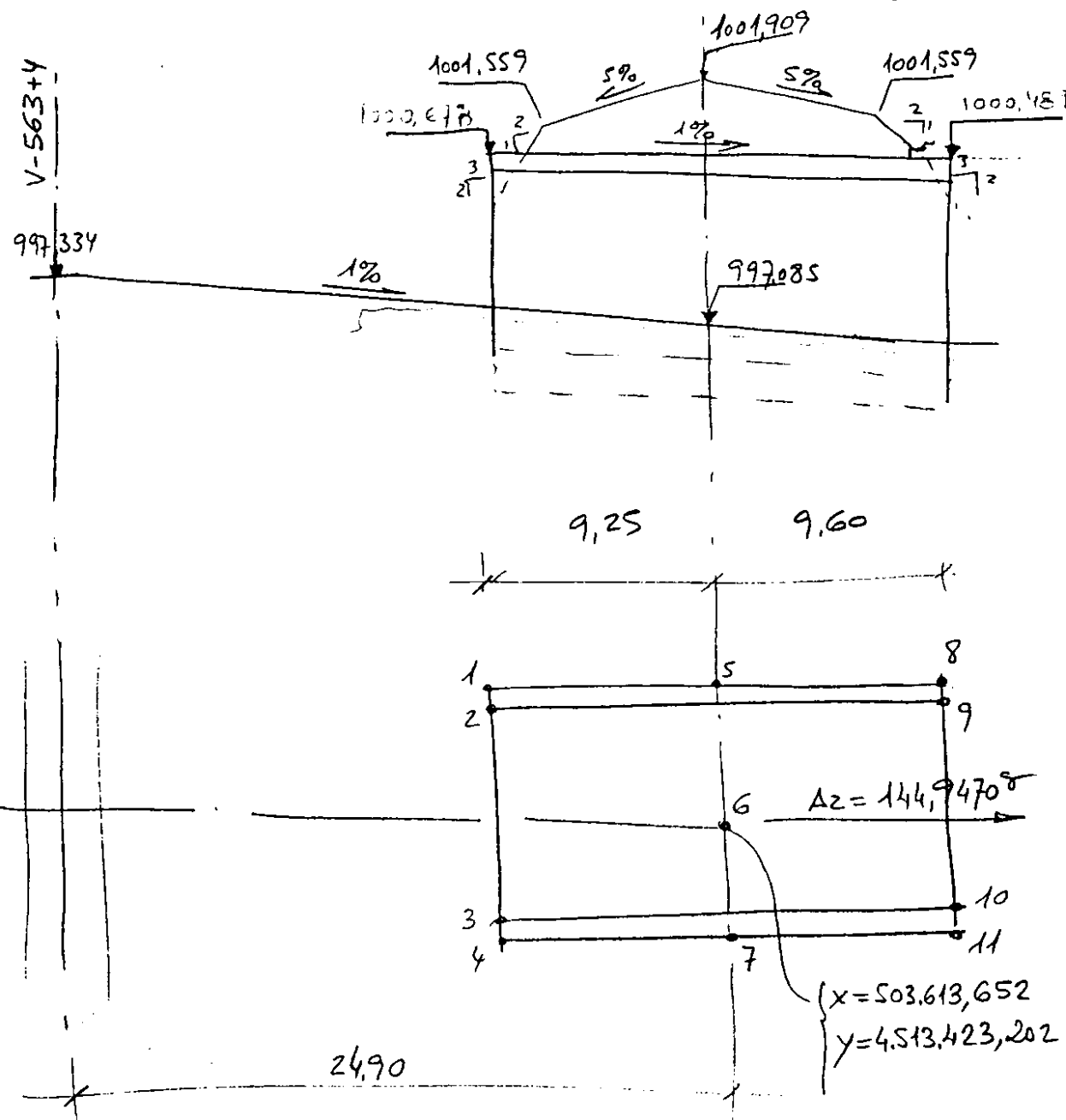
EJE	P.K.	AZIMUT	COS A	SEN A
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3	115.000	44.947000	.760946	.648815
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	31	1	3	115.000	3627.012	13415.752	996.935
1	31	2	3	115.000	3626.688	13415.372	996.935
1	31	3	3	115.000	3625.066	13413.469	996.935
1	31	4	3	115.000	3623.444	13411.567	996.935
1	31	5	3	115.000	3623.119	13411.186	996.935

P.I. 563+900

COTAS EN EJE
DEL PASO



TITULO DEL TRABAJO PI-563+900 PASO FAUNA

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
4	0	3	3	63899.999	100.000	3613.652	13423.202	1002.533	997.085
				AZ.E	AZ.3				
				44.947000	144.947000				

SEGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	90.750	44.947000	.760946	.648815

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	1	3	90.750	3608.559	13431.486	997.178 — (1)
1	1	2	3	90.750	3608.235	13431.105	997.178 — (2)
1	1	3	3	90.750	3606.613	13429.203	997.178
1	1	4	3	90.750	3604.991	13427.301	997.178 — (3)
1	1	5	3	90.750	3604.666	13426.920	997.178 — (4)

EJE	P.K.	AZIMUT	COS A	SEN A
3	100.000	44.947000	.760946	.648815

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	2	1	3	100.000	3615.598	13425.484	997.085 — (5)
1	2	2	3	100.000	3615.274	13425.104	997.085
1	2	3	3	100.000	3613.652	13423.202	997.085 — (6)
1	2	4	3	100.000	3612.030	13421.299	997.085
1	2	5	3	100.000	3611.705	13420.919	997.085 — (7)

EJE	P.K.	AZIMUT	COS A	SEN A
(1)	109.600	44.947000	.760946	.648815

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	3	1	3	109.600	3622.903	13419.256	996.989 — (8)
1	3	2	3	109.600	3622.579	13418.875	996.989 — (9)
1	3	3	3	109.600	3620.957	13416.973	996.989
1	3	4	3	109.600	3619.335	13415.071	996.989 — (10)
1	3	5	3	109.600	3619.010	13414.690	996.989 — (11)

PI-563+900 PASO FAUNA										1001 FERROCARRIL									
63386.585 3280.541 13032.521 44.947										1 63712.493 1001.983 .00154589 2									
1 66100.										-2 63887.507 67294.428									
										1 66100.									
2 63386.585 1.5325 2. 5.4675 1.5325 0.										1.5325 0. 1.5325 5.4675 2.									
66100. 1.5325 2. 5.4675 1.5325 0.										1.5325 0. 1.5325 5.4675 2.									
2 63386.585 -.5 -.17796										.17796 .5									
66100. -.5 -.17796										.17796 .5									
7 1 0. 2 0. 3 0. 0 0.										8 0. 9 0. 10 0.									
										PASO FAUNA									
0. 3537.557 13488.083 144.947										1 0. 998.085 -.01 1									
1 150.										1 150.									
2 0. 0.5 2.5										2.5 0.5									
150. 0.5 2.5										2.5 0.5									
2 0. 150.																			
5 1 0. 2 0. 3 0. 9 0. 10 0.																			
1 40 3																			
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1 3 3 90.75 100. 109.6										53 13 23 33 43 5									
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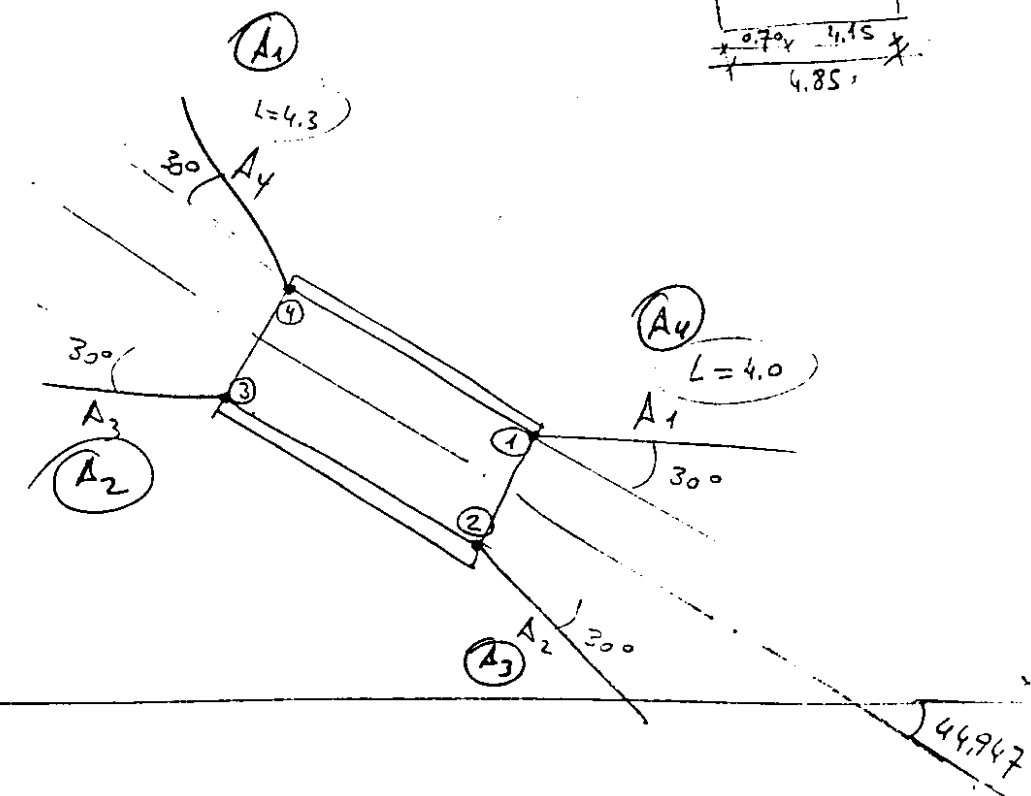
REPLANTEO DE LAS ALETAS

$$\nabla Z_A = 1000,489 - 0,029 = \underline{\underline{1000,46}}$$

A hand-drawn diagram of a rectangular area. The top horizontal dimension is labeled 0.76 . The right vertical dimension is labeled 0.5 . Inside the rectangle, there is a label 2.0% with an arrow pointing to the right, and a label $1000,489$ with an arrow pointing to the left. On the left side, there is a label 1% with an arrow pointing to the left, and a label 0.3 with an arrow pointing to the right. At the bottom, there are two horizontal dimensions: 0.41 and 0.35 . A small triangle is drawn at the bottom center of the rectangle, with a label $2a$ next to it.

$$Z_A = 1000,308 - 0,028 = 1000,280$$

YN A



ALFA 1	ALFA 2	ALFA 3	ALFA 4
503.622,579	503.619,335	503.604,991	503.608,235
4.513.418,875	4.513.415,071	4.513.427,301	4.513.431,105
30.	30	30	30
4.0	4.0	4.3	4.3
0,146	0,146	0,1586	0,1586
0,08	0,08	0,083	0,083
0,1	0,4	0,4	0,4
2,55	2,55	2,55	2,55
2,55	2,55	2,55	2,55
0,3	0,3	0,3	0,3

TITULO :REPLANTEO ALETAS P.I. 563+900. PASO DE FAUNA

ANGULO DEL EJE OX CON EL EJE DEL PORTICO. BETA = -44.947000000 g
ANCHO DE LA JUNTA ENTRE LOS HASTIALES DEL
PORTICO Y LAS ALETAS = .020000 m

ALETA NUMERO = 4 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 503622.579000
YA = 4513418.875000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 4.000000 m
ESPESOR DEL TALUD. ZONA INICIAL = .146000 m
ZONA FINAL = .080000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 2.550 m
ANCHO DEL 2' TACON TRASERO = 2.550 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 503626.468
YI = 4513417.934

PUNTO C : XC = 503626.511
YC = 4513418.150

PUNTO D : XD = 503626.527
YD = 4513418.228

PUNTO E : XE = 503626.606
YE = 4513418.620

PUNTO G : XG = 503627.032
YG = 4513420.728

PUNTO K : XK = 503627.032
YK = 4513420.728

PUNTO J : XJ = 503622.488
YJ = 4513418.738

PUNTO AP: XAP = 503622.602
YAP = 4513418.871

PUNTO B : XB = 503622.688
YB = 4513419.003

PUNTO BP: XBP = 503622.711
YBP = 4513418.999

PUNTO F : XF = 503623.008
YF = 4513419.347

PUNTO H : XH = 503624.603
YH = 4513421.218

PUNTO P : XP = 503624.603
YP = 4513421.218

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I y J = 4.060 m Z_1
C y A = 3.999 m
C y AP = 3.976 m
D y BP = 3.893 m D
E y F = 3.671 m C
G y H = 2.478 m
K y P = 2.478 m Z_2, Z_3

$Z_A = 1000.280$ $B = 3.500$
 $Z_B = 998.300$ $A = 0.171$
 $Z_C = 995.500$ $Z_2 = 2.478$
 $H_1 = 4.380$ $Z_3 =$
 $H_2 = 2.400$ $E = 2.15$
 $F =$
 $Z = 2.85$

ALETA NUMERO = 3 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 503619.335000
YA = 4513415.071000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 4.000000 m
ESPESOR DEL TALUD. ZONA INICIAL = .146000 m
ZONA FINAL = .080000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 2.550 m
ANCHO DEL 2' TACON TRASERO = 2.550 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 503620.879
YI = 4513411.380

PUNTO C : XC = 503620.673
YC = 4513411.303

PUNTO D : XD = 503620.598
YD = 4513411.275

PUNTO E : XE = 503620.223

YE = 4513411.135 } (P₁)

PUNTO G : XG = 503618.210
YG = 4513410.381

PUNTO K : XK = 503618.210
YK = 4513410.381

PUNTO J : XJ = 503619.456
YJ = 4513415.182

PUNTO AP: XAP = 503619.343
YAP = 4513415.049

PUNTO B : XB = 503619.226
YB = 4513414.943

PUNTO BP: XBP = 503619.234
YBP = 4513414.921

PUNTO F : XF = 503618.937 } (P₂)
YF = 4513414.573

PUNTO H : XH = 503617.341
YH = 4513412.702

PUNTO P : XP = 503617.341
YP = 4513412.702

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS

$Z_A = 1000,280$ $B = 3,500$ $I Y J = 4.060 \text{ m } Z_1$
 $Z_B = 998,300$ $A = 0,171$ $C Y A = 3.999 \text{ m}$
 $Z_C = 995,900$ $Z_2 = 2,478$ $C Y AP = 3.976 \text{ m}$
 $H_1 = 4,380$ $Z_3 = \text{---}$ $D Y BP = 3.893 \text{ m } D$
 $H_2 = 2,400$ $E = 2,15$ $E Y F = 3.671 \text{ m } C$
 $F = \text{---}$ $G Y H = 2.478 \text{ m}$
 $Z = 2,85$ $K Y P = 2.478 \text{ m } Z_2, Z_3$

ALETA NUMERO = 2 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 503604.991000
YA = 4513427.301000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
 LONGITUD DE LA ALETA = 4.300000 m
 ESPESOR DEL TALUD. ZONA INICIAL = .158670 m
 ZONA FINAL = .083300 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
 ZAPATA. ANCHO DEL 1' TACON TRASERO = 2.550 m

ANCHO DEL 2' TACON TRASERO = 2.550 m
 ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 503600.807
YI = 4513428.293

PUNTO C : XC = 503600.764
YC = 4513428.081

PUNTO D : XD = 503600.747
YD = 4513427.999

PUNTO E : XE = 503600.668 } (P₁)
YE = 4513427.607

PUNTO G : XG = 503600.240
YG = 4513425.500

PUNTO K : XK = 503600.240
YK = 4513425.500

PUNTO J : XJ = 503605.072
YJ = 4513427.427

PUNTO AP: XAP = 503604.968
YAP = 4513427.305

PUNTO B : XB = 503604.872
YB = 4513427.162

PUNTO BP: XBP = 503604.850
YBP = 4513427.166

PUNTO F : XF = 503604.553 } (P₂)
YF = 4513426.818

PUNTO H : XH = 503602.959
YH = 4513424.948

PUNTO P : XP = 503602.959
YP = 4513424.948

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS

$Z_A = 1000,460$ $B = 3,800$ $I Y J = 4.352 \text{ m } Z_1$
 $Z_B = 998,200$ $A = 0,165$ $C Y A = 4.299 \text{ m}$
 $Z_C = 995,700$ $Z_2 = 2,774$ $C Y AP = 4.275 \text{ m}$
 $H_1 = 4,760$ $Z_3 = \text{---}$ $D Y BP = 4.186 \text{ m } D$
 $H_2 = 2,800$ $E = 2,150$ $E Y F = 3.965 \text{ m } C$
 $F = \text{---}$ $G Y H = 2.774 \text{ m}$
 $Z = 2,850$ $K Y P = 2.774 \text{ m } Z_2, Z_3$

PUNTO P : XP = 503610.237
YP = 4513433.484

ALETA NUMERO = 1 DATOS DE ENTRADA Y SALIDA
=====

COORDENADAS DEL PUNTO A : XA = 503608.235000
YA = 4513431.105000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 4.300000 m
ESPESOR DEL TALUD. ZONA INICIAL = .158670 m
ZONA FINAL = .083300 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 2.550 m
ANCHO DEL 2' TACON TRASERO = 2.550 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA
=====

PUNTO I : XI = 503606.594
YI = 4513435.080

PUNTO C : XC = 503606.797
YC = 4513435.156

PUNTO D : XD = 503606.875
YD = 4513435.185

PUNTO E : XE = 503607.249
YE = 4513435.326

PUNTO G : XG = 503609.262
YG = 4513436.081

PUNTO K : XK = 503609.262
YK = 4513436.081

PUNTO J : XJ = 503608.123
YJ = 4513431.005

PUNTO AP: XAP = 503608.227
YAP = 4513431.127

PUNTO B : XB = 503608.354
YB = 4513431.244

PUNTO BP: XBP = 503608.346
YBP = 4513431.266

PUNTO F : XF = 503608.642
YF = 4513431.614

PUNTO H : XH = 503610.237
YH = 4513433.484

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA
=====

DISTANCIA ENTRE LOS PUNTOS I Y J = 4.352 m z_1
C Y A = 4.299 m
C Y AP = 4.275 m
D Y BP = 4.186 m z_2
E Y F = 3.965 m z_3
G Y H = 2.774 m
K Y P = 2.774 m z_2, z_3

$z_A = 1000,460$ $B = 3,800$
 $z_B = 998,200$ $A = 0,165$
 $z_C = 995,700$ $z_2 = 2,774$
 $H_1 = 4,760$ $z_3 = \text{---}$
 $H_2 = 2,500$ $E = 2,150$
 $F = \text{---}$
 $Z = 2,850$

REPLANTEO ALETAS P.I. 563+900. PASO DE FAUNA

-44.947

.02

503622.579	503619.335	503604.991	503608.235
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4513418.875	4513415.071	4513427.301	4513431.105
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30.	30.	30.	30.
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4.	4.	4.3	4.3
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.146	.146	.15867	.15867
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.08	.08	.0833	.0833
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.4	.4	.4	.4
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2.55	2.55	2.55	2.55
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2.55	2.55	2.55	2.55
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.3	.3	.3	.3
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4.4.7 Paso inferior de fauna 565+38

4.4.7 PASO INFERIOR DE FAUNA PK 565+38

ÍNDICE

- DEFINICIÓN GEOMÉTRICA:
 - DATOS GENERALES DEL TRAZADO
 - REPLANTEO DE LOS BORDES DEL FFCC.
 - REPLANTEO DEL PÓRTICO
 - REPLANTEO DE LAS ALETAS

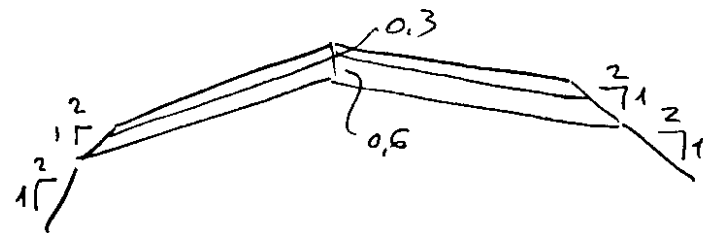
. DEFINICION GEOMETICA P.F. 565+38

DATOS GENERALES DEL TRAZADO

PI 565+380

RECTA 566+100
 $S63+386,585$
 $X = 503280,541$
 $Y = 4.513.032,521$
 $Az = 44,947$

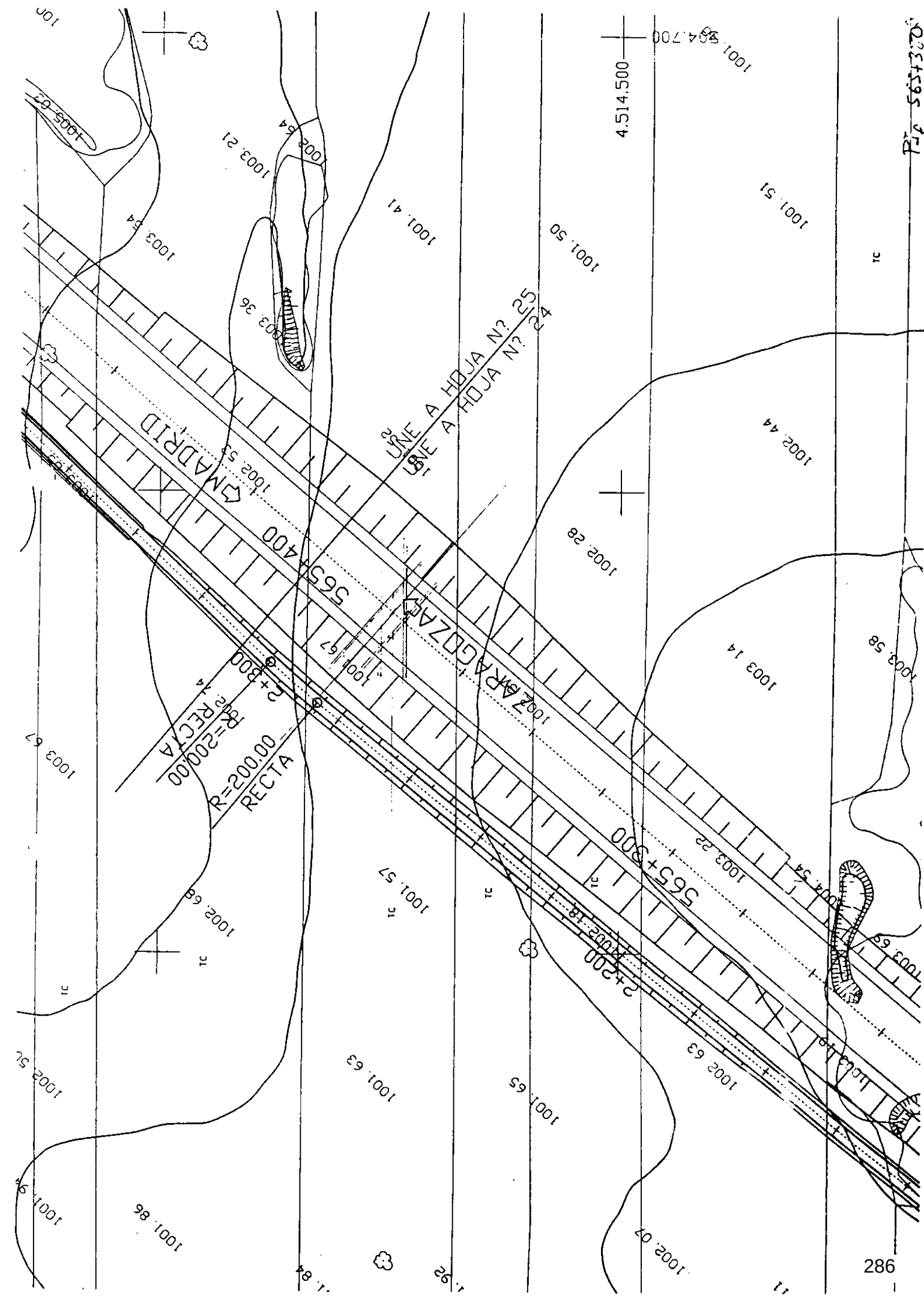
1002,481
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 $563+887,507$
 $1011,655$
 $566+100$



PLANTA

ALZADO

SECCION



REPLANTEO DE LOS BORDES DEL FERROCARRIL

PI-565+380 PASO FAUNA 1000 FERROCARRIL
63386.585 3280.541 13032.521 44.947 1 63887.507 1002.481 .00414661 1
1 66100. 1 66100.
2 63386.585 1.5325 2. 5.4675 1.5325 0. 1.5325 0. 1.53255.4675 2.
66100. 1.5325 2. 5.4675 1.5325 0. 1.5325 0. 1.53255.4675 2.
2 63386.585 -.5 -.17796 .17796 .5
66100. -.5 -.17796 .17796 .5
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1 0 1 65380. 10 4
0
0
0
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/R

TITULO DEL TRABAJO PI-565+380 PASO FAUNA

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	65350.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	1	0	65350.000	4547.585	14532.414	1006.572
1	1	2	0	65350.000	4549.107	14531.116	1007.572
1	1	3	0	65350.000	4553.267	14527.569	1008.545
1	1	4	0	65350.000	4554.434	14526.575	1008.545
1	1	5	0	65350.000	4555.600	14525.580	1008.545
1	1	6	0	65350.000	4559.760	14522.033	1007.572
1	1	7	0	65350.000	4561.282	14520.735	1006.572

EJE	P.K.	AZIMUT	COS A	SEN A
0	65351.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	2	1	0	65351.000	4548.234	14533.175	1006.577
1	2	2	0	65351.000	4549.756	14531.877	1007.577
1	2	3	0	65351.000	4553.916	14528.330	1008.550
1	2	4	0	65351.000	4555.082	14527.335	1008.550
1	2	5	0	65351.000	4556.249	14526.341	1008.550
1	2	6	0	65351.000	4560.409	14522.794	1007.577
1	2	7	0	65351.000	4561.931	14521.496	1006.577

EJE	P.K.	AZIMUT	COS A	SEN A
0	65352.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	3	1	0	65352.000	4548.883	14533.936	1006.581
1	3	2	0	65352.000	4550.405	14532.638	1007.581
1	3	3	0	65352.000	4554.565	14529.091	1008.554
1	3	4	0	65352.000	4555.731	14528.096	1008.554
1	3	5	0	65352.000	4556.897	14527.102	1008.554
1	3	6	0	65352.000	4561.058	14523.555	1007.581
1	3	7	0	65352.000	4562.580	14522.257	1006.581

EJE	P.K.	AZIMUT	COS A	SEN A
0	65353.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	4	1	0	65353.000	4549.532	14534.697	1006.585
1	4	2	0	65353.000	4551.053	14533.399	1007.585
1	4	3	0	65353.000	4555.214	14529.852	1008.558
1	4	4	0	65353.000	4556.380	14528.857	1008.558
1	4	5	0	65353.000	4557.546	14527.863	1008.558
1	4	6	0	65353.000	4561.707	14524.316	1007.585
1	4	7	0	65353.000	4563.229	14523.018	1006.585

EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
0	65354.000	-55.053000			.648815	-.760946	
1	5	1	0	65354.000	4550.180	14535.458	1006.589
1	5	2	0	65354.000	4551.702	14534.160	1007.589
1	5	3	0	65354.000	4555.863	14530.613	1008.562
1	5	4	0	65354.000	4557.029	14529.618	1008.562
1	5	5	0	65354.000	4558.195	14528.624	1008.562
1	5	6	0	65354.000	4562.356	14525.077	1007.589
1	5	7	0	65354.000	4563.877	14523.779	1006.589
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65355.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	6	1	0	65355.000	4550.829	14536.219	1006.593
1	6	2	0	65355.000	4552.351	14534.921	1007.593
1	6	3	0	65355.000	4556.512	14531.374	1008.566
1	6	4	0	65355.000	4557.678	14530.379	1008.566
1	6	5	0	65355.000	4558.844	14529.385	1008.566
1	6	6	0	65355.000	4563.004	14525.838	1007.593
1	6	7	0	65355.000	4564.526	14524.540	1006.593
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65356.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	7	1	0	65356.000	4551.478	14536.980	1006.597
1	7	2	0	65356.000	4553.000	14535.682	1007.597
1	7	3	0	65356.000	4557.160	14532.135	1008.570
1	7	4	0	65356.000	4558.327	14531.140	1008.570
1	7	5	0	65356.000	4559.493	14530.146	1008.570
1	7	6	0	65356.000	4563.653	14526.599	1007.597
1	7	7	0	65356.000	4565.175	14525.301	1006.597
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65357.000	-55.053000	.648815	-.760946			
PO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	8	1	0	65357.000	4552.127	14537.740	1006.601
1	8	2	0	65357.000	4553.649	14536.443	1007.601
1	8	3	0	65357.000	4557.809	14532.895	1008.574
1	8	4	0	65357.000	4558.975	14531.901	1008.574
1	8	5	0	65357.000	4560.142	14530.907	1008.574
1	8	6	0	65357.000	4564.302	14527.359	1007.601
1	8	7	0	65357.000	4565.824	14526.062	1006.601
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65358.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	9	1	0	65358.000	4552.776	14538.501	1006.606
1	9	2	0	65358.000	4554.298	14537.204	1007.606
1	9	3	0	65358.000	4558.458	14533.656	1008.579
1	9	4	0	65358.000	4559.624	14532.662	1008.579
1	9	5	0	65358.000	4560.790	14531.668	1008.579

EJE	P.K.	AZIMUT	COS A	SEN A			
1	9	6	0	65358.000 4564.951 14528.120 1007.606			
1	9	7	0	65358.000 4566.473 14526.823 1006.606			
0	65359.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	10	1	0	65359.000	4553.424	14539.262	1006.610
1	10	2	0	65359.000	4554.946	14537.965	1007.610
1	10	3	0	65359.000	4559.107	14534.417	1008.583
1	10	4	0	65359.000	4560.273	14533.423	1008.583
1	10	5	0	65359.000	4561.439	14532.429	1008.583
1	10	6	0	65359.000	4565.600	14528.881	1007.610
1	10	7	0	65359.000	4567.121	14527.584	1006.610
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65360.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	11	1	0	65360.000	4554.073	14540.023	1006.614
1	11	2	0	65360.000	4555.595	14538.726	1007.614
1	11	3	0	65360.000	4559.756	14535.178	1008.587
1	11	4	0	65360.000	4560.922	14534.184	1008.587
1	11	5	0	65360.000	4562.088	14533.190	1008.587
1	11	6	0	65360.000	4566.248	14529.642	1007.614
1	11	7	0	65360.000	4567.770	14528.345	1006.614
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65361.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	12	1	0	65361.000	4554.722	14540.784	1006.618
1	12	2	0	65361.000	4556.244	14539.487	1007.618
1	12	3	0	65361.000	4560.404	14535.939	1008.591
1	12	4	0	65361.000	4561.571	14534.945	1008.591
1	12	5	0	65361.000	4562.737	14533.951	1008.591
1	12	6	0	65361.000	4566.897	14530.403	1007.618
1	12	7	0	65361.000	4568.419	14529.106	1006.618
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65362.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	13	1	0	65362.000	4555.371	14541.545	1006.622
1	13	2	0	65362.000	4556.893	14540.248	1007.622
1	13	3	0	65362.000	4561.053	14536.700	1008.595
1	13	4	0	65362.000	4562.219	14535.706	1008.595
1	13	5	0	65362.000	4563.386	14534.712	1008.595
1	13	6	0	65362.000	4567.546	14531.164	1007.622
1	13	7	0	65362.000	4569.068	14529.867	1006.622
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65363.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z

1	14	1	0	65363.000	4556.020	14542.306	1006.626
1	14	2	0	65363.000	4557.542	14541.009	1007.626
1	14	3	0	65363.000	4561.702	14537.461	1008.599
1	14	4	0	65363.000	4562.868	14536.467	1008.599
1	14	5	0	65363.000	4564.034	14535.473	1008.599
1	14	6	0	65363.000	4568.195	14531.925	1007.626
1	14	7	0	65363.000	4569.717	14530.628	1006.626

EJE	P.K.	AZIMUT	COS A	SEN A
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0	65364.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	0	65364.000	4556.669	14543.067	1006.630
1	15	2	0	65364.000	4558.190	14541.769	1007.630
1	15	3	0	65364.000	4562.351	14538.222	1008.603
1	15	4	0	65364.000	4563.517	14537.228	1008.603
1	15	5	0	65364.000	4564.683	14536.233	1008.603
1	15	6	0	65364.000	4568.844	14532.686	1007.630
1	15	7	0	65364.000	4570.366	14531.388	1006.630

EJE	P.K.	AZIMUT	COS A	SEN A
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0	65365.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	0	65365.000	4557.317	14543.828	1006.635
1	16	2	0	65365.000	4558.839	14542.530	1007.635
1	16	3	0	65365.000	4563.000	14538.983	1008.608
1	16	4	0	65365.000	4564.166	14537.989	1008.608
1	16	5	0	65365.000	4565.332	14536.994	1008.608
1	16	6	0	65365.000	4569.492	14533.447	1007.635
1	16	7	0	65365.000	4571.014	14532.149	1006.635

EJE	P.K.	AZIMUT	COS A	SEN A
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0	65366.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	0	65366.000	4557.966	14544.589	1006.639
1	17	2	0	65366.000	4559.488	14543.291	1007.639
1	17	3	0	65366.000	4563.649	14539.744	1008.612
1	17	4	0	65366.000	4564.815	14538.750	1008.612
1	17	5	0	65366.000	4565.981	14537.755	1008.612
1	17	6	0	65366.000	4570.141	14534.208	1007.639
1	17	7	0	65366.000	4571.663	14532.910	1006.639

EJE	P.K.	AZIMUT	COS A	SEN A
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0	65367.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	0	65367.000	4558.615	14545.350	1006.643
1	18	2	0	65367.000	4560.137	14544.052	1007.643
1	18	3	0	65367.000	4564.297	14540.505	1008.616
1	18	4	0	65367.000	4565.463	14539.511	1008.616
1	18	5	0	65367.000	4566.630	14538.516	1008.616
1	18	6	0	65367.000	4570.790	14534.969	1007.643
1	18	7	0	65367.000	4572.312	14533.671	1006.643

EJE	P.K.	AZIMUT	COS A	SEN A
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0	65368.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	0	65368.000	4559.264	14546.111	1006.647
1	19	2	0	65368.000	4560.786	14544.813	1007.647
1	19	3	0	65368.000	4564.946	14541.266	1008.620
1	19	4	0	65368.000	4566.112	14540.272	1008.620
1	19	5	0	65368.000	4567.278	14539.277	1008.620
1	19	6	0	65368.000	4571.439	14535.730	1007.647
1	19	7	0	65368.000	4572.961	14534.432	1006.647

EJE	P.K.	AZIMUT	COS A	SEN A
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0	65369.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	0	65369.000	4559.913	14546.872	1006.651
1	20	2	0	65369.000	4561.435	14545.574	1007.651
1	20	3	0	65369.000	4565.595	14542.027	1008.624
1	20	4	0	65369.000	4566.761	14541.033	1008.624
1	20	5	0	65369.000	4567.927	14540.038	1008.624
1	20	6	0	65369.000	4572.088	14536.491	1007.651
1	20	7	0	65369.000	4573.610	14535.193	1006.651

EJE	P.K.	AZIMUT	COS A	SEN A
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0	65370.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	0	65370.000	4560.561	14547.633	1006.655
1	21	2	0	65370.000	4562.083	14546.335	1007.655
1	21	3	0	65370.000	4566.244	14542.788	1008.628
1	21	4	0	65370.000	4567.410	14541.793	1008.628
1	21	5	0	65370.000	4568.576	14540.799	1008.628
1	21	6	0	65370.000	4572.737	14537.252	1007.655
1	21	7	0	65370.000	4574.258	14535.954	1006.655

EJE	P.K.	AZIMUT	COS A	SEN A
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0	65371.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	0	65371.000	4561.210	14548.394	1006.659
1	22	2	0	65371.000	4562.732	14547.096	1007.659
1	22	3	0	65371.000	4566.893	14543.549	1008.632
1	22	4	0	65371.000	4568.059	14542.554	1008.632
1	22	5	0	65371.000	4569.225	14541.560	1008.632
1	22	6	0	65371.000	4573.385	14538.013	1007.659
1	22	7	0	65371.000	4574.907	14536.715	1006.659

EJE	P.K.	AZIMUT	COS A	SEN A
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0	65372.000	-55.053000	.648815	-.760946
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	0	65372.000	4561.859	14549.155	1006.664
1	23	2	0	65372.000	4563.381	14547.857	1007.664
1	23	3	0	65372.000	4567.541	14544.310	1008.637

1	23	4	0	65372.000	4568.708	14543.315	1008.637
1	23	5	0	65372.000	4569.874	14542.321	1008.637
1	23	6	0	65372.000	4574.034	14538.774	1007.664
1	23	7	0	65372.000	4575.556	14537.476	1006.664

EJE	P.K.	AZIMUT	COS A	SEN A
0	65373.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	24	1	0	65373.000	4562.508	14549.916	1006.668
1	24	2	0	65373.000	4564.030	14548.618	1007.668
1	24	3	0	65373.000	4568.190	14545.071	1008.641
1	24	4	0	65373.000	4569.356	14544.076	1008.641
1	24	5	0	65373.000	4570.523	14543.082	1008.641
1	24	6	0	65373.000	4574.683	14539.535	1007.668
1	24	7	0	65373.000	4576.205	14538.237	1006.668

EJE	P.K.	AZIMUT	COS A	SEN A
0	65374.000	-55.053000	.648815	-.760946

PO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	25	1	0	65374.000	4563.157	14550.677	1006.672
1	25	2	0	65374.000	4564.679	14549.379	1007.672
1	25	3	0	65374.000	4568.839	14545.832	1008.645
1	25	4	0	65374.000	4570.005	14544.837	1008.645
1	25	5	0	65374.000	4571.171	14543.843	1008.645
1	25	6	0	65374.000	4575.332	14540.296	1007.672
1	25	7	0	65374.000	4576.854	14538.998	1006.672

EJE	P.K.	AZIMUT	COS A	SEN A
0	65375.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	26	1	0	65375.000	4563.806	14551.438	1006.676
1	26	2	0	65375.000	4565.327	14550.140	1007.676
1	26	3	0	65375.000	4569.488	14546.593	1008.649
1	26	4	0	65375.000	4570.654	14545.598	1008.649
1	26	5	0	65375.000	4571.820	14544.604	1008.649
1	26	6	0	65375.000	4575.981	14541.056	1007.676
1	26	7	0	65375.000	4577.503	14539.759	1006.676

EJE	P.K.	AZIMUT	COS A	SEN A
0	65376.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	27	1	0	65376.000	4564.454	14552.198	1006.680
1	27	2	0	65376.000	4565.976	14550.901	1007.680
1	27	3	0	65376.000	4570.137	14547.353	1008.653
1	27	4	0	65376.000	4571.303	14546.359	1008.653
1	27	5	0	65376.000	4572.469	14545.365	1008.653
1	27	6	0	65376.000	4576.629	14541.817	1007.680
1	27	7	0	65376.000	4578.151	14540.520	1006.680

EJE	P.K.	AZIMUT	COS A	SEN A
0	65377.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	28	1	0	65377.000	4565.103	14552.959	1006.684
1	28	2	0	65377.000	4566.625	14551.662	1007.684
1	28	3	0	65377.000	4570.785	14548.114	1008.657
1	28	4	0	65377.000	4571.952	14547.120	1008.657
1	28	5	0	65377.000	4573.118	14546.126	1008.657
1	28	6	0	65377.000	4577.278	14542.578	1007.684
1	28	7	0	65377.000	4578.800	14541.281	1006.684

EJE	P.K.	AZIMUT	COS A	SEN A
0	65378.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	29	1	0	65378.000	4565.752	14553.720	1006.688
1	29	2	0	65378.000	4567.274	14552.423	1007.688
1	29	3	0	65378.000	4571.434	14548.875	1008.661
1	29	4	0	65378.000	4572.600	14547.881	1008.661
1	29	5	0	65378.000	4573.767	14546.887	1008.661
1	29	6	0	65378.000	4577.927	14543.339	1007.688
1	29	7	0	65378.000	4579.449	14542.042	1006.688

EJE	P.K.	AZIMUT	COS A	SEN A
0	65379.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	30	1	0	65379.000	4566.401	14554.481	1006.693
1	30	2	0	65379.000	4567.923	14553.184	1007.693
1	30	3	0	65379.000	4572.083	14549.636	1008.666
1	30	4	0	65379.000	4573.249	14548.642	1008.666
1	30	5	0	65379.000	4574.415	14547.648	1008.666
1	30	6	0	65379.000	4578.576	14544.100	1007.693
1	30	7	0	65379.000	4580.098	14542.803	1006.693

EJE	P.K.	AZIMUT	COS A	SEN A
0	65380.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	31	1	0	65380.000	4567.050	14555.242	1006.697
1	31	2	0	65380.000	4568.571	14553.945	1007.697
1	31	3	0	65380.000	4572.732	14550.397	1008.670
1	31	4	0	65380.000	4573.898	14549.403	1008.670
1	31	5	0	65380.000	4575.064	14548.409	1008.670
1	31	6	0	65380.000	4579.225	14544.861	1007.697
1	31	7	0	65380.000	4580.747	14543.564	1006.697

EJE	P.K.	AZIMUT	COS A	SEN A
0	65381.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	32	1	0	65381.000	4567.698	14556.003	1006.701
1	32	2	0	65381.000	4569.220	14554.706	1007.701
1	32	3	0	65381.000	4573.381	14551.158	1008.674
1	32	4	0	65381.000	4574.547	14550.164	1008.674
1	32	5	0	65381.000	4575.713	14549.170	1008.674
1	32	6	0	65381.000	4579.874	14545.622	1007.701

1	32	7	0	65381.000	4581.395	14544.325	1006.701
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65382.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	33	1	0	65382.000	4568.347	14556.764	1006.705
1	33	2	0	65382.000	4569.869	14555.467	1007.705
1	33	3	0	65382.000	4574.030	14551.919	1008.678
1	33	4	0	65382.000	4575.196	14550.925	1008.678
1	33	5	0	65382.000	4576.362	14549.931	1008.678
1	33	6	0	65382.000	4580.522	14546.383	1007.705
1	33	7	0	65382.000	4582.044	14545.085	1006.705
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65383.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	34	1	0	65383.000	4568.996	14557.525	1006.709
1	34	2	0	65383.000	4570.518	14556.227	1007.709
1	34	3	0	65383.000	4574.678	14552.680	1008.682
1	34	4	0	65383.000	4575.845	14551.686	1008.682
1	34	5	0	65383.000	4577.011	14550.691	1008.682
1	34	6	0	65383.000	4581.171	14547.144	1007.709
1	34	7	0	65383.000	4582.693	14545.846	1006.709
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65384.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	35	1	0	65384.000	4569.645	14558.286	1006.713
1	35	2	0	65384.000	4571.167	14556.988	1007.713
1	35	3	0	65384.000	4575.327	14553.441	1008.686
1	35	4	0	65384.000	4576.493	14552.447	1008.686
1	35	5	0	65384.000	4577.660	14551.452	1008.686
1	35	6	0	65384.000	4581.820	14547.905	1007.713
1	35	7	0	65384.000	4583.342	14546.607	1006.713
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65385.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	36	1	0	65385.000	4570.294	14559.047	1006.718
1	36	2	0	65385.000	4571.816	14557.749	1007.718
1	36	3	0	65385.000	4575.976	14554.202	1008.691
1	36	4	0	65385.000	4577.142	14553.208	1008.691
1	36	5	0	65385.000	4578.308	14552.213	1008.691
1	36	6	0	65385.000	4582.469	14548.666	1007.718
1	36	7	0	65385.000	4583.991	14547.368	1006.718
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65386.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	37	1	0	65386.000	4570.942	14559.808	1006.722

1	37	2	0	65386.000	4572.464	14558.510	1007.722
1	37	3	0	65386.000	4576.625	14554.963	1008.695
1	37	4	0	65386.000	4577.791	14553.969	1008.695
1	37	5	0	65386.000	4578.957	14552.974	1008.695
1	37	6	0	65386.000	4583.118	14549.427	1007.722
1	37	7	0	65386.000	4584.639	14548.129	1006.722
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65387.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	38	1	0	65387.000	4571.591	14560.569	1006.726
1	38	2	0	65387.000	4573.113	14559.271	1007.726
1	38	3	0	65387.000	4577.274	14555.724	1008.699
1	38	4	0	65387.000	4578.440	14554.730	1008.699
1	38	5	0	65387.000	4579.606	14553.735	1008.699
1	38	6	0	65387.000	4583.766	14550.188	1007.726
1	38	7	0	65387.000	4585.288	14548.890	1006.726
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65388.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	39	1	0	65388.000	4572.240	14561.330	1006.730
1	39	2	0	65388.000	4573.762	14560.032	1007.730
1	39	3	0	65388.000	4577.922	14556.485	1008.703
1	39	4	0	65388.000	4579.089	14555.491	1008.703
1	39	5	0	65388.000	4580.255	14554.496	1008.703
1	39	6	0	65388.000	4584.415	14550.949	1007.730
1	39	7	0	65388.000	4585.937	14549.651	1006.730
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65389.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	40	1	0	65389.000	4572.889	14562.091	1006.734
1	40	2	0	65389.000	4574.411	14560.793	1007.734
1	40	3	0	65389.000	4578.571	14557.246	1008.707
1	40	4	0	65389.000	4579.737	14556.251	1008.707
1	40	5	0	65389.000	4580.904	14555.257	1008.707
1	40	6	0	65389.000	4585.064	14551.710	1007.734
1	40	7	0	65389.000	4586.586	14550.412	1006.734
EJE	P.K.	AZIMUT	COS A	SEN A			
0	65390.000	-55.053000	.648815	-.760946			
GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	41	1	0	65390.000	4573.538	14562.852	1006.738
1	41	2	0	65390.000	4575.060	14561.554	1007.738
1	41	3	0	65390.000	4579.220	14558.007	1008.711
1	41	4	0	65390.000	4580.386	14557.012	1008.711
1	41	5	0	65390.000	4581.552	14556.018	1008.711
1	41	6	0	65390.000	4585.713	14552.471	1007.738
1	41	7	0	65390.000	4587.235	14551.173	1006.738
EJE	P.K.	AZIMUT	COS A	SEN A			

0 65391.000 -55.053000 .648815 -.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	42	1	0	65391.000	4574.187	14563.613	1006.742
1	42	2	0	65391.000	4575.708	14562.315	1007.742
1	42	3	0	65391.000	4579.869	14558.768	1008.715
1	42	4	0	65391.000	4581.035	14557.773	1008.715
1	42	5	0	65391.000	4582.201	14556.779	1008.715
1	42	6	0	65391.000	4586.362	14553.232	1007.742
1	42	7	0	65391.000	4587.884	14551.934	1006.742

EJE	P.K.	AZIMUT	COS A	SEN A
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0 65392.000 -55.053000 .648815 -.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	43	1	0	65392.000	4574.835	14564.374	1006.747
1	43	2	0	65392.000	4576.357	14563.076	1007.747
1	43	3	0	65392.000	4580.518	14559.529	1008.720
1	43	4	0	65392.000	4581.684	14558.534	1008.720
1	43	5	0	65392.000	4582.850	14557.540	1008.720
1	43	6	0	65392.000	4587.010	14553.993	1007.747
1	43	7	0	65392.000	4588.532	14552.695	1006.747

EJE	P.K.	AZIMUT	COS A	SEN A
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0 65393.000 -55.053000 .648815 -.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	44	1	0	65393.000	4575.484	14565.135	1006.751
1	44	2	0	65393.000	4577.006	14563.837	1007.751
1	44	3	0	65393.000	4581.167	14560.290	1008.724
1	44	4	0	65393.000	4582.333	14559.295	1008.724
1	44	5	0	65393.000	4583.499	14558.301	1008.724
1	44	6	0	65393.000	4587.659	14554.754	1007.751
1	44	7	0	65393.000	4589.181	14553.456	1006.751

EJE	P.K.	AZIMUT	COS A	SEN A
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0 65394.000 -55.053000 .648815 -.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	45	1	0	65394.000	4576.133	14565.896	1006.755
1	45	2	0	65394.000	4577.655	14564.598	1007.755
1	45	3	0	65394.000	4581.815	14561.050	1008.728
1	45	4	0	65394.000	4582.981	14560.056	1008.728
1	45	5	0	65394.000	4584.148	14559.062	1008.728
1	45	6	0	65394.000	4588.308	14555.514	1007.755
1	45	7	0	65394.000	4589.830	14554.217	1006.755

EJE	P.K.	AZIMUT	COS A	SEN A
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0 65395.000 -55.053000 .648815 -.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	46	1	0	65395.000	4576.782	14566.656	1006.759
1	46	2	0	65395.000	4578.304	14565.359	1007.759
1	46	3	0	65395.000	4582.464	14561.811	1008.732
1	46	4	0	65395.000	4583.630	14560.817	1008.732

1	46	5	0	65395.000	4584.796	14559.823	1008.732
1	46	6	0	65395.000	4588.957	14556.275	1007.759
1	46	7	0	65395.000	4590.479	14554.978	1006.759

EJE	P.K.	AZIMUT	COS A	SEN A
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0 65396.000 -55.053000 .648815 -.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	47	1	0	65396.000	4577.431	14567.417	1006.763
1	47	2	0	65396.000	4578.953	14566.120	1007.763
1	47	3	0	65396.000	4583.113	14562.572	1008.736
1	47	4	0	65396.000	4584.279	14561.578	1008.736
1	47	5	0	65396.000	4585.445	14560.584	1008.736
1	47	6	0	65396.000	4589.606	14557.036	1007.763
1	47	7	0	65396.000	4591.128	14555.739	1006.763

EJE	P.K.	AZIMUT	COS A	SEN A
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0 65397.000 -55.053000 .648815 -.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	48	1	0	65397.000	4578.079	14568.178	1006.767
1	48	2	0	65397.000	4579.601	14566.881	1007.767
1	48	3	0	65397.000	4583.762	14563.333	1008.740
1	48	4	0	65397.000	4584.928	14562.339	1008.740
1	48	5	0	65397.000	4586.094	14561.345	1008.740
1	48	6	0	65397.000	4590.255	14557.797	1007.767
1	48	7	0	65397.000	4591.776	14556.500	1006.767

EJE	P.K.	AZIMUT	COS A	SEN A
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0 65398.000 -55.053000 .648815 -.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	49	1	0	65398.000	4578.728	14568.939	1006.771
1	49	2	0	65398.000	4580.250	14567.642	1007.771
1	49	3	0	65398.000	4584.411	14564.094	1008.744
1	49	4	0	65398.000	4585.577	14563.100	1008.744
1	49	5	0	65398.000	4586.743	14562.106	1008.744
1	49	6	0	65398.000	4590.903	14558.558	1007.771
1	49	7	0	65398.000	4592.425	14557.261	1006.771

EJE	P.K.	AZIMUT	COS A	SEN A
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0 65399.000 -55.053000 .648815 -.760946

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	50	1	0	65399.000	4579.377	14569.700	1006.776
1	50	2	0	65399.000	4580.899	14568.403	1007.776
1	50	3	0	65399.000	4585.059	14564.855	1008.749
1	50	4	0	65399.000	4586.226	14563.861	1008.749
1	50	5	0	65399.000	4587.392	14562.867	1008.749
1	50	6	0	65399.000	4591.552	14559.319	1007.776
1	50	7	0	65399.000	4593.074	14558.022	1006.776

EJE	P.K.	AZIMUT	COS A	SEN A
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0 65400.000 -55.053000 .648815 -.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	51	1	0	65400.000	4580.026	14570.461	1006.780
1	51	2	0	65400.000	4581.548	14569.164	1007.780
1	51	3	0	65400.000	4585.708	14565.616	1008.753
1	51	4	0	65400.000	4586.874	14564.622	1008.753
1	51	5	0	65400.000	4588.041	14563.628	1008.753
1	51	6	0	65400.000	4592.201	14560.080	1007.780
1	51	7	0	65400.000	4593.723	14558.783	1006.780

EJE	P.K.	AZIMUT	COS A	SEN A
0	65401.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	52	1	0	65401.000	4580.675	14571.222	1006.784
1	52	2	0	65401.000	4582.197	14569.925	1007.784
1	52	3	0	65401.000	4586.357	14566.377	1008.757
1	52	4	0	65401.000	4587.523	14565.383	1008.757
1	52	5	0	65401.000	4588.689	14564.388	1008.757
1	52	6	0	65401.000	4592.850	14560.841	1007.784
1	52	7	0	65401.000	4594.372	14559.543	1006.784

EJE	P.K.	AZIMUT	COS A	SEN A
0	65402.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	53	1	0	65402.000	4581.323	14571.983	1006.788
1	53	2	0	65402.000	4582.845	14570.685	1007.788
1	53	3	0	65402.000	4587.006	14567.138	1008.761
1	53	4	0	65402.000	4588.172	14566.144	1008.761
1	53	5	0	65402.000	4589.338	14565.149	1008.761
1	53	6	0	65402.000	4593.499	14561.602	1007.788
1	53	7	0	65402.000	4595.021	14560.304	1006.788

EJE	P.K.	AZIMUT	COS A	SEN A
0	65403.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	54	1	0	65403.000	4581.972	14572.744	1006.792
1	54	2	0	65403.000	4583.494	14571.446	1007.792
1	54	3	0	65403.000	4587.655	14567.899	1008.765
1	54	4	0	65403.000	4588.821	14566.905	1008.765
1	54	5	0	65403.000	4589.987	14565.910	1008.765
1	54	6	0	65403.000	4594.147	14562.363	1007.792
1	54	7	0	65403.000	4595.669	14561.065	1006.792

EJE	P.K.	AZIMUT	COS A	SEN A
0	65404.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	55	1	0	65404.000	4582.621	14573.505	1006.796
1	55	2	0	65404.000	4584.143	14572.207	1007.796
1	55	3	0	65404.000	4588.303	14568.660	1008.769
1	55	4	0	65404.000	4589.470	14567.666	1008.769
1	55	5	0	65404.000	4590.636	14566.671	1008.769
1	55	6	0	65404.000	4594.796	14563.124	1007.796
1	55	7	0	65404.000	4596.318	14561.826	1006.796

EJE	P.K.	AZIMUT	COS A	SEN A
0	65405.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	56	1	0	65405.000	4583.270	14574.266	1006.800
1	56	2	0	65405.000	4584.792	14572.968	1007.800
1	56	3	0	65405.000	4588.952	14569.421	1008.773
1	56	4	0	65405.000	4590.118	14568.427	1008.773
1	56	5	0	65405.000	4591.285	14567.432	1008.773
1	56	6	0	65405.000	4595.445	14563.885	1007.800
1	56	7	0	65405.000	4596.967	14562.587	1006.800

EJE	P.K.	AZIMUT	COS A	SEN A
0	65406.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	57	1	0	65406.000	4583.919	14575.027	1006.805
1	57	2	0	65406.000	4585.441	14573.729	1007.805
1	57	3	0	65406.000	4589.601	14570.182	1008.778
1	57	4	0	65406.000	4590.767	14569.188	1008.778
1	57	5	0	65406.000	4591.933	14568.193	1008.778
1	57	6	0	65406.000	4596.094	14564.646	1007.805
1	57	7	0	65406.000	4597.616	14563.348	1006.805

EJE	P.K.	AZIMUT	COS A	SEN A
0	65407.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	58	1	0	65407.000	4584.568	14575.788	1006.809
1	58	2	0	65407.000	4586.089	14574.490	1007.809
1	58	3	0	65407.000	4590.250	14570.943	1008.782
1	58	4	0	65407.000	4591.416	14569.948	1008.782
1	58	5	0	65407.000	4592.582	14568.954	1008.782
1	58	6	0	65407.000	4596.743	14565.407	1007.809
1	58	7	0	65407.000	4598.265	14564.109	1006.809

EJE	P.K.	AZIMUT	COS A	SEN A
0	65408.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	59	1	0	65408.000	4585.216	14576.549	1006.813
1	59	2	0	65408.000	4586.738	14575.251	1007.813
1	59	3	0	65408.000	4590.899	14571.704	1008.786
1	59	4	0	65408.000	4592.065	14570.709	1008.786
1	59	5	0	65408.000	4593.231	14569.715	1008.786
1	59	6	0	65408.000	4597.392	14566.168	1007.813
1	59	7	0	65408.000	4598.913	14564.870	1006.813

EJE	P.K.	AZIMUT	COS A	SEN A
0	65409.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	60	1	0	65409.000	4585.865	14577.310	1006.817
1	60	2	0	65409.000	4587.387	14576.012	1007.817

1	60	3	0	65409.000	4591.548	14572.465	1008.790
1	60	4	0	65409.000	4592.714	14571.470	1008.790
1	60	5	0	65409.000	4593.880	14570.476	1008.790
1	60	6	0	65409.000	4598.040	14566.929	1007.817
1	60	7	0	65409.000	4599.562	14565.631	1006.817

EJE	P.K.	AZIMUT	COS A	SEN A
0	65410.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	61	1	0	65410.000	4586.514	14578.071	1006.821
1	61	2	0	65410.000	4588.036	14576.773	1007.821
1	61	3	0	65410.000	4592.196	14573.226	1008.794
1	61	4	0	65410.000	4593.363	14572.231	1008.794
1	61	5	0	65410.000	4594.529	14571.237	1008.794
1	61	6	0	65410.000	4598.689	14567.690	1007.821
1	61	7	0	65410.000	4600.211	14566.392	1006.821

SEGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	65380.000	-55.053000	.648815	-.760946

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	4	0	65380.000	4573.898	14549.403	1008.670

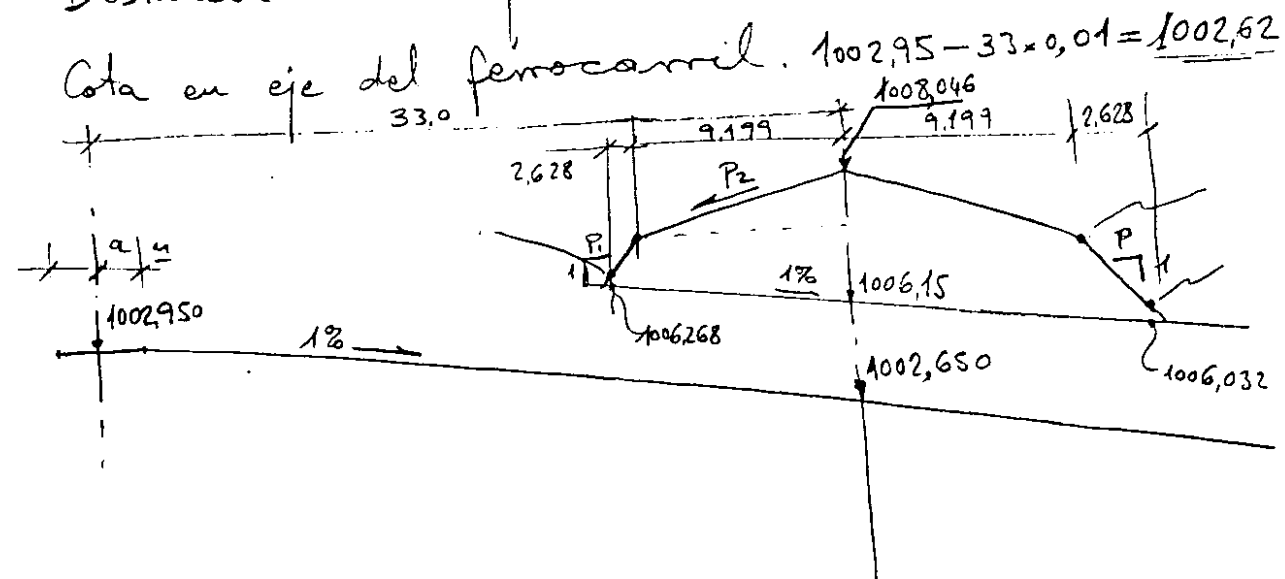
REPLANTEO DEL PORTICO

SOLUCION ESVIADA

Adoptamos el ángulo 100° para el az. del
paso de fauna, y con el 1%

$$\begin{aligned} \text{Cota camino CS-564+2} & \rightarrow 1002,931 + (2268,75 - 2265) \times 0,005 = \\ \text{P.K. 2+265} & \\ \text{Cota terreno } 1002 & = \underline{1002,950} \end{aligned}$$

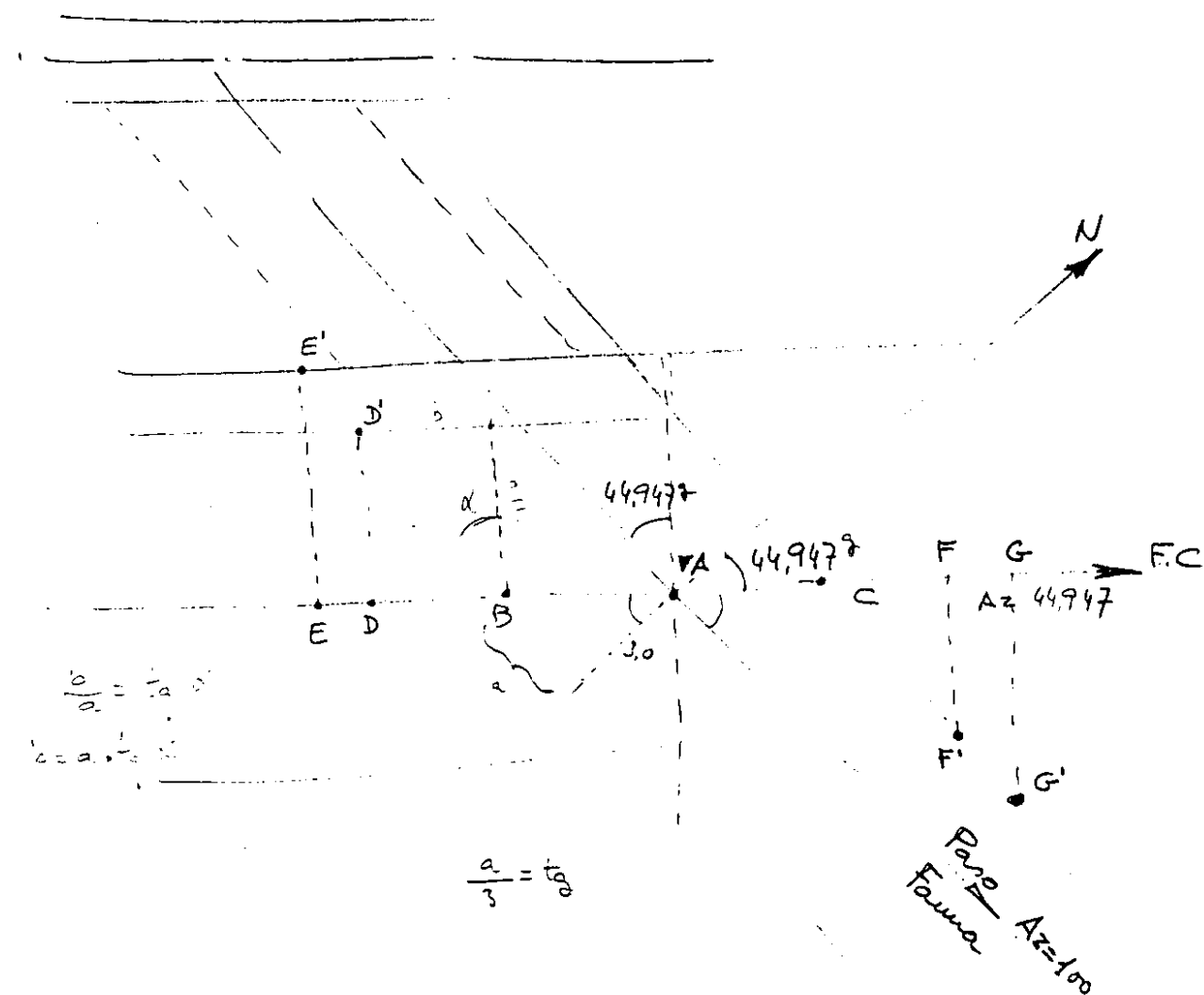
Distancia entre ejes. 33,0 m.



$$a = \frac{3}{\cos 44,947051} = 3,942$$

$$P_1 = \frac{2}{\cos 44,947} = \frac{2,0}{0,76095} = 2,628$$

$$P_2 = \frac{5 \times 0,76095}{100} = 0,03805$$



$$\cos 44,947^\circ = 0,760946$$

$$V_A = 1008,046 \quad (\text{sobre-balasto})$$

$$\overline{AB} = \frac{3,0}{\cos 44,947} = 3,94246$$

$$\overline{BD} = 7,0 \times \tan 44,947 = 5,96849 \quad \overline{BE} = 9,0 \times \tan 44,947 = 7,67378$$

$$V_D = 1008,046 - 9,91095 \times 0,00414661 = 1008,005$$

$$V_F = 1008,046 + 9,91095 \times 0,00414661 = 1008,087$$

$$V_E = 1008,046 - 11,61624 \times 0,00414661 = 1007,993$$

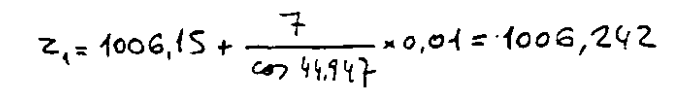
$$V_G = 1008,046 + 11,61624 \times 0,00414661 = 1008,094$$

$$V_{D'} = 1008,005 - 7 \times 0,05 = 1007,655$$

$$V_{E'} = 1007,998 - 7 \times 0,05 - 2,0 \times \frac{1}{2} = 1006,648$$

$$V_{F'} = 1008,087 - 7 \times 0,05 = 1007,737$$

$$V_{G'} = 1008,094 - 7 \times 0,05 - 2,0 \times \frac{1}{2} = 1006,744$$



$$Z_2 = 1006,15 + \frac{9}{\text{an } 44,94\%} \times 0,01 = 1006,268$$

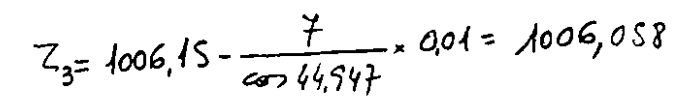
$$t_{\beta} = \frac{\cos 44.947}{2} = 0.38047$$

$$L = 1006,648 - 1006,268 - 0,17 = 0,21$$

$$N = \frac{0,21}{0,38047 + 0,01} = 0,5378$$

$$M = 0,5378 + 0,4 + 0,41 = \underline{\underline{1,348 \text{ m.}}}$$

$$z_s = 1006,268 + 1.348 \times 0,01 = \underline{\underline{1006,281}}$$



$$Z_y = 1006,15 - \frac{9}{\omega 44,947} \times 0,01 = 1006,032$$

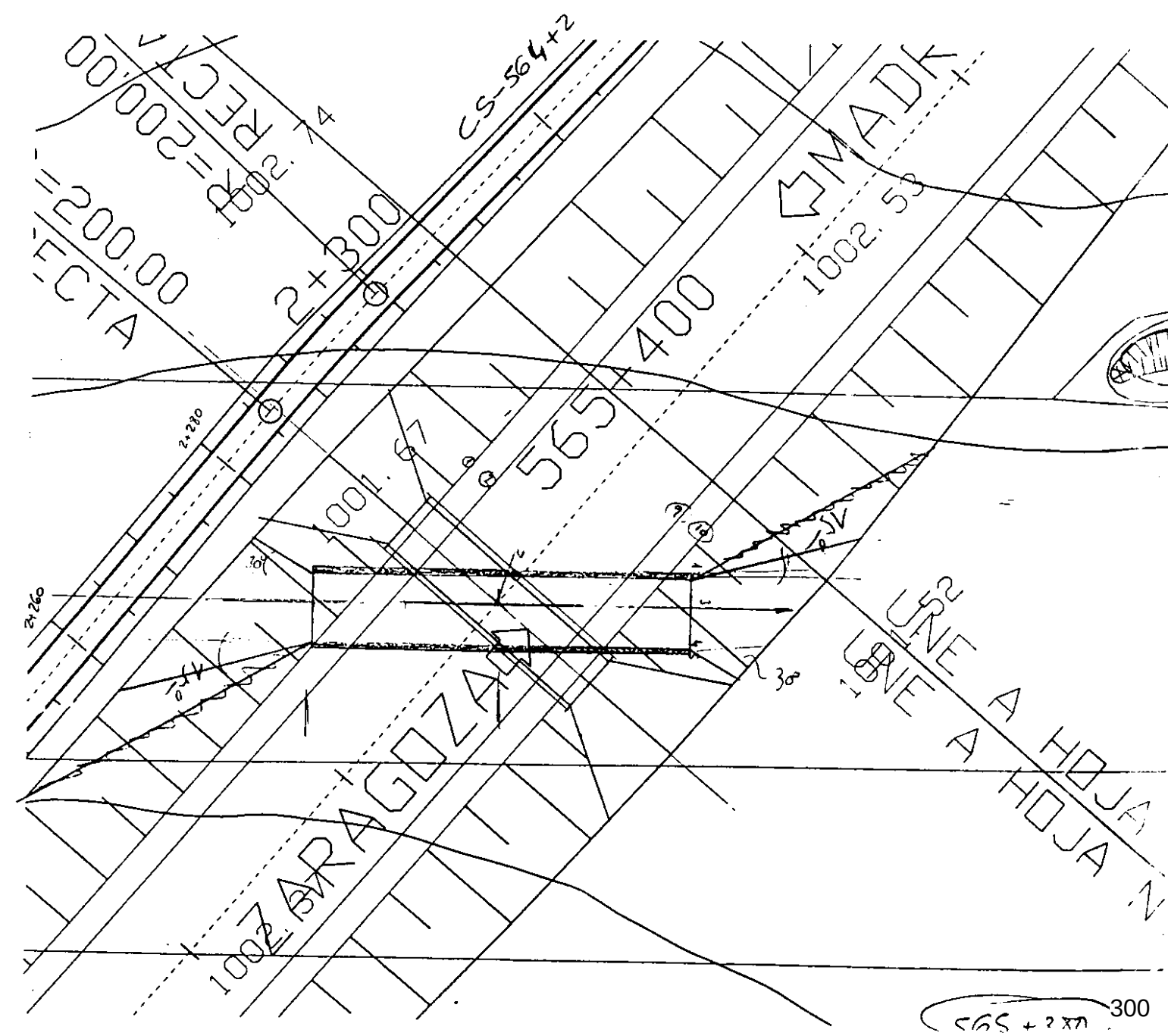
$$L = 1006,744 - 1006,032 - 0,17 = 0,5423$$

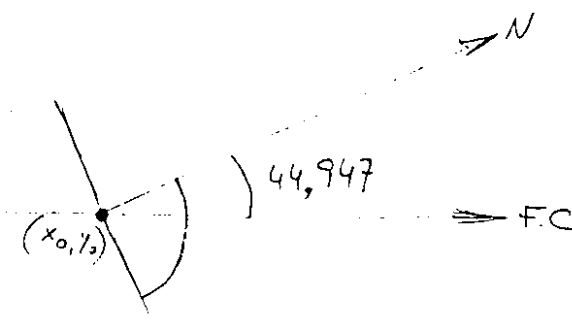
$$N = \frac{0,5423}{0,38047 - 0,01} = 1,4637$$

$$M = 1,4637 + 0,4 + 0,41 = \underline{\underline{2,2737}}$$

$$Z_c = 1006,032 - 2,2737 \times 0,01 = \underline{\underline{1006,009}}$$

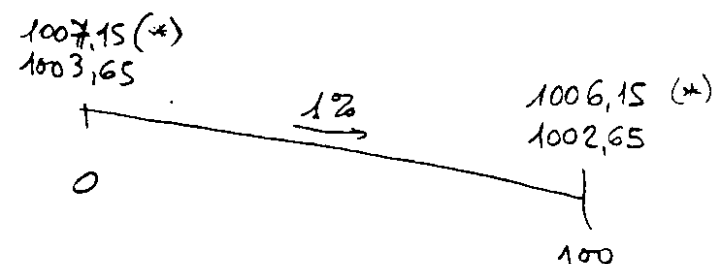
1:500





$$\begin{cases} x = 504.573,898 \\ y = 4.514.549,403 \\ A_z = 100^\circ \end{cases}$$

$$\begin{cases} x_0 = 504.473,898 \\ y_0 = 4.514.549,403 \end{cases}$$



(*) con estas cotas se obtienen los puntos de intersección de los taludes 2:1 con la cara superior del pórtico

84,25
116,70

PI-565+380 PASO FAUNA (ESVIADO)										1001 FERROCARRIL									
63386.585	3280.541	13032.521	44.947	1	63887.507	1002.481	.00414661	1											
1	66100.				1	66100.													
2	63386.585	1.5325	2.	5.4675	1.5325	0.	1.5325	0.	1.5325	5.4675	2.								
	66100.	1.5325	2.	5.4675	1.5325	0.	1.5325	0.	1.5325	5.4675	2.								
2	63386.585	-.5	-.17796																
	66100.	-.5	-.17796																
7	1	0.	2	0.	3	0.	0	0.	8	0.	9	0.	10	0.					
										PASO FAUNA (ESVIADO)									
0.		4473.898	14549.403	100.					1	0.	1003.65	-.01							1
1	150.								1	150.									
2	0.		0.5	2.5								2.5	0.5						
	150.		0.5	2.5								2.5	0.5						
2	0.																		
	150.																		
5	1	0.	2	0.	3	0.	9	0.	10	0.									
	1	40	3																
1	3	75.	1.		125.	53	13	23	33	43	5								
0																			
0																			
0																			
0																			
0																			
/R																			

TITULO DEL TRABAJO PI-565+380 PASO FAUNA (ESVIADO)

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
4	0	3	3	65380.000	100.000	4573.898	14549.403	1008.670	1002.650

AZ.E AZ.3

44.947000 100.000000

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	75.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	3	75.000	4548.898	14552.403	1002.900
1	1	2	3	75.000	4548.898	14551.903	1002.900
1	1	3	3	75.000	4548.898	14549.403	1002.900
1	1	4	3	75.000	4548.898	14546.903	1002.900
1	1	5	3	75.000	4548.898	14546.403	1002.900

EJE	P.K.	AZIMUT	COS A	SEN A
3	76.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	3	76.000	4549.898	14552.403	1002.890
1	2	2	3	76.000	4549.898	14551.903	1002.890
1	2	3	3	76.000	4549.898	14549.403	1002.890
1	2	4	3	76.000	4549.898	14546.903	1002.890
1	2	5	3	76.000	4549.898	14546.403	1002.890

EJE	P.K.	AZIMUT	COS A	SEN A
3	77.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	3	77.000	4550.898	14552.403	1002.880
1	3	2	3	77.000	4550.898	14551.903	1002.880
1	3	3	3	77.000	4550.898	14549.403	1002.880
1	3	4	3	77.000	4550.898	14546.903	1002.880
1	3	5	3	77.000	4550.898	14546.403	1002.880

EJE	P.K.	AZIMUT	COS A	SEN A
3	78.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	3	78.000	4551.898	14552.403	1002.870
1	4	2	3	78.000	4551.898	14551.903	1002.870
1	4	3	3	78.000	4551.898	14549.403	1002.870
1	4	4	3	78.000	4551.898	14546.903	1002.870
1	4	5	3	78.000	4551.898	14546.403	1002.870

EJE	P.K.	AZIMUT	COS A	SEN A
3	79.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	5	1	3	79.000	4552.898	14552.403	1002.860
1	5	2	3	79.000	4552.898	14551.903	1002.860
1	5	3	3	79.000	4552.898	14549.403	1002.860
1	5	4	3	79.000	4552.898	14546.903	1002.860
1	5	5	3	79.000	4552.898	14546.403	1002.860

EJE	P.K.	AZIMUT	COS A	SEN A
3	80.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	6	1	3	80.000	4553.898	14552.403	1002.850
1	6	2	3	80.000	4553.898	14551.903	1002.850
1	6	3	3	80.000	4553.898	14549.403	1002.850
1	6	4	3	80.000	4553.898	14546.903	1002.850
1	6	5	3	80.000	4553.898	14546.403	1002.850

EJE	P.K.	AZIMUT	COS A	SEN A
3	81.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	7	1	3	81.000	4554.898	14552.403	1002.840
1	7	2	3	81.000	4554.898	14551.903	1002.840
1	7	3	3	81.000	4554.898	14549.403	1002.840
1	7	4	3	81.000	4554.898	14546.903	1002.840
1	7	5	3	81.000	4554.898	14546.403	1002.840

EJE	P.K.	AZIMUT	COS A	SEN A
3	82.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	8	1	3	82.000	4555.898	14552.403	1002.830
1	8	2	3	82.000	4555.898	14551.903	1002.830
1	8	3	3	82.000	4555.898	14549.403	1002.830
1	8	4	3	82.000	4555.898	14546.903	1002.830
1	8	5	3	82.000	4555.898	14546.403	1002.830

EJE	P.K.	AZIMUT	COS A	SEN A
3	83.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	9	1	3	83.000	4556.898	14552.403	1002.820
1	9	2	3	83.000	4556.898	14551.903	1002.820
1	9	3	3	83.000	4556.898	14549.403	1002.820
1	9	4	3	83.000	4556.898	14546.903	1002.820
1	9	5	3	83.000	4556.898	14546.403	1002.820

EJE	P.K.	AZIMUT	COS A	SEN A
3	84.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	10	1	3	84.000	4557.898	14552.403	1002.810
1	10	2	3	84.000	4557.898	14551.903	1002.810
1	10	3	3	84.000	4557.898	14549.403	1002.810
1	10	4	3	84.000	4557.898	14546.903	1002.810
1	10	5	3	84.000	4557.898	14546.403	1002.810

EJE	P.K.	AZIMUT	COS A	SEN A
3	85.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	11	1	3	85.000	4558.898	14552.403	1002.800
1	11	2	3	85.000	4558.898	14551.903	1002.800
1	11	3	3	85.000	4558.898	14549.403	1002.800
1	11	4	3	85.000	4558.898	14546.903	1002.800
1	11	5	3	85.000	4558.898	14546.403	1002.800

EJE	P.K.	AZIMUT	COS A	SEN A
3	86.000	.000000	1.000000	.000000

PO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	12	1	3	86.000	4559.898	14552.403	1002.790
1	12	2	3	86.000	4559.898	14551.903	1002.790
1	12	3	3	86.000	4559.898	14549.403	1002.790
1	12	4	3	86.000	4559.898	14546.903	1002.790
1	12	5	3	86.000	4559.898	14546.403	1002.790

EJE	P.K.	AZIMUT	COS A	SEN A
3	87.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	13	1	3	87.000	4560.898	14552.403	1002.780
1	13	2	3	87.000	4560.898	14551.903	1002.780
1	13	3	3	87.000	4560.898	14549.403	1002.780
1	13	4	3	87.000	4560.898	14546.903	1002.780
1	13	5	3	87.000	4560.898	14546.403	1002.780

EJE	P.K.	AZIMUT	COS A	SEN A
3	88.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	14	1	3	88.000	4561.898	14552.403	1002.770
1	14	2	3	88.000	4561.898	14551.903	1002.770
1	14	3	3	88.000	4561.898	14549.403	1002.770
1	14	4	3	88.000	4561.898	14546.903	1002.770
1	14	5	3	88.000	4561.898	14546.403	1002.770

EJE	P.K.	AZIMUT	COS A	SEN A
3	89.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	3	89.000	4562.898	14552.403	1002.760
1	15	2	3	89.000	4562.898	14551.903	1002.760
1	15	3	3	89.000	4562.898	14549.403	1002.760
1	15	4	3	89.000	4562.898	14546.903	1002.760

1	15	5	3	89.000	4562.898	14546.403	1002.760
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EJE	P.K.	AZIMUT	COS A	SEN A
3	90.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	3	90.000	4563.898	14552.403	1002.750
1	16	2	3	90.000	4563.898	14551.903	1002.750
1	16	3	3	90.000	4563.898	14549.403	1002.750
1	16	4	3	90.000	4563.898	14546.903	1002.750
1	16	5	3	90.000	4563.898	14546.403	1002.750

EJE	P.K.	AZIMUT	COS A	SEN A
3	91.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	3	91.000	4564.898	14552.403	1002.740
1	17	2	3	91.000	4564.898	14551.903	1002.740
1	17	3	3	91.000	4564.898	14549.403	1002.740
1	17	4	3	91.000	4564.898	14546.903	1002.740
1	17	5	3	91.000	4564.898	14546.403	1002.740

EJE	P.K.	AZIMUT	COS A	SEN A
3	92.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	3	92.000	4565.898	14552.403	1002.730
1	18	2	3	92.000	4565.898	14551.903	1002.730
1	18	3	3	92.000	4565.898	14549.403	1002.730
1	18	4	3	92.000	4565.898	14546.903	1002.730
1	18	5	3	92.000	4565.898	14546.403	1002.730

EJE	P.K.	AZIMUT	COS A	SEN A
3	93.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	3	93.000	4566.898	14552.403	1002.720
1	19	2	3	93.000	4566.898	14551.903	1002.720
1	19	3	3	93.000	4566.898	14549.403	1002.720
1	19	4	3	93.000	4566.898	14546.903	1002.720
1	19	5	3	93.000	4566.898	14546.403	1002.720

EJE	P.K.	AZIMUT	COS A	SEN A
3	94.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	3	94.000	4567.898	14552.403	1002.710
1	20	2	3	94.000	4567.898	14551.903	1002.710
1	20	3	3	94.000	4567.898	14549.403	1002.710
1	20	4	3	94.000	4567.898	14546.903	1002.710
1	20	5	3	94.000	4567.898	14546.403	1002.710

EJE	P.K.	AZIMUT	COS A	SEN A
3	95.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	3	95.000	4568.898	14552.403	1002.700
1	21	2	3	95.000	4568.898	14551.903	1002.700
1	21	3	3	95.000	4568.898	14549.403	1002.700
1	21	4	3	95.000	4568.898	14546.903	1002.700
1	21	5	3	95.000	4568.898	14546.403	1002.700

EJE	P.K.	AZIMUT	COS A	SEN A
3	96.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	3	96.000	4569.898	14552.403	1002.690
1	22	2	3	96.000	4569.898	14551.903	1002.690
1	22	3	3	96.000	4569.898	14549.403	1002.690
1	22	4	3	96.000	4569.898	14546.903	1002.690
1	22	5	3	96.000	4569.898	14546.403	1002.690

EJE	P.K.	AZIMUT	COS A	SEN A
3	97.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	3	97.000	4570.898	14552.403	1002.680
1	23	2	3	97.000	4570.898	14551.903	1002.680
1	23	3	3	97.000	4570.898	14549.403	1002.680
1	23	4	3	97.000	4570.898	14546.903	1002.680
1	23	5	3	97.000	4570.898	14546.403	1002.680

EJE	P.K.	AZIMUT	COS A	SEN A
3	98.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	24	1	3	98.000	4571.898	14552.403	1002.670
1	24	2	3	98.000	4571.898	14551.903	1002.670
1	24	3	3	98.000	4571.898	14549.403	1002.670
1	24	4	3	98.000	4571.898	14546.903	1002.670
1	24	5	3	98.000	4571.898	14546.403	1002.670

EJE	P.K.	AZIMUT	COS A	SEN A
3	99.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	25	1	3	99.000	4572.898	14552.403	1002.660
1	25	2	3	99.000	4572.898	14551.903	1002.660
1	25	3	3	99.000	4572.898	14549.403	1002.660
1	25	4	3	99.000	4572.898	14546.903	1002.660
1	25	5	3	99.000	4572.898	14546.403	1002.660

EJE	P.K.	AZIMUT	COS A	SEN A
3	100.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	26	1	3	100.000	4573.898	14552.403	1002.650
1	26	2	3	100.000	4573.898	14551.903	1002.650
1	26	3	3	100.000	4573.898	14549.403	1002.650

1	26	4	3	100.000	4573.898	14546.903	1002.650
1	26	5	3	100.000	4573.898	14546.403	1002.650

EJE	P.K.	AZIMUT	COS A	SEN A
3	101.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	27	1	3	101.000	4574.898	14552.403	1002.640
1	27	2	3	101.000	4574.898	14551.903	1002.640
1	27	3	3	101.000	4574.898	14549.403	1002.640
1	27	4	3	101.000	4574.898	14546.903	1002.640
1	27	5	3	101.000	4574.898	14546.403	1002.640

EJE	P.K.	AZIMUT	COS A	SEN A
3	102.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	28	1	3	102.000	4575.898	14552.403	1002.630
1	28	2	3	102.000	4575.898	14551.903	1002.630
1	28	3	3	102.000	4575.898	14549.403	1002.630
1	28	4	3	102.000	4575.898	14546.903	1002.630
1	28	5	3	102.000	4575.898	14546.403	1002.630

EJE	P.K.	AZIMUT	COS A	SEN A
3	103.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	29	1	3	103.000	4576.898	14552.403	1002.620
1	29	2	3	103.000	4576.898	14551.903	1002.620
1	29	3	3	103.000	4576.898	14549.403	1002.620
1	29	4	3	103.000	4576.898	14546.903	1002.620
1	29	5	3	103.000	4576.898	14546.403	1002.620

EJE	P.K.	AZIMUT	COS A	SEN A
3	104.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	30	1	3	104.000	4577.898	14552.403	1002.610
1	30	2	3	104.000	4577.898	14551.903	1002.610
1	30	3	3	104.000	4577.898	14549.403	1002.610
1	30	4	3	104.000	4577.898	14546.903	1002.610
1	30	5	3	104.000	4577.898	14546.403	1002.610

EJE	P.K.	AZIMUT	COS A	SEN A
3	105.000	.000000	1.000000	.000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	31	1	3	105.000	4578.898	14552.403	1002.600
1	31	2	3	105.000	4578.898	14551.903	1002.600
1	31	3	3	105.000	4578.898	14549.403	1002.600
1	31	4	3	105.000	4578.898	14546.903	1002.600
1	31	5	3	105.000	4578.898	14546.403	1002.600

EJE	P.K.	AZIMUT	COS A	SEN A
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3	106.000	.000000	1.000000	.000000			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	32	1	3	106.000	4579.898	14552.403	1002.590
1	32	2	3	106.000	4579.898	14551.903	1002.590
1	32	3	3	106.000	4579.898	14549.403	1002.590
1	32	4	3	106.000	4579.898	14546.903	1002.590
1	32	5	3	106.000	4579.898	14546.403	1002.590

EJE	P.K.	AZIMUT	COS A	SEN A
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3	107.000	.000000	1.000000	.000000
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	33	1	3	107.000	4580.898	14552.403	1002.580
1	33	2	3	107.000	4580.898	14551.903	1002.580
1	33	3	3	107.000	4580.898	14549.403	1002.580
1	33	4	3	107.000	4580.898	14546.903	1002.580
1	33	5	3	107.000	4580.898	14546.403	1002.580

EJE	P.K.	AZIMUT	COS A	SEN A
-----	------	--------	-------	-------

3	108.000	.000000	1.000000	.000000
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	34	1	3	108.000	4581.898	14552.403	1002.570
1	34	2	3	108.000	4581.898	14551.903	1002.570
1	34	3	3	108.000	4581.898	14549.403	1002.570
1	34	4	3	108.000	4581.898	14546.903	1002.570
1	34	5	3	108.000	4581.898	14546.403	1002.570

EJE	P.K.	AZIMUT	COS A	SEN A
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3	109.000	.000000	1.000000	.000000
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	35	1	3	109.000	4582.898	14552.403	1002.560
1	35	2	3	109.000	4582.898	14551.903	1002.560
1	35	3	3	109.000	4582.898	14549.403	1002.560
1	35	4	3	109.000	4582.898	14546.903	1002.560
1	35	5	3	109.000	4582.898	14546.403	1002.560

EJE	P.K.	AZIMUT	COS A	SEN A
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3	110.000	.000000	1.000000	.000000
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	36	1	3	110.000	4583.898	14552.403	1002.550
1	36	2	3	110.000	4583.898	14551.903	1002.550
1	36	3	3	110.000	4583.898	14549.403	1002.550
1	36	4	3	110.000	4583.898	14546.903	1002.550
1	36	5	3	110.000	4583.898	14546.403	1002.550

EJE	P.K.	AZIMUT	COS A	SEN A
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3	111.000	.000000	1.000000	.000000
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	37	1	3	111.000	4584.898	14552.403	1002.540
1	37	2	3	111.000	4584.898	14551.903	1002.540

1	37	3	3	111.000	4584.898	14549.403	1002.540
1	37	4	3	111.000	4584.898	14546.903	1002.540
1	37	5	3	111.000	4584.898	14546.403	1002.540

EJE	P.K.	AZIMUT	COS A	SEN A
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3	112.000	.000000	1.000000	.000000
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	38	1	3	112.000	4585.898	14552.403	1002.530
1	38	2	3	112.000	4585.898	14551.903	1002.530
1	38	3	3	112.000	4585.898	14549.403	1002.530
1	38	4	3	112.000	4585.898	14546.903	1002.530
1	38	5	3	112.000	4585.898	14546.403	1002.530

EJE	P.K.	AZIMUT	COS A	SEN A
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3	113.000	.000000	1.000000	.000000
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	39	1	3	113.000	4586.898	14552.403	1002.520
1	39	2	3	113.000	4586.898	14551.903	1002.520
1	39	3	3	113.000	4586.898	14549.403	1002.520
1	39	4	3	113.000	4586.898	14546.903	1002.520
1	39	5	3	113.000	4586.898	14546.403	1002.520

EJE	P.K.	AZIMUT	COS A	SEN A
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3	114.000	.000000	1.000000	.000000
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	40	1	3	114.000	4587.898	14552.403	1002.510
1	40	2	3	114.000	4587.898	14551.903	1002.510
1	40	3	3	114.000	4587.898	14549.403	1002.510
1	40	4	3	114.000	4587.898	14546.903	1002.510
1	40	5	3	114.000	4587.898	14546.403	1002.510

EJE	P.K.	AZIMUT	COS A	SEN A
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3	115.000	.000000	1.000000	.000000
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	41	1	3	115.000	4588.898	14552.403	1002.500
1	41	2	3	115.000	4588.898	14551.903	1002.500
1	41	3	3	115.000	4588.898	14549.403	1002.500
1	41	4	3	115.000	4588.898	14546.903	1002.500
1	41	5	3	115.000	4588.898	14546.403	1002.500

EJE	P.K.	AZIMUT	COS A	SEN A
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3	116.000	.000000	1.000000	.000000
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	42	1	3	116.000	4589.898	14552.403	1002.490
1	42	2	3	116.000	4589.898	14551.903	1002.490
1	42	3	3	116.000	4589.898	14549.403	1002.490
1	42	4	3	116.000	4589.898	14546.903	1002.490
1	42	5	3	116.000	4589.898	14546.403	1002.490

EJE	P.K.	AZIMUT	COS A	SEN A
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3 117.000 .000000 1.000000 .000000

PO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	43	1	3	117.000	4590.898	14552.403	1002.480
1	43	2	3	117.000	4590.898	14551.903	1002.480
1	43	3	3	117.000	4590.898	14549.403	1002.480
1	43	4	3	117.000	4590.898	14546.903	1002.480
1	43	5	3	117.000	4590.898	14546.403	1002.480

EJE	P.K.	AZIMUT	COS A	SEN A
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3 118.000 .000000 1.000000 .000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	44	1	3	118.000	4591.898	14552.403	1002.470
1	44	2	3	118.000	4591.898	14551.903	1002.470
1	44	3	3	118.000	4591.898	14549.403	1002.470
1	44	4	3	118.000	4591.898	14546.903	1002.470
1	44	5	3	118.000	4591.898	14546.403	1002.470

EJE	P.K.	AZIMUT	COS A	SEN A
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3 119.000 .000000 1.000000 .000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	45	1	3	119.000	4592.898	14552.403	1002.460
1	45	2	3	119.000	4592.898	14551.903	1002.460
1	45	3	3	119.000	4592.898	14549.403	1002.460
1	45	4	3	119.000	4592.898	14546.903	1002.460
1	45	5	3	119.000	4592.898	14546.403	1002.460

EJE	P.K.	AZIMUT	COS A	SEN A
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3 120.000 .000000 1.000000 .000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	46	1	3	120.000	4593.898	14552.403	1002.450
1	46	2	3	120.000	4593.898	14551.903	1002.450
1	46	3	3	120.000	4593.898	14549.403	1002.450
1	46	4	3	120.000	4593.898	14546.903	1002.450
1	46	5	3	120.000	4593.898	14546.403	1002.450

EJE	P.K.	AZIMUT	COS A	SEN A
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3 121.000 .000000 1.000000 .000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	47	1	3	121.000	4594.898	14552.403	1002.440
1	47	2	3	121.000	4594.898	14551.903	1002.440
1	47	3	3	121.000	4594.898	14549.403	1002.440
1	47	4	3	121.000	4594.898	14546.903	1002.440
1	47	5	3	121.000	4594.898	14546.403	1002.440

EJE	P.K.	AZIMUT	COS A	SEN A
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3 122.000 .000000 1.000000 .000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	48	1	3	122.000	4595.898	14552.403	1002.430

1	48	2	3	122.000	4595.898	14551.903	1002.430
1	48	3	3	122.000	4595.898	14549.403	1002.430
1	48	4	3	122.000	4595.898	14546.903	1002.430
1	48	5	3	122.000	4595.898	14546.403	1002.430

EJE	P.K.	AZIMUT	COS A	SEN A
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3 123.000 .000000 1.000000 .000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	49	1	3	123.000	4596.898	14552.403	1002.420
1	49	2	3	123.000	4596.898	14551.903	1002.420
1	49	3	3	123.000	4596.898	14549.403	1002.420
1	49	4	3	123.000	4596.898	14546.903	1002.420
1	49	5	3	123.000	4596.898	14546.403	1002.420

EJE	P.K.	AZIMUT	COS A	SEN A
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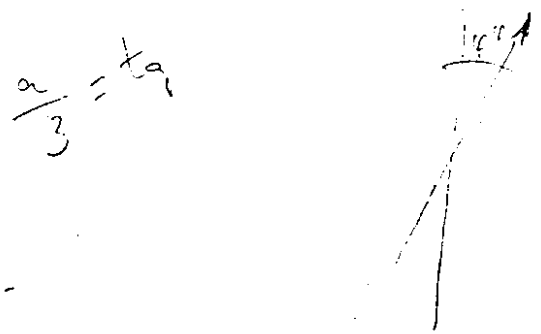
3 124.000 .000000 1.000000 .000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	50	1	3	124.000	4597.898	14552.403	1002.410
1	50	2	3	124.000	4597.898	14551.903	1002.410
1	50	3	3	124.000	4597.898	14549.403	1002.410
1	50	4	3	124.000	4597.898	14546.903	1002.410
1	50	5	3	124.000	4597.898	14546.403	1002.410

EJE	P.K.	AZIMUT	COS A	SEN A
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3 125.000 .000000 1.000000 .000000

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	51	1	3	125.000	4598.898	14552.403	1002.400
1	51	2	3	125.000	4598.898	14551.903	1002.400
1	51	3	3	125.000	4598.898	14549.403	1002.400
1	51	4	3	125.000	4598.898	14546.903	1002.400
1	51	5	3	125.000	4598.898	14546.403	1002.400



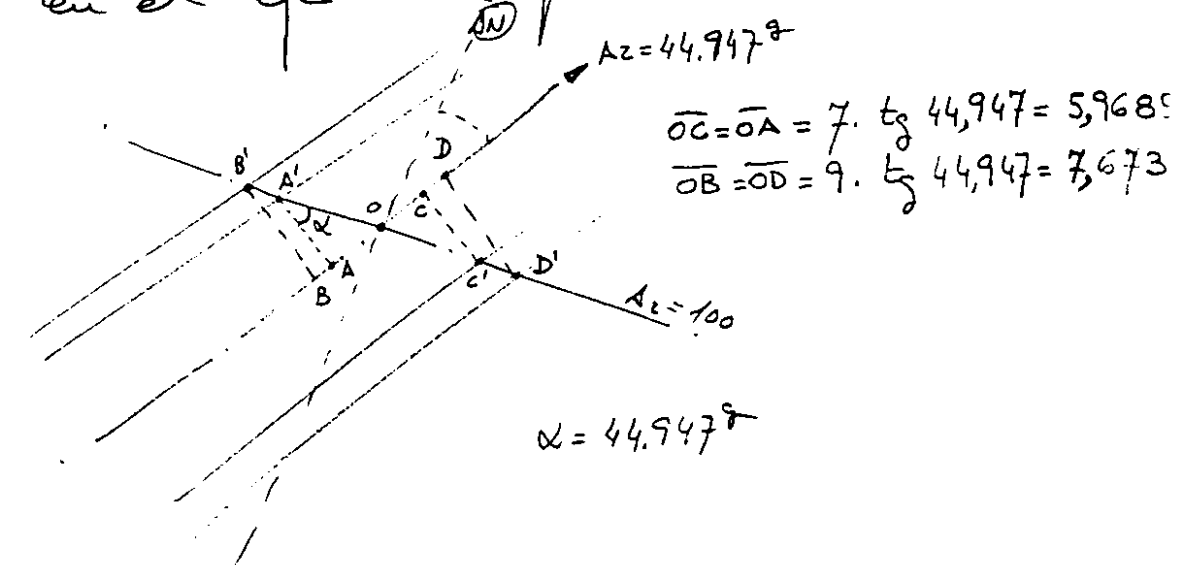
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	3	102.558	4576.456	14552.403	1002.624
1	4	2	3	102.558	4576.456	14551.903	1002.624
1	4	3	3	102.558	4576.456	14549.403	1002.624
1	4	4	3	102.558	4576.456	14546.903	1002.624
1	4	5	3	102.558	4576.456	14546.403	1002.624

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z	
1	5	1	3	116.700	4590.598	14552.403	1002.483	— (8)
1	5	2	3	116.700	4590.598	14551.903	1002.483	— (9)
1	5	3	3	116.700	4590.598	14549.403	1002.483	
1	5	4	3	116.700	4590.598	14546.903	1002.483	— (10)
1	5	5	3	116.700	4590.598	14546.403	1002.483	— (11)

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PI 565+380 (Esviado)

Cotas en el eje del paso



$$PK_0 = 565.380$$

$$PK_A = 565.380 - 5.9685 = 565.374,0315$$

$$PK_B = 565.380 - 7.6738 = 565.372,3262$$

$$PK_C = 565.380 + 5.9685 = 565.385,9685$$

$$PK_D = 565.380 + 7.6738 = 565.387,6738$$

$$\nabla_{A'} = 1002,481 + 0,00414661 \times (5374,0315 - 3887,507) - 7 \times 0,05 - 0,623 = 1007,722$$

$$\nabla_{B'} = 1002,481 + 0,00414661 \times (5372,3262 - 3887,507) - 7 \times 0,05 - 2,0 \times 0,05 - 0,623 = 1006,66$$

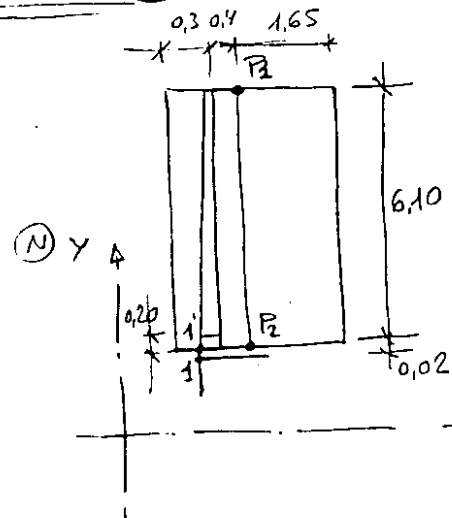
$$\nabla_O = 1008,670 - 0,623 = 1008,047$$

$$\nabla_{C'} = 1002,481 + 0,00414661 \times (5385,9685 - 3887,507) - 7 \times 0,05 - 0,623 = 1007,722$$

$$\nabla_{D'} = 1002,481 + 0,00414661 \times (5387,6738 - 3887,507) - 7 \times 0,05 - 2,0 \times 0,05 - 0,623 = 1006,71$$

REPLANTEO DE LAS ALETAS

Aleta (A1)



$$\textcircled{1} \begin{cases} x = 504.558,148 \\ y = 4.514.552,403 \end{cases}$$

$$\textcircled{1'} \begin{cases} x = 504.558,148 \\ y = 4.514.552,423 \end{cases}$$

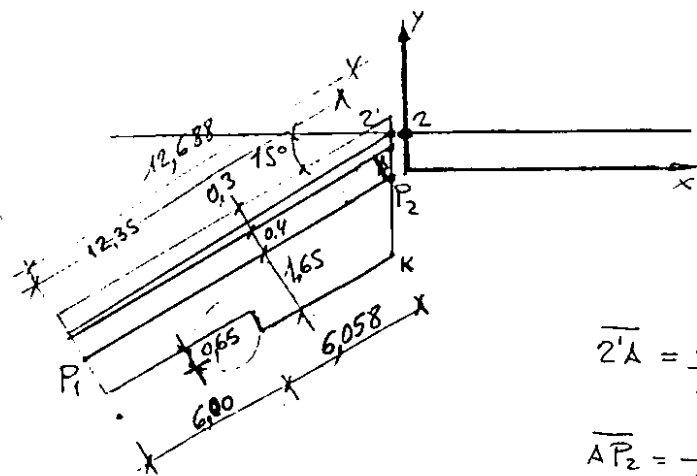
$$\textcircled{P_2} \begin{cases} x = 504.558,730 \\ y = 4.514.552,423 \end{cases}$$

$$\textcircled{P_1} \begin{cases} x = 504.558,730 \\ y = 4.514.558,523 \end{cases}$$

$$\overline{A'P_2} = 0,4 + 0,182 = 0,58$$

$$\overline{P_1P_2} = 6,10$$

Aleta (A2)



$$\textcircled{2} \begin{cases} x = 504.558,148 \\ y = 4.514.546,903 \\ \overline{2-2'} = 0,02 \end{cases}$$

$$\textcircled{2'} \begin{cases} x = 504.558,128 \\ y = 4.514.546,903 \end{cases}$$

$$\overline{2'A} = \frac{0,1823}{\cos 15^\circ} = 0,1888$$

$$\overline{AP_2} = \frac{0,4}{\cos 15^\circ} = 0,414$$

$$\overline{2'P_2} = 0,603$$

$$\textcircled{P_2} \begin{cases} x = 504.558,128 \\ y = 4.514.546,300 \end{cases}$$

$$\overline{P_1P_2} = 12,50 \text{ m.}$$

$$\Delta x = -\overline{P_1P_2} \cos 15^\circ = -12,074$$

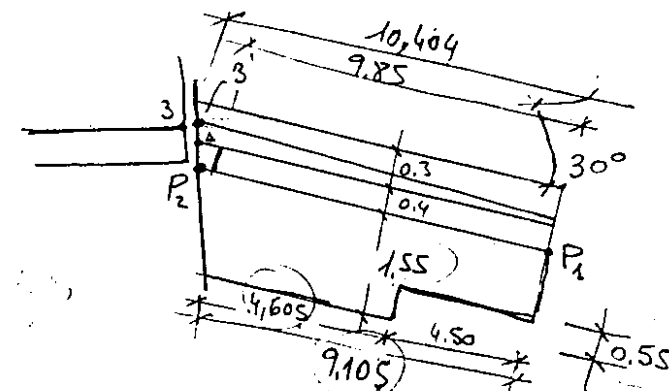
$$\Delta y = -\overline{P_1P_2} \sin 15^\circ = -3,235$$

$$\textcircled{P_1} \begin{cases} x = 504.546,054 \\ y = 4.514.543,065 \end{cases}$$

$$\overline{P_2K} = \frac{1,65}{\cos 15^\circ} = 1,708$$

$$\frac{a}{0,4} = \tan 15^\circ$$

Aleta (A3)



$$\textcircled{3} \begin{cases} x = 504.590,598 \\ y = 4.514.546,903 \end{cases}$$

$$\overline{33'} = 0,02$$

$$\textcircled{3'} \begin{cases} x = 504.590,618 \\ y = 4.514.546,903 \end{cases}$$

$$\overline{3'A} = \frac{0,173}{\cos 30^\circ} = 0,200$$

$$\overline{AP_2} = \frac{0,4}{\cos 30^\circ} = 0,462$$

$$\overline{3'P_2} = 0,662$$

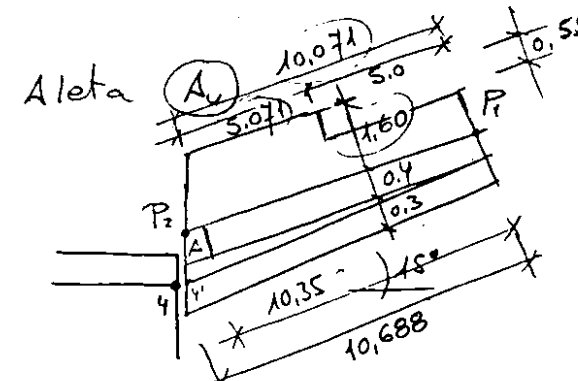
$$\textcircled{P_2} \begin{cases} x = 504.590,618 \\ y = 4.514.546,241 \end{cases}$$

$$\overline{P_1P_2} = 10,0 \text{ m.}$$

$$\Delta x = \overline{P_1P_2} \cos 30^\circ = 8,660$$

$$\Delta y = -\overline{P_1P_2} \sin 30^\circ = 5,000$$

$$\textcircled{P_1} \begin{cases} x = 504.599,278 \\ y = 4.514.541,241 \end{cases}$$



$$\textcircled{4} \begin{cases} x = 504.590,598 \\ y = 4.514.551,903 \end{cases}$$

$$\overline{44'} = 0,02$$

$$\textcircled{4'} \begin{cases} x = 504.590,618 \\ y = 4.514.551,903 \end{cases}$$

$$\overline{4'A} = \frac{0,173}{\cos 15^\circ} = 0,1794$$

$$\overline{AP_2} = \frac{0,4}{\cos 15^\circ} = 0,4141$$

$$\overline{4'P_2} = 0,594$$

$$\textcircled{P_2} \begin{cases} x = 504.590,618 \\ y = 4.514.552,497 \end{cases}$$

$$\overline{P_1P_2} = 10,5 \text{ m.}$$

$$\Delta x = \overline{P_1P_2} \cos 15^\circ = 10,142$$

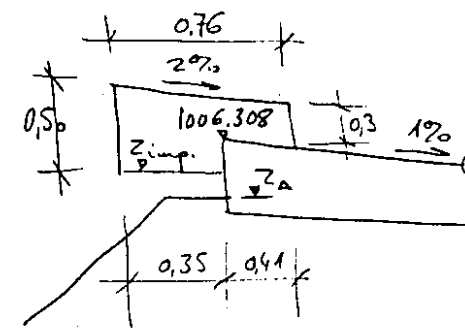
$$\Delta y = \overline{P_1P_2} \sin 15^\circ = 2,717$$

$$\textcircled{P_1} \begin{cases} x = 504.600,760 \\ y = 4.514.555,214 \end{cases}$$

PI 565+380

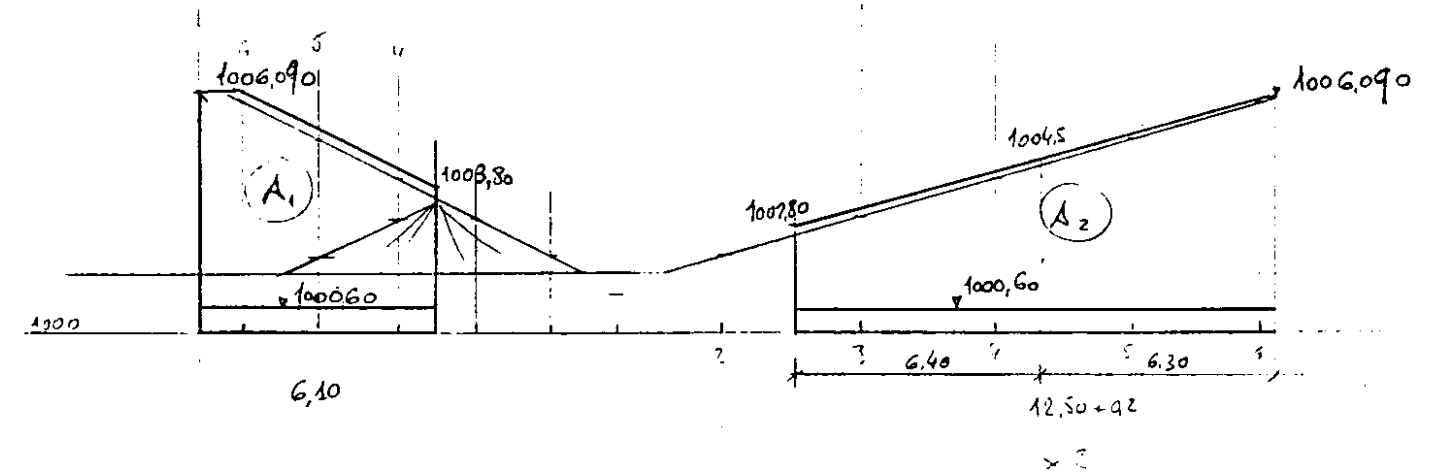
Aletas (A₁) y (A₂)

terreno = 1001,5
apoyo zap 1001,5 - 1,5 = 1000,00
sup. zapata 1000,60

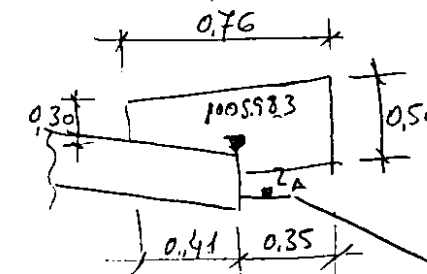


$$Z_{importa} = 1006,308 - 0,41 \times 0,01 + 0,3 + 0,76 \times 0,02 - 0,50 = 1006,119$$

$$Z_A = 1006,119 - 0,029 = 1006,090$$

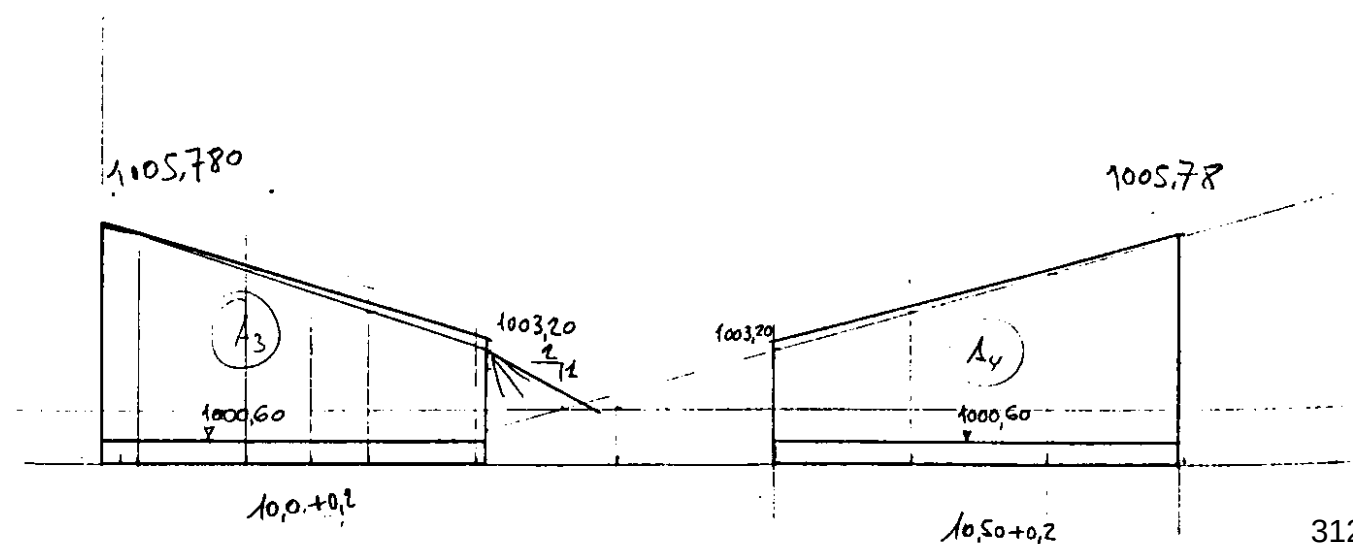


Aletas (A₃) y (A₄)



$$Z_{imp} = 1005,983 + 0,41 \times 0,01 + 0,3 + 0,76 \times 0,02 - 0,50 = 1005,802$$

$$Z_A = 1005,802 - 0,022 = 1005,780$$



4.4.8 Paso inferior de fauna PK 568+94

4.4.8 PASO INFERIOR DE FAUNA PK 568+94

ÍNDICE

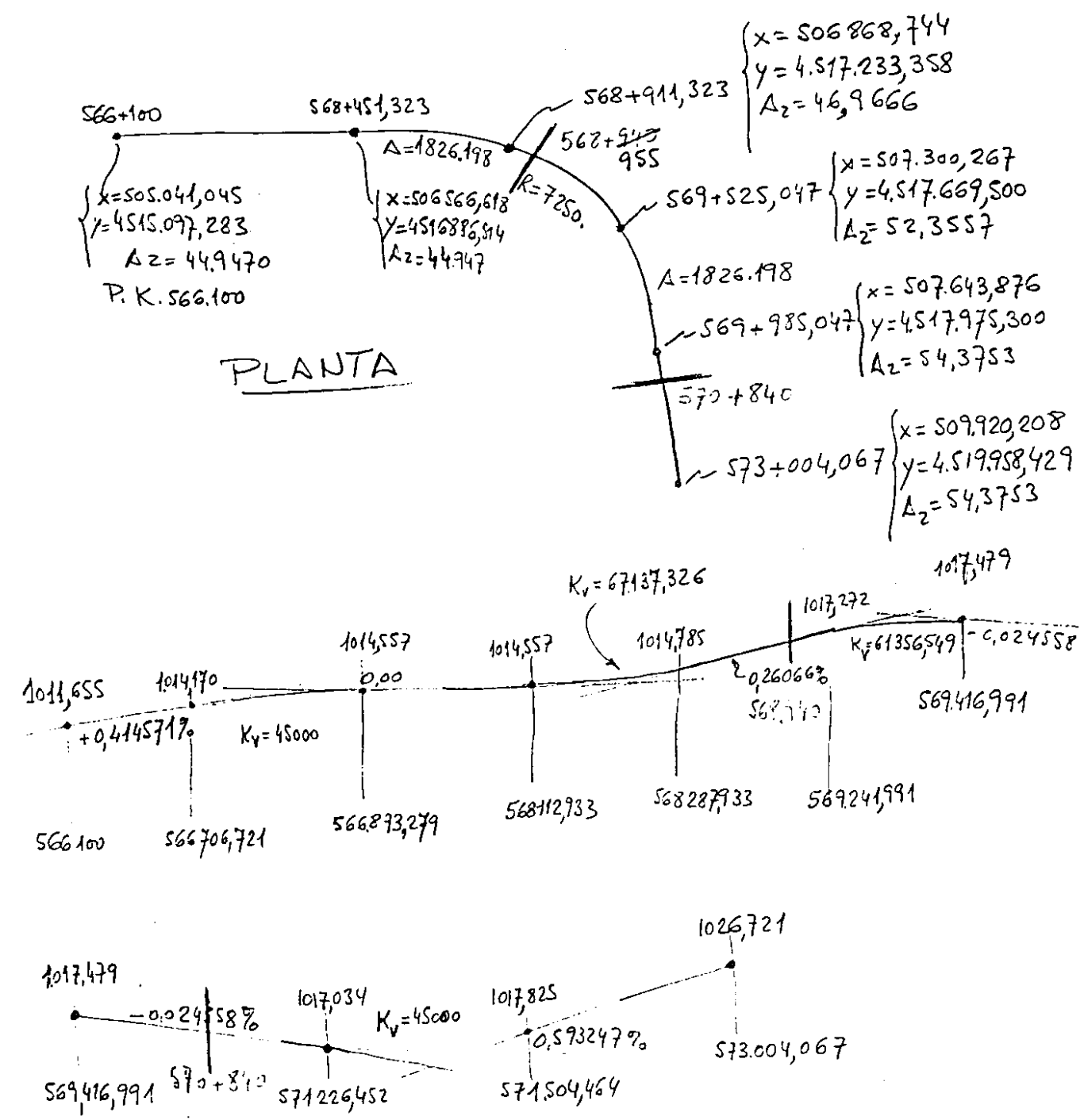
- DEFINICIÓN GEOMÉTRICA:
 - DATOS GENERALES DEL TRAZADO
 - REPLANTEO DE LOS BORDES DEL FFCC.
 - REPLANTEO DEL PÓRTICO
 - REPLANTEO DE LAS ALETAS

DEFINICION GEOMETICA P.F. 568+94

DATOS GENERALES DEL TRAZADO

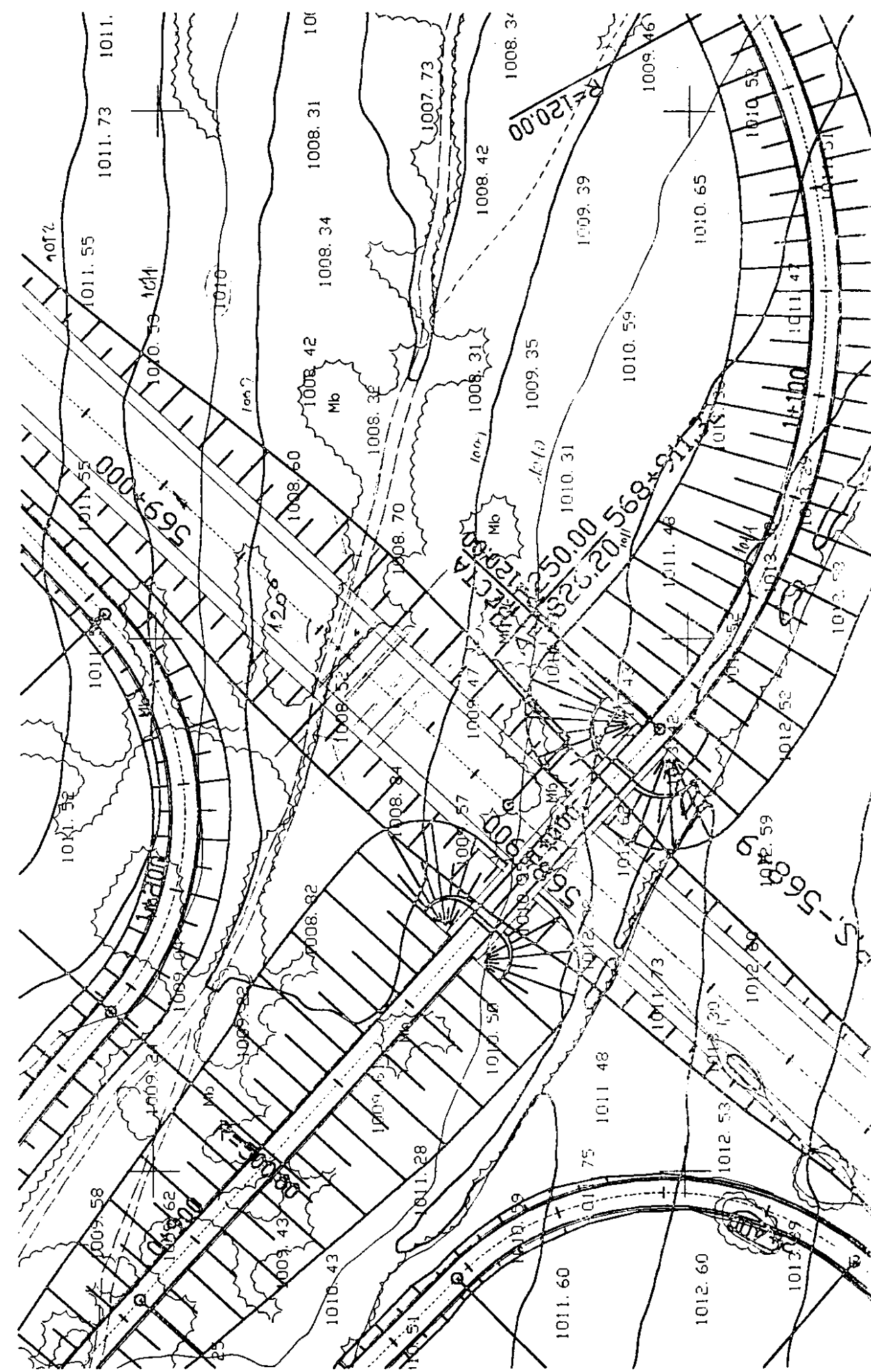
TRAMO III

PLANTA



E 1/1000

568+955



REPLANTEO DE LOS BORDES DEL FERROCARRIL

PI-568+940 PASO FAUNA

1000FERROCARRIL

8911.323 6868.744 17233.358 46.9666 1 8287.933 1014.785 .0026066 1
 2 9525.047 7250. 1 9241.991
 2 8911.323 1.5325 2. 5.46751.5325 0. 2.9675 0. 2.96754.0325 2.
 9525.047 1.5325 2. 5.46751.5325 0. 2.9675 0. 2.96754.0325 2.
 2 8911.323 -.5 -.17796.406525 0. 0. -.20994.24129 .5
 9525.047 -.5 -.17796.406525 0. 0. -.20994.24129 .5
 7 1 0. 2 0. 3 0. 0 0. 8 0. 9 0. 10 0.
 1 0 8910. 1. 8970. 70 10 20 30 40 50 60 7
 1 0 1 8940. 10 4

0
 0
 0
 /*
 /R

TITULO DEL TRABAJO PI-568+940 PASO FAUNA

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	8910.000	-53.045017	.672489	-.740107

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	1	0	8910.000	6861.193	17238.431	1014.433
1	1	2	0	8910.000	6862.673	17237.086	1015.433
1	1	3	0	8910.000	6866.720	17233.410	1016.406
1	1	4	0	8910.000	6867.854	17232.379	1016.406
1	1	5	0	8910.000	6870.050	17230.383	1016.406
1	1	6	0	8910.000	6873.035	17227.671	1015.433
1	1	7	0	8910.000	6874.515	17226.327	1014.433

EJE	P.K.	AZIMUT	COS A	SEN A
J	8911.000	-53.036236	.672591	-.740014

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	2	1	0	8911.000	6861.867	17239.172	1014.436
1	2	2	0	8911.000	6863.347	17237.827	1015.436
1	2	3	0	8911.000	6867.393	17234.150	1016.409
1	2	4	0	8911.000	6868.527	17233.119	1016.409
1	2	5	0	8911.000	6870.723	17231.123	1016.409
1	2	6	0	8911.000	6873.707	17228.411	1015.436
1	2	7	0	8911.000	6875.187	17227.066	1014.436

EJE	P.K.	AZIMUT	COS A	SEN A
0	8912.000	-53.027455	.672693	-.739921

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	3	1	0	8912.000	6862.540	17239.913	1014.439
1	3	2	0	8912.000	6864.020	17238.568	1015.439
1	3	3	0	8912.000	6868.065	17234.890	1016.412
1	3	4	0	8912.000	6869.199	17233.859	1016.412
1	3	5	0	8912.000	6871.395	17231.863	1016.412
1	3	6	0	8912.000	6874.379	17229.150	1015.439
1	3	7	0	8912.000	6875.859	17227.805	1014.439

EJE	P.K.	AZIMUT	COS A	SEN A
0	8913.000	-53.018674	.672796	-.739828

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	4	1	0	8913.000	6863.214	17240.654	1014.441
1	4	2	0	8913.000	6864.693	17239.308	1015.441
1	4	3	0	8913.000	6868.738	17235.630	1016.414
1	4	4	0	8913.000	6869.872	17234.599	1016.414
1	4	5	0	8913.000	6872.068	17232.602	1016.414
1	4	6	0	8913.000	6875.051	17229.889	1015.441
1	4	7	0	8913.000	6876.531	17228.544	1014.441

EJE	P.K.	AZIMUT	COS A	SEN A
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
0	8914.000	-53.009893			.672898	-.739736	
1	5	1	0	8914.000	6863.887	17241.395	1014.444
1	5	2	0	8914.000	6865.367	17240.049	1015.444
1	5	3	0	8914.000	6869.411	17236.370	1016.417
1	5	4	0	8914.000	6870.545	17235.339	1016.417
1	5	5	0	8914.000	6872.740	17233.342	1016.417
1	5	6	0	8914.000	6875.723	17230.628	1015.444
1	5	7	0	8914.000	6877.203	17229.283	1014.444

EJE	P.K.	AZIMUT	COS A	SEN A
0	8915.000	-53.001112	.673000	-.739643

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	6	1	0	8915.000	6864.561	17242.135	1014.447
1	6	2	0	8915.000	6866.040	17240.789	1015.447
1	6	3	0	8915.000	6870.084	17237.110	1016.420
1	6	4	0	8915.000	6871.218	17236.078	1016.420
1	6	5	0	8915.000	6873.413	17234.081	1016.420
1	6	6	0	8915.000	6876.395	17231.367	1015.447
1	6	7	0	8915.000	6877.875	17230.021	1014.447

EJE	P.K.	AZIMUT	COS A	SEN A
0	8916.000	-52.992331	.673102	-.739550

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	7	1	0	8916.000	6865.235	17242.876	1014.449
1	7	2	0	8916.000	6866.714	17241.530	1015.449
1	7	3	0	8916.000	6870.758	17237.849	1016.422
1	7	4	0	8916.000	6871.891	17236.818	1016.422
1	7	5	0	8916.000	6874.086	17234.820	1016.422
1	7	6	0	8916.000	6877.068	17232.106	1015.449
1	7	7	0	8916.000	6878.547	17230.760	1014.449

EJE	P.K.	AZIMUT	COS A	SEN A
0	8917.000	-52.983550	.673204	-.739457

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	8	1	0	8917.000	6865.909	17243.616	1014.452
1	8	2	0	8917.000	6867.388	17242.270	1015.452
1	8	3	0	8917.000	6871.431	17238.589	1016.425
1	8	4	0	8917.000	6872.564	17237.557	1016.425
1	8	5	0	8917.000	6874.758	17235.560	1016.425
1	8	6	0	8917.000	6877.740	17232.845	1015.452
1	8	7	0	8917.000	6879.219	17231.499	1014.452

EJE	P.K.	AZIMUT	COS A	SEN A
0	8918.000	-52.974770	.673306	-.739364

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	9	1	0	8918.000	6866.583	17244.357	1014.454
1	9	2	0	8918.000	6868.062	17243.010	1015.454
1	9	3	0	8918.000	6872.104	17239.329	1016.427
1	9	4	0	8918.000	6873.237	17238.297	1016.427

1	9	5	0	8918.000	6875.431	17236.299	1016.427
1	9	6	0	8918.000	6878.413	17233.584	1015.454
1	9	7	0	8918.000	6879.892	17232.237	1014.454

EJE	P.K.	AZIMUT	COS A	SEN A
0	8919.000	-52.965989	.673408	-.739271

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	10	1	0	8919.000	6867.257	17245.097	1014.457
1	10	2	0	8919.000	6868.736	17243.750	1015.457
1	10	3	0	8919.000	6872.778	17240.068	1016.430
1	10	4	0	8919.000	6873.911	17239.036	1016.430
1	10	5	0	8919.000	6876.105	17237.038	1016.430
1	10	6	0	8919.000	6879.086	17234.322	1015.457
1	10	7	0	8919.000	6880.564	17232.975	1014.457

EJE	P.K.	AZIMUT	COS A	SEN A
0	8920.000	-52.957208	.673510	-.739179

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	11	1	0	8920.000	6867.932	17245.837	1014.460
1	11	2	0	8920.000	6869.410	17244.490	1015.460
1	11	3	0	8920.000	6873.451	17240.808	1016.433
1	11	4	0	8920.000	6874.584	17239.775	1016.433
1	11	5	0	8920.000	6876.778	17237.777	1016.433
1	11	6	0	8920.000	6879.758	17235.061	1015.460
1	11	7	0	8920.000	6881.237	17233.714	1014.460

EJE	P.K.	AZIMUT	COS A	SEN A
0	8921.000	-52.948427	.673611	-.739086

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	12	1	0	8921.000	6868.606	17246.577	1014.462
1	12	2	0	8921.000	6870.084	17245.230	1015.462
1	12	3	0	8921.000	6874.125	17241.547	1016.435
1	12	4	0	8921.000	6875.258	17240.514	1016.435
1	12	5	0	8921.000	6877.451	17238.516	1016.435
1	12	6	0	8921.000	6880.431	17235.799	1015.462
1	12	7	0	8921.000	6881.910	17234.452	1014.462

EJE	P.K.	AZIMUT	COS A	SEN A
0	8922.000	-52.939646	.673713	-.738993

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	13	1	0	8922.000	6869.280	17247.317	1014.465
1	13	2	0	8922.000	6870.758	17245.970	1015.465
1	13	3	0	8922.000	6874.799	17242.286	1016.438
1	13	4	0	8922.000	6875.931	17241.254	1016.438
1	13	5	0	8922.000	6878.124	17239.254	1016.438
1	13	6	0	8922.000	6881.104	17236.538	1015.465
1	13	7	0	8922.000	6882.582	17235.190	1014.465

EJE	P.K.	AZIMUT	COS A	SEN A
0	8923.000	-52.930865	.673815	-.738900

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	14	1	0	8923.000	6869.955	17248.057	1014.467
1	14	2	0	8923.000	6871.433	17246.709	1015.467
1	14	3	0	8923.000	6875.473	17243.025	1016.440
1	14	4	0	8923.000	6876.605	17241.992	1016.440
1	14	5	0	8923.000	6878.798	17239.993	1016.440
1	14	6	0	8923.000	6881.777	17237.276	1015.467
1	14	7	0	8923.000	6883.255	17235.928	1014.467

EJE	P.K.	AZIMUT	COS A	SEN A
0	8924.000	-52.922084	.673917	-.738807

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	0	8924.000	6870.630	17248.797	1014.470
1	15	2	0	8924.000	6872.107	17247.449	1015.470
1	15	3	0	8924.000	6876.147	17243.764	1016.443
1	15	4	0	8924.000	6877.279	17242.731	1016.443
1	15	5	0	8924.000	6879.471	17240.731	1016.443
1	15	6	0	8924.000	6882.451	17238.014	1015.470
1	15	7	0	8924.000	6883.928	17236.666	1014.470

JE	P.K.	AZIMUT	COS A	SEN A
0	8925.000	-52.913303	.674019	-.738714

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	0	8925.000	6871.305	17249.536	1014.473
1	16	2	0	8925.000	6872.782	17248.188	1015.473
1	16	3	0	8925.000	6876.821	17244.503	1016.446
1	16	4	0	8925.000	6877.953	17243.470	1016.446
1	16	5	0	8925.000	6880.145	17241.470	1016.446
1	16	6	0	8925.000	6883.124	17238.752	1015.473
1	16	7	0	8925.000	6884.601	17237.404	1014.473

EJE	P.K.	AZIMUT	COS A	SEN A
0	8926.000	-52.904522	.674121	-.738621

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	0	8926.000	6871.980	17250.276	1014.475
1	17	2	0	8926.000	6873.457	17248.928	1015.475
1	17	3	0	8926.000	6877.495	17245.242	1016.448
1	17	4	0	8926.000	6878.627	17244.209	1016.448
1	17	5	0	8926.000	6880.819	17242.208	1016.448
1	17	6	0	8926.000	6883.797	17239.490	1015.475
1	17	7	0	8926.000	6885.275	17238.142	1014.475

EJE	P.K.	AZIMUT	COS A	SEN A
0	8927.000	-52.895741	.674223	-.738528

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	0	8927.000	6872.655	17251.015	1014.478
1	18	2	0	8927.000	6874.132	17249.667	1015.478
1	18	3	0	8927.000	6878.169	17245.981	1016.451
1	18	4	0	8927.000	6879.301	17244.947	1016.451
1	18	5	0	8927.000	6881.493	17242.947	1016.451
1	18	6	0	8927.000	6884.471	17240.228	1015.478
1	18	7	0	8927.000	6885.948	17238.879	1014.478

EJE	P.K.	AZIMUT	COS A	SEN A
0	8928.000	-52.886960	.674325	-.738435

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	0	8928.000	6873.330	17251.755	1014.480
1	19	2	0	8928.000	6874.806	17250.406	1015.480
1	19	3	0	8928.000	6878.844	17246.719	1016.453
1	19	4	0	8928.000	6879.976	17245.686	1016.453
1	19	5	0	8928.000	6882.167	17243.685	1016.453
1	19	6	0	8928.000	6885.145	17240.966	1015.480
1	19	7	0	8928.000	6886.621	17239.617	1014.480

EJE	P.K.	AZIMUT	COS A	SEN A
0	8929.000	-52.878179	.674427	-.738342

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	0	8929.000	6874.005	17252.494	1014.483
1	20	2	0	8929.000	6875.482	17251.145	1015.483
1	20	3	0	8929.000	6879.518	17247.458	1016.456
1	20	4	0	8929.000	6880.650	17246.424	1016.456
1	20	5	0	8929.000	6882.841	17244.423	1016.456
1	20	6	0	8929.000	6885.818	17241.703	1015.483
1	20	7	0	8929.000	6887.295	17240.354	1014.483

EJE	P.K.	AZIMUT	COS A	SEN A
0	8930.000	-52.869398	.674528	-.738249

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	0	8930.000	6874.680	17253.233	1014.486
1	21	2	0	8930.000	6876.157	17251.884	1015.486
1	21	3	0	8930.000	6880.193	17248.196	1016.459
1	21	4	0	8930.000	6881.324	17247.162	1016.459
1	21	5	0	8930.000	6883.515	17245.161	1016.459
1	21	6	0	8930.000	6886.492	17242.441	1015.486
1	21	7	0	8930.000	6887.969	17241.092	1014.486

EJE	P.K.	AZIMUT	COS A	SEN A
0	8931.000	-52.860617	.674630	-.738156

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	0	8931.000	6875.356	17253.972	1014.488
1	22	2	0	8931.000	6876.832	17252.623	1015.488
1	22	3	0	8931.000	6880.868	17248.935	1016.461
1	22	4	0	8931.000	6881.999	17247.901	1016.461
1	22	5	0	8931.000	6884.189	17245.899	1016.461
1	22	6	0	8931.000	6887.166	17243.178	1015.488
1	22	7	0	8931.000	6888.642	17241.829	1014.488

EJE	P.K.	AZIMUT	COS A	SEN A
0	8932.000	-52.851836	.674732	-.738063

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	0	8932.000	6876.031	17254.711	1014.491
1	23	2	0	8932.000	6877.507	17253.362	1015.491

1	23	3	0	8932.000	6881.543	17249.673	1016.464
1	23	4	0	8932.000	6882.674	17248.639	1016.464
1	23	5	0	8932.000	6884.864	17246.637	1016.464
1	23	6	0	8932.000	6887.840	17243.916	1015.491
1	23	7	0	8932.000	6889.316	17242.566	1014.491

EJE	P.K.	AZIMUT	COS A	SEN A
0	8933.000	-52.843055	.674834	-.737970

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	24	1	0	8933.000	6876.707	17255.450	1014.493
1	24	2	0	8933.000	6878.183	17254.101	1015.493
1	24	3	0	8933.000	6882.217	17250.411	1016.466
1	24	4	0	8933.000	6883.348	17249.377	1016.466
1	24	5	0	8933.000	6885.538	17247.374	1016.466
1	24	6	0	8933.000	6888.514	17244.653	1015.493
1	24	7	0	8933.000	6889.990	17243.303	1014.493

EJE	P.K.	AZIMUT	COS A	SEN A
0	8934.000	-52.834274	.674936	-.737877

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	25	1	0	8934.000	6877.382	17256.189	1014.496
1	25	2	0	8934.000	6878.858	17254.839	1015.496
1	25	3	0	8934.000	6882.893	17251.149	1016.469
1	25	4	0	8934.000	6884.023	17250.115	1016.469
1	25	5	0	8934.000	6886.213	17248.112	1016.469
1	25	6	0	8934.000	6889.188	17245.390	1015.496
1	25	7	0	8934.000	6890.664	17244.040	1014.496

EJE	P.K.	AZIMUT	COS A	SEN A
0	8935.000	-52.825493	.675037	-.737783

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	26	1	0	8935.000	6878.058	17256.928	1014.499
1	26	2	0	8935.000	6879.534	17255.578	1015.499
1	26	3	0	8935.000	6883.568	17251.887	1016.472
1	26	4	0	8935.000	6884.698	17250.853	1016.472
1	26	5	0	8935.000	6886.888	17248.849	1016.472
1	26	6	0	8935.000	6889.863	17246.127	1015.499
1	26	7	0	8935.000	6891.338	17244.777	1014.499

EJE	P.K.	AZIMUT	COS A	SEN A
0	8936.000	-52.816712	.675139	-.737690

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	27	1	0	8936.000	6878.734	17257.667	1014.501
1	27	2	0	8936.000	6880.210	17256.316	1015.501
1	27	3	0	8936.000	6884.243	17252.625	1016.474
1	27	4	0	8936.000	6885.373	17251.590	1016.474
1	27	5	0	8936.000	6887.562	17249.587	1016.474
1	27	6	0	8936.000	6890.537	17246.864	1015.501
1	27	7	0	8936.000	6892.013	17245.514	1014.501

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8937.000	-52.807931	.675241	-.737597
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	28	1	0	8937.000	6879.410	17258.405	1014.504
1	28	2	0	8937.000	6880.885	17257.055	1015.504
1	28	3	0	8937.000	6884.918	17253.363	1016.477
1	28	4	0	8937.000	6886.049	17252.328	1016.477
1	28	5	0	8937.000	6888.237	17250.324	1016.477
1	28	6	0	8937.000	6891.212	17247.601	1015.504
1	28	7	0	8937.000	6892.687	17246.251	1014.504

EJE	P.K.	AZIMUT	COS A	SEN A
0	8938.000	-52.799150	.675343	-.737504

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	29	1	0	8938.000	6880.086	17259.144	1014.506
1	29	2	0	8938.000	6881.561	17257.793	1015.506
1	29	3	0	8938.000	6885.594	17254.100	1016.479
1	29	4	0	8938.000	6886.724	17253.065	1016.479
1	29	5	0	8938.000	6888.912	17251.061	1016.479
1	29	6	0	8938.000	6891.886	17248.338	1015.506
1	29	7	0	8938.000	6893.361	17246.987	1014.506

EJE	P.K.	AZIMUT	COS A	SEN A
0	8939.000	-52.790369	.675444	-.737411

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	30	1	0	8939.000	6880.763	17259.882	1014.509
1	30	2	0	8939.000	6882.237	17258.531	1015.509
1	30	3	0	8939.000	6886.269	17254.838	1016.482
1	30	4	0	8939.000	6887.399	17253.803	1016.482
1	30	5	0	8939.000	6889.588	17251.799	1016.482
1	30	6	0	8939.000	6892.561	17249.075	1015.509
1	30	7	0	8939.000	6894.036	17247.724	1014.509

EJE	P.K.	AZIMUT	COS A	SEN A
0	8940.000	-52.781588	.675546	-.737318

PO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	31	1	0	8940.000	6881.439	17260.620	1014.512
1	31	2	0	8940.000	6882.914	17259.269	1015.512
1	31	3	0	8940.000	6886.945	17255.576	1016.485
1	31	4	0	8940.000	6888.075	17254.540	1016.485
1	31	5	0	8940.000	6890.263	17252.536	1016.485
1	31	6	0	8940.000	6893.236	17249.811	1015.512
1	31	7	0	8940.000	6894.711	17248.460	1014.512

EJE	P.K.	AZIMUT	COS A	SEN A
0	8941.000	-52.772807	.675648	-.737225

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	32	1	0	8941.000	6882.115	17261.358	1014.514
1	32	2	0	8941.000	6883.590	17260.007	1015.514
1	32	3	0	8941.000	6887.621	17256.313	1016.487
1	32	4	0	8941.000	6888.750	17255.278	1016.487
1	32	5	0	8941.000	6890.938	17253.273	1016.487

1	32	6	0	8941.000	6893.911	17250.548	1015.514
1	32	7	0	8941.000	6895.385	17249.197	1014.514

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8942.000	-52.764026	.675749	-.737131
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	33	1	0	8942.000	6882.792	17262.097	1014.517
1	33	2	0	8942.000	6884.266	17260.745	1015.517
1	33	3	0	8942.000	6888.296	17257.050	1016.490
1	33	4	0	8942.000	6889.426	17256.015	1016.490
1	33	5	0	8942.000	6891.614	17254.009	1016.490
1	33	6	0	8942.000	6894.586	17251.285	1015.517
1	33	7	0	8942.000	6896.060	17249.933	1014.517

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8943.000	-52.755245	.675851	-.737038
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	34	1	0	8943.000	6883.469	17262.835	1014.520
1	34	2	0	8943.000	6884.943	17261.483	1015.520
1	34	3	0	8943.000	6888.972	17257.788	1016.492
1	34	4	0	8943.000	6890.102	17256.752	1016.492
1	34	5	0	8943.000	6892.289	17254.746	1016.492
1	34	6	0	8943.000	6895.261	17252.021	1015.519
1	34	7	0	8943.000	6896.735	17250.669	1014.519

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8944.000	-52.746464	.675953	-.736945
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	35	1	0	8944.000	6884.145	17263.572	1014.522
1	35	2	0	8944.000	6885.619	17262.221	1015.522
1	35	3	0	8944.000	6889.648	17258.525	1016.495
1	35	4	0	8944.000	6890.778	17257.489	1016.495
1	35	5	0	8944.000	6892.965	17255.483	1016.495
1	35	6	0	8944.000	6895.936	17252.757	1015.522
1	35	7	0	8944.000	6897.410	17251.405	1014.522

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8945.000	-52.737684	.676054	-.736852
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	36	1	0	8945.000	6884.822	17264.310	1014.525
1	36	2	0	8945.000	6886.296	17262.958	1015.525
1	36	3	0	8945.000	6890.325	17259.262	1016.498
1	36	4	0	8945.000	6891.454	17258.226	1016.498
1	36	5	0	8945.000	6893.640	17256.220	1016.498
1	36	6	0	8945.000	6896.612	17253.493	1015.525
1	36	7	0	8945.000	6898.085	17252.141	1014.525

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8946.000	-52.728903	.676156	-.736758
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
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1	37	1	0	8946.000	6885.499	17265.048	1014.527
1	37	2	0	8946.000	6886.973	17263.696	1015.527
1	37	3	0	8946.000	6891.001	17259.999	1016.500
1	37	4	0	8946.000	6892.130	17258.963	1016.500
1	37	5	0	8946.000	6894.316	17256.956	1016.500
1	37	6	0	8946.000	6897.287	17254.229	1015.527
1	37	7	0	8946.000	6898.761	17252.877	1014.527

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8947.000	-52.720122	.676258	-.736665
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	38	1	0	8947.000	6886.176	17265.786	1014.530
1	38	2	0	8947.000	6887.649	17264.433	1015.530
1	38	3	0	8947.000	6891.677	17260.736	1016.503
1	38	4	0	8947.000	6892.806	17259.699	1016.503
1	38	5	0	8947.000	6894.992	17257.692	1016.503
1	38	6	0	8947.000	6897.963	17254.965	1015.530
1	38	7	0	8947.000	6899.436	17253.613	1014.530

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8948.000	-52.711341	.676359	-.736572
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	39	1	0	8948.000	6886.853	17266.523	1014.533
1	39	2	0	8948.000	6888.326	17265.170	1015.533
1	39	3	0	8948.000	6892.354	17261.472	1016.506
1	39	4	0	8948.000	6893.482	17260.436	1016.506
1	39	5	0	8948.000	6895.668	17258.429	1016.506
1	39	6	0	8948.000	6898.638	17255.701	1015.533
1	39	7	0	8948.000	6900.112	17254.349	1014.533

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8949.000	-52.702560	.676461	-.736479
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	40	1	0	8949.000	6887.530	17267.261	1014.535
1	40	2	0	8949.000	6889.003	17265.908	1015.535
1	40	3	0	8949.000	6893.030	17262.209	1016.508
1	40	4	0	8949.000	6894.159	17261.172	1016.508
1	40	5	0	8949.000	6896.344	17259.165	1016.508
1	40	6	0	8949.000	6899.314	17256.437	1015.535
1	40	7	0	8949.000	6900.787	17255.084	1014.535

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8950.000	-52.693779	.676562	-.736385
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	41	1	0	8950.000	6888.208	17267.998	1014.538
1	41	2	0	8950.000	6889.681	17266.645	1015.538
1	41	3	0	8950.000	6893.707	17262.946	1016.511
1	41	4	0	8950.000	6894.835	17261.909	1016.511
1	41	5	0	8950.000	6897.021	17259.901	1016.511
1	41	6	0	8950.000	6899.990	17257.173	1015.538
1	41	7	0	8950.000	6901.463	17255.820	1014.538

EJE	P.K.	AZIMUT	COS A	SEN A
0	8951.000	-52.684998	.676664	-.736292

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	42	1	0	8951.000	6888.885	17268.735	1014.540
1	42	2	0	8951.000	6890.358	17267.382	1015.540
1	42	3	0	8951.000	6894.384	17263.682	1016.513
1	42	4	0	8951.000	6895.512	17262.645	1016.513
1	42	5	0	8951.000	6897.697	17260.637	1016.513
1	42	6	0	8951.000	6900.666	17257.909	1015.540
1	42	7	0	8951.000	6902.139	17256.555	1014.540

EJE	P.K.	AZIMUT	COS A	SEN A
0	8952.000	-52.676217	.676766	-.736199

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	43	1	0	8952.000	6889.563	17269.472	1014.543
1	43	2	0	8952.000	6891.035	17268.119	1015.543
1	43	3	0	8952.000	6895.060	17264.419	1016.516
1	43	4	0	8952.000	6896.189	17263.381	1016.516
1	43	5	0	8952.000	6898.373	17261.373	1016.516
1	43	6	0	8952.000	6901.342	17258.644	1015.543
1	43	7	0	8952.000	6902.814	17257.291	1014.543

EJE	P.K.	AZIMUT	COS A	SEN A
0	8953.000	-52.667436	.676867	-.736105

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	44	1	0	8953.000	6890.241	17270.209	1014.546
1	44	2	0	8953.000	6891.713	17268.856	1015.546
1	44	3	0	8953.000	6895.737	17265.155	1016.519
1	44	4	0	8953.000	6896.865	17264.118	1016.519
1	44	5	0	8953.000	6899.050	17262.109	1016.519
1	44	6	0	8953.000	6902.018	17259.380	1015.546
1	44	7	0	8953.000	6903.490	17258.026	1014.546

EJE	P.K.	AZIMUT	COS A	SEN A
0	8954.000	-52.658655	.676969	-.736012

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	45	1	0	8954.000	6890.918	17270.946	1014.548
1	45	2	0	8954.000	6892.390	17269.592	1015.548
1	45	3	0	8954.000	6896.414	17265.891	1016.521
1	45	4	0	8954.000	6897.542	17264.854	1016.521
1	45	5	0	8954.000	6899.726	17262.845	1016.521
1	45	6	0	8954.000	6902.694	17260.115	1015.548
1	45	7	0	8954.000	6904.166	17258.761	1014.548

EJE	P.K.	AZIMUT	COS A	SEN A
0	8955.000	-52.649874	.677070	-.735919

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	46	1	0	8955.000	6891.596	17271.683	1014.551
1	46	2	0	8955.000	6893.068	17270.329	1015.551
1	46	3	0	8955.000	6897.092	17266.627	1016.524

1	46	4	0	8955.000	6898.219	17265.590	1016.524
1	46	5	0	8955.000	6900.403	17263.580	1016.524
1	46	6	0	8955.000	6903.371	17260.850	1015.551
1	46	7	0	8955.000	6904.843	17259.496	1014.551

EJE	P.K.	AZIMUT	COS A	SEN A
0	8956.000	-52.641093	.677172	-.735825

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	47	1	0	8956.000	6892.274	17272.420	1014.553
1	47	2	0	8956.000	6893.746	17271.066	1015.553
1	47	3	0	8956.000	6897.769	17267.363	1016.526
1	47	4	0	8956.000	6898.897	17266.325	1016.526
1	47	5	0	8956.000	6901.080	17264.316	1016.526
1	47	6	0	8956.000	6904.047	17261.585	1015.553
1	47	7	0	8956.000	6905.519	17260.231	1014.553

EJE	P.K.	AZIMUT	COS A	SEN A
0	8957.000	-52.632312	.677273	-.735732

PO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	48	1	0	8957.000	6892.952	17273.157	1014.556
1	48	2	0	8957.000	6894.424	17271.802	1015.556
1	48	3	0	8957.000	6898.446	17268.099	1016.529
1	48	4	0	8957.000	6899.574	17267.061	1016.529
1	48	5	0	8957.000	6901.757	17265.051	1016.529
1	48	6	0	8957.000	6904.724	17262.320	1015.556
1	48	7	0	8957.000	6906.195	17260.966	1014.556

EJE	P.K.	AZIMUT	COS A	SEN A
0	8958.000	-52.623531	.677375	-.735638

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	49	1	0	8958.000	6893.630	17273.893	1014.559
1	49	2	0	8958.000	6895.102	17272.539	1015.559
1	49	3	0	8958.000	6899.124	17268.835	1016.532
1	49	4	0	8958.000	6900.251	17267.797	1016.532
1	49	5	0	8958.000	6902.434	17265.787	1016.532
1	49	6	0	8958.000	6905.401	17263.055	1015.559
1	49	7	0	8958.000	6906.872	17261.701	1014.559

EJE	P.K.	AZIMUT	COS A	SEN A
0	8959.000	-52.614750	.677476	-.735545

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	50	1	0	8959.000	6894.309	17274.630	1014.561
1	50	2	0	8959.000	6895.780	17273.275	1015.561
1	50	3	0	8959.000	6899.801	17269.571	1016.534
1	50	4	0	8959.000	6900.928	17268.533	1016.534
1	50	5	0	8959.000	6903.111	17266.522	1016.534
1	50	6	0	8959.000	6906.077	17263.790	1015.561
1	50	7	0	8959.000	6907.548	17262.435	1014.561

EJE	P.K.	AZIMUT	COS A	SEN A
0	8960.000	-52.605969	.677577	-.735451

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	51	1	0	8960.000	6894.987	17275.366	1014.564
1	51	2	0	8960.000	6896.458	17274.011	1015.564
1	51	3	0	8960.000	6900.479	17270.306	1016.537
1	51	4	0	8960.000	6901.606	17269.268	1016.537
1	51	5	0	8960.000	6903.788	17267.257	1016.537
1	51	6	0	8960.000	6906.754	17264.525	1015.564
1	51	7	0	8960.000	6908.225	17263.170	1014.564

EJE	P.K.	AZIMUT	COS A	SEN A
0	8961.000	-52.597188	.677679	-.735358

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	52	1	0	8961.000	6895.665	17276.103	1014.566
1	52	2	0	8961.000	6897.136	17274.747	1015.566
1	52	3	0	8961.000	6901.157	17271.042	1016.539
1	52	4	0	8961.000	6902.284	17270.003	1016.539
1	52	5	0	8961.000	6904.466	17267.992	1016.539
1	52	6	0	8961.000	6907.431	17265.260	1015.566
1	52	7	0	8961.000	6908.902	17263.904	1014.566

EJE	P.K.	AZIMUT	COS A	SEN A
0	8962.000	-52.588407	.677780	-.735264

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	53	1	0	8962.000	6896.344	17276.839	1014.569
1	53	2	0	8962.000	6897.815	17275.483	1015.569
1	53	3	0	8962.000	6901.835	17271.777	1016.542
1	53	4	0	8962.000	6902.961	17270.739	1016.542
1	53	5	0	8962.000	6905.143	17268.727	1016.542
1	53	6	0	8962.000	6908.108	17265.994	1015.569
1	53	7	0	8962.000	6909.579	17264.639	1014.569

EJE	P.K.	AZIMUT	COS A	SEN A
0	8963.000	-52.579626	.677882	-.735171

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	54	1	0	8963.000	6897.023	17277.575	1014.572
1	54	2	0	8963.000	6898.493	17276.219	1015.572
1	54	3	0	8963.000	6902.513	17272.513	1016.545
1	54	4	0	8963.000	6903.639	17271.474	1016.545
1	54	5	0	8963.000	6905.821	17269.462	1016.545
1	54	6	0	8963.000	6908.785	17266.729	1015.572
1	54	7	0	8963.000	6910.256	17265.373	1014.572

EJE	P.K.	AZIMUT	COS A	SEN A
0	8964.000	-52.570845	.677983	-.735077

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	55	1	0	8964.000	6897.701	17278.311	1014.574
1	55	2	0	8964.000	6899.172	17276.955	1015.574
1	55	3	0	8964.000	6903.191	17273.248	1016.547
1	55	4	0	8964.000	6904.317	17272.209	1016.547
1	55	5	0	8964.000	6906.498	17270.197	1016.547
1	55	6	0	8964.000	6909.463	17267.463	1015.574

1	55	7	0	8964.000	6910.933	17266.107	1014.574
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EJE	P.K.	AZIMUT	COS A	SEN A
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0	8965.000	-52.562064	.678085	-.734984
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	56	1	0	8965.000	6898.380	17279.047	1014.577
1	56	2	0	8965.000	6899.850	17277.691	1015.577
1	56	3	0	8965.000	6903.869	17273.983	1016.550
1	56	4	0	8965.000	6904.995	17272.944	1016.550
1	56	5	0	8965.000	6907.176	17270.932	1016.550
1	56	6	0	8965.000	6910.140	17268.198	1015.577
1	56	7	0	8965.000	6911.610	17266.841	1014.577

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8966.000	-52.553283	.678186	-.734890
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	57	1	0	8966.000	6899.059	17279.783	1014.579
1	57	2	0	8966.000	6900.529	17278.426	1015.579
1	57	3	0	8966.000	6904.547	17274.718	1016.552
1	57	4	0	8966.000	6905.673	17273.679	1016.552
1	57	5	0	8966.000	6907.854	17271.667	1016.552
1	57	6	0	8966.000	6910.818	17268.932	1015.579
1	57	7	0	8966.000	6912.287	17267.575	1014.579

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8967.000	-52.544502	.678287	-.734797
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	58	1	0	8967.000	6899.738	17280.518	1014.582
1	58	2	0	8967.000	6901.208	17279.162	1015.582
1	58	3	0	8967.000	6905.225	17275.453	1016.555
1	58	4	0	8967.000	6906.352	17274.414	1016.555
1	58	5	0	8967.000	6908.532	17272.401	1016.555
1	58	6	0	8967.000	6911.495	17269.666	1015.582
1	58	7	0	8967.000	6912.965	17268.309	1014.582

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8968.000	-52.535721	.678389	-.734703
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	59	1	0	8968.000	6900.418	17281.254	1014.585
1	59	2	0	8968.000	6901.887	17279.897	1015.585
1	59	3	0	8968.000	6905.904	17276.188	1016.558
1	59	4	0	8968.000	6907.030	17275.149	1016.558
1	59	5	0	8968.000	6909.210	17273.136	1016.558
1	59	6	0	8968.000	6912.173	17270.400	1015.585
1	59	7	0	8968.000	6913.642	17269.043	1014.585

EJE	P.K.	AZIMUT	COS A	SEN A
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0	8969.000	-52.526940	.678490	-.734610
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	60	1	0	8969.000	6901.097	17281.990	1014.587

1	60	2	0	8969.000	6902.566	17280.633	1015.587
1	60	3	0	8969.000	6906.583	17276.923	1016.560
1	60	4	0	8969.000	6907.708	17275.883	1016.560
1	60	5	0	8969.000	6909.888	17273.870	1016.560
1	60	6	0	8969.000	6912.851	17271.134	1015.587
1	60	7	0	8969.000	6914.320	17269.777	1014.587

EJE	P.K.	AZIMUT	COS A	SEN A
0	8970.000	-52.518159	.678591	-.734516

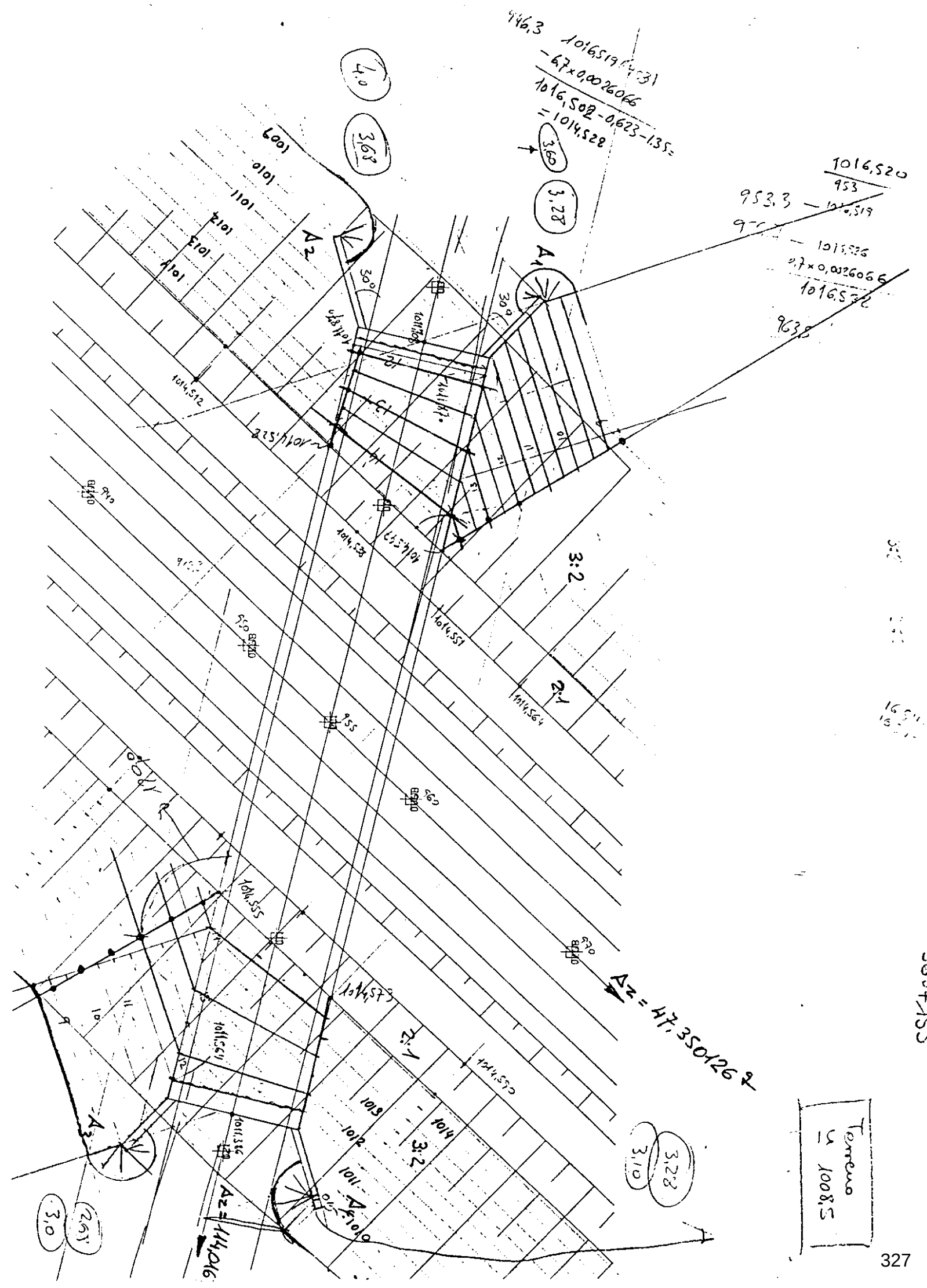
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	61	1	0	8970.000	6901.776	17282.725	1014.590
1	61	2	0	8970.000	6903.245	17281.368	1015.590
1	61	3	0	8970.000	6907.261	17277.658	1016.563
1	61	4	0	8970.000	6908.387	17276.618	1016.563
1	61	5	0	8970.000	6910.567	17274.604	1016.563
1	61	6	0	8970.000	6913.528	17271.868	1015.590
1	61	7	0	8970.000	6914.998	17270.511	1014.590

EGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	8940.000	-52.781588	.675546	-.737318

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	4	0	8940.000	6888.075	17254.540	1016.485

REPLANTEO DEL PORTICO



TITULO DEL TRABAJO PI-568+940 PASO FAUNA

SEGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	8955.000	-52.649874	.677070	-.735919

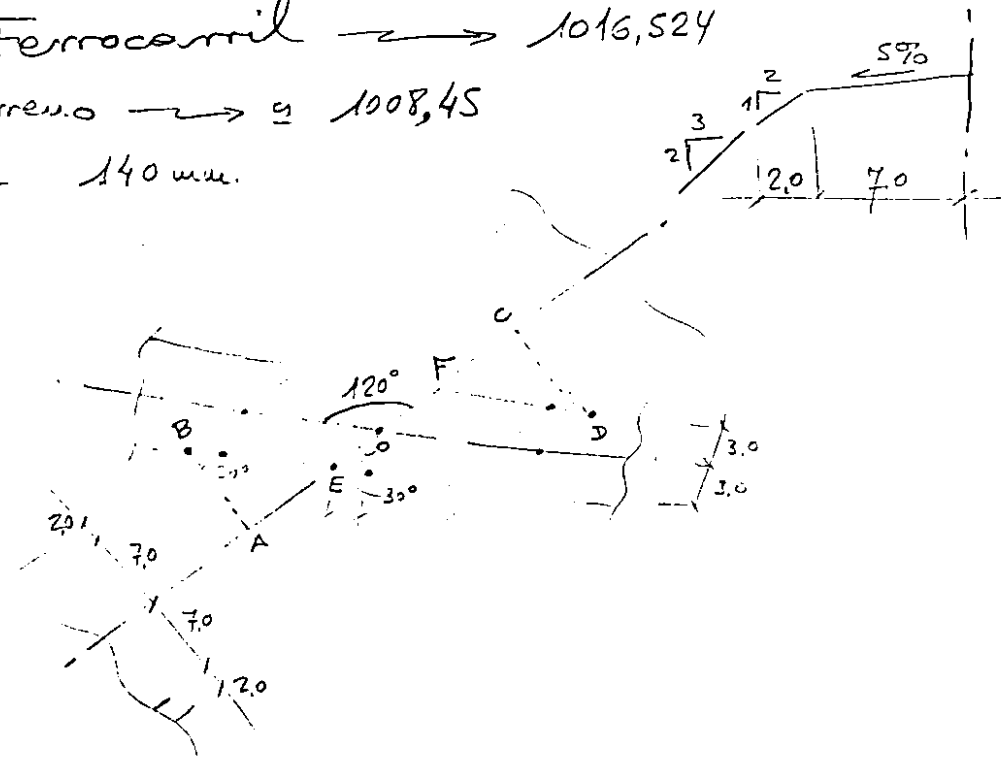
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	4	0	8955.000	6898.219	17265.590	1016.524

PI-568+940 PASO FAUNA 1000FERROCARRIL

8911.323	6868.744	17233.358	46.9666	1	8287.933	1014.785	.0026066	1
2	9525.047	7250.			1	9241.991		
2	8911.323	1.5325	2.	5.46751.5325	0.	2.9675	0.	2.96754.0325 2.
	9525.047	1.5325	2.	5.46751.5325	0.	2.9675	0.	2.96754.0325 2.
2	8911.323	-.5	-.17796.406525	0.	0.	-.20994.24129	.5	
	9525.047	-.5	-.17796.406525	0.	0.	-.20994.24129	.5	
7	1	0.	2	0.	3	0.	0	0.
							8	0.
							9	0.
							10	0.
0								
1	0	1	8955.				10	4
0								
0								
0								
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/R								

PI-568+940 $\xrightarrow{(CURVA)}$ PI-568+955 $\xrightarrow{\text{esviado } 120^\circ}$ 4-XI-98
 Autorizado el cambio en reunión del 3-XI-98

Cota Ferrocarril $\rightarrow$ 1016,524
 Cota terreno $\rightarrow$ 1008,45
 peralte 140 mm.



$$\overline{OF} = \overline{OE} = \frac{3}{\cos 30^\circ} = 3,46412 \text{ m.}$$

$$\overline{AE} = \overline{FC} = 9 \times \tan 30^\circ = 5,19615 \text{ m.}$$

$$P.K._A = 568955 - 3,464 - 5,196 = 568946,34$$

$$\nabla_{F.C.} = 1014,785 + 1,0026066 \times (946,3 - 287,733) = 1016,501$$

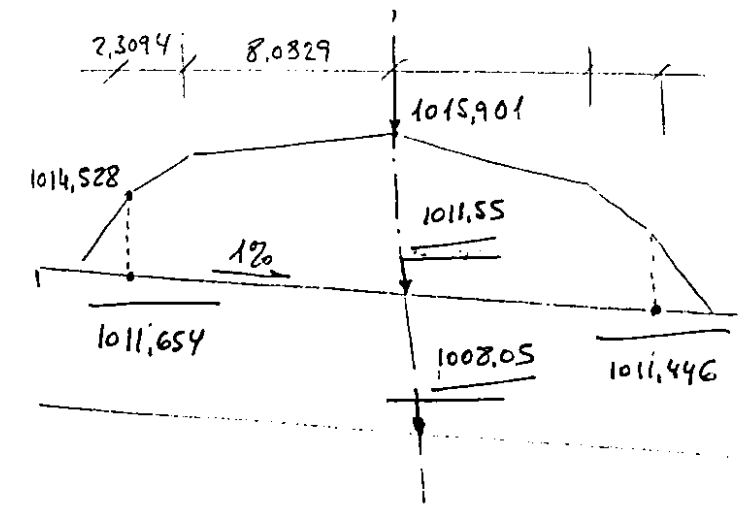
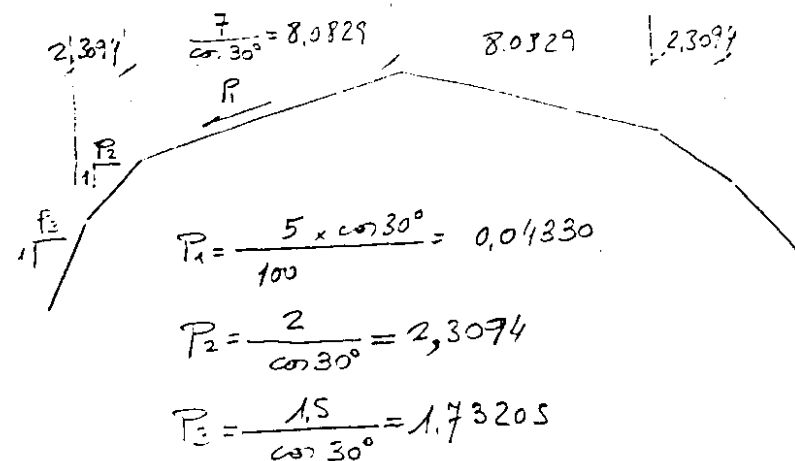
$$P.K._C = 568955 + 3,464 + 5,196 = 568963,66$$

$$\nabla_{FC} = 1016,546$$

$$\nabla_O = 1016,524 - 0,623 = 1015,901$$

$$\nabla_B = \nabla_A - 7 \times 0,05 - 2 \times 0,5 - 0,623 = 1014,528$$

$$\nabla_D = \nabla_C - 7 \times 0,05 - 2 \times 0,5 - 0,623 = 1014,573$$



Extremo superior

$$\tan \beta = \frac{1}{1,73205} = 0,57735$$

$$\tan \alpha = 0,01$$

$$N = 1014,528 - \frac{1011,654}{0,57735 + 0,01} - 0,17 = 2,704$$

$$L = \frac{N}{\tan \beta + \tan \alpha} = \frac{2,704}{0,57735 + 0,01} = 4,6037$$

$$M = \frac{4,6037}{0,57735 + 0,01} + 0,4 + 0,41 = 5,4137$$

$$\nabla_S = \frac{1011,654 + 5,4137 \times 0,01}{0,57735 + 0,01} = 1011,708$$

Extremo inferior.

$$N = 1014,573 - \frac{1011,446}{0,57735 - 0,01} - 0,17 = 2,957$$

$$L = \frac{2,957}{0,57735 - 0,01} = 5,212$$

$$M = \frac{5,212}{0,57735 - 0,01} + 0,4 + 0,41 = 6,022$$

$$\nabla_C = \frac{1011,446 + 6,022 \times 0,01}{0,57735 - 0,01} = 1011,386$$

PI-568+955 PASO FAUNA 1001FERROCARRIL

8911.323 6868.744 17233.358 46.9666 1 8287.933 1014.785 .0026066 1

2 9525.047 7250. 1 9241.991

2 8911.323 1.5325 2. 5.46751.5325 0. 2.9675 0. 2.96754.0325 2.

9525.047 1.5325 2. 5.46751.5325 0. 2.9675 0. 2.96754.0325 2.

2 8911.323 -.5 -.17796.406525 0. 0. -.20994.24129 .5

9525.047 -.5 -.17796.406525 0. 0. -.20994.24129 .5

7 1 0. 2 0. 3 0. 0 0. 8 0. 9 0. 10 0.

PASO FAUNA

0. 6800.633 17287.43 114.016793 1 0. 1009.05 -.01 1

1 150. 1 150.

2 0. 0.5 2.5 2.5 0.5

150. 0.5 2.5 2.5 0.5

2 0.

150.

5 1 0. 2 0. 3 0. 9 0. 10 0.

1 40 3

1 3 75. 1. 125. 53 13 23 33 43 5

1 3 5 82.45 98.268 100. 53 13 23 33 43 5

101.732 118.15

0

0

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/R

TITULO DEL TRABAJO PI-568+955 PASO FAUNA

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
4	0	3	3	8955.000	100.001	6898.220	17265.590	1016.524	1008.050

AZ.E AZ.3

47.350128 114.016793

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	75.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	3	75.000	6874.478	17273.978	1008.300
1	1	2	3	75.000	6874.368	17273.490	1008.300
1	1	3	3	75.000	6873.822	17271.050	1008.300
1	1	4	3	75.000	6873.276	17268.610	1008.300
1	1	5	3	75.000	6873.167	17268.122	1008.300

EJE	P.K.	AZIMUT	COS A	SEN A
3	76.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	3	76.000	6875.454	17273.759	1008.290
1	2	2	3	76.000	6875.344	17273.271	1008.290
1	2	3	3	76.000	6874.798	17270.832	1008.290
1	2	4	3	76.000	6874.252	17268.392	1008.290
1	2	5	3	76.000	6874.143	17267.904	1008.290

EJE	P.K.	AZIMUT	COS A	SEN A
3	77.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	3	77.000	6876.429	17273.541	1008.280
1	3	2	3	77.000	6876.320	17273.053	1008.280
1	3	3	3	77.000	6875.774	17270.613	1008.280
1	3	4	3	77.000	6875.228	17268.174	1008.280
1	3	5	3	77.000	6875.119	17267.686	1008.280

EJE	P.K.	AZIMUT	COS A	SEN A
3	78.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	3	78.000	6877.405	17273.322	1008.270
1	4	2	3	78.000	6877.296	17272.834	1008.270
1	4	3	3	78.000	6876.750	17270.395	1008.270
1	4	4	3	78.000	6876.204	17267.955	1008.270
1	4	5	3	78.000	6876.095	17267.467	1008.270

EJE	P.K.	AZIMUT	COS A	SEN A
3	79.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	5	1	3	79.000	6878.381	17273.104	1008.260
1	5	2	3	79.000	6878.272	17272.616	1008.260
1	5	3	3	79.000	6877.726	17270.176	1008.260
1	5	4	3	79.000	6877.180	17267.737	1008.260
1	5	5	3	79.000	6877.071	17267.249	1008.260

EJE	P.K.	AZIMUT	COS A	SEN A
3	80.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	6	1	3	80.000	6879.357	17272.886	1008.250
1	6	2	3	80.000	6879.248	17272.398	1008.250
1	6	3	3	80.000	6878.702	17269.958	1008.250
1	6	4	3	80.000	6878.156	17267.518	1008.250
1	6	5	3	80.000	6878.047	17267.030	1008.250

EJE	P.K.	AZIMUT	COS A	SEN A
3	81.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	7	1	3	81.000	6880.333	17272.667	1008.240
1	7	2	3	81.000	6880.224	17272.179	1008.240
1	7	3	3	81.000	6879.678	17269.740	1008.240
1	7	4	3	81.000	6879.132	17267.300	1008.240
1	7	5	3	81.000	6879.022	17266.812	1008.240

EJE	P.K.	AZIMUT	COS A	SEN A
3	82.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	8	1	3	82.000	6881.309	17272.449	1008.230
1	8	2	3	82.000	6881.199	17271.961	1008.230
1	8	3	3	82.000	6880.653	17269.521	1008.230
1	8	4	3	82.000	6880.107	17267.081	1008.230
1	8	5	3	82.000	6879.998	17266.594	1008.230

EJE	P.K.	AZIMUT	COS A	SEN A
3	83.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	9	1	3	83.000	6882.285	17272.230	1008.220
1	9	2	3	83.000	6882.175	17271.742	1008.220
1	9	3	3	83.000	6881.629	17269.303	1008.220
1	9	4	3	83.000	6881.083	17266.863	1008.220
1	9	5	3	83.000	6880.974	17266.375	1008.220

EJE	P.K.	AZIMUT	COS A	SEN A
3	84.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	10	1	3	84.000	6883.260	17272.012	1008.210
1	10	2	3	84.000	6883.151	17271.524	1008.210
1	10	3	3	84.000	6882.605	17269.084	1008.210
1	10	4	3	84.000	6882.059	17266.645	1008.210
1	10	5	3	84.000	6881.950	17266.157	1008.210

EJE	P.K.	AZIMUT	COS A	SEN A
3	85.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	11	1	3	85.000	6884.236	17271.794	1008.200
1	11	2	3	85.000	6884.127	17271.306	1008.200
1	11	3	3	85.000	6883.581	17268.866	1008.200
1	11	4	3	85.000	6883.035	17266.426	1008.200
1	11	5	3	85.000	6882.926	17265.938	1008.200

EJE	P.K.	AZIMUT	COS A	SEN A
3	86.000	14.016793	.975859	.218401

PO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	12	1	3	86.000	6885.212	17271.575	1008.190
1	12	2	3	86.000	6885.103	17271.087	1008.190
1	12	3	3	86.000	6884.557	17268.648	1008.190
1	12	4	3	86.000	6884.011	17266.208	1008.190
1	12	5	3	86.000	6883.902	17265.720	1008.190

EJE	P.K.	AZIMUT	COS A	SEN A
3	87.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	13	1	3	87.000	6886.188	17271.357	1008.180
1	13	2	3	87.000	6886.079	17270.869	1008.180
1	13	3	3	87.000	6885.533	17268.429	1008.180
1	13	4	3	87.000	6884.987	17265.989	1008.180
1	13	5	3	87.000	6884.878	17265.502	1008.180

EJE	P.K.	AZIMUT	COS A	SEN A
3	88.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	14	1	3	88.000	6887.164	17271.138	1008.170
1	14	2	3	88.000	6887.055	17270.650	1008.170
1	14	3	3	88.000	6886.509	17268.211	1008.170
1	14	4	3	88.000	6885.963	17265.771	1008.170
1	14	5	3	88.000	6885.853	17265.283	1008.170

EJE	P.K.	AZIMUT	COS A	SEN A
3	89.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	3	89.000	6888.140	17270.920	1008.160
1	15	2	3	89.000	6888.030	17270.432	1008.160
1	15	3	3	89.000	6887.484	17267.992	1008.160
1	15	4	3	89.000	6886.938	17265.553	1008.160

1 15 5 3 89.000 6886.829 17265.065 1008.160

EJE P.K. AZIMUT COS A SEN A

3 90.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	3	90.000	6889.116	17270.702	1008.150
1	16	2	3	90.000	6889.006	17270.214	1008.150
1	16	3	3	90.000	6888.460	17267.774	1008.150
1	16	4	3	90.000	6887.914	17265.334	1008.150
1	16	5	3	90.000	6887.805	17264.846	1008.150

EJE P.K. AZIMUT COS A SEN A

3 91.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	3	91.000	6890.091	17270.483	1008.140
1	17	2	3	91.000	6889.982	17269.995	1008.140
1	17	3	3	91.000	6889.436	17267.556	1008.140
1	17	4	3	91.000	6888.890	17265.116	1008.140
1	17	5	3	91.000	6888.781	17264.628	1008.140

EJE P.K. AZIMUT COS A SEN A

3 92.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	3	92.000	6891.067	17270.265	1008.130
1	18	2	3	92.000	6890.958	17269.777	1008.130
1	18	3	3	92.000	6890.412	17267.337	1008.130
1	18	4	3	92.000	6889.866	17264.897	1008.130
1	18	5	3	92.000	6889.757	17264.410	1008.130

EJE P.K. AZIMUT COS A SEN A

3 93.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	3	93.000	6892.043	17270.046	1008.120
1	19	2	3	93.000	6891.934	17269.558	1008.120
1	19	3	3	93.000	6891.388	17267.119	1008.120
1	19	4	3	93.000	6890.842	17264.679	1008.120
1	19	5	3	93.000	6890.733	17264.191	1008.120

EJE P.K. AZIMUT COS A SEN A

3 94.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	3	94.000	6893.019	17269.828	1008.110
1	20	2	3	94.000	6892.910	17269.340	1008.110
1	20	3	3	94.000	6892.364	17266.900	1008.110
1	20	4	3	94.000	6891.818	17264.461	1008.110
1	20	5	3	94.000	6891.709	17263.973	1008.110

EJE P.K. AZIMUT COS A SEN A

3 95.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	3	95.000	6893.995	17269.610	1008.100
1	21	2	3	95.000	6893.886	17269.122	1008.100
1	21	3	3	95.000	6893.340	17266.682	1008.100
1	21	4	3	95.000	6892.794	17264.242	1008.100
1	21	5	3	95.000	6892.684	17263.754	1008.100

EJE P.K. AZIMUT COS A SEN A

3 96.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	3	96.000	6894.971	17269.391	1008.090
1	22	2	3	96.000	6894.861	17268.903	1008.090
1	22	3	3	96.000	6894.315	17266.464	1008.090
1	22	4	3	96.000	6893.769	17264.024	1008.090
1	22	5	3	96.000	6893.660	17263.536	1008.090

EJE P.K. AZIMUT COS A SEN A

3 97.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	3	97.000	6895.947	17269.173	1008.080
1	23	2	3	97.000	6895.837	17268.685	1008.080
1	23	3	3	97.000	6895.291	17266.245	1008.080
1	23	4	3	97.000	6894.745	17263.805	1008.080
1	23	5	3	97.000	6894.636	17263.318	1008.080

EJE P.K. AZIMUT COS A SEN A

3 98.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	24	1	3	98.000	6896.922	17268.954	1008.070
1	24	2	3	98.000	6896.813	17268.466	1008.070
1	24	3	3	98.000	6896.267	17266.027	1008.070
1	24	4	3	98.000	6895.721	17263.587	1008.070
1	24	5	3	98.000	6895.612	17263.099	1008.070

EJE P.K. AZIMUT COS A SEN A

3 99.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	25	1	3	99.000	6897.898	17268.736	1008.060
1	25	2	3	99.000	6897.789	17268.248	1008.060
1	25	3	3	99.000	6897.243	17265.808	1008.060
1	25	4	3	99.000	6896.697	17263.369	1008.060
1	25	5	3	99.000	6896.588	17262.881	1008.060

EJE P.K. AZIMUT COS A SEN A

3 100.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	26	1	3	100.000	6898.874	17268.518	1008.050
1	26	2	3	100.000	6898.765	17268.030	1008.050
1	26	3	3	100.000	6898.219	17265.590	1008.050

1	26	4	3	100.000	6897.673	17263.150	1008.050
1	26	5	3	100.000	6897.564	17262.662	1008.050

EJE	P.K.	AZIMUT	COS A	SEN A
3	101.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	27	1	3	101.000	6899.850	17268.299	1008.040
1	27	2	3	101.000	6899.741	17267.811	1008.040
1	27	3	3	101.000	6899.195	17265.372	1008.040
1	27	4	3	101.000	6898.649	17262.932	1008.040
1	27	5	3	101.000	6898.540	17262.444	1008.040

EJE	P.K.	AZIMUT	COS A	SEN A
3	102.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	28	1	3	102.000	6900.826	17268.081	1008.030
1	28	2	3	102.000	6900.717	17267.593	1008.030
1	28	3	3	102.000	6900.171	17265.153	1008.030
1	28	4	3	102.000	6899.625	17262.713	1008.030
1	28	5	3	102.000	6899.515	17262.226	1008.030

EJE	P.K.	AZIMUT	COS A	SEN A
3	103.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	29	1	3	103.000	6901.802	17267.862	1008.020
1	29	2	3	103.000	6901.692	17267.374	1008.020
1	29	3	3	103.000	6901.146	17264.935	1008.020
1	29	4	3	103.000	6900.600	17262.495	1008.020
1	29	5	3	103.000	6900.491	17262.007	1008.020

EJE	P.K.	AZIMUT	COS A	SEN A
3	104.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	30	1	3	104.000	6902.778	17267.644	1008.010
1	30	2	3	104.000	6902.668	17267.156	1008.010
1	30	3	3	104.000	6902.122	17264.716	1008.010
1	30	4	3	104.000	6901.576	17262.277	1008.010
1	30	5	3	104.000	6901.467	17261.789	1008.010

EJE	P.K.	AZIMUT	COS A	SEN A
3	105.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	31	1	3	105.000	6903.753	17267.426	1008.000
1	31	2	3	105.000	6903.644	17266.938	1008.000
1	31	3	3	105.000	6903.098	17264.498	1008.000
1	31	4	3	105.000	6902.552	17262.058	1008.000
1	31	5	3	105.000	6902.443	17261.570	1008.000

EJE	P.K.	AZIMUT	COS A	SEN A
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3	106.000	14.016793	.975859	.218401
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	32	1	3	106.000	6904.729	17267.207	1007.990
1	32	2	3	106.000	6904.620	17266.719	1007.990
1	32	3	3	106.000	6904.074	17264.280	1007.990
1	32	4	3	106.000	6903.528	17261.840	1007.990
1	32	5	3	106.000	6903.419	17261.352	1007.990

EJE	P.K.	AZIMUT	COS A	SEN A
3	107.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	33	1	3	107.000	6905.705	17266.989	1007.980
1	33	2	3	107.000	6905.596	17266.501	1007.980
1	33	3	3	107.000	6905.050	17264.061	1007.980
1	33	4	3	107.000	6904.504	17261.621	1007.980
1	33	5	3	107.000	6904.395	17261.134	1007.980

EJE	P.K.	AZIMUT	COS A	SEN A
3	108.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	34	1	3	108.000	6906.681	17266.770	1007.970
1	34	2	3	108.000	6906.572	17266.282	1007.970
1	34	3	3	108.000	6906.026	17263.843	1007.970
1	34	4	3	108.000	6905.480	17261.403	1007.970
1	34	5	3	108.000	6905.371	17260.915	1007.970

EJE	P.K.	AZIMUT	COS A	SEN A
3	109.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	35	1	3	109.000	6907.657	17266.552	1007.960
1	35	2	3	109.000	6907.548	17266.064	1007.960
1	35	3	3	109.000	6907.002	17263.624	1007.960
1	35	4	3	109.000	6906.456	17261.185	1007.960
1	35	5	3	109.000	6906.346	17260.697	1007.960

EJE	P.K.	AZIMUT	COS A	SEN A
3	110.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	36	1	3	110.000	6908.633	17266.334	1007.950
1	36	2	3	110.000	6908.524	17265.846	1007.950
1	36	3	3	110.000	6907.978	17263.406	1007.950
1	36	4	3	110.000	6907.432	17260.966	1007.950
1	36	5	3	110.000	6907.322	17260.478	1007.950

EJE	P.K.	AZIMUT	COS A	SEN A
3	111.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	37	1	3	111.000	6909.609	17266.115	1007.940
1	37	2	3	111.000	6909.499	17265.627	1007.940

3 117.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	43	1	3	117.000	6915.464	17264.805	1007.880
1	43	2	3	117.000	6915.355	17264.317	1007.880
1	43	3	3	117.000	6914.809	17261.877	1007.880
1	43	4	3	117.000	6914.263	17259.437	1007.880
1	43	5	3	117.000	6914.153	17258.950	1007.880

EJE P.K. AZIMUT COS A SEN A

3 118.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	44	1	3	118.000	6916.440	17264.586	1007.870
1	44	2	3	118.000	6916.330	17264.098	1007.870
1	44	3	3	118.000	6915.784	17261.659	1007.870
1	44	4	3	118.000	6915.238	17259.219	1007.870
1	44	5	3	118.000	6915.129	17258.731	1007.870

EJE P.K. AZIMUT COS A SEN A

3 119.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	45	1	3	119.000	6917.415	17264.368	1007.860
1	45	2	3	119.000	6917.306	17263.880	1007.860
1	45	3	3	119.000	6916.760	17261.440	1007.860
1	45	4	3	119.000	6916.214	17259.001	1007.860
1	45	5	3	119.000	6916.105	17258.513	1007.860

EJE P.K. AZIMUT COS A SEN A

3 120.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	46	1	3	120.000	6918.391	17264.149	1007.850
1	46	2	3	120.000	6918.282	17263.662	1007.850
1	46	3	3	120.000	6917.736	17261.222	1007.850
1	46	4	3	120.000	6917.190	17258.782	1007.850
1	46	5	3	120.000	6917.081	17258.294	1007.850

EJE P.K. AZIMUT COS A SEN A

3 121.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	47	1	3	121.000	6919.367	17263.931	1007.840
1	47	2	3	121.000	6919.258	17263.443	1007.840
1	47	3	3	121.000	6918.712	17261.004	1007.840
1	47	4	3	121.000	6918.166	17258.564	1007.840
1	47	5	3	121.000	6918.057	17258.076	1007.840

EJE P.K. AZIMUT COS A SEN A

3 122.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	48	1	3	122.000	6920.343	17263.713	1007.830

1	37	3	3	111.000	6908.953	17263.188	1007.940
1	37	4	3	111.000	6908.407	17260.748	1007.940
1	37	5	3	111.000	6908.298	17260.260	1007.940

EJE P.K. AZIMUT COS A SEN A

3 112.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	38	1	3	112.000	6910.584	17265.897	1007.930
1	38	2	3	112.000	6910.475	17265.409	1007.930
1	38	3	3	112.000	6909.929	17262.969	1007.930
1	38	4	3	112.000	6909.383	17260.529	1007.930
1	38	5	3	112.000	6909.274	17260.042	1007.930

EJE P.K. AZIMUT COS A SEN A

3 113.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	39	1	3	113.000	6911.560	17265.678	1007.920
1	39	2	3	113.000	6911.451	17265.190	1007.920
1	39	3	3	113.000	6910.905	17262.751	1007.920
1	39	4	3	113.000	6910.359	17260.311	1007.920
1	39	5	3	113.000	6910.250	17259.823	1007.920

EJE P.K. AZIMUT COS A SEN A

3 114.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	40	1	3	114.000	6912.536	17265.460	1007.910
1	40	2	3	114.000	6912.427	17264.972	1007.910
1	40	3	3	114.000	6911.881	17262.532	1007.910
1	40	4	3	114.000	6911.335	17260.093	1007.910
1	40	5	3	114.000	6911.226	17259.605	1007.910

EJE P.K. AZIMUT COS A SEN A

3 115.000 14.016793 .975859 .218401

PO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	41	1	3	115.000	6913.512	17265.242	1007.900
1	41	2	3	115.000	6913.403	17264.754	1007.900
1	41	3	3	115.000	6912.857	17262.314	1007.900
1	41	4	3	115.000	6912.311	17259.874	1007.900
1	41	5	3	115.000	6912.202	17259.386	1007.900

EJE P.K. AZIMUT COS A SEN A

3 116.000 14.016793 .975859 .218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	42	1	3	116.000	6914.488	17265.023	1007.890
1	42	2	3	116.000	6914.379	17264.535	1007.890
1	42	3	3	116.000	6913.833	17262.096	1007.890
1	42	4	3	116.000	6913.287	17259.656	1007.890
1	42	5	3	116.000	6913.177	17259.168	1007.890

EJE P.K. AZIMUT COS A SEN A

1	48	2	3	122.000	6920.234	17263.225	1007.830
1	48	3	3	122.000	6919.688	17260.785	1007.830
1	48	4	3	122.000	6919.142	17258.345	1007.830
1	48	5	3	122.000	6919.033	17257.858	1007.830

EJE	P.K.	AZIMUT	COS A	SEN A
3	123.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	49	1	3	123.000	6921.319	17263.494	1007.820
1	49	2	3	123.000	6921.210	17263.006	1007.820
1	49	3	3	123.000	6920.664	17260.567	1007.820
1	49	4	3	123.000	6920.118	17258.127	1007.820
1	49	5	3	123.000	6920.008	17257.639	1007.820

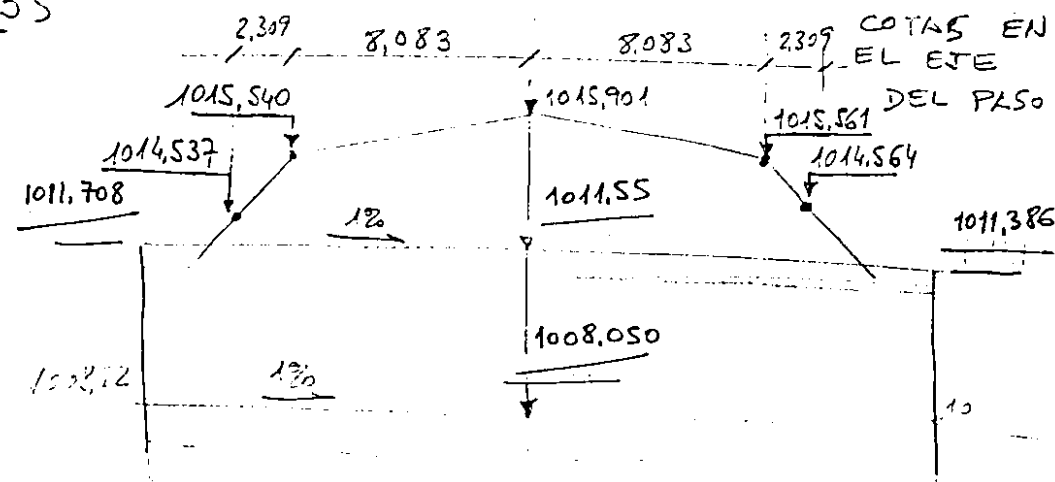
EJE	P.K.	AZIMUT	COS A	SEN A
3	124.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	50	1	3	124.000	6922.295	17263.276	1007.810
1	50	2	3	124.000	6922.186	17262.788	1007.810
1	50	3	3	124.000	6921.640	17260.348	1007.810
1	50	4	3	124.000	6921.094	17257.909	1007.810
1	50	5	3	124.000	6920.984	17257.421	1007.810

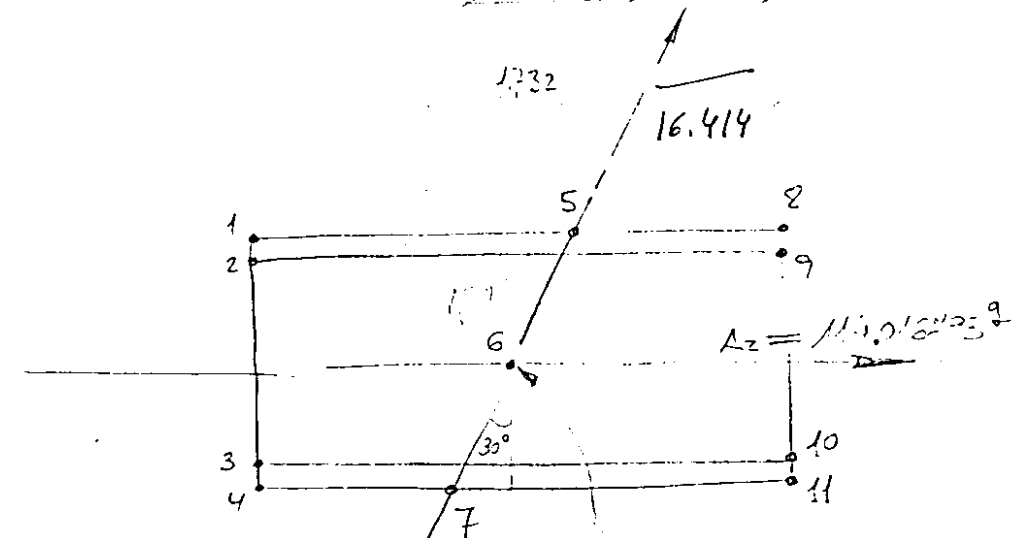
EJE	P.K.	AZIMUT	COS A	SEN A
3	125.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	51	1	3	125.000	6923.271	17263.057	1007.800
1	51	2	3	125.000	6923.161	17262.570	1007.800
1	51	3	3	125.000	6922.615	17260.130	1007.800
1	51	4	3	125.000	6922.069	17257.690	1007.800
1	51	5	3	125.000	6921.960	17257.202	1007.800

PI - 568+955



(18,15)
18,146
K=5.3015



15.806
3.0 x tg 30° = 1.732

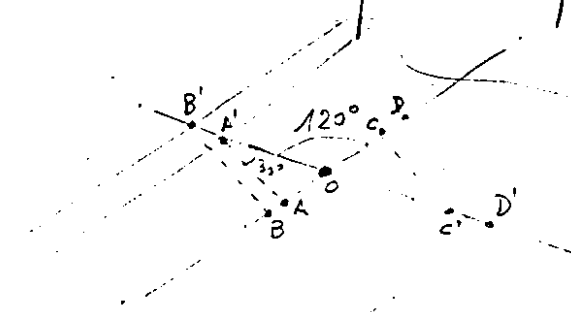
17,538

(17,55)

X = 506.898,217
Y = 4.517.265,590
L₂ = 47.5501°
L₂ = 114.0168°
PK_{F.C.} = 568+955

PI - 568+955

Cotas en el eje del paso.



$$\overline{OC} = \overline{OA} = 7 \cdot \tan 30^\circ = 4,041452$$

$$\overline{OD} = \overline{OB} = 9 \cdot \tan 30^\circ = 5,196152$$

$$PK_0 = 568.955$$

$$PK_A = 568.955 - 4.041 = 568.950,959$$

$$PK_B = 568.955 - 5.196 = 568.949,804$$

$$PK_C = 568.955 + 4.041 = 568.959,041$$

$$PK_D = 568.955 + 5.196 = 568.960,196$$

$$V_{A'} = 1014.785 + 0,0026066(950,959 - 287,933) - 7 \times 0,05 - 0,623 = 1015,540$$

$$V_{B'} = 1014.785 + 0,0026066(949,804 - 287,933) - 7 \times 0,05 - 2 \times 0,5 - 0,623 = 1014,561$$

$$V_O = 1016,524 - 0,623 = 1015,901$$

$$V_{C'} = 1014.785 + 0,0026066(959,041 - 287,933) - 7 \times 0,05 - 0,623 = 1015,561$$

$$V_{D'} = 1014.785 + 0,0026066(960,196 - 287,933) - 7 \times 0,05 - 2 \times 0,5 - 0,623 = 1014,561$$

TITULO DEL TRABAJO PI-568+955 PASO FAUNA

SEGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	82.450	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	1	3	82.450	6881.748	17272.350	1008.226 -1
1	1	2	3	82.450	6881.639	17271.863	1008.226 -2
1	1	3	3	82.450	6881.093	17269.423	1008.226
1	1	4	3	82.450	6880.547	17266.983	1008.226 -3
1	1	5	3	82.450	6880.437	17266.495	1008.226 -4

EJE	P.K.	AZIMUT	COS A	SEN A
3	98.268	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	2	1	3	98.268	6897.184	17268.896	1008.067
1	2	2	3	98.268	6897.075	17268.408	1008.067
1	2	3	3	98.268	6896.529	17265.968	1008.067
1	2	4	3	98.268	6895.983	17263.529	1008.067
1	2	5	3	98.268	6895.874	17263.041	1008.067 -7

EJE	P.K.	AZIMUT	COS A	SEN A
3	100.000	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	3	1	3	100.000	6898.874	17268.518	1008.050
1	3	2	3	100.000	6898.765	17268.030	1008.050
1	3	3	3	100.000	6898.219	17265.590	1008.050 -6
1	3	4	3	100.000	6897.673	17263.150	1008.050
1	3	5	3	100.000	6897.564	17262.662	1008.050

EJE	P.K.	AZIMUT	COS A	SEN A
3	101.732	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	4	1	3	101.732	6900.564	17268.139	1008.033 -5
1	4	2	3	101.732	6900.455	17267.651	1008.033
1	4	3	3	101.732	6899.909	17265.212	1008.033
1	4	4	3	101.732	6899.363	17262.772	1008.033
1	4	5	3	101.732	6899.254	17262.284	1008.033

EJE	P.K.	AZIMUT	COS A	SEN A
3	118.150	14.016793	.975859	.218401

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	5	1	3	118.150	6916.586	17264.554	1007.869 -8
1	5	2	3	118.150	6916.477	17264.066	1007.869 -9
1	5	3	3	118.150	6915.931	17261.626	1007.869
1	5	4	3	118.150	6915.385	17259.186	1007.869 -10
1	5	5	3	118.150	6915.276	17258.698	1007.869 -11

PI-568+955 PASO FAUNA

1001FERROCARRIL

8911.323	6868.744	17233.358	46.9666	1	8287.933	1014.785	.0026066	1
2	9525.047	7250.			1	9241.991		
2	8911.323	1.5325	2.	5.46751.5325	0.	2.9675	0.	2.96754.0325 2.
	9525.047	1.5325	2.	5.46751.5325	0.	2.9675	0.	2.96754.0325 2.
2	8911.323	-.5	-.17796.406525	0.	0.	-.20994.24129	.5	
	9525.047	-.5	-.17796.406525	0.	0.	-.20994.24129	.5	
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					10	0.		

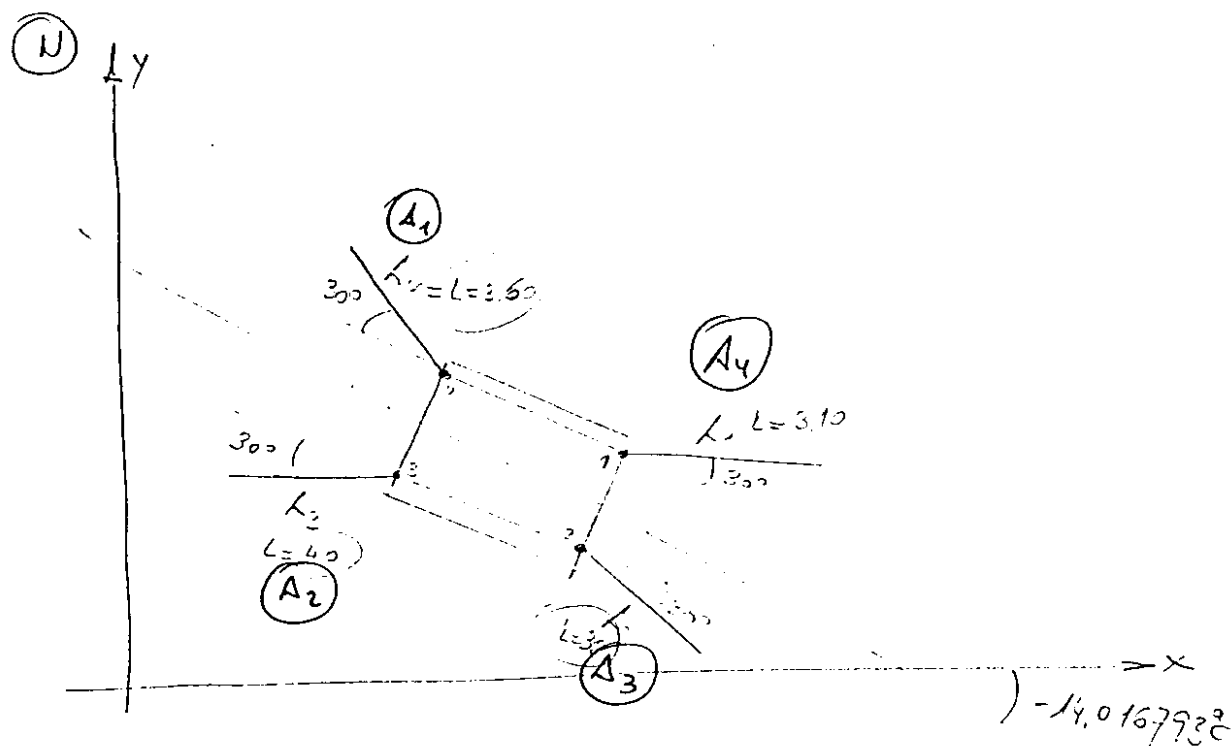
PASO FAUNA

0.	6800.633	17287.43	114.016793	1	0.	1009.05	-.01	1
1	150.				1	150.		
2	0.	0.5	2.5				2.5	0.5
	150.	0.5	2.5				2.5	0.5
2	0.							
	150.							
5	1	0.	2	0.	3	0.	9	0.
					10	0.		
0								
1	3	5	82.45	98.268	100.	101.732	53	13
			118.15				23	33
							43	5

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/R

REPLANTEO DE LAS ALETAS

PI- 568+955



TITULO :REPLANTEO ALETAS P.I. 568+955. PASO DE FAUNA

ANGULO DEL EJE OX CON EL EJE DEL PORTICO. BETA = -14.016793000 g
ANCHO DE LA JUNTA ENTRE LOS HASTIALES DEL
PORTICO Y LAS ALETAS = .020000 m

ALETA NUMERO = 4 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 506916.477000
YA = 4517264.066000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 3.600000 m
ESPESOR DEL TALUD. ZONA INICIAL = .119333 m
ZONA FINAL = .080000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.600 m
ANCHO DEL 2' TACON TRASERO = 1.600 m
ANCHO DEL TACON DELANTERO = .300 m

(1)	(2)	(3)	(4)
ALETA 1	ALETA 2	ALETA 3	ALETA 4
506.916,477	506.899,363	506.880,547	506.851,639
4.517.267,651	4.517.262,772	4.517.265,983	4.517.271,263
30	30	30	30
3.60	3.10	4.00	3.60
0.1193	0.1193	0.1295	0.1295
0.08	0.07	0.085	0.08
0.11	0.11	0.11	0.11
1.60	1.35	1.60	1.35
1.60	1.35	1.60	1.35
0.3	0.3	0.3	0.3

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 506919.975
YI = 4517264.931

PUNTO C : XC = 506919.912
YC = 4517265.141

PUNTO D : XD = 506919.889
YD = 4517265.218

PUNTO E : XE = 506919.773
YE = 4517265.601

PUNTO G : XG = 506919.428
YG = 4517266.750

PUNTO K : XK = 506919.428
YK = 4517266.750

PUNTO J : XJ = 506916.454
YJ = 4517263.871

PUNTO AP: XAP = 506916.499
YAP = 4517264.073

PUNTO B : XB = 506916.507
YB = 4517264.200

PUNTO BP: XBP = 506916.529
YBP = 4517264.207

PUNTO F : XF = 506916.629
YF = 4517264.655

PUNTO H : XH = 506916.930
YH = 4517265.999

PUNTO P : XP = 506916.930
YP = 4517265.999

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I y J = 3.677 m Z_1
 $Z_A = 1011,180$ B = 3,100 C y A = 3.599 m
 $Z_B = 1010,000$ A = 0,183 C y AP = 3.576 m
 $Z_C = 1007,600$ $Z_2 = 2,608$ D y BP = 3.508 m D
 $H_1 = 3,580$ $Z_3 = \text{---}$ E y F = 3.283 m C
 $H_2 = 2,400$ E = 1,20 G y H = 2.608 m
F = $Z = 1,90$ K y P = 2.608 m Z_2, Z_3

ALETA NUMERO = 3 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 506915.385000
YA = 4517259.186000
INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 3.000000 m
ESPESOR DEL TALUD. ZONA INICIAL = .119333 m
ZONA FINAL = .070000 m
ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.350 m
ANCHO DEL 2' TACON TRASERO = 1.350 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 506917.745
YI = 4517257.327

PUNTO C : XC = 506917.592
YC = 4517257.156

PUNTO D : XD = 506917.545
YD = 4517257.103

PUNTO E : XE = 506917.280

YE = 4517256.804

PUNTO G : XG = 506916.648
YG = 4517256.095

PUNTO K : XK = 506916.648
YK = 4517256.095

PUNTO J : XJ = 506915.447
YJ = 4517259.371

PUNTO AP: XAP = 506915.402
YAP = 4517259.170

PUNTO B : XB = 506915.355
YB = 4517259.052

PUNTO BP: XBP = 506915.372
YBP = 4517259.036

PUNTO F : XF = 506915.272
YF = 4517258.590

PUNTO H : XH = 506915.035
YH = 4517257.530

PUNTO P : XP = 506915.035
YP = 4517257.530

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I y J = 3.075 m Z_1
 $Z_A = 1011,180$ B = 2,500 C y A = 2.999 m
 $Z_B = 1009,700$ A = 0,187 C y AP = 2.976 m
 $Z_C = 1007,600$ $Z_2 = 2,159$ D y BP = 2.909 m D
 $H_1 = 3,580$ $Z_3 = \text{---}$ E y F = 2.687 m C
 $H_2 = 2,100$ E = 0,95 G y H = 2.159 m
F = $Z = 1,65$ K y P = 2.159 m Z_2, Z_3

ALETA NUMERO = 2 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 506880.547000
YA = 4517266.983000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 4.000000 m
ESPESOR DEL TALUD. ZONA INICIAL = .129670 m
ZONA FINAL = .086670 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.600 m

ANCHO DEL 2' TACON TRASERO = 1.600 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 506876.669
YI = 4517265.992

PUNTO C : XC = 506876.731
YC = 4517265.788

PUNTO D : XD = 506876.756
YD = 4517265.705

PUNTO E : XE = 506876.871
YE = 4517265.322

PUNTO G : XG = 506877.217
YG = 4517264.173

PUNTO K : XK = 506877.217
YK = 4517264.173

PUNTO J : XJ = 506880.568
YJ = 4517267.166

PUNTO AP: XAP = 506880.525
YAP = 4517266.976

PUNTO B : XB = 506880.514
YB = 4517266.837

PUNTO BP: XBP = 506880.492
YBP = 4517266.830

PUNTO F : XF = 506880.392
YF = 4517266.382

PUNTO H : XH = 506880.091
YH = 4517265.039

PUNTO P : XP = 506880.091
YP = 4517265.039

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I Y J = 4.071 m Z_1
C Y A = 3.999 m
C Y AP = 3.976 m
D Y BP = 3.902 m D
E Y F = 3.677 m C
G Y H = 3.002 m
K Y P = 3.002 m Z_2, Z_3

$Z_A = 1011.490$ B = 3,500
 $Z_B = 1010.200$ A = 0.177
 $Z_C = 1007.600$ $Z_2 = 3,002$
 $H_1 = 3.890$ $Z_3 = \text{—}$
 $H_2 = 2.60$ E = 1.20
F = —
Z = 1.90

ALETA NUMERO = 4 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 506881.639000
YA = 4517271.863000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 3.600000 m
ESPESOR DEL TALUD. ZONA INICIAL = .129670 m
ZONA FINAL = .066670 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.350 m
ANCHO DEL 2' TACON TRASERO = 1.350 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 506878.836
YI = 4517274.125

PUNTO C : XC = 506878.991
YC = 4517274.300

PUNTO D : XD = 506879.035
YD = 4517274.350

PUNTO E : XE = 506879.300
YE = 4517274.649

PUNTO G : XG = 506879.931
YG = 4517275.359

PUNTO K : XK = 506879.931
YK = 4517275.359

PUNTO J : XJ = 506881.580
YJ = 4517271.690

PUNTO AP: XAP = 506881.622
YAP = 4517271.879

PUNTO B : XB = 506881.672
YB = 4517272.009

PUNTO BP: XBP = 506881.655
YBP = 4517272.024

PUNTO F : XF = 506881.754
YF = 4517272.470

PUNTO H : XH = 506881.992
YH = 4517273.530

PUNTO P : XP = 506881.992
YP = 4517273.530

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS		I Y J = 3.669 m Z_1
$Z_A = 1011.490$	$B = 3,100$	C Y A = 3.599 m
$Z_B = 1009.700$	$A = 0,181$	C Y AP = 3.576 m
$Z_C = 1007.600$	$Z_2 = 2.755$	D Y BP = 3.503 m D
$H_1 = 3.890$	$Z_3 = \text{---}$	E Y F = 3.281 m C
$H_2 = 2.000$	$E = 0.95$	G Y H = 2.755 m
	$F = \text{---}$	K Y P = 2.755 m Z_2, Z_3
	$Z = 1,65$	

REPLANTEO ALETAS P.I. 568+955. PASO DE FAUNA

-14.016793

.02

506916.477	506915.385	506880.547	506881.639
4517264.066	4517259.186	4517266.983	4517271.863
30.	30.	30.	30.
3.6	3.	4.	3.6
.119333	.119333	.12967	.12967
.08	.07	.08667	.06667
.4	.4	.4	.4
1.6	1.35	1.6	1.35
1.6	1.35	1.6	1.35
.3	.3	.3	.3

4.4.9 Paso inferior de fauna PK 570+84

4.4.9 PASO INFERIOR DE FAUNA PK 570+84

ÍNDICE

- DEFINICIÓN GEOMÉTRICA:
 - DATOS GENERALES DEL TRAZADO
 - REPLANTEO DE LOS BORDES DEL FFCC.
 - REPLANTEO DEL PÓRTICO
 - REPLANTEO DE LAS ALETAS

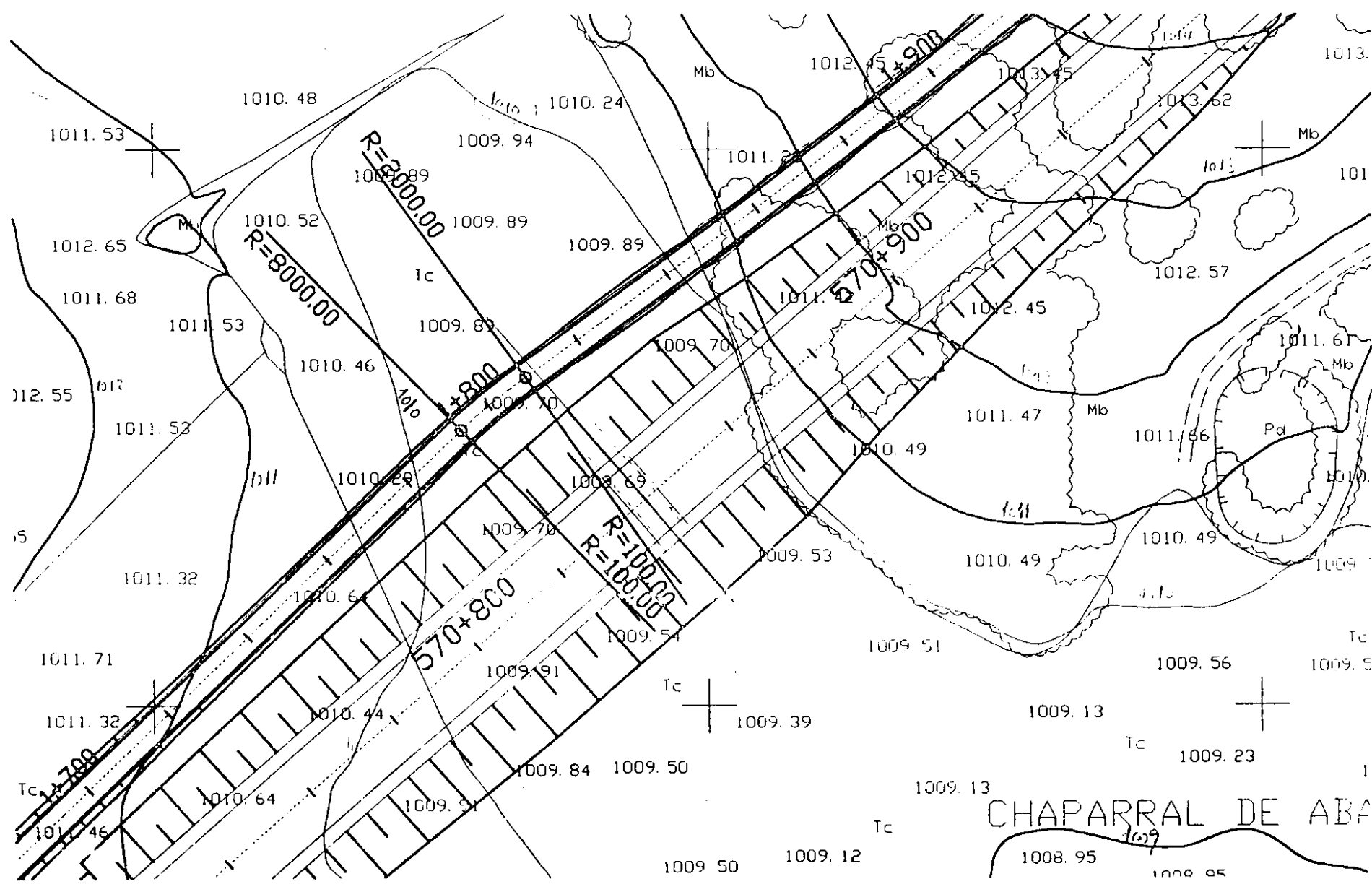
DEFINICION GEOMETICA P.F. 570+84

DATOS GENERALES DEL TRAZADO

E 1/1000

570+845

V-570+2 hasta 2+700



REPLANTEO DE LOS BORDES DEL FERROCARRIL

PI-570+840 PASO FAUNA 1000 FERROCARRIL
 69985.047 7643.876 17975.3 54.3753 1 69416.991 1017.479 -.00024558 1
 1 73004.067 1 71226.452
 2 69985.047 1.5325 2. 5.4675 1.5325 0. 1.5325 0. 1.5325 5.4675 2.
 73004.067 1.5325 2. 5.4675 1.5325 0. 1.5325 0. 1.5325 5.4675 2.
 2 69985.047 -.5 -.17796 .17796 .5
 73004.067 -.5 -.17796 .17796 .5
 7 1 0. 2 0. 3 0. 0 0. 8 0. 9 0. 10 0.
 1 0 70810. 1. 70870. 70 10 20 30 40 50 60 7
 1 0 1 70840. 10 4
 0
 0
 0
 /*
 /R

TITULO DEL TRABAJO PI-570+840 PASO FAUNA

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	70810.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	1	1	0	70810.000	8259.976	18523.980	1015.164
1	1	2	0	70810.000	8261.290	18522.472	1016.164
1	1	3	0	70810.000	8264.881	18518.349	1017.137
1	1	4	0	70810.000	8265.888	18517.194	1017.137
1	1	5	0	70810.000	8266.894	18516.038	1017.137
1	1	6	0	70810.000	8270.486	18511.916	1016.164
1	1	7	0	70810.000	8271.800	18510.408	1015.164

EJE	P.K.	AZIMUT	COS A	SEN A
0	70811.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	2	1	0	70811.000	8260.730	18524.637	1015.164
1	2	2	0	70811.000	8262.044	18523.129	1016.164
1	2	3	0	70811.000	8265.635	18519.006	1017.137
1	2	4	0	70811.000	8266.642	18517.851	1017.137
1	2	5	0	70811.000	8267.648	18516.695	1017.137
1	2	6	0	70811.000	8271.240	18512.573	1016.164
1	2	7	0	70811.000	8272.554	18511.065	1015.164

EJE	P.K.	AZIMUT	COS A	SEN A
0	70812.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	3	1	0	70812.000	8261.484	18525.293	1015.163
1	3	2	0	70812.000	8262.798	18523.785	1016.163
1	3	3	0	70812.000	8266.389	18519.663	1017.136
1	3	4	0	70812.000	8267.396	18518.508	1017.136
1	3	5	0	70812.000	8268.402	18517.352	1017.136
1	3	6	0	70812.000	8271.994	18513.230	1016.163
1	3	7	0	70812.000	8273.308	18511.722	1015.163

EJE	P.K.	AZIMUT	COS A	SEN A
0	70813.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	4	1	0	70813.000	8262.238	18525.950	1015.163
1	4	2	0	70813.000	8263.552	18524.442	1016.163
1	4	3	0	70813.000	8267.143	18520.320	1017.136
1	4	4	0	70813.000	8268.150	18519.164	1017.136
1	4	5	0	70813.000	8269.156	18518.009	1017.136
1	4	6	0	70813.000	8272.748	18513.886	1016.163
1	4	7	0	70813.000	8274.062	18512.378	1015.163

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70814.000	-45.624700	.753997	-.656878			
PO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	5	1	0	70814.000	8262.992	18526.607	1015.163
1	5	2	0	70814.000	8264.306	18525.099	1016.163
1	5	3	0	70814.000	8267.897	18520.977	1017.136
1	5	4	0	70814.000	8268.904	18519.821	1017.136
1	5	5	0	70814.000	8269.910	18518.666	1017.136
1	5	6	0	70814.000	8273.502	18514.543	1016.163
1	5	7	0	70814.000	8274.816	18513.035	1015.163

EJE	P.K.	AZIMUT	COS A	SEN A			
0	70815.000	-45.624700	.753997	-.656878			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	6	1	0	70815.000	8263.746	18527.264	1015.163
1	6	2	0	70815.000	8265.060	18525.756	1016.163
1	6	3	0	70815.000	8268.651	18521.634	1017.136
1	6	4	0	70815.000	8269.658	18520.478	1017.136
1	6	5	0	70815.000	8270.664	18519.323	1017.136
1	6	6	0	70815.000	8274.256	18515.200	1016.163
1	6	7	0	70815.000	8275.570	18513.692	1015.163

EJE	P.K.	AZIMUT	COS A	SEN A			
0	70816.000	-45.624700	.753997	-.656878			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	7	1	0	70816.000	8264.500	18527.921	1015.162
1	7	2	0	70816.000	8265.814	18526.413	1016.162
1	7	3	0	70816.000	8269.405	18522.291	1017.135
1	7	4	0	70816.000	8270.412	18521.135	1017.135
1	7	5	0	70816.000	8271.418	18519.980	1017.135
1	7	6	0	70816.000	8275.010	18515.857	1016.162
1	7	7	0	70816.000	8276.324	18514.349	1015.162

EJE	P.K.	AZIMUT	COS A	SEN A			
0	70817.000	-45.624700	.753997	-.656878			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	8	1	0	70817.000	8265.254	18528.578	1015.162
1	8	2	0	70817.000	8266.568	18527.070	1016.162
1	8	3	0	70817.000	8270.159	18522.947	1017.135
1	8	4	0	70817.000	8271.166	18521.792	1017.135
1	8	5	0	70817.000	8272.172	18520.636	1017.135
1	8	6	0	70817.000	8275.764	18516.514	1016.162
1	8	7	0	70817.000	8277.078	18515.006	1015.162

EJE	P.K.	AZIMUT	COS A	SEN A			
0	70818.000	-45.624700	.753997	-.656878			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	9	1	0	70818.000	8266.008	18529.235	1015.162
1	9	2	0	70818.000	8267.322	18527.727	1016.162
1	9	3	0	70818.000	8270.913	18523.604	1017.135
1	9	4	0	70818.000	8271.920	18522.449	1017.135

1	9	5	0	70818.000	8272.926	18521.293	1017.135
1	9	6	0	70818.000	8276.518	18517.171	1016.162
1	9	7	0	70818.000	8277.832	18515.663	1015.162
EJE	P.K.	AZIMUT	COS A	SEN A			
0	70819.000	-45.624700	.753997	-.656878			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	10	1	0	70819.000	8266.762	18529.892	1015.162
1	10	2	0	70819.000	8268.076	18528.384	1016.162
1	10	3	0	70819.000	8271.667	18524.261	1017.135
1	10	4	0	70819.000	8272.674	18523.106	1017.135
1	10	5	0	70819.000	8273.680	18521.950	1017.135
1	10	6	0	70819.000	8277.272	18517.828	1016.162
1	10	7	0	70819.000	8278.586	18516.320	1015.162
EJE	P.K.	AZIMUT	COS A	SEN A			
0	70820.000	-45.624700	.753997	-.656878			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	11	1	0	70820.000	8267.516	18530.549	1015.161
1	11	2	0	70820.000	8268.830	18529.041	1016.161
1	11	3	0	70820.000	8272.421	18524.918	1017.134
1	11	4	0	70820.000	8273.428	18523.763	1017.134
1	11	5	0	70820.000	8274.434	18522.607	1017.134
1	11	6	0	70820.000	8278.026	18518.485	1016.161
1	11	7	0	70820.000	8279.340	18516.977	1015.161
EJE	P.K.	AZIMUT	COS A	SEN A			
0	70821.000	-45.624700	.753997	-.656878			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	12	1	0	70821.000	8268.270	18531.205	1015.161
1	12	2	0	70821.000	8269.584	18529.697	1016.161
1	12	3	0	70821.000	8273.175	18525.575	1017.134
1	12	4	0	70821.000	8274.182	18524.419	1017.134
1	12	5	0	70821.000	8275.188	18523.264	1017.134
1	12	6	0	70821.000	8278.780	18519.141	1016.161
1	12	7	0	70821.000	8280.094	18517.633	1015.161
EJE	P.K.	AZIMUT	COS A	SEN A			
0	70822.000	-45.624700	.753997	-.656878			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	13	1	0	70822.000	8269.024	18531.862	1015.161
1	13	2	0	70822.000	8270.338	18530.354	1016.161
1	13	3	0	70822.000	8273.929	18526.232	1017.134
1	13	4	0	70822.000	8274.936	18525.076	1017.134
1	13	5	0	70822.000	8275.942	18523.921	1017.134
1	13	6	0	70822.000	8279.534	18519.798	1016.161
1	13	7	0	70822.000	8280.848	18518.290	1015.161
EJE	P.K.	AZIMUT	COS A	SEN A			
0	70823.000	-45.624700	.753997	-.656878			

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	14	1	0	70823.000	8269.778	18532.519	1015.161
1	14	2	0	70823.000	8271.092	18531.011	1016.161
1	14	3	0	70823.000	8274.683	18526.889	1017.134
1	14	4	0	70823.000	8275.690	18525.733	1017.134
1	14	5	0	70823.000	8276.696	18524.578	1017.134
1	14	6	0	70823.000	8280.288	18520.455	1016.161
1	14	7	0	70823.000	8281.602	18518.947	1015.161

EJE	P.K.	AZIMUT	COS A	SEN A
0	70824.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	0	70824.000	8270.532	18533.176	1015.160
1	15	2	0	70824.000	8271.846	18531.668	1016.160
1	15	3	0	70824.000	8275.437	18527.546	1017.133
1	15	4	0	70824.000	8276.444	18526.390	1017.133
1	15	5	0	70824.000	8277.450	18525.235	1017.133
1	15	6	0	70824.000	8281.042	18521.112	1016.160
1	15	7	0	70824.000	8282.356	18519.604	1015.160

JE	P.K.	AZIMUT	COS A	SEN A
0	70825.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	0	70825.000	8271.286	18533.833	1015.160
1	16	2	0	70825.000	8272.600	18532.325	1016.160
1	16	3	0	70825.000	8276.191	18528.202	1017.133
1	16	4	0	70825.000	8277.198	18527.047	1017.133
1	16	5	0	70825.000	8278.204	18525.891	1017.133
1	16	6	0	70825.000	8281.796	18521.769	1016.160
1	16	7	0	70825.000	8283.110	18520.261	1015.160

EJE	P.K.	AZIMUT	COS A	SEN A
0	70826.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	0	70826.000	8272.040	18534.490	1015.160
1	17	2	0	70826.000	8273.354	18532.982	1016.160
1	17	3	0	70826.000	8276.945	18528.859	1017.133
1	17	4	0	70826.000	8277.952	18527.704	1017.133
1	17	5	0	70826.000	8278.958	18526.548	1017.133
1	17	6	0	70826.000	8282.550	18522.426	1016.160
1	17	7	0	70826.000	8283.864	18520.918	1015.160

EJE	P.K.	AZIMUT	COS A	SEN A
0	70827.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	0	70827.000	8272.794	18535.147	1015.160
1	18	2	0	70827.000	8274.108	18533.639	1016.160
1	18	3	0	70827.000	8277.699	18529.516	1017.133
1	18	4	0	70827.000	8278.706	18528.361	1017.133
1	18	5	0	70827.000	8279.712	18527.205	1017.133
1	18	6	0	70827.000	8283.304	18523.083	1016.160
1	18	7	0	70827.000	8284.618	18521.575	1015.160

EJE	P.K.	AZIMUT	COS A	SEN A
0	70828.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	0	70828.000	8273.548	18535.804	1015.159
1	19	2	0	70828.000	8274.862	18534.296	1016.159
1	19	3	0	70828.000	8278.453	18530.173	1017.132
1	19	4	0	70828.000	8279.460	18529.018	1017.132
1	19	5	0	70828.000	8280.466	18527.862	1017.132
1	19	6	0	70828.000	8284.058	18523.740	1016.159
1	19	7	0	70828.000	8285.372	18522.232	1015.159

EJE	P.K.	AZIMUT	COS A	SEN A
0	70829.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	0	70829.000	8274.302	18536.460	1015.159
1	20	2	0	70829.000	8275.616	18534.952	1016.159
1	20	3	0	70829.000	8279.207	18530.830	1017.132
1	20	4	0	70829.000	8280.214	18529.674	1017.132
1	20	5	0	70829.000	8281.220	18528.519	1017.132
1	20	6	0	70829.000	8284.812	18524.396	1016.159
1	20	7	0	70829.000	8286.126	18522.888	1015.159

EJE	P.K.	AZIMUT	COS A	SEN A
0	70830.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	0	70830.000	8275.056	18537.117	1015.159
1	21	2	0	70830.000	8276.370	18535.609	1016.159
1	21	3	0	70830.000	8279.961	18531.487	1017.132
1	21	4	0	70830.000	8280.968	18530.331	1017.132
1	21	5	0	70830.000	8281.974	18529.176	1017.132
1	21	6	0	70830.000	8285.566	18525.053	1016.159
1	21	7	0	70830.000	8286.880	18523.545	1015.159

EJE	P.K.	AZIMUT	COS A	SEN A
0	70831.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	0	70831.000	8275.810	18537.774	1015.159
1	22	2	0	70831.000	8277.124	18536.266	1016.159
1	22	3	0	70831.000	8280.715	18532.144	1017.132
1	22	4	0	70831.000	8281.722	18530.988	1017.132
1	22	5	0	70831.000	8282.728	18529.833	1017.132
1	22	6	0	70831.000	8286.320	18525.710	1016.159
1	22	7	0	70831.000	8287.634	18524.202	1015.159

EJE	P.K.	AZIMUT	COS A	SEN A
0	70832.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	0	70832.000	8276.564	18538.431	1015.159
1	23	2	0	70832.000	8277.878	18536.923	1016.159

1	23	3	0	70832.000	8281.469	18532.801	1017.132
1	23	4	0	70832.000	8282.476	18531.645	1017.132
1	23	5	0	70832.000	8283.482	18530.490	1017.132
1	23	6	0	70832.000	8287.074	18526.367	1016.159
1	23	7	0	70832.000	8288.388	18524.859	1015.159

EJE	P.K.	AZIMUT	COS A	SEN A
0	70833.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	24	1	0	70833.000	8277.318	18539.088	1015.158
1	24	2	0	70833.000	8278.632	18537.580	1016.158
1	24	3	0	70833.000	8282.223	18533.457	1017.131
1	24	4	0	70833.000	8283.230	18532.302	1017.131
1	24	5	0	70833.000	8284.236	18531.146	1017.131
1	24	6	0	70833.000	8287.828	18527.024	1016.158
1	24	7	0	70833.000	8289.142	18525.516	1015.158

EJE	P.K.	AZIMUT	COS A	SEN A
0	70834.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	25	1	0	70834.000	8278.072	18539.745	1015.158
1	25	2	0	70834.000	8279.386	18538.237	1016.158
1	25	3	0	70834.000	8282.977	18534.114	1017.131
1	25	4	0	70834.000	8283.984	18532.959	1017.131
1	25	5	0	70834.000	8284.990	18531.803	1017.131
1	25	6	0	70834.000	8288.582	18527.681	1016.158
1	25	7	0	70834.000	8289.896	18526.173	1015.158

EJE	P.K.	AZIMUT	COS A	SEN A
0	70835.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	26	1	0	70835.000	8278.826	18540.402	1015.158
1	26	2	0	70835.000	8280.140	18538.894	1016.158
1	26	3	0	70835.000	8283.731	18534.771	1017.131
1	26	4	0	70835.000	8284.738	18533.616	1017.131
1	26	5	0	70835.000	8285.744	18532.460	1017.131
1	26	6	0	70835.000	8289.336	18528.338	1016.158
1	26	7	0	70835.000	8290.650	18526.830	1015.158

EJE	P.K.	AZIMUT	COS A	SEN A
0	70836.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	27	1	0	70836.000	8279.580	18541.059	1015.158
1	27	2	0	70836.000	8280.894	18539.551	1016.158
1	27	3	0	70836.000	8284.485	18535.428	1017.131
1	27	4	0	70836.000	8285.492	18534.273	1017.131
1	27	5	0	70836.000	8286.498	18533.117	1017.131
1	27	6	0	70836.000	8290.090	18528.995	1016.158
1	27	7	0	70836.000	8291.404	18527.487	1015.158

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70837.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	28	1	0	70837.000	8280.334	18541.715	1015.157
1	28	2	0	70837.000	8281.647	18540.207	1016.157
1	28	3	0	70837.000	8285.239	18536.085	1017.130
1	28	4	0	70837.000	8286.246	18534.929	1017.130
1	28	5	0	70837.000	8287.252	18533.774	1017.130
1	28	6	0	70837.000	8290.844	18529.652	1016.157
1	28	7	0	70837.000	8292.158	18528.144	1015.157

EJE	P.K.	AZIMUT	COS A	SEN A
0	70838.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	29	1	0	70838.000	8281.088	18542.372	1015.157
1	29	2	0	70838.000	8282.401	18540.864	1016.157
1	29	3	0	70838.000	8285.993	18536.742	1017.130
1	29	4	0	70838.000	8287.000	18535.586	1017.130
1	29	5	0	70838.000	8288.006	18534.431	1017.130
1	29	6	0	70838.000	8291.598	18530.308	1016.157
1	29	7	0	70838.000	8292.912	18528.800	1015.157

EJE	P.K.	AZIMUT	COS A	SEN A
0	70839.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	30	1	0	70839.000	8281.842	18543.029	1015.157
1	30	2	0	70839.000	8283.155	18541.521	1016.157
1	30	3	0	70839.000	8286.747	18537.399	1017.130
1	30	4	0	70839.000	8287.754	18536.243	1017.130
1	30	5	0	70839.000	8288.760	18535.088	1017.130
1	30	6	0	70839.000	8292.352	18530.965	1016.157
1	30	7	0	70839.000	8293.666	18529.457	1015.157

EJE	P.K.	AZIMUT	COS A	SEN A
0	70840.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	31	1	0	70840.000	8282.596	18543.686	1015.157
1	31	2	0	70840.000	8283.909	18542.178	1016.157
1	31	3	0	70840.000	8287.501	18538.056	1017.130
1	31	4	0	70840.000	8288.508	18536.900	1017.130
1	31	5	0	70840.000	8289.514	18535.745	1017.130
1	31	6	0	70840.000	8293.106	18531.622	1016.157
1	31	7	0	70840.000	8294.420	18530.114	1015.157

EJE	P.K.	AZIMUT	COS A	SEN A
0	70841.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	32	1	0	70841.000	8283.350	18544.343	1015.156
1	32	2	0	70841.000	8284.663	18542.835	1016.156
1	32	3	0	70841.000	8288.255	18538.712	1017.129
1	32	4	0	70841.000	8289.262	18537.557	1017.129
1	32	5	0	70841.000	8290.268	18536.401	1017.129

1	32	6	0	70841.000	8293.860	18532.279	1016.156
1	32	7	0	70841.000	8295.174	18530.771	1015.156

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70842.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	33	1	0	70842.000	8284.104	18545.000	1015.156
1	33	2	0	70842.000	8285.417	18543.492	1016.156
1	33	3	0	70842.000	8289.009	18539.369	1017.129
1	33	4	0	70842.000	8290.016	18538.214	1017.129
1	33	5	0	70842.000	8291.022	18537.058	1017.129
1	33	6	0	70842.000	8294.614	18532.936	1016.156
1	33	7	0	70842.000	8295.928	18531.428	1015.156

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70843.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	34	1	0	70843.000	8284.858	18545.657	1015.156
1	34	2	0	70843.000	8286.171	18544.149	1016.156
1	34	3	0	70843.000	8289.763	18540.026	1017.129
1	34	4	0	70843.000	8290.770	18538.871	1017.129
1	34	5	0	70843.000	8291.776	18537.715	1017.129
1	34	6	0	70843.000	8295.368	18533.593	1016.156
1	34	7	0	70843.000	8296.682	18532.085	1015.156

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70844.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	35	1	0	70844.000	8285.612	18546.314	1015.156
1	35	2	0	70844.000	8286.925	18544.806	1016.156
1	35	3	0	70844.000	8290.517	18540.683	1017.129
1	35	4	0	70844.000	8291.524	18539.528	1017.129
1	35	5	0	70844.000	8292.530	18538.372	1017.129
1	35	6	0	70844.000	8296.122	18534.250	1016.156
1	35	7	0	70844.000	8297.436	18532.742	1015.156

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70845.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	36	1	0	70845.000	8286.366	18546.970	1015.155
1	36	2	0	70845.000	8287.679	18545.462	1016.155
1	36	3	0	70845.000	8291.271	18541.340	1017.128
1	36	4	0	70845.000	8292.278	18540.185	1017.128
1	36	5	0	70845.000	8293.284	18539.029	1017.128
1	36	6	0	70845.000	8296.876	18534.907	1016.155
1	36	7	0	70845.000	8298.190	18533.399	1015.155

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70846.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
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1	37	1	0	70846.000	8287.120	18547.627	1015.155
1	37	2	0	70846.000	8288.433	18546.119	1016.155
1	37	3	0	70846.000	8292.025	18541.997	1017.128
1	37	4	0	70846.000	8293.032	18540.841	1017.128
1	37	5	0	70846.000	8294.038	18539.686	1017.128
1	37	6	0	70846.000	8297.630	18535.563	1016.155
1	37	7	0	70846.000	8298.944	18534.055	1015.155

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70847.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	38	1	0	70847.000	8287.874	18548.284	1015.155
1	38	2	0	70847.000	8289.187	18546.776	1016.155
1	38	3	0	70847.000	8292.779	18542.654	1017.128
1	38	4	0	70847.000	8293.786	18541.498	1017.128
1	38	5	0	70847.000	8294.792	18540.343	1017.128
1	38	6	0	70847.000	8298.384	18536.220	1016.155
1	38	7	0	70847.000	8299.698	18534.712	1015.155

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70848.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	39	1	0	70848.000	8288.628	18548.941	1015.155
1	39	2	0	70848.000	8289.941	18547.433	1016.155
1	39	3	0	70848.000	8293.533	18543.311	1017.128
1	39	4	0	70848.000	8294.540	18542.155	1017.128
1	39	5	0	70848.000	8295.546	18541.000	1017.128
1	39	6	0	70848.000	8299.138	18536.877	1016.155
1	39	7	0	70848.000	8300.452	18535.369	1015.155

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70849.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	40	1	0	70849.000	8289.382	18549.598	1015.154
1	40	2	0	70849.000	8290.695	18548.090	1016.154
1	40	3	0	70849.000	8294.287	18543.968	1017.127
1	40	4	0	70849.000	8295.294	18542.812	1017.127
1	40	5	0	70849.000	8296.300	18541.657	1017.127
1	40	6	0	70849.000	8299.892	18537.534	1016.154
1	40	7	0	70849.000	8301.206	18536.026	1015.154

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70850.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	41	1	0	70850.000	8290.136	18550.255	1015.154
1	41	2	0	70850.000	8291.449	18548.747	1016.154
1	41	3	0	70850.000	8295.041	18544.624	1017.127
1	41	4	0	70850.000	8296.048	18543.469	1017.127
1	41	5	0	70850.000	8297.054	18542.313	1017.127
1	41	6	0	70850.000	8300.646	18538.191	1016.154
1	41	7	0	70850.000	8301.960	18536.683	1015.154

EJE	P.K.	AZIMUT	COS A	SEN A
0	70851.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	42	1	0	70851.000	8290.890	18550.912	1015.154
1	42	2	0	70851.000	8292.203	18549.404	1016.154
1	42	3	0	70851.000	8295.795	18545.281	1017.127
1	42	4	0	70851.000	8296.802	18544.126	1017.127
1	42	5	0	70851.000	8297.808	18542.970	1017.127
1	42	6	0	70851.000	8301.400	18538.848	1016.154
1	42	7	0	70851.000	8302.714	18537.340	1015.154

EJE	P.K.	AZIMUT	COS A	SEN A
0	70852.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	43	1	0	70852.000	8291.644	18551.569	1015.154
1	43	2	0	70852.000	8292.957	18550.061	1016.154
1	43	3	0	70852.000	8296.549	18545.938	1017.127
1	43	4	0	70852.000	8297.556	18544.783	1017.127
1	43	5	0	70852.000	8298.562	18543.627	1017.127
1	43	6	0	70852.000	8302.154	18539.505	1016.154
1	43	7	0	70852.000	8303.467	18537.997	1015.154

EJE	P.K.	AZIMUT	COS A	SEN A
0	70853.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	44	1	0	70853.000	8292.398	18552.226	1015.153
1	44	2	0	70853.000	8293.711	18550.718	1016.153
1	44	3	0	70853.000	8297.303	18546.595	1017.126
1	44	4	0	70853.000	8298.310	18545.440	1017.126
1	44	5	0	70853.000	8299.316	18544.284	1017.126
1	44	6	0	70853.000	8302.908	18540.162	1016.153
1	44	7	0	70853.000	8304.221	18538.654	1015.153

EJE	P.K.	AZIMUT	COS A	SEN A
0	70854.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	45	1	0	70854.000	8293.152	18552.882	1015.153
1	45	2	0	70854.000	8294.465	18551.374	1016.153
1	45	3	0	70854.000	8298.057	18547.252	1017.126
1	45	4	0	70854.000	8299.064	18546.096	1017.126
1	45	5	0	70854.000	8300.070	18544.941	1017.126
1	45	6	0	70854.000	8303.662	18540.818	1016.153
1	45	7	0	70854.000	8304.975	18539.310	1015.153

EJE	P.K.	AZIMUT	COS A	SEN A
0	70855.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	46	1	0	70855.000	8293.906	18553.539	1015.153
1	46	2	0	70855.000	8295.219	18552.031	1016.153
1	46	3	0	70855.000	8298.811	18547.909	1017.126

1	46	4	0	70855.000	8299.818	18546.753	1017.126
1	46	5	0	70855.000	8300.824	18545.598	1017.126
1	46	6	0	70855.000	8304.416	18541.475	1016.153
1	46	7	0	70855.000	8305.729	18539.967	1015.153

EJE	P.K.	AZIMUT	COS A	SEN A
0	70856.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	47	1	0	70856.000	8294.660	18554.196	1015.153
1	47	2	0	70856.000	8295.973	18552.688	1016.153
1	47	3	0	70856.000	8299.565	18548.566	1017.126
1	47	4	0	70856.000	8300.572	18547.410	1017.126
1	47	5	0	70856.000	8301.578	18546.255	1017.126
1	47	6	0	70856.000	8305.170	18542.132	1016.153
1	47	7	0	70856.000	8306.483	18540.624	1015.153

EJE	P.K.	AZIMUT	COS A	SEN A
0	70857.000	-45.624700	.753997	-.656878

PO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	48	1	0	70857.000	8295.414	18554.853	1015.152
1	48	2	0	70857.000	8296.727	18553.345	1016.152
1	48	3	0	70857.000	8300.319	18549.223	1017.125
1	48	4	0	70857.000	8301.326	18548.067	1017.125
1	48	5	0	70857.000	8302.332	18546.912	1017.125
1	48	6	0	70857.000	8305.924	18542.789	1016.152
1	48	7	0	70857.000	8307.237	18541.281	1015.152

EJE	P.K.	AZIMUT	COS A	SEN A
0	70858.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	49	1	0	70858.000	8296.168	18555.510	1015.152
1	49	2	0	70858.000	8297.481	18554.002	1016.152
1	49	3	0	70858.000	8301.073	18549.879	1017.125
1	49	4	0	70858.000	8302.080	18548.724	1017.125
1	49	5	0	70858.000	8303.086	18547.568	1017.125
1	49	6	0	70858.000	8306.678	18543.446	1016.152
1	49	7	0	70858.000	8307.991	18541.938	1015.152

EJE	P.K.	AZIMUT	COS A	SEN A
0	70859.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K.	X	Y	Z
1	50	1	0	70859.000	8296.922	18556.167	1015.152
1	50	2	0	70859.000	8298.235	18554.659	1016.152
1	50	3	0	70859.000	8301.827	18550.536	1017.125
1	50	4	0	70859.000	8302.834	18549.381	1017.125
1	50	5	0	70859.000	8303.840	18548.225	1017.125
1	50	6	0	70859.000	8307.432	18544.103	1016.152
1	50	7	0	70859.000	8308.745	18542.595	1015.152

EJE	P.K.	AZIMUT	COS A	SEN A
0	70860.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	51	1	0	70860.000	8297.676	18556.824	1015.152
1	51	2	0	70860.000	8298.989	18555.316	1016.152
1	51	3	0	70860.000	8302.581	18551.193	1017.125
1	51	4	0	70860.000	8303.588	18550.038	1017.125
1	51	5	0	70860.000	8304.594	18548.882	1017.125
1	51	6	0	70860.000	8308.186	18544.760	1016.152
1	51	7	0	70860.000	8309.499	18543.252	1015.152

EJE	P.K.	AZIMUT	COS A	SEN A
0	70861.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	52	1	0	70861.000	8298.430	18557.481	1015.151
1	52	2	0	70861.000	8299.743	18555.973	1016.151
1	52	3	0	70861.000	8303.335	18551.850	1017.124
1	52	4	0	70861.000	8304.342	18550.695	1017.124
1	52	5	0	70861.000	8305.348	18549.539	1017.124
1	52	6	0	70861.000	8308.940	18545.417	1016.151
1	52	7	0	70861.000	8310.253	18543.909	1015.151

EJE	P.K.	AZIMUT	COS A	SEN A
0	70862.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	53	1	0	70862.000	8299.184	18558.137	1015.151
1	53	2	0	70862.000	8300.497	18556.629	1016.151
1	53	3	0	70862.000	8304.089	18552.507	1017.124
1	53	4	0	70862.000	8305.096	18551.351	1017.124
1	53	5	0	70862.000	8306.102	18550.196	1017.124
1	53	6	0	70862.000	8309.694	18546.073	1016.151
1	53	7	0	70862.000	8311.007	18544.565	1015.151

EJE	P.K.	AZIMUT	COS A	SEN A
0	70863.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	54	1	0	70863.000	8299.938	18558.794	1015.151
1	54	2	0	70863.000	8301.251	18557.286	1016.151
1	54	3	0	70863.000	8304.843	18553.164	1017.124
1	54	4	0	70863.000	8305.850	18552.008	1017.124
1	54	5	0	70863.000	8306.856	18550.853	1017.124
1	54	6	0	70863.000	8310.448	18546.730	1016.151
1	54	7	0	70863.000	8311.761	18545.222	1015.151

EJE	P.K.	AZIMUT	COS A	SEN A
0	70864.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	55	1	0	70864.000	8300.692	18559.451	1015.151
1	55	2	0	70864.000	8302.005	18557.943	1016.151
1	55	3	0	70864.000	8305.597	18553.821	1017.124
1	55	4	0	70864.000	8306.604	18552.665	1017.124
1	55	5	0	70864.000	8307.610	18551.510	1017.124
1	55	6	0	70864.000	8311.202	18547.387	1016.151

1	55	7	0	70864.000	8312.515	18545.879	1015.151
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EJE	P.K.	AZIMUT	COS A	SEN A
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0	70865.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	56	1	0	70865.000	8301.446	18560.108	1015.150
1	56	2	0	70865.000	8302.759	18558.600	1016.150
1	56	3	0	70865.000	8306.351	18554.478	1017.123
1	56	4	0	70865.000	8307.358	18553.322	1017.123
1	56	5	0	70865.000	8308.364	18552.167	1017.123
1	56	6	0	70865.000	8311.956	18548.044	1016.150
1	56	7	0	70865.000	8313.269	18546.536	1015.150

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70866.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	57	1	0	70866.000	8302.200	18560.765	1015.150
1	57	2	0	70866.000	8303.513	18559.257	1016.150
1	57	3	0	70866.000	8307.105	18555.134	1017.123
1	57	4	0	70866.000	8308.112	18553.979	1017.123
1	57	5	0	70866.000	8309.118	18552.823	1017.123
1	57	6	0	70866.000	8312.710	18548.701	1016.150
1	57	7	0	70866.000	8314.023	18547.193	1015.150

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70867.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	58	1	0	70867.000	8302.954	18561.422	1015.150
1	58	2	0	70867.000	8304.267	18559.914	1016.150
1	58	3	0	70867.000	8307.859	18555.791	1017.123
1	58	4	0	70867.000	8308.866	18554.636	1017.123
1	58	5	0	70867.000	8309.872	18553.480	1017.123
1	58	6	0	70867.000	8313.464	18549.358	1016.150
1	58	7	0	70867.000	8314.777	18547.850	1015.150

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70868.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	59	1	0	70868.000	8303.708	18562.079	1015.150
1	59	2	0	70868.000	8305.021	18560.571	1016.150
1	59	3	0	70868.000	8308.613	18556.448	1017.123
1	59	4	0	70868.000	8309.620	18555.293	1017.123
1	59	5	0	70868.000	8310.626	18554.137	1017.123
1	59	6	0	70868.000	8314.218	18550.015	1016.150
1	59	7	0	70868.000	8315.531	18548.507	1015.150

EJE	P.K.	AZIMUT	COS A	SEN A
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0	70869.000	-45.624700	.753997	-.656878
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	60	1	0	70869.000	8304.462	18562.736	1015.149

1	60	2	0	70869.000	8305.775	18561.228	1016.149
1	60	3	0	70869.000	8309.367	18557.105	1017.122
1	60	4	0	70869.000	8310.374	18555.950	1017.122
1	60	5	0	70869.000	8311.380	18554.794	1017.122
1	60	6	0	70869.000	8314.972	18550.672	1016.149
1	60	7	0	70869.000	8316.285	18549.164	1015.149

EJE	P.K.	AZIMUT	COS A	SEN A
0	70870.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	61	1	0	70870.000	8305.216	18563.392	1015.149
1	61	2	0	70870.000	8306.529	18561.884	1016.149
1	61	3	0	70870.000	8310.121	18557.762	1017.122
1	61	4	0	70870.000	8311.128	18556.606	1017.122
1	61	5	0	70870.000	8312.134	18555.451	1017.122
1	61	6	0	70870.000	8315.726	18551.328	1016.149
1	61	7	0	70870.000	8317.039	18549.820	1015.149

EGUNDA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
0	70840.000	-45.624700	.753997	-.656878

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	4	0	70840.000	8288.508	18536.900	1017.130

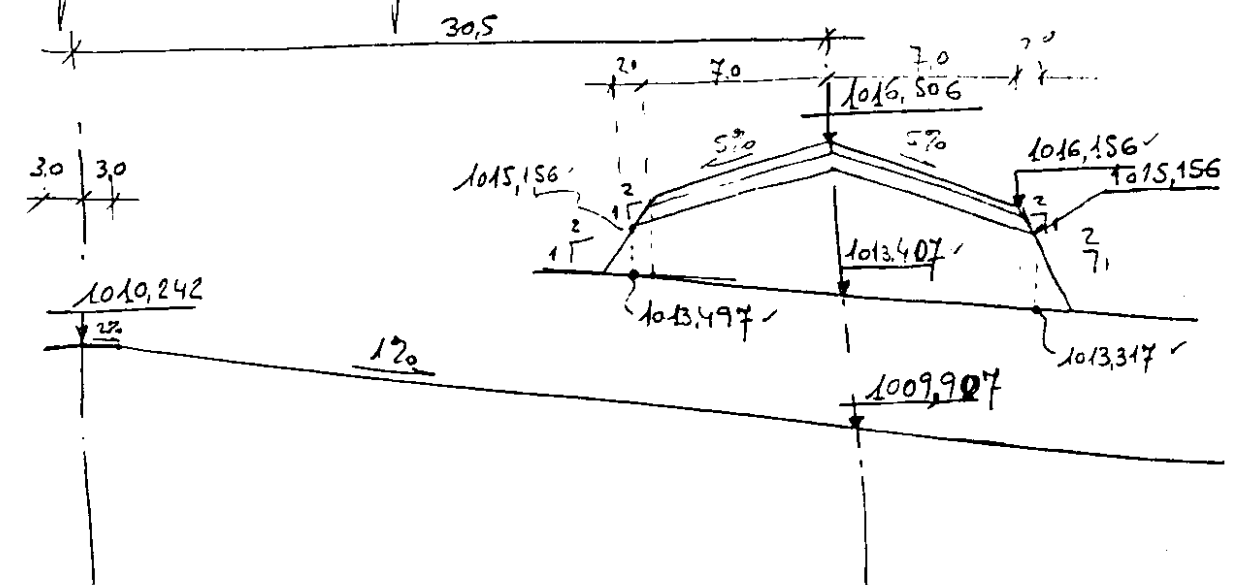
REPLANTEO DEL PORTICO

PI - 570+840 (en recta)

$$\left\{ \begin{array}{l} \text{Cota Ferrocarril} \longrightarrow 1017,129' - 0,623 = 1016,506' \\ \text{Cota terreno} \longrightarrow 1009,15 \end{array} \right.$$

$$\left\{ \begin{array}{l} \text{Cota Variante (V-570+2)} \longrightarrow 1010,436 - \frac{16,634}{1810,5-1793,866} \times 0,02 + \\ \text{en PK-1,810,5} \quad + 16,634^2 \frac{1}{2 \times 1000} = 1010,242' \\ \text{Cota terreno} \longrightarrow \approx \underline{1009,837} \end{array} \right.$$

Separación de ejes 30,5 m.



Δ cota por la pte. long. del F.C.

$$3 \times 0,00024558 = 0,00074 \text{ (no afecta)}$$

Extremo superior

$$N = 1015,156 - 1013,497 - 0,17 = 1,489'$$

$$\begin{array}{l} t_{\beta} = 0,5 \\ t_{\alpha} = 0,01 \end{array}$$

$$L = \frac{N}{t_{\beta} + t_{\alpha}} = \frac{1,489}{0,51} = 2,9196'$$

$$M = 2,9196 + 0,4 + 0,41 = 3,73' \longrightarrow \boxed{3,75}$$

$$\nabla_s = 1013,497 + 3,75 \times 0,01 = \underline{1013,534'}$$

Extremo inferior

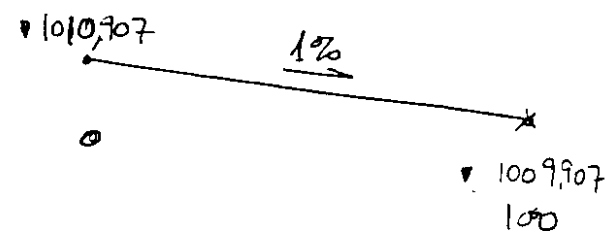
$$N = 1015,156 - 1013,317 - 0,17 = 1,669'$$

$$L = \frac{N}{t_{\beta} - t_{\alpha}} = \frac{1,669}{0,49} = 3,406'$$

$$M = 3,406 + 0,4 + 0,41 = 4,216' \longrightarrow \boxed{4,25}$$

Hand-drawn graph showing a line with a negative slope. The line intersects the x-axis at 54,375.3 and the y-axis at 100. A point on the line is labeled with coordinates $x = 508.288$ and $y = 4518.536$, and is associated with the value PK 70840. The x-axis is labeled F.C.

$$\left\{ \begin{aligned} X_0 &= 508.288,508 - \frac{PK=100}{100 \cos \alpha} = 508.222.820 \\ Y_0 &= 4.518.536,9 + 100 \sin \alpha = 4.518.612,300 \end{aligned} \right.$$



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PI-570+840 PASO FAUNA
69985.047 7643.876 17975.3 54.3753 1 69416.991 1017.479 -.00024558 1
1 73004.067 1 71226.452
2 69985.047 1.5325 2. 5.4675 1.5325 0. 1.5325 0. 1.5325 5.4675 2.
73004.067 1.5325 2. 5.4675 1.5325 0. 1.5325 0. 1.5325 5.4675 2.
2 69985.047 -.5 -.17796 .17796 .5
73004.067 -.5 -.17796 .17796 .5
7 1 0. 2 0. 3 0. 0 0. 8 0. 9 0. 10 0.
PASO FAUNA
0. 8222.82 18612.3 154.3753 1 0. 1010.907 -.01 1
1 150. 1 150.
2 0. 0.5 2.5 2.5 0.5
150. 0.5 2.5 2.5 0.5
2 0.
150.
5 1 0. 2 0. 3 0. 9 0. 10 0.
1 40 3
1 3 80. 1. 120. 53 13 23 33 43 5
0
0
0
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TITULO DEL TRABAJO PI-570+840 PASO FAUNA

SEXTA PARTE = INTERSECCION DE EJES

CVA.	EJE	CVA.	EJE	PK.E	PK.3	X	Y	ZE	Z3
4	0	3	3	70840.000	100.000	8288.508	18536.900	1017.130	1009.907
				AZ.E	AZ.3				
				54.375300	154.375300				

PRIMERA PARTE = SECCIONES NORMALES

EJE	P.K.	AZIMUT	COS A	SEN A
3	80.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	1	1	3	80.000	8277.632	18553.951	1010.107
1	1	2	3	80.000	8277.255	18553.622	1010.107
1	1	3	3	80.000	8275.370	18551.980	1010.107
1	1	4	3	80.000	8273.485	18550.338	1010.107
1	1	5	3	80.000	8273.108	18550.010	1010.107

EJE	P.K.	AZIMUT	COS A	SEN A
3	81.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	2	1	3	81.000	8278.289	18553.197	1010.097
1	2	2	3	81.000	8277.912	18552.868	1010.097
1	2	3	3	81.000	8276.027	18551.226	1010.097
1	2	4	3	81.000	8274.142	18549.584	1010.097
1	2	5	3	81.000	8273.765	18549.256	1010.097

EJE	P.K.	AZIMUT	COS A	SEN A
3	82.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	3	1	3	82.000	8278.946	18552.443	1010.087
1	3	2	3	82.000	8278.569	18552.114	1010.087
1	3	3	3	82.000	8276.684	18550.472	1010.087
1	3	4	3	82.000	8274.799	18548.830	1010.087
1	3	5	3	82.000	8274.422	18548.502	1010.087

EJE	P.K.	AZIMUT	COS A	SEN A
3	83.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	4	1	3	83.000	8279.603	18551.689	1010.077
1	4	2	3	83.000	8279.226	18551.360	1010.077
1	4	3	3	83.000	8277.341	18549.718	1010.077
1	4	4	3	83.000	8275.456	18548.076	1010.077
1	4	5	3	83.000	8275.079	18547.748	1010.077

EJE	P.K.	AZIMUT	COS A	SEN A
3	84.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	5	1	3	84.000	8280.260	18550.935	1010.067
1	5	2	3	84.000	8279.883	18550.606	1010.067
1	5	3	3	84.000	8277.998	18548.964	1010.067
1	5	4	3	84.000	8276.113	18547.322	1010.067
1	5	5	3	84.000	8275.736	18546.994	1010.067

EJE	P.K.	AZIMUT	COS A	SEN A
3	85.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	6	1	3	85.000	8280.917	18550.181	1010.057
1	6	2	3	85.000	8280.540	18549.852	1010.057
1	6	3	3	85.000	8278.655	18548.210	1010.057
1	6	4	3	85.000	8276.770	18546.568	1010.057
1	6	5	3	85.000	8276.393	18546.240	1010.057

EJE	P.K.	AZIMUT	COS A	SEN A
3	86.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	7	1	3	86.000	8281.574	18549.427	1010.047
1	7	2	3	86.000	8281.197	18549.098	1010.047
1	7	3	3	86.000	8279.312	18547.456	1010.047
1	7	4	3	86.000	8277.427	18545.814	1010.047
1	7	5	3	86.000	8277.050	18545.486	1010.047

EJE	P.K.	AZIMUT	COS A	SEN A
3	87.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	8	1	3	87.000	8282.230	18548.673	1010.037
1	8	2	3	87.000	8281.853	18548.344	1010.037
1	8	3	3	87.000	8279.968	18546.702	1010.037
1	8	4	3	87.000	8278.083	18545.060	1010.037
1	8	5	3	87.000	8277.706	18544.732	1010.037

EJE	P.K.	AZIMUT	COS A	SEN A
3	88.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	9	1	3	88.000	8282.887	18547.919	1010.027
1	9	2	3	88.000	8282.510	18547.590	1010.027
1	9	3	3	88.000	8280.625	18545.948	1010.027
1	9	4	3	88.000	8278.740	18544.306	1010.027
1	9	5	3	88.000	8278.363	18543.978	1010.027

EJE	P.K.	AZIMUT	COS A	SEN A
3	89.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	10	1	3	89.000	8283.544	18547.165	1010.017
1	10	2	3	89.000	8283.167	18546.837	1010.017
1	10	3	3	89.000	8281.282	18545.194	1010.017
1	10	4	3	89.000	8279.397	18543.552	1010.017
1	10	5	3	89.000	8279.020	18543.224	1010.017

EJE	P.K.	AZIMUT	COS A	SEN A
3	90.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	11	1	3	90.000	8284.201	18546.411	1010.007
1	11	2	3	90.000	8283.824	18546.083	1010.007
1	11	3	3	90.000	8281.939	18544.440	1010.007
1	11	4	3	90.000	8280.054	18542.798	1010.007
1	11	5	3	90.000	8279.677	18542.470	1010.007

EJE	P.K.	AZIMUT	COS A	SEN A
3	91.000	54.375300	.656878	.753997

PO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	12	1	3	91.000	8284.858	18545.657	1009.997
1	12	2	3	91.000	8284.481	18545.329	1009.997
1	12	3	3	91.000	8282.596	18543.686	1009.997
1	12	4	3	91.000	8280.711	18542.044	1009.997
1	12	5	3	91.000	8280.334	18541.716	1009.997

EJE	P.K.	AZIMUT	COS A	SEN A
3	92.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	13	1	3	92.000	8285.515	18544.903	1009.987
1	13	2	3	92.000	8285.138	18544.575	1009.987
1	13	3	3	92.000	8283.253	18542.932	1009.987
1	13	4	3	92.000	8281.368	18541.290	1009.987
1	13	5	3	92.000	8280.991	18540.962	1009.987

EJE	P.K.	AZIMUT	COS A	SEN A
3	93.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	14	1	3	93.000	8286.172	18544.149	1009.977
1	14	2	3	93.000	8285.795	18543.821	1009.977
1	14	3	3	93.000	8283.910	18542.178	1009.977
1	14	4	3	93.000	8282.025	18540.536	1009.977
1	14	5	3	93.000	8281.648	18540.208	1009.977

EJE	P.K.	AZIMUT	COS A	SEN A
3	94.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	15	1	3	94.000	8286.829	18543.395	1009.967
1	15	2	3	94.000	8286.452	18543.067	1009.967
1	15	3	3	94.000	8284.567	18541.424	1009.967
1	15	4	3	94.000	8282.682	18539.782	1009.967

1	15	5	3	94.000	8282.305	18539.454	1009.967
EJE	P.K.	AZIMUT	COS A	SEN A			
3	95.000	54.375300	.656878	.753997			

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	16	1	3	95.000	8287.485	18542.641	1009.957
1	16	2	3	95.000	8287.108	18542.313	1009.957
1	16	3	3	95.000	8285.223	18540.670	1009.957
1	16	4	3	95.000	8283.338	18539.028	1009.957
1	16	5	3	95.000	8282.961	18538.700	1009.957

EJE	P.K.	AZIMUT	COS A	SEN A
3	96.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	17	1	3	96.000	8288.142	18541.887	1009.947
1	17	2	3	96.000	8287.765	18541.559	1009.947
1	17	3	3	96.000	8285.880	18539.916	1009.947
1	17	4	3	96.000	8283.995	18538.274	1009.947
1	17	5	3	96.000	8283.618	18537.946	1009.947

EJE	P.K.	AZIMUT	COS A	SEN A
3	97.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	18	1	3	97.000	8288.799	18541.133	1009.937
1	18	2	3	97.000	8288.422	18540.805	1009.937
1	18	3	3	97.000	8286.537	18539.162	1009.937
1	18	4	3	97.000	8284.652	18537.520	1009.937
1	18	5	3	97.000	8284.275	18537.192	1009.937

EJE	P.K.	AZIMUT	COS A	SEN A
3	98.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	19	1	3	98.000	8289.456	18540.379	1009.927
1	19	2	3	98.000	8289.079	18540.051	1009.927
1	19	3	3	98.000	8287.194	18538.408	1009.927
1	19	4	3	98.000	8285.309	18536.766	1009.927
1	19	5	3	98.000	8284.932	18536.438	1009.927

EJE	P.K.	AZIMUT	COS A	SEN A
3	99.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	20	1	3	99.000	8290.113	18539.625	1009.917
1	20	2	3	99.000	8289.736	18539.297	1009.917
1	20	3	3	99.000	8287.851	18537.654	1009.917
1	20	4	3	99.000	8285.966	18536.012	1009.917
1	20	5	3	99.000	8285.589	18535.684	1009.917

EJE	P.K.	AZIMUT	COS A	SEN A
3	100.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	21	1	3	100.000	8290.770	18538.871	1009.907
1	21	2	3	100.000	8290.393	18538.543	1009.907
1	21	3	3	100.000	8288.508	18536.900	1009.907
1	21	4	3	100.000	8286.623	18535.258	1009.907
1	21	5	3	100.000	8286.246	18534.930	1009.907

EJE	P.K.	AZIMUT	COS A	SEN A
3	101.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	22	1	3	101.000	8291.427	18538.117	1009.897
1	22	2	3	101.000	8291.050	18537.789	1009.897
1	22	3	3	101.000	8289.165	18536.146	1009.897
1	22	4	3	101.000	8287.280	18534.504	1009.897
1	22	5	3	101.000	8286.903	18534.176	1009.897

EJE	P.K.	AZIMUT	COS A	SEN A
3	102.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	23	1	3	102.000	8292.084	18537.363	1009.887
1	23	2	3	102.000	8291.707	18537.035	1009.887
1	23	3	3	102.000	8289.822	18535.392	1009.887
1	23	4	3	102.000	8287.937	18533.750	1009.887
1	23	5	3	102.000	8287.560	18533.422	1009.887

EJE	P.K.	AZIMUT	COS A	SEN A
3	103.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	24	1	3	103.000	8292.740	18536.609	1009.877
1	24	2	3	103.000	8292.363	18536.281	1009.877
1	24	3	3	103.000	8290.478	18534.638	1009.877
1	24	4	3	103.000	8288.593	18532.996	1009.877
1	24	5	3	103.000	8288.216	18532.668	1009.877

EJE	P.K.	AZIMUT	COS A	SEN A
3	104.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	25	1	3	104.000	8293.397	18535.855	1009.867
1	25	2	3	104.000	8293.020	18535.527	1009.867
1	25	3	3	104.000	8291.135	18533.884	1009.867
1	25	4	3	104.000	8289.250	18532.242	1009.867
1	25	5	3	104.000	8288.873	18531.914	1009.867

EJE	P.K.	AZIMUT	COS A	SEN A
3	105.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	26	1	3	105.000	8294.054	18535.101	1009.857
1	26	2	3	105.000	8293.677	18534.773	1009.857
1	26	3	3	105.000	8291.792	18533.130	1009.857

1	26	4	3	105.000	8289.907	18531.488	1009.857
1	26	5	3	105.000	8289.530	18531.160	1009.857

EJE	P.K.	AZIMUT	COS A	SEN A
3	106.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	27	1	3	106.000	8294.711	18534.347	1009.847
1	27	2	3	106.000	8294.334	18534.019	1009.847
1	27	3	3	106.000	8292.449	18532.376	1009.847
1	27	4	3	106.000	8290.564	18530.734	1009.847
1	27	5	3	106.000	8290.187	18530.406	1009.847

EJE	P.K.	AZIMUT	COS A	SEN A
3	107.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	28	1	3	107.000	8295.368	18533.593	1009.837
1	28	2	3	107.000	8294.991	18533.265	1009.837
1	28	3	3	107.000	8293.106	18531.622	1009.837
1	28	4	3	107.000	8291.221	18529.980	1009.837
1	28	5	3	107.000	8290.844	18529.652	1009.837

EJE	P.K.	AZIMUT	COS A	SEN A
3	108.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	29	1	3	108.000	8296.025	18532.839	1009.827
1	29	2	3	108.000	8295.648	18532.511	1009.827
1	29	3	3	108.000	8293.763	18530.868	1009.827
1	29	4	3	108.000	8291.878	18529.226	1009.827
1	29	5	3	108.000	8291.501	18528.898	1009.827

EJE	P.K.	AZIMUT	COS A	SEN A
3	109.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	30	1	3	109.000	8296.682	18532.085	1009.817
1	30	2	3	109.000	8296.305	18531.757	1009.817
1	30	3	3	109.000	8294.420	18530.114	1009.817
1	30	4	3	109.000	8292.535	18528.472	1009.817
1	30	5	3	109.000	8292.158	18528.144	1009.817

EJE	P.K.	AZIMUT	COS A	SEN A
3	110.000	54.375300	.656878	.753997

GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	31	1	3	110.000	8297.339	18531.331	1009.807
1	31	2	3	110.000	8296.962	18531.003	1009.807
1	31	3	3	110.000	8295.077	18529.360	1009.807
1	31	4	3	110.000	8293.192	18527.718	1009.807
1	31	5	3	110.000	8292.815	18527.390	1009.807

EJE	P.K.	AZIMUT	COS A	SEN A
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3	111.000	54.375300	.656878	.753997			
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	32	1	3	111.000	8297.995	18530.577	1009.797
1	32	2	3	111.000	8297.618	18530.249	1009.797
1	32	3	3	111.000	8295.733	18528.606	1009.797
1	32	4	3	111.000	8293.849	18526.964	1009.797
1	32	5	3	111.000	8293.472	18526.636	1009.797

EJE	P.K.	AZIMUT	COS A	SEN A
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3	112.000	54.375300	.656878	.753997
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	33	1	3	112.000	8298.652	18529.823	1009.787
1	33	2	3	112.000	8298.275	18529.495	1009.787
1	33	3	3	112.000	8296.390	18527.852	1009.787
1	33	4	3	112.000	8294.505	18526.210	1009.787
1	33	5	3	112.000	8294.128	18525.882	1009.787

EJE	P.K.	AZIMUT	COS A	SEN A
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3	113.000	54.375300	.656878	.753997
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	34	1	3	113.000	8299.309	18529.069	1009.777
1	34	2	3	113.000	8298.932	18528.741	1009.777
1	34	3	3	113.000	8297.047	18527.098	1009.777
1	34	4	3	113.000	8295.162	18525.456	1009.777
1	34	5	3	113.000	8294.785	18525.128	1009.777

EJE	P.K.	AZIMUT	COS A	SEN A
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3	114.000	54.375300	.656878	.753997
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	35	1	3	114.000	8299.966	18528.315	1009.767
1	35	2	3	114.000	8299.589	18527.987	1009.767
1	35	3	3	114.000	8297.704	18526.344	1009.767
1	35	4	3	114.000	8295.819	18524.702	1009.767
1	35	5	3	114.000	8295.442	18524.374	1009.767

EJE	P.K.	AZIMUT	COS A	SEN A
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3	115.000	54.375300	.656878	.753997
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	36	1	3	115.000	8300.623	18527.561	1009.757
1	36	2	3	115.000	8300.246	18527.233	1009.757
1	36	3	3	115.000	8298.361	18525.590	1009.757
1	36	4	3	115.000	8296.476	18523.948	1009.757
1	36	5	3	115.000	8296.099	18523.620	1009.757

EJE	P.K.	AZIMUT	COS A	SEN A
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3	116.000	54.375300	.656878	.753997
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	37	1	3	116.000	8301.280	18526.807	1009.747
1	37	2	3	116.000	8300.903	18526.479	1009.747

1	37	3	3	116.000	8299.018	18524.836	1009.747
1	37	4	3	116.000	8297.133	18523.194	1009.747
1	37	5	3	116.000	8296.756	18522.866	1009.747

EJE	P.K.	AZIMUT	COS A	SEN A
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3	117.000	54.375300	.656878	.753997
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	38	1	3	117.000	8301.937	18526.053	1009.737
1	38	2	3	117.000	8301.560	18525.725	1009.737
1	38	3	3	117.000	8299.675	18524.082	1009.737
1	38	4	3	117.000	8297.790	18522.440	1009.737
1	38	5	3	117.000	8297.413	18522.112	1009.737

EJE	P.K.	AZIMUT	COS A	SEN A
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3	118.000	54.375300	.656878	.753997
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	39	1	3	118.000	8302.594	18525.299	1009.727
1	39	2	3	118.000	8302.217	18524.971	1009.727
1	39	3	3	118.000	8300.332	18523.328	1009.727
1	39	4	3	118.000	8298.447	18521.686	1009.727
1	39	5	3	118.000	8298.070	18521.358	1009.727

EJE	P.K.	AZIMUT	COS A	SEN A
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3	119.000	54.375300	.656878	.753997
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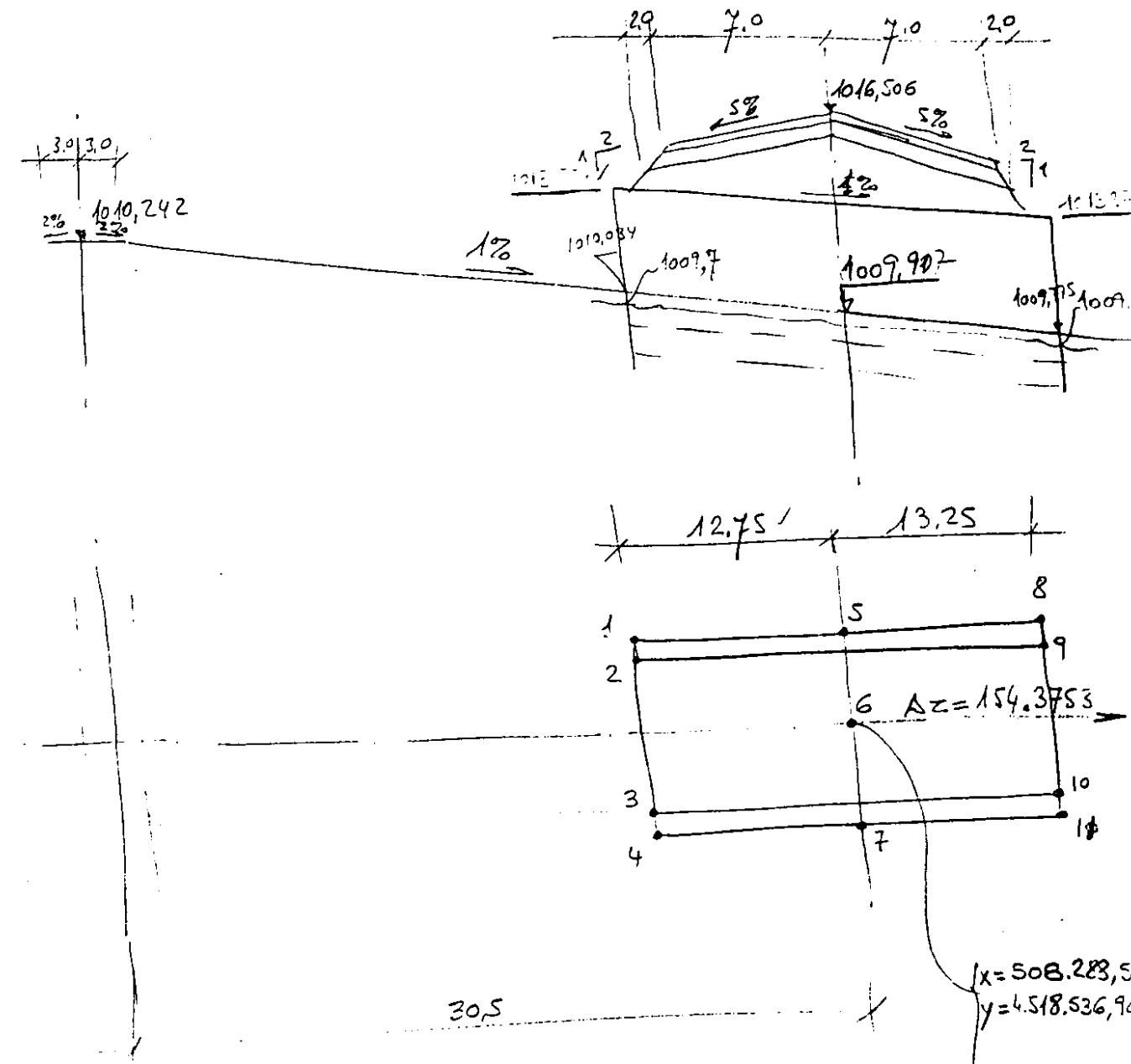
GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	40	1	3	119.000	8303.251	18524.545	1009.717
1	40	2	3	119.000	8302.874	18524.217	1009.717
1	40	3	3	119.000	8300.989	18522.574	1009.717
1	40	4	3	119.000	8299.104	18520.932	1009.717
1	40	5	3	119.000	8298.727	18520.604	1009.717

EJE	P.K.	AZIMUT	COS A	SEN A
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3	120.000	54.375300	.656878	.753997
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GPO.	RTA.	CVA.	EJE	P.K	X	Y	Z
1	41	1	3	120.000	8303.907	18523.791	1009.707
1	41	2	3	120.000	8303.530	18523.463	1009.707
1	41	3	3	120.000	8301.645	18521.820	1009.707
1	41	4	3	120.000	8299.760	18520.178	1009.707
1	41	5	3	120.000	8299.383	18519.850	1009.707

P.I. - 570+840



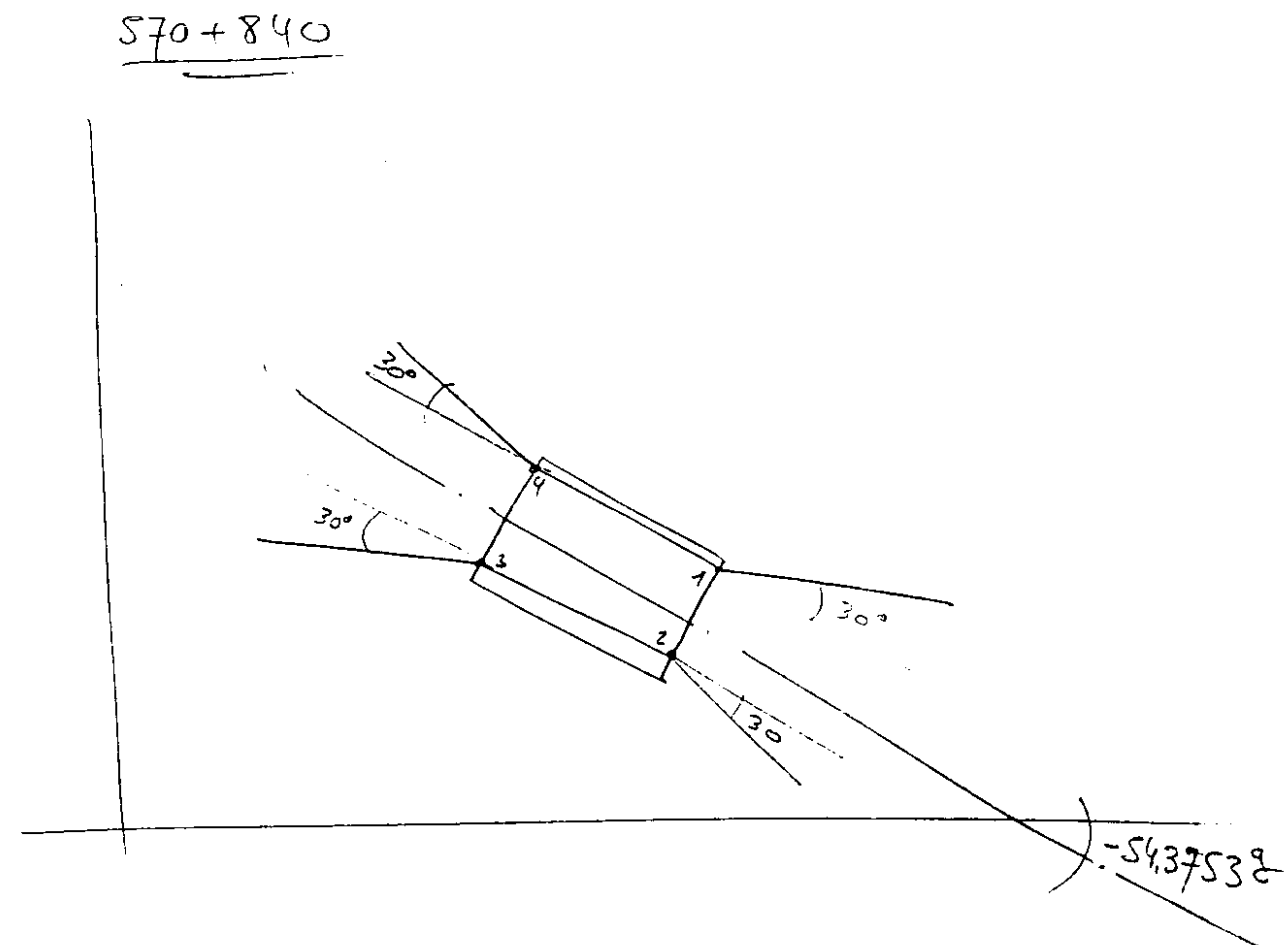
REPLANTEO DEL MARCO

Altura tierras sobre clave 3,0

1009.902
1009.902

REPLANTEO DE LAS ALETAS

REPLANTEO DE LAS ALETAS



ALETA 1	ALETA 2	ALETA 3	ALETA 4
508299,096	508295,326	508278,248	508282,018
4518528,552	4518525,268	4518544,872	4518548,156
30	30	30	30
5,70	5,70	6,80	6,80
0,1476	0,1476	0,1506	0,1506
0,072	0,072	0,06	0,06
1,50	1,50	1,50	1,50
1,50	1,50	1,50	1,50
0,3	0,3	0,3	0,3

REPLANTEO ALETAS P.I. 570+840. PASO DE FAUNA

-54.3753

.02

508299.096	508295.326	508278.248	508282.018
4518528.552	4518525.268	4518544.872	4518548.156
30.	30.	30.	30.
5.7	5.7	6.8	6.8
.147667	.147667	.15067	.15067
.072	.072	.06667	.06667
.4	.4	.4	.4
1.5	1.5	1.5	1.5
1.5	1.5	1.5	1.5
.3	.3	.3	.3

TITULO :REPLANTEO ALETAS P.I. 570+840. PASO DE FAUNA

ANGULO DEL EJE OX CON EL EJE DEL PORTICO. BETA = -54.375300000 g
 ANCHO DE LA JUNTA ENTRE LOS HASTIALES DEL
 PORTICO Y LAS ALETAS = .020000 m

ALETA NUMERO = 4 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 508299.096000
 YA = 4518528.552000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
 LONGITUD DE LA ALETA = 5.700000 m
 ESPESOR DEL TALUD. ZONA INICIAL = .147667 m
 ZONA FINAL = .072000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
 ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.500 m
 ANCHO DEL 2' TACON TRASERO = 1.500 m
 ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 508304.410
 YI = 4518526.488

PUNTO C : XC = 508304.487
 YC = 4518526.702

PUNTO D : XD = 508304.511
 YD = 4518526.770

PUNTO E : XE = 508304.646
 YE = 4518527.147

PUNTO G : XG = 508305.017
 YG = 4518528.182

PUNTO K : XK = 508305.017
 YK = 4518528.182

PUNTO J : XJ = 508298.987
 YJ = 4518528.430

PUNTO AP: XAP = 508299.118
 YAP = 4518528.545

PUNTO B : XB = 508299.225
 YB = 4518528.664

PUNTO BP: XBP = 508299.246
YBP = 4518528.656

PUNTO F : XF = 508299.592
YF = 4518528.957

PUNTO H : XH = 508300.542
YH = 4518529.785

PUNTO P : XP = 508300.542
YP = 4518529.785

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I y J = 5.760 m z_1
C y A = 5.699 m
C y AP = 5.676 m
D y BP = 5.592 m D
E y F = 5.369 m C
G y H = 4.753 m
K y P = 4.753 m z_2, z_3

$z_A = 1013,070$ B = 5,200
 $z_B = 1010,800$ $\Delta = 0,169$
 $z_C = 1008,640$ $z_2 = 4,753$
 $H_1 = 4,430$ $z_3 = \text{---}$
 $H_2 = 2,160$ E = 1,200
F = ---
Z = 1,900

ALETA NUMERO = 3 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 508295.326000
YA = 4518525.268000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 5.700000 m
ESPESOR DEL TALUD. ZONA INICIAL = .147667 m
ZONA FINAL = .072000 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.500 m
ANCHO DEL 2' TACON TRASERO = 1.500 m
ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 508296.643
YI = 4518519.722

PUNTO C : XC = 508296.419
YC = 4518519.675

PUNTO D : XD = 508296.349
YD = 4518519.660

PUNTO E : XE = 508295.958

YE = 4518519.578

PUNTO G : XG = 508294.881
YG = 4518519.352

PUNTO K : XK = 508294.881
YK = 4518519.352

PUNTO J : XJ = 508295.461
YJ = 4518525.359

PUNTO AP: XAP = 508295.330
YAP = 4518525.245

PUNTO B : XB = 508295.197
YB = 4518525.156

PUNTO BP: XBP = 508295.202
YBP = 4518525.134

PUNTO F : XF = 508294.857
YF = 4518524.832

PUNTO H : XH = 508293.906
YH = 4518524.004

PUNTO P : XP = 508293.906
YP = 4518524.004

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I y J = 5.760 m z_1
C y A = 5.699 m
C y AP = 5.676 m
D y BP = 5.592 m D
E y F = 5.369 m C
G y H = 4.753 m
K y P = 4.753 m z_2, z_3

$z_A = 1013,070$ B = 5,200
 $z_B = 1010,800$ $\Delta = 0,169$
 $z_C = 1008,640$ $z_2 = 4,753$
 $H_1 = 4,430$ $z_3 = \text{---}$
 $H_2 = 2,160$ E = 1,200
F = ---
Z = 1,900

ALETA NUMERO = 2 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 508278.248000
YA = 4518544.872000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
LONGITUD DE LA ALETA = 6.800000 m
ESPESOR DEL TALUD. ZONA INICIAL = .150670 m
ZONA FINAL = .066670 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.500 m

ANCHO DEL 2' TACON TRASERO = 1.500 m
 ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 508271.895
 YI = 4518547.298

PUNTO C : XC = 508271.817
 YC = 4518547.079

PUNTO D : XD = 508271.794
 YD = 4518547.016

PUNTO E : XE = 508271.660
 YE = 4518546.639

PUNTO G : XG = 508271.290
 YG = 4518545.603

PUNTO K : XK = 508271.290
 YK = 4518545.603

PUNTO J : XJ = 508278.355
 YJ = 4518544.991

PUNTO AP: XAP = 508278.226
 YAP = 4518544.879

PUNTO B : XB = 508278.117
 YB = 4518544.758

PUNTO BP: XBP = 508278.095
 YBP = 4518544.765

PUNTO F : XF = 508277.749
 YF = 4518544.464

PUNTO H : XH = 508276.799
 YH = 4518543.636

PUNTO P : XP = 508276.799
 YP = 4518543.636

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS I Y J = 6.859 m Z_1
 C Y A = 6.799 m
 C Y AP = 6.776 m
 D Y BP = 6.691 m D
 E Y F = 6.466 m C
 G Y H = 5.849 m
 K Y P = 5.849 m Z_2, Z_3

$Z_A = 1013,320$
 $Z_B = 1010,800$
 $Z_C = 1008,800$
 $H_1 = 4,520$
 $H_2 = 2,000$

$B = 6,300$
 $A = 0,166$
 $Z_2 = 5,849$
 $Z_3 = \text{---}$
 $E = 1,200$
 $F = \text{---}$
 $Z = 1,900$

ALETA NUMERO = 4 DATOS DE ENTRADA Y SALIDA

COORDENADAS DEL PUNTO A : XA = 508282.018000
 YA = 4518548.156000

INCLINACION RESPECTO DEL EJE OX = 30.000000 '
 LONGITUD DE LA ALETA = 6.800000 m
 ESPESOR DEL TALUD. ZONA INICIAL = .150670 m
 ZONA FINAL = .066670 m

ANCHO DE LA CORONACION DE LA ALETA = .400 m
 ZAPATA. ANCHO DEL 1' TACON TRASERO = 1.500 m
 ANCHO DEL 2' TACON TRASERO = 1.500 m
 ANCHO DEL TACON DELANTERO = .300 m

COORDENADAS DE LOS PUNTOS DE LA ALETA

PUNTO I : XI = 508280.485
 YI = 4518554.781

PUNTO C : XC = 508280.713
 YC = 4518554.829

PUNTO D : XD = 508280.779
 YD = 4518554.842

PUNTO E : XE = 508281.170
 YE = 4518554.924

PUNTO G : XG = 508282.247
 YG = 4518555.149

PUNTO K : XK = 508282.247
 YK = 4518555.149

PUNTO J : XJ = 508281.885
 YJ = 4518548.067

PUNTO AP: XAP = 508282.014
 YAP = 4518548.179

PUNTO B : XB = 508282.149
 YB = 4518548.270

PUNTO BP: XBP = 508282.144
 YBP = 4518548.293

PUNTO F : XF = 508282.490
 YF = 4518548.594

PUNTO H : XH = 508283.441
 YH = 4518549.422

PUNTO P : XP = 508283.441
YP = 4518549.422

LONGITUDES DE LOS PARAMENTOS EN LA ZAPATA

DISTANCIA ENTRE LOS PUNTOS		
$Z_A = 1013,320$	$B = 6,300$	I y J = 6.859 m Z_1
$Z_B = 1010,800$	$A = 0,166$	C y A = 6.799 m
$Z_C = 1008,800$	$Z_2 = 5,849$	C y AP = 6.776 m
$H_1 = 4,520$	$Z_3 = \text{---}$	D y BP = 6.691 m D
$H_2 = 2,000$	$E = 1,200$	E y F = 6.466 m C
	$F = \text{---}$	G y H = 5.849 m
	$Z = 1,900$	K y P = 5.849 m Z_2, Z_3

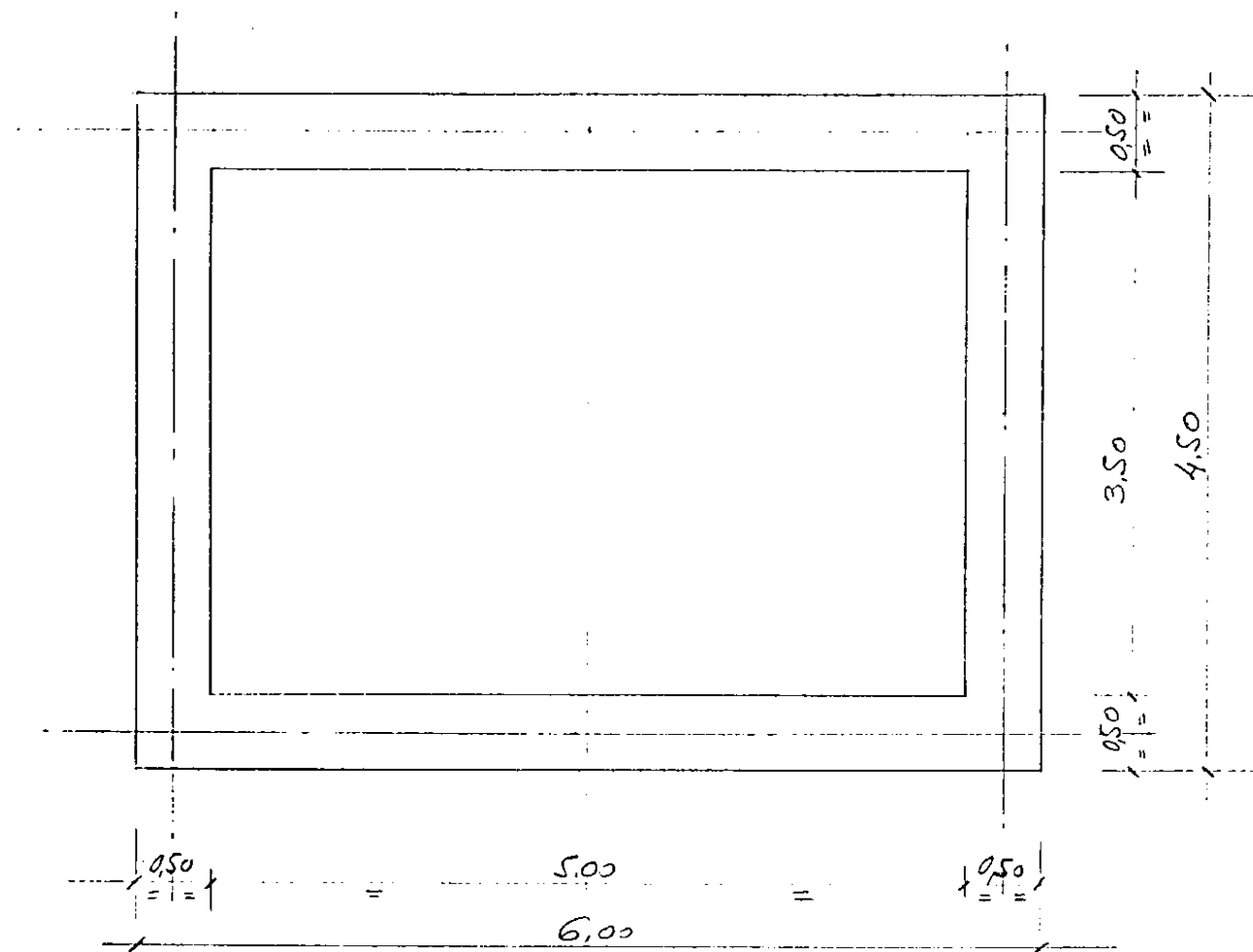
4.4.10 Cálculos estructurales de los pasos inferiores de fauna

4.4.10 CÁLCULOS ESTRUCTURALES

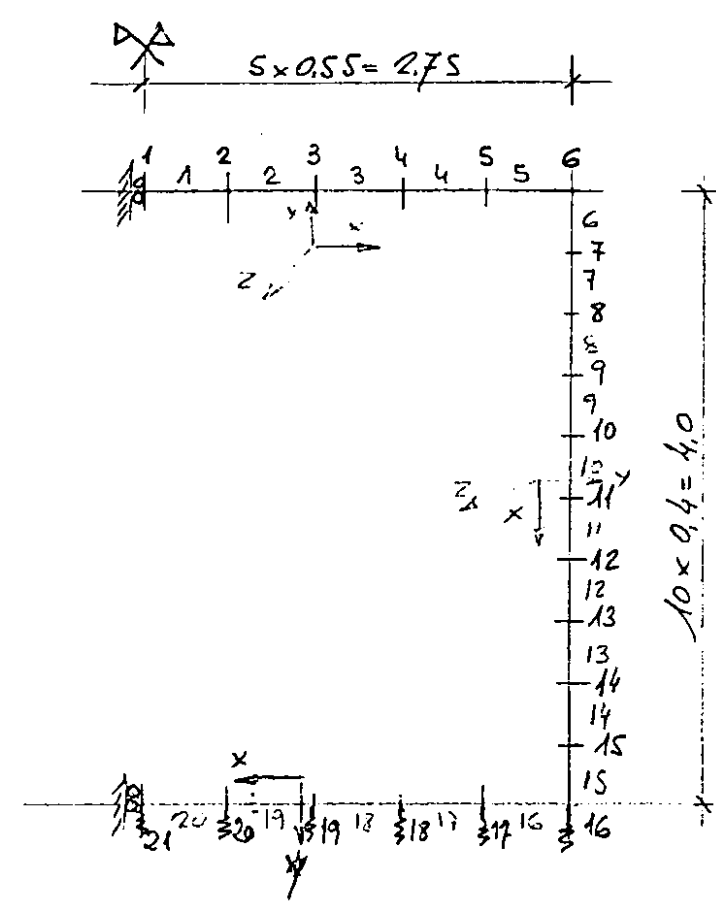
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- CÁLCULO DE ESFUERZOS
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DISCRETIZACION DE LA ESTRUCTURA



Modelo de cálculo.



Sección 0,5 m.
Inercia $\frac{0,5^3 \times 1,0}{12} = 0,010416 \text{ m}^4$

$E_{\text{intel y solera}} = 190.000 \sqrt{250} = 3.000.000 \text{ t/m}$

$E_{\text{astiales}} = 190.000 \sqrt{0,9 \times 250} = 2.850.000 \text{ t/m}$

$\psi = 35^\circ$

$K_a = \tan^2(45 - \frac{\psi}{2}) = 0,271$

$K_r = 1 - \tan \psi = 0,426$

Constante de muelles para $K_{Vc} = 5.100 \text{ t/m}^3$

Nudo 16 $K_{FY} = 5100(0,275 + 0,25) = 2677,5$

Nudos 17 a 20 $K_{FY} = 5100 \times 0,55 = 2805$

Nudo 21 $K_{FY} = 5100 \times 0,275 = 1402,5$

Constante de muelles para $K_{Vc} = 9.000 \text{ t/m}^3$

Nudo 16 = 4725.

Nudos 17 a 20 = 4950.

Nudo 21 = 2475.

HIPOTESIS DE CALCULO

CALCULO DE SOBRECARGAS EN PASOS DE FAUNA

P.F. 550+800

Coefficiente de Impacto:

a) Instrucción española

$$33 \cdot 10^{-2} \times 200 = 66, \quad I = 1'66$$

b) Eurocódigo

$$L_m = \frac{1}{4} \cdot (4 + 5'50 + 4 + 5'50) = 4'75 \text{ m.}$$

$$L_\phi = 1'4 \times 4'75 = 6'65 \text{ m.}$$

$$\phi_2 = \frac{1'44}{\sqrt{6'65} - 0'2} + 0'82 = 1'43$$

c) Reducción del coeficiente de impacto de la instrucción española

$$I = 1'66 - \frac{(2'00 - 1)}{10} = 1'56$$

d) Reducción del coeficiente de impacto del Eurocódigo

$$I = 1'43 - \frac{(2'00 - 1)}{10} = 1'33$$

Sobrecargas de Tráfico:

a) Tren A instrucción española:

$$\frac{90 \times 2 \times 1'56}{10 \times \frac{1}{4}} = 4'75 \text{ t/m}^2$$

b) Tren B instrucción española:

$$\frac{12 \times 2 \times 1'56}{10} = 3'7 \text{ t/m}^2$$

c) Tren Eurocódigo

$$\frac{2 \times 8 \times 1'33}{10} + \frac{4 \times 12'2 \times 2 \times 1'33}{10 \times 8'8} = 3'6 \text{ t/m}^2$$

P.F. 553+850

Coefficiente de Impacto:

a) Instrucción española; $I = 1'66$

b) Eurocódigo $I = 1'43$

c) Reducción del coeficiente de impacto de la instrucción española

$$I = 1'66 - \frac{(3 - 1)}{10} = 1'46$$

d) Reducción del coeficiente de impacto del Eurocódigo

$$I = 1'43 - \frac{(3 - 1)}{10} = 1'23$$

Sobrecargas de Tráfico

a) Tren A instrucción española

$$\frac{90 \times 2 \times 1'46}{12 \times 9} = 2'43 \text{ t/m}^2$$

b) Tren B instrucción española

$$\frac{12 \times 2 \times 1'46}{12} = 2'92 \text{ t/m}^2$$

c) Tren Eurocódigo

$$\frac{2 \times 8 \times 1'23}{12} + \frac{4 \times 12'2 \times 2 \times 1'23}{12 \times 10'8} = 2'56 \text{ t/m}^2$$

P.F. 559+170

Coeficiente de Impacto:

- a) Instrucción española; $I = 1'66$
 b) Eurocódigo; $I = 1'43$
 c) Reducción del coeficiente de impacto de la instrucción española

$$I = 1'66 - \frac{(2'20 - 1)}{10} = 1'54$$

 d) Reducción del coeficiente de impacto del Eurocódigo

$$I = 1'43 - \frac{(2'20 - 1)}{10} = 1'31$$

Sobrecargas de tráfico

- a) Tren A instrucción española

$$\frac{90 \times 2 \times 1'54}{10'4 \times 7'4} = 3'6 \text{ t/m}^2$$

- b) Tren B instrucción española

$$\frac{12 \times 2 \times 1'54}{10'4} = 3'55 \text{ t/m}^2$$

- c) Tren Eurocódigo

$$\frac{3 \times 8 \times 1'31}{10'4} + \frac{4 \times 12'2 \times 2 \times 1'31}{10'4 \times 9'2} = 3'35 \text{ t/m}^2$$

P.F. 563+900

Coeficiente de Impacto

- a) Instrucción española; $I = 1'66$
 b) Eurocódigo; $I = 1'43$
 c) Reducción del coeficiente de impacto de la instrucción española

$$I = 1'66 - \frac{(1'90 - 1)}{10} = 1'57$$

 d) Reducción del coeficiente de impacto del Eurocódigo

$$I = 1'43 - \frac{(1'90 - 1)}{10} = 1'37$$

Sobrecargas de tráfico

- a) Tren A instrucción española

$$\frac{90 \times 2 \times 1'57}{9'8 \times 6'8} = 4'24 \text{ t/m}^2$$

- b) Tren B instrucción española

$$\frac{18 \times 2 \times 1'57}{9'8} = 3'84 \text{ t/m}^2$$

- c) Tren Eurocódigo

$$\frac{3 \times 8 \times 1'37}{9'8} + \frac{4 \times 12'2 \times 2 \times 1'37}{9'8 \times 3'6} = 3'82 \text{ t/m}^2$$

P.F. 565+380

Coeficiente de Impacto

- a) Instrucción española ; $I = 1'66$
 b) Eurocódigo ; $I = 1'43$
 c) Reducción del coeficiente de impacto de la instrucción española
 $I = 1'66 - \frac{2'40-1}{10} = 1'52$

- d) Reducción del coeficiente de impacto del Eurocódigo
 $I = 1'43 - \frac{2'40-1}{10} = 1'29$

Sobrecargas de tráfico

a) Tren A instrucción española

$$\frac{90 \times 2 \times 1'52}{10'80 \times 7'80} = 3'25 \text{ t/m}^2$$

b) Tren B instrucción española

$$\frac{12 \times 2 \times 1'52}{10'80} = 3'33 \text{ t/m}^2$$

c) Tren Eurocódigo

$$\frac{3 \times 3 \times 1'29}{10'80} + \frac{4 \times 12'2 \times 2 \times 1'29}{10'3 \times 9'6} = 3'12 \text{ t/m}^2$$

P.F. 568+940

Coeficiente de impacto

- a) Instrucción española ; $I = 1'66$
 b) Eurocódigo ; $I = 1'43$
 c) Reducción del coeficiente de impacto de la instrucción española
 $I = 1'66 - \frac{4'45-1}{10} = 1'315$

- d) Reducción del coeficiente de impacto del Eurocódigo
 $I = 1'43 - \frac{4'45-1}{10} = 1'085$

Sobrecargas de tráfico

a) Tren A instrucción española

$$\frac{90 \times 2 \times 1'315}{14'90 \times 11'90} = 1'33 \text{ t/m}^2$$

b) Tren B instrucción española

$$\frac{12 \times 2 \times 1'315}{14'90} = 2'11 \text{ t/m}^2$$

c) Tren Eurocódigo

$$\frac{3 \times 3 \times 1'085}{14'90} + \frac{4 \times 12'2 \times 2 \times 1'085}{14'90 \times 13'7} = 1'68 \text{ t/m}^2$$

PF 570+840

Coficiente de impacto

a) Instrucción española; $I = 1'66$

b) Eurocódigo; $I = 1'43$

c) Reducción del coeficiente de impacto de la instrucción española

$$I = 1'66 - \frac{3'60 - 1}{10} = 1'40$$

d) Reducción del coeficiente de impacto del Eurocódigo

$$I = 1'43 - \frac{3'60 - 1}{10} = 1'17$$

Sobrecargas de ferrocarril

a) Tren a instrucción española

$$\frac{90 \times 2 \times 1'40}{13'2 \times 10'2} = 1'87 \text{ t/m}^2$$

b) Tren a instrucción española

$$\frac{12 \times 2 \times 1'40}{13'2} = 2'54 \text{ t/m}^2$$

c) Tren Eurocódigo

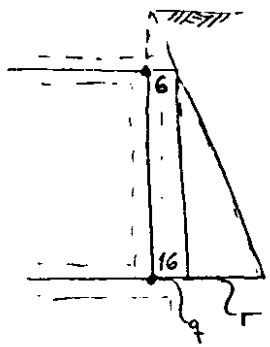
$$\frac{5 \times 3 \times 1'17}{13'2} + \frac{4 \times 12'2 \times 2 \times 1'17}{13'2 \times 12} = 2'44 \text{ t/m}^2$$

MARCO TIPO I

$$\left\{ \begin{array}{l} q_{tierras} = 3,8 \text{ t/m}^2 \\ q_{sc} = 4,25 \text{ t/m}^2 \end{array} \right.$$

Hipótesis I.- Pórtico en construcción

Tierras hasta dintel y sin sobrecarga (K reposo)



Cargas en dintel $-0,5 \times 2,5 = -1,25 \text{ t/m}$
 " " hastiales $-0,5 \times 2,5 = -1,25 \text{ "}$
 " " solera $-0,5 \times 2,5 = -1,25 \text{ "}$

Empujes

$$q = \left(0,5 + \frac{0,5}{2}\right) \times 2,0 \times 0,426 = 0,639$$

$$r = 2,0 \times 4,0 \times 0,426 = 3,408$$

$$e_6 = 0,639$$

$$e_{12} = -2,6838$$

$$e_7 = 0,639 + \frac{3,408}{10} = 0,9798$$

$$e_{13} = -3,0246$$

$$e_8 = -1,3206$$

$$e_{14} = -3,3654$$

$$e_9 = -1,6614$$

$$e_{15} = -3,7062$$

$$e_{10} = -2,0022$$

$$e_{16} = -4,047$$

$$e_{11} = -2,343$$

Hipótesis II.- Pórtico descargado.

Sobrecarga mínima, empuje máximo (3 t/m^2 actuando en trasdos y K reposo)

Cargas en dintel $-0,5 \times 2,5 - 3,8 = -5,05$

" " hastiales $-0,5 \times 2,5 = -1,25$

" " solera a) min $+0,5 \times 2,5 = 1,25 \text{ t/m}$

b) max $-(0,5 \times 2,5 + 0,2 \times 2,4 + 0,3 \times 2,0 + 0,4) = -2,73 \text{ t/m}$

Empujes.-

$$q = (3,0 + 3,8 + 0,25 \times 2,0) \cdot 0,426 = 3,1098$$

$$r = 2,0 \times 4,0 \times 0,426 = 3,408$$

$$e_6 = -3,1098$$

$$e_{12} = -5,1546$$

$$e_7 = -3,4506$$

$$e_{13} = -5,4954$$

$$e_8 = -3,7914$$

$$e_{14} = -5,8362$$

$$e_9 = -4,1322$$

$$e_{15} = -6,177$$

$$e_{10} = -4,473$$

$$e_{16} = -6,5178$$

$$e_{11} = -4,8138$$

Hipótesis III.- Pórtico en carga con empuje activo

Sobrecarga máxima, empuje mínimo (K activo)

Cargas en dintel $-0,5 \times 2,5 - 3,8 - 4,25 = -9,30$

" " hastiales $-0,5 \times 2,5 = -1,25$

" " solera $-0,5 \times 2,5 = -1,25$

Empujes

$$q = (3,8 + 0,25 \times 2,0) \times 0,271 = 1,1653$$

$$r = 2,0 \times 4,0 \times 0,271 = 2,168$$

$$e_6 = -1,1653$$

$$e_{12} = -2,4661$$

$$e_7 = -1,3821$$

$$e_{13} = -2,6829$$

$$e_8 = -1,5989$$

$$e_{14} = -2,8997$$

$$e_9 = -1,8157$$

$$e_{15} = -3,1165$$

$$e_{10} = -2,0325$$

$$e_{16} = -3,3333$$

$$e_{11} = -2,2493$$

Hipótesis IV.- Pórtico en carga con empuje en reposo.

Sobrecarga máxima, empuje máximo (3 t/m^2 actuando en trasdos y K reposo)

Cargas en dintel $-0,5 \times 2,5 - 3,8 - 4,25 = -9,30$

" " hastiales $-0,5 \times 2,5 = -1,25$

" " solera $-0,5 \times 2,5 = -1,25$

Empujes.-

$$q = (3,0 + 3,8 + 0,25 \times 2,0) \cdot 0,426 = 3,1098$$

$$r = 2,0 \times 4,0 \times 0,426 = 3,408$$

$$e_6 = -3,1098$$

$$e_{12} = -5,1546$$

$$e_7 = -3,4506$$

$$e_{13} = -5,4954$$

$$e_8 = -3,7914$$

$$e_{14} = -5,8362$$

$$e_9 = -4,1322$$

$$e_{15} = -6,177$$

$$e_{10} = -4,473$$

$$e_{16} = -6,5178$$

$$e_{11} = -4,8138$$

CALCULO DE ESFUERZOS

STAAD PLANE PASO DE FAUNA TIPO 1A. Coef. 5,1.

UNIT ME MT
OUTP WIDT 72
PAGE EJECT
INPUT NO

*

JOIN COOR

1	0.	4.0	0.
2	0.55	4.0	0.
3	1.1	4.0	0.
4	1.65	4.0	0.
5	2.2	4.0	0.
6	2.75	4.0	0.
7	2.75	3.6	0.
8	2.75	3.2	0.
9	2.75	2.8	0.
10	2.75	2.4	0.
11	2.75	2.0	0.
12	2.75	1.6	0.
13	2.75	1.2	0.
14	2.75	0.8	0.
15	2.75	0.4	0.
16	2.75	0.	0.
17	2.2	0.	0.
18	1.65	0.	0.
19	1.1	0.	0.
20	0.55	0.	0.
21	0.	0.	0.

*

MEMB INCI

1 1 2 20

*

MEMB PROP

1 TO 20 PRIX AX 0.5 IZ 0.0104167

*

CONST

E 3000000. 1 TO 5

E 2850000. 6 TO 15

E 3000000. 16 TO 20

POISS 0.2 ALL

*

PP

1	FIXED BUT FY
16	FIXED BUT FX MZ KFY 2677.5
17 TO 20	FIXED BUT FX MZ KFY 2805.
21	FIXED BUT KFY 1402.5

*

LOAD 1 PORTICO EN CONSTRUCCION

MEMB LOAD

1 TO 5 UNI GY -1.25
6 TO 15 UNI GY -1.25
16 TO 20 UNI GY -1.25

JOIN LOAD

6	FX	-0.639
7	FX	-0.9798
8	FX	-1.3206
9	FX	-1.6614
10	FX	-2.0022
11	FX	-2.343
12	FX	-2.6838

13	FX	-3.0246
14	FX	-3.3654
15	FX	-3.7062
16	FX	-4.047

*

LOAD 2 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -5.05
6 TO 15 UNI GY -1.25
16 TO 20 UNI GY -1.25

JOIN LOAD

6	FX	-3.1098
7	FX	-3.4506
8	FX	-3.7914
9	FX	-4.1322
10	FX	-4.473
11	FX	-4.8138
12	FX	-5.1546
13	FX	-5.4954
14	FX	-5.8362
15	FX	-6.177
16	FX	-6.5178

*

LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO

MEMB LOAD

1 TO 5 UNI GY -9.3
6 TO 15 UNI GY -1.25
16 TO 20 UNI GY -1.25

JOIN LOAD

6	FX	-1.1653
7	FX	-1.3821
8	FX	-1.5989
9	FX	-1.8157
10	FX	-2.0325
11	FX	-2.2493
12	FX	-2.4661
13	FX	-2.6829
14	FX	-2.8997
15	FX	-3.1165
16	FX	-3.3333

*

LOAD 4 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -9.3
6 TO 15 UNI GY -1.25
16 TO 20 UNI GY -1.25

JOIN LOAD

6	FX	-3.1098
7	FX	-3.4506
8	FX	-3.7914
9	FX	-4.1322
10	FX	-4.473
11	FX	-4.8138
12	FX	-5.1546
13	FX	-5.4954
14	FX	-5.8362
15	FX	-6.177
16	FX	-6.5178

*

PERF AN

PRINT ANAL RESU
FINISH

```
*****
*
*      S T A A D - III
*      REVISION 10.2b(VERSION 10 LEVEL 2)
*      PROPRIETARY PROGRAM OF
*      RESEARCH ENGINEERS,INC.
*      DATE=      NOV  6, 1998
*      TIME=      19: 4: 3
*
*****
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```
1. STAAD PLANE PASO DE FAUNA TIPO 1A. Coef. 5,1.
2. UNIT ME MT
3. OUTP WIDT 72
4. PAGE EJECT
5. INPUT NO
6. *
7. JOIN COOR
8. 1      0.      4.0      0.
9. 2      0.55     4.0      0.
10. 3      1.1      4.0      0.
11. 4      1.65     4.0      0.
12. 5      2.2      4.0      0.
13. 6      2.75     4.0      0.
14. 7      2.75     3.6      0.
15. 8      2.75     3.2      0.
16. 9      2.75     2.8      0.
17. 10     2.75     2.4      0.
18. 11     2.75     2.0      0.
19. 12     2.75     1.6      0.
20. 13     2.75     1.2      0.
21. 14     2.75     0.8      0.
22. 15     2.75     0.4      0.
23. 16     2.75     0.      0.
24. 17     2.2      0.      0.
25. 18     1.65     0.      0.
26. 19     1.1      0.      0.
27. 20     0.55     0.      0.
28. 21     0.      0.      0.
29. *
30. MEMB INCI
31. 1 1 2 20
32. *
33. MEMB PROP
34. 1 TO 20 PRIX AX 0.5 IZ 0.0104167
35. *
36. CONST
37. E 3000000. 1 TO 5
38. E 2850000. 6 TO 15
39. E 3000000. 16 TO 20
40. POISS 0.2 ALL
41. *
42. SUPP
43. 1      FIXED BUT FY
44. 16     FIXED BUT FX MZ KFY 2677.5
45. 17 TO 20 FIXED BUT FX MZ KFY 2805.
46. 21     FIXED BUT KFY 1402.5
47. *
```


48. LOAD 1 PORTICO EN CONSTRUCCION
 49. MEMB LOAD
 50. 1 TO 5 UNI GY -1.25
 51. 6 TO 15 UNI GY -1.25
 52. 16 TO 20 UNI GY -1.25
 53. JOIN LOAD
 54. 6 FX -0.639
 55. 7 FX -0.9798
 56. 8 FX -1.3206
 57. 9 FX -1.6614
 58. 10 FX -2.0022
 59. 11 FX -2.343
 60. 12 FX -2.6838
 61. 13 FX -3.0246
 62. 14 FX -3.3654
 63. 15 FX -3.7062
 64. 16 FX -4.047
 65. *
 66. LOAD 2 PORTICO DESCARGADO
 67. MEMB LOAD
 68. 1 TO 5 UNI GY -5.05
 69. 6 TO 15 UNI GY -1.25
 70. 16 TO 20 UNI GY -1.25
 71. JOIN LOAD
 72. 6 FX -3.1098
 73. 7 FX -3.4506
 74. 8 FX -3.7914
 75. 9 FX -4.1322
 76. 10 FX -4.473
 77. 11 FX -4.8138
 78. 12 FX -5.1546
 79. 13 FX -5.4954
 80. 14 FX -5.8362
 81. 15 FX -6.177
 82. 16 FX -6.5178
 83. *
 84. LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO
 85. MEMB LOAD
 86. 1 TO 5 UNI GY -9.3
 87. 6 TO 15 UNI GY -1.25
 88. 16 TO 20 UNI GY -1.25
 89. JOIN LOAD
 90. 6 FX -1.1653
 91. 7 FX -1.3821
 92. 8 FX -1.5989
 93. 9 FX -1.8157
 94. 10 FX -2.0325
 95. 11 FX -2.2493
 96. 12 FX -2.4661
 97. 13 FX -2.6829
 98. 14 FX -2.8997
 99. 15 FX -3.1165
 100. 16 FX -3.3333
 101. *
 102. LOAD 4 PORTICO DESCARGADO
 103. MEMB LOAD
 104. 1 TO 5 UNI GY -9.3
 105. 6 TO 15 UNI GY -1.25
 106. 16 TO 20 UNI GY -1.25
 107. JOIN LOAD

108. 6 FX -3.1098
 109. 7 FX -3.4506
 110. 8 FX -3.7914
 111. 9 FX -4.1322
 112. 10 FX -4.473
 113. 11 FX -4.8138
 114. 12 FX -5.1546
 115. 13 FX -5.4954
 116. 14 FX -5.8362
 117. 15 FX -6.177
 118. 16 FX -6.5178
 119. *

120. PERF AN

** PROCESSING MEMBER/ELEMENT INFORMATION.

** PERFORMING BANDWIDTH REDUCTION.

ORIGINAL BANDWIDTH = 1
 REDUCED BANDWIDTH = 1

* CHECKING LOAD DATA.

** PROCESSING SUPPORT CONDITION.

** PROCESSING AND SETTING UP LOAD VECTOR.

** PROCESSING ELEMENT STIFFNESS MATRIX. 19: 4: 8

** PROCESSING GLOBAL STIFFNESS MATRIX. 19: 4: 9

** PROCESSING TRIANGULAR FACTORIZATION. 19: 4: 9

** CALCULATING JOINT DISPLACEMENT. 19: 4: 9

** CALCULATING ELEMENT FORCES. 19: 4: 9

121. PRINT ANAL RESU

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	0.00000	-0.07348	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.19164	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.46039	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.39486	0.00000	0.00000	0.00000	0.00000
2	1	-0.00031	-0.07341	0.00000	0.00000	0.00000	0.00000
	2	-0.00082	-0.18909	0.00000	0.00000	0.00000	0.00009
	3	-0.00038	-0.45151	0.00000	0.00000	0.00000	0.00032
	4	-0.00084	-0.38767	0.00000	0.00000	0.00000	0.00026
3	1	-0.00061	-0.07341	0.00000	0.00000	0.00000	0.00000
	2	-0.00163	-0.18218	0.00000	0.00000	0.00000	0.00015
	3	-0.00076	-0.42624	0.00000	0.00000	0.00000	0.00059
	4	-0.00167	-0.36747	0.00000	0.00000	0.00000	0.00046
4	1	-0.00092	-0.07400	0.00000	0.00000	0.00000	-0.00002
	2	-0.00245	-0.17312	0.00000	0.00000	0.00000	0.00016
	3	-0.00113	-0.38866	0.00000	0.00000	0.00000	0.00076
	4	-0.00251	-0.33834	0.00000	0.00000	0.00000	0.00057
5	1	-0.00123	-0.07612	0.00000	0.00000	0.00000	-0.00006
	2	-0.00327	-0.16563	0.00000	0.00000	0.00000	0.00009
	3	-0.00151	-0.34558	0.00000	0.00000	0.00000	0.00078
	4	-0.00335	-0.30709	0.00000	0.00000	0.00000	0.00053

6	1	-0.00153	-0.08104	0.00000	0.00000	0.00000	-0.00012
	2	-0.00408	-0.16486	0.00000	0.00000	0.00000	-0.00009
	3	-0.00189	-0.30654	0.00000	0.00000	0.00000	0.00060
	4	-0.00418	-0.28325	0.00000	0.00000	0.00000	0.00030
7	1	-0.00746	-0.08093	0.00000	0.00000	0.00000	-0.00016
	2	-0.01050	-0.16446	0.00000	0.00000	0.00000	-0.00022
	3	0.01810	-0.30581	0.00000	0.00000	0.00000	0.00040
	4	0.00295	-0.28252	0.00000	0.00000	0.00000	0.00008
8	1	-0.01421	-0.08082	0.00000	0.00000	0.00000	-0.00017
	2	-0.02029	-0.16405	0.00000	0.00000	0.00000	-0.00026
	3	0.03106	-0.30507	0.00000	0.00000	0.00000	0.00025
	4	0.00339	-0.28178	0.00000	0.00000	0.00000	-0.00004
9	1	-0.02035	-0.08068	0.00000	0.00000	0.00000	-0.00014
	2	-0.03009	-0.16363	0.00000	0.00000	0.00000	-0.00022
	3	0.03866	-0.30432	0.00000	0.00000	0.00000	0.00013
	4	0.00062	-0.28103	0.00000	0.00000	0.00000	-0.00009
10	1	-0.02471	-0.08054	0.00000	0.00000	0.00000	-0.00008
	2	-0.03734	-0.16319	0.00000	0.00000	0.00000	-0.00013
	3	0.04222	-0.30355	0.00000	0.00000	0.00000	0.00005
	4	-0.00269	-0.28026	0.00000	0.00000	0.00000	-0.00007
11	1	-0.02651	-0.08038	0.00000	0.00000	0.00000	-0.00001
	2	-0.04037	-0.16274	0.00000	0.00000	0.00000	-0.00002
	3	0.04267	-0.30277	0.00000	0.00000	0.00000	-0.00002
	4	-0.00475	-0.27948	0.00000	0.00000	0.00000	-0.00003
12	1	-0.02536	-0.08021	0.00000	0.00000	0.00000	0.00007
	2	-0.03849	-0.16227	0.00000	0.00000	0.00000	0.00011
	3	0.04049	-0.30198	0.00000	0.00000	0.00000	-0.00009
	4	-0.00474	-0.27869	0.00000	0.00000	0.00000	0.00003
13	1	-0.02140	-0.08002	0.00000	0.00000	0.00000	0.00013
	2	-0.03202	-0.16179	0.00000	0.00000	0.00000	0.00021
	3	0.03569	-0.30117	0.00000	0.00000	0.00000	-0.00016
	4	-0.00288	-0.27788	0.00000	0.00000	0.00000	0.00006
14	1	-0.01536	-0.07982	0.00000	0.00000	0.00000	0.00017
	2	-0.02242	-0.16129	0.00000	0.00000	0.00000	0.00026
	3	0.02775	-0.30034	0.00000	0.00000	0.00000	-0.00025
	4	-0.00051	-0.27705	0.00000	0.00000	0.00000	0.00005
15	1	-0.00859	-0.07960	0.00000	0.00000	0.00000	0.00016
	2	-0.01233	-0.16078	0.00000	0.00000	0.00000	0.00023
	3	0.01554	-0.29951	0.00000	0.00000	0.00000	-0.00037
	4	-0.00013	-0.27622	0.00000	0.00000	0.00000	-0.00004
16	1	-0.00319	-0.07937	0.00000	0.00000	0.00000	0.00010
	2	-0.00563	-0.16026	0.00000	0.00000	0.00000	0.00008
	3	-0.00265	-0.29865	0.00000	0.00000	0.00000	-0.00055
	4	-0.00553	-0.27537	0.00000	0.00000	0.00000	-0.00025
17	1	-0.00255	-0.08150	0.00000	0.00000	0.00000	-0.00001
	2	-0.00450	-0.15869	0.00000	0.00000	0.00000	-0.00012
	3	-0.00212	-0.26310	0.00000	0.00000	0.00000	-0.00071
	4	-0.00442	-0.25432	0.00000	0.00000	0.00000	-0.00048
18	1	-0.00191	-0.07961	0.00000	0.00000	0.00000	-0.00005
	2	-0.00338	-0.14966	0.00000	0.00000	0.00000	-0.00019
	3	-0.00159	-0.22427	0.00000	0.00000	0.00000	-0.00068
	4	-0.00332	-0.22609	0.00000	0.00000	0.00000	-0.00052
19	1	-0.00128	-0.07639	0.00000	0.00000	0.00000	-0.00006
	2	-0.00225	-0.13915	0.00000	0.00000	0.00000	-0.00018
	3	-0.00106	-0.19090	0.00000	0.00000	0.00000	-0.00052
	4	-0.00221	-0.19985	0.00000	0.00000	0.00000	-0.00042
20	1	-0.00064	-0.07373	0.00000	0.00000	0.00000	-0.00004
	2	-0.00113	-0.13124	0.00000	0.00000	0.00000	-0.00010
	3	-0.00053	-0.16873	0.00000	0.00000	0.00000	-0.00028
	4	-0.00111	-0.18177	0.00000	0.00000	0.00000	-0.00023

21	1	0.00000	-0.07272	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.12835	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.16100	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.17537	0.00000	0.00000	0.00000	0.00000

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	8.37	0.00	0.00	0.00	0.00	-0.16
	2	22.26	0.00	0.00	0.00	0.00	-5.40
	3	10.30	0.00	0.00	0.00	0.00	-18.58
	4	22.81	0.00	0.00	0.00	0.00	-15.08
16	1	0.00	2.13	0.00	0.00	0.00	0.00
	2	0.00	4.29	0.00	0.00	0.00	0.00
	3	0.00	8.00	0.00	0.00	0.00	0.00
	4	0.00	7.37	0.00	0.00	0.00	0.00
17	1	0.00	2.29	0.00	0.00	0.00	0.00
	2	0.00	4.45	0.00	0.00	0.00	0.00
	3	0.00	7.38	0.00	0.00	0.00	0.00
	4	0.00	7.13	0.00	0.00	0.00	0.00
18	1	0.00	2.23	0.00	0.00	0.00	0.00
	2	0.00	4.20	0.00	0.00	0.00	0.00
	3	0.00	6.29	0.00	0.00	0.00	0.00
	4	0.00	6.34	0.00	0.00	0.00	0.00
19	1	0.00	2.14	0.00	0.00	0.00	0.00
	2	0.00	3.90	0.00	0.00	0.00	0.00
	3	0.00	5.35	0.00	0.00	0.00	0.00
	4	0.00	5.61	0.00	0.00	0.00	0.00
20	1	0.00	2.07	0.00	0.00	0.00	0.00
	2	0.00	3.68	0.00	0.00	0.00	0.00
	3	0.00	4.73	0.00	0.00	0.00	0.00
	4	0.00	5.10	0.00	0.00	0.00	0.00
21	1	17.40	1.02	0.00	0.00	0.00	2.24
	2	30.69	1.80	0.00	0.00	0.00	6.28
	3	14.44	2.26	0.00	0.00	0.00	16.36
	4	30.14	2.46	0.00	0.00	0.00	13.66

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	8.37	0.00	0.00	0.00	0.00	-0.16
		2	-8.37	0.69	0.00	0.00	0.00	-0.03
	2	1	22.26	0.00	0.00	0.00	0.00	-5.40
		2	-22.26	2.78	0.00	0.00	0.00	4.63
	3	1	10.30	0.00	0.00	0.00	0.00	-18.58
		2	-10.30	5.12	0.00	0.00	0.00	17.17
	4	1	22.81	0.00	0.00	0.00	0.00	-15.08
		2	-22.81	5.11	0.00	0.00	0.00	13.68
2	1	2	8.37	-0.69	0.00	0.00	0.00	0.03
		3	-8.37	1.38	0.00	0.00	0.00	-0.59
	2	2	22.26	-2.78	0.00	0.00	0.00	-4.63

	3	3	-22.26	5.56	0.00	0.00	0.00	2.34	9	1	9	4.94	3.77	0.00	0.00	0.00	-3.40			
		2	10.30	-5.11	0.00	0.00	0.00	-17.17			10	-5.44	-3.77	0.00	0.00	0.00	4.91			
		3	-10.30	10.23	0.00	0.00	0.00	12.95			2	9	15.39	7.78	0.00	0.00	0.00	-5.01		
		4	2	22.81	-5.12	0.00	0.00	0.00			-13.68	10	-15.89	-7.78	0.00	0.00	0.00	8.12		
	4	3	-22.81	10.23	0.00	0.00	0.00	9.46		3	9	27.08	4.34	0.00	0.00	0.00	7.38			
												10	-27.58	-4.34	0.00	0.00	0.00	-5.61		
												4	9	27.07	8.33	0.00	0.00	0.00	0.72	
												10	-27.57	-8.33	0.00	0.00	0.00	2.61		
3	1	3	8.37	-1.38	0.00	0.00	0.00	0.59	10	1	10	5.44	1.77	0.00	0.00	0.00	-4.91			
		4	-8.37	2.06	0.00	0.00	0.00	-1.54			11	-5.94	-1.77	0.00	0.00	0.00	5.61			
		2	3	22.26	-5.56	0.00	0.00	0.00			-2.34	2	10	15.89	3.31	0.00	0.00	0.00	-8.12	
		4	-22.26	8.33	0.00	0.00	0.00	-1.48			11	-16.39	-3.31	0.00	0.00	0.00	9.44			
	3	3	10.30	-10.23	0.00	0.00	0.00	-12.95		3	10	27.57	2.30	0.00	0.00	0.00	5.64			
		4	-10.30	15.35	0.00	0.00	0.00	5.92			11	-28.07	-2.30	0.00	0.00	0.00	-4.72			
		4	3	22.81	-10.23	0.00	0.00	0.00			-9.46	4	10	27.57	3.85	0.00	0.00	0.00	-2.61	
		4	-22.81	15.34	0.00	0.00	0.00	2.43			11	-28.07	-3.85	0.00	0.00	0.00	4.16			
4	1	4	8.37	-2.06	0.00	0.00	0.00	1.54	11	1	11	5.94	-0.58	0.00	0.00	0.00	-5.61			
		5	-8.37	2.75	0.00	0.00	0.00	-2.86			12	-6.44	0.58	0.00	0.00	0.00	5.38			
		2	4	22.26	-8.33	0.00	0.00	0.00			1.48	2	11	16.39	-1.51	0.00	0.00	0.00	-9.44	
		5	-22.26	11.11	0.00	0.00	0.00	-6.83			12	-16.89	1.51	0.00	0.00	0.00	8.84			
	3	4	10.30	-15.34	0.00	0.00	0.00	-5.92		3	11	28.08	0.05	0.00	0.00	0.00	4.72			
		5	-10.30	20.46	0.00	0.00	0.00	-3.93			12	-28.58	-0.05	0.00	0.00	0.00	-4.70			
		4	4	22.81	-15.34	0.00	0.00	0.00			-2.43	4	11	28.07	-0.96	0.00	0.00	0.00	-4.16	
		5	-22.81	20.46	0.00	0.00	0.00	-7.42			12	-28.57	0.96	0.00	0.00	0.00	3.77			
5	1	5	8.37	-2.75	0.00	0.00	0.00	2.86	12	1	12	6.44	-3.26	0.00	0.00	0.00	-5.38			
		6	-8.37	3.44	0.00	0.00	0.00	-4.56			13	-6.94	3.26	0.00	0.00	0.00	4.08			
		2	5	22.26	-11.11	0.00	0.00	0.00			6.83	2	12	16.89	-6.66	0.00	0.00	0.00	-8.84	
		6	-22.26	13.89	0.00	0.00	0.00	-13.70			3	13	-17.39	6.66	0.00	0.00	0.00	6.18		
	3	5	10.30	-20.46	0.00	0.00	0.00	3.93		2	12	16.89	-6.66	0.00	0.00	0.00	-8.84			
		6	-10.30	25.57	0.00	0.00	0.00	-16.59			13	-17.39	6.66	0.00	0.00	0.00	6.18			
		4	5	22.81	-20.46	0.00	0.00	0.00			7.42	3	12	28.57	-2.41	0.00	0.00	0.00	4.70	
		6	-22.81	25.58	0.00	0.00	0.00	-20.08			4	13	-29.07	2.41	0.00	0.00	0.00	-5.66		
6	1	6	3.44	7.73	0.00	0.00	0.00	4.56	13	4	12	28.57	-6.11	0.00	0.00	0.00	-3.77			
		7	-3.94	-7.73	0.00	0.00	0.00	-1.47			13	-29.07	6.11	0.00	0.00	0.00	1.33			
		2	6	13.89	19.15	0.00	0.00	0.00			13.70	1	13	13	6.94	-6.29	0.00	0.00	0.00	-4.08
		7	-14.39	-19.15	0.00	0.00	0.00	-6.04			14			-7.44	6.29	0.00	0.00	0.00	1.57	
	3	6	25.58	9.13	0.00	0.00	0.00	16.59		2	13	17.39	-12.16	0.00	0.00	0.00	-6.18			
		7	-26.08	-9.13	0.00	0.00	0.00	-12.94			14	-17.89	12.16	0.00	0.00	0.00	1.31			
		4	6	25.58	19.70	0.00	0.00	0.00			20.08	3	13	29.08	-5.10	0.00	0.00	0.00	5.66	
		7	-26.08	-19.70	0.00	0.00	0.00	-12.20			14	-29.58	5.10	0.00	0.00	0.00	-7.70			
7	1	7	3.94	6.75	0.00	0.00	0.00	1.47	14	4	13	29.07	-11.61	0.00	0.00	0.00	-1.33			
		8	-4.44	-6.75	0.00	0.00	0.00	1.23			14	-29.57	11.61	0.00	0.00	0.00	-3.32			
		2	7	14.39	15.70	0.00	0.00	0.00			6.04	1	14	14	7.44	-9.65	0.00	0.00	0.00	-1.57
		8	-14.89	-15.70	0.00	0.00	0.00	0.24			15			-7.94	9.65	0.00	0.00	0.00	-2.30	
	3	7	26.08	7.75	0.00	0.00	0.00	12.94		2	14	17.89	-17.99	0.00	0.00	0.00	-1.31			
		8	-26.58	-7.75	0.00	0.00	0.00	-9.84			15	-18.39	17.99	0.00	0.00	0.00	-5.88			
		4	7	26.07	16.25	0.00	0.00	0.00			12.20	3	14	29.58	-8.00	0.00	0.00	0.00	7.70	
		8	-26.57	-16.25	0.00	0.00	0.00	-5.70			15	-30.08	8.00	0.00	0.00	0.00	-10.90			
8	1	8	4.44	5.43	0.00	0.00	0.00	-1.23	15	4	14	29.57	-17.45	0.00	0.00	0.00	3.32			
		9	-4.94	-5.43	0.00	0.00	0.00	3.40			15	-30.07	17.45	0.00	0.00	0.00	-10.30			
		2	8	14.89	11.91	0.00	0.00	0.00			-0.24	1	15	15	7.94	-13.36	0.00	0.00	0.00	2.30
		9	-15.39	-11.91	0.00	0.00	0.00	5.01			16			-8.44	13.36	0.00	0.00	0.00	-7.64	
	3	8	26.58	6.15	0.00	0.00	0.00	9.84		2	15	18.39	-24.17	0.00	0.00	0.00	5.88			
		9	-27.08	-6.15	0.00	0.00	0.00	-7.38			16	-18.89	24.17	0.00	0.00	0.00	-15.55			
		4	8	26.58	12.46	0.00	0.00	0.00			5.70	3	15	15	30.08	-11.11	0.00	0.00	0.00	10.90
		9	-27.08	-12.46	0.00	0.00	0.00	-0.72			16			-30.58	11.11	0.00	0.00	0.00	-15.35	

	4	15	30.08	-23.62	0.00	0.00	0.00	10.30
		16	-30.58	23.62	0.00	0.00	0.00	-19.74
16	1	16	17.40	-6.31	0.00	0.00	0.00	-7.64 ✓
		17	-17.40	7.00	0.00	0.00	0.00	3.98
	2	16	30.69	-14.60	0.00	0.00	0.00	-15.55 ✓
		17	-30.69	15.28	0.00	0.00	0.00	7.33
	3	16	14.44	-22.58	0.00	0.00	0.00	-15.35 ✓
		17	-14.44	23.27	0.00	0.00	0.00	2.74
	4	16	30.14	-23.20	0.00	0.00	0.00	-19.74 ✓
		17	-30.14	23.89	0.00	0.00	0.00	6.79
17	1	17	17.40	-4.71	0.00	0.00	0.00	-3.98 ✓
		18	-17.40	5.40	0.00	0.00	0.00	1.20
	2	17	30.69	-10.83	0.00	0.00	0.00	-7.33 ✓
		18	-30.69	11.52	0.00	0.00	0.00	1.19
	3	17	14.44	-15.89	0.00	0.00	0.00	-2.74 ✓
		18	-14.44	16.57	0.00	0.00	0.00	-6.19 ✓
	4	17	30.14	-16.76	0.00	0.00	0.00	-6.79 ✓
		18	-30.14	17.44	0.00	0.00	0.00	-2.61
18	1	18	17.40	-3.17	0.00	0.00	0.00	-1.20 ✓
		19	-17.40	3.86	0.00	0.00	0.00	-0.74
	2	18	30.69	-7.32	0.00	0.00	0.00	-1.19 ✓
		19	-30.69	8.01	0.00	0.00	0.00	-3.03
	3	18	14.44	-10.28	0.00	0.00	0.00	6.19 ✓
		19	-14.44	10.97	0.00	0.00	0.00	-12.03
	4	18	30.14	-11.10	0.00	0.00	0.00	2.61 ✓
		19	-30.14	11.79	0.00	0.00	0.00	-8.90
19	1	19	17.40	-1.71	0.00	0.00	0.00	0.74 ✓
		20	-17.40	2.40	0.00	0.00	0.00	-1.87
	2	19	30.69	-4.11	0.00	0.00	0.00	3.03 ✓
		20	-30.69	4.79	0.00	0.00	0.00	-5.48
	3	19	14.44	-5.62	0.00	0.00	0.00	12.03 ✓
		20	-14.44	6.30	0.00	0.00	0.00	-15.31
	4	19	30.14	-6.18	0.00	0.00	0.00	8.91 ✓
		20	-30.14	6.87	0.00	0.00	0.00	-12.49
20	1	20	17.40	-0.33	0.00	0.00	0.00	1.87 ✓
		21	-17.40	1.02	0.00	0.00	0.00	-2.24
	2	20	30.69	-1.11	0.00	0.00	0.00	5.48 ✓
		21	-30.69	1.80	0.00	0.00	0.00	-6.28
	3	20	14.44	-1.57	0.00	0.00	0.00	15.31 ✓
		21	-14.44	2.26	0.00	0.00	0.00	-16.36
	4	20	30.14	-1.77	0.00	0.00	0.00	12.50 ✓
		21	-30.14	2.46	0.00	0.00	0.00	-13.66

STAAD PLANE PASO DE FAUNA TIPO 1A. Coef. 9.

UNIT ME MT

OUTP WIDT 72

PAGE EJECT

INPUT NO

*

JOIN COOR

1	0.	4.0	0.
2	0.55	4.0	0.
3	1.1	4.0	0.
4	1.65	4.0	0.
5	2.2	4.0	0.
6	2.75	4.0	0.
7	2.75	3.6	0.
8	2.75	3.2	0.
9	2.75	2.8	0.
10	2.75	2.4	0.
11	2.75	2.0	0.
12	2.75	1.6	0.
13	2.75	1.2	0.
14	2.75	0.8	0.
15	2.75	0.4	0.
16	2.75	0.	0.
17	2.2	0.	0.
18	1.65	0.	0.
19	1.1	0.	0.
20	0.55	0.	0.
21	0.	0.	0.

*

MEMB INCI

1 1 2 20

*

MEMB PROP

1 TO 20 PRIX AX 0.5 IZ 0.0104167

*

CONST

E 3000000. 1 TO 5

E 2850000. 6 TO 15

E 3000000. 16 TO 20

POISS 0.2 ALL

*

PP

1	FIXED BUT FY
16	FIXED BUT FX MZ KFY 4725.
17 TO 20	FIXED BUT FX MZ KFY 4950.
21	FIXED BUT KFY 2475.

*

LOAD 1 PORTICO EN CONSTRUCCION

MEMB LOAD

1 TO 5 UNI GY -1.25

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6	FX -0.639
7	FX -0.9798
8	FX -1.3206
9	FX -1.6614
10	FX -2.0022
11	FX -2.343
12	FX -2.6838

13 FX -3.0246

14 FX -3.3654

15 FX -3.7062

16 FX -4.047

*

LOAD 2 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -5.05

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -3.1098

7 FX -3.4506

8 FX -3.7914

9 FX -4.1322

10 FX -4.473

11 FX -4.8138

12 FX -5.1546

13 FX -5.4954

14 FX -5.8362

15 FX -6.177

16 FX -6.5178

LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO

MEMB LOAD

1 TO 5 UNI GY -9.3

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -1.1653

7 FX -1.3821

8 FX -1.5989

9 FX -1.8157

10 FX -2.0325

11 FX -2.2493

12 FX -2.4661

13 FX -2.6829

14 FX -2.8997

15 FX -3.1165

16 FX -3.3333

*

LOAD 4 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -9.3

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -3.1098

7 FX -3.4506

8 FX -3.7914

9 FX -4.1322

10 FX -4.473

11 FX -4.8138

12 FX -5.1546

13 FX -5.4954

14 FX -5.8362

15 FX -6.177

16 FX -6.5178

*

PERF AN

PRINT ANAL RESU
FINISH

```
*****
*
*          S T A A D - III
*          REVISION 10.2b(VERSION 10 LEVEL 2)
*          PROPRIETARY PROGRAM OF
*          RESEARCH ENGINEERS, INC.
*          DATE=      NOV  6, 1998
*          TIME=      19: 4:52
*
*****
```

```
1. STAAD PLANE PASO DE FAUNA TIPO 1A. Coef. 9.
2. UNIT ME MT
3. OUTP WIDT 72
4. PAGE EJECT
5. INPUT NO
6. *
7. JOIN COOR
8. 1      0.      4.0      0.
9. 2      0.55     4.0      0.
10. 3      1.1      4.0      0.
11. 4      1.65     4.0      0.
12. 5      2.2      4.0      0.
13. 6      2.75     4.0      0.
14. 7      2.75     3.6      0.
15. 8      2.75     3.2      0.
16. 9      2.75     2.8      0.
17. 10     2.75     2.4      0.
18. 11     2.75     2.0      0.
19. 12     2.75     1.6      0.
20. 13     2.75     1.2      0.
21. 14     2.75     0.8      0.
22. 15     2.75     0.4      0.
23. 16     2.75     0.       0.
24. 17     2.2      0.       0.
25. 18     1.65     0.       0.
26. 19     1.1      0.       0.
27. 20     0.55     0.       0.
28. 21     0.       0.       0.
29. *
30. MEMB INCI
31. 1 1 2 20
32. *
33. MEMB PROP
34. 1 TO 20 PRIX AX 0.5 IZ 0.0104167
35. *
36. CONST
37. E 3000000. 1 TO 5
38. E 2850000. 6 TO 15
39. E 3000000. 16 TO 20
40. POISS 0.2 ALL
41. *
42. SUPP
43. 1      FIXED BUT FY
44. 16     FIXED BUT FX MZ KFY 4725.
45. 17 TO 20 FIXED BUT FX MZ KFY 4950.
46. 21     FIXED BUT KFY 2475.
47. *
48. LOAD 1 PORTICO EN CONSTRUCCION
```

49. MEMB LOAD
50. 1 TO 5 UNI GY -1.25
51. 6 TO 15 UNI GY -1.25
52. 16 TO 20 UNI GY -1.25
53. JOIN LOAD
54. 6 FX -0.639
55. 7 FX -0.9798
56. 8 FX -1.3206
57. 9 FX -1.6614
58. 10 FX -2.0022
59. 11 FX -2.343
60. 12 FX -2.6838
61. 13 FX -3.0246
62. 14 FX -3.3654
63. 15 FX -3.7062
64. 16 FX -4.047
65. *
66. LOAD 2 PORTICO DESCARGADO
67. MEMB LOAD
68. 1 TO 5 UNI GY -5.05
69. 6 TO 15 UNI GY -1.25
70. 16 TO 20 UNI GY -1.25
71. JOIN LOAD
72. 6 FX -3.1098
73. 7 FX -3.4506
74. 8 FX -3.7914
75. 9 FX -4.1322
76. 10 FX -4.473
77. 11 FX -4.8138
78. 12 FX -5.1546
79. 13 FX -5.4954
80. 14 FX -5.8362
81. 15 FX -6.177
82. 16 FX -6.5178
83. *
84. LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO
85. MEMB LOAD
86. 1 TO 5 UNI GY -9.3
87. 6 TO 15 UNI GY -1.25
88. 16 TO 20 UNI GY -1.25
89. JOIN LOAD
90. 6 FX -1.1653
91. 7 FX -1.3821
92. 8 FX -1.5989
93. 9 FX -1.8157
94. 10 FX -2.0325
95. 11 FX -2.2493
96. 12 FX -2.4661
97. 13 FX -2.6829
98. 14 FX -2.8997
99. 15 FX -3.1165
100. 16 FX -3.3333
101. *
102. LOAD 4 PORTICO DESCARGADO
103. MEMB LOAD
104. 1 TO 5 UNI GY -9.3
105. 6 TO 15 UNI GY -1.25
106. 16 TO 20 UNI GY -1.25
107. JOIN LOAD
108. 6 FX -3.1098

109. 7 FX -3.4506
110. 8 FX -3.7914
111. 9 FX -4.1322
112. 10 FX -4.473
113. 11 FX -4.8138
114. 12 FX -5.1546
115. 13 FX -5.4954
116. 14 FX -5.8362
117. 15 FX -6.177
118. 16 FX -6.5178
119. *
120. PERF AN
** PROCESSING MEMBER/ELEMENT INFORMATION.

** PERFORMING BANDWIDTH REDUCTION.

ORIGINAL BANDWIDTH = 1
REDUCED BANDWIDTH = 1

** CHECKING LOAD DATA.
* PROCESSING SUPPORT CONDITION.
** PROCESSING AND SETTING UP LOAD VECTOR.

** PROCESSING ELEMENT STIFFNESS MATRIX. 19: 4:57
** PROCESSING GLOBAL STIFFNESS MATRIX. 19: 4:57
** PROCESSING TRIANGULAR FACTORIZATION. 19: 4:57
** CALCULATING JOINT DISPLACEMENT. 19: 4:58
** CALCULATING ELEMENT FORCES. 19: 4:58

121. PRINT ANAL RESU

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	0.00000	-0.03927	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.12574	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.35277	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.29029	0.00000	0.00000	0.00000	0.00000
2	1	-0.00031	-0.03921	0.00000	0.00000	0.00000	0.00000
	2	-0.00082	-0.12321	0.00000	0.00000	0.00000	0.00009
	3	-0.00039	-0.34400	0.00000	0.00000	0.00000	0.00031
	4	-0.00085	-0.28318	0.00000	0.00000	0.00000	0.00025
3	1	-0.00062	-0.03922	0.00000	0.00000	0.00000	0.00000
	2	-0.00164	-0.11638	0.00000	0.00000	0.00000	0.00015
	3	-0.00078	-0.31906	0.00000	0.00000	0.00000	0.00058
	4	-0.00169	-0.26322	0.00000	0.00000	0.00000	0.00046
4	1	-0.00092	-0.03984	0.00000	0.00000	0.00000	-0.00002
	2	-0.00246	-0.10745	0.00000	0.00000	0.00000	0.00016
	3	-0.00118	-0.28204	0.00000	0.00000	0.00000	0.00075
	4	-0.00254	-0.23449	0.00000	0.00000	0.00000	0.00056
5	1	-0.00123	-0.04199	0.00000	0.00000	0.00000	-0.00006
	2	-0.00328	-0.10013	0.00000	0.00000	0.00000	0.00009
	3	-0.00157	-0.23973	0.00000	0.00000	0.00000	0.00076
	4	-0.00339	-0.20380	0.00000	0.00000	0.00000	0.00052
6	1	-0.00154	-0.04696	0.00000	0.00000	0.00000	-0.00013

7	2	-0.00410	-0.09959	0.00000	0.00000	0.00000	-0.00009
	3	-0.00196	-0.20167	0.00000	0.00000	0.00000	0.00058
	4	-0.00423	-0.18067	0.00000	0.00000	0.00000	0.00028
	1	-0.00750	-0.04685	0.00000	0.00000	0.00000	-0.00017
8	2	-0.01071	-0.09919	0.00000	0.00000	0.00000	-0.00022
	3	0.01717	-0.20095	0.00000	0.00000	0.00000	0.00038
	4	0.00229	-0.17995	0.00000	0.00000	0.00000	0.00006
	1	-0.01430	-0.04673	0.00000	0.00000	0.00000	-0.00017
9	2	-0.02071	-0.09878	0.00000	0.00000	0.00000	-0.00026
	3	0.02925	-0.20021	0.00000	0.00000	0.00000	0.00023
	4	0.00208	-0.17921	0.00000	0.00000	0.00000	-0.00006
	1	-0.02047	-0.04660	0.00000	0.00000	0.00000	-0.00014
10	2	-0.03070	-0.09836	0.00000	0.00000	0.00000	-0.00023
	3	0.03602	-0.19946	0.00000	0.00000	0.00000	0.00012
	4	-0.00130	-0.17846	0.00000	0.00000	0.00000	-0.00010
	1	-0.02487	-0.04646	0.00000	0.00000	0.00000	-0.00008
11	2	-0.03811	-0.09792	0.00000	0.00000	0.00000	-0.00014
	3	0.03888	-0.19869	0.00000	0.00000	0.00000	0.00003
	4	-0.00511	-0.17769	0.00000	0.00000	0.00000	-0.00008
	1	-0.02669	-0.04630	0.00000	0.00000	0.00000	-0.00001
12	2	-0.04125	-0.09747	0.00000	0.00000	0.00000	-0.00002
	3	0.03885	-0.19791	0.00000	0.00000	0.00000	-0.00003
	4	-0.00752	-0.17691	0.00000	0.00000	0.00000	-0.00003
	1	-0.02554	-0.04612	0.00000	0.00000	0.00000	0.00007
13	2	-0.03941	-0.09700	0.00000	0.00000	0.00000	0.00011
	3	0.03649	-0.19711	0.00000	0.00000	0.00000	-0.00009
	4	-0.00764	-0.17611	0.00000	0.00000	0.00000	0.00003
	1	-0.02158	-0.04594	0.00000	0.00000	0.00000	0.00013
14	2	-0.03289	-0.09652	0.00000	0.00000	0.00000	0.00021
	3	0.03191	-0.19631	0.00000	0.00000	0.00000	-0.00014
	4	-0.00562	-0.17530	0.00000	0.00000	0.00000	0.00007
	1	-0.01550	-0.04573	0.00000	0.00000	0.00000	0.00017
15	2	-0.02313	-0.09602	0.00000	0.00000	0.00000	0.00027
	3	0.02466	-0.19548	0.00000	0.00000	0.00000	-0.00022
	4	-0.00275	-0.17448	0.00000	0.00000	0.00000	0.00006
	1	-0.00867	-0.04552	0.00000	0.00000	0.00000	0.00016
16	2	-0.01275	-0.09551	0.00000	0.00000	0.00000	0.00024
	3	0.01371	-0.19464	0.00000	0.00000	0.00000	-0.00033
	4	-0.00146	-0.17364	0.00000	0.00000	0.00000	-0.00002
	1	-0.00319	-0.04529	0.00000	0.00000	0.00000	0.00010
17	2	-0.00561	-0.09499	0.00000	0.00000	0.00000	0.00010
	3	-0.00258	-0.19379	0.00000	0.00000	0.00000	-0.00049
	4	-0.00547	-0.17279	0.00000	0.00000	0.00000	-0.00021
	1	-0.00255	-0.04760	0.00000	0.00000	0.00000	0.00000
18	2	-0.00449	-0.09427	0.00000	0.00000	0.00000	-0.00010
	3	-0.00206	-0.16190	0.00000	0.00000	0.00000	-0.00063
	4	-0.00438	-0.15440	0.00000	0.00000	0.00000	-0.00043
	1	-0.00191	-0.04593	0.00000	0.00000	0.00000	-0.00005
19	2	-0.00337	-0.08627	0.00000	0.00000	0.00000	-0.00017
	3	-0.00155	-0.12737	0.00000	0.00000	0.00000	-0.00060
	4	-0.00328	-0.12932	0.00000	0.00000	0.00000	-0.00046
	1	-0.00127	-0.04294	0.00000	0.00000	0.00000	-0.00005
20	2	-0.00224	-0.07675	0.00000	0.00000	0.00000	-0.00016
	3	-0.00103	-0.09806	0.00000	0.00000	0.00000	-0.00045
	4	-0.00219	-0.10608	0.00000	0.00000	0.00000	-0.00037
	1	-0.00064	-0.04045	0.00000	0.00000	0.00000	-0.00003
21	2	-0.00112	-0.06958	0.00000	0.00000	0.00000	-0.00009
	3	-0.00052	-0.07877	0.00000	0.00000	0.00000	-0.00024
	4	-0.00109	-0.09013	0.00000	0.00000	0.00000	-0.00020
	1	0.00000	-0.03951	0.00000	0.00000	0.00000	0.00000

2	0.00000	-0.06695	0.00000	0.00000	0.00000	0.00000
3	0.00000	-0.07208	0.00000	0.00000	0.00000	0.00000
4	0.00000	-0.08450	0.00000	0.00000	0.00000	0.00000

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	8.39	0.00	0.00	0.00	0.00	-0.15
	2	22.36	0.00	0.00	0.00	0.00	-5.34
	3	10.70	0.00	0.00	0.00	0.00	-18.35
	4	23.10	0.00	0.00	0.00	0.00	-14.92
16	1	0.00	2.14	0.00	0.00	0.00	0.00
	2	0.00	4.49	0.00	0.00	0.00	0.00
	3	0.00	9.16	0.00	0.00	0.00	0.00
	4	0.00	8.16	0.00	0.00	0.00	0.00
17	1	0.00	2.36	0.00	0.00	0.00	0.00
	2	0.00	4.67	0.00	0.00	0.00	0.00
	3	0.00	8.01	0.00	0.00	0.00	0.00
	4	0.00	7.64	0.00	0.00	0.00	0.00
18	1	0.00	2.27	0.00	0.00	0.00	0.00
	2	0.00	4.27	0.00	0.00	0.00	0.00
	3	0.00	6.30	0.00	0.00	0.00	0.00
	4	0.00	6.40	0.00	0.00	0.00	0.00
19	1	0.00	2.13	0.00	0.00	0.00	0.00
	2	0.00	3.80	0.00	0.00	0.00	0.00
	3	0.00	4.85	0.00	0.00	0.00	0.00
	4	0.00	5.25	0.00	0.00	0.00	0.00
20	1	0.00	2.00	0.00	0.00	0.00	0.00
	2	0.00	3.44	0.00	0.00	0.00	0.00
	3	0.00	3.90	0.00	0.00	0.00	0.00
	4	0.00	4.46	0.00	0.00	0.00	0.00
21	1	17.39	0.98	0.00	0.00	0.00	2.10
	2	30.60	1.66	0.00	0.00	0.00	5.70
	3	14.05	1.78	0.00	0.00	0.00	14.13
	4	29.85	2.09	0.00	0.00	0.00	11.99

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	8.39	0.00	0.00	0.00	0.00	-0.15
		2	-8.39	0.69	0.00	0.00	0.00	-0.04
	2	1	22.36	0.00	0.00	0.00	0.00	-5.34
		2	-22.36	2.78	0.00	0.00	0.00	4.58
	3	1	10.70	0.00	0.00	0.00	0.00	-18.35
		2	-10.70	5.11	0.00	0.00	0.00	16.94
	4	1	23.10	0.00	0.00	0.00	0.00	-14.92
		2	-23.10	5.11	0.00	0.00	0.00	13.51
2	1	2	8.39	-0.69	0.00	0.00	0.00	0.04
		3	-8.39	1.37	0.00	0.00	0.00	-0.60
	2	2	22.36	-2.78	0.00	0.00	0.00	-4.58
		3	-22.36	5.55	0.00	0.00	0.00	2.29

		16	-30.58	23.33	0.00	0.00	0.00	-18.76
16	1	16	17.39	-6.30	0.00	0.00	0.00	-7.57
		17	-17.39	6.99	0.00	0.00	0.00	3.92
	2	16	30.60	-14.40	0.00	0.00	0.00	-15.24
		17	-30.60	15.09	0.00	0.00	0.00	7.13
	3	16	14.05	-21.42	0.00	0.00	0.00	-13.98
		17	-14.05	22.11	0.00	0.00	0.00	2.01
	4	16	29.85	-22.41	0.00	0.00	0.00	-18.76
		17	-29.85	23.10	0.00	0.00	0.00	6.24
17	1	17	17.39	-4.63	0.00	0.00	0.00	-3.92
		18	-17.39	5.32	0.00	0.00	0.00	1.19
	2	17	30.60	-10.42	0.00	0.00	0.00	-7.13
		18	-30.60	11.11	0.00	0.00	0.00	1.21
	3	17	14.05	-14.09	0.00	0.00	0.00	-2.01
		18	-14.05	14.78	0.00	0.00	0.00	-5.93
	4	17	29.85	-15.46	0.00	0.00	0.00	-6.24
		18	-29.85	16.14	0.00	0.00	0.00	-2.45
18	1	18	17.39	-3.04	0.00	0.00	0.00	-1.19
		19	-17.39	3.73	0.00	0.00	0.00	-0.68
	2	18	30.60	-6.84	0.00	0.00	0.00	-1.21
		19	-30.60	7.52	0.00	0.00	0.00	-2.74
	3	18	14.05	-8.47	0.00	0.00	0.00	5.93
		19	-14.05	9.16	0.00	0.00	0.00	-10.78
	4	18	29.85	-9.74	0.00	0.00	0.00	2.45
		19	-29.85	10.43	0.00	0.00	0.00	-7.99
19	1	19	17.39	-1.61	0.00	0.00	0.00	0.68
		20	-17.39	2.29	0.00	0.00	0.00	-1.75
	2	19	30.60	-3.73	0.00	0.00	0.00	2.74
		20	-30.60	4.41	0.00	0.00	0.00	-4.98
	3	19	14.05	-4.31	0.00	0.00	0.00	10.78
		20	-14.05	5.00	0.00	0.00	0.00	-13.33
	4	19	29.85	-5.18	0.00	0.00	0.00	7.99
		20	-29.85	5.87	0.00	0.00	0.00	-11.03
20	1	20	17.39	-0.29	0.00	0.00	0.00	1.75
		21	-17.39	0.98	0.00	0.00	0.00	-2.10
	2	20	30.60	-0.97	0.00	0.00	0.00	4.98
		21	-30.60	1.66	0.00	0.00	0.00	-5.70
	3	20	14.05	-1.10	0.00	0.00	0.00	13.33
		21	-14.05	1.78	0.00	0.00	0.00	-14.13
	4	20	29.85	-1.40	0.00	0.00	0.00	11.03
		21	-29.85	2.09	0.00	0.00	0.00	-11.99

13 FX -3.0246
 14 FX -3.3654
 15 FX -3.7062
 16 FX -4.047
 *

LOAD 2 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -5.05
 6 TO 15 UNI GY -1.25
 16 TO 20 UNI GY -2.73

JOIN LOAD

6 FX -3.1098
 7 FX -3.4506
 8 FX -3.7914
 9 FX -4.1322
 10 FX -4.473
 11 FX -4.8138
 12 FX -5.1546
 13 FX -5.4954
 14 FX -5.8362
 15 FX -6.177
 16 FX -6.5178

LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO

MEMB LOAD

1 TO 5 UNI GY -9.3
 6 TO 15 UNI GY -1.25
 16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -1.1653
 7 FX -1.3821
 8 FX -1.5989
 9 FX -1.8157
 10 FX -2.0325
 11 FX -2.2493
 12 FX -2.4661
 13 FX -2.6829
 14 FX -2.8997
 15 FX -3.1165
 16 FX -3.3333

*

AD 4 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -9.3
 6 TO 15 UNI GY -1.25
 16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -3.1098
 7 FX -3.4506
 8 FX -3.7914
 9 FX -4.1322
 10 FX -4.473
 11 FX -4.8138
 12 FX -5.1546
 13 FX -5.4954
 14 FX -5.8362
 15 FX -6.177
 16 FX -6.5178

*

PERF AN

STAAD PLANE PASO DE FAUNA TIPO 1B. Coef. 5,1.

UNIT ME MT

OUTP WIDT 72

PAGE EJECT

INPUT NO

*

JOIN COOR

1	0.	4.0	0.
2	0.55	4.0	0.
3	1.1	4.0	0.
4	1.65	4.0	0.
5	2.2	4.0	0.
6	2.75	4.0	0.
7	2.75	3.6	0.
8	2.75	3.2	0.
9	2.75	2.8	0.
10	2.75	2.4	0.
11	2.75	2.0	0.
12	2.75	1.6	0.
13	2.75	1.2	0.
14	2.75	0.8	0.
15	2.75	0.4	0.
.	2.75	0.	0.
17	2.2	0.	0.
18	1.65	0.	0.
19	1.1	0.	0.
20	0.55	0.	0.
21	0.	0.	0.

*

MEMB INCI

1 1 2 20

*

MEMB PROP

1 TO 20 PRIX AX 0.5 IZ 0.0104167

*

CONST

E 3000000. 1 TO 5
 E 2850000. 6 TO 15
 E 3000000. 16 TO 20
 POISS 0.2 ALL

*

. PP

1 FIXED BUT FY
 16 FIXED BUT FX MZ KFY 2677.5
 17 TO 20 FIXED BUT FX MZ KFY 2805.
 21 FIXED BUT KFY 1402.5

*

LOAD 1 PORTICO EN CONSTRUCCION

MEMB LOAD

1 TO 5 UNI GY -1.25
 6 TO 15 UNI GY -1.25
 16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -0.639
 7 FX -0.9798
 8 FX -1.3206
 9 FX -1.6614
 10 FX -2.0022
 11 FX -2.343
 12 FX -2.6838

PRINT ANAL RESU
FINISH

```
*****
*
*          S T A A D - III
*          REVISION 10.2b(VERSION 10 LEVEL 2)
*          PROPRIETARY PROGRAM OF
*          RESEARCH ENGINEERS, INC.
*          DATE=      NOV  6, 1998
*          TIME=      19: 4:26
*
*****
```

```
1. STAAD PLANE PASO DE FAUNA TIPO 1B. Coef. 5,1.
2. UNIT ME MT
3. OUTP WIDT 72
4. PAGE EJECT
5. INPUT NO
6. *
7. JOIN COOR
8. 1      0.      4.0      0.
9. 2      0.55     4.0      0.
10. 3      1.1      4.0      0.
11. 4      1.65     4.0      0.
12. 5      2.2      4.0      0.
13. 6      2.75     4.0      0.
14. 7      2.75     3.6      0.
15. 8      2.75     3.2      0.
16. 9      2.75     2.8      0.
17. 10     2.75     2.4      0.
18. 11     2.75     2.0      0.
19. 12     2.75     1.6      0.
20. 13     2.75     1.2      0.
21. 14     2.75     0.8      0.
22. 15     2.75     0.4      0.
23. 16     2.75     0.      0.
24. 17     2.2      0.      0.
25. 18     1.65     0.      0.
26. 19     1.1      0.      0.
27. 20     0.55     0.      0.
28. 21     0.      0.      0.
29. *
30. MEMB INCI
31. 1 1 2 20
32. *
33. MEMB PROP
34. 1 TO 20 PRIX AX 0.5 IZ 0.0104167
35. *
36. CONST
37. E 3000000. 1 TO 5
38. E 2850000. 6 TO 15
39. E 3000000. 16 TO 20
40. POISS 0.2 ALL
41. *
42. SUPP
43. 1      FIXED BUT FY
44. 16     FIXED BUT FX MZ KFY 2677.5
45. 17 TO 20 FIXED BUT FX MZ KFY 2805.
46. 21     FIXED BUT KFY 1402.5
47. *
48. LOAD 1 PORTICO EN CONSTRUCCION
```

49. MEMB LOAD
 50. 1 TO 5 UNI GY -1.25
 51. 6 TO 15 UNI GY -1.25
 52. 16 TO 20 UNI GY -1.25
 53. JOIN LOAD
 54. 6 FX -0.639
 55. 7 FX -0.9798
 56. 8 FX -1.3206
 57. 9 FX -1.6614
 58. 10 FX -2.0022
 59. 11 FX -2.343
 60. 12 FX -2.6838
 61. 13 FX -3.0246
 62. 14 FX -3.3654
 63. 15 FX -3.7062
 64. 16 FX -4.047
 65. *
 66. LOAD 2 PORTICO DESCARGADO
 67. MEMB LOAD
 68. 1 TO 5 UNI GY -5.05
 69. 6 TO 15 UNI GY -1.25
 70. 16 TO 20 UNI GY -2.73
 71. JOIN LOAD
 72. 6 FX -3.1098
 73. 7 FX -3.4506
 74. 8 FX -3.7914
 75. 9 FX -4.1322
 76. 10 FX -4.473
 77. 11 FX -4.8138
 78. 12 FX -5.1546
 79. 13 FX -5.4954
 80. 14 FX -5.8362
 81. 15 FX -6.177
 82. 16 FX -6.5178
 83. *
 84. LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO
 85. MEMB LOAD
 86. 1 TO 5 UNI GY -9.3
 87. 6 TO 15 UNI GY -1.25
 88. 16 TO 20 UNI GY -1.25
 89. JOIN LOAD
 90. 6 FX -1.1653
 91. 7 FX -1.3821
 92. 8 FX -1.5989
 93. 9 FX -1.8157
 94. 10 FX -2.0325
 95. 11 FX -2.2493
 96. 12 FX -2.4661
 97. 13 FX -2.6829
 98. 14 FX -2.8997
 99. 15 FX -3.1165
 100. 16 FX -3.3333
 101. *
 102. LOAD 4 PORTICO DESCARGADO
 103. MEMB LOAD
 104. 1 TO 5 UNI GY -9.3
 105. 6 TO 15 UNI GY -1.25
 106. 16 TO 20 UNI GY -1.25
 107. JOIN LOAD
 108. 6 FX -3.1098

109. 7 FX -3.4506
 110. 8 FX -3.7914
 111. 9 FX -4.1322
 112. 10 FX -4.473
 113. 11 FX -4.8138
 114. 12 FX -5.1546
 115. 13 FX -5.4954
 116. 14 FX -5.8362
 117. 15 FX -6.177
 118. 16 FX -6.5178
 119. *
 120. PERF AN
 ** PROCESSING MEMBER/ELEMENT INFORMATION.
 ** PERFORMING BANDWIDTH REDUCTION.

ORIGINAL BANDWIDTH = 1
 REDUCED BANDWIDTH = 1

** CHECKING LOAD DATA.
 * PROCESSING SUPPORT CONDITION.
 ** PROCESSING AND SETTING UP LOAD VECTOR.

** PROCESSING ELEMENT STIFFNESS MATRIX. 19: 4:31
 ** PROCESSING GLOBAL STIFFNESS MATRIX. 19: 4:31
 ** PROCESSING TRIANGULAR FACTORIZATION. 19: 4:31
 ** CALCULATING JOINT DISPLACEMENT. 19: 4:32
 ** CALCULATING ELEMENT FORCES. 19: 4:32

121. PRINT ANAL RESU

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	0.00000	-0.07348	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.21677	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.46039	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.39486	0.00000	0.00000	0.00000	0.00000
2	1	-0.00031	-0.07341	0.00000	0.00000	0.00000	0.00000
	2	-0.00082	-0.21424	0.00000	0.00000	0.00000	0.00009
	3	-0.00038	-0.45151	0.00000	0.00000	0.00000	0.00032
	4	-0.00084	-0.38767	0.00000	0.00000	0.00000	0.00026
3	1	-0.00061	-0.07341	0.00000	0.00000	0.00000	0.00000
	2	-0.00164	-0.20738	0.00000	0.00000	0.00000	0.00015
	3	-0.00076	-0.42624	0.00000	0.00000	0.00000	0.00059
	4	-0.00167	-0.36747	0.00000	0.00000	0.00000	0.00046
4	1	-0.00092	-0.07400	0.00000	0.00000	0.00000	-0.00002
	2	-0.00246	-0.19841	0.00000	0.00000	0.00000	0.00016
	3	-0.00113	-0.38866	0.00000	0.00000	0.00000	0.00076
	4	-0.00251	-0.33834	0.00000	0.00000	0.00000	0.00057
5	1	-0.00123	-0.07612	0.00000	0.00000	0.00000	-0.00006
	2	-0.00327	-0.19102	0.00000	0.00000	0.00000	0.00009
	3	-0.00151	-0.34558	0.00000	0.00000	0.00000	0.00078
	4	-0.00335	-0.30709	0.00000	0.00000	0.00000	0.00053
6	1	-0.00153	-0.08104	0.00000	0.00000	0.00000	-0.00012

	2	-0.00409	-0.19040	0.00000	0.00000	0.00000	-0.00009
	3	-0.00189	-0.30654	0.00000	0.00000	0.00000	0.00060
	4	-0.00418	-0.28325	0.00000	0.00000	0.00000	0.00030
7	1	-0.00746	-0.08093	0.00000	0.00000	0.00000	-0.00016
	2	-0.01063	-0.19000	0.00000	0.00000	0.00000	-0.00022
	3	0.01810	-0.30581	0.00000	0.00000	0.00000	0.00040
	4	0.00295	-0.28252	0.00000	0.00000	0.00000	0.00008
8	1	-0.01421	-0.08082	0.00000	0.00000	0.00000	-0.00017
	2	-0.02056	-0.18959	0.00000	0.00000	0.00000	-0.00026
	3	0.03106	-0.30507	0.00000	0.00000	0.00000	0.00025
	4	0.00339	-0.28178	0.00000	0.00000	0.00000	-0.00004
9	1	-0.02035	-0.08068	0.00000	0.00000	0.00000	-0.00014
	2	-0.03048	-0.18917	0.00000	0.00000	0.00000	-0.00022
	3	0.03866	-0.30432	0.00000	0.00000	0.00000	0.00013
	4	0.00062	-0.28103	0.00000	0.00000	0.00000	-0.00009
10	1	-0.02471	-0.08054	0.00000	0.00000	0.00000	-0.00008
	2	-0.03783	-0.18873	0.00000	0.00000	0.00000	-0.00014
	3	0.04222	-0.30355	0.00000	0.00000	0.00000	0.00005
	4	-0.00269	-0.28026	0.00000	0.00000	0.00000	-0.00007
11	1	-0.02651	-0.08038	0.00000	0.00000	0.00000	-0.00001
	2	-0.04094	-0.18828	0.00000	0.00000	0.00000	-0.00002
	3	0.04267	-0.30277	0.00000	0.00000	0.00000	-0.00002
	4	-0.00475	-0.27948	0.00000	0.00000	0.00000	-0.00003
12	1	-0.02536	-0.08021	0.00000	0.00000	0.00000	0.00007
	2	-0.03908	-0.18781	0.00000	0.00000	0.00000	0.00011
	3	0.04049	-0.30198	0.00000	0.00000	0.00000	-0.00009
	4	-0.00474	-0.27869	0.00000	0.00000	0.00000	0.00003
13	1	-0.02140	-0.08002	0.00000	0.00000	0.00000	0.00013
	2	-0.03258	-0.18733	0.00000	0.00000	0.00000	0.00021
	3	0.03569	-0.30117	0.00000	0.00000	0.00000	-0.00016
	4	-0.00288	-0.27788	0.00000	0.00000	0.00000	0.00006
14	1	-0.01536	-0.07982	0.00000	0.00000	0.00000	0.00017
	2	-0.02288	-0.18683	0.00000	0.00000	0.00000	0.00026
	3	0.02775	-0.30034	0.00000	0.00000	0.00000	-0.00025
	4	-0.00051	-0.27705	0.00000	0.00000	0.00000	0.00005
15	1	-0.00859	-0.07960	0.00000	0.00000	0.00000	0.00016
	2	-0.01260	-0.18632	0.00000	0.00000	0.00000	0.00023
	3	0.01554	-0.29951	0.00000	0.00000	0.00000	-0.00037
	4	-0.00013	-0.27622	0.00000	0.00000	0.00000	-0.00004
16	1	-0.00319	-0.07937	0.00000	0.00000	0.00000	0.00010
	2	-0.00562	-0.18580	0.00000	0.00000	0.00000	0.00009
	3	-0.00265	-0.29865	0.00000	0.00000	0.00000	-0.00055
	4	-0.00553	-0.27537	0.00000	0.00000	0.00000	-0.00025
17	1	-0.00255	-0.08150	0.00000	0.00000	0.00000	-0.00001
	2	-0.00449	-0.18475	0.00000	0.00000	0.00000	-0.00011
	3	-0.00212	-0.26310	0.00000	0.00000	0.00000	-0.00071
	4	-0.00442	-0.25432	0.00000	0.00000	0.00000	-0.00048
18	1	-0.00191	-0.07961	0.00000	0.00000	0.00000	-0.00005
	2	-0.00337	-0.17625	0.00000	0.00000	0.00000	-0.00018
	3	-0.00159	-0.22427	0.00000	0.00000	0.00000	-0.00068
	4	-0.00332	-0.22609	0.00000	0.00000	0.00000	-0.00052
19	1	-0.00128	-0.07639	0.00000	0.00000	0.00000	-0.00006
	2	-0.00225	-0.16618	0.00000	0.00000	0.00000	-0.00017
	3	-0.00106	-0.19090	0.00000	0.00000	0.00000	-0.00052
	4	-0.00221	-0.19985	0.00000	0.00000	0.00000	-0.00042
20	1	-0.00064	-0.07373	0.00000	0.00000	0.00000	-0.00004
	2	-0.00112	-0.15857	0.00000	0.00000	0.00000	-0.00010
	3	-0.00053	-0.16873	0.00000	0.00000	0.00000	-0.00028
	4	-0.00111	-0.18177	0.00000	0.00000	0.00000	-0.00023
21	1	0.00000	-0.07272	0.00000	0.00000	0.00000	0.00000

2	0.00000	-0.15578	0.00000	0.00000	0.00000	0.00000
3	0.00000	-0.16100	0.00000	0.00000	0.00000	0.00000
4	0.00000	-0.17537	0.00000	0.00000	0.00000	0.00000

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	8.37	0.00	0.00	0.00	0.00	-0.16
	2	22.32	0.00	0.00	0.00	0.00	-5.36
	3	10.30	0.00	0.00	0.00	0.00	-18.58
	4	22.81	0.00	0.00	0.00	0.00	-15.08
16	1	0.00	2.13	0.00	0.00	0.00	0.00
	2	0.00	4.97	0.00	0.00	0.00	0.00
	3	0.00	8.00	0.00	0.00	0.00	0.00
	4	0.00	7.37	0.00	0.00	0.00	0.00
17	1	0.00	2.29	0.00	0.00	0.00	0.00
	2	0.00	5.18	0.00	0.00	0.00	0.00
	3	0.00	7.38	0.00	0.00	0.00	0.00
	4	0.00	7.13	0.00	0.00	0.00	0.00
18	1	0.00	2.23	0.00	0.00	0.00	0.00
	2	0.00	4.94	0.00	0.00	0.00	0.00
	3	0.00	6.29	0.00	0.00	0.00	0.00
	4	0.00	6.34	0.00	0.00	0.00	0.00
19	1	0.00	2.14	0.00	0.00	0.00	0.00
	2	0.00	4.66	0.00	0.00	0.00	0.00
	3	0.00	5.35	0.00	0.00	0.00	0.00
	4	0.00	5.61	0.00	0.00	0.00	0.00
20	1	0.00	2.07	0.00	0.00	0.00	0.00
	2	0.00	4.45	0.00	0.00	0.00	0.00
	3	0.00	4.73	0.00	0.00	0.00	0.00
	4	0.00	5.10	0.00	0.00	0.00	0.00
21	1	17.40	1.02	0.00	0.00	0.00	2.24
	2	30.63	2.18	0.00	0.00	0.00	6.10
	3	14.44	2.26	0.00	0.00	0.00	16.36
	4	30.14	2.46	0.00	0.00	0.00	13.66

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	8.37	0.00	0.00	0.00	0.00	-0.16
		2	-8.37	0.69	0.00	0.00	0.00	-0.03
	2	1	22.32	0.00	0.00	0.00	0.00	-5.36
		2	-22.32	2.78	0.00	0.00	0.00	4.60
	3	1	10.30	0.00	0.00	0.00	0.00	-18.58
		2	-10.30	5.12	0.00	0.00	0.00	17.17
	4	1	22.81	0.00	0.00	0.00	0.00	-15.08
		2	-22.81	5.11	0.00	0.00	0.00	13.68
2	1	2	8.37	-0.69	0.00	0.00	0.00	0.03
		3	-8.37	1.38	0.00	0.00	0.00	-0.59
	2	2	22.32	-2.78	0.00	0.00	0.00	-4.60
		3	-22.32	5.55	0.00	0.00	0.00	2.31

	3	2	10.30	-5.11	0.00	0.00	0.00	-17.17		2	10	-5.44	-3.77	0.00	0.00	0.00	4.91
		3	-10.30	10.23	0.00	0.00	0.00	12.95			9	15.39	7.84	0.00	0.00	0.00	-5.05
		4	22.81	-5.12	0.00	0.00	0.00	-13.68			10	-15.89	-7.84	0.00	0.00	0.00	8.18
		3	-22.81	10.23	0.00	0.00	0.00	9.46			3	9	27.08	4.34	0.00	0.00	7.38
3	1	3	8.37	-1.38	0.00	0.00	0.00	0.59	10	4	10	-27.58	-4.34	0.00	0.00	0.00	-5.64
		4	-8.37	2.06	0.00	0.00	0.00	-1.54			9	27.07	8.33	0.00	0.00	0.00	0.72
	2	3	22.32	-5.56	0.00	0.00	0.00	-2.31		10	10	-27.57	-8.33	0.00	0.00	0.00	2.61
		4	-22.32	8.33	0.00	0.00	0.00	-1.51			1	10	5.44	1.77	0.00	0.00	-4.91
	3	3	10.30	-10.23	0.00	0.00	0.00	-12.95		2	11	-5.94	-1.77	0.00	0.00	0.00	5.61
		4	-10.30	15.35	0.00	0.00	0.00	5.92			10	15.89	3.37	0.00	0.00	0.00	-8.18
	4	3	22.81	-10.23	0.00	0.00	0.00	-9.46		3	11	-16.39	-3.37	0.00	0.00	0.00	9.53
		4	-22.81	15.34	0.00	0.00	0.00	2.43			10	27.57	2.30	0.00	0.00	0.00	5.64
4	1	4	8.37	-2.06	0.00	0.00	0.00	1.54	11	4	11	-28.07	-2.30	0.00	0.00	0.00	-4.72
		5	-8.37	2.75	0.00	0.00	0.00	-2.86			10	27.57	3.85	0.00	0.00	0.00	-2.61
	2	4	22.32	-8.33	0.00	0.00	0.00	1.51		11	11	-28.07	-3.85	0.00	0.00	0.00	4.16
		5	-22.32	11.11	0.00	0.00	0.00	-6.86			1	11	5.94	-0.58	0.00	0.00	-5.61
	3	4	10.30	-15.34	0.00	0.00	0.00	-5.92		2	12	-6.44	0.58	0.00	0.00	0.00	5.38
		5	-10.30	20.46	0.00	0.00	0.00	-3.93			11	16.39	-1.45	0.00	0.00	0.00	-9.53
	4	4	22.81	-15.34	0.00	0.00	0.00	-2.43		3	12	-16.89	1.45	0.00	0.00	0.00	8.95
		5	-22.81	20.46	0.00	0.00	0.00	-7.42			11	28.08	0.05	0.00	0.00	0.00	4.72
5	1	5	8.37	-2.75	0.00	0.00	0.00	2.86	12	4	12	-28.58	-0.05	0.00	0.00	0.00	-4.70
		6	-8.37	3.44	0.00	0.00	0.00	-4.56			11	28.07	-0.96	0.00	0.00	0.00	-4.16
	2	5	22.32	-11.11	0.00	0.00	0.00	6.86		12	12	-28.57	0.96	0.00	0.00	0.00	3.77
		6	-22.32	13.89	0.00	0.00	0.00	-13.73			1	12	6.44	-3.26	0.00	0.00	-5.38
	3	5	10.30	-20.46	0.00	0.00	0.00	3.93		2	13	-6.94	3.26	0.00	0.00	0.00	4.08
		6	-10.30	25.57	0.00	0.00	0.00	-16.59			12	16.89	-6.60	0.00	0.00	0.00	-8.95
	4	5	22.81	-20.46	0.00	0.00	0.00	7.42		3	13	-17.39	6.60	0.00	0.00	0.00	6.31
		6	-22.81	25.58	0.00	0.00	0.00	-20.08			12	28.57	-2.41	0.00	0.00	0.00	4.70
6	1	6	3.44	7.73	0.00	0.00	0.00	4.56	13	4	13	-29.07	2.41	0.00	0.00	0.00	-5.66
		7	-3.94	-7.73	0.00	0.00	0.00	-1.47			12	28.57	-6.11	0.00	0.00	0.00	-3.77
	2	6	13.89	19.21	0.00	0.00	0.00	13.73		13	13	-29.07	6.11	0.00	0.00	0.00	1.33
		7	-14.39	-19.21	0.00	0.00	0.00	-6.05			1	13	6.94	-6.29	0.00	0.00	-4.08
	3	6	25.58	9.13	0.00	0.00	0.00	16.59		2	14	-7.44	6.29	0.00	0.00	0.00	1.57
		7	-26.08	-9.13	0.00	0.00	0.00	-12.94			13	17.39	-12.10	0.00	0.00	0.00	-6.31
	4	6	25.58	19.70	0.00	0.00	0.00	20.08		3	14	-17.89	12.10	0.00	0.00	0.00	1.47
		7	-26.08	-19.70	0.00	0.00	0.00	-12.20			13	29.08	-5.10	0.00	0.00	0.00	5.66
7	1	7	3.94	6.75	0.00	0.00	0.00	1.47	14	4	14	-29.58	5.10	0.00	0.00	0.00	-7.70
		8	-4.44	-6.75	0.00	0.00	0.00	1.23			13	29.07	-11.61	0.00	0.00	0.00	-1.33
	2	7	14.39	15.76	0.00	0.00	0.00	6.05		14	14	-29.57	11.61	0.00	0.00	0.00	-3.32
		8	-14.89	-15.76	0.00	0.00	0.00	0.26			1	14	7.44	-9.65	0.00	0.00	-1.57
	3	7	26.08	7.75	0.00	0.00	0.00	12.94		2	15	-7.94	9.65	0.00	0.00	0.00	-2.30
		8	-26.58	-7.75	0.00	0.00	0.00	-9.84			14	17.89	-17.93	0.00	0.00	0.00	-1.47
	4	7	26.07	16.25	0.00	0.00	0.00	12.20		3	15	-18.39	17.93	0.00	0.00	0.00	-5.70
		8	-26.57	-16.25	0.00	0.00	0.00	-5.70			14	29.58	-8.00	0.00	0.00	0.00	7.70
8	1	8	4.44	5.43	0.00	0.00	0.00	-1.23	15	4	15	-30.08	8.00	0.00	0.00	0.00	-10.90
		9	-4.94	-5.43	0.00	0.00	0.00	3.40			14	29.57	-17.45	0.00	0.00	0.00	3.32
	2	8	14.89	11.97	0.00	0.00	0.00	-0.26		15	15	-30.07	17.45	0.00	0.00	0.00	-10.30
		9	-15.39	-11.97	0.00	0.00	0.00	5.05			1	15	7.94	-13.36	0.00	0.00	2.30
	3	8	26.58	6.15	0.00	0.00	0.00	9.84		2	16	-8.44	13.36	0.00	0.00	0.00	-7.64
		9	-27.08	-6.15	0.00	0.00	0.00	-7.38			15	18.39	-24.11	0.00	0.00	0.00	5.70
	4	8	26.58	12.46	0.00	0.00	0.00	5.70		3	16	-18.89	24.11	0.00	0.00	0.00	-15.35
		9	-27.08	-12.46	0.00	0.00	0.00	-0.72			15	30.08	-11.11	0.00	0.00	0.00	10.90
9	1	9	4.94	3.77	0.00	0.00	0.00	-3.40	4	15	16	-30.58	11.11	0.00	0.00	0.00	-15.35
											15	30.08	-23.62	0.00	0.00	0.00	10.30

		16	-30.58	23.62	0.00	0.00	0.00	-19.74
16	1	16	17.40	-6.31	0.00	0.00	0.00	-7.64
		17	-17.40	7.00	0.00	0.00	0.00	3.98
	2	16	30.63	-13.91	0.00	0.00	0.00	-15.35
		17	-30.63	15.41	0.00	0.00	0.00	7.28
	3	16	14.44	-22.58	0.00	0.00	0.00	-15.35
		17	-14.44	23.27	0.00	0.00	0.00	2.74
	4	16	30.14	-23.20	0.00	0.00	0.00	-19.74
		17	-30.14	23.89	0.00	0.00	0.00	6.79
17	1	17	17.40	-4.71	0.00	0.00	0.00	-3.98
		18	-17.40	5.40	0.00	0.00	0.00	1.20
	2	17	30.63	-10.23	0.00	0.00	0.00	-7.28
		18	-30.63	11.73	0.00	0.00	0.00	1.24
	3	17	14.44	-15.89	0.00	0.00	0.00	-2.74
		18	-14.44	16.57	0.00	0.00	0.00	-6.19
	4	17	30.14	-16.76	0.00	0.00	0.00	-6.79
		18	-30.14	17.44	0.00	0.00	0.00	-2.61
18	1	18	17.40	-3.17	0.00	0.00	0.00	-1.20
		19	-17.40	3.86	0.00	0.00	0.00	-0.74
	2	18	30.63	-6.79	0.00	0.00	0.00	-1.24
		19	-30.63	8.29	0.00	0.00	0.00	-2.90
	3	18	14.44	-10.28	0.00	0.00	0.00	6.19
		19	-14.44	10.97	0.00	0.00	0.00	-12.03
	4	18	30.14	-11.10	0.00	0.00	0.00	2.61
		19	-30.14	11.79	0.00	0.00	0.00	-8.90
19	1	19	17.40	-1.71	0.00	0.00	0.00	0.74
		20	-17.40	2.40	0.00	0.00	0.00	-1.87
	2	19	30.63	-3.63	0.00	0.00	0.00	2.90
		20	-30.63	5.13	0.00	0.00	0.00	-5.31
	3	19	14.44	-5.62	0.00	0.00	0.00	12.03
		20	-14.44	6.30	0.00	0.00	0.00	-15.31
	4	19	30.14	-6.18	0.00	0.00	0.00	8.91
		20	-30.14	6.87	0.00	0.00	0.00	-12.49
20	1	20	17.40	-0.33	0.00	0.00	0.00	1.87
		21	-17.40	1.02	0.00	0.00	0.00	-2.24
	2	20	30.63	-0.68	0.00	0.00	0.00	5.31
		21	-30.63	2.18	0.00	0.00	0.00	-6.10
	3	20	14.44	-1.57	0.00	0.00	0.00	15.31
		21	-14.44	2.26	0.00	0.00	0.00	-16.36
	4	20	30.14	-1.77	0.00	0.00	0.00	12.50
		21	-30.14	2.46	0.00	0.00	0.00	-13.66

STAAD PLANE PASO DE FAUNA TIPO 1B. Coef. 9.

UNIT ME MT

OUTP WIDT 72

PAGE EJECT

INPUT NO

*

JOIN COOR

1	0.	4.0	0.
2	0.55	4.0	0.
3	1.1	4.0	0.
4	1.65	4.0	0.
5	2.2	4.0	0.
6	2.75	4.0	0.
7	2.75	3.6	0.
8	2.75	3.2	0.
9	2.75	2.8	0.
10	2.75	2.4	0.
11	2.75	2.0	0.
12	2.75	1.6	0.
13	2.75	1.2	0.
14	2.75	0.8	0.
15	2.75	0.4	0.
	2.75	0.	0.
17	2.2	0.	0.
18	1.65	0.	0.
19	1.1	0.	0.
20	0.55	0.	0.
21	0.	0.	0.

*

MEMB INCI

1 1 2 20

*

MEMB PROP

1 TO 20 PRIX AX 0.5 IZ 0.0104167

*

CONST

E 3000000. 1 TO 5

E 2850000. 6 TO 15

E 3000000. 16 TO 20

POISS 0.2 ALL

*

PP

1	FIXED BUT FY
16	FIXED BUT FX MZ KFY 4725.
17 TO 20	FIXED BUT FX MZ KFY 4950.
21	FIXED BUT KFY 2475.

*

LOAD 1 PORTICO EN CONSTRUCCION

MEMB LOAD

1 TO 5 UNI GY -1.25

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6	FX -0.639
7	FX -0.9798
8	FX -1.3206
9	FX -1.6614
10	FX -2.0022
11	FX -2.343
12	FX -2.6838

13 FX -3.0246

14 FX -3.3654

15 FX -3.7062

16 FX -4.047

*

LOAD 2 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -5.05

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -2.73

JOIN LOAD

6 FX -3.1098

7 FX -3.4506

8 FX -3.7914

9 FX -4.1322

10 FX -4.473

11 FX -4.8138

12 FX -5.1546

13 FX -5.4954

14 FX -5.8362

15 FX -6.177

16 FX -6.5178

LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO

MEMB LOAD

1 TO 5 UNI GY -9.3

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -1.1653

7 FX -1.3821

8 FX -1.5989

9 FX -1.8157

10 FX -2.0325

11 FX -2.2493

12 FX -2.4661

13 FX -2.6829

14 FX -2.8997

15 FX -3.1165

16 FX -3.3333

*

LOAD 4 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -9.3

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -3.1098

7 FX -3.4506

8 FX -3.7914

9 FX -4.1322

10 FX -4.473

11 FX -4.8138

12 FX -5.1546

13 FX -5.4954

14 FX -5.8362

15 FX -6.177

16 FX -6.5178

*

PERF AN

PRINT ANAL RESU
FINISH

```
*****
*
*           S T A A D - III
*           REVISION 10.2b(VERSION 10 LEVEL 2)
*           PROPRIETARY PROGRAM OF
*           RESEARCH ENGINEERS, INC.
*           DATE=    NOV  6, 1998
*           TIME=    19: 5:12
*
*****
```

```
1. STAAD PLANE PASO DE FAUNA TIPO 1B. Coef. 9.
2. UNIT ME MT
3. OUTP WIDT 72
4. PAGE EJECT
5. INPUT NO
6. *
7. JOIN COOR
8. 1      0.      4.0    0.
9. 2      0.55    4.0    0.
10. 3      1.1     4.0    0.
11. 4      1.65    4.0    0.
12. 5      2.2     4.0    0.
13. 6      2.75    4.0    0.
14. 7      2.75    3.6    0.
15. 8      2.75    3.2    0.
16. 9      2.75    2.8    0.
17. 10     2.75    2.4    0.
18. 11     2.75    2.0    0.
19. 12     2.75    1.6    0.
20. 13     2.75    1.2    0.
21. 14     2.75    0.8    0.
22. 15     2.75    0.4    0.
23. 16     2.75    0.     0.
24. 17     2.2     0.     0.
25. 18     1.65    0.     0.
26. 19     1.1     0.     0.
27. 20     0.55    0.     0.
28. 21     0.      0.     0.
29. *
30. MEMB INCI
31. 1 1 2 20
32. *
33. MEMB PROP
34. 1 TO 20 PRIX AX 0.5 IZ 0.0104167
35. *
36. CONST
37. E 3000000. 1 TO 5
38. E 2850000. 6 TO 15
39. E 3000000. 16 TO 20
40. POISS 0.2 ALL
41. *
42. SUPP
43. 1      FIXED BUT FY
44. 16     FIXED BUT FX MZ KFY 4725.
45. 17 TO 20 FIXED BUT FX MZ KFY 4950.
46. 21     FIXED BUT KFY 2475.
47. *
48. LOAD 1 PORTICO EN CONSTRUCCION
```


49. MEMB LOAD
 50. 1 TO 5 UNI GY -1.25
 51. 6 TO 15 UNI GY -1.25
 52. 16 TO 20 UNI GY -1.25
 53. JOIN LOAD
 54. 6 FX -0.639
 55. 7 FX -0.9798
 56. 8 FX -1.3206
 57. 9 FX -1.6614
 58. 10 FX -2.0022
 59. 11 FX -2.343
 60. 12 FX -2.6838
 61. 13 FX -3.0246
 62. 14 FX -3.3654
 63. 15 FX -3.7062
 64. 16 FX -4.047
 65. *
 66. LOAD 2 PORTICO DESCARGADO
 67. MEMB LOAD
 68. 1 TO 5 UNI GY -5.05
 69. 6 TO 15 UNI GY -1.25
 70. 16 TO 20 UNI GY -2.73
 71. JOIN LOAD
 72. 6 FX -3.1098
 73. 7 FX -3.4506
 74. 8 FX -3.7914
 75. 9 FX -4.1322
 76. 10 FX -4.473
 77. 11 FX -4.8138
 78. 12 FX -5.1546
 79. 13 FX -5.4954
 80. 14 FX -5.8362
 81. 15 FX -6.177
 82. 16 FX -6.5178
 83. *
 84. LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO
 85. MEMB LOAD
 86. 1 TO 5 UNI GY -9.3
 87. 6 TO 15 UNI GY -1.25
 88. 16 TO 20 UNI GY -1.25
 89. JOIN LOAD
 90. 6 FX -1.1653
 91. 7 FX -1.3821
 92. 8 FX -1.5989
 93. 9 FX -1.8157
 94. 10 FX -2.0325
 95. 11 FX -2.2493
 96. 12 FX -2.4661
 97. 13 FX -2.6829
 98. 14 FX -2.8997
 99. 15 FX -3.1165
 100. 16 FX -3.3333
 101. *
 102. LOAD 4 PORTICO DESCARGADO
 103. MEMB LOAD
 104. 1 TO 5 UNI GY -9.3
 105. 6 TO 15 UNI GY -1.25
 106. 16 TO 20 UNI GY -1.25
 107. JOIN LOAD
 108. 6 FX -3.1098

109. 7 FX -3.4506
 110. 8 FX -3.7914
 111. 9 FX -4.1322
 112. 10 FX -4.473
 113. 11 FX -4.8138
 114. 12 FX -5.1546
 115. 13 FX -5.4954
 116. 14 FX -5.8362
 117. 15 FX -6.177
 118. 16 FX -6.5178
 119. *
 120. PERF AN

** PROCESSING MEMBER/ELEMENT INFORMATION.

** PERFORMING BANDWIDTH REDUCTION.

ORIGINAL BANDWIDTH = 1
 REDUCED BANDWIDTH = 1

** CHECKING LOAD DATA.

* PROCESSING SUPPORT CONDITION.

** PROCESSING AND SETTING UP LOAD VECTOR.

** PROCESSING ELEMENT STIFFNESS MATRIX. 19: 5:17

** PROCESSING GLOBAL STIFFNESS MATRIX. 19: 5:18

** PROCESSING TRIANGULAR FACTORIZATION. 19: 5:18

** CALCULATING JOINT DISPLACEMENT. 19: 5:18

** CALCULATING ELEMENT FORCES. 19: 5:18

121. PRINT ANAL RESU

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	0.00000	-0.03927	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.13950	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.35277	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.29029	0.00000	0.00000	0.00000	0.00000
2	1	-0.00031	-0.03921	0.00000	0.00000	0.00000	0.00000
	2	-0.00082	-0.13699	0.00000	0.00000	0.00000	0.00009
	3	-0.00039	-0.34400	0.00000	0.00000	0.00000	0.00031
	4	-0.00085	-0.28318	0.00000	0.00000	0.00000	0.00025
3	1	-0.00062	-0.03922	0.00000	0.00000	0.00000	0.00000
	2	-0.00164	-0.13020	0.00000	0.00000	0.00000	0.00015
	3	-0.00078	-0.31906	0.00000	0.00000	0.00000	0.00058
	4	-0.00169	-0.26322	0.00000	0.00000	0.00000	0.00046
4	1	-0.00092	-0.03984	0.00000	0.00000	0.00000	-0.00002
	2	-0.00247	-0.12135	0.00000	0.00000	0.00000	0.00016
	3	-0.00118	-0.28204	0.00000	0.00000	0.00000	0.00075
	4	-0.00254	-0.23449	0.00000	0.00000	0.00000	0.00056
5	1	-0.00123	-0.04199	0.00000	0.00000	0.00000	-0.00006
	2	-0.00329	-0.11413	0.00000	0.00000	0.00000	0.00009
	3	-0.00157	-0.23973	0.00000	0.00000	0.00000	0.00076
	4	-0.00339	-0.20380	0.00000	0.00000	0.00000	0.00052
6	1	-0.00154	-0.04696	0.00000	0.00000	0.00000	-0.00013

7	2	-0.00411	-0.11372	0.00000	0.00000	0.00000	-0.00009
	3	-0.00196	-0.20167	0.00000	0.00000	0.00000	0.00058
	4	-0.00423	-0.18067	0.00000	0.00000	0.00000	0.00028
	1	-0.00750	-0.04685	0.00000	0.00000	0.00000	-0.00017
8	2	-0.01083	-0.11332	0.00000	0.00000	0.00000	-0.00023
	3	0.01717	-0.20095	0.00000	0.00000	0.00000	0.00038
	4	0.00229	-0.17995	0.00000	0.00000	0.00000	0.00006
	1	-0.01430	-0.04673	0.00000	0.00000	0.00000	-0.00017
9	2	-0.02095	-0.11291	0.00000	0.00000	0.00000	-0.00027
	3	0.02925	-0.20021	0.00000	0.00000	0.00000	0.00023
	4	0.00208	-0.17921	0.00000	0.00000	0.00000	-0.00006
	1	-0.02047	-0.04660	0.00000	0.00000	0.00000	-0.00014
10	2	-0.03105	-0.11249	0.00000	0.00000	0.00000	-0.00023
	3	0.03602	-0.19946	0.00000	0.00000	0.00000	0.00012
	4	-0.00130	-0.17846	0.00000	0.00000	0.00000	-0.00010
	1	-0.02487	-0.04646	0.00000	0.00000	0.00000	-0.00008
11	2	-0.03856	-0.11205	0.00000	0.00000	0.00000	-0.00014
	3	0.03888	-0.19869	0.00000	0.00000	0.00000	0.00003
	4	-0.00511	-0.17769	0.00000	0.00000	0.00000	-0.00008
	1	-0.02669	-0.04630	0.00000	0.00000	0.00000	-0.00001
12	2	-0.04176	-0.11160	0.00000	0.00000	0.00000	-0.00002
	3	0.03885	-0.19791	0.00000	0.00000	0.00000	-0.00003
	4	-0.00752	-0.17691	0.00000	0.00000	0.00000	-0.00003
	1	-0.02554	-0.04612	0.00000	0.00000	0.00000	0.00007
13	2	-0.03994	-0.11113	0.00000	0.00000	0.00000	0.00011
	3	0.03649	-0.19711	0.00000	0.00000	0.00000	-0.00009
	4	-0.00764	-0.17611	0.00000	0.00000	0.00000	0.00003
	1	-0.02158	-0.04594	0.00000	0.00000	0.00000	0.00013
14	2	-0.03340	-0.11065	0.00000	0.00000	0.00000	0.00021
	3	0.03191	-0.19631	0.00000	0.00000	0.00000	-0.00014
	4	-0.00562	-0.17530	0.00000	0.00000	0.00000	0.00007
	1	-0.01550	-0.04573	0.00000	0.00000	0.00000	0.00017
15	2	-0.02355	-0.11015	0.00000	0.00000	0.00000	0.00027
	3	0.02466	-0.19548	0.00000	0.00000	0.00000	-0.00022
	4	-0.00275	-0.17448	0.00000	0.00000	0.00000	0.00006
	1	-0.00867	-0.04552	0.00000	0.00000	0.00000	0.00016
16	2	-0.01300	-0.10964	0.00000	0.00000	0.00000	0.00024
	3	0.01371	-0.19464	0.00000	0.00000	0.00000	-0.00033
	4	-0.00146	-0.17364	0.00000	0.00000	0.00000	-0.00002
	1	-0.00319	-0.04529	0.00000	0.00000	0.00000	0.00010
17	2	-0.00560	-0.10912	0.00000	0.00000	0.00000	0.00011
	3	-0.00258	-0.19379	0.00000	0.00000	0.00000	-0.00049
	4	-0.00547	-0.17279	0.00000	0.00000	0.00000	-0.00021
	1	-0.00255	-0.04760	0.00000	0.00000	0.00000	0.00000
18	2	-0.00448	-0.10887	0.00000	0.00000	0.00000	-0.00009
	3	-0.00206	-0.16190	0.00000	0.00000	0.00000	-0.00063
	4	-0.00438	-0.15440	0.00000	0.00000	0.00000	-0.00043
	1	-0.00191	-0.04593	0.00000	0.00000	0.00000	-0.00005
19	2	-0.00336	-0.10134	0.00000	0.00000	0.00000	-0.00017
	3	-0.00155	-0.12737	0.00000	0.00000	0.00000	-0.00060
	4	-0.00328	-0.12932	0.00000	0.00000	0.00000	-0.00046
	1	-0.00127	-0.04294	0.00000	0.00000	0.00000	-0.00005
20	2	-0.00224	-0.09221	0.00000	0.00000	0.00000	-0.00015
	3	-0.00103	-0.09806	0.00000	0.00000	0.00000	-0.00045
	4	-0.00219	-0.10608	0.00000	0.00000	0.00000	-0.00037
	1	-0.00064	-0.04045	0.00000	0.00000	0.00000	-0.00003
21	2	-0.00112	-0.08529	0.00000	0.00000	0.00000	-0.00009
	3	-0.00052	-0.07877	0.00000	0.00000	0.00000	-0.00024
	4	-0.00109	-0.09013	0.00000	0.00000	0.00000	-0.00020
	1	0.00000	-0.03951	0.00000	0.00000	0.00000	0.00000

2	0.00000	-0.08275	0.00000	0.00000	0.00000	0.00000
3	0.00000	-0.07208	0.00000	0.00000	0.00000	0.00000
4	0.00000	-0.08450	0.00000	0.00000	0.00000	0.00000

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	8.39	0.00	0.00	0.00	0.00	-0.15
	2	22.41	0.00	0.00	0.00	0.00	-5.31
	3	10.70	0.00	0.00	0.00	0.00	-18.35
	4	23.10	0.00	0.00	0.00	0.00	-14.92
16	1	0.00	2.14	0.00	0.00	0.00	0.00
	2	0.00	5.16	0.00	0.00	0.00	0.00
	3	0.00	9.16	0.00	0.00	0.00	0.00
	4	0.00	8.16	0.00	0.00	0.00	0.00
17	1	0.00	2.36	0.00	0.00	0.00	0.00
	2	0.00	5.39	0.00	0.00	0.00	0.00
	3	0.00	8.01	0.00	0.00	0.00	0.00
	4	0.00	7.64	0.00	0.00	0.00	0.00
18	1	0.00	2.27	0.00	0.00	0.00	0.00
	2	0.00	5.02	0.00	0.00	0.00	0.00
	3	0.00	6.30	0.00	0.00	0.00	0.00
	4	0.00	6.40	0.00	0.00	0.00	0.00
19	1	0.00	2.13	0.00	0.00	0.00	0.00
	2	0.00	4.56	0.00	0.00	0.00	0.00
	3	0.00	4.85	0.00	0.00	0.00	0.00
	4	0.00	5.25	0.00	0.00	0.00	0.00
20	1	0.00	2.00	0.00	0.00	0.00	0.00
	2	0.00	4.22	0.00	0.00	0.00	0.00
	3	0.00	3.90	0.00	0.00	0.00	0.00
	4	0.00	4.46	0.00	0.00	0.00	0.00
21	1	17.39	0.98	0.00	0.00	0.00	2.10
	2	30.54	2.05	0.00	0.00	0.00	5.56
	3	14.05	1.78	0.00	0.00	0.00	14.13
	4	29.85	2.09	0.00	0.00	0.00	11.99

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	8.39	0.00	0.00	0.00	0.00	-0.15
		2	-8.39	0.69	0.00	0.00	0.00	-0.04
		1	22.41	0.00	0.00	0.00	0.00	-5.31
		2	-22.41	2.78	0.00	0.00	0.00	4.55
	3	1	10.70	0.00	0.00	0.00	0.00	-18.35
		2	-10.70	5.11	0.00	0.00	0.00	16.94
		1	23.10	0.00	0.00	0.00	0.00	-14.92
		2	-23.10	5.11	0.00	0.00	0.00	13.51
2	1	2	8.39	-0.69	0.00	0.00	0.00	0.04
		3	-8.39	1.37	0.00	0.00	0.00	-0.60
	2	2	22.41	-2.78	0.00	0.00	0.00	-4.55
		3	-22.41	5.55	0.00	0.00	0.00	2.26

		10	-5.44	-3.79	0.00	0.00	0.00	4.93			3	2	10.70	-5.11	0.00	0.00	0.00	-16.94											
		2	9	15.39	7.93	0.00	0.00	0.00			-5.10	3	3	-10.70	10.23	0.00	0.00	0.00	12.72										
			10	-15.89	-7.93	0.00	0.00	0.00			8.27	4	2	23.10	-5.11	0.00	0.00	0.00	-13.51										
		3	9	27.07	4.73	0.00	0.00	0.00			7.13	3	3	-23.10	10.23	0.00	0.00	0.00	9.29										
		10	-27.57	-4.73	0.00	0.00	0.00	-5.23																					
		4	9	27.07	8.62	0.00	0.00	0.00												0.54	3	1	3	8.39	-1.38	0.00	0.00	0.00	0.60
			10	-27.57	-8.62	0.00	0.00	0.00												2.91			4	-8.39	2.06	0.00	0.00	0.00	-1.55
																					2	3	22.41	-5.55	0.00	0.00	0.00	-2.26	
10	1	10	5.44	1.78	0.00	0.00	0.00	-4.93																					
		11	-5.94	-1.78	0.00	0.00	0.00	5.64											3	3	10.70	-10.23	0.00	0.00	0.00	-12.72			
	2	10	15.89	3.45	0.00	0.00	0.00	-8.27																					
		11	-16.39	-3.45	0.00	0.00	0.00	9.65												4	3	23.10	-10.23	0.00	0.00	0.00	-9.29		
	3	10	27.57	2.70	0.00	0.00	0.00	5.23																					
		11	-28.07	-2.70	0.00	0.00	0.00	-4.15														4	-23.10	15.35	0.00	0.00	0.00	2.26	
	4	10	27.58	4.14	0.00	0.00	0.00	-2.91																					
		11	-28.08	-4.14	0.00	0.00	0.00	4.57												4	1	4	8.39	-2.06	0.00	0.00	0.00	1.55	
11																													
																					5	-8.39	2.75	0.00	0.00	0.00	-2.87		
	1	11	5.94	-0.56	0.00	0.00	0.00	-5.64																					
		12	-6.44	0.56	0.00	0.00	0.00	5.42											2	4	22.41	-8.33	0.00	0.00	0.00	1.56			
	2	11	16.39	-1.36	0.00	0.00	0.00	-9.65																					
		12	-16.89	1.36	0.00	0.00	0.00	9.11												3	4	10.70	-15.35	0.00	0.00	0.00	-5.69		
	3	11	28.08	0.45	0.00	0.00	0.00	4.15																					
		12	-28.58	-0.45	0.00	0.00	0.00	-3.97												4	5	-10.70	20.46	0.00	0.00	0.00	-4.16		
4	11	28.08	-0.67	0.00	0.00	0.00	-4.57																						
	12	-28.58	0.67	0.00	0.00	0.00	4.30												4	4	23.10	-15.35	0.00	0.00	0.00	-2.26			
12																													
																					5	-23.10	20.46	0.00	0.00	0.00	-7.59		
	1	12	6.44	-3.24	0.00	0.00	0.00	-5.42																					
		13	-6.94	3.24	0.00	0.00	0.00	4.12											5	6	-8.39	3.44	0.00	0.00	0.00	-4.57			
	2	12	16.89	-6.52	0.00	0.00	0.00	-9.11																					
		13	-17.39	6.52	0.00	0.00	0.00	6.50												2	5	22.41	-11.11	0.00	0.00	0.00	6.91		
	3	12	28.57	-2.01	0.00	0.00	0.00	3.97																					
		13	-29.07	2.01	0.00	0.00	0.00	-4.78												3	6	-22.41	13.89	0.00	0.00	0.00	-13.78		
4	12	28.57	-5.83	0.00	0.00	0.00	-4.30																						
	13	-29.07	5.83	0.00	0.00	0.00	1.97												4	6	-10.70	25.57	0.00	0.00	0.00	-16.82			
13																													
																					6	-23.10	25.57	0.00	0.00	0.00	-20.25		
	1	13	6.94	-6.27	0.00	0.00	0.00	-4.12																					
		14	-7.44	6.27	0.00	0.00	0.00	1.61											6	7	3.44	7.75	0.00	0.00	0.00	4.57			
	2	13	17.39	-12.01	0.00	0.00	0.00	-6.50																					
		14	-17.89	12.01	0.00	0.00	0.00	1.69												2	6	-3.94	-7.75	0.00	0.00	0.00	-1.47		
	3	13	29.08	-4.70	0.00	0.00	0.00	4.78																					
		14	-29.58	4.70	0.00	0.00	0.00	-6.66												3	7	13.89	19.30	0.00	0.00	0.00	13.78		
4	13	29.07	-11.32	0.00	0.00	0.00	-1.97																						
	14	-29.57	11.32	0.00	0.00	0.00	-2.56												4	7	-14.39	-19.30	0.00	0.00	0.00	-6.06			
14																													
																					7	-26.08	-19.99	0.00	0.00	0.00	-12.25		
	1	14	7.44	-9.63	0.00	0.00	0.00	-1.61																					
		15	-7.94	9.63	0.00	0.00	0.00	-2.24											7	8	25.58	9.53	0.00	0.00	0.00	16.82			
	2	14	17.89	-17.85	0.00	0.00	0.00	-1.69																					
		15	-18.39	17.85	0.00	0.00	0.00	-5.44												3	7	-26.08	-9.53	0.00	0.00	0.00	-13.01		
	3	14	29.58	-7.60	0.00	0.00	0.00	6.66																					
		15	-30.08	7.60	0.00	0.00	0.00	-9.70												4	6	25.58	19.99	0.00	0.00	0.00	20.25		
4	14	29.58	-17.16	0.00	0.00	0.00	2.56																						
	15	-30.08	17.16	0.00	0.00	0.00	-9.42												7	7	-26.08	-19.99	0.00	0.00	0.00	-12.25			
15																													
																					8	-4.44	-6.77	0.00	0.00	0.00	1.23		
	1	15	7.94	-13.34	0.00	0.00	0.00	2.24																					
		16	-8.44	13.34	0.00	0.00	0.00	-7.57											2	7	14.39	15.85	0.00	0.00	0.00	6.06			
	2	15	18.39	-24.02	0.00	0.00	0.00	5.44																					
		16	-18.89	24.02	0.00	0.00	0.00	-15.05												3	8	-14.89	-15.85	0.00	0.00	0.00	0.28		
	3	15	30.07	-10.71	0.00	0.00	0.00	9.70																					
		16	-30.57	10.71	0.00	0.00	0.00	-13.98												4	8	26.08	8.15	0.00	0.00	0.00	13.01		
4	15	30.08	-23.33	0.00	0.00	0.00	9.42																						
																				8	8	-26.58	-8.15	0.00	0.00	0.00	-9.75		
																					9	-4.94	-5.45	0.00	0.00	0.00	3.41		
	1	15	7.94	-13.34	0.00	0.00	0.00	2.24																					
		16	-8.44	13.34	0.00	0.00	0.00	-7.57											2	8	14.89	12.06	0.00	0.00	0.00	-0.28			
	2	15	18.39	-24.02	0.00	0.00	0.00	5.44																					
		16	-18.89	24.02	0.00	0.00	0.00	-15.05												3	9	-15.39	-12.06	0.00	0.00	0.00	5.10		
	3	15	30.07	-10.71	0.00	0.00	0.00	9.70																					
		16	-30.57	10.71	0.00	0.00	0.00	-13.98												4	9	26.58	6.55	0.00	0.00	0.00	9.75		
4	15	30.08	-23.33	0.00	0.00	0.00	9.42																						
																				9	9	-27.08	-6.55	0.00	0.00	0.00	-7.13		
																					9	-27.08	-12.75	0.00	0.00	0.00	-0.54		
	1	15	7.94	-13.34	0.00	0.00	0.00	2.24																					
		16	-8.44	13.34	0.00	0.00	0.00	-7.57											2	8	26.58	12.75	0.00	0.00	0.00	5.63			
	2	15	18.39	-24.02	0.00	0.00	0.00	5.44																					
		16	-18.89	24.02	0.00	0.00	0.00	-15.05												3	9	-27.08	-12.75	0.00	0.00	0.00	-0.54		
	3	15	30.07	-10.71	0.00	0.00	0.00	9.70																					
		16	-30.57	10.71	0.00	0.00	0.00	-13.98												4	9	-27.08	-12.75	0.00	0.00	0.00	-0.54		
4	15	30.08	-23.33	0.00	0.00	0.00	9.42																						
																				9	1	9	4.94	3.79	0.00	0.00	0.00	-3.41	

		16	-30.58	23.33	0.00	0.00	0.00	-18.76
16	1	16	17.39	-6.30	0.00	0.00	0.00	-7.57
		17	-17.39	6.99	0.00	0.00	0.00	3.92
	2	16	30.54	-13.73	0.00	0.00	0.00	-15.05
		17	-30.54	15.23	0.00	0.00	0.00	7.09
	3	16	14.05	-21.42	0.00	0.00	0.00	-13.98
		17	-14.05	22.11	0.00	0.00	0.00	2.01
	4	16	29.85	-22.41	0.00	0.00	0.00	-18.76
		17	-29.85	23.10	0.00	0.00	0.00	6.24
17	1	17	17.39	-4.63	0.00	0.00	0.00	-3.92
		18	-17.39	5.32	0.00	0.00	0.00	1.19
	2	17	30.54	-9.84	0.00	0.00	0.00	-7.09
		18	-30.54	11.35	0.00	0.00	0.00	1.26
	3	17	14.05	-14.09	0.00	0.00	0.00	-2.01
		18	-14.05	14.78	0.00	0.00	0.00	-5.93
	4	17	29.85	-15.46	0.00	0.00	0.00	-6.24
		18	-29.85	16.14	0.00	0.00	0.00	-2.45
18	1	18	17.39	-3.04	0.00	0.00	0.00	-1.19
		19	-17.39	3.73	0.00	0.00	0.00	-0.68
	2	18	30.54	-6.33	0.00	0.00	0.00	-1.26
		19	-30.54	7.83	0.00	0.00	0.00	-2.63
	3	18	14.05	-8.47	0.00	0.00	0.00	5.93
		19	-14.05	9.16	0.00	0.00	0.00	-10.78
	4	18	29.85	-9.74	0.00	0.00	0.00	2.45
		19	-29.85	10.43	0.00	0.00	0.00	-7.99
19	1	19	17.39	-1.61	0.00	0.00	0.00	0.68
		20	-17.39	2.29	0.00	0.00	0.00	-1.75
	2	19	30.54	-3.27	0.00	0.00	0.00	2.63
		20	-30.54	4.77	0.00	0.00	0.00	-4.84
	3	19	14.05	-4.31	0.00	0.00	0.00	10.78
		20	-14.05	5.00	0.00	0.00	0.00	-13.33
	4	19	29.85	-5.18	0.00	0.00	0.00	7.99
		20	-29.85	5.87	0.00	0.00	0.00	-11.03
20	1	20	17.39	-0.29	0.00	0.00	0.00	1.75
		21	-17.39	0.98	0.00	0.00	0.00	-2.10
	2	20	30.54	-0.55	0.00	0.00	0.00	4.84
		21	-30.54	2.05	0.00	0.00	0.00	-5.56
	3	20	14.05	-1.10	0.00	0.00	0.00	13.33
		21	-14.05	1.78	0.00	0.00	0.00	-14.13
	4	20	29.85	-1.40	0.00	0.00	0.00	11.03
		21	-29.85	2.09	0.00	0.00	0.00	-11.99

MARCO TIPO II Aumentando 0,4m de tierras sobre clave

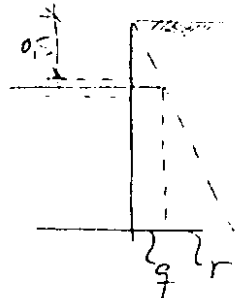
$$Q_{\text{tierras}} = 9,0 + 0,4 \times 2,0 = 9,8 \text{ t/m}^2$$

$$Q_{\text{sc}} = 2,15 \text{ t/m}^2$$

HIPOTESIS I. - Pórtico en construcción

Tierras hasta diintel y sin sobrecarga (Kreoso)

$$\text{Peso propio marco } 0,5 \times 2,5 = 1,25 \text{ t/m.}$$



Empujes

$$K_r = 1 - \tan \varphi = 0,426$$

$$q = \left(0,5 + \frac{0,5}{2}\right) \times 2,0 \times 0,426 = 0,639 \text{ t/m.}$$

$$r = 2,0 \times 1,0 \times 0,426 = 3,408 \text{ t/m.}$$

$$e_6 = -0,639 \text{ t}$$

$$e_{12} = -2,6838$$

$$e_7 = -0,639 - \frac{3,408}{10} = -0,9798 \text{ t}$$

$$e_{13} = -3,0246$$

$$e_8 = -1,3205$$

$$e_{14} = -3,3654$$

$$e_9 = -1,6611$$

$$e_{15} = -3,7062$$

$$e_{10} = -2,0022$$

$$e_{16} = -4,047$$

$$e_{11} = -2,343$$

HIPOTESIS II. - Pórtico descargado

Sobrecarga mínima, empuje máximo (3 t/m² actuando en tramos y Kreoso)

$$\text{Cargas en diintel } -0,5 \times 2,5 - 9,8 = 11,05 \text{ t/m.}$$

$$\text{" en laterales } -0,5 \times 2,5 = -1,25 \text{ t/m.}$$

$$\text{" en solera } -0,5 \times 2,5 = -1,25 \text{ t/m.}$$

$$\left. \begin{array}{l} \text{a) } -0,5 \times 2,5 - 0,2 \times 3,1 - 0,3 \times 2,0 - 0,4 = -2,73 \text{ t/m.} \\ \text{b) } -0,5 \times 2,5 - 0,2 \times 3,1 - 0,3 \times 2,0 - 0,4 = -2,73 \text{ t/m.} \end{array} \right\}$$

Empujes

$$q = (3 + 9,8 + 0,25 \times 2,0) \times 0,426 = 5,666$$

$$r = 2,0 \times 4,0 \times 0,426 = 3,408$$

$$e_6 = -5,666$$

$$e_{12} = -7,711$$

$$e_7 = -5,666 - \frac{3,408}{10} = -6,007$$

$$e_{13} = -8,051$$

$$e_8 = -6,347$$

$$e_{14} = -8,392$$

$$e_9 = -6,688$$

$$e_{15} = -8,733$$

$$e_{10} = -7,029$$

$$e_{16} = -9,074$$

$$e_{11} = -7,370$$

HIPOTESIS III. - Pórtico en carga con empuje activo
Sobrecarga máxima, empuje mínimo (Kactivo)

$$\text{Cargas en diintel } -0,5 \times 2,5 - 9,8 - 2,15 = -13,20$$

$$\text{" en laterales } -0,5 \times 2,5 = -1,25$$

$$\text{" en solera } -0,5 \times 2,5 = -1,25$$

Empujes

$$q = (9,8 + 0,25 \times 2) \times 0,271 = 2,791$$

$$r = 2,0 \times 4,0 \times 0,271 = 2,168$$

$$e_6 = -2,791$$

$$e_{12} = -4,092$$

$$e_7 = -2,791 - 0,217 = -3,008$$

$$e_{13} = -4,309$$

$$e_8 = -3,225$$

$$e_{14} = -4,526$$

$$e_9 = -3,442$$

$$e_{15} = -4,742$$

$$e_{10} = -3,658$$

$$e_{16} = -4,959$$

$$e_{11} = -3,875$$

HIPOTESIS IV. - Pórtico en carga con empuje en reposo

Sobrecarga máxima, empuje máximo (3 t/m² actuando en tramos y Kreoso)

$$\text{Cargas en diintel } -0,5 \times 2,5 - 9,8 - 2,15 = -13,20$$

$$\text{" en laterales } -0,5 \times 2,5 = -1,25$$

$$\text{" en solera } -0,5 \times 2,5 = -1,25$$

Empujes

$$q = (3 + 9,8 + 0,25 \times 2,0) \times 0,426 = 5,666$$

$$r = 2,0 \times 4,0 \times 0,426 = 3,408$$

$$e_6 = -5,666$$

$$e_{12} = -7,711$$

$$e_7 = -6,007$$

$$e_{13} = -8,051$$

$$e_8 = -6,347$$

$$e_{14} = -8,392$$

$$e_9 = -6,688$$

$$e_{15} = -8,733$$

$$e_{10} = -7,029$$

$$e_{16} = -9,074$$

$$e_{11} = -7,370$$

STAAD PLANE PASO DE FAUNA TIPO 2A. Coef. 5,1. (+ 0,4 m.)

UNIT ME MT
OUTP WIDT 72
PAGE EJECT
INPUT NO

*
JOIN COOR
1 0. 4.0 0.
2 0.55 4.0 0.
3 1.1 4.0 0.
4 1.65 4.0 0.
5 2.2 4.0 0.
6 2.75 4.0 0.
7 2.75 3.6 0.
8 2.75 3.2 0.
9 2.75 2.8 0.
10 2.75 2.4 0.
11 2.75 2.0 0.
12 2.75 1.6 0.
13 2.75 1.2 0.
14 2.75 0.8 0.
15 2.75 0.4 0.
16 2.75 0. 0.
17 2.2 0. 0.
18 1.65 0. 0.
19 1.1 0. 0.
20 0.55 0. 0.
21 0. 0. 0.

*
MEMB INCI
1 1 2 20
*
MEMB PROP
1 TO 20 PRIX AX 0.5 IZ 0.0104167
*

CONST
E 3000000. 1 TO 5
E 2850000. 6 TO 15
E 3000000. 16 TO 20
POISS 0.2 ALL

*
1 2P
1 FIXED BUT FY
16 FIXED BUT FX MZ KFY 2677.5
17 TO 20 FIXED BUT FX MZ KFY 2805.
21 FIXED BUT KFY 1402.5
*

LOAD 1 PORTICO EN CONSTRUCCION

MEMB LOAD
1 TO 5 UNI GY -1.25
6 TO 15 UNI GY -1.25
16 TO 20 UNI GY -1.25
JOIN LOAD
6 FX -0.639
7 FX -0.9798
8 FX -1.3206
9 FX -1.6614
10 FX -2.0022
11 FX -2.343
12 FX -2.6838

13 FX -3.0246
14 FX -3.3654
15 FX -3.7062
16 FX -4.047
*

LOAD 2 PORTICO DESCARGADO
MEMB LOAD

1 TO 5 UNI GY -11.05
6 TO 15 UNI GY -1.25
16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -5.666
7 FX -6.007
8 FX -6.347
9 FX -6.688
10 FX -7.029
11 FX -7.370
12 FX -7.711
13 FX -8.051
14 FX -8.392
15 FX -8.733
16 FX -9.074

LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO

MEMB LOAD
1 TO 5 UNI GY -13.2
6 TO 15 UNI GY -1.25
16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -2.791
7 FX -3.008
8 FX -3.225
9 FX -3.442
10 FX -3.658
11 FX -3.875
12 FX -4.092
13 FX -4.309
14 FX -4.526
15 FX -4.742
16 FX -4.959
*

LOAD 4 PORTICO DESCARGADO

MEMB LOAD
1 TO 5 UNI GY -13.2
6 TO 15 UNI GY -1.25
16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -5.666
7 FX -6.007
8 FX -6.347
9 FX -6.688
10 FX -7.029
11 FX -7.370
12 FX -7.711
13 FX -8.051
14 FX -8.392
15 FX -8.733
16 FX -9.074
*

PERF AN

PRINT ANAL RESU
FINISH

```
*****
*
*          S T A A D - III
*          REVISION 10.2b(VERSION 10 LEVEL 2)
*          PROPRIETARY PROGRAM OF
*          RESEARCH ENGINEERS, INC.
*          DATE=      NOV 14, 1998
*          TIME=      9:21:32
*
*****
```

1. STAAD PLANE PASO DE FAUNA TIPO 2A. Coef. 5,1. (+ 0,4 m.)
2. UNIT ME MT
3. OUTP WIDT 72
4. PAGE EJECT
5. INPUT NO

*** THIS RUN WILL ALLOW ANALYSIS ONLY AND NO DESIGN ***

```
6. *
7. JOIN COOR
8. 1      0.      4.0      0.
9. 2      0.55     4.0      0.
10. 3      1.1      4.0      0.
11. 4      1.65     4.0      0.
12. 5      2.2      4.0      0.
13. 6      2.75     4.0      0.
14. 7      2.75     3.6      0.
15. 8      2.75     3.2      0.
16. 9      2.75     2.8      0.
17. 10     2.75     2.4      0.
18. 11     2.75     2.0      0.
19. 12     2.75     1.6      0.
20. 13     2.75     1.2      0.
21. 14     2.75     0.8      0.
22. 15     2.75     0.4      0.
23. 16     2.75     0.      0.
24. 17     2.2      0.      0.
25. 18     1.65     0.      0.
26. 19     1.1      0.      0.
27. 20     0.55     0.      0.
28. 21     0.      0.      0.
29. *
30. MEMB INCI
31. 1 1 2 20
32. *
33. MEMB PROP
34. 1 TO 20 PRIX AX 0.5 IZ 0.0104167
35. *
36. CONST
37. E 3000000. 1 TO 5
38. E 2850000. 6 TO 15
39. E 3000000. 16 TO 20
40. POISS 0.2 ALL
41. *
42. SUPP
43. 1      FIXED BUT FY
44. 16     FIXED BUT FX MZ KFY 2677.5
45. 17 TO 20 FIXED BUT FX MZ KFY 2805.
```

46. 21 FIXED BUT KFY 1402.5
 47. *
 48. LOAD 1 PORTICO EN CONSTRUCCION
 49. MEMB LOAD
 50. 1 TO 5 UNI GY -1.25
 51. 6 TO 15 UNI GY -1.25
 52. 16 TO 20 UNI GY -1.25
 53. JOIN LOAD
 54. 6 FX -0.639
 55. 7 FX -0.9798
 56. 8 FX -1.3206
 57. 9 FX -1.6614
 58. 10 FX -2.0022
 59. 11 FX -2.343
 60. 12 FX -2.6838
 61. 13 FX -3.0246
 62. 14 FX -3.3654
 63. 15 FX -3.7062
 64. 16 FX -4.047
 65. *
 66. LOAD 2 PORTICO DESCARGADO
 67. MEMB LOAD
 68. 1 TO 5 UNI GY -11.05
 69. 6 TO 15 UNI GY -1.25
 70. 16 TO 20 UNI GY -1.25
 71. JOIN LOAD
 72. 6 FX -5.666
 73. 7 FX -6.007
 74. 8 FX -6.347
 75. 9 FX -6.688
 76. 10 FX -7.029
 77. 11 FX -7.370
 78. 12 FX -7.711
 79. 13 FX -8.051
 80. 14 FX -8.392
 81. 15 FX -8.733
 82. 16 FX -9.074
 83. *
 84. LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO
 85. MEMB LOAD
 86. 1 TO 5 UNI GY -13.2
 87. 6 TO 15 UNI GY -1.25
 88. 16 TO 20 UNI GY -1.25
 89. JOIN LOAD
 90. 6 FX -2.791
 91. 7 FX -3.008
 92. 8 FX -3.225
 93. 9 FX -3.442
 94. 10 FX -3.658
 95. 11 FX -3.875
 96. 12 FX -4.092
 97. 13 FX -4.309
 98. 14 FX -4.526
 99. 15 FX -4.742
 100. 16 FX -4.959
 101. *
 102. LOAD 4 PORTICO DESCARGADO
 103. MEMB LOAD
 104. 1 TO 5 UNI GY -13.2
 105. 6 TO 15 UNI GY -1.25

106. 16 TO 20 UNI GY -1.25
 107. JOIN LOAD
 108. 6 FX -5.666
 109. 7 FX -6.007
 110. 8 FX -6.347
 111. 9 FX -6.688
 112. 10 FX -7.029
 113. 11 FX -7.370
 114. 12 FX -7.711
 115. 13 FX -8.051
 116. 14 FX -8.392
 117. 15 FX -8.733
 118. 16 FX -9.074
 119. *
 120. PERF AN

** PROCESSING MEMBER/ELEMENT INFORMATION.

** PERFORMING BANDWIDTH REDUCTION.

ORIGINAL BANDWIDTH = 1
 REDUCED BANDWIDTH = 1

** CHECKING LOAD DATA.
 ** PROCESSING SUPPORT CONDITION.
 ** PROCESSING AND SETTING UP LOAD VECTOR.

** PROCESSING ELEMENT STIFFNESS MATRIX. 9:21:37
 ** PROCESSING GLOBAL STIFFNESS MATRIX. 9:21:38
 ** PROCESSING TRIANGULAR FACTORIZATION. 9:21:38
 ** CALCULATING JOINT DISPLACEMENT. 9:21:38
 ** CALCULATING ELEMENT FORCES. 9:21:38

121. PRINT ANAL RESU
 PASO DE FAUNA TIPO 2A. Coef. 5,1. (+ 0,4 m.)

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	0.00000	-0.07348	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.41280	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.60506	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.51561	0.00000	0.00000	0.00000	0.00000
2	1	-0.00031	-0.07341	0.00000	0.00000	0.00000	0.00000
	2	-0.00135	-0.40542	0.00000	0.00000	0.00000	0.00026
	3	-0.00072	-0.59302	0.00000	0.00000	0.00000	0.00043
	4	-0.00136	-0.50588	0.00000	0.00000	0.00000	0.00035
3	1	-0.00061	-0.07341	0.00000	0.00000	0.00000	0.00000
	2	-0.00271	-0.38490	0.00000	0.00000	0.00000	0.00047
	3	-0.00144	-0.55883	0.00000	0.00000	0.00000	0.00079
	4	-0.00273	-0.47864	0.00000	0.00000	0.00000	0.00063
4	1	-0.00092	-0.07400	0.00000	0.00000	0.00000	-0.00002
	2	-0.00406	-0.35609	0.00000	0.00000	0.00000	0.00056
	3	-0.00216	-0.50829	0.00000	0.00000	0.00000	0.00101
	4	-0.00409	-0.43967	0.00000	0.00000	0.00000	0.00076

5	1	-0.00123	-0.07612	0.00000	0.00000	0.00000	-0.00006
	2	-0.00541	-0.32709	0.00000	0.00000	0.00000	0.00047
	3	-0.00288	-0.45106	0.00000	0.00000	0.00000	0.00103
	4	-0.00545	-0.39865	0.00000	0.00000	0.00000	0.00069
6	1	-0.00153	-0.08104	0.00000	0.00000	0.00000	-0.00012
	2	-0.00677	-0.30921	0.00000	0.00000	0.00000	0.00014
	3	-0.00360	-0.40068	0.00000	0.00000	0.00000	0.00075
	4	-0.00682	-0.36910	0.00000	0.00000	0.00000	0.00033
7	1	-0.00746	-0.08093	0.00000	0.00000	0.00000	-0.00016
	2	-0.00709	-0.30835	0.00000	0.00000	0.00000	-0.00013
	3	0.02052	-0.39965	0.00000	0.00000	0.00000	0.00047
	4	-0.00029	-0.36807	0.00000	0.00000	0.00000	0.00002
8	1	-0.01421	-0.08082	0.00000	0.00000	0.00000	-0.00017
	2	-0.01505	-0.30747	0.00000	0.00000	0.00000	-0.00025
	3	0.03485	-0.39861	0.00000	0.00000	0.00000	0.00026
	4	-0.00307	-0.36703	0.00000	0.00000	0.00000	-0.00014
9	1	-0.02035	-0.08068	0.00000	0.00000	0.00000	-0.00014
	2	-0.02522	-0.30658	0.00000	0.00000	0.00000	-0.00024
	3	0.04236	-0.39756	0.00000	0.00000	0.00000	0.00012
	4	-0.00969	-0.36598	0.00000	0.00000	0.00000	-0.00018
10	1	-0.02471	-0.08054	0.00000	0.00000	0.00000	-0.00008
	2	-0.03353	-0.30568	0.00000	0.00000	0.00000	-0.00016
	3	0.04532	-0.39649	0.00000	0.00000	0.00000	0.00003
	4	-0.01600	-0.36491	0.00000	0.00000	0.00000	-0.00013
11	1	-0.02651	-0.08038	0.00000	0.00000	0.00000	-0.00001
	2	-0.03737	-0.30477	0.00000	0.00000	0.00000	-0.00003
	3	0.04527	-0.39541	0.00000	0.00000	0.00000	-0.00003
	4	-0.01935	-0.36383	0.00000	0.00000	0.00000	-0.00003
12	1	-0.02536	-0.08021	0.00000	0.00000	0.00000	0.00007
	2	-0.03564	-0.30384	0.00000	0.00000	0.00000	0.00011
	3	0.04296	-0.39431	0.00000	0.00000	0.00000	-0.00009
	4	-0.01857	-0.36273	0.00000	0.00000	0.00000	0.00007
13	1	-0.02140	-0.08002	0.00000	0.00000	0.00000	0.00013
	2	-0.02882	-0.30289	0.00000	0.00000	0.00000	0.00022
	3	0.03830	-0.39320	0.00000	0.00000	0.00000	-0.00015
	4	-0.01408	-0.36162	0.00000	0.00000	0.00000	0.00014
14	1	-0.01536	-0.07982	0.00000	0.00000	0.00000	0.00017
	2	-0.01907	-0.30193	0.00000	0.00000	0.00000	0.00025
	3	0.03031	-0.39208	0.00000	0.00000	0.00000	-0.00026
	4	-0.00798	-0.36049	0.00000	0.00000	0.00000	0.00014
15	1	-0.00859	-0.07960	0.00000	0.00000	0.00000	0.00016
	2	-0.01026	-0.30096	0.00000	0.00000	0.00000	0.00016
	3	0.01710	-0.39094	0.00000	0.00000	0.00000	-0.00042
	4	-0.00409	-0.35936	0.00000	0.00000	0.00000	0.00003
16	1	-0.00319	-0.07937	0.00000	0.00000	0.00000	0.00010
	2	-0.00810	-0.29997	0.00000	0.00000	0.00000	-0.00009
	3	-0.00422	-0.38979	0.00000	0.00000	0.00000	-0.00066
	4	-0.00805	-0.35820	0.00000	0.00000	0.00000	-0.00026
17	1	-0.00255	-0.08150	0.00000	0.00000	0.00000	-0.00001
	2	-0.00648	-0.28510	0.00000	0.00000	0.00000	-0.00041
	3	-0.00337	-0.34538	0.00000	0.00000	0.00000	-0.00090
	4	-0.00644	-0.33347	0.00000	0.00000	0.00000	-0.00059
18	1	-0.00191	-0.07961	0.00000	0.00000	0.00000	-0.00005
	2	-0.00486	-0.25934	0.00000	0.00000	0.00000	-0.00050
	3	-0.00253	-0.29553	0.00000	0.00000	0.00000	-0.00088
	4	-0.00483	-0.29800	0.00000	0.00000	0.00000	-0.00066
19	1	-0.00128	-0.07639	0.00000	0.00000	0.00000	-0.00006
	2	-0.00324	-0.23362	0.00000	0.00000	0.00000	-0.00042
	3	-0.00169	-0.25218	0.00000	0.00000	0.00000	-0.00068
	4	-0.00322	-0.26433	0.00000	0.00000	0.00000	-0.00054

20	1	-0.00064	-0.07373	0.00000	0.00000	0.00000	-0.00004
	2	-0.00162	-0.21534	0.00000	0.00000	0.00000	-0.00023
	3	-0.00084	-0.22322	0.00000	0.00000	0.00000	-0.00036
	4	-0.00161	-0.24090	0.00000	0.00000	0.00000	-0.00030
21	1	0.00000	-0.07272	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.20879	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.21308	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.23257	0.00000	0.00000	0.00000	0.00000

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	8.37	0.00	0.00	0.00	0.00	-0.16
	2	36.91	0.00	0.00	0.00	0.00	-15.53
	3	19.62	0.00	0.00	0.00	0.00	-25.21
	4	37.18	0.00	0.00	0.00	0.00	-20.43
16	1	0.00	2.13	0.00	0.00	0.00	0.00
	2	0.00	8.03	0.00	0.00	0.00	0.00
	3	0.00	10.44	0.00	0.00	0.00	0.00
	4	0.00	9.59	0.00	0.00	0.00	0.00
17	1	0.00	2.29	0.00	0.00	0.00	0.00
	2	0.00	8.00	0.00	0.00	0.00	0.00
	3	0.00	9.69	0.00	0.00	0.00	0.00
	4	0.00	9.35	0.00	0.00	0.00	0.00
18	1	0.00	2.23	0.00	0.00	0.00	0.00
	2	0.00	7.27	0.00	0.00	0.00	0.00
	3	0.00	8.29	0.00	0.00	0.00	0.00
	4	0.00	8.36	0.00	0.00	0.00	0.00
19	1	0.00	2.14	0.00	0.00	0.00	0.00
	2	0.00	6.55	0.00	0.00	0.00	0.00
	3	0.00	7.07	0.00	0.00	0.00	0.00
	4	0.00	7.41	0.00	0.00	0.00	0.00
20	1	0.00	2.07	0.00	0.00	0.00	0.00
	2	0.00	6.04	0.00	0.00	0.00	0.00
	3	0.00	6.26	0.00	0.00	0.00	0.00
	4	0.00	6.76	0.00	0.00	0.00	0.00
21	1	17.40	1.02	0.00	0.00	0.00	2.24
	2	44.16	2.93	0.00	0.00	0.00	14.05
	3	23.01	2.99	0.00	0.00	0.00	21.45
	4	43.89	3.26	0.00	0.00	0.00	17.78

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	8.37	0.00	0.00	0.00	0.00	-0.16
		2	-8.37	0.69	0.00	0.00	0.00	-0.03
	2	1	36.91	0.00	0.00	0.00	0.00	-15.53
		2	-36.91	6.08	0.00	0.00	0.00	13.85
	3	1	19.62	0.00	0.00	0.00	0.00	-25.21
		2	-19.62	7.26	0.00	0.00	0.00	23.21
	4	1	37.18	0.00	0.00	0.00	0.00	-20.43
		2	-37.18	7.26	0.00	0.00	0.00	18.43

2	1	2	8.37	-0.69	0.00	0.00	0.00	0.03	4	9	-37.80	-10.60	0.00	0.00	0.00	-8.20
		3	-8.37	1.38	0.00	0.00	0.00	-0.59		8	37.30	19.16	0.00	0.00	0.00	6.68
	2	2	36.91	-6.08	0.00	0.00	0.00	-13.85		9	-37.80	-19.16	0.00	0.00	0.00	0.99
		3	-36.91	12.15	0.00	0.00	0.00	8.84		9	1	9	4.94	3.77	0.00	0.00	0.00	-3.40
3	2	19.62	-7.26	0.00	0.00	0.00	-23.21	10	-5.44		-3.77	0.00	0.00	0.00	4.91	
	3	-19.62	14.52	0.00	0.00	0.00	17.22	2	9		31.89	12.20	0.00	0.00	0.00	-3.89
4	2	3	37.18	-7.26	0.00	0.00	0.00	-18.43	10		-32.39	-12.20	0.00	0.00	0.00	8.76
		3	-37.18	14.52	0.00	0.00	0.00	12.44	3	9	37.80	7.16	0.00	0.00	0.00	8.20
3	1	3	8.37	-1.38	0.00	0.00	0.00	0.59	10	-38.30	-7.16	0.00	0.00	0.00	-5.34	
		4	-8.37	2.06	0.00	0.00	0.00	-1.54	4	9	37.80	12.47	0.00	0.00	0.00	-0.99
	2	3	36.91	-12.16	0.00	0.00	0.00	-8.84	10	-38.30	-12.47	0.00	0.00	0.00	5.98	
		4	-36.91	18.23	0.00	0.00	0.00	0.48	10	1	10	5.44	1.77	0.00	0.00	0.00	-4.91
3	3	19.62	-14.52	0.00	0.00	0.00	-17.22	11		-5.94	-1.77	0.00	0.00	0.00	5.61	
	4	-19.62	21.78	0.00	0.00	0.00	7.24	2		10	32.39	5.17	0.00	0.00	0.00	-8.76
4	3	3	37.18	-14.52	0.00	0.00	0.00	-12.44		11	-32.89	-5.17	0.00	0.00	0.00	10.83
		4	-37.18	21.78	0.00	0.00	0.00	2.46	3	10	38.30	3.50	0.00	0.00	0.00	5.34
4	1	4	8.37	-2.06	0.00	0.00	0.00	1.54	11	-38.80	-3.50	0.00	0.00	0.00	-3.94	
		5	-8.37	2.75	0.00	0.00	0.00	-2.86	4	10	38.30	5.44	0.00	0.00	0.00	-5.98
	2	4	36.91	-18.23	0.00	0.00	0.00	-0.48	11	-38.80	-5.44	0.00	0.00	0.00	8.16	
		5	-36.91	24.31	0.00	0.00	0.00	-11.22	11	1	11	5.94	-0.58	0.00	0.00	0.00	-5.61
3	4	19.62	-21.78	0.00	0.00	0.00	-7.24	12		-6.44	0.58	0.00	0.00	0.00	5.38	
	5	-19.62	29.04	0.00	0.00	0.00	-6.73	2		11	32.89	-2.20	0.00	0.00	0.00	-10.83
4	4	4	37.18	-21.78	0.00	0.00	0.00	-2.46		12	-33.39	2.20	0.00	0.00	0.00	9.95
		5	-37.18	29.04	0.00	0.00	0.00	-11.52	3	11	38.80	-0.38	0.00	0.00	0.00	3.94
5	1	5	8.37	-2.75	0.00	0.00	0.00	2.86	12	-39.30	0.38	0.00	0.00	0.00	-4.09	
		6	-8.37	3.44	0.00	0.00	0.00	-4.56	4	11	38.80	-1.93	0.00	0.00	0.00	-8.16
	2	5	36.91	-24.31	0.00	0.00	0.00	11.22	12	-39.30	1.93	0.00	0.00	0.00	7.39	
		6	-36.91	30.39	0.00	0.00	0.00	-26.26	12	1	12	6.44	-3.26	0.00	0.00	0.00	-5.38
3	5	19.62	-29.04	0.00	0.00	0.00	6.73	13		-6.94	3.26	0.00	0.00	0.00	4.08	
	6	-19.62	36.30	0.00	0.00	0.00	-24.70	2		12	33.39	-9.91	0.00	0.00	0.00	-9.95
4	5	5	37.18	-29.04	0.00	0.00	0.00	11.52		13	-33.89	9.91	0.00	0.00	0.00	5.99
		6	-37.18	36.30	0.00	0.00	0.00	-29.49	3	12	39.30	-4.47	0.00	0.00	0.00	4.09
6	1	6	3.44	7.73	0.00	0.00	0.00	4.56	13	-39.80	4.47	0.00	0.00	0.00	-5.88	
		7	-3.94	-7.73	0.00	0.00	0.00	-1.47	4	12	39.30	-9.64	0.00	0.00	0.00	-7.39
	2	6	30.39	31.24	0.00	0.00	0.00	26.26	13	-39.80	9.64	0.00	0.00	0.00	3.53	
		7	-30.89	-31.24	0.00	0.00	0.00	-13.76	13	1	13	6.94	-6.29	0.00	0.00	0.00	-4.08
3	6	36.30	16.83	0.00	0.00	0.00	24.70	14		-7.44	6.29	0.00	0.00	0.00	1.57	
	7	-36.80	-16.83	0.00	0.00	0.00	-17.97	2		13	33.89	-17.96	0.00	0.00	0.00	-5.99
4	6	6	36.30	31.52	0.00	0.00	0.00	29.49		14	-34.39	17.96	0.00	0.00	0.00	-1.20
		7	-36.80	-31.52	0.00	0.00	0.00	-16.88	3	13	39.80	-8.78	0.00	0.00	0.00	5.88
7	1	7	3.94	6.75	0.00	0.00	0.00	1.47	14	-40.30	8.78	0.00	0.00	0.00	-9.39	
		8	-4.44	-6.75	0.00	0.00	0.00	1.23	4	13	39.80	-17.69	0.00	0.00	0.00	-3.53
	2	7	30.89	25.23	0.00	0.00	0.00	13.76	14	-40.30	17.69	0.00	0.00	0.00	-3.54	
		8	-31.39	-25.23	0.00	0.00	0.00	-3.67	14	1	14	7.44	-9.65	0.00	0.00	0.00	-1.57
3	7	36.80	13.82	0.00	0.00	0.00	17.97	15		-7.94	9.65	0.00	0.00	0.00	-2.30	
	8	-37.30	-13.82	0.00	0.00	0.00	-12.44	2		14	34.39	-26.36	0.00	0.00	0.00	1.20
4	7	7	36.80	25.51	0.00	0.00	0.00	16.88		15	-34.89	26.36	0.00	0.00	0.00	-11.74
		8	-37.30	-25.51	0.00	0.00	0.00	-6.68	3	14	40.30	-13.30	0.00	0.00	0.00	9.39
8	1	8	4.44	5.43	0.00	0.00	0.00	-1.23	15	-40.80	13.30	0.00	0.00	0.00	-14.71	
		9	-4.94	-5.43	0.00	0.00	0.00	3.40	4	14	40.30	-26.08	0.00	0.00	0.00	3.54
	2	8	31.39	18.89	0.00	0.00	0.00	3.67	15	-40.80	26.08	0.00	0.00	0.00	-13.97	
		9	-31.89	-18.89	0.00	0.00	0.00	3.89	15	1	15	7.94	-13.36	0.00	0.00	0.00	2.30
3	8	37.30	10.60	0.00	0.00	0.00	12.44	16		-8.44	13.36	0.00	0.00	0.00	-7.64	

	2	15	34.89	-35.09	0.00	0.00	0.00	11.74
		16	-35.39	35.09	0.00	0.00	0.00	-25.78
	3	15	40.80	-18.05	0.00	0.00	0.00	14.71
		16	-41.30	18.05	0.00	0.00	0.00	-21.93
	4	15	40.80	-34.81	0.00	0.00	0.00	13.97
		16	-41.30	34.81	0.00	0.00	0.00	-27.90
16	1	16	17.40	-6.31	0.00	0.00	0.00	-7.64
		17	-17.40	7.00	0.00	0.00	0.00	3.98
	2	16	44.16	-27.36	0.00	0.00	0.00	-25.78
		17	-44.16	28.04	0.00	0.00	0.00	10.54
	3	16	23.01	-30.86	0.00	0.00	0.00	-21.93
		17	-23.01	31.55	0.00	0.00	0.00	4.77
	4	16	43.89	-31.71	0.00	0.00	0.00	-27.90
		17	-43.89	32.40	0.00	0.00	0.00	10.27
17	1	17	17.40	-4.71	0.00	0.00	0.00	-3.98
		18	-17.40	5.40	0.00	0.00	0.00	1.20
	2	17	44.16	-20.05	0.00	0.00	0.00	-10.54
		18	-44.16	20.73	0.00	0.00	0.00	-0.67
	3	17	23.01	-21.86	0.00	0.00	0.00	-4.77
		18	-23.01	22.55	0.00	0.00	0.00	-7.44
	4	17	43.89	-23.04	0.00	0.00	0.00	-10.27
		18	-43.89	23.73	0.00	0.00	0.00	-2.59
18	1	18	17.40	-3.17	0.00	0.00	0.00	-1.20
		19	-17.40	3.86	0.00	0.00	0.00	-0.74
	2	18	44.16	-13.46	0.00	0.00	0.00	0.67
		19	-44.16	14.15	0.00	0.00	0.00	-8.26
	3	18	23.01	-14.26	0.00	0.00	0.00	7.44
		19	-23.01	14.95	0.00	0.00	0.00	-15.48
	4	18	43.89	-15.37	0.00	0.00	0.00	2.59
		19	-43.89	16.06	0.00	0.00	0.00	-11.24
19	1	19	17.40	-1.71	0.00	0.00	0.00	0.74
		20	-17.40	2.40	0.00	0.00	0.00	-1.87
	2	19	44.16	-7.59	0.00	0.00	0.00	8.26
		20	-44.16	8.28	0.00	0.00	0.00	-12.63
	3	19	23.01	-7.87	0.00	0.00	0.00	15.48
		20	-23.01	8.56	0.00	0.00	0.00	-20.00
	4	19	43.89	-8.64	0.00	0.00	0.00	11.24
		20	-43.89	9.33	0.00	0.00	0.00	-16.18
20	1	20	17.40	-0.33	0.00	0.00	0.00	1.87
		21	-17.40	1.02	0.00	0.00	0.00	-2.24
	2	20	44.16	-2.24	0.00	0.00	0.00	12.63
		21	-44.16	2.93	0.00	0.00	0.00	-14.05
	3	20	23.01	-2.30	0.00	0.00	0.00	20.00
		21	-23.01	2.99	0.00	0.00	0.00	-21.45
	4	20	43.89	-2.57	0.00	0.00	0.00	16.18
		21	-43.89	3.26	0.00	0.00	0.00	-17.78

***** DATE= NOV 14,1998 TIME= 9:21:40 *****

 * FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
 * CALL (01) 686-7682, CROYDON, U.K. TLX. 929181 *

***** END OF LATEST ANALYSIS RESULT *****

122. FINISH

***** END OF STAAD-III *****

STAAD PLANE PASO DE FAUNA TIPO 2A. Coef. 9. (+ 0,4 m.)

UNIT ME MT
OUTP WIDT 72
PAGE EJECT
INPUT NO

*

JOIN COOR

1	0.	4.0	0.
2	0.55	4.0	0.
3	1.1	4.0	0.
4	1.65	4.0	0.
5	2.2	4.0	0.
6	2.75	4.0	0.
7	2.75	3.6	0.
8	2.75	3.2	0.
9	2.75	2.8	0.
10	2.75	2.4	0.
11	2.75	2.0	0.
12	2.75	1.6	0.
13	2.75	1.2	0.
14	2.75	0.8	0.
15	2.75	0.4	0.
16	2.75	0.	0.
17	2.2	0.	0.
18	1.65	0.	0.
19	1.1	0.	0.
20	0.55	0.	0.
21	0.	0.	0.

*

MEMB INCI

1 1 2 20

*

MEMB PROP

1 TO 20 PRIN AX 0.5 IZ 0.0104167

*

CONST

E 3000000. 1 TO 5

E 2850000. 6 TO 15

E 3000000. 16 TO 20

POISS 0.2 ALL

*

PP

1	FIXED BUT FY
16	FIXED BUT FX MZ KFY 4725.
17 TO 20	FIXED BUT FX MZ KFY 4950.
21	FIXED BUT KFY 2475.

*

LOAD 1 PORTICO EN CONSTRUCCION

MEMB LOAD

1 TO 5 UNI GY -1.25

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6	FX -0.639
7	FX -0.9798
8	FX -1.3206
9	FX -1.6614
10	FX -2.0022
11	FX -2.343
12	FX -2.6838

13 FX -3.0246

14 FX -3.3654

15 FX -3.7062

16 FX -4.047

*

LOAD 2 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -11.05

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -5.666

7 FX -6.007

8 FX -6.347

9 FX -6.688

10 FX -7.029

11 FX -7.370

12 FX -7.711

13 FX -8.051

14 FX -8.392

15 FX -8.733

16 FX -9.074

LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO

MEMB LOAD

1 TO 5 UNI GY -13.2

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -2.791

7 FX -3.008

8 FX -3.225

9 FX -3.442

10 FX -3.658

11 FX -3.875

12 FX -4.092

13 FX -4.309

14 FX -4.526

15 FX -4.742

16 FX -4.959

*

LOAD 4 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -13.2

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -5.666

7 FX -6.007

8 FX -6.347

9 FX -6.688

10 FX -7.029

11 FX -7.370

12 FX -7.711

13 FX -8.051

14 FX -8.392

15 FX -8.733

16 FX -9.074

*

PERF AN

PRINT ANAL RESU
FINISH

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*
*          S T A A D - III
*          REVISION 10.2b(VERSION 10 LEVEL 2)
*          PROPRIETARY PROGRAM OF
*          RESEARCH ENGINEERS, INC.
*          DATE=      NOV 14, 1998
*          TIME=      9:28:46
*
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1. STAAD PLANE PASO DE FAUNA TIPO 2A. Coef. 9. (+ 0,4 m.)
2. UNIT ME MT
3. OUTP WIDT 72
4. PAGE EJECT
5. INPUT NO

*** THIS RUN WILL ALLOW ANALYSIS ONLY AND NO DESIGN ***

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6. *
7. JOIN COOR
8. 1      0.      4.0      0.
9. 2      0.55     4.0      0.
10. 3      1.1      4.0      0.
11. 4      1.65     4.0      0.
12. 5      2.2      4.0      0.
13. 6      2.75     4.0      0.
14. 7      2.75     3.6      0.
15. 8      2.75     3.2      0.
16. 9      2.75     2.8      0.
17. 10     2.75     2.4      0.
18. 11     2.75     2.0      0.
19. 12     2.75     1.6      0.
20. 13     2.75     1.2      0.
21. 14     2.75     0.8      0.
22. 15     2.75     0.4      0.
23. 16     2.75     0.      0.
24. 17     2.2      0.      0.
25. 18     1.65     0.      0.
26. 19     1.1      0.      0.
27. 20     0.55     0.      0.
28. 21     0.      0.      0.
29. *
30. MEMB INCI
31. 1 1 2 20
32. *
33. MEMB PROP
34. 1 TO 20 PRIX AX 0.5 IZ 0.0104167
35. *
36. CONST
37. E 3000000. 1 TO 5
38. E 2850000. 6 TO 15
39. E 3000000. 16 TO 20
40. POISS 0.2 ALL
41. *
42. SUPP
43. 1      FIXED BUT FY
44. 16     FIXED BUT FX MZ KFY 4725.
45. 17 TO 20 FIXED BUT FX MZ KFY 4950.
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46. 21      FIXED BUT KFY 2475.
47. *
48. LOAD 1 PORTICO EN CONSTRUCCION
49. MEMB LOAD
50. 1 TO 5   UNI GY -1.25
51. 6 TO 15  UNI GY -1.25
52. 16 TO 20 UNI GY -1.25
53. JOIN LOAD
54. 6  FX -0.639
55. 7  FX -0.9798
56. 8  FX -1.3206
57. 9  FX -1.6614
58. 10 FX -2.0022
59. 11 FX -2.343
60. 12 FX -2.6838
61. 13 FX -3.0246
62. 14 FX -3.3654
63. 15 FX -3.7062
64. 16 FX -4.047
65. *
66. LOAD 2 PORTICO DESCARGADO
67. MEMB LOAD
68. 1 TO 5   UNI GY -11.05
69. 6 TO 15  UNI GY -1.25
70. 16 TO 20 UNI GY -1.25
71. JOIN LOAD
72. 6  FX -5.666
73. 7  FX -6.007
74. 8  FX -6.347
75. 9  FX -6.688
76. 10 FX -7.029
77. 11 FX -7.370
78. 12 FX -7.711
79. 13 FX -8.051
80. 14 FX -8.392
81. 15 FX -8.733
82. 16 FX -9.074
83. *
84. LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO
85. MEMB LOAD
86. 1 TO 5   UNI GY -13.2
87. 6 TO 15  UNI GY -1.25
88. 16 TO 20 UNI GY -1.25
89. JOIN LOAD
90. 6  FX -2.791
91. 7  FX -3.008
92. 8  FX -3.225
93. 9  FX -3.442
94. 10 FX -3.658
95. 11 FX -3.875
96. 12 FX -4.092
97. 13 FX -4.309
98. 14 FX -4.526
99. 15 FX -4.742
100. 16 FX -4.959
101. *
102. LOAD 4 PORTICO DESCARGADO
103. MEMB LOAD
104. 1 TO 5   UNI GY -13.2
105. 6 TO 15  UNI GY -1.25

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106. 16 TO 20 UNI GY -1.25
107. JOIN LOAD
108. 6  FX -5.666
109. 7  FX -6.007
110. 8  FX -6.347
111. 9  FX -6.688
112. 10 FX -7.029
113. 11 FX -7.370
114. 12 FX -7.711
115. 13 FX -8.051
116. 14 FX -8.392
117. 15 FX -8.733
118. 16 FX -9.074
119. *
120. PERF AN

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** PROCESSING MEMBER/ELEMENT INFORMATION.

** PERFORMING BANDWIDTH REDUCTION.

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ORIGINAL BANDWIDTH = 1
REDUCED  BANDWIDTH = 1

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** CHECKING LOAD DATA.
** PROCESSING SUPPORT CONDITION.
** PROCESSING AND SETTING UP LOAD VECTOR.

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** PROCESSING ELEMENT STIFFNESS MATRIX.          9:28:51
** PROCESSING GLOBAL STIFFNESS MATRIX.          9:28:51
** PROCESSING TRIANGULAR FACTORIZATION.          9:28:51
** CALCULATING JOINT DISPLACEMENT.              9:28:51
** CALCULATING ELEMENT FORCES.                   9:28:52

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121. PRINT ANAL RESU

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	0.00000	-0.03927	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.29529	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.46386	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.37854	0.00000	0.00000	0.00000	0.00000
2	1	-0.00031	-0.03921	0.00000	0.00000	0.00000	0.00000
	2	-0.00136	-0.28799	0.00000	0.00000	0.00000	0.00026
	3	-0.00074	-0.45196	0.00000	0.00000	0.00000	0.00043
	4	-0.00138	-0.36891	0.00000	0.00000	0.00000	0.00034
3	1	-0.00062	-0.03922	0.00000	0.00000	0.00000	0.00000
	2	-0.00273	-0.26768	0.00000	0.00000	0.00000	0.00046
	3	-0.00148	-0.41819	0.00000	0.00000	0.00000	0.00078
	4	-0.00275	-0.34197	0.00000	0.00000	0.00000	0.00062
4	1	-0.00092	-0.03984	0.00000	0.00000	0.00000	-0.00002
	2	-0.00409	-0.23924	0.00000	0.00000	0.00000	0.00055
	3	-0.00221	-0.36836	0.00000	0.00000	0.00000	0.00100
	4	-0.00413	-0.30351	0.00000	0.00000	0.00000	0.00075
5	1	-0.00123	-0.04199	0.00000	0.00000	0.00000	-0.00006
	2	-0.00545	-0.21074	0.00000	0.00000	0.00000	0.00045

6	3	-0.00295	-0.31212	0.00000	0.00000	0.00000	0.00100
	4	-0.00551	-0.26318	0.00000	0.00000	0.00000	0.00067
	1	-0.00154	-0.04696	0.00000	0.00000	0.00000	-0.00013
	2	-0.00681	-0.19351	0.00000	0.00000	0.00000	0.00013
7	3	-0.00369	-0.26301	0.00000	0.00000	0.00000	0.00073
	4	-0.00688	-0.23453	0.00000	0.00000	0.00000	0.00032
	1	-0.00750	-0.04685	0.00000	0.00000	0.00000	-0.00017
	2	-0.00770	-0.19265	0.00000	0.00000	0.00000	-0.00014
8	3	0.01934	-0.26198	0.00000	0.00000	0.00000	0.00044
	4	-0.00113	-0.23351	0.00000	0.00000	0.00000	0.00000
	1	-0.01430	-0.04673	0.00000	0.00000	0.00000	-0.00017
	2	-0.01625	-0.19178	0.00000	0.00000	0.00000	-0.00026
9	3	0.03254	-0.26094	0.00000	0.00000	0.00000	0.00023
	4	-0.00472	-0.23247	0.00000	0.00000	0.00000	-0.00016
	1	-0.02047	-0.04660	0.00000	0.00000	0.00000	-0.00014
	2	-0.02696	-0.19089	0.00000	0.00000	0.00000	-0.00026
10	3	0.03897	-0.25989	0.00000	0.00000	0.00000	0.00010
	4	-0.01209	-0.23141	0.00000	0.00000	0.00000	-0.00019
	1	-0.02487	-0.04646	0.00000	0.00000	0.00000	-0.00008
	2	-0.03574	-0.18999	0.00000	0.00000	0.00000	-0.00017
11	3	0.04103	-0.25882	0.00000	0.00000	0.00000	0.00001
	4	-0.01905	-0.23034	0.00000	0.00000	0.00000	-0.00014
	1	-0.02669	-0.04630	0.00000	0.00000	0.00000	-0.00001
	2	-0.03990	-0.18907	0.00000	0.00000	0.00000	-0.00003
12	3	0.04037	-0.25774	0.00000	0.00000	0.00000	-0.00004
	4	-0.02283	-0.22926	0.00000	0.00000	0.00000	-0.00004
	1	-0.02554	-0.04612	0.00000	0.00000	0.00000	0.00007
	2	-0.03828	-0.18814	0.00000	0.00000	0.00000	0.00011
	3	0.03783	-0.25664	0.00000	0.00000	0.00000	-0.00008
	4	-0.02221	-0.22817	0.00000	0.00000	0.00000	0.00007

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
13	1	-0.02158	-0.04594	0.00000	0.00000	0.00000	0.00013
	2	-0.03132	-0.18720	0.00000	0.00000	0.00000	0.00023
	3	0.03344	-0.25553	0.00000	0.00000	0.00000	-0.00014
	4	-0.01753	-0.22705	0.00000	0.00000	0.00000	0.00015
14	1	-0.01550	-0.04573	0.00000	0.00000	0.00000	0.00017
	2	-0.02111	-0.18624	0.00000	0.00000	0.00000	0.00027
	3	0.02635	-0.25441	0.00000	0.00000	0.00000	-0.00022
	4	-0.01079	-0.22593	0.00000	0.00000	0.00000	0.00017
15	1	-0.00867	-0.04552	0.00000	0.00000	0.00000	0.00016
	2	-0.01147	-0.18527	0.00000	0.00000	0.00000	0.00019
	3	0.01474	-0.25327	0.00000	0.00000	0.00000	-0.00037
	4	-0.00576	-0.22479	0.00000	0.00000	0.00000	0.00006
16	1	-0.00319	-0.04529	0.00000	0.00000	0.00000	0.00010
	2	-0.00805	-0.18428	0.00000	0.00000	0.00000	-0.00005
	3	-0.00412	-0.25212	0.00000	0.00000	0.00000	-0.00059
	4	-0.00798	-0.22364	0.00000	0.00000	0.00000	-0.00020
17	1	-0.00255	-0.04760	0.00000	0.00000	0.00000	0.00000
	2	-0.00644	-0.17183	0.00000	0.00000	0.00000	-0.00036
	3	-0.00330	-0.21241	0.00000	0.00000	0.00000	-0.00080
	4	-0.00638	-0.20225	0.00000	0.00000	0.00000	-0.00052
18	1	-0.00191	-0.04593	0.00000	0.00000	0.00000	-0.00005
	2	-0.00483	-0.14896	0.00000	0.00000	0.00000	-0.00044
	3	-0.00247	-0.16810	0.00000	0.00000	0.00000	-0.00078

19	4	-0.00479	-0.17074	0.00000	0.00000	0.00000	-0.00059
	1	-0.00127	-0.04294	0.00000	0.00000	0.00000	-0.00005
	2	-0.00322	-0.12600	0.00000	0.00000	0.00000	-0.00037
	3	-0.00165	-0.12996	0.00000	0.00000	0.00000	-0.00059
20	4	-0.00319	-0.14084	0.00000	0.00000	0.00000	-0.00048
	1	-0.00064	-0.04045	0.00000	0.00000	0.00000	-0.00003
	2	-0.00161	-0.10971	0.00000	0.00000	0.00000	-0.00021
	3	-0.00082	-0.10470	0.00000	0.00000	0.00000	-0.00032
21	4	-0.00160	-0.12011	0.00000	0.00000	0.00000	-0.00026
	1	0.00000	-0.03951	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.10388	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.09591	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.11275	0.00000	0.00000	0.00000	0.00000

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	8.39	0.00	0.00	0.00	0.00	-0.15
	2	37.17	0.00	0.00	0.00	0.00	-15.38
	3	20.13	0.00	0.00	0.00	0.00	-24.92
	4	37.54	0.00	0.00	0.00	0.00	-20.22
16	1	0.00	2.14	0.00	0.00	0.00	0.00
	2	0.00	8.71	0.00	0.00	0.00	0.00
	3	0.00	11.91	0.00	0.00	0.00	0.00
	4	0.00	10.57	0.00	0.00	0.00	0.00
17	1	0.00	2.36	0.00	0.00	0.00	0.00
	2	0.00	8.51	0.00	0.00	0.00	0.00
	3	0.00	10.51	0.00	0.00	0.00	0.00
	4	0.00	10.01	0.00	0.00	0.00	0.00
18	1	0.00	2.27	0.00	0.00	0.00	0.00
	2	0.00	7.37	0.00	0.00	0.00	0.00
	3	0.00	8.32	0.00	0.00	0.00	0.00
	4	0.00	8.45	0.00	0.00	0.00	0.00
19	1	0.00	2.13	0.00	0.00	0.00	0.00
	2	0.00	6.24	0.00	0.00	0.00	0.00
	3	0.00	6.43	0.00	0.00	0.00	0.00
	4	0.00	6.97	0.00	0.00	0.00	0.00
20	1	0.00	2.00	0.00	0.00	0.00	0.00
	2	0.00	5.43	0.00	0.00	0.00	0.00
	3	0.00	5.18	0.00	0.00	0.00	0.00
	4	0.00	5.95	0.00	0.00	0.00	0.00
21	1	17.39	0.98	0.00	0.00	0.00	2.10
	2	43.90	2.57	0.00	0.00	0.00	12.49
	3	22.50	2.37	0.00	0.00	0.00	18.57
	4	43.52	2.79	0.00	0.00	0.00	15.67

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	8.39	0.00	0.00	0.00	0.00	-0.15
		2	-8.39	0.69	0.00	0.00	0.00	-0.04
	2	1	37.17	0.00	0.00	0.00	0.00	-15.38

	3	2	-37.17	6.08	0.00	0.00	0.00	13.70	8	1	8	4.44	5.45	0.00	0.00	0.00	-1.23		
		1	20.13	0.00	0.00	0.00	0.00	-24.92		9	-4.94	-5.45	0.00	0.00	0.00	3.41			
		2	-20.13	7.26	0.00	0.00	0.00	22.92		2	8	31.39	19.15	0.00	0.00	0.00	3.61		
		4	1	37.54	0.00	0.00	0.00	-20.22		9	-31.89	-19.15	0.00	0.00	0.00	4.05			
	4	2	-37.54	7.26	0.00	0.00	0.00	18.22		3	8	37.30	11.11	0.00	0.00	0.00	12.33		
										9	-37.80	-11.11	0.00	0.00	0.00	-7.88			
		2	1	2	8.39	-0.69	0.00	0.00		0.00	0.04	4	8	37.30	19.52	0.00	0.00	0.00	6.59
		3	-8.39	1.37	0.00	0.00	0.00	-0.60		9	9	-37.80	-19.52	0.00	0.00	0.00	1.22		
	2	2	37.17	-6.08	0.00	0.00	0.00	-13.70	9	1	9	4.94	3.79	0.00	0.00	0.00	-3.41		
		3	-37.17	12.16	0.00	0.00	0.00	8.69		10	-5.44	-3.79	0.00	0.00	0.00	4.93			
		3	2	20.13	-7.26	0.00	0.00	0.00		-22.92	2	9	31.89	12.46	0.00	0.00	0.00	-4.05	
		3	-20.13	14.52	0.00	0.00	0.00	16.93		10	-32.39	-12.46	0.00	0.00	0.00	9.03			
	4	2	37.54	-7.26	0.00	0.00	0.00	-18.22		3	9	37.80	7.67	0.00	0.00	0.00	7.88		
		3	-37.54	14.52	0.00	0.00	0.00	12.23		10	-38.30	-7.67	0.00	0.00	0.00	-4.82			
		3	1	3	8.39	-1.38	0.00	0.00		0.00	0.60	4	9	37.80	12.84	0.00	0.00	0.00	-1.22
		4	-8.39	2.06	0.00	0.00	0.00	-1.55		10	10	-38.30	-12.84	0.00	0.00	0.00	6.35		
	3	2	37.17	-12.15	0.00	0.00	0.00	-8.69	10	1	10	5.44	1.78	0.00	0.00	0.00	-4.93		
		4	-37.17	18.23	0.00	0.00	0.00	0.33		11	-5.94	-1.78	0.00	0.00	0.00	5.64			
		3	3	20.13	-14.52	0.00	0.00	0.00		-16.93	2	10	32.39	5.43	0.00	0.00	0.00	-9.03	
		4	-20.13	21.78	0.00	0.00	0.00	6.95		11	-32.89	-5.43	0.00	0.00	0.00	11.21			
	4	3	37.54	-14.52	0.00	0.00	0.00	-12.23		3	10	38.30	4.01	0.00	0.00	0.00	4.82		
		4	-37.54	21.78	0.00	0.00	0.00	2.25		11	-38.80	-4.01	0.00	0.00	0.00	-3.21			
		4	1	4	8.39	-2.06	0.00	0.00		0.00	1.55	4	10	38.30	5.81	0.00	0.00	0.00	-6.35
		5	-8.39	2.75	0.00	0.00	0.00	-2.87		11	11	-38.80	-5.81	0.00	0.00	0.00	8.67		
	2	4	37.17	-18.23	0.00	0.00	0.00	-0.33	11	1	11	5.94	-0.56	0.00	0.00	0.00	-5.64		
		5	-37.17	24.31	0.00	0.00	0.00	-11.37		12	-6.44	0.56	0.00	0.00	0.00	5.42			
		3	4	20.13	-21.78	0.00	0.00	0.00		-6.95	2	11	32.89	-1.94	0.00	0.00	0.00	-11.21	
		5	-20.13	29.04	0.00	0.00	0.00	-7.03		12	-33.39	1.94	0.00	0.00	0.00	10.43			
	4	4	37.54	-21.78	0.00	0.00	0.00	-2.25		3	11	38.80	0.13	0.00	0.00	0.00	3.21		
		5	-37.54	29.04	0.00	0.00	0.00	-11.72		12	-39.30	-0.13	0.00	0.00	0.00	-3.16			
		5	1	5	8.39	-2.75	0.00	0.00		0.00	2.87	4	11	38.80	-1.56	0.00	0.00	0.00	-8.67
		6	-8.39	3.44	0.00	0.00	0.00	-4.57		12	12	-39.30	1.56	0.00	0.00	0.00	8.05		
	5	2	37.17	-24.31	0.00	0.00	0.00	11.37	12	1	12	6.44	-3.24	0.00	0.00	0.00	-5.42		
		6	-37.17	30.39	0.00	0.00	0.00	-26.41		13	-6.94	3.24	0.00	0.00	0.00	4.12			
		3	5	20.13	-29.04	0.00	0.00	0.00		7.03	2	12	33.39	-9.65	0.00	0.00	0.00	-10.43	
		6	-20.13	36.30	0.00	0.00	0.00	-24.99		13	-33.89	9.65	0.00	0.00	0.00	6.57			
	4	5	37.54	-29.04	0.00	0.00	0.00	11.72		3	12	39.30	-3.96	0.00	0.00	0.00	3.16		
		6	-37.54	36.30	0.00	0.00	0.00	-29.69		13	-39.80	3.96	0.00	0.00	0.00	-4.74			
		6	1	6	3.44	7.75	0.00	0.00		0.00	4.57	4	12	39.30	-9.27	0.00	0.00	0.00	-8.05
		7	-3.94	-7.75	0.00	0.00	0.00	-1.47		13	13	-39.80	9.27	0.00	0.00	0.00	4.34		
	6	2	30.39	31.50	0.00	0.00	0.00	26.41	13	1	13	6.94	-6.27	0.00	0.00	0.00	-4.12		
		7	-30.89	-31.50	0.00	0.00	0.00	-13.81		14	-7.44	6.27	0.00	0.00	0.00	1.61			
		3	6	36.30	17.34	0.00	0.00	0.00		24.99	2	13	33.89	-17.70	0.00	0.00	0.00	-6.57	
		7	-36.80	-17.34	0.00	0.00	0.00	-18.06		14	-34.39	17.70	0.00	0.00	0.00	-0.51			
	4	6	36.30	31.88	0.00	0.00	0.00	29.69		3	13	39.80	-8.27	0.00	0.00	0.00	4.74		
		7	-36.80	-31.88	0.00	0.00	0.00	-16.94		14	-40.30	8.27	0.00	0.00	0.00	-8.05			
		7	1	7	3.94	6.77	0.00	0.00		0.00	1.47	4	13	39.80	-17.33	0.00	0.00	0.00	-4.34
		8	-4.44	-6.77	0.00	0.00	0.00	1.23		14	14	-40.30	17.33	0.00	0.00	0.00	-2.59		
	2	7	30.89	25.49	0.00	0.00	0.00	13.81	14	1	14	7.44	-9.63	0.00	0.00	0.00	-1.61		
		8	-31.39	-25.49	0.00	0.00	0.00	-3.61		15	-7.94	9.63	0.00	0.00	0.00	-2.24			
		3	7	36.80	14.33	0.00	0.00	0.00		18.06	2	14	34.39	-26.09	0.00	0.00	0.00	0.51	
		8	-37.30	-14.33	0.00	0.00	0.00	-12.33		15	-34.89	26.09	0.00	0.00	0.00	-10.95			
	4	7	36.80	25.87	0.00	0.00	0.00	16.94		3	14	40.30	-12.79	0.00	0.00	0.00	8.05		
		8	-37.30	-25.87	0.00	0.00	0.00	-6.59		15	-40.80	12.79	0.00	0.00	0.00	-13.17			

	4	14	40.30	-25.72	0.00	0.00	0.00	2.59
		15	-40.80	25.72	0.00	0.00	0.00	-12.88
15	1	15	7.94	-13.34	0.00	0.00	0.00	2.24
		16	-8.44	13.34	0.00	0.00	0.00	-7.57
	2	15	34.89	-34.83	0.00	0.00	0.00	10.95
		16	-35.39	34.83	0.00	0.00	0.00	-24.88
	3	15	40.80	-17.54	0.00	0.00	0.00	13.17
		16	-41.30	17.54	0.00	0.00	0.00	-20.18
	4	15	40.80	-34.45	0.00	0.00	0.00	12.88
		16	-41.30	34.45	0.00	0.00	0.00	-26.66
16	1	16	17.39	-6.30	0.00	0.00	0.00	-7.57
		17	-17.39	6.99	0.00	0.00	0.00	3.92
	2	16	43.90	-26.68	0.00	0.00	0.00	-24.88
		17	-43.90	27.37	0.00	0.00	0.00	10.02
	3	16	22.50	-29.39	0.00	0.00	0.00	-20.18
		17	-22.50	30.07	0.00	0.00	0.00	3.83
	4	16	43.52	-30.73	0.00	0.00	0.00	-26.66
		17	-43.52	31.42	0.00	0.00	0.00	9.57
17	1	17	17.39	-4.63	0.00	0.00	0.00	-3.92
		18	-17.39	5.32	0.00	0.00	0.00	1.19
	2	17	43.90	-18.86	0.00	0.00	0.00	-10.01
		18	-43.90	19.55	0.00	0.00	0.00	-0.55
	3	17	22.50	-19.56	0.00	0.00	0.00	-3.83
		18	-22.50	20.25	0.00	0.00	0.00	-7.11
	4	17	43.52	-21.41	0.00	0.00	0.00	-9.57
		18	-43.52	22.10	0.00	0.00	0.00	-2.40
18	1	18	17.39	-3.04	0.00	0.00	0.00	-1.19
		19	-17.39	3.73	0.00	0.00	0.00	-0.68
	2	18	43.90	-12.18	0.00	0.00	0.00	0.55
		19	-43.90	12.86	0.00	0.00	0.00	-7.43
	3	18	22.50	-11.93	0.00	0.00	0.00	7.11
		19	-22.50	12.61	0.00	0.00	0.00	-13.86
	4	18	43.52	-13.65	0.00	0.00	0.00	2.40
		19	-43.52	14.33	0.00	0.00	0.00	-10.09
19	1	19	17.39	-1.61	0.00	0.00	0.00	0.68
		20	-17.39	2.29	0.00	0.00	0.00	-1.75
	2	19	43.90	-6.63	0.00	0.00	0.00	7.43
		20	-43.90	7.31	0.00	0.00	0.00	-11.27
	3	19	22.50	-6.18	0.00	0.00	0.00	13.86
		20	-22.50	6.87	0.00	0.00	0.00	-17.45
	4	19	43.52	-7.36	0.00	0.00	0.00	10.09
		20	-43.52	8.05	0.00	0.00	0.00	-14.33
20	1	20	17.39	-0.29	0.00	0.00	0.00	1.75
		21	-17.39	0.98	0.00	0.00	0.00	-2.10
	2	20	43.90	-1.88	0.00	0.00	0.00	11.27
		21	-43.90	2.57	0.00	0.00	0.00	-12.49
	3	20	22.50	-1.69	0.00	0.00	0.00	17.45
		21	-22.50	2.37	0.00	0.00	0.00	-18.57
	4	20	43.52	-2.10	0.00	0.00	0.00	14.33
		21	-43.52	2.79	0.00	0.00	0.00	-15.67

122. FINISH

***** END OF STAAD-III *****

***** DATE= NOV 14,1998 TIME= 9:28:53 *****

 * FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
 * CALL (01) 686-7682, CROYDON, U.K. TLX. 929181 *

***** END OF LATEST ANALYSIS RESULT *****

STAAD PLANE PASO DE FAUNA TIPO 2B. Coef. 5,1. (+ 0,4 m.)

UNIT ME MT
OUTP WIDT 72
PAGE EJECT
INPUT NO

*

JOIN COOR

1	0.	4.0	0.
2	0.55	4.0	0.
3	1.1	4.0	0.
4	1.65	4.0	0.
5	2.2	4.0	0.
6	2.75	4.0	0.
7	2.75	3.6	0.
8	2.75	3.2	0.
9	2.75	2.8	0.
10	2.75	2.4	0.
11	2.75	2.0	0.
12	2.75	1.6	0.
13	2.75	1.2	0.
14	2.75	0.8	0.
15	2.75	0.4	0.
	2.75	0.	0.
17	2.2	0.	0.
18	1.65	0.	0.
19	1.1	0.	0.
20	0.55	0.	0.
21	0.	0.	0.

*

MEMB INCI

1 1 2 20

*

MEMB PROP

1 TO 20 PRIX AX 0.5 IZ 0.0104167

*

CONST

E 3000000. 1 TO 5

E 2850000. 6 TO 15

E 3000000. 16 TO 20

POISS 0.2 ALL

*

PP

1	FIXED BUT FY
16	FIXED BUT FX MZ KFY 2677.5
17 TO 20	FIXED BUT FX MZ KFY 2805.
21	FIXED BUT KFY 1402.5

*

LOAD 1 PORTICO EN CONSTRUCCION

MEMB LOAD

1 TO 5 UNI GY -1.25
6 TO 15 UNI GY -1.25
16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -0.639
7 FX -0.9798
8 FX -1.3206
9 FX -1.6614
10 FX -2.0022
11 FX -2.343
12 FX -2.6838

13 FX -3.0246
14 FX -3.3654
15 FX -3.7062
16 FX -4.047

*

LOAD 2 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -11.05
6 TO 15 UNI GY -1.25
16 TO 20 UNI GY -2.73

JOIN LOAD

6 FX -5.666
7 FX -6.007
8 FX -6.347
9 FX -6.688
10 FX -7.029
11 FX -7.370
12 FX -7.711
13 FX -8.051
14 FX -8.392
15 FX -8.733
16 FX -9.074

LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO

MEMB LOAD

1 TO 5 UNI GY -13.2
6 TO 15 UNI GY -1.25
16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -2.791
7 FX -3.008
8 FX -3.225
9 FX -3.442
10 FX -3.658
11 FX -3.875
12 FX -4.092
13 FX -4.309
14 FX -4.526
15 FX -4.742
16 FX -4.959

*

AD 4 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -13.2
6 TO 15 UNI GY -1.25
16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -5.666
7 FX -6.007
8 FX -6.347
9 FX -6.688
10 FX -7.029
11 FX -7.370
12 FX -7.711
13 FX -8.051
14 FX -8.392
15 FX -8.733
16 FX -9.074

*

PERF AN

PRINT ANAL RESU
FINISH

```
*****
*
*          S T A A D - III
*          REVISION 10.2b(VERSION 10 LEVEL 2)
*          PROPRIETARY PROGRAM OF
*          RESEARCH ENGINEERS, INC.
*          DATE=      NOV 14, 1998
*          TIME=      9:42:45
*
*****
```

1. STAAD PLANE PASO DE FAUNA TIPO 2B. Coef. 5,1. (+ 0,4 m.)
2. UNIT ME MT
3. OUTP WIDT 72
4. PAGE EJECT
5. INPUT NO

*** THIS RUN WILL ALLOW ANALYSIS ONLY AND NO DESIGN ***

```
6. *
7. JOIN COOR
8. 1      0.      4.0      0.
9. 2      0.55     4.0      0.
10. 3      1.1      4.0      0.
11. 4      1.65     4.0      0.
12. 5      2.2      4.0      0.
13. 6      2.75     4.0      0.
14. 7      2.75     3.6      0.
15. 8      2.75     3.2      0.
16. 9      2.75     2.8      0.
17. 10     2.75     2.4      0.
18. 11     2.75     2.0      0.
19. 12     2.75     1.6      0.
20. 13     2.75     1.2      0.
21. 14     2.75     0.8      0.
22. 15     2.75     0.4      0.
23. 16     2.75     0.      0.
24. 17     2.2      0.      0.
25. 18     1.65     0.      0.
26. 19     1.1      0.      0.
27. 20     0.55     0.      0.
28. 21     0.      0.      0.
29. *
30. MEMB INCI
31. 1 1 2 20
32. *
33. MEMB PROP
34. 1 TO 20 PRIX AX 0.5 IZ 0.0104167
35. *
36. CONST
37. E 3000000. 1 TO 5
38. E 2850000. 6 TO 15
39. E 3000000. 16 TO 20
40. POISS 0.2 ALL
41. *
42. SUPP
43. 1          FIXED BUT FY
44. 16         FIXED BUT FX MZ KFY 2677.5
45. 17 TO 20  FIXED BUT FX MZ KFY 2805.
```

106. 16 TO 20 UNI GY -1.25
 107. JOIN LOAD
 108. 6 FX -5.666
 109. 7 FX -6.007
 110. 8 FX -6.347
 111. 9 FX -6.688
 112. 10 FX -7.029
 113. 11 FX -7.370
 114. 12 FX -7.711
 115. 13 FX -8.051
 116. 14 FX -8.392
 117. 15 FX -8.733
 118. 16 FX -9.074
 119. *
 120. PERF AN

** PROCESSING MEMBER/ELEMENT INFORMATION.

** PERFORMING BANDWIDTH REDUCTION.

ORIGINAL BANDWIDTH = 1
 REDUCED BANDWIDTH = 1

** CHECKING LOAD DATA.

** PROCESSING SUPPORT CONDITION.

** PROCESSING AND SETTING UP LOAD VECTOR.

** PROCESSING ELEMENT STIFFNESS MATRIX. 9:42:50
 ** PROCESSING GLOBAL STIFFNESS MATRIX. 9:42:51
 ** PROCESSING TRIANGULAR FACTORIZATION. 9:42:51
 ** CALCULATING JOINT DISPLACEMENT. 9:42:51
 ** CALCULATING ELEMENT FORCES. 9:42:51

121. PRINT ANAL RESU

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	0.00000	-0.07348	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.43794	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.60506	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.51561	0.00000	0.00000	0.00000	0.00000
2	1	-0.00031	-0.07341	0.00000	0.00000	0.00000	0.00000
	2	-0.00136	-0.43057	0.00000	0.00000	0.00000	0.00026
	3	-0.00072	-0.59302	0.00000	0.00000	0.00000	0.00043
	4	-0.00136	-0.50588	0.00000	0.00000	0.00000	0.00035
3	1	-0.00061	-0.07341	0.00000	0.00000	0.00000	0.00000
	2	-0.00271	-0.41010	0.00000	0.00000	0.00000	0.00047
	3	-0.00144	-0.55883	0.00000	0.00000	0.00000	0.00079
	4	-0.00273	-0.47864	0.00000	0.00000	0.00000	0.00063
4	1	-0.00092	-0.07400	0.00000	0.00000	0.00000	-0.00002
	2	-0.00407	-0.38138	0.00000	0.00000	0.00000	0.00055
	3	-0.00216	-0.50829	0.00000	0.00000	0.00000	0.00101
	4	-0.00409	-0.43967	0.00000	0.00000	0.00000	0.00076
5	1	-0.00123	-0.07612	0.00000	0.00000	0.00000	-0.00006
	2	-0.00542	-0.35248	0.00000	0.00000	0.00000	0.00046

46. 21 FIXED BUT KFY 1402.5
 47. *
 48. LOAD 1 PORTICO EN CONSTRUCCION
 49. MEMB LOAD
 50. 1 TO 5 UNI GY -1.25
 51. 6 TO 15 UNI GY -1.25
 52. 16 TO 20 UNI GY -1.25
 53. JOIN LOAD
 54. 6 FX -0.639
 55. 7 FX -0.9798
 56. 8 FX -1.3206
 57. 9 FX -1.6614
 58. 10 FX -2.0022
 59. 11 FX -2.343
 60. 12 FX -2.6838
 61. 13 FX -3.0246
 62. 14 FX -3.3654
 63. 15 FX -3.7062
 64. 16 FX -4.047
 65. *

66. LOAD 2 PORTICO DESCARGADO
 67. MEMB LOAD
 68. 1 TO 5 UNI GY -11.05
 69. 6 TO 15 UNI GY -1.25
 70. 16 TO 20 UNI GY -2.73
 71. JOIN LOAD

72. 6 FX -5.666
 73. 7 FX -6.007
 74. 8 FX -6.347
 75. 9 FX -6.688
 76. 10 FX -7.029
 77. 11 FX -7.370
 78. 12 FX -7.711
 79. 13 FX -8.051
 80. 14 FX -8.392
 81. 15 FX -8.733
 82. 16 FX -9.074

83. *
 84. LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO

85. MEMB LOAD
 86. 1 TO 5 UNI GY -13.2
 87. 6 TO 15 UNI GY -1.25
 88. 16 TO 20 UNI GY -1.25

89. JOIN LOAD
 90. 6 FX -2.791
 91. 7 FX -3.008
 92. 8 FX -3.225
 93. 9 FX -3.442
 94. 10 FX -3.658
 95. 11 FX -3.875
 96. 12 FX -4.092
 97. 13 FX -4.309
 98. 14 FX -4.526
 99. 15 FX -4.742
 100. 16 FX -4.959

101. *
 102. LOAD 4 PORTICO DESCARGADO
 103. MEMB LOAD
 104. 1 TO 5 UNI GY -13.2
 105. 6 TO 15 UNI GY -1.25

6	3	-0.00288	-0.45106	0.00000	0.00000	0.00000	0.00103
	4	-0.00545	-0.39865	0.00000	0.00000	0.00000	0.00069
	1	-0.00153	-0.08104	0.00000	0.00000	0.00000	-0.00012
	2	-0.00678	-0.33475	0.00000	0.00000	0.00000	0.00014
7	3	-0.00360	-0.40068	0.00000	0.00000	0.00000	0.00075
	4	-0.00682	-0.36910	0.00000	0.00000	0.00000	0.00033
	1	-0.00746	-0.08093	0.00000	0.00000	0.00000	-0.00016
	2	-0.00723	-0.33389	0.00000	0.00000	0.00000	-0.00013
8	3	0.02052	-0.39965	0.00000	0.00000	0.00000	0.00047
	4	-0.00029	-0.36807	0.00000	0.00000	0.00000	0.00002
	1	-0.01421	-0.08082	0.00000	0.00000	0.00000	-0.00017
	2	-0.01532	-0.33301	0.00000	0.00000	0.00000	-0.00025
9	3	0.03485	-0.39861	0.00000	0.00000	0.00000	0.00026
	4	-0.00307	-0.36703	0.00000	0.00000	0.00000	-0.00014
	1	-0.02035	-0.08068	0.00000	0.00000	0.00000	-0.00014
	2	-0.02561	-0.33212	0.00000	0.00000	0.00000	-0.00025
10	3	0.04236	-0.39756	0.00000	0.00000	0.00000	0.00012
	4	-0.00969	-0.36598	0.00000	0.00000	0.00000	-0.00018
	1	-0.02471	-0.08054	0.00000	0.00000	0.00000	-0.00008
	2	-0.03403	-0.33122	0.00000	0.00000	0.00000	-0.00016
11	3	0.04532	-0.39649	0.00000	0.00000	0.00000	0.00003
	4	-0.01600	-0.36491	0.00000	0.00000	0.00000	-0.00013
	1	-0.02651	-0.08038	0.00000	0.00000	0.00000	-0.00001
	2	-0.03794	-0.33031	0.00000	0.00000	0.00000	-0.00003
12	3	0.04527	-0.39541	0.00000	0.00000	0.00000	-0.00003
	4	-0.01935	-0.36383	0.00000	0.00000	0.00000	-0.00003
	1	-0.02536	-0.08021	0.00000	0.00000	0.00000	0.00007
	2	-0.03623	-0.32938	0.00000	0.00000	0.00000	0.00011
	3	0.04296	-0.39431	0.00000	0.00000	0.00000	-0.00009
	4	-0.01857	-0.36273	0.00000	0.00000	0.00000	0.00007

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
13	1	-0.02140	-0.08002	0.00000	0.00000	0.00000	0.00013
	2	-0.02938	-0.32843	0.00000	0.00000	0.00000	0.00022
	3	0.03830	-0.39320	0.00000	0.00000	0.00000	-0.00015
	4	-0.01408	-0.36162	0.00000	0.00000	0.00000	0.00014
14	1	-0.01536	-0.07982	0.00000	0.00000	0.00000	0.00017
	2	-0.01952	-0.32747	0.00000	0.00000	0.00000	0.00026
	3	0.03031	-0.39208	0.00000	0.00000	0.00000	-0.00026
	4	-0.00798	-0.36049	0.00000	0.00000	0.00000	0.00014
15	1	-0.00859	-0.07960	0.00000	0.00000	0.00000	0.00016
	2	-0.01053	-0.32650	0.00000	0.00000	0.00000	0.00017
	3	0.01710	-0.39094	0.00000	0.00000	0.00000	-0.00042
	4	-0.00409	-0.35936	0.00000	0.00000	0.00000	0.00003
16	1	-0.00319	-0.07937	0.00000	0.00000	0.00000	0.00010
	2	-0.00809	-0.32552	0.00000	0.00000	0.00000	-0.00008
	3	-0.00422	-0.38979	0.00000	0.00000	0.00000	-0.00066
	4	-0.00805	-0.35820	0.00000	0.00000	0.00000	-0.00026
17	1	-0.00255	-0.08150	0.00000	0.00000	0.00000	-0.00001
	2	-0.00647	-0.31115	0.00000	0.00000	0.00000	-0.00040
	3	-0.00337	-0.34538	0.00000	0.00000	0.00000	-0.00090
	4	-0.00644	-0.33347	0.00000	0.00000	0.00000	-0.00059
18	1	-0.00191	-0.07961	0.00000	0.00000	0.00000	-0.00005
	2	-0.00485	-0.28593	0.00000	0.00000	0.00000	-0.00049
	3	-0.00253	-0.29553	0.00000	0.00000	0.00000	-0.00088

19	4	-0.00483	-0.29800	0.00000	0.00000	0.00000	-0.00066
	1	-0.00128	-0.07639	0.00000	0.00000	0.00000	-0.00006
	2	-0.00323	-0.26065	0.00000	0.00000	0.00000	-0.00041
	3	-0.00169	-0.25218	0.00000	0.00000	0.00000	-0.00068
20	4	-0.00322	-0.26433	0.00000	0.00000	0.00000	-0.00054
	1	-0.00064	-0.07373	0.00000	0.00000	0.00000	-0.00004
	2	-0.00162	-0.24267	0.00000	0.00000	0.00000	-0.00023
	3	-0.00084	-0.22322	0.00000	0.00000	0.00000	-0.00036
21	4	-0.00161	-0.24090	0.00000	0.00000	0.00000	-0.00030
	1	0.00000	-0.07272	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.23622	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.21308	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.23257	0.00000	0.00000	0.00000	0.00000

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	8.37	0.00	0.00	0.00	0.00	-0.16
	2	36.96	0.00	0.00	0.00	0.00	-15.49
	3	19.62	0.00	0.00	0.00	0.00	-25.21
	4	37.18	0.00	0.00	0.00	0.00	-20.43
16	1	0.00	2.13	0.00	0.00	0.00	0.00
	2	0.00	8.72	0.00	0.00	0.00	0.00
	3	0.00	10.44	0.00	0.00	0.00	0.00
	4	0.00	9.59	0.00	0.00	0.00	0.00
17	1	0.00	2.29	0.00	0.00	0.00	0.00
	2	0.00	8.73	0.00	0.00	0.00	0.00
	3	0.00	9.69	0.00	0.00	0.00	0.00
	4	0.00	9.35	0.00	0.00	0.00	0.00
18	1	0.00	2.23	0.00	0.00	0.00	0.00
	2	0.00	8.02	0.00	0.00	0.00	0.00
	3	0.00	8.29	0.00	0.00	0.00	0.00
	4	0.00	8.36	0.00	0.00	0.00	0.00
19	1	0.00	2.14	0.00	0.00	0.00	0.00
	2	0.00	7.31	0.00	0.00	0.00	0.00
	3	0.00	7.07	0.00	0.00	0.00	0.00
	4	0.00	7.41	0.00	0.00	0.00	0.00
20	1	0.00	2.07	0.00	0.00	0.00	0.00
	2	0.00	6.81	0.00	0.00	0.00	0.00
	3	0.00	6.26	0.00	0.00	0.00	0.00
	4	0.00	6.76	0.00	0.00	0.00	0.00
21	1	17.40	1.02	0.00	0.00	0.00	2.24
	2	44.10	3.31	0.00	0.00	0.00	13.87
	3	23.01	2.99	0.00	0.00	0.00	21.45
	4	43.89	3.26	0.00	0.00	0.00	17.78

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	8.37	0.00	0.00	0.00	0.00	-0.16
		2	-8.37	0.69	0.00	0.00	0.00	-0.03
	2	1	36.96	0.00	0.00	0.00	0.00	-15.49

		2	-36.96	6.08	0.00	0.00	0.00	13.82	8	1	8	4.44	5.43	0.00	0.00	0.00	-1.23
		3	1	19.62	0.00	0.00	0.00	-25.21			9	-4.94	-5.43	0.00	0.00	0.00	3.40
			2	-19.62	7.26	0.00	0.00	23.21		2	8	31.39	18.94	0.00	0.00	0.00	3.66
		4	1	37.18	0.00	0.00	0.00	-20.43			9	-31.89	-18.94	0.00	0.00	0.00	3.92
2		2	-37.18	7.26	0.00	0.00	0.00	18.43		3	8	37.30	10.60	0.00	0.00	0.00	12.44
		1	2	8.37	-0.69	0.00	0.00	0.03		4	9	-37.80	-10.60	0.00	0.00	0.00	-8.20
			3	-8.37	1.38	0.00	0.00	-0.59			8	37.30	19.16	0.00	0.00	0.00	6.68
		2	2	36.96	-6.08	0.00	0.00	-13.82			9	-37.80	-19.16	0.00	0.00	0.00	0.99
	3	3	-36.96	12.15	0.00	0.00	0.00	8.81	9	1	9	4.94	3.77	0.00	0.00	0.00	-3.40
		2	2	19.62	-7.26	0.00	0.00	-23.21			10	-5.44	-3.77	0.00	0.00	0.00	4.91
		3	3	-19.62	14.52	0.00	0.00	17.22		2	9	31.89	12.26	0.00	0.00	0.00	-3.92
		4	2	37.18	-7.26	0.00	0.00	-18.43			10	-32.39	-12.26	0.00	0.00	0.00	8.82
		3	-37.18	14.52	0.00	0.00	0.00	12.44		3	9	37.80	7.16	0.00	0.00	0.00	8.20
		1	3	8.37	-1.38	0.00	0.00	0.59		4	10	-38.30	-7.16	0.00	0.00	0.00	-5.34
			4	-8.37	2.06	0.00	0.00	-1.54			9	37.80	12.47	0.00	0.00	0.00	-0.99
		2	3	36.96	-12.16	0.00	0.00	-8.81			10	-38.30	-12.47	0.00	0.00	0.00	5.98
3		4	-36.96	18.23	0.00	0.00	0.00	0.45	10	1	10	5.44	1.77	0.00	0.00	0.00	-4.91
		3	3	19.62	-14.52	0.00	0.00	-17.22			11	-5.94	-1.77	0.00	0.00	0.00	5.61
			4	-19.62	21.78	0.00	0.00	7.24		2	10	32.39	5.23	0.00	0.00	0.00	-8.82
		4	3	37.18	-14.52	0.00	0.00	-12.44			11	-32.89	-5.23	0.00	0.00	0.00	10.92
		4	-37.18	21.78	0.00	0.00	0.00	2.46		3	10	38.30	3.50	0.00	0.00	0.00	5.34
		1	4	8.37	-2.06	0.00	0.00	1.54			11	-38.80	-3.50	0.00	0.00	0.00	-3.94
			5	-8.37	2.75	0.00	0.00	-2.86		4	10	38.30	5.44	0.00	0.00	0.00	-5.98
		2	4	36.96	-18.23	0.00	0.00	-0.45			11	-38.80	-5.44	0.00	0.00	0.00	8.16
	3	5	-36.96	24.31	0.00	0.00	0.00	-11.25	11	1	11	5.94	-0.58	0.00	0.00	0.00	-5.61
		4	4	19.62	-21.78	0.00	0.00	-7.24			12	-6.44	0.58	0.00	0.00	0.00	5.38
			5	-19.62	29.04	0.00	0.00	-6.73		2	11	32.89	-2.14	0.00	0.00	0.00	-10.92
		4	4	37.18	-21.78	0.00	0.00	-2.46			12	-33.39	2.14	0.00	0.00	0.00	10.06
4		5	-37.18	29.04	0.00	0.00	0.00	-11.52		3	11	38.80	-0.38	0.00	0.00	0.00	3.94
		1	5	8.37	-2.75	0.00	0.00	2.86			12	-39.30	0.38	0.00	0.00	0.00	-4.09
			6	-8.37	3.44	0.00	0.00	-4.56		4	11	38.80	-1.93	0.00	0.00	0.00	-8.16
		2	5	36.96	-24.31	0.00	0.00	11.25			12	-39.30	1.93	0.00	0.00	0.00	7.39
	3	6	-36.96	30.39	0.00	0.00	0.00	-26.29	12	1	12	6.44	-3.26	0.00	0.00	0.00	-5.38
		5	5	19.62	-29.04	0.00	0.00	6.73			13	-6.94	3.26	0.00	0.00	0.00	4.08
			6	-19.62	36.30	0.00	0.00	-24.70		2	12	33.39	-9.85	0.00	0.00	0.00	-10.06
		4	5	37.18	-29.04	0.00	0.00	11.52			13	-33.89	9.85	0.00	0.00	0.00	6.12
		6	-37.18	36.30	0.00	0.00	0.00	-29.49		3	12	39.30	-4.47	0.00	0.00	0.00	4.09
		1	6	3.44	7.73	0.00	0.00	4.56			13	-39.80	4.47	0.00	0.00	0.00	-5.88
			7	-3.94	-7.73	0.00	0.00	-1.47		4	12	39.30	-9.64	0.00	0.00	0.00	-7.39
		2	6	30.39	31.30	0.00	0.00	26.29			13	-39.80	9.64	0.00	0.00	0.00	3.53
5		7	-30.89	-31.30	0.00	0.00	0.00	-13.77	13	1	13	6.94	-6.29	0.00	0.00	0.00	-4.08
		3	6	36.30	16.83	0.00	0.00	24.70			14	-7.44	6.29	0.00	0.00	0.00	1.57
			7	-36.80	-16.83	0.00	0.00	-17.97		2	13	33.89	-17.91	0.00	0.00	0.00	-6.12
		4	6	36.30	31.52	0.00	0.00	29.49			14	-34.39	17.91	0.00	0.00	0.00	-1.05
		7	-36.80	-31.52	0.00	0.00	0.00	-16.88		3	13	39.80	-8.78	0.00	0.00	0.00	5.88
		1	7	3.94	6.75	0.00	0.00	1.47			14	-40.30	8.78	0.00	0.00	0.00	-9.39
			8	-4.44	-6.75	0.00	0.00	1.23		4	13	39.80	-17.69	0.00	0.00	0.00	-3.53
		2	7	30.89	25.29	0.00	0.00	13.77			14	-40.30	17.69	0.00	0.00	0.00	-3.54
	3	8	-31.39	-25.29	0.00	0.00	0.00	-3.66	14	1	14	7.44	-9.65	0.00	0.00	0.00	-1.57
			7	36.80	13.82	0.00	0.00	17.97			15	-7.94	9.65	0.00	0.00	0.00	-2.30
			8	-37.30	-13.82	0.00	0.00	-12.44		2	14	34.39	-26.30	0.00	0.00	0.00	1.05
		4	7	36.80	25.51	0.00	0.00	16.88			15	-34.89	26.30	0.00	0.00	0.00	-11.56
7		8	-37.30	-25.51	0.00	0.00	0.00	-6.68		3	14	40.30	-13.30	0.00	0.00	0.00	9.39
											15	-40.80	13.30	0.00	0.00	0.00	-14.71

	4	14	40.30	-26.08	0.00	0.00	0.00	3.54
		15	-40.80	26.08	0.00	0.00	0.00	-13.97
15	1	15	7.94	-13.36	0.00	0.00	0.00	2.30
		16	-8.44	13.36	0.00	0.00	0.00	-7.64
	2	15	34.89	-35.03	0.00	0.00	0.00	11.56
		16	-35.39	35.03	0.00	0.00	0.00	-25.58
	3	15	40.80	-18.05	0.00	0.00	0.00	14.71
		16	-41.30	18.05	0.00	0.00	0.00	-21.93
	4	15	40.80	-34.81	0.00	0.00	0.00	13.97
		16	-41.30	34.81	0.00	0.00	0.00	-27.90
16	1	16	17.40	-6.31	0.00	0.00	0.00	-7.64
		17	-17.40	7.00	0.00	0.00	0.00	3.98
	2	16	44.10	-26.67	0.00	0.00	0.00	-25.58
		17	-44.10	28.17	0.00	0.00	0.00	10.49
	3	16	23.01	-30.86	0.00	0.00	0.00	-21.93
		17	-23.01	31.55	0.00	0.00	0.00	4.77
	4	16	43.89	-31.71	0.00	0.00	0.00	-27.90
		17	-43.89	32.40	0.00	0.00	0.00	10.27
17	1	17	17.40	-4.71	0.00	0.00	0.00	-3.98
		18	-17.40	5.40	0.00	0.00	0.00	1.20
	2	17	44.10	-19.45	0.00	0.00	0.00	-10.49
		18	-44.10	20.95	0.00	0.00	0.00	-0.61
	3	17	23.01	-21.86	0.00	0.00	0.00	-4.77
		18	-23.01	22.55	0.00	0.00	0.00	-7.44
	4	17	43.89	-23.04	0.00	0.00	0.00	-10.27
		18	-43.89	23.73	0.00	0.00	0.00	-2.59
18	1	18	17.40	-3.17	0.00	0.00	0.00	-1.20
		19	-17.40	3.86	0.00	0.00	0.00	-0.74
	2	18	44.10	-12.93	0.00	0.00	0.00	0.61
		19	-44.10	14.43	0.00	0.00	0.00	-8.14
	3	18	23.01	-14.26	0.00	0.00	0.00	7.44
		19	-23.01	14.95	0.00	0.00	0.00	-15.48
	4	18	43.89	-15.37	0.00	0.00	0.00	2.59
		19	-43.89	16.06	0.00	0.00	0.00	-11.24
19	1	19	17.40	-1.71	0.00	0.00	0.00	0.74
		20	-17.40	2.40	0.00	0.00	0.00	-1.87
	2	19	44.10	-7.12	0.00	0.00	0.00	8.14
		20	-44.10	8.62	0.00	0.00	0.00	-12.46
	3	19	23.01	-7.87	0.00	0.00	0.00	15.48
		20	-23.01	8.56	0.00	0.00	0.00	-20.00
	4	19	43.89	-8.64	0.00	0.00	0.00	11.24
		20	-43.89	9.33	0.00	0.00	0.00	-16.18
20	1	20	17.40	-0.33	0.00	0.00	0.00	1.87
		21	-17.40	1.02	0.00	0.00	0.00	-2.24
	2	20	44.10	-1.81	0.00	0.00	0.00	12.46
		21	-44.10	3.31	0.00	0.00	0.00	-13.87
	3	20	23.01	-2.30	0.00	0.00	0.00	20.00
		21	-23.01	2.99	0.00	0.00	0.00	-21.45
	4	20	43.89	-2.57	0.00	0.00	0.00	16.18
		21	-43.89	3.26	0.00	0.00	0.00	-17.78

122. FINISH

***** END OF STAAD-III *****

***** DATE= NOV 14,1998 TIME= 9:42:53 *****

 * FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
 * CALL (01) 686-7682, CROYDON, U.K. TLX. 929181 *

***** END OF LATEST ANALYSIS RESULT *****

STAAD PLANE PASO DE FAUNA TIPO 2B. Coef. 9. (+ 0,4 m.)

UNIT ME MT

OUTP WIDT 72

PAGE EJECT

INPUT NO

*

JOIN COOR

1	0.	4.0	0.
2	0.55	4.0	0.
3	1.1	4.0	0.
4	1.65	4.0	0.
5	2.2	4.0	0.
6	2.75	4.0	0.
7	2.75	3.6	0.
8	2.75	3.2	0.
9	2.75	2.8	0.
10	2.75	2.4	0.
11	2.75	2.0	0.
12	2.75	1.6	0.
13	2.75	1.2	0.
14	2.75	0.8	0.
15	2.75	0.4	0.
	2.75	0.	0.
17	2.2	0.	0.
18	1.65	0.	0.
19	1.1	0.	0.
20	0.55	0.	0.
21	0.	0.	0.

*

MEMB INCI

1 1 2 20

*

MEMB PROP

1 TO 20 PRIX AX 0.5 IZ 0.0104167

*

CONST

E 3000000. 1 TO 5

E 2850000. 6 TO 15

E 3000000. 16 TO 20

POISS 0.2 ALL

*

PP

1	FIXED BUT FY
16	FIXED BUT FX MZ KFY 4725.
17 TO 20	FIXED BUT FX MZ KFY 4950.
21	FIXED BUT KFY 2475.

*

LOAD 1 PORTICO EN CONSTRUCCION

MEMB LOAD

1 TO 5 UNI GY -1.25

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6	FX -0.639
7	FX -0.9798
8	FX -1.3206
9	FX -1.6614
10	FX -2.0022
11	FX -2.343
12	FX -2.6838

13 FX -3.0246

14 FX -3.3654

15 FX -3.7062

16 FX -4.047

*

LOAD 2 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -11.05

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -2.73

JOIN LOAD

6 FX -5.666

7 FX -6.007

8 FX -6.347

9 FX -6.688

10 FX -7.029

11 FX -7.370

12 FX -7.711

13 FX -8.051

14 FX -8.392

15 FX -8.733

16 FX -9.074

LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO

MEMB LOAD

1 TO 5 UNI GY -13.2

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -2.791

7 FX -3.008

8 FX -3.225

9 FX -3.442

10 FX -3.658

11 FX -3.875

12 FX -4.092

13 FX -4.309

14 FX -4.526

15 FX -4.742

16 FX -4.959

*

AD 4 PORTICO DESCARGADO

MEMB LOAD

1 TO 5 UNI GY -13.2

6 TO 15 UNI GY -1.25

16 TO 20 UNI GY -1.25

JOIN LOAD

6 FX -5.666

7 FX -6.007

8 FX -6.347

9 FX -6.688

10 FX -7.029

11 FX -7.370

12 FX -7.711

13 FX -8.051

14 FX -8.392

15 FX -8.733

16 FX -9.074

*

PERF AN

PRINT ANAL RESU
FINISH

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*****
*
*          S T A A D - III
*          REVISION 10.2b(VERSION 10 LEVEL 2)
*          PROPRIETARY PROGRAM OF
*          RESEARCH ENGINEERS, INC.
*          DATE=      NOV 14, 1998
*          TIME=      9:48:20
*
*****
```

1. STAAD PLANE PASO DE FAUNA TIPO 2B. Coef. 9. (+ 0,4 m.)
2. UNIT ME MT
3. OUTP WIDT 72
4. PAGE EJECT
5. INPUT NO

*** THIS RUN WILL ALLOW ANALYSIS ONLY AND NO DESIGN ***

```
6. *
7. JOIN COOR
8. 1      0.      4.0    0.
9. 2      0.55    4.0    0.
10. 3     1.1     4.0    0.
11. 4     1.65    4.0    0.
12. 5     2.2     4.0    0.
13. 6     2.75    4.0    0.
14. 7     2.75    3.6    0.
15. 8     2.75    3.2    0.
16. 9     2.75    2.8    0.
17. 10    2.75    2.4    0.
18. 11    2.75    2.0    0.
19. 12    2.75    1.6    0.
20. 13    2.75    1.2    0.
21. 14    2.75    0.8    0.
22. 15    2.75    0.4    0.
23. 16    2.75    0.     0.
24. 17    2.2     0.     0.
25. 18    1.65    0.     0.
26. 19    1.1     0.     0.
27. 20    0.55    0.     0.
28. 21    0.      0.     0.
29. *
30. MEMB INCI
31. 1 1 2 20
32. *
33. MEMB PROP
34. 1 TO 20 PRIX AX 0.5 IZ 0.0104167
35. *
36. CONST
37. E 3000000. 1 TO 5
38. E 2850000. 6 TO 15
39. E 3000000. 16 TO 20
40. POISS 0.2 ALL
41. *
42. SUPP
43. 1      FIXED BUT FY
44. 16     FIXED BUT FX MZ KFY 4725.
45. 17 TO 20 FIXED BUT FX MZ KFY 4950.
```

46. 21 FIXED BUT KFY 2475.
 47. *
 48. LOAD 1 PORTICO EN CONSTRUCCION
 49. MEMB LOAD
 50. 1 TO 5 UNI GY -1.25
 51. 6 TO 15 UNI GY -1.25
 52. 16 TO 20 UNI GY -1.25
 53. JOIN LOAD
 54. 6 FX -0.639
 55. 7 FX -0.9798
 56. 8 FX -1.3206
 57. 9 FX -1.6614
 58. 10 FX -2.0022
 59. 11 FX -2.343
 60. 12 FX -2.6838
 61. 13 FX -3.0246
 62. 14 FX -3.3654
 63. 15 FX -3.7062
 64. 16 FX -4.047
 65. *
 66. LOAD 2 PORTICO DESCARGADO
 67. MEMB LOAD
 68. 1 TO 5 UNI GY -11.05
 69. 6 TO 15 UNI GY -1.25
 70. 16 TO 20 UNI GY -2.73
 71. JOIN LOAD
 72. 6 FX -5.666
 73. 7 FX -6.007
 74. 8 FX -6.347
 75. 9 FX -6.688
 76. 10 FX -7.029
 77. 11 FX -7.370
 78. 12 FX -7.711
 79. 13 FX -8.051
 80. 14 FX -8.392
 81. 15 FX -8.733
 82. 16 FX -9.074
 83. *
 84. LOAD 3 PORTICO EN CARGA, EMPUJE ACTIVO
 85. MEMB LOAD
 86. 1 TO 5 UNI GY -13.2
 87. 6 TO 15 UNI GY -1.25
 88. 16 TO 20 UNI GY -1.25
 89. JOIN LOAD
 90. 6 FX -2.791
 91. 7 FX -3.008
 92. 8 FX -3.225
 93. 9 FX -3.442
 94. 10 FX -3.658
 95. 11 FX -3.875
 96. 12 FX -4.092
 97. 13 FX -4.309
 98. 14 FX -4.526
 99. 15 FX -4.742
 100. 16 FX -4.959
 101. *
 102. LOAD 4 PORTICO DESCARGADO
 103. MEMB LOAD
 104. 1 TO 5 UNI GY -13.2
 105. 6 TO 15 UNI GY -1.25

106. 16 TO 20 UNI GY -1.25
 107. JOIN LOAD
 108. 6 FX -5.666
 109. 7 FX -6.007
 110. 8 FX -6.347
 111. 9 FX -6.688
 112. 10 FX -7.029
 113. 11 FX -7.370
 114. 12 FX -7.711
 115. 13 FX -8.051
 116. 14 FX -8.392
 117. 15 FX -8.733
 118. 16 FX -9.074
 119. *
 120. PERF AN

** PROCESSING MEMBER/ELEMENT INFORMATION.

** PERFORMING BANDWIDTH REDUCTION.

ORIGINAL BANDWIDTH = 1
 REDUCED BANDWIDTH = 1

** CHECKING LOAD DATA.
 ** PROCESSING SUPPORT CONDITION.
 ** PROCESSING AND SETTING UP LOAD VECTOR.

** PROCESSING ELEMENT STIFFNESS MATRIX. 9:48:26
 ** PROCESSING GLOBAL STIFFNESS MATRIX. 9:48:26
 ** PROCESSING TRIANGULAR FACTORIZATION. 9:48:26
 ** CALCULATING JOINT DISPLACEMENT. 9:48:26
 ** CALCULATING ELEMENT FORCES. 9:48:27

121. PRINT ANAL RESU

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	1	0.00000	-0.03927	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.30906	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.46386	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.37854	0.00000	0.00000	0.00000	0.00000
2	1	-0.00031	-0.03921	0.00000	0.00000	0.00000	0.00000
	2	-0.00136	-0.30176	0.00000	0.00000	0.00000	0.00026
	3	-0.00074	-0.45196	0.00000	0.00000	0.00000	0.00043
	4	-0.00138	-0.36891	0.00000	0.00000	0.00000	0.00034
3	1	-0.00062	-0.03922	0.00000	0.00000	0.00000	0.00000
	2	-0.00273	-0.28151	0.00000	0.00000	0.00000	0.00046
	3	-0.00148	-0.41819	0.00000	0.00000	0.00000	0.00078
	4	-0.00275	-0.34197	0.00000	0.00000	0.00000	0.00062
4	1	-0.00092	-0.03984	0.00000	0.00000	0.00000	-0.00002
	2	-0.00409	-0.25313	0.00000	0.00000	0.00000	0.00055
	3	-0.00221	-0.36836	0.00000	0.00000	0.00000	0.00100
	4	-0.00413	-0.30351	0.00000	0.00000	0.00000	0.00075
5	1	-0.00123	-0.04199	0.00000	0.00000	0.00000	-0.00006
	2	-0.00546	-0.22474	0.00000	0.00000	0.00000	0.00045

6	3	-0.00295	-0.31212	0.00000	0.00000	0.00000	0.00100
	4	-0.00551	-0.26318	0.00000	0.00000	0.00000	0.00067
	1	-0.00154	-0.04696	0.00000	0.00000	0.00000	-0.00013
	2	-0.00682	-0.20764	0.00000	0.00000	0.00000	0.00012
7	3	-0.00369	-0.26301	0.00000	0.00000	0.00000	0.00073
	4	-0.00688	-0.23453	0.00000	0.00000	0.00000	0.00032
	1	-0.00750	-0.04685	0.00000	0.00000	0.00000	-0.00017
	2	-0.00782	-0.20678	0.00000	0.00000	0.00000	-0.00015
8	3	0.01934	-0.26198	0.00000	0.00000	0.00000	0.00044
	4	-0.00113	-0.23351	0.00000	0.00000	0.00000	0.00000
	1	-0.01430	-0.04673	0.00000	0.00000	0.00000	-0.00017
	2	-0.01649	-0.20591	0.00000	0.00000	0.00000	-0.00026
9	3	0.03254	-0.26094	0.00000	0.00000	0.00000	0.00023
	4	-0.00472	-0.23247	0.00000	0.00000	0.00000	-0.00016
	1	-0.02047	-0.04660	0.00000	0.00000	0.00000	-0.00014
	2	-0.02732	-0.20502	0.00000	0.00000	0.00000	-0.00026
10	3	0.03897	-0.25989	0.00000	0.00000	0.00000	0.00010
	4	-0.01209	-0.23141	0.00000	0.00000	0.00000	-0.00019
	1	-0.02487	-0.04646	0.00000	0.00000	0.00000	-0.00008
	2	-0.03619	-0.20412	0.00000	0.00000	0.00000	-0.00017
11	3	0.04103	-0.25882	0.00000	0.00000	0.00000	0.00001
	4	-0.01905	-0.23034	0.00000	0.00000	0.00000	-0.00014
	1	-0.02669	-0.04630	0.00000	0.00000	0.00000	-0.00001
	2	-0.04041	-0.20320	0.00000	0.00000	0.00000	-0.00003
12	3	0.04037	-0.25774	0.00000	0.00000	0.00000	-0.00004
	4	-0.02283	-0.22926	0.00000	0.00000	0.00000	-0.00004
	1	-0.02554	-0.04612	0.00000	0.00000	0.00000	0.00007
	2	-0.03882	-0.20227	0.00000	0.00000	0.00000	0.00011
	3	0.03783	-0.25664	0.00000	0.00000	0.00000	-0.00008
	4	-0.02221	-0.22817	0.00000	0.00000	0.00000	0.00007

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
13	1	-0.02158	-0.04594	0.00000	0.00000	0.00000	0.00013
	2	-0.03183	-0.20133	0.00000	0.00000	0.00000	0.00023
	3	0.03344	-0.25553	0.00000	0.00000	0.00000	-0.00014
	4	-0.01753	-0.22705	0.00000	0.00000	0.00000	0.00015
14	1	-0.01550	-0.04573	0.00000	0.00000	0.00000	0.00017
	2	-0.02152	-0.20037	0.00000	0.00000	0.00000	0.00027
	3	0.02635	-0.25441	0.00000	0.00000	0.00000	-0.00022
	4	-0.01079	-0.22593	0.00000	0.00000	0.00000	0.00017
15	1	-0.00867	-0.04552	0.00000	0.00000	0.00000	0.00016
	2	-0.01172	-0.19940	0.00000	0.00000	0.00000	0.00020
	3	0.01474	-0.25327	0.00000	0.00000	0.00000	-0.00037
	4	-0.00576	-0.22479	0.00000	0.00000	0.00000	0.00006
16	1	-0.00319	-0.04529	0.00000	0.00000	0.00000	0.00010
	2	-0.00804	-0.19841	0.00000	0.00000	0.00000	-0.00004
	3	-0.00412	-0.25212	0.00000	0.00000	0.00000	-0.00059
	4	-0.00798	-0.22364	0.00000	0.00000	0.00000	-0.00020
17	1	-0.00255	-0.04760	0.00000	0.00000	0.00000	0.00000
	2	-0.00643	-0.18642	0.00000	0.00000	0.00000	-0.00035
	3	-0.00330	-0.21241	0.00000	0.00000	0.00000	-0.00080
	4	-0.00638	-0.20225	0.00000	0.00000	0.00000	-0.00052
18	1	-0.00191	-0.04593	0.00000	0.00000	0.00000	-0.00005
	2	-0.00482	-0.16403	0.00000	0.00000	0.00000	-0.00043
	3	-0.00247	-0.16810	0.00000	0.00000	0.00000	-0.00078

19	4	-0.00479	-0.17074	0.00000	0.00000	0.00000	-0.00059
	1	-0.00127	-0.04294	0.00000	0.00000	0.00000	-0.00005
	2	-0.00322	-0.14146	0.00000	0.00000	0.00000	-0.00037
	3	-0.00165	-0.12996	0.00000	0.00000	0.00000	-0.00059
20	4	-0.00319	-0.14084	0.00000	0.00000	0.00000	-0.00048
	1	-0.00064	-0.04045	0.00000	0.00000	0.00000	-0.00003
	2	-0.00161	-0.12542	0.00000	0.00000	0.00000	-0.00021
	3	-0.00082	-0.10470	0.00000	0.00000	0.00000	-0.00032
21	4	-0.00160	-0.12011	0.00000	0.00000	0.00000	-0.00026
	1	0.00000	-0.03951	0.00000	0.00000	0.00000	0.00000
	2	0.00000	-0.11968	0.00000	0.00000	0.00000	0.00000
	3	0.00000	-0.09591	0.00000	0.00000	0.00000	0.00000
	4	0.00000	-0.11275	0.00000	0.00000	0.00000	0.00000

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	8.39	0.00	0.00	0.00	0.00	-0.15
	2	37.22	0.00	0.00	0.00	0.00	-15.35
	3	20.13	0.00	0.00	0.00	0.00	-24.92
	4	37.54	0.00	0.00	0.00	0.00	-20.22
16	1	0.00	2.14	0.00	0.00	0.00	0.00
	2	0.00	9.37	0.00	0.00	0.00	0.00
	3	0.00	11.91	0.00	0.00	0.00	0.00
	4	0.00	10.57	0.00	0.00	0.00	0.00
17	1	0.00	2.36	0.00	0.00	0.00	0.00
	2	0.00	9.23	0.00	0.00	0.00	0.00
	3	0.00	10.51	0.00	0.00	0.00	0.00
	4	0.00	10.01	0.00	0.00	0.00	0.00
18	1	0.00	2.27	0.00	0.00	0.00	0.00
	2	0.00	8.12	0.00	0.00	0.00	0.00
	3	0.00	8.32	0.00	0.00	0.00	0.00
	4	0.00	8.45	0.00	0.00	0.00	0.00
19	1	0.00	2.13	0.00	0.00	0.00	0.00
	2	0.00	7.00	0.00	0.00	0.00	0.00
	3	0.00	6.43	0.00	0.00	0.00	0.00
	4	0.00	6.97	0.00	0.00	0.00	0.00
20	1	0.00	2.00	0.00	0.00	0.00	0.00
	2	0.00	6.21	0.00	0.00	0.00	0.00
	3	0.00	5.18	0.00	0.00	0.00	0.00
	4	0.00	5.95	0.00	0.00	0.00	0.00
21	1	17.39	0.98	0.00	0.00	0.00	2.10
	2	43.85	2.96	0.00	0.00	0.00	12.35
	3	22.50	2.37	0.00	0.00	0.00	18.57
	4	43.52	2.79	0.00	0.00	0.00	15.67

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	8.39	0.00	0.00	0.00	0.00	-0.15
		2	-8.39	0.69	0.00	0.00	0.00	-0.04
	2	1	37.22	0.00	0.00	0.00	0.00	-15.35

		2	-37.22	6.08	0.00	0.00	0.00	13.67	8	1	8	4.44	5.45	0.00	0.00	0.00	-1.23
		3	1	20.13	0.00	0.00	0.00	-24.92			9	-4.94	-5.45	0.00	0.00	0.00	3.41
			2	-20.13	7.26	0.00	0.00	22.92		2	8	31.39	19.20	0.00	0.00	0.00	3.60
		4	1	37.54	0.00	0.00	0.00	-20.22			9	-31.89	-19.20	0.00	0.00	0.00	4.08
2			2	-37.54	7.26	0.00	0.00	18.22		3	8	37.30	11.11	0.00	0.00	0.00	12.33
		1	2	8.39	-0.69	0.00	0.00	0.04			9	-37.80	-11.11	0.00	0.00	0.00	-7.88
			3	-8.39	1.37	0.00	0.00	-0.60		4	8	37.30	19.52	0.00	0.00	0.00	6.59
		2	2	37.22	-6.08	0.00	0.00	-13.67			9	-37.80	-19.52	0.00	0.00	0.00	1.22
			3	-37.22	12.15	0.00	0.00	8.66	9	1	9	4.94	3.79	0.00	0.00	0.00	-3.41
		3	2	20.13	-7.26	0.00	0.00	-22.92			10	-5.44	-3.79	0.00	0.00	0.00	4.93
			3	-20.13	14.52	0.00	0.00	16.93		2	9	31.89	12.51	0.00	0.00	0.00	-4.08
		4	2	37.54	-7.26	0.00	0.00	-18.22			10	-32.39	-12.51	0.00	0.00	0.00	9.09
			3	-37.54	14.52	0.00	0.00	12.23		3	9	37.80	7.67	0.00	0.00	0.00	7.88
		3	1	3	8.39	-1.38	0.00	0.00			10	-38.30	-7.67	0.00	0.00	0.00	-4.82
			4	-8.39	2.06	0.00	0.00	-1.55		4	9	37.80	12.84	0.00	0.00	0.00	-1.22
		2	3	37.22	-12.16	0.00	0.00	-8.66			10	-38.30	-12.84	0.00	0.00	0.00	6.35
3			4	-37.22	18.23	0.00	0.00	0.30	10	1	10	5.44	1.78	0.00	0.00	0.00	-4.93
		3	3	20.13	-14.52	0.00	0.00	-16.93			11	-5.94	-1.78	0.00	0.00	0.00	5.64
			4	-20.13	21.78	0.00	0.00	6.95		2	10	32.39	5.48	0.00	0.00	0.00	-9.09
		4	3	37.54	-14.52	0.00	0.00	-12.23			11	-32.89	-5.48	0.00	0.00	0.00	11.28
			4	-37.54	21.78	0.00	0.00	2.25		3	10	38.30	4.01	0.00	0.00	0.00	4.82
		4	1	4	8.39	-2.06	0.00	0.00			11	-38.80	-4.01	0.00	0.00	0.00	-3.21
			5	-8.39	2.75	0.00	0.00	-2.87		4	10	38.30	5.81	0.00	0.00	0.00	-6.35
		2	4	37.22	-18.23	0.00	0.00	-0.30			11	-38.80	-5.81	0.00	0.00	0.00	8.67
			5	-37.22	24.31	0.00	0.00	-11.40	11	1	11	5.94	-0.56	0.00	0.00	0.00	-5.64
		3	4	20.13	-21.78	0.00	0.00	-6.95			12	-6.44	0.56	0.00	0.00	0.00	5.42
			5	-20.13	29.04	0.00	0.00	-7.03		2	11	32.89	-1.89	0.00	0.00	0.00	-11.28
		4	4	37.54	-21.78	0.00	0.00	-2.25			12	-33.39	1.89	0.00	0.00	0.00	10.53
4			5	-37.54	29.04	0.00	0.00	-11.72		3	11	38.80	0.13	0.00	0.00	0.00	3.21
		5	1	5	8.39	-2.75	0.00	0.00			12	-39.30	-0.13	0.00	0.00	0.00	-3.16
			6	-8.39	3.44	0.00	0.00	-4.57		4	11	38.80	-1.56	0.00	0.00	0.00	-8.67
		2	5	37.22	-24.31	0.00	0.00	11.40			12	-39.30	1.56	0.00	0.00	0.00	8.05
			6	-37.22	30.39	0.00	0.00	-26.44	12	1	12	6.44	-3.24	0.00	0.00	0.00	-5.42
		3	5	20.13	-29.04	0.00	0.00	7.03			13	-6.94	3.24	0.00	0.00	0.00	4.12
			6	-20.13	36.30	0.00	0.00	-24.99		2	12	33.39	-9.60	0.00	0.00	0.00	-10.53
		4	5	37.54	-29.04	0.00	0.00	11.72			13	-33.89	9.60	0.00	0.00	0.00	6.69
			6	-37.54	36.30	0.00	0.00	-29.69		3	12	39.30	-3.96	0.00	0.00	0.00	3.16
		6	1	6	3.44	7.75	0.00	0.00			13	-39.80	3.96	0.00	0.00	0.00	-4.74
			7	-3.94	-7.75	0.00	0.00	-1.47		4	12	39.30	-9.27	0.00	0.00	0.00	-8.05
		2	6	30.39	31.55	0.00	0.00	26.44			13	-39.80	9.27	0.00	0.00	0.00	4.34
6			7	-30.89	-31.55	0.00	0.00	-13.82	13	1	13	6.94	-6.27	0.00	0.00	0.00	-4.12
		3	6	36.30	17.34	0.00	0.00	24.99			14	-7.44	6.27	0.00	0.00	0.00	1.61
			7	-36.80	-17.34	0.00	0.00	-18.06		2	13	33.89	-17.65	0.00	0.00	0.00	-6.69
		4	6	36.30	31.88	0.00	0.00	29.69			14	-34.39	17.65	0.00	0.00	0.00	-0.37
			7	-36.80	-31.88	0.00	0.00	-16.94		3	13	39.80	-8.27	0.00	0.00	0.00	4.74
		7	1	7	3.94	6.77	0.00	0.00			14	-40.30	8.27	0.00	0.00	0.00	-8.05
			8	-4.44	-6.77	0.00	0.00	1.23		4	13	39.80	-17.33	0.00	0.00	0.00	-4.34
		2	7	30.89	25.55	0.00	0.00	13.82			14	-40.30	17.33	0.00	0.00	0.00	-2.59
			8	-31.39	-25.55	0.00	0.00	-3.60	14	1	14	7.44	-9.63	0.00	0.00	0.00	-1.61
		3	7	36.80	14.33	0.00	0.00	18.06			15	-7.94	9.63	0.00	0.00	0.00	-2.24
			8	-37.30	-14.33	0.00	0.00	-12.33		2	14	34.39	-26.04	0.00	0.00	0.00	0.37
		4	7	36.80	25.87	0.00	0.00	16.94			15	-34.89	26.04	0.00	0.00	0.00	-10.79
7			8	-37.30	-25.87	0.00	0.00	-6.59		3	14	40.30	-12.79	0.00	0.00	0.00	8.05
											15	-40.80	12.79	0.00	0.00	0.00	-13.17

	4	14	40.30	-25.72	0.00	0.00	0.00	2.59
		15	-40.80	25.72	0.00	0.00	0.00	-12.88
15	1	15	7.94	-13.34	0.00	0.00	0.00	2.24
		16	-8.44	13.34	0.00	0.00	0.00	-7.57
	2	15	34.89	-34.77	0.00	0.00	0.00	10.79
		16	-35.39	34.77	0.00	0.00	0.00	-24.70
	3	15	40.80	-17.54	0.00	0.00	0.00	13.17
		16	-41.30	17.54	0.00	0.00	0.00	-20.18
	4	15	40.80	-34.45	0.00	0.00	0.00	12.88
		16	-41.30	34.45	0.00	0.00	0.00	-26.66
16	1	16	17.39	-6.30	0.00	0.00	0.00	-7.57
		17	-17.39	6.99	0.00	0.00	0.00	3.92
	2	16	43.85	-26.01	0.00	0.00	0.00	-24.70
		17	-43.85	27.51	0.00	0.00	0.00	9.98
	3	16	22.50	-29.39	0.00	0.00	0.00	-20.18
		17	-22.50	30.07	0.00	0.00	0.00	3.83
	4	16	43.52	-30.73	0.00	0.00	0.00	-26.66
		17	-43.52	31.42	0.00	0.00	0.00	9.57
17	1	17	17.39	-4.63	0.00	0.00	0.00	-3.92
		18	-17.39	5.32	0.00	0.00	0.00	1.19
	2	17	43.85	-18.29	0.00	0.00	0.00	-9.98
		18	-43.85	19.79	0.00	0.00	0.00	-0.49
	3	17	22.50	-19.56	0.00	0.00	0.00	-3.83
		18	-22.50	20.25	0.00	0.00	0.00	-7.11
	4	17	43.52	-21.41	0.00	0.00	0.00	-9.57
		18	-43.52	22.10	0.00	0.00	0.00	-2.40
18	1	18	17.39	-3.04	0.00	0.00	0.00	-1.19
		19	-17.39	3.73	0.00	0.00	0.00	-0.68
	2	18	43.85	-11.67	0.00	0.00	0.00	0.49
		19	-43.85	13.17	0.00	0.00	0.00	-7.32
	3	18	22.50	-11.93	0.00	0.00	0.00	7.11
		19	-22.50	12.61	0.00	0.00	0.00	-13.86
	4	18	43.52	-13.65	0.00	0.00	0.00	2.40
		19	-43.52	14.33	0.00	0.00	0.00	-10.09
19	1	19	17.39	-1.61	0.00	0.00	0.00	0.68
		20	-17.39	2.29	0.00	0.00	0.00	-1.75
	2	19	43.85	-6.17	0.00	0.00	0.00	7.32
		20	-43.85	7.67	0.00	0.00	0.00	-11.13
	3	19	22.50	-6.18	0.00	0.00	0.00	13.86
		20	-22.50	6.87	0.00	0.00	0.00	-17.45
	4	19	43.52	-7.36	0.00	0.00	0.00	10.09
		20	-43.52	8.05	0.00	0.00	0.00	-14.33
20	1	20	17.39	-0.29	0.00	0.00	0.00	1.75
		21	-17.39	0.98	0.00	0.00	0.00	-2.10
	2	20	43.85	-1.46	0.00	0.00	0.00	11.13
		21	-43.85	2.96	0.00	0.00	0.00	-12.35
	3	20	22.50	-1.69	0.00	0.00	0.00	17.45
		21	-22.50	2.37	0.00	0.00	0.00	-18.57
	4	20	43.52	-2.10	0.00	0.00	0.00	14.33
		21	-43.52	2.79	0.00	0.00	0.00	-15.67

122. FINISH

***** END OF STAAD-III *****

***** DATE= NOV 14,1998 TIME= 9:48:28 *****

 * FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
 * CALL (01) 686-7682, CROYDON, U.K. TLX. 929181 *

***** END OF LATEST ANALYSIS RESULT *****

CALCULO DE LAS ARMADURAS

TIPO I

$$K_{vi} > 5.1 \text{ Kg/cm}^3$$

--- Ia }
— Ib }

TIPO I,

Armadura de dintel

$$\left. \begin{array}{l} H-250 \\ b=1.0 \\ h=0.5 \\ d=0.45 \end{array} \right\}$$

$$U_c d = \frac{2500}{1.5} \times 1.0 \times 0.45^2 = 337.5 \text{ m}^2$$

$$U_s = \frac{0.97 \times 1.5 \times M}{0.45} \left(1 + \frac{1.5 M}{337.5} \right) = 3.233 M \left(1 + \frac{M}{225} \right)$$

Nudo 1	M = -18.58	U _i = 65.04 t
2	M = -17.17	U _i = 59.75 t.
3	M = -12.95	U _i = 44.28 t.
4	M = -5.92	U _i = 19.64 t.
5	M = 7.59	U _s = 25.37 t.
6	M = 20.25	U _s = 71.37 t.

Armadura de laterales

$$\left. \begin{array}{l} H-250 \\ b=1.0 \\ h=0.5 \\ d=0.45 \end{array} \right\}$$

$$U_c d = \frac{0.9 \times 2500}{1.5} \times 1.0 \times 0.45^2 = 303.75$$

$$U_s = \frac{0.97 \times 1.5 \times M}{0.45} \left(1 + \frac{1.5 M}{303.75} \right) = 3.233 M \left(1 + \frac{M}{202.5} \right)$$

Nudo 6	M = 20.25 m ² /m.	U _e = 72.02 t/m.
7	M = 13.01	U _e = 44.77
8	M = 9.84	U _e = 33.36
9	M = 7.38 M* = 5.07	U _e = 24.73 U _e = 16.80
10	M = 5.64 M* = 8.21	U _e = 18.74 U _e = 27.62
11	M = 4.72 M* = 9.57	U _e = 15.62 U _e = 32.41
12	M = 4.70 M* = 9.01	U _e = 15.55 U _e = 30.43
13	M = 5.66 M* = 6.38	U _e = 18.81 U _e = 21.28
14	M = 7.70	U _e = 25.84
15	M = 10.90	U _e = 37.14
16	M = 19.74	U _e = 70.05

Los esfuerzos que se obtienen son similares en ambos casos (sin y con sobrecarga en solera)

Armadura de solera

Nodo 16	$M = 19,74 \text{ mt/m.}$	$U_e = 69,43 \text{ t/m.}$
17	$M = 7,33$	$U_e = 24,47$
18	$M = 6,19$	$U_s = 20,56$
19	$M = 12,03$	$U_s = 40,98$
20	$M = 15,31$	$U_s = 52,87$
21	$M = 16,36$	$U_s = 56,74$

COMPROBACION A CORTANTE

Comprobación a cortante

Según E.H.91 39.1.4.2.2.

$$V_{u,a} = 0,5 V_{cu} \leq (1 + 50 \beta)$$

$$\xi = 1,6 - d = 1,6 - 0,45 = 1,15 \text{ m}$$

$$\beta = \frac{L_c}{b \cdot d}$$

Barra 12 a 15 $L_c = 1,15 \times 5 = 5,75 \text{ m}$ $\phi 12 \geq 10$ $\beta = \frac{5,75}{40 \times 0,45} = 0,0012$
 Barra 16 a 18 $L_c = 1,15 \times 5 = 5,75 \text{ m}$ $\phi 16 \geq 10$ $\beta = \frac{5,75}{40 \times 0,45} = 0,0022$

PRACTICAS (Barra 6 a 15)

$$V_{u,a} = 0,5 \cdot 27,56 \cdot 1,15 (1 + 50 \cdot 0,0022) = 17,59 \text{ t/m}$$

$$f_{cr} = 0,5 \sqrt{\frac{259 \cdot 0,9}{1,5}} \times 10 = 51,54 \text{ t/m}^2$$

$$V_{cu} = 51,54 \times 1,0 \times 0,45 = 23,29 \text{ t/m}$$

$$V_{u,max} = \frac{17,59}{1,5} = 11,73 \text{ t/m}$$

TIPO 2

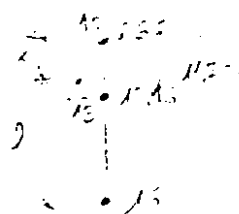
Cor. corr. $\phi 10 \geq 10$ (cada 250 mm en longitudinal)

$$V_{u,a} = \frac{0,9 \times d \times h_{cor}}{S} \cdot \frac{0,9 \times 0,45 \times 0,25 \times 10}{0,2} \cdot 4,2 = 26,55 \text{ t/m}$$

$$f_{cr} \geq \frac{1}{2} \sqrt{\frac{259 \cdot 0,9}{1,5}}$$

$$V_{u,max} = 17,59 = 26,55 = 11,73 \text{ t/m}$$

$$\beta = \frac{5,75}{40 \times 0,45} = 0,0022$$



$$\frac{12,16 - 5,66}{0,4} \cdot x + 6,66 = 11,73$$

$$x = 0,34 \text{ m}$$

$$L = 4,2 - 0,34 + 0,45 - 0,55 = 3,76 \text{ m}$$

22,9	0	7,36	14,52	21,78	29,04	36,30
24,5	0	6,82	13,64	20,46	27,72	34,10
14,9	0	5,11	10,23	15,35	20,46	25,57
14,5	0	5,12	10,23	15,34	20,46	25,58

Cortante

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83
19,70	19,99	29,90	30,24	31,38	30,24	29,90	24,24	24,58	25,37	12,46	12,75	18,23	12,57	19,52	8,32	8,62	11,83	12,22	11,83

TIPO II.- (Con 0,4m. más de tierras)

Con cercas $\phi 10$ a 20 (5 p.m. longitudinales)

$$V_{su} = \frac{0,9 \times 0,45 \times 0,79 \times 5}{0,2} \times 1,2 = 33,59 \text{ t/m.}$$

$$V_{dmax} = 17,59 - 33,59 = 51,18 \text{ t} \quad V_{max} = \frac{51,18}{1,5} = 34,12 \text{ t} = 34,81$$

$$\begin{array}{l} 9 \\ 10 \\ 11 \end{array} \left| \begin{array}{l} 12,84 \\ 5,81 \end{array} \right. \quad x \cdot \frac{12,84 - 5,81}{0,4} + 5,81 = 11,73$$

$$x = 0,34 \text{ m.}$$

$$l = 5 \times 0,4 - 0,34 + 0,45 - 0,25 = 1,86 \text{ m.}$$

$$\begin{array}{l} 12 \\ 13 \\ 14 \end{array} \left| \begin{array}{l} 9,91 \\ 17,69 \end{array} \right. \quad x \cdot \frac{17,69 - 9,91}{0,4} + 9,91 = 11,73$$

$$x = 0,094 \text{ m.}$$

$$l = 4 \times 0,4 - 0,094 + 0,45 - 0,25 = 1,71 \text{ m.}$$

DINTEL y SOLETA

$$V_{d2,2} = 0,5 \times 29,05 \times 1,15 (1 + 80 \times 0,0012) = 17,71 \text{ t/m.}$$

$$f_{cr} = 0,5 \sqrt{\frac{250}{1,5}} \times 10 = 64,55 \text{ t/m}^2$$

$$V_{cu} = 5 \times 55 \times 10 \times 0,45 = 29,05 \text{ t/m.}$$

$$V_{max} = \frac{17,71}{1,5} = 11,81 \text{ t/m.}$$

TIPO I.

Con cerco $\phi 10$ a 50 (4 p.m. longitudinales)

$$V_{su} = \frac{0,9 \cdot d \cdot A_{70}}{5} f_{yt} = \frac{0,9 \times 245 \times 4 \times 2,73}{0,2} \cdot 1,2 = 26,88 \text{ t/m.}$$

$$V_{dmax} = 17,71 - 26,88 = 44,59 \text{ t/m.} \quad V_{max} = \frac{44,59}{1,5} = 29,73 \text{ t/m.} > 25,5$$

$$\begin{array}{l} 12,75 \\ 15,15 \end{array} \left| \begin{array}{l} 10,23 \\ 15,15 \end{array} \right. \quad x \cdot \frac{15,15 - 10,23}{0,55} + 10,23 = 11,81 \quad x = 0,17 \text{ m.}$$

$$l = 2 \times 0,55 - 0,17 + 0,45 - 0,25 = 1,68 \text{ m.}$$

$$\text{solera} \quad \begin{array}{l} 17 \\ 18 \end{array} \left| \begin{array}{l} 11,79 \\ 17,44 \end{array} \right. \quad 11,81 = 11,79 + \frac{17,44 - 11,79}{0,55} \cdot x \quad x = 0,002$$

$$l = 3 \times 0,55 + 0,45 - 0,25 = 1,85 \text{ m.}$$

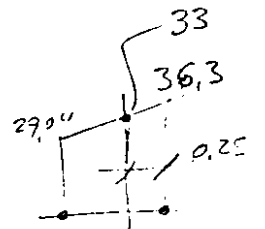
TIPO II.- (+0,4m tierras)

Con cercas $\phi 10$ a 20 (5 p.m. longitudinales)

$$V_{su} = \frac{0,9 \times 0,45 \times 5 \times 0,79}{0,2} \times 1,2 = 33,6 \text{ t/m.}$$

$$V_{dmax} = 17,71 + 33,6 = 51,3 \text{ t/m.}$$

$$V_{max} = \frac{51,3}{1,5} = 34,2 \text{ t/m.} > 33 \text{ t/m.}$$



dintel

$$\begin{array}{l} 7,26 \\ 14,52 \end{array} \left| \begin{array}{l} 7,26 \\ 14,52 \end{array} \right.$$

$$11,81 = 7,26 + \frac{14,52 - 7,26}{0,55} \cdot x \quad x = 0,345 \text{ m.}$$

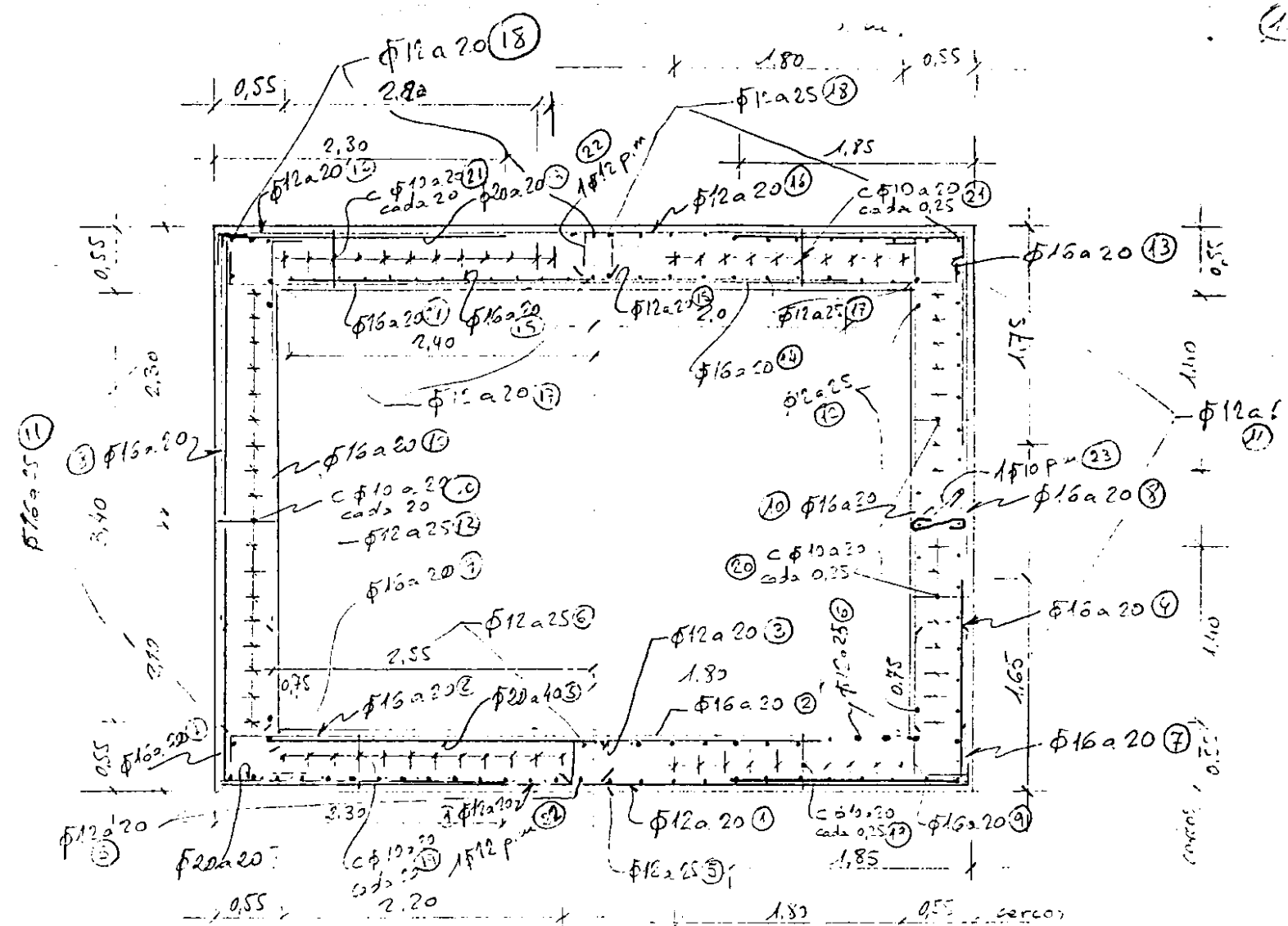
$$l = 4 \times 0,55 - 0,345 + 0,45 - 0,25 = 2,055 \text{ m.}$$

solera

$$\begin{array}{l} 20 \\ 19 \end{array} \left| \begin{array}{l} 9,33 \\ 16,06 \end{array} \right.$$

$$11,81 = 9,33 + \frac{16,06 - 9,33}{0,55} \cdot x \quad x = 0,203$$

$$l = 4 \times 0,55 - 0,203 + 0,45 - 0,25 = 2,137 \text{ m.}$$



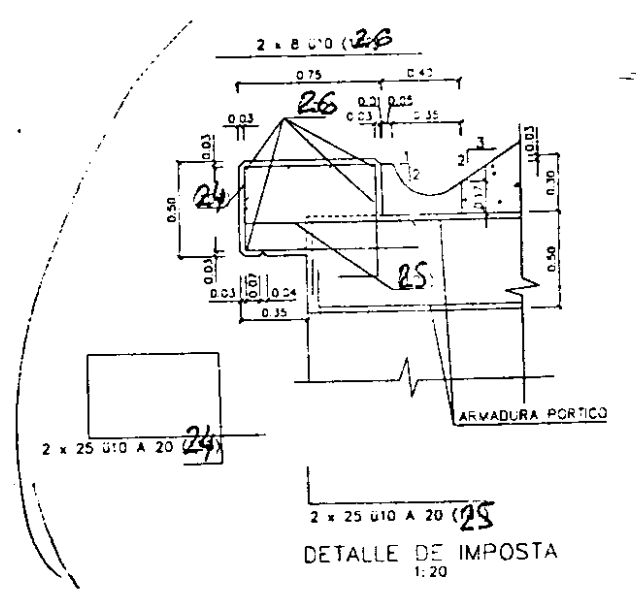
TIPO 2

PI	553+850
PI	565+330
PI	568+955
PI	570+840

TIPO 1

PI	550+800
PI	559+170
PI	563+900

EL TIPO 2 NO TIENE LA BARRA (23)



. CALCULO DE ALETAS P.F. 550+8

PENDIENTE DEL TALUD DE TIERRAS	=	.33333000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333300
" " " SUPERIOR DEL TRASDOS	=	.00000000
" " " INFERIOR " "	=	.00000000

VUELO DELANTERO	=	.172	M
ESPEJOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.600	M
" " " " " " " DCHO	=	.600	M
LONGITUD TOTAL DE LA ZAPATA	=	2.750	M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.45000000	

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	= .07000	M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	= 2250.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	= .06000	M
PESO ESPECIFICO DEL HORMIGON	= 2.50000	T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	= 2.00000	T/M3

1000

COF. MINORACION DE CARGAS FAVORABLES PARA LA		
COMPROBACION DE LAS ESTABILIDADES =	1.100	

EN LA ZONA VERTICAL	=	.000000	'
" " " INCLINADA SUPERIOR	=	.000000	'
" " " " INFERIOR	=	.000000	'
DEL RELLENO CONSIGO MISMO	=	18.434950	'

ZONA DEL RELLENO. COMPONENTE	HORIZONTAL	KH=	.296478
"	VERTICAL	KV=	.098826
ZONA VERTICAL DEL MURO. COMP	HORIZONTAL	KH=	.335046
"	VERTICAL	KV=	.000000
ZONA INCLINADA SUPERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000
ZONA INCLINADA INFERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000

[illegible]
$$\begin{array}{r} 0,55 + 0,40 \approx 1,0 \\ \underline{0,30} \end{array}$$

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	ARMAD. NECESARIA MOMENTO MT	TRACCION T	NECESARIA COMPRES T	CORTANTE VCU T
.480	.416	.490	.077	.010	.000	.000	20.0
.960	.432	.998	.309	.091	.000	.000	21.6
1.440	.448	1.526	.695	.316	.000	.000	22.8
1.920	.464	2.074	1.235	.758	.960	.156	23.4
2.400	.480	2.640	1.930	1.493	2.971	.198	24.6
2.880	.496	3.226	2.779	2.593	6.071	.242	25.2
3.360	.512	3.830	3.783	4.134	10.428	.287	26.2
3.840	.528	4.454	4.940	6.188	16.207	.334	27.0

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	NECESARIA COMPRES T	CORTAN VCU T
.480	.416	.490	.116	.017	.000	.000	20.6
.960	.432	.998	.463	.140	.000	.000	21.6
1.440	.448	1.526	1.042	.482	.325	.076	22.5
1.920	.464	2.074	1.853	1.153	1.594	.104	23.4

2.400	.480	2.640	2.895	2.265	3.780	.132	24.400
2.880	.496	3.226	4.169	3.927	7.060	.161	25.329
3.360	.512	3.830	5.674	6.252	11.601	.192	26.259
3.840	.528	4.454	7.411	9.350	17.567	.223	27.188

CALCULO DE LA ZAPATA

=====

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA=	7.782 T
" " " " NORMALES " " " =	25.980 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO =	1.502
MOMENTO DE VUELCO =	13.290 MT
MOMENTO DE ESTABILIDAD =	41.500 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO =	3.123
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA =	7.782 T
" " " " NORMALES " " " =	28.318 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA=	7.291 MT
LONGITUD TOTAL DE LA ZAPATA =	2.750 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA =	.257 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPECIAL
TENSION EN EL VERTICE DELANTERO = 16.082 T/M2
TENSION EN EL VERTICE TRASERO = 4.513 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T

.251	.600	.000	3.530	.449	1.234	.000
						34.211

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T

.410	.600	.000	4.658	1.515	4.178	.000	34.211
.820	.600	.000	5.903	3.708	10.300	.000	34.211
1.230	.600	.000	6.329	6.243	17.482	.000	34.211
1.640	.600	.000	5.935	8.785	24.797	.000	34.211
2.050	.600	.000	4.722	10.998	31.257	.000	34.211

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA=	11.673 T
" " " " NORMALES " " " =	27.277 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO =	1.052
MOMENTO DE VUELCO =	19.935 MT
MOMENTO DE ESTABILIDAD =	45.067 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO =	2.261
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA =	11.673 T
" " " " NORMALES " " " =	29.615 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA=	12.152 MT
LONGITUD TOTAL DE LA ZAPATA =	2.750 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA =	.410 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPECIAL
TENSION EN EL VERTICE DELANTERO = 20.411 T/M2
TENSION EN EL VERTICE TRASERO = 1.128 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T

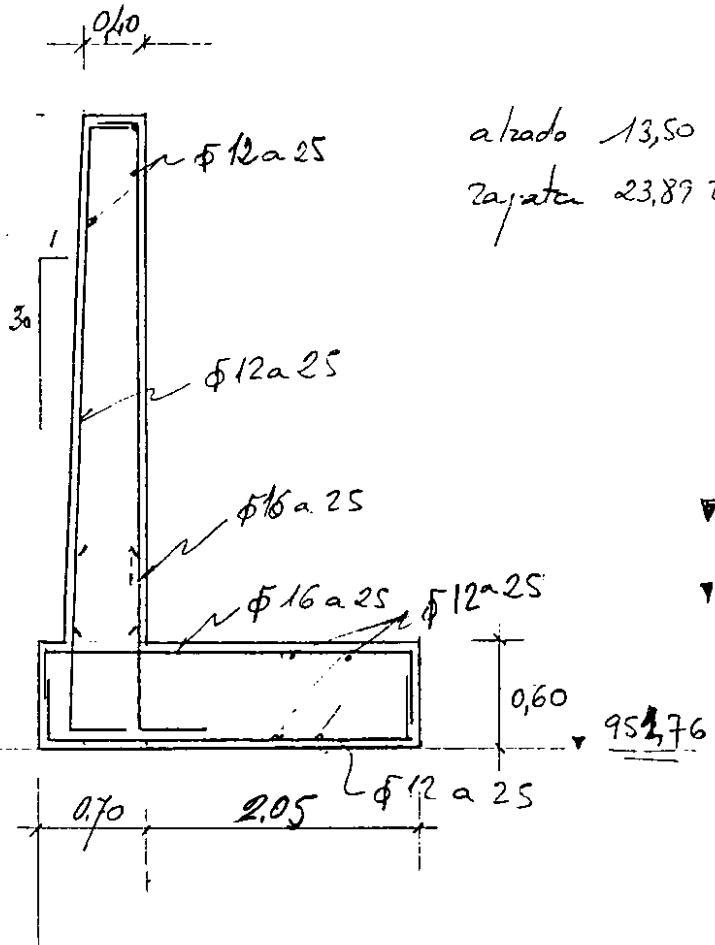
.251	.600	.000	4.529	.578	1.059	.000	34.211

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND	CANTO	ESFUERZOS MAYORADOS	ARMAD. NECESARIA	CORTANTE

SECCION M	SECCION M	AXIL T	CORTANTE T	MOMENTO MT	TRACCION T	COMPRES T	VCU T	ALETAS DEL PASO INFERIOR 550+800 (MT-2)					
								0.4	0.0	3.84	0.	0.	0.
								0.33333	0.033333	0.	0.		
								0.172	0.6	0.6	2.75	0.45	
								0.	0.				
.410	.600	.000	5.810	1.767	3.246	.000	34.211	2500.	0.07	2250.	0.06	2.5	2.0
.820	.600	.000	7.736	4.588	8.479	.000	34.211	1					
1.230	.600	.000	8.371	7.934	14.767	.000	34.211	1.5	35.000	0.	0.	0.	1.1
1.640	.600	.000	7.715	11.276	21.134	.000	34.211	18.43495	0.	0.	0.	0	
2.050	.600	.000	5.768	14.084	26.552	.000	34.211						

$$P_2 = 552 + 8770$$



alzado 13,50 t/m $\rightarrow$ $\phi 12$ a 20
 zapata 23,89 t/m $\rightarrow$ $\phi 12$ a 20

$$\nabla_{\text{terreno}} = 953,26$$

$$\nabla_{\text{ciment}} = 953,26 - 1,5 = 951,76$$

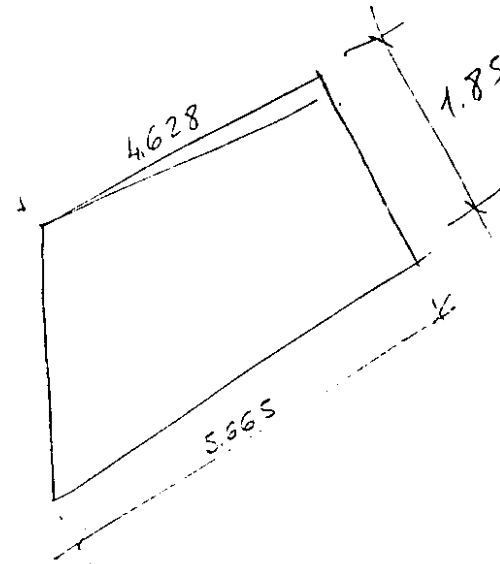
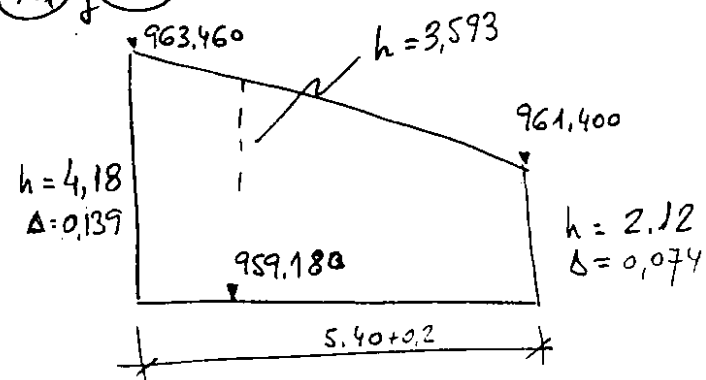
$$951,76$$

. CALCULO DE ALETAS P.F. 553+85

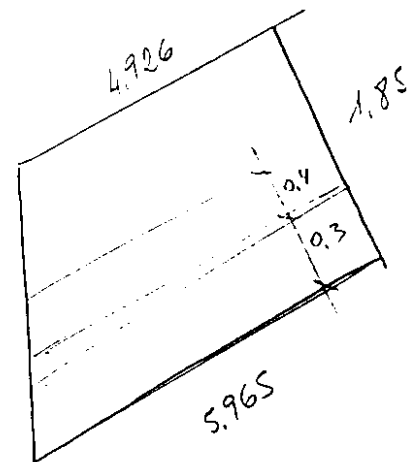
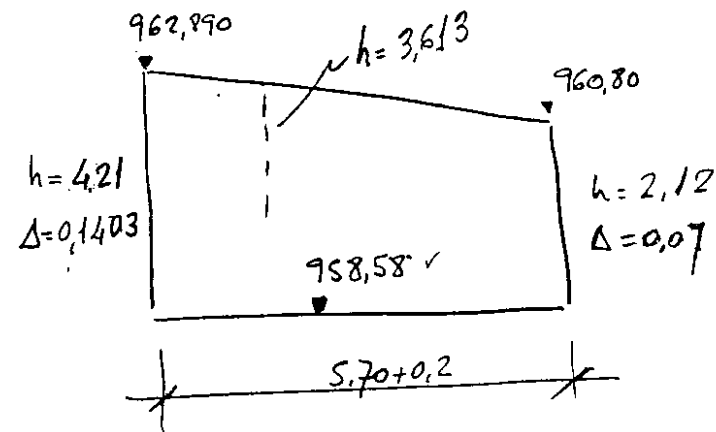
PI 553+850

ALETAS (Croquis de cálculo)

(A₁) y (A₂)



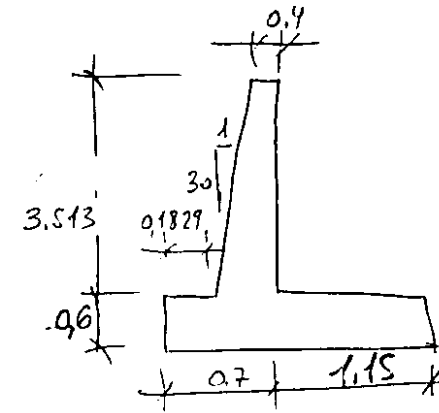
(A₃) y (A₄)



MT-1

PI - 553+850

Aletas



Aletas (L₁) y (L₂)

Talud terraplen 2:1
Angulo aletas 30°

P₁ = 0.25

β = 14.03624°

MT-1

Coef. roz 0.55

PENDIENTE DEL TALUD DE TIERRAS	=	.25000000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333300
" " " SUPERIOR DEL TRASDOS	=	.00000000
" " " INFERIOR " "	=	.00000000

VUELO DELANTERO	=	.183	M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.600	M
" " " " " " DCHO	=	.600	M
LONGITUD TOTAL DE LA ZAPATA	=	1.850	M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000	

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	= .07000	M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	= 2250.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	= .06000	M
PESO ESPECIFICO DEL HORMIGON	= 2.50000	T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	= 2.00000	T/M3

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 ' /
SOBRECARGA UMR SOBRE EL RELLENO	=	.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T
COF. MINORACION DE CARGAS FAVORABLES PARA LA COMPROBACION DE LAS ESTABILIDADES	=	1.100

EN LA ZONA VERTICAL	=	.000000	'
" " " INCLINADA SUPERIOR	=	.000000	'
" " " " INFERIOR	=	.000000	'
DEL RELLENO CONSIGO MISMO	=	14.036240	'

ZONA DEL RELLENO. COMPONENTE	HORIZONTAL	KH=	.284496
"	VERTICAL	KV=	.071124
ZONA VERTICAL DEL MURO. COMP	HORIZONTAL	KH=	.314825
"	VERTICAL	KV=	.000000
ZONA INCLINADA SUPERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000
ZONA INCLINADA INFERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000

— — — — —

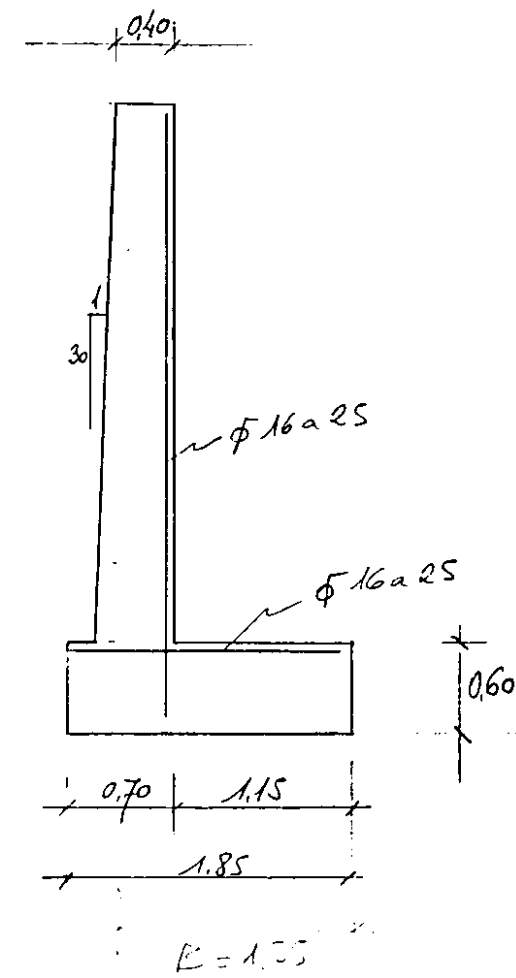
PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS			ARMAD. NECESARIA	CORTAN	
		AXIL T	CORTANTE T	MOMENTO MT	TRACCION T	COMPRES T	VCU T

.439	.415	.447	.061	.007	.000	.000	20.6
.878	.429	.910	.243	.065	.000	.000	21.4
1.317	.444	1.390	.546	.225	.000	.000	22.3
1.757	.459	1.885	.971	.542	.358	.141	23.1
2.196	.473	2.396	1.518	1.068	1.736	.180	24.0
2.635	.488	2.924	2.185	1.857	3.909	.219	24.8
3.074	.502	3.468	2.975	2.962	7.000	.260	25.7
3.513	.517	4.027	3.885	4.437	11.125	.302	26.5

PROFUND	CANTO	ESFUERZOS MAYORADOS		ARMAD. NECESARIA		CORTAN	
SECCION	SECCION	AXIL	CORTANTE	MOMENTO	TRACCION	COMPRES	VCU
M	M	T	T	MT	T	T	T

.439	.415	.447	.091	.012	.000	.000	20.6
.878	.429	.910	.364	.100	.000	.000	21.4
1.317	.444	1.390	.820	.345	.067	.069	22.3
1.757	.459	1.885	1.457	.826	.933	.094	23.1

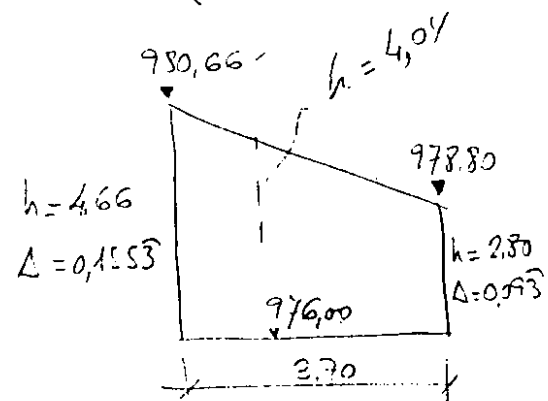
SECCION M	SECCION M	AXIL T	CORTANTE T	MOMENTO MT	TRACCION T	COMPRES T	VCU T
.383	.600	.000	4.829	1.192	2.187	.000	34.211
.767	.600	.000	8.030	3.686	6.799	.000	34.211
1.150	.600	.000	8.472	6.963	12.932	.000	34.211



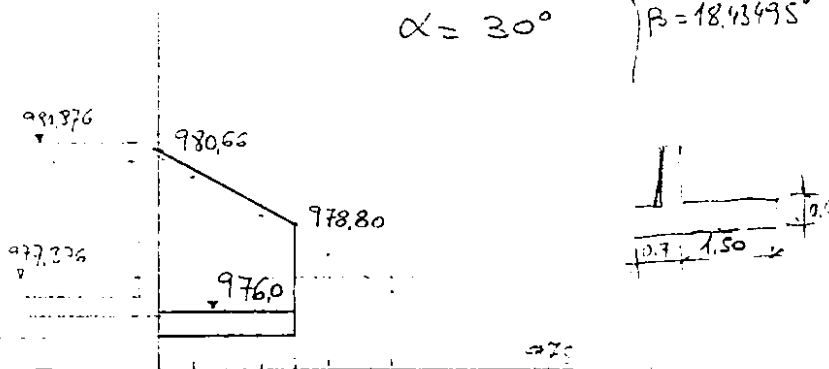
CALCULO DE ALETAS P.F. 559+17

ALETAS

(A_1) y (A_2)

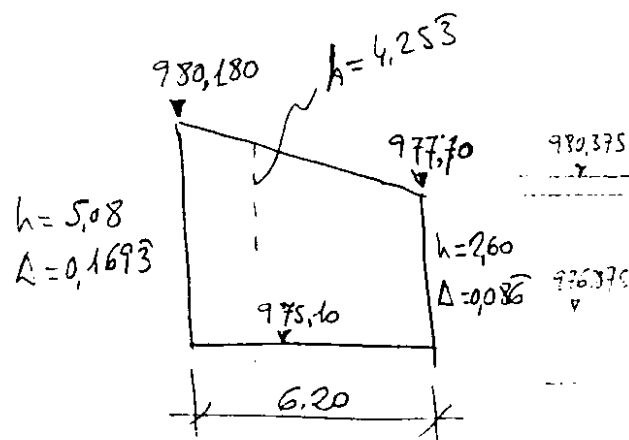


Talud 3:2 $\left\{ \begin{array}{l} P_1 = 0.3 \\ \alpha = 30^\circ \end{array} \right. \left. \begin{array}{l} P_2 = 0.3 \\ \beta = 18.43495^\circ \end{array} \right.$

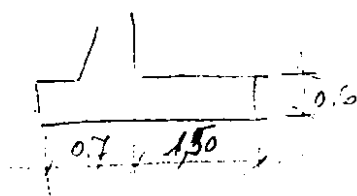
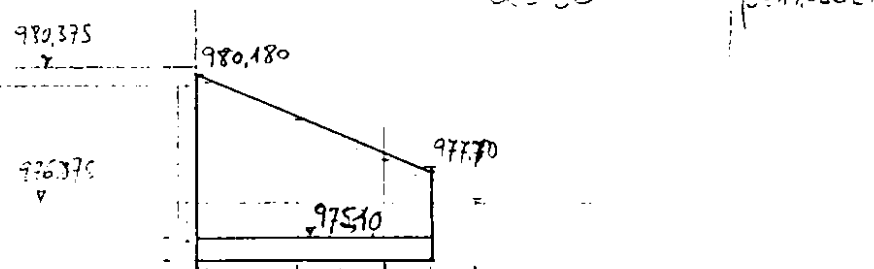


Terreno = 976.900
Apoyo zapata $976.9 - 1.5 = 975.400$
Cera cup " $975.400 + 0.6 = \underline{\underline{976.0}}$

(A), (A)

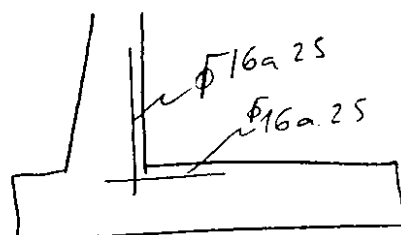


Tailed 2:1 $|P_1 = 0,25$
 $\alpha = 30^\circ$ $\beta = 14,03624$



Terreno 976
Apoyo zapata. $976 - 1,5 = 974,50$
Cara sup. " $974,50 + 0,6 = 975,100$

MT-1

$$Y_{\text{top}} = 0,55$$


Aumentar 0,5 m la Δx

TITULO :ALETAS A1 y A2 DEL PASO INFERIOR 559+170 (MT-1)

DIMENSIONES GEOMETRICAS DEL MURO

ANCHO DE LA CORONACION	=	.400 M
PROFUNDIDAD DEL PARAMENTO VERTICAL DEL INTRADOS	=	.000 M
" " " " " TRASDOS	=	4.040 M
PROFUNDIDAD DE LOS PARAMENTOS INCLINADOS EN EL TRASDOS		
	ZONA SUPERIOR =	.000 M
	ZONA INFERIOR =	.000 M
PROFUNDIDAD DEL TALUD DE TIERRAS EN EL TRASDOS	=	.000 M

PENDIENTE DEL TALUD DE TIERRAS	=	.33330000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333300
" " " SUPERIOR DEL TRASDOS	=	.00000000
" " " INFERIOR " "	=	.00000000

DIMENSIONES DE LA ZAPATA

VUELO DELANTERO	=	.165 M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.600 M
" " " " " " " DCHO	=	.600 M
LONGITUD TOTAL DE LA ZAPATA	=	2.200 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000

SITUACION DE LA CARGA CONCENTRADA EXTERIOR. DISTANCIA=.000 M
PROFUNDIDAD=.000 M

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	= .07000	M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	= 2250.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	= .06000	M
PESO ESPECIFICO DEL HORMIGON	= 2.50000	T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	= 2.00000	T/M3

HIPOTESIS = 1

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 '
SOBRECARGA UMR SOBRE EL RELLENO	=	.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T
COF. MINORACION DE CARGAS FAVORABLES PARA LA		
COMPROBACION DE LAS ESTABILIDADES	=	1.100

ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASDOS
 EN LA ZONA VERTICAL = .000000 '
 " " " INCLINADA SUPERIOR = .000000 '
 " " " " INFERIOR = .000000 '
 DEL RELLENO CONSIGO MISMO = 18.434950 '

COEFICIENTES DE EMPUJE

ZONA DEL RELLENO. COMPONENTE HORIZONTAL KH= .296470
 " VERTICAL KV= .098823
 ZONA VERTICAL DEL MURO. COMP HORIZONTAL KH= .335038
 " VERTICAL KV= .000000
 ZONA INCLINADA SUPERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000
 ZONA INCLINADA INFERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.449	.415	.457	.068	.008	.000	.000	20.621
.898	.430	.931	.270	.074	.000	.000	21.491
1.347	.445	1.422	.608	.257	.000	.000	22.360
1.796	.460	1.930	1.080	.618	.595	.145	23.229
2.244	.475	2.454	1.688	1.218	2.208	.184	24.099
2.693	.490	2.996	2.430	2.117	4.725	.225	24.968
3.142	.505	3.554	3.308	3.375	8.284	.267	25.837
3.591	.520	4.128	4.321	5.054	13.022	.310	26.706
4.040	.535	4.720	5.468	7.213	19.073	.354	27.576

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.449	.415	.457	.101	.013	.000	.000	20.621
.898	.430	.931	.405	.114	.000	.000	21.491
1.347	.445	1.422	.911	.393	.169	.071	22.360

1.796	.460	1.930	1.620	.942	1.184	.096	23.
2.244	.475	2.454	2.532	1.849	2.960	.123	24.
2.693	.490	2.996	3.646	3.208	5.644	.150	24.
3.142	.505	3.554	4.962	5.108	9.374	.178	25.
3.591	.520	4.128	6.481	7.640	14.285	.206	26.
4.040	.535	4.720	8.203	10.895	20.511	.236	27.

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION
 SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS
 LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO
 TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 7.833 T
 " " " " NORMALES " " " = 21.602 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.517

MOMENTO DE VUELCO = 13.420 MT
 MOMENTO DE ESTABILIDAD = 28.173 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 2.099

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 7.833 T
 " " " " NORMALES " " " = 23.501 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 8.855 MT
 LONGITUD TOTAL DE LA ZAPATA = 2.200 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
 CENTRO DE LA ZAPATA = .377 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 2.170 M
 TENSION EN EL VERTICE DELANTERO = 21.663 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.245	.600	.000	4.649	.583	1.603	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MOMENTO MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES COMPRES T	CORTANTE VCU T
.375	.600	.000	5.938	1.649	4.551	.000	34.211
.750	.600	.000	7.773	4.267	11.873	.000	34.211
1.125	.600	.000	8.109	7.291	20.485	.000	34.211
1.500	.600	.000	6.948	10.161	28.804	.000	34.211

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 11.749 T
" " " " NORMALES " " " = 22.907 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.072

MOMENTO DE VUELCO = 20.129 MT
MOMENTO DE ESTABILIDAD = 31.045 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.542

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 11.749 T
" " " " NORMALES " " " = 24.807 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 14.128 MT
LONGITUD TOTAL DE LA ZAPATA = 2.200 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .570 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 1.591 M
TENSION EN EL VERTICE DELANTERO = 31.176 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES COMPRES T	CORTANTE VCU T
.245	.600	.000	6.695	.846	1.551	.000	34.211

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES COMPRES T	CORTANTE VCU T
.375	.600	.000	6.532	1.717	3.154	.000	34.211
.750	.600	.000	10.163	4.878	9.020	.000	34.211
1.125	.600	.000	11.480	9.025	16.836	.000	34.211
1.500	.600	.000	9.948	13.132	24.707	.000	34.211

ALETAS A1 y A2 DEL PASO INFERIOR 559+170 (MT-1)					
0.4	0.0	4.04	0.	0.	0.
0.3333	0.033333	0.	0.		
0.1653	0.6	0.6	2.2	0.55	
0.	0.				
2500.	0.07	2250.	0.06	2.5	2.0
1					
1.5	35.000	0.	0.	0.	1.1
18.43495	0.	0.	0.	0	

TITULO :ALETAS A3 y A4 DEL PASO INFERIOR 559+170 (MT-1)

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DIMENSIONES GEOMETRICAS DEL MURO

ANCHO DE LA CORONACION	=	.400 M
PROFUNDIDAD DEL PARAMENTO VERTICAL DEL INTRADOS	=	.000 M
" " " " " TRASDOS	=	4.253 M
PROFUNDIDAD DE LOS PARAMENTOS INCLINADOS EN EL TRASDOS		
ZONA SUPERIOR	=	.000 M
ZONA INFERIOR	=	.000 M
PROFUNDIDAD DEL TALUD DE TIERRAS EN EL TRASDOS	=	.000 M

PENDIENTE DEL TALUD DE TIERRAS	=	.25000000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333300
" " " " SUPERIOR DEL TRASDOS	=	.00000000
" " " " INFERIOR " "	=	.00000000

DIMENSIONES DE LA ZAPATA		
VUELO DELANTERO	=	.158 M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.600 M
" " " " " " " DCHO	=	.600 M
LONGITUD TOTAL DE LA ZAPATA	=	2.200 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000

SITUACION DE LA CARGA CONCENTRADA EXTERIOR. DISTANCIA	=	.000 M
PROFUNDIDAD	=	.000 M

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA	=	2500.00 T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	=	.07000 M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	=	2250.00 T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	=	.06000 M
PESO ESPECIFICO DEL HORMIGON	=	2.50000 T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	=	2.00000 T/M3

HIPOTESIS = 1

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 ' /
SOBRECARGA UMR SOBRE EL RELLENO	=	.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T
COF. MINORACION DE CARGAS FAVORABLES PARA LA		
COMPROBACION DE LAS ESTABILIDADES	=	1.100

ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASDOS
 EN LA ZONA VERTICAL = .000000 '
 " " " INCLINADA SUPERIOR = .000000 '
 " " " " INFERIOR = .000000 '
 DEL RELLENO CONSIGO MISMO = 14.036240 '

COEFICIENTES DE EMPUJE

ZONA DEL RELLENO. COMPONENTE HORIZONTAL KH= .284496
 " VERTICAL KV= .071124
 ZONA VERTICAL DEL MURO. COMP HORIZONTAL KH= .314825
 " VERTICAL KV= .000000
 ZONA INCLINADA SUPERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000
 ZONA INCLINADA INFERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.473	.416	.482	.070	.009	.000	.000	20.667
.945	.432	.982	.281	.081	.000	.000	21.582
1.418	.447	1.501	.633	.282	.000	.000	22.497
1.890	.463	2.039	1.125	.677	.701	.153	23.413
2.363	.479	2.595	1.758	1.335	2.463	.195	24.328
2.835	.495	3.170	2.531	2.320	5.200	.238	25.243
3.308	.510	3.764	3.445	3.699	9.062	.282	26.158
3.780	.526	4.376	4.499	5.538	14.194	.328	27.073
4.253	.542	5.007	5.695	7.904	20.742	.375	27.988

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.473	.416	.482	.105	.015	.000	.000	20.667
.945	.432	.982	.422	.125	.000	.000	21.582
1.418	.447	1.501	.949	.431	.213	.075	22.497

1.890	.463	2.039	1.687	1.032	1.324	.102	23.4
2.363	.479	2.595	2.636	2.027	3.258	.130	24.1
2.835	.495	3.170	3.796	3.516	6.173	.159	25.2
3.308	.510	3.764	5.167	5.598	10.217	.188	26.3
3.780	.526	4.376	6.749	8.373	15.533	.219	27.4
4.253	.542	5.007	8.542	11.941	22.267	.250	27.9

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION
 SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS
 LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO
 TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 7.776 T
 " " " " NORMALES " " " = 21.606 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.528

MOMENTO DE VUELCO = 13.551 MT
 MOMENTO DE ESTABILIDAD = 27.371 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 2.020

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 7.776 T
 " " " " NORMALES " " " = 23.572 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 9.800 MT
 LONGITUD TOTAL DE LA ZAPATA = 2.200 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
 CENTRO DE LA ZAPATA = .416 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 2.053 M
 TENSION EN EL VERTICE DELANTERO = 22.966 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.239	.600	.000	4.820	.590	1.622	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MAYORADOS MOMENTO MT	ARMAD. NECESARIA TRACCION T	NECESARIA COMPRES T	CORTANTE VCU T
.375	.600	.000	5.652	1.459	4.024	.000	34.211
.750	.600	.000	7.838	4.040	11.234	.000	34.211
1.125	.600	.000	8.380	7.132	20.026	.000	34.211
1.500	.600	.000	7.278	10.119	28.681	.000	34.211

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 11.664 T
 " " " " NORMALES " " " = 22.578 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.065

MOMENTO DE VUELCO = 20.326 MT
 MOMENTO DE ESTABILIDAD = 29.509 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.452

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 11.664 T
 " " " " NORMALES " " " = 24.544 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 15.506 MT
 LONGITUD TOTAL DE LA ZAPATA = 2.200 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .632 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 1.405 M
 TENSION EN EL VERTICE DELANTERO = 34.945 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	NECESARIA COMPRES T	CORTANTE VCU T
.239	.600	.000	7.296	.902	1.654	.000	34.211

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	NECESARIA COMPRES T	CORTANTE VCU T
.375	.600	.000	5.942	1.481	2.719	.000	34.211
.750	.600	.000	9.871	4.448	8.218	.000	34.211
1.125	.600	.000	12.376	8.727	16.269	.000	34.211
1.500	.600	.000	11.338	13.284	25.003	.000	34.211

ALETAS A3 Y A4 DEL PASO INFERIOR 559+170 (MT-1)					
0.4	0.0	4.253	0.	0.	0.
0.25	0.033333	0.	0.		
0.1582	0.6	0.6	2.2	0.55	
0.	0.				
2500.	0.07	2250.	0.06	2.5	2.0
1					
1.5	35.000	0.	0.	0.	1.1
14.03624	0.	0.	0.	0	

CALCULO DE ALETAS P.F. 563+9

ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASDOS
 EN LA ZONA VERTICAL = .000000 '
 " " " INCLINADA SUPERIOR = .000000 '
 " " " " INFERIOR = .000000 '
 DEL RELLENO CONSIGO MISMO = 18.434950 '

COEFICIENTES DE EMPUJE

ZONA DEL RELLENO. COMPONENTE HORIZONTAL KH= .296478
 " VERTICAL KV= .098826
 ZONA VERTICAL DEL MURO. COMP HORIZONTAL KH= .335046
 " VERTICAL KV= .000000
 ZONA INCLINADA SUPERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000
 ZONA INCLINADA INFERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.445	.415	.453	.066	.008	.000	.000	20.614
.890	.430	.923	.266	.072	.000	.000	21.476
1.336	.445	1.410	.598	.251	.000	.000	22.339
1.781	.459	1.913	1.062	.603	.555	.143	23.201
2.226	.474	2.432	1.660	1.188	2.125	.182	24.063
2.671	.489	2.968	2.391	2.065	4.577	.223	24.925
3.116	.504	3.521	3.254	3.292	8.049	.264	25.787
3.562	.519	4.090	4.250	4.929	12.671	.307	26.649
4.007	.534	4.676	5.379	7.035	18.577	.351	27.511

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.445	.415	.453	.100	.013	.000	.000	20.614
.890	.430	.923	.398	.111	.000	.000	21.476
1.336	.445	1.410	.896	.384	.152	.070	22.339

1.781	.459	1.913	1.594	.918	1.139	.096	23.2
2.226	.474	2.432	2.490	1.804	2.870	.122	24.0
2.671	.489	2.968	3.586	3.129	5.488	.148	24.9
3.116	.504	3.521	4.881	4.982	9.128	.176	25.7
3.562	.519	4.090	6.375	7.452	13.923	.205	26.6
4.007	.534	4.676	8.068	10.627	20.002	.234	27.5

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION
 SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS
 LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO
 TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 8.402 T
 " " " " NORMALES " " " = 28.001 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.500

MOMENTO DE VUELCO = 14.908 MT
 MOMENTO DE ESTABILIDAD = 46.286 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 3.105

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 8.402 T
 " " " " NORMALES " " " = 30.521 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 8.285 MT
 LONGITUD TOTAL DE LA ZAPATA = 2.850 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
 CENTRO DE LA ZAPATA = .271 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPEZIAL
 TENSION EN EL VERTICE DELANTERO = 16.829 T/M2
 TENSION EN EL VERTICE TRASERO = 4.589 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.246	.600	.000	3.648	.455	1.251	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MAYORADOS MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.430	.600	.000	5.076	1.726	4.765	.000	34.211
.860	.600	.000	6.433	4.234	11.780	.000	34.211
1.290	.600	.000	6.874	7.127	20.013	.000	34.211
1.720	.600	.000	6.397	10.013	28.371	.000	34.211
2.150	.600	.000	5.002	12.497	35.682	.000	34.211

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA
ZAPATA QUE A CONTINUACION SE DEFINEN, SE
CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 12.602 T
" " " " NORMALES " " " = 29.401 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.050

MOMENTO DE VUELCO = 22.363 MT
MOMENTO DE ESTABILIDAD = 50.276 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 2.248

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 12.602 T
" " " " NORMALES " " " = 31.921 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 13.743 MT
LONGITUD TOTAL DE LA ZAPATA = 2.850 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
CENTRO DE LA ZAPATA = .431 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRAPECIAL
TENSION EN EL VERTICE DELANTERO = 21.352 T/M2
TENSION EN EL VERTICE TRASERO = 1.048 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.246	.600	.000	4.677	.585	1.072	.000	34.211

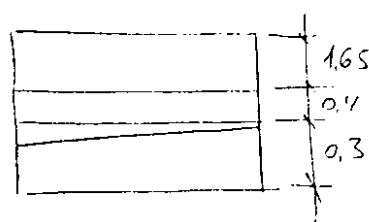
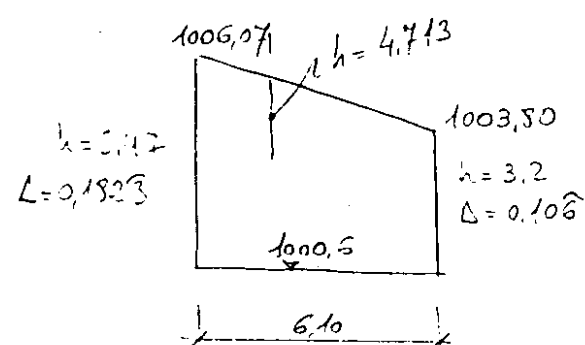
ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.430	.600	.000	6.337	2.016	3.706	.000	34.211
.860	.600	.000	8.432	5.243	9.703	.000	34.211
1.290	.600	.000	9.087	9.061	16.905	.000	34.211
1.720	.600	.000	8.301	12.851	24.166	.000	34.211
2.150	.600	.000	6.075	15.994	30.272	.000	34.211

ALETAS DEL PASO INFERIOR 563+900 (MT-2)					
0.4	0.0	4.0067	0.	0.	0.
0.33333	0.033333	0.	0.		
0.16644	0.6	0.6	2.85	0.45	
0.	0.				
2500.	0.07	2250.	0.06	2.5	2.0
1					
1.5	35.000	0.	0.	0.	1.1
18.43495	0.	0.	0.	0	

CALCULO DE ALETAS P.F. 565+38

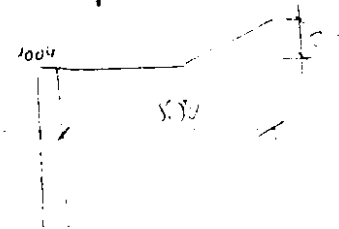
Alfa (A₁)



Angulo alfa 90°

$$P_1 = \frac{2.0}{8.8} = 0.2273 \quad \text{equivalente}$$

$$\beta = \arctan 0,2273 = 12,804266^\circ$$



DIMENSIONES GEOMETRICAS DEL MURO

ANCHO DE LA CORONACION	=	.400 M
PROFUNDIDAD DEL PARAMENTO VERTICAL DEL INTRADOS	=	.000 M
" " " " " TRASDOS	=	4.713 M
PROFUNDIDAD DE LOS PARAMENTOS INCLINADOS EN EL TRASDOS		
	ZONA SUPERIOR =	.000 M
	ZONA INFERIOR =	.000 M
PROFUNDIDAD DEL TALUD DE TIERRAS EN EL TRASDOS	=	.000 M

PENDIENTE DEL TALUD DE TIERRAS	=	.22730000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333300
" " " SUPERIOR DEL TRASDOS	=	.00000000
" " " INFERIOR " "	=	.00000000

DIMENSIONES DE LA ZAPATA

VUELO DELANTERO	=	.143 M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.600 M
" " " " " " " DCHO	=	.600 M
LONGITUD TOTAL DE LA ZAPATA	=	2.350 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000

SITUACION DE LA CARGA CONCENTRADA EXTERIOR. DISTANCIA=.000 M
PROFUNDIDAD=.000 M

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	= .07000	M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	= 2250.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	= .06000	M
PESO ESPECIFICO DEL HORMIGON	= 2.50000	T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	= 2.00000	T/M3

HIPOTESIS = 1

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 ' /
SOBRECARGA UMR SOBRE EL RELLENO	=	.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T
COF. MINORACION DE CARGAS FAVORABLES PARA LA COMPROBACION DE LAS ESTABILIDADES	=	1.100

ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASDOS
 EN LA ZONA VERTICAL = .000000 '
 " " " INCLINADA SUPERIOR = .000000 '
 " " " " INFERIOR = .000000 '
 DEL RELLENO CONSIGO MISMO = 12.804270 '

COEFICIENTES DE EMPUJE

 ZONA DEL RELLENO. COMPONENTE HORIZONTAL KH= .282017
 " VERTICAL KV= .064095
 ZONA VERTICAL DEL MURO. COMP HORIZONTAL KH= .309944
 " VERTICAL KV= .000000
 ZONA INCLINADA SUPERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000
 ZONA INCLINADA INFERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.471	.416	.481	.069	.009	.000	.000	20.665
.943	.431	.980	.275	.079	.000	.000	21.578
1.414	.447	1.497	.620	.275	.000	.000	22.490
1.885	.463	2.033	1.102	.661	.647	.152	23.403
2.357	.479	2.588	1.721	1.303	2.357	.194	24.316
2.828	.494	3.161	2.478	2.264	5.020	.237	25.228
3.299	.510	3.753	3.373	3.611	8.781	.281	26.141
3.770	.526	4.363	4.406	5.407	13.781	.327	27.053
4.242	.541	4.991	5.577	7.717	20.161	.374	27.966
4.713	.557	5.639	6.885	10.606	28.062	.423	28.879

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.471	.416	.481	.103	.014	.000	.000	20.665
.943	.431	.980	.413	.122	.000	.000	21.578

1.414	.447	1.497	.929	.421	.189	.075	22.
1.885	.463	2.033	1.652	1.007	1.268	.102	23.
2.357	.479	2.588	2.582	1.979	3.151	.129	24.
2.828	.494	3.161	3.718	3.432	5.991	.158	25.
3.299	.510	3.753	5.060	5.466	9.933	.188	26.
3.770	.526	4.363	6.609	8.176	15.117	.218	27.
4.242	.541	4.991	8.365	11.659	21.683	.250	27.
4.713	.557	5.639	10.327	16.014	29.771	.282	28.

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION
 SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS
 LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO
 TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 9.124 T
 " " " " NORMALES " " " = 25.106 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.513
 MOMENTO DE VUELCO = 17.300 MT
 MOMENTO DE ESTABILIDAD = 33.564 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.940

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 9.124 T
 " " " " NORMALES " " " = 27.409 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 13.073 MT
 LONGITUD TOTAL DE LA ZAPATA = 2.350 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
 CENTRO DE LA ZAPATA = .477 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 2.094 M
 TENSION EN EL VERTICE DELANTERO = 26.176 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.226	.600	.000	5.268	.609	1.674	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MAYORADOS MOMENTO MT	ARMAD. NECESARIA TRACCION T	NECESARIA COMPRES T	CORTANTE VCU T
.413	.600	.000	6.698	1.835	5.068	.000	34.211
.825	.600	.000	9.527	5.258	14.677	.000	34.211
1.238	.600	.000	10.152	9.392	26.560	.000	34.211
1.650	.600	.000	8.573	13.330	38.158	.000	34.211

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 13.686 T
 " " " " NORMALES " " " = 26.143 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.051

MOMENTO DE VUELCO = 25.950 MT
 MOMENTO DE ESTABILIDAD = 36.000 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.387

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 13.686 T
 " " " " NORMALES " " " = 28.446 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 20.504 MT
 LONGITUD TOTAL DE LA ZAPATA = 2.350 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .721 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 1.363 M.
 TENSION EN EL VERTICE DELANTERO = 41.754 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

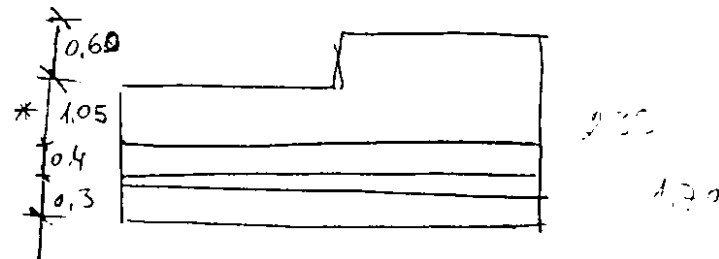
PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MAYORADOS MOMENTO MT	ARMAD. NECESARIA TRACCION T	NECESARIA COMPRES T	CORTANTE VCU T
.226	.600	.000	8.330	.973	1.784	.000	34.211

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MAYORADOS MOMENTO MT	ARMAD. NECESARIA TRACCION T	NECESARIA COMPRES T	CORTANTE VCU T
.413	.600	.000	6.851	1.843	3.387	.000	34.2
.825	.600	.000	11.552	5.642	10.450	.000	34.2
1.238	.600	.000	15.217	11.283	21.148	.000	34.2
1.650	.600	.000	13.994	17.490	33.206	.000	34.2

Aleta A1 del Paso Inferior 565+380 (MT-1)					
0.4	0.0	4.713	0.	0.	0.
0.2273	0.033333	0.	0.		
0.1429	0.6	0.6	2.35	0.55	
0.	0.				
2500.	0.07	2250.	0.06	2.5	2.0
1					
1.5	35.000	0.	0.	0.	1.1
12.80427	0.	0.	0.	0	

Aleta (A_2)



* Unificando com aleta Δy

ángulo ceta 15°

Talud normal 7,7274 : 1
 $P_1 = 0,1294095$

$$\beta = 7.37364^\circ$$

MT-1

Coef. roz 0,55

DIMENSIONES GEOMETRICAS DEL MURO

PENDIENTE DEL TALUD DE TIERRAS	=	.12940000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333300
" " " SUPERIOR DEL TRASDOS	=	.00000000
" " " INFERIOR " "	=	.00000000

VUELO DELANTERO	=	.190 M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.600 M
" " " " " " " DCHO	=	.600 M
LONGITUD TOTAL DE LA ZAPATA	=	1.700 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	= .07000	M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	= 2250.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	= .06000	M
PESO ESPECIFICO DEL HORMIGON	= 2.50000	T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	= 2.00000	T/M3

HIPOTESIS = 1

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 ' /
SOBRECARGA UMR SOBRE EL RELLENO	=	.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T
COF. MINORACION DE CARGAS FAVORABLES PARA LA		
COMPROBACION DE LAS ESTABILIDADES	=	1.100

ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASDOS
 EN LA ZONA VERTICAL = .000000 '
 " " " INCLINADA SUPERIOR = .000000 '
 " " " " INFERIOR = .000000 '
 DEL RELLENO CONSIGO MISMO = 7.373640 '

COEFICIENTES DE EMPUJE

ZONA DEL RELLENO. COMPONENTE HORIZONTAL KH= .274424
 " VERTICAL KV= .035513
 ZONA VERTICAL DEL MURO. COMP HORIZONTAL KH= .291245
 " VERTICAL KV= .000000
 ZONA INCLINADA SUPERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000
 ZONA INCLINADA INFERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	ARMAD. NECESARIA MOMENTO MT	TRACCION T	COMPRES T	CORTANTE VCU T
.471	.416	.481	.065	.008	.000	.000	20.665
.943	.431	.980	.259	.074	.000	.000	21.578
1.414	.447	1.498	.583	.257	.000	.000	22.491
1.886	.463	2.034	1.036	.620	.495	.153	23.404
2.357	.479	2.589	1.618	1.222	2.071	.194	24.317
2.829	.494	3.162	2.330	2.125	4.538	.237	25.230
3.300	.510	3.754	3.172	3.390	8.032	.282	26.143

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	ARMAD. NECESARIA MOMENTO MT	TRACCION T	COMPRES T	CORTANTE VCU T
.471	.416	.481	.097	.013	.000	.000	20.665
.943	.431	.980	.388	.114	.000	.000	21.578
1.414	.447	1.498	.874	.395	.123	.075	22.491
1.886	.463	2.034	1.553	.945	1.117	.102	23.404
2.357	.479	2.589	2.427	1.858	2.865	.129	24.317

2.829	.494	3.162	3.495	3.224	5.510	.158	25.
3.300	.510	3.754	4.757	5.134	9.186	.188	26.

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION
 SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS
 LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO
 TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 4.456 T
 " " " " NORMALES " " " = 12.425 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.534

MOMENTO DE VUELCO = 5.984 MT
 MOMENTO DE ESTABILIDAD = 11.920 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.992

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 4.456 T
 " " " " NORMALES " " " = 13.610 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 4.539 MT
 LONGITUD TOTAL DE LA ZAPATA = 1.700 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
 CENTRO DE LA ZAPATA = .333 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 1.550 M
 TENSION EN EL VERTICE DELANTERO = 17.566 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	ARMAD. NECESARIA MOMENTO MT	TRACCION T	COMPRES T	CORTANTE VCU T
.266	.600	.000	3.879	.535	1.471	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.333	.600	.000	3.159	.643	1.770	.000	34.211
.667	.600	.000	4.581	1.969	5.440	.000	34.211
1.000	.600	.000	4.715	3.554	9.869	.000	34.211

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA
ZAPATA QUE A CONTINUACION SE DEFINEN, SE
CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 6.683 T
" " " " NORMALES " " " = 12.713 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.046

MOMENTO DE VUELCO = 8.977 MT
MOMENTO DE ESTABILIDAD = 12.410 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.382

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 6.683 T
" " " " NORMALES " " " = 13.898 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 7.286 MT
LONGITUD TOTAL DE LA ZAPATA = 1.700 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
CENTRO DE LA ZAPATA = .524 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = .977 M
TENSION EN EL VERTICE DELANTERO = 28.442 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.266	.600	.000	6.147	.865	1.586	.000	34.211

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
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.333	.600	.000	3.348	.655	1.200	.000	34.2
.667	.600	.000	6.092	2.229	4.099	.000	34.2
1.000	.600	.000	7.687	4.609	8.519	.000	34.2

ALETA A2 (MENOR) DEL PASO INFERIOR 565+380 (MT-1)					
0.4	0.0	3.3	0.	0.	0.
0.1294	0.033333	0.	0.		
0.19	0.6	0.6	1.7	0.55	
0.	0.				
2500.	0.07	2250.	0.06	2.5	2.0
1					
1.5	35.000	0.	0.	0.	1.1
7.37364	0.	0.	0.	0	

TITULO :ALETA A2 (MAYOR) DEL PASO INFERIOR 565+380 (MT-1)
=====

DIMENSIONES GEOMETRICAS DEL MURO

ANCHO DE LA CORONACION	=	.400 M
PROFUNDIDAD DEL PARAMENTO VERTICAL DEL INTRADOS	=	.000 M
" " " " " TRASDOS	=	4.929 M
PROFUNDIDAD DE LOS PARAMENTOS INCLINADOS EN EL TRASDOS		
ZONA SUPERIOR	=	.000 M
ZONA INFERIOR	=	.000 M
PROFUNDIDAD DEL TALUD DE TIERRAS EN EL TRASDOS	=	.000 M

PENDIENTE DEL TALUD DE TIERRAS	=	.12940000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333300
" " " " SUPERIOR DEL TRASDOS	=	.00000000
" " " " INFERIOR " "	=	.00000000

DIMENSIONES DE LA ZAPATA

VUELO DELANTERO	=	.136 M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.600 M
" " " " " " DCHO	=	.600 M
LONGITUD TOTAL DE LA ZAPATA	=	2.350 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000

SITUACION DE LA CARGA CONCENTRADA EXTERIOR. DISTANCIA	=	.000 M
PROFUNDIDAD	=	.000 M

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA	=	2500.00 T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	=	.07000 M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	=	2250.00 T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	=	.06000 M
PESO ESPECIFICO DEL HORMIGON	=	2.50000 T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	=	2.00000 T/M3

HIPOTESIS = 1

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 °
SOBRECARGA UMR SOBRE EL RELLENO	=	.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T
COF. MINORACION DE CARGAS FAVORABLES PARA LA		
COMPROBACION DE LAS ESTABILIDADES	=	1.100

ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASDOS
 EN LA ZONA VERTICAL = .000000 '
 " " " INCLINADA SUPERIOR = .000000 '
 " " " " INFERIOR = .000000 '
 DEL RELLENO CONSIGO MISMO = 7.373640 '

COEFICIENTES DE EMPUJE

ZONA DEL RELLENO. COMPONENTE HORIZONTAL KH= .274424
 " VERTICAL KV= .035513
 ZONA VERTICAL DEL MURO. COMP HORIZONTAL KH= .291245
 " VERTICAL KV= .000000
 ZONA INCLINADA SUPERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000
 ZONA INCLINADA INFERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.493	.416	.503	.071	.010	.000	.000	20.707
.986	.433	1.026	.283	.085	.000	.000	21.661
1.479	.449	1.570	.637	.295	.000	.000	22.616
1.972	.466	2.134	1.132	.710	.722	.160	23.570
2.465	.482	2.718	1.769	1.399	2.549	.204	24.525
2.957	.499	3.322	2.547	2.432	5.385	.249	25.479
3.450	.515	3.946	3.467	3.879	9.383	.296	26.434
3.943	.531	4.591	4.529	5.809	14.692	.344	27.388
4.436	.548	5.256	5.731	8.291	21.459	.394	28.343
4.929	.564	5.941	7.076	11.395	29.835	.446	29.297

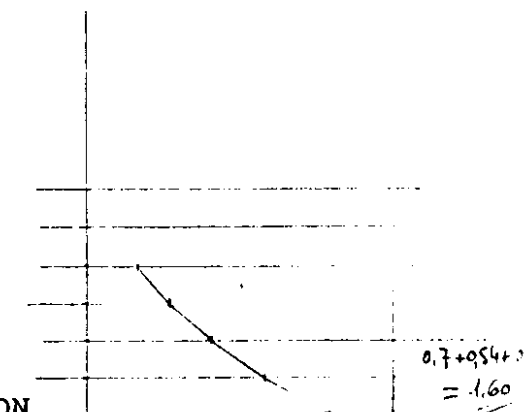
MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.493	.416	.503	.106	.015	.000	.000	20.707
.986	.433	1.026	.425	.131	.000	.000	21.661

1.479	.449	1.570	.955	.452	.220	.078	22.6
1.972	.466	2.134	1.698	1.082	1.375	.107	23.5
2.465	.482	2.718	2.653	2.126	3.383	.136	24.5
2.957	.499	3.322	3.821	3.688	6.406	.166	25.4
3.450	.515	3.946	5.201	5.873	10.596	.197	26.4
3.943	.531	4.591	6.793	8.785	16.099	.230	27.3
4.436	.548	5.256	8.597	12.528	23.063	.263	28.3
4.929	.564	5.941	10.614	17.208	31.636	.297	29.2

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS



LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 9.050 T
 " " " " NORMALES " " " = 24.884 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.512
 MOMENTO DE VUELCO = 17.322 MT
 MOMENTO DE ESTABILIDAD = 32.110 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.854

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 9.050 T
 " " " " NORMALES " " " = 27.255 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 14.301 MT
 LONGITUD TOTAL DE LA ZAPATA = 2.350 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .525 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 1.951 M
 TENSION EN EL VERTICE DELANTERO = 27.942 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.220	.600	.000	5.479	.616	1.695	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.413	.600	.000	6.009	1.483	4.090	.000	34.211
.825	.600	.000	9.507	4.768	13.290	.000	34.211
1.238	.600	.000	10.524	8.985	25.376	.000	34.211
1.650	.600	.000	9.059	13.109	37.499	.000	34.211

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CÁLCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 13.574 T
 " " " " NORMALES " " " = 25.470 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.032

MOMENTO DE VUELCO = 25.983 MT
 MOMENTO DE ESTABILIDAD = 33.486 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.289

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 13.574 T
 " " " " NORMALES " " " = 27.841 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 22.275 MT
 LONGITUD TOTAL DE LA ZAPATA = 2.350 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .800 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR INADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 1.125 M
 TENSION EN EL VERTICE DELANTERO = 49.503 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

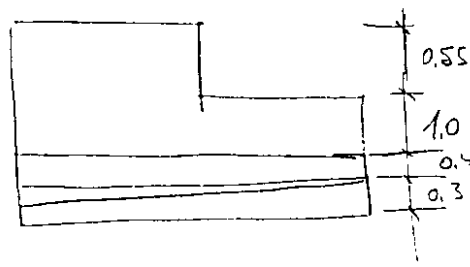
PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.220	.600	.000	9.509	1.087	1.994	.000	34.211

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.413	.600	.000	6.010	1.483	2.722	.000	34.211
.825	.600	.000	10.806	4.953	9.160	.000	34.211
1.238	.600	.000	15.554	10.391	19.440	.000	34.211
1.650	.600	.000	16.293	17.219	32.672	.000	34.211

. ALETA A2 (MAYOR) DEL PASO INFERIOR 565+380 (MT-1)					
0.4	0.0	4.929	0.	0.	0.
0.1294	0.033333	0.	0.		
0.1357	0.6	0.6	2.35	0.55	
0.	0.				
2500.	0.07	2250.	0.06	2.5	2.0
1					
1.5	35.000	0.	0.	0.	1.1
7.37364	0.	0.	0.	0	

Aleta (A₃)


$$\begin{aligned} T_1 &= 0 \\ \beta &= 0 \end{aligned}$$

2. 2nd 5.

DIMENSIONES GEOMETRICAS DEL MURO

PENDIENTE	DEL TALUD DE TIERRAS	=	.00000000
"	DE LA ZONA INFERIOR DEL INTRADOS	=	.03333300
"	" " " SUPERIOR DEL TRASDOS	=	.00000000
"	" " " INFERIOR " "	=	.00000000

VUELO DELANTERO	=	.141 M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.600 M
" " " " " " " DCHO	=	.600 M
LONGITUD TOTAL DE LA ZAPATA	=	2.250 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	=	.07000 M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	=	2250.00 T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	=	.06000 M
PESO ESPECIFICO DEL HORMIGON	=	2.50000 T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	=	2.00000 T/M3

HIPOTESIS = 1

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 '°
SOBRECARGA UMR SOBRE EL RELLENO	=	.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T
COF. MINORACION DE CARGAS FAVORABLES PARA LA COMPROBACION DE LAS ESTABILIDADES	=	1.100

ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASDOS
 EN LA ZONA VERTICAL = .000000 '
 " " " INCLINADA SUPERIOR = .000000 '
 " " " " INFERIOR = .000000 '
 DEL RELLENO CONSIGO MISMO = .000000 '

COEFICIENTES DE EMPUJE

ZONA DEL RELLENO. COMPONENTE HORIZONTAL KH= .270990
 " VERTICAL KV= .000000
 ZONA VERTICAL DEL MURO. COMP HORIZONTAL KH= .270990
 " VERTICAL KV= .000000
 ZONA INCLINADA SUPERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000
 ZONA INCLINADA INFERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.477	.416	.486	.062	.008	.000	.000	20.675
.953	.432	.991	.246	.070	.000	.000	21.598
1.430	.448	1.515	.554	.246	.000	.000	22.521
1.907	.464	2.058	.985	.594	.377	.154	23.444
2.383	.479	2.620	1.539	1.172	1.859	.197	24.368
2.860	.495	3.201	2.217	2.040	4.193	.240	25.291
3.337	.511	3.801	3.017	3.254	7.506	.285	26.214
3.813	.527	4.419	3.941	4.875	11.922	.331	27.137
4.290	.543	5.057	4.987	6.960	17.562	.379	28.060
4.767	.559	5.713	6.157	9.569	24.547	.429	28.983

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.477	.416	.486	.092	.013	.000	.000	20.675
.953	.432	.991	.369	.110	.000	.000	21.598

1.430	.448	1.515	.831	.379	.071	.076	22.4
1.907	.464	2.058	1.478	.907	1.007	.103	23.4
2.383	.479	2.620	2.309	1.784	2.664	.131	24.3
2.860	.495	3.201	3.325	3.096	5.178	.160	25.2
3.337	.511	3.801	4.526	4.932	8.676	.190	26.2
3.813	.527	4.419	5.911	7.380	13.280	.221	27.1
4.290	.543	5.057	7.481	10.526	19.111	.253	28.0
4.767	.559	5.713	9.236	14.461	26.288	.286	28.9

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION
 SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS
 LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO
 TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 7.805 T
 " " " " NORMALES " " " = 21.696 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.529

MOMENTO DE VUELCO = 13.962 MT
 MOMENTO DE ESTABILIDAD = 25.645 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.837

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 7.805 T
 " " " " NORMALES " " " = 23.865 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 12.601 MT
 LONGITUD TOTAL DE LA ZAPATA = 2.250 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
 CENTRO DE LA ZAPATA = .528 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 1.791 M
 TENSION EN EL VERTICE DELANTERO = 26.650 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.225	.600	.000	5.281	.608	1.672	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MAYORADOS MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANT VCU T
.388	.600	.000	4.275	.828	2.280	.000	34.21
.775	.600	.000	7.808	3.235	8.974	.000	34.21
1.163	.600	.000	9.144	6.592	18.479	.000	34.21
1.550	.600	.000	8.246	10.033	28.430	.000	34.21

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 11.707 T
 " " " " NORMALES " " " = 21.696 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.019
 MOMENTO DE VUELCO = 20.943 MT
 MOMENTO DE ESTABILIDAD = 25.645 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.225
 RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 11.707 T
 " " " " NORMALES " " " = 23.865 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 19.582 MT
 LONGITUD TOTAL DE LA ZAPATA = 2.250 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA = .821 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR INADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = .913 M
 TENSION EN EL VERTICE DELANTERO = 52.253 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	ARMAD. NECESARIA MOMENTO MT	TRACCION T	COMPRES T	CORTANT VCU T
.225	.600	.000	9.969	1.175	2.157	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANT VCU T
.388	.600	.000	4.275	.828	1.519	.000	34.21
.775	.600	.000	8.551	3.314	6.107	.000	34.21
1.163	.600	.000	12.826	7.455	13.862	.000	34.21
1.550	.600	.000	15.799	13.161	24.765	.000	34.21

TITULO CALETA A3 (MENOR) DEL PASO INFERIOR 565+580 (MT-1)

ANCHO DE LA CORONACION	=	.400 M
PROFUNDIDAD DEL PARAMENTO VERTICAL DEL INTRADOS	=	.000 M
" " " " " TRASDOS	=	3.467 M
PROFUNDIDAD DE LOS PARAMENTOS INCLINADOS EN EL TRASDOS		
	ZONA SUPERIOR =	.000 M
	ZONA INFERIOR =	.000 M
PROFUNDIDAD DEL TALUD DE TIERRAS EN EL TRASDOS	=	.000 M

PENDIENTE DEL TALUD DE TIERRAS	=	.00000000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333300
" " " SUPERIOR DEL TRASDOS	=	.00000000
" " " INFERIOR " "	=	.00000000

VUELO DELANTERO	=	.184 M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.600 M
" " " " " " " DCHO	=	.600 M
LONGITUD TOTAL DE LA ZAPATA	=	1.700 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000

SITUACION DE LA CARGA CONCENTRADA EXTERIOR. DISTANCIA=.000 M
PROFUNDIDAD=.000 M

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	=	.07000 M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	=	2250.00 T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	=	.06000 M
PESO ESPECIFICO DEL HORMIGON	=	2.50000 T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	=	2.00000 T/M3

HIPOTESIS = 1

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ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASDOS
EN LA ZONA VERTICAL = .000000 '
" " " INCLINADA SUPERIOR = .000000 '
" " " " INFERIOR = .000000 '
DEL RELLENO CONSIGO MISMO = .000000 '

COEFICIENTES DE EMPUJE

ZONA DEL RELLENO. COMPONENTE HORIZONTAL KH= .270990
" VERTICAL KV= .000000
ZONA VERTICAL DEL MURO. COMP HORIZONTAL KH= .270990
" VERTICAL KV= .000000
ZONA INCLINADA SUPERIOR.COMP HORIZONTAL KH= .000000
" VERTICAL KV= .000000
ZONA INCLINADA INFERIOR.COMP HORIZONTAL KH= .000000
" VERTICAL KV= .000000

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.495	.417	.505	.066	.009	.000	.000	20.711
.990	.433	1.031	.266	.079	.000	.000	21.670
1.486	.450	1.578	.598	.277	.000	.000	22.629
1.981	.466	2.144	1.063	.668	.558	.161	23.588
2.476	.483	2.732	1.662	1.317	2.243	.205	24.547
2.971	.499	3.339	2.393	2.290	4.875	.250	25.506
3.467	.516	3.967	3.257	3.654	8.596	.298	26.465

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.495	.417	.505	.100	.014	.000	.000	20.711
.990	.433	1.031	.399	.123	.000	.000	21.670
1.486	.450	1.578	.897	.425	.148	.079	22.629
1.981	.466	2.144	1.595	1.019	1.214	.107	23.588
2.476	.483	2.732	2.492	2.003	3.082	.137	24.547

2.971	.499	3.339	3.589	3.475	5.903	.167	25.5
3.467	.516	3.967	4.885	5.535	9.817	.198	26.5

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION
SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS
LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO
TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 4.482 T
" " " " NORMALES " " " = 12.228 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.501

MOMENTO DE VUELCO = 6.075 MT
MOMENTO DE ESTABILIDAD = 11.229 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.848

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 4.482 T
" " " " NORMALES " " " = 13.451 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 5.157 MT
LONGITUD TOTAL DE LA ZAPATA = 1.700 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
CENTRO DE LA ZAPATA = .383 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 1.400 M
TENSION EN EL VERTICE DELANTERO = 19.217 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.262	.600	.000	4.167	.566	1.556	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.333	.600	.000	2.804	.468	1.288	.000	34.211
.667	.600	.000	4.700	1.762	4.863	.000	34.211
1.000	.600	.000	5.071	3.433	9.527	.000	34.211

M	M	T	T	MT	T	T	T
.333	.600	.000	2.811	.469	.858	.000	34..
.667	.600	.000	5.623	1.874	3.444	.000	34..
1.000	.600	.000	8.421	4.217	7.787	.000	34..

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA
ZAPATA QUE A CONTINUACION SE DEFINEN, SE
CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 6.722 T
" " " " NORMALES " " " = 12.228 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.000

MOMENTO DE VUELCO = 9.113 MT
MOMENTO DE ESTABILIDAD = 11.229 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.232

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 6.722 T
" " " " NORMALES " " " = 13.451 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 8.194 MT
LONGITUD TOTAL DE LA ZAPATA = 1.700 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
CENTRO DE LA ZAPATA = .609 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR INADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = .722 M
TENSION EN EL VERTICE DELANTERO = 37.239 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.262	.600	.000	7.588	1.070	1.963	.000	34.21

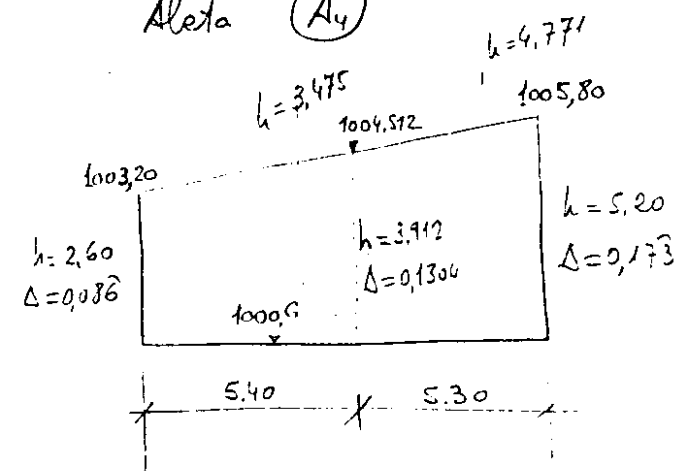
ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION	CANTO SECCION	ESFUERZOS AXIL	MAYORADOS CORTANTE	MOMENTO	ARMAD. NECESARIA TRACCION	COMPRES	CORTANTE VCU
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ALETA A3 (MAYOR) DEL PASO INFERIOR 565+380 (MT-1)					
0.4	0.0	4.7667	0.	0.	0.
0.	0.033333	0.	0.		
0.1411	0.6	0.6	2.25	0.55	
0.	0.				
2500.	0.07	2250.	0.06	2.5	2.0
1					
1.5	35.000	0.	0.	0.	1.1
0.0	0.	0.	0.	0	

PI 565+380

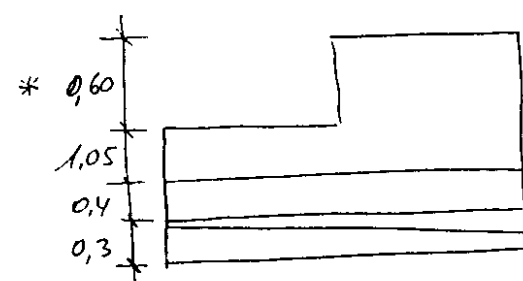
Aleta (A₄)



Talud tierras 2:1
 Angulo aleta 15°
 Talud normal 7.7274:1
 $P_1 = 0.1294095$
 $\beta = 7.32365^\circ$

ALETA A4 (MAYOR) DEL PASO INFERIOR 565+380 (MT-1)

0.4	0.0	4.771	0.	0.	0.
0.1294	0.033333	0.	0.		
0.141	0.6	0.6	2.3	0.55	
0.	0.				
2500.	0.07	2250.	0.06	2.5	2.0
1					
1.5	35.000	0.	0.	0.	1.1
7.37364	0.	0.	0.	0	



* por unificar con aleta A₂

Figure 1

ANCHO DE LA CORONACION = 100 M

PENDIENTE DEL TALUD DE TIERRAS = 13840000

VUELO DEL ANTERO

VUELO DEL ANTERO	141	M
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SITUACION DE LA CARGA CONCENTRADA EXTERIOR DISTANCIA= 200 M

RESISTENCIA CARACTERISTICA DEL HORMICON DE LA ZARZETA 2500 20 T/M2

COEFICIENTE DE MAYORACION DE CARCAS = 1,500

EN LA ZONA VERTICAL. = 000000 '.

ZONA DEI PELLENO COMPONENTE HORIZONTAL KH= 274424

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 2755 2756 2757 2758 2759 2760 2761 2762 2763 2764 2765 2766 2767 2768 2769 2770 2771 2772 2773 2774 2775 2776 2777 2778 2779 2780 2781 2782 2783 2784 2785 2786 2787 2788 2789 2790 2791 2792 2793 2794 2795 2796 2797 2798 2799 2800 2801 2802 2803 2804 2805 2806 2807 2808 2809 2810 2811 2812 2813 2814 2815 2816 2

PROFUND CANTO ESFUERZOS CARACTERISTICOS ARMAD NECESARIA CORTAN

PROFUND CANTO ESFUERZOS MAYORADOS ARMAD NECESARIA CORTA

1.431	.448	1.517	.895	.409	.148	.076	22.524
1.908	.464	2.060	1.591	.980	1.183	.103	23.448
2.386	.480	2.623	2.486	1.926	2.997	.131	24.372
2.863	.495	3.204	3.580	3.342	5.739	.160	25.296
3.340	.511	3.804	4.873	5.323	9.546	.190	26.219
3.817	.527	4.424	6.364	7.963	14.554	.221	27.141
4.294	.543	5.062	8.055	11.357	20.895	.253	28.061
4.771	.559	5.719	9.944	15.600	28.703	.286	28.991

CALCULO DE LA ZAPATA =====

MAYORANDO TODOS LOS ESFUERZOS -----

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA=	8.539 T
" " " " NORMALES " " " =	23.621 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO =	1.522
MOMENTO DE VUELCO =	15.876 MT
MOMENTO DE ESTABILIDAD =	29.881 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO =	1.882
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA =	8.539 T
" " " " NORMALES " " " =	25.873 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA=	13.015 MT
LONGITUD TOTAL DE LA ZAPATA =	2.300 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA =	.503 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA =	1.941 M
TENSION EN EL VERTICE DELANTERO =	26.661 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR) -----

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTAN VCU T
.225	.600	.000	5.310	.610	1.678	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR) -----

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTAN VCU T
.400	.600	.000	5.655	1.356	3.737	.000	34.2
.800	.600	.000	8.852	4.331	12.056	.000	34.2
1.200	.600	.000	9.810	8.138	22.925	.000	34.2
1.600	.600	.000	8.528	11.880	33.857	.000	34.2

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA=	12.808 T
" " " " NORMALES " " " =	24.173 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO =	1.038
MOMENTO DE VUELCO =	23.814 MT
MOMENTO DE ESTABILIDAD =	31.151 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO =	1.308
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA =	12.808 T
" " " " NORMALES " " " =	26.425 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA=	20.318 MT
LONGITUD TOTAL DE LA ZAPATA =	2.300 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA =	.769 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR INADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA =	1.143 M
TENSION EN EL VERTICE DELANTERO =	46.223 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR) -----

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTAN VCU T
.225	.600	.000	9.034	1.054	1.933	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANT VCU T
.400	.600	.000	5.667	1.356	2.488	.000	34.21
.800	.600	.000	10.187	4.528	8.367	.000	34.21
1.200	.600	.000	14.628	9.499	17.738	.000	34.21
1.600	.600	.000	15.130	15.667	29.634	.000	34.21

ALETA A4 (MENOR) DEL PASO INFERIOR 565+380 (MT-1)

0.4	0.0	3.475	0.	0.	0.
0.1294	0.033333	0.	0.		
0.1842	0.6	0.6	1.75	0.55	
0.	0.				
2500.	0.07	2250.	0.06	2.5	2.0
1					
1.5	35.000	0.	0.	0.	1.1
7.37364	0.	0.	0.	0	

TITULO :ALETA A4 (MENOR) DEL PASO INFERIOR 565+380 (MT-1)

DIMENSIONES GEOMETRICAS DEL MURO

ANCHO DE LA CORONACION = .400 M
PROFUNDIDAD DEL PARAMENTO VERTICAL DEL INTRADOS= .000 M
" " " " " TRASDOS = 3.475 M
PROFUNDIDAD DE LOS PARAMENTOS INCLINADOS EN EL TRASDOS
ZONA SUPERIOR = .000 M
ZONA INFERIOR = .000 M
PROFUNDIDAD DEL TALUD DE TIERRAS EN EL TRASDOS = .000 M

PENDIENTE DEL TALUD DE TIERRAS = .12940000
" DE LA ZONA INFERIOR DEL INTRADOS= .03333300
" " " " SUPERIOR DEL TRASDOS = .00000000
" " " " INFERIOR " " = .00000000

DIMENSIONES DE LA ZAPATA

VUELO DELANTERO = .184 M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQDO = .600 M
" " " " " " DCHO = .600 M
LONGITUD TOTAL DE LA ZAPATA = 1.750 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO = .55000000

SITUACION DE LA CARGA CONCENTRADA EXTERIOR. DISTANCIA= .000 M
PROFUNDIDAD= .000 M

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA= 2500.00 T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA = .07000 M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO = 2250.00 T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO = .06000 M
PESO ESPECIFICO DEL HORMIGON = 2.50000 T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO = 2.00000 T/M3

HIPOTESIS = 1

COEFICIENTE DE MAYORACION DE CARGAS = 1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO = 35.000000 '
SOBRECARGA UMR SOBRE EL RELLENO = .000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA= .000 T
" VERTICAL " " " " = .000 T
COF. MINORACION DE CARGAS FAVORABLES PARA LA
COMPROBACION DE LAS ESTABILIDADES = 1.100

ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASDOS
EN LA ZONA VERTICAL = .000000 '
" " " INCLINADA SUPERIOR = .000000 '
" " " " INFERIOR = .000000 '
DEL RELLENO CONSIGO MISMO = 7.373640 '

COEFICIENTES DE EMPUJE

ZONA DEL RELLENO. COMPONENTE HORIZONTAL KH= .274424
" VERTICAL KV= .035513
ZONA VERTICAL DEL MURO. COMP HORIZONTAL KH= .291245
" VERTICAL KV= .000000
ZONA INCLINADA SUPERIOR.COMP HORIZONTAL KH= .000000
" VERTICAL KV= .000000
ZONA INCLINADA INFERIOR.COMP HORIZONTAL KH= .000000
" VERTICAL KV= .000000

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTAN VCU T
.496	.417	.507	.072	.010	.000	.000	20.7
.993	.433	1.034	.287	.087	.000	.000	21.6
1.489	.450	1.582	.646	.301	.000	.000	22.6
1.986	.466	2.150	1.148	.725	.762	.161	23.5
2.482	.483	2.739	1.794	1.430	2.632	.205	24.5
2.979	.499	3.348	2.584	2.485	5.532	.251	25.5
3.475	.516	3.978	3.517	3.963	9.617	.298	26.4

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTAN VCU T
.496	.417	.507	.108	.016	.000	.000	20.7
.993	.433	1.034	.431	.134	.000	.000	21.6
1.489	.450	1.582	.969	.462	.237	.079	22.6
1.986	.466	2.150	1.723	1.106	1.420	.108	23.5
2.482	.483	2.739	2.692	2.172	3.473	.137	24.5

2.979	.499	3.348	3.876	3.768	6.561	.167	25.52
3.475	.516	3.978	5.275	6.000	10.839	.199	26.48

CALCULO DE LA ZAPATA =====

MAYORANDO TODOS LOS ESFUERZOS -----

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA=	4.866 T
" " " " NORMALES " " "	= 13.396 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO	= 1.514
MOMENTO DE VUELCO	= 6.830 MT
MOMENTO DE ESTABILIDAD	= 13.197 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO	= 1.932
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA	= 4.866 T
" " " " NORMALES " " "	= 14.673 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA=	5.262 MT
LONGITUD TOTAL DE LA ZAPATA	= 1.750 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA =	.359 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA	=	1.549 M
TENSION EN EL VERTICE DELANTERO	=	18.942 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR) -----

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANT VCU T
.262	.600	.000	4.144	.560	1.541	.000	34.21

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR) -----

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANT VCU T
.350	.600	.000	3.530	.746	2.053	.000	34.2
.700	.600	.000	5.148	2.309	6.386	.000	34.2
1.050	.600	.000	5.236	4.171	11.603	.000	34.2

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA=	7.299 T
" " " " NORMALES " " "	= 13.711 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO	= 1.033
MOMENTO DE VUELCO	= 10.245 MT
MOMENTO DE ESTABILIDAD	= 13.748 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO	= 1.342
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA	= 7.299 T
" " " " NORMALES " " "	= 14.988 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA=	8.401 MT
LONGITUD TOTAL DE LA ZAPATA	= 1.750 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA =	.561 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA	=	.943 M
TENSION EN EL VERTICE DELANTERO	=	31.774 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR) -----

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANT VCU T
.262	.600	.000	6.767	.935	1.715	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR) -----

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANT VCU T
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.350	.600	.000	3.666	.753	1.380	.000	34.2
.700	.600	.000	6.671	2.563	4.716	.000	34.2
1.050	.600	.000	8.647	5.338	9.881	.000	34.2

CALCULO DE ALETAS P.F. 568+94

PJ-568+955

Terreno 1008,50

Cota superior aletas.

MT-1

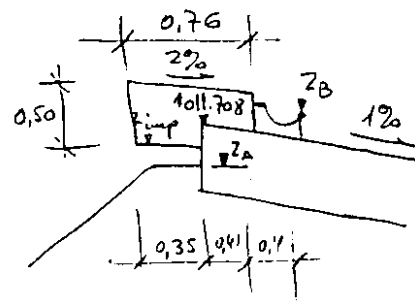
$\gamma_{roz} = 0,55$

(A₁) y (A₂)

$$z_{imp} = 1011,708 - 0,41 \times 0,01 + 0,3 + 0,76 \times 0,02 - 0,5 = 1011,519$$

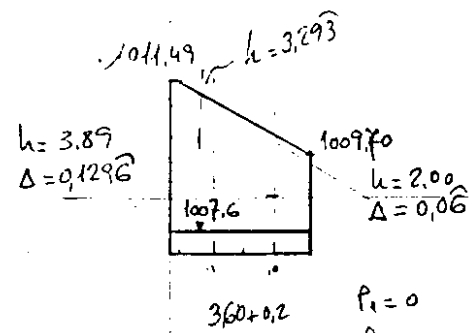
$$z_{A \nabla Aleta} = 1011,519 - 0,029 = 1011,490$$

$$z_B = 1011,708 - 0,81 \times 0,01 + 0,17 = 1011,870$$

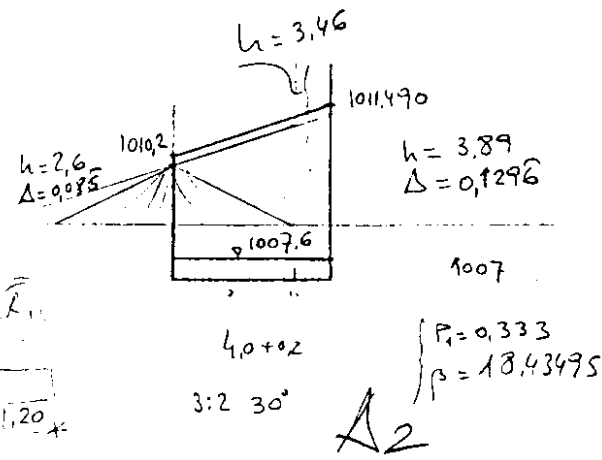
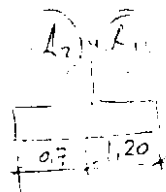
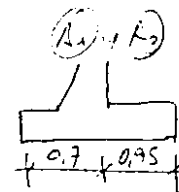


ALETAS A1 y A3 DEL PASO INFERIOR 568+955 (MT-1)

0.4	0.0	3.2933	0.	0.	0.
0.	0.033333	0.	0.		
0.1902	0.6	0.6	1.65	0.55	
0.	0.				
2500.	0.07	2250.	0.06	2.5	2.0
1					
1.5	35.000	0.	0.	0.	1.1
0.0	0.	0.	0.	0	



A1



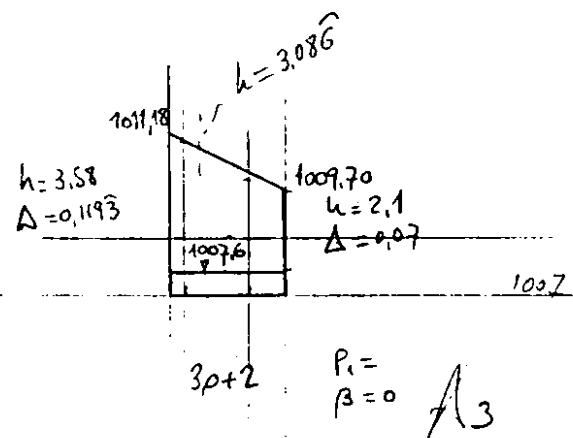
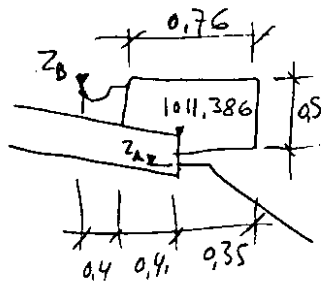
A2

(A₃) y (A₄)

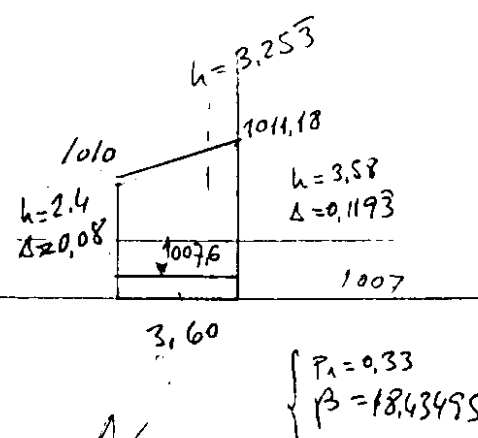
$$z_{imp} = 1011,386 + 0,41 \times 0,01 + 0,3 + 0,76 \times 0,02 - 0,5 = 1011,205$$

$$z_{A \nabla} = 1011,205 - 0,025 = 1011,180$$

$$z_B = 1011,386 + 0,81 \times 0,01 + 0,17 = 1011,564$$



A3



A4

[illegible]

PENDIENTE DEL TALUD DE TIERRAS	=	.00000000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333300
" " " SUPERIOR DEL TRASDOS	=	.00000000
" " " INFERIOR " "	=	.00000000

VUELO DELANTERO	=	.190	M
ESPOSOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.600	M
" " " " " " DCHO	=	.600	M
LONGITUD TOTAL DE LA ZAPATA	=	1.650	M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000	

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	=	.07000 M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	=	2250.00 T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	=	.06000 M
PESO ESPECIFICO DEL HORMIGON	=	2.50000 T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	=	2.00000 T/M3

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 ' ,
SOBRECARGA UMR SOBRE EL RELLENO	=	.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T
COF. MINORACION DE CARGAS FAVORABLES PARA LA COMPROBACION DE LAS ESTABILIDADES	=	1.100

—

ZONA DEL RELLENO. COMPONENTE	HORIZONTAL	KH=	.270990
"	VERTICAL	KV=	.000000
ZONA VERTICAL DEL MURO. COMP	HORIZONTAL	KH=	.270990
"	VERTICAL	KV=	.000000
ZONA INCLINADA SUPERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000
ZONA INCLINADA INFERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	NECESARIA COMPRES T	CORTA. VCU T
.470	.416	.480	.060	.008	.000	.000	20.
.941	.431	.978	.240	.068	.000	.000	21.
1.411	.447	1.494	.540	.237	.000	.000	22.
1.882	.463	2.029	.960	.571	.321	.152	23.
2.352	.478	2.583	1.500	1.127	1.739	.194	24.
2.823	.494	3.155	2.159	1.960	3.977	.237	25.
3.293	.510	3.745	2.939	3.128	7.161	.281	26.

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTA VCU T
.470	.416	.480	.090	.012	.000	.000	20.0
.941	.431	.978	.360	.105	.000	.000	21.5
1.411	.447	1.494	.810	.364	.047	.075	22.5
1.882	.463	2.029	1.440	.872	.942	.101	23.5
2.352	.478	2.583	2.249	1.715	2.532	.129	24.5

2.823	.494	3.155	3.239	2.976	4.948	.158	25.21
3.293	.510	3.745	4.409	4.741	8.314	.187	26.13

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA=	4.108 T
" " " " NORMALES " " "	= 11.343 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO	= 1.519
MOMENTO DE VUELCO	= 5.331 MT
MOMENTO DE ESTABILIDAD	= 10.145 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO	= 1.903
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA	= 4.108 T
" " " " NORMALES " " "	= 12.478 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA=	4.465 MT
LONGITUD TOTAL DE LA ZAPATA	= 1.650 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA =	.358 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA	=	1.402 M
TENSION EN EL VERTICE DELANTERO	=	17.806 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.267	.600	.000	3.897	.540	1.484	.000	34.21

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.475	.600	.000	3.515	.888	2.444	.000	34.1
.950	.600	.000	4.556	2.918	8.086	.000	34.1

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA=	6.161 T
" " " " NORMALES " " "	= 11.343 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO	= 1.013

MOMENTO DE VUELCO	= 7.996 MT
MOMENTO DE ESTABILIDAD	= 10.145 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO	= 1.269

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA	= 6.161 T
" " " " NORMALES " " "	= 12.478 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA=	7.130 MT
LONGITUD TOTAL DE LA ZAPATA	= 1.650 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA =	.571 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR INADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA	=	.761 M
TENSION EN EL VERTICE DELANTERO	=	32.807 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.267	.600	.000	6.815	.977	1.791	.000	34.2

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
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.475	.600	.000	3.841	.912	1.673	.000	34.21
.950	.600	.000	7.603	3.648	6.728	.000	34.21

ALETAS A2 y A4 DEL PASO INFERIOR 568+955 (MT-1)					
0.4	0.0	3.46	0.	0.	0.
0.333	0.033333	0.	0.		
0.1902	0.6	0.6	1.9	0.55	
0.	0.				
2500.	0.07	2250.	0.06	2.5	2.0
1					
1.5	35.000	0.	0.	0.	1.1
18.43495	0.	0.	0.	0	

Make sure other names were added

PENDIENTE DEL TALUD DE TIERRAS	=	.33300000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333300
" " " SUPERIOR DEL TRASDOS	=	.00000000
" " " INFERIOR " "	=	.00000000

VUELO DELANTERO	=	.190 M
ESPESOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.600 M
" " " " " " " DCHO	=	.600 M
LONGITUD TOTAL DE LA ZAPATA	=	1.900 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	=	.07000 M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	=	2250.00 T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	=	.06000 M
PESO ESPECIFICO DEL HORMIGON	=	2.50000 T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	=	2.00000 T/M3

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 '°
SOBRECARGA UMR SOBRE EL RELLENO	=	.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T
COF. MINORACION DE CARGAS FAVORABLES PARA LA COMPROBACION DE LAS ESTABILIDADES	=	1.100

ZONA DEL RELLENO. COMPONENTE	HORIZONTAL	KH=	.296389
"	VERTICAL	KV=	.098796
ZONA VERTICAL DEL MURO. COMP	HORIZONTAL	KH=	.334958
"	VERTICAL	KV=	.000000
ZONA INCLINADA SUPERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000
ZONA INCLINADA INFERIOR.COMP	HORIZONTAL	KH=	.000000
"	VERTICAL	KV=	.000000

.....

PROFUND	CANTO	ESFUERZOS	CARACTERISTICOS	ARMAD. NECESARIA	CORTA		
SECCION	SECCION	AXIL	CORTANTE	MOMENTO	TRACCION COMPRES	VCU	
M	M	T	T	MT	T	T	
.494	.416	.504	.082	.011	.000	.000	20.0
.989	.433	1.029	.327	.100	.000	.000	21.0
1.483	.449	1.574	.737	.345	.000	.000	22.0
1.977	.466	2.140	1.309	.829	1.147	.161	23.0
2.471	.482	2.726	2.046	1.631	3.358	.204	24.0
2.966	.499	3.332	2.946	2.833	6.749	.250	25.0
3.460	.515	3.959	4.010	4.515	11.505	.297	26.0

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTAN VCU T
.494	.416	.504	.123	.018	.000	.000	20.7
.989	.433	1.029	.491	.153	.000	.000	21.6
1.483	.449	1.574	1.105	.527	.405	.079	22.6
1.977	.466	2.140	1.964	1.260	1.801	.107	23.5
2.471	.482	2.726	3.069	2.474	4.193	.136	24.5

2.966	.499	3.332	4.419	4.289	7.771	.167	25.495
3.460	.515	3.959	6.015	6.828	12.717	.198	26.451

CALCULO DE LA ZAPATA =====

MAYORANDO TODOS LOS ESFUERZOS -----

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA=	5.890 T
" " " " NORMALES " " "	= 16.099 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO	= 1.503
MOMENTO DE VUELCO	= 8.752 MT
MOMENTO DE ESTABILIDAD	= 18.341 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO	= 2.096
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA	= 5.890 T
" " " " NORMALES " " "	= 17.513 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA=	5.587 MT
LONGITUD TOTAL DE LA ZAPATA	= 1.900 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA =	.319 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA	= 1.893 M
TENSION EN EL VERTICE DELANTERO	= 18.503 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR) -----

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANT VCU T
.267	.600	.000	4.199	.577	1.587	.000	34.21

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR) -----

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANT VCU T
.398	.600	.000	4.832	1.408	3.882	.000	34.
.796	.600	.000	6.046	3.628	10.076	.000	34.
1.194	.600	.000	5.605	6.003	16.796	.000	34.

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA ZAPATA QUE A CONTINUACION SE DEFINEN, SE CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA=	8.835 T
" " " " NORMALES " " "	= 17.081 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO	= 1.063
MOMENTO DE VUELCO	= 13.127 MT
MOMENTO DE ESTABILIDAD	= 20.206 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO	= 1.539
RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA	= 8.835 T
" " " " NORMALES " " "	= 18.495 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA=	9.030 MT
LONGITUD TOTAL DE LA ZAPATA	= 1.900 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA =	.488 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA	= 1.385 M
TENSION EN EL VERTICE DELANTERO	= 26.703 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR) -----

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANT VCU T
.267	.600	.000	6.052	.840	1.541	.000	34.

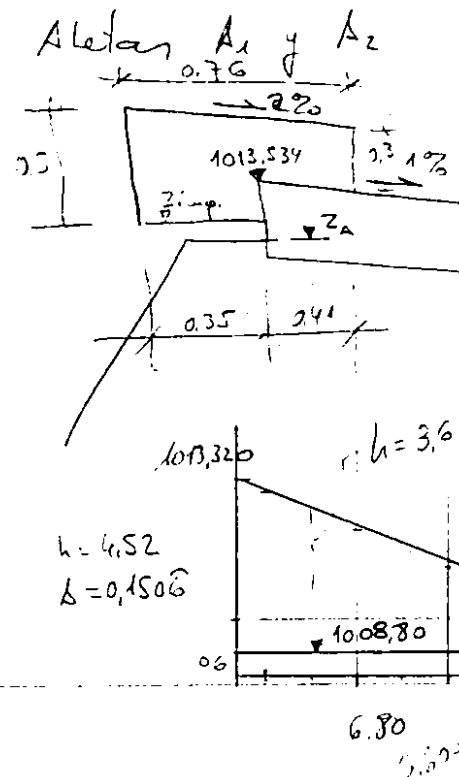
ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR) -----

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANT VCU T
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.398	.600	.000	5.580	1.505	2.764	.000	34.2
.796	.600	.000	8.327	4.357	8.049	.000	34.2
1.194	.600	.000	8.043	7.721	14.364	.000	34.2

CALCULO DE ALETAS P.F. 570+84

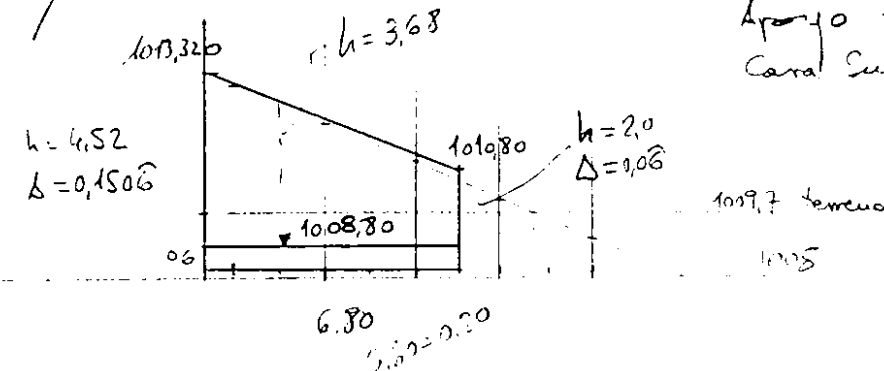
taludes 2:1 / 2:1
MT-1 $\gamma_{\text{roz}} = 0,55$



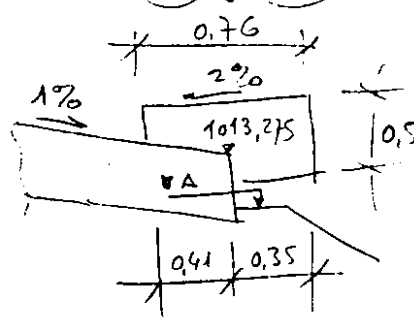
$$Z_{impota} = 1013,534 - 0,41 \times 0,01 + 0,3 + 0,76 \times 0,02 - 0,5 = 1013,345 \text{ m}$$

$$\nabla Z_A = 1013,345 - 0,025 = 1013,32$$

Elev terreno	≈ 1009.70
Aproyo zapata	1008,20
Cara Sup. zap.	1008,80



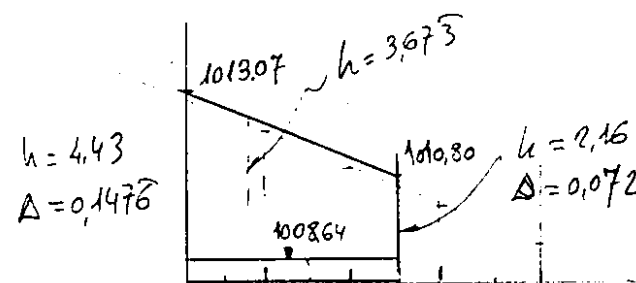
Aletas (A_3) y (A_4)



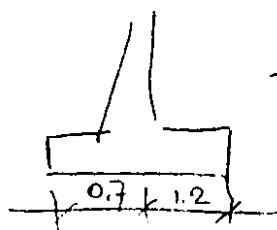
$$Z_{imp} = 1013,275 + 941 \times 0,01 + 0,3 + 0,76 \times 0,02 - 0,5 = 1013,094$$

$$\nabla A = 1013,094 - 0,024 = 1013,070$$

Elevar terreno a	1009,54
Apoyo zapata	1008,04
Cara Sup. "	1008,64



1908



DIMENSIONES GEOMETRICAS DEL MURO

ANCHO DE LA CORONACION	=	.400 M
PROFUNDIDAD DEL PARAMENTO VERTICAL DEL INTRADOS	=	.000 M
" " " " " TRASDOS	=	3.680 M
PROFUNDIDAD DE LOS PARAMENTOS INCLINADOS EN EL TRASDOS		
	ZONA SUPERIOR =	.000 M
	ZONA INFERIOR =	.000 M
PROFUNDIDAD DEL TALUD DE TIERRAS EN EL TRASDOS	=	.000 M

PENDIENTE DEL TALUD DE TIERRAS	=	.25000000
" DE LA ZONA INFERIOR DEL INTRADOS	=	.03333300
" " " SUPERIOR DEL TRASDOS	=	.00000000
" " " INFERIOR " "	=	.00000000

VUELO DELANTERO	=	.177 M
ESPEJOR DE LA ZAPATA EN EL EXTREMO IZQDO	=	.600 M
" " " " " " " DCHO	=	.600 M
LONGITUD TOTAL DE LA ZAPATA	=	1.900 M
COEFICIENTE DE ROZAMIENTO ZAPATA-TERRENO	=	.55000000

SITUACION DE LA CARGA CONCENTRADA EXTERIOR. DISTANCIA=.000 M
PROFUNDIDAD=.000 M

RESISTENCIA CARACTERISTICA DEL HORMIGON DE LA ZAPATA=	2500.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DE LA ZAPATA	= .07000	M
RESISTENCIA CARACTERISTICA DEL HORMIGON DEL ALZADO	= 2250.00	T/M2
RECUBRIMIENTO DE LAS ARMADURAS DEL ALZADO	= .06000	M
PESO ESPECIFICO DEL HORMIGON	= 2.50000	T/M3
PESO ESPECIFICO DE LAS TIERRAS DEL RELLENO	= 2.00000	T/M3

HIPOTESIS = 1

COEFICIENTE DE MAYORACION DE CARGAS	=	1.500
ANGULO DE ROZAMIENTO INTERNO DEL RELLENO	=	35.000000 '°
SOBRECARGA UMR SOBRE EL RELLENO	=	.000 T/M2
COMPONENTE HORIZONTAL DE LA FUERZA CONCENTRADA	=	.000 T
" VERTICAL " " " "	=	.000 T
COF. MINORACION DE CARGAS FAVORABLES PARA LA COMPROBACION DE LAS ESTABILIDADES	=	1.100

ANGULOS DE ROZAMIENTO DEL RELLENO CON EL TRASDOS
 EN LA ZONA VERTICAL = .000000 '
 " " " INCLINADA SUPERIOR = .000000 '
 " " " " INFERIOR = .000000 '
 DEL RELLENO CONSIGO MISMO = 14.036240 '

COEFICIENTES DE EMPUJE

ZONA DEL RELLENO. COMPONENTE HORIZONTAL KH= .284496
 " VERTICAL KV= .071124
 ZONA VERTICAL DEL MURO. COMP HORIZONTAL KH= .314825
 " VERTICAL KV= .000000
 ZONA INCLINADA SUPERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000
 ZONA INCLINADA INFERIOR.COMP HORIZONTAL KH= .000000
 " VERTICAL KV= .000000

ESFUERZOS Y ARMADURAS DEL ALZADO DEL ESTRIBO (TRASDOS)

MAYORANDO TODAS LAS ACCIONES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.460	.415	.469	.067	.008	.000	.000	20.643
.920	.431	.955	.266	.074	.000	.000	21.534
1.380	.446	1.459	.600	.259	.000	.000	22.425
1.840	.461	1.981	1.066	.624	.564	.149	23.315
2.300	.477	2.520	1.665	1.230	2.176	.189	24.206
2.760	.492	3.077	2.398	2.138	4.692	.231	25.097
3.220	.507	3.652	3.264	3.409	8.252	.274	25.988
3.680	.523	4.244	4.263	5.105	12.990	.318	26.878

MAYORANDO SOLO LAS ACCIONES HORIZONTALES

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS MAYORADOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.460	.415	.469	.100	.014	.000	.000	20.643
.920	.431	.955	.400	.115	.000	.000	21.534
1.380	.446	1.459	.899	.397	.154	.073	22.425
1.840	.461	1.981	1.599	.951	1.169	.099	23.315

2.300	.477	2.520	2.498	1.868	2.948	.126	24.206
2.760	.492	3.077	3.597	3.241	5.637	.154	25.097
3.220	.507	3.652	4.896	5.161	9.372	.183	25.988
3.680	.523	4.244	6.395	7.720	14.289	.212	26.878

CALCULO DE LA ZAPATA

MAYORANDO TODOS LOS ESFUERZOS

LOS ESFUERZOS Y TENSIONES QUE A CONTINUACION
 SE CALCULAN, SE DETERMINAN CON LAS CARGAS CARACTERISTICAS
 LAS ARMADURAS DE LA ZAPATA SE CALCULAN MAYORANDO
 TODAS LAS ACCIONES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 5.968 T
 " " " " NORMALES " " " = 16.298 T
 COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.502

MOMENTO DE VUELCO = 9.111 MT
 MOMENTO DE ESTABILIDAD = 18.030 MT
 COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.979

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 5.968 T
 " " " " NORMALES " " " = 17.778 T
 MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 6.450 MT
 LONGITUD TOTAL DE LA ZAPATA = 1.900 M
 EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
 CENTRO DE LA ZAPATA = .363 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 1.762 M
 TENSION EN EL VERTICE DELANTERO = 20.185 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS CARACTERISTICOS AXIL T	CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.256	.600	.000	4.403	.579	1.592	.000	34.206

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	CARACTERISTICOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.400	.600	.000	4.844	1.314	3.623	.000	34.21
.800	.600	.000	6.392	3.625	10.068	.000	34.21
1.200	.600	.000	6.027	6.173	17.282	.000	34.21

SECCION M	SECCION M	AXIL T	CORTANTE T	MOMENTO MT	TRACCION T	COMPRES T	VCU T
.400	.600	.000	5.236	1.348	2.475	.000	34.
.800	.600	.000	8.810	4.176	7.711	.000	34.
1.200	.600	.000	9.400	7.962	14.820	.000	34.

LOS ESFUERZOS, TENSIONES Y ARMADURAS DE LA
ZAPATA QUE A CONTINUACION SE DEFINEN, SE
CALCULAN MAYORANDO UNICAMENTE LAS ACCIONES HORIZONTALES

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA= 8.952 T
" " " " NORMALES " " " = 17.044 T
COEFICIENTE DE ESTABILIDAD AL DESLIZAMIENTO = 1.047

MOMENTO DE VUELCO = 13.666 MT
MOMENTO DE ESTABILIDAD = 19.448 MT
COEFICIENTE DE ESTABILIDAD AL VUELCO = 1.423

RESULTANTE DE LAS FUERZAS TANGENTES A LA ZAPATA = 8.952 T
" " " " NORMALES " " " = 18.524 T
MOMENTO RESULTANTE RESPECTO DEL CENTRO DE LA ZAPATA= 10.297 MT
LONGITUD TOTAL DE LA ZAPATA = 1.900 M
EXCENTRICIDAD DE LA RESULTANTE RESPECTO DEL
CENTRO DE LA ZAPATA = .556 M

EL DIAGRAMA DE PRESIONES SOBRE EL TERRENO ES TRIANGULAR ADMISIBLE

LONGITUD DE LA ZONA COMPRIMIDA = 1.182 M
TENSION EN EL VERTICE DELANTERO = 31.333 T/M2

ARMADURA DEL VUELO DELANTERO DE LA ZAPATA (INFERIOR)

PROFUND SECCION M	CANTO SECCION M	ESFUERZOS AXIL T	MAYORADOS CORTANTE T	MOMENTO MT	ARMAD. NECESARIA TRACCION T	COMPRES T	CORTANTE VCU T
.256	.600	.000	6.762	.901	1.653	.000	34.21

ARMADURA DEL VUELO TRASERO DE LA ZAPATA (SUPERIOR)

PROFUND	CANTO	ESFUERZOS	MAYORADOS	ARMAD. NECESARIA	CORTANTE
---------	-------	-----------	-----------	------------------	----------

ALETAS DEL PASO INFERIOR 570+840 (MT-1)					
0.4	0.0	3.68	0.	0.	0.
0.25	0.033333	0.	0.		
0.1773	0.6	0.6	1.9	0.55	
0.	0.				
2500.	0.07	2250.	0.06	2.5	2.0
1					
1.5	35.000	0.	0.	0.	1.1
14.03624	0.	0.	0.	0	

5. Proceso constructivo

5. PROCESO CONSTRUCTIVO

Dentro del presente proyecto existen los siguientes tipos estructurales

- a) Pasos Superiores
- b) Pasos Inferiores
- c) Viaducto
- d) Pasos de Fauna

PASOS SUPERIORES

La tipología y el método constructivo de estas estructuras (10 uds) es igual, en todas ellas cambiando únicamente las dimensiones del tablero.

En el documento N°2 Planos, se pueden apreciar estas características.

Resumen del proceso constructivo

- Zapatas de estribos y pilas
- Alzados de estribos y pilas
- Colocación de cimbra para losa
- Encofrado de losas (Barcos)
- Colocación de ferralla para losas y hormigonado
- Espaldones de estribos
- Aceras, barandillas, acabados, etc

PASOS INFERIORES

Dentro de estas estructuras se pueden distinguir:

- a) Con elementos Prefabricados (4 uds)
- b) Pasos inferiores con Vigas Artesa (1 ud)

Resumen del proceso constructivo

a) Con elementos Prefabricados

- Excavación de zanja
- Hormigonado de la losa inferior, situando los marcos. Igual en Aletas
- Encofrado perdido de la losa superior
- Ferralla y hormigonado de la losa superior
- Aletas

b) Pasos inferiores con vigas artesas

- Zapatas, estribos y aletas
- Alzados de estribos y aletas
- Lanzamiento de dos vigas artesas prefabricadas
- Encofrado perdido de la losa de compresión
- Ferralla y hormigonado de la losa de compresión
- Aletas, muro guarda balasto, barandillas, aceras, canaletas, etc

VIADUCTO

En esta obra existe un único viaducto.

Resumen del proceso constructivo

- Zapatas de estribos, aletas y pilas
- Alzados de estribos, aletas y pilas
- Cimbra
- Encofrado de losa mediante barco
- Ferralla, aligeramiento de losa y vainas para tendones de post-tensado y hormigonado de losa
- Espaldones de estribos
- Post-tensado de la losa
- Cierre de galería de servicio
- Aceras, canaletas, muro guarda-balasto, barandilla, acabados, etc.

PASOS DE FAUNA

Existen siete pasos de fauna

Resumen del proceso constructivo

- Excavación y extendido de hormigón de limpieza
- Muros prefabricados
- Zapatas de aletas
- Alzados de aletas

6. Control de calidad

6. CONTROL DE CALIDAD

ÍNDICE

- 6.1 VIADUCTO
- 6.2 PASOS SUPERIORES
- 6.3 PASOS INFERIORES
- 6.4 PASOS PARA UNGULADOS

UNIDAD DE OBRA:	VIADUCTO		
LOCALIZACION:	556+110	FECHA FEBRERO - 00	
OBSERVACIONES:	COMPROBACION ARRANQUE ZAPATA ALETAS		
			3100

Pto.		Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	497.718,880	497.718,891	-0,011	
	Y	4.508.315,370	4.508.315,400	-0,030	
	Z				
2	X	497.724,254	497.724,307	-0,053	
	Y	4.508.313,783	4.508.313,768	0,015	
	Z				
3	X	497.729,691	497.729,704	-0,013	
	Y	4.508.312,381	4.508.312,307	0,074	
	Z				
4	X	497.735,000	497.735,017	-0,017	
	Y	4.508.310,600	4.508.310,655	-0,055	
	Z				
5	X	497.737,956	497.738,009	-0,053	
	Y	4.508.308,347	4.508.308,383	-0,036	
	Z				
6	X	497.747,226	497.747,249	-0,023	
	Y	4.508.297,856	4.508.297,871	-0,015	
	Z				
7	X				
	Y				
	Z				
8	X				
	Y				
	Z				

ESTRIBO 1. ALETAS

Notas: Se considera la ejecución como apta.

UNIDAD DE OBRA:	VIADUCTO		
LOCALIZACION:	556+110	FECHA FEBRERO - 00	
OBSERVACIONES:	COMPROBACION ARRANQUE PILA 1		
			3100

Pto.		Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	497.746,456	497.746,510	-0,054	
	Y	4.508.312,190	4.508.312,171	0,019	
	Z				
2	X	497.752,063	497.752,069	-0,006	
	Y	4.508.305,802	4.508.305,773	0,029	
	Z				
3	X				
	Y				
	Z				
4	X				
	Y				
	Z				
5	X				
	Y				
	Z				
6	X				
	Y				
	Z				
7	X				
	Y				
	Z				
8	X				
	Y				
	Z				

PILA 1

Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: VIADUCTO
 LOCALIZACION: 556+110 FECHA FEBRERO - 00
 OBSERVACIONES: COMPROBACION ARRANQUE PILA 2

3100

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X 497.771,415	497.771,438	-0,023	
	Y 4.508.322,790	4.508.322,824	-0,034	
	Z			
2	X 497.765,808	497.765,835	-0,027	
	Y 4.508.329,177	4.508.329,120	0,057	
	Z			
3	X 497.770,693	497.770,761	-0,068	
	Y 4.508.333,465	4.508.333,422	0,043	
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 2

Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: VIADUCTO
 LOCALIZACION: 556+110 FECHA FEBRERO - 00
 OBSERVACIONES: COMPROBACION ARRANQUE ESTRIBO 2

3100

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X 497.773,616	497.773,622	-0,006	
	Y 4.508.340,327	4.508.340,272	0,055	
	Z			
2	X 497.781,254	497.781,267	-0,013	
	Y 4.508.336,971	4.508.336,962	0,009	
	Z			
3	X 497.783,476	497.783,516	-0,040	
	Y 4.508.329,023	4.508.329,052	-0,029	
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 2

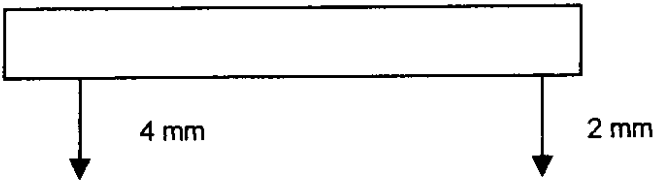
Notas: Se considera la ejecución como apta.

UNIDAD DE OBRA: VIADUCTO
LOCALIZACION: 556+110 FECHA MARZO - 00
OBSERVACIONES: COMPROBACION VERTICALIDAD E-1

3100

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 1



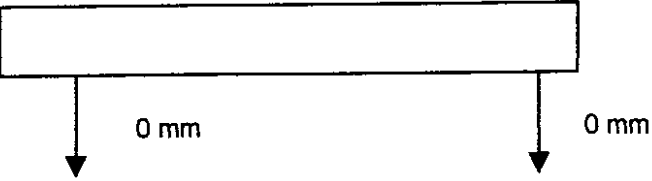
Notas: Se considera la ejecución como apta.

UNIDAD DE OBRA: VIADUCTO
LOCALIZACION: 556+110 FECHA MARZO - 00
OBSERVACIONES: COMPROBACION VERTICALIDAD P-2

3100

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

P-2

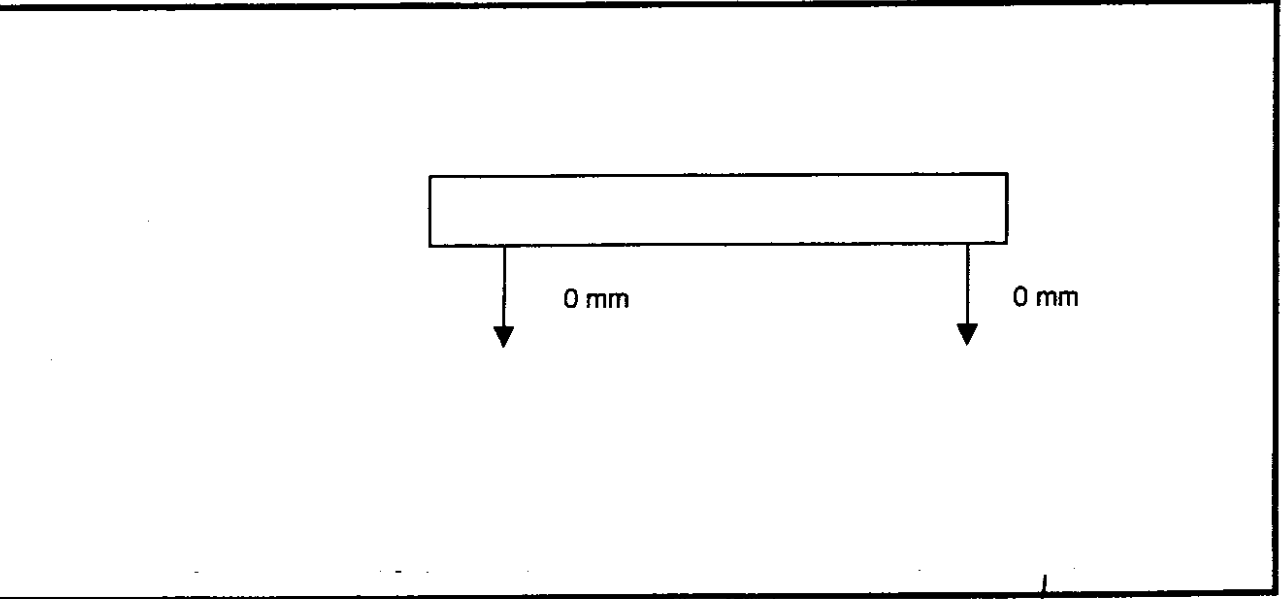


Notas: Se considera la ejecución como apta.

UNIDAD DE OBRA:	VIADUCTO		
LOCALIZACION:	556+110	FECHA	ABRIL - 00
OBSERVACIONES:	COMPROBACION VERTICALIDAD P-1		
	(despues de hormigonar)		3100

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

P-1

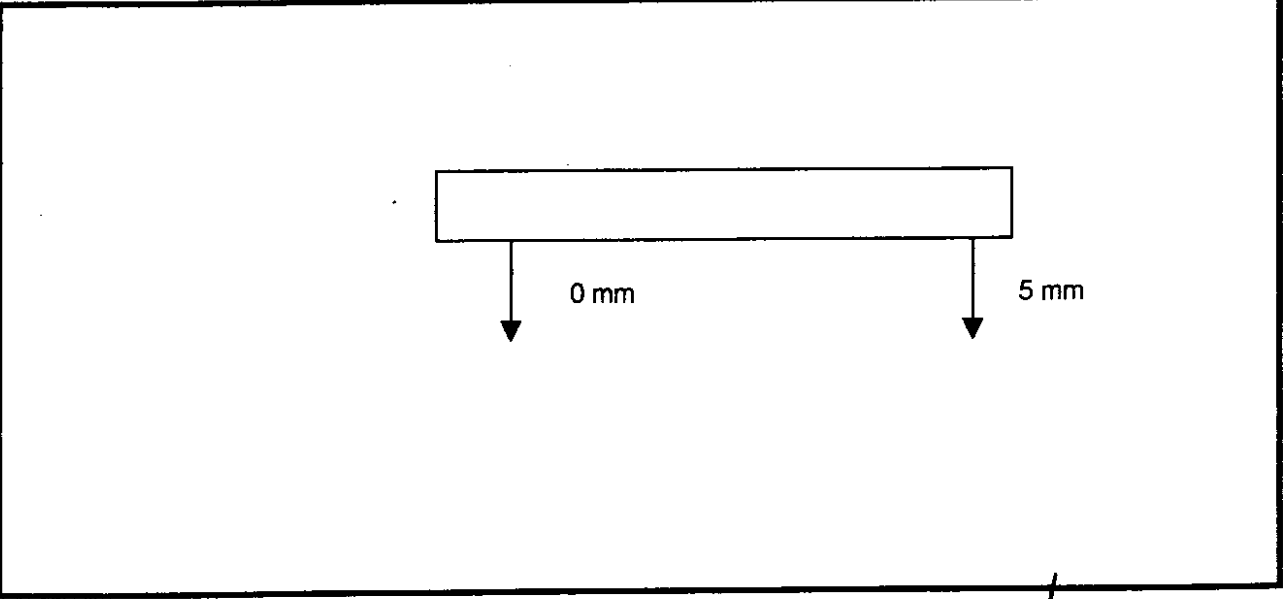


Notas: Se considera la ejecución como apta.

UNIDAD DE OBRA:	VIADUCTO		
LOCALIZACION:	556+110	FECHA	ABRIL - 00
OBSERVACIONES:	COMPROBACION VERTICALIDAD P-1		
			3100

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

P-1

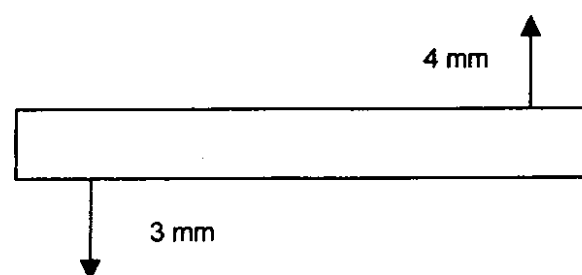


Notas: Se considera la ejecución como apta.

UNIDAD DE OBRA: VIADUCTO
 LOCALIZACION: 556+110 FECHA ABRIL - 00
 OBSERVACIONES: COMPROBACION VERTICALIDAD E-2
 (despues de hormigonar) 3100

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

E-2

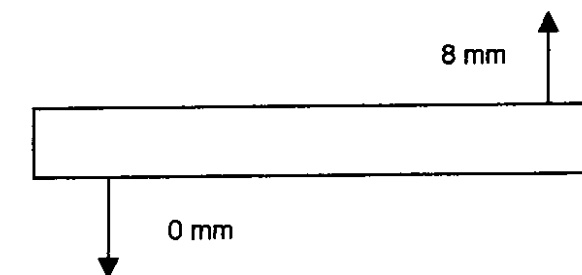


Notas: Se considera la ejecución como apta.

UNIDAD DE OBRA: VIADUCTO
 LOCALIZACION: 556+110 FECHA ABRIL - 00
 OBSERVACIONES: COMPROBACION VERTICALIDAD E-2
 3100

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

E-2



Notas: Se considera la ejecución como apta.

PUNTO	NIVELADAS		COTA OBSERVADA	COTA OBSERVADA 2ª	COTA PROYECTO	DIFERENCIA
	ATRÁS	ADELANTE				
BR-3031						
	DISTANCIAS	LADO ZARAGOZA				
1	2,55		960,570			
2	4,50		960,580			
3	6,60		960,570			
4	8,60		960,580			
5	10,60		960,580			
6	12,60		960,580			
7	14,60		960,590			
8	16,60		960,600			
9	18,60		960,620			
10	20,60		960,630			
11	22,60		960,630			
12	24,60		960,640			
13	26,60		960,640			
14	28,60		960,650			
15	30,60		960,660			
16	32,60		960,660			
17	37,60		960,690			
18	39,60		960,690			
19	41,60		960,690			
20	43,60		960,700			
21	45,60		960,710			
22	49,60		960,730			
23	51,60		960,740			
	DISTANCIAS	LADO MADRID				
1	2,55		960,560			
2	4,50		960,560			
3	6,60		960,580			
4	8,60		960,580			
5	10,60		960,580			
6	12,60		960,590			
7	14,60		960,600			
8	16,60		960,610			
9	18,60		960,630			
10	20,60		960,620			
11	22,60		960,630			
12	24,60		960,630			
13	26,60		960,640			
14	28,60		960,650			
15	30,60		960,650			
16	32,60		960,660			
17	37,60		960,690			
18	39,60		960,680			
19	41,60		960,690			
20	43,60		960,700			
21	45,60		960,700			
22	49,60		960,720			
23	51,60		960,740			



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0235

Nº DE REGISTRO:0235

TAMAÑO ÁRIDO:40 MIM

ELEMENTOS:Zapata Aleta Izquierda E-1, Viaducto 556+1.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:M-2835-VY

HORA SALIDA:12:55

ESTADO TIEMPO:Soleado

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:

INCIDENCIAS:

SERIE:119

TIPO:H-250

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:8 051

HORA TOMA:13:15

TEMPERATURA:16 °C

FECHA TOMA:15/02/00

REALIZADO:Vicente

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
607	22/02/00	7	47,5	268,8
608	22/02/00	7	46,6	263,7
MEDIA				266
609	14/03/00	28	58,0	328,2
610	14/03/00	28	58,2	329,3
611	14/03/00	28	56,5	319,7
MEDIA				326

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0237

Nº DE REGISTRO:0237

TAMAÑO ÁRIDO:40 MIM

ELEMENTOS:Zapata Aleta Derecha E-1, Viaducto 556+1.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:M-2835-VY

HORA SALIDA:16:15

ESTADO TIEMPO:Nublado

CONO ABRAMS:8 cm

CONDICIONES DE COLOCACIÓN:

INCIDENCIAS:

SERIE:119 Bis

TIPO:H-250

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:8.065

HORA TOMA:16:35

TEMPERATURA:10 °C

FECHA TOMA:16/02/00

REALIZADO:Vicente

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
607	23/02/00	7	53,6	303,3
608	23/02/00	7	54,2	306,7
MEDIA				305
609	15/03/00	28	70,8	400,7
610	15/03/00	28	69,6	393,9
611	15/03/00	28	68,8	389,3
MEDIA				395

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 Prensa utilizada: CME-120

175



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162.
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0233

Nº DE REGISTRO: 0233 SERIE: 117 FECHA TOMA: 15/02/00
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Vicente
ELEMENTOS: Zapata Aleta Izquierda E-1, Viaducto 556+1.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-H Nº ALBARÁN: 8.046
HORA SALIDA: 9:35 HORA TOMA: 10:00
ESTADO TIEMPO: Soleado TEMPERATURA: 10 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN:
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
597	22/02/00	7	46,9	265,4
598	22/02/00	7	48,1	272,2
MEDIA				269
599	14/03/00	28	59,8	338,4
600	14/03/00	28	59,4	336,1
601	14/03/00	28	60,5	342,4
MEDIA				339

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y retrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0234

Nº DE REGISTRO: 0234 SERIE: 118 FECHA TOMA: 15/02/00
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Vicente
ELEMENTOS: Zapata Aleta Izquierda E-1, Viaducto 556+1.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-H Nº ALBARÁN: 8.043
HORA SALIDA: 11:25 HORA TOMA: 11.40
ESTADO TIEMPO: Soleado TEMPERATURA: 14 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN:
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
602	22/02/00	7	46,5	263,1
603	22/02/00	7	47,0	266,0
MEDIA				265
604	14/03/00	28	60,2	340,7
605	14/03/00	28	62,8	355,4
606	14/03/00	28	61,3	346,9
MEDIA				348

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y retrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
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C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0238

Nº DE REGISTRO: 0238
TAMAÑO ÁRIDO: 40 MIM
SÉRIE: 120
FECHA TOMA: 16/02/00
TIPO: H-250
REALIZADO: Vicente
ELEMENTOS: Zapata Aleta Derecha E-1, Viaducto 556+1.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L
CAMIÓN: M-2835-VY
HORA SALIDA: 17:20
ESTADO TIEMPO: Nublado
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
612	23/02/00	7	48,5	274,5
613	23/02/00	7	47,9	271,1
MEDIA				273
614	15/03/00	28	60,5	342,4
615	15/03/00	28	59,5	338,7
616	15/03/00	28	61,9	350,3
MEDIA				343

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
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C/ Bodegón del Ciego, s/n Teléfono 949322162
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0247

Nº DE REGISTRO: 0247
TAMAÑO ÁRIDO: 40 MIM
SÉRIE: 123
FECHA TOMA: 22/02/00
TIPO: H-250
REALIZADO: Vicente
ELEMENTOS: Zapata E-1 Viaducto 556+1
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L
CAMIÓN: GU-6623-F
HORA SALIDA: 9:40
ESTADO TIEMPO: Soleado
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
627	29/02/00	7	48,6	275,0
628	29/02/00	7	47,2	267,1
MEDIA				271
629	21/03/00	28	64,6	365,6
630	21/03/00	28	62,1	351,4
631	21/02/00	28	66,2	374,6
MEDIA				364

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCION: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0248

Nº DE REGISTRO

0248

SERIE:

124

FECHA TOMA

22/02/00

TAMAÑO ÁRIDO:

40 MIM

TIPO:

H-250

REALIZADO:

Vicente

ELEMENTOS:

Zapata E-1 Viaducto 556+1

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR

Planta valdemorillo S.L

TIPO DE CEMENTO.

II/AP 42,5R

CAMIÓN:

GU-6623-F

Nº ALBARÁN

8.097

HORA SALIDA

11:20

HORA TOMA:

11:40

ESTADO TIEMPO.

Soleado

TEMPERATURA

9 °C

CONO ABRAMS

8 cm

CONDICIONES DE COLOCACIÓN:

Vertido Directo

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
632	29/02/00	7	48,9	276,7
633	29/02/00	7	48,5	274,5
MEDIA				276
634	21/03/00	28	62,0	350,9
635	21/03/00	28	60,0	342,9
636	21/03/00	28	61,2	346,3
MEDIA				347

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCION: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0249

Nº DE REGISTRO

0249

SERIE:

125

FECHA TOMA

22/02/00

TAMAÑO ÁRIDO:

40 MIM

TIPO:

H-250

REALIZADO:

Vicente

ELEMENTOS:

Zapata E-1 Viaducto 556+1

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:

Planta valdemorillo S.L

TIPO DE CEMENTO.

II/AP 42,5R

CAMIÓN

GU-7187-H

Nº ALBARAN

8.102

HORA SALIDA

12:35

HORA TOMA

12:50

ESTADO TIEMPO

Soleado

TEMPERATURA

11 °C

CONO ABRAMS:

9 cm

CONDICIONES DE COLOCACIÓN:

Vertido Directo

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
637	29/02/00	7	45,1	255,2
638	29/02/00	7	43,8	247,9
MEDIA				252
639	21/03/00	28	57,4	324,8
640	21/03/00	28	59,4	336,1
641	21/03/00	28	61,6	348,6
MEDIA				337

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
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C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0250

Nº DE REGISTRO: 025 SERIE: 126 FECHA TOMA: 22/02/00
TAMAÑO ARIDO: 40 MIM TIPO: H-250 REALIZADO: Vicente
ELEMENTOS: Zapata E-1 Viaducto 556+1
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2835-VY Nº ALBARÁN: 8.115
HORA SALIDA: 15:30 HORA TOMA: 15:50
ESTADO TIEMPO: Nublado TEMPERATURA: 10 °C
CONO ABRAMS 7 cm
CONDICIONES DE COLOCACIÓN Vertido Directo
INCIDENCIAS

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
642	29/02/00	7	53,1	300,5
643	29/02/00	7	52,2	295,4
MEDIA				298
644	21/03/00	28	68,7	388,8
645	21/03/00	28	69,7	394,4
646	21/03/00	28	68,5	387,6
MEDIA				390

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0251

Nº DE REGISTRO: 0251 SERIE: 127 FECHA TOMA: 23/02/00
TAMAÑO ARIDO: 40 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata, E-2 Viaducto 556+1.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: SO-9966-F Nº ALBARÁN: 8.128
HORA SALIDA: 9:50 HORA TOMA: 10:05
ESTADO TIEMPO: Soleado TEMPERATURA: 12 °C
COND ABRAMS 10 cm
CONDICIONES DE COLOCACION: Vertido Directo
INCIDENCIAS

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
647	1/03/00	7	38,4	217,3
648	1/03/00	7	39,6	224,1
MEDIA				221
649	22/03/00	28	60,4	341,8
650	22/03/00	28	63,4	358,8
651	22/03/00	28	59,6	337,3
MEDIA				346

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0252

Nº DE REGISTRO: 0252 SERIE: 128 FECHA TOMA: 23/02/00
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata, E-2 Viaducto 556+1.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-M Nº ALBARÁN: 8.130
HORA SALIDA: 10:15 HORA TOMA: 10:30
ESTADO TIEMPO: Soleado TEMPERATURA: 12 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
652	1/03/00	7	45,2	255,8
653	1/03/00	7	46,0	260,3
MEDIA				258
654	22/03/00	28	56,6	320,3
655	22/03/00	28	58,7	332,2
656	22/03/00	28	56,2	318,0
MEDIA				324

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0253

Nº DE REGISTRO: 0253 SERIE: 129 FECHA TOMA: 23/02/00
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata, E-2 Viaducto 556+1.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: III/AP 42,5R
CAMIÓN: M-2835-VY Nº ALBARÁN: 8.141
HORA SALIDA: 12:30 HORA TOMA: 12:50
ESTADO TIEMPO: Nublado TEMPERATURA: 11 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
657	1/03/00	7	44,9	254,1
658	1/03/00	7	45,2	255,8
MEDIA				255
659	22/03/00	28	63,1	357,1
660	22/03/00	28	63,0	356,5
661	22/03/00	28	60,1	340,1
MEDIA				351

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO 0254

Nº DE REGISTRO: 0254 SERIE 130 FECHA TOMA 23/02/00
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata, E-2 Viaducto 556+1.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2835-VY Nº ALBARÁN 8.145
HORA SALIDA: 13:15 HORA TOMA: 13:35
ESTADO TIEMPO: Nublado TEMPERATURA 11 °C
CONO ABRAMS 8 cm
CONDICIONES DE COLOCACIÓN Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
662	1/03/00	7	49,0	277,3
663	1/03/00	7	51,0	288,6
MEDIA				283
664	22/03/00	28	67,5	382,0
665	22/03/00	28	68,2	385,9
666	22/03/00	28	68,7	388,8
MEDIA				386

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO 0255

Nº DE REGISTRO: 0255 SERIE 131 FECHA TOMA 23/02/00
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata, E-2 Viaducto 556+1.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2835-VY Nº ALBARÁN 7.761
HORA SALIDA: 16:30 HORA TOMA: 16:45
ESTADO TIEMPO: Nublado TEMPERATURA: 12 °C
CONO ABRAMS 7 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS: Lleva Anticongelante.

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
667	1/03/00	7	56,4	319,2
668	1/03/00	7	56,7	320,9
MEDIA				320
669	22/03/00	28	70,9	401,2
670	22/03/00	28	71,2	402,9
671	22/03/00	28	69,3	392,2
MEDIA				399

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0256

Nº DE REGISTRO: 0256
TAMAÑO ÁRIDO: 40 MIM
SÉRIE: 132
FECHA TOMA: 23/02/00
TIPO: H-250
REALIZADO: Jesús
ELEMENTOS: Zapata, E-2 Viaducto 556+1.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L.
CAMIÓN: M-2835-VY
HORA SALIDA: 17:25
ESTADO TIEMPO: Nublado
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS: Lleva Anticongelante.

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
672	1/03/00	7	56,5	319,7
673	1/03/00	7	54,7	309,5
MEDIA				315
674	22/03/00	28	68,5	387,7
675	22/03/00	28	71,6	405,2
676	22/03/00	28	69,6	393,9
MEDIA				396

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0259

Nº DE REGISTRO: 0259
TAMAÑO ÁRIDO: 40 MIM
SÉRIE: 133
FECHA TOMA: 1/03/00
TIPO: H-250
REALIZADO: Jesús
ELEMENTOS: Zapata,P-2 Viaducto 556+1.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L.
CAMIÓN: GU-6623-F
HORA SALIDA: 10:00
ESTADO TIEMPO: Soleado
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
677	8/03/00	7	46,0	260,3
678	8/03/00	7	44,2	250,1
MEDIA				255
679	29/03/00	28	58,5	331,0
680	29/03/00	28	58,0	328,2
681	29/03/00	28	59,1	334,4
MEDIA				331

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162.
19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0260

Nº DE REGISTRO:0260

SERIE:134

FECHA TOMA:1/03/00

TAMAÑO ÁRIDO:40 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:Zapata,P-2 Viaducto 556+1.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L.

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:SO-9966-F

Nº ALBARAN:7.787

HORA SALIDA:11:15

HORA TOMA:11:30

ESTADO TIEMPO:Soleado

TEMPERATURA:10 °C

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido Directo

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
682	8/03/00	7	50,2	284,1
683	8/03/00	7	51,0	288,6
MEDIA				286
684	29/03/00	28	54,1	306,1
685	29/03/00	28	58,8	332,7
686	29/03/00	28	54,3	307,3
MEDIA				315

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0261

Nº DE REGISTRO:0261

SERIE:135

FECHA TOMA:1/03/00

TAMAÑO ÁRIDO:40 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:Zapata,P-1 Viaducto 556+1.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L.

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:GU-7187-H

Nº ALBARAN:7.792

HORA SALIDA:12:45

HORA TOMA:13:05

ESTADO TIEMPO:Soleado

TEMPERATURA:12 °C

CONO ABRAMS:9 cm

CONDICIONES DE COLOCACIÓN:Vertido Directo

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
687	8/03/00	7	50,3	284,6
688	8/03/00	7	50,6	286,3
MEDIA				285
689	29/03/00	28	61,7	349,2
690	29/03/00	28	60,0	339,5
691	29/03/00	28	61,8	349,7
MEDIA				346

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCION: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0262

Nº DE REGISTRO

0262

SERIE:

136

FECHA TOMA:

1/03/00

TAMAÑO ÁRIDO:

40 MIM

TIPO:

H-250

REALIZADO:

Jesús

ELEMENTOS:

Zapata,P-1 Viaducto 556+1.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:

Planta valdemorillo S.L

TIPO DE CEMENTO:

II/AP 42,5R

CAMIÓN:

SO-9966-F

Nº ALBARÁN:

7.808

HORA SALIDA:

16:30

HORA TOMA:

16.50

ESTADO TIEMPO:

Soleado

TEMPERATURA:

13 °C

CONO ABRAMS:

8 cm

CONDICIONES DE COLOCACIÓN:

Vertido Directo

INCIDENCIAS:

ROTURAS

Nº PROBETA

FECHA ROTURA

EDAD

CARGA

RESISTENCIA

692

8/03/00

7

48,9

276,7

693

8/03/00

7

48,2

278,4

MEDIA

278

694

29/03/00

28

64,9

367,3

695

29/03/00

28

63,4

358,8

696

29/03/00

28

69,3

392,2

MEDIA

373

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCION: Miguel Angel, Nº 21

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0271

Nº DE REGISTRO

0271

SERIE

139

FECHA TOMA

15/03/00

TAMAÑO ÁRIDO:

20 MIM

TIPO:

H-250

REALIZADO:

Jesús

ELEMENTOS:

Estribo-1. Viaducto 556+100.

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:

Planta valdemorillo S.L

TIPO DE CEMENTO:

II/AP 42,5R

CAMIÓN

M-7454-JK

Nº ALBARÁN:

7.946

HORA SALIDA:

10:05

HORA TOMA:

10:40

ESTADO TIEMPO:

Soleado

TEMPERATURA:

15 °C

CONO ABRAMS:

9 cm

CONDICIONES DE COLOCACIÓN:

Vertido con Bomba.

INCIDENCIAS:

ROTURAS

Nº PROBETA

FECHA ROTURA

EDAD

CARGA

RESISTENCIA

707

22/03/00

7

46,2

261,4

708

10/03/00

7

46,5

263,1

MEDIA

262

709

12/04/00

28

63,7

360,5

710

12/04/00

28

57,7

326,5

711

12/04/00

28

60,0

339,5

MEDIA

342

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0272

Nº DE REGISTRO: 0272 SERIE: 140 FECHA TOMA: 15/03/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Estribo-1. Viaducto 556+100.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-H Nº ALBARÁN: 7.951
HORA SALIDA: 11:40 HORA TOMA: 11:55
ESTADO TIEMPO: Soleado TEMPERATURA: 16 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
712	22/03/00	7	52,4	296,5
713	22/03/00	7	53,6	303,3
MEDIA				300
714	12/04/00	28	71,0	401,8
715	12/04/00	28	70,7	396,7
716	12/04/00	28	68,0	384,8
MEDIA				394

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162.
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0273

Nº DE REGISTRO: 0273 SERIE: 141 FECHA TOMA: 15/03/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Estribo-1. Viaducto 556+100.
Línea A.V.E. Madrid-Zaragoza Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-7454-JK Nº ALBARÁN: 7.964
HORA SALIDA: 15:25 HORA TOMA: 15:40
ESTADO TIEMPO: Soleado TEMPERATURA: 18 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
717	22/03/00	7	49,0	277,3
718	22/03/00	7	46,0	260,3
MEDIA				269
719	12/04/00	28	61,4	347,3
720	12/04/00	28	58,9	333,3
721	12/04/00	28	63,8	361,0
MEDIA				347

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0274

Nº DE REGISTRO: 0274 SERIE: 142 FECHA TOMA: 15/03/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Estribo-1. Viaducto 556+100.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-H Nº ALBARÁN: 7.969
HORA SALIDA: 16:40 HORA TOMA: 16:55
ESTADO TIEMPO: Soleado TEMPERATURA: 18 °C
CONO ABRAMS: 12 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
722	22/03/00	7	48,3	273,3
723	22/03/00	7	48,6	275,0
MEDIA				274
724	12/04/00	28	60,5	342,4
725	12/04/00	28	58,0	328,2
726	12/04/00	28	62,2	352,0
MEDIA				341

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U.N.E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0275

Nº DE REGISTRO: 0275 SERIE: 143 FECHA TOMA: 15/03/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Estribo-1. Viaducto 556+100.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-H Nº ALBARÁN: 7.972
HORA SALIDA: 17:40 HORA TOMA: 17:55
ESTADO TIEMPO: Soleado TEMPERATURA: 18 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACION: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
727	22/03/00	7	53,6	303,3
728	22/03/00	7	53,1	300,5
MEDIA				302
729	12/04/00	28	66,2	385,9
730	12/04/00	28	69,2	391,6
731	12/04/00	28	69,2	391,6
MEDIA				390

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U.N.E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0281

Nº DE REGISTRO: 0281 SERIE: 149 FECHA TOMA: 20/03/00
TAMAÑO ARIDO 20 MM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Cabecero Estribo-1 Viaducto 556+1.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: SO- 9966-F Nº ALBARÁN: 7.879
HORA SALIDA: 10:20 HORA TOMA: 10:50
ESTADO TIEMPO: Nublado TEMPERATURA: 10 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
757	27/03/00	7	46,3	262,0
758	27/03/00	7	47,2	267,1
MEDIA				265
759	17/04/00	28	62,9	355,9
760	17/04/00	28	57,2	323,9
761	17/04/00	28	61,9	350,3
MEDIA				343

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre.
Método operativo según UNE 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0282

Nº DE REGISTRO: 0282 SERIE: 150 FECHA TOMA: 20/03/00
TAMAÑO ARIDO 20 M.M TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Pilar-2 Viaducto 556+1.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: SO- 9966-F Nº ALBARÁN: 7.883
HORA SALIDA: 13:40 HORA TOMA: 13:50
ESTADO TIEMPO: Nublado TEMPERATURA: 11 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
762	27/03/00	7	50,1	283,5
763	27/03/00	7	51,7	292,6
MEDIA				288
763	17/04/00	28	77,5	438,6
764	17/04/00	28	76,3	431,8
765	17/04/00	28	74,9	423,9
MEDIA				431

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre.
Método operativo según UNE 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0283

Nº DE REGISTRO

0283

SERIE:

151

FECHA TOMA:

20/03/00

TAMAÑO ARIDO:

20 MIM

TIPO:

H-300

REALIZADO:

Jesús

ELEMENTOS:

Pilar-2 Viaducto 556+1

Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:

Planta valdemorillo S.L

TIPO DE CEMENTO:

II/AP 42,5R

CAMIÓN:

GU-7187-H

Nº ALBARÁN:

7.886

HORA SALIDA:

16:20

HORA TOMA:

16:40

ESTADO TIEMPO:

Nublado

TEMPERATURA:

13 °C

CONO ABRAMS:

10 cm

CONDICIONES DE COLOCACIÓN:

Vertido con Bomba.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
767	27/03/00	7	50,1	283,5
768	27/03/00	7	51,7	292,6
MEDIA				288
769	17/04/00	28	69,4	392,7
770	17/04/00	28	70,9	401,2
771	17/04/00	28	67,1	379,7
MEDIA				391

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0288

Nº DE REGISTRO:

0288

SERIE:

152

FECHA TOMA:

28/03/00

TAMAÑO ARIDO:

20 MIM

TIPO:

H-250

REALIZADO:

Jesús

ELEMENTOS:

Aleta M-3, Viaducto 556+1.

Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:

Planta valdemorillo S.L

TIPO DE CEMENTO:

II/AP 42,5R

CAMIÓN:

GU-7187-H

Nº ALBARÁN:

7.896

HORA SALIDA:

16:20

HORA TOMA:

16:35

ESTADO TIEMPO:

Nublado

TEMPERATURA:

8 °C

CONO ABRAMS:

8 cm

CONDICIONES DE COLOCACIÓN:

Vertido con Bomba.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
772	4/04/00	7	36,5	206,5
773	4/04/00	7	35,9	203,2
MEDIA				205
774	25/04/00	28	46,4	262,6
775	25/04/00	28	48,3	273,3
776	25/04/00	28	48,9	276,7
MEDIA				271

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0295

Nº DE REGISTRO: 0295 SERIE: 157 FECHA TOMA: 5/04/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Aleta M-2 Viaducto 556+1
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: III/AP 42,5R
CAMIÓN: GU-7187-H Nº ALBARÁN: 7 927
HORA SALIDA: 11:20 HORA TOMA: 11:45
ESTADO TIEMPO: Nublado TEMPERATURA: 7 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACION: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
797	12/04/00	7	54,0	305,6
798	12/04/00	7	53,3	301,6
MEDIA				304
799	3/05/00	28	67,1	379,1
800	3/05/00	28	68,4	387,1
801	3/05/00	28	67,2	380,3
MEDIA				382

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192.Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0299

Nº DE REGISTRO: 0299 SERIE: 161 FECHA TOMA: 11/04/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Pilar-1 Viaducto 556+1.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: III/AP 42,5R
CAMIÓN: M-7454-IK Nº ALBARÁN: 7.946
HORA SALIDA: 11:30 HORA TOMA: 11:50
ESTADO TIEMPO: Nublado TEMPERATURA: 8 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
817	18/04/00	7	64,9	367,3
818	18/04/00	7	64,4	364,4
MEDIA				366
819	9/05/00	28	70,2	397,3
820	9/05/00	28	69,3	392,2
821	9/05/00	28	68,8	389,4
MEDIA				393

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0300

Nº DE REGISTRO: 0300 SERIE: 162 FECHA TOMA: 11/04/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Pilar-1 Viaducto 556+1.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: SO-9966-K Nº ALBARÁN: 7.947
HORA SALIDA: 12:10 HORA TOMA: 12:50
ESTADO TIEMPO: Nublado TEMPERATURA: 10 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.

INCIDENCIAS

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
822	18/04/00	7	62,0	350,9
823	18/04/00	7	61,4	347,5
MEDIA				349
824	9/05/00	28	65,1	368,4
825	9/05/00	28	66,1	374,1
826	9/05/00	28	64,8	366,7
MEDIA				370

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83 300, 83 301, 83 303, 83 304 Y 83,313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0301

Nº DE REGISTRO: 0301 SERIE: 163 FECHA TOMA: 11/04/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Pila-1 Viaducto 556+1.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-7454-IK Nº ALBARÁN: 9.254
HORA SALIDA: 15:40 HORA TOMA: 16:05
ESTADO TIEMPO: Nublado TEMPERATURA: 12 °C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.

INCIDENCIAS

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
827	18/04/00	7	60,0	339,5
828	18/04/00	7	62,0	350,9
MEDIA				345
829	9/05/00	28	76,9	435,2
830	9/05/00	28	74,8	423,3
831	9/05/00	28	76,8	434,6
MEDIA				431

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83 300, 83 301, 83 303, 83 304 Y 83,313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego. s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0304

Nº DE REGISTRO:0304

TAMAÑO ARIDO:20 MIM

ELEMENTOS:Estribo-2, Viaducto 556+1

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:Z-1581-AK

HORA SALIDA:9:50

ESTADO TIEMPO:Nublado

CONO ABRAMS:8 cm

CONDICIONES DE COLOCACIÓN: Vertido con Bomba.

INCIDENCIAS:

SERIE:164

TIPO:H-250

FECHA TOMA:18/04/00

REALIZADO:Jesús

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:9.271

HORA TOMA:10:15

TEMPERATURA:6 °C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
832	25/04/00	7	49,0	277,3
833	25/04/00	7	50,1	283,5
MEDIA				280
834	16/05/00	28	64,9	367,3
835	16/05/00	28	66,3	375,2
836	16/05/00	28	66,5	376,3
MEDIA				373

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego. s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0305

Nº DE REGISTRO:0305

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Estribo-2, Viaducto 556+1

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:M-2174-LM

HORA SALIDA:11:45

ESTADO TIEMPO:Nublado

CONO ABRAMS:9 cm

CONDICIONES DE COLOCACIÓN: Vertido con Bomba.

INCIDENCIAS:

SERIE:165

TIPO:H-250

FECHA TOMA:18/04/00

REALIZADO:Jesús

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:9.277

HORA TOMA:12:10

TEMPERATURA:5 °C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
837	25/04/00	7	54,6	309,0
838	25/04/00	7	53,1	300,5
MEDIA				305
839	16/05/00	28	68,4	387,1
840	16/05/00	28	68,7	388,8
841	16/05/00	28	69,1	391,0
MEDIA				389

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0306

Nº DE REGISTRO:	0306	SERIE:	166	FECHA TOMA:	18/04/00
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO	Jesús
ELEMENTOS: Estribo-2, Viaducto 556+1 Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	Z-1581-AK	Nº ALBARÁN:	9.284		
HORA SALIDA:	13:05	HORA TOMA:	13:50		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	8 °C		
CONO ABRAMS:	9 cm				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
842	25/04/00	7	48,7	275,6
843	25/04/00	7	48,0	271,6
MEDIA				274
844	16/05/00	28	61,0	345,2
845	16/05/00	28	59,4	336,1
846	16/05/00	28	62,7	354,8
MEDIA				345

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0307

Nº DE REGISTRO	0307	SERIE	167	FECHA TOMA:	18/04/00
TAMAÑO ÁRIDO:	20 MIM	TIPO	H-250	REALIZADO:	Jesús
ELEMENTOS: Estribo-2, Viaducto 556+1 Línea A.V.E. Madrid-Zaragoza Subtramo V-b.					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	Z-3094-AK	Nº ALBARÁN:	9.290		
HORA SALIDA:	14:45	HORA TOMA:	15:30		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	5 °C		
CONO ABRAMS:	10 cm				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
847	25/04/00	7	46,4	262,6
848	25/04/00	7	48,2	272,7
MEDIA				268
849	16/05/00	28	62,0	350,8
850	16/05/00	28	63,8	361,0
851	16/05/00	28	64,2	363,3
MEDIA				358

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0308

Nº DE REGISTRO 0308 SERIE 168 FECHA TOMA 18/04/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Estribo-2, Viaducto 556+1
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: Z-1581-AK Nº ALBARÁN: 9.295
HORA SALIDA: 16:40 HORA TOMA 17:00
ESTADO TIEMPO: Nublado TEMPERATURA: 5 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
852	25/04/00	7	47,1	266,5
853	25/04/00	7	45,3	256,3
MEDIA				261
854	16/05/00	28	63,5	359,3
855	16/05/00	28	66,5	376,3
856	16/05/00	28	65,6	371,2
MEDIA				369

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0309

Nº DE REGISTRO 0309 SERIE 169 FECHA TOMA 18/04/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Estribo-2, Viaducto 556+1
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: Z-3094-AK Nº ALBARÁN: 9.300
HORA SALIDA: 19:30 HORA TOMA 19:45
ESTADO TIEMPO: Nublado TEMPERATURA: 6 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
857	25/04/00	7	39,3	222,4
858	25/04/00	7	43,0	243,3
MEDIA				233
859	16/05/00	28	56,5	319,7
860	16/05/00	28	59,2	335,0
861	16/05/00	28	58,1	328,8
MEDIA				328

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO 0310

Nº DE REGISTRO 0310 SERIE 170 FECHA TOMA 18/04/00
TAMAÑO ÁRIDO 20 MIM TIPO H-250 REALIZADO Jesús
ELEMENTOS: Estribo-2, Viaducto 556+1
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-9937-LV Nº ALBARÁN: 9.301
HORA SALIDA 20:00 HORA TOMA: 20:25
ESTADO TIEMPO Nublado TEMPERATURA: 6 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
862	25/04/00	7	38,2	216,2
863	25/04/00	7	41,5	234,8
MEDIA				226
864	16/05/00	28	54,6	308,9
865	16/05/00	28	53,9	305,0
866	16/05/00	28	54,5	308,4
MEDIA				307

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO 0311

Nº DE REGISTRO 0311 SERIE 171 FECHA TOMA 18/04/00
TAMAÑO ÁRIDO 20 MIM TIPO H-250 REALIZADO Jesús
ELEMENTOS: Estribo-2, Viaducto 556+1
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: Z-3094-AK Nº ALBARÁN: 9.303
HORA SALIDA 20:20 HORA TOMA: 20:50
ESTADO TIEMPO Nublado TEMPERATURA: 6 °C
CONO ABRAMS 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
867	25/04/00	7	38,8	219,6
868	25/04/00	7	36,9	208,8
MEDIA				214
869	16/05/00	28	51,3	290,3
870	16/05/00	28	52,1	294,8
871	16/05/00	28	51,2	289,7
MEDIA				292

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0326

Nº DE REGISTRO: 0326
TAMAÑO ÁRIDO: 20 MIM
SERIE: 183
FECHA TOMA: 11/05/00
TIPO: H-400
REALIZADO: Jesús

ELEMENTOS: Prueba Viaducto 556+1
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L
CAMIÓN: M-2174-LM
HORA SALIDA: 18:20
ESTADO TIEMPO: Nublado
CONO ABRAMS: 6 cm
TIPO DE CEMENTO: II/AP 42,5R
Nº ALBARÁN: 9.390
HORA TOMA: 19:00
TEMPERATURA: 15 °C
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
927	18/05/00	7	56,6	376,9
928	18/05/00	7	57,2	380,3
MEDIA				379
929	8/06/00	28	75,9	429,5
930	8/06/00	28	77,8	440,3
931	8/06/00	28	78,4	443,7
MEDIA				438

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y reftrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0327

Nº DE REGISTRO: 0327
TAMAÑO ÁRIDO: 20 MIM
SERIE: 184
FECHA TOMA: 11/05/00
TIPO: H-400
REALIZADO: Jesús

ELEMENTOS: Prueba Viaducto 556+1
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L
CAMIÓN: M-3708-JV
HORA SALIDA: 18:40
ESTADO TIEMPO: Nublado
CONO ABRAMS: 22 cm
TIPO DE CEMENTO: II/AP 42,5R
Nº ALBARÁN: 9.391
HORA TOMA: 19:30
TEMPERATURA: 15 °C
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
932	18/05/00	7	51,8	293,1
933	18/05/00	7	51,4	290,9
MEDIA				292
934	8/06/00	28	69,7	394,4
935	8/06/00	28	68,0	384,8
936	8/06/00	28	68,9	389,9
MEDIA				390

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y reftrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0387

Nº DE REGISTRO:	0387	SERIE:	203	FECHA TOMA:	25/07/00
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-400	REALIZADO	Jesús
ELEMENTOS:	Losa Viaducto 556+110 Línea A.V.E . Madrid-Zaragoza. Subtramo V-b .				
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	GU-6623-F	Nº ALBARÁN:	8.459		
HORA SALIDA:	8:55	HORA TOMA:	9:15		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	18 °C		
CONO ABRAMS:	13 cm				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba				
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1027	1/08/00	7	53,0	299,9
1028	1/08/00	7	51,1	289,1
MEDIA				295
1029	22/08/00	28	67,5	382,0
1030	22/08/00	28	66,5	376,3
MEDIA				379

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y reftrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0388

Nº DE REGISTRO:	0388	SERIE:	204	FECHA TOMA:	25/07/00
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-400	REALIZADO:	Jesús
ELEMENTOS:					
Losa Viaducto 556+110					
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:		II/AP 42,5R	
CAMIÓN	SO-1950-G	Nº ALBARÁN:		8.463	
HORA SALIDA:	9:45	HORA TOMA:		10:00	
ESTADO TIEMPO:	Nublado	TEMPERATURA:		18 °C	
CONO ABRAMS:	12 cm				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1034	1/08/00	7	54,7	309,5
1035	1/08/00	7	54,7	309,5
MEDIA				310
1036	22/08/00	28	71,5	404,6
1037	22/08/00	28	69,8	395,0
MEDIA				400

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y reftrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0389

Nº DE REGISTRO: 0389 SERIE: 205 FECHA TOMA: 25/07/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-400 REALIZADO: Jesús
ELEMENTOS: Losa Viaducto 556+110
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-1121-EC Nº ALBARÁN: 8.472
HORA SALIDA: 11:25 HORA TOMA: 11:45
ESTADO TIEMPO: Nublado TEMPERATURA: 20 °C
CONO ABRAMS: 13 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1039	1/08/00	7	58,9	333,3
1040	1/08/00	7	60,7	343,5
MEDIA				338
1041	22/08/00	28	74,9	423,9
1042	22/08/00	28	74,5	421,6
1043	22/08/00	28	77,3	437,4
MEDIA				428

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0390

Nº DE REGISTRO: 0390 SERIE: 206 FECHA TOMA: 25/07/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-400 REALIZADO: Jesús
ELEMENTOS: Losa Viaducto 556+110
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-4508-XF Nº ALBARÁN: 8.479
HORA SALIDA: 12:40 HORA TOMA: 13:00
ESTADO TIEMPO: Nublado TEMPERATURA: 22 °C
CONO ABRAMS: 11cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1044	1/08/00	7	59,2	335,0
1045	1/08/00	7	57,6	325,9
MEDIA				330
1046	22/08/00	28	73,1	413,7
1047	22/08/00	28	73,9	418,2
1048	22/08/00	28	70,3	398,0
MEDIA				410

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0391

Nº DE REGISTRO: 0391 SERIE: 207 FECHA TOMA: 25/07/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-400 REALIZADO: Jesús
ELEMENTOS: Losa Viaducto 556+110
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42.5R
CAMIÓN: A-9495-DW Nº ALBARÁN: 8.487
HORA SALIDA: 14:05 HORA TOMA: 14:30
ESTADO TIEMPO: Soleado TEMPERATURA: 20 °C
CONO ABRAMS: 10cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1049	1/08/00	7	58,9	333,3
1050	1/08/00	7	60,6	342,9
MEDIA				338
1051	22/08/00	28	75,8	428,9
1052	22/08/00	28	77,9	440,8
1053	22/08/00	28	77,4	438,1
MEDIA				436

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0392

Nº DE REGISTRO: 0392 SERIE: 208 FECHA TOMA: 25/07/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-400 REALIZADO: Jesús
ELEMENTOS: Losa Viaducto 556+110
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42.5R
CAMIÓN: Z-1581-AK Nº ALBARÁN: 8.495
HORA SALIDA: 15:30 HORA TOMA: 15:55
ESTADO TIEMPO: Nublado TEMPERATURA: 27°C
CONO ABRAMS: 13 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1054	1/08/00	7	62,3	352,5
1055	1/08/00	7	62,6	354,2
MEDIA				353
1056	22/08/00	28	81,9	463,5
1057	22/08/00	28	79,6	450,5
1058	22/08/00	28	81,6	461,8
MEDIA				459

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0393

Nº DE REGISTRO: 0393 SERIE: 209 FECHA TOMA: 25/07/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-400 REALIZADO: Jesús

ELEMENTOS: Losa Viaducto 556+110
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-6623-7 Nº ALBARÁN: 8.500
HORA SALIDA: 16:25 HORA TOMA: 16:50
ESTADO TIEMPO: Soleado TEMPERATURA: 27°C
CONO ABRAMS: 12 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1059	1/08/00	7	63,0	356,3
1060	1/08/00	7	62,2	351,9
MEDIA				354
1061	22/08/00	28	78,9	446,5
1062	22/08/00	28	79,3	448,8
1063	22/08/00	28	76,2	431,2
MEDIA				442

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0394

Nº DE REGISTRO: 0394 SERIE: 210 FECHA TOMA: 25/07/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-400 REALIZADO: Jesús

ELEMENTOS: Losa Viaducto 556+110
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-1121-EC Nº ALBARÁN: 8.514
HORA SALIDA: 18:55 HORA TOMA: 19:20
ESTADO TIEMPO: Soleado TEMPERATURA: 28°C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1066	1/08/00	7	66,8	378,0
1067	1/08/00	7	66,6	376,8
MEDIA				377
1068	22/08/00	28	83,1	470,3
1069	22/08/00	28	84,3	477,1
1070	22/08/00	28	86,4	488,9
MEDIA				479

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120



alder construcciones, s.a.

CONSTRUCTORA
HISPANICA, S.A.

L.A.V. MADRID - BARCELONA - F. FRANCESA
TRAMO: MADRID - ZARAGOZA.
SUBTRAMO V-b
U.T.E. TORIJA

Ctra. N-II Km 75. Area de servicio Maypa (casetas de obra). Torija. Guadalajara.
Tel.: 949-322-173/-174/-182/-183 Fax: 949-322-175

Empresa destino : EUROESTUDIOS,S.A.

A la atención de : Nicolás Machado

Número de fax : 949-322171

Remitente : Andrés Rodríguez Torre

Fecha : 06/07/00

Nº de páginas (incluida portada) : 3

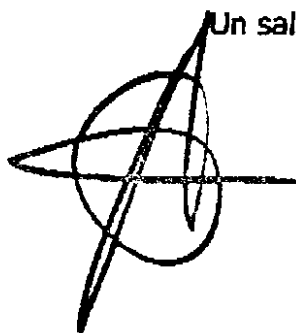
Asunto :

TEXTO

Nicolás, adjunto te envío los certificados de calidad del cable para el postesado del tablero del viaducto que hemos recibido ayer (05/07/00).

Si necesitas alguna aclaración, no dudes en llamarme.

Un saludo



CL 3100703730

Nicolás

06/07/00

[Handwritten signature]

carpentera

557

572

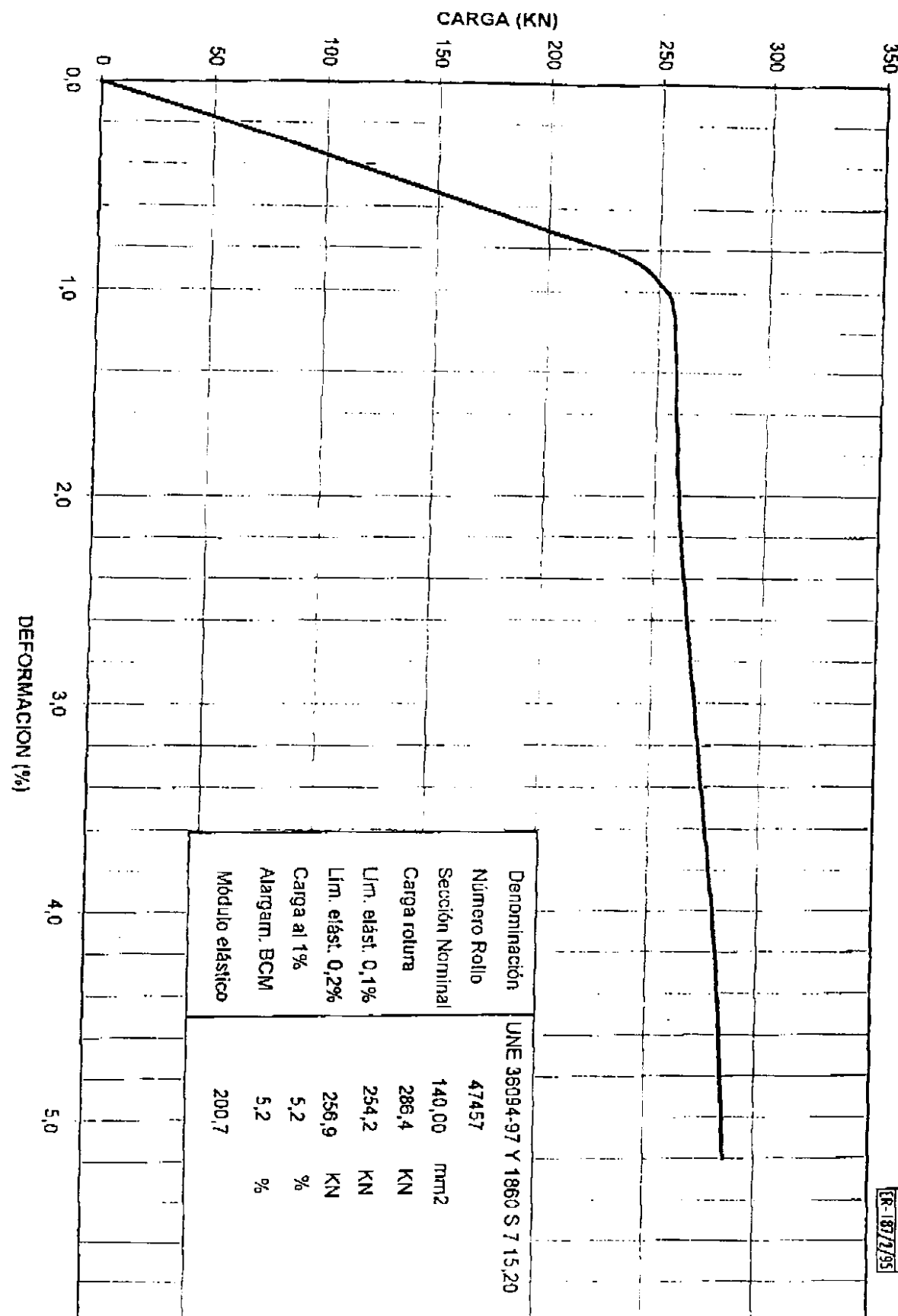
200 04 24

04/07/00

TREFILERÍAS QUIJANO S.A.
LOS CORALES DE BUELNA
CANTABRIA-ESPAÑA



CURVA CARGAS / DEFORMACIONES



Denominación	UNE 36094-97 Y 1860 S 7 15,20
Número Rollo	47457
Sección Nominal	140,00 mm ²
Carga rotura	286,4 KN
Lím. elást. 0,1%	254,2 KN
Lím. elást. 0,2%	256,9 KN
Carga al 1%	5,2 %
Alargam. BCM	5,2 %
Módulo elástico	200,7





Los Corrales de Buelna
Cantabria - España

TREF LERIAS QU JANO S.A.

Laboratorio de ensayos y análisis
CONTROL DE CALIDAD

CERTIFICADO DE ENSAYO DE CORDÓN (1x7+0) PARA PRE-POSTENSADO

CLIENTE TORIJA UTE

Nº PEDIDO

REFERENCIA 15849

SECCIÓN NOM. 140,00 mm²

DENOMINACIÓN UNE 36094-97 Y 1860 S 7 15,20 (BAJA RELAJACION)

Nº CERTIFICADO 808660

PESO NETO 12678 kg

DIÁMETRO NOM. 15,20 mm

ARROLLAM. Derecha

SUPERFICIE Seco

Rollo Nº	Colada Nº	Sección mm ²	Peso g/m	Carga Rotura kN	N/mm ²	Carga 0.01% kN	N/mm ²	Carga 0.1% kN	N/mm ²	Carga 0.2% kN	N/mm ²	Carga Mín. 1% Alargam. kN	N/mm ²	Módulo Elástico kN/mm ²	Alargam. Carga Máx %	Longit. m	Peso Neto kg
Mínimos		140,0	1077,00	260,0				221,0		229,0				181,4	3,50		
Máximos		142,8	1121,00	304,0										208,7			
47456	11482	142,0	1109,50	267,0				241,0		246,5				200,7	5,25	2390	2650
47457	11482	141,8	1107,70	286,4				254,2		256,9				198,6	5,26	2220	2458
47458	11482	142,5	1113,30	286,0				255,7		257,8				198,7	5,24	2200	2452
47459	11482	142,5	1112,90	276,8				242,0		247,1				197,9	5,23	2210	2458
47460	11482	142,5	1113,00	289,2				251,4		254,2				198,7	5,23	2390	2660

COMPOSICIÓN QUÍMICA

Colada Nº	C (%)	Mn (%)	Si (%)	P (%)	S (%)
11482	0,780	0,730	0,261	0,010	0,008

Material fabricado por TYCSA-PSC en Santander.

Este certificado ha sido verificado por nuestro Sistema Informático.

Santander

29-06-2000

TEFADO UNION TABLERO - ESTERZO2 - Producto ST6 + 40

Tipo de tendón $\rightarrow 7 \phi 0.6''$

Sección acero $\rightarrow 140 \text{ mm}^2$

Caract. físicas $\rightarrow 7 \times 140 \rightarrow 980 \text{ mm}^2$

Caract. mecánicas $\rightarrow 980 \times 190 \rightarrow 186.200 \text{ kg}$

Tefado al 70% carga rotura

$$T_A = \frac{186.200 \times 0.7}{980} = 133 \text{ kg/mm}^2$$

Pérdidas pretendidas por rozamiento:

$\mu \rightarrow$ rozamiento en curva = 0.21

$\alpha \rightarrow$ desviación angular = 0.176

$k \rightarrow$ ondulación paralela = 0.0035

$L \rightarrow$ longitud tendón entre anclajes = 3.20 m

$$T_B = T_A \cdot e^{-\mu(\alpha + kL)}$$

$$T_B = 133 \cdot e^{-0.21(0.176 + 0.0035 \times 3.20)} = 127.87 \text{ kg/mm}^2$$

$$\text{slarf.} = \frac{T_A + T_B}{2} \cdot \frac{L}{E} = \left(\frac{133 + 127.87}{2} \right) \times \frac{3.20}{20} = \underline{\underline{20.869 \text{ mm}}}$$

tecypresa s.a.

Hoja n.º

Obra Hacienda Zaragoza Subvenc. I. B

Empresa 2175

Estructura n.º Producto 0.5551

Gato TP-25

Especialista P. Castillo

Central 108

Tendón	Anclaje	Longitud Tendón	Tipo de Tendón	Presión marca inicial	Presión subida y anclaje		Alargamientos		Totales
					Sube a:	Ancla a:	D	I	
N.º	N.º	m.	mm.	Kg/cm.²					mm.
1	2		7 ϕ 0.6		394	394			20
2	11		11		11	11			19
3	11		11		11	11			19
4	11		11		11	11			20
5	11		11		11	11			21
6	11		11		11	11			20
7	11		11		11	11			19
1	11		11		11	11			19
2	11		11		11	11			20
3	11		11		11	11			20
4	11		11		11	11			20
5	11		11		11	11			21
6	11		11		11	11			20
7	11		11		11	11			19

Hoja

P. Castillo

PUNTO	NIVELADAS		PLANO COMPARA.	COTA CALCULADA	COTA PROYECTO	DIFERENCIA
	ATRÁS	ADELANTE				
BR - 10	BR-8					
ZARAGOZA	DISTANCIAS					
1	1,500			964,510	964,508	0,002
2	4,300			964,560	964,564	-0,004
3	7,400			964,630	964,626	0,004
4	11,000			964,690	964,698	-0,008
5	12,800			964,730	964,734	-0,004
6	15,900			964,780	964,796	
7	19,000			964,850	964,858	-0,008
8	22,400			964,930	964,926	0,004
9	25,400			965,000	964,986	
10	29,300			965,080	965,064	
11	33,100			965,170	965,140	
12	36,200			965,210	965,202	0,008
MADRID						
1	1,500			964,500	964,508	-0,008
2	4,300			964,560	964,564	-0,004
3	7,400			964,620	964,626	-0,006
4	11,000			964,700	964,698	0,002
5	12,800			964,730	964,734	-0,004
6	15,900			964,790	964,796	-0,006
7	19,000			964,860	964,858	0,002
8	22,400			964,940	964,926	
9	25,400			965,010	964,986	
10	29,300			965,080	965,064	
11	33,100			965,160	965,140	
12	36,200			965,210	965,202	0,008
ALAS						
ZARAGOZA						
1	1,500					
2	4,300			965,550	965,534	
3	7,400			965,600	965,596	0,004
4	11,000			965,650	965,668	
5	12,800			965,700	965,704	-0,004
6	15,900			965,770	965,766	0,004
7	19,000			965,840	965,828	
8	22,400			965,910	965,896	
9	25,400			965,960	965,956	0,004
10	29,300			966,040	966,034	0,006
11	33,100			966,120	966,110	0,010
12	36,200			966,200	966,172	
13	39,200			966,270	966,232	

E2

E1

L. MADRID L. ZARAGOZA

[illegible]

UNIDAD DE OBRA: PASO SUPERIOR 551+3

LOCALIZACION: 551+300

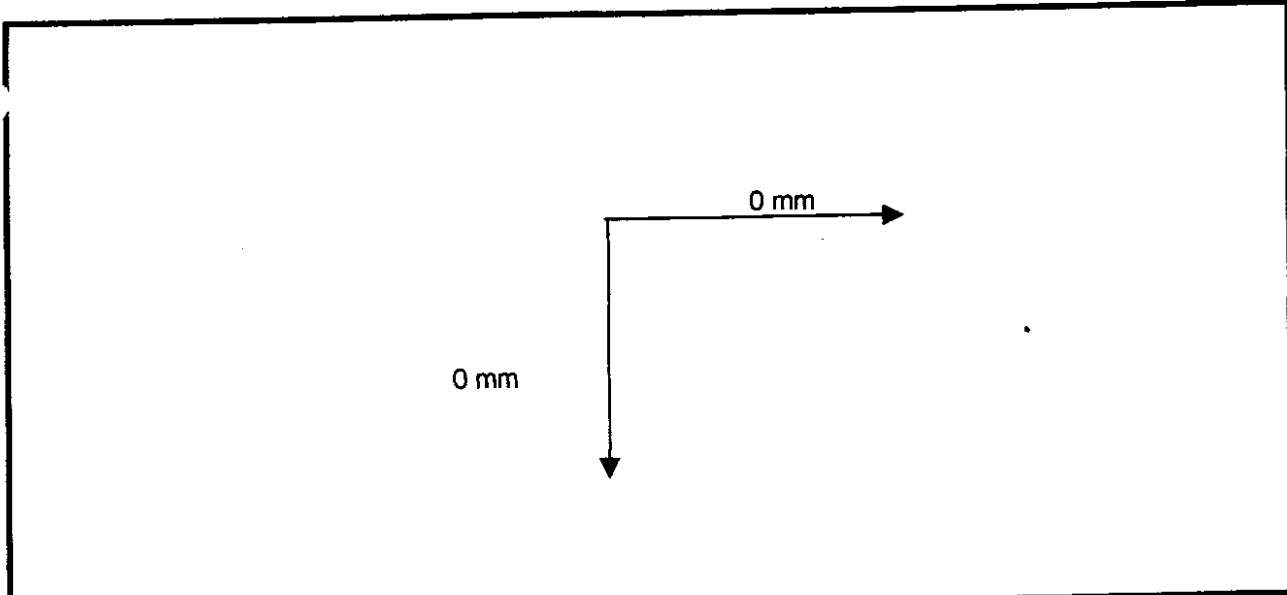
FECHA NOVIEMBRE - 99

OBSERVACIONES: COMPROBACION VERTICALIDAD P/1

3201

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 1



Notas: Se considera la ejecución como apta.

UNIDAD DE OBRA: PASO SUPERIOR 553+2

LOCALIZACION: 553+200

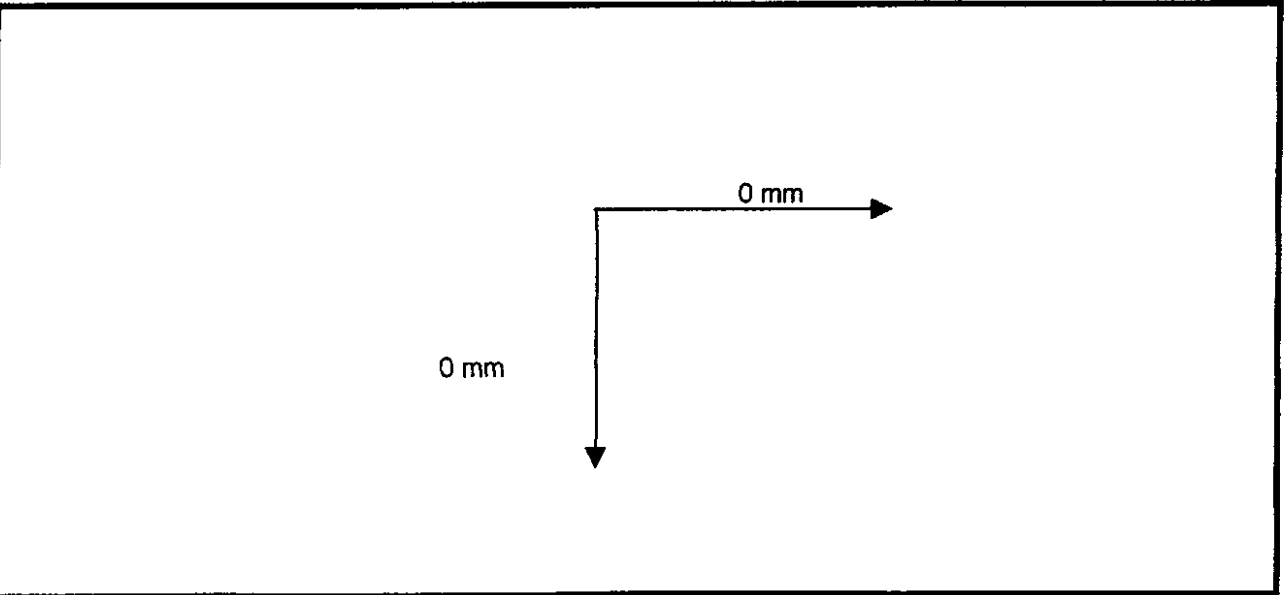
FECHA NOVIEMBRE - 99

OBSERVACIONES: COMPROBACION VERTICALIDAD P/2

3202

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 2



Notas: Se considera la ejecución como apta.

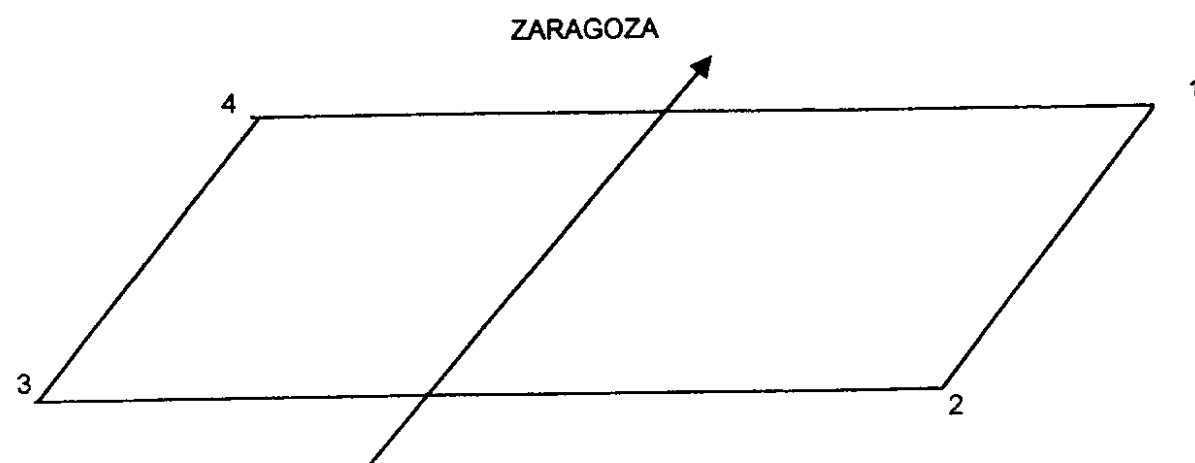
L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 551+3
LOCALIZACION: 551+300
OBSERVACIONES: COMPROBACION ARRANQUE ALZADO ESTRIBO 2

3.201

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	495065,814	495065,855	0,041
	Y	4504468,72	4504468,734	0,014
	Z			
2	X	495068,969	495068,954	-0,015
	Y	4504467,324	4504467,334	0,010
	Z			
3	X	495062,576	495062,601	0,025
	Y	4504461,405	4504461,373	-0,032
	Z			
4	X	495062,9	495062,979	0,079
	Y	4504462,136	4504462,169	0,033
	Z			
5	X	495064,91	495064,927	0,017
	Y	4504461,246	4504461,321	0,075
	Z			
6	X	495065,491	495065,514	0,023
	Y	4504467,989	4504467,945	-0,044
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 1



Notas: Se considera la ejecución como apta.

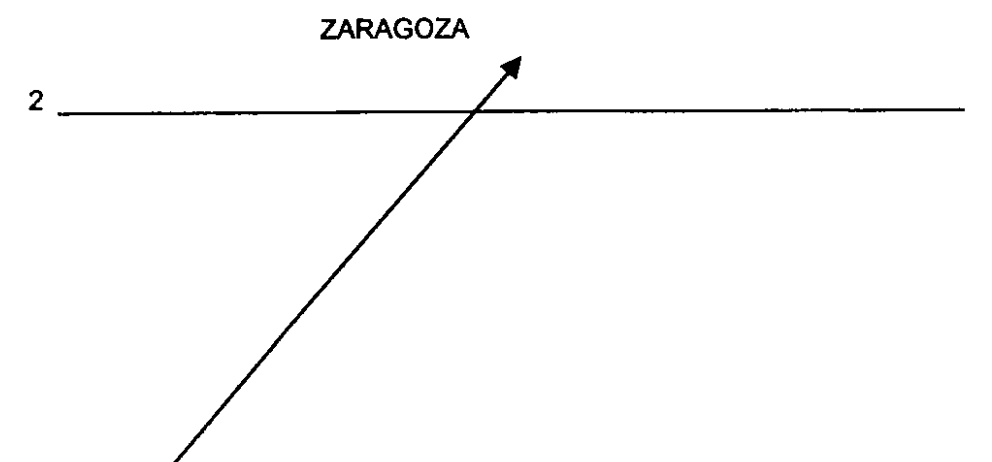
L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 553+2
LOCALIZACION: 553+200
OBSERVACIONES: COMPROBACION COTA DE HIERRO CARGADERO E/1

3.202

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z	971,634	971,642	0,008
2	X			
	Y			
	Z	971,634	971,632	-0,002
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 1



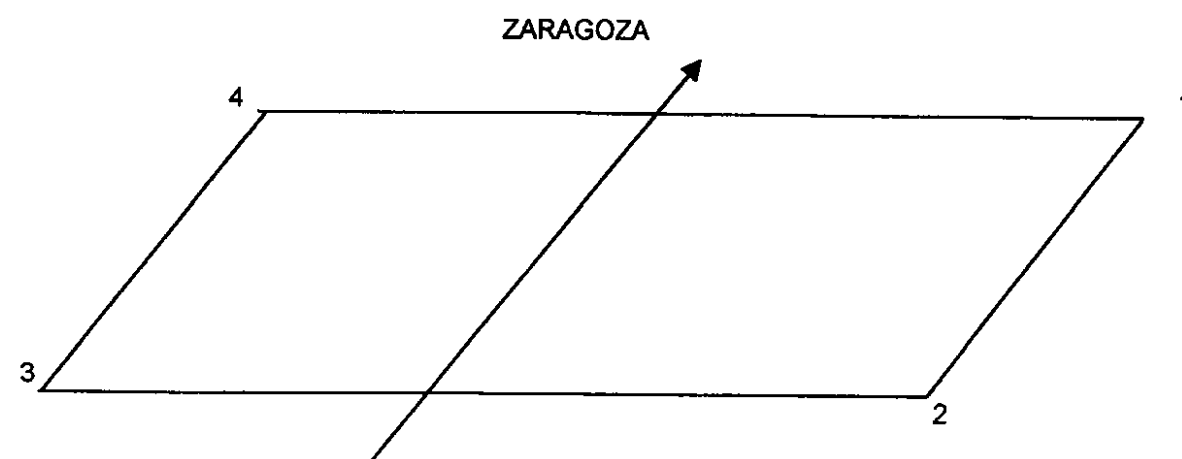
Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 553+2
 LOCALIZACION: 553+200 FECHA AGOSTO - 99
 OBSERVACIONES: COMPROBACION DE REPLANTEO EXCAVACION
 3.202

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	495952,438	495952,059	-0,379
	Y	4506082,771	4506082,760	-0,011
	Z			
2	X	495947,796	495947,641	-0,155
	Y	4506075,063	4506075,235	0,172
	Z			
3	X	495942,649	495942,575	-0,074
	Y	4506078,162	4506078,011	-0,151
	Z			
4	X	495947,298	495946,947	-0,351
	Y	4506085,868	4506085,744	-0,124
	Z			
	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 1



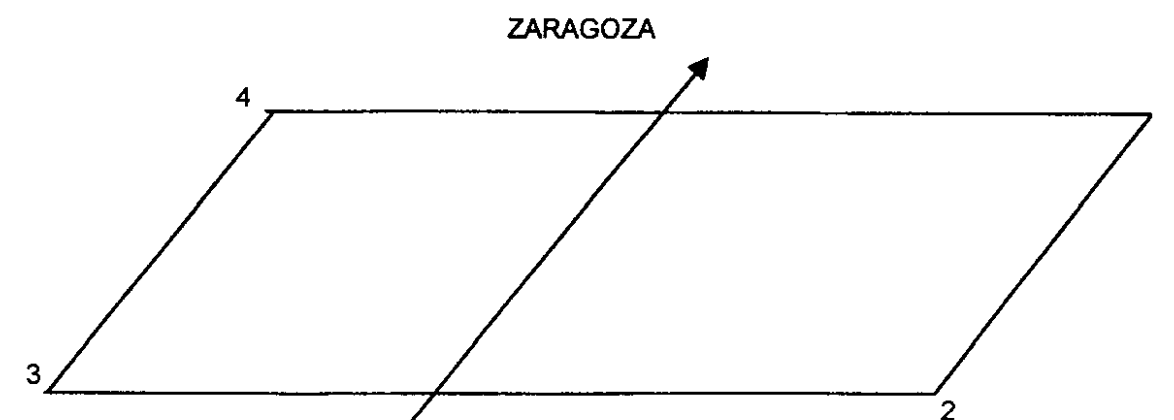
Notas: Estribo excavado

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 553+2
 LOCALIZACION: 553+200 FECHA AGOSTO - 99
 OBSERVACIONES: COMPROBACION DE REPLANTEO EXCAVACION
 3.202

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	495960,444	495960,440	-0,004
	Y	4506075,025	4506075,052	0,027
	Z			
2	X	495958,371	495958,385	0,014
	Y	4506071,601	4506071,606	0,005
	Z			
3	X	495954,948	495954,876	-0,072
	Y	4506073,667	4506073,688	0,021
	Z			
4	X	495957,014	495956,999	-0,015
	Y	4506077,091	4506077,098	0,007
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 1



Notas: Se considera la ejecución como apta.

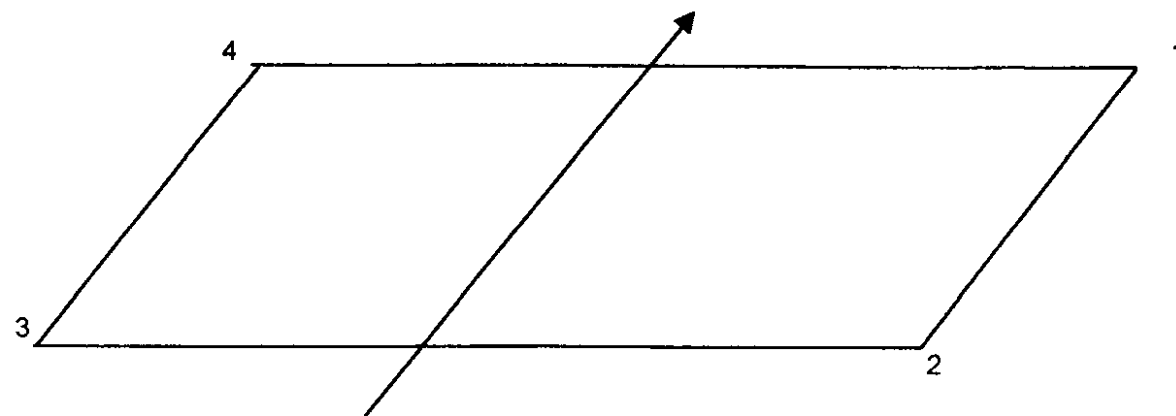
L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 553+2
LOCALIZACION: 553+200 FECHA AGOSTO - 99
OBSERVACIONES: COMPROBACION DE REPLANTEO EXCAVACION
3.202

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	495975,078	495975,051	-0,027
	Y	4506066,196	4506066,191	-0,005
	Z			
2	X	495973,019	495972,94	-0,079
	Y	4506062,772	4506062,759	-0,013
	Z			
3	X	495969,592	495969,557	-0,035
	Y	4506064,837	4506064,844	0,007
	Z			
4	X	495971,658	495971,624	-0,034
	Y	4506068,261	4506068,27	0,009
	Z			
	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 2

ZARAGOZA



Notas: Se considera la ejecución como apta.

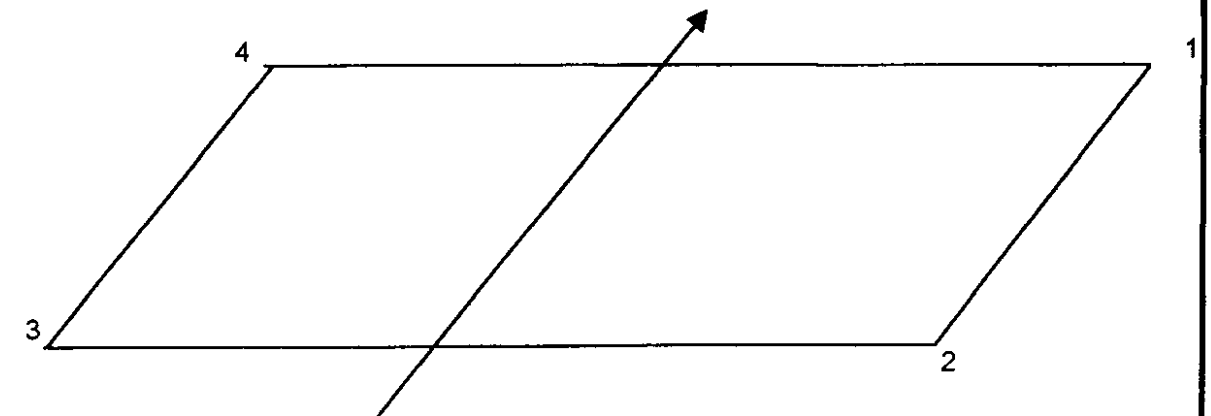
L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 553+2
LOCALIZACION: 553+200 FECHA AGOSTO - 99
OBSERVACIONES: COMPROBACION DE REPLANTEO EXCAVACION
3.202

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	495987,373	495987,516	0,143
	Y	4506061,698	4506061,723	0,025
	Z			
2	X			0
	Y			0
	Z			
3	X	495977,596	495976,79	-0,806
	Y	4506057,096	4506056,922	-0,174
	Z			PUNTO DESPLAZADO
4	X	495982,242	495982,297	0,055
	Y	4506064,798	4506064,891	0,093
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 2

ZARAGOZA



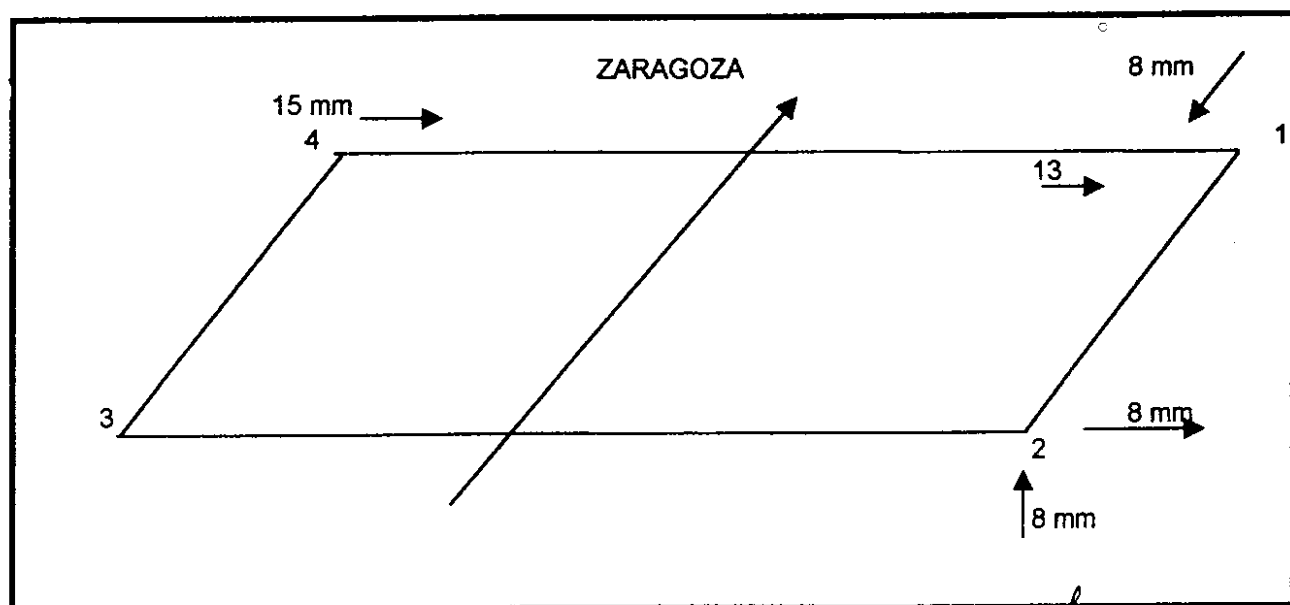
Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTIERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 553+2
 LOCALIZACION: 553+200 FECHA OCTUBRE - 99
 OBSERVACIONES: COMPROBACION VERTICALIDAD E/1
 3.202

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 1



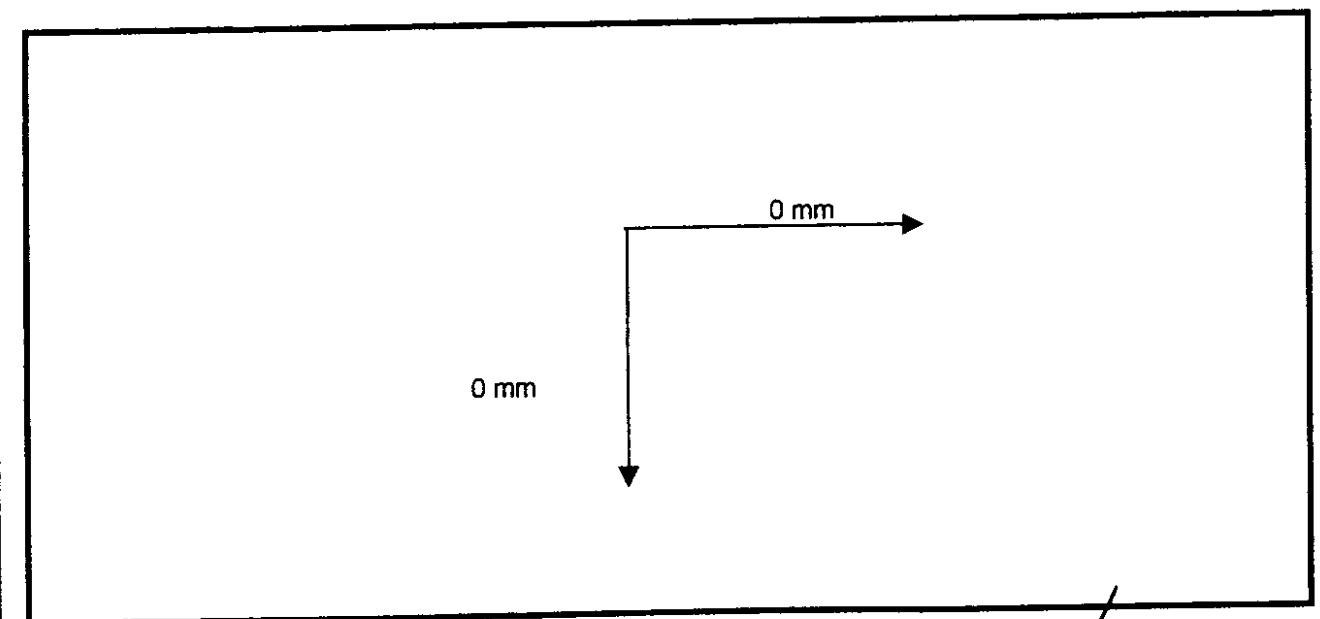
Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTIERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 553+2
 LOCALIZACION: 553+200 FECHA OCTUBRE - 99
 OBSERVACIONES: COMPROBACION VERTICALIDAD P/1
 3.202

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 1



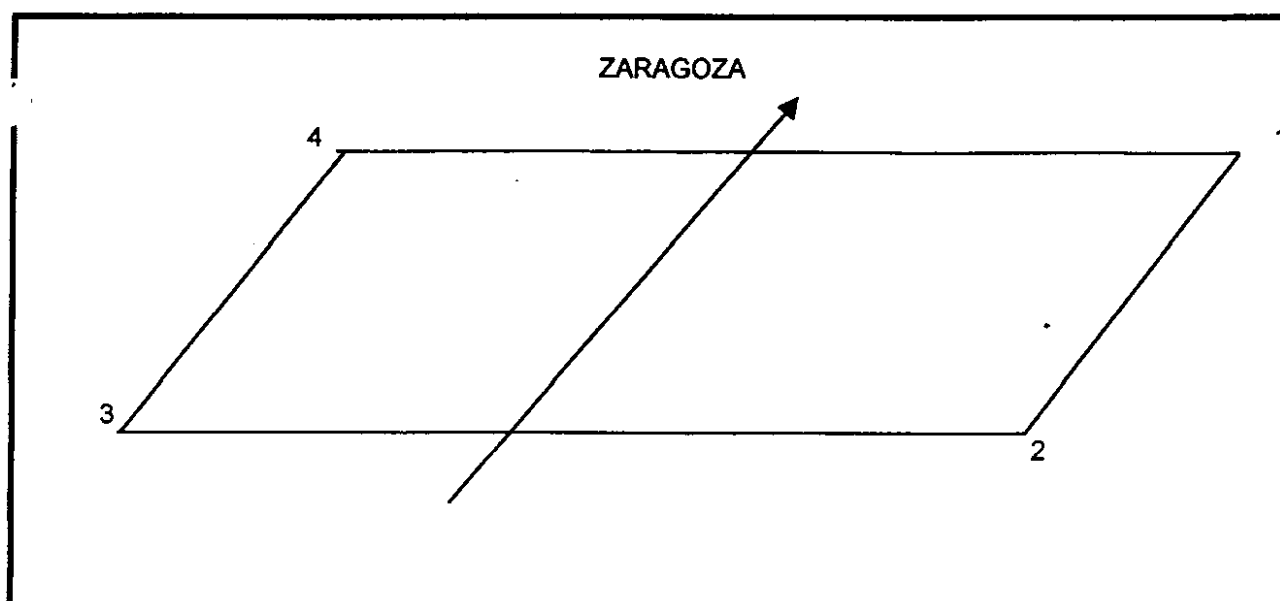
Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 571+6
LOCALIZACION: 571+600 FECHA NOVIEMBRE - 99
OBSERVACIONES: COMPROBACION EXCAVACION ZAPATA E2
3211

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	508.881,361	508.881,372	-0,011
	Y	4.519.028,987	4.519.028,964	0,023
	Z			
2	X	508.884,119	508.884,134	-0,015
	Y	4.519.025,820	4.519.025,811	0,009
	Z			
3	X	508.874,951	508.874,970	-0,019
	Y	4.519.023,404	4.519.023,415	-0,011
	Z			
4	X	508.877,711	508.877,700	0,011
	Y	4.519.020,237	4.519.020,250	-0,013
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 2



Notas: Se considera la ejecución como apta.

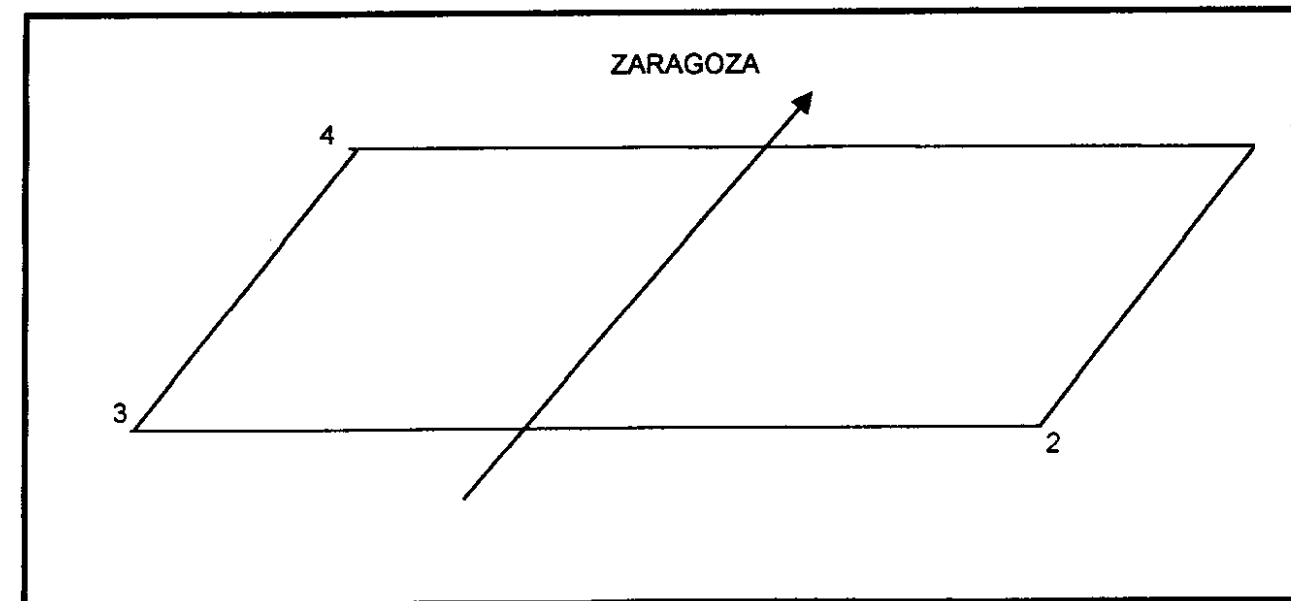
[Signature]

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 571+6
LOCALIZACION: 571+600 FECHA NOVIEMBRE - 99
OBSERVACIONES: COMPROBACION EXCAVACION ZAPATA E1
3211

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	508.857,023	508.857,038	-0,015
	Y	4.519.056,922	4.519.056,953	-0,031
	Z			
2	X	508.850,614	508.850,626	-0,012
	Y	4.519.051,340	4.519.051,354	-0,014
	Z			
3	X	508.854,560	508.854,580	-0,020
	Y	4.519.059,749	4.519.059,800	-0,051
	Z			
4	X	508.848,151	508.848,200	-0,049
	Y	4.519.054,166	4.519.054,203	-0,037
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 1



Notas: Se considera la ejecución como apta.

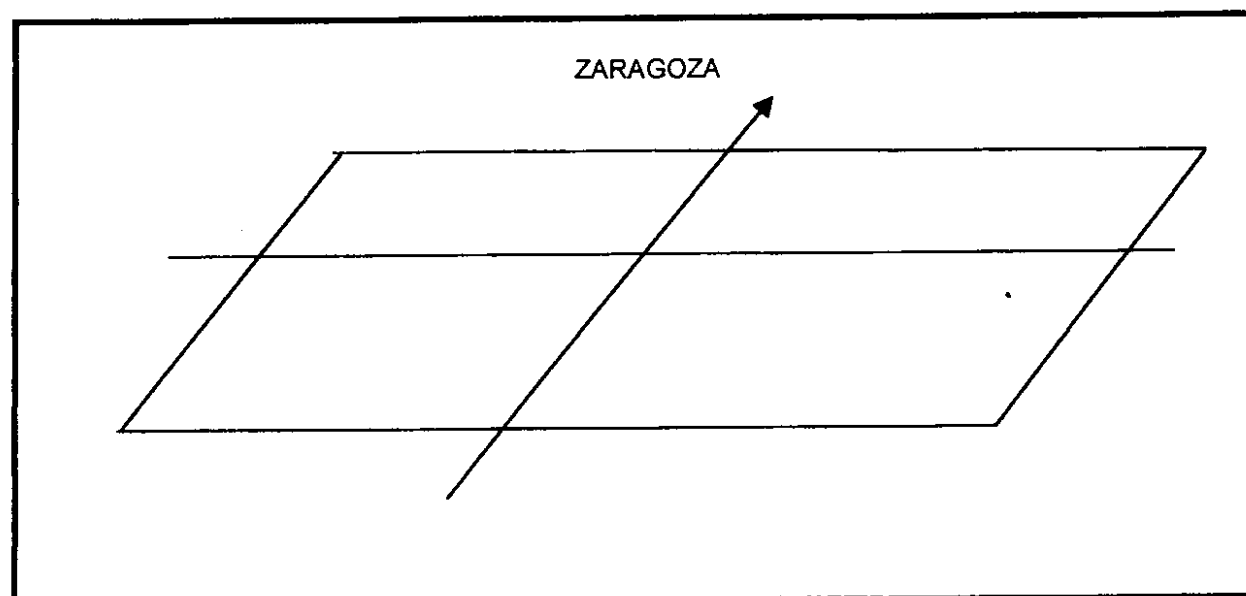
[Signature]

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: OBRA DE FABRICA
 LOCALIZACION: 550+440 FECHA DICIEMBRE - 99
 OBSERVACIONES: Comprobación de línea LADO ZARAGOZA

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X		0	
	Y			
	Z			
2	X		9	
	Y			
	Z			
3	X		15	
	Y			
	Z			
4	X		16	
	Y			
	Z			
5	X		23	
	Y			
	Z			
6	X		16	
	Y			
	Z			
7	X		10	
	Y			
	Z		0	
8	X			
	Y			
	Z			

PENDIENTE LONGITUD
 TEORICA
 REAL

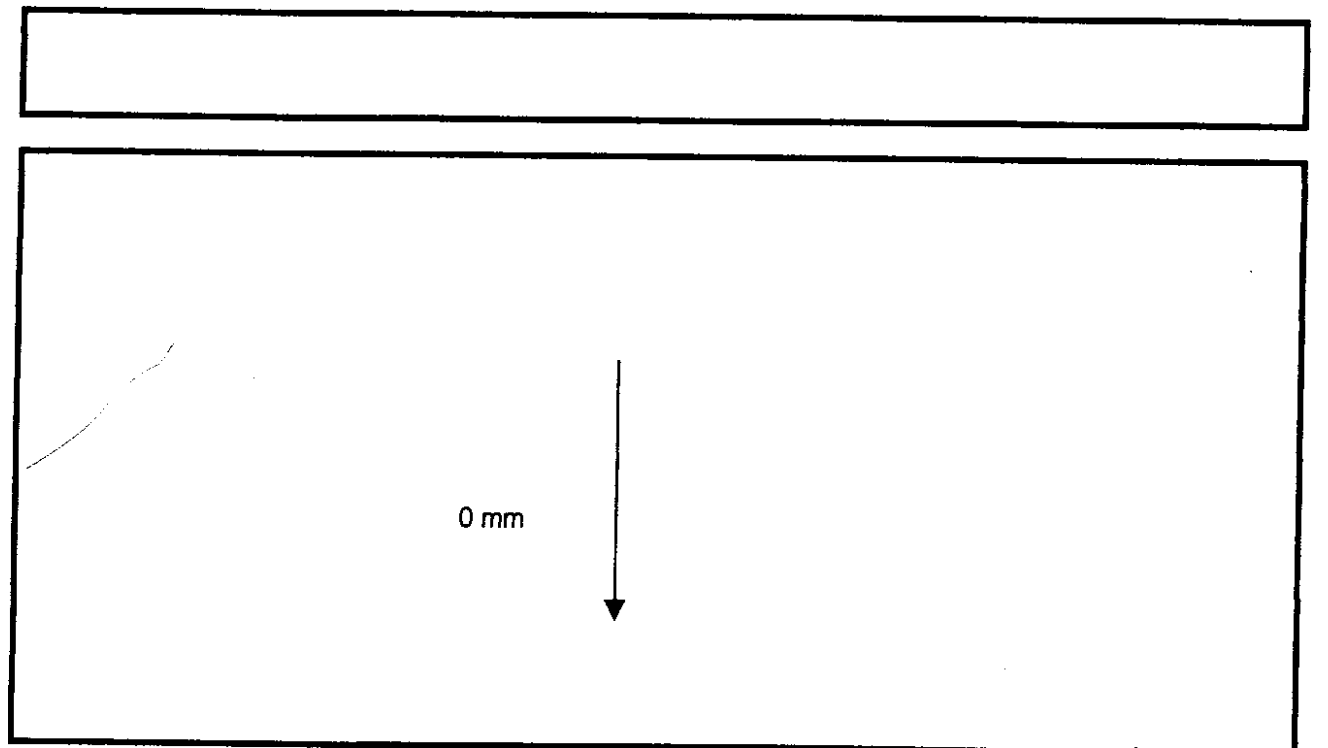


Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 570+1
 LOCALIZACION: 570+100 FECHA DICIEMBRE - 99
 OBSERVACIONES: COMPROBACION COTA DE ZAPATAS DE ESTRIBOS 3210

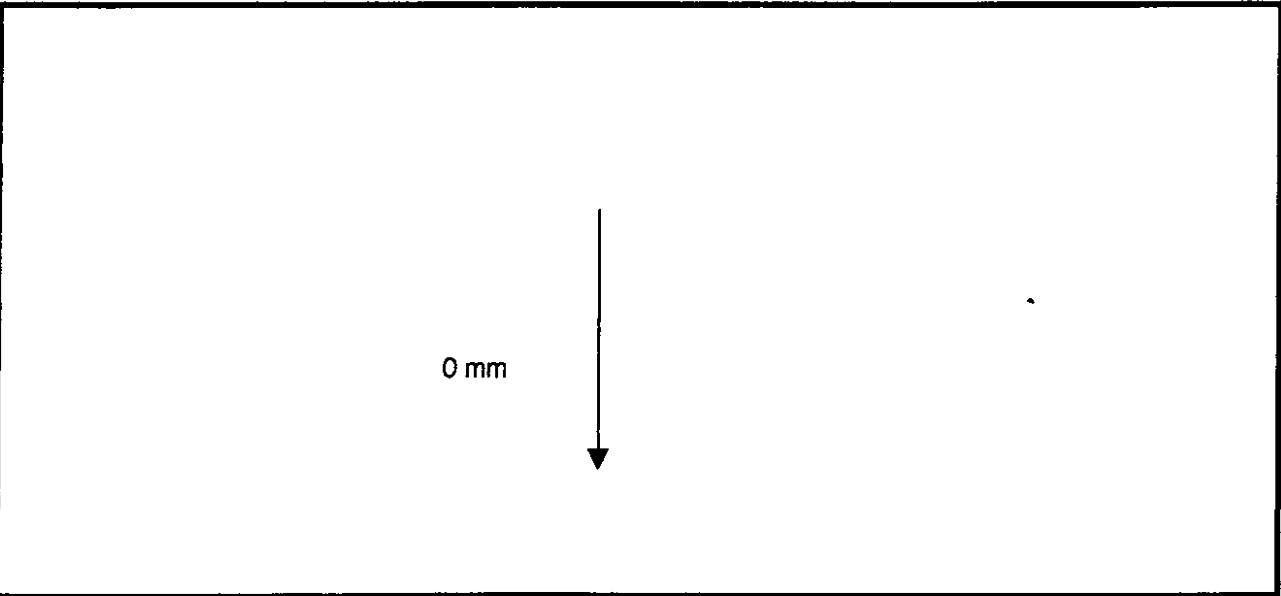
Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z	1017,06	1017,060	0,000 ESTRIBO 1
2	X			
	Y			
	Z	1017,06	1017,070	-0,010 ESTRIBO 2
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			



Notas: Se considera la ejecución como apta.

UNIDAD DE OBRA:	PASO SUPERIOR 571+6		
LOCALIZACION:	571+600	FECHA	DICIEMBRE - 99
OBSERVACIONES:	COMPROBACION GEOMETRIA DE ZAPATAS DE ESTRIBOS		
3211			

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z		OK	ESTRIBO 1
2	X			
	Y			
	Z		OK	ESTRIBO 2
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

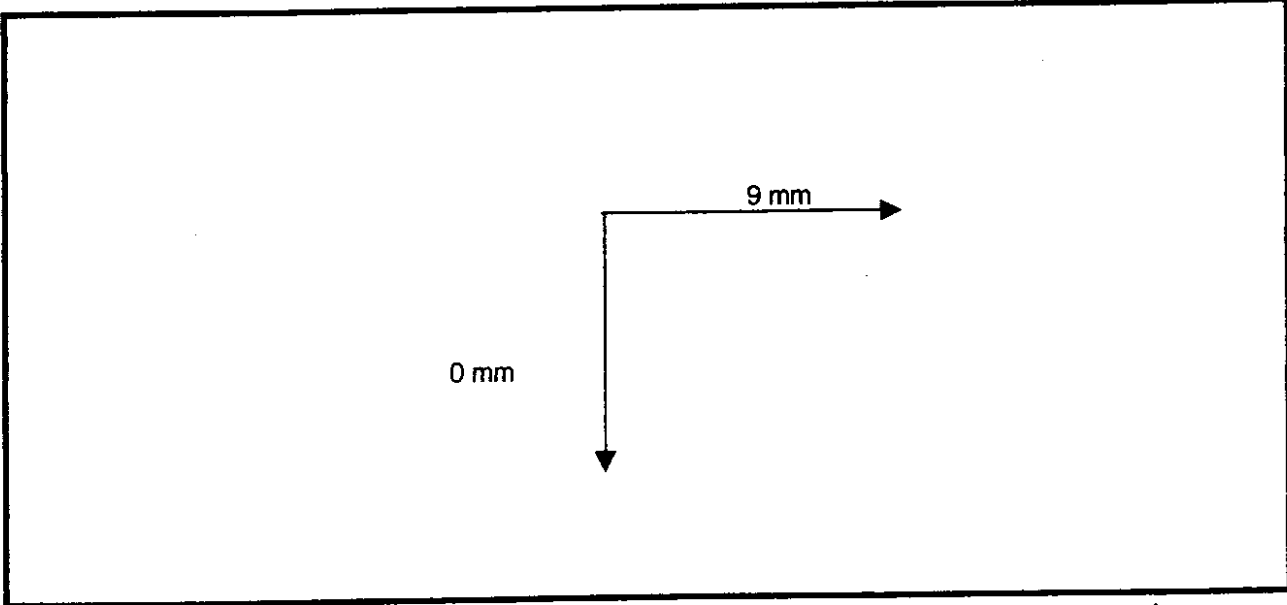


Notas: Se considera la ejecución como apta.

UNIDAD DE OBRA:	PASO SUPERIOR 572+9		
LOCALIZACION:	572+900	FECHA	DICIEMBRE - 99
OBSERVACIONES:	COMPROBACION VERTICALIDAD E/1		
3212			

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 1

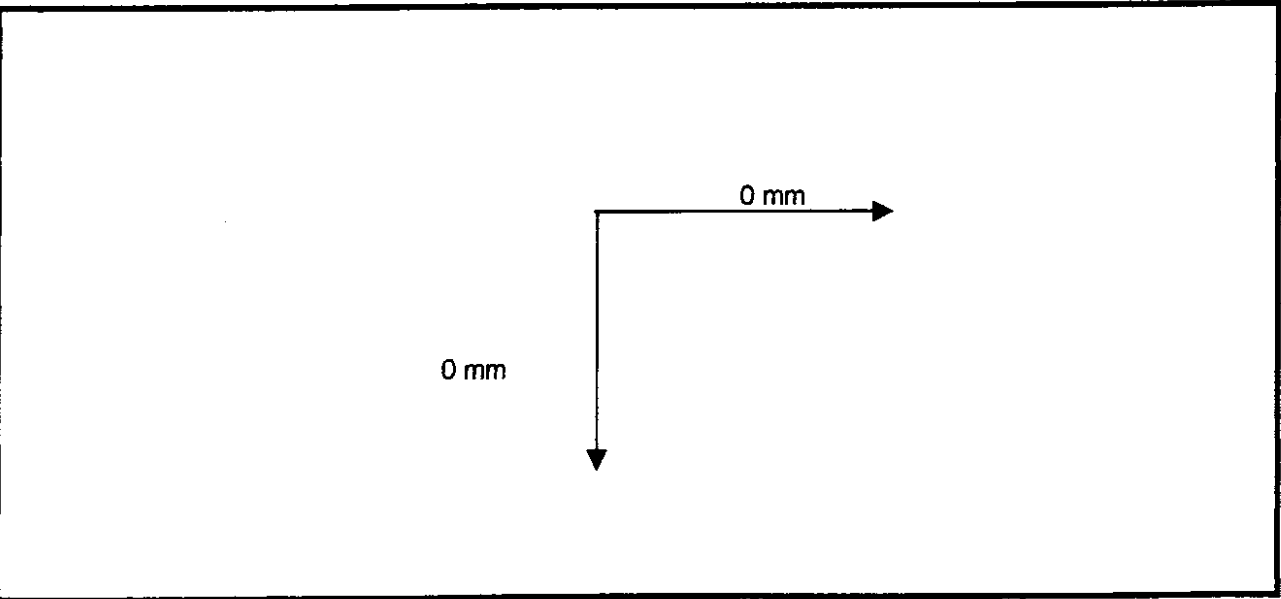


Notas: Se considera la ejecución como apta.

UNIDAD DE OBRA:	PASO SUPERIOR 572+9		
LOCALIZACION:	572+900	FECHA:	DICIEMBRE - 99
OBSERVACIONES:	COMPROBACION VERTICALIDAD P/2		
3212			

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 2

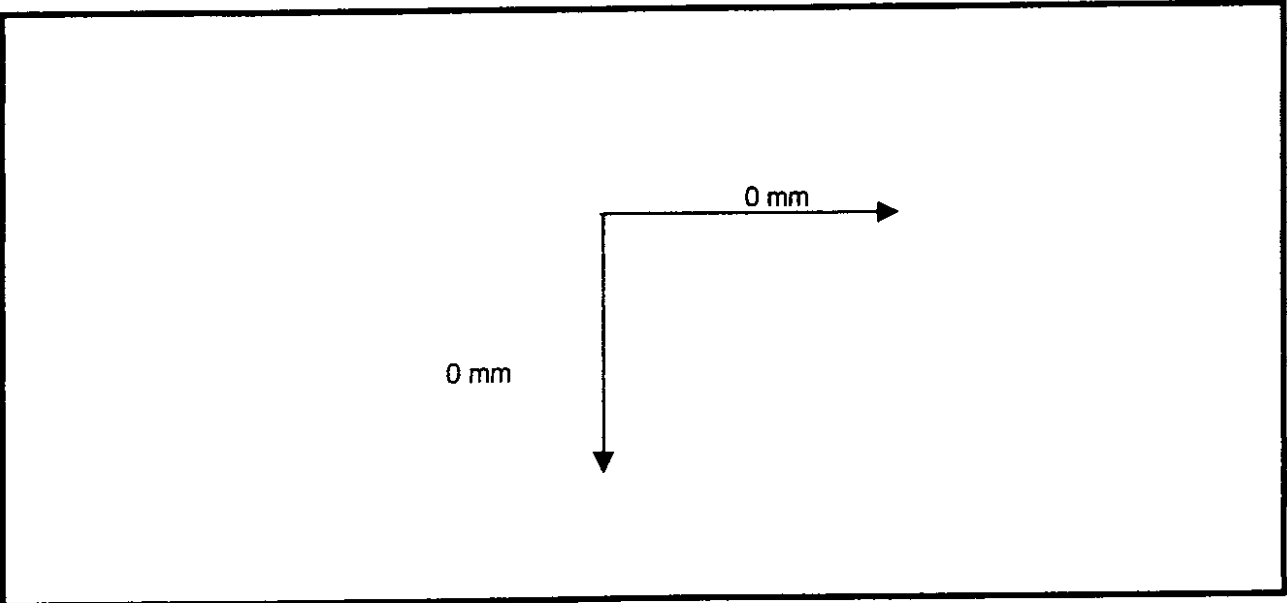


Notas: Se considera la ejecución como apta.

UNIDAD DE OBRA:	PASO SUPERIOR 572+9		
LOCALIZACION:	572+900	FECHA:	DICIEMBRE - 99
OBSERVACIONES:	COMPROBACION VERTICALIDAD P/1		
3212			

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 1



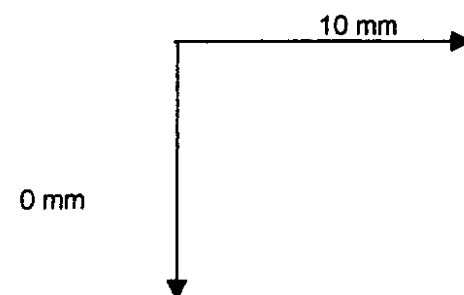
Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTIERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 572+9
LOCALIZACION: 572+900 FECHA DICIEMBRE - 99
OBSERVACIONES: COMPROBACION VERTICALIDAD E/2
3212

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 2



Notas: Se considera la ejecución como apta.

HOJA
ASUNTO: COMPROBACION TABLERO P.S. 553+2

FECHA 28/12/99

PUNTO	NIVELADAS		PLANO COMPARA.	COTA CALCULADA	COTA PROYECTO	DIFERENCIA
	ATRÁS	ADELANTE				
BR - 16	10,190		972,779			
MADRID						
1		-0,900		971,879	971,844	
2		-0,970		971,809	971,795	
3		-1,050		971,729	971,726	0,003
4		-1,120		971,659	971,657	0,002
5		-1,170		971,609	971,595	
6		-1,230		971,549	971,538	
7		-1,300		971,479	971,488	-0,009
8		-1,350		971,429	971,425	0,004
9		-1,410		971,369	971,363	0,006
10		-1,480		971,299	971,301	-0,002
11		-1,520		971,259	971,261	-0,002
12		-1,590		971,189	971,211	
13		-1,650		971,129	971,153	
14		-1,710		971,069	971,080	
ZARAGOZA						
1						
2		-0,970		971,809	971,795	
3		-1,050		971,729	971,726	0,003
4		-1,110		971,669	971,657	
5		-1,160		971,619	971,595	
6		-1,230		971,549	971,538	
7		-1,300		971,479	971,488	-0,009
8		-1,350		971,429	971,425	0,004
9		-1,400		971,379	971,363	
10		-1,500		971,279	971,301	
11		-1,540		971,239	971,261	
12		-1,600		971,179	971,211	
13		-1,650		971,129	971,153	
14		-1,710		971,069	971,080	
ALAS						
MADRID						
1		0,120		972,899	972,824	
5		-0,190		972,589	972,586	0,003
11		-0,520		972,259	972,236	
14		-0,740		972,039	972,050	
ZARAGOZA						
5		-0,200		972,579	972,586	-0,007
14		-0,740		972,039	972,050	

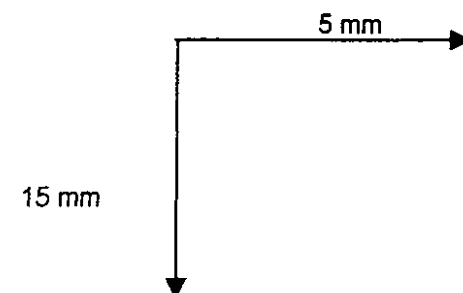
L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 571+6
LOCALIZACION: 571+600 FECHA ENERO - 00
OBSERVACIONES: COMPROBACION VERTICALIDAD P/1

3211

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 1



Notas: Se considera la ejecución como apta.

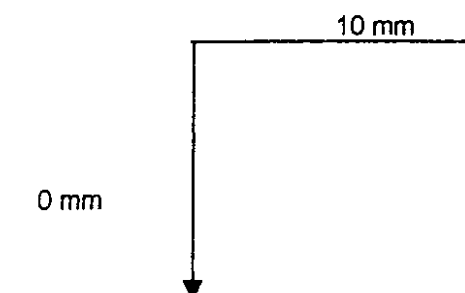
L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 571+6
LOCALIZACION: 571+600 FECHA ENERO - 00
OBSERVACIONES: COMPROBACION VERTICALIDAD P/2

3211

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

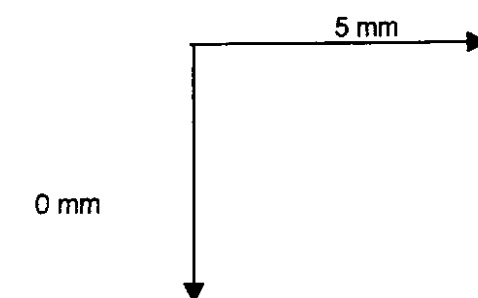
PILA 2



Notas: Se considera la ejecución como apta.

3210

PILA 1

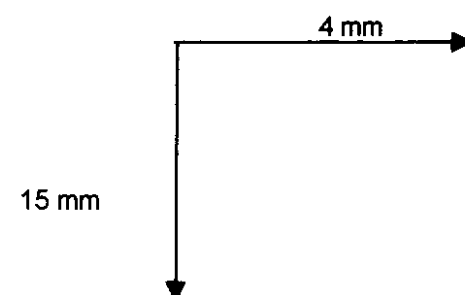


L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA:	PASO SUPERIOR 567+5		
LOCALIZACION:	567+500	FECHA:	FEBRERO - 00
OBSERVACIONES:	COMPROBACION VERTICALIDAD P/2		
3208			

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 2



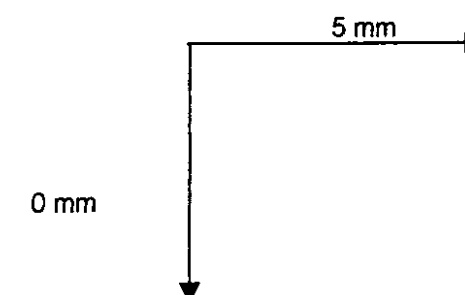
Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA:	PASO SUPERIOR 570+1		
LOCALIZACION:	570+100	FECHA:	FEBRERO - 00
OBSERVACIONES:	COMPROBACION VERTICALIDAD P/1		
3210			

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 1



Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTIERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA:	P.S. 556+9	FECHA:	MARZO - 00
LOCALIZACION:	556+900		
OBSERVACIONES:	COMPROBACION ARRANQUE ESTRIBO 1		

3203

Pto.		Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	498.442,073	498.442,085	-0,012	
	Y	4.508.840,133	4.508.840,115	0,018	
	Z				
2	X				
	Y				
	Z				
3	X				
	Y				
	Z				
4	X				
	Y				
	Z				
5	X				
	Y				
	Z				
6	X				
	Y				
	Z				
7	X				
	Y				
	Z				
8	X				
	Y				
	Z				

ESTRIBO 1

Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTIERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA:	P.S. 556+9	FECHA:	MARZO - 00
LOCALIZACION:	556+900		
OBSERVACIONES:	COMPROBACION ARRANQUE ESTRIBO 2		

3203

Pto.		Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	498.417,176	498.417,204	-0,028	
	Y	4.508.872,456	4.508.872,437	0,019	
	Z				
2	X				
	Y				
	Z				
3	X				
	Y				
	Z				
4	X				
	Y				
	Z				
5	X				
	Y				
	Z				
6	X				
	Y				
	Z				
7	X				
	Y				
	Z				
8	X				
	Y				
	Z				

ESTRIBO 2

Notas: Se considera la ejecución como apta.

UNTO	NIVELADAS		COTA PROYECTO			DIFERENCIA
	ATRÁS	ADELANTE				
	DISTANCIAS					Z. PROY- Z.CAL
E/2	1	1,000	10,000	1,256		
	2	2,200	8,800	1,256		0,009
	3	3,300	7,700	1,256		-0,001
	4	4,300	6,700	1,256		-0,001
	5	5,300	5,700	1,256		
	6	6,300	4,700	1,256		-0,001
	7	7,200	3,800	1,256		
	8	8,400	2,600	1,256		
	9	9,100	1,900	1,256		
	10	10,200	0,800	1,256		
	11	11,700	0,700	1,256		
	12	12,600	1,600	1,256		
	13	13,400	2,400	1,256		
	14	14,300	3,300	1,256		
	15	15,200	4,200	1,256		
	16	16,200	5,200	1,256		-0,001
	17	17,200	6,200	1,256		-0,001
	18	18,200	7,200	1,256		0,009
	19	19,200	8,200	1,256		0,009
	20	20,200	9,200	1,256		0,009
	21	21,500	10,500	1,256		0,009
	22	22,600	11,600	1,256		0,009
	23	23,500	12,500	1,256		-0,001
	24	24,800	13,800	1,256		-0,001
	25	25,500	14,500	1,256		
	26	26,500	15,500	1,256		
	27	27,500	16,500	1,256		
	28	29,000	18,000	1,256		
	29	30,100	19,100	1,256		
	30	31,000	20,000	1,256		
	31	32,000	21,000	1,256		
	32	32,900	21,900	1,256		
	33	33,900	22,900	1,256		
	34	34,900	23,900	1,256		
	35	36,100	25,100	1,256		
	36	37,100	26,100	1,256		
E/1	37	38,100	27,100	1,256		
		PILA 2			PILA 1	

L. MADRID E1 E2 L. ZARAGOZA

PUNTO	NIVELADAS		COTA PROYECTO			DIFERENCIA
	ATRÁS	ADELANTE				
	DISTANCIAS					Z. PROY- Z.CAL
E/2	1	1,000	10,000	1021,209		
	2	2,200	8,800	1021,221		-0,005
	3	3,300	7,700	1021,232		
	4	4,300	6,700	1021,242		
	5	5,300	5,700	1021,252		
	6	6,300	4,700	1021,262		
	7	7,200	3,800	1021,271		
	8	8,400	2,600	1021,283		
	9	9,100	1,900	1021,290		
	10	10,200	0,800	1021,301		
	11	11,700	0,700	1021,316		
	12	12,600	1,600	1021,325		
	13	13,400	2,400	1021,333		
	14	14,300	3,300	1021,342		
	15	15,200	4,200	1021,351		
	16	16,200	5,200	1021,361		
	17	17,200	6,200	1021,371		
	18	18,200	7,200	1021,381		
	19	19,200	8,200	1021,391		
	20	20,200	9,200	1021,401		
	21	21,500	10,500	1021,414		
	22	22,600	11,600	1021,425		
	23	23,500	12,500	1021,434		
	24	24,800	13,800	1021,447		
	25	25,500	14,500	1021,454		-0,008
	26	26,500	15,500	1021,464		0,002
	27	27,500	16,500	1021,474		0,002
	28	29,000	18,000	1021,489		0,007
	29	30,100	19,100	1021,500		
	30	31,000	20,000	1021,509		
	31	32,000	21,000	1021,519		-0,003
	32	32,900	21,900	1021,528		
	33	33,900	22,900	1021,538		
	34	34,900	23,900	1021,548		-0,002
	35	36,100	25,100	1021,560		-0,004
	36	37,100	26,100	1021,570		0,006
E/1	37	38,100	27,100	1021,580		
		PILA 2		PILA 1		

E2

E1

L. MADRID L. ZARAGOZA



PUNTO	NIVELADAS		PLANO COMPARA.	COTA CALCULADA	COTA PROYECTO	DIFERENCIA
	ATRÁS	ADELANTE				
BR - 103						
ZARAGOZA	DISTANCIAS					
1	1,270			1020,326	1020,326	0,000
2	3,770			1020,286	1020,301	
3	6,270			1020,266	1020,276	-0,010
4	8,770			1020,256	1020,251	0,005
5	11,270			1020,216	1020,226	-0,010
6	13,770			1020,206	1020,201	0,005
7	16,270			1020,186	1020,175	
8	18,770			1020,166	1020,150	
9	21,270			1020,136	1020,125	
10	23,770			1020,106	1020,100	0,006
11	26,270			1020,096	1020,075	
12	28,770			1020,066	1020,050	
13	31,270			1020,046	1020,024	
14	33,770			1020,016	1019,999	
15	36,270			1019,986	1019,974	
16	38,770			1019,986	1019,949	
MADRID						
1	1,270			1020,326	1020,326	0,000
2	3,770			1020,286	1020,301	
3	6,270			1020,256	1020,276	
4	8,770			1020,236	1020,251	
5	11,270			1020,216	1020,226	-0,010
6	13,770			1020,196	1020,201	-0,005
7	16,270			1020,176	1020,175	0,001
8	18,770			1020,186	1020,150	
9	21,270			1020,136	1020,125	
10	23,770			1020,106	1020,100	0,006
11	26,270			1020,086	1020,075	
12	28,770			1020,066	1020,050	
13	31,270			1020,036	1020,024	
14	33,770			1020,016	1019,999	
15	36,270					
16	38,770					
ALAS	(ZARAGOZA)					
1	1,270			1021,356	1021,366	-0,010
5	11,270			1021,246	1021,266	
9	21,270			1021,156	1021,165	-0,009
13	31,270			1021,066	1021,064	0,002
ALAS	(MADRID)					
1	1,270			1021,356	1021,366	-0,010
5	11,270			1021,246	1021,266	
9	21,270			1021,156	1021,165	-0,009
13	31,270			1021,066	1021,064	0,002

PUNTO	NIVELADAS		PLANO COMPARA.	COTA CALCULADA	COTA PROYECTO	DIFERENCIA
	ATRÁS	ADELANTE				
BR - 130						
	DISTANCIAS					
1	1,100			1034,718	1034,754	
2	4,900			1034,728	1034,773	
3	9,150			1034,728	1034,794	
4	13,050			1034,778	1034,814	
5	17,100			1034,788	1034,833	
6	21,100			1034,808	1034,854	
7	25,300			1034,818	1034,874	
8	28,900			1034,858	1034,892	
9	33,100			1034,858	1034,913	
10	37,200			1034,898	1034,933	

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: P.S. 556+9
LOCALIZACION: 556+900 FECHA ABRIL - 00
OBSERVACIONES: COMPROBACION ARRANQUE ESTRIBO 1
3203

Pto.		Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	498.442,073	498.442,080	-0,007	
	Y	4.508.840,133	4.508.840,125	0,008	
	Z				
2	X				
	Y				
	Z				
3	X				
	Y				
	Z				
4	X				
	Y				
	Z				
5	X				
	Y				
	Z				
6	X				
	Y				
	Z				
7	X				
	Y				
	Z				
8	X				
	Y				
	Z				

ESTRIBO 1

Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: P.S. 556+9
LOCALIZACION: 556+900 FECHA ABRIL - 00
OBSERVACIONES: COMPROBACION ARRANQUE ESTRIBO 2
3203

Pto.		Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	498.417,176	498.417,214	-0,038	
	Y	4.508.872,456	4.508.872,447	0,009	
	Z				
2	X				
	Y				
	Z				
3	X				
	Y				
	Z				
4	X				
	Y				
	Z				
5	X				
	Y				
	Z				
6	X				
	Y				
	Z				
7	X				
	Y				
	Z				
8	X				
	Y				
	Z				

ESTRIBO 2

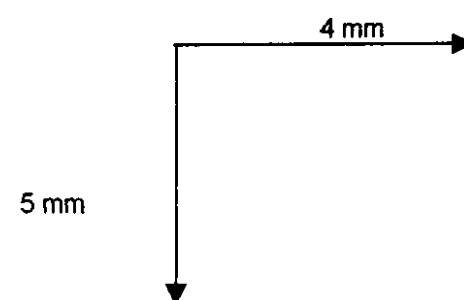
Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTIERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA:	PASO SUPERIOR 556+9		
LOCALIZACION:	556+900	FECHA	MAYO-00
OBSERVACIONES:	COMPROBACION VERTICALIDAD P/1		
3203			

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 1



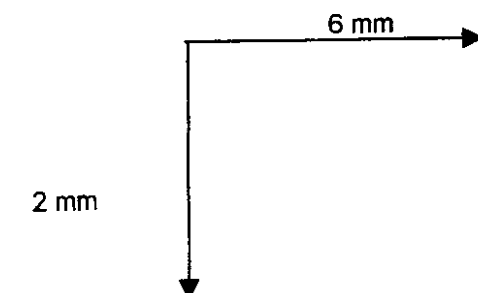
Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTIERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA:	PASO SUPERIOR 556+9		
LOCALIZACION:	556+900	FECHA	MAYO-00
OBSERVACIONES:	COMPROBACION VERTICALIDAD P/2		
3203			

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 2



Notas: Se considera la ejecución como apta.

PUNTO	NIVELADAS		PLANO COMPARA.	COTA OBSERVADA	COTA PROYECTO	DIFERENCIA
	ATRÁS	ADELANTE				
N-46						
	DISTANCIAS	LADO ZARAGOZA				
1	1,35			1025,381	1025,325	
2	1,65			1025,371	1025,324	
3	3,45			1025,341	1025,315	
4	6,00			1025,311	1025,302	0,009
5	8,50			1025,301	1025,290	
6	11,00			1025,271	1025,277	-0,006
7	12,10			1025,271	1025,272	0,000
8	13,05			1025,281	1025,267	
9	15,55			1025,271	1025,254	
10	18,05			1025,251	1025,242	0,009
11	20,60			1025,261	1025,229	
12	23,10			1025,231	1025,217	
13	25,60			1025,221	1025,204	
14	28,10			1025,201	1025,192	0,010
15	29,10			1025,191	1025,187	0,005
16	31,30			1025,181	1025,176	0,006
17	33,80			1025,181	1025,163	
18	36,30			1025,181	1025,151	
19	38,80			1025,181	1025,138	
	DISTANCIAS	LADO MADRID				
1	1,35			1025,361	1025,325	
2	1,65			1025,361	1025,324	
3	3,45			1025,331	1025,315	
4	6,00			1025,321	1025,302	
5	8,50			1025,301	1025,290	
6	11,00			1025,261	1025,277	
7	12,10			1025,261	1025,272	
8	13,05					
9	15,55			1025,261	1025,254	0,007
10	18,05			1025,241	1025,242	-0,001
11	20,60			1025,231	1025,229	0,002
12	23,10			1025,221	1025,217	0,005
13	25,60			1025,211	1025,204	0,007
14	28,10			1025,261	1025,192	
15	29,10			1025,231	1025,187	
16	31,30			1025,181	1025,176	0,006
17	33,80			1025,181	1025,163	
18	36,30			1025,191	1025,151	
19	38,80			1025,181	1025,138	

E2

E1

L. MADRID

L. ZARAGOZA

[illegible]

[illegible]

Notas: Se considera la ejecución como apta.

[illegible]

29

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

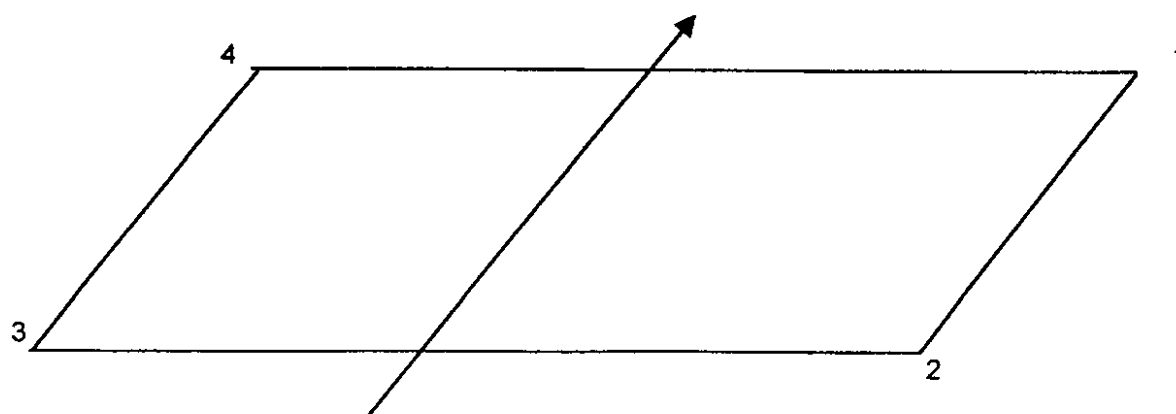
UNIDAD DE OBRA: PASO SUPERIOR 572+9
LOCALIZACION: 572+900 FECHA AGOSTO - 99
OBSERVACIONES: COMPROBACION DE REPLANTEO EXCAVACION

3.212

Pto.		Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	509848,947	509848,966	0,019	
	Y	4519919,09	4519919,083	-0,007	
	Z				
2	X	509842,163	509842,201	0,038	
	Y	4519913,182	4519913,132	-0,05	
	Z				
3	X	509838,059	509838,133	0,074	
	Y	4519917,894	4519917,833	-0,061	
	Z				
4	X	509844,842	509844,877	0,035	
	Y	4519923,804	4519923,771	-0,033	
	Z				
5	X				
	Y				
	Z				
6	X				
	Y				
	Z				
7	X				
	Y				
	Z				
8	X				
	Y				
	Z				

ESTRIBO 1

ZARAGOZA



Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

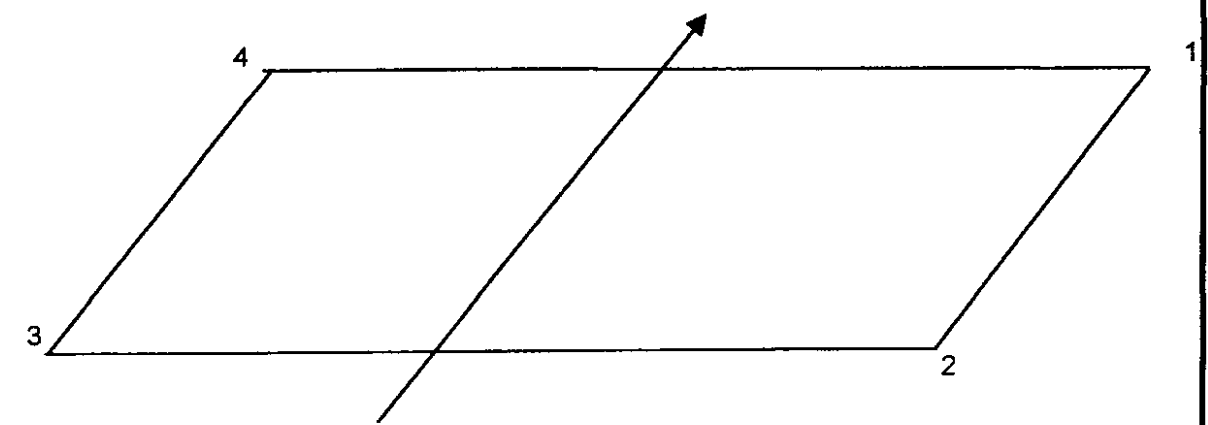
UNIDAD DE OBRA: PASO SUPERIOR 572+9
LOCALIZACION: 572+900 FECHA AGOSTO - 99
OBSERVACIONES: COMPROBACION DE REPLANTEO EXCAVACION

3.212

Pto.		Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	509854,378	509854,427	0,049	
	Y	4519909,436	4519909,398	-0,038	
	Z				
2	X	509850,988	509851,002	0,014	
	Y	4519906,477	4519906,474	-0,003	
	Z				
3	X	509848,033	509848,035	0,002	
	Y	4519909,874	4519909,855	-0,019	
	Z				
4	X	509851,42	509851,47	0,050	
	Y	4519912,82	4519912,779	-0,041	
	Z				
5	X				
	Y				
	Z				
6	X				
	Y				
	Z				
7	X				
	Y				
	Z				
8	X				
	Y				
	Z				

PILA 1

ZARAGOZA



Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

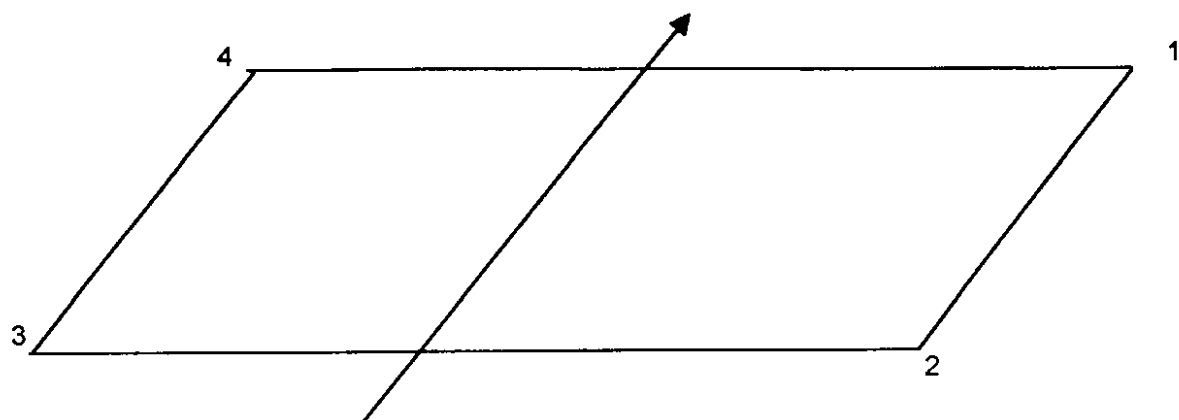
UNIDAD DE OBRA: PASO SUPERIOR 572+9
LOCALIZACION: 572+900 FECHA AGOSTO - 99
OBSERVACIONES: COMPROBACION DE REPLANTEO EXCAVACION

3.212

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	509865,611	509865,632	0,021
	Y	4519896,542	4519896,518	-0,024
	Z			
2	X	509862,219	509862,225	0,006
	Y	4519893,587	4519893,577	-0,010
	Z			
3	X	509859,264	509859,311	0,047
	Y	4519896,981	4519896,935	-0,046
	Z			
4	X	509862,657	509862,676	0,019
	Y	4519899,931	4519899,897	-0,034
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

PILA 2

ZARAGOZA



Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

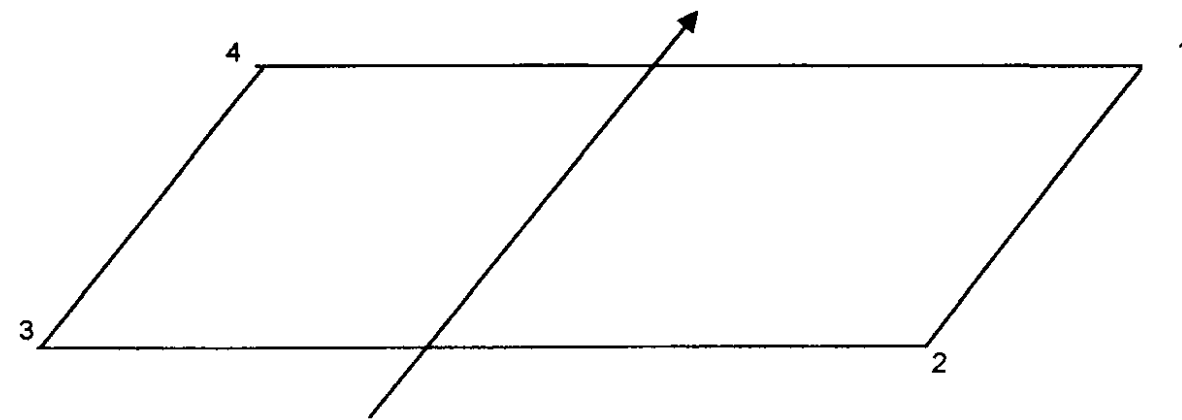
UNIDAD DE OBRA: PASO SUPERIOR 572+9
LOCALIZACION: 572+900 FECHA AGOSTO - 99
OBSERVACIONES: COMPROBACION DE REPLANTEO EXCAVACION

3.212

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X	509875,584	509875,622	0,038
	Y	4519888,518	4519888,513	-0,005
	Z			
2	X	509868,796	509868,782	-0,014
	Y	4519882,603	4519882,614	0,011
	Z			
3	X	509864,694	509864,698	0,004
	Y	4519887,325	4519887,296	-0,029
	Z			
4	X	509871,478	509871,467	-0,011
	Y	4519893,229	4519893,186	-0,043
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 2

ZARAGOZA



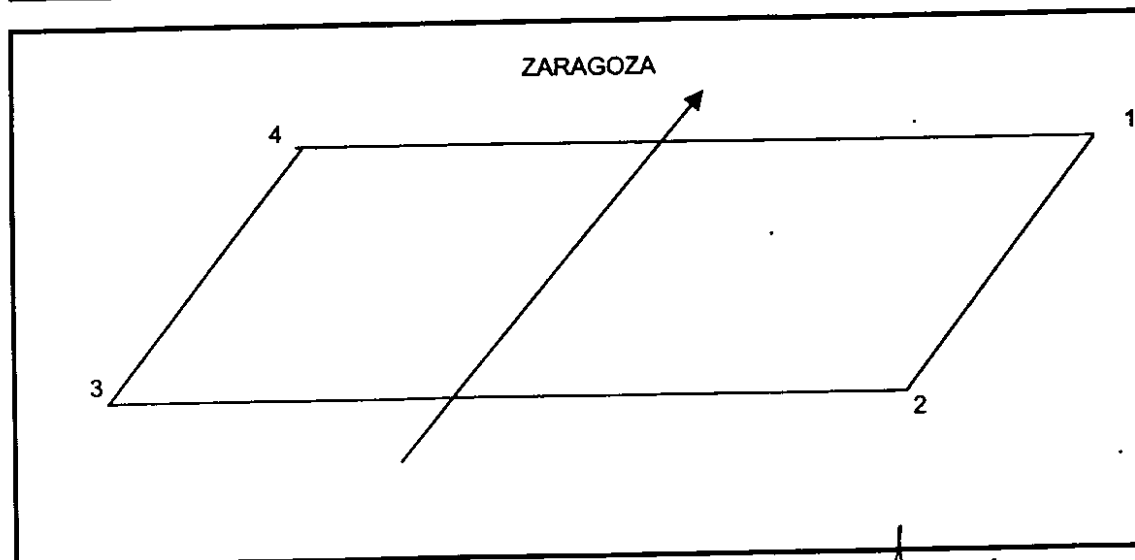
Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTIERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 572+9
LOCALIZACION: 572+900 FECHA: SEPTIEMBRE - 99
OBSERVACIONES: COMPROBACION ARRANQUE 3.212

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X 509848,947	509848,977	0,030	
	Y 4519919,09	4519918,988	-0,102	
	Z			
2	X 509842,163	509842,171	0,008	
	Y 4519913,182	4519913,123	-0,059	
	Z			
3	X 509838,059	509838,091	0,032	
	Y 4519917,894	4519917,823	-0,071	
	Z			
4	X 509844,842	509844,881	0,039	
	Y 4519923,804	4519923,751	-0,053	
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 1



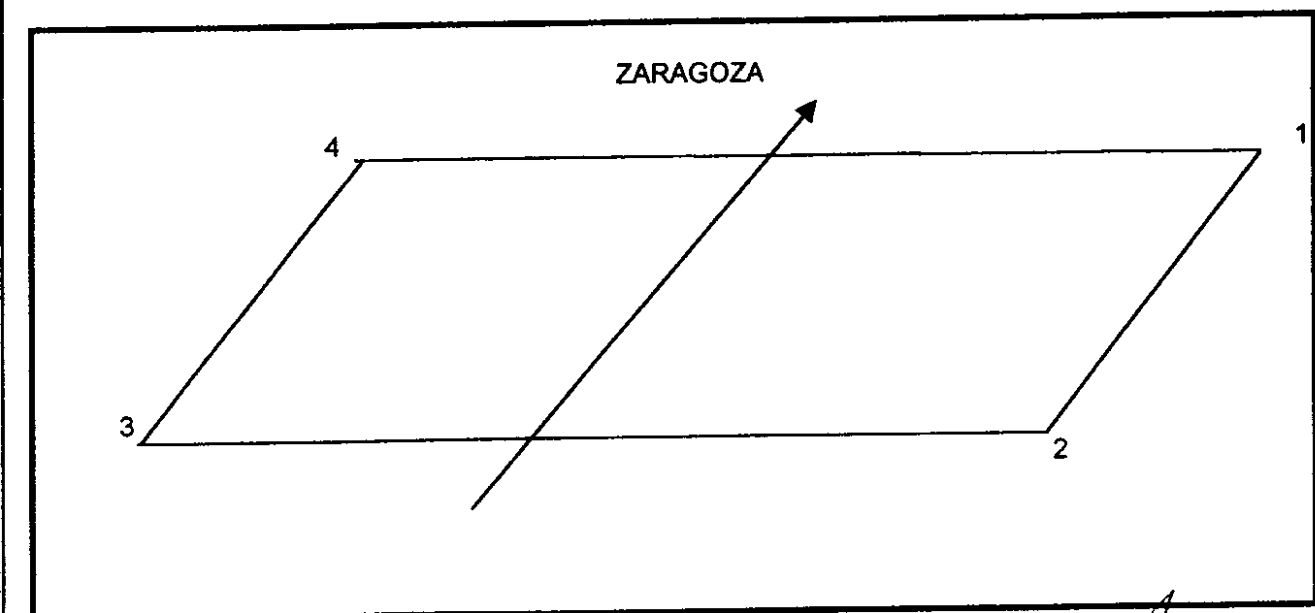
Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTIERA FRANCESA
TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO SUPERIOR 551+3
LOCALIZACION: 551+300 FECHA: OCTUBRE - 99
OBSERVACIONES: COMPROBACION ZAPATA ESTRIBO 2 3.201

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X 495107,349	495107,290	-0,059	
	Y 4504450,885	4504450,911	0,026	
	Z			
2	X 495102,822	495102,779	-0,043	
	Y 4504452,889	4504452,908	0,019	
	Z			
3	X 495099,18	495099,105	-0,075	
	Y 4504444,659	4504444,714	0,055	
	Z			
4	X 495103,707	495103,657	-0,050	
	Y 4504442,655	4504442,686	0,031	
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ESTRIBO 2



Notas: Se considera la ejecución como apta.



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 077

Nº DE REGISTRO:77

TAMAÑO ÁRIDO:40 MIM

ELEMENTOS:

Zapata Estribo Izquierdo . Paso Superior 551+300.

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

CAMIÓN:GU-6008-C

HORA SALIDA:15:48

ESTADO TIEMPO:Nublado

CONO ABRAMS:3' 5 cm

CONDICIONES DE COLOCACIÓN:Vertido Directo

INCIDENCIAS:

SERIE:32

TIPO:H-250

FECHA TOMA:5/10/99

REALIZADO:Carlos

TIPO DE CEMENTO:II/AP42,5R

Nº ALBARÁN:72.661

HORA TOMA:16:50

TEMPERATURA:13 °C

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
156	12/10/99	7	53,0	300,0
157	12/10/99	7	51,8	293,1
MEDIA				296
158	2/11/99	28	62,7	354,8
159	2/11/99	28	64,2	363,3
160	2/11/99	28	62,7	354,8
MEDIA				358

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 078

Nº DE REGISTRO:078

TAMAÑO ÁRIDO:40 MIM

ELEMENTOS:

Zapata Estribo Izquierdo . Paso Superior 551+300.

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Andos Pascual

CAMIÓN:GU-6262-G

HORA SALIDA:16:46

ESTADO TIEMPO:Nublado

CONO ABRAMS:9 cm

CONDICIONES DE COLOCACIÓN:Vertido Directo

INCIDENCIAS:

SERIE:33

TIPO:H-250

FECHA TOMA:5/10/99

REALIZADO:Carlos

TIPO DE CEMENTO:II/AP42,5R

Nº ALBARÁN:72.666

HORA TOMA:17:40

TEMPERATURA:13 °C

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
161	12/10/99	7	54,9	310,7
162	12/10/99	7	52,2	295,4
MEDIA				303
163	2/11/99	28	62,1	251,4
164	2/11/99	28	60,3	341,2
165	2/11/99	28	63,8	361,0
MEDIA				351

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

33



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 086

Nº DE REGISTRO: 086 SERIE: 34 FECHA TOMA: 7/10/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Estribo Izquierdo . Paso Superior 551+300.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP42,5R
CAMIÓN: GU-7337-E Nº ALBARÁN: 72.771
HORA SALIDA: 16:10 HORA TOMA: 17:00
ESTADO TIEMPO: Nublado TEMPERATURA: 13 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
166	14/10/99	7	45,3	256,3
167	14/10/99	7	42,3	239,3
MEDIA				248
168	4/11/99	28	48,5	274,5
169	4/11/99	28	51,3	290,3
170	4/11/99	28	53,9	305,0
MEDIA				290

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 087

Nº DE REGISTRO: 087 SERIE: 35 FECHA TOMA: 7/10/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Estribo Izquierdo . Paso Superior 551+300.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP42,5R
CAMIÓN: GU-6262-G Nº ALBARÁN: 72.778
HORA SALIDA: 17:20 HORA TOMA: 18:10
ESTADO TIEMPO: Nublado TEMPERATURA: 13 °C
CONO ABRAMS: 9' 5 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
171	14/10/99	7	44,8	253,5
172	14/10/99	7	45,0	254,6
MEDIA				254
173	4/11/99	28	56,2	318,0
174	4/11/99	28	54,6	309,0
175	4/11/99	28	58,0	328,2
MEDIA				318

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 090

Nº DE REGISTRO: 090 SERIE 36 FECHA TOMA 14/10/99
TAMAÑO ÁRIDO 40 M/M TIPO: H-250 REALIZADO Carlos
ELEMENTOS: Zapata Pila Izquierda . Paso Superior 551+300.
Linea A.V.E . Madrid-Zaragoza Subtramo V-b .
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP42,5R
CAMIÓN: M-2188-KJ Nº ALBARÁN: 72.936
HORA SALIDA: 16:28 HORA TOMA: 17:45
ESTADO TIEMPO: Soleado TEMPERATURA: 17 °C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
176	21/10/99	7	45,3	256,3
177	21/10/99	7	44,1	249,6
MEDIA				253
178	11/11/99	28	54,6	309,0
179	11/11/99	28	53,9	305,0
180	11/11/99	28	56,9	322,0
MEDIA				312

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162.
-19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 091

Nº DE REGISTRO: 091 SERIE 37 FECHA TOMA 15/10/99
TAMAÑO ÁRIDO: 40 M/M TIPO: H-250 REALIZADO Carlos
ELEMENTOS: Zapata Pila Derecha . Paso Superior 551+300.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP42,5R
CAMIÓN: GU-8960-.F Nº ALBARÁN: 72.970
HORA SALIDA: 14:32 HORA TOMA 15:15
ESTADO TIEMPO: Soleado TEMPERATURA 21 °C
CONO ABRAMS: 6 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
181	22/10/99	7	37,3	211,1
182	22/10/99	7	41,7	236,0
MEDIA				223
183	12/11/99	28	57,4	324,8
184	12/11/99	28	53,2	312,3
185	12/11/99	28	58,6	331,6
MEDIA				323

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratono de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0111

Nº DE REGISTRO:0111

SERIE:42

FECHA TOMA:9/11/99

TAMAÑO ÁRIDO20 MM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS:

Estribo Izquierdo Paso Superior 551+300.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

TIPO DE CEMENTO:II/AP42,5R

CAMIÓN:GU-6262-G

Nº ALBARÁN:73.826

HORA SALIDA:9:00

HORA TOMA:10:20

ESTADO TIEMPO:Soleado

TEMPERATURA:5 °C

CONO ABRAMS:9 cm

CONDICIONES DE COLOCACIÓN:Vertido Con Bomba.

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
206	16/11/99	7	42,0	237,6
207	16/11/99	7	41,5	234,8
MEDIA				236
208	7/12/99	28	51,1	289,2
209	7/12/99	28	52,9	299,4
210	7/12/99	28	52,5	297,1
MEDIA				295

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0112

Nº DE REGISTRO:0112

SERIE:43

FECHA TOMA:9/11/99

TAMAÑO ÁRIDO20 MM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS:

Estribo Izquierdo Paso Superior 551+300.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

TIPO DE CEMENTO:II/AP42,5R

CAMIÓN:GU-6262-G

Nº ALBARÁN:73.833

HORA SALIDA:11:29

HORA TOMA:12:30

ESTADO TIEMPO:Soleado

TEMPERATURA:5 °C

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido Con Bomba.

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
211	16/11/99	7	47,1	266,5
212	16/11/99	7	46,7	264,2
MEDIA				265
213	7/12/99	28	53,9	305,0
214	7/12/99	28	54,2	306,7
215	7/12/99	28	56,0	316,9
MEDIA				309

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0113

Nº DE REGISTRO: 0113 SERIE: 44 FECHA TOMA: 9/11/99
TAMAÑO ÁRIDO: 20 MM TIPO: H-300 REALIZADO: Carlos
ELEMENTOS: Pila Izquierda .Paso Superior 551+300.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP42,5R
CAMIÓN: GU-6262-G Nº ALBARÁN: 73.845
HORA SALIDA: 15:00 HORA TOMA: 16:05
ESTADO TIEMPO: Soleado TEMPERATURA: 8 °C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido Con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
216	16/11/99	7	47,5	268,8
217	16/11/99	7	48,9	276,7
MEDIA				273
218	7/12/99	28	58,2	329,3
219	7/12/99	28	61,6	348,6
220	7/12/99	28	60,5	342,4
MEDIA				340

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0123

Nº DE REGISTRO: 0123 SERIE: 50 FECHA TOMA: 19/11/99
TAMAÑO ÁRIDO: 20 MM TIPO: H-300 REALIZADO: Carlos
ELEMENTOS: Pila Derecha, Paso Superior 551+300.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-4509-I Nº ALBARÁN: 74.220
HORA SALIDA: 14:36 HORA TOMA: 15:40
ESTADO TIEMPO: Soleado TEMPERATURA: 6 °C
CONO ABRAMS: 6 cm
CONDICIONES DE COLOCACIÓN: Vertido Con Bomba.
INCIDENCIAS: Lleva Anticongelante

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
254	26/11/99	7	43,0	243,3
255	26/11/99	7	44,1	249,6
MEDIA				246
256	17/12/99	28	53,8	304,4
257	17/12/99	28	53,2	301,0
258	17/12/99	28	54,6	309,5
MEDIA				305

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0124

Nº DE REGISTRO:0124

SERIE:51

FECHA TOMA:19/11/99

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS:Estribo Derecho, Paso Superior 551+300

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

TIPO DE CEMENTO:III/AP 42,5R

CAMIÓN:M-2188-KJ

Nº ALBARÁN:74.226

HORA SALIDA:15:55

HORA TOMA:17:00

ESTADO TIEMPO:Soleado

TEMPERATURA:6 °C

CONO ABRAMS7 cm

CONDICIONES DE COLOCACIÓN:Vertido Con Bomba.

INCIDENCIAS:Lleva Anticongelante.

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
259	26/11/99	7	43,2	244,5
260	26/11/99	7	42,1	238,2
MEDIA				241
261	17/12/99	28	56,5	319,7
262	17/12/99	28	56,8	321,4
263	17/12/99	28	56,0	316,9
MEDIA				319

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0125

Nº DE REGISTRO:0125

SERIE:52

FECHA TOMA:19/11/99

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS:Estribo Derecho, Paso Superior 551+300

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

TIPO DE CEMENTO:III/AP 42,5R

CAMIÓN:GU-7337-E

Nº ALBARÁN:74.227

HORA SALIDA:16:09

HORA TOMA:17:25

ESTADO TIEMPO:Nublado

TEMPERATURA:5 °C

CONO ABRAMS7 cm

CONDICIONES DE COLOCACIÓN:Vertido Con Bomba.

INCIDENCIAS:Lleva Anticongelante

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
264	26/11/99	7	43,8	247,9
265	26/11/99	7	44,4	251,2
MEDIA				249
266	17/12/99	28	51,9	293,7
267	17/12/99	28	50,8	287,5
268	17/12/99	28	53,1	300,5
MEDIA				294

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias)
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0224

Nº DE REGISTRO: 0224 SERIE: 112 FECHA TOMA: 11/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Vicente
ELEMENTOS: Tablero P.S 551+300
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2174-LM Nº ALBARÁN: 8.018
HORA SALIDA: 9:30 HORA TOMA: 10:15
ESTADO TIEMPO: Nublado TEMPERATURA: 10 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
572	18/02/00	7	45,5	257,5
573	18/02/00	7	46,7	264,2
MEDIA				261
574	10/03/00	28	59,8	338,4
575	10/03/00	28	60,2	340,7
576	10/03/00	28	58,9	333,3
MEDIA				337

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U.N.E. 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias)
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0225

Nº DE REGISTRO: 0225 SERIE: 113 FECHA TOMA: 11/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Vicente
ELEMENTOS: Tablero P.S 551+300
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-M Nº ALBARÁN: 8.020
HORA SALIDA: 0,523611111 HORA TOMA: 10:45
ESTADO TIEMPO: Soleado TEMPERATURA: 12 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
577	18/02/00	7	52,2	295,4
578	18/02/00	7	53,8	304,4
MEDIA				300
579	10/03/00	28	66,9	378,6
580	10/03/00	28	67,8	383,7
581	10/03/00	28	68,9	389,9
MEDIA				384

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U.N.E. 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCION: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0226

Nº DE REGISTRO: 0226 SERIE: 114 FECHA TOMA: 11/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Vicente
ELEMENTOS: Tablero P.S 551+300
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2835-VY Nº ALBARÁN: 8.023
HORA SALIDA: 11:20 HORA TOMA: 11:45
ESTADO TIEMPO: Nublado TEMPERATURA: 10 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
582	18/02/00	7	54,6	309,0
583	18/02/00	7	53,8	304,4
MEDIA				307
584	10/03/00		69,5	393,3
585	10/03/00		70,2	397,3
586	10/03/00		69,5	393,3
MEDIA				395

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y reñfrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCION: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0227

Nº DE REGISTRO: 0227 SERIE: 115 FECHA TOMA: 11/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Vicente
ELEMENTOS: Tablero P.S 551+300
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2835-VY Nº ALBARÁN: 8.027
HORA SALIDA: 12:40 HORA TOMA: 13:10
ESTADO TIEMPO: Nublado TEMPERATURA: 10 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
587	18/02/00	7	54,8	310,1
588	18/02/00	7	56,1	317,5
MEDIA				314
589	10/03/00	28	70,5	398,9
590	10/03/00	28	71,2	402,9
591	10/03/00	28	69,8	395,0
MEDIA				399

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y reñfrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162.
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0228

Nº DE REGISTRO: 0228 SERIE: 116 FECHA TOMA: 11/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Vicente
ELEMENTOS: Tablero P.S 551+300
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-H Nº ALBARÁN: 8.036
HORA SALIDA: 15:15 HORA TOMA: 15:45
ESTADO TIEMPO: Nublado TEMPERATURA: 12 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
592	18/02/00	7	49,9	282,4
593	18/02/00	7	49,4	279,5
MEDIA				281
594	10/03/00	28	68,9	389,9
595	10/03/00	28	71,2	402,9
596	10/03/00	28	70,5	399,0
MEDIA				397

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES. Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0297

Nº DE REGISTRO: 0297 SERIE: 159 FECHA TOMA: 7/04/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-400 REALIZADO: Jesús
ELEMENTOS: Losa Transición P.S 551+3.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: SO-9966-F Nº ALBARÁN: 7.934
HORA SALIDA: 10:40 HORA TOMA: 11:25
ESTADO TIEMPO: Nublado TEMPERATURA: 14 °C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
807	14/04/00	7	64,6	365,6
808	14/04/00	7	59,5	336,7
MEDIA				351
809	5/05/00	28	76,0	430,1
810	5/05/00	28	78,4	443,1
811	5/05/00	28	79,0	447,1
MEDIA				440

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES. Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo:V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 030

Nº DE REGISTRO: 030 SERIE: 13 FECHA TOMA: 9/09/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Estribo Izquierdo P.S 553+220.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP42,5R
CAMIÓN: M-2188-KJ Nº ALBARÁN: 71.696
HORA SALIDA: 16:23 HORA TOMA: 17:11
ESTADO TIEMPO: Soleado TEMPERATURA: 30 °C
CONO ABRAMS: 10,5 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
61	16/09/99	7	44,7	253,0
62	16/09/99	7	36,6	207
MEDIA				230
63	7/10/99	28	48,8	276,2
64	7/10/99	28	53,5	302,7
65	7/10/99	28	49,0	277,3
MEDIA				285

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo:V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 031

Nº DE REGISTRO: 031 SERIE: 14 FECHA TOMA: 9/09/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Estribo Izquierdo P.S 553+220
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP42,5R
CAMIÓN: GU-6008-C Nº ALBARÁN: 71.700
HORA SALIDA: 16:56 HORA TOMA: 17:40
ESTADO TIEMPO: Soleado TEMPERATURA: 30 °C
CONO ABRAMS: 10,5 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
66	16/09/99	7	48,2	273
67	16/09/99	7	46,7	264
MEDIA				268
68	7/10/99	28	49,8	281,8
69	7/10/99	28	51,8	293,1
70	7/10/99	28	50,2	284,1
MEDIA				286

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo:V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 032

Nº DE REGISTRO:032

SERIE:15

FECHA TOMA:9/09/99

TAMAÑO ÁRIDO:40 MIM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS:Zapata Estribo Izquierdo.P.S 553+220.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

TIPO DE CEMENTO:II/AP42,5R

CAMIÓN:P-0727-BRR

Nº ALBARÁN:71.709

HORA SALIDA:17:19

HORA TOMA:18:10

ESTADO TIEMPO:Soleado

TEMPERATURA:30 °C

CONO ABRAMS:11' 5 cm

CONDICIONES DE COLOCACIÓN:Vertido Directo.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
71	16/09/99	7	48,2	272,8
72	16/09/99	7	46,1	260,9
MEDIA				267
73	7/10/99	28	51,5	291,4
74	7/10/99	28	52,2	295,4
75	7/10/99	28	51,8	293,1
MEDIA				293

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms.conservados en cámara húmeda y reñrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo:V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 033

Nº DE REGISTRO:033

SERIE:16

FECHA TOMA:9/09/99

TAMAÑO ÁRIDO:40 MIM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS:Zapata Estribo Derecho, Paso Superior 553+220.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:GU-6262-G

Nº ALBARÁN:71.711

HORA SALIDA:18:35

HORA TOMA:20:20

ESTADO TIEMPO:Soleado

TEMPERATURA:25 °C

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido Directo.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
76	16/09/99	7	46,9	265,4
77	16/09/99	7	45,9	259,7
MEDIA				263
78	7/10/99	28	50,1	283,5
79	7/10/99	28	49,8	281,8
80	7/10/99	28	51,0	288,6
MEDIA				285

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms.conservados en cámara húmeda y reñrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo:V-b

Hoja de
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C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 034

Nº DE REGISTRO: 034 SERIE: 17 FECHA TOMA: 9/09/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Estribo Derecho , Paso Superior 553+220.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Áridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7337-E Nº ALBARÁN: 74.068
HORA SALIDA: 15:56 HORA TOMA: 16:10
ESTADO TIEMPO: Soleado TEMPERATURA: 7 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido Con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
81	16/09/99	7	47,5	269
82	16/09/99	7	47,4	268
MEDIA				268
83	7/10/99	28	54,7	309,5
84	7/10/99	28	55,9	316,3
85	7/10/99	28	53,6	303,3
MEDIA				310

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo:V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 035

Nº DE REGISTRO: 035 SERIE: 18 FECHA TOMA: 9/09/99
TAMAÑO ARIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Estribo Derecho , Paso Superior 553+220.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Áridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7337-H Nº ALBARÁN: 71.717
HORA SALIDA: 20:46 HORA TOMA: 21:46
ESTADO TIEMPO: Soleado TEMPERATURA: 20 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
86	16/09/99	7	48,8	276
87	16/09/99	7	48,6	275
MEDIA				275
88	7/10/99	28	53,9	305,0
89	7/10/99	28	55,5	314,1
90	7/10/99	28	56,7	320,9
MEDIA				313

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo:V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 036

Nº DE REGISTRO: 036 SERIE: 19 FECHA TOMA: 13/09/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos

ELEMENTOS: Zapata Pila Derecha P.S 553+220
Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-8960-E Nº ALBARÁN: 71.841
HORA SALIDA: 16:12 HORA TOMA: 17:15
ESTADO TIEMPO: Soleado TEMPERATURA: 30 °C
CONO ABRAMS: 11 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
91	20/09/99	7	43,2	244,5
92	20/09/99	7	46,3	262,0
MEDIA				253
93	11/10/99	28	52,7	298,2
94	11/10/99	28	55,8	315,7
95	11/10/99	28	53,9	305,0
MEDIA				306

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo:V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 037

Nº DE REGISTRO: 037 SERIE: 20 FECHA TOMA: 13/09/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos

ELEMENTOS: Zapata Pila Izquierda . P.S 553+220.
Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-8961-F Nº ALBARÁN: 71.828
HORA SALIDA: 17:50 HORA TOMA: 18:50
ESTADO TIEMPO: Soleado TEMPERATURA: 30 °C
CONO ABRAMS: 13 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
96	20/09/99	7	44,8	253,5
97	20/09/99	7	46,6	243,7
MEDIA				249
98	11/10/99	28	56,4	319,1
97	11/10/99	28	52,6	297,6
99	11/10/99	28	49,8	281,8
MEDIA				299

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



EUROESTUDIOS S.A.
Laboratorio acreditado por la com
áreas: H.C. Control de hormigón en masa, de cementos, de áridos, y de agua
(03109HC95). SE. Ensayos de laboratorio de mecánica de suelo (0311SE95).
Publicado en B.O.E. Día 29-3-95

Hoja de
Laboratorio de Madrid
Polígono Industrial Santa Ana
C/ Tornillo, 13 Teléfono 6668693
28529 Rivas VaciaMadrid (MADRID)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 098

Nº DE REGISTRO: 098

TAMAÑO ÁRIDO: 20 MIM

ELEMENTOS: Estribo Izquierdo Paso Superior 553+200.Alzado.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Aridos Pascual

CAMIÓN: GU-4466-E

HORA SALIDA: 13:49

ESTADO TIEMPO: Lluvia

CONO ABRAMS: 7' 5 cm

CONDICIONES DE COLOCACIÓN: Vertido Con Bomba.

INCIDENCIAS:

SERIE: 38

TIPO: H-250

TIPO DE CEMENTO:

Nº ALBARÁN: 73.272

HORA TOMA: 14:40

TEMPERATURA: 10 °C

FECHA TOMA: 22/10/99

REALIZADO: Carlos

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
186	29/10/99	7	43,9	248,4
187	29/10/99	7	45,0	254,6
MEDIA				251
188	19/11/99	28	53,2	301,1
189	19/11/99	28	54,2	306,7
190	19/11/99	28	53,8	304,4
MEDIA				304

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



EUROESTUDIOS S.A.
Laboratorio acreditado por la com
áreas: H.C. Control de hormigón en masa, de cementos, de áridos, y de agua
(03109HC95). SE. Ensayos de laboratorio de mecánica de suelo (0311SE95).
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Hoja de
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Polígono Industrial Santa Ana
C/ Tornillo, 13 Teléfono 6668693
28529 Rivas VaciaMadrid (MADRID)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 099

Nº DE REGISTRO: 099

TAMAÑO ÁRIDO: 20 MIM

ELEMENTOS: Estribo Izquierdo Paso Superior 553+200.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Aridos Pascual

CAMIÓN: P-4686-BBB

HORA SALIDA: 14:16

ESTADO TIEMPO: Lluvia

CONO ABRAMS: 9 cm

CONDICIONES DE COLOCACIÓN: Vertido Con Bomba.

INCIDENCIAS:

SERIE: 39

TIPO: H-250

TIPO DE CEMENTO:

Nº ALBARÁN: 73.275

HORA TOMA: 15:35

TEMPERATURA: 10 °C

FECHA TOMA: 22/10/99

REALIZADO: Carlos

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
191	29/10/99	7	42,0	237,6
192	29/10/99	7	41,3	233,7
MEDIA				236
193	19/11/99	28	48,2	272,8
194	19/11/99	28	47,9	271,1
195	19/11/99	28	48,8	276,2
MEDIA				273

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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EUROESTUDIOS S.A.
Laboratorio acreditado por la com
áreas: H.C. Control de hormigón en masa, de cementos, de áridos, y de agua
(03109HC95). SE. Ensayos de laboratorio de mecánica de suelo (0311SE95).
Publicado en B.O.E. Día 29-3-95

Hoja de
Laboratorio de Madrid
Polígono Industrial Santa Ana
C/ Tornillo, 13 Teléfono 6668693
28529 Rivas VaciaMadrid (MADRID)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F. (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0100

Nº DE REGISTRO:	0100	SERIE:	40	FECHA TOMA:	22/10/99
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Carlos
ELEMENTOS: Estribo Izquierdo Paso Superior 553+200. Linea A.V.E. Madrid-Zaragoza.Subtramo V-b.					
SUMINISTRADOR:	Aridos Pascual	TIPO DE CEMENTO:			
CAMIÓN:	GU-8961-F	Nº ALBARÁN:	73.285		
HORA SALIDA:	16:40	HORA TOMA:	17:47		
ESTADO TIEMPO:	Lluvia	TEMPERATURA:	9 °C		
CONO ABRAMS:	8 cm				
CONDICIONES DE COLOCACIÓN:	Vertido Con Bomba.				
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
196	29/10/99	7	48,2	272,7
197	29/10/99	7	48,6	275,0
MEDIA				274
198	19/11/99	28	58,0	328,2
199	19/11/99	28	59,2	335,0
200	19/11/99	28	56,6	320,3
MEDIA				328

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F. (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0106

Nº DE REGISTRO:	0106	SERIE:	41	FECHA TOMA:	4/11/99
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Carlos
ELEMENTOS: Estribo Izquierdo Paso Superior 553+200. Linea A.V.E. Madrid-Zaragoza.Subtramo V-b.					
SUMINISTRADOR:	Aridos Pascual	TIPO DE CEMENTO:	II/AP42.5R		
CAMIÓN:	M-2188-KJ	Nº ALBARÁN:	73.723		
HORA SALIDA:	15:21	HORA TOMA:	16:25		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	17 °C		
CONO ABRAMS:	8 cm				
CONDICIONES DE COLOCACIÓN:	Vertido Con Cubo.				
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
201	11/11/99	7	45,5	257,5
202	11/11/99	7	44,9	254,1
MEDIA				256
203	2/12/99	28	52,9	299,3
204	2/12/99	28	53,3	301,6
205	2/12/99	28	53,8	304,4
MEDIA				302

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



EUROESTUDIOS S.A.
Laboratorio acreditado por la com
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INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0114

Nº DE REGISTRO:0114

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Pila Derecha .Paso Superior 553+200.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

CAMIÓN:GU-4509-I

HORA SALIDA:16:25

ESTADO TIEMPO:Soleado

CONO ABRAMS:9 cm

CONDICIONES DE COLOCACIÓN:Vertido Con Bomba.

INCIDENCIAS:

SERIE:45

TIPO:H-300

TIPO DE CEMENTO:

Nº ALBARÁN:73.852

HORA TOMA:17:25

TEMPERATURA:8 °C

FECHA TOMA:9/11/99

REALIZADO:Carlos

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
221	16/11/99	7	48,1	272,1
222	16/11/99	7	46,1	260,8
MEDIA				266
223	7/12/01	28	54,1	306,1
224	7/12/01	28	52,1	294,8
225	7/12/01	28	53,9	305,0
MEDIA				302

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

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19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0116

Nº DE REGISTRO:0116

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Estribo Derecho, Paso Superior 553+200.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

CAMIÓN:GU-6262-G

HORA SALIDA:15:08

ESTADO TIEMPO:Soleado

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido Con Bomba.

INCIDENCIAS:

SERIE:46

TIPO:H-250

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:74.064

HORA TOMA:16:15

TEMPERATURA:7 °C

FECHA TOMA:16/11/99

REALIZADO:Carlos

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
228	23/11/99	7	43,8	247,8
229	23/11/99	7	42,0	237,6
MEDIA				243
230	14/12/99	28	53,9	305,0
231	14/12/99	28	54,1	306,1
232	14/12/99	28	55,3	312,9
MEDIA				308

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

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19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0117

Nº DE REGISTRO: 0117 SERIE: 47 FECHA TOMA: 16/11/99
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Estribo Derecho, Paso Superior 553+200.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7337-E Nº ALBARÁN: 74.068
HORA SALIDA: 15:56 HORA TOMA: 16:10
ESTADO TIEMPO: Soleado TEMPERATURA: 7 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido Con Bomba.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
235	23/11/99	7	43,8	247,9
236	23/11/99	7	42,5	240,5
MEDIA				244
237	14/12/99	28	52,4	296,5
238	14/12/99	28	53,8	304,4
239	14/12/99	28	53,3	301,6
MEDIA				301

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
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19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0118

Nº DE REGISTRO: 0118 SERIE: 48 FECHA TOMA: 16/11/99
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Estribo Derecho, Paso Superior 553+200.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-8960-F Nº ALBARÁN: 74.072
HORA SALIDA: 16:48 HORA TOMA: 17:10
ESTADO TIEMPO: Soleado TEMPERATURA: 6 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido Con Bomba.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
242	23/11/99	7	43,4	245,6
243	23/11/99	7	42,4	239,9
MEDIA				243
244	14/12/99	28	48,7	275,6
245	14/12/99	28	52,9	299,4
246	14/12/99	28	51,0	288,6
MEDIA				288

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

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19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0119

Nº DE REGISTRO: 0119
TAMAÑO ÁRIDO: 20 MM
SERIE: 49
FECHA TOMA: 16/11/99
TIPO: H-250
REALIZADO: Carlos
ELEMENTOS: Estribo Derecho, Paso Superior 553+200.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Aridos Pascual
CAMIÓN: GU-6008-C
HORA SALIDA: 18:08
ESTADO TIEMPO: Noche
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido Con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
249	23/11/99	7	45,0	254,6
250	23/11/99	7	44,2	250,1
MEDIA				252
251	14/12/99	28	54,6	308,9
252	14/12/99	28	53,2	301,0
253	14/12/99	28	53,7	303,9
MEDIA				305

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

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C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0126

Nº DE REGISTRO: 0126
TAMAÑO ÁRIDO: 20 MM
SERIE: 53
FECHA TOMA: 25/11/99
TIPO: H-300
REALIZADO: Carlos
ELEMENTOS: Pila Izquierda. P.K 572+900.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Aridos Pascual
CAMIÓN: GU-6262-G
HORA SALIDA: 8:10
ESTADO TIEMPO: Soleado
CONO ABRAMS: 6 cm
CONDICIONES DE COLOCACIÓN: Vertido Con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
269	2/12/99	7	53,0	299,9
270	2/12/99	7	52,8	298,7
MEDIA				299
271	23/12/99	28	65,7	371,8
272	23/12/99	28	66,9	378,6
273	23/12/99	28	66,3	375,2
MEDIA				375

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

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C/ Bodegón del Ciego. s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0127

Nº DE REGISTRO	0127	SERIE	54	FECHA TOMA	25/11/99
TAMAÑO ÁRIDO	20 MM	TIPO:	H-250	REALIZADO	Carlos
ELEMENTOS: Estribo Izquierdo. P.K 572+900. Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR	Aridos Pascual	TIPO DE CEMENTO:		II/AP 42,5R	
CAMIÓN:	GU-4466-E	Nº ALBARÁN:		74.412	
HORA SALIDA:	9:25	HORA TOMA:		10.45	
ESTADO TIEMPO:	Soleado	TEMPERATURA:		6 °C	
CONO ABRAMS	8 cm				
CONDICIONES DE COLOCACIÓN:	Vertido Con Bomba.				
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
274	2/12/99	7	49,2	278,4
275	2/12/99	7	48,5	274,4
MEDIA				276
276	23/12/99	28	56,4	319,2
277	23/12/99	28	57,0	322,6
278	23/12/99	28	56,5	319,7
MEDIA				320

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0128

Nº DE REGISTRO:	0128	SERIE	55	FECHA TOMA:	25/11/99
TAMAÑO ÁRIDO:	20 MM	TIPO:	H-250	REALIZADO	Carlos
ELEMENTOS:					
Estribo Izquierdo. P.K 572+900.					
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Aridos Pascual	TIPO DE CEMENTO:		II/AP 42.5R	
CAMIÓN:	GU-7227-E	Nº ALBARÁN:		74.415	
HORA SALIDA:	10:03	HORA TOMA:		11:50	
ESTADO TIEMPO:	Soleado	TEMPERATURA:		8 °C	
CONO ABRAMS:	7' 5 cm				
CONDICIONES DE COLOCACIÓN:	Vertido Con Bomba.				
INCIDENCIAS.					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
279	2/12/99	7	44,9	254,0
280	2/12/99	7	45,1	255,2
MEDIA				255
281	23/12/99	28	58,4	330,5
282	23/12/99	28	59,7	337,8
283	23/12/99	28	57,8	327,1
MEDIA				332

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0129

Nº DE REGISTRO:0129

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Estribo Izquierdo . P.K 572+900.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

CAMIÓN:GU-4509-I

HORA SALIDA:11:26

ESTADO TIEMPO:Soleado

CONO ABRAMS:8 cm

CONDICIONES DE COLOCACIÓN:Vertido Con Bomba.

INCIDENCIAS:

SERIE:56

TIPO:H-250

FECHA TOMA:25/11/99

REALIZADO:Carlos

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
284	2/12/99	7	49.4	279,5
285	2/12/99	7	49.4	279,5
MEDIA				279
286	23/12/99	28	59.6	337,3
287	23/12/99	28	61.7	349,1
288	23/12/99	28	61.8	349,7
MEDIA				345

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

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19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0134

Nº DE REGISTRO:0134

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Cabecero Derecho . P.S 553+200.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

CAMIÓN:GU-4509-I

HORA SALIDA:15:00

ESTADO TIEMPO:Soleado

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido Con Bomba.

INCIDENCIAS:

SERIE:57

TIPO:H-250

FECHA TOMA:30/11/99

REALIZADO:Carlos

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
289	7/12/99	7	45.0	254,6
290	7/12/99	7	46.1	260,9
MEDIA				258
291	28/12/99	28	55.0	311,2
292	28/12/99	28	54.0	305,6
293	28/12/99	28	54.9	310,7
MEDIA				309

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
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19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias)

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0182

Nº DE REGISTRO: 0182 SERIE: 89 FECHA TOMA: 5/01/00
TAMAÑO ÁR.DO: 20 MIM TIPO: H-300 REALIZADO: Carlos
ELEMENTOS: Tablero, P.S 553+2.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: AL-2406-AG Nº ALBARÁN: 9.224
HORA SALIDA: 11:45 HORA TOMA: 12:00
ESTADO TIEMPO: Soleado TEMPERATURA: 6 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS: Lleva Anticongelante

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
457	12/01/00	7	41,7	236,0
458	12/01/00	7	40,7	230,3
MEDIA				233
460	2/02/00	28	58,7	332,2
461	2/02/00	28	59,1	334,4
MEDIA				333

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias)

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0183

Nº DE REGISTRO: 0183 SERIE: 90 FECHA TOMA: 5/01/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Carlos
ELEMENTOS: Tablero, P.S 553+2
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2835-VY Nº ALBARÁN: 9.232
HORA SALIDA: 14:30 HORA TOMA: 14:50
ESTADO TIEMPO: Soleado TEMPERATURA: 6 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS: Lleva Anticongelante

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
462	12/01/00	7	29,9	169,2
463	12/01/00	7	29,5	166,9
MEDIA				168
465	2/02/00	28	54,6	309,0
466	2/02/00	28	56,9	322,0
MEDIA				316

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0184

Nº DE REGISTRO:	0184	SERIE:	91	FECHA TOMA:	5/01/00
TAMAÑO ÁRIDO	20 MIM	TIPO:	H-300	REALIZADO	Carlos
ELEMENTOS: Tablero, P.S 553+200. Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN	M-1973-YD	Nº ALBARÁN:	9.234		
HORA SALIDA:	15:25	HORA TOMA:	15:50		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	6 °C		
CONO ABRAMS:	9 cm				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba.				
INCIDENCIAS:	Lleva Anticongelante				

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
467	12/01/00	7	30,8	174,3
468	12/01/00	7	30,8	174,3
MEDIA				174
470	2/02/00	28	57,2	323,7
471	2/02/00	28	57,9	327,7
MEDIA				326

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0187

Nº DE REGISTRO:	0187	SERIE:	94	FECHA TOMA:	11/01/00
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO	Carlos
ELEMENTOS: Cabecero Derecho P.S 572+9 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	AL-2406-AG	Nº ALBARÁN:	9.013		
HORA SALIDA:	11:15	HORA TOMA:	16:45		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	8 °C		
CONO ABRAMS:	9 cm				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba.				
INCIDENCIAS:	Lleva Anticongelante				

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
482	19/01/00	7	31,5	178,3
483	19/01/00	7	30,9	174,9
MEDIA				177
484	9/02/00	28	50,2	284,1
485	9/02/00	28	51,6	292,0
486	9/02/00	28	49,1	277,9
MEDIA				285

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

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19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0289

Nº DE REGISTRO:0289

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Tablero P.S 572+900.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:SO-9966-F

HORA SALIDA:9:00

ESTADO TIEMPO:Soleado.

CONO ABRAMS:8 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba.

INCIDENCIAS:

SERIE:153

TIPO:H-300

FECHA TOMA:29/03/00

REALIZADO:Jesús

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:7.900

HORA TOMA:9:50

TEMPERATURA:1 °C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
777	5/04/00	7	61.8	349,7
778	5/04/00	7	60.4	341,8
MEDIA				346
779	26/04/00	28	72.7	411,4
780	26/04/00	28	73.6	416,5
781	26/04/00	28	72.5	410,3
MEDIA				413

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0290

Nº DE REGISTRO:0290

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Tablero P.S 572+900.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:GU-7187-H

HORA SALIDA:11:55

ESTADO TIEMPO:Nublado

CONO ABRAMS:9 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba.

INCIDENCIAS:

SERIE:154

TIPO:H-300

FECHA TOMA:29/03/00

REALIZADO:Jesús

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:7.907

HORA TOMA:12:25

TEMPERATURA:5 °C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
782	5/04/00	7	57.6	326,0
783	5/04/00	7	56.8	321,4
MEDIA				324
784	26/04/00	28	72.2	408,6
785	26/04/00	28	70.5	399,0
786	26/04/00	28	70.6	399,5
MEDIA				402

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
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C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0291

Nº DE REGISTRO: 0291 SERIE: 155 FECHA TOMA: 29/03/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús

ELEMENTOS: Tablero P.S 572+900.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-7454-IK Nº ALBARÁN: 7.909
HORA SALIDA: 12:25 HORA TOMA: 12:55
ESTADO TIEMPO: Nublado TEMPERATURA: 8 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
787	5/04/00	7	58,7	332,2
788	5/04/00	7	59,2	335,0
MEDIA				334
789	26/04/00	28	75,6	427,8
790	26/04/00	28	74,5	421,6
791	26/04/00	28	73,9	418,2
MEDIA				423

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
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C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0292

Nº DE REGISTRO: 0292 SERIE: 156 FECHA TOMA: 29/03/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús

ELEMENTOS: Tablero P.S 572+900.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-7454-IK Nº ALBARÁN: 7.921
HORA SALIDA: 16:25 HORA TOMA: 16:55
ESTADO TIEMPO: Nublado TEMPERATURA: 10 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
792	5/04/00	7	57,9	327,7
793	5/04/00	7	56,2	318,0
MEDIA				323
794	26/04/00	28	73,0	413,1
795	26/04/00	28	75,2	425,6
796	26/04/00	28	73,0	413,1
MEDIA				417

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0296

Nº DE REGISTRO: 0296 SERIE: 158 FECHA TOMA: 5/04/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Acera P.S 553+2
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-H Nº ALBARÁN: 7.930
HORA SALIDA: 17:30 HORA TOMA: 18:30
ESTADO TIEMPO: Nublado TEMPERATURA: 6 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
802	12/04/00	7	52,3	296,0
803	12/04/00	7	49,7	281,2
MEDIA				289
804	3/05/00	28	64,8	366,7
805	3/05/00	28	63,2	357,6
806	3/05/00	28	62,5	353,7
MEDIA				359

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0298

Nº DE REGISTRO: 0298 SERIE: 160 FECHA TOMA: 7/04/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-400 REALIZADO: Jesús
ELEMENTOS: Losa Transición P.S 553+260.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: SO-9966-F Nº ALBARÁN: 7.935
HORA SALIDA: 12:15 HORA TOMA: 12:50
ESTADO TIEMPO: Soleado TEMPERATURA: 16 °C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
812	14/04/00	7	69,5	393,3
813	14/04/00	7	63,1	385,4
MEDIA				389
814	5/05/00	28	84,4	477,6
815	5/05/00	28	83,9	474,8
816	5/05/00	28	85,4	483,3
MEDIA				479

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0314

Nº DE REGISTRO: 0314 SERIE: 172 FECHA TOMA: 25/04/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-400 REALIZADO: Jesús
ELEMENTOS: Zapata Estribo Izquierdo P.S 556+900
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: Z-3094-AK Nº ALBARÁN: 9.314
HORA SALIDA: 10:35 HORA TOMA: 10:50
ESTADO TIEMPO: Soleado TEMPERATURA: 10 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
872	2/05/00	7	82,9	355,9
873	2/05/00	7	85,2	369,0
MEDIA				362
874	23/05/00	28	74,4	421,0
875	23/05/00	28	79,2	448,2
876	23/05/00	28	76,4	432,3
MEDIA				434

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0315

Nº DE REGISTRO: 0315 SERIE: 173 FECHA TOMA: 25/04/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata Estribo Derecho P.S 556+900
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: Z-3094-AK Nº ALBARÁN: 9.327
HORA SALIDA: 17:10 HORA TOMA: 21:25
ESTADO TIEMPO: Soleado TEMPERATURA: 16 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
877	2/05/00	7	43,2	246,2
878	2/05/00	7	46,5	263,1
MEDIA				255
879	23/05/00	28	59,1	334,4
880	23/05/00	28	60,9	344,6
881	23/05/00	28	60,5	342,4
MEDIA				340

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0317

Nº DE REGISTRO: 0317 SERIE: 174 FECHA TOMA: 5/05/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Estribo Izquierdo P.S 556+900
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42.5R
CAMIÓN: M-6871-JK Nº ALBARÁN: 9.342
HORA SALIDA: 10:15 HORA TOMA: 10:40
ESTADO TIEMPO: Nublado TEMPERATURA: 10 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
882	12/05/00	7	49.2	278,4
883	12/05/00	7	49.6	280,7
MEDIA				280
884	2/06/00	28	64.5	365,0
885	2/06/00	28	57.1	323,1
886	2/06/00	28	59.6	337,3
MEDIA				342

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0318

Nº DE REGISTRO: 0318 SERIE: 175 FECHA TOMA: 5/05/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata Pila Derecha P.S 556+900
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42.5R
CAMIÓN: M-6871-JK Nº ALBARÁN: 9.346
HORA SALIDA: 12:05 HORA TOMA: 13:05
ESTADO TIEMPO: Nublado TEMPERATURA: 13 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
887	12/05/00	7	47.6	269,4
888	12/05/00	7	47.1	266,5
MEDIA				268
889	2/06/00	28	59.0	333,9
890	2/06/00	28	57.1	323,2
891	2/06/00	28	59.9	339,0
MEDIA				332

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego. s/n Teléfono 949322162

19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0324

Nº DE REGISTRO:0324

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Pila Derecha P.S 556+900.

Línea A.V.E . Madrid-Zaragoza. Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:M-2174-LM

HORA SALIDA:8:20

ESTADO TIEMPO:Nublado

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido con bomba.

INCIDENCIAS:

SERIE:181

FECHA TOMA:11/05/00

TIPO:H-300

REALIZADO:Jesús

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:9.380

HORA TOMA:9:35

TEMPERATURA:8 °C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
917	18/05/00	7	51,9	293,7
918	18/05/00	7	53,4	302,2
MEDIA				298
919	8/06/00	28	67,7	383,1
920	8/06/00	28	64,2	363,3
921	8/06/00	28	65,6	371,2
MEDIA				373

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego. s/n Teléfono 949322162

19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0325

Nº DE REGISTRO:0325

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Estribo Derecho P.S 556+900.

Línea A.V.E . Madrid-Zaragoza. Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMION:M-2174-LM

HORA SALIDA:11:50

ESTADO TIEMPO:Nublado

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido con bomba.

INCIDENCIAS:

SERIE:182

FECHA TOMA:11/05/00

TIPO:H-300

REALIZADO:Jesús

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:9.384

HORA TOMA:12:20

TEMPERATURA:12 °C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
922	18/05/00	7	48,0	271,6
923	18/05/00	7	45,4	256,9
MEDIA				264
924	8/06/00	28	59,4	336,1
925	8/06/00	28	61,0	345,2
926	8/06/00	28	60,7	343,5
MEDIA				342

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

60



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0329

Nº DE REGISTRO: 0329 SERIE: 185 FECHA TOMA: 18/05/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Pilar Izquierda P.S 556+9
Linea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: SO-1950-G Nº ALBARÁN: 9.396
HORA SALIDA: 9:55 HORA TOMA: 10:15
ESTADO TIEMPO: Soleado TEMPERATURA: 15 °C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
937	25/05/00	7	53,5	302,8
938	25/05/00	7	54,5	308,4
MEDIA				306
939	15/06/00	28	66,2	374,0
940	15/06/00	28	66,3	375,2
941	15/06/00	28	66,1	374,1
MEDIA				374

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0401

Nº DE REGISTRO: 0401 SERIE: 212 FECHA TOMA: 18/08/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Losa Paso Superior 556+900
Linea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: Z-3094-AK Nº ALBARÁN: 8.692
HORA SALIDA: 9:30 HORA TOMA: 9:55
ESTADO TIEMPO: Soleado TEMPERATURA: 22°C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1076	25/08/00	7	50,2	284,1
1077	25/08/00	7	47,8	270,5
				277
1078	15/09/00	28	67,2	380,2
1079	15/09/00	28	70,2	397,2
1080	15/09/00	28	66,4	387,0
MEDIA				388

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0402

Nº DE REGISTRO: 0402 SERIE: 213 FECHA TOMA: 18/08/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Losa Paso Superior 556+900
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-4508-XF Nº ALBARÁN: 7.001
HORA SALIDA: 11:35 HORA TOMA: 11:55
ESTADO TIEMPO: Soleado TEMPERATURA: 25°C
CONO ABRAMS 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1081	25/08/00	7	47,6	269,4
1082	25/08/00	7	47,7	269,9
				270
1083	15/09/00	28	68,2	385,9
1084	15/09/00	28	67,9	384,2
1085	15/09/00	28	65,8	372,3
		MEDIA		381

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre.
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0403

Nº DE REGISTRO: 0403 SERIE: 214 FECHA TOMA: 18/08/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Losa Paso Superior 556+900
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-4508-XF Nº ALBARÁN: 7.013
HORA SALIDA: 14:40 HORA TOMA: 14:56
ESTADO TIEMPO: Soleado TEMPERATURA: 30°C
CONO ABRAMS 8 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1086	25/08/00	7	54,1	306,1
1087	25/08/00	7	58,1	328,8
				317
1088	15/09/00	28	75,2	425,5
1089	15/09/00	28	76,2	431,2
1090	15/09/00	28	74,4	421,0
		MEDIA		426

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre.
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F. (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0404

Nº DE REGISTRO:	0404	SERIE	215	FECHA TOMA	18/08/00
TAMAÑO ARIDO:	20 MIM	TIPO:	H-300	REALIZADO:	Jesús
ELEMENTOS: Losa Paso Superior 556+900 Línea A.V.E. Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	Z-3094-AK	Nº ALBARÁN	7.015		
HORA SALIDA:	15:25	HORA TOMA:	15:40		
ESTADO TIEMPO	Soleado	TEMPERATURA:	30°C		
CONO ABRAMS:	7 cm				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba				
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1091	25/08/00	7	61,2	346,3
1092	25/08/00	7	62,6	354,2
				350
1093	15/09/00	28	75,7	428,3
1094	15/09/00	28	75,7	428,3
1095	15/09/00	28	76,1	430,6
MEDIA				429

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U.N.E. 83.300, 83.301, 83.303, 83.304 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0499

Nº DE REGISTRO:	499	SERIE:	261	FECHA TOMA:	16/01/01
TAMAÑO ÁRIDO:	20 MIM	TIPO	H-250	REALIZADO	Jesús
ELEMENTOS: Zapata Estribo Izquierdo P.S 559+600. Linea A.V.E . Madrid-Zaragoza Subtramo V-b .					
SUMINISTRADOR:	Planta valdemonillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-1121-EG	Nº ALBARÁN:	8.741		
HORA SALIDA:	16:00	HORA TOMA:	16:30		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	6°C		
CONO ABRAMS:	7				
CONDICIONES DE COLOCACIÓN: Vertido Directo					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1321	23/01/01	7	27,0	152,8
1322	23/01/01	7	28,4	160,7
MEDIA				157
1324	13/02/01	28	44,4	251,2
1325	13/02/01	28	42,0	237,6
MEDIA				244

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre.
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0501

Nº DE REGISTRO:	501	SERIE:	262	FECHA TOMA:	24/01/01
TAMAÑO ÁRIDO:	20 MIM	TIPO	H-250	REALIZADO:	Jesús
ELEMENTOS: Zapata Derecha P.S 559+680. Linea A.V.E . Madrid-Zaragoza Subtramo V-b .					
SUMINISTRADOR:	Planta valdemonillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-1121-EG	Nº ALBARÁN:	7.738		
HORA SALIDA:	10:30	HORA TOMA:	10:50		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	9°C		
CONO ABRAMS:	8				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1326	31/01/01	7	41,3	233,7
1327	31/01/01	7	43,2	244,5
MEDIA				239
1328	21/02/01	28	66,6	376,8
1329	21/02/01	28	66,8	378,0
1330	21/02/01	28	66,0	373,4
MEDIA				376

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre.
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O.
Tramo: Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F. (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0538

Nº DE REGISTRO: 538
TAMAÑO ÁRIDO: 20 MIM
SERIE: 288
FECHA TOMA: 28/02/01
TIPO: H-250
REALIZADO: Jesús

ELEMENTOS: Alzado Estribo Izquierdo P.S 559+600.
Línea A.V.E. Madrid-Zaragoza. Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L.
CAMIÓN: A-9495-DW
HORA SALIDA: 12:35
ESTADO TIEMPO: Nublado
CONO ABRAMS: 8
TIPO DE CEMENTO: II/AP 42,5R
Nº ALBARÁN: 11.125
HORA TOMA: 13:00
TEMPERATURA: 5°C

CONDICIONES DE COLOCACIÓN: Vertido con Bomba. Lleva anticogelante.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1456	7/03/01	7	45,9	259,7
1457	7/03/01	7	42,7	241,6
MEDIA				251
1458	28/03/01	28	58,2	329,3
1459	28/03/01	28	59,3	335,5
1460	28/03/01	28	60,5	342,3
MEDIA				336

fck H-250

Kp/cm²

Kp/cm²



A.C.O.
Tramo: Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F. (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0539

Nº DE REGISTRO: 539
TAMAÑO ÁRIDO: 20 MIM
SERIE: 289
FECHA TOMA: 28/02/01
TIPO: H-250
REALIZADO: Jesús

ELEMENTOS: Alzado Estribo Derecho P.S 559+600.
Línea A.V.E. Madrid-Zaragoza Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L.
CAMIÓN: A-9495-DW
HORA SALIDA: 9:40
ESTADO TIEMPO: Nublado
CONO ABRAMS: 8
TIPO DE CEMENTO: II/AP 42,5R
Nº ALBARÁN: 11.116
HORA TOMA: 10:35
TEMPERATURA: 5°C

CONDICIONES DE COLOCACIÓN: Vertido con Bomba. Lleva anticogelante.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1461	7/03/01	7	41,9	237,1
1462	7/03/01	7	39,6	224,0
MEDIA				231
1463	28/03/01	28	60,9	344,6
1464	28/03/01	28	59,9	338,9
1465	28/03/01	28	60,6	342,9
MEDIA				342

fck H-250

Kp/cm²

Kp/cm²



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0501

Nº DE REGISTRO: 501

TAMAÑO ÁRIDO: 20 MIM

ELEMENTOS: Zapata Derecha P.S 559+680.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L

CAMIÓN: A-1121-EG

HORA SALIDA: 10:30

ESTADO TIEMPO: Nublado

CONO ABRAMS: 8

CONDICIONES DE COLOCACIÓN: Vertido con Bomba

INCIDENCIAS:

SERIE: 262

TIPO: H-250

TIPO DE CEMENTO: II/AP 42,5R

Nº ALBARÁN: 7.738

HORA TOMA: 10:50

TEMPERATURA: 9°C

FECHA TOMA: 24/01/01

REALIZADO: Jesús

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1326	31/01/01	7	41,3	233,7
1327	31/01/01	7	43,2	244,5
MEDIA				239
1328	21/02/01	28	66,6	376,8
1329	21/02/01	28	66,8	378,0
1330	21/02/01	28	66,0	373,4
MEDIA				376

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0538

Nº DE REGISTRO: 538

TAMAÑO ÁRIDO: 20 MIM

ELEMENTOS: Alzado Estribo Izquierdo P.S 559+600.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L

CAMIÓN: A-9495-DW

HORA SALIDA: 12:35

ESTADO TIEMPO: Nublado

CONO ABRAMS: 8

CONDICIONES DE COLOCACIÓN: Vertido con Bomba. Lleva anticogelante.

INCIDENCIAS:

SERIE: 288

TIPO: H-250

TIPO DE CEMENTO: II/AP 42,5R

Nº ALBARÁN: 11.125

HORA TOMA: 13:00

TEMPERATURA: 5°C

FECHA TOMA: 28/02/01

REALIZADO: Jesús

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1456	7/03/01	7	45,9	259,7
1457	7/03/01	7	42,7	241,6
MEDIA				251
1458	28/03/01	28	58,2	329,3
1459	28/03/01	28	59,3	335,5
1460	28/03/01	28	60,5	342,3
MEDIA				336

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego. s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0539

Nº DE REGISTRO:	539	SERIE:	289	FECHA TOMA:	28/02/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO	Jesús
ELEMENTOS: Alzado Estribo Derecho P.S 559+600. Línea A.V.E . Madrid-Zaragoza Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-9495-DW	Nº ALBARÁN:	11.116		
HORA SALIDA:	9:40	HORA TOMA:	10:35		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	5°C		
CONO ABRAMS:	8				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba. Lleva anticogelante.					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1461	7/03/01	7	41,9	237,1
1462	7/03/01	7	39,6	224,0
MEDIA				231
1463	28/03/01	28	60,9	344,6
1464	28/03/01	28	59,9	338,9
1465	28/03/01	28	60,6	342,9
MEDIA				342

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego. s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0568

Nº DE REGISTRO:	568	SERIE:	315	FECHA TOMA:	4/04/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-300	REALIZADO	Jesús
ELEMENTOS: Alzado Pila Izquierda P.S 559+6 Línea A.V.E . Madrid-Zaragoza Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-1121-EC	Nº ALBARÁN:	11.586		
HORA SALIDA:	9:05	HORA TOMA:	9:50		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	12°C		
CONO ABRAMS:	9				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1591	11/04/01	7	59,9	338,9
1592	11/04/01	7	58,8	332,7
MEDIA				336
1593	2/05/01	28	73,8	417,6
1594	2/05/01	28	73,1	413,6
1595	2/05/01	28	71,6	405,1
MEDIA				412

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0576

Nº DE REGISTRO: 576

TAMAÑO ÁRIDO: 20 MIM

ELEMENTOS: Alzado Pila Derecha P.S 559+6.
Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L

CAMIÓN: A-1121-EC

HORA SALIDA: 11:55

ESTADO TIEMPO: Soleado

CONO ABRAMS: 8

CONDICIONES DE COLOCACIÓN: Vertido con Bomba

INCIDENCIAS:

SERIE: 319

TIPO: H-300

TIPO DE CEMENTO: II/AP 42,5R

Nº ALBARAN: 11.624

HORA TOMA: 12:45

TEMPERATURA: 16°C

FECHA TOMA: 6/04/01

REALIZADO: Jesús

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1611	13/04/01	7	48,3	273,3
1612	13/04/01	7	48,8	276,1
MEDIA				275
1613	4/05/01	28	59,6	337,2
1614	4/05/01	28	58,9	333,3
1615	4/05/01	28	58,5	331,0
MEDIA				334

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0594

Nº DE REGISTRO: 594

TAMAÑO ARIDO: 20 MIM

ELEMENTOS: Losa P.S 559+600
Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L

CAMIÓN: A-9495-DW

HORA SALIDA: 9:00

ESTADO TIEMPO: Soleado

CONO ABRAMS: 8

CONDICIONES DE COLOCACIÓN: Vertido con Bomba

INCIDENCIAS:

SERIE: 325

TIPO: H-300

TIPO DE CEMENTO: II/AP 42,5R

Nº ALBARÁN: 13.338

HORA TOMA: 9:50

TEMPERATURA: 16°C

FECHA TOMA: 21/05/01

REALIZADO: Jesús

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1641	28/05/01	7	52,3	295,9
1642	28/05/01	7	54,0	305,5
MEDIA				301
1643	18/06/01	28	68,4	387,0
1644	18/06/01	28	69,2	391,6
1645	18/06/01	28	68,9	389,9
MEDIA				390

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDECENCIA L.A.V Madrid-Zaragoza Subtramo V-b

Nº TRABAJO: 0595

Nº DE REGISTRO:595

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Losa P.S 559+600

Linea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:A-9960-DT

HORA SALIDA:10:10

ESTADO TIEMPO:Soleado

CONO ABRAMS:7

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

SERIE:326

TIPO:H-300

FECHA TOMA:21/05/01

REALIZADO:Jesús

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:13.341

HORA TOMA:11:20

TEMPERATURA:17°C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1646	28/05/01	7	48,6	275,0
1647	28/05/01	7	50,5	285,7
MEDIA				280
1648	18/06/01	28	64,1	362,7
1649	18/06/01	28	67,2	380,2
1650	18/06/01	28	67,0	379,1
MEDIA				374

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms conservados en cámara húmeda y retrenitados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDECENCIA L.A.V Madrid-Zaragoza Subtramo V-b

Nº TRABAJO: 0596

Nº DE REGISTRO:596

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Losa P.S 559+600

Linea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:A-9960-DT

HORA SALIDA:12:00

ESTADO TIEMPO:Soleado

CONO ABRAMS:7

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

SERIE:327

TIPO:H-300

FECHA TOMA:21/05/01

REALIZADO:Jesús

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:13.346

HORA TOMA:12:30

TEMPERATURA:20°C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1651	28/05/01	7	49,8	281,8
1652	28/05/01	7	51,8	293,1
MEDIA				287
1653	18/06/01	28	73,1	413,6
1654	18/06/01	28	71,3	403,4
1655	18/06/01	28	68,5	387,6
MEDIA				402

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms conservados en cámara húmeda y retrenitados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0597

Nº DE REGISTRO: 597 SERIE: 328 FECHA TOMA: 21/05/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Losa P.S 559+600
Línea A.V.E. Madrid-Zaragoza Subtramo V-b

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-9495-DW Nº ALBARÁN: 13.347
HORA SALIDA: 12:20 HORA TOMA: 12:45
ESTADO TIEMPO: Soleado TEMPERATURA: 20°C
CONO ABRAMS: 7
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1656	28/05/01	7	53,4	302,1
1657	28/05/01	7	54,7	309,5
MEDIA				306
1658	18/06/01	28	74,8	423,2
1659	18/06/01	28	77,3	437,4
1660	18/06/01	28	79,8	451,5
MEDIA				437

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0461

Nº DE REGISTRO: 461 SERIE: 236 FECHA TOMA: 26/10/00
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata Izquierda P.S 560+900
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-4508-XF Nº ALBARÁN: 7.408
HORA SALIDA: 11:15 HORA TOMA: 11:35
ESTADO TIEMPO: Nublado TEMPERATURA: 13°C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1196	2/11/00	7	25,0	141,5
1197	2/11/00	7	25,5	144,3
MEDIA				143
1198	23/11/00	28	35,9	203,1
1199	23/11/00	28	36,0	203,7
MEDIA				203
1200	24/01/01	90	40,2	272,7

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0462

Nº DE REGISTRO: 462 SERIE: 237 FECHA TOMA: 26/10/00
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata Izquierda P.S 560+900
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-4508-XF Nº ALBARÁN: 7.411
HORA SALIDA: 11:55 HORA TOMA: 12:10
ESTADO TIEMPO: Nublado TEMPERATURA: 15°C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1201	2/11/00	7	31,5	178,3
1202	2/11/00	7	30,0	170,0
MEDIA				174
1203	23/11/00	28	42,1	238,2
1204	24/01/01	90	54,2	306,7
1205	23/11/00	28	44,4	251,2
MEDIA				245

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0469

Nº DE REGISTRO	469	SERIE:	239	FECHA TOMA	7/11/00
TAMAÑO ÁRIDO	40 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Zapata Estribo Derecho P.S 560+900 Línea A.V.E . Madrid-Zaragoza Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-9495-DW	Nº ALBARÁN:	7.433		
HORA SALIDA:	11:55	HORA TOMA	12:10		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	7ºC		
CONO ABRAMS:	9 cm				
CONDICIONES DE COLOCACIÓN: Vertido Directo					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1211	14/11/00	7	24,1	136,3
1212	14/11/00	7	26,4	149,3
MEDIA				143
1213	5/12/00	28	39,8	225,2
1214	5/12/00	28	40,3	228,0
1215	5/12/00	28	38,7	219,0
MEDIA				224

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y reftentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0470

Nº DE REGISTRO	470	SERIE:	240	FECHA TOMA	7/11/00
TAMAÑO ÁRIDO	40 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Zapata Estribo Derecho P.S 560+900 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-1121-GC	Nº ALBARÁN:	7.442		
HORA SALIDA:	16:35	HORA TOMA:	16:50		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	9ºC		
CONO ABRAMS:	8				
CONDICIONES DE COLOCACIÓN: Vertido Directo					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1216	14/11/00	7	35,7	202,0
1217	14/11/00	7	33,5	189,5
MEDIA				196
1218	5/12/00	28	49,7	281,2
1219	5/12/00	28	50,7	286,9
1220	5/12/00	28	49,7	281,2
MEDIA				283

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y reftentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0479

Nº DE REGISTRO:	479	SERIE:	246	FECHA TOMA:	21/11/00
TAMAÑO ÁRIDO:	40 MIM	TIPO:	H-250	REALIZADO	Jesús
ELEMENTOS: Zapata Pila Izquierda P.S 560+980 Línea A.V.E . Madrid-Zaragoza Subtramo V-b .					
SUMINISTRADOR: Planta valdemorillo S.L					
CAMIÓN: A-1121-EC					
HORA SALIDA: 17:10					
ESTADO TIEMPO: Nublado					
CONO ABRAMS: 8					
CONDICIONES DE COLOCACIÓN: Vertido Directo					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1246	28/11/00	7	35,4	200,3
1247	28/11/00	7	34,6	195,8
MEDIA				198
1248	19/12/00	28	54,2	306,7
1249	19/12/00	28	51,3	290,3
1250	19/12/00	28	52,8	298,7
MEDIA				299

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0480

Nº DE REGISTRO:	480	SERIE:	247	FECHA TOMA:	21/11/00
TAMAÑO ÁRIDO:	40 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Zapata Pila Derecha P.S 560+980 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR: Planta valdemorillo S.L					
CAMIÓN: A-9495-DW					
HORA SALIDA: 17:20					
ESTADO TIEMPO: Nublado					
CONO ABRAMS: 8					
CONDICIONES DE COLOCACIÓN: Vertido Directo					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1251	28/11/00	7	40,4	228,6
1252	28/11/00	7	39,2	221,8
MEDIA				225
1253	19/12/00	28	54,6	308,9
1254	19/12/00	28	55,9	310,6
1255	19/12/00	28	59,7	337,8
MEDIA				319

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0502

Nº DE REGISTRO:502

SERIE:263

FECHA TOMA:25/01/01

TAMAÑO ARIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Estribo Izquierdo P.S 560+980.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-9960-DT

Nº ALBARÁN:7.745

HORA SALIDA:11:40

HORA TOMA:12:00

ESTADO TIEMPO:Nublado

TEMPERATURA:7°C

CONO ABRAMS:6

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1331	1/02/01	7	36,6	207,1
1332	1/02/01	7	35,3	199,8
MEDIA				203
1333	22/02/01	28	67,2	380,3
1334	22/02/01	28	67,9	384,2
1335	22/02/01	28	68,1	385,4
MEDIA				383

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0503

Nº DE REGISTRO:503

SERIE:264

FECHA TOMA:25/01/01

TAMAÑO ARIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Estribo Izquierdo P.S 560+980.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-1121-EC

Nº ALBARÁN:7.746

HORA SALIDA:12:10

HORA TOMA:12:35

ESTADO TIEMPO:Nublado

TEMPERATURA:6°C

CONO ABRAMS:4

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1336	1/02/01	7	41,8	236,5
1337	1/02/01	7	42,1	238,2
MEDIA				237
1338	22/02/01	28	68,5	387,6
1339	22/02/01	28	69,1	391,0
1340	22/02/01	28	68,6	388,2
MEDIA				389

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0509

Nº DE REGISTRO: 509 SERIE: 268 FECHA TOMA: 1/02/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús

ELEMENTOS: Pila Derecha y Cabecero Izquierdo P.S 560+900.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-1121-F Nº ALBARÁN: 8.815
HORA SALIDA: 9:55 HORA TOMA: 10:10
ESTADO TIEMPO: Soleado TEMPERATURA: 6°C
CONO ABRAMS: 8
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1356	8/02/01	7	39,4	223,0
1357	8/02/01	7	40,2	227,5
MEDIA				225
1358	1/03/01	28	58,4	330,4
1359	1/03/01	28	56,5	319,7
1355	1/03/01	28	54,5	308,4
MEDIA				320

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0524

Nº DE REGISTRO: 526 SERIE: 282 FECHA TOMA: 16/02/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús

ELEMENTOS: Estribo Alzado Derecho P.S 560+900
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-1121-EC Nº ALBARÁN: 10.972
HORA SALIDA: 10:00 HORA TOMA: 10:20
ESTADO TIEMPO: Soleado TEMPERATURA: 11°C
CONO ABRAMS: 9
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1426	23/02/01	7	39,3	222,4
1427	23/02/01	7	40,3	228,1
MEDIA				225
1428	16/03/01	28	58,2	329,3
1429	16/03/01	28	58,4	330,5
1430	16/03/01	28	57,5	325,4
MEDIA				328

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313. Prensa utilizada: CME-120

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0564

Nº DE REGISTRO:	564	SERIE:	311	FECHA TOMA:	2/04/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-300	REALIZADO:	Jesús
ELEMENTOS: Losa P.S 560+900 Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-9960-DT	Nº ALBARÁN:	11.544		
HORA SALIDA:	12:35	HORA TOMA:	13:10		
ESTADO TIEMPO	Soleado	TEMPERATURA	15°C		
CONO ABRAMS	8				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba				
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1571	9/04/01	7	54,5	308,4
1572	9/04/01	7	52,4	296,5
MEDIA				302
1573	30/04/01	28	64,2	363,3
1574	30/04/01	28	66,5	376,3
1575	30/04/01	28	66,8	378,0
MEDIA				373

fck H-300

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0565

Nº DE REGISTRO:	565	SERIE:	312	FECHA TOMA:	2/04/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-300	REALIZADO:	Jesús
ELEMENTOS: Losa P.S 560+900 Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-1121-EC	Nº ALBARÁN:	11.546		
HORA SALIDA:	13:10	HORA TOMA:	13:35		
ESTADO TIEMPO	Soleado	TEMPERATURA	15°C		
CONO ABRAMS	8				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba				
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1576	9/04/01	7	54,4	307,8
1577	9/04/01	7	54,5	308,4
MEDIA				308
1578	30/04/01	28	68,4	387,0
1579	30/04/01	28	68,9	389,9
1580	30/04/01	28	69,7	394,4
MEDIA				390

fck H-300

Kp/cm²

Kp/cm²



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0566

Nº DE REGISTRO:566

SERIE:313

FECHA TOMA:2/04/01

TAMAÑO ÁRIDO:20 MIM

TIPO:H-300

REALIZADO:Jesús

ELEMENTOS:

Losa P.S 560+900

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-9495-DW

Nº ALBARÁN:11.560

HORA SALIDA:16:25

HORA TOMA:16:45

ESTADO TIEMPO:Nublado

TEMPERATURA:15°C

CONO ABRAMS:9

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1581	9/04/01	7	54,3	307,2
1582	9/04/01	7	56,1	317,4
MEDIA				312
1583	30/04/01	28	68,6	388,2
1584	30/04/01	28	69,0	390,4
1585	30/04/01	28	68,8	389,3
MEDIA				389

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0567

Nº DE REGISTRO:567

SERIE:314

FECHA TOMA:2/04/01

TAMAÑO ÁRIDO:20 MIM

TIPO:H-300

REALIZADO:Jesús

ELEMENTOS:

Losa P.S 560+900

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-9960-DT

Nº ALBARÁN:11.561

HORA SALIDA:16:45

HORA TOMA:17:05

ESTADO TIEMPO:Nublado

TEMPERATURA:15°C

CONO ABRAMS:8

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1586	9/04/01	7	53,0	299,9
1587	9/04/01	7	53,4	302,1
MEDIA				301
1588	30/04/01	28	67,5	381,9
1589	30/04/01	28	68,9	389,9
1590	30/04/01	28	68,6	388,2
MEDIA				387

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0435

Nº DE REGISTRO:435

SERIE:223

FECHA TOMA:29/09/00

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:Zapata Estribo Izquierdo, P.S 566+340

Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-9495-DW

Nº ALBARÁN:7.288

HORA SALIDA:10:35

HORA TOMA:10:50

ESTADO TIEMPO:Nublado

TEMPERATURA:12°C

CONO ABRAMS:16 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba.

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1131	6/10/00	7	43,6	246,7
1132	6/10/00	7	42,9	242,7
MEDIA				245
1133	27/10/00	28	57,9	327,9
1134	27/10/00	28	58,1	328,7
1135	27/10/00	28	57,2	323,6
MEDIA				327

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120

A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0436

Nº DE REGISTRO:436

SERIE:224

FECHA TOMA:29/09/00

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:Zapata Estribo izquierdo, P.S 566+340

Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-9495-DW

Nº ALBARÁN:7.295

HORA SALIDA:15:15

HORA TOMA:15:25

ESTADO TIEMPO:Nublado

TEMPERATURA:15°C

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba.

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1136	6/10/00	7	53,5	302,7
1137	6/10/00	7	52,4	296,5
MEDIA				300
1138	27/10/00	28	67,9	384,2
1139	27/10/00	28	70,4	398,4
1140	27/10/00	28	70,6	399,5
MEDIA				394

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120

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A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0437

Nº DE REGISTRO:437

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:

Zapata Estribo Izquierdo, P.S 566+340

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:A-1121-EC

HORA SALIDA:16:20

ESTADO TIEMPO:Nublado

CONO ABRAMS:9 cm

CONDICIONES DE COLOCACIÓN: Vertido con Bomba.

INCIDENCIAS:

SERIE:225

TIPO:H-250

FECHA TOMA:29/09/00

REALIZADO:Jesús

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:7.299

HORA TOMA:16:30

TEMPERATURA:15°C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1141	6/10/00	7	54,1	306,1
1142	6/10/00	7	54,5	308,4
MEDIA				307
1143	27/10/00	28	69,1	391,0
1144	27/10/00	28	68,7	388,7
1145	27/10/00	28	69,5	393,2
MEDIA				391

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0438

Nº DE REGISTRO:438

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:

Zapata Estribo Izquierdo, P.S 566+340

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:M-450-XF

HORA SALIDA:17:25

ESTADO TIEMPO:Nublado

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN: Vertido con Bomba.

INCIDENCIAS:

SERIE:226

TIPO:H-250

FECHA TOMA:29/09/00

REALIZADO:Jesús

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:7.303

HORA TOMA:17:55

TEMPERATURA:15°C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1146	6/10/00	7	46,1	260,8
1147	6/10/00	7	45,4	256,4
MEDIA				259
1148	27/10/00	28	62,2	351,9
1149	27/10/00	28	62,4	353,1
1150	27/10/00	28	63,1	357,0
MEDIA				354

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b
Nº TRABAJO: 0440

Nº DE REGISTRO:	440	SERIE:	227	FECHA TOMA:	3/10/00
TAMAÑO ÁRIDO:	40 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Zapata Pila Izquierda P.S 566+340 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	M-450-XF	Nº ALBARÁN:	7.309		
HORA SALIDA:	12:05	HORA TOMA:	12:20		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	13°C		
CONO ABRAMS:	6 cm				
CONDICIONES DE COLOCACIÓN: Vertido Directo.					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1151	10/10/00	7	37,9	214,4
1152	10/10/00	7	37,9	214,4
MEDIA				214
1153	31/10/00	28	48,1	272,2
1154	31/10/00	28	49,5	280,1
1155	31/10/00	28	51,7	292,6
MEDIA				282

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b
Nº TRABAJO: 0441

Nº DE REGISTRO:	441	SERIE:	228	FECHA TOMA:	3/10/00
TAMAÑO ÁRIDO:	40 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Zapata Pila Derecha P.S 566+340 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	M-450-XF	Nº ALBARÁN:	7.310		
HORA SALIDA:	13:10	HORA TOMA:	13:40		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	15°C		
CONO ABRAMS:	6 cm				
CONDICIONES DE COLOCACIÓN: Vertido Directo.					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1156	10/10/00	7	39,3	222,3
1157	10/10/00	7	36,3	205,4
MEDIA				214
1158	31/10/00	28	47,6	269,4
1159	31/10/00	28	46,2	261,4
1160	31/10/00	28	47,3	267,7
MEDIA				266

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L A V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO 0448

Nº DE REGISTRO:448

SERIE:229

FECHA TOMA:9/10/00

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Zapata Estribo Derecho, P.S 566+300

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:III/AP 42,5R

CAMIÓN:A-1121-EC

Nº ALBARÁN:7.323

HORA SALIDA:9:40

HORA TOMA:10.15

ESTADO TIEMPO:Soleado

TEMPERATURA:12°C

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1161	16/10/00	7	44,6	252,3
1162	16/10/00	7	44,8	253,5
MEDIA				253
1163	6/11/00	28	58,7	332,1
1164	6/11/00	28	61,0	345,1
1165	6/11/00	28	64,0	362,1
MEDIA				346

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L A V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO 0449

Nº DE REGISTRO:449

SERIE:230

FECHA TOMA:9/10/00

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Zapata Estribo Derecho, P.S 566+300

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:III/AP 42,5R

CAMIÓN:A-1121-EC

Nº ALBARÁN:7.332

HORA SALIDA:13:25

HORA TOMA:13:45

ESTADO TIEMPO:Soleado

TEMPERATURA:16°C

CONO ABRAMS:8 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1166	16/10/00	7	46,5	263,1
1167	16/10/00	7	46,9	265,4
MEDIA				264
1168	6/11/00	28	63,6	359,9
1169	6/11/00	28	62,8	355,3
1170	6/11/00	28	62,8	355,3
MEDIA				357

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F. (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0450

Nº DE REGISTRO:450

SERIE:231

FECHA TOMA:9/10/00

TAMAÑO ARIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Zapata Estribo Derecho, P.S 566+300

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:M-4508-XF

Nº ALBARÁN:7 337

HORA SALIDA:15:10

HORA TOMA:15:30

ESTADO TIEMPO:Soleado

TEMPERATURA:20°C

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1171	16/10/00	7	46,2	261,4
1172	16/10/00	7	46,5	263,1
MEDIA				262
1173	6/11/00	28	64,0	362,1
1174	6/11/00	28	67,8	383,6
1175	6/11/00	28	65,5	370,6
MEDIA				372

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F. (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0451

Nº DE REGISTRO:451

SERIE:232

FECHA TOMA:9/10/00

TAMAÑO ARIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Zapata Estribo Derecho, P.S 566+300

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-1121-EC

Nº ALBARÁN:7.341

HORA SALIDA:16:15

HORA TOMA:16:35

ESTADO TIEMPO:Soleado

TEMPERATURA:20°C

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1176	16/10/00	7	46,9	265,4
1177	16/10/00	7	46,8	264,8
MEDIA				265
1178	6/11/00	28	64,3	363,8
1179	6/11/00	28	67,6	382,5
1780	6/11/00	28	64,1	362,7
MEDIA				370

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0471

Nº DE REGISTRO: 471 SERIE: 241 FECHA TOMA: 9/11/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Pila Izquierda P.S 566+300
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-1121-EC Nº ALBARÁN: 7.456
HORA SALIDA: 9:35 HORA TOMA: 10:45
ESTADO TIEMPO: Nublado TEMPERATURA: 6°C
CONO ABRAMS: 8
CONDICIONES DE COLOCACIÓN: Vertido con bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1221	16/11/00	7	42,8	342,2
1222	16/11/00	7	41,9	237,1
MEDIA				290
1223	7/12/00	28	70,2	397,2
1224	7/12/00	28	76,3	431,7
1225	7/12/00	28	73,7	417,0
MEDIA				415

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0481

Nº DE REGISTRO: 481 SERIE: 248 FECHA TOMA: 28/11/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Pila Derecha P.S 566+280
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-1121-F Nº ALBARÁN: 7.541
HORA SALIDA: 8:50 HORA TOMA: 9:45
ESTADO TIEMPO: Nublado TEMPERATURA: 7°C
CONO ABRAMS: 7
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1256	5/12/00	7	43,7	247,2
1257	5/12/00	7	43,1	243,9
MEDIA				246
1258	26/12/00	28	56,9	321,9
1259	26/12/00	28	55,3	312,9
1260	26/12/00	28	55,0	311,3
MEDIA				315

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0482

Nº DE REGISTRO: 482 SERIE: 249 FECHA TOMA: 28/11/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Estribo Izquierdo P.S 566+280
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-9960-DT Nº ALBARÁN: 7.546
HORA SALIDA: 12:15 HORA TOMA: 12:45
ESTADO TIEMPO: Soleado TEMPERATURA: 8°C
CONO ABRAMS: 8
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1261	5/12/00	7	40,9	231,4
1262	5/12/00	7	42,3	239,8
MEDIA				236
1263	26/12/00	28	61,3	346,8
1264	26/12/00	28	63,1	357,0
1265	26/12/00	28	61,9	350,2
MEDIA				351

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0483

Nº DE REGISTRO: 483 SERIE: 250 FECHA TOMA: 28/11/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Estribo Izquierdo P.S 566+280
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-9960-DT Nº ALBARÁN: 7.549
HORA SALIDA: 13:45 HORA TOMA: 14:15
ESTADO TIEMPO: Soleado TEMPERATURA: 9°C
CONO ABRAMS: 9
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1266	5/12/00	7	37,9	214,4
1267	5/12/00	7	36,4	205,9
MEDIA				210
1268	26/12/00	28	54,7	309,5
1269	26/12/00	28	56,0	316,9
1270	26/12/00	28	53,1	300,4
MEDIA				309

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0493

Nº DE REGISTRO:	493	SERIE	256	FECHA TOMA	20/12/00
TAMAÑO ÁRIDO	20 MM	TIPO	H-250	REALIZADO	Jesús
ELEMENTOS: Estribo Alzado Derecho P.S 566+300. Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:		II/AP 42,5R	
CAMIÓN:	A-1121-EC	Nº ALBARÁN		7.635	
HORA SALIDA:	12:10	HORA TOMA		12:30	
ESTADO TIEMPO:	Nublado	TEMPERATURA:		10°C	
CONO ABRAMS	8				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba					
INCIDENCIAS: Lleva Anticogelante 6,4					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1296	27/12/00	7	42,5	240,5
1297	27/12/00	7	40,4	228,6
MEDIA				235
1298	17/01/01	28	59,4	336,1
1299	17/01/01	28	58,2	329,3
1300	17/01/01	28	29,1	334,4
MEDIA				333

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0492

Nº DE REGISTRO:	492	SERIE:	255	FECHA TOMA	20/12/00
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Estribo Alzado Derecho P.S 566+300. Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO		II/AP 42,5R	
CAMIÓN	A-9960-DT	Nº ALBARÁN		7.634	
HORA SALIDA:	11:50	HORA TOMA		12:10	
ESTADO TIEMPO	Nublado	TEMPERATURA:		8°C	
CONO ABRAMS:	7				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba				
INCIDENCIAS:	Lleva Anticogelante 6,4				

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1291	27/12/00	7	43,5	246,1
1292	27/12/00	7	42,3	239,3
MEDIA				243
1293	17/01/01	28	62,1	351,4
1294	17/01/01	28	59,8	338,4
1295	17/01/01	28	57,8	327,1
MEDIA				339

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0533

Nº DE REGISTRO:533

SERIE:283

FECHA TOMA:22/02/01

TAMAÑO ÁRIDO:20 MIM

TIPO:H-300

REALIZADO:Jesús

ELEMENTOS:

Losa P.S 566+300

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42.5R

CAMIÓN:A-9960-DT

Nº ALBARÁN:11.049

HORA SALIDA:10:35

HORA TOMA:11:10

ESTADO TIEMPO:Soleado

TEMPERATURA:10°C

CONO ABRAMS:8

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1431	1/03/01	7	46,7	264,2
1432	1/03/01	7	47,7	269,9
MEDIA				267
1433	22/03/01	28	62,9	355,9
1434	22/03/01	28	65,3	369,5
1435	22/03/01	28	65,6	371,2
MEDIA				366

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0534

Nº DE REGISTRO:534

SERIE:284

FECHA TOMA:22/02/01

TAMAÑO ÁRIDO:20 MIM

TIPO:H-300

REALIZADO:Jesús

ELEMENTOS:

Losa P.S 566+300

Línea A.V.E . Madnd-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42.5R

CAMIÓN:A-9995-DN

Nº ALBARÁN:11.052

HORA SALIDA:11:05

HORA TOMA:11:45

ESTADO TIEMPO:Soleado

TEMPERATURA:10°C

CONO ABRAMS:7

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1436	1/03/01	7	51,4	290,8
1437	1/03/01	7	50,7	286,9
MEDIA				289
1438	22/03/01	28	71,9	406,9
1439	22/03/01	28	70,8	400,7
1440	22/03/01	28	72,1	408,0
MEDIA				405

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0534

Nº DE REGISTRO:535

SERIE:285

FECHA TOMA:22/02/01

TAMAÑO ÁRIDO:20 MIM

TIPO:H-300

REALIZADO:Jesús

ELEMENTOS:

Losa P.S 566+300

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-9960-DT

Nº ALBARÁN:11.057

HORA SALIDA:13:05

HORA TOMA:13.40

ESTADO TIEMPO:Soleado

TEMPERATURA:11°C

CONO ABRAMS:8

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1441	1/03/01	7	42,6	241,0
1442	1/03/01	7	43,1	243,9
MEDIA				242
1443	22/03/01	28	68,5	387,6
1444	22/03/01	28	67,2	380,3
1445	22/03/01	28	67,9	384,2
MEDIA				384

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0536

Nº DE REGISTRO:536

SERIE:286

FECHA TOMA:22/02/01

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Losa P.S 566+300

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-1121-EC

Nº ALBARÁN:11.064

HORA SALIDA:17:00

HORA TOMA:17:35

ESTADO TIEMPO:Soleado

TEMPERATURA:11°C

CONO ABRAMS:9

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1446	1/03/01	7	44,9	254,0
1447	1/03/01	7	45,8	259,1
MEDIA				257
1448	22/03/01	28	70,9	401,2
1449	22/03/01	28	69,1	391,0
1450	22/03/01	28	68,4	387,1
MEDIA				393

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192.Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0188

Nº DE REGISTRO: 0188
TAMAÑO ÁRIDO: 20 MM
SÉRIE: 95
FECHA TOMA: 20/01/00
TIPO: H-250
REALIZADO: Carlos

ELEMENTOS: Estribo Izquierdo, P.S 567+5.
Línea A.V.E. Madrid-Zaragoza Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L.
CAMIÓN: M-2835-VY
HORA SALIDA: 10:10
ESTADO TIEMPO: Soleado
CONO ABRAMS: 9 cm
TIPO DE CEMENTO: II/AP 42,5R
Nº ALBARÁN: 9.020
HORA TOMA: 11.45
TEMPERATURA: 4 °C

CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS: Lleva Anticongelante

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
487	27/01/00	7	33,6	190,1
488	27/01/00	7	38,0	215,0
MEDIA				203
489	17/02/00	28	52,6	297,7
490	17/02/00	28	52,7	298,2
491	17/02/00	28	53,8	304,3
MEDIA				300

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192.Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0189

Nº DE REGISTRO: 0189
TAMAÑO ÁRIDO: 20 MM
SÉRIE: 96
FECHA TOMA: 20/01/00
TIPO: H-250
REALIZADO: Carlos

ELEMENTOS: Estribo Izquierdo, P.S 567+5.
Línea A.V.E. Madrid-Zaragoza Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L.
CAMIÓN: AL-3259-AG
HORA SALIDA: 12:00
ESTADO TIEMPO: Soleado
CONO ABRAMS: 9 cm
TIPO DE CEMENTO: II/AP 42,5R
Nº ALBARÁN: 9.022
HORA TOMA: 12:30
TEMPERATURA: 5 °C

CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS: Lleva Anticongelante

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
492	27/01/00	7	26,6	150,5
493	27/01/00	7	27,7	156,7
MEDIA				154
494	17/02/00	28	49,8	281,8
495	17/02/00	28	50,6	286,3
496	17/02/00	28	50,9	288,0
MEDIA				285

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0190

Nº DE REGISTRO: 0190 SERIE 97 FECHA TOMA: 20/01/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO Carlos
ELEMENTOS: Estribo Izquierdo P.S 567+5.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO III/AP 42.5R
CAMIÓN: M-2835-VY Nº ALBARÁN 9.032
HORA SALIDA: 16:20 HORA TOMA 16:45
ESTADO TIEMPO: Soleado TEMPERATURA 6 °C
CONO ABRAMS 8 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS: Lleva Anticongelante

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
497	27/01/00	7	29,9	169,2
498	27/01/00	7	29,8	168,6
MEDIA				169
499	17/02/00	28	48,7	275,6
500	17/02/00	28	50,6	286,3
501	17/02/00	28	51,2	289,7
MEDIA				284

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0193

Nº DE REGISTRO: 0193 SERIE: 100 FECHA TOMA: 26/01/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO Carlos
ELEMENTOS: Estribo Derecho P.S 567+5.
Línea A.V.E. Madrid-Zaragoza Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO III/AP 42.5R
CAMIÓN: AL-2406-AG Nº ALBARÁN 8.185
HORA SALIDA: 10:20 HORA TOMA 11:00
ESTADO TIEMPO: Nublado TEMPERATURA 3 °C
CONO ABRAMS 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS: Lleva Anticongelante

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
512	2/02/00	7	46,7	264,3
513	2/02/00	7	46,8	264,8
MEDIA				265
514	23/02/00	28	61,2	346,3
515	23/02/00	28	59,9	339,0
516	23/02/00	28	60,9	344,6
MEDIA				343

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0198

Nº DE REGISTRO:	0198	SERIE:	105	FECHA TOMA:	27/01/00
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Carlos
ELEMENTOS: Zapata Pila Derecha P.S 567+500. Línea A.V.E. Madrid-Zaragoza Subtramo V-b.					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	M-2835-VY	Nº ALBARÁN:	8 210		
HORA SALIDA:	11:25	HORA TOMA:	12:00		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	5 °C		
CONO ABRAMS:	9 cm				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba.				
INCIDENCIAS:	Lleva Anticongelante				

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
537	3/02/00	7	48,5	274,5
538	3/02/00	7	47,7	269,9
MEDIA				272
539	24/02/00	28	64,7	366,1
540	24/02/00	28	65,0	367,8
541	24/02/00	28	65,8	372,4
MEDIA				369

fck H-250

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0209

Nº DE REGISTRO:	0209	SERIE:	107	FECHA TOMA:	2/02/00
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-300	REALIZADO:	Carlos
ELEMENTOS: Pila Izquierda, P.S 567+500. Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	AL-5663-AG	Nº ALBARÁN:	8.236		
HORA SALIDA:	11:10	HORA TOMA:	12:45		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	8 °C		
CONO ABRAMS:	7 cm				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba.				
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
547	9/02/00	7	56,0	316,9
548	9/02/00	7	55,7	315,2
MEDIA				316
549	1/03/00	28	70,0	396,1
550	1/03/00	28	72,8	411,9
551	1/03/00	28	72,8	411,9
MEDIA				407

fck H-250

Kp/cm²

Kp/cm²



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0215

Nº DE REGISTRO: 0215
TAMAÑO ÁRIDO: 20 MM
SÉRIE: 110
FECHA TOMA: 4/02/00
TIPO: H-300
REALIZADO: Carlos
ELEMENTOS: Pila Derecha, P.S 567+5.
Línea A.V.E. Madrid-Zaragoza Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L.
CAMIÓN: AL-5663.AG
HORA SALIDA: 10:20
ESTADO TIEMPO: Soleado
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
562	11/02/00	7	51,9	293,7
563	11/02/00	7	52,8	298,8
MEDIA				296
564	3/03/00	28	68,1	385,4
565	3/03/00	28	69,0	390,5
566	3/03/00	28	70,5	399,0
MEDIA				392

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre.
Método operativo según U.N.E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0276

Nº DE REGISTRO: 0276
TAMAÑO ÁRIDO: 20 MM
SÉRIE: 144
FECHA TOMA: 16/03/00
TIPO: H-300
REALIZADO: Jesús
ELEMENTOS: Tablero P.S 567+500
Línea A.V.E. Madrid-Zaragoza Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L.
CAMIÓN: SO-9966-F
HORA SALIDA: 8:55
ESTADO TIEMPO: Soleado
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
732	23/03/00	7	56,1	317,5
733	23/03/00	7	54,0	305,6
MEDIA				312
734	13/04/00	28	70,2	397,3
735	13/04/00	28	72,5	410,3
736	13/04/00	28	72,7	411,4
MEDIA				406

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre.
Método operativo según U.N.E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0277

Nº DE REGISTRO	0277	SERIE	145	FECHA TOMA	16/03/00
TAMAÑO ÁRIDO:	20 MIM	TIPO	H-300	REALIZADO:	Jesús
ELEMENTOS: Tablero P.S 567+500					
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:		II/AP 42,5R	
CAMIÓN:	Z-3094-AX	Nº ALBARÁN:		7.985	
HORA SALIDA:	10:30	HORA TOMA:		10:50	
ESTADO TIEMPO	Soleado	TEMPERATURA:		15 °C	
CONO ABRAMS:	10 cm				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.					
INCIDENCIAS					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
737	23/03/00	7	59,4	336,1
738	23/03/00	7	55,6	314,6
MEDIA				325
739	13/04/00	28	69,2	391,6
740	13/04/00	28	69,6	393,9
741	13/04/00	28	70,5	399,0
MEDIA				395

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0278

Nº DE REGISTRO	0278	SERIE	146	FECHA TOMA	16/03/00
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-300	REALIZADO:	Jesús
ELEMENTOS: Tablero P.S 567+500					
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR	Planta valdemorillo S.L	TIPO DE CEMENTO:		II/AP 42,5R	
CAMIÓN:	Z-3094-AK	Nº ALBARÁN:		7.993	
HORA SALIDA	12:25	HORA TOMA:		12:40	
ESTADO TIEMPO	Soleado	TEMPERATURA:		18 °C	
CONO ABRAMS	9 cm				
CONDICIONES DE COLOCACIÓN	Vertido con Bomba.				
INCIDENCIAS					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
742	23/03/00	7	55,1	311,8
743	23/03/00	7	57,8	327,1
MEDIA				319
744	13/04/00	28	72,8	412,0
745	13/04/00	28	74,0	418,8
746	13/04/00	28	76,0	430,0
MEDIA				420

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0279

Nº DE REGISTRO:0279

SERIE:147

FECHA TOMA:16/03/00

TAMAÑO ARIDO:20 MIM

TIPO:H-300

REALIZADO:Jesús

ELEMENTOS:Tablero P.S 567+500

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:Z-3094-AK

Nº ALBARÁN:7 859

HORA SALIDA:16:20

HORA TOMA:16:50

ESTADO TIEMPO:Soleado

TEMPERATURA:18 °C

CONO ABRAMS:10 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba.

INCIDENCIAS

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
747	23/03/00	7	47,2	267,1
748	23/03/00	7	47,5	268,8
MEDIA				268
749	13/04/00	28	63,3	358,8
750	13/04/00	28	58,9	333,3
751	13/04/00	28	63,2	357,6
MEDIA				350

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0280

Nº DE REGISTRO:0280

SERIE:148

FECHA TOMA:16/03/00

TAMAÑO ARIDO:20 MIM

TIPO:H-300

REALIZADO:Jesús

ELEMENTOS:Tablero P.S 567+500

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:Z-3094-AK

Nº ALBARÁN:7.863

HORA SALIDA:17:20

HORA TOMA:17:50

ESTADO TIEMPO:Soleado

TEMPERATURA:16 °C

CONO ABRAMS:10 cm

CONDICIONES DE COLOCACION:Vertido con Bomba.

INCIDENCIAS

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
752	23/03/00	7	61,5	348,0
753	23/03/00	7	60,5	342,4
MEDIA				345
754	13/04/00	28	78,4	443,7
755	13/04/00	28	77,2	436,9
756	13/04/00	28	77,2	436,9
MEDIA				439

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192.Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0138

Nº DE REGISTRO: 0138 SERIE: 58 FECHA TOMA: 2/12/99
TAMAÑO ÁRIDO: 20 MM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Izquierda P.S 570+1
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta, Torija UTE TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2835-V-Y Nº ALBARÁN: 9.051
HORA SALIDA: 13:00 HORA TOMA: 13:40
ESTADO TIEMPO: Soleado TEMPERATURA: 10 °C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
294	9/12/99	7	47,3	267,7
295	9/12/99	7	46,1	260,9
MEDIA				264
298	30/12/99	28	59,4	336,1
299	30/12/99	28	60,6	342,9
300	30/12/99	28	59,6	337,3
MEDIA				339

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0139

Nº DE REGISTRO: 0139 SERIE: 59 FECHA TOMA: 2/12/99
TAMAÑO ÁRIDO: 20 MM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Izquierda, Paso Superior 570+1
Línea A.V.E. Madrid-Zaragoza Subtramo V-b .
SUMINISTRADOR: Planta, Torija UTE TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2835-V-Y Nº ALBARÁN: 9.053
HORA SALIDA: 15:30 HORA TOMA: 16:20
ESTADO TIEMPO: Soleado TEMPERATURA: 8 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
301	9/12/99	7	36,0	203,7
302	9/12/99	7	36,3	205,4
MEDIA				205
303	30/12/99	28	47,5	336,1
304	30/12/99	28	46,5	342,9
305	30/12/99	28	49,1	337,3
MEDIA				270

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0140

Nº DE REGISTRO:0140

SERIE:60

FECHA TOMA:2/12/99

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS:

Zapata Izquierda, Paso Superior 570+1.

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Planta, Tonja UTE

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:M-0708-JU

Nº ALBARÁN:9 054

HORA SALIDA:16:00

HORA TOMA:16:50

ESTADO TIEMPO:Soleado

TEMPERATURA:8 °C

CONO ABRAMS:10 cm

CONDICIONES DE COLOCACIÓN:Vertido Directo.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
306	9/12/99	7	43,4	245,6
307	9/12/99	7	46,0	260,3
MEDIA				253
308	30/12/99	28	62,6	354,2
309	30/12/99	28	61,5	348,0
310	30/12/99	28	60,9	344,6
MEDIA				349

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0208

Nº DE REGISTRO:0208

SERIE:106

FECHA TOMA:2/02/00

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS:

Zapata Pila Derecha P.S 570+100.

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:M-2835-VY

Nº ALBARÁN:8.233

HORA SALIDA:8:30

HORA TOMA:9.40

ESTADO TIEMPO:Nublado

TEMPERATURA:5 °C

CONO ABRAMS:9 cm

CONDICIONES DE COLOCACIÓN:Vertido Directo.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
542	9/02/00	7	53,1	300,5
543	9/02/00	7	51,8	293,1
MEDIA				297
544	1/03/00	28	63,4	358,8
545	1/03/00	28	64,6	365,6
546	1/03/00	28	62,9	355,9
MEDIA				360

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0210

Nº DE REGISTRO	0210	SERIE:	108	FECHA TOMA	2/02/00
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Carlos
ELEMENTOS: Zapata Pila Izquierda, P.S 570+100. Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO	II/AP 42,5R		
CAMIÓN:	AL-5663-AG	Nº ALBARÁN:	8.240		
HORA SALIDA:	16:35	HORA TOMA:	17.05		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	10 °C		
CONO ABRAMS:	7 cm				
CONDICIONES DE COLOCACIÓN: Vertido con Cubo.					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
552	9/02/00	7	51,3	290,3
553	9/02/00	7	50,1	283,5
MEDIA				287
554	1/03/00	28	68,9	389,9
555	1/03/00	28	70,3	397,8
556	1/03/00	28	69,8	394,9
MEDIA				394

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y reentados con azufre
Método operatvno según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0185

Nº DE REGISTRO:0185

TAMAÑO ÁRIDO:20 MM

ELEMENTOS:Estribo Izquierdo, P.S 571+6

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:AL-2406-AG

HORA SALIDA:9:50

ESTADO TIEMPO:Soleado

CONO ABRAMS:8 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba.

INCIDENCIAS:Lleva Anticongelante

SERIE:92

TIPO:H-250

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:9.245

HORA TOMA:10:40

TEMPERATURA:6 °C

FECHA TOMA:11/01/00

REALIZADO:Carlos

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
472	18/01/00	7	42,5	240,5
473	18/01/00	7	43,6	246,7
MEDIA				244
474	8/02/00	28	62,1	351,4
475	8/02/00	28	63,8	361,0
476	8/02/00	28	62,6	354,2
MEDIA				356

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0186

Nº DE REGISTRO:0186

TAMAÑO ÁRIDO:20 MM

ELEMENTOS:Estribo Izquierdo, P.S 571+6

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:M-5793-LS

HORA SALIDA:11:40

ESTADO TIEMPO:Soleado

CONO ABRAMS:8 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba.

INCIDENCIAS:Lleva Anticongelante

SERIE:93

TIPO:H-250

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:9.248

HORA TOMA:12:20

TEMPERATURA:6 °C

FECHA TOMA:11/01/00

REALIZADO:Carlos

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
477	18/01/00	7	38,9	220,1
478	18/01/00	7	40,2	227,5
MEDIA				224
479	8/02/00	28	49,6	280,7
480	8/02/00	28	50,7	286,9
481	8/02/00	28	51,6	292,0
MEDIA				287

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratono de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0191

Nº DE REGISTRO0191

TAMAÑO ÁRIDO:20 MM

ELEMENTOS:

Estribo Derecho P.S 571+6.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:M-2835-VY

HORA SALIDA:9:45

ESTADO TIEMPO:Soleado

CONO ABRAMS:9 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba.

INCIDENCIAS:Lleva Anticongelante

SERIE:98

FECHA TOMA:21/01/00

TIPO:H-250

REALIZADO:Carlos

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:9.044

HORA TOMA:10:40

TEMPERATURA:6 °C

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
502	28/01/00	7	28,4	160,7
503	28/01/00	7	28,5	161,3
MEDIA				161
504	18/02/00	28	52,6	297,7
505	18/02/00	28	51,5	291,4
506	18/02/00	28	52,4	296,5
MEDIA				295

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndncas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0192

Nº DE REGISTRO:0192

TAMAÑO ÁRIDO:20 MM

ELEMENTOS:

Estribo Derecho P.S 571+6.

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:M-2835-VY

HORA SALIDA:12:10

ESTADO TIEMPO:Soleado

CONO ABRAMS:10 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba.

INCIDENCIAS:Lleva Anticongelante

SERIE:99

FECHA TOMA:21/01/00

TIPO:H-250

REALIZADO:Carlos

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:9.048

HORA TOMA:13:00

TEMPERATURA:7 °C

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
507	28/01/00	7	29,7	168,1
508	28/01/00	7	28,7	162,4
MEDIA				165
509	18/02/00	28	49,6	280,7
510	18/02/00	28	50,1	283,5
511	18/02/00	28	48,7	275,6
MEDIA				280

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

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C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0195

Nº DE REGISTRO:0195

TAMAÑO ÁRIDO:20 MM

ELEMENTOS:Pila izquierda, P.S 571+600.

Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:M-2635-VY

HORA SALIDA:17:30

ESTADO TIEMPO:Nublado

CONO ABRAMS10 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba.

INCIDENCIAS:Lleva Anticongelante

SERIE:102

TIPO:H-300

FECHA TOMA:26/01/00

REALIZADO:Carlos

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:8.199

HORA TOMA:18:15

TEMPERATURA:6 °C

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
522	2/02/00	7	55,1	311,8
523	2/02/00	7	55,2	312,4
MEDIA				312
524	23/02/00	28	76,4	432,3
525	23/02/00	28	73,8	417,6
526	23/02/00	28	74,6	422,2
MEDIA				424

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

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C/ Bodegón del Ciego. s/n Teléfono 949322162.

19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0196

Nº DE REGISTRO:0196

TAMAÑO ÁRIDO:20 MM

ELEMENTOS:Pila Derecha P.S 571+600.

Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

CAMIÓN:AL-3259-AG

HORA SALIDA:17:55

ESTADO TIEMPO:Nublado

CONO ABRAMS9 cm

CONDICIONES DE COLOCACIÓN:Vertido con Bomba.

INCIDENCIAS:Lleva Anticongelante

SERIE:103

TIPO:H-300

FECHA TOMA:26/01/00

REALIZADO:Carlos

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:8.201

HORA TOMA:18.45

TEMPERATURA:6 °C

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
527	2/02/00	7	53,8	304,4
528	2/02/00	7	52,5	297,1
MEDIA				301
529	23/02/00	28	70,8	400,7
530	23/02/00	28	72,5	410,3
531	23/02/00	28	72,3	409,1
MEDIA				407

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
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C/ Bodegón del Ciego. s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0214

Nº DE REGISTRO: 0214 SERIE: 109 FECHA TOMA: 4/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Cabecero Derecho, P.S 571+6.
Línea A.V.E . Madrid-Zaragoza Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO II/AP 42,5R
CAMIÓN: M-2835-VY Nº ALBARÁN: 8.244
HORA SALIDA: 8:40 HORA TOMA: 9:30
ESTADO TIEMPO: Soleado TEMPERATURA: 8 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
557	11/02/00	7	46,6	263,7
558	11/02/00	7	48,6	275,0
MEDIA				269
559	3/03/00	28	64,6	365,6
560	3/03/00	28	63,2	357,7
561	3/03/00	28	63,1	357,1
MEDIA				360

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0216

Nº DE REGISTRO: 0216 SERIE: 111 FECHA TOMA: 4/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Carlos
ELEMENTOS: Pila Izquierda, P.S 570+1.
Línea A.V.E . Madrid-Zaragoza Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO II/AP 42,5R
CAMIÓN: AL-5663.AG Nº ALBARÁN: 8.248
HORA SALIDA: 13:35 HORA TOMA: 14:15
ESTADO TIEMPO: Soleado TEMPERATURA: 12 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
567	11/02/00	7	50,4	285,2
568	11/02/00	7	51,9	293,7
MEDIA				289
569	3/03/00	28	69,4	392,7
570	3/03/00	28	68,7	388,8
571	3/03/00	28	71,7	405,7
MEDIA				396

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0321

Nº DE REGISTRO:0321

SERIE:178

FECHA TOMA:9/05/00

TAMAÑO ÁRIDO:20 MIM

TIPO:H-300

REALIZADO:Jesús

ELEMENTOS:Tablero P.S 571+600.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:M-3708-JV

Nº ALBARÁN:9.369

HORA SALIDA:14:15

HORA TOMA:15:00

ESTADO TIEMPO:Nublado

TEMPERATURA:15 °C

CONO ABRAMS:6 cm

CONDICIONES DE COLOCACIÓN:Vertido con bomba.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
902	16/05/00	7	57,6	325,9
903	16/05/00	7	56,9	322,0
MEDIA				324
MEDIA				

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0322

Nº DE REGISTRO:0322

SERIE:179

FECHA TOMA:9/05/00

TAMAÑO ÁRIDO:20 MIM

TIPO:H-300

REALIZADO:Jesús

ELEMENTOS:Tablero P.S 571+600.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:SO-1950-G

Nº ALBARÁN:9 371

HORA SALIDA:15:05

HORA TOMA:15:50

ESTADO TIEMPO:Nublado

TEMPERATURA:16 °C

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido con bomba.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
907	16/05/00	7	58,3	329,9
908	16/05/00	7	51,2	346,3
MEDIA				338
909	6/06/00	28	69,1	391,0
910	6/06/00	28	72,7	411,4
911	6/06/00	28	69,3	392,2
MEDIA				398

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0319

Nº DE REGISTRO: 0319
TAMAÑO ÁRIDO: 20 MIM
SERIE: 176
FECHA TOMA: 9/05/00
TIPO: H-300
REALIZADO: Jesús
ELEMENTOS: Tablero P.S 571+600.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L.
CAMIÓN: SO-1950-G
HORA SALIDA: 10:30
ESTADO TIEMPO: Nublado
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
892	16/05/00	7	46,7	264,3
893	16/05/00	7	49,7	281,2
				273
894	6/06/00	28	71,5	404,6
895	6/06/00	28	69,8	395,0
896	6/06/00	28	70,8	400,7
MEDIA				400

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83 300, 83 301, 83.303, 83.304 Y 83,313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
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19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0320

Nº DE REGISTRO: 0320
TAMAÑO ÁRIDO: 20 MIM
SERIE: 177
FECHA TOMA: 9/05/00
TIPO: H-300
REALIZADO: Jesús
ELEMENTOS: Tablero P.S 571+600.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L.
CAMIÓN: M-2174-LM
HORA SALIDA: 11:15
ESTADO TIEMPO: Nublado
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
897	16/05/00	7	59,1	334,4
898	16/05/00	7	57,0	322,6
MEDIA				329
899	6/06/00	28	67,0	379,1
900	6/06/00	28	73,5	415,9
901	6/06/00	28	70,7	400,1
MEDIA				398

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83 300, 83 301, 83.303, 83.304 Y 83,313 . Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
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C/ Bodegón del Ciego. s/n Teléfono 949322162
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0323

Nº DE REGISTRO: 0323 SERIE: 180 FECHA TOMA: 9/05/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Tablero P.S 571+600.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2179-LM Nº ALBARÁN: 9 374
HORA SALIDA: 20:25 HORA TOMA: 17:15
ESTADO TIEMPO: Nublado TEMPERATURA: 16 °C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS:

ROTURAS					
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA	
912	16/05/00	7	58,2	329,3	
913	16/05/00	7	57,0	322,6	
MEDIA				326	
914	6/06/00	28	71,1	402,3	
915	6/06/00	28	72,1	408,0	
916	6/06/00	28	72,3	409,1	
MEDIA				406	

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83 300, 83 301, 83 303, 83 304 Y 83,313 Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

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Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0356

Nº DE REGISTRO: 0356 SERIE: 188 FECHA TOMA: 19/06/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Losa Paso Superior 570+1.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: Z-3094-AK Nº ALBARÁN: 9.414
HORA SALIDA: 10:40 HORA TOMA: 11:10
ESTADO TIEMPO: Soleado TEMPERATURA: 28 °C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS:

ROTURAS					
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA	
952	26/06/00	7	53,9	305,0	
953	26/06/00	7	56,3	318,6	
MEDIA				311,8	
954	17/07/00	28	67,1	379,7	
955	17/07/00	28	67,9	384,2	
956	17/07/00	28	65,1	368,4	
MEDIA				377,1	

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83 300, 83 301, 83 303, 83 304 Y 83,313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0359

Nº DE REGISTRO: 0359 SERIE: 191 FECHA TOMA: 19/06/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Losa Paso Superior 570+1.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: Z-3094-AK Nº ALBARÁN: 9.426
HORA SALIDA: 16:05 HORA TOMA: 16:35
ESTADO TIEMPO: Soleado TEMPERATURA: 30 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
967	26/06/00	7	48,3	273,3
968	26/06/00	7	48,1	272,2
MEDIA				273
969	17/07/00	28	59,8	338,4
970	17/07/00	28	57,0	322,5
971	17/07/00	28	57,3	324,3
MEDIA				328

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0360

Nº DE REGISTRO: 0360 SERIE: 192 FECHA TOMA: 19/06/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Losa Paso Superior 570+1.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-H Nº ALBARÁN: 9.432
HORA SALIDA: 17:50 HORA TOMA: 18:30
ESTADO TIEMPO: Soleado TEMPERATURA: 30 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
972	26/06/00	7	50,5	285,8
973	26/06/00	7	48,9	276,7
MEDIA				281
974	17/07/00	28	64,0	362,2
975	17/07/00	28	64,6	365,6
976	17/07/00	28	65,3	369,5
MEDIA				366

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo:V-b

Hoja de
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C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 049

Nº DE REGISTRO: 049 SERIE: 23 FECHA TOMA: 22/09/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Estribo Izquierdo P.S 572+900
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: P-0727BBB Nº ALBARÁN: 72.131
HORA SALIDA: 13:01 HORA TOMA: 14:03
ESTADO TIEMPO: Nublado TEMPERATURA: 25 °C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
111	29/09/99	7	48,3	273,3
112	29/09/99	7	46,6	263,7
MEDIA				268
113	20/10/99	28	56,0	316,9
114	20/10/99	28	57,5	325,4
115	20/10/99	28	56,8	321,4
MEDIA				321

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo:V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 048

Nº DE REGISTRO: 048 SERIE: 22 FECHA TOMA: 22/09/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Estribo Izquierdo P.S 572+900
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2188-KJ Nº ALBARÁN: 72.125
HORA SALIDA: 11:30 HORA TOMA: 12:40
ESTADO TIEMPO: Soleado TEMPERATURA: 15 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
106	29/09/99	7	47,8	270,5
107	29/09/99	7	50,0	282,9
MEDIA				277
108	20/10/99	28	58,4	330,5
109	20/10/99	28	58,3	330,0
110	20/10/99	28	58,6	331,6
MEDIA				331

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo:V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 050

Nº DE REGISTRO:050

SERIE:24

FECHA TOMA:22/09/99

TAMAÑO ÁRIDO:40 MIM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS: Zapata Estribo Izquierdo P.S 572+900

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Aridos Pascual

TIPO DE CEMENTO: II/AP 42,5R

CAMIÓN: GU-0736-E

Nº ALBARÁN: 72.136

HORA SALIDA: 14:45

HORA TOMA: 15:35

ESTADO TIEMPO: Nublado

TEMPERATURA: 15 °C

CONO ABRAMS: 9 cm

CONDICIONES DE COLOCACIÓN: Vertido Directo.

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
116	29/09/99	7	53,0	299,9
117	29/09/99	7	52,2	295,4
MEDIA				298
118	20/10/99	28	56,6	320,3
119	20/10/99	28	59,3	335,6
120	20/10/99	28	58,1	328,8
MEDIA				328

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo:V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 051

Nº DE REGISTRO:051

SERIE:25

FECHA TOMA:24/09/99

TAMAÑO ÁRIDO:40 MIM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS: Zapata Estribo Derecho Paso Superior 572+900.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Aridos Pascual

TIPO DE CEMENTO: II/AP 42,5R

CAMIÓN: GU-8960-F

Nº ALBARÁN: 72.233

HORA SALIDA: 10:23

HORA TOMA: 11:23

ESTADO TIEMPO: Nublado

TEMPERATURA: 15 °C

CONO ABRAMS: 4 cm

CONDICIONES DE COLOCACIÓN: Vertido Directo.

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
121	1/10/99	7	50,7	286,9
122	1/10/99	7	47,2	267,1
MEDIA				277
123	22/10/99	28	57,3	324,3
124	22/10/99	28	56,4	319,2
125	22/10/99	28	55,9	316,3
MEDIA				320

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo:V-b

Hoja de
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C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 052

Nº DE REGISTRO: 052 SERIE: 26 FECHA TOMA: 24/09/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos

ELEMENTOS: Zapata Estribo Derecho Paso Superior 572+900.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7337-E Nº ALBARÁN: 72.242
HORA SALIDA: 12:08 HORA TOMA: 13:00
ESTADO TIEMPO: Nublado TEMPERATURA: 15 °C
CONO ABRAMS: 6 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
126	1/10/99	7	52,5	297,1
127	1/10/99	7	50,7	286,9
MEDIA				292
128	22/10/99	28	61,4	347,5
129	22/10/99	28	57,9	327,6
130	22/10/99	28	58,6	331,6
MEDIA				336

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo:V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 053

Nº DE REGISTRO: 053 SERIE: 27 FECHA TOMA: 24/09/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos

ELEMENTOS: Zapata Estribo Derecho Paso Superior 572+900.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-0736-E Nº ALBARÁN: 72.247
HORA SALIDA: 13:23 HORA TOMA: 14:20
ESTADO TIEMPO: Nublado TEMPERATURA: 15 °C
CONO ABRAMS: 6 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
131	1/10/99	7	48,1	272,2
132	1/10/99	7	50,3	284,6
MEDIA				278
133	22/10/99	28	52,7	298,2
134	22/10/99	28	54,7	309,5
135	22/10/99	28	52,9	299,3
MEDIA				302

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilindricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo:V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 070

Nº DE REGISTRO: 070 SERIE: 29 FECHA TOMA: 30/09/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Pila Derecha P.S 572+900.
Línea A.V.E . Madrid-Zaragoza. Subtramo V-b .

SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-8961-F Nº ALBARÁN: 72.456
HORA SALIDA: 14:02 HORA TOMA: 15:05
ESTADO TIEMPO: Soleado TEMPERATURA: 28 °C
CONO ABRAMS: 5,5 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
141	7/10/99	7	46,1	260,0
142	7/10/99	7	44,6	252,4
MEDIA				256
143	28/10/99	28	59,1	334,4
144	28/10/99	28	56,7	320,9
145	28/10/99	28	55,4	313,5
MEDIA				323

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo:V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 071

Nº DE REGISTRO: 071 SERIE: 30 FECHA TOMA: 30/09/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Pila Izquierda P.S 572+900.
Línea A.V.E . Madrid-Zaragoza. Subtramo V-b .

SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2188-KJ Nº ALBARÁN: 72.447
HORA SALIDA: 11:58 HORA TOMA: 13:05
ESTADO TIEMPO: Soleado TEMPERATURA: 25 °C
CONO ABRAMS: 6,5 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
146	7/10/99	7	50,4	285,2
147	7/10/99	7	49,2	278,4
MEDIA				282
148	28/10/99	28	56,4	319,2
149	28/10/99	28	58,7	332,2
150	28/10/99	28	56,4	319,2
MEDIA				324

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G I F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 078

Nº DE REGISTRO:078

SERIE:33

FECHA TOMA:5/10/99

TAMAÑO ÁRIDO:40 MIM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS:

Zapata Estribo izquierdo . Paso Superior 551+300.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

TIPO DE CEMENTO:II/AP42,5R

CAMIÓN:GU-6262-G

Nº ALBARÁN:72.666

HORA SALIDA:16.46

HORA TOMA:17.40

ESTADO TIEMPO:Nublado

TEMPERATURA:13 °C

CONO ABRAMS:9 cm

CONDICIONES DE COLOCACIÓN:Vertido Directo

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
161	12/10/99	7	54,9	310,7
162	12/10/99	7	52,2	295,4
MEDIA				303
163	2/11/99	28	62,1	251,4
164	2/11/99	28	60,3	341,2
165	2/11/99	28	63,8	361,0
MEDIA				351

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 077

Nº DE REGISTRO:77

SERIE:32

FECHA TOMA:5/10/99

TAMAÑO ÁRIDO:40 MIM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS:

Zapata Estribo izquierdo . Paso Superior 551+300.

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

TIPO DE CEMENTO:III/AP42,5R

CAMIÓN:GU-6008-C

Nº ALBARÁN:72.661

HORA SALIDA:15:48

HORA TOMA:16:50

ESTADO TIEMPO:Nublado

TEMPERATURA:13 °C

CONO ABRAMS:3' 5 cm

CONDICIONES DE COLOCACIÓN:Vertido Directo

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
156	12/10/99	7	53,0	300,0
157	12/10/99	7	51,8	293,1
MEDIA				296
158	2/11/99	28	62,7	354,8
159	2/11/99	28	64,2	363,3
160	2/11/99	28	62,7	354,8
MEDIA				358

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 087

Nº DE REGISTRO: 087 SERIE: 35 FECHA TOMA: 7/10/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Estribo Izquierdo . Paso Superior 551+300.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP42,5R
CAMIÓN: GU-6262-G Nº ALBARÁN: 72 778
HORA SALIDA: 17:20 HORA TOMA: 18:10
ESTADO TIEMPO: Nublado TEMPERATURA: 13 °C
CONO ABRAMS: 9' 5 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
171	14/10/99	7	44,8	253,5
172	14/10/99	7	45,0	254,6
MEDIA				254
173	4/11/99	28	56,2	318,0
174	4/11/99	28	54,6	309,0
175	4/11/99	28	58,0	328,2
MEDIA				318

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 086

Nº DE REGISTRO: 086 SERIE: 34 FECHA TOMA: 7/10/99
TAMAÑO ÁRIDO: 40 MIM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Zapata Estribo Izquierdo . Paso Superior 551+300.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP42,5R
CAMIÓN: GU-7337-E Nº ALBARÁN: 72.771
HORA SALIDA: 16:10 HORA TOMA: 17:00
ESTADO TIEMPO: Nublado TEMPERATURA: 13 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
166	14/10/99	7	45,3	256,3
167	14/10/99	7	42,3	239,3
MEDIA				248
168	4/11/99	28	48,5	274,5
169	4/11/99	28	51,3	290,3
170	4/11/99	28	53,9	305,0
MEDIA				290

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo: Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 091

Nº DE REGISTRO:	091	SERIE:	37	FECHA TOMA:	15/10/99																																													
TAMAÑO ÁRIDO:	40 Mm	TIPO:	H-250	REALIZADO:	Carlos																																													
ELEMENTOS: Zapata Pila Derecha . Paso Superior 551+300. Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .																																																		
SUMINISTRADOR:	Aridos Pascual	TIPO DE CEMENTO:	III/AP42,5R																																															
CAMIÓN:	GU-8960- F	Nº ALBARÁN:	72.970																																															
HORA SALIDA:	14:32	HORA TOMA:	15:15																																															
ESTADO TIEMPO:	Soleado	TEMPERATURA:	21 °C																																															
CONO ABRAMS	6 cm																																																	
CONDICIONES DE COLOCACIÓN:	Vertido Directo																																																	
INCIDENCIAS:																																																		
<table><thead><tr><th colspan="5">ROTURAS</th></tr><tr><th>Nº PROBETA</th><th>FECHA ROTURA</th><th>EDAD</th><th>CARGA</th><th>RESISTENCIA</th></tr></thead><tbody><tr><td>181</td><td>22/10/99</td><td>7</td><td>37,3</td><td>211,1</td></tr><tr><td>182</td><td>22/10/99</td><td>7</td><td>41,7</td><td>236,0</td></tr><tr><td colspan="4">MEDIA</td><td>223</td></tr><tr><td>183</td><td>12/11/99</td><td>28</td><td>57,4</td><td>324,8</td></tr><tr><td>184</td><td>12/11/99</td><td>28</td><td>53,2</td><td>312,3</td></tr><tr><td>185</td><td>12/11/99</td><td>28</td><td>58,6</td><td>331,6</td></tr><tr><td colspan="4">MEDIA</td><td>323</td></tr></tbody></table>						ROTURAS					Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA	181	22/10/99	7	37,3	211,1	182	22/10/99	7	41,7	236,0	MEDIA				223	183	12/11/99	28	57,4	324,8	184	12/11/99	28	53,2	312,3	185	12/11/99	28	58,6	331,6	MEDIA				323
ROTURAS																																																		
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA																																														
181	22/10/99	7	37,3	211,1																																														
182	22/10/99	7	41,7	236,0																																														
MEDIA				223																																														
183	12/11/99	28	57,4	324,8																																														
184	12/11/99	28	53,2	312,3																																														
185	12/11/99	28	58,6	331,6																																														
MEDIA				323																																														

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo: Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 090

Nº DE REGISTRO:	090	SERIE:	36	FECHA TOMA:	14/10/99																																													
TAMAÑO ÁRIDO:	40 Mm	TIPO:	H-250	REALIZADO:	Carlos																																													
ELEMENTOS: Zapata Pila Izquierda . Paso Superior 551+300. Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .																																																		
SUMINISTRADOR:	Aridos Pascual	TIPO DE CEMENTO:	II/AP42,5R																																															
CAMIÓN:	M-2188-KJ	Nº ALBARÁN:	72.936																																															
HORA SALIDA:	16:28	HORA TOMA:	17:45																																															
ESTADO TIEMPO:	Soleado	TEMPERATURA:	17 °C																																															
CONO ABRAMS	7 cm																																																	
CONDICIONES DE COLOCACIÓN:	Vertido Directo																																																	
INCIDENCIAS:																																																		
<table><thead><tr><th colspan="5">ROTURAS</th></tr><tr><th>Nº PROBETA</th><th>FECHA ROTURA</th><th>EDAD</th><th>CARGA</th><th>RESISTENCIA</th></tr></thead><tbody><tr><td>176</td><td>21/10/99</td><td>7</td><td>45,3</td><td>256,3</td></tr><tr><td>177</td><td>21/10/99</td><td>7</td><td>44,1</td><td>249,6</td></tr><tr><td colspan="4">MEDIA</td><td>253</td></tr><tr><td>178</td><td>11/11/99</td><td>28</td><td>54,6</td><td>309,0</td></tr><tr><td>179</td><td>11/11/99</td><td>28</td><td>53,9</td><td>305,0</td></tr><tr><td>180</td><td>11/11/99</td><td>28</td><td>56,9</td><td>322,0</td></tr><tr><td colspan="4">MEDIA</td><td>312</td></tr></tbody></table>						ROTURAS					Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA	176	21/10/99	7	45,3	256,3	177	21/10/99	7	44,1	249,6	MEDIA				253	178	11/11/99	28	54,6	309,0	179	11/11/99	28	53,9	305,0	180	11/11/99	28	56,9	322,0	MEDIA				312
ROTURAS																																																		
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA																																														
176	21/10/99	7	45,3	256,3																																														
177	21/10/99	7	44,1	249,6																																														
MEDIA				253																																														
178	11/11/99	28	54,6	309,0																																														
179	11/11/99	28	53,9	305,0																																														
180	11/11/99	28	56,9	322,0																																														
MEDIA				312																																														

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0111

Nº DE REGISTRO: 0111 SERIE: 42 FECHA TOMA: 9/11/99
TAMAÑO ÁRIDO: 20 MM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Estribo Izquierdo Paso Superior 551+300.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP42,5R
CAMIÓN: GU-6262-G Nº ALBARÁN: 73.826
HORA SALIDA: 9:00 HORA TOMA: 10:20
ESTADO TIEMPO: Soleado TEMPERATURA: 5 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido Con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
206	16/11/99	7	42,0	237,6
207	16/11/99	7	41,5	234,8
MEDIA				236
208	7/12/99	28	51,1	289,2
209	7/12/99	28	52,9	299,4
210	7/12/99	28	52,5	297,1
MEDIA				295

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0112

Nº DE REGISTRO: 0112 SERIE: 43 FECHA TOMA: 9/11/99
TAMAÑO ÁRIDO: 20 MM TIPO: H-250 REALIZADO: Carlos
ELEMENTOS: Estribo Izquierdo Paso Superior 551+300.
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Aridos Pascual TIPO DE CEMENTO: II/AP42,5R
CAMIÓN: GU-6262-G Nº ALBARÁN: 73.833
HORA SALIDA: 11:29 HORA TOMA: 12:30
ESTADO TIEMPO: Soleado TEMPERATURA: 5 °C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido Con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
211	16/11/99	7	47,1	266,5
212	16/11/99	7	46,7	264,2
MEDIA				265
213	7/12/99	28	53,9	305,0
214	7/12/99	28	54,2	306,7
215	7/12/99	28	56,0	316,9
MEDIA				309

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313. Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0113

Nº DE REGISTRO:0113

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Pila Izquierda .Paso Superior 551+300.

LINEA A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

CAMIÓN:GU-6262-G

HORA SALIDA:15:00

ESTADO TIEMPO:Soleado

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido Con Bomba.

INCIDENCIAS:

SERIE:44

FECHA TOMA:9/11/99

TIPO:H-300

REALIZADO:Carlos

TIPO DE CEMENTO:II/AP42,5R

Nº ALBARÁN:73.845

HORA TOMA:16:05

TEMPERATURA:8 °C

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
216	16/11/99	7	47,5	268,8
217	16/11/99	7	48,9	276,7
MEDIA				273
218	7/12/99	28	58,2	329,3
219	7/12/99	28	61,6	348,6
220	7/12/99	28	60,5	342,4
MEDIA				340

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83 300, 83 301, 83 303 Y 83,313 Prensa utilizada CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDECENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0123

Nº DE REGISTRO:0123

TAMAÑO ÁRIDO:20 MIM

ELEMENTOS:Pila Derecha, Paso Superior 551+300.

LINEA A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

CAMIÓN:GU-4509-I

HORA SALIDA:14:36

ESTADO TIEMPO:Soleado

CONO ABRAMS:6 cm

CONDICIONES DE COLOCACIÓN:Vertido Con Bomba.

INCIDENCIAS:Lleva Anticongelante

SERIE:50

FECHA TOMA:19/11/99

TIPO:H-300

REALIZADO:Carlos

TIPO DE CEMENTO:II/AP 42,5R

Nº ALBARÁN:74.220

HORA TOMA:15:40

TEMPERATURA:6 °C

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
254	26/11/99	7	43,0	243,3
255	26/11/99	7	44,1	249,6
MEDIA				246
256	17/12/99	28	53,8	304,4
257	17/12/99	28	53,2	301,0
258	17/12/99	28	54,6	309,5
MEDIA				305

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83 300, 83 301, 83 303 Y 83,313 Prensa utilizada CME-120

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A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0124

Nº DE REGISTRO:0124

SERIE:51

FECHA TOMA:19/11/99

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS:

Estribo Derecho, Paso Superior 551+300

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

TIPO DE CEMENTO:III/AP 42,5R

CAMIÓN:M-2188-KJ

Nº ALBARÁN:74 226

HORA SALIDA:15:55

HORA TOMA:17:00

ESTADO TIEMPO:Soleado

TEMPERATURA:6 °C

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido Con Bomba.

INCIDENCIAS:Lleva Anticongelante

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
259	26/11/99	7	43,2	244,5
260	26/11/99	7	42,1	238,2
MEDIA				241
261	17/12/99	28	56,5	319,7
262	17/12/99	28	56,8	321,4
263	17/12/99	28	56,0	316,9
MEDIA				319

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES. Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0125

Nº DE REGISTRO:0125

SERIE:52

FECHA TOMA:19/11/99

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Carlos

ELEMENTOS:

Estribo Derecho, Paso Superior 551+300

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Aridos Pascual

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:GU-7337-E

Nº ALBARÁN:74 227

HORA SALIDA:16:09

HORA TOMA:17:25

ESTADO TIEMPO:Nublado

TEMPERATURA:5 °C

CONO ABRAMS:7 cm

CONDICIONES DE COLOCACIÓN:Vertido Con Bomba.

INCIDENCIAS:Lleva Anticongelante

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
264	26/11/99	7	43,8	247,9
265	26/11/99	7	44,4	251,2
MEDIA				249
266	17/12/99	28	51,9	293,7
267	17/12/99	28	50,8	287,5
268	17/12/99	28	53,1	300,5
MEDIA				294

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES. Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

114



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0224

Nº DE REGISTRO: 0224 SERIE: 112 FECHA TOMA: 11/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Vicente
ELEMENTOS: Tablero P.S 551+300
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2174-LM Nº ALBARÁN: 8.018
HORA SALIDA: 9:30 HORA TOMA: 10:15
ESTADO TIEMPO: Nublado TEMPERATURA: 10 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
572	18/02/00	7	45,5	257,5
573	18/02/00	7	46,7	264,2
MEDIA				261
574	10/03/00	28	59,8	338,4
575	10/03/00	28	60,2	340,7
576	10/03/00	28	58,9	333,3
MEDIA				337

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0225

Nº DE REGISTRO: 0225 SERIE: 113 FECHA TOMA: 11/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Vicente
ELEMENTOS: Tablero P.S 551+300
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-M Nº ALBARÁN: 8.020
HORA SALIDA: 0,523611111 HORA TOMA: 10:45
ESTADO TIEMPO: Soleado TEMPERATURA: 12 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
577	18/02/00	7	52,2	295,4
578	18/02/00	7	53,8	304,4
MEDIA				300
579	10/03/00	28	66,9	378,6
580	10/03/00	28	67,8	383,7
581	10/03/00	28	68,9	389,9
MEDIA				384

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0226

Nº DE REGISTRO: 0226 SERIE: 114 FECHA TOMA: 11/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Vicente

ELEMENTOS: Tablero P.S 551+300
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2835-VY Nº ALBARÁN: 8.023
HORA SALIDA: 11:20 HORA TOMA: 11:45
ESTADO TIEMPO: Nublado TEMPERATURA: 10 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
582	18/02/00	7	54,6	309,0
583	18/02/00	7	53,8	304,4
MEDIA				307
584	10/03/00		69,5	393,3
585	10/03/00		70,2	397,3
586	10/03/00		69,5	393,3
MEDIA				395

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0227

Nº DE REGISTRO: 0227 SERIE: 115 FECHA TOMA: 11/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Vicente

ELEMENTOS: Tablero P.S 551+300
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2835-VY Nº ALBARÁN: 8.027
HORA SALIDA: 12:40 HORA TOMA: 13:10
ESTADO TIEMPO: Nublado TEMPERATURA: 10 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
587	18/02/00	7	54,8	310,1
588	18/02/00	7	56,1	317,5
MEDIA				314
589	10/03/00	28	70,5	398,9
590	10/03/00	28	71,2	402,9
591	10/03/00	28	69,8	395,0
MEDIA				399

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0228

Nº DE REGISTRO: 0228 SERIE: 116 FECHA TOMA: 11/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Vicente
ELEMENTOS: Tablero P.S 551+300
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-H Nº ALBARÁN: 8.036
HORA SALIDA: 15:15 HORA TOMA: 15:45
ESTADO TIEMPO: Nublado TEMPERATURA: 12 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
592	18/02/00	7	49,9	282,4
593	18/02/00	7	49,4	279,5
MEDIA				281
594	10/03/00	28	68,9	389,9
595	10/03/00	28	71,2	402,9
596	10/03/00	28	70,5	399,0
MEDIA				397

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0297

Nº DE REGISTRO: 0297 SERIE: 159 FECHA TOMA: 7/04/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-400 REALIZADO: Jesús
ELEMENTOS: Losa Transición P.S 551+3.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: SO-9966-F Nº ALBARÁN: 7.934
HORA SALIDA: 10:40 HORA TOMA: 11:25
ESTADO TIEMPO: Nublado TEMPERATURA: 14 °C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido Directo.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
807	14/04/00	7	64,6	365,6
808	14/04/00	7	59,5	336,7
MEDIA				351
809	5/05/00	28	76,0	430,1
810	5/05/00	28	78,4	443,1
811	5/05/00	28	79,0	447,1
MEDIA				440

fck H-400

Kp/cm²

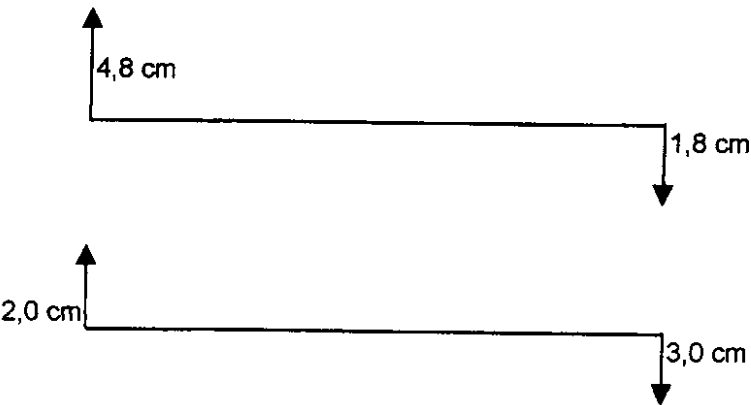
Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

UNIDAD DE OBRA: PASO INFERIOR 568+7
LOCALIZACION: 568+7 FECHA DICIEMBRE - 99
OBSERVACIONES: COMPROBACION VERTICALIDAD

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ZARAGOZA

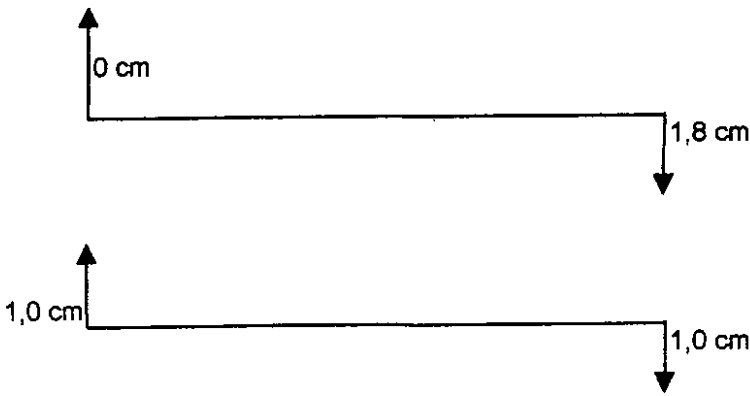


Notas: Se considera la ejecución como no apta.

UNIDAD DE OBRA: PASO INFERIOR 568+7
LOCALIZACION: 568+7 FECHA DICIEMBRE - 99
OBSERVACIONES: COMPROBACION VERTICALIDAD

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ZARAGOZA



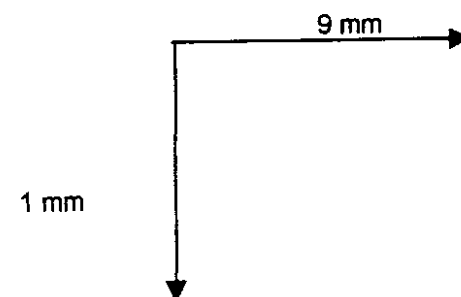
Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO INFERIOR 562+7
 LOCALIZACION: 562+700 FECHA ENERO-01
 OBSERVACIONES: COMPROBACION EXCAVACION ZAPATA

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ZAPATA



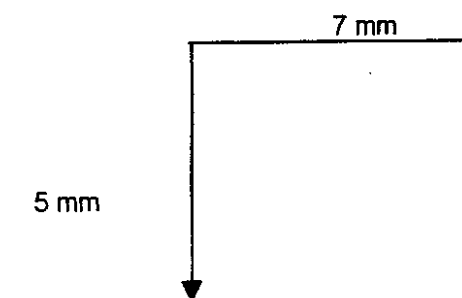
Notas: Se considera la ejecución como apta.

L.A.V. MADRID-ZARAGOZA-FRONTERA FRANCESA
 TRAMO: MADRID-ZARAGOZA SUBTRAMO Vb-Plataforma

UNIDAD DE OBRA: PASO INFERIOR 564+0
 LOCALIZACION: 564+000 FECHA ENERO-01
 OBSERVACIONES: COMPROBACION GEOMETRIA ZAPATA

Pto.	Coordenadas teoricas	Coordenadas Obser.	Diferencias	Observaciones
1	X			
	Y			
	Z			
2	X			
	Y			
	Z			
3	X			
	Y			
	Z			
4	X			
	Y			
	Z			
5	X			
	Y			
	Z			
6	X			
	Y			
	Z			
7	X			
	Y			
	Z			
8	X			
	Y			
	Z			

ZAPATA



Notas: Se considera la ejecución como apta.

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0494

Nº DE REGISTRO: 494 SERIE: 257 FECHA TOMA: 21/12/00
TAMAÑO ARIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata P.I 558+700.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-9960-DT Nº ALBARÁN: 7.650
HORA SALIDA: 11:15 HORA TOMA: 11:25
ESTADO TIEMPO: Soleado TEMPERATURA: 9°C
CONO ABRAMS: 7
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS: Lleva Anticogelante 6,4

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1301	28/12/00	7	40,8	230,8
1302	28/12/00	7	39,2	221,8
MEDIA				226
1303	18/01/01	28	63,8	361,0
1304	18/01/01	28	66,0	373,4
1305	18/01/01	28	64,1	362,7
MEDIA				366

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0495

Nº DE REGISTRO: 495 SERIE: 258 FECHA TOMA: 21/12/00
TAMAÑO ARIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata P.I 558+700.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-1121-EC Nº ALBARÁN: 7.651
HORA SALIDA: 11:35 HORA TOMA: 11:50
ESTADO TIEMPO: Soleado TEMPERATURA: 10°C
CONO ABRAMS: 7
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS: Lleva Anticogelante 6,4

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1306	28/12/00	7	41,3	237,2
1307	28/12/00	7	40,9	231,4
MEDIA				234
1308	18/01/01	28	59,8	338,4
1309	18/01/01	28	58,6	331,6
1310	18/01/01	28	59,8	338,4
MEDIA				336

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0518

Nº DE REGISTRO: 518
TAMAÑO ARIDO: 20 MIM
SERIE: 276
FECHA TOMA: 8/02/01
TIPO: H-250
REALIZADO: Jesús
ELEMENTOS: Losa P.I 558+700.
Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L.
CAMIÓN: A-9960-DT
HORA SALIDA: 11:00
ESTADO TIEMPO: Nublado
CONO ABRAMS: 9
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

TIPO DE CEMENTO: II/AP 42,5R
Nº ALBARÁN: 8.916
HORA TOMA: 11:30
TEMPERATURA: 12°C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1396	15/02/01	7	37,2	210,5
1397	15/02/01	7	39,4	222,9
MEDIA				217
1398	8/03/01	28	57,9	327,6
1399	8/03/01	28	57,3	324,2
1400	8/03/01	28	57,0	322,5
MEDIA				325

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0505

Nº DE REGISTRO: 505
TAMAÑO ÁRIDO: 20 MIM
SERIE: 265
FECHA TOMA: 29/01/01
TIPO: H-250
REALIZADO: Jesús
ELEMENTOS: Zapata P.I 562+640
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L
CAMIÓN: A-1121-EC
HORA SALIDA: 11:25
ESTADO TIEMPO: Claros
CONO ABRAMS: 4
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1341	5/02/01	7	41,5	234,8
1342	5/02/01	7	42,9	242,7
MEDIA				239
1343	26/02/01	28	61,1	345,7
1344	26/02/01	28	59,5	336,7
1345	26/02/01	28	61,1	345,7
MEDIA				343

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0506

Nº DE REGISTRO: 506
TAMAÑO ÁRIDO: 20 MIM
SERIE: 266
FECHA TOMA: 29/01/01
TIPO: H-250
REALIZADO: Jesús
ELEMENTOS: Zapata P.I 562+640
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L
CAMIÓN: A-9960-DT
HORA SALIDA: 11:50
ESTADO TIEMPO: Nublado
CONO ABRAMS: 8
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1346	5/02/01	7	39,0	220,7
1347	5/02/01	7	37,7	213,3
MEDIA				217
1348	26/02/01	28	56,6	320,2
1349	26/02/01	28	57,2	323,6
1350	26/02/01	28	61,3	346,8
MEDIA				330

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b
Nº TRABAJO: 0507

Nº DE REGISTRO:507

SERIE:267

FECHA TOMA:29/01/01

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Zapata P.I 562+640

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:III/AP 42,5R

CAMIÓN:A-9960-DT

Nº ALBARÁN:8.773

HORA SALIDA:12:30

HORA TOMA:12:45

ESTADO TIEMPO:Nublado

TEMPERATURA:5°C

CONO ABRAMS:10

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1351	5/02/01	7	38,3	216,7
1352	5/02/01	7	38,3	216,7
MEDIA				217
1353	26/02/01	28	56,8	321,4
1354	26/02/01	28	58,7	332,1
1355	26/02/01	28	57,3	324,2
MEDIA				326

fck H-250

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b
Nº TRABAJO: 0523

Nº DE REGISTRO:523

SERIE:280

FECHA TOMA:15/02/01

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Losa P.I 562+600

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-1121-EC

Nº ALBARÁN:8.997

HORA SALIDA:10:15

HORA TOMA:10:30

ESTADO TIEMPO:Soleado

TEMPERATURA:7°C

CONO ABRAMS:8

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1416	22/02/01	7	45,2	255,8
1417	22/02/01	7	43,5	246,2
MEDIA				251
1418	15/03/01	28	61,5	348,0
1419	15/03/01	28	60,6	342,9
1420	15/03/01	28	58,3	329,9
MEDIA				340

fck H-250

Kp/cm²

Kp/cm²



A.C.O.
Tramo: Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192, Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F. (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0524

Nº DE REGISTRO:	524	SERIE:	281	FECHA TOMA:	15/02/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Losa P.I 562+600 Línea A.V.E. Madrid-Zaragoza. Subtramo V-b.					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-1121-EC	Nº ALBARÁN:	10.951		
HORA SALIDA:	11:10	HORA TOMA:	11:25		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	7ºC		
CONO ABRAMS:	10				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1421	22/02/01	7	41,9	237,1
1422	22/02/01	7	42,8	242,2
MEDIA				240
1423	15/03/01	28	62,0	350,8
1424	15/03/01	28	61,5	348,0
1425	15/03/01	28	60,9	344,6
MEDIA				348

fck H-250

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0510

Nº DE REGISTRO:510

SERIE:269

FECHA TOMA:1/02/01

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Zapata Estribo Izquierdo P.I 562+7

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-9960-DT

Nº ALBARÁN:8.820

HORA SALIDA:13:15

HORA TOMA:13:30

ESTADO TIEMPO:Soleado

TEMPERATURA:12°C

CONO ABRAMS:9

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1361	8/02/01	7	39,5	223,5
1362	8/02/01	7	37,7	213,3
MEDIA				218
1363	1/03/01	28	59,9	338,9
1364	1/03/01	28	57,4	324,8
1365	1/03/01	28	61,6	348,5
MEDIA				337

fck H-250

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0511

Nº DE REGISTRO:511

SERIE:270

FECHA TOMA:1/02/01

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Zapata Estribo Izquierdo P.I 562+7

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-1121-EC

Nº ALBARÁN:8.829

HORA SALIDA:15:50

HORA TOMA:16:55

ESTADO TIEMPO:Soleado

TEMPERATURA:12°C

CONO ABRAMS:8

CONDICIONES DE COLOCACIÓN:Vertido con Bomba

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1366	8/02/01	7	42,0	237,7
1367	8/02/01	7	41,3	233,7
MEDIA				236
1368	1/03/01	28	62,7	354,8
1369	1/03/01	28	59,9	338,9
1370	1/03/01	28	58,8	332,7
MEDIA				342

fck H-250

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0512

Nº DE REGISTRO:	512	SERIE:	271	FECHA TOMA:	5/02/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Zapata Estribo Derecho P.I 562+7 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-1121-EC	Nº ALBARÁN:	8.857		
HORA SALIDA:	10:25	HORA TOMA:	10:40		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	6°C		
CONO ABRAMS:	10				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1371	12/02/01	7	34,0	192,4
1372	12/02/01	7	36,3	205,4
MEDIA				199
1373	5/03/01	28	49,5	280,1
1374	5/03/01	28	50,6	286,3
1375	5/03/01	28	48,3	273,3
MEDIA				280

fck H-250

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0513

Nº DE REGISTRO:	513	SERIE:	272	FECHA TOMA:	5/02/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Zapata Estribo Derecho P.I 562+7 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-9495-DW	Nº ALBARÁN:	8.859		
HORA SALIDA:	10:50	HORA TOMA:	11:05		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	6°C		
CONO ABRAMS:	8				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1376	12/02/01	7	45,9	259,7
1377	12/02/01	7	40,1	226,9
MEDIA				243
1378	5/03/01	28	63,8	361,0
1379	5/03/01	28	62,3	352,5
1380	5/03/01	28	63,7	360,4
MEDIA				358

fck H-250

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0514

Nº DE REGISTRO:	514	SERIE:	273	FECHA TOMA:	5/02/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS:	Zapata Estribo Derecho P.I 562+7 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .				
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMION:	A-9495-DW	Nº ALBARÁN:	8.868		
HORA SALIDA:	12:30	HORA TOMA:	12:45		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	7ºC		
CONO ABRAMS:	6				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba				
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1381	12/02/01	7	50,3	284,6
1382	12/02/01	7	54,9	310,6
MEDIA				298
1383	5/03/01	28	75,0	424,4
1384	5/03/01	28	71,7	405,0
1385	5/03/01	28	74,0	418,7
MEDIA				416

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0515

Nº DE REGISTRO:	515	SERIE:	274	FECHA TOMA:	5/02/01
TAMAÑO ÁRIDO:	20 MM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS:	Zapata Estribo Derecho P.I 562+7 Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .				
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-1121-EC	Nº ALBARÁN:	8.872		
HORA SALIDA:	13:15	HORA TOMA:	13:30		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	7ºC		
CONO ABRAMS:	9				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba				
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1386	12/02/01	7	35,0	198,0
1387	12/02/01	7	33,6	190,1
MEDIA				194
1388	5/03/01	28	50,1	283,5
1389	5/03/01	28	49,5	280,1
1390	5/03/01	28	49,7	282,2
MEDIA				282

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0516

Nº DE REGISTRO:	516	SERIE:	275	FECHA TOMA:	6/02/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Zapata Aleta Estribo Izquierdo P.I 562+7 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-9960-DT	Nº ALBARÁN:	8.886		
HORA SALIDA:	10:55	HORA TOMA:	11:15		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	6°C		
CONO ABRAMS:	7				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1391	13/02/01	7	48,0	271,6
1392	13/02/01	7	48,1	272,1
MEDIA				272
1393	6/03/01	28	65,2	368,9
1394	6/03/01	28	65,3	369,5
1395	6/03/01	28	66,5	376,3
MEDIA				372

fck H-250

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0520

Nº DE REGISTRO:	520	SERIE:	278	FECHA TOMA:	13/02/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Zapata Estribo Izquierdo P.I 562+750 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-1121-EC	Nº ALBARÁN:	8.975		
HORA SALIDA:	12:10	HORA TOMA:	12:30		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	9°C		
CONO ABRAMS:	8				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1406	20/02/01	7	39,2	221,8
1407	20/02/01	7	38,7	219,0
MEDIA				220
1408	13/03/01	28	61,7	349,1
1409	13/03/01	28	60,8	344,0
1410	13/03/01	28	60,0	399,5
MEDIA				364

fck H-250

Kp/cm²

Kp/cm²



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0521

Nº DE REGISTRO: 521
TAMAÑO ÁRIDO: 20 MIM
ELEMENTOS: Zapata Estribo Izquierdo P.I 562+750
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SERIE: 279
FECHA TOMA: 13/02/01
TIPO: H-250
REALIZADO: Jesús

SUMINISTRADOR: Planta valdemorillo S.L
CAMIÓN: A-9495-DW
HORA SALIDA: 12:35
ESTADO TIEMPO: Soleado
CONO ABRAMS: 9
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

TIPO DE CEMENTO: II/AP 42,5R
Nº ALBARÁN: 8.977
HORA TOMA: 12:55
TEMPERATURA: 9°C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1411	20/02/01	7	39,4	222,9
1412	20/02/01	7	35,6	201,4
MEDIA				212
1413	13/03/01	28	54,8	310,1
1414	13/03/01	28	53,3	301,6
1415	13/03/01	28	55,9	316,3
MEDIA				309

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0537

Nº DE REGISTRO: 537
TAMAÑO ÁRIDO: 20 MIM
ELEMENTOS: Alzado Aleta Izquierda P.I 562+800
Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SERIE: 287
FECHA TOMA: 23/02/01
TIPO: H-250
REALIZADO: Jesús

SUMINISTRADOR: Planta valdemorillo S.L
CAMIÓN: A-9495-DW
HORA SALIDA: 9:00
ESTADO TIEMPO: Soleado
CONO ABRAMS: 6
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

TIPO DE CEMENTO: II/AP 42,5R
Nº ALBARÁN: 11.071
HORA TOMA: 9:50
TEMPERATURA: 8°C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1451	2/03/01	7	39,7	224,6
1452	2/03/01	7	40,8	230,8
MEDIA				228
1453	23/03/01	28	58,3	329,9
1454	23/03/01	28	58,2	329,3
1455	23/03/01	28	59,6	337,2
MEDIA				332

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0540

Nº DE REGISTRO: 540 SERIE: 290 FECHA TOMA: 1/03/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús

ELEMENTOS: Zapata P.I 562+700
Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-9960-DT Nº ALBARÁN: 11.143
HORA SALIDA: 10:00 HORA TOMA: 10:15
ESTADO TIEMPO: Nublado TEMPERATURA: 2°C
CONO ABRAMS: 9
CONDICIONES DE COLOCACION: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1466	8/03/01	7	38,5	217,8
1467	8/03/01	7	38,1	215,6
MEDIA				217
1468	29/03/01	28	53,9	305,0
1469	29/03/01	28	53,7	303,8
1470	29/03/01	28	53,4	302,1
MEDIA				304

fck H-250

Kp/cm²

Kp/cm²



A.C.O.
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192.Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0541

Nº DE REGISTRO: 541 SERIE: 291 FECHA TOMA: 1/03/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús

ELEMENTOS: Zapata P.I 562+700
Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-9495-DW Nº ALBARÁN: 11.148
HORA SALIDA: 12:00 HORA TOMA: 12:30
ESTADO TIEMPO: Nublado TEMPERATURA: 2°C
CONO ABRAMS: 10
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1471	8/03/01	7	41,2	233,1
1472	8/03/01	7	40,5	229,1
MEDIA				231
1473	29/03/01	28	54,2	306,7
1474	29/03/01	28	56,0	316,9
1475	29/03/01	28	55,9	316,3
MEDIA				313

fck H-250

Kp/cm²

Kp/cm²



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F. (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0542

Nº DE REGISTRO: 542 SERIE: 292 FECHA TOMA: 1/03/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata P.I 562+700
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-4077-ZX Nº ALBARÁN: 11.153
HORA SALIDA: 13:00 HORA TOMA: 13:15
ESTADO TIEMPO: Nublado TEMPERATURA: 2°C
CONO ABRAMS: 7
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1476	8/03/01	7	41,5	234,8
1477	8/03/01	7	39,6	224,0
MEDIA				229
1478	29/03/01	28	59,4	336,1
1479	29/03/01	28	60,3	341,2
1480	29/03/01	28	61,5	348,0
MEDIA				342

fck H-250

Kp/cm²

Kp/cm²



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F. (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0543

Nº DE REGISTRO: 543 SERIE: 293 FECHA TOMA: 1/03/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata P.I 562+700
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-9960-DT Nº ALBARÁN: 11.167
HORA SALIDA: 16:25 HORA TOMA: 16:40
ESTADO TIEMPO: Nublado TEMPERATURA: 4°C
CONO ABRAMS: 7
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1481	8/03/01	7	38,1	215,6
1482	8/03/01	7	37,4	211,6
MEDIA				214
1483	29/03/01	28	52,0	294,2
1484	29/03/01	28	52,4	296,5
1485	29/03/01	28	55,3	312,9
MEDIA				301

fck H-250

Kp/cm²

Kp/cm²



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0544

Nº DE REGISTRO:544

SERIE:294

FECHA TOMA:8/03/01

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Zapata Aleta derecha P.I 562+700

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-9960-DT

Nº ALBARÁN:11.234

HORA SALIDA:10:10

HORA TOMA:10:25

ESTADO TIEMPO:Nublado

TEMPERATURA:8°C

CONO ABRAMS:9

CONDICIONES DE COLOCACIÓN: Vertido con Bomba.

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1486	15/03/01	7	36,5	206,1
1487	15/03/01	7	35,9	203,1
MEDIA				205
1488	5/04/01	28	52,6	297,6
1489	5/04/01	28	52,0	294,2
1490	5/04/01	28	52,8	298,7
MEDIA				297

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0544

Nº DE REGISTRO:545

SERIE:295

FECHA TOMA:8/03/01

TAMAÑO ÁRIDO:20 MIM

TIPO:H-250

REALIZADO:Jesús

ELEMENTOS:

Zapata Aleta P.I 562+700

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:A-9960-DT

Nº ALBARÁN:11.239

HORA SALIDA:11:00

HORA TOMA:11:15

ESTADO TIEMPO:Nublado

TEMPERATURA:8°C

CONO ABRAMS:11

CONDICIONES DE COLOCACIÓN: Vertido con Bomba.

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1491	15/03/01	7	34,2	193,5
1492	15/03/01	7	32,4	183,3
MEDIA				188
1493	5/04/01	28	50,6	286,3
1494	5/04/01	28	49,3	278,9
1495	5/04/01	28	51,8	293,1
MEDIA				286

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0546

Nº DE REGISTRO	546	SERIE	296	FECHA TOMA	8/03/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO	Jesús
ELEMENTOS: Zapata Aleta P.I 562+700 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-1121-EC	Nº ALBARÁN:	11.243		
HORA SALIDA:	11:45	HORA TOMA:	12:25		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	9°C		
CONO ABRAMS:	8				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1496	15/03/01	7	41,3	233,0
1497	15/03/01	7	42,3	293,3
MEDIA				263
1498	5/04/01	28	55,3	312,9
1499	5/04/01	28	56,5	319,7
1500	5/04/01	28	53,9	305,0
MEDIA				313

fck H-250

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0549

Nº DE REGISTRO	549	SERIE	299	FECHA TOMA:	14/03/01
TAMAÑO ÁRIDO	20 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Zapata Estribo P.I 562+700 Línea A.V.E . Madrid-Zaragoza Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-9960-DT	Nº ALBARÁN:	11.307		
HORA SALIDA:	12:10	HORA TOMA:	12:30		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	13°C		
CONO ABRAMS:	7				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1511	21/03/01	7	39,2	221,8
1512	21/03/01	7	40,5	229,2
MEDIA				226
1513	11/04/01	28	53,9	305,0
1514	11/04/01	28	52,5	297,0
1515	11/04/01	28	53,1	300,4
MEDIA				301

fck H-250

Kp/cm²

Kp/cm²



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO

0550

Nº DE REGISTRO:

550

SERIE:

300

FECHA TOMA

14/03/01

TAMAÑO ÁRIDO:

20 MIM

TIPO:

H-250

REALIZADO

Jesús

ELEMENTOS:

Zapata Estribo P.I 562+700

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:

Planta valdemorillo S.L

TIPO DE CEMENTO

II/AP 42,5R

CAMIÓN:

M-4077-ZX

Nº ALBARÁN

11.312

HORA SALIDA:

13:10

HORA TOMA:

13:30

ESTADO TIEMPO:

Soleado

TEMPERATURA:

15°C

CONO ABRAMS

8

CONDICIONES DE COLOCACIÓN:

Vertido con Bomba

INCIDENCIAS

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1516	21/03/01	7	37,9	214,5
1517	21/03/01	7	38,1	215,6
MEDIA				215
1518	11/04/01	28	51,5	291,4
1519	11/04/01	28	51,3	290,3
1520	11/04/01	28	52,2	295,3
MEDIA				292

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azulre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO

0551

Nº DE REGISTRO

551

SERIE

301

FECHA TOMA

14/03/01

TAMAÑO ÁRIDO

20 MIM

TIPO:

H-250

REALIZADO

Jesús

ELEMENTOS:

Zapata Estribo 4º P.I 562+700

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:

Planta valdemorillo S.L

TIPO DE CEMENTO:

II/AP 42,5R

CAMIÓN:

A-1121-EC

Nº ALBARÁN:

11.325

HORA SALIDA:

16:05

HORA TOMA:

16:25

ESTADO TIEMPO:

Soleado

TEMPERATURA

16°C

CONO ABRAMS

9

CONDICIONES DE COLOCACIÓN:

Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1521	21/03/01	7	38,6	218,4
1522	21/03/01	7	39,2	221,8
MEDIA				220
1523	11/04/01	28	54,7	309,5
1524	11/04/01	28	54,3	307,2
1525	11/04/01	28	54,2	306,7
MEDIA				308

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azulre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0552

Nº DE REGISTRO:	552	SERIE:	302	FECHA TOMA:	14/03/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Zapata Aleta 4º P.I 562+700 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO	II/AP 42,5R		
CAMIÓN:	A-9495-DW	Nº ALBARÁN:	11.331		
HORA SALIDA:	17:25	HORA TOMA:	17:45		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	16°C		
CONO ABRAMS:	9				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1526	21/03/01	7	37,2	210,5
1527	21/03/01	7	36,9	208,8
MEDIA				210
1528	11/04/01	28	52,3	295,9
1529	11/04/01	28	52,9	299,3
1530	11/04/01	28	52,1	294,8
MEDIA				297

fck H-250

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0554

Nº DE REGISTRO:	554	SERIE:	303	FECHA TOMA:	15/03/01
TAMAÑO ÁRIDO:	20 MIM	TIPO:	H-250	REALIZADO:	Jesús
ELEMENTOS: Alzado Estribo Derecho P.I 562+7 Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO	II/AP 42,5R		
CAMIÓN:	A-9495-DW	Nº ALBARÁN:	11.343		
HORA SALIDA:	10:00	HORA TOMA:	10:20		
ESTADO TIEMPO:	Soleado	TEMPERATURA:	13°C		
CONO ABRAMS:	9				
CONDICIONES DE COLOCACIÓN: Vertido con Bomba					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1531	22/03/01	7	38,7	219,0
1532	22/03/01	7	37,8	213,9
MEDIA				216
1533	12/04/01	28	53,9	305,0
1534	12/04/01	28	55,5	314,0
1535	12/04/01	28	53,6	303,3
MEDIA				307

fck H-250

Kp/cm²

Kp/cm²

A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0555

Nº DE REGISTRO: 555

SERIE: 304

FECHA TOMA: 15/03/01

TAMAÑO ÁRIDO: 20 MIM

TIPO: H-250

REALIZADO: Jesús

ELEMENTOS: Alzado Estribo Derecho P.I 562+7

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L

TIPO DE CEMENTO: II/AP 42,5R

CAMIÓN: A-9960-DT

Nº ALBARÁN: 11.350

HORA SALIDA: 11:30

HORA TOMA: 11:40

ESTADO TIEMPO: Soleado

TEMPERATURA: 13°C

CONO ABRAMS: 8

CONDICIONES DE COLOCACIÓN: Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1536	22/03/01	7	42,1	238,2
1537	22/03/01	7	41,6	235,4
MEDIA				237
1538	12/04/01		61,3	346,8
1539	12/04/01		60,4	341,8
1540	12/04/01		62,8	355,3
MEDIA				348

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313. Prensa utilizada: CME-120

A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0556

Nº DE REGISTRO: 556

SERIE: 305

FECHA TOMA: 15/03/01

TAMAÑO ÁRIDO: 20 MIM

TIPO: H-250

REALIZADO: Jesús

ELEMENTOS: Alzado Estribo Derecho P.I 562+7

Línea A.V.E . Madrid-Zaragoza Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L

TIPO DE CEMENTO: II/AP 42,5R

CAMIÓN: A-9960-DT

Nº ALBARÁN: 11.353

HORA SALIDA: 12:10

HORA TOMA: 13:00

ESTADO TIEMPO: Soleado

TEMPERATURA: 15°C

CONO ABRAMS: 9

CONDICIONES DE COLOCACIÓN: Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1541	22/03/01	7	39,9	225,8
1542	22/03/01	7	40,9	231,4
MEDIA				229
1543	12/04/01	28	56,7	320,8
1544	12/04/01	28	57,8	327,0
1545	12/04/01	28	56,2	318,0
MEDIA				322

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313. Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0557

Nº DE REGISTRO: 557 SERIE: 306 FECHA TOMA: 20/03/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Espaldón Estribo lado Madrid.P.I 562+700
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-1121-EC Nº ALBARÁN: 11.412
HORA SALIDA: 12:20 HORA TOMA: 12:40
ESTADO TIEMPO: Nublado TEMPERATURA: 14°C
CONO ABRAMS: 9
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1546	27/03/01	7	46,4	262,5
1547	27/03/01	7	45,8	259,1
MEDIA				261
1548	17/04/01	28	59,5	336,7
1549	17/04/01	28	59,2	335,0
1550	17/04/01	28	59,2	335,0
MEDIA				336

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0558

Nº DE REGISTRO: 558 SERIE: 307 FECHA TOMA: 26/03/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Alzado Estribo Derecho P.I 562+700
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-9960-DT Nº ALBARÁN: 11.458
HORA SALIDA: 11:45 HORA TOMA: 12:05
ESTADO TIEMPO: Nublado TEMPERATURA: 12°C
CONO ABRAMS: 9
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1551	2/04/01	7	43,7	247,2
1552	2/04/01	7	42,5	240,5
MEDIA				244
1553	23/04/01	28	54,1	306,1
1554	23/04/01	28	54,5	308,4
1555	23/04/01	28	53,9	305,0
MEDIA				307

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0559

Nº DE REGISTRO	559	SERIE	308	FECHA TOMA	26/03/01
TAMAÑO ÁRIDO	20 MIM	TIPO	H-250	REALIZADO	Jesús
ELEMENTOS: Alzado Estribo Derecho P.I 562+700 Línea A.V.E . Madrid-Zaragoza Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-9960-DT	Nº ALBARÁN:	11.462		
HORA SALIDA:	12:40	HORA TOMA	13:00		
ESTADO TIEMPO	Nublado	TEMPERATURA:	12ºC		
CONO ABRAMS:	8				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba				
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1556	2/04/01	7	47,7	270,0
1557	2/04/01	7	45,5	257,5
MEDIA				264
1558	23/04/01	28	56,9	321,9
1559	23/04/01	28	56,4	319,1
1560	23/04/01	28	57,0	322,5
MEDIA				321

fck H-250

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDECIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0560

Nº DE REGISTRO	560	SERIE	309	FECHA TOMA	26/03/01
TAMAÑO ÁRIDO	20 MIM	TIPO	H-250	REALIZADO	Jesus
ELEMENTOS: Alzado Estribo Derecho P.I 562+700 Línea A.V.E . Madrid-Zaragoza Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:	A-9960-DT	Nº ALBARAN	11.472		
HORA SALIDA:	16:45	HORA TOMA	17:05		
ESTADO TIEMPO:	Nublado	TEMPERATURA:	13ºC		
CONO ABRAMS	11				
CONDICIONES DE COLOCACIÓN:	Vertido con Bomba				
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1561	2/04/01	7	37,7	213,3
1562	2/04/01	7	38,6	218,4
MEDIA				216
1563	23/04/01	28	50,6	286,3
1564	23/04/01	28	49,7	281,2
1565	23/04/01	28	49,9	282,3
MEDIA				283

fck H-250

Kp/cm²

Kp/cm²



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0561

Nº DE REGISTRO: 561 SERIE: 310 FECHA TOMA: 28/03/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Alzado Aleta P.I 562+700
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-4077-ZX Nº ALBARÁN: 11.495
HORA SALIDA: 11:55 HORA TOMA: 12:20
ESTADO TIEMPO: Nublado TEMPERATURA: 13°C
CONO ABRAMS: 8
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1566	4/04/01	7	48,4	273,8
1567	4/04/01	7	46,6	263,7
MEDIA				269
1568	25/04/01	28	59,5	336,7
1569	25/04/01	28	60,2	340,6
1570	25/04/01	28	59,9	338,9
MEDIA				339

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0569

Nº DE REGISTRO: 569 SERIE: 316 FECHA TOMA: 4/04/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Alzado Estribo Izquierdo P.I 562+700
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-9960-DT Nº ALBARÁN: 11.593
HORA SALIDA: 12:00 HORA TOMA: 12:20
ESTADO TIEMPO: Soleado TEMPERATURA: 15°C
CONO ABRAMS: 10
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1596	11/04/01	7	41,6	235,4
1597	11/04/01	7	42,8	242,2
MEDIA				239
1598	2/05/01	28	57,6	325,9
1599	2/05/01	28	57,6	325,9
1560	2/05/01	28	57,9	327,6
MEDIA				326

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0570

Nº DE REGISTRO: 570

TAMAÑO ÁRIDO: 20 MIM

ELEMENTOS: Alzado Estribo Izquierdo P.I 562+700

Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L

CAMIÓN: A-1121-EC

HORA SALIDA: 12:30

ESTADO TIEMPO: Soleado

CONO ABRAMS: 9

CONDICIONES DE COLOCACIÓN: Vertido con Bomba

INCIDENCIAS:

TIPO DE CEMENTO: II/AP 42,5R

Nº ALBARÁN: 11.594

HORA TOMA: 13:05

TEMPERATURA: 15°C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1601	11/04/01	7	46,0	260,3
1602	11/04/01	7	46,2	261,4
MEDIA				261
1603	2/05/01	28	59,3	335,5
1604	2/05/01	28	59,9	338,9
1605	2/05/01	28	60,1	340,1
MEDIA				338

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azulre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0571

Nº DE REGISTRO: 571

TAMAÑO ÁRIDO: 20 MIM

ELEMENTOS: Zapata Aleta Derecha P.I 562+7

Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L

CAMIÓN: A-9960-DT

HORA SALIDA: 12:30

ESTADO TIEMPO: Soleado

CONO ABRAMS: 7

CONDICIONES DE COLOCACIÓN: Vertido con Bomba

INCIDENCIAS:

TIPO DE CEMENTO: II/AP 42,5R

Nº ALBARÁN: 11.603

HORA TOMA: 17:40

TEMPERATURA: 13°C

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1606	11/04/01	7	45,2	255,7
1607	11/04/01	7	45,7	258,6
MEDIA				257
1608	2/05/01	28	61,8	349,7
1609	2/05/01	28	62,9	355,9
1610	2/05/01	28	61,5	348,0
MEDIA				351

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azulre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0577

Nº DE REGISTRO: 577 SERIE: 320 FECHA TOMA: 10/04/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Alzado Estribo 4 P.I 562+700.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-9960-DT Nº ALBARÁN: 11.655
HORA SALIDA: 11:35 HORA TOMA: 12:00
ESTADO TIEMPO: Soleado TEMPERATURA: 17°C
CONO ABRAMS: 8
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1616	17/04/01	7	50,9	288,0
1617	17/04/01	7	50,5	285,7
MEDIA				287
1618	8/05/01	28	65,8	372,3
1619	8/05/01	28	65,3	369,5
1620	8/05/01	28	66,1	374,0
MEDIA				372

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0577

Nº DE REGISTRO: 578 SERIE: 321 FECHA TOMA: 10/04/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Alzado Estribo 4 P.I 562+700.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-4077-ZX Nº ALBARÁN: 11.656
HORA SALIDA: 12:15 HORA TOMA: 12:45
ESTADO TIEMPO: Soleado TEMPERATURA: 18°C
CONO ABRAMS: 8
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1621	17/04/01	7	46,1	260,8
1622	17/04/01	7	45,5	257,4
MEDIA				259
1623	8/05/01	28	62,9	355,9
1624	8/05/01	28	62,9	355,9
1625	8/05/01	28	63,3	358,2
MEDIA				357

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0583

Nº DE REGISTRO: 583

SERIE: 322

FECHA TOMA: 23/04/01

TAMAÑO ÁRIDO: 20 MIM

TIPO: H-250

REALIZADO: Jesús

ELEMENTOS:

Aleta P.I 562+700

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L

TIPO DE CEMENTO: II/AP 42,5R

CAMIÓN: A-9960-DT

Nº ALBARÁN: 11.763

HORA SALIDA: 16:50

HORA TOMA: 17:20

ESTADO TIEMPO: Soleado

TEMPERATURA: 20°C

CONO ABRAMS: 8

CONDICIONES DE COLOCACIÓN: Vertido con Bomba

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1626	30/04/01	7	43,8	247,8
1627	30/04/01	7	45,9	259,7
MEDIA				254
1628	21/05/01	28	64,8	366,7
1629	21/05/01	28	63,9	361,6
1630	21/05/01	28	64,5	365,0
MEDIA				364

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0583

Nº DE REGISTRO: 586

SERIE: 323

FECHA TOMA: 7/05/01

TAMAÑO ÁRIDO: 20 MIM

TIPO: H-250

REALIZADO: Jesús

ELEMENTOS:

Losa P.I 562+700

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L

TIPO DE CEMENTO: II/AP 42,5R

CAMIÓN: M-4077-ZX

Nº ALBARÁN: 11.900

HORA SALIDA: 11:25

HORA TOMA: 11:45

ESTADO TIEMPO: Soleado

TEMPERATURA: 20°C

CONO ABRAMS: 8

CONDICIONES DE COLOCACIÓN: Vertido con Bomba

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1631	14/05/01	7	50,6	286,3
1632	14/05/01	7	50,1	283,5
MEDIA				285
1633	4/06/01	28	57,6	325,9
1634	4/06/01	28	57,2	323,6
1635	4/06/01	28	59,9	338,9
MEDIA				329

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDECIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0583

Nº DE REGISTRO: 587

SERIE: 324

FECHA TOMA: 7/05/01

TAMAÑO ÁRIDO: 20 MIM

TIPO: H-250

REALIZADO: Jesús

ELEMENTOS: Losa P.I 562+700

Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L

TIPO DE CEMENTO: II/AP 42,5R

CAMIÓN: A-1121-EC

Nº ALBARÁN: 11.903

HORA SALIDA: 12:15

HORA TOMA: 12:40

ESTADO TIEMPO: Soleado

TEMPERATURA: 20°C

CONO ABRAMS: 7

CONDICIONES DE COLOCACIÓN: Vertido con Bomba

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1636	14/05/01	7	53,3	301,6
1637	14/05/01	7	50,3	284,6
MEDIA				293
1638	4/06/01	28	57,5	325,3
1639	4/06/01	28	60,2	340,6
1640	4/06/01	28	58,4	330,4
MEDIA				332

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrenlados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b
Nº TRABAJO: 0547

Nº DE REGISTRO:	547	SERIE:	297	FECHA TOMA:	12/03/01
TAMAÑO ÁRIDO:	10 MIM	TIPO:	H-700	REALIZADO:	Jesús
ELEMENTOS: Vigas nº1, primera toma. Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:		Nº ALBARÁN:			
HORA SALIDA:	14:15	HORA TOMA:	14:20		
ESTADO TIEMPO:	Claros	TEMPERATURA:	15°C		
CONO ABRAMS:	9				
CONDICIONES DE COLOCACIÓN: Vertido con cubo					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1501	14/03/01	2	87,7	496,3
1502	14/03/01	2	79,4	449,3
MEDIA				473
1503	19/03/01	7	90	509,3
1504	19/03/01	7	90	509,3
1505	9/04/01	28		
MEDIA				509

fck H-700

Kp/cm²

Kp/cm²

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b
Nº TRABAJO: 0548

Nº DE REGISTRO:	548	SERIE:	298	FECHA TOMA:	12/03/01
TAMAÑO ÁRIDO:	10 MIM	TIPO:	H-700	REALIZADO:	Jesús
ELEMENTOS: Vigas nº1, segunda toma. Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .					
SUMINISTRADOR:	Planta valdemorillo S.L	TIPO DE CEMENTO:	II/AP 42,5R		
CAMIÓN:		Nº ALBARÁN:			
HORA SALIDA:	14:50	HORA TOMA:	15:10		
ESTADO TIEMPO:	Claros	TEMPERATURA:	15°C		
CONO ABRAMS:	8				
CONDICIONES DE COLOCACIÓN: Vertido con cubo					
INCIDENCIAS:					

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1506	14/03/01	2	81,2	459,5
1507	14/03/01	2	80,2	456,4
MEDIA				458
1508	19/03/01	7	90	509,3
1509	19/03/01	7	90	509,3
1510	9/04/01	28		
MEDIA				509

fck H-700

Kp/cm²

Kp/cm²



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias)
DIRECCIÓN Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO 0496

Nº DE REGISTRO: 496 SERIE: 259 FECHA TOMA: 9/01/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata P.I 564.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: H-9960-DT Nº ALBARÁN: 7.690
HORA SALIDA: 11:40 HORA TOMA: 12:00
ESTADO TIEMPO: Nublado TEMPERATURA: 6°C
CONO ABRAMS: 9
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS: Lleva Anticogelante

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1311	16/01/01	7	35,1	198,6
1312	16/01/01	7	34,0	192,4
MEDIA				196
1313	6/02/01	28	40,3	228,0
1315	6/02/01	28	41,0	232,0
MEDIA				230

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO 0497

Nº DE REGISTRO: 497 SERIE: 260 FECHA TOMA: 9/01/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata P.I 564.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-1121-EG Nº ALBARÁN: 7.691
HORA SALIDA: 12:15 HORA TOMA: 12:20
ESTADO TIEMPO: Nublado TEMPERATURA: 6°C
CONO ABRAMS: 6
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS: Lleva Anticogelante

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1316	16/01/01	7	41,3	233,7
1317	16/01/01	7	40,8	230,9
MEDIA				232
1318	6/02/01	28	69,5	393,2
1319	6/02/01	28	68,2	385,9
1320	6/02/01	28	69,9	395,5
MEDIA				392

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego. s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0519

Nº DE REGISTRO: 519 SERIE: 277 FECHA TOMA: 9/02/01
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Losa P.I 564+100.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: III/AP 42,5R
CAMIÓN: A-9960-DT Nº ALBARÁN: 8.937
HORA SALIDA: 11:45 HORA TOMA: 12:05
ESTADO TIEMPO: Nublado TEMPERATURA: 7°C
CONO ABRAMS: 9
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1401	16/02/01	7	63,9	361,6
1402	16/02/01	7	63,6	359,9
MEDIA				361
1403	9/03/01	28	68,2	385,9
1404	9/03/01	28	69,4	392,7
1405	9/03/01	28	70,9	401,2
MEDIA				393

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0263

Nº DE REGISTRO: 0263 SERIE: 137 FECHA TOMA: 3/03/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Losa Superior ,Paso de Fauna 556+0
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: SO-9966-F Nº ALBARÁN: 7.821
HORA SALIDA: 10:50 HORA TOMA: 11.05
ESTADO TIEMPO: Soleado TEMPERATURA: 10 °C
CONO ABRAMS 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
697	10/03/00	7	54,1	306,1
698	10/03/00	7	53,5	303,3
MEDIA				305
699	31/03/00	28	74,3	420,5
700	31/03/00	28	74,9	423,9
701	31/03/00	28	75,0	424,4
MEDIA				423

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0264

Nº DE REGISTRO: 0264 SERIE: 138 FECHA TOMA: 3/03/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-300 REALIZADO: Jesús
ELEMENTOS: Losa Superior ,Paso de Fauna 556+0
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: SO-9966-F Nº ALBARÁN: 7.822
HORA SALIDA: 11.45 HORA TOMA: 12.00
ESTADO TIEMPO: Soleado TEMPERATURA: 15 °C
CONO ABRAMS: 8 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
702	10/03/00	7	60,5	342,4
703	10/03/00	7	61,1	345,8
MEDIA				344
704	31/03/00	28	70,2	397,3
705	31/03/00	28	70,8	400,7
706	31/03/00	28	69,5	393,3
MEDIA				397

fck H-300

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0239

Nº DE REGISTRO: 0239 SERIE: 121 FECHA TOMA: 17/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Vicente
ELEMENTOS: Muro-2 Paso de Fauna 556+0.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: M-2835-VY Nº ALBARÁN: 8.075
HORA SALIDA: 15:50 HORA TOMA: 16:10
ESTADO TIEMPO: Nublado TEMPERATURA: 11 °C
CONO ABRAMS: 9 cm
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
617	24/02/00	7	47,5	268,8
618	24/02/00	7	46,5	263,1
MEDIA				266
619	15/03/00	28	71,8	406,3
620	15/03/00	28	70,0	396,1
621	15/03/00	28	69,2	391,6
MEDIA				398

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0240

Nº DE REGISTRO: 0240 SERIE: 122 FECHA TOMA: 17/02/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Vicente
ELEMENTOS: Muro-1 Paso de Fauna 556+0.
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: GU-7187-H Nº ALBARÁN: 8.076
HORA SALIDA: 16:30 HORA TOMA: 16:50
ESTADO TIEMPO: Nublado TEMPERATURA: 10 °C
CONO ABRAMS: 10 cm
CONDICIONES DE COLOCACIÓN: Vertido con bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
622	24/02/00	7	48,4	273,9
623	24/02/00	7	46,9	265,4
MEDIA				270
624	16/03/00	28	67,6	382,5
625	16/03/00	28	67,6	382,5
626	16/03/00	28	71,6	405,2
MEDIA				390

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303 Y 83.313 . Prensa utilizada: CME-120

A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0331

Nº DE REGISTRO:0331

SERIE:187

FECHA TOMA:18/05/00

TAMAÑO ÁRIDO:20 MIM

TIPO:H-400

REALIZADO:Jesús

ELEMENTOS:

Zapata Izquierda P.F 556+0.

Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:SO-1950-G

Nº ALBARÁN:9.399

HORA SALIDA:15:15

HORA TOMA:15:40

ESTADO TIEMPO:Soleado

TEMPERATURA:16 °C

CONO ABRAMS:12 cm

CONDICIONES DE COLOCACIÓN: Vertido con bomba.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
947	25/05/00	7	59,2	335,0
948	25/05/00	7	58,6	331,6
MEDIA				333
MEDIA				

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada CME-120

A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0330

Nº DE REGISTRO:0330

SERIE:186

FECHA TOMA:18/05/00

TAMAÑO ÁRIDO:20 MIM

TIPO:H-400

REALIZADO:Jesús

ELEMENTOS:

Zapata Izquierda, P.F 556+0.

Linea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:Planta valdemorillo S.L

TIPO DE CEMENTO:II/AP 42,5R

CAMIÓN:SO-1950-G

Nº ALBARÁN:9.398

HORA SALIDA:13:00

HORA TOMA:13:15

ESTADO TIEMPO:Soleado

TEMPERATURA:15 °C

CONO ABRAMS:5,5 cm

CONDICIONES DE COLOCACIÓN: Vertido con bomba.

INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
942	25/05/00	7	68,0	384,8
943	25/05/00	7	67,1	379,7
MEDIA				382
944	15/06/00	28	82,7	468,0
945	15/06/00	28	79,1	447,6
946	15/06/00	28	79,6	450,4
MEDIA				455

fck H-400

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0473

Nº DE REGISTRO: 475 SERIE: 244 FECHA TOMA: 15/11/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata P.U 563+00
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-1121-EC Nº ALBARÁN: 7.482
HORA SALIDA: 12:40 HORA TOMA: 12:55
ESTADO TIEMPO: Soleado TEMPERATURA: 8°C
CONO ABRAMS: 7
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1236	22/11/00	7	30,5	172,5
1237	22/11/00	7	28,3	160,1
MEDIA				166
1238	13/12/00	28	70,4	398,4
1239	13/12/00	28	69,1	391,0
1240	13/12/00	28	68,7	388,8
MEDIA				393

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara)

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0476

Nº DE REGISTRO: 476 SERIE: 245 FECHA TOMA: 15/11/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Zapata P.U 563+900
Línea A.V.E. Madrid-Zaragoza.Subtramo V-b.
SUMINISTRADOR: Planta valdemorillo S.L. TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-9495-DW Nº ALBARÁN: 7.489
HORA SALIDA: 17:30 HORA TOMA: 17:45
ESTADO TIEMPO: Soleado TEMPERATURA: 9°C
CONO ABRAMS: 7
CONDICIONES DE COLOCACIÓN: Vertido Directo
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1241	22/11/00	7	29,3	165,8
1242	22/11/00	7	28,2	159,5
MEDIA				163
1243	13/02/01	90	41,2	233,1
1244	13/12/00	28	38,8	219,6
1245	13/12/00	28	39,2	221,8
MEDIA				221

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313. Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratono de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN Miguel Angel, Nº 21.
PROCEDENCL L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO 0484

Nº DE REGISTRO: 484 SERIE: 251 FECHA TOMA: 29/11/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Alzado Lado Zaragoza P.U 563+000
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO II/AP 42,5R
CAMIÓN: A-1121-EC Nº ALBARAN: 7.562
HORA SALIDA: 12:10 HORA TOMA: 12:30
ESTADO TIEMPO: Nublado TEMPERATURA: 10°C
CONO ABRAMS: 10
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1271	6/12/00	7	39,5	223,5
1272	6/12/00	7	42,3	239,3
MEDIA				231
1273	27/12/00	28	60,5	342,3
1274	27/12/00	28	59,8	338,4
1275	27/12/00	28	61,0	345,1
MEDIA				342

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN Miguel Angel, Nº 21.
PROCEDENCL L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO 0485

Nº DE REGISTRO: 485 SERIE: 252 FECHA TOMA: 29/11/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Alzado Lado Madrid P.U 563+000
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO II/AP 42,5R
CAMIÓN: A-9495-DW Nº ALBARAN: 7.565
HORA SALIDA: 15:00 HORA TOMA: 15:30
ESTADO TIEMPO: Nublado TEMPERATURA: 8°C
CONO ABRAMS: 9
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1276	6/12/00	7	38,7	219,0
1277	6/12/00	7	40,2	227,4
MEDIA				223
1278	27/12/00	28	58,4	330,4
1279	27/12/00	28	60,9	344,6
1280	27/12/00	28	60,3	341,2
MEDIA				339

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0489

Nº DE REGISTRO

489

SERIE

253

FECHA TOMA:

19/12/00

TAMAÑO ÁRIDO:

20 MIM

TIPO:

H-250

REALIZADO:

Jesús

ELEMENTOS:

Losa P.U 563+3

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:

Planta valdemorillo S.L

TIPO DE CEMENTO:

III/AP 42,5R

CAMIÓN:

A-9960-DT

Nº ALBARÁN:

7.619

HORA SALIDA:

12:05

HORA TOMA:

12:30

ESTADO TIEMPO:

Nublado

TEMPERATURA:

10°C

CONO ABRAMS:

9

CONDICIONES DE COLOCACIÓN:

Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1281	26/12/00	7	45,4	256,9
1282	26/12/00	7	47,5	268,8
MEDIA				263
1283	16/01/01	28	60,5	342,4
1284	16/01/01	28	59,5	336,7
1285	16/01/01	28	57,8	327,1
MEDIA				335

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162.

19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0490

Nº DE REGISTRO

490

SERIE

254

FECHA TOMA:

19/12/00

TAMAÑO ÁRIDO:

20 MIM

TIPO:

H-250

REALIZADO:

Jesús

ELEMENTOS:

Losa P.U 563+3

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:

Planta valdemorillo S.L

TIPO DE CEMENTO:

III/AP 42,5R

CAMIÓN:

A-1121-EG

Nº ALBARÁN:

7.620

HORA SALIDA:

13:11

HORA TOMA:

13:15

ESTADO TIEMPO:

Nublado

TEMPERATURA:

10°C

CONO ABRAMS:

7

CONDICIONES DE COLOCACIÓN:

Vertido con Bomba

INCIDENCIAS:

ROTURAS

Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1286	26/12/00	7	44,5	251,8
1287	26/12/00	7	44,1	249,5
MEDIA				251
1288	16/01/01	28	58,9	333,3
1289	16/01/01	28	60,6	342,9
1290	16/01/01	28	59,1	334,4
MEDIA				337

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0455

Nº DE REGISTRO

455

SERIE:

233

FECHA TOMA

11/10/00

TAMAÑO ÁRIDO

40 mm

TIPO:

H-250

REALIZADO:

Jesús

ELEMENTOS:

Zapata P.U 558+760

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:

Planta valdemorillo S.L

TIPO DE CEMENTO:

II/AP 42,5R

CAMIÓN:

A-9495-DW

Nº ALBARÁN:

7.357

HORA SALIDA:

11:05

HORA TOMA:

11:25

ESTADO TIEMPO:

Soleado

TEMPERATURA:

9°C

CONO ABRAMS:

9 cm

CONDICIONES DE COLOCACIÓN:

Vertido Directo

INCIDENCIAS:

ROTURAS					
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA	
1181	18/10/00	7	26,8	151,6	
1182	18/10/00	7	26,9	152,2	
MEDIA				152	
1183	9/01/01	90	47,8	270,4	
1184	8/11/00	28	37,9	214,4	
1185	8/11/00	28	40,7	230,3	
MEDIA				222	

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O

Tramo:Madrid-Zaragoza

Subtramo: V-b

Hoja de

Laboratorio de Trijueque

C/ Bodegón del Ciego, s/n Teléfono 949322162

19192.Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).

DIRECCIÓN: Miguel Angel, Nº 21.

PROCEDENCIA: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0456

Nº DE REGISTRO

456

SERIE:

234

FECHA TOMA

11/10/00

TAMAÑO ÁRIDO

40 mm

TIPO:

H-250

REALIZADO:

Jesús

ELEMENTOS:

Zapata P.U 558+760

Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR:

Planta valdemorillo S.L

TIPO DE CEMENTO:

II/AP 42,5R

CAMIÓN:

M-4508-XF

Nº ALBARÁN:

7.359

HORA SALIDA:

11:36

HORA TOMA:

11:50

ESTADO TIEMPO:

Soleado

TEMPERATURA:

12°C

CONO ABRAMS:

9 cm

CONDICIONES DE COLOCACIÓN:

Vertido Directo

INCIDENCIAS:

ROTURAS					
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA	
1186	18/10/00	7	27,0	152,7	
1187	18/10/00	7	27,8	157,3	
MEDIA				155	
1188	8/11/00	28	38,5	217,8	
1189	8/11/00	28	38,9	220,1	
MEDIA				219	
1190	9/01/01	90	52,7	298,2	

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms. conservados en cámara húmeda y refrentados con azufre

Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

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A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0458

Nº DE REGISTRO: 458 SERIE: 235 FECHA TOMA: 24/10/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Alzado P.U 558+700
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: III/AP 42,5R
CAMIÓN: M-4508-XF Nº ALBARÁN: 7.384
HORA SALIDA: 17:15 HORA TOMA: 11:30
ESTADO TIEMPO: Soleado TEMPERATURA: 13°C
CONO ABRAMS: 6 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba.
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1191	30/10/00	7	38,1	215,6
1192	30/10/00	7	39,4	223,0
MEDIA				219
1193	21/11/00	28	51,6	292,0
1194	21/11/00	28	52,1	294,8
1195	21/11/00	28	52,6	297,7
MEDIA				295

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN Miguel Angel, Nº 21.
PROCEDENCIA L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0463

Nº DE REGISTRO: 463 SERIE: 238 FECHA TOMA: 26/10/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Alzado P.U 558+700
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .
SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: III/AP 42,5R
CAMIÓN: A-1121-EC Nº ALBARÁN: 7.422
HORA SALIDA: 16:05 HORA TOMA: 16:45
ESTADO TIEMPO: Nublado TEMPERATURA: 15°C
CONO ABRAMS: 7 cm
CONDICIONES DE COLOCACIÓN: Vertido con Bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1206	2/11/00	7	45,5	257,5
1207	2/11/00	7	46,4	262,6
MEDIA				260
1208	23/11/00	28	51,9	293,4
1209	23/11/00	28	57,4	324,8
1210	23/11/00	28	58,8	332,7
MEDIA				317

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCI: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0472

Nº DE REGISTRO: 472 SERIE: 242 FECHA TOMA: 9/11/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Losa P.U 558+700
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-1121-EC Nº ALBARÁN: 7.462
HORA SALIDA: 13:35 HORA TOMA: 14:10
ESTADO TIEMPO: Soleado TEMPERATURA: 8°C
CONO ABRAMS: 8
CONDICIONES DE COLOCACIÓN: Vertido con bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1226	16/11/00	7	38,2	216,2
1227	16/11/00	7	35,8	202,6
MEDIA				209
1228	7/12/00	28	55,9	316,3
1229	7/12/00	28	56,8	321,8
1230	7/12/00	28	54,2	306,7
MEDIA				315

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120



A.C.O
Tramo:Madrid-Zaragoza
Subtramo: V-b

Hoja de
Laboratorio de Trijueque
C/ Bodegón del Ciego, s/n Teléfono 949322162.
19192,Trijueque (Guadalajara).

INFORMES DE ENSAYOS DE HORMIGÓN

PETICIONARIO: G.I.F (Gestor de Infraestructuras Ferroviarias).
DIRECCIÓN: Miguel Angel, Nº 21.
PROCEDENCI: L.A.V. Madrid-Zaragoza. Subtramo V-b

Nº TRABAJO: 0473

Nº DE REGISTRO: 473 SERIE: 243 FECHA TOMA: 9/11/00
TAMAÑO ÁRIDO: 20 MIM TIPO: H-250 REALIZADO: Jesús
ELEMENTOS: Losa P.U 558+700
Línea A.V.E . Madrid-Zaragoza.Subtramo V-b .

SUMINISTRADOR: Planta valdemorillo S.L TIPO DE CEMENTO: II/AP 42,5R
CAMIÓN: A-1121-EC Nº ALBARÁN: 7.466
HORA SALIDA: 15:10 HORA TOMA: 15:30
ESTADO TIEMPO: Soleado TEMPERATURA: 9°C
CONO ABRAMS: 7
CONDICIONES DE COLOCACIÓN: Vertido con bomba
INCIDENCIAS:

ROTURAS				
Nº PROBETA	FECHA ROTURA	EDAD	CARGA	RESISTENCIA
1231	16/11/00	7	34,5	195,2
1232	16/11/00	7	34,0	192,4
MEDIA				194
1233	7/12/00	28	49,4	279,5
1234	7/12/00	28	47,7	269,9
1235	7/12/00	28	50,5	285,7
MEDIA				278

fck H-250

Kp/cm²

Kp/cm²

OBSERVACIONES: Probetas cilíndricas de 15 x 30 cms.conservados en cámara húmeda y refrentados con azufre
Método operativo según U N E 83.300, 83.301, 83.303, 83.304 Y 83.313 . Prensa utilizada: CME-120

7. Accesos y elementos para mantenimiento

7. ACCESO Y ELEMENTOS PARA MANTENIMIENTO

VIADUCTO 556+1

Para poder acceder al viaducto hay que hacerlo por la margen izquierda a traves de una puerta situada el cerramiento, pk 556+200. Este acceso se encuentra en la intersección de la carretera de Valdegrudas y la Línea de Alta Velocidad.

En los planos de planta se puede encontrar la ubicación de la puerta.

Se ha dispuesto una galería en el estribo N°2 del lado de Zaragoza para poder acceder a los anclajes de los tendones que unen la losa post-tesada al estribo N°2

Los elementos a tener en cuenta son:

- Anclajes horizontales entre losa post-tesada y estribo N°2

8. Recomendaciones para la conservación y el mantenimiento

8. RECOMENDACIONES PARA LA CONSERVACIÓN Y EL MANTENIMIENTO

A la hora de elaborar el proyecto construido no se disponía la documentación necesaria para este apartado.

Movimientos previstos en las estructuras

MOVIMIENTOS PREVISTOS EN LAS ESTRUCTURAS

La documentación relativa a este apartado está recogido en el presente anejo en el punto 4.Cálculos.