ANEJO Nº 6. ESTRUCTURAS

ANEJO Nº 6. ESTRUCTURAS

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Movimiento previsto en las estructuras

1. Cuadro resumen

VIADUCTOS. DATOS BÁSICOS

Nº	PUNTO KILOMÉTRICO		LONGITUD	NÚMERO DE	LUZ (m)		ALTURA DE	PROFUNDIDAD
	INICIO	FINAL	(m)	VANOS	CENTRAL	LATERAL	PILA (m)	PILOTE (m)
V-1	302+978	303+056	78	4	23	16	6,68	17
V-2	303+493	303+548	55	3	23	16	9,95	17
V-3	309+693	309+748	55	3	23	16	5,31	25
V-4	310+132	310+572	440	16	28	21	5,25	31
V-5	312+945	313+011	66	3	26	20	6,77	30

PASOS SUPERIORES.
DATOS BÁSICOS

Nº	PUNTO KILOMÉTRICO	LONGITUD (m)	LUZ (m)		ALTURA DE PILA (m)	ANCHO DE TABLERO (m)	OBSERVACIONES
			LATERAL	CENTRAL			
PS-1	300+700	43	13	17	11,6	8,80	Reposición de servidumbre
PS-2	306+000	43	13	17	10,2	8,80	Camino vecinal
PS-3	307+037	43	13	17	10,1	8,80	Camino vecinal
PS-4	307+520	43	13	17	12,0	12,70	Colada Galiana
PS-5	308+588	62	18	26	11,4	11,40	Carretera M-300
PS-6	316+460	43	13	17	11,6	8,80	Servidumbre de paso

PASOS INFERIORES.
DATOS BÁSICOS

Nº	PUNTO KILOMÉTRICO	LONGITUD (m)	DIMENSIONES (m x m)	OBSERVACIONES
PI-1	304+450	21,40	6,60 x 8,00	Acceso a finca particular
PI-2	309+280	15,20	4,30 x 9,50	Vía pecuaria
PI-3	311+076	16,90	6,28 x 9,50	Carretera local
PI-4	311+860	18,50	5,90 x 8,00	Camino existente
PI-5	312+360	18,51	5,54 x 8,00	Camino existente
PI-6	313+611	20,41	6,45 x 8,00	Camino existente
PI-7	314+995	15,20	5,90 x 8,00	Camino existente
PI-8	314+030	15,20	5,67 x 8,00	Camino vecinal

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

2. DESCRIPCIÓN: tipología, aparatos de apoyo, juntas, impermeabilización, etc

El contenido de este epígrafe se encuentra dentro del apartado “4 CÁLCULOS” de cada una de las estructuras (Viaductos, Paso Superiores y Pasos Inferiores) que integran este Subtramo.

3. Definición geométrica

3. DEFINICIÓN GEOMÉTRICA

El contenido de este epígrafe se encuentra dentro del apartado “4 CÁLCULOS” de cada una de las estructuras (Viaductos, Paso Superiores y Pasos Inferiores) que integran este Subtramo.

4. Cálculos

4.1. Viaducto 1

VIADUCTO 1

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- DESCRIPCIÓN Y DEFINICIÓN GEOMÉTRICA
- CÁLCULOS

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    Estudio del tablero

    Aparatos de apoyo

    Cálculo de las pilas

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    Proyecto de prueba de carga
- PROCESO CONSTRUCTIVO
- RESUMEN DEL CONTROL DE CALIDAD
- ACCESOS Y ELEMENTOS PARA MANTENIMIENTO

Descripción y Definición geométrica

DESCRIPCIÓN DE LA ESTRUCTURA Y DEFINICIÓN GEOMÉTRICA

La estructura que se analiza en esta nota de cálculos es uno de los viaductos que aparecen en la traza, en concreto el situado entre los PP.KK. 302 + 980 y 303+060, denominado como Viaducto 1, y que salva el camino asfaltado de Valdecelada.

Consiste en una viga continua de hormigón pretensado de cuatro vanos con luces de 16+23+23+16 m. La sección es una losa aligerada de canto y ancho constante, con valores de 1.90 y 14.00 m respectivamente. Tiene tres aligeramientos circulares de 1.20 m de diámetro y se apoya en cada eje de pilas y estribos mediante dos aparatos de apoyo que lo empotran a torsión. Estos aparatos de apoyo son en todo caso deslizantes, tipo Pot, con la distribución y características que se indican:

	TIPO DE APOYO	F_V (KH)	F_H (KN)	Ct (mm)	C- (mm)	GIRO (Rad)
E1	(2) B11 22-G2	3920	392	80	130	0,011
P1	(2) B11 22-G3	7840	490	105	105	0,018
P2	(2) B11 22-G4	9820	588	105	105	0,011
P3	(2) B11 22-G3	7840	490	105	105	0,011
E2	(2) B11 22-G2	3920	392	80	130	0,018

Cada eje de pilas consta de dos fustes cilíndricos con sección transversal circular de diámetro 1.40 m, que se empotran en un encepado. A las pilas se las ha dotado de un rehundido lateral con el único fin de mejorar su aspecto estético, resolviéndose la cimentación de las mismas con se indica a continuación:

Pila 1

El encepado tiene unas dimensiones de 12x7,5x2,50 m y se apoya en 6 pilotes de diámetro de 1,5 m y longitud 17 m.

Pila 2

El encepado es esviado 33,945º para afectar lo menos posible a la carretera existente durante la ejecución y tiene unas dimensiones de 12x7,5x2,50 m y se apoyan en 6 pilotes de diámetro 1,50 m y longitud 17,00 m.

Pila 3

Es exactamente igual que la pila 2.

Para poder ejecutar tanto la pila 2 como la pila 3 fue necesario realizar hinca de carriles y desvíos provisionales de la carretera.

El tablero está anclado en el estribo 1 mediante 6 cables de 24 Ø0,6" inyectados con grasa y la carga horizontal debida al frenado la transmite mediante seis apoyos de neopreno zunchado 300 x 400 x 96. Este anclaje es visitable, de modo que se pueden destesar para realizar la sustitución de los aparatos de apoyo.

Este estribo está cimentado mediante un encepado de dimensiones 16,50 x 14,00 x 3,00 que se apoya en 12 pilotes de diámetro 1,50 m y longitud 24,00 m. Además tiene unas aletas para evitar el derrame lateral de las tierras, de altura variable y cimentadas superficialmente mediante zapatas.

Al existir la unión entre el estribo y el tablero no hay movimiento horizontal, por lo que no es necesaria una junta de dilatación. Se ha dispuesto no obstante un sistema para evitar que el balasto entre por la junta existente y que consiste en dos chapas embebidas en el estribo y en el tablero, la del estribo de dimensiones 200 x 10 x 6 600 (2 ud), anclada mediante pernos Ø 20 cada 0,50 m y la del tablero de dimensiones 300 x 15 x 6 600 (2 ud) anclada mediante pernos Ø 20 cada 0,50 m. Sobre ellas se disponen dos chapas de 470 x 15 x 6600 atornilladas a los pernos del estribo, y se ha sellado la junta entre chapas con mastic, de modo que no entre agua y chorree en el parámetro del estribo.

El estribo 2 está cimentado mediante un encepado de dimensiones 16,50 x 8,50 x 2,50 m que se apoya en 8 pilotes con diámetro 1,50 m y longitud 21,00 m, notablemente inferior al 1 al no recibir capas longitudinales en frenado. En este estribo sí existe movimiento entre tablero y estribo, por lo que se ha dispuesto una junta consistente en el mismo sistema que la del estribo 1 y de idénticas dimensiones de modo que la chapa desliza sobre la del tablero cuando esta se mueve.

Calidades de los materiales

A continuación se detallan las calidades de cada uno de los materiales utilizados.

a) Hormigones

Tablero	H-400	fck ≥ 400 kp/cm2
Alzado de pilas	H-300	fck ≥ 300 kp/cm2
Encepados y estribos	H-250	fck ≥ 250 kp/cm2
Pilotes	H-200	fck ≥ 200 kp/cm2

b) Acero pasivo

AEH-500-N	fyk ≥ 5100 kp/cm2

c) Acero activo

A-190-SE	fyk ≥ 14000 kp/cm2

PLANTA, ALZADO Y SECCIÓN GENERAL DE LA ESTRUCTURA

CÁLCULOS

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PLANTA, ALZADO Y SECCIÓN GENERAL DE LA ESTRUCTURA

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ESTUDIO DEL TABLERO

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SON VALIDAS LAS CALCULADAS PARA EL VIADUCTO V

CALCULO DE LOS COEFICIENTES DE EXCENTRICIDAD E IMPACTO

SON VALIDOS LOS CALCULADOS PARA EL VIADUCTO V

CALCULO DEL PRETENSADO LONGITUDINAL

```
CALCULO DEL PRETENSADO
 2
      1  9 1.6
  3   1  9 2.3
1 16  1 10 1.6
2
1  23 0  0  1
23 41 1  1  1
16.501 4.7065 0.834 1.065 14.00
13.108 4.2849 0.791 1.108 14.00
1
1 1
9 2
1 1
2
9 2
1 1
1
9 2
1 1
400 2.5
  2 0 2

.0  0.0  0.000012
1.14  1.49
1.5  1.19  1.13  2
5 0.005
1
1.1 0.9
0.00025 .04 2.5
19000 190 75 24
4 0 3
1 15
0.0000     -0.791     -0.128
6.4000     -1.200      0.000
14.250     -0.550      0.167
16.000     -0.400      0.000
18.500     -0.686     -0.229
27.500     -1.720      0.000
36.500     -0.686      0.229
39.000     -0.400      0.000
   00      -0.686     -0.229
  .00      -1.720      0.000
59.500     -0.686      0.229
62.000     -0.400      0.000
63.750     -0.550     -0.167
71.600     -1.200      0.000
78.000     -0.791      0.128
1  2
0.0000     -0.211      0.000
78.000     -0.211      0.000
1  2
0.0000     -1.750      0.000
78.000     -1.750      0.000
1 3035.0 21723. 0.21 0.006 0 1 41  1 23 1
1 3035.0 21723. 0.21 0.006 2 1 41 23 41 2
2 1437.0 10296. 0.21 0.006 0 1 41  1 41 1
3 1437.0 10296. 0.21 0.006 0 1 41  1 41 1
2.000 1.000
```

Programa general de puentes continuos (V1-0)

Proyecto : LAV MADRID-ZARAGOZA. LOSA VANOS 16+23+23+16

Definicion geometrica de vanos

	Longitud
Vano 1	16.0000 m
Vano 2	23.0000 m
Vano 3	23.0000 m
Vano 4	16.0000 m

Definicion de cargas

Cargas muertas ..... = 0.830 t/m2

Tren RENFE :

Coef. de excent. en centro de vano	1.140
Coef. de excent. en apoyo	1.490
Ancho de aceras	1.500 m
Coef. de impacto para tren de RENFE	1.190
Numero de vias	2

Temperatura :

Coef. de dilatacion termica de 1E-04
Gradiente lineal termico entre ..... 5.000 y 0.000 grad

Descensos de apoyos (Lentos) :

Hip. 1 Apoyo 1 descenso de 0.005 m.
Hip. 2 Apoyo 11 descenso de 0.005 m.
Hip. 3 Apoyo 21 descenso de 0.005 m.
Hip. 4 Apoyo 31 descenso de 0.005 m.
Hip. 5 Apoyo 41 descenso de 0.005 m.

Caracteristicas de los materiales

Resistencia caracteristica del hormigon ..... =	400.00	kg/cm2
Densidad del hormigon ..... =	2.50	t/m3
Modulo de elasticidad del acero de pretensar .. =	19000.00	kg/mm2
Tension de rotura de los cables ..... =	190.00	kg/mm2
Porcentaje a que se tesan los cables ..... =	75.	%
Retraccion del hormigon .... =	0.00025	
Coeficiente de relajacion del acero ..... =	0.04000	
Coeficiente de fluencia del hormigon ..... =	2.50000	
Coef. de ponderacion para pretensado inicial .. =	1.1000	
Coef. de ponderacion para pretensado final .. =	0.9000	

Definicion de secciones de la estructura final

Vano	Sec	X	Y(Vs)	Vi	Area	Inercia	Ancho
1	1	0.000	0.834	1.065	16.501	4.706500	14.000
	2	1.600	0.791	1.108	13.108	4.284900	14.000
	3	3.200	0.791	1.108	13.108	4.284900	14.000
	4	4.800	0.791	1.108	13.108	4.284900	14.000
	5	6.400	0.791	1.108	13.108	4.284900	14.000
	6	8.000	0.791	1.108	13.108	4.284900	14.000
	7	9.600	0.791	1.108	13.108	4.284900	14.000
	8	11.200	0.791	1.108	13.108	4.284900	14.000
	9	12.800	0.791	1.108	13.108	4.284900	14.000
	10	14.400	0.791	1.108	13.108	4.284900	14.000
	11	16.000	0.834	1.065	16.501	4.706500	14.000
2	11	16.000	0.834	1.065	16.501	4.706500	14.000
	12	18.300	0.791	1.108	13.108	4.284900	14.000
	13	20.600	0.791	1.108	13.108	4.284900	14.000
	14	22.900	0.791	1.108	13.108	4.284900	14.000
	15	25.200	0.791	1.108	13.108	4.284900	14.000
	16	27.500	0.791	1.108	13.108	4.284900	14.000
	17	29.800	0.791	1.108	13.108	4.284900	14.000
	18	32.100	0.791	1.108	13.108	4.284900	14.000
	19	34.400	0.791	1.108	13.108	4.284900	14.000
	20	36.700	0.791	1.108	13.108	4.284900	14.000
	21	39.000	0.834	1.065	16.501	4.706500	14.000
3	21	39.000	0.834	1.065	16.501	4.706500	14.000
	22	41.300	0.791	1.108	13.108	4.284900	14.000
	23	43.600	0.791	1.108	13.108	4.284900	14.000
	24	45.900	0.791	1.108	13.108	4.284900	14.000
	25	48.200	0.791	1.108	13.108	4.284900	14.000
	26	50.500	0.791	1.108	13.108	4.284900	14.000
	27	52.800	0.791	1.108	13.108	4.284900	14.000
	28	55.100	0.791	1.108	13.108	4.284900	14.000
	29	57.400	0.791	1.108	13.108	4.284900	14.000
	30	59.700	0.791	1.108	13.108	4.284900	14.000
	31	62.000	0.834	1.065	16.501	4.706500	14.000
4	31	62.000	0.834	1.065	16.501	4.706500	14.000
	32	63.600	0.791	1.108	13.108	4.284900	14.000
	33	65.200	0.791	1.108	13.108	4.284900	14.000
	34	66.800	0.791	1.108	13.108	4.284900	14.000
	35	68.400	0.791	1.108	13.108	4.284900	14.000
	36	70.000	0.791	1.108	13.108	4.284900	14.000
	37	71.600	0.791	1.108	13.108	4.284900	14.000
	38	73.200	0.791	1.108	13.108	4.284900	14.000
	39	74.800	0.791	1.108	13.108	4.284900	14.000
	40	76.400	0.791	1.108	13.108	4.284900	14.000
	41	78.000	0.834	1.065	16.501	4.706500	14.000

Definicion de estados de la estructura

		Numero de secciones	Numero de secciones activas
Estado	1	23	de 1 a 23
Estado	2	41	de 1 a 41

Cable Numero 1 (Pertenece a familia 1)

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 23 (Activa)

Fuerza de Pretensado ..... = 3035.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.791	-0.12800
2	6.400	-1.200	0.00000
3	14.250	-0.550	0.16700
4	16.000	-0.400	0.00000
5	18.500	-0.686	-0.22900
6	27.500	-1.720	0.00000
7	36.500	-0.686	0.22900
8	39.000	-0.400	0.00000
9	41.500	-0.686	-0.22900
10	50.500	-1.720	0.00000
11	59.500	-0.686	0.22900
12	62.000	-0.400	0.00000
13	63.750	-0.550	-0.16700
14	71.600	-1.200	0.00000
15	78.000	-0.791	0.12800

Cable Numero 2 (Pertenece a familia 2)

Definicion general

Seccion inicial ..... = 23 (Pasiva)
Seccion final ..... = 41 (Activa)

Fuerza de Pretensado ..... = 3035.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.791	-0.12800
2	6.400	-1.200	0.00000
3	14.250	-0.550	0.16700
4	16.000	-0.400	0.00000
5	18.500	-0.686	-0.22900
6	27.500	-1.720	0.00000
7	36.500	-0.686	0.22900
8	39.000	-0.400	0.00000
9	41.500	-0.686	-0.22900
10	50.500	-1.720	0.00000
11	59.500	-0.686	0.22900
12	62.000	-0.400	0.00000
13	63.750	-0.550	-0.16700
14	71.600	-1.200	0.00000
15	78.000	-0.791	0.12800

Cable Numero 3 (Pertenece a familia 1)

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 41 (Activa)

Fuerza de Pretensado ..... = 1437.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.211	0.00000
2	78.000	-0.211	0.00000

Cable Numero 4 (Pertenece a familia 1)

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 41 (Activa)

Fuerza de Pretensado ..... = 1437.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.750	0.00000
2	78.000	-1.750	0.00000

Esfuerzos acumulados por peso propio

Estado 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-166.95	-3.69
	1	2	219.83	-107.73	-3.69
	2	3	350.30	-55.33	0.00
	3	4	396.89	-2.90	0.00
	4	5	359.58	49.53	0.00
	5	6	238.38	101.97	0.00
	6	7	33.29	154.40	0.00
	7	8	-255.69	206.83	0.00
	8	9	-628.57	259.26	0.00
	9	10	-1085.33	311.69	0.00
	10	11	-1631.45	370.81	-9.17
2	11	11	-1631.45	-441.92	-7.47
	11	12	-712.76	-356.80	-7.47
	12	13	21.33	-281.48	0.00
	13	14	582.06	-206.11	0.00
	14	15	969.44	-130.74	0.00
	15	16	1183.47	-55.37	0.00
	16	17	1224.14	20.00	0.00
	17	18	1091.46	95.37	0.00
	18	19	785.42	170.74	0.00
	19	20	306.04	246.11	0.00
	20	21	-357.96	331.20	-5.40
3	21	21	-357.96	-160.49	-2.20
	21	22	-86.68	-75.36	-2.20
	22	23	0.00	0.00	0.00

Esfuerzos acumulados por peso propio

Estado 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-356.31	-7.98
	1	2	475.52	-237.88	-7.98
	2	3	772.34	-133.08	0.00
	3	4	901.37	-28.21	0.00
	4	5	862.62	76.65	0.00
	5	6	656.09	181.51	0.00
	6	7	281.78	286.38	0.00
	7	8	-260.32	391.24	0.00
	8	9	-970.20	496.11	0.00
	9	10	-1847.86	600.97	0.00
	10	11	-2904.23	719.21	-17.74
2	11	11	-2904.23	-815.91	-13.66
	11	12	-1223.12	-645.66	-13.66
	12	13	88.78	-495.02	0.00
	13	14	1053.97	-344.28	0.00
	14	15	1672.45	-193.53	0.00
	15	16	1944.23	-42.79	0.00
	16	17	1869.30	107.95	0.00
	17	18	1447.66	258.69	0.00
	18	19	679.32	409.43	0.00
	19	20	-435.73	560.17	0.00
	20	21	-1919.99	730.34	-12.06
3	21	21	-1919.99	-559.63	-8.87
	21	22	-828.44	-389.38	-8.87
	22	23	-106.10	-238.69	0.00
	23	24	356.20	-163.32	0.00
	24	25	645.16	-87.95	0.00
	25	26	760.76	-12.58	0.00
	26	27	703.01	62.79	0.00
	27	28	471.91	138.17	0.00
	28	29	67.45	213.54	0.00
	29	30	-510.36	288.91	0.00
	30	31	-1272.78	373.99	-6.20
4	31	31	-1272.78	-348.40	-8.57
	31	32	-762.53	-289.18	-8.57
	32	33	-341.63	-236.85	0.00
	33	34	-4.62	-184.41	0.00
	34	35	248.49	-131.98	0.00
	35	36	417.71	-79.55	0.00
	36	37	503.05	-27.12	0.00
	37	38	504.49	25.31	0.00
	38	39	422.04	77.75	0.00
	39	40	255.70	130.18	0.00
	40	41	0.00	189.36	-4.29

Esfuerzos acumulados por peso propio

Estructura completa estado inicial

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-356.31	-7.98
	1	2	475.52	-237.88	-7.98
	2	3	772.34	-133.08	0.00
	3	4	901.37	-28.21	0.00
	4	5	862.62	76.65	0.00
	5	6	656.09	181.51	0.00
	6	7	281.78	286.38	0.00
	7	8	-260.32	391.24	0.00
	8	9	-970.20	496.11	0.00
	9	10	-1847.86	600.97	0.00
	10	11	-2904.23	719.21	-17.74
2	11	11	-2904.23	-815.91	-13.66
	11	12	-1223.12	-645.66	-13.66
	12	13	88.78	-495.02	0.00
	13	14	1053.97	-344.28	0.00
	14	15	1672.45	-193.53	0.00
	15	16	1944.23	-42.79	0.00
	16	17	1869.30	107.95	0.00
	17	18	1447.66	258.69	0.00
	18	19	679.32	409.43	0.00
	19	20	-435.73	560.17	0.00
	20	21	-1919.99	730.34	-12.06
3	21	21	-1919.99	-559.63	-8.87
	21	22	-828.44	-389.38	-8.87
	22	23	-106.10	-238.69	0.00
	23	24	356.20	-163.32	0.00
	24	25	645.16	-87.95	0.00
	25	26	760.76	-12.58	0.00
	26	27	703.01	62.79	0.00
	27	28	471.91	138.17	0.00
	28	29	67.45	213.54	0.00
	29	30	-510.36	288.91	0.00
	30	31	-1272.78	373.99	-6.20
4	31	31	-1272.78	-348.40	-8.57
	31	32	-762.53	-289.18	-8.57
	32	33	-341.63	-236.85	0.00
	33	34	-4.62	-184.41	0.00
	34	35	248.49	-131.98	0.00
	35	36	417.71	-79.55	0.00
	36	37	503.05	-27.12	0.00
	37	38	504.49	25.31	0.00
	38	39	422.04	77.75	0.00
	39	40	255.70	130.18	0.00
	40	41	0.00	189.36	-4.29

Esfuerzos acumulados por peso propio

Estructura completa estado final

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-203.07	-4.60
	1	2	273.74	-138.99	-4.60
	2	3	450.79	-82.29	0.00
	3	4	537.07	-25.55	0.00
	4	5	532.56	31.18	0.00
	5	6	437.28	87.92	0.00
	6	7	251.22	144.65	0.00
	7	8	-25.61	201.39	0.00
	8	9	-393.23	258.13	0.00
	9	10	-851.62	314.86	0.00
	10	11	-1406.70	378.84	-9.32
2	11	11	-1406.70	-410.27	-6.81
	11	12	-568.87	-318.15	-6.81
	12	13	69.20	-236.64	0.00
	13	14	519.69	-155.08	0.00
	14	15	782.59	-73.53	0.00
	15	16	857.91	8.03	0.00
	16	17	745.64	89.59	0.00
	17	18	445.80	171.15	0.00
	18	19	-41.63	252.71	0.00
	19	20	-716.65	334.26	0.00
	20	21	-1591.42	426.32	-7.11
3	21	21	-1591.42	-412.31	-6.85
	21	22	-748.88	-320.20	-6.85
	22	23	-106.10	-238.69	0.00
	23	24	356.20	-163.32	0.00
	24	25	645.16	-87.95	0.00
	25	26	760.76	-12.58	0.00
	26	27	703.01	62.79	0.00
	27	28	471.91	138.17	0.00
	28	29	67.45	213.54	0.00
	29	30	-510.36	288.91	0.00
	30	31	-1272.78	373.99	-6.20
4	31	31	-1272.78	-348.40	-8.57
	31	32	-762.53	-289.18	-8.57
	32	33	-341.63	-236.85	0.00
	33	34	-4.62	-184.41	0.00
	34	35	248.49	-131.98	0.00
	35	36	417.71	-79.55	0.00
	36	37	503.05	-27.12	0.00
	37	38	504.49	25.31	0.00
	38	39	422.04	77.75	0.00
	39	40	255.70	130.18	0.00
	40	41	0.00	189.36	-4.29

Esfuerzos debidos a cargas muertas

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-64.94	-1.50
	1	2	89.06	-46.35	-1.50
	2	3	148.37	-27.77	0.00
	3	4	177.93	-9.18	0.00
	4	5	177.74	9.41	0.00
	5	6	147.81	28.00	0.00
	6	7	88.13	46.60	0.00
	7	8	-1.30	65.19	0.00
	8	9	-120.48	83.78	0.00
	9	10	-269.40	102.37	0.00
	10	11	-448.08	120.93	-3.00
2	11	11	-448.08	-129.19	-2.16
	11	12	-181.64	-102.46	-2.16
	12	13	23.32	-75.75	0.00
	13	14	166.81	-49.02	0.00
	14	15	248.83	-22.30	0.00
	15	16	269.38	4.43	0.00
	16	17	228.47	31.15	0.00
	17	18	126.08	57.88	0.00
	18	19	-37.78	84.61	0.00
	19	20	-263.11	111.33	0.00
	20	21	-549.91	138.04	-2.33
3	21	21	-549.91	-138.04	-2.33
	21	22	-263.11	-111.31	-2.33
	22	23	-37.78	-84.61	0.00
	23	24	126.08	-57.88	0.00
	24	25	228.47	-31.15	0.00
	25	26	269.38	-4.43	0.00
	26	27	248.83	22.30	0.00
	27	28	166.81	49.02	0.00
	28	29	23.32	75.75	0.00
	29	30	-181.64	102.48	0.00
	30	31	-448.08	129.19	-2.16
4	31	31	-448.08	-120.93	-3.00
	31	32	-269.40	-102.34	-3.00
	32	33	-120.48	-83.78	0.00
	33	34	-1.30	-65.19	0.00
	34	35	88.13	-46.60	0.00
	35	36	147.81	-28.00	0.00
	36	37	177.74	-9.41	0.00
	37	38	177.93	9.18	0.00
	38	39	148.37	27.77	0.00
	39	40	89.07	46.36	0.00
	40	41	0.00	64.94	-1.50

Esfuerzos por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
1	1	1	0.00	-39.92	-1.07	-0.01	-0.01
	1	2	63.90	-39.92	-1.07	-1.19	1.64
	2	3	127.79	-39.94	0.00	-2.36	3.30
	3	4	191.69	-39.94	0.00	-3.54	4.96
	4	5	255.58	-39.94	0.00	-4.72	6.61
	5	6	319.48	-39.94	0.00	-5.90	8.26
	6	7	383.37	-39.94	0.00	-7.08	9.91
	7	8	447.27	-39.94	0.00	-8.26	11.57
	8	9	511.16	-39.94	0.00	-9.44	13.22
	9	10	575.06	-39.94	0.00	-10.62	14.87
	10	11	638.96	-39.92	1.07	-11.32	14.46
2	11	11	638.95	8.12	0.15	-11.32	14.46
	11	12	620.27	8.12	0.15	-11.45	16.04
	12	13	601.58	8.12	0.00	-11.11	15.56
	13	14	582.90	8.12	0.00	-10.76	15.07
	14	15	564.22	8.12	0.00	-10.42	14.59
	15	16	545.53	8.12	0.00	-10.07	14.11
	16	17	526.85	8.12	0.00	-9.73	13.62
	17	18	508.16	8.12	0.00	-9.38	13.14
	18	19	489.48	8.12	0.00	-9.04	12.66
	19	20	470.79	8.12	0.00	-8.69	12.17
	20	21	452.11	8.12	-0.15	-8.01	10.23
3	21	21	452.11	-8.12	-0.15	-8.01	10.23
	21	22	470.79	-8.12	-0.15	-8.69	12.17
	22	23	489.48	-8.12	0.00	-9.04	12.66
	23	24	508.16	-8.12	0.00	-9.38	13.14
	24	25	526.85	-8.12	0.00	-9.73	13.62
	25	26	545.53	-8.12	0.00	-10.07	14.11
	26	27	564.22	-8.12	0.00	-10.42	14.59
	27	28	582.90	-8.12	0.00	-10.76	15.07
	28	29	601.58	-8.12	0.00	-11.11	15.56
	29	30	620.27	-8.12	0.00	-11.45	16.04
	30	31	638.95	-8.12	0.15	-11.32	14.46
4	31	31	638.96	39.92	1.07	-11.32	14.46
	31	32	575.06	39.92	1.07	-10.61	14.88
	32	33	511.16	39.94	0.00	-9.44	13.22
	33	34	447.27	39.94	0.00	-8.26	11.57
	34	35	383.37	39.94	0.00	-7.08	9.91
	35	36	319.48	39.94	0.00	-5.90	8.26
	36	37	255.58	39.94	0.00	-4.72	6.61
	37	38	191.69	39.94	0.00	-3.54	4.96
	38	39	127.79	39.94	0.00	-2.36	3.30
	39	40	63.90	39.94	0.00	-1.18	1.65
	40	41	0.00	39.92	-1.07	-0.01	-0.01

Envolvente de cortantes por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
1	1	1	MAX	0.00	21.91	0.59	0.00	0.00
		1	MIN	0.00	-21.91	-0.59	0.00	0.00
	1	2	MAX	-35.08	21.91	0.59	0.65	-0.90
		2	MIN	35.08	-21.91	-0.59	-0.65	0.90
	2	3	MAX	-70.15	21.92	0.00	1.29	-1.81
		3	MIN	70.15	-21.92	0.00	-1.29	1.81
	3	4	MAX	-105.22	21.92	0.00	1.94	-2.72
		4	MIN	105.22	-21.92	0.00	-1.94	2.72
	4	5	MAX	-140.30	21.92	0.00	2.59	-3.63
		5	MIN	140.30	-21.92	0.00	-2.59	3.63
	5	6	MAX	-175.38	21.92	0.00	3.24	-4.53
		6	MIN	175.37	-21.92	0.00	-3.24	4.53
	6	7	MAX	-210.45	21.92	0.00	3.88	-5.44
		7	MIN	210.45	-21.92	0.00	-3.88	5.44
	7	8	MAX	-245.52	21.92	0.00	4.53	-6.35
		8	MIN	245.52	-21.92	0.00	-4.53	6.35
	8	9	MAX	-280.60	21.92	0.00	5.18	-7.26
		9	MIN	280.60	-21.92	0.00	-5.18	7.26
	9	10	MAX	-315.67	21.92	0.00	5.83	-8.16
		10	MIN	315.67	-21.92	0.00	-5.83	8.16
	10	11	MAX	-350.75	21.91	-0.59	6.21	-7.94
		11	MIN	350.75	-21.91	0.59	-6.21	7.94
2	11	11	MAX	350.75	30.41	0.57	-6.21	7.94
		11	MIN	-350.75	-30.41	-0.57	6.21	-7.94
	11	12	MAX	280.79	30.41	0.57	-5.18	7.26
		12	MIN	-280.79	-30.41	-0.57	5.18	-7.26
	12	13	MAX	210.82	30.42	0.00	-3.89	5.45
		13	MIN	-210.82	-30.42	0.00	3.89	-5.45
	13	14	MAX	140.86	30.42	0.00	-2.60	3.64
		14	MIN	-140.86	-30.42	0.00	2.60	-3.64
	14	15	MAX	70.90	30.42	0.00	-1.31	1.83
		15	MIN	-70.90	-30.42	0.00	1.31	-1.83
	15	16	MAX	0.94	30.42	0.00	-0.02	0.02
		16	MIN	-0.94	-30.42	0.00	0.02	-0.02
	16	17	MAX	-69.03	30.42	0.00	1.27	-1.78
		17	MIN	69.03	-30.42	0.00	-1.27	1.78
	17	18	MAX	-138.99	30.42	0.00	2.57	-3.59
		18	MIN	138.99	-30.42	0.00	-2.57	3.59
	18	19	MAX	-208.95	30.42	0.00	3.86	-5.40
		19	MIN	208.95	-30.42	0.00	-3.86	5.40
	19	20	MAX	-278.91	30.42	0.00	5.15	-7.21
		20	MIN	278.91	-30.42	0.00	-5.15	7.21
	20	21	MAX	-348.88	30.41	-0.57	6.18	-7.90
		21	MIN	348.88	-30.41	0.57	-6.18	7.90

Envolvente de cortantes por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
3	21	21	MAX	348.88	30.41	0.57	-6.18	7.90
		21	MIN	-348.88	-30.41	-0.57	6.18	-7.90
	21	22	MAX	278.91	30.41	0.57	-5.14	7.22
		22	MIN	-278.91	-30.41	-0.57	5.14	-7.22
	22	23	MAX	208.95	30.42	0.00	-3.86	5.40
		23	MIN	-208.95	-30.42	0.00	3.86	-5.40
	23	24	MAX	138.99	30.42	0.00	-2.57	3.59
		24	MIN	-138.99	-30.42	0.00	2.57	-3.59
	24	25	MAX	69.03	30.42	0.00	-1.27	1.78
		25	MIN	-69.03	-30.42	0.00	1.27	-1.78
	25	26	MAX	-0.94	30.42	0.00	0.02	-0.02
		26	MIN	0.94	-30.42	0.00	-0.02	0.02
	26	27	MAX	-70.90	30.42	0.00	1.31	-1.83
		27	MIN	70.90	-30.42	0.00	-1.31	1.83
	27	28	MAX	-140.86	30.42	0.00	2.60	-3.64
		28	MIN	140.86	-30.42	0.00	-2.60	3.64
	28	29	MAX	-210.82	30.42	0.00	3.89	-5.45
		29	MIN	210.82	-30.42	0.00	-3.89	5.45
	29	30	MAX	-280.79	30.42	0.00	5.18	-7.26
		30	MIN	280.79	-30.42	0.00	-5.18	7.26
	30	31	MAX	-350.75	30.41	-0.57	6.21	-7.94
		31	MIN	350.75	-30.41	0.57	-6.21	7.94
4	31	31	MAX	350.75	21.91	0.59	-6.21	7.94
		31	MIN	-350.75	-21.91	-0.59	6.21	-7.94
	31	32	MAX	315.67	21.91	0.59	-5.82	8.17
		32	MIN	-315.67	-21.91	-0.59	5.82	-8.17
	32	33	MAX	280.60	21.92	0.00	-5.18	7.26
		33	MIN	-280.60	-21.92	0.00	5.18	-7.26
	33	34	MAX	245.52	21.92	0.00	-4.53	6.35
		34	MIN	-245.52	-21.92	0.00	4.53	-6.35
	34	35	MAX	210.45	21.92	0.00	-3.88	5.44
		35	MIN	-210.45	-21.92	0.00	3.88	-5.44
	35	36	MAX	175.37	21.92	0.00	-3.24	4.53
		36	MIN	-175.38	-21.92	0.00	3.24	-4.53
	36	37	MAX	140.30	21.92	0.00	-2.59	3.63
		37	MIN	-140.30	-21.92	0.00	2.59	-3.63
	37	38	MAX	105.22	21.92	0.00	-1.94	2.72
		38	MIN	-105.22	-21.92	0.00	1.94	-2.72
	38	39	MAX	70.15	21.92	0.00	-1.29	1.81
		39	MIN	-70.15	-21.92	0.00	1.29	-1.81
	39	40	MAX	35.08	21.92	0.00	-0.65	0.91
		40	MIN	-35.08	-21.92	0.00	0.65	-0.91
	40	41	MAX	0.00	21.91	-0.59	0.00	0.00
		41	MIN	0.00	-21.91	0.59	0.00	0.00

Envolvente de momentos por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
1	1	1	MAX	0.00	-21.91	-0.59	0.00	0.00
		1	MIN	0.00	21.91	0.59	0.00	0.00
	1	2	MAX	35.08	-21.91	-0.59	-0.65	0.90
		2	MIN	-35.08	21.91	0.59	0.65	-0.90
	2	3	MAX	70.15	-21.92	0.00	-1.29	1.81
		3	MIN	-70.15	21.92	0.00	1.29	-1.81
	3	4	MAX	105.22	-21.92	0.00	-1.94	2.72
		4	MIN	-105.22	21.92	0.00	1.94	-2.72
	4	5	MAX	140.30	-21.92	0.00	-2.59	3.63
		5	MIN	-140.30	21.92	0.00	2.59	-3.63
	5	6	MAX	175.37	-21.92	0.00	-3.24	4.53
		6	MIN	-175.38	21.92	0.00	3.24	-4.53
	6	7	MAX	210.45	-21.92	0.00	-3.88	5.44
		7	MIN	-210.45	21.92	0.00	3.88	-5.44
	7	8	MAX	245.52	-21.92	0.00	-4.53	6.35
		8	MIN	-245.52	21.92	0.00	4.53	-6.35
	8	9	MAX	280.60	-21.92	0.00	-5.18	7.26
		9	MIN	-280.60	21.92	0.00	5.18	-7.26
	9	10	MAX	315.67	-21.92	0.00	-5.83	8.16
		10	MIN	-315.67	21.92	0.00	5.83	-8.16
	10	11	MAX	350.75	-21.91	0.59	-6.21	7.94
		11	MIN	-350.75	21.91	-0.59	6.21	-7.94
2	11	11	MAX	350.75	30.41	0.57	-6.21	7.94
		11	MIN	-350.75	-30.41	-0.57	6.21	-7.94
	11	12	MAX	280.79	30.41	0.57	-5.18	7.26
		12	MIN	-280.79	-30.41	-0.57	5.18	-7.26
	12	13	MAX	210.82	30.42	0.00	-3.89	5.45
		13	MIN	-210.82	-30.42	0.00	3.89	-5.45
	13	14	MAX	160.78	18.13	0.00	-2.97	4.16
		14	MIN	-160.78	-18.13	0.00	2.97	-4.16
	14	15	MAX	119.07	18.13	0.00	-2.20	3.08
		15	MIN	-119.07	-18.13	0.00	2.20	-3.08
	15	16	MAX	118.83	-1.07	0.00	-2.19	3.07
		16	MIN	-118.83	1.07	0.00	2.19	-3.07
	16	17	MAX	121.29	-1.07	0.00	-2.24	3.14
		17	MIN	-121.30	1.07	0.00	2.24	-3.14
	17	18	MAX	156.23	-21.65	0.00	-2.88	4.04
		18	MIN	-156.23	21.65	0.00	2.88	-4.04
	18	19	MAX	208.95	-30.42	0.00	-3.86	5.40
		19	MIN	-208.95	30.42	0.00	3.86	-5.40
	19	20	MAX	278.91	-30.42	0.00	-5.15	7.21
		20	MIN	-278.91	30.42	0.00	5.15	-7.21
	20	21	MAX	348.88	-30.41	0.57	-6.18	7.90
		21	MIN	-348.88	30.41	-0.57	6.18	-7.90

Envolvente de momentos por descenso lento d

Para estado final (nulos para estado inicia

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Ax (t)
3	21	21	MAX	348.88	30.41	
		21	MIN	-348.88	-30.41	-
	21	22	MAX	278.91	30.41	
		22	MIN	-278.91	-30.41	-
	22	23	MAX	208.95	30.42	
		23	MIN	-208.95	-30.42	
	23	24	MAX	156.23	21.65	
		24	MIN	-156.23	-21.65	
	24	25	MAX	121.29	1.07	
		25	MIN	-121.30	-1.07	
	25	26	MAX	118.83	1.07	
		26	MIN	-118.83	-1.07	
	26	27	MAX	119.07	-18.13	
		27	MIN	-119.07	18.13	
	27	28	MAX	160.78	-18.13	
		28	MIN	-160.78	18.13	
	28	29	MAX	210.82	-30.42	
		29	MIN	-210.82	30.42	
	29	30	MAX	280.79	-30.42	
		30	MIN	-280.79	30.42	
	30	31	MAX	350.75	-30.41	
		31	MIN	-350.75	30.41	-
4	31	31	MAX	350.75	21.91	
		31	MIN	-350.75	-21.91	-
	31	32	MAX	315.67	21.91	
		32	MIN	-315.67	-21.91	-
	32	33	MAX	280.60	21.92	
		33	MIN	-280.60	-21.92	
	33	34	MAX	245.52	21.92	
		34	MIN	-245.52	-21.92	
	34	35	MAX	210.45	21.92	
		35	MIN	-210.45	-21.92	
	35	36	MAX	175.37	21.92	
		36	MIN	-175.38	-21.92	
	36	37	MAX	140.30	21.92	
		37	MIN	-140.30	-21.92	
	37	38	MAX	105.22	21.92	
		38	MIN	-105.22	-21.92	
	38	39	MAX	70.15	21.92	
		39	MIN	-70.15	-21.92	
	39	40	MAX	35.08	21.92	
		40	MIN	-35.08	-21.92	
	40	41	MAX	0.00	21.91	-
		41	MIN	0.00	-21.91	

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	85.81	1.55
		1	MIN	0.00	-361.03	-6.24
	1	2	MAX	-130.89	81.81	0.00
		2	MIN	500.47	-279.51	-1.07
	2	3	MAX	-248.87	77.77	0.00
		3	MIN	856.71	-204.48	0.00
	3	4	MAX	-353.95	73.74	0.00
		4	MIN	1084.47	-136.00	0.00
	4	5	MAX	-446.13	69.71	0.00
		5	MIN	1199.50	-74.07	0.00
	5	6	MAX	172.41	90.23	0.00
		6	MIN	456.69	-57.09	0.00
	6	7	MAX	219.87	147.12	0.00
		7	MIN	558.13	-58.14	0.00
	7	8	MAX	-64.39	215.59	0.00
		8	MIN	662.95	-59.19	0.00
	8	9	MAX	-482.30	290.61	0.00
		9	MIN	771.14	-60.25	0.00
	9	10	MAX	-1049.60	372.19	0.00
		10	MIN	882.70	-61.30	0.00
	10	11	MAX	-257.77	460.20	-7.67
		11	MIN	-291.15	-62.33	1.48
2	11	11	MAX	-257.77	76.06	1.00
		11	MIN	-291.15	-537.50	-6.11
	11	12	MAX	813.16	72.88	0.15
		12	MIN	-729.97	-416.70	0.00
	12	13	MAX	643.37	69.68	0.00
		13	MIN	112.65	-305.26	0.00
	13	14	MAX	488.27	66.49	0.00
		14	MIN	673.40	-203.25	0.00
	14	15	MAX	347.85	63.30	0.00
		15	MIN	984.79	-110.67	0.00
	15	16	MAX	222.12	60.11	0.00
		16	MIN	863.92	-32.99	0.00
	16	17	MAX	1353.34	130.30	0.00
		17	MIN	-120.76	-28.31	0.00
	17	18	MAX	986.09	223.56	0.00
		18	MIN	-58.87	-29.94	0.00
	18	19	MAX	366.41	326.23	0.00
		19	MIN	10.54	-31.58	0.00
	19	20	MAX	-538.19	438.34	0.00
		20	MIN	87.49	-33.22	0.00
	20	21	MAX	-618.04	559.80	-6.45
		21	MIN	-618.04	-34.85	0.44
3	21	21	MAX	-618.04	34.85	0.44
		21	MIN	-618.04	-559.80	-6.45
	21	22	MAX	87.49	33.22	0.00
		22	MIN	-538.19	-438.34	-0.15

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	10.54	31.58	0.00
		23	MIN	366.42	-326.23	0.00
	23	24	MAX	-58.87	29.94	0.00
		24	MIN	986.08	-223.56	0.00
	24	25	MAX	-120.76	28.31	0.00
		25	MIN	1353.34	-130.30	0.00
	25	26	MAX	863.92	32.99	0.00
		26	MIN	222.12	-60.11	0.00
	26	27	MAX	984.79	110.67	0.00
		27	MIN	347.85	-63.30	0.00
	27	28	MAX	673.40	203.25	0.00
		28	MIN	488.27	-66.49	0.00
	28	29	MAX	112.65	305.26	0.00
		29	MIN	643.37	-69.68	0.00
	29	30	MAX	-729.97	416.70	0.00
		30	MIN	813.16	-72.88	0.00
	30	31	MAX	-291.14	537.50	-6.11
		31	MIN	-257.77	-76.06	1.00
4	31	31	MAX	-291.14	62.33	1.48
		31	MIN	-257.77	-460.20	-7.67
	31	32	MAX	882.70	61.28	1.07
		32	MIN	-1049.60	-372.19	0.00
32		33	MAX	771.14	60.25	0.00
		33	MIN	-482.30	-290.61	0.00
33		34	MAX	662.95	59.19	0.00
		34	MIN	-64.39	-215.59	0.00
34		35	MAX	558.13	58.14	0.00
		35	MIN	219.87	-147.12	0.00
35		36	MAX	456.69	57.09	0.00
		36	MIN	172.41	-90.23	0.00
36		37	MAX	1199.50	74.07	0.00
		37	MIN	-446.13	-69.71	0.00
37		38	MAX	1084.47	136.00	0.00
		38	MIN	-353.95	-73.74	0.00
38		39	MAX	856.71	204.48	0.00
		39	MIN	-248.87	-77.77	0.00
39		40	MAX	500.47	279.53	0.00
		40	MIN	-130.89	-81.81	0.00
40		41	MAX	0.00	361.03	-6.24
		41	MIN	0.00	-85.81	1.55

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-361.03	-6.24
		1	MIN	0.00	85.81	1.55
	1	2	MAX	500.47	-279.41	-6.24
		2	MIN	-130.89	81.78	1.55
	2	3	MAX	856.71	-204.48	0.00
		3	MIN	-248.87	77.77	0.00
	3	4	MAX	1084.47	-136.00	0.00
		4	MIN	-353.95	73.74	0.00
	4	5	MAX	1199.50	-74.07	0.00
		5	MIN	-446.13	69.71	0.00
	5	6	MAX	1217.53	-18.70	0.00
		6	MIN	-525.40	65.67	0.00
	6	7	MAX	1255.16	39.28	0.00
		7	MIN	-669.19	69.71	0.00
	7	8	MAX	1187.45	103.81	0.00
		8	MIN	-825.89	73.74	0.00
	8	9	MAX	998.67	174.91	0.00
		9	MIN	-995.49	77.77	0.00
	9	10	MAX	882.70	-61.30	0.00
		10	MIN	-1217.49	335.18	0.00
	10	11	MAX	943.49	-62.33	1.48
		11	MIN	-1565.88	410.03	-6.87
2	11	11	MAX	943.49	76.06	1.00
		11	MIN	-1565.88	-537.50	-6.11
	11	12	MAX	813.16	72.86	1.00
		12	MIN	-775.14	-361.28	-5.28
	12	13	MAX	1105.35	-219.14	0.00
		13	MIN	-425.28	-31.58	0.00
	13	14	MAX	1539.91	-172.29	0.00
		14	MIN	-334.99	3.77	0.00
	14	15	MAX	1767.45	-80.95	0.00
		15	MIN	-332.49	10.19	0.00
	15	16	MAX	1783.91	0.96	0.00
		16	MIN	-370.38	29.23	0.00
	16	17	MAX	1765.08	81.99	0.00
		17	MIN	-472.10	37.65	0.00
	17	18	MAX	1539.20	172.44	0.00
		18	MIN	-631.63	58.37	0.00
	18	19	MAX	1073.78	272.32	0.00
		19	MIN	-807.76	61.56	0.00
	19	20	MAX	613.42	-1.12	0.00
		20	MIN	-1143.26	379.61	0.00
	20	21	MAX	620.78	-1.58	-0.03
		21	MIN	-1881.36	551.67	-6.29
3	21	21	MAX	620.78	26.73	0.29
		21	MIN	-1881.36	-551.67	-6.29
	21	22	MAX	613.42	1.13	-0.03
		22	MIN	-1143.26	-379.53	-5.52

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	1073.78	-272.32	0.00
		23	MIN	-807.76	-61.56	0.00
	23	24	MAX	1539.20	-172.44	0.00
		24	MIN	-631.63	-58.37	0.00
	24	25	MAX	1765.08	-81.99	0.00
		25	MIN	-472.10	-37.65	0.00
	25	26	MAX	1783.91	-0.96	0.00
		26	MIN	-370.38	-29.23	0.00
	26	27	MAX	1767.45	80.95	0.00
		27	MIN	-332.49	-10.19	0.00
	27	28	MAX	1539.91	172.29	0.00
		28	MIN	-334.99	-3.77	0.00
	28	29	MAX	1105.35	219.14	0.00
		29	MIN	-425.28	31.58	0.00
	29	30	MAX	813.16	-72.88	0.00
		30	MIN	-775.14	361.35	0.00
	30	31	MAX	943.49	-76.06	1.00
		31	MIN	-1565.88	537.50	-6.11
4	31	31	MAX	943.49	62.33	1.48
		31	MIN	-1565.88	-410.03	-6.87
	31	32	MAX	882.70	61.28	1.48
		32	MIN	-1217.49	-335.05	-6.87
	32	33	MAX	998.67	-174.91	0.00
		33	MIN	-995.49	-77.77	0.00
	33	34	MAX	1187.45	-103.81	0.00
		34	MIN	-825.89	-73.74	0.00
	34	35	MAX	1255.16	-39.28	0.00
		35	MIN	-669.19	-69.71	0.00
	35	36	MAX	1217.53	18.70	0.00
		36	MIN	-525.40	-65.67	0.00
	36	37	MAX	1199.50	74.07	0.00
		37	MIN	-446.13	-69.71	0.00
	37	38	MAX	1084.47	136.00	0.00
		38	MIN	-353.95	-73.74	0.00
	38	39	MAX	856.71	204.48	0.00
		39	MIN	-248.87	-77.77	0.00
	39	40	MAX	500.47	279.53	0.00
		40	MIN	-130.89	-81.81	0.00
	40	41	MAX	0.00	361.03	0.48
		41	MIN	0.00	-85.81	-5.16

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	107.72	2.14
		1	MIN	0.00	-382.95	-6.82
	1	2	MAX	-165.96	103.72	0.59
		2	MIN	535.54	-301.43	-1.66
	2	3	MAX	-319.02	99.69	0.00
		3	MIN	926.86	-226.41	0.00
	3	4	MAX	-459.18	95.66	0.00
		4	MIN	1189.69	-157.92	0.00
	4	5	MAX	-586.43	91.63	0.00
		5	MIN	1339.79	-95.99	0.00
	5	6	MAX	-2.96	112.16	0.00
		6	MIN	632.06	-79.01	0.00
	6	7	MAX	9.42	169.04	0.00
		7	MIN	768.58	-80.06	0.00
	7	8	MAX	-309.92	237.51	0.00
		8	MIN	908.47	-81.12	0.00
	8	9	MAX	-762.90	312.53	0.00
		9	MIN	1051.74	-82.17	0.00
	9	10	MAX	-1365.27	394.11	0.00
		10	MIN	1198.37	-83.22	0.00
	10	11	MAX	-260.79	482.11	-8.26
		11	MIN	-288.12	-84.24	2.07
2	11	11	MAX	-260.79	106.47	1.57
		11	MIN	-288.12	-567.91	-6.68
	11	12	MAX	1093.94	103.29	0.72
		12	MIN	-1010.76	-447.11	-0.57
	12	13	MAX	854.20	100.10	0.00
		13	MIN	-98.18	-335.68	0.00
	13	14	MAX	629.13	96.91	0.00
		14	MIN	532.53	-233.67	0.00
	14	15	MAX	418.75	93.72	0.00
		15	MIN	913.89	-141.08	0.00
	15	16	MAX	223.06	90.53	0.00
		16	MIN	862.99	-63.41	0.00
	16	17	MAX	1284.31	160.72	0.00
		17	MIN	-51.73	-58.72	0.00
	17	18	MAX	847.10	253.98	0.00
		18	MIN	80.12	-60.36	0.00
	18	19	MAX	157.46	356.65	0.00
		19	MIN	219.49	-62.00	0.00
	19	20	MAX	-817.10	468.76	0.00
		20	MIN	366.41	-63.64	0.00
	20	21	MAX	-618.04	590.21	-7.01
		21	MIN	-618.04	-65.26	1.00
3	21	21	MAX	-618.04	65.26	1.00
		21	MIN	-618.04	-590.21	-7.01
	21	22	MAX	366.41	63.63	0.57
		22	MIN	-817.10	-468.75	-0.72

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	219.49	62.00	0.00
		23	MIN	157.47	-356.65	0.00
	23	24	MAX	80.12	60.36	0.00
		24	MIN	847.09	-253.98	0.00
	24	25	MAX	-51.73	58.72	0.00
		25	MIN	1284.31	-160.72	0.00
	25	26	MAX	862.99	63.41	0.00
		26	MIN	223.06	-90.53	0.00
	26	27	MAX	913.89	141.08	0.00
		27	MIN	418.75	-93.72	0.00
	27	28	MAX	532.53	233.67	0.00
		28	MIN	629.13	-96.91	0.00
	28	29	MAX	-98.18	335.68	0.00
		29	MIN	854.20	-100.10	0.00
	29	30	MAX	-1010.76	447.12	0.00
		30	MIN	1093.94	-103.30	0.00
	30	31	MAX	-288.12	567.91	-6.68
		31	MIN	-260.79	-106.47	1.57
4	31	31	MAX	-288.12	84.24	2.07
		31	MIN	-260.79	-482.11	-8.26
	31	32	MAX	1198.37	83.20	1.66
		32	MIN	-1365.27	-394.10	-0.59
	32	33	MAX	1051.74	82.17	0.00
		33	MIN	-762.90	-312.53	0.00
	33	34	MAX	908.47	81.12	0.00
		34	MIN	-309.92	-237.51	0.00
	34	35	MAX	768.58	80.06	0.00
		35	MIN	9.42	-169.04	0.00
	35	36	MAX	632.06	79.01	0.00
		36	MIN	-2.96	-112.16	0.00
	36	37	MAX	1339.79	95.99	0.00
		37	MIN	-586.43	-91.63	0.00
	37	38	MAX	1189.69	157.92	0.00
		38	MIN	-459.18	-95.66	0.00
	38	39	MAX	926.86	226.41	0.00
		39	MIN	-319.02	-99.69	0.00
	39	40	MAX	535.54	301.45	0.00
		40	MIN	-165.96	-103.73	0.00
	40	41	MAX	0.00	382.95	-6.82
		41	MIN	0.00	-107.72	2.14

Envolvente de momentos por sobrecarga total
(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-382.95	-6.82
		1	MIN	0.00	107.72	2.14
	1	2	MAX	535.54	-301.33	-6.82
		2	MIN	-165.96	103.69	2.14
	2	3	MAX	926.86	-226.41	0.00
		3	MIN	-319.02	99.69	0.00
	3	4	MAX	1189.69	-157.92	0.00
		4	MIN	-459.18	95.66	0.00
	4	5	MAX	1339.79	-95.99	0.00
		5	MIN	-586.43	91.63	0.00
	5	6	MAX	1392.90	-40.62	0.00
		6	MIN	-700.78	87.60	0.00
	6	7	MAX	1465.61	17.36	0.00
		7	MIN	-879.64	91.63	0.00
	7	8	MAX	1432.98	81.89	0.00
		8	MIN	-1071.42	95.66	0.00
	8	9	MAX	1279.27	152.98	0.00
		9	MIN	-1276.09	99.69	0.00
	9	10	MAX	1198.37	-83.22	0.00
		10	MIN	-1533.17	357.10	0.00
	10	11	MAX	1275.60	-84.24	2.07
		11	MIN	-1897.99	431.94	-7.46
2	11	11	MAX	1275.60	106.47	1.57
		11	MIN	-1897.99	-567.91	-6.68
	11	12	MAX	1093.94	103.28	1.57
		12	MIN	-1055.92	-391.69	-5.85
	12	13	MAX	1316.17	-188.72	0.00
		13	MIN	-636.10	-62.00	0.00
	13	14	MAX	1700.69	-154.15	0.00
		14	MIN	-495.77	-14.36	0.00
	14	15	MAX	1886.53	-62.82	0.00
		15	MIN	-451.56	-7.94	0.00
	15	16	MAX	1902.74	-0.12	0.00
		16	MIN	-489.20	30.31	0.00
	16	17	MAX	1886.37	80.92	0.00
		17	MIN	-593.40	38.72	0.00
	17	18	MAX	1695.44	150.79	0.00
		18	MIN	-787.86	80.02	0.00
	18	19	MAX	1282.73	241.91	0.00
		19	MIN	-1016.71	91.98	0.00
	19	20	MAX	892.33	-31.54	0.00
		20	MIN	-1422.18	410.02	0.00
	20	21	MAX	948.00	-31.99	0.54
		21	MIN	-2208.57	582.09	-6.86
3	21	21	MAX	948.00	57.14	0.85
		21	MIN	-2208.57	-582.09	-6.86
	21	22	MAX	892.33	31.54	0.54
		22	MIN	-1422.18	-409.95	-6.09

Envolvente de momentos por sobrecarga total
(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	1282.73	-241.91	0.00
		23	MIN	-1016.71	-91.98	0.00
	23	24	MAX	1695.44	-150.79	0.00
		24	MIN	-787.86	-80.02	0.00
	24	25	MAX	1886.37	-80.92	0.00
		25	MIN	-593.40	-38.72	0.00
	25	26	MAX	1902.74	0.12	0.00
		26	MIN	-489.20	-30.31	0.00
	26	27	MAX	1886.53	62.82	0.00
		27	MIN	-451.56	7.94	0.00
	27	28	MAX	1700.69	154.15	0.00
		28	MIN	-495.77	14.36	0.00
	28	29	MAX	1316.17	188.72	0.00
		29	MIN	-636.10	62.00	0.00
	29	30	MAX	1093.94	-103.30	0.00
		30	MIN	-1055.92	391.77	0.00
	30	31	MAX	1275.60	-106.47	1.57
		31	MIN	-1897.99	567.91	-6.68
4	31	31	MAX	1275.60	84.24	2.07
		31	MIN	-1897.99	-431.94	-7.46
	31	32	MAX	1198.37	83.19	2.07
		32	MIN	-1533.17	-356.96	-7.46
	32	33	MAX	1279.27	-152.98	0.00
		33	MIN	-1276.09	-99.69	0.00
	33	34	MAX	1432.98	-81.89	0.00
		34	MIN	-1071.42	-95.66	0.00
	34	35	MAX	1465.61	-17.36	0.00
		35	MIN	-879.64	-91.63	0.00
	35	36	MAX	1392.90	40.62	0.00
		36	MIN	-700.78	-87.60	0.00
	36	37	MAX	1339.79	95.99	0.00
		37	MIN	-586.43	-91.63	0.00
	37	38	MAX	1189.69	157.92	0.00
		38	MIN	-459.18	-95.66	0.00
	38	39	MAX	926.86	226.41	0.00
		39	MIN	-319.02	-99.69	0.00
	39	40	MAX	535.54	301.45	0.00
		40	MIN	-165.96	-103.73	0.00
	40	41	MAX	0.00	382.95	-0.11
		41	MIN	0.00	-107.72	-4.57

Cable Numero 1

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 23 (Activa)

Fuerza de Pretensado ..... = 3035.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 1

Se.	X	Y (s)	Y (i)	Pend.
1	0.000	0.791	1.108	-0.1280
2	1.600	0.970	0.929	-0.0959
3	3.200	1.098	0.801	-0.0639
4	4.800	1.174	0.725	-0.0319
5	6.400	1.200	0.699	0.0000
6	8.000	1.173	0.726	0.0334
7	9.600	1.093	0.806	0.0671
8	11.200	0.959	0.940	0.1011
9	12.800	0.769	1.130	0.1355
10	14.400	0.526	1.373	0.1537
11	16.000	0.400	1.499	0.0000
12	18.300	0.642	1.257	-0.2106
13	20.600	1.111	0.788	-0.1760
14	22.900	1.449	0.450	-0.1176
15	25.200	1.652	0.247	-0.0590
16	27.500	1.720	0.179	0.0000
17	29.800	1.652	0.247	0.0590
18	32.100	1.449	0.450	0.1176
19	34.400	1.111	0.788	0.1760
20	36.700	0.642	1.257	0.2106
21	39.000	0.400	1.499	0.0000
22	41.300	0.642	1.257	-0.2106
23	43.600	1.111	0.788	-0.1760

Cable Numero 2

Definicion general

Seccion inicial ..... = 23 (Pasiva)
Seccion final ..... = 41 (Activa)

Fuerza de Pretensado ..... = 3035.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 2

Se.	X	Y (s)	Y (i)	Pend.
23	43.600	1.111	0.788	-0.1760
24	45.900	1.449	0.450	-0.1176
25	48.200	1.652	0.247	-0.0590
26	50.500	1.720	0.179	0.0000
27	52.800	1.652	0.247	0.0590
28	55.100	1.449	0.450	0.1176
29	57.400	1.111	0.788	0.1760
30	59.700	0.642	1.257	0.2106
31	62.000	0.400	1.499	0.0000
32	63.600	0.526	1.373	-0.1537
33	65.200	0.769	1.130	-0.1355
34	66.800	0.959	0.940	-0.1011
35	68.400	1.093	0.806	-0.0671
36	70.000	1.173	0.726	-0.0334
37	71.600	1.200	0.699	0.0000
38	73.200	1.174	0.725	0.0319
39	74.800	1.098	0.801	0.0639
40	76.400	0.970	0.929	0.0959
41	78.000	0.791	1.108	0.1280

Cable Numero 3

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 41 (Activa)

Fuerza de Pretensado ..... = 1437.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 3

Se.	X	Y (s)	Y (i)	Pend.
1	0.000	0.211	1.688	0.0000
2	1.600	0.211	1.688	0.0000
3	3.200	0.211	1.688	0.0000
4	4.800	0.211	1.688	0.0000
5	6.400	0.211	1.688	0.0000
6	8.000	0.211	1.688	0.0000
7	9.600	0.211	1.688	0.0000
8	11.200	0.211	1.688	0.0000
9	12.800	0.211	1.688	0.0000
10	14.400	0.211	1.688	0.0000
11	16.000	0.211	1.688	0.0000
12	18.300	0.211	1.688	0.0000
13	20.600	0.211	1.688	0.0000
14	22.900	0.211	1.688	0.0000
15	25.200	0.211	1.688	0.0000
16	27.500	0.211	1.688	0.0000
17	29.800	0.211	1.688	0.0000
18	32.100	0.211	1.688	0.0000
19	34.400	0.211	1.688	0.0000
20	36.700	0.211	1.688	0.0000
21	39.000	0.211	1.688	0.0000
22	41.300	0.211	1.688	0.0000
23	43.600	0.211	1.688	0.0000
24	45.900	0.211	1.688	0.0000
25	48.200	0.211	1.688	0.0000
26	50.500	0.211	1.688	0.0000
27	52.800	0.211	1.688	0.0000
28	55.100	0.211	1.688	0.0000
29	57.400	0.211	1.688	0.0000
30	59.700	0.211	1.688	0.0000
31	62.000	0.211	1.688	0.0000
32	63.600	0.211	1.688	0.0000
33	65.200	0.211	1.688	0.0000
34	66.800	0.211	1.688	0.0000
35	68.400	0.211	1.688	0.0000
36	70.000	0.211	1.688	0.0000
37	71.600	0.211	1.688	0.0000
38	73.200	0.211	1.688	0.0000
39	74.800	0.211	1.688	0.0000
40	76.400	0.211	1.688	0.0000
41	78.000	0.211	1.688	0.0000

Se.	X	Y (s)	Y (i)	Pend.

Cable Numero 4

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 41 (Activa)

Fuerza de Pretensado ..... = 1437.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 4

Se.	X	Y (s)	Y (i)	Pend.
1	0.000	1.750	0.149	0.0000
2	1.600	1.750	0.149	0.0000
3	3.200	1.750	0.149	0.0000
4	4.800	1.750	0.149	0.0000
5	6.400	1.750	0.149	0.0000
6	8.000	1.750	0.149	0.0000
7	9.600	1.750	0.149	0.0000
8	11.200	1.750	0.149	0.0000
9	12.800	1.750	0.149	0.0000
10	14.400	1.750	0.149	0.0000
11	16.000	1.750	0.149	0.0000
12	18.300	1.750	0.149	0.0000
13	20.600	1.750	0.149	0.0000
14	22.900	1.750	0.149	0.0000
15	25.200	1.750	0.149	0.0000
16	27.500	1.750	0.149	0.0000
17	29.800	1.750	0.149	0.0000
18	32.100	1.750	0.149	0.0000
19	34.400	1.750	0.149	0.0000
20	36.700	1.750	0.149	0.0000
21	39.000	1.750	0.149	0.0000
22	41.300	1.750	0.149	0.0000
23	43.600	1.750	0.149	0.0000
24	45.900	1.750	0.149	0.0000
25	48.200	1.750	0.149	0.0000
26	50.500	1.750	0.149	0.0000
27	52.800	1.750	0.149	0.0000
28	55.100	1.750	0.149	0.0000
29	57.400	1.750	0.149	0.0000
30	59.700	1.750	0.149	0.0000
31	62.000	1.750	0.149	0.0000
32	63.600	1.750	0.149	0.0000
33	65.200	1.750	0.149	0.0000
34	66.800	1.750	0.149	0.0000
35	68.400	1.750	0.149	0.0000
36	70.000	1.750	0.149	0.0000
37	71.600	1.750	0.149	0.0000
38	73.200	1.750	0.149	0.0000
39	74.800	1.750	0.149	0.0000
40	76.400	1.750	0.149	0.0000
41	78.000	1.750	0.149	0.0000

Se.	X	Y (s)	Y (i)	Pend.

Definicion esfuerzos unitarios cable : 1

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
1	3035.000	-385.336	3010.439
2	3008.788	-287.209	2995.049
3	2982.724	-190.088	2976.661
4	2956.850	-94.259	2955.347
5	2931.203	0.000	2931.203
6	2904.885	96.851	2903.271
7	2878.640	192.626	2872.188
8	2852.516	286.984	2838.043
9	2826.563	379.593	2800.958
10	2795.095	424.692	2762.642
11	2701.530	0.000	2701.530
12	2578.800	-531.524	2523.428
13	2534.647	-439.307	2496.286
14	2497.183	-291.726	2480.084
15	2514.670	-148.023	2510.310
16	2553.354	0.000	2553.354
17	2592.635	152.613	2588.139
18	2632.128	307.491	2614.106
19	2671.618	463.047	2631.184
20	2718.156	560.247	2659.792
21	2847.518	0.000	2847.518
22	2983.037	-614.843	2918.986
23	3035.000	-526.028	2989.067

Alargamiento del cable ..... 292.2 mm.

Definicion esfuerzos unitarios cable : 2

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
23	2315.214	-401.275	2280.175
24	2349.949	-274.526	2333.859
25	2385.746	-140.434	2381.609
26	2422.448	0.000	2422.448
27	2459.714	144.788	2455.449
28	2497.183	291.726	2480.084
29	2534.647	439.307	2496.286
30	2578.800	531.524	2523.428
31	2701.530	0.000	2701.530
32	2795.095	-424.692	2762.642
33	2826.563	-379.594	2800.958
34	2852.516	-286.984	2838.043
35	2878.640	-192.626	2872.188
36	2904.885	-96.851	2903.271
37	2931.203	0.000	2931.203
38	2956.850	94.259	2955.347
39	2982.724	190.088	2976.661
40	3008.788	287.209	2995.049
41	3035.000	385.336	3010.439

Alargamiento del cable ..... 223.0 mm.

Definicion esfuerzos unitarios cable : 1

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
1	3035.000	-385.336	3010.439
2	3008.788	-287.209	2995.049
3	2982.724	-190.088	2976.661
4	2956.850	-94.259	2955.347
5	2931.203	0.000	2931.203
6	2904.885	96.851	2903.271
7	2878.640	192.626	2872.188
8	2852.516	286.984	2838.043
9	2826.563	379.593	2800.958
10	2795.095	424.692	2762.642
11	2701.530	0.000	2701.530
12	2588.543	-487.960	2542.135
13	2562.156	-433.868	2525.154
14	2531.878	-321.564	2511.375
15	2565.392	-181.100	2558.992
16	2611.295	0.000	2611.295
17	2658.019	187.639	2651.388
18	2697.662	342.619	2675.817
19	2729.922	462.277	2690.497
20	2758.038	519.911	2708.591
21	2878.422	0.000	2878.422
22	3004.061	-566.288	2950.204
23	3035.000	-513.938	2991.169

Alargamiento del cable ..... 294.0 mm.

Definicion esfuerzos unitarios cable : 2

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
23	2344.319	-396.980	2310.463
24	2372.354	-301.303	2353.142
25	2407.737	-169.970	2401.730
26	2450.818	0.000	2450.818
27	2494.671	176.107	2488.448
28	2531.878	321.563	2511.375
29	2562.156	433.868	2525.154
30	2588.543	487.960	2542.135
31	2701.530	0.000	2701.530
32	2795.095	-424.692	2762.642
33	2826.563	-379.594	2800.958
34	2852.516	-286.984	2838.043
35	2878.640	-192.626	2872.188
36	2904.885	-96.851	2903.271
37	2931.203	0.000	2931.203
38	2956.850	94.259	2955.347
39	2982.724	190.088	2976.661
40	3008.788	287.209	2995.049
41	3035.000	385.336	3010.439

Alargamiento del cable ..... 224.2 mm.

Definicion esfuerzos unitarios cable : 3

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
1	1437.000	0.000	1437.000
2	1434.106	0.000	1434.106
3	1431.218	0.000	1431.218
4	1428.335	0.000	1428.335
5	1425.459	0.000	1425.459
6	1422.588	0.000	1422.588
7	1419.723	0.000	1419.723
8	1416.864	0.000	1416.864
9	1414.010	0.000	1414.010
10	1411.162	0.000	1411.162
11	1408.320	0.000	1408.320
12	1404.245	0.000	1404.245
13	1400.181	0.000	1400.181
14	1396.129	0.000	1396.129
15	1392.089	0.000	1392.089
16	1388.061	0.000	1388.061
17	1384.044	0.000	1384.044
18	1380.039	0.000	1380.039
19	1376.045	0.000	1376.045
20	1372.063	0.000	1372.063
21	1368.093	0.000	1368.093
22	1372.063	0.000	1372.063
23	1376.045	0.000	1376.045
24	1380.039	0.000	1380.039
25	1384.044	0.000	1384.044
26	1388.061	0.000	1388.061
27	1392.089	0.000	1392.089
28	1396.129	0.000	1396.129
29	1400.181	0.000	1400.181
30	1404.245	0.000	1404.245
31	1408.320	0.000	1408.320
32	1411.162	0.000	1411.162
33	1414.010	0.000	1414.010
34	1416.864	0.000	1416.864
35	1419.723	0.000	1419.723
36	1422.588	0.000	1422.588
37	1425.459	0.000	1425.459
38	1428.335	0.000	1428.335
39	1431.218	0.000	1431.218
40	1434.106	0.000	1434.106
41	1437.000	0.000	1437.000

Alargamiento del cable ..... 559.2 mm.

...fuerzos unitarios cable : 4

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
1	1437.000	0.000	1437.000
2	1434.106	0.000	1434.106
3	1431.218	0.000	1431.218
4	1428.335	0.000	1428.335
5	1425.459	0.000	1425.459
6	1422.588	0.000	1422.588
7	1419.723	0.000	1419.723
8	1416.864	0.000	1416.864
9	1414.010	0.000	1414.010
10	1411.162	0.000	1411.162
11	1408.320	0.000	1408.320
12	1404.245	0.000	1404.245
13	1400.181	0.000	1400.181
14	1396.129	0.000	1396.129
15	1392.089	0.000	1392.089
16	1388.061	0.000	1388.061
17	1384.044	0.000	1384.044
18	1380.039	0.000	1380.039
19	1376.045	0.000	1376.045
20	1372.063	0.000	1372.063
21	1368.093	0.000	1368.093
22	1372.063	0.000	1372.063
23	1376.045	0.000	1376.045
24	1380.039	0.000	1380.039
25	1384.044	0.000	1384.044
26	1388.061	0.000	1388.061
27	1392.089	0.000	1392.089
28	1396.129	0.000	1396.129
29	1400.181	0.000	1400.181
30	1404.245	0.000	1404.245
31	1408.320	0.000	1408.320
32	1411.162	0.000	1411.162
33	1414.010	0.000	1414.010
34	1416.864	0.000	1416.864
35	1419.723	0.000	1419.723
36	1422.588	0.000	1422.588
37	1425.459	0.000	1425.459
38	1428.335	0.000	1428.335
39	1431.218	0.000	1431.218
40	1434.106	0.000	1434.106
41	1437.000	0.000	1437.000

...ento del cable ..... 559.2 mm.

Esfuerzos unitarios debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-254.12	443.8	-5999.3
		2	-883.32	345.1	-5975.5
	2	2	-883.43	184.4	-5985.2
		3	-1095.03	87.3	-5961.0
	3	3	-1095.03	87.3	-5961.0
		4	-1149.35	-8.5	-5933.9
	4	4	-1149.35	-8.5	-5933.9
		5	-1049.35	-102.8	-5904.0
	5	5	-1049.35	-102.8	-5904.0
		6	-795.08	-199.7	-5870.4
	6	6	-795.08	-199.7	-5870.4
		7	-387.08	-295.4	-5833.5
	7	7	-387.08	-295.4	-5833.5
		8	170.45	-389.8	-5793.7
	8	8	170.45	-389.8	-5793.7
		9	872.29	-482.4	-5750.9
	9	9	872.29	-482.4	-5750.9
		10	1709.24	-527.5	-5706.9
	10	10	1708.91	-680.6	-5691.1
		11	2440.97	-254.3	-5635.7
2	11	11	2442.23	155.6	-5636.3
		12	1373.24	640.3	-5459.6
	12	12	1372.31	538.1	-5472.5
		13	166.21	484.0	-5447.4
	13	13	166.21	484.0	-5447.4
		14	-816.18	371.7	-5425.5
	14	14	-816.18	371.7	-5425.5
		15	-1552.49	231.3	-5465.1
	15	15	-1552.49	231.3	-5465.1
		16	-1931.50	50.2	-5509.3
	16	16	-1931.50	50.2	-5509.3
		17	-1861.28	-137.5	-5541.4
	17	17	-1861.28	-137.5	-5541.4
		18	-1377.93	-292.5	-5557.8
	18	18	-1377.93	-292.5	-5557.8
		19	-566.60	-412.1	-5564.5
	19	19	-566.60	-412.1	-5564.5
		20	483.07	-469.7	-5574.6
	20	20	482.23	-576.9	-5572.6
		21	1374.08	-54.0	-5724.7
3	21	21	1374.52	107.2	-5734.6
		22	399.93	674.9	-5803.7
	22	22	400.33	566.3	-5816.2
		23	-886.52	513.9	-5865.2

Esfuerzos unitarios debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	12.2	0.3
		2	-19.48	12.2	0.3
	2	2	-19.48	12.2	0.0
		3	-38.96	12.2	0.0
	3	3	-38.96	12.2	0.0
		4	-58.43	12.2	0.0
	4	4	-58.43	12.2	0.0
		5	-77.91	12.2	0.0
	5	5	-77.91	12.2	0.0
		6	-97.39	12.2	0.0
	6	6	-97.39	12.2	0.0
		7	-116.87	12.2	0.0
	7	7	-116.87	12.2	0.0
		8	-136.34	12.2	0.0
	8	8	-136.34	12.2	0.0
		9	-155.82	12.2	0.0
	9	9	-155.82	12.2	0.0
		10	-175.30	12.2	0.0
	10	10	-175.30	12.2	-0.3
		11	-194.78	12.2	-0.3
2	11	11	-194.78	-36.9	-0.7
		12	-109.91	-36.9	-0.7
	12	12	-109.91	-36.9	0.0
		13	-25.05	-36.9	0.0
	13	13	-25.05	-36.9	0.0
		14	59.82	-36.9	0.0
	14	14	59.82	-36.9	0.0
		15	144.68	-36.9	0.0
	15	15	144.68	-36.9	0.0
		16	229.55	-36.9	0.0
	16	16	229.55	-36.9	0.0
		17	314.41	-36.9	0.0
	17	17	314.41	-36.9	0.0
		18	399.28	-36.9	0.0
	18	18	399.28	-36.9	0.0
		19	484.14	-36.9	0.0
	19	19	484.14	-36.9	0.0
		20	569.01	-36.9	0.0
	20	20	569.01	-36.9	0.7
		21	653.87	-36.9	0.7
3	21	21	653.87	-6.7	-0.1
		22	669.40	-6.7	-0.1
	22	22	669.40	-6.8	0.0
		23	684.93	-6.8	0.0
	23	23	0.16	390.2	-2310.5
		24	-814.51	294.6	-2353.1
	24	24	-814.51	294.6	-2353.1
		25	-1385.60	163.2	-2401.7

Esfuerzos unitarios debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-1385.60	163.2	-2401.7
		26	-1618.83	-6.8	-2450.8
	26	26	-1618.83	-6.8	-2450.8
		27	-1430.43	-182.9	-2488.4
	27	27	-1430.43	-182.9	-2488.4
		28	-854.28	-328.3	-2511.4
	28	28	-854.28	-328.3	-2511.4
		29	29.68	-440.6	-2525.2
	29	29	29.68	-440.6	-2525.2
		30	1137.35	-494.7	-2542.1
	30	30	1136.52	-545.1	-2539.7
		31	1980.73	-54.3	-2689.9
4	31	31	1981.26	123.1	-2699.6
		32	1460.14	549.3	-2749.3
	32	32	1460.44	475.3	-2762.6
		33	708.07	430.2	-2801.0
	33	33	708.07	430.2	-2801.0
		34	90.81	337.6	-2838.0
	34	34	90.81	337.6	-2838.0
		35	-382.13	243.2	-2872.2
	35	35	-382.13	243.2	-2872.2
		36	-705.54	147.4	-2903.3
	36	36	-705.54	147.4	-2903.3
		37	-875.22	50.6	-2931.2
	37	37	-875.22	50.6	-2931.2
		38	-890.63	-43.7	-2955.3
	38	38	-890.63	-43.7	-2955.3
		39	-751.72	-139.5	-2976.7
	39	39	-751.72	-139.5	-2976.7
		40	-455.52	-236.6	-2995.0
	40	40	-455.45	-317.0	-2987.6
		41	129.52	-415.5	-3000.4

Esfuerzos unitarios en estructura total debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-254.12	448.2	-5877.2
		2	-890.39	349.5	-5853.4
	2	2	-890.50	192.1	-5863.3
		3	-1114.41	95.0	-5839.1
	3	3	-1114.41	95.0	-5839.1
		4	-1181.03	-0.8	-5812.0
	4	4	-1181.03	-0.8	-5812.0
		5	-1093.35	-95.1	-5782.1
	5	5	-1093.34	-95.1	-5782.1
		6	-851.39	-192.0	-5748.4
	6	6	-851.39	-192.0	-5748.4
		7	-455.69	-287.7	-5711.6
	7	7	-455.69	-287.7	-5711.6
		8	89.53	-382.1	-5671.8
	8	8	89.53	-382.1	-5671.8
		9	779.06	-474.7	-5629.0
	9	9	779.06	-474.7	-5629.0
		10	1603.70	-519.8	-5585.0
	10	10	1603.37	-669.7	-5569.4
		11	2317.88	-243.3	-5514.0
2	11	11	2319.14	131.0	-5514.8
		12	1306.63	615.8	-5338.2
	12	12	1305.70	515.9	-5350.6
		13	150.84	461.8	-5325.5
	13	13	150.84	461.8	-5325.5
		14	-780.32	349.5	-5303.6
	14	14	-780.32	349.5	-5303.6
		15	-1465.39	209.0	-5343.2
	15	15	-1465.39	209.0	-5343.2
		16	-1793.17	27.9	-5387.4
	16	16	-1793.17	27.9	-5387.4
		17	-1671.71	-159.7	-5419.5
	17	17	-1671.71	-159.7	-5419.5
		18	-1137.12	-314.7	-5435.9
	18	18	-1137.11	-314.7	-5435.9
		19	-274.56	-434.4	-5442.6
	19	19	-274.56	-434.4	-5442.6
		20	826.35	-492.0	-5452.7
	20	20	825.51	-596.9	-5450.3
		21	1763.36	-74.0	-5602.4
3	21	21	1763.80	122.9	-5612.4
		22	753.22	690.5	-5681.5
	22	22	753.62	584.2	-5694.3
		23	-574.46	531.9	-5743.3
	23	23	312.06	17.9	-2752.1
		24	269.42	17.9	-2760.1
	24	24	269.42	17.9	-2760.1
		25	226.77	17.9	-2768.1

Esfuerzos unitarios en estructura total debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	226.77	17.9	-2768.1
		26	184.12	17.9	-2776.1
	26	26	184.12	17.9	-2776.1
		27	141.47	17.9	-2784.2
	27	27	141.47	17.9	-2784.2
		28	98.81	17.9	-2792.3
	28	28	98.81	17.9	-2792.3
		29	56.15	17.9	-2800.4
	29	29	56.14	17.9	-2800.4
		30	13.48	17.9	-2808.5
	30	30	13.52	-34.6	-2808.3
		31	91.96	-34.7	-2816.5
4	31	31	91.89	104.9	-2814.8
		32	-77.02	105.1	-2820.5
	32	32	-76.99	29.2	-2822.3
		33	-124.79	29.2	-2828.0
	33	33	-124.79	29.2	-2828.0
		34	-172.59	29.2	-2833.7
	34	34	-172.59	29.2	-2833.7
		35	-220.40	29.2	-2839.4
	35	35	-220.40	29.2	-2839.4
		36	-268.20	29.2	-2845.2
	36	36	-268.20	29.2	-2845.2
		37	-316.01	29.2	-2850.9
	37	37	-316.01	29.2	-2850.9
		38	-363.82	29.2	-2856.7
	38	38	-363.82	29.2	-2856.7
		39	-411.63	29.2	-2862.4
	39	39	-411.63	29.2	-2862.4
		40	-459.45	29.2	-2868.2
	40	40	-459.41	-47.8	-2868.0
		41	-383.65	-48.0	-2873.8

Esfuerzos unitarios en estructura total debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	12.2	0.3
		2	-19.48	12.2	0.3
	2	2	-19.48	12.2	0.0
		3	-38.96	12.2	0.0
	3	3	-38.96	12.2	0.0
		4	-58.43	12.2	0.0
	4	4	-58.43	12.2	0.0
		5	-77.91	12.2	0.0
	5	5	-77.91	12.2	0.0
		6	-97.39	12.2	0.0
	6	6	-97.39	12.2	0.0
		7	-116.87	12.2	0.0
	7	7	-116.87	12.2	0.0
		8	-136.34	12.2	0.0
	8	8	-136.34	12.2	0.0
		9	-155.82	12.2	0.0
	9	9	-155.82	12.2	0.0
		10	-175.30	12.2	0.0
	10	10	-175.30	12.2	-0.3
		11	-194.78	12.2	-0.3
2	11	11	-194.78	-36.9	-0.7
		12	-109.91	-36.9	-0.7
	12	12	-109.91	-36.9	0.0
		13	-25.05	-36.9	0.0
	13	13	-25.05	-36.9	0.0
		14	59.82	-36.9	0.0
	14	14	59.82	-36.9	0.0
		15	144.68	-36.9	0.0
	15	15	144.68	-36.9	0.0
		16	229.55	-36.9	0.0
	16	16	229.55	-36.9	0.0
		17	314.41	-36.9	0.0
	17	17	314.41	-36.9	0.0
		18	399.28	-36.9	0.0
	18	18	399.28	-36.9	0.0
		19	484.14	-36.9	0.0
	19	19	484.14	-36.9	0.0
		20	569.01	-36.9	0.0
	20	20	569.01	-36.9	0.7
		21	653.87	-36.9	0.7
3	21	21	653.87	-6.7	-0.1
		22	669.40	-6.7	-0.1
	22	22	669.40	-6.8	0.0
		23	684.93	-6.8	0.0
	23	23	0.16	390.2	-2310.5
		24	-814.51	294.6	-2353.1
	24	24	-814.51	294.6	-2353.1
		25	-1385.60	163.2	-2401.7

Esfuerzos unitarios en estructura total debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-1385.60	163.2	-2401.7
		26	-1618.83	-6.8	-2450.8
	26	26	-1618.83	-6.8	-2450.8
		27	-1430.43	-182.9	-2488.4
	27	27	-1430.43	-182.9	-2488.4
		28	-854.28	-328.3	-2511.4
	28	28	-854.28	-328.3	-2511.4
		29	29.68	-440.6	-2525.2
	29	29	29.68	-440.6	-2525.2
		30	1137.35	-494.7	-2542.1
	30	30	1136.52	-545.1	-2539.7
		31	1980.73	-54.3	-2689.9
4	31	31	1981.26	123.1	-2699.6
		32	1460.14	549.3	-2749.3
	32	32	1460.44	475.3	-2762.6
		33	708.07	430.2	-2801.0
	33	33	708.07	430.2	-2801.0
		34	90.81	337.6	-2838.0
	34	34	90.81	337.6	-2838.0
		35	-382.13	243.2	-2872.2
	35	35	-382.13	243.2	-2872.2
		36	-705.54	147.4	-2903.3
	36	36	-705.54	147.4	-2903.3
		37	-875.22	50.6	-2931.2
	37	37	-875.22	50.6	-2931.2
		38	-890.63	-43.7	-2955.3
	38	38	-890.63	-43.7	-2955.3
		39	-751.72	-139.5	-2976.7
	39	39	-751.72	-139.5	-2976.7
		40	-455.52	-236.6	-2995.0
	40	40	-455.45	-317.0	-2987.6
		41	129.52	-415.5	-3000.4

Coeficientes para perdidas de pretensado

Coef. de retraccion del hormigon ..... = 0.00025
Coef. de relajacion del acero ..... = 0.04000
Coef. de fluencia del hormigon ..... = 2.50000

Coef. medio de perdidas elasticas instantaneas ..... = 0.99287
Coef. medio de perdidas diferidas ..... = 0.88472
Coef. medio de perdidas totales ..... = 0.87841

Coef. de ponderacion para pretensado inicial (Pti) ... = 1.10000
Coef. de ponderacion para pretensado final (Ptf) ... = 0.90000

Nota: (*) Resultados de tensiones sin ponderar

Comprobacion de tensiones

Estado 1 Pretensado de 3035. tn Familia 1
Estado 2 Pretensado de 3035. tn Familia 2
Estado 3 Pretensado de 1437. tn Familia 1
Estado 4 Pretensado de 1437. tn Familia 1

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

Esfuerzos de pretensado Est. Inicial (*coef. perdidas elasticas)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-252.31	452.7	-5956.2
		2	-896.36	354.8	-5932.5
	2	2	-896.47	195.2	-5942.5
		3	-1125.90	98.7	-5918.5
	3	3	-1125.90	98.7	-5918.5
		4	-1199.17	3.6	-5891.6
	4	4	-1199.17	3.6	-5891.6
		5	-1119.22	-90.0	-5861.9
	5	5	-1119.22	-90.0	-5861.9
		6	-886.11	-186.1	-5828.5
	6	6	-886.11	-186.1	-5828.5
		7	-500.35	-281.2	-5791.9
	7	7	-500.35	-281.2	-5791.9
		8	33.86	-374.9	-5752.4
	8	8	33.86	-374.9	-5752.4
		9	711.36	-466.9	-5709.9
	9	9	711.36	-466.9	-5709.9
		10	1523.00	-511.6	-5666.2
	10	10	1522.67	-663.7	-5650.8
		11	2230.17	-240.4	-5595.8
2	11	11	2231.42	117.8	-5596.8
		12	1254.31	599.1	-5421.4
	12	12	1253.40	497.7	-5433.5
		13	140.16	443.9	-5408.6
	13	13	140.16	443.9	-5408.6
		14	-750.97	332.4	-5386.8
	14	14	-750.97	332.4	-5386.8
		15	-1397.77	193.0	-5426.1
	15	15	-1397.77	193.0	-5426.1
		16	-1689.82	13.2	-5470.0
	16	16	-1689.82	13.2	-5470.0
		17	-1535.83	-173.1	-5501.9
	17	17	-1535.83	-173.1	-5501.9
		18	-971.67	-327.0	-5518.2
	18	18	-971.67	-327.0	-5518.2
		19	-81.87	-445.8	-5524.8
	19	19	-81.87	-445.8	-5524.8
		20	1044.57	-503.0	-5534.9
	20	20	1043.73	-609.4	-5532.1
		21	2013.49	-90.3	-5683.2
3	21	21	2013.93	99.8	-5693.8
		22	1061.70	663.4	-5762.5
	22	22	1062.10	555.5	-5774.8
		23	-200.15	503.6	-5823.3
	23	23	0.15	387.4	-5147.5
		24	-808.70	292.5	-5189.9
	24	24	-808.70	292.5	-5189.9
		25	-1375.71	162.1	-5238.1

Esfuerzos de pretensado Est. Inicial (*coef. perdidas elasticas)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-1375.71	162.1	-5238.1
		26	-1607.28	-6.7	-5286.8
	26	26	-1607.28	-6.7	-5286.8
		27	-1420.22	-181.6	-5324.2
	27	27	-1420.22	-181.6	-5324.2
		28	-848.19	-326.0	-5347.0
	28	28	-848.19	-326.0	-5347.0
		29	29.47	-437.5	-5360.6
	29	29	29.47	-437.5	-5360.6
		30	1129.24	-491.2	-5377.5
	30	30	1128.41	-594.6	-5374.6
		31	2089.30	-107.2	-5523.7
4	31	31	2078.02	198.9	-5532.8
		32	1437.91	622.1	-5582.2
	32	32	1438.21	471.9	-5596.4
		33	691.21	427.1	-5634.5
	33	33	691.21	427.1	-5634.5
		34	78.36	335.1	-5671.3
	34	34	78.36	335.1	-5671.3
		35	-391.22	241.5	-5705.2
	35	35	-391.21	241.5	-5705.2
		36	-712.32	146.4	-5736.1
	36	36	-712.32	146.4	-5736.1
		37	-880.79	50.2	-5763.8
	37	37	-880.79	50.2	-5763.8
		38	-896.08	-43.4	-5787.8
	38	38	-896.08	-43.4	-5787.8
		39	-758.16	-138.5	-5808.9
	39	39	-758.16	-138.5	-5808.9
		40	-464.08	-235.0	-5827.2
	40	40	-464.01	-391.4	-5818.8
		41	239.49	-489.2	-5831.5

Esfuerzos de pretensado Est. Final (*coef. perdidas totales)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-223.22	404.1	-5171.1
		2	-798.72	317.4	-5150.2
	2	2	-798.82	178.9	-5159.1
		3	-1011.72	93.6	-5137.9
	3	3	-1011.72	93.6	-5137.9
		4	-1086.47	9.4	-5114.1
	4	4	-1086.47	9.4	-5114.1
		5	-1025.67	-73.4	-5087.8
	5	5	-1025.67	-73.4	-5087.8
		6	-829.35	-158.5	-5058.3
	6	6	-829.35	-158.5	-5058.3
		7	-497.99	-242.6	-5025.9
	7	7	-497.99	-242.6	-5025.9
		8	-35.29	-325.5	-4990.9
	8	8	-35.29	-325.5	-4990.9
		9	554.18	-406.8	-4953.3
	9	9	554.18	-406.8	-4953.3
		10	1262.33	-446.5	-4914.7
	10	10	1262.04	-578.3	-4901.3
		11	1873.83	-203.8	-4852.6
2	11	11	1874.93	84.5	-4853.6
		12	1056.01	510.3	-4698.5
	12	12	1055.19	422.3	-4708.8
		13	111.61	374.8	-4686.8
	13	13	111.61	374.8	-4686.8
		14	-635.48	276.2	-4667.5
	14	14	-635.48	276.2	-4667.5
		15	-1166.40	152.8	-4702.3
	15	15	-1166.40	152.8	-4702.3
		16	-1383.47	-6.3	-4741.1
	16	16	-1383.47	-6.3	-4741.1
		17	-1205.93	-171.1	-4769.3
	17	17	-1205.93	-171.1	-4769.3
		18	-665.48	-307.3	-4783.7
	18	18	-665.48	-307.3	-4783.7
		19	163.04	-412.4	-4789.6
	19	19	163.04	-412.4	-4789.6
		20	1200.94	-463.0	-4798.5
	20	20	1200.20	-555.3	-4795.8
		21	2095.24	-96.0	-4929.4
3	21	21	2095.63	100.9	-4938.9
		22	1224.16	599.5	-4999.6
	22	22	1224.51	506.0	-5010.7
		23	74.53	460.0	-5053.7
	23	23	251.75	357.2	-4455.8
		24	-498.24	273.2	-4499.7
	24	24	-498.24	273.2	-4499.7
		25	-1034.27	157.8	-4548.8

Esfuerzos de pretensado Est. Final (*coef. perdidas totales)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-1034.27	157.8	-4548.8
		26	-1273.53	8.5	-4598.4
	26	26	-1273.53	8.5	-4598.4
		27	-1142.43	-146.2	-4638.0
	27	27	-1142.43	-146.2	-4638.0
		28	-670.73	-273.9	-4664.6
	28	28	-670.74	-273.9	-4664.6
		29	71.34	-372.6	-4683.3
	29	29	71.34	-372.6	-4683.3
		30	1009.92	-420.1	-4704.8
	30	30	1009.23	-510.6	-4702.4
		31	1822.94	-79.5	-4841.0
4	31	31	1822.49	198.3	-4848.1
		32	1219.63	572.8	-4896.3
	32	32	1219.92	441.1	-4909.6
		33	520.49	401.4	-4947.8
	33	33	520.49	401.4	-4947.8
		34	-60.25	320.1	-4985.0
	34	34	-60.25	320.1	-4985.0
		35	-514.23	237.2	-5019.6
	35	35	-514.23	237.2	-5019.6
		36	-836.86	153.1	-5051.6
	36	36	-836.86	153.1	-5051.6
		37	-1024.46	68.0	-5080.7
	37	37	-1024.46	68.0	-5080.7
		38	-1076.54	-14.8	-5106.6
	38	38	-1076.54	-14.8	-5106.6
		39	-993.07	-99.0	-5129.9
	39	39	-993.07	-99.0	-5129.9
		40	-771.44	-184.3	-5150.7
	40	40	-771.35	-322.6	-5144.0
		41	-187.51	-409.2	-5159.8

Tensiones en Construccion (kg/cm2) Estado 1

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
1	1	-32.	-42.	-35.	-46.	0.	0.	-35.	-46.
	2	-29.	-68.	-32.	-75.	-4.	6.	-36.	-69.
	3	-25.	-73.	-28.	-81.	-6.	9.	-34.	-72.
	4	-24.	-74.	-26.	-82.	-7.	10.	-34.	-72.
	5	-25.	-72.	-28.	-79.	-7.	9.	-35.	-70.
	6	-30.	-65.	-33.	-71.	-4.	6.	-37.	-65.
	7	-37.	-54.	-41.	-60.	-1.	1.	-41.	-59.
	8	-47.	-40.	-52.	-43.	5.	-7.	-47.	-50.
	9	-60.	-21.	-66.	-23.	12.	-16.	-54.	-39.
	10	-74.	1.	-82.	1.	20.	-28.	-62.	-27.
	11	-77.	21.	-85.	23.	24.	-31.	-61.	-8.
2	11	-77.	21.	-85.	23.	24.	-31.	-61.	-8.
	12	-67.	-6.	-73.	-7.	13.	-18.	-60.	-25.
	13	-44.	-37.	-49.	-41.	0.	1.	-49.	-40.
	14	-26.	-62.	-29.	-68.	-11.	15.	-39.	-53.
	15	-13.	-81.	-14.	-89.	-18.	25.	-32.	-64.
	16	-6.	-91.	-7.	-100.	-22.	30.	-29.	-70.
	17	-8.	-90.	-9.	-99.	-22.	31.	-31.	-67.
	18	-17.	-77.	-19.	-85.	-20.	28.	-39.	-57.
	19	-32.	-57.	-35.	-62.	-14.	20.	-49.	-42.
	20	-51.	-30.	-56.	-33.	-6.	8.	-62.	-25.
	21	-59.	-4.	-64.	-4.	4.	-5.	-61.	-9.
3	21	-59.	-4.	-65.	-4.	4.	-5.	-61.	-9.
	22	-51.	-34.	-56.	-37.	2.	-2.	-55.	-39.
	23A	-28.	-67.	-31.	-74.	0.	0.	-31.	-74.

Tensiones en Construccion (kg/cm2) Estado 2

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
1	1	-32.	-42.	-35.	-46.	0.	0.	-35.	-46.
	2	-29.	-68.	-32.	-75.	-9.	12.	-40.	-63.
	3	-24.	-74.	-27.	-82.	-14.	20.	-41.	-62.
	4	-23.	-76.	-25.	-84.	-17.	23.	-42.	-60.
	5	-24.	-74.	-26.	-81.	-16.	22.	-42.	-59.
	6	-28.	-67.	-31.	-74.	-12.	17.	-43.	-57.
	7	-35.	-57.	-38.	-63.	-5.	7.	-44.	-56.
	8	-45.	-43.	-49.	-47.	5.	-7.	-44.	-54.
	9	-57.	-25.	-62.	-28.	18.	-25.	-45.	-53.
	10	-71.	-4.	-78.	-4.	34.	-48.	-45.	-52.
	11	-73.	17.	-81.	18.	42.	-54.	-38.	-36.
2	11	-73.	17.	-81.	18.	42.	-54.	-39.	-36.
	12	-65.	-9.	-71.	-10.	22.	-31.	-49.	-41.
	13	-44.	-38.	-48.	-41.	-2.	2.	-50.	-39.
	14	-27.	-61.	-30.	-67.	-19.	27.	-49.	-40.
	15	-16.	-78.	-17.	-85.	-31.	43.	-48.	-42.
	16	-11.	-85.	-12.	-94.	-36.	50.	-47.	-44.
	17	-14.	-82.	-15.	-90.	-34.	48.	-49.	-42.
	18	-24.	-67.	-27.	-74.	-27.	37.	-53.	-37.
	19	-41.	-44.	-45.	-49.	-12.	17.	-57.	-31.
	20	-61.	-15.	-68.	-17.	8.	-11.	-60.	-28.
	21	-70.	11.	-77.	12.	27.	-34.	-50.	-22.
3	21	-70.	11.	-77.	12.	27.	-34.	-51.	-22.
	22	-64.	-17.	-70.	-18.	15.	-21.	-55.	-40.
	23	-40.	-44.	-44.	-49.	2.	-3.	-42.	-52.
	24	-25.	-61.	-27.	-67.	-7.	9.	-34.	-57.
	25	-15.	-76.	-16.	-83.	-12.	17.	-28.	-67.
	26	-11.	-82.	-12.	-90.	-14.	20.	-26.	-71.
	27	-14.	-77.	-16.	-85.	-13.	18.	-29.	-67.
	28	-25.	-63.	-28.	-69.	-9.	12.	-36.	-57.
	29	-41.	-40.	-46.	-44.	-1.	2.	-47.	-42.
	30	-62.	-12.	-68.	-13.	9.	-13.	-59.	-26.
	31	-70.	14.	-78.	15.	18.	-23.	-59.	-8.
4	31	-70.	13.	-77.	15.	18.	-23.	-59.	-9.
	32	-69.	-5.	-76.	-6.	14.	-20.	-62.	-26.
	33	-56.	-25.	-61.	-28.	6.	-9.	-55.	-36.
	34	-45.	-41.	-49.	-45.	0.	0.	-49.	-45.
	35	-36.	-54.	-40.	-59.	-5.	6.	-44.	-53.
	36	-31.	-62.	-34.	-68.	-8.	11.	-41.	-58.
	37	-28.	-67.	-30.	-73.	-9.	13.	-40.	-61.
	38	-28.	-67.	-30.	-74.	-9.	13.	-40.	-61.
	39	-30.	-64.	-33.	-70.	-8.	11.	-41.	-59.
	40	-36.	-56.	-39.	-62.	-5.	7.	-44.	-56.
	41	-40.	-30.	-44.	-33.	0.	0.	-44.	-33.

Tensiones en Servicio (kg/cm2) Estado inicial

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pi+Pti F.Sup	Pi+Pti F.Inf	Pi+Pti+M F.Sup	Pi+Pti+M F.Inf	Pi+Pti+M+Sp F.Sup	Pi+Pti+M+Sp F.Inf	Pi+Pti+M+Sn F.Sup	Pi+Pti+M+Sn F.Inf
1	1	-32.	-42.	-35.	-46.	-35.	-46.	-35.	-46.	-35.	-46.
	2	-29.	-68.	-40.	-63.	-42.	-61.	-51.	-48.	-40.	-64.
	3	-24.	-74.	-41.	-62.	-44.	-58.	-60.	-36.	-39.	-64.
	4	-23.	-76.	-42.	-60.	-45.	-56.	-65.	-28.	-38.	-65.
	5	-24.	-74.	-42.	-59.	-46.	-54.	-68.	-23.	-37.	-66.
	6	-28.	-67.	-43.	-57.	-46.	-53.	-68.	-22.	-36.	-67.
	7	-35.	-57.	-44.	-56.	-45.	-53.	-68.	-21.	-33.	-71.
	8	-45.	-43.	-44.	-54.	-44.	-54.	-66.	-23.	-29.	-75.
	9	-57.	-25.	-44.	-53.	-42.	-56.	-61.	-30.	-24.	-82.
	10	-71.	-4.	-44.	-52.	-39.	-59.	-56.	-36.	-17.	-90.
	11	-73.	17.	-38.	-36.	-32.	-45.	-48.	-23.	-4.	-80.
2	11	-73.	17.	-38.	-36.	-32.	-45.	-48.	-23.	-4.	-80.
	12	-65.	-9.	-48.	-42.	-45.	-46.	-60.	-25.	-31.	-66.
	13	-44.	-38.	-50.	-39.	-50.	-39.	-71.	-10.	-42.	-49.
	14	-27.	-61.	-49.	-39.	-52.	-35.	-81.	5.	-46.	-44.
	15	-16.	-78.	-48.	-42.	-53.	-36.	-85.	10.	-46.	-44.
	16	-11.	-85.	-47.	-44.	-52.	-37.	-85.	9.	-46.	-46.
	17	-14.	-82.	-49.	-42.	-54.	-36.	-86.	10.	-45.	-48.
	18	-24.	-67.	-53.	-37.	-56.	-33.	-84.	7.	-44.	-50.
	19	-41.	-44.	-57.	-31.	-57.	-32.	-76.	-4.	-42.	-53.
	20	-61.	-15.	-60.	-28.	-55.	-35.	-66.	-19.	-34.	-64.
	21	-70.	11.	-50.	-22.	-42.	-33.	-53.	-19.	-9.	-75.
3	21	-70.	11.	-50.	-22.	-42.	-33.	-53.	-19.	-9.	-75.
	22	-64.	-17.	-55.	-40.	-50.	-46.	-61.	-31.	-29.	-76.
	23AI	-41.	-50.	-43.	-57.	-42.	-58.	-62.	-31.	-27.	-79.
	23AD	-39.	-39.	-41.	-46.	-41.	-47.	-60.	-19.	-26.	-68.
	24	-25.	-61.	-34.	-57.	-36.	-54.	-64.	-14.	-24.	-70.
	25	-15.	-76.	-28.	-66.	-32.	-60.	-65.	-15.	-23.	-73.
	26	-11.	-82.	-26.	-70.	-31.	-63.	-64.	-17.	-24.	-73.
	27	-14.	-77.	-29.	-67.	-33.	-60.	-66.	-15.	-27.	-69.
	28	-25.	-63.	-36.	-57.	-39.	-52.	-68.	-13.	-33.	-61.
	29	-41.	-40.	-47.	-42.	-47.	-42.	-68.	-13.	-39.	-53.
	30	-62.	-12.	-59.	-26.	-55.	-31.	-70.	-10.	-41.	-51.
	31	-70.	14.	-59.	-8.	-53.	-17.	-69.	5.	-25.	-52.
4	31	-70.	13.	-59.	-9.	-53.	-17.	-69.	4.	-25.	-53.
	32	-69.	-5.	-62.	-26.	-57.	-33.	-73.	-10.	-35.	-64.
	33	-56.	-25.	-55.	-36.	-53.	-40.	-71.	-14.	-34.	-65.
	34	-45.	-41.	-49.	-45.	-49.	-46.	-71.	-15.	-34.	-67.
	35	-36.	-54.	-45.	-53.	-46.	-50.	-69.	-18.	-34.	-68.
	36	-31.	-62.	-41.	-58.	-44.	-54.	-67.	-22.	-34.	-67.
	37	-28.	-67.	-40.	-60.	-43.	-56.	-65.	-25.	-35.	-67.
	38	-28.	-67.	-40.	-61.	-43.	-56.	-63.	-28.	-36.	-66.
	39	-30.	-64.	-41.	-59.	-44.	-56.	-60.	-33.	-39.	-62.
	40	-36.	-56.	-44.	-55.	-46.	-53.	-55.	-40.	-43.	-57.
	41	-40.	-30.	-44.	-33.	-44.	-33.	-44.	-33.	-44.	-33.

Tensiones en Servicio (kg/cm2) Estado final

V.	Sec	Ptf (*) F.Sup	Ptf (*) F.Inf	Pf+Ptf+M F.Sup	Pf+Ptf+M F.Inf	Pf+Ptf+M+Sp F.Sup	Pf+Ptf+M+Sp F.Inf	Pf+Ptf+M+Sn F.Sup	Pf+Ptf+M+Sn F.Inf
1	1	-27.	-36.	-25.	-33.	-25.	-33.	-25.	-33.
	2	-25.	-60.	-29.	-45.	-39.	-31.	-26.	-49.
	3	-21.	-65.	-30.	-43.	-47.	-19.	-24.	-52.
	4	-19.	-67.	-30.	-42.	-52.	-11.	-22.	-54.
	5	-20.	-65.	-31.	-40.	-56.	-6.	-20.	-56.
	6	-23.	-60.	-32.	-39.	-57.	-3.	-19.	-57.
	7	-29.	-51.	-32.	-37.	-60.	1.	-16.	-60.
	8	-37.	-39.	-33.	-36.	-60.	1.	-13.	-63.
	9	-48.	-23.	-34.	-34.	-57.	-1.	-10.	-67.
	10	-61.	-5.	-34.	-33.	-56.	-2.	-6.	-73.
	11	-63.	13.	-29.	-23.	-52.	6.	4.	-66.
2	11	-63.	13.	-29.	-23.	-52.	6.	4.	-66.
	12	-55.	-9.	-36.	-27.	-56.	1.	-17.	-55.
	13	-38.	-33.	-36.	-27.	-60.	7.	-24.	-44.
	14	-24.	-52.	-34.	-29.	-66.	15.	-25.	-42.
	15	-14.	-66.	-32.	-33.	-67.	16.	-24.	-44.
	16	-11.	-72.	-30.	-36.	-66.	14.	-21.	-48.
	17	-14.	-68.	-31.	-36.	-66.	13.	-20.	-51.
	18	-24.	-54.	-32.	-34.	-64.	10.	-18.	-54.
	19	-40.	-32.	-34.	-31.	-58.	2.	-15.	-57.
	20	-59.	-6.	-35.	-30.	-51.	-7.	-9.	-67.
	21	-67.	18.	-29.	-25.	-45.	-3.	10.	-75.
3	21	-67.	17.	-29.	-25.	-46.	-3.	10.	-75.
	22	-61.	-7.	-36.	-32.	-53.	-9.	-10.	-69.
	23AI	-40.	-37.	-33.	-37.	-57.	-4.	-15.	-63.
	23AD	-39.	-27.	-32.	-28.	-56.	5.	-13.	-55.
	24	-25.	-47.	-32.	-30.	-63.	14.	-17.	-50.
	25	-16.	-61.	-30.	-33.	-65.	16.	-19.	-48.
	26	-12.	-68.	-29.	-35.	-65.	15.	-20.	-47.
	27	-14.	-65.	-30.	-34.	-65.	15.	-22.	-45.
	28	-23.	-53.	-33.	-31.	-64.	13.	-24.	-44.
	29	-37.	-34.	-35.	-28.	-59.	6.	-23.	-45.
	30	-55.	-10.	-36.	-27.	-57.	2.	-17.	-54.
	31	-62.	12.	-31.	-21.	-53.	8.	3.	-64.
4	31	-62.	12.	-31.	-21.	-53.	8.	3.	-64.
	32	-60.	-6.	-35.	-32.	-57.	-1.	-7.	-72.
	33	-47.	-24.	-34.	-34.	-58.	-1.	-11.	-67.
	34	-37.	-40.	-33.	-36.	-60.	1.	-13.	-63.
	35	-29.	-52.	-32.	-38.	-59.	0.	-16.	-60.
	36	-23.	-60.	-31.	-40.	-57.	-4.	-18.	-58.
	37	-20.	-65.	-30.	-41.	-55.	-6.	-20.	-56.
	38	-19.	-67.	-30.	-42.	-52.	-12.	-21.	-54.
	39	-21.	-65.	-29.	-44.	-46.	-20.	-23.	-52.
	40	-25.	-59.	-29.	-44.	-39.	-31.	-26.	-49.
	41	-28.	-36.	-25.	-32.	-25.	-32.	-25.	-32.

Resumen de tracciones maximas en Construccion (kg/cm2)

Resumen de compresiones maximas en Construccion (kg/cm2)

Seccion	23	T =	-74.	Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	4	T =	-72.	Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	3	T =	-72.	Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	26	T =	-71.	Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	16	T =	-70.	Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	5	T =	-70.	Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	2	T =	-69.	Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	17	T =	-67.	Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	27	T =	-67.	Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	25	T =	-67.	Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	6	T =	-65.	Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	15	T =	-64.	Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	32	T =	-62.	Estado	2	F.Sup. Hipot. Pi+Pti
Seccion	10	T =	-62.	Estado	1	F.Sup. Hipot. Pi+Pti
Seccion	20	T =	-62.	Estado	1	F.Sup. Hipot. Pi+Pti
Seccion	38	T =	-61.	Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	21	T =	-61.	Estado	1	F.Sup. Hipot. Pi+Pti
Seccion	11	T =	-61.	Estado	1	F.Sup. Hipot. Pi+Pti
Seccion	37	T =	-61.	Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	12	T =	-60.	Estado	1	F.Sup. Hipot. Pi+Pti
Seccion	39	T =	-59.	Estado	2	F.Inf. Hipot. Pi+Pti

Resumen de tracciones maximas en Servicio (kg/cm2)

Seccion	25	T =	16.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	15	T =	16.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	27	T =	15.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	14	T =	15.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	26	T =	15.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	24	T =	14.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	16	T =	14.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	17	T =	13.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	28	T =	13.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	21	T =	10.	Estado final	F.Sup.	Hipot.	Pf+Ptf+M+Sn
Seccion	18	T =	10.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	31	T =	8.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	13	T =	7.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	11	T =	6.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	29	T =	6.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	23	T =	5.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	19	T =	2.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	30	T =	2.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	34	T =	1.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	8	T =	1.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp
Seccion	12	T =	1.	Estado final	F.Inf.	Hipot.	Pf+Ptf+M+Sp

Resumen de compresiones maximas en Servicio (kg/cm2)

Seccion	10	T =	-90.	Estado inicial	F.Inf.	Hipot.	Pi+Pti+M+Sn
Seccion	17	T =	-86.	Estado inicial	F.Sup.	Hipot.	Pi+Pti+M+Sp
Seccion	16	T =	-85.	Estado inicial	F.Sup.	Hipot.	Pi+Pti+M+Sp
Seccion	15	T =	-85.	Estado inicial	F.Sup.	Hipot.	Pi+Pti+M+Sp
Seccion	18	T =	-84.	Estado inicial	F.Sup.	Hipot.	Pi+Pti+M+Sp
Seccion	9	T =	-82.	Estado inicial	F.Inf.	Hipot.	Pi+Pti+M+Sn
Seccion	14	T =	-81.	Estado inicial	F.Sup.	Hipot.	Pi+Pti+M+Sp
Seccion	11	T =	-80.	Estado inicial	F.Inf.	Hipot.	Pi+Pti+M+Sn
Seccion	23	T =	-79.	Estado inicial	F.Inf.	Hipot.	Pi+Pti+M+Sn
Seccion	19	T =	-76.	Estado inicial	F.Sup.	Hipot.	Pi+Pti+M+Sp
Seccion	22	T =	-76.	Estado inicial	F.Inf.	Hipot.	Pi+Pti+M+Sn
Seccion	8	T =	-75.	Estado inicial	F.Inf.	Hipot.	Pi+Pti+M+Sn
Seccion	21	T =	-75.	Estado inicial	F.Inf.	Hipot.	Pi+Pti+M+Sn
Seccion	32	T =	-73.	Estado inicial	F.Sup.	Hipot.	Pi+Pti+M+Sp
Seccion	26	T =	-73.	Estado inicial	F.Inf.	Hipot.	Pi+Pti+M+Sn
Seccion	25	T =	-73.	Estado inicial	F.Inf.	Hipot.	Pi+Pti+M+Sn
Seccion	33	T =	-71.	Estado inicial	F.Sup.	Hipot.	Pi+Pti+M+Sp
Seccion	34	T =	-71.	Estado inicial	F.Sup.	Hipot.	Pi+Pti+M+Sp
Seccion	13	T =	-71.	Estado inicial	F.Sup.	Hipot.	Pi+Pti+M+Sp
Seccion	7	T =	-71.	Estado inicial	F.Inf.	Hipot.	Pi+Pti+M+Sn
Seccion	24	T =	-70.	Estado inicial	F.Inf.	Hipot.	Pi+Pti+M+Sn

COMPROBACION DE FISURACION POR TENSIONES NORMALES

CONTROL TENSIONES LONGITUDINALES
COMBINACION CASI PERMANENTE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50		0.30						0.00											
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-25	-33	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	-23	-31	-27	-35
2	-29	-45	1	1	-1	2	1	1	1	1	-7	9	2	-3	1	1	0	0	0	0	0	0	-26	-39	-34	-49
3	-30	-43	1	2	-2	3	1	1	1	1	-11	16	4	-5	1	1	0	0	0	0	0	0	-26	-33	-37	-48
4	-30	-42	2	3	-4	5	1	1	1	1	-15	21	6	-8	1	1	0	0	0	0	0	0	-24	-28	-40	-49
5	-31	-40	3	4	-5	7	1	1	1	1	-16	23	12	-11	1	1	0	0	0	0	0	0	-23	-24	-43	-49
6	-32	-39	3	5	-6	8	1	1	1	1	-17	23	9	-14	1	1	0	0	0	0	0	0	-25	-21	-45	-50
7	-32	-37	4	5	-7	10	1	1	1	1	-16	22	11	-16	1	1	0	0	0	0	0	0	-23	-19	-46	-49
8	-33	-36	5	6	-8	12	1	1	1	1	-13	18	13	-19	1	1	0	0	0	0	0	0	-22	-17	-48	-50
9	-34	-34	5	7	-9	13	1	1	1	1	-8	10	16	-23	1	1	0	0	0	0	0	0	-22	-16	-48	-50
10	-34	-33	6	8	-11	15	1	1	1	1	-5	6	18	-26	1	1	0	0	0	0	0	0	-21	-14	-49	-51
11	-29	-23	6	8	-11	14	1	1	1	1	-4	6	22	-29	1	1	0	0	0	0	0	0	-15	-4	-44	-42
11	-29	-23	6	8	-11	14	1	1	1	1	-4	6	22	-29	1	1	0	0	0	0	0	0	-14	-4	-44	-42
12	-36	-27	5	7	-11	16	1	1	1	1	-3	4	11	-17	1	1	0	0	0	0	0	0	-26	-9	-49	-41
13	-36	-27	4	5	-11	16	1	1	1	1	-8	11	7	-10	1	1	0	0	0	0	0	0	-28	-9	-50	-37
14	-34	-29	3	4	-11	15	1	1	1	1	-16	23	5	-8	1	1	0	0	0	0	0	0	-28	-9	-49	-37
15	-32	-33	2	3	-10	15	1	1	1	1	-21	29	6	-8	1	1	0	0	0	0	0	0	-26	-12	-47	-40
16	-30	-36	2	3	-10	14	1	1	1	1	-23	32	7	-10	1	1	0	0	0	0	0	0	-24	-15	-46	-44
17	-31	-36	2	3	-10	14	1	1	1	1	-22	30	8	-8	1	1	0	0	0	0	0	0	-25	-15	-46	-43
18	-32	-34	3	4	-9	13	1	1	1	1	-17	24	8	-15	1	1	0	0	0	0	0	0	-25	-15	-46	-44
19	-34	-31	4	5	-9	13	1	1	1	1	-9	13	13	-18	1	1	0	0	0	0	0	0	-24	-14	-47	-43
20	-35	-30	5	7	-9	12	1	1	1	1	-2	3	18	-25	1	1	0	0	0	0	0	0	-23	-14	-47	-46
21	-29	-25	6	8	-8	10	1	1	1	1	-2	3	27	-34	1	1	0	0	0	0	0	0	-13	-9	-41	-45
21	-29	-25	6	8	-8	10	1	1	1	1	-2	3	27	-34	1	1	0	0	0	0	0	0	-13	-9	-42	-45
22	-36	-32	5	7	-9	12	1	1	1	1	-2	3	17	-24	1	1	0	0	0	0	0	0	-24	-16	-48	-48
23	-33	-37	4	5	-9	13	1	1	1	1	-10	13	13	-18	1	1	0	0	0	0	0	0	-23	-20	-46	-49
23	-32	-28	4	5	-9	13	1	1	1	1	-10	13	13	-18	1	1	0	0	0	0	0	0	-22	-11	-45	-40
24	-32	-30	3	4	-9	13	1	1	1	1	-17	25	10	-14	1	1	0	0	0	0	0	0	-24	-10	-46	-40
25	-30	-33	2	3	-10	14	1	1	1	1	-22	31	8	-11	1	1	0	0	0	0	0	0	-24	-12	-45	-41
27	-29	-35	2	3	-10	14	1	1	1	1	-22	32	7	-10	1	1	0	0	0	0	0	0	-23	-14	-44	-43
27	-30	-34	2	3	-10	15	1	1	1	1	-21	30	5	-8	1	1	0	0	0	0	0	0	-25	-13	-45	-41
28	-33	-31	3	4	-11	15	1	1	1	1	-16	23	6	-8	1	1	0	0	0	0	0	0	-26	-11	-48	-39
29	-35	-28	4	5	-11	16	1	1	1	1	-8	11	7	-9	1	1	0	0	0	0	0	0	-27	-10	-49	-38
30	-36	-27	5	7	-11	16	1	1	1	1	-3	4	12	-17	1	1	0	0	0	0	0	0	-26	-9	-49	-41
31	-31	-21	6	8	-11	14	1	1	1	1	-5	6	22	-28	1	1	0	0	0	0	0	0	-17	-2	-46	-39
31	-31	-21	6	8	-11	14	1	1	0	0	-5	6	22	-28	0	0	0	0	0	0	0	0	-18	-4	-45	-38
32	-35	-32	6	8	-11	15	1	1	0	0	-5	7	18	-26	0	0	0	0	0	0	0	0	-23	-14	-49	-48
33	-34	-34	5	7	-9	13	1	1	0	0	-8	11	16	-23	0	0	0	0	0	0	0	0	-24	-17	-46	-48
34	-33	-36	5	6	-8	12	1	1	0	0	-12	18	14	-19	0	0	0	0	0	0	0	0	-23	-18	-46	-48
35	-32	-38	4	5	-7	10	1	1	0	0	-15	22	12	-15	0	0	0	0	0	0	0	0	-24	-21	-45	-48
36	-31	-40	3	5	-6	8	1	1	0	0	-16	23	10	-13	0	0	0	0	0	0	0	0	-25	-24	-42	-49
37	-30	-41	3	4	-5	7	1	1	0	0	-16	24	8	-10	0	0	0	0	0	0	0	0	-24	-26	-41	-49
38	-30	-42	2	3	-4	5	1	1	0	0	-15	21	6	-8	0	0	0	0	0	0	0	0	-26	-30	-39	-48
39	-29	-44	1	2	-2	3	1	1	0	0	-12	16	4	-5	0	0	0	0	0	0	0	0	-26	-35	-36	-48
40	-29	-44	1	1	-1	2	1	1	6	6	-6	9	2	-2	0	0	0	0	0	0	0	0	-21	-33	-40	-52
41	-25	-32	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	-21	-28	-31	-36

CONTROL TENSIONES LONGITUDINALES
COMBINACION FRECUENTE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

							0.50		0.50				0.60						0.00							
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-25	-33	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	-23	-31	-27	-35
2	-29	-45	1	1	-1	2	1	1	1	1	-7	9	2	-3	1	1	0	0	0	0	0	0	-25	-36	-37	-50
3	-30	-43	1	2	-2	3	1	1	1	1	-11	16	4	-5	1	1	0	0	0	0	0	0	-25	-28	-41	-50
4	-30	-42	2	3	-4	5	1	1	1	1	-15	21	6	-8	1	1	0	0	0	0	0	0	-22	-22	-45	-52
5	-31	-40	3	4	-5	7	1	1	1	1	-16	23	12	-11	1	1	0	0	0	0	0	0	-19	-17	-48	-53
6	-32	-39	3	5	-6	8	1	1	1	1	-17	23	9	-14	1	1	0	0	0	0	0	0	-22	-14	-50	-55
7	-32	-37	4	5	-7	10	1	1	1	1	-16	22	11	-16	1	1	0	0	0	0	0	0	-19	-12	-51	-54
8	-33	-36	5	6	-8	12	1	1	1	1	-13	18	13	-19	1	1	0	0	0	0	0	0	-18	-11	-52	-56
9	-34	-34	5	7	-9	13	1	1	1	1	-8	10	16	-23	1	1	0	0	0	0	0	0	-17	-12	-50	-57
10	-34	-33	6	8	-11	15	1	1	1	1	-5	6	18	-26	1	1	0	0	0	0	0	0	-15	-12	-51	-59
11	-29	-23	6	8	-11	14	1	1	1	1	-4	6	22	-29	1	1	0	0	0	0	0	0	-8	-2	-45	-51
11	-29	-23	6	8	-11	14	1	1	1	1	-4	6	22	-29	1	1	0	0	0	0	0	0	-8	-2	-45	-51
12	-36	-27	5	7	-11	16	1	1	1	1	-3	4	11	-17	1	1	0	0	0	0	0	0	-22	-8	-50	-46
13	-36	-27	4	5	-11	16	1	1	1	1	-8	11	7	-10	1	1	0	0	0	0	0	0	-26	-5	-52	-40
14	-34	-29	3	4	-11	15	1	1	1	1	-16	23	5	-8	1	1	0	0	0	0	0	0	-26	-2	-54	-40
15	-32	-33	2	3	-10	15	1	1	1	1	-21	29	6	-8	1	1	0	0	0	0	0	0	-24	-3	-54	-43
16	-30	-36	2	3	-10	14	1	1	1	1	-23	32	7	-10	1	1	0	0	0	0	0	0	-22	-5	-53	-47
17	-31	-36	2	3	-10	14	1	1	1	1	-22	30	8	-8	1	1	0	0	0	0	0	0	-22	-6	-53	-46
18	-32	-34	3	4	-9	13	1	1	1	1	-17	24	8	-15	1	1	0	0	0	0	0	0	-22	-7	-52	-49
19	-34	-31	4	5	-9	13	1	1	1	1	-9	13	13	-18	1	1	0	0	0	0	0	0	-20	-10	-50	-49
20	-35	-30	5	7	-9	12	1	1	1	1	-2	3	18	-25	1	1	0	0	0	0	0	0	-17	-13	-48	-54
21	-29	-25	6	8	-8	10	1	1	1	1	-2	3	27	-34	1	1	0	0	0	0	0	0	-5	-8	-42	-56
21	-29	-25	6	8	-8	10	1	1	1	1	-2	3	27	-34	1	1	0	0	0	0	0	0	-5	-8	-42	-56
22	-36	-32	5	7	-9	12	1	1	1	1	-2	3	17	-24	1	1	0	0	0	0	0	0	-19	-15	-49	-56
23	-33	-37	4	5	-9	13	1	1	1	1	-10	13	13	-18	1	1	0	0	0	0	0	0	-19	-16	-50	-55
23	-32	-28	4	5	-9	13	1	1	1	1	-10	13	13	-18	1	1	0	0	0	0	0	0	-18	-7	-49	-46
24	-32	-30	3	4	-9	13	1	1	1	1	-17	25	10	-14	1	1	0	0	0	0	0	0	-21	-2	-52	-45
25	-30	-33	2	3	-10	14	1	1	1	1	-22	31	8	-11	1	1	0	0	0	0	0	0	-21	-2	-52	-45
26	-29	-35	2	3	-10	14	1	1	1	1	-22	32	7	-10	1	1	0	0	0	0	0	0	-21	--	-51	-46
27	-30	-34	2	3	-10	15	1	1	1	1	-21	30	5	-8	1	1	0	0	0	0	0	0	-23	-3	-52	-44
28	-33	-31	3	4	-11	15	1	1	1	1	-16	23	6	-8	1	1	0	0	0	0	0	0	-24	-4	-53	-42
29	-35	-28	4	5	-11	16	1	1	1	1	-8	11	7	-9	1	1	0	0	0	0	0	0	-25	-6	-51	-41
30	-36	-27	5	7	-11	16	1	1	1	1	-3	4	12	-17	1	1	0	0	0	0	0	0	-22	-8	-50	-46
31	-31	-21	6	8	-11	14	1	1	1	1	-5	6	22	-28	1	1	0	0	0	0	0	0	-10	0	-48	-48
31	-31	-21	6	8	-11	14	1	1	0	0	-5	6	22	-28	0	0	0	0	0	0	0	0	-11	-2	-46	-46
32	-35	-32	6	8	-11	15	1	1	0	0	-5	7	18	-26	0	0	0	0	0	0	0	0	-18	-12	-50	-56
33	-34	-34	5	7	-9	13	1	1	0	0	-8	11	16	-23	0	0	0	0	0	0	0	0	-19	-13	-49	-55
34	-33	-36	5	6	-8	12	1	1	0	0	-12	18	14	-19	0	0	0	0	0	0	0	0	-19	-13	-50	-54
35	-32	-38	4	5	-7	10	1	1	0	0	-15	22	12	-15	0	0	0	0	0	0	0	0	-20	-14	-49	-53
36	-31	-40	3	5	-6	8	1	1	0	0	-16	23	10	-13	0	0	0	0	0	0	0	0	-22	-17	-47	-53
37	-30	-41	3	4	-5	7	1	1	0	0	-16	24	8	-10	0	0	0	0	0	0	0	0	-22	-19	-46	-52
38	-30	-42	2	3	-4	5	1	1	0	0	-15	21	6	-8	0	0	0	0	0	0	0	0	-24	-23	-44	-50
39	-29	-44	1	2	-2	3	1	1	0	0	-12	16	4	-5	0	0	0	0	0	0	0	0	-25	-30	-39	-50
40	-29	-44	1	1	-1	2	1	1	6	6	-6	9	2	-2	0	0	0	0	0	0	0	0	-21	-31	-40	-52
41	-25	-32	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	-21	-28	-29	-36

CONTROL TENSIONES LONGITUDINALES
COMBINACION POCO PROBABLE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.60		0.60			1.00						0.00									
	PUENTE		DESC.		GRAD		COACC		ROZAM.	SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL	SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-25	-33	0	0	0	0	1	1	1 1	0	0	0	0	1	1	0	0	0	0	0	0	-22	-30	-28	-36
2	-29	-45	1	1	-1	2	1	1	1 1	-7	9	2	-3	1	1	0	0	0	0	0	0	-23	-31	-40	-52
3	-30	-43	1	2	-2	3	1	1	1 1	-11	16	4	-5	1	1	0	0	0	0	0	0	-22	-21	-46	-53
4	-30	-42	2	3	-4	5	1	1	1 1	-15	21	6	-8	1	1	0	0	0	0	0	0	-19	-12	-52	-56
5	-31	-40	3	4	-5	7	1	1	1 1	-16	23	12	-11	1	1	0	0	0	0	0	0	-13	-6	-56	-58
6	-32	-39	3	5	-6	8	1	1	1 1	-17	23	9	-14	1	1	0	0	0	0	0	0	-17	-4	-58	-61
7	-32	-37	4	5	-7	10	1	1	1 1	-16	22	11	-16	1	1	0	0	0	0	0	0	-14	-1	-59	-61
8	-33	-36	5	6	-8	12	1	1	1 1	-13	18	13	-19	1	1	0	0	0	0	0	0	-12	-2	-58	-64
9	-34	-34	5	7	-9	13	1	1	1 1	-8	10	16	-23	1	1	0	0	0	0	0	0	-10	-7	-55	-67
10	-34	-33	6	8	-11	15	1	1	1 1	-5	6	18	-26	1	1	0	0	0	0	0	0	-7	-7	-54	-70
11	-29	-23	6	8	-11	14	1	1	1 1	-4	6	22	-29	1	1	0	0	0	0	0	0	2	2	-48	-63
11	-29	-23	6	8	-11	14	1	1	1 1	-4	6	22	-29	1	1	0	0	0	0	0	0	2	2	-48	-63
12	-36	-27	5	7	-11	16	1	1	1 1	-3	4	11	-17	1	1	0	0	0	0	0	0	-17	-4	-53	-54
13	-36	-27	4	5	-11	16	1	1	1 1	-8	11	7	-10	1	1	0	0	0	0	0	0	-22	1	-57	-45
14	-34	-29	3	4	-11	15	1	1	1 1	-16	23	5	-8	1	1	0	0	0	0	0	0	-23	10	-62	-44
15	-32	-33	2	3	-10	15	1	1	1 1	-21	29	6	-8	1	1	0	0	0	0	0	0	-21	11	-64	-47
16	-30	-36	2	3	-10	14	1	1	1 1	-23	32	7	-10	1	1	0	0	0	0	0	0	-18	10	-64	-52
17	-31	-36	2	3	-10	14	1	1	1 1	-22	30	8	-8	1	1	0	0	0	0	0	0	-18	8	-64	-50
18	-32	-34	3	4	-9	13	1	1	1 1	-17	24	8	-15	1	1	0	0	0	0	0	0	-18	4	-60	-56
19	-34	-31	4	5	-9	13	1	1	1 1	-9	13	13	-18	1	1	0	0	0	0	0	0	-14	-3	-55	-57
20	-35	-30	5	7	-9	12	1	1	1 1	-2	3	18	-25	1	1	0	0	0	0	0	0	-9	-10	-50	-65
21	-29	-25	6	8	-8	10	1	1	1 1	-2	3	27	-34	1	1	0	0	0	0	0	0	7	-5	-44	-70
21	-29	-25	6	8	-8	10	1	1	1 1	-2	3	27	-34	1	1	0	0	0	0	0	0	7	-5	-45	-70
22	-36	-32	5	7	-9	12	1	1	1 1	-2	3	17	-24	1	1	0	0	0	0	0	0	-11	-12	-51	-66
23	-33	-37	4	5	-9	13	1	1	1 1	-10	13	13	-18	1	1	0	0	0	0	0	0	-13	-9	-55	-63
23	-32	-28	4	5	-9	13	1	1	1 1	-10	13	13	-18	1	1	0	0	0	0	0	0	-12	0	-54	-54
24	-32	-30	3	4	-9	13	1	1	1 1	-17	25	10	-14	1	1	0	0	0	0	0	0	-16	9	-60	-51
25	-30	-33	2	3	-10	14	1	1	1 1	-22	31	8	-11	1	1	0	0	0	0	0	0	-17	12	-63	-50
26	-29	-35	2	3	-10	14	1	1	1 1	-22	32	7	-10	1	1	0	0	0	0	0	0	-17	11	-62	-51
27	-30	-34	2	3	-10	15	1	1	1 1	-21	30	5	-8	1	1	0	0	0	0	0	0	-20	11	-62	-48
28	-33	-31	3	4	-11	15	1	1	1 1	-16	23	6	-8	1	1	0	0	0	0	0	0	-21	8	-61	-46
29	-35	-28	4	5	-11	16	1	1	1 1	-8	11	7	-9	1	1	0	0	0	0	0	0	-21	0	-56	-45
30	-36	-27	5	7	-11	16	1	1	1 1	-3	4	12	-17	1	1	0	0	0	0	0	0	-16	-4	-53	-54
31	-31	-21	6	8	-11	14	1	1	1 1	-5	6	22	-28	1	1	0	0	0	0	0	0	0	4	-51	-60
31	-31	-21	6	8	-11	14	1	1	0 0	-5	6	22	-28	0	0	0	0	0	0	0	0	-2	2	-49	-58
32	-35	-32	6	8	-11	15	1	1	0 0	-5	7	18	-26	0	0	0	0	0	0	0	0	-10	-7	-53	-67
33	-34	-34	5	7	-9	13	1	1	0 0	-8	11	16	-23	0	0	0	0	0	0	0	0	-12	-8	-53	-65
34	-33	-36	5	6	-8	12	1	1	0 0	-12	18	14	-19	0	0	0	0	0	0	0	0	-13	-4	-55	-62
35	-32	-38	4	5	-7	10	1	1	0 0	-15	22	12	-15	0	0	0	0	0	0	0	0	-15	-4	-56	-59
36	-31	-40	3	5	-6	8	1	1	0 0	-16	23	10	-13	0	0	0	0	0	0	0	0	-17	-7	-54	-59
37	-30	-41	3	4	-5	7	1	1	0 0	-16	24	8	-10	0	0	0	0	0	0	0	0	-18	-8	-53	-56
38	-30	-42	2	3	-4	5	1	1	0 0	-15	21	6	-8	0	0	0	0	0	0	0	0	-21	-14	-50	-54
39	-29	-44	1	2	-2	3	1	1	0 0	-12	16	4	-5	0	0	0	0	0	0	0	0	-23	-24	-44	-52
40	-29	-44	1	1	-1	2	1	1	6 6	-6	9	2	-2	0	0	0	0	0	0	0	0	-20	-27	-43	-53
41	-25	-32	0	0	0	0	1	1	3 3	0	0	0	0	0	0	0	0	0	0	0	0	-21	-28	-29	-36

VIADUCTO 1
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE CONSTRUCCION

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI
1	1	0.403	0.712	1.900	0	0		0.00		0.00
	2	0.387	0.623	1.900	0	0		0.00		0.00
	3	0.387	0.623	1.900	0	0		0.00		0.00
	4	0.387	0.623	1.900	0	0		0.00		0.00
	5	0.387	0.623	1.900	0	0		0.00		0.00
	6	0.387	0.623	1.900	0	0		0.00		0.00
	7	0.387	0.623	1.900	0	0		0.00		0.00
	8	0.387	0.623	1.900	0	0		0.00		0.00
	9	0.387	0.623	1.900	0	0		0.00		0.00
	10	0.387	0.623	1.900	0	0		0.00		0.00
	11	0.403	0.712	1.900	0	0		0.00		0.00
2	11	0.403	0.712	1.900	0	0		0.00		0.00
	12	0.387	0.623	1.900	0	0		0.00		0.00
	13	0.387	0.623	1.900	0	0		0.00		0.00
	14	0.387	0.623	1.900	0	0		0.00		0.00
	15	0.387	0.623	1.900	0	0		0.00		0.00
	16	0.387	0.623	1.900	0	0		0.00		0.00
	17	0.387	0.623	1.900	0	0		0.00		0.00
	18	0.387	0.623	1.900	0	0		0.00		0.00
	19	0.387	0.623	1.900	0	0		0.00		0.00
	20	0.387	0.623	1.900	0	0		0.00		0.00
	21	0.403	0.712	1.900	0	0		0.00		0.00
3	21	0.403	0.712	1.900	0	0		0.00		0.00
	22	0.387	0.623	1.900	0	0		0.00		0.00
	23	0.387	0.623	1.900	0	0		0.00		0.00
	24	0.387	0.623	1.900	0	0		0.00		0.00
	25	0.387	0.623	1.900	0	0		0.00		0.00
	26	0.387	0.623	1.900	0	0		0.00		0.00
	27	0.387	0.623	1.900	0	0		0.00		0.00
	28	0.387	0.623	1.900	0	0		0.00		0.00
	29	0.387	0.623	1.900	0	0		0.00		0.00
	30	0.387	0.623	1.900	0	0		0.00		0.00
	31	0.403	0.712	1.900	0	0		0.00		0.00
4	31	0.403	0.712	1.900	0	0		0.00		0.00
	32	0.387	0.623	1.900	0	0		0.00		0.00
	33	0.387	0.623	1.900	0	0		0.00		0.00
	34	0.387	0.623	1.900	0	0		0.00		0.00
	35	0.387	0.623	1.900	0	0		0.00		0.00
	36	0.387	0.623	1.900	0	0		0.00		0.00
	37	0.387	0.623	1.900	0	0		0.00		0.00
	38	0.387	0.623	1.900	0	0		0.00		0.00
	39	0.387	0.623	1.900	0	0		0.00		0.00
	40	0.387	0.623	1.900	0	0		0.00		0.00
	41	0.403	0.712	1.900	0	0		0.00		0.00

VIADUCTO 1
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE SERVICIO - ESTADO INICIAL

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI	F. SUP	F. INF	HS	ACTS	HI	ACTI
1	1	0.403	0.712	1.900	0	0					0	0				
	2	0.387	0.623	1.900	0	0					0	0				
	3	0.387	0.623	1.900	0	0					0	0				
	4	0.387	0.623	1.900	0	0					0	0				
	5	0.387	0.623	1.900	0	0					0	0				
	6	0.387	0.623	1.900	0	0					0	0				
	7	0.387	0.623	1.900	0	0					0	0				
	8	0.387	0.623	1.900	0	0					0	0				
	9	0.387	0.623	1.900	0	0					0	0				
	10	0.387	0.623	1.900	0	0					0	0				
	11	0.403	0.712	1.900	0	0					0	0				
2	11	0.403	0.712	1.900	0	0					0	0				
	12	0.387	0.623	1.900	0	0					0	0				
	13	0.387	0.623	1.900	0	0					0	0				
	14	0.387	0.623	1.900	-81	5			0.110	5.52	0	0				
	15	0.387	0.623	1.900	-85	10			0.200	10.00	0	0				
	16	0.387	0.623	1.900	-85	9			0.182	9.10	0	0				
	17	0.387	0.623	1.900	-86	10			0.198	9.90	0	0				
	18	0.387	0.623	1.900	-84	7			0.146	7.31	0	0				
	19	0.387	0.623	1.900	0	0					0	0				
	20	0.387	0.623	1.900	0	0					0	0				
	21	0.403	0.712	1.900	0	0					0	0				
3	21	0.403	0.712	1.900	0	0					0	0				
	22	0.387	0.623	1.900	0	0					0	0				
	23	0.387	0.623	1.900	0	0					0	0				
	24	0.387	0.623	1.900	0	0					0	0				
	25	0.387	0.623	1.900	0	0					0	0				
	26	0.387	0.623	1.900	0	0					0	0				
	27	0.387	0.623	1.900	0	0					0	0				
	28	0.387	0.623	1.900	0	0					0	0				
	29	0.387	0.623	1.900	0	0					0	0				
	30	0.387	0.623	1.900	0	0					0	0				
	31	0.403	0.712	1.900	-69	5			0.128	6.42	0	0				
4	31	0.403	0.712	1.900	-69	4			0.104	5.21	0	0				
	32	0.387	0.623	1.900	0	0					0	0				
	33	0.387	0.623	1.900	0	0					0	0				
	34	0.387	0.623	1.900	0	0					0	0				
	35	0.387	0.623	1.900	0	0					0	0				
	36	0.387	0.623	1.900	0	0					0	0				
	37	0.387	0.623	1.900	0	0					0	0				
	38	0.387	0.623	1.900	0	0					0	0				
	39	0.387	0.623	1.900	0	0					0	0				
	40	0.387	0.623	1.900	0	0					0	0				
	41	0.403	0.712	1.900	0	0					0	0				

VIADUCTO 1
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE SERVICIO - ESTADO FINAL

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI	F. SUP	F. INF	HS	ACTS	HI	ACTI
1	1	0.403	0.712	1.900	0	0					0	0				
	2	0.387	0.623	1.900	0	0					0	0				
	3	0.387	0.623	1.900	0	0					0	0				
	4	0.387	0.623	1.900	0	0					0	0				
	5	0.387	0.623	1.900	0	0					0	0				
	6	0.387	0.623	1.900	0	0					0	0				
	7	0.387	0.623	1.900	-60	1			0.031	1.56	0	0				
	8	0.387	0.623	1.900	-60	1			0.031	1.56	0	0				
	9	0.387	0.623	1.900	0	0					0	0				
	10	0.387	0.623	1.900	0	0					0	0				
	11	0.403	0.712	1.900	-52	6			0.197	9.83	4	-66	0.109	10.63		
2	11	0.403	0.712	1.900	-52	6			0.197	9.83	4	-66	0.109	10.63		
	12	0.387	0.623	1.900	-56	1			0.033	1.67	0	0				
	13	0.387	0.623	1.900	-60	7			0.199	9.93	0	0				
	14	0.387	0.623	1.900	-66	15			0.352	17.59	0	0				
	15	0.387	0.623	1.900	-67	16			0.366	18.31	0	0				
	16	0.387	0.623	1.900	-66	14			0.333	16.63	0	0				
	17	0.387	0.623	1.900	-66	13			0.313	15.63	0	0				
	18	0.387	0.623	1.900	-64	10			0.257	12.84	0	0				
	19	0.387	0.623	1.900	-58	2			0.063	3.17	0	0				
	20	0.387	0.623	1.900	0	0					0	0				
	21	0.403	0.712	1.900	0	0					10	-75	0.224	11.18		
3	21	0.403	0.712	1.900	0	0					10	-75	0.224	11.18		
	22	0.387	0.623	1.900	0	0					0	0				
	23	0.387	0.623	1.900	-56	5			0.156	7.79	0	0				
	24	0.387	0.623	1.900	-63	14			0.345	17.27	0	0				
	25	0.387	0.623	1.900	-65	16			0.375	18.77	0	0				
	26	0.387	0.623	1.900	-65	15			0.356	17.81	0	0				
	27	0.387	0.623	1.900	-65	15			0.356	17.81	0	0				
	28	0.387	0.623	1.900	-64	13			0.321	16.04	0	0				
	29	0.387	0.623	1.900	-59	6			0.175	8.77	0	0				
	30	0.387	0.623	1.900	-57	2			0.064	3.22	0	0				
	31	0.403	0.712	1.900	-53	8			0.249	12.46	3	-64	0.085	10.63		
4	31	0.403	0.712	1.900	-53	8			0.249	12.46	3	-64	0.085	10.63		
	32	0.387	0.623	1.900	0	0					0	0				
	33	0.387	0.623	1.900	0	0					0	0				
	34	0.387	0.623	1.900	-60	1			0.031	1.56	0	0				
	35	0.387	0.623	1.900	0	0					0	0				
	36	0.387	0.623	1.900	0	0					0	0				
	37	0.387	0.623	1.900	0	0					0	0				
	38	0.387	0.623	1.900	0	0					0	0				
	39	0.387	0.623	1.900	0	0					0	0				
	40	0.387	0.623	1.900	0	0					0	0				
	41	0.403	0.712	1.900	0	0					0	0				

REACCIONES, GIROS Y DESPLAZAMIENTOS

Reacciones y giros acumulados por peso propio

Estructura completa estado inicial

Apoyo	Reaccion (t)	Giro (rad*1000)
1	356.38	-0.003766
11	1535.42	-0.004346
21	1290.11	0.008299
31	722.53	0.001161
41	189.40	0.002395

Reacciones y giros acumulados por peso propio

Estructura completa estado final

Apoyo	Reaccion (t)	Giro (rad*1000)
1	203.10	-0.002507
11	789.25	-0.001422
21	838.74	0.000681
31	722.53	0.001161
41	189.40	0.002395

Reacciones y giros debidos a cargas muertas

Apoyo	Reaccion (t)	Giro (rad*1000)
1	64.95	-0.000843
11	250.17	-0.000408
21	276.12	0.000000
31	250.17	0.000408
41	64.95	0.000843

Reacciones y giros por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

Apoyo	Reaccion (t)	Giro (rad*1000)
1	39.93	0.002534
11	-48.06	-0.000750
21	16.25	0.000000
31	-48.06	0.000750
41	39.93	-0.002534

Reacciones y giros debidos a descenso lento de apoyos

Para estado final (nulos para estado inicial)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	4.894	-4.901	0.0006712	-0.0006712
11	11.700	-11.701	0.0003133	-0.0003133
21	13.459	-13.601	0.0003354	-0.0003354
31	11.700	-11.701	0.0003133	-0.0003133
41	4.894	-4.901	0.0006712	-0.0006712

Reacciones y giros por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	221.096	-48.411	0.0047420	-0.0037751
11	534.514	-99.021	0.0030753	-0.0051225
21	599.464	-25.132	0.0048590	-0.0048590
31	534.514	-99.021	0.0051225	-0.0030753
41	221.096	-48.411	0.0037751	-0.0047420

Reacciones y giros por sobrecarga total

(+descensos lentos estructura final+temperatura)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	225.989	-53.312	0.0054132	-0.0044463
11	546.214	-110.723	0.0033886	-0.0054358
21	612.923	-38.733	0.0051944	-0.0051944
31	546.214	-110.723	0.0054358	-0.0033886
41	225.989	-53.312	0.0044463	-0.0054132

Reacciones y giros por pretensado (*coef. perdidas elasticas)

Estructura completa estado inicial

Apoyo	Reaccion (t)	Giro (rad*1000)
1	89.98	0.006361
11	-103.16	0.001885
21	19.88	-0.003130
31	-56.91	-0.002455
41	50.21	-0.003986

Reacciones y giros por pretensado (*coef. perdidas totales)

Estructura completa estado final

Apoyo	Reaccion (t)	Giro (rad*1000)
1	73.41	0.005879
11	-67.10	0.001140
21	-14.83	-0.000582
31	-59.47	-0.000954
41	68.00	-0.005820

Desplazamientos y giros acumulados por peso propio

Estructura completa estado inicial

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	-0.003766
	2	-0.000332	-0.003351
	3	-0.000593	-0.002257
	4	-0.000735	-0.000799
	5	-0.000737	0.000738
	6	-0.000606	0.002066
	7	-0.000374	0.002894
	8	-0.000099	0.002936
	9	0.000132	0.001904
	10	0.000208	-0.000487
	11	0.000000	-0.004346
2	11	0.000000	-0.004346
	12	-0.000931	-0.009121
	13	-0.002256	-0.010446
	14	-0.003561	-0.008968
	15	-0.004533	-0.005536
	16	-0.004972	-0.001007
	17	-0.004788	0.003766
	18	-0.004006	0.007926
	19	-0.002763	0.010619
	20	-0.001309	0.010990
	21	0.000000	0.008299
3	21	0.000000	0.008299
	22	0.000858	0.005147
	23	0.001445	0.004067
	24	-0.001107	-0.003334
	25	-0.001471	-0.002065
	26	-0.001629	-0.000295
	27	-0.001545	0.001545
	28	-0.001238	0.003028
	29	-0.000782	0.003728
	30	-0.000308	0.003218
	31	0.000000	0.001161
4	31	0.000000	0.001161
	32	0.000024	-0.000490
	33	-0.000069	-0.001424
	34	-0.000217	-0.001709
	35	-0.000367	-0.001489
	36	-0.000479	-0.000906
	37	-0.000526	-0.000103
	38	-0.000495	0.000773
	39	-0.000387	0.001580
	40	-0.000213	0.002173
	41	0.000000	0.002395

Desplazamientos y giros acumulados por peso propio

Estructura completa estado final

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	-0.002507
	2	-0.000222	-0.002270
	3	-0.000404	-0.001635
	4	-0.000515	-0.000775
	5	-0.000543	0.000155
	6	-0.000489	0.001001
	7	-0.000367	0.001604
	8	-0.000207	0.001809
	9	-0.000052	0.001464
	10	0.000039	0.000410
	11	0.000000	-0.001422
2	11	0.000000	-0.001422
	12	-0.000359	-0.003703
	13	-0.000903	-0.004279
	14	-0.001429	-0.003516
	15	-0.001791	-0.001872
	16	-0.001904	0.000188
	17	-0.001743	0.002204
	18	-0.001345	0.003711
	19	-0.000807	0.004247
	20	-0.000288	0.003352
	21	0.000000	0.000681
3	21	0.000000	0.000681
	22	-0.000111	-0.002027
	23	-0.000462	-0.003042
	24	-0.001107	-0.003334
	25	-0.001471	-0.002065
	26	-0.001629	-0.000295
	27	-0.001545	0.001545
	28	-0.001238	0.003028
	29	-0.000782	0.003728
	30	-0.000308	0.003218
	31	0.000000	0.001161
4	31	0.000000	0.001161
	32	0.000024	-0.000490
	33	-0.000069	-0.001424
	34	-0.000217	-0.001709
	35	-0.000367	-0.001489
	36	-0.000479	-0.000906
	37	-0.000526	-0.000103
	38	-0.000495	0.000773
	39	-0.000387	0.001580
	40	-0.000213	0.002173
	41	0.000000	0.002395

Desplazamientos y giros debidos a cargas muertas

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	-0.000843
	2	-0.000075	-0.000766
	3	-0.000136	-0.000559
	4	-0.000175	-0.000274
	5	-0.000186	0.000035
	6	-0.000169	0.000319
	7	-0.000130	0.000525
	8	-0.000077	0.000604
	9	-0.000024	0.000504
	10	0.000009	0.000173
	11	0.000000	-0.000408
2	11	0.000000	-0.000408
	12	-0.000109	-0.001136
	13	-0.000276	-0.001319
	14	-0.000438	-0.001072
	15	-0.000547	-0.000548
	16	-0.000576	0.000105
	17	-0.000520	0.000730
	18	-0.000392	0.001180
	19	-0.000224	0.001302
	20	-0.000070	0.000942
	21	0.000000	0.000000
3	21	0.000000	0.000000
	22	-0.000070	-0.000942
	23	-0.000224	-0.001302
	24	-0.000392	-0.001180
	25	-0.000520	-0.000730
	26	-0.000576	-0.000105
	27	-0.000547	0.000548
	28	-0.000438	0.001072
	29	-0.000276	0.001319
	30	-0.000109	0.001136
	31	0.000000	0.000408
4	31	0.000000	0.000408
	32	0.000009	-0.000173
	33	-0.000024	-0.000504
	34	-0.000077	-0.000604
	35	-0.000130	-0.000525
	36	-0.000169	-0.000319
	37	-0.000186	-0.000035
	38	-0.000175	0.000274
	39	-0.000136	0.000559
	40	-0.000075	0.000766
	41	0.000000	0.000843

Desplazamientos y giros por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	0.002534
	2	0.000194	0.001716
	3	0.000318	0.001009
	4	0.000382	0.000412
	5	0.000397	-0.000077
	6	0.000372	-0.000454
	7	0.000317	-0.000723
	8	0.000242	-0.000881
	9	0.000159	-0.000932
	10	0.000075	-0.000871
	11	0.000000	-0.000750
2	11	0.000000	-0.000750
	12	-0.000084	-0.000529
	13	-0.000136	-0.000279
	14	-0.000159	-0.000077
	15	-0.000159	0.000080
	16	-0.000140	0.000190
	17	-0.000110	0.000255
	18	-0.000075	0.000274
	19	-0.000040	0.000246
	20	-0.000012	0.000173
	21	0.000000	0.000000
3	21	0.000000	0.000000
	22	-0.000012	-0 000173
	23	-0.000040	-0.000246
	24	-0.000075	-0.000274
	25	-0.000110	-0.000255
	26	-0.000140	-0.000190
	27	-0.000159	-0.000080
	28	-0.000159	0.000077
	29	-0.000136	0.000279
	30	-0.000084	0.000529
	31	0.000000	0.000750
4	31	0.000000	0.000750
	32	0.000075	0.000871
	33	0.000159	0.000932
	34	0.000242	0.000881
	35	0.000317	0.000723
	36	0.000372	0.000454
	37	0.000397	0.000077
	38	0.000382	-0.000412
	39	0.000318	-0.001009
	40	0.000194	-0.001716
	41	0.000000	-0.002534

Desplazamientos y giros debidos a descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	-0.000410	0.008177	-0.008177
	2	0.000011	-0.000422	0.000665	-0.000665
	3	0.000022	-0.000432	0.000645	-0.000645
	4	0.000031	-0.000441	0.000611	-0.000611
	5	0.000038	-0.000448	0.000564	-0.000564
	6	0.000042	-0.000453	0.000504	-0.000503
	7	0.000043	-0.000454	0.000442	-0.000442
	8	0.000040	-0.000451	0.000416	-0.000416
	9	0.000032	-0.000443	0.000385	-0.000385
	10	0.000019	-0.000430	0.000350	-0.000350
	11	0.000000	-0.000410	0.000313	-0.000313
2	11	0.000000	-0.000410	0.003817	-0.003817
	12	0.000038	-0.000448	0.000331	-0.000331
	13	0.000067	-0.000478	0.000395	-0.000395
	14	0.000089	-0.000500	0.000433	-0.000433
	15	0.000103	-0.000513	0.000451	-0.000452
	16	0.000108	-0.000518	0.000471	-0.000471
	17	0.000104	-0.000515	0.000453	-0.000453
	18	0.000092	-0.000502	0.000446	-0.000446
	19	0.000070	-0.000481	0.000431	-0.000431
	20	0.000040	-0.000450	0.000393	-0.000393
	21	0.000000	-0.000410	0.000335	-0.000335
3	21	0.000000	-0.000410	0.004086	-0.004086
	22	0.000040	-0.000450	0.000393	-0.000393
	23	0.000070	-0.000481	0.000431	-0.000431
	24	0.000092	-0.000502	0.000446	-0.000446
	25	0.000104	-0.000515	0.000453	-0.000453
	26	0.000108	-0.000518	0.000471	-0.000471
	27	0.000103	-0.000513	0.000452	-0.000451
	28	0.000089	-0.000500	0.000433	-0.000433
	29	0.000067	-0.000478	0.000395	-0.000395
	30	0.000038	-0.000448	0.000331	-0.000331
	31	0.000000	-0.000410	0.000313	-0.000313
4	31	0.000000	-0.000410	0.003817	-0.003817
	32	0.000019	-0.000430	0.000350	-0.000350
	33	0.000032	-0.000443	0.000385	-0.000385
	34	0.000040	-0.000451	0.000416	-0.000416
	35	0.000043	-0.000454	0.000442	-0.000442
	36	0.000042	-0.000453	0.000503	-0.000504
	37	0.000038	-0.000448	0.000564	-0.000564
	38	0.000031	-0.000441	0.000611	-0.000611
	39	0.000022	-0.000432	0.000645	-0.000645
	40	0.000011	-0.000422	0.000665	-0.000665
	41	0.000000	-0.000410	0.000671	-0.000671

Desplazamientos y giros por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	0.000000	0.002208	-0.006309
	2	0.000533	-0.000200	0.002145	-0.005271
	3	0.000957	-0.000389	0.001946	-0.003944
	4	0.001251	-0.000553	0.001613	-0.002447
	5	0.001404	-0.000681	0.001225	-0.000960
	6	0.001415	-0.000760	0.001211	-0.000143
	7	0.001292	-0.000778	0.001997	-0.000180
	8	0.001056	-0.000723	0.003100	-0.001044
	9	0.000735	-0.000582	0.003836	-0.002040
	10	0.000368	-0.000345	0.004095	-0.003170
	11	0.000000	0.000000	0.003826	-0.004372
2	11	0.000000	0.000000	0.003826	-0.004372
	12	0.000664	-0.000451	0.003042	-0.005465
	13	0.001385	-0.000798	0.002372	-0.005297
	14	0.002016	-0.001063	0.001719	-0.004138
	15	0.002446	-0.001245	0.001381	-0.002407
	16	0.002608	-0.001336	0.000901	-0.000763
	17	0.002478	-0.001325	0.002267	-0.000979
	18	0.002071	-0.001203	0.004009	-0.001412
	19	0.001448	-0.000953	0.005318	-0.002426
	20	0.000710	-0.000556	0.005695	-0.003615
	21	0.000000	0.000000	0.004859	-0.004859
3	21	0.000000	0.000000	0.004859	-0.004859
	22	0.000710	-0.000556	0.003615	-0.005695
	23	0.001448	-0.000953	0.002426	-0.005318
	24	0.002071	-0.001203	0.001412	-0.004009
	25	0.002478	-0.001325	0.000979	-0.002267
	26	0.002608	-0.001336	0.000763	-0.000901
	27	0.002446	-0.001245	0.002407	-0.001381
	28	0.002016	-0.001063	0.004138	-0.001719
	29	0.001385	-0.000798	0.005297	-0.002372
	30	0.000664	-0.000451	0.005465	-0.003042
	31	0.000000	0.000000	0.004372	-0.003826
4	31	0.000000	0.000000	0.004372	-0.003826
	32	0.000368	-0.000345	0.003170	-0.004095
	33	0.000735	-0.000582	0.002040	-0.003836
	34	0.001056	-0.000723	0.001044	-0.003100
	35	0.001292	-0.000778	0.000180	-0.001997
	36	0.001415	-0.000760	0.000143	-0.001211
	37	0.001404	-0.000681	0.000960	-0.001225
	38	0.001251	-0.000553	0.002447	-0.001613
	39	0.000957	-0.000389	0.003944	-0.001946
	40	0.000533	-0.000200	0.005271	-0.002145
	41	0.000000	0.000000	0.006309	-0.002208

Desplazamientos y giros por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	-0.000410	0.002879	-0.006981
	2	0.000544	-0.000622	0.002810	-0.005936
	3	0.000979	-0.000821	0.002591	-0.004589
	4	0.001282	-0.000994	0.002224	-0.003058
	5	0.001442	-0.001129	0.001789	-0.001524
	6	0.001457	-0.001212	0.001715	-0.000646
	7	0.001336	-0.001231	0.002439	-0.000622
	8	0.001097	-0.001173	0.003515	-0.001459
	9	0.000768	-0.001025	0.004221	-0.002425
	10	0.000387	-0.000774	0.004445	-0.003520
	11	0.000000	-0.000410	0.004139	-0.004685
2	11	0.000000	-0.000410	0.004139	-0.004685
	12	0.000701	-0.000899	0.003373	-0.005795
	13	0.001453	-0.001276	0.002767	-0.005693
	14	0.002105	-0.001563	0.002152	-0.004571
	15	0.002549	-0.001759	0.001832	-0.002858
	16	0.002716	-0.001854	0.001372	-0.001234
	17	0.002582	-0.001840	0.002720	-0.001432
	18	0.002163	-0.001705	0.004455	-0.001858
	19	0.001518	-0.001433	0.005749	-0.002857
	20	0.000750	-0.001006	0.006088	-0.004008
	21	0.000000	-0.000410	0.005194	-0.005194
3	21	0.000000	-0.000410	0.005194	-0.005194
	22	0.000750	-0.001006	0.004008	-0.006088
	23	0.001518	-0.001433	0.002857	-0.005749
	24	0.002163	-0.001705	0.001858	-0.004455
	25	0.002582	-0.001840	0.001432	-0.002720
	26	0.002716	-0.001854	0.001234	-0.001372
	27	0.002549	-0.001759	0.002858	-0.001832
	28	0.002105	-0.001563	0.004571	-0.002152
	29	0.001453	-0.001276	0.005693	-0.002767
	30	0.000701	-0.000899	0.005795	-0.003373
	31	0.000000	-0.000410	0.004685	-0.004139
4	31	0.000000	-0.000410	0.004685	-0.004139
	32	0.000387	-0.000774	0.003520	-0.004445
	33	0.000768	-0.001025	0.002425	-0.004221
	34	0.001097	-0.001173	0.001459	-0.003515
	35	0.001336	-0.001231	0.000622	-0.002439
	36	0.001457	-0.001212	0.000646	-0.001715
	37	0.001442	-0.001129	0.001524	-0.001789
	38	0.001282	-0.000994	0.003058	-0.002224
	39	0.000979	-0.000821	0.004589	-0.002591
	40	0.000544	-0.000622	0.005936	-0.002810
	41	0.000000	-0.000410	0.006981	-0.002879

Desplazamientos y giros por pretensado (*coef. perdidas elasticas)

Estructura completa estado inicial

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	0.006361
	2	0.000542	0.005391
	3	0.000958	0.003622
	4	0.001198	0.001596
	5	0.001251	-0.000425
	6	0.001129	-0.002176
	7	0.000868	-0.003398
	8	0.000530	-0.003830
	9	0.000198	-0.003223
	10	-0.000021	-0.001322
	11	0.000000	0.001885
2	11	0.000000	0.001885
	12	0.000563	0.006306
	13	0.001535	0.007987
	14	0.002557	0.007153
	15	0.003336	0.004407
	16	0.003667	0.000473
	17	0.003454	-0.003636
	18	0.002749	-0.006836
	19	0.001733	-0.008219
	20	0.000695	-0.007072
	21	0.000000	-0.003130
3	21	0.000000	-0.003130
	22	-0.000128	0.000866
	23	0.000088	0.001892
	24	0.002681	0.006469
	25	0.003366	0.003682
	26	0.003608	-0.000114
	27	0.003334	-0.003970
	28	0.002605	-0.006867
	29	0.001604	-0.007956
	30	0.000617	-0.006566
	31	0.000000	-0.002455
4	31	0.000000	-0.002455
	32	-0.000083	0.000558
	33	0.000061	0.002367
	34	0.000314	0.002994
	35	0.000582	0.002696
	36	0.000788	0.001717
	37	0.000884	0.000317
	38	0.000842	-0.001237
	39	0.000660	-0.002689
	40	0.000360	-0.003771
	41	0.000000	-0.003986

Desplazamientos y giros por pretensado (*coef. perdidas totales)

Estructura completa estado final

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	0.005879
	2	0.000503	0.005014
	3	0.000892	0.003432
	4	0.001124	0.001605
	5	0.001186	-0.000235
	6	0.001088	-0.001855
	7	0.000860	-0.003022
	8	0.000555	-0.003506
	9	0.000244	-0.003091
	10	0.000022	-0.001547
	11	0.000000	0.001140
2	11	0.000000	0.001140
	12	0.000415	0.004871
	13	0.001176	0.006277
	14	0.001976	0.005560
	15	0.002571	0.003253
	16	0.002792	-0.000004
	17	0.002569	-0.003312
	18	0.001960	-0.005716
	19	0.001138	-0.006410
	20	0.000374	-0.004764
	21	0.000000	-0.000582
3	21	0.000000	-0.000582
	22	0.000222	0.003656
	23	0.000839	0.005226
	24	0.001698	0.005271
	25	0.002278	0.003300
	26	0.002525	0.000349
	27	0.002365	-0.002738
	28	0.001838	-0.005063
	29	0.001097	-0.005872
	30	0.000383	-0.004573
	31	0.000000	-0.000954
4	31	0.000000	-0.000954
	32	0.000036	0.001656
	33	0.000265	0.003134
	34	0.000576	0.003501
	35	0.000880	0.002981
	36	0.001103	0.001794
	37	0.001195	0.000168
	38	0.001127	-0.001662
	39	0.000891	-0.003466
	40	0.000500	-0.005008
	41	0.000000	-0.005820

COMPROBACION A ROTURA

```
LAV MADRID - ZARAGOZA. LOSA VANOS 16+23+23+16
5100.  1.15  19000.  1.10  400.  1.5  1.5  1.5
2
   -4  6.414  0.025
   -4  2.814  0.025
2
5  1  11 21  31 41                    1
8  2 -10 12 -20 22 -30 32 -40        2
1
0.6425
2
5  1  11 21  31  41                      1  1
8  2 -10 12 -20  22 -30  32 -40          1  1
2
5    0
1    9   3.100  0.000
2    8   4.050  1.200
3    7   7.000  1.500
4    6   7.000  1.760
5    0   0.000  1.900
5    2
1    9   3.100  0.000
     8   4.050  1.200
     7   7.000  1.500
     6   7.000  1.760
5    0   0.000  1.900
1    3   1.200  2.100   0.900
2    0   1.200  0.000   0.900
2
5   1   11  21   31  41                      1
8   2  -10  12  -20  22  -30  32  -40        2
1
3
7   1
1   3  4  5  6  7  9
3  -1
1   3   2
3  -1
9   8   7
1
2   1   -41 1
1
    7  -0.025   2
    9
1   2   2   7     1.12  0. 0.
2   3   2   15    1.12  0. 0.
4   5   1   35    2.02  0. 0.
5   6   1   35    2.02  0. 0.
7   8   2   15    1.12  0. 0.
8   9   2   7     1.12  0. 0.
9   1   1   30    2.02  0. 0.
1
2   1  -41  1  1
8
823   668   439  264  -264  -439  -668  -823
4
2   1  -11  2  1  8
2  11  -21  2  2  7
2  21  -31  2  3  6
2  31  -41  2  4  5
```


Calculo de Comprobacion a Rotura

Datos generales

Limite elastico del acero pasivo	=	5100.00	kg/cm2
Coeficiente del acero pasivo	=	1.15	
Limite elastico de acero activo	=	19000.00	kg/cm2
Coeficiente del acero activo	=	1.10	
Resistencia caracteristica del hormigon	=	400.00	kg/cm2
Coeficiente del hormigon	=	1.50	
Coef. mayoracion Cargas muertas y Peso propio	=	1.50	
Coef. mayoracion Sobrecargas	=	1.50	

Calculo de Comprobacion a Rotura

Tipo de seccion 1

Definicion de puntos

Pt	X	Y	Pt	X	Y	Pt	X	Y
1	3.100	0.0000	2	4.050	1.2000	3	7.000	1.5000
4	7.000	1.7600	5	0.000	1.9000	6	-7.000	1.7600
7	-7.000	1.5000	8	-4.050	1.2000	9	-3.100	0.0000

Tipo de seccion 2

Definicion de puntos

Pt	X	Y	Pt	X	Y	Pt	X	Y
1	3.100	0.0000	2	4.050	1.2000	3	7.000	1.5000
4	7.000	1.7600	5	0.000	1.9000	6	-7.000	1.7600
7	-7.000	1.5000	8	-4.050	1.2000	9	-3.100	0.0000

Definicion de inclusiones circulares

In	X	Y	D	In	X	Y	D
1	2.100	0.900	1.200	2	0.000	0.900	1.200
3	-2.100	0.900	1.200				

Calculo de Comprobacion a Rotura

Definicion de circuitos

Tipo de circuito 1

Circuito 1 : Numero de vertices 7 (Clave 1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	1	2	3	3	4	4	5	5	6	6	7
7	9										

Circuito 2 : Numero de vertices 3 (Clave -1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	1	2	3	3	2						

Circuito 3 : Numero de vertices 3 (Clave -1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	9	2	8	3	7						

Calculo de Comprobacion a Rotura

Definicion de armaduras pasivas

Tipo de armadura 1

Pi	Pf	Nr	A.(cm2)	Pi	Pf	Nr	A.(cm2)	Pi	Pf	Nr	A.(cm2)
1	2	7	1.12	2	3	15	1.12	4	5	35	2.02
5	6	35	2.02	7	8	15	1.12	8	9	7	1.12
9	1	30	2.02								

Definicion de axiles de calculo

Axil	Axil	Axil	Axil
0.00	823.00	668.00	439.00
264.00	-264.00	-439.00	-668.00
-823.00			

Calculo de Comprobacion a Rotura

Datos secciones/secc.-circuitos-armaduras

V.	Sec	T. Seccion	T. Circuito	T. Arm. 1	T. Arm. 2	T. Arm. 3
1	1	1	1	1		
	2	2	1	1		
	3	2	1	1		
	4	2	1	1		
	5	2	1	1		
	6	2	1	1		
	7	2	1	1		
	8	2	1	1		
	9	2	1	1		
	10	2	1	1		
	11	1	1	1		
2	11	1	1	1		
	12	2	1	1		
	13	2	1	1		
	14	2	1	1		
	15	2	1	1		
	16	2	1	1		
	17	2	1	1		
	18	2	1	1		
	19	2	1	1		
	20	2	1	1		
	21	1	1	1		
3	21	1	1	1		
	22	2	1	1		
	23AI	2	1	1		
	23AD	2	1	1		
	24	2	1	1		
	25	2	1	1		
	26	2	1	1		
	27	2	1	1		
	28	2	1	1		
	29	2	1	1		
	30	2	1	1		
	31	1	1	1		
4	31	1	1	1		
	32	2	1	1		
	33	2	1	1		
	34	2	1	1		
	35	2	1	1		
	36	2	1	1		
	37	2	1	1		
	38	2	1	1		
	39	2	1	1		
	40	2	1	1		
	41	1	1	1		

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento P. propio (m x t)	Momento C.muertas (m x t)	Momento Sobre.(+) (m x t)	Momento Sobre.(-) (m x t)	Momento Hip. Pret .(m x t)
1	1	0.00	0.00	0.00	0.00	0.00
	2	273.74	89.07	471.65	-165.96	117.08
	3	450.79	148.37	799.07	-319.02	234.53
	4	537.07	177.93	998.01	-459.18	351.98
	5	532.56	177.74	1084.21	-586.43	469.43
	6	437.28	147.81	1073.42	-700.78	586.88
	7	251.22	88.13	1082.24	-879.64	704.33
	8	-25.61	-1.30	985.71	-1071.42	821.78
	9	-393.23	-120.48	768.10	-1276.09	939.23
	10	-851.62	-269.40	623.31	-1533.17	1056.68
	11	-1153.46	-367.07	653.76	-1897.99	1174.50
2	11	-1153.46	-367.07	653.76	-1897.99	1174.50
	12	-568.87	-181.64	473.67	-1055.92	1188.63
	13	69.20	23.32	714.59	-636.10	1203.13
	14	519.68	166.81	1117.79	-495.77	1217.64
	15	782.59	248.83	1322.31	-451.56	1232.14
	16	857.91	269.39	1357.21	-489.20	1246.64
	17	745.64	228.47	1359.53	-593 40	1261.14
	18	445.80	126.08	1187.28	-787.86	1275.64
	19	-41.63	-37.78	793.25	-1016.72	1290.14
	20	-716.65	-263.11	421.54	-1422.18	1304.63
	21	-1325.56	-461.11	490.10	-2208.57	1319.51
3	21	-1325.56	-461.11	490.10	-2208.57	1319.51
	22	-748.88	-263.11	421.54	-1422.18	1299.53
	23AI	-106.10	-37.78	793.25	-1016.72	1279.92
	23AD	-106.10	-37.78	793.25	-1016.72	1279.92
	24	356.20	126.08	1187.28	-787.86	1260.42
	25	645.16	228.47	1359.53	-593.40	1240.92
	26	760.76	269.39	1357.21	-489.20	1221.41
	27	703.01	248.83	1322.31	-451.56	1201.90
	28	471.91	166.81	1117.79	-495.77	1182.40
	29	67.45	23.32	714.59	-636.10	1162.89
	30	-510.36	-181.64	473.67	-1055.92	1143.41
	31	-1041.20	-367.07	653.76	-1897.99	1124.12
4	31	-1041.20	-367.07	653.76	-1897.99	1123.19
	32	-762.53	-269.40	623.31	-1533.17	1014.29
	33	-341.63	-120.48	768.10	-1276.09	905.56
	34	-4.62	-1.30	985.71	-1071.42	796.83
	35	248.49	88.13	1082.24	-879.64	688.10
	36	417.71	147.81	1073.42	-700.78	579.38
	37	503.05	177.74	1084.21	-586.43	470.64
	38	504.49	177.93	998.01	-459.18	361.91
	39	422.04	148.37	799.07	-319.02	253.18
	40	255.70	89.07	471.65	-165.96	144.45
	41	0.00	0.00	0.00	0.00	35.72

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
1	1	0.	0.	0.	5535.	-6796.	-	-
		823.			5062.	-6363.	-	-
		-823.			5990.	-7210.	-	-
	2	0.	1380.	424.	6322.	-6029.	4.6	-
		823.			5890.	-5550.	4.3	-
		-823.			6736.	-6471.	4.9	-
	3	0.	2355.	678.	6854.	-5583.	2.9	-
		823.			6412.	-5074.	2.7	-
		-823.			7278.	-6042.	3.1	-
	4	0.	2957.	771.	7142.	-5327.	2.4	-
		823.			6699.	-4802.	2.3	-
		-823.			7566.	-5793.	2.6	-
	5	0.	3208.	702.	7238.	-5237.	2.3	-
		823.			6795.	-4713.	2.1	-
		-823.			7662.	-5713.	2.4	-
	6	0.	3133.	355.	7138.	-5324.	2.3	-
		823.			6695.	-4802.	2.1	-
		-823.			7562.	-5792.	2.4	-
	7	0.	2907.	-177.	6837.	-5593.	2.4	-
		823.			6393.	-5082.	2.2	-
		-823.			7261.	-6045.	2.5	-
	8	0.	2342.	-908.	6226.	-6055.	2.7	6.7
		823.			5792.	-5575.	2.5	6.1
		-823.			6641.	-6500.	2.8	7.2
	9	0.	1415.	-1839.	5408.	-6751.	3.8	3.7
		823.			4967.	-6320.	3.5	3.4
		-823.			5831.	-7150.	4.1	3.9
	10	0.	204.	-3030.	4504.	-7721.	-	2.5
		823.			4054.	-7359.	-	2.4
		-823.			4931.	-8043.	-	2.7
	11	0.	-243.	-4071.	4061.	-8432.	-	2.1
		668.			3666.	-8067.	-	2.0
		-668.			4449.	-8706.	-	2.1
2	11	0.	-243.	-4071.	4061.	-8432.	-	2.1
		668.			3666.	-8067.	-	2.0
		-668.			4449.	-8706.	-	2.1
	12	0.	655.	-1640.	4929.	-7139.	7.5	4.4
		668.			4567.	-6814.	7.0	4.2
		-668.			5279.	-7449.	8.1	4.5
	13	0.	2534.	267.	6732.	-5554.	2.7	-
		668.			6382.	-5161.	2.5	-
		-668.			7069.	-5921.	2.8	-
	14	0.	4046.	1625.	8121.	-4521.	2.0	-
		668.			7762.	-4038.	1.9	-
		-668.			8467.	-4984.	2.1	-
	15	0.	4886.	2225.	8989.	-4079.	1.8	-
		668.			8630.	-3529.	1.8	-
		-668.			9335.	-4589.	1.9	-
	16	0.	5098.	2328.	9304.	-3966.	1.8	-
		668.			8946.	-3399.	1.8	-
		-668.			9651.	-4492.	1.9	-

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
	17	0.	4888.	1958.	8989.	-4072.	1.8	-
		668.			8631.	-3527.	1.8	-
		-668.			9336.	-4579.	1.9	-
	18	0.	4042.	824.	8122.	-4534.	2.0	-
		668.			7763.	-4055.	1.9	-
		-668.			8468.	-4992.	2.1	-
	19	0.	2490.	-483.	6787.	-5601.	2.7	-
		668.			6438.	-5191.	2.6	-
		-668.			7124.	-5966.	2.9	-
	20	0.	337.	-2429.	4957.	-7194.	-	3.0
		668.			4598.	-6870.	-	2.8
		-668.			5307.	-7500.	-	3.1
	21	0.	-757.	-4805.	4088.	-8488.	-	1.8
		439.			3830.	-8221.	-	1.7
		-439.			4342.	-8693.	-	1.8
3	21	0.	-757.	-4805.	4088.	-8488.	-	1.8
		439.			3830.	-8221.	-	1.7
		-439.			4342.	-8693.	-	1.8
	22	0.	284.	-2482.	4995.	-7253.	-	2.9
		439.			4760.	-7043.	-	2.8
		-439.			5225.	-7456.	-	3.0
	23AI	0.	2382.	-589.	4155.	-3568.	1.7	6.1
		439.			3891.	-3209.	1.6	5.4
		-439.			4415.	-3916.	1.9	6.6
	23AD	0.	2382.	-589.	6663.	-5512.	2.8	9.4
		439.			6434.	-5260.	2.7	8.9
		-439.			6888.	-5759.	2.9	9.8
	24	0.	3891.	676.	8122.	-4515.	2.1	-
		439.			7887.	-4197.	2.0	-
		-439.			8351.	-4826.	2.1	-
	25	0.	4715.	1785.	8989.	-4090.	1.9	-
		439.			8755.	-3728.	1.9	-
		-439.			9218.	-4436.	2.0	-
	26	0.	4925.	2155.	9304.	-3984.	1.9	-
		439.			9070.	-3611.	1.8	-
		-439.			9533.	-4345.	1.9	-
	27	0.	4733.	2073.	8989.	-4084.	1.9	-
		439.			8754.	-3724.	1.8	-
		-439.			9218.	-4425.	1.9	-
	28	0.	3935.	1515.	8121.	-4521.	2.1	-
		439.			7886.	-4205.	2.0	-
		-439.			8350.	-4828.	2.1	-
	29	0.	2487.	229.	6732.	-5554.	2.7	-
		439.			6504.	-5304.	2.6	-
		-439.			6955.	-5797.	2.8	-
	30	0.	702.	-1593.	4929.	-7139.	7.0	4.5
		439.			4693.	-6927.	6.7	4.3
		-439.			5160.	-7345.	7.4	4.6
	31	0.	-120.	-3948.	4061.	-8432.	-	2.1
		264.			3905.	-8317.	-	2.1
		-264.			4216.	-8541.	-	2.2

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
4	31	0.	-121.	-3949.	4061.	-8432.	-	2.1
		264.			3905.	-8317.	-	2.1
		-264.			4216.	-8541.	-	2.2
	32	0.	300.	-2935.	4504.	-7720.	-	2.6
		264.			4361.	-7606.	-	2.6
		-264.			4643.	-7833.	-	2.7
	33	0.	1455.	-1792.	5408.	-6750.	3.7	3.8
		264.			5268.	-6615.	3.6	3.7
		-264.			5545.	-6883.	3.8	3.8
	34	0.	2346.	-899.	6226.	-6055.	2.7	6.7
		264.			6089.	-5904.	2.6	6.6
		-264.			6361.	-6202.	2.7	6.9
	35	0.	2885.	-195.	6837.	-5593.	2.4	-
		264.			6697.	-5433.	2.3	-
		-264.			6975.	-5748.	2.4	-
	36	0.	3096.	319.	7138.	-5324.	2.3	-
		264.			6998.	-5165.	2.3	-
		-264.			7276.	-5477.	2.4	-
	37	0.	3165.	659.	7238.	-5237.	2.3	-
		264.			7098.	-5078.	2.2	-
		-264.			7376.	-5393.	2.3	-
	38	0.	2919.	733.	7142.	-5327.	2.4	-
		264.			7002.	-5164.	2.4	-
		-264.			7280.	-5480.	2.5	-
	39	0.	2333.	656.	6854.	-5583.	2.9	-
		264.			6714.	-5424.	2.9	-
		-264.			6992.	-5739.	3.0	-
	40	0.	1384.	427.	6322.	-6029.	4.6	-
		264.			6186.	-5879.	4.5	-
		-264.			6457.	-6175.	4.7	-
	41	0.	32.	32.	5535.	-6796.	-	-
		264.			5385.	-6659.	-	-
		-264.			5683.	-6932.	-	-

COMPROBACION A CORTANTE

Calculo de Comprobacion a Cortante

Datos generales

Limite elastico del acero pasivo	=	5100.00	kg/cm2
Coeficiente del acero pasivo	=	1.15	
Limite elastico de acero activo	=	19000.00	kg/cm2
Coeficiente del acero activo	=	1.10	
Resistencia caracteristica del hormigon	=	400.00	kg/cm2
Coeficiente del hormigon	=	1.50	
Coef. mayoracion Cargas muertas y Peso propio	=	1.50	
Coef. mayoracion Sobrecargas	=	1.50	

Calculo de Comprobacion a Cortante

Datos secciones/anchos-recubrimientos

V.	Sec	Ancho Seccion m	Ancho Eficaz m	Recubrimiento m
1	1	6.854	6.414	0.025
	2	3.254	2.814	0.025
	3	3.254	2.814	0.025
	4	3.254	2.814	0.025
	5	3.254	2.814	0.025
	6	3.254	2.814	0.025
	7	3.254	2.814	0.025
	8	3.254	2.814	0.025
	9	3.254	2.814	0.025
	10	3.254	2.814	0.025
	11	6.854	6.414	0.025
2	11	6.854	6.414	0.025
	12	3.254	2.814	0.025
	13	3.254	2.814	0.025
	14	3.254	2.814	0.025
	15	3.254	2.814	0.025
	16	3.254	2.814	0.025
	17	3.254	2.814	0.025
	18	3.254	2.814	0.025
	19	3.254	2.814	0.025
	20	3.254	2.814	0.025
	21	6.854	6.414	0.025
3	21	6.854	6.414	0.025
	22	3.254	2.814	0.025
	23AI	3.254	2.814	0.025
	23AD	3.254	2.814	0.025
	24	3.254	2.814	0.025
	25	3.254	2.814	0.025
	26	3.254	2.814	0.025
	27	3.254	2.814	0.025
	28	3.254	2.814	0.025
	29	3.254	2.814	0.025
	30	3.254	2.814	0.025
	31	6.854	6.414	0.025
4	31	6.854	6.414	0.025
	32	3.254	2.814	0.025
	33	3.254	2.814	0.025
	34	3.254	2.814	0.025
	35	3.254	2.814	0.025
	36	3.254	2.814	0.025
	37	3.254	2.814	0.025
	38	3.254	2.814	0.025
	39	3.254	2.814	0.025
	40	3.254	2.814	0.025
	41	6.854	6.414	0.025

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-200.90	158.9	-4659.9	1447.32	-25.	-33.	AB AB	87.0
	2	-423.63	100.9	-4643.3	-1198.32	-28.	-46.	AB AB	41.3
	3	-490.34	68.7	-4624.1	-1000.43	-26.	-48.	AB AB	41.3
	4	-594.10	99.8	-4602.7	-924.31	-24.	-50.	AB AB	41.3
	5	-737.29	132.3	-4579.1	-969.26	-21.	-54.	AB AB	41.3
	6	126.77	199.5	-4552.4	-1134.95	-37.	-31.	AB AB	41.3
	7	74.96	322.1	-4523.3	-1421.14	-36.	-33.	AB AB	41.3
	8	-537.00	463.2	-4491.8	1356.97	-24.	-48.	AB AB	41.3
	9	-1416.14	615.5	-4458.0	816.47	-8.	-71.	AB AB	41.3
	10	-2593.47	755.8	-4426.8	167.22	14.	-101.	AB AB	41.3
	11	-985.55	761.4	-4398.2	-516.79	-9.	-49.	AB AB	87.0
2	11	-984.56	-228.7	-4379.4	-517.54	-9.	-49.	AB AB	87.0
	12	1465.19	-56.4	-4239.5	-2699.50	-59.	6.	AB AB	41.3
	13	1520.52	18.9	-4218.1	-1843.63	-60.	7.	AB AB	41.3
	14	1401.51	87.7	-4200.8	-1164.10	-58.	4.	AB AB	41.3
	15	1125.50	134.3	-4232.0	-699.19	-53.	-3.	AB AB	41.3
	16	780.40	148.8	-4267.0	-518.29	-47.	-12.	AB AB	41.3
	17	2302.30	268.2	-4292.4	-688.55	-75.	27.	AB C	41.3
	18	1529.52	448.0	-4305.3	-1180.31	-61.	7.	AB AB	41.3
	19	263.82	669.8	-4310.6	-1928.17	-38.	-26.	AB AB	41.3
	20	-1614.77	913.3	-4325.0	193.25	-3.	-75.	AB AB	44.5
	21	-1721.35	1166.3	-4461.1	-697.56	3.	-66.	AB AB	87.0
3	21	-1721.00	-250.1	-4457.2	-695.63	3.	-66.	AB AB	87.0
	22	133.53	-54.4	-4511.1	227.10	-37.	-31.	AB AB	41.3
	23AI	180.50	22.0	-4548.3	-1946.75	-38.	-30.	AB AB	41.3
	23AD	339.99	-70.4	-4010.2	-1883.85	-37.	-22.	AB AB	41.3
	24	395.18	4.6	-4049.7	-1225.19	-38.	-21.	AB AB	41.3
	25	302.00	51.5	-4094.0	-761.04	-37.	-23.	AB AB	41.3
	26	1693.53	77.3	-4138.6	-564.16	-63.	12.	AB AB	41.3
	27	1770.42	207.7	-4174.2	-696.86	-65.	14.	AB AB	41.3
	28	1153.22	384.7	-4198.2	-1131.30	-53.	-2.	AB AB	41.3
	29	53.10	602.1	-4215.0	1179.32	-33.	-31.	AB AB	41.3
	30	-1645.52	838.9	-4239.9	340.31	-2.	-75.	AB AB	41.3
	31	-903.93	1078.7	-4379.5	-473.80	-11.	-47.	AB AB	87.0
	31	-904.34	3.4	-4377.6	-471.68	-11.	-47.	AB AB	87.0
	32	1347.46	-6.3	-4420.1	-2921.40	-59.	1.	AB AB	41.3
	33	1352.89	3.6	-4453.1	-2308.74	-59.	1.	AB AB	41.3
	34	1299.60	35.3	-4486.5	-1799.90	-58.	-1.	AB AB	41.3
	35	1194.99	65.7	-4517.7	-1404.18	-57.	-4.	AB AB	41.3
	36	1043.20	94.9	-4546.4	-1125.69	-54.	-8.	AB AB	41.3
	37	2108.86	150.4	-4572.6	-967.70	-74.	20.	AB AB	41.3
	38	1839.29	275.3	-4595.9	-930.44	-69.	12.	AB AB	41.3
	39	1352.14	408.8	-4616.9	-1014.25	-60.	0.	AB AB	41.3
	40	626.20	488.8	-4638.2	-1220.24	-47.	-19.	AB AB	41.3
	1	-168.75	444.2	-4662.8	-1419.43	-25.	-32.	AB AB	87.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-200.90	-463.0	-4673.4	1447.32	-25.	-33.	AB AB	87.0
	2	628.63	-506.9	-4645.0	-1198.32	-47.	-19.	AB AB	41.3
	3	1378.48	-420.5	-4624.1	-1000.43	-61.	0.	AB AB	41.3
	4	1879.21	-280.5	-4602.7	-924.31	-70.	13.	AB AB	41.3
	5	2152.05	-149.2	-4579.1	-969.26	-75.	21.	AB AB	41.3
	6	1079.31	-87.3	-4552.4	-1134.95	-55.	-7.	AB AB	41.3
	7	1213.71	-51.6	-4523.3	-1421.14	-57.	-3.	AB AB	41.3
	8	1290.58	-14.7	-4491.8	-1824.55	-58.	-1.	AB AB	41.3
	9	1305.82	23.5	-4458.0	-2341.09	-58.	0.	AB AB	41.3
	10	1252.00	39.8	-4425.2	-2961.42	-57.	-1.	AB AB	41.3
	11	-1026.54	30.8	-4382.7	-516.79	-8.	-50.	AB AB	87.0
2	11	-1025.55	-1125.1	-4391.7	-517.54	-8.	-50.	AB AB	87.0
	12	-1691.86	-882.0	-4240.4	298.90	-1.	-76.	AB AB	41.8
	13	91.96	-634.8	-4218.1	1144.01	-34.	-30.	AB AB	41.3
	14	1256.62	-408.1	-4200.8	-1164.10	-55.	0.	AB AB	41.3
	15	1868.21	-217.9	-4232.0	-699.19	-67.	16.	AB AB	41.3
	16	1740.30	-82.1	-4267.0	-518.29	-65.	12.	AB AB	41.3
	17	298.23	-61.0	-4292.4	-688.55	-38.	-25.	AB AB	41.3
	18	379.05	-23.5	-4305.3	-1180.31	-40	-23.	AB AB	41.3
	19	356.86	41.8	-4310.6	-1928.17	-39.	-24.	AB AB	41.3
	20	160.50	114.7	-4324.1	193.25	-36.	-29.	AB AB	41.3
	21	-1721.35	297.4	-4449.1	-697.56	4.	-66.	AB AB	87.0
3	21	-1721.00	-1118.9	-4469.3	-695.63	3.	-66.	AB AB	87.0
	22	-1641.73	-853.0	-4512.1	227.10	-4.	-77.	AB AB	41.3
	23AI	87.46	-605.9	-4548.3	-1946.75	-36.	-32.	AB AB	41.3
	23AD	246.95	-698.4	-4010.2	-1883.85	-35.	-24.	AB AB	41.3
	24	1545.65	-466.9	-4049.7	-1225.19	-59.	9.	AB AB	41.3
	25	2306.07	-277.7	-4094.0	-761.04	-74.	28.	AB C	41.3
	26	733.63	-153.6	-4138.6	-564.16	-45.	-13.	AB AB	41.3
	27	1027.71	-144.5	-4174.2	-696.86	-51.	-5.	AB AB	41.3
	28	1298.11	-111.1	-4198.2	-1131.30	-56.	2.	AB AB	41.3
	29	1481.66	-51.6	-4215.0	-1806.10	-60.	6.	AB AB	41.3
	30	1511.53	13.3	-4239.0	-2658.06	-60.	7.	AB AB	41.3
	31	-862.94	182.3	-4367.1	-473.80	-11.	-46.	AB AB	87.0
4	31	-863.35	-727.3	-4393.0	-471.68	-11.	-46.	AB AB	87.0
	32	-2498.00	-722.3	-4421.8	204.07	12.	-98.	AB AB	41.3
	33	-1369.07	-588.4	-4453.1	845.34	-9.	-69.	AB AB	41.3
	34	-527.98	-442.6	-4486.5	1377.88	-24.	-48.	AB AB	41.3
	35	56.24	-308.0	-4517.7	-1404.18	-36.	-33.	AB AB	41.3
	36	90.66	-191.8	-4546.4	-1125.69	-36.	-32.	AB AB	41.3
	37	-780.47	-131.0	-4572.6	-967.70	-20.	-55.	AB AB	41.3
	38	-634.02	-105.1	-4595.9	-930.44	-23.	-51.	AB AB	41.3
	39	-516.69	-80.3	-4616.9	-1014.25	-26.	-49.	AB AB	41.3
	40	-426.06	-118.9	-4636.5	-1220.24	-28.	-46.	AB AB	41.3
	41	-168.76	-177.6	-4649.3	1412.46	-25.	-32.	AB AB	87.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-245.55	340.9	-5690.5	1768.94	-30.	-40.	AB AB	87.0
	2	-801.07	261.7	-5672.4	-1464.61	-28.	-64.	AB AB	41.3
	3	-1052.18	153.4	-5651.7	-1222.74	-24.	-70.	AB AB	41.3
	4	-1240.39	122.6	-5625.5	-1129.71	-20.	-75.	AB AB	41.3
	5	-1368.60	93.2	-5596.6	-1184.65	-17.	-78.	AB AB	41.3
	6	-390.15	98.2	-5564.1	-1387.16	-35.	-53.	AB AB	41.3
	7	-228.25	158.8	-5528.5	-1736.95	-38.	-48.	AB AB	41.3
	8	-527.91	238.1	-5490.0	1658.52	-32.	-56.	AB AB	41.3
	9	-997.09	329.0	-5448.7	997.91	-23.	-67.	AB AB	41.3
	10	-1668.42	403.0	-5404.7	204.39	-10.	-84.	AB AB	41.3
	11	301.54	398.3	-5361.4	-631.63	-38.	-26.	AB AB	87.0
2	11	302.75	120.4	-5344.7	-632.55	-38.	-26.	AB AB	87.0
	12	2126.62	289.3	-5177.5	-3299.39	-79.	15.	AB AB	41.3
	13	1487.33	281.3	-5155.4	-2253.32	-67.	-1.	AB AB	41.3
	14	862.52	265.4	-5134.3	-1422.80	-55.	-17.	AB AB	41.3
	15	273.36	222.4	-5172.5	-854.57	-45.	-32.	AB AB	41.3
	16	-172.67	140.1	-5215.3	-633.46	-37.	-44.	AB AB	41.3
	17	1476.65	161.5	-5246.2	-841.56	-67.	-2.	AB AB	41.3
	18	1053.30	249.1	-5262.1	-1442.60	-60.	-13.	AB AB	41.3
	19	344.08	385.0	-5268.6	-2356.66	-47.	-31.	AB AB	41.3
	20	-786.80	544.1	-5281.6	236.19	-26.	-61.	AB AB	41.3
	21	-230.29	795.8	-5441.4	-852.57	-29.	-38.	AB AB	87.0
3	21	-229.86	117.9	-5439.5	-850.21	-29.	-38.	AB AB	87.0
	22	985.59	315.1	-5509.4	277.56	-60.	-17.	AB AB	41.3
	23AI	281.73	308.0	-5559.1	-2379.36	-48.	-35.	AB AB	41.3
	23AD	476.67	195.0	-4901.4	-2302.48	-46.	-25.	AB AB	41.3
	24	6.16	192.0	-4949.7	-1497.46	-38.	-38.	AB AB	41.3
	25	-429.03	154.5	-5003.7	-930.16	-30.	-49.	AB AB	41.3
	26	820.73	89.2	-5058.3	-689.52	-54.	-17.	AB AB	41.3
	27	970.83	127.4	-5101.8	-851.71	-57.	-14.	AB AB	41.3
	28	635.84	217.6	-5131.1	-1382.69	-51.	-23.	AB AB	41.3
	29	12.90	354.0	-5151.6	1441.40	-40.	-39.	AB AB	41.3
	30	-1028.41	511.0	-5178.1	415.93	-21.	-66.	AB AB	41.3
	31	305.62	749.1	-5342.6	-579.09	-38.	-25.	AB AB	87.0
4	31	305.12	349.7	-5340.2	-576.50	-38.	-25.	AB AB	87.0
	32	2210.58	330.0	-5397.2	-3570.60	-82.	16.	AB AB	41.3
	33	1734.26	276.3	-5442.6	-2821.79	-74.	3.	AB AB	41.3
	34	1291.11	249.1	-5483.5	-2199.87	-66.	-8.	AB AB	41.3
	35	890.18	220.3	-5521.6	-1716.22	-59.	-19.	AB AB	41.3
	36	536.51	190.1	-5556.7	-1375.84	-52.	-29.	AB AB	41.3
	37	1495.50	185.9	-5588.8	-1182.74	-70.	-4.	AB AB	41.3
	38	1214.53	251.6	-5617.2	-1137.20	-65.	-11.	AB AB	41.3
	39	811.28	325.7	-5642.9	-1239.64	-58.	-22.	AB AB	41.3
	40	265.06	332.2	-5666.0	-1491.41	-48.	-36.	AB AB	41.3
	41	-206.26	266.8	-5691.3	-1734.86	-31.	-39.	AB AB	87.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-245.55	-280.9	-5703.9	1768.94	-30.	-40.	AB AB	87.0
	2	251.19	-346.0	-5674.1	-1464.61	-48.	-37.	AB AB	41.3
	3	816.64	-335.7	-5651.7	-1222.74	-58.	-22.	AB AB	41.3
	4	1232.92	-257.8	-5625.5	-1129.71	-66.	-11.	AB AB	41.3
	5	1520.73	-188.2	-5596.6	-1184.65	-71.	-3.	AB AB	41.3
	6	562.39	-188.5	-5564.1	-1387.16	-53.	-28.	AB AB	41.3
	7	910.50	-214.8	-5528.5	-1736.95	-59.	-19.	AB AB	41.3
	8	1299.68	-239.8	-5490.0	-2230.01	-66.	-8.	AB AB	41.3
	9	1724.87	-263.1	-5448.7	-2861.33	-73.	3.	AB AB	41.3
	10	2177.04	-313.0	-5403.1	-3619.52	-81.	15.	AB AB	41.3
	11	260.55	-332.3	-5345.9	-631.63	-37.	-27.	AB AB	87.0
2	11	261.76	-776.0	-5357.1	-632.55	-37.	-27.	AB AB	87.0
	12	-1030.44	-536.3	-5178.5	365.32	-20.	-66.	AB AB	41.3
	13	58.77	-372.4	-5155.4	1398.24	-40.	-38.	AB AB	41.3
	14	717.62	-230.4	-5134.3	-1422.80	-52.	-21.	AB AB	41.3
	15	1016.08	-129.8	-5172.5	-854.57	-58.	-13.	AB AB	41.3
	16	787.23	-90.8	-5215.3	-633.46	-54.	-19.	AB AB	41.3
	17	-527.42	-167.7	-5246.2	-841.56	-30.	-54.	AB AB	41.3
	18	-97.17	-222.4	-5262.1	-1442.60	-38.	-43.	AB AB	41.3
	19	437.12	-243.0	-5268.6	-2356.66	-48.	-29.	AB AB	41.3
	20	988.46	-254.5	-5280.7	236.19	-59.	-15.	AB AB	41.3
	21	-230.29	-73.1	-5429.3	-852.57	-29.	-38.	AB AB	87.0
3	21	-229.86	-751.0	-5451.5	-850.21	-29.	-38.	AB AB	87.0
	22	-789.67	-483.5	-5510.4	277.56	-27.	-62.	AB AB	41.3
	23AI	188.69	-320.0	-5559.1	-2379.36	-46.	-38.	AB AB	41.3
	23AD	383.63	-433.0	-4901.4	-2302.48	-44.	-27.	AB AB	41.3
	24	1156.63	-279.5	-4949.7	-1497.46	-59.	-8.	AB AB	41.3
	25	1575.04	-174.7	-5003.7	-930.16	-67.	3.	AB AB	41.3
	26	-139.17	-141.7	-5058.3	-689.52	-36.	-42.	AB AB	41.3
	27	228.11	-224.8	-5101.8	-851.71	-43.	-33.	AB AB	41.3
	28	780.73	-278.2	-5131.1	-1382.69	-54.	-19.	AB AB	41.3
	29	1441.46	-299.6	-5151.6	-2207.45	-66.	-2.	AB AB	41.3
	30	2128.65	-314.6	-5177.2	-3248.74	-79.	16.	AB AB	41.3
	31	346.60	-147.3	-5330.3	-579.09	-38.	-24.	AB AB	87.0
4	31	346.11	-380.9	-5355.7	-576.50	-39.	-25.	AB AB	87.0
	32	-1634.89	-386.0	-5398.9	249.41	-11.	-83.	AB AB	41.3
	33	-987.70	-315.8	-5442.6	1033.19	-23.	-67.	AB AB	41.3
	34	-536.48	-228.8	-5483.5	1684.07	-32.	-56.	AB AB	41.3
	35	-248.57	-153.4	-5521.6	-1716.22	-38.	-49.	AB AB	41.3
	36	-416.03	-96.7	-5556.7	-1375.84	-35.	-53.	AB AB	41.3
	37	-1393.84	-95.5	-5588.8	-1182.74	-17.	-79.	AB AB	41.3
	38	-1258.78	-128.7	-5617.2	-1137.20	-20.	-75.	AB AB	41.3
	39	-1057.55	-163.4	-5642.9	-1239.64	-24.	-70.	AB AB	41.3
	40	-787.20	-275.5	-5664.3	-1491.41	-29.	-64.	AB AB	41.3
	41	-206.26	-355.0	-5677.8	1726.34	-31.	-39.	AB AB	87.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-200.90	-462.8	-4673.4	1447.32	-25.	-33.	AB AB	87.0
	2	628.63	-506.7	-4652.7	-1198.32	-47.	-19.	AB AB	41.3
	3	1378.48	-420.5	-4624.1	-1000.43	-61.	0.	AB AB	41.3
	4	1879.21	-280.5	-4602.7	-924.31	-70.	13.	AB AB	41.3
	5	2152.05	-149.2	-4579.1	-969.26	-75.	21.	AB AB	41.3
	6	2220.57	-29.7	-4552.4	-1134.95	-76.	23.	AB AB	41.3
	7	2259.25	94.6	-4523.3	-1421.14	-76.	24.	AB AB	41.3
	8	2077.34	229.8	-4491.8	-1824.55	-73.	19.	AB AB	41.3
	9	1647.11	376.2	-4458.0	-2341.09	-64.	9.	AB AB	41.3
	10	1252.00	39.8	-4425.2	-2961.42	-57.	-1.	AB AB	41.3
	11	1319.05	30.8	-4382.7	-516.79	-50.	3.	AB AB	87.0
2	11	1320.04	-228.7	-4379.4	-517.54	-50.	3.	AB AB	87.0
	12	1465.19	-56.4	-4238.2	-2699.50	-59.	6.	AB AB	41.3
	13	2213.49	-414.3	-4218.1	-1843.63	-73.	25.	AB C	41.3
	14	3008.84	-288.9	-4200.8	-1164.10	-88.	46.	AB C	41.3
	15	3327.16	-100.5	-4232.0	-699.19	-94.	54.	AB C	41.3
	16	3299.93	12.8	-4267.0	-518.29	-93.	53.	AB C	41.3
	17	3205.39	148.5	-4292.4	-688.55	-92.	50.	AB C	41.3
	18	2802.03	293.2	-4305.3	-1180.31	-85.	40.	AB C	41.3
	19	1951.72	497.7	-4310.6	-1928.17	-69.	18.	AB AB	41.3
	20	949.38	162.8	-4324.2	193.25	-51.	-8.	AB AB	41.3
	21	627.70	346.3	-4449.8	-697.56	-38.	-13.	AB AB	87.0
3	21	628.06	-284.5	-4457.5	-695.63	-38.	-13.	AB AB	87.0
	22	922.42	-102.5	-4511.0	227.10	-51.	-11.	AB AB	41.3
	23AI	1775.35	-433.8	-4548.3	-1946.75	-67.	11.	AB AB	41.3
	23AD	1934.84	-526.3	-4010.2	-1883.85	-66.	19.	AB AB	41.3
	24	2818.16	-312.1	-4049.7	-1225.19	-83.	42.	AB C	41.3
	25	3209.16	-158.0	-4094.0	-761.04	-90.	52.	AB C	41.3
	26	3253.16	-17.7	-4138.6	-564.16	-92.	53.	AB C	41.3
	27	3229.37	90.3	-4174.2	-696.86	-91.	52.	AB C	41.3
	28	2905.45	265.5	-4198.2	-1131.30	-86.	43.	AB C	41.3
	29	2174.62	381.7	-4215.0	-1806.10	-72.	24.	AB AB	41.3
	30	1511.53	13.3	-4239.0	-2658.06	-60.	7.	AB AB	41.3
	31	1441.66	182.3	-4367.1	-473.80	-52.	6.	AB AB	87.0
4	31	1441.25	3.3	-4377.6	-471.68	-52.	6.	AB AB	87.0
	32	1347.46	-6.3	-4419.5	-2921.40	-59.	1.	AB AB	41.3
	33	1694.18	-349.1	-4453.1	-2308.74	-65.	10.	AB AB	41.3
	34	2086.36	-209.2	-4486.5	-1799.90	-73.	20.	AB AB	41.3
	35	2240.54	-80.4	-4517.7	-1404.18	-76.	23.	AB AB	41.3
	36	2184.46	37.4	-4546.4	-1125.69	-75.	22.	AB AB	41.3
	37	2108.86	150.4	-4572.6	-967.70	-74.	20.	AB AB	41.3
	38	1839.29	275.3	-4595.9	-930.44	-69.	12.	AB AB	41.3
	39	1352.14	408.8	-4616.9	-1014.25	-60.	0.	AB AB	41.3
	40	626.20	488.8	-4638.2	-1220.24	-47.	-19.	AB AB	41.3
	41	-168.75	444.2	-4652.7	-1419.43	-25.	-32.	AB AB	87.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-200.90	158.8	-4659.9	1447.32	-25.	-33.	AB AB	87.0
	2	-423.63	100.8	-4641.0	-1198.32	-28.	-46.	AB AB	41.3
	3	-490.34	68.7	-4624.1	-1000.43	-26.	-48.	AB AB	41.3
	4	-594.10	99.8	-4602.7	-924.31	-24.	-50.	AB AB	41.3
	5	-737.29	132.3	-4579.1	-969.26	-21.	-54.	AB AB	41.3
	6	-919.94	162.6	-4552.4	2089.52	-18.	-59.	AB AB	41.3
	7	-1258.63	206.0	-4523.3	1782.71	-11.	-67.	AB AB	41.3
	8	-1679.25	250.4	-4491.8	1356.97	-3.	-78.	AB AB	41.3
	9	-2185.93	296.2	-4458.0	816.47	6.	-91.	AB AB	41.3
	10	-2845.31	700.2	-4426.8	167.22	19.	-107.	AB AB	41.3
	11	-3441.35	703.8	-4397.0	-516.79	34.	-105.	C AB	87.0
2	11	-3440.36	-1073.7	-4391.7	-517.54	34.	-104.	C AB	87.0
	12	-1759.61	-798.8	-4248.4	298.90	0.	-78.	AB AB	41.3
	13	-714.93	-224.3	-4218.1	1144.01	-19.	-51.	AB AB	41.3
	14	-285.84	-79.2	-4200.8	-1164.10	-27.	-39.	AB AB	41.3
	15	-179.97	-18.2	-4232.0	-699.19	-29.	-37.	AB AB	41.3
	16	-287.99	58.5	-4267.0	-518.29	-27.	-40.	AB AB	41.3
	17	-514.26	85.2	-4292.4	-688.55	-23.	-46.	AB AB	41.3
	18	-922.92	187.0	-4305.3	1869.14	-16.	-57.	AB AB	41.3
	19	-1497.45	272.8	-4310.6	1125.02	-5.	-72.	AB AB	41.3
	20	-2522.38	825.2	-4324.9	193.25	14.	-98.	AB AB	41.3
	21	-4107.15	1107.1	-4460.9	-697.56	46.	-120.	C AB	87.0
3	21	-4106.80	-1059.7	-4469.0	-695.63	46.	-120.	C AB	87.0
	22	-2549.34	-764.8	-4520.2	227.10	13.	-100.	AB AB	41.3
	23AI	-1673.82	-208.9	-4548.3	1274.81	-4.	-78.	AB AB	41.3
	23AD	-1514.32	-301.4	-4010.2	956.55	-3.	-70.	AB AB	41.3
	24	-906.79	-206.0	-4049.7	1643.21	-14.	-54.	AB AB	41.3
	25	-510.50	-94.7	-4094.0	-761.04	-22.	-44.	AB AB	41.3
	26	-334.76	-63.3	-4138.6	-564.16	-25.	-40.	AB AB	41.3
	27	-277.76	8.0	-4174.2	-696.86	-27.	-39.	AB AB	41.3
	28	-389.24	55.8	-4198.2	-1131.30	-25.	-42.	AB AB	41.3
	29	-753.79	191.6	-4215.0	1179.32	-18.	-52.	AB AB	41.3
	30	-1713.27	755.9	-4239.9	340.31	-1.	-77.	AB AB	41.3
	31	-3318.75	1027.3	-4379.5	-473.80	32.	-102.	C AB	87.0
4	31	-3319.15	-669.4	-4391.8	-471.68	32.	-102.	C AB	87.0
	32	-2749.84	-666.6	-4432.1	204.07	17.	-105.	AB AB	41.3
	33	-2138.86	-269.2	-4453.1	845.34	6.	-89.	AB AB	41.3
	34	-1670.24	-229.8	-4486.5	1377.88	-3.	-77.	AB AB	41.3
	35	-1277.35	-191.8	-4517.7	1795.65	-11.	-67.	AB AB	41.3
	36	-956.05	-155.0	-4546.4	2094.49	-17.	-59.	AB AB	41.3
	37	-780.47	-131.0	-4572.6	-967.70	-20.	-55.	AB AB	41.3
	38	-634.02	-105.1	-4595.9	-930.44	-23.	-51.	AB AB	41.3
	39	-516.69	-80.3	-4616.9	-1014.25	-26.	-49.	AB AB	41.3
	40	-426.06	-118.9	-4636.5	-1220.24	-28.	-46.	AB AB	41.3
	41	-168.76	-177.6	-4659.4	1412.46	-25.	-32.	AB AB	87.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-245.55	-280.8	-5703.9	1768.94	-30.	-40.	AB AB	87.0
	2	251.19	-345.9	-5681.8	-1464.61	-48.	-37.	AB AB	41.3
	3	816.64	-335.7	-5651.7	-1222.74	-58.	-22.	AB AB	41.3
	4	1232.92	-257.8	-5625.5	-1129.71	-66.	-11.	AB AB	41.3
	5	1520.73	-188.2	-5596.6	-1184.65	-71.	-3.	AB AB	41.3
	6	1703.65	-130.9	-5564.1	-1387.16	-74.	2.	AB AB	41.3
	7	1956.04	-68.7	-5528.5	-1736.95	-78.	8.	AB AB	41.3
	8	2086.43	4.7	-5490.0	-2230.01	-80.	12.	AB AB	41.3
	9	2066.17	89.7	-5448.7	-2861.33	-80.	12.	AB AB	41.3
	10	2177.04	-313.0	-5403.1	-3619.52	-81.	15.	AB AB	41.3
	11	2606.14	-332.3	-5345.9	-631.63	-79.	27.	AB C	87.0
2	11	2607.35	120.4	-5344.7	-632.55	-79.	27.	AB C	87.0
	12	2126.62	289.3	-5176.2	-3299.39	-79.	16.	AB AB	41.3
	13	2180.30	-151.9	-5155.4	-2253.32	-80.	17.	AB AB	41.3
	14	2469.85	-111.2	-5134.3	-1422.80	-85.	25.	AB C	41.3
	15	2475.03	-12.4	-5172.5	-854.57	-85.	25.	AB C	41.3
	16	2346.86	4.1	-5215.3	-633.46	-83.	21.	AB AB	41.3
	17	2379.74	41.8	-5246.2	-841.56	-84.	22.	AB AB	41.3
	18	2325.81	94.3	-5262.1	-1442.60	-83.	20.	AB AB	41.3
	19	2031.97	212.8	-5268.6	-2356.66	-78.	12.	AB AB	41.3
	20	1777.35	-206.3	-5280.8	236.19	-73.	6.	AB AB	41.3
	21	2118.76	-24.3	-5430.0	-852.57	-70.	15.	AB AB	87.0
3	21	2119.19	83.5	-5439.7	-850.21	-71.	15.	AB AB	87.0
	22	1774.48	266.9	-5509.3	277.56	-75.	4.	AB AB	41.3
	23AI	1876.59	-147.9	-5559.1	-2379.36	-77.	6.	AB AB	41.3
	23AD	2071.52	-260.9	-4901.4	-2302.48	-76.	16.	AB AB	41.3
	24	2429.15	-124.8	-4949.7	-1497.16	-83.	25.	AB C	41.3
	25	2478.13	-55.0	-5003.7	-930.16	-84.	26.	AB C	41.3
	26	2380.36	-5.8	-5058.3	-689.52	-83.	23.	AB AB	41.3
	27	2429.78	10.0	-5101.8	-851.71	-84.	24.	AB AB	41.3
	28	2388.07	98.4	-5131.1	-1382.69	-83.	23.	AB AB	41.3
	29	2134.43	133.6	-5151.6	-2207.45	-79.	16.	AB AB	41.3
	30	2128.65	-314.6	-5177.2	-3248.74	-79.	16.	AB AB	41.3
	31	2651.20	-147.3	-5330.3	-579.09	-79.	28.	AB C	87.0
4	31	2650.71	349.7	-5340.2	-576.50	-79.	28.	AB C	87.0
	32	2210.58	330.0	-5396.6	-3570.60	-82.	16.	AB AB	41.3
	33	2075.55	-76.5	-5442.6	-2821.79	-80.	12.	AB AB	41.3
	34	2077.86	4.6	-5483.5	-2199.87	-80.	12.	AB AB	41.3
	35	1935.72	74.2	-5521.6	-1716.22	-78.	8.	AB AB	41.3
	36	1677.77	132.5	-5556.7	-1375.84	-73.	1.	AB AB	41.3
	37	1495.50	185.9	-5588.8	-1182.74	-70.	-4.	AB AB	41.3
	38	1214.53	251.6	-5617.2	-1137.20	-65.	-11.	AB AB	41.3
	39	811.28	325.7	-5642.9	-1239.64	-58.	-22.	AB AB	41.3
	40	265.06	332.2	-5666.0	-1491.41	-48.	-36.	AB AB	41.3
	41	-206.26	266.8	-5681.2	-1734.86	-31.	-39.	AB AB	87.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-245.55	340.9	-5690.5	1768.94	-30.	-40.	AB AB	87.0
	2	-801.07	261.7	-5670.1	-1464.61	-28.	-64.	AB AB	41.3
	3	-1052.18	153.4	-5651.7	-1222.74	-24.	-70.	AB AB	41.3
	4	-1240.39	122.6	-5625.5	-1129.71	-20.	-75.	AB AB	41.3
	5	-1368.60	93.2	-5596.6	-1184.65	-17.	-78.	AB AB	41.3
	6	-1436.87	61.4	-5564.1	2553.85	-16.	-80.	AB AB	41.3
	7	-1561.84	42.7	-5528.5	2178.87	-13.	-83.	AB AB	41.3
	8	-1670.16	25.4	-5490.0	1658.52	-11.	-85.	AB AB	41.3
	9	-1766.88	9.7	-5448.7	997.91	-9.	-87.	AB AB	41.3
	10	-1920.26	347.5	-5404.7	204.39	-6.	-91.	AB AB	41.3
	11	-2154.26	340.6	-5360.2	-631.63	6.	-81.	AB AB	87.0
2	11	-2153.05	-724.5	-5357.1	-632.55	6.	-81.	AB AB	87.0
	12	-1098.18	-453.2	-5186.4	365.32	-19.	-68.	AB AB	41.3
	13	-748.12	38.1	-5155.4	1398.24	-26.	-59.	AB AB	41.3
	14	-824.83	98.5	-5134.3	-1422.80	-24.	-60.	AB AB	41.3
	15	-1032.10	69.9	-5172.5	-854.57	-20.	-66.	AB AB	41.3
	16	-1241.06	49.7	-5215.3	-633.46	-17.	-72.	AB AB	41.3
	17	-1339.91	-21.5	-5246.2	-841.56	-15.	-75.	AB AB	41.3
	18	-1399.14	-11.8	-5262.1	2284.50	-14.	-76.	AB AB	41.3
	19	-1417.19	-12.1	-5268.6	1375.03	-14.	-77.	AB AB	41.3
	20	-1694.41	456.0	-5281.5	236.19	-9.	-84.	AB AB	41.3
	21	-2616.10	736.6	-5441.1	-852.57	13.	-92.	AB AB	87.0
3	21	-2615.67	-691.7	-5451.3	-850.21	13.	-92.	AB AB	87.0
	22	-1697.28	-395.3	-5518.5	277.56	-11.	-86.	AB AB	41.3
	23AI	-1572.58	77.0	-5559.1	1558.10	-13.	-83.	AB AB	41.3
	23AD	-1377.64	-36.0	-4901.4	1169.12	-12.	-73.	AB AB	41.3
	24	-1295.81	-18.6	-4949.7	2008.36	-14.	-71.	AB AB	41.3
	25	-1241.53	8.3	-5003.7	-930.16	-15.	-70.	AB AB	41.3
	26	-1207.56	-51.4	-5058.3	-689.52	-16.	-70.	AB AB	41.3
	27	-1077.35	-72.3	-5101.8	-851.71	-19.	-67.	AB AB	41.3
	28	-906.61	-111.3	-5131.1	-1382.69	-22.	-63.	AB AB	41.3
	29	-793.98	-56.5	-5151.6	1441.40	-25.	-60.	AB AB	41.3
	30	-1096.15	428.0	-5178.1	415.93	-19.	-68.	AB AB	41.3
	31	-2109.20	697.7	-5342.6	-579.09	5.	-80.	AB AB	87.0
4	31	-2109.69	-323.0	-5354.5	-576.50	5.	-80.	AB AB	87.0
	32	-1886.73	-330.3	-5409.2	249.41	-6.	-90.	AB AB	41.3
	33	-1757.49	3.5	-5442.6	1033.19	-9.	-87.	AB AB	41.3
	34	-1678.73	-16.0	-5483.5	1684.07	-11.	-85.	AB AB	41.3
	35	-1582.16	-37.2	-5521.6	2194.68	-13.	-83.	AB AB	41.3
	36	-1462.74	-59.8	-5556.7	2559.94	-15.	-80.	AB AB	41.3
	37	-1393.84	-95.5	-5588.8	-1182.74	-17.	-79.	AB AB	41.3
	38	-1258.78	-128.7	-5617.2	-1137.20	-20.	-75.	AB AB	41.3
	39	-1057.55	-163.4	-5642.9	-1239.64	-24.	-70.	AB AB	41.3
	40	-787.20	-275.5	-5664.3	-1491.41	-29.	-64.	AB AB	41.3
	41	-206.26	-355.0	-5687.9	1726.34	-31.	-39.	AB AB	87.0

COMPROBACION A RASANTE

Calculo de Comprobacion a Rasante

Datos generales

Limite elastico del acero pasivo	=	5100.00	kg/cm2
Coeficiente del acero pasivo	=	1.15	
Limite elastico de acero activo	=	19000.00	kg/cm2
Coeficiente del acero activo	=	1.10	
Resistencia caracteristica del hormigon	=	400.00	kg/cm2
Coeficiente del hormigon	=	1.50	
Coef. mayoracion Cargas muertas y Peso propio .	=	1.50	
Coef. mayoracion Sobrecargas	=	1.50	

Calculo de Comprobacion a Rasante

Datos secciones/momentos estaticos

V.	Sec	M.Estatico m3	M.Estatico m3	M.Estatico m3
1	1	0.642		
	2	0.642		
	3	0.642		
	4	0.642		
	5	0.642		
	6	0.642		
	7	0.642		
	8	0.642		
	9	0.642		
	10	0.642		
	11	0.642		
2	11	0.642		
	12	0.642		
	13	0.642		
	14	0.642		
	15	0.642		
	16	0.642		
	17	0.642		
	18	0.642		
	19	0.642		
	20	0.642		
	21	0.642		
3	21	0.642		
	22	0.642		
	23AI	0.642		
	23AD	0.642		
	24	0.642		
	25	0.642		
	26	0.642		
	27	0.642		
	28	0.642		
	29	0.642		
	30	0.642		
	31	0.642		
4	31	0.642		
	32	0.642		
	33	0.642		
	34	0.642		
	35	0.642		
	36	0.642		
	37	0.642		
	38	0.642		
	39	0.642		
	40	0.642		
	41	0.642		

Calculo de Comprobacion a Rasante

Datos secciones/momentos estaticos

V.	Sec	M.Estatico m3	M.Estatico m3	M.Estatico m3
1	1	0.642		
	2	0.642		
	3	0.642		
	4	0.642		
	5	0.642		
	6	0.642		
	7	0.642		
	8	0.642		
	9	0.642		
	10	0.642		
	11	0.642		
2	11	0.642		
	12	0.642		
	13	0.642		
	14	0.642		
	15	0.642		
	16	0.642		
	17	0.642		
	18	0.642		
	19	0.642		
	20	0.642		
	21	0.642		
3	21	0.642		
	22	0.642		
	23AI	0.642		
	23AD	0.642		
	24	0.642		
	25	0.642		
	26	0.642		
	27	0.642		
	28	0.642		
	29	0.642		
	30	0.642		
	31	0.642		
4	31	0.642		
	32	0.642		
	33	0.642		
	34	0.642		
	35	0.642		
	36	0.642		
	37	0.642		
	38	0.642		
	39	0.642		
	40	0.642		
	41	0.642		

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	158.9	1.355	5.2				
	2	100.9	0.945	3.6				
	3	68.7	0.643	2.5				
	4	99.8	0.936	3.6				
	5	132.3	1.240	4.7				
	6	199.5	1.870	7.1				
	7	322.1	3.019	11.5				
	8	463.2	4.341	16.5				
	9	615.5	5.768	22.0				
	10	755.8	7.083	27.0				
	11	761.4	6.497	24.7				
2	11	228.7	1.952	7.4				
	12	56.4	0.528	2.0				
	13	18.9	0.177	0.7				
	14	87.7	0.822	3.1				
	15	134.3	1.259	4.8				
	16	148.8	1.395	5.3				
	17	268.2	2.513	9.6				
	18	448.0	4.198	16.0				
	19	669.8	6.277	23.9				
	20	913.3	8.559	32.6				
	21	1166.3	9.951	37.9				
3	21	250.1	2.134	8.1				
	22	54.4	0.510	1.9				
	23AI	22.0	0.206	0.8				
	23AD	70.4	0.660	2.5				
	24	4.6	0.043	0.2				
	25	51.5	0.482	1.8				
	26	77.3	0.724	2.8				
	27	207.7	1.947	7.4				
	28	384.7	3.606	13.7				
	29	602.1	5.643	21.5				
	30	838.9	7.862	29.9				
	31	1078.7	9.204	35.1				
4	31	3.4	0.029	0.1				
	32	6.3	0.059	0.2				
	33	3.6	0.034	0.1				
	34	35.3	0.331	1.3				
	35	65.7	0.616	2.3				
	36	94.9	0.890	3.4				
	37	150.4	1.409	5.4				
	38	275.3	2.580	9.8				
	39	408.8	3.831	14.6				
	40	488.8	4.581	17.5				
	41	444.2	3.790	14.4				

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	463.0	3.950	15.0				
	2	506.9	4.750	18.1				
	3	420.5	3.941	15.0				
	4	280.5	2.629	10.0				
	5	149.2	1.398	5.3				
	6	87.3	0.818	3.1				
	7	51.6	0.483	1.8				
	8	14.7	0.138	0.5				
	9	23.5	0.220	0.8				
	10	39.8	0.373	1.4				
	11	30.8	0.263	1.0				
2	11	1125.1	9.600	36.6				
	12	882.0	8.266	31.5				
	13	634.8	5.949	22.7				
	14	408.1	3.825	14.6				
	15	217.9	2.042	7.8				
	16	82.1	0.769	2.9				
	17	61.0	0.572	2.2				
	18	23.5	0.221	0.8				
	19	41.8	0.392	1.5				
	20	114.7	1.075	4.1				
	21	297.4	2.538	9.7				
3	21	1118.9	9.547	36.4				
	22	853.0	7.994	30.5				
	23AI	605.9	5.679	21.6				
	23AD	698.4	6.545	24.9				
	24	466.9	4.375	16.7				
	25	277.7	2.602	9.9				
	26	153.6	1.440	5.5				
	27	144.5	1.354	5.2				
	28	111.1	1.041	4.0				
	29	51.6	0.483	1.8				
	30	13.3	0.125	0.5				
	31	182.3	1.556	5.9				
4	31	727.3	6.205	23.6				
	32	722.3	6.769	25.8				
	33	588.4	5.515	21.0				
	34	442.6	4.148	15.8				
	35	308.0	2.886	11.0				
	36	191.8	1.797	6.8				
	37	131.0	1.228	4.7				
	38	105.1	0.985	3.8				
	39	80.3	0.753	2.9				
	40	118.9	1.114	4.2				
	41	177.6	1.515	5.8				

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	340.9	2.909	11.1				
	2	261.7	2.453	9.3				
	3	153.4	1.438	5.5				
	4	122.6	1.149	4.4				
	5	93.2	0.874	3.3				
	6	98.2	0.921	3.5				
	7	158.8	1.488	5.7				
	8	238.1	2.232	8.5				
	9	329.0	3.083	11.7				
	10	403.0	3.776	14.4				
	11	398.3	3.398	12.9				
2	11	120.4	1.027	3.9				
	12	289.3	2.711	10.3				
	13	281.3	2.636	10.0				
	14	265.4	2.488	9.5				
	15	222.4	2.084	7.9				
	16	140.1	1.313	5.0				
	17	161.5	1.514	5.8				
	18	249.1	2.334	8.9				
	19	385.0	3.608	13.7				
	20	544.1	5.099	19.4				
	21	795.8	6.790	25.9				
3	21	117.9	1.006	3.8				
	22	315.1	2.953	11.2				
	23AI	308.0	2.886	11.0				
	23AD	195.0	1.827	7.0				
	24	192.0	1.799	6.9				
	25	154.5	1.448	5.5				
	26	89.2	0.836	3.2				
	27	127.4	1.194	4.5				
	28	217.6	2.040	7.8				
	29	354.0	3.318	12.6				
	30	511.0	4.789	18.2				
	31	749.1	6.391	24.3				
4	31	349.7	2.984	11.4				
	32	330.0	3.093	11.8				
	33	276.3	2.589	9.9				
	34	249.1	2.335	8.9				
	35	220.3	2.065	7.9				
	36	190.1	1.781	6.8				
	37	185.9	1.742	6.6				
	38	251.6	2.358	9.0				
	39	325.7	3.052	11.6				
	40	332.2	3.114	11.9				
	41	266.8	2.276	8.7				

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	280.9	2.397	9.1				
	2	346.0	3.243	12.4				
	3	335.7	3.146	12.0				
	4	257.8	2.416	9.2				
	5	188.2	1.764	6.7				
	6	188.5	1.767	6.7				
	7	214.8	2.013	7.7				
	8	239.8	2.247	8.6				
	9	263.1	2.465	9.4				
	10	313.0	2.933	11.2				
	11	332.3	2.835	10.8				
2	11	776.0	6.621	25.2				
	12	536.3	5.026	19.1				
	13	372.4	3.490	13.3				
	14	230.4	2.159	8.2				
	15	129.8	1.217	4.6				
	16	90.8	0.851	3.2				
	17	167.7	1.571	6.0				
	18	222.4	2.084	7.9				
	19	243.0	2.278	8.7				
	20	254.5	2.385	9.1				
	21	73.1	0.624	2.4				
3	21	751.0	6.407	24.4				
	22	483.5	4.531	17.3				
	23AI	320.0	2.999	11.4				
	23AD	433.0	4.058	15.5				
	24	279.5	2.620	10.0				
	25	171.7	1.637	6.2				
	26	141.7	1.328	5.1				
	27	224.8	2.107	8.0				
	28	278.2	2.607	9.9				
	29	299.6	2.808	10.7				
	30	314.6	2.948	11.2				
	31	147.3	1.257	4.8				
4	31	380.9	3.250	12.4				
	32	386.0	3.617	13.8				
	33	315.8	2.959	11.3				
	34	228.8	2.144	8.2				
	35	153.4	1.437	5.5				
	36	96.7	0.906	3.5				
	37	95.5	0.895	3.4				
	38	128.7	1.206	4.6				
	39	163.4	1.532	5.8				
	40	275.5	2.582	9.8				
	41	355.0	3.029	11.5				

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	462.8	3.949	15.0				
	2	506.7	4.749	18.1				
	3	420.5	3.941	15.0				
	4	280.5	2.629	10.0				
	5	149.2	1.398	5.3				
	6	29.7	0.278	1.1				
	7	94.6	0.886	3.4				
	8	229.8	2.153	8.2				
	9	376.2	3.525	13.4				
	10	39.8	0.373	1.4				
	11	30.8	0.263	1.0				
2	11	228.7	1.952	7.4				
	12	56.4	0.528	2.0				
	13	414.3	3.883	14.8				
	14	288.9	2.707	10.3				
	15	100.5	0.942	3.6				
	16	12.8	0.120	0.5				
	17	148.5	1.391	5.3				
	18	293.2	2.748	10.5				
	19	497.7	4.664	17.8				
	20	162.8	1.526	5.8				
	21	346.3	2.954	11.3				
3	21	284.5	2.428	9.2				
	22	102.5	0.961	3.7				
	23AI	433.8	4.066	15.5				
	23AD	526.3	4.932	18.8				
	24	312.1	2.925	11.1				
	25	158.0	1.481	5.6				
	26	17.7	0.166	0.6				
	27	90.3	0.846	3.2				
	28	265.5	2.488	9.5				
	29	381.7	3.577	13.6				
	30	13.3	0.125	0.5				
	31	182.3	1.556	5.9				
4	31	3.3	0.029	0.1				
	32	6.3	0.059	0.2				
	33	349.1	3.272	12.5				
	34	209.2	1.960	7.5				
	35	80.4	0.754	2.9				
	36	37.4	0.350	1.3				
	37	150.4	1.409	5.4				
	38	275.3	2.580	9.8				
	39	408.8	3.831	14.6				
	40	488.8	4.581	17.5				
	41	444.2	3.790	14.4				

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	158.8	1.355	5.2				
	2	100.8	0.945	3.6				
	3	68.7	0.643	2.5				
	4	99.8	0.936	3.6				
	5	132.3	1.240	4.7				
	6	162.6	1.524	5.8				
	7	206.0	1.930	7.4				
	8	250.4	2.347	8.9				
	9	296.2	2.776	10.6				
	10	700.2	6.562	25.0				
	11	703.8	6.005	22.9				
2	11	1073.7	9.161	34.9				
	12	798.8	7.486	28.5				
	13	224.3	2.102	8.0				
	14	79.2	0.742	2.8				
	15	18.2	0.170	0.6				
	16	58.5	0.548	2.1				
	17	85.2	0.798	3.0				
	18	187.0	1.753	6.7				
	19	272.8	2.557	9.7				
	20	825.2	7.733	29.5				
	21	1107.1	9.446	36.0				
3	21	1059.7	9.041	34.4				
	22	764.8	7.167	27.3				
	23AI	208.9	1.958	7.5				
	23AD	301.4	2.825	10.8				
	24	206.0	1.930	7.4				
	25	94.7	0.887	3.4				
	26	63.3	0.593	2.3				
	27	8.0	0.075	0.3				
	28	55.8	0.523	2.0				
	29	191.6	1.796	6.8				
	30	755.9	7.084	27.0				
	31	1027.3	8.765	33.4				
4	31	669.4	5.711	21.8				
	32	666.6	6.247	23.8				
	33	269.2	2.523	9.6				
	34	229.8	2.154	8.2				
	35	191.8	1.798	6.8				
	36	155.0	1.452	5.5				
	37	131.0	1.228	4.7				
	38	105.1	0.985	3.8				
	39	80.3	0.753	2.9				
	40	118.9	1.114	4.2				
	41	177.6	1.515	5.8				

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	280.8	2.396	9.1				
	2	345.9	3.241	12.3				
	3	335.7	3.146	12.0				
	4	257.8	2.416	9.2				
	5	188.2	1.764	6.7				
	6	130.9	1.227	4.7				
	7	68.7	0.644	2.5				
	8	4.7	0.044	0.2				
	9	89.7	0.840	3.2				
	10	313.0	2.933	11.2				
	11	332.3	2.835	10.8				
2	11	120.4	1.027	3.9				
	12	289.3	2.711	10.3				
	13	151.9	1.424	5.4				
	14	111.2	1.042	4.0				
	15	12.4	0.116	0.4				
	16	4.1	0.038	0.1				
	17	41.8	0.392	1.5				
	18	94.3	0.884	3.4				
	19	212.8	1 995	7.6				
	20	206.3	1.934	7.4				
	21	24.3	0.207	0.8				
3	21	83.5	0.712	2.7				
	22	266.9	2.502	9.5				
	23AI	147.9	1.386	5.3				
	23AD	260.9	2.445	9.3				
	24	124.8	1.169	4.5				
	25	55.0	0.515	2.0				
	26	5.8	0.054	0.2				
	27	10.0	0.094	0.4				
	28	98.4	0.922	3.5				
	29	133.6	1.252	4.8				
	30	314.6	2.948	11.2				
	31	147.3	1.257	4.8				
4	31	349.7	2.984	11.4				
	32	330.0	3.093	11.8				
	33	76.5	0.717	2.7				
	34	4.6	0.043	0.2				
	35	74.2	0.695	2.6				
	36	132.5	1.242	4.7				
	37	185.9	1.742	6.6				
	38	251.6	2.358	9.0				
	39	325.7	3.052	11.6				
	40	332.2	3.114	11.9				
	41	266.8	2.276	8.7				

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	340.9	2.908	11.1				
	2	261.7	2.452	9.3				
	3	153.4	1.438	5.5				
	4	122.6	1.149	4.4				
	5	93.2	0.874	3.3				
	6	61.4	0.575	2.2				
	7	42.7	0.400	1.5				
	8	25.4	0.238	0.9				
	9	9.7	0.091	0.3				
	10	347.5	3.256	12.4				
	11	340.6	2.906	11.1				
2	11	724.5	6.182	23.5				
	12	453.2	4.247	16.2				
	13	38.1	0.357	1.4				
	14	98.5	0.923	3.5				
	15	69.9	0.655	2.5				
	16	49.7	0.466	1.8				
	17	21.5	0.201	0.8				
	18	11.8	0.111	0.4				
	19	12.1	0.113	0.4				
	20	456.0	4.273	16.3				
	21	736.6	6.285	23.9				
3	21	691.7	5.902	22.5				
	22	395.3	3.705	14.1				
	23AI	77.0	0.722	2.8				
	23AD	36.0	0.337	1.3				
	24	18.6	0.174	0.7				
	25	8.3	0.078	0.3				
	26	51.4	0.482	1.8				
	27	72.3	0.677	2.6				
	28	111.3	1.043	4.0				
	29	56.5	0.529	2.0				
	30	428.0	4.011	15.3				
	31	697.7	5.953	22.7				
4	31	323.0	2.756	10.5				
	32	330.3	3.095	11.8				
	33	3.5	0.033	0.1				
	34	16.0	0.150	0.6				
	35	37.2	0.349	1.3				
	36	59.8	0.561	2.1				
	37	95.5	0.895	3.4				
	38	128.7	1.206	4.6				
	39	163.4	1.532	5.8				
	40	275.5	2.582	9.8				
	41	355.0	3.029	11.5				

ESTUDIO DE LA SECCION TRANSVERSAL

ARMADURA DEL VOLADIZO

SON VALIDAS LAS CALCULADAS PARA EL VIADUCTO V

ARMADURA DE LA LOSA

SON VALIDAS LAS CALCULADAS PARA EL VIADUCTO V

ARMADURA DE LAS TRAVIESAS SOBRE PILAS

SON VALIDAS LAS CALCULADAS PARA EL VIADUCTO V

ARMADURAS DE LAS TRAVIESAS SOBRE ESTRIBOS

SON VALIDAS LAS CALCULADAS PARA EL VIADUCTO V

APARATOS DE APOYO

DEF. POR TEMPERATURA

DEF. POR RETRACCION

VANO	LUZ	TEMP (+)		TEMP(-)		T	Bt	B(infinito)	DE 0 A T	DE T A INFINITO	DE 0 A INFINITO
	(M)	PARC (MM)	ACUM (MM)	PARC (MM)	ACUM (MM)	(DIAS)	A TIEMPO T	A T INFINITO	PARC (MM)	PARC (MM)	ACUM (MM)
1	16.00	2.4	2.4	-2.4	-2.4	60	0.060	1.000	0.2	3.6	3.8
2	23.00	3.5	5.9	-3.5	-5.9	45	0.045	1.000	0.2	5.3	9.1
3	23.00	3.5	9.3	-3.5	-9.3	30	0.030	1.000	0.2	5.4	14.2
4	16.00	2.4	11.7	-2.4	-11.7	15	0.015	1.000	0.1	3.8	17.6

DEFORMACIONES POR FLUENCIA

VANO	LUZ	N° CABLES	ESPESOR	TIEMPO	Bt	Bt'	Φ_o		DE 0 A T	DE T A INFINITO	DE 0 A INFINITO
	(M)	(UD)	(CM)	(DIAS)			A TIEMPO T	A T INFINITO	PARC (MM)	PARC (MM)	ACUM (MM)
1	16.00	288	75	60	0.080	0.690	0.436	3.140	0.9	5.6	6.5
2	23.00	288	75	45	0.070	0.650	0.400	3.300	1.2	6.8	13.7
3	23.00	288	75	30	0.060	0.580	0.352	3.348	1.1	7.9	17.8
4	16.00	288	75	15	0.050	0.480	0.292	3.408	0.6	8.5	22.2

RESUMEN DEFORMACIONES LONGITUDINALES

APOYO	TEMP +	TEMP -	RET	FLU	TOTAL	
	(MM)	(MM)	(MM)	(MM)	(MAX)	(MIN)
EST 1	0.0	0.0	0.0	0.0	0.0	0.0
PILA 1	2 4	-2.4	3.8	6.5	12.8	8.0
PILA 2	5.9	-5.9	9.1	13.7	28.6	16.9
PILA 3	9.3	-9.3	14.2	17.8	41.3	22.7
EST 2	11.7	-11.7	17.6	22.2	51.5	28.1

REACCIONES SOBRE APOYOS (EN SERVICIO)

APOYO	LV	DIST	P.PR	PRET	C.PERM	TEMP	DESC+	DESC-	SC EP75+	SC EP75-	SC UIC+	SC UIC-	TOT CP	TOT SC +	TOT SC -	MAX	MIN
EST-1	0.00	78.00	203.10	73.41	64.95	39.93	4.89	-4.90	181.16	-48.41	0.00	0.00	341.46	225.98	-53.31	567.44	238.15
PILA 1	16.00	62.00	789.25	-67.10	250.17	-48.06	11.70	-11.70	534.51	-50.96	0.00	0.00	972.32	546.21	-110.72	1518.53	861.60
PILA 2	23.00	39.00	838.74	-14.83	276.12	16.25	13.45	-13.60	583.22	-25.13	0.00	0.00	1100.03	612.92	-38.73	1712.95	1061.30
PILA 3	23.00	16.00	722.53	-59.47	250.17	-48.06	11.70	-11.70	534.51	-50.96	0.00	0.00	913.23	546.21	-110.72	1459.44	802.51
EST-2	16.00	0.00	189.40	68.00	64.95	39.39	4.89	-4.90	181.16	-48.41	0.00	0.00	322.35	225.44	-53.31	547.79	269.04

ACCIONES. REOLOGICAS (EN SERVICIO)

Eh = 4000000 $\Delta T° =$ 15.0 $\mu =$ 0.05

APOYO	X	H	RCP	RSC	RHMAX	$I_{(PILA)}$	$Smin_{(NEOP)}$	DIMENSIONES APOYOS	$\delta_{(TAB)}$	$\delta_{(PILA)}$	$\delta_{(TEFL)}$	RH	$RH_{(ACUM)}$
EST 1	0.000	0.000	341.460	225.98	17.07	1000000	0.1891	2 AP. "POT" PARA 400 T	0.000		0.000	0.00	0.00
PILA 1	16.000	7.000	972.320	546.21	48.62	0.3558	0.5062	2 AP. "POT" PARA 800 T	0.003	0.003	0.000	35.85	152.63
PILA 2	39.000	7.000	1100.030	612.92	55.00	0.3558	0.5710	2 AP. "POT" PARA 1000 T	0.007	0.004	0.003	55.00	116.78
PILA 3	62.000	7.000	913.230	546.21	45.66	0.3558	0.4865	2 AP. "POT" PARA 800 T	0.011	0.004	0.007	45.66	61.78
EST 2	78.000	0.000	322.350	225.44	16.12	0	0.1826	2 AP. "POT" PARA 400 T	0.014		0.014	16.12	16.12

EVALUACION DEL FRENADO

VANO	APOYOS	LONG	EP75		UIC	
			QCARG	FREN	QCARG	FRE
1	EST1-P1	78.00	1596.00	199.50	1345.60	336.40
2	P1-P2	62.00	1292.00	161.50	1089.60	272.40
3	P2-P3	39.00	855.00	106.88	721.60	180.40
4	P3-EST2	21.00	478.80	59.85	433.60	108.40

ACC. CARRIL

APOYO	LONG	F
EST1-P1	78.00	158.00
P1-P2	62.00	142.00
P2-P3	39.00	119.00
P3-EST2	21.00	101.00

DISTRIBUCION DE FUERZAS REOLOGICAS, TEMPERATURA, INTERACCION CARRIL-ESTRUCTURA Y FRENADO, SEGUN VANOS (EN SERVICIO) (valores sin mayorar)

			COMBINACION CASI PERMANENTE [5] = ([1] + 0.50 * [2]) + 0.30 * [3] [6] = ([1] + 0.50 * [2]) + 0.30 * [4]				COMBINACION FRECUENTE [9] = ([1] + 0.50 * [2]) + 0.60 * [7] [10] = ([1] + 0.50 * [2]) + 0.60 * [8]				COMBINACION POCO PROBABLE [13] = ([1] + 0.60 * [2]) + [11] [14] = ([1] + 0.60 * [2]) + [12]			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
VANO	R+T	CARRIL	FREN EP75	FREN UIC	MAX EP75	MAX UIC	FREN EP75	FREN UIC	MAX EP75	MAX UIC	FREN EP75	FREN UIC	MAX EP75	MAX UIC
1	152.63	158.00	199.50	336.40	291.48	332.55	199.50	336.40	351.33	433.47	199.50	336.40	446.93	583.83
2	116.78	142.00	161.50	272.40	236.23	269.50	161.50	272.40	284.68	351.22	161.50	272.40	363.48	474.38
3	61.78	119.00	106.88	180.40	153.34	175.40	106.88	180.40	185.40	229.52	106.88	180.40	240.05	313.58
4	16.12	101.00	59.85	108.40	84.57	99.14	59.85	108.40	102.53	131.66	59.85	108.40	136.57	185.12

DISTRIBUCION DE FUERZAS REOLOGICAS, TEMPERATURA, INTERACCION CARRIL-ESTRUCTURA Y FRENADO, SEGUN VANOS (EN SERVICIO) (valores mayorados)

			COMBINACION CASI PERMANENTE [5'] = 1.35 * ([1] + 0.50 * [2]) +1.45 * 0.30 * [3] [6'] = 1.35 * ([1] + 0.50 * [2]) +1.45 * 0.30 * [4]				COMBINACION FRECUENTE [9'] = 1.35 * ([1] + 0.50 * [2]) + 1.45 * 0.60 * [7] [10'] = 1.35 * ([1] + 0.50 * [2]) +1.45 * 0.60 * [8]				COMBINACION POCO PROBABLE [13'] = 1.35 * ([1] + 0.60 * [2]) +1.45 * [11] [14'] =1.35 * ([1] + 0.60 * [2]) + 1.45 * [12]			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
VANO	R+T	CARRIL	FREN EP75	FREN UIC	MAX EP75	MAX UIC	FREN EP75	FREN UIC	MAX EP75	MAX UIC	FREN EP75	FREN UIC	MAX EP75	MAX UIC
1	152.63	158.00	199.50	336.40	399.48	459.03	199.50	336.40	486.27	605.37	199.50	336.40	623.31	821.81
2	116.78	142.00	161.50	272.40	323.76	372.00	161.50	272.40	394.01	490.49	161.50	272.40	506.85	667.65
3	61.78	119.00	106.88	180.40	210.22	242.20	106.88	180.40	256.71	320.67	106.88	180.40	334.76	441.37
4	16.12	101.00	59.85	108.40	115.97	137.09	59.85	108.40	142.00	184.24	59.85	108.40	190.35	260.75

CARACTERISTICAS DE LOS APOYOS

(VALORES POR APOYO Y FUSTE)

APOYO	R.VERTICAL	GIRO	ΦB	ACORT	ALARG	R.TRANSVERSAL	LONG CHAPA			ANCH CHAPA
	(TON)	(RAD)	(MM)	(MM)	(MM)	(TON)	L1(MM)	L2(MM)	L1+L2 (MM)	(MM)
EST 1	400	0.0180	525	0	0	40	450	450	900	725
PILA 1	800	0.0110	734	13	2	60	550	550	1100	1025
PILA 2	1000	0.0110	824	29	6	60	600	600	1200	1025
PILA 3	800	0.0110	734	41	9	60	600	550	1150	1025
EST 2	400	0.0186	525	52	12	40	500	450	950	725

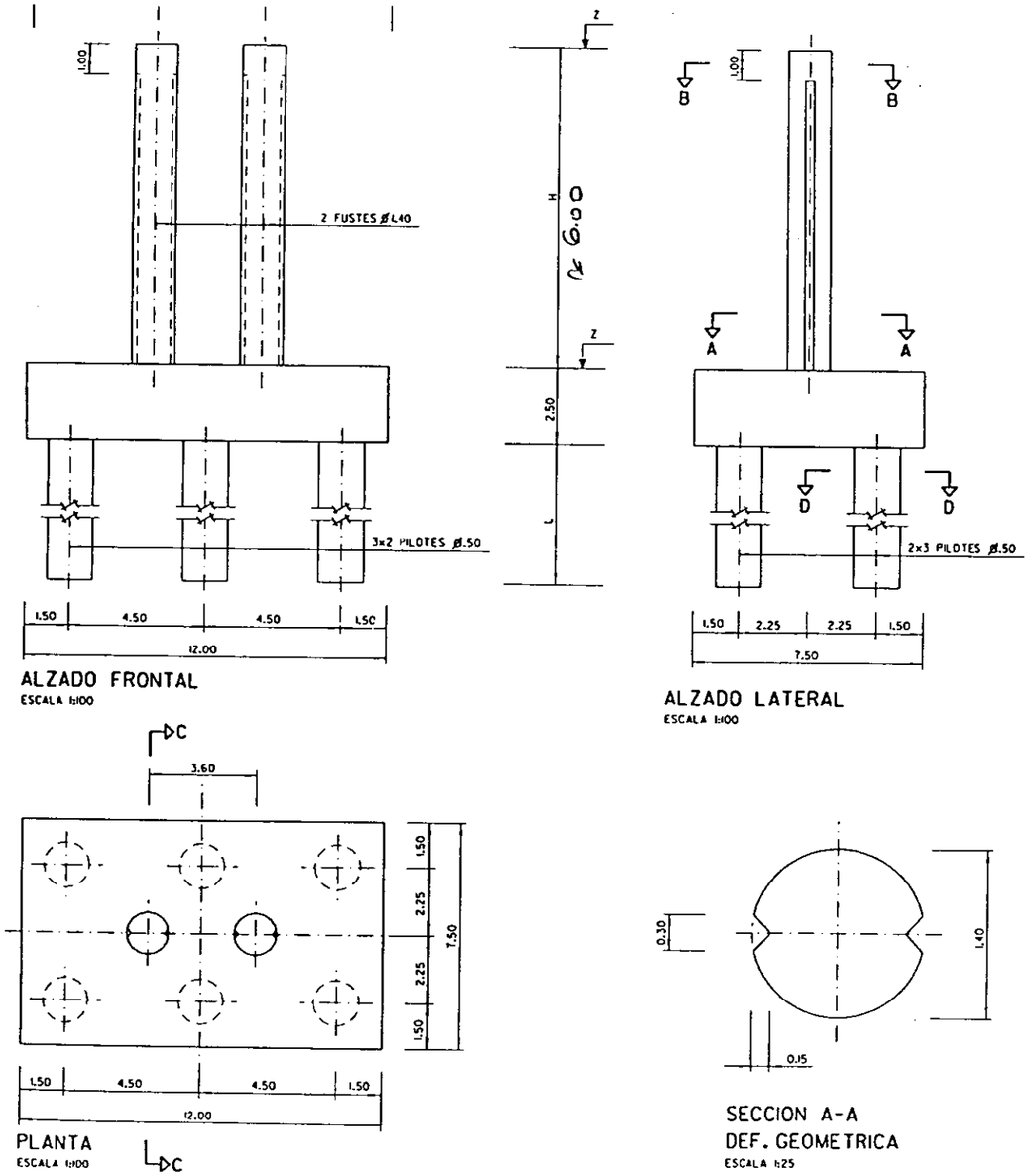
ΦB = DIAMETRO EXTERIOR CAZOLETA (mm)

L1 = LONGITUD DESDE CENTRO APOYO A EXTREMO LADO ESTRIBO NO ANCLADO (EST.2) (mm)

L2 = LONGITUD DESDE CENTRO APOYO A EXTREMO LADO ESTRIBO ANCLADO (EST.1) (mm)

CALCULO DE LAS PILAS

CALCULO DE LA PILA 1

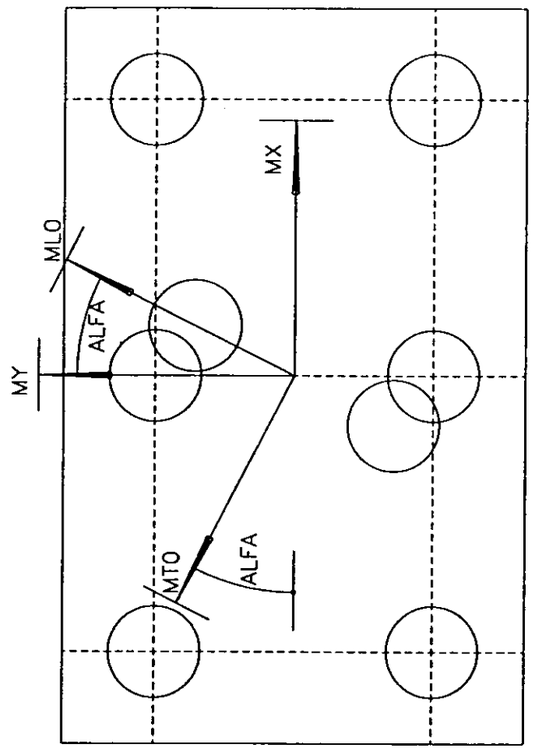


ALZADO FRONTAL
ESCALA 1:100

ALZADO LATERAL
ESCALA 1:100

PLANTA
ESCALA 1:100

SECCION A-A
DEF. GEOMETRICA
ESCALA 1:25



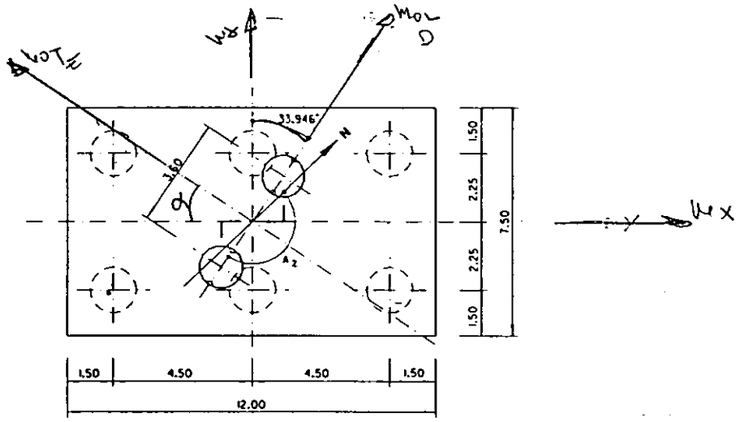
Las caracteristicas geometricas y armaduras seran iguales a las de la pila 2

viaducto 5

Se acaba de hacer el calculo de dicha pila para este viaducto

CALCULO DE LA PILAS 2 y 3

Es válido para esta estructura el cálculo de los hastes del viaducto 5.



CARGAS MAXIMAS Y MINIMAS EN PILOTES EN PILAS 2 Y 3

PILAS	HIPOT	N	ML0	MT0	MX	MY	QMAX	QMIN
ALFA	1	1717	468	113	168	451	324	249
33.946	2	2291	468	480	-137	656	428	335
0.5925	3	2330	468	707	-325	783	456	321

ARMADURA DEL ENCEPADO (P. 243)

$M_x = 2 \times 456 \times 4.50 = 4104$

$M' = \frac{4104 \times 1.6}{7.50} = 875$ mt/ml.

$A_c = 4000$ cm²

$A_s = 4000 \left(1 - \sqrt{1 - \frac{2 \cdot 875}{2.40 \times 4000}}\right) = 38.3$ cm².

$W = 383 \text{ kN} / 5_1 = 86.14$ cm² 2 c/ø32/20

En la dirección

$M = 3 \times 456 \times 2.25 = 3075$ $M' = 410.275$ mt/m

Armadura ø16/0.30/0.60

CALCULO DE LOS ESTRIBOS

ESTRIBO 1 (ANCLADO)

```
250.0,5100.0,0.04,1
1.800,30.0,0.00,3.00,0.00,0.00,1
VIADUCTO 1. ESTRIBO 1
 15,279.29,583.83,40.00,101.391,0.0,0.0
 ,5.20,2.50,5.40,0.50,2.00,0.40,14.00,0.0,3.00,9.00,00.0,3
```

CALCULO DE ESTRIBOS. VERSION 09-01-1996

PROGRAMA PROPIEDAD DE INTECSA

VIADUCTO 1. ESTRIBO 1

CARACTERISTICAS DEL RELLENO

PESO ESPECIFICO (TN/M3)	= 1.80
ANGULO DE ROZAMIENTO FI	= 30.00
ANGULO ROZAMIENTO TERRENO-MURO	= .00
SOBRECARGA (TN/M2)	= 3.00
COEFICIENTE DE EMPUJE ACTIVO	= .333

CARACTERISTICAS DE LOS MATERIALES

RESISTENCIA CARACTERISTICA DEL HORMIGON	= 250. KG/CM2
LIMITE ELASTICO DEL ACERO	= 5100. KG/CM2
RECUBRIMIENTO DE LAS ARMADURAS	= .040 M

CARGAS SOBRE EL ESTRIBO

CARGA VERTICAL DE TABLERO PESO PROPIO Y CARGA PERMANENTE	288.1 TN
CARGA VERTICAL DE SOBRECARGAS	279.3 TN
FUERZA LONGITUDINAL DE FRENADO RETRACCION Y TEMPERATURA	583.8 TN
FUERZA TRANSVERSAL DE VIENTO	40.0 TN
MOMENTO TRANSVERSAL DE SOBRECARGAS	101.4 MT
FUERZA LONGITUDINAL DE SISMO	.0 TN
FUERZA TRANSVERSAL DE SISMO	.0 TN

GEOMETRIA DEL ESTRIBO
==========

ANCHURA DEL ESTRIBO	B	= 14.00
ESVIAJE (GRADOS SEXAGESIMALES)	BETA	= .00

ALZADO DEL ESTRIBO

ESPESOR DEL FALDON	A3	= 2.50
ALTURA DEL FALDON	A6	= 2.00
DISTANCIA DE APOYO A BORDE ESTRIBO	A5	= .50
ESPESOR DEL ESTRIBO	A2	= 5.20
ESPESOR DE LAS ALETAS	A7	= .40
ALTURA TOTAL DEL ESTRIBO	H + C	= 12.00
ALTURA DE TIERRAS	H	= 9.00

ZAPATA

VUELO DELANTERO	A1	= 3.40
VUELO TRASERO	A4	= 5.40
LONGITUD TOTAL	L	= 14.00
CANTO	C	= 3.00
RESGUARDO SOBRE ZAPATA		= 0.30
TENSION MEDIA PEDIDA SOBRE TERRENO		= LIBRE

ARMADURAS DEL ALZADO

TRASDOS. U(CALCULO)= 6.3	ZONA INFERIOR	AV.= 77.6 CM2/M	(FI 25 A .062 M)
CM2/M		AH.= 41.8 CM2/M	(FI 25 A .100 M)
	2.6 M. SUPERIORES	AV.= 38.8 CM2/M	(FI 25 A .125 M)
		AH.= 41.8 CM2/M	(FI 25 A .100 M)
INTRADOS		AV.= 16.7 CM2/M	(FI 20 A .175 M)
		AH.= 41.8 CM2/M	(FI 25 A .100 M)
FALDON	TRASDOS	AV.= 37.0 CM2/M	(FI 25 A .125 M)
		AH.= 36.6 CM2/M	(FI 25 A .125 M)
	INTRADOS	AV.= 37.0 CM2/M	(FI 25 A .125 M)
		AH.= 13.4 CM2/M	(FI 20 A .225 M)
ALETAS	TRASDOS	AV.= 30.7 CM2/M	(FI 25 A .150 M)
		AH.= 47.1 CM2/M	(FI 25 A .100 M)
	INTRADOS	AV.= 15.4 CM2/M	(FI 20 A .200 M)
		AH.= 23.6 CM2/M	(FI 20 A .125 M)

ESTRIBO CON RELLENO DE TIERRAS Y SIN TABLERO

ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	=	4370.5 TN.
MOMENTO LONGITUDINAL	=	-1601.6 M.T.
EMPUJE LONGITUDINAL	=	772.8 TN.

ESTRIBO CON PUENTE EN SERVICIO

ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	=	4938.0 TN.
MOMENTO LONGITUDINAL	=	5995.8 M,T.
EMPUJE LONGITUDINAL	=	1356.6 TN.
MOMENTO TRANSVERSAL	=	501.4 M.T.

-ON DEL ESTRIBO
==========

HORMIGON

ENCEPADO		588.00
ALZADO		509.60
FALDON TRASERO		70.00
ALETAS		38.88
TOTAL M3	=	1206.48

ARMADURAS

	DIAMETRO	NUMERO	LONGITUD	PESO	PESO TOTAL
FALDON					
	25.	112	8.30	3.86	3584.77
	25.	16	18.70	3.86	1153.79
	20.	9	18.70	2.47	415.36
ALZADO					
	25.	223	15.20	3.86	13071.14
	20.	80	10.00	2.47	1974.40
	25.	123	24.10	3.86	11431.08
	25.	71	24.10	3.86	6598.43
	25.	59	24.10	3.86	5483.20
DEDUCIR					
	25.	111	5.80	3.86	-2482.65
	25.	59	24.10	3.86	-5483.20
'AS					
	25.	72	12.10	3.86	3359.57
	25.	180	7.05	3.86	4893.58
	20.	54	12.10	2.47	1612.59
	20.	144	7.05	2.47	2505.51
)O					

TOTAL KG = 48117.58

UTILIDUCTO 1. ESTRIBO 1

EN COLECT

$F_x = 772$

$F_y = -4370$

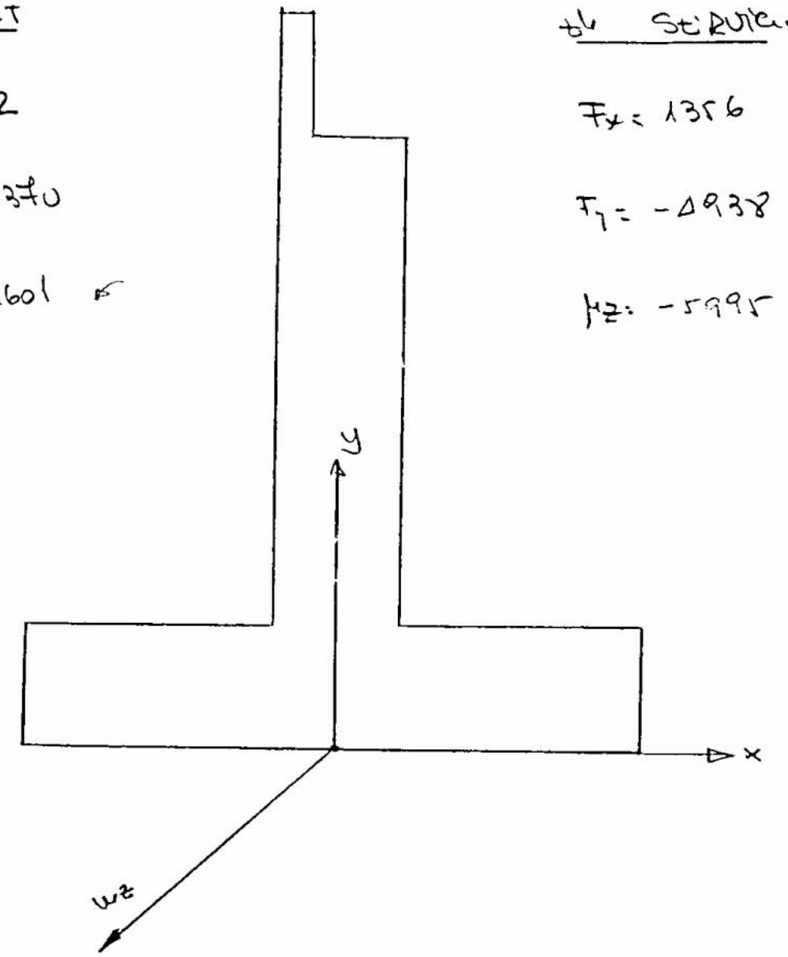
$M_z = 1601$

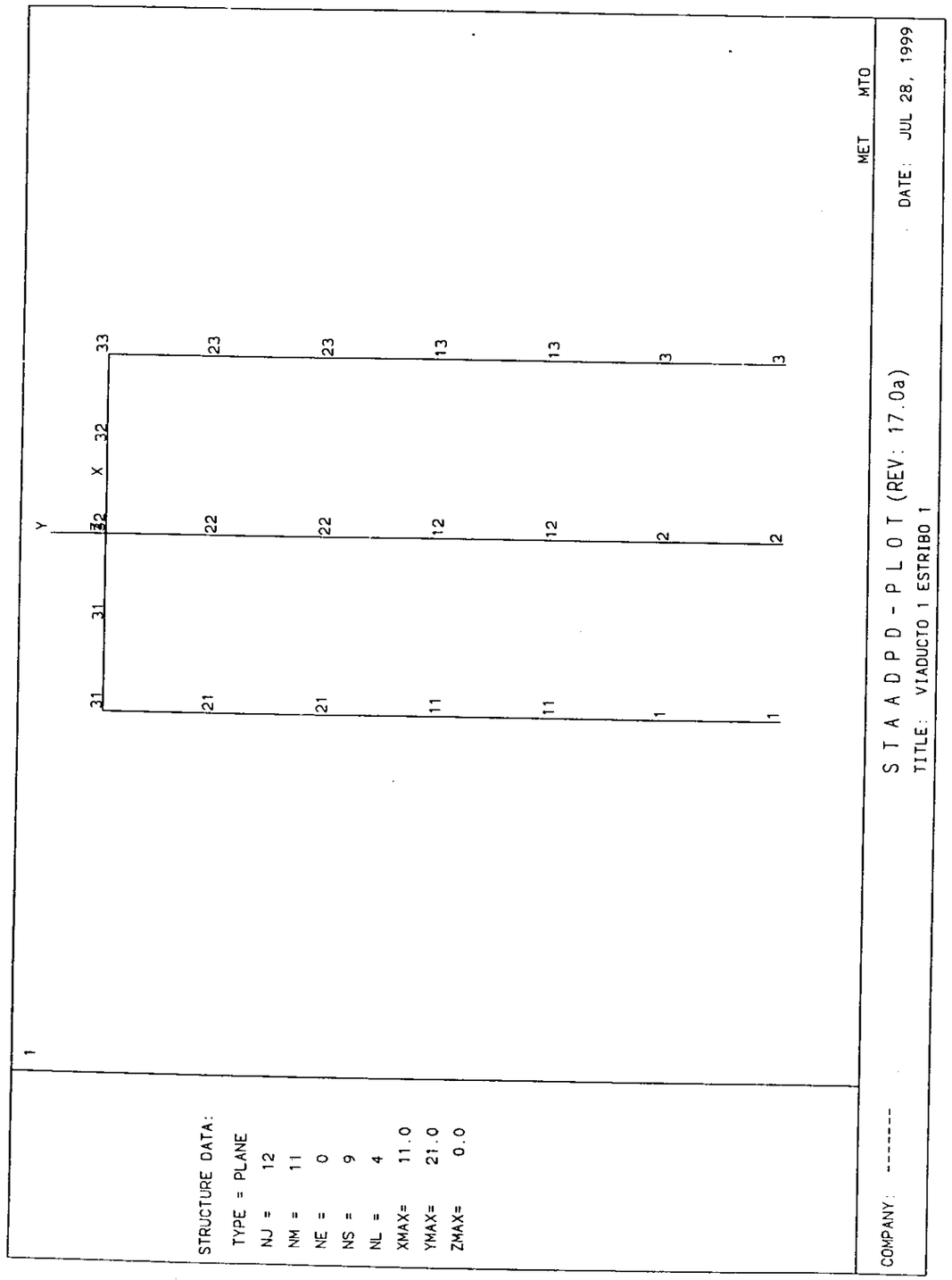
EN ESTRIBO

$F_x = 1356$

$F_y = -4938$

$M_z = -5995$






```
*************************************************
*                                               *
*           S T A A D - III                     *
*           Revision 17.0a                      *
*           Proprietary Program of              *
*           RESEARCH ENGINEERS, Inc.            *
*           Date=     JUL 28, 1999              *
*           Time=      9:47:42                  *
*                                               *
*************************************************
```

```
1. STAAD PLANE VIADUCTO 1 ESTRIBO 1
2. *EFECTOS CARGAS GRAVITATORIAS
3. UNIT MTO MET
4. JOINT COORDINATES
5.    1  -5.500   -21.000
6.    2   0.000   -21.000
7.    3   5.500   -21.000
8.   11  -5.500   -14.000
9.   12   0.000   -14.000
10.  13   5.500   -14.000
11.  21  -5.500    -7.000
12.  22   0.000    -7.000
13.  23   5.500    -7.000
14.  31  -5.500    -0.000
15.  32   0.000    -0.000
16.  33   5.500    -0.000
17. MEMBER INCIDENCES
18.   1    1    11
19.   R    2    10   10
20.   2    2    12
21.   R    2    10   10
22.   3    3    13
23.   R    2    10   10
24.   31   31   32
25.   32   32   33
26. MEMBER PROPERTY
27. *PILOTES  3 * 4 PILOTES
28. 1 11 21 PR AX  7.065 IZ  0.99330
29. 2 12 22 PR AX  7.065 IZ  0.99330
30. 3 13 23 PR AX  7.065 IZ  0.99330
31. *ENCEPADO (1.50+3*4.50+1.50)*2.5
32. 31 32   PR AX 41.250 IZ  21.4843
33. CONSTANT
34. E  3250000.   ALL
35. POI 0.15
36. DEN 2.50
37. SUPPORT
38. 1 2 3          PINNED
39. 11 12 13       FIXED BUT FY MZ KFX  152250
40. 21 22 23       FIXED BUT FY MZ KFX   94500
41. LOADING 1 RELLENO DE TIERRAS Y SIN TABLERO
42. JOINT LOAD
43. *PROCEDENTE DE CALCULO DE ESTRIBO
44. 32             FX   772
45. 32             FY -4370
46. 32             MZ  1601
47. LOADING 2 PUENTE EN SERVICIO
```

```
*EFECTOS CARGAS GRAVITATORIAS
48. JOINT LOAD
49. *PROCEDENTE DE CALCULO DE ESTRIBO
50. 32          FX  1356
51. 32          FY -4938
52. 32          MZ -5995
53. LOADING COMBINATION 3  ESFUERZOS NAYORADOS
54. 1 1.50
55. LOADING COMBINATION 4  ESFUERZOS MAYORADOS
56. 2 1.50
57. PERFORM ANALISIS
```

P R O B L E M S T A T I S T I C S

```
NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    12/   11/    9
ORIGINAL/FINAL BAND-WIDTH =     3/    2
TOTAL PRIMARY LOAD CASES  =     2, TOTAL DEGREES OF FREEDOM =    30
SIZE OF STIFFNESS MATRIX =      270 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE =   12.02 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX.              9:47:43
++ PROCESSING GLOBAL STIFFNESS MATRIX.               9:47:43
++ PROCESSING TRIANGULAR FACTORIZATION.              9:47:43
++ CALCULATING JOINT DISPLACEMENTS.                  9:47:43
++ CALCULATING MEMBER  FORCES.                       9:47:43

58. LOAD LIST  1 2 3 4
59. PRINT MEMBER FORCES LIST  21 22 23
```


MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
21	1	21	937.20	219.41	0.00	0.00	0.00	510.19
		31	-937.20	-219.41	0.00	0.00	0.00	1025.68
	2	21	139.34	415.96	0.00	0.00	0.00	933.37
		31	-139.34	-415.96	0.00	0.00	0.00	1978.37
	3	21	1405.79	329.11	0.00	0.00	0.00	765.29
		31	-1405.79	-329.11	0.00	0.00	0.00	1538.51
	4	21	209.01	623.94	0.00	0.00	0.00	1400.06
		31	-209.01	-623.94	0.00	0.00	0.00	2967.55
22	1	22	2080.22	263.21	0.00	0.00	0.00	505.89
		32	-2080.22	-263.21	0.00	0.00	0.00	1336.57
	2	22	2350.60	445.01	0.00	0.00	0.00	931.19
		32	-2350.60	-445.01	0.00	0.00	0.00	2183.85
	3	22	3120.32	394.81	0.00	0.00	0.00	758.83
		32	-3120.32	-394.81	0.00	0.00	0.00	2004.85
	4	22	3525.89	667.51	0.00	0.00	0.00	1396.79
		32	-3525.89	-667.51	0.00	0.00	0.00	3275.78
23	1	23	1352.59	289.38	0.00	0.00	0.00	502.27
		33	-1352.59	-289.38	0.00	0.00	0.00	1523.41
	2	23	2448.07	495.03	0.00	0.00	0.00	924.42
		33	-2448.07	-495.03	0.00	0.00	0.00	2540.79
	3	23	2028.88	434.07	0.00	0.00	0.00	753.40
		33	-2028.88	-434.07	0.00	0.00	0.00	2285.11
	4	23	3672.10	742.55	0.00	0.00	0.00	1386.63
		33	-3672.10	-742.55	0.00	0.00	0.00	3811.19

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

60. PRINT MEMBER FORCES LIST  11 12 13
```

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
11	1	11	937.20	-47.26	0.00	0.00	0.00	179.40
		21	-937.20	47.26	0.00	0.00	0.00	-510.19
	2	11	139.34	-85.02	0.00	0.00	0.00	338.21
		21	-139.34	85.02	0.00	0.00	0.00	-933.37
	3	11	1405.79	-70.89	0.00	0.00	0.00	269.09
		21	-1405.79	70.89	0.00	0.00	0.00	-765.29
	4	11	209.01	-127.53	0.00	0.00	0.00	507.32
		21	-209.01	127.53	0.00	0.00	0.00	-1400.06
12	1	12	2080.22	-42.37	0.00	0.00	0.00	209.28
		22	-2080.22	42.37	0.00	0.00	0.00	-505.89
	2	12	2350.60	-81.87	0.00	0.00	0.00	358.07
		22	-2350.60	81.87	0.00	0.00	0.00	-931.19
	3	12	3120.32	-63.56	0.00	0.00	0.00	313.92
		22	-3120.32	63.56	0.00	0.00	0.00	-758.83
	4	12	3525.90	-122.81	0.00	0.00	0.00	537.10
		22	-3525.90	122.81	0.00	0.00	0.00	-1396.79
13	1	13	1352.59	-39.31	0.00	0.00	0.00	227.08
		23	-1352.59	39.31	0.00	0.00	0.00	-502.27
	2	13	2448.07	-76.05	0.00	0.00	0.00	392.10
		23	-2448.07	76.05	0.00	0.00	0.00	-924.42
	3	13	2028.88	-58.97	0.00	0.00	0.00	340.63
		23	-2028.88	58.97	0.00	0.00	0.00	-753.40
	4	13	3672.10	-114.07	0.00	0.00	0.00	588.15
		23	-3672.10	114.07	0.00	0.00	0.00	-1386.63

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

51. PRINT MEMBER FORCES LIST 1 2 3

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	937.20	-25.63	0.00	0.00	0.00	0.00
		11	-937.20	25.63	0.00	0.00	0.00	-179.40
	2	1	139.34	-48.32	0.00	0.00	0.00	0.00
		11	-139.34	48.32	0.00	0.00	0.00	-338.21
	3	1	1405.79	-38.44	0.00	0.00	0.00	0.00
		11	-1405.79	38.44	0.00	0.00	0.00	-269.09
	4	1	209.01	-72.47	0.00	0.00	0.00	0.00
		11	-209.01	72.47	0.00	0.00	0.00	-507.32
2	1	2	2080.22	-29.90	0.00	0.00	0.00	0.00
		12	-2080.22	29.90	0.00	0.00	0.00	-209.28
	2	2	2350.60	-51.15	0.00	0.00	0.00	0.00
		12	-2350.60	51.15	0.00	0.00	0.00	-358.07
	3	2	3120.32	-44.85	0.00	0.00	0.00	0.00
		12	-3120.32	44.85	0.00	0.00	0.00	-313.92
	4	2	3525.89	-76.73	0.00	0.00	0.00	0.00
		12	-3525.89	76.73	0.00	0.00	0.00	-537.10
3	1	3	1352.59	-32.44	0.00	0.00	0.00	0.00
		13	-1352.59	32.44	0.00	0.00	0.00	-227.08
	2	3	2448.07	-56.01	0.00	0.00	0.00	0.00
		13	-2448.07	56.01	0.00	0.00	0.00	-392.10
	3	3	2028.88	-48.66	0.00	0.00	0.00	0.00
		13	-2028.88	48.66	0.00	0.00	0.00	-340.63
	4	3	3672.10	-84.02	0.00	0.00	0.00	0.00
		13	-3672.10	84.02	0.00	0.00	0.00	-588.15

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

62. PRINT MEMBER FORCES LIST 31 32

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
31	1	31	-219.41	937.20	0.00	0.00	0.00	-1025.68
		32	219.41	-937.20	0.00	0.00	0.00	6180.26
	2	31	-415.94	139.34	0.00	0.00	0.00	-1978.37
		32	415.94	-139.34	0.00	0.00	0.00	2744.72
	3	31	-329.11	1405.79	0.00	0.00	0.00	-1538.52
		32	329.11	-1405.79	0.00	0.00	0.00	9270.38
	4	31	-623.92	209.01	0.00	0.00	0.00	-2967.55
		32	623.92	-209.01	0.00	0.00	0.00	4117.08
32	1	32	289.40	-1352.59	0.00	0.00	0.00	-5915.82
		33	-289.40	1352.59	0.00	0.00	0.00	-1523.41
	2	32	495.01	-2448.07	0.00	0.00	0.00	-10923.57
		33	-495.01	2448.07	0.00	0.00	0.00	-2540.80
	3	32	434.10	-2028.88	0.00	0.00	0.00	-8873.73
		33	-434.10	2028.88	0.00	0.00	0.00	-2285.11
	4	32	742.52	-3672.10	0.00	0.00	0.00	-16385.36
		33	-742.52	3672.10	0.00	0.00	0.00	-3811.19

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

63. PRINT REACC ALL

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	25.63	937.20	0.00	0.00	0.00	0.00
	2	48.32	139.34	0.00	0.00	0.00	0.00
	3	38.44	1405.79	0.00	0.00	0.00	0.00
	4	72.47	209.01	0.00	0.00	0.00	0.00
2	1	29.90	2080.22	0.00	0.00	0.00	0.00
	2	51.15	2350.60	0.00	0.00	0.00	0.00
	3	44.85	3120.32	0.00	0.00	0.00	0.00
	4	76.73	3525.89	0.00	0.00	0.00	0.00
3	1	32.44	1352.59	0.00	0.00	0.00	0.00
	2	56.01	2448.07	0.00	0.00	0.00	0.00
	3	48.66	2028.88	0.00	0.00	0.00	0.00
	4	84.02	3672.10	0.00	0.00	0.00	0.00
11	1	21.63	0.00	0.00	0.00	0.00	0.00
	2	36.71	0.00	0.00	0.00	0.00	0.00
	3	32.44	0.00	0.00	0.00	0.00	0.00
	4	55.06	0.00	0.00	0.00	0.00	0.00
12	1	12.47	0.00	0.00	0.00	0.00	0.00
	2	30.72	0.00	0.00	0.00	0.00	0.00
	3	18.71	0.00	0.00	0.00	0.00	0.00
	4	46.08	0.00	0.00	0.00	0.00	0.00
13	1	6 87	0.00	0.00	0.00	0.00	0.00
	2	20.03	0.00	0.00	0.00	0.00	0.00
	3	10.31	0.00	0.00	0.00	0.00	0.00
	4	30.05	0.00	0.00	0.00	0.00	0.00
21	1	-266.67	0.00	0.00	0.00	0.00	0.00
	2	-500.99	0.00	0.00	0.00	0.00	0.00
	3	-400.00	0.00	0.00	0.00	0.00	0.00
	4	-751.48	0.00	0.00	0.00	0.00	0.00
22	1	-305.58	0.00	0.00	0.00	0.00	0.00
	2	-526.88	0.00	0.00	0.00	0.00	0.00
	3	-458.37	0.00	0.00	0.00	0.00	0.00
	4	-790.32	0.00	0.00	0.00	0.00	0.00
23	1	-328.69	0.00	0.00	0.00	0.00	0.00
	2	-571.08	0.00	0.00	0.00	0.00	0.00
	3	-493.04	0.00	0.00	0.00	0.00	0.00
	4	-856.61	0.00	0.00	0.00	0.00	0.00

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

64. PLOT DIS FILE
65. PLOT BEN FILE
66. FINISH

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

**** DATE= JUL 28,1999 TIME= 9:47:44 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

VIADUCTO 1 - ESTRIBO 1 - ARMADURAS DE PILOTES

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-1402	1538	-351	385	0.17	0.12	0.20	96	14	19
BARRA 22	-3120	2004	-780	501	0.37	0.16	0.28	134	17	27
BARRA 23	-2448	2285	-612	571	0.29	0.18	0.37	177	22	36

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-209	2967	-52	742	0.02	0.23	0.65	311	39	63
BARRA 22	-3525	3275	-881	819	0.42	0.26	0.68	325	40	66
BARRA 23	-3672	3811	-918	953	0.43	0.30	0.82	392	49	80

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-1402	765	-351	191	0.17	0.06	0.04	19	14	18
BARRA 12	-3120	758	-780	190	0.37	0.06	0.04	19	14	18
BARRA 13	-2448	753	-612	188	0.29	0.06	0.04	19	14	18

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-209	1400	-52	350	0.02	0.11	0.28	134	17	27
BARRA 12	-3525	1396	-881	349	0.42	0.11	0.08	38	14	18
BARRA 13	-3672	1386	-918	347	0.43	0.11	0.08	38	14	18

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-1402	269	-351	67	0.17	0.02	0.04	19	14	18
BARRA 2	-3120	313	-780	78	0.37	0.02	0.04	19	14	18
BARRA 3	-2448	340	-612	85	0.29	0.03	0.04	19	14	18

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-209	507	-52	127	0.02	0.04	0.04	19	14	18
BARRA 2	-3525	537	-881	134	0.42	0.04	0.04	19	14	18
BARRA 3	-3672	588	-918	147	0.43	0.05	0.04	19	14	18

$\nu = N' / 4 / 2120$

$\mu = M' / 4 / 1.5 / 2120$

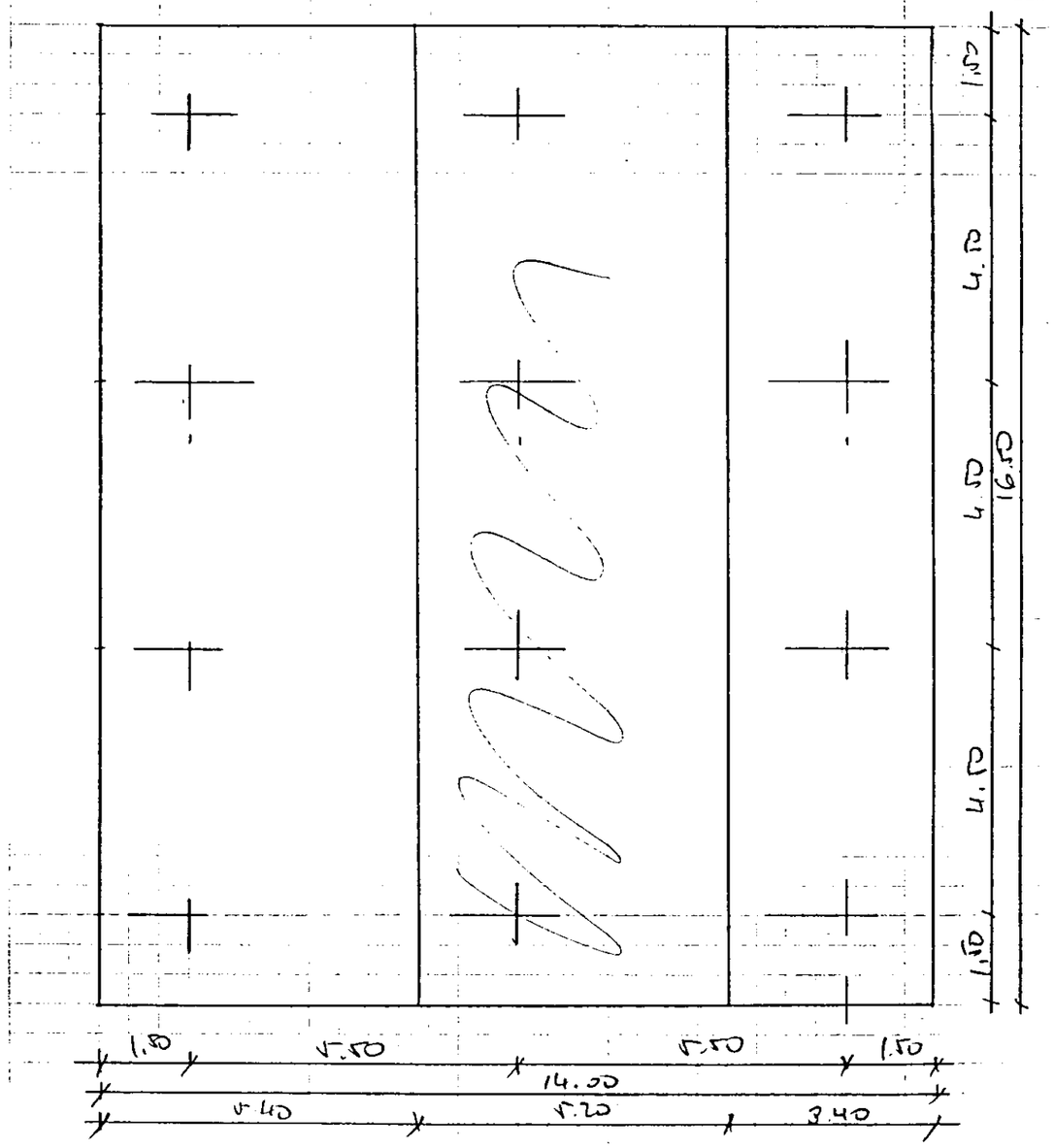
PROYECTO:

EJECUTIVO:

HOJA ___ DE ___

FECHA ___

CALCULO DEL ENCEPADO



ARMADURA INFERIOR

PILOTE MAS CARGADO

$Q = \frac{2458}{4} = 613$ ton.

$U = 3{,}40 - 1{,}50 + 0{,}15 \times 5{,}20 = 2{,}68$ m.

$M = 613 \times 2{,}68 = 1642$ mt / pilote

$h = \frac{1642}{2{,}25 + 1{,}50} = 438$ mt/ml

$M' = 438 \times 1{,}6 = 700$ mt/ml.

$A_c = \frac{2500}{1{,}50} \times 2{,}90 = 4833$ t

$A_s = 4833 \left(1 - \sqrt{1 - \frac{2 \times 700}{2{,}90 \times 4833}}\right) = 248$ t/m

$\omega = 248 \times 1{,}15 / 5{,}1 = 56$ cm²/m $\phi 32/15$

$\omega_R = 56/4 = 14$ cm²/m $\phi 25/30$

ARMADURA SUPERIOR

$q = 9 \times 1{,}80 + 3{,}00 \times 2{,}50 + 3 = 26{,}7$ t/m²

$Q_p = 139$ t

$\mu = 26{,}7 \times \left(\frac{5{,}40 + 0{,}15 \times 5{,}20}{2}\right)^2 \times 3{,}75 - 139 \times (3{,}90 + 0{,}15 \times 5{,}2) =$

$= 1912 - 650 = 1262$ mt/pilote

$\mu = \frac{1262}{3{,}75} = 336$ mt/ml

$\mu' = 1{,}6 \times 336 = 538$ mt

$A_c = 4833$ t.

$A_s = 4833 \left(1 - \sqrt{1 - \frac{2 \times 538}{2{,}9 \times 4833}}\right) = 190$ t/m

$\omega = 190 \times 1{,}15 / 5{,}1 = 42{,}8$ cm²/m → $\phi 32/15$

$\omega_R = 42{,}8/4 = 10{,}7$ cm² — $\phi 25/30$

continue.

$Q_1 = \frac{613}{3{,}75} = 163$ t/ml

$Q_2 = 26{,}7 \times 5{,}4 - \frac{139}{3{,}75} = 144 - 37 = 107$ t/ml

$T_b = 5 \sqrt{\frac{250}{1{,}5}} \times 2{,}9 = 187$ t/ml > 163

Se dispone longitudinal $\phi 16/30/60$

HOJA ___ DE ___
FECHA ___

COMPROBACIÓN DE LOS PILOTS DANALUZ

HIPÓTESIS SOBRE APOYOS HACIA TIERRA.

$F_x = 1356 - 2 \times 583.8 = 188$ ton

$F_y = -4938$ ton

$M_z = -5995 + 2 \times 583.8 (9.00 + 8.00 - 2.00) =$

$-5995 + 11676 = 5681$ mt

El valor cambia de signo pero en valor absoluto es inferior al de servicio y por lo tanto el pilote más cargado es el de lado tierra con estos esfuerzos a los considerados.

A efectos de anclaje inferior tenemos

$V = 5.40 + 0.15 \times 5.20 = 6.18$

$M_u = \frac{2448 \times (6.18 - 1.50)}{16.50} - \left(3 \times 2.50 + 9 \times 1.80 + 3.00\right) \times \frac{6.18^2}{2} =$

$= 694 - 509 = 184$ mt/ml

Vale la anadura dispuesta.

ESTRIBO 2 (DESLIZANTE)

```
250.0,5100.0,0.04,1
1.800,30.0,0.00,3.00,0.00,0.00,1
VIADUCTO 1. ESTRIBO 2
   04,178.75,16.12,40.00,101.391,0.0,0.0
5.. 1.70,0.40,3.40,0.50,2.00,0.40,14.00,0.0,2.50,10.15,00.0,3
```

CALCULO DE ESTRIBOS. VERSION 09-01-1996

PROGRAMA PROPIEDAD DE INTECSA

VIADUCTO 1. ESTRIBO 2

CARACTERISTICAS DEL RELLENO

PESO ESPECIFICO (TN/M3)	= 1.80
ANGULO DE ROZAMIENTO FI	= 30.00
ANGULO ROZAMIENTO TERRENO-MURO	= .00
SOBRECARGA (TN/M2)	= 3.00
COEFICIENTE DE EMPUJE ACTIVO	= .333

CARACTERISTICAS DE LOS MATERIALES

RESISTENCIA CARACTERISTICA DEL HORMIGON	= 250. KG/CM2
LIMITE ELASTICO DEL ACERO	= 5100. KG/CM2
RECUBRIMIENTO DE LAS ARMADURAS	= .040 M

CARGAS SOBRE EL ESTRIBO

CARGA VERTICAL DE TABLERO PESO PROPIO Y CARGA PERMANENTE	264.0 TN
CARGA VERTICAL DE SOBRECARGAS	178.8 TN
FUERZA LONGITUDINAL DE FRENADO RETRACCION Y TEMPERATURA	16.1 TN
FUERZA TRANSVERSAL DE VIENTO	40.0 TN
MOMENTO TRANSVERSAL DE SOBRECARGAS	101.4 MT
FUERZA LONGITUDINAL DE SISMO	.0 TN
FUERZA TRANSVERSAL DE SISMO	.0 TN

GEOMETRIA DEL ESTRIBO
==========

ANCHURA DEL ESTRIBO	B	= 14.00
ESVIAJE (GRADOS SEXAGESIMALES)	BETA	= .00

ALZADO DEL ESTRIBO

ESPESOR DEL FALDON	A3	= .40
ALTURA DEL FALDON	A6	= 2.00
DISTANCIA DE APOYO A BORDE ESTRIBO	A5	= .50
ESPESOR DEL ESTRIBO	A2	= 1.70
ESPESOR DE LAS ALETAS	A7	= .40
ALTURA TOTAL DEL ESTRIBO	H + C	= 12.65
ALTURA DE TIERRAS	H	= 10.15

ZAPATA

VUELO DELANTERO	A1	= 3.40
VUELO TRASERO	A4	= 3.40
LONGITUD TOTAL	L	= 8.50
CANTO	C	= 2.50
RESGUARDO SOBRE ZAPATA		= 0.30
TENSION MEDIA PEDIDA SOBRE TERRENO		= LIBRE

ARMADURAS DEL ALZADO

TRASDOS.	ZONA INFERIOR	AV.= 31.7 CM2/M	(FI 25 A .150 M)
U(CALCULO)= 2.6CM2/M		AH.= 13.7 CM2/M	(FI 20 A .225 M)
	5.2 M. SUPERIORES	AV.= 15.9 CM2/M	(FI 25 A .300 M)
		AH.= 13.7 CM2/M	(FI 20 A .225 M)
INTRADOS		AV.= 5.5 CM2/M	(FI 12 A .200 M)
		AH.= 13.7 CM2/M	(FI 20 A .225 M)
FALDON	TRASDOS	AV.= 5.4 CM2/M	(FI 12 A .200 M)
		AH.= 14.5 CM2/M	(FI 20 A .200 M)
	INTRADOS	AV.= 5.4 CM2/M	(FI 12 A .200 M)
		AH.= 2.1 CM2/M	(FI 8 A .200 M)
ALETAS	TRASDOS	AV.= 23.3 CM2/M	(FI 20 A .125 M)
		AH.= 26.9 CM2/M	(FI 25 A .175 M)
	INTRADOS	AV.= 11.6 CM2/M	(FI 20 A .250 M)
		AH.= 13.5 CM2/M	(FI 20 A .225 M)

ESTRIBO CON RELLENO DE TIERRAS Y SIN TABLERO
==========

ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	=	2269.1 TN.
MOMENTO LONGITUDINAL	=	1354.2 M.T.
EMPUJE LONGITUDINAL	=	849.2 TN.

ESTRIBO CON PUENTE EN SERVICIO
==========

ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	=	2711.9 TN.
MOMENTO LONGITUDINAL	=	1680.9 M,T.
EMPUJE LONGITUDINAL	=	865.3 TN.
MOMENTO TRANSVERSAL	=	527.4 M.T.

MEDICION DEL ESTRIBO
====================

HORMIGON

ENCEPADO		297.50
ALZADO		193.97
FALDON TRASERO		11.20
ALETAS		27.61
TOTAL M3	=	530.28

ARMADURAS

	DIAMETRO	NUMERO	LONGITUD	PESO	PESO TOTAL
FALDON					
	12.	70	6.20	.89	385.60
	20.	10	14.50	2.47	357.86
	8.	10	14.50	.39	57.20
ALZADO					
	25.	93	12.35	3.86	4429.10
	12.	70	10.65	.89	662.36
	20.	44	17.10	2.47	1856.92
	20.	37	17.10	2.47	1561.50
	20.	22	17.10	2.47	928.46
A DEDUCIR					
	25.	46	4.95	3.86	-878.07
	20.	22	17.10	2.47	-928.46
ALETAS					
	20.	54	12.75	2.47	1699.22
	25.	116	5.05	3.86	2258.99
	20.	28	12.75	2.47	881.08
	20.	90	5.05	2.47	1121.71
ENCEPADO					
TOTAL KG	=				14393.53

En montaje

$F_x = -849,2$

$F_y = -2709$

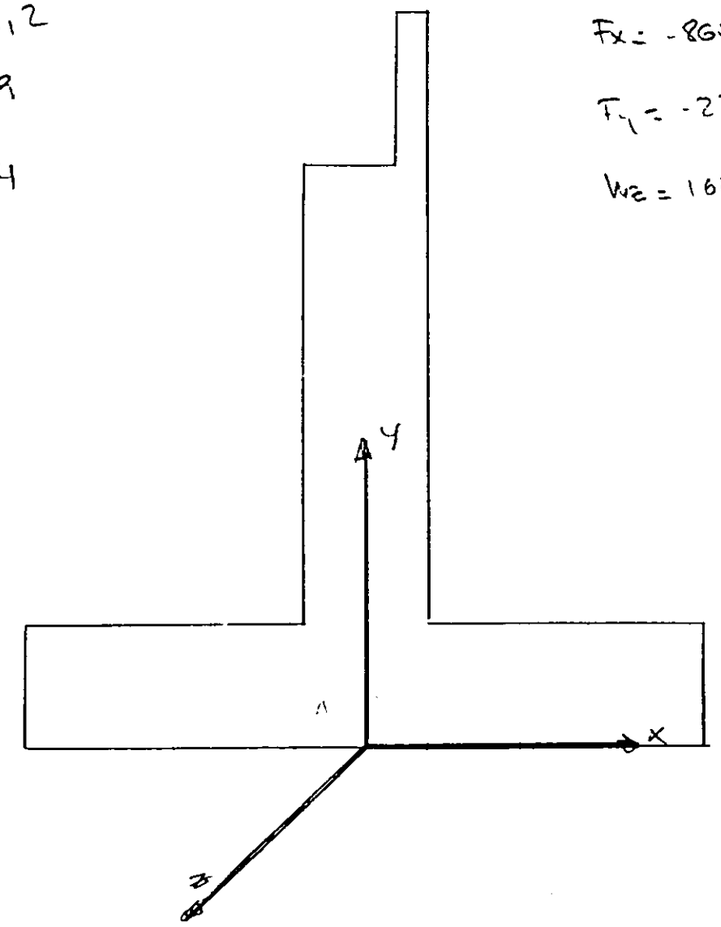
$M_z = 1354$

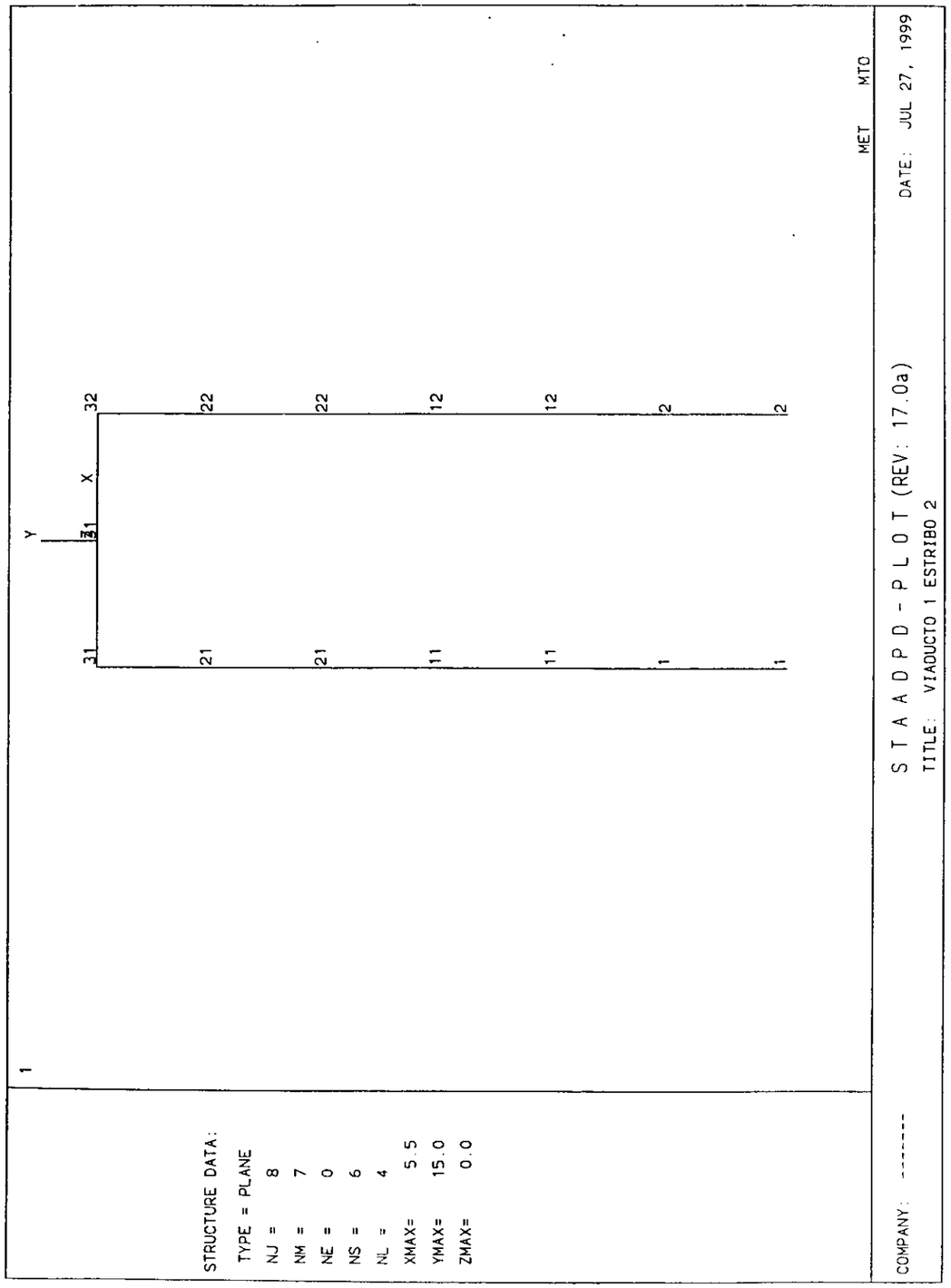
En servicio

$F_x = -865$

$F_y = -2711$

$M_z = 1680$






```
*************************************************
*                                               *
*           S T A A D - III                     *
*           Revision 17.0a                      *
*           Proprietary Program of              *
*           RESEARCH ENGINEERS, Inc.            *
*           Date=    JUL 27, 1999               *
*           Time=    11:48:39                   *
*                                               *
*************************************************
```

```
 1. STAAD PLANE VIADUCTO 1 ESTRIBO 2
 2. *EFECTOS CARGAS GRAVITATORIAS
 3. UNIT MTO MET
 4. JOINT COORDINATES
 5.   1  -2.750   -15.000
 6.   2   2.750   -15.000
 7.  11  -2.750   -10.000
 8.  12   2.750   -10.000
 9.  21  -2.750    -5.000
10.  22   2.750    -5.000
11.  31  -2.750    -0.000
12.  32   2.750    -0.000
13. MEMBER INCIDENCES
14.   1    1    11
15.   R    2    10   10
16.   2    2    12
17.   R    2    10   10
18.   31   31   32
19. MEMBER PROPERTY
20. *PILOTES  2 * 4 PILOTES
21. 1 11 21 PR AX  7.065 IZ  0.99330
22. 2 12 22 PR AX  7.065 IZ  0.99330
23. *ENCEPADO (1.50+3*4.50+1.50)*2.5
24. 31      PR AX 41.250 IZ  21.4843
25. CONSTANT
26. E  3250000.   ALL
27. POI 0.15
28. DEN 2.50
29. SUPPORT
30. 1 2           PINNED
31. 11 12         FIXED BUT FY MZ KFX  162500
32. 21 22         FIXED BUT FY MZ KFX  100000
33. LOADING 1 RELLENO DE TIERRAS Y SIN TABLERO
34. MEMBER LOAD
35. *PROCEDENTE DE CALCULO DE ESTRIBO
36. 31       CON  GX  -849
37. 31       CON  GY -2269
38. 31       CMOM GZ  1354
39. LOADING 2 PUENTE EN SERVICIO
40. MEMBER LOAD
41. *PROCEDENTE DE CALCULO DE ESTRIBO
42. 31       CON  GX  -865
43. 31       CON  GY -2711
44. 31       CMOM GZ  1680
45. LOADING COMBINATION 3  ESFUERZOS NAYORADOS
46. 1 1.50
47. LOADING COMBINATION 4  ESFUERZOS MAYORADOS
```

*EFECTOS CARGAS GRAVITATORIAS
48. 2 1.50
49. PERFORM ANALISIS

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 8/ 7/ 6
ORIGINAL/FINAL BAND-WIDTH = 2/ 1
TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 20
SIZE OF STIFFNESS MATRIX = 120 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 12.01 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX. 11:48:40
++ PROCESSING GLOBAL STIFFNESS MATRIX. 11:48:40
++ PROCESSING TRIANGULAR FACTORIZATION. 11:48:40
++ CALCULATING JOINT DISPLACEMENTS. 11:48:40
++ CALCULATING MEMBER FORCES. 11:48:40

50. LOAD LIST 1 2 3 4
51. PRINT MEMBER FORCES LIST 21 22

*EFECTOS CARGAS GRAVITATORIAS

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
21	1	21	1976.11	-436.99	0.00	0.00	0.00	-473.83
		31	-1976.11	436.99	0.00	0.00	0.00	-1711.14
	2	21	2265.96	-447.43	0.00	0.00	0.00	-485.31
		31	-2265.96	447.43	0.00	0.00	0.00	-1751.82
	3	21	2964.17	-655.49	0.00	0.00	0.00	-710.74
		31	-2964.17	655.49	0.00	0.00	0.00	-2566.70
	4	21	3398.94	-671.14	0.00	0.00	0.00	-727.97
		31	-3398.94	671.14	0.00	0.00	0.00	-2627.72
22	1	22	292.89	-412.01	0.00	0.00	0.00	-496.30
		32	-292.89	412.01	0.00	0.00	0.00	-1563.74
	2	22	445.04	-417.57	0.00	0.00	0.00	-512.16
		32	-445.04	417.57	0.00	0.00	0.00	-1575.71
	3	22	439.33	-618.01	0.00	0.00	0.00	-744.45
		32	-439.33	618.01	0.00	0.00	0.00	-2345.61
	4	22	667.56	-626.36	0.00	0.00	0.00	-768.24
		32	-667.56	626.36	0.00	0.00	0.00	-2363.56

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

52. PRINT MEMBER FORCES LIST 11 12

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
11	1	11	1976.11	-2.41	0.00	0.00	0.00	-485.89
		21	-1976.11	2.41	0.00	0.00	0.00	473.83
	2	11	2265.96	-2.44	0.00	0.00	0.00	-497.53
		21	-2265.96	2.44	0.00	0.00	0.00	485.31
	3	11	2964.17	-3.62	0.00	0.00	0.00	-728.83
		21	-2964.17	3.62	0.00	0.00	0.00	710.74
	4	11	3398.94	-3.67	0.00	0.00	0.00	-746.30
		21	-3398.94	3.67	0.00	0.00	0.00	727.97
12	1	12	292.89	5.04	0.00	0.00	0.00	-471.11
		22	-292.89	-5.04	0.00	0.00	0.00	496.30
	2	12	445.04	6.46	0.00	0.00	0.00	-479.88
		22	-445.04	-6.46	0.00	0.00	0.00	512.16
	3	12	439.33	7.56	0.00	0.00	0.00	-706.66
		22	-439.33	-7.56	0.00	0.00	0.00	744.45
	4	12	667.56	9.69	0.00	0.00	0.00	-719.82
		22	-667.56	-9.69	0.00	0.00	0.00	768.24

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

53. PRINT MEMBER FORCES LIST 1 2

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	1976.11	97.18	0.00	0.00	0.00	0.00
		11	-1976.11	-97.18	0.00	0.00	0.00	485.89
	2	1	2265.96	99.51	0.00	0.00	0.00	0.00
		11	-2265.96	-99.51	0.00	0.00	0.00	497.53
	3	1	2964.17	145.77	0.00	0.00	0.00	0.00
		11	-2964.17	-145.77	0.00	0.00	0.00	728.83
	4	1	3398.94	149.26	0.00	0.00	0.00	0.00
		11	-3398.94	-149.26	0.00	0.00	0.00	746.30
2	1	2	292.89	94.22	0.00	0.00	0.00	0.00
		12	-292.89	-94.22	0.00	0.00	0.00	471.11
	2	2	445.04	95.98	0.00	0.00	0.00	0.00
		12	-445.04	-95.98	0.00	0.00	0.00	479.88
	3	2	439.33	141.33	0.00	0.00	0.00	0.00
		12	-439.33	-141.33	0.00	0.00	0.00	706.66
	4	2	667.56	143.96	0.00	0.00	0.00	0.00
		12	-667.56	-143.96	0.00	0.00	0.00	719.82

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

54. PRINT MEMBER FORCES LIST 31

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
31	1	31	436.99	1976.11	0.00	0.00	0.00	1711.14
		32	412.01	292.89	0.00	0.00	0.00	1563.74
	2	31	447.42	2265.96	0.00	0.00	0.00	1751.82
		32	417.58	445.04	0.00	0.00	0.00	1575.71
	3	31	655.48	2964.17	0.00	0.00	0.00	2566.70
		32	618.02	439.33	0.00	0.00	0.00	2345.61
	4	31	671.12	3398.94	0.00	0.00	0.00	2627.72
		32	626.38	667.56	0.00	0.00	0.00	2363.56

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

55. PRINT REACC ALL

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	-97.18	1976.11	0.00	0.00	0.00	0.00
	2	-99.51	2265.96	0.00	0.00	0.00	0.00
	3	-145.77	2964.17	0.00	0.00	0.00	0.00
	4	-149.26	3398.94	0.00	0.00	0.00	0.00
2	1	-94.22	292.89	0.00	0.00	0.00	0.00
	2	-95.98	445.04	0.00	0.00	0.00	0.00
	3	-141.33	439.33	0.00	0.00	0.00	0.00
	4	-143.96	667.56	0.00	0.00	0.00	0.00
11	1	99.59	0.00	0.00	0.00	0.00	0.00
	2	101.95	0.00	0.00	0.00	0.00	0.00
	3	149.38	0.00	0.00	0.00	0.00	0.00
	4	152.93	0.00	0.00	0.00	0.00	0.00
12	1	89.18	0.00	0.00	0.00	0.00	0.00
	2	89.52	0.00	0.00	0.00	0.00	0.00
	3	133.78	0.00	0.00	0.00	0.00	0.00
	4	134.28	0.00	0.00	0.00	0.00	0.00
21	1	434.58	0.00	0.00	0.00	0.00	0.00
	2	444.98	0.00	0.00	0.00	0.00	0.00
	3	651.87	0.00	0.00	0.00	0.00	0.00
	4	667.47	0.00	0.00	0.00	0.00	0.00
22	1	417.05	0.00	0.00	0.00	0.00	0.00
	2	424.03	0.00	0.00	0.00	0.00	0.00
	3	625.57	0.00	0.00	0.00	0.00	0.00
	4	636.05	0.00	0.00	0.00	0.00	0.00

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

56. PLOT DIS FILE
57. PLOT BEN FILE
58. FINISH

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

**** DATE= JUL 27,1999 TIME= 11:48:41 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

VIADUCTO 1 - ESTRIBO 2 - ARMADURAS DE PILOTES

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-2964	2565	-741	641	0.35	0.20	0.43	206	26	42
BARRA 22	-439	2345	-110	586	0.05	0.18	0.48	229	29	47

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-3398	2627	-850	657	0.40	0.21	0.48	229	29	47
BARRA 22	-667	2363	-167	591	0.08	0.19	0.48	229	29	47

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-2964	710	-741	178	0.35	0.06	0.04	19	14	18
BARRA 12	-439	744	-110	186	0.05	0.06	0.10	48	14	18

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-3398	727	-850	182	0.40	0.06	0.04	19	14	18
BARRA 12	-667	768	-167	192	0.08	0.06	0.08	38	14	18

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-2964	728	-741	182	0.35	0.06	0.04	19	14	18
BARRA 2	-439	706	-110	177	0.05	0.06	0.10	48	14	18

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-3398	746	-850	187	0.40	0.06	0.04	19	14	18
BARRA 2	-667	719	-167	180	0.08	0.06	0.08	38	14	18

ν = N' / 4 / 2120

μ= M' / 4 / 1.5 / 2120

Intecsa

PROYECTO: HOJA DE

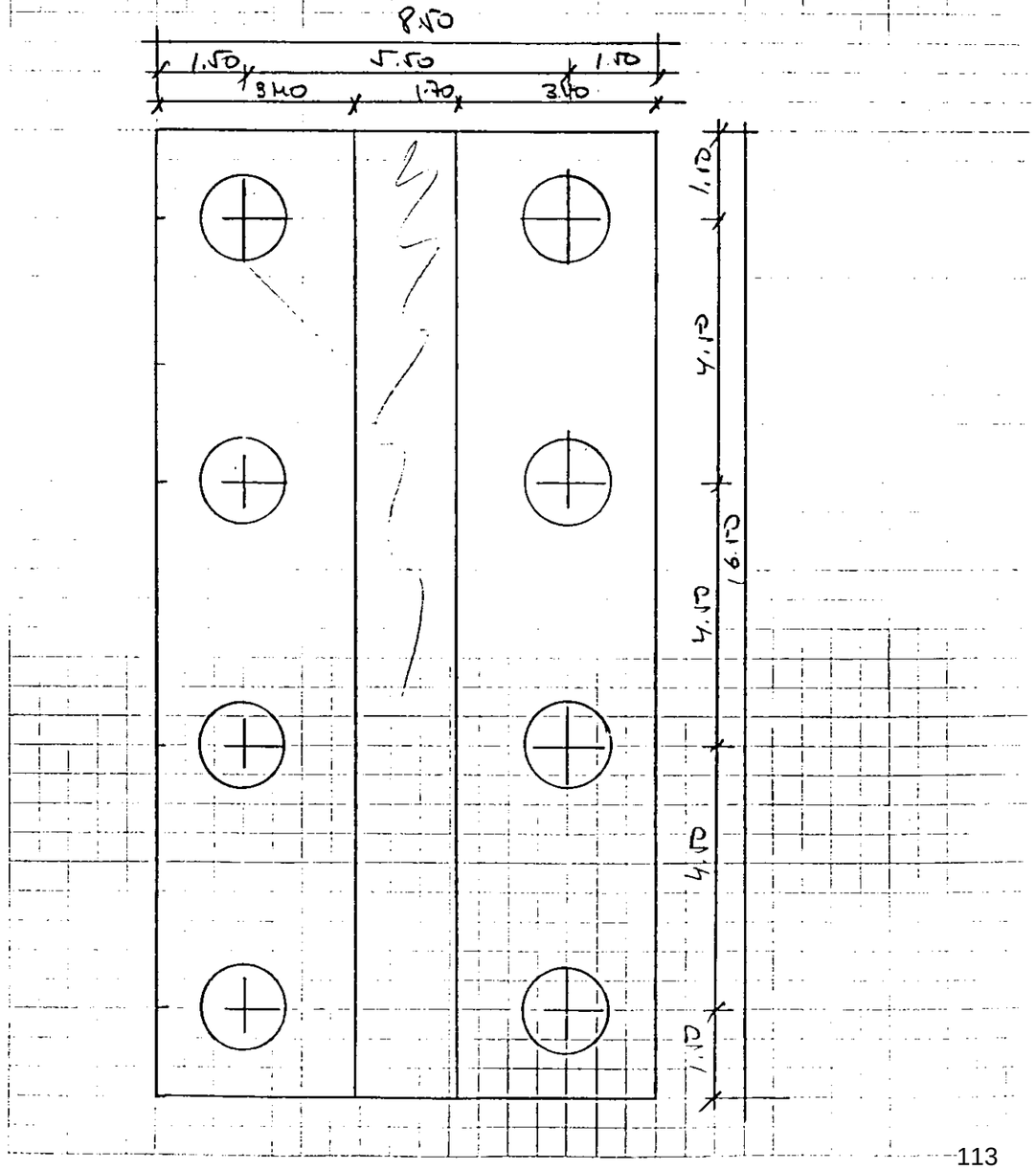
FECHA

EJECUTANTE:

CALCULO DEL ENCEPADO 4x2 PILOTES Φ1.50

PILOTE MAS CARGADO

Q = 2265 - 5667
4



ARMADURA SUPERIOR

$M_u = 566 \times (3.40 - 1.50 + 0.15 \times 1.50) = 1220$ mt

$\mu = \frac{1220}{2.25 + 1.50} = 325$ mt/ml

$\mu' = 1.6 + 325 = 520$ mt

$A_c = \frac{2500}{1.5} \times 2.40 \times 1.00 = 4000$

$d_f = 4000\left(1 - \sqrt{1 - \frac{2 \times 520}{2.40 \times 4000}}\right) = 223$ ton/m

$\omega = 223 \times 1.15 / 5.1 = 50$ cm²/ml Ø32/15

$\omega_{12} = 50/4 = 12.5$ cm²/ml → Ø25/30

ARMADURA INFERIOR

$q = (2.5 \times 2.5 + 10.15 \times 1.5 + 3) = 6.25 + 15.25 + 3 = 24.5$ t/m²

$Q_p = 292/4 = 73$ t/punto

$\mu = 24.5 \times (2.25 + 1.50) \times \frac{(3.40 + 0.15 \times 17.0)^2}{2} - 73 \times (1.9 + 0.15 \times 17.0)$

$= 91.97 \times 6.68 - 1373.2 = 456$ mt/mlst

$\mu = \frac{456}{2.25 + 1.50} = 122$ mt

$\mu' = 122 \times 1.6 = 195$ mt

$A_c = 4000$ t

$A_s = 4000\left(1 - \sqrt{1 - \frac{2 \times 195}{24 \times 4000}}\right) = 82$ t

$\omega = 82 \times 1.15 / 5.1 = 18.5$ cm²/ml → #Ø20/15

Cons:-

$Q = \frac{566}{2.25 + 1.50} = 151$ t/m

$Q' = 151 \times 1.6 = 241$ ton/m

$T_b = 5\sqrt{\frac{250}{1.5}} \times 2.40 \times 1.00 = 155$ t/m

$\omega_t = \frac{241 - 155}{0.9 \times 4.2 \times 2.4} = 9.47$ cm²/ml

$\omega_{t\,min} = 0.02 \times \frac{2500}{1.5} \times \frac{1}{4.2} = 7.9$ cm²/m.

Se dejara horquillas b16/60/30

COMPRO BLOQUE DE LOS PILOTES PARA

RECOGER SOLO ESFUERZOS HACIA LADO

TIERRAS

$F_x = -849{,}2 + 2(16{,}12) = -817$ Tm

$F_y = -2711$ Tm

$M_z = 1680 - 2 \times 16{,}12 \times (10{,}15 + 2{,}50 - 2{,}00) =$

$= 1680 - 32{,}24 \times 10{,}65 = 1336$ mt < 1680 mt

No hay inversión de momentos y el valor absoluto es menor.

VIADUCTO 1

PRUEBA DE CARGA

La estructura se ha modelizado como una viga continua de las siguientes características:

- Luces: 16.00, 23.00, 23.00, 16.00 m
- Sección transversal (A): 13.108 m^2
- Momento de inercia (I): 4.2849 m^4
- Resistencia característica del hormigón (f_{ck}): 400 kp/cm^2
- Módulo de elasticidad (E): $3.8x10^6$ t/m^2

El tren de cargas ha consistido en 6 camiones no articulados de 3 ejes y 26 t de peso total (tipo *dumper*), agrupados en dos bloques de tres vehículos en fondo con las cajas enfrentadas. Con dicho tren recorriendo la estructura, se han calculado* las líneas de influencia de las flechas y momentos en centros de vano, y de las reacciones en los apoyos. Los ejes de cada camión transmiten cargas de 7.0 t (eje delantero) y 9.5 t (cada eje del tándem trasero), siendo los interejes de 3.90 y 1.35 m. El tren de cargas completo queda definido por los siguientes parámetros:

- Cargas: 21, 28.5, 28.5, 28.5, 28.5, 21 t
- Interejes: 3.90, 1.35, 3.00, 1.35, 3.90 m

Se ha calculado**, así mismo, el valor del período de vibración correspondiente a la frecuencia principal de vibración libre de la estructura.

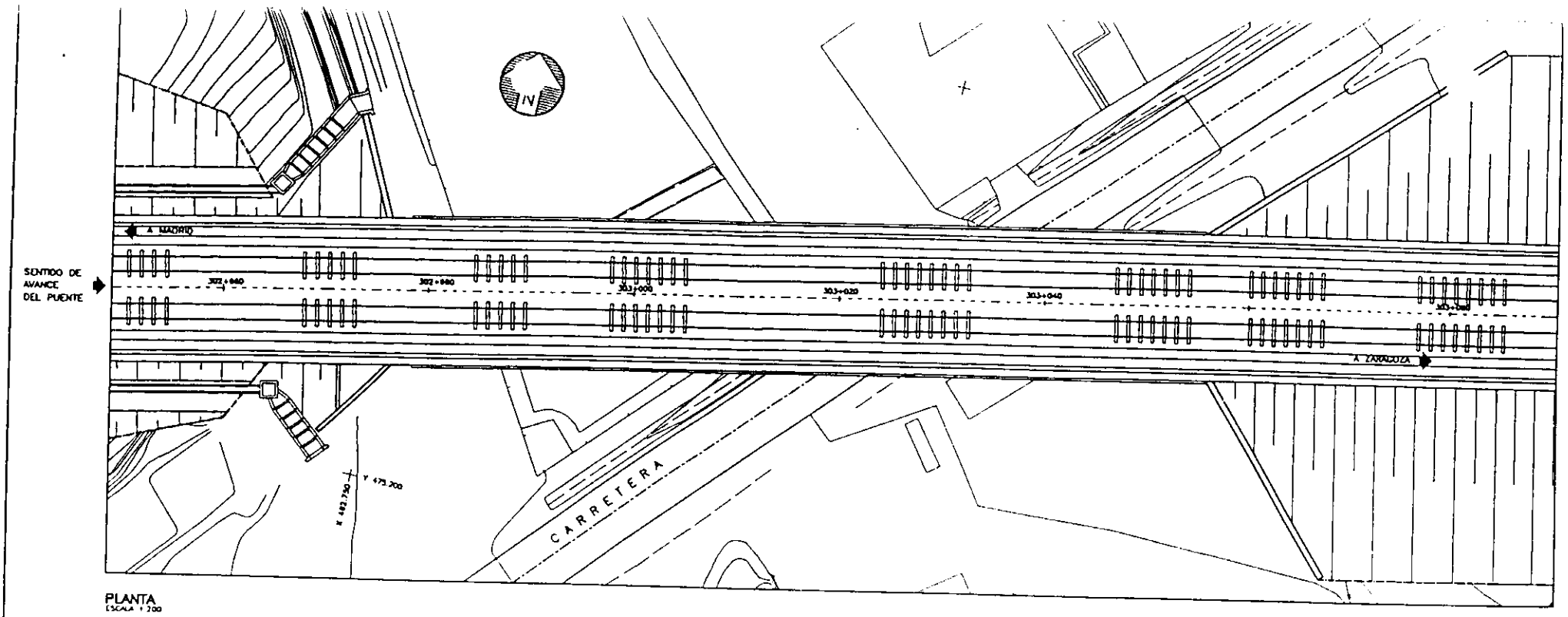
Los resultados previstos son los siguientes:

Vano	Abscisa de carga [m]	Flecha [mm]	Momento flector [mt]
1	13.25	-0.42	287
2	19.75	-0.98	376
3	16.75	-0.98	376
4	15.08	-0.43	281

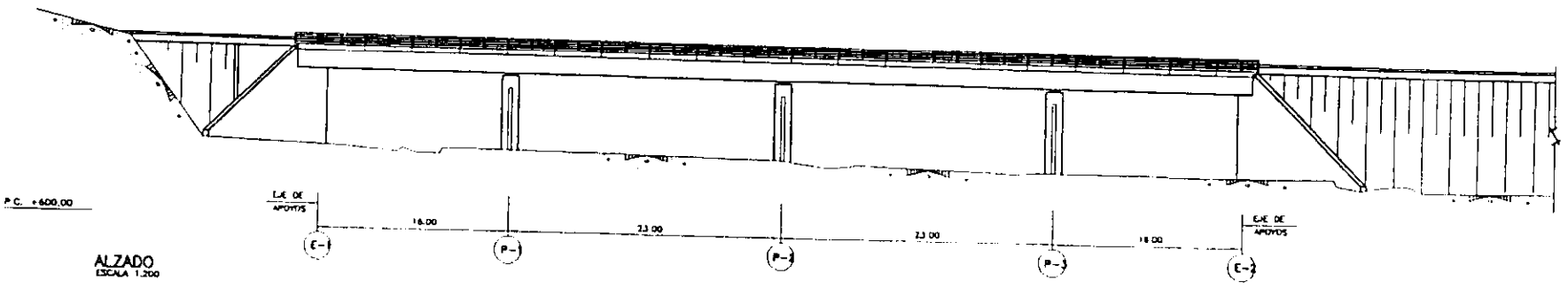
Flechas previstas en viaducto 1

La frecuencia principal de vibración es de 7.99 Hz, correspondiente a un período de 0.1251 s.

* Con el programa Merlin, de Kinesia
** Con el programa SAP 80



PLANTA
ESCALA 1:700

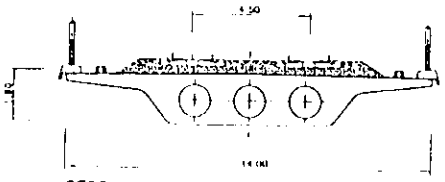


ALZADO
ESCALA 1:200

COORDENADAS DE REPLANTEO

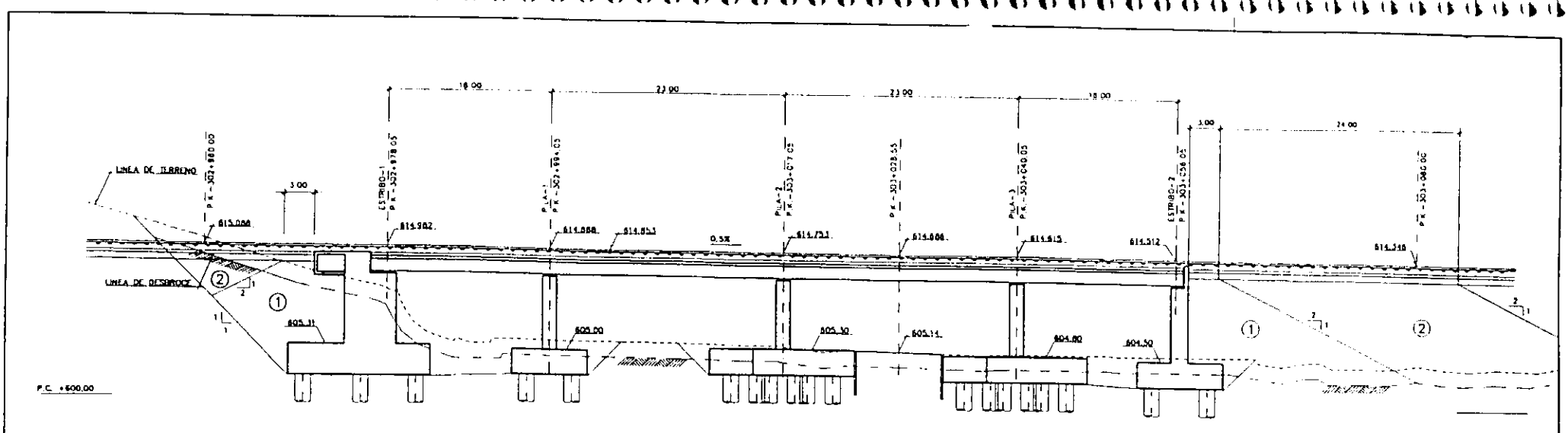
	D.D.	X	Y	Az
E-1	302+878.050	482.751,783	4.475.218,515	186,338g
P-1	302+944.050	482.787,431	4.475.221,800	186,198g
P-2	303+017.050	482.788,923	4.475.228,708	186,418g
P-3	303+040.050	482.812,431	4.475.231,444	186,636g
E-2	303+056.050	482.828,087	4.475.234,885	187,057g

VIGENTE
FECHA: 28.9.99
RESPONSABLE
CODIGO: P.P. 2.9.1.-B



SECCION TRANSVERSAL TIPO

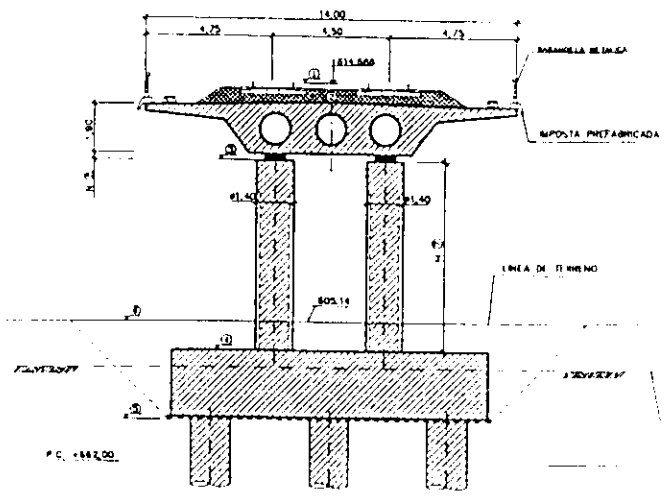
GIF	TITULO: PROYECTO CONSTRUCTIVO LINEA DE ALTA VELOCIDAD MADRID-BARCELONA-FRONTERA FRANCESA TRAMO MADRID-ZARAGOZA SUBTRAMO: PLATAFORMA (MODIFICADO Nº 2)	EL INGENIERO DIRECTOR DEL PROYECTO	EL INGENIERO AUTOR	AUTOR U.T.E. DRAGADOS TECSA	CONFORME POR EL CONTRATISTA	ESCALA 1:200 1:100	FECHA SEPTIEMBRE 1999	TITULO DEL PLANO ESTRUCTURA P.K. 303+028,55 PLANO GENERAL VIADUCTO 1	Nº DE PLANO 2.9.1.-B Hoja 1 de



SECCION LONGITUDINAL
ESCALA 1/200

①	SUELO ESTABILIZADO CON CEMENTO
②	TERRAPLENES COMPACTADAS

	① RASANTE	② CORONACION TABLERO	③ CORONACION PILA	④ CORONACION ZAPATA	⑤ FONDO EXCAVACION	⑥ TERRENO	⑦ H PILAS	⑧ ALTURA N (mm)
ESTRIBO-1	814.882	814.312	612.234	605.31	602.21	605.81		178
PILA-1	814.888	814.218	612.128	605.00	602.40	605.56	7.128	190
PILA-2	814.753	814.063	611.909	605.30	602.70	605.80	6.689	194
PILA-3	814.815	813.945	611.855	604.80	602.20	605.30	7.055	190
ESTRIBO-2	814.512	813.842	611.784	604.50	601.90	605.00		178

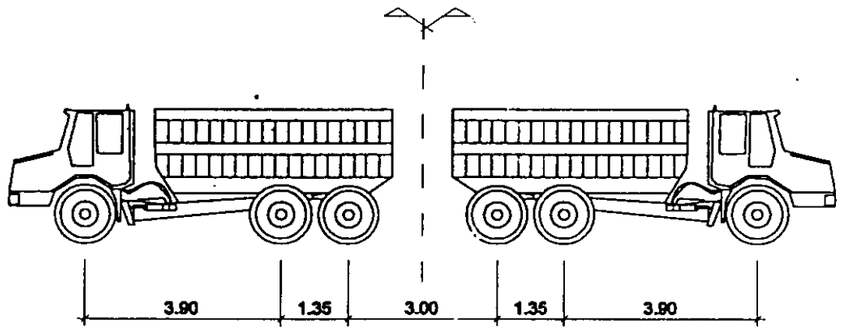


SECCION TRANSVERSAL
ESCALA 1/200

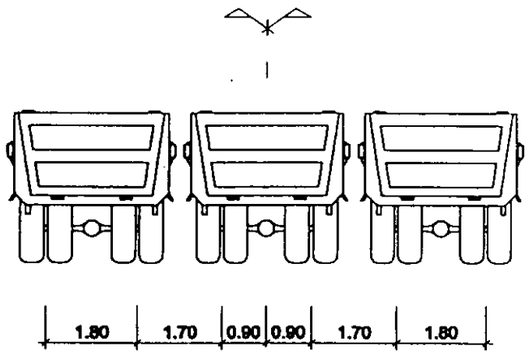
VIGENTE
FECHA: 2.5 - 1 - 2000
CODIGO: P.P. 2.9.1.3-B

GIF	TITULO PROYECTO CONSTRUCTIVO LINEA DE ALTA VELOCIDAD MADRID-BARCELONA-FRONTERA FRANCESA	EL INGENIERO DIRECTOR DEL PROYECTO	AUTOR U.T.E. DRAGADOS – TECSA	CONFORME POR EL CONTRATISTA	ESCALA 1:200	FECHA ENERO 2000	TITULO DEL PLANO P.K. 303+028,86 SECC. LONGITUDINAL Y TRANSVERSAL	Nº DE PLANO 2.9.1.B

DISPOSICION DE CAMIONES EN TODOS LOS VANOS

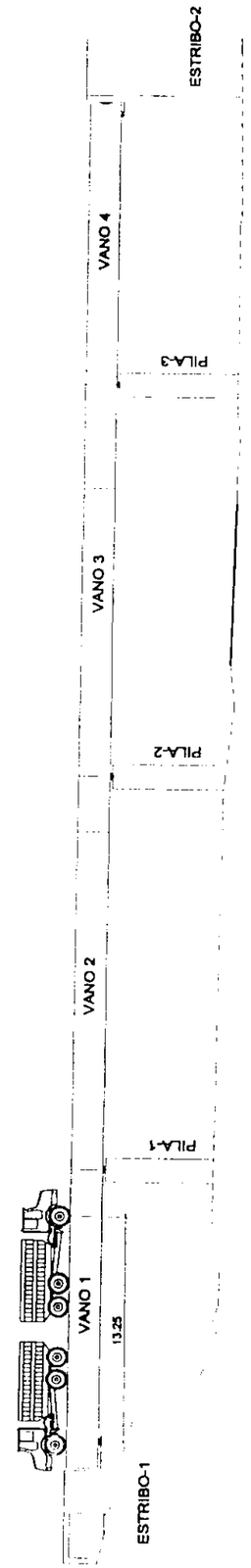


LONGITUDINALMENTE

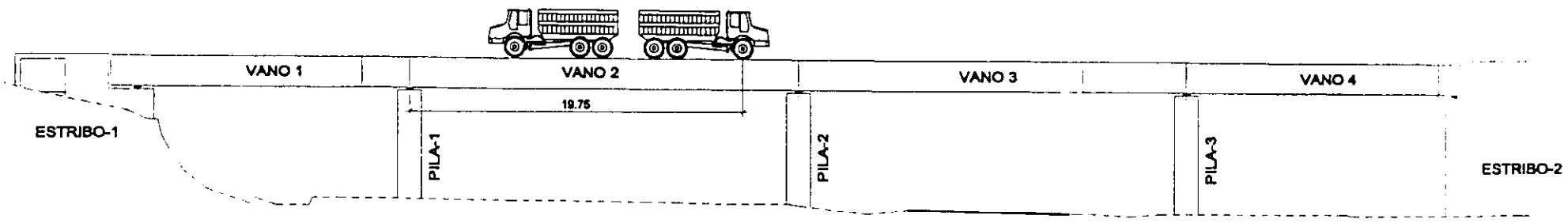


TRANSVERSALMENTE

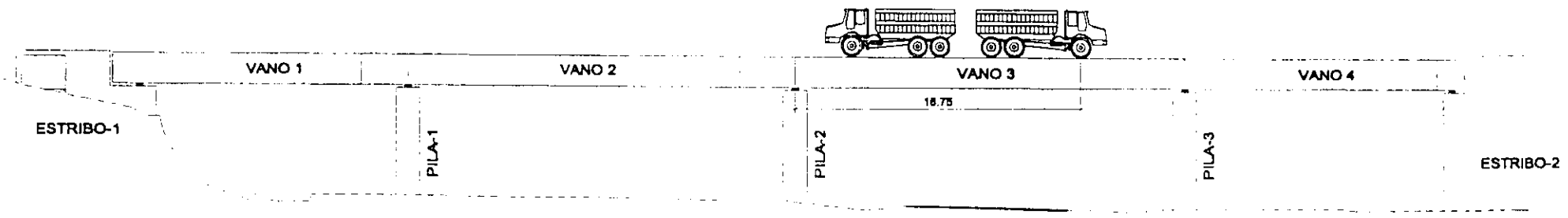
PRUEBA DE CARGA VIADUCTO Nº 1



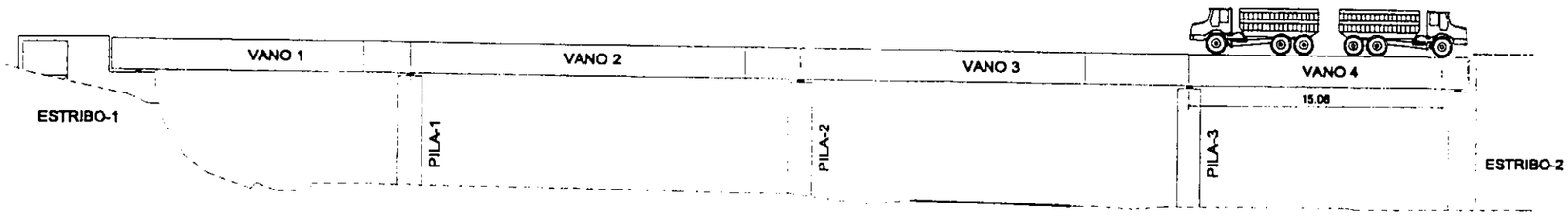
PRUEBA DE CARGA VIADUCTO Nº 1



PRUEBA DE CARGA VIADUCTO Nº 1



PRUEBA DE CARGA VIADUCTO Nº 1




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VIADUCTO 1
SAP80 V85.02

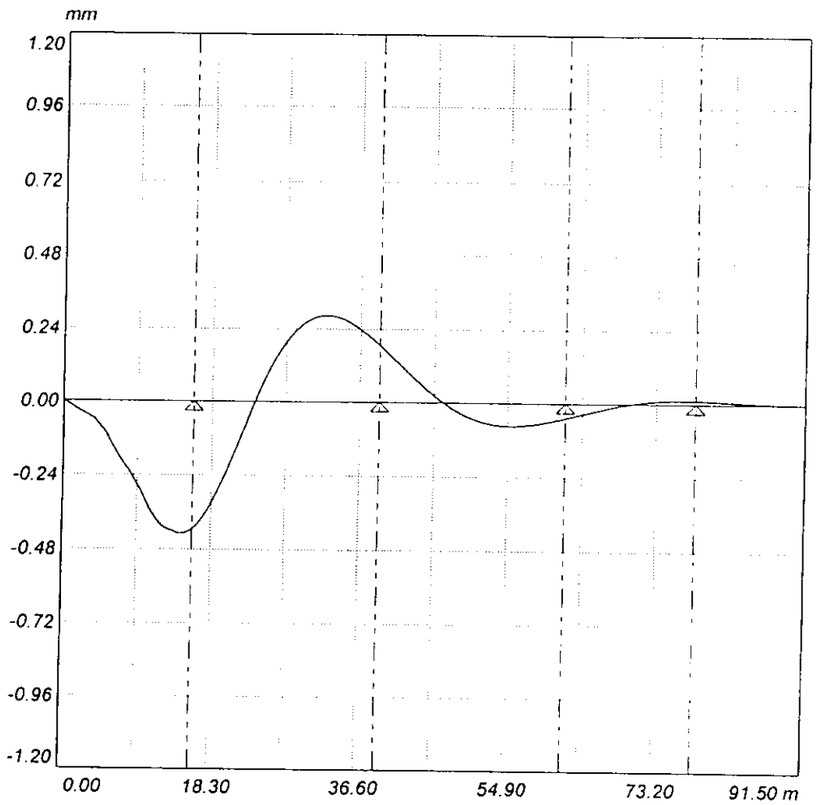
 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
 * * *  E V A L U A T I O N   O F   E I G E N V A L U E S  * * *
 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

 NUMBER OF EQUATIONS                    =  153
 HALF BAND WIDTH                        =    3
 NUMBER OF MASSES                       =   74
 NUMBER OF VALUES TO BE EVALUATED=        1
 SIZE OF SUBSPACE                       =    2
 NUMBER OF ITERATIONS PER SHIFT         =    2

    CURRENT # BELOW ITER
        SHIFT   SHIFT    #          APPROXIMATIONS OF NEXT 4 EIGENVALUES
-.10000E+01         0
                         1  .3413334E+04  .9016512E+04  .0000000E+00  .0000000E+00
                         2  .2605577E+04  .5902304E+04  .3413334E+04  .9016512E+04
 .23450E+04      0
                         3  .2522294E+04  .5147677E+04  .2605577E+04  .5902304E+04
                         4  .2522259E+04  .5094953E+04  .2522294E+04  .5147677E+04
 .22700E+04      0
                         5  .2522259E+04  .5091465E+04  .2522259E+04  .5094953E+04

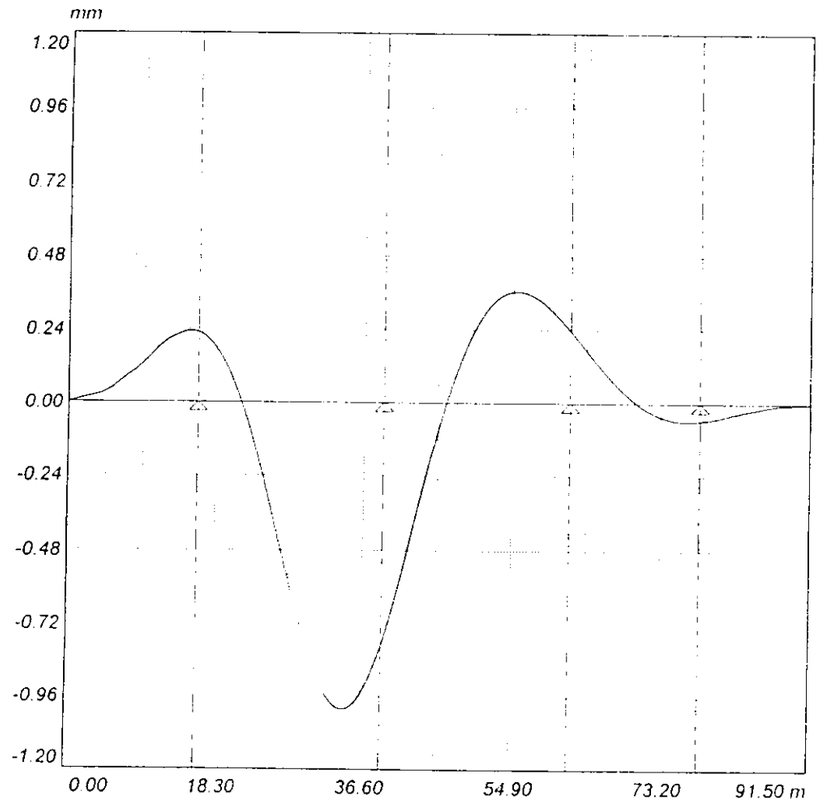
                                EIGENVALUE #  1  =      .2522259E+04
                                PERIOD (SECONDS) =       .12510
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Viaducto V1
Línea de influencia: flecha en vano 1
3+3 Camiones 26 t

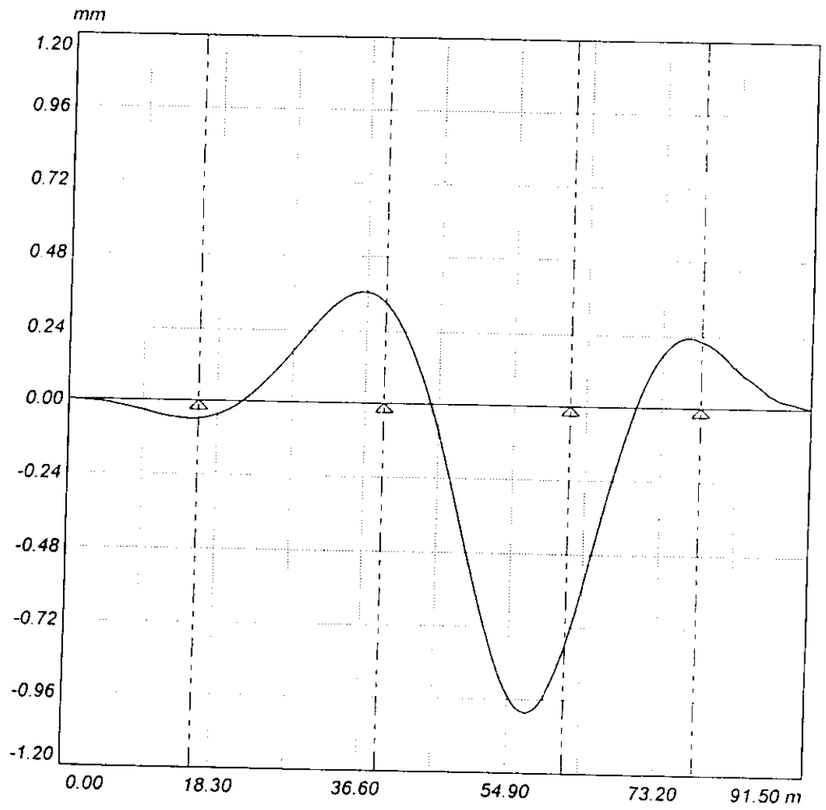


Kinesia

Viaducto V1
Línea de influencia: flecha en vano 2
3+3 Camiones 26 t

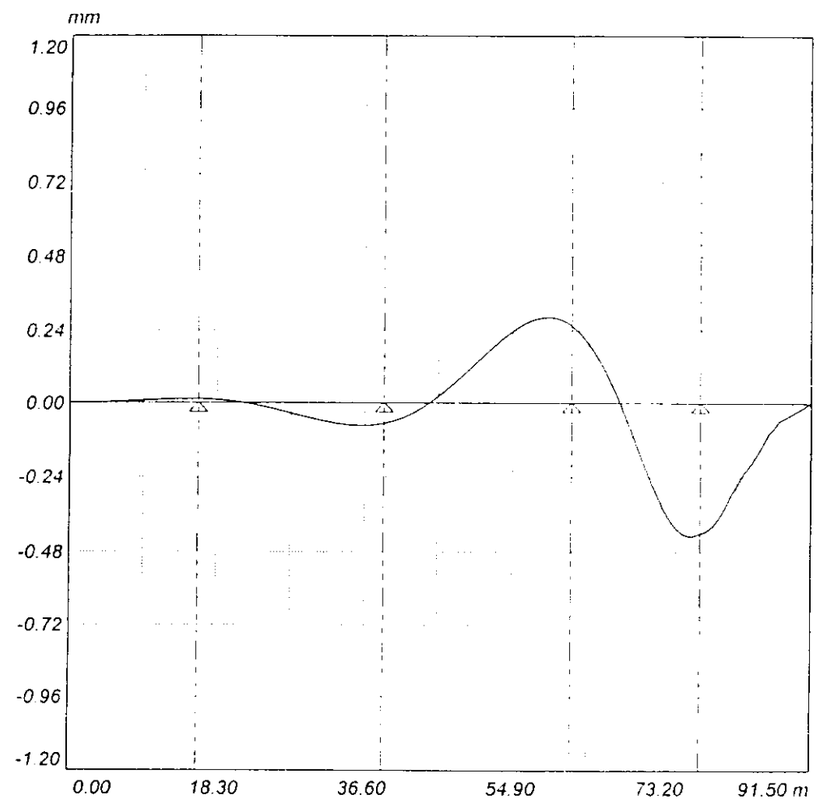


Viaducto V1
Línea de influencia: flecha en vano 3
3+3 Camiones 26 t

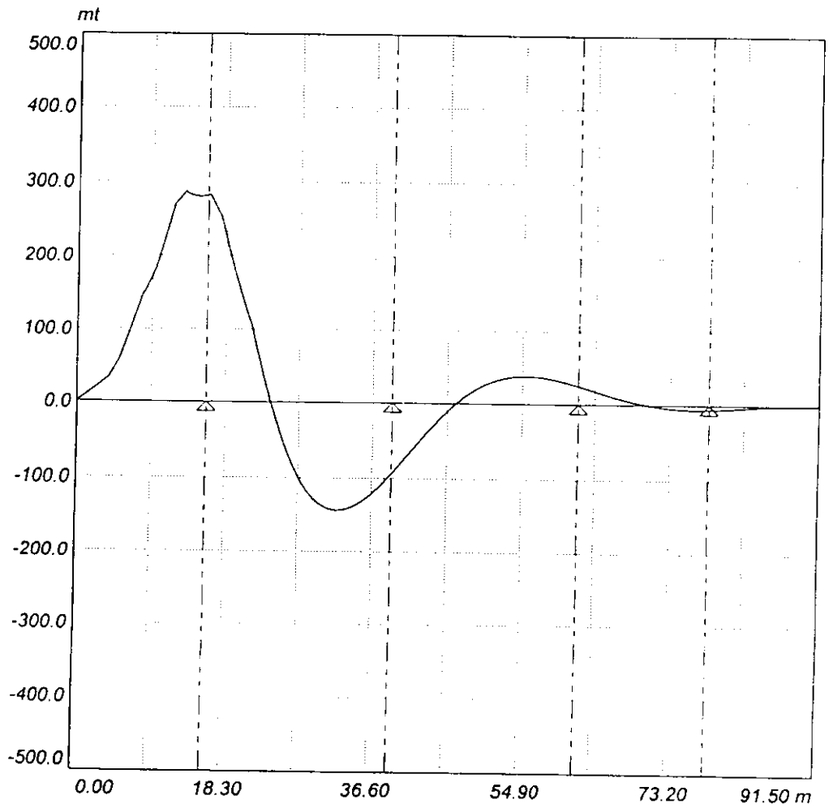


Kinesia

Viaducto V1
Línea de influencia: flecha en vano 4
3+3 Camiones 26 t

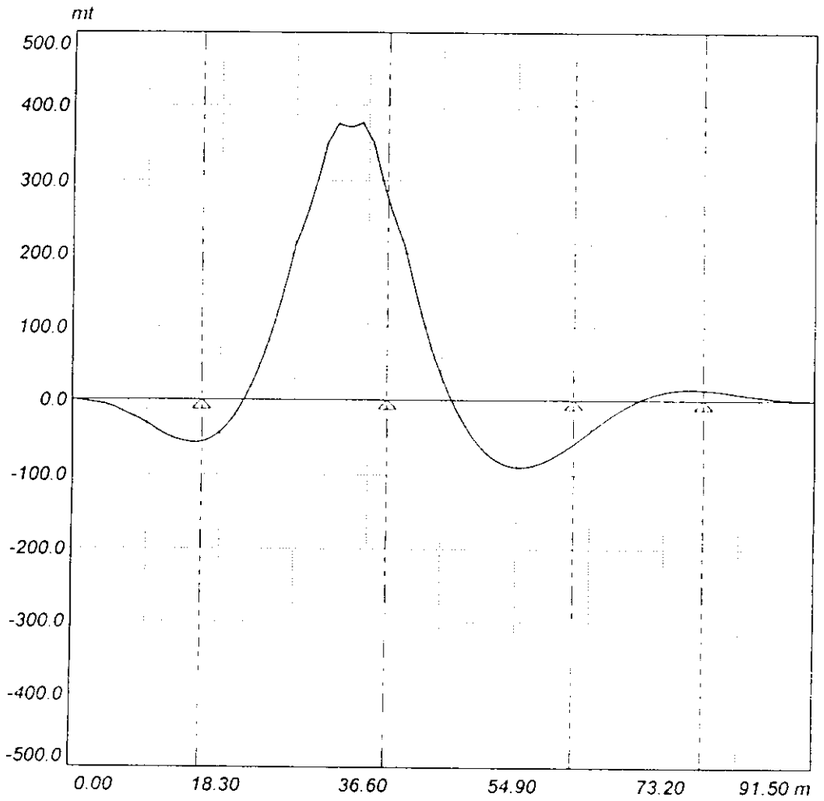


Viaducto V1
Línea de influencia: momento en vano 1
3+3 Camiones 26 t

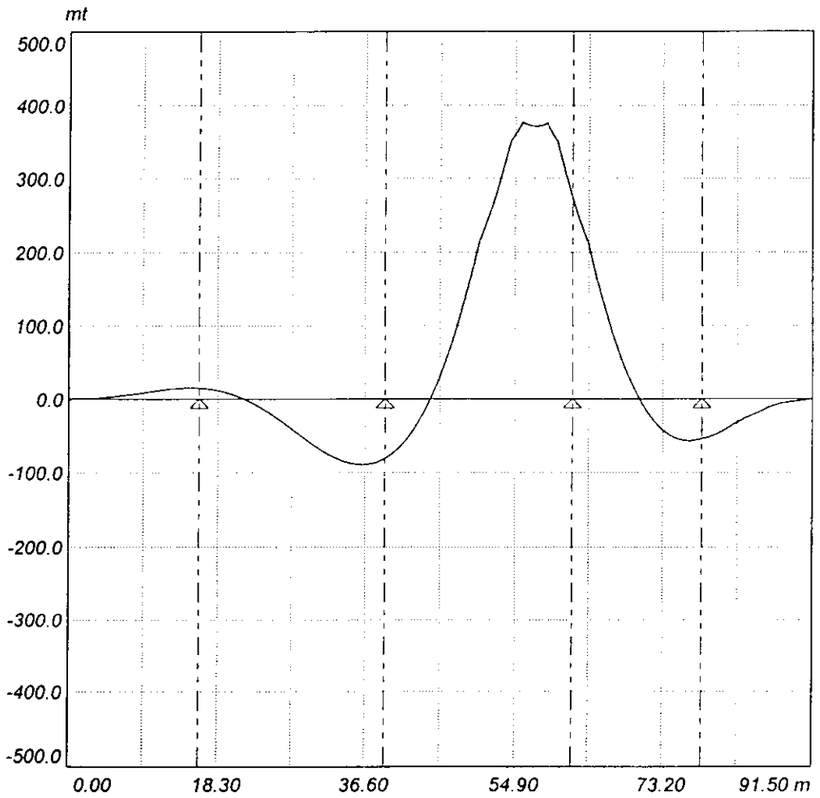


Kinesia

Viaducto V1
Línea de influencia: momento en vano 2
3+3 Camiones 26 t

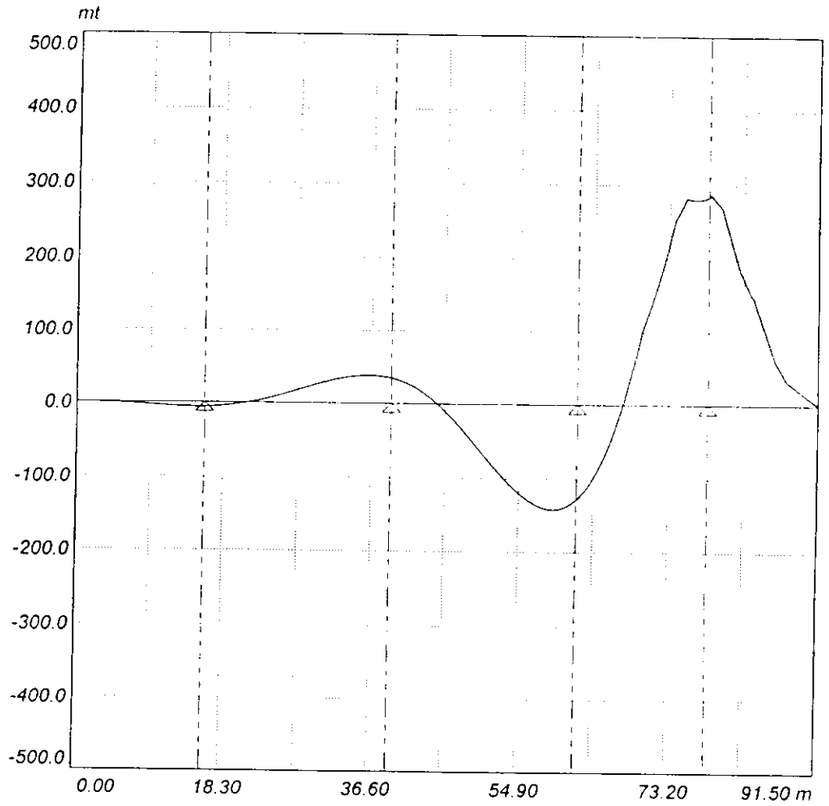


Viaducto 1
Momento en vano 3 (línea de influencia)
3+3 Camiones 26 t

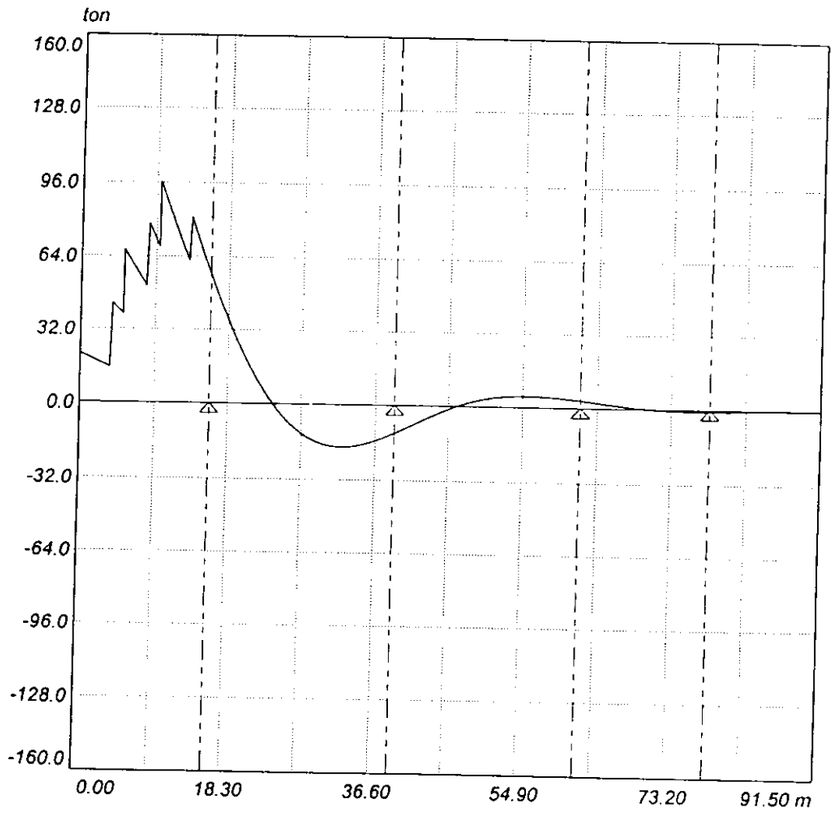


Kinesia

Viaducto 1
Momento en vano 4 (línea de influencia)
3+3 Camiones 26 t

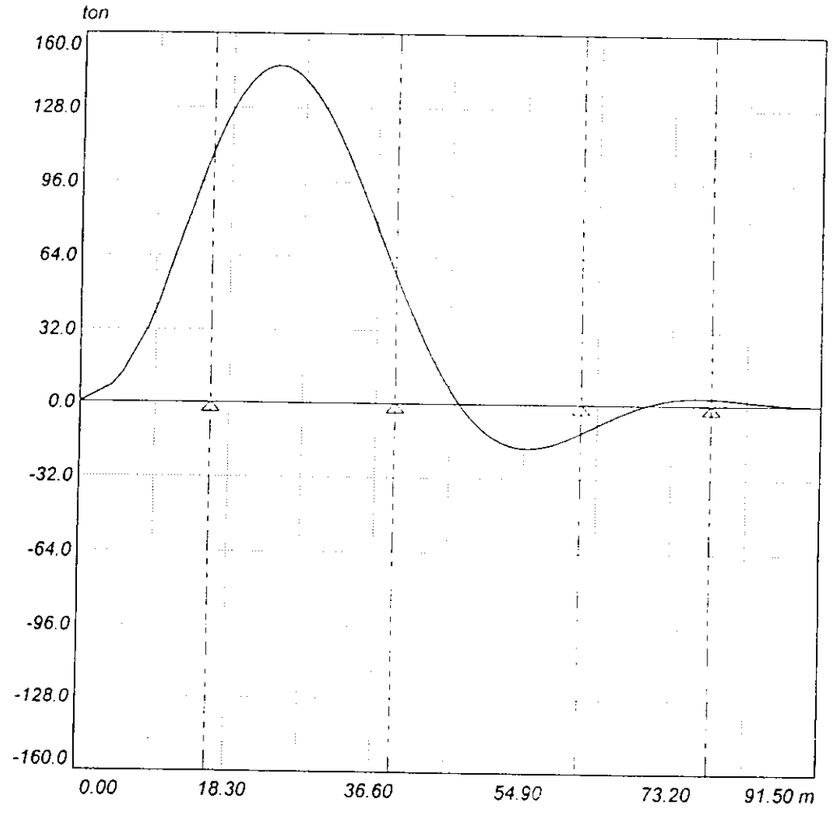


Viaducto 1
Reacción en apoyo 1 (línea de influencia)
3+3 Camiones 26 t

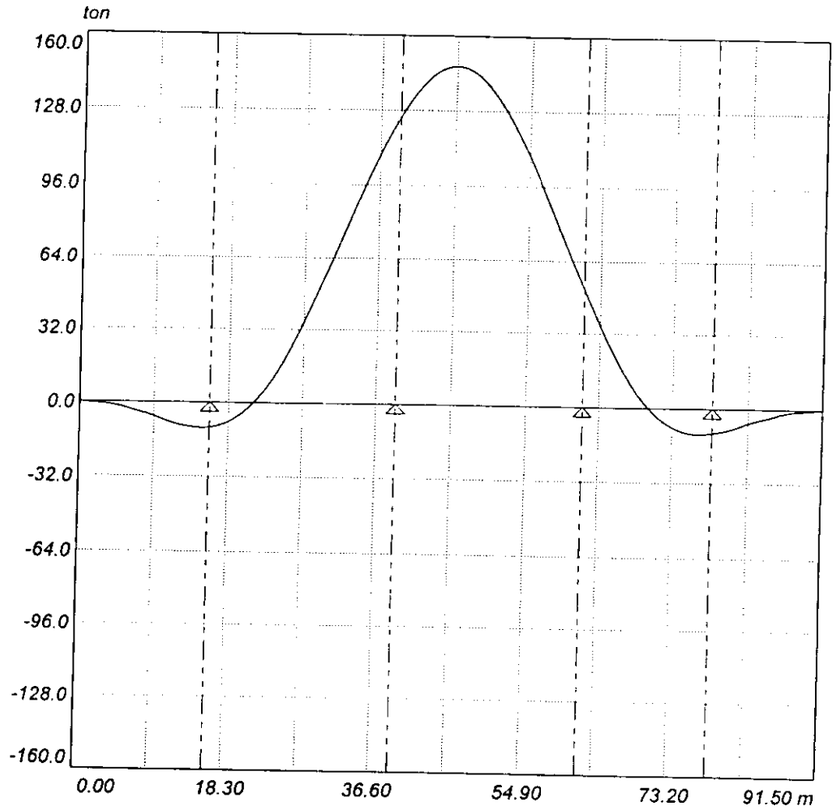


Kinesia

Viaducto 1
Reacción en apoyo 2 (línea de influencia)
3+3 Camiones 26 t

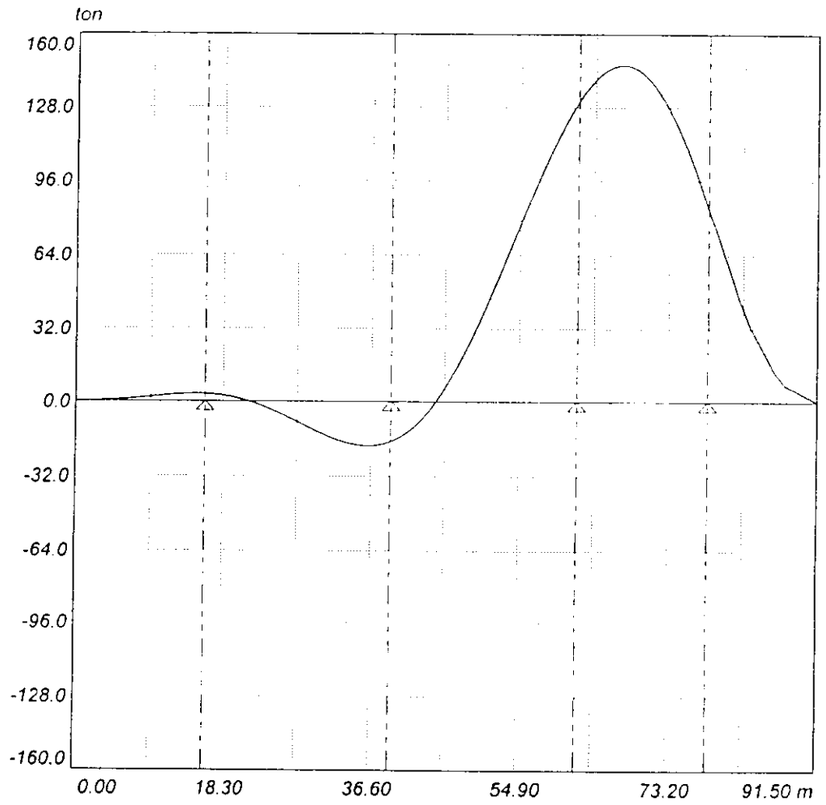


Viaducto 1
Reacción en apoyo 3 (línea de influencia)
3+3 Camiones 26 t

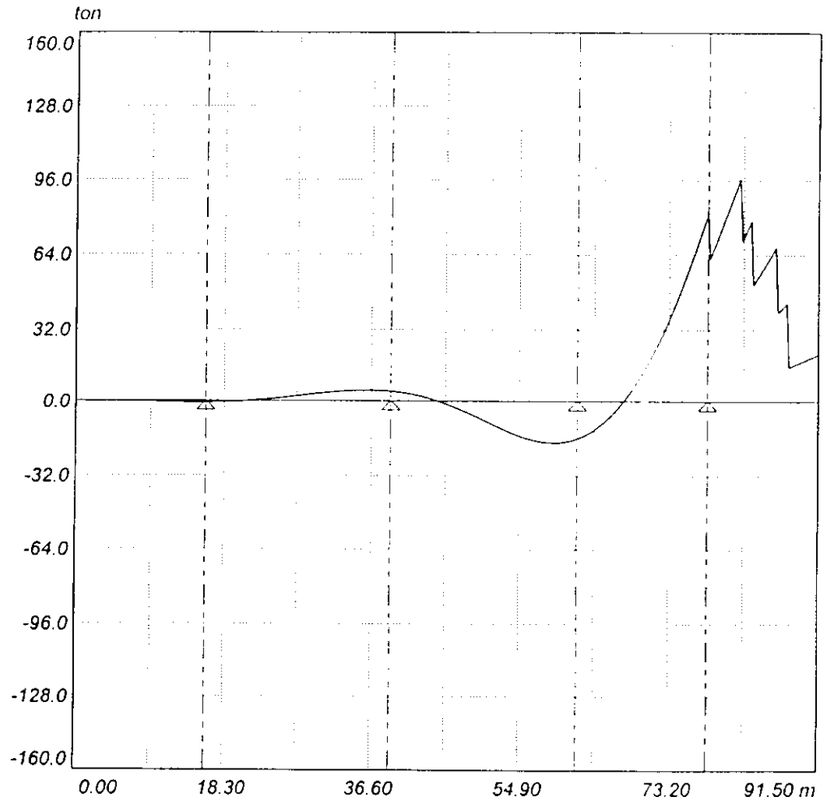


Kinesia

Viaducto 1
Reacción en apoyo 4 (línea de influencia)
3+3 Camiones 26 t



Viaducto 1
Reacción en apoyo 5 (línea de influencia)
3+3 Camiones 26 t



PROCESO CONSTRUCTIVO

La construcción del viaducto comienza con la ejecución de los pilotes 1 hacia el estribo 2, habiéndose repuesto previamente los cerramientos provisionales correspondientes. Una vez ejecutados los pilotes se procede a la ejecución de los encepados. Para la excavación de los encepados de las pilas 2 y 3 se realizó un hinca de carriles con objeto de minimizar la afección sobre la carretera y un desvío provisional de ésta.

Ejecutados los cimientos se procede a levantar los alzados tanto de estribos como de pilas, utilizando un juego de dos encofrados para el fuste de los mismos con acabado machiembrado en todos los paramentos vistos. Finalizada esta tarea se comienza con las labores necesarias para poder realizar el tablero que se ha hormigonado en dos fases y que han sido:

Ejecución de la cimbra cuajada cimentada en una losa de hormigón en masa y que salva la carretera mediante unas vigas metálicas apoyándose en unas torres. Sobre esta cimbra se dispone el enconfrado de todo el tablero con todos los elementos auxiliares y se monta la armadura tanto activa como pasiva de la primera fase de hormigonado que va del estribo 1 hasta 4,60 m después de la pila 2. Una vez hormigonada esta fase y tras comprobar que el hormigón ha alcanzado la resistencia requerida se procede al trazado a los 3 días y se monta la armadura de esta segunda fase, se hormigona y se tesa tras esto se realiza el anclaje del tablero al estribo 1.

Finalizado el tablero se desmonta la cimbra y se ejecutan las tareas de remate consistentes en ejecutar la canaleta para comunicaciones, impermeabilizar el tablero, disponer la barandilla y ejecutar las juntas.

Resumen del control de calidad

RESUMEN DEL CONTROL DE CALIDAD

Cuadro resumen de ensayos de hormigón

Parte de tesado

SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-1 PILOTES P.P.I. Nº 16

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3	FECHA FINAL	CEMENTO	RESISTENCIA	OBSERVACION
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. EST.	Nº	RES. MEDIA	VERTIDO	LOTE	TIPO	ESTIMADA f. esl.	
567	883	24/01/00	E-2 Pilote 8	03010101	H-200	17	Liquida	2	183		244			45	31/01/00	I 42,5 S/SR		
568	884	25/01/00	E-2 Pilote 7	03010101	H-200	13	Fluida	2	183		244			45	01/02/00	I 42,5 S/SR		
568	885	25/01/00	E-2 Pilote 7	03010101	H-200	14	Fluida	2	154		205			45	01/02/00	I 42,5 S/SR		
572	890	25/01/00	E-2 Pilote 2	03010101	H-200	17	Fluida			3	237			45	22/02/00	I 42,5 S/SR		
581	908	27/01/00	P-1 Pilote 3	03010101	H-200	14	Fluida	2	232		309			45	03/02/00	I 42,5 S/SR		
591	923	31/01/00	E-1 Pilote 1	03010101	H-200	15	Fluida	2	242		323			45	07/02/00	I 42,5 S/SR		
592	924	31/01/00	E-1 Pilote 1	03010101	H-200	16	Fluida	2	248		331			45	07/02/00	I 42,5 S/SR		
596	930	01/02/00	E-1 Pilote 12	03010101	H-200	14	Fluida	2	151		202			45	08/02/00	I 42,5 S/SR		
598	933	01/02/00	E-1 Pilote 4	03010101	H-200	14	Fluida	2	182		243			45	08/02/00	I 42,5 S/SR		
599	934	01/02/00	E-1 Pilote 4	03010101	H-200	14	Fluida	2	171		227			45	08/02/00	I 42,5 S/SR		
602	937	02/02/00	P-1 Pilote 6	03010101	H-200	14	Fluida	2	180		240			45	09/02/00	I 42,5 S/SR		
603	942	02/02/00	P-1 Pilote 6	03010101	H-200	12	Fluida	2	178		237			45	09/02/00	I 42,5 S/SR		
605	943	02/02/00	E-1 Pilote 6	03010101	H-200	14	Fluida	2	152		203			45	09/02/00	I 42,5 S/SR		
606	944	02/02/00	E-1 Pilote 6	03010101	H-200	14	Fluida	2	151		201			45	09/02/00	I 42,5 S/SR		
608	947	03/02/00	P-1 Pilote 5	03010101	H-200	14	Fluida	2	212		282			45	10/02/00	I 42,5 S/SR		
611	950	03/02/00	P-1 Pilote 4	03010101	H-200	14	Fluida	2	151		201			45	10/02/00	I 42,5 S/SR		
613	955	03/02/00	P-2 Pilote 6	03010101	H-200	14	Fluida	2	199		265			45	10/02/00	I 42,5 S/SR		
614	956	03/02/00	P-2 Pilote 2	03010101	H-200	14	Fluida	2	249		332			45	10/02/00	I 42,5 S/SR		
646	959	04/02/00	P-1 Pilote 2	03010101	H-200	10	Fluida	2	302		403			45	11/02/00	I 42,5 S/SR		

FECHA: FIRMA: NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-1 P.P.I. Nº 20

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3	FECHA FINAL	CEMENTO	RESISTENCIA	OBSERVACION
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA	VERTIDO	LOTE	TIPO	ESTIMADA f. est.	
681	1072	21/02/00	P-3 Encepado	03010102	H-250	8	Blanda			3	262			100	21/03/00	I 42,5 R/SR	231	
681	1073	21/02/00	P-3 Encepado	03010102	H-250	8	Blanda			3	291			100	21/03/00	I 42,5 R/SR	231	
682	1074	21/02/00	P-3 Encepado	03010102	H-250	7	Blanda			3	237			100	21/03/00	I 42,5 R/SR	209	
682	1075	21/02/00	P-3 Encepado	03010102	H-250	7	Blanda			3	261			100	21/03/00	I 42,5 R/SR	209	
688	1083	23/02/00	E-2 Encepado	03010102	H-250	8	Blanda			3	310			100	23/03/00	I 42,5 R/SR	152	
688	1084	23/02/00	E-2 Encepado	03010102	H-250	8	Blanda			3	173		213	100	23/03/00	I 42,5 R/SR	152	
689	1085	23/02/00	E-2 Encepado	03010102	H-250	7	Blanda			3	259			100	23/03/00	I 42,5 R/SR	228	
689	1086	23/02/00	E-2 Encepado	03010102	H-250	8	Blanda			3	334			100	23/03/00	I 42,5 R/SR	228	
690	1087	23/02/00	E-2 Encepado	03010102	H-250	8	Blanda			3	302			50	23/03/00	I 42,5 R/SR	266	
701	1105	29/02/00	P-1 Encepado	03010102	H-250	13	Fluida			3	291			100	28/03/00	I 42,5 R/SR	153	
701	1106	29/02/00	P-1 Encepado	03010102	H-250	14	Fluida			3	174		221	100	28/03/00	I 42,5 R/SR	153	
702	1107	29/02/00	P-1 Encepado	03010102	H-250	14	Fluida			3	269			100	28/03/00	I 42,5 R/SR	237	
702	1108	29/02/00	P-1 Encepado	03010102	H-250	14	Fluida			3	299			100	28/03/00	I 42,5 R/SR	237	
704	1112	02/03/00	E-1 Encepado	03010102	H-250	14	Fluida			3	270			100	31/03/00	I 42,5 R/SR	238	
704	1113	02/03/00	E-1 Encepado	03010102	H-250	14	Fluida			3	301			100	31/03/00	I 42,5 R/SR	238	
705	1114	02/03/00	E-1 Encepado	03010102	H-250	12	Fluida			3	302			100	31/03/00	I 42,5 R/SR	225	
705	1115	02/03/00	E-1 Encepado	03010102	H-250	15	Fluida			3	256			100	31/03/00	I 42,5 R/SR	225	
706	1116	02/03/00	E-1 Encepado	03010102	H-250	12	Fluida			3	317			100	31/03/00	I 42,5 R/SR	239	
706	1117	02/03/00	E-1 Encepado	03010102	H-250	14	Fluida			3	272			100	31/03/00	I 42,5 R/SR	239	
707	1118	02/03/00	E-1 Encepado	03010102	H-250	14	Fluida			3	261			100	31/03/00	I 42,5 R/SR	230	
707	1119	02/03/00	E-1 Encepado	03010102	H-250	11	Fluida			3	342			100	31/03/00	I 42,5 R/SR	230	
708	1120	02/03/00	E-1 Encepado	03010102	H-250	12	Fluida			3	397			100	31/03/00	I 42,5 R/SR	330	
708	1121	02/03/00	E-1 Encepado	03010102	H-250	14	Fluida			3	375			100	31/03/00	I 42,5 R/SR	330	
715	1133	06/03/00	P-2 Encepado	03010102	H-250	14	Fluida			3	217		236	100	04/04/00	I 42,5 R/SR	191	
715	1134	06/03/00	P-2 Encepado	03010102	H-250	14	Fluida			3	227		253	100	04/04/00	I 42,5 R/SR	191	
719	1140	08/03/00	E-2/Zap aleta,i	03010102	H-250	6	Fluida			3	282			100	05/04/00	I 42,5 R/SR	190	
719	1141	08/03/00	E-2/Zap aleta,i	03010102	H-250	8	Fluida			3	237			100	05/04/00	I 42,5 R/SR	190	
722	1147	09/03/00	P-3,i	03010103	H-300	12	Fluida			3	346			12	06/04/00	II AL 45,2 R	346	
724	1154	13/03/00	E-2/Zap ale i 2ª f	03010102	H-250	12	Fluida			3	321			100	10/04/00	I 42,5 R/SR	260	
733	1167	16/03/00	P-1,i	03010103	H-300	14	Fluida			3	378			12	13/04/00	II AL 45,2 R	378	
745	1188	20/03/00	P-1,d	03010103	H-300	14	Fluida			3	357			6	18/04/00	II AL 45,2 R	357	
751	1202	22/03/00	P-2,d	03010103	H-300	14	Fluida			3	400			6	19/04/00	II AL 45,2 R	400	

FECHA: FIRMA: NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-1

P.P.I Nº 20

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
783	1286	07/04/00	E-2 Alzado	03010103	H-250	10	Fluida			3	283			100	05/05/00	II AL 42,5 R	249	
794	1287	07/04/00	E-2 Alzado	03010103	H-250	12	Fluida			3	269			100	05/05/00	II AL 42,5 R	237	
794	1288	07/04/00	E-2 Alzado	03010103	H-250	9	Fluida			3	287			100	05/05/00	II AL 42,5 R	237	
822	1351	28/04/00	E-1 Alzado	03010103	H-250	12	Fluida			3	335			100	26/05/00	II AL 42,5 R	243	
826	1352	28/04/00	E-1 Alzado	03010103	H-250	11	Fluida			3	274			100	26/05/00	II AL 42,5 R	230	
826	1353	28/04/00	E-1 Alzado	03010103	H-250	14	Fluida			3	261			100	26/05/00	II AL 42,5 R	230	
827	1354	28/04/00	E-1 Alzado	03010103	H-250	14	Fluida			3	250			100	26/05/00	II AL 42,5 R	220	
827	1355	28/04/00	E-1 Alzado	03010103	H-250	15	Fluida			3	259			100	26/05/00	II AL 42,5 R	220	
828	1356	28/04/00	E-1 Alzado	03010103	H-250	15	Fluida			3	301			100	26/05/00	II AL 42,5 R	236	
828	1357	28/04/00	E-1 Alzado	03010103	H-250	14	Fluida			3	268			100	26/05/00	II AL 42,5 R	236	
841	1379	09/05/00	E-2 Aleta, i	03010103	H-250	7	Blanda			3	265			100	06/06/00	II AL 42,5 R	233	
841	1380	09/05/00	E-2 Aleta, i	03010103	H-250	8	Blanda			3	271			100	06/06/00	II AL 42,5 R	233	
842	1381	10/05/00	E-1 Aleta, i	03010103	H-250	14	Fluida			3	273			100	07/06/00	II AL 42,5 R	240	
842	1382	10/05/00	E-1 Aleta, d	03010103	H-250	13	Fluida			3	292			100	07/06/00	II AL 42,5 R	240	
851	1401	24/05/00	E-2 Aleta, d	03010103	H-250	6	Blanda			3	272			100	27/06/00	II AL 42,5 R	239	
864	1431	06/06/00	Tablero 1ª	03010105	H-400	15	Fluida	7	329	3	396			100	04/07/00	II AL 42,5 R	348	
864	1432	06/06/00	Tablero 1ª	03010105	H-400	11	Fluida			3	501			100	04/07/00	II AL 42,5 R	348	
865	1433	06/06/00	Tablero 1ª	03010105	H-400	15	Fluida	7	406	3	487			100	04/07/00	II AL 42,5 R	423	
865	1434	06/06/00	Tablero 1ª	03010105	H-400	16	Fluida			3	481			100	04/07/00	II AL 42,5 R	423	
866	1435	06/06/00	Tablero 1ª	03010105	H-400	12	Fluida	7	435	3	498			100	04/07/00	II AL 42,5 R	420	
866	1436	06/06/00	Tablero 1ª	03010105	H-400	20	Liquida	7	407	3	477			100	04/07/00	II AL 42,5 R	420	
867	1437	06/06/00	Tablero 1ª	03010105	H-400	12	Fluida			3	543			100	04/07/00	II AL 42,5 R	414	
867	1438	06/06/00	Tablero 1ª	03010105	H-400	11	Fluida	7	426	3	471			100	04/07/00	II AL 42,5 R	414	
868	1439	06/06/00	Tablero 1ª	03010105	H-400	12	Fluida			3	509			100	04/07/00	II AL 42,5 R	381	
868	1440	06/06/00	Tablero 1ª	03010105	H-400	12	Fluida			3	433			100	04/07/00	II AL 42,5 R	381	
880	1461	20/06/00	Tablero 2ª	03010105	H-400	14	Fluida	3	298	3	407			100	18/07/00	II AL 42,5 R	336	
880	1462	20/06/00	Tablero 2ª	03010105	H-400	15	Fluida	3	292	3	382			100	18/07/00	II AL 42,5 R	336	
881	1463	20/06/00	Tablero 2ª	03010105	H-400	14	Fluida	3	327	3	399			100	18/07/00	II AL 42,5 R	351	
881	1464	20/06/00	Tablero 2ª	03010105	H-400	13	Fluida	3	357	3	475			100	18/07/00	II AL 42,5 R	351	
882	1465	20/06/00	Tablero 2ª	03010105	H-400	12	Fluida	3	313	3	423			100	18/07/00	II AL 42,5 R	372	
882	1466	20/06/00	Tablero 2ª	03010105	H-400	12	Fluida	3	358	3	493			100	18/07/00	II AL 42,5 R	372	

FECHA:

FIRMA:

NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de Laboratorio

[ ] LOTE DE f. est. < 0,9 fck

MEKANO-4

PARTE DE TESADO

FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 1, FASE 1
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	9/06/00
Fase de tesado:	única

Técnico Sr.	MINO LOPEZ
Tipo de gato	M-4 y M-3
Número de gato	1 Y 154
Area de presión gato	678.564 y 433,527 cm2
Tipo de central	BPT-11
Número de central	34

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	500		500	550	TES mm	RET mm
3	19/0.6"	550	80	103	155		4	60	111	161		17	40	286.2	
4	19/0.6"	550	69	93	144		4	57	111	159		16	40	285.1	
5	19/0.6"	550	72	92	144		3	57	117	158		7	38	289.6	
6	19/0.6"	550	70	91	145		3	59	107	152		18	37	272.8	
7	19/0.6"	550	70	92	147		6	60	109	160		17	40	285.1	
8	19/0.6"	550	75	98	149		5	66	109	159		16	40	282.9	
1	19/0.6"	550	90	121	179		15	65	115	155		7	27	279.5	
2	19/0.6"	550	69	91	142		4	57	105	155		12	30	271.6	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)										Alargamientos	
				60	100	200	300	200	300	400	500	540	TES mm	RET mm
17	12/0,6"	540		54	80	137		2	55	110	165	185	299.3	
18	12/0,6"	540		55	77	134	190		12	67	125	149	306.0	
11	12/0,6"	540		51	75	132	187		8	60	119	142	303.8	
12	12/0,6"	540		55	80	135	186		16	70	126	149	297.0	
16	12/0,6"	540		49	72	130	184		9	62	117	143	302.6	
19	12/0,6"	540		55	77	136	192		5	59	114	139	304.9	
13	12/0,6"	540		50	75	135	188		15	72	126	148	304.9	
10	12/0,6"	540		50	74	127	182		10	67	120	145	300.4	
14	12/0,6"	540		55	79	130	182		15	69	119	140	283.5	
20	12/0,6"	540		57	77	135	189		17	67	124	144	291.4	
9	12/0,6"	540		54	75	136	193		14	67	124	144	302.6	
15	12/0,6"	540		55	80	135	187		10	62	115	135	289.1	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1 Tesa	Rete	Total		Alargamientos fase 2 Tesa	Rete	Total		Alarg Total	Alarg Teor	Difer %
3	286	0	286						286	266	7.6
4	285	0	285						285	266	7.2
5	290	0	290						290	266	8.9
6	273	0	273						273	266	2.5
7	285	0	285						285	266	7.2
8	283	0	283						283	266	6.3
1	279	0	282						282	266	6.0
2	272	0	272						272	266	2.1
17	299	0	299						299	287	4.3
18	306	0	306						306	287	6.6
11	304	0	304						304	287	5.8
12	297	0	297						297	287	3.5
16	303	0	303						303	287	5.4
19	305	0	305						305	287	6.2
13	305	0	305						305	287	6.2
10	300	0	300						300	287	4.7
14	284	0	284						284	287	-1.2
20	291	0	291						291	287	1.5
9	303	0	303						303	287	5.4
15	289	0	289						289	287	0.7

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....	=	8.9 %
Diferencia negativa maxima.....	=	-1.2 %
DIFERENCIA MEDIA.....	=	4.9 %

El alargamiento teórico ha sido calculado por MK4.
El alargamiento obtenido está dentro del rango de valores esperables.
Por lo tanto, desde nuestro punto de vista, la operación de tesado puede darse por correcta y concluida.

NOTA: en los tendones 1 y 3 de 19/0,6" se ha escapado algún torón, tesándose de nuevo con un gato unitario Arrow-2. En concreto, en el tendón número 1, no se tomaron lecturas sobre el émbolo, por lo que se han estimado dichas lecturas siguiendo la evolución de las anteriores.

MEKANO-4

PARTE DE TESADO

FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 1, FASE 2
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	23/06/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-4 y M-3
Número de gato	1 Y 154
Area de presión gato	678.564 y 433,527 cm2
Tipo de central	BPT-11
Número de central	34

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)									Alargamientos	
			60	100	200	300	300	400	500	550		TES mm	RET mm
3	19/0.6"	550	64	82	122	160	10	53	90	112		222.2	
4	19/0.6"	550	63	79	120	156	10	51	92	115		222.2	
5	19/0.6"	550	62	82	122	160	10	49	89	118		231.2	
6	19/0.6"	550	55	75	114	151	16	57	96	117		221.1	
7	19/0.6"	550	65	77	119	152	5	50	87	105		209.9	
8	19/0.6"	550	57	72	112	155	11	52	92	112		223.4	
1	19/0.6"	550	59	75	116	152	10	51	92	112		218.9	
2	19/0.6"	550	50	68	111	150	10	53	95	115		230.1	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)									Alargamientos	
			60	100	200	300	300	400	500	540		TES mm	RET mm
17	12/0,6"	540	40	59	102	148	10	50	96	115		239.6	
18	12/0,6"	540	47	55	98	142	10	52	98	116		226.1	
11	12/0,6"	540	55	71	115	162	10	54	98	116		239.6	
12	12/0,6"	540	44	61	104	144	10	54	100	120		236.3	
16	12/0,6"	540	43	60	107	149	12	57	101	121		241.9	
19	12/0,6"	540	46	70	106	153	10	50	96	114		237.4	
13	12/0,6"	540	40	58	103	150	5	52	100	118		250.9	
10	12/0,6"	540	37	56	100	145	9	66	115	127		254.3	
14	12/0,6"	540	55	74	112	156	10	55	99	117		234.0	
20	12/0,6"	540	51	69	114	158	11	58	100	118		240.8	
9	12/0,6"	540	43	61	105	151	10	54	98	118		243.0	
15	12/0,6"	540	35	55	115	141	8	49	94	112		236.3	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	222	0	222						222	230	-3.2
4	222	0	222						222	230	-3.2
5	231	0	231						231	230	0.7
6	221	0	221						221	230	-3.7
7	210	0	210						210	230	-8.6
8	223	0	223						223	230	-2.7
1	219	0	219						219	230	-4.7
2	230	0	230						230	230	0.2
17	240	0	240						240	251	-4.5
18	226	0	226						226	251	-9.9
11	240	0	240						240	251	-4.5
12	236	0	236						236	251	-5.8
16	242	0	242						242	251	-3.6
19	237	0	237						237	251	-5.4
13	251	0	251						251	251	0.0
10	254	0	254						254	251	1.3
14	234	0	234						234	251	-6.7
20	241	0	241						241	251	-4.0
9	243	0	243						243	251	-3.1
15	236	0	236						236	251	-5.8

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	1.3	%
Diferencia negativa maxima.....=	-9.9	%
DIFERENCIA MEDIA.....=	-3.9	%

El alargamiento teórico ha sido calculado por MK4.
El alargamiento obtenido está dentro del rango de valores esperables.
Por lo tanto, desde nuestro punto de vista, la operación de tesado puede darse por correcta y concluida.

Accesos y elementos para mantenimiento

ACCESOS Y ELEMENTOS PARA MANTENIMIENTO

Los mismos elementos que requieren un mantenimiento son los aparatos de apoyo que habrá que sustituirles cuando haya finalizado su vida útil. A todos ellos se accede desde la carretera que se salva con este viaducto. Dado que el tablero está anclado en el estribo 1, para poder sustituir estos aparatos de apoyo es necesario liberar este anclaje antes de levantar el tablero, para ello se ha dejado visitable el trasdós del estribo mediante una puerta metálica en el lado derecho del mencionado estribo que permite el acceso con los elementos necesarios.

4.2. Viaducto 2

VIADUCTO 2

ÍNDICE

- DESCRIPCIÓN Y DEFINICIÓN GEOMÉTRICA
- CÁLCULOS

  Planta, Alzado y Sección general de la estructura

  - Estudio del tablero
  - Aparatos de apoyo
  - Cálculo de las pilas
  - Cálculo de los estribos
  - Proyecto de prueba de carga
- PROCESO CONSTRUCTIVO
- RESUMEN DEL CONTROL DE CALIDAD
- ACCESOS Y ELEMENTOS PARA MANTENIMIENTO

DESCRIPCIÓN DE LA ESTRUCTURA Y DEFINICIÓN GEOMÉTRICA

La estructura que se analiza en esta nota de cálculos es uno de los viaductos que aparecen en la traza, en concreto el situado entre los PP.KK. 303+493 y 303+548, denominado como Viaducto 2, y que salva la carretera M-206, que va de Torrejón a Loeches.

Consiste en una viga continua de hormigón pretensado de tres vanos con luces de 16+23+16 m. La sección es una losa aligerada de canto y ancho constante, con valores de 1.90 y 14.00 m respectivamente. Tiene tres aligeramientos circulares de 1.20 m de diámetro y se apoya en cada eje de pilas y estribos mediante dos aparatos de apoyo que lo empotran a torsión. Estos aparatos de apoyo son en todo caso deslizantes, tipo Pot, con la distribución y características que se indican:

	TIPO DE APOYO	F_V (KH)	F_H (KN)	Ct (mm)	C- (mm)	GIRO (Rad)
E1	(2) B11 22-G2	3920	392	80	130	0,018
P1	(2) B11 22-G3	7840	490	105	105	0,011
P2	(2) B11 22-G3	7840	588	105	105	0,011
E2	(2) B11 22-G2	3920	392	80	130	0,018

Cada eje de pilas consta de dos fustes cilíndricos con sección transversal circular de diámetro 1.40 m, que se empotran en un encepado. A las pilas se las ha dotado de un rehundido lateral con el único fin de mejorar su aspecto estético.

La pila 1 está cimentada mediante un encepado de dimensiones 12,00 x 7,50 x 2,50 m que se apoya en 6 pilotes de diámetro 1,50 m y longitud 17,00 m.

La pila 2 está cimentada mediante un encepado que está esviado 68,818º de modo que la afección a la carretera fuera mínima durante la ejecución, que tiene unas dimensiones de 12,00 x 7,50 x 2,50 m y se apoya en 6 pilotes de diámetro 1,50 m y longitud 17,00 m.

El tablero está anclado de estribo 1 mediante 2 cables de 19 Ø 0,6" inyectadas con grasa, y la carga horizontal debida al frenado la transmite mediante 4 apoyos de neopreno zunchado de 400 x 500 x 96. Este anclaje es visitable, de modo que se puede destesar para realizar la sustitución de los aparatos de apoyo.

Este estribo está cimentado mediante un encepado de dimensiones 16,00 x 18,00 x 2,50 que se apoya en 12 pilotes de diámetro 1,50 m y longitud 24,00 m. En el trasdós del estribo se disponen tres contrafuertes y un muro de cierre, que constituye una estructura hueca, de modo que sobre el encepado no actúa carga de tierras, lo que obligaría dado que tiene más de 12 m de altura a aumentar el tamaño de la cimentación.

Al existir la unión entre el estribo y el tablero no hay movimiento horizontal, por lo que no es necesaria una junta de dilatación. Se ha dispuesto no obstante un sistema para evitar que el balasto entre por la junta existente y que consiste en dos chapas embebidas en el estribo y en el tablero, la del estribo de dimensiones 200 x 10 x 6 600 (2 ud), anclada mediante pernos Ø 20 cada 0,50 m y la del tablero de dimensiones 300 x 15 x 6 600 (2 ud) anclada mediante pernos Ø 20 cada 0,50 m. Sobre ellas se disponen dos chapas de 470 x 15 x 6600 atornilladas a los pernos del estribo, y se ha sellado la junta entre chapas con mastic, de modo que no entre agua y chorree en el parámetro del estribo.

El estribo 2 está cimentado mediante un encepado de dimensiones 16,00 x 14,00 x 2,50 m que se apoya en 9 pilotes con diámetro 1,50 m. Al igual que en el estribo 1 en el trasdós se ha realizado una estructura hueca, y la justificación es la misma que la presentada en ese caso.

En este estribo sí existe movimiento entre tablero y estribo, por lo que se ha dispuesto una junta consistente en el mismo sistema que la del estribo 1 y de idénticas dimensiones de modo que la chapa desliza sobre la del tablero cuando esta se mueve.

Calidades de los materiales

A continuación se detallan las calidades de cada uno de los materiales utilizados.

a) Hormigones

Tablero	H-400	fck ≥ 400 kp/cm2
Alzado de pilas	H-300	fck ≥ 300 kp/cm2
Encepados y estribos	H-250	fck ≥ 250 kp/cm2
Pilotes	H-200	fck ≥ 200 kp/cm2

b) Acero pasivo

AEH-500-N	fyk ≥ 5100 kp/cm2

c) Acero activo

A-190-SE	fyk ≥ 14000 kp/cm2

Cálculos

CÁLCULOS

ÍNDICE

PLANTA, ALZADO Y SECCIÓN GENERAL DE LA ESTRUCTURA

- Estudio del tablero
- Aparatos de apoyo
- Cálculo de las pilas
- Cálculo de los estribos
- Proyecto de prueba de carga

PLANTA, ALZADO Y SECCION GENERAL DE LA ESTRUCTURA

ESTUDIO DEL TABLERO

ES IDENTICO AL TABLERO DEL VIADUCTO III

APARATOS DE APOYO

REACCIONES SOBRE APOYOS (EN SERVICIO)

APOYO	LV	DIST	P.PR	PRET	C.PERM	TEMP	DESC+	DESC-	SC EP75+	SC EP75-	SC UIC+	SC UIC-	TOT CP	TOT SC +	TOT SC -	MAX	MIN
EST-1	0.00	55.00	184.10	59.59	63.49	37.25	13.10	-12.77	176.23	-46.67	0.00	0.00	307.18	226.57	-59.44	533.75	247.74
PILA 1	16.00	39.00	743.87	-69.19	256.06	-37.25	30.83	30.54	530.05	-26.87	0.00	0.00	930.74	591.42	-64.12	1522.16	866.62
PILA 2	23.00	16.00	731.94	-36.20	256.06	-37.25	30.83	-30.54	530.05	-26.87	0.00	0.00	951.80	560.88	-94.66	1512.68	857.14
EST-2	16.00	0.00	189.09	45.80	63.49	37.25	13.10	-12.77	176.23	-46.67	0.00	0.00	298.38	226.57	-59.44	524.95	238.94

ACCIONES. REOLOGICAS (EN SERVICIO)

Eh = 4000000 ΔT° = 15.0 μ = 0.05

APOYO	X	H	RCP	RSC	RHMAX	$I_{(PILA)}$	$Smin_{(NEOP)}$	DIMENSIONES APOYOS	$\delta_{(TAB)}$	$\delta_{(PILA)}$	$\delta_{(TEFL)}$	RH	$RH_{(ACUM)}$
EST 1	0.000	0.000	307.180	226.57	15.36	0.3558	0.1779	2 AP. "POT" PARA 300 T	0.000	0.000	0.000	15.36	54.74
PILA 1	16.000	12.000	930.740	591.42	46.54	0.3558	0.5074	2 AP. "POT" PARA 800 T	0.003	0.003	0.000	7.12	39.38
PILA 2	39.000	12.000	951.800	560.88	47.59	0.3558	0.5042	2 AP. "POT" PARA 800 T	0.007	0.007	0.000	17.35	32.26
EST 2	55.000	0.000	298.380	226.57	14.92	0	0.1750	2 AP. "POT" PARA 300 T	0.010		0.010	14.92	14.92

EVALUACION DEL FRENADO

VANO	APOYOS	LONG	EP75		UIC	
			QCARG	FREN	QCARG	FRE
1	EST1-P1	55.00	1159.00	144.88	977.60	244.40
2	P1-P2	39.00	855.00	106.88	721.60	180.40
3	P2-EST2	16.00	364.80	45.60	353.60	88.40

ACC. CARRIL

APOYO	LONG	F
EST1-P1	55.00	135.00
P1-P2	39.00	119.00
P2-EST2	16.00	96.00

DISTRIBUCION DE FUERZAS REOLOGICAS, TEMPERATURA, INTERACCION CARRIL-ESTRUCTURA Y FRENADO, SEGUN VANOS (EN SERVICIO) (valores sin mayorar)

COMBINACION CASI PERMANENTE

[5] = ([1] + 0.50 * [2]) + 0.30 * [3]

[6] = ([1] + 0.50 * [2]) + 0.30 * [4]

COMBINACION FRECUENTE

[9] = ([1] + 0.50 * [2]) + 0.60 * [7]

[10] = ([1] + 0.50 * [2]) + 0.60 * [8]

COMBINACION POCO PROBABLE

[13] = ([1] + 0.60 * [2]) + [11]

[14] = ([1] + 0.60 * [2]) + [12]

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
VANO	R+T	CARRIL	FREN	FREN	MAX	MAX	FREN	FREN	MAX	MAX	FREN	FREN	MAX	MAX
			EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC
1	39.38	135.00	144.88	244.40	150.34	180.20	144.88	244.40	193.81	253.52	144.88	244.40	265.26	364.78
2	32.26	119.00	106.88	180.40	123.83	145.88	106.88	180.40	155.89	200.00	106.88	180.40	210.54	284.06
3	14.92	96.00	45.60	88.40	76.60	89.44	45.60	88.40	90.28	115.96	45.60	88.40	118.12	160.92

DISTRIBUCION DE FUERZAS REOLOGICAS, TEMPERATURA, INTERACCION CARRIL-ESTRUCTURA Y FRENADO, SEGUN VANOS (EN SERVICIO) (valores mayorados)

COMBINACION CASI PERMANENTE

[5'] = 1.35 * ([1] + 0.50 * [2]) +1.45 * 0.30 * [3]

[6'] = 1.35 * ([1] + 0.50 * [2]) +1.45 * 0.30 * [4]

COMBINACION FRECUENTE

[9'] = 1.35 * ([1] + 0.50 * [2]) + 1.45 * 0.60 * [7]

[10'] = 1.35 * ([1] + 0.50 * [2]) +1.45 * 0.60 * [8]

COMBINACION POCO PROBABLE

[13'] = 1.35 * ([1] + 0.60 * [2]) +1.45 * [11]

[14'] =1.35 * ([1] + 0.60 * [2]) + 1.45 * [12]

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
VANO	R+T	CARRIL	FREN	FREN	MAX	MAX	FREN	FREN	MAX	MAX	FREN	FREN	MAX	MAX
			EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC
1	39.38	135.00	144.88	244.40	207.31	250.60	144.88	244.40	270.33	356.92	144.88	244.40	372.58	516.89
2	32.26	119.00	106.88	180.40	170.37	202.36	106.88	180.40	216.86	280.83	106.88	180.40	294.92	401.53
3	14.92	96.00	45.60	88.40	104.78	123.39	45.60	88.40	124.61	161.85	45.60	88.40	164.02	226.08

DEF. POR TEMPERATURA

DEF. POR RETRACCION

VANO	LUZ	TEMP (+)		TEMP(-)		T	Bt	B(infinito)	DE 0 A T	DE T A INFINITO	DE 0 A INFINITO
	(M)	PARC (MM)	ACUM (MM)	PARC (MM)	ACUM (MM)	(DIAS)	A TIEMPO T	A T INFINITO	PARC (MM)	PARC (MM)	ACUM (MM)
1	16.00	2.4	2.4	-2.4	-2.4	45	0.045	1.000	0.2	3.7	3.8
2	23.00	3.5	5.9	-3.5	-5.9	30	0.030	1.000	0.2	5.4	9.2
3	16.00	2.4	8.3	-2.4	-8.3	15	0.150	1.000	0.6	3.3	12.9

DEFORMACIONES POR FLUENCIA

VANO	LUZ	Nº CABLES	ESPESOR	TIEMPO	Bt	Bt'	Φ_o		DE 0 A T	DE T A INFINITO	DE 0 A INFINITO
	(M)	(UD)	(CM)	(DIAS)			A TIEMPO T	A T INFINITO	PARC (MM)	PARC (MM)	ACUM (MM)
1	16.00	288	75	45	0.070	0.650	0.400	3.160	0.8	5.7	6.6
2	23.00	288	75	30	0.060	0.580	0.352	3.348	1.1	6.8	13.6
3	16.00	288	75	15	0.050	0.480	0.292	3.408	0.6	7.4	20.6

RESUMEN DEFORMACIONES LONGITUDINALES

APOYO	TEMP +	TEMP -	RET	FLU	TOTAL	
	(MM)	(MM)	(MM)	(MM)	(MAX)	(MIN)
EST 1	0.0	0.0	0.0	0.0	0.0	0.0
PILA 1	2.4	-2.4	3.8	6.6	12.8	8.0
PILA 2	5.9	-5.9	9.2	13.6	28.6	16.9
EST 2	8.3	-8.3	12.9	20.6	41.7	25.2

CARACTERISTICAS DE LOS APOYOS

(VALORES POR APOYO Y FUSTE)

APOYO	R VERTICAL	GIRO	ΦB	ACORT	ALARG	R.TRANSVERSAL	LONG CHAPA			ANCH CHAPA
	(TON)	(RAD)	(MM)	(MM)	(MM)	(TON)	L1(MM)	L2(MM)	L1+L2 (MM)	(MM)
EST 1	400	0.0180	525	0	0	40	450	450	900	725
PILA 1	800	0.0110	734	13	2	60	550	550	1100	1025
PILA 2	800	0.0110	734	29	6	60	550	550	1100	1025
EST 2	400	0.0180	525	42	8	40	500	450	950	725

ΦB = DIAMETRO EXTERIOR CAZOLETA (mm)

L1 = LONGITUD DESDE CENTRO APOYO A EXTREMO LADO ESTRIBO NO ANCLADO (EST.2) (mm)

L2 = LONGITUD DESDE CENTRO APOYO A EXTREMO LADO ESTRIBO ANCLADO (EST.1) (mm)

CALCULO DE LAS PILAS

CALCULO DE LAS PILAS

AREA DE UN FUSTE 1.493 m²

Rq = 1.38 m.

I = 0.1479 m⁴

i = 0.345 m.

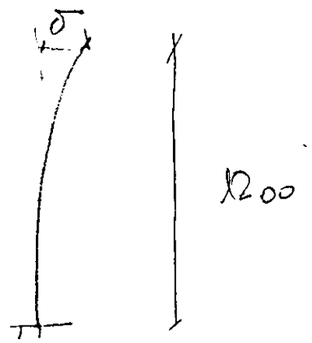
En cuanto a pandeo, los esfuerzos que le hacen en cabeza son los correspondiente a los desplazamientos impuestos por el tablero.

Transversalmente, la longitud de pandeo es la correspondiente a empotrado-articulado. Es decir

$L_{PT} = 0.7 \times 12.50 = 8.75$ m. $< 35 \times 0.345 = 12.07$ m.

Longitudinalmente, la máxima deformación longitudinal es $\delta = 22$ mm.

Lo cual sobre en la pila (en cabeza) un esfuerzo de (por hipótesis)



$$\delta = \frac{PL^3}{3EI}$$

$$P = \frac{3EI\delta}{L^3} = \frac{3 \times 4.0 \times 10^6 \times 0.1479 \times 0.028}{12^3} = 34.6 \text{ ton}$$

Se considera la pila como empotrada articulada con un momento longitudinal de

$M = 34.6 \times 12.00 + V \times 0.028 = 415.2 + 0.028V$

Siendo V la carga vertical

$L_P = 12.00 \times 0.7 = 8.4 < 0.35 \times 0.345 = 12.07$ m.

HIPOTESIS I (Pk recto hacia afuera)

CARGAS ACTUANTES (VALORES POR FUSTE)

VERTICALES	PESO FUSTE	1.493×12×2,50 =	44.80 tm
	P. LOSA	0.5×742.87 =	371.9
	Pretensado	-0.5×69.19 =	-34.6
	C. Perm	0.5×256,06 =	128,0
	Desc apoyos	0.5×30.83 =	15.42
	Grad térmico	=	—
	Pk viento lateral	=	12.80
	TOTAL	=	538.3 t
LONGITUDINALES	F_H = 34.6	=	34.6 t
	M_L = 34.6×12	=	415 mt
TRANSVERSALES	F_T =	=	6.65 t
	M_T = 6.65×12	=	79.8 mt

VALORES PARA DIMENSIONAMIENTO

$N^1 = 1.35(44.80 + 371.9 - 34.6 + 128,0) + 1.5(15.42 + 12.8$

$= 689 + 42 = 731$ t

$M^1 = 1.5\left(\sqrt{(415 + 0.022 \times 538,3)^2 + 79,8^2}\right) = 656$ mt

$Dc = 2687$ t

$\nu = \frac{731}{2687} = 0.27$

$\mu = \frac{656}{1,38 \times 2687} = 0.18$

$\omega = 0.38$

HIPOTESIS II (Pk cargado con 2 vías viales

CARGAS ACTUANTES (valores por fuste)

VERTICALES	PESO FUSTE	=	44.80 t
	P. LOSA	=	371.90 t
	Pretensado	=	-34.6 t
	C. Perm.	=	128.0 t
	Descabezos	=	15.42 t
	Grd térmico	=	—
	Sobrecarga	=	265.0 t

F_{ZA} COLUMNA = 9.89 t

Viento = 2×0.6×19 = 22.8 t

EFECTO LAZO = 8.5 t

TOTAL = 86 t

LONGITUDINAL $F_L = 34.6 = 34.6$ t

$M_L = 34.6 \times 12 = 415$ mt

TRANSVERSAL $F_{T_1} = 2 \times 9.89 = 9.89$ t

$M_{T_1} = 9.89 \times 12 = 118.7$ mt

$F_{T_2} = 0.6 \times 0.5 \times 32.7 = 9.81$ t

$M_{T_2} = 9.81 \times 12 = 117.7$ mt

$F_{T_3} = 20.0 \times 0.5 = 10$ t

$M_{T_3} = 12 \times 10 = 120$ mt

VALORES PARA DIMENSIONAMIENTO

$N' = 1.35(44.85 + 371.9 = 31.6 + 128) + 1.5(15.42 + 265 + 17.92 + 22.8 + 8.5)$

$= 689 + 494 = 1183$ t

$M' = 1.5\sqrt{(415 + 0.028 \times 840)^2 + (1187 + 1177 + 120)^2} = 2947$ t

$A_C = 2687$ t

$\nu = \frac{1183}{2687} = 0.44$

$\mu = \frac{847}{1.38 \times 2687} = 0.22$

$\omega = 0.53$

HIPOTESIS III (Rotura carga de fin viento)

CARGAS ACTUANTES.

VERTICAL $N = 817$ t

LONGITUDINAL $F_L = 34.6$ t

$M_L = 34.6 \times 12 = 415$ mt

TRANSVERSAL $F_{T_1} = 9.89$ t

$M_{T_1} = 118.7$ mt

$F_{T_3} = 10.0$ t

$M_{T_3} = 120$ mt

VALORES PARA DIMENSIONADO

$N' = 689 + 1.5(15.42 + 265 + 17.92 + 8.5) = 1150$

$M' = 1.5\sqrt{(415 + 0.028 \times 817)^2 + (1187 + 120)^2} = 2492$

$A_C = 2687$ t.

HOJA ___ DE ___
FECHA ___

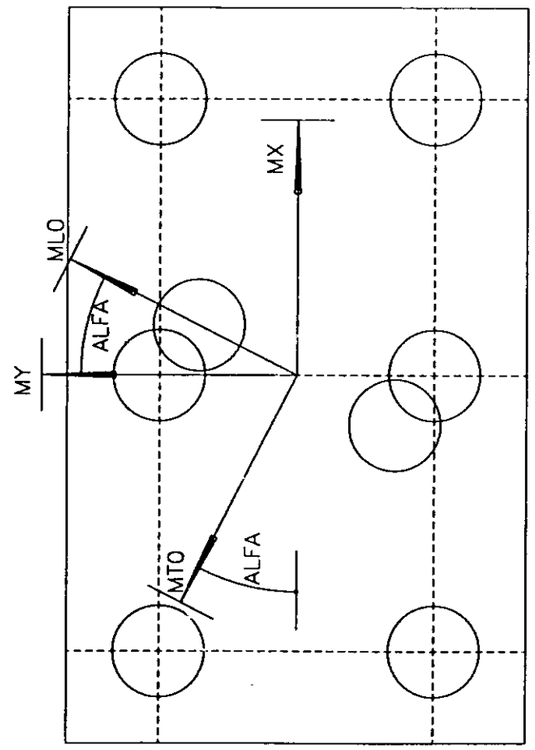
$$\nu = \frac{1150}{2687} = 0.43$$

$$\mu = \frac{448}{1.38 \times 2687} = 0.20$$

$\omega = 0.44$

se dispone

$\omega = 0.53 \times 2687 \times 1.15 / 5.1 = 321\ cm^2$ 40 ϕ32.



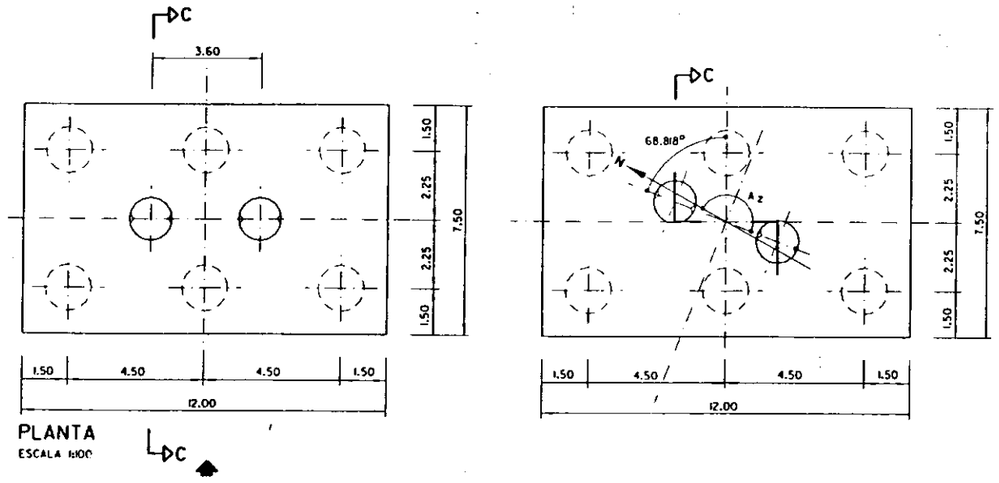
CARGAS MAXIMAS Y MINIMAS EN PILOTES EN PILAS 1 Y 2

PILA 1	HIPOT	N	ML0	MT0	MX	MY	QMAX	QMIN
ALFA	1	1683	1003	193	1003	193	366	195
90	2	2242	1003	861	1003	861	496	252
1.5708	3	2196	1003	577	1003	577	472	260

PILA 2	HIPOT	N	ML0	MT0	MX	MY	QMAX	QMIN
ALFA	1	1683	1003	193	865	542	375	186
68.818	2	2242	1003	861	624	1165	485	263
1.2011	3	2196	1003	577	727	900	470	262

CALCOLO DEL ENCEPADO

$P_Z = 7.50 * 12 * 2.50 * 2.50 = 562 t$



PILA 1

HIPOTESIS I

$N = 562 + 2 \times 538,3 = 1638 t$

$M_L = 2 \times 34.6 (12 + 2.50) = 1003 mt$

$M_T = 2 \times 6.65 \times (12 + 2.50) = 193 mt$

HIPOTESIS II

$N = 562 + 2 \times 817 = 2196$

$M_L = 1008 mt$

$M_T = 2 \times 14.50 \times (8.89 + 10) = 577 t$

HIPOTESIS III

$N = 562 + 2 \times 840 = 2242 t$

$M_L = 1003 mt$

$M_T = 2(9.89 + 9.81 + 10) \times 14.5 = 861 mt$

CALCULO DE LOS ESTRIBOS

ESTRIBO 1 (ANCLADO)

SOLUCION 1

NUMERO DE FILAS	5
SEPARACION ENTRE FILAS	4.50
NUMERO DE HILERAS	3
SEPARACION ENTRE HILERAS	6.50
DIMENSION "a" DEL ENCEPADO	21.00
DIMENSION "b" DEL ENCEPADO	16.00

						FX	FY	MZ	MZ0
ENCEPADO	21.00	16.00	2.00	2.50	10.50	0	-1680	-17640	0
ALZADO	14.75	14.00	12.40	2.50	7.38	0	-6402	-47211	20005
	9.30	11.00	12.40	-2.50	5.65	0	3171	17918	-15381
EMP TIERRAS						646	0	-3961	-3961
TOTAL ESTRIBO						646	-4910	-50894	663
TAB CP						0	-248	-3410	-806
TAB SC						0	-285	-3919	-926
ANCLAJE +						365	0	-4891	-4891
ANCLAJE -						-365	0	4891	4891
TOTAL TABLERO (+)						365	-533	-12220	-6623
TOTAL TABLERO (-)						-365	-533	-2438	3159
SOB UNIF	14.75	14.00	1.00	3.00	7.38	0	-620	-4569	1936

SIN TABLERO	646	-4910	-50894	663
EN SERV ANC +	1011	-6063	-67683	-4024
EN SERV ANC -	281	-6063	-57901	5758

SOLUCION 2

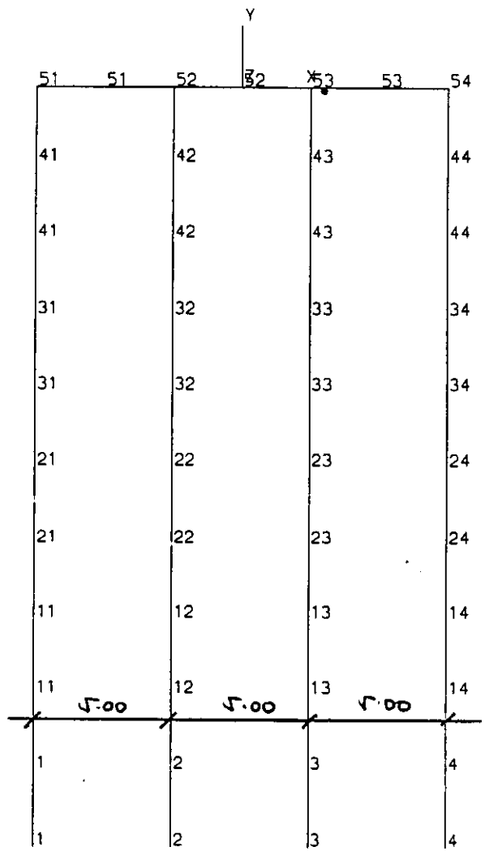
NUMERO DE FILAS	4
SEPARACION ENTRE FILAS	4.50
NUMERO DE HILERAS	3
SEPARACION ENTRE HILERAS	6.50
DIMENSION "a" DEL ENCEPADO	16.50
DIMENSION "b" DEL ENCEPADO	16.00

						FX	FY	MZ	MZ0
ENCEPADO	16.50	16.00	2.00	2.50	8.25	0	-1320	-10890	0
ALZADO	11.25	14.00	12.40	2.50	5.63	0	-4883	-27464	12817
	5.80	11.00	12.40	-2.50	3.90	0	1978	7713	-8603
EMP TIERRAS						646	0	-3961	-3961
TOTAL ESTRIBO						646	-4225	-34602	252
TAB CP						0	-248	-2542	-496
TAB SC						0	-285	-2921	-570
ANCLAJE +						365	0	-4891	-4891
ANCLAJE -						-365	0	4891	4891
TOTAL TABLERO (+)						365	-533	-10354	-5957
TOTAL TABLERO (-)						-365	-533	-572	3825
SOB UNIF	11.25	14.00	1.00	3.00	5.63	0	-473	-2658	1240

SIN TABLERO	646	-4225	-34602	252
EN SERV ANC +	1011	-5230	-47614	-4464
EN SERV ANC -	281	-5230	-37832	5318

STRUCTURE DATA:

TYPE = PLANE
NJ = 24
NM = 23
NE = 0
NS = 16
NL = 6
XMAX= 13.5
YMAX= 25.0
ZMAX= 0.0



MET MTO

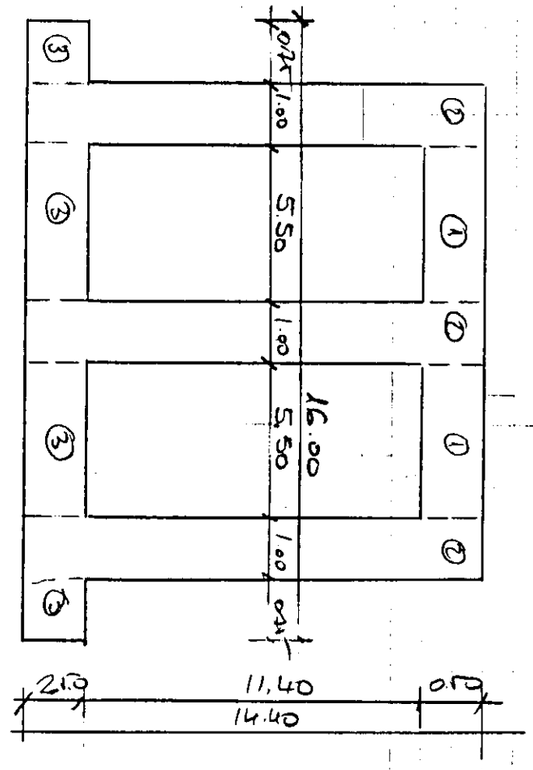
COMPANY: -------

S T A A D P D - P L O T (REV: 17.0a)

TITLE. VIADUCTO 2 ESTRIBO 1

DATE: AUG 6, 1999

BARRAS 51 Y 52



S_1 = 0.20 × 2 × 5.50 = 5.50

S_2 = 4.00 × 3 × 14.40 = 43.20

S_3 = 6.25 × 2 × 2.50 = 31.25

TOTAL = 79.95

q_1 = 5.50 × 14.17 = 77.82

q_2 = 43.20 × 7.20 = 311.04

q_3 = 31.25 × 1.25 = 39.06

TOTAL = 427.92

$\bar{x}_q = \frac{427.92}{79.95} = 5.35$

$J_1 = \frac{1}{3}\left(11.00 \times 14.40^3 - 11.00 \times 13.90^3\right) = 1101.34\ m^4$

$J_2 = \frac{1}{3}\ 3.00 \times 14.40^3 = 2985.98\ m^4$

$J_3 = \frac{1}{3}\ 16 \times 2.50^3 = 8336\ m^4$

TOTAL 4170.68 m^4

$J_G = 4170.68 - 79.95 \times 5.35^2 = 1282.31\ m^4$

BARRA 53

$S = 16.00 \times 2.50 = 40.00\ m^2$

$J = \frac{1}{12}\ 16 \times 2.5^3 = 20.833\ m^4$


```
*****************************************************
*                                                   *
*           S T A A D - III                         *
*           Revision 17.0a                          *
*           Proprietary Program of                  *
*           RESEARCH ENGINEERS, Inc.                *
*           Date=     AUG 17, 1999                  *
*           Time=     10: 3:51                      *
*                                                   *
*****************************************************

 1. STAAD PLANE VIADUCTO 2 ESTRIBO 1
 2. *EFECTOS CARGAS GRAVITATORIAS
 3. UNIT MTO MET
 4. JOINT COORDINATES
 5.   1  -7.500   -25.000
 6.   2  -2.500   -25.000
 7.   3   2.500   -25.000
 8.   4   7.500   -25.000
 9.  11  -7.500   -20.000
10.  12  -2.500   -20.000
11.  13   2.500   -20.000
12.  14   7.500   -20.000
13.  21  -7.500   -15.000
14.  22  -2.500   -15.000
15.  23   2.500   -15.000
16.  24   7.500   -15.000
17.  31  -7.500   -10.000
18.  32  -2.500   -10.000
19.  33   2.500   -10.000
20.  34   7.500   -10.000
21.  41  -7.500    -5.000
22.  42  -2.500    -5.000
23.  43   2.500    -5.000
24.  44   7.500    -5.000
25.  51  -7.500     0.000
26.  52  -2.500     0.000
27.  53   2.500     0.000
28.  54   7.500     0.000
29. MEMBER INCIDENCES
30.   1    1    11
31.   R    4    10   10
32.   2    2    12
33.   R    4    10   10
34.   3    3    13
35.   R    4    10   10
36.   4    4    14
37.   R    4    10   10
38.  51   51    52
39.  52   52    53
40.  53   53    54
41. MEMBER PROPERTY
42. *PILOTES  3 * 5 PILOTES
43. 1 11 21 31 41     PR AX  5.298 IZ  0.74513
44. 2 12 22 32 42     PR AX  5.298 IZ  0.74513
45. 3 13 23 33 43     PR AX  5.298 IZ  0.74513
46. 4 14 24 34 44     PR AX  5.298 IZ  0.74513
47. *ENCEPADO (1.5+6.5+6.5+1.5)*2.0
```

```
*EFECTOS CARGAS GRAVITATORIAS
48. 51 52              PR AX 73.700 IZ  1882.31
49. 53                 PR AX 40.000 IZ    20.83
50. CONSTANT
51. E  3250000.   ALL
52. POI 0.15
53. DEN 2.50
54. SUPPORT
55. 1 2 3 4          PINNED
56. 11 12 13 14      FIXED BUT FY MZ KFX  168750
57. 21 22 23 24      FIXED BUT FY MZ KFX   97125
58. 31 32 33 34      FIXED BUT FY MZ KFX   25500
59. LOADING 1 RELLENO DE TIERRAS Y SIN TABLERO
60. MEMBER LOAD
61. *PROCEDENTE DE CALCULO DE ESTRIBO
62. 52       CON  GX   646
63. 52       CON  GY -4225
64. 52       CMOM GZ   252
65. LOADING 2 PUENTE EN SERVICIO. ANCLAJE HACIA VALLE
66. MEMBER LOAD
67. *PROCEDENTE DE CALCULO DE ESTRIBO
68. 52       CON  GX  1011
69. 52       CON  GY -5230
70. 52       CMOM GZ -4464
71. LOADING 3 PUENTE EN SERVICIO. ANCLAJE HACIA MONTAàA
72. MEMBER LOAD
73. *PROCEDENTE DE CALCULO DE ESTRIBO
74. 52       CON  GX   281
75. 52       CON  GY -5230
76. 52       CMOM GZ  5318
77. LOADING COMBINATION 4
78. 1 1.50
79. LOADING COMBINATION 5
80. 2 1.50
81. LOADING COMBINATION 6
82. 3 1.50
83. PERFORM ANALISIS
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 24/ 23/ 16
ORIGINAL/FINAL BAND-WIDTH = 4/ 3
TOTAL PRIMARY LOAD CASES = 3, TOTAL DEGREES OF FREEDOM = 64
SIZE OF STIFFNESS MATRIX = 768 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 12.05 MEGA-BYTES

```
++ PROCESSING ELEMENT STIFFNESS MATRIX.          10: 3:54
++ PROCESSING GLOBAL STIFFNESS MATRIX.           10: 3:54
++ PROCESSING TRIANGULAR FACTORIZATION.          10: 3:54
++ CALCULATING JOINT DISPLACEMENTS.              10: 3:54
++ CALCULATING MEMBER  FORCES.                   10: 3:54

84. LOAD LIST  ALL
85. PRINT MEMBER FORCES LIST  41 42 43 44
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MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
41	1	41	713.27	159.18	0.00	0.00	0.00	-348.27
		51	-713.27	-159.18	0.00	0.00	0.00	1144.17
	2	41	488.06	249.37	0.00	0.00	0.00	-536.80
		51	-488.06	-249.37	0.00	0.00	0.00	1783.63
	3	41	1423.34	67.71	0.00	0.00	0.00	-154.50
		51	-1423.34	-67.71	0.00	0.00	0.00	493.04
	4	41	1069.91	238.77	0.00	0.00	0.00	-522.40
		51	-1069.91	-238.77	0.00	0.00	0.00	1716.26
	5	41	732.09	374.05	0.00	0.00	0.00	-805.21
		51	-732.09	-374.05	0.00	0.00	0.00	2675.44
	6	41	2135.00	101.56	0.00	0.00	0.00	-231.75
		51	-2135.00	-101.56	0.00	0.00	0.00	739.57
42	1	42	1010.83	159.36	0.00	0.00	0.00	-349.07
		52	-1010.83	-159.36	0.00	0.00	0.00	1145.84
	2	42	1134.77	249.56	0.00	0.00	0.00	-537.66
		52	-1134.77	-249.56	0.00	0.00	0.00	1785.45
	3	42	1417.28	67.92	0.00	0.00	0.00	-155.55
		52	-1417.28	-67.92	0.00	0.00	0.00	495.16
	4	42	1516.24	239.03	0.00	0.00	0.00	-523.60
		52	-1516.24	-239.03	0.00	0.00	0.00	1718.77
	5	42	1702.16	374.34	0.00	0.00	0.00	-806.49
		52	-1702.16	-374.34	0.00	0.00	0.00	2678.17
	6	42	2125.92	101.88	0.00	0.00	0.00	-233.32
		52	-2125.92	-101.88	0.00	0.00	0.00	742.74
43	1	43	1292.47	159.72	0.00	0.00	0.00	-350.93
		53	-1292.47	-159.72	0.00	0.00	0.00	1149.54
	2	43	1764.38	250.01	0.00	0.00	0.00	-539.93
		53	-1764.38	-250.01	0.00	0.00	0 00	1789.96
	3	43	1389.18	68.38	0.00	0.00	0 00	-157.88
		53	-1389.18	-68.38	0.00	0.00	0.00	499.80
	4	43	1938.71	239.59	0.00	0.00	0.00	-526.39
		53	-1938.71	-239.59	0.00	0.00	0.00	1724.32
	5	43	2646.57	375.01	0.00	0.00	0.00	-809.89
		53	-2646.57	-375.01	0.00	0.00	0.00	2684.95
	6	43	2083.78	102.58	0.00	0.00	0.00	-236.82
		53	-2083.78	-102.58	0.00	0.00	0.00	749.70
44	1	44	1208.43	167.74	0.00	0.00	0.00	-391.51
		54	-1208.43	-167.74	0.00	0.00	0.00	1230.21
	2	44	1842.78	262.07	0.00	0.00	0.00	-601.01
		54	-1842.78	-262.07	0.00	0,00	0.00	1911.36
	3	44	1000.20	76.99	0.00	0.00	0.00	-201.34
		54	-1000.20	-76.99	0.00	0.00	0.00	586.27
	4	44	1812.64	251.61	0.00	0.00	0.00	-587.27
		54	-1812.64	-251.61	0.00	0.00	0.00	1845.32

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	5	44	2764.17	393.11	0.00	0.00	0.00	-901.52
		54	-2764.17	-393.11	0.00	0.00	0.00	2867.04
	6	44	1500.30	115.48	0.00	0.00	0.00	-302.01
		54	-1500.30	-115.48	0.00	0.00	0.00	879.40

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

86. PRINT MEMBER FORCES LIST 31 32 33 34

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
31	1	31	713.27	159.18	0.00	0.00	0.00	447.64
		41	-713.27	-159.18	0.00	0.00	0.00	348.27
	2	31	488.06	249.36	0.00	0.00	0.00	710.02
		41	-488.06	-249.36	0.00	0.00	0.00	536.80
	3	31	1423.34	67.71	0.00	0.00	0.00	184.04
		41	-1423.34	-67.71	0.00	0.00	0.00	154.50
	4	31	1069.91	238.77	0.00	0.00	0.00	671.46
		41	-1069.91	-238.77	0.00	0.00	0.00	522.40
	5	31	732.09	374.05	0.00	0.00	0.00	1065.03
		41	-732.09	-374.05	0.00	0.00	0.00	805.21
	6	31	2135.00	101.56	0.00	0.00	0.00	276.06
		41	-2135.00	-101.56	0.00	0.00	0.00	231.75
32	1	32	1010.83	159.36	0.00	0.00	0.00	447.71
		42	-1010.83	-159.36	0.00	0.00	0.00	349.07
	2	32	1134.77	249.56	0.00	0.00	0.00	710.13
		42	-1134.77	-249.56	0.00	0.00	0.00	537.66
	3	32	1417.28	67.92	0.00	0.00	0.00	184.06
		42	-1417.28	-67.92	0.00	0.00	0.00	155.55
	4	32	1516.24	239.03	0.00	0.00	0.00	671.57
		42	-1516.24	-239.03	0.00	0.00	0.00	523.60
	5	32	1702.16	374.34	0.00	0.00	0.00	1065.20
		42	-1702.16	-374.34	0.00	0.00	0.00	806.49
	6	32	2125.92	101.88	0.00	0.00	0.00	276.09
		42	-2125.92	-101.88	0.00	0.00	0.00	233.32
33	1	33	1292.47	159.72	0.00	0.00	0.00	447.69
		43	-1292.47	-159.72	0.00	0.00	0.00	350.93
	2	33	1764.38	250.01	0.00	0.00	0.00	710.11
		43	-1764.38	-250.01	0.00	0.00	0.00	539.93
	3	33	1389.18	68.38	0.00	0.00	0.00	184.04
		43	-1389.18	-68.38	0.00	0.00	0.00	157.88
	4	33	1938.71	239.59	0.00	0.00	0.00	671.54
		43	-1938.71	-239.59	0.00	0.00	0.00	526.39
	5	33	2646.57	375.01	0.00	0.00	0.00	1065.16
		43	-2646.57	-375.01	0.00	0.00	0.00	809.89
	6	33	2083.78	102.58	0.00	0.00	0.00	276.06
		43	-2083.78	-102.58	0.00	0.00	0.00	236.82
34	1	34	1208.43	167.74	0.00	0.00	0.00	447.18
		44	-1208.43	-167.74	0.00	0.00	0.00	391.51
	2	34	1842.78	262.07	0.00	0.00	0.00	709.33
		44	-1842.78	-262.07	0.00	0.00	0.00	601.01
	3	34	1000.20	76.99	0.00	0.00	0.00	183.59
		44	-1000.20	-76.99	0.00	0.00	0.00	201.34
	4	34	1812.64	251.61	0.00	0.00	0.00	670.77
		44	-1812.64	-251.61	0.00	0.00	0.00	587.27

MBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	5	34	2764.17	393.10	0.00	0.00	0.00	1064.00
		44	-2764.17	-393.10	0.00	0.00	0.00	901.52
	6	34	1500.30	115.48	0.00	0.00	0.00	275.38
		44	-1500.30	-115.48	0.00	0.00	0.00	302.01

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

87. PRINT MEMBER FORCES LIST 21 22 23 24

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
21	1	21	713.27	3.91	0.00	0.00	0.00	467.21
		31	-713.27	-3.91	0.00	0.00	0.00	-447.64
	2	21	488.06	5.12	0.00	0.00	0.00	735.61
		31	-488.06	-5.12	0.00	0.00	0.00	-710.02
	3	21	1423.34	2.40	0.00	0.00	0.00	196.03
		31	-1423.34	-2.40	0.00	0.00	0.00	-184.04
	4	21	1069.91	5.87	0.00	0.00	0.00	700.81
		31	-1069.91	-5.87	0.00	0.00	0.00	-671.46
	5	21	732.09	7.68	0.00	0.00	0.00	1103.42
		31	-732.09	-7.68	0.00	0.00	0.00	-1065.03
	6	21	2135.00	3.60	0.00	0.00	0.00	294.05
		31	-2135.00	-3.60	0.00	0.00	0.00	-276.06
22	1	22	1010.83	3.97	0.00	0.00	0.00	467.54
		32	-1010.83	-3.97	0.00	0.00	0.00	-447.71
	2	22	1134.77	5.17	0.00	0.00	0.00	736.00
		32	-1134.77	-5.17	0.00	0.00	0.00	-710.13
	3	22	1417.28	2.47	0.00	0.00	0.00	196.41
		32	-1417.28	-2.47	0.00	0.00	0.00	-184.06
	4	22	1516.24	5.95	0.00	0.00	0.00	701.31
		32	-1516.24	-5.95	0.00	0.00	0.00	-671.57
	5	22	1702.16	7.76	0.00	0.00	0.00	1104.00
		32	-1702.16	-7.76	0.00	0.00	0.00	-1065.20
	6	22	2125.92	3.71	0.00	0.00	0.00	294.62
		32	-2125.92	-3.71	0.00	0.00	0.00	-276.09
23	1	23	1292.47	4.10	0.00	0.00	0.00	468.17
		33	-1292.47	-4.10	0.00	0.00	0.00	-447.69
	2	23	1764.38	5.33	0.00	0.00	0.00	736.77
		33	-1764.38	-5.33	0.00	0.00	0.00	-710.11
	3	23	1389.18	2.63	0.00	0.00	0.00	197.21
		33	-1389.18	-2.63	0.00	0.00	0.00	-184.04
	4	23	1938.71	6.14	0.00	0.00	0.00	702.26
		33	-1938.71	-6.14	0.00	0.00	0.00	-671.54
	5	23	2646.57	8.00	0.00	0.00	0.00	1105.16
		33	-2646.57	-8.00	0.00	0.00	0.00	-1065.16
	6	23	2083.78	3.95	0.00	0.00	0.00	295.81
		33	-2083.78	-3.95	0.00	0.00	0.00	-276.06
24	1	24	1208.43	6.95	0.00	0.00	0.00	481.94
		34	-1208.43	-6.95	0.00	0.00	0.00	-447.18
	2	24	1842.78	9.63	0.00	0.00	0.00	757.48
		34	-1842.78	-9.63	0.00	0.00	0.00	-709.34
	3	24	1000.20	5.69	0.00	0.00	0.00	212.02
		34	-1000.20	-5.69	0.00	0.00	0.00	-183.59
	4	24	1812.64	10.43	0.00	0.00	0.00	722.91
		34	-1812.64	-10.43	0.00	0.00	0.00	-670.78

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	5	24	2764.17	14.44	0.00	0.00	0.00	1136.22
		34	-2764.17	-14.44	0.00	0.00	0.00	-1064.00
	6	24	1500.30	8.53	0.00	0.00	0.00	318.03
		34	-1500.30	-8.53	0.00	0.00	0.00	-275.38

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

88. PRINT MEMBER FORCES LIST 11 12 13 14

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
11	1	11	713.27	-74.35	0.00	0.00	0.00	95.45
		21	-713.27	74.35	0.00	0.00	0.00	-467.21
	2	11	488.06	-117.22	0.00	0.00	0.00	149.50
		21	-488.06	117.22	0.00	0.00	0.00	-735.61
	3	11	1423.34	-31.08	0.00	0.00	0.00	40.62
		21	-1423.34	31.08	0.00	0.00	0.00	-196.03
	4	11	1069.91	-111.53	0.00	0.00	0.00	143.17
		21	-1069.91	111.53	0.00	0.00	0.00	-700.81
	5	11	732.09	-175.83	0.00	0.00	0.00	224.25
		21	-732.09	175.83	0.00	0.00	0.00	-1103.42
	6	11	2135.00	-46.62	0.00	0.00	0.00	60.93
		21	-2135.00	46.62	0.00	0.00	0.00	-294.05
12	1	12	1010.83	-74.40	0.00	0.00	0.00	95.55
		22	-1010.83	74.40	0.00	0.00	0.00	-467.54
	2	12	1134.77	-117.28	0.00	0.00	0.00	149.62
		22	-1134.77	117.28	0.00	0.00	0.00	-736.00
	3	12	1417.28	-31.13	0.00	0.00	0.00	40.75
		22	-1417.28	31.13	0.00	0.00	0.00	-196.41
	4	12	1516.24	-111.60	0.00	0.00	0.00	143.33
		22	-1516.24	111.60	0.00	0.00	0.00	-701.31
	5	12	1702.16	-175.91	0.00	0.00	0.00	224.42
		22	-1702.16	175.91	0.00	0.00	0.00	-1104.00
	6	12	2125.92	-46.70	0.00	0.00	0.00	61.12
		22	-2125.92	46.70	0.00	0.00	0.00	-294.62
13	1	13	1292.47	-74.48	0.00	0.00	0.00	95.78
		23	-1292.47	74.48	0.00	0.00	0.00	-468.17
	2	13	1764.38	-117.38	0.00	0.00	0.00	149.89
		23	-1764.38	117.38	0.00	0.00	0.00	-736.77
	3	13	1389.18	-31.24	0.00	0.00	0.00	41.03
		23	-1389.18	31.24	0.00	0.00	0.00	-197.21
	4	13	1938.71	-111.72	0.00	0.00	0.00	143.67
		23	-1938.71	111.72	0.00	0.00	0.00	-702.26
	5	13	2646.57	-176.06	0.00	0.00	0.00	224.83
		23	-2646.57	176.06	0.00	0.00	0.00	-1105.16
	6	13	2083.78	-46.85	0.00	0.00	0.00	61.54
		23	-2083.78	46.85	0.00	0.00	0.00	-295.81
14	1	14	1208.43	-76.26	0.00	0.00	0.00	100.65
		24	-1208.43	76.26	0.00	0.00	0.00	-481.94
	2	14	1842.78	-120.05	0.00	0.00	0.00	157.22
		24	-1842.78	120.05	0.00	0.00	0.00	-757.48
	3	14	1000.20	-33.15	0.00	0.00	0.00	46.26
		24	-1000.20	33.15	0.00	0.00	0.00	-212.02
	4	14	1812.64	-114.39	0.00	0.00	0.00	150.98
		24	-1812.64	114.39	0.00	0.00	0.00	-722.91

MBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	5	14	2764.17	-180.08	0.00	0.00	0.00	235.83
		24	-2764.17	180.08	0.00	0.00	0.00	-1136.22
	6	14	1500.30	-49.73	0.00	0.00	0.00	69.39
		24	-1500.30	49.73	0.00	0.00	0.00	-318.03

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

89. PRINT MEMBER FORCES LIST 1 2 3 4

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	713.27	-19.09	0.00	0.00	0.00	0.00
		11	-713.27	19.09	0.00	0.00	0.00	-95.45
	2	1	488.06	-29.90	0.00	0.00	0.00	0.00
		11	-488.06	29.90	0.00	0.00	0.00	-149.50
	3	1	1423.34	-8.12	0.00	0.00	0.00	0.00
		11	-1423.34	8.12	0.00	0.00	0.00	-40.62
	4	1	1069.91	-28.63	0.00	0.00	0.00	0.00
		11	-1069.91	28.63	0.00	0.00	0.00	-143.17
	5	1	732.09	-44.85	0.00	0.00	0.00	0.00
		11	-732.09	44.85	0.00	0.00	0.00	-224.25
	6	1	2135.00	-12.19	0.00	0.00	0.00	0.00
		11	-2135.00	12.19	0.00	0.00	0.00	-60.93
2	1	2	1010.83	-19.11	0.00	0.00	0.00	0.00
		12	-1010.83	19.11	0.00	0.00	0.00	-95.55
	2	2	1134.77	-29.92	0.00	0.00	0.00	0.00
		12	-1134.77	29.92	0.00	0.00	0.00	-149.62
	3	2	1417.28	-8.15	0.00	0.00	0.00	0.00
		12	-1417.28	8.15	0.00	0.00	0.00	-40.75
	4	2	1516.24	-28.67	0.00	0.00	0.00	0.00
		12	-1516.24	28.67	0.00	0.00	0.00	-143.33
	5	2	1702.16	-44.88	0.00	0.00	0.00	0.00
		12	-1702.16	44.88	0.00	0.00	0.00	-224.42
	6	2	2125.92	-12.22	0.00	0.00	0.00	0.00
		12	-2125.92	12.22	0.00	0.00	0.00	-61.12
3	1	3	1292.47	-19.16	0.00	0.00	0.00	0.00
		13	-1292.47	19.16	0.00	0.00	0.00	-95.78
	2	3	1764.38	-29.98	0.00	0.00	0.00	0.00
		13	-1764.38	29.98	0.00	0.00	0.00	-149.89
	3	3	1389.18	-8.21	0.00	0.00	0.00	0.00
		13	-1389.18	8.21	0.00	0.00	0.00	-41.03
	4	3	1938.71	-28.73	0.00	0.00	0.00	0.00
		13	-1938.71	28.73	0.00	0.00	0.00	-143.67
	5	3	2646.57	-44.97	0.00	0.00	0.00	0.00
		13	-2646.57	44.97	0.00	0.00	0.00	-224.83
	6	3	2083.78	-12.31	0.00	0.00	0.00	0.00
		13	-2083.78	12.31	0.00	0.00	0.00	-61.54
4	1	4	1208.43	-20.13	0.00	0.00	0.00	0.00
		14	-1208.43	20.13	0.00	0.00	0.00	-100.65
	2	4	1842.78	-31.44	0.00	0.00	0.00	0.00
		14	-1842.78	31.44	0.00	0.00	0.00	-157.22
	3	4	1000.20	-9.25	0.00	0.00	0.00	0.00
		14	-1000.20	9.25	0.00	0.00	0.00	-46.26
	4	4	1812.64	-30.20	0.00	0.00	0.00	0.00
		14	-1812.64	30.20	0.00	0.00	0.00	-150.98

MBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	5	4	2764.17	-47.17	0.00	0.00	0.00	0.00
		14	-2764.17	47.17	0.00	0.00	0.00	-235.83
	6	4	1500.30	-13.88	0.00	0.00	0.00	0.00
		14	-1500.30	13.88	0.00	0.00	0.00	-69.39

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

90. PRINT MEMBER FORCES LIST 51 52 53

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
51	1	51	-159.19	713.31	0.00	0.00	0.00	-1144.14
		52	159.19	-713.31	0.00	0.00	0.00	4710.58
	2	51	-249.52	488.07	0.00	0.00	0.00	-1783.58
		52	249.52	-488.07	0.00	0.00	0.00	4223.99
	3	51	-67.70	1423.50	0.00	0.00	0.00	-492.89
		52	67.70	-1423.50	0.00	0.00	0.00	7609.88
	4	51	-238.78	1069.96	0.00	0.00	0.00	-1716.20
		52	238.78	-1069.96	0.00	0.00	0.00	7065.87
	5	51	-374.28	732.11	0.00	0.00	0.00	-2675.36
		52	374.28	-732.11	0.00	0.00	0.00	6335.99
	6	51	-101.55	2135.26	0.00	0.00	0.00	-739.34
		52	101.55	-2135.26	0.00	0.00	0.00	11414.82
52	1	52	-318.50	1724.09	0.00	0.00	0.00	-5856.31
		53	-327.50	2500.91	0.00	0.00	0.00	3662.33
	2	52	-499.02	1622.85	0.00	0.00	0.00	-6009.13
		53	-511.98	3607.15	0.00	0.00	0.00	5512.80
	3	52	-135.64	2840.56	0.00	0.00	0.00	-8105.06
		53	-145.36	2389.44	0.00	0.00	0.00	3914.86
	4	52	-477.74	2586.14	0.00	0.00	0.00	-8784.47
		53	-491.26	3751.36	0.00	0.00	0.00	5493.50
	5	52	-748.53	2434.28	0.00	0.00	0.00	-9013.69
		53	-767.97	5410.72	0.00	0.00	0.00	8269.20
	6	52	-203.46	4260.84	0.00	0.00	0.00	-12157.59
		53	-218.04	3584.16	0.00	0.00	0.00	5872.29
53	1	53	167.78	-1208.43	0.00	0.00	0.00	-4811.93
		54	-167.78	1208.43	0.00	0.00	0.00	-1230.21
	2	53	262.05	-1842.78	0.00	0.00	0.00	-7302.54
		54	-262.05	1842.78	0.00	0.00	0.00	-1911.36
	3	53	76.97	-1000.20	0.00	0.00	0.00	-4414.74
		54	-76.97	1000.20	0.00	0.00	0.00	-586.26
	4	53	251.67	-1812.64	0.00	0.00	0.00	-7217.90
		54	-251.67	1812.64	0.00	0.00	0.00	-1845.32
	5	53	393.08	-2764.17	0.00	0.00	0.00	-10953.81
		54	-393.08	2764.17	0.00	0.00	0.00	-2867.04
	6	53	115.46	-1500.30	0.00	0.00	0.00	-6622.12
		54	-115.46	1500.30	0.00	0.00	0.00	-879.39

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

91. PRINT REACC ALL

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	19.09	713.27	0.00	0.00	0.00	0.00
	2	29.90	488.06	0.00	0.00	0.00	0.00
	3	8.12	1423.34	0.00	0.00	0.00	0.00
	4	28.63	1069.91	0.00	0.00	0.00	0.00
	5	44.85	732.09	0.00	0.00	0.00	0.00
	6	12.19	2135.00	0.00	0.00	0.00	0.00
2	1	19.11	1010.83	0.00	0.00	0.00	0.00
	2	29.92	1134.77	0.00	0.00	0.00	0.00
	3	8.15	1417.28	0.00	0.00	0.00	0.00
	4	28.67	1516.24	0.00	0.00	0.00	0.00
	5	44.88	1702.16	0.00	0.00	0.00	0.00
	6	12.22	2125.92	0.00	0.00	0.00	0.00
3	1	19.16	1292.47	0.00	0.00	0.00	0.00
	2	29.98	1764.38	0.00	0.00	0.00	0.00
	3	8.21	1389.18	0.00	0.00	0.00	0.00
	4	28.73	1938.71	0.00	0.00	0.00	0.00
	5	44.97	2646.57	0.00	0.00	0.00	0.00
	6	12.31	2083.78	0.00	0.00	0.00	0.00
4	1	20.13	1208.43	0.00	0.00	0.00	0.00
	2	31.44	1842.78	0.00	0.00	0.00	0.00
	3	9.25	1000.20	0.00	0.00	0.00	0.00
	4	30.20	1812.64	0.00	0.00	0.00	0.00
	5	47.17	2764.17	0.00	0.00	0.00	0.00
	6	13.88	1500.30	0.00	0.00	0.00	0.00
11	1	55.26	0.00	0.00	0.00	0.00	0.00
	2	87.32	0.00	0.00	0.00	0.00	0.00
	3	22.96	0.00	0.00	0.00	0.00	0.00
	4	82.89	0.00	0.00	0.00	0.00	0.00
	5	130.98	0.00	0.00	0.00	0.00	0.00
	6	34.44	0.00	0.00	0.00	0.00	0.00
12	1	55.29	0.00	0.00	0.00	0.00	0.00
	2	87.35	0.00	0.00	0.00	0.00	0.00
	3	22.98	0.00	0.00	0.00	0.00	0.00
	4	82.93	0.00	0.00	0.00	0.00	0.00
	5	131.03	0.00	0.00	0.00	0.00	0.00
	6	34.48	0.00	0.00	0.00	0.00	0.00
13	1	55.32	0.00	0.00	0.00	0.00	0.00
	2	87.40	0.00	0.00	0.00	0.00	0.00
	3	23.03	0.00	0.00	0.00	0.00	0.00
	4	82.99	0.00	0.00	0.00	0.00	0.00
	5	131.10	0.00	0.00	0.00	0.00	0.00
	6	34.55	0.00	0.00	0.00	0.00	0.00
14	1	56.13	0.00	0.00	0.00	0.00	0.00
	2	88.61	0.00	0.00	0.00	0.00	0.00
	3	23.90	0.00	0.00	0.00	0.00	0.00
	4	84.19	0.00	0.00	0.00	0.00	0.00
	5	132.91	0.00	0.00	0.00	0.00	0.00
	6	35.85	0.00	0.00	0.00	0.00	0.00
21	1	-78.26	0.00	0.00	0.00	0.00	0.00
	2	-122.34	0.00	0.00	0.00	0.00	0.00

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
	3	-33.48	0.00	0.00	0.00	0.00	0.00
	4	-117.40	0.00	0.00	0.00	0.00	0.00
	5	-183.51	0.00	0.00	0.00	0.00	0.00
	6	-50.22	0.00	0.00	0.00	0.00	0.00
22	1	-78.36	0.00	0.00	0.00	0.00	0.00
	2	-122.45	0.00	0.00	0.00	0.00	0.00
	3	-33.60	0.00	0.00	0.00	0.00	0.00
	4	-117.54	0.00	0.00	0.00	0.00	0.00
	5	-183.67	0.00	0.00	0.00	0.00	0.00
	6	-50.41	0.00	0.00	0.00	0.00	0.00
23	1	-78.58	0.00	0.00	0.00	0.00	0.00
	2	-122.71	0.00	0.00	0.00	0.00	0.00
	3	-33.87	0.00	0.00	0.00	0.00	0.00
	4	-117.86	0.00	0.00	0.00	0.00	0.00
	5	-184.06	0.00	0.00	0.00	0.00	0.00
	6	-50.81	0.00	0.00	0.00	0.00	0.00
24	1	-83.21	0.00	0.00	0.00	0.00	0.00
	2	-129.68	0.00	0.00	0.00	0.00	0.00
	3	-38.84	0.00	0.00	0.00	0.00	0.00
	4	-124.81	0.00	0.00	0.00	0.00	0.00
	5	-194.52	0.00	0.00	0.00	0.00	0.00
	6	-58.26	0.00	0.00	0.00	0.00	0.00
31	1	-155.27	0.00	0.00	0.00	0.00	0.00
	2	-244.25	0.00	0.00	0.00	0.00	0.00
	3	-65.31	0.00	0.00	0.00	0.00	0.00
	4	-232.90	0.00	0.00	0.00	0.00	0.00
	5	-366.37	0.00	0.00	0.00	0.00	0.00
	6	-97.97	0.00	0.00	0.00	0.00	0.00
32	1	-155.39	0.00	0.00	0.00	0.00	0.00
	2	-244.39	0.00	0.00	0.00	0.00	0.00
	3	-65.45	0.00	0.00	0.00	0.00	0.00
	4	-233.08	0.00	0.00	0.00	0.00	0.00
	5	-366.58	0.00	0.00	0.00	0.00	0.00
	6	-98.18	0.00	0.00	0.00	0.00	0.00
33	1	-155.63	0.00	0.00	0.00	0.00	0.00
	2	-244.67	0.00	0.00	0.00	0.00	0.00
	3	-65.75	0.00	0.00	0.00	0.00	0.00
	4	-233.44	0.00	0.00	0.00	0.00	0.00
	5	-367.01	0.00	0.00	0.00	0.00	0.00
	6	-98.63	0.00	0.00	0.00	0.00	0.00
34	1	-160.79	0.00	0.00	0.00	0.00	0.00
	2	-252.44	0.00	0.00	0.00	0.00	0.00
	3	-71.30	0.00	0.00	0.00	0.00	0.00
	4	-241.18	0.00	0.00	0.00	0.00	0.00
	5	-378.66	0.00	0.00	0.00	0.00	0.00
	6	-106.95	0.00	0.00	0.00	0.00	0.00

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

92. PLOT  DIS FILE
93. PLOT  BEN FILE
94. FINISH

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

    **** DATE= AUG 17,1999    TIME= 10: 3:56 ****

  ************************************************************
  *  FOR  QUESTIONS REGARDING THIS VERSION OF PROGRAM    *
  * TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
  * 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
  ************************************************************
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VIADUCTO 2 - ESTRIBO 1 - ARMADURAS DE PILOTES

1/2

HIPOTESIS 4	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 41	-1069	1716	-356	572	0.17	0.18	0.40	191	24	39
BARRA 42	-1516	1718	-505	573	0.24	0.18	0.33	158	20	32
BARRA 43	-1938	1724	-646	575	0.30	0.18	0.37	177	22	36
BARRA 44	-1812	1845	-604	615	0.28	0.19	0.40	191	24	39

HIPOTESIS 5	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 41	-732	2675	-244	892	0.12	0.28	0.78	373	46	76
BARRA 42	-1702	2678	-567	893	0.27	0.28	0.73	349	43	71
BARRA 43	-2646	2684	-882	895	0.42	0.28	0.75	359	45	73
BARRA 44	-2764	2867	-921	956	0.43	0.30	0.83	397	49	81

HIPOTESIS 6	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 41	-2135	739	-712	246	0.34	0.08	0.04	19	14	18
BARRA 42	-2125	742	-708	247	0.33	0.08	0.04	19	14	18
BARRA 43	-2083	749	-694	250	0.33	0.08	0.04	19	14	18
BARRA 44	-1500	879	-500	293	0.24	0.09	0.04	19	14	18

HIPOTESIS 4	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 31	-1069	522	-356	174	0.17	0.05	0.04	19	14	18
BARRA 32	-1516	523	-505	174	0.24	0.05	0.04	19	14	18
BARRA 33	-1938	526	-646	175	0.30	0.06	0.04	19	14	18
BARRA 34	-1812	587	-604	196	0.28	0.06	0.04	19	14	18

HIPOTESIS 5	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 31	-732	805	-244	268	0.12	0.08	0.10	48	14	18
BARRA 32	-1702	806	-567	269	0.27	0.08	0.04	19	14	18
BARRA 33	-2646	809	-882	270	0.42	0.08	0.04	19	14	18
BARRA 34	-2764	901	-921	300	0.43	0.09	0.04	19	14	18

HIPOTESIS 6	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 31	-2135	231	-712	77	0.34	0.02	0.04	19	14	18
BARRA 32	-2125	233	-708	78	0.33	0.02	0.04	19	14	18
BARRA 33	-2083	236	-694	79	0.33	0.02	0.04	19	14	18
BARRA 34	-1500	302	-500	101	0.24	0.03	0.04	19	14	18

HIPOTESIS 4	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-1069	671	-356	224	0.17	0.07	0.04	19	14	18
BARRA 22	-1516	671	-505	224	0.24	0.07	0.04	19	14	18
BARRA 23	-1938	671	-646	224	0.30	0.07	0.04	19	14	18
BARRA 24	-1812	671	-604	224	0.28	0.07	0.04	19	14	18

HIPOTESIS 5	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-732	1065	-244	355	0.12	0.11	0.20	96	14	19
BARRA 22	-1702	1065	-567	355	0.27	0.11	0.12	57	14	18
BARRA 23	-2646	1065	-882	355	0.42	0.11	0.10	48	14	18
BARRA 24	-2764	1064	-921	355	0.43	0.11	0.08	38	14	18

HIPOTESIS 6	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-2135	276	-712	92	0.34	0.03	0.04	19	14	18
BARRA 22	-2125	276	-708	92	0.33	0.03	0.04	19	14	18
BARRA 23	-2083	276	-694	92	0.33	0.03	0.04	19	14	18
BARRA 24	-1500	275	-500	92	0.24	0.03	0.04	19	14	18

VIADUCTO 2 - ESTRIBO 1 - ARMADURAS DE PILOTES
2/2

HIPOTESIS 4	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-1069	700	-356	233	0.17	0.07	0.04	19	14	18
BARRA 12	-1516	701	-505	234	0.24	0.07	0.04	19	14	18
BARRA 13	-1938	702	-646	234	0.30	0.07	0.04	19	14	18
BARRA 14	-1812	723	-604	241	0.28	0.08	0.04	19	14	18

HIPOTESIS 5	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-732	1103	-244	368	0.12	0.12	0.23	110	14	22
BARRA 12	-1702	1104	-567	368	0.27	0.12	0.15	72	14	18
BARRA 13	-2646	1105	-882	368	0.42	0.12	0.13	62	14	18
BARRA 14	-2764	1136	-921	379	0.43	0.12	0.13	62	14	18

HIPOTESIS 6	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-2135	294	-712	98	0.34	0.03	0.04	19	14	18
BARRA 12	-2125	294	-708	98	0.33	0.03	0.04	19	14	18
BARRA 13	-2083	296	-694	99	0.33	0.03	0.04	19	14	18
BARRA 14	-1500	318	-500	106	0.24	0.03	0.04	19	14	18

HIPOTESIS 4	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-1069	143	-356	48	0.17	0.01	0.04	19	14	18
BARRA 2	-1516	143	-505	48	0.24	0.01	0.04	19	14	18
BARRA 3	-1938	143	-646	48	0.30	0.01	0.04	19	14	18
BARRA 4	-1812	151	-604	50	0.28	0.02	0.04	19	14	18

HIPOTESIS 5	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-732	224	-244	75	0.12	0.02	0.04	19	14	18
BARRA 2	-1702	224	-567	75	0.27	0.02	0.04	19	14	18
BARRA 3	-2646	224	-882	75	0.42	0.02	0.04	19	14	18
BARRA 4	-2764	235	-921	78	0.43	0.02	0.04	19	14	18

HIPOTESIS 6	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-2135	61	-712	20	0.34	0.01	0.04	19	14	18
BARRA 2	-2125	61	-708	20	0.33	0.01	0.04	19	14	18
BARRA 3	-2083	62	-694	21	0.33	0.01	0.04	19	14	18
BARRA 4	-1500	69	-500	23	0.24	0.01	0.04	19	14	18

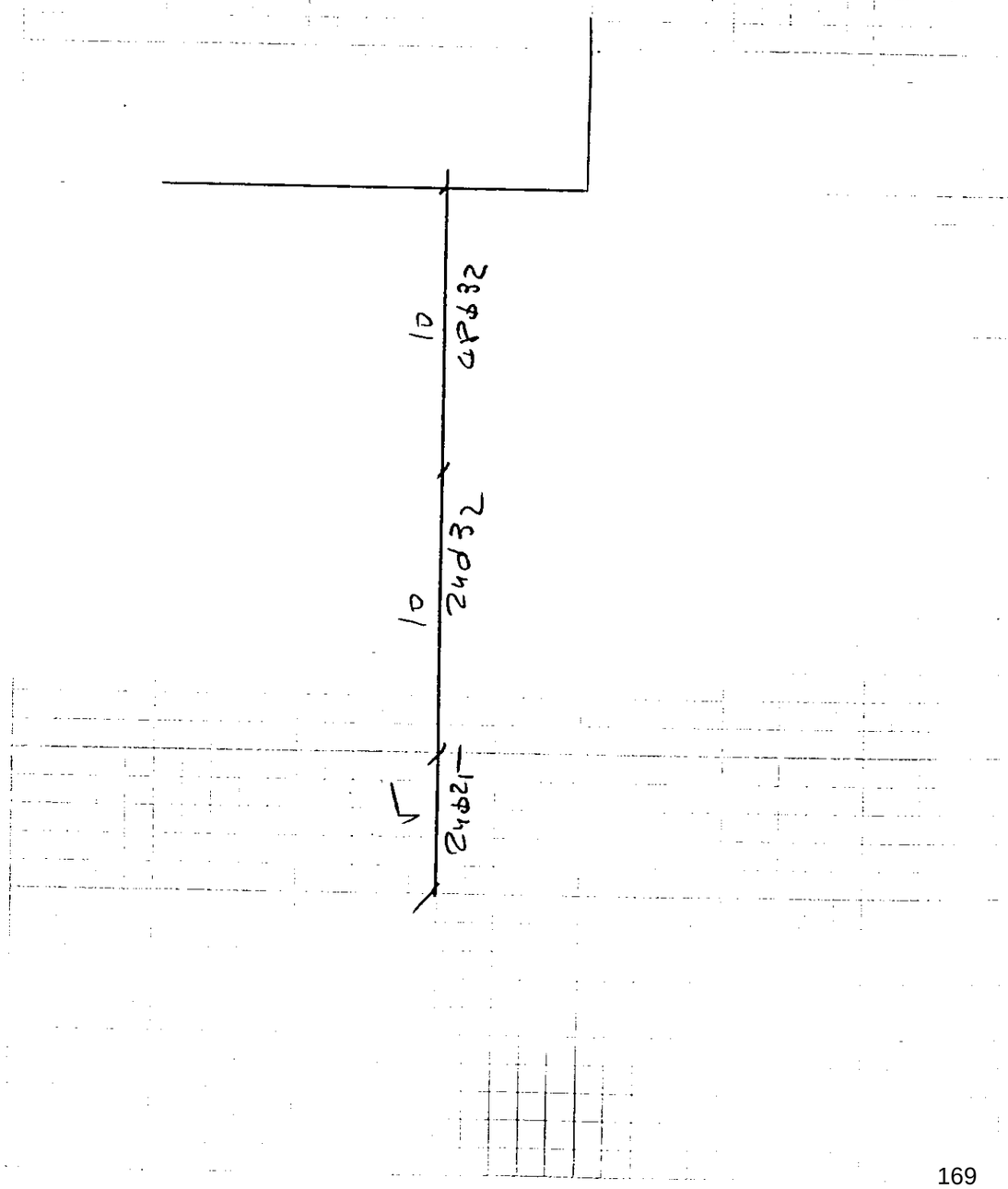
ν = N' / 3 / 2120

μ= M' / 3 / 1.5 / 2120

Intecsa PROYECTO: HOJA ___ DE ___
ESCALA: FECHA

DISPOSICIÓN ARMADURAS.

Lpilote = 24.00 m.



ARRANQUE DEL ENCEPADO

ARRANQUE INFERIOR

$U = 5.25 - 1.50 + 0.15 \times 4.45 = 4.42$

$b_1 = 1.50 + 0.75 - 4.42 = 6.67$

$b_2 = 16.00 / 3 = 5.33$

$b = 5.33$

PILOTE MAS CARGADO

$Q = \frac{921}{1.5} = 614$ tn.

$\mu = 614 \times \frac{4.42}{5.33} = 509$ mt/ml

$\mu' = 509 \times 1.6 = 814$ mt/ml

$A_c = \frac{2500}{1.5} \times 3.00 \times 2.40 = 4000$

$A_s = 4000 \left(1 - \sqrt{1 - \frac{2 \times 814}{2.40 \times 4000}}\right) = 355$ t/ml

$\omega = 355 \times 1.15 / 5.1 = 80$ cm²/ml 2 cos ϕ32/20

ARRANQUE DE REPARTO

$\omega = \frac{80}{4} = 20$ cm²/ml ϕ25/25

ARRANQUE SUPERIOR

$\omega = 0.30 \times 80 = 24$ cm²/ml. ϕ25/20

CORTANTE

$Q = \frac{814}{5.33} = 115$ t/ml

$Q' = 1.6 \times 115 = 184$ t/ml

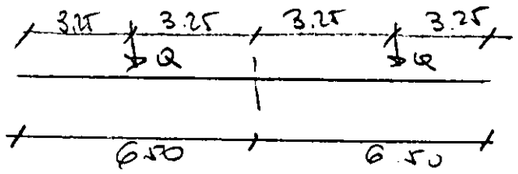
$t_b = 5 \sqrt{210/1.5} \times 1.00 \times 2.40 = 155$ t/ml

$\omega_t = \frac{184 - 155}{0.9 \times 4.2 \times 2.4} = 3.20$ cm²/ml

$\omega_{tu} = 0.02 \times \frac{2500}{1.5} \times \frac{1}{4.2} = 7.9$ cm²/ml

se dejan tres ϕ16/30/60 = 11.27 cm²/ml.

ARRANQUE DEL ESTRIBO



$Q = 365$ ton $/ 2 = 182$ ton

$M_E = \frac{Fab(L+b)}{2L}$ $a = b = \frac{3.25}{2} = 1.625$

$q_E = \frac{182 \times 1.62 \times 1.62 (6.50 + 3.25)}{2 \times 6.50^2} = 55$ mt

$M_{CJ} = \frac{182 \times 6.50}{4} - \frac{55}{2} = 296 - 27 = 269$ mt.

b en N'de b = 2.00

$\mu = \frac{269 \times 1.6}{2.00} = 215$ mt/ml

$A_c = \frac{2500}{1.50} \times 1.00 \times 1.65 = 2750$ Tn

$A_s = 2750 \left(1 - \sqrt{1 - \frac{2 \times 215}{1.65 \times 2750}}\right) = 183.5$ ton

$\omega = 183.5 \times 1.15 / 5.1 = 30,10$ cm²/ml

$\omega_{min} = 2,8 \times 10^{-3} \times 165 \times 100 = 46,2$ cm²/ml

Se dispone ϕ 22/15.

ARMADURA DE CORTANTE

$Q = \frac{182}{2} + \frac{55}{6.50} = 91 + 8.5 = 99.5$ Tn/m.

$\sigma' = 99.5 \times 1.60 = 159$ ton/ml

$T_D = 5 \sqrt{\frac{250}{1.5}} \times 1.65 \times 1.00 = 107$ t/ml

$\omega_t = \frac{159 - 107}{0.9 \times 1.65 \times 4.2} = 8.33$ cm²/ml.

Se dispone ϕ16/15/30 = 8.08 cm²/ml.

MUROS $b = 1.00$

ARMADURA MINIMA

$\omega_{HMIN} = 1.6 \times 10^{-3} \times 100 \times 95 = 15.2$ cm²/ml

$\omega_{VMIN} = 0.9 \times 10^{-3} \times 100 \times 95 = 8.55$ cm²/ml.

MURO POSTERIOR

$q = \frac{1.8 \times 12.41}{3} = 7.47$ t/ml.

$\mu_E = 7.47 \times \frac{6.50^2}{8} = 39.34$ mt/ml.

$\mu_{CV} = 7.47 \times \frac{6.50^2}{8} - \frac{39.34}{2} = 19.67$ mt/ml.

Momento de calculo.

$\mu' = 39.34 \times 1.6 - 62.9$ mt/ml

$A_c = \frac{2500}{1.5} \times 0.95 = 1583$ t/ml

$A_s = 1583 \left(1 - \sqrt{1 - \frac{2 \times 62.9}{0.95 \times 1583}}\right) = 61.6$ cm²

$\omega = 61.6 \times 1.15 / 5.1 = 15.3$ cm²/ml ϕ20/20.

intecsa
INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS, S.A.

PROYECTO: _____ HOJA ___ DE ___

_____ FECHA _____

EJECUTANTE: _____

DINTEL SUPERIOR.

$q = 2.50 \times 0.70 + 3.00 = 4.00$ t/ml

$\mu = 4.0 \times \frac{6.50^2}{8} = 21.12$ mt/ml

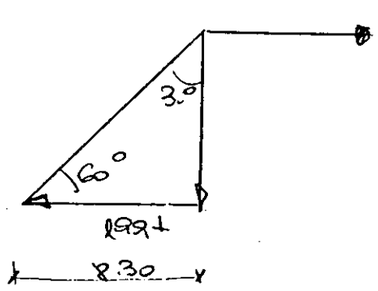
$\mu' = 1.6 \times 21.12 = 33.8$ mt/ml

$A_c = \frac{2500}{1.5} \times 0.47 \times 1.00 = 783$ t

$A_s = 783 \left(1 - \sqrt{1 - \frac{2 \times 33.80}{0.47 \times 783}}\right) = 15.6$ t

$w = 15.6 \times 1.15 / S_1 = 17.1$ cm²/ml $\phi 20/15$

ARMADURA DE ADHERENCIA EN MUROS.



$R = 99.5 \times 2 = 199$ t

$w_t = \frac{199 \times 1.6}{0.9 \times 820 \times 4.2} = 10.9$ cm²/ml $\phi 20/2 = 31.4$

ESTRIBO 2 (DESLIZANTE)

SOLUCION 1

NUMERO DE FILAS	3
SEPARACION ENTRE FILAS	5.50
NUMERO DE HILERAS	3
SEPARACION ENTRE HILERAS	6.50
DIMENSION "a" DEL ENCEPADO	14.00
DIMENSION "b" DEL ENCEPADO	16.00

						FX	FY	MZ	MZ0
ENCEPADO	14.00	16.00	2.00	2.50	7.00	0	-1120	-7840	0
ALZADO	8.25	14.00	14.40	2.50	4.13	0	-4158	-17152	11954
	5.55	11.00	14.40	-2.50	3.78	0	2198	8297	-7088
EMP TIERRAS						871	0	-5922	-5922
TOTAL ESTRIBO						871	-3080	-22617	-1056
TAB CP						0	-248	-1798	-62
TAB SC						0	-285	-2066	-71
ANCLAJE +						25	0	-385	-385
ANCLAJE -						-25	0	385	385
TOTAL TABLERO (+)						15	-533	-4249	-518
TOTAL TABLERO (-)						-15	-533	-3479	252
SOB UNIF	8.25	14.00	1.00	3.00	4.13	0	-347	-1429	996

SIN TABLERO	871	-3080	-22617	-1056
EN SERV ANC +	886	-3960	-28296	-578
EN SERV ANC -	856	-3960	-27526	192

SOLUCION 2

NUMERO DE FILAS	0
SEPARACION ENTRE FILAS	5.50
NUMERO DE HILERAS	0
SEPARACION ENTRE HILERAS	6.50
DIMENSION "a" DEL ENCEPADO	-2.50
DIMENSION "b" DEL ENCEPADO	14.00

						FX	FY	MZ	MZ0
ENCEPADO	-2.50	14.00	2.00	2.50	-1.25	0	175	-219	0
ALZADO	5.00	14.00	12.40	2.50	2.50	0	-2170	-5425	-8138
	-0.45	11.00	12.40	-2.50	0.78	0	-153	-119	-311
EMP TIERRAS						646	0	-3961	-3961
TOTAL ESTRIBO						646	-2148	-9724	-12409
TAB CP						0	-248	-992	-1302
TAB SC						0	-285	-1140	-1496
ANCLAJE +						25	0	-335	-335
ANCLAJE -						-25	0	335	335
TOTAL TABLERO (+)						25	-533	-2467	-3133
TOTAL TABLERO (-)						-25	-533	-1797	-2463
SOB UNIF	5.00	14.00	1.00	3.00	2.50	0	-210	-525	-788

SIN TABLERO	646	-2148	-9724	-12409
EN SERV ANC +	671	-2891	-12716	-16330
EN SERV ANC -	621	-2891	-12046	-15660

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 ****************************************************
 *                                                  *
 *           S T A A D - III                        *
 *           Revision 17.0a                         *
 *           Proprietary Program of                 *
 *           RESEARCH ENGINEERS, Inc.               *
 *           Date=    AUG 17, 1999                  *
 *           Time=    13: 2:15                      *
 *                                                  *
 ****************************************************

  1. STAAD PLANE VIADUCTO 2 ESTRIBO 2
  2. *EFECTOS CARGAS GRAVITATORIAS
  3. UNIT MTO MET
  4. JOINT COORDINATES
  5.    1  -5.500   -25.000
  6.    2   0.000   -25.000
  7.    3   5.500   -25.000
  8.   11  -5.500   -20.000
  9.   12   0.000   -20.000
 10.   13   5.500   -20.000
 11.   21  -5.500   -15.000
 12.   22   0.000   -15.000
 13.   23   5.500   -15.000
 14.   31  -5.500   -10.000
 15.   32   0.000   -10.000
 16.   33   5.500   -10.000
 17.   41  -5.500    -5.000
 18.   42   0.000    -5.000
 19.   43   5.500    -5.000
 20.   51  -5.500     0.000
 21.   52   0.000     0.000
 22.   53   5.500     0.000
 23. MEMBER INCIDENCES
 24.    1    1    11
 25.    R    4    10   10
 26.    2    2    12
 27.    R    4    10   10
 28.    3    3    13
 29.    R    4    10   10
 30.   51   51    52
 31.   52   52    53
 32. MEMBER PROPERTY
 33. *PILOTES  3 * 3 PILOTES
 34. 1 11 21 31 41      PR AX  5.298 IZ  0.74513
 35. 2 12 22 32 42      PR AX  5.298 IZ  0.74513
 36. 3 13 23 33 43      PR AX  5.298 IZ  0.74513
 37. *ENCEPADO (1.5+6.5+6.5+1.5)*2.5
 38. 51                 PR AX 40.000 IZ  20.8300
 39. 52                 PR AX 73.700 IZ  1882.31
 40. CONSTANT
 41. E  3250000.   ALL
 42. POI 0.15
 43. DEN 2.50
 44. SUPPORT
 45. 1 2 3          PINNED
 46. 11 12 13       FIXED BUT FY MZ KFX  168750
 47. 21 22 23       FIXED BUT FY MZ KFX   97125
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VIADUCTO 2 ESTRIBO 2
*EFECTOS CARGAS GRAVITATORIAS
 48. 31 32 33       FIXED BUT FY MZ KFX   25500
 49. LOADING 1 RELLENO DE TIERRAS Y SIN TABLERO
 50. JOINT LOAD
 51. *PROCEDENTE DE CALCULO DE ESTRIBO
 52. 52             FX  -871
 53. 52             FY -3080
 54. 52             MZ  1056
 55. LOADING 2 PUENTE EN SERVICIO ANCLAJE HACIA VALLE
 56. JOINT LOAD
 57. *PROCEDENTE DE CALCULO DE ESTRIBO
 58. 52             FX  -886
 59. 52             FY -3960
 60. 52             MZ   578
 61. LOADING 3 PUENTE EN SERVICIO ANCLAJE HACIA MONTAàA
 62. JOINT LOAD
 63. *PROCEDENTE DE CALCULO DE ESTRIBO
 64. 52             FX  -856
 65. 52             FY -3960
 66. 52             MZ  -192
 67. MEMBER LOAD
 68. LOADING COMBINATION 4
 69. 1 1.50
 70. LOADING COMBINATION 5
 71. 2 1.50
 72. LOADING COMBINATION 6
 73. 3 1.50
 74. PERFORM ANALISIS

                P R O B L E M   S T A T I S T I C S
                -----------------------------------

   NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =     18/    17/    12
   ORIGINAL/FINAL BAND-WIDTH =      3/     2
   TOTAL PRIMARY LOAD CASES  =      3, TOTAL DEGREES OF FREEDOM =     48
   SIZE OF STIFFNESS MATRIX =       432 DOUBLE PREC. WORDS
   TOTAL REQUIRED DISK SPACE =    12.04 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX.              13: 2:17
 + PROCESSING GLOBAL STIFFNESS MATRIX.               13: 2:17
++ PROCESSING TRIANGULAR FACTORIZATION.              13: 2:17
++ CALCULATING JOINT DISPLACEMENTS.                  13: 2:17
++ CALCULATING MEMBER  FORCES.                       13: 2:17

 75. LOAD LIST  ALL
 76. PRINT MEMBER FORCES LIST  41 42 43
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MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
41	1	41	1594.86	-297.70	0.00	0.00	0.00	667.36
		51	-1594.86	297.70	0.00	0.00	0.00	-2155.86
	2	41	1833.75	-304.69	0.00	0.00	0.00	690.23
		51	-1833.75	304.69	0.00	0.00	0.00	-2213.71
	3	41	1750.82	-294.19	0.00	0.00	0.00	668.91
		51	-1750.82	294.19	0.00	0.00	0.00	-2139.87
	4	41	2392.29	-446.55	0.00	0.00	0.00	1001.03
		51	-2392.29	446.55	0.00	0.00	0.00	-3233.79
	5	41	2750.62	-457.04	0.00	0.00	0.00	1035.35
		51	-2750.62	457.04	0.00	0.00	0.00	-3320.56
	6	41	2626.23	-441.29	0.00	0.00	0.00	1003.37
		51	-2626.23	441.29	0.00	0.00	0.00	-3209.80
42	1	42	1217.75	-286.75	0.00	0.00	0.00	611.83
		52	-1217.75	286.75	0.00	0.00	0.00	-2045.60
	2	42	1553.70	-290.78	0.00	0.00	0.00	619.73
		52	-1553.70	290.78	0.00	0.00	0.00	-2073.64
	3	42	1542.05	-281.04	0.00	0.00	0.00	602.26
		52	-1542.05	281.04	0.00	0.00	0.00	-2007.45
	4	42	1826.63	-430.13	0.00	0.00	0.00	917.75
		52	-1826.63	430.13	0.00	0.00	0.00	-3068.40
	5	42	2330.55	-436.17	0.00	0.00	0.00	929.60
		52	-2330.55	436.17	0.00	0.00	0.00	-3110.45
	6	42	2313.07	-421.55	0.00	0.00	0.00	903.40
		52	-2313.07	421.55	0.00	0.00	0.00	-3011.17
43	1	43	267.38	-286.55	0.00	0.00	0.00	610.94
		53	-267.38	286.55	0.00	0.00	0.00	-2043.67
	2	43	572.55	-290.52	0.00	0.00	0.00	618.60
		53	-572.55	290.52	0.00	0.00	0.00	-2071.22
	3	43	667.13	-280.77	0.00	0.00	0.00	601.08
		53	-667.13	280.77	0.00	0.00	0.00	-2004.94
	4	43	401.08	-429.82	0.00	0.00	0.00	916.41
		53	-401.08	429.82	0.00	0.00	0.00	-3065.50
	5	43	858.83	-435.79	0.00	0.00	0.00	927.90
		53	-858.83	435.79	0.00	0.00	0.00	-3106.83
	6	43	1000.70	-421.16	0.00	0.00	0.00	901.62
		53	-1000.70	421.16	0.00	0.00	0.00	-3007.41

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

77. PRINT MEMBER FORCES LIST 31 32 33

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
31	1	31	1594.86	-297.70	0.00	0.00	0.00	-821.15
		41	-1594.86	297.70	0.00	0.00	0.00	-667.35
	2	31	1833.75	-304.70	0.00	0.00	0.00	-833.25
		41	-1833.75	304.70	0.00	0.00	0.00	-690.23
	3	31	1750.82	-294.19	0.00	0.00	0.00	-802.04
		41	-1750.82	294.19	0.00	0.00	0.00	-668.91
	4	31	2392.29	-446.55	0.00	0.00	0.00	-1231.73
		41	-2392.29	446.55	0.00	0.00	0.00	-1001.03
	5	31	2750.62	-457.04	0.00	0.00	0.00	-1249.87
		41	-2750.62	457.04	0.00	0.00	0.00	-1035.34
	6	31	2626.23	-441.29	0.00	0.00	0.00	-1203.06
		41	-2626.23	441.29	0.00	0.00	0.00	-1003.37
32	1	32	1217.75	-286.75	0.00	0.00	0.00	-821.93
		42	-1217.75	286.75	0.00	0.00	0.00	-611.83
	2	32	1553.70	-290.78	0.00	0.00	0.00	-834.17
		42	-1553.70	290.78	0.00	0.00	0.00	-619.73
	3	32	1542.05	-281.04	0.00	0.00	0.00	-802.92
		42	-1542.05	281.04	0.00	0.00	0.00	-602.27
	4	32	1826.63	-430.13	0.00	0.00	0.00	-1232.90
		42	-1826.63	430.13	0.00	0.00	0.00	-917.75
	5	32	2330.55	-436.17	0.00	0.00	0.00	-1251.25
		42	-2330.55	436.17	0.00	0.00	0.00	-929.60
	6	32	2313.07	-421.55	0.00	0.00	0.00	-1204.38
		42	-2313.07	421.55	0.00	0.00	0.00	-903.40
33	1	33	267.38	-286.55	0.00	0.00	0.00	-821.79
		43	-267.38	286.55	0.00	0.00	0.00	-610.94
	2	33	572.55	-290.52	0.00	0.00	0.00	-834.02
		43	-572.55	290.52	0.00	0.00	0.00	-618.60
	3	33	667.13	-280.77	0.00	0.00	0.00	-802.78
		43	-667.13	280.77	0.00	0.00	0.00	-601.08
	4	33	401.08	-429.82	0.00	0.00	0.00	-1232.68
		43	-401.08	429.82	0.00	0.00	0.00	-916.41
	5	33	858.83	-435.79	0.00	0.00	0.00	-1251.04
		43	-858.83	435.79	0.00	0.00	0.00	-927.90
	6	33	1000.70	-421.16	0.00	0.00	0.00	-1204.17
		43	-1000.70	421.16	0.00	0.00	0.00	-901.62

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

78. PRINT MEMBER FORCES LIST 21 22 23

MBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
21	1	21	1594.86	-9.17	0.00	0.00	0.00	-866.98
		31	-1594.86	9.17	0.00	0.00	0.00	821.15
	2	21	1833.75	-10.21	0.00	0.00	0.00	-884.30
		31	-1833.75	10.21	0.00	0.00	0.00	833.25
	3	21	1750.82	-10.14	0.00	0.00	0.00	-852.77
		31	-1750.82	10.14	0.00	0.00	0.00	802.04
	4	21	2392.29	-13.75	0.00	0.00	0.00	-1300.47
		31	-2392.29	13.75	0.00	0.00	0.00	1231.73
	5	21	2750.62	-15.32	0.00	0.00	0.00	-1326.45
		31	-2750.62	15.32	0.00	0.00	0.00	1249.87
	6	21	2626.23	-15.22	0.00	0.00	0.00	-1279.15
		31	-2626.23	15.22	0.00	0.00	0.00	1203.06
	1	22	1217.75	-5.26	0.00	0.00	0.00	-848.22
		32	-1217.75	5.26	0.00	0.00	0.00	821.93
	2	22	1553.70	-5.25	0.00	0.00	0.00	-860.42
		32	-1553.70	5.25	0.00	0.00	0.00	834.17
	3	22	1542.05	-5.46	0.00	0.00	0.00	-830.19
		32	-1542.05	5.46	0.00	0.00	0.00	802.92
	4	22	1826.63	-7.89	0.00	0.00	0.00	-1272.33
		32	-1826.63	7.89	0.00	0.00	0.00	1232.90
	5	22	2330.55	-7.88	0.00	0.00	0.00	-1290.63
		32	-2330.55	7.88	0.00	0.00	0.00	1251.25
	6	22	2313.07	-8.18	0.00	0.00	0.00	-1245.29
		32	-2313.07	8.18	0.00	0.00	0.00	1204.38
23	1	23	267.38	-5.20	0.00	0.00	0.00	-847.79
		33	-267.38	5.20	0.00	0.00	0.00	821.79
	2	23	572.55	-5.18	0.00	0.00	0.00	-859.91
		33	-572.55	5.18	0.00	0.00	0.00	834.02
	3	23	667.13	-5.38	0.00	0.00	0.00	-829.67
		33	-667.13	5.38	0.00	0.00	0.00	802.78
	4	23	401.08	-7.80	0.00	0.00	0.00	-1271.69
		33	-401.08	7.80	0.00	0.00	0.00	1232.68
	5	23	858.83	-7.77	0.00	0.00	0.00	-1289.87
		33	-858.83	7.77	0.00	0.00	0.00	1251.04
	6	23	1000.70	-8.07	0.00	0.00	0.00	-1244.51
		33	-1000.70	8.07	0.00	0.00	0.00	1204.17

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

79. PRINT MEMBER FORCES LIST 11 12 13

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
11	1	11	1594.86	137.69	0.00	0.00	0.00	-178.55
		21	-1594.86	-137.69	0.00	0.00	0.00	866.98
	2	11	1833.75	140.31	0.00	0.00	0.00	-182.77
		21	-1833.75	-140.31	0.00	0.00	0.00	884.30
	3	11	1750.82	135.26	0.00	0.00	0.00	-176.48
		21	-1750.82	-135.26	0.00	0.00	0.00	852.77
	4	11	2392.29	206.53	0.00	0.00	0.00	-267.83
		21	-2392.29	-206.53	0.00	0.00	0.00	1300.47
	5	11	2750.62	210.46	0.00	0.00	0.00	-274.16
		21	-2750.62	-210.46	0.00	0.00	0.00	1326.45
	6	11	2626.23	202.89	0.00	0.00	0.00	-264.71
		21	-2626.23	-202.89	0.00	0.00	0.00	1279.15
12	1	12	1217.75	135.26	0.00	0.00	0.00	-171.90
		22	-1217.75	-135.26	0.00	0.00	0.00	848.22
	2	12	1553.70	137.22	0.00	0.00	0.00	-174.31
		22	-1553.70	-137.22	0.00	0.00	0.00	860.42
	3	12	1542.05	132.34	0.00	0.00	0.00	-168.48
		22	-1542.05	-132.34	0.00	0.00	0.00	830.19
	4	12	1826.63	202.90	0.00	0.00	0.00	-257.85
		22	-1826.63	-202.90	0.00	0.00	0.00	1272.33
	5	12	2330.55	205.83	0.00	0.00	0.00	-261.46
		22	-2330.55	-205.83	0.00	0.00	0.00	1290.63
	6	12	2313.07	198.51	0.00	0.00	0.00	-252.72
		22	-2313.07	-198.51	0.00	0.00	0.00	1245.29
13	1	13	267.38	135.20	0.00	0.00	0.00	-171.77
		23	-267.38	-135.20	0.00	0.00	0.00	847.79
	2	13	572.55	137.15	0.00	0.00	0.00	-174.15
		23	-572.55	-137.15	0.00	0.00	0.00	859.92
	3	13	667.13	132.27	0.00	0.00	0.00	-168.32
		23	-667.13	-132.27	0.00	0.00	0.00	829.67
	4	13	401.08	202.81	0.00	0.00	0.00	-257.66
		23	-401.08	-202.81	0.00	0.00	0.00	1271.69
	5	13	858.83	205.73	0.00	0.00	0.00	-261.23
		23	-858.83	-205.73	0.00	0.00	0.00	1289.87
	6	13	1000.70	198.41	0.00	0.00	0.00	-252.48
		23	-1000.70	-198.41	0.00	0.00	0.00	1244.51

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

80. PRINT MEMBER FORCES LIST 1 2 3

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	1594.86	35.71	0.00	0.00	0.00	0.00
		11	-1594.86	-35.71	0.00	0.00	0.00	178.55
	2	1	1833.75	36.55	0.00	0.00	0.00	0.00
		11	-1833.75	-36.55	0.00	0.00	0.00	182.77
	3	1	1750.82	35.30	0.00	0.00	0.00	0.00
		11	-1750.82	-35.30	0.00	0.00	0.00	176.48
	4	1	2392.29	53.57	0.00	0.00	0.00	0.00
		11	-2392.29	-53.57	0.00	0.00	0.00	267.83
	5	1	2750.62	54.83	0.00	0.00	0.00	0.00
		11	-2750.62	-54.83	0.00	0.00	0.00	274.16
	6	1	2626.23	52.94	0.00	0.00	0.00	0.00
		11	-2626.23	-52.94	0.00	0.00	0.00	264.71
2	1	2	1217.75	34.38	0.00	0.00	0.00	0.00
		12	-1217.75	-34.38	0.00	0.00	0.00	171.90
	2	2	1553.70	34.86	0.00	0.00	0.00	0.00
		12	-1553.70	-34.86	0.00	0.00	0.00	174.31
	3	2	1542.05	33.70	0.00	0.00	0.00	0.00
		12	-1542.05	-33.70	0.00	0.00	0.00	168.48
	4	2	1826.63	51.57	0.00	0.00	0.00	0.00
		12	-1826.63	-51.57	0.00	0.00	0.00	257.85
	5	2	2330.55	52.29	0.00	0.00	0.00	0.00
		12	-2330.55	-52.29	0.00	0.00	0.00	261.46
	6	2	2313.07	50.54	0.00	0.00	0.00	0.00
		12	-2313.07	-50.54	0.00	0.00	0.00	252.72
3	1	3	267.38	34.35	0.00	0.00	0.00	0.00
		13	-267.38	-34.35	0.00	0.00	0.00	171.77
	2	3	572.55	34.83	0.00	0.00	0.00	0.00
		13	-572.55	-34.83	0.00	0.00	0.00	174.15
	3	3	667.13	33.66	0.00	0.00	0.00	0.00
		13	-667.13	-33.66	0.00	0.00	0.00	168.32
	4	3	401.08	51.53	0.00	0.00	0.00	0.00
		13	-401.08	-51.53	0.00	0.00	0.00	257.66
	5	3	858.83	52.25	0.00	0.00	0.00	0.00
		13	-858.83	-52.25	0.00	0.00	0.00	261.23
	6	3	1000.70	50.50	0.00	0.00	0.00	0.00
		13	-1000.70	-50.50	0.00	0.00	0.00	252.48

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

81. PRINT MEMBER FORCES LIST 51 52

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
51	1	51	297.72	1594.86	0.00	0.00	0.00	2155.86
		52	-297.72	-1594.86	0.00	0.00	0.00	6615.88
	2	51	304.75	1833.75	0.00	0.00	0.00	2213.71
		52	-304.75	-1833.75	0.00	0.00	0.00	7871.90
	3	51	294.22	1750.82	0.00	0.00	0.00	2139.87
		52	-294.22	-1750.82	0.00	0.00	0.00	7489.63
	4	51	446.58	2392.29	0.00	0.00	0.00	3233.79
		52	-446.58	-2392.29	0.00	0.00	0.00	9923.81
	5	51	457.12	2750.62	0.00	0.00	0.00	3320.56
		52	-457.12	-2750.62	0.00	0.00	0.00	11807.85
	6	51	441.34	2626.23	0.00	0.00	0.00	3209.81
		52	-441.34	-2626.23	0.00	0.00	0.00	11234.44
52	1	52	-286.65	-267.46	0.00	0.00	0.00	-3514.54
		53	286.65	267.46	0.00	0.00	0.00	2043.50
	2	52	-290.64	-572.51	0.00	0.00	0.00	-5220.14
		53	290.64	572.51	0.00	0.00	0.00	2071.36
	3	52	-280.78	-667.06	0.00	0.00	0.00	-5673.95
		53	280.78	667.06	0.00	0.00	0.00	2005.25
	4	52	-429.97	-401.19	0.00	0.00	0.00	-5271.81
		53	429.97	401.19	0.00	0.00	0.00	3065.25
	5	52	-435.95	-858.77	0.00	0.00	0.00	-7830.21
		53	435.95	858.77	0.00	0.00	0.00	3107.04
	6	52	-421.18	-1000.60	0.00	0.00	0.00	-8510.92
		53	421.18	1000.60	0.00	0.00	0.00	3007.88

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

82. PRINT REACC ALL

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	-35.71	1594.86	0.00	0.00	0.00	0.00
	2	-36.55	1833.75	0.00	0.00	0.00	0.00
	3	-35.30	1750.82	0.00	0.00	0.00	0.00
	4	-53.57	2392.29	0.00	0.00	0.00	0.00
	5	-54.83	2750.62	0.00	0.00	0.00	0.00
	6	-52.94	2626.23	0.00	0.00	0.00	0.00
2	1	-34.38	1217.75	0.00	0.00	0.00	0.00
	2	-34.86	1553.70	0.00	0.00	0.00	0.00
	3	-33.70	1542.05	0.00	0.00	0.00	0.00
	4	-51.57	1826.63	0.00	0.00	0.00	0.00
	5	-52.29	2330.55	0.00	0.00	0.00	0.00
	6	-50.54	2313.07	0.00	0.00	0.00	0.00
3	1	-34.35	267.38	0.00	0.00	0.00	0.00
	2	-34.83	572.55	0.00	0.00	0.00	0.00
	3	-33.66	667.13	0.00	0.00	0.00	0.00
	4	-51.53	401.08	0.00	0.00	0.00	0.00
	5	-52.25	858.83	0.00	0.00	0.00	0.00
	6	-50.50	1000.70	0.00	0.00	0.00	0.00
11	1	-101.97	0.00	0.00	0.00	0.00	0.00
	2	-103.75	0.00	0.00	0.00	0.00	0.00
	3	-99.96	0.00	0.00	0.00	0.00	0.00
	4	-152.96	0.00	0.00	0.00	0.00	0.00
	5	-155.63	0.00	0.00	0.00	0.00	0.00
	6	-149.94	0.00	0.00	0.00	0.00	0.00
12	1	-100.88	0.00	0.00	0.00	0.00	0.00
	2	-102.36	0.00	0.00	0.00	0.00	0.00
	3	-98.65	0.00	0.00	0.00	0.00	0.00
	4	-151.33	0.00	0.00	0.00	0.00	0.00
	5	-153.54	0.00	0.00	0.00	0.00	0.00
	6	-147.97	0.00	0.00	0.00	0.00	0.00
13	1	-100.85	0.00	0.00	0.00	0.00	0.00
	2	-102.32	0.00	0.00	0.00	0.00	0.00
	3	-98.61	0.00	0.00	0.00	0.00	0.00
	4	-151.28	0.00	0.00	0.00	0.00	0.00
	5	-153.48	0.00	0.00	0.00	0.00	0.00
	6	-147.91	0.00	0.00	0.00	0.00	0.00
21	1	146.85	0.00	0.00	0.00	0.00	0.00
	2	150.52	0.00	0.00	0.00	0.00	0.00
	3	145.40	0.00	0.00	0.00	0.00	0.00
	4	220.28	0.00	0.00	0.00	0.00	0.00
	5	225.78	0.00	0.00	0.00	0.00	0.00
	6	218.10	0.00	0.00	0.00	0.00	0.00
22	1	140.52	0.00	0.00	0.00	0.00	0.00
	2	142.47	0.00	0.00	0.00	0.00	0.00
	3	137.80	0.00	0.00	0.00	0.00	0.00
	4	210.78	0.00	0.00	0.00	0.00	0.00
	5	213.71	0.00	0.00	0.00	0.00	0.00
	6	206.70	0.00	0.00	0.00	0.00	0.00
23	1	140.41	0.00	0.00	0.00	0.00	0.00
	2	142.33	0.00	0.00	0.00	0.00	0.00

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
	3	137.65	0.00	0.00	0.00	0.00	0.00
	4	210.61	0.00	0.00	0.00	0.00	0.00
	5	213.50	0.00	0.00	0.00	0.00	0.00
	6	206.47	0.00	0.00	0.00	0.00	0.00
31	1	288.54	0.00	0.00	0.00	0.00	0.00
	2	294.48	0.00	0.00	0.00	0.00	0.00
	3	284.05	0.00	0.00	0.00	0.00	0.00
	4	432.80	0.00	0.00	0.00	0.00	0.00
	5	441.73	0.00	0.00	0.00	0.00	0.00
	6	426.07	0.00	0.00	0.00	0.00	0.00
32	1	281.50	0.00	0.00	0.00	0.00	0.00
	2	285.53	0.00	0.00	0.00	0.00	0.00
	3	275.58	0.00	0.00	0.00	0.00	0.00
	4	422.24	0.00	0.00	0.00	0.00	0.00
	5	428.29	0.00	0.00	0.00	0.00	0.00
	6	413.37	0.00	0.00	0.00	0.00	0.00
33	1	281.34	0.00	0.00	0.00	0.00	0.00
	2	285.35	0.00	0.00	0.00	0.00	0.00
	3	275.39	0.00	0.00	0.00	0.00	0.00
	4	422.02	0.00	0.00	0.00	0.00	0.00
	5	428.02	0.00	0.00	0.00	0.00	0.00
	6	413.09	0.00	0.00	0.00	0.00	0.00

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

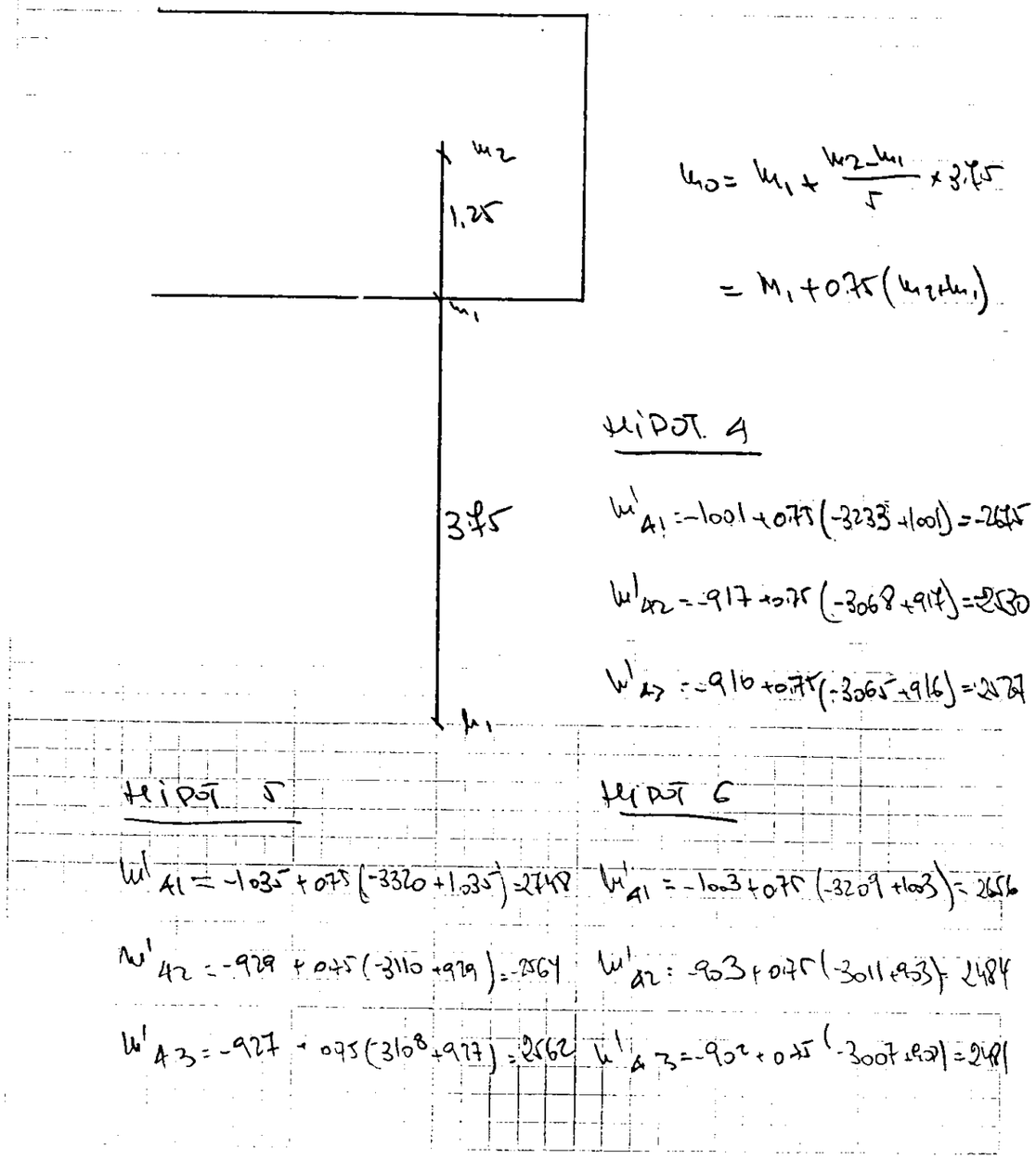
83. PLOT DIS FILE
84. PLOT BEN FILE
85. FINISH

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

**** DATE= AUG 17,1999 TIME= 13: 2:19 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

Los valores sombreados corresponden a valores en cota inferior excepto.



$$M_0 = M_1 + \frac{M_2 - M_1}{5} \times 3{,}75$$

$$= M_1 + 0{,}75(M_2 - M_1)$$

HIPOT 4

$M'_{A1} = -1001 + 0{,}75(-3235 + 1001) = -2675$

$M'_{A2} = -917 + 0{,}75(-3068 + 917) = -2530$

$M'_{A3} = -916 + 0{,}75(-3065 + 916) = -2527$

HIPOT 5

$M'_{A1} = -1035 + 0{,}75(-3320 + 1035) = -2748$

$M'_{A2} = -929 + 0{,}75(-3110 + 929) = -2564$

$M'_{A3} = -927 + 0{,}75(3108 + 927) = 2562$

HIPOT 6

$M'_{A1} = -1003 + 0{,}75(-3209 + 1003) = 2656$

$M'_{A2} = -903 + 0{,}75(-3011 + 903) = 2484$

$M'_{A3} = -902 + 0{,}75(-3007 + 902) = 2481$

VIADUCTO 2 - ESTRIBO 2 - ARMADURAS DE PILOTES
1/2

HIPOTESIS 4	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 41	-2392	2675	-797	892	0.38	0.28	0.75	359	45	73
BARRA 42	-1826	2530	-609	843	0.29	0.27	0.70	335	42	68
BARRA 43	-2626	2527	-875	842	0.41	0.26	0.66	316	39	64

HIPOTESIS 5	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 41	-2750	2748	-917	916	0.43	0.29	0.78	373	46	76
BARRA 42	-2330	2564	-777	855	0.37	0.27	0.70	335	42	68
BARRA 43	-2313	2562	-771	854	0.36	0.27	0.70	335	42	68

HIPOTESIS 6	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 41	-401	2656	-134	885	0.06	0.28	0.04	19	14	18
BARRA 42	-2125	2484	-708	828	0.33	0.26	0.04	19	14	18
BARRA 43	-1000	2481	-333	827	0.16	0.26	0.04	19	14	18

HIPOTESIS 4	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 31	-2392	1001	-797	334	0.38	0.10	0.05	24	14	18
BARRA 32	-1826	917	-609	306	0.29	0.10	0.07	33	14	18
BARRA 33	-2626	916	-875	305	0.41	0.10	0.06	29	14	18

HIPOTESIS 5	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 31	-2750	1035	-917	345	0.43	0.11	0.09	43	14	18
BARRA 32	-2330	929	-777	310	0.37	0.10	0.06	29	14	18
BARRA 33	-2313	927	-771	309	0.36	0.10	0.06	29	14	18

HIPOTESIS 6	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 31	-401	1003	-134	334	0.06	0.11	0.25	120	15	24
BARRA 32	-2125	903	-708	301	0.33	0.09	0.04	19	14	18
BARRA 33	-1000	901	-333	300	0.16	0.09	0.11	53	14	18

HIPOTESIS 4	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-2392	1231	-797	410	0.38	0.13	0.18	86	14	18
BARRA 22	-1826	1232	-609	411	0.29	0.13	0.04	19	14	18
BARRA 23	-2626	1232	-875	411	0.41	0.13	0.04	19	14	18

HIPOTESIS 5	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-2750	1249	-917	416	0.43	0.13	0.18	86	14	18
BARRA 22	-2330	1251	-777	417	0.37	0.13	0.18	86	14	18
BARRA 23	-2313	1251	-771	417	0.36	0.13	0.18	86	14	18

HIPOTESIS 6	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-401	1203	-134	401	0.06	0.13	0.32	153	19	31
BARRA 22	-2125	1204	-708	401	0.33	0.13	0.18	86	14	18
BARRA 23	-1000	1204	-333	401	0.16	0.13	0.25	120	15	24

VIADUCTO 2 - ESTRIBO 2 - ARMADURAS DE PILOTES
2/2

HIPOTESIS 4	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-2392	1300	-797	433	0.38	0.14	0.21	100	14	20
BARRA 12	-1826	1272	-609	424	0.29	0.13	0.18	86	14	18
BARRA 13	-2626	1271	-875	424	0.41	0.13	0.18	86	14	18

HIPOTESIS 5	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-2750	1326	-917	442	0.43	0.14	0.20	96	14	19
BARRA 12	-2330	1290	-777	430	0.37	0.14	0.20	96	14	19
BARRA 13	-2313	1290	-771	430	0.36	0.14	0.22	105	14	21

HIPOTESIS 6	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-401	1279	-134	426	0.06	0.13	0.32	153	19	31
BARRA 12	-2125	1245	-708	415	0.33	0.13	0.18	86	14	18
BARRA 13	-1000	1244	-333	415	0.16	0.13	0.25	120	15	24

HIPOTESIS 4	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-2392	267	-797	89	0.38	0.03	0.04	19	14	18
BARRA 2	-1826	257	-609	86	0.29	0.03	0.04	19	14	18
BARRA 3	-2626	257	-875	86	0.41	0.03	0.04	19	14	18

HIPOTESIS 5	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-2750	274	-917	91	0.43	0.03	0.04	19	14	18
BARRA 2	-2330	261	-777	87	0.37	0.03	0.04	19	14	18
BARRA 3	-2313	261	-771	87	0.36	0.03	0.04	19	14	18

HIPOTESIS 6	N'	M'	N'/3	M'/3	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-401	264	-134	88	0.06	0.03	0.04	19	14	18
BARRA 2	-2125	252	-708	84	0.33	0.03	0.04	19	14	18
BARRA 3	-1000	252	-333	84	0.16	0.03	0.04	19	14	18

ν = N' / 3 / 2120

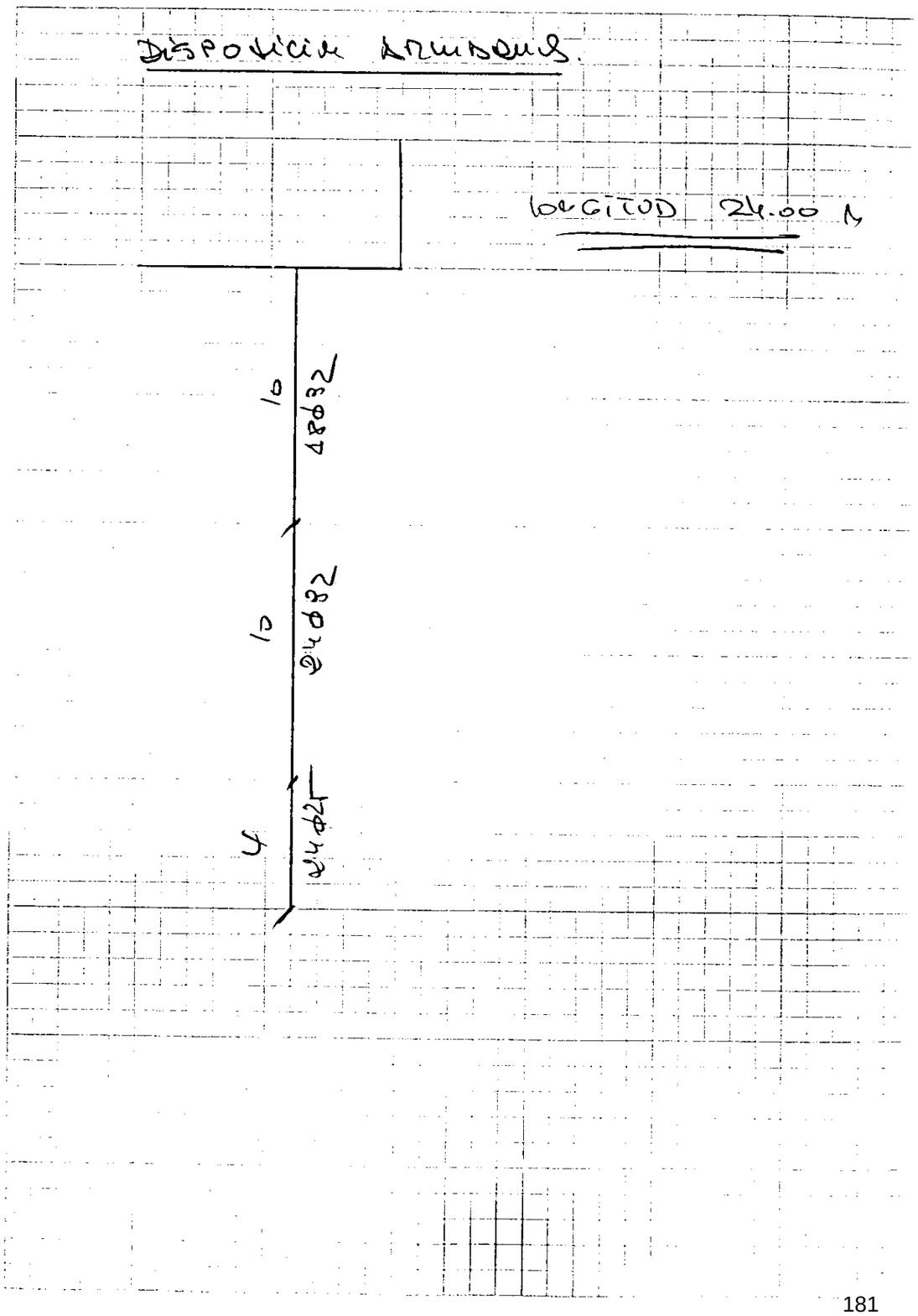
μ= M' / 3 / 1.5 / 2120

intecsa

PROYECTO: HOJA DE

FECHA

EJECUTANTE:



ARMADURA DEL ENCEPADO

ARMADURA INFERIOR

$U = 5.15 - 1.50 + 0.15 \times 1.40 = 5.05$ m.

$b_1 = 1.50 + 0.75 + 5.05 = 7.30$

$b_2 = 16.00/3 = 5.33$ m. | $b = 5.33$

PILOTE MAS CARGADO

$Q = \frac{917}{1.5} = 611$ ton.

$\mu = 611 \times \frac{5.05}{5.33} = 579$ ton./m

$\mu' = 579 \times 1.6 = 926$ mt/m

$A_c = \frac{2500}{1.5} \times 3.00 \times 2.40 = 4000$

$A_S = 4000\left(1 - \sqrt{1 - \frac{2 \times 926}{2.40 \times 4000}}\right) = 406$ ton/m.

$\omega = 406 \times 1.15/5.1 = 91.5$ cm² 2 ramas ø32/15

ARMADURA DE REPARTO

$\omega = \frac{91.5}{4} = 22.9$ cm²/m ø25/20

ARMADURA SUPERIOR

$\omega = 0.30 \times 91.5 = 27.5$ cm² ø25/20.

CORTANTE

$Q = \frac{611}{5.33} = 115$ t/m

$Q' = 1.6 \times 115 = 184$ t/m

$t_b = 5\sqrt{210/1.5} \times 3.00 \times 2.40 = 155$ t/m

$\omega_t = \frac{184 - 155}{0.9 \times 4.2 \times 2.4} = 3.20$ cm²/m

$\omega_{tmi} = 0.02 \times \frac{2500}{1.5} \times \frac{1}{4.2} = 7.9$ cm²/m

Se dispone transversal ø16/30/60 = 11.22 cm²/m.

Vanos b=1.00

Apoyo izquierdo

$w_{Hmin} = 1.6 \times 10^{-3} \times 100 \times 95 = 15.2\ cm^2/m$

$w_{Vmin} = 0.9 \times 10^{-3} \times 100 \times 95 = 8.55\ cm^2/m$

Vano posterior

$q = \frac{1.8 \times 12.41}{3} = 7.45\ t/m$

$\mu_E = 7.45 \times \frac{6.50^2}{8} = 39.34\ mt/m$

$\mu_V = 7.45 \times \frac{6.50^2}{8} - \frac{39.34}{2} = 19.67\ mt/m$

Momento de calculo

$\mu' = 39.34 \times 1.6 = 62.9\ mt/m$

$A_c = \frac{2500}{1.5} \times 0.95 = 1583\ t/m$

$A_s = 1583 \left(1 - \sqrt{1 - \frac{2 \times 62.9}{0.95 \times 1583}}\right) = 67.6\ cm^2$

$w = 67.6 \times 1.15/5.1 = 15.3\ cm/m$ $\phi 16/20$.

Dintel superior

$q = 2.50 \times 0.70 + 3.00 = 4.00\ t/m$

$\mu = 4.0 \times \frac{6.50^2}{8} = 21.12\ mt/m$

$\mu' = 1.6 \times 21.12 = 33.8\ mt/m$

$A_c = \frac{2500}{1.5} \times 0.47 \times 1.00 = 783\ t$

$A_s = 783 \left(1 - \sqrt{1 - \frac{2 \times 33.80}{0.47 \times 783}}\right) = 45.6\ t$

$w = 45.6 \times 1.15/5.1 = 17.1\ cm/m$ $\phi 20/15$.

VIADUCTO 2

PRUEBA DE CARGA

La estructura se ha modelizado como una viga continua de las siguientes características:

- Luces: 16.00, 23.00, 16.00 m
- Sección transversal (A): 13.108 m^2
- Momento de inercia (I): 4.2849 m^4
- Resistencia característica del hormigón (f_{ck}): 400 kp/cm^2
- Módulo de elasticidad (E): $3.8x10^6$ t/m^2

El tren de cargas ha consistido en 6 camiones no articulados de 3 ejes y 26 t de peso total (tipo *dumper*), agrupados en dos bloques de tres vehículos en fondo con las cajas enfrentadas. Con dicho tren recorriendo la estructura, se han calculado* las líneas de influencia de las flechas y momentos en centros de vano, y de las reacciones en los apoyos. Los ejes de cada camión transmiten cargas de 7.0 t (eje delantero) y 9.5 t (cada eje del tándem trasero), siendo los interejes de 3.90 y 1.35 m. El tren de cargas completo queda definido por los siguientes parámetros:

- Cargas: 21, 28.5, 28.5, 28.5, 28.5, 21 t
- Interejes: 3.90, 1.35, 3.00, 1.35, 3.90 m

Se ha calculado**, así mismo, el valor del período de vibración correspondiente a la frecuencia principal de vibración libre de la estructura.

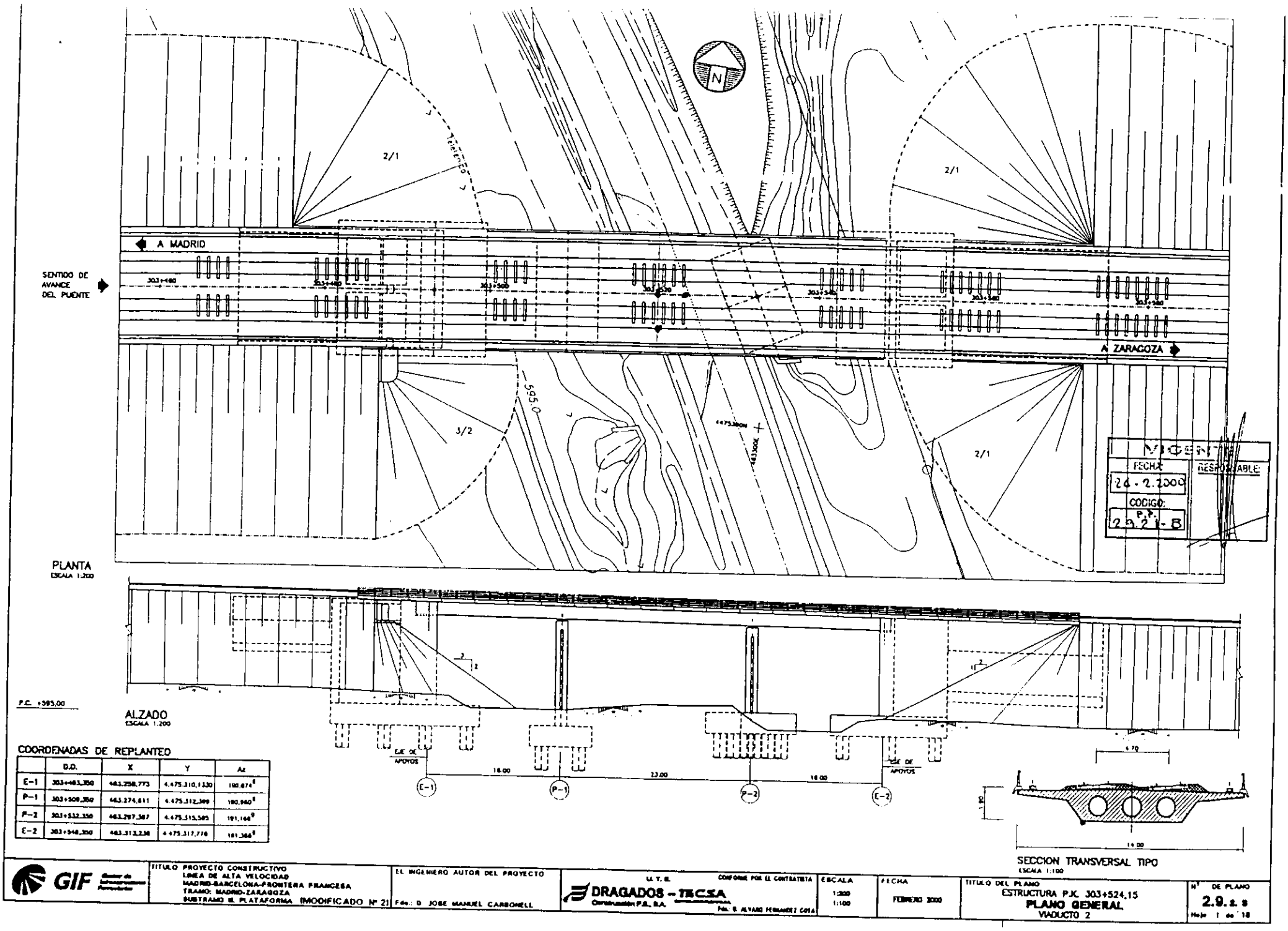
Los resultados previstos son los siguientes:

Vano	Abscisa de carga [m]	Flecha [mm]	Momento flector [mt]
1	14.63	-0.43	280
2	19.75	-0.94	367
3	14.88	-0.43	280

Flechas previstas en viaductos 2 y 3

La frecuencia principal de vibración es de 9.16 Hz, correspondiente a un período de 0.1092 s.

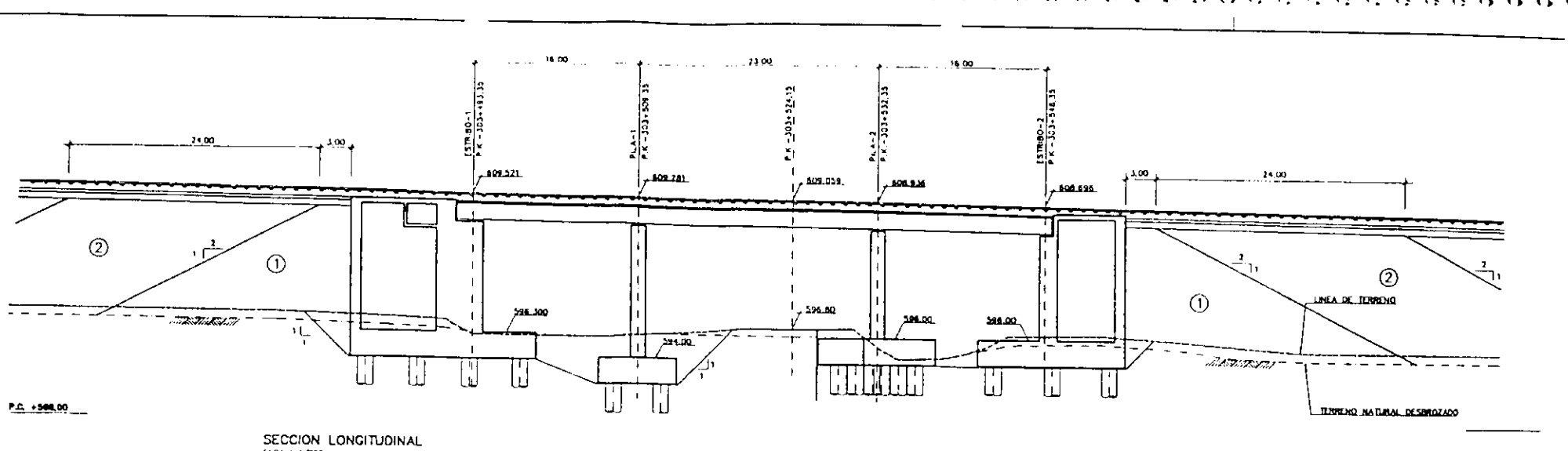
* Con el programa Merlin, de Kinesia
** Con el programa SAP 80



COORDENADAS DE REPLANTEO

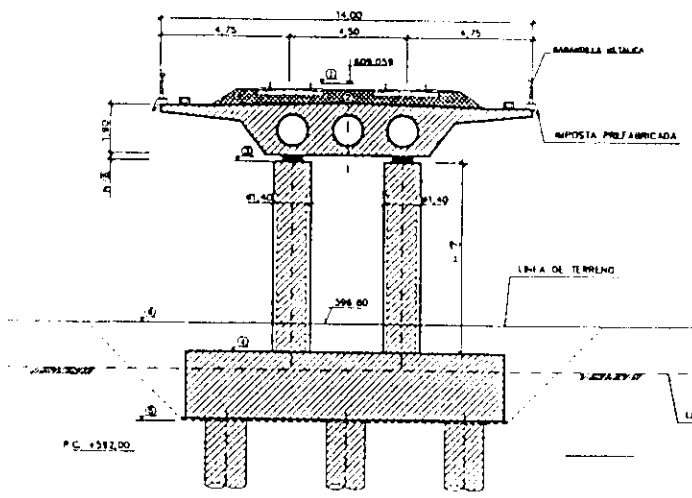
	P.K.	X	Y	Az
E-1	303+483,350	463.258,773	4.475.310,130	180.874g
P-1	303+509,350	463.274,611	4.475.312,389	180.960g
P-2	303+532,350	463.297,387	4.475.315,585	181.164g
E-2	303+548,350	463.313,236	4.475.317,776	181.368g

GIF	TITULO PROYECTO CONSTRUCTIVO LINEA DE ALTA VELOCIDAD MADRID-BARCELONA-FRONTERA FRANCESA TRAMO: MADRID-ZARAGOZA SUBTRAMO III: PLATAFORMA (MODIFICADO Nº 2)	EL INGENIERO AUTOR DEL PROYECTO Fdo.: D. JOSE MANUEL CARBONELL	U. T. E. DRAGADOS – TECSA Construcción P.S., S.A. CONFORME POR EL CONTRATISTA Fdo.: D. ALVARO HERNANDEZ COTA	ESCALA 1:2000 1:100	FECHA FEBRERO 2000	TITULO DEL PLANO ESTRUCTURA P.K. 303+524,15 PLANO GENERAL VIADUCTO 2	Nº DE PLANO 2.9.2.8 Hoja 1 de 18



①	SUELO ESTABILIZADO CON CEMENTO
②	ZAHORRAS COMPACTADAS

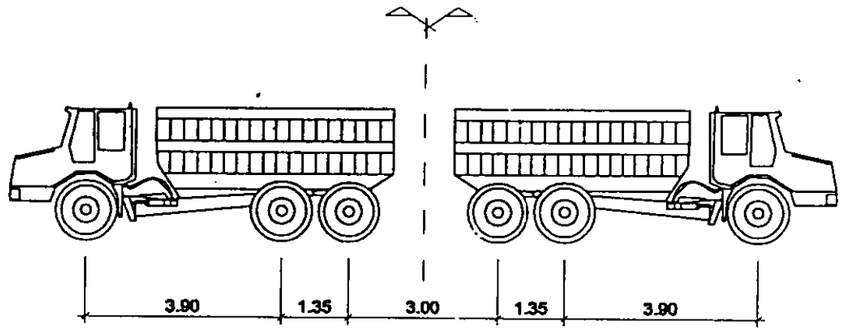
	① RASANTE	② CORONACION TABLERO	③ CORONACION PILA	④ CORONACION ZAPATA	⑤ FONDO EXCAVACION	⑥ TERRENO	⑦ H PILAS	⑧ ALTURA V (mm)
ESTRIBO-1	609.521	608.851	606.773	596.30	593.70	596.80	10.473	178
PILA-1	609.281	608.911	608.521	594.00	591.40	594.50	12.521	190
PILA-2	608.936	608.266	608.176	596.00	593.40	593.50	10.176	190
ESTRIBO-2	608.696	608.026	605.948	596.00	593.40	594.50	9.948	178



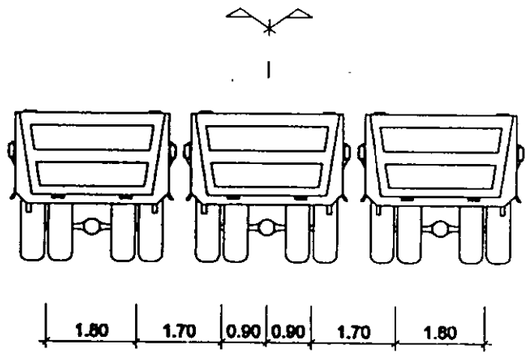
SECCION TRANSVERSAL
ESCALA 1/100

GIF	TITULO PROYECTO CONSTRUCTIVO LINEA DE ALTA VELOCIDAD MADRID-BARCELONA-FRONTERA FRANCESA	EL INGENIERO DIRECTOR DEL PROYECTO	AUTOR U. T. E. DRAGADOS – TECSA CONFORME POR EL CONTRATISTA	ESCALA 1:700	FECHA ENERO 2000	TITULO DEL PLANO P.K. 303+524,15 SECC. LONGITUDINAL Y TRANSVERSAL	Nº DE PLANO 2.9.2.8

DISPOSICION DE CAMIONES EN TODOS LOS VANOS

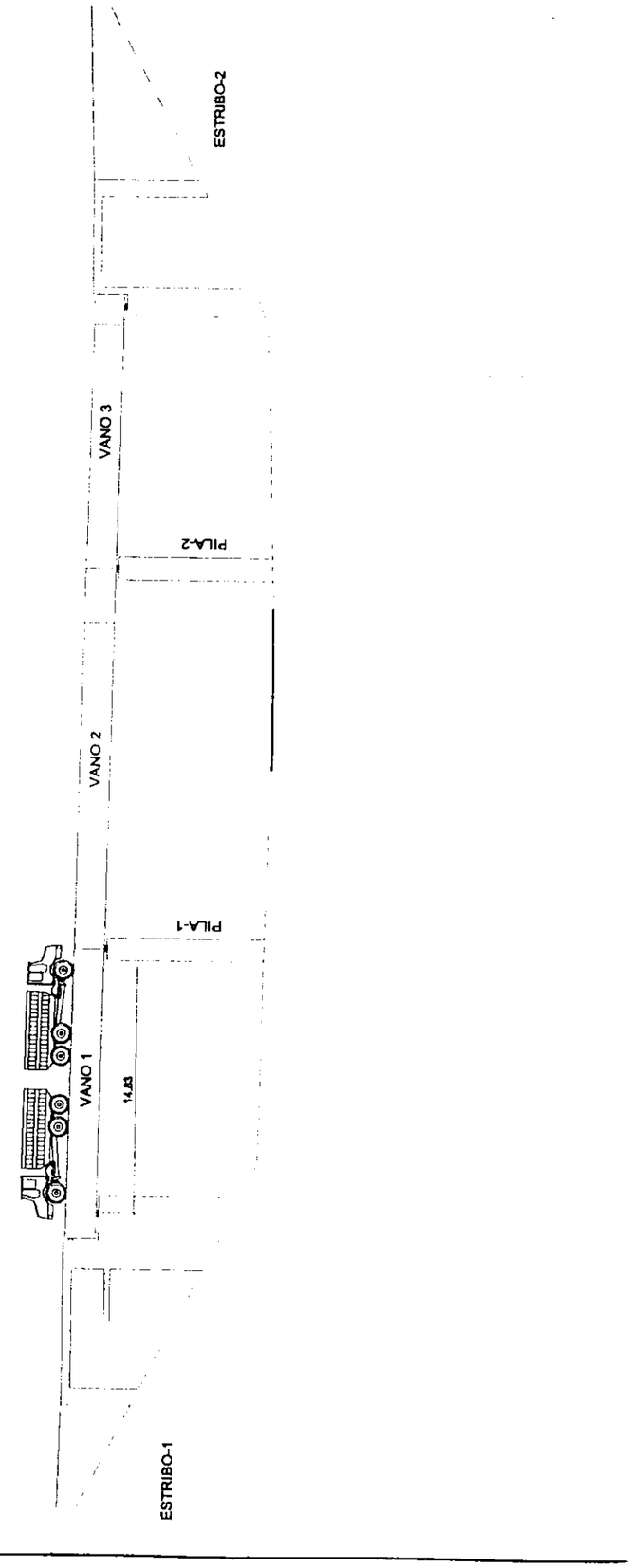


LONGITUDINALMENTE

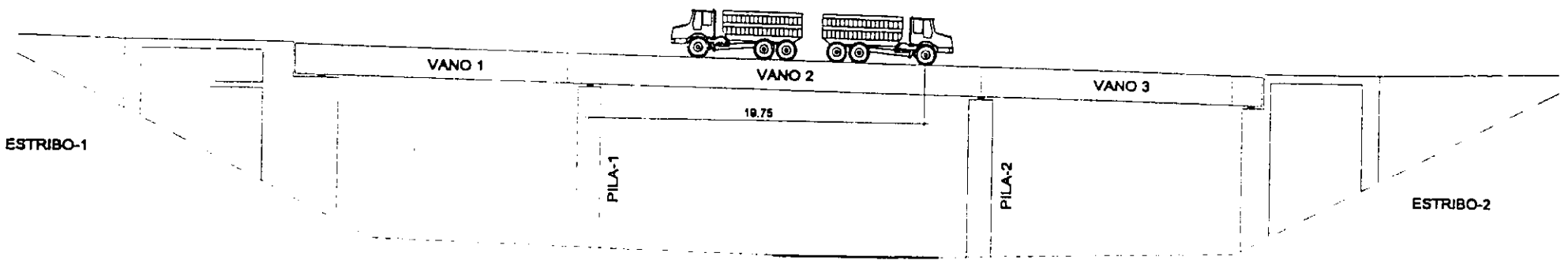


TRANSVERSALMENTE

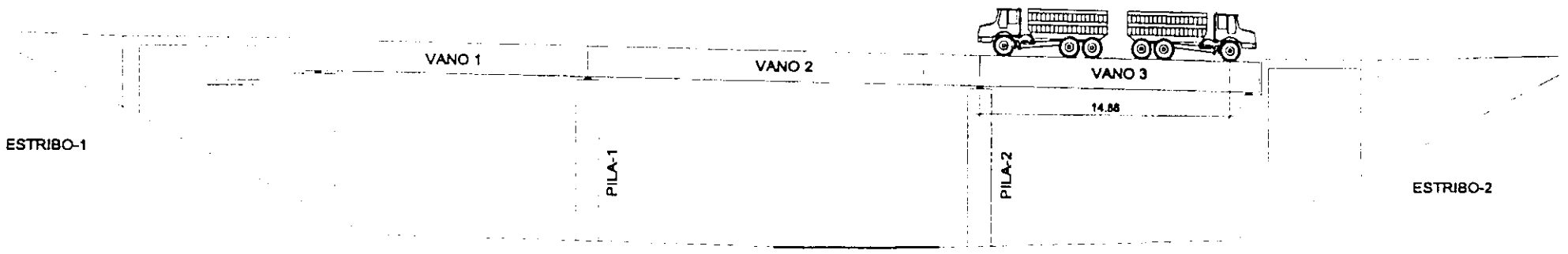
PRUEBA DE CARGA VIADUCTO Nº 2



PRUEBA DE CARGA VIADUCTO Nº 2



PRUEBA DE CARGA VIADUCTO Nº 2



VIADUCTO 2
SAP80 V85.02

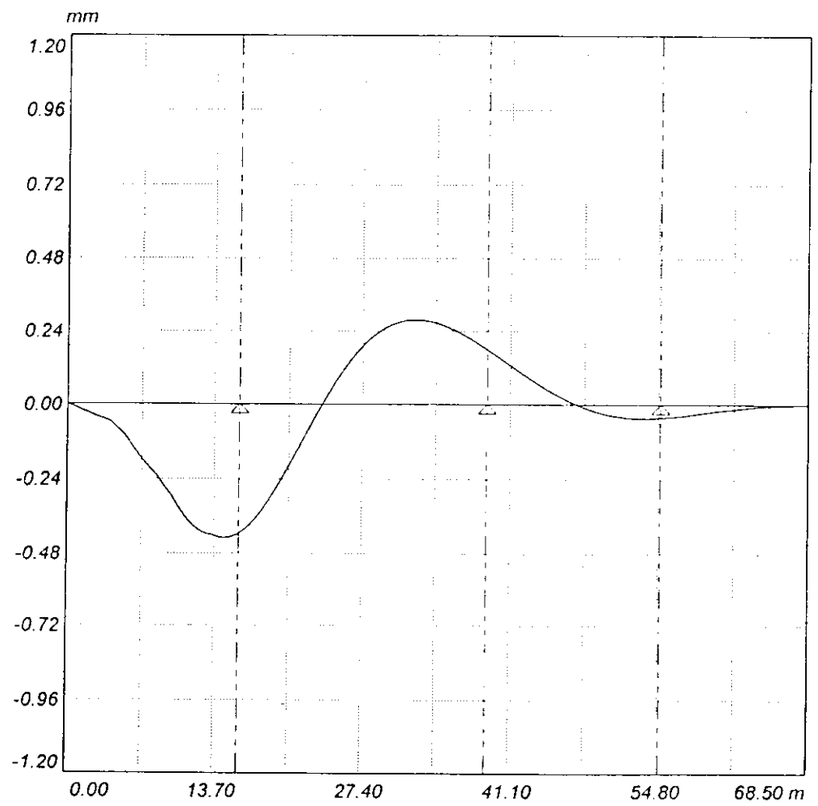
* *
* * * E V A L U A T I O N O F E I G E N V A L U E S * * *
* *

NUMBER OF EQUATIONS = 108
HALF BAND WIDTH = 3
NUMBER OF MASSES = 52
NUMBER OF VALUES TO BE EVALUATED= 1
SIZE OF SUBSPACE = 2
NUMBER OF ITERATIONS PER SHIFT = 2

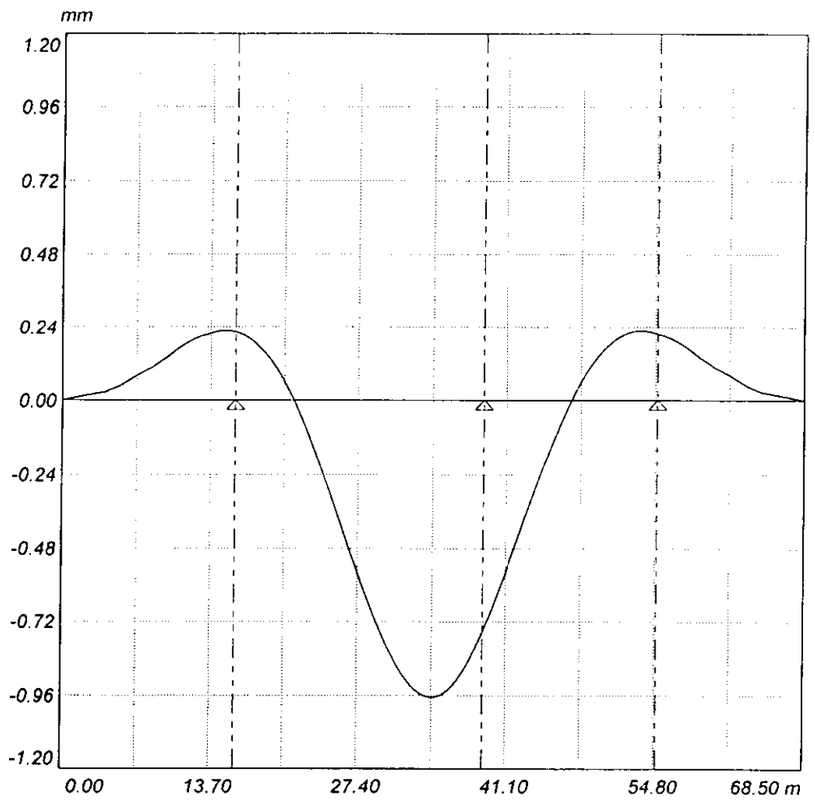
CURRENT SHIFT	# BELOW SHIFT	ITER #	APPROXIMATIONS OF NEXT 4 EIGENVALUES			
-.10000E+01	0					
		1	.3833404E+04	.1338465E+05	.0000000E+00	.0000000E+00
		2	.3333126E+04	.1197061E+05	.3833404E+04	.1338465E+05
.29998E+04	0					
		3	.3310473E+04	.1127919E+05	.3333126E+04	.1197061E+05
		4	.3310453E+04	.1091070E+05	.3310473E+04	.1127919E+05
.29794E+04	0					
		5	.3310453E+04	.1073167E+05	.3310453E+04	.1091070E+05

EIGENVALUE # 1 = .331045E+04
PERIOD (SECONDS) = .109203

Viaducto 2
Flecha en vano 1 (línea de influencia)
3+3 Camiones 26 t

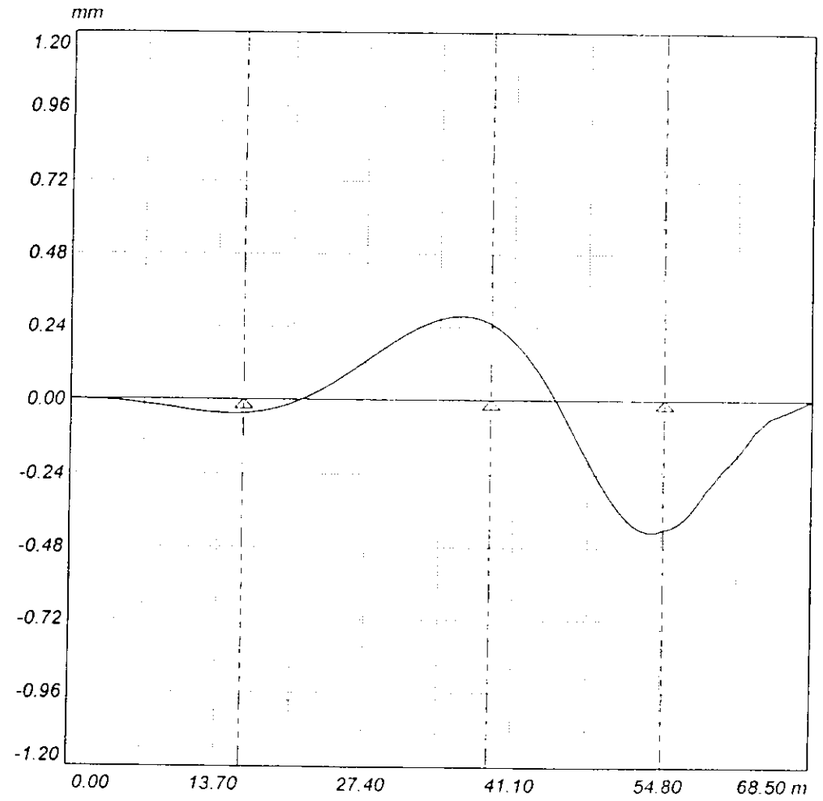


Viaducto 2
Flecha en vano 2 (línea de influencia)
3+3 Camiones 26 t

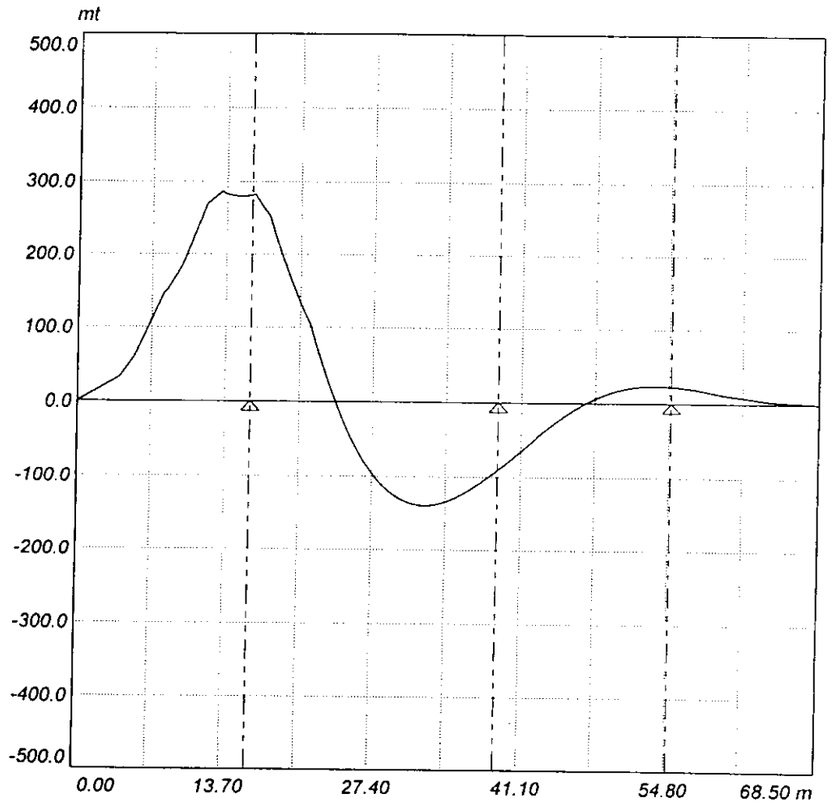


Kinesia

Viaducto 2
Flecha en vano 3 (línea de influencia)
3+3 Camiones 26 t

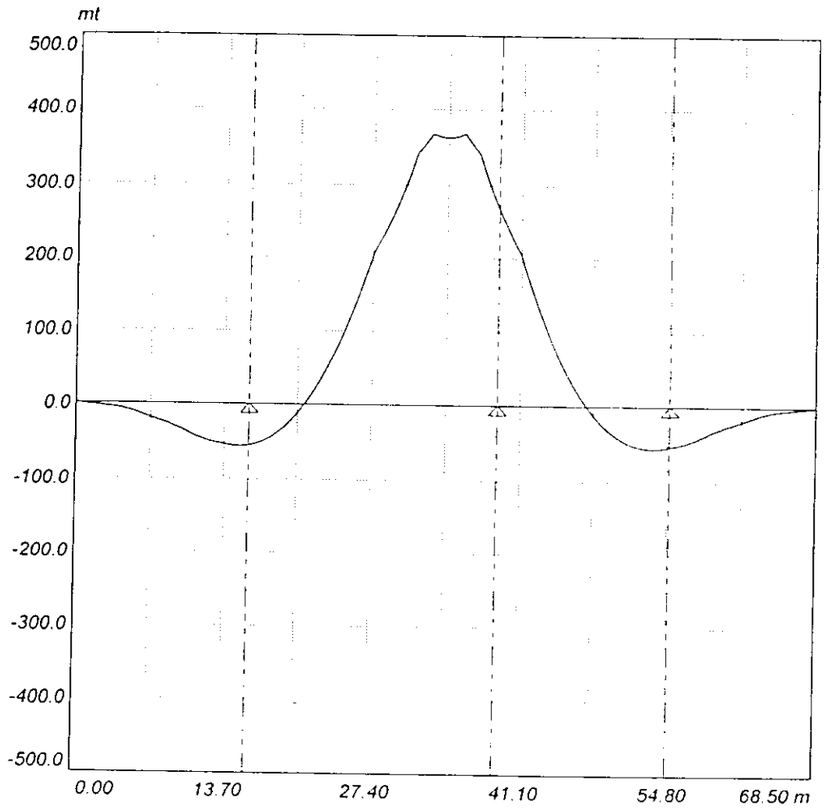


Viaducto 2
Momento en vano 1 (línea de influencia)
3+3 Camiones 26 t

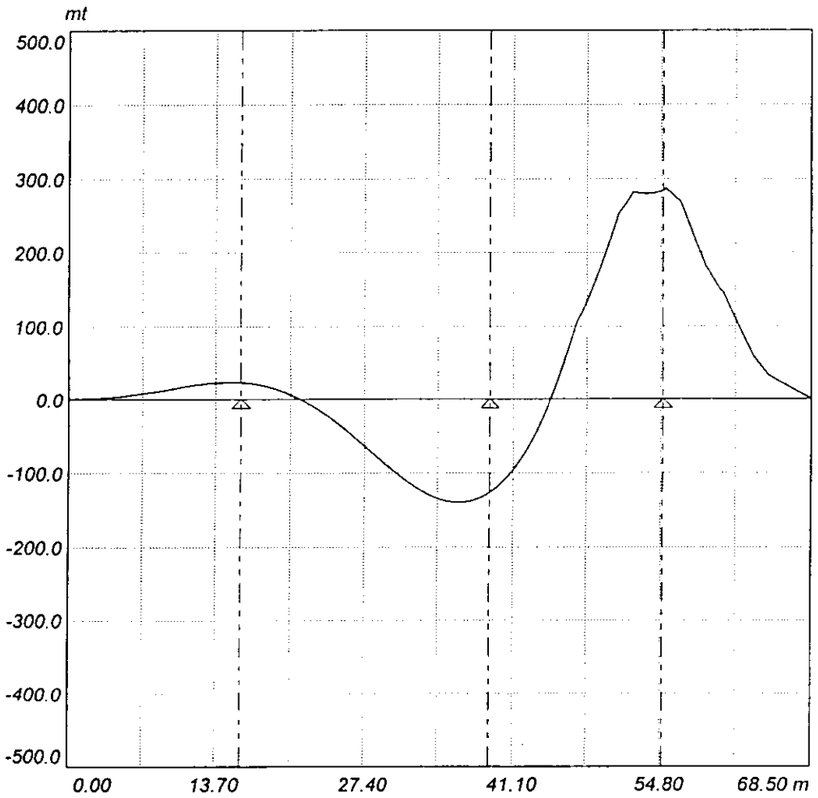


Kinesia

Viaducto 2
Momento en vano 2 (línea de influencia)
3+3 Camiones 26 t

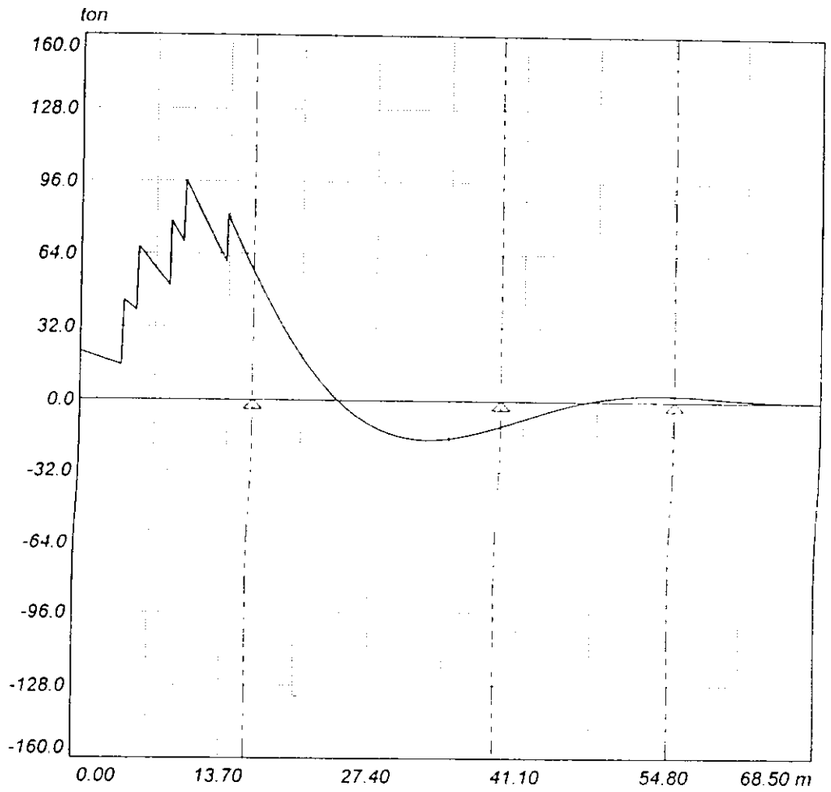


Viaducto 2
Momento en vano 3 (línea de influencia)
3+3 Camiones 26 t

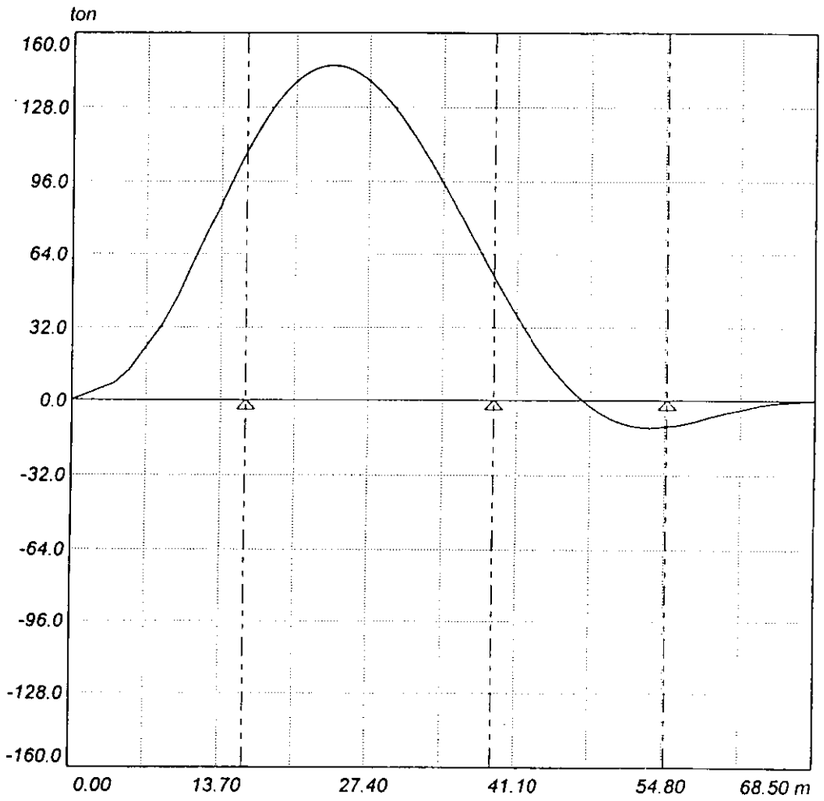


Kinesia

Viaducto 2
Reacción en apoyo 1 (línea de influencia)
3+3 Camiones 26 t

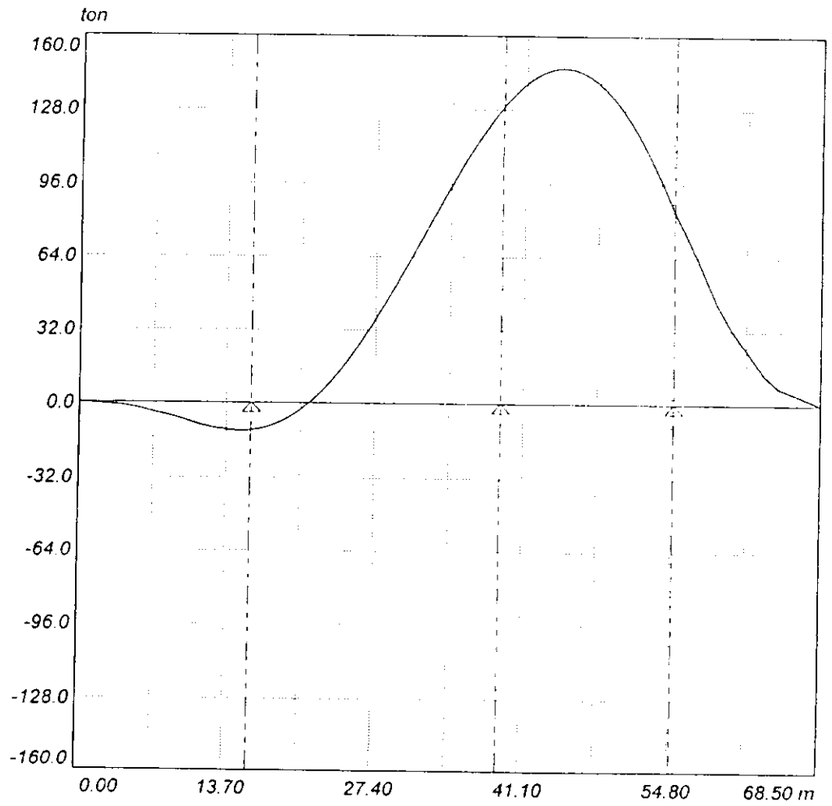


Viaducto 2
Reacción en apoyo 2 (línea de influencia)
3+3 Camiones 26 t

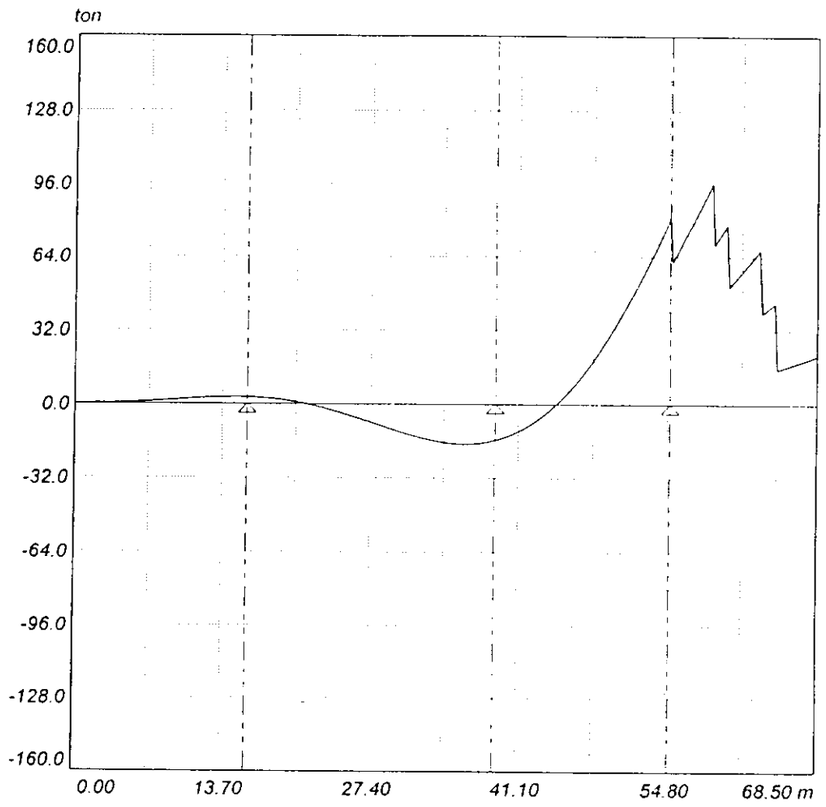


Kinesia

Viaducto 2
Reacción en apoyo 3 (línea de influencia)
3+3 Camiones 26 t



Viaducto 2
Reacción en apoyo 4 (línea de influencia)
3+3 Camiones 26 t



PROCESO CONSTRUCTIVO

La construcción del viaducto comienza con la ejecución de los pilotes con un equipo, ejecutándose los dos estribos y la pila 1 y, finalmente la pila 2, para lo que fue necesario desviar la carretera M-206. Una vez ejecutados los pilotes se procede a la ejecución de los encepados. Para la excavación de los encepados de las pilas 1 y 2 se realizó un hinca de carriles con objeto de minimizar la afección sobre la carretera.

Ejecutados los cimientos se procede a levantar los alzados tanto de estribos como de pilas, utilizando un juego de dos encofrados para el fuste de los mismos con acabado machiembrado en todos los paramentos vistos. Finalizada esta tarea se comienza con las labores necesarias para poder realizar el tablero que se ha hormigonado en dos fases y que han sido:

Ejecución de la cimbra cuajada cimentada en una losa de hormigón en masa y que salva la carretera mediante unas vigas metálicas apoyándose en unas torres. Sobre esta cimbra se dispone el enconfrado de todo el tablero con todos los elementos auxiliares y se monta la armadura tanto activa como pasiva de la primera fase de hormigonado que va del estribo 1 hasta 3,20 m después de la pila 2. Una vez hormigonada esta fase y tras comprobar que el hormigón ha alcanzado la resistencia requerida se procede al trazado a los 3 días y se monta la armadura de esta segunda fase, se hormigona y se tesa tras esto se realiza el anclaje del tablero al estribo 1. La razón por la que se ha ejecutado el tablero en dos fases es por tener menores volúmenes de hormigonado, realizables en no más de 10 ó 12 horas.

Finalizado el tablero se desmonta la cimbra y se ejecutan las tareas de remate consistentes en ejecutar la canaleta para comunicaciones, impermeabilizar el tablero, disponer la imposta, la barandilla y ejecutar las juntas.

Resumen del control de calidad

RESUMEN DEL CONTROL DE CALIDAD

Cuadro resumen de ensayos de hormigón

Parte de tesado

SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE H(/IGÓN

ELEMENTO V-2

P.P.I. Nº 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
429	670	02/11/99	E-1 Encepado	03010202	H-250	6	Blanda			3	335			100	30/11/99	I 42,5 S/SR	295	
445	671	02/11/99	E-1 Encepado	03010202	H-250	7	Blanda			3	331			100	30/11/99	I 42,5 S/SR	278	
445	672	02/11/99	E-1 Encepado	03010202	H-250	7	Blanda			3	316			100	30/11/99	I 42,5 S/SR	278	
446	673	02/11/99	E-1 Encepado	03010202	H-250	7	Blanda			3	335			100	30/11/99	I 42,5 S/SR	295	
446	674	02/11/99	E-1 Encepado	03010202	H-250	7	Blanda			3	335			100	30/11/99	I 42,5 S/SR	295	
447	675	02/11/99	E-1 Encepado	03010202	H-250	8	Blanda			3	291			100	30/11/99	I 42,5 S/SR	256	
447	676	02/11/99	E-1 Encepado	03010202	H-250	7	Blanda			3	291			100	30/11/99	I 42,5 S/SR	256	
460	693	05/11/99	E-2 Encepado	03010202	H-250	6	Blanda			3	401			100	03/12/99	I 42,5 S/SR	253	
460	694	05/11/99	E-2 Encepado	03010202	H-250	7	Blanda			3	287			100	03/12/99	I 42,5 S/SR	253	
461	695	05/11/99	E-2 Encepado	03010202	H-250	8	Blanda			3	347			100	03/12/99	I 42,5 S/SR	305	
461	696	05/11/99	E-2 Encepado	03010202	H-250	6	Blanda			3	380			100	03/12/99	I 42,5 S/SR	305	
462	697	05/11/99	E-2 Encepado	03010202	H-250	7	Blanda			3	333			100	03/12/99	I 42,5 S/SR	293	
462	698	05/11/99	E-2 Encepado	03010202	H-250	8	Blanda			3	334			100	03/12/99	I 42,5 S/SR	293	
463	699	05/11/99	E-2 Encepado	03010202	H-250	10	Fluida			3	364			100	13/12/99	I 42,5 S/SR	304	
467	703	11/11/99	P-1 Encepado	03010202	H-250	8	Blanda			3	324			100	09/12/99	I 42,5 S/SR	285	
467	704	11/11/99	P-1 Encepado	03010202	H-250	10	Fluida			3	344			100	09/12/99	I 42,5 S/SR	285	
468	705	11/11/99	P-1 Encepado	03010202	H-250	7	Blanda			3	388			100	09/12/99	I 42,5 S/SR	299	
468	706	11/11/99	P-1 Encepado	03010202	H-250	5	Blanda			3	340			100	09/12/99	I 42,5 S/SR	299	
512	781	22/12/99	P-1,i	03010203	H-300	7	Blanda			3	354			8	19/01/00	II AL 42,5 R	354	
536	824	05/01/00	P-1,d	03010203	H-300	7	Blanda			3	359			8	02/02/00	II AL 42,5 R	359	
678	1064	18/02/00	P-2 Encepado	03010202	H-250	10	Fluida			3	393			100	17/03/00	I 42,5 S/SR	268	
678	1065	18/02/00	P-2 Encepado	03010202	H-250	14	Fluida			3	305			100	17/03/00	I 42,5 S/SR	268	
693	1090	24/02/00	P-2,d	03010203	H-300	8	Blanda			3	353			8	23/03/00	II AL 42,5 R	353	
697	1097	28/02/00	E-1 Alzado	03010203	H-250	7	Blanda			3	286			100	27/03/00	II AL 42,5 R	252	
697	1098	28/02/00	E-1 Alzado	03010203	H-250	8	Blanda			3	301			100	27/03/00	II AL 42,5 R	252	
698	1099	28/02/00	E-1 Alzado	03010203	H-250	8	Blanda			3	332			100	27/03/00	II AL 42,5 R	282	
698	1100	28/02/00	E-1 Alzado	03010203	H-250	8	Blanda			3	320			100	27/03/00	II AL 42,5 R	282	
699	1101	28/02/00	E-1 Alzado	03010203	H-250	7	Blanda			3	358			100	27/03/00	II AL 42,5 R	287	
699	1102	28/02/00	E-1 Alzado	03010203	H-250	8	Blanda			3	326			100	27/03/00	II AL 42,5 R	287	
723	1148	10/03/00	E-2 Alzado	03010203	H-250	7	Blanda			3	244			100	07/04/00	II AL 42,5 R	210	
723	1149	10/03/00	E-2 Alzado	03010203	H-250	6	Blanda			3	239			100	07/04/00	II AL 42,5 R	210	
724	1150	10/03/00	E-2 Alzado	03010203	H-250	8	Blanda			3	296			100	10/04/00	II AL 42,5 R	260	

FECHA: FIRMA:

NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-2

P.P.I. Nº 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
										28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº DIA	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
736	1172	17/03/00	E-1 Alzado 2º	03010203	H-250	12	Fluida			3	255			100	14/04/00	II AL 42,5 R	225	
736	1173	17/03/00	E-1 Alzado 2º	03010203	H-250	14	Fluida			3	266			100	14/04/00	II AL 42,5 R	225	
737	1174	17/03/00	E-1 Alzado 2º	03010203	H-250	14	Fluida			3	258			100	14/04/00	II AL 42,5 R	209	
737	1175	17/03/00	E-1 Alzado 2º	03010203	H-250	14	Fluida			3	238			100	14/04/00	II AL 42,5 R	209	
729	1196	22/03/00	E-2 Alzado 2º	03010203	H-250	14	Fluida			3	272			100	19/04/00	II AL 42,5 R	239	
764	1225	28/03/00	E-1 Zap aleta	03010203	H-250	12	Fluida			3	243			100	25/04/00	II AL 42,5 R	213	
764	1226	28/03/00	E-1 Zap aleta	03010203	H-250	12	Fluida			3	242			100	25/04/00	II AL 42,5 R	213	
772	1243	30/03/00	E-1 Alzado	03010203	H-250	11	Fluida			3	307			100	27/04/00	II AL 42,5 R	270	
772	1244	30/03/00	E-1 Alzado	03010203	H-250	12	Fluida			3	314			100	27/04/00	II AL 42,5 R	270	
773	1245	30/03/00	E-1 Alzado	03010203	H-250	12	Fluida			3	276			100	27/04/00	II AL 42,5 R	243	
773	1246	30/03/00	E-1 Alzado	03010203	H-250	13	Fluida			3	341			100	27/04/00	II AL 42,5 R	243	
782	1262	04/04/00	E-2 Alzado 2º	03010203	H-250	15	Fluida			3	300			100	03/05/00	II AL 42,5 R	244	
782	1263	04/04/00	E-2 Alzado 2º	03010203	H-250	11	Fluida			3	277			100	03/05/00	II AL 42,5 R	244	
783	1264	04/04/00	E-2 Alzado 2º	03010203	H-250	10	Fluida			3	408			100	05/05/00	II AL 42,5 R	249	
808	1314	18/04/00	Tablero 1ª	03010205	H-400	15	Fluida	6	392	3	411			100	17/05/00	II AL 42,5 R	362	
808	1315	18/04/00	Tablero 1ª	03010205	H-400	14	Fluida	6	393	3	414			100	17/05/00	II AL 42,5 R	362	
809	1316	18/04/00	Tablero 1ª	03010205	H-400	14	Fluida	6	357	3	416			100	17/05/00	II AL 42,5 R	364	
809	1317	18/04/00	Tablero 1ª	03010205	H-400	14	Fluida	6	380	3	414			100	17/05/00	II AL 42,5 R	364	
810	1318	18/04/00	Tablero 1ª	03010205	H-400	15	Fluida	6	338	3	409			100	17/05/00	II AL 42,5 R	360	
810	1319	18/04/00	Tablero 1ª	03010205	H-400	16	Fluida	6	383	3	410			100	17/05/00	II AL 42,5 R	360	
811	1320	18/04/00	Tablero 1ª	03010205	H-400	15	Fluida	6	338	3	394			100	17/05/00	II AL 42,5 R	347	
811	1321	18/04/00	Tablero 1ª	03010205	H-400	14	Fluida	6	330	3	410			100	17/05/00	II AL 42,5 R	347	
812	1322	18/04/00	Tablero 1ª	03010205	H-400	12	Fluida	6	422	3	485			100	17/05/00	II AL 42,5 R	422	
812	1325	18/04/00	Tablero 1ª	03010205	H-400	12	Fluida	6	373	3	479			100	17/05/00	II AL 42,5 R	422	
821	1340	26/04/00	E-2 Alzado 3º	03010203	H-250	12	Fluida			3	298			100	24/05/00	II AL 42,5 R	262	
821	1341	26/04/00	E-2 Alzado 3º	03010203	H-250	12	Fluida			3	333			100	24/05/00	II AL 42,5 R	262	
822	1342	26/04/00	E-2 Alzado 3º	03010203	H-250	12	Fluida			3	276			100	26/05/00	II AL 42,5 R	243	
835	1368	04/05/00	E-2 Zap aleta	03010203	H-250	12	Fluida			3	298			100	01/06/00	II AL 42,5 R	259	
835	1369	04/05/00	E-2 Zap aleta	03010203	H-250	12	Fluida			3	294			100	01/06/00	II AL 42,5 R	259	
836	1370	04/05/00	E-2 Zap aleta	03010203	H-250	14	Fluida			3	237			100	01/06/00	II AL 42,5 R	209	
836	1371	04/05/00	E-2 Zap aleta	03010203	H-250	11	Fluida			3	298			100	01/06/00	II AL 42,5 R	209	
837	1372	04/05/00	E-2 Zap aleta	03010203	H-250	15	Fluida			3	274			100	02/06/00	II AL 42,5 R	241	

FECHA: FIRMA:

NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE H' 'MIGÓN

ELEMENTO V-2

P.P.I. Nº 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
										28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº DIA	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
838	1373	05/05/00	Tablero 2ª	03010205	H-400	12	Fluida	4	415	3	466			100	02/06/00	II AL 42,5 R	410	
838	1374	05/05/00	Tablero 2ª	03010205	H-400	12	Fluida	4	351	3	492			100	02/06/00	II AL 42,5 R	410	
839	1375	05/05/00	Tablero 2ª	03010205	H-400	12	Fluida	4	362	3	441			100	02/06/00	II AL 42,5 R	388	
839	1376	05/05/00	Tablero 2ª	03010205	H-400	12	Fluida	4	367	3	470			100	02/06/00	II AL 42,5 R	388	
849	1396	22/05/00	E-1 / Aleta,i	03010203	H-250	15	Fluida			3	241			100	19/06/00	II AL 42,5 R	212	
849	1397	22/05/00	E-1 / Aleta,i	03010203	H-250	13	Fluida			3	247			100	19/06/00	II AL 42,5 R	212	
852	1408	26/05/00	E-1 / Aleta,d	03010203	H-250	10	Fluida			3	311			100	23/06/00	II AL 42,5 R	227	
852	1409	26/05/00	E-1 / Aleta,d	03010203	H-250	13	Fluida			3	258			100	23/06/00	II AL 42,5 R	227	
851	1414	30/05/00	E-1 / Aleta,d 2ª	03010203	H-250	12	Fluida			3	319			100	27/06/00	II AL 42,5 R	239	
859	1420	02/06/00	E-1 Espaldin	03010203	H-300	9	Blanda			3	302			50	30/06/00	II AL 42,5 R	302	
869	1441	08/06/00	E-2 Aleta, i 1ª	03010203	H-250	9	Blanda			3	258			100	06/07/00	II AL 42,5 R	227	
869	1442	08/06/00	E-2 Aleta, i 1ª	03010203	H-250	7	Blanda			3	273			100	06/07/00	II AL 42,5 R	227	
870	1443	08/06/00	E-2 Aleta, i 1ª	03010203	H-250	7	Blanda			3	273			100	06/07/00	II AL 42,5 R	225	
870	1446	12/06/00	E-2 Aleta, d 1ª	03010203	H-250	7	Blanda			3	256			100	06/07/00	II AL 42,5 R	225	
873	1447	12/06/00	E-2 Aleta, d 1ª	03010203	H-250	7	Blanda			3	239			100	10/07/00	II AL 42,5 R	210	
873	1148	12/06/00	E-2 Aleta, d 1ª	03010203	H-250	7	Blanda			3	278			100	10/07/00	II AL 42,5 R	210	

FECHA: FIRMA:

NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

3/3

SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-2 Piloles

P.P.I. Nº 16

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. EST.	Nº	RES. MEDIA					
322	483	22/09/99	P-1 Pilote 1	03010201	H-200	15	Fluida	2	242		323			50	29/09/99	I 42,5 R/SR		
325	486	23/09/99	P-1 Pilote 2	03010201	H-200	15	Fluida	2	261		348			50	30/09/99	I 42,5 R/SR		
340	514	27/09/99	E-1 Pilote 9	03010201	H-200	15	Fluida	2	250		333			50	04/10/99	I 42,5 R/SR		
345	519	28/09/99	E-1 Pilote 11	03010201	H-200	15	Fluida	2	177		236			50	05/10/99	I 42,5 R/SR		
348	523	28/09/99	E-1 Pilote 4	03010201	H-200	15	Fluida	2	164		219			50	05/10/99	I 42,5 R/SR		
355	533	30/09/99	E-1 Pilote 2	03010201	H-200	15	Fluida	2	237		316			50	07/10/99	I 42,5 R/SR		
357	535	30/09/99	E-1 Pilote 12	03010201	H-200	13	Fluida	2	143		191			50	07/10/99	I 42,5 R/SR		
360	539	01/10/99	E-1 Pilote 7	03010201	H-200	15	Fluida	2	156		208			50	08/10/99	I 42,5 R/SR		
365	546	04/10/99	E-1 Pilote 6	03010201	H-200	15	Fluida	2	175		233			50	11/10/99	I 42,5 R/SR		
373	556	05/10/99	E-2 Pilote 3	03010201	H-200	15	Fluida	2	277		369			50	12/10/99	I 42,5 R/SR		
374	557	06/10/99	E-2 Pilote 1	03010201	H-200	15	Fluida	2	169		225			50	12/10/99	I 42,5 R/SR		
380	563	06/10/99	E-2 Pilote 9	03010201	H-200	15	Fluida	2	279		372			50	12/10/99	I 42,5 R/SR		
384	570	07/10/99	E-2 Pilote 2	03010201	H-200	15	Fluida	2	149		199			50	14/10/99	I 42,5 R/SR		
388	578	07/10/99	E-2 Pilote 8	03010201	H-200	15	Fluida	2	217		289			50	14/10/99	I 42,5 R/SR		
389	579	07/10/99	E-2 Pilote 8	03010201	H-200	15	Fluida	2	194		259			50	14/10/99	I 42,5 R/SR		
400	597	13/10/99	P-2 Pilote 6	03010201	H-200	15	Fluida	2	208		277			50	20/10/99	I 42,5 R/SR		
401	598	13/10/99	P-2 Pilote 2	03010201	H-200	15	Fluida	2	234		312			50	20/10/99	I 42,5 R/SR		
407	607	14/10/99	P-2 Pilote 4	03010201	H-200	15	Fluida	2	223		297			50	21/10/99	I 42,5 R/SR		
583	910	27/01/00	P-2 Pilote 3	03010201	H-200	14	Fluida	2	191		255			45	03/02/00	I 42,5 R/SR		
587	916	28/01/00	P-2 Pilote 1	03010201	H-200	14	Fluida	2	210		280			45	04/02/00	I 42,5 R/SR		
588	917	28/01/00	P-2 Pilote 5	03010201	H-200	14	Fluida	2	284		379			45	04/02/00	I 42,5 R/SR		

FECHA FIRMA

NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

MEKANO-4	PARTE DE TESADO
	FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 2, FASE 1
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	24/04/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-4 y M-3
Número de gato	1 y 154
Area de presión gato	678.564 y 433.527 cm2
Tipo de central	BPT-9
Número de central	18

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	500		500	550	TES mm	RET mm
3	19/0.6"	550	81	106	154		13	61	111	164		19	38	272.8	
4	19/0.6"	550	67	96	145		14	57	111	161		18	38	275.0	
5	19/0.6"	550	84	104	152		12	58	106	152		17	33	251.4	
6	19/0.6"	550	92	116	168		14	57	108	159		16	34	268.3	
7	19/0.6"	550	75	98	145		10	54	103	151		16	35	258.2	
8	19/0.6"	550	75	97	149		14	56	106	157		16	37	267.1	
1	19/0.6"	550	68	86	138		11	55	101	153		15	34	259.3	
2	19/0.6"	550	73	94	147		14	58	110	161		15	34	269.4	

NOTA:
En el tendón nº 6 se ha roto un cable.

Ten	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)										Alargamientos	
				60	100	200	300		300	400	500	540	TES mm	RET mm
14	12/0,6"	540		47	69	123	175		11	65	124	147	297.0	
15	12/0,6"	540		52	77	127	177		13	66	120	140	283.5	
10	12/0,6"	540		45	68	124	176		13	66	124	147	298.1	
11	12/0,6"	540		53	73	130	183		14	63	122	147	295.9	
12	12/0,6"	540		49	74	130	173		16	67	118	140	279.0	
16	12/0,6"	540		40	64	114	168		16	58	111	135	277.9	
9	12/0,6"	540		51	79	130	185		7	65	122	146	307.1	
13	12/0,6"	540		57	76	130	176		12	69	124	144	282.4	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	273	0	273						273	260	5.1
4	275	0	275						275	260	6.0
5	251	0	251						251	260	-3.1
6	268	0	268						268	260	3.4
7	258	0	258						258	260	-0.5
8	267	0	267						267	260	2.9
1	259	0	259						259	260	-0.1
2	269	0	269						269	260	3.8
14	297	0	297						297	282	5.3
15	284	0	284						284	282	0.5
10	298	0	298						298	282	5.7
11	296	0	296						296	282	4.9
12	279	0	279						279	282	-1.1
16	278	0	278						278	282	-1.5
9	307	0	307						307	282	8.9
13	282	0	282						282	282	0.1

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	8.9	%
Diferencia negativa maxima.....=	-3.1	%
DIFERENCIA MEDIA.....=	2.5	%

El alargamiento teórico ha sido calculado por MK4.
El alargamiento obtenido está dentro del rango de valores esperables.
Por lo tanto, desde nuestro punto de vista, la operación de tesado puede darse por correcta y concluida.

MFKANO-4	PARTE DE TESADO
	FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 2, FASE 2
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	9/05/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-4 y M-3
Número de gato	
Area de presión gato	678,564 y 433,527 cm2
Tipo de central	BPT-11
Número de central	18

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
				100	200	300	400	500	550					TES mm	RET mm
3	19/0.6"	550		31	50	63	86	104	119					107.6	
4	19/0.6"	550		27	47	65	84	105	116					108.8	
5	19/0.6"	550		32	52	71	87	108	121					108.8	
6	19/0.6"	550		29	46	63	82	102	114					103.9	
7	19/0.6"	550		37	52	71	89	110	119					100.2	
8	19/0.6"	550		35	53	72	91	112	126					111.2	
1	19/0.6"	550		34	54	71	90	109	121					106.3	
2	19/0.6"	550		30	48	66	86	106	118					107.6	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
				100	200	300	400	500	540					TES mm	RET mm
	12/0,6"	540		28	50	66	84	103	111					101.9	
15	12/0,6"	540		29	47	66	85	103	117					108.0	
10	12/0,6"	540		26	47	65	83	102	111					104.3	
11	12/0,6"	540		35	55	71	91	111	120					104.3	
12	12/0,6"	540		26	45	62	81	100	116					110.5	
16	12/0,6"	540		24	41	60	79	102	112					108.0	
9	12/0,6"	540		28	48	66	85	104	114					105.5	
13	12/0,6"	540		28	47	65	84	106	117					109.2	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	108	0	108						108	108	-0.4
4	109	0	109						109	108	0.7
5	109	0	109						109	108	0.7
6	104	0	104						104	108	-3.8
7	100	0	100						100	108	-7.2
8	111	0	111						111	108	3
1	106	0	106						106	108	-1.5
2	108	0	108						108	108	-0.4
14	102	0	102						102	106	-3.9
15	108	0	108						108	106	1.9
10	104	0	104						104	106	-1.6
11	104	0	104						104	106	-1.6
12	110	0	110						110	106	4.2
16	108	0	108						108	106	1.9
9	106	0	106						106	106	-0.4
13	109	0	109						109	106	3

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	4	%
Diferencia negativa maxima.....=	-7.2	%
DIFERENCIA MEDIA.....=	-0.3	%

El alargamiento teórico ha sido calculado por MK4.
El alargamiento obtenido está dentro del rango de valores esperables.
Por lo tanto, desde nuestro punto de vista, la operación de tesado puede darse por correcta y concluida.

Accesos y elementos para mantenimiento

ACCESOS Y ELEMENTOS PARA MANTENIMIENTO

Los mismos elementos que requieren un mantenimiento son los aparatos de apoyo que habrá que sustituirles cuando haya finalizado su vida útil. A todos ellos se accede desde la carretera M-206 que es la que se salva con este viaducto. Dado que el tablero está anclado en el estribo 1, para poder sustituir estos aparatos de apoyo es necesario liberar este anclaje antes de levantar el tablero, para ello se ha dejado visitable el trasdós del estribo mediante una puerta metálica en el lado derecho del mencionado estribo que permite el acceso con los elementos necesarios.

4.3. Viaducto 3

VIADUCTO 3

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- ACCESOS Y ELEMENTOS PATRA MANTENIMIENTO

DESCRIPCIÓN DE LA ESTRUCTURA Y DEFINICIÓN GEOMÉTRICA

La estructura que se estudia en esta nota de cálculo es uno de los viaductos que aparecen en la traza, en concreto el situado entre los PP.KK. 309+693 y 309+748, denominado como Viaducto 3, y que se ejecuta por razones hidráulicas para la avenida de período 500 años del Arroyo del Anchuelo.

Consiste en una viga continua de hormigón pretensado de tres vanos con luces de 16+23+16 m. La sección es una losa aligerada de canto y ancho constante, con valores de 1,90 y 14,00 m respectivamente. Tiene tres aligeramientos circulares de 1,20 m de diámetro y se apoya en cada eje de pilas y estribos mediante dos aparatos de apoyo que lo empotran a torsión. Estos aparatos de apoyo son en todo caso deslizantes, tipo Pot, con la distribución y característica que a continuación se indican:

	Tipo Apoyo	F_V (KH)	F_H (KN)	Ct (mm)	C- (mm)	GIRO (Rad)
E1	(2) B1122-G2	3920	392	88	130	0,018
P1	(2) B1122-G	9800	588	105	105	0,011
P2	(2) B1122-G4	9800	588	105	105	0,011
F2	(2) B1122-G2	3920	392	80	130	0,018

Cada eje de pilas consta de dos fustes cilíndricos con sección transversal circular de diámetros 1,40 m, que se empotran en un encepado. A las pilas se las ha dotado de un rehundido lateral con el único fin de mejorar su aspecto estético, resolviéndose la cimentación de las mismas mediante pilotes de la siguiente manera:

En ambas pilas el encepado tiene unas dimensiones de 12,0 x 7,50 x 2,50 m y se apoya sobre 6 pilotes de 1,50 m de diámetro, y de longitud 27,00 m.

El tablero está anclado de estribo 1 mediante 3 cables de 12 Ø 0,6" inyectados con grasa y la carga horizontal debida al frenado la transmite mediante seis apoyos de neopreno zunchado de 300 x 400 x 96. Este anclaje es visitable, de modo que se pueden destesar para realizar la sustitución de los aparatos de apoyo.

Este estribo está cimentado mediante un encepado de dimensiones 16,50 x 16,50 x 3,00 m que se apoya en 16 pilotes de diámetro 1,50 m y longitud 25,00 m. El estribo tiene dos contrafuertes que unen el tuste con el encepado y cuya misión es conducir las cargas horizontales que transmite al tablero hasta la cimentación.

Al existir la unión entre el estribo y el tablero no hay movimiento horizontal, por lo que no es necesario disponer junta de dilatación. Se ha dispuesto no obstante un sistema para evitar que el balasto entre por la junta existente y que consiste en dos chapas embebidas en el estribo y en el tablero, la del estribo de dimensiones 200 x 10 x 6 600 (2 ud) , anclada mediante pernos Ø 20 cada 0,50 m y la del tablero de dimensiones 300 x 15 x 6 600 (2 ud) anclada mediante pernos Ø 20 cada 0,50 m. Sobre ellas se dispone una chapa de 470 x 15 x 6 600 atornillada a los pernos del estribo, y se ha sellado la junta entre chapas con mastic, de modo que no entre agua y chorree en el parámetro del estribo.

El estribo dos está cimentado mediante un encepado de dimensiones 16,50 x 13,50 x 2,50 m que se apoya en doce pilotes con diámetro 1,50 m y longitud 21,00 m, inferior a la del 1 al no recibir capas horizontales en frenado. Al igual que en el estribo 1 se han dispuesto dos contrafuertes cuya función es aumentar la rigidez del alzado para transmitir las cargas de empuje de tierras a la cimentación.

En este estribo sí existe movimiento entre tablero y estribo, por lo que se ha dispuesto una junta consistente en el mismo sistema que la del estribo 1 y de idénticas dimensiones de modo que la chapa superior desliza sobre la del tablero cuando esta se mueve.

Sobre el tablero se han dispuesto dos canaletas de comunicaciones, ejecutadas "in situ" con armadura pasante desde el tablero y la impermeabilización, consistente en una emulsión de brea-epoxi con una dotación de 2 kg/m^2.

Calidades de los materiales:

A continuación se detallan las calidades de cada uno de los materiales utilizados.

a) Hormigones

Tablero	H-400	fck ≥ 400 kp/cm^2
Alzados de pilas	H-300	fck ≥ 300 kp/cm^2
Encepados y estribos	H-250	fck ≥ 250 kp/cm^2
Pilotes	H-200	fck ≥ 200 kp/cm^2

b) Acero pasivo

AEH-500 N	fck ≥ 500 kp/cm^2

c) Acero activo

A-190 SE	fck ≥ 14000 kp/cm^2

Cálculos

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SON VALIDOS LOS CALCULADOS PARA EL VIADUCTO V

CALCULO DEL PRETENSADO LONGITUDINAL

```
2
   5  1  9 1.6
1     1  9 2.3
1 16  1 10 1.6
2
1  23 0  0  1
23 31 1  1  1
16.501 4.7065 0.834 1.065 14.00
13.108 4.2849 0.791 1.108 14.00
1
1 1
9 2
1 1
1
9 2
1 1
1
9 2
1 1
400 2.5
  3 0 2
5.0    0.0   0.000012
1.14  1.49
1.5  1.19  1.13  2
4  0.005
1
1.1 0.9
0.00025 .04 2.5
19000 190 75 24
4 0 3
1 11
0.0000    -0.791    -0.128
6.4000    -1.200     0.000
14.250    -0.550     0.167
16.000    -0.400     0.000
18.500    -0.686    -0.229
27.500    -1.720     0.000
36.500    -0.686     0.229
39.000    -0.400     0.000
   750    -0.550    -0.167
   70     -1.200     0.000
55.000    -0.791     0.128
1  2
0.0000    -0.211     0.000
55.000    -0.211     0.000
1  2
0.0000    -1.750     0.000
55.000    -1.750     0.000
1 3035.0 21736. 0.21 0.006 0 1 31  1 23 1
1 3035.0 21736. 0.21 0.006 2 1 31 23 31 2
2  959.0  6864. 0.21 0.006 0 1 31  1 31 1
3  959.0  6864. 0.21 0.006 0 1 31  1 31 1
2.000 1.000
```

Programa general de puentes continuos (V1-0)

Proyecto : LAV MADRID-ZARAGOZA. LOSA VANOS 16+23+16 s/pilotes

Definicion geometrica de vanos

	Longitud
Vano 1	16.0000 m
Vano 2	23.0000 m
Vano 3	16.0000 m

Definicion de cargas

Cargas muertas ..... = 0.830 t/m2

Tren RENFE :

Coef. de excent. en centro de vano	1.140
Coef. de excent. en apoyo	1.490
Ancho de aceras	1.500 m
Coef. de impacto para tren de RENFE	1.190
Numero de vias	2

Temperatura :

Coef. de dilatacion termica de	.1E-04
Gradiente lineal termico entre	5.000 y 0.000 grad

Descensos de apoyos (Lentos) :

Hip. 1	Apoyo	1	descenso de	0.005	m.
Hip. 2	Apoyo	11	descenso de	0.005	m.
Hip. 3	Apoyo	21	descenso de	0.005	m.
Hip. 4	Apoyo	31	descenso de	0.005	m.

Caracteristicas de los materiales

Resistencia caracteristica del hormigon ..... =	400.00	kg/cm2
Densidad del hormigon ..... =	2.50	t/m3
Modulo de elasticidad del acero de pretensar .. =	19000.00	kg/mm2
Tension de rotura de los cables ..... =	190.00	kg/mm2
Porcentaje a que se tesan los cables ..... =	75.	%
Retraccion del hormigon .... =	0.00025	
Coeficiente de relajacion del acero ..... =	0.04000	
Coeficiente de fluencia del hormigon ..... =	2.50000	
Coef. de ponderacion para pretensado inicial .. =	1.1000	
Coef. de ponderacion para pretensado final .. =	0.9000	

Definicion de secciones de la estructura final

Vano	Sec	X	Y(Vs)	Vi	Area	Inercia	Ancho
1	1	0.000	0.834	1.065	16.501	4.706500	14.000
	2	1.600	0.791	1.108	13.108	4.284900	14.000
	3	3.200	0.791	1.108	13.108	4.284900	14.000
	4	4.800	0.791	1.108	13.108	4.284900	14.000
	5	6.400	0.791	1.108	13.108	4.284900	14.000
	6	8.000	0.791	1.108	13.108	4.284900	14.000
	7	9.600	0.791	1.108	13.108	4.284900	14.000
	8	11.200	0.791	1.108	13.108	4.284900	14.000
	9	12.800	0.791	1.108	13.108	4.284900	14.000
	10	14.400	0.791	1.108	13.108	4.284900	14.000
	11	16.000	0.834	1.065	16.501	4.706500	14.000
2	11	16.000	0.834	1.065	16.501	4.706500	14.000
	12	18.300	0.791	1.108	13.108	4.284900	14.000
	13	20.600	0.791	1.108	13.108	4.284900	14.000
	14	22.900	0.791	1.108	13.108	4.284900	14.000
	15	25.200	0.791	1.108	13.108	4.284900	14.000
	16	27.500	0.791	1.108	13.108	4.284900	14.000
	17	29.800	0.791	1.108	13.108	4.284900	14.000
	18	32.100	0.791	1.108	13.108	4.284900	14.000
	19	34.400	0.791	1.108	13.108	4.284900	14.000
	20	36.700	0.791	1.108	13.108	4.284900	14.000
	21	39.000	0.834	1.065	16.501	4.706500	14.000
3	21	39.000	0.834	1.065	16.501	4.706500	14.000
	22	40.600	0.791	1.108	13.108	4.284900	14.000
	23	42.200	0.791	1.108	13.108	4.284900	14.000
	24	43.800	0.791	1.108	13.108	4.284900	14.000
	25	45.400	0.791	1.108	13.108	4.284900	14.000
	26	47.000	0.791	1.108	13.108	4.284900	14.000
	27	48.600	0.791	1.108	13.108	4.284900	14.000
	28	50.200	0.791	1.108	13.108	4.284900	14.000
	29	51.800	0.791	1.108	13.108	4.284900	14.000
	30	53.400	0.791	1.108	13.108	4.284900	14.000
	31	55.000	0.834	1.065	16.501	4.706500	14.000

Definicion de estados de la estructura

	Numero de secciones	Numero de secciones activas
Estado 1	23	de 1 a 23
Estado 2	31	de 23 a 31

Cable Numero 1 (Pertenece a familia 1)

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 23 (Activa)

Fuerza de Pretensado ..... = 3035.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.791	-0.12800
2	6.400	-1.200	0.00000
3	14.250	-0.550	0.16700
4	16.000	-0.400	0.00000
5	18.500	-0.686	-0.22900
6	27.500	-1.720	0.00000
7	36.500	-0.686	0.22900
8	39.000	-0.400	0.00000
9	41.750	-0.550	-0.16700
10	48.600	-1.200	0.00000
11	55.000	-0.791	0.12800

Cable Numero 2 (Pertenece a familia 2)

Definicion general

Seccion inicial ..... = 23 (Pasiva)
Seccion final ..... = 31 (Activa)

Fuerza de Pretensado ..... = 3035.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.791	-0.12800
2	6.400	-1.200	0.00000
3	14.250	-0.550	0.16700
4	16.000	-0.400	0.00000
5	18.500	-0.686	-0.22900
6	27.500	-1.720	0.00000
7	36.500	-0.686	0.22900
8	39.000	-0.400	0.00000
9	41.750	-0.550	-0.16700
10	48.600	-1.200	0.00000
11	55.000	-0.791	0.12800

Cable Numero 3 (Pertenece a familia 1)

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 31 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.211	0.00000
2	55.000	-0.211	0.00000

Cable Numero 4 (Pertenece a familia 1)

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 31 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.750	0.00000
2	55.000	-1.750	0.00000

Esfuerzos acumulados por peso propio

Estado 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-163.51	-3.60
	1	2	214.33	-104.30	-3.60
	2	3	339.30	-51.89	0.00
	3	4	380.38	0.54	0.00
	4	5	337.57	52.97	0.00
	5	6	210.87	105.40	0.00
	6	7	0.27	157.84	0.00
	7	8	-294.21	210.27	0.00
	8	9	-672.58	262.70	0.00
	9	10	-1134.85	315.13	0.00
	10	11	-1686.47	374.25	-9.26
2	11	11	-1686.47	-452.35	-7.66
	11	12	-743.81	-367.22	-7.66
	12	13	14.25	-291.90	0.00
	13	14	598.96	-216.54	0.00
	14	15	1010.31	-141.16	0.00
	15	16	1248.31	-65.79	0.00
	16	17	1312.96	9.58	0.00
	17	18	1204.25	84.95	0.00
	18	19	922.19	160.32	0.00
	19	20	466.77	235.69	0.00
	20	21	-173.24	320.78	-5.20
3	21	21	-173.24	-111.64	-2.20
	21	22	-41.95	-52.42	-2.20
	22	23	0.00	0.00	0.00

Esfuerzos acumulados por peso propio

Estado 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-171.27	-3.81
	1	2	226.73	-112.05	-3.81
	2	3	364.12	-59.65	0.00
	3	4	417.61	-7.22	0.00
	4	5	387.20	45.22	0.00
	5	6	272.91	97.65	0.00
	6	7	74.73	150.08	0.00
	7	8	-207.35	202.51	0.00
	8	9	-573.32	254.94	0.00
	9	10	-1023.17	307.38	0.00
	10	11	-1562.39	366.49	-9.05
2	11	11	-1562.39	-428.84	-7.22
	11	12	-673.79	-343.72	-7.22
	12	13	30.21	-268.40	0.00
	13	14	560.85	-193.03	0.00
	14	15	918.14	-117.66	0.00
	15	16	1102.07	-42.29	0.00
	16	17	1112.65	33.08	0.00
	17	18	949.88	108.46	0.00
	18	19	613.76	183.83	0.00
	19	20	104.28	259.20	0.00
	20	21	-589.81	344.29	-5.64
3	21	21	-589.81	-305.73	-7.42
	21	22	-147.85	-246.51	-7.42
	22	23	204.75	-194.16	0.00
	23	24	473.46	-141.73	0.00
	24	25	658.27	-89.29	0.00
	25	26	759.20	-36.86	0.00
	26	27	776.23	15.57	0.00
	27	28	709.38	68.00	0.00
	28	29	558.63	120.43	0.00
	29	30	323.99	172.87	0.00
	30	31	0.00	232.03	-5.44

Esfuerzos acumulados por peso propio

Estructura completa estado inicial

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-171.27	-3.81
	1	2	226.73	-112.05	-3.81
	2	3	364.12	-59.65	0.00
	3	4	417.61	-7.22	0.00
	4	5	387.20	45.22	0.00
	5	6	272.91	97.65	0.00
	6	7	74.73	150.08	0.00
	7	8	-207.35	202.51	0.00
	8	9	-573.32	254.94	0.00
	9	10	-1023.17	307.38	0.00
	10	11	-1562.39	366.49	-9.05
2	11	11	-1562.39	-428.84	-7.22
	11	12	-673.79	-343.72	-7.22
	12	13	30.21	-268.40	0.00
	13	14	560.85	-193.03	0.00
	14	15	918.14	-117.66	0.00
	15	16	1102.07	-42.29	0.00
	16	17	1112.65	33.08	0.00
	17	18	949.88	108.46	0.00
	18	19	613.76	183.83	0.00
	19	20	104.28	259.20	0.00
	20	21	-589.81	344.29	-5.64
3	21	21	-589.81	-305.73	-7.42
	21	22	-147.85	-246.51	-7.42
	22	23	204.75	-194.16	0.00
	23	24	473.46	-141.73	0.00
	24	25	658.27	-89.29	0.00
	25	26	759.20	-36.86	0.00
	26	27	776.23	15.57	0.00
	27	28	709.38	68.00	0.00
	28	29	558.63	120.43	0.00
	29	30	323.99	172.87	0.00
	30	31	0.00	232.03	-5.44

Esfuerzos acumulados por peso propio

Estructura completa estado final

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-184.07	-4.15
	1	2	247.22	-124.85	-4.15
	2	3	405.09	-72.45	0.00
	3	4	479.07	-20.02	0.00
	4	5	469.16	32.41	0.00
	5	6	375.36	84.84	0.00
	6	7	197.66	137.28	0.00
	7	8	-63.92	189.71	0.00
	8	9	-409.40	242.14	0.00
	9	10	-838.77	294.57	0.00
	10	11	-1357.49	353.69	-8.71
2	11	11	-1357.49	-390.03	-6.50
	11	12	-558.16	-304.91	-6.50
	12	13	56.56	-229.58	0.00
	13	14	497.92	-154.21	0.00
	14	15	765.94	-78.84	0.00
	15	16	860.60	-3.47	0.00
	16	17	781.90	71.90	0.00
	17	18	529.86	147.27	0.00
	18	19	104.46	222.64	0.00
	19	20	-494.30	298.01	0.00
	20	21	-1277.65	383.09	-6.37
3	21	21	-1277.65	-348.71	-8.58
	21	22	-766.92	-289.49	-8.58
	22	23	-345.53	-237.15	0.00
	23	24	-8.04	-184.72	0.00
	24	25	245.56	-132.29	0.00
	25	26	415.28	-79.85	0.00
	26	27	501.10	-27.42	0.00
	27	28	503.02	25.01	0.00
	28	29	421.06	77.44	0.00
	29	30	255.21	129.87	0.00
	30	31	0.00	189.06	-4.29

Esfuerzos debidos a cargas muertas

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-63.48	-1.46
	1	2	86.73	-44.89	-1.46
	2	3	143.70	-26.31	0.00
	3	4	170.92	-7.72	0.00
	4	5	168.39	10.87	0.00
	5	6	136.12	29.47	0.00
	6	7	74.10	48.06	0.00
	7	8	-17.66	66.65	0.00
	8	9	-139.18	85.24	0.00
	9	10	-290.44	103.83	0.00
	10	11	-471.45	122.39	-3.04
2	11	11	-471.45	-133.61	-2.25
	11	12	-194.83	-106.89	-2.25
	12	13	20.32	-80.18	0.00
	13	14	173.99	-53.45	0.00
	14	15	266.19	-26.73	0.00
	15	16	296.93	0.00	0.00
	16	17	266.19	26.73	0.00
	17	18	173.99	53.45	0.00
	18	19	20.32	80.18	0.00
	19	20	-194.83	106.90	0.00
	20	21	-471.45	133.61	-2.25
3	21	21	-471.45	-122.39	-3.04
	21	22	-290.44	-103.80	-3.04
	22	23	-139.18	-85.24	0.00
	23	24	-17.66	-66.65	0.00
	24	25	74.10	-48.06	0.00
	25	26	136.12	-29.47	0.00
	26	27	168.39	-10.87	0.00
	27	28	170.92	7.72	0.00
	28	29	143.70	26.31	0.00
	29	30	86.73	44.90	0.00
	30	31	0.00	63.48	-1.46

Esfuerzos por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
1	1	1	0.00	-37.24	-1.00	-0.01	-0.01
	1	2	59.61	-37.24	-1.00	-1.11	1.53
	2	3	119.21	-37.25	0.00	-2.20	3.08
	3	4	178.82	-37.25	0.00	-3.30	4.62
	4	5	238.43	-37.25	0.00	-4.40	6.17
	5	6	298.04	-37.25	0.00	-5.50	7.71
	6	7	357.64	-37.25	0.00	-6.60	9.25
	7	8	417.25	-37.25	0.00	-7.70	10.79
	8	9	476.86	-37.25	0.00	-8.80	12.33
	9	10	536.46	-37.25	0.00	-9.90	13.87
	10	11	596.07	-37.24	1.00	-10.56	13.49
2	11	11	596.07	0.00	0.00	-10.56	13.49
	11	12	596.07	0.00	0.00	-11.00	15.41
	12	13	596.07	0.00	0.00	-11.00	15.41
	13	14	596.07	0.00	0.00	-11.00	15.41
	14	15	596.07	0.00	0.00	-11.00	15.41
	15	16	596.07	0.00	0.00	-11.00	15.41
	16	17	596.07	0.00	0.00	-11.00	15.41
	17	18	596.07	0.00	0.00	-11.00	15.41
	18	19	596.07	0.00	0.00	-11.00	15.41
	19	20	596.07	0.00	0.00	-11.00	15.41
	20	21	596.07	0.00	0.00	-10.56	13.49
3	21	21	596.07	37.24	1.00	-10.56	13.49
	21	22	536.47	37.24	1.00	-9.90	13.88
	22	23	476.86	37.25	0.00	-8.80	12.33
	23	24	417.25	37.25	0.00	-7.70	10.79
	24	25	357.64	37.25	0.00	-6.60	9.25
	25	26	298.04	37.25	0.00	-5.50	7.71
	26	27	238.43	37.25	0.00	-4.40	6.17
	27	28	178.82	37.25	0.00	-3.30	4.62
	28	29	119.21	37.25	0.00	-2.20	3.08
	29	30	59.61	37.25	0.00	-1.10	1.54
	30	31	0.00	37.24	-1.00	-0.01	-0.01

Envolvente de cortantes por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
1	1	1	MAX	0.00	21.96	0.59	0.00	0.00
		1	MIN	0.00	-21.96	-0.59	0.00	0.00
	1	2	MAX	-35.15	21.96	0.59	0.65	-0.90
		2	MIN	35.15	-21.96	-0.59	-0.65	0.90
	2	3	MAX	-70.31	21.97	0.00	1.30	-1.82
		3	MIN	70.31	-21.97	0.00	-1.30	1.82
	3	4	MAX	-105.46	21.97	0.00	1.95	-2.73
		4	MIN	105.46	-21.97	0.00	-1.95	2.73
	4	5	MAX	-140.62	21.97	0.00	2.60	-3.64
		5	MIN	140.62	-21.97	0.00	-2.60	3.64
	5	6	MAX	-175.77	21.97	0.00	3.24	-4.55
		6	MIN	175.77	-21.97	0.00	-3.24	4.55
	6	7	MAX	-210.93	21.97	0.00	3.89	-5.45
		7	MIN	210.93	-21.97	0.00	-3.89	5.45
	7	8	MAX	-246.08	21.97	0.00	4.54	-6.36
		8	MIN	246.08	-21.97	0.00	-4.54	6.36
	8	9	MAX	-281.23	21.97	0.00	5.19	-7.27
		9	MIN	281.23	-21.97	0.00	-5.19	7.27
	9	10	MAX	-316.39	21.97	0.00	5.84	-8.18
		10	MIN	316.39	-21.97	0.00	-5.84	8.18
	10	11	MAX	-351.54	21.96	-0.59	6.23	-7.96
		11	MIN	351.54	-21.96	0.59	-6.23	7.96
2	11	11	MAX	351.54	30.56	0.57	-6.23	7.96
		11	MIN	-351.54	-30.56	-0.57	6.23	-7.96
	11	12	MAX	281.23	30.56	0.57	-5.19	7.28
		12	MIN	-281.23	-30.56	-0.57	5.19	-7.28
	12	13	MAX	210.93	30.57	0.00	-3.89	5.45
		13	MIN	-210.93	-30.57	0.00	3.89	-5.45
	13	14	MAX	140.62	30.57	0.00	-2.60	3.64
		14	MIN	-140.62	-30.57	0.00	2.60	-3.64
	14	15	MAX	70.31	30.57	0.00	-1.30	1.82
		15	MIN	-70.31	-30.57	0.00	1.30	-1.82
	15	16	MAX	0.00	30.57	0.00	0.00	0.00
		16	MIN	0.00	-30.57	0.00	0.00	0.00
	16	17	MAX	-70.31	30.57	0.00	1.30	-1.82
		17	MIN	70.31	-30.57	0.00	-1.30	1.82
	17	18	MAX	-140.62	30.57	0.00	2.60	-3.64
		18	MIN	140.62	-30.57	0.00	-2.60	3.64
	18	19	MAX	-210.93	30.57	0.00	3.89	-5.45
		19	MIN	210.93	-30.57	0.00	-3.89	5.45
	19	20	MAX	-281.23	30.57	0.00	5.19	-7.27
		20	MIN	281.23	-30.57	0.00	-5.19	7.27
	20	21	MAX	-351.54	30.56	-0.57	6.23	-7.96
		21	MIN	351.54	-30.56	0.57	-6.23	7.96

Envolvente de cortantes por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
3	21	21	MAX	351.54	21.96	0.59	-6.23	7.96
		21	MIN	-351.54	-21.96	-0.59	6.23	-7.96
	21	22	MAX	316.39	21.96	0.59	-5.84	8.19
		22	MIN	-316.39	-21.96	-0.59	5.84	-8.19
	22	23	MAX	281.23	21.97	0.00	-5.19	7.27
		23	MIN	-281.23	-21.97	0.00	5.19	-7.27
	23	24	MAX	246.08	21.97	0.00	-4.54	6.36
		24	MIN	-246.08	-21.97	0.00	4.54	-6.36
	24	25	MAX	210.93	21.97	0.00	-3.89	5.45
		25	MIN	-210.93	-21.97	0.00	3.89	-5.45
	25	26	MAX	175.77	21.97	0.00	-3.24	4.55
		26	MIN	-175.77	-21.97	0.00	3.24	-4.55
	26	27	MAX	140.62	21.97	0.00	-2.60	3.64
		27	MIN	-140.62	-21.97	0.00	2.60	-3.64
	27	28	MAX	105.46	21.97	0.00	-1.95	2.73
		28	MIN	-105.46	-21.97	0.00	1.95	-2.73
	28	29	MAX	70.31	21.97	0.00	-1.30	1.82
		29	MIN	-70.31	-21.97	0.00	1.30	-1.82
	29	30	MAX	35.15	21.97	0.00	-0.65	0.91
		30	MIN	-35.15	-21.97	0.00	0.65	-0.91
	30	31	MAX	0.00	21.96	-0.59	0.00	0.00
		31	MIN	0.00	-21.96	0.59	0.00	0.00

Envolvente de momentos por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
1	1	1	MAX	0.00	-21.96	-0.59	0.00	0.00
		1	MIN	0.00	21.96	0.59	0.00	0.00
	1	2	MAX	35.15	-21.96	-0.59	-0.65	0.90
		2	MIN	-35.15	21.96	0.59	0.65	-0.90
	2	3	MAX	70.31	-21.97	0.00	-1.30	1.82
		3	MIN	-70.31	21.97	0.00	1.30	-1.82
	3	4	MAX	105.46	-21.97	0.00	-1.95	2.73
		4	MIN	-105.46	21.97	0.00	1.95	-2.73
	4	5	MAX	140.62	-21.97	0.00	-2.60	3.64
		5	MIN	-140.62	21.97	0.00	2.60	-3.64
	5	6	MAX	175.77	-21.97	0.00	-3.24	4.55
		6	MIN	-175.77	21.97	0.00	3.24	-4.55
	6	7	MAX	210.93	-21.97	0.00	-3.89	5.45
		7	MIN	-210.93	21.97	0.00	3.89	-5.45
	7	8	MAX	246.08	-21.97	0.00	-4.54	6.36
		8	MIN	-246.08	21.97	0.00	4.54	-6.36
	8	9	MAX	281.23	-21.97	0.00	-5.19	7.27
		9	MIN	-281.23	21.97	0.00	5.19	-7.27
	9	10	MAX	316.39	-21.97	0.00	-5.84	8.18
		10	MIN	-316.39	21.97	0.00	5.84	-8.18
	10	11	MAX	351.54	-21.96	0.59	-6.23	7.96
		11	MIN	-351.54	21.96	-0.59	6.23	-7.96
2	11	11	MAX	351.54	30.56	0.57	-6.23	7.96
		11	MIN	-351.54	-30.56	-0.57	6.23	-7.96
	11	12	MAX	281.23	30.56	0.57	-5.19	7.28
		12	MIN	-281.23	-30.56	-0.57	5.19	-7.28
	12	13	MAX	210.93	30.57	0.00	-3.89	5.45
		13	MIN	-210.93	-30.57	0.00	3.89	-5.45
	13	14	MAX	155.23	21.56	0.00	-2.87	4.01
		14	MIN	-155.23	-21.56	0.00	2.87	-4.01
	14	15	MAX	112.15	0.00	0.00	-2.07	2.90
		15	MIN	-112.15	0.00	0.00	2.07	-2.90
	15	16	MAX	112.15	0.00	0.00	-2.07	2.90
		16	MIN	-112.15	0.00	0.00	2.07	-2.90
	16	17	MAX	112.15	0.00	0.00	-2.07	2.90
		17	MIN	-112.15	0.00	0.00	2.07	-2.90
	17	18	MAX	155.23	-21.56	0.00	-2.87	4.01
		18	MIN	-155.23	21.56	0.00	2.87	-4.01
	18	19	MAX	210.93	-30.57	0.00	-3.89	5.45
		19	MIN	-210.93	30.57	0.00	3.89	-5.45
	19	20	MAX	281.23	-30.57	0.00	-5.19	7.27
		20	MIN	-281.23	30.57	0.00	5.19	-7.27
	20	21	MAX	351.54	-30.56	0.57	-6.23	7.96
		21	MIN	-351.54	30.56	-0.57	6.23	-7.96

Envolvente de momentos por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
3	21	21	MAX	351.54	21.96	0.59	-6.23	7.96
		21	MIN	-351.54	-21.96	-0.59	6.23	-7.96
	21	22	MAX	316.39	21.96	0.59	-5.84	8.19
		22	MIN	-316.39	-21.96	-0.59	5.84	-8.19
	22	23	MAX	281.23	21.97	0.00	-5.19	7.27
		23	MIN	-281.23	-21.97	0.00	5.19	-7.27
	23	24	MAX	246.08	21.97	0.00	-4.54	6.36
		24	MIN	-246.08	-21.97	0.00	4.54	-6.36
	24	25	MAX	210.93	21.97	0.00	-3.89	5.45
		25	MIN	-210.93	-21.97	0.00	3.89	-5.45
	25	26	MAX	175.77	21.97	0.00	-3.24	4.55
		26	MIN	-175.77	-21.97	0.00	3.24	-4.55
	26	27	MAX	140.62	21.97	0.00	-2.60	3.64
		27	MIN	-140.62	-21.97	0.00	2.60	-3.64
	27	28	MAX	105.46	21.97	0.00	-1.95	2.73
		28	MIN	-105.46	-21.97	0.00	1.95	-2.73
	28	29	MAX	70.31	21.97	0.00	-1.30	1.82
		29	MIN	-70.31	-21.97	0.00	1.30	-1.82
	29	30	MAX	35.15	21.97	0.00	-0.65	0.91
		30	MIN	-35.15	-21.97	0.00	0.65	-0.91
	30	31	MAX	0.00	21.96	-0.59	0.00	0.00
		31	MIN	0.00	-21.96	0.59	0.00	0.00

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	82.72	1.49
		1	MIN	0.00	-349.60	-6.01
	1	2	MAX	-126.18	78.86	0.00
		2	MIN	482.84	-268.49	-1.00
	2	3	MAX	-239.91	74.97	0.00
		3	MIN	822.76	-193.87	0.00
	3	4	MAX	-341.21	71.08	0.00
		4	MIN	1035.52	-125.80	0.00
	4	5	MAX	-430.07	67.20	0.00
		5	MIN	1136.86	-64.28	0.00
	5	6	MAX	184.44	88.73	0.00
		6	MIN	370.37	-46.30	0.00
	6	7	MAX	238.65	145.17	0.00
		7	MIN	449.78	-46.85	0.00
	7	8	MAX	-41.22	213.52	0.00
		8	MIN	530.96	-47.41	0.00
	8	9	MAX	-454.36	288.43	0.00
		9	MIN	613.92	-47.96	0.00
	9	10	MAX	-1016.54	369.89	0.00
		10	MIN	698.66	-48.52	0.00
	10	11	MAX	-330.92	457.79	-7.63
		11	MIN	-377.58	-49.06	1.21
2	11	11	MAX	-330.92	35.82	0.45
		11	MIN	-377.58	-531.54	-6.04
	11	12	MAX	697.77	34.14	0.00
		12	MIN	-713.07	-411.02	0.00
	12	13	MAX	618.10	32.46	0.00
		13	MIN	116.31	-299.87	0.00
	13	14	MAX	546.18	30.77	0.00
		14	MIN	665.10	-198.13	0.00
	14	15	MAX	482.00	29.09	0.00
		15	MIN	965.83	-105.83	0.00
	15	16	MAX	1425.24	27.41	0.00
		16	MIN	829.17	-27.41	0.00
	16	17	MAX	1561.90	105.83	0.00
		17	MIN	-114.07	-29.09	0.00
	17	18	MAX	1261.17	198.13	0.00
		18	MIN	-49.89	-30.77	0.00
	18	19	MAX	712.38	299.87	0.00
		19	MIN	22.03	-32.46	0.00
	19	20	MAX	-116.99	411.02	0.00
		20	MIN	101.69	-34.14	0.00
	20	21	MAX	-79.54	531.54	-6.04
		21	MIN	-628.96	-35.82	0.45
3	21	21	MAX	-79.54	49.06	1.21
		21	MIN	-628.96	-457.79	-7.63
	21	22	MAX	698.66	48.51	1.00
		22	MIN	-1016.54	-369.89	0.00

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	613.92	47.96	0.00
		23	MIN	-454.36	-288.43	0.00
	23	24	MAX	530.96	47.41	0.00
		24	MIN	-41.22	-213.52	0.00
	24	25	MAX	449.78	46.85	0.00
		25	MIN	238.65	-145.17	0.00
	25	26	MAX	370.37	46.30	0.00
		26	MIN	184.44	-88.73	0.00
	26	27	MAX	1136.86	64.28	0.00
		27	MIN	-430.07	-67.20	0.00
	27	28	MAX	1035.52	125.80	0.00
		28	MIN	-341.21	-71.08	0.00
	28	29	MAX	822.76	193.87	0.00
		29	MIN	-239.91	-74.97	0.00
	29	30	MAX	482.83	268.51	0.00
		30	MIN	-126.18	-78.86	0.00
	30	31	MAX	0.00	349.60	-6.01
		31	MIN	0.00	-82.72	1.49

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-349.60	-6.01
		1	MIN	0.00	82.72	1.49
	1	2	MAX	482.84	-268.40	-6.01
		2	MIN	-126.18	78.83	1.49
	2	3	MAX	822.76	-193.87	0.00
		3	MIN	-239.91	74.97	0.00
	3	4	MAX	1035.52	-125.80	0.00
		4	MIN	-341.21	71.08	0.00
	4	5	MAX	1136.86	-64.28	0.00
		5	MIN	-430.07	67.20	0.00
	5	6	MAX	1142.52	-9.32	0.00
		6	MIN	-506.48	63.31	0.00
	6	7	MAX	1161.20	49.07	0.00
		7	MIN	-645.10	67.20	0.00
	7	8	MAX	1073.23	114.01	0.00
		8	MIN	-796.16	71.08	0.00
	8	9	MAX	862.86	185.52	0.00
		9	MIN	-959.65	74.97	0.00
	9	10	MAX	698.66	-48.52	0.00
		10	MIN	-1190.53	333.31	0.00
	10	11	MAX	752.39	-49.06	1.21
		11	MIN	-1537.10	408.07	-6.83
2	11	11	MAX	752.39	35.82	0.45
		11	MIN	-1537.10	-531.54	-6.04
	11	12	MAX	697.77	34.13	0.45
		12	MIN	-754.41	-354.32	-5.19
	12	13	MAX	1087.45	-245.51	0.00
		13	MIN	-425.87	-32.46	0.00
	13	14	MAX	1540.03	-172.37	0.00
		14	MIN	-333.01	-30.77	0.00
	14	15	MAX	1769.48	-81.47	0.00
		15	MIN	-248.02	-11.35	0.00
	15	16	MAX	1789.87	0.00	0.00
		16	MIN	-216.24	-4.46	0.00
	16	17	MAX	1769.48	81.47	0.00
		17	MIN	-248.02	11.35	0.00
	17	18	MAX	1540.03	172.37	0.00
		18	MIN	-333.01	30.77	0.00
	18	19	MAX	1087.45	245.51	0.00
		19	MIN	-425.87	32.46	0.00
	19	20	MAX	697.76	-34.14	0.00
		20	MIN	-754.41	354.39	0.00
	20	21	MAX	752.39	-35.82	0.45
		21	MIN	-1537.10	531.54	-6.04
3	21	21	MAX	752.39	49.06	1.21
		21	MIN	-1537.10	-408.07	-6.83
	21	22	MAX	698.66	48.50	1.21
		22	MIN	-1190.53	-333.18	-6.83

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	862.86	-185.52	0.00
		23	MIN	-959.65	-74.97	0.00
	23	24	MAX	1073.23	-114.01	0.00
		24	MIN	-796.16	-71.08	0.00
	24	25	MAX	1161.20	-49.07	0.00
		25	MIN	-645.10	-67.20	0.00
	25	26	MAX	1142.52	9.32	0.00
		26	MIN	-506.48	-63.31	0.00
	26	27	MAX	1136.86	64.28	0.00
		27	MIN	-430.07	-67.20	0.00
	27	28	MAX	1035.52	125.80	0.00
		28	MIN	-341.21	-71.08	0.00
	28	29	MAX	822.76	193.87	0.00
		29	MIN	-239.91	-74.97	0.00
	29	30	MAX	482.83	268.51	0.00
		30	MIN	-126.18	-78.86	0.00
	30	31	MAX	0.00	349.60	0.49
		31	MIN	0.00	-82.72	-5.00

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	104.68	2.08
		1	MIN	0.00	-371.57	-6.60
	1	2	MAX	-161.33	100.82	0.59
		2	MIN	517.99	-290.46	-1.59
	2	3	MAX	-310.22	96.94	0.00
		3	MIN	893.06	-215.85	0.00
	3	4	MAX	-446.67	93.06	0.00
		4	MIN	1140.98	-147.77	0.00
	4	5	MAX	-570.68	89.17	0.00
		5	MIN	1277.47	-86.25	0.00
	5	6	MAX	8.67	110.70	0.00
		6	MIN	546.15	-68.27	0.00
	6	7	MAX	27.72	167.14	0.00
		7	MIN	660.71	-68.82	0.00
	7	8	MAX	-287.30	235.49	0.00
		8	MIN	777.04	-69.38	0.00
	8	9	MAX	-735.60	310.40	0.00
		9	MIN	895.16	-69.93	0.00
	9	10	MAX	-1332.93	391.86	0.00
		10	MIN	1015.05	-70.49	0.00
	10	11	MAX	-333.98	479.75	-8.22
		11	MIN	-374.52	-71.02	1.80
2	11	11	MAX	-333.98	66.38	1.02
		11	MIN	-374.52	-562.11	-6.61
	11	12	MAX	979.00	64.70	0.57
		12	MIN	-994.30	-441.59	-0.57
	12	13	MAX	829.03	63.03	0.00
		13	MIN	-94.62	-330.43	0.00
	13	14	MAX	686.80	61.34	0.00
		14	MIN	524.48	-228.70	0.00
	14	15	MAX	552.31	59.66	0.00
		15	MIN	895.52	-136.40	0.00
	15	16	MAX	1425.24	57.98	0.00
		16	MIN	829.17	-57.98	0.00
	16	17	MAX	1491.59	136.40	0.00
		17	MIN	-43.76	-59.66	0.00
	17	18	MAX	1120.55	228.70	0.00
		18	MIN	90.73	-61.34	0.00
	18	19	MAX	501.45	330.43	0.00
		19	MIN	232.96	-63.03	0.00
	19	20	MAX	-398.23	441.59	0.00
		20	MIN	382.93	-64.71	0.00
	20	21	MAX	-76.48	562.11	-6.61
		21	MIN	-632.02	-66.38	1.02
3	21	21	MAX	-76.48	71.02	1.80
		21	MIN	-632.02	-479.75	-8.22
	21	22	MAX	1015.05	70.47	1.59
		22	MIN	-1332.93	-391.86	-0.59

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	895.16	69.93	0.00
		23	MIN	-735.60	-310.40	0.00
	23	24	MAX	777.04	69.38	0.00
		24	MIN	-287.30	-235.49	0.00
	24	25	MAX	660.71	68.82	0.00
		25	MIN	27.72	-167.14	0.00
	25	26	MAX	546.15	68.27	0.00
		26	MIN	8.67	-110.70	0.00
	26	27	MAX	1277.47	86.25	0.00
		27	MIN	-570.68	-89.17	0.00
	27	28	MAX	1140.98	147.77	0.00
		28	MIN	-446.67	-93.06	0.00
	28	29	MAX	893.06	215.85	0.00
		29	MIN	-310.22	-96.94	0.00
	29	30	MAX	517.99	290.48	0.00
		30	MIN	-161.33	-100.83	0.00
	30	31	MAX	0.00	371.57	-6.60
		31	MIN	0.00	-104.68	2.08

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-371.57	-6.60
		1	MIN	0.00	104.68	2.08
	1	2	MAX	517.99	-290.36	-6.60
		2	MIN	-161.33	100.80	2.08
	2	3	MAX	893.06	-215.85	0.00
		3	MIN	-310.22	96.94	0.00
	3	4	MAX	1140.98	-147.77	0.00
		4	MIN	-446.67	93.06	0.00
	4	5	MAX	1277.47	-86.25	0.00
		5	MIN	-570.68	89.17	0.00
	5	6	MAX	1318.29	-31.30	0.00
		6	MIN	-682.26	85.28	0.00
	6	7	MAX	1372.13	27.09	0.00
		7	MIN	-856.03	89.17	0.00
	7	8	MAX	1319.31	92.04	0.00
		8	MIN	-1042.24	93.06	0.00
	8	9	MAX	1144.10	163.55	0.00
		9	MIN	-1240.89	96.94	0.00
	9	10	MAX	1015.05	-70.49	0.00
		10	MIN	-1506.91	355.28	0.00
	10	11	MAX	1085.22	-71.02	1.80
		11	MIN	-1869.93	430.03	-7.42
2	11	11	MAX	1085.22	66.38	1.02
		11	MIN	-1869.93	-562.11	-6.61
	11	12	MAX	979.00	64.70	1.02
		12	MIN	-1035.65	-384.89	-5.76
	12	13	MAX	1298.38	-214.94	0.00
		13	MIN	-636.80	-63.03	0.00
	13	14	MAX	1695.26	-150.81	0.00
		14	MIN	-488.24	-52.33	0.00
	14	15	MAX	1881.63	-81.47	0.00
		15	MIN	-360.17	-11.35	0.00
	15	16	MAX	1902.02	0.00	0.00
		16	MIN	-328.40	-4.46	0.00
	16	17	MAX	1881.63	81.47	0.00
		17	MIN	-360.17	11.35	0.00
	17	18	MAX	1695.26	150.81	0.00
		18	MIN	-488.24	52.33	0.00
	18	19	MAX	1298.38	214.94	0.00
		19	MIN	-636.80	63.03	0.00
	19	20	MAX	979.00	-64.71	0.00
		20	MIN	-1035.65	384.96	0.00
	20	21	MAX	1085.22	-66.38	1.02
		21	MIN	-1869.93	562.11	-6.61
3	21	21	MAX	1085.22	71.02	1.80
		21	MIN	-1869.93	-430.03	-7.42
	21	22	MAX	1015.05	70.46	1.80
		22	MIN	-1506.91	-355.14	-7.42

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	1144.10	-163.55	0.00
		23	MIN	-1240.89	-96.94	0.00
	23	24	MAX	1319.31	-92.04	0.00
		24	MIN	-1042.24	-93.06	0.00
	24	25	MAX	1372.13	-27.09	0.00
		25	MIN	-856.03	-89.17	0.00
	25	26	MAX	1318.29	31.30	0.00
		26	MIN	-682.26	-85.28	0.00
	26	27	MAX	1277.47	86.25	0.00
		27	MIN	-570.68	-89.17	0.00
	27	28	MAX	1140.98	147.77	0.00
		28	MIN	-446.67	-93.06	0.00
	28	29	MAX	893.06	215.85	0.00
		29	MIN	-310.22	-96.94	0.00
	29	30	MAX	517.99	290.48	0.00
		30	MIN	-161.33	-100.83	0.00
	30	31	MAX	0.00	371.57	-0.10
		31	MIN	0.00	-104.68	-4.41

Cable Numero 1

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 23 (Activa)

Fuerza de Pretensado ..... = 3035.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 1

Se.	X	Y (s)	Y (i)	Pend.
1	0.000	0.791	1.108	-0.1280
2	1.600	0.970	0.929	-0.0959
3	3.200	1.098	0.801	-0.0639
4	4.800	1.174	0.725	-0.0319
5	6.400	1.200	0.699	0.0000
6	8.000	1.173	0.726	0.0334
7	9.600	1.093	0.806	0.0671
8	11.200	0.959	0.940	0.1011
9	12.800	0.769	1.130	0.1355
10	14.400	0.526	1.373	0.1537
11	16.000	0.400	1.499	0.0000
12	18.300	0.642	1.257	-0.2106
13	20.600	1.111	0.788	-0.1760
14	22.900	1.449	0.450	-0.1176
15	25.200	1.652	0.247	-0.0590
16	27.500	1.720	0.179	0.0000
17	29.800	1.652	0.247	0.0590
18	32.100	1.449	0.450	0.1176
19	34.400	1.111	0.788	0.1760
20	36.700	0.642	1.257	0.2106
21	39.000	0.400	1.499	0.0000
22	40.600	0.428	1.471	-0.0549
23	42.200	0.624	1.275	-0.1602

Cable Numero 2

Definicion general

Seccion inicial ..... = 23 (Pasiva)
Seccion final ..... = 31 (Activa)

Fuerza de Pretensado ..... = 3035.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 2

Se.	X	Y (s)	Y (i)	Pend.
23	42.200	0.624	1.275	-0.1602
24	43.800	0.858	1.041	-0.1314
25	45.400	1.040	0.859	-0.0950
26	47.000	1.158	0.741	-0.0512
27	48.600	1.200	0.699	0.0000
28	50.200	1.174	0.725	0.0319
29	51.800	1.098	0.801	0.0639
30	53.400	0.970	0.929	0.0959
31	55.000	0.791	1.108	0.1280

Cable Numero 3

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 31 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 3

Se.	X	Y (s)	Y (i)	Pend.
1	0.000	0.211	1.688	0.0000
2	1.600	0.211	1.688	0.0000
3	3.200	0.211	1.688	0.0000
4	4.800	0.211	1.688	0.0000
5	6.400	0.211	1.688	0.0000
6	8.000	0.211	1.688	0.0000
7	9.600	0.211	1.688	0.0000
8	11.200	0.211	1.688	0.0000
9	12.800	0.211	1.688	0.0000
10	14.400	0.211	1.688	0.0000
11	16.000	0.211	1.688	0.0000
12	18.300	0.211	1.688	0.0000
13	20.600	0.211	1.688	0.0000
14	22.900	0.211	1.688	0.0000
15	25.200	0.211	1.688	0.0000
16	27.500	0.211	1.688	0.0000
17	29.800	0.211	1.688	0.0000
18	32.100	0.211	1.688	0.0000
19	34.400	0.211	1.688	0.0000
20	36.700	0.211	1.688	0.0000
21	39.000	0.211	1.688	0.0000
22	40.600	0.211	1.688	0.0000
23	42.200	0.211	1.688	0.0000
24	43.800	0.211	1.688	0.0000
25	45.400	0.211	1.688	0.0000
26	47.000	0.211	1.688	0.0000
27	48.600	0.211	1.688	0.0000
28	50.200	0.211	1.688	0.0000
29	51.800	0.211	1.688	0.0000
30	53.400	0.211	1.688	0.0000
31	55.000	0.211	1.688	0.0000

Cable Numero 4

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 31 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 4

Se.	X	Y (s)	Y (i)	Pend.
1	0.000	1.750	0.149	0.0000
2	1.600	1.750	0.149	0.0000
3	3.200	1.750	0.149	0.0000
4	4.800	1.750	0.149	0.0000
5	6.400	1.750	0.149	0.0000
6	8.000	1.750	0.149	0.0000
7	9.600	1.750	0.149	0.0000
8	11.200	1.750	0.149	0.0000
9	12.800	1.750	0.149	0.0000
10	14.400	1.750	0.149	0.0000
11	16.000	1.750	0.149	0.0000
12	18.300	1.750	0.149	0.0000
13	20.600	1.750	0.149	0.0000
14	22.900	1.750	0.149	0.0000
15	25.200	1.750	0.149	0.0000
16	27.500	1.750	0.149	0.0000
17	29.800	1.750	0.149	0.0000
18	32.100	1.750	0.149	0.0000
19	34.400	1.750	0.149	0.0000
20	36.700	1.750	0.149	0.0000
21	39.000	1.750	0.149	0.0000
22	40.600	1.750	0.149	0.0000
23	42.200	1.750	0.149	0.0000
24	43.800	1.750	0.149	0.0000
25	45.400	1.750	0.149	0.0000
26	47.000	1.750	0.149	0.0000
27	48.600	1.750	0.149	0.0000
28	50.200	1.750	0.149	0.0000
29	51.800	1.750	0.149	0.0000
30	53.400	1.750	0.149	0.0000
31	55.000	1.750	0.149	0.0000

Definicion esfuerzos unitarios cable : 1

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
1	3035.000	-385.336	3010.439
2	3008.788	-287.209	2995.049
3	2982.724	-190.088	2976.661
4	2956.850	-94.259	2955.347
5	2931.203	0.000	2931.203
6	2904.885	96.851	2903.271
7	2878.640	192.626	2872.188
8	2852.516	286.984	2838.043
9	2826.563	379.593	2800.958
10	2795.095	424.692	2762.642
11	2701.530	0.000	2701.530
12	2588.543	-487.960	2542.135
13	2562.156	-433.868	2525.154
14	2560.260	-325.168	2539.526
15	2598.445	-183.433	2591.962
16	2644.939	0.000	2644.939
17	2692.266	190.056	2685.549
18	2732.420	347.033	2710.292
19	2765.095	468.233	2725.162
20	2793.573	526.609	2743.489
21	2915.509	0.000	2915.509
22	2955.230	-161.983	2950.788
23	3035.000	-480.155	2996.778

Alargamiento del cable ..... 285.9 mm.

Definicion esfuerzos unitarios cable : 2

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
23	2812.251	-444.915	2776.834
24	2834.704	-369.178	2810.561
25	2861.898	-270.737	2849.063
26	2894.017	-148.101	2890.225
27	2931.203	0.000	2931.203
28	2956.850	94.259	2955.347
29	2982.724	190.088	2976.661
30	3008.788	287.209	2995.049
31	3035.000	385.336	3010.439

Alargamiento del cable ..... 90.6 mm.

Definicion esfuerzos unitarios cable : 3

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
1	959.000	0.000	959.000
2	957.069	0.000	957.069
3	955.141	0.000	955.141
4	953.217	0.000	953.217
5	951.298	0.000	951.298
6	949.382	0.000	949.382
7	947.470	0.000	947.470
8	945.562	0.000	945.562
9	943.657	0.000	943.657
10	941.757	0.000	941.757
11	939.860	0.000	939.860
12	937.140	0.000	937.140
13	934.428	0.000	934.428
14	931.724	0.000	931.724
15	929.028	0.000	929.028
16	926.340	0.000	926.340
17	929.028	0.000	929.028
18	931.724	0.000	931.724
19	934.428	0.000	934.428
20	937.140	0.000	937.140
21	939.860	0.000	939.860
22	941.757	0.000	941.757
23	943.657	0.000	943.657
24	945.562	0.000	945.562
25	947.470	0.000	947.470
26	949.382	0.000	949.382
27	951.298	0.000	951.298
28	953.217	0.000	953.217
29	955.141	0.000	955.141
30	957.069	0.000	957.069
31	959.000	0.000	959.000

Alargamiento del cable ..... 397.5 mm.

Definicion esfuerzos unitarios cable : 4

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
1	959.000	0.000	959.000
2	957.069	0.000	957.069
3	955.141	0.000	955.141
4	953.217	0.000	953.217
5	951.298	0.000	951.298
6	949.382	0.000	949.382
7	947.470	0.000	947.470
8	945.562	0.000	945.562
9	943.657	0.000	943.657
10	941.757	0.000	941.757
11	939.860	0.000	939.860
12	937.140	0.000	937.140
13	934.428	0.000	934.428
14	931.724	0.000	931.724
15	929.028	0.000	929.028
16	926.340	0.000	926.340
17	929.028	0.000	929.028
18	931.724	0.000	931.724
19	934.428	0.000	934.428
20	937.140	0.000	937.140
21	939.860	0.000	939.860
22	941.757	0.000	941.757
23	943.657	0.000	943.657
24	945.562	0.000	945.562
25	947.470	0.000	947.470
26	949.382	0.000	949.382
27	951.298	0.000	951.298
28	953.217	0.000	953.217
29	955.141	0.000	955.141
30	957.069	0.000	957.069
31	959.000	0.000	959.000

Alargamiento del cable ..... 397.5 mm.

Esfuerzos unitarios debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-126.51	427.4	-4952.1
		2	-729.86	328.8	-4930.2
	2	2	-729.96	196.2	-4939.9
		3	-960.75	99.1	-4917.6
	3	3	-960.75	99.1	-4917.6
		4	-1034.25	3.2	-4892.5
	4	4	-1034.25	3.2	-4892.5
		5	-953.44	-91.0	-4864.5
	5	5	-953.44	-91.0	-4864.5
		6	-718.35	-187.9	-4832.7
	6	6	-718.35	-187.9	-4832.7
		7	-329.54	-283.6	-4797.8
	7	7	-329.54	-283.6	-4797.8
		8	208.81	-378.0	-4759.9
	8	8	208.81	-378.0	-4759.9
		9	891.47	-470.6	-4719.0
	9	9	891.47	-470.6	-4719.0
		10	1709.24	-515.7	-4676.8
	10	10	1708.92	-641.2	-4661.7
		11	2377.59	-214.9	-4608.2
2	11	11	2378.82	135.0	-4608.3
		12	1356.76	619.8	-4434.4
	12	12	1355.85	536.7	-4447.1
		13	152.47	482.6	-4424.7
	13	13	152.47	482.6	-4424.7
		14	-845.33	373.9	-4433.7
	14	14	-845.33	373.9	-4433.7
		15	-1589.64	232.2	-4480.7
	15	15	-1589.64	232.2	-4480.7
		16	-1969.34	48.8	-4528.3
	16	16	-1969.34	48.8	-4528.3
		17	-1895.92	-141.3	-4574.3
	17	17	-1895.92	-141.3	-4574.3
		18	-1404.04	-298.3	-4604.4
	18	18	-1404.04	-298.3	-4604.4
		19	-579.96	-419.5	-4624.7
	19	19	-579.96	-419.5	-4624.7
		20	485.54	-477.8	-4648.5
	20	20	484.61	-567.9	-4646.5
		21	1347.92	-38.1	-4814.1
3	21	21	1348.65	129.7	-4825.7
		22	1070.92	292.6	-4860.4
	22	22	1071.12	162.0	-4865.0
		23	501.52	480.2	-4914.8

Esfuerzos unitarios debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	5.2	0.1
		2	-8.26	5.2	0.1
	2	2	-8.26	5.2	0.0
		3	-16.52	5.2	0.0
	3	3	-16.52	5.2	0.0
		4	-24.78	5.2	0.0
	4	4	-24.78	5.2	0.0
		5	-33.04	5.2	0.0
	5	5	-33.04	5.2	0.0
		6	-41.30	5.2	0.0
	6	6	-41.30	5.2	0.0
		7	-49.56	5.2	0.0
	7	7	-49.56	5.2	0.0
		8	-57.82	5.2	0.0
	8	8	-57.82	5.2	0.0
		9	-66.08	5.2	0.0
	9	9	-66.08	5.2	0.0
		10	-74.34	5.2	0.0
	10	10	-74.34	5.2	-0.1
		11	-82.60	5.2	-0.1
2	11	11	-82.60	-15.6	-0.3
		12	-46.61	-15.6	0.0
	12	12	-46.61	-15.6	0.0
		13	-10.62	-15.6	0.0
	13	13	-10.62	-15.6	0.0
		14	25.37	-15.6	0.0
	14	14	25.37	-15.6	0.0
		15	61.36	-15.6	0.0
	15	15	61.36	-15.6	0.0
		16	97.35	-15.6	0.0
	16	16	97.35	-15.6	0.0
		17	133.34	-15.6	0.0
	17	17	133.34	-15.6	0.0
		18	169.32	-15.6	0.0
	18	18	169.32	-15.6	0.0
		19	205.31	-15.6	0.0
	19	19	205.31	-15.6	0.0
		20	241.30	-15.6	0.0
	20	20	241.30	-15.6	0.3
		21	277.29	-15.6	0.3
3	21	21	277.29	17.3	0.5
		22	249.56	17.3	0.5
	22	22	249.56	17.3	0.0
		23	221.83	17.3	0.0
	23	23	686.54	462.2	-2776.8
		24	6.06	386.5	-2810.6
	24	24	6.06	386.5	-2810.6
		25	-543.05	288.1	-2849.1

Esfuerzos unitarios debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-543.05	288.1	-2849.1
		26	-922.10	165.4	-2890.2
	26	26	-922.10	165.4	-2890.2
		27	-1087.95	17.3	-2931.2
	27	27	-1087.95	17.3	-2931.2
		28	-1050.17	-76.9	-2955.3
	28	28	-1050.17	-76.9	-2955.3
		29	-858.08	-172.8	-2976.7
	29	29	-858.08	-172.8	-2976.7
		30	-508.70	-269.9	-2995.0
	30	30	-508.63	-350.2	-2986.8
		31	129.52	-448.8	-2999.5

Esfuerzos unitarios en estructura total debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-126.51	435.2	-4921.2
		2	-742.24	336.6	-4899.3
	2	2	-742.34	204.7	-4909.2
		3	-986.82	107.6	-4886.9
	3	3	-986.82	107.6	-4886.9
		4	-1074.01	11.8	-4861.8
	4	4	-1074.01	11.8	-4861.8
		5	-1006.90	-82.5	-4833.8
	5	5	-1006.90	-82.5	-4833.8
		6	-785.51	-179.3	-4802.0
	6	6	-785.51	-179.3	-4802.0
		7	-410.38	-275.1	-4767.1
	7	7	-410.39	-275.1	-4767.1
		8	114.27	-369.4	-4729.2
	8	8	114.27	-369.4	-4729.2
		9	783.23	-462.1	-4688.3
	9	9	783.23	-462.1	-4688.3
		10	1587.31	-507.2	-4646.2
	10	10	1586.99	-631.8	-4631.3
		11	2240.65	-205.5	-4577.8
2	11	11	2241.88	108.7	-4578.1
		12	1280.20	593.5	-4404.2
	12	12	1279.29	511.1	-4416.4
		13	134.98	457.0	-4394.0
	13	13	134.98	457.0	-4394.0
		14	-803.76	348.3	-4403.0
	14	14	-803.76	348.3	-4403.0
		15	-1489.01	206.5	-4450.0
	15	15	-1489.01	206.5	-4450.0
		16	-1809.64	23.1	-4497.6
	16	16	-1809.64	23.1	-4497.6
		17	-1677.15	-167.0	-4543.6
	17	17	-1677.15	-167.0	-4543.6
		18	-1126.21	-323.9	-4573.7
	18	18	-1126.21	-323.9	-4573.7
		19	-243.07	-445.1	-4594.0
	19	19	-243.07	-445.1	-4594.0
		20	881.50	-503.5	-4617.8
	20	20	880.57	-593.0	-4615.4
		21	1801.63	-63.2	-4783.0
3	21	21	1802.36	178.1	-4793.7
		22	1447.13	341.1	-4828.4
	22	22	1447.33	211.2	-4834.3
		23	798.91	529.4	-4884.1
	23	23	297.39	49.3	-1887.3
		24	217.91	49.3	-1891.1
	24	24	217.91	49.3	-1891.1
		25	138.42	49.3	-1894.9

Esfuerzos unitarios en estructura total debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	138.42	49.3	-1894.9
		26	58.93	49.3	-1898.8
	26	26	58.93	49.3	-1898.8
		27	-20.56	49.3	-1902.6
	27	27	-20.56	49.3	-1902.6
		28	-100.05	49.3	-1906.4
	28	28	-100.05	49.3	-1906.4
		29	-179.54	49.3	-1910.3
	29	29	-179.54	49.3	-1910.3
		30	-259.03	49.3	-1914.1
	30	30	-259.05	-2.3	-1914.8
		31	-256.07	-2.2	-1918.6

Esfuerzos unitarios en estructura total debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	5.2	0.1
		2	-8.26	5.2	0.1
	2	2	-8.26	5.2	0.0
		3	-16.52	5.2	0.0
	3	3	-16.52	5.2	0.0
		4	-24.78	5.2	0.0
	4	4	-24.78	5.2	0.0
		5	-33.04	5.2	0.0
	5	5	-33.04	5.2	0.0
		6	-41.30	5.2	0.0
	6	6	-41.30	5.2	0.0
		7	-49.56	5.2	0.0
	7	7	-49.56	5.2	0.0
		8	-57.82	5.2	0.0
	8	8	-57.82	5.2	0.0
		9	-66.08	5.2	0.0
	9	9	-66.08	5.2	0.0
		10	-74.34	5.2	0.0
	10	10	-74.34	5.2	-0.1
		11	-82.60	5.2	-0.1
2	11	11	-82.60	-15.6	-0.3
		12	-46.61	-15.6	-0.3
	12	12	-46.61	-15.6	0.0
		13	-10.62	-15.6	0.0
	13	13	-10.62	-15.6	0.0
		14	25.37	-15.6	0.0
	14	14	25.37	-15.6	0.0
		15	61.36	-15.6	0.0
	15	15	61.36	-15.6	0.0
		16	97.35	-15.6	0.0
	16	16	97.35	-15.6	0.0
		17	133.34	-15.6	0.0
	17	17	133.34	-15.6	0.0
		18	169.32	-15.6	0.0
	18	18	169.32	-15.6	0.0
		19	205.31	-15.6	0.0
	19	19	205.31	-15.6	0.0
		20	241.30	-15.6	0.0
	20	20	241.30	-15.6	0.3
		21	277.29	-15.6	0.3
3	21	21	277.29	17.3	0.5
		22	249.56	17.3	0.5
	22	22	249.56	17.3	0.0
		23	221.83	17.3	0.0
	23	23	686.54	462.2	-2776.8
		24	6.06	386.5	-2810.6
	24	24	6.06	386.5	-2810.6
		25	-543.05	288.1	-2849.1

Esfuerzos unitarios en estructura total debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-543.05	288.1	-2849.1
		26	-922.10	165.4	-2890.2
	26	26	-922.10	165.4	-2890.2
		27	-1087.95	17.3	-2931.2
	27	27	-1087.95	17.3	-2931.2
		28	-1050.17	-76.9	-2955.3
	28	28	-1050.17	-76.9	-2955.3
		29	-858.08	-172.8	-2976.7
	29	29	-858.08	-172.8	-2976.7
		30	-508.70	-269.9	-2995.0
	30	30	-508.63	-350.2	-2986.8
		31	129.52	-448.8	-2999.5

Coeficientes para perdidas de pretensado

Coef. de retraccion del hormigon ..... = 0.00025
Coef. de relajacion del acero ..... = 0.04000
Coef. de fluencia del hormigon ..... = 2.50000

Coef. medio de perdidas elasticas instantaneas ..... = 0.99408
Coef. medio de perdidas diferidas ..... = 0.89545
Coef. medio de perdidas totales ..... = 0.89015

Coef. de ponderacion para pretensado inicial (Pti) ... = 1.10000
Coef. de ponderacion para pretensado final (Ptf) ... = 0.90000

Nota: (*) Resultados de tensiones sin ponderar

Comprobacion de tensiones

Estado 1 Pretensado de 3035. tn Familia 1
Estado 2 Pretensado de 3035. tn Familia 2
Estado 3 Pretensado de 959. tn Familia 1
Estado 4 Pretensado de 959. tn Familia 1

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

Esfuerzos de pretensado Est. Inicial (*coef. perdidas elasticas)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-125.76	430.0	-4922.7
		2	-733.75	332.0	-4900.9
	2	2	-733.85	200.2	-4910.6
		3	-971.48	103.6	-4888.5
	3	3	-971.48	103.6	-4888.5
		4	-1052.76	8.3	-4863.5
	4	4	-1052.76	8.3	-4863.5
		5	-980.64	-85.4	-4835.7
	5	5	-980.64	-85.4	-4835.7
		6	-755.16	-181.6	-4804.1
	6	6	-755.16	-181.6	-4804.1
		7	-376.85	-276.8	-4769.4
	7	7	-376.85	-276.8	-4769.4
		8	150.10	-370.6	-4731.7
	8	8	150.10	-370.6	-4731.7
		9	820.50	-462.7	-4691.0
	9	9	820.50	-462.7	-4691.0
		10	1625.22	-507.5	-4649.2
	10	10	1624.91	-632.3	-4634.3
		11	2281.41	-208.5	-4581.1
2	11	11	2282.63	118.6	-4581.4
		12	1302.40	600.5	-4408.5
	12	12	1301.49	518.0	-4420.8
		13	141.01	464.2	-4398.5
	13	13	141.01	464.2	-4398.5
		14	-815.10	356.2	-4407.4
	14	14	-815.10	356.2	-4407.4
		15	-1519.24	215.3	-4454.2
	15	15	-1519.24	215.3	-4454.2
		16	-1860.92	32.9	-4501.5
	16	16	-1860.92	32.9	-4501.5
		17	-1752.15	-156.0	-4547.2
	17	17	-1752.15	-156.0	-4547.2
		18	-1227.41	-312.0	-4577.2
	18	18	-1227.40	-312.0	-4577.2
		19	-372.43	-432.5	-4597.3
	19	19	-372.43	-432.5	-4597.3
		20	722.54	-490.6	-4620.9
	20	20	721.62	-580.1	-4618.7
		21	1615.59	-53.4	-4785.3
3	21	21	1616.32	146.1	-4796.7
		22	1312.66	308.1	-4831.2
	22	22	1312.86	178.3	-4836.2
		23	719.07	494.5	-4885.7
	23	23	682.48	459.5	-4667.0
		24	6.03	384.2	-4700.6
	24	24	6.03	384.2	-4700.6
		25	-539.84	286.4	-4738.8

Esfuerzos de pretensado Est. Inicial (*coef. perdidas elasticas)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-539.84	286.4	-4738.8
		26	-916.65	164.5	-4779.8
	26	26	-916.64	164.5	-4779.8
		27	-1081.51	17.2	-4820.5
	27	27	-1081.51	17.2	-4820.5
		28	-1043.96	-76.5	-4844.5
	28	28	-1043.96	-76.5	-4844.5
		29	-853.00	-171.7	-4865.7
	29	29	-853.00	-171.7	-4865.7
		30	-505.69	-268.3	-4884.0
	30	30	-505.62	-399.4	-4875.0
		31	210.74	-497.3	-4887.7

Esfuerzos de pretensado Est. Final (*coef. perdidas totales)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-112.61	391.4	-4382.7
		2	-667.15	303.6	-4363.2
	2	2	-667.24	186.2	-4372.1
		3	-891.21	99.8	-4352.3
	3	3	-891.21	99.8	-4352.3
		4	-975.18	14.5	-4329.9
	4	4	-975.18	14.5	-4329.9
		5	-921.79	-69.4	-4305.0
	5	5	-921.79	-69.4	-4305.0
		6	-731.07	-155.6	-4276.8
	6	6	-731.07	-155.6	-4276.8
		7	-403.51	-240.9	-4245.7
	7	7	-403.51	-240.9	-4245.7
		8	57.16	-324.9	-4211.9
	8	8	57.16	-324.9	-4211.9
		9	646.28	-407.3	-4175.5
	9	9	646.28	-407.3	-4175.5
		10	1355.67	-447.5	-4138.0
	10	10	1355.39	-558.5	-4124.9
		11	1930.98	-179.0	-4077.3
2	11	11	1932.08	84.8	-4077.7
		12	1103.67	516.3	-3922.9
	12	12	1102.86	442.9	-3933.5
		13	111.97	394.7	-3913.6
	13	13	111.97	394.7	-3913.6
		14	-695.92	298.0	-3921.5
	14	14	-695.92	298.0	-3921.5
		15	-1278.17	171.8	-3963.4
	15	15	-1278.17	171.8	-3963.4
		16	-1535.86	8.5	-4005.8
	16	16	-1535.86	8.5	-4005.8
		17	-1390.21	-160.7	-4046.7
	17	17	-1390.21	-160.7	-4046.7
		18	-872.07	-300.4	-4073.5
	18	18	-872.07	-300.4	-4073.5
		19	-58.22	-408.3	-4091.6
	19	19	-58.22	-408.3	-4091.6
		20	970.52	-460.3	-4112.7
	20	20	969.70	-540.0	-4110.4
		21	1817.39	-68.4	-4259.5
3	21	21	1818.04	170.4	-4269.0
		22	1482.81	315.5	-4299.9
	22	22	1482.99	199.9	-4305.5
		23	886.88	483.1	-4349.8
	23	23	854.12	451.7	-4154.0
		24	183.44	384.3	-4187.2
	24	24	183.44	384.3	-4187.2
		25	-370.30	296.7	-4224.5

Esfuerzos de pretensado Est. Final (*coef. perdidas totales)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-370.30	296.7	-4224.5
		26	-772.66	187.5	-4264.3
	26	26	-772.66	187.5	-4264.3
		27	-985.23	55.7	-4303.9
	27	27	-985.23	55.7	-4303.9
		28	-1016.56	-28.2	-4328.5
	28	28	-1016.56	-28.2	-4328.5
		29	-910.52	-113.5	-4350.7
	29	29	-910.52	-113.5	-4350.7
		30	-664.47	-200.0	-4370.2
	30	30	-664.42	-317.4	-4363.3
		31	-87.91	-405.0	-4377.8

Tensiones en Construccion (kg/cm2) Estado 1

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
1	1	-28.	-33.	-30.	-36.	0.	0.	-30.	-36.
	2	-24.	-56.	-26.	-62.	-4.	5.	-30.	-56.
	3	-20.	-62.	-22.	-68.	-6.	9.	-28.	-59.
	4	-18.	-64.	-20.	-70.	-7.	10.	-27.	-60.
	5	-19.	-61.	-21.	-68.	-6.	9.	-28.	-59.
	6	-23.	-55.	-26.	-61.	-4.	5.	-30.	-55.
	7	-30.	-45.	-33.	-49.	0.	0.	-33.	-49.
	8	-40.	-31.	-44.	-34.	5.	-8.	-39.	-41.
	9	-52.	-13.	-57.	-14.	12.	-17.	-45.	-31.
	10	-67.	9.	-73.	9.	21.	-29.	-53.	-20.
	11	-70.	26.	-77.	28.	25.	-32.	-52.	-4.
2	11	-70.	26.	-77.	28.	25.	-32.	-52.	-4.
	12	-59.	1.	-64.	1.	14.	-19.	-51.	-18.
	13	-36.	-30.	-40.	-33.	0.	0.	-40.	-32.
	14	-18.	-55.	-20.	-61.	-11.	15.	-31.	-45.
	15	-5.	-75.	-5.	-82.	-19.	26.	-24.	-56.
	16	2.	-85.	2.	-93.	-23.	32.	-21.	-61.
	17	0.	-83.	0.	-92.	-24.	34.	-24.	-58.
	18	-9.	-71.	-10.	-78.	-22.	31.	-32.	-47.
	19	-24.	-50.	-27.	-55.	-17.	24.	-44.	-31.
	20	-44.	-23.	-49.	-25.	-9.	12.	-57.	-13.
	21	-53.	1.	-58.	1.	1.	-1.	-57.	0.
3	21	-53.	1.	-58.	1.	1.	-1.	-57.	0.
	22	-57.	-9.	-62.	-10.	1.	-1.	-61.	-11.
	23A	-46.	-24.	-51.	-27.	0.	0.	-51.	-27.

Tensiones en Construccion (kg/cm2) Estado 2

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
1	1	-28.	-33.	-30.	-36.	0.	0.	-30.	-36.
	2	-24.	-56.	-26.	-62.	-4.	6.	-30.	-56.
	3	-19.	-62.	-21.	-69.	-7.	9.	-28.	-59.
	4	-18.	-64.	-19.	-71.	-8.	11.	-27.	-60.
	5	-19.	-62.	-21.	-68.	-7.	10.	-28.	-59.
	6	-23.	-56.	-25.	-62.	-5.	7.	-30.	-55.
	7	-29.	-46.	-32.	-51.	-1.	2.	-34.	-49.
	8	-39.	-32.	-43.	-35.	4.	-5.	-39.	-41.
	9	-51.	-15.	-56.	-16.	11.	-15.	-46.	-31.
	10	-65.	7.	-72.	7.	19.	-26.	-53.	-19.
	11	-68.	24.	-75.	26.	23.	-29.	-52.	-3.
2	11	-68.	24.	-75.	26.	23.	-29.	-52.	-3.
	12	-58.	0.	-63.	0.	12.	-17.	-51.	-17.
	13	-36.	-30.	-40.	-33.	-1.	1.	-40.	-32.
	14	-19.	-55.	-20.	-60.	-10.	14.	-31.	-46.
	15	-6.	-73.	-7.	-81.	-17.	24.	-23.	-57.
	16	0.	-82.	0.	-91.	-20.	28.	-20.	-62.
	17	-2.	-80.	-3.	-88.	-20.	29.	-23.	-59.
	18	-12.	-67.	-13.	-73.	-17.	24.	-31.	-49.
	19	-28.	-45.	-31.	-49.	-11.	16.	-42.	-33.
	20	-49.	-17.	-53.	-18.	-2.	3.	-55.	-16.
	21	-58.	8.	-63.	8.	7.	-9.	-57.	0.
3	21	-58.	8.	-63.	8.	7.	-9.	-57.	0.
	22	-61.	-3.	-67.	-3.	3.	-4.	-65.	-7.
	23	-49.	-18.	-54.	-20.	-4.	5.	-58.	-15.
	24	-36.	-36.	-40.	-39.	-9.	12.	-48.	-27.
	25	-26.	-50.	-29.	-55.	-12.	17.	-41.	-38.
	26	-20.	-60.	-21.	-66.	-14.	20.	-35.	-47.
	27	-17.	-65.	-18.	-71.	-14.	20.	-33.	-51.
	28	-18.	-64.	-19.	-70.	-13.	18.	-32.	-52.
	29	-21.	-59.	-24.	-65.	-10.	14.	-34.	-51.
	30	-28.	-50.	-31.	-55.	-6.	8.	-37.	-47.
	31	-33.	-25.	-37.	-27.	0.	0.	-37.	-27.

Tensiones en Servicio (kg/cm2) Estado inicial

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pi+Pti F.Sup	Pi+Pti F.Inf	Pi+Pti+M F.Sup	Pi+Pti+M F.Inf	Pi+Pti+M+Sp F.Sup	Pi+Pti+M+Sp F.Inf	Pi+Pti+M+Sn F.Sup	Pi+Pti+M+Sn F.Inf
1	1	-28.	-33.	-30.	-36.	-30.	-36.	-30.	-36.	-30.	-36.
	2	-24.	-56.	-30.	-56.	-32.	-54.	-41.	-42.	-30.	-57.
	3	-19.	-62.	-28.	-59.	-31.	-56.	-46.	-34.	-26.	-62.
	4	-18.	-64.	-27.	-60.	-30.	-56.	-49.	-29.	-24.	-64.
	5	-19.	-62.	-28.	-58.	-31.	-54.	-52.	-25.	-23.	-65.
	6	-23.	-56.	-30.	-55.	-33.	-51.	-54.	-22.	-23.	-64.
	7	-29.	-46.	-34.	-49.	-35.	-47.	-57.	-17.	-23.	-64.
	8	-39.	-32.	-39.	-41.	-39.	-41.	-58.	-14.	-24.	-62.
	9	-51.	-15.	-45.	-31.	-43.	-34.	-59.	-12.	-25.	-59.
	10	-65.	7.	-53.	-19.	-48.	-27.	-61.	-9.	-26.	-58.
	11	-68.	24.	-52.	-3.	-45.	-12.	-58.	5.	-18.	-47.
2	11	-68.	24.	-52.	-3.	-45.	-12.	-58.	5.	-18.	-47.
	12	-58.	0.	-51.	-17.	-47.	-23.	-60.	-4.	-34.	-42.
	13	-36.	-30.	-40.	-32.	-41.	-32.	-61.	-3.	-33.	-43.
	14	-19.	-55.	-31.	-46.	-34.	-41.	-62.	-1.	-28.	-50.
	15	-6.	-73.	-23.	-57.	-28.	-50.	-61.	-4.	-24.	-56.
	16	0.	-82.	-20.	-62.	-26.	-55.	-59.	-8.	-22.	-60.
	17	-2.	-80.	-23.	-59.	-28.	-52.	-61.	-7.	-23.	-59.
	18	-12.	-67.	-31.	-49.	-34.	-44.	-63.	-4.	-28.	-53.
	19	-28.	-45.	42.	-33.	-43.	-33.	-63.	-5.	-35.	-44.
	20	-49.	-17.	-55.	-16.	-52.	-21.	-65.	-3.	-38.	-40.
	21	-58.	8.	-57.	0.	-50.	-9.	-63.	8.	-23.	-44.
3	21	-58.	8.	-57.	0.	-50.	-9.	-63.	8.	-23.	-44.
	22	-61.	-3.	-65.	-7.	-59.	-15.	-72.	3.	-37.	-45.
	23AI	-51.	-19.	-59.	-15.	-57.	-19.	-73.	3.	-39.	-44.
	23AD	-48.	-18.	-57.	-14.	-54.	-18.	-70.	4.	-37.	-43.
	24	-36.	-36.	-48.	-27.	-48.	-27.	-68.	0.	-33.	-48.
	25	-26.	-50.	-41.	-38.	-42.	-36.	-64.	-6.	-30.	-53.
	26	-20.	-60.	-36.	-47.	-38.	-43.	-59.	-13.	-29.	-56.
	27	-17.	-65.	-33.	-51.	-36.	-47.	-57.	-17.	-28.	-58.
	28	-18.	-64.	-33.	-52.	-36.	-48.	-55.	-21.	-29.	-56.
	29	-21.	-59.	-34.	-51.	-36.	-47.	-52.	-26.	-32.	-53.
	30	-28.	-50.	-37.	-47.	-38.	-45.	-47.	-32.	-36.	-48.
	31	-33.	-25.	-37.	-27.	-37.	-27.	-37.	-27.	-37.	-27.

Tensiones en Servicio (kg/cm2) Estado final

V.	Sec	Ptf (*) F.Sup	Ptf (*) F.Inf	Pf+Ptf+M F.Sup	Pf+Ptf+M F.Inf	Pf+Ptf+M+Sp F.Sup	Pf+Ptf+M+Sp F.Inf	Pf+Ptf+M+Sn F.Sup	Pf+Ptf+M+Sn F.Inf
1	1	-25.	-29.	-22.	-26.	-22.	-26.	-22.	-26.
	2	-21.	-51.	-25.	-37.	-35.	-24.	-22.	-41.
	3	-17.	-56.	-25.	-36.	-42.	-13.	-19.	-44.
	4	-15.	-58.	-26.	-36.	-47.	-6.	-17.	-47.
	5	-16.	-57.	-26.	-35.	-50.	-1.	-15.	-49.
	6	-19.	-52.	-27.	-33.	-51.	1.	-14.	-51.
	7	-25.	-43.	-27.	-32.	-53.	4.	-12.	-54.
	8	-33.	-31.	-28.	-30.	-53.	4.	-9.	-57.
	9	-44.	-15.	-29.	-28.	-50.	2.	-6.	-60.
	10	-57.	4.	-30.	-26.	-49.	0.	-2.	-65.
	11	-59.	19.	-26.	-17.	-46.	7.	7.	-59.
2	11	-59.	19.	-26.	-17.	-46.	8.	7.	-59.
	12	-50.	-1.	-31.	-21.	-50.	5.	-12.	-48.
	13	-32.	-27.	-30.	-22.	-54.	11.	-18.	-39.
	14	-17.	-48.	-28.	-26.	-59.	18.	-19.	-38.
	15	-7.	-63.	-25.	-30.	-60.	18.	-18.	-40.
	16	-2.	-70.	-23.	-33.	-58.	16.	-17.	-42.
	17	-5.	-67.	-24.	-33.	-59.	16.	-17.	-42.
	18	-15.	-54.	-26.	-30.	-58.	14.	-17.	-43.
	19	-30.	-33.	-29.	-26.	-53.	7.	-18.	-43.
	20	-49.	-6.	-32.	-24.	-50.	2.	-13.	-50.
	21	-58.	15.	-27.	-19.	-46.	6.	6.	-61.
3	21	-58.	15.	-27.	-19.	-46.	6.	6.	-61.
	22	-60.	6.	-35.	-22.	-53.	4.	-7.	-61.
	23AI	-50.	-10.	-36.	-22.	-57.	8.	-13.	-54.
	23AD	-47.	-10.	-34.	-21.	-55.	8.	-11.	-53.
	24	-35.	-27.	-31.	-25.	-56.	9.	-12.	-52.
	25	-25.	-42.	-29.	-29.	-54.	6.	-13.	-51.
	26	-18.	-53.	-27.	-33.	-51.	1.	-14.	-51.
	27	-15.	-58.	-26.	-35.	-49.	-2.	-15.	-50.
	28	-14.	-59.	-25.	-36.	-46.	-6.	-17.	-48.
	29	-16.	-57.	-25.	-36.	-42.	-13.	-19.	-44.
	30	-21.	-50.	-25.	-37.	-35.	-23.	-22.	-41.
	31	-25.	-29.	-23.	-26.	-23.	-26.	-23.	-26.

Resumen de tracciones maximas en Construccion (kg/cm2)

Seccion 21 T = 0. Estado 1 F.Inf. Hipot. Pi+Pti

Resumen de compresiones maximas en Construccion (kg/cm2)

Seccion	22	T =	-65. Estado	2	F.Sup. Hipot. Pi+Pti
Seccion	16	T =	-62. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	4	T =	-60. Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	3	T =	-59. Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	17	T =	-59. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	5	T =	-59. Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	23	T =	-58. Estado	2	F.Sup. Hipot. Pi+Pti
Seccion	21	T =	-57. Estado	1	F.Sup. Hipot. Pi+Pti
Seccion	20	T =	-57. Estado	1	F.Sup. Hipot. Pi+Pti
Seccion	15	T =	-57. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	2	T =	-56. Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	6	T =	-55. Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	10	T =	-53. Estado	2	F.Sup. Hipot. Pi+Pti
Seccion	28	T =	-52. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	11	T =	-52. Estado	2	F.Sup. Hipot. Pi+Pti
Seccion	27	T =	-51. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	12	T =	-51. Estado	2	F.Sup. Hipot. Pi+Pti
Seccion	29	T =	-51. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	7	T =	-49. Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	18	T =	-49. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	24	T =	-48. Estado	2	F.Sup. Hipot. Pi+Pti

Resumen de tracciones maximas en Servicio (kg/cm2)

Seccion	15	T =	18.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	14	T =	18.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	16	T =	16.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	17	T =	16.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	18	T =	14.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	13	T =	11.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	24	T =	9.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	23	T =	8.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	21	T =	8.	Estado inicial	F.Inf.	Hipot. Pi+Pti+M+Sp
Seccion	11	T =	8.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	19	T =	7.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	25	T =	6.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	12	T =	5.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	8	T =	4.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	7	T =	4.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	22	T =	4.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	20	T =	2.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	9	T =	2.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	26	T =	1.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	6	T =	1.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	10	T =	0.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp

Resumen de compresiones maximas en Servicio (kg/cm2)

Seccion	23	T =	-73.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	22	T =	-72.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	24	T =	-68.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	5	T =	-65.	Estado inicial	F.Inf.	Hipot. Pi+Pti+M+Sn
Seccion	10	T =	-65.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sn
Seccion	20	T =	-65.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	4	T =	-64.	Estado inicial	F.Inf.	Hipot. Pi+Pti+M+Sn
Seccion	6	T =	-64.	Estado inicial	F.Inf.	Hipot. Pi+Pti+M+Sn
Seccion	25	T =	-64.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	7	T =	-64.	Estado inicial	F.Inf.	Hipot. Pi+Pti+M+Sn
Seccion	21	T =	-63.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	19	T =	-63.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	18	T =	-63.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	14	T =	-62.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	8	T =	-62.	Estado inicial	F.Inf.	Hipot. Pi+Pti+M+Sn
Seccion	3	T =	-62.	Estado inicial	F.Inf.	Hipot. Pi+Pti+M+Sn
Seccion	15	T =	-61.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	13	T =	-61.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	17	T =	-61.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	12	T =	-60.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	16	T =	-60.	Estado inicial	F.Inf.	Hipot. Pi+Pti+M+Sn

COMPROBACION DE FISURACION POR TENSIONES NORMALES

CONTROL TENSIONES LONGITUDINALES
COMBINACION CASI PERMANENTE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

											0.50		0.50		0.30		0.00									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-22	-26	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	-20	-24	-24	-28
2	-25	-37	1	1	-1	2	1	1	1	1	-6	9	2	-3	1	1	0	0	0	0	0	0	-22	-31	-30	-41
3	-25	-36	1	2	-2	3	1	1	1	1	-11	16	4	-5	1	1	0	0	0	0	0	0	-21	-26	-32	-41
4	-26	-36	2	3	-3	5	1	1	1	1	-14	20	5	-8	1	1	0	0	0	0	0	0	-21	-23	-36	-43
5	-26	-35	3	4	-4	6	1	1	1	1	-16	22	7	-10	1	1	0	0	0	0	0	0	-19	-20	-38	-44
6	-27	-33	3	5	-6	8	1	1	1	1	-16	22	9	-13	1	1	0	0	0	0	0	0	-20	-16	-40	-44
7	-27	-32	4	5	-7	9	1	1	1	1	-14	19	11	-16	1	1	0	0	0	0	0	0	-18	-15	-41	-44
8	-28	-30	5	6	-8	11	1	1	1	1	-11	15	13	-19	1	1	0	0	0	0	0	0	-17	-12	-42	-44
9	-29	-28	5	7	-9	12	1	1	1	1	-6	8	16	-22	1	1	0	0	0	0	0	0	-17	-11	-42	-43
10	-30	-26	6	8	-10	14	1	1	1	1	-3	3	18	-26	1	1	0	0	0	0	0	0	-17	-8	-44	-44
11	-26	-17	6	8	-11	14	1	1	1	1	-2	3	22	-28	1	1	0	0	0	0	0	0	-12	1	-40	-35
11	-26	-17	6	8	-11	14	1	1	1	1	-3	3	22	-28	1	1	0	0	0	0	0	0	-11	1	-40	-35
12	-31	-21	5	7	-11	16	1	1	1	1	-2	2	11	-16	1	1	0	0	0	0	0	0	-21	-4	-44	-35
13	-30	-22	4	5	-11	16	1	1	1	1	-8	11	7	-10	1	1	0	0	0	0	0	0	-22	-4	-44	-32
14	-28	-26	3	4	-11	16	1	1	1	1	-16	22	5	-7	1	1	0	0	0	0	0	0	-22	-6	-43	-34
15	-25	-30	2	3	-11	16	1	1	1	1	-21	28	4	-6	1	1	0	0	0	0	0	0	-20	-9	-41	-37
16	-23	-33	2	3	-11	16	1	1	1	1	-22	30	4	-6	1	1	0	0	0	0	0	0	-18	-11	-39	-40
17	-24	-33	2	3	-11	16	1	1	1	1	-20	29	5	-6	1	1	0	0	0	0	0	0	-19	-12	-39	-40
18	-26	-30	3	4	-11	16	1	1	1	1	-16	22	5	-8	1	1	0	0	0	0	0	0	-20	-10	-41	-38
19	-29	-26	4	5	-11	16	1	1	1	1	-7	17	7	-9	1	1	0	0	0	0	0	0	-21	-6	-42	-36
20	-32	-24	5	7	-11	16	1	1	1	1	-1	2	12	-17	1	1	0	0	0	0	0	0	-22	-7	-45	-38
21	-27	-19	6	8	-11	14	1	1	1	1	-3	3	21	-28	1	1	0	0	0	0	0	0	-13	-1	-41	-37
21	-27	-19	6	8	-11	14	1	1	0	0	-3	3	22	-28	0	0	0	0	0	0	0	0	-14	-2	-40	-36
22	-35	-22	6	8	-10	14	1	1	0	0	-3	4	18	-25	0	0	0	0	0	0	0	0	-23	-5	-47	-38
23	-36	-22	5	7	-10	12	1	1	0	0	-6	9	16	-21	0	0	0	0	0	0	0	0	-26	-6	-48	-36
23	-34	-21	5	7	-9	12	1	1	0	0	-7	8	15	-22	0	0	0	0	0	0	0	0	-24	-5	-46	-35
24	-31	-25	5	6	-8	11	1	1	0	0	-11	15	13	-19	0	0	0	0	0	0	0	0	-22	-9	-44	-37
25	-29	-29	4	5	-7	9	1	1	0	0	-14	20	11	-15	0	0	0	0	0	0	0	0	-21	-13	-41	-39
26	-27	-33	5	5	-6	8	1	1	0	0	-15	22	10	-13	0	0	0	0	0	0	0	0	-19	-17	-40	-42
27	-26	-35	4	4	-4	6	1	1	0	0	-15	22	8	-10	0	0	0	0	0	0	0	0	-19	-21	-37	-43
28	-25	-36	3	3	-3	5	1	1	0	0	-14	21	6	-8	0	0	0	0	0	0	0	0	-20	-24	-35	-42
29	-25	-36	2	2	-2	3	1	1	0	0	-11	16	4	-5	0	0	0	0	0	0	0	0	-21	-27	-33	-40
30	-25	-37	1	1	-1	2	1	1	6	6	-6	9	2	-2	0	0	0	0	0	0	0	0	-17	-26	-36	-45
31	-23	-26	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	-19	-22	-29	-30

CONTROL TENSIONES LONGITUDINALES
COMBINACION FRECUENTE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

											0.50		0.50				0.60						0.00							
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75												SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN								SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI							FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-22	-26	0	0	0	0	1	1	1	1	0	0	0	0	1	1							0	0	0	0	0	0	-20	-24	-24	-28
2	-25	-37	1	1	-1	2	1	1	1	1	-6	9	2	-3	1	1							0	0	0	0	0	0	-21	-28	-32	-42
3	-25	-36	1	2	-2	3	1	1	1	1	-11	16	4	-5	1	1							0	0	0	0	0	0	-20	-21	-36	-43
4	-26	-36	2	3	-3	5	1	1	1	1	-14	20	5	-8	1	1							0	0	0	0	0	0	-19	-16	-40	-46
5	-26	-35	3	4	-4	6	1	1	1	1	-16	22	7	-10	1	1							0	0	0	0	0	0	-17	-13	-43	-47
6	-27	-33	3	5	-6	8	1	1	1	1	-16	22	9	-13	1	1							0	0	0	0	0	0	-17	-9	-45	-48
7	-27	-32	4	5	-7	9	1	1	1	1	-14	19	11	-16	1	1							0	0	0	0	0	0	-14	-9	-45	-49
8	-28	-30	5	6	-8	11	1	1	1	1	-11	15	13	-19	1	1							0	0	0	0	0	0	-13	-7	-46	-50
9	-29	-28	5	7	-9	12	1	1	1	1	-6	8	16	-22	1	1							0	0	0	0	0	0	-12	-8	-44	-50
10	-30	-26	6	8	-10	14	1	1	1	1	-3	3	18	-26	1	1							0	0	0	0	0	0	-11	-7	-45	-52
11	-26	-17	6	8	-11	14	1	1	1	1	-2	3	22	-28	1	1							0	0	0	0	0	0	-5	2	-41	-44
11	-26	-17	6	8	-11	14	1	1	1	1	-3	3	22	-28	1	1							0	0	0	0	0	0	-5	2	-42	-44
12	-31	-21	5	7	-11	16	1	1	1	1	-2	2	11	-16	1	1							0	0	0	0	0	0	-17	-3	-45	-40
13	-30	-22	4	5	-11	16	1	1	1	1	-8	11	7	-10	1	1							0	0	0	0	0	0	-20	0	-46	-35
14	-28	-26	3	4	-11	16	1	1	1	1	-16	22	5	-7	1	1							0	0	0	0	0	0	-20	1	-48	-36
15	-25	-30	2	3	-11	16	1	1	1	1	-21	28	4	-6	1	1							0	0	0	0	0	0	-19	0	-47	-39
16	-23	-33	2	3	-11	16	1	1	1	1	-22	30	4	-6	1	1							0	0	0	0	0	0	-17	-2	-46	-42
17	-24	-33	2	3	-11	16	1	1	1	1	-20	29	5	-6	1	1							0	0	0	0	0	0	-17	-3	-46	-42
18	-26	-30	3	4	-11	16	1	1	1	1	-16	22	5	-8	1	1							0	0	0	0	0	0	-18	-3	-46	-41
19	-29	-26	4	5	-11	16	1	1	1	1	-7	17	7	-9	1	1							0	0	0	0	0	0	-19	-1	-45	-39
20	-32	-24	5	7	-11	16	1	1	1	1	-1	2	12	-17	1	1							0	0	0	0	0	0	-18	-6	-45	-43
21	-27	-19	6	8	-11	14	1	1	1	1	-3	3	21	-28	1	1							0	0	0	0	0	0	-6	0	-42	-46
21	-27	-19	6	8	-11	14	1	1	0	0	-3	3	22	-28	0	0							0	0	0	0	0	0	-7	-2	-41	-44
22	-35	-22	6	8	-10	14	1	1	0	0	-3	4	18	-25	0	0							0	0	0	0	0	0	-18	-4	-48	-46
23	-36	-22	5	7	-10	12	1	1	0	0	-6	9	16	-21	0	0							0	0	0	0	0	0	-21	-3	-50	-42
23	-34	-21	5	7	-9	12	1	1	0	0	-7	8	15	-22	0	0							0	0	0	0	0	0	-20	-3	-48	-42
24	-31	-25	5	6	-8	11	1	1	0	0	-11	15	13	-19	0	0							0	0	0	0	0	0	-18	-4	-47	-43
25	-29	-29	4	5	-7	9	1	1	0	0	-14	20	11	-15	0	0							0	0	0	0	0	0	-18	-7	-45	-44
26	-27	-33	5	5	-6	8	1	1	0	0	-15	22	10	-13	0	0							0	0	0	0	0	0	-16	-10	-45	-46
27	-26	-35	4	4	-4	6	1	1	0	0	-15	22	8	-10	0	0							0	0	0	0	0	0	-17	-14	-42	-46
28	-25	-36	3	3	-3	5	1	1	0	0	-14	21	6	-8	0	0							0	0	0	0	0	0	-18	-17	-38	-44
29	-25	-36	2	2	-2	3	1	1	0	0	-11	16	4	-5	0	0							0	0	0	0	0	0	-20	-22	-35	-42
30	-25	-37	1	1	-1	2	1	1	6	6	-6	9	2	-2	0	0							0	0	0	0	0	0	-17	-24	-36	-45
31	-23	-26	0	0	0	0	1	1	3	3	0	0	0	0	0	0							0	0	0	0	0	0	-19	-22	-27	-30

CONTROL TENSIONES LONGITUDINALES
COMBINACION POCO PROBABLE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
					0.60		0.60				1.00						0.00									
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-22	-26	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	-19	-23	-25	-29
2	-25	-37	1	1	-1	2	1	1	1	1	-6	9	2	-3	1	1	0	0	0	0	0	0	-19	-23	-35	-44
3	-25	-36	1	2	-2	3	1	1	1	1	-11	16	4	-5	1	1	0	0	0	0	0	0	-17	-14	-41	-46
4	-26	-36	2	3	-3	5	1	1	1	1	-14	20	5	-8	1	1	0	0	0	0	0	0	-16	-7	-46	-50
5	-26	-35	3	4	-4	6	1	1	1	1	-16	22	7	-10	1	1	0	0	0	0	0	0	-13	-3	-50	-52
6	-27	-33	3	5	-6	8	1	1	1	1	-16	22	9	-13	1	1	0	0	0	0	0	0	-12	1	-52	-54
7	-27	-32	4	5	-7	9	1	1	1	1	-14	19	11	-16	1	1	0	0	0	0	0	0	-9	0	-52	-56
8	-28	-30	5	6	-8	11	1	1	1	1	-11	15	13	-19	1	1	0	0	0	0	0	0	-7	0	-51	-58
9	-29	-28	5	7	-9	12	1	1	1	1	-6	8	16	-22	1	1	0	0	0	0	0	0	-5	-3	-48	-60
10	-30	-26	6	8	-10	14	1	1	1	1	-3	3	18	-26	1	1	0	0	0	0	0	0	-3	-4	-48	-63
11	-26	-17	6	8	-11	14	1	1	1	1	-2	3	22	-28	1	1	0	0	0	0	0	0	5	5	-43	-56
11	-26	-17	6	8	-11	14	1	1	1	1	-3	3	22	-28	1	1	0	0	0	0	0	0	5	5	-44	-56
12	-31	-21	5	7	-11	16	1	1	1	1	-2	2	11	-16	1	1	0	0	0	0	0	0	-12	0	-47	-47
13	-30	-22	4	5	-11	16	1	1	1	1	-8	11	7	-10	1	1	0	0	0	0	0	0	-16	6	-51	-40
14	-28	-26	3	4	-11	16	1	1	1	1	-16	22	5	-7	1	1	0	0	0	0	0	0	-17	12	-56	-40
15	-25	-30	2	3	-11	16	1	1	1	1	-21	28	4	-6	1	1	0	0	0	0	0	0	-16	13	-57	-42
16	-23	-33	2	3	-11	16	1	1	1	1	-22	30	4	-6	1	1	0	0	0	0	0	0	-14	12	-56	-45
17	-24	-33	2	3	-11	16	1	1	1	1	-20	29	5	-6	1	1	0	0	0	0	0	0	-14	11	-55	-45
18	-26	-30	3	4	-11	16	1	1	1	1	-16	22	5	-8	1	1	0	0	0	0	0	0	-15	8	-54	-45
19	-29	-26	4	5	-11	16	1	1	1	1	-7	17	7	-9	1	1	0	0	0	0	0	0	-15	8	-49	-43
20	-32	-24	5	7	-11	16	1	1	1	1	-1	2	12	-17	1	1	0	0	0	0	0	0	-12	-3	-47	-51
21	-27	-19	6	8	-11	14	1	1	1	1	-3	3	21	-28	1	1	0	0	0	0	0	0	3	3	-45	-58
1	-27	-19	6	8	-11	14	1	1	0	0	-3	3	22	-28	0	0	0	0	0	0	0	0	2	1	-43	-56
22	-35	-22	6	8	-10	14	1	1	0	0	-3	4	18	-25	0	0	0	0	0	0	0	0	-10	-1	-51	-56
23	-36	-22	5	7	-10	12	1	1	0	0	-6	9	16	-21	0	0	0	0	0	0	0	0	-14	2	-54	-51
23	-34	-21	5	7	-9	12	1	1	0	0	-7	8	15	-22	0	0	0	0	0	0	0	0	-13	2	-52	-51
24	-31	-25	5	6	-8	11	1	1	0	0	-11	15	13	-19	0	0	0	0	0	0	0	0	-12	3	-52	-51
25	-29	-29	4	5	-7	9	1	1	0	0	-14	20	11	-15	0	0	0	0	0	0	0	0	-13	2	-52	-50
26	-27	-33	5	5	-6	8	1	1	0	0	-15	22	10	-13	0	0	0	0	0	0	0	0	-11	-1	-51	-52
27	-26	-35	4	4	-4	6	1	1	0	0	-15	22	8	-10	0	0	0	0	0	0	0	0	-13	-5	-48	-50
28	-25	-36	3	3	-3	5	1	1	0	0	-14	21	6	-8	0	0	0	0	0	0	0	0	-15	-8	-44	-48
29	-25	-36	2	2	-2	3	1	1	0	0	-11	16	4	-5	0	0	0	0	0	0	0	0	-18	-16	-40	-44
30	-25	-37	1	1	-1	2	1	1	6	6	-6	9	2	-2	0	0	0	0	0	0	0	0	-16	-20	-39	-46
31	-23	-26	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	-19	-22	-27	-30

CONTROL TENSIONES LONGITUDINALES
COMBINACION CASI PERMANENTE UIC
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
					0.50		0.50				0.00						0.30									
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-22	-26	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	-20	-24	-24	-28
2	-25	-37	1	1	-1	2	1	1	1	1	-6	9	2	-3	1	1	0	0	0	0	0	0	-23	-34	-28	-40
3	-25	-36	1	2	-2	3	1	1	1	1	-11	16	4	-5	1	1	0	0	0	0	0	0	-23	-31	-29	-40
4	-26	-36	2	3	-3	5	1	1	1	1	-14	20	5	-8	1	1	0	0	0	0	0	0	-23	-29	-31	-41
5	-26	-35	3	4	-4	6	1	1	1	1	-16	22	7	-10	1	1	0	0	0	0	0	0	-22	-27	-33	-41
6	-27	-33	3	5	-6	8	1	1	1	1	-16	22	9	-13	1	1	0	0	0	0	0	0	-23	-23	-35	-40
7	-27	-32	4	5	-7	9	1	1	1	1	-14	19	11	-16	1	1	0	0	0	0	0	0	-22	-21	-36	-39
8	-28	-30	5	6	-8	11	1	1	1	1	-11	15	13	-19	1	1	0	0	0	0	0	0	-22	-17	-39	-38
9	-29	-28	5	7	-9	12	1	1	1	1	-6	8	16	-22	1	1	0	0	0	0	0	0	-23	-14	-40	-37
10	-30	-26	6	8	-10	14	1	1	1	1	-3	3	18	-26	1	1	0	0	0	0	0	0	-23	-10	-43	-36
11	-26	-17	6	8	-11	14	1	1	1	1	2	3	22	-28	1	1	0	0	0	0	0	0	-19	-1	-39	-27
11	-26	-17	6	8	-11	14	1	1	1	1	-3	3	22	-28	1	1	0	0	0	0	0	0	-18	0	-39	-27
12	-31	-21	5	7	-11	16	1	1	1	1	-2	2	11	-16	1	1	0	0	0	0	0	0	-25	-5	-43	-30
13	-30	-22	4	5	-11	16	1	1	1	1	-8	11	7	-10	1	1	0	0	0	0	0	0	-25	-8	-41	-29
14	-28	-26	3	4	-11	16	1	1	1	1	-16	22	5	-7	1	1	0	0	0	0	0	0	-24	-13	-38	-32
15	-25	-30	2	3	-11	16	1	1	1	1	-21	28	4	-6	1	1	0	0	0	0	0	0	-22	-18	-34	-35
16	-23	-33	2	3	-11	16	1	1	1	1	-22	30	4	-6	1	1	0	0	0	0	0	0	-20	-21	-32	-38
17	-24	-33	2	3	-11	16	1	1	1	1	-20	29	5	-6	1	1	0	0	0	0	0	0	-21	-21	-33	-38
18	-26	-30	3	4	-11	16	1	1	1	1	-16	22	5	-8	1	1	0	0	0	0	0	0	-22	-17	-36	-36
19	-29	-26	4	5	-11	16	1	1	1	1	-7	17	7	-9	1	1	0	0	0	0	0	0	-24	-12	-40	-33
20	-32	-24	5	7	-11	16	1	1	1	1	-1	2	12	-17	1	1	0	0	0	0	0	0	-26	-8	-44	-33
21	-27	-19	6	8	-11	14	1	1	1	1	-3	3	21	-28	1	1	0	0	0	0	0	0	-20	-3	-40	-29
21	-27	-19	6	8	-11	14	1	1	0	0	-3	3	22	-28	0	0	0	0	0	0	0	0	-20	-3	-39	-28
22	-35	-22	6	8	-10	14	1	1	0	0	-3	4	18	-25	0	0	0	0	0	0	0	0	-29	-7	-47	-31
23	-36	-22	5	7	-10	12	1	1	0	0	-6	9	16	-21	0	0	0	0	0	0	0	0	-31	-9	-47	-30
23	-34	-21	5	7	-9	12	1	1	0	0	-7	8	15	-22	0	0	0	0	0	0	0	0	-29	-8	-44	-29
24	-31	-25	5	6	-8	11	1	1	0	0	-11	15	13	-19	0	0	0	0	0	0	0	0	-26	-13	-41	-32
25	-29	-29	4	5	-7	9	1	1	0	0	-14	20	11	-15	0	0	0	0	0	0	0	0	-25	-19	-37	-35
26	-27	-33	5	5	-6	8	1	1	0	0	-15	22	10	-13	0	0	0	0	0	0	0	0	-22	-24	-36	-39
27	-26	-35	4	4	-4	6	1	1	0	0	-15	22	8	-10	0	0	0	0	0	0	0	0	-22	-28	-33	-40
28	-25	-36	3	3	-3	5	1	1	0	0	-14	21	6	-8	0	0	0	0	0	0	0	0	-22	-30	-30	-40
29	-25	-36	2	2	-2	3	1	1	0	0	-11	16	4	-5	0	0	0	0	0	0	0	0	-23	-32	-29	-39
30	-25	-37	1	1	-1	2	1	1	6	6	-6	9	2	-2	0	0	0	0	0	0	0	0	-18	-29	-33	-44
31	-23	-26	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	-19	-22	-27	-30

CONTROL TENSIONES LONGITUDINALES
COMBINACION FRECUENTE UIC
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.00						0.60											
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-22	-26	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	-20	-24	-24	-28
2	-25	-37	1	1	-1	2	1	1	1	1	-6	9	2	-3	1	1	0	0	0	0	0	0	-23	-34	-28	-40
3	-25	-36	1	2	-2	3	1	1	1	1	-11	16	4	-5	1	1	0	0	0	0	0	0	-23	-31	-29	-40
4	-26	-36	2	3	-3	5	1	1	1	1	-14	20	5	-8	1	1	0	0	0	0	0	0	-23	-29	-31	-41
5	-26	-35	3	4	-4	6	1	1	1	1	-16	22	7	-10	1	1	0	0	0	0	0	0	-22	-27	-33	-41
6	-27	-33	3	5	-6	8	1	1	1	1	-16	22	9	-13	1	1	0	0	0	0	0	0	-23	-23	-35	-40
7	-27	-32	4	5	-7	9	1	1	1	1	-14	19	11	-16	1	1	0	0	0	0	0	0	-22	-21	-36	-39
8	-28	-30	5	6	-8	11	1	1	1	1	-11	15	13	-19	1	1	0	0	0	0	0	0	-22	-17	-39	-38
9	-29	-28	5	7	-9	12	1	1	1	1	-6	8	16	-22	1	1	0	0	0	0	0	0	-23	-14	-40	-37
10	-30	-26	6	8	-10	14	1	1	1	1	-3	3	18	-26	1	1	0	0	0	0	0	0	-23	-10	-43	-36
11	-26	-17	6	8	-11	14	1	1	1	1	-2	3	22	-28	1	1	0	0	0	0	0	0	-19	-1	-39	-27
11	-26	-17	6	8	-11	14	1	1	1	1	-3	3	22	-28	1	1	0	0	0	0	0	0	-18	0	-39	-27
12	-31	-21	5	7	-11	16	1	1	1	1	-2	2	11	-16	1	1	0	0	0	0	0	0	-25	-5	-43	-30
13	-30	-22	4	5	-11	16	1	1	1	1	-8	11	7	-10	1	1	0	0	0	0	0	0	-25	-8	-41	-29
14	-28	-26	3	4	-11	16	1	1	1	1	-16	22	5	-7	1	1	0	0	0	0	0	0	-24	-13	-38	-32
15	-25	-30	2	3	-11	16	1	1	1	1	-21	28	4	-6	1	1	0	0	0	0	0	0	-22	-18	-34	-35
16	-23	-33	2	3	-11	16	1	1	1	1	-22	30	4	-6	1	1	0	0	0	0	0	0	-20	-21	-32	-38
17	-24	-33	2	3	-11	16	1	1	1	1	-20	29	5	-6	1	1	0	0	0	0	0	0	-21	-21	-33	-38
18	-26	-30	3	4	-11	16	1	1	1	1	-16	22	5	-8	1	1	0	0	0	0	0	0	-22	-17	-36	-36
19	-29	-26	4	5	-11	16	1	1	1	1	-7	17	7	-9	1	1	0	0	0	0	0	0	-24	-12	-40	-33
20	-32	-24	5	7	-11	16	1	1	1	1	-1	2	12	-17	1	1	0	0	0	0	0	0	-26	-8	-44	-33
21	-27	-19	6	8	-11	14	1	1	1	1	-3	3	21	-28	1	1	0	0	0	0	0	0	-20	-3	-40	-29
	-27	-19	6	8	-11	14	1	1	0	0	-3	3	22	-28	0	0	0	0	0	0	0	0	-20	-3	-39	-28
22	-35	-22	6	8	-10	14	1	1	0	0	-3	4	18	-25	0	0	0	0	0	0	0	0	-29	-7	-47	-31
23	-36	-22	5	7	-10	12	1	1	0	0	-6	9	16	-21	0	0	0	0	0	0	0	0	-31	-9	-47	-30
23	-34	-21	5	7	-9	12	1	1	0	0	-7	8	15	-22	0	0	0	0	0	0	0	0	-29	-8	-44	-29
24	-31	-25	5	6	-8	11	1	1	0	0	-11	15	13	-19	0	0	0	0	0	0	0	0	-26	-13	-41	-32
25	-29	-29	4	5	-7	9	1	1	0	0	-14	20	11	-15	0	0	0	0	0	0	0	0	-25	-19	-37	-35
26	-27	-33	5	5	-6	8	1	1	0	0	-15	22	10	-13	0	0	0	0	0	0	0	0	-22	-24	-36	-39
27	-26	-35	4	4	-4	6	1	1	0	0	-15	22	8	-10	0	0	0	0	0	0	0	0	-22	-28	-33	-40
28	-25	-36	3	3	-3	5	1	1	0	0	-14	21	6	-8	0	0	0	0	0	0	0	0	-22	-30	-30	-40
29	-25	-36	2	2	-2	3	1	1	0	0	-11	16	4	-5	0	0	0	0	0	0	0	0	-23	-32	-29	-39
30	-25	-37	1	1	-1	2	1	1	6	6	-6	9	2	-2	0	0	0	0	0	0	0	0	-18	-29	-33	-44
31	-23	-26	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	-19	-22	-27	-30

CONTROL TENSIONES LONGITUDINALES
COMBINACION POCO PROBABLE UIC
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.60		0.60				0.00						1.00											
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-22	-26	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	-20	-24	-24	-28
2	-25	-37	1	1	-1	2	1	1	1	1	-6	9	2	-3	1	1	0	0	0	0	0	0	-22	-33	-28	-40
3	-25	-36	1	2	-2	3	1	1	1	1	-11	16	4	-5	1	1	0	0	0	0	0	0	-22	-31	-29	-40
4	-26	-36	2	3	-3	5	1	1	1	1	-14	20	5	-8	1	1	0	0	0	0	0	0	-22	-28	-31	-41
5	-26	-35	3	4	-4	6	1	1	1	1	-16	22	7	-10	1	1	0	0	0	0	0	0	-21	-26	-33	-41
6	-27	-33	3	5	-6	8	1	1	1	1	-16	22	9	-13	1	1	0	0	0	0	0	0	-22	-22	-35	-40
7	-27	-32	4	5	-7	9	1	1	1	1	-14	19	11	-16	1	1	0	0	0	0	0	0	-21	-20	-37	-39
8	-28	-30	5	6	-8	11	1	1	1	1	-11	15	13	-19	1	1	0	0	0	0	0	0	-21	-16	-39	-38
9	-29	-28	5	7	-9	12	1	1	1	1	-6	8	16	-22	1	1	0	0	0	0	0	0	-22	-12	-41	-37
10	-30	-26	6	8	-10	14	1	1	1	1	-3	3	18	-26	1	1	0	0	0	0	0	0	-22	-8	-44	-36
11	-26	-17	6	8	-11	14	1	1	1	1	-2	3	22	-28	1	1	0	0	0	0	0	0	-18	1	-40	-27
11	-26	-17	6	8	-11	14	1	1	1	1	-3	3	22	-28	1	1	0	0	0	0	0	0	-18	1	-40	-27
12	-31	-21	5	7	-11	16	1	1	1	1	-2	2	11	-16	1	1	0	0	0	0	0	0	-24	-3	-44	-30
13	-30	-22	4	5	-11	16	1	1	1	1	-8	11	7	-10	1	1	0	0	0	0	0	0	-24	-6	-42	-29
14	-28	-26	3	4	-11	16	1	1	1	1	-16	22	5	-7	1	1	0	0	0	0	0	0	-23	-11	-39	-32
15	-25	-30	2	3	-11	16	1	1	1	1	-21	28	4	-6	1	1	0	0	0	0	0	0	-21	-16	-35	-35
16	-23	-33	2	3	-11	16	1	1	1	1	-22	30	4	-6	1	1	0	0	0	0	0	0	-19	-19	-33	-38
17	-24	-33	2	3	-11	16	1	1	1	1	-20	29	5	-6	1	1	0	0	0	0	0	0	-20	-19	-34	-38
18	-26	-30	3	4	-11	16	1	1	1	1	-16	22	5	-8	1	1	0	0	0	0	0	0	-21	-15	-37	-36
19	-29	-26	4	5	-11	16	1	1	1	1	-7	17	7	-9	1	1	0	0	0	0	0	0	-23	-10	-41	-33
20	-32	-24	5	7	-11	16	1	1	1	1	-1	2	12	-17	1	1	0	0	0	0	0	0	-25	-6	-45	-33
21	-27	-19	6	8	-11	14	1	1	1	1	-3	3	21	-28	1	1	0	0	0	0	0	0	-19	-1	-41	-29
21	-27	-19	6	8	-11	14	1	1	0	0	-3	3	22	-28	0	0	0	0	0	0	0	0	-20	-2	-40	-28
22	-35	-22	6	8	-10	14	1	1	0	0	-3	4	18	-25	0	0	0	0	0	0	0	0	-28	-5	-48	-31
23	-36	-22	5	7	-10	12	1	1	0	0	-6	9	16	-21	0	0	0	0	0	0	0	0	-30	-7	-48	-30
23	-34	-21	5	7	-9	12	1	1	0	0	-7	8	15	-22	0	0	0	0	0	0	0	0	-28	-6	-45	-29
24	-31	-25	5	6	-8	11	1	1	0	0	-11	15	13	-19	0	0	0	0	0	0	0	0	-25	-12	-41	-32
25	-29	-29	4	5	-7	9	1	1	0	0	-14	20	11	-15	0	0	0	0	0	0	0	0	-24	-18	-38	-35
26	-27	-33	5	5	-6	8	1	1	0	0	-15	22	10	-13	0	0	0	0	0	0	0	0	-21	-23	-36	-39
27	-26	-35	4	4	-4	6	1	1	0	0	-15	22	8	-10	0	0	0	0	0	0	0	0	-21	-27	-33	-40
28	-25	-36	3	3	-3	5	1	1	0	0	-14	21	6	-8	0	0	0	0	0	0	0	0	-21	-29	-30	-40
29	-25	-36	2	2	-2	3	1	1	0	0	-11	16	4	-5	0	0	0	0	0	0	0	0	-22	-32	-29	-39
30	-25	-37	1	1	-1	2	1	1	6	6	-6	9	2	-2	0	0	0	0	0	0	0	0	-18	-29	-33	-44
31	-23	-26	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	-19	-22	-27	-30

VIADUCTO 3
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE CONSTRUCCION

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI
1	1	0.403	0.712	1.900	0	0		0.00		0.00
	2	0.387	0.623	1.900	0	0		0.00		0.00
	3	0.387	0.623	1.900	0	0		0.00		0.00
	4	0.387	0.623	1.900	0	0		0.00		0.00
	5	0.387	0.623	1.900	0	0		0.00		0.00
	6	0.387	0.623	1.900	0	0		0.00		0.00
	7	0.387	0.623	1.900	0	0		0.00		0.00
	8	0.387	0.623	1.900	0	0		0.00		0.00
	9	0.387	0.623	1.900	0	0		0.00		0.00
	10	0.387	0.623	1.900	0	0		0.00		0.00
	11	0.403	0.712	1.900	0	0		0.00		0.00
2	11	0.403	0.712	1.900	0	0		0.00		0.00
	12	0.387	0.623	1.900	0	0		0.00		0.00
	13	0.387	0.623	1.900	0	0		0.00		0.00
	14	0.387	0.623	1.900	0	0		0.00		0.00
	15	0.387	0.623	1.900	0	0		0.00		0.00
	16	0.387	0.623	1.900	0	0		0.00		0.00
	17	0.387	0.623	1.900	0	0		0.00		0.00
	18	0.387	0.623	1.900	0	0		0.00		0.00
	19	0.387	0.623	1.900	0	0		0.00		0.00
	20	0.387	0.623	1.900	0	0		0.00		0.00
	21	0.403	0.712	1.900	0	0		0.00		0.00
3	21	0.403	0.712	1.900	0	0		0.00		0.00
	22	0.387	0.623	1.900	0	0		0.00		0.00
	23	0.387	0.623	1.900	0	0		0.00		0.00
	24	0.387	0.623	1.900	0	0		0.00		0.00
	25	0.387	0.623	1.900	0	0		0.00		0.00
	26	0.387	0.623	1.900	0	0		0.00		0.00
	27	0.387	0.623	1.900	0	0		0.00		0.00
	28	0.387	0.623	1.900	0	0		0.00		0.00
	29	0.387	0.623	1.900	0	0		0.00		0.00
	30	0.387	0.623	1.900	0	0		0.00		0.00
	31	0.403	0.712	1.900	0	0		0.00		0.00

VIADUCTO 3
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE SERVICIO - ESTADO INICIAL

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI	F. SUP	F. INF	HS	ACTS	HI	ACTI
1	1	0.403	0.712	1.900	0	0					0	0				
	2	0.387	0.623	1.900	0	0					0	0				
	3	0.387	0.623	1.900	0	0					0	0				
	4	0.387	0.623	1.900	0	0					0	0				
	5	0.387	0.623	1.900	0	0					0	0				
	6	0.387	0.623	1.900	0	0					0	0				
	7	0.387	0.623	1.900	0	0					0	0				
	8	0.387	0.623	1.900	0	0					0	0				
	9	0.387	0.623	1.900	0	0					0	0				
	10	0.387	0.623	1.900	0	0					0	0				
	11	0.403	0.712	1.900	-58	5			0.151	7.54	0	0				
2	11	0.403	0.712	1.900	-58	5			0.151	7.54	0	0				
	12	0.387	0.623	1.900	0	0					0	0				
	13	0.387	0.623	1.900	0	0					0	0				
	14	0.387	0.623	1.900	0	0					0	0				
	15	0.387	0.623	1.900	0	0					0	0				
	16	0.387	0.623	1.900	0	0					0	0				
	17	0.387	0.623	1.900	0	0					0	0				
	18	0.387	0.623	1.900	0	0					0	0				
	19	0.387	0.623	1.900	0	0					0	0				
	20	0.387	0.623	1.900	0	0					0	0				
	21	0.403	0.712	1.900	-63	8			0.214	10.70	0	0				
3	21	0.403	0.712	1.900	-63	8			0.214	10.70	0	0				
	22	0.387	0.623	1.900	-72	3			0.076	3.80	0	0				
	23	0.387	0.623	1.900	-73	3			0.075	3.75	0	0				
	24	0.387	0.623	1.900	-70	4			0.103	5.14	0	0				
	25	0.387	0.623	1.900	0	0					0	0				
	26	0.387	0.623	1.900	0	0					0	0				
	27	0.387	0.623	1.900	0	0					0	0				
	28	0.387	0.623	1.900	0	0					0	0				
	29	0.387	0.623	1.900	0	0					0	0				
	30	0.387	0.623	1.900	0	0					0	0				
	31	0.403	0.712	1.900	0	0					0	0				

VIADUCTO 3
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE SERVICIO - ESTADO FINAL

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI	F. SUP	F. INF	HS	ACTS	HI	ACTI
1	1	0.403	0.712	1.900	0	0										
	2	0.387	0.623	1.900	0	0					0	0				
	3	0.387	0.623	1.900	0	0					0	0				
	4	0.387	0.623	1.900	0	0					0	0				
	5	0.387	0.623	1.900	0	0					0	0				
	6	0.387	0.623	1.900	-51	1			0.037	1.83	0	0				
	7	0.387	0.623	1.900	-53	4			0.133	6.67	0	0				
	8	0.387	0.623	1.900	-53	4			0.133	6.67	0	0				
	9	0.387	0.623	1.900	-50	2			0.073	3.65	0	0				
	10	0.387	0.623	1.900	0	0					0	0				
	11	0.403	0.712	1.900	-46	7			0.251	12.55	7	-59	0.202	10.63		
2	11	0.403	0.712	1.900	-46	8			0.281	14.07	7	-59	0.202	10.63		
	12	0.387	0.623	1.900	-50	5			0.173	8.64	0	0				
	13	0.387	0.623	1.900	-54	11			0.322	16.08	0	0				
	14	0.387	0.623	1.900	-59	18			0.444	22.21	0	0				
	15	0.387	0.623	1.900	-60	18			0.438	21.92	0	0				
	16	0.387	0.623	1.900	-58	16			0.411	20.54	0	0				
	17	0.387	0.623	1.900	-59	16			0.405	20.27	0	0				
	18	0.387	0.623	1.900	-58	14			0.369	18.47	0	0				
	19	0.387	0.623	1.900	-53	7			0.222	11.08	0	0				
	20	0.387	0.623	1.900	-50	2			0.073	3.65	0	0				
	21	0.403	0.712	1.900	-46	6			0.219	10.96	6	-61	0.170	10.63		
3	21	0.403	0.712	1.900	-46	6			0.219	10.96	6	-61	0.170	10.63		
	22	0.387	0.623	1.900	-53	4			0.133	6.67	0	0				
	23	0.387	0.623	1.900	-57	8			0.234	11.69	0	0				
	24	0.387	0.623	1.900	-55	8			0.241	12.06	0	0				
	25	0.387	0.623	1.900	-56	9			0.263	13.15	0	0				
	26	0.387	0.623	1.900	-54	6			0.190	9.50	0	0				
	27	0.387	0.623	1.900	-51	1			0.037	1.83	0	0				
	28	0.387	0.623	1.900	0	0					0	0				
	29	0.387	0.623	1.900	0	0					0	0				
	30	0.387	0.623	1.900	0	0					0	0				
	31	0.403	0.712	1.900	0	0					0	0				

REACCIONES, GIROS Y DESPLAZAMIENTOS

Reacciones y giros acumulados por peso propio

Estructura completa estado inicial

Apoyo	Reaccion (t)	Giro (rad*1000)
1	171.30	-0.001569
11	795.49	-0.002796
21	650.13	0.006700
31	232.08	0.004351

Reacciones y giros acumulados por peso propio

Estructura completa estado final

Apoyo	Reaccion (t)	Giro (rad*1000)
1	184.10	-0.002152
11	743.87	-0.001639
21	731.94	0.001960
31	189.09	0.002381

Reacciones y giros debidos a cargas muertas

Apoyo	Reaccion (t)	Giro (rad*1000)
1	63.49	-0.000777
11	256.06	-0.000541
21	256.06	0.000541
31	63.49	0.000777

Reacciones y giros por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

Apoyo	Reaccion (t)	Giro (rad*1000)
1	37.25	0.002658
11	-37.25	-0.000993
21	-37.25	0.000993
31	37.25	-0.002658

Reacciones y giros debidos a descenso lento de apoyos

Para estado final (nulos para estado inicial)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	4.887	-4.912	0.0006718	-0.0006718
11	11.782	-11.746	0.0003062	-0.0003062
21	11.782	-11.746	0.0003062	-0.0003062
31	4.887	-4.912	0.0006718	-0.0006718

Reacciones y giros por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	213.479	-46.668	0.0047874	-0.0035500
11	530.047	-64.123	0.0026285	-0.0052081
21	530.047	-64.123	0.0052081	-0.0026285
31	213.479	-46.668	0.0035500	-0.0047874

Reacciones y giros por sobrecarga total

(+descensos lentos estructura final+temperatura)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	218.366	-51.580	0.0054592	-0.0042218
11	541.829	-75.870	0.0029347	-0.0055143
21	541.829	-75.870	0.0055143	-0.0029347
31	218.366	-51.580	0.0042218	-0.0054592

Reacciones y giros por pretensado (*coef. perdidas elasticas)

Estructura completa estado inicial

Apoyo	Reaccion (t)	Giro (rad*1000)
1	85.35	0.005174
11	-118.29	0.002863
21	15.71	-0.005975
31	17.23	-0.005304

Reacciones y giros por pretensado (*coef. perdidas totales)

Estructura completa estado final

Apoyo	Reaccion (t)	Giro (rad*1000)
1	69.44	0.004944
11	-77.95	0.001940
21	-47.17	-0.002791
31	55.67	-0.004940

Desplazamientos y giros acumulados por peso propio

Estructura completa estado inicial

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	-0.001569
	2	-0.000137	-0.001370
	3	-0.000241	-0.000852
	4	-0.000289	-0.000169
	5	-0.000272	0.000534
	6	-0.000195	0.001110
	7	-0.000076	0.001422
	8	0.000053	0.001319
	9	0.000149	0.000661
	10	0.000153	-0.000695
	11	0.000000	-0.002796
2	11	0.000000	-0.002796
	12	-0.000562	-0.005384
	13	-0.001341	-0.006142
	14	-0.002114	-0.005379
	15	-0.002710	-0.003520
	16	-0.003013	-0.000993
	17	-0.002962	0.001772
	18	-0.002554	0.004349
	19	-0.001842	0.006311
	20	-0.000936	0.007233
	21	0.000000	0.006700
3	21	0.000000	0.006700
	22	0.000582	0.006110
	23	0.001140	0.006171
	24	-0.000860	-0.002620
	25	-0.001058	-0.001637
	26	-0.001153	-0.000410
	27	-0.001130	0.000918
	28	-0.000986	0.002204
	29	-0.000731	0.003304
	30	-0.000390	0.004072
	31	0.000000	0.004351

Desplazamientos y giros acumulados por peso propio

Estructura completa estado final

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	-0.002152
	2	-0.000191	-0.001937
	3	-0.000344	-0.001366
	4	-0.000435	-0.000595
	5	-0.000452	0.000230
	6	-0.000396	0.000966
	7	-0.000282	0.001469
	8	-0.000138	0.001595
	9	-0.000005	0.001201
	10	0.000062	0.000143
	11	0.000000	-0.001639
2	11	0.000000	-0.001639
	12	-0.000383	-0.003853
	13	-0.000945	-0.004434
	14	-0.001494	-0.003716
	15	-0.001886	-0.002122
	16	-0.002034	-0.000082
	17	-0.001907	0.001978
	18	-0.001530	0.003632
	19	-0.000986	0.004448
	20	-0.000413	0.004004
	21	0.000000	0.001960
3	21	0.000000	0.001960
	22	0.000097	0.000301
	23	0.000076	-0.000640
	24	-0.000213	-0.001702
	25	-0.000362	-0.001487
	26	-0.000474	-0.000908
	27	-0.000522	-0.000110
	28	-0.000492	0.000762
	29	-0.000384	0.001567
	30	-0.000211	0.002159
	31	0.000000	0.002381

Desplazamientos y giros debidos a cargas muertas

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	-0.000777
	2	-0.000069	-0.000702
	3	-0.000125	-0.000499
	4	-0.000158	-0.000225
	5	-0.000165	0.000070
	6	-0.000146	0.000335
	7	-0.000106	0.000520
	8	-0.000055	0.000572
	9	-0.000007	0.000442
	10	0.000019	0.000079
	11	0.000000	-0.000541
2	11	0.000000	-0.000541
	12	-0.000129	-0.001312
	13	-0.000321	-0.001515
	14	-0.000508	-0.001262
	15	-0.000640	-0.000707
	16	-0.000688	0.000000
	17	-0.000640	0.000707
	18	-0.000508	0.001262
	19	-0.000321	0.001515
	20	-0.000129	0.001312
	21	0.000000	0.000541
3	21	0.000000	0.000541
	22	0.000019	-0.000079
	23	-0.000007	-0.000442
	24	-0.000055	-0.000572
	25	-0.000106	-0.000520
	26	-0.000146	-0.000335
	27	-0.000165	-0.000070
	28	-0.000158	0.000225
	29	-0.000125	0.000499
	30	-0.000069	0.000702
	31	0.000000	0.000777

Desplazamientos y giros por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	0.002658
	2	0.000205	0.001834
	3	0.000340	0.001117
	4	0.000413	0.000501
	5	0.000435	-0.000012
	6	0.000414	-0.000424
	7	0.000360	-0.000733
	8	0.000282	-0.000939
	9	0.000191	-0.001044
	10	0.000094	-0.001047
	11	0.000000	-0.000993
2	11	0.000000	-0.000993
	12	-0.000121	-0.000848
	13	-0.000219	-0.000637
	14	-0.000289	-0.000424
	15	-0.000331	-0.000213
	16	-0.000345	0.000000
	17	-0.000331	0.000213
	18	-0.000289	0.000424
	19	-0.000219	0.000637
	20	-0.000121	0.000848
	21	0.000000	0.000993
3	21	0.000000	0.000993
	22	0.000094	0.001047
	23	0.000191	0.001044
	24	0.000282	0.000939
	25	0.000360	0.000733
	26	0.000414	0.000424
	27	0.000435	0.000012
	28	0.000413	-0.000501
	29	0.000340	-0.001117
	30	0.000205	-0.001834
	31	0.000000	-0.002658

Desplazamientos y giros debidos a descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	-0.000410	0.008184	-0.008184
	2	0.000011	-0.000422	0.000665	-0.000665
	3	0.000022	-0.000432	0.000645	-0.000645
	4	0.000031	-0.000441	0.000611	-0.000611
	5	0.000038	-0.000448	0.000564	-0.000564
	6	0.000042	-0.000452	0.000504	-0.000504
	7	0.000043	-0.000453	0.000442	-0.000442
	8	0.000040	-0.000450	0.000414	-0.000414
	9	0.000032	-0.000443	0.000382	-0.000382
	10	0.000019	-0.000430	0.000345	-0.000345
	11	0.000000	-0.000410	0.000306	-0.000306
2	11	0.000000	-0.000410	0.003730	-0.003730
	12	0.000036	-0.000447	0.000330	-0.000330
	13	0.000065	-0.000475	0.000395	-0.000394
	14	0.000085	-0.000496	0.000432	-0.000432
	15	0.000098	-0.000508	0.000453	-0.000453
	16	0.000102	-0.000512	0.000472	-0.000472
	17	0.000098	-0.000508	0.000453	-0.000453
	18	0.000085	-0.000496	0.000432	-0.000432
	19	0.000065	-0.000475	0.000394	-0.000395
	20	0.000036	-0.000447	0.000330	-0.000330
	21	0.000000	-0.000410	0.000306	-0.000306
3	21	0.000000	-0.000410	0.003730	-0.003730
	22	0.000019	-0.000430	0.000345	-0.000345
	23	0.000032	-0.000443	0.000382	-0.000382
	24	0.000040	-0.000450	0.000414	-0.000414
	25	0.000043	-0.000453	0.000442	-0.000442
	26	0.000042	-0.000452	0.000504	-0.000504
	27	0.000038	-0.000448	0.000564	-0.000564
	28	0.000031	-0.000441	0.000611	-0.000611
	29	0.000022	-0.000432	0.000645	-0.000645
	30	0.000011	-0.000422	0.000665	-0.000665
	31	0.000000	-0.000410	0.000672	-0.000672

Desplazamientos y giros por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	0.000000	0.002129	-0.006208
	2	0.000524	-0.000193	0.002068	-0.005170
	3	0.000939	-0.000375	0.001876	-0.003854
	4	0.001225	-0.000533	0.001555	-0.002370
	5	0.001372	-0.000656	0.001119	-0.000843
	6	0.001379	-0.000732	0.001168	-0.000075
	7	0.001256	-0.000750	0.001988	-0.000173
	8	0.001023	-0.000697	0.003051	-0.001005
	9	0.000708	-0.000561	0.003740	-0.001967
	10	0.000352	-0.000332	0.003948	-0.003054
	11	0.000000	0.000000	0.003622	-0.004215
2	11	0.000000	0.000000	0.003622	-0.004215
	12	0.000639	-0.000420	0.002770	-0.005255
	13	0.001332	-0.000729	0.001939	-0.005065
	14	0.001932	-0.000935	0.001290	-0.003911
	15	0.002334	-0.001050	0.000941	-0.002206
	16	0.002475	-0.001080	0.000475	-0.000475
	17	0.002334	-0.001050	0.002206	-0.000941
	18	0.001932	-0.000935	0.003911	-0.001290
	19	0.001332	-0.000729	0.005065	-0.001939
	20	0.000639	-0.000420	0.005255	-0.002770
	21	0.000000	0.000000	0.004215	-0.003622
3	21	0.000000	0.000000	0.004215	-0.003622
	22	0.000352	-0.000332	0.003054	-0.003948
	23	0.000708	-0.000561	0.001967	-0.003740
	24	0.001023	-0.000697	0.001005	-0.003051
	25	0.001256	-0.000750	0.000173	-0.001988
	26	0.001379	-0.000732	0.000075	-0.001168
	27	0.001372	-0.000656	0.000843	-0.001119
	28	0.001225	-0.000533	0.002370	-0.001555
	29	0.000939	-0.000375	0.003854	-0.001876
	30	0.000524	-0.000193	0.005170	-0.002068
	31	0.000000	0.000000	0.006208	-0.002129

Desplazamientos y giros por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	-0.000410	0.002801	-0.006880
	2	0.000535	-0.000615	0.002733	-0.005835
	3	0.000961	-0.000807	0.002521	-0.004499
	4	0.001256	-0.000974	0.002167	-0.002981
	5	0.001410	-0.001104	0.001683	-0.001407
	6	0.001421	-0.001185	0.001671	-0.000579
	7	0.001299	-0.001203	0.002430	-0.000615
	8	0.001063	-0.001147	0.003465	-0.001419
	9	0.000740	-0.001004	0.004122	-0.002349
	10	0.000371	-0.000762	0.004293	-0.003399
	11	0.000000	-0.000410	0.003928	-0.004521
2	11	0.000000	-0.000410	0.003928	-0.004521
	12	0.000676	-0.000867	0.003100	-0.005585
	13	0.001397	-0.001204	0.002334	-0.005459
	14	0.002017	-0.001431	0.001722	-0.004343
	15	0.002432	-0.001558	0.001393	-0.002659
	16	0.002577	-0.001592	0.000947	-0.000947
	17	0.002432	-0.001558	0.002659	-0.001393
	18	0.002017	-0.001431	0.004343	-0.001722
	19	0.001397	-0.001204	0.005459	-0.002334
	20	0.000676	-0.000867	0.005585	-0.003100
	21	0.000000	-0.000410	0.004521	-0.003928
3	21	0.000000	-0.000410	0.004521	-0.003928
	22	0.000371	-0.000762	0.003399	-0.004293
	23	0.000740	-0.001004	0.002349	-0.004122
	24	0.001063	-0.001147	0.001419	-0.003465
	25	0.001299	-0.001203	0.000615	-0.002430
	26	0.001421	-0.001185	0.000579	-0.001671
	27	0.001410	-0.001104	0.001407	-0.001683
	28	0.001256	-0.000974	0.002981	-0.002167
	29	0.000961	-0.000807	0.004499	-0.002521
	30	0.000535	-0.000615	0.005835	-0.002733
	31	0.000000	-0.000410	0.006880	-0.002801

Desplazamientos y giros por pretensado (*coef. perdidas elasticas)

Estructura completa estado inicial

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	0.005174
	2	0.000444	0.004438
	3	0.000786	0.002944
	4	0.000976	0.001176
	5	0.001001	-0.000602
	6	0.000873	-0.002122
	7	0.000627	-0.003126
	8	0.000324	-0.003352
	9	0.000044	-0.002552
	10	-0.000105	-0.000470
	11	0.000000	0.002863
2	11	0.000000	0.002863
	12	0.000700	0.007402
	13	0.001822	0.009140
	14	0.002993	0.008233
	15	0.003901	0.005255
	16	0.004321	0.000959
	17	0.004142	-0.003628
	18	0.003401	-0.007410
	19	0.002266	-0.009470
	20	0.001013	-0.009078
	21	0.000000	-0.005975
3	21	0.000000	-0.005975
	22	-0.000436	-0.003527
	23	-0.000666	-0.001678
	24	0.000751	0.003227
	25	0.001031	0.002736
	26	0.001228	0.001445
	27	0.001282	-0.000319
	28	0.001167	-0.002174
	29	0.000890	-0.003833
	30	0.000479	-0.005032
	31	0.000000	-0.005304

Desplazamientos y giros por pretensado (*coef. perdidas totales)

Estructura completa estado final

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	0.004944
	2	0.000426	0.004276
	3	0.000759	0.002912
	4	0.000952	0.001282
	5	0.000993	-0.000374
	6	0.000889	-0.001820
	7	0.000672	-0.002824
	8	0.000392	-0.003150
	9	0.000122	-0.002575
	10	-0.000045	-0.000872
	11	0.000000	0.001940
2	11	0.000000	0.001940
	12	0.000530	0.005799
	13	0.001418	0.007262
	14	0.002345	0.006473
	15	0.003048	0.003950
	16	0.003340	0.000366
	17	0.003139	-0.003361
	18	0.002492	-0.006248
	19	0.001566	-0.007473
	20	0.000625	-0.006383
	21	0.000000	-0.002791
3	21	0.000000	-0.002791
	22	-0.000129	-0.000044
	23	-0.000028	0.002084
	24	0.000325	0.003270
	25	0.000623	0.003082
	26	0.000865	0.002063
	27	0.000985	0.000510
	28	0.000953	-0.001235
	29	0.000761	-0.002916
	30	0.000427	-0.004297
	31	0.000000	-0.004940

COMPROBACION A ROTURA

```
LAV MADRID - ZARAGOZA. LOSA VANOS 16+23+23+16
5100.  1.15  19000.  1.10  400.  1.5  1.5  1.5
2
   54  6.414  0.025
       2.814  0.025
2
4  1  11 21  31                      1
6  2 -10 12 -20 22 -30                2
1
0.6425
2
4  1  11 21  31                         1  1
6  2 -10 12 -20  22 -30                 1  1
2
5    0
1    9   3.100  0.000
2    8   4.050  1.200
3    7   7.000  1.500
4    6   7.000  1.760
5    0   0.000  1.900
5    2
1    9   3.100  0.000
2    8   4.050  1.200
3    7   7.000  1.500
4    6   7.000  1.760
5    0   0.000  1.900
1    3   1.200  2.100   0.900
2    0   1.200  0.000   0.900
2
4   1   11  21   31                          1
6   2  -10  12  -20  22  -30                 2
1
3
7   1
1   3  4  5  6  7  9
3  -1
1   3   2
3  -1
9   8   7
1
2   1   -31 1
1
    7  -0.025   2
   -2
1       2   7      1.12  0. 0.
2   3   2   15     1.12  0. 0.
4   5   1   35     2.02  0. 0.
5   6   1   35     2.02  0. 0.
7   8   2   15     1.12  0. 0.
8   9   2   7      1.12  0. 0.
9   1   1   30     2.02  0. 0.
1
2   1  -31  1  1
6
595   442   226  -226  -442  -595
3
2   1  -11  2  1  6
2  11  -21  2  2  5
2  21  -31  2  3  4
```


Calculo de Comprobacion a Rotura

Datos generales

Limite elastico del acero pasivo ..... =	5100.00	kg/cm2
Coeficiente del acero pasivo ..... =	1.15	
Limite elastico de acero activo ..... =	19000.00	kg/cm2
Coeficiente del acero activo ..... =	1.10	
Resistencia caracteristica del hormigon ..... =	400.00	kg/cm2
Coeficiente del hormigon ..... =	1.50	
Coef. mayoracion Cargas muertas y Peso propio . =	1.50	
Coef. mayoracion Sobrecargas ..... =	1.50	

Calculo de Comprobacion a Rotura

Tipo de seccion 1

Definicion de puntos

Pt	X	Y	Pt	X	Y	Pt	X	Y
1	3.100	0.0000	2	4.050	1.2000	3	7.000	1.5000
4	7.000	1.7600	5	0.000	1.9000	6	-7.000	1.7600
7	-7.000	1.5000	8	-4.050	1.2000	9	-3.100	0.0000

Tipo de seccion 2

Definicion de puntos

Pt	X	Y	Pt	X	Y	Pt	X	Y
1	3.100	0.0000	2	4.050	1.2000	3	7.000	1.5000
4	7.000	1.7600	5	0.000	1.9000	6	-7.000	1.7600
7	-7.000	1.5000	8	-4.050	1.2000	9	-3.100	0.0000

Definicion de inclusiones circulares

In	X	Y	D	In	X	Y	D
1	2.100	0.900	1.200	2	0.000	0.900	1.200
3	-2.100	0.900	1.200				

Calculo de Comprobacion a Rotura

Definicion de circuitos

Tipo de circuito 1

Circuito 1 : Numero de vertices 7 (Clave 1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	1	2	3	3	4	4	5	5	6	6	7
7	9										

Circuito 2 : Numero de vertices 3 (Clave -1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	1	2	3	3	2						

Circuito 3 : Numero de vertices 3 (Clave -1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	9	2	8	3	7						

Calculo de Comprobacion a Rotura

Definicion de armaduras pasivas

Tipo de armadura 1

Pi	Pf	Nr	A.(cm2)	Pi	Pf	Nr	A.(cm2)	Pi	Pf	Nr	A.(cm2)
1	2	7	1.12	2	3	15	1.12	4	5	35	2.02
5	6	35	2.02	7	8	15	1.12	8	9	7	1.12
9	1	30	2.02								

Definicion de axiles de calculo

Axil	Axil	Axil	Axil
0.00	595.00	442.00	226.00
-226.00	-442.00	-595.00	

Calculo de Comprobacion a Rotura

Datos secciones/secc.-circuitos-armaduras

V.	Sec	T. Seccion	T. Circuito	T. Arm. 1	T. Arm. 2	T. Arm. 3
1	1	1	1	1		
	2	2	1	1		
	3	2	1	1		
	4	2	1	1		
	5	2	1	1		
	6	2	1	1		
	7	2	1	1		
	8	2	1	1		
	9	2	1	1		
	10	2	1	1		
	11	1	1	1		
2	11	1	1	1		
	12	2	1	1		
	13	2	1	1		
	14	2	1	1		
	15	2	1	1		
	16	2	1	1		
	17	2	1	1		
	18	2	1	1		
	19	2	1	1		
	20	2	1	1		
	21	1	1	1		
3	21	1	1	1		
	22	2	1	1		
	23AI	2	1	1		
	23AD	2	1	1		
	24	2	1	1		
	25	2	1	1		
	26	2	1	1		
	27	2	1	1		
	28	2	1	1		
	29	2	1	1		
	30	2	1	1		
	31	1	1	1		

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento P. propio (m x t)	Momento C.muertas (m x t)	Momento Sobre.(+) (m x t)	Momento Sobre.(-) (m x t)	Momento Hip. Pret (m x t)
1	1	0.00	0.00	0.00	0.00	0.00
	2	247.23	86.73	458.38	-161.33	111.00
	3	405.09	143.70	773.85	-310.22	222.10
	4	479.07	170.92	962.16	-446.67	333.20
	5	469.16	168.40	1039.05	-570.68	444.30
	6	375.36	136.12	1020.25	-682.26	555.40
	7	197.66	74.11	1014.49	-856.03	666.49
	8	-63.92	-17.66	902.06	-1042.24	777.59
	9	-409.40	-139.18	667.24	-1240.89	888.68
	10	-838.77	-290.44	478.58	-1506.91	999.78
	11	-1118.31	-388.35	502.42	-1869.93	1110.97
2	11	-1118.31	-388.35	502.42	-1869.93	1110.97
	12	-558.16	-194.83	382.93	-1035.65	1091.30
	13	56.56	20.32	702.31	-636.80	1071.73
	14	497.92	173.99	1099.19	-488.24	1052.17
	15	765.94	266.20	1285.56	-360.17	1032.60
	16	860.60	296.93	1305.95	-328.40	1013.02
	17	781.90	266.20	1285.56	-360.17	993.45
	18	529.86	173.99	1099.19	-488.24	973.88
	19	104.46	20.32	702.31	-636.80	954.30
	20	-494.30	-194.83	382.93	-1035.65	934.72
	21	-1042.72	-388.35	502.42	-1869.93	915.25
3	21	-1042.72	-388.35	502.42	-1869.93	915.25
	22	-766.92	-290.44	478.58	-1506.91	826.07
	23AI	-345.53	-139.18	667.24	-1240.89	736.99
	23AD	-345.53	-139.18	667.24	-1240.89	736.99
	24	-8.04	-17.66	902.06	-1042.24	647.96
	25	245.57	74.11	1014.49	-856.03	558.93
	26	415.28	136.12	1020.25	-682.26	469.90
	27	501.10	168.40	1039.05	-570.68	380.86
	28	503.02	170.92	962.16	-446.67	291.83
	29	421.06	143.70	773.85	-310.22	202.80
	30	255.21	86.73	458.38	-161.33	113.75
	31	0.00	0.00	0.00	0.00	24.70

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
1	1	0.	0.	0.	4684.	-6211.	-	-
		595.			4331.	-5891.	-	-
		-595.			5028.	-6524.	-	-
	2	0.	1311.	381.	5480.	-5430.	4.2	-
		595.			5157.	-5068.	3.9	-
		-595.			5794.	-5778.	4.4	-
	3	0.	2228.	602.	5990.	-4951.	2.7	-
		595.			5659.	-4565.	2.5	-
		-595.			6313.	-5323.	2.8	-
	4	0.	2785.	672.	6278.	-4678.	2.3	-
		595.			5945.	-4277.	2.1	-
		-595.			6601.	-5062.	2.4	-
	5	0.	3004.	589.	6374.	-4588.	2.1	-
		595.			6041.	-4183.	2.0	-
		-595.			6697.	-4977.	2.2	-
	6	0.	2909.	244.	6274.	-4677.	2.2	-
		595.			5942.	-4276.	2.0	-
		-595.			6597.	-5063.	2.3	-
	7	0.	2663.	-277.	5973.	-4957.	2.2	-
		595.			5641.	-4570.	2.1	-
		-595.			6295.	-5330.	2.4	-
	8	0.	2086.	-986.	5381.	-5452.	2.6	5.5
		595.			5056.	-5091.	2.4	5.2
		-595.			5696.	-5801.	2.7	5.9
	9	0.	1156.	-1884.	4552.	-6198.	3.9	3.3
		595.			4223.	-5876.	3.7	3.1
		-595.			4873.	-6511.	4.2	3.5
	10	0.	-76.	-3054.	3634.	-7238.	-	2.4
		595.			3298.	-6903.	-	2.3
		-595.			3962.	-7500.	-	2.5
	11	0.	-506.	-4065.	3187.	-7799.	-	1.9
		442.			2917.	-7509.	-	1.8
		-442.			3454.	-8077.	-	2.0
2	11	0.	-506.	-4065.	3187.	-7799.	-	1.9
		442.			2917.	-7509.	-	1.8
		-442.			3454.	-8077.	-	2.0
	12	0.	427.	-1701.	4064.	-6614.	9.5	3.9
		442.			3816.	-6393.	8.9	3.8
		-442.			4307.	-6831.	-	4.0
	13	0.	2348.	125.	5888.	-4934.	2.5	-
		442.			5648.	-4646.	2.4	-
		-442.			6122.	-5214.	2.6	-
	14	0.	3814.	1433.	7256.	-3794.	1.9	-
		442.			7010.	-3448.	1.8	-
		-442.			7497.	-4121.	2.0	-
	15	0.	4612.	2144.	8125.	-3266.	1.8	-
		442.			7879.	-2891.	1.7	-
		-442.			8366.	-3633.	1.8	-
	16	0.	4810.	2358.	8440.	-3128.	1.8	-
		442.			8194.	-2743.	1.7	-
		-442.			8681.	-3506.	1.8	-

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
	17	0.	4593.	2125.	8125.	-3262.	1.8	-
		442.			7879.	-2889.	1.7	-
		-442.			8366.	-3628.	1.8	-
	18	0.	3776.	1395.	7257.	-3811.	1.9	-
		442.			7010.	-3471.	1.9	-
		-442.			7497.	-4133.	2.0	-
	19	0.	2290.	91.	5952.	-4962.	2.6	-
		442.			5706.	-4675.	2.5	-
		-442.			6189.	-5241.	2.7	-
	20	0.	382.	-1746.	4098.	-6664.	-	3.8
		442.			3851.	-6444.	-	3.7
		-442.			4340.	-6881.	-	3.9
	21	0.	-569.	-4128.	3219.	-7799.	-	1.9
		226.			3083.	-7652.	-	1.9
		-226.			3355.	-7943.	-	1.9
3	21	0.	-569.	-4128.	3219.	-7799.	-	1.9
		226.			3083.	-7652.	-	1.9
		-226.			3355.	-7943.	-	1.9
	22	0.	-125.	-3103.	3324.	-7678.	-	2.5
		226.			3198.	-7527.	-	2.4
		-226.			3449.	-7826.	-	2.5
	23AI	0.	1084.	-1925.	2227.	-5470.	2.1	2.8
		226.			2092.	-5284.	1.9	2.7
		-226.			2360.	-5654.	2.2	2.9
	23AD	0.	1084.	-1925.	3983.	-6808.	3.7	3.5
		226.			3857.	-6699.	3.6	3.5
		-226.			4108.	-6916.	3.8	3.6
	24	0.	2027.	-1019.	4926.	-5839.	2.4	5.7
		226.			4802.	-5711.	2.4	5.6
		-226.			5047.	-5967.	2.5	5.9
	25	0.	2616.	-302.	5767.	-5147.	2.2	-
		226.			5645.	-5005.	2.2	-
		-226.			5887.	-5288.	2.3	-
	26	0.	2874.	227.	6216.	-4729.	2.2	-
		226.			6091.	-4579.	2.1	-
		-226.			6340.	-4877.	2.2	-
	27	0.	2982.	567.	6374.	-4588.	2.1	-
		226.			6249.	-4436.	2.1	-
		-226.			6498.	-4739.	2.2	-
	28	0.	2775.	662.	6278.	-4678.	2.3	-
		226.			6153.	-4527.	2.2	-
		-226.			6402.	-4827.	2.3	-
	29	0.	2231.	605.	5990.	-4951.	2.7	-
		226.			5865.	-4806.	2.6	-
		-226.			6114.	-5095.	2.7	-
	30	0.	1326.	396.	5480.	-5430.	4.1	-
		226.			5358.	-5294.	4.0	-
		-226.			5600.	-5564.	4.2	-
	31	0.	22.	22.	4684.	-6211.	-	-
		226.			4551.	-6090.	-	-
		-226.			4815.	-6331.	-	-

COMPROBACION A CORTANTE

Por 2 tes (V2) $R_{max} = 243t$

$R_{ii} = \frac{462}{2} - 243 = -12t$

Por 2 tes ($V_1 + V_2$) $R_{max} = 272t$

$R_{ii} = 462 - 787 = 190t$

ACCIONES VERTICALES (POR FUSTE)

POR PESO PROPIO = $0.5 \times 867,79 = 433.9t$

POR PRETENSADO = $-0.5 \times 64,58 = -32.29t$

POR CARGA PERM = $0.5 \times 298.99 = 149.50$

POR DESCENSO Ap = $0.5 \times 6.93 = 3.47t$

POR GRAD. TERMICO = —

POR SOBRECARGA = 284 ton.

TOTAL = 220 ton

ACCIONES LONGITUDINALES

Se supone en la vida $\mu = 0.05 \times CP$

$F_L = 0.05 \times (433,9 - 32.29 + 149.50) = 27,64$ / fuste

ACCIONES TRANSVERSALES

FUERZA CENTRIFUGA

a) PARA TREN ICF 44 $V = 200 km/h$

$F_C = Q \cdot \frac{V^2}{127R}$

Calculo de Comprobacion a Cortante

Datos generales

Limite elastico del acero pasivo	=	5100.00	kg/cm2
Coeficiente del acero pasivo	=	1.15	
Limite elastico de acero activo	=	19000.00	kg/cm2
Coeficiente del acero activo	=	1.10	
Resistencia caracteristica del hormigon	=	400.00	kg/cm2
Coeficiente del hormigon	=	1.50	
Coef. mayoracion Cargas muertas y Peso propio	=	1.50	
Coef. mayoracion Sobrecargas	=	1.50	

Calculo de Comprobacion a Cortante

Datos secciones/anchos-recubrimientos

V.	Sec	Ancho Seccion m	Ancho Eficaz m	Recubrimiento m
1	1	6.854	6.414	0.025
	2	3.254	2.814	0.025
	3	3.254	2.814	0.025
	4	3.254	2.814	0.025
	5	3.254	2.814	0.025
	6	3.254	2.814	0.025
	7	3.254	2.814	0.025
	8	3.254	2.814	0.025
	9	3.254	2.814	0.025
	10	3.254	2.814	0.025
	11	6.854	6.414	0.025
2	11	6.854	6.414	0.025
	12	3.254	2.814	0.025
	13	3.254	2.814	0.025
	14	3.254	2.814	0.025
	15	3.254	2.814	0.025
	16	3.254	2.814	0.025
	17	3.254	2.814	0.025
	18	3.254	2.814	0.025
	19	3.254	2.814	0.025
	20	3.254	2.814	0.025
	21	6.854	6.414	0.025
3	21	6.854	6.414	0.025
	22	3.254	2.814	0.025
	23AI	3.254	2.814	0.025
	23AD	3.254	2.814	0.025
	24	3.254	2.814	0.025
	25	3.254	2.814	0.025
	26	3.254	2.814	0.025
	27	3.254	2.814	0.025
	28	3.254	2.814	0.025
	29	3.254	2.814	0.025
	30	3.254	2.814	0.025
	31	6.854	6.414	0.025

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-101.35	166.4	-3949.7	1157.74	-22.	-26.	AB AB	87.0
	2	-341.54	117.0	-3934.7	-1024.04	-24.	-39.	AB AB	41.3
	3	-444.24	87.1	-3917.1	-816.71	-22.	-41.	AB AB	41.3
	4	-572.68	111.0	-3896.9	-732.80	-19.	-45.	AB AB	41.3
	5	-729.30	136.2	-3874.5	-771.59	-16.	-48.	AB AB	41.3
	6	122.26	197.4	-3849.1	-932.72	-32.	-26.	AB AB	41.3
	7	86.07	311.9	-3821.1	-1215.97	-31.	-27.	AB AB	41.3
	8	-501.88	445.4	-3790.7	1066.93	-20.	-42.	AB AB	41.3
	9	-1344.61	590.1	-3757.9	527.05	-4.	-63.	AB AB	41.3
	10	-2473.22	732.6	-3727.5	-122.98	17.	-92.	AB AB	41.3
	11	-1023.07	747.4	-3699.5	-755.12	-4.	-46.	AB AB	87.0
2	11	-1022.09	-266.8	-3681.5	-756.00	-4.	-45.	AB AB	87.0
	12	1331.95	-89.1	-3541.5	-2453.98	-52.	7.	AB AB	41.3
	13	1459.62	-14.9	-3522.2	-1556.37	-54.	11.	AB AB	41.3
	14	1411.74	48.7	-3529.4	-832.24	-53.	10.	AB AB	41.3
	15	1226.30	85.7	-3567.1	-323.79	-50.	4.	AB AB	41.3
	16	2491.87	89.4	-3605.2	-107.62	-74.	37.	AB C	41.3
	17	2558.34	207.9	-3642.0	-253.94	-75.	38.	AB C	41.3
	18	1951.74	373.8	-3666.2	-730.24	-64.	22.	AB AB	41.3
	19	886.94	582.4	-3682.4	-1469.42	-44.	-5.	AB AB	41.3
	20	-757.93	819.6	-3707.3	218.62	-14.	-48.	AB AB	41.3
	21	-625.67	1078.0	-3856.4	-608.95	-12.	-38.	AB AB	87.0
3	21	-625.09	-227.4	-3856.8	-607.25	-12.	-38.	AB AB	87.0
	22	1271.15	-252.4	-3879.9	-192.14	-53.	3.	AB AB	41.3
	23AI	1413.87	56.1	-3914.8	-2416.05	-56.	7.	AB AB	41.3
	23AD	1384.38	27.9	-3738.6	-2313.74	-54.	7.	AB AB	41.3
	24	1292.12	72.9	-3768.4	-1722.46	-53.	5.	AB AB	41.3
	25	1137.30	99.7	-3802.1	-1238.00	-50.	0.	AB AB	41.3
	26	950.93	107.2	-3837.9	-890.67	-47.	-5.	AB AB	41.3
	27	2033.74	122.0	-3873.5	-714.08	-67.	23.	AB AB	41.3
	28	1807.48	245.3	-3895.7	-695.05	-63.	17.	AB AB	41.3
	29	1367.27	377.2	-3915.6	-798.71	-55.	5.	AB AB	41.3
	30	691.89	465.0	-3935.5	-1026.15	-43.	-12.	AB AB	41.3
	31	-79.12	429.6	-3958.5	-1268.34	-23.	-26.	AB AB	87.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-101.35	-434.5	-3962.8	1157.74	-22.	-26.	AB AB	87.0
	2	677.44	-469.9	-3936.3	-1024.04	-43.	-13.	AB AB	41.3
	3	1360.69	-382.1	-3917.1	-816.71	-55.	5.	AB AB	41.3
	4	1808.80	-250.2	-3896.9	-732.80	-63.	17.	AB AB	41.3
	5	2042.94	-126.9	-3874.5	-771.59	-67.	23.	AB AB	41.3
	6	928.48	-71.0	-3849.1	-932.72	-47.	-5.	AB AB	41.3
	7	1035.55	-42.0	-3821.1	-1215.97	-48.	-2.	AB AB	41.3
	8	1094.63	-11.9	-3790.7	-1618.00	-49.	-1.	AB AB	41.3
	9	1101.53	19.6	-3757.9	-2134.67	-49.	0.	AB AB	41.3
	10	1048.75	39.1	-3725.9	-122.98	-48.	-1.	AB AB	41.3
	11	-1083.87	39.3	-3684.4	-755.12	-3.	-47.	AB AB	87.0
2	11	-1082.89	-1096.0	-3692.9	-756.00	-3.	-47.	AB AB	87.0
	12	-1628.00	-848.5	-3542.3	50.10	3.	-69.	AB AB	41.3
	13	74.16	-605.0	-3522.2	938.38	-28.	-25.	AB AB	41.3
	14	1168.27	-386.4	-3529.4	-832.24	-48.	3.	AB AB	41.3
	15	1741.12	-208.3	-3567.1	-323.79	-59.	18.	AB AB	41.3
	16	1597.77	-84.5	-3605.2	-107.62	-57.	14.	AB AB	41.3
	17	255.31	-86.1	-3642.0	-253.94	-32.	-21.	AB AB	41.3
	18	407.00	-61.3	-3666.2	-730.24	-35.	-17.	AB AB	41.3
	19	484.19	-7.8	-3682.4	-1469.42	-37.	-15.	AB AB	41.3
	20	413.81	60.2	-3706.4	218.62	-36.	-18.	AB AB	41.3
	21	-1458.98	248.8	-3845.0	-608.95	3.	-56.	AB AB	87.0
3	21	-1458.40	-935.4	-3871.9	-607.25	2.	-56.	AB AB	87.0
	22	-2250.82	-945.9	-3881.6	-192.14	12.	-88.	AB AB	48.9
	23AI	-1032.27	-514.4	-3914.8	356.79	-11.	-57.	AB AB	41.3
	23AD	-1061.75	-542.6	-3738.6	334.29	-9.	-56.	AB AB	41.3
	24	-304.39	-384.4	-3768.4	946.70	-23.	-37.	AB AB	41.3
	25	187.82	-254.2	-3802.1	-1238.00	-32	-24.	AB AB	41.3
	26	144.71	-161.3	-3837.9	-890.67	-32.	-26.	AB AB	41.3
	27	-738.50	-141.1	-3873.5	-714.08	-16.	-49.	AB AB	41.3
	28	-574.00	-115.9	-3895.7	-695.05	-19.	-45.	AB AB	41.3
	29	-437.66	-92.0	-3915.6	-798.71	-22.	-41.	AB AB	41.3
	30	-327.09	-121.9	-3933.9	-1026.15	-24.	-38.	AB AB	41.3
	31	-79.12	-171.3	-3945.5	1134.32	-23.	-26.	AB AB	87.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase		Armad cm2/m
1	1	-123.87	336.0	-4822.9	1415.02	-27.	-32.	AB	AB	87.0
	2	-675.35	267.9	-4806.5	-1251.60	-24.	-54.	AB	AB	41.3
	3	-951.75	166.3	-4787.6	-998.20	-19.	-61.	AB	AB	41.3
	4	-1157.72	130.5	-4762.9	-895.65	-15.	-66.	AB	AB	41.3
	5	-1296.19	96.3	-4735.5	-943.06	-12.	-70.	AB	AB	41.3
	6	-330.85	97.7	-4704.4	-1139.99	-30.	-44.	AB	AB	41.3
	7	-157.69	152.5	-4670.3	-1486.19	-33.	-40.	AB	AB	41.3
	8	-441.50	226.6	-4633.1	1304.02	-27.	-47.	AB	AB	41.3
	9	-886.21	312.2	-4593.0	644.17	-19.	-58.	AB	AB	41.3
	10	-1524.59	393.0	-4550.3	-150.31	-7.	-74.	AB	AB	41.3
	11	267.12	399.9	-4507.9	-922.93	-32.	-21.	AB	AB	87.0
2	11	268.32	76.3	-4491.8	-924.01	-32.	-21.	AB	AB	87.0
	12	2004.40	254.0	-4324.5	-2999.30	-70.	19.	AB	AB	41.3
	13	1435.89	249.9	-4304.9	-1902.23	-59.	4.	AB	AB	41.3
	14	869.41	232.9	-4313.7	-1017.18	-49.	-10.	AB	AB	41.3
	15	351.39	183.4	-4359.8	-395.74	-40.	-24.	AB	AB	41.3
	16	1490.19	93.2	-4406.4	-131.54	-61.	5.	AB	AB	41.3
	17	1651.44	116.6	-4451.4	-310.37	-64.	9.	AB	AB	41.3
	18	1355.02	193.3	-4480.9	-892.52	-59.	1.	AB	AB	41.3
	19	800.43	319.1	-4500.8	-1795.95	-49.	-14.	AB	AB	41.3
	20	-150.43	476.7	-4527.0	267.21	-32.	-38.	AB	AB	41.3
	21	596.45	737.5	-4703.2	-744.28	-39.	-15.	AB	AB	87.0
3	21	597.16	73.6	-4703.7	-742.20	-39.	-15.	AB	AB	87.0
	22	2202.15	35.1	-4737 0	-234.83	-77.	21.	AB	AB	41.3
	23AI	1882.07	346.1	-4784.8	-2952.95	-71.	12.	AB	AB	41.3
	23AD	1846.03	311.6	-4569.4	-2827.91	-69.	13.	AB	AB	41.3
	24	1344.22	300.6	-4605.9	-2105.23	-60.	0.	AB	AB	41.3
	25	871.44	267.3	-4647.0	-1513.11	-52.	-13.	AB	AB	41.3
	26	465.56	210.3	-4690.7	-1088.59	-44.	-24.	AB	AB	41.3
	27	1435.00	156.2	-4734.3	-872.76	-63.	1.	AB	AB	41.3
	28	1199.81	220.1	-4761.4	-849.50	-58.	-5.	AB	AB	41.3
	29	846.31	292.3	-4785.7	-976.20	-52.	-15.	AB	AB	41.3
	30	353.84	308.4	-4807.2	-1254.18	-43.	-28.	AB	AB	41.3
	31	-96.70	254.3	-4830.6	-1550.20	-28.	-31.	AB	AB	87.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase		Armad cm2/m
1	1	-123.87	-264.9	-4835.9	1415.02	-27.	-32.	AB	AB	87.0
	2	343.63	-319.1	-4808.2	-1251.60	-43.	-28.	AB	AB	41.3
	3	853.17	-302.9	-4787.6	-998.20	-52.	-14.	AB	AB	41.3
	4	1223.76	-230.7	-4762.9	-895.65	-59.	-5.	AB	AB	41.3
	5	1476.04	-166.8	-4735.5	-943.06	-63.	2.	AB	AB	41.3
	6	475.37	-170.7	-4704.4	-1139.99	-45.	-24.	AB	AB	41.3
	7	791.79	-201.4	-4670.3	-1486.19	-50.	-15.	AB	AB	41.3
	8	1155.01	-230.7	-4633.1	-1977.56	-57.	-5.	AB	AB	41.3
	9	1559.93	-258.3	-4593.0	-2609.05	-64.	5.	AB	AB	41.3
	10	1997.37	-300.5	-4548.7	-150.31	-72.	17.	AB	AB	41.3
	11	206.32	-308.1	-4492.8	-922.93	-31.	-23.	AB	AB	87.0
2	11	207.52	-753.0	-4503.2	-924.01	-31.	-23.	AB	AB	87.0
	12	-955.55	-505.5	-4325.4	61.23	-15.	-58.	AB	AB	41.3
	13	50.43	-340.2	-4304.9	1146.90	-34.	-32.	AB	AB	41.3
	14	625.94	-202.2	-4313.7	-1017.18	-44.	-17.	AB	AB	41.3
	15	866.21	-110.6	-4359.8	-395.74	-49.	-11.	AB	AB	41.3
	16	596.08	-80.7	-4406.4	-131.54	-45.	-18.	AB	AB	41.3
	17	-651.59	-177.5	-4451.4	-310.37	-22.	-51.	AB	AB	41.3
	18	-189.72	-241.8	-4480.9	-892.52	-31.	-39.	AB	AB	41.3
	19	397.68	-271.1	-4500.8	-1795.95	-42.	-24.	AB	AB	41.3
	20	1021.30	-282.8	-4526.2	267.21	-53.	-8.	AB	AB	41.3
	21	-236.86	-91.8	-4691.7	-744.28	-24.	-34.	AB	AB	87.0
3	21	-236.15	-634.4	-4718.7	-742.20	-24.	-34.	AB	AB	87.0
	22	-1319.82	-658.4	-4738.6	-234.83	-12.	-70.	AB	AB	41.3
	23AI	-564.07	-224.4	-4784.8	436.08	-26.	-51.	AB	AB	41.3
	23AD	-600.11	-258.9	-4569.4	408.58	-24.	-50.	AB	AB	41.3
	24	-252.28	-156.7	-4605.9	1157.07	-30.	-42.	AB	AB	41.3
	25	-78.05	-86.7	-4647.0	-1513.11	-34.	-37.	AB	AB	41.3
	26	-340.66	-58.2	-4690.7	-1088.59	-29.	-45.	AB	AB	41.3
	27	-1337.24	-107.0	-4734.3	-872.76	-11.	-71.	AB	AB	41.3
	28	-1181.67	-141.2	-4761.4	-849.50	-15.	-67.	AB	AB	41.3
	29	-958.62	-176.9	-4785.7	-976.20	-19.	-61.	AB	AB	41.3
	30	-665.15	-278.5	-4805.5	-1254.18	-24.	-54.	AB	AB	41.3
	31	-96.70	-346.7	-4817.6	1386.39	-27.	-31.	AB	AB	87.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-101.35	-434.4	-3962.8	1157.74	-22.	-26.	AB AB	87.0
	2	677.44	-469.8	-3943.8	-1024.04	-43.	-13.	AB AB	41.3
	3	1360.69	-382.1	-3917.1	-816.71	-55.	5.	AB AB	41.3
	4	1808.80	-250.2	-3896.9	-732.80	-63.	17.	AB AB	41.3
	5	2042.94	-126.9	-3874.5	-771.59	-67.	23.	AB AB	41.3
	6	2086.69	-15.6	-3849.1	-932.72	-68.	25.	AB C	41.3
	7	2102.69	101.8	-3821.1	-1215.97	-68.	25.	AB C	41.3
	8	1908.03	230.2	-3790.7	-1618.00	-64.	20.	AB AB	41.3
	9	1474.94	369.8	-3757.9	-2134.67	-56.	9.	AB AB	41.3
	10	1048.75	39.1	-3725.9	-122.98	-48.	-1.	AB AB	41.3
	11	1105.74	39.3	-3684.4	-755.12	-42.	3.	AB AB	87.0
2	11	1106.72	-266.8	-3681.5	-756.00	-42.	3.	AB AB	87.0
	12	1331.95	-89.1	-3540.8	-2453.98	-52.	7.	AB AB	41.3
	13	2163.65	-431.8	-3522.2	-1556.37	-67.	29.	AB C	41.3
	14	2924.44	-269.6	-3529.4	-832.24	-81.	49.	AB C	41.3
	15	3220.29	-125.9	-3567.1	-323.79	-87.	56.	AB C	41.3
	16	3207.04	2.5	-3605.2	-107.62	-87.	55.	AB C	41.3
	17	3143.41	125.5	-3642.0	-253.94	-86.	53.	AB C	41.3
	18	2813.80	256.9	-3666.2	-730.24	-80.	45.	AB C	41.3
	19	2082.33	409.2	-3682.4	-1469.42	-67.	26.	AB C	41.3
	20	1307.91	60.2	-3706.4	-2402.34	-52.	6.	AB AB	41.3
	21	1116.88	248.8	-3845.0	-608.95	-43.	2.	AB AB	87.0
3	21	1117.46	-227.4	-3856.8	-607.25	-43.	2.	AB AB	87.0
	22	1271.15	-252.4	-3879.6	-192.14	-53.	3.	AB AB	41.3
	23AI	1787.28	-294.1	-3914.8	-2416.05	-63.	16.	AB AB	41.3
	23AD	1757.79	-322.4	-3738.6	-2313.74	-61.	17.	AB AB	41.3
	24	2105.52	-169.2	-3768.4	-1722.46	-68.	26.	AB C	41.3
	25	2204.43	-44.2	-3802.1	-1238.00	-70.	28.	AB C	41.3
	26	2109.14	51.7	-3837.9	-890.67	-68.	25.	AB C	41.3
	27	2033.74	122.0	-3873.5	-714.08	-67.	23.	AB AB	41.3
	28	1807.48	245.3	-3895.7	-695.05	-63.	17.	AB AB	41.3
	29	1367.27	377.2	-3915.6	-798.71	-55.	5.	AB AB	41.3
	30	691.89	465.0	-3935.5	-1026.15	-43.	-12.	AB AB	41.3
	31	-79.12	429.6	-3948.8	-1268.34	-23.	-26.	AB AB	87.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-101.35	166.3	-3949.7	1157.74	-22.	-26.	AB AB	87.0
	2	-341.54	117.0	-3932.4	-1024.04	-24.	-39.	AB AB	41.3
	3	-444.24	87.1	-3917.1	-816.71	-22.	-41.	AB AB	41.3
	4	-572.68	111.0	-3896.9	-732.80	-19.	-45.	AB AB	41.3
	5	-729.30	136.2	-3874.5	-771.59	-16.	-48.	AB AB	41.3
	6	-914.13	159.3	-3849.1	1793.55	-12.	-53.	AB AB	41.3
	7	-1239.55	194.9	-3821.1	1490.50	-6.	-61.	AB AB	41.3
	8	-1634.29	231.7	-3790.7	1066.93	1.	-71.	AB AB	41.3
	9	-2102.54	269.9	-3757.9	527.05	10.	-83.	AB AB	41.3
	10	-2734.20	677.7	-3727.5	-122.98	22.	-99.	AB AB	41.3
	11	-3327.00	690.3	-3698.3	-755.12	37.	-98.	C AB	87.0
2	11	-3326.01	-1043.3	-3692.9	-756.00	37.	-98.	C AB	87.0
	12	-1690.02	-763.5	-3550.1	50.10	4.	-71.	AB AB	41.3
	13	-739.11	-203.9	-3522.2	938.38	-13.	-46.	AB AB	41.3
	14	-350.82	-121.8	-3529.4	-832.24	-20.	-36.	AB AB	41.3
	15	-142.41	-20.8	-3567.1	-323.79	-25.	-31.	AB AB	41.3
	16	-138.58	-4.2	-3605.2	-107.62	-25.	-31.	AB AB	41.3
	17	-219.30	20.4	-3642.0	-253.94	-24.	-33.	AB AB	41.3
	18	-461.45	109.2	-3666.2	-730.24	-19.	-40.	AB AB	41.3
	19	-820.44	181.3	-3682.4	1138.82	-13.	-49.	AB AB	41.3
	20	-1714.05	734.7	-3707.3	218.62	3.	-73.	AB AB	41.3
	21	-3315.85	1025.4	-3856.4	-608.95	35.	-98.	C AB	87.0
3	21	-3315.27	-878.2	-3870.7	-607.25	35.	-98.	C AB	87.0
	22	-2511.79	-890.8	-3891.8	-192.14	17.	-95.	AB AB	43.7
	23AI	-1790.20	-194.2	-3914.8	356.79	3.	-76.	AB AB	41.3
	23AD	-1819.69	-222.5	-3738.6	334.29	5.	-76.	AB AB	41.3
	24	-1436.81	-170.8	-3768.4	946.70	-2.	-66.	AB AB	41.3
	25	-1137.80	-137.3	-3802.1	1454.99	-8.	-58.	AB AB	41.3
	26	-891.67	-123.1	-3837.9	1827.67	-13.	-52.	AB AB	41.3
	27	-738.50	-141.1	-3873.5	-714.08	-16.	-49.	AB AB	41.3
	28	-574.00	-115.9	-3895.7	-695.05	-19.	-45.	AB AB	41.3
	29	-437.66	-92.0	-3915.6	-798.71	-22.	-41.	AB AB	41.3
	30	-327.09	-121.9	-3933.9	-1026.15	-24.	-38.	AB AB	41.3
	31	-79.12	-171.3	-3955.2	1134.32	-23.	-26.	AB AB	87.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-123.87	-264.8	-4835.9	1415.02	-27.	-32.	AB AB	87.0
	2	343.63	-318.9	-4815.7	-1251.60	-43.	-28.	AB AB	41.3
	3	853.17	-302.9	-4787.6	-998.20	-52.	-14.	AB AB	41.3
	4	1223.76	-230.7	-4762.9	-895.65	-59.	-5.	AB AB	41.3
	5	1476.04	-166.8	-4735.5	-943.06	-63.	2.	AB AB	41.3
	6	1633.59	-115.3	-4704.4	-1139.99	-66.	6.	AB AB	41.3
	7	1858.92	-57.6	-4670.3	-1486.19	-70.	12.	AB AB	41.3
	8	1968.41	11.4	-4633.1	-1977.56	-72.	16.	AB AB	41.3
	9	1933.34	91.9	-4593.0	-2609.05	-71.	15.	AB AB	41.3
	10	1997.37	-300.5	-4548.7	-150.31	-72.	17.	AB AB	41.3
	11	2395.93	-308.1	-4492.8	-922.93	-70.	27.	AB C	87.0
2	11	2397.13	76.2	-4491.8	-924.01	-70.	27.	AB C	87.0
	12	2004.40	253.9	-4323.8	-2999.30	-70.	19.	AB AB	41.3
	13	2139.92	-167.0	-4304.9	-1902.23	-72.	22.	AB AB	41.3
	14	2382.11	-85.4	-4313.7	-1017.18	-77.	29.	AB C	41.3
	15	2345.38	-28.2	-4359.8	-395.74	-77.	27.	AB C	41.3
	16	2205.35	6.2	-4406.4	-131.54	-74.	23.	AB AB	41.3
	17	2236.51	34.2	-4451.4	-310.37	-75.	24.	AB AB	41.3
	18	2217.08	76.4	-4480.9	-892.52	-75.	23.	AB AB	41.3
	19	1995.82	145.8	-4500.8	-1795.95	-71.	17.	AB AB	41.3
	20	1915.41	-282.8	-4526.2	-2936.19	-70.	15.	AB AB	41.3
	21	2339.00	-91.8	-4691.7	-744.28	-70.	24.	AB C	87.0
3	21	2339.71	73.6	-4703.7	-742.20	-70.	24.	AB C	87.0
	22	2202.15	35.1	-4736.7	-234.83	-77.	21.	AB AB	41.3
	23AI	2255.48	-4.1	-4784.8	-2952.95	-78.	22.	AB AB	41.3
	23AD	2219.44	-38.6	-4569.4	-2827.91	-76.	23.	AB AB	41.3
	24	2157.63	58.4	-4605.9	-2105.23	-75.	21.	AB AB	41.3
	25	1938.57	123.4	-4647.0	-1513.11	-71.	15.	AB AB	41.3
	26	1623.77	154.8	-4690.7	-1088.59	-66.	6.	AB AB	41.3
	27	1435.00	156.2	-4734.3	-872.76	-63.	1.	AB AB	41.3
	28	1199.81	220.1	-4761.4	-849.50	-58.	-5.	AB AB	41.3
	29	846.31	292.3	-4785.7	-976.20	-52.	-15.	AB AB	41.3
	30	353.84	308.4	-4807.2	-1254.18	-43.	-28.	AB AB	41.3
	31	-96.70	254.3	-4820.9	-1550.20	-28.	-31.	AB AB	87.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-123.87	336.0	-4822.9	1415.02	-27.	-32.	AB AB	87.0
	2	-675.35	267.8	-4804.3	-1251.60	-24.	-54.	AB AB	41.3
	3	-951.75	166.3	-4787.6	-998.20	-19.	-61.	AB AB	41.3
	4	-1157.72	130.5	-4762.9	-895.65	-15.	-66.	AB AB	41.3
	5	-1296.19	96.3	-4735.5	-943.06	-12.	-70.	AB AB	41.3
	6	-1367.23	59.6	-4704.4	2192.12	-11.	-71.	AB AB	41.3
	7	-1483.31	35.6	-4670.3	1821.72	-8.	-74.	AB AB	41.3
	8	-1573.91	12.9	-4633.1	1304.02	-6.	-76.	AB AB	41.3
	9	-1644.14	-8.0	-4593.0	644.17	-5.	-78.	AB AB	41.3
	10	-1785.57	338.1	-4550.3	-150.31	-2.	-81.	AB AB	41.3
	11	-2036.81	342.9	-4506.7	-922.93	9.	-73.	AB AB	87.0
2	11	-2035.60	-700.3	-4503.2	-924.01	9.	-73.	AB AB	87.0
	12	-1017.57	-420.4	-4333.1	61.23	-14.	-59.	AB AB	41.3
	13	-762.84	60.9	-4304.9	1146.90	-19.	-53.	AB AB	41.3
	14	-893.15	62.4	-4313.7	-1017.18	-16.	-56.	AB AB	41.3
	15	-1017.33	76.9	-4359.8	-395.74	-14.	-60.	AB AB	41.3
	16	-1140.27	-0.4	-4406.4	-131.54	-13.	-63.	AB AB	41.3
	17	-1126.20	-70.9	-4451.4	-310.37	-13.	-63.	AB AB	41.3
	18	-1058.17	-71.3	-4480.9	-892.52	-15.	-62.	AB AB	41.3
	19	-906.95	-82.0	-4500.8	1391.90	-18.	-58.	AB AB	41.3
	20	-1106.56	391.7	-4527.0	267.21	-14.	-63.	AB AB	41.3
	21	-2093.73	684.9	-4703.2	-744.28	9.	-76.	AB AB	87.0
3	21	-2093.02	-577.2	-4717.5	-742.20	8.	-76.	AB AB	87.0
	22	-1580.80	-603.3	-4748.9	-234.83	-7.	-77.	AB AB	41.3
	23AI	-1322.00	95.8	-4784.8	436.08	-12.	-71.	AB AB	41.3
	23AD	-1358.04	61.3	-4569.4	408.58	-10.	-70.	AB AB	41.3
	24	-1384.70	56.9	-4605.9	1157.07	-10.	-71.	AB AB	41.3
	25	-1403.66	30.3	-4647.0	1778.32	-10.	-72.	AB AB	41.3
	26	-1377.05	-20.1	-4690.7	2233.82	-10.	-71.	AB AB	41.3
	27	-1337.24	-107.0	-4734.3	-872.76	-11.	-71.	AB AB	41.3
	28	-1181.67	-141.2	-4761.4	-849.50	-15.	-67.	AB AB	41.3
	29	-958.62	-176.9	-4785.7	-976.20	-19.	-61.	AB AB	41.3
	30	-665.15	-278.5	-4805.5	-1254.18	-24.	-54.	AB AB	41.3
	31	-96.70	-346.7	-4827.3	1386.39	-28.	-31.	AB AB	87.0

COMPROBACION A RASANTE

Calculo de Comprobacion a Rasante

Datos generales

Limite elastico del acero pasivo	=	5100.00	kg/cm2
Coeficiente del acero pasivo	=	1.15	
Limite elastico de acero activo	=	19000.00	kg/cm2
Coeficiente del acero activo	=	1.10	
Resistencia caracteristica del hormigon	=	400.00	kg/cm2
Coeficiente del hormigon	=	1.50	
Coef. mayoracion Cargas muertas y Peso propio .	=	1.50	
Coef. mayoracion Sobrecargas	=	1.50	

Calculo de Comprobacion a Rasante

Datos secciones/momentos estaticos

V.	Sec	M.Estatico m3	M.Estatico m3	M.Estatico m3
1	1	0.642		
	2	0.642		
	3	0.642		
	4	0.642		
	5	0.642		
	6	0.642		
	7	0.642		
	8	0.642		
	9	0.642		
	10	0.642		
	11	0.642		
2	11	0.642		
	12	0.642		
	13	0.642		
	14	0.642		
	15	0.642		
	16	0.642		
	17	0.642		
	18	0.642		
	19	0.642		
	20	0.642		
	21	0.642		
3	21	0.642		
	22	0.642		
	23AI	0.642		
	23AD	0.642		
	24	0.642		
	25	0.642		
	26	0.642		
	27	0.642		
	28	0.642		
	29	0.642		
	30	0.642		
	31	0.642		

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	166.4	1.420	5.4				
	2	117.0	1.097	4.2				
	3	87.1	0.816	3.1				
	4	111.0	1.040	4.0				
	5	136.2	1.276	4.9				
	6	197.4	1.850	7.0				
	7	311.9	2.923	11.1				
	8	445.4	4.174	15.9				
	9	590.1	5.530	21.1				
	10	732.6	6.866	26.2				
	11	747.4	6.377	24.3				
2	11	266.8	2.276	8.7				
	12	89.1	0.835	3.2				
	13	14.9	0.139	0.5				
	14	48.7	0.456	1.7				
	15	85.7	0.804	3.1				
	16	89.4	0.838	3.2				
	17	207.9	1.949	7.4				
	18	373.8	3.503	13.3				
	19	582.4	5.458	20.8				
	20	819.6	7.681	29.3				
	21	1078.0	9.198	35.0				
3	21	227.4	1.940	7.4				
	22	252.4	2.365	9.0				
	23AI	56.1	0.526	2.0				
	23AD	27.9	0.261	1.0				
	24	72.9	0.683	2.6				
	25	99.7	0.935	3.6				
	26	107.2	1.004	3.8				
	27	122.0	1.144	4.4				
	28	245.3	2.299	8.8				
	29	377.2	3.535	13.5				
	30	465.0	4.358	16.6				
	31	429.6	3.666	14.0				

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	434.5	3.708	14.1				
	2	469.9	4.404	16.8				
	3	382.1	3.581	13.6				
	4	250.2	2.345	8.9				
	5	126.9	1.190	4.5				
	6	71.0	0.666	2.5				
	7	42.0	0.394	1.5				
	8	11.9	0.112	0.4				
	9	19.6	0.183	0.7				
	10	39.1	0.367	1.4				
	11	39.3	0.335	1.3				
2	11	1096.0	9.351	35.6				
	12	848.5	7.952	30.3				
	13	605.0	5.670	21.6				
	14	386.4	3.621	13.8				
	15	208.3	1.952	7.4				
	16	84.5	0.792	3.0				
	17	86.1	0.807	3.1				
	18	61.3	0.574	2.2				
	19	7.8	0.073	0.3				
	20	60.2	0.564	2.1				
	21	248.8	2.123	8.1				
3	21	935.4	7.981	30.4				
	22	945.9	8.865	33.8				
	23AI	514.4	4.821	18.4				
	23AD	542.6	5.085	19.4				
	24	384.4	3.603	13.7				
	25	254.2	2.382	9.1				
	26	161.3	1.511	5.8				
	27	141.1	1.322	5.0				
	28	115.9	1.086	4.1				
	29	92.0	0.862	3.3				
	30	121.9	1.143	4.4				
	31	171.3	1.461	5.6				

Pac 2 tes (V2) $R_{uex} = 243t$

$R_{ui} = \frac{462}{2} - 243 = -12t$

Pac 2 tes ($V_1 + V_2$) $R_{uex} = 222t$

$R_{ui} = 462 - 222 = 180t$

ACCIONES VERTICALES (POR FUSTE)

POR PESO PROPIO = $0.5 \times 867,79 = 433,9t$

POR PRETENSADO = $-0.5 \times 64,58 = -32,29t$

POR CARGA PERM = $0.5 \times 298,99 = 149,50$

POR DESCENSO AP = $0.5 \times 6,93 = 3,47t$

POR GRAD. TERMICO = —

POR SOBRECARGA = 284 ton.

TOTAL = 229 ton

ACCIONES LONGITUDINALES

Se supone en la vida útil $\mu = 0.05 \times CP$

$F_L = 0.05 \times (433,9 - 32,29 + 149,50) = 27,64$ / fuste

ACCIONES TRANSVERSALES

FUERZA CENTRIFUGA

a) PARA TREN LIGERO $V = 200$ km/h

$F_C = Q \cdot \frac{V^2}{127R}$

Q = 10 t/ml

R = 4250 m

$F_C = 10 \times \frac{200^2}{127 \times 4250} = 0.43$ t/ml/vía

b) Para Tte U.I.C L = 3000 V = 300 km/h

$F_C = Q \times f \times \frac{V^2}{127 R} = 8 \times 0.45 \times \frac{300^2}{127 \times 4250} = 0.35$ t/ml/vía

Valor a considerar en los hilos

$F_C = 0.43 \times \frac{20+26}{2} = 9.89$ t/vía (mi 2 hilos)

Momento respecto a c de g.

$M = 9.89 (1.8 + 0.7 + 0.78) = 32,25$ mt/vía

$\Delta u = \frac{32.25}{3.60} = 8.96$ t/vía

ACCIÓN DEL VIENTO

$l_h = 1.90 + 1.00 = 2.90$

$f_V = 2.90 \times 0.20 = 0.58$ t/ml → $0.58 \times 23 = 13.3$ t/m

Referido a c de g

$M_V = 13.30 \times (1.80 - 1.108) = 9.20$ mt.

$\Delta u = \frac{9.20}{3.60} = 2.60$ t/hilo

b) En SERVICIO

$l_h = 2.90 + 3.50 = 6.40$ m

$f_V = 6.40 \times 0.20 = 1.28$ t/ml. → $1.28 \times 23 = 29.44$ t

Referido a c de g

$M = 29.44 \times \left(\frac{6.40}{2} - 1.108\right) = 61.6$ mt/vía

$\Delta u = \frac{61.6}{3.60} = 17.10$ t

Con dos tte

$f_V = 2.90 \times 0.20 + 3.50 \times 0.20 \times 1.20 = 0.52 + 0.84 = 1.42$ t

Ofrecida a $1.42 \times 23 = 32.7$ t.

$M = 32.7 \times (3.20 - 1.108) = 68.40$ mt

$\Delta u = \frac{68.40}{3.60} = 19.0$ t/vía

EFECTO LAZO

PARA 1 tte

$F_L = 10$ T/vía

$d = 0.80 + 0.734 = 1.534$ m

$M = 10 \times 1.532 = 15.32$ mt.

$\Delta u = \frac{15.32}{3.60} = 4.25$ t.

DAKE 2 Tens

F = 20 t

ΔV = 830 ton

HIPOTESIS 1 (PP + VACIO)

CARGAS ACTUANTES (VALORES POR FUSTE)

VERTICALES

PESO FUSTE = 23.4 ton

P. LOSA = 28.9 t

PRETENSADO = -32.79 t

C. DE VIA = 149.10t

DESC. APOYOS = 3.47

GRAD TERMICO = —

VIENTO LATERAL = 12.8 t.

N' = 1.35(23.4 + 28.9 - 32.79 + 149.10) + 1.50 × 2.6 =

= 776.4 = 780 ton

LONGITUDINAL (NOS. teflon) = 27.55 t

TRANSVERSAL viato lateral = 0.5 × 133 = 66.5 t.

VALORES PARA DIMENSIONAMIENTO

N' = 780 ton

$F' = \sqrt{(1.50 \times 27.55)^2 + (1.5 \times 66.5)^2} = 42.51$ t

$M' = 42.51 \times 6.86 + 480 \times 0.005 = 295.5$ M.

$P_C = 2687$ t

$$\gamma = \frac{480}{2687} = 0.30$$

$$\mu = \frac{295.5}{1.38 \times 2687} = 0.08$$

$\left.\begin{array}{l}\gamma = 0.30 \\ \mu = 0.08\end{array}\right\}$ $\omega = 0.04$

HIPOTESIS II VIENTE CARGADO con 2 vías

CARGAS ACTUANTES.

VERTICALES	PESO FUSTE	= 237 t
	PLOSA	= 433.9 t
	Pretensado	= -32.29 t
	C PERMAN	= 149.50
	Desc sobre	= 3.47
	Sob térmico	= ———
	Sobrecarga	= 282 ton
	Fza centrífuga	= 11.97 t

$N' = 1.35(237 + 4339 - 32.29 + 149.50) + 1.5(3.47 + 282 + 11.97) =$

$= 826 + 455 = 1281$ ton

LONGITUDINAL POR TEFLONES 21.77 ton

$F'_L = 21.77 \times 1.50 = 41$ ton

TRANSVERSAL EFECTO LAZO + F_{ZA} CENTRIFUGA

$F'_T = (8.50 + 19.78) \times 1.5 = 42.42$ ton

VALORES PARA DIMENSIONAMIENTO

$N' = 1281$ ton

$F' = \sqrt{41^2 + 42.42^2} = 59$ ton

$M' = 59 \times 6.86 + 1269 \times 0.005 = 405 + 6 = 411$ M

$P_C = 2687$ t

$$\gamma = \frac{1281}{2687} = 0.48$$

$$\mu = \frac{411}{1.38 \times 2687} = 0.11$$

$\left.\begin{array}{l}\gamma = 0.48 \\ \mu = 0.11\end{array}\right\}$ $\omega = 0.12$

HIPOTESIS III (PP con 2 vías + viento)

VERTICALES	PESO FUSTE	= 237 t
	PLOSA	= 433.9 t
	Pretensado	= -32.29 t
	C PERM	= 149.50 t

DESC. ADOTOS = 3.47 t

Grad terreno = ——

Sobrecarga = 282 t

Fz centrifuga = 8,96 t.

viento = 19.0 t.

$N' = 1.35\left(23.7 + 4339 - 32.29 + 149.5\right) + 1.5\left(8.50 + 282\right) +$

$+ 1.5 \times 0.6\left(19.0\right) = 776 + 435 + 17 = 1228\ t$

MOMENTOS DOS TRAMOS = 24.55 t.

$F_L = 24.55 \times 1.5 = 41.0\ t$

TRANSVERSAL E.LAZO + Fcent + 0.6 Viento

$F'_T = (8.50 + 19.78) \times 1.50 + 1.50 \times 0.6 \times 1330 =$

$= 4242 + 12 = 54.42$ ton.

VALORES PARA DIMENSIONAMIENTO

$N' = 1228\ t$

$F' = \sqrt{41^2 + 54.42^2} = 68,1\ t$

$\mu' = 68.1 \times 6.86 + 1228 \times 0.005 = 473\ mt$

$\Delta c = 1627\ t$

$\nu = \frac{1274}{2687} = 0.46$

$\mu = \frac{473}{1.38 \times 2687} = 0.13$

$\left.\begin{matrix}\\\\\end{matrix}\right\} w = 0.16$

HIPOTESIS IV : Igual que la II pero con un solo tren

$N' = 1.35\left(23.7 + 4339 - 32.29 + 149.50\right) + 1.5\left(276 + 425 + 3.47 + 284\right) = 776 + 406 = 1182\ ton$

$F'_L = 24.55 \times 1.50 = 41\ t$

$F'_T = \left(4.25 + 9.89\right) \times 1.5 = 21,21$

VALORES PARA DIMENSIONAMIENTO

$N' = 1182\ ton$

$F' = \sqrt{41^2 + 21.21^2} = 46\ t$

$\mu' = 46 \times 6.86 + 1182 \times 0.005 = 315 + 6 = 321\ mt$

$\Delta c = 2687\ t$

$\nu = \frac{1182}{2687} = 0.44$

$\mu = \frac{321}{1.38 \times 2687} = 0.09$

$\left.\begin{matrix}\\\\\end{matrix}\right\} 0.04$

HIPOTESIS I Igual que la III en sobrecarga.

$N = 1.35(237 + 4239 - 32.29 + 149.5) + 1.5(4,25 + 2,84)$

$+ 1,5 \times 0.6(11.16) = 776 + 432 + 15 = 1223\,t$

$F'_L = 27.55 \times 1.5 = 41.0$ ton

$F'_T = (4,25 + 9.39) \times 1.50 + 1.50 \times 0.6 \times 14.12 = 34,46$ t

Bloque para diafragmatico

$N' = 1273$ t

$F' = \sqrt{41.2 + 34.46^2} = 53.6$ ton

$M' = 53.6 \times 0.86 + 1273 \times 0.005 \cdot 368 + 6 = 374$ m·t

$A_C = 2687$ t

$\gamma = \frac{1273}{2687} - 0.45$

$\mu = \frac{374}{1.35 \times 2687} - 0.10$

$\Big\} \omega = 0.07$

Se dispone como armadura longitudinal

$\omega = 0.16 \times 2687 \times 1.15 / 5{,}1 = 96\,cm^2 \rightarrow 7\phi 25$

Es decir la misma disposición en el lado libre del tablero.

PAGE NO. 1

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*****************************************************
*                                                   *
*           S T A A D - III                         *
*           Revision 17.0a                          *
*           Proprietary Program of                  *
*           RESEARCH ENGINEERS, Inc.                *
*           Date=    JUL 19, 1999                   *
*           Time=    10:22:45                       *
*                                                   *
*****************************************************

 1. STAAD FLOOR LAV MADRID-ZARAGOZA. LOSA VANOS 20+26+20
 2. *REACCIONES VERTICALES SOBRE LAS PILAS
 3. UNIT METER MTON
 4. JOINT COORDINATES
 5. 101    0.000   0.000  -3.750  110  18.000   0.000  -3.750
 6. 111   20.000   0.000  -3.750  120  43.400   0.000  -3.750
 7. 121   46.000   0.000  -3.750  131  66.000   0.000  -3.750
 8. 201    0.000   0.000  -1.050  210  18.000   0.000  -1.050
 9. 211   20.000   0.000  -1.050  220  43.400   0.000  -1.050
10. 221   46.000   0.000  -1.050  231  66.000   0.000  -1.050
11. 301    0.000   0.000   1.050  310  18.000   0.000   1.050
12. 311   20.000   0.000   1.050  320  43.400   0.000   1.050
13. 321   46.000   0.000   1.050  331  66.000   0.000   1.050
14. 401    0.000   0.000   3.750  410  18.000   0.000   3.750
15. 411   20.000   0.000   3.750  420  43.400   0.000   3.750
16. 421   46.000   0.000   3.750  431  66.000   0.000   3.750
17. 10001  0.000   0.000  -2.150
18. 10002 20.000   0.000  -1.800
19. 10003 46.000   0.000  -1.800
20. 10004 66.000   0.000  -2.150
21. 10011  0.000   0.000   2.150
22. 10012 20.000   0.000   1.800
23. 10013 46.000   0.000   1.800
24. 10014 66.000   0.000   2.150
25. MEMBER INCIDENCES
26.    101  101  102
27.    R    29   1    1
28.    RA   3    100  100
29.    1101 101  201
30.    R    30   1    1
31.    1201 201  301
32.    R    30   1    1
33.    1301 301  401
34.    R    30   1    1
35. 10001  101   10001
36. 10002  10001 201
37. 10011  111   10002
38. 10012  10002 211
39. 10021  121   10003
40. 10022  10003 221
41. 10031  131   10004
42. 10032  10004 231
43. 10101  301   10011
44. 10102  10011 401
45. 10111  311   10012
46. 10112  10012 411
47. 10121  321   10013
```

```
48. 10122  10013 421
49. 10131  131   10014
50. 10132  10014 431
51. DELETE MEMBER 1101 1111 1121 1131 1301 1311 1321 1331
52. MEMBER PROPERTY
53. 101  TO  130  PR  AX  3.7040  IX  0.1829  IZ  1.0080
54. 201  TO  230  PR  AX  2.8500  IX  0.1829  IZ  1.1340
55. 301  TO  330  PR  AX  2.8500  IX  0.1829  IZ  1.1340
56. 401  TO  430  PR  AX  3.7040  IX  0.1829  IZ  1.0080
57. 1102 TO 1110  PR  AX  1.4000  IX  0.0340  IZ  0.0143
58. 1112 TO 1120  PR  AX  1.4000  IX  0.0340  IZ  0.0143
59. 1122 TO 1130  PR  AX  1.4000  IX  0.0340  IZ  0.0143
60. 1201 TO 1231  PR  AX  1.4000  IX  0.0340  IZ  0.0143
61. 1302 TO 1310  PR  AX  1.4000  IX  0.0340  IZ  0.0143
62. 1312 TO 1320  PR  AX  1.4000  IX  0.0340  IZ  0.0143
63. 1322 TO 1330  PR  AX  1.4000  IX  0.0340  IZ  0.0143
64. 10001   10002 PR  AX  1.4000  IX  0.0340  IZ  0.0143
65. 10011   10012 PR  AX  1.4000  IX  0.0340  IZ  0.0143
66. 10021   10022 PR  AX  1.4000  IX  0.0340  IZ  0.0143
67. 10031   10032 PR  AX  1.4000  IX  0.0340  IZ  0.0143
68. 10101   10102 PR  AX  1.4000  IX  0.0340  IZ  0.0143
69. 10111   10112 PR  AX  1.4000  IX  0.0340  IZ  0.0143
70. 10121   10122 PR  AX  1.4000  IX  0.0340  IZ  0.0143
71. 10131   10132 PR  AX  1.4000  IX  0.0340  IZ  0.0143
72. CONSTANTS
73. E   3250000.  ALL
74. DEN  7.85      ALL
75. POI  0.15      ALL
76. SUPPORTS
77. 10001 TO 10004    PINNED
78. 10011 TO 10014    PINNED
79. LOADING 1 UN TREN A TODO LO LARGO CON RIPADO DE 30 CM (VIA 1)
80. MEMBER LOAD
81. *TREN SOBRE VIA 1
82. *SOBRECARGA DE 0.40 EN ACERA CORRESPONDIENTE
83. 101 TO 130  UNI GY  -6.775
84. 201 TO 230  UNI GY  -5.225
85. 101 TO 130  UNI GY  -0.600
86. 101 TO 130  UMOM GX -1.500
87. LOADING 2 UN TREN A TODO LO LARGO CON RIPADO DE 30 CM (VIA 2)
88. MEMBER LOAD
89. *TREN SOBRE VIA 2
90. *SOBRECARGA DE 0.40 EN ACERA CORRESPONDIENTE
91. 301 TO 330  UNI GY  -7.840
92. 401 TO 430  UNI GY  -4.160
93. 401 TO 430  UNI GY  -0.600
94. 401 TO 430  UMOM GX -1.500
95. LOADING COMBINATION 3
96. 1  1.00  2  1.00
97. PERFORM ANALISIS
```


P R O B L E M S T A T I S T I C S

```
NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =   132/  221/    8
ORIGINAL/FINAL BAND-WIDTH =  124/    6
TOTAL PRIMARY LOAD CASES  =    2, TOTAL DEGREES OF FREEDOM =   388
SIZE OF STIFFNESS MATRIX =    8148 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE =   12.48 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX.              10:22:49
++ PROCESSING GLOBAL STIFFNESS MATRIX.               10:22:49
++ PROCESSING TRIANGULAR FACTORIZATION.              10:22:49
++ CALCULATING JOINT DISPLACEMENTS.                  10:22:49
++ CALCULATING MEMBER  FORCES.                       10:22:49

  98. LOAD LIST ALL
  99. PRINT REACC ALL
```

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = FLOOR

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
10001	1	0.00	113.74	0.00	0.00	0.00	0.00
	2	0.00	-0.72	0.00	0.00	0.00	0.00
	3	0.00	113.03	0.00	0.00	0.00	0.00
10002	1	0.00	398.76	0.00	0.00	0.00	0.00
	2	0.00	-7.27	0.00	0.00	0.00	0.00
	3	0.00	391.49	0.00	0.00	0.00	0.00
10003	1	0.00	398.87	0.00	0.00	0.00	0.00
	2	0.00	-17.65	0.00	0.00	0.00	0.00
	3	0.00	381.22	0.00	0.00	0.00	0.00
10004	1	0.00	113.47	0.00	0.00	0.00	0.00
	2	0.00	7.28	0.00	0.00	0.00	0.00
	3	0.00	120.75	0.00	0.00	0.00	0.00
10011	1	0.00	-21.02	0.00	0.00	0.00	0.00
	2	0.00	93.92	0.00	0.00	0.00	0.00
	3	0.00	72.91	0.00	0.00	0.00	0.00
10012	1	0.00	-75.07	0.00	0.00	0.00	0.00
	2	0.00	327.24	0.00	0.00	0.00	0.00
	3	0.00	252.17	0.00	0.00	0.00	0.00
10013	1	0.00	-77.21	0.00	0.00	0.00	0.00
	2	0.00	346.26	0.00	0.00	0.00	0.00
	3	0.00	269.06	0.00	0.00	0.00	0.00
10014	1	0.00	-19.95	0.00	0.00	0.00	0.00
	2	0.00	82.52	0.00	0.00	0.00	0.00
	3	0.00	62.58	0.00	0.00	0.00	0.00

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

100. PLOT BEND FILE
101. PLOT DISP FILE
102. FINISH

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

**** DATE= JUL 19,1999 TIME= 10:23: 1 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

CALCULO DE LOS ESTRIBOS

ESTRIBO 1 (ANCLADO)

```
250.0,5100.0,0.04,1
1.800,30.0,0.00,3.00,0.00,0.00,1
VIADUCTO 3. ESTRIBO 1
    .45,272.94,423.70,40.00,101.391,0.0,0.0
     5.20,2.50,7.90,0.50,2.00,0.40,14.00,0.0,2.50,9.00,00.0,3
```

CALCULO DE ESTRIBOS. VERSION 09-01-1996

PROGRAMA PROPIEDAD DE INTECSA

VIADUCTO 3. ESTRIBO 1

CARACTERISTICAS DEL RELLENO

PESO ESPECIFICO (TN/M3)	=	1.80
ANGULO DE ROZAMIENTO FI	=	30.00
ANGULO ROZAMIENTO TERRENO-MURO	=	.00
SOBRECARGA (TN/M2)	=	3.00
COEFICIENTE DE EMPUJE ACTIVO	=	.333

CARACTERISTICAS DE LOS MATERIALES

RESISTENCIA CARACTERISTICA DEL HORMIGON	=	250. KG/CM2
LIMITE ELASTICO DEL ACERO	=	5100. KG/CM2
RECUBRIMIENTO DE LAS ARMADURAS	=	.040 M

CARGAS SOBRE EL ESTRIBO

CARGA VERTICAL DE TABLERO PESO PROPIO Y CARGA PERMANENTE	265.5 TN
CARGA VERTICAL DE SOBRECARGAS	272.9 TN
FUERZA LONGITUDINAL DE FRENADO RETRACCION Y TEMPERATURA	423.7 TN
FUERZA TRANSVERSAL DE VIENTO	40.0 TN
MOMENTO TRANSVERSAL DE SOBRECARGAS	101.4 MT
FUERZA LONGITUDINAL DE SISMO	.0 TN
FUERZA TRANSVERSAL DE SISMO	.0 TN

GEOMETRIA DEL ESTRIBO
=====================

ANCHURA DEL ESTRIBO	B	= 14.00
ESVIAJE (GRADOS SEXAGESIMALES)	BETA	= .00

ALZADO DEL ESTRIBO

ESPESOR DEL FALDON	A3	= 2.50
ALTURA DEL FALDON	A6	= 2.00
DISTANCIA DE APOYO A BORDE ESTRIBO	A5	= .50
ESPESOR DEL ESTRIBO	A2	= 5.20
ESPESOR DE LAS ALETAS	A7	= .40
ALTURA TOTAL DEL ESTRIBO	H + C	= 11.50
ALTURA DE TIERRAS	H	= 9.00

ZAPATA

VUELO DELANTERO	A1	= 3.40
VUELO TRASERO	A4	= 7.90
LONGITUD TOTAL	L	= 16.50
CANTO	C	= 2.50
RESGUARDO SOBRE ZAPATA		= 0.30
TENSION MEDIA PEDIDA SOBRE TERRENO		= LIBRE

ESTRIBO CON RELLENO DE TIERRAS Y SIN TABLERO
==

ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	= 5016.3 TN.
MOMENTO LONGITUDINAL	= -3052.2 M.T.
EMPUJE LONGITUDINAL	= 716.5 TN.

ESTRIBO CON PUENTE EN SERVICIO
==========

ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	=	5554.7 TN.
MOMENTO LONGITUDINAL	=	3315.0 M,T.
EMPUJE LONGITUDINAL	=	1140.2 TN.
MOMENTO TRANSVERSAL	=	481.4 M.T.

VIADUCTO 3. ESTRIBO 1

Con TIERRAS y SIN AB.

$F_x = 716$

$F_y = -5016$

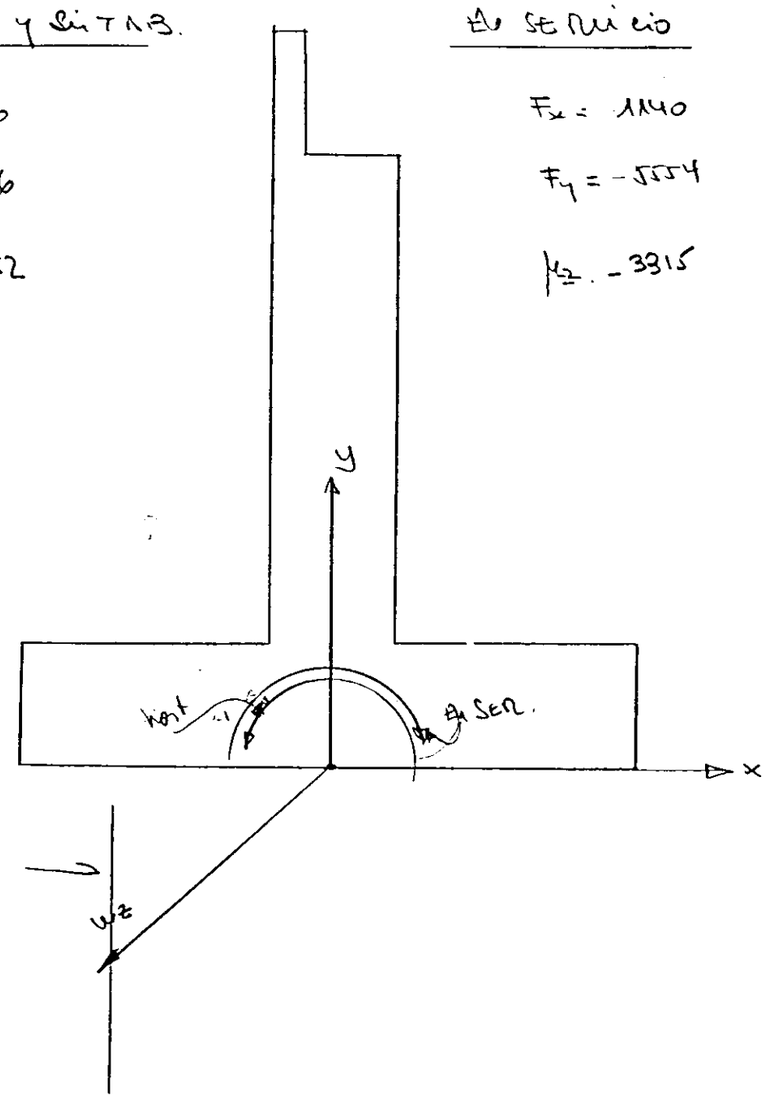
$M_z = 3052$

En Servicio

$F_x = 1140$

$F_y = -5554$

$M_z = -3315$



```
 ************************************************
 *                                              *
 *          S T A A D - III                     *
 *          Revision 17.0a                      *
 *          Proprietary Program of              *
 *          RESEARCH ENGINEERS, Inc.            *
 *          Date=    JUL 23, 1999               *
 *          Time=    10:53:23                   *
 *                                              *
 ************************************************

  1. STAAD PLANE VIADUCTO 3 ESTRIBO 1
  2. *EFECTOS CARGAS GRAVITATORIAS
  3. UNIT MTO MET
  4. JOINT COORDINATES
  5.   1  -6.750   -25.000
  6.   2  -2.250   -25.000
  7.   3   2.250   -25.000
  8.   4   6.750   -25.000
  9.  11  -6.750   -20.000
 10.  12  -2.250   -20.000
 11.  13   2.250   -20.000
 12.  14   6.750   -20.000
 13.  21  -6.750   -15.000
 14.  22  -2.250   -15.000
 15.  23   2.250   -15.000
 16.  24   6.750   -15.000
 17.  31  -6.750   -10.000
 18.  32  -2.250   -10.000
 19.  33   2.250   -10.000
 20.  34   6.750   -10.000
 21.  41  -6.750    -5.000
 22.  42  -2.250    -5.000
 23.  43   2.250    -5.000
 24.  44   6.750    -5.000
 25.  51  -6.750      .000
 26.  52  -2.250      .000
 27.  53   2.250      .000
 28.  54   6.750      .000
 29. MEMBER INCIDENCES
 30.   1    1    11
 31.   R    4    10   10
 32.   2    2    12
 33.   R    4    10   10
 34.   3    3    13
 35.   R    4    10   10
 36.   4    4    14
 37.   R    4    10   10
 38.   51   51    52
 39.   52   52    53
 40.   53   53    54
 41. MEMBER PROPERTY
 42. *PILOTES  4 * 4 PILOTES
 43. 1 11 21 31 41      PR AX  7.062 IZ  0.99325
 44. 2 12 22 32 42      PR AX  7.062 IZ  0.99325
 45. 3 13 23 33 43      PR AX  7.062 IZ  0.99325
 46. 4 14 24 34 44      PR AX  7.062 IZ  0.99325
 47. *ENCEPADO (1.5+4.5+4.5+1.5)*2.5
```



```
 48. 51 52 53           PR AX 30.000 IZ  15.6257
 49. CONSTANT
 50. E  3250000.   ALL
 51. POI 0.15
 52. DEN 2.50
 53. SUPPORT
 54. 1 2 3 4       PINNED
 55. 11 12 13 14  FIXED BUT FY MZ KFX  163200
 56. 21 22 23 24  FIXED BUT FY MZ KFX  163200
 57. 31 32 33 34  FIXED BUT FY MZ KFX   85040
 58. 41 42 43 44  FIXED BUT FY MZ KFX    6800
 59. LOADING 1 RELLENO DE TIERRAS Y SIN TABLERO
 60. MEMBER LOAD
 61. *PROCEDENTE DE CALCULO DE ESTRIBO
 62. 52        CON  GY -5016
 63. 52        CON  GX   716
 64. 52        CMOM GZ  2989
 65. MEMBER LOAD
 66. *EMPUJE DE TIERRAS SOBRE PILOTES
 67. 41            UNI GX  88.00
 68. 31            UNI GX  44.00
 69. 42            UNI GX  44.00
 70. 32            UNI GX  22.00
 71. LOADING 2 PUENTE EN SERVICIO
 72. MEMBER LOAD
 73. *PROCEDENTE DE CALCULO DE ESTRIBO
 74. 52        CON  GY -5554
 75. 52        CON  GX  1140
 76. 52        CMOM GZ -3315
 77. MEMBER LOAD
 78. *EMPUJE DE TIERRAS SOBRE PILOTES
 79. 41            UNI GX  88.00
 80. 31            UNI GX  44.00
 81. 42            UNI GX  44.00
 82. 32            UNI GX  22.00
 83. LOADING COMBINATION 3
 84. 1 1.50
 85. LOADING COMBINATION 4
 86. 2 1.50
 87. PERFORM ANALISIS


      P R O B L E M   S T A T I S T I C S
      -----------------------------------

   NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    24/   23/   20
   ORIGINAL/FINAL BAND-WIDTH =     4/    3
   TOTAL PRIMARY LOAD CASES  =     2, TOTAL DEGREES OF FREEDOM =    64
   SIZE OF STIFFNESS MATRIX =      768 DOUBLE PREC. WORDS
   TOTAL REQUIRED DISK SPACE =   12.05 MEGA-BYTES


++ PROCESSING ELEMENT STIFFNESS MATRIX.              10:53:24
++ PROCESSING GLOBAL STIFFNESS MATRIX.               10:53:24
++ PROCESSING TRIANGULAR FACTORIZATION.              10:53:24
++ CALCULATING JOINT DISPLACEMENTS.                  10:53:24
++ CALCULATING MEMBER  FORCES.                       10:53:25

 88. LOAD LIST  1 2 3 4
```

89. PRINT MEMBER FORCES LIST 41 42 43 44

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
41	1	41	393.92	278.71	0.00	0.00	0.00	-547.02
		51	-393.92	161.29	0.00	0.00	0.00	840.56
	2	41	-86.69	383.70	0.00	0.00	0.00	-628.87
		51	86.69	56.30	0.00	0.00	0.00	1447.38
	3	41	590.87	418.06	0.00	0.00	0.00	-820.53
		51	-590.87	241.94	0.00	0.00	0.00	1260.84
	4	41	-130.04	575.55	0.00	0.00	0.00	-943.30
		51	130.04	84.45	0.00	0.00	0.00	2171.07
42	1	42	1810.33	319.62	0.00	0.00	0.00	-441.62
		52	-1810.33	-99.62	0.00	0.00	0.00	1489.73
	2	42	1709.60	420.11	0.00	0.00	0.00	-507.21
		52	-1709.60	-200.11	0.00	0.00	0.00	2057.73
	3	42	2715.49	479.43	0.00	0.00	0.00	-662.43
		52	-2715.49	-149.43	0.00	0.00	0.00	2234.60
	4	42	2564.41	630.16	0.00	0.00	0.00	-760.81
		52	-2564.41	-300.16	0.00	0.00	0.00	3086.60
43	1	43	1809.32	389.58	0.00	0.00	0.00	-440.04
		53	-1809.32	-389.58	0.00	0.00	0.00	2387.96
	2	43	2311.75	495.42	0.00	0.00	0.00	-524.70
		53	-2311.75	-495.42	0.00	0.00	0.00	3001.81
	3	43	2713.97	584.37	0.00	0.00	0.00	-660.07
		53	-2713.97	-584.37	0.00	0.00	0.00	3581.93
	4	43	3467.62	743.13	0.00	0.00	0.00	-787.05
		53	-3467.62	-743.13	0.00	0.00	0.00	4502.72
44	1	44	1002.44	388.09	0.00	0.00	0.00	-435.56
		54	-1002.44	-388.09	0.00	0.00	0.00	2376.00
	2	44	1619.34	500.77	0.00	0.00	0.00	-544.77
		54	-1619.34	-500 77	0.00	0.00	0.00	3048.61
	3	44	1503.66	582.13	0.00	0.00	0.00	-653.35
		54	-1503.66	-582.13	0.00	0.00	0.00	3564.00
	4	44	2429.01	751.15	0.00	0.00	0.00	-817.15
		54	-2429.01	-751.15	0.00	0.00	0.00	4572.92

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

90. PRINT MEMBER FORCES LIST 31 32 33 34

MBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
31	1	31	393.92	397.98	0.00	0.00	0.00	892.89
		41	-393.92	-177.98	0.00	0.00	0.00	547.02
	2	31	-86.69	474.52	0.00	0.00	0.00	1193.71
		41	86.69	-254.52	0.00	0.00	0.00	628.87
	3	31	590.87	596.97	0.00	0.00	0.00	1339.33
		41	-590.87	-266.97	0.00	0.00	0.00	820.53
	4	31	-130.04	711.77	0.00	0.00	0.00	1790.56
		41	130.04	-381.77	0.00	0.00	0.00	943.30
32	1	32	1810.33	331.80	0.00	0.00	0.00	942.38
		42	-1810.33	-221.80	0.00	0.00	0.00	441.62
	2	32	1709.60	404.40	0.00	0.00	0.00	1239.78
		42	-1709.60	-294.40	0.00	0.00	0.00	507.21
	3	32	2715.49	497.70	0.00	0.00	0.00	1413.58
		42	-2715.49	-332.70	0.00	0.00	0.00	662.43
	4	32	2564.41	606.59	0.00	0.00	0.00	1859.66
		42	-2564.41	-441.59	0.00	0.00	0.00	760.81
33	1	33	1809.32	290.93	0.00	0.00	0.00	1014.61
		43	-1809.32	-290.93	0.00	0.00	0.00	440.05
	2	33	2311.75	368.19	0.00	0.00	0.00	1316.27
		43	-2311.75	-368.19	0.00	0.00	0.00	524.70
	3	33	2713.98	436.40	0.00	0.00	0.00	1521.92
		43	-2713.98	-436.40	0.00	0.00	0.00	660.07
	4	33	3467.62	552.29	0.00	0.00	0.00	1974.40
		43	-3467.62	-552.29	0.00	0.00	0.00	787.04
34	1	34	1002.44	289.67	0.00	0.00	0.00	1012.81
		44	-1002.44	-289.67	0.00	0.00	0.00	435.56
	2	34	1619.34	372.90	0.00	0.00	0.00	1319.73
		44	-1619.34	-372.90	0.00	0.00	0.00	544.77
	3	34	1503.66	434.51	0.00	0.00	0.00	1519.21
		44	-1503.66	-434.51	0.00	0.00	0.00	653.35
	4	34	2429.01	559.35	0.00	0.00	0.00	1979.59
		44	-2429.01	-559.35	0.00	0.00	0.00	817.15

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

91. PRINT MEMBER FORCES LIST 21 22 23 24

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
21	1	21	393.92	-59.00	0.00	0.00	0.00	597.87
		31	-393.92	59.00	0.00	0.00	0.00	-892.89
	2	21	-86.69	-89.72	0.00	0.00	0.00	745.11
		31	86.69	89.72	0.00	0.00	0.00	-1193.71
	3	21	590.87	-88.50	0.00	0.00	0.00	896.81
		31	-590.87	88.50	0.00	0.00	0.00	-1339.33
	4	21	-130.04	-134.58	0.00	0.00	0.00	1117.66
		31	130.04	134.58	0.00	0.00	0.00	-1790.56
22	1	22	1810.33	-78.89	0.00	0.00	0.00	547.92
		32	-1810.33	78.89	0.00	0.00	0.00	-942.38
	2	22	1709.60	-109.84	0.00	0.00	0.00	690.59
		32	-1709.60	109.84	0.00	0.00	0.00	-1239.78
	3	22	2715.49	-118.34	0.00	0.00	0.00	821.88
		32	-2715.49	118.34	0.00	0.00	0.00	-1413.57
	4	22	2564.41	-164.76	0.00	0.00	0.00	1035.88
		32	-2564.41	164.76	0.00	0.00	0.00	-1859.66
23	1	23	1809.32	-97.43	0.00	0.00	0.00	527.48
		33	-1809.32	97.43	0.00	0.00	0.00	-1014.62
	2	23	2311.75	-128.13	0.00	0.00	0.00	675.61
		33	-2311.75	128.13	0.00	0.00	0.00	-1316.27
	3	23	2713.98	-146.14	0.00	0.00	0.00	791.22
		33	-2713.98	146.14	0.00	0.00	0.00	-1521.92
	4	23	3467.62	-192.20	0.00	0.00	0.00	1013.41
		33	-3467.62	192.20	0.00	0.00	0.00	-1974.40
24	1	24	1002.44	-97.39	0.00	0.00	0.00	525.84
		34	-1002.44	97.39	0.00	0.00	0.00	-1012.81
	2	24	1619.34	-127.77	0.00	0.00	0.00	680.90
		34	-1619.34	127.77	0.00	0.00	0.00	-1319.73
	3	24	1503.66	-146.09	0.00	0.00	0.00	788.76
		34	-1503.66	146.09	0.00	0.00	0.00	-1519.21
	4	24	2429.01	-191.65	0.00	0.00	0.00	1021.36
		34	-2429.01	191.65	0.00	0.00	0.00	-1979.59

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

92. PRINT MEMBER FORCES LIST 11 12 13 14

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
11	1	11	393.92	-100.71	0.00	0.00	0.00	94.31
		21	-393.92	100.71	0.00	0.00	0.00	-597.87
	2	11	-86.69	-127.27	0.00	0.00	0.00	108.75
		21	86.69	127.27	0.00	0.00	0.00	-745.11
	3	11	590.87	-151.07	0.00	0.00	0.00	141.47
		21	-590.87	151.07	0.00	0.00	0.00	-896.81
	4	11	-130.04	-190.91	0.00	0.00	0.00	163.13
		21	130.04	190.91	0.00	0.00	0.00	-1117.66
12	1	12	1810.33	-94.99	0.00	0.00	0.00	72.96
		22	-1810.33	94.99	0.00	0.00	0.00	-547.92
	2	12	1709.60	-120.85	0.00	0.00	0.00	86.31
		22	-1709.60	120.85	0.00	0.00	0.00	-690.59
	3	12	2715.49	-142.49	0.00	0.00	0.00	109.44
		22	-2715.49	142.49	0.00	0.00	0.00	-821.88
	4	12	2564.41	-181.28	0.00	0.00	0.00	129.47
		22	-2564.41	181.28	0.00	0.00	0.00	-1035.88
13	1	13	1809.32	-93.78	0.00	0.00	0.00	58.58
		23	-1809.32	93.78	0.00	0.00	0.00	-527.48
	2	13	2311.75	-120.48	0.00	0.00	0.00	73.22
		23	-2311.75	120.48	0.00	0.00	0.00	-675.61
	3	13	2713.98	-140.67	0.00	0.00	0.00	87.87
		23	-2713.98	140.67	0.00	0.00	0.00	-791.22
	4	13	3467.62	-180.72	0.00	0.00	0.00	109.83
		23	-3467.62	180.72	0.00	0.00	0.00	-1013.41
14	1	14	1002.44	-93.52	0.00	0.00	0.00	58.26
		24	-1002.44	93.52	0.00	0.00	0.00	-525.84
	2	14	1619.34	-121.27	0.00	0.00	0.00	74.54
		24	-1619.34	121.27	0.00	0.00	0.00	-680.90
	3	14	1503.66	-140.28	0.00	0.00	0.00	87.38
		24	-1503.66	140.28	0.00	0.00	0.00	-788.76
	4	14	2429.01	-181.91	0.00	0.00	0.00	111.81
		24	-2429.01	181.91	0.00	0.00	0.00	-1021.36

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

93. PRINT MEMBER FORCES LIST 1 2 3 4

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	393.92	-18.86	0.00	0.00	0.00	0.00
		11	-393.92	18.86	0.00	0.00	0.00	-94.31
	2	1	-86.69	-21.75	0.00	0.00	0.00	0.00
		11	86.69	21.75	0.00	0.00	0.00	-108.75
	3	1	590.87	-28.29	0.00	0.00	0.00	0.00
		11	-590.87	28.29	0.00	0.00	0.00	-141.47
	4	1	-130.04	-32.63	0.00	0.00	0.00	0.00
		11	130.04	32.63	0.00	0.00	0.00	-163.13
2	1	2	1810.33	-14.59	0.00	0.00	0.00	0.00
		12	-1810.33	14.59	0.00	0.00	0.00	-72.96
	2	2	1709.60	-17.26	0.00	0.00	0.00	0.00
		12	-1709.60	17.26	0.00	0.00	0.00	-86.31
	3	2	2715.49	-21.89	0.00	0.00	0.00	0.00
		12	-2715.49	21.89	0.00	0.00	0.00	-109.44
	4	2	2564.41	-25.89	0.00	0.00	0.00	0.00
		12	-2564.41	25.89	0.00	0.00	0.00	-129.47
3	1	3	1809.32	-11.72	0.00	0.00	0.00	0.00
		13	-1809.32	11.72	0.00	0.00	0.00	-58.58
	2	3	2311.75	-14.64	0.00	0.00	0.00	0.00
		13	-2311.75	14.64	0.00	0.00	0.00	-73.22
	3	3	2713.98	-17.57	0.00	0.00	0.00	0.00
		13	-2713.98	17.57	0.00	0.00	0.00	-87.87
	4	3	3467.62	-21.97	0.00	0.00	0.00	0.00
		13	-3467.62	21.97	0.00	0.00	0.00	-109.83
4	1	4	1002.44	-11.65	0.00	0.00	0.00	0.00
		14	-1002.44	11.65	0.00	0.00	0.00	-58.26
	2	4	1619.34	-14.91	0.00	0.00	0.00	0.00
		14	-1619.34	14.91	0.00	0.00	0.00	-74.54
	3	4	1503.66	-17.48	0.00	0.00	0.00	0.00
		14	-1503.66	17.48	0.00	0.00	0.00	-87.38
	4	4	2429.01	-22.36	0.00	0.00	0.00	0.00
		14	-2429.01	22.36	0.00	0.00	0.00	-111.81

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

94. PRINT MEMBER FORCES LIST 51 52 53

MBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
51	1	51	161.29	393.92	0.00	0.00	0.00	-840.56
		52	-161.29	-393.92	0.00	0.00	0.00	2613.18
	2	51	56.29	-86.69	0.00	0.00	0.00	-1447.38
		52	-56.29	86.69	0.00	0.00	0.00	1057.27
	3	51	241.94	590.87	0.00	0.00	0.00	-1260.84
		52	-241.94	-590.87	0.00	0.00	0.00	3919.77
	4	51	84.43	-130.04	0.00	0.00	0.00	-2171.07
		52	-84.43	130.04	0.00	0.00	0.00	1585.90
52	1	52	61.68	2204.24	0.00	0.00	0.00	-4102.92
		53	-777.68	2811.76	0.00	0.00	0.00	-252.99
	2	52	-143.84	1622.91	0.00	0.00	0.00	-3115.00
		53	-996.16	3931.09	0.00	0.00	0.00	1236.61
	3	52	92.52	3306.37	0.00	0.00	0.00	-6154.37
		53	-1166.52	4217.63	0.00	0.00	0.00	-379.48
	4	52	-215.76	2434.37	0.00	0.00	0.00	-4672.50
		53	-1494.24	5896.63	0.00	0.00	0.00	1854.92
53	1	53	388.12	-1002.44	0.00	0.00	0.00	-2134.97
		54	-388.12	1002.44	0.00	0.00	0.00	-2376.00
	2	53	500.70	-1619.34	0.00	0.00	0.00	-4238.42
		54	-500.70	1619.34	0.00	0.00	0.00	-3048.61
	3	53	582.18	-1503.66	0.00	0.00	0.00	-3202.45
		54	-582.18	1503.66	0.00	0.00	0.00	-3564.00
	4	53	751.05	-2429.01	0.00	0.00	0.00	-6357.63
		54	-751.05	2429.01	0.00	0.00	0.00	-4572.91

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

95. PRINT REACC ALL

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	18.86	393.92	0.00	0.00	0.00	0.00
	2	21.75	-86.69	0.00	0.00	0.00	0.00
	3	28.29	590.87	0.00	0.00	0.00	0.00
	4	32.63	-130.04	0.00	0.00	0.00	0.00
2	1	14.59	1810.33	0.00	0.00	0.00	0.00
	2	17.26	1709.60	0.00	0.00	0.00	0.00
	3	21.89	2715.49	0.00	0.00	0.00	0.00
	4	25.89	2564.41	0.00	0.00	0.00	0.00
3	1	11.72	1809.32	0.00	0.00	0.00	0.00
	2	14.64	2311.75	0.00	0.00	0.00	0.00
	3	17.57	2713.98	0.00	0.00	0.00	0.00
	4	21.97	3467.62	0.00	0.00	0.00	0.00
4	1	11.65	1002.44	0.00	0.00	0.00	0.00
	2	14.91	1619.34	0.00	0.00	0.00	0.00
	3	17.48	1503.66	0.00	0.00	0.00	0.00
	4	22.36	2429.01	0.00	0.00	0.00	0.00
11	1	81.85	0.00	0.00	0.00	0.00	0.00
	2	105.52	0.00	0.00	0.00	0.00	0.00
	3	122.78	0.00	0.00	0.00	0.00	0.00
	4	158.28	0.00	0.00	0.00	0.00	0.00
12	1	80.40	0.00	0.00	0.00	0.00	0.00
	2	103.59	0.00	0.00	0.00	0.00	0.00
	3	120.60	0.00	0.00	0.00	0.00	0.00
	4	155.39	0.00	0.00	0.00	0.00	0.00
13	1	82.06	0.00	0.00	0.00	0.00	0.00
	2	105.83	0.00	0.00	0.00	0.00	0.00
	3	123.09	0.00	0.00	0.00	0.00	0.00
	4	158.75	0.00	0.00	0.00	0.00	0.00
14	1	81.87	0.00	0.00	0.00	0.00	0.00
	2	106.37	0.00	0.00	0.00	0.00	0.00
	3	122.80	0.00	0.00	0.00	0.00	0.00
	4	159.55	0.00	0.00	0.00	0.00	0.00
21	1	-41.71	0.00	0.00	0.00	0.00	0.00
	2	-37.55	0.00	0.00	0.00	0.00	0.00
	3	-62.56	0.00	0.00	0.00	0.00	0.00
	4	-56.33	0.00	0.00	0.00	0.00	0.00
22	1	-16.10	0.00	0.00	0.00	0.00	0.00
	2	-11.02	0.00	0.00	0.00	0.00	0.00
	3	-24.15	0.00	0.00	0.00	0.00	0.00
	4	-16.53	0.00	0.00	0.00	0.00	0.00
23	1	3.65	0.00	0.00	0.00	0.00	0.00
	2	7.65	0.00	0.00	0.00	0.00	0.00
	3	5.47	0.00	0.00	0.00	0.00	0.00
	4	11.48	0.00	0.00	0.00	0.00	0.00
24	1	3.88	0.00	0.00	0.00	0.00	0.00
	2	6.49	0.00	0.00	0.00	0.00	0.00
	3	5.81	0.00	0.00	0.00	0.00	0.00
	4	9.74	0.00	0.00	0.00	0.00	0.00
31	1	-456.99	0.00	0.00	0.00	0.00	0.00
	2	-564.24	0.00	0.00	0.00	0.00	0.00

JPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
	3	-685.48	0.00	0.00	0.00	0.00	0.00
	4	-846.35	0.00	0.00	0.00	0.00	0.00
32	1	-410.69	0.00	0.00	0.00	0.00	0.00
	2	-514.23	0.00	0.00	0.00	0.00	0.00
	3	-616.04	0.00	0.00	0.00	0.00	0.00
	4	-771.35	0.00	0.00	0.00	0.00	0.00
33	1	-388.36	0.00	0.00	0.00	0.00	0.00
	2	-496.33	0.00	0.00	0.00	0.00	0.00
	3	-582.54	0.00	0.00	0.00	0.00	0.00
	4	-744.49	0.00	0.00	0.00	0.00	0.00
34	1	-387.07	0.00	0.00	0.00	0.00	0.00
	2	-500.67	0.00	0.00	0.00	0.00	0.00
	3	-580.60	0.00	0.00	0.00	0.00	0.00
	4	-751.00	0.00	0.00	0.00	0.00	0.00
41	1	-100.73	0.00	0.00	0.00	0.00	0.00
	2	-129.19	0.00	0.00	0.00	0.00	0.00
	3	-151.09	0.00	0.00	0.00	0.00	0.00
	4	-193.78	0.00	0.00	0.00	0.00	0.00
42	1	-97.82	0.00	0.00	0.00	0.00	0.00
	2	-125.71	0.00	0.00	0.00	0.00	0.00
	3	-146.73	0.00	0.00	0.00	0.00	0.00
	4	-188.56	0.00	0.00	0.00	0.00	0.00
43	1	-98.65	0.00	0.00	0.00	0.00	0.00
	2	-127.23	0.00	0.00	0.00	0.00	0.00
	3	-147.97	0.00	0.00	0.00	0.00	0.00
	4	-190.85	0.00	0.00	0.00	0.00	0.00
44	1	-98.41	0.00	0.00	0.00	0.00	0.00
	2	-127.87	0.00	0.00	0.00	0.00	0.00
	3	-147.62	0.00	0.00	0.00	0.00	0.00
	4	-191.80	0.00	0.00	0.00	0.00	0.00

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

96. PLOT DIS FILE
97. PLOT BEN FILE
98. FINISH

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

**** DATE= JUL 23,1999 TIME= 10:53:26 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

HOJA DE
FECHA

Nota: los valores ponderados corresponden a valores interpolados en la cara inferior del encepado $K = \frac{5.00-1.25}{5.00} = 0.75$

$\mu_0 = 820 + 0.75(1760-820) = 1150$

$\mu_0 = 662 + 0.75(2734-662) = 1841$

$\mu_0 = 660 + 0.75(3581-660) = 2251$

$\mu_0 = 653 + 0.75(3564-653) = 2836$

$\mu_0 = 943 + 0.75(2171-943) = 1864$

$\mu_0 = 760 + 0.75(3086-760) = 2504$

$\mu_0 = 787 + 0.75(4502-787) = 3573$

$\mu_0 = 817 + 0.75(4577-817) = 3633$

VIADUCTO 3 - ESTRIBO 1 - ARMADURAS DE PILOTES

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 41	-590	1150	-148	288	0.07	0.09	0.18	86	14	18
BARRA 42	-2715	1841	-679	460	0.32	0.14	0.21	100	14	20
BARRA 43	-2713	2851	-678	713	0.32	0.22	0.52	249	31	51
BARRA 44	-1503	2836	-376	709	0.18	0.22	0.54	258	32	53

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 41	130	1864	33	466	0.02	0.15	0.42	201	25	41
BARRA 42	-2564	2504	-641	626	0.30	0.20	0.44	210	26	43
BARRA 43	-3467	3573	-867	893	0.41	0.28	0.75	359	45	73
BARRA 44	-2429	3633	-607	908	0.29	0.29	0.82	392	49	80

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 31	-590	822	-148	206	0.07	0.06	0.08	38	14	18
BARRA 32	-2715	644	-679	161	0.32	0.05	0.04	19	14	18
BARRA 33	-2713	641	-678	160	0.32	0.05	0.04	19	14	18
BARRA 34	-1503	655	-376	164	0.18	0.05	0.04	19	14	18

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 31	130	941	33	235	0.02	0.07	0.18	86	14	18
BARRA 32	-2564	780	-641	195	0.30	0.06	0.04	19	14	18
BARRA 33	-3467	807	-867	202	0.41	0.06	0.04	19	14	18
BARRA 34	-2429	814	-607	204	0.29	0.06	0.04	19	14	18

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-590	1347	-148	337	0.07	0.11	0.23	110	14	22
BARRA 22	-2715	1417	-679	354	0.32	0.11	0.10	48	14	18
BARRA 23	-2713	1525	-678	381	0.32	0.12	0.14	67	14	18
BARRA 24	-1503	1527	-376	382	0.18	0.12	0.17	81	14	18

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	130	1781	33	445	0.02	0.14	0.38	182	23	37
BARRA 22	-2564	1855	-641	464	0.30	0.15	0.25	120	15	24
BARRA 23	-3467	1970	-867	493	0.41	0.15	0.25	120	15	24
BARRA 24	-2429	1970	-607	493	0.29	0.15	0.27	129	16	26

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-590	900	-148	225	0.07	0.07	0.13	62	14	18
BARRA 12	-2715	820	-679	205	0.32	0.06	0.04	19	14	18
BARRA 13	-2713	789	-678	197	0.32	0.06	0.04	19	14	18
BARRA 14	-1503	792	-376	198	0.18	0.06	0.04	19	14	18

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	130	1113	33	278	0.02	0.09	0.22	105	14	21
BARRA 12	-2564	1037	-641	259	0.30	0.08	0.04	19	14	18
BARRA 13	-3467	1015	-867	254	0.41	0.08	0.04	19	14	18
BARRA 14	-2429	1016	-607	254	0.29	0.08	0.04	19	14	18

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-590	141	-148	35	0.07	0.01	0.04	19	14	18
BARRA 2	-2715	108	-679	27	0.32	0.01	0.04	19	14	18
BARRA 3	-2713	87	-678	22	0.32	0.01	0.04	19	14	18
BARRA 4	-1503	87	-376	22	0.18	0.01	0.04	19	14	18

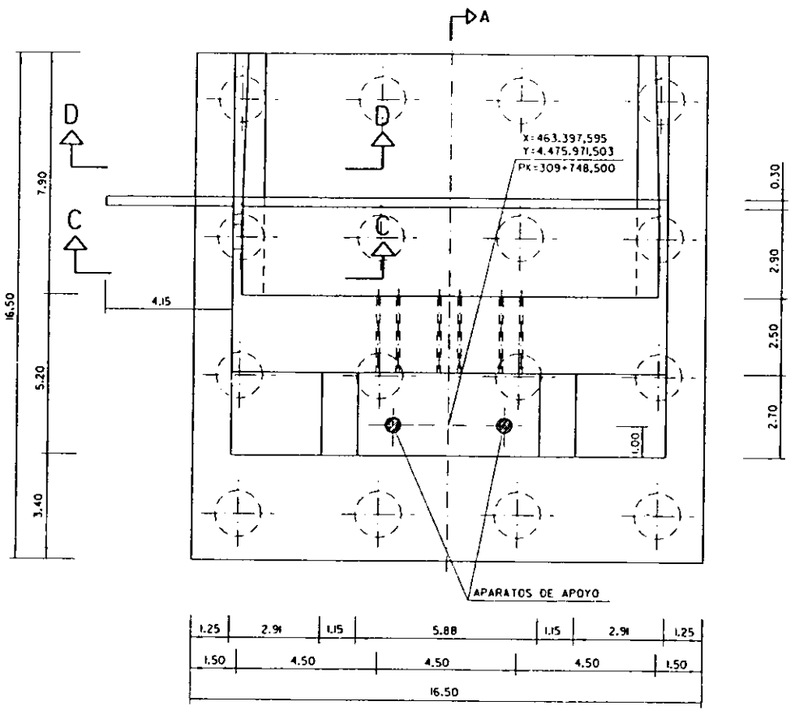
HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	130	163	33	41	0.02	0.01	0.04	19	14	18
BARRA 2	-2564	130	-641	33	0.30	0.01	0.04	19	14	18
BARRA 3	-3467	110	-867	28	0.41	0.01	0.04	19	14	18
BARRA 4	-2429	111	-607	28	0.29	0.01	0.04	19	14	18

ν = N' / 4 / 2120

μ= M' / 4 / 1.5 / 2120

HOJA ... DE ...
FECHA ...

CALCULO DEL ENCEPADO



PLANTA
ESCALA 1:100

L_{DA}

MAXIMA CARGA EN PILOTE

$Q = \frac{2311}{4} = 577$ ton

MINIMA CARGA EN PILOTE

$Q = \frac{87}{4} = 21$ ton (tracción)

ANNEAUX MEMOIRE

$U = 3{,}40 - 1{,}50 + 5{,}20 \times 0{,}15 = 2{,}68$

$\mu = 4 \times 577 \times 2{,}68 / 16{,}50 = 375$ mt/ml

$\mu' = 1{,}6 \times 375 = 600$ mt

$A_c = \frac{2500}{1{,}5} \times 29 \times 1{,}00 = 48333$

$A_s = 4833 \left(1 - \sqrt{1 - \frac{2 \times 600}{29 \times 4833}}\right) = 212$ bars

$w = 212 \times 1{,}15 / S_1 = 47$ cm2/ml → ϕ32/15

$w_2 = 47/4 = 11{,}7$ cm2/ml ϕ20/15

ANNEAUX SUPERIEUR

$U = 1{,}9 + 0{,}15 \times 5{,}20 = 8{,}68$

$\mu = \left(2{,}5 \times 3 + 1{,}8 \times 900 + 3\right) \times \frac{8{,}68^2}{2} + 21 \times 4 \times 7{,}18 \frac{1}{16{,}50}$

$= 1005 + 36 = 1041$ mt

$\mu' = 1041 \times 1{,}6 = 1665$ mt

$A_c = 4833$

$A_s = 4833 \left(1 - \sqrt{1 - \frac{2 \times 1665}{2{,}9 \times 4833}}\right) = 613$ bars

$w = 613 \times 1{,}15 / S_1 = 138$ cm2 2 cadres ϕ32/12

CENCO

$Q = 267 \times 8{,}68 + 84 \times \frac{1}{16{,}5} = 232 + 5 = 237$ t

$Q' = 237 \times 1{,}6 = 379$ t

$T_b = \sqrt{\frac{250}{1{,}5}} \times 29 = 187$ t

$w_t = \frac{379 - 187}{2{,}9 \times 4{,}2 \times 0{,}9} = 17{,}5$ cm2 1 barp ϕ16/30/30 = 22,4

HOJA ___ DE ___
FECHA ___

COMPROBACION DE LOS PILOTS PARA UNA REACCION DE APOYO HACIA LADO TIERRAS

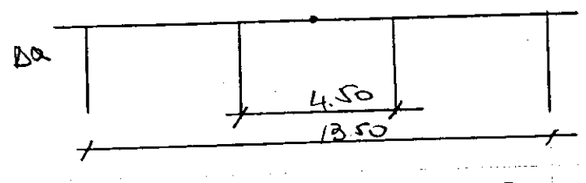
$F_x = 1140 - 2 \times 423 t_o = 293$ t

$F_y = -5554$ to

$M_z = -3315 + 2 \times 423 t_o (9.00 + 3,00 - 2.00) =$

$= -3315 + 8474 = 5159$

La reacción sobre hilera es



$5159 = \Delta Q \times 13.50 + \Delta Q \times \frac{2.25}{6.50} \times 4.50 = 15,0 \Delta Q.$

$\Delta Q = 343$ (cada hilera)

$Q_{max} = \frac{5554}{16} + \frac{343}{4} = 347 + 85 = 432 t$

Lo cual $642/1,5 = 428 t$ / hilera. $< 577 t$

ESTRIBO 2 (DESLIZANTE)

```
250.0,5100.0,0.04,1
1.800,30.0,0.00,3.00,0.00,0.00,1
VIADUCTO 3. ESTRIBO 2
  .67,269.94,15.41,40.00,101.391,0.0,0.0
      1.70,0.40,5.90,0.50,2.00,0.40,14.00,0.0,2.50,9.00,00.0,3
```

CALCULO DE ESTRIBOS. VERSION 09-01-1996

PROGRAMA PROPIEDAD DE INTECSA

VIADUCTO 3. ESTRIBO 2

CARACTERISTICAS DEL RELLENO

PESO ESPECIFICO (TN/M3)	= 1.80
ANGULO DE ROZAMIENTO FI	= 30.00
ANGULO ROZAMIENTO TERRENO-MURO	= .00
SOBRECARGA (TN/M2)	= 3.00
COEFICIENTE DE EMPUJE ACTIVO	= .333

CARACTERISTICAS DE LOS MATERIALES

RESISTENCIA CARACTERISTICA DEL HORMIGON	= 250. KG/CM2
LIMITE ELASTICO DEL ACERO	= 5100. KG/CM2
RECUBRIMIENTO DE LAS ARMADURAS	= .040 M

CARGAS SOBRE EL ESTRIBO

CARGA VERTICAL DE TABLERO PESO PROPIO Y CARGA PERMANENTE	256.7 TN
CARGA VERTICAL DE SOBRECARGAS	269.9 TN
FUERZA LONGITUDINAL DE FRENADO RETRACCION Y TEMPERATURA	15.4 TN
FUERZA TRANSVERSAL DE VIENTO	40.0 TN
MOMENTO TRANSVERSAL DE SOBRECARGAS	101.4 MT
FUERZA LONGITUDINAL DE SISMO	.0 TN
FUERZA TRANSVERSAL DE SISMO	.0 TN

GEOMETRIA DEL ESTRIBO
==========

ANCHURA DEL ESTRIBO	B	= 14.00
ESVIAJE (GRADOS SEXAGESIMALES)	BETA	= .00

ALZADO DEL ESTRIBO

ESPESOR DEL FALDON	A3	= .40
ALTURA DEL FALDON	A6	= 2.00
DISTANCIA DE APOYO A BORDE ESTRIBO	A5	= .50
ESPESOR DEL ESTRIBO	A2	= 1.70
ESPESOR DE LAS ALETAS	A7	= .40
ALTURA TOTAL DEL ESTRIBO	H + C	= 11.50
ALTURA DE TIERRAS	H	= 9.00

ZAPATA

VUELO DELANTERO	A1	= 5.90
VUELO TRASERO	A4	= 5.90
LONGITUD TOTAL	L	= 13.50
CANTO	C	= 2.50
RESGUARDO SOBRE ZAPATA		= 0.30
TENSION MEDIA PEDIDA SOBRE TERRENO		= LIBRE

ARMADURAS DEL ALZADO

TRASDOS.	ZONA INFERIOR	AV.= 25.0 CM2/M	(FI 20 A .125 M)
U(CALCULO)= 1.2CM2/M		AH.= 13.7 CM2/M	(FI 20 A .225 M)
	4.6 M. SUPERIORES	AV.= 12.5 CM2/M	(FI 20 A .250 M)
		AH.= 13.7 CM2/M	(FI 20 A .225 M)
INTRADOS		AV.= 5.5 CM2/M	(FI 12 A .200 M)
		AH.= 13.7 CM2/M	(FI 20 A .225 M)
FALDON	TRASDOS	AV.= 5.4 CM2/M	(FI 12 A .200 M)
		AH.= 52.0 CM2/M	(FI 25 A .087 M)
	INTRADOS	AV.= 5.4 CM2/M	(FI 12 A .200 M)
		AH.= 2.1 CM2/M	(FI 8 A .200 M)
ALETAS	TRASDOS	AV.= 32.4 CM2/M	(FI 25 A .150 M)
		AH.= 52.4 CM2/M	(FI 25 A .087 M)
	INTRADOS	AV.= 16.2 CM2/M	(FI 20 A .175 M)
		AH.= 26.2 CM2/M	(FI 25 A .175 M)

ESTRIBO CON RELLENO DE TIERRAS Y SIN TABLERO
==========

ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	=	3211.7 TN.
MOMENTO LONGITUDINAL	=	-2989.7 M.T.
EMPUJE LONGITUDINAL	=	716.5 TN.

ESTRIBO CON PUENTE EN SERVICIO
==========

ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	=	3738.3 TN.
MOMENTO LONGITUDINAL	=	-2659.0 M,T.
EMPUJE LONGITUDINAL	=	731.9 TN.
MOMENTO TRANSVERSAL	=	481.4 M.T.

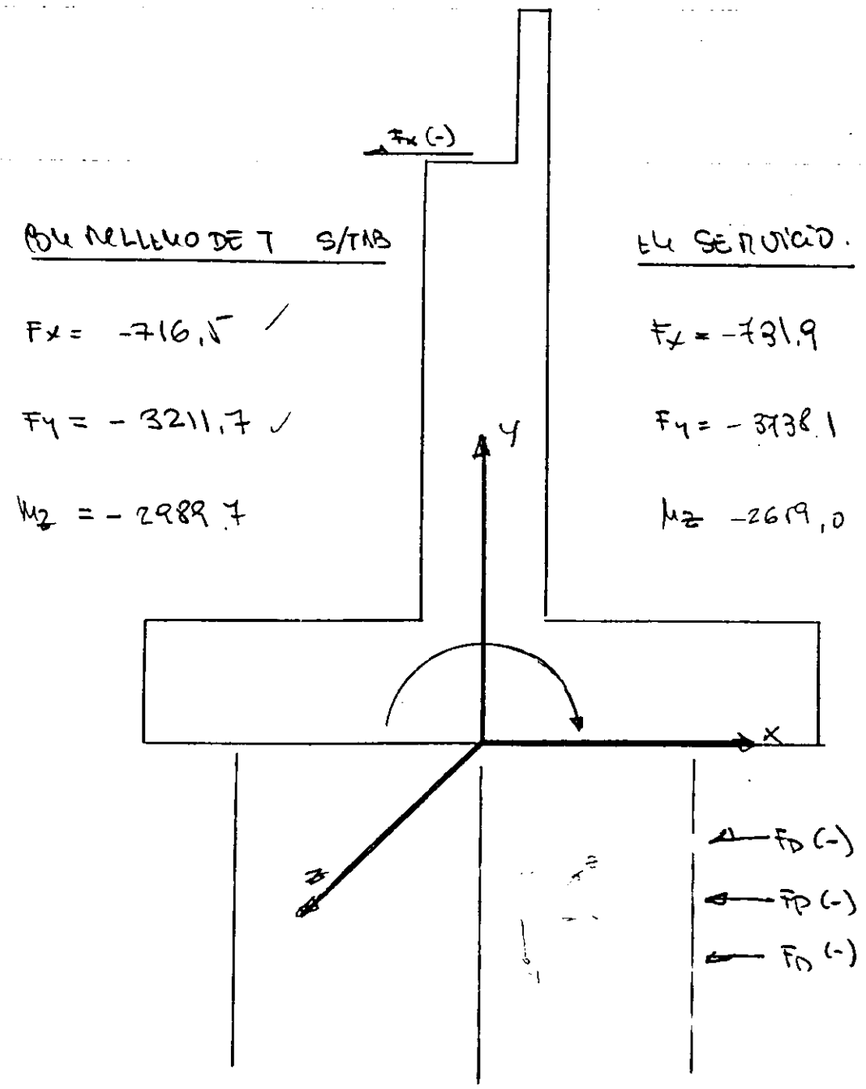
intecsa
INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS S.A.

PROYECTO: _____ HOJA ____ DE ____

FECHA _____

EJECUTANTE: _____

VIADUCTO 3 ESTRIBO 2.



RELLENO DE T S/TAB

Fx = -716,5 ✓

Fy = -3211,7 ✓

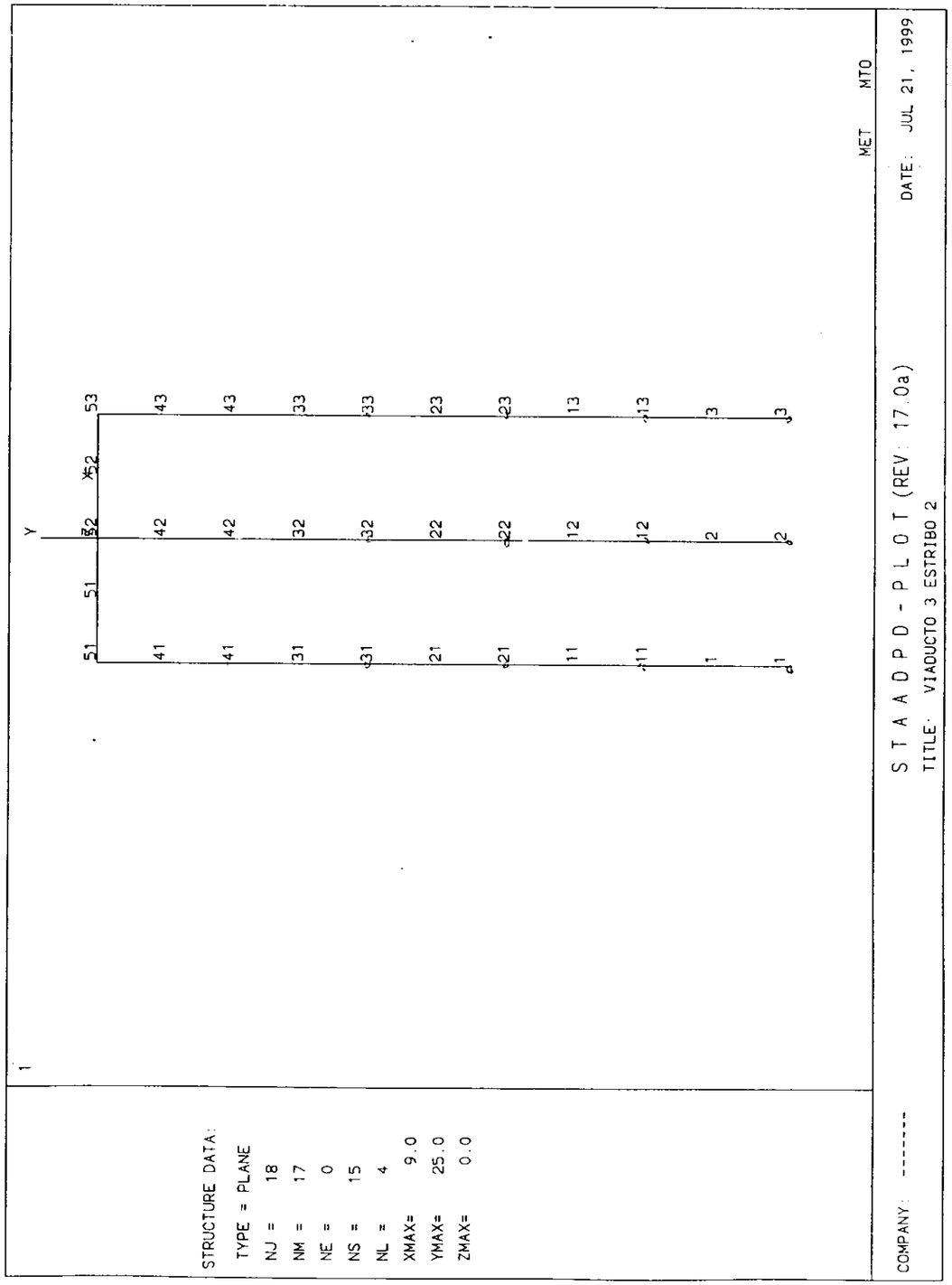
Mz = -2989,7

EN SERVICIO.

Fx = -731,9

Fy = -3738,1

Mz = -2619,0



```
 **************************************************
 *                                                *
 *          S T A A D - III                       *
 *          Revision 17.0a                        *
 *          Proprietary Program of                *
 *          RESEARCH ENGINEERS, Inc.              *
 *          Date=    JUL 23, 1999                 *
 *          Time=     8:51:34                     *
 *                                                *
 **************************************************

  1. STAAD PLANE VIADUCTO 3 ESTRIBO 2
  2. *EFECTOS CARGAS GRAVITATORIAS
  3. UNIT MTO MET
  4. JOINT COORDINATES
  5.    1  -5.250   -25.000
  6.    2   0.000   -25.000
  7.    3   5.250   -25.000
  8.   11  -5.250   -20.000
  9.   12   0.000   -20.000
  0.   13   5.250   -20.000
 11.   21  -5.250   -15.000
 12.   22   0.000   -15.000
 13.   23   5.250   -15.000
 14.   31  -5.250   -10.000
 15.   32   0.000   -10.000
 16.   33   5.250   -10.000
 17.   41  -5.250    -5.000
 18.   42   0.000    -5.000
 19.   43   5.250    -5.000
 20.   51  -5.250     0.000
 21.   52   0.000     0.000
 22.   53   5.250     0.000
 23. MEMBER INCIDENCES
 24.    1     1     11
 25.    R     4     10    10
 26.    2     2     12
 27.    R     4     10    10
 28.    3     3     13
 29.    R     4     10    10
  0.    51    51     52
 31.    52    52     53
 32. MEMBER PROPERTY
 33. *PILOTES  4 * 3 PILOTES
 34. 1 11 21 31 41       PR AX  7.062 IZ  0.99325
 35. 2 12 22 32 42       PR AX  7.062 IZ  0.99325
 36. 3 13 23 33 43       PR AX  7.062 IZ  0.99325
 37. *ENCEPADO (1.5+4.5+4.5+1.5)*2.5
 38. 51 52               PR AX 30.000 IZ  15.6257
 39. CONSTANT
 40. E  3250000.    ALL
 41. POI 0.15
 42. DEN 2.50
 43. SUPPORT
 44. 1 2 3          PINNED
 45. 11 12 13       FIXED BUT FY MZ KFX  240000
 46. 21 22 23       FIXED BUT FY MZ KFX  153000
 47. 31 32 33       FIXED BUT FY MZ KFX   66000
```



```
 48. 41 42 43       FIXED BUT FY MZ KFX    6800
 49. LOADING 1 RELLENO DE TIERRAS Y SIN TABLERO
 50. JOINT LOAD
 51. *PROCEDENTE DE CALCULO DE ESTRIBO
 52. 52             FY -3211
 53. 52             FX  -716
 54. 52             MZ -2989
 55. MEMBER LOAD
 56. *EMPUJE DE TIERRAS SOBRE PILOTES
 57. 43             UNI GX -93.34
 58. 33             UNI GX -46.68
 59. 42             UNI GX -46.68
 60. 32             UNI GX -23.34
 61. LOADING 2 PUENTE EN SERVICIO
 62. JOINT LOAD
 63. *PROCEDENTE DE CALCULO DE ESTRIBO
 64. 52             FY -3738
 65. 52             FX  -731
 66. 52             MZ -2659
 67. MEMBER LOAD
 68. *EMPUJE DE TIERRAS SOBRE PILOTES
 69. 43             UNI GX -93.34
 70. 33             UNI GX -46.68
 71. 42             UNI GX -46.68
 72. 32             UNI GX -23.34
 73. LOADING COMBINATION 3
 74. 1 1.50
 75. LOADING COMBINATION 4
 76. 2 1.50
 77. PERFORM ANALISIS

      P R O B L E M   S T A T I S T I C S
      -----------------------------------

   NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    18/   17/   15
   ORIGINAL/FINAL BAND-WIDTH =     3/    2
   TOTAL PRIMARY LOAD CASES  =     2, TOTAL DEGREES OF FREEDOM =    48
   SIZE OF STIFFNESS MATRIX =      432 DOUBLE PREC. WORDS
   TOTAL REQUIRED DISK SPACE =   12.03 MEGA-BYTES


++ PROCESSING ELEMENT STIFFNESS MATRIX.              8:51:36
++ PROCESSING GLOBAL STIFFNESS MATRIX.               8:51:36
++ PROCESSING TRIANGULAR FACTORIZATION.              8:51:36
++ CALCULATING JOINT DISPLACEMENTS.                  8:51:36
++ CALCULATING MEMBER  FORCES.                       8:51:36

 78. LOAD LIST  1 2 3 4
 79. PRINT MEMBER FORCES LIST  41 42 43
```

MBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
41	1	41	1289.66	-513.37	0.00	0.00	0.00	543.87
		51	-1289.66	513.37	0.00	0.00	0.00	-3110.73
	2	41	1467.18	-522.21	0.00	0.00	0.00	561.07
		51	-1467.18	522.21	0.00	0.00	0.00	-3172.13
	3	41	1934.49	-770.06	0.00	0.00	0.00	815.80
		51	-1934.49	770.06	0.00	0.00	0.00	-4666.09
	4	41	2200.77	-783.32	0.00	0.00	0.00	841.60
		51	-2200.77	783.32	0.00	0.00	0.00	-4758.20
42	1	42	1461.91	-481.68	0.00	0.00	0.00	707.96
		52	-1461.91	248.28	0.00	0.00	0.00	-2532.87
	2	42	1712.68	-486.16	0.00	0.00	0.00	708.91
		52	-1712.68	252.76	0.00	0.00	0.00	-2556.20
	3	42	2192.87	-722.52	0.00	0.00	0.00	1061.94
		52	-2192.87	372.42	0.00	0.00	0.00	-3799.31
	4	42	2569.02	-729.24	0.00	0.00	0.00	1063.37
		52	-2569.02	379.14	0.00	0.00	0.00	-3834.30
43	1	43	459.43	-421.04	0.00	0.00	0.00	765.65
		53	-459.43	-45.65	0.00	0.00	0.00	-1704.13
	2	43	558.14	-422.73	0.00	0.00	0.00	756.23
		53	-558.14	-43.97	0.00	0.00	0.00	-1703.12
	3	43	689.14	-631.57	0.00	0.00	0.00	1148.48
		53	-689.14	-68.48	0.00	0.00	0.00	-2556.19
	4	43	837.21	-634.09	0.00	0.00	0.00	1134.34
		53	-837.21	-65.96	0.00	0.00	0.00	-2554.68

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

80. PRINT MEMBER FORCES LIST 31 32 33

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
31	1	31	1289.66	-370.34	0.00	0.00	0.00	-1307.81
		41	-1289.66	370.34	0.00	0.00	0.00	-543.87
	2	31	1467.18	-377.12	0.00	0.00	0.00	-1324.56
		41	-1467.18	377.12	0.00	0.00	0.00	-561.07
	3	31	1934.49	-555.50	0.00	0.00	0.00	-1961.71
		41	-1934.49	555.50	0.00	0.00	0.00	-815.80
	4	31	2200.77	-565.69	0.00	0.00	0.00	-1986.83
		41	-2200.77	565.69	0.00	0.00	0.00	-841.60
32	1	32	1461.91	-449.98	0.00	0.00	0.00	-1250.19
		42	-1461.91	333.28	0.00	0.00	0.00	-707.96
	2	32	1712.68	-453.01	0.00	0.00	0.00	-1264.39
		42	-1712.68	336.31	0.00	0.00	0.00	-708.91
	3	32	2192.87	-674.97	0.00	0.00	0.00	-1875.29
		42	-2192.87	499.92	0.00	0.00	0.00	-1061.94
	4	32	2569.02	-679.52	0.00	0.00	0.00	-1896.59
		42	-2569.02	504.47	0.00	0.00	0.00	-1063.37
33	1	33	459.43	-504.77	0.00	0.00	0.00	-1174.72
		43	-459.43	271.37	0.00	0.00	0.00	-765.65
	2	33	558.14	-505.40	0.00	0.00	0.00	-1187.28
		43	-558.14	272.00	0.00	0.00	0.00	-756.23
	3	33	689.14	-757.16	0.00	0.00	0.00	-1762.08
		43	-689.14	407.06	0.00	0.00	0.00	-1148.48
	4	33	837.21	-758.10	0.00	0.00	0.00	-1780.91
		43	-837.21	408.00	0.00	0.00	0.00	-1134.34

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

81. PRINT MEMBER FORCES LIST 21 22 23

MBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
21	1	21	1289.66	99.93	0.00	0.00	0.00	-808.18
		31	-1289.66	-99.93	0.00	0.00	0.00	1307.81
	2	21	1467.18	100.74	0.00	0.00	0.00	-820.85
		31	-1467.18	-100.74	0.00	0.00	0.00	1324.56
	3	21	1934.49	149.89	0.00	0.00	0.00	-1212.26
		31	-1934.49	-149.89	0.00	0.00	0.00	1961.71
	4	21	2200.77	151.11	0.00	0.00	0.00	-1231.27
		31	-2200.77	-151.11	0.00	0.00	0.00	1986.83
22	1	22	1461.91	73.73	0.00	0.00	0.00	-881.54
		32	-1461.91	-73.73	0.00	0.00	0.00	1250.19
	2	22	1712.68	75.04	0.00	0.00	0.00	-889.19
		32	-1712.68	-75.04	0.00	0.00	0.00	1264.39
	3	22	2192.87	110.60	0.00	0.00	0.00	-1322.31
		32	-2192.87	-110.60	0.00	0.00	0.00	1875.29
	4	22	2569.02	112.56	0.00	0.00	0.00	-1333.78
		32	-2569.02	-112.56	0.00	0.00	0.00	1896.59
23	1	23	459.43	50.67	0.00	0.00	0.00	-921.39
		33	-459.43	-50.67	0.00	0.00	0.00	1174.72
	2	23	558.14	52.29	0.00	0.00	0.00	-925.82
		33	-558.14	-52.29	0.00	0.00	0.00	1187.28
	3	23	689.14	76.00	0.00	0.00	0.00	-1382.08
		33	-689.14	-76.00	0.00	0.00	0.00	1762.08
	4	23	837.21	78.44	0.00	0.00	0.00	-1388.73
		33	-837.21	-78.44	0.00	0.00	0.00	1780.91

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

82. PRINT MEMBER FORCES LIST 11 12 13

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
11	1	11	1289.66	147.21	0.00	0.00	0.00	-72.13
		21	-1289.66	-147.21	0.00	0.00	0.00	808.18
	2	11	1467.18	149.42	0.00	0.00	0.00	-73.76
		21	-1467.18	-149.42	0.00	0.00	0.00	820.85
	3	11	1934.49	220.81	0.00	0.00	0.00	-108.19
		21	-1934.49	-220.81	0.00	0.00	0.00	1212.26
	4	11	2200.77	224.13	0.00	0.00	0.00	-110.64
		21	-2200.77	-224.13	0.00	0.00	0.00	1231.28
12	1	12	1461.91	155.87	0.00	0.00	0.00	-102.19
		22	-1461.91	-155.87	0.00	0.00	0.00	881.54
	2	12	1712.68	157.31	0.00	0.00	0.00	-102.63
		22	-1712.68	-157.31	0.00	0.00	0.00	889.19
	3	12	2192.87	233.80	0.00	0.00	0.00	-153.28
		22	-2192.87	-233.80	0.00	0.00	0.00	1322.31
	4	12	2569.02	235.97	0.00	0.00	0.00	-153.94
		22	-2569.02	-235.97	0.00	0.00	0.00	1333.78
13	1	13	459.43	159.40	0.00	0.00	0.00	-124.41
		23	-459.43	-159.40	0.00	0.00	0.00	921.39
	2	13	558.14	160.35	0.00	0.00	0.00	-124.08
		23	-558.14	-160.35	0.00	0.00	0.00	925.82
	3	13	689.14	239.09	0.00	0.00	0.00	-186.61
		23	-689.14	-239.09	0.00	0.00	0.00	1382.08
	4	13	837.21	240.52	0.00	0.00	0.00	-186.13
		23	-837.21	-240.52	0.00	0.00	0.00	1388.73

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

83. PRINT MEMBER FORCES LIST 1 2 3

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	1289.66	14.43	0.00	0.00	0.00	0.00
		11	-1289.66	-14.43	0.00	0.00	0.00	72.13
	2	1	1467.18	14.75	0.00	0.00	0.00	0.00
		11	-1467.18	-14.75	0.00	0.00	0.00	73.76
	3	1	1934.49	21.64	0.00	0.00	0.00	0.00
		11	-1934.49	-21.64	0.00	0.00	0.00	108.19
	4	1	2200.77	22.13	0.00	0.00	0.00	0.00
		11	-2200.77	-22.13	0.00	0.00	0.00	110.64
2	1	2	1461.91	20.44	0.00	0.00	0.00	0.00
		12	-1461.91	-20.44	0.00	0.00	0.00	102.19
	2	2	1712.68	20.53	0.00	0.00	0.00	0.00
		12	-1712.68	-20.53	0.00	0.00	0.00	102.63
	3	2	2192.87	30.66	0.00	0.00	0.00	0.00
		12	-2192.87	-30.66	0.00	0.00	0.00	153.28
	4	2	2569.02	30.79	0.00	0.00	0.00	0.00
		12	-2569.02	-30.79	0.00	0.00	0.00	153.94
3	1	3	459.43	24.88	0.00	0.00	0.00	0.00
		13	-459.43	-24.88	0.00	0.00	0.00	124.41
	2	3	558.14	24.82	0.00	0.00	0.00	0.00
		13	-558.14	-24.82	0.00	0.00	0.00	124.08
	3	3	689.14	37.32	0.00	0.00	0.00	0.00
		13	-689.14	-37.32	0.00	0.00	0.00	186.61
	4	3	837.21	37.23	0.00	0.00	0.00	0.00
		13	-837.21	-37.23	0.00	0.00	0.00	186.13

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

84. PRINT MEMBER FORCES LIST 51 52

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
51	1	51	513.38	1289.66	0.00	0.00	0.00	3110.72
		52	-513.38	-1289.66	0.00	0.00	0.00	3660.00
	2	51	522.23	1467.18	0.00	0.00	0.00	3172.13
		52	-522.23	-1467.18	0.00	0.00	0.00	4530.55
	3	51	770.06	1934.49	0.00	0.00	0.00	4666.09
		52	-770.06	-1934.49	0.00	0.00	0.00	5490.00
	4	51	783.35	2200.77	0.00	0.00	0.00	4758.20
		52	-783.35	-2200.77	0.00	0.00	0.00	6795.83
52	1	52	45.68	-459.43	0.00	0.00	0.00	-4116.13
		53	-45.68	459.43	0.00	0.00	0.00	1704.13
	2	52	43.95	-558.14	0.00	0.00	0.00	-4633.36
		53	-43.95	558.14	0.00	0.00	0.00	1703.12
	3	52	68.52	-689.14	0.00	0.00	0.00	-6174.19
		53	-68.52	689.14	0.00	0.00	0.00	2556.20
	4	52	65.93	-837.21	0.00	0.00	0.00	-6950.04
		53	-65.93	837.21	0.00	0.00	0.00	2554.68

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

85. PRINT REACC ALL

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	-14.43	1289.66	0.00	0.00	0.00	0.00
	2	-14.75	1467.18	0.00	0.00	0.00	0.00
	3	-21.64	1934.49	0.00	0.00	0.00	0.00
	4	-22.13	2200.77	0.00	0.00	0.00	0.00
2	1	-20.44	1461.91	0.00	0.00	0.00	0.00
	2	-20.53	1712.68	0.00	0.00	0.00	0.00
	3	-30.66	2192.87	0.00	0.00	0.00	0.00
	4	-30.79	2569.02	0.00	0.00	0.00	0.00
3	1	-24.88	459.43	0.00	0.00	0.00	0.00
	2	-24.82	558.14	0.00	0.00	0.00	0.00
	3	-37.32	689.14	0.00	0.00	0.00	0.00
	4	-37.23	837.21	0.00	0.00	0.00	0.00
11	1	-132.78	0.00	0.00	0.00	0.00	0.00
	2	-134.67	0.00	0.00	0.00	0.00	0.00
	3	-199.18	0.00	0.00	0.00	0.00	0.00
	4	-202.00	0.00	0.00	0.00	0.00	0.00
12	1	-135.43	0.00	0.00	0.00	0.00	0.00
	2	-136.79	0.00	0.00	0.00	0.00	0.00
	3	-203.15	0.00	0.00	0.00	0.00	0.00
	4	-205.18	0.00	0.00	0.00	0.00	0.00
13	1	-134.51	0.00	0.00	0.00	0.00	0.00
	2	-135.53	0.00	0.00	0.00	0.00	0.00
	3	-201.77	0.00	0.00	0.00	0.00	0.00
	4	-203.30	0.00	0.00	0.00	0.00	0.00
21	1	47.28	0.00	0.00	0.00	0.00	0.00
	2	48.68	0.00	0.00	0.00	0.00	0.00
	3	70.92	0.00	0.00	0.00	0.00	0.00
	4	73.01	0.00	0.00	0.00	0.00	0.00
22	1	82.14	0.00	0.00	0.00	0.00	0.00
	2	82.27	0.00	0.00	0.00	0.00	0.00
	3	123.21	0.00	0.00	0.00	0.00	0.00
	4	123.41	0.00	0.00	0.00	0.00	0.00
23	1	108.73	0.00	0.00	0.00	0.00	0.00
	2	108.06	0.00	0.00	0.00	0.00	0.00
	3	163.09	0.00	0.00	0.00	0.00	0.00
	4	162.08	0.00	0.00	0.00	0.00	0.00
31	1	470.26	0.00	0.00	0.00	0.00	0.00
	2	477.87	0.00	0.00	0.00	0.00	0.00
	3	705.39	0.00	0.00	0.00	0.00	0.00
	4	716.80	0.00	0.00	0.00	0.00	0.00
32	1	523.71	0.00	0.00	0.00	0.00	0.00
	2	528.05	0.00	0.00	0.00	0.00	0.00
	3	785.57	0.00	0.00	0.00	0.00	0.00
	4	792.08	0.00	0.00	0.00	0.00	0.00
33	1	555.44	0.00	0.00	0.00	0.00	0.00
	2	557.69	0.00	0.00	0.00	0.00	0.00
	3	833.16	0.00	0.00	0.00	0.00	0.00
	4	836.54	0.00	0.00	0.00	0.00	0.00
41	1	143.04	0.00	0.00	0.00	0.00	0.00
	2	145.09	0.00	0.00	0.00	0.00	0.00

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
	3	214.55	0.00	0.00	0.00	0.00	0.00
	4	217.63	0.00	0.00	0.00	0.00	0.00
42	1	148.40	0.00	0.00	0.00	0.00	0.00
	2	149.85	0.00	0.00	0.00	0.00	0.00
	3	222.60	0.00	0.00	0.00	0.00	0.00
	4	224.77	0.00	0.00	0.00	0.00	0.00
43	1	149.67	0.00	0.00	0.00	0.00	0.00
	2	150.73	0.00	0.00	0.00	0.00	0.00
	3	224.51	0.00	0.00	0.00	0.00	0.00
	4	226.09	0.00	0.00	0.00	0.00	0.00

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

86. PLOT DIS FILE
87. PLOT BEN FILE
88. FINISH

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

**** DATE= JUL 23,1999 TIME= 8:51:37 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

VIADUCTO 3 - ESTRIBO 2 - ARMADURAS DE PILOTES

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 41	-1934	[illegible]3703	-484	926	0.23	0.29	0.78	373	46	76
BARRA 42	-2195	[illegible]3115	-549	779	0.26	0.24	0.60	287	36	58
BARRA 43	-689	[illegible]2205	-172	551	0.08	0.17	0.43	206	26	42

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 41	-2200	[illegible]3779	-550	945	0.26	0.30	0.78	373	46	76
BARRA 42	-2569	[illegible]3141	-642	785	0.30	0.25	0.59	282	35	57
BARRA 43	-837	[illegible]2201	-209	550	0.10	0.17	0.42	201	25	41

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 31	-1934	768	-484	192	0.23	0.06	0.04	19	14	18
BARRA 32	-2195	1014	-549	254	0.26	0.08	0.04	19	14	18
BARRA 33	-689	1100	-172	275	0.08	0.09	0.15	72	14	18

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 31	-2200	794	-550	199	0.26	0.06	0.04	19	14	18
BARRA 32	-2569	1015	-642	254	0.30	0.08	0.04	19	14	18
BARRA 33	-837	1086	-209	272	0.10	0.09	0.15	72	14	18

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-1934	2070	-484	518	0.23	0.16	0.32	153	19	31
BARRA 22	-2195	2011	-549	503	0.26	0.16	0.30	143	18	29
BARRA 23	-689	1915	-172	479	0.08	0.15	0.35	167	21	34

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-2200	2098	-550	525	0.26	0.16	0.30	143	18	29
BARRA 22	-2569	2034	-642	509	0.30	0.16	0.28	134	17	27
BARRA 23	-837	1934	-209	484	0.10	0.15	0.33	158	20	32

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-1934	1042	-484	261	0.23	0.08	0.04	19	14	18
BARRA 12	-2195	1144	-549	286	0.26	0.09	0.04	19	14	18
BARRA 13	-689	1201	-172	300	0.08	0.09	0.17	81	14	18

HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-2200	1059	-550	265	0.26	0.08	0.04	19	14	18
BARRA 12	-2569	1154	-642	289	0.30	0.09	0.04	19	14	18
BARRA 13	-837	1206	-209	302	0.10	0.09	0.15	72	14	18

HIPOTESIS 3	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-1934	106	-484	27	0.23	0.01	0.04	19	14	18
BARRA 2	-2195	144	-549	36	0.26	0.01	0.04	19	14	18
BARRA 3	-689	173	-172	43	0.08	0.01	0.04	19	14	18

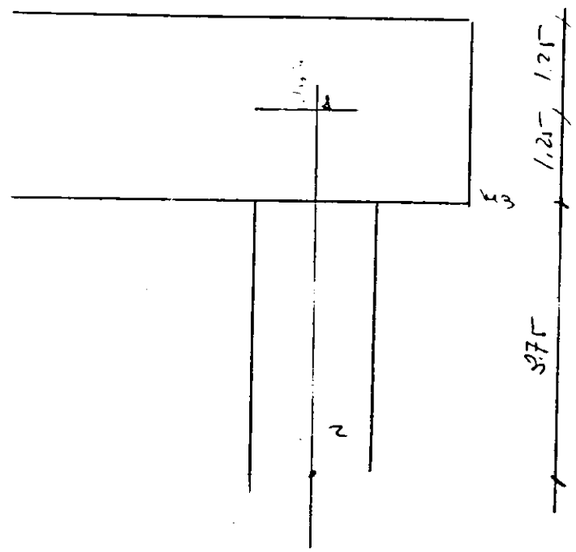
HIPOTESIS 4	N'	M'	N'/4	M'/4	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-2200	108	-550	27	0.26	0.01	0.04	19	14	18
BARRA 2	-2569	145	-642	36	0.30	0.01	0.04	19	14	18
BARRA 3	-837	172	-209	43	0.10	0.01	0.04	19	14	18

ν = N' / 4 / 2120

μ= M' / 4 / 1.5 / 2120

HOJA ... DE ...
FECHA ...

NOTA: los valores subrayados corresponden a valores redondeados a cero milímetros encima.



$$L_3 = L_{2+} \frac{L_1 - L_2}{5} \times 3{,}7$$

① $L_0 = 815 + (4666 - 815) \times 0{,}75 =$ 3703 mt

② $L_0 = 1061 + (3799 - 1061) \times 0{,}75 =$ 3115 mt

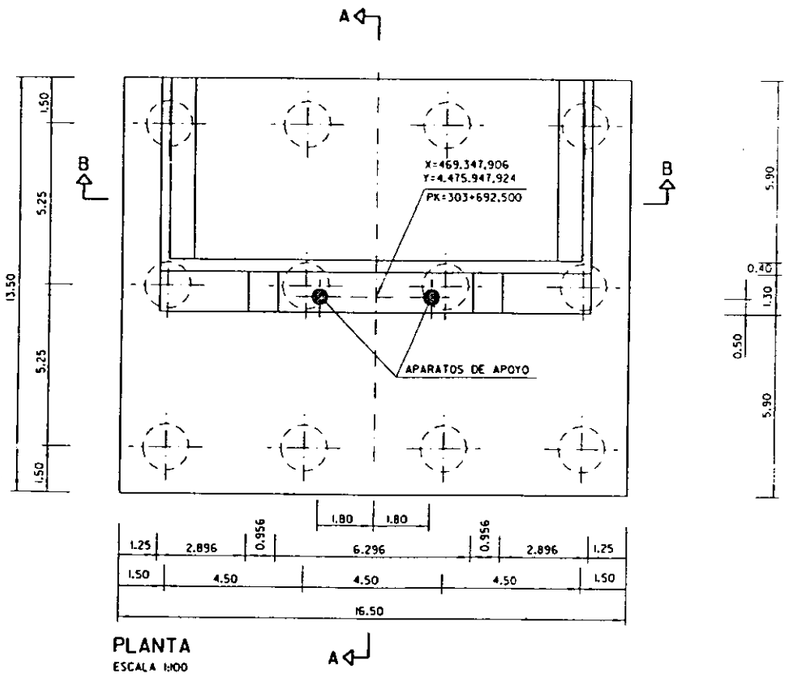
③ $L_0 = 1148 + (2558 - 1148) \times 0{,}75 =$ 2205 mt

④ $L_0 = 841 + (4758 - 841) \times 0{,}75 =$ 3779 mt

⑤ $L_0 = 1063 + (3834 - 1063) \times 0{,}75 =$ 3141 mt

⑥ $L_0 = 1134 + (2954 - 1134) \times 0{,}75 =$ 2201 mt

CALCULO DEL ENCEPADO



PILOTE MAS CARGADO $Q = \frac{1712}{4} = 428$ t.

PILOTE MENOS CARGADO $Q = \frac{459}{4} = 115$ ton.

ARMADURA INFERIOR

$v = 5.90 - 1.50 + 0.15 \times 1.10 = 4.65$ m

$\mu = 4 \times 428 \times 4.65 / 16.50 = 482$ mt/ml

$\mu' = 482 \times 1.6 = 772$ mt/ml

$A_c = \frac{2000}{1.5} \times 2.4 \times 1.0 = 4000$

$A_s = 4000 \left(1 - \sqrt{1 - \frac{2 \times 772}{2.4 \times 4000}}\right) = 335$ t/ml

$w = 335 \times 1.15 / 5.1 = 76$ cm²/ml 2 caps ϕ32/20

$w_2 = 76/4 = 19$ cm²/ml ϕ25/20

ARMADURA SUPERIOR

$q = 2.5 \times 2.5 + 1.8 \times 8.0 + 3 = 23.65$ t/m

$Q = 115$ t

$\mu = 23.65 \times \frac{6.15^2}{2} - \frac{115 \times 4}{16.50} \times 4.65 = 447 - 129 =$

$= 317$ mt/ml

$\mu' = 317 \times 1.6 = 507$ mt/ml

$A_c = 4000$ t/ml

$A_s = 4000 \left(1 - \sqrt{1 - \frac{2 \times 507}{2.4 \times 4000}}\right) = 217$ t

$w = 217 \times 1.15 / 5.1 = 49$ cm²/ml ϕ32/15

CORTANTE

$Q_1 = \frac{4 \times 428}{16.50} = 104$ t/ml

$Q_2 = 23.65 \times 6.15 - \frac{115 \times 4}{16.50} = 145 - 27 = 118$ t/ml.

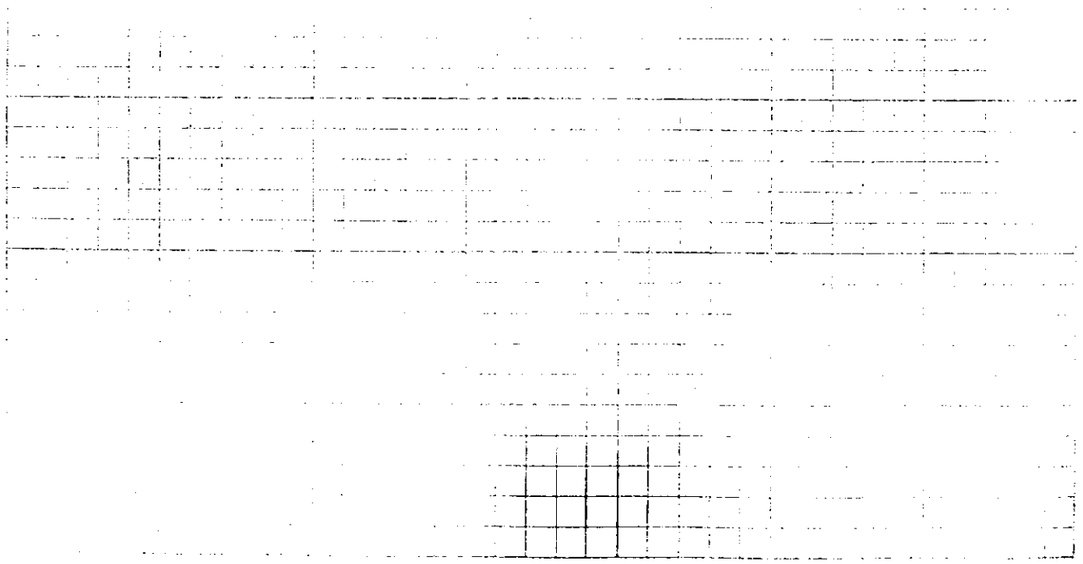
$Q' = 118 \times 1{,}6 = 189$ t/ml

$T_b = 5\sqrt{\frac{250}{1.5}} \times 2.4 \times 100 = 155$ t/ml

$w_1 = \frac{189-155}{0.9 \times 4.2 \times 2.4} = 3.75$ cm²/m

$w_{min} = 0.02 \times \frac{2500}{1.5} \times \frac{1}{4.2} = 9.52$ cm²/m

Horquillas Φ16/30/60



COMPROBACIÓN DE LOS PILOTES PARA QUE NO RESULTEN SOMETIDOS HACIA ARRIBA TIERRAS.

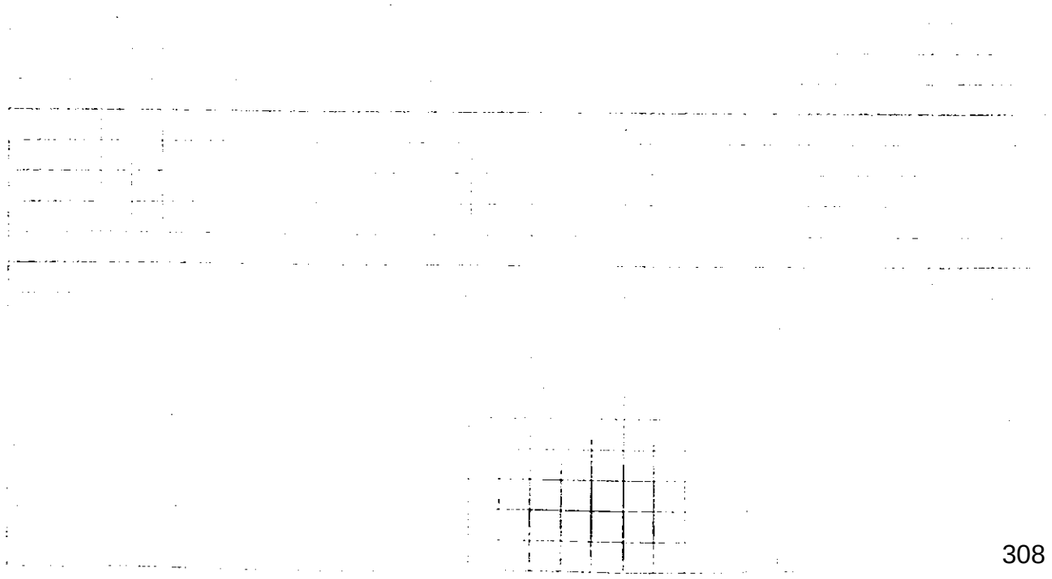
$F_x = -731{,}9 + 2 \times 15{,}41 = -700$ ton

$F_y = -3738$ t

$M_z = -2659 - 2 \times 15{,}41 (9{,}00 + 2{,}50 - 2{,}00) =$

$-2659 - 292 = -2951$ mt

No hay inversión de momentos y los valores resultan inferiores a los hipótesis de montaje



VIADUCTO 3

PRUEBA DE CARGA

La estructura se ha modelizado como una viga continua de las siguientes características:

- Luces: 16.00, 23.00, 16.00 m
- Sección transversal (A): 13.108 m^2
- Momento de inercia (I): 4.2849 m^4
- Resistencia característica del hormigón (f_{ck}): 400 kp/cm^2
- Módulo de elasticidad (E): $3.8x10^6$ t/m^2

El tren de cargas ha consistido en 6 camiones no articulados de 3 ejes y 26 t de peso total (tipo *dumper*), agrupados en dos bloques de tres vehículos en fondo con las cajas enfrentadas. Con dicho tren recorriendo la estructura, se han calculado* las líneas de influencia de las flechas y momentos en centros de vano, y de las reacciones en los apoyos. Los ejes de cada camión transmiten cargas de 7.0 t (eje delantero) y 9.5 t (cada eje del tándem trasero), siendo los interejes de 3.90 y 1.35 m. El tren de cargas completo queda definido por los siguientes parámetros:

- Cargas: 21, 28.5, 28.5, 28.5, 28.5, 21 t
- Interejes: 3.90, 1.35, 3.00, 1.35, 3.90 m

Se ha calculado**, así mismo, el valor del período de vibración correspondiente a la frecuencia principal de vibración libre de la estructura.

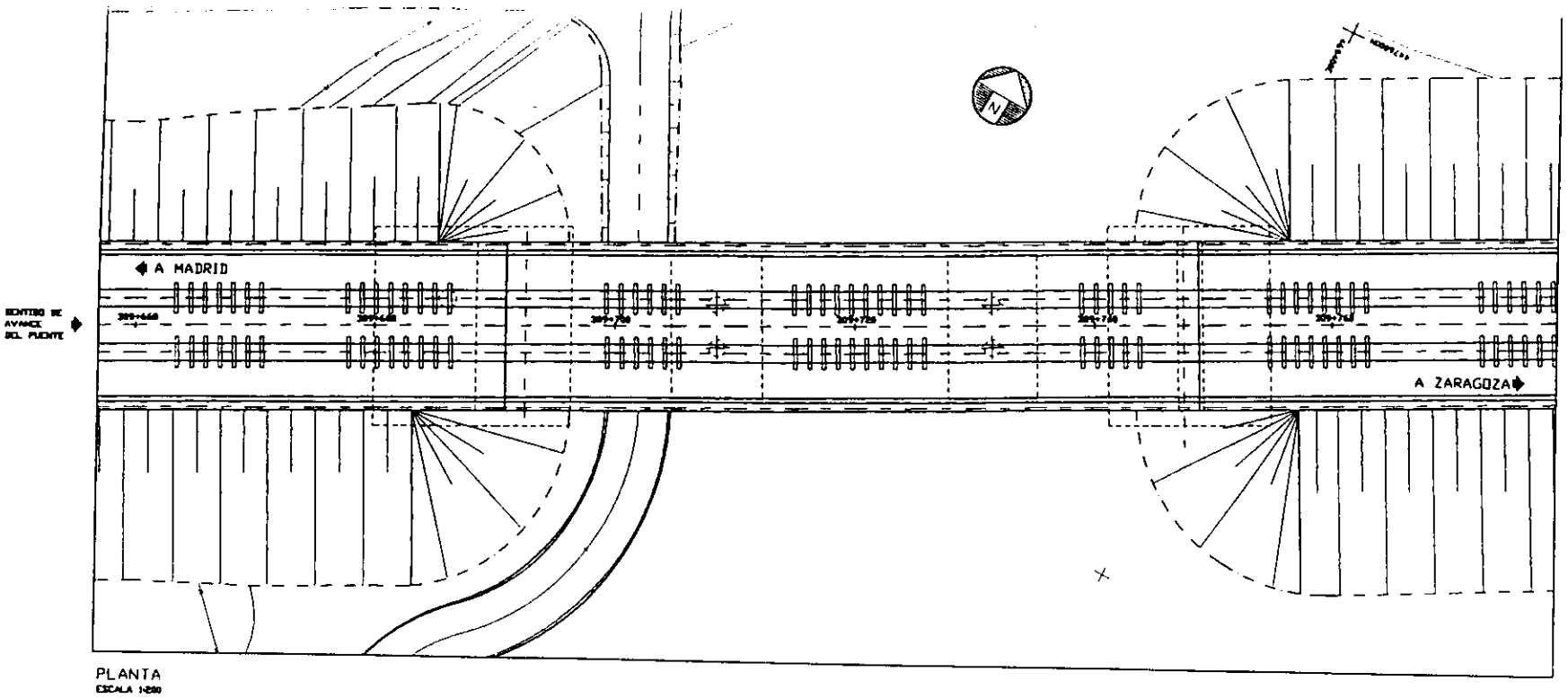
Los resultados previstos son los siguientes:

Vano	Abscisa de carga [m]	Flecha [mm]	Momento flector [mt]
1	14.63	-0.43	280
2	19.75	-0.94	367
3	14.88	-0.43	280

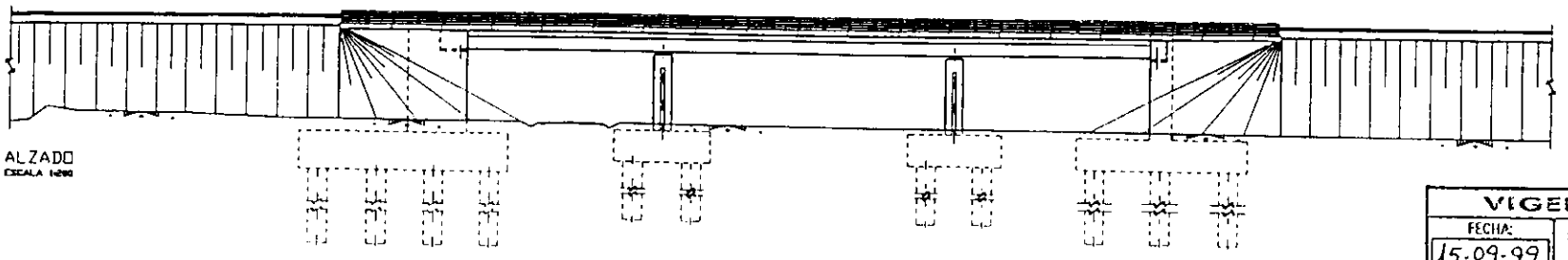
Flechas previstas en viaductos 2 y 3

La frecuencia principal de vibración es de 9.16 Hz, correspondiente a un período de 0.1092 s.

* Con el programa Merlin, de Kinesia
** Con el programa SAP 80

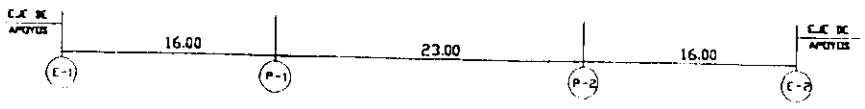


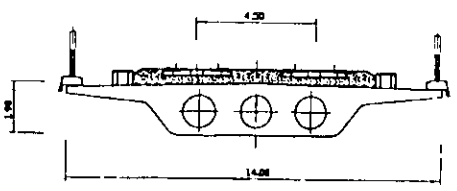
PLANTA
ESCALA 1:200



ALZADO
ESCALA 1:200

P.C. +630.00





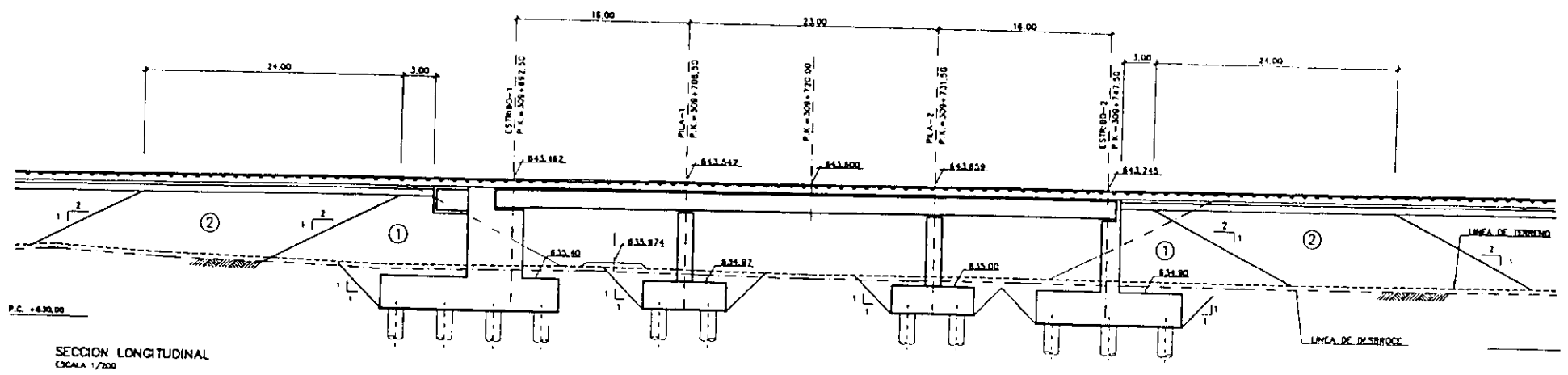
SECCION TRANSVERSAL TIPO
ESCALA 1:100

VIGENTE	
FECHA: 15-09-99	RESPONSABLE:
CODIGO: 2931-C	

COORDENADAS DE REPLANTEO

	P.K.	X	Y	Az
E-1	309+692,500	469.347,986	473.947,984	178,822g
P-1	309+706,500	469.362,379	473.934,745	178,822g
P-2	309+731,500	469.383,579	473.914,685	178,822g
E-2	309+747,500	469.397,393	473.971,583	178,543g

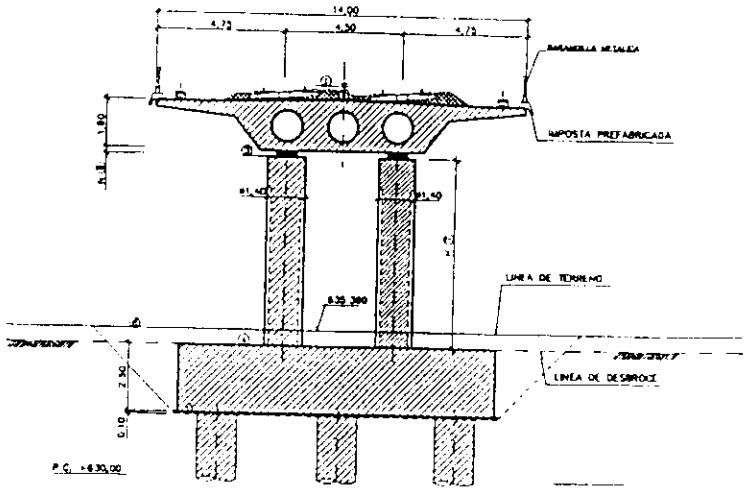
GIF	TITULO: PROYECTO CONSTRUCTIVO LINEA DE ALTA VELOCIDAD MADRID-BARCELONA-FRONTERA FRANCESA TRAMO: MADRID-ZARAGOZA SUBTRAMO III PLATAFORMA (MODIFICADO Nº 2)	EL INGENIERO DIRECTOR DEL PROYECTO Fdo.: D. JOSE MANUEL CARBONELL	EL INGENIERO AUTOR Fdo.: D.	AUTOR: U. T. E. DRAGADOS TECSA	CONFORME POR EL CONTRATISTA Fdo.: D. ALVARO FERNANDEZ OSTA	ESCALA 1:200 1:100	FECHA SEPTIEMBRE 1999	TITULO DEL PLANO ESTRUCTURA P.K. 309+720 PLANO GENERAL VIADUCTO 3	Nº DE PLANO 2.9.3.-C Hoja 1 de



SECCION LONGITUDINAL
ESCALA 1/200

①	SUELO ESTABILIZADO CON CEMENTO
②	ZAHORRAS COMPACTADAS

	① RASANTE	② CORONACION TABLERO	③ CORONACION PILA	④ CORONACION ZAPATA	⑤ FONDO EXCAVACION	⑥ TERRENO	⑦ H PILAS	⑧ ALTURA N (mm)
ESTRIBO-1	843.460	842.792	840.714	835.40	832.40	835.380	5.314	178
PILA-1	843.542	842.872	840.782	834.87	832.47	835.390	5.812	190
PILA-2	843.858	842.988	840.888	835.00	832.50	835.390	5.889	190
ESTRIBO-2	843.745	843.075	840.997	834.90	832.40	835.380	6.097	178

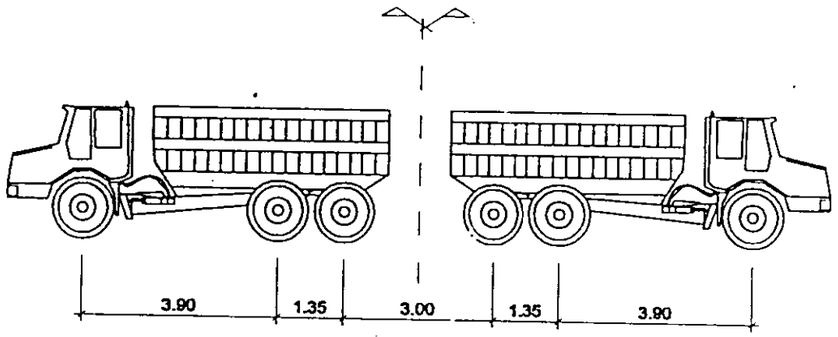


SECCION TRANSVERSAL
ESCALA 1/100

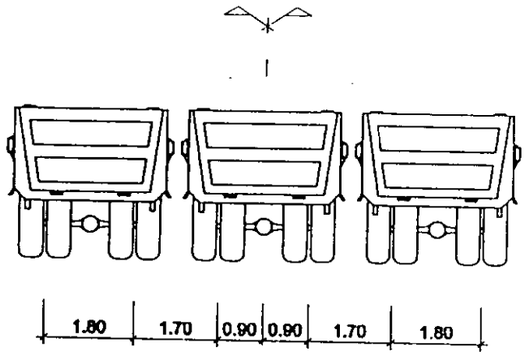
GIF	TITULO: PROYECTO CONSTRUCTIVO LINEA DE ALTA VELOCIDAD MADRID-BARCELONA-FRONTERA FRANCESA TRAMO: MADRID-ZARAGOZA	EL INGENIERO DIRECTOR DEL PROYECTO	AUTOR: U. T. E. DRAGADOS – TECSA	CONFORME POR EL CONTRATISTA	ESCALA 1:200	FECHA	TITULO DEL PLANO P.K. 309+720,00	Nº DE PLANO

VIGENTE	
FECHA: 25-1-200X	RESPONSABLE:
CODIGO: P.P. 2.9.3.-C	

DISPOSICION DE CAMIONES EN TODOS LOS VANOS

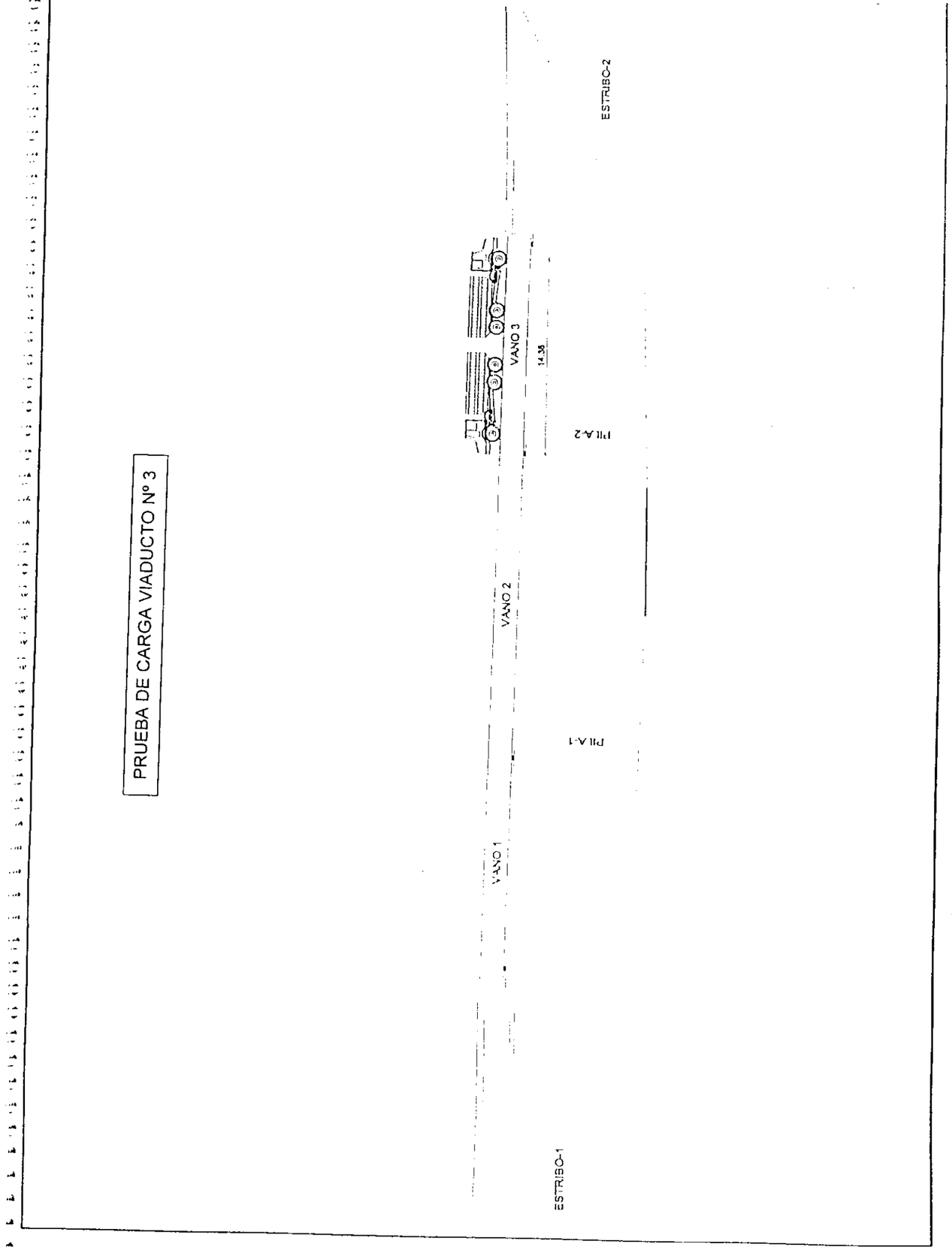


LONGITUDINALMENTE

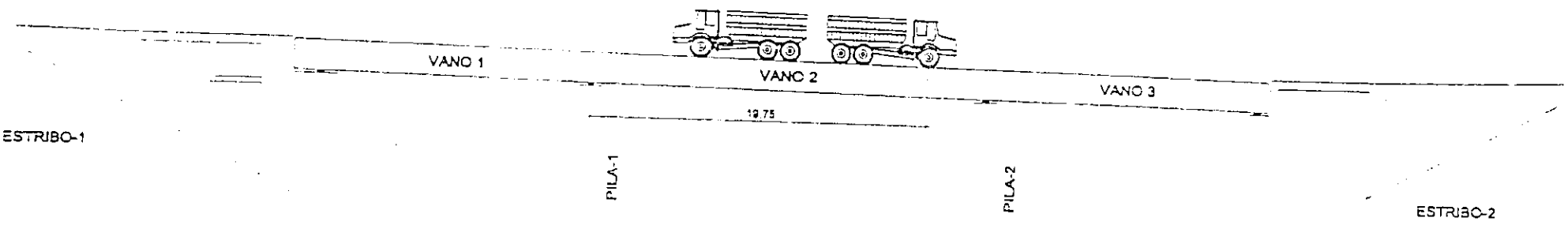


TRANSVERSALMENTE

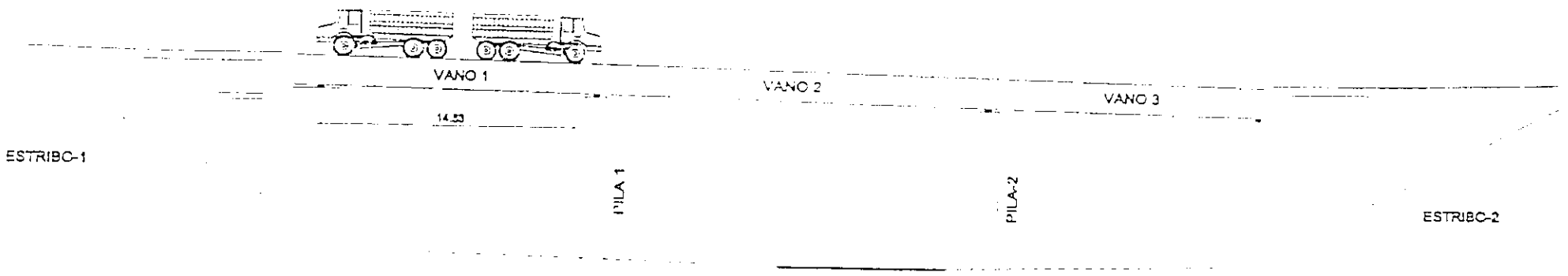
PRUEBA DE CARGA VIADUCTO Nº 3



PRUEBA DE CARGA VIADUCTO Nº 3



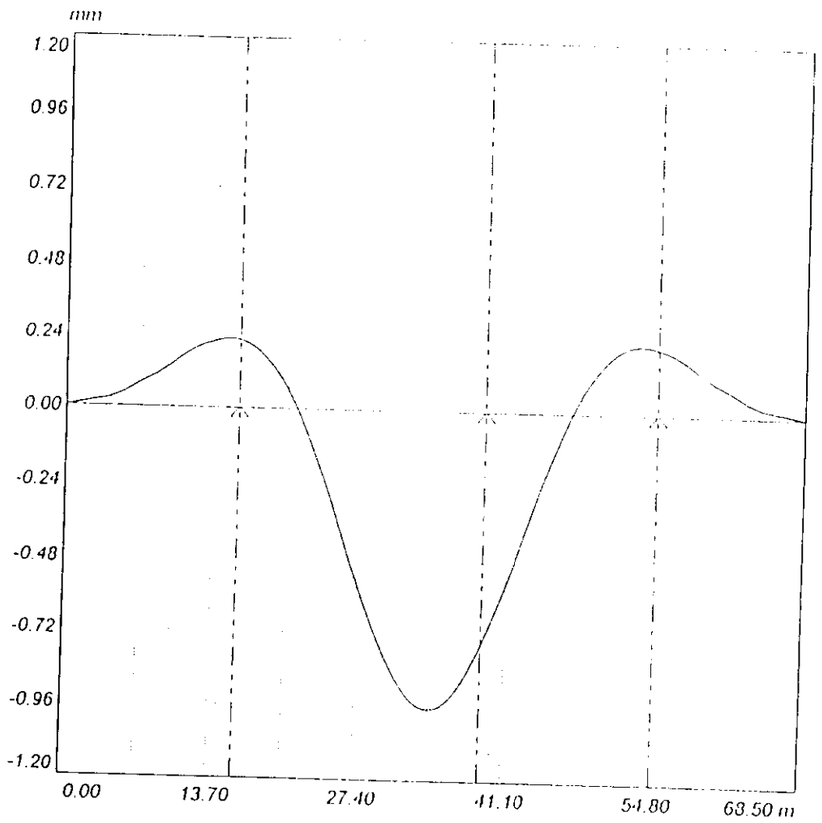
PRUEBA DE CARGA VIADUCTO Nº 3



VIADUCTO 3
.AP80 V85 . 02

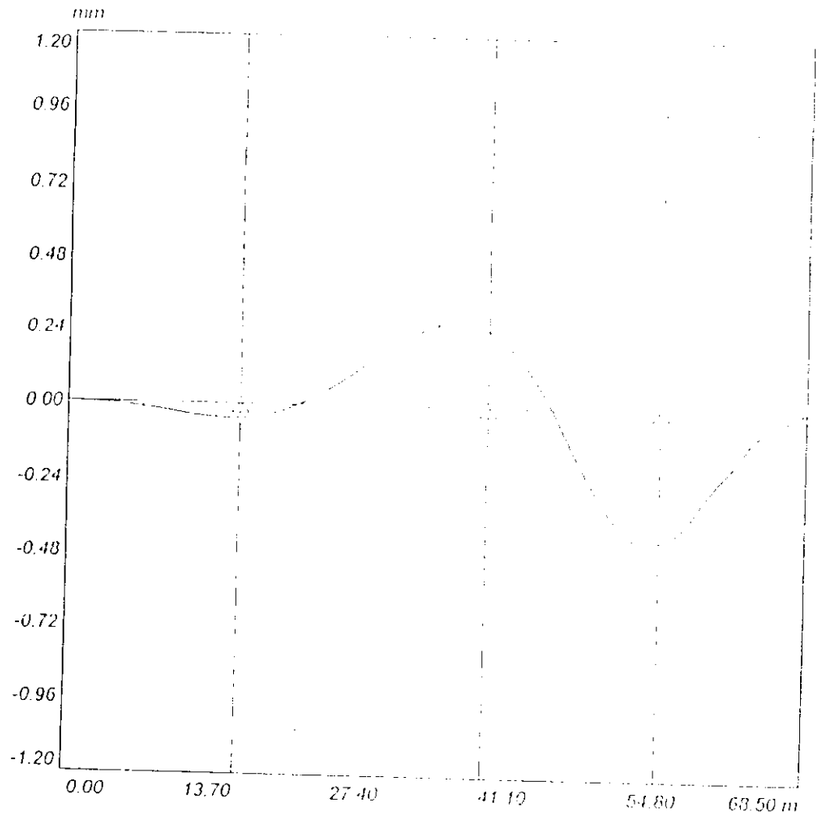
* * * \

Viaducto 3
Flecha en vano 2 (línea de influencia)
3+3 Camiones 26 t



Kinesia

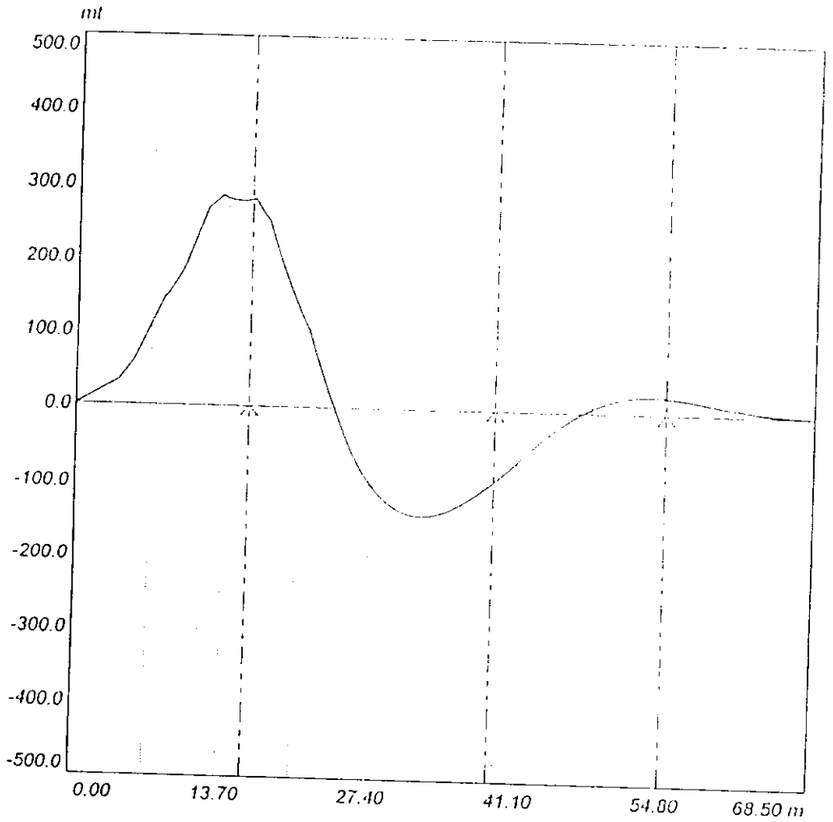
Viaducto 3
Flecha en vano 3 (línea de influencia)
3+3 Camiones 26 t



Viaducto 3

Momento en vano 1 (línea de influencia)

3+3 Camiones 26 t

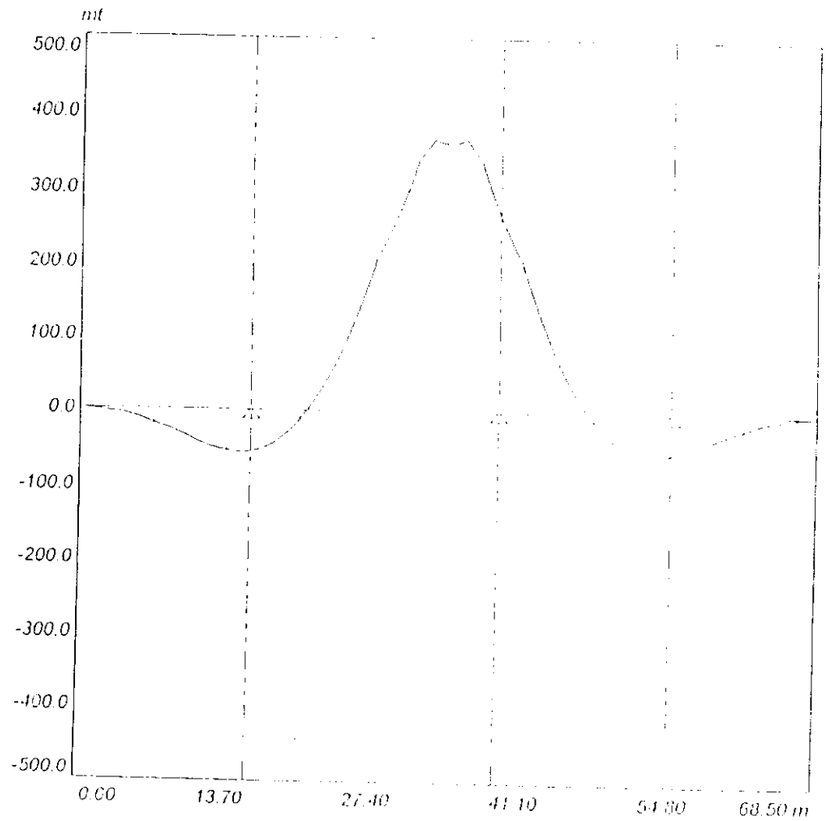


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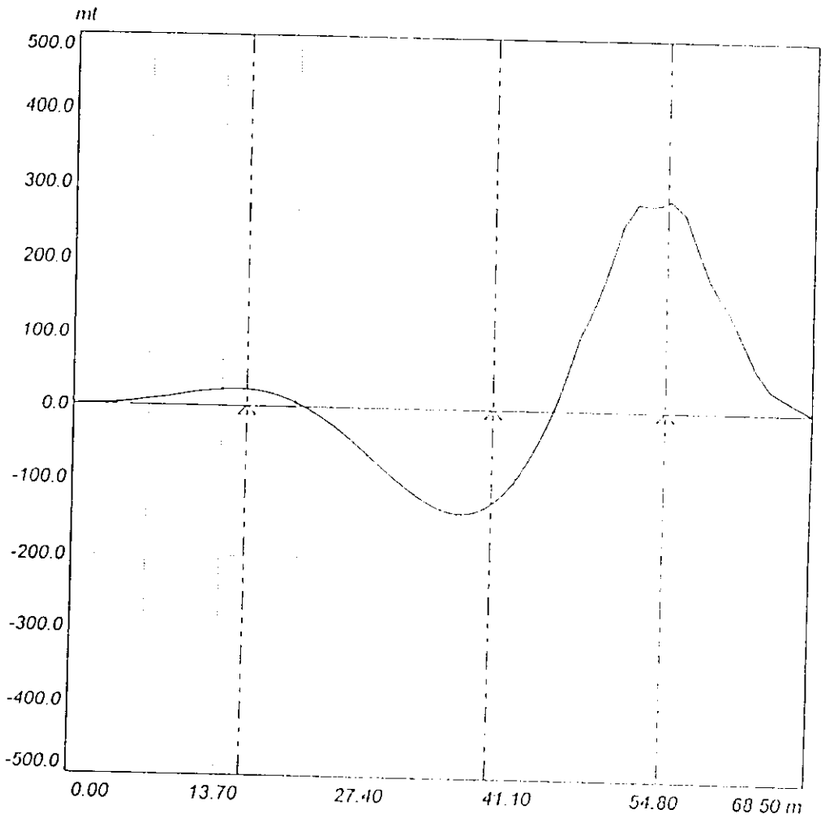
Viaducto 3

Momento en vano 2 (línea de influencia)

3+3 Camiones 26 t

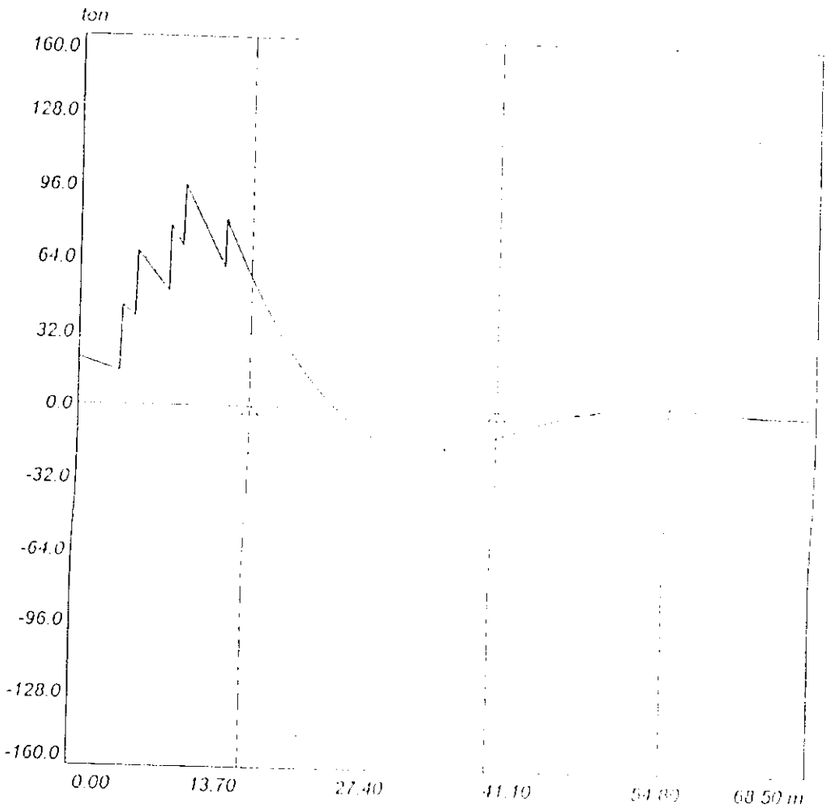


Viaducto 3
Momento en vano 3 (línea de influencia)
3+3 Camiones 26 t

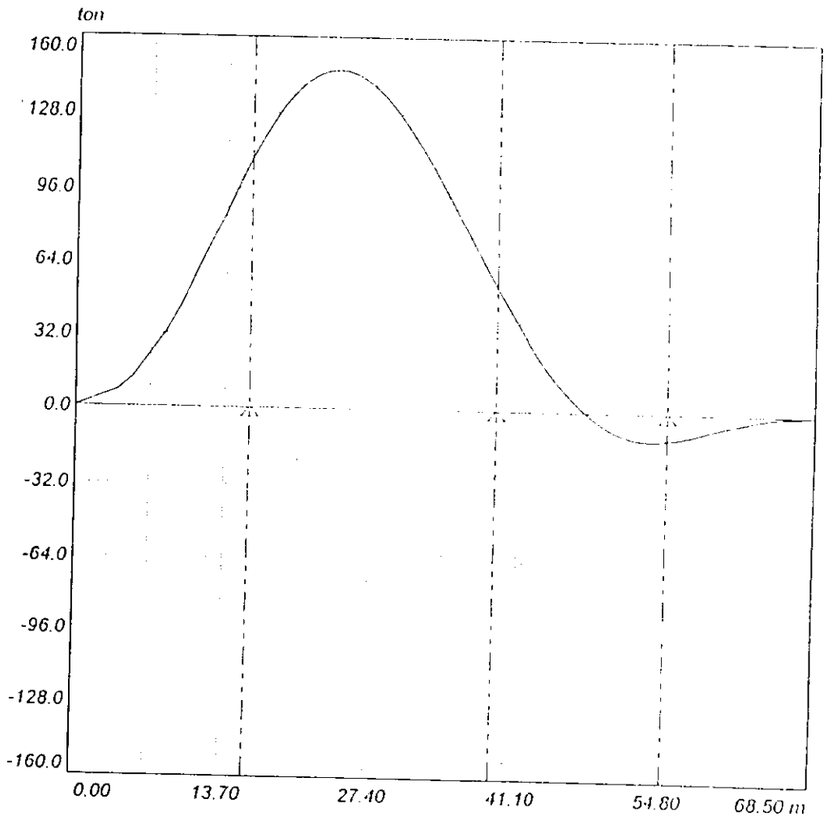


Kinesia

Viaducto 3
Reacción en apoyo 1 (línea de influencia)
3+3 Camiones 26 t

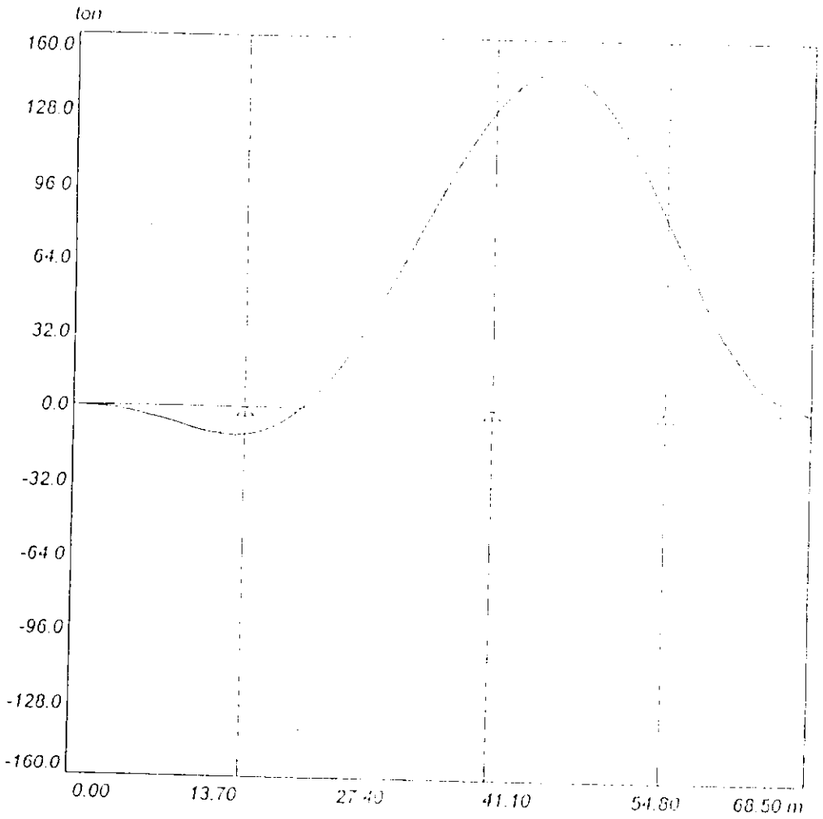


Viaducto 3
Reacción en apoyo 2 (línea de influencia)
3+3 Camiones 26 t



Kinesia

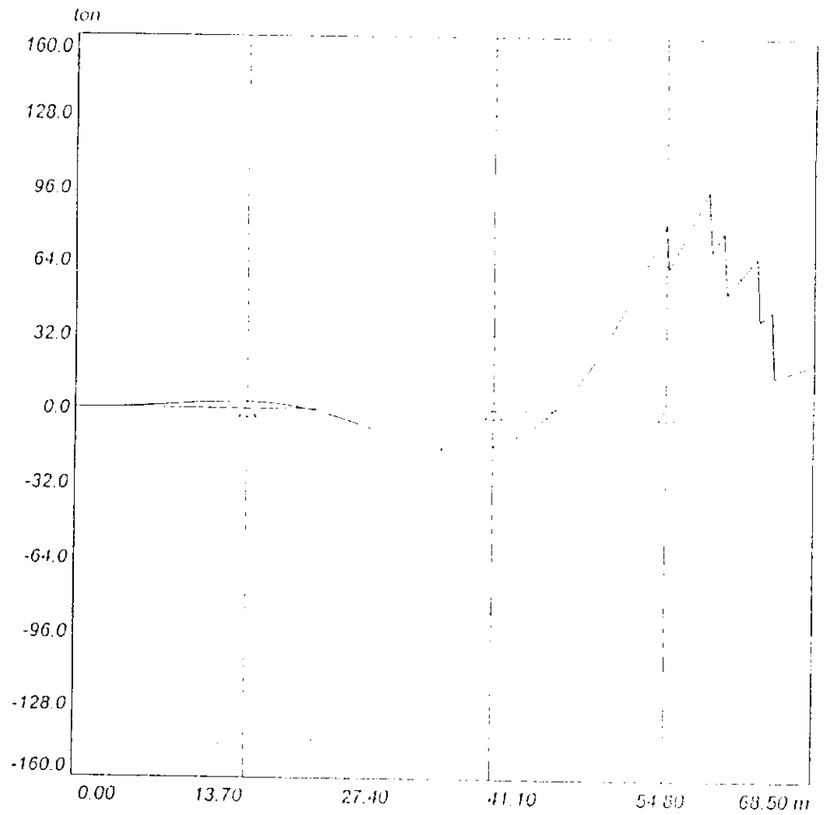
Viaducto 3
Reacción en apoyo 3 (línea de influencia)
3+3 Camiones 26 t



Viaducto 3

Reacción en apoyo 4 (línea de influencia)

3+3 Camiones 26 t



Proceso Constructivo

PROCESO CONSTRUCTIVO

La construcción del viaducto comienza con la ejecución de los pilotes donde el estribo 2 hacia el estribo 2, encamisándose los 15 m superiores de aluvial. Una vez ejecutados los pilotes se procede a la ejecución de los encepados. Ejecutados los cimientos se procede a levantar los alzados tanto de estribos como de pilas, utilizando un juego de dos encofrados para el fuste de los mismos con acabado machiembrado en todos los paramentos vistos.

Finalizada esta tarea se comienza con las labores necesarias para poder realizar el tablero que se ha hormigonado en dos fases y que han sido:

Ejecución de la cimbra cuajada cimentada en una losa de hormigón en masa con objeto de evitar el movimiento del encofrado durante el proceso en hormigonado. Sobre esta cimbra se dispone el encofrado que va del estribo 1 hasta 4,80 m después de la pila 2. Una vez hormigonada esta fase y tras comprobar que el hormigón ha alcanzado la resistencia requerida se procede al tesado a los tres días y se monta la armadura de esta segunda fase, se hormigonea y se tesa. Tras esto se realiza el anclaje del tablero al estribo 1. La razón de ejecutar el hormigonado en dos fases es tener un volumen de hormigón ejecutable en unas 10 ó 12 horas de trabajo como máximo.

Finalizado el tablero se desmonta la cimbra y se ejecutan las tareas de remate consistentes en ejecutar la canaleta para comunicaciones, impermeabilizar el tablero y disponer la barandilla y ejecutar las juntas.

Resumen del control de calidad

RESUMEN DEL CONTROL DE CALIDAD

Cuadro resumen de ensayos de hormigón

Parte de tesado

SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-3 P.P.I. Nº 20

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS 7 días		RESISTENCIAS 28 días		RESISTENCIAS 90 días		M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f est	OBSERVACIÓN
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
387	583	08/10/99	P-2 Encepado	03010302	H-250	6	Blanda			3	279			100	05/11/99	I 42,5 S/SR	246	
393	584	08/10/99	P-2 Encepado	03010302	H-250	6	Blanda			3	345			100	05/11/99	I 42,5 S/SR	291	
393	585	08/10/99	P-2 Encepado	03010302	H-250	6	Blanda			3	331			100	05/11/99	I 42,5 S/SR	291	
394	586	08/10/99	P-2 Encepado	03010302	H-250	7	Blanda			3	340			100	05/11/99	I 42,5 S/SR	299	
394	587	08/10/99	P-2 Encepado	03010302	H-250	7	Blanda			3	362			100	05/11/99	I 42,5 S/SR	299	
405	603	14/10/99	P-1 Encepado	03010302	H-250	10	Blanda			3	333			100	11/11/99	I 42,5 S/SR	293	
405	604	14/10/99	P-1 Encepado	03010302	H-250	5	Blanda			3	358			100	11/11/99	I 42,5 S/SR	293	
406	605	14/10/99	P-1 Encepado	03010302	H-250	8	Blanda			3	335			100	11/11/99	I 42,5 S/SR	295	
406	606	14/10/99	P-1 Encepado	03010302	H-250	7	Blanda			3	362			100	11/11/99	I 42,5 S/SR	295	
424	634	21/10/99	E-1 Encepado	03010302	H-250	9	Blanda			3	360			100	18/11/99	I 42,5 S/SR	293	
425	635	21/10/99	E-1 Encepado	03010302	H-250	9	Blanda			3	337			100	18/11/99	I 42,5 S/SR	297	
425	638	21/10/99	E-1 Encepado	03010302	H-250	8	Blanda			3	356			100	18/11/99	I 42,5 S/SR	297	
426	639	21/10/99	E-1 Encepado	03010302	H-250	8	Blanda			3	323			100	18/11/99	I 42,5 S/SR	276	
426	640	21/10/99	E-1 Encepado	03010302	H-250	8	Blanda			3	314			100	18/11/99	I 42,5 S/SR	276	
427	641	21/10/99	E-1 Encepado	03010302	H-250	7	Blanda			3	341			100	18/11/99	I 42,5 S/SR	300	
427	642	21/10/99	E-1 Encepado	03010302	H-250	8	Blanda			3	359			100	18/11/99	I 42,5 S/SR	300	
429	643	21/10/99	E-1 Encepado	03010302	H-250	7	Blanda			3	387			100	30/11/99	I 42,5 S/SR	295	
437	654	26/10/99	E-2 Encepado	03010302	H-250	7	Blanda			3	363			100	23/11/99	I 42,5 S/SR	266	
437	655	26/10/99	E-2 Encepado	03010302	H-250	9	Blanda			3	302			100	23/11/99	I 42,5 S/SR	266	
438	656	26/10/99	E-2 Encepado	03010302	H-250	6	Blanda			3	375			100	23/11/99	I 42,5 S/SR	330	
438	657	26/10/99	E-2 Encepado	03010302	H-250	7	Blanda			3	382			100	23/11/99	I 42,5 S/SR	330	
439	658	26/10/99	E-2 Encepado	03010302	H-250	7	Blanda			3	354			100	23/11/99	I 42,5 S/SR	272	
439	659	26/10/99	E-2 Encepado	03010302	H-250	6	Blanda			3	309			100	23/11/99	I 42,5 S/SR	272	
440	660	26/10/99	E-2 Encepado	03010302	H-250	7	Blanda			3	297			100	23/11/99	I 42,5 S/SR	261	
440	661	26/10/99	E-2 Encepado	03010302	H-250	8	Blanda			3	351			100	23/11/99	I 42,5 S/SR	261	
441	662	26/10/99	E-2 Encepado	03010302	H-250	8	Blanda			3	304			70	23/11/99	I 42,5 S/SR	268	
441	663	26/10/99	E-2 Encepado	03010302	H-250	8	Blanda			3	380			70	23/11/99	I 42,5 S/SR	268	
459	691	04/11/99	Pila 2,i	03010303	H-300	6	Blanda			3	396			8	02/12/99	II AL 42,5 R	396	
466	702	10/11/99	Pila 2,d	03010303	H-300	5	Blanda			3	405			8	09/12/99	II AL 42,5 R	405	
472	712	16/11/99	Pila 1,i	03010303	H-300	7	Blanda			3	404			8	14/12/99	II AL 42,5 R	404	
478	720	18/11/99	Pila 1,d	03010303	H-300	7	Blanda			3	308			8	16/12/99	II AL 42,5 R	308	

FECHA FIRMA NOMBRE. Ana Mª Martín Herrero

CARGO Jefe de Laboratorio

LOTE DE f est < 0,9 fck

SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-3 P.P.I. Nº 20

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS		RESISTENCIAS 28 días		RESISTENCIAS 90 días		M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f est	OBSERVACIÓN
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF	TIPO	CONO ABRAMS	CONSIS-TENCIA	DIA	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
508	773	21/12/99	E-1 Alzado 1f	03010303	H-250	9	Blanda			3	283			100	18/01/00	II AL 42,5 R	244	
508	774	21/12/99	E-1 Alzado1f	03010303	H-250	8	Blanda			3	277			100	18/01/00	II AL 42,5 R	244	
509	775	21/12/99	E-1 Alzado 1f	03010303	H-250	7	Blanda			3	311			100	18/01/00	II AL 42,5 R	248	
509	776	21/12/99	E-1 Alzado1f	03010303	H-250	6	Blanda			3	282			100	18/01/00	II AL 42,5 R	248	
510	777	21/12/99	E-1 Alzado 1f	03010303	H-250	5	Blanda			3	333			100	18/01/00	II AL 42,5 R	286	
510	778	21/12/99	E-1 Alzado1f	03010303	H-250	7	Blanda			3	325			100	18/01/00	II AL 42,5 R	286	
511	779	21/12/99	E-1 Alzado 1f	03010303	H-250	8	Blanda			3	297			100	18/01/00	II AL 42,5 R	261	
511	780	21/12/99	E-1 Alzado1f	03010303	H-250	8	Blanda			3	320			100	18/01/00	II AL 42,5 R	261	
578	901	27/01/00	E-2 Alzado 1f	03010303	H-250	14	Fluida	4	211	3	310			100	24/02/00	II AL 42,5 R	273	
578	902	27/01/00	E-2 Alzado 1f	03010303	H-250	14	Fluida	4	213	3	329			100	24/02/00	II AL 42,5 R	273	
579	903	27/01/00	E-2 Alzado 1f	03010303	H-250	12	Fluida			3	320			100	24/02/00	II AL 42,5 R	282	
595	929	01/02/00	E-2 Alzado 2f	03010303	H-250	7	Blanda			3	312			50	29/02/00	II AL 42,5 R	275	

FECHA FIRMA NOMBRE Ana Mª Martín Herrero

CARGO Jefe de Laboratorio

LOTE DE f est < 0,9 fck

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-3 Pilotes **P.P.I. Nº** 16

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS 7 días		RESISTENCIAS 28 días		RESISTENCIAS 90 días		M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. ESTIM	Nº	RES. MEDIA					
232	355	01/09/99	E-1 Pilote 11	03010301	H-200	15	Fluida	2	207		276			50	08/09/99	I 42,5 S/SR	243	
235	358	01/09/99	E-1 Pilote 8	03010301	H-200	15	Fluida	2	154		205			50	08/09/99	I 42,5 S/SR	181	
235b	359	01/09/99	E-1 Pilote 8	03010301	H-200	15	Fluida	2	191		255			50	08/09/99	I 42,5 S/SR	224	
242	370	03/09/99	E-1 Pilote 1	03010301	H-200	15	Fluida	2	243		324			50	10/09/99	I 42,5 S/SR	285	
243	371	03/09/99	E-1 Pilote 1	03010301	H-200	15	Fluida	2	231		308			50	10/09/99	I 42,5 S/SR	271	
249	379	03/09/99	E-1 Pilote 6	03010301	H-200	15	Fluida	2	239		319			50	10/09/99	I 42,5 S/SR	280	
250	380	03/09/99	E-1 Pilote 6	03010301	H-200	15	Fluida	2	276		368			50	10/09/99	I 42,5 S/SR	324	
251	382	06/09/99	E-1 Pilote 13	03010301	H-200	15	Fluida	2	189		252			50	13/09/99	I 42,5 S/SR	222	
253	384	06/09/99	E-1 Pilote 5	03010301	H-200	13	Fluida	2	269		359			50	13/09/99	I 42,5 S/SR	316	
254	385	06/09/99	E-1 Pilote 5	03010301	H-200	10	Fluida	2	241		321			50	13/09/99	I 42,5 S/SR	283	
255	386	06/09/99	E-1 Pilote 5	03010301	H-200	12	Fluida	2	260		347			50	13/09/99	I 42,5 S/SR	305	
262	396	07/09/99	E-1 Pilote 4	03010301	H-200	15	Fluida	2	257		343			50	14/09/99	I 42,5 S/SR	302	
264	398	07/09/99	E-1 Pilote 2	03010301	H-200	15	Fluida	2	231		308			50	14/09/99	I 42,5 S/SR	271	
265	399	07/09/99	E-1 Pilote 7	03010301	H-200	15	Fluida	2	244		325			50	14/09/99	I 42,5 S/SR	286	
268	410	08/09/99	P-1 Pilote 6	03010301	H-200	13	Fluida	2	232		309			50	15/09/99	I 42,5 S/SR	272	
271	402	08/09/99	E-1 Pilote 15	03010301	H-200	15	Fluida	2	260		347			50	15/09/99	I 42,5 S/SR	305	
272	403	08/09/99	P-1 Pilote 2	03010301	H-200	12	Fluida	2	292		389			50	15/09/99	I 42,5 S/SR	343	
273	411	09/09/99	P-1 Pilote 1	03010301	H-200	15	Fluida	2	239		319			50	16/09/99	I 42,5 S/SR	280	
276	415	09/09/99	P-1 Pilote 6	03010301	H-200	10	Fluida	2	254		339			50	16/09/99	I 42,5 S/SR	298	
277	421	09/09/99	P-1 Pilote 6	03010301	H-200	15	Fluida	2	263		351			50	16/09/99	I 42,5 S/SR	309	
283	425	10/09/99	P-2 Pilote 4	03010301	H-200	15	Fluida	2	304		405			50	17/09/99	I 42,5 S/SR	357	
284	426	10/09/99	P-2 Pilote 4	03010301	H-200	12	Fluida	2	279		372			50	17/09/99	I 42,5 S/SR	327	
288	432	13/09/99	E-2 Pilote 11	03010301	H-200	13	Fluida	2	281		375			50	20/09/99	I 42,5 S/SR	330	
291	435	14/09/99	E-2 Pilote 10	03010301	H-200	14	Fluida	2	287		383			50	21/09/99	I 42,5 S/SR	337	
292	436	14/09/99	E-2 Pilote 8	03010301	H-200	15	Fluida	2	292		389			50	21/09/99	I 42,5 S/SR	343	
294	439	14/09/99	E-2 Pilote 12	03010301	H-200	14	Fluida	2	264		352			50	21/09/99	I 42,5 S/SR	310	
295	440	15/09/99	E-2 Pilote 1	03010301	H-200	15	Fluida	2	205		273			50	22/09/99	I 42,5 S/SR	241	
302	449	15/09/99	E-2 Pilote 5	03010301	H-200	12	Fluida	2	234		312			50	22/09/99	I 42,5 S/SR	275	
303	450	15/09/99	E-2 Pilote 9	03010301	H-200	10	Fluida	2	252		336			50	22/09/99	I 42,5 S/SR	296	
305	458	16/09/99	E-2 Pilote 6	03010301	H-200	15	Fluida	2	193		257			50	23/09/99	I 42,5 S/SR	226	
306	459	16/09/99	E-2 Pilote 3	03010301	H-200	13	Fluida	2	213		284			50	23/09/99	I 42,5 S/SR	250	

FECHA: FIRMA: NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de laborato

LOTE DE f. est. < 0,9 fck

SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-3 **P.P.I. Nº** 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS 7 días		RESISTENCIAS 28 días		RESISTENCIAS 90 días		M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f est	OBSERVACIÓN
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES MEDIA	Nº	RES MEDIA	Nº	RES MEDIA					
668	1045	17/02/00	Tablero 1º	03010305	H-400	17	Fluida	2	380	3	412			100	16/03/00	II 42,5 R/SR	363	
668	1046	17/02/00	Tablero 1º	03010305	H-400	17	Fluida	2	408	3	446			100	16/03/00	II 42,5 R/SR	363	
669	1047	17/02/00	Tablero 1º	03010305	H-400	15	Fluida	2	400	3	435			100	16/03/00	II 42,5 R/SR	383	
669	1048	17/02/00	Tablero 1º	03010305	H-400	15	Fluida	2	395	3	436			100	16/03/00	II 42,5 R/SR	383	
670	1049	17/02/00	Tablero 1º	03010305	H-400	15	Fluida	2	395	3	473			100	16/03/00	II 42,5 R/SR	416	
670	1050	17/02/00	Tablero 1º	03010305	H-400	15	Fluida	2	428	3	481			100	16/03/00	II 42,5 R/SR	416	
671	1051	17/02/00	Tablero 1º	03010305	H-400	14	Fluida	2	440	3	496			100	16/03/00	II 42,5 R/SR	429	
671	1052	17/02/00	Tablero 1º	03010305	H-400	14	Fluida	2	422	3	488			100	16/03/00	II 42,5 R/SR	429	
672	1053	17/02/00	Tablero 1º	03010305	H-400	14	Fluida	2	411	3	475			100	16/03/00	II 42,5 R/SR	405	
672	1054	17/02/00	Tablero 1º	03010305	H-400	15	Fluida	2	401	3	460			100	16/03/00	II 42,5 R/SR	405	
710	1124	03/03/00	Tablero 2º	03010305	H-400	10	Fluida				475			100	31/03/00	II 42,5 R/SR	380	
710	1125	03/03/00	Tablero 2º	03010305	H-400	14	Fluida				432			100	31/03/00	II 42,5 R/SR	380	
711	1126	03/03/00	Tablero 2º	03010305	H-400	12	Fluida				459			100	06/04/00	II 42,5 R/SR	383	

FECHA FIRMA NOMBRE Ana Mª Martin Herrero

CARGO Jefe de Laboratorio

LOTE DE f est < 0 9 fck

MEKANO-4	PARTE DE TESADO
	FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 3, FASE 1
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	22/02/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-4 y M-3
Número de gato	--
Area de presión gato	678.564 y 433,527 cm2
Tipo de central	BPT-11
Número de central	--

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200	300		300	400	500	550			TES mm	RET mm
3	19/0.6"	550	64	85	137	180		15	75	126	156			288.5	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	500		500	550	TES mm	RET mm
4	19/0.6"	550	70	85	136		12	58	108	160		13	35	264.9	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200	260		260	300	400	500	550		TES mm	RET mm
5	19/0.6"	550	74	93	146	177		24	40	88	140	165		273.9	
6	19/0.6"	550	64	88	139	167		14	30	81	132			251.1	
7	19/0.6"	550	65	87	137	165		13	28	78	132	152		268.3	
8	19/0.6"	550	57	80	133	160		12	27	78	136	160		281.7	
1	19/0.6"	550	65	82	135	164		15	30	80	134	155		268.3	
	19/0.6"	550	67	86	139	170		12	30	82	136	156		277.2	

NOTA:
En el tendón nº 6 se ha roto un cable.

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
				60	100	200	300		300	400	500	540		TES mm	RET mm
14	12/0,6"	540		42	65	126	170		17	77	117	139		281.3	
15	12/0,6"	540		56	80	135	190		17	64	123	147		297.0	
10	12/0,6"	540		46	72	126	176		20	71	130	155		298.1	
11	12/0,6"	540		37	61	120	170		15	65	125	147		298.1	
12	12/0,6"	540		50	72	130	184		23	71	130	154		298.1	
16	12/0,6"	540		50	67	123	175		16	65	124	152		293.6	
9	12/0,6"	540		40	65	122	171		17	66	125	150		297.0	
1	12/0,6"	540		45	69	123	174		15	65	119	142		288.0	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	288	0	288						288	284	1.6
4	265	0	265						265	284	-6.7
5	274	0	274						274	284	-3.6
6	251	0	251						251	284	-12
7	268	0	268						268	284	-5.5
8	282	0	282						282	284	-0.8
1	268	0	268						268	284	-5.5
2	277	0	277						277	284	-2.4
14	281	0	281						281	305	-7.7
15	297	0	297						297	305	-2.5
10	298	0	298						298	305	-2.1
11	298	0	298						298	305	-2.1
12	298	0	298						298	305	-2.1
16	294	0	294						294	305	-3.6
9	297	0	297						297	305	-2.5
13	288	0	288						288	305	-5.5

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....	=	2 %
Diferencia negativa maxima.....	=	-11.6 %
DIFERENCIA MEDIA.....	=	-3.9 %

Datos según el alargamiento de proyecto.

MEKANO-4

PARTE DE TESADO

FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 3, FASE 2
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	9/03/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	--
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	--

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)										Alargamientos	
				100	200	300	400	500	550				TES mm	RET mm
3	19/0.6"	550		38	59	75	97	117	127				108.8	
4	19/0.6"	550		29	49	66	85	106	117				107.6	
5	19/0.6"	550		37	56	74	93	111	124				106.3	
6	19/0.6"	550		29	48	67	86	108	121				112.4	
7	19/0.6"	550		35	55	73	82	111	124				108.8	
8	19/0.6"	550		27	46	65	84	105	116				108.8	
1	19/0.6"	550		45	65	82	103	123	134				108.8	
2	19/0.6"	550		30	50	67	87	108	118				107.6	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)										Alargamientos	
				100	200	300	400	500	540				TES mm	RET mm
14	12/0,6"	540		32	53	72	93	116	127				116.6	
15	12/0,6"	540		39	48	67	85	108	119				98.2	
10	12/0,6"	540		29	49	68	86	106	114				104.3	
11	12/0,6"	540		24	42	59	79	98	101				94.5	
12	12/0,6"	540		34	53	71	91	111	120				105.5	
16	12/0,6"	540		31	50	69	89	109	117				105.5	
9	12/0,6"	540		40	60	79	99	119	128				108.0	
13	12/0,6"	540		44	64	82	101	121	128				103.1	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total	[redacted]	Tesa	Rete	Total	[redacted]			
3	109	0	109	[redacted]				[redacted]	109	108	0.7
4	108	0	108	[redacted]				[redacted]	108	108	-0.4
5	106	0	106	[redacted]				[redacted]	106	108	-1.5
6	112	0	112	[redacted]				[redacted]	112	108	4.1
7	109	0	109	[redacted]				[redacted]	109	108	0.7
8	109	0	109	[redacted]				[redacted]	109	108	0.7
1	109	0	109	[redacted]				[redacted]	109	108	0.7
2	108	0	108	[redacted]				[redacted]	108	108	-0.4
14	117	0	117	[redacted]				[redacted]	117	106	10
15	98	0	98	[redacted]				[redacted]	98	106	-7.4
10	104	0	104	[redacted]				[redacted]	104	106	-1.6
11	95	0	95	[redacted]				[redacted]	95	106	-11
12	106	0	106	[redacted]				[redacted]	106	106	-0.4
16	106	0	106	[redacted]				[redacted]	106	106	-0.4
9	108	0	108	[redacted]				[redacted]	108	106	1.9
13	103	0	103	[redacted]				[redacted]	103	106	-2.7
				[redacted]				[redacted]			

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	10	%
Diferencia negativa maxima.....=	-10.8	%
DIFERENCIA MEDIA.....=	-0.4	%

El alargamiento teórico ha sido calculado por MK4.
El alargamiento obtenido está dentro del rango de valores esperables.
Por lo tanto, desde nuestro punto de vista, la operación de tesado puede darse por correcta y concluida.

Accesos y elementos para mantenimiento

ACCESOS Y ELEMENTOS PARA MANTENIMIENTO

Los mismos elementos que requieren un mantenimiento son los aparatos de apoyo que habrá que sustituirles cuando haya finalizado su vida útil. A todos ellos se accede desde abajo del tablero por un camino que sale desde el polígono industrial situado en las afueras de los Hueros (carretera M-220). Dado que el tablero está anclado en el estribo 1, para poder sustituir estos aparatos de apoyo es necesario liberar este anclaje antes de levantar el tablero, para lo que se ha dejado visitable el trasdós del estribo mediante una puerta metálica en el lado derecho del mencionado estribo que permite el acceso con los elementos, necesarios.

Viaducto 4

VIADUCTO 4

ÍNDICE

- DESCRIPCIÓN Y DEFINICIÓN GEOMÉTRICA
- CÁLCULOS
- PROCESO CONSTRUCTIVO
- RESUMEN DEL CONTROL DE CALIDAD
- ACCESOS Y ELEMENTOS PARA MANTENIMIENTO

Descripción y Definición geométrica

DESCRIPCIÓN DE LA ESTRUCTURA Y DEFINICIÓN GEOMÉTRICA

La estructura que se estudia en esta nota de cálculo es uno de los viaductos que aparecen en la traza, en concreto el situado entre los PP.KK. 310+132 y 310+571, denominado como Viaducto 4, y que se ejecuta por razones hidráulicos para la avenida del periodo de retorno 500 años del Arroyo Anchuelo y para salvar la Carretera M-220.

Consiste en una viga continua de hormigón pretensado de dieciséis vanos con luces de 21+11*28+3*30+21 m. La sección es una losa aligerada de canto y ancho constante, con valores de 2.16 y 14.00 m respectivamente. Tiene tres aligeramientos poligonales de porex se apoya en cada eje de pilas y estribos mediante dos aparatos de apoyo que lo empotran a torsión. Estos aparatos de apoyo son en todo caso deslizantes. Tipo Pot, con la distribución y características que a continuación se indican:

	TIPO DE APOYO	F_V (KH)	F_H (KN)	Ct (mm)	C- (mm)	GIRO (Rad)
E1	(2) B11 22-G2	3920	392	88	130	0,018
P1	(2) B11 22-G4	9800	588	105	105	0,011
P2	(2) B11 22-G4	9800	588	105	105	0,011
P3	(2) B11 22-G4	9800	588	105	105	0,011
P4	(2) B11 22-G4	9800	588	105	105	0,011
P5	(2) B11 22-G42	9800	588	105	255	0,011
P6	(2) B11 22-G42	9800	588	105	255	0,011
P7	(2) B11 22-G42	9800	588	105	255	0,011
P8	(2) B11 22-G42	9800	588	105	255	0,011
P9	(2) B11 22-G42	9800	588	105	255	0,011
P10	(2) B11 22-G43	9800	588	105	355	0,011
P11	(2) B11 22-G43	9800	588	105	355	0,011
P12	(2) B11 22-G43	9800	588	105	355	0,011
P13	(2) G11 22-G5	12250	588	88	408	0,011
P14	(2) G11 22-G5	12250	588	88	408	0,011
P15	(2) G11 22-G44	9800	588	105	455	0,011
E2	(2) G11 22-G22	3920	392	80	470	0,018

Cada eje de pilas consta de dos fustes cilíndricos con sección transversal circular de diámetro 1.40 m, que se empotran en un encepado. A las pilas se las ha dotado de un rehundido lateral con el único fin de mejorar su aspecto estético.

El encepado tiene unas dimensiones de 12,0 x 7,50 x 2,50 m y se apoya en 6 pilotes de diámetro 1,50 m y longitudes según el cuadro que adjunta.

Pilas 1 a 11, 14 y 15

En encepado de dismensiones 12,00 x 7,50 x 2,50 m permite transmitir las cargas a un conjunto de 6 pilotes cuyo diámetro es 1,50 m, y de longitudes según el cuadro que se adjunta:

PILA	LONGITUD PILOTES
P1	26 m
P2	30 m
P3	29 m
P4	29 m
P5	29 m
P6	28 m
P7	28 m
P8	28 m
P9	28 m
P10	28 m
P11	28 m
P12	28 m
P13	27 m
P14	26 m
P15	26 m

Pilas 12 y 13

El encepado tiene unas dimensiones 12x7,5x2,50 m, y se apoya sobre 6 pilotes de 1,50 m de diámetro, y de longitud 26 m en ambos casos. Tienen un cierto esviaje (27º del pila 12 y 30,73º la pila 13) para acomodarse al trazado de la carretera existente y alterar el tráfico lo mínimo durante la construcción.

El tablero está anclado de estribo 1 mediante 6 cables de 24 Ø 0,6" inyectadas con grasa y la carga horizontal debida al frenado la transmite mediante seis apoyos de neopreno encauchado de 1300 x 450 x 110. Este anclaje es visitable, de modo que se puede destesar para realizar la sustitución de los aparatos de apoyo.

Este estribo está cimentado mediante un encepado de dimensiones 21,00 x 25,50 x 3,00 que se apoya en 30 pilotes de diámetro 1,50 m y longitud 31,00 m. El estribo dispone de dos contrafuertes laterales, que van hasta el encepado, constituyendo una sección en U, de gran rigidez para transmitir las cargas horizontales de frenado.

Al existir la unión entre el estribo y el tablero no hay movimiento horizontal, por lo que no es necesaria una junta de dilatación. Se ha dispuesto no obstante un sistema para evitar que el balasto entre por la junta existente y que consiste en dos chapas embebidas en el estribo y en el tablero, la del estribo de dimensiones 200 x 10 x 6 600 (2 ud) , anclada mediante pernos Ø 20 cada 0,50 m y la del tablero de dimensiones 300 x 15 x 6 600 (2 ud) anclada mediante pernos Ø 20 cada 0,50 m. Sobre ellas se disponen dos chapas de 470 x 15 x 6 660 atornilladas a los pernos del estribo, y se ha sellado la junta entre chapas con mastic, de modo que no entre agua y chorree en el parámetro del estribo.

El estribo 2 está cimentado mediante un encepado de dimensiones 14,00 x 13,50 x 2,50 m que se apoya en 9 pilotes con diámetro 1,50 m y longitud 28,00 m, notablemente inferior al no recibir capas longitudinales en frenado.

El alzado del estribo tiene dos contrafuertes laterales que unen el fuste con el encepado. Dichos contrafuertes se prolongan en dos aletas cimentadas mediante zapatas, cuya misión es evitar el derrame lateral de las tierras.

En este estribo sí existe movimiento entre tablero y estribo, por lo que se ha dispuesto una junta consistente en el mismo sistema que la del estribo 1 y con una chapa de dimensiones 900x15x6600 de modo que la chapa superior desliza sobre la del tablero cuando éste se mueve.

Sobre el tablero se han dispuesto dos canaletas de comunicaciones, ejecutadas “in situ” con armadura pasante desde el tablero, un cruce de comunicaciones, situado en el PK 310+554, y la impermeabilización, consistente en una emulsión de brea-epoxi con una dotación de 2 kg/m^2. No se ha dispuesto imposta, anclándose la barandilla directamente sobre el voladizo del tablero.

Cálculos

CÁLCULOS

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- ESTUDIO DEL TABLERO

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  Cálculo de los coeficientes de excentricidad e impacto

  Cálculo del pretensado longitudinal

  Comprobación de fisuración por tensiones normales

  Reacciones, Giros y Desplazamientos

  Comprobación a rotura

  Comprobación a cortante

  Comprobación a rasante

  Estudio de la sección transversal. Armadura de voladizo

  Armadura de las traviesas sobre pilas

  Armadura del cajón

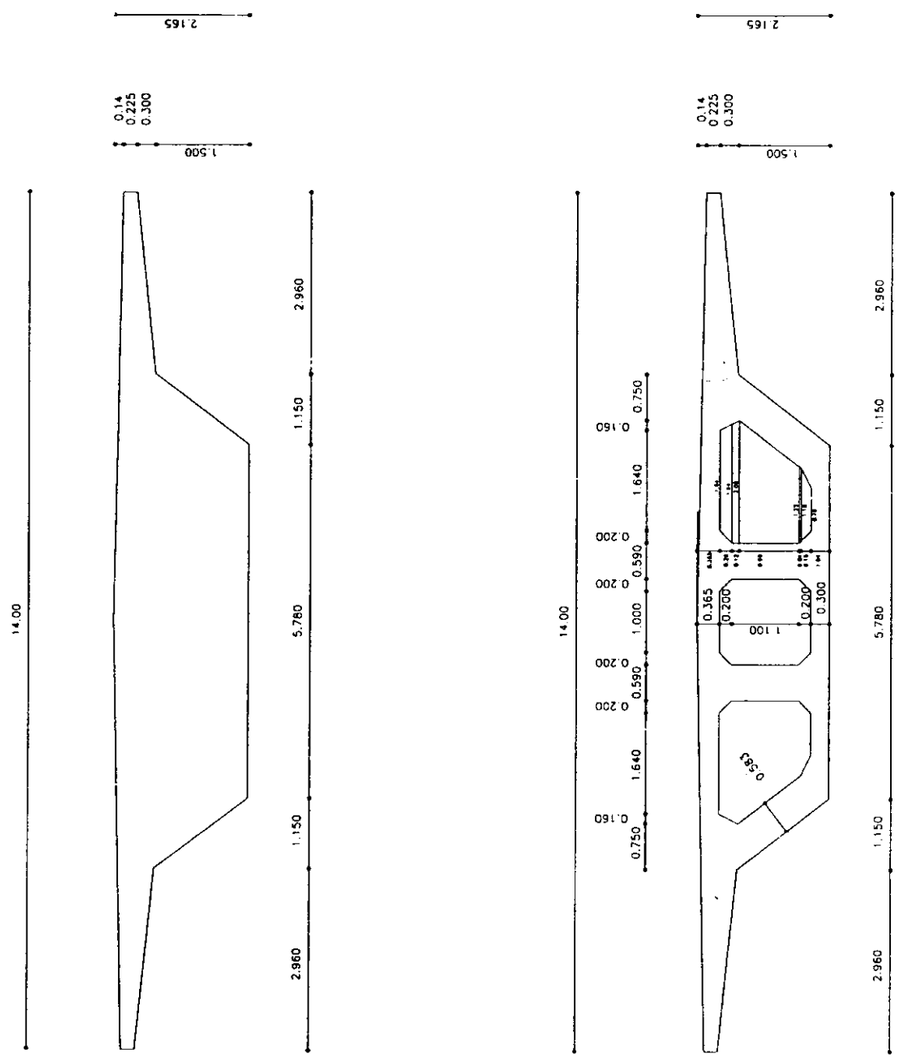
  Armadura de las traviesas sobre estribos

- APARATOS DE APOYO
- CÁLCULO DE LAS PILAS
- CÁLCULO DE LOS ESTRIBOS
- PROYECTO DE PRUEBA DE CARGA

PLANTA, ALZADO Y SECCION GENERAL DE LA ESTRUCTURA

ESTUDIO DEL TABLERO

CARACTERISTICAS GEOMETRICAS Y MECANICAS DE LA SECCION TRANSVERSAL




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4
4,  2.165
   000, 14.000, 0.140, 0.000
1..000, 14.000, 0.225, 0.140
14.000,  8.080, 0.300, 0.365
 8.080,  5.780, 1.500, 0.665
 0
12, 2.165
 0.000, 14.000, 0.140, 0.000
14.000, 14.000, 0.225, 0.140
14.000,  8.080, 0.300, 0.365
 8.080,  5.780, 1.500, 0.665
-1.000, -1.400, 0.200, 0.365
-1.400, -1.400, 1.100, 0.565
-1.400, -1.000, 0.200, 1.665
-3.280, -3.880, 0.200, 0.365
-3.880, -4.000, 0.120, 0.565
-4.000, -2.500, 0.980, 0.685
-2.500, -2.360, 0.040, 1.665
-2.360, -1.400, 0.160, 1.705
 0
-9, 14.00
   225,  0.584, 2.960, 0.000
 0.584,  2.107, 1.150, 2.960
 2.107,  2.165, 2.890, 4.110
 2.165,  2.107, 2.890, 7.000
 2.107,  0.584, 1.150, 9.890
 0.584,  0.225, 2.960,11.040
-0.000, -0.529, 0.160, 3.710
-0.529, -1.340, 0 622, 3.870
-1.340, -1.500, 0.320, 4.492
-1.500, -1.500, 0.698, 4.812
-1.500, -1.100, 0.200, 5.510
-1.100, -1.500, 0.200, 6.300
-1.500, -1.500, 1.000, 6.500
-1.500, -1.100, 0.200, 7.500
-1.100, -1.500, 0.200, 8.290
-1.500, -1.500, 0.698, 8.490
-1.500, -1.340, 0.320, 9.188
-1.340, -0.529, 0.622, 9.508
-0.529, -0 000, 0.160,10.130

., 2.165
1.990,  1.990, 0.365, 0.000
0.990,  0.590, 0.200, 0.365
0.590,  0.590, 1.100, 0.565
0.590,  0.990, 0.200, 1.665
1.990,  1.990, 0.300, 1.865
0
```

CALCULO DE CARACTERISTICAS MECANICAS
==========

BASE SUPERIOR	BASE INFERIOR	ALTURA	D.A B.SUP.
.000	14.000	.140	.000
14.000	14.000	.225	.140
14.000	8.080	.300	.365
8.080	5.780	1.500	.665

AREA (M2)	INERCIA (M4)	V.SUP (M)	V.INF (M)	CANTO (M)	W.SUP (M-3)	W.INF (M-3)	C. EQ. N
17.837	6.7511	.943	1.222	2.165	.140	.181	1.0

CALCULO DE CARACTERISTICAS MECANICAS
==========

BASE SUPERIOR	BASE INFERIOR	ALTURA	D.A B.SUP.
.000	14.000	.140	.000
14.000	14.000	.225	.140
14.000	8.080	.300	.365
8.080	5.780	1.500	.665
-1.000	-1.400	.200	.365
-1.400	-1.400	1.100	.565
-1.400	-1.000	.200	1.665
-3.280	-3.880	.200	.365
-3.880	-4.000	.120	.565
-4.000	-2.500	.980	.685
-2.500	-2.360	.040	1.665
-2.360	-1.400	.160	1.705

AREA (M2)	INERCIA (M4)	V.SUP (M)	V.INF (M)	CANTO (M)	W.SUP (M-3)	W.INF (M-3)	C. EQ. N
11.045	5.4311	.871	1.294	2.165	.160	.238	1.0

CALCULO DE CARACTERISTICAS MECANICAS
==========

BASE SUPERIOR	BASE INFERIOR	ALTURA	D.A B.SUP.
.225	.584	2.960	.000
.584	2.107	1.150	2.960
2.107	2.165	2.890	4.110
2.165	2.107	2.890	7.000
2.107	.584	1.150	9.890
.584	.225	2.960	11.040
.000	-.529	.160	3.710
-.529	-1.340	.622	3.870
-1.340	-1.500	.320	4.492
-1.500	-1.500	.698	4.812
-1.500	-1.100	.200	5.510
-1.100	-1.500	.200	6.300
-1.500	-1.500	1.000	6.500
-1.500	-1.100	.200	7.500
-1.100	-1.500	.200	8.290
-1.500	-1.500	.698	8.490
-1.500	-1.340	.320	9.188
-1.340	-.529	.622	9.508
-.529	.000	.160	10.130

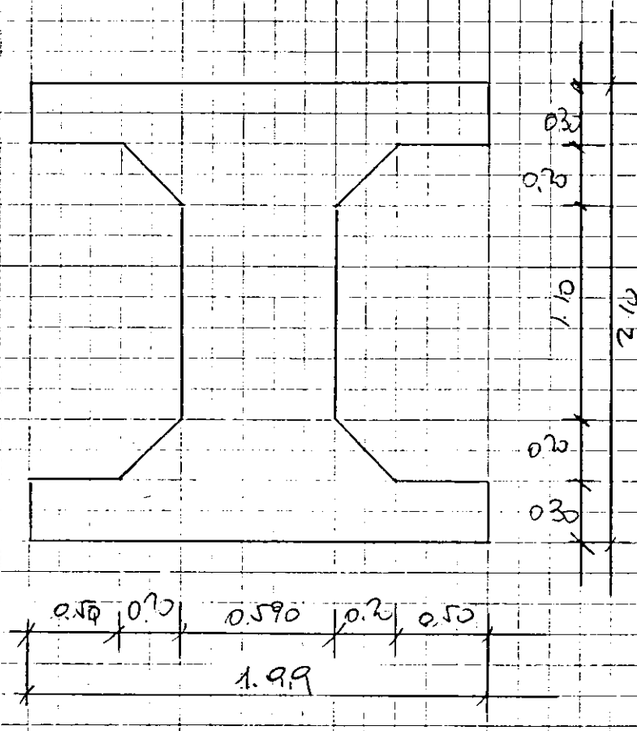
AREA (M2)	INERCIA (M4)	V.SUP (M)	V.INF (M)	CANTO (M)	W.SUP (M-3)	W.INF (M-3)	C. EQ. N
11.015	114.8995	7.000	7.000	14.000	.061	.061	1.0

CALCULO DE CARACTERISTICAS MECANICAS
==========

BASE SUPERIOR	BASE INFERIOR	ALTURA	D.A B.SUP.
1.990	1.990	.365	.000
.990	.590	.200	.365
.590	.590	1.100	.565
.590	.990	.200	1.665
1.990	1.990	.300	1.865

AREA (M2)	INERCIA (M4)	V.SUP (M)	V.INF (M)	CANTO (M)	W.SUP (M-3)	W.INF (M-3)	C. EQ. N
2.288	1.3226	1.054	1.111	2.165	.797	.840	1.0

CARACTERÍSTICAS MUROS CORTINA



$S_0 = 2.159$

$I_0 = 1.1796$

$I_G = 1.1796 + 2.159 \times (1.05)^2 - 2.159 \times 0.802^2 =$

$= 1.1796 + 2.3803 - 1.3884 = 2.1717$

$I_T = 2\left(0.30^3 \times 1.99 + 0.30 + 0.59^3 \times 1.50 \times 0.30\right) = 0.2428$

CARACTERÍSTICAS MUROS LATERALES

$S = \frac{1}{2}(11.115 - 2 \times 2.159) = 3.3985\ m^2$

$I_G = \frac{1}{2}(5.4579 - 2 \times 2.1717) = 0.5577\ m^4$

COMPROBACIÓN

$S_T = 2(2.159 + 3.3985) = 11.115$

$I_T = 2(2.1717 + 0.5577) = 5.4579$

CALCULO DE LOS COEFICIENTES DE EXCENTRICIDAD E IMPACTO

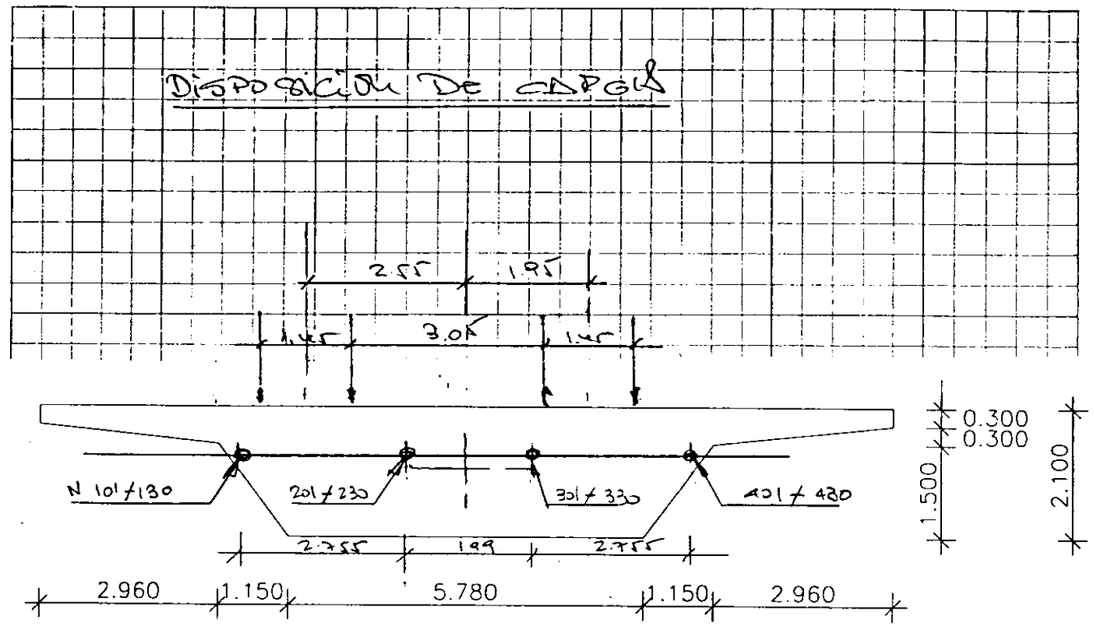
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PROYECTO: _____ HOJA ___ DE ___

_____ FECHA _____

EJECUTANTE: _____

DISPOSICIÓN DE CARGA



SOLO N 111 / 120 → $Q = 6 \times \left(\frac{2.28}{2.755} + \frac{0.23}{2.755} \right) =$

$= 6.775$ t/ml

SOLO N 211 / 220 → $Q = 6 \times \left(\frac{0.475}{2.755} + \frac{1.925}{2.755} \right) =$

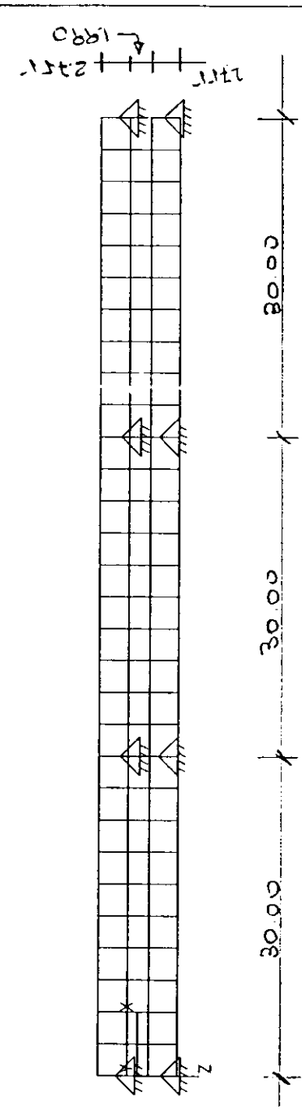
$= 5.225$ t/ml

SOLO N 311 / 320 → $Q = 6 \times \left(\frac{2.525}{2.755} + \frac{1.075}{2.755} \right) =$

$= 7.84$ t/ml

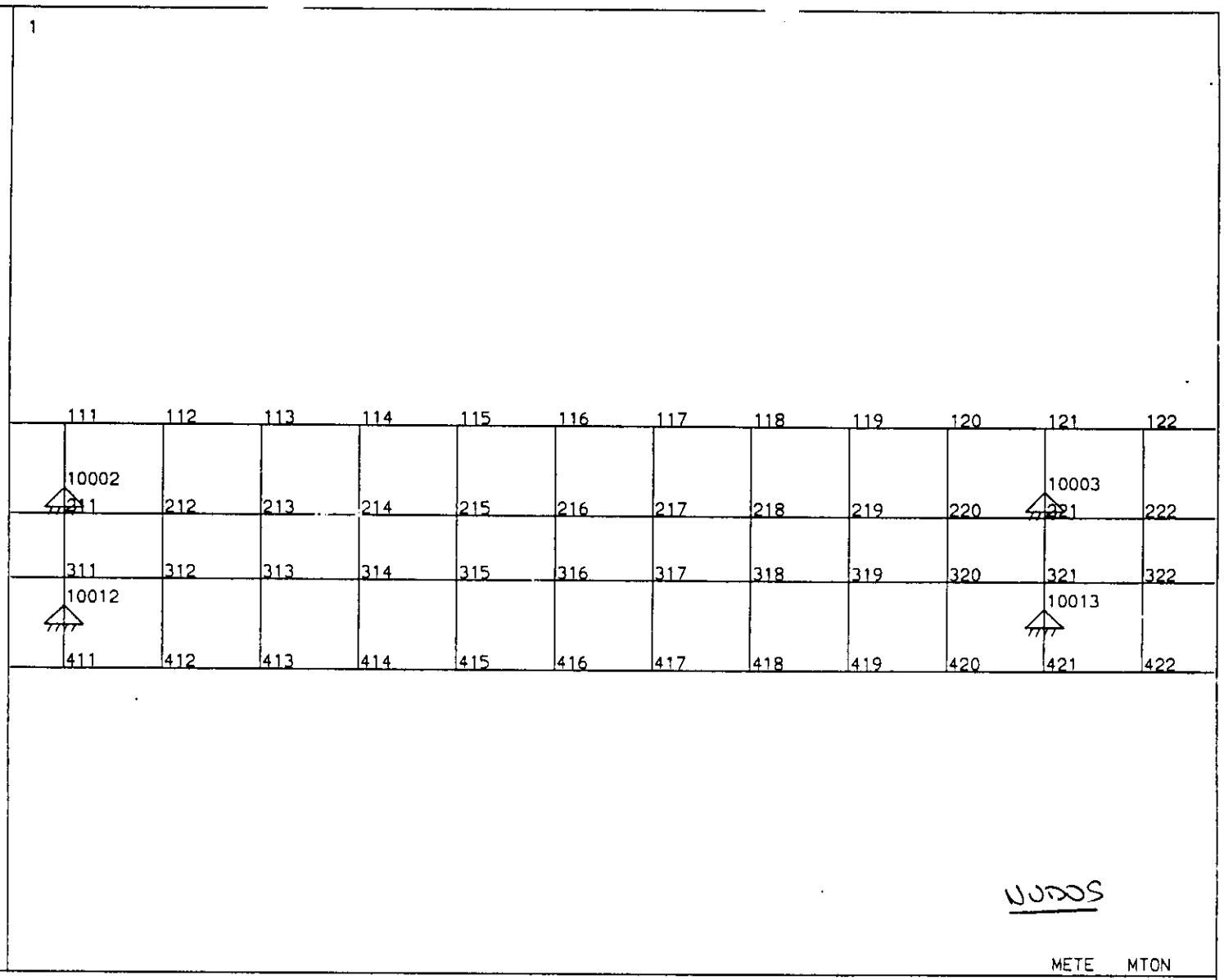
SOLO N 411 / 420 → $Q = 6 \times \left(\frac{0.23}{2.755} + \frac{1.68}{2.755} \right) =$

$= 4.16$ t/ml



STRUCTURE DATA:

TYPE = FLOOR
NJ = 132
NM = 221
NE = 0
NS = 8
NL = 1
XMAX= 90.0
YMAX= 0.0
ZMAX= 7.5



COMPANY: -------

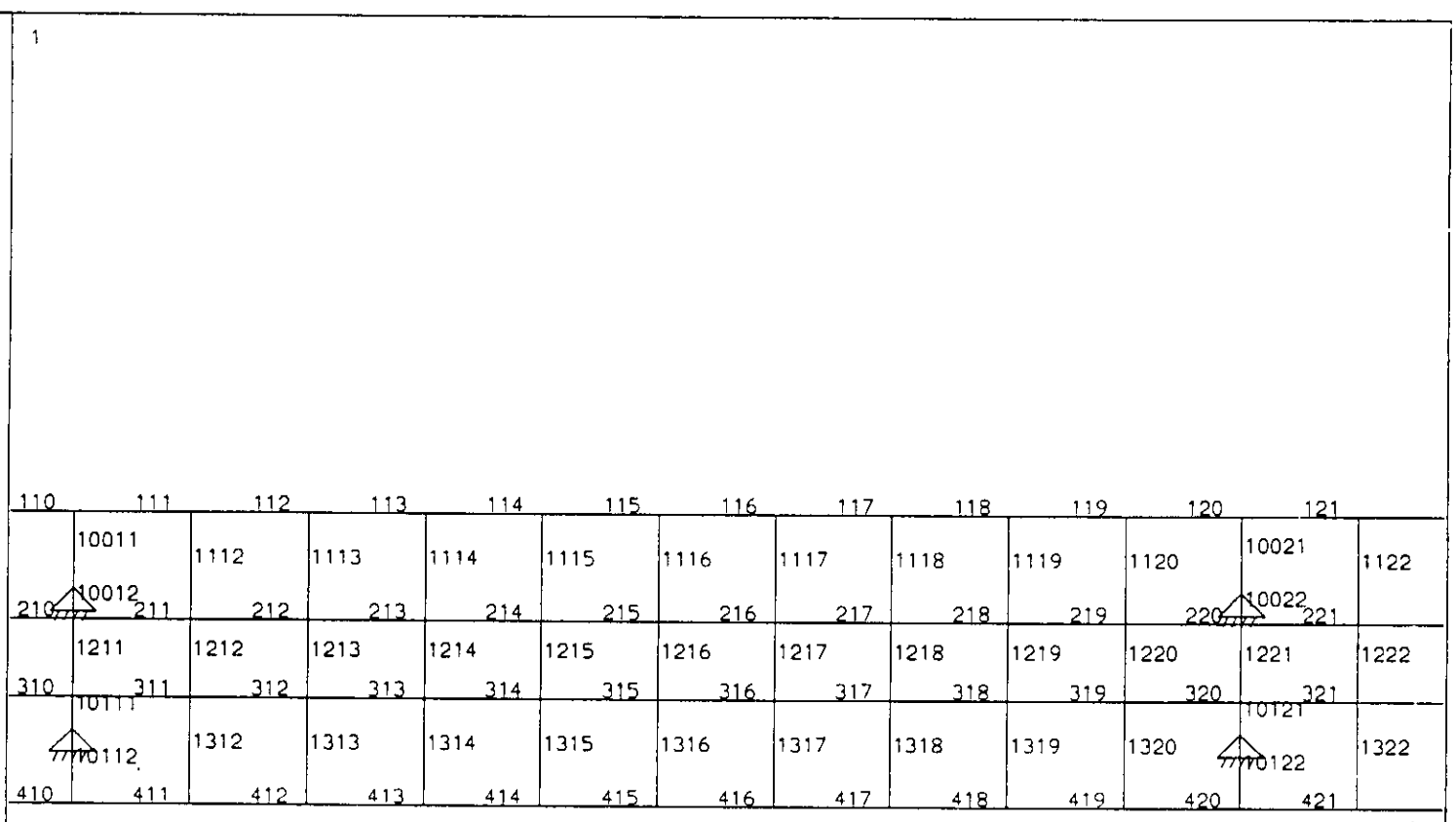
S T A A D P D - P L O T (REV: 17.0a)

TITLE: LAV MADRID-ZARAGOZA. LOSA VANOS 1*21+28*

DATE: MAY 24, 1999

STRUCTURE DATA:

TYPE = FLOOR
NJ = 132
NM = 221
NE = 0
NS = 8
NL = 1
XMAX= 90.0
YMAX= 0.0
ZMAX= 7.5

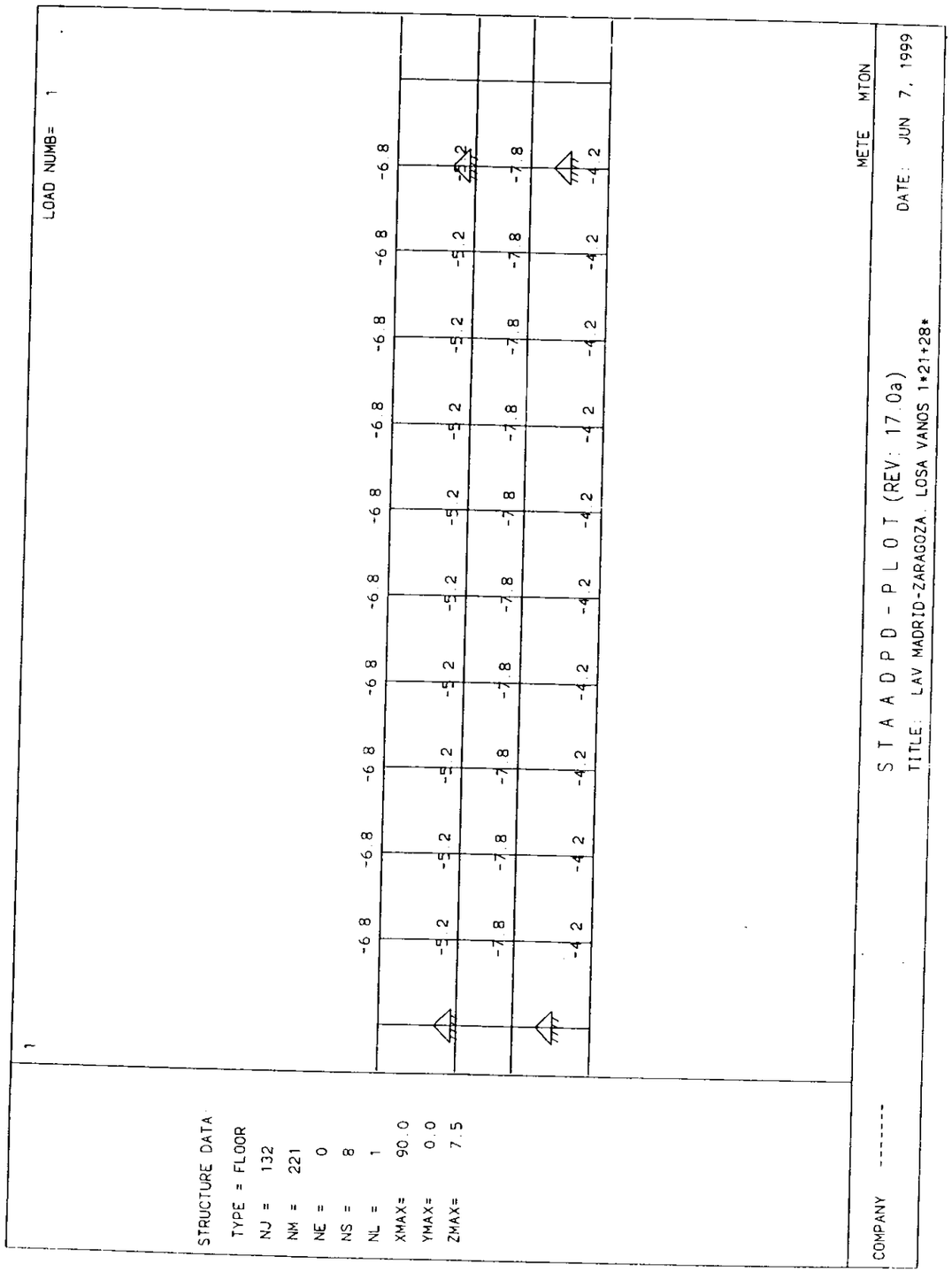


COMPANY: -------

S T A A D P D - P L O T (REV: 17.0a)

TITLE: LAV MADRID-ZARAGOZA. LOSA VANOS 1*21+28*

DATE: MAY 24, 1999




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*************************************************
*                                               *
*           S T A A D - III                     *
*           Revision 17.0a                      *
*           Proprietary Program of              *
*           RESEARCH ENGINEERS, Inc.            *
*           Date=    JUN  7, 1999               *
*           Time=     9:48:11                   *
*                                               *
*************************************************
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```
1. STAAD FLOOR LAV MADRID-ZARAGOZA. LOSA VANOS 1*21+28*3+30*3+21
2. *REPARTO TRANSVERSAL
3. UNIT METER MTON
4. JOINT COORDINATES
5. 101    0.000   0.000  -3.750  110  27.000   0.000  -3.750
6. 111   30.000   0.000  -3.750  120  57.000   0.000  -3.750
7. 121   60.000   0.000  -3.750  131  90.000   0.000  -3.750
8. 201    0.000   0.000  -0.995  210  27.000   0.000  -0.995
9. 211   30.000   0.000  -0.995  220  57.000   0.000  -0.995
10. 221  60.000   0.000  -0.995  231  90.000   0.000  -0.995
11. 301   0.000   0.000   0.995  310  27.000   0.000   0.995
12. 311  30.000   0.000   0.995  320  57.000   0.000   0.995
13. 321  60.000   0.000   0.995  331  90.000   0.000   0.995
14. 401   0.000   0.000   3.750  410  27.000   0.000   3.750
15. 411  30.000   0.000   3.750  420  57.000   0.000   3.750
16. 421  60.000   0.000   3.750  431  90.000   0.000   3.750
17. 10001  0.000   0.000  -2.150
18. 10002 30.000   0.000  -1.800
19. 10003 60.000   0.000  -1.800
20. 10004 90.000   0.000  -2.150
21. 10011  0.000   0.000   2.150
22. 10012 30.000   0.000   1.800
23. 10013 60.000   0.000   1.800
24. 10014 90.000   0.000   2.150
25. MEMBER INCIDENCES
26.    101  101  102
27.    R    29   1    1
28.    RA   3    100  100
29.    1101 101  201
30.    R    30   1    1
31.    1201 201  301
32.    R    30   1    1
33.    1301 301  401
34.    R    30   1    1
35. 10001  101   10001
36. 10002  10001 201
37. 10011  111   10002
38. 10012  10002 211
39. 10021  121   10003
40. 10022  10003 221
41. 10031  131   10004
42. 10032  10004 231
43. 10101  301   10011
44. 10102  10011 401
45. 10111  311   10012
46. 10112  10012 411
47. 10121  321   10013
```

```
*REPARTO TRANSVERSAL
48. 10122  10013 421
49. 10131  131   10014
 0. 10132  10014 431
51. DELETE MEMBER 1101 1111 1121 1131 1301 1311 1321 1331
52. MEMBER PROPERTY
53. 101  TO  130  PR  AX  3.3985  IX  0.2923  IZ  0.5577
54. 201  TO  230  PR  AX  2.1590  IX  0.2923  IZ  2.1712
55. 301  TO  330  PR  AX  2.1590  IX  0.2923  IZ  2.1712
56. 401  TO  430  PR  AX  3.3985  IX  0.2923  IZ  0.5577
57. 1102 TO 1110  PR  AX  1.8000  IX  0.0267  IZ  0.0135
58. 1112 TO 1120  PR  AX  1.8000  IX  0.0267  IZ  0.0135
59. 1122 TO 1130  PR  AX  1.8000  IX  0.0267  IZ  0.0135
60. 1201 TO 1231  PR  AX  1.8000  IX  0.0267  IZ  0.0135
61. 1302 TO 1310  PR  AX  1.8000  IX  0.0267  IZ  0.0135
62. 1312 TO 1320  PR  AX  1.8000  IX  0.0267  IZ  0.0135
63. 1322 TO 1330  PR  AX  1.8000  IX  0.0267  IZ  0.0135
64. 10001   10002 PR  AX  1.8000  IX  0.0267  IZ  0.0135
65. 10011   10012 PR  AX  1.8000  IX  0.0267  IZ  0.0135
66. 10021   10022 PR  AX  1.8000  IX  0.0267  IZ  0.0135
67. 10031   10032 PR  AX  1.8000  IX  0.0267  IZ  0.0135
68. 10101   10102 PR  AX  1.8000  IX  0.0267  IZ  0.0135
69. 10111   10112 PR  AX  1.8000  IX  0.0267  IZ  0.0135
70. 10121   10122 PR  AX  1.8000  IX  0.0267  IZ  0.0135
71. 10131   10132 PR  AX  1.8000  IX  0.0267  IZ  0.0135
72. CONSTANTS
73. E   3250000.  ALL
74. DEN  7.85      ALL
75. POI  0.15      ALL
76. SUPPORTS
77. 10001 TO 10004    PINNED
78. 10011 TO 10014    PINNED
79. LOADING 1 DOS TRENES EN VANO DE 30.0 M CON RIPADO 30 CM
80. MEMBER LOAD
81. *TREN SOBRE UNA VIA
82. 111 TO 120  UNI GY  -6.775
83. 211 TO 220  UNI GY  -5.225
84. *TREN SOBRE OTRA VIA
85. 311 TO 320  UNI GY  -7.840
86. 411 TO 420  UNI GY  -4.160
87. PERFORM ANALISIS


      P R O B L E M   S T A T I S T I C S
      -----------------------------------

   NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =   132/  221/    8
   ORIGINAL/FINAL BAND-WIDTH =  124/    6
   TOTAL PRIMARY LOAD CASES  =    1, TOTAL DEGREES OF FREEDOM =   388
   SIZE OF STIFFNESS MATRIX =    8148 DOUBLE PREC. WORDS
   TOTAL REQUIRED DISK SPACE =   12.46 MEGA-BYTES


++ PROCESSING ELEMENT STIFFNESS MATRIX.              9:48:13
++ PROCESSING GLOBAL STIFFNESS MATRIX.               9:48:14
++ PROCESSING TRIANGULAR FACTORIZATION.              9:48:14
++ CALCULATING JOINT DISPLACEMENTS.                  9:48:14
++ CALCULATING MEMBER  FORCES.                       9:48:14

  88. LOAD LIST 1
```



```
*REPARTO TRANSVERSAL
89. PRINT MEMBER FORCES LIST 115 215 315 415
```

'MBER END FORCES STRUCTURE TYPE = FLOOR

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
115	1	115	0.00	14.21	0.00	2.82	0.00	-185.94
		116	0.00	6.12	0.00	-2.82	0.00	198.08
215	1	215	0.00	22.98	0.00	3.74	0.00	-624.03
		216	0.00	-7.30	0.00	-3.74	0.00	669.44
315	1	315	0.00	25.92	0.00	0.06	0.00	-570.41
		316	0.00	-2.40	0.00	-0.06	0.00	612.89
415	1	415	0.00	9.50	0.00	-0.23	0.00	-149.01
		416	0.00	2.98	0.00	0.23	0.00	158.80

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

90. PRINT MEMBER FORCES LIST 111 211 311 411

MEMBER END FORCES STRUCTURE TYPE = FLOOR

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
111	1	111	0.00	53.61	0.00	8.93	0.00	134.55
		112	0.00	-33.29	0.00	-8.93	0.00	-4.19
211	1	211	0.00	143.03	0.00	44.65	0.00	461.67
		212	0.00	-127.35	0.00	-44.65	0.00	-56.11
311	1	311	0.00	125.05	0.00	-22.27	0.00	374.29
		312	0.00	-101.53	0.00	22.27	0.00	-34.43
411	1	411	0.00	38.91	0.00	3.24	0.00	99.29
		412	0.00	-26.43	0.00	-3.24	0.00	-1.26

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

91. PRINT JOI DIS LIST 116 216 316 416

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = FLOOR

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
116	1	0.00000	-1.12290	0.00000	-0.00143	0.00000	0.00000
216	1	0.00000	-0.77937	0.00000	-0.00071	0.00000	0.00000
316	1	0.00000	-0.72472	0.00000	0.00013	0.00000	0.00000
416	1	0.00000	-0.85235	0.00000	0.00061	0.00000	0.00000

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

92. PRINT REACC ALL

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = FLOOR

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
10001	1	0.00	-17.78	0.00	0.00	0.00	0.00
10002	1	0.00	227.95	0.00	0.00	0.00	0.00
10003	1	0.00	230.60	0.00	0.00	0.00	0.00
10004	1	0.00	-20.22	0.00	0.00	0.00	0.00
10011	1	0.00	-17.88	0.00	0.00	0.00	0.00
10012	1	0.00	168.31	0.00	0.00	0.00	0.00
10013	1	0.00	163.86	0.00	0.00	0.00	0.00
10014	1	0.00	-14.84	0.00	0.00	0.00	0.00

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

93. PLOT BEND FILE
94. PLOT DISP FILE
95. FINISH

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

**** DATE= JUN 7,1999 TIME= 9:48:23 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

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PROYECTO: _____ HOJA ___ DE ___

FECHA _____

EJECUTANTE: _____

REPARTO TORSIONAL EN CM

PISOS	μ	I	W_I	$\frac{W_I}{\Sigma W_I}$
115	198.08	0.5577	355	1.15
Q15	669.44	2.1712	308	1.00
315	612.89	2.1712	282	0.92
A15	158.80	0.5577	285	0.93
TOTAL	1639.22	5.4579	1230	4.00

$Y_{CV} = 1.15$ //

REPARTO TORSIONAL EN PISOS

PISOS	μ	I	W_I	$\frac{W_I}{\Sigma W_I}$
111	-134.55	0.5577	241	1.19
Q11	-461.67	2.1712	213	1.06
311	-354.29	2.1712	172	0.86
A11	-99.79	0.5577	178	0.89
TOTAL	1069.8	5.4579	804	4.00

$Y_{PP} = 1.19$ //

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PROYECTO: _____ HOJA ___ DE ___

FECHA _____

EJECUTANTE: _____

CALCULO DEL COEFICIENTE DE AMPLIFICACION

a) SEGUN NDF77

$$J = 65 \frac{\mu}{1 - \mu + \mu^2}$$

$$\mu = \frac{VT}{2L}$$

$V = 200\ Km/h = \frac{200 \times 10^3}{3600} = 55.55\ m/seg$

$E = 3.8 \times 10^6\ kg/cm^2$

$I = 5.4579\ m^4$

$m = \frac{1}{9.8}(11.115 \times 2.50 + 14 \times 0.83) = 4.52$

$$f = 1.57 \sqrt{\frac{EI}{mL^4}}$$

a-1) VALORES DE Z1.00 A

$$f = 1.57 \sqrt{\frac{3.8 \times 10^6 \times 5.4579}{4.52 \times 21^4}} = 8.08\ Hz$$

$T = 1/f = 0.12\ Seg$

$\mu = \frac{55.55 \times 0.12}{2 \times 21} = 0.16$

$J = 65 \times \frac{0.16}{1 - 0.16 + 0.16^2} = 12$ $\quad \phi = 1.12$ //

a-2) VANOS DE 28.00 m

$$f = 1.57\sqrt{\frac{3.8\times10^6 \times 5.4579}{4.02 \times 28^4}} = 4.55 \text{ Hz}$$

$$T = 1/f = 0.22$$

$$\mu = \frac{55.55 \times 0.22}{2\times28} = 0.22$$

$$J = 6\sqrt{\frac{0.22}{1-0.22+0.0484}} = 17 \qquad \phi = 1.17$$

a)3) vans de 30.00 m.

$$f = 1.57\sqrt{\frac{3.8\times10^6 \times 5.4579}{4.02 \times 30^4}} = 3.96 \text{ Hz}$$

$$T = 1/f = 0.25$$

$$\mu = \frac{55.55 \times 0.25}{2\times30} = 0.23$$

$$J = 6\sqrt{\frac{0.23}{1-0.23+0.0529}} = 18 \qquad \phi = 1.18$$

b) SEGÚN U.J.C.

PARA NUEVOS PUENTES

$$\phi = \frac{1.44}{\sqrt{L\phi} - 0.20} + 0.82 < 1.67$$

EN VANOS DE 21.00 m

$$\phi_{21} = \frac{1.44}{\sqrt{21} - 0.20} + 0.82 = 1.14$$

EN VANOS DE 28.00 m

$$\phi_{28} = \frac{1.44}{\sqrt{28} - 0.20} + 0.82 = 1.10$$

EN VANOS DE 30.0 m

$$\phi_{30} = \frac{1.44}{\sqrt{30} - 0.20} + 0.82 = 1.09$$

CALCULO DEL PRETENSADO LONGITUDINAL

```
LAV MADRID-ZARAGOZA. LOSA VANOS 21+28*3+30*3+21
CALCULO DEL PRETENSADO
8 2
  21  1  9 2.1
   .  1  9 2.8
3 30  1  9 3.0
1 21  1 10 2.1
7
1  23 0  0  1
23 33 1  1  1
33 43 1  2  1
43 53 1  3  1
53 63 1  4  1
63 73 1  5  1
73 81 1  6  1
17.837 6.7511 0.943 1.222 14.00
11.045 5.4311 0.871 1.294 14.00
1
1 1
9 2
1 1
6
 2


9 2
1 1
400 2.5
1 2 0 2
0.83
5.0    0.0   0.000012
1.15  1.19
1.5  1.18  1.14  2
9   0.005
1
1.1 0.9
0.00025 .04 2.5
19000 190 75 24
20 0 4
1 31
0.0000     -1.115     -0.1125
8.0000     -1.565      0.000
   000     -0.641      0.185
   0       -0.365      0.000
24.0       -0.697     -0.221
35.000     -1.915      0.000
46.000     -0.697      0.221
49.000     -0.365      0.000
52.000     -0.697     -0.221
63.000     -1.915      0.000
74.000     -0.697      0.221
77.000     -0.365      0.000
80.000     -0.697     -0.221
91.000     -1.915      0.000
102.00     -0.697      0.221
105.00     -0.365      0.000
108.30     -0.706     -0.207
120.00     -1.915      0.000
131.70     -0.706      0.207
135.00     -0.365      0.000
138.30     -0.706     -0.207
150.00     -1.915      0.000
   .70     -0.706      0.207
153.       -0.365      0.000
168.3      -0.706     -0.207
180.00     -1.915      0.000
191.70     -0.706      0.207
195.00     -0.365      0.000
198.00     -0.641     -0.185
  8.00     -1.565      0.000
2  .00     -1.115      0.1125
1 2
0.0000   -0.185    0.000
216.00   -0.185    0.000
1 2
0.0000   -1.980    0.000
216.00   -1.980    0.000
1 2
0.0000   -1.865    0.000
216.00   -1.865    0.000
1 3834.0 32032.  0.21 0.006 0 1 81  1 23 1
1 3834.0 32032.  0.21 0.006 2 1 81 23 33 2
1 3834.0 32032.  0.21 0.006 2 1 81 33 43 3
1 3834.0 32032.  0.21 0.006 2 1 81 43 53 4
1 3834.0 32032.  0.21 0.006 2 1 81 53 63 5
1 3834.0 32032.  0.21 0.006 2 1 81 63 73 6
1 3834.0 32032.  0.21 0.006 2 1 81 73 81 7
2 1918.0 13732.  0.21 0.006 0 1 81  1 43 1
  1918.0 13734.  0.21 0.006 0 1 81  1 43 1
   959.0  6867.  0.21 0.006 2 1 81 43 53 4
3  959.0  6867.  0.21 0.006 2 1 81 43 53 4
4  959.0  6867.  0.21 0.006 2 1 81 43 53 4
2  959.0  6867.  0.21 0.006 2 1 81 53 63 5
3  959.0  6867.  0.21 0.006 2 1 81 53 63 5
4  959.0  6867.  0.21 0.006 2 1 81 53 63 5
2  959.0  6867.  0.21 0.006 2 1 81 63 73 6
3  959.0  6867.  0.21 0.006 2 1 81 63 73 6
4  959.0  6867.  0.21 0.006 2 1 81 63 73 6
2  959.0  6867.  0.21 0.006 2 1 81 73 81 7
3  959.0  6867.  0.21 0.006 2 1 81 73 81 7
2.000 1.000
```

Programa general de puentes continuos (V1-0)

Proyecto : LAV MADRID-ZARAGOZA. LOSA VANOS 21+28*3+30*3+21

Definicion geometrica de vanos

	Longitud
Vano 1	21.0000 m
Vano 2	28.0000 m
Vano 3	28.0000 m
Vano 4	28.0000 m
Vano 5	30.0000 m
Vano 6	30.0000 m
Vano 7	30.0000 m
Vano 8	21.0000 m

Definicion de cargas

Cargas muertas ..... = 0.830 t/m2

Tren RENFE/U.I.C. :

Coef. de excent. en centro de vano	1.150
Coef. de excent. en apoyo	1.190
Ancho de aceras	1.500 m
Coef. de impacto para tren de RENFE	1.180
Coef. de impacto para tren de U.I.C.	1.140
Numero de vias	2

Temperatura :

Coef. de dilatacion termica de 1E-04
Gradiente lineal termico entre ..... 5.000 y 0.000 grad

Descensos de apoyos (Lentos) :

Hip.	1	Apoyo	1	descenso de	0.005 m.
Hip.	2	Apoyo	11	descenso de	0.005 m.
Hip.	3	Apoyo	21	descenso de	0.005 m.
Hip.	4	Apoyo	31	descenso de	0.005 m.
Hip.	5	Apoyo	41	descenso de	0.005 m.
Hip.	6	Apoyo	51	descenso de	0.005 m.
Hip.	7	Apoyo	61	descenso de	0.005 m.
Hip.	8	Apoyo	71	descenso de	0.005 m.
Hip.	9	Apoyo	81	descenso de	0.005 m.

Caracteristicas de los materiales

Resistencia caracteristica del hormigon ..... =	400.00	kg/cm2
Densidad del hormigon ..... =	2.50	t/m3
Modulo de elasticidad del acero de pretensar .. =	19000.00	kg/mm2
Tension de rotura de los cables ..... =	190.00	kg/mm2
Porcentaje a que se tesan los cables ..... =	75.	%
Retraccion del hormigon .... =	0.00025	
Coeficiente de relajacion del acero ..... =	0.04000	
Coeficiente de fluencia del hormigon ..... =	2.50000	
Coef. de ponderacion para pretensado inicial .. =	1.1000	
Coef. de ponderacion para pretensado final .. =	0.9000	

Definicion de secciones de la estructura final

Vano	Sec	X	Y(Vs)	Vi	Area	Inercia	Ancho
1	1	0.000	0.943	1.222	17.837	6.751100	14.000
	2	2.100	0.871	1.294	11.045	5.431100	14.000
	3	4.200	0.871	1.294	11.045	5.431100	14.000
	4	6.300	0.871	1.294	11.045	5.431100	14.000
	5	8.400	0.871	1.294	11.045	5.431100	14.000
	6	10.500	0.871	1.294	11.045	5.431100	14.000
	7	12.600	0.871	1.294	11.045	5.431100	14.000
	8	14.700	0.871	1.294	11.045	5.431100	14.000
	9	16.800	0.871	1.294	11.045	5.431100	14.000
	10	18.900	0.871	1.294	11.045	5.431100	14.000
	11	21.000	0.943	1.222	17.837	6.751100	14.000
2	11	21.000	0.943	1.222	17.837	6.751100	14.000
	12	23.800	0.871	1.294	11.045	5.431100	14.000
	13	26.600	0.871	1.294	11.045	5.431100	14.000
	14	29.400	0.871	1.294	11.045	5.431100	14.000
	15	32.200	0.871	1.294	11.045	5.431100	14.000
	16	35.000	0.871	1.294	11.045	5.431100	14.000
	17	37.800	0.871	1.294	11.045	5.431100	14.000
	18	40.600	0.871	1.294	11.045	5.431100	14.000
	19	43.400	0.871	1.294	11.045	5.431100	14.000
	20	46.200	0.871	1.294	11.045	5.431100	14.000
	21	49.000	0.943	1.222	17.837	6.751100	14.000
3	21	49.000	0.943	1.222	17.837	6.751100	14.000
	22	51.800	0.871	1.294	11.045	5.431100	14.000
	23	54.600	0.871	1.294	11.045	5.431100	14.000
	24	57.400	0.871	1.294	11.045	5.431100	14.000
	25	60.200	0.871	1.294	11.045	5.431100	14.000
	26	63.000	0.871	1.294	11.045	5.431100	14.000
	27	65.800	0.871	1.294	11.045	5.431100	14.000
	28	68.600	0.871	1.294	11.045	5.431100	14.000
	29	71.400	0.871	1.294	11.045	5.431100	14.000
	30	74.200	0.871	1.294	11.045	5.431100	14.000
	31	77.000	0.943	1.222	17.837	6.751100	14.000
4	31	77.000	0.943	1.222	17.837	6.751100	14.000
	32	79.800	0.871	1.294	11.045	5.431100	14.000
	33	82.600	0.871	1.294	11.045	5.431100	14.000
	34	85.400	0.871	1.294	11.045	5.431100	14.000
	35	88.200	0.871	1.294	11.045	5.431100	14.000
	36	91.000	0.871	1.294	11.045	5.431100	14.000
	37	93.800	0.871	1.294	11.045	5.431100	14.000
	38	96.600	0.871	1.294	11.045	5.431100	14.000
	39	99.400	0.871	1.294	11.045	5.431100	14.000
	40	102.200	0.871	1.294	11.045	5.431100	14.000
	41	105.000	0.943	1.222	17.837	6.751100	14.000
5	41	105.000	0.943	1.222	17.837	6.751100	14.000
	42	108.000	0.871	1.294	11.045	5.431100	14.000

Definicion de secciones de la estructura final

Vano	Sec	X	Y(Vs)	Vi	Area	Inercia	Ancho
	43	111.000	0.871	1.294	11.045	5.431100	14.000
	44	114.000	0.871	1.294	11.045	5.431100	14.000
	45	117.000	0.871	1.294	11.045	5.431100	14.000
	46	120.000	0.871	1.294	11.045	5.431100	14.000
	47	123.000	0.871	1.294	11.045	5.431100	14.000
	48	126.000	0.871	1.294	11.045	5.431100	14.000
	49	129.000	0.871	1.294	11.045	5.431100	14.000
	50	132.000	0.871	1.294	11.045	5.431100	14.000
	51	135.000	0.943	1.222	17.837	6.751100	14.000
6	51	135.000	0.943	1.222	17.837	6.751100	14.000
	52	138.000	0.871	1.294	11.045	5.431100	14.000
	53	141.000	0.871	1.294	11.045	5.431100	14.000
	54	144.000	0.871	1.294	11.045	5.431100	14.000
	55	147.000	0.871	1.294	11.045	5.431100	14.000
	56	150.000	0.871	1.294	11.045	5.431100	14.000
	57	153.000	0.871	1.294	11.045	5.431100	14.000
	58	156.000	0.871	1.294	11.045	5.431100	14.000
	59	159.000	0.871	1.294	11.045	5.431100	14.000
	60	162.000	0.871	1.294	11.045	5.431100	14.000
	61	165.000	0.943	1.222	17.837	6.751100	14.000
7	61	165.000	0.943	1.222	17.837	6.751100	14.000
	62	168.000	0.871	1.294	11.045	5.431100	14.000
	63	171.000	0.871	1.294	11.045	5.431100	14.000
	64	174.000	0.871	1.294	11.045	5.431100	14.000
	65	177.000	0.871	1.294	11.045	5.431100	14.000
	66	180.000	0.871	1.294	11.045	5.431100	14.000
	67	183.000	0.871	1.294	11.045	5.431100	14.000
	68	186.000	0.871	1.294	11.045	5.431100	14.000
	69	189.000	0.871	1.294	11.045	5.431100	14.000
	70	192.000	0.871	1.294	11.045	5.431100	14.000
	71	195.000	0.943	1.222	17.837	6.751100	14.000
8	71	195.000	0.943	1.222	17.837	6.751100	14.000
	72	197.100	0.871	1.294	11.045	5.431100	14.000
	73	199.200	0.871	1.294	11.045	5.431100	14.000
	74	201.300	0.871	1.294	11.045	5.431100	14.000
	75	203.400	0.871	1.294	11.045	5.431100	14.000
	76	205.500	0.871	1.294	11.045	5.431100	14.000
	77	207.600	0.871	1.294	11.045	5.431100	14.000
	78	209.700	0.871	1.294	11.045	5.431100	14.000
	79	211.800	0.871	1.294	11.045	5.431100	14.000
	80	213.900	0.871	1.294	11.045	5.431100	14.000
	81	216.000	0.943	1.222	17.837	6.751100	14.000

Definicion de estados de la estructura

		Numero de secciones	Numero de secciones activas
Estado	1	23	de 1 a 23
Estado	2	33	de 23 a 33
Estado	3	43	de 33 a 43
Estado	4	53	de 43 a 53
Estado	5	63	de 53 a 63
Estado	6	73	de 63 a 73
Estado	7	81	de 73 a 81

Cable Numero 1 (Pertenece a familia 1)

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 23 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.115	-0.11250
2	8.000	-1.565	0.00000
3	18.000	-0.641	0.18500
4	21.000	-0.365	0.00000
5	24.000	-0.697	-0.22100
6	35.000	-1.915	0.00000
7	46.000	-0.697	0.22100
8	49.000	-0.365	0.00000
9	52.000	-0.697	-0.22100
10	63.000	-1.915	0.00000
11	74.000	-0.697	0.22100
12	77.000	-0.365	0.00000
13	80.000	-0.697	-0.22100
14	91.000	-1.915	0.00000
15	102.000	-0.697	0.22100
16	105.000	-0.365	0.00000
17	108.300	-0.706	-0.20700
18	120.000	-1.915	0.00000
19	131.700	-0.706	0.20700
20	135.000	-0.365	0.00000
21	138.300	-0.706	-0.20700
22	150.000	-1.915	0.00000
23	161.700	-0.706	0.20700
24	165.000	-0.365	0.00000
25	168.300	-0.706	-0.20700
26	180.000	-1.915	0.00000
27	191.700	-0.706	0.20700
28	195.000	-0.365	0.00000
29	198.000	-0.641	-0.18500
30	208.000	-1.565	0.00000
31	216.000	-1.115	0.11250

Cable Numero 2 (Pertenece a familia 2)

Definicion general

Seccion inicial ..... = 23 (Pasiva)
Seccion final ..... = 33 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.115	-0.11250
2	8.000	-1.565	0.00000
3	18.000	-0.641	0.18500
4	21.000	-0.365	0.00000
5	24.000	-0.697	-0.22100
6	35.000	-1.915	0.00000
7	46.000	-0.697	0.22100
8	49.000	-0.365	0.00000
9	52.000	-0.697	-0.22100
10	63.000	-1.915	0.00000
11	74.000	-0.697	0.22100
12	77.000	-0.365	0.00000
13	80.000	-0.697	-0.22100
14	91.000	-1.915	0.00000
15	102.000	-0.697	0.22100
16	105.000	-0.365	0.00000
17	108.300	-0.706	-0.20700
18	120.000	-1.915	0.00000
19	131.700	-0.706	0.20700
20	135.000	-0.365	0.00000
21	138.300	-0.706	-0.20700
22	150.000	-1.915	0.00000
23	161.700	-0.706	0.20700
24	165.000	-0.365	0.00000
25	168.300	-0.706	-0.20700
26	180.000	-1.915	0.00000
27	191.700	-0.706	0.20700
28	195.000	-0.365	0.00000
29	198.000	-0.641	-0.18500
30	208.000	-1.565	0.00000
31	216.000	-1.115	0.11250

Cable Numero 3 (Pertenece a familia 3)

Definicion general

Seccion inicial ..... = 33 (Pasiva)
Seccion final ..... = 43 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.115	-0.11250
2	8.000	-1.565	0.00000
3	18.000	-0.641	0.18500
4	21.000	-0.365	0.00000
5	24.000	-0.697	-0.22100
6	35.000	-1.915	0.00000
7	46.000	-0.697	0.22100
8	49.000	-0.365	0.00000
9	52.000	-0.697	-0.22100
10	63.000	-1.915	0.00000
11	74.000	-0.697	0.22100
12	77.000	-0.365	0.00000
13	80.000	-0.697	-0.22100
14	91.000	-1.915	0.00000
15	102.000	-0.697	0.22100
16	105.000	-0.365	0.00000
17	108.300	-0.706	-0.20700
18	120.000	-1.915	0.00000
19	131.700	-0.706	0.20700
20	135.000	-0.365	0.00000
21	138.300	-0.706	-0.20700
22	150.000	-1.915	0.00000
23	161.700	-0.706	0.20700
24	165.000	-0.365	0.00000
25	168.300	-0.706	-0.20700
26	180.000	-1.915	0.00000
27	191.700	-0.706	0.20700
28	195.000	-0.365	0.00000
29	198.000	-0.641	-0.18500
30	208.000	-1.565	0.00000
31	216.000	-1.115	0.11250

Cable Numero 4 (Pertenece a familia 4)

Definicion general

Seccion inicial ..... = 43 (Pasiva)
Seccion final ..... = 53 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.115	-0.11250
2	8.000	-1.565	0.00000
3	18.000	-0.641	0.18500
4	21.000	-0.365	0.00000
5	24.000	-0.697	-0.22100
6	35.000	-1.915	0.00000
7	46.000	-0.697	0.22100
8	49.000	-0.365	0.00000
9	52.000	-0.697	-0.22100
10	63.000	-1.915	0.00000
11	74.000	-0.697	0.22100
12	77.000	-0.365	0.00000
13	80.000	-0.697	-0.22100
14	91.000	-1.915	0.00000
15	102.000	-0.697	0.22100
16	105.000	-0.365	0.00000
17	108.300	-0.706	-0.20700
18	120.000	-1.915	0.00000
19	131.700	-0.706	0.20700
20	135.000	-0.365	0.00000
21	138.300	-0.706	-0.20700
22	150.000	-1.915	0.00000
23	161.700	-0.706	0.20700
24	165.000	-0.365	0.00000
25	168.300	-0.706	-0.20700
26	180.000	-1.915	0.00000
27	191.700	-0.706	0.20700
28	195.000	-0.365	0.00000
29	198.000	-0.641	-0.18500
30	208.000	-1.565	0.00000
31	216.000	-1.115	0.11250

Cable Numero 5 (Pertenece a familia 5)

Definicion general

Seccion inicial ..... = 53 (Pasiva)
Seccion final ..... = 63 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.115	-0.11250
2	8.000	-1.565	0.00000
3	18.000	-0.641	0.18500
4	21.000	-0.365	0.00000
5	24.000	-0.697	-0.22100
6	35.000	-1.915	0.00000
7	46.000	-0.697	0.22100
8	49.000	-0.365	0.00000
9	52.000	-0.697	-0.22100
10	63.000	-1.915	0.00000
11	74.000	-0.697	0.22100
12	77.000	-0.365	0.00000
13	80.000	-0.697	-0.22100
14	91.000	-1.915	0.00000
15	102.000	-0.697	0.22100
16	105.000	-0.365	0.00000
17	108.300	-0.706	-0.20700
18	120.000	-1.915	0.00000
19	131.700	-0.706	0.20700
20	135.000	-0.365	0.00000
21	138.300	-0.706	-0.20700
22	150.000	-1.915	0.00000
23	161.700	-0.706	0.20700
24	165.000	-0.365	0.00000
25	168.300	-0.706	-0.20700
26	180.000	-1.915	0.00000
27	191.700	-0.706	0.20700
28	195.000	-0.365	0.00000
29	198.000	-0.641	-0.18500
30	208.000	-1.565	0.00000
31	216.000	-1.115	0.11250

6 (Pertenece a familia 6)

Definicion general

Seccion inicial ..... = 63 (Pasiva)
Seccion final ..... = 73 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.115	-0.11250
2	8.000	-1.565	0.00000
3	18.000	-0.641	0.18500
4	21.000	-0.365	0.00000
5	24.000	-0.697	-0.22100
6	35.000	-1.915	0.00000
7	46.000	-0.697	0.22100
8	49.000	-0.365	0.00000
9	52.000	-0.697	-0.22100
10	63.000	-1.915	0.00000
11	74.000	-0.697	0.22100
12	77.000	-0.365	0.00000
13	80.000	-0.697	-0.22100
14	91.000	-1.915	0.00000
15	102.000	-0.697	0.22100
16	105.000	-0.365	0.00000
17	108.300	-0.706	-0.20700
18	120.000	-1.915	0.00000
19	131.700	-0.706	0.20700
20	135.000	-0.365	0.00000
21	138.300	-0.706	-0.20700
22	150.000	-1.915	0.00000
23	161.700	-0.706	0.20700
24	165.000	-0.365	0.00000
25	168.300	-0.706	-0.20700
26	180.000	-1.915	0.00000
27	191.700	-0.706	0.20700
28	195.000	-0.365	0.00000
29	198.000	-0.641	-0.18500
30	208.000	-1.565	0.00000
31	216.000	-1.115	0.11250

Cable Numero 7 (Pertenece a familia 7)

Definicion general

Seccion inicial ..... = 73 (Pasiva)
Seccion final ..... = 81 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.115	-0.11250
2	8.000	-1.565	0.00000
3	18.000	-0.641	0.18500
4	21.000	-0.365	0.00000
5	24.000	-0.697	-0.22100
6	35.000	-1.915	0.00000
7	46.000	-0.697	0.22100
8	49.000	-0.365	0.00000
9	52.000	-0.697	-0.22100
10	63.000	-1.915	0.00000
11	74.000	-0.697	0.22100
12	77.000	-0.365	0.00000
13	80.000	-0.697	-0.22100
14	91.000	-1.915	0.00000
15	102.000	-0.697	0.22100
16	105.000	-0.365	0.00000
17	108.300	-0.706	-0.20700
18	120.000	-1.915	0.00000
19	131.700	-0.706	0.20700
20	135.000	-0.365	0.00000
21	138.300	-0.706	-0.20700
22	150.000	-1.915	0.00000
23	161.700	-0.706	0.20700
24	165.000	-0.365	0.00000
25	168.300	-0.706	-0.20700
26	180.000	-1.915	0.00000
27	191.700	-0.706	0.20700
28	195.000	-0.365	0.00000
29	198.000	-0.641	-0.18500
30	208.000	-1.565	0.00000
31	216.000	-1.115	0.11250

Cable Numero 8 (Pertenece a familia 1)

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 43 (Activa)

Fuerza de Pretensado ..... = 1918.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.185	0.00000
2	216.000	-0.185	0.00000

Cable Numero 9 (Pertenece a familia 1)

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 43 (Activa)

Fuerza de Pretensado ..... = 1918.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.980	0.00000
2	216.000	-1.980	0.00000

Cable Numero 10 (Pertenece a familia 4)

Definicion general

Seccion inicial ..... = 43 (Pasiva)
Seccion final ..... = 53 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.185	0.00000
2	216.000	-0.185	0.00000

Cable Numero 11 (Pertenece a familia 4)

Definicion general

Seccion inicial ..... = 43 (Pasiva)
Seccion final ..... = 53 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.980	0.00000
2	216.000	-1.980	0.00000

Cable Numero 12 (Pertenece a familia 4)

Definicion general

Seccion inicial ..... = 43 (Pasiva)
Seccion final ..... = 53 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.865	0.00000
2	216.000	-1.865	0.00000

Cable Numero 13 (Pertenece a familia 5)

Definicion general

Seccion inicial ..... = 53 (Pasiva)
Seccion final ..... = 63 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.185	0.00000
2	216.000	-0.185	0.00000

Cable Numero 14 (Pertenece a familia 5)

Definicion general

Seccion inicial ..... = 53 (Pasiva)
Seccion final ..... = 63 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.980	0.00000
2	216.000	-1.980	0.00000

Cable Numero 15 (Pertenece a familia 5)

Definicion general

Seccion inicial ..... = 53 (Pasiva)
Seccion final ..... = 63 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.865	0.00000
2	216.000	-1.865	0.00000

Cable Numero 16 (Pertenece a familia 6)

Definicion general

Seccion inicial ..... = 63 (Pasiva)
Seccion final ..... = 73 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.185	0.00000
2	216.000	-0.185	0.00000

Cable Numero 17 (Pertenece a familia 6)

Definicion general

Seccion inicial ..... = 63 (Pasiva)
Seccion final ..... = 73 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.980	0.00000
2	216.000	-1.980	0.00000

Cable Numero 18 (Pertenece a familia 6)

Definicion general

Seccion inicial ..... = 63 (Pasiva)
Seccion final ..... = 73 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.865	0.00000
2	216.000	-1.865	0.00000

Cable Numero 19 (Pertenece a familia 7)

Definicion general

Seccion inicial ..... = 73 (Pasiva)
Seccion final ..... = 81 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.185	0.00000
2	216.000	-0.185	0.00000

Cable Numero 20 (Pertenece a familia 7)

Definicion general

Seccion inicial ..... = 73 (Pasiva)
Seccion final ..... = 81 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.980	0.00000
2	216.000	-1.980	0.00000

Esfuerzos acumulados por peso propio

Estado 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-205.16	-5.73
	1	2	351.43	-129.34	-5.73
	2	3	562.27	-71.41	0.00
	3	4	651.34	-13.42	0.00
	4	5	618.64	44.56	0.00
	5	6	464.17	102.55	0.00
	6	7	187.93	160.54	0.00
	7	8	-210.08	218.52	0.00
	8	9	-729.86	276.51	0.00
	9	10	-1371.41	334.49	0.00
	10	11	-2153.55	410.14	-12.76
2	11	11	-2153.55	-470.50	-10.80
	11	12	-977.28	-369.41	-10.80
	12	13	-50.88	-292.20	0.00
	13	14	659.05	-214.89	0.00
	14	15	1152.49	-137.57	0.00
	15	16	1429.46	-60.26	0.00
	16	17	1489.94	17.06	0.00
	17	18	1333.94	94.37	0.00
	18	19	961.45	171.69	0.00
	19	20	372.49	249.00	0.00
	20	21	-466.34	350.02	-7.70
3	21	21	-466.34	-178.39	-3.29
	21	22	-108.24	-77.31	-3.29
	22	23	0.00	0.00	0.00

Esfuerzos acumulados por peso propio

Estado 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-221.66	-6.30
	1	2	386.11	-145.84	-6.30
	2	3	631.63	-87.92	0.00
	3	4	755.38	-29.94	0.00
	4	5	757.36	28.05	0.00
	5	6	637.57	86.04	0.00
	6	7	396.01	144.02	0.00
	7	8	32.67	202.01	0.00
	8	9	-452.43	259.99	0.00
	9	10	-1059.30	317.98	0.00
	10	11	-1806.76	393.63	-12.20
2	11	11	-1806.76	-415.80	-9.39
	11	12	-783.71	-314.71	-9.39
	12	13	-10.51	-237.49	0.00
	13	14	546.21	-160.17	0.00
	14	15	886.45	-82.85	0.00
	15	16	1010.20	-5.54	0.00
	16	17	917.48	71.77	0.00
	17	18	608.27	149.09	0.00
	18	19	82.58	226.40	0.00
	19	20	-659.60	303.72	0.00
	20	21	-1651.63	404.72	-9.11
3	21	21	-1651.63	-452.58	-10.34
	21	22	-525.56	-351.49	-10.34
	22	23	350.66	-274.28	0.00
	23	24	1010.40	-196.96	0.00
	24	25	1453.65	-119.65	0.00
	25	26	1680.42	-42.33	0.00
	26	27	1690.71	34.98	0.00
	27	28	1484.51	112.30	0.00
	28	29	1061.84	189.61	0.00
	29	30	422.68	266.93	0.00
	30	31	-466.34	367.94	-8.16
4	31	31	-466.34	-178.39	-3.29
	31	32	-108.24	-77.31	-3.29
	32	33	0.00	0.00	0.00

Esfuerzos acumulados por peso propio

Estado 3

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-217.19	-6.15
	1	2	376.71	-141.37	-6.15
	2	3	612.82	-83.45	0.00
	3	4	727.17	-25.46	0.00
	4	5	719.75	32.53	0.00
	5	6	590.56	90.51	0.00
	6	7	339.60	148.50	0.00
	7	8	-33.13	206.49	0.00
	8	9	-527.64	264.47	0.00
	9	10	-1143.91	322.46	0.00
	10	11	-1900.77	398.11	-12.35
2	11	11	-1900.77	-430.63	-9.77
	11	12	-836.18	-329.54	-9.77
	12	13	-21.45	-252.32	0.00
	13	14	576.80	-175.00	0.00
	14	15	958.57	-97.69	0.00
	15	16	1123.86	-20.37	0.00
	16	17	1072.67	56.94	0.00
	17	18	804.99	134.26	0.00
	18	19	320.83	211.57	0.00
	19	20	-379.81	288.89	0.00
	20	21	-1330.30	389.89	-8.73
3	21	21	-1330.30	-399.65	-8.98
	21	22	-352.48	-298.57	-8.98
	22	23	375.50	-221.33	0.00
	23	24	886.99	-144.02	0.00
	24	25	1182.00	-66.70	0.00
	25	26	1260.52	10.61	0.00
	26	27	1122.57	87.93	0.00
	27	28	768.13	165.24	0.00
	28	29	197.21	242.56	0.00
	29	30	-590.19	319.87	0.00
	30	31	-1627.45	420.87	-9.52
4	31	31	-1627.45	-449.25	-10.25
	31	32	-510.69	-348.16	-10.25
	32	33	356.21	-270.95	0.00
	33	34	1006.62	-193.63	0.00
	34	35	1440.56	-116.32	0.00
	35	36	1658.01	-39.00	0.00
	36	37	1658.98	38.31	0.00
	37	38	1443.47	115.63	0.00
	38	39	1011.48	192.94	0.00
	39	40	363.01	270.26	0.00
	40	41	-535.33	371.27	-8.25
5	41	41	-535.33	-191.14	-3.29
	41	42	-124.26	-82.83	-3.29
	42	43	0.00	0.00	0.00

Esfuerzos acumulados por peso propio

Estado 4

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-218.67	-6.20
	1	2	379.82	-142.85	-6.20
	2	3	619.06	-84.93	0.00
	3	4	736.53	-26.94	0.00
	4	5	732.22	31.04	0.00
	5	6	606.15	89.03	0.00
	6	7	358.30	147.02	0.00
	7	8	-11.31	205.00	0.00
	8	9	-502.70	262.99	0.00
	9	10	-1115.86	320.97	0.00
	10	11	-1869.60	396.62	-12.30
2	11	11	-1869.60	-425.71	-9.65
	11	12	-818.78	-324.63	-9.65
	12	13	-17.82	-247.40	0.00
	13	14	566.66	-170.08	0.00
	14	15	934.66	-92.77	0.00
	15	16	1086.17	-15.45	0.00
	16	17	1021.21	61.86	0.00
	17	18	739.76	139.18	0.00
	18	19	241.83	216.49	0.00
	19	20	-472.58	293.80	0.00
	20	21	-1436.85	394.81	-8.85
3	21	21	-1436.85	-417.20	-9.43
	21	22	-409.87	-316.12	-9.43
	22	23	367.26	-238.89	0.00
	23	24	927.91	-161.57	0.00
	24	25	1272.07	-84.26	0.00
	25	26	1399.75	-6.94	0.00
	26	27	1310.95	70.37	0.00
	27	28	1005.67	147.69	0.00
	28	29	483.91	225.00	0.00
	29	30	-254.34	302.32	0.00
	30	31	-1242.44	403.32	-9.07
4	31	31	-1242.44	-385.62	-8.62
	31	32	-303.92	-284.53	-8.62
	32	33	384.75	-207.30	0.00
	33	34	856.93	-129.98	0.00
	34	35	1112.64	-52.67	0.00
	35	36	1151.86	24.65	0.00
	36	37	974.60	101.96	0.00
	37	38	580.85	179.28	0.00
	38	39	-29.37	256.60	0.00
	39	40	-856.08	333.91	0.00
	40	41	-1932.64	434.90	-9.88
5	41	41	-1932.64	-486.14	-10.37
	41	42	-636.31	-377.83	-10.37
	42	43	373.21	-295.09	0.00
	43	44	1134.22	-212.25	0.00
	44	45	1646.72	-129.41	0.00
	45	46	1910.71	-46.58	0.00

Esfuerzos acumulados por peso propio

Estado 4

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	46	47	1926.18	36.26	0.00
	47	48	1693.15	119.10	0.00
	48	49	1211.60	201.93	0.00
	49	50	481.54	284.77	0.00
	50	51	-535.33	393.01	-8.13
6	51	51	-535.33	-191.14	-3.29
	51	52	-124.26	-82.83	-3.29
	52	53	0.00	0.00	0.00

Esfuerzos acumulados por peso propio

Estado 5

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-218.26	-6.18
	1	2	378.96	-142.44	-6.18
	2	3	617.34	-84.52	0.00
	3	4	733.94	-26.53	0.00
	4	5	728.78	31.45	0.00
	5	6	601.84	89.44	0.00
	6	7	353.14	147.43	0.00
	7	8	-17.34	205.41	0.00
	8	9	-509.59	263.40	0.00
	9	10	-1123.60	321.38	0.00
	10	11	-1878.21	397.03	-12.31
2	11	11	-1878.21	-427.07	-9.68
	11	12	-823.59	-325.98	-9.68
	12	13	-18.82	-248.76	0.00
	13	14	569.46	-171.44	0.00
	14	15	941.26	-94.13	0.00
	15	16	1096.58	-16.81	0.00
	16	17	1035.42	60.50	0.00
	17	18	757.77	137.82	0.00
	18	19	263.64	215.13	0.00
	19	20	-446.97	292.45	0.00
	20	21	-1407.43	393.45	-8.82
3	21	21	-1407.43	-412.36	-9.30
	21	22	-394.02	-311.27	-9.30
	22	23	369.54	-234.04	0.00
	23	24	916.61	-156.72	0.00
	24	25	1247.20	-79.41	0.00
	25	26	1361.31	-2.10	0.00
	26	27	1258.94	75.22	0.00
	27	28	940.09	152.53	0.00
	28	29	404.75	229.85	0.00
	29	30	-347.07	307.16	0.00
	30	31	-1348.74	408.17	-9.20
4	31	31	-1348.74	-403.19	-9.07
	31	32	-361.01	-302.10	-9.07
	32	33	376.87	-224.87	0.00
	33	34	898.26	-147.56	0.00
	34	35	1203.18	-70.24	0.00
	35	36	1291.61	7.07	0.00
	36	37	1163.56	84.39	0.00
	37	38	819.02	161.70	0.00
	38	39	258.01	239.02	0.00
	39	40	-519.49	316.33	0.00
	40	41	-1546.84	417.33	-9.43
5	41	41	-1546.84	-428.05	-8.97
	41	42	-424.84	-319.74	-8.97
	42	43	410.35	-236.98	0.00
	43	44	997.03	-154.14	0.00
	44	45	1335.19	-71.30	0.00
	45	46	1424.85	11.53	0.00

Esfuerzos acumulados por peso propio

Estado 5

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	46	47	1265.99	94.37	0.00
	47	48	858.62	177.21	0.00
	48	49	202.74	260.04	0.00
	49	50	-701.65	342.88	0.00
	50	51	-1892.85	451.11	-9.53
6	51	51	-1892.85	-484.82	-10.34
	51	52	-600.49	-376.51	-10.34
	52	53	405.05	-293.76	0.00
	53	54	1162.08	-210.92	0.00
	54	55	1670.60	-128.09	0.00
	55	56	1930.60	-45.25	0.00
	56	57	1942.10	37.59	0.00
	57	58	1705.08	120.42	0.00
	58	59	1219.56	203.26	0.00
	59	60	485.52	286.10	0.00
	60	61	-535.33	394.34	-8.16
7	61	61	-535.33	-191.14	-3.29
	61	62	-124.26	-82.83	-3.29
	62	63	0.00	0.00	0.00

Esfuerzos acumulados por peso propio

Estado 6

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-218.38	-6.19
	1	2	379.21	-142.56	-6.19
	2	3	617.84	-84.64	0.00
	3	4	734.69	-26.65	0.00
	4	5	729.78	31.33	0.00
	5	6	603.10	89.32	0.00
	6	7	354.64	147.31	0.00
	7	8	-15.59	205.29	0.00
	8	9	-507.58	263.28	0.00
	9	10	-1121.35	321.26	0.00
	10	11	-1875.70	396.91	-12.31
2	11	11	-1875.71	-426.68	-9.67
	11	12	-822.19	-325.59	-9.67
	12	13	-18.53	-248.36	0.00
	13	14	568.65	-171.05	0.00
	14	15	939.34	-93.73	0.00
	15	16	1093.55	-16.42	0.00
	16	17	1031.29	60.90	0.00
	17	18	752.53	138.21	0.00
	18	19	257.30	215.53	0.00
	19	20	-454.42	292.84	0.00
	20	21	-1415.99	393.85	-8.83
3	21	21	-1415.99	-413.77	-9.34
	21	22	-398.63	-312.68	-9.34
	22	23	368.87	-235.45	0.00
	23	24	919.90	-158.13	0.00
	24	25	1254.43	-80.82	0.00
	25	26	1372.49	-3.50	0.00
	26	27	1274.06	73.81	0.00
	27	28	959.16	151.13	0.00
	28	29	427.77	228.44	0.00
	29	30	-320.11	305.76	0.00
	30	31	-1317.83	406.76	-9.16
4	31	31	-1317.83	-398.08	-8.94
	31	32	-344.41	-296.99	-8.94
	32	33	379.16	-219.76	0.00
	33	34	886.24	-142.45	0.00
	34	35	1176.85	-65.13	0.00
	35	36	1250.97	12.18	0.00
	36	37	1108.61	89.50	0.00
	37	38	749.77	166.81	0.00
	38	39	174.44	244.13	0.00
	39	40	-617.36	321.44	0.00
	40	41	-1659.03	422.44	-9.56
5	41	41	-1659.03	-444.94	-9.38
	41	42	-486.33	-336.63	-9.38
	42	43	399.55	-253.88	0.00
	43	44	1036.92	-171.04	0.00
	44	45	1425.78	-88.20	0.00
	45	46	1566.12	-5.36	0.00

Esfuerzos acumulados por peso propio

Estado 6

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	46	47	1457.96	77.47	0.00
	47	48	1101.28	160.31	0.00
	48	49	496.10	243.15	0.00
	49	50	-357.60	325.98	0.00
	50	51	-1498.11	434.21	-9.12
6	51	51	-1498.11	-424.02	
	51	52	-388.20	-315.71	-8.88
	52	53	434.90	-232.95	-8.88
	53	54	1009.49	-150.11	0.00
	54	55	1335.56	-67.27	0.00
	55	56	1413.13	15.56	0.00
	56	57	1242.18	98.40	0.00
	57	58	822.72	181.24	0.00
	58	59	154.75	264.08	0.00
	59	60	-761.73	346.91	0.00
	60	61	-1965.02	455.13	-9.62
7	61	61	-1965.02	-496.32	
	61	62	-638.15	-388.01	-10.61
	62	63	401.90	-305.27	-10.61
	63	64	1193.45	-222.43	0.00
	64	65	1736.48	-139.59	0.00
	65	66	2031.00	-56.76	0.00
	66	67	2077.01	26.08	0.00
	67	68	1874.51	108.92	0.00
	68	69	1423.50	191.76	0.00
	69	70	723.98	274.59	0.00
	70	71	-262.36	382.84	-7.89
8	71	71	-262.36	-133.79	
	71	72	-60.89	-57.97	-3.29
	72	73	0.00	0.00	-3.29
					0.00

Esfuerzos acumulados por peso propio

Estado 7

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-218.36	-6.19
	1	2	379.18	-142.55	-6.19
	2	3	617.78	-84.62	0.00
	3	4	734.61	-26.64	0.00
	4	5	729.66	31.35	0.00
	5	6	602.95	89.33	0.00
	6	7	354.46	147.32	0.00
	7	8	-15.79	205.31	0.00
	8	9	-507.82	263.29	0.00
	9	10	-1121.62	321.28	0.00
	10	11	-1876.00	396.93	-12.31
2	11	11	-1876.00	-426.72	-9.67
	11	12	-822.35	-325.64	-9.67
	12	13	-18.57	-248.41	0.00
	13	14	568.74	-171.09	0.00
	14	15	939.57	-93.78	0.00
	15	16	1093.91	-16.47	0.00
	16	17	1031.78	60.85	0.00
	17	18	753.15	138.17	0.00
	18	19	258.05	215.48	0.00
	19	20	-453.53	292.79	0.00
	20	21	-1414.97	393.80	-8.83
3	21	21	-1414.97	-413.60	-9.34
	21	22	-398.08	-312.51	-9.34
	22	23	368.95	-235.28	0.00
	23	24	919.51	-157.97	0.00
	24	25	1253.58	-80.65	0.00
	25	26	1371.17	-3.34	0.00
	26	27	1272.27	73.98	0.00
	27	28	956.90	151.29	0.00
	28	29	425.04	228.61	0.00
	29	30	-323.30	305.92	0.00
	30	31	-1321.49	406.92	-9.16
4	31	31	-1321.49	-398.68	-8.95
	31	32	-346.37	-297.60	-8.95
	32	33	378.89	-220.37	0.00
	33	34	887.67	-143.05	0.00
	34	35	1179.96	-65.74	0.00
	35	36	1255.78	11.58	0.00
	36	37	1115.11	88.89	0.00
	37	38	757.97	166.21	0.00
	38	39	184.33	243.53	0.00
	39	40	-605.78	320.84	0.00
	40	41	-1645.75	421.84	-9.55
5	41	41	-1645.75	-442.94	-9.33
	41	42	-479.05	-334.63	-9.33
	42	43	400.83	-251.88	0.00
	43	44	1032.20	-169.04	0.00
	44	45	1415.06	-86.20	0.00
	45	46	1549.40	-3.36	0.00

Esfuerzos acumulados por peso propio

Estado 7

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	46	47	1435.24	79.47	0.00
	47	48	1072.57	162.31	0.00
	48	49	461.38	245.15	0.00
	49	50	-398.32	327.98	0.00
	50	51	-1544.82	436.21	-9.17
6	51	51	-1544.82	-431.21	-9.05
	51	52	-413.32	-322.91	-9.05
	52	53	431.37	-240.14	0.00
	53	54	1027.55	-157.31	0.00
	54	55	1375.21	-74.47	0.00
	55	56	1474.37	8.37	0.00
	56	57	1325.01	91.20	0.00
	57	58	927.15	174.04	0.00
	58	59	280.77	256.88	0.00
	59	60	-614.12	339.72	0.00
	60	61	-1795.81	447.94	-9.45
7	61	61	-1795.81	-470.21	-9.98
	61	62	-547.29	-361.90	-9.98
	62	63	414.43	-279.15	0.00
	63	64	1127.63	-196.31	0.00
	64	65	1592.32	-113.48	0.00
	65	66	1808.50	-30.64	0.00
	66	67	1776.17	52.20	0.00
	67	68	1495.33	135.03	0.00
	68	69	965.97	217.87	0.00
	69	70	188.11	300.71	0.00
	70	71	-876.56	408.94	-8.51
8	71	71	-876.56	-349.36	-10.68
	71	72	-222.13	-273.55	-10.68
	72	73	291.73	-215.70	0.00
	73	74	683.81	-157.71	0.00
	74	75	954.12	-99.73	0.00
	75	76	1102.67	-41.74	0.00
	76	77	1129.44	16.24	0.00
	77	78	1034.44	74.23	0.00
	78	79	817.67	132.22	0.00
	79	80	479.13	190.20	0.00
	80	81	0.00	265.93	-7.82

Esfuerzos acumulados por peso propio

Estructura completa estado inicial

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-218.36	-6.19
	1	2	379.18	-142.55	-6.19
	2	3	617.78	-84.62	0.00
	3	4	734.61	-26.64	0.00
	4	5	729.66	31.35	0.00
	5	6	602.95	89.33	0.00
	6	7	354.46	147.32	0.00
	7	8	-15.79	205.31	0.00
	8	9	-507.82	263.29	0.00
	9	10	-1121.62	321.28	0.00
	10	11	-1876.00	396.93	-12.31
2	11	11	-1876.00	-426.72	-9.67
	11	12	-822.35	-325.64	-9.67
	12	13	-18.57	-248.41	0.00
	13	14	568.74	-171.09	0.00
	14	15	939.57	-93.78	0.00
	15	16	1093.91	-16.47	0.00
	16	17	1031.78	60.85	0.00
	17	18	753.15	138.17	0.00
	18	19	258.05	215.48	0.00
	19	20	-453.53	292.79	0.00
	20	21	-1414.97	393.80	-8.83
3	21	21	-1414.97	-413.60	-9.34
	21	22	-398.08	-312.51	-9.34
	22	23	368.95	-235.28	0.00
	23	24	919.51	-157.97	0.00
	24	25	1253.58	-80.65	0.00
	25	26	1371.17	-3.34	0.00
	26	27	1272.27	73.98	0.00
	27	28	956.90	151.29	0.00
	28	29	425.04	228.61	0.00
	29	30	-323.30	305.92	0.00
	30	31	-1321.49	406.92	-9.16
4	31	31	-1321.49	-398.68	-8.95
	31	32	-346.37	-297.60	-8.95
	32	33	378.89	-220.37	0.00
	33	34	887.67	-143.05	0.00
	34	35	1179.96	-65.74	0.00
	35	36	1255.78	11.58	0.00
	36	37	1115.11	88.89	0.00
	37	38	757.97	166.21	0.00
	38	39	184.33	243.53	0.00
	39	40	-605.78	320.84	0.00
	40	41	-1645.75	421.84	-9.55
5	41	41	-1645.75	-442.94	-9.33
	41	42	-479.05	-334.63	-9.33
	42	43	400.83	-251.88	0.00
	43	44	1032.20	-169.04	0.00
	44	45	1415.06	-86.20	0.00
	45	46	1549.40	-3.36	0.00

Esfuerzos acumulados por peso propio

Estructura completa estado inicial

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	46	47	1435.24	79.47	0.00
	47	48	1072.57	162.31	0.00
	48	49	461.38	245.15	0.00
	49	50	-398.32	327.98	0.00
	50	51	-1544.82	436.21	-9.17
6	51	51	-1544.82	-431.21	-9.05
	51	52	-413.32	-322.91	-9.05
	52	53	431.37	-240.14	0.00
	53	54	1027.55	-157.31	0.00
	54	55	1375.21	-74.47	0.00
	55	56	1474.37	8.37	0.00
	56	57	1325.01	91.20	0.00
	57	58	927.15	174.04	0.00
	58	59	280.77	256.88	0.00
	59	60	-614.12	339.72	0.00
	60	61	-1795.81	447.94	-9.45
7	61	61	-1795.81	-470.21	-9.98
	61	62	-547.29	-361.90	-9.98
	62	63	414.43	-279.15	0.00
	63	64	1127.63	-196.31	0.00
	64	65	1592.32	-113.48	0.00
	65	66	1808.50	-30.64	0.00
	66	67	1776.17	52.20	0.00
	67	68	1495.33	135.03	0.00
	68	69	965.97	217.87	0.00
	69	70	188.11	300.71	0.00
	70	71	-876.56	408.94	-8.51
8	71	71	-876.56	-349.36	-10.68
	71	72	-222.13	-273.55	-10.68
	72	73	291.73	-215.70	0.00
	73	74	683.81	-157.71	0.00
	74	75	954.12	-99.73	0.00
	75	76	1102.67	-41.74	0.00
	76	77	1129.44	16.24	0.00
	77	78	1034.44	74.23	0.00
	78	79	817.67	132.22	0.00
	79	80	479.13	190.20	0.00
	80	81	0.00	265.93	-7.82

Esfuerzos acumulados por peso propio

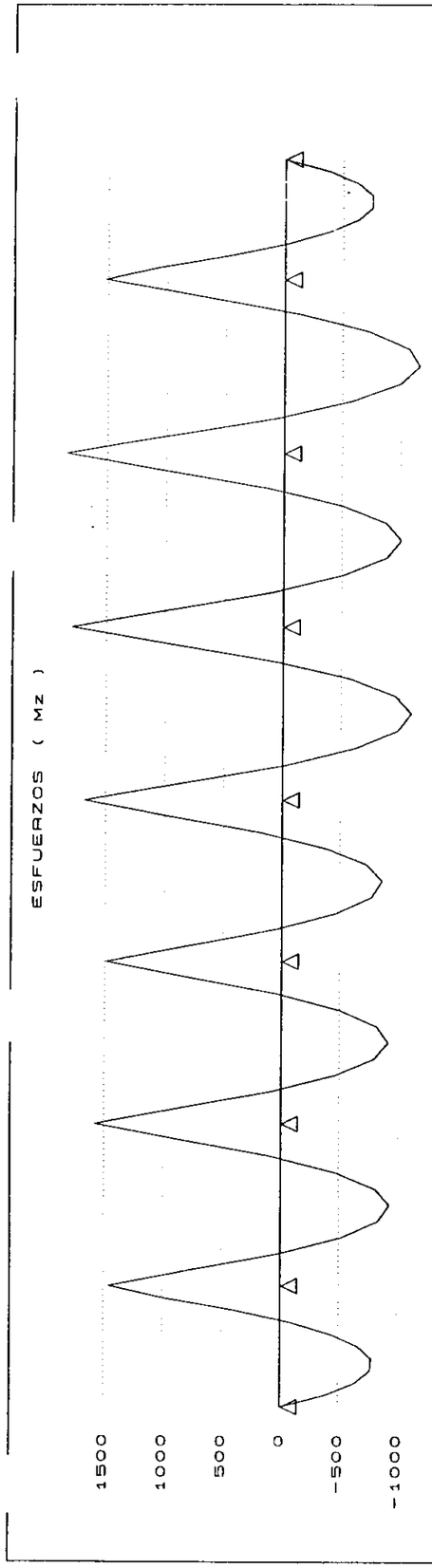
Estructura completa estado final

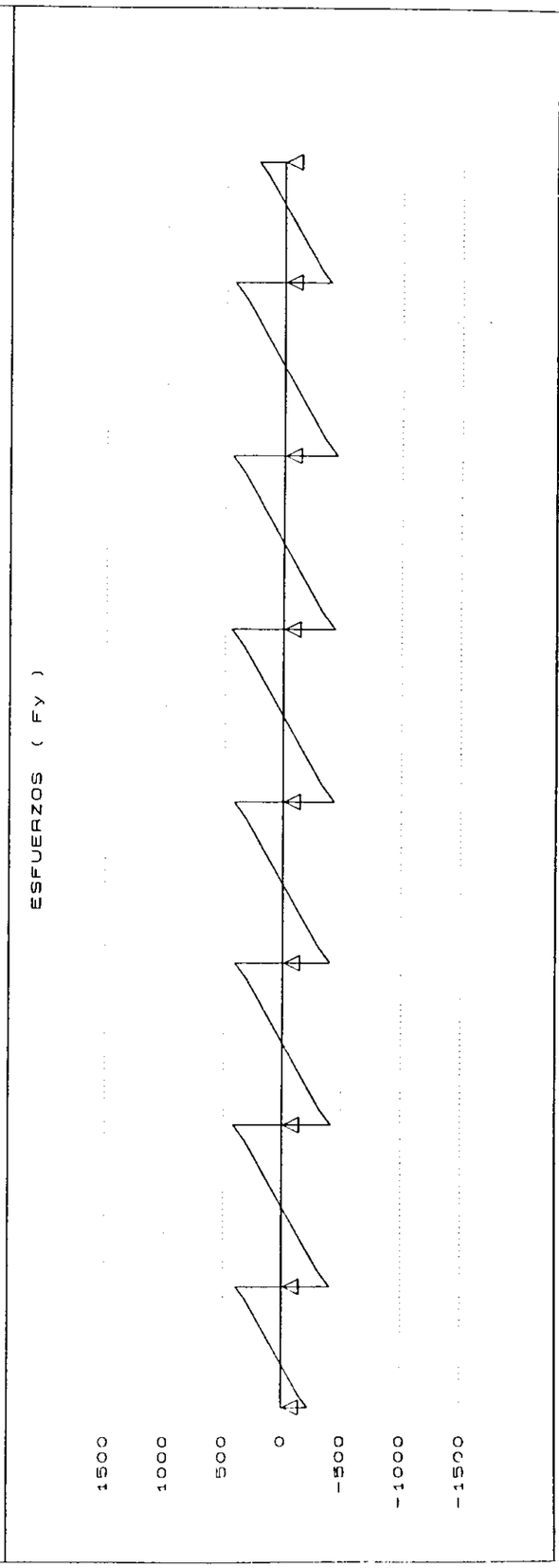
V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-224.71	-6.40
	1	2	392.51	-148.89	-6.40
	2	3	644.43	-90.97	0.00
	3	4	774.58	-32.98	0.00
	4	5	782.96	25.00	0.00
	5	6	669.57	82.99	0.00
	6	7	434.41	140.97	0.00
	7	8	77.48	198.96	0.00
	8	9	-401.23	256.95	0.00
	9	10	-1001.70	314.93	0.00
	10	11	-1742.76	390.59	-12.09
2	11	11	-1742.76	-405.70	-9.13
	11	12	-747.98	-304.62	-9.13
	12	13	-3.05	-227.39	0.00
	13	14	525.39	-150.07	0.00
	14	15	837.35	-72.76	0.00
	15	16	932.83	4.56	0.00
	16	17	811.82	81.87	0.00
	17	18	474.34	159.19	0.00
	18	19	-79.63	236.50	0.00
	19	20	-850.08	313.82	0.00
	20	21	-1870.39	414.82	-9.37
3	21	21	-1870.39	-413.74	-9.34
	21	22	-853.11	-312.65	-9.34
	22	23	-85.69	-235.42	0.00
	23	24	465.25	-158.11	0.00
	24	25	799.70	-80.79	0.00
	25	26	917.68	-3.48	0.00
	26	27	819.17	73.84	0.00
	27	28	504.18	151.15	0.00
	28	29	-27.29	228.47	0.00
	29	30	-775.25	305.78	0.00
	30	31	-1773.06	406.79	-9.16
4	31	31	-1773.06	-402.72	-9.06
	31	32	-786.65	-301.63	-9.06
	32	33	-50.10	-224.40	0.00
	33	34	469.97	-147.08	0.00
	34	35	773.56	-69.77	0.00
	35	36	860.66	7.55	0.00
	36	37	731.28	84.86	0.00
	37	38	385.43	162.18	0.00
	38	39	-176.92	239.49	0.00
	39	40	-955.74	316.81	0.00
	40	41	-1984.42	417.81	-9.44
5	41	41	-1984.42	-435.50	-9.15
	41	42	-840.04	-327.20	-9.15
	42	43	17.53	-244.44	0.00
	43	44	626.58	-161.60	0.00
	44	45	987.13	-78.76	0.00
	45	46	1099.16	4.07	0.00

Esfuerzos acumulados por peso propio

Estructura completa estado final

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	46	47	962.68	86.91	0.00
	47	48	577.69	169.75	0.00
	48	49	-55.80	252.59	0.00
	49	50	-937.82	335.42	0.00
	50	51	-2106.64	443.65	-9.35
6	51	51	-2106.64	-437.62	-9.20
	51	52	-955.91	-329.31	-9.20
	52	53	-92.00	-246.55	0.00
	53	54	523.40	-163.71	0.00
	54	55	890.29	-80.88	0.00
	55	56	1008.67	1.96	0.00
	56	57	878.53	84.80	0.00
	57	58	499.89	167.63	0.00
	58	59	-127.26	250.47	0.00
	59	60	-1002.93	333.31	0.00
	60	61	-2165.41	441.53	-9.30
7	61	61	-2165.41	-451.41	-9.53
	61	62	-973.30	-343.10	-9.53
	62	63	-68.01	-260.35	0.00
	63	64	588.77	-177.51	0.00
	64	65	997.04	-94.67	0.00
	65	66	1156.80	-11.83	0.00
	66	67	1068.05	71.00	0.00
	67	68	730.79	153.84	0.00
	68	69	145.02	236.68	0.00
	69	70	-689.27	319.51	0.00
	70	71	-1810.36	427.74	-8.97
8	71	71	-1810.36	-393.80	-12.20
	71	72	-1062.54	-317.99	-12.20
	72	73	-455.31	-260.17	0.00
	73	74	30.15	-202.18	0.00
	74	75	393.85	-144.19	0.00
	75	76	635.77	-86.21	0.00
	76	77	755.92	-28.22	0.00
	77	78	754.30	29.76	0.00
	78	79	630.91	87.75	0.00
	79	80	385.75	145.74	0.00
	80	81	0.00	221.49	-6.29





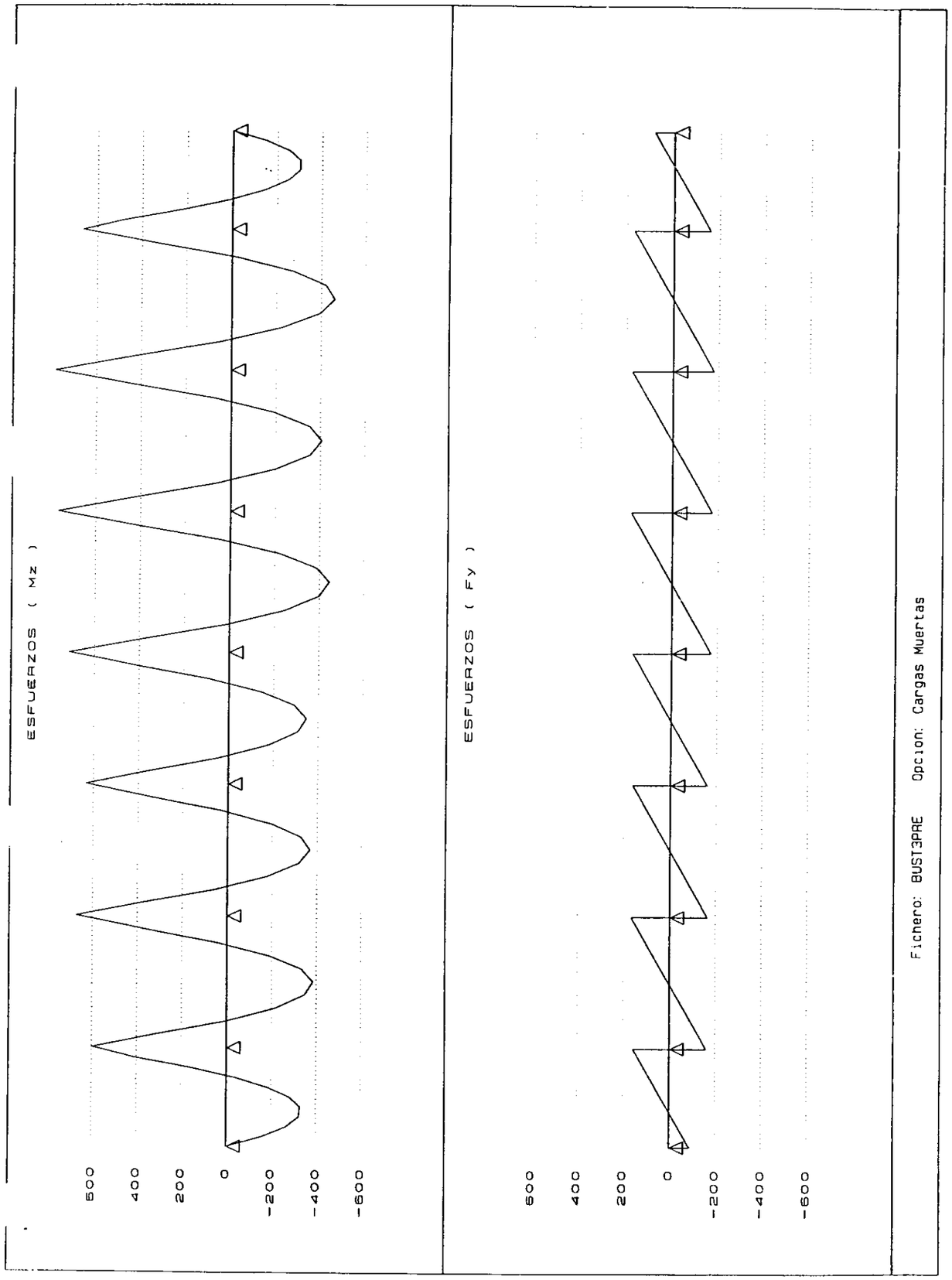
Fichero: BUST3PRE Opcion: Peso Propio (Estructura Final)

Esfuerzos debidos a cargas muertas

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-87.88	-2.59
	1	2	159.01	-63.48	-2.59
	2	3	266.75	-39.10	0.00
	3	4	323.25	-14.70	0.00
	4	5	328.50	9.70	0.00
	5	6	282.51	34.10	0.00
	6	7	185.27	58.51	0.00
	7	8	36.78	82.91	0.00
	8	9	-162.94	107.31	0.00
	9	10	-413.91	131.71	0.00
	10	11	-716.16	156.04	-4.93
2	11	11	-716.16	-159.98	-3.69
	11	12	-313.63	-127.44	-3.69
	12	13	-2.24	-94.94	0.00
	13	14	218.06	-62.41	0.00
	14	15	347.25	-29.87	0.00
	15	16	385.34	2.66	0.00
	16	17	332.33	35.20	0.00
	17	18	188.22	67.74	0.00
	18	19	-46.99	100.27	0.00
	19	20	-373.31	132.81	0.00
	20	21	-790.75	165.31	-3.83
3	21	21	-790.75	-164.09	-3.80
	21	22	-376.72	-131.55	-3.80
	22	23	-53.83	-99.05	0.00
	23	24	177.97	-66.51	0.00
	24	25	318.66	-33.98	0.00
	25	26	368.25	-1.44	0.00
	26	27	326.74	31.09	0.00
	27	28	194.13	63.63	0.00
	28	29	-29.58	96.17	0.00
	29	30	-344.39	128.70	0.00
	30	31	-750.33	161.20	-3.73
4	31	31	-750.33	-159.67	-3.69
	31	32	-348.67	-127.13	-3.69
	32	33	-38.15	-94.63	0.00
	33	34	181.27	-62.10	0.00
	34	35	309.60	-29.56	0.00
	35	36	346.82	2.97	0.00
	36	37	292.94	35.51	0.00
	37	38	147.96	68.05	0.00
	38	39	-88.12	100.58	0.00
	39	40	-415.30	133.12	0.00
	40	41	-833.61	165.62	-3.84
5	41	41	-833.61	-172.30	-3.72
	41	42	-368.85	-137.44	-3.72

Esfuerzos debidos a cargas muertas

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	42	43	-8.71	-102.62	0.00
	43	44	246.86	-67.76	0.00
	44	45	397.85	-32.90	0.00
	45	46	444.25	1.96	0.00
	46	47	386.08	36.82	0.00
	47	48	223.33	71.68	0.00
	48	49	-44.01	106.54	0.00
	49	50	-415.92	141.40	0.00
	50	51	-892.44	176.23	-3.81
6	51	51	-892.44	-173.69	-3.75
	51	52	-423.52	-138.83	-3.75
	52	53	-59.21	-104.01	0.00
	53	54	200.52	-69.15	0.00
	54	55	355.67	-34.29	0.00
	55	56	406.24	0.57	0.00
	56	57	352.23	35.43	0.00
	57	58	193.64	70.29	0.00
	58	59	-69.54	105.15	0.00
	59	60	-437.29	140.01	0.00
	60	61	-909.65	174.84	-3.78
7	61	61	-909.65	-178.46	-3.87
	61	62	-426.40	-143.61	-3.87
	62	63	-47.77	-108.78	0.00
	63	64	226.28	-73.92	0.00
	64	65	395.76	-39.06	0.00
	65	66	460.65	-4.20	0.00
	66	67	420.96	30.66	0.00
	67	68	276.70	65.52	0.00
	68	69	27.85	100.38	0.00
	69	70	-325.58	135.24	0.00
	70	71	-783.61	170.07	-3.66
8	71	71	-783.61	-159.25	-5.04
	71	72	-474.62	-134.85	-5.04
	72	73	-216.91	-110.52	0.00
	73	74	-10.43	-86.12	0.00
	74	75	144.79	-61.72	0.00
	75	76	248.78	-37.31	0.00
	76	77	301.52	-12.91	0.00
	77	78	303.01	11.49	0.00
	78	79	253.26	35.89	0.00
	79	80	152.27	60.29	0.00
	80	81	0.00	84.67	-2.48



Esfuerzos por temperatura (Gradiente termico de 5.00 gr.)

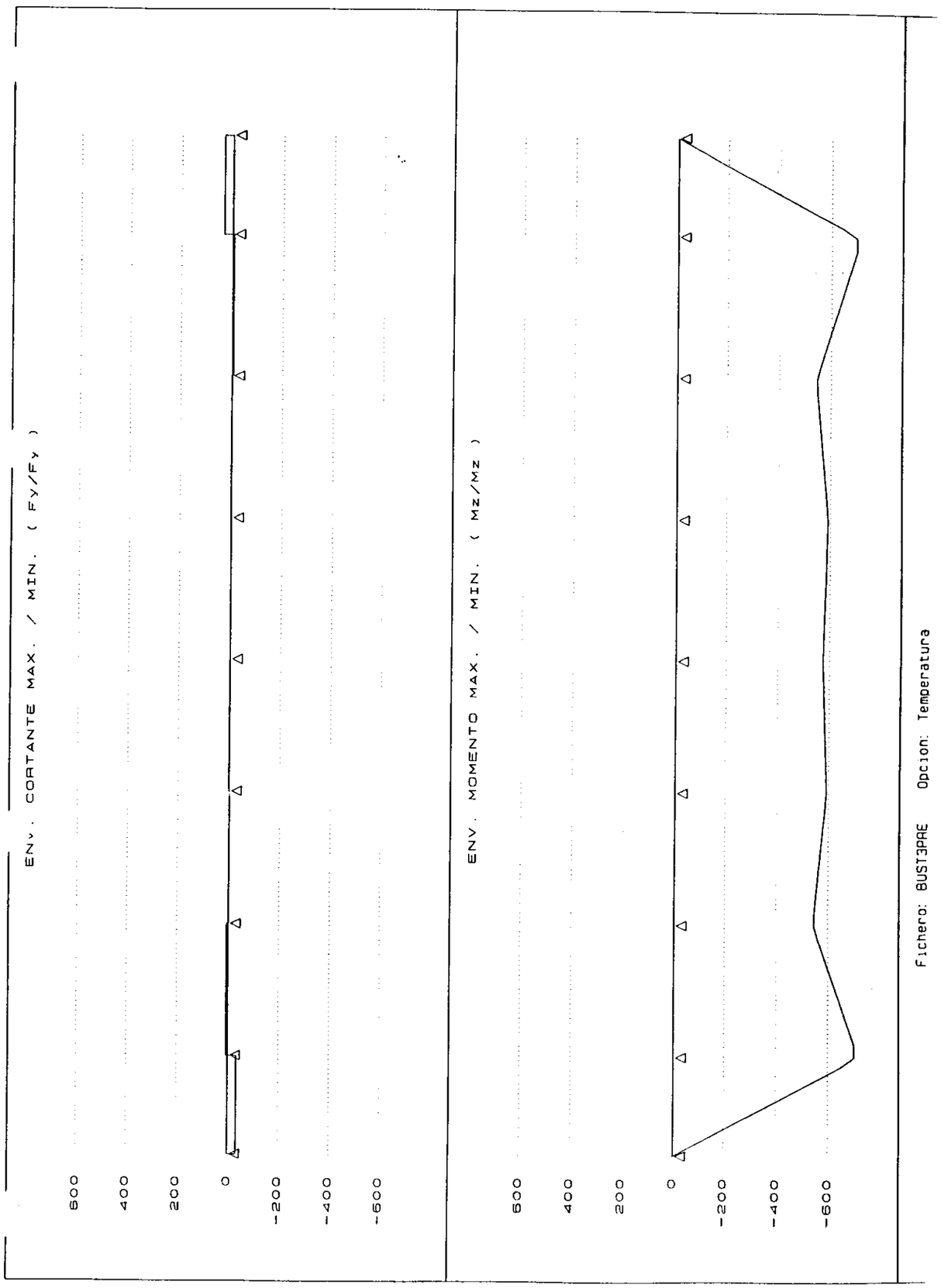
Para Gradiente termico de 0.00 * 0.00

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
1	1	1	0.00	-34.17	-1.17	-0.01	-0.01
	1	2	71.81	-34.17	-1.17	-1.16	1.70
	2	3	143.62	-34.19	0.00	-2.30	3.42
	3	4	215.42	-34.19	0.00	-3.45	5.13
	4	5	287.23	-34.19	0.00	-4.61	6.84
	5	6	359.04	-34.19	0.00	-5.76	8.55
	6	7	430.84	-34.19	0.00	-6.91	10.27
	7	8	502.65	-34.19	0.00	-8.06	11.98
	8	9	574.46	-34.19	0.00	-9.21	13.69
	9	10	646.26	-34.19	0.00	-10.36	15.40
	10	11	718.07	-34.17	1.17	-10.02	13.00
2	11	11	718.07	6.27	0.16	-10.03	13.00
	11	12	700.50	6.27	0.16	-11.23	16.69
	12	13	682.93	6.28	0.00	-10.95	16.27
	13	14	665.36	6.28	0.00	-10.67	15.85
	14	15	647.79	6.28	0.00	-10.39	15.43
	15	16	630.22	6.28	0.00	-10.11	15.02
	16	17	612.65	6.28	0.00	-9.83	14.60
	17	18	595.08	6.28	0.00	-9.54	14.18
	18	19	577.51	6.28	0.00	-9.26	13.76
	19	20	559.94	6.28	0.00	-8.98	13.34
	20	21	542.37	6.27	-0.16	-7.58	9.82
3	21	21	542.37	-1.76	-0.05	-7.58	9.82
	21	22	547.29	-1.76	-0.05	-8.78	13.04
	22	23	552.22	-1.76	0.00	-8.86	13.16
	23	24	557.14	-1.76	0.00	-8.94	13.27
	24	25	562.07	-1.76	0.00	-9.01	13.39
	25	26	566.99	-1.76	0.00	-9.09	13.51
	26	27	571.91	-1.76	0.00	-9.17	13.63
	27	28	576.84	-1.76	0.00	-9.25	13.74
	28	29	581.76	-1.76	0.00	-9.33	13.86
	29	30	586.69	-1.76	0.00	-9.41	13.98
	30	31	591.61	-1.76	0.05	-8.26	10.71
4	31	31	591.61	0.59	0.01	-8.26	10.71
	31	32	589.95	0.59	0.01	-9.46	14.06
	32	33	588.28	0.60	0.00	-9.43	14.02
	33	34	586.62	0.60	0.00	-9.41	13.98
	34	35	584.95	0.60	0.00	-9.38	13.94
	35	36	583.29	0.60	0.00	-9.35	13.90
	36	37	581.62	0.60	0.00	-9.33	13.86
	37	38	579.96	0.60	0.00	-9.30	13.82
	38	39	578.29	0.60	0.00	-9.27	13.78
	39	40	576.63	0.60	0.00	-9.25	13.74
	40	41	574.96	0.59	-0.01	-8.03	10.41

Esfuerzos por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
5	41	41	574.96	-0.56	-0.01	-8.03	10.41
	41	42	576.63	-0.56	-0.01	-9.25	13.74
	42	43	578.29	-0.56	0.00	-9.27	13.78
	43	44	579.96	-0.56	0.00	-9.30	13.82
	44	45	581.62	-0.56	0.00	-9.33	13.86
	45	46	583.28	-0.56	0.00	-9.35	13.90
	46	47	584.95	-0.56	0.00	-9.38	13.94
	47	48	586.61	-0.56	0.00	-9.41	13.98
	48	49	588.28	-0.56	0.00	-9.43	14.02
	49	50	589.94	-0.56	0.00	-9.46	14.06
	50	51	591.61	-0.56	0.01	-8.26	10.71
6	51	51	591.61	1.59	0.04	-8.26	10.71
	51	52	586.85	1.59	0.04	-9.41	13.98
	52	53	582.09	1.59	0.00	-9.34	13.87
	53	54	577.34	1.59	0.00	-9.26	13.76
	54	55	572.58	1.59	0.00	-9.18	13.64
	55	56	567.82	1.59	0.00	-9.11	13.53
	56	57	563.07	1.59	0.00	-9.03	13.42
	57	58	558.31	1.59	0.00	-8.95	13.30
	58	59	553.55	1.59	0.00	-8.88	13.19
	59	60	548.80	1.59	0.00	-8.80	13.08
	60	61	544.04	1.59	-0 04	-7.60	9.85
7	61	61	544.04	-5.64	-0.14	-7.60	9.85
	61	62	560.96	-5.64	-0.14	-9.00	13.36
	62	63	577.87	-5.64	0.00	-9.27	13.77
	63	64	594.78	-5.64	0.00	-9.54	14.17
	64	65	611.70	-5.64	0.00	-9.81	14.57
	65	66	628.61	-5.64	0.00	-10.08	14.98
	66	67	645.53	-5.64	0.00	-10.35	15.38
	67	68	662.44	-5.64	0.00	-10.62	15.78
	68	69	679.35	-5.64	0.00	-10.89	16.19
	69	70	696.27	-5.64	0.00	-11.17	16.59
	70	71	713.18	-5.64	0.14	-9.96	12.91
8	71	71	713.19	33.94	1.16	-9.96	12.92
	71	72	641.87	33.94	1.16	-10.28	15.30
	72	73	570.55	33.96	0.00	-9.15	13.59
	73	74	499.23	33.96	0.00	-8.01	11.89
	74	75	427.91	33.96	0.00	-6.86	10.20
	75	76	356.59	33.96	0.00	-5.72	8.50
	76	77	285.27	33.96	0.00	-4.58	6.80
	77	78	213.95	33.96	0.00	-3.43	5.10
	78	79	142.64	33.96	0.00	-2.29	3.40
	79	80	71.32	33.96	0.00	-1.14	1.70
	80	81	0.00	33.94	-1.16	-0.01	-0.01



Envolvente de cortantes por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
1	1	1	MAX	0.00	13.65	0.47	0.00	0.00
		1	MIN	0.00	-13.65	-0.47	0.00	0.00
	1	2	MAX	-28.67	13.65	0.47	0.46	-0.68
		2	MIN	28.67	-13.65	-0.47	-0.46	0.68
	2	3	MAX	-57.35	13.65	0.00	0.92	-1.37
		3	MIN	57.35	-13.65	0.00	-0.92	1.37
	3	4	MAX	-86.02	13.65	0.00	1.38	-2.05
		4	MIN	86.02	-13.65	0.00	-1.38	2.05
	4	5	MAX	-114.69	13.65	0.00	1.84	-2.73
		5	MIN	114.69	-13.65	0.00	-1.84	2.73
	5	6	MAX	-143.36	13.65	0.00	2.30	-3.42
		6	MIN	143.36	-13.65	0.00	-2.30	3.42
	6	7	MAX	-172.04	13.65	0.00	2.76	-4.10
		7	MIN	172.04	-13.65	0.00	-2.76	4.10
	7	8	MAX	-200.71	13.65	0.00	3.22	-4.78
		8	MIN	200.71	-13.65	0.00	-3.22	4.78
	8	9	MAX	-229.38	13.65	0.00	3.68	-5.47
		9	MIN	229.38	-13.65	0.00	-3.68	5.47
	9	10	MAX	-258.06	13.65	0.00	4.14	-6.15
		10	MIN	258.06	-13.65	0.00	-4.14	6.15
	10	11	MAX	-286.73	13.65	-0.47	4.00	-5.19
		11	MIN	286.73	-13.65	0.47	-4.00	5.19
2	11	11	MAX	286.73	20.92	0.54	-4.00	5.19
		11	MIN	-286.73	-20.92	-0.54	4.00	-5.19
	11	12	MAX	228.12	20.92	0.54	-3.65	5.44
		12	MIN	-228.12	-20.92	-0.54	3.65	-5.44
	12	13	MAX	169.52	20.93	0.00	-2.72	4.04
		13	MIN	-169.52	-20.93	0.00	2.72	-4.04
	13	14	MAX	110.91	20.93	0.00	-1.78	2.64
		14	MIN	-110.91	-20.93	0.00	1.78	-2.64
	14	15	MAX	52.31	20.93	0.00	-0.84	1.25
		15	MIN	-52.31	-20.93	0.00	0.84	-1.25
	15	16	MAX	-6.30	20.93	0.00	0.10	-0.15
		16	MIN	6.30	-20.93	0.00	-0.10	0.15
	16	17	MAX	-64.91	20.93	0.00	1.04	-1.55
		17	MIN	64.91	-20.93	0.00	-1.04	1.55
	17	18	MAX	-123.51	20.93	0.00	1.98	-2.94
		18	MIN	123.51	-20.93	0.00	-1.98	2.94
	18	19	MAX	-182.12	20.93	0.00	2.92	-4.34
		19	MIN	182.12	-20.93	0.00	-2.92	4.34
	19	20	MAX	-240.73	20.93	0.00	3.86	-5.74
		20	MIN	240.73	-20.93	0.00	-3.86	5.74
	20	21	MAX	-299.33	20.92	-0.54	4.18	-5.42
		21	MIN	299.33	-20.92	0.54	-4.18	5.42

Envolvente de cortantes por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
3	21	21	MAX	299.33	21.36	0.55	-4.18	5.42
		21	MIN	-299.33	-21.36	-0.55	4.18	-5.42
	21	22	MAX	239.49	21.36	0.55	-3.84	5.71
		22	MIN	-239.49	-21.36	-0.55	3.84	-5.71
	22	23	MAX	179.66	21.37	0.00	-2.88	4.28
		23	MIN	-179.66	-21.37	0.00	2.88	-4.28
	23	24	MAX	119.82	21.37	0.00	-1.92	2.85
		24	MIN	-119.82	-21.37	0.00	1.92	-2.85
	24	25	MAX	59.98	21.37	0.00	-0.96	1.43
		25	MIN	-59.98	-21.37	0.00	0.96	-1.43
	25	26	MAX	0.15	21.37	0.00	0.00	0.00
		26	MIN	-0.15	-21.37	0.00	0.00	0.00
	26	27	MAX	-59.69	21.37	0.00	0.96	-1.42
		27	MIN	59.69	-21.37	0.00	-0.96	1.42
	27	28	MAX	-119.53	21.37	0.00	1.92	-2.85
		28	MIN	119.53	-21.37	0.00	-1.92	2.85
	28	29	MAX	-179.37	21.37	0.00	2.88	-4.27
		29	MIN	179.37	-21.37	0.00	-2.88	4.27
	29	30	MAX	-239.20	21.37	0.00	3.84	-5.70
		30	MIN	239.20	-21.37	0.00	-3.84	5.70
	30	31	MAX	-299.04	21.36	-0.55	4.17	-5.42
		31	MIN	299.04	-21.36	0.55	-4.17	5.42
4	31	31	MAX	299.04	20.86	0.54	-4.17	5.42
		31	MIN	-299.04	-20.86	-0.54	4.17	-5.42
	31	32	MAX	240.61	20.86	0.54	-3.85	5.74
		32	MIN	-240.61	-20.86	-0.54	3.85	-5.74
	32	33	MAX	182.17	20.87	0.00	-2.92	4.34
		33	MIN	-182.17	-20.87	0.00	2.92	-4.34
	33	34	MAX	123.74	20.87	0.00	-1.98	2.95
		34	MIN	-123.74	-20.87	0.00	1.98	-2.95
	34	35	MAX	65.30	20.87	0.00	-1.05	1.56
		35	MIN	-65.30	-20.87	0.00	1.05	-1.56
	35	36	MAX	6.87	20.87	0.00	-0.11	0.16
		36	MIN	-6.87	-20.87	0.00	0.11	-0.16
	36	37	MAX	-51.56	20.87	0.00	0.83	-1.23
		37	MIN	51.56	-20.87	0.00	-0.83	1.23
	37	38	MAX	-110.00	20.87	0.00	1.76	-2.62
		38	MIN	110.00	-20.87	0.00	-1.76	2.62
	38	39	MAX	-168.43	20.87	0.00	2.70	-4.01
		39	MIN	168.43	-20.87	0.00	-2.70	4.01
	39	40	MAX	-226.87	20.87	0.00	3.64	-5.41
		40	MIN	226.87	-20.87	0.00	-3.64	5.41
	40	41	MAX	-285.30	20.86	-0.54	3.98	-5.17
		41	MIN	285.30	-20.86	0.54	-3.98	5.17
5	41	41	MAX	285.30	18.56	0.45	-3.98	5.17
		41	MIN	-285.30	-18.56	-0.44	3.98	-5.17
	41	42	MAX	229.59	18.56	0.45	-3.68	5.47
		42	MIN	-229.60	-18.56	-0.44	3.68	-5.47

Envolvente de cortantes por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
	42	43 MAX	173.89	18.57	0.00	-2.79	4.14
		43 MIN	-173.89	-18.57	0.00	2.79	-4.14
	43	44 MAX	118.18	18.57	0.00	-1.90	2.82
		44 MIN	-118.18	-18.57	0.00	1.90	-2.82
	44	45 MAX	62.48	18.57	0.00	-1.00	1.49
		45 MIN	-62.48	-18.57	0.00	1.00	-1.49
	45	46 MAX	6.77	18.57	0.00	-0.11	0.16
		46 MIN	-6.77	-18.57	0.00	0.11	-0.16
	46	47 MAX	-48.93	18.57	0.00	0.78	-1.17
		47 MIN	48.93	-18.57	0.00	-0.78	1.17
	47	48 MAX	-104.64	18.57	0.00	1.68	-2.49
		48 MIN	104.64	-18.57	0.00	-1.68	2.49
	48	49 MAX	-160.34	18.57	0.00	2.57	-3.82
		49 MIN	160.34	-18.57	0.00	-2.57	3.82
	49	50 MAX	-216.05	18.57	0.00	3.46	-5.15
		50 MIN	216.05	-18.57	0.00	-3.46	5.15
	50	51 MAX	-271.75	18.56	-0.45	3.79	-4.92
		51 MIN	271.75	-18.56	0.44	-3.79	4.92
6	51	51 MAX	271.75	17.99	0.43	-3.79	4.92
		51 MIN	-271.75	-17.99	-0.43	3.79	-4.92
	51	52 MAX	217.78	17.99	0.43	-3.49	5.19
		52 MIN	-217.78	-17.99	-0.43	3.49	-5.19
	52	53 MAX	163.82	17.99	0.00	-2.63	3.90
		53 MIN	-163.82	-17.99	0.00	2.63	-3.90
	53	54 MAX	109.85	17.99	0.00	-1.76	2.62
		54 MIN	-109.85	-17.99	0.00	1.76	-2.62
	54	55 MAX	55.88	17.99	0.00	-0.90	1.33
		55 MIN	-55.88	-17.99	0.00	0.90	-1.33
	55	56 MAX	1.91	17.99	0.00	-0.03	0.05
		56 MIN	-1.91	-17.99	0.00	0.03	-0.05
	56	57 MAX	-52.06	17.99	0.00	0.83	-1.24
		57 MIN	52.06	-17.99	0.00	-0.83	1.24
	57	58 MAX	-106.03	17.99	0.00	1.70	-2.53
		58 MIN	106.03	-17.99	0.00	-1.70	2.53
	58	59 MAX	-160.00	17.99	0.00	2.57	-3.81
		59 MIN	160.00	-17.99	0.00	-2.57	3.81
	59	60 MAX	-213.97	17.99	0.00	3.43	-5.10
		60 MIN	213.97	-17.99	0.00	-3.43	5.10
	60	61 MAX	-267.94	17.99	-0.43	3.74	-4.85
		61 MIN	267.94	-17.99	0.43	-3.74	4.85
7	61	61 MAX	267.94	17.81	0.43	-3.74	4.85
		61 MIN	-267.94	-17.81	-0.43	3.74	-4.85
	61	62 MAX	214.49	17.81	0.43	-3.44	5.11
		62 MIN	-214.49	-17.81	-0.43	3.44	-5.11
	62	63 MAX	161.03	17.82	0.00	-2.58	3.84
		63 MIN	-161.03	-17.82	0.00	2.58	-3.84

Envolvente de cortantes por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
	63	64 MAX	107.58	17.82	0.00	-1.73	2.56
		64 MIN	-107.58	-17.82	0.00	1.73	-2.56
	64	65 MAX	54.13	17.82	0.00	-0.87	1.29
		65 MIN	-54.13	-17.82	0.00	0.87	-1.29
	65	66 MAX	0.68	17.82	0.00	-0.01	0.02
		66 MIN	-0.68	-17.82	0.00	0.01	-0.02
	66	67 MAX	-52.77	17.82	0.00	0.85	-1.26
		67 MIN	52.77	-17.82	0.00	-0.85	1.26
	67	68 MAX	-106.22	17.82	0.00	1.70	-2.53
		68 MIN	106.22	-17.82	0.00	-1.70	2.53
	68	69 MAX	-159.67	17.82	0.00	2.56	-3.80
		69 MIN	159.67	-17.82	0.00	-2.56	3.80
	69	70 MAX	-213.12	17.82	0.00	3.42	-5.08
		70 MIN	213.12	-17.82	0.00	-3.42	5.08
	70	71 MAX	-266.57	17.81	-0.43	3.72	-4.83
		71 MIN	266.57	-17.81	0.43	-3.72	4.83
8	71	71 MAX	266.57	12.69	0.44	-3.72	4.83
		71 MIN	-266.57	-12.69	-0.44	3.72	-4.83
	71	72 MAX	239.92	12.69	0.44	-3.84	5.72
		72 MIN	-239.92	-12.69	-0.44	3.84	-5.72
	72	73 MAX	213.26	12.69	0.00	-3.42	5.08
		73 MIN	-213.26	-12.69	0.00	3.42	-5.08
	73	74 MAX	186.60	12.69	0.00	-2.99	4.45
		74 MIN	-186.60	-12.69	0.00	2.99	-4.45
	74	75 MAX	159.94	12.69	0.00	-2.57	3.81
		75 MIN	-159.94	-12.69	0.00	2.57	-3.81
	75	76 MAX	133.29	12.69	0.00	-2.14	3.18
		76 MIN	-133.29	-12.69	0.00	2.14	-3.18
	76	77 MAX	106.63	12.69	0.00	-1.71	2.54
		77 MIN	-106.63	-12.69	0.00	1.71	-2.54
	77	78 MAX	79.97	12.69	0.00	-1.28	1.91
		78 MIN	-79.97	-12.69	0.00	1.28	-1.91
	78	79 MAX	53.31	12.69	0.00	-0.86	1.27
		79 MIN	-53.31	-12.69	0.00	0.86	-1.27
	79	80 MAX	26.66	12.69	0.00	-0.43	0.64
		80 MIN	-26.66	-12.69	0.00	0.43	-0.64
	80	81 MAX	0.00	12.69	-0.44	0.00	0.00
		81 MIN	0.00	-12.69	0.44	0.00	0.00

Envolvente de momentos por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
1	1	1 MAX	0.00	-13.65	-0.47	0.00	0.00
		1 MIN	0.00	13.65	0.47	0.00	0.00
	1	2 MAX	28.67	-13.65	-0.47	-0.46	0.68
		2 MIN	-28.67	13.65	0.47	0.46	-0.68
	2	3 MAX	57.35	-13.65	0.00	-0.92	1.37
		3 MIN	-57.35	13.65	0.00	0.92	-1.37
	3	4 MAX	86.02	-13.65	0.00	-1.38	2.05
		4 MIN	-86.02	13.65	0.00	1.38	-2.05
	4	5 MAX	114.69	-13.65	0.00	-1.84	2.73
		5 MIN	-114.69	13.65	0.00	1.84	-2.73
	5	6 MAX	143.36	-13.65	0.00	-2.30	3.42
		6 MIN	-143.36	13.65	0.00	2.30	-3.42
	6	7 MAX	172.04	-13.65	0.00	-2.76	4.10
		7 MIN	-172.04	13.65	0.00	2.76	-4.10
	7	8 MAX	200.71	-13.65	0.00	-3.22	4.78
		8 MIN	-200.71	13.65	0.00	3.22	-4.78
	8	9 MAX	229.38	-13.65	0.00	-3.68	5.47
		9 MIN	-229.38	13.65	0.00	3.68	-5.47
	9	10 MAX	258.06	-13.65	0.00	-4.14	6.15
		10 MIN	-258.06	13.65	0.00	4.14	-6.15
	10	11 MAX	286.73	-13.65	0.47	-4.00	5.19
		11 MIN	-286.73	13.65	-0.47	4.00	-5.19
2	11	11 MAX	286.73	20.92	0.54	-4.00	5.19
		11 MIN	-286.73	-20.92	-0.54	4.00	-5.19
	11	12 MAX	228.12	20.92	0.54	-3.65	5.44
		12 MIN	-228.12	-20.92	-0.54	3.65	-5.44
	12	13 MAX	169.52	20.93	0.00	-2.72	4.04
		13 MIN	-169.52	-20.93	0.00	2.72	-4.04
	13	14 MAX	129.31	12.01	0.00	-2.07	3.08
		14 MIN	-129.31	-12.01	0.00	2.07	-3.08
	14	15 MAX	95.68	12.01	0.00	-1.53	2.28
		15 MIN	-95.68	-12.01	0.00	1.53	-2.28
	15	16 MAX	98.72	-1.39	0.00	-1.58	2.35
		16 MIN	-98.72	1.39	0.00	1.58	-2.35
	16	17 MAX	102.62	-1.39	0.00	-1.65	2.44
		17 MIN	-102.62	1.39	0.00	1.65	-2.44
	17	18 MAX	136.79	-15.29	0.00	-2.19	3.26
		18 MIN	-136.79	15.29	0.00	2.19	-3.26
	18	19 MAX	182.12	-20.93	0.00	-2.92	4.34
		19 MIN	-182.12	20.93	0.00	2.92	-4.34
	19	20 MAX	240.73	-20.93	0.00	-3.86	5.74
		20 MIN	-240.73	20.93	0.00	3.86	-5.74
	20	21 MAX	299.33	-20.92	0.54	-4.18	5.42
		21 MIN	-299.33	20.92	-0.54	4.18	-5.42

Envolvente de momentos por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
3	21	21 MAX	299.33	21.36	0.55	-4.18	5.42
		21 MIN	-299.33	-21.36	-0.55	4.18	-5.42
	21	22 MAX	239.49	21.36	0.55	-3.84	5.71
		22 MIN	-239.49	-21.36	-0.55	3.84	-5.71
	22	23 MAX	179.66	21.37	0.00	-2.88	4.28
		23 MIN	-179.66	-21.37	0.00	2.88	-4.28
	23	24 MAX	139.58	12.89	0.00	-2.24	3.33
		24 MIN	-139.58	-12.90	0.00	2.24	-3.33
	24	25 MAX	106.65	-0.05	0.00	-1.71	2.54
		25 MIN	-106.65	0.05	0.00	1.71	-2.54
	25	26 MAX	106.79	-0.05	0.00	-1.71	2.54
		26 MIN	-106.79	0.05	0.00	1.71	-2.54
	26	27 MAX	106.93	-0.05	0.00	-1.71	2.55
		27 MIN	-106.93	0.05	0.00	1.71	-2.55
	27	28 MAX	139.03	-13.13	0.00	-2.23	3.31
		28 MIN	-139.03	13.13	0.00	2.23	-3.31
	28	29 MAX	179.37	-21.37	0.00	-2.88	4.27
		29 MIN	-179.37	21.37	0.00	2.88	-4.27
	29	30 MAX	239.20	-21.37	0.00	-3.84	5.70
		30 MIN	-239.20	21.37	0.00	3.84	-5.70
	30	31 MAX	299.04	-21.36	0.55	-4.17	5.42
		31 MIN	-299.04	21.36	-0.55	4.17	-5.42
4	31	31 MAX	299.04	20.86	0.54	-4.17	5.42
		31 MIN	-299.04	-20.86	-0.54	4.17	-5.42
	31	32 MAX	240.61	20.86	0.54	-3.85	5.74
		32 MIN	-240.61	-20.86	-0.54	3.85	-5.74
	32	33 MAX	182.17	20.87	0.00	-2.92	4.34
		33 MIN	-182.17	-20.87	0.00	2.92	-4.34
	33	34 MAX	142.58	12.86	0.00	-2.29	3.40
		34 MIN	-142.58	-12.86	0.00	2.29	-3.40
	34	35 MAX	106.94	0.56	0.00	-1.71	2.55
		35 MIN	-106.94	-0.56	0.00	1.71	-2.55
	35	36 MAX	105.38	0.56	0.00	-1.69	2.51
		36 MIN	-105.38	-0.56	0.00	1.69	-2.51
	36	37 MAX	103.82	0.56	0.00	-1.67	2.47
		37 MIN	-103.82	-0.56	0.00	1.67	-2.47
	37	38 MAX	131.71	-12.20	0.00	-2.11	3.14
		38 MIN	-131.71	12.20	0.00	2.11	-3.14
	38	39 MAX	168.43	-20.87	0.00	-2.70	4.01
		39 MIN	-168.43	20.87	0.00	2.70	-4.01
	39	40 MAX	226.87	-20.87	0.00	-3.64	5.41
		40 MIN	-226.87	20.87	0.00	3.64	-5.41
	40	41 MAX	285.30	-20.86	0.54	-3.98	5.17
		41 MIN	-285.30	20.86	-0.54	3.98	-5.17
5	41	41 MAX	285.30	18.56	0.45	-3.98	5.17
		41 MIN	-285.30	-18.56	-0.44	3.98	-5.17
	41	42 MAX	229.59	18.56	0.45	-3.68	5.47
		42 MIN	-229.60	-18.56	-0.44	3.68	-5.47

Envolvente de momentos por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
	42	43	MAX	173.89	18.57	0.00	-2.79	4.14
		43	MIN	-173.89	-18.57	0.00	2.79	-4.14
	43	44	MAX	135.37	11.29	0.00	-2.17	3.23
		44	MIN	-135.37	-11.29	0.00	2.17	-3.23
	44	45	MAX	102.84	0.55	0.00	-1.65	2.45
		45	MIN	-102.84	-0.55	0.00	1.65	-2.45
	45	46	MAX	101.19	0.55	0.00	-1.62	2.41
		46	MIN	-101.19	-0.55	0.00	1.62	-2.41
	46	47	MAX	99.54	0.55	0.00	-1.60	2.37
		47	MIN	-99.54	-0.55	0.00	1.60	-2.37
	47	48	MAX	124.74	-10.59	0.00	-2.00	2.97
		48	MIN	-124.74	10.59	0.00	2.00	-2.97
	48	49	MAX	160.34	-18.57	0.00	-2.57	3.82
		49	MIN	-160.34	18.57	0.00	2.57	-3.82
	49	50	MAX	216.05	-18.57	0.00	-3.46	5.15
		50	MIN	-216.05	18.57	0.00	3.46	-5.15
	50	51	MAX	271.75	-18.56	0.44	-3.79	4.92
		51	MIN	-271.75	18.56	-0.45	3.79	-4.92
6	51	51	MAX	271.75	17.99	0.43	-3.79	4.92
		51	MIN	-271.75	-17.99	-0.43	3.79	-4.92
	51	52	MAX	217.78	17.99	0.43	-3.49	5.19
		52	MIN	-217.78	-17.99	-0.43	3.49	-5.19
	52	53	MAX	163.82	17.99	0.00	-2.63	3.90
		53	MIN	-163.82	-17.99	0.00	2.63	-3.90
	53	54	MAX	127.46	10.97	0.00	-2.04	3.04
		54	MIN	-127.46	-10.97	0.00	2.04	-3.04
	54	55	MAX	98.56	0.26	0.00	-1.58	2.35
		55	MIN	-98.56	-0.26	0.00	1.58	-2.35
	55	56	MAX	97.77	0.26	0.00	-1.57	2.33
		56	MIN	-97.77	-0.26	0.00	1.57	-2.33
	56	57	MAX	96.99	0.26	0.00	-1.56	2.31
		57	MIN	-96.99	-0.26	0.00	1.56	-2.31
	57	58	MAX	124.95	-10.38	0.00	-2.00	2.98
		58	MIN	-124.95	10.38	0.00	2.00	-2.98
	58	59	MAX	160.00	-17.99	0.00	-2.57	3.81
		59	MIN	-160.00	17.99	0.00	2.57	-3.81
	59	60	MAX	213.97	-17.99	0.00	-3.43	5.10
		60	MIN	-213.97	17.99	0.00	3.43	-5.10
	60	61	MAX	267.94	-17.99	0.43	-3.74	4.85
		61	MIN	-267.94	17.99	-0.43	3.74	-4.85
7	61	61	MAX	267.94	17.81	0.43	-3.74	4.85
		61	MIN	-267.94	-17.81	-0.43	3.74	-4.85
	61	62	MAX	214.49	17.81	0.43	-3.44	5.11
		62	MIN	-214.49	-17.81	-0.43	3.44	-5.11
	62	63	MAX	161.03	17.82	0.00	-2.58	3.84
		63	MIN	-161.03	-17.82	0.00	2.58	-3.84

Envolvente de momentos por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
	63	64	MAX	120.36	12.75	0.00	-1.93	2.87
		64	MIN	-120.36	-12.75	0.00	1.93	-2.87
	64	65	MAX	93.08	0.82	0.00	-1.49	2.22
		65	MIN	-93.08	-0.82	0.00	1.49	-2.22
	65	66	MAX	90.63	0.82	0.00	-1.45	2.16
		66	MIN	-90.63	-0.82	0.00	1.45	-2.16
	66	67	MAX	90.95	-10.27	0.00	-1.46	2.17
		67	MIN	-90.95	10.27	0.00	1.46	-2.17
	67	68	MAX	121.75	-10.27	0.00	-1.95	2.90
		68	MIN	-121.75	10.27	0.00	1.95	-2.90
	68	69	MAX	159.67	-17.82	0.00	-2.56	3.80
		69	MIN	-159.67	17.82	0.00	2.56	-3.80
	69	70	MAX	213.12	-17.82	0.00	-3.42	5.08
		70	MIN	-213.12	17.82	0.00	3.42	-5.08
	70	71	MAX	266.57	-17.81	0.43	-3.72	4.83
		71	MIN	-266.57	17.81	-0.43	3.72	-4.83
8	71	71	MAX	266.57	12.69	0.44	-3.72	4.83
		71	MIN	-266.57	-12.69	-0.44	3.72	-4.83
	71	72	MAX	239.92	12.69	0.44	-3.84	5.72
		72	MIN	-239.92	-12.69	-0.44	3.84	-5.72
	72	73	MAX	213.26	12.69	0.00	-3.42	5.08
		73	MIN	-213.26	-12.69	0.00	3.42	-5.08
	73	74	MAX	186.60	12.69	0.00	-2.99	4.45
		74	MIN	-186.60	-12.69	0.00	2.99	-4.45
	74	75	MAX	159.94	12.69	0.00	-2.57	3.81
		75	MIN	-159.94	-12.69	0.00	2.57	-3.81
	75	76	MAX	133.29	12.69	0.00	-2.14	3.18
		76	MIN	-133.29	-12.69	0.00	2.14	-3.18
	76	77	MAX	106.63	12.69	0.00	-1.71	2.54
		77	MIN	-106.63	-12.69	0.00	1.71	-2.54
	77	78	MAX	79.97	12.69	0.00	-1.28	1.91
		78	MIN	-79.97	-12.69	0.00	1.28	-1.91
	78	79	MAX	53.31	12.69	0.00	-0.86	1.27
		79	MIN	-53.31	-12.69	0.00	0.86	-1.27
	79	80	MAX	26.66	12.69	0.00	-0.43	0.64
		80	MIN	-26.66	-12.69	0.00	0.43	-0.64
	80	81	MAX	0.00	12.69	-0.44	0.00	0.00
		81	MIN	0.00	-12.69	0.44	0.00	0.00

Envolvente de cortantes por paso de ferrocarril (RENFE)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	77.68	2.24
		1	MIN	0.00	-331.56	-8.51
	1	2	MAX	-162.12	77.20	0.00
		2	MIN	616.25	-257.40	0.00
	2	3	MAX	-322.05	76.68	0.00
		3	MIN	1073.83	-184.10	0.00
	3	4	MAX	-479.79	76.16	0.00
		4	MIN	1375.84	-111.76	0.00
	4	5	MAX	-635.33	75.63	0.00
		5	MIN	1525.38	-40.41	0.00
	5	6	MAX	418.86	106.87	0.00
		6	MIN	219.61	-20.92	0.00
	6	7	MAX	443.43	176.58	0.00
		7	MIN	265.36	-21.06	0.00
	7	8	MAX	-1.52	248.88	0.00
		8	MIN	311.73	-21.21	0.00
	8	9	MAX	-602.91	322.15	0.00
		9	MIN	358.71	-21.35	0.00
	9	10	MAX	-1363.80	396.40	0.00
		10	MIN	406.30	-21.50	0.00
	10	11	MAX	-2287.32	471.41	-12.54
		11	MIN	454.49	-21.63	0.62
2	11	11	MAX	454.49	71.69	1.55
		11	MIN	-2322.36	-522.67	-10.25
	11	12	MAX	251.99	71.23	0.00
		12	MIN	-987.21	-423.21	0.00
	12	13	MAX	52.20	70.75	0.00
		13	MIN	62.86	-324.93	0.00
	13	14	MAX	-144.90	70.26	0.00
		14	MIN	833.35	-227.94	0.00
	14	15	MAX	-339.30	69.78	0.00
		15	MIN	1037.08	-133.69	0.00
	15	16	MAX	-531.00	69.30	0.00
		16	MIN	1292.10	-54.50	0.00
	16	17	MAX	1099.50	148.76	0.00
		17	MIN	-207.66	-40.29	0.00
	17	18	MAX	555.01	244.56	0.00
		18	MIN	-95.50	-40.57	0.00
	18	19	MAX	-264.24	341.66	0.00
		19	MIN	18.21	-40.85	0.00
	19	20	MAX	-1363.70	440.06	0.00
		20	MIN	133.48	-41.13	0.00
	20	21	MAX	-2748.88	539.63	-10.61
		21	MIN	250.31	-41.39	0.89
3	21	21	MAX	428.75	70.62	1.53
		21	MIN	-2672.02	-538.68	-10.60
	21	22	MAX	229.39	70.17	0.00
		22	MIN	-1289.97	-439.12	0.00

Envolvente de cortantes por paso de ferrocarril (RENFE)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	32.69	69.69	0.00
		23	MIN	-193.61	-340.73	0.00
	23	24	MAX	-161.34	69.22	0.00
		24	MIN	622.57	-243.64	0.00
	24	25	MAX	-352.72	68.74	0.00
		25	MIN	838.42	-156.06	0.00
	25	26	MAX	1071.79	68.74	0.00
		26	MIN	1156.99	-76.71	0.00
	26	27	MAX	1116.40	151.71	0.00
		27	MIN	-328.26	-63.56	0.00
	27	28	MAX	563.71	247.53	0.00
		28	MIN	-151.34	-64.00	0.00
	28	29	MAX	-263.85	344.65	0.00
		29	MIN	28.04	-64.43	0.00
	29	30	MAX	-1371.73	443.07	0.00
		30	MIN	209.88	-64.87	0.00
	30	31	MAX	-2765.46	542.65	-10.68
		31	MIN	394.18	-65.29	1.41
4	31	31	MAX	496.78	82.11	1.77
		31	MIN	-2721.58	-542.11	-10.67
	31	32	MAX	265.01	81.58	0.00
		32	MIN	-1329.66	-442.53	0.00
	32	33	MAX	36.33	81.03	0.00
		33	MIN	-223.55	-344.11	0.00
	33	34	MAX	-189.26	80.48	0.00
		34	MIN	602.25	-247.00	0.00
	34	35	MAX	-411.75	79.93	0.00
		35	MIN	827.36	-156.51	0.00
	35	36	MAX	1036.19	83.56	0.00
		36	MIN	1147.27	-77.16	0.00
	36	37	MAX	697.45	162.96	0.00
		37	MIN	-346.09	-65.23	0.00
	37	38	MAX	464.19	255.15	0.00
		38	MIN	-164.57	-65.68	0.00
	38	39	MAX	-385.53	352.32	0.00
		39	MIN	19.47	-66.13	0.00
	39	40	MAX	-1515.87	450.79	0.00
		40	MIN	206.03	-66.58	0.00
	40	41	MAX	-2932.33	550.43	-10.85
		41	MIN	395.11	-67.01	1.45
5	41	41	MAX	482.69	72.68	1.47
		41	MIN	-2973.18	-573.05	-10.51
	41	42	MAX	262.80	72.21	0.00
		42	MIN	-1393.60	-466.38	0.00
	42	43	MAX	45.84	71.73	0.00
		43	MIN	-153.80	-360.99	0.00
	43	44	MAX	-168.19	71.24	0.00
		44	MIN	770.53	-256.99	0.00
	44	45	MAX	-379.28	70.75	0.00
		45	MIN	1028.80	-154.63	0.00

Envolvente de cortantes por paso de ferrocarril (RENFE)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	45	46	MAX	1264.52	76.43	0.00
		46	MIN	1356.58	-69.70	0.00
	46	47	MAX	915.75	161.41	0.00
		47	MIN	-334.88	-60.68	0.00
	47	48	MAX	688.68	260.49	0.00
		48	MIN	-153.89	-61.10	0.00
	48	49	MAX	-246.79	364.52	0.00
		49	MIN	29.61	-61.52	0.00
	49	50	MAX	-1503.87	469.93	0.00
		50	MIN	215.63	-61.94	0.00
	50	51	MAX	-3088.89	576.63	-10.59
		51	MIN	404.17	-62.34	1.26
6	51	51	MAX	450.51	69.39	1.40
		51	MIN	-3132.17	-579.53	-10.64
	51	52	MAX	240.66	68.94	0.00
		52	MIN	-1538.21	-472.82	0.00
	52	53	MAX	33.61	68.47	0.00
		53	MIN	-272.30	-367.38	0.00
	53	54	MAX	-170.64	68.01	0.00
		54	MIN	671.88	-263.34	0.00
	54	55	MAX	-372.09	67.54	0.00
		55	MIN	1300.60	-160.69	0.00
	55	56	MAX	1282.56	75.83	0.00
		56	MIN	1224.92	-71.01	0.00
	56	57	MAX	935.73	160.80	0.00
		57	MIN	-391.68	-71.41	0.00
	57	58	MAX	719.34	260.39	0.00
		58	MIN	-178.69	-71.90	0.00
	58	59	MAX	-215.59	364.41	0.00
		59	MIN	37.27	-72.39	0.00
	59	60	MAX	-1472.14	469.83	0.00
		60	MIN	256.19	-72.89	0.00
	60	61	MAX	-3056.61	576.52	-10.58
		61	MIN	478.07	-73.36	1.48
7	61	61	MAX	241.22	37.22	0.75
		61	MIN	-3104.14	-574.64	-10.54
	61	62	MAX	128.66	36.98	0.00
		62	MIN	-1524.95	-467.96	0.00
	62	63	MAX	17.61	36.73	0.00
		63	MIN	-273.62	-362.55	0.00
	63	64	MAX	-91.94	36.48	0.00
		64	MIN	656.18	-258.54	0.00
	64	65	MAX	-199.99	36.23	0.00
		65	MIN	1270.73	-155.93	0.00
	65	66	MAX	1519.47	52.98	0.00
		66	MIN	-590.00	-73.24	0.00
	66	67	MAX	1565.95	138.24	0.00
		67	MIN	-372.86	-73.75	0.00
	67	68	MAX	1006.86	240.74	0.00
		68	MIN	-152.67	-74.26	0.00

Envolvente de cortantes por paso de ferrocarril (RENFE)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	68	69	MAX	133.25	344.63	0.00
		69	MIN	70.58	-74.77	0.00
	69	70	MAX	-1061.17	449.91	0.00
		70	MIN	296.89	-75.28	0.00
	70	71	MAX	-2582.71	556.47	-10.18
		71	MIN	526.25	-75.76	1.53
8	71	71	MAX	526.25	25.05	0.72
		71	MIN	-2504.35	-481.74	-12.83
	71	72	MAX	470.44	24.89	0.00
		72	MIN	-1557.82	-406.67	0.00
	72	73	MAX	415.34	24.72	0.00
		73	MIN	-774.20	-332.35	0.00
	73	74	MAX	360.95	24.55	0.00
		74	MIN	-150.38	-259.01	0.00
	74	75	MAX	307.26	24.39	0.00
		75	MIN	316.71	-186.64	0.00
	75	76	MAX	254.28	24.22	0.00
		76	MIN	293.06	-118.85	0.00
	76	77	MAX	1552.19	43.60	0.00
		77	MIN	-751.03	-89.41	0.00
	77	78	MAX	1396.09	114.98	0.00
		78	MIN	-567.17	-90.03	0.00
	78	79	MAX	1087.41	187.33	0.00
		79	MIN	-380.70	-90.64	0.00
	79	80	MAX	623.09	260.66	0.00
		80	MIN	-191.65	-91.26	0.00
	80	81	MAX	0.00	334.83	-8.60
		81	MIN	0.00	-91.83	2.65

Envolvente de momentos por paso de ferrocarril (RENFE)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-331.56	-8.51
		1	MIN	0.00	77.68	2.24
	1	2	MAX	616.25	-257.23	-8.51
		2	MIN	-162.12	77.16	2.24
	2	3	MAX	1073.83	-184.10	0.00
		3	MIN	-322.05	76.68	0.00
	3	4	MAX	1375.85	-111.76	0.00
		4	MIN	-479.79	76.16	0.00
	4	5	MAX	1525.38	-40.41	0.00
		5	MIN	-635.33	75.63	0.00
	5	6	MAX	1525.50	29.98	0.00
		6	MIN	-788.67	75.11	0.00
	6	7	MAX	1398.61	100.77	0.00
		7	MIN	-952.99	75.63	0.00
	7	8	MAX	1120.56	172.55	0.00
		8	MIN	-1119.51	76.16	0.00
	8	9	MAX	688.27	245.30	0.00
		9	MIN	-1288.22	76.68	0.00
	9	10	MAX	406.30	-21.50	0.00
		10	MIN	-1505.84	351.19	0.00
	10	11	MAX	454.49	-21.63	0.62
		11	MIN	-2322.36	414.13	-11.06
2	11	11	MAX	454.49	71.69	1.55
		11	MIN	-2322.36	-522.67	-10.25
	11	12	MAX	251.99	71.21	1.55
		12	MIN	-1101.40	-377.68	-9.09
	12	13	MAX	666.41	-230.87	0.00
		13	MIN	-668.00	-40.85	0.00
	13	14	MAX	1316.45	-204.95	0.00
		14	MIN	-567.27	3.11	0.00
	14	15	MAX	1745.57	-109.43	0.00
		15	MIN	-582.74	10.74	0.00
	15	16	MAX	1906.93	-15.20	0.00
		16	MIN	-620.94	31.75	0.00
	16	17	MAX	1831.28	78.82	0.00
		17	MIN	-730.09	69.78	0.00
	17	18	MAX	1489.04	174.13	0.00
		18	MIN	-931.87	70.26	0.00
	18	19	MAX	874.76	270.75	0.00
		19	MIN	-1136.36	70.75	0.00
	19	20	MAX	370.82	-19.66	0.00
		20	MIN	-1462.06	385.47	0.00
	20	21	MAX	428.75	-19.79	0.43
		21	MIN	-2748.88	539.63	-10.61
3	21	21	MAX	428.75	70.62	1.53
		21	MIN	-2748.88	-484.23	-9.59
	21	22	MAX	229.39	70.15	1.53
		22	MIN	-1495.93	-400.50	-9.59

Envolvente de momentos por paso de ferrocarril (RENFE)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	757.74	-282.60	0.00
		23	MIN	-1054.46	-64.43	0.00
	23	24	MAX	1405.77	-185.90	0.00
		24	MIN	-894.71	-20.95	0.00
	24	25	MAX	1805.02	-107.89	0.00
		25	MIN	-841.02	-13.16	0.00
	25	26	MAX	1961.69	-13.67	0.00
		26	MIN	-809.26	-5.47	0.00
	26	27	MAX	1882.12	80.35	0.00
		27	MIN	-831.85	20.81	0.00
	27	28	MAX	1535.90	175.68	0.00
		28	MIN	-936.60	69.22	0.00
	28	29	MAX	917.57	272.30	0.00
		29	MIN	-1138.18	69.69	0.00
	29	30	MAX	430.44	-22.50	0.00
		30	MIN	-1491.76	392.45	0.00
	30	31	MAX	496.78	-22.64	0.49
		31	MIN	-2765.46	542.65	-10.68
4	31	31	MAX	496.78	82.11	1.77
		31	MIN	-2765.46	-484.70	-9.60
	31	32	MAX	341.93	17.70	0.38
		32	MIN	-1511.10	-400.96	-9.60
	32	33	MAX	845.38	-279.35	0.00
		33	MIN	-1091.54	-66.13	0.00
	33	34	MAX	1483.80	-182.68	0.00
		34	MIN	-933.84	-12.27	0.00
	34	35	MAX	1849.84	-87.31	0.00
		35	MIN	-904.04	-4.53	0.00
	35	36	MAX	1968.33	-13.86	0.00
		36	MIN	-896.40	21.82	0.00
	36	37	MAX	1889.33	80.16	0.00
		37	MIN	-974.87	29.62	0.00
	37	38	MAX	1543.70	175.49	0.00
		38	MIN	-1090.61	80.48	0.00
	38	39	MAX	925.96	272.11	0.00
		39	MIN	-1324.98	81.03	0.00
	39	40	MAX	418.29	-21.84	0.00
		40	MIN	-1699.00	407.69	0.00
	40	41	MAX	482.69	-21.98	0.48
		41	MIN	-2973.18	491.32	-9.74
5	41	41	MAX	482.69	72.68	1.47
		41	MIN	-2973.18	-573.05	-10.51
	41	42	MAX	342.39	16.68	0.34
		42	MIN	-1534.03	-416.29	-9.33
	42	43	MAX	914.89	-299.99	0.00
		43	MIN	-1077.75	-61.52	0.00
	43	44	MAX	1650.18	-196.40	0.00
		44	MIN	-887.10	-61.10	0.00
	44	45	MAX	2072.75	-94.21	0.00
		45	MIN	-830.98	-7.42	0.00

Envolvente de momentos por paso de ferrocarril (RENFE)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	45	46	MAX	2194.25	-12.07	0.00
		46	MIN	-842.05	18.45	0.00
	46	47	MAX	2094.73	88.69	0.00
		47	MIN	-915.94	26.77	0.00
	47	48	MAX	1688.99	190.84	0.00
		48	MIN	-1023.04	71.24	0.00
	48	49	MAX	970.78	294.39	0.00
		49	MIN	-1245.24	71.73	0.00
	49	50	MAX	390.02	-19.16	0.00
		50	MIN	-1711.74	423.35	0.00
	50	51	MAX	450.51	-19.28	0.39
		51	MIN	-3132.17	512.88	-9.47
6	51	51	MAX	450.51	69.39	1.40
		51	MIN	-3132.17	-579.53	-10.64
	51	52	MAX	350.17	17.09	0.35
		52	MIN	-1685.49	-417.63	-9.35
	52	53	MAX	945.92	-297.71	0.00
		53	MIN	-1265.83	-72.39	0.00
	53	54	MAX	1674.20	-194.14	0.00
		54	MIN	1041.50	-71.90	0.00
	54	55	MAX	2089.88	-91.97	0.00
		55	MIN	-936.80	-21.35	0.00
	55	56	MAX	2199.22	8.82	0.00
		56	MIN	-905.05	7.32	0.00
	56	57	MAX	2036.62	109.72	0.00
		57	MIN	-945.75	15.57	0.00
	57	58	MAX	1587.55	200.55	0.00
		58	MIN	-1011.70	23.93	0.00
	58	59	MAX	839.31	304.16	0.00
		59	MIN	-198.90	68.47	0.00
	59	60	MAX	256.19	-72.89	0.00
		60	MIN	-1685.76	422.73	0.00
	60	61	MAX	478.07	-73.36	1.48
		61	MIN	-3104.14	512.26	-9.45
7	61	61	MAX	478.07	20.73	0.42
		61	MIN	-3104.14	-574.64	-10.54
	61	62	MAX	413.07	20.59	0.42
		62	MIN	-1672.04	-411.43	-9.23
	62	63	MAX	994.86	-288.18	0.00
		63	MIN	-1275.21	-74.77	0.00
	63	64	MAX	1694.42	-184.68	0.00
		64	MIN	-1043.75	-74.26	0.00
	64	65	MAX	2081.77	-82.57	0.00
		65	MIN	-815.34	-73.75	0.00
	65	66	MAX	2163.16	18.15	0.00
		66	MIN	-658.85	-40.15	0.00
	66	67	MAX	1972.12	119.12	0.00
		67	MIN	-575.83	-17.15	0.00
	67	68	MAX	1473.61	221.48	0.00
		68	MIN	-540.39	-9.01	0.00

Envolvente de momentos por paso de ferrocarril (RENFE)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	68	69	MAX	731.57	250.87	0.00
		69	MIN	-643.47	36.73	0.00
	69	70	MAX	296.89	-75.28	0.00
		70	MIN	-1160.45	399.24	0.00
	70	71	MAX	526.25	-75.76	1.53
		71	MIN	-2582.71	556.47	-10.18
8	71	71	MAX	526.25	25.05	0.72
		71	MIN	-2582.71	-426.52	-11.41
	71	72	MAX	470.44	24.88	0.72
		72	MIN	-1738.58	-363.28	-11.41
	72	73	MAX	742.62	-242.06	0.00
		73	MIN	-1522.82	-90.64	0.00
	73	74	MAX	1167.79	-169.33	0.00
		74	MIN	-1323.39	-90.03	0.00
	74	75	MAX	1438.82	-97.58	0.00
		75	MIN	-1126.55	-89.41	0.00
	75	76	MAX	1558.78	-26.81	0.00
		76	MIN	-932.31	-88.79	0.00
	76	77	MAX	1552.19	43.60	0.00
		77	MIN	-751.03	-89.41	0.00
	77	78	MAX	1396.09	114.98	0.00
		78	MIN	-567.17	-90.03	0.00
	78	79	MAX	1087.41	187.33	0.00
		79	MIN	-380.70	-90.64	0.00
	79	80	MAX	623.09	260.66	0.00
		80	MIN	-191.65	-91.26	0.00
	80	81	MAX	0.00	334.83	2.65
		81	MIN	0.00	-91.83	-8.60

Envolvente de cortantes por paso de ferrocarril (UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	61.74	1.78
		1	MIN	0.00	-255.26	-6.70
	1	2	MAX	-128.85	61.36	0.00
		2	MIN	485.15	-208.37	0.00
	2	3	MAX	-255.96	60.94	0.00
		3	MIN	869.27	-161.99	0.00
	3	4	MAX	-381.32	60.53	0.00
		4	MIN	1154.32	-116.23	0.00
	4	5	MAX	-504.93	60.11	0.00
		5	MIN	1335.20	-28.30	0.00
	5	6	MAX	253.54	85.98	0.00
		6	MIN	172.76	-16.45	0.00
	6	7	MAX	604.08	149.17	0.00
		7	MIN	208.75	-16.57	0.00
	7	8	MAX	162.57	237.93	0.00
		8	MIN	245.23	-16.68	0.00
	8	9	MAX	-386.61	284.53	0.00
		9	MIN	282.18	-16.80	0.00
	9	10	MAX	-1038.37	331.74	0.00
		10	MIN	319.62	-16.91	0.00
	10	11	MAX	-1794.67	379.39	-10.27
		11	MIN	357.53	-17.02	0.49
2	11	11	MAX	357.53	56.39	1.22
		11	MIN	-1868.37	-399.75	-7.98
	11	12	MAX	198.24	56.03	0.00
		12	MIN	-828.23	-336.80	0.00
	12	13	MAX	41.06	55.65	0.00
		13	MIN	30.08	-274.56	0.00
	13	14	MAX	-113.99	55.28	0.00
		14	MIN	710.03	-213.14	0.00
	14	15	MAX	-266.91	54.90	0.00
		15	MIN	1216.75	-160.99	0.00
	15	16	MAX	-417.72	54.52	0.00
		16	MIN	861.21	-38.56	0.00
	16	17	MAX	1075.16	169.87	0.00
		17	MIN	-185.89	-36.07	0.00
	17	18	MAX	542.41	222.09	0.00
		18	MIN	-85.49	-36.31	0.00
	18	19	MAX	-163.91	283.57	0.00
		19	MIN	16.30	-36.56	0.00
	19	20	MAX	-1048.95	345.87	0.00
		20	MIN	119.49	-36.81	0.00
	20	21	MAX	-2116.14	408.88	-8.18
		21	MIN	224.07	-37.05	0.80
3	21	21	MAX	339.53	55.93	1.21
		21	MIN	-2123.46	-411.44	-8.23
	21	22	MAX	181.66	55.57	0.00
		22	MIN	-1049.08	-348.42	0.00

Envolvente de cortantes por paso de ferrocarril (UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	25.89	55.19	0.00
		23	MIN	-156.96	-286.10	0.00
	23	24	MAX	-127.77	54.81	0.00
		24	MIN	556.36	-224.60	0.00
	24	25	MAX	-279.32	54.44	0.00
		25	MIN	1095.99	-172.37	0.00
	25	26	MAX	-428.77	54.06	0.00
		26	MIN	749.28	-52.76	0.00
	26	27	MAX	1086.46	172.76	0.00
		27	MIN	-272.75	-52.81	0.00
	27	28	MAX	545.64	225.00	0.00
		28	MIN	-125.75	-53.17	0.00
	28	29	MAX	-168.88	286.50	0.00
		29	MIN	23.30	-53.54	0.00
	29	30	MAX	-1062.22	348.82	0.00
		30	MIN	174.39	-53.90	0.00
	30	31	MAX	-2137.83	411.85	-8.24
		31	MIN	327.53	-54.25	1.17
4	31	31	MAX	391.19	64.66	1.40
		31	MIN	-2141.95	-413.29	-8.27
	31	32	MAX	208.68	64.24	0.00
		32	MIN	-1062.30	-350.26	0.00
	32	33	MAX	28.61	63.81	0.00
		33	MIN	-164.97	-287.93	0.00
	33	34	MAX	-149.03	63.37	0.00
		34	MIN	553.48	-226.41	0.00
	34	35	MAX	-324.23	62.94	0.00
		35	MIN	1098.19	-174.17	0.00
	35	36	MAX	-497.00	62.50	0.00
		36	MIN	749.99	-54.31	0.00
	36	37	MAX	1028.04	178.50	0.00
		37	MIN	-282.61	-53.27	0.00
	37	38	MAX	470.65	230.77	0.00
		38	MIN	-134.39	-53.63	0.00
	38	39	MAX	-260.66	292.31	0.00
		39	MIN	15.90	-54.00	0.00
	39	40	MAX	-1171.01	354.67	0.00
		40	MIN	168.24	-54.37	0.00
	40	41	MAX	-2263.85	417.74	-8.37
		41	MIN	322.64	-54.72	1.18
5	41	41	MAX	390.29	58.77	1.19
		41	MIN	-2306.79	-431.38	-8.04
	41	42	MAX	212.49	58.39	0.00
		42	MIN	-1102.53	-363.90	0.00
	42	43	MAX	37.06	58.00	0.00
		43	MIN	-107.12	-297.20	0.00
	43	44	MAX	-135.99	57.60	0.00
		44	MIN	683.42	-231.37	0.00
	44	45	MAX	-306.67	57.21	0.00
		45	MIN	1273.44	-170.64	0.00

Envolvente de cortantes por paso de ferrocarril (UIC)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	45	46 MAX	-474.99	56.81	0.00
		46 MIN	917.07	-49.67	0.00
	46	47 MAX	1208.38	174.04	0.00
		47 MIN	-267.83	-48.53	0.00
	47	48 MAX	607.63	234.79	0.00
		48 MIN	-123.08	-48.87	0.00
	48	49 MAX	-193.77	300.64	0.00
		49 MIN	23.68	-49.20	0.00
	49	50 MAX	-1200.19	367.37	0.00
		50 MIN	172.46	-49.54	0.00
	50	51 MAX	-2415.59	434.88	-8.11
		51 MIN	323.25	-49.86	1.00
6	51	51 MAX	368.42	56.74	1.14
		51 MIN	-2418.58	-435.90	-8.13
	51	52 MAX	196.81	56.38	0.00
		52 MIN	-1200.12	-368.39	0.00
	52	53 MAX	27.49	56.00	0.00
		53 MIN	-190.68	-301.65	0.00
	53	54 MAX	-139.54	55.62	0.00
		54 MIN	613.69	-235.79	0.00
	54	55 MAX	-304.29	55.23	0.00
		55 MIN	1217.38	-175.03	0.00
	55	56 MAX	870.03	55.07	0.00
		56 MIN	-474.99	-55.98	0.00
	56	57 MAX	1224.63	174.74	0.00
		57 MIN	-309.19	-56.37	0.00
	57	58 MAX	621.88	235.50	0.00
		58 MIN	-141.05	-56.76	0.00
	58	59 MAX	-181.56	301.36	0.00
		59 MIN	29.42	-57.15	0.00
	59	60 MAX	-1190.04	368.09	0.00
		60 MIN	202.23	-57.54	0.00
	60	61 MAX	-2407.54	435.60	-8.13
		61 MIN	377.38	-57.91	1.17
7	61	61 MAX	215.93	33.31	0.67
		61 MIN	-2396.45	-431.82	-8.05
	61	62 MAX	115.18	33.10	0.00
		62 MIN	-1190.30	-364.33	0.00
	62	63 MAX	15.77	32.88	0.00
		63 MIN	-193.01	-297.63	0.00
	63	64 MAX	-82.30	32.65	0.00
		64 MIN	599.39	-231.79	0.00
	64	65 MAX	-179.02	32.43	0.00
		65 MIN	1191.26	-171.06	0.00
	65	66 MAX	1028.48	36.61	0.00
		66 MIN	-466.74	-57.94	0.00
	66	67 MAX	1389.95	160.55	0.00
		67 MIN	-294.96	-58.34	0.00
	67	68 MAX	831.20	221.21	0.00
		68 MIN	-120.77	-58.74	0.00

Envolvente de cortantes por paso de ferrocarril (UIC)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	68	69 MAX	72.36	286.97	0.00
		69 MIN	55.84	-59.15	0.00
	69	70 MAX	-890.94	353.60	0.00
		70 MIN	234.86	-59.55	0.00
	70	71 MAX	-2062.67	421.02	-7.83
		71 MIN	416.31	-59.94	1.21
8	71	71 MAX	416.31	19.81	0.57
		71 MIN	-1945.96	-386.59	-10.48
	71	72 MAX	372.16	19.69	0.00
		72 MIN	-1173.62	-338.90	0.00
	72	73 MAX	328.57	19.56	0.00
		73 MIN	-506.02	-291.64	0.00
	73	74 MAX	285.54	19.42	0.00
		74 MIN	58.80	-244.99	0.00
	74	75 MAX	243.07	19.29	0.00
		75 MIN	515.75	-156.18	0.00
	75	76 MAX	201.16	19.16	0.00
		76 MIN	159.66	-94.92	0.00
	76	77 MAX	1346.83	29.68	0.00
		77 MIN	-588.72	-70.09	0.00
	77	78 MAX	1163.10	117.62	0.00
		78 MIN	-444.59	-70.57	0.00
	78	79 MAX	875.16	163.40	0.00
		79 MIN	-298.43	-71.06	0.00
	79	80 MAX	488.12	209.79	0.00
		80 MIN	-150.23	-71.54	0.00
	80	81 MAX	0.00	256.68	-6.74
		81 MIN	0.00	-71.98	2.07

Envolvente de momentos por paso de ferrocarril (UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-255.26	-6.70
		1	MIN	0.00	61.74	1.78
	1	2	MAX	485.15	-208.24	-6.70
		2	MIN	-128.85	61.32	1.78
	2	3	MAX	8	-161.99	0.00
		3	MIN	-255.96	60.94	0.00
	3	4	MAX	115[illegible]32	-116.23	0.00
		4	MIN	-381.32	60.53	0.00
	4	5	MAX	1335.20	-28.30	0.00
		5	MIN	-504.93	60.11	0.00
	5	6	MAX	1332.56	37.44	0.00
		6	MIN	-626.81	59.70	0.00
	6	7	MAX	1176.84	103.71	0.00
		7	MIN	-757.40	60.11	0.00
	7	8	MAX	[illegible]	192.16	0.00
		8	MIN	-899.74	60.53	0.00
	8	9	MAX	38[illegible]53	238.44	0.00
		9	MIN	-1023.82	60.94	0.00
	9	10	MAX	319.62	-16.91	0.00
		10	MIN	-1242.35	269.47	0.00
	10	11	MAX	357.53	-17.02	0.49
		11	MIN	-186[illegible]37	316.73	-8.47
2	11	11	MAX	357.53	56.39	1.22
		11	MIN	-1868.37	-399.75	-7.98
	11	12	MAX	198.24	56.01	1.22
		12	MIN	-910.97	-281.00	-6.77
	12	13	MAX	480.88	-206.81	0.00
		13	MIN	-597.98	-36.56	0.00
	13	14	MAX	1055.54	-187.65	0.00
		14	MIN	-492.22	-36.31	0.00
	14	15	MAX	148[illegible]00	-135.67	0.00
		15	MIN	-3[illegible]86	-36.07	0.00
	15	16	MAX	1646.20	-3.63	0.00
		16	MIN	-4[illegible].72	54.52	0.00
	16	17	MAX	1509.48	128.35	0.00
		17	MIN	-574.33	54.90	0.00
	17	18	MAX	1096.78	180.29	0.00
		18	MIN	-733.07	55.28	0.00
	18	19	MAX	523.54	215.82	0.00
		19	MIN	-89[illegible]93	55.65	0.00
	19	20	MAX	29[illegible].66	-15.57	0.00
		20	MIN	-1199.54	294.68	0.00
	20	21	MAX	339.53	-15.67	0.34
		21	MIN	-2123.46	357.36	-7.07
3	21	21	MAX	339.53	55.93	1.21
		21	MIN	-2123.46	-411.44	-8.23
	21	22	MAX	194.19	10.13	0.22
		22	MIN	-1189.43	-295.59	-7.09

Envolvente de momentos por paso de ferrocarril (UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	525.20	-203.87	0.00
		23	MIN	-876.17	-53.54	0.00
	23	24	MAX	1101.83	-184.39	0.00
		24	MIN	-721.31	-53.17	0.00
	24	25	MAX	1525.90	-132.43	0.00
		25	MIN	-568.49	-52.81	0.00
	25	26	MAX	1673.84	-0.41	0.00
		26	MIN	-428.77	54.06	0.00
	26	27	MAX	1528.24	131.60	0.00
		27	MIN	-584.19	54.44	0.00
	27	28	MAX	1106.53	183.55	0.00
		28	MIN	-741.71	54.81	0.00
	28	29	MAX	530.35	204.28	0.00
		29	MIN	-901.33	55.19	0.00
	29	30	MAX	338.95	-17.72	0.00
		30	MIN	-1212.21	296.71	0.00
	30	31	MAX	391.19	-17.83	0.38
		31	MIN	-2141.95	359.41	-7.11
4	31	31	MAX	391.19	64.66	1.40
		31	MIN	-2141.95	-413.29	-8.27
	31	32	MAX	284.12	14.71	0.32
		32	MIN	-1206.52	-297.18	-7.12
	32	33	MAX	531.06	-198.06	0.00
		33	MIN	-891.34	-54.00	0.00
	33	34	MAX	1109.38	-185.85	0.00
		34	MIN	-735.09	-53.63	0.00
	34	35	MAX	1537.48	-133.89	0.00
		35	MIN	-580.90	-53.27	0.00
	35	36	MAX	1689.39	-1.86	0.00
		36	MIN	-497.00	62.50	0.00
	36	37	MAX	1547.98	130.14	0.00
		37	MIN	-676.69	62.94	0.00
	37	38	MAX	1130.52	182.08	0.00
		38	MIN	-858.81	63.37	0.00
	38	39	MAX	553.04	202.45	0.00
		39	MIN	-1043.36	63.81	0.00
	39	40	MAX	338.21	-17.66	0.00
		40	MIN	-1354.80	304.26	0.00
	40	41	MAX	390.29	-17.77	0.38
		41	MIN	-2306.79	367.01	-7.27
5	41	41	MAX	390.29	58.77	1.19
		41	MIN	-2306.79	-431.38	-8.04
	41	42	MAX	279.60	13.62	0.28
		42	MIN	-1222.29	-309.67	-6.95
	42	43	MAX	573.20	-215.43	0.00
		43	MIN	-861.96	-49.20	0.00
	43	44	MAX	1219.95	-194.41	0.00
		44	MIN	-709.49	-48.87	0.00
	44	45	MAX	1696.19	-133.94	0.00
		45	MIN	-559.02	-48.53	0.00

Envolvente de momentos por paso de ferrocarril (UIC)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	45	46 MAX	1873.75	-1.91	0.00
		46 MIN	-474.99	56.81	0.00
	46	47 MAX	1707.75	130.09	0.00
		47 MIN	-649.91	57.21	0.00
	47	48 MAX	1243.22	190.53	0.00
		48 MIN	-827.20	57.60	0.00
	48	49 MAX	597.78	218.87	0.00
		49 MIN	-1006.86	58.00	0.00
	49	50 MAX	318.95	-15.66	0.00
		50 MIN	-1358.48	315.60	0.00
	50	51 MAX	368.42	-15.77	0.32
		51 MIN	-2418.58	382.77	-7.06
6	51	51 MAX	368.42	56.74	1.14
		51 MIN	-2418.58	-435.90	-8.13
	51	52 MAX	280.06	13.67	0.28
		52 MIN	-1354.23	-315.92	-7.07
	52	53 MAX	598.20	-214.71	0.00
		53 MIN	-999.22	-57.15	0.00
	53	54 MAX	1245.40	-192.18	0.00
		54 MIN	-822.14	-56.76	0.00
	54	55 MAX	1714.81	-131.72	0.00
		55 MIN	-647.40	-56.37	0.00
	55	56 MAX	1885.64	0.29	0.00
		56 MIN	-474.99	-55.98	0.00
	56	57 MAX	1713.07	132.30	0.00
		57 MIN	-635.68	55.23	0.00
	57	58 MAX	1241.89	192.77	0.00
		58 MIN	-806.92	55.62	0.00
	58	59 MAX	594.39	214.42	0.00
		59 MIN	-980.45	56.00	0.00
	59	60 MAX	202.23	-57.54	0.00
		60 MIN	-1337.32	315.32	0.00
	60	61 MAX	377.38	-57.91	1.17
		61 MIN	-2407.54	435.60	-8.13
7	61	61 MAX	377.38	16.36	0.33
		61 MIN	-2407.54	-380.89	-7.03
	61	62 MAX	326.07	16.25	0.33
		62 MIN	-1353.10	-313.63	-7.03
	62	63 MAX	593.18	-229.10	0.00
		63 MIN	-1008.80	-59.15	0.00
	63	64 MAX	1233.82	-186.66	0.00
		64 MIN	-825.69	-58.74	0.00
	64	65 MAX	1686.86	-126.23	0.00
		65 MIN	-645.01	-58.34	0.00
	65	66 MAX	1841.53	5.74	0.00
		66 MIN	-466.74	-57.94	0.00
	66	67 MAX	1652.20	137.79	0.00
		67 MIN	-373.60	32.43	0.00
	67	68 MAX	1164.02	198.29	0.00
		68 MIN	-474.14	32.65	0.00

Envolvente de momentos por paso de ferrocarril (UIC)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	68	69 MAX	519.59	218.45	0.00
		69 MIN	-576.02	32.88	0.00
	69	70 MAX	234.86	-59.55	0.00
		70 MIN	-946.78	296.35	0.00
	70	71 MAX	416.31	-59.94	1.21
		71 MIN	-2062.67	421.02	-7.83
8	71	71 MAX	416.31	19.81	0.57
		71 MIN	-2062.67	-325.98	-8.73
	71	72 MAX	372.16	19.68	0.57
		72 MIN	-1416.04	-278.49	-8.73
	72	73 MAX	411.19	-237.04	0.00
		73 MIN	-1193.71	-71.06	0.00
	73	74 MAX	855.89	-190.76	0.00
		74 MIN	-1037.38	-70.57	0.00
	74	75 MAX	1194.28	-102.33	0.00
		75 MIN	-883.08	-70.09	0.00
	75	76 MAX	1346.99	-36.07	0.00
		76 MIN	-730.82	-69.60	0.00
	76	77 MAX	1346.83	29.68	0.00
		77 MIN	-588.72	-70.09	0.00
	77	78 MAX	1163.10	117.62	0.00
		78 MIN	-444.59	-70.57	0.00
	78	79 MAX	875.16	163.40	0.00
		79 MIN	-298.43	-71.06	0.00
	79	80 MAX	488.12	209.79	0.00
		80 MIN	-150.23	-71.54	0.00
	80	81 MAX	0.00	256.68	2.07
		81 MIN	0.00	-71.98	-6.74

Envolvente de cortantes por ferrocarril (RENFE/UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	77.68	2.24
		1	MIN	0.00	-331.56	-8.51
	1	2	MAX	-162.12	77.20	0.00
		2	MIN	616.25	-257.40	0.00
	2	3	MAX	-322.05	76.68	0.00
		3	MIN	1073.83	-184.10	0.00
	3	4	MAX	-479.79	76.16	0.00
		4	MIN	1154.32	-116.23	0.00
	4	5	MAX	-635.33	75.63	0.00
		5	MIN	1525.38	-40.41	0.00
	5	6	MAX	418.86	106.87	0.00
		6	MIN	219.61	-20.92	0.00
	6	7	MAX	443.43	176.58	0.00
		7	MIN	265.36	-21.06	0.00
	7	8	MAX	-1.52	248.88	0.00
		8	MIN	311.73	-21.21	0.00
	8	9	MAX	-602.91	322.15	0.00
		9	MIN	358.71	-21.35	0.00
	9	10	MAX	-1363.80	396.40	0.00
		10	MIN	406.30	-21.50	0.00
	10	11	MAX	-767.25	471.41	-12.54
		11	MIN	-749.68	-21.63	0.52
2	11	11	MAX	-767.25	71.69	1.55
		11	MIN	-749.68	-522.67	-10.25
	11	12	MAX	251.99	71.23	0.00
		12	MIN	-987.21	-423.21	0.00
	12	13	MAX	52.20	70.75	0.00
		13	MIN	62.86	-324.93	0.00
	13	14	MAX	-144.90	70.26	0.00
		14	MIN	833.35	-227.94	0.00
	14	15	MAX	-339.30	69.78	0.00
		15	MIN	1216.75	-160.99	0.00
	15	16	MAX	-531.00	69.30	0.00
		16	MIN	1292.10	-54.50	0.00
	16	17	MAX	1075.16	169.87	0.00
		17	MIN	-207.66	-40.29	0.00
	17	18	MAX	555.01	244.56	0.00
		18	MIN	-95.50	-40.57	0.00
	18	19	MAX	-264.24	341.66	0.00
		19	MIN	18.21	-40.85	0.00
	19	20	MAX	-1363.70	440.06	0.00
		20	MIN	133.48	-41.13	0.00
	20	21	MAX	-988.15	539.63	-10.61
		21	MIN	-1027.43	-41.39	0.89
3	21	21	MAX	-988.15	70.62	1.53
		21	MIN	-1027.43	-538.68	-10.60
	21	22	MAX	229.39	70.17	0.00
		22	MIN	-1289.97	-439.12	0.00

Envolvente de cortantes por ferrocarril (RENFE/UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	32.69	69.69	0.00
		23	MIN	-193.61	-340.73	0.00
	23	24	MAX	-161.34	69.22	0.00
		24	MIN	622.57	-243.64	0.00
	24	25	MAX	-352.72	68.74	0.00
		25	MIN	1095.99	-172.37	0.00
	25	26	MAX	1071.79	68.74	0.00
		26	MIN	1156.99	-76.71	0.00
	26	27	MAX	1086.46	172.76	0.00
		27	MIN	-328.26	-63.56	0.00
	27	28	MAX	563.71	247.53	0.00
		28	MIN	-151.34	-64.00	0.00
	28	29	MAX	-263.85	344.65	0.00
		29	MIN	28.04	-64.43	0.00
	29	30	MAX	-1371.73	443.07	0.00
		30	MIN	209.88	-64.87	0.00
	30	31	MAX	-965.88	542.65	-10.68
		31	MIN	-988.63	-65.29	1.41
4	31	31	MAX	-965.88	82.11	1.77
		31	MIN	-988.63	-542.11	-10.67
	31	32	MAX	265.01	81.58	0.00
		32	MIN	-1329.66	-442.53	0.00
	32	33	MAX	36.33	81.03	0.00
		33	MIN	-223.55	-344.11	0.00
	33	34	MAX	-189.26	80.48	0.00
		34	MIN	602.25	-247.00	0.00
	34	35	MAX	-411.75	79.93	0.00
		35	MIN	1098.19	-174.17	0.00
	35	36	MAX	1036.19	83.56	0.00
		36	MIN	1147.27	-77.16	0.00
	36	37	MAX	1028.04	178.50	0.00
		37	MIN	-346.09	-65.23	0.00
	37	38	MAX	464.19	255.15	0.00
		38	MIN	-164.57	-65.68	0.00
	38	39	MAX	-385.53	352.32	0.00
		39	MIN	19.47	-66.13	0.00
	39	40	MAX	-1515.87	450.79	0.00
		40	MIN	206.03	-66.58	0.00
	40	41	MAX	-1049.22	550.43	-10.85
		41	MIN	-1103.52	-67.01	1.45
5	41	41	MAX	-1049.22	72.68	1.47
		41	MIN	-1103.52	-573.05	-10.51
	41	42	MAX	262.80	72.21	0.00
		42	MIN	-1399.60	-466.38	0.00
	42	43	MAX	45.84	71.73	0.00
		43	MIN	-153.80	-360.99	0.00
	43	44	MAX	-168.19	71.24	0.00
		44	MIN	770.53	-256.99	0.00
	44	45	MAX	-379.28	70.75	0.00
		45	MIN	1273.44	-170.64	0.00

Envolvente de cortantes por ferrocarril (RENFE/UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	45	46	MAX	1264.52	76.43	0.00
		46	MIN	1356.58	-69.70	0.00
	46	47	MAX	1208.38	174.04	0.00
		47	MIN	-334.88	-60.68	0.00
	47	48	MAX	688.68	260.49	0.00
		48	MIN	-153.89	-61.10	0.00
	48	49	MAX	-246.79	364.52	0.00
		49	MIN	29.61	-61.52	0.00
	49	50	MAX	-1503.87	469.93	0.00
		50	MIN	215.63	-61.94	0.00
	50	51	MAX	-1133.11	576.63	-10.59
		51	MIN	-1173.83	-62.34	1.26
6	51	51	MAX	-1133.11	69.39	1.40
		51	MIN	-1173.83	-579.53	-10.64
	51	52	MAX	240.66	68.94	0.00
		52	MIN	-1538.21	-472.82	0.00
	52	53	MAX	33.61	68.47	0.00
		53	MIN	-272.30	-367.38	0.00
	53	54	MAX	-170.64	68.01	0.00
		54	MIN	671.88	-263.34	0.00
	54	55	MAX	-372.09	67.54	0.00
		55	MIN	1217.38	-175.03	0.00
	55	56	MAX	1282.56	75.83	0.00
		56	MIN	1224.92	-71.01	0.00
	56	57	MAX	1224.63	174.74	0.00
		57	MIN	-391.68	-71.41	0.00
	57	58	MAX	719.34	260.39	0.00
		58	MIN	-178.69	-71.90	0.00
	58	59	MAX	-215.59	364.41	0.00
		59	MIN	37.27	-72.39	0.00
	59	60	MAX	-1472.14	469.83	0.00
		60	MIN	256.19	-72.89	0.00
	60	61	MAX	-1208.53	576.52	-10.58
		61	MIN	-1129.38	-73.36	1.48
7	61	61	MAX	-1208.53	37.22	0.75
		61	MIN	-1129.38	-574.64	-10.54
	61	62	MAX	128.66	36.98	0.00
		62	MIN	-1524.95	-467.96	0.00
	62	63	MAX	17.61	36.73	0.00
		63	MIN	-273.62	-362.55	0.00
	63	64	MAX	-91.94	36.48	0.00
		64	MIN	656.18	-258.54	0.00
	64	65	MAX	-199.99	36.23	0.00
		65	MIN	1191.26	-171.06	0.00
	65	66	MAX	1519.47	52.98	0.00
		66	MIN	-590.00	-73.24	0.00
	66	67	MAX	1389.95	160.55	0.00
		67	MIN	-372.86	-73.75	0.00
	67	68	MAX	1006.86	240.74	0.00
		68	MIN	-152.67	-74.26	0.00

Envolvente de cortantes por ferrocarril (RENFE/UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	68	69	MAX	133.25	344.63	0.00
		69	MIN	70.58	-74.77	0.00
	69	70	MAX	-1061.17	449.91	0.00
		70	MIN	296.89	-75.28	0.00
	70	71	MAX	-833.13	556.47	-10.18
		71	MIN	-837.12	-75.76	1.53
8	71	71	MAX	-833.13	25.05	0.72
		71	MIN	-837.12	-481.74	-12.83
	71	72	MAX	470.44	24.89	0.00
		72	MIN	-1557.82	-406.67	0.00
	72	73	MAX	415.34	24.72	0.00
		73	MIN	-774.20	-332.35	0.00
	73	74	MAX	360.95	24.55	0.00
		74	MIN	-150.38	-259.01	0.00
	74	75	MAX	307.26	24.39	0.00
		75	MIN	316.71	-186.64	0.00
	75	76	MAX	254.28	24.22	0.00
		76	MIN	293.06	-118.85	0.00
	76	77	MAX	1552.19	43.60	0.00
		77	MIN	-751.03	-89.41	0.00
	77	78	MAX	1163.10	117.62	0.00
		78	MIN	-567.17	-90.03	0.00
	78	79	MAX	1087.41	187.33	0.00
		79	MIN	-380.70	-90.64	0.00
	79	80	MAX	623.09	260.66	0.00
		80	MIN	-191.65	-91.26	0.00
	80	81	MAX	0.00	334.83	-8.60
		81	MIN	0.00	-91.83	2.65

Envolvente de momentos por ferrocarril (RENFE/UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-255.26	-6.70
		1	MIN	0.00	61.74	1.78
	1	2	MAX	616.25	-257.23	-8.51
		2	MIN	-162.12	77.16	2.24
	2	3	MAX	1073.33	-184.10	0.00
		3	MIN	-322.05	76.68	0.00
	3	4	MAX	1375.85	-111.76	0.00
		4	MIN	-479.79	76.16	0.00
	4	5	MAX	1525.38	-40.41	0.00
		5	MIN	-635.33	75.63	0.00
	5	6	MAX	1525.50	29.98	0.00
		6	MIN	-788.67	75.11	0.00
	6	7	MAX	1398.61	100.77	0.00
		7	MIN	-952.99	75.63	0.00
	7	8	MAX	1120.56	172.55	0.00
		8	MIN	-1119.51	76.16	0.00
	8	9	MAX	688.37	245.30	0.00
		9	MIN	-1288.22	76.68	0.00
	9	10	MAX	406.30	-21.50	0.00
		10	MIN	-1505.84	351.19	0.00
	10	11	MAX	415.82	-21.63	0.62
		11	MIN	-1987.51	414.13	-11.06
2	11	11	MAX	415.82	71.69	1.55
		11	MIN	-1987.51	-522.67	-10.25
	11	12	MAX	251.99	71.21	1.55
		12	MIN	-1101.40	-377.68	-9.09
	12	13	MAX	666.41	-230.87	0.00
		13	MIN	-668.00	-40.85	0.00
	13	14	MAX	1316.45	-204.95	0.00
		14	MIN	-567.27	3.11	0.00
	14	15	MAX	1745.57	-109.43	0.00
		15	MIN	-582.74	10.74	0.00
	15	16	MAX	1906.93	-15.20	0.00
		16	MIN	-620.94	31.75	0.00
	16	17	MAX	1831.29	78.82	0.00
		17	MIN	-730.09	69.78	0.00
	17	18	MAX	1489.04	174.13	0.00
		18	MIN	-931.87	70.26	0.00
	18	19	MAX	874.76	270.75	0.00
		19	MIN	-1136.36	70.75	0.00
	19	20	MAX	370.82	-19.66	0.00
		20	MIN	-1462.06	385.47	0.00
	20	21	MAX	391.45	-19.79	0.43
		21	MIN	-2380.67	539.63	-10.61
3	21	21	MAX	391.45	70.62	1.53
		21	MIN	-2380.67	-484.23	-9.59
	21	22	MAX	229.39	70.15	1.53
		22	MIN	-1495.93	-400.50	-9.59

Envolvente de momentos por ferrocarril (RENFE/UIC)

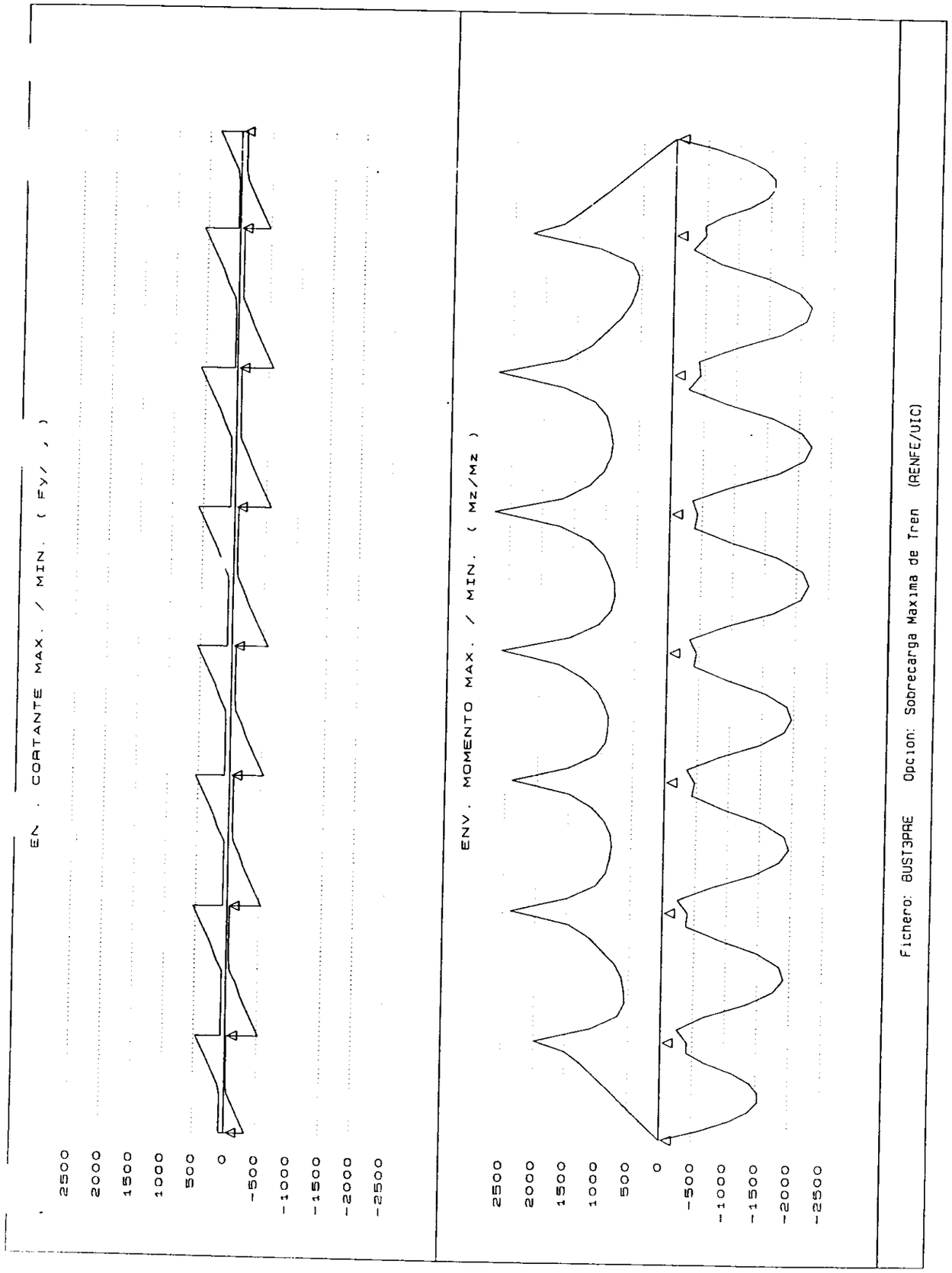
V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	757.74	-282.60	0.00
		23	MIN	-1054.46	-64.43	0.00
	23	24	MAX	1405.77	-185.90	0.00
		24	MIN	-894.71	-20.95	0.00
	24	25	MAX	1805.02	-107.89	0.00
		25	MIN	-841.02	-13.16	0.00
	25	26	MAX	1961.69	-13.67	0.00
		26	MIN	-809.26	-5.47	0.00
	26	27	MAX	1882.12	80.35	0.00
		27	MIN	-831.85	20.81	0.00
	27	28	MAX	1535.90	175.68	0.00
		28	MIN	-936.60	69.22	0.00
	28	29	MAX	917.57	272.30	0.00
		29	MIN	-1138.18	69.69	0.00
	29	30	MAX	430.44	-22.50	0.00
		30	MIN	-1491.76	392.45	0.00
	30	31	MAX	464.71	-22.64	0.49
		31	MIN	-2398.94	542.65	-10.68
4	31	31	MAX	464.71	82.11	1.77
		31	MIN	-2398.94	-484.70	-9.60
	31	32	MAX	341.93	17.70	0.38
		32	MIN	-1511.10	-400.96	-9.60
	32	33	MAX	845.38	-279.35	0.00
		33	MIN	-1091.54	-66.13	0.00
	33	34	MAX	1483.80	-182.68	0.00
		34	MIN	-933.84	-12.27	0.00
	34	35	MAX	1849.84	-87.31	0.00
		35	MIN	-904.04	-4.53	0.00
	35	36	MAX	1968.33	-13.86	0.00
		36	MIN	-896.40	21.82	0.00
	36	37	MAX	1889.33	80.16	0.00
		37	MIN	-974.87	29.62	0.00
	37	38	MAX	1543.70	175.49	0.00
		38	MIN	-1090.61	80.48	0.00
	38	39	MAX	925.96	272.11	0.00
		39	MIN	-1324.98	81.03	0.00
	39	40	MAX	418.29	-21.84	0.00
		40	MIN	-1699.00	407.69	0.00
	40	41	MAX	454.37	-21.98	0.48
		41	MIN	-2593.72	491.32	-9.74
5	41	41	MAX	454.37	72.68	1.47
		41	MIN	-2593.72	-573.05	-10.51
	41	42	MAX	342.39	16.68	0.34
		42	MIN	-1534.03	-416.29	-9.33
	42	43	MAX	914.89	-299.99	0.00
		43	MIN	-1077.75	-61.52	0.00
	43	44	MAX	1650.18	-196.40	0.00
		44	MIN	-887.10	-61.10	0.00
	44	45	MAX	2072.75	-94.21	0.00
		45	MIN	-830.98	-7.42	0.00

Envolvente de momentos por ferrocarril (RENFE/UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	45	46	MAX	2194.25	-12.07	0.00
		46	MIN	-842.05	18.45	0.00
	46	47	MAX	2094.73	88.69	0.00
		47	MIN	-915.94	26.77	0.00
	47	48	MAX	1688.99	190.84	0.00
		48	MIN	-1023.04	71.24	0.00
	48	49	MAX	970.78	294.39	0.00
		49	MIN	-1245.24	71.73	0.00
	49	50	MAX	390.02	-19.16	0.00
		50	MIN	-1711.74	423.35	0.00
	50	51	MAX	428.75	-19.28	0.39
		51	MIN	-2744.21	512.88	-9.47
6	51	51	MAX	428.75	69.39	1.40
		51	MIN	-2744.21	-579.53	-10.64
	51	52	MAX	350.17	17.09	0.35
		52	MIN	-1685.49	-417.63	-9.35
	52	53	MAX	945.92	-297.71	0.00
		53	MIN	-1265.83	-72.39	0.00
	53	54	MAX	1674.20	-194.14	0.00
		54	MIN	-1041.50	-71.90	0.00
	54	55	MAX	2089.88	-91.97	0.00
		55	MIN	-936.80	-21.35	0.00
	55	56	MAX	2199.22	8.82	0.00
		56	MIN	-905.05	7.32	0.00
	56	57	MAX	2036.62	109.72	0.00
		57	MIN	-945.75	15.57	0.00
	57	58	MAX	1587.55	200.55	0.00
		58	MIN	-1011.70	23.93	0.00
	58	59	MAX	839.31	304.16	0.00
		59	MIN	-1198.90	68.47	0.00
	59	60	MAX	256.19	-72.89	0.00
		60	MIN	-1685.76	422.73	0.00
	60	61	MAX	439.25	-73.36	1.48
		61	MIN	-2718.44	512.26	-9.45
7	61	61	MAX	439.25	20.73	0.42
		61	MIN	-2718.44	-574.64	-10.54
	61	62	MAX	413.07	20.59	0.42
		62	MIN	-1672.04	-411.43	-9.23
	62	63	MAX	994.86	-288.18	0.00
		63	MIN	-1275.21	-74.77	0.00
	63	64	MAX	1694.42	-184.68	0.00
		64	MIN	-1043.75	-74.26	0.00
	64	65	MAX	2081.77	-82.57	0.00
		65	MIN	-815.34	-73.75	0.00
	65	66	MAX	2163.16	18.15	0.00
		66	MIN	-658.85	-40.15	0.00
	66	67	MAX	1972.12	119.12	0.00
		67	MIN	-575.83	-17.15	0.00
	67	68	MAX	1473.61	221.48	0.00
		68	MIN	-540.39	-9.01	0.00

Envolvente de momentos por ferrocarril (RENFE/UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	68	69	MAX	731.57	250.87	0.00
		69	MIN	-643.47	36.73	0.00
	69	70	MAX	296.89	-75.28	0.00
		70	MIN	-1160.45	399.24	0.00
	70	71	MAX	484.43	-75.76	1.53
		71	MIN	-2227.09	556.47	-10.18
8	71	71	MAX	484.43	25.05	0.72
		71	MIN	-2227.09	-426.52	-11.41
	71	72	MAX	470.44	24.88	0.72
		72	MIN	-1738.58	-363.28	-11.41
	72	73	MAX	742.62	-242.06	0.00
		73	MIN	-1522.82	-90.64	0.00
	73	74	MAX	1167.79	-169.33	0.00
		74	MIN	-1323.39	-90.03	0.00
	74	75	MAX	1438.82	-97.58	0.00
		75	MIN	-1126.55	-89.41	0.00
	75	76	MAX	1558.78	-26.81	0.00
		76	MIN	-932.31	-88.79	0.00
	76	77	MAX	1552.19	43.60	0.00
		77	MIN	-751.03	-89.41	0.00
	77	78	MAX	1396.09	114.98	0.00
		78	MIN	-567.17	-90.03	0.00
	78	79	MAX	1087.41	187.33	0.00
		79	MIN	-380.70	-90.64	0.00
	79	80	MAX	623.09	260.66	0.00
		80	MIN	-191.65	-91.26	0.00
	80	81	MAX	0.00	256.68	2.07
		81	MIN	0.00	-71.98	-6.74



Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	77.68	2.24
		1	MIN	0.00	-365.73	-9.68
	1	2	MAX	-162.12	77.20	0.00
		2	MIN	688.06	-291.58	-1.17
	2	3	MAX	-322.05	76.68	0.00
		3	MIN	1217.44	-218.29	0.00
	3	4	MAX	-479.79	76.16	0.00
		4	MIN	1369.74	-150.42	0.00
	4	5	MAX	-635.33	75.63	0.00
		5	MIN	1812.61	-74.60	0.00
	5	6	MAX	418.86	106.87	0.00
		6	MIN	578.65	-55.11	0.00
	6	7	MAX	443.43	176.58	0.00
		7	MIN	696.21	-55.26	0.00
	7	8	MAX	-1.52	248.88	0.00
		8	MIN	814.38	-55.40	0.00
	8	9	MAX	-602.91	322.15	0.00
		9	MIN	933.16	-55.55	0.00
	9	10	MAX	-1363.80	396.40	0.00
		10	MIN	1052.56	-55.69	0.00
	10	11	MAX	-410.76	471.41	-12.54
		11	MIN	-404.53	-55.80	1.80
2	11	11	MAX	-410.76	77.96	1.71
		11	MIN	-404.53	-522.67	-10.25
	11	12	MAX	952.50	77.50	0.16
		12	MIN	-987.21	-423.21	0.00
	12	13	MAX	735.13	77.02	0.00
		13	MIN	62.86	-324.93	0.00
	13	14	MAX	520.46	76.54	0.00
		14	MIN	833.35	-227.94	0.00
	14	15	MAX	308.49	76.06	0.00
		15	MIN	1216.75	-160.99	0.00
	15	16	MAX	99.22	75.58	0.00
		16	MIN	1292.10	-54.50	0.00
	16	17	MAX	1687.80	176.14	0.00
		17	MIN	-207.66	-40.29	0.00
	17	18	MAX	1150.09	250.83	0.00
		18	MIN	-95.50	-40.57	0.00
	18	19	MAX	313.27	347.93	0.00
		19	MIN	18.21	-40.85	0.00
	19	20	MAX	-803.76	446.33	0.00
		20	MIN	133.48	-41.13	0.00
	20	21	MAX	-714.41	545.90	-10.78
		21	MIN	-755.53	-41.39	0.89
3	21	21	MAX	-714.41	70.62	1.53
		21	MIN	-755.53	-540.44	-10.64
	21	22	MAX	229.39	70.17	0.00
		22	MIN	-742.68	-440.88	-0.05

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	32.69	69.69	0.00
		23	MIN	358.61	-342.49	0.00
	23	24	MAX	-161.34	69.22	0.00
		24	MIN	1179.71	-245.40	0.00
	24	25	MAX	-352.72	68.74	0.00
		25	MIN	1658.06	-174.12	0.00
	25	26	MAX	1071.79	68.74	0.00
		26	MIN	1723.98	-78.47	0.00
	26	27	MAX	1086.46	172.76	0.00
		27	MIN	243.66	-65.32	0.00
	27	28	MAX	563.71	247.53	0.00
		28	MIN	425.50	-65.75	0.00
	28	29	MAX	-263.85	344.65	0.00
		29	MIN	609.80	-66.19	0.00
	29	30	MAX	-1371.73	443.07	0.00
		30	MIN	796.57	-66.63	0.00
	30	31	MAX	-670.31	542.65	-10.68
		31	MIN	-693.53	-67.05	1.46
4	31	31	MAX	-670.31	82.70	1.79
		31	MIN	-693.53	-542.11	-10.67
	31	32	MAX	854.96	82.18	0.01
		32	MIN	-1329.66	-442.53	0.00
	32	33	MAX	624.61	81.63	0.00
		33	MIN	-223.55	-344.11	0.00
	33	34	MAX	397.36	81.07	0.00
		34	MIN	602.25	-247.00	0.00
	34	35	MAX	173.20	80.52	0.00
		35	MIN	1098.19	-174.17	0.00
	35	36	MAX	1619.48	84.16	0.00
		36	MIN	1147.27	-77.16	0.00
	36	37	MAX	1609.66	179.09	0.00
		37	MIN	-346.09	-65.23	0.00
	37	38	MAX	1044.15	255.74	0.00
		38	MIN	-164.57	-65.68	0.00
	38	39	MAX	192.76	352.91	0.00
		39	MIN	19.47	-66.13	0.00
	39	40	MAX	-939.24	451.38	0.00
		40	MIN	206.03	-66.58	0.00
	40	41	MAX	-761.50	551.02	-10.86
		41	MIN	-815.81	-67.01	1.45
5	41	41	MAX	-761.50	72.68	1.47
		41	MIN	-815.81	-573.60	-10.52
	41	42	MAX	262.80	72.21	0.00
		42	MIN	-822.97	-466.94	-0.01
	42	43	MAX	45.84	71.73	0.00
		43	MIN	424.49	-361.54	0.00
	43	44	MAX	-168.19	71.24	0.00
		44	MIN	1350.48	-257.54	0.00
	44	45	MAX	-379.28	70.75	0.00
		45	MIN	1855.06	-171.19	0.00

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	45	46	MAX	1264.52	76.43	0.00
		46	MIN	1939.86	-70.25	0.00
	46	47	MAX	1208.38	174.04	0.00
		47	MIN	250.07	-61.24	0.00
	47	48	MAX	688.68	260.49	0.00
		48	MIN	432.72	-61.66	0.00
	48	49	MAX	-246.79	364.52	0.00
		49	MIN	617.89	-62.08	0.00
	49	50	MAX	-1503.87	469.93	0.00
		50	MIN	805.57	-62.49	0.00
	50	51	MAX	-837.95	576.63	-10.59
		51	MIN	-878.25	-62.90	1.27
6	51	51	MAX	-837.95	70.97	1.44
		51	MIN	-878.25	-579.53	-10.64
	51	52	MAX	827.51	70.53	0.04
		52	MIN	-1538.21	-472.82	0.00
	52	53	MAX	615.70	70.06	0.00
		53	MIN	-272.30	-367.38	0.00
	53	54	MAX	406.70	69.59	0.00
		54	MIN	671.88	-263.34	0.00
	54	55	MAX	200.49	69.13	0.00
		55	MIN	1217.38	-175.03	0.00
	55	56	MAX	1850.38	77.42	0.00
		56	MIN	1224.92	-71.01	0.00
	56	57	MAX	1787.70	176.33	0.00
		57	MIN	-391.68	-71.41	0.00
	57	58	MAX	1277.66	261.97	0.00
		58	MIN	-178.69	-71.90	0.00
	58	59	MAX	337.96	365.99	0.00
		59	MIN	37.27	-72.39	0.00
	59	60	MAX	-923.34	471.41	0.00
		60	MIN	256.19	-72.89	0.00
	60	61	MAX	-935.86	578.10	-10.62
		61	MIN	-855.07	-73.36	1.48
7	61	61	MAX	-935.86	37.22	0.75
		61	MIN	-855.07	-580.27	-10.68
	61	62	MAX	128.66	36.98	0.00
		62	MIN	-964.00	-473.59	-0.14
	62	63	MAX	17.61	36.73	0.00
		63	MIN	304.25	-368.19	0.00
	63	64	MAX	-91.94	36.48	0.00
		64	MIN	1250.97	-264.18	0.00
	64	65	MAX	-199.99	36.23	0.00
		65	MIN	1802.96	-176.70	0.00
	65	66	MAX	1519.47	52.98	0.00
		66	MIN	38.61	-78.88	0.00
	66	67	MAX	1389.95	160.55	0.00
		67	MIN	272.66	-79.39	0.00
	67	68	MAX	1006.86	240.74	0.00
		68	MIN	509.77	-79.89	0.00

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	68	69	MAX	133.25	344.63	0.00
		69	MIN	749.94	-80.40	0.00
	69	70	MAX	-1061.17	449.91	0.00
		70	MIN	993.16	-80.91	0.00
	70	71	MAX	-490.33	556.47	-10.18
		71	MIN	-482.81	-81.40	1.66
8	71	71	MAX	-490.33	58.99	1.89
		71	MIN	-482.81	-481.74	-12.83
	71	72	MAX	1112.31	58.83	1.16
		72	MIN	-1557.82	-406.67	0.00
	72	73	MAX	985.89	58.68	0.00
		73	MIN	-774.20	-332.35	0.00
	73	74	MAX	860.18	58.51	0.00
		74	MIN	-150.38	-259.01	0.00
	74	75	MAX	735.17	58.35	0.00
		75	MIN	316.71	-186.64	0.00
	75	76	MAX	610.88	58.18	0.00
		76	MIN	293.06	-118.85	0.00
	76	7	MAX	1 .. 46	77.56	0.00
		77	MIN	-751.03	-89.41	0.00
	77	78	MAX	1377.05	151.58	0.00
		78	MIN	-567.17	-90.03	0.00
	78	79	MAX	1230.05	221.29	0.00
		79	MIN	-380.70	-90.64	0.00
	79	80	MAX	694.41	294.62	0.00
		80	MIN	-191.65	-91.26	0.00
	80	81	MAX	0.00	368.78	-9.76
		81	MIN	0.00	-91.83	2.65

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-289.43	-7.87
		1	MIN	0.00	61.74	1.78
	1	2	MAX	688.06	-291.41	-9.68
		2	MIN	-162.12	77.16	2.24
	2	3	MAX	1217.44	-218.29	0.00
		3	MIN	-322.05	76.68	0.00
	3	4	MAX	1591.27	-145.96	0.00
		4	MIN	-479.79	76.16	0.00
	4	5	MAX	1812.61	-74.60	0.00
		5	MIN	-635.33	75.63	0.00
	5	6	MAX	1884.54	-4.22	0.00
		6	MIN	-788.67	75.11	0.00
	6	7	MAX	1829.46	66.58	0.00
		7	MIN	-952.99	75.63	0.00
	7	8	MAX	1623.21	138.35	0.00
		8	MIN	-1119.51	76.16	0.00
	8	9	MAX	1262.72	211.10	0.00
		9	MIN	-1288.22	76.68	0.00
	9	10	MAX	1052.56	-55.69	0.00
		10	MIN	-1505.84	351.19	0.00
	10	11	MAX	1117.46	-55.80	1.80
		11	MIN	-1987.51	414.13	-11.06
2	11	11	MAX	1117.46	77.96	1.71
		11	MIN	-1987.51	-522.67	-10.25
	11	12	MAX	952.50	77.48	1.71
		12	MIN	-1101.40	-377.68	-9.09
	12	13	MAX	1349.34	-224.59	0.00
		13	MIN	-668.00	-40.85	0.00
	13	14	MAX	1981.81	-198.68	0.00
		14	MIN	-567.27	3.11	0.00
	14	15	MAX	2393.36	-103.15	0.00
		15	MIN	-582.74	10.74	0.00
	15	16	MAX	2537.15	-8.92	0.00
		16	MIN	-620.94	31.75	0.00
	16	17	MAX	2443.93	85.09	0.00
		17	MIN	-730.09	69.78	0.00
	17	18	MAX	2084.12	180.41	0.00
		18	MIN	-931.87	70.26	0.00
	18	19	MAX	1452.27	277.02	0.00
		19	MIN	-1136.36	70.75	0.00
	19	20	MAX	930.76	-13.38	0.00
		20	MIN	-1462.06	385.47	0.00
	20	21	MAX	937.08	-13.51	0.27
		21	MIN	-2380.67	539.63	-10.61
3	21	21	MAX	937.08	68.86	1.48
		21	MIN	-2380.67	-484.23	-9.59
	21	22	MAX	776.69	68.39	1.48
		22	MIN	-1495.93	-400.50	-9.59

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	1309.95	-284.36	0.00
		23	MIN	-1054.46	-64.43	0.00
	23	24	MAX	1962.91	-187.66	0.00
		24	MIN	-894.71	-20.95	0.00
	24	25	MAX	2367.09	-109.65	0.00
		25	MIN	-841.02	-13.16	0.00
	25	26	MAX	2528.68	-15.43	0.00
		26	MIN	-809.26	-5.47	0.00
	26	27	MAX	2454.03	78.59	0.00
		27	MIN	-831.85	20.81	0.00
	27	28	MAX	2112.74	173.92	0.00
		28	MIN	-936.60	69.22	0.00
	28	29	MAX	1499.33	270.55	0.00
		29	MIN	-1138.18	69.69	0.00
	29	30	MAX	1017.13	-24.26	0.00
		30	MIN	-1491.76	392.45	0.00
	30	31	MAX	1055.37	-24.40	0.54
		31	MIN	-2398.94	542.65	-10.68
4	31	31	MAX	1055.37	82.70	1.79
		31	MIN	-2398.94	-484.70	-9.60
	31	32	MAX	931.88	18.30	0.40
		32	MIN	-1511.10	-400.96	-9.60
	32	33	MAX	1433.66	-278.76	0.00
		33	MIN	-1091.54	-66.13	0.00
	33	34	MAX	2070.41	-182.08	0.00
		34	MIN	-933.84	-12.27	0.00
	34	35	MAX	2434.79	-86.71	0.00
		35	MIN	-904.04	-4.53	0.00
	35	36	MAX	2551.61	-13.26	0.00
		36	MIN	-896.40	21.82	0.00
	36	37	MAX	2470.95	80.76	0.00
		37	MIN	-974.87	29.62	0.00
	37	38	MAX	2123.65	176.08	0.00
		38	MIN	-1090.61	80.48	0.00
	38	39	MAX	1504.25	272.71	0.00
		39	MIN	-1324.98	81.03	0.00
	39	40	MAX	994.91	-21.25	0.00
		40	MIN	-1699.00	407.69	0.00
	40	41	MAX	1029.80	-21.39	0.46
		41	MIN	-2593.72	491.32	-9.74
5	41	41	MAX	1029.80	72.13	1.45
		41	MIN	-2593.72	-573.05	-10.51
	41	42	MAX	919.02	16.13	0.33
		42	MIN	-1534.03	-416.29	-9.33
	42	43	MAX	1493.19	-300.54	0.00
		43	MIN	-1077.75	-61.52	0.00
	43	44	MAX	2230.13	-196.96	0.00
		44	MIN	-887.10	-61.10	0.00
	44	45	MAX	2654.37	-94.77	0.00
		45	MIN	-830.98	-7.42	0.00

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	45	46	MAX	2777.54	-12.63	0.00
		46	MIN	-842.05	18.45	0.00
	46	47	MAX	2679.67	88.13	0.00
		47	MIN	-915.94	26.77	0.00
	47	48	MAX	2275.60	190.28	0.00
		48	MIN	-1023.04	71.24	0.00
	48	49	MAX	1559.06	293.83	0.00
		49	MIN	-1245.24	71.73	0.00
	49	50	MAX	979.96	-19.71	0.00
		50	MIN	-1711.74	423.35	0.00
	50	51	MAX	1019.48	-19.84	0.40
		51	MIN	-2744.21	512.88	-9.47
6	51	51	MAX	1019.48	70.97	1.44
		51	MIN	-2744.21	-579.53	-10.64
	51	52	MAX	937.02	18.67	0.38
		52	MIN	-1685.49	-417.63	-9.35
	52	53	MAX	1528.01	-296.12	0.00
		53	MIN	-1265.83	-72.39	0.00
	53	54	MAX	2251.54	-192.56	0.00
		54	MIN	-1041.50	-71.90	0.00
	54	55	MAX	2662.46	-90.38	0.00
		55	MIN	-936.80	-21.35	0.00
	55	56	MAX	2767.04	10.40	0.00
		56	MIN	-905.05	7.32	0.00
	56	57	MAX	2599.68	111.31	0.00
		57	MIN	-945.75	15.57	0.00
	57	58	MAX	2145.86	202.13	0.00
		58	MIN	-1011.70	23.93	0.00
	58	59	MAX	1392.87	305.75	0.00
		59	MIN	-1198.90	68.47	0.00
	59	60	MAX	804.99	-71.30	0.00
		60	MIN	-1685.76	422.73	0.00
	60	61	MAX	986.22	-71.78	1.44
		61	MIN	-2718.44	512.26	-9.45
7	61	61	MAX	986.22	15.09	0.28
		61	MIN	-2718.44	-574.64	-10.54
	61	62	MAX	974.02	14.95	0.28
		62	MIN	-1672.04	-411.43	-9.23
	62	63	MAX	1572.73	-293.82	0.00
		63	MIN	-1275.21	-74.77	0.00
	63	64	MAX	2289.21	-190.32	0.00
		64	MIN	-1043.75	-74.26	0.00
	64	65	MAX	2693.47	-88.21	0.00
		65	MIN	-815.34	-73.75	0.00
	65	66	MAX	2791.77	12.51	0.00
		66	MIN	-658.85	-40.15	0.00
	66	67	MAX	2617.64	113.48	0.00
		67	MIN	-575.83	-17.15	0.00
	67	68	MAX	2136.05	215.84	0.00
		68	MIN	-540.39	-9.01	0.00

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	68	69 MAX	1410.92	245.23	0.00
		69 MIN	-643.47	36.73	0.00
	69	70 MAX	993.16	-80.91	0.00
		70 MIN	-1160.45	399.24	0.00
	70	71 MAX	1181.54	-81.40	1.66
		71 MIN	-2227.09	556.47	-10.18
8	71	71 MAX	1181.54	58.99	1.89
		71 MIN	-2227.09	-426.52	-11.41
	71	72 MAX	1112.31	58.82	1.89
		72 MIN	-1738.58	-363.28	-11.41
	72	73 MAX	1313.16	-208.10	0.00
		73 MIN	-1522.82	-90.64	0.00
	73	74 MAX	1667.02	-135.37	0.00
		74 MIN	-1323.39	-90.03	0.00
	74	75 MAX	1866.73	-63.62	0.00
		75 MIN	-1126.55	-89.41	0.00
	75	76 MAX	1915.37	7.16	0.00
		76 MIN	-932.31	-88.79	0.00
	76	77 MAX	1837.46	77.56	0.00
		77 MIN	-751.03	-89.41	0.00
	77	78 MAX	1610.04	148.94	0.00
		78 MIN	-567.17	-90.03	0.00
	78	79 MAX	1230.05	221.29	0.00
		79 MIN	-380.70	-90.64	0.00
	79	80 MAX	694.41	294.62	0.00
		80 MIN	-191.65	-91.26	0.00
	80	81 MAX	0.00	290.62	0.91
		81 MIN	0.00	-71.98	-6.74

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1 MAX	0.00	91.32	2.71
		1 MIN	0.00	-379.38	-10.15
	1	2 MAX	-190.80	90.85	0.47
		2 MIN	716.73	-305.22	-1.64
	2	3 MAX	-379.40	90.33	0.00
		3 MIN	1274.79	-231.94	0.00
	3	4 MAX	-565.81	89.81	0.00
		4 MIN	1455.76	-164.07	0.00
	4	5 MAX	-750.02	89.29	0.00
		5 MIN	1927.30	-88.25	0.00
	5	6 MAX	275.50	120.52	0.00
		6 MIN	722.01	-68.76	0.00
	6	7 MAX	271.39	190.23	0.00
		7 MIN	868.24	-68.91	0.00
	7	8 MAX	-202.23	262.53	0.00
		8 MIN	1015.09	-69.05	0.00
	8	9 MAX	-832.29	335.80	0.00
		9 MIN	1162.55	-69.20	0.00
	9	10 MAX	-1621.86	410.05	0.00
		10 MIN	1310.61	-69.34	0.00
	10	11 MAX	-413.72	485.06	-13.00
		11 MIN	-401.57	-69.45	2.26
2	11	11 MAX	-413.72	98.88	2.25
		11 MIN	-401.57	-543.60	-10.79
	11	12 MAX	1180.62	98.43	0.70
		12 MIN	-1215.33	-444.14	-0.54
	12	13 MAX	904.64	97.95	0.00
		13 MIN	-106.65	-345.86	0.00
	13	14 MAX	631.37	97.47	0.00
		14 MIN	722.44	-248.87	0.00
	14	15 MAX	360.79	96.99	0.00
		15 MIN	1164.44	-181.92	0.00
	15	16 MAX	92.92	96.51	0.00
		16 MIN	1298.40	-75.43	0.00
	16	17 MAX	1622.90	197.07	0.00
		17 MIN	-142.75	-61.22	0.00
	17	18 MAX	1026.57	271.77	0.00
		18 MIN	28.01	-61.50	0.00
	18	19 MAX	131.15	368.86	0.00
		19 MIN	200.33	-61.78	0.00
	19	20 MAX	-1044.48	467.26	0.00
		20 MIN	374.21	-62.06	0.00
	20	21 MAX	-714.59	566.82	-11.31
		21 MIN	-755.35	-62.31	1.43
3	21	21 MAX	-714.59	91.99	2.08
		21 MIN	-755.35	-561.81	-11.19
	21	22 MAX	468.89	91.53	0.55
		22 MIN	-982.17	-462.24	-0.59

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	212.35	91.06	0.00
		23	MIN	178.95	-363.86	0.00
	23	24	MAX	-41.52	90.59	0.00
		24	MIN	1059.89	-266.77	0.00
	24	25	MAX	-292.74	90.11	0.00
		25	MIN	1598.08	-195.50	0.00
	25	26	MAX	1071.93	90.11	0.00
		26	MIN	1723.83	-99.84	0.00
	26	27	MAX	1026.77	194.13	0.00
		27	MIN	303.35	-86.69	0.00
	27	28	MAX	444.18	268.90	0.00
		28	MIN	545.03	-87.13	0.00
	28	29	MAX	-443.21	366.02	0.00
		29	MIN	789.17	-87.56	0.00
	29	30	MAX	-1610.94	464.44	0.00
		30	MIN	1035.77	-88.00	0.00
	30	31	MAX	-670.11	564.02	-11.23
		31	MIN	-693.74	-88.41	2.01
4	31	31	MAX	-670.11	103.57	2.33
		31	MIN	-693.74	-562.98	-11.21
	31	32	MAX	1095.56	103.04	0.55
		32	MIN	-1570.27	-463.39	-0.54
	32	33	MAX	806.78	102.49	0.00
		33	MIN	-405.72	-364.98	0.00
	33	34	MAX	521.10	101.94	0.00
		34	MIN	478.51	-267.87	0.00
	34	35	MAX	238.51	101.39	0.00
		35	MIN	1032.88	-195.04	0.00
	35	36	MAX	1626.35	105.03	0.00
		36	MIN	1140.40	-98.03	0.00
	36	37	MAX	1558.09	199.96	0.00
		37	MIN	-294.52	-86.10	0.00
	37	38	MAX	934.15	276.61	0.00
		38	MIN	-54.57	-86.55	0.00
	38	39	MAX	24.33	373.78	0.00
		39	MIN	187.90	-87.00	0.00
	39	40	MAX	-1166.11	472.25	0.00
		40	MIN	432.89	-87.45	0.00
	40	41	MAX	-760.57	571.88	-11.40
		41	MIN	-816.75	-87.87	1.98
5	41	41	MAX	-760.57	91.25	1.91
		41	MIN	-816.75	-592.17	-10.97
	41	42	MAX	492.39	90.78	0.45
		42	MIN	-1052.56	-485.50	-0.46
	42	43	MAX	219.73	90.29	0.00
		43	MIN	250.60	-380.11	0.00
	43	44	MAX	-50.00	89.81	0.00
		44	MIN	1232.30	-276.11	0.00
	44	45	MAX	-316.80	89.32	0.00
		45	MIN	1792.58	-189.76	0.00

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	45	46	MAX	1271.29	95.00	0.00
		46	MIN	1933.09	-88.82	0.00
	46	47	MAX	1159.45	192.61	0.00
		47	MIN	299.00	-79.81	0.00
	47	48	MAX	584.05	279.06	0.00
		48	MIN	537.36	-80.22	0.00
	48	49	MAX	-407.13	383.08	0.00
		49	MIN	778.23	-80.64	0.00
	49	50	MAX	-1719.92	488.50	0.00
		50	MIN	1021.62	-81.06	0.00
	50	51	MAX	-837.72	595.19	-11.03
		51	MIN	-878.49	-81.46	1.72
6	51	51	MAX	-837.72	88.96	1.87
		51	MIN	-878.49	-597.51	-11.07
	51	52	MAX	1045.30	88.51	0.47
		52	MIN	-1756.00	-490.80	-0.43
	52	53	MAX	779.52	88.05	0.00
		53	MIN	-436.12	-385.37	0.00
	53	54	MAX	516.55	87.58	0.00
		54	MIN	562.03	-281.33	0.00
	54	55	MAX	256.37	87.11	0.00
		55	MIN	1161.50	-193.02	0.00
	55	56	MAX	1852.29	95.41	0.00
		56	MIN	1223.01	-88.99	0.00
	56	57	MAX	1735.64	194.32	0.00
		57	MIN	-339.62	-89.40	0.00
	57	58	MAX	1171.63	279.96	0.00
		58	MIN	-72.66	-89.89	0.00
	58	59	MAX	177.96	383.98	0.00
		59	MIN	197.27	-90.38	0.00
	59	60	MAX	-1137.31	489.40	0.00
		60	MIN	470.15	-90.88	0.00
	60	61	MAX	-935.79	596.09	-11.05
		61	MIN	-855.14	-91.35	1.91
7	61	61	MAX	-935.79	55.03	1.18
		61	MIN	-855.14	-598.08	-11.11
	61	62	MAX	343.15	54.79	0.43
		62	MIN	-1178.48	-491.40	-0.56
	62	63	MAX	178.65	54.54	0.00
		63	MIN	143.22	-386.01	0.00
	63	64	MAX	15.64	54.29	0.00
		64	MIN	1143.39	-282.00	0.00
	64	65	MAX	-145.85	54.04	0.00
		65	MIN	1748.83	-194.52	0.00
	65	66	MAX	1520.16	70.80	0.00
		66	MIN	37.93	-96.69	0.00
	66	67	MAX	1337.18	178.37	0.00
		67	MIN	325.43	-97.20	0.00
	67	68	MAX	900.64	258.56	0.00
		68	MIN	615.99	-97.71	0.00

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	68	69	MAX	-26.43	362.44	0.00
		69	MIN	909.61	-98.22	0.00
	69	70	MAX	-1274.30	467.73	0.00
		70	MIN	1206.28	-98.73	0.00
	70	71	MAX	-488.25	574.28	-10.61
		71	MIN	-484.89	-99.21	2.09
8	71	71	MAX	-488.25	71.67	2.32
		71	MIN	-484.89	-494.43	-13.27
	71	72	MAX	1352.23	71.52	1.60
		72	MIN	-1797.73	-419.35	-0.44
	72	73	MAX	1199.15	71.38	0.00
		73	MIN	-987.46	-345.04	0.00
	73	74	MAX	1046.78	71.21	0.00
		74	MIN	-336.98	-271.70	0.00
	74	75	MAX	895.12	71.04	0.00
		75	MIN	156.77	-199.33	0.00
	75	76	MAX	744.16	70.87	0.00
		76	MIN	159.78	-131.54	0.00
	76	77	MAX	1944.09	90.25	0.00
		77	MIN	-857.66	-102.10	0.00
	77	78	MAX	1457.03	164.27	0.00
		78	MIN	-647.14	-102.72	0.00
	78	79	MAX	1283.36	233.99	0.00
		79	MIN	-434.02	-103.34	0.00
	79	80	MAX	721.07	307.32	0.00
		80	MIN	-218.31	-103.96	0.00
	80	81	MAX	0.00	381.46	-10.20
		81	MIN	0.00	-104.51	3.08

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-303.07	-8.34
		1	MIN	0.00	75.38	2.25
	1	2	MAX	716.73	-305.05	-10.15
		2	MIN	-190.80	90.80	2.71
	2	3	MAX	1274.79	-231.94	0.00
		3	MIN	-379.40	90.33	0.00
	3	4	MAX	1677.29	-159.61	0.00
		4	MIN	-565.81	89.81	0.00
	4	5	MAX	1927.30	-88.25	0.00
		5	MIN	-750.02	89.29	0.00
	5	6	MAX	2027.90	-17.87	0.00
		6	MIN	-932.04	88.76	0.00
	6	7	MAX	2001.49	52.93	0.00
		7	MIN	-1125.03	89.29	0.00
	7	8	MAX	1823.92	124.70	0.00
		8	MIN	-1320.22	89.81	0.00
	8	9	MAX	1492.11	197.45	0.00
		9	MIN	-1517.60	90.33	0.00
	9	10	MAX	1310.61	-69.34	0.00
		10	MIN	-1763.90	364.85	0.00
	10	11	MAX	1390.15	-69.45	2.26
		11	MIN	-2260.20	427.77	-11.53
2	11	11	MAX	1390.15	98.88	2.25
		11	MIN	-2260.20	-543.60	-10.79
	11	12	MAX	1180.62	98.40	2.25
		12	MIN	-1329.52	-398.60	-9.63
	12	13	MAX	1518.85	-203.66	0.00
		13	MIN	-837.52	-61.78	0.00
	13	14	MAX	2111.11	-186.67	0.00
		14	MIN	-696.57	-8.90	0.00
	14	15	MAX	2489.04	-91.14	0.00
		15	MIN	-678.42	-1.27	0.00
	15	16	MAX	2635.87	-10.32	0.00
		16	MIN	-719.65	33.14	0.00
	16	17	MAX	2546.54	83.70	0.00
		17	MIN	-832.70	71.18	0.00
	17	18	MAX	2220.91	165.11	0.00
		18	MIN	-1068.66	85.56	0.00
	18	19	MAX	1634.39	256.09	0.00
		19	MIN	-1318.48	91.68	0.00
	19	20	MAX	1171.48	-34.31	0.00
		20	MIN	-1702.79	406.40	0.00
	20	21	MAX	1219.24	-34.44	0.80
		21	MIN	-2662.83	560.55	-11.15
3	21	21	MAX	1219.24	90.23	2.03
		21	MIN	-2662.83	-505.59	-10.14
	21	22	MAX	1016.18	89.75	2.03
		22	MIN	-1735.43	-421.86	-10.14

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	1489.61	-262.99	0.00
		23	MIN	-1234.12	-85.81	0.00
	23	24	MAX	2102.49	-174.76	0.00
		24	MIN	-1034.29	-33.85	0.00
	24	25	MAX	2473.74	-109.70	0.00
		25	MIN	-947.67	-13.11	0.00
	25	26	MAX	2635.48	-15.48	0.00
		26	MIN	-916.05	-5.42	0.00
	26	27	MAX	2560.96	78.54	0.00
		27	MIN	-938.78	20.86	0.00
	27	28	MAX	2251.77	160.79	0.00
		28	MIN	-1075.63	82.34	0.00
	28	29	MAX	1678.70	249.17	0.00
		29	MIN	-1317.54	91.06	0.00
	29	30	MAX	1256.33	-45.63	0.00
		30	MIN	-1730.96	413.82	0.00
	30	31	MAX	1337.27	-45.76	1.08
		31	MIN	-2680.84	564.02	-11.23
4	31	31	MAX	1337.27	103.57	2.33
		31	MIN	-2680.84	-505.56	-10.13
	31	32	MAX	1172.49	39.16	0.94
		32	MIN	-1751.71	-421.82	-10.13
	32	33	MAX	1615.83	-257.89	0.00
		33	MIN	-1273.71	-87.00	0.00
	33	34	MAX	2212.99	-169.22	0.00
		34	MIN	-1076.42	-25.12	0.00
	34	35	MAX	2541.73	-86 15	0.00
		35	MIN	-1010.98	-5.08	0.00
	35	36	MAX	2657.00	-12.71	0.00
		36	MIN	-1001.78	21.26	0.00
	36	37	MAX	2574.78	81.32	0.00
		37	MIN	-1078.69	29.07	0.00
	37	38	MAX	2255.36	163.88	0.00
		38	MIN	-1222.32	92.68	0.00
	38	39	MAX	1672.69	251.84	0.00
		39	MIN	-1493.41	101.90	0.00
	39	40	MAX	1221.78	-42.11	0.00
		40	MIN	-1925.86	428.56	0.00
	40	41	MAX	1299.09	-42.25	1.00
		41	MIN	-2863.01	512.18	-10.28
5	41	41	MAX	1299.09	90.69	1.90
		41	MIN	-2863.01	-591.61	-10.96
	41	42	MAX	1148.62	34.69	0.77
		42	MIN	-1763.62	-434.85	-9.77
	42	43	MAX	1667.07	-281.97	0.00
		43	MIN	-1251.64	-80.09	0.00
	43	44	MAX	2365.50	-185.67	0.00
		44	MIN	-1022.47	-72.39	0.00
	44	45	MAX	2757.21	-94.22	0.00
		45	MIN	-933.82	-7.97	0.00

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	45	46	MAX	2878.72	-12.08	0.00
		46	MIN	-943.24	17.90	0.00
	46	47	MAX	2779.21	88.68	0.00
		47	MIN	-1015.47	26.22	0.00
	47	48	MAX	2400.34	179.70	0.00
		48	MIN	-1147.78	81.83	0.00
	48	49	MAX	1719.40	275.26	0.00
		49	MIN	-1405.58	90.29	0.00
	49	50	MAX	1196.00	-38.28	0.00
		50	MIN	-1927.79	441.91	0.00
	50	51	MAX	1276.40	-38.40	0.85
		51	MIN	-3001.13	531.44	-9.91
6	51	51	MAX	1276.40	88.96	1.87
		51	MIN	-3001.13	-597.51	-11.07
	51	52	MAX	1154.80	36.66	0.82
		52	MIN	-1903.27	-435.62	-9.79
	52	53	MAX	1691.82	-278.14	0.00
		53	MIN	-1429.64	-90.38	0.00
	53	54	MAX	2379.00	-181.59	0.00
		54	MIN	-1168.96	-82.87	0.00
	54	55	MAX	2761.02	-90.12	0.00
		55	MIN	-1035.36	-21.61	0.00
	55	56	MAX	2864.81	10.66	0.00
		56	MIN	-1002.83	7.06	0.00
	56	57	MAX	2696.67	111.57	0.00
		57	MIN	-1042.74	15.31	0.00
	57	58	MAX	2270.81	191.76	0.00
		58	MIN	-1136.65	34.31	0.00
	58	59	MAX	1552.87	287.76	0.00
		59	MIN	-1358.90	86.46	0.00
	59	60	MAX	1018.95	-89.29	0.00
		60	MIN	-1899.73	440.72	0.00
	60	61	MAX	1239.62	-89.76	1.87
		61	MIN	-2971.84	530.24	-9.89
7	61	61	MAX	1239.62	32.90	0.71
		61	MIN	-2971.84	-592.45	-10.97
	61	62	MAX	1188.51	32.76	0.71
		62	MIN	-1886.53	-429.25	-9.66
	62	63	MAX	1733.76	-276.00	0.00
		63	MIN	-1436.24	-92.58	0.00
	63	64	MAX	2409.57	-177.57	0.00
		64	MIN	-1164.11	-87.00	0.00
	64	65	MAX	2786.55	-87.39	0.00
		65	MIN	-908.43	-74.57	0.00
	65	66	MAX	2882.40	13.33	0.00
		66	MIN	-749.48	-40.97	0.00
	66	67	MAX	2708.59	103.21	0.00
		67	MIN	-666.78	-6.88	0.00
	67	68	MAX	2257.79	205.58	0.00
		68	MIN	-662.14	1.26	0.00

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	68	69	MAX	1570.60	227.41	0.00
		69	MIN	-803.14	54.54	0.00
	69	70	MAX	1206.28	-98.73	0.00
		70	MIN	-1373.58	417.06	0.00
	70	71	MAX	1435.73	-99.21	2.09
		71	MIN	-2481.27	574.28	-10.61
8	71	71	MAX	1435.73	71.67	2.32
		71	MIN	-2481.27	-439.21	-11.85
	71	72	MAX	1352.23	71.51	2.32
		72	MIN	-1978.50	-375.97	-11.85
	72	73	MAX	1526.42	-195.41	0.00
		73	MIN	-1736.08	-103.34	0.00
	73	74	MAX	1853.62	-122.68	0.00
		74	MIN	-1509.99	-102.72	0.00
	74	75	MAX	2026.68	-50.93	0.00
		75	MIN	-1286.50	-102.10	0.00
	75	76	MAX	2048.66	19.85	0.00
		76	MIN	-1065.59	-101.49	0.00
	76	77	MAX	1944.09	90.25	0.00
		77	MIN	-857.66	-102.10	0.00
	77	78	MAX	1690.02	161.63	0.00
		78	MIN	-647.14	-102.72	0.00
	78	79	MAX	1283.37	233.99	0.00
		79	MIN	-434.02	-103.34	0.00
	79	80	MAX	721.07	307.32	0.00
		80	MIN	-218.31	-103.96	0.00
	80	81	MAX	0.00	303.30	0.47
		81	MIN	0.00	-84.67	-6.30

Cable Numero 1

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 23 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 1

Se.	X	Y (s)	Y (i)	Pend.
1	0.000	1.115	1.050	-0.1125
2	2.100	1.320	0.845	-0.0830
3	4.200	1.463	0.702	-0.0534
4	6.300	1.545	0.620	-0.0239
5	8.400	1.564	0.601	0.0074
6	10.500	1.507	0.658	0.0461
7	12.600	1.370	0.795	0.0850
8	14.700	1.151	1.014	0.1238
9	16.800	0.850	1.315	0.1627
10	18.900	0.500	1.665	0.1289
11	21.000	0.365	1.800	0.0000
12	23.800	0.654	1.511	-0.2063
13	26.600	1.204	0.961	-0.1690
14	29.400	1.599	0.566	-0.1128
15	32.200	1.836	0.329	-0.0565
16	35.000	1.915	0.250	0.0000
17	37.800	1.836	0.329	0.0565
18	40.600	1.599	0.566	0.1128
19	43.400	1.204	0.961	0.1690
20	46.200	0.654	1.511	0.2063
21	49.000	0.365	1.800	0.0000
22	51.800	0.654	1.511	-0.2063
23	54.600	1.204	0.961	-0.1690

Cable Numero 2

Definicion general

Seccion inicial ..... = 23 (Pasiva)
Seccion final ..... = 33 (Activa)

Fuerza de pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 2

Se.	X	Y (s)	Y (i)	Pend.
23	54.600	1.204	0.961	-0.1690
24	57.400	1.599	0.566	-0.1128
25	60.200	1.836	0.329	-0.0565
26	63.000	1.915	0.250	0.0000
27	65.800	1.836	0.329	0.0565
28	68.600	1.599	0.566	0.1128
29	71.400	1.204	0.961	0.1690
30	74.200	0.654	1.511	0.2063
31	77.000	0.365	1.800	0.0000
32	79.800	0.654	1.511	-0.2063
33	82.600	1.204	0.961	-0.1690

Cable Numero 3

Definicion general

Seccion inicial ..... = 33 (Pasiva)
Seccion final ..... = 43 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 3

Se.	X	Y (s)	Y (i)	Pend.
33	82.600	1.204	0.961	-0.1690
34	85.400	1.599	0.566	-0.1128
35	88.200	1.836	0.329	-0.0565
36	91.000	1.915	0.250	0.0000
37	93.800	1.836	0.329	0.0565
38	96.600	1.599	0.566	0.1128
39	99.400	1.204	0.961	0.1690
40	102.200	0.654	1.511	0.2063
41	105.000	0.365	1.800	0.0000
42	108.000	0.647	1.518	-0.1881
43	111.000	1.200	0.965	-0.1591

Cable Numero 4

Definicion general

Seccion inicial ..... = 43 (Pasiva)
Seccion final ..... = 53 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 4

Se.	X	Y (s)	Y (i)	Pend.
43	111.000	1.200	0.965	-0.1591
44	114.000	1.598	0.567	-0.1059
45	117.000	1.836	0.329	-0.0529
46	120.000	1.915	0.250	0.0000
47	123.000	1.836	0.329	0.0529
48	126.000	1.598	0.567	0.1059
49	129.000	1.200	0.965	0.1591
50	132.000	0.647	1.518	0.1881
51	135.000	0.365	1.800	0.0000
52	138.000	0.647	1.518	-0.1881
53	141.000	1.200	0.965	-0.1591

Cable Numero 5

Definicion general

Seccion inicial ..... = 53 (Pasiva)
Seccion final ..... = 63 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 5

Se.	X	Y (s)	Y (i)	Pend.
53	141.000	1.200	0.965	-0.1591
54	144.000	1.598	0.567	-0.1059
55	147.000	1.836	0.329	-0.0529
56	150.000	1.915	0.250	0.0000
57	153.000	1.836	0.329	0.0529
58	156.000	1.598	0.567	0.1059
59	159.000	1.200	0.965	0.1591
60	162.000	0.647	1.518	0.1881
61	165.000	0.365	1.800	0.0000
62	168.000	0.647	1.518	-0.1881
63	171.000	1.200	0.965	-0.1591

Cable Numero 6

Definicion general

Seccion inicial ..... = 63 (Pasiva)
Seccion final ..... = 73 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 6

Se.	X	Y (s)	Y (i)	Pend.
63	171.000	1.200	0.965	-0.1591
64	174.000	1.598	0.567	-0.1059
65	177.000	1.836	0.329	-0.0529
66	180.000	1.915	0.250	0.0000
67	183.000	1.836	0.329	0.0529
68	186.000	1.598	0.567	0.1059
69	189.000	1.200	0.965	0.1591
70	192.000	0.647	1.518	0.1881
71	195.000	0.365	1.800	0.0000
72	197.100	0.500	1.665	-0.1289
73	199.200	0.850	1.315	-0.1627

Cable Numero 7

Definicion general

Seccion inicial ..... = 73 (Pasiva)
Seccion final ..... = 81 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 7

Se.	X	Y (s)	Y (i)	Pend.
73	199.200	0.850	1.315	-0.1627
74	201.300	1.151	1.014	-0.1238
75	203.400	1.370	0.795	-0.0850
76	205.500	1.507	0.658	-0.0461
77	207.600	1.564	0.601	-0.0074
78	209.700	1.545	0.620	0.0239
79	211.800	1.463	0.702	0.0534
80	213.900	1.320	0.845	0.0830
81	216.000	1.115	1.050	0.1125

Cable Numero 8

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 43 (Activa)

Fuerza de Pretensado ..... = 1918.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 8

Se.	X	Y (s)	Y (i)	Pend.
1	0.000	0.185	1.980	0.0000
2	2.100	0.185	1.980	0.0000
3	4.200	0.185	1.980	0.0000
4	6.300	0.185	1.980	0.0000
5	8.400	0.185	1.980	0.0000
6	10.500	0.185	1.980	0.0000
7	12.600	0.185	1.980	0.0000
8	14.700	0.185	1.980	0.0000
9	16.800	0.185	1.980	0.0000
10	18.900	0.185	1.980	0.0000
11	21.000	0.185	1.980	0.0000
12	23.800	0.185	1.980	0.0000
13	26.600	0.185	1.980	0.0000
14	29.400	0.185	1.980	0.0000
15	32.200	0.185	1.980	0.0000
16	35.000	0.185	1.980	0.0000
17	37.800	0.185	1.980	0.0000
18	40.600	0.185	1.980	0.0000
19	43.400	0.185	1.980	0.0000
20	46.200	0.185	1.980	0.0000
21	49.000	0.185	1.980	0.0000
22	51.800	0.185	1.980	0.0000
23	54.600	0.185	1.980	0.0000
24	57.400	0.185	1.980	0.0000
25	60.200	0.185	1.980	0.0000
26	63.000	0.185	1.980	0.0000
27	65.800	0.185	1.980	0.0000
28	68.600	0.185	1.980	0.0000
29	71.400	0.185	1.980	0.0000
30	74.200	0.185	1.980	0.0000
31	77.000	0.185	1.980	0.0000
32	79.800	0.185	1.980	0.0000
33	82.600	0.185	1.980	0.0000
34	85.400	0.185	1.980	0.0000
35	88.200	0.185	1.980	0.0000
36	91.000	0.185	1.980	0.0000
37	93.800	0.185	1.980	0.0000
38	96.600	0.185	1.980	0.0000
39	99.400	0.185	1.980	0.0000
40	102.200	0.185	1.980	0.0000
41	105.000	0.185	1.980	0.0000

Se.	X	Y (s)	Y (i)	Pend.
42	108.000	0.185	1.980	0.0000
43	111.000	0.185	1.980	0.0000

Cable Numero 9

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 43 (Activa)

Fuerza de Pretensado ..... = 1918.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 9

Se.	X	Y (s)	Y (i)	Pend.
1	0.000	1.980	0.185	0.0000
2	2.100	1.980	0.185	0.0000
3	4.200	1.980	0.185	0.0000
4	6.300	1.980	0.185	0.0000
5	8.400	1.980	0.185	0.0000
6	10.500	1.980	0.185	0.0000
7	12.600	1.980	0.185	0.0000
8	14.700	1.980	0.185	0.0000
9	16.800	1.980	0.185	0.0000
10	18.900	1.980	0.185	0.0000
11	21.000	1.980	0.185	0.0000
12	23.800	1.980	0.185	0.0000
13	26.600	1.980	0.185	0.0000
14	29.400	1.980	0.185	0.0000
15	32.200	1.980	0.185	0.0000
16	35.000	1.980	0.185	0.0000
17	37.800	1.980	0.185	0.0000
18	40.600	1.980	0.185	0.0000
19	43.400	1.980	0.185	0.0000
20	46.200	1.980	0.185	0.0000
21	49.000	1.980	0.185	0.0000
22	51.800	1.980	0.185	0.0000
23	54.600	1.980	0.185	0.0000
24	57.400	1.980	0.185	0.0000
25	60.200	1.980	0.185	0.0000
26	63.000	1.980	0.185	0.0000
27	65.800	1.980	0.185	0.0000
28	68.600	1.980	0.185	0.0000
29	71.400	1.980	0.185	0.0000
30	74.200	1.980	0.185	0.0000
31	77.000	1.980	0.185	0.0000
32	79.800	1.980	0.185	0.0000
33	82.600	1.980	0.185	0.0000
34	85.400	1.980	0.185	0.0000
35	88.200	1.980	0.185	0.0000
36	91.000	1.980	0.185	0.0000
37	93.800	1.980	0.185	0.0000
38	96.600	1.980	0.185	0.0000
39	99.400	1.980	0.185	0.0000
40	102.200	1.980	0.185	0.0000
41	105.000	1.980	0.185	0.0000

Se.	X	Y (s)	Y (i)	Pend.
42	108.000	1.980	0.185	0.0000
43	111.000	1.980	0.185	0.0000

Cable Numero 10

Definicion general

Seccion inicial ..... = 43 (Pasiva)
Seccion final ..... = 53 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 10

Se.	X	Y (s)	Y (i)	Pend.
43	111.000	0.185	1.980	0.0000
44	114.000	0.185	1.980	0.0000
45	117.000	0.185	1.980	0.0000
46	120.000	0.185	1.980	0.0000
47	123.000	0.185	1.980	0.0000
48	126.000	0.185	1.980	0.0000
49	129.000	0.185	1.980	0.0000
50	132.000	0.185	1.980	0.0000
51	135.000	0.185	1.980	0.0000
52	138.000	0.185	1.980	0.0000
53	141.000	0.185	1.980	0.0000

Cable Numero 11

Definicion general

Seccion inicial ..... = 43 (Pasiva)
Seccion final ..... = 53 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 11

Se.	X	Y (s)	Y (i)	Pend.
43	111.000	1.980	0.185	0.0000
44	114.000	1.980	0.185	0.0000
45	117.000	1.980	0.185	0.0000
46	120.000	1.980	0.185	0.0000
47	123.000	1.980	0.185	0.0000
48	126.000	1.980	0.185	0.0000
49	129.000	1.980	0.185	0.0000
50	132.000	1.980	0.185	0.0000
51	135.000	1.980	0.185	0.0000
52	138.000	1.980	0.185	0.0000
53	141.000	1.980	0.185	0.0000

Cable Numero 12

Definicion general

Seccion inicial ..... = 43 (Pasiva)
Seccion final ..... = 53 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 12

Se.	X	Y (s)	Y (i)	Pend.
43	111.000	1.865	0.300	0.0000
44	114.000	1.865	0.300	0.0000
45	117.000	1.865	0.300	0.0000
46	120.000	1.865	0.300	0.0000
47	123.000	1.865	0.300	0.0000
48	126.000	1.865	0.300	0.0000
49	129.000	1.865	0.300	0.0000
50	132.000	1.865	0.300	0.0000
51	135.000	1.865	0.300	0.0000
52	138.000	1.865	0.300	0.0000
53	141.000	1.865	0.300	0.0000

Cable Numero 13

Definicion general

Seccion inicial ..... = 53 (Pasiva)
Seccion final ..... = 63 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 13

Se.	X	Y (s)	Y (i)	Pend.
53	141.000	0.185	1.980	0.0000
54	144.000	0.185	1.980	0.0000
55	147.000	0.185	1.980	0.0000
56	150.000	0.185	1.980	0.0000
57	153.000	0.185	1.980	0.0000
58	156.000	0.185	1.980	0.0000
59	159.000	0.185	1.980	0.0000
60	162.000	0.185	1.980	0.0000
61	165.000	0.185	1.980	0.0000
62	168.000	0.185	1.980	0.0000
63	171.000	0.185	1.980	0.0000

Cable Numero 14

Definicion general

Seccion inicial ..... = 53 (Pasiva)
Seccion final ..... = 63 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 14

Se.	X	Y (s)	Y (i)	Pend.
53	141.000	1.980	0.185	0.0000
54	144.000	1.980	0.185	0.0000
55	147.000	1.980	0.185	0.0000
56	150.000	1.980	0.185	0.0000
57	153.000	1.980	0.185	0.0000
58	156.000	1.980	0.185	0.0000
59	159.000	1.980	0.185	0.0000
60	162.000	1.980	0.185	0.0000
61	165.000	1.980	0.185	0.0000
62	168.000	1.980	0.185	0.0000
63	171.000	1.980	0.185	0.0000

Cable Numero 15

Definicion general

Seccion inicial ..... = 53 (Pasiva)
Seccion final ..... = 63 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 15

Se.	X	Y (s)	Y (i)	Pend.
53	141.000	1.865	0.300	0.0000
54	144.000	1.865	0.300	0.0000
55	147.000	1.865	0.300	0.0000
56	150.000	1.865	0.300	0.0000
57	153.000	1.865	0.300	0.0000
58	156.000	1.865	0.300	0.0000
59	159.000	1.865	0.300	0.0000
60	162.000	1.865	0.300	0.0000
61	165.000	1.865	0.300	0.0000
62	168.000	1.865	0.300	0.0000
63	171.000	1.865	0.300	0.0000

Cable Numero 16

Definicion general

Seccion inicial ..... = 63 (Pasiva)
Seccion final ..... = 73 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 16

Se.	X	Y (s)	Y (i)	Pend.
63	171.000	0.185	1.980	0.0000
64	174.000	0.185	1.980	0.0000
65	177.000	0.185	1.980	0.0000
66	180.000	0.185	1.980	0.0000
67	183.000	0.185	1.980	0.0000
68	186.000	0.185	1.980	0.0000
69	189.000	0.185	1.980	0.0000
70	192.000	0.185	1.980	0.0000
71	195.000	0.185	1.980	0.0000
72	197.100	0.185	1.980	0.0000
73	199.200	0.185	1.980	0.0000

Cable Numero 17

Definicion general

Seccion inicial ..... = 63 (Pasiva)
Seccion final ..... = 73 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 17

Se.	X	Y (s)	Y (i)	Pend.
63	171.000	1.980	0.185	0.0000
64	174.000	1.980	0.185	0.0000
65	177.000	1.980	0.185	0.0000
66	180.000	1.980	0.185	0.0000
67	183.000	1.980	0.185	0.0000
68	186.000	1.980	0.185	0.0000
69	189.000	1.980	0.185	0.0000
70	192.000	1.980	0.185	0.0000
71	195.000	1.980	0.185	0.0000
72	197.100	1.980	0.185	0.0000
73	199.200	1.980	0.185	0.0000

Cable Numero 18

Definicion general

Seccion inicial ..... = 63 (Pasiva)
Seccion final ..... = 73 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 18

Se.	X	Y (s)	Y (i)	Pend.
63	171.000	1.865	0.300	0.0000
64	174.000	1.865	0.300	0.0000
65	177.000	1.865	0.300	0.0000
66	180.000	1.865	0.300	0.0000
67	183.000	1.865	0.300	0.0000
68	186.000	1.865	0.300	0.0000
69	189.000	1.865	0.300	0.0000
70	192.000	1.865	0.300	0.0000
71	195.000	1.865	0.300	0.0000
72	197.100	1.865	0.300	0.0000
73	199.200	1.865	0.300	0.0000

Cable Numero 19

Definicion general

Seccion inicial ..... = 73 (Pasiva)
Seccion final ..... = 81 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 19

Se.	X	Y (s)	Y (i)	Pend.
73	199.200	0.185	1.980	0.0000
74	201.300	0.185	1.980	0.0000
75	203.400	0.185	1.980	0.0000
76	205.500	0.185	1.980	0.0000
77	207.600	0.185	1.980	0.0000
78	209.700	0.185	1.980	0.0000
79	211.800	0.185	1.980	0.0000
80	213.900	0.185	1.980	0.0000
81	216.000	0.185	1.980	0.0000

Cable Numero 20

Definicion general

Seccion inicial ..... = 73 (Pasiva)
Seccion final ..... = 81 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 20

Se.	X	Y (s)	Y (i)	Pend.
73	199.200	1.980	0.185	0.0000
74	201.300	1.980	0.185	0.0000
75	203.400	1.980	0.185	0.0000
76	205.500	1.980	0.185	0.0000
77	207.600	1.980	0.185	0.0000
78	209.700	1.980	0.185	0.0000
79	211.800	1.980	0.185	0.0000
80	213.900	1.980	0.185	0.0000
81	216.000	1.980	0.185	0.0000

Definicion esfuerzos unitarios cable : 1

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
1	3834.000	-428.621	3809.966
2	3800.453	-314.239	3787.439
3	3767.086	-201.017	3761.719
4	3733.940	-89.239	3732.873
5	3699.691	27.292	3699.591
6	3660.027	168.685	3656.138
7	3620.853	306.491	3607.858
8	3582.248	440.183	3555.101
9	3544.286	569.296	3498.266
10	3478.676	444.620	3450.144
11	3377.349	0.000	3377.349
12	3224.680	-651.619	3158.157
13	3170.354	-528.328	3126.022
14	3129.942	-350.986	3110.200
15	3178.108	-179.319	3173.045
16	3227.375	0.000	3227.375
17	3277.406	184.922	3272.185
18	3327.841	373.178	3306.851
19	3378.436	563.005	3331.195
20	3436.328	694.387	3365.438
21	3599.017	0.000	3599.017
22	3769.409	-761.693	3691.648
23	3834.000	-638.923	3790.388

Alargamiento del cable ..... 312.4 mm.

Definicion esfuerzos unitarios cable : 2

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
23	3083.068	-513.782	3039.957
24	3129.942	-350.986	3110.200
25	3178.108	-179.319	3173.045
26	3227.375	0.000	3227.375
27	3277.406	184.922	3272.185
28	3327.841	373.178	3306.851
29	3378.436	563.005	3331.194
30	3436.327	694.388	3365.438
31	3599.017	0.000	3599.017
32	3769.409	-761.695	3691.648
33	3834.000	-638.923	3780.388

Alargamiento del cable ..... 159.1 mm.

Definicion esfuerzos unitarios cable : 3

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
33	3092.586	-515.369	3049.341
34	3139.604	-352.069	3119.802
35	3187.919	-179.873	3182.840
36	3237.338	0.000	3237.338
37	3287.524	185.493	3282.287
38	3338.114	374.330	3317.060
39	3388.866	564.743	3341.478
40	3446.936	696.531	3375.827
41	3610.128	0.000	3610.128
42	3768.088	-696.558	3703.146
43	3834.000	-602.240	3786.405

Alargamiento del cable ..... 161.6 mm.

Definicion esfuerzos unitarios cable : 4

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
43	3110.085	-488.529	3071.477
44	3156.288	-332.405	3138.735
45	3203.481	-169.184	3199.010
46	3251.491	0.000	3251.491
47	3300.222	174.293	3295.616
48	3349.567	352.760	3330.940
49	3399.327	533.962	3357.128
50	3458.789	639.382	3399.178
51	3610.128	0.000	3610.128
52	3768.088	-696.558	3703.146
53	3834.000	-602.240	3786.405

Alargamiento del cable ..... 171.1 mm.

Definicion esfuerzos unitarios cable : 5

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
53	3110.085	-488.529	3071.477
54	3156.288	-332.405	3138.735
55	3203.481	-169.184	3199.010
56	3251.491	0.000	3251.491
57	3300.222	174.293	3295.616
58	3349.567	352.760	3330.940
59	3399.327	533.962	3357.128
60	3458.789	639.382	3399.178
61	3610.128	0.000	3610.128
62	3768.088	-696.558	3703.146
63	3834.000	-602.240	3786.405

Alargamiento del cable ..... 171.1 mm.

Definicion esfuerzos unitarios cable : 6

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
63	3147.379	-494.387	3108.308
64	3194.136	-336.391	3176.373
65	3241.895	-171.213	3237.370
66	3290.481	0.000	3290.481
67	3339.795	176.383	3335.134
68	3389.732	356.990	3370.882
69	3440.089	540.365	3397.384
70	3500.264	647.049	3439.938
71	3653.417	0.000	3653.417
72	3763.026	-480.965	3732.162
73	3834.000	-615.831	3784.218

Alargamiento del cable ..... 161.7 mm.

Definicion esfuerzos unitarios cable : 7

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
73	3544.286	-569.296	3498.266
74	3582.248	-440.183	3555.101
75	3620.853	-306.491	3607.858
76	3660.027	-168.685	3656.138
77	3699.691	-27.291	3699.591
78	3733.939	89.239	3732.873
79	3767.086	201.017	3761.719
80	3800.452	314.239	3787.439
81	3834.000	428.621	3809.966

Alargamiento del cable ..... 101.8 mm.

Definicion esfuerzos unitarios cable : 8

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
1	1918.000	0.000	1918.000
2	1912.932	0.000	1912.932
3	1907.877	0.000	1907.877
4	1902.835	0.000	1902.835
5	1897.807	0.000	1897.807
6	1892.792	0.000	1892.792
7	1887.790	0.000	1887.790
8	1882.802	0.000	1882.802
9	1877.826	0.000	1877.826
10	1872.864	0.000	1872.864
11	1867.915	0.000	1867.915
12	1861.337	0.000	1861.337
13	1854.782	0.000	1854.782
14	1848.250	0.000	1848.250
15	1841.740	0.000	1841.740
16	1835.254	0.000	1835.254
17	1828.791	0.000	1828.791
18	1822.350	0.000	1822.350
19	1815.932	0.000	1815.932
20	1809.537	0.000	1809.537
21	1803.164	0.000	1803.164
22	1796.814	0.000	1796.814
23	1790.486	0.000	1790.486
24	1792.743	0.000	1792.743
25	1799.079	0.000	1799.079
26	1805.438	0.000	1805.438
27	1811.818	0.000	1811.818
28	1818.222	0.000	1818.222
29	1824.648	0.000	1824.648
30	1831.097	0.000	1831.097
31	1837.568	0.000	1837.568
32	1844.062	0.000	1844.062
33	1850.580	0.000	1850.580
34	1857.120	0.000	1857.120
35	1863.684	0.000	1863.684
36	1870.270	0.000	1870.270
37	1876.880	0.000	1876.880
38	1883.514	0.000	1883.514
39	1890.170	0.000	1890.170
40	1896.851	0.000	1896.851
41	1903.555	0.000	1903.555
42	1910.764	0.000	1910.764
43	1918.000	0.000	1918.000

Alargamiento del cable ..... 788.9 mm.

Definicion esfuerzos unitarios cable : 9

Se.	Acciones del cable Esf.un. (t)	Proy v. (t)	Proy.h. (t)
1	1918.000	0.000	1918.000
2	1912.932	0.000	1912.932
3	1907.877	0.000	1907.877
4	1902.835	0.000	1902.835
5	1897.807	0.000	1897.807
6	1892.792	0.000	1892.792
7	1887.790	0.000	1887.790
8	1882.802	0.000	1882.802
9	1877.826	0.000	1877.826
10	1872.864	0.000	1872.864
11	1867.915	0.000	1867.915
12	1861.337	0.000	1861.337
13	1854.782	0.000	1854.782
14	1848.250	0.000	1848.250
15	1841.740	0.000	1841.740
16	1835.254	0.000	1835.254
17	1828.791	0.000	1828.791
18	1822.350	0.000	1822.350
19	1815.932	0.000	1815.932
20	1809.537	0.000	1809.537
21	1803.164	0.000	1803.164
22	1796.814	0.000	1796.814
23	1790.486	0.000	1790.486
24	1792.743	0.000	1792.743
25	1799.079	0.000	1799.079
26	1805.438	0.000	1805.438
27	1811.818	0.000	1811.818
28	1818.222	0.000	1818.222
29	1824.648	0.000	1824.648
30	1831.097	0.000	1831.097
31	1837.568	0.000	1837.568
32	1844.062	0.000	1844.062
33	1850.580	0.000	1850.580
34	1857.120	0.000	1857.120
35	1863.684	0.000	1863.684
36	1870.270	0.000	1870.270
37	1876.880	0.000	1876.880
38	1883.514	0.000	1883.514
39	1890.170	0.000	1890.170
40	1896.851	0.000	1896.851
41	1903.555	0.000	1903.555
42	1910.764	0.000	1910.764
43	1918.000	0.000	1918.000

Alargamiento del cable ..... 788.7 mm.

Definicion esfuerzos unitarios cable : 12

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
43	923.426	0.000	923.426
44	926.924	0.000	926.924
45	930.434	0.000	930.434
46	933.958	0.000	933.958
47	937.495	0.000	937.495
48	941.045	0.000	941.045
49	944.609	0.000	944.609
50	948.186	0.000	948.186
51	951.777	0.000	951.777
52	955.382	0.000	955.382
53	959.000	0.000	959.000

Alargamiento del cable ..... 216.4 mm.

Definicion esfuerzos unitarios cable : 10

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
43	923.426	0.000	923.426
44	926.924	0.000	926.924
45	930.434	0.000	930.434
46	933.958	0.000	933.958
47	937.495	0.000	937.495
48	941.045	0.000	941.045
49	944.609	0.000	944.609
50	948.186	0.000	948.186
51	951.777	0.000	951.777
52	955.382	0.000	955.382
53	959.000	0.000	959.000

Alargamiento del cable ..... 216.4 mm.

Definicion esfuerzos unitarios cable : 11

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
43	923.426	0.000	923.426
44	926.924	0.000	926.924
45	930.434	0.000	930.434
46	933.958	0.000	933.958
47	937.495	0.000	937.495
48	941.045	0.000	941.045
49	944.609	0.000	944.609
50	948.186	0.000	948.186
51	951.777	0.000	951.777
52	955.382	0.000	955.382
53	959.000	0.000	959.000

Alargamiento del cable ..... 216.4 mm.

Definicion esfuerzos unitarios cable : 13

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
53	923.426	0.000	923.426
54	926.924	0.000	926.924
55	930.434	0.000	930.434
56	933.958	0.000	933.958
57	937.495	0.000	937.495
58	941.045	0.000	941.045
59	944.609	0.000	944.609
60	948.186	0.000	948.186
61	951.777	0.000	951.777
62	955.382	0.000	955.382
63	959.000	0.000	959.000

Alargamiento del cable ..... 216.4 mm.

Definicion esfuerzos unitarios cable : 14

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
53	923.426	0.000	923.426
54	926.924	0.000	926.924
55	930.434	0.000	930.434
56	933.958	0.000	933.958
57	937.495	0.000	937.495
58	941.045	0.000	941.045
59	944.609	0.000	944.609
60	948.186	0.000	948.186
61	951.777	0.000	951.777
62	955.382	0.000	955.382
63	959.000	0.000	959.000

Alargamiento del cable ..... 216.4 mm.

Definicion esfuerzos unitarios cable : 15

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
53	923.426	0.000	923.426
54	926.924	0.000	926.924
55	930.434	0.000	930.434
56	933.958	0.000	933.958
57	937.495	0.000	937.495
58	941.045	0.000	941.045
59	944.609	0.000	944.609
60	948.186	0.000	948.186
61	951.777	0.000	951.777
62	955.382	0.000	955.382
63	959.000	0.000	959.000

Alargamiento del cable ..... 216.4 mm.

Definicion esfuerzos unitarios cable : 16

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
63	925.523	0.000	925.523
64	929.028	0.000	929.028
65	932.547	0.000	932.547
66	936.078	0.000	936.078
67	939.623	0.000	939.623
68	943.182	0.000	943.182
69	946.754	0.000	946.754
70	950.339	0.000	950.339
71	953.938	0.000	953.938
72	956.466	0.000	956.466
73	959.000	0.000	959.000

Alargamiento del cable ..... 203.7 mm.

Definicion esfuerzos unitarios cable : 17

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
63	925.523	0.000	925.523
64	929.028	0.000	929.028
65	932.547	0.000	932.547
66	936.078	0.000	936.078
67	939.623	0.000	939.623
68	943.182	0.000	943.182
69	946.754	0.000	946.754
70	950.339	0.000	950.339
71	953.938	0.000	953.938
72	956.466	0.000	956.466
73	959.000	0.000	959.000

Alargamiento del cable ..... 203.7 mm.

Definicion esfuerzos unitarios cable : 18

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
63	925.523	0.000	925.523
64	929.028	0.000	929.028
65	932.547	0.000	932.547
66	936.078	0.000	936.078
67	939.623	0.000	939.623
68	943.182	0.000	943.182
69	946.754	0.000	946.754
70	950.339	0.000	950.339
71	953.938	0.000	953.938
72	956.466	0.000	956.466
73	959.000	0.000	959.000

Alargamiento del cable ..... 203.7 mm.

Definicion esfuerzos unitarios cable : 19

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
73	938.913	0.000	938.913
74	941.401	0.000	941.401
75	943.895	0.000	943.895
76	946.396	0.000	946.396
77	948.903	0.000	948.903
78	951.418	0.000	951.418
79	953.938	0.000	953.938
80	956.466	0.000	956.466
81	959.000	0.000	959.000

Alargamiento del cable ..... 122.2 mm.

Definicion esfuerzos unitarios cable : 20

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
73	938.913	0.000	938.913
74	941.401	0.000	941.401
75	943.895	0.000	943.895
76	946.396	0.000	946.396
77	948.903	0.000	948.903
78	951.418	0.000	951.418
79	953.938	0.000	953.938
80	956.466	0.000	956.466
81	959.000	0.000	959.000

Alargamiento del cable ..... 122.2 mm.

Esfuerzos unitarios debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-1190.16	576.9	-7890.0
		2	-2272.00	461.5	-7853.4
	2	2	-2272.27	192.0	-7868.3
		3	-2540.62	78.8	-7832.5
	3	3	-2540.62	78.8	-7832.5
		4	-2567.80	-33.0	-7793.6
	4	4	-2567.80	-33.0	-7793.6
		5	-2356.23	-149.6	-7750.2
	5	5	-2356.23	-149.6	-7750.2
		6	-1861.86	-290.9	-7696.8
	6	6	-1861.86	-290.9	-7696.8
		7	-1075.72	-428.7	-7638.5
	7	7	-1075.72	-428.7	-7638.5
		8	-11.29	-562.4	-7575.7
	8	8	-11.29	-562.4	-7575.7
		9	1315.98	-691.6	-7508.9
	9	9	1315.98	-691.6	-7508.9
		10	2780.80	-566.9	-7450.9
	10	10	2780.12	-821.9	-7428.1
		11	3997.75	-374.7	-7360.7
2	11	11	4000.59	253.4	-7362.5
		12	2269.29	898.8	-7113.5
	12	12	2267.12	715.6	-7135.9
		13	365.14	592.3	-7090.6
	13	13	365.14	592.3	-7090.6
		14	-1033.42	415.0	-7061.7
	14	14	-1033.42	415.0	-7061.7
		15	-2008.05	243.3	-7111.6
	15	15	-2008.05	243.3	-7111.6
		16	-2492.37	64.0	-7152.9
	16	16	-2492.38	64.0	-7152.9
		17	-2456.57	-120.9	-7184.8
	17	17	-2456.57	-120.9	-7184.8
		18	-1882.24	-309.2	-7206.6
	18	18	-1882.24	-309.2	-7206.6
		19	-761.77	-499.0	-7218.1
	19	19	-761.77	-499.0	-7218.1
		20	900.60	-630.4	-7239.5
	20	20	898.70	-821.9	-7237.0
		21	2351.01	-122.1	-7439.9
3	21	21	2352.28	191.8	-7458.6
		22	796.79	955.3	-7518.9
	22	22	797.43	761.7	-7540.3
		23	-1259.04	638.9	-7616.4

Esfuerzos unitarios debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	18.1	0.6
		2	-38.02	18.1	0.6
	2	2	-38.02	18.1	0.0
		3	-76.04	18.1	0.0
	3	3	-76.04	18.1	0.0
		4	-114.06	18.1	0.0
	4	4	-114.06	18.1	0.0
		5	-152.08	18.1	0.0
	5	5	-152.08	18.1	0.0
		6	-190.10	18.1	0.0
	6	6	-190.10	18.1	0.0
		7	-228.13	18.1	0.0
	7	7	-228.13	18.1	0.0
		8	-266.15	18.1	0.0
	8	8	-266.15	18.1	0.0
		9	-304.17	18.1	0.0
	9	9	-304.17	18.1	0.0
		10	-342.19	18.1	0.0
	10	10	-342.19	18.1	-0.6
		11	-380.21	18.1	-0.6
2	11	11	-380.21	-60.0	-1.5
		12	-212.24	-60.0	-1.5
	12	12	-212.24	-60.0	0.0
		13	-44.26	-60.0	0.0
	13	13	-44.26	-60.0	0.0
		14	123.71	-60.0	0.0
	14	14	123.71	-60.0	0.0
		15	291.68	-60.0	0.0
	15	15	291.68	-60.0	0.0
		16	459.66	-60.0	0.0
	16	16	459.66	-60.0	0.0
		17	627.63	-60.0	0.0
	17	17	627.63	-60.0	0.0
		18	795.60	-60.0	0.0
	18	18	795.60	-60.0	0.0
		19	963.57	-60.0	0.0
	19	19	963.57	-60.0	0.0
		20	1131.55	-60.0	0.0
	20	20	1131.55	-60.0	1.5
		21	1299.52	-60.0	1.5
3	21	21	1299.52	46.4	1.2
		22	1169.58	46.4	1.2
	22	22	1169.58	46.4	0.0
		23	1039.63	46.4	0.0
	23	23	27.19	560.2	-3040.0
		24	-1353.57	397.4	-3110.2
	24	24	-1353.57	397.4	-3110.2
		25	-2281.74	225.7	-3173.0

Esfuerzos unitarios debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-2281.73	225.7	-3173.0
		26	-2719.58	46.4	-3227.4
	26	26	-2719.58	46.4	-3227.4
		27	-2637.27	-138.5	-3272.2
	27	27	-2637.27	-138.5	-3272.2
		28	-2016.45	-326.8	-3306.9
	28	28	-2016.44	-326.8	-3306.9
		29	-849.46	-516.6	-3331.2
	29	29	-849.46	-516.6	-3331.2
		30	859.43	-648.0	-3365.4
	30	30	857.41	-740.3	-3363.8
		31	2078.24	-40.1	-3579.4
4	31	31	2079.51	92.5	-3598.5
		32	799.36	856.3	-3671.5
	32	32	800.10	761.7	-3691.6
		33	-1259.04	638.9	-3780.4

Esfuerzos unitarios debidos al cable 3

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-5.0	-0.2
		2	10.51	-5.0	-0.2
	2	2	10.51	-5.0	0.0
		3	21.02	-5.0	0.0
	3	3	21.02	-5.0	0.0
		4	31.52	-5.0	0.0
	4	4	31.52	-5.0	0.0
		5	42.03	-5.0	0.0
	5	5	42.03	-5.0	0.0
		6	52.54	-5.0	0.0
	6	6	52.54	-5.0	0.0
		7	63.05	-5.0	0.0
	7	7	63.05	-5.0	0.0
		8	73.56	-5.0	0.0
	8	8	73.56	-5.0	0.0
		9	84.07	-5.0	0.0
	9	9	84.07	-5.0	0.0
		10	94.57	-5.0	0.0
	10	10	94.57	-5.0	0.2
		11	105.08	-5.0	0.2
2	11	11	105.08	16.6	0.4
		12	58.66	16.6	0.4
	12	12	58.66	16.6	0.0
		13	12.23	16.6	0.0
	13	13	12.23	16.6	0.0
		14	-34.19	16.6	0.0
	14	14	-34.19	16.6	0.0
		15	-80.62	16.6	0.0
	15	15	-80.62	16.6	0.0
		16	-127.04	16.6	0.0
	16	16	-127.04	16.6	0.0
		17	-173.46	16.6	0.0
	17	17	-173.46	16.6	0.0
		18	-219.89	16.6	0.0
	18	18	-219.89	16.6	0.0
		19	-266.32	16.6	0.0
	19	19	-266.32	16.6	0.0
		20	-312.74	16.6	0.0
	20	20	-312.74	16.6	-0.4
		21	-359.16	16.6	-0.4
3	21	21	-359.16	-59.2	-1.5
		22	-193.46	-59.2	-1.5
	22	22	-193.46	-59.2	0.0
		23	-27.76	-59.2	0.0
	23	23	-27.76	-59.2	0.0
		24	137.94	-59.2	0.0
	24	24	137.94	-59.2	0.0
		25	303.64	-59.2	0.0

Esfuerzos unitarios debidos al cable 3

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	303.64	-59.2	0.0
		26	469.34	-59.2	0.0
	26	26	469.34	-59.2	0.0
		27	635.04	-59.2	0.0
	27	27	635.04	-59.2	0.0
		28	800.74	-59.2	0.0
	28	28	800.74	-59.2	0.0
		29	966.44	-59.2	0.0
	29	29	966.44	-59.2	0.0
		30	1132.14	-59.2	0.0
	30	30	1132.14	-59.2	1.5
		31	1297.84	-59.2	1.5
4	31	31	1297.84	46.3	1.2
		32	1168.07	46.3	1.2
	32	32	1168.07	46.3	0.0
		33	1038.29	46.3	0.0
	33	33	22.73	561.7	-3049.3
		34	-1361.73	398.4	-3119.8
	34	34	-1361.73	398.4	-3119.8
		35	-2292.19	226.2	-3182.8
	35	35	-2292.19	226.2	-3182.8
		36	-2730.81	46.3	-3237.3
	36	36	-2730.81	46.3	-3237.3
		37	-2647.69	-139.1	-3282.3
	37	37	-2647.69	-139.1	-3282.3
		38	-2024.38	-328.0	-3317.1
	38	38	-2024.38	-328.0	-3317.1
		39	-853.23	-518.4	-3341.5
	39	39	-853.23	-518.4	-3341.5
		40	861.51	-650.2	-3375.8
	40	40	859.48	-742.7	-3374.1
		41	2084.65	-40.4	-3590.5
5	41	41	2085.91	86.6	-3609.7
		42	829.72	785.2	-3686.0
	42	42	830.48	696.6	-3703.1
		43	-1246.28	602.2	-3786.4

Esfuerzos unitarios debidos al cable 4

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	2.2	0.1
		2	-4.61	2.2	0.1
	2	2	-4.61	2.2	0.0
		3	-9.22	2.2	0.0
	3	3	-9.22	2.2	0.0
		4	-13.83	2.2	0.0
	4	4	-13.83	2.2	0.0
		5	-18.44	2.2	0.0
	5	5	-18.44	2.2	0.0
		6	-23.06	2.2	0.0
	6	6	-23.06	2.2	0.0
		7	-27.67	2.2	0.0
	7	7	-27.67	2.2	0.0
		8	-32.28	2.2	0.0
	8	8	-32.28	2.2	0.0
		9	-36.89	2.2	0.0
	9	9	-36.89	2.2	0.0
		10	-41.50	2.2	0.0
	10	10	-41.50	2.2	-0.1
		11	-46.11	2.2	-0.1
2	11	11	-46.11	-7.3	-0.2
		12	-25.74	-7.3	-0.2
	12	12	-25.74	-7.3	0.0
		13	-5.37	-7.3	0.0
	13	13	-5.37	-7.3	0.0
		14	15.00	-7.3	0.0
	14	14	15.00	-7.3	0.0
		15	35.37	-7.3	0.0
	15	15	35.37	-7.3	0.0
		16	55.74	-7.3	0.0
	16	16	55.74	-7.3	0.0
		17	76.12	-7.3	0.0
	17	17	76.12	-7.3	0.0
		18	96.49	-7.3	0.0
	18	18	96.49	-7.3	0.0
		19	116.86	-7.3	0.0
	19	19	116.86	-7.3	0.0
		20	137.23	-7.3	0.0
	20	20	137.23	-7.3	0.2
		21	157.60	-7.3	0.2
3	21	21	157.60	26.0	0.7
		22	84.89	26.0	0.7
	22	22	84.89	26.0	0.0
		23	12.18	26.0	0.0
	23	23	12.18	26.0	0.0
		24	-60.53	26.0	0.0
	24	24	-60.53	26.0	0.0
		25	-133.24	26.0	0.0

Esfuerzos unitarios debidos al cable 4

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-133.24	26.0	0.0
		26	-205.94	26.0	0.0
	26	26	-205.94	26.0	0.0
		27	-278.65	26.0	0.0
	27	27	-278.65	26.0	0.0
		28	-351.36	26.0	0.0
	28	28	-351.36	26.0	0.0
		29	-424.07	26.0	0.0
	29	29	-424.07	26.0	0.0
		30	-496.78	26.0	0.0
	30	30	-496.78	26.0	-0.7
		31	-569.49	26.0	-0.7
4	31	31	-569.49	-94.1	-2.4
		32	-305.85	-94.1	-2.4
	32	32	-305.85	-94.2	0.0
		33	-42.22	-94.2	0.0
	33	33	-42.22	-94.2	0.0
		34	221.42	-94.2	0.0
	34	34	221.42	-94.2	0.0
		35	485.05	-94.2	0.0
	35	35	485.05	-94.2	0.0
		36	748.69	-94.2	0.0
	36	36	748.69	-94.2	0.0
		37	1012.33	-94.2	0.0
	37	37	1012.33	-94.2	0.0
		38	1275.96	-94.2	0.0
	38	38	1275.96	-94.2	0.0
		39	1539.60	-94.2	0.0
	39	39	1539.60	-94.2	0.0
		40	1803.23	-94.2	0.0
	40	40	1803.23	-94.1	2.4
		41	2066.87	-94.1	2.4
5	41	41	2066.87	68.9	1.7
		42	1860.19	68.9	1.7
	42	42	1860.19	68.9	0.0
		43	1653.51	68.9	0.0
	43	43	-665.95	557.4	-5841.8
		44	-2147.07	401.3	-5919.5
	44	44	-2147.07	401.3	-5919.5
		45	-3164.37	238.1	-5990.3
	45	45	-3164.37	238.1	-5990.3
		46	-3684.50	68.9	-6053.4
	46	46	-3684.50	68.9	-6053.4
		47	-3680.93	-105.4	-6108.1
	47	47	-3680.93	-105.4	-6108.1
		48	-3133.45	-283.9	-6154.1
	48	48	-3133.45	-283.9	-6154.1
		49	-2030.07	-465.1	-6191.0
	49	49	-2030.07	-465.1	-6191.0
		50	-374.52	-570.5	-6243.7

Esfuerzos unitarios debidos al cable 4

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	-376.44	-725.4	-6242.3
		51	941.66	-80.9	-6448.6
6	51	51	942.73	155.1	-6464.2
		52	-524.15	854.0	-6551.3
	52	52	-523.29	696.6	-6569.3
		53	-2605.19	602.2	-6663.4

Esfuerzos unitarios debidos al cable 5

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-0.6	0.0
		2	1.27	-0.6	0.0
	2	2	1.27	-0.6	0.0
		3	2.55	-0.6	0.0
	3	3	2.55	-0.6	0.0
		4	3.82	-0.6	0.0
	4	4	3.82	-0.6	0.0
		5	5.09	-0.6	0.0
	5	5	5.09	-0.6	0.0
		6	6.36	-0.6	0.0
	6	6	6.36	-0.6	0.0
		7	7.64	-0.6	0.0
	7	7	7.64	-0.6	0.0
		8	8.91	-0.6	0.0
	8	8	8.91	-0.6	0.0
		9	10.19	-0.6	0.0
	9	9	10.19	-0.6	0.0
		10	11.46	-0.6	0.0
	10	10	11.46	-0.6	0.0
		11	12.73	-0.6	0.0
2	11	11	12.73	2.0	0.1
		12	7.11	2.0	0.1
	12	12	7.11	2.0	0.0
		13	1.48	2.0	0.0
	13	13	1.48	2.0	0.0
		14	-4.14	2.0	0.0
	14	14	-4.14	2.0	0.0
		15	-9.77	2.0	0.0
	15	15	-9.77	2.0	0.0
		16	-15.39	2.0	0.0
	16	16	-15.39	2.0	0.0
		17	-21.02	2.0	0.0
	17	17	-21.02	2.0	0.0
		18	-26.64	2.0	0.0
	18	18	-26.64	2.0	0.0
		19	-32.26	2.0	0.0
	19	19	-32.26	2.0	0.0
		20	-37.89	2.0	0.0
	20	20	-37.89	2.0	-0.1
		21	-43.51	2.0	-0.1
3	21	21	-43.51	-7.2	-0.2
		22	-23.44	-7.2	-0.2
	22	22	-23.44	-7.2	0.0
		23	-3.36	-7.2	0.0
	23	23	-3.36	-7.2	0.0
		24	16.71	-7.2	0.0
	24	24	16.71	-7.2	0.0
		25	36.79	-7.2	0.0

Esfuerzos unitarios debidos al cable 5

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	36.79	-7.2	0.0
		26	56.86	-7.2	0.0
	26	26	56.86	-7.2	0.0
		27	76.94	-7.2	0.0
	27	27	76.94	-7.2	0.0
		28	97.01	-7.2	0.0
	28	28	97.01	-7.2	0.0
		29	117.09	-7.2	0.0
	29	29	117.09	-7.2	0.0
		30	137.16	-7.2	0.0
	30	30	137.16	-7.2	0.2
		31	157.24	-7.2	0.2
4	31	31	157.24	26.0	0.7
		32	84.45	26.0	0.7
	32	32	84.45	26.0	0.0
		33	11.66	26.0	0.0
	33	33	11.66	26.0	0.0
		34	-61.13	26.0	0.0
	34	34	-61.13	26.0	0.0
		35	-133.93	26.0	0.0
	35	35	-133.93	26.0	0.0
		36	-206.71	26.0	0.0
	36	36	-206.71	26.0	0.0
		37	-279.51	26.0	0.0
	37	37	-279.51	26.0	0.0
		38	-352.30	26.0	0.0
	38	38	-352.30	26.0	0.0
		39	-425.09	26.0	0.0
	39	39	-425.09	26.0	0.0
		40	-497.88	26.0	0.0
	40	40	-497.88	26.0	-0.7
		41	-570.67	26.0	-0.7
5	41	41	-570.67	-85.9	-2.1
		42	-312.80	-85.9	-2.1
	42	42	-312.80	-86.0	0.0
		43	-54.93	-86.0	0.0
	43	43	-54.93	-86.0	0.0
		44	202.93	-86.0	0.0
	44	44	202.93	-86.0	0.0
		45	460.80	-86.0	0.0
	45	45	460.80	-86.0	0.0
		46	718.67	-86.0	0.0
	46	46	718.67	-86.0	0.0
		47	976.54	-86.0	0.0
	47	47	976.54	-86.0	0.0
		48	1234.40	-86.0	0.0
	48	48	1234.40	-86.0	0.0
		49	1492.27	-86.0	0.0
	49	49	1492.27	-86.0	0.0
		50	1750.14	-86.0	0.0

Esfuerzos unitarios debidos al cable 5

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	1750.14	-85.9	2.1
		51	2008.01	-85.9	2.1
6	51	51	2008.01	66.9	1.6
		52	1807.21	66.9	1.6
	52	52	1807.21	66.9	0.0
		53	1606.42	66.9	0.0
	53	53	-713.04	555.5	-5841.8
		54	-2188.28	399.3	-5919.5
	54	54	-2188.28	399.3	-5919.5
		55	-3199.69	236.1	-5990.3
	55	55	-3199.69	236.1	-5990.3
		56	-3713.94	66.9	-6053.4
	56	56	-3713.94	66.9	-6053.4
		57	-3704.48	-107.4	-6108.1
	57	57	-3704.48	-107.4	-6108.1
		58	-3151.10	-285.8	-6154.1
	58	58	-3151.10	-285.8	-6154.1
		59	-2041.84	-467.0	-6191.0
	59	59	-2041.84	-467.0	-6191.0
		60	-380.40	-572.5	-6243.7
	60	60	-382.33	-727.4	-6242.2
		61	941.66	-82.9	-6448.6
7	61	61	942.73	155.1	-6464.2
		62	-524.15	854.0	-6551.3
	62	62	-523.29	696.6	-6569.3
		63	-2605.19	602.2	-6663.4

Esfuerzos unitarios debidos al cable 6

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	0.2	0.0
		2	-0.35	0.2	0.0
	2	2	-0.35	0.2	0.0
		3	-0.71	0.2	0.0
	3	3	-0.71	0.2	0.0
		4	-1.06	0.2	0.0
	4	4	-1.06	0.2	0.0
		5	-1.41	0.2	0.0
	5	5	-1.41	0.2	0.0
		6	-1.77	0.2	0.0
	6	6	-1.77	0.2	0.0
		7	-2.12	0.2	0.0
	7	7	-2.12	0.2	0.0
		8	-2.48	0.2	0.0
	8	8	-2.48	0.2	0.0
		9	-2.83	0.2	0.0
	9	9	-2.83	0.2	0.0
		10	-3.18	0.2	0.0
	10	10	-3.18	0.2	0.0
		11	-3.54	0.2	0.0
2	11	11	-3.54	-0.6	0.0
		12	-1.98	-0.6	0.0
	12	12	-1.98	-0.6	0.0
		13	-0.41	-0.6	0.0
	13	13	-0.41	-0.6	0.0
		14	1.15	-0.6	0.0
	14	14	1.15	-0.6	0.0
		15	2.71	-0.6	0.0
	15	15	2.71	-0.6	0.0
		16	4.28	-0.6	0.0
	16	16	4.28	-0.6	0.0
		17	5.84	-0.6	0.0
	17	17	5.84	-0.6	0.0
		18	7.40	-0.6	0.0
	18	18	7.40	-0.6	0.0
		19	8.97	-0.6	0.0
	19	19	8.97	-0.6	0.0
		20	10.53	-0.6	0.0
	20	20	10.53	-0.6	0.0
		21	12.09	-0.6	0.0
3	21	21	12.09	2.0	0.1
		22	6.51	2.0	0.1
	22	22	6.51	2.0	0.0
		23	0.94	2.0	0.0
	23	23	0.94	2.0	0.0
		24	-4.64	2.0	0.0
	24	24	-4.64	2.0	0.0
		25	-10.22	2.0	0.0

Esfuerzos unitarios debidos al cable 6

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-10.22	2.0	0.0
		26	-15.80	2.0	0.0
	26	26	-15.80	2.0	0.0
		27	-21.38	2.0	0.0
	27	27	-21.38	2.0	0.0
		28	-26.95	2.0	0.0
	28	28	-26.95	2.0	0.0
		29	-32.53	2.0	0.0
	29	29	-32.53	2.0	0.0
		30	-38.11	2.0	0.0
	30	30	-38.11	2.0	0.0
		31	-43.69	2.0	0.0
4	31	31	-43.69	-7.2	-0.2
		32	-23.46	-7.2	-0.2
	32	32	-23.46	-7.2	0.0
		33	-3.24	-7.2	0.0
	33	33	-3.24	-7.2	0.0
		34	16.99	-7.2	0.0
	34	34	16.99	-7.2	0.0
		35	37.21	-7.2	0.0
	35	35	37.21	-7.2	0.0
		36	57.44	-7.2	0.0
	36	36	57.44	-7.2	0.0
		37	77.66	-7.2	0.0
	37	37	77.66	-7.2	0.0
		38	97.89	-7.2	0.0
	38	38	97.89	-7.2	0.0
		39	118.11	-7.2	0.0
	39	39	118.11	-7.2	0.0
		40	138.34	-7.2	0.0
	40	40	138.34	-7.2	0.2
		41	158.56	-7.2	0.2
5	41	41	158.56	23.9	0.6
		42	86.91	23.9	0.6
	42	42	86.91	23.9	0.0
		43	15.26	23.9	0.0
	43	43	15.26	23.9	0.0
		44	-56.39	23.9	0.0
	44	44	-56.39	23.9	0.0
		45	-128.04	23.9	0.0
	45	45	-128.04	23.9	0.0
		46	-199.68	23.9	0.0
	46	46	-199.68	23.9	0.0
		47	-271.33	23.9	0.0
	47	47	-271.33	23.9	0.0
		48	-342.98	23.9	0.0
	48	48	-342.98	23.9	0.0
		49	-414.63	23.9	0.0
	49	49	-414.63	23.9	0.0
		50	-486.28	23.9	0.0

Esfuerzos unitarios debidos al cable 6

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	-486.28	23.9	-0.6
		51	-557.93	23.9	-0.6
6	51	51	-557.93	-85.9	-2.1
		52	-300.06	-85.9	-2.1
	52	52	-300.06	-86.0	0.0
		53	-42.20	-86.0	0.0
	53	53	-42.20	-86.0	0.0
		54	215.67	-86.0	0.0
	54	54	215.67	-86.0	0.0
		55	473.54	-86.0	0.0
	55	55	473.54	-86.0	0.0
		56	731.40	-86.0	0.0
	56	56	731.40	-86.0	0.0
		57	989.27	-86.0	0.0
	57	57	989.27	-86.0	0.0
		58	1247.13	-86.0	0.0
	58	58	1247.13	-86.0	0.0
		59	1505.00	-86.0	0.0
	59	59	1505.00	-86.0	0.0
		60	1762.86	-86.0	0.0
	60	60	1762.86	-85.9	2.1
		61	2020.73	-85.9	2.1
7	61	61	2020.73	67.3	1.6
		62	1818.66	67.3	1.6
	62	62	1818.66	67.4	0.0
		63	1616.60	67.4	0.0
	63	63	-717.96	561.7	-5884.9
		64	-2209.69	403.7	-5963.5
	64	64	-2209.69	403.7	-5963.5
		65	-3232.05	238.6	-6035.0
	65	65	-3232.05	238.6	-6035.0
		66	-3751.27	67.4	-6098.7
	66	66	-3751.27	67.4	-6098.7
		67	-3740.51	-109.0	-6154.0
	67	67	-3740.51	-109.0	-6154.0
		68	-3179.32	-289.6	-6200.4
	68	68	-3179.32	-289.6	-6200.4
		69	-2055.57	-473.0	-6237.6
	69	69	-2055.57	-473.0	-6237.6
		70	-373.02	-579.7	-6291.0
	70	70	-374.97	-735.8	-6289.4
		71	964.09	-83.6	-6498.1
8	71	71	965.33	223.3	-6512.4
		72	29.37	706.9	-6582.2
	72	72	30.07	481.0	-6601.6
		73	-1278.07	615.8	-6661.2

Esfuerzos unitarios debidos al cable 7

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	0.0	0.0
		2	0.05	0.0	0.0
	2	2	0.05	0.0	0.0
		3	0.09	0.0	0.0
	3	3	0.09	0.0	0.0
		4	0.13	0.0	0.0
	4	4	0.13	0.0	0.0
		5	0.18	0.0	0.0
	5	5	0.18	0.0	0.0
		6	0.22	0.0	0.0
	6	6	0.22	0.0	0.0
		7	0.27	0.0	0.0
	7	7	0.27	0.0	0.0
		8	0.31	0.0	0.0
	8	8	0.31	0.0	0.0
		9	0.36	0.0	0.0
	9	9	0.36	0.0	0.0
		10	0.40	0.0	0.0
	10	10	0.40	0.0	0.0
		11	0.45	0.0	0.0
2	11	11	0.45	0.1	0.0
		12	0.25	0.1	0.0
	12	12	0.25	0.1	0.0
		13	0.05	0.1	0.0
	13	13	0.05	0.1	0.0
		14	-0.15	0.1	0.0
	14	14	-0.15	0.1	0.0
		15	-0.34	0.1	0.0
	15	15	-0.34	0.1	0.0
		16	-0.54	0.1	0.0
	16	16	-0.54	0.1	0.0
		17	-0.74	0.1	0.0
	17	17	-0.74	0.1	0.0
		18	-0.94	0.1	0.0
	18	18	-0.94	0.1	0.0
		19	-1.13	0.1	0.0
	19	19	-1.13	0.1	0.0
		20	-1.33	0.1	0.0
	20	20	-1.33	0.1	0.0
		21	-1.53	0.1	0.0
3	21	21	-1.53	-0.3	0.0
		22	-0.82	-0.3	0.0
	22	22	-0.82	-0.3	0.0
		23	-0.12	-0.3	0.0
	23	23	-0.12	-0.3	0.0
		24	0.59	-0.3	0.0
	24	24	0.59	-0.3	0.0
		25	1.29	-0.3	0.0

Esfuerzos unitarios debidos al cable 7

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	1.29	-0.3	0.0
		26	2.00	-0.3	0.0
	26	26	2.00	-0.3	0.0
		27	2.70	-0.3	0.0
	27	27	2.70	-0.3	0.0
		28	3.41	-0.3	0.0
	28	28	3.41	-0.3	0.0
		29	4.12	-0.3	0.0
	29	29	4.12	-0.3	0.0
		30	4.82	-0.3	0.0
	30	30	4.82	-0.3	0.0
		31	5.53	-0.3	0.0
4	31	31	5.53	0.9	0.0
		32	2.97	0.9	0.0
	32	32	2.97	0.9	0.0
		33	0.41	0.9	0.0
	33	33	0.41	0.9	0.0
		34	-2.15	0.9	0.0
	34	34	-2.15	0.9	0.0
		35	-4.71	0.9	0.0
	35	35	-4.71	0.9	0.0
		36	-7.27	0.9	0.0
	36	36	-7.27	0.9	0.0
		37	-9.83	0.9	0.0
	37	37	-9.83	0.9	0.0
		38	-12.39	0.9	0.0
	38	38	-12.39	0.9	0.0
		39	-14.95	0.9	0.0
	39	39	-14.95	0.9	0.0
		40	-17.51	0.9	0.0
	40	40	-17.51	0.9	0.0
		41	-20.07	0.9	0.0
5	41	41	-20.07	-3.0	-0.1
		42	-11.00	-3.0	-0.1
	42	42	-11.00	-3.0	0.0
		43	-1.93	-3.0	0.0
	43	43	-1.93	-3.0	0.0
		44	7.14	-3.0	0.0
	44	44	7.14	-3.0	0.0
		45	16.20	-3.0	0.0
	45	45	16.20	-3.0	0.0
		46	25.27	-3.0	0.0
	46	46	25.27	-3.0	0.0
		47	34.34	-3.0	0.0
	47	47	34.34	-3.0	0.0
		48	43.40	-3.0	0.0
	48	48	43.40	-3.0	0.0
		49	52.47	-3.0	0.0
	49	49	52.47	-3.0	0.0
		50	61.54	-3.0	0.0

Esfuerzos unitarios debidos al cable 7

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	61.54	-3.0	0.1
		51	70.61	-3.0	0.1
6	51	51	70.61	10.9	0.3
		52	37.97	10.9	0.3
	52	52	37.97	10.9	0.0
		53	5.34	10.9	0.0
	53	53	5.34	10.9	0.0
		54	-27.29	10.9	0.0
	54	54	-27.29	10.9	0.0
		55	-59.93	10.9	0.0
	55	55	-59.93	10.9	0.0
		56	-92.56	10.9	0.0
	56	56	-92.56	10.9	0.0
		57	-125.19	10.9	0.0
	57	57	-125.19	10.9	0.0
		58	-157.83	10.9	0.0
	58	58	-157.83	10.9	0.0
		59	-190.46	10.9	0.0
	59	59	-190.46	10.9	0.0
		60	-223.10	10.9	0.0
	60	60	-223.10	10.9	-0.3
		61	-255.73	10.9	-0.3
7	61	61	-255.73	-39.5	-0.9
		62	-137.33	-39.5	-0.9
	62	62	-137.33	-39.5	0.0
		63	-18.93	-39.5	0.0
	63	63	-18.93	-39.5	0.0
		64	99.47	-39.5	0.0
	64	64	99.47	-39.5	0.0
		65	217.88	-39.5	0.0
	65	65	217.88	-39.5	0.0
		66	336.28	-39.5	0.0
	66	66	336.28	-39.5	0.0
		67	454.68	-39.5	0.0
	67	67	454.68	-39.5	0.0
		68	573.08	-39.5	0.0
	68	68	573.08	-39.5	0.0
		69	691.48	-39.5	0.0
	69	69	691.48	-39.5	0.0
		70	809.89	-39.5	0.0
	70	70	809.89	-39.5	0.9
		71	928.29	-39.5	0.9
8	71	71	928.29	44.2	1.5
		72	835.46	44.2	1.5
	72	72	835.46	44.2	0.0
		73	742.63	44.2	0.0
	73	73	420.19	613.5	-5376.1
		74	-742.11	484.4	-5437.9
	74	74	-742.11	484.4	-5437.9
		75	-1641.58	350.7	-5495.6

Esfuerzos unitarios debidos al cable 7

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	75	75	-1641.58	350.7	-5495.6
		76	-2262.75	212.9	-5548.9
	76	76	-2262.75	212.9	-5548.9
		77	-2592.14	71.5	-5597.4
	77	77	-2592.14	71.5	-5597.4
		78	-2638.73	-45.0	-5635.7
	78	78	-2638.73	-45.0	-5635.7
		79	-2446.57	-156.8	-5669.6
	79	79	-2446.57	-156.8	-5669.6
		80	-2013.24	-270.0	-5700.4
	80	80	-2013.01	-465.2	-5688.0
		81	-922.64	-580.5	-5711.6

Esfuerzos unitarios en estructura total debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-1190.16	574.9	-7634.9
		2	-2267.67	459.4	-7598.3
	2	2	-2267.95	198.7	-7613.3
		3	-2550.33	85.4	-7577.5
	3	3	-2550.33	85.4	-7577.5
		4	-2591.55	-26.3	-7538.5
	4	4	-2591.55	-26.3	-7538.5
		5	-2394.01	-142.9	-7495.2
	5	5	-2394.01	-142.9	-7495.2
		6	-1913.69	-284.3	-7441.7
	6	6	-1913.69	-284.3	-7441.7
		7	-1141.58	-422.1	-7383.4
	7	7	-1141.58	-422.1	-7383.4
		8	-91.18	-555.8	-7320.7
	8	8	-91.18	-555.8	-7320.7
		9	1222.04	-684.9	-7253.9
	9	9	1222.04	-684.9	-7253.9
		10	2672.83	-560.2	-7195.9
	10	10	2672.15	-806.5	-7173.4
		11	3857.38	-359.3	-7106.0
2	11	11	3860.22	227.7	-7108.1
		12	2200.67	873.2	-6859.0
	12	12	2198.50	696.5	-6880.8
		13	349.91	573.2	-6835.6
	13	13	349.92	573.2	-6835.6
		14	-995.26	395.9	-6806.7
	14	14	-995.26	395.9	-6806.7
		15	-1916.50	224.2	-6856.5
	15	15	-1916.50	224.2	-6856.5
		16	-2347.43	44.9	-6897.9
	16	16	-2347.43	44.9	-6897.9
		17	-2258.23	-140.0	-6929.8
	17	17	-2258.23	-140.0	-6929.8
		18	-1630.52	-328.3	-6951.6
	18	18	-1630.52	-328.3	-6951.6
		19	-456.66	-518.1	-6963.1
	19	19	-456.66	-518.1	-6963.1
		20	1259.11	-649.5	-6984.5
	20	20	1257.20	-834.4	-6981.6
		21	2744.54	-134.6	-7184.5
3	21	21	2745.81	202.9	-7203.2
		22	1159.31	966.4	-7263.5
	22	22	1159.94	779.3	-7285.3
		23	-945.91	656.6	-7361.4
	23	23	313.13	17.6	-3581.0
		24	262.80	17.6	-3585.5
	24	24	262.79	17.6	-3585.5
		25	210.73	17.6	-3598.2

Esfuerzos unitarios en estructura total debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	210.73	17.6	-3598.2
		26	158.66	17.6	-3610.9
	26	26	158.66	17.6	-3610.9
		27	106.58	17.6	-3623.6
	27	27	106.58	17.6	-3623.6
		28	54.49	17.6	-3636.4
	28	28	54.49	17.6	-3636.4
		29	2.40	17.6	-3649.3
	29	29	2.40	17.6	-3649.3
		30	-49.71	17.6	-3662.2
	30	30	-49.83	-76.8	-3661.5
		31	162.67	-76.5	-3674.4
4	31	31	162.67	95.9	-3673.9
		32	-108.64	96.2	-3686.8
	32	32	-108.53	1.4	-3688.1
		33	-115.24	1.4	-3701.2
	33	33	-115.24	1.4	-3701.2
		34	-121.96	1.4	-3714.2
	34	34	-121.96	1.4	-3714.2
		35	-128.69	1.4	-3727.4
	35	35	-128.69	1.4	-3727.4
		36	-135.43	1.4	-3740.5
	36	36	-135.43	1.4	-3740.5
		37	-142.17	1.4	-3753.8
	37	37	-142.18	1.4	-3753.8
		38	-148.93	1.4	-3767.0
	38	38	-148.93	1.4	-3767.0
		39	-155.70	1.4	-3780.3
	39	39	-155.70	1.4	-3780.3
		40	-162.47	1.4	-3793.7
	40	40	-162.59	-96.5	-3792.5
		41	104.74	-96.1	-3805.9
5	41	41	104.73	117.5	-3805.4
		42	-251.02	117.9	-3819.8
	42	42	-250.89	26.2	-3821.5
		43	-332.54	26.2	-3836.0
	43	43	478.77	26.2	0.0
		44	400.19	26.2	0.0
	44	44	400.19	26.2	0.0
		45	321.60	26.2	0.0
	45	45	321.60	26.2	0.0
		46	243.01	26.2	0.0
	46	46	243.01	26.2	0.0
		47	164.43	26.2	0.0
	47	47	164.43	26.2	0.0
		48	85.84	26.2	0.0
	48	48	85.84	26.2	0.0
		49	7.25	26.2	0.0
	49	49	7.25	26.2	0.0
		50	-71.34	26.2	0.0

Esfuerzos unitarios en estructura total debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	-71.34	26.2	-0.6
		51	-149.92	26.2	-0.6
6	51	51	-149.92	-6.4	-0.2
		52	-130.77	-6.4	-0.2
	52	52	-130.77	-6.4	0.0
		53	-111.62	-6.4	0.0
	53	53	-111.62	-6.4	0.0
		54	-92.47	-6.4	0.0
	54	54	-92.47	-6.4	0.0
		55	-73.32	-6.4	0.0
	55	55	-73.32	-6.4	0.0
		56	-54.17	-6.4	0.0
	56	56	-54.17	-6.4	0.0
		57	-35.02	-6.4	0.0
	57	57	-35.02	-6.4	0.0
		58	-15.86	-6.4	0.0
	58	58	-15.86	-6.4	0.0
		59	3.29	-6.4	0.0
	59	59	3.29	-6.4	0.0
		60	22.44	-6.4	0.0
	60	60	22.44	-6.4	0.2
		61	41.59	-6.4	0.2
7	61	61	41.59	1.8	0.0
		62	36.18	1.8	0.0
	62	62	36.18	1.8	0.0
		63	30.77	1.8	0.0
	63	63	30.77	1.8	0.0
		64	25.35	1.8	0.0
	64	64	25.35	1.8	0.0
		65	19.94	1.8	0.0
	65	65	19.94	1.8	0.0
		66	14.53	1.8	0.0
	66	66	14.53	1.8	0.0
		67	9.12	1.8	0.0
	67	67	9.12	1.8	0.0
		68	3.71	1.8	0.0
	68	68	3.71	1.8	0.0
		69	-1.70	1.8	0.0
	69	69	-1.70	1.8	0.0
		70	-7.11	1.8	0.0
	70	70	-7.11	1.8	0.0
		71	-12.53	1.8	0.0
8	71	71	-12.53	-0.6	0.0
		72	-11.27	-0.6	0.0
	72	72	-11.27	-0.6	0.0
		73	-10.02	-0.6	0.0
	73	73	-10.02	-0.6	0.0
		74	-8.77	-0.6	0.0
	74	74	-8.77	-0.6	0.0
		75	-7.51	-0.6	0.0

Esfuerzos unitarios en estructura total debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	75	75	-7.51	-0.6	0.0
		76	-6.26	-0.6	0.0
	76	76	-6.26	-0.6	0.0
		77	-5.01	-0.6	0.0
	77	77	-5.01	-0.6	0.0
		78	-3.76	-0.6	0.0
	78	78	-3.76	-0.6	0.0
		79	-2.51	-0.6	0.0
	79	79	-2.51	-0.6	0.0
		80	-1.25	-0.6	0.0
	80	80	-1.25	-0.6	0.0
		81	0.00	-0.6	0.0

Esfuerzos unitarios en estructura total debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	15.8	0.5
		2	-33.24	15.8	0.5
	2	2	-33.24	15.8	0.0
		3	-66.47	15.8	0.0
	3	3	-66.47	15.8	0.0
		4	-99.71	15.8	0.0
	4	4	-99.71	15.8	0.0
		5	-132.95	15.8	0.0
	5	5	-132.95	15.8	0.0
		6	-166.18	15.8	0.0
	6	6	-166.18	15.8	0.0
		7	-199.42	15.8	0.0
	7	7	-199.42	15.8	0.0
		8	-232.65	15.8	0.0
	8	8	-232.65	15.8	0.0
		9	-265.89	15.8	0.0
	9	9	-265.89	15.8	0.0
		10	-299.13	15.8	0.0
	10	10	-299.13	15.8	-0.5
		11	-332.36	15.8	-0.5
2	11	11	-332.36	-52.4	-1.3
		12	-185.53	-52.4	-1.3
	12	12	-185.53	-52.4	0.0
		13	-38.69	-52.4	0.0
	13	13	-38.69	-52.4	0.0
		14	108.14	-52.4	0.0
	14	14	108.14	-52.4	0.0
		15	254.98	-52.4	0.0
	15	15	254.98	-52.4	0.0
		16	401.82	-52.4	0.0
	16	16	401.82	-52.4	0.0
		17	548.65	-52.4	0.0
	17	17	548.65	-52.4	0.0
		18	695.49	-52.4	0.0
	18	18	695.49	-52.4	0.0
		19	842.32	-52.4	0.0
	19	19	842.32	-52.4	0.0
		20	989.16	-52.4	0.0
	20	20	989.16	-52.4	1.3
		21	1135.99	-52.4	1.3
3	21	21	1135.99	19.5	0.5
		22	1081.49	19.5	0.5
	22	22	1081.49	19.5	0.0
		23	1026.99	19.5	0.0
	23	23	14.55	533.2	-3040.0
		24	-1290.77	370.5	-3110.2
	24	24	-1290.77	370.5	-3110.2
		25	-2143.49	198.8	-3173.0

Esfuerzos unitarios en estructura total debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-2143.49	198.8	-3173.0
		26	-2505.89	19.5	-3227.4
	26	26	-2505.89	19.5	-3227.4
		27	-2348.15	-165.5	-3272.2
	27	27	-2348.15	-165.5	-3272.2
		28	-1651.87	-353.7	-3306.9
	28	28	-1651.87	-353.7	-3306.9
		29	-409.45	-543.5	-3331.2
	29	29	-409.45	-543.5	-3331.2
		30	1374.89	-674.9	-3365.4
	30	30	1372.87	-767.2	-3363.1
		31	2669.14	-67.0	-3578.7
4	31	31	2670.41	119.3	-3597.8
		32	1315.26	883.1	-3670.8
	32	32	1316.00	788.5	-3691.6
		33	-818.14	665.7	-3780.4
	33	33	440.90	26.8	0.0
		34	365.90	26.8	0.0
	34	34	365.90	26.8	0.0
		35	290.90	26.8	0.0
	35	35	290.90	26.8	0.0
		36	215.90	26.8	0.0
	36	36	215.90	26.8	0.0
		37	140.90	26.8	0.0
	37	37	140.90	26.8	0.0
		38	65.89	26.8	0.0
	38	38	65.89	26.8	0.0
		39	-9.11	26.8	0.0
	39	39	-9.11	26.8	0.0
		40	-84.11	26.8	0.0
	40	40	-84.11	26.8	-0.7
		41	-159.11	26.8	-0.7
5	41	41	-159.11	-6.8	-0.2
		42	-138.81	-6.8	-0.2
	42	42	-138.81	-6.8	0.0
		43	-118.52	-6.8	0.0
	43	43	-118.52	-6.8	0.0
		44	-98.22	-6.8	0.0
	44	44	-98.22	-6.8	0.0
		45	-77.93	-6.8	0.0
	45	45	-77.93	-6.8	0.0
		46	-57.63	-6.8	0.0
	46	46	-57.63	-6.8	0.0
		47	-37.33	-6.8	0.0
	47	47	-37.33	-6.8	0.0
		48	-17.04	-6.8	0.0
	48	48	-17.04	-6.8	0.0
		49	3.26	-6.8	0.0
	49	49	3.26	-6.8	0.0
		50	23.55	-6.8	0.0

Esfuerzos unitarios en estructura total debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	23.55	-6.8	0.2
		51	43.85	-6.8	0.2
6	51	51	43.85	1.9	0.0
		52	38.25	1.9	0.0
	52	52	38.25	1.9	0.0
		53	32.65	1.9	0.0
	53	53	32.65	1.9	0.0
		54	27.04	1.9	0.0
	54	54	27.04	1.9	0.0
		55	21.44	1.9	0.0
	55	55	21.44	1.9	0.0
		56	15.84	1.9	0.0
	56	56	15.84	1.9	0.0
		57	10.24	1.9	0.0
	57	57	10.24	1.9	0.0
		58	4.64	1.9	0.0
	58	58	4.64	1.9	0.0
		59	-0.96	1.9	0.0
	59	59	-0.96	1.9	0.0
		60	-6.56	1.9	0.0
	60	60	-6.56	1.9	0.0
		61	-12.16	1.9	0.0
7	61	61	-12.16	-0.5	0.0
		62	-10.58	-0.5	0.0
	62	62	-10.58	-0.5	0.0
		63	-9.00	-0.5	0.0
	63	63	-9.00	-0.5	0.0
		64	-7.41	-0.5	0.0
	64	64	-7.41	-0.5	0.0
		65	-5.83	-0.5	0.0
	65	65	-5.83	-0.5	0.0
		66	-4.25	-0.5	0.0
	66	66	-4.25	-0.5	0.0
		67	-2.67	-0.5	0.0
	67	67	-2.67	-0.5	0.0
		68	-1.09	-0.5	0.0
	68	68	-1.09	-0.5	0.0
		69	0.50	-0.5	0.0
	69	69	0.50	-0.5	0.0
		70	2.08	-0.5	0.0
	70	70	2.08	-0.5	0.0
		71	3.66	-0.5	0.0
8	71	71	3.66	0.2	0.0
		72	3.30	0.2	0.0
	72	72	3.30	0.2	0.0
		73	2.93	0.2	0.0
	73	73	2.93	0.2	0.0
		74	2.56	0.2	0.0
	74	74	2.56	0.2	0.0
		75	2.20	0.2	0.0

Esfuerzos unitarios en estructura total debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	75	75	2.20	0.2	0.0
		76	1.83	0.2	0.0
	76	76	1.83	0.2	0.0
		77	1.47	0.2	0.0
	77	77	1.47	0.2	0.0
		78	1.10	0.2	0.0
	78	78	1.10	0.2	0.0
		79	0.73	0.2	0.0
	79	79	0.73	0.2	0.0
		80	0.37	0.2	0.0
	80	80	0.37	0.2	0.0
		81	0.00	0.2	0.0

Esfuerzos unitarios en estructura total debidos al cable 3

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-4.4	-0.2
		2	9.27	-4.4	-0.2
	2	2	9.27	-4.4	0.0
		3	18.54	-4.4	0.0
	3	3	18.54	-4.4	0.0
		4	27.82	-4.4	0.0
	4	4	27.82	-4.4	0.0
		5	37.09	-4.4	0.0
	5	5	37.09	-4.4	0.0
		6	46.36	-4.4	0.0
	6	6	46.36	-4.4	0.0
		7	55.63	-4.4	0.0
	7	7	55.63	-4.4	0.0
		8	64.90	-4.4	0.0
	8	8	64.90	-4.4	0.0
		9	74.18	-4.4	0.0
	9	9	74.18	-4.4	0.0
		10	83.45	-4.4	0.0
	10	10	83.45	-4.4	0.2
		11	92.72	-4.4	0.2
2	11	11	92.72	14.6	0.4
		12	51.76	14.6	0.4
	12	12	51.76	14.6	0.0
		13	10.79	14.6	0.0
	13	13	10.79	14.6	0.0
		14	-30.17	14.6	0.0
	14	14	-30.17	14.6	0.0
		15	-71.13	14.6	0.0
	15	15	-71.13	14.6	0.0
		16	-112.10	14.6	0.0
	16	16	-112.10	14.6	0.0
		17	-153.06	14.6	0.0
	17	17	-153.06	14.6	0.0
		18	-194.02	14.6	0.0
	18	18	-194.02	14.6	0.0
		19	-234.99	14.6	0.0
	19	19	-234.99	14.6	0.0
		20	-275.95	14.6	0.0
	20	20	-275.95	14.6	-0.4
		21	-316.91	14.6	-0.4
3	21	21	-316.91	-52.2	-1.3
		22	-170.71	-52.2	-1.3
	22	22	-170.71	-52.2	0.0
		23	-24.50	-52.2	0.0
	23	23	-24.50	-52.2	0.0
		24	121.71	-52.2	0.0
	24	24	121.71	-52.2	0.0
		25	267.92	-52.2	0.0

Esfuerzos unitarios en estructura total debidos al cable 3

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	267.92	-52.2	0.0
		26	414.13	-52.2	0.0
	26	26	414.13	-52.2	0.0
		27	560.34	-52.2	0.0
	27	27	560.34	-52.2	0.0
		28	706.54	-52.2	0.0
	28	28	706.54	-52.2	0.0
		29	852.75	-52.2	0.0
	29	29	852.75	-52.2	0.0
		30	998.96	-52.2	0.0
	30	30	998.96	-52.2	1.3
		31	1145.17	-52.2	1.3
4	31	31	1145.17	21.1	0.5
		32	1086.07	21.1	0.5
	32	32	1086.07	21.1	0.0
		33	1026.97	21.1	0.0
	33	33	11.41	536.5	-3049.3
		34	-1302.37	373.2	-3119.8
	34	34	-1302.37	373.2	-3119.8
		35	-2162.15	201.0	-3182.8
	35	35	-2162.15	201.0	-3182.8
		36	-2530.10	21.1	-3237.3
	36	36	-2530.10	21.1	-3237.3
		37	-2376.29	-164.4	-3282.3
	37	37	-2376.29	-164.4	-3282.3
		38	-1682.30	-353.2	-3317.1
	38	38	-1682.30	-353.2	-3317.1
		39	-440.48	-543.6	-3341.5
	39	39	-440.48	-543.6	-3341.5
		40	1344.94	-675.4	-3375.8
	40	40	1342.91	-768.0	-3373.5
		41	2638.75	-65.7	-3589.8
5	41	41	2640.02	110.3	-3609.1
		42	1312.91	808.8	-3685.4
	42	42	1313.67	720.2	-3703.1
		43	-834.02	625.9	-3786.4
	43	43	412.27	23.6	0.0
		44	341.35	23.6	0.0
	44	44	341.35	23.6	0.0
		45	270.43	23.6	0.0
	45	45	270.43	23.6	0.0
		46	199.51	23.6	0.0
	46	46	199.51	23.6	0.0
		47	128.59	23.6	0.0
	47	47	128.59	23.6	0.0
		48	57.67	23.6	0.0
	48	48	57.67	23.6	0.0
		49	-13.25	23.6	0.0
	49	49	-13.25	23.6	0.0
		50	-84.17	23.6	0.0

Esfuerzos unitarios en estructura total debidos al cable 3

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	-84.17	23.6	-0.6
		51	-155.09	23.6	-0.6
6	51	51	-155.09	-6.6	-0.2
		52	-135.28	-6.6	-0.2
	52	52	-135.28	-6.6	0.0
		53	-115.46	-6.6	0.0
	53	53	-115.46	-6.6	0.0
		54	-95.65	-6.6	0.0
	54	54	-95.65	-6.6	0.0
		55	-75.84	-6.6	0.0
	55	55	-75.84	-6.6	0.0
		56	-56.03	-6.6	0.0
	56	56	-56.03	-6.6	0.0
		57	-36.22	-6.6	0.0
	57	57	-36.22	-6.6	0.0
		58	-16.41	-6.6	0.0
	58	58	-16.41	-6.6	0.0
		59	3.40	-6.6	0.0
	59	59	3.40	-6.6	0.0
		60	23.21	-6.6	0.0
	60	60	23.21	-6.6	0.2
		61	43.02	-6.6	0.2
7	61	61	43.02	1.9	0.0
		62	37.42	1.9	0.0
	62	62	37.42	1.9	0.0
		63	31.83	1.9	0.0
	63	63	31.83	1.9	0.0
		64	26.23	1.9	0.0
	64	64	26.23	1.9	0.0
		65	20.63	1.9	0.0
	65	65	20.63	1.9	0.0
		66	15.03	1.9	0.0
	66	66	15.03	1.9	0.0
		67	9.43	1.9	0.0
	67	67	9.43	1.9	0.0
		68	3.84	1.9	0.0
	68	68	3.84	1.9	0.0
		69	-1.76	1.9	0.0
	69	69	-1.76	1.9	0.0
		70	-7.36	1.9	0.0
	70	70	-7.36	1.9	0.0
		71	-12.96	1.9	0.0
8	71	71	-12.96	-0.6	0.0
		72	-11.66	-0.6	0.0
	72	72	-11.66	-0.6	0.0
		73	-10.37	-0.6	0.0
	73	73	-10.37	-0.6	0.0
		74	-9.07	-0.6	0.0
	74	74	-9.07	-0.6	0.0
		75	-7.77	-0.6	0.0

Esfuerzos unitarios en estructura total debidos al cable 3

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	75	75	-7.77	-0.6	0.0
		76	-6.48	-0.6	0.0
	76	76	-6.48	-0.6	0.0
		77	-5.18	-0.6	0.0
	77	77	-5.18	-0.6	0.0
		78	-3.89	-0.6	0.0
	78	78	-3.89	-0.6	0.0
		79	-2.59	-0.6	0.0
	79	79	-2.59	-0.6	0.0
		80	-1.30	-0.6	0.0
	80	80	-1.30	-0.6	0.0
		81	0.00	-0.6	0.0

Esfuerzos unitarios en estructura total debidos al cable 4

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	1.6	0.1
		2	-3.43	1.6	0.1
	2	2	-3.43	1.6	0.0
		3	-6.86	1.6	0.0
	3	3	-6.86	1.6	0.0
		4	-10.29	1.6	0.0
	4	4	-10.29	1.6	0.0
		5	-13.72	1.6	0.0
	5	5	-13.72	1.6	0.0
		6	-17.15	1.6	0.0
	6	6	-17.15	1.6	0.0
		7	-20.58	1.6	0.0
	7	7	-20.58	1.6	0.0
		8	-24.02	1.6	0.0
	8	8	-24.02	1.6	0.0
		9	-27.45	1.6	0.0
	9	9	-27.45	1.6	0.0
		10	-30.88	1.6	0.0
	10	10	-30.88	1.6	-0.1
		11	-34.31	1.6	-0.1
2	11	11	-34.31	-5.4	-0.1
		12	-19.15	-5.4	-0.1
	12	12	-19.15	-5.4	0.0
		13	-3.99	-5.4	0.0
	13	13	-3.99	-5.4	0.0
		14	11.16	-5.4	0.0
	14	14	11.16	-5.4	0.0
		15	26.32	-5.4	0.0
	15	15	26.32	-5.4	0.0
		16	41.48	-5.4	0.0
	16	16	41.48	-5.4	0.0
		17	56.63	-5.4	0.0
	17	17	56.63	-5.4	0.0
		18	71.79	-5.4	0.0
	18	18	71.79	-5.4	0.0
		19	86.95	-5.4	0.0
	19	19	86.95	-5.4	0.0
		20	102.11	-5.4	0.0
	20	20	102.11	-5.4	0.1
		21	117.26	-5.4	0.1
3	21	21	117.26	19.3	0.5
		22	63.16	19.3	0.5
	22	22	63.16	19.3	0.0
		23	9.06	19.3	0.0
	23	23	9.06	19.3	0.0
		24	-45.04	19.3	0.0
	24	24	-45.04	19.3	0.0
		25	-99.14	19.3	0.0

Esfuerzos unitarios en estructura total debidos al cable 4

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-99.14	19.3	0.0
		26	-153.24	19.3	0.0
	26	26	-153.24	19.3	0.0
		27	-207.34	19.3	0.0
	27	27	-207.34	19.3	0.0
		28	-261.44	19.3	0.0
	28	28	-261.44	19.3	0.0
		29	-315.54	19.3	0.0
	29	29	-315.54	19.3	0.0
		30	-369.64	19.3	0.0
	30	30	-369.64	19.3	-0.5
		31	-423.74	19.3	-0.5
4	31	31	-423.74	-70.0	-1.8
		32	-227.57	-70.0	-1.8
	32	32	-227.57	-70.1	0.0
		33	-31.41	-70.1	0.0
	33	33	-31.41	-70.1	0.0
		34	164.75	-70.1	0.0
	34	34	164.75	-70.1	0.0
		35	360.91	-70.1	0.0
	35	35	360.91	-70.1	0.0
		36	557.07	-70.1	0.0
	36	36	557.07	-70.1	0.0
		37	753.23	-70.1	0.0
	37	37	753.23	-70.1	0.0
		38	949.40	-70.1	0.0
	38	38	949.40	-70.1	0.0
		39	1145.56	-70.1	0.0
	39	39	1145.56	-70.1	0.0
		40	1341.72	-70.1	0.0
	40	40	1341.72	-70.0	1.8
		41	1537.88	-70.0	1.8
5	41	41	1537.88	-10.8	-0.3
		42	1570.24	-10.8	-0.3
	42	42	1570.24	-10.8	0.0
		43	1602.59	-10.8	0.0
	43	43	-716.87	477.7	-5841.8
		44	-1958.96	321.6	-5919.5
	44	44	-1958.96	321.6	-5919.5
		45	-2737.22	158.4	-5990.3
	45	45	-2737.22	158.4	-5990.3
		46	-3018.32	-10.8	-6053.4
	46	46	-3018.32	-10.8	-6053.4
		47	-2775.72	-185.1	-6108.1
	47	47	-2775.72	-185.1	-6108.1
		48	-1989.20	-363.5	-6154.1
	48	48	-1989.20	-363.5	-6154.1
		49	-646.79	-544.7	-6191.0
	49	49	-646.79	-544.7	-6191.0
		50	1247.80	-650.2	-6243.7

Esfuerzos unitarios en estructura total debidos al cable 4

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	1245.87	-805.1	-6240.4
		51	2803.01	-160.6	-6446.7
6	51	51	2804.07	233.0	-6462.3
		52	1103.54	931.8	-6549.4
	52	52	1104.40	774.4	-6569.3
		53	-1211.16	680.1	-6663.4
	53	53	1394.03	77.9	0.0
		54	1160.38	77.9	0.0
	54	54	1160.38	77.9	0.0
		55	926.72	77.9	0.0
	55	55	926.72	77.9	0.0
		56	693.06	77.9	0.0
	56	56	693.06	77.9	0.0
		57	459.41	77.9	0.0
	57	57	459.41	77.9	0.0
		58	225.75	77.9	0.0
	58	58	225.75	77.9	0.0
		59	-7.91	77.9	0.0
	59	59	-7.91	77.9	0.0
		60	-241.56	77.9	0.0
	60	60	-241.56	77.9	-1.9
		61	-475.22	77.9	-1.9
7	61	61	-475.22	-20.6	-0.5
		62	-413.38	-20.6	-0.5
	62	62	-413.38	-20.6	0.0
		63	-351.55	-20.6	0.0
	63	63	-351.55	-20.6	0.0
		64	-289.71	-20.6	0.0
	64	64	-289.71	-20.6	0.0
		65	-227.88	-20.6	0.0
	65	65	-227.88	-20.6	0.0
		66	-166.04	-20.6	0.0
	66	66	-166.04	-20.6	0.0
		67	-104.21	-20.6	0.0
	67	67	-104.21	-20.6	0.0
		68	-42.38	-20.6	0.0
	68	68	-42.38	-20.6	0.0
		69	19.46	-20.6	0.0
	69	69	19.46	-20.6	0.0
		70	81.29	-20.6	0.0
	70	70	81.29	-20.6	0.5
		71	143.13	-20.6	0.5
8	71	71	143.13	6.8	0.2
		72	128.81	6.8	0.2
	72	72	128.81	6.8	0.0
		73	114.50	6.8	0.0
	73	73	114.50	6.8	0.0
		74	100.19	6.8	0.0
	74	74	100.19	6.8	0.0
		75	85.88	6.8	0.0

Esfuerzos unitarios en estructura total debidos al cable 4

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	75	75	85.88	6.8	0.0
		76	71.56	6.8	0.0
	76	76	71.56	6.8	0.0
		77	57.25	6.8	0.0
	77	77	57.25	6.8	0.0
		78	42.94	6.8	0.0
	78	78	42.94	6.8	0.0
		79	28.63	6.8	0.0
	79	79	28.63	6.8	0.0
		80	14.31	6.8	0.0
	80	80	14.31	6.8	-0.2
		81	0.00	6.8	-0.2

Esfuerzos unitarios en estructura total debidos al cable 5

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-0.4	0.0
		2	0.94	-0.4	0.0
	2	2	0.94	-0.4	0.0
		3	1.89	-0.4	0.0
	3	3	1.89	-0.4	0.0
		4	2.83	-0.4	0.0
	4	4	2.83	-0.4	0.0
		5	3.77	-0.4	0.0
	5	5	3.77	-0.4	0.0
		6	4.71	-0.4	0.0
	6	6	4.71	-0.4	0.0
		7	5.66	-0.4	0.0
	7	7	5.66	-0.4	0.0
		8	6.60	-0.4	0.0
	8	8	6.60	-0.4	0.0
		9	7.54	-0.4	0.0
	9	9	7.54	-0.4	0.0
		10	8.48	-0.4	0.0
	10	10	8.48	-0.4	0.0
		11	9.43	-0.4	0.0
2	11	11	9.43	1.5	0.0
		12	5.26	1.5	0.0
	12	12	5.26	1.5	0.0
		13	1.10	1.5	0.0
	13	13	1.10	1.5	0.0
		14	-3.07	1.5	0.0
	14	14	-3.07	1.5	0.0
		15	-7.23	1.5	0.0
	15	15	-7.23	1.5	0.0
		16	-11.40	1.5	0.0
	16	16	-11.40	1.5	0.0
		17	-15.56	1.5	0.0
	17	17	-15.56	1.5	0.0
		18	-19.73	1.5	0.0
	18	18	-19.73	1.5	0.0
		19	-23.89	1.5	0.0
	19	19	-23.89	1.5	0.0
		20	-28.06	1.5	0.0
	20	20	-28.06	1.5	0.0
		21	-32.22	1.5	0.0
3	21	21	-32.22	-5.3	-0.1
		22	-17.36	-5.3	-0.1
	22	22	-17.36	-5.3	0.0
		23	-2.49	-5.3	0.0
	23	23	-2.49	-5.3	0.0
		24	12.38	-5.3	0.0
	24	24	12.38	-5.3	0.0
		25	27.24	-5.3	0.0

Esfuerzos unitarios en estructura total debidos al cable 5

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	27.24	-5.3	0.0
		26	42.11	-5.3	0.0
	26	26	42.11	-5.3	0.0
		27	56.98	-5.3	0.0
	27	27	56.98	-5.3	0.0
		28	71.84	-5.3	0.0
	28	28	71.84	-5.3	0.0
		29	86.71	-5.3	0.0
	29	29	86.71	-5.3	0.0
		30	101.58	-5.3	0.0
	30	30	101.58	-5.3	0.1
		31	116.44	-5.3	0.1
4	31	31	116.44	19.2	0.5
		32	62.54	19.2	0.5
	32	32	62.54	19.3	0.0
		33	8.63	19.3	0.0
	33	33	8.63	19.3	0.0
		34	-45.27	19.3	0.0
	34	34	-45.27	19.3	0.0
		35	-99.18	19.3	0.0
	35	35	-99.18	19.3	0.0
		36	-153.09	19.3	0.0
	36	36	-153.09	19.3	0.0
		37	-206.99	19.3	0.0
	37	37	-206.99	19.3	0.0
		38	-260.90	19.3	0.0
	38	38	-260.90	19.3	0.0
		39	-314.81	19.3	0.0
	39	39	-314.81	19.3	0.0
		40	-368.71	19.3	0.0
	40	40	-368.71	19.2	-0.5
		41	-422.62	19.2	-0.5
5	41	41	-422.62	-63.6	-1.5
		42	-231.65	-63.6	-1.5
	42	42	-231.65	-63.7	0.0
		43	-40.68	-63.7	0.0
	43	43	-40.68	-63.7	0.0
		44	150.29	-63.7	0.0
	44	44	150.29	-63.7	0.0
		45	341.26	-63.7	0.0
	45	45	341.26	-63.7	0.0
		46	532.23	-63.7	0.0
	46	46	532.23	-63.7	0.0
		47	723.20	-63.7	0.0
	47	47	723.20	-63.7	0.0
		48	914.16	-63.7	0.0
	48	48	914.16	-63.7	0.0
		49	1105.13	-63.7	0.0
	49	49	1105.13	-63.7	0.0
		50	1296.10	-63.7	0.0

Esfuerzos unitarios en estructura total debidos al cable 5

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	1296.10	-63.6	1.5
		51	1487.07	-63.6	1.5
6	51	51	1487.07	-13.3	-0.3
		52	1527.05	-13.3	-0.3
	52	52	1527.05	-13.3	0.0
		53	1567.02	-13.3	0.0
	53	53	-752.44	475.2	-5841.8
		54	-1986.91	319.1	-5919.5
	54	54	-1986.91	319.1	-5919.5
		55	-2757.55	155.9	-5990.3
	55	55	-2757.55	155.9	-5990.3
		56	-3031.03	-13.3	-6053.4
	56	56	-3031.03	-13.3	-6053.4
		57	-2780.81	-187.6	-6108.1
	57	57	-2780.81	-187.6	-6108.1
		58	-1986.67	-366.1	-6154.1
	58	58	-1986.67	-366.1	-6154.1
		59	-636.64	-547.3	-6191.0
	59	59	-636.64	-547.3	-6191.0
		60	1265.57	-652.7	-6243.7
	60	60	1263.54	-807.6	-6240.3
		61	2828.40	-163.1	-6446.6
7	61	61	2829.47	235.5	-6462.2
		62	1121.56	934.3	-6549.3
	62	62	1122.42	776.9	-6569.3
		63	-1200.52	682.6	-6663.4
	63	63	1404.67	80.3	0.0
		64	1163.64	80.3	0.0
	64	64	1163.64	80.3	0.0
		65	922.60	80.3	0.0
	65	65	922.60	80.3	0.0
		66	681.57	80.3	0.0
	66	66	681.57	80.3	0.0
		67	440.54	80.3	0.0
	67	67	440.54	80.3	0.0
		68	199.50	80.3	0.0
	68	68	199.50	80.3	0.0
		69	-41.53	80.3	0.0
	69	69	-41.53	80.3	0.0
		70	-282.57	80.3	0.0
	70	70	-282.57	80.3	-1.9
		71	-523.60	80.3	-1.9
8	71	71	-523.60	-24.9	-0.9
		72	-471.24	-24.9	-0.9
	72	72	-471.24	-24.9	0.0
		73	-418.88	-24.9	0.0
	73	73	-418.88	-24.9	0.0
		74	-366.52	-24.9	0.0
	74	74	-366.52	-24.9	0.0
		75	-314.16	-24.9	0.0

Esfuerzos unitarios en estructura total debidos al cable 5

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	75	75	-314.16	-24.9	0.0
		76	-261.80	-24.9	0.0
	76	76	-261.80	-24.9	0.0
		77	-209.44	-24.9	0.0
	77	77	-209.44	-24.9	0.0
		78	-157.08	-24.9	0.0
	78	78	-157.08	-24.9	0.0
		79	-104.72	-24.9	0.0
	79	79	-104.72	-24.9	0.0
		80	-52.36	-24.9	0.0
	80	80	-52.36	-24.9	0.9
		81	0.00	-24.9	0.9

Esfuerzos unitarios en estructura total debidos al cable 6

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	0.1	0.0
		2	-0.26	0.1	0.0
	2	2	-0.26	0.1	0.0
		3	-0.52	0.1	0.0
	3	3	-0.52	0.1	0.0
		4	-0.79	0.1	0.0
	4	4	-0.79	0.1	0.0
		5	-1.05	0.1	0.0
	5	5	-1.05	0.1	0.0
		6	-1.31	0.1	0.0
	6	6	-1.31	0.1	0.0
		7	-1.57	0.1	0.0
	7	7	-1.57	0.1	0.0
		8	-1.83	0.1	0.0
	8	8	-1.83	0.1	0.0
		9	-2.10	0.1	0.0
	9	9	-2.10	0.1	0.0
		10	-2.36	0.1	0.0
	10	10	-2.36	0.1	0.0
		11	-2.62	0.1	0.0
2	11	11	-2.62	-0.4	0.0
		12	-1.46	-0.4	0.0
	12	12	-1.46	-0.4	0.0
		13	-0.31	-0.4	0.0
	13	13	-0.31	-0.4	0.0
		14	0.85	-0.4	0.0
	14	14	0.85	-0.4	0.0
		15	2.01	-0.4	0.0
	15	15	2.01	-0.4	0.0
		16	3.17	-0.4	0.0
	16	16	3.17	-0.4	0.0
		17	4.33	-0.4	0.0
	17	17	4.33	-0.4	0.0
		18	5.48	-0.4	0.0
	18	18	5.48	-0.4	0.0
		19	6.64	-0.4	0.0
	19	19	6.64	-0.4	0.0
		20	7.80	-0.4	0.0
	20	20	7.80	-0.4	0.0
		21	8.96	-0.4	0.0
3	21	21	8.96	1.5	0.0
		22	4.82	1.5	0.0
	22	22	4.82	1.5	0.0
		23	0.69	1.5	0.0
	23	23	0.69	1.5	0.0
		24	-3.44	1.5	0.0
	24	24	-3.44	1.5	0.0
		25	-7.57	1.5	0.0

Esfuerzos unitarios en estructura total debidos al cable 6

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-7.57	1.5	0.0
		26	-11.70	1.5	0.0
	26	26	-11.70	1.5	0.0
		27	-15.84	1.5	0.0
	27	27	-15.84	1.5	0.0
		28	-19.97	1.5	0.0
	28	28	-19.97	1.5	0.0
		29	-24.10	1.5	0.0
	29	29	-24.10	1.5	0.0
		30	-28.24	1.5	0.0
	30	30	-28.24	1.5	0.0
		31	-32.37	1.5	0.0
4	31	31	-32.37	-5.3	-0.1
		32	-17.38	-5.3	-0.1
	32	32	-17.38	-5.4	0.0
		33	-2.40	-5.4	0.0
	33	33	-2.40	-5.4	0.0
		34	12.58	-5.4	0.0
	34	34	12.58	-5.4	0.0
		35	27.57	-5.4	0.0
	35	35	27.57	-5.4	0.0
		36	42.55	-5.4	0.0
	36	36	42.55	-5.4	0.0
		37	57.54	-5.4	0.0
	37	37	57.54	-5.4	0.0
		38	72.52	-5.4	0.0
	38	38	72.52	-5.4	0.0
		39	87.50	-5.4	0.0
	39	39	87.50	-5.4	0.0
		40	102.49	-5.4	0.0
	40	40	102.49	-5.3	0.1
		41	117.47	-5.3	0.1
5	41	41	117.47	17.7	0.4
		42	64.39	17.7	0.4
	42	42	64.39	17.7	0.0
		43	11.31	17.7	0.0
	43	43	11.31	17.7	0.0
		44	-41.77	17.7	0.0
	44	44	-41.77	17.7	0.0
		45	-94.86	17.7	0.0
	45	45	-94.86	17.7	0.0
		46	-147.94	17.7	0.0
	46	46	-147.94	17.7	0.0
		47	-201.02	17.7	0.0
	47	47	-201.02	17.7	0.0
		48	-254.10	17.7	0.0
	48	48	-254.10	17.7	0.0
		49	-307.18	17.7	0.0
	49	49	-307.18	17.7	0.0
		50	-360.27	17.7	0.0

Esfuerzos unitarios en estructura total debidos al cable 6

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	-360.27	17.7	-0.4
		51	-413.35	17.7	-0.4
6	51	51	-413.35	-63.7	-1.5
		52	-222.30	-63.7	-1.5
	52	52	-222.30	-63.7	0.0
		53	-31.26	-63.7	0.0
	53	53	-31.26	-63.7	0.0
		54	159.78	-63.7	0.0
	54	54	159.78	-63.7	0.0
		55	350.82	-63.7	0.0
	55	55	350.82	-63.7	0.0
		56	541.87	-63.7	0.0
	56	56	541.87	-63.7	0.0
		57	732.91	-63.7	0.0
	57	57	732.91	-63.7	0.0
		58	923.95	-63.7	0.0
	58	58	923.95	-63.7	0.0
		59	1114.99	-63.7	0.0
	59	59	1114.99	-63.7	0.0
		60	1306.04	-63.7	0.0
	60	60	1306.04	-63.7	1.5
		61	1497.08	-63.7	1.5
7	61	61	1497.08	-13.5	-0.3
		62	1537.46	-13.5	-0.3
	62	62	1537.46	-13.5	0.0
		63	1577.84	-13.5	0.0
	63	63	-756.71	480.9	-5884.9
		64	-2006.00	322.9	-5963.5
	64	64	-2006.00	322.9	-5963.5
		65	-2785.91	157.8	-6035.0
	65	65	-2785.91	157.8	-6035.0
		66	-3062.69	-13.5	-6098.7
	66	66	-3062.69	-13.5	-6098.7
		67	-2809.48	-189.8	-6154.0
	67	67	-2809.48	-189.8	-6154.0
		68	-2005.84	-370.5	-6200.4
	68	68	-2005.84	-370.5	-6200.4
		69	-639.65	-553.8	-6237.6
	69	69	-639.65	-553.8	-6237.6
		70	1285.35	-660.5	-6291.0
	70	70	1283.41	-816.6	-6287.5
		71	2864.91	-164.4	-6496.2
8	71	71	2866.15	313.7	-6509.3
		72	1740.11	797.4	-6579.1
	72	72	1740.81	571.5	-6601.6
		73	242.59	706.3	-6661.2
	73	73	1520.66	90.5	0.0
		74	1330.57	90.5	0.0
	74	74	1330.57	90.5	0.0
		75	1140.49	90.5	0.0

Esfuerzos unitarios en estructura total debidos al cable 6

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	75	75	1140.49	90.5	0.0
		76	950.41	90.5	0.0
	76	76	950.41	90.5	0.0
		77	760.33	90.5	0.0
	77	77	760.33	90.5	0.0
		78	570.25	90.5	0.0
	78	78	570.25	90.5	0.0
		79	380.16	90.5	0.0
	79	79	380.16	90.5	0.0
		80	190.08	90.5	0.0
	80	80	190.08	90.5	-3.1
		81	0.00	90.5	-3.1

Esfuerzos unitarios en estructura total debidos al cable 7

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	0.0	0.0
		2	0.05	0.0	0.0
	2	2	0.05	0.0	0.0
		3	0.09	0.0	0.0
	3	3	0.09	0.0	0.0
		4	0.13	0.0	0.0
	4	4	0.13	0.0	0.0
		5	0.18	0.0	0.0
	5	5	0.18	0.0	0.0
		6	0.22	0.0	0.0
	6	6	0.22	0.0	0.0
		7	0.27	0.0	0.0
	7	7	0.27	0.0	0.0
		8	0.31	0.0	0.0
	8	8	0.31	0.0	0.0
		9	0.36	0.0	0.0
	9	9	0.36	0.0	0.0
		10	0.40	0.0	0.0
	10	10	0.40	0.0	0.0
		11	0.45	0.0	0.0
2	11	11	0.45	0.1	0.0
		12	0.25	0.1	0.0
	12	12	0.25	0.1	0.0
		13	0.05	0.1	0.0
	13	13	0.05	0.1	0.0
		14	-0.15	0.1	0.0
	14	14	-0.15	0.1	0.0
		15	-0.34	0.1	0.0
	15	15	-0.34	0.1	0.0
		16	-0.54	0.1	0.0
	16	16	-0.54	0.1	0.0
		17	-0.74	0.1	0.0
	17	17	-0.74	0.1	0.0
		18	-0.94	0.1	0.0
	18	18	-0.94	0.1	0.0
		19	-1.13	0.1	0.0
	19	19	-1.13	0.1	0.0
		20	-1.33	0.1	0.0
	20	20	-1.33	0.1	0.0
		21	-1.53	0.1	0.0
3	21	21	-1.53	-0.3	0.0
		22	-0.82	-0.3	0.0
	22	22	-0.82	-0.3	0.0
		23	-0.12	-0.3	0.0
	23	23	-0.12	-0.3	0.0
		24	0.59	-0.3	0.0
	24	24	0.59	-0.3	0.0
		25	1.29	-0.3	0.0

Esfuerzos unitarios en estructura total debidos al cable 7

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	1.29	-0.3	0.0
		26	2.00	-0.3	0.0
	26	26	2.00	-0.3	0.0
		27	2.70	-0.3	0.0
	27	27	2.70	-0.3	0.0
		28	3.41	-0.3	0.0
	28	28	3.41	-0.3	0.0
		29	4.12	-0.3	0.0
	29	29	4.12	-0.3	0.0
		30	4.82	-0.3	0.0
	30	30	4.82	-0.3	0.0
		31	5.53	-0.3	0.0
4	31	31	5.53	0.9	0.0
		32	2.97	0.9	0.0
	32	32	2.97	0.9	0.0
		33	0.41	0.9	0.0
	33	33	0.41	0.9	0.0
		34	-2.15	0.9	0.0
	34	34	-2.15	0.9	0.0
		35	-4.71	0.9	0.0
	35	35	-4.71	0.9	0.0
		36	-7.27	0.9	0.0
	36	36	-7.27	0.9	0.0
		37	-9.83	0.9	0.0
	37	37	-9.83	0.9	0.0
		38	-12.39	0.9	0.0
	38	38	-12.39	0.9	0.0
		39	-14.95	0.9	0.0
	39	39	-14.95	0.9	0.0
		40	-17.51	0.9	0.0
	40	40	-17.51	0.9	0.0
		41	-20.07	0.9	0.0
5	41	41	-20.07	-3.0	-0.1
		42	-11.00	-3.0	-0.1
	42	42	-11.00	-3.0	0.0
		43	-1.93	-3.0	0.0
	43	43	-1.93	-3.0	0.0
		44	7.14	-3.0	0.0
	44	44	7.14	-3.0	0.0
		45	16.20	-3.0	0.0
	45	45	16.20	-3.0	0.0
		46	25.27	-3.0	0.0
	46	46	25.27	-3.0	0.0
		47	34.34	-3.0	0.0
	47	47	34.34	-3.0	0.0
		48	43.40	-3.0	0.0
	48	48	43.40	-3.0	0.0
		49	52.47	-3.0	0.0
	49	49	52.47	-3.0	0.0
		50	61.54	-3.0	0.0

Esfuerzos unitarios en estructura total debidos al cable 7

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	61.54	-3.0	0.1
		51	70.61	-3.0	0.1
6	51	51	70.61	10.9	0.3
		52	37.97	10.9	0.3
	52	52	37.97	10.9	0.0
		53	5.34	10.9	0.0
	53	53	5.34	10.9	0.0
		54	-27.29	10.9	0.0
	54	54	-27.29	10.9	0.0
		55	-59.93	10.9	0.0
	55	55	-59.93	10.9	0.0
		56	-92.56	10.9	0.0
	56	56	-92.56	10.9	0.0
		57	-125.19	10.9	0.0
	57	57	-125.19	10.9	0.0
		58	-157.83	10.9	0.0
	58	58	-157.83	10.9	0.0
		59	-190.46	10.9	0.0
	59	59	-190.46	10.9	0.0
		60	-223.10	10.9	0.0
	60	60	-223.10	10.9	-0.3
		61	-255.73	10.9	-0.3
7	61	61	-255.73	-39.5	-0.9
		62	-137.33	-39.5	-0.9
	62	62	-137.33	-39.5	0.0
		63	-18.93	-39.5	0.0
	63	63	-18.93	-39.5	0.0
		64	99.47	-39.5	0.0
	64	64	99.47	-39.5	0.0
		65	217.88	-39.5	0.0
	65	65	217.88	-39.5	0.0
		66	336.28	-39.5	0.0
	66	66	336.28	-39.5	0.0
		67	454.68	-39.5	0.0
	67	67	454.68	-39.5	0.0
		68	573.08	-39.5	0.0
	68	68	573.08	-39.5	0.0
		69	691.48	-39.5	0.0
	69	69	691.48	-39.5	0.0
		70	809.89	-39.5	0.0
	70	70	809.89	-39.5	0.9
		71	928.29	-39.5	0.9
8	71	71	928.29	44.2	1.5
		72	835.46	44.2	1.5
	72	72	835.46	44.2	0.0
		73	742.63	44.2	0.0
	73	73	420.19	613.5	-5376.1
		74	-742.11	484.4	-5437.9
	74	74	-742.11	484.4	-5437.9
		75	-1641.58	350.7	-5495.6

Esfuerzos unitarios en estructura total debidos al cable 7

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	75	75	-1641.58	350.7	-5495.6
		76	-2262.75	212.9	-5548.9
	76	76	-2262.75	212.9	-5548.9
		77	-2592.14	71.5	-5597.4
	77	77	-2592.14	71.5	-5597.4
		78	-2638.73	-45.0	-5635.7
	78	78	-2638.73	-45.0	-5635.7
		79	-2446.57	-156.8	-5669.6
	79	79	-2446.57	-156.8	-5669.6
		80	-2013.24	-270.0	-5700.4
	80	80	-2013.01	-465.2	-5688.0
		81	-922.64	-580.5	-5711.6

Coeficientes para perdidas de pretensado

Coef. de retraccion del hormigon ..... = 0.00025
Coef. de relajacion del acero ..... = 0.04000
Coef. de fluencia del hormigon ..... = 2.50000

Coef. medio de perdidas elasticas instantaneas ..... = 0.99122
Coef. medio de perdidas diferidas ..... = 0.87956
Coef. medio de perdidas totales ..... = 0.87184

Coef. de ponderacion para pretensado inicial (Pti) ... = 1.10000
Coef. de ponderacion para pretensado final (Ptf) ... = 0.90000

Nota: (*) Resultados de tensiones sin ponderar

Comprobacion de tensiones

Estado 1 Pretensado de 3834. tn Familia 1
Estado 2 Pretensado de 3834. tn Familia 2
Estado 3 Pretensado de 3834. tn Familia 3
Estado 4 Pretensado de 3834. tn Familia 4
Estado 5 Pretensado de 3834. tn Familia 5
Estado 6 Pretensado de 3834. tn Familia 6
Estado 7 Pretensado de 3834. tn Familia 7
Estado 8 Pretensado de 1918. tn Familia 1
Estado 9 Pretensado de 1918. tn Familia 1
Estado 10 Pretensado de 959. tn Familia 4
Estado 11 Pretensado de 959. tn Familia 4
Estado 12 Pretensado de 959. tn Familia 4
Estado 13 Pretensado de 959. tn Familia 5
Estado 14 Pretensado de 959. tn Familia 5
Estado 15 Pretensado de 959. tn Familia 5
Estado 16 Pretensado de 959. tn Familia 6
Estado 17 Pretensado de 959. tn Familia 6
Estado 18 Pretensado de 959. tn Familia 6
Estado 19 Pretensado de 959. tn Familia 7
Estado 20 Pretensado de 959. tn Familia 7

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto
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Esfuerzos de pretensado Est. Inicial (*coef. perdidas elasticas)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-1179.71	586.6	-7820.2
		2	-2282.94	472.1	-7784.0
	2	2	-2283.21	205.0	-7799.3
		3	-2580.09	92.8	-7763.7
	3	3	-2580.09	92.8	-7763.7
		4	-2637.92	-18.0	-7725.2
	4	4	-2637.92	-18.0	-7725.2
		5	-2459.09	-133.5	-7682.2
	5	5	-2459.09	-133.5	-7682.2
		6	-1999.95	-273.7	-7629.2
	6	6	-1999.95	-273.7	-7629.2
		7	-1251.59	-410.3	-7571.4
	7	7	-1251.59	-410.3	-7571.4
		8	-227.39	-542.8	-7509.2
	8	8	-227.39	-542.8	-7509.2
		9	1057.34	-670.8	-7443.0
	9	9	1057.34	-670.8	-7443.0
		10	2478.41	-547.2	-7385.5
	10	10	2477.74	-800.0	-7363.4
		11	3653.79	-356.7	-7296.5
2	11	11	3656.61	202.4	-7299.1
		12	2076.96	842.2	-7052.3
	12	12	2074.81	660.6	-7073.2
		13	325.98	538.4	-7028.4
	13	13	325.98	538.4	-7028.4
		14	-923.85	362.6	-6999.7
	14	14	-923.85	362.6	-6999.7
		15	-1753.48	192.4	-7049.1
	15	15	-1753.48	192.4	-7049.1
		16	-2097.10	14.7	-7090.1
	16	16	-2097.10	14.7	-7090.1
		17	-1925.15	-168.6	-7121.7
	17	17	-1925.15	-168.6	-7121.7
		18	-1219.42	-355.2	-7143.3
	18	18	-1219.42	-355.2	-7143.3
		19	27.66	-543.4	-7154.7
	19	19	27.66	-543.4	-7154.7
		20	1811.90	-673.6	-7176.0
	20	20	1810.01	-863.4	-7172.2
		21	3386.02	-169.8	-7373.4
3	21	21	3387.29	197.8	-7392.9
		22	1823.89	954.6	-7452.7
	22	22	1824.52	762.7	-7474.1
		23	-235.45	641.0	-7549.5
	23	23	8.98	517.0	-6815.6
		24	-1252.41	355.6	-6885.2
	24	24	-1252.41	355.6	-6885.2
		25	-2065.18	185.4	-6947.5

Esfuerzos de pretensado Est. Inicial (*coef. perdidas elasticas)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-2065.18	185.4	-6947.5
		26	-2391.94	7.7	-7001.4
	26	26	-2391.94	7.7	-7001.4
		27	-2203.11	-175.6	-7045.8
	27	27	-2203.11	-175.6	-7045.8
		28	-1480.49	-362.2	-7080.1
	28	28	-1480.49	-362.2	-7080.1
		29	-216.51	-550.4	-7104.3
	29	29	-216.51	-550.4	-7104.3
		30	1584.64	-680.6	-7138.2
	30	30	1582.63	-869.8	-7134.3
		31	3173.75	-175.8	-7348.1
4	31	31	3150.06	161.6	-7368.7
		32	1685.42	918.7	-7441.1
	32	32	1686.16	727.1	-7461.6
		33	-276.86	605.4	-7549.5
	33	33	-35.53	483.0	-6824.9
		34	-1201.15	321.1	-6894.7
	34	34	-1201.15	321.1	-6894.7
		35	-1916.76	150.4	-6957.2
	35	35	-1916.76	150.4	-6957.2
		36	-2144.86	-27.9	-7011.2
	36	36	-2144.86	-27.9	-7011.2
		37	-1855.78	-211.7	-7055.8
	37	37	-1855.78	-211.7	-7055.8
		38	-1031.26	-398.9	-7090.3
	38	38	-1031.26	-398.9	-7090.3
		39	336.29	-587.7	-7114.5
	39	39	336.29	-587.7	-7114.5
		40	2242.66	-718.3	-7148.5
	40	40	2240.65	-907.8	-7143.7
		41	3935.50	-211.6	-7358.1
5	41	41	3647.92	204.0	-7378.6
		42	2048.22	896.5	-7454.2
	42	42	2048.98	717.4	-7473.0
		43	-90.33	623.9	-7555.5
	43	43	-349.90	511.2	-5790.5
		44	-1693.91	356.4	-5867.5
	44	44	-1693.91	356.4	-5867.5
		45	-2578.18	194.6	-5937.7
	45	45	-2578.18	194.6	-5937.7
		46	-2969.65	26.9	-6000.2
	46	46	-2969.65	26.9	-6000.2
		47	-2842.01	-145.8	-6054.5
	47	47	-2842.01	-145.8	-6054.5
		48	-2175.24	-322.7	-6100.1
	48	48	-2175.24	-322.7	-6100.1
		49	-957.45	-502.4	-6136.6
	49	49	-957.45	-502.4	-6136.6
		50	807.67	-606.8	-6188.9

Esfuerzos de pretensado Est. Inicial (*coef. perdidas elasticas)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	805.77	-760.4	-6186.5
		51	2236.40	-121.6	-6391.0
6	51	51	2441.79	145.7	-6407.6
		52	1012.01	838.4	-6493.9
	52	52	1012.87	682.4	-6511.6
		53	-1026.54	588.9	-6604.9
	53	53	-743.32	476.2	-5790.5
		54	-1982.34	321.4	-5867.5
	54	54	-1982.34	321.4	-5867.5
		55	-2761.63	159.6	-5937.7
	55	55	-2761.63	159.6	-5937.7
		56	-3048.10	-8.1	-6000.2
	56	56	-3048.10	-8.1	-6000.2
		57	-2815.47	-180.8	-6054.5
	57	57	-2815.47	-180.8	-6054.5
		58	-2043.70	-357.7	-6100.1
	58	58	-2043.70	-357.7	-6100.1
		59	-720.93	-537.3	-6136.6
	59	59	-720.93	-537.3	-6136.6
		60	1149.19	-641.8	-6188.9
	60	60	1147.28	-795.4	-6185.7
		61	2682.90	-156.5	-6390.2
7	61	61	2683.96	181.4	-6406.8
		62	1147.03	874.1	-6493.1
	62	62	1147.88	718.1	-6511.6
		63	-998.67	624.6	-6604.9
	63	63	-730.42	517.7	-5833.2
		64	-2091.69	361.1	-5911.1
	64	64	-2091.69	361.1	-5911.1
		65	-2987.71	197.4	-5982.0
	65	65	-2987.71	197.4	-5982.0
		66	-3385.02	27.6	-6045.2
	66	66	-3385.02	27.6	-6045.2
		67	-3256.99	-147.2	-6100.0
	67	67	-3256.99	-147.2	-6100.0
		68	-2583.36	-326.2	-6146.0
	68	68	-2583.36	-326.2	-6146.0
		69	-1352.11	-508.0	-6182.9
	69	69	-1352.11	-508.0	-6182.9
		70	433.03	-613.7	-6235.7
	70	70	431.10	-768.5	-6233.3
		71	1875.77	-122.0	-6440.2
8	71	71	1877.00	265.1	-6453.7
		72	857.24	744.5	-6522.9
	72	72	857.93	520.6	-6543.6
		73	-530.74	654.2	-6602.7
	73	73	416.50	608.1	-5328.9
		74	-735.59	480.1	-5390.2
	74	74	-735.60	480.1	-5390.2
		75	-1627.16	347.6	-5447.4

Esfuerzos de pretensado Est. Inicial (*coef. perdidas elasticas)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	75	75	-1627.17	347.6	-5447.4
		76	-2242.89	211.0	-5500.2
	76	76	-2242.89	211.0	-5500.2
		77	-2569.38	70.9	-5548.3
	77	77	-2569.38	70.9	-5548.3
		78	-2615.57	-44.6	-5586.2
	78	78	-2615.57	-44.6	-5586.2
		79	-2425.09	-155.4	-5619.8
	79	79	-2425.09	-155.4	-5619.8
		80	-1995.57	-267.7	-5650.3
	80	80	-1995.34	-461.1	-5638.0
		81	-914.54	-575.4	-5661.5

Esfuerzos de pretensado Est. Final (*coef. perdidas totales)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-1037.63	512.6	-6674.3
		2	-2000.94	411.9	-6642.4
	2	2	-2001.18	184.0	-6655.9
		3	-2269.94	85.2	-6624.6
	3	3	-2269.94	85.2	-6624.6
		4	-2328.45	-12.2	-6590.7
	4	4	-2328.45	-12.2	-6590.7
		5	-2178.79	-113.8	-6552.9
	5	5	-2178.79	-113.8	-6552.9
		6	-1782.59	-237.1	-6506.3
	6	6	-1782.59	-237.1	-6506.3
		7	-1132.00	-357.2	-6455.5
	7	7	-1132.00	-357.2	-6455.5
		8	-238.79	-473.8	-6400.8
	8	8	-238.79	-473.8	-6400.8
		9	883.57	-586.4	-6342.5
	9	9	883.57	-586.4	-6342.5
		10	2125.85	-477.7	-6291.9
	10	10	2125.27	-693.0	-6272.7
		11	3137.34	-303.1	-6213.9
2	11	11	3139.82	163.2	-6216.3
		12	1791.96	725.9	-5999.2
	12	12	1790.08	571.4	-6017.3
		13	278.72	464.0	-5977.8
	13	13	278.72	464.0	-5977.8
		14	-793.74	309.3	-5952.6
	14	14	-793.74	309.3	-5952.6
		15	-1496.59	159.7	-5996.1
	15	15	-1496.59	159.7	-5996.1
		16	-1771.98	3.3	-6032.1
	16	16	-1771.98	3.3	-6032.1
		17	-1593.89	-157.9	-6059.9
	17	17	-1593.89	-157.9	-6059.9
		18	-946.30	-322.0	-6078.9
	18	18	-946.30	-322.0	-6078.9
		19	177.45	-487.5	-6089.0
	19	19	177.45	-487.5	-6089.0
		20	1773.65	-602.1	-6107.7
	20	20	1771.99	-763.8	-6104.2
		21	3170.35	-153.6	-6281.1
3	21	21	3171.47	162.6	-6298.7
		22	1828.19	828.3	-6351.3
	22	22	1828.75	664.7	-6369.9
		23	34.00	557.7	-6436.2
	23	23	249.00	448.6	-5790.7
		24	-844.11	306.7	-5855.5
	24	24	-844.11	306.7	-5855.5
		25	-1544.00	157.0	-5920.5

Esfuerzos de pretensado Est. Final (*coef. perdidas totales)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-1544.00	157.0	-5920.5
		26	-1816.41	0.7	-5978.0
	26	26	-1816.41	0.7	-5978.0
		27	-1635.35	-160.6	-6027.3
	27	27	-1635.35	-160.6	-6027.3
		28	-984.79	-324.7	-6067.7
	28	28	-984.79	-324.7	-6067.7
		29	141.93	-490.2	-6099.3
	29	29	141.93	-490.2	-6099.3
		30	1741.11	-604.7	-6139.4
	30	30	1739.26	-767.8	-6135.9
		31	3144.43	-157.1	-6334.3
4	31	31	3143.74	156.6	-6352.1
		32	1812.86	822.8	-6426.1
	32	32	1813.61	657.3	-6444.6
		33	35.09	550.3	-6532.4
	33	33	247.36	442.6	-5895.0
		34	-829.80	300.2	-5966.9
	34	34	-829.80	300.2	-5966.9
		35	-1511.15	150.1	-6032.4
	35	35	-1511.15	150.1	-6032.4
		36	-1763.70	-6.8	-6090.4
	36	36	-1763.70	-6.8	-6090.4
		37	-1561.38	-168.5	-6140.2
	37	37	-1561.38	-168.5	-6140.2
		38	-888.11	-333.1	-6181.2
	38	38	-888.11	-333.1	-6181.2
		39	262.78	-499.1	-6213.1
	39	39	262.78	-499.1	-6213.1
		40	1887.60	-614.0	-6253.7
	40	40	1885.73	-780.1	-6250.0
		41	3322.83	-167.5	-6449.3
5	41	41	3303.08	143.8	-6467.7
		42	2000.57	753.1	-6545.7
	42	42	2001.34	595.9	-6561.4
		43	222.53	513.6	-6645.5
	43	43	-5.78	414.5	-5093.1
		44	-1082.63	278.4	-5160.9
	44	44	-1082.63	278.4	-5160.9
		45	-1755.10	136.1	-5222.6
	45	45	-1755.10	136.1	-5222.6
		46	-1994.12	-11.4	-5277.6
	46	46	-1994.12	-11.4	-5277.6
		47	-1776.56	-163.4	-5325.3
	47	47	-1776.56	-163.4	-5325.3
		48	-1084.78	-319.0	-5365.4
	48	48	-1084.78	-319.0	-5365.4
		49	91.64	-476.9	-5397.5
	49	49	91.64	-476.9	-5397.5
		50	1749.48	-568.9	-5443.6

Esfuerzos de pretensado Est. Final (*coef. perdidas totales)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	50	50	1747.80	-703.9	-5440.6
		51	3111.44	-142.0	-5620.5
6	51	51	3127.12	135.2	-5635.7
		52	1848.45	744.5	-5711.7
	52	52	1849.20	607.2	-5727.4
		53	34.32	525.0	-5809.4
	53	53	283.43	425.8	-5093.1
		54	-827.46	289.7	-5160.9
	54	54	-827.46	289.7	-5160.9
		55	-1533.98	147.4	-5222.6
	55	55	-1533.98	147.4	-5222.6
		56	-1807.04	-0.1	-5277.6
	56	56	-1807.04	-0.1	-5277.6
		57	-1623.51	-152.0	-5325.3
	57	57	-1623.51	-152.0	-5325.3
		58	-965.78	-307.6	-5365.4
	58	58	-965.78	-307.6	-5365.4
		59	176.60	-465.6	-5397.5
	59	59	176.60	-465.6	-5397.5
		60	1800.40	-557.5	-5443.6
	60	60	1798.72	-692.6	-5440.9
		61	3128.31	-130.7	-5620.7
7	61	61	3129.24	145.2	-5635.5
		62	1820.48	754.5	-5711.4
	62	62	1821.23	617.2	-5727.4
		63	-23.73	535.0	-5809.4
	63	63	212.22	441.0	-5130.7
		64	-942.04	303.2	-5199.2
	64	64	-942.04	303.2	-5199.2
		65	-1687.07	159.2	-5261.6
	65	65	-1687.08	159.2	-5261.6
		66	-1993.46	10.0	-5317.1
	66	66	-1993.46	10.0	-5317.1
		67	-1837.78	-143.8	-5365.3
	67	67	-1837.78	-143.8	-5365.3
		68	-1202.21	-301.3	-5405.8
	68	68	-1202.21	-301.3	-5405.8
		69	-76.18	-461.2	-5438.2
	69	69	-76.18	-461.2	-5438.3
		70	1537.05	-554.2	-5484.7
	70	70	1535.35	-690.3	-5482.2
		71	2849.09	-121.6	-5664.2
8	71	71	2850.18	290.2	-5674.5
		72	1833.31	711.9	-5735.4
	72	72	1833.92	515.0	-5755.5
		73	492.57	632.6	-5807.5
	73	73	1325.73	592.0	-4687.1
		74	192.46	479.4	-4741.0
	74	74	192.46	479.4	-4741.0
		75	-711.65	362.9	-4791.3

Esfuerzos de pretensado Est. Final (*coef. perdidas totales)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	75	75	-711.65	362.9	-4791.3
		76	-1373.15	242.7	-4837.8
	76	76	-1373.15	242.7	-4837.8
		77	-1780.24	119.4	-4880.1
	77	77	-1780.24	119.4	-4880.1
		78	-1940.79	17.8	-4913.5
	78	78	-1940.79	17.8	-4913.5
		79	-1893.18	-79.6	-4943.0
	79	79	-1893.18	-79.6	-4943.0
		80	-1635.31	-178.3	-4969.8
	80	80	-1635.11	-348.5	-4961.0
		81	-804.40	-449.0	-4981.6

Tensiones en Construccion (kg/cm2) Estado 1

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
1	1	-27.	-65.	-30.	-72.	0.	0.	-30.	-72.
	2	-34.	-124.	-38.	-137.	-6.	8.	-43.	-128.
	3	-30.	-130.	-33.	-143.	-9.	13.	-42.	-130.
	4	-29.	-131.	-32.	-144.	-10.	15.	-42.	-128.
	5	-32.	-125.	-35.	-138.	-10.	15.	-45.	-123.
	6	-39.	-113.	-43.	-124.	-7.	11.	-51.	-113.
	7	-51.	-94.	-57.	-103.	-3.	4.	-60.	-99.
	8	-68.	-68.	-75.	-75.	3.	-5.	-71.	-80.
	9	-88.	-36.	-97.	-40.	12.	-17.	-86.	-57.
	10	-111.	-1.	-122.	-1.	22.	-32.	-100.	-34.
	11	-96.	31.	-106.	34.	25.	-33.	-81.	1.
2	11	-96.	31.	-106.	34.	25.	-33.	-81.	1.
	12	-100.	-10.	-110.	-11.	15.	-23.	-95.	-35.
	13	-69.	-55.	-76.	-61.	1.	-1.	-76.	-62.
	14	-47.	-88.	-52.	-97.	-10.	16.	-62.	-81.
	15	-32.	-111.	-35.	-122.	-18.	27.	-53.	-95.
	16	-25.	-123.	-27.	-135.	-23.	34.	-50.	-102.
	17	-25.	-122.	-28.	-135.	-24.	35.	-52.	-100.
	18	-35.	-109.	-38.	-120.	-21.	32.	-59.	-89.
	19	-53.	-83.	-58.	-91.	-15.	23.	-73.	-68.
	20	-79.	-44.	-87.	-48.	-6.	9.	-93.	-39.
	21	-74.	1.	-81.	1.	4.	-5.	-77.	-4.
3	21	-74.	1.	-81.	1.	4.	-5.	-77.	-4.
	22	-80.	-49.	-88.	-54.	2.	-3.	-87.	-56.
	23A	-48.	-98.	-53.	-108.	0.	0.	-53.	-108.

Tensiones en Construccion (kg/cm2) Estado 2

		Pti (*)		Pti		Pi		Pti+Pi	
V.	Sec	F.Sup	F.Inf	F.Sup	F.Inf	F.Sup	F.Inf	F.Sup	F.Inf
1	1	-27.	-65.	-30.	-72.	0.	0.	-30.	-72.
	2	-34.	-125.	-37.	-138.	-6.	9.	-43.	-129.
	3	-29.	-132.	-32.	-145.	-10.	15.	-42.	-130.
	4	-27.	-133.	-30.	-147.	-12.	18.	-42.	-129.
	5	-30.	-129.	-33.	-142.	-12.	18.	-45.	-124.
	6	-36.	-118.	-40.	-129.	-10.	15.	-50.	-114.
	7	-48.	-99.	-53.	-109.	-6.	9.	-59.	-100.
	8	-64.	-75.	-70.	-82.	-1.	1.	-70.	-81.
	9	-83.	-43.	-92.	-48.	7.	-11.	-85.	-59.
	10	-106.	-9.	-116.	-10.	17.	-25.	-99.	-35.
	11	-91.	24.	-100.	26.	21.	-27.	-79.	-1.
2	11	-91.	24.	-100.	26.	21.	-27.	-79.	-1.
	12	-97.	-15.	-106.	-17.	12.	-19.	-94.	-35.
	13	-69.	-56.	-76.	-62.	0.	0.	-75.	-62.
	14	-49.	-85.	-54.	-93.	-9.	13.	-62.	-80.
	15	-37.	-104.	-40.	-115.	-14.	21.	-54.	-94.
	16	-32.	-112.	-35.	-123.	-16.	24.	-51.	-100.
	17	-35.	-108.	-39.	-118.	-15.	22.	-54.	-97.
	18	-47.	-90.	-52.	-99.	-10.	14.	-62.	-85.
	19	-68.	-60.	-75.	-66.	-1.	2.	-76.	-64.
	20	-97.	-17.	-107.	-19.	10.	-16.	-97.	-34.
	21	-92.	24.	-101.	27.	19.	-24.	-83.	2.
3	21	-92.	24.	-101.	26.	19.	-24.	-83.	2.
	22	-99.	-21.	-109.	-23.	8.	-12.	-100.	-36.
	23	-64.	-67.	-70.	-74.	-6.	8.	-75.	-66.
	24	-41.	-94.	-45.	-104.	-16.	24.	-61.	-80.
	25	-27.	-117.	-29.	-128.	-23.	34.	-52.	-94.
	26	-20.	-128.	-22.	-140.	-27.	40.	-49.	-101.
	27	-22.	-126.	-24.	-139.	-27.	40.	-51.	-99.
	28	-32.	-112.	-35.	-123.	-24.	35.	-59.	-88.
	29	-51.	-84.	-56.	-93.	-17.	25.	-73.	-68.
	30	-78.	-44.	-86.	-49.	-7.	10.	-93.	-39.
	31	-74.	1.	-81.	1.	4.	-5.	-77.	-4.
4	31	-74.	1.	-81.	1.	4.	-5.	-77.	-5.
	32	-80.	-49.	-88.	-54.	2.	-3.	-86.	-57.
	33A	-48.	-99.	-53.	-109.	0.	0.	-53.	-109.

Tensiones en Construccion (kg/cm2) Estado 3

		Pti (*)		Pti		Pi		Pti+Pi	
V.	Sec	F.Sup	F.Inf	F.Sup	F.Inf	F.Sup	F.Inf	F.Sup	F.Inf
1	1	-27.	-65.	-30.	-72.	0.	0.	-30.	-72.
	2	-34.	-125.	-37.	-137.	-6.	9.	-43.	-128.
	3	-29.	-132.	-32.	-145.	-10.	14.	-42.	-130.
	4	-28.	-133.	-31.	-146.	-12.	17.	-42.	-129.
	5	-30.	-128.	-33.	-141.	-11.	17.	-45.	-124.
	6	-37.	-116.	-41.	-128.	-9.	14.	-50.	-114.
	7	-49.	-98.	-54.	-108.	-5.	8.	-59.	-100.
	8	-65.	-73.	-71.	-80.	1.	-1.	-71.	-81.
	9	-85.	-42.	-93.	-46.	8.	-12.	-85.	-58.
	10	-107.	-7.	-118.	-8.	18.	-27.	-100.	-35.
	11	-92.	26.	-102.	28.	22.	-29.	-80.	0.
2	11	-93.	26.	-102.	29.	22.	-29.	-80.	0.
	12	-98.	-14.	-107.	-15.	13.	-20.	-94.	-35.
	13	-69.	-56.	-76.	-61.	0.	-1.	-75.	-62.
	14	-48.	-86.	-53.	-94.	-9.	14.	-62.	-81.
	15	-35.	-106.	-39.	-117.	-15.	23.	-54.	-94.
	16	-30.	-115.	-33.	-127.	-18.	27.	-51.	-100.
	17	-33.	-112.	-36.	-123.	-17.	25.	-53.	-98.
	18	-44.	-96.	-48.	-105.	-13.	19.	-61.	-86.
	19	-64.	-66.	-70.	-73.	-5.	8.	-75.	-65.
	20	-92.	-24.	-101.	-27.	6.	-9.	-96.	-36.
	21	-87.	18.	-96.	19.	14.	-19.	-81.	1.
3	21	-87.	18.	-96.	19.	14.	-19.	-81.	0.
	22	-96.	-26.	-105.	-28.	6.	-8.	-100.	-37.
	23	-63.	-68.	-69.	-75.	-6.	9.	-75.	-66.
	24	-43.	-91.	-47.	-100.	-14.	21.	-61.	-79.
	25	-31.	-110.	-35.	-121.	-19.	28.	-53.	-93.
	26	-28.	-117.	-30.	-128.	-20.	30.	-50.	-98.
	27	-32.	-111.	-35.	-122.	-18.	27.	-53.	-96.
	28	-45.	-93.	-49.	-102.	-12.	18.	-61.	-84.
	29	-66.	-62.	-73.	-68.	-3.	5.	-76.	-63.
	30	-96.	-18.	-106.	-19.	9.	-14.	-97.	-33.
	31	-92.	24.	-101.	27.	18.	-24.	-83.	3.
4	31	-92.	24.	-101.	26.	18.	-24.	-83.	3.
	32	-98.	-22.	-108.	-24.	8.	-12.	-100.	-36.
	33	-63.	-68.	-69.	-75.	-6.	8.	-75.	-66.
	34	-40.	-95.	-44.	-105.	-16.	24.	-60.	-81.
	35	-26.	-118.	-29.	-129.	-23.	34.	-52.	-95.
	36	-20.	-129.	-22.	-141.	-26.	39.	-48.	-102.
	37	-21.	-127.	-24.	-140.	-26.	39.	-50.	-101.
	38	-32.	-113.	-35.	-124.	-23.	34.	-58.	-90.
	39	-50.	-85.	-55.	-94.	-16.	24.	-72.	-70.
	40	-78.	-45.	-86.	-49.	-6.	9.	-92.	-41.
	41	-74.	1.	-81.	1.	5.	-6.	-76.	-6.
5	41	-70.	-5.	-77.	-5.	5.	-6.	-72.	-11.
	42	-75.	-57.	-82.	-63.	2.	-3.	-80.	-66.
	43A	-41.	-109.	-45.	-119.	0.	0.	-45.	-119.

Tensiones en Construccion (kg/cm2) Estado 4

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
1	1	-27.	-65.	-30.	-72.	0.	0.	-30.	-72.
	2	-34.	-125.	-37.	-137.	-6.	9.	-43.	-129.
	3	-29.	-132.	-32.	-145.	-10.	15.	-42.	-130.
	4	-28.	-133.	-30.	-146.	-12.	17.	-42.	-129.
	5	-30.	-128.	-33.	-141.	-12.	17.	-45.	-124.
	6	-37.	-117.	-41.	-129.	-10.	14.	-50.	-114.
	7	-48.	-99.	-53.	-108.	-6.	8.	-59.	-100.
	8	-64.	-74.	-71.	-81.	0.	0.	-70.	-81.
	9	-84.	-42.	-93.	-47.	8.	-12.	-85.	-58.
	10	-106.	-8.	-117.	-9.	18.	-26.	-99.	-35.
	11	-92.	25.	-101.	28.	22.	-28.	-79.	-1.
2	11	-92.	25.	-101.	28.	22.	-28.	-79.	-1.
	12	-97.	-15.	-107.	-16.	13.	-19.	-94.	-35.
	13	-69.	-56.	-76.	-61.	0.	0.	-75.	-62.
	14	-49.	-85.	-53.	-94.	-9.	13.	-62.	-80.
	15	-36.	-105.	-39.	-116.	-15.	22.	-54.	-94.
	16	-31.	-114.	-34.	-125.	-17.	26.	-51.	-100.
	17	-34.	-110.	-37.	-121.	-16.	24.	-53.	-97.
	18	-45.	-93.	-50.	-103.	-12.	17.	-62.	-85.
	19	-66.	-64.	-72.	-70.	-4.	6.	-76.	-64.
	20	-94.	-21.	-104.	-23.	7.	-11.	-96.	-34.
	21	-89.	21.	-98.	23.	16.	-21.	-82.	2.
3	21	-89.	20.	-98.	23.	16.	-21.	-82.	2.
	22	-97.	-24.	-107.	-26.	6.	-10.	-100.	-36.
	23	-63.	-68.	-70.	-74.	-6.	9.	-75.	-66.
	24	-42.	-92.	-46.	-102.	-15.	22.	-61.	-80.
	25	-29.	-113.	-32.	-124.	-20.	30.	-52.	-94.
	26	-24.	-121.	-27.	-134.	-22.	33.	-49.	-100.
	27	-28.	-118.	-30.	-129.	-21.	31.	-51.	-98.
	28	-39.	-101.	-43.	-111.	-16.	24.	-59.	-87.
	29	-59.	-72.	-65.	-79.	-8.	11.	-73.	-67.
	30	-88.	-29.	-97.	-32.	4.	-6.	-93.	-38.
	31	-84.	14.	-92.	16.	13.	-17.	-79.	-2.
4	31	-84.	14.	-92.	15.	13.	-17.	-79.	-2.
	32	-93.	-29.	-103.	-32.	5.	-7.	-98.	-39.
	33	-62.	-69.	-69.	-76.	-6.	9.	-75.	-67.
	34	-44.	-90.	-48.	-99.	-14.	20.	-62.	-79.
	35	-34.	-106.	-37.	-117.	-18.	26.	-55.	-91.
	36	-32.	-111.	-35.	-122.	-18.	27.	-53.	-95.
	37	-37.	-103.	-41.	-113.	-15.	23.	-57.	-90.
	38	-52.	-82.	-57.	-91.	-9.	14.	-66.	-77.
	39	-75.	-49.	-82.	-54.	0.	-1.	-82.	-54.
	40	-107.	-2.	-117.	-3.	14.	-20.	-104.	-23.
	41	-102.	38.	-112.	42.	22.	-29.	-90.	13.
5	41	-98.	32.	-108.	36.	22.	-29.	-86.	7.
	42	-104.	-13.	-115.	-14.	10.	-15.	-105.	-30.
	43	-58.	-65.	-63.	-71.	-6.	9.	-69.	-62.
	44	-24.	-97.	-26.	-107.	-18.	27.	-44.	-80.
	45	-7.	-123.	-8.	-136.	-26.	39.	-34.	-97.

Tensiones en Construccion (kg/cm2) Estado 4

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
	46	2.	-138.	2.	-152.	-30.	45.	-28.	-107.
	47	3.	-140.	3.	-154.	-31.	45.	-28.	-109.
	48	-5.	-129.	-6.	-142.	-27.	40.	-33.	-102.
	49	-22.	-105.	-24.	-116.	-19.	29.	-44.	-87.
	50	-48.	-68.	-53.	-75.	-8.	11.	-60.	-64.
	51	-46.	-23.	-51.	-25.	5.	-6.	-46.	-31.
6	51	-49.	-19.	-54.	-21.	5.	-6.	-49.	-27.
	52	-51.	-71.	-56.	-78.	2.	-3.	-54.	-81.
	53A	-18.	-121.	-20.	-133.	0.	0.	-20.	-133.

Tensiones en Construccion (kg/cm2) Estado 5

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
1	1	-27.	-65.	-30.	-72.	0.	0.	-30.	-72.
	2	-34.	-125.	-37.	-137.	-6.	9.	-43.	-129.
	3	-29.	-132.	-32.	-145.	-10.	15.	-42.	-130.
	4	-28.	-133.	-30.	-146.	-12.	17.	-42.	-129.
	5	-30.	-128.	-33.	-141.	-12.	17.	-45.	-124.
	6	-37.	-117.	-41.	-128.	-10.	14.	-50.	-114.
	7	-49.	-98.	-53.	-108.	-6.	8.	-59.	-100.
	8	-64.	-73.	-71.	-81.	0.	0.	-71.	-81.
	9	-84.	-42.	-93.	-46.	8.	-12.	-85.	-58.
	10	-107.	-8.	-117.	-8.	18.	-27.	-99.	-35.
	11	-92.	25.	-101.	28.	22.	-28.	-79.	-1.
2	11	-92.	25.	-101.	28.	22.	-28.	-79.	-1.
	12	-97.	-14.	-107.	-16.	13.	-19.	-94.	-35.
	13	-69.	-56.	-76.	-61.	0.	0.	-75.	-62.
	14	-49.	-85.	-53.	-94.	-9.	13.	-62.	-81.
	15	-36.	-106.	-39.	-116.	-15.	22.	-54.	-94.
	16	-31.	-114.	-34.	-126.	-17.	26.	-51.	-100.
	17	-34.	-110.	-37.	-122.	-16.	24.	-53.	-97.
	18	-45.	-94.	-50.	-103.	-12.	18.	-62.	-85.
	19	-65.	-64.	-72.	-71.	-4.	6.	-76.	-65.
	20	-94.	-22.	-103.	-24.	7.	-11.	-96.	-35.
	21	-88.	20.	-97.	22.	15.	-20.	-82.	2.
3	21	-89.	20.	-97.	22.	15.	-20.	-82.	1.
	22	-97.	-24.	-106.	-27.	6.	-9.	-100.	-36.
	23	-63.	-68.	-70.	-75.	-6.	9.	-75.	-66.
	24	-42.	-92.	-47.	-101.	-15.	22.	-61.	-80.
	25	-30.	-112.	-33.	-123.	-20.	29.	-53.	-94.
	26	-25.	-120.	-28.	-132.	-22.	32.	-49.	-100.
	27	-29.	-116.	-32.	-127.	-20.	30.	-52.	-98.
	28	-41.	-99.	-45.	-109.	-15.	22.	-60.	-87.
	29	-61.	-69.	-67.	-76.	-6.	10.	-74.	-66.
	30	-91.	-26.	-100.	-29.	5.	-8.	-94.	-37.
	31	-86.	17.	-95.	19.	15.	-19.	-80.	0.
4	31	-86.	16.	-94.	18.	15.	-19.	-80.	-1.
	32	-95.	-27.	-104.	-29.	6.	-9.	-99.	-38.
	33	-63.	-69.	-69.	-76.	-6.	9.	-75.	-67.
	34	-43.	-91.	-47.	-101.	-14.	21.	-61.	-79.
	35	-32.	-109.	-35.	-120.	-19.	28.	-54.	-92.
	36	-28.	-116.	-31.	-127.	-21.	31.	-52.	-97.
	37	-33.	-110.	-36.	-121.	-18.	27.	-55.	-93.
	38	-46.	-91.	-51.	-100.	-13.	19.	-64.	-81.
	39	-68.	-59.	-75.	-65.	-4.	6.	-79.	-59.
	40	-99.	-14.	-109.	-16.	8.	-12.	-100.	-28.
	41	-94.	27.	-104.	30.	17.	-22.	-87.	8.
5	41	-90.	22.	-99.	24.	17.	-22.	-82.	2.
	42	-99.	-21.	-109.	-23.	7.	-10.	-102.	-33.
	43	-57.	-66.	-62.	-73.	-7.	10.	-69.	-63.
	44	-27.	-92.	-29.	-102.	-16.	24.	-45.	-78.
	45	-14.	-113.	-16.	-124.	-21.	32.	-37.	-92.

Tensiones en Construccion (kg/cm2) Estado 5

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
	46	-9.	-121.	-10.	-133.	-23.	34.	-33.	-99.
	47	-13.	-117.	-14.	-129.	-20.	30.	-34.	-99.
	48	-25.	-100.	-28.	-110.	-14.	20.	-41.	-90.
	49	-46.	-70.	-51.	-77.	-3.	5.	-54.	-72.
	50	-76.	-27.	-83.	-29.	11.	-17.	-72.	-46.
	51	-74.	13.	-81.	15.	22.	-28.	-60.	-13.
6	51	-77.	17.	-84.	19.	21.	-28.	-63.	-9.
	52	-79.	-29.	-87.	-31.	9.	-14.	-78.	-46.
	53	-43.	-76.	-47.	-84.	-6.	10.	-53.	-74.
	54	-18.	-105.	-20.	-115.	-18.	27.	-39.	-88.
	55	-3.	-129.	-3.	-142.	-27.	39.	-30.	-103.
	56	5.	-142.	5.	-156.	-31.	46.	-26.	-111.
	57	4.	-142.	4.	-157.	-31.	46.	-26.	-111.
	58	-5.	-130.	-6.	-143.	-27.	40.	-33.	-102.
	59	-23.	-104.	-25.	-114.	-19.	29.	-45.	-85.
	60	-50.	-65.	-55.	-72.	-8.	11.	-63.	-60.
	61	-49.	-19.	-54.	-21.	5.	-6.	-49.	-27.
7	61	-49.	-19.	-54.	-21.	5.	-6.	-49.	-27.
	62	-51.	-71.	-56.	-78.	2.	-3.	-54.	-81.
	63A	-18.	-121.	-20.	-133.	0.	0.	-20.	-133.

Tensiones en Construccion (kg/cm2) Estado 6

		Pti (*)		Pti		Pi		Pti+Pi	
V.	Sec	F.Sup	F.Inf	F.Sup	F.Inf	F.Sup	F.Inf	F.Sup	F.Inf
1	1	-27.	-65.	-30.	-72.	0.	0.	-30.	-72.
	2	-34.	-125.	-37.	-137.	-6.	9.	-43.	-129.
	3	-29.	-132.	-32.	-145.	-10.	15.	-42.	-130.
	4	-28.	-133.	-30.	-146.	-12.	17.	-42.	-129.
	5	-30.	-128.	-33.	-141.	-12.	17.	-45.	-124.
	6	-37.	-117.	-41.	-128.	-10.	14.	-50.	-114.
	7	-48.	-98.	-53.	-108.	-6.	8.	-59.	-100.
	8	-64.	-73.	-71.	-81.	0.	0.	-71.	-81.
	9	-84.	-42.	-93.	-46.	8.	-12.	-85.	-58.
	10	-107.	-8.	-117.	-9.	18.	-27.	-99.	-35.
	11	-92.	25.	-101.	28.	22.	-28.	-79.	-1.
2	11	-92.	25.	-101.	28.	22.	-28.	-79.	-1.
	12	-97.	-14.	-107.	-16.	13.	-19.	-94.	-35.
	13	-69.	-56.	-76.	-61.	0.	0.	-75.	-62.
	14	-49.	-85.	-53.	-94.	-9.	13.	-62.	-80.
	15	-36.	-106.	-39.	-116.	-15.	22.	-54.	-94.
	16	-31.	-114.	-34.	-126.	-17.	26.	-51.	-100.
	17	-34.	-110.	-37.	-121.	-16.	24.	-53.	-97.
	18	-45.	-94.	-50.	-103.	-12.	18.	-62.	-85.
	19	-65.	-64.	-72.	-71.	-4.	6.	-76.	-64.
	20	-94.	-22.	-103.	-24.	7.	-11.	-96.	-35.
	21	-89.	20.	-98.	22.	16.	-20.	-82.	2.
3	21	-89.	20.	-98.	22.	16.	-20.	-82.	2.
	22	-97.	-24.	-107.	-26.	6.	-9.	-100.	-36.
	23	-63.	-68.	-70.	-74.	-6.	9.	-75.	-66.
	24	-42.	-92.	-46.	-101.	-15.	22.	-61.	-80.
	25	-30.	-112.	-33.	-123.	-20.	30.	-53.	-94.
	26	-25.	-120.	-27.	-132.	-22.	32.	-49.	-100.
	27	-28.	-116.	-31.	-128.	-20.	30.	-52.	-98.
	28	-40.	-99.	-44.	-109.	-15.	23.	-60.	-87.
	29	-61.	-70.	-67.	-77.	-7.	10.	-74.	-66.
	30	-90.	-27.	-99.	-30.	5.	-8.	-94.	-37.
	31	-85.	16.	-94.	18.	14.	-19.	-80.	-1.
4	31	-85.	16.	-94.	17.	14.	-19.	-80.	-1.
	32	-94.	-27.	-104.	-30.	5.	-8.	-98.	-38.
	33	-63.	-69.	-69.	-76.	-6.	9.	-75.	-67.
	34	-43.	-91.	-48.	-100.	-14.	21.	-62.	-79.
	35	-32.	-109.	-36.	-119.	-19.	28.	-54.	-92.
	36	-29.	-114.	-32.	-126.	-20.	30.	-52.	-96.
	37	-34.	-108.	-38.	-119.	-18.	26.	-55.	-92.
	38	-48.	-88.	-53.	-97.	-12.	18.	-65.	-80.
	39	-70.	-56.	-77.	-62.	-3.	4.	-80.	-58.
	40	-101.	-11.	-111.	-12.	10.	-15.	-101.	-27.
	41	-97.	30.	-106.	33.	19.	-24.	-88.	9.
5	41	-93.	25.	-102.	28.	19.	-24.	-83.	3.
	42	-101.	-19.	-111.	-20.	8.	-12.	-103.	-32.
	43	-57.	-66.	-63.	-72.	-6.	9.	-69.	-63.
	44	-26.	-94.	-28.	-103.	-16.	24.	-45.	-79.
	45	-12.	-116.	-13.	-127.	-23.	34.	-36.	-93.

Tensiones en Construccion (kg/cm2) Estado 6

		Pti (*)		Pti		Pi		Pti+Pi	
V.	Sec	F.Sup	F.Inf	F.Sup	F.Inf	F.Sup	F.Inf	F.Sup	F.Inf
	46	-6.	-126.	-7.	-138.	-25.	37.	-32.	-101.
	47	-9.	-123.	-10.	-136.	-23.	34.	-33.	-101.
	48	-20.	-108.	-22.	-119.	-18.	26.	-39.	-93.
	49	-39.	-80.	-43.	-88.	-8.	12.	-51.	-76.
	50	-68.	-38.	-75.	-42.	6.	-8.	-69.	-51.
	51	-66.	3.	-73.	4.	16.	-21.	-56.	-18.
6	51	-69.	7.	-76.	8.	16.	-21.	-59.	-14.
	52	-75.	-36.	-82.	-39.	6.	-9.	-76.	-48.
	53	-42.	-77.	-46.	-85.	-7.	10.	-53.	-75.
	54	-22.	-100.	-24.	-110.	-16.	24.	-40.	-86.
	55	-10.	-118.	-11.	-130.	-21.	32.	-33.	-98.
	56	-7.	-125.	-8.	-137.	-22.	33.	-30.	-104.
	57	-12.	-119.	-13.	-131.	-20.	29.	-33.	-101.
	58	-25.	-100.	-27.	-110.	-13.	19.	-41.	-91.
	59	-47.	-68.	-52.	-75.	-2.	4.	-54.	-71.
	60	-78.	-23.	-86.	-26.	12.	-18.	-74.	-44.
	61	-77.	17.	-85.	19.	22.	-29.	-62.	-10.
7	61	-77.	17.	-85.	19.	22.	-29.	-62.	-10.
	62	-79.	-28.	-87.	-31.	10.	-15.	-77.	-46.
	63	-43.	-76.	-47.	-84.	-6.	9.	-53.	-75.
	64	-18.	-106.	-20.	-116.	-19.	28.	-39.	-88.
	65	-3.	-130.	-3.	-144.	-28.	41.	-31.	-103.
	66	5.	-143.	5.	-158.	-32.	48.	-27.	-110.
	67	4.	-144.	5.	-158.	-33.	49.	-28.	-109.
	68	-5.	-131.	-6.	-144.	-30.	44.	-35.	-100.
	69	-23.	-105.	-26.	-115.	-23.	34.	-48.	-81.
	70	-51.	-65.	-56.	-72.	-12.	17.	-67.	-55.
	71	-49.	-19.	-54.	-21.	1.	-2.	-53.	-22.
8	71	-50.	-19.	-55.	-21.	1.	-2.	-53.	-22.
	72	-60.	-58.	-66.	-64.	1.	-1.	-65.	-66.
	73A	-39.	-90.	-43.	-99.	0.	0.	-43.	-99.

Tensiones en Construccion (kg/cm2) Estado 7

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
1	1	-27.	-65.	-30.	-72.	0.	0.	-30.	-72.
	2	-34.	-125.	-37.	-137.	-6.	9.	-43.	-129.
	3	-29.	-132.	-32.	-145.	-10.	15.	-42.	-130.
	4	-28.	-133.	-30.	-146.	-12.	17.	-42.	-129.
	5	-30.	-128.	-33.	-141.	-12.	17.	-45.	-124.
	6	-37.	-117.	-41.	-128.	-10.	14.	-50.	-114.
	7	-48.	-98.	-53.	-108.	-6.	8.	-59.	-100.
	8	-64.	-73.	-71.	-81.	0.	0.	-71.	-81.
	9	-84.	-42.	-93.	-46.	8.	-12.	-85.	-58.
	10	-107.	-8.	-117.	-8.	18.	-27.	-99.	-35.
	11	-92.	25.	-101.	28.	22.	-28.	-79.	-1.
2	11	-92.	25.	-101.	28.	22.	-28.	-79.	-1.
	12	-97.	-14.	-107.	-16.	13.	-19.	-94.	-35.
	13	-69.	-56.	-76.	-61.	0.	0.	-75.	-62.
	14	-49.	-85.	-53.	-94.	-9.	13.	-62.	-80.
	15	-36.	-106.	-39.	-116.	-15.	22.	-54.	-94.
	16	-31.	-114.	-34.	-126.	-17.	26.	-51.	-100.
	17	-34.	-110.	-37.	-121.	-16.	24.	-53.	-97.
	18	-45.	-94.	-50.	-103.	-12.	18.	-62.	-85.
	19	-65.	-64.	-72.	-71.	-4.	6.	-76.	-64.
	20	-94.	-22.	-103.	-24.	7.	-11.	-96.	-35.
	21	-89.	20.	-97.	22.	16.	-20.	-82.	2.
3	21	-89.	20.	-98.	22.	16.	-20.	-82.	2.
	22	-97.	-24.	-107.	-27.	6.	-9.	-100.	-36.
	23	-63.	-68.	-70.	-75.	-6.	9.	-75.	-66.
	24	-42.	-92.	-46.	-101.	-15.	22.	-61.	-80.
	25	-30.	-112.	-33.	-123.	-20.	30.	-53.	-94.
	26	-25.	-120.	-28.	-132.	-22.	32.	-49.	-100.
	27	-28.	-116.	-31.	-128.	-20.	30.	-52.	-98.
	28	-40.	-99.	-44.	-109.	-15.	23.	-60.	-87.
	29	-61.	-69.	-67.	-76.	-7.	10.	-74.	-66.
	30	-90.	-27.	-99.	-30.	5.	-8.	-94.	-37.
	31	-86.	16.	-94.	18.	14.	-19.	-80.	-1.
4	31	-85.	16.	-94.	17.	14.	-19.	-80.	-1.
	32	-94.	-27.	-104.	-30.	5.	-8.	-98.	-38.
	33	-63.	-69.	-69.	-76.	-6.	9.	-75.	-67.
	34	-43.	-91.	-47.	-100.	-14.	21.	-62.	-79.
	35	-32.	-109.	-35.	-120.	-19.	28.	-54.	-92.
	36	-29.	-115.	-32.	-126.	-20.	30.	-52.	-96.
	37	-34.	-108.	-38.	-119.	-18.	26.	-55.	-93.
	38	-48.	-89.	-52.	-98.	-12.	18.	-64.	-80.
	39	-70.	-56.	-77.	-62.	-3.	4.	-80.	-58.
	40	-101.	-11.	-111.	-12.	10.	-14.	-101.	-27.
	41	-96.	30.	-106.	33.	18.	-24.	-87.	9.
5	41	-92.	25.	-102.	27.	18.	-24.	-83.	3.
	42	-100.	-19.	-110.	-21.	8.	-11.	-103.	-32.
	43	-57.	-66.	-63.	-72.	-6.	9.	-69.	-63.
	44	-26.	-93.	-29.	-103.	-16.	24.	-45.	-78.
	45	-12.	-115.	-14.	-127.	-22.	33.	-36.	-93.

Tensiones en Construccion (kg/cm2) Estado 7

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
	46	-7.	-125.	-7.	-138.	-25.	37.	-32.	-101.
	47	-9.	-123.	-10.	-135.	-23.	34.	-33.	-101.
	48	-20.	-107.	-22.	-118.	-17.	25.	-39.	-92.
	49	-40.	-78.	-44.	-86.	-7.	11.	-52.	-75.
	50	-69.	-37.	-76.	-40.	6.	-9.	-70.	-50.
	51	-67.	5.	-74.	5.	17.	-22.	-57.	-17.
6	51	-70.	8.	-77.	9.	17.	-22.	-60.	-13.
	52	-75.	-35.	-83.	-38.	7.	-10.	-76.	-48.
	53	-42.	-77.	-46.	-85.	-7.	10.	-53.	-75.
	54	-21.	-100.	-23.	-110.	-16.	24.	-40.	-86.
	55	-9.	-120.	-10.	-132.	-22.	32.	-32.	-99.
	56	-5.	-127.	-6.	-140.	-23.	35.	-29.	-105.
	57	-10.	-122.	-11.	-134.	-21.	31.	-32.	-103.
	58	-22.	-104.	-25.	-114.	-15.	22.	-39.	-92.
	59	-44.	-73.	-48.	-80.	-4.	7.	-53.	-73.
	60	-74.	-29.	-82.	-32.	10.	-15.	-72.	-46.
	61	-73.	13.	-81.	14.	20.	-26.	-60.	-12.
7	61	-73.	13.	-81.	14.	20.	-26.	-60.	-12.
	62	-77.	-32.	-85.	-35.	9.	-13.	-76.	-48.
	63	-42.	-77.	-47.	-85.	-7.	10.	-53.	-75.
	64	-20.	-103.	-22.	-114.	-18.	27.	-40.	-87.
	65	-6.	-125.	-7.	-138.	-25.	38.	-32.	-100.
	66	0.	-135.	0.	-149.	-29.	43.	-29.	-106.
	67	-3.	-133.	-3.	-146.	-28.	42.	-32.	-104.
	68	-14.	-117.	-16.	-129.	-24.	35.	-39.	-94.
	69	-34.	-88.	-38.	-97.	-15.	23.	-53.	-74.
	70	-63.	-46.	-70.	-51.	-3.	4.	-73.	-46.
	71	-62.	-2.	-69.	-2.	8.	-11.	-60.	-13.
8	71	-62.	-2.	-69.	-2.	8.	-11.	-60.	-13.
	72	-73.	-39.	-80.	-43.	3.	-5.	-77.	-48.
	73	-53.	-55.	-58.	-61.	-5.	7.	-63.	-54.
	74	-37.	-66.	-41.	-73.	-11.	16.	-52.	-57.
	75	-23.	-88.	-26.	-97.	-15.	23.	-41.	-74.
	76	-14.	-103.	-15.	-114.	-18.	26.	-33.	-88.
	77	-9.	-111.	-10.	-123.	-18.	27.	-28.	-96.
	78	-9.	-113.	-9.	-124.	-16.	24.	-26.	-100.
	79	-12.	-109.	-13.	-120.	-13.	19.	-26.	-100.
	80	-19.	-99.	-21.	-109.	-8.	11.	-29.	-97.
	81	-19.	-48.	-21.	-53.	0.	0.	-21.	-53.

Tensiones en Servicio (kg/cm2) Estado inicial

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pi+Pti F.Sup	Pi+Pti F.Inf	Pi+Pti+M F.Sup	Pi+Pti+M F.Inf	Pi+Pti+M+Sp F.Sup	Pi+Pti+M+Sp F.Inf	Pi+Pti+M+Sn F.Sup	Pi+Pti+M+Sn F.Inf
1	1	-27.	-65.	-30.	-72.	-30.	-72.	-30.	-72.	-30.	-72.
	2	-34.	-125.	-43.	-128.	-46.	-125.	-57.	-108.	-43.	-128.
	3	-29.	-132.	-42.	-130.	-46.	-124.	-66.	-95.	-41.	-132.
	4	-28.	-133.	-42.	-129.	-47.	-121.	-73.	-83.	-40.	-132.
	5	-30.	-128.	-45.	-124.	-50.	-116.	-79.	-73.	-40.	-131.
	6	-37.	-117.	-50.	-114.	-55.	-107.	-85.	-62.	-42.	-126.
	7	-48.	-98.	-59.	-100.	-62.	-95.	-91.	-52.	-47.	-118.
	8	-64.	-73.	-71.	-81.	-71.	-80.	-97.	-42.	-53.	-107.
	9	-84.	-42.	-85.	-59.	-82.	-62.	-102.	-32.	-61.	-93.
	10	-107.	-8.	-99.	-35.	-93.	-45.	-109.	-20.	-68.	-81.
	11	-92.	25.	-79.	-1.	-71.	-12.	-86.	8.	-43.	-48.
2	11	-92.	25.	-79.	-1.	-71.	-12.	-86.	9.	-43.	-48.
	12	-97.	-14.	-94.	-36.	-89.	-43.	-104.	-20.	-71.	-69.
	13	-69.	-56.	-75.	-62.	-75.	-62.	-97.	-30.	-65.	-78.
	14	-49.	-85.	-63.	-80.	-66.	-75.	-98.	-28.	-57.	-89.
	15	-36.	-106.	-54.	-94.	-60.	-86.	-98.	-28.	-51.	-99.
	16	-31.	-114.	-51.	-100.	-57.	-90.	-98.	-30.	-47.	-105.
	17	-34.	-110.	-54.	-97.	-59.	-89.	-98.	-31.	-47.	-106.
	18	-45.	-94.	-62.	-85.	-65.	-81.	-98.	-31.	-50.	-103.
	19	-65.	-64.	-76.	-64.	-75.	-66.	-98.	-31.	-57.	-93.
	20	-94.	-22.	-96.	-35.	-90.	-44.	-105.	-22.	-67.	-79.
	21	-89.	20.	-82.	1.	-72.	-11.	-86.	6.	-39.	-54.
3	21	-89.	20.	-82.	1.	-73.	-11.	-86.	6.	-39.	-54.
	22	-97.	-24.	-100.	-36.	-94.	-45.	-107.	-27.	-70.	-81.
	23AI	-65.	-74.	-77.	-73.	-76.	-74.	-97.	-43.	-59.	-99.
	23AD	-62.	-61.	-74.	-59.	-73.	-60.	-94.	-29.	-56.	-85.
	24	-42.	-92.	-61.	-79.	-64.	-75.	-96.	-28.	-50.	-97.
	25	-30.	-112.	-53.	-93.	-58.	-86.	-96.	-29.	-44.	-106.
	26	-25.	-120.	-50.	-100.	-55.	-91.	-96.	-31.	-42.	-110.
	27	-28.	-116.	-52.	-98.	-57.	-90.	-96.	-31.	-44.	-110.
	28	-40.	-99.	-60.	-87.	-63.	-82.	-97.	-32.	-48.	-104.
	29	-61.	-69.	-74.	-66.	-73.	-67.	-97.	-31.	-55.	-94.
	30	-90.	-27.	-94.	-37.	-88.	-46.	-105.	-21.	-64.	-81.
	31	-86.	16.	-80.	-1.	-71.	-12.	-86.	7.	-37.	-56.
4	31	-85.	16.	-79.	-2.	-71.	-13.	-85.	6.	-37.	-56.
	32	-94.	-27.	-98.	-38.	-93.	-47.	-108.	-24.	-69.	-83.
	33AI	-64.	-75.	-76.	-73.	-76.	-74.	-99.	-40.	-58.	-100.
	33AD	-61.	-63.	-73.	-60.	-73.	-61.	-96.	-27.	-55.	-87.
	34	-43.	-91.	-62.	-79.	-65.	-75.	-98.	-25.	-50.	-97.
	35	-32.	-109.	-54.	-91.	-59.	-84.	-98.	-26.	-45.	-106.
	36	-29.	-115.	-52.	-96.	-58.	-88.	-99.	-27.	-43.	-109.
	37	-34.	-108.	-55.	-92.	-60.	-85.	-100.	-26.	-44.	-109.
	38	-48.	-89.	-65.	-80.	-67.	-76.	-101.	-25.	-49.	-102.
	39	-70.	-56.	-80.	-58.	-78.	-60.	-102.	-24.	-57.	-91.
	40	-101.	-11.	-101.	-27.	-94.	-37.	-110.	-13.	-67.	-77.
	41	-96.	30.	-87.	9.	-77.	-4.	-92.	14.	-41.	-51.
5	41	-92.	25.	-83.	3.	-73.	-10.	-87.	9.	-37.	-57.
	42	-100.	-19.	-103.	-32.	-97.	-41.	-112.	-19.	-72.	-78.
	43AI	-67.	-71.	-80.	-68.	-80.	-68.	-104.	-33.	-63.	-94.

Tensiones en Servicio (kg/cm2) Estado inicial

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pi+Pti F.Sup	Pi+Pti F.Inf	Pi+Pti+M F.Sup	Pi+Pti+M F.Inf	Pi+Pti+M+Sp F.Sup	Pi+Pti+M+Sp F.Inf	Pi+Pti+M+Sn F:Sup	Pi+Pti+M+Sn F.Inf
	43AD	-47.	-61.	-58.	-57.	-58.	-57.	-82.	-22.	-41.	-83.
	44	-26.	-93.	-45.	-78.	-49.	-72.	-85.	-19.	-35.	-93.
	45	-12.	-115.	-36.	-93.	-43.	-84.	-85.	-20.	-29.	-103.
	46	-7.	-125.	-32.	-101.	-39.	-90.	-84.	-24.	-26.	-110.
	47	-9.	-123.	-33.	-101.	-39.	-91.	-82.	-28.	-25.	-113.
	48	-20.	-107.	-40.	-92.	-43.	-87.	-80.	-33.	-27.	-111.
	49	-40.	-78.	-52.	-75.	-51.	-76.	-76.	-39.	-31.	-106.
	50	-69.	-37.	-70.	-50.	-63.	-60.	-79.	-37.	-35.	-101.
	51	-67.	5.	-57.	-17.	-46.	-31.	-60.	-13.	-8.	-81.
6	51	-70.	8.	-60.	-13.	-49.	-27.	-63.	-9.	-11.	-77.
	52	-75.	-35.	-76.	-48.	-69.	-58.	-84.	-36.	-42.	-98.
	53AI	-43.	-84.	-55.	-82.	-54.	-84.	-78.	-47.	-33.	-114.
	53AD	-41.	-70.	-51.	-67.	-51.	-68.	-75.	-32.	-30.	-98.
	54	-21.	-100.	-40.	-86.	-43.	-81.	-79.	-27.	-26.	-106.
	55	-9.	-120.	-32.	-99.	-38.	-90.	-81.	-27.	-23.	-113.
	56	-5.	-127.	-30.	-105.	-36.	-95.	-81.	-29.	-22.	-116.
	57	-10.	-122.	-32.	-103.	-38.	-94.	-79.	-32.	-22.	-117.
	58	-22.	-104.	-40.	-92.	-43.	-88.	-77.	-36.	-26.	-112.
	59	-44.	-73.	-53.	-73.	-52.	-75.	-74.	-42.	-33.	-104.
	60	-74.	-29.	-72.	-46.	-65.	-57.	-78.	-37.	-38.	-97.
	61	-73.	13.	-60.	-13.	-49.	-27.	-63.	-9.	-11.	-76.
7	61	-73.	13.	-60.	-13.	-49.	-27.	-63.	-9.	-12.	-76.
	62	-77.	-32.	-76.	-48.	-69.	-58.	-85.	-35.	-43.	-98.
	63AI	-44.	-84.	-55.	-82.	-54.	-83.	-79.	-46.	-34.	-114.
	63AD	-41.	-70.	-52.	-67.	-51.	-69.	-76.	-31.	-31.	-99.
	64	-20.	-103.	-40.	-87.	-44.	-81.	-80.	-27.	-27.	-106.
	65	-6.	-125.	-32.	-100.	-39.	-91.	-82.	-26.	-26.	-110.
	66	0.	-135.	-29.	-106.	-37.	-95.	-82.	-28.	-26.	-111.
	67	-3.	-133.	-32.	-104.	-39.	-94.	-81.	-31.	-29.	-107.
	68	-14.	-117.	-40.	-93.	-44.	-87.	-78.	-36.	-35.	-100.
	69	-34.	-88.	-53.	-74.	-54.	-73.	-76.	-40.	-43.	-89.
	70	-63.	-46.	-73.	-46.	-68.	-54.	-83.	-30.	-49.	-82.
	71	-62.	-2.	-60.	-13.	-51.	-25.	-67.	-4.	-20.	-66.
8	71	-62.	-2.	-60.	-13.	-51.	-25.	-68.	-4.	-20.	-66.
	72	-73.	-39.	-77.	-48.	-69.	-59.	-87.	-33.	-41.	-101.
	73AI	-51.	-72.	-61.	-73.	-58.	-78.	-79.	-47.	-33.	-114.
	73AD	-55.	-38.	-65.	-35.	-62.	-40.	-83.	-9.	-37.	-77.
	74	-37.	-66.	-52.	-57.	-52.	-57.	-78.	-17.	-30.	-88.
	75	-23.	-88.	-41.	-74.	-43.	-71.	-73.	-26.	-25.	-98.
	76	-14.	-103.	-33.	-87.	-37.	-81.	-68.	-36.	-22.	-104.
	77	-9.	-111.	-28.	-96.	-33.	-89.	-62.	-45.	-21.	-106.
	78	-9.	-113.	-26.	-100.	-31.	-92.	-57.	-54.	-22.	-106.
	79	-12.	-109.	-26.	-100.	-30.	-94.	-50.	-65.	-24.	-103.
	80	-19.	-99.	-29.	-97.	-31.	-94.	-42.	-77.	-28.	-98.
	81	-19.	-48.	-21.	-53.	-21.	-53.	-21.	-53.	-21.	-53.

Tensiones en Servicio (kg/cm2) Estado final

V.	Sec	Ptf (*) F.Sup	Ptf (*) F.Inf	Pf+Ptf+M F.Sup	Pf+Ptf+M F.Inf	Pf+Ptf+M+Sp F.Sup	Pf+Ptf+M+Sp F.Inf	Pf+Ptf+M+Sn F.Sup	Pf+Ptf+M+Sn F.Inf
1	1	-23.	-56.	-21.	-51.	-21.	-51.	-21.	-51.
	2	-28.	-108.	-34.	-84.	-46.	-67.	-31.	-89.
	3	-24.	-114.	-36.	-81.	-56.	-51.	-30.	-90.
	4	-22.	-115.	-38.	-77.	-65.	-38.	-29.	-91.
	5	-24.	-111.	-40.	-74.	-71.	-28.	-28.	-92.
	6	-30.	-101.	-43.	-69.	-75.	-20.	-28.	-91.
	7	-40.	-85.	-46.	-62.	-78.	-14.	-28.	-89.
	8	-54.	-64.	-51.	-55.	-80.	-11.	-29.	-86.
	9	-72.	-36.	-55.	-46.	-79.	-11.	-31.	-82.
	10	-91.	-6.	-59.	-39.	-80.	-8.	-31.	-81.
	11	-79.	22.	-42.	-18.	-62.	8.	-11.	-59.
2	11	-79.	22.	-42.	-17.	-62.	8.	-11.	-58.
	12	-83.	-12.	-58.	-36.	-77.	-8.	-37.	-68.
	13	-59.	-47.	-53.	-43.	-77.	-7.	-39.	-63.
	14	-41.	-73.	-49.	-48.	-83.	2.	-38.	-64.
	15	-30.	-90.	-46.	-53.	-86.	7.	-35.	-69.
	16	-26.	-97.	-45.	-56.	-87.	7.	-33.	-73.
	17	-29.	-93.	-45.	-56.	-86.	4.	-31.	-76.
	18	-40.	-78.	-47.	-54.	-82.	-1.	-29.	-80.
	19	-58.	-51.	-50.	-49.	-76.	-10.	-29.	-80.
	20	-84.	-13.	-56.	-41.	-75.	-13.	-28.	-82.
	21	-79.	22.	-40.	-21.	-57.	1.	-3.	-69.
3	21	-80.	22.	-40.	-21.	-57.	1.	-3.	-69.
	22	-87.	-14.	-59.	-42.	-75.	-18.	-31.	-83.
	23AI	-59.	-57.	-51.	-55.	-75.	-20.	-31.	-84.
	23AD	-56.	-46.	-49.	-45.	-72.	-10.	-29.	-75.
	24	-39.	-73.	-46.	-50.	-80.	0.	-29.	-75.
	25	-29.	-90.	-44.	-55.	-84.	4.	-29.	-77.
	26	-25.	-97.	-43.	-57.	-85.	6.	-28.	-79.
	27	-28.	-94.	-44.	-57.	-85.	4.	-29.	-79.
	28	-39.	-78.	-46.	-54.	-83.	0.	-29.	-80.
	29	-57.	-52.	-51.	-48.	-78.	-8.	-30.	-79.
	30	-83.	-14.	-57.	-39.	-77.	-9.	-29.	-81.
	31	-79.	21.	-42.	-19.	-61.	5.	-5.	-68.
4	31	-80.	21.	-42.	-19.	-61.	5.	-5.	-68.
	32	-87.	-15.	-60.	-41.	-79.	-13.	-32.	-82.
	33AI	-60.	-58.	-52.	-55.	-78.	-16.	-32.	-85.
	33AD	-57.	-47.	-50.	-45.	-76.	-6.	-30.	-75.
	34	-41.	-74.	-47.	-51.	-83.	2.	-30.	-77.
	35	-30.	-91.	-45.	-56.	-85.	5.	-29.	-80.
	36	-27.	-97.	-44.	-59.	-86.	5.	-27.	-83.
	37	-31.	-93.	-44.	-59.	-85.	2.	-27.	-85.
	38	-42.	-77.	-46.	-57.	-82.	-3.	-26.	-86.
	39	-60.	-50.	-50.	-51.	-77.	-11.	-26.	-87.
	40	-87.	-12.	-56.	-43.	-76.	-14.	-25.	-89.
	41	-83.	24.	-41.	-22.	-59.	2.	-1.	-74.
5	41	-82.	24.	-41.	-22.	-59.	1.	-1.	-74.
	42	-91.	-12.	-63.	-39.	-81.	-12.	-35.	-81.
	43AI	-64.	-55.	-58.	-49.	-84.	-9.	-37.	-79.

Tensiones en Servicio (kg/cm2) Estado final

V.	Sec	Ptf (*) F.Sup	Ptf (*) F.Inf	Pf+Ptf+M F.Sup	Pf+Ptf+M F.Inf	Pf+Ptf+M+Sp F.Sup	Pf+Ptf+M+Sp F.Inf	Pf+Ptf+M+Sn F.Sup	Pf+Ptf+M+Sn F.Inf
	43AD	-46.	-46.	-42.	-41.	-68.	-2.	-21.	-71.
	44	-29.	-73.	-40.	-44.	-78.	12.	-24.	-69.
	45	-19.	-89.	-39.	-47.	-84.	18.	-24.	-69.
	46	-16.	-95.	-39.	-49.	-85.	20.	-24.	-71.
	47	-20.	-91.	-39.	-49.	-84.	17.	-23.	-74.
	48	-31.	-74.	-41.	-48.	-79.	9.	-23.	-75.
	49	-50.	-47.	-44.	-44.	-71.	-3.	-21.	-78.
	50	-77.	-8.	-48.	-39.	-67.	-11.	-17.	-85.
	51	-75.	25.	-32.	-24.	-50.	-1.	10.	-78.
6	51	-75.	25.	-32.	-24.	-50.	-1.	10.	-78.
	52	-81.	-8.	-51.	-40.	-70.	-12.	-21.	-85.
	53AI	-53.	-52.	-45.	-50.	-73.	-10.	-22.	-84.
	53AD	-51.	-39.	-43.	-39.	-70.	1.	-20.	-73.
	54	-33.	-66.	-42.	-43.	-80.	14.	-23.	-70.
	55	-23.	-84.	-40.	-46.	-85.	20.	-24.	-70.
	56	-19.	-91.	-40.	-48.	-86.	20.	-24.	-72.
	57	-22.	-87.	-40.	-49.	-83.	15.	-23.	-74.
	58	-33.	-72.	-41.	-48.	-77.	6.	-23.	-75.
	59	-52.	-45.	-43.	-45.	-68.	-8.	-22.	-77.
	60	-78.	-6.	-47.	-40.	-64.	-16.	-17.	-85.
	61	-75.	25.	-31.	-25.	-48.	-3.	10.	-79.
7	61	-75.	25.	-31.	-25.	-48.	-3.	10.	-79.
	62	-81.	-8.	-50.	-41.	-70.	-13.	-20.	-86.
	63AI	-52.	-53.	-45.	-51.	-73.	-9.	-22.	-85.
	63AD	-50.	-41.	-43.	-40.	-71.	1.	-20.	-74.
	64	-32.	-70.	-42.	-43.	-80.	14.	-23.	-71.
	65	-21.	-88.	-41.	-46.	-86.	21.	-26.	-68.
	66	-16.	-96.	-40.	-48.	-87.	21.	-28.	-65.
	67	-19.	-92.	-41.	-48.	-85.	17.	-30.	-64.
	68	-30.	-78.	-43.	-46.	-79.	8.	-32.	-62.
	69	-48.	-51.	-46.	-42.	-71.	-4.	-33.	-61.
	70	-74.	-13.	-51.	-36.	-70.	-7.	-29.	-69.
	71	-72.	20.	-34.	-22.	-54.	4.	1.	-67.
8	71	-72.	20.	-34.	-22.	-54.	4.	0.	-67.
	72	-81.	-8.	-49.	-44.	-70.	-12.	-17.	-91.
	73AI	-60.	-41.	-44.	-53.	-68.	-16.	-16.	-94.
	73AD	-64.	-11.	-47.	-26.	-71.	11.	-19.	-67.
	74	-46.	-38.	-42.	-34.	-71.	10.	-18.	-70.
	75	-32.	-60.	-37.	-41.	-70.	7.	-17.	-72.
	76	-22.	-77.	-34.	-48.	-67.	1.	-17.	-73.
	77	-16.	-87.	-31.	-53.	-62.	-6.	-17.	-73.
	78	-13.	-91.	-29.	-56.	-56.	-16.	-19.	-72.
	79	-14.	-90.	-27.	-60.	-48.	-29.	-20.	-70.
	80	-19.	-84.	-26.	-63.	-37.	-46.	-22.	-68.
	81	-17.	-42.	-15.	-38.	-15.	-38.	-15.	-38.

Resumen de tracciones maximas en Construccion (kg/cm2)

Seccion	41	T =	13.	Estado 4	F.Inf. Hipot. Pi+Pti
Seccion	31	T =	3.	Estado 3	F.Inf. Hipot. Pi+Pti
Seccion	21	T =	2.	Estado 2	F.Inf. Hipot. Pi+Pti
Seccion	11	T =	1.	Estado 1	F.Inf. Hipot. Pi+Pti

Resumen de compresiones maximas en Construccion (kg/cm2)

Seccion	53	T = -133.	Estado	4	F.Inf. Hipot. Pi+Pti
Seccion	63	T = -133.	Estado	5	F.Inf. Hipot. Pi+Pti
Seccion	3	T = -130.	Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	4	T = -129.	Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	2	T = -129.	Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	5	T = -124.	Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	43	T = -119.	Estado	3	F.Inf. Hipot. Pi+Pti
Seccion	6	T = -114.	Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	57	T = -111.	Estado	5	F.Inf. Hipot. Pi+Pti
Seccion	56	T = -111.	Estado	5	F.Inf. Hipot. Pi+Pti
Seccion	66	T = -110.	Estado	6	F.Inf. Hipot. Pi+Pti
Seccion	67	T = -109.	Estado	6	F.Inf. Hipot. Pi+Pti
Seccion	33	T = -109.	Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	47	T = -109.	Estado	4	F.Inf. Hipot. Pi+Pti
Seccion	23	T = -108.	Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	46	T = -107.	Estado	4	F.Inf. Hipot. Pi+Pti
Seccion	42	T = -105.	Estado	4	F.Sup. Hipot. Pi+Pti
Seccion	40	T = -104.	Estado	4	F.Sup. Hipot. Pi+Pti
Seccion	55	T = -103.	Estado	5	F.Inf. Hipot. Pi+Pti
Seccion	65	T = -103.	Estado	6	F.Inf. Hipot. Pi+Pti
Seccion	58	T = -102.	Estado	5	F.Inf. Hipot. Pi+Pti

Resumen de tracciones maximas en Servicio (kg/cm2)

Seccion	66	T =	21.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	65	T =	21.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	56	T =	20.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	55	T =	20.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	46	T =	20.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	45	T =	18.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	67	T =	17.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	47	T =	17.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	57	T =	15.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	64	T =	14.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	54	T =	14.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	44	T =	12.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	73	T =	11.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	61	T =	10.	Estado final	F.Sup. Hipot.	Pf+Ptf+M+Sn
Seccion	74	T =	10.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	51	T =	10.	Estado final	F.Sup. Hipot.	Pf+Ptf+M+Sn
Seccion	48	T =	9.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	41	T =	9.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sp
Seccion	11	T =	9.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sp
Seccion	68	T =	8.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp
Seccion	16	T =	7.	Estado final	F.Inf. Hipot.	Pf+Ptf+M+Sp

Resumen de compresiones maximas en Servicio (kg/cm2)

Seccion	4	T = -132.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	3	T = -132.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	5	T = -131.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	2	T = -128.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	6	T = -126.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	7	T = -118.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	57	T = -117.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	56	T = -116.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	73	T = -114.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	53	T = -114.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	63	T = -114.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	47	T = -113.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	55	T = -113.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	58	T = -112.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	42	T = -112.	Estado inicial	F.Sup. Hipot.	Pi+Pti+M+Sp
Seccion	48	T = -111.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	66	T = -111.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	40	T = -110.	Estado inicial	F.Sup. Hipot.	Pi+Pti+M+Sp
Seccion	26	T = -110.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	46	T = -110.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn
Seccion	65	T = -110.	Estado inicial	F.Inf. Hipot.	Pi+Pti+M+Sn

COMPROBACION DE FISURACION POR TENSIONES NORMALES

CONTROL TENSIONES LONGITUDINALES
COMBINACION CASI PERMANENTE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.30						0.00									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-21	-51	0	0	0	0	1	1	5	5	0	0	0	0	4	4	0	0	0	0	7	7	-14	-44	-28	-58
2	-34	-84	0	1	-1	2	2	2	8	8	-10	15	3	-4	7	7	-8	12	2	-3	11	11	-22	-67	-49	-97
	-36	-81	1	1	-2	4	2	2	8	8	-17	26	5	-7	7	7	-14	21	4	-6	11	11	-23	-59	-54	-95
4	-38	-77	1	2	-3	5	2	2	8	8	-22	33	8	-12	7	7	-18	27	6	-9	11	11	-24	-51	-58	-94
5	-40	-74	2	3	-4	7	2	2	8	8	-25	36	10	-15	7	7	-21	32	8	-12	11	11	-24	-46	-63	-92
6	-43	-69	2	3	-5	9	2	2	8	8	-25	37	13	-19	7	7	-21	32	10	-15	11	11	-26	-40	-66	-89
7	-46	-62	3	4	-7	11	2	2	8	8	-22	33	15	-23	7	7	-19	28	12	-18	11	11	-28	-32	-70	-84
8	-51	-55	3	5	-8	12	2	2	8	8	-18	27	18	-27	7	7	-13	20	15	-21	11	11	-32	-25	-74	-79
9	-55	-46	4	5	-9	14	2	2	8	8	-11	16	21	-31	7	7	-6	9	17	-25	11	11	-34	-18	-78	-71
10	-59	-39	4	6	-10	16	2	2	8	8	-6	9	24	-36	7	7	-5	7	20	-30	11	11	-37	-11	-81	-67
11	-42	-18	4	5	-10	13	1	1	5	5	-6	7	27	-36	4	4	-5	6	22	-29	7	7	-23	3	-59	-41
11	-42	-17	4	5	-10	13	1	1	5	5	-6	7	27	-36	4	4	-5	6	22	-29	7	7	-23	4	-59	-40
12	-58	-36	4	5	-11	17	2	2	8	8	-4	6	17	-26	7	7	-4	5	14	-22	11	11	-38	-10	-79	-60
13	-53	-43	3	4	-10	17	2	2	8	8	-11	16	11	-16	7	7	-8	11	10	-15	11	11	-36	-15	-75	-63
14	-49	-48	2	3	-10	16	2	2	8	8	-21	32	9	-13	7	7	-17	25	8	-12	11	11	-33	-16	-73	-66
15	-46	-53	2	2	-10	16	2	2	8	8	-28	41	9	-14	7	7	-24	35	6	-9	11	11	-30	-20	-72	-70
16	-45	-56	2	2	-10	16	2	2	8	8	-30	45	10	-15	7	7	-26	39	7	-10	11	11	-29	-22	-72	-73
17	-45	-56	2	2	-9	15	2	2	8	8	-29	43	12	-18	7	7	-24	36	9	-14	11	11	-28	-23	-71	-74
18	-47	-54	2	3	-9	15	2	2	8	8	-24	35	15	-22	7	7	-17	26	12	-18	11	11	-30	-22	-72	-75
19	-50	-49	3	4	-9	14	2	2	8	8	-14	21	19	-27	7	7	-8	12	15	-21	11	11	-30	-21	-73	-72
20	-56	-41	4	6	-9	14	2	2	8	8	-6	9	24	-35	7	7	-4	7	20	-29	11	11	-34	-14	-77	-68
21	-40	-21	4	5	-7	10	1	1	5	5	-5	7	34	-43	4	4	-4	6	26	-34	7	7	-19	-2	-56	-46
21	-40	-21	4	5	-7	10	1	1	4	4	-5	7	33	-43	4	4	-4	6	26	-34	7	7	-20	-3	-55	-45
	-59	-42	4	6	-8	13	2	2	7	7	-3	5	24	-36	7	7	-3	4	19	-29	11	11	-38	-18	-78	-69
23	-51	-55	3	6	-8	14	2	2	7	7	-12	18	17	-25	7	7	-8	13	14	-21	11	11	-33	-27	-72	-78
23	-49	-45	3	4	-8	14	2	2	7	7	-12	18	17	-25	7	7	-8	12	14	-21	11	11	-31	-19	-70	-66
24	-46	-50	2	3	-8	14	2	2	7	7	-23	34	14	-21	7	7	-18	27	11	-17	11	11	-30	-20	-69	-69
25	-44	-55	2	3	-9	14	2	2	7	7	-29	43	13	-20	7	7	-25	37	9	-13	11	11	-28	-22	-69	-74
26	-43	-57	2	3	-9	14	2	2	7	7	-32	47	13	-19	7	7	-27	40	7	-10	11	11	-27	-23	-69	-76
27	-44	-57	2	3	-9	14	2	2	7	7	-30	45	13	-19	7	7	-25	37	9	-14	11	11	-28	-23	-69	-76
28	-46	-54	2	3	-9	14	2	2	7	7	-24	36	15	-23	7	7	-17	26	12	-18	11	11	-30	-23	-70	-74
29	-51	-48	3	4	-9	14	2	2	7	7	-15	22	18	-27	7	7	-9	12	14	-22	11	11	-33	-20	-73	-70
30	-57	-39	4	6	-9	14	2	2	7	7	-7	10	24	-36	7	7	-5	8	20	-29	11	11	-36	-13	-78	-66
31	-42	-19	4	5	-8	11	1	1	4	4	-7	8	33	-44	4	4	-5	7	26	-34	7	7	-22	0	-58	-43
31	-42	-19	4	5	-8	11	1	1	4	4	-7	8	33	-44	4	4	-5	7	26	-34	7	7	-22	0	-58	-43
32	-60	-41	4	6	-9	15	2	2	7	7	-6	8	24	-36	7	7	-5	7	19	-29	11	11	-39	-15	-80	-68
33	-52	-55	3	4	-9	14	2	2	7	7	-13	21	18	-26	7	7	-8	13	15	-21	11	11	-34	-27	-73	-77
33	-50	-45	3	4	-9	14	2	2	7	7	-14	20	18	-26	7	7	-9	12	14	-22	11	11	-32	-18	-72	-67
34	-47	-51	2	3	-9	14	2	2	7	7	-23	36	15	-22	7	7	-17	27	12	-17	11	11	-31	-20	-70	-71
35	-45	-56	2	3	-9	14	2	2	7	7	-30	44	14	-21	7	7	-25	37	9	-14	11	11	-29	-23	-70	-75
36	-44	-59	2	3	-9	14	2	2	7	7	-31	47	15	-21	7	7	-27	40	8	-12	11	11	-28	-25	-70	-78
37	-44	-59	2	2	-9	14	2	2	7	7	-30	45	16	-23	7	7	-25	37	11	-16	11	11	-27	-26	-69	-78
38	-46	-57	2	3	-9	14	2	2	7	7	-25	37	17	-26	7	7	-18	27	14	-20	11	11	-29	-26	-70	-78
39	-50	-51	3	4	-9	14	2	2	7	7	-15	22	21	-32	7	7	-9	13	16	-25	11	11	-31	-23	-72	-75
40	-56	-43	4	5	-9	14	2	2	7	7	-7	10	27	-40	7	7	-6	8	21	-32	11	11	-34	-18	-76	-70
	-41	-22	4	5	-8	11	1	1	4	4	-6	8	36	-47	4	4	-5	7	28	-37	7	7	-21	-3	-57	-47

CONTROL TENSIONES LONGITUDINALES
COMBINACION CASI PERMANENTE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.30						0.00									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
41	-41	-22	4	5	-8	11	1	1	1	1	-6	8	36	-47	2	2	-5	7	28	-37	3	3	-24	-7	-53	-43
42	-63	-39	4	5	-9	14	2	2	2	2	-5	8	25	-37	3	3	-4	6	20	-30	4	4	-48	-21	-76	-58
43	-58	-49	3	4	-9	14	2	2	2	2	-14	22	17	-25	3	3	-9	14	14	-20	4	4	-47	-28	-73	-64
43	-42	-41	3	4	-9	14	2	2	2	2	-14	22	17	-26	3	3	-9	14	14	-20	4	4	-31	-20	-57	-56
44	-40	-44	2	3	-9	14	2	2	2	2	-26	39	15	-21	3	3	-19	29	12	-17	4	4	-30	-19	-58	-57
45	-39	-47	2	2	-9	14	2	2	2	2	-34	50	13	-19	3	3	-28	41	8	-13	4	4	-30	-19	-59	-58
46	-39	-49	2	2	-9	14	2	2	2	2	-35	52	14	-20	3	3	-30	44	8	-12	4	4	-29	-21	-59	-60
47	-39	-49	2	2	-9	14	2	2	2	2	-34	49	14	-22	3	3	-28	40	10	-16	4	4	-29	-22	-59	-61
48	-41	-48	2	3	-9	14	2	2	2	2	-27	41	16	-24	3	3	-20	30	13	-19	4	4	-31	-22	-59	-62
49	-44	-44	3	4	-9	14	2	2	2	2	-16	23	20	-30	3	3	-10	14	16	-24	4	4	-32	-22	-60	-60
50	-48	-39	3	5	-9	15	2	2	2	2	-7	10	27	-40	3	3	-5	8	21	-32	4	4	-34	-20	-61	-59
51	-32	-24	4	5	-8	11	1	1	1	1	-6	8	38	-50	2	2	-5	7	29	-38	3	3	-15	-9	-44	-46
51	-32	-24	4	5	-8	11	1	1	1	1	-6	8	38	-50	1	1	-5	6	29	-39	2	2	-15	-10	-43	-46
52	-51	-40	3	5	-9	14	1	1	1	1	-5	8	27	-40	2	2	-4	6	22	-33	3	3	-37	-23	-62	-60
53	-45	-50	3	4	-9	14	1	1	1	1	-15	23	21	-30	2	2	-9	14	16	-24	3	3	-33	-29	-59	-66
53	-43	-39	3	4	-9	14	1	1	1	1	-15	22	20	-30	2	2	-9	14	15	-24	3	3	-31	-19	-57	-55
54	-42	-43	2	3	-9	14	1	1	1	1	-27	40	16	-24	2	2	-20	30	13	-19	3	3	-33	-18	-59	-56
55	-40	-46	2	2	-9	14	1	1	1	1	-34	50	15	-22	2	2	-28	41	10	-15	3	3	-31	-19	-59	-57
56	-40	-48	2	2	-9	14	1	1	1	1	-36	53	14	-21	2	2	-31	45	7	-11	3	3	-31	-21	-60	-59
57	-40	-49	2	2	-9	14	1	1	1	1	-32	48	16	-23	2	2	-27	40	11	-16	3	3	-31	-23	-58	-60
58	-41	-48	2	3	-9	14	1	1	1	1	-25	38	16	-24	2	2	-20	30	13	-19	3	3	-32	-24	-57	-61
59	-43	-45	3	4	-8	14	1	1	1	1	-13	20	20	-28	2	2	-9	14	16	-23	3	3	-31	-26	-57	-60
60	-47	-40	3	5	-8	14	1	1	1	1	-4	7	27	-40	2	2	-3	5	22	-31	3	3	-33	-24	-58	-60
61	-31	-25	4	5	-7	10	1	1	1	1	-6	8	38	-49	1	1	-4	6	30	-38	2	2	-14	-11	-42	-46
61	-31	-25	4	5	-7	10	1	1	0	0	-6	8	38	-49	1	1	-4	6	30	-38	1	1	-15	-12	-41	-46
62	-50	-41	3	5	-9	14	1	1	1	1	-7	10	27	-40	1	1	-5	8	21	-32	2	2	-37	-24	-61	-60
63	-45	-51	3	4	-9	14	1	1	1	1	-16	24	21	-30	1	1	-9	14	17	-24	2	2	-34	-31	-59	-66
63	-43	-40	3	4	-9	14	1	1	1	1	-16	24	20	-30	1	1	-9	14	16	-24	2	2	-32	-20	-57	-55
64	-42	-43	2	3	-9	15	1	1	1	1	-27	40	17	-25	1	1	-19	29	14	-20	2	2	-33	-19	-58	-55
65	-41	-46	1	2	-9	15	1	1	1	1	-33	50	13	-19	1	1	-27	41	11	-15	2	2	-34	-20	-58	-55
66	-40	-48	1	2	-10	15	1	1	1	1	-35	51	10	-16	1	1	-30	44	7	-11	2	2	-34	-21	-58	-56
67	-41	-48	1	2	-10	16	1	1	1	1	-32	47	9	-14	1	1	-26	39	6	-9	2	2	-36	-22	-58	-56
68	-43	-46	2	3	-10	16	1	1	1	1	-24	35	9	-13	1	1	-19	28	8	-11	2	2	-37	-23	-59	-55
69	-46	-42	3	4	-10	17	1	1	1	1	-12	18	10	-15	1	1	-9	13	9	-13	2	2	-38	-23	-59	-52
70	-51	-36	3	5	-11	17	1	1	1	1	-5	7	19	-28	1	1	-4	5	15	-23	2	2	-41	-19	-62	-51
71	-34	-22	4	5	-10	13	1	1	0	0	-6	8	32	-41	1	1	-5	7	25	-33	1	1	-19	-7	-46	-40
71	-34	-22	4	5	-10	13	1	1	0	0	-6	8	31	-41	0	0	-5	7	25	-33	1	1	-20	-7	-45	-40
72	-49	-44	4	6	-10	16	1	1	0	0	-8	11	27	-42	1	1	-6	9	22	-34	1	1	-36	-26	-61	-63
73	-44	-53	3	5	-9	14	1	1	0	0	-12	18	24	-36	1	1	-7	10	19	-28	1	1	-33	-35	-56	-70
73	-47	-26	3	5	-9	14	1	1	0	0	-12	18	24	-36	1	1	-7	10	19	-29	1	1	-36	-8	-59	-43
74	-42	-34	3	4	-8	12	1	1	0	0	-19	28	21	-31	1	1	-14	21	16	-24	1	1	-32	-15	-55	-48
75	-37	-41	3	4	-7	11	1	1	0	0	-23	34	18	-27	1	1	-19	28	14	-21	1	1	-28	-21	-51	-54
76	-34	-48	2	3	-5	9	1	1	0	0	-25	38	15	-22	1	1	-22	33	11	-17	1	1	-27	-28	-47	-58
77	-31	-53	2	3	-4	7	1	1	0	0	-25	37	12	-17	1	1	-22	33	9	-14	1	1	-25	-35	-43	-62
78	-29	-56	1	2	-3	5	1	1	0	0	-23	33	9	-14	1	1	-19	27	7	-11	1	1	-25	-41	-39	-63
79	-27	-60	1	1	-2	4	1	1	0	0	-17	26	7	-9	1	1	-14	21	5	-7	1	1	-23	-49	-35	-64
80	-26	-63	0	1	-1	2	1	1	0	0	-10	14	3	-5	1	1	-8	11	2	-4	1	1	-24	-56	-30	-66
81	-15	-38	0	0	0	0	1	1	0	0	0	0	-1	0	0	0	0	0	-1	0	1	1	-15	-38	-16	-38

CONTROL TENSIONES LONGITUDINALES
COMBINACION FRECUENTE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.60						0.00									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-21	-51	0	0	0	0	1	1	4	4	0	0	0	0	4	4	0	0	0	0	7	7	-14	-44	-28	-58
2	-34	-84	0	1	-1	2	2	2	6	6	-10	15	3	-4	7	7	-8	12	2	-3	11	11	-22	-63	-51	-98
3	-36	-81	1	1	-2	4	2	2	6	6	-17	26	5	-7	7	7	-14	21	4	-6	11	11	-21	-52	-59	-97
4	-38	-77	1	2	-3	5	2	2	6	6	-22	33	8	-12	7	7	-18	27	6	-9	11	11	-22	-42	-64	-97
5	-40	-74	2	3	-4	7	2	2	6	6	-25	36	10	-15	7	7	-21	32	8	-12	11	11	-21	-35	-70	-97
	-43	-69	2	3	-5	9	2	2	6	6	-25	37	13	-19	7	7	-21	32	10	-15	11	11	-23	-29	-73	-94
7	-46	-62	3	4	-7	11	2	2	6	6	-22	33	15	-23	7	7	-19	28	12	-18	11	11	-23	-22	-76	-90
8	-51	-55	3	5	-8	12	2	2	6	6	-18	27	18	-27	7	7	-13	20	15	-21	11	11	-27	-17	-79	-87
9	-55	-46	4	5	-9	14	2	2	6	6	-11	16	21	-31	7	7	-6	9	17	-25	11	11	-28	-14	-81	-80
10	-59	-39	4	6	-10	16	2	2	6	6	-6	9	24	-36	7	7	-5	7	20	-30	11	11	-30	-9	-82	-77
11	-42	-18	4	5	-10	13	1	1	4	4	-6	7	27	-36	4	4	-5	6	22	-29	7	7	-15	4	-61	-51
11	-42	-17	4	5	-10	13	1	1	4	4	-6	7	27	-36	4	4	-5	6	22	-29	7	7	-15	5	-61	-50
12	-58	-36	4	5	-11	17	2	2	6	6	-4	6	17	-26	7	7	-4	5	14	-22	11	11	-33	-8	-80	-67
13	-53	-43	3	4	-10	17	2	2	6	6	-11	16	11	-16	7	7	-8	11	10	-15	11	11	-33	-10	-78	-67
14	-49	-48	2	3	-10	16	2	2	6	6	-21	32	9	-13	7	7	-17	25	8	-12	11	11	-31	-7	-79	-69
15	-46	-53	2	2	-10	16	2	2	6	6	-28	41	9	-14	7	7	-24	35	6	-9	11	11	-28	-8	-80	-74
16	-45	-56	2	2	-10	16	2	2	6	6	-30	45	10	-15	7	7	-26	39	7	-10	11	11	-26	-9	-80	-78
17	-45	-56	2	2	-9	15	2	2	6	6	-29	43	12	-18	7	7	-24	36	9	-14	11	11	-25	-10	-80	-79
18	-47	-54	2	3	-9	15	2	2	6	6	-24	35	15	-22	7	7	-17	26	12	-18	11	11	-25	-12	-79	-81
19	-50	-49	3	4	-9	14	2	2	6	6	-14	21	19	-27	7	7	-8	12	15	-21	11	11	-25	-15	-76	-80
20	-56	-41	4	6	-9	14	2	2	6	6	-6	9	24	-35	7	7	-4	7	20	-29	11	11	-27	-12	-78	-79
21	-40	-21	4	5	-7	10	1	1	4	4	-5	7	34	-43	4	4	-4	6	26	-34	7	7	-9	0	-57	-58
21	-40	-21	4	5	-7	10	1	1	3	3	-5	7	33	-43	4	4	-4	6	26	-34	7	7	-10	0	-57	-58
22	-59	-42	4	6	-8	13	2	2	6	6	-3	5	24	-36	7	7	-3	4	19	-29	11	11	-30	-16	-79	-80
23	-51	-55	3	6	-8	14	2	2	6	6	-12	18	17	-25	7	7	-8	13	14	-21	11	11	-27	-21	-76	-86
23	-49	-45	3	4	-8	14	2	2	6	6	-12	18	17	-25	7	7	-8	12	14	-21	11	11	-25	-13	-74	-74
	-46	-50	2	3	-8	14	2	2	6	6	-23	34	14	-21	7	7	-18	27	11	-17	11	11	-25	-9	-77	-76
25	-44	-55	2	3	-9	14	2	2	6	6	-29	43	13	-20	7	7	-25	37	9	-13	11	11	-24	-9	-78	-80
26	-43	-57	2	3	-9	14	2	2	6	6	-32	47	13	-19	7	7	-27	40	7	-10	11	11	-23	-8	-79	-82
27	-44	-57	2	3	-9	14	2	2	6	6	-30	45	13	-19	7	7	-25	37	9	-14	11	11	-24	-9	-79	-82
28	-46	-54	2	3	-9	14	2	2	6	6	-24	36	15	-23	7	7	-17	26	12	-18	11	11	-25	-12	-77	-81
29	-51	-48	3	4	-9	14	2	2	6	6	-15	22	18	-27	7	7	-9	12	14	-22	11	11	-27	-13	-78	-79
30	-57	-39	4	6	-9	14	2	2	6	6	-7	10	24	-36	7	7	-5	8	20	-29	11	11	-28	-9	-80	-77
31	-42	-19	4	5	-8	11	1	1	3	3	-7	8	33	-44	4	4	-5	7	26	-34	7	7	-12	3	-61	-57
31	-42	-19	4	5	-8	11	1	1	3	3	-7	8	33	-44	4	4	-5	7	26	-34	7	7	-12	3	-61	-57
32	-60	-41	4	6	-9	15	2	2	5	5	-6	8	24	-36	7	7	-5	7	19	-29	11	11	-31	-13	-82	-79
33	-52	-55	3	4	-9	14	2	2	5	5	-13	21	18	-26	7	7	-8	13	15	-21	11	11	-28	-21	-78	-85
33	-50	-45	3	4	-9	14	2	2	5	5	-14	20	18	-26	7	7	-9	12	14	-22	11	11	-26	-11	-76	-75
34	-47	-51	2	3	-9	14	2	2	5	5	-23	36	15	-22	7	7	-17	27	12	-17	11	11	-26	-9	-78	-78
35	-45	-56	2	3	-9	14	2	2	5	5	-30	44	14	-21	7	7	-25	37	9	-14	11	11	-24	-9	-80	-82
36	-44	-59	2	3	-9	14	2	2	5	5	-31	47	15	-21	7	7	-27	40	8	-12	11	11	-23	-10	-79	-85
37	-44	-59	2	2	-9	14	2	2	5	5	-30	45	16	-23	7	7	-25	37	11	-16	11	11	-22	-13	-79	-85
38	-46	-57	2	3	-9	14	2	2	5	5	-25	37	17	-26	7	7	-18	27	14	-20	11	11	-23	-14	-78	-86
39	-50	-51	3	4	-9	14	2	2	5	5	-15	22	21	-32	7	7	-9	13	16	-25	11	11	-24	-16	-77	-85
40	-56	-43	4	5	-9	14	2	2	5	5	-7	10	27	-40	7	7	-6	8	21	-32	11	11	-25	-15	-79	-82
41	-41	-22	4	5	-8	11	1	1	3	3	-6	8	36	-47	4	4	-5	7	28	-37	7	7	-10	-1	-59	-61

CONTROL TENSIONES LONGITUDINALES
COMBINACION FRECUENTE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.60						0.00									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
41	-41	-22	4	5	-8	11	1	1	1	1	-6	8	36	-47	2	2	-5	7	28	-37	3	3	-13	-4	-55	-58
42	-63	-39	4	5	-9	14	2	2	2	2	-5	8	25	-37	3	3	-4	6	20	-30	4	4	-40	-18	-79	-70
43	-58	-49	3	4	-9	14	2	2	2	2	-14	22	17	-25	3	3	-9	14	14	-20	4	4	-41	-21	-78	-72
43	-42	-41	3	4	-9	14	2	2	2	2	-14	22	17	-26	3	3	-9	14	14	-20	4	4	-25	-13	-62	-65
44	-40	-44	2	3	-9	14	2	2	2	2	-26	39	15	-21	3	3	-19	29	12	-17	4	4	-25	-6	-66	-64
45	-39	-47	2	2	-9	14	2	2	2	2	-34	50	13	-19	3	3	-28	41	8	-13	4	4	-25	-4	-70	-65
46	-39	-49	2	2	-9	14	2	2	2	2	-35	52	14	-20	3	3	-30	44	8	-12	4	4	-24	-4	-71	-67
47	-39	-49	2	2	-9	14	2	2	2	2	-34	49	14	-22	3	3	-28	40	10	-16	4	4	-24	-6	-70	-68
48	-41	-48	2	3	-9	14	2	2	2	2	-27	41	16	-24	3	3	-20	30	13	-19	4	4	-25	-9	-68	-70
49	-44	-44	3	4	-9	14	2	2	2	2	-16	23	20	-30	3	3	-10	14	16	-24	4	4	-25	-15	-65	-70
50	-48	-39	3	5	-9	15	2	2	2	2	-7	10	27	-40	3	3	-5	8	21	-32	4	4	-25	-17	-64	-72
51	-32	-24	4	5	-8	11	1	1	1	1	-6	8	38	-50	2	2	-5	7	29	-38	3	3	-3	-6	-46	-62
51	-32	-24	4	5	-8	11	1	1	1	1	-6	8	38	-50	1	1	-5	6	29	-39	2	2	-3	-7	-45	-61
52	-51	-40	3	5	-9	14	1	1	1	1	-5	8	27	-40	2	2	-4	6	22	-33	3	3	-29	-20	-65	-72
53	-45	-50	3	4	-9	14	1	1	1	1	-15	23	21	-30	2	2	-9	14	16	-24	3	3	-26	-22	-64	-75
53	-43	-39	3	4	-9	14	1	1	1	1	-15	22	20	-30	2	2	-9	14	16	-24	3	3	-25	-12	-62	-64
54	-42	-43	2	3	-9	14	1	1	1	1	-27	40	16	-24	2	2	-20	30	13	-19	3	3	-27	-6	-68	-63
55	-40	-46	2	2	-9	14	1	1	1	1	-34	50	15	-22	2	2	-28	41	10	-15	3	3	-26	-4	-70	-64
56	-40	-48	2	2	-9	14	1	1	1	1	-36	53	14	-21	2	2	-31	45	7	-11	3	3	-27	-4	-71	-66
57	-40	-49	2	2	-9	14	1	1	1	1	-32	48	16	-23	2	2	-27	40	11	-16	3	3	-25	-8	-69	-68
58	-41	-48	2	3	-9	14	1	1	1	1	-25	38	16	-24	2	2	-20	30	13	-19	3	3	-26	-12	-65	-68
59	-43	-45	3	4	-8	14	1	1	1	1	-13	20	20	-28	2	2	-9	14	16	-23	3	3	-25	-19	-61	-69
60	-47	-40	3	5	-8	14	1	1	1	1	-4	7	27	-40	2	2	-3	5	22	-31	3	3	-25	-21	-60	-72
61	-31	-25	4	5	-7	10	1	1	1	1	-6	8	38	-49	1	1	-4	6	30	-38	2	2	-2	-8	-44	-61
61	-31	-25	4	5	-7	10	1	1	0	0	-6	8	38	-49	1	1	-4	6	30	-38	1	1	-3	-9	-43	-61
62	-50	-41	3	5	-9	14	1	1	1	1	-7	10	27	-40	1	1	-5	8	21	-32	2	2	-29	-21	-63	-72
63	-45	-51	3	4	-9	14	1	1	1	1	-16	24	21	-30	1	1	-9	14	17	-24	2	2	-27	-23	-64	-75
63	-43	-40	3	4	-9	14	1	1	1	1	-16	24	20	-30	1	1	-9	14	16	-24	2	2	-26	-12	-62	-64
64	-42	-43	2	3	-9	15	1	1	1	1	-27	40	17	-25	1	1	-19	29	14	-20	2	2	-28	-7	-67	-63
65	-41	-46	1	2	-9	15	1	1	1	1	-33	50	13	-19	1	1	-27	41	11	-15	2	2	-30	-4	-68	-61
66	-40	-48	1	2	-10	15	1	1	1	1	-35	51	10	-16	1	1	-30	44	7	-11	2	2	-31	-6	-69	-62
67	-41	-48	1	2	-10	16	1	1	1	1	-32	47	9	-14	1	1	-26	39	6	-9	2	2	-33	-8	-68	-60
68	-43	-46	2	3	-10	16	1	1	1	1	-24	35	9	-13	1	1	-19	28	8	-11	2	2	-34	-12	-66	-59
69	-46	-42	3	4	-10	17	1	1	1	1	-12	18	10	-15	1	1	-9	13	9	-13	2	2	-35	-17	-63	-57
70	-51	-36	3	5	-11	17	1	1	1	1	-5	7	19	-28	1	1	-4	5	15	-23	2	2	-35	-16	-64	-60
71	-34	-22	4	5	-10	13	1	1	0	0	-6	8	32	-41	1	1	-5	7	25	-33	1	1	-10	-4	-48	-53
71	-34	-22	4	5	-10	13	1	1	0	0	-6	8	31	-41	0	0	-5	7	25	-33	1	1	-11	-5	-47	-52
72	-49	-44	4	6	-10	16	1	1	0	0	-8	11	27	-42	1	1	-6	9	22	-34	1	1	-28	-23	-64	-76
73	-44	-53	3	5	-9	14	1	1	0	0	-12	18	24	-36	1	1	-7	10	19	-28	1	1	-26	-29	-59	-81
73	-47	-26	3	5	-9	14	1	1	0	0	-12	18	24	-36	1	1	-7	10	19	-29	1	1	-29	-2	-62	-54
74	-42	-34	3	4	-8	12	1	1	0	0	-19	28	21	-31	1	1	-14	21	16	-24	1	1	-25	-6	-61	-58
75	-37	-41	3	4	-7	11	1	1	0	0	-23	34	18	-27	1	1	-19	28	14	-21	1	1	-22	-10	-58	-62
76	-34	-48	2	3	-5	9	1	1	0	0	-25	38	15	-22	1	1	-22	33	11	-17	1	1	-22	-17	-55	-65
77	-31	-53	2	3	-4	7	1	1	0	0	-25	37	12	-17	1	1	-22	33	9	-14	1	1	-21	-23	-51	-67
78	-29	-56	1	2	-3	5	1	1	0	0	-23	33	9	-14	1	1	-19	27	7	-11	1	1	-22	-31	-46	-67
79	-27	-60	1	1	-2	4	1	1	0	0	-17	26	7	-9	1	1	-14	21	5	-7	1	1	-21	-41	-40	-67
80	-26	-63	0	1	-1	2	1	1	0	0	-10	14	3	-5	1	1	-8	11	2	-4	1	1	-23	-52	-33	-68
81	-15	-38	0	0	0	0	1	1	0	0	0	0	-1	0	0	0	0	0	-1	0	1	1	-14	-37	-16	-39

CONTROL TENSIONES LONGITUDINALES
COMBINACION POCO PROBABLE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

	PUENTE VACIO		DESC. APOYOS		GRAD TERM 0.60		COACC CARRIL 0.60		ROZAM. TEFL 1.00		SOBRECARGA IPF75 SOB (+)		SOB (-)		FREN		SOBRECARGA U.I.C. SOB (+)		SOB (-)		FREN		TRACC MAX		COMP MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-21	-51	0	0	0	0	1	1	4	4	0	0	0	0	4	4	0	0	0	0	7	7	-13	-43	-29	-59
2	-34	-84	0	1	-1	2	2	2	6	6	-10	15	3	-4	7	7	-8	12	2	-3	11	11	-18	-54	-58	-102
3	-36	-81	1	1	-2	4	2	2	6	6	-17	26	5	-7	7	7	-14	21	4	-6	11	11	-17	-38	-69	-102
4	-38	-77	1	2	-3	5	2	2	6	6	-22	33	8	-12	7	7	-18	27	6	-9	11	11	-16	-25	-76	-104
5	-40	-74	2	3	-4	7	2	2	6	6	-25	36	10	-15	7	7	-21	32	8	-12	11	11	-15	-17	-83	-105
6	-43	-69	2	3	-5	9	2	2	6	6	-25	37	13	-19	7	7	-21	32	10	-15	11	11	-15	-10	-87	-104
7	-46	-62	3	4	-7	11	2	2	6	6	-22	33	15	-23	7	7	-19	28	12	-18	11	11	-15	-5	-88	-102
	-51	-55	3	5	-8	12	2	2	6	6	-18	27	18	-27	7	7	-13	20	15	-21	11	11	-17	-2	-90	-100
9	-55	-46	4	5	-9	14	2	2	6	6	-11	16	21	-31	7	7	-6	9	17	-25	11	11	-17	-3	-89	-95
10	-59	-39	4	6	-10	16	2	2	6	6	-6	9	24	-36	7	7	-5	7	20	-30	11	11	-18	-1	-88	-94
11	-42	-18	4	5	-10	13	1	1	4	4	-6	7	27	-36	4	4	-5	6	22	-29	7	7	-3	10	-66	-67
11	-42	-17	4	5	-10	13	1	1	4	4	-6	7	27	-36	4	4	-5	6	22	-29	7	7	-3	11	-66	-66
12	-58	-36	4	5	-11	17	2	2	6	6	-4	6	17	-26	7	7	-4	5	14	-22	11	11	-24	-1	-86	-80
13	-53	-43	3	4	-10	17	2	2	6	6	-11	16	11	-16	7	7	-8	11	10	-15	11	11	-26	0	-87	-76
14	-49	-48	2	3	-10	16	2	2	6	6	-21	32	9	-13	7	7	-17	25	8	-12	11	11	-25	10	-91	-77
15	-46	-53	2	2	-10	16	2	2	6	6	-28	41	9	-14	7	7	-24	35	6	-9	11	11	-22	13	-95	-82
16	-45	-56	2	2	-10	16	2	2	6	6	-30	45	10	-15	7	7	-26	39	7	-10	11	11	-20	14	-96	-86
17	-45	-56	2	2	-9	15	2	2	6	6	-29	43	12	-18	7	7	-24	36	9	-14	11	11	-18	11	-95	-89
18	-47	-54	2	3	-9	15	2	2	6	6	-24	35	15	-22	7	7	-17	26	12	-18	11	11	-17	6	-92	-92
19	-50	-49	3	4	-9	14	2	2	6	6	-14	21	19	-27	7	7	-8	12	15	-21	11	11	-15	-2	-86	-93
20	-56	-41	4	6	-9	14	2	2	6	6	-6	9	24	-35	7	7	-4	7	20	-29	11	11	-15	-4	-85	-95
21	-40	-21	4	5	-7	10	1	1	4	4	-5	7	34	-43	4	4	-4	6	26	-34	7	7	6	5	-62	-77
21	-40	-21	4	5	-7	10	1	1	3	3	-5	7	33	-43	4	4	-4	6	26	-34	7	7	5	5	-62	-77
22	-59	-42	4	6	-8	13	2	2	6	6	-3	5	24	-36	7	7	-3	4	19	-29	11	11	-18	-10	-84	-97
23	-51	-55	3	6	-8	14	2	2	6	6	-12	18	17	-25	7	7	-8	13	14	-21	11	11	-18	-10	-84	-99
23	-49	-45	3	4	-8	14	2	2	6	6	-12	18	17	-25	7	7	-8	12	14	-21	11	11	-16	-2	-82	-87
24	-46	-50	2	3	-8	14	2	2	6	6	-23	34	14	-21	7	7	-18	27	11	-17	11	11	-17	9	-89	-87
25	-44	-55	2	3	-9	14	2	2	6	6	-29	43	13	-20	7	7	-25	37	9	-13	11	11	-16	13	-93	-91
	-43	-57	2	3	-9	14	2	2	6	6	-32	47	13	-19	7	7	-27	40	7	-10	11	11	-15	15	-95	-92
--	-44	-57	2	3	-9	14	2	2	6	6	-30	45	13	-19	7	7	-25	37	9	-14	11	11	-16	13	-95	-92
28	-46	-54	2	3	-9	14	2	2	6	6	-24	36	15	-23	7	7	-17	26	12	-18	11	11	-16	7	-91	-93
29	-51	-48	3	4	-9	14	2	2	6	6	-15	22	18	-27	7	7	-9	12	14	-22	11	11	-17	0	-88	-92
30	-57	-39	4	6	-9	14	2	2	6	6	-7	10	24	-36	7	7	-5	8	20	-29	11	11	-16	-1	-87	-94
31	-42	-19	4	5	-8	11	1	1	3	3	-7	8	33	-44	4	4	-5	7	26	-34	7	7	3	9	-66	-76
31	-42	-19	4	5	-8	11	1	1	3	3	-7	8	33	-44	4	4	-5	7	26	-34	7	7	3	9	-66	-76
32	-60	-41	4	6	-9	15	2	2	5	5	-6	8	24	-36	7	7	-5	7	19	-29	11	11	-19	-5	-89	-96
33	-52	-55	3	4	-9	14	2	2	5	5	-13	21	18	-26	7	7	-8	13	15	-21	11	11	-18	-8	-87	-98
33	-50	-45	3	4	-9	14	2	2	5	5	-14	20	18	-26	7	7	-9	12	14	-22	11	11	-16	1	-86	-88
34	-47	-51	2	3	-9	14	2	2	5	5	-23	36	15	-22	7	7	-17	27	12	-17	11	11	-17	10	-90	-89
35	-45	-56	2	3	-9	14	2	2	5	5	-30	44	14	-21	7	7	-25	37	9	-14	11	11	-16	13	-95	-93
36	-44	-59	2	3	-9	14	2	2	5	5	-31	47	15	-21	7	7	-27	40	8	-12	11	11	-14	13	-95	-96
37	-44	-59	2	2	-9	14	2	2	5	5	-30	45	16	-23	7	7	-25	37	11	-16	11	11	-13	10	-94	-97
38	-46	-57	2	3	-9	14	2	2	5	5	-25	37	17	-26	7	7	-18	27	14	-20	11	11	-14	5	-91	-99
39	-50	-51	3	4	-9	14	2	2	5	5	-15	22	21	-32	7	7	-9	13	16	-25	11	11	-13	-3	-86	-100
40	-56	-43	4	5	-9	14	2	2	5	5	-7	10	27	-40	7	7	-6	8	21	-32	11	11	-12	-6	-85	-101
41	-41	-22	4	5	-8	11	1	1	3	3	-6	8	36	-47	4	4	-5	7	28	-37	7	7	7	5	-63	-82

CONTROL TENSIONES LONGITUDINALES
COMBINACION POCO PROBABLE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

	PUENTE VACIO		DESC. APOYOS		GRAD TERM 0.60		COACC CARRIL 0.60		ROZAM. TEFL 1.00		SOBRECARGA IPF75 SOB (+)		SOB (-)		FREN		SOBRECARGA U.I.C. SOB (+)		SOB (-)		FREN		TRACC MAX		COMP MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
41	-41	-22	4	5	-8	11	1	1	1	1	-6	8	36	-47	2	2	-5	7	28	-37	3	3	2	1	-59	-77
42	-63	-39	4	5	-9	14	2	2	2	2	-5	8	25	-37	3	3	-4	6	20	-30	4	4	-29	-12	-83	-86
43	-58	-49	3	4	-9	14	2	2	2	2	-14	22	17	-25	3	3	-9	14	14	-20	4	4	-33	-9	-86	-83
43	-42	-41	3	4	-9	14	2	2	2	2	-14	22	17	-26	3	3	-9	14	14	-20	4	4	-17	-1	-70	-76
44	-40	-44	2	3	-9	14	2	2	2	2	-26	39	15	-21	3	3	-19	29	12	-17	4	4	-18	12	-79	-73
45	-39	-47	2	2	-9	14	2	2	2	2	-34	50	13	-19	3	3	-28	41	8	-13	4	4	-19	19	-86	-73
46	-39	-49	2	2	-9	14	2	2	2	2	-35	52	14	-20	3	3	-30	44	8	-12	4	4	-18	19	-87	-76
47	-39	-49	2	2	-9	14	2	2	2	2	-34	49	14	-22	3	3	-28	40	10	-16	4	4	-18	16	-86	-78
48	-41	-48	2	3	-9	14	2	2	2	2	-27	41	16	-24	3	3	-20	30	13	-19	4	4	-18	10	-81	-80
49	-44	-44	3	4	-9	14	2	2	2	2	-16	23	20	-30	3	3	-10	14	16	-24	4	4	-16	-3	-74	-83
50	-48	-39	3	5	-9	15	2	2	2	2	-7	10	27	-40	3	3	-5	8	21	-32	4	4	-13	-10	-69	-89
51	-32	-24	4	5	-8	11	1	1	1	1	-6	8	38	-50	2	2	-5	7	29	-38	3	3	13	-1	-50	-82
51	-32	-24	4	5	-8	11	1	1	1	1	-6	8	38	-50	1	1	-5	6	29	-39	2	2	12	-2	-49	-81
52	-51	-40	3	5	-9	14	1	1	1	1	-5	8	27	-40	2	2	-4	6	22	-33	3	3	-17	-14	-68	-89
53	-45	-50	3	4	-9	14	1	1	1	1	-15	23	21	-30	2	2	-9	14	16	-24	3	3	-17	-10	-72	-88
53	-43	-39	3	4	-9	14	1	1	1	1	-15	22	20	-30	2	2	-9	14	16	-24	3	3	-16	0	-70	-77
54	-42	-43	2	3	-9	14	1	1	1	1	-27	40	16	-24	2	2	-20	30	13	-19	3	3	-20	12	-80	-74
55	-40	-46	2	2	-9	14	1	1	1	1	-34	50	15	-22	2	2	-28	41	10	-15	3	3	-19	18	-85	-74
56	-40	-48	2	2	-9	14	1	1	1	1	-36	53	14	-21	2	2	-31	45	7	-11	3	3	-20	19	-87	-75
57	-40	-49	2	2	-9	14	1	1	1	1	-32	48	16	-23	2	2	-27	40	11	-16	3	3	-18	13	-83	-78
58	-41	-48	2	3	-9	14	1	1	1	1	-25	38	16	-24	2	2	-20	30	13	-19	3	3	-19	5	-77	-79
59	-43	-45	3	4	-8	14	1	1	1	1	-13	20	20	-28	2	2	-9	14	16	-23	3	3	-16	-9	-68	-81
60	-47	-40	3	5	-8	14	1	1	1	1	-4	7	27	-40	2	2	-3	5	22	-31	3	3	-13	-16	-63	-89
61	-31	-25	4	5	-7	10	1	1	1	1	-6	8	38	-49	1	1	-4	6	30	-38	2	2	13	-3	-48	-81
61	-31	-25	4	5	-7	10	1	1	0	0	-6	8	38	-49	1	1	-4	6	30	-38	1	1	13	-4	-47	-81
62	-50	-41	3	5	-9	14	1	1	1	1	-7	10	27	-40	1	1	-5	8	21	-32	2	2	-17	-15	-68	-89
63	-45	-51	3	4	-9	14	1	1	1	1	-16	24	21	-30	1	1	-9	14	17	-24	2	2	-18	-12	-72	-88
63	-43	-40	3	4	-9	14	1	1	1	1	-16	24	20	-30	1	1	-9	14	16	-24	2	2	-17	-1	-70	77
64	-42	-43	2	3	-9	15	1	1	1	1	-27	40	17	-25	1	1	-19	29	14	-20	2	2	-20	11	-79	-74
65	-41	-46	1	2	-9	15	1	1	1	1	-33	50	13	-19	1	1	-27	41	11	-15	2	2	-24	18	-83	-70
66	-40	-48	1	2	-10	15	1	1	1	1	-35	51	10	-16	1	1	-30	44	7	-11	2	2	-26	17	-84	-69
67	-41	-48	1	2	-10	16	1	1	1	1	-32	47	9	-14	1	1	-26	39	6	-9	2	2	-28	13	-82	-67
68	-43	-46	2	3	-10	16	1	1	1	1	-24	35	9	-13	1	1	-19	28	8	-11	2	2	-29	4	-78	-65
69	-46	-42	3	4	-10	17	1	1	1	1	-12	18	10	-15	1	1	-9	13	9	-13	2	2	-30	-7	-70	-64
70	-51	-36	3	5	-11	17	1	1	1	1	-5	7	19	-28	1	1	-4	5	15	-23	2	2	-26	-11	-68	-72
71	-34	-22	4	5	-10	13	1	1	0	0	-6	8	32	-41	1	1	-5	7	25	-33	1	1	4	1	-51	-70
71	-34	-22	4	5	-10	13	1	1	0	0	-6	8	31	-41	0	0	-5	7	25	-33	1	1	2	0	-50	-69
72	-49	-44	4	6	-10	16	1	1	0	0	-8	11	27	-42	1	1	-6	9	22	-34	1	1	-17	-16	-68	-93
73	-44	-53	3	5	-9	14	1	1	0	0	-12	18	24	-36	1	1	-7	10	19	-28	1	1	-16	-20	-65	-95
73	-47	-26	3	5	-9	14	1	1	0	0	-12	18	24	-36	1	1	-7	10	19	-29	1	1	-19	7	-68	-68
74	-42	-34	3	4	-8	12	1	1	0	0	-19	28	21	-31	1	1	-14	21	16	-24	1	1	-17	7	-70	-70
75	-37	-41	3	4	-7	11	1	1	0	0	-23	34	18	-27	1	1	-19	28	14	-21	1	1	-15	5	-68	-73
76	-34	-48	2	3	-5	9	1	1	0	0	-25	38	15	-22	1	1	-22	33	11	-17	1	1	-16	0	-66	-74
77	-31	-53	2	3	-4	7	1	1	0	0	-25	37	12	-17	1	1	-22	33	9	-14	1	1	-16	-8	-62	-74
78	-29	-56	1	2	-3	5	1	1	0	0	-23	33	9	-14	1	1	-19	27	7	-11	1	1	-18	-17	-56	-73
79	-27	-60	1	1	-2	4	1	1	0	0	-17	26	7	-9	1	1	-14	21	5	-7	1	1	-18	-30	-48	-71
80	-26	-63	0	1	-1	2	1	1	0	0	-10	14	3	-5	1	1	-8	11	2	-4	1	1	-22	-46	-38	-70
81	-15	-38	0	0	0	0	1	1	0	0	0	0	-1	0	0	0	0	0	-1	0	1	1	-14	-37	-17	-39

CONTROL TENSIONES LONGITUDINALES
COMBINACION CASI PERMANENTE UIC
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.00						0.30									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-21	-51	0	0	0	0	1	1	4	4	0	0	0	0	4	4	0	0	0	0	7	7	15	-45	-27	-57
2	-34	-84	0	1	-1	2	2	2	6	6	-10	15	3	-4	7	7	-8	12	2	-3	11	11	-24	-68	-47	-96
3	-36	-81	1	1	-2	4	2	2	6	6	-17	26	5	-7	7	7	-14	21	4	-6	11	11	-25	-62	-52	-94
4	-38	-77	1	2	-3	5	2	2	6	6	-22	33	8	-12	7	7	-18	27	6	-9	11	11	-27	-54	-56	-92
5	-40	-74	2	3	-4	7	2	2	6	6	-25	36	10	-15	7	7	-21	32	8	-12	11	11	-28	-48	-61	-91
6	-43	-69	2	3	-5	9	2	2	6	6	-25	37	13	-19	7	7	-21	32	10	-15	11	11	-31	-42	-64	-87
7	-46	-62	3	4	-7	11	2	2	6	6	-22	33	15	-23	7	7	-19	28	12	-18	11	11	-33	-34	-68	-81
8	-51	-55	3	5	-8	12	2	2	6	6	-18	27	18	-27	7	7	-13	20	15	-21	11	11	-38	-28	-72	-76
9	-55	-46	4	5	-9	14	2	2	6	6	-11	16	21	-31	7	7	-6	9	17	-25	11	11	-41	-21	-75	-69
10	-59	-39	4	6	-10	16	2	2	6	6	-6	9	24	-36	7	7	-5	7	20	-30	11	11	-45	-13	-79	-64
11	-42	-18	4	5	-10	13	1	1	4	4	-6	7	27	-36	4	4	-5	6	22	-29	7	7	-32	2	-58	-38
11	-42	-17	4	5	-10	13	1	1	4	4	-6	7	27	-36	4	4	-5	6	22	-29	7	7	-32	3	-59	-37
12	-58	-36	4	5	-11	17	2	2	6	6	-4	6	17	-26	7	7	-4	5	14	-22	11	11	-44	-11	-79	-58
13	-53	-43	3	4	-10	17	2	2	6	6	-11	16	11	-16	7	7	-8	11	10	-15	11	11	-40	-17	-74	-62
14	-49	-48	2	3	-10	16	2	2	6	6	-21	32	9	-13	7	7	-17	25	8	-12	11	11	-37	-19	-71	-65
15	-46	-53	2	2	-10	16	2	2	6	6	-28	41	9	-14	7	7	-24	35	6	-9	11	11	-34	-22	-70	-68
16	-45	-56	2	2	-10	16	2	2	6	6	-30	45	10	-15	7	7	-26	39	7	-10	11	11	-33	-25	-70	-71
17	-45	-56	2	2	-9	15	2	2	6	6	-29	43	12	-18	7	7	-24	36	9	-14	11	11	-33	-26	-69	-72
18	-47	-54	2	3	-9	15	2	2	6	6	-24	35	15	-22	7	7	-17	26	12	-18	11	11	-35	-26	-69	-72
19	-50	-49	3	4	-9	14	2	2	6	6	-14	21	19	-27	7	7	-8	12	15	-21	11	11	-37	-24	-70	-69
20	-56	-41	4	6	-9	14	2	2	6	6	-6	9	24	-35	7	7	-4	7	20	-29	11	11	-42	-16	-75	-66
21	-40	-21	4	5	-7	10	1	1	4	4	-5	7	34	-43	4	4	-4	6	26	-34	7	7	-30	-3	-55	-42
21	-40	-21	4	5	-7	10	1	1	3	3	-5	7	33	-43	4	4	-4	6	26	-34	7	7	-30	-3	-55	-42
22	-59	-42	4	6	-8	13	2	2	6	6	-3	5	24	-36	7	7	-3	4	19	-29	11	11	-45	-18	-78	-67
23	-51	-55	3	6	-8	14	2	2	6	6	-12	18	17	-25	7	7	-8	13	14	-21	11	11	-38	-28	-71	-77
23	-49	-45	3	4	-8	14	2	2	6	6	-12	18	17	-25	7	7	-8	12	14	-21	11	11	-36	-21	-69	-65
24	-46	-50	2	3	-8	14	2	2	6	6	-23	34	14	-21	7	7	-18	27	11	-17	11	11	-34	-22	-68	-68
25	-44	-55	2	3	-9	14	2	2	6	6	-29	43	13	-20	7	7	-25	37	9	-13	11	11	-32	-24	-68	-72
26	-43	-57	2	3	-9	14	2	2	6	6	-32	47	13	-19	7	7	-27	40	7	-10	11	11	-31	-25	-67	-73
27	-44	-57	2	3	-9	14	2	2	6	6	-30	45	13	-19	7	7	-25	37	9	-14	11	11	-32	-26	-68	-74
28	-46	-54	2	3	-9	14	2	2	6	6	-24	36	15	-23	7	7	-17	26	12	-18	11	11	-34	-26	-67	-72
29	-51	-48	3	4	-9	14	2	2	6	6	-15	22	18	-27	7	7	-9	12	14	-22	11	11	-38	-23	-71	-69
30	-57	-39	4	6	-9	14	2	2	6	6	-7	10	24	-36	7	7	-5	8	20	-29	11	11	-43	-13	-77	-64
31	-42	-19	4	5	-8	11	1	1	3	3	-7	8	33	-44	4	4	-5	7	26	-34	7	7	-32	0	-57	-40
31	-42	-19	4	5	-8	11	1	1	3	3	-7	8	33	-44	4	4	-5	7	26	-34	7	7	-32	0	-58	-40
32	-60	-41	4	6	-9	15	2	2	5	5	-6	8	24	-36	7	7	-5	7	19	-29	11	11	-46	-16	-80	-65
33	-52	-55	3	4	-9	14	2	2	5	5	-13	21	18	-26	7	7	-8	13	15	-21	11	11	-39	-30	-72	-75
33	-50	-45	3	4	-9	14	2	2	5	5	-14	20	18	-26	7	7	-9	12	14	-22	11	11	-37	-20	-70	-65
34	-47	-51	2	3	-9	14	2	2	5	5	-23	36	15	-22	7	7	-17	27	12	-17	11	11	-35	-23	-68	-69
35	-45	-56	2	3	-9	14	2	2	5	5	-30	44	14	-21	7	7	-25	37	9	-14	11	11	-33	-25	-69	-73
36	-44	-59	2	3	-9	14	2	2	5	5	-31	47	15	-21	7	7	-27	40	8	-12	11	11	-32	-27	-68	-75
37	-44	-59	2	2	-9	14	2	2	5	5	-30	45	16	-23	7	7	-25	37	11	-16	11	11	-32	-29	-68	-76
38	-46	-57	2	3	-9	14	2	2	5	5	-25	37	17	-26	7	7	-18	27	14	-20	11	11	-34	-29	-68	-76
39	-50	-51	3	4	-9	14	2	2	5	5	-15	22	21	-32	7	7	-9	13	16	-25	11	11	-37	-26	-70	-72
40	-56	-43	4	5	-9	14	2	2	5	5	-7	10	27	-40	7	7	-6	8	21	-32	11	11	-42	-19	-76	-67
41	-41	-22	4	5	-8	11	1	1	3	3	-6	8	36	-47	4	4	-5	7	28	-37	7	7	-31	-4	-56	-44

CONTROL TENSIONES LONGITUDINALES
COMBINACION CASI PERMANENTE UIC
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.00						0.30									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
41	-41	-22	4	5	-8	11	1	1	1	1	-6	8	36	-47	2	2	-5	7	28	-37	3	3	-35	-7	-53	-41
42	-63	-39	4	5	-9	14	2	2	2	2	-5	8	25	-37	3	3	-4	6	20	-30	4	4	-55	-21	-76	-57
43	-58	-49	3	4	-9	14	2	2	2	2	-14	22	17	-25	3	3	-9	14	14	-20	4	4	-51	-30	-72	-63
43	-42	-41	3	4	-9	14	2	2	2	2	-14	22	17	-26	3	3	-9	14	14	-20	4	4	-35	-22	-56	-55
44	-40	-44	2	3	-9	14	2	2	2	2	-26	39	15	-21	3	3	-19	29	12	-17	4	4	-34	-21	-56	-56
45	-39	-47	2	2	-9	14	2	2	2	2	-34	50	13	-19	3	3	-28	41	8	-13	4	4	-33	-22	-58	-57
46	-39	-49	2	2	-9	14	2	2	2	2	-35	52	14	-20	3	3	-30	44	8	-12	4	4	-33	-23	-58	-59
47	-39	-49	2	2	-9	14	2	2	2	2	-34	49	14	-22	3	3	-28	40	10	-16	4	4	-33	-24	-58	-60
48	-41	-48	2	3	-9	14	2	2	2	2	-27	41	16	-24	3	3	-20	30	13	-19	4	4	-35	-25	-57	-61
49	-44	-44	3	4	-9	14	2	2	2	2	-16	23	20	-30	3	3	-10	14	16	-24	4	4	-37	-25	-58	-59
50	-48	-39	3	5	-9	15	2	2	2	2	-7	10	27	-40	3	3	-5	8	21	-32	4	4	-41	-20	-61	-58
51	-32	-24	4	5	-8	11	1	1	1	1	-6	8	38	-50	2	2	-5	7	29	-38	3	3	-26	-9	-44	-43
51	-32	-24	4	5	-8	11	1	1	1	1	-6	8	38	-50	1	1	-5	6	29	-39	2	2	-26	-10	-43	-42
52	-51	-40	3	5	-9	14	1	1	1	1	-5	8	27	-40	2	2	-4	6	22	-33	3	3	-45	-23	-63	-58
53	-45	-50	3	4	-9	14	1	1	1	1	-15	23	21	-30	2	2	-9	14	16	-24	3	3	-39	-32	-58	-64
53	-43	-39	3	4	-9	14	1	1	1	1	-15	22	20	-30	2	2	-9	14	16	-24	3	3	-37	-21	-56	-53
54	-42	-43	2	3	-9	14	1	1	1	1	-27	40	16	-24	2	2	-20	30	13	-19	3	3	-37	-21	-57	-55
55	-40	-46	2	2	-9	14	1	1	1	1	-34	50	15	-22	2	2	-28	41	10	-15	3	3	-35	-22	-58	-55
56	-40	-48	2	2	-9	14	1	1	1	1	-36	53	14	-21	2	2	-31	45	7	-11	3	3	-35	-23	-59	-56
57	-40	-49	2	2	-9	14	1	1	1	1	-32	48	16	-23	2	2	-27	40	11	-16	3	3	-35	-25	-57	-59
58	-41	-48	2	3	-9	14	1	1	1	1	-25	38	16	-24	2	2	-20	30	13	-19	3	3	-36	-26	-56	-60
59	-43	-45	3	4	-8	14	1	1	1	1	-13	20	20	-28	2	2	-9	14	16	-23	3	3	-37	-27	-56	-59
60	-47	-40	3	5	-8	14	1	1	1	1	-4	7	27	-40	2	2	-3	5	22	-31	3	3	-41	-24	-58	-57
61	-31	-25	4	5	-7	10	1	1	1	1	-6	8	38	-49	1	1	-4	6	30	-38	2	2	-25	-11	-42	-43
61	-31	-25	4	5	-7	10	1	1	0	0	-6	8	38	-49	1	1	-4	6	30	-38	1	1	-26	-12	-41	-43
62	-50	-41	3	5	-9	14	1	1	1	1	-7	10	27	-40	1	1	-5	8	21	-32	2	2	-45	-25	-61	-57
63	-45	-51	3	4	-9	14	1	1	1	1	-16	24	21	-30	1	1	-9	14	17	-24	2	2	-40	-34	-57	-64
63	-43	-40	3	4	-9	14	1	1	1	1	-16	24	20	-30	1	1	-9	14	16	-24	2	2	-38	-23	-55	-53
64	-42	-43	2	3	-9	15	1	1	1	1	-27	40	17	-25	1	1	-19	29	14	-20	2	2	-38	-22	-56	-54
65	-41	-46	1	2	-9	15	1	1	1	1	-33	50	13	-19	1	1	-27	41	11	-15	2	2	-38	-22	-57	-54
66	-40	-48	1	2	-10	15	1	1	1	1	-35	51	10	-16	1	1	-30	44	7	-11	2	2	-37	-23	-57	-55
67	-41	-48	1	2	-10	16	1	1	1	1	-32	47	9	-14	1	1	-26	39	6	-9	2	2	-38	-24	-57	-55
68	-43	-46	2	3	-10	16	1	1	1	1	-24	35	9	-13	1	1	-19	28	8	-11	2	2	-39	-25	-58	-54
69	-46	-42	3	4	-10	17	1	1	1	1	-12	18	10	-15	1	1	-9	13	9	-13	2	2	-41	-24	-59	-52
70	-51	-36	3	5	-11	17	1	1	1	1	-5	7	19	-28	1	1	-4	5	15	-23	2	2	-46	-19	-62	-50
71	-34	-22	4	5	-10	13	1	1	0	0	-6	8	32	-41	1	1	-5	7	25	-33	1	1	-29	-7	-45	-38
71	-34	-22	4	5	-10	13	1	1	0	0	-6	8	31	-41	0	0	-5	7	25	-33	1	1	-29	-8	-45	-37
72	-49	-44	4	6	-10	16	1	1	0	0	-8	11	27	-42	1	1	-6	9	22	-34	1	1	-44	-26	-61	-61
73	-44	-53	3	5	-9	14	1	1	0	0	-12	18	24	-36	1	1	-7	10	19	-28	1	1	-40	-37	-54	-67
73	-47	-26	3	5	-9	14	1	1	0	0	-12	18	24	-36	1	1	-7	10	19	-29	1	1	-43	-10	-57	-41
74	-42	-34	3	4	-8	12	1	1	0	0	-19	28	21	-31	1	1	-14	21	16	-24	1	1	-38	-17	-54	-46
75	-37	-41	3	4	-7	11	1	1	0	0	-23	34	18	-27	1	1	-19	28	14	-21	1	1	-33	-22	-50	-52
76	-34	-48	2	3	-5	9	1	1	0	0	-25	38	15	-22	1	1	-22	33	11	-17	1	1	-31	-30	-46	-57
77	-31	-53	2	3	-4	7	1	1	0	0	-25	37	12	-17	1	1	-22	33	9	-14	1	1	-28	-36	-43	-61
78	-29	-56	1	2	-3	5	1	1	0	0	-23	33	9	-14	1	1	-19	27	7	-11	1	1	-27	-42	-38	-62
79	-27	-60	1	1	-2	4	1	1	0	0	-17	26	7	-9	1	1	-14	21	5	-7	1	1	-25	-50	-34	-64
80	-26	-63	0	1	-1	2	1	1	0	0	-10	14	3	-5	1	1	-8	11	2	-4	1	1	-25	-57	-30	-66
81	-15	-38	0	0	0	0	1	1	0	0	0	0	-1	0	0	0	0	0	-1	0	1	1	-14	-37	-16	-39

CONTROL TENSIONES LONGITUDINALES
COMBINACION FRECUENTE UIC
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.00						0.60									
	PUENTE VACIO		DESC. APOYOS		GRAD TERM		COACC CARRIL		ROZAM. TEFL		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC MAX		COMP MAX	
											SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN					
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-21	-51	0	0	0	0	1	1	4	4	0	0	0	0	4	4	0	0	0	0	7	7	-13	-43	-29	-59
2	-34	-84	0	1	-1	2	2	2	6	6	-10	15	3	-4	7	7	-8	12	2	-3	11	11	-21	-61	-53	-100
3	-36	-81	1	1	-2	4	2	2	6	6	-17	26	5	-7	7	7	-14	21	4	-6	11	11	-22	-52	-60	-99
4	-38	-77	1	2	-3	5	2	2	6	6	-22	33	8	-12	7	7	-18	27	6	-9	11	11	-24	-43	-65	-98
5	-40	-74	2	3	-4	7	2	2	6	6	-25	36	10	-15	7	7	-21	32	8	-12	11	11	-25	-35	-70	-98
6	-43	-69	2	3	-5	9	2	2	6	6	-25	37	13	-19	7	7	-21	32	10	-15	11	11	-28	-29	-74	-94
7	-46	-62	3	4	-7	11	2	2	6	6	-22	33	15	-23	7	7	-19	28	12	-18	11	11	-30	-22	-77	-90
8	-51	-55	3	5	-8	12	2	2	6	6	-18	27	18	-27	7	7	-13	20	15	-21	11	11	-35	-18	-79	-86
9	-55	-46	4	5	-9	14	2	2	6	6	-11	16	21	-31	7	7	-6	9	17	-25	11	11	-38	-15	-80	-79
10	-59	-39	4	6	-10	16	2	2	6	6	-6	9	24	-36	7	7	-5	7	20	-30	11	11	-42	-7	-84	-76
11	-42	-18	4	5	-10	13	1	1	4	4	-6	7	27	-36	4	4	-5	6	22	-29	7	7	-30	6	-62	-49
11	-42	-17	4	5	-10	13	1	1	4	4	-6	7	27	-36	4	4	-5	6	22	-29	7	7	-30	7	-62	-48
12	-58	-36	4	5	-11	17	2	2	6	6	-4	6	17	-26	7	7	-4	5	14	-22	11	11	-41	-6	-83	-68
13	-53	-43	3	4	-10	17	2	2	6	6	-11	16	11	-16	7	7	-8	11	10	-15	11	11	-37	-11	-79	-69
14	-49	-48	2	3	-10	16	2	2	6	6	-21	32	9	-13	7	7	-17	25	8	-12	11	11	-34	-8	-80	-72
15	-46	-53	2	2	-10	16	2	2	6	6	-28	41	9	-14	7	7	-24	35	6	-9	11	11	-31	-9	-81	-74
16	-45	-56	2	2	-10	16	2	2	6	6	-30	45	10	-15	7	7	-26	39	7	-10	11	11	-30	-9	-81	-77
17	-45	-56	2	2	-9	15	2	2	6	6	-29	43	12	-18	7	7	-24	36	9	-14	11	11	-30	-11	-79	-80
18	-47	-54	2	3	-9	15	2	2	6	6	-24	35	15	-22	7	7	-17	26	12	-18	11	11	-32	-15	-77	-81
19	-50	-49	3	4	-9	14	2	2	6	6	-14	21	19	-27	7	7	-8	12	15	-21	11	11	-34	-17	-76	-79
20	-56	-41	4	6	-9	14	2	2	6	6	-6	9	24	-35	7	7	-4	7	20	-29	11	11	-39	-10	-80	-78
21	-40	-21	4	5	-7	10	1	1	4	4	-5	7	34	-43	4	4	-4	6	26	-34	7	7	-28	1	-58	-55
21	-40	-21	4	5	-7	10	1	1	3	3	-5	7	33	-43	4	4	-4	6	26	-34	7	7	-28	1	-58	-55
22	-59	-42	4	6	-8	13	2	2	6	6	-3	5	24	-36	7	7	-3	4	19	-29	11	11	-42	-14	-82	-79
23	-51	-55	3	6	-8	14	2	2	6	6	-12	18	17	-25	7	7	-8	13	14	-21	11	11	-35	-21	-76	-87
23	-49	-45	3	4	-8	14	2	2	6	6	-12	18	17	-25	7	7	-8	12	14	-21	11	11	-33	-14	-74	-75
24	-46	-50	2	3	-8	14	2	2	6	6	-23	34	14	-21	7	7	-18	27	11	-17	11	11	-31	-11	-76	-77
25	-44	-55	2	3	-9	14	2	2	6	6	-29	43	13	-20	7	7	-25	37	9	-13	11	11	-29	-10	-79	-79
26	-43	-57	2	3	-9	14	2	2	6	6	-32	47	13	-19	7	7	-27	40	7	-10	11	11	-28	-10	-79	-79
27	-44	-57	2	3	-9	14	2	2	6	6	-30	45	13	-19	7	7	-25	37	9	-14	11	11	-29	-11	-79	-82
28	-46	-54	2	3	-9	14	2	2	6	6	-24	36	15	-23	7	7	-17	26	12	-18	11	11	-31	-15	-76	-81
29	-51	-48	3	4	-9	14	2	2	6	6	-15	22	18	-27	7	7	-9	12	14	-22	11	11	-35	-16	-77	-79
30	-57	-39	4	6	-9	14	2	2	6	6	-7	10	24	-36	7	7	-5	8	20	-29	11	11	-40	-8	-82	-76
31	-42	-19	4	5	-8	11	1	1	3	3	-7	8	33	-44	4	4	-5	7	26	-34	7	7	-30	4	-61	-53
31	-42	-19	4	5	-8	11	1	1	3	3	-7	8	33	-44	4	4	-5	7	26	-34	7	7	-30	4	-61	-53
32	-60	-41	4	6	-9	15	2	2	5	5	-6	8	24	-36	7	7	-5	7	19	-29	11	11	-43	-10	-85	-78
33	-52	-55	3	4	-9	14	2	2	5	5	-13	21	18	-26	7	7	-8	13	15	-21	11	11	-36	-23	-77	-85
33	-50	-45	3	4	-9	14	2	2	5	5	-14	20	18	-26	7	7	-9	12	14	-22	11	11	-34	-13	-76	-75
34	-47	-51	2	3	-9	14	2	2	5	5	-23	36	15	-22	7	7	-17	27	12	-17	11	11	-32	-11	-77	-77
35	-45	-56	2	3	-9	14	2	2	5	5	-30	44	14	-21	7	7	-25	37	9	-14	11	11	-30	-10	-80	-81
36	-44	-59	2	3	-9	14	2	2	5	5	-31	47	15	-21	7	7	-27	40	8	-12	11	11	-29	-12	-80	-82
37	-44	-59	2	2	-9	14	2	2	5	5	-30	45	16	-23	7	7	-25	37	11	-16	11	11	-29	-14	-79	-84
38	-46	-57	2	3	-9	14	2	2	5	5	-25	37	17	-26	7	7	-18	27	14	-20	11	11	-31	-17	-76	-85
39	-50	-51	3	4	-9	14	2	2	5	5	-15	22	21	-32	7	7	-9	13	16	-25	11	11	-34	-19	-76	-83
40	-56	-43	4	5	-9	14	2	2	5	5	-7	10	27	-40	7	7	-6	8	21	-32	11	11	-39	-13	-81	-80
41	-41	-22	4	5	-8	11	1	1	3	3	-6	8	36	-47	4	4	-5	7	28	-37	7	7	-29	0	-60	-57

CONTROL TENSIONES LONGITUDINALES
COMBINACION FRECUENTE UIC
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.00						0.60									
	PUENTE VACIO		DESC. APOYOS		GRAD TERM		COACC CARRIL		ROZAM. TEFL		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC MAX		COMP MAX	
											SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN					
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
41	-41	-22	4	5	-8	11	1	1	1	1	-6	8	36	-47	2	2	-5	7	28	-37	3	3	-34	-4	-55	-52
42	-63	-39	4	5	-9	14	2	2	2	2	-5	8	25	-37	3	3	-4	6	20	-30	4	4	-54	-18	-79	-67
43	-58	-49	3	4	-9	14	2	2	2	2	-14	22	17	-25	3	3	-9	14	14	-20	4	4	-50	-24	-76	-70
43	-42	-41	3	4	-9	14	2	2	2	2	-14	22	17	-26	3	3	-9	14	14	-20	4	4	-34	-16	-60	-62
44	-40	-44	2	3	-9	14	2	2	2	2	-26	39	15	-21	3	3	-19	29	12	-17	4	4	-33	-11	-63	-62
45	-39	-47	2	2	-9	14	2	2	2	2	-34	50	13	-19	3	3	-28	41	8	-13	4	4	-32	-8	-67	-62
46	-39	-49	2	2	-9	14	2	2	2	2	-35	52	14	-20	3	3	-30	44	8	-12	4	4	-32	-8	-69	-63
47	-39	-49	2	2	-9	14	2	2	2	2	-34	49	14	-22	3	3	-28	40	10	-16	4	4	-32	-11	-67	-66
48	-41	-48	2	3	-9	14	2	2	2	2	-27	41	16	-24	3	3	-20	30	13	-19	4	4	-34	-15	-65	-68
49	-44	-44	3	4	-9	14	2	2	2	2	-16	23	20	-30	3	3	-10	14	16	-24	4	4	-36	-19	-63	-68
50	-48	-39	3	5	-9	15	2	2	2	2	-7	10	27	-40	3	3	-5	8	21	-32	4	4	-40	-17	-64	-68
51	-32	-24	4	5	-8	11	1	1	1	1	-6	8	38	-50	2	2	-5	7	29	-38	3	3	-25	-6	-46	-55
51	-32	-24	4	5	-8	11	1	1	1	1	-6	8	38	-50	1	1	-5	6	29	-39	2	2	-26	-7	-45	-55
52	-51	-40	3	5	-9	14	1	1	1	1	-5	8	27	-40	2	2	-4	6	22	-33	3	3	-44	-20	-65	-69
53	-45	-50	3	4	-9	14	1	1	1	1	-15	23	21	-30	2	2	-9	14	16	-24	3	3	-38	-27	-62	-72
53	-43	-39	3	4	-9	14	1	1	1	1	-15	22	20	-30	2	2	-9	14	16	-24	3	3	-36	-16	-60	-61
54	-42	-43	2	3	-9	14	1	1	1	1	-27	40	16	-24	2	2	-20	30	13	-19	3	3	-36	-11	-64	-61
55	-40	-46	2	2	-9	14	1	1	1	1	-34	50	15	-22	2	2	-28	41	10	-15	3	3	-34	-9	-67	-61
56	-40	-48	2	2	-9	14	1	1	1	1	-36	53	14	-21	2	2	-31	45	7	-11	3	3	-34	-8	-69	-60
57	-40	-49	2	2	-9	14	1	1	1	1	-32	48	16	-23	2	2	-27	40	11	-16	3	3	-34	-12	-66	-64
58	-41	-48	2	3	-9	14	1	1	1	1	-25	38	16	-24	2	2	-20	30	13	-19	3	3	-35	-16	-63	-66
59	-43	-45	3	4	-8	14	1	1	1	1	-13	20	20	-28	2	2	-9	14	16	-23	3	3	-36	-22	-59	-67
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61	-31	-25	4	5	-7	10	1	1	1	1	-6	8	38	-49	1	1	-4	6	30	-38	2	2	-25	-9	-43	-55
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62	-50	-41	3	5	-9	14	1	1	1	1	-7	10	27	-40	1	1	-5	8	21	-32	2	2	-45	-22	-63	-68
63	-45	-51	3	4	-9	14	1	1	1	1	-16	24	21	-30	1	1	-9	14	17	-24	2	2	-40	-29	-60	-72
63	-43	-40	3	4	-9	14	1	1	1	1	-16	24	20	-30	1	1	-9	14	16	-24	2	2	-38	-18	-58	-61
64	-42	-43	2	3	-9	15	1	1	1	1	-27	40	17	-25	1	1	-19	29	14	-20	2	2	-38	-13	-62	-60
65	-41	-46	1	2	-9	15	1	1	1	1	-33	50	13	-19	1	1	-27	41	11	-15	2	2	-38	-9	-65	-59
66	-40	-48	1	2	-10	15	1	1	1	1	-35	51	10	-16	1	1	-30	44	7	-11	2	2	-37	-9	-66	-59
67	-41	-48	1	2	-10	16	1	1	1	1	-32	47	9	-14	1	1	-26	39	6	-9	2	2	-38	-12	-65	-58
68	-43	-46	2	3	-10	16	1	1	1	1	-24	35	9	-13	1	1	-19	28	8	-11	2	2	-39	-16	-64	-58
69	-46	-42	3	4	-10	17	1	1	1	1	-12	18	10	-15	1	1	-9	13	9	-13	2	2	-41	-19	-62	-56
70	-51	-36	3	5	-11	17	1	1	1	1	-5	7	19	-28	1	1	-4	5	15	-23	2	2	-46	-17	-64	-57
71	-34	-22	4	5	-10	13	1	1	0	0	-6	8	32	-41	1	1	-5	7	25	-33	1	1	-28	-5	-47	-48
71	-34	-22	4	5	-10	13	1	1	0	0	-6	8	31	-41	0	0	-5	7	25	-33	1	1	-29	-5	-47	-48
72	-49	-44	4	6	-10	16	1	1	0	0	-8	11	27	-42	1	1	-6	9	22	-34	1	1	-44	-23	-63	-72
73	-44	-53	3	5	-9	14	1	1	0	0	-12	18	24	-36	1	1	-7	10	19	-28	1	1	-40	-34	-57	-76
73	-47	-26	3	5	-9	14	1	1	0	0	-12	18	24	-36	1	1	-7	10	19	-29	1	1	-43	-7	-60	-50
74	-42	-34	3	4	-8	12	1	1	0	0	-19	28	21	-31	1	1	-14	21	16	-24	1	1	-38	-10	-58	-54
75	-37	-41	3	4	-7	11	1	1	0	0	-23	34	18	-27	1	1	-19	28	14	-21	1	1	-33	-14	-56	-59
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77	-31	-53	2	3	-4	7	1	1	0	0	-25	37	12	-17	1	1	-22	33	9	-14	1	1	-28	-25	-50	-66
78	-29	-56	1	2	-3	5	1	1	0	0	-23	33	9	-14	1	1	-19	27	7	-11	1	1	-27	-34	-44	-66
79	-27	-60	1	1	-2	4	1	1	0	0	-17	26	7	-9	1	1	-14	21	5	-7	1	1	-25	-43	-39	-66
80	-26	-63	0	1	-1	2	1	1	0	0	-10	14	3	-5	1	1	-8	11	2	-4	1	1	-25	-53	-33	-68
81	-15	-38	0	0	0	0	1	1	0	0	0	0	-1	0	0	0	0	0	-1	0	1	1	-14	-37	-16	-39

CONTROL TENSIONES LONGITUDINALES
COMBINACION POCO PROBABLE UIC
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.60		0.60				0.00						1.00									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-21	-51	0	0	0	0	1	1	4	4	0	0	0	0	4	4	0	0	0	0	7	7	-10	-40	-32	-62
2	-34	-84	0	1	-1	2	2	2	6	6	-10	15	3	-4	7	7	-8	12	2	-3	11	11	-16	-52	-61	-106
3	-36	-81	1	1	-2	4	2	2	6	6	-17	26	5	-7	7	7	-14	21	4	-6	11	11	-17	-39	-70	-106
4	-38	-77	1	2	-3	5	2	2	6	6	-22	33	8	-12	7	7	-18	27	6	-9	11	11	-19	-27	-77	-106
5	-40	-74	2	3	-4	7	2	2	6	6	-25	36	10	-15	7	7	-21	32	8	-12	11	11	-20	-17	-84	-107
6	-43	-69	2	3	-5	9	2	2	6	6	-25	37	13	-19	7	7	-21	32	10	-15	11	11	-23	-11	-87	-105
7	-46	-62	3	4	-7	11	2	2	6	6	-22	33	15	-23	7	7	-19	28	12	-18	11	11	-25	-5	-90	-102
8	-51	-55	3	5	-8	12	2	2	6	6	-18	27	18	-27	7	7	-13	20	15	-21	11	11	-30	-4	-90	-99
9	-55	-46	4	5	-9	14	2	2	6	6	-11	16	21	-31	7	7	-6	9	17	-25	11	11	-33	-5	-88	-94
10	-59	-39	4	6	-10	16	2	2	6	6	-6	9	24	-36	7	7	-5	7	20	-30	11	11	-37	2	-92	-93
11	-42	-18	4	5	-10	13	1	1	4	4	-6	7	27	-36	4	4	-5	6	22	-29	7	7	-27	12	-68	-63
11	-42	-17	4	5	-10	13	1	1	4	4	-5	7	27	-36	4	4	-5	6	22	-29	7	7	-27	13	-68	-62
12	-58	-36	4	5	-11	17	2	2	6	6	-4	6	17	-26	7	7	-4	5	14	-22	11	11	-36	2	-90	-81
13	-53	-43	3	4	-10	17	2	2	6	6	-11	16	11	-16	7	7	-8	11	10	-15	11	11	-32	0	-88	-80
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15	-46	-53	2	2	-10	16	2	2	6	6	-28	41	9	-14	7	7	-24	35	6	-9	11	11	-26	12	-96	-82
16	-45	-56	2	2	-10	16	2	2	6	6	-30	45	10	-15	7	7	-26	39	7	-10	11	11	-25	12	-97	-86
17	-45	-56	2	2	-9	15	2	2	6	6	-29	43	12	-18	7	7	-24	36	9	-14	11	11	-25	9	-95	-90
18	-47	-54	2	3	-9	15	2	2	6	6	-24	35	15	-22	7	7	-17	26	12	-18	11	11	-27	2	-90	-93
19	-50	-49	3	4	-9	14	2	2	6	6	-14	21	19	-27	7	7	-8	12	15	-21	11	11	-29	-6	-84	-92
20	-56	-41	4	6	-9	14	2	2	6	6	-6	9	24	-35	7	7	-4	7	20	-29	11	11	-34	-2	-87	-94
21	-40	-21	4	5	-7	10	1	1	4	4	-5	7	34	-43	4	4	-4	6	26	-34	7	7	-25	7	-63	-71
21	-40	-21	4	5	-7	10	1	1	3	3	-5	7	33	-43	4	4	-4	6	26	-34	7	7	-25	7	-64	-71
22	-59	-42	4	6	-8	13	2	2	6	6	-3	5	24	-36	7	7	-3	4	19	-29	11	11	-37	-6	-89	-95
23	-51	-55	3	6	-8	14	2	2	6	6	-12	18	17	-25	7	7	-8	13	14	-21	11	11	-30	-10	-85	-100
23	-49	-45	3	4	-8	14	2	2	6	6	-12	18	17	-25	7	7	-8	12	14	-21	11	11	-28	-3	-83	-88
24	-46	-50	2	3	-8	14	2	2	6	6	-23	34	14	-21	7	7	-18	27	11	-17	11	11	-26	6	-89	-88
25	-44	-55	2	3	-9	14	2	2	6	6	-29	43	13	-20	7	7	-25	37	9	-13	11	11	-24	11	-94	-89
26	-43	-57	2	3	-9	14	2	2	6	6	-32	47	13	-19	7	7	-27	40	7	-10	11	11	-23	12	-95	-88
27	-44	-57	2	3	-9	14	2	2	6	6	-30	45	13	-19	7	7	-25	37	9	-14	11	11	-24	9	-94	-92
28	-46	-54	2	3	-9	14	2	2	6	6	-24	36	15	-23	7	7	-17	26	12	-18	11	11	-26	2	-88	-93
29	-51	-48	3	4	-9	14	2	2	6	6	-15	22	18	-27	7	7	-9	12	14	-22	11	11	-30	-5	-86	-92
30	-57	-39	4	6	-9	14	2	2	6	6	-7	10	24	-36	7	7	-5	8	20	-29	11	11	-35	2	-89	-92
31	-42	-19	4	5	-8	11	1	1	3	3	-7	8	33	-44	4	4	-5	7	26	-34	7	7	-27	11	-67	-69
31	-42	-19	4	5	-8	11	1	1	3	3	-7	8	33	-44	4	4	-5	7	26	-34	7	7	-27	11	-67	-69
32	-60	-41	4	6	-9	15	2	2	5	5	-6	8	24	-36	7	7	-5	7	19	-29	11	11	-38	-1	-92	-94
33	-52	-55	3	4	-9	14	2	2	5	5	-13	21	18	-26	7	7	-8	13	15	-21	11	11	-31	-11	-86	-98
33	-50	-45	3	4	-9	14	2	2	5	5	-14	20	18	-26	7	7	-9	12	14	-22	11	11	-29	-2	-85	-89
34	-47	-51	2	3	-9	14	2	2	5	5	-23	36	15	-22	7	7	-17	27	12	-17	11	11	-27	6	-89	-89
35	-45	-56	2	3	-9	14	2	2	5	5	-30	44	14	-21	7	7	-25	37	9	-14	11	11	-25	11	-95	-91
36	-44	-59	2	3	-9	14	2	2	5	5	-31	47	15	-21	7	7	-27	40	8	-12	11	11	-24	10	-96	-92
37	-44	-59	2	2	-9	14	2	2	5	5	-30	45	16	-23	7	7	-25	37	11	-16	11	11	-24	6	-94	-95
38	-46	-57	2	3	-9	14	2	2	5	5	-25	37	17	-26	7	7	-18	27	14	-20	11	11	-26	-1	-89	-98
39	-50	-51	3	4	-9	14	2	2	5	5	-15	22	21	-32	7	7	-9	13	16	-25	11	11	-29	-8	-85	-98
40	-56	-43	4	5	-9	14	2	2	5	5	-7	10	27	-40	7	7	-6	8	21	-32	11	11	-34	-4	-89	-98
41	-41	-22	4	5	-8	11	1	1	3	3	-6	8	36	-47	4	4	-5	7	28	-37	7	7	-26	7	-65	-75

CONTROL TENSIONES LONGITUDINALES
COMBINACION POCO PROBABLE UIC
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.60		0.60				0.00						1.00									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
41	-41	-22	4	5	-8	11	1	1	1	1	-6	8	36	-47	2	2	-5	7	28	-37	3	3	-33	1	-59	-68
42	-63	-39	4	5	-9	14	2	2	2	2	-5	8	25	-37	3	3	-4	6	20	-30	4	4	-52	-12	-83	-81
43	-58	-49	3	4	-9	14	2	2	2	2	-14	22	17	-25	3	3	-9	14	14	-20	4	4	-48	-15	-82	-80
43	-42	-41	3	4	-9	14	2	2	2	2	-14	22	17	-26	3	3	-9	14	14	-20	4	4	-32	-7	-66	-72
44	-40	-44	2	3	-9	14	2	2	2	2	-26	39	15	-21	3	3	-19	29	12	-17	4	4	-31	4	-73	-71
45	-39	-47	2	2	-9	14	2	2	2	2	-34	50	13	-19	3	3	-28	41	8	-13	4	4	-30	12	-81	-69
46	-39	-49	2	2	-9	14	2	2	2	2	-35	52	14	-20	3	3	-30	44	8	-12	4	4	-30	13	-83	-70
47	-39	-49	2	2	-9	14	2	2	2	2	-34	49	14	-22	3	3	-28	40	10	-16	4	4	-30	9	-81	-74
48	-41	-48	2	3	-9	14	2	2	2	2	-27	41	16	-24	3	3	-20	30	13	-19	4	4	-32	1	-75	-77
49	-44	-44	3	4	-9	14	2	2	2	2	-16	23	20	-30	3	3	-10	14	16	-24	4	4	-34	-10	-69	-79
50	-48	-39	3	5	-9	15	2	2	2	2	-7	10	27	-40	3	3	-5	8	21	-32	4	4	-38	-10	-68	-83
51	-32	-24	4	5	-8	11	1	1	1	1	-6	8	38	-50	2	2	-5	7	29	-38	3	3	-24	-1	-50	-71
51	-32	-24	4	5	-8	11	1	1	1	1	-6	8	38	-50	1	1	-5	6	29	-39	2	2	-25	-3	-49	-71
52	-51	-40	3	5	-9	14	1	1	1	1	-5	8	27	-40	2	2	-4	6	22	-33	3	3	-43	-15	-69	-83
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54	-42	-43	2	3	-9	14	1	1	1	1	-27	40	16	-24	2	2	-20	30	13	-19	3	3	-35	4	-74	-70
55	-40	-46	2	2	-9	14	1	1	1	1	-34	50	15	-22	2	2	-28	41	10	-15	3	3	-33	11	-80	-68
56	-40	-48	2	2	-9	14	1	1	1	1	-36	53	14	-21	2	2	-31	45	7	-11	3	3	-33	13	-83	-66
57	-40	-49	2	2	-9	14	1	1	1	1	-32	48	16	-23	2	2	-27	40	11	-16	3	3	-33	7	-79	-72
58	-41	-48	2	3	-9	14	1	1	1	1	-25	38	16	-24	2	2	-20	30	13	-19	3	3	-34	-2	-73	-75
59	-43	-45	3	4	-8	14	1	1	1	1	-13	20	20	-28	2	2	-9	14	16	-23	3	3	-35	-14	-65	-77
60	-47	-40	3	5	-8	14	1	1	1	1	-4	7	27	-40	2	2	-3	5	22	-31	3	3	-39	-17	-63	-81
61	-31	-25	4	5	-7	10	1	1	1	1	-6	8	38	-49	1	1	-4	6	30	-38	2	2	-24	-5	-47	-71
61	-31	-25	4	5	-7	10	1	1	0	0	-6	8	38	-49	1	1	-4	6	30	-38	1	1	-25	-6	-45	-70
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63	-45	-51	3	4	-9	14	1	1	1	1	-16	24	21	-30	1	1	-9	14	17	-24	2	2	-39	-21	-66	-82
63	-43	-40	3	4	-9	14	1	1	1	1	-16	24	20	-30	1	1	-9	14	16	-24	2	2	-37	-10	-64	-71
64	-42	-43	2	3	-9	15	1	1	1	1	-27	40	17	-25	1	1	-19	29	14	-20	2	2	-37	1	-72	-69
65	-41	-46	1	2	-9	15	1	1	1	1	-33	50	13	-19	1	1	-27	41	11	-15	2	2	-37	9	-78	-66
66	-40	-48	1	2	-10	15	1	1	1	1	-35	51	10	-16	1	1	-30	44	7	-11	2	2	-36	11	-80	-64
67	-41	-48	1	2	-10	16	1	1	1	1	-32	47	9	-14	1	1	-26	39	6	-9	2	2	-37	6	-77	-62
68	-43	-46	2	3	-10	16	1	1	1	1	-24	35	9	-13	1	1	-19	28	8	-11	2	2	-38	-2	-73	-63
69	-46	-42	3	4	-10	17	1	1	1	1	-12	18	10	-15	1	1	-9	13	9	-13	2	2	-40	-12	-68	-62
70	-51	-36	3	5	-11	17	1	1	1	1	-5	7	19	-28	1	1	-4	5	15	-23	2	2	-45	-12	-68	-67
71	-34	-22	4	5	-10	13	1	1	0	0	-6	8	32	-41	1	1	-5	7	25	-33	1	1	-28	0	-51	-62
71	-34	-22	4	5	-10	13	1	1	0	0	-6	8	31	-41	0	0	-5	7	25	-33	1	1	-29	-1	-50	-61
72	-49	-44	4	6	-10	16	1	1	0	0	-8	11	27	-42	1	1	-6	9	22	-34	1	1	-43	-18	-67	-86
73	-44	-53	3	5	-9	14	1	1	0	0	-12	18	24	-36	1	1	-7	10	19	-28	1	1	-39	-28	-61	-88
73	-47	-26	3	5	-9	14	1	1	0	0	-12	18	24	-36	1	1	-7	10	19	-29	1	1	-42	-1	-64	-62
74	-42	-34	3	4	-8	12	1	1	0	0	-19	28	21	-31	1	1	-14	21	16	-24	1	1	-37	0	-65	-64
75	-37	-41	3	4	-7	11	1	1	0	0	-23	34	18	-27	1	1	-19	28	14	-21	1	1	-32	-1	-65	-68
76	-34	-48	2	3	-5	9	1	1	0	0	-25	38	15	-22	1	1	-22	33	11	-17	1	1	-30	-5	-63	-70
77	-31	-53	2	3	-4	7	1	1	0	0	-25	37	12	-17	1	1	-22	33	9	-14	1	1	-27	-11	-59	-72
78	-29	-56	1	2	-3	5	1	1	0	0	-23	33	9	-14	1	1	-19	27	7	-11	1	1	-26	-22	-53	-71
79	-27	-60	1	1	-2	4	1	1	0	0	-17	26	7	-9	1	1	-14	21	5	-7	1	1	-24	-34	-45	-70
80	-26	-63	0	1	-1	2	1	1	0	0	-10	14	3	-5	1	1	-8	11	2	-4	1	1	-24	-48	-36	-70
81	-15	-38	0	0	0	0	1	1	0	0	0	0	-1	0	0	0	0	0	-1	0	1	1	-14	-37	-17	-39

VIADUCTO 4
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE CONSTRUCCION

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI
1	1	0.510	0.956	2.165	0	0		0.00		0.00
	2	0.445	0.727	2.165	0	0		0.00		0.00
	3	0.445	0.727	2.165	0	0		0.00		0.00
	4	0.445	0.727	2.165	0	0		0.00		0.00
	5	0.445	0.727	2.165	0	0		0.00		0.00
	6	0.445	0.727	2.165	0	0		0.00		0.00
	7	0.445	0.727	2.165	0	0		0.00		0.00
	8	0.445	0.727	2.165	0	0		0.00		0.00
	9	0.445	0.727	2.165	0	0		0.00		0.00
	10	0.445	0.727	2.165	0	0		0.00		0.00
	11	0.510	0.956	2.165	-81	1		0.00	0.026	1.32
2	11	0.510	0.956	2.165	-81	1		0.00	0.026	1.32
	12	0.445	0.727	2.165	0	0		0.00		0.00
	13	0.445	0.727	2.165	0	0		0.00		0.00
	14	0.445	0.727	2.165	0	0		0.00		0.00
	15	0.445	0.727	2.165	0	0		0.00		0.00
	16	0.445	0.727	2.165	0	0		0.00		0.00
	17	0.445	0.727	2.165	0	0		0.00		0.00
	18	0.445	0.727	2.165	0	0		0.00		0.00
	19	0.445	0.727	2.165	0	0		0.00		0.00
	20	0.445	0.727	2.165	0	0		0.00		0.00
	21	0.510	0.956	2.165	-83	2		0.00	0.051	2.55
3	21	0.510	0.956	2.165	-83	2		0.00	0.051	2.55
	22	0.445	0.727	2.165	0	0		0.00		0.00
	23	0.445	0.727	2.165	0	0		0.00		0.00
	24	0.445	0.727	2.165	0	0		0.00		0.00
	25	0.445	0.727	2.165	0	0		0.00		0.00
	26	0.445	0.727	2.165	0	0		0.00		0.00
	27	0.445	0.727	2.165	0	0		0.00		0.00
	28	0.445	0.727	2.165	0	0		0.00		0.00
	29	0.445	0.727	2.165	0	0		0.00		0.00
	30	0.445	0.727	2.165	0	0		0.00		0.00
	31	0.510	0.956	2.165	-83	3		0.00	0.076	3.78
4	31	0.510	0.956	2.165	-83	3		0.00	0.076	3.78
	32	0.445	0.727	2.165	0	0		0.00		0.00
	33	0.445	0.727	2.165	0	0		0.00		0.00
	34	0.445	0.727	2.165	0	0		0.00		0.00
	35	0.445	0.727	2.165	0	0		0.00		0.00
	36	0.445	0.727	2.165	0	0		0.00		0.00
	37	0.445	0.727	2.165	0	0		0.00		0.00
	38	0.445	0.727	2.165	0	0		0.00		0.00
	39	0.445	0.727	2.165	0	0		0.00		0.00
	40	0.445	0.727	2.165	0	0		0.00		0.00
	41	0.510	0.956	2.165	-90	13		0.00	0.273	13.66

VIADUCTO 4
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE CONSTRUCCION

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI
5	41	0.510	0.956	2.165	-90	13		0.00	0.273	13.66
	42	0.445	0.727	2.165	0	0		0.00		0.00
	43	0.445	0.727	2.165	0	0		0.00		0.00
	44	0.445	0.727	2.165	0	0		0.00		0.00
	45	0.445	0.727	2.165	0	0		0.00		0.00
	46	0.445	0.727	2.165	0	0		0.00		0.00
	47	0.445	0.727	2.165	0	0		0.00		0.00
	48	0.445	0.727	2.165	0	0		0.00		0.00
	49	0.445	0.727	2.165	0	0		0.00		0.00
	50	0.445	0.727	2.165	0	0		0.00		0.00
	51	0.510	0.956	2.165	0	0		0.00		0.00
6	51	0.510	0.956	2.165	0	0		0.00		0.00
	52	0.445	0.727	2.165	0	0		0.00		0.00
	53	0.445	0.727	2.165	0	0		0.00		0.00
	54	0.445	0.727	2.165	0	0		0.00		0.00
	55	0.445	0.727	2.165	0	0		0.00		0.00
	56	0.445	0.727	2.165	0	0		0.00		0.00
	57	0.445	0.727	2.165	0	0		0.00		0.00
	58	0.445	0.727	2.165	0	0		0.00		0.00
	59	0.445	0.727	2.165	0	0		0.00		0.00
	60	0.445	0.727	2.165	0	0		0.00		0.00
	61	0.510	0.956	2.165	0	0		0.00		0.00
7	61	0.510	0.956	2.165	0	0		0.00		0.00
	62	0.445	0.727	2.165	0	0		0.00		0.00
	63	0.445	0.727	2.165	0	0		0.00		0.00
	64	0.445	0.727	2.165	0	0		0.00		0.00
	65	0.445	0.727	2.165	0	0		0.00		0.00
	66	0.445	0.727	2.165	0	0		0.00		0.00
	67	0.445	0.727	2.165	0	0		0.00		0.00
	68	0.445	0.727	2.165	0	0		0.00		0.00
	69	0.445	0.727	2.165	0	0		0.00		0.00
	70	0.445	0.727	2.165	0	0		0.00		0.00
	71	0.510	0.956	2.165	0	0		0.00		0.00
8	71	0.510	0.956	2.165	0	0		0.00		0.00
	72	0.445	0.727	2.165	0	0		0.00		0.00
	73	0.445	0.727	2.165	0	0		0.00		0.00
	74	0.445	0.727	2.165	0	0		0.00		0.00
	75	0.445	0.727	2.165	0	0		0.00		0.00
	76	0.445	0.727	2.165	0	0		0.00		0.00
	77	0.445	0.727	2.165	0	0		0.00		0.00
	78	0.445	0.727	2.165	0	0		0.00		0.00
	79	0.445	0.727	2.165	0	0		0.00		0.00
	80	0.445	0.727	2.165	0	0		0.00		0.00
	81	0.510	0.956	2.165	0	0		0.00		0.00

VIADUCTO 4
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE SERVICIO - ESTADO INICIAL

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI	F. SUP	F. INF	HS	ACTS	HI	ACTI
1	1	0.510	0.956	2.165	0	0					0	0				
	2	0.445	0.727	2.165	0	0					0	0				
	3	0.445	0.727	2.165	0	0					0	0				
	4	0.445	0.727	2.165	0	0					0	0				
	5	0.445	0.727	2.165	0	0					0	0				
	6	0.445	0.727	2.165	0	0					0	0				
	7	0.445	0.727	2.165	0	0					0	0				
	8	0.445	0.727	2.165	0	0					0	0				
	9	0.445	0.727	2.165	0	0					0	0				
	10	0.445	0.727	2.165	0	0					0	0				
	11	0.510	0.956	2.165	-86	8			0.184	9.21	0	0				
2	11	0.510	0.956	2.165	-86	9			0.205	10.26	0	0				
	12	0.445	0.727	2.165	0	0					0	0				
	13	0.445	0.727	2.165	0	0					0	0				
	14	0.445	0.727	2.165	0	0					0	0				
	15	0.445	0.727	2.165	0	0					0	0				
	16	0.445	0.727	2.165	0	0					0	0				
	17	0.445	0.727	2.165	0	0					0	0				
	18	0.445	0.727	2.165	0	0					0	0				
	19	0.445	0.727	2.165	0	0					0	0				
	20	0.445	0.727	2.165	0	0					0	0				
	21	0.510	0.956	2.165	-86	6			0.141	7.06	0	0				
3	21	0.510	0.956	2.165	-86	6			0.141	7.06	0	0				
	22	0.445	0.727	2.165	0	0					0	0				
	23	0.445	0.727	2.165	0	0					0	0				
	24	0.445	0.727	2.165	0	0					0	0				
	25	0.445	0.727	2.165	0	0					0	0				
	26	0.445	0.727	2.165	0	0					0	0				
	27	0.445	0.727	2.165	0	0					0	0				
	28	0.445	0.727	2.165	0	0					0	0				
	29	0.445	0.727	2.165	0	0					0	0				
	30	0.445	0.727	2.165	0	0					0	0				
	31	0.510	0.956	2.165	-86	7			0.163	8.15	0	0				
4	31	0.510	0.956	2.165	-85	6			0.143	7.14	0	0				
	32	0.445	0.727	2.165	0	0					0	0				
	33	0.445	0.727	2.165	0	0					0	0				
	34	0.445	0.727	2.165	0	0					0	0				
	35	0.445	0.727	2.165	0	0					0	0				
	36	0.445	0.727	2.165	0	0					0	0				
	37	0.445	0.727	2.165	0	0					0	0				
	38	0.445	0.727	2.165	0	0					0	0				
	39	0.445	0.727	2.165	0	0					0	0				
	40	0.445	0.727	2.165	0	0					0	0				
	41	0.510	0.956	2.165	-92	14			0.286	14.30	0	0				

VIADUCTO 4
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE SERVICIO - ESTADO INICIAL

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI	F. SUP	F. INF	HS	ACTS	HI	ACTI
5	41	0.510	0.956	2.165	0	0					0	0				
	42	0.445	0.727	2.165	0	0					0	0				
	43	0.445	0.727	2.165	0	0					0	0				
	44	0.445	0.727	2.165	0	0					0	0				
	45	0.445	0.727	2.165	0	0					0	0				
	46	0.445	0.727	2.165	0	0					0	0				
	47	0.445	0.727	2.165	0	0					0	0				
	48	0.445	0.727	2.165	0	0					0	0				
	49	0.445	0.727	2.165	0	0					0	0				
	50	0.445	0.727	2.165	0	0					0	0				
	51	0.510	0.956	2.165	0	0					0	0				
6	51	0.510	0.956	2.165	0	0					0	0				
	52	0.445	0.727	2.165	0	0					0	0				
	53	0.445	0.727	2.165	0	0					0	0				
	54	0.445	0.727	2.165	0	0					0	0				
	55	0.445	0.727	2.165	0	0					0	0				
	56	0.445	0.727	2.165	0	0					0	0				
	57	0.445	0.727	2.165	0	0					0	0				
	58	0.445	0.727	2.165	0	0					0	0				
	59	0.445	0.727	2.165	0	0					0	0				
	60	0.445	0.727	2.165	0	0					0	0				
	61	0.510	0.956	2.165	0	0					0	0				
7	61	0.510	0.956	2.165	0	0					0	0				
	62	0.445	0.727	2.165	0	0					0	0				
	63	0.445	0.727	2.165	0	0					0	0				
	64	0.445	0.727	2.165	0	0					0	0				
	65	0.445	0.727	2.165	0	0					0	0				
	66	0.445	0.727	2.165	0	0					0	0				
	67	0.445	0.727	2.165	0	0					0	0				
	68	0.445	0.727	2.165	0	0					0	0				
	69	0.445	0.727	2.165	0	0					0	0				
	70	0.445	0.727	2.165	0	0					0	0				
	71	0.510	0.956	2.165	0	0					0	0				
8	71	0.510	0.956	2.165	0	0					0	0				
	72	0.445	0.727	2.165	0	0					0	0				
	73	0.445	0.727	2.165	0	0					0	0				
	74	0.445	0.727	2.165	0	0					0	0				
	75	0.445	0.727	2.165	0	0					0	0				
	76	0.445	0.727	2.165	0	0					0	0				
	77	0.445	0.727	2.165	0	0					0	0				
	78	0.445	0.727	2.165	0	0					0	0				
	79	0.445	0.727	2.165	0	0					0	0				
	80	0.445	0.727	2.165	0	0					0	0				
	81	0.510	0.956	2.165	0	0					0	0				

VIADUCTO 4
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE SERVICIO - ESTADO FINAL

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI	F. SUP	F. INF	HS	ACTS	HI	ACTI
1	1	0.510	0.956	2.165	0	0					0	0				
	2	0.445	0.727	2.165	0	0					0	0				
	3	0.445	0.727	2.165	0	0					0	0				
	4	0.445	0.727	2.165	0	0					0	0				
	5	0.445	0.727	2.165	0	0					0	0				
	6	0.445	0.727	2.165	0	0					0	0				
	7	0.445	0.727	2.165	0	0					0	0				
	8	0.445	0.727	2.165	0	0					0	0				
	9	0.445	0.727	2.165	0	0					0	0				
	10	0.445	0.727	2.165	0	0					0	0				
	11	0.510	0.956	2.165	-62	8			0.247	12.37	0	0				
2	11	0.510	0.956	2.165	-62	8			0.247	12.37	0	0				
	12	0.445	0.727	2.165	0	0					0	0				
	13	0.445	0.727	2.165	0	0					0	0				
	14	0.445	0.727	2.165	-83	2			0.051	2.55	0	0				
	15	0.445	0.727	2.165	-86	7			0.163	8.15	0	0				
	16	0.445	0.727	2.165	-87	7			0.161	8.06	0	0				
	17	0.445	0.727	2.165	-86	4			0.096	4.81	0	0				
	18	0.445	0.727	2.165	0	0					0	0				
	19	0.445	0.727	2.165	0	0					0	0				
	20	0.445	0.727	2.165	0	0					0	0				
	21	0.510	0.956	2.165	-57	1			0.037	1.87	0	0				
3	21	0.510	0.956	2.165	-57	1			0.037	1.87	0	0				
	22	0.445	0.727	2.165	0	0					0	0				
	23	0.445	0.727	2.165	0	0					0	0				
	24	0.445	0.727	2.165	0	0					0	0				
	25	0.445	0.727	2.165	-84	4			0.098	4.92	0	0				
	26	0.445	0.727	2.165	-85	6			0.143	7.14	0	0				
	27	0.445	0.727	2.165	-85	4			0.097	4.87	0	0				
	28	0.445	0.727	2.165	0	0					0	0				
	29	0.445	0.727	2.165	0	0					0	0				
	30	0.445	0.727	2.165	0	0					0	0				
	31	0.510	0.956	2.165	-61	5			0.164	8.20	0	0				
4	31	0.510	0.956	2.165	-61	5			0.164	8.20	0	0				
	32	0.445	0.727	2.165	0	0					0	0				
	33	0.445	0.727	2.165	0	0					0	0				
	34	0.445	0.727	2.165	-83	2			0.051	2.55	0	0				
	35	0.445	0.727	2.165	-85	5			0.120	6.01	0	0				
	36	0.445	0.727	2.165	-86	5			0.119	5.95	0	0				
	37	0.445	0.727	2.165	-85	2			0.050	2.49	0	0				
	38	0.445	0.727	2.165	0	0					0	0				
	39	0.445	0.727	2.165	0	0					0	0				
	40	0.445	0.727	2.165	0	0					0	0				
	41	0.510	0.956	2.165	-59	2			0.071	3.55	0	0				

VIADUCTO 4
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE SERVICIO - ESTADO FINAL

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI	F. SUP	F. INF	HS	ACTS	HI	ACTI
5	41	0.510	0.956	2.165	-59	1			0.036	1.80	0	0				
	42	0.445	0.727	2.165	0	0					0	0				
	43	0.445	0.727	2.165	0	0					0	0				
	44	0.445	0.727	2.165	-78	12			0.289	14.43	0	0				
	45	0.445	0.727	2.165	-84	18			0.382	19.10	0	0				
	46	0.445	0.727	2.165	-85	20			0.412	20.62	0	0				
	47	0.445	0.727	2.165	-84	17			0.364	18.22	0	0				
	48	0.445	0.727	2.165	-79	9			0.221	11.07	0	0				
	49	0.445	0.727	2.165	0	0					0	0				
	50	0.445	0.727	2.165	0	0					0	0				
	51	0.510	0.956	2.165	0	0					10	-78	0.246	12.30		
6	51	0.510	0.956	2.165	0	0					10	-78	0.246	12.30		
	52	0.445	0.727	2.165	0	0					0	0				
	53	0.445	0.727	2.165	-70	1			0.030	1.52	0	0				
	54	0.445	0.727	2.165	-80	14			0.322	16.12	0	0				
	55	0.445	0.727	2.165	-85	20			0.412	20.62	0	0				
	56	0.445	0.727	2.165	-86	20			0.408	20.42	0	0				
	57	0.445	0.727	2.165	-83	15			0.331	16.57	0	0				
	58	0.445	0.727	2.165	-77	6			0.157	7.83	0	0				
	59	0.445	0.727	2.165	0	0					0	0				
	60	0.445	0.727	2.165	0	0					0	0				
	61	0.510	0.956	2.165	0	0					10	-79	0.243	12.16		
7	61	0.510	0.956	2.165	0	0					10	-79	0.243	12.16		
	62	0.445	0.727	2.165	0	0					0	0				
	63	0.445	0.727	2.165	-71	1			0.030	1.50	0	0				
	64	0.445	0.727	2.165	-80	14			0.322	16.12	0	0				
	65	0.445	0.727	2.165	-86	21			0.425	21.25	0	0				
	66	0.445	0.727	2.165	-87	21			0.421	21.05	0	0				
	67	0.445	0.727	2.165	-85	17			0.361	18.04	0	0				
	68	0.445	0.727	2.165	-79	8			0.199	9.95	0	0				
	69	0.445	0.727	2.165	0	0					0	0				
	70	0.445	0.727	2.165	0	0					0	0				
	71	0.510	0.956	2.165	-54	4			0.149	7.47	1	-67	0.032	11.81		
8	71	0.510	0.956	2.165	-54	4			0.149	7.47	0	0				
	72	0.445	0.727	2.165	0	0					0	0				
	73	0.445	0.727	2.165	-71	11			0.290	14.52	0	0				
	74	0.445	0.727	2.165	-71	10			0.267	13.36	0	0				
	75	0.445	0.727	2.165	-70	7			0.197	9.84	0	0				
	76	0.445	0.727	2.165	-67	1			0.032	1.59	0	0				
	77	0.445	0.727	2.165	0	0					0	0				
	78	0.445	0.727	2.165	0	0					0	0				
	79	0.445	0.727	2.165	0	0					0	0				
	80	0.445	0.727	2.165	0	0					0	0				
	81	0.510	0.956	2.165	0	0					0	0				

REACCIONES, GIROS Y DESPLAZAMIENTOS

Reacciones y giros acumulados por peso propio

Estructura completa estado inicial

Apoyo	Reaccion (t)	Giro (rad*1000)
1	218.43	-0.003592
11	823.91	-0.001670
21	807.57	0.003395
31	805.77	0.005950
41	864.95	0.003834
51	867.58	0.007001
61	918.32	0.005365
71	758.51	0.011856
81	266.02	0.006545

Reacciones y giros acumulados por peso propio

Estructura completa estado final

Apoyo	Reaccion (t)	Giro (rad*1000)
1	224.77	-0.003983
11	796.54	-0.000904
21	828.73	0.000428
31	809.67	0.000674
41	853.48	-0.000563
51	881.42	0.000929
61	893.10	-0.000067
71	821.79	0.002601
81	221.55	0.003785

Reacciones y giros debidos a cargas muertas

Apoyo	Reaccion (t)	Giro (rad*1000)
1	87.91	-0.001662
11	316.13	-0.000346
21	329.47	0.000066
31	320.94	0.000084
41	337.99	-0.000396
51	349.99	0.000161
61	353.37	-0.000229
71	329.42	0.000733
81	84.70	0.001464

Reacciones y giros por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

Apoyo	Reaccion (t)	Giro (rad*1000)
1	34.19	0.002918
11	-40.47	-0.000904
21	8.03	0.000248
31	-2.35	-0.000065
41	1.15	0.000002
51	-2.14	0.000065
61	7.22	-0.000255
71	-39.60	0.000934
81	33.96	-0.002932

Reacciones y giros debidos a descenso lento de apoyos

Para estado final (nulos para estado inicial)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	2.956	-3.052	0.0005297	-0.0005297
11	7.536	-7.732	0.0002394	-0.0002394
21	9.356	-9.457	0.0002759	-0.0002759
31	9.515	-9.443	0.0002794	-0.0002795
41	8.738	-8.817	0.0002882	-0.0002881
51	8.227	-8.173	0.0002749	-0.0002749
61	7.966	-8.005	0.0002678	-0.0002678
71	6.585	-6.821	0.0002404	-0.0002405
81	2.790	-2.838	0.0005163	-0.0005163

Reacciones y giros por paso de ferrocarril (RENFE)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	236.241	-55.351	0.0034191	-0.0066148
11	667.414	-66.482	0.0053145	-0.0066794
21	729.357	-64.405	0.0078522	-0.0072571
31	731.847	-74.624	0.0082606	-0.0078854
41	758.202	-67.435	0.0083235	-0.0092258
51	778.162	-63.161	0.0095190	-0.0094195
61	774.233	-67.025	0.0087040	-0.0095033
71	700.302	-71.816	0.0078959	-0.0055955
81	238.577	-65.432	0.0067597	-0.0040422

Reacciones y giros por paso de ferrocarril (UIC)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	188.258	-45.535	0.0028135	-0.0056287
11	533.245	-54.134	0.0039479	-0.0054943
21	566.887	-52.792	0.0057840	-0.0058678
31	569.762	-60.825	0.0059010	-0.0059463
41	588.690	-56.439	0.0060964	-0.0068871
51	603.628	-53.465	0.0070616	-0.0071000
61	602.026	-54.764	0.0070738	-0.0069324
71	553.069	-58.806	0.0064071	-0.0040736
81	189.307	-53.091	0.0056933	-0.0032795

Reacciones y giros por ferrocarril (RENFE/UIC)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	236.241	-55.351	0.0034191	-0.0066148
11	667.414	-66.482	0.0053145	-0.0066794
21	729.357	-64.405	0.0078522	-0.0072571
31	731.847	-74.624	0.0082606	-0.0078854
41	758.202	-67.435	0.0083235	-0.0092258
51	778.162	-63.161	0.0095190	-0.0094195
61	774.233	-67.025	0.0087040	-0.0095033
71	700.302	-71.816	0.0078959	-0.0055955
81	238.577	-65.432	0.0067597	-0.0040422

Reacciones y giros por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	270.435	-55.351	0.0063373	-0.0066148
11	667.414	-106.951	0.0053145	-0.0075835
21	737.391	-64.405	0.0081000	-0.0072571
31	731.847	-76.977	0.0082606	-0.0079500
41	759.351	-67.435	0.0083252	-0.0092258
51	778.162	-65.301	0.0095836	-0.0094195
61	781.456	-67.025	0.0087040	-0.0097581
71	700.302	-111.415	0.0088297	-0.0055955
81	272.538	-65.432	0.0067597	-0.0069744

Reacciones y giros por sobrecarga total

(+descensos lentos estructura final+temperatura)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	273.391	-58.403	0.0068670	-0.0071445
11	674.950	-114.683	0.0055539	-0.0078229
21	746.746	-73.862	0.0083759	-0.0075330
31	741.362	-86.421	0.0085400	-0.0082295
41	768.090	-76.252	0.0086134	-0.0095139
51	786.389	-73.474	0.0098585	-0.0096944
61	789.423	-75.030	0.0089718	-0.0100259
71	706.887	-118.236	0.0090701	-0.0058360
81	275.328	-68.270	0.0072760	-0.0074907

Reacciones y giros por pretensado (*coef. perdidas elasticas)

Estructura completa estado inicial

Apoyo	Reaccion (t)	Giro (rad*1000)
1	106.48	0.016055
11	-121.17	0.000190
21	7.00	-0.001697
31	35.57	-0.005109
41	-54.79	-0.000024
51	35.00	-0.013186
61	-35.72	-0.011672
71	-16.17	-0.017700
81	43.82	-0.016596

Reacciones y giros por pretensado (*coef. perdidas totales)

Estructura completa estado final

Apoyo	Reaccion (t)	Giro (rad*1000)
1	90.02	0.014229
11	-93.35	-0.000155
21	2.68	-0.000167
31	7.41	-0.000644
41	4.66	0.000447
51	-11.35	-0.001790
61	-10.03	-0.000341
71	-85.69	-0.002992
81	95.64	-0.011177

Desplazamientos y giros acumulados por peso propio

Estructura completa estado inicial

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	-0.003592
	2	-0.000419	-0.003271
	3	-0.000762	-0.002367
	4	-0.000975	-0.001147
	5	-0.001034	0.000173
	6	-0.000939	0.001374
	7	-0.000717	0.002241
	8	-0.000422	0.002560
	9	-0.000132	0.002115
	10	0.000047	0.000684
	11	0.000000	-0.001670
2	11	0.000000	-0.001670
	12	-0.000522	-0.004466
	13	-0.001341	-0.005421
	14	-0.002174	-0.004728
	15	-0.002798	-0.002899
	16	-0.003071	-0.000450
	17	-0.002936	0.002110
	18	-0.002416	0.004266
	19	-0.001617	0.005508
	20	-0.000726	0.005316
	21	0.000000	0.003395
3	21	0.000000	0.003395
	22	0.000366	0.001529
	23	0.000588	0.001539
	24	-0.003407	-0.005826
	25	-0.004142	-0.003210
	26	-0.004408	-0.000058
	27	-0.004160	0.003110
	28	-0.003435	0.005796
	29	-0.002354	0.007475
	30	-0.001118	0.007636
	31	0.000000	0.005950
4	31	0.000000	0.005950
	32	0.000790	0.004239
	33	0.001453	0.004320
	34	-0.003059	-0.005070
	35	-0.003681	-0.002578
	36	-0.003863	0.000349
	37	-0.003574	0.003199
	38	-0.002868	0.005459
	39	-0.001881	0.006617
	40	-0.000831	0.006159
	41	0.000000	0.003834
5	41	0.000000	0.003834
	42	0.000420	0.001489

Desplazamientos y giros acumulados por peso propio

Estructura completa estado inicial

V.	Nud	D.Vertical (m)	Giro (rad*1000)
	43	0.000640	0.001443
	44	-0.004380	-0.007035
	45	-0.005331	-0.003878
	46	-0.005675	-0.000066
	47	-0.005353	0.003773
	48	-0.004413	0.007007
	49	-0.003015	0.009006
	50	-0.001424	0.009137
	51	0.000000	0.007001
6	51	0.000000	0.007001
	52	0.000981	0.004847
	53	0.001790	0.004922
	54	-0.004144	-0.006466
	55	-0.005001	-0.003367
	56	-0.005268	0.000304
	57	-0.004901	0.003906
	58	-0.003965	0.006817
	59	-0.002634	0.008399
	60	-0.001190	0.008030
	61	0.000000	0.005365
7	61	0.000000	0.005365
	62	0.000659	0.002775
	63	0.001091	0.002658
	64	-0.005313	-0.008791
	65	-0.006540	-0.005287
	66	-0.007082	-0.000922
	67	-0.006843	0.003679
	68	-0.005840	0.007882
	69	-0.004193	0.011055
	70	-0.002134	0.012572
	71	0.000000	0.011856
8	71	0.000000	0.011856
	72	0.001365	0.011006
	73	0.002685	0.011085
	74	-0.001696	-0.003944
	75	-0.002087	-0.002471
	76	-0.002276	-0.000628
	77	-0.002232	0.001372
	78	-0.001948	0.003313
	79	-0.001446	0.004974
	80	-0.000771	0.006144
	81	0.000000	0.006545

Desplazamientos y giros acumulados por peso propio

Estructura completa estado final

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	-0.003983
	2	-0.000466	-0.003650
	3	-0.000853	-0.002713
	4	-0.001104	-0.001433
	5	-0.001193	-0.000032
	6	-0.001116	0.001276
	7	-0.000898	0.002273
	8	-0.000590	0.002746
	9	-0.000267	0.002477
	10	-0.000033	0.001248
	11	0.000000	-0.000904
2	11	0.000000	-0.000904
	12	-0.000380	-0.003484
	13	-0.001031	-0.004332
	14	-0.001689	-0.003671
	15	-0.002155	-0.002015
	16	-0.002310	0.000125
	17	-0.002117	0.002233
	18	-0.001622	0.003798
	19	-0.000955	0.004308
	20	-0.000324	0.003250
	21	0.000000	0.000428
3	21	0.000000	0.000428
	22	-0.000187	-0.002399
	23	-0.000682	-0.003467
	24	-0.001573	-0.003710
	25	-0.002055	-0.002168
	26	-0.002240	-0.000093
	27	-0.002084	0.002006
	28	-0.001623	0.003616
	29	-0.000977	0.004223
	30	-0.000348	0.003317
	31	0.000000	0.000674
4	31	0.000000	0.000674
	32	-0.000133	-0.001978
	33	-0.000549	-0.002926
	34	-0.001428	-0.003284
	35	-0.001843	-0.001769
	36	-0.001971	0.000208
	37	-0.001779	0.002137
	38	-0.001315	0.003502
	39	-0.000713	0.003791
	40	-0.000184	0.002492
	41	0.000000	-0.000563
5	41	0.000000	-0.000563
	42	-0.000403	-0.003697

Desplazamientos y giros acumulados por peso propio

Estructura completa estado final

V.	Nud	D.Vertical (m)	Giro (rad*1000)
	43	-0.001155	-0.004688
	44	-0.002352	-0.004668
	45	-0.002987	-0.002568
	46	-0.003200	0.000131
	47	-0.002944	0.002799
	48	-0.002276	0.004806
	49	-0.001366	0.005520
	50	-0.000488	0.004313
	51	0.000000	0.000929
6	51	0.000000	0.000929
	52	-0.000170	-0.002475
	53	-0.000737	-0.003752
	54	-0.001921	-0.004243
	55	-0.002504	-0.002397
	56	-0.002709	0.000065
	57	-0.002483	0.002511
	58	-0.001883	0.004313
	59	-0.001074	0.004837
	60	-0.000329	0.003456
	61	0.000000	-0.000067
7	61	0.000000	-0.000067
	62	-0.000350	-0.003556
	63	-0.001103	-0.004825
	64	-0.002471	-0.005217
	65	-0.003205	-0.003153
	66	-0.003513	-0.000367
	67	-0.003326	0.002506
	68	-0.002682	0.004841
	69	-0.001729	0.006005
	70	-0.000721	0.005367
	71	0.000000	0.002601
8	71	0.000000	0.002601
	72	0.000165	0.000346
	73	0.000116	-0.000984
	74	-0.000506	-0.002650
	75	-0.000807	-0.002255
	76	-0.001027	-0.001324
	77	-0.001113	-0.000070
	78	-0.001039	0.001289
	79	-0.000807	0.002537
	80	-0.000442	0.003458
	81	0.000000	0.003785

Desplazamientos y giros debidos a cargas muertas

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	-0.001662
	2	-0.000195	-0.001529
	3	-0.000357	-0.001143
	4	-0.000464	-0.000613
	5	-0.000502	-0.000026
	6	-0.000472	0.000524
	7	-0.000381	0.000948
	8	-0.000253	0.001152
	9	-0.000117	0.001047
	10	-0.000017	0.000543
	11	0.000000	-0.000346
2	11	0.000000	-0.000346
	12	-0.000153	-0.001417
	13	-0.000419	-0.001773
	14	-0.000688	-0.001499
	15	-0.000878	-0.000813
	16	-0.000938	0.000073
	17	-0.000855	0.000941
	18	-0.000649	0.001574
	19	-0.000374	0.001759
	20	-0.000120	0.001281
	21	0.000000	0.000066
3	21	0.000000	0.000066
	22	-0.000099	-0.001150
	23	-0.000333	-0.001642
	24	-0.000590	-0.001477
	25	-0.000783	-0.000871
	26	-0.000858	-0.000040
	27	-0.000795	0.000801
	28	-0.000611	0.001436
	29	-0.000357	0.001649
	30	-0.000116	0.001223
	31	0.000000	0.000084
4	31	0.000000	0.000084
	32	-0.000090	-0.001061
	33	-0.000305	-0.001501
	34	-0.000538	-0.001312
	35	-0.000704	-0.000714
	36	-0.000756	0.000082
	37	-0.000679	0.000857
	38	-0.000494	0.001396
	39	-0.000255	0.001485
	40	-0.000053	0.000908
	41	0.000000	-0.000396
5	41	0.000000	-0.000396
	42	-0.000198	-0.001737

Desplazamientos y giros debidos a cargas muertas

V.	Nud	D.Vertical (m)	Giro (rad*1000)
	43	-0.000549	-0.002194
	44	-0.000907	-0.001869
	45	-0.001162	-0.001028
	46	-0.001247	0.000061
	47	-0.001142	0.001136
	48	-0.000872	0.001932
	49	-0.000509	0.002182
	50	-0.000169	0.001620
	51	0.000000	0.000161
6	51	0.000000	0.000161
	52	-0.000114	-0.001309
	53	-0.000403	-0.001899
	54	-0.000722	-0.001698
	55	-0.000957	-0.000970
	56	-0.001041	0.000017
	57	-0.000951	0.001002
	58	-0.000711	0.001717
	59	-0.000391	0.001897
	60	-0.000105	0.001276
	61	0.000000	-0.000229
7	61	0.000000	-0.000229
	62	-0.000183	-0.001721
	63	-0.000542	-0.002300
	64	-0.000927	-0.002051
	65	-0.001215	-0.001241
	66	-0.001336	-0.000131
	67	-0.001259	0.001009
	68	-0.001002	0.001916
	69	-0.000629	0.002325
	70	-0.000247	0.001969
	71	0.000000	0.000733
8	71	0.000000	0.000733
	72	0.000024	-0.000257
	73	-0.000048	-0.000862
	74	-0.000167	-0.001058
	75	-0.000290	-0.000930
	76	-0.000382	-0.000572
	77	-0.000422	-0.000077
	78	-0.000399	0.000468
	79	-0.000311	0.000969
	80	-0.000171	0.001337
	81	0.000000	0.001464

Desplazamientos y giros por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	0.002918
	2	0.000293	0.001969
	3	0.000479	0.001154
	4	0.000576	0.000466
	5	0.000597	-0.000093
	6	0.000558	-0.000525
	7	0.000476	-0.000831
	8	0.000364	-0.001007
	9	0.000238	-0.001058
	10	0.000114	-0.000979
	11	0.000000	-0.000904
2	11	0.000000	-0.000904
	12	-0.000132	-0.000752
	13	-0.000229	-0.000459
	14	-0.000282	-0.000208
	15	-0.000298	0.000003
	16	-0.000283	0.000171
	17	-0.000245	0.000298
	18	-0.000190	0.000384
	19	-0.000124	0.000428
	20	-0.000055	0.000429
	21	0.000000	0.000248
3	21	0.000000	0.000248
	22	0.000024	0.000054
	23	0.000029	0.000010
	24	0.000028	-0.000021
	25	0.000023	-0.000040
	26	0.000016	-0.000049
	27	0.000008	-0.000044
	28	0.000002	-0.000030
	29	0.000000	-0.000002
	30	0.000002	0.000037
	31	0.000000	-0.000065
4	31	0.000000	-0.000065
	32	-0.000018	-0.000161
	33	-0.000040	-0.000112
	34	-0.000054	-0.000065
	35	-0.000061	-0.000023
	36	-0.000061	0.000016
	37	-0.000056	0.000051
	38	-0.000045	0.000082
	39	-0.000030	0.000108
	40	-0.000011	0.000131
	41	0.000000	0.000002
5	41	0.000000	0.000002

Desplazamientos y giros por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

V.	Nud	D.Vertical (m)	Giro (rad*1000)
	42	-0.000012	-0.000138
	43	-0.000033	-0.000113
	44	-0.000050	-0.000086
	45	-0.000063	-0.000054
	46	-0.000069	-0.000017
	47	-0.000068	0.000023
	48	-0.000060	0.000068
	49	-0.000045	0.000117
	50	-0.000020	0.000169
	51	0.000000	0.000065
6	51	0.000000	0.000065
	52	0.000002	-0.000044
	53	-0.000002	-0.000002
	54	0.000001	0.000028
	55	0.000007	0.000044
	56	0.000015	0.000049
	57	0.000023	0.000044
	58	0.000029	0.000024
	59	0.000031	-0.000007
	60	0.000026	-0.000051
	61	0.000000	-0.000255
7	61	0.000000	-0.000255
	62	-0.000061	-0.000447
	63	-0.000138	-0.000443
	64	-0.000211	-0.000398
	65	-0.000272	-0.000309
	66	-0.000315	-0.000176
	67	-0.000331	-0.000002
	68	-0.000313	0.000216
	69	-0.000254	0.000476
	70	-0.000147	0.000780
	71	0.000000	0.000934
8	71	0.000000	0.000934
	72	0.000117	0.001000
	73	0.000243	0.001070
	74	0.000370	0.001014
	75	0.000482	0.000831
	76	0.000565	0.000522
	77	0.000603	0.000086
	78	0.000580	-0.000476
	79	0.000483	-0.001166
	80	0.000295	-0.001983
	81	0.000000	-0.002932

Desplazamientos y giros debidos a descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	-0.000410	0.006452	-0.006452
	2	0.000013	-0.000423	0.000525	-0.000525
	3	0.000025	-0.000435	0.000508	-0.000507
	4	0.000035	-0.000446	0.000479	-0.000479
	5	0.000043	-0.000454	0.000439	-0.000439
	6	0.000048	-0.000459	0.000388	-0.000388
	7	0.000050	-0.000460	0.000337	-0.000337
	8	0.000046	-0.000456	0.000316	-0.000316
	9	0.000037	-0.000447	0.000293	-0.000293
	10	0.000022	-0.000432	0.000266	-0.000266
	11	0.000000	-0.000410	0.000239	-0.000239
2	11	0.000000	-0.000410	0.002916	-0.002916
	12	0.000035	-0.000446	0.000276	-0.000276
	13	0.000064	-0.000474	0.000328	-0.000328
	14	0.000085	-0.000496	0.000358	-0.000358
	15	0.000099	-0.000509	0.000371	-0.000371
	16	0.000104	-0.000515	0.000384	-0.000384
	17	0.000101	-0.000512	0.000365	-0.000365
	18	0.000090	-0.000500	0.000359	-0.000359
	19	0.000069	-0.000480	0.000348	-0.000348
	20	0.000039	-0.000450	0.000318	-0.000318
	21	0.000000	-0.000410	0.000276	-0.000276
3	21	0.000000	-0.000410	0.003362	-0.003362
	22	0.000040	-0.000451	0.000319	-0.000319
	23	0.000072	-0.000482	0.000353	-0.000352
	24	0.000095	-0.000505	0.000366	-0.000367
	25	0.000108	-0.000519	0.000370	-0.000370
	26	0.000113	-0.000523	0.000386	-0.000386
	27	0.000108	-0.000519	0.000371	-0.000371
	28	0.000095	-0.000505	0.000368	-0.000368
	29	0.000072	-0.000483	0.000356	-0.000356
	30	0.000040	-0.000451	0.000324	-0.000324
	31	0.000000	-0.000410	0.000279	-0.000280
4	31	0.000000	-0.000410	0.003403	-0.003405
	32	0.000041	-0.000451	0.000320	-0.000320
	33	0.000072	-0.000483	0.000350	-0.000350
	34	0.000094	-0.000505	0.000361	-0.000361
	35	0.000107	-0.000518	0.000364	-0.000364
	36	0.000111	-0.000522	0.000383	-0.000383
	37	0.000106	-0.000517	0.000371	-0.000371
	38	0.000093	-0.000503	0.000371	-0.000371
	39	0.000070	-0.000481	0.000361	-0.000361
	40	0.000039	-0.000449	0.000331	-0.000331
	41	0.000000	-0.000410	0.000288	-0.000288
5	41	0.000000	-0.000410	0.003512	-0.003510
	42	0.000045	-0.000455	0.000308	-0.000308

Desplazamientos y giros debidos a descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
	43	0.000080	-0.000490	0.000336	-0.000336
	44	0.000104	-0.000515	0.000346	-0.000346
	45	0.000118	-0.000529	0.000349	-0.000349
	46	0.000123	-0.000533	0.000369	-0.000369
	47	0.000117	-0.000528	0.000357	-0.000357
	48	0.000102	-0.000512	0.000356	-0.000356
	49	0.000077	-0.000488	0.000347	-0.000346
	50	0.000043	-0.000453	0.000318	-0.000318
	51	0.000000	-0.000410	0.000275	-0.000275
6	51	0.000000	-0.000410	0.003349	-0.003349
	52	0.000043	-0.000453	0.000312	-0.000313
	53	0.000076	-0.000487	0.000339	-0.000339
	54	0.000100	-0.000511	0.000347	-0.000347
	55	0.000114	-0.000525	0.000348	-0.000348
	56	0.000119	-0.000529	0.000365	-0.000365
	57	0.000114	-0.000524	0.000351	-0.000351
	58	0.000099	-0.000509	0.000348	-0.000348
	59	0.000075	-0.000486	0.000337	-0.000337
	60	0.000042	-0.000452	0.000306	-0.000306
	61	0.000000	-0.000410	0.000268	-0.000268
7	61	0.000000	-0.000410	0.003262	-0.003262
	62	0.000041	-0.000451	0.000307	-0.000307
	63	0.000072	-0.000483	0.000335	-0.000335
	64	0.000094	-0.000504	0.000344	-0.000344
	65	0.000106	-0.000517	0.000348	-0.000348
	66	0.000110	-0.000520	0.000364	-0.000364
	67	0.000105	-0.000515	0.000349	-0.000349
	68	0.000091	-0.000501	0.000334	-0.000335
	69	0.000068	-0.000479	0.000305	-0.000305
	70	0.000038	-0.000448	0.000254	-0.000254
	71	0.000000	-0.000410	0.000240	-0.000241
8	71	0.000000	-0.000410	0.002929	-0.002930
	72	0.000020	-0.000430	0.000267	-0.000267
	73	0.000033	-0.000444	0.000293	-0.000293
	74	0.000042	-0.000452	0.000317	-0.000317
	75	0.000045	-0.000455	0.000337	-0.000337
	76	0.000044	-0.000454	0.000385	-0.000385
	77	0.000039	-0.000450	0.000432	-0.000433
	78	0.000032	-0.000442	0.000469	-0.000469
	79	0.000022	-0.000433	0.000496	-0.000496
	80	0.000012	-0.000422	0.000512	-0.000512
	81	0.000000	-0.000410	0.000516	-0.000516

Desplazamientos y giros por paso de ferrocarril (RENFE)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	0.000000	0.003419	-0.006615
	2	0.000781	-0.000408	0.003328	-0.006250
	3	0.001473	-0.000792	0.003018	-0.005154
	4	0.002001	-0.001126	0.002501	-0.003562
	5	0.002318	-0.001385	0.001780	-0.001667
	6	0.002398	-0.001546	0.001210	-0.000237
	7	0.002240	-0.001582	0.002262	-0.000284
	8	0.001864	-0.001469	0.003911	-0.001627
	9	0.001317	-0.001182	0.005091	-0.003175
	10	0.000666	-0.000697	0.005611	-0.004931
	11	0.000000	0.000000	0.005315	-0.006679
2	11	0.000000	0.000000	0.005315	-0.006679
	12	0.001215	-0.000776	0.004372	-0.008151
	13	0.002525	-0.001397	0.003375	-0.007899
	14	0.003672	-0.001860	0.002571	-0.006203
	15	0.004463	-0.002166	0.002152	-0.003520
	16	0.004773	-0.002316	0.001395	-0.001098
	17	0.004557	-0.002327	0.003283	-0.001264
	18	0.003837	-0.002136	0.005889	-0.002021
	19	0.002712	-0.001709	0.007955	-0.003477
	20	0.001353	-0.001006	0.008727	-0.005332
	21	0.000000	0.000000	0.007852	-0.007257
3	21	0.000000	0.000000	0.007852	-0.007257
	22	0.001290	-0.001121	0.006149	-0.008563
	23	0.002656	-0.001966	0.004414	-0.008189
	24	0.003841	-0.002544	0.002902	-0.006379
	25	0.004650	-0.002875	0.002152	-0.003588
	26	0.004964	-0.002972	0.001384	-0.001545
	27	0.004735	-0.002841	0.003377	-0.001993
	28	0.003989	-0.002497	0.006096	-0.002930
	29	0.002824	-0.001945	0.008210	-0.004393
	30	0.001415	-0.001118	0.009081	-0.006081
	31	0.000000	0.000000	0.008261	-0.007885
4	31	0.000000	0.000000	0.008261	-0.007885
	32	0.001367	-0.001189	0.006590	-0.008861
	33	0.002754	-0.002106	0.004850	-0.008224
	34	0.003914	-0.002751	0.003403	-0.006404
	35	0.004672	-0.003138	0.002505	-0.003604
	36	0.004987	-0.003275	0.001682	-0.001553
	37	0.004758	-0.003217	0.003445	-0.002061
	38	0.004009	-0.002887	0.006262	-0.003143
	39	0.002840	-0.002260	0.008275	-0.004901
	40	0.001424	-0.001304	0.009130	-0.007067
	41	0.000000	0.000000	0.008323	-0.009226
5	41	0.000000	0.000000	0.008323	-0.009226
	42	0.001729	-0.001277	0.006568	-0.010521

Desplazamientos y giros por paso de ferrocarril (RENFE)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
	43	0.003500	-0.002250	0.004889	-0.009763
	44	0.004991	-0.002927	0.003430	-0.007599
	45	0.005967	-0.003362	0.002525	-0.004253
	46	0.006311	-0.003568	0.001766	-0.001611
	47	0.006009	-0.003503	0.004133	-0.002183
	48	0.005046	-0.003145	0.007514	-0.003100
	49	0.003555	-0.002464	0.009805	-0.004967
	50	0.001767	-0.001423	0.010681	-0.007186
	51	0.000000	0.000000	0.009519	-0.009420
6	51	0.000000	0.000000	0.009519	-0.009420
	52	0.001756	-0.001446	0.007344	-0.010647
	53	0.003543	-0.002517	0.005266	-0.009826
	54	0.005041	-0.003233	0.003533	-0.007371
	55	0.006015	-0.003647	0.002429	-0.004142
	56	0.006331	-0.003820	0.001752	-0.001641
	57	0.005948	-0.003702	0.004198	-0.002564
	58	0.004923	-0.003282	0.007580	-0.003503
	59	0.003410	-0.002540	0.009788	-0.005297
	60	0.001658	-0.001451	0.010264	-0.007414
	61	0.000000	0.000000	0.008704	-0.009503
7	61	0.000000	0.000000	0.008704	-0.009503
	62	0.001757	-0.001283	0.006288	-0.010580
	63	0.003522	-0.002161	0.003986	-0.009645
	64	0.004982	-0.002674	0.002136	-0.007124
	65	0.005912	-0.002882	0.001304	-0.003964
	66	0.006187	-0.002836	0.001223	-0.001693
	67	0.005774	-0.002576	0.004320	-0.002590
	68	0.004740	-0.002160	0.007556	-0.003077
	69	0.003247	-0.001605	0.009566	-0.003815
	70	0.001554	-0.000883	0.009791	-0.004690
	71	0.000000	0.000000	0.007896	-0.005596
8	71	0.000000	0.000000	0.007896	-0.005596
	72	0.000695	-0.000823	0.005828	-0.005819
	73	0.001367	-0.001397	0.003752	-0.005226
	74	0.001926	-0.001736	0.001923	-0.003979
	75	0.002306	-0.001870	0.000337	-0.002274
	76	0.002463	-0.001827	0.000274	-0.001346
	77	0.002376	-0.001638	0.001742	-0.002103
	78	0.002049	-0.001331	0.003667	-0.002958
	79	0.001506	-0.000936	0.005281	-0.003567
	80	0.000798	-0.000482	0.006391	-0.003934
	81	0.000000	0.000000	0.006760	-0.004042

Desplazamientos y giros por paso de ferrocarril (UIC)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	0.000000	0.002813	-0.005629
	2	0.000665	-0.000335	0.002737	-0.005334
	3	0.001258	-0.000651	0.002484	-0.004428
	4	0.001713	-0.000926	0.002058	-0.003070
	5	0.001983	-0.001140	0.001464	-0.001384
	6	0.002040	-0.001272	0.001007	-0.000192
	7	0.001882	-0.001301	0.002155	-0.000234
	8	0.001536	-0.001208	0.003520	-0.001339
	9	0.001056	-0.000972	0.004346	-0.002613
	10	0.000516	-0.000573	0.004508	-0.004056
	11	0.000000	0.000000	0.003948	-0.005494
2	11	0.000000	0.000000	0.003948	-0.005494
	12	0.001002	-0.000536	0.002761	-0.006744
	13	0.002092	-0.000884	0.002159	-0.006613
	14	0.003058	-0.001063	0.002093	-0.005252
	15	0.003726	-0.001271	0.001752	-0.003051
	16	0.003973	-0.001506	0.001136	-0.000803
	17	0.003750	-0.001621	0.003004	-0.001171
	18	0.003099	-0.001570	0.005173	-0.001414
	19	0.002138	-0.001309	0.006627	-0.002368
	20	0.001036	-0.000795	0.006885	-0.004088
	21	0.000000	0.000000	0.005784	-0.005868
3	21	0.000000	0.000000	0.005784	-0.005868
	22	0.001052	-0.000785	0.004047	-0.007006
	23	0.002176	-0.001296	0.002365	-0.006770
	24	0.003160	-0.001558	0.002129	-0.005316
	25	0.003832	-0.001614	0.001765	-0.003098
	26	0.004073	-0.001546	0.001126	-0.001100
	27	0.003835	-0.001658	0.003091	-0.001714
	28	0.003164	-0.001601	0.005308	-0.002072
	29	0.002181	-0.001332	0.006772	-0.002428
	30	0.001056	-0.000807	0.007023	-0.004159
	31	0.000000	0.000000	0.005901	-0.005946
4	31	0.000000	0.000000	0.005901	-0.005946
	32	0.001066	-0.000802	0.004136	-0.007090
	33	0.002202	-0.001324	0.002573	-0.006850
	34	0.003199	-0.001594	0.002466	-0.005388
	35	0.003882	-0.001654	0.002042	-0.003143
	36	0.004129	-0.001792	0.001302	-0.001131
	37	0.003893	-0.001921	0.003119	-0.001744
	38	0.003219	-0.001855	0.005348	-0.002115
	39	0.002226	-0.001543	0.006859	-0.002813
	40	0.001083	-0.000935	0.007163	-0.004817
	41	0.000000	0.000000	0.006096	-0.006887
5	41	0.000000	0.000000	0.006096	-0.006887
	42	0.001333	-0.000887	0.004264	-0.008323

Desplazamientos y giros por paso de ferrocarril (UIC)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
	43	0.002768	-0.001463	0.002632	-0.008091
	44	0.004030	-0.001759	0.002538	-0.006381
	45	0.004897	-0.001822	0.002114	-0.003721
	46	0.005212	-0.001966	0.001360	-0.001189
	47	0.004913	-0.002112	0.003688	-0.001808
	48	0.004057	-0.002042	0.006334	-0.002182
	49	0.002798	-0.001701	0.008100	-0.002883
	50	0.001355	-0.001032	0.008411	-0.004957
	51	0.000000	0.000000	0.007062	-0.007100
6	51	0.000000	0.000000	0.007062	-0.007100
	52	0.001364	-0.001027	0.004938	-0.008465
	53	0.002816	-0.001694	0.002882	-0.008165
	54	0.004087	-0.002036	0.002482	-0.006400
	55	0.004953	-0.002108	0.002056	-0.003732
	56	0.005262	-0.001966	0.001318	-0.001339
	57	0.004951	-0.002071	0.003737	-0.002096
	58	0.004083	-0.002000	0.006407	-0.002527
	59	0.002812	-0.001664	0.008165	-0.002831
	60	0.001360	-0.001008	0.008453	-0.004849
	61	0.000000	0.000000	0.007074	-0.006932
7	61	0.000000	0.000000	0.007074	-0.006932
	62	0.001330	-0.001026	0.004918	-0.008247
	63	0.002743	-0.001688	0.002838	-0.007922
	64	0.003971	-0.002021	0.001459	-0.006161
	65	0.004800	-0.002083	0.001208	-0.003574
	66	0.005079	-0.001932	0.000876	-0.001386
	67	0.004754	-0.001626	0.003677	-0.002121
	68	0.003892	-0.001222	0.006302	-0.002520
	69	0.002653	-0.000978	0.007896	-0.002581
	70	0.001263	-0.000593	0.007988	-0.002850
	71	0.000000	0.000000	0.006407	-0.004074
8	71	0.000000	0.000000	0.006407	-0.004074
	72	0.000530	-0.000668	0.004728	-0.004601
	73	0.001079	-0.001134	0.003046	-0.004407
	74	0.001564	-0.001409	0.001560	-0.003552
	75	0.001912	-0.001517	0.000274	-0.002161
	76	0.002070	-0.001483	0.000225	-0.001112
	77	0.002010	-0.001329	0.001417	-0.001707
	78	0.001734	-0.001080	0.003117	-0.002400
	79	0.001273	-0.000759	0.004485	-0.002896
	80	0.000673	-0.000391	0.005398	-0.003192
	81	0.000000	0.000000	0.005693	-0.003279

Desplazamientos y giros por ferrocarril (RENFE/UIC)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	0.000000	0.003419	-0.006615
	2	0.000781	-0.000408	0.003328	-0.006250
	3	0.001473	-0.000792	0.003018	-0.005154
	4	0.002001	-0.001126	0.002501	-0.003562
	5	0.002318	-0.001385	0.001780	-0.001667
	6	0.002398	-0.001546	0.001210	-0.000237
	7	0.002240	-0.001582	0.002262	-0.000285
	8	0.001864	-0.001469	0.003911	-0.001627
	9	0.001317	-0.001182	0.005091	-0.003175
	10	0.000666	-0.000697	0.005611	-0.004931
	11	0.000000	0.000000	0.005315	-0.006679
2	11	0.000000	0.000000	0.005315	-0.006679
	12	0.001215	-0.000776	0.004372	-0.008151
	13	0.002525	-0.001397	0.003375	-0.007899
	14	0.003672	-0.001860	0.002571	-0.006203
	15	0.004463	-0.002166	0.002152	-0.003520
	16	0.004773	-0.002316	0.001395	-0.001098
	17	0.004557	-0.002327	0.003283	-0.001264
	18	0.003837	-0.002136	0.005889	-0.002021
	19	0.002712	-0.001709	0.007955	-0.003477
	20	0.001353	-0.001006	0.008727	-0.005332
	21	0.000000	0.000000	0.007852	-0.007257
3	21	0.000000	0.000000	0.007852	-0.007257
	22	0.001290	-0.001121	0.006149	-0.008563
	23	0.002656	-0.001966	0.004414	-0.008189
	24	0.003841	-0.002544	0.002903	-0.006379
	25	0.004650	-0.002875	0.002152	-0.003588
	26	0.004964	-0.002972	0.001384	-0.001545
	27	0.004735	-0.002841	0.003377	-0.001993
	28	0.003989	-0.002497	0.006096	-0.002930
	29	0.002824	-0.001945	0.008240	-0.004393
	30	0.001415	-0.001118	0.009081	-0.006081
	31	0.000000	0.000000	0.008261	-0.007885
4	31	0.000000	0.000000	0.008261	-0.007885
	32	0.001367	-0.001189	0.006590	-0.008861
	33	0.002754	-0.002106	0.004850	-0.008224
	34	0.003914	-0.002751	0.003403	-0.006404
	35	0.004672	-0.003138	0.002505	-0.003604
	36	0.004987	-0.003275	0.001683	-0.001553
	37	0.004758	-0.003217	0.003445	-0.002061
	38	0.004009	-0.002887	0.006262	-0.003143
	39	0.002840	-0.002260	0.008275	-0.004901
	40	0.001424	-0.001304	0.009130	-0.007067
	41	0.000000	0.000000	0.008323	-0.009226
5	41	0.000000	0.000000	0.008323	-0.009226
	42	0.001729	-0.001277	0.006568	-0.010521

Desplazamientos y giros por ferrocarril (RENFE/UIC)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
	43	0.003500	-0.002250	0.004889	-0.009763
	44	0.004991	-0.002927	0.003430	-0.007599
	45	0.005967	-0.003362	0.002526	-0.004253
	46	0.006311	-0.003568	0.001766	-0.001611
	47	0.006009	-0.003503	0.004133	-0.002183
	48	0.005046	-0.003145	0.007514	-0.003100
	49	0.003555	-0.002464	0.009805	-0.004967
	50	0.001767	-0.001423	0.010681	-0.007186
	51	0.000000	0.000000	0.009519	-0.009419
6	51	0.000000	0.000000	0.009519	-0.009419
	52	0.001756	-0.001446	0.007344	-0.010646
	53	0.003543	-0.002517	0.005266	-0.009826
	54	0.005041	-0.003233	0.003533	-0.007370
	55	0.006015	-0.003647	0.002429	-0.004142
	56	0.006331	-0.003820	0.001752	-0.001641
	57	0.005948	-0.003702	0.004198	-0.002564
	58	0.004923	-0.003282	0.007580	-0.003503
	59	0.003410	-0.002540	0.009788	-0.005297
	60	0.001658	-0.001451	0.010264	-0.007414
	61	0.000000	0.000000	0.008704	-0.009503
7	61	0.000000	0.000000	0.008704	-0.009503
	62	0.001757	-0.001283	0.006288	-0.010580
	63	0.003522	-0.002161	0.003986	-0.009645
	64	0.004982	-0.002674	0.002136	-0.007124
	65	0.005912	-0.002882	0.001304	-0.003964
	66	0.006187	-0.002836	0.001224	-0.001693
	67	0.005774	-0.002576	0.004320	-0.002590
	68	0.004740	-0.002160	0.007556	-0.003077
	69	0.003247	-0.001605	0.009566	-0.003815
	70	0.001554	-0.000883	0.009791	-0.004690
	71	0.000000	0.000000	0.007896	-0.005596
8	71	0.000000	0.000000	0.007896	-0.005596
	72	0.000695	-0.000823	0.005828	-0.005819
	73	0.001367	-0.001397	0.003753	-0.005226
	74	0.001926	-0.001736	0.001923	-0.003979
	75	0.002306	-0.001870	0.000337	-0.002274
	76	0.002463	-0.001827	0.000274	-0.001346
	77	0.002376	-0.001638	0.001742	-0.002103
	78	0.002049	-0.001331	0.003667	-0.002958
	79	0.001506	-0.000936	0.005281	-0.003568
	80	0.000798	-0.000482	0.006391	-0.003934
	81	0.000000	0.000000	0.006760	-0.004042

Desplazamientos y giros por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	0.000000	0.003419	-0.009547
	2	0.001076	-0.000408	0.003328	-0.008233
	3	0.001956	-0.000792	0.003018	-0.006320
	4	0.002582	-0.001126	0.002501	-0.004039
	5	0.002921	-0.001385	0.001866	-0.001667
	6	0.002963	-0.001546	0.001731	-0.000237
	7	0.002722	-0.001582	0.003093	-0.000285
	8	0.002234	-0.001469	0.004925	-0.001627
	9	0.001561	-0.001182	0.006161	-0.003175
	10	0.000783	-0.000697	0.006611	-0.004931
	11	0.000000	0.000000	0.006248	-0.006679
2	11	0.000000	0.000000	0.006248	-0.006679
	12	0.001215	-0.000923	0.005152	-0.008151
	13	0.002525	-0.001651	0.003852	-0.007899
	14	0.003672	-0.002173	0.002787	-0.006203
	15	0.004463	-0.002497	0.002152	-0.003522
	16	0.004773	-0.002630	0.001395	-0.001274
	17	0.004557	-0.002599	0.003283	-0.001572
	18	0.003837	-0.002347	0.005889	-0.002419
	19	0.002712	-0.001847	0.007955	-0.003920
	20	0.001353	-0.001067	0.008727	-0.005779
	21	0.000000	0.000000	0.007852	-0.007512
3	21	0.000000	0.000000	0.007852	-0.007512
	22	0.001316	-0.001121	0.006149	-0.008613
	23	0.002687	-0.001966	0.004414	-0.008196
	24	0.003870	-0.002544	0.002927	-0.006379
	25	0.004674	-0.002875	0.002196	-0.003588
	26	0.004980	-0.002972	0.001433	-0.001545
	27	0.004742	-0.002841	0.003421	-0.001993
	28	0.003989	-0.002497	0.006124	-0.002930
	29	0.002824	-0.001947	0.008240	-0.004395
	30	0.001417	-0.001118	0.009081	-0.006124
	31	0.000000	0.000000	0.008325	-0.007885
4	31	0.000000	0.000000	0.008325	-0.007885
	32	0.001367	-0.001210	0.006760	-0.008861
	33	0.002754	-0.002150	0.004967	-0.008224
	34	0.003914	-0.002812	0.003472	-0.006404
	35	0.004672	-0.003206	0.002527	-0.003604
	36	0.004987	-0.003344	0.001683	-0.001571
	37	0.004758	-0.003280	0.003445	-0.002115
	38	0.004009	-0.002938	0.006262	-0.003229
	39	0.002840	-0.002294	0.008275	-0.005014
	40	0.001424	-0.001315	0.009130	-0.007205
	41	0.000000	0.000000	0.008325	-0.009226
5	41	0.000000	0.000000	0.008325	-0.009226
	42	0.001729	-0.001288	0.006699	-0.010521

Desplazamientos y giros por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
	43	0.003500	-0.002280	0.004997	-0.009763
	44	0.004991	-0.002972	0.003512	-0.007599
	45	0.005967	-0.003418	0.002576	-0.004253
	46	0.006311	-0.003630	0.001782	-0.001611
	47	0.006009	-0.003564	0.004133	-0.002206
	48	0.005046	-0.003199	0.007514	-0.003164
	49	0.003555	-0.002504	0.009805	-0.005079
	50	0.001767	-0.001441	0.010681	-0.007346
	51	0.000000	0.000000	0.009519	-0.009484
6	51	0.000000	0.000000	0.009519	-0.009484
	52	0.001759	-0.001446	0.007381	-0.010646
	53	0.003543	-0.002518	0.005266	-0.009828
	54	0.005043	-0.003233	0.003533	-0.007400
	55	0.006024	-0.003647	0.002429	-0.004185
	56	0.006347	-0.003820	0.001752	-0.001690
	57	0.005971	-0.003702	0.004198	-0.002604
	58	0.004951	-0.003282	0.007580	-0.003524
	59	0.003439	-0.002540	0.009798	-0.005297
	60	0.001682	-0.001451	0.010318	-0.007414
	61	0.000000	0.000000	0.008952	-0.009503
7	61	0.000000	0.000000	0.008952	-0.009503
	62	0.001757	-0.001338	0.006718	-0.010580
	63	0.003522	-0.002285	0.004414	-0.009645
	64	0.004982	-0.002864	0.002520	-0.007124
	65	0.005912	-0.003127	0.001602	-0.003964
	66	0.006187	-0.003119	0.001395	-0.001693
	67	0.005774	-0.002874	0.004323	-0.002590
	68	0.004740	-0.002442	0.007556	-0.003285
	69	0.003247	-0.001834	0.009566	-0.004274
	70	0.001554	-0.001015	0.009791	-0.005442
	71	0.000000	0.000000	0.007896	-0.006500
8	71	0.000000	0.000000	0.007896	-0.006500
	72	0.000810	-0.000823	0.005828	-0.006798
	73	0.001605	-0.001397	0.003753	-0.006283
	74	0.002290	-0.001736	0.001923	-0.004986
	75	0.002782	-0.001870	0.000337	-0.003105
	76	0.003022	-0.001827	0.000274	-0.001871
	77	0.002973	-0.001638	0.001742	-0.002196
	78	0.002625	-0.001331	0.004133	-0.002958
	79	0.001986	-0.000936	0.006435	-0.003568
	80	0.001091	-0.000482	0.008360	-0.003934
	81	0.000000	0.000000	0.009678	-0.004042

Desplazamientos y giros por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	-0.000410	0.003949	-0.010077
	2	0.001088	-0.000831	0.003853	-0.008757
	3	0.001981	-0.001227	0.003525	-0.006827
	4	0.002617	-0.001571	0.002980	-0.004518
	5	0.002964	-0.001839	0.002305	-0.002106
	6	0.003011	-0.002005	0.002119	-0.000625
	7	0.002771	-0.002042	0.003429	-0.000621
	8	0.002280	-0.001925	0.005242	-0.001943
	9	0.001598	-0.001630	0.006454	-0.003467
	10	0.000805	-0.001129	0.006877	-0.005197
	11	0.000000	-0.000410	0.006488	-0.006919
2	11	0.000000	-0.000410	0.006488	-0.006919
	12	0.001250	-0.001368	0.005428	-0.008427
	13	0.002589	-0.002125	0.004180	-0.008228
	14	0.003758	-0.002669	0.003145	-0.006561
	15	0.004561	-0.003006	0.002523	-0.003893
	16	0.004878	-0.003145	0.001778	-0.001658
	17	0.004658	-0.003111	0.003648	-0.001937
	18	0.003927	-0.002847	0.006248	-0.002778
	19	0.002781	-0.002327	0.008303	-0.004268
	20	0.001393	-0.001517	0.009045	-0.006097
	21	0.000000	-0.000410	0.008128	-0.007788
3	21	0.000000	-0.000410	0.008128	-0.007788
	22	0.001357	-0.001571	0.006468	-0.008932
	23	0.002759	-0.002448	0.004767	-0.008549
	24	0.003965	-0.003049	0.003293	-0.006746
	25	0.004782	-0.003394	0.002566	-0.003959
	26	0.005092	-0.003495	0.001819	-0.001931
	27	0.004850	-0.003360	0.003791	-0.002364
	28	0.004084	-0.003002	0.006492	-0.003298
	29	0.002897	-0.002429	0.008595	-0.004750
	30	0.001457	-0.001568	0.009405	-0.006449
	31	0.000000	-0.000410	0.008605	-0.008165
4	31	0.000000	-0.000410	0.008605	-0.008165
	32	0.001408	-0.001660	0.007079	-0.009181
	33	0.002826	-0.002633	0.005317	-0.008574
	34	0.004009	-0.003316	0.003833	-0.006765
	35	0.004779	-0.003724	0.002891	-0.003968
	36	0.005099	-0.003866	0.002066	-0.001954
	37	0.004864	-0.003797	0.003817	-0.002487
	38	0.004102	-0.003441	0.006633	-0.003600
	39	0.002910	-0.002774	0.008635	-0.005375
	40	0.001463	-0.001765	0.009461	-0.007536
	41	0.000000	-0.000410	0.008613	-0.009514
5	41	0.000000	-0.000410	0.008613	-0.009514
	42	0.001774	-0.001743	0.007006	-0.010828

Desplazamientos y giros por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
	43	0.003580	-0.002770	0.005333	-0.010100
	44	0.005095	-0.003487	0.003858	-0.007946
	45	0.006086	-0.003947	0.002925	-0.004603
	46	0.006434	-0.004163	0.002151	-0.001980
	47	0.006126	-0.004091	0.004490	-0.002563
	48	0.005147	-0.003711	0.007870	-0.003521
	49	0.003632	-0.002991	0.010152	-0.005425
	50	0.001810	-0.001894	0.010999	-0.007664
	51	0.000000	-0.000410	0.009794	-0.009759
6	51	0.000000	-0.000410	0.009794	-0.009759
	52	0.001801	-0.001899	0.007693	-0.010959
	53	0.003620	-0.003004	0.005604	-0.010167
	54	0.005143	-0.003743	0.003880	-0.007747
	55	0.006138	-0.004171	0.002778	-0.004534
	56	0.006466	-0.004349	0.002117	-0.002054
	57	0.006085	-0.004226	0.004548	-0.002955
	58	0.005050	-0.003792	0.007928	-0.003872
	59	0.003514	-0.003026	0.010135	-0.005634
	60	0.001724	-0.001903	0.010625	-0.007720
	61	0.000000	-0.000410	0.009220	-0.009771
7	61	0.000000	-0.000410	0.009220	-0.009771
	62	0.001798	-0.001789	0.007025	-0.010888
	63	0.003594	-0.002767	0.004748	-0.009979
	64	0.005076	-0.003368	0.002864	-0.007468
	65	0.006019	-0.003644	0.001950	-0.004312
	66	0.006297	-0.003639	0.001758	-0.002057
	67	0.005879	-0.003389	0.004672	-0.002939
	68	0.004831	-0.002943	0.007890	-0.003619
	69	0.003315	-0.002313	0.009871	-0.004580
	70	0.001592	-0.001464	0.010046	-0.005696
	71	0.000000	-0.000410	0.008136	-0.006740
8	71	0.000000	-0.000410	0.008136	-0.006740
	72	0.000829	-0.001254	0.006095	-0.007065
	73	0.001639	-0.001841	0.004046	-0.006576
	74	0.002332	-0.002188	0.002240	-0.005303
	75	0.002827	-0.002325	0.000674	-0.003442
	76	0.003065	-0.002281	0.000659	-0.002256
	77	0.003013	-0.002087	0.002174	-0.002628
	78	0.002656	-0.001773	0.004602	-0.003428
	79	0.002008	-0.001369	0.006931	-0.004063
	80	0.001103	-0.000904	0.008872	-0.004446
	81	0.000000	-0.000410	0.010194	-0.004558

Desplazamientos y giros por pretensado (*coef. perdidas elasticas)

Estructura completa estado inicial

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	0.016055
	2	0.001771	0.013264
	3	0.003109	0.008892
	4	0.003898	0.004204
	5	0.004125	-0.000374
	6	0.003829	-0.004399
	7	0.003109	-0.007346
	8	0.002123	-0.008726
	9	0.001091	-0.008048
	10	0.000289	-0.004851
	11	0.000000	0.000190
2	11	0.000000	0.000190
	12	0.000591	0.006721
	13	0.001946	0.009461
	14	0.003434	0.008609
	15	0.004577	0.005297
	16	0.005061	0.000588
	17	0.004757	-0.004322
	18	0.003730	-0.008202
	19	0.002249	-0.009769
	20	0.000791	-0.007698
	21	0.000000	-0.001697
3	21	0.000000	-0.001697
	22	0.000248	0.004365
	23	0.001157	0.006143
	24	0.004995	0.009612
	25	0.006237	0.005541
	26	0.006702	0.000118
	27	0.006267	-0.005474
	28	0.005004	-0.009991
	29	0.003188	-0.012155
	30	0.001301	-0.010643
	31	0.000000	-0.005109
4	31	0.000000	-0.005109
	32	-0.000334	0.000561
	33	-0.000055	0.002126
	34	0.003936	0.008224
	35	0.004972	0.004391
	36	0.005287	-0.000566
	37	0.004796	-0.005451
	38	0.003609	-0.009027
	39	0.002039	-0.010006
	40	0.000608	-0.007062
	41	0.000000	-0.000024
5	41	0.000000	-0.000024
	42	0.000642	0.007008

Desplazamientos y giros por pretensado (*coef. perdidas elasticas)

Estructura completa estado inicial

V.	Nud	D.Vertical (m)	Giro (rad*1000)
	43	0.002132	0.009403
	44	0.007462	0.014106
	45	0.009440	0.008531
	46	0.010303	0.001336
	47	0.009881	-0.006200
	48	0.008230	-0.012735
	49	0.005641	-0.016878
	50	0.002649	-0.017169
	51	0.000000	-0.013186
6	51	0.000000	-0.013186
	52	-0.001843	-0.008688
	53	-0.003269	-0.008795
	54	0.007673	0.014323
	55	0.009634	0.008150
	56	0.010399	0.000621
	57	0.009845	-0.006982
	58	0.008073	-0.013314
	59	0.005421	-0.016992
	60	0.002469	-0.016547
	61	0.000000	-0.011672
7	61	0.000000	-0.011672
	62	-0.001543	-0.006749
	63	-0.002614	-0.006648
	64	0.008818	0.016589
	65	0.011136	0.009989
	66	0.012160	0.001746
	67	0.011717	-0.006847
	68	0.009865	-0.014427
	69	0.006897	-0.019592
	70	0.003354	-0.020859
	71	0.000000	-0.017700
8	71	0.000000	-0.017700
	72	-0.001980	-0.015333
	73	-0.003778	-0.014982
	74	0.003012	0.008918
	75	0.003971	0.006759
	76	0.004585	0.003258
	77	0.004722	-0.001080
	78	0.004313	-0.005738
	79	0.003347	-0.010266
	80	0.001865	-0.014243
	81	0.000000	-0.016596

Desplazamientos y giros por pretensado (*coef. perdidas totales)

Estructura completa estado final

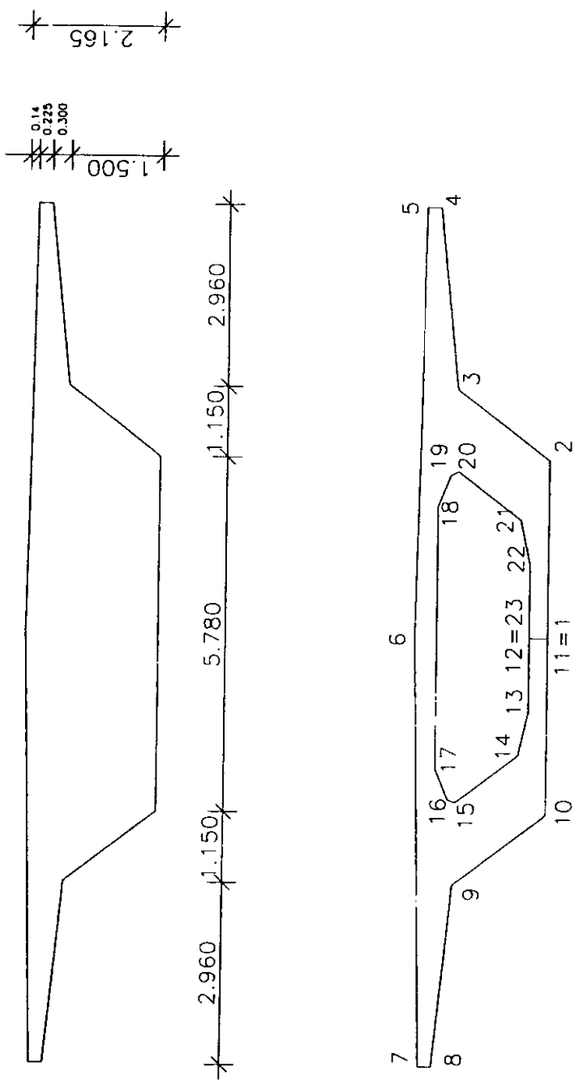
V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	0.014229
	2	0.001571	0.011778
	3	0.002762	0.007940
	4	0.003470	0.003811
	5	0.003682	-0.000237
	6	0.003431	-0.003814
	7	0.002802	-0.006457
	8	0.001932	-0.007730
	9	0.001013	-0.007209
	10	0.000287	-0.004486
	11	0.000000	-0.000155
2	11	0.000000	-0.000155
	12	0.000458	0.005472
	13	0.001574	0.007830
	14	0.002805	0.007093
	15	0.003738	0.004257
	16	0.004110	0.000256
	17	0.003815	-0.003861
	18	0.002924	-0.007005
	19	0.001680	-0.008052
	20	0.000515	-0.005837
	21	0.000000	-0.000167
3	21	0.000000	-0.000167
	22	0.000465	0.005606
	23	0.001592	0.007723
	24	0.003013	0.007266
	25	0.003965	0.004315
	26	0.004337	0.000205
	27	0.004026	-0.004016
	28	0.003102	-0.007253
	29	0.001812	-0.008388
	30	0.000586	-0.006251
	31	0.000000	-0.000644
4	31	0.000000	-0.000644
	32	0.000385	0.005081
	33	0.001426	0.007183
	34	0.002819	0.006929
	35	0.003721	0.004034
	36	0.004055	0.000026
	37	0.003728	-0.004043
	38	0.002815	-0.007078
	39	0.001572	-0.007958
	40	0.000440	-0.005507
	41	0.000000	0.000447
5	41	0.000000	0.000447
	42	0.000670	0.006963

Desplazamientos y giros por pretensado (*coef. perdidas totales)

Estructura completa estado final

V.	Nud	D.Vertical (m)	Giro (rad*1000)
	43	0.002169	0.009709
	44	0.004029	0.008734
	45	0.005235	0.004999
	46	0.005683	0.000102
	47	0.005270	-0.004827
	48	0.004092	-0.008603
	49	0.002449	-0.010011
	50	0.000860	-0.007767
	51	0.000000	-0.001790
6	51	0.000000	-0.001790
	52	0.000254	0.004356
	53	0.001269	0.006669
	54	0.003304	0.007778
	55	0.004399	0.004645
	56	0.004832	0.000267
	57	0.004486	-0.004229
	58	0.003440	-0.007661
	59	0.001984	-0.008813
	60	0.000616	-0.006392
	61	0.000000	-0.000341
7	61	0.000000	-0.000341
	62	0.000502	0.005779
	63	0.001753	0.007979
	64	0.004003	0.008867
	65	0.005257	0.005398
	66	0.005784	0.000587
	67	0.005449	-0.004422
	68	0.004323	-0.008426
	69	0.002681	-0.010203
	70	0.001019	-0.008438
	71	0.000000	-0.002992
8	71	0.000000	-0.002992
	72	-0.000118	0.000892
	73	0.000142	0.003012
	74	0.001223	0.006059
	75	0.001938	0.005546
	76	0.002502	0.003639
	77	0.002775	0.000781
	78	0.002671	-0.002571
	79	0.002153	-0.006022
	80	0.001232	-0.009201
	81	0.000000	-0.011177

COMPROBACION A ROTURA



intecsa
INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS S.A

PROYECTO: HOJA DE

FECHA

EJECUTANTE:

CALCULO MOMENTO ESTATICO DEL ALA

$$M_E = \frac{1}{2} 296 \times 0.059 \times \left(0.73 + 0.059 \tfrac{1}{3}\right) +$$

$$+ 296 \times 0.225 \times \left(0.536 + 0.225 \tfrac{1}{2}\right) +$$

$$+ \frac{1}{2} 296 \times 0.300 \times \left(0.236 + 0.300 \tfrac{2}{3}\right) =$$

$$= 0.0655 + 0.4119 + 0.1803 = 0.6577 m^3$$

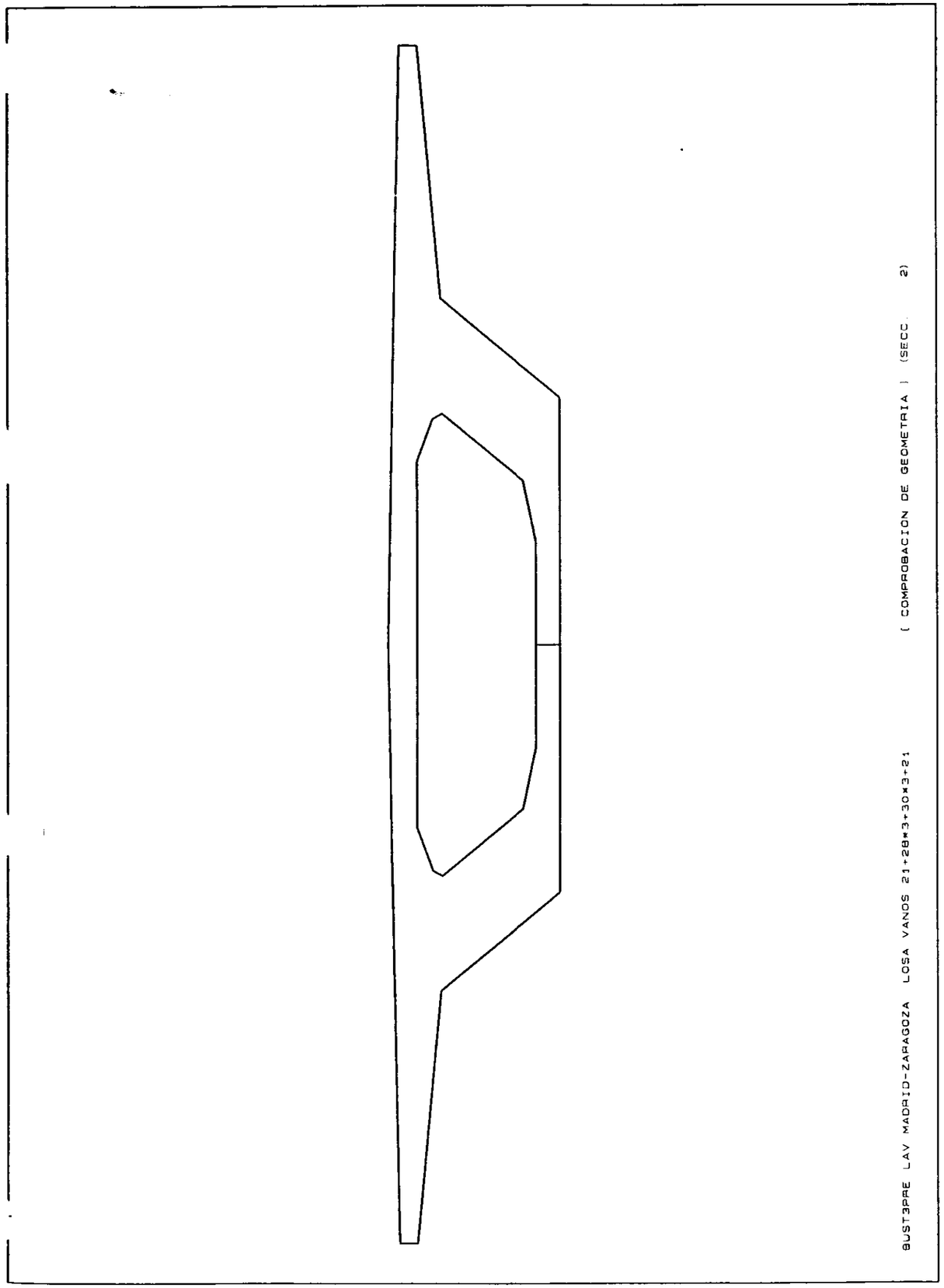
MOMENTO ESTATICO ALTERNON

$$M_E = 0.75 \times 0.310 \times \left(0.77 - 0.0624 - 0.155\right) = 0.1520 m^3$$

```
LAV MADRID - ZARAGOZA. LOSA VANOS 21+28*3+30*3+21
5100.  1.15  19000.  1.10  400.  1.5  1.5  1.5
2
  930  6.490  0.025
   0  2.210  0.025
3
9  1  11 21  31 41  51 61  71 81   1
8  2 -10 12 -20 22 -30 32 -40      2
8 42 -50 52 -60 62 -70 72 -80      2
2
0.6577  0.1520
3
9  1  11 21  31  41  51  61  71  81   1  1
8  2 -10 12 -20  22 -30  32 -40       2  1 2
8 42 -50 52 -60  62 -70  72 -80       2  1 2
2
6    0
1   11   0.000  0.000
2   10   2.890  0.000
3    9   4.040  1.500
4    8   7.000  1.800
5    7   7.000  2.025
     0   0.000  2.165
     0
    .1   0.000  0.000
2   10   2.890  0.000
3    9   4.040  1.500
4    8   7.000  1.800
5    7   7.000  2.025
6    0   0.000  2.165
12  23   0.000  0 300
13  22  -1.198  0.300
14  21  -1.918  0.460
15  20  -2.700  1.480
16  19  -2.640  1.600
17  18  -2.140  1.800
24   0   0.000  0.000
3
9   1   11  21   31  41   51  61   71  81   1
8   2  -10  12  -20  22  -30  32  -40       2
8  42  -50  52  -60  62  -70  72  -80       2
2

    1
1     4  5  6  7  8  10
3  -1
2   4   3
3  -1
10  9   8
4
8   1
1   2  4  5  6  7  8  10
3  -1
2   4   3
3  -1
10  9   8
12 -1
23 22 21 20 19 18 17 16 15 14 13 12
3
9   1   11  21   31  41   51  61   71  81   1
8   2  -10  12  -20  22  -30  32  -40  2
8  42  -50  52  -60  62  -70  72  -80  2

    -0.025   2
1  -11
1   2   1   15    2.02  0. 0.
2   3   2   10    1.12  0. 0.
3   4   1   15    1.12  0. 0.
5   6   1   35    2.02  0. 0.
    7   1   35    2.02  0. 0.
    9   1   15    1.12  0. 0.
9  10   2   10    1.12  0. 0.
10 11   1   15    2.02  0. 0.
1
2   1  -81  1  1
6
2853  1712  571 -571 -1712 -2853
3
2   1  -31  2  1  6
2  31  -61  2  2  5
2  61  -81  2  3  4
```



Calculo de Comprobacion a Rotura

Datos generales

Limite elastico del acero pasivo	=	5100.00	kg/cm2
Coeficiente del acero pasivo	=	1.15	
Limite elastico de acero activo	=	19000.00	kg/cm2
Coeficiente del acero activo	=	1.10	
Resistencia caracteristica del hormigon	=	400.00	kg/cm2
Coeficiente del hormigon	=	1.50	
Coef. mayoracion Cargas muertas y Peso propio .	=	1.50	
Coef. mayoracion Sobrecargas	=	1.50	

Calculo de Comprobacion a Rotura

Tipo de seccion 1

Definicion de puntos

Pt	X	Y	Pt	X	Y	Pt	X	Y
1	0.000	0.0000	2	2.890	0.0000	3	4.040	1.5000
4	7.000	1.8000	5	7.000	2.0250	6	0.000	2.1650
7	-7.000	2.0250	8	-7.000	1.8000	9	-4.040	1.5000
10	-2.890	0.0000	11	0.000	0.0000			

Tipo de seccion 2

Definicion de puntos

Pt	X	Y	Pt	X	Y	Pt	X	Y
1	0.000	0.0000	2	2.890	0.0000	3	4.040	1.5000
4	7.000	1.8000	5	7.000	2.0250	6	0.000	2.1650
7	-7.000	2.0250	8	-7.000	1.8000	9	-4.040	1.5000
10	-2.890	0.0000	11	0.000	0.0000	12	0.000	0.3000
13	-1.198	0.3000	14	-1.918	0.4600	15	-2.700	1.4800
16	-2.640	1.6000	17	-2.140	1.8000	18	2.140	1.8000
19	2.640	1.6000	20	2.700	1.4800	21	1.918	0.4600
22	1.198	0.3000	23	0.000	0.3000	24	0.000	0.0000

Calculo de Comprobacion a Rotura

Definicion de circuitos

Tipo de circuito 1

Circuito 1 : Numero de vertices 8 (Clave 1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	1	2	2	3	4	4	5	5	6	6	7
7	8	8	10								

Circuito 2 : Numero de vertices 3 (Clave -1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	2	2	4	3	3						

Circuito 3 : Numero de vertices 3 (Clave -1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	10	2	9	3	8						

Tipo de circuito 2

Circuito 1 : Numero de vertices 8 (Clave 1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	1	2	2	3	4	4	5	5	6	6	7
7	8	8	10								

Circuito 2 : Numero de vertices 3 (Clave -1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	2	2	4	3	3						

Circuito 3 : Numero de vertices 3 (Clave -1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	10	2	9	3	8						

Circuito 4 : Numero de vertices 12 (Clave -1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	23	2	22	3	21	4	20	5	19	6	18
7	17	8	16	9	15	10	14	11	13	12	12

Calculo de Comprobacion a Rotura

Definicion de armaduras pasivas

Tipo de armadura 1

Pi	Pf	Nr	A.(cm2)	Pi	Pf	Nr	A.(cm2)	Pi	Pf	Nr	A.(cm2)
1	2	15	2.02	2	3	10	1.12	3	4	15	1.12
5	6	35	2.02	6	7	35	2.02	8	9	15	1.12
9	10	10	1.12	10	11	15	2.02				

Definicion de axiles de calculo

Axil	Axil	Axil	Axil
0.00	2853.00	1712.00	571.00
-571.00	-1712.00	-2853.00	

Calculo de Comprobacion a Rotura

Datos secciones/secc.-circuitos-armaduras

V.	Sec	T. Seccion	T. Circuito	T. Arm. 1	T. Arm. 2	T. Arm. 3
1	1	1	1	1		
	2	2	2	1		
	3	2	2	1		
	4	2	2	1		
	5	2	2	1		
	6	2	2	1		
	7	2	2	1		
	8	2	2	1		
	9	2	2	1		
	10	2	2	1		
	11	1	1	1		
2	11	1	1	1		
	12	2	2	1		
	13	2	2	1		
	14	2	2	1		
	15	2	2	1		
	16	2	2	1		
	17	2	2	1		
	18	2	2	1		
	19	2	2	1		
	20	2	2	1		
	21	1	1	1		
3	21	1	1	1		
	22	2	2	1		
	23AI	2	2	1		
	23AD	2	2	1		
	24	2	2	1		
	25	2	2	1		
	26	2	2	1		
	27	2	2	1		
	28	2	2	1		
	29	2	2	1		
	30	2	2	1		
	31	1	1	1		
4	31	1	1	1		
	32	2	2	1		
	33AI	2	2	1		
	33AD	2	2	1		
	34	2	2	1		
	35	2	2	1		
	36	2	2	1		
	37	2	2	1		
	38	2	2	1		
	39	2	2	1		
	40	2	2	1		
	41	1	1	1		
5	41	1	1	1		
	42	2	2	1		

Calculo de Comprobacion a Rotura

Datos secciones/secc.-circuitos-armaduras

V.	Sec	T. Seccion	T. Circuito	T. Arm. 1	T. Arm. 2	T. Arm. 3
	43AI	2	2	1		
	43AD	2	2	1		
	44	2	2	1		
	45	2	2	1		
	46	2	2	1		
	47	2	2	1		
	48	2	2	1		
	49	2	2	1		
	50	2	2	1		
	51	1	1	1		
6	51	1	1	1		
	52	2	2	1		
	53AI	2	2	1		
	53AD	2	2	1		
	54	2	2	1		
	55	2	2	1		
	56	2	2	1		
	57	2	2	1		
	58	2	2	1		
	59	2	2	1		
	60	2	2	1		
	61	1	1	1		
7	61	1	1	1		
	62	2	2	1		
	63AI	2	2	1		
	63AD	2	2	1		
	64	2	2	1		
	65	2	2	1		
	66	2	2	1		
	67	2	2	1		
	68	2	2	1		
	69	2	2	1		
	70	2	2	1		
	71	1	1	1		
8	71	1	1	1		
	72	2	2	1		
	73AI	2	2	1		
	73AD	2	2	1		
	74	2	2	1		
	75	2	2	1		
	76	2	2	1		
	77	2	2	1		
	78	2	2	1		
	79	2	2	1		
	80	2	2	1		
	81	1	1	1		

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento P. propio (m x t)	Momento C.muertas (m x t)	Momento Sobre.(+) (m x t)	Momento Sobre.(-) (m x t)	Momento Hip. Pret (m x t)
1	1	0.00	0.00	0.00	0.00	0.00
	2	392.51	159.01	644.92	-190.80	187.71
	3	644.43	266.75	1131.17	-379.40	376.73
	4	774.58	323.25	1461.86	-565.81	565.76
	5	782.96	328.50	1640.07	-750.02	754.79
	6	669.57	282.51	1668.87	-932.04	943.82
	7	434.41	185.27	1570.65	-1125.03	1132.85
	8	77.48	36.78	1321.27	-1320.22	1321.89
	9	-401.23	-162.94	917.65	-1517.60	1510.92
	10	-1001.70	-413.91	664.35	-1763.90	1699.95
	11	-1455.29	-599.37	688.51	-2260.20	1890.30
2	11	-1455.29	-599.37	688.51	-2260.20	1890.30
	12	-747.98	-313.63	480.12	-1329.52	1879.64
	13	-3.05	-2.24	835.92	-837.52	1870.29
	14	525.39	218.05	1445.75	-696.57	1860.95
	15	837.35	347.25	1841.25	-678.42	1851.60
	16	932.83	385.34	2005.65	-719.65	1842.26
	17	811.82	332.33	1933.90	-832.70	1832.92
	18	474.33	188.22	1625.83	-1068.66	1823.58
	19	-79.63	-46.99	1056.88	-1318.48	1814.25
	20	-850.08	-373.31	611.55	-1702.79	1804.91
	21	-1574.98	-670.20	673.61	-2662.83	1796.89
3	21	-1574.98	-670.20	673.61	-2662.83	1796.89
	22	-853.11	-376.72	468.89	-1735.43	1793.74
	23AI	-85.69	-53.83	937.39	-1234.12	1791.91
	23AD	-85.69	-53.83	937.39	-1234.12	1791.91
	24	465.25	177.96	1545.35	-1034.29	1790.14
	25	799.70	318.66	1911.68	-947.67	1788.51
	26	917.68	368.25	2068.49	-916.05	1786.87
	27	819.17	326.74	1989.05	-938.78	1785.24
	28	504.18	194.13	1674.93	-1075.63	1783.61
	29	-27.29	-29.58	1096.94	-1317.54	1781.98
	30	-775.24	-344.39	669.64	-1730.96	1780.36
	31	-1485.39	-633.25	746.61	-2680.84	1779.57
4	31	-1485.39	-633.25	746.61	-2680.84	1777.77
	32	-786.65	-348.68	582.54	-1751.71	1796.06
	33AI	-50.10	-38.15	1027.55	-1273.71	1815.19
	33AD	-50.10	-38.15	1027.55	-1273.71	1815.19
	34	469.97	181.27	1626.38	-1076.42	1834.32
	35	773.56	309.60	1956.78	-1010.98	1853.45
	36	860.66	346.82	2073.71	-1001.78	1872.59
	37	731.28	292.94	1993.16	-1078.69	1891.74
	38	385.43	147.96	1675.41	-1222.32	1910.88
	39	-176.91	-88.12	1094.39	-1493.41	1930.03
	40	-955.74	-415.30	645.15	-1925.86	1949.18
	41	-1680.43	-710.08	723.66	-2863.01	1968.48
5	41	-1680.43	-710.08	723.66	-2863.01	1947.63
	42	-840.04	-368.86	571.99	-1763.62	1981.95
	43AI	17.53	-8.71	1088.78	-1251.64	2016.41

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento P. propio (m x t)	Momento C.muertas (m x t)	Momento Sobre.(+) (m x t)	Momento Sobre.(-) (m x t)	Momento Hip. Pret (m x t)
	43AD	17.53	-8.71	1088.78	-1251.64	2016.41
	44	626.58	246.86	1785.55	-1022.47	2050.66
	45	987.13	397.85	2175.59	-933.82	2084.91
	46	1099.16	444.25	2295.44	-943.24	2119.17
	47	962.68	386.08	2194.26	-1015.47	2153.42
	48	577.69	223.33	1813.73	-1147.78	2187.68
	49	-55.81	-44.01	1131.12	-1405.58	2221.94
	50	-937.82	-415.92	606.06	-1927.79	2256.20
	51	-1792.77	-764.51	685.66	-3001.13	2290.46
6	51	-1792.77	-764.51	685.66	-3001.13	2305.21
	52	-955.91	-423.52	567.96	-1903.27	2305.42
	53AI	-92.00	-59.21	1109.73	-1429.64	2305.63
	53AD	-92.00	-59.21	1109.73	-1429.64	2305.63
	54	523.40	200.52	1801.66	-1168.96	2305.84
	55	890.29	355.67	2188.44	-1035.36	2306.04
	56	1008.67	406.24	2296.99	-1002.83	2306.26
	57	878.53	352.23	2133.60	-1042.74	2306.47
	58	499.89	193.63	1712.50	-1136.65	2306.69
	59	-127.26	-63.54	999.31	-1358.90	2306.91
	60	-1002.93	-437.29	470.15	-1899.73	2307.12
	61	-1846.80	-780.34	692.65	-2971.84	2307.34
7	61	-1846.80	-780.34	692.65	-2971.84	2307.34
	62	-973.30	-426.40	627.55	-1886.53	2277.46
	63AI	-68.01	-47.77	1155.89	-1436.24	2247.58
	63AD	-68.01	-47.77	1155.89	-1436.24	2247.58
	64	588.77	226.28	1814.78	-1164.11	2217.70
	65	997.04	395.76	2174.85	-908.43	2187.83
	66	1156.80	460.65	2253.78	-749.48	2157.95
	67	1068.05	420.96	2063.06	-666.78	2128.08
	68	730.79	276.70	1595.35	-662.14	2098.21
	69	145.02	27.85	891.24	-803.14	2068.34
	70	-689.27	-325.58	510.01	-1373.58	2038.47
	71	-1514.11	-661.91	738.62	-2481.27	2008.60
8	71	-1514.11	-661.91	738.62	-2481.27	2008.60
	72	-1062.54	-474.62	710.36	-1978.50	1807.73
	73AI	-455.31	-216.91	955.88	-1736.08	1606.87
	73AD	-455.31	-216.91	955.88	-1736.08	1606.87
	74	30.15	-10.44	1354.39	-1509.99	1406.01
	75	393.85	144.79	1598.77	-1286.50	1205.15
	76	635.77	248.78	1692.07	-1065.59	1004.29
	77	755.92	301.52	1658.82	-857.66	803.43
	78	754.30	303.01	1476.06	-647.14	602.57
	79	630.91	253.26	1140.73	-434.02	401.71
	80	385.75	152.27	649.75	-218.31	200.85
	81	0.00	0.00	0.00	0.00	0.00

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
1	1	0.	0.	0.	9509.	-8354.	-	-
		2853.			7710.	-6647.	-	-
		-2853.			10951.	-9561.	-	-
	2	0.	2001.	748.	10940.	-6677.	5.5	-
		2853.			9299.	-5173.	4.6	-
		-2853.			11854.	-7319.	5.9	-
	3	0.	3478.	1212.	11746.	-6273.	3.4	-
		2853.			10100.	-4509.	2.9	-
		-2853.			12744.	-7050.	3.7	-
	4	0.	4462.	1420.	12196.	-6079.	2.7	-
		2853.			10549.	-4163.	2.4	-
		-2853.			13261.	-6937.	3.0	-
	5	0.	4958.	1372.	12300.	-6048.	2.5	-
		2853.			10653.	-4077.	2.1	-
		-2853.			13374.	-6936.	2.7	-
	6	0.	4970.	1068.	11989.	-6193.	2.4	-
		2853.			10342.	-4314.	2.1	-
		-2853.			12992.	-7056.	2.6	-
	7	0.	4532.	262.	11228.	-6568.	2.5	-
		2853.			9579.	-4924.	2.1	-
		-2853.			12108.	-7328.	2.7	-
	8	0.	3607.	-619.	9675.	-7264.	2.7	-
		2853.			8072.	-5999.	2.2	9.7
		-2853.			10794.	-7827.	3.0	-
	9	0.	2192.	-1763.	7841.	-8418.	3.6	4.8
		2853.			6192.	-7555.	2.8	4.3
		-2853.			9149.	-8672.	4.2	4.9
	10	0.	403.	-3239.	6008.	-10031.	-	3.1
		2853.			4299.	-9519.	-	2.9
		-2853.			7550.	-9900.	-	3.1
	11	0.	-348.	-4771.	5495.	-12426.	-	2.6
		2853.			3514.	-11274.	-	2.4
		-2853.			7309.	-13221.	-	2.8
2	11	0.	-348.	-4771.	5495.	-12426.	-	2.6
		2853.			3514.	-11274.	-	2.4
		-2853.			7309.	-13221.	-	2.8
	12	0.	819.	-1895.	6660.	-9202.	8.1	4.9
		2853.			5000.	-8558.	6.1	4.5
		-2853.			8128.	-9301.	9.9	4.9
	13	0.	3303.	419.	9886.	-7094.	3.0	-
		2853.			8277.	-5639.	2.5	-
		-2853.			11000.	-7843.	3.3	-
	14	0.	5331.	2117.	12500.	-6138.	2.3	-
		2853.			10848.	-3871.	2.0	-
		-2853.			13405.	-7266.	2.5	-
	15	0.	6576.	2796.	13814.	-5707.	2.1	-
		2853.			12160.	-3075.	1.8	-
		-2853.			15032.	-7052.	2.3	-
	16	0.	7012.	2924.	14253.	-5602.	2.0	-
		2853.			12599.	-2880.	1.8	-
		-2853.			15584.	-6992.	2.2	-

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
	17	0.	6633.	2483.	13815.	-5694.	2.1	-
		2853.			12161.	-3081.	1.8	-
		-2853.			15081.	-6996.	2.3	-
	18	0.	5439.	1032.	12503.	-6098.	2.3	-
		2853.			10849.	-3902.	2.0	-
		-2853.			13487.	-7186.	2.5	-
	19	0.	3391.	-535.	9962.	-7107.	2.9	-
		2853.			8356.	-5702.	2.5	-
		-2853.			11065.	-7815.	3.3	-
	20	0.	707.	-2765.	6727.	-9292.	9.5	3.4
		2853.			5076.	-8641.	7.2	3.1
		-2853.			8178.	-9368.	-	3.4
	21	0.	-740.	-5745.	5517.	-12526.	-	2.2
		2853.			3544.	-11286.	-	2.0
		-2853.			7323.	-13313.	-	2.3
3	21	0.	-740.	-5745.	5517.	-12526.	-	2.2
		2853.			3544.	-11286.	-	2.0
		-2853.			7323.	-13313.	-	2.3
	22	0.	473.	-2834.	6824.	-9396.	-	3.3
		2853.			5178.	-8732.	-	3.1
		-2853.			8235.	-9420.	-	3.3
	23AI	0.	3168.	-448.	6292.	-4951.	2.0	-
		2853.			4475.	-2406.	1.4	5.4
		-2853.			7927.	-6526.	2.5	-
	23AD	0.	3168.	-448.	9865.	-7106.	3.1	-
		2853.			8249.	-5648.	2.6	-
		-2853.			11001.	-7904.	3.5	-
	24	0.	5252.	1025.	12507.	-6146.	2.4	-
		2853.			10849.	-3879.	2.1	-
		-2853.			13432.	-7285.	2.6	-
	25	0.	6512.	2223.	13819.	-5719.	2.1	-
		2853.			12161.	-3090.	1.9	-
		-2853.			15056.	-7064.	2.3	-
	26	0.	6997.	2520.	14257.	-5609.	2.0	-
		2853.			12599.	-2881.	1.8	-
		-2853.			15592.	-7002.	2.2	-
	27	0.	6666.	2274.	13817.	-5699.	2.1	-
		2853.			12161.	-3082.	1.8	-
		-2853.			15091.	-7001.	2.3	-
	28	0.	5522.	1039.	12504.	-6097.	2.3	-
		2853.			10849.	-3903.	2.0	-
		-2853.			13490.	-7187.	2.4	-
	29	0.	3520.	-458.	9961.	-7104.	2.8	-
		2853.			8355.	-5698.	2.4	-
		-2853.			11062.	-7809.	3.1	-
	30	0.	927.	-2674.	6725.	-9279.	7.3	3.5
		2853.			5074.	-8628.	5.5	3.2
		-2853.			8169.	-9351.	8.8	3.5
	31	0.	-456.	-5598.	5514.	-12518.	-	2.2
		1712.			4345.	-11862.	-	2.1
		-1712.			6619.	-13007.	-	2.3

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
4	31	0.	-458.	-5599.	5514.	-12518.	-	2.2
		1712.			4345.	-11862.	-	2.1
		-1712.			6619.	-13007.	-	2.3
	32	0.	787.	-2714.	6819.	-9370.	8.7	3.5
		1712.			5855.	-9066.	7.4	3.3
		-1712.			7712.	-9451.	9.8	3.5
	33AI	0.	3406.	-409.	6293.	-4951.	1.8	-
		1712.			5218.	-3561.	1.5	8.7
		-1712.			7297.	-5950.	2.1	-
	33AD	0.	3406.	-409.	9860.	-7093.	2.9	-
		1712.			8914.	-6292.	2.6	-
		-1712.			10632.	-7644.	3.1	-
	34	0.	5434.	1013.	12499.	-6134.	2.3	-
		1712.			11530.	-4840.	2.1	-
		-1712.			13220.	-6889.	2.4	-
	35	0.	6599.	2147.	13811.	-5699.	2.1	-
		1712.			12842.	-4205.	1.9	-
		-1712.			14656.	-6637.	2.2	-
	36	0.	6982.	2368.	14248.	-5590.	2.0	-
		1712.			13280.	-4036.	1.9	-
		-1712.			15093.	-6572.	2.2	-
	37	0.	6607.	1621.	13809.	-5678.	2.1	-
		1712.			12841.	-4204.	1.9	-
		-1712.			14653.	-6583.	2.2	-
	38	0.	5415.	686.	12495.	-6090.	2.3	-
		1712.			11528.	-4846.	2.1	-
		-1712.			13279.	-6817.	2.5	-
	39	0.	3367.	-901.	9955.	-7090.	3.0	7.9
		1712.			9016.	-6335.	2.7	7.0
		-1712.			10694.	-7612.	3.2	8.5
	40	0.	665.	-3191.	6721.	-9250.	-	2.9
		1712.			5752.	-8989.	8 6	2.8
		-1712.			7625.	-9365.	-	2.9
	41	0.	-729.	-6109.	5510.	-12495.	-	2.0
		1712.			4344.	-11831.	-	1.9
		-1712.			6612.	-12996.	-	2.1
5	41	0.	-747.	-6127.	5510.	-12495.	-	2.0
		1712.			4344.	-11831.	-	1.9
		-1712.			6612.	-12996.	-	2.1
	42	0.	828.	-2675.	6773.	-9377.	8.2	3.5
		1712.			5810.	-9085.	7.0	3.4
		-1712.			7664.	-9436.	9.3	3.5
	43AI	0.	3864.	-49.	10076.	-7098.	2.6	-
		1712.			9147.	-6424.	2.4	-
		-1712.			10776.	-7563.	2.8	-
	43AD	0.	3864.	-49.	9794.	-5824.	2.5	-
		1712.			8830.	-4834.	2.3	-
		-1712.			10675.	-6593.	2.8	-
	44	0.	6244.	1622.	12439.	-4494.	2.0	-
		1712.			11446.	-3082.	1.8	-
		-1712.			13325.	-5650.	2.1	-

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
	45	0.	7634.	2970.	13756.	-3934.	1.8	-
		1712.			12763.	-2298.	1.7	-
		-1712.			14642.	-5317.	1.9	-
	46	0.	8089.	3231.	14194.	-3794.	1.8	-
		1712.			13202.	-2095.	1.6	-
		-1712.			15081.	-5229.	1.9	-
	47	0.	7683.	2869.	13755.	-3925.	1.8	-
		1712.			12763.	-2294.	1.7	-
		-1712.			14641.	-5278.	1.9	-
	48	0.	6329.	1449.	12437.	-4494.	2.0	-
		1712.			11445.	-3105.	1.8	-
		-1712.			13322.	-5610.	2.1	-
	49	0.	3991.	-258.	9891.	-5861.	2.5	-
		1712.			8928.	-4883.	2.2	-
		-1712.			10746.	-6588.	2.7	-
	50	0.	909.	-2892.	6634.	-8383.	7.3	2.9
		1712.			5640.	-7828.	6.2	2.7
		-1712.			7561.	-8660.	8.3	3.0
	51	0.	-746.	-6276.	5435.	-11156.	-	1.8
		1712.			4251.	-10374.	-	1.7
		-1712.			6559.	-11791.	-	1.9
6	51	0.	-733.	-6263.	5435.	-11156.	-	1.8
		1712.			4251.	-10374.	-	1.7
		-1712.			6559.	-11791.	-	1.9
	52	0.	858.	-2849.	6723.	-8479.	7.8	3.0
		1712.			5740.	-7898.	6.7	2.8
		-1712.			7638.	-8744.	8.9	3.1
	53AI	0.	3974.	-296.	10037.	-5901.	2.5	-
		1712.			9083.	-4968.	2.3	-
		-1712.			10853.	-6583.	2.7	-
	53AD	0.	3974.	-296.	9793.	-5825.	2.5	-
		1712.			8829.	-4835.	2.2	-
		-1712.			10674.	-6596.	2.7	-
	54	0.	6325.	1408.	12439.	-4495.	2.0	-
		1712.			11446.	-3081.	1.8	-
		-1712.			13325.	-5653.	2.1	-
	55	0.	7688.	2853.	13756.	-3935.	1.8	-
		1712.			12763.	-2298.	1.7	-
		-1712.			14642.	-5321.	1.9	-
	56	0.	8105.	3155.	14194.	-3795.	1.8	-
		1712.			13202.	-2095.	1.6	-
		-1712.			15081.	-5232.	1.9	-
	57	0.	7584.	2819.	13755.	-3926.	1.8	-
		1712.			12763.	-2294.	1.7	-
		-1712.			14641.	-5281.	1.9	-
	58	0.	6146.	1411.	12437.	-4494.	2.0	-
		1712.			11445.	-3105.	1.9	-
		-1712.			13322.	-5612.	2.2	-
	59	0.	3741.	-257.	9890.	-5861.	2.6	-
		1712.			8927.	-4883.	2.4	-
		-1712.			10746.	-6589.	2.9	-

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
	60	0.	621.	-2934.	6634.	-8384.	-	2.9
		1712.			5640.	-7829.	9.1	2.7
		-1712.			7561.	-8661.	-	3.0
	61	0.	-825.	-6322.	5435.	-11156.	-	1.8
		571.			5046.	-10930.	-	1.7
		-571.			5816.	-11379.	-	1.8
7	61	0.	-825.	-6322.	5435.	-11156.	-	1.8
		571.			5046.	-10930.	-	1.7
		-571.			5816.	-11379.	-	1.8
	62	0.	891.	-2880.	6723.	-8479.	7.5	2.9
		571.			6402.	-8310.	7.2	2.9
		-571.			7036.	-8582.	7.9	3.0
	63AI	0.	4033.	-305.	10038.	-5901.	2.5	-
		571.			9729.	-5617.	2.4	-
		-571.			10336.	-6150.	2.6	-
	63AD	0.	4033.	-305.	9806.	-5830.	2.4	-
		571.			9491.	-5509.	2.4	-
		-571.			10110.	-6109.	2.5	-
	64	0.	6384.	1472.	12438.	-4495.	1.9	-
		571.			12118.	-4044.	1.9	-
		-571.			12750.	-4926.	2.0	-
	65	0.	7758.	3133.	13756.	-3931.	1.8	-
		571.			13435.	-3410.	1.7	-
		-571.			14067.	-4428.	1.8	-
	66	0.	8181.	3676.	14194.	-3790.	1.7	-
		571.			13874.	-3245.	1.7	-
		-571.			14505.	-4303.	1.8	-
	67	0.	7669.	3574.	13755.	-3922.	1.8	-
		571.			13435.	-3405.	1.8	-
		-571.			14066.	-4414.	1.8	-
	68	0.	6212.	2826.	12437.	-4494.	2.0	-
		571.			12117.	-4050.	2.0	-
		-571.			12748.	-4916.	2.1	-
	69	0.	3871.	916.	9905.	-5865.	2.6	-
		571.			9593.	-5550.	2.5	-
		-571.			10207.	-6123.	2.6	-
	70	0.	1077.	-1748.	6645.	-8391.	6.2	4.8
		571.			6322.	-8255.	5.9	4.7
		-571.			6961.	-8492.	6.5	4.9
	71	0.	-348.	-5178.	5438.	-11167.	-	2.2
		571.			5049.	-10941.	-	2.1
		-571.			5819.	-11390.	-	2.2
8	71	0.	-348.	-5178.	5438.	-11167.	-	2.2
		571.			5049.	-10941.	-	2.1
		-571.			5819.	-11390.	-	2.2
	72	0.	387.	-3647.	5991.	-9222.	-	2.5
		571.			5658.	-9082.	-	2.5
		-571.			6317.	-9343.	-	2.6
	73AI	0.	2193.	-2166.	7846.	-7455.	3.6	3.4
		571.			7524.	-7291.	3.4	3.4
		-571.			8158.	-7608.	3.7	3.5

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
	73AD	0.	2193.	-2166.	5924.	-7791.	2.7	3.6
		571.			5585.	-7593.	2.5	3.5
		-571.			6256.	-7951.	2.9	3.7
	74	0.	3608.	-970.	7785.	-6376.	2.2	6.6
		571.			7454.	-6075.	2.1	6.3
		-571.			8107.	-6646.	2.2	6.9
	75	0.	4532.	-37.	9319.	-5461.	2.1	-
		571.			8980.	-5086.	2.0	-
		-571.			9651.	-5823.	2.1	-
	76	0.	4970.	632.	10081.	-4950.	2.0	-
		571.			9741.	-4529.	2.0	-
		-571.			10413.	-5354.	2.1	-
	77	0.	4958.	1183.	10391.	-4756.	2.1	-
		571.			10052.	-4318.	2.0	-
		-571.			10723.	-5177.	2.2	-
	78	0.	4463.	1278.	10287.	-4821.	2.3	-
		571.			9948.	-4391.	2.2	-
		-571.			10619.	-5234.	2.4	-
	79	0.	3479.	1117.	9838.	-5114.	2.8	-
		571.			9498.	-4711.	2.7	-
		-571.			10170.	-5500.	2.9	-
	80	0.	2003.	700.	9045.	-5678.	4.5	-
		571.			8704.	-5324.	4.3	-
		-571.			9376.	-6011.	4.7	-
	81	0.	0.	0.	7632.	-7033.	-	-
		571.			7262.	-6674.	-	-
		-571.			7993.	-7382.	-	-

COMPROBACION A CORTANTE

Calculo de Comprobacion a Cortante

Datos generales

Limite elastico del acero pasivo	=	5100.00	kg/cm2
Coeficiente del acero pasivo	=	1.15	
Limite elastico de acero activo	=	19000.00	kg/cm2
Coeficiente del acero activo	=	1.10	
Resistencia caracteristica del hormigon	=	400.00	kg/cm2
Coeficiente del hormigon	=	1.50	
Coef. mayoracion Cargas muertas y Peso propio	=	1.50	
Coef. mayoracion Sobrecargas	=	1.50	

Calculo de Comprobacion a Cortante

Datos secciones/anchos-recubrimientos

V.	Sec	Ancho Seccion m	Ancho Eficaz m	Recubrimiento m
1	1	6.930	6.490	0.025
	2	2.650	2.210	0.025
	3	2.650	2.210	0.025
	4	2.650	2.210	0.025
	5	2.650	2.210	0.025
	6	2.650	2.210	0.025
	7	2.650	2.210	0.025
	8	2.650	2.210	0.025
	9	2.650	2.210	0.025
	10	2.650	2.210	0.025
	11	6.930	6.490	0.025
2	11	6.930	6.490	0.025
	12	2.650	2.210	0.025
	13	2.650	2.210	0.025
	14	2.650	2.210	0.025
	15	2.650	2.210	0.025
	16	2.650	2.210	0.025
	17	2.650	2.210	0.025
	18	2.650	2.210	0.025
	19	2.650	2.210	0.025
	20	2.650	2.210	0.025
	21	6.930	6.490	0.025
3	21	6.930	6.490	0.025
	22	2.650	2.210	0.025
	23AI	2.650	2.210	0.025
	23AD	2.650	2.210	0.025
	24	2.650	2.210	0.025
	25	2.650	2.210	0.025
	26	2.650	2.210	0.025
	27	2.650	2.210	0.025
	28	2.650	2.210	0.025
	29	2.650	2.210	0.025
	30	2.650	2.210	0.025
	31	6.930	6.490	0.025
4	31	6.930	6.490	0.025
	32	2.650	2.210	0.025
	33AI	2.650	2.210	0.025
	33AD	2.650	2.210	0.025
	34	2.650	2.210	0.025
	35	2.650	2.210	0.025
	36	2.650	2.210	0.025
	37	2.650	2.210	0.025
	38	2.650	2.210	0.025
	39	2.650	2.210	0.025
	40	2.650	2.210	0.025
	41	6.930	6.490	0.025
5	41	6.930	6.490	0.025
	42	2.650	2.210	0.025

Calculo de Comprobacion a Cortante

Datos secciones/anchos-recubrimientos

V.	Sec	Ancho Seccion m	Ancho Eficaz m	Recubrimiento m
	43AI	2.650	2.210	0.025
	43AD	2.650	2.210	0.025
	44	2.650	2.210	0.025
	45	2.650	2.210	0.025
	46	2.650	2.210	0.025
	47	2.650	2.210	0.025
	48	2.650	2.210	0.025
	49	2.650	2.210	0.025
	50	2.650	2.210	0.025
	51	6.930	6.490	0.025
6	51	6.930	6.490	0.025
	52	2.650	2.210	0.025
	53AI	2.650	2.210	0.025
	53AD	2.650	2.210	0.025
	54	2.650	2.210	0.025
	55	2.650	2.210	0.025
	56	2.650	2.210	0.025
	57	2.650	2.210	0.025
	58	2.650	2.210	0.025
	59	2.650	2.210	0.025
	60	2.650	2.210	0.025
	61	6.930	6.490	0.025
7	61	6.930	6.490	0.025
	62	2.650	2.210	0.025
	63AI	2.650	2.210	0.025
	63AD	2.650	2.210	0.025
	64	2.650	2.210	0.025
	65	2.650	2.210	0.025
	66	2.650	2.210	0.025
	67	2.650	2.210	0.025
	68	2.650	2.210	0.025
	69	2.650	2.210	0.025
	70	2.650	2.210	0.025
	71	6.930	6.490	0.025
8	71	6.930	6.490	0.025
	72	2.650	2.210	0.025
	73AI	2.650	2.210	0.025
	73AD	2.650	2.210	0.025
	74	2.650	2.210	0.025
	75	2.650	2.210	0.025
	76	2.650	2.210	0.025
	77	2.650	2.210	0.025
	78	2.650	2.210	0.025
	79	2.650	2.210	0.025
	80	2.650	2.210	0.025
	81	6.930	6.490	0.025

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-933.87	175.1	-6016.3	2794.37	-21.	-51.	AB AB	88.0
	2	-1259.87	85.8	-5990.6	-1577.46	-34.	-84.	AB AB	33.7
	3	-1245.27	17.1	-5962.2	-1323.01	-34.	-84.	AB AB	33.7
	4	-1297.58	52.2	-5931.6	-1253.10	-33.	-85.	AB AB	33.7
	5	-1418.76	83.6	-5897.6	-1368.59	-31.	-87.	AB AB	33.7
	6	237.03	143.0	-5855.6	-1701.48	-57.	-47.	AB AB	33.7
	7	317.80	263.1	-5809.9	-2261.19	-58.	-45.	AB AB	33.7
	8	-346.87	390.2	-5760.7	2403.99	-47.	-60.	AB AB	33.7
	9	-1299.48	522.4	-5708.3	1373.96	-31.	-83.	AB AB	33.7
	10	-2643.20	758.1	-5667.2	235.57	-9.	-114.	AB AB	33.7
	11	-878.96	800.2	-5637.6	-1091.44	-19.	-48.	AB AB	88.0
2	11	-876.73	-143.8	-5610.5	-1093.01	-19.	-47.	AB AB	88.0
	12	1790.43	83.3	-5416.5	-4664.67	-78.	-6.	AB AB	33.7
	13	1599.88	81.0	-5380.0	-3288.15	-74.	-11.	AB AB	33.7
	14	1347.85	105.9	-5357.4	-2310.15	-70.	-16.	AB AB	33.7
	15	971.15	135.2	-5396.5	-1699.65	-64.	-26.	AB AB	33.7
	16	521.85	158.6	-5428.9	-1470.13	-58.	-37.	AB AB	33.7
	17	2716.07	329.1	-5453.9	-1644.53	-93.	15.	AB AB	33.7
	18	1682.02	458.2	-5471.0	-2237.01	-77.	-9.	AB AB	33.7
	19	166.56	619.7	-5480.1	-3253.48	-52.	-46.	AB AB	33.7
	20	-1806.27	756.1	-5505.7	492.70	-21.	-93.	AB AB	33.7
	21	-1586.35	1060.8	-5689.7	-1102.43	-10.	-61.	AB AB	88.0
3	21	-1585.35	-119.1	-5685.4	-1098.52	-10.	-61.	AB AB	88.0
	22	504.20	142.8	-5734.0	529.72	-60.	-40.	AB AB	33.7
	23AI	139.85	136.8	-5792.6	-3300.82	-55.	-49.	AB AB	33.7
	23AD	333.34	38.6	-5211.6	-3166.32	-53.	-39.	AB AB	33.7
	24	142.83	74.9	-5270.0	-2215.47	-50.	-44.	AB AB	33.7
	25	-151.16	104.3	-5328.4	-1618.57	-46.	-52.	AB AB	33.7
	26	1902.02	128.4	-5380.2	-1402.63	-79.	-3.	AB AB	33.7
	27	1787.20	304.1	-5424.5	-1590.62	-78.	-7.	AB AB	33.7
	28	827.43	433.3	-5461.0	-2196.70	-63.	-30.	AB AB	33.7
	29	-622.38	594.8	-5489.3	1958.23	-40.	-65.	AB AB	33.7
	30	-2529.69	730.6	-5534.0	532.94	-10.	-110.	AB AB	33.7
	31	-1353.14	1035.0	-5737.0	-1064.27	-13.	-57.	AB AB	88.0
4	31	-1353.75	-83.8	-5732.5	-1058.69	-13.	-57.	AB AB	88.0
	32	1572.27	177.4	-5801.0	569.00	-78.	-15.	AB AB	33.7
	33AI	1109.38	170.4	-5879.1	-3350.66	-71.	-27.	AB AB	33.7
	33AD	1300.42	73.5	-5305.5	-3217.87	-69.	-17.	AB AB	33.7
	34	1011.70	109.3	-5370.2	-2284.96	-65.	-25.	AB AB	33.7
	35	622.45	138.1	-5429.2	-1705.01	-59.	-34.	AB AB	33.7
	36	2663.41	167.2	-5481.4	-1507.21	-92.	14.	AB AB	33.7
	37	2468.23	328.9	-5526.2	-1714.58	-90.	9.	AB AB	33.7
	38	1402.00	460.4	-5563.0	-2341.32	-73.	-17.	AB AB	33.7
	39	-124.55	621.6	-5591.8	1888.39	-49.	-54.	AB AB	33.7
	40	-2107.72	755.8	-5637.0	440.16	-17.	-101.	AB AB	33.7
	41	-1736.07	1059.6	-5841.4	-1192.77	-8.	-64.	AB AB	88.0
5	41	-1753.85	-232.7	-5837.3	-1169.87	-8.	-64.	AB AB	88.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
	42	726.10	46.2	-5907.5	440.48	-65.	-36.	AB AB	33.7
	43AI	543.09	77.1	-5981.0	-3576.85	-63.	-41.	AB AB	33.7
	43AD	337.62	-12.1	-4583.8	-2582.59	-47.	-33.	AB AB	33.7
	44	260.79	41.2	-4644.8	-1647.86	-46.	-36.	AB AB	33.7
	45	22.67	89.0	-4700.4	-1074.00	-43.	-42.	AB AB	33.7
	46	2427.35	141.3	-4749.8	-886.81	-82.	15.	AB AB	33.7
	47	2163.42	327.5	-4792.8	-1106.87	-78.	8.	AB AB	33.7
	48	1101.30	493.7	-4828.9	-1749.83	-61.	-17.	AB AB	33.7
	49	-677.93	684.1	-4857.8	1763.50	-33.	-60.	AB AB	33.7
	50	-3036.70	875.1	-4908.1	287.43	4.	-117.	AB AB	36.0
	51	-2292.21	1218.2	-5094.7	-1233.55	3.	-70.	AB AB	88.0
6	51	-2278.09	-249.2	-5088.8	-1243.41	3.	-70.	AB AB	88.0
	52	1162.73	38.7	-5156.9	292.16	-65.	-19.	AB AB	33.7
	53AI	973.35	78.7	-5228.5	-2982.65	-63.	-24.	AB AB	33.7
	53AD	1197.55	-10.5	-4583.8	-2842.87	-61.	-13.	AB AB	33.7
	54	1115.98	42.8	-4644.8	-1877.51	-60.	-15.	AB AB	33.7
	55	872.91	90.6	-4700.4	-1273.01	-57.	-22.	AB AB	33.7
	56	3274.46	146.8	-4749.8	-1055.19	-96.	35.	AB C	33.7
	57	2988.43	335.0	-4792.8	-1244.61	-91.	28.	AB C	33.7
	58	1928.52	500.0	-4828.9	-1856.93	-75.	2.	AB AB	33.7
	59	130.68	690.4	-4857.8	1687.04	-46.	-41.	AB AB	33.7
	60	-2246.69	881.4	-4908.1	241.65	-8.	-98.	AB AB	36.5
	61	-2528.93	1224.5	-5094.9	-1248.66	7.	-74.	AB AB	88.0
7	61	-2528.09	-318.7	-5090.3	-1245.38	7.	-74.	AB AB	88.0
	62	53.93	-30.7	-5157.2	317.29	-48.	-45.	AB AB	33.7
	63AI	72.94	9.6	-5228.5	-2930.40	-49.	-46.	AB AB	33.7
	63AD	285.30	-75.0	-4617.6	-2797.88	-46.	-35.	AB AB	33.7
	64	398.22	-22.8	-4679.3	-1793.86	-49.	-33.	AB AB	33.7
	65	352.05	23.8	-4735.4	-1155.02	-49.	-34.	AB AB	33.7
	66	2912.30	91.1	-4785.4	-907.50	-90.	26.	AB C	33.7
	67	2585.30	290.6	-4828.8	-1072.10	-85.	18.	AB AB	33.7
	68	1780.21	445.7	-4865.2	-1664.68	-73.	-2.	AB AB	33.7
	69	151.10	634.2	-4894.4	-2694.60	-47.	-41.	AB AB	33.7
	70	-2051.13	823.6	-4944.9	492.79	-12.	-94.	AB AB	33.7
	71	-1432.20	1168.9	-5132.6	-985.26	-9.	-55.	AB AB	88.0
8	71	-1431.23	-51.4	-5129.5	-983.35	-9.	-55.	AB AB	88.0
	72	1372.85	-20.0	-5182.6	314.71	-69.	-14.	AB AB	33.7
	73AI	1233.71	120.3	-5226.8	-3394.10	-67.	-18.	AB AB	33.7
	73AD	1983.56	83.8	-4218.4	-3574.66	-70.	9.	AB AB	33.7
	74	1772.96	105.8	-4266.9	-2582.10	-67.	4.	AB AB	33.7
	75	1510.14	124.3	-4312.2	-1793.98	-63.	-3.	AB AB	33.7
	76	1207.23	139.5	-4354.0	-1222.24	-59.	-11.	AB AB	33.7
	77	2900.06	181.2	-4392.0	-877.32	-86.	29.	AB C	33.7
	78	2024.79	324.4	-4422.1	-749.80	-73.	8.	AB AB	33.7
	79	1547.44	464.8	-4448.7	-807.66	-65.	-3.	AB AB	33.7
	80	416.94	532.9	-4476.6	-1051.22	-47.	-31.	AB AB	33.7
	81	-723.95	495.0	-4511.9	-1075.54	-15.	-38.	AB AB	88.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec.. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-933.87	-444.4	-6035.6	2794.37	-21.	-51.	AB AB	88.0
	2	101.42	-508.3	-5992.2	-1577.46	-56.	-52.	AB AB	33.7
	3	1236.01	-466.3	-5962.2	-1323.01	-74.	-25.	AB AB	33.7
	4	1734.77	-328.6	-5931.6	-1253.10	-82.	-12.	AB AB	33.7
	5	2597.23	-182.8	-5897.6	-1368.59	-95.	8.	AB AB	33.7
	6	906.79	-140.9	-5855.6	-1701.48	-68.	-31.	AB AB	33.7
	7	1213.07	-125.6	-5809.9	-2261.19	-72.	-24.	AB AB	33.7
	8	1479.11	-107.2	-5760.7	-3037.29	-76.	-17.	AB AB	33.7
	9	1692.78	-85.1	-5708.3	-4017.83	-79.	-11.	AB AB	33.7
	10	1755.51	39.0	-5665.6	235.57	-79.	-9.	AB AB	33.7
	11	-860.74	55.6	-5614.7	-1091.44	-19.	-47.	AB AB	88.0
2	11	-858.51	-1020.6	-5630.1	-1093.01	-20.	-47.	AB AB	88.0
	12	-1803.49	-730.6	-5417.4	442.91	-20.	-92.	AB AB	33.7
	13	82.93	-584.7	-5380.0	1793.59	-50.	-47.	AB AB	33.7
	14	1484.46	-413.6	-5357.4	-2310.15	-72.	-13.	AB AB	33.7
	15	2176.62	-283.1	-5396.5	-1699.65	-84.	3.	AB AB	33.7
	16	2330.06	-99.3	-5428.9	-1470.13	-87.	6.	AB AB	33.7
	17	67.60	-58.3	-5453.9	-1644.53	-50.	-48.	AB AB	33.7
	18	184.17	-41.7	-5471.0	-2237.01	-52.	-45.	AB AB	33.7
	19	270.26	-26.3	-5480.1	-3253.48	-54.	-43.	AB AB	33.7
	20	321.76	-37.9	-5504.8	492.70	-55.	-42.	AB AB	33.7
	21	-1647.49	204.0	-5670.6	-1102.43	-9.	-62.	AB AB	88.0
3	21	-1646.49	-1012.8	-5705.3	-1098.52	-9.	-62.	AB AB	88.0
	22	-1672.39	-687.9	-5734.8	529.72	-25.	-92.	AB AB	33.7
	23AI	89.75	-545.6	-5792.6	-3300.82	-54.	-50.	AB AB	33.7
	23AD	283.24	-643.8	-5211.6	-3166.32	-52.	-40.	AB AB	33.7
	24	1794.96	-461.1	-5270.0	-2215.47	-76.	-5.	AB AB	33.7
	25	2685.06	-324.1	-5328.4	-1618.57	-91.	16.	AB AB	33.7
	26	2879.87	-156.6	-5380.2	-1402.63	-95.	20.	AB AB	33.7
	27	702.07	-117.1	-5424.5	-1590.62	-60.	-32.	AB AB	33.7
	28	978.71	-100.7	-5461.0	-2196.70	-65.	-26.	AB AB	33.7
	29	1226.19	-85.6	-5489.3	-3226.75	-69.	-20.	AB AB	33.7
	30	1440.37	-98.0	-5533.1	532.94	-73.	-16.	AB AB	33.7
	31	-1388.57	143.3	-5717.2	-1064.27	-13.	-57.	AB AB	88.0
4	31	-1389.19	-996.6	-5752.8	-1058.69	-13.	-57.	AB AB	88.0
	32	-2426.47	-672.3	-5801.8	569.00	-14.	-110.	AB AB	33.7
	33AI	-709.38	-530.8	-5879.1	2202.52	-42.	-70.	AB AB	33.7
	33AD	-518.34	-627.7	-5305.5	1793.50	-40.	-60.	AB AB	33.7
	34	947.81	-445.4	-5370.2	-2284.96	-64.	-26.	AB AB	33.7
	35	1814.02	-306.5	-5429.2	-1705.01	-78.	-6.	AB AB	33.7
	36	1934.49	-137.3	-5481.4	-1507.21	-81.	-4.	AB AB	33.7
	37	-310.69	-100.2	-5526.2	-1714.58	-45.	-57.	AB AB	33.7
	38	-81.08	-84.3	-5563.0	-2341.32	-49.	-52.	AB AB	33.7
	39	120.80	-69.6	-5591.8	1888.39	-53.	-48.	AB AB	33.7
	40	290.78	-83.7	-5636.2	440.16	-56.	-44.	AB AB	33.7
	41	-1820.34	157.0	-5821.3	-1192.77	-7.	-66.	AB AB	88.0
5	41	-1838.12	-1170.9	-5856.7	-1169.87	-7.	-66.	AB AB	88.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
	42	-1591.34	-818.2	-5908.2	440.48	-28.	-91.	AB AB	33.7
	43AI	589.41	-628.5	-5981.0	-3576.85	-64.	-40.	AB AB	33.7
	43AD	383.93	-717.7	-4583.8	-2582.59	-48.	-32.	AB AB	33.7
	44	2184.24	-507.7	-4644.8	-1647.86	-77.	10.	AB AB	33.7
	45	3186.74	-329.7	-4700.4	-1074.00	-94.	33.	AB C	33.7
	46	3420.04	-134.5	-4749.8	-886.81	-98.	38.	AB C	33.7
	47	872.74	-81.1	-4792.8	-1106.87	-57.	-23.	AB AB	33.7
	48	1031.27	-45.3	-4828.9	-1749.83	-60.	-19.	AB AB	33.7
	49	1100.11	-11.5	-4857.8	-2824.95	-62.	-18.	AB AB	33.7
	50	1075.61	20.8	-4907.4	287.43	-62.	-19.	AB AB	33.7
	51	-2353.36	290.2	-5075.6	-1233.55	4.	-71.	AB AB	88.0
6	51	-2339.25	-1191.9	-5108.2	-1243.41	4.	-71.	AB AB	88.0
	52	-3039.21	-830.2	-5157.6	292.16	2.	-119.	AB AB	33.7
	53AI	-850.10	-631.4	-5228.5	1955.96	-34.	-68.	AB AB	33.7
	53AD	-625.91	-720.6	-4583.8	1486.77	-31.	-56.	AB AB	33.7
	54	1184.21	-510.5	-4644.8	-1877.51	-61.	-14.	AB AB	33.7
	55	2230.60	-329.6	-4700.4	-1273.01	-78.	11.	AB AB	33.7
	56	2330.53	-129.8	-4749.8	-1055.19	-80.	13.	AB AB	33.7
	57	-124.46	-90.6	-4792.8	-1244.61	-41.	-46.	AB AB	33.7
	58	62.10	-54.8	-4828.9	-1856.93	-45.	-42.	AB AB	33.7
	59	159.64	-21.2	-4857.8	-2901.41	-47.	-40.	AB AB	33.7
	60	164.51	11.0	-4907.5	241.65	-47.	-41.	AB AB	33.7
	61	-2407.95	280.4	-5075.4	-1248.66	5.	-72.	AB AB	88.0
7	61	-2407.11	-1211.6	-5108.7	-1245.38	5.	-72.	AB AB	88.0
	62	-2228.52	-850.0	-5157.9	317.29	-11.	-100.	AB AB	33.7
	63AI	19.80	-651.2	-5228.5	-2930.40	-48.	-47.	AB AB	33.7
	63AD	232.15	-735.8	-4617.6	-2797.88	-46.	-36.	AB AB	33.7
	64	2089.83	-527.2	-4679.3	-1793.86	-76.	7.	AB AB	33.7
	65	3194.07	-349.1	-4735.4	-1155.02	-94.	33.	AB C	33.7
	66	688.96	-160.1	-4785.4	-907.50	-54.	-27.	AB AB	33.7
	67	1067.67	-122.8	-4828.8	-1072.10	-61.	-18.	AB AB	33.7
	68	1353.23	-88.7	-4865.2	-1664.68	-66.	-12.	AB AB	33.7
	69	1555.16	-56.8	-4894.4	-2694.60	-69.	-7.	AB AB	33.7
	70	1669.74	-26.0	-4944.2	-4168.72	-72.	-5.	AB AB	33.7
	71	-1427.18	245.6	-5113.6	-985.26	-9.	-55.	AB AB	88.0
8	71	-1426.20	-813.3	-5152.8	-983.35	-9.	-55.	AB AB	88.0
	72	-3352.09	-756.4	-5184.2	314.71	7.	-127.	AB AB	33.7
	73AI	-2046.20	-504.3	-5226.8	1542.89	-15.	-96.	AB AB	33.7
	73AD	-1296.35	-540.8	-4218.4	409.85	-17.	-69.	AB AB	33.7
	74	-302.67	-408.5	-4266.9	1448.22	-34.	-46.	AB AB	33.7
	75	402.63	-281.3	-4312.2	-1793.98	-45.	-29.	AB AB	33.7
	76	330.65	-164.2	-4354.0	-1222.24	-45.	-32.	AB AB	33.7
	77	-1302.57	-107.4	-4392.0	-877.32	-19.	-71.	AB AB	33.7
	78	-1131.46	-76.1	-4422.1	-749.80	-22.	-67.	AB AB	33.7
	79	-1028.63	-41.2	-4448.7	-807.66	-24.	-65.	AB AB	33.7
	80	-992.13	-84.0	-4475.1	-1051.22	-25.	-64.	AB AB	33.7
	81	-723.96	-147.3	-4492.0	2112.61	-15.	-38.	AB AB	88.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-1141.40	403.1	-7345.8	3415.34	-25.	-62.	AB AB	88.0
	2	-1990.99	272.8	-7317.8	-1928.00	-34.	-114.	AB AB	33.7
	3	-2245.97	112.2	-7287.1	-1617.01	-30.	-119.	AB AB	33.7
	4	-2421.96	78.4	-7249.8	-1531.57	-27.	-123.	AB AB	33.7
	5	-2521.39	40.0	-7208.2	-1672.73	-25.	-125.	AB AB	33.7
	6	-690.74	25.4	-7156.9	-2079.59	-54.	-81.	AB AB	33.7
	7	-280.41	71.9	-7101.0	-2763.68	-60.	-71.	AB AB	33.7
	8	-463.18	126.3	-7040.8	2938.22	-56.	-75.	AB AB	33.7
	9	-784.26	186.5	-6976.8	1679.28	-51.	-82.	AB AB	33.7
	10	-1368.72	373.1	-6918.6	287.92	-41.	-95.	AB AB	33.7
	11	981.31	397.8	-6870.2	-1333.98	-52.	-21.	AB AB	88.0
2	11	984.03	247.0	-6846.1	-1335.91	-52.	-21.	AB AB	88.0
	12	2785.60	472.3	-6614.3	-5701.27	-105.	6.	AB AB	33.7
	13	1658.79	367.2	-6575.6	-4018.85	-86.	-20.	AB AB	33.7
	14	743.04	295.2	-6547.9	-2823.51	-71.	-42.	AB AB	33.7
	15	-38.93	228.8	-6595.7	-2077.35	-59.	-61.	AB AB	33.7
	16	-623.45	154.9	-6635.3	-1796.82	-50.	-75.	AB AB	33.7
	17	1710.80	327.3	-6665.9	-2009.98	-88.	-20.	AB AB	33.7
	18	1095.23	257.7	-6686.8	-2734.13	-78.	-34.	AB AB	33.7
	19	277.96	320.1	-6697.8	-3976.48	-65.	-54.	AB AB	33.7
	20	-717.67	351.6	-6723.0	602.19	-49.	-78.	AB AB	33.7
	21	394.83	657.8	-6938.0	-1347.42	-44.	-32.	AB AB	88.0
3	21	396.05	290.8	-6937.3	-1342.64	-44.	-32.	AB AB	88.0
	22	1607.79	558.6	-7002.1	647.43	-89.	-25.	AB AB	33.7
	23AI	230.36	449.0	-7079.8	-4034.33	-68.	-59.	AB AB	33.7
	23AD	466.86	329.0	-6369.7	-3869.94	-65.	-47.	AB AB	33.7
	24	-411.91	271.0	-6441.1	-2707.80	-52.	-68.	AB AB	33.7
	25	-1130.98	204.6	-6512.5	-1978.25	-41.	-86.	AB AB	33.7
	26	767.18	131.5	-6575.8	-1714.32	-72.	-41.	AB AB	33.7
	27	772.59	209.0	-6630.0	-1944.10	-72.	-42.	AB AB	33.7
	28	211.49	239.5	-6674.5	-2684.85	-64.	-55.	AB AB	33.7
	29	-559.87	302.0	-6709.2	2393.39	-52.	-74.	AB AB	33.7
	30	-1509.87	332.7	-6757.7	651.37	-37.	-97.	AB AB	33.7
	31	546.93	638.4	-6996.2	-1300.77	-47.	-29.	AB AB	88.0
4	31	546.18	315.7	-6995.3	-1293.95	-47.	-29.	AB AB	88.0
	32	2616.11	582.7	-7084.2	695.45	-106.	-2.	AB AB	33.7
	33AI	1169.35	471.9	-7185.6	-4095.26	-84.	-37.	AB AB	33.7
	33AD	1402.85	353.4	-6484.5	-3932.95	-81.	-25.	AB AB	33.7
	34	454.99	294.9	-6563.6	-2792.73	-67.	-49.	AB AB	33.7
	35	-329.67	227.7	-6635.6	-2083.90	-55.	-68.	AB AB	33.7
	36	1586.18	159.6	-6699.5	-1842.14	-86.	-23.	AB AB	33.7
	37	1541.42	222.9	-6754.2	-2095.60	-86.	-24.	AB AB	33.7
	38	904.35	255.7	-6799.3	-2861.62	-76.	-40.	AB AB	33.7
	39	87.03	317.7	-6834.4	2308.04	-63.	-60.	AB AB	33.7
	40	-907.76	346.5	-6883.4	537.97	-48.	-84.	AB AB	33.7
	41	362.81	651.5	-7123.3	-1457.83	-45.	-33.	AB AB	88.0
5	41	341.08	180.2	-7123.1	-1429.84	-45.	-34.	AB AB	88.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
	42	1851.63	459.9	-7214.4	538.36	-95.	-21.	AB AB	33.7
	43AI	582.31	388.1	-7310.1	-4371.71	-76.	-52.	AB AB	33.7
	43AD	331.17	279.0	-5602.4	-3156.49	-56.	-43.	AB AB	33.7
	44	-479.80	234.5	-5677.0	-2014.06	-44.	-63.	AB AB	33.7
	45	-1159.34	183.2	-5744.9	-1312.67	-33.	-80.	AB AB	33.7
	46	1102.47	135.4	-5805.3	-1083.88	-70.	-26.	AB AB	33.7
	47	998.85	220.6	-5857.8	-1352.84	-69.	-29.	AB AB	33.7
	48	403.73	285.0	-5901.9	-2138.69	-60.	-44.	AB AB	33.7
	49	-599.72	373.2	-5937.3	2155.39	-44.	-68.	AB AB	33.7
	50	-1874.74	461.8	-5992.5	351.31	-24.	-99.	AB AB	33.7
	51	-135.55	803.5	-6210.9	-1507.68	-33.	-37.	AB AB	88.0
6	51	-118.30	164.1	-6208.2	-1519.73	-33.	-37.	AB AB	88.0
	52	2360.15	454.8	-6297.0	357.08	-95.	-1.	AB AB	33.7
	53AI	1070.95	394.1	-6390.4	-3645.46	-75.	-32.	AB AB	33.7
	53AD	1344.96	285.0	-5602.4	-3474.62	-72.	-19.	AB AB	33.7
	54	516.14	240.5	-5677.0	-2294.74	-60.	-39.	AB AB	33.7
	55	-181.46	189.2	-5744.9	-1555.91	-49.	-56.	AB AB	33.7
	56	2064.11	145.3	-5805.3	-1289.68	-86.	-3.	AB AB	33.7
	57	1925.28	232.4	-5857.8	-1521.19	-84.	-7.	AB AB	33.7
	58	1319.25	295.7	-5901.9	-2269.58	-75.	-22.	AB AB	33.7
	59	284.09	383.9	-5937.3	2061.93	-58.	-47.	AB AB	33.7
	60	-1022.65	472.5	-5992.7	295.36	-38.	-79.	AB AB	33.7
	61	-326.98	814.2	-6211.2	-1526.14	-30.	-41.	AB AB	88.0
7	61	-325.96	107.7	-6209.3	-1522.14	-30.	-41.	AB AB	88.0
	62	1257.93	398.6	-6297.1	387.80	-77.	-27.	AB AB	33.7
	63AI	137.66	338.1	-6390.4	-3581.60	-60.	-55.	AB AB	33.7
	63AD	397.21	234.7	-5643.8	-3419.64	-57.	-42.	AB AB	33.7
	64	-279.23	188.7	-5719.1	-2192.50	-47.	-58.	AB AB	33.7
	65	-821.05	135.9	-5787.7	-1411.70	-39.	-72.	AB AB	33.7
	66	1543.13	102.7	-5848.8	-1109.16	-78.	-16.	AB AB	33.7
	67	1324.33	200.8	-5901.9	-1310.35	-75.	-22.	AB AB	33.7
	68	935.27	253.8	-5946.4	-2034.61	-69.	-32.	AB AB	33.7
	69	32.15	339.7	-5982.1	-3293.40	-55.	-53.	AB AB	33.7
	70	-1134.98	426.4	-6037.8	602.30	-36.	-82.	AB AB	33.7
	71	443.22	770.8	-6257.9	-1204.20	-41.	-27.	AB AB	88.0
8	71	444.42	357.2	-6254.0	-1201.88	-41.	-27.	AB AB	88.0
	72	2661.87	374.4	-6326.6	384.65	-100.	6.	AB AB	33.7
	73AI	1735.55	469.3	-6388.3	-4148.35	-86.	-16.	AB AB	33.7
	73AD	2652.03	424.6	-5155.8	-4369.03	-89.	17.	AB AB	33.7
	74	1799.62	374.7	-5215.1	-3155.90	-76.	-4.	AB AB	33.7
	75	1044.63	320.4	-5270.5	-2192.64	-64.	-23.	AB AB	33.7
	76	401.87	262.1	-5321.6	-1493.85	-55.	-39.	AB AB	33.7
	77	1909.56	229.7	-5368.1	-1072.28	-79.	-3.	AB AB	33.7
	78	1002.25	303.2	-5404.8	-916.42	-65.	-25.	AB AB	33.7
	79	638.31	374.7	-5437.3	-987.15	-59.	-34.	AB AB	33.7
	80	-232.91	356.6	-5467.1	-1284.82	-46.	-55.	AB AB	33.7
	81	-884.84	283.5	-5503.0	-1314.55	-18.	-47.	AB AB	88.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-1141.40	-216.4	-7365.1	3415.34	-25.	-62.	AB AB	88.0
	2	-629.70	-321.3	-7319.3	-1928.00	-56.	-81.	AB AB	33.7
	3	235.31	-371.2	-7287.1	-1617.01	-70.	-60.	AB AB	33.7
	4	610.39	-302.5	-7249.8	-1531.57	-75.	-51.	AB AB	33.7
	5	1494.59	-226.3	-7208.2	-1672.73	-89.	-30.	AB AB	33.7
	6	-20.97	-258.6	-7156.9	-2079.59	-64.	-65.	AB AB	33.7
	7	614.87	-316.8	-7101.0	-2763.68	-74.	-50.	AB AB	33.7
	8	1362.80	-371.1	-7040.8	-3712.25	-86.	-31.	AB AB	33.7
	9	2207.99	-421.0	-6976.8	-4910.69	-99.	-11.	AB AB	33.7
	10	3029.99	-346.0	-6917.0	287.92	-111.	10.	AB AB	33.7
	11	999.52	-346.8	-6847.3	-1333.98	-52.	-20.	AB AB	88.0
2	11	1002.25	-629.8	-6865.6	-1335.91	-52.	-20.	AB AB	88.0
	12	-808.32	-341.6	-6615.2	541.34	-47.	-79.	AB AB	33.7
	13	141.85	-298.5	-6575.6	2192.16	-62.	-56.	AB AB	33.7
	14	879.65	-224.3	-6547.9	-2823.51	-73.	-38.	AB AB	33.7
	15	1166.55	-189.6	-6595.7	-2077.35	-78.	-32.	AB AB	33.7
	16	1184.77	-103.0	-6635.3	-1796.82	-79.	-32.	AB AB	33.7
	17	-937.67	-160.1	-6665.9	-2009.98	-45.	-83.	AB AB	33.7
	18	-402.62	-242.2	-6686.8	-2734.13	-54.	-70.	AB AB	33.7
	19	381.72	-325.8	-6697.8	-3976.48	-67.	-52.	AB AB	33.7
	20	1410.36	-442.4	-6722.0	602.19	-83.	-27.	AB AB	33.7
	21	333.69	-199.1	-6918.9	-1347.42	-43.	-33.	AB AB	88.0
3	21	334.92	-602.9	-6957.2	-1342.64	-44.	-33.	AB AB	88.0
	22	-568.79	-272.1	-7003.0	647.43	-54.	-77.	AB AB	33.7
	23AI	180.26	-233.4	-7079.8	-4034.33	-67.	-60.	AB AB	33.7
	23AD	416.75	-353.4	-6369.7	-3869.94	-64.	-48.	AB AB	33.7
	24	1240.21	-265.0	-6441.1	-2707.80	-78.	-29.	AB AB	33.7
	25	1705.24	-223.8	-6512.5	-1978.25	-86.	-18.	AB AB	33.7
	26	1745.03	-153.5	-6575.8	-1714.32	-88.	-18.	AB AB	33.7
	27	-312.54	-212.2	-6630.0	-1944.10	-55.	-67.	AB AB	33.7
	28	362.76	-294.6	-6674.5	-2684.85	-66.	-52.	AB AB	33.7
	29	1288.70	-378.4	-6709.2	-3943.81	-81.	-30.	AB AB	33.7
	30	2460.19	-495.9	-6756.8	651.37	-101.	-3.	AB AB	33.7
	31	511.49	-253.2	-6976.3	-1300.77	-46.	-30.	AB AB	88.0
4	31	510.74	-597.1	-7015.6	-1293.95	-46.	-30.	AB AB	88.0
	32	-1382.63	-267.0	-7085.0	695.45	-42.	-97.	AB AB	33.7
	33AI	-649.41	-229.3	-7185.6	2691.97	-55.	-81.	AB AB	33.7
	33AD	-415.92	-347.8	-6484.5	2192.05	-52.	-69.	AB AB	33.7
	34	391.10	-259.9	-6563.6	-2792.73	-66.	-50.	AB AB	33.7
	35	861.90	-216.9	-6635.6	-2083.90	-74.	-40.	AB AB	33.7
	36	857.26	-145.0	-6699.5	-1842.14	-74.	-40.	AB AB	33.7
	37	-1237.50	-206.1	-6754.2	-2095.60	-41.	-91.	AB AB	33.7
	38	-578.74	-289.1	-6799.3	-2861.62	-52.	-75.	AB AB	33.7
	39	332.38	-373.5	-6834.4	2308.04	-67.	-54.	AB AB	33.7
	40	1490.74	-493.1	-6882.6	537.97	-86.	-27.	AB AB	33.7
	41	278.54	-251.1	-7103.2	-1457.83	-44.	-35.	AB AB	88.0
5	41	256.81	-758.0	-7142.5	-1429.84	-44.	-35.	AB AB	88.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase		Armad cm2/m
	42	-465.81	-404.5	-7215.0	538.36	-58.	-76.	AB	AB	33.7
	43AI	628.62	-317.5	-7310.1	-4371.71	-76.	-51.	AB	AB	33.7
	43AD	377.48	-426.6	-5602.4	-3156.49	-57.	-42.	AB	AB	33.7
	44	1443.65	-314.4	-5677.0	-2014.06	-75.	-17.	AB	AB	33.7
	45	2004.74	-235.4	-5744.9	-1312.67	-84.	-4.	AB	AB	33.7
	46	2095.17	-140.4	-5805.3	-1083.88	-86.	-3.	AB	AB	33.7
	47	-291.83	-188.1	-5857.8	-1352.84	-48.	-60.	AB	AB	33.7
	48	333.70	-253.9	-5901.9	-2138.69	-59.	-45.	AB	AB	33.7
	49	1178.33	-322.4	-5937.3	-3452.72	-73.	-26.	AB	AB	33.7
	50	2237.58	-392.5	-5991.9	351.31	-90.	-1.	AB	AB	33.7
	51	-196.70	-124.5	-6191.8	-1507.68	-32.	-38.	AB	AB	88.0
6	51	-179.45	-778.6	-6227.6	-1519.73	-32.	-38.	AB	AB	88.0
	52	-1841.78	-414.2	-6297.6	357.08	-27.	-101.	AB	AB	33.7
	53AI	-752.51	-316.1	-6390.4	2390.62	-46.	-76.	AB	AB	33.7
	53AD	-478.49	-425.1	-5602.4	1817.16	-43.	-62.	AB	AB	33.7
	54	584.37	-312.9	-5677.0	-2294.74	-61.	-37.	AB	AB	33.7
	55	1176.23	-231.0	-5744.9	-1555.91	-71.	-24.	AB	AB	33.7
	56	1120.18	-131.3	-5805.3	-1289.68	-71.	-26.	AB	AB	33.7
	57	-1187.62	-193.1	-5857.8	-1521.19	-34.	-81.	AB	AB	33.7
	58	-547.17	-259.1	-5901.9	-2269.58	-45.	-66.	AB	AB	33.7
	59	313.04	-327.[illegible]	-5937.3	-3546.17	-59.	-46.	AB	AB	33.7
	60	1388.55	-397.9	-5992.0	295.36	-77.	-21.	AB	AB	33.7
	61	-206.00	-129.9	-6191.7	-1526.14	-32.	-38.	AB	AB	88.0
7	61	-204.98	-785.2	-6227.8	-1522.14	-32.	-39.	AB	AB	88.0
	62	-1024.52	-420.7	-6297.8	387.80	-41.	-81.	AB	AB	33.7
	63AI	84.52	-322.7	-6390.4	-3581.60	-59.	-56.	AB	AB	33.7
	63AD	344.06	-426.1	-5643.8	-3419.64	-57.	-43.	AB	AB	33.7
	64	1412.39	-315.7	-5719.1	-2192.50	-74.	-18.	AB	AB	33.7
	65	2020.97	-237.0	-5787.7	-1411.70	-85.	-4.	AB	AB	33.7
	66	-680.20	-148.5	-5848.8	-1109.16	-42.	-69.	AB	AB	33.7
	67	-193.29	-212.5	-5901.9	-1310.35	-50.	-58.	AB	AB	33.7
	68	508.30	-280.6	-5946.4	-2034.61	-62.	-42.	AB	AB	33.7
	69	1436.20	-351.3	-5982.1	-3293.40	-77.	-20.	AB	AB	33.7
	70	2585.88	-423.3	-6037.1	-5095.10	-96.	7.	AB	AB	33.7
	71	448.25	-152.5	-6238.8	-1204.20	-41.	-27.	AB	AB	88.0
8	71	449.44	-404.7	-6277.4	-1201.88	-41.	-27.	AB	AB	88.0
	72	-2063.07	-361.9	-6328.1	384.65	-24.	-106.	AB	AB	33.7
	73AI	-1544.35	-155.4	-6388.3	1885.75	-33.	-95.	AB	AB	33.7
	73AD	-627.87	-200.0	-5155.8	500.93	-37.	-62.	AB	AB	33.7
	74	-276.01	-139.7	-5215.1	1770.05	-43.	-54.	AB	AB	33.7
	75	-62.89	-85.2	-5270.5	-2192.64	-47.	-49.	AB	AB	33.7
	76	-474.71	-41.5	-5321.6	-1493.85	-41.	-59.	AB	AB	33.7
	77	-2293.07	-58.8	-5368.1	-1072.28	-12.	-103.	AB	AB	33.7
	78	-2154.00	-97.3	-5404.8	-916.42	-14.	-100.	AB	AB	33.7
	79	-1937.77	-131.3	-5437.3	-987.15	-18.	-95.	AB	AB	33.7
	80	-1641.98	-260.3	-5465.6	-1284.82	-23.	-89.	AB	AB	33.7
	81	-884.84	-358.8	-5483.0	2582.08	-18.	-47.	AB	AB	88.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase		Armad cm2/m
1	1	-933.87	-418.3	-6032.9	2794.37	-21.	-51.	AB	AB	88.0
	2	101.42	-508.1	-6005.0	-1577.46	-56.	-52.	AB	AB	33.7
	3	1236.01	-466.3	-5962.2	-1323.01	-74.	-25.	AB	AB	33.7
	4	2067.07	-321.9	-5931.6	-1253.10	-87.	-4.	AB	AB	33.7
	5	2597.23	-182.8	-5897.6	-1368.59	-95.	8.	AB	AB	33.7
	6	2865.63	-64.5	-5855.6	-1701.48	-99.	15.	AB	AB	33.7
	7	2912.95	57.1	-5809.9	-2261.19	-99.	17.	AB	AB	33.7
	8	2692.36	183.4	-5760.7	-3037.29	-95.	12.	AB	AB	33.7
	9	2187.12	314.8	-5708.3	-4017.83	-87.	0.	AB	AB	33.7
	10	1755.51	39.0	-5665.6	235.57	-79.	-9.	AB	AB	33.7
	11	1826.85	55.6	-5614.7	-1091.44	-57.	2.	AB	AB	88.0
2	11	1829.08	-143.8	-5610.5	-1093.01	-57.	2.	AB	AB	88.0
	12	1790.43	83.2	-5414.2	-4664.67	-78.	-6.	AB	AB	33.7
	13	2521.19	-371.4	-5380.0	-3288.15	-89.	11.	AB	AB	33.7
	14	3567.47	-320.3	-5357.4	-2310.15	-106.	36.	AB	C	33.7
	15	4163.52	-146.9	-5396.5	-1699.65	-116.	50.	AB	C	33.7
	16	4336.27	-1.6	-5428.9	-1470.13	-119.	54.	AB	C	33.7
	17	4101.54	159.1	-5453.9	-1644.53	-115.	48.	AB	C	33.7
	18	3473.52	298.2	-5471.0	-2237.01	-105.	33.	AB	C	33.7
	19	2421.35	450.5	-5480.1	-3253.48	-88.	8.	AB	AB	33.7
	20	1517.68	3.7	-5504.9	492.70	-74.	-14.	AB	AB	33.7
	21	1314.39	245.7	-5671.6	-1102.43	-50.	-8.	AB	AB	88.0
3	21	1315.39	-121.8	-5685.5	-1098.52	-50.	-8.	AB	AB	88.0
	22	1325.14	140.1	-5731.7	529.72	-73.	-20.	AB	AB	33.7
	23AI	2055.74	-394.3	-5792.6	-3300.82	-85.	-3.	AB	AB	33.7
	23AD	2249.23	-492.5	-5211.6	-3166.32	-83.	6.	AB	AB	33.7
	24	3358.85	-323.1	-5270.0	-2215.47	-102.	32.	AB	C	33.7
	25	3998.56	-195.4	-5328.4	-1618.57	-112.	47.	AB	C	33.7
	26	4247.33	-30.0	-5380.2	-1402.63	-117.	52.	AB	C	33.7
	27	4088.49	130.7	-5424.5	-1590.62	-115.	48.	AB	C	33.7
	28	3538.81	271.1	-5461.0	-2196.70	-106.	35.	AB	C	33.7
	29	2560.48	419.5	-5489.3	-3226.75	-91.	11.	AB	AB	33.7
	30	1771.21	-34.5	-5533.1	-4684.70	-79.	-8.	AB	AB	33.7
	31	1657.93	207.1	-5718.6	-1064.27	-55.	-2.	AB	AB	88.0
4	31	1657.31	-139.4	-5732.5	-1058.69	-55.	-2.	AB	AB	88.0
	32	1687.66	81.6	-5800.4	-4901.69	-80.	-12.	AB	AB	33.7
	33AI	2322.96	-370.1	-5879.1	-3350.66	-90.	2.	AB	AB	33.7
	33AD	2514.00	-467.1	-5305.5	-3217.87	-88.	12.	AB	AB	33.7
	34	3549.53	-297.4	-5370.2	-2284.96	-106.	36.	AB	C	33.7
	35	4077.29	-143.2	-5429.2	-1705.01	-115.	48.	AB	C	33.7
	36	4209.38	-9.4	-5481.4	-1507.21	-117.	51.	AB	C	33.7
	37	3993.26	150.9	-5526.2	-1714.58	-114.	45.	AB	C	33.7
	38	3383.82	291.3	-5563.0	-2341.32	-105.	30.	AB	C	33.7
	39	2347.98	438.7	-5591.8	-3393.36	-88.	5.	AB	AB	33.7
	40	1474.11	-15.7	-5636.2	440.16	-75.	-16.	AB	AB	33.7
	41	1353.41	225.2	-5822.8	-1192.77	-52.	-8.	AB	AB	88.0
5	41	1335.63	-278.7	-5837.4	-1169.87	-51.	-9.	AB	AB	88.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
	42	1710.44	-38.0	-5907.0	440.48	-81.	-13.	AB AB	33.7
	43AI	2714.11	-481.3	-5981.0	-3576.85	-98.	11.	AB AB	33.7
	43AD	2508.64	-570.5	-4583.8	-2582.59	-82.	18.	AB AB	33.7
	44	3884.05	-372.0	-4644.8	-1647.86	-104.	50.	AB C	33.7
	45	4633.68	-186.3	-4700.4	-1074.00	-117.	68.	AB C	33.7
	46	4838.50	-19.3	-4749.8	-886.81	-121.	72.	AB C	33.7
	47	4593.06	171.6	-4792.8	-1106.87	-117.	66.	AB C	33.7
	48	3825.74	344.6	-4828.9	-1749.83	-105.	47.	AB C	33.7
	49	2511.86	522.3	-4857.8	-2824.95	-84.	16.	AB AB	33.7
	50	1337.18	85.0	-4907.4	287.43	-66.	-13.	AB AB	33.7
	51	878.96	354.5	-5076.9	-1233.55	-41.	-13.	AB AB	88.0
6	51	893.08	-291.3	-5088.8	-1243.41	-41.	-12.	AB AB	88.0
	52	1326.99	-39.0	-5156.4	292.16	-68.	-15.	AB AB	33.7
	53AI	2341.81	-470.6	-5228.5	-2982.65	-85.	8.	AB AB	33.7
	53AD	2566.00	-559.8	-4583.8	-2842.87	-83.	20.	AB AB	33.7
	54	3909.66	-360.9	-4644.8	-1877.51	-105.	51.	AB C	33.7
	55	4629.88	-175.2	-4700.4	-1273.01	-117.	68.	AB C	33.7
	56	4793.24	19.7	-4749.8	-1055.19	-120.	71.	AB C	33.7
	57	4429.98	210.9	-4792.8	-1244.61	-114.	62.	AB C	33.7
	58	3577.30	367.7	-4828.9	-1856.93	-101.	42.	AB C	33.7
	59	2193.04	546.0	-4857.8	-2901.41	-79.	8.	AB AB	33.7
	60	987.70	13.4	-4907.5	241.65	-60.	-21.	AB AB	33.7
	61	734.19	282.7	-5075.5	-1248.66	-39.	-15.	AB AB	88.0
7	61	735.03	-351.8	-5091.0	-1245.38	-39.	-15.	AB AB	88.0
	62	1321.97	-63.7	-5156.7	317.29	-68.	-15.	AB AB	33.7
	63AI	2405.61	-486.2	-5228.5	-2930.40	-86.	10.	AB AB	33.7
	63AD	2617.97	-570.8	-4617.6	-2797.88	-84.	21.	AB AB	33.7
	64	3989.10	-370.6	-4679.3	-1793.86	-106.	53.	AB C	33.7
	65	4750.65	-188.4	-4735.4	-1155.02	-119.	70.	AB C	33.7
	66	4955.66	4.9	-4785.4	-907.50	-123.	75.	AB C	33.7
	67	4642.40	177.9	-4828.8	-1072.10	-118.	67.	AB C	33.7
	68	3815.93	366.2	-4865.2	-1664.68	-105.	47.	AB C	33.7
	69	2546.64	431.7	-4894.4	-2694.60	-85.	16.	AB AB	33.7
	70	1669.74	-26.0	-4944.2	-4168.72	-72.	-5.	AB AB	33.7
	71	1453.76	245.6	-5113.6	-985.26	-49.	-2.	AB AB	88.0
8	71	1454.73	-51.4	-5129.5	-983.35	-49.	-2.	AB AB	88.0
	72	1372.85	-20.1	-5181.6	314.71	-69.	-14.	AB AB	33.7
	73AI	1724.62	-279.8	-5226.8	-3394.10	-75.	-6.	AB AB	33.7
	73AD	2474.47	-316.4	-4218.4	-3574.66	-78.	21.	AB AB	33.7
	74	2983.23	-185.0	-4266.9	-2582.10	-86.	32.	AB C	33.7
	75	3207.48	-58.7	-4312.2	-1793.98	-90.	37.	AB C	33.7
	76	3163.97	62.9	-4354.0	-1222.24	-90.	36.	AB C	33.7
	77	2900.07	181.2	-4392.0	-877.32	-86.	29.	AB C	33.7
	78	2374.28	320.4	-4422.1	-749.80	-78.	17.	AB AB	33.7
	79	1547.44	464.8	-4448.7	-807.66	-65.	-3.	AB AB	33.7
	80	416.94	532.9	-4476.6	-1051.22	-47.	-31.	AB AB	33.7
	81	-723.95	468.4	-4495.9	-1075.54	-15.	-38.	AB AB	88.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-933.87	169.6	-6017.0	2794.37	-21.	-51.	AB AB	88.0
	2	-1259.87	85.7	-5987.3	-1577.46	-34.	-84.	AB AB	33.7
	3	-1245.27	17.1	-5962.2	-1323.01	-34.	-84.	AB AB	33.7
	4	-1297.58	52.2	-5931.6	-1253.10	-33.	-85.	AB AB	33.7
	5	-1418.76	83.6	-5897.6	-1368.59	-31.	-87.	AB AB	33.7
	6	-1574.28	95.4	-5855.6	-1701.48	-28.	-91.	AB AB	33.7
	7	-1776.84	111.6	-5809.9	3226.59	-24.	-95.	AB AB	33.7
	8	-2023.85	131.1	-5760.7	2403.99	-20.	-100.	AB AB	33.7
	9	-2327.44	154.2	-5708.3	1373.96	-14.	-107.	AB AB	33.7
	10	-2856.26	690.3	-5667.2	235.57	-6.	-119.	AB AB	33.7
	11	-3648.68	728.3	-5635.4	-1091.44	19.	-98.	AB AB	88.0
2	11	-3646.45	-981.0	-5630.1	-1093.01	19.	-98.	AB AB	88.0
	12	-1974.77	-662.3	-5431.1	442.91	-18.	-96.	AB AB	33.7
	13	-1013.36	-158.6	-5380.0	1793.59	-32.	-73.	AB AB	33.7
	14	-644.06	-53.7	-5357.4	-2310.15	-38.	-64.	AB AB	33.7
	15	-587.67	-12.1	-5396.5	-1699.65	-39.	-63.	AB AB	33.7
	16	-697.01	63.6	-5428.9	-1470.13	-38.	-66.	AB AB	33.7
	17	-967.33	140.3	-5453.9	-1644.53	-34.	-72.	AB AB	33.7
	18	-1460.82	178.9	-5471.0	2930.68	-26.	-84.	AB AB	33.7
	19	-2007.95	203.9	-5480.1	1922.74	-17.	-97.	AB AB	33.7
	20	-2793.72	664.8	-5505.6	492.70	-5.	-116.	AB AB	33.7
	21	-4508.71	1004.0	-5689.5	-1102.43	31.	-114.	C AB	88.0
3	21	-4507.71	-942.3	-5703.7	-1098.52	31.	-114.	C AB	88.0
	22	-2802.27	-627.3	-5749.2	529.72	-7.	-119.	AB AB	33.7
	23AI	-2029.86	-128.5	-5792.6	2170.60	-20.	-101.	AB AB	33.7
	23AD	-1836.36	-226.7	-5211.6	1756.33	-18.	-91.	AB AB	33.7
	24	-1346.31	-111.7	-5270.0	2762.30	-26.	-80.	AB AB	33.7
	25	-1133.56	-50.5	-5328.4	-1618.57	-30.	-75.	AB AB	33.7
	26	-1079.96	-14.9	-5380.2	-1402.63	-31.	-74.	AB AB	33.7
	27	-1161.12	44.2	-5424.5	-1590.62	-30.	-77.	AB AB	33.7
	28	-1452.29	153.5	-5461.0	2961.50	-26.	-84.	AB AB	33.7
	29	-1933.88	182.4	-5489.3	1958.23	-19.	-96.	AB AB	33.7
	30	-2709.73	654.7	-5534.0	532.94	-7.	-115.	AB AB	33.7
	31	-4369.22	990.9	-5737.0	-1064.27	29.	-111.	C AB	88.0
4	31	-4369.84	-924.2	-5751.2	-1058.69	29.	-111.	C AB	88.0
	32	-2698.64	-609.9	-5816.2	569.00	-9.	-117.	AB AB	33.7
	33AI	-2011.36	-113.8	-5879.1	2202.52	-21.	-101.	AB AB	33.7
	33AD	-1820.32	-210.7	-5305.5	1793.50	-19.	-91.	AB AB	33.7
	34	-1384.59	-81.3	-5370.2	2787.53	-26.	-82.	AB AB	33.7
	35	-1251.77	-21.6	-5429.2	-1705.01	-29.	-79.	AB AB	33.7
	36	-1278.78	41.6	-5481.4	-1507.21	-29.	-80.	AB AB	33.7
	37	-1486.95	72.5	-5526.2	3505.22	-26.	-85.	AB AB	33.7
	38	-1832.71	184.5	-5563.0	2913.27	-21.	-94.	AB AB	33.7
	39	-2401.17	213.7	-5591.8	1888.39	-12.	-108.	AB AB	33.7
	40	-3247.36	690.3	-5637.0	440.16	1.	-128.	AB AB	33.7
	41	-4889.73	984.0	-5839.7	-1192.77	36.	-121.	C AB	88.0
5	41	-4907.51	-1129.4	-5856.6	-1169.87	36.	-122.	C AB	88.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
	42	-2657.92	-742.3	-5922.2	440.48	-11.	-117.	AB AB	33.7
	43AI	-1663.96	-178.4	-5981.0	2072.52	-27.	-94.	AB AB	33.7
	43AD	-1869.43	-267.7	-4583.8	1747.06	-12.	-86.	AB AB	33.7
	44	-1197.91	-202.1	-4644.8	2739.40	-23.	-71.	AB AB	33.7
	45	-902.86	-57.0	-4700.4	-1074.00	-28.	-64.	AB AB	33.7
	46	-894.45	25.6	-4749.8	-886.81	-29.	-64.	AB AB	33.7
	47	-1098.97	77.9	-4792.8	-1106.87	-26.	-70.	AB AB	33.7
	48	-1496.44	197.8	-4828.9	2811.29	-20.	-79.	AB AB	33.7
	49	-2175.61	244.9	-4857.8	1763.50	-9.	-96.	AB AB	33.7
	50	-3348.51	805.3	-4908.1	287.43	9.	-124.	AB AB	33.7
	51	-5537.32	1136.5	-5093.0	-1233.55	49.	-129.	C AB	88.0
6	51	-5523.21	-1147.1	-5108.2	-1243.41	49.	-129.	C AB	88.0
	52	-3260.12	-747.5	-5171.6	292.16	5.	-124.	AB AB	33.7
	53AI	-2340.39	-188.9	-5228.5	1955.96	-10.	-103.	AB AB	33.7
	53AD	-2116.20	-278.1	-4583.8	1486.77	-8.	-92.	AB AB	33.7
	54	-1412.28	-212.8	-4644.8	2509.75	-19.	-76.	AB AB	33.7
	55	-1064.69	-72.5	-4700.4	-1273.01	-25.	-68.	AB AB	33.7
	56	-1008.22	14.3	-4749.8	-1055.19	-27.	-67.	AB AB	33.7
	57	-1179.14	66.5	-4792.8	-1244.61	-24.	-71.	AB AB	33.7
	58	-1533.89	131.5	-4828.9	2704.19	-19.	-80.	AB AB	33.7
	59	-2174.61	244.1	-4857.8	1687.04	-9.	-96.	AB AB	33.7
	60	-3390.32	808.4	-4908.1	241.65	10.	-125.	AB AB	33.7
	61	-5583.00	1139.7	-5093.1	-1248.66	49.	-130.	C AB	88.0
7	61	-5582.16	-1157.3	-5108.5	-1245.38	49.	-130.	C AB	88.0
	62	-3290.58	-756.7	-5171.7	317.29	6.	-125.	AB AB	33.7
	63AI	-2349.39	-211.1	-5228.5	2008.21	-10.	-103.	AB AB	33.7
	63AD	-2137.04	-295.7	-4617.6	1563.72	-8.	-93.	AB AB	33.7
	64	-1371.41	-234.7	-4679.3	2625.98	-20.	-75.	AB AB	33.7
	65	-791.81	-169.1	-4735.4	-1155.02	-30.	-62.	AB AB	33.7
	66	-492.15	-76.5	-4785.4	-907.50	-35.	-55.	AB AB	33.7
	67	-420.64	12.7	-4828.8	-1072.10	-37.	-54.	AB AB	33.7
	68	-563.97	59.8	-4865.2	-1664.68	-35.	-57.	AB AB	33.7
	69	-1013.97	172.4	-4894.4	1928.46	-28.	-68.	AB AB	33.7
	70	-2200.05	747.6	-4944.9	492.79	-9.	-97.	AB AB	33.7
	71	-4421.75	1127.8	-5132.6	-985.26	33.	-109.	C AB	88.0
8	71	-4420.77	-744.2	-5150.7	-983.35	33.	-109.	C AB	88.0
	72	-3623.24	-691.3	-5201.3	314.71	11.	-133.	AB AB	33.7
	73AI	-3169.14	-141.7	-5226.8	1542.89	4.	-123.	AB AB	33.7
	73AD	-2419.29	-178.3	-4218.4	409.85	1.	-96.	AB AB	33.7
	74	-2062.19	-155.1	-4266.9	1448.22	-6.	-88.	AB AB	33.7
	75	-1762.27	-135.4	-4312.2	2279.14	-11.	-81.	AB AB	33.7
	76	-1507.41	-119.1	-4354.0	2890.37	-15.	-75.	AB AB	33.7
	77	-1302.57	-107.4	-4392.0	-877.32	-19.	-71.	AB AB	33.7
	78	-1131.46	-76.1	-4422.1	-749.80	-22.	-67.	AB AB	33.7
	79	-1028.63	-41.2	-4448.7	-807.66	-24.	-65.	AB AB	33.7
	80	-992.13	-84.0	-4475.1	-1051.22	-25.	-64.	AB AB	33.7
	81	-723.96	-140.5	-4506.1	2112.61	-15.	-38.	AB AB	88.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-1141.40	-190.3	-7362.3	3415.34	-25.	-62.	AB AB	88.0
	2	-629.70	-321.0	-7332.1	-1928.00	-56.	-81.	AB AB	33.7
	3	235.31	-371.2	-7287.1	-1617.01	-70.	-60.	AB AB	33.7
	4	942.68	-295.8	-7249.8	-1531.57	-81.	-43.	AB AB	33.7
	5	1494.59	-226.3	-7208.2	-1672.73	-89.	-30.	AB AB	33.7
	6	1937.87	-182.2	-7156.9	-2079.59	-96.	-19.	AB AB	33.7
	7	2314.74	-134.0	-7101.0	-2763.68	-101.	-9.	AB AB	33.7
	8	2576.04	-80.4	-7040.8	-3712.25	-105.	-2.	AB AB	33.7
	9	2702.34	-21.0	-6976.8	-4910.69	-107.	1.	AB AB	33.7
	10	3029.99	-346.0	-6917.0	287.92	-111.	10.	AB AB	33.7
	11	3687.11	-346.8	-6847.3	-1333.98	-90.	28.	AB C	88.0
2	11	3689.84	247.0	-6846.1	-1335.91	-90.	28.	AB C	88.0
	12	2785.60	472.2	-6612.0	-5701.27	-105.	7.	AB AB	33.7
	13	2580.11	-85.2	-6575.6	-4018.85	-101.	2.	AB AB	33.7
	14	2962.66	-131.0	-6547.9	-2823.51	-107.	11.	AB AB	33.7
	15	3153.44	-53.4	-6595.7	-2077.35	-110.	15.	AB AB	33.7
	16	3190.97	-5.3	-6635.3	-1796.82	-111.	16.	AB AB	33.7
	17	3096.27	57.2	-6665.9	-2009.98	-110.	13.	AB AB	33.7
	18	2886.73	97.7	-6686.8	-2734.13	-107.	8.	AB AB	33.7
	19	2532.81	151.0	-6697.8	-3976.48	-101.	0.	AB AB	33.7
	20	2606.28	-400.8	-6722.2	602.19	-103.	1.	AB AB	33.7
	21	3295.58	-157.4	-6919.8	-1347.42	-85.	21.	AB AB	88.0
3	21	3296.80	288.1	-6937.4	-1342.64	-85.	21.	AB AB	88.0
	22	2428.73	555.9	-6999.9	647.43	-102.	-6.	AB AB	33.7
	23AI	2146.25	-82.0	-7079.8	-4034.33	-99.	-13.	AB AB	33.7
	23AD	2382.74	-202.1	-6369.7	-3869.94	-96.	-1.	AB AB	33.7
	24	2804.10	-127.0	-6441.1	-2707.80	-103.	9.	AB AB	33.7
	25	3018.74	-95.1	-6512.5	-1978.25	-107.	13.	AB AB	33.7
	26	3112.49	-26.9	-6575.8	-1714.32	-109.	15.	AB AB	33.7
	27	3073.88	35.6	-6630.0	-1944.10	-109.	13	AB AB	33.7
	28	2922.86	77.3	-6674.5	-2684.85	-107.	9.	AB AB	33.7
	29	2622.99	126.7	-6709.2	-3943.81	-103.	2.	AB AB	33.7
	30	2791.03	-432.4	-6756.8	-5725.74	-106.	5.	AB AB	33.7
	31	3558.00	-189.5	-6977.7	-1300.77	-89.	25.	AB C	88.0
4	31	3557.24	260.1	-6995.3	-1293.95	-89.	25.	AB C	88.0
	32	2731.50	486.9	-7083.6	-5990.96	-108.	1.	AB AB	33.7
	33AI	2382.92	-68.7	-7185.6	-4095.26	-103.	-8.	AB AB	33.7
	33AD	2616.42	-187.1	-6484.5	-3932.95	-101.	4.	AB AB	33.7
	34	2992.83	-111.9	-6563.6	-2792.73	-107.	12.	AB AB	33.7
	35	3125.17	-53.6	-6635.6	-2083.90	-110.	14.	AB AB	33.7
	36	3132.15	-17.0	-6699.5	-1842.14	-111.	14.	AB AB	33.7
	37	3066.45	45.0	-6754.2	-2095.60	-110.	12.	AB AB	33.7
	38	2886.17	86.6	-6799.3	-2861.62	-108.	7.	AB AB	33.7
	39	2559.56	134.8	-6834.4	-4147.44	-103.	-1.	AB AB	33.7
	40	2674.07	-425.1	-6882.6	537.97	-105.	1.	AB AB	33.7
	41	3452.29	-182.9	-7104.7	-1457.83	-88.	23.	AB AB	88.0
5	41	3430.56	134.2	-7123.2	-1429.84	-88.	22.	AB AB	88.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
	42	2835.96	375.8	-7213.9	538.36	-111.	2.	AB AB	33.7
	43AI	2753.33	-170.3	-7310.1	-4371.71	-110.	-1.	AB AB	33.7
	43AD	2502.19	-279.4	-5602.4	-3156.49	-91.	9.	AB AB	33.7
	44	3143.46	-178.7	-5677.0	-2014.06	-102.	23.	AB AB	33.7
	45	3451.68	-92.1	-5744.9	-1312.67	-107.	30.	AB C	33.7
	46	3513.62	-25.2	-5805.3	-1083.88	-109.	31.	AB C	33.7
	47	3428.49	64.7	-5857.8	-1352.84	-108.	29.	AB C	33.7
	48	3128.17	136.0	-5901.9	-2138.69	-104.	21.	AB AB	33.7
	49	2590.08	211.5	-5937.3	-3452.72	-95.	8.	AB AB	33.7
	50	2499.15	-328.4	-5991.9	351.31	-94.	5.	AB AB	33.7
	51	3035.62	-60.1	-6193.1	-1507.68	-77.	20.	AB AB	88.0
6	51	3052.87	122.0	-6208.2	-1519.73	-77.	20.	AB AB	88.0
	52	2524.42	377.0	-6296.4	357.08	-97.	3.	AB AB	33.7
	53AI	2439.40	-155.2	-6390.4	-3645.46	-97.	0.	AB AB	33.7
	53AD	2713.42	-264.3	-5602.4	-3474.62	-94.	14.	AB AB	33.7
	54	3309.82	-163.2	-5677.0	-2294.74	-104.	27.	AB C	33.7
	55	3575.52	-76.7	-5744.9	-1555.91	-109.	33.	AB C	33.7
	56	3582.89	18.2	-5805.3	-1289.68	-110.	33.	AB C	33.7
	57	3366.82	108.3	-5857.8	-1521.19	-107.	27.	AB C	33.7
	58	2968.03	163.4	-5901.9	-2269.58	-101.	17.	AB AB	33.7
	59	2346.44	239.5	-5937.3	-3546.17	-91.	2.	AB AB	33.7
	60	2211.75	-395.6	-5992.0	295.36	-90.	-2.	AB AB	33.7
	61	2936.14	-127.5	-6191.8	-1526.14	-76.	18.	AB AB	88.0
7	61	2937.17	74.6	-6210.0	-1522.14	-76.	18.	AB AB	88.0
	62	2525.96	365.5	-6296.5	387.80	-98.	3.	AB AB	33.7
	63AI	2470.33	-157.7	-6390.4	-3581.60	-97.	1.	AB AB	33.7
	63AD	2729.88	-261.1	-5643.8	-3419.64	-95.	14.	AB AB	33.7
	64	3311.66	-159.1	-5719.1	-2192.50	-105.	27.	AB C	33.7
	65	3577.56	-76.3	-5787.7	-1411.70	-110.	33.	AB C	33.7
	66	3586.50	16.5	-5848.8	-1109.16	-110.	32.	AB C	33.7
	67	3381.44	88.1	-5901.9	-1310.35	-108.	27.	AB C	33.7
	68	2971.00	174.4	-5946.4	-2034.61	-101.	17.	AB AB	33.7
	69	2427.68	137.2	-5982.1	-3293.40	-93.	4.	AB AB	33.7
	70	2585.88	-423.3	-6037.1	-5095.10	-96.	7.	AB AB	33.7
	71	3329.18	-152.5	-6238.8	-1204.20	-81.	25.	AB C	88.0
8	71	3330.38	357.2	-6254.0	-1201.88	-82.	25.	AB C	88.0
	72	2661.87	374.4	-6325.5	384.65	-100.	6.	AB AB	33.7
	73AI	2226.46	69.1	-6388.3	-4148.35	-94.	-5.	AB AB	33.7
	73AD	3142.94	24.5	-5155.8	-4369.03	-97.	28.	AB C	33.7
	74	3009.89	83.9	-5215.1	-3155.90	-95.	24.	AB C	33.7
	75	2741.97	137.4	-5270.5	-2192.64	-92.	18.	AB AB	33.7
	76	2358.62	185.6	-5321.6	-1493.85	-86.	8.	AB AB	33.7
	77	1909.56	229.7	-5368.1	-1072.28	-79.	-3.	AB AB	33.7
	78	1351.73	299.2	-5404.8	-916.42	-71.	-17.	AB AB	33.7
	79	638.31	374.7	-5437.3	-987.15	-59.	-34.	AB AB	33.7
	80	-232.91	356.6	-5467.1	-1284.82	-46.	-55.	AB AB	33.7
	81	-884.84	256.9	-5487.0	-1314.55	-18.	-47.	AB AB	88.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-1141.40	397.6	-7346.5	3415.34	-25.	-62.	AB AB	88.0
	2	-1990.99	272.8	-7314.4	-1928.00	-34.	-114.	AB AB	33.7
	3	-2245.97	112.2	-7287.1	-1617.01	-30.	-119.	AB AB	33.7
	4	-2421.96	78.4	-7249.8	-1531.57	-27.	-123.	AB AB	33.7
	5	-2521.39	40.0	-7208.2	-1672.73	-25.	-125.	AB AB	33.7
	6	-2502.05	-22.3	-7156.9	-2079.59	-25.	-124.	AB AB	33.7
	7	-2375.04	-79.5	-7101.0	3943.61	-26.	-121.	AB AB	33.7
	8	-2140.16	-132.8	-7040.8	2938.22	-29.	-115.	AB AB	33.7
	9	-1812.22	-181.7	-6976.8	1679.28	-34.	-106.	AB AB	33.7
	10	-1581.78	305.3	-6918.6	287.92	-37.	-100.	AB AB	33.7
	11	-1788.42	325.9	-6867.9	-1333.98	-14.	-71.	AB AB	88.0
2	11	-1785.69	-590.2	-6865.6	-1335.91	-14.	-71.	AB AB	88.0
	12	-979.60	-273.3	-6628.9	541.34	-44.	-83.	AB AB	33.7
	13	-954.45	127.6	-6575.6	2192.16	-44.	-82.	AB AB	33.7
	14	-1248.87	135.7	-6547.9	-2823.51	-39.	-89.	AB AB	33.7
	15	-1597.74	81.4	-6595.7	-2077.35	-34.	-98.	AB AB	33.7
	16	-1842.31	59.9	-6635.3	-1796.82	-31.	-104.	AB AB	33.7
	17	-1972.60	38.5	-6665.9	-2009.98	-29.	-107.	AB AB	33.7
	18	-2047.61	-21.6	-6686.8	3581.94	-28.	-109.	AB AB	33.7
	19	-1896.48	-95.7	-6697.8	2350.01	-30.	-106.	AB AB	33.7
	20	-1705.12	260.3	-6722.8	602.19	-34.	-101.	AB AB	33.7
	21	-2527.53	600.9	-6937.8	-1347.42	-4.	-85.	AB AB	88.0
3	21	-2526.30	-532.4	-6955.6	-1342.64	-4.	-85.	AB AB	88.0
	22	-1698.68	-211.5	-7017.3	647.43	-36.	-104.	AB AB	33.7
	23AI	-1939.35	183.7	-7079.8	2652.96	-33.	-110.	AB AB	33.7
	23AD	-1702.85	63.7	-6369.7	2146.63	-30.	-98.	AB AB	33.7
	24	-1901.06	84.4	-6441.1	3376.15	-28.	-104.	AB AB	33.7
	25	-2113.38	49.7	-6512.5	-1978.25	-25.	-109.	AB AB	33.7
	26	-2214.80	-11.8	-6575.8	-1714.32	-24.	-112.	AB AB	33.7
	27	-2175.73	-50.9	-6630.0	-1944.10	-25.	-112.	AB AB	33.7
	28	-2068.23	-40.4	-6674.5	3619.61	-27.	-110.	AB AB	33.7
	29	-1871.37	-110.5	-6709.2	2393.39	-31.	-105.	AB AB	33.7
	30	-1689.91	256.8	-6757.7	651.37	-34.	-101.	AB AB	33.7
	31	-2469.16	594.4	-6996.2	-1300.77	-5.	-84.	AB AB	88.0
4	31	-2469.91	-524.7	-7013.9	-1293.95	-5.	-84.	AB AB	88.0
	32	-1654.79	-204.6	-7099.4	695.45	-38.	-104.	AB AB	33.7
	33AI	-1951.39	187.7	-7185.6	2691.97	-34.	-112.	AB AB	33.7
	33AD	-1717.90	69.2	-6484.5	2192.05	-31.	-100.	AB AB	33.7
	34	-1941.29	104.3	-6563.6	3406.98	-28.	-106.	AB AB	33.7
	35	-2203.89	68.0	-6635.6	-2083.90	-25.	-113.	AB AB	33.7
	36	-2356.01	33.9	-6699.5	-1842.14	-23.	-117.	AB AB	33.7
	37	-2413.76	-33.4	-6754.2	4284.16	-22.	-119.	AB AB	33.7
	38	-2330.36	-20.2	-6799.3	3560.67	-24.	-117.	AB AB	33.7
	39	-2189.59	-90.1	-6834.4	2308.04	-27.	-114.	AB AB	33.7
	40	-2047.40	280.9	-6883.4	537.97	-29.	-111.	AB AB	33.7
	41	-2790.85	575.8	-7121.6	-1457.83	-1.	-90.	AB AB	88.0
5	41	-2812.58	-716.5	-7142.5	-1429.84	-1.	-91.	AB AB	88.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
	42	-1532.39	-328.6	-7229.0	538.36	-41.	-102.	AB AB	33.7
	43AI	-1624.74	132.5	-7310.1	2533.08	-40.	-105.	AB AB	33.7
	43AD	-1875.88	23.5	-5602.4	2135.29	-21.	-95.	AB AB	33.7
	44	-1938.50	-8.8	-5677.0	3348.16	-20.	-98.	AB AB	33.7
	45	-2084.87	37.2	-5744.9	-1312.67	-19.	-102.	AB AB	33.7
	46	-2219.33	19.7	-5805.3	-1083.88	-17.	-105.	AB AB	33.7
	47	-2263.54	-29.0	-5857.8	-1352.84	-17.	-107.	AB AB	33.7
	48	-2194.01	-10.8	-5901.9	3436.02	-18.	-106.	AB AB	33.7
	49	-2097.40	-66.0	-5937.3	2155.39	-20.	-104.	AB AB	33.7
	50	-2186.54	391.9	-5992.5	351.31	-19.	-106.	AB AB	33.7
	51	-3380.66	721.9	-6209.2	-1507.68	12.	-96.	AB AB	88.0
6	51	-3363.41	-733.8	-6227.6	-1519.73	12.	-96.	AB AB	88.0
	52	-2062.70	-331.4	-6311.7	357.08	-24.	-106.	AB AB	33.7
	53AI	-2242.80	126.4	-6390.4	2390.62	-22.	-111.	AB AB	33.7
	53AD	-1968.78	17.4	-5602.4	1817.16	-19.	-98.	AB AB	33.7
	54	-2012.12	-15.2	-5677.0	3067.47	-19.	-99.	AB AB	33.7
	55	-2119.06	26.1	-5744.9	-1555.91	-18.	-103.	AB AB	33.7
	56	-2218.57	12.8	-5805.3	-1289.68	-17.	-105.	AB AB	33.7
	57	-2242.29	-36.1	-5857.8	-1521.19	-17.	-106.	AB AB	33.7
	58	-2143.16	-72.8	-5901.9	3305.12	-19.	-104.	AB AB	33.7
	59	-2021.21	-62.4	-5937.3	2061.93	-21.	-102.	AB AB	33.7
	60	-2166.28	399.5	-5992.6	295.36	-20.	-106.	AB AB	33.7
	61	-3381.05	729.4	-6209.4	-1526.14	12.	-96.	AB AB	88.0
7	61	-3380.03	-730.8	-6227.6	-1522.14	12.	-96.	AB AB	88.0
	62	-2086.59	-327.5	-6311.5	387.80	-24.	-107.	AB AB	33.7
	63AI	-2284.67	117.4	-6390.4	2454.47	-21.	-112.	AB AB	33.7
	63AD	-2025.13	14.0	-5643.8	1911.21	-19.	-99.	AB AB	33.7
	64	-2048.86	-23.2	-5719.1	3209.53	-19.	-101.	AB AB	33.7
	65	-1964.91	-57.1	-5787.7	-1411.70	-21.	-99.	AB AB	33.7
	66	-1861.32	-64.9	-5848.8	-1109.16	-23.	-97.	AB AB	33.7
	67	-1681.61	-77.0	-5901.9	-1310.35	-26.	-94.	AB AB	33.7
	68	-1408.90	-132.1	-5946.4	-2034.61	-31.	-87.	AB AB	33.7
	69	-1132.93	-122.1	-5982.1	2357.01	-36.	-81.	AB AB	33.7
	70	-1283.91	350.4	-6037.8	602.30	-34.	-85.	AB AB	33.7
	71	-2546.32	729.7	-6257.9	-1204.20	0.	-81.	AB AB	88.0
8	71	-2545.13	-335.6	-6275.3	-1201.88	0.	-81.	AB AB	88.0
	72	-2334.22	-296.8	-6345.2	384.65	-20.	-113.	AB AB	33.7
	73AI	-2667.30	207.2	-6388.3	1885.75	-15.	-121.	AB AB	33.7
	73AD	-1750.81	162.6	-5155.8	500.93	-19.	-88.	AB AB	33.7
	74	-2035.53	113.8	-5215.1	1770.05	-15.	-96.	AB AB	33.7
	75	-2227.79	60.7	-5270.5	2785.62	-12.	-101.	AB AB	33.7
	76	-2312.76	3.6	-5321.6	3532.68	-11.	-103.	AB AB	33.7
	77	-2293.07	-58.8	-5368.1	-1072.28	-12.	-103.	AB AB	33.7
	78	-2154.00	-97.3	-5404.8	-916.42	-14.	-100.	AB AB	33.7
	79	-1937.77	-131.3	-5437.3	-987.15	-18.	-95.	AB AB	33.7
	80	-1641.98	-260.3	-5465.6	-1284.82	-23.	-89.	AB AB	33.7
	81	-884.84	-352.0	-5497.1	2582.08	-18.	-47.	AB AB	88.0

COMPROBACION A RASANTE

Calculo de Comprobacion a Rasante

Datos generales

Limite elastico del acero pasivo	=	5100.00	kg/cm2
Coeficiente del acero pasivo	=	1.15	
Limite elastico de acero activo	=	19000.00	kg/cm2
Coeficiente del acero activo	=	1.10	
Resistencia caracteristica del hormigon	=	400.00	kg/cm2
Coeficiente del hormigon	=	1.50	
Coef. mayoracion Cargas muertas y Peso propio	=	1.50	
Coef. mayoracion Sobrecargas	=	1.50	

Calculo de Comprobacion a Rasante

Datos secciones/momentos estaticos

V.	Sec	M.Estatico m3	M.Estatico m3	M.Estatico m3
1	1	0.658		
	2	0.658	0.152	
	3	0.658	0.152	
	4	0.658	0.152	
	5	0.658	0.152	
	6	0.658	0.152	
	7	0.658	0.152	
	8	0.658	0.152	
	9	0.658	0.152	
	10	0.658	0.152	
	11	0.658		
2	11	0.658		
	12	0.658	0.152	
	13	0.658	0.152	
	14	0.658	0.152	
	15	0.658	0.152	
	16	0.658	0.152	
	17	0.658	0.152	
	18	0.658	0.152	
	19	0.658	0.152	
	20	0.658	0.152	
	21	0.658		
3	21	0.658		
	22	0.658	0.152	
	23AI	0.658	0.152	
	23AD	0.658	0.152	
	24	0.658	0.152	
	25	0.658	0.152	
	26	0.658	0.152	
	27	0.658	0.152	
	28	0.658	0.152	
	29	0.658	0.152	
	30	0.658	0.152	
	31	0.658		
4	31	0.658		
	32	0.658	0.152	
	33AI	0.658	0.152	
	33AD	0.658	0.152	
	34	0.658	0.152	
	35	0.658	0.152	
	36	0.658	0.152	
	37	0.658	0.152	
	38	0.658	0.152	
	39	0.658	0.152	
	40	0.658	0.152	
	41	0.658		
5	41	0.658		
	42	0.658	0.152	

Calculo de Comprobacion a Rasante

Datos secciones/momentos estaticos

V.	Sec	M.Estatico m3	M.Estatico m3	M.Estatico m3
	43AI	0.658	0.152	
	43AD	0.658	0.152	
	44	0.658	0.152	
	45	0.658	0.152	
	46	0.658	0.152	
	47	0.658	0.152	
	48	0.658	0.152	
	49	0.658	0.152	
	50	0.658	0.152	
	51	0.658		
6	51	0.658		
	52	0.658	0.152	
	53AI	0.658	0.152	
	53AD	0.658	0.152	
	54	0.658	0.152	
	55	0.658	0.152	
	56	0.658	0.152	
	57	0.658	0.152	
	58	0.658	0.152	
	59	0.658	0.152	
	60	0.658	0.152	
	61	0.658		
7	61	0.658		
	62	0.658	0.152	
	63AI	0.658	0.152	
	63AD	0.658	0.152	
	64	0.658	0.152	
	65	0.658	0.152	
	66	0.658	0.152	
	67	0.658	0.152	
	68	0.658	0.152	
	69	0.658	0.152	
	70	0.658	0.152	
	71	0.658		
8	71	0.658		
	72	0.658	0.152	
	73AI	0.658	0.152	
	73AD	0.658	0.152	
	74	0.658	0.152	
	75	0.658	0.152	
	76	0.658	0.152	
	77	0.658	0.152	
	78	0.658	0.152	
	79	0.658	0.152	
	80	0.658	0.152	
	81	0.658		

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	175.1	1.066	4.1				
	2	85.8	0.649	2.5	0.150	0.6		
	3	17.1	0.129	0.5	0.030	0.1		
	4	52.2	0.395	1.5	0.091	0.3		
	5	83.6	0.632	2.4	0.146	0.6		
	6	143.0	1.083	4.1	0.250	1.0		
	7	263.1	1.991	7.6	0.460	1.8		
	8	390.2	2.953	11.3	0.683	2.6		
	9	522.4	3.954	15.1	0.914	3.5		
	10	758.1	5.738	21.9	1.326	5.1		
	11	800.2	4.872	18.6				
2	11	143.8	0.876	3.3				
	12	83.3	0.630	2.4	0.146	0.6		
	13	81.0	0.613	2.3	0.142	0.5		
	14	105.9	0.801	3.1	0.185	0.7		
	15	135.2	1.024	3.9	0.237	0.9		
	16	158.6	1.200	4.6	0.277	1.1		
	17	329.1	2.491	9.5	0.576	2.2		
	18	458.2	3.468	13.2	0.802	3.1		
	19	619.7	4.690	17.9	1.084	4.1		
	20	756.1	5.723	21.8	1.323	5.0		
	21	1060.8	6.459	24.6				
3	21	119.1	0.725	2.8				
	22	142.8	1.080	4.1	0.250	1.0		
	23AI	136.8	1.035	3.9	0.239	0.9		
	23AD	38.6	0.292	1.1	0.068	0.3		
	24	74.9	0.567	2.2	0.131	0.5		
	25	104.3	0.789	3.0	0.182	0.7		
	26	128.4	0.972	3.7	0.225	0.9		
	27	304.1	2.302	8.8	0.532	2.0		
	28	433.3	3.279	12.5	0.758	2.9		
	29	594.8	4.502	17.1	1.040	4.0		
	30	730.6	5.530	21.1	1.278	4.9		
	31	1035.0	6.302	24.0				
4	31	83.8	0.510	1.9				
	32	177.4	1.342	5.1	0.310	1.2		
	33AI	170.4	1.290	4.9	0.298	1.1		
	33AD	73.5	0.556	2.1	0.129	0.5		
	34	109.3	0.827	3.2	0.191	0.7		
	35	138.1	1.046	4.0	0.242	0.9		
	36	167.2	1.266	4.8	0.293	1.1		
	37	328.9	2.489	9.5	0.575	2.2		
	38	460.4	3.485	13.3	0.805	3.1		
	39	621.6	4.704	17.9	1.087	4.1		
	40	755.8	5.720	21.8	1.322	5.0		
	41	1059.6	6.452	24.6				
5	41	232.7	1.417	5.4				
	42	46.2	0.350	1.3	0.081	0.3		

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
	43AI	77.1	0.584	2.2	0.135	0.5		
	43AD	12.1	0.092	0.3	0.021	0.1		
	44	41.2	0.312	1.2	0.072	0.3		
	45	89.0	0.673	2.6	0.156	0.6		
	46	141.3	1.069	4.1	0.247	0.9		
	47	327.5	2.479	9.4	0.573	2.2		
	48	493.7	3.736	14.2	0.864	3.3		
	49	684.1	5.177	19.7	1.197	4.6		
	50	875.1	6.624	25.2	1.531	5.8		
	51	1218.2	7.417	28.3				
6	51	249.2	1.517	5.8				
	52	38.7	0.293	1.1	0.068	0.3		
	53AI	78.7	0.596	2.3	0.138	0.5		
	53AD	10.5	0.079	0.3	0.018	0.1		
	54	42.8	0.324	1.2	0.075	0.3		
	55	90.6	0.686	2.6	0.158	0.6		
	56	146.8	1.111	4.2	0.257	1.0		
	57	335.0	2.535	9.7	0.586	2.2		
	58	500.0	3.784	14.4	0.875	3.3		
	59	690.4	5.225	19.9	1.208	4.6		
	60	881.4	6.671	25.4	1.542	5.9		
	61	1224.5	7.456	28.4				
7	61	318.7	1.941	7.4				
	62	30.7	0.232	0.9	0.054	0.2		
	63AI	9.6	0.073	0.3	0.017	0.1		
	63AD	75.0	0.568	2.2	0.131	0.5		
	64	22.8	0.173	0.7	0.040	0.2		
	65	23.8	0.180	0.7	0.042	0.2		
	66	91.1	0.690	2.6	0.159	0.6		
	67	290.6	2.200	8.4	0.508	1.9		
	68	445.7	3.373	12.9	0.780	3.0		
	69	634.2	4.800	18.3	1.109	4.2		
	70	823.6	6.234	23.7	1.441	5.5		
	71	1168.9	7.117	27.1				
8	71	51.4	0.313	1.2				
	72	20.0	0.152	0.6	0.035	0.1		
	73AI	120.3	0.911	3.5	0.210	0.8		
	73AD	83.8	0.634	2.4	0.147	0.6		
	74	105.8	0.801	3.1	0.185	0.7		
	75	124.3	0.941	3.6	0.217	0.8		
	76	139.5	1.056	4.0	0.244	0.9		
	77	181.2	1.371	5.2	0.317	1.2		
	78	324.4	2.455	9.4	0.567	2.2		
	79	464.8	3.518	13.4	0.813	3.1		
	80	532.9	4.033	15.4	0.932	3.6		
	81	495.0	3.014	11.5				

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	444.4	2.706	10.3				
	2	508.3	3.847	14.7	0.889	3.4		
	3	466.3	3.529	13.4	0.816	3.1		
	4	328.6	2.487	9.5	0.575	2.2		
	5	182.8	1.383	5.3	0.320	1.2		
	6	140.9	1.066	4.1	0.246	0.9		
	7	125.6	0.951	3.6	0.220	0.8		
	8	107.2	0.811	3.1	0.187	0.7		
	9	85.1	0.644	2.5	0.149	0.6		
	10	39.0	0.295	1.1	0.068	0.3		
	11	55.6	0.338	1.3				
2	11	1020.6	6.214	23.7				
	12	730.6	5.530	21.1	1.278	4.9		
	13	584.7	4.426	16.9	1.023	3.9		
	14	413.6	3.131	11.9	0.724	2.8		
	15	283.1	2.143	8.2	0.495	1.9		
	16	99.3	0.752	2.9	0.174	0.7		
	17	58.3	0.441	1.7	0.102	0.4		
	18	41.7	0.315	1.2	0.073	0.3		
	19	26.3	0.199	0.8	0.046	0.2		
	20	37.9	0.287	1.1	0.066	0.3		
	21	204.0	1.242	4.7				
3	21	1012.8	6.167	23.5				
	22	687.9	5.207	19.8	1.203	4.6		
	23AI	545.6	4.129	15.7	0.954	3.6		
	23AD	643.8	4.872	18.6	1.126	4.3		
	24	461.1	3.490	13.3	0.807	3.1		
	25	324.1	2.453	9.3	0.567	2.2		
	26	156.6	1.185	4.5	0.274	1.0		
	27	117.1	0.887	3.4	0.205	0.8		
	28	100.7	0.763	2.9	0.176	0.7		
	29	85.6	0.648	2.5	0.150	0.6		
	30	98.0	0.742	2.8	0.171	0.7		
	31	143.3	0.873	3.3				
4	31	996.6	6.068	23.1				
	32	672.3	5.088	19.4	1.176	4.5		
	33AI	530.8	4.017	15.3	0.928	3.5		
	33AD	627.7	4.751	18.1	1.098	4.2		
	34	445.4	3.371	12.8	0.779	3.0		
	35	306.5	2.320	8.8	0.536	2.0		
	36	137.3	1.040	4.0	0.240	0.9		
	37	100.2	0.759	2.9	0.175	0.7		
	38	84.3	0.638	2.4	0.147	0.6		
	39	69.6	0.527	2.0	0.122	0.5		
	40	83.7	0.634	2.4	0.146	0.6		
	41	157.0	0.956	3.6				
5	41	1170.9	7.129	27.2				
	42	818.2	6.193	23.6	1.431	5.5		

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
	43AI	628.5	4.757	18.1	1.099	4.2		
	43AD	717.7	5.432	20.7	1.255	4.8		
	44	507.7	3.842	14.6	0.888	3.4		
	45	329.7	2.495	9.5	0.577	2.2		
	46	134.5	1.018	3.9	0.235	0.9		
	47	81.1	0.614	2.3	0.142	0.5		
	48	45.3	0.343	1.3	0.079	0.3		
	49	11.5	0.087	0.3	0.020	0.1		
	50	20.8	0.157	0.6	0.036	0.1		
	51	290.2	1.767	6.7				
6	51	1191.9	7.257	27.6				
	52	830.2	6.284	23.9	1.452	5.5		
	53AI	631.4	4.779	18.2	1.104	4.2		
	53AD	720.6	5.454	20.8	1.261	4.8		
	54	510.5	3.864	14.7	0.893	3.4		
	55	329.6	2.495	9.5	0.577	2.2		
	56	129.8	0.982	3.7	0.227	0.9		
	57	90.6	0.686	2.6	0.158	0.6		
	58	54.8	0.415	1.6	0.096	0.4		
	59	21.2	0.160	0.6	0.037	0.1		
	60	11.0	0.084	0.3	0.019	0.1		
	61	280.4	1.707	6.5				
7	61	1211.6	7.377	28.1				
	62	850.0	6.433	24.5	1.487	5.7		
	63AI	651.2	4.929	18.8	1.139	4.3		
	63AD	735.8	5.569	21.2	1.287	4.9		
	64	527.2	3.990	15.2	0.922	3.5		
	65	349.1	2.642	10.1	0.611	2.3		
	66	160.1	1.212	4.6	0.280	1.1		
	67	122.8	0.929	3.5	0.215	0.8		
	68	88.7	0.671	2.6	0.155	0.6		
	69	56.8	0.430	1.6	0.099	0.4		
	70	26.0	0.197	0.8	0.046	0.2		
	71	245.6	1.495	5.7				
8	71	813.3	4.952	18.9				
	72	756.4	5.725	21.8	1.323	5.0		
	73AI	504.3	3.817	14.5	0.882	3.4		
	73AD	540.8	4.093	15.6	0.946	3.6		
	74	408.5	3.092	11.8	0.715	2.7		
	75	281.3	2.129	8.1	0.492	1.9		
	76	164.2	1.242	4.7	0.287	1.1		
	77	107.4	0.813	3.1	0.188	0.7		
	78	76.1	0.576	2.2	0.133	0.5		
	79	41.2	0.312	1.2	0.072	0.3		
	80	84.0	0.636	2.4	0.147	0.6		
	81	147.3	0.897	3.4				

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec.	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	403.1	2.454	9.3				
	2	272.8	2.065	7.9	0.477	1.8		
	3	112.2	0.849	3.2	0.196	0.7		
	4	78.4	0.593	2.3	0.137	0.5		
	5	40.0	0.303	1.2	0.070	0.3		
	6	25.4	0.192	0.7	0.044	0.2		
	7	71.9	0.544	2.1	0.126	0.5		
	8	126.3	0.956	3.6	0.221	0.8		
	9	186.5	1.412	5.4	0.326	1.2		
	10	373.1	2.824	10.8	0.653	2.5		
	11	397.8	2.422	9.2				
2	11	247.0	1.504	5.7				
	12	472.3	3.575	13.6	0.826	3.1		
	13	367.2	2.779	10.6	0.642	2.4		
	14	295.2	2.235	8.5	0.516	2.0		
	15	228.8	1.731	6.6	0.400	1.5		
	16	154.9	1.173	4.5	0.271	1.0		
	17	227.3	1.720	6.6	0.398	1.5		
	18	257.7	1.950	7.4	0.451	1.7		
	19	320.1	2.423	9.2	0.560	2.1		
	20	351.6	2.661	10.1	0.615	2.3		
	21	657.8	4.005	15.3				
3	21	290.8	1.770	6.7				
	22	558.6	4.228	16.1	0.977	3.7		
	23AI	449.0	3.399	12.9	0.785	3.0		
	23AD	329.0	2.490	9.5	0.576	2.2		
	24	271.0	2.051	7.8	0.474	1.8		
	25	204.6	1.548	5.9	0.358	1.4		
	26	131.5	0.995	3.8	0.230	0.9		
	27	209.0	1.582	6.0	0.366	1.4		
	28	239.5	1.813	6.9	0.419	1.6		
	29	302.0	2.286	8.7	0.528	2.0		
	30	332.7	2.518	9.6	0.582	2.2		
	31	638.4	3.887	14.8				
4	31	315.7	1.922	7.3				
	32	582.7	4.410	16.8	1.019	3.9		
	33AI	471.9	3.572	13.6	0.825	3.1		
	33AD	353.4	2.675	10.2	0.618	2.4		
	34	294.9	2.232	8.5	0.516	2.0		
	35	227.7	1.724	6.6	0.398	1.5		
	36	159.6	1.208	4.6	0.279	1.1		
	37	222.9	1.687	6.4	0.390	1.5		
	38	255.7	1.935	7.4	0.447	1.7		
	39	317.7	2.405	9.2	0.556	2.1		
	40	346.5	2.622	10.0	0.606	2.3		
	41	651.5	3.967	15.1				
5	41	180.2	1.097	4.2				
	42	459.9	3.481	13.3	0.804	3.1		

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
	43AI	388.1	2.937	11.2	0.679	2.6		
	43AD	279.0	2.112	8.0	0.488	1.9		
	44	234.5	1.775	6.8	0.410	1.6		
	45	183.2	1.386	5.3	0.320	1.2		
	46	135.4	1.025	3.9	0.237	0.9		
	47	220.6	1.669	6.4	0.386	1.5		
	48	285.0	2.157	8.2	0.499	1.9		
	49	373.2	2.825	10.8	0.653	2.5		
	50	461.8	3.495	13.3	0.808	3.1		
	51	803.5	4.893	18.6				
6	51	164.1	0.999	3.8				
	52	454.8	3.442	13.1	0.796	3.0		
	53AI	394.1	2.982	11.4	0.689	2.6		
	53AD	285.0	2.157	8.2	0.499	1.9		
	54	240.5	1.820	6.9	0.421	1.6		
	55	189.2	1.432	5.5	0.331	1.3		
	56	145.3	1.100	4.2	0.254	1.0		
	57	232.4	1.759	6.7	0.407	1.5		
	58	295.7	2.238	8.5	0.517	2.0		
	59	383.9	2.905	11.1	0.671	2.6		
	60	472.5	3.576	13.6	0.826	3.1		
	61	814.2	4.958	18.9				
7	61	107.7	0.656	2.5				
	62	398.6	3.017	11.5	0.697	2.7		
	63AI	338.1	2.559	9.7	0.591	2.3		
	63AD	234.7	1.776	6.8	0.411	1.6		
	64	188.7	1.428	5.4	0.330	1.3		
	65	135.9	1.028	3.9	0.238	0.9		
	66	102.7	0.777	3.0	0.180	0.7		
	67	200.8	1.520	5.8	0.351	1.3		
	68	253.8	1.921	7.3	0.444	1.7		
	69	339.7	2.571	9.8	0.594	2.3		
	70	426.4	3.227	12.3	0.746	2.8		
	71	770.8	4.694	17.9				
8	71	357.2	2.175	8.3				
	72	374.4	2.834	10.8	0.655	2.5		
	73AI	469.3	3.552	13.5	0.821	3.1		
	73AD	424.6	3.214	12.2	0.743	2.8		
	74	374.7	2.836	10.8	0.655	2.5		
	75	320.4	2.425	9.2	0.560	2.1		
	76	262.1	1.984	7.6	0.458	1.7		
	77	229.7	1.739	6.6	0.402	1.5		
	78	303.2	2.295	8.7	0.530	2.0		
	79	374.7	2.836	10.8	0.655	2.5		
	80	356.6	2.699	10.3	0.624	2.4		
	81	283.5	1.726	6.6				

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	216.4	1.318	5.0				
	2	321.3	2.432	9.3	0.562	2.1		
	3	371.2	2.810	10.7	0.649	2.5		
	4	302.5	2.289	8.7	0.529	2.0		
	5	226.3	1.713	6.5	0.396	1.5		
	6	258.6	1.957	7.5	0.452	1.7		
	7	316.8	2.398	9.1	0.554	2.1		
	8	371.1	2.808	10.7	0.649	2.5		
	9	421.0	3.186	12.1	0.736	2.8		
	10	346.0	2.619	10.0	0.605	2.3		
	11	346.8	2.112	8.0				
2	11	629.8	3.835	14.6				
	12	341.6	2.585	9.8	0.597	2.3		
	13	298.5	2.260	8.6	0.522	2.0		
	14	224.3	1.697	6.5	0.392	1.5		
	15	189.6	1.435	5.5	0.332	1.3		
	16	103.0	0.779	3.0	0.180	0.7		
	17	160.1	1.212	4.6	0.280	1.1		
	18	242.2	1.833	7.0	0.424	1.6		
	19	325.8	2.466	9.4	0.570	2.2		
	20	442.4	3.348	12.8	0.774	2.9		
	21	199.1	1.212	4.6				
3	21	602.9	3.671	14.0				
	22	272.1	2.059	7.8	0.476	1.8		
	23AI	233.4	1.766	6.7	0.408	1.6		
	23AD	353.4	2.675	10.2	0.618	2.4		
	24	265.0	2.006	7.6	0.464	1.8		
	25	223.8	1.694	6.5	0.392	1.5		
	26	153.5	1.162	4.4	0.268	1.0		
	27	212.2	1.606	6.1	0.371	1.4		
	28	294.6	2.229	8.5	0.515	2.0		
	29	378.4	2.864	10.9	0.662	2.5		
	30	495.9	3.754	14.3	0.868	3.3		
	31	253.2	1.542	5.9				
4	31	597.1	3.635	13.8				
	32	267.0	2.021	7.7	0.467	1.8		
	33AI	229.3	1.735	6.6	0.401	1.5		
	33AD	347.8	2.632	10.0	0.608	2.3		
	34	259.9	1.967	7.5	0.455	1.7		
	35	216.9	1.642	6.3	0.379	1.4		
	36	145.0	1.098	4.2	0.254	1.0		
	37	206.1	1.560	5.9	0.361	1.4		
	38	289.1	2.188	8.3	0.506	1.9		
	39	373.5	2.827	10.8	0.653	2.5		
	40	493.1	3.732	14.2	0.862	3.3		
	41	251.1	1.529	5.8				
5	41	758.0	4.615	17.6				
	42	404.5	3.062	11.7	0.708	2.7		

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
	43AI	317.5	2.403	9.2	0.555	2.1		
	43AD	426.6	3.229	12.3	0.746	2.8		
	44	314.4	2.379	9.1	0.550	2.1		
	45	235.4	1.782	6.8	0.412	1.6		
	46	140.4	1.062	4.0	0.246	0.9		
	47	188.1	1.423	5.4	0.329	1.3		
	48	253.9	1.922	7.3	0.444	1.7		
	49	322.4	2.440	9.3	0.564	2.1		
	50	392.5	2.971	11.3	0.687	2.6		
	51	124.5	0.758	2.9				
6	51	778.6	4.741	18.1				
	52	414.2	3.135	11.9	0.724	2.8		
	53AI	316.1	2.392	9.1	0.553	2.1		
	53AD	425.1	3.218	12.3	0.744	2.8		
	54	312.9	2.368	9.0	0.547	2.1		
	55	231.0	1.748	6.7	0.404	1.5		
	56	131.3	0.994	3.8	0.230	0.9		
	57	193.1	1.462	5.6	0.338	1.3		
	58	259.1	1.961	7.5	0.453	1.7		
	59	327.7	2.480	9.4	0.573	2.2		
	60	397.9	3.012	11.5	0.696	2.7		
	61	129.9	0.791	3.0				
7	61	785.2	4.781	18.2				
	62	420.7	3.184	12.1	0.736	2.8		
	63AI	322.7	2.442	9.3	0.564	2.2		
	63AD	426.1	3.225	12.3	0.745	2.8		
	64	315.7	2.390	9.1	0.552	2.1		
	65	237.0	1.794	6.8	0.415	1.6		
	66	148.5	1.124	4.3	0.260	1.0		
	67	212.5	1.608	6.1	0.372	1.4		
	68	280.6	2.123	8.1	0.491	1.9		
	69	351.3	2.659	10.1	0.614	2.3		
	70	423.3	3.204	12.2	0.740	2.8		
	71	152.5	0.928	3.5				
8	71	404.7	2.464	9.4				
	72	361.9	2.739	10.4	0.633	2.4		
	73AI	155.4	1.176	4.5	0.272	1.0		
	73AD	200.0	1.514	5.8	0.350	1.3		
	74	139.7	1.057	4.0	0.244	0.9		
	75	85.2	0.645	2.5	0.149	0.6		
	76	41.5	0.314	1.2	0.073	0.3		
	77	58.8	0.445	1.7	0.103	0.4		
	78	97.3	0.737	2.8	0.170	0.6		
	79	131.3	0.994	3.8	0.230	0.9		
	80	260.3	1.970	7.5	0.455	1.7		
	81	358.8	2.184	8.3				

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	418.3	2.547	9.7				
	2	508.1	3.845	14.6	0.889	3.4		
	3	466.3	3.529	13.4	0.816	3.1		
	4	321.9	2.437	9.3	0.563	2.1		
	5	182.8	1.383	5.3	0.320	1.2		
	6	64.5	0.489	1.9	0.113	0.4		
	7	57.1	0.432	1.6	0.100	0.4		
	8	183.4	1.388	5.3	0.321	1.2		
	9	314.8	2.383	9.1	0.551	2.1		
	10	39.0	0.295	1.1	0.068	0.3		
	11	55.6	0.338	1.3				
2	11	143.8	0.876	3.3				
	12	83.2	0.630	2.4	0.146	0.6		
	13	371.4	2.811	10.7	0.650	2.5		
	14	320.3	2.424	9.2	0.560	2.1		
	15	146.9	1.112	4.2	0.257	1.0		
	16	1.6	0.012	0.0	0.003	0.0		
	17	159.1	1.204	4.6	0.278	1.1		
	18	298.2	2.257	8.6	0.522	2.0		
	19	450.5	3.410	13.0	0.788	3.0		
	20	3.7	0.028	0.1	0.007	0.0		
	21	245.7	1.496	5.7				
3	21	121.8	0.742	2.8				
	22	140.1	1.060	4.0	0.245	0.9		
	23AI	394.3	2.984	11.4	0.690	2.6		
	23AD	492.5	3.727	14.2	0.861	3.3		
	24	323.1	2.445	9.3	0.565	2.2		
	25	195.4	1.479	5.6	0.342	1.3		
	26	30.0	0.227	0.9	0.053	0.2		
	27	130.7	0.989	3.8	0.229	0.9		
	28	271.1	2.052	7.8	0.474	1.8		
	29	419.5	3.175	12.1	0.734	2.8		
	30	34.5	0.261	1.0	0.060	0.2		
	31	207.1	1.261	4.8				
4	31	139.4	0.849	3.2				
	32	81.6	0.617	2.4	0.143	0.5		
	33AI	370.1	2.801	10.7	0.647	2.5		
	33AD	467.1	3.535	13.5	0.817	3.1		
	34	297.4	2.251	8.6	0.520	2.0		
	35	143.2	1.084	4.1	0.250	1.0		
	36	9.4	0.071	0.3	0.016	0.1		
	37	150.9	1.142	4.4	0.264	1.0		
	38	291.3	2.205	8.4	0.510	1.9		
	39	438.7	3.320	12.6	0.767	2.9		
	40	15.7	0.119	0.5	0.028	0.1		
	41	225.2	1.371	5.2				
5	41	278.7	1.697	6.5				
	42	38.0	0.287	1.1	0.066	0.3		

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
	43AI	481.3	3.643	13.9	0.842	3.2		
	43AD	570.5	4.318	16.4	0.998	3.8		
	44	372.0	2.815	10.7	0.651	2.5		
	45	186.3	1.410	5.4	0.326	1.2		
	46	19.3	0.146	0.6	0.034	0.1		
	47	171.6	1.299	4.9	0.300	1.1		
	48	344.6	2.608	9.9	0.603	2.3		
	49	522.3	3.953	15.1	0.914	3.5		
	50	85.0	0.643	2.5	0.149	0.6		
	51	354.5	2.159	8.2				
6	51	291.3	1.774	6.8				
	52	39.0	0.296	1.1	0.068	0.3		
	53AI	470.6	3.561	13.6	0.823	3.1		
	53AD	559.8	4.237	16.1	0.979	3.7		
	54	360.9	2.732	10.4	0.631	2.4		
	55	175.2	1.326	5.1	0.307	1.2		
	56	19.7	0.149	0.6	0.035	0.1		
	57	210.9	1.596	6.1	0.369	1.4		
	58	367.7	2.783	10.6	0.643	2.4		
	59	546.0	4.133	15.7	0.955	3.6		
	60	13.4	0.102	0.4	0.023	0.1		
	61	282.7	1.722	6.6				
7	61	351.8	2.142	8.2				
	62	63.7	0.482	1.8	0.111	0.4		
	63AI	486.2	3.680	14.0	0.850	3.2		
	63AD	570.8	4.320	16.5	0.998	3.8		
	64	370.6	2.805	10.7	0.648	2.5		
	65	188.4	1.426	5.4	0.330	1.3		
	66	4.9	0.037	0.1	0.009	0.0		
	67	177.9	1.346	5.1	0.311	1.2		
	68	366.2	2.772	10.6	0.641	2.4		
	69	431.7	3.267	12.4	0.755	2.9		
	70	26.0	0.197	0.8	0.046	0.2		
	71	245.6	1.495	5.7				
8	71	51.4	0.313	1.2				
	72	20.1	0.152	0.6	0.035	0.1		
	73AI	279.8	2.118	8.1	0.489	1.9		
	73AD	316.4	2.394	9.1	0.553	2.1		
	74	185.0	1.400	5.3	0.324	1.2		
	75	58.7	0.444	1.7	0.103	0.4		
	76	62.9	0.476	1.8	0.110	0.4		
	77	181.2	1.371	5.2	0.317	1.2		
	78	320.4	2.425	9.2	0.560	2.1		
	79	464.8	3.518	13.4	0.813	3.1		
	80	532.9	4.033	15.4	0.932	3.6		
	81	468.4	2.852	10.9				

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	169.6	1.033	3.9				
	2	85.7	0.649	2.5	0.150	0.6		
	3	17.1	0.129	0.5	0.030	0.1		
	4	52.2	0.395	1.5	0.091	0.3		
	5	83.6	0.632	2.4	0.146	0.6		
	6	95.4	0.722	2.8	0.167	0.6		
	7	111.6	0.845	3.2	0.195	0.7		
	8	131.1	0.992	3.8	0.229	0.9		
	9	154.2	1.167	4.4	0.270	1.0		
	10	690.3	5.224	19.9	1.207	4.6		
	11	728.3	4.434	16.9				
2	11	981.0	5.973	22.8				
	12	662.3	5.013	19.1	1.158	4.4		
	13	158.6	1.200	4.6	0.277	1.1		
	14	53.7	0.406	1.5	0.094	0.4		
	15	12.1	0.092	0.3	0.021	0.1		
	16	63.6	0.481	1.8	0.111	0.4		
	17	140.3	1.062	4.0	0.245	0.9		
	18	178.9	1.354	5.2	0.313	1.2		
	19	203.9	1.543	5.9	0.357	1.4		
	20	664.8	5.032	19.2	1.163	4.4		
	21	1004.0	6.113	23.3				
3	21	942.3	5.737	21.9				
	22	627.3	4.748	18.1	1.097	4.2		
	23AI	128.5	0.973	3.7	0.225	0.9		
	23AD	226.7	1.716	6.5	0.397	1.5		
	24	111.7	0.846	3.2	0.195	0.7		
	25	50.5	0.382	1.5	0.088	0.3		
	26	14.9	0.113	0.4	0.026	0.1		
	27	44.2	0.334	1.3	0.077	0.3		
	28	153.5	1.161	4.4	0.268	1.0		
	29	182.4	1.380	5.3	0.319	1.2		
	30	654.7	4.955	18.9	1.145	4.4		
	31	990.9	6.034	23.0				
4	31	924.2	5.627	21.4				
	32	609.9	4.616	17.6	1.067	4.1		
	33AI	113.8	0.861	3.3	0.199	0.8		
	33AD	210.7	1.595	6.1	0.369	1.4		
	34	81.3	0.615	2.3	0.142	0.5		
	35	21.6	0.163	0.6	0.038	0.1		
	36	41.6	0.315	1.2	0.073	0.3		
	37	72.5	0.549	2.1	0.127	0.5		
	38	184.5	1.397	5.3	0.323	1.2		
	39	213.7	1.618	6.2	0.374	1.4		
	40	690.3	5.224	19.9	1.207	4.6		
	41	984.0	5.991	22.8				
5	41	1129.4	6.877	26.2				
	42	742.3	5.618	21.4	1.298	4.9		

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
	43AI	178.4	1.351	5.1	0.312	1.2		
	43AD	267.7	2.026	7.7	0.468	1.8		
	44	202.1	1.529	5.8	0.353	1.3		
	45	57.0	0.431	1.6	0.100	0.4		
	46	25.6	0.194	0.7	0.045	0.2		
	47	77.9	0.590	2.2	0.136	0.5		
	48	197.8	1.497	5.7	0.346	1.3		
	49	244.9	1.853	7.1	0.428	1.6		
	50	805.3	6.095	23.2	1.409	5.4		
	51	1136.5	6.920	26.4				
6	51	1147.1	6.984	26.6				
	52	747.5	5.657	21.6	1.307	5.0		
	53AI	188.9	1.430	5.4	0.330	1.3		
	53AD	278.1	2.105	8.0	0.487	1.9		
	54	212.8	1.611	6.1	0.372	1.4		
	55	72.5	0.549	2.1	0.127	0.5		
	56	14.3	0.108	0.4	0.025	0.1		
	57	66.5	0.503	1.9	0.116	0.4		
	58	131.5	0.995	3.8	0.230	0.9		
	59	244.1	1.847	7.0	0.427	1.6		
	60	808.4	6.119	23.3	1.414	5.4		
	61	1139.7	6.939	26.4				
7	61	1157.3	7.046	26.8				
	62	756.7	5.727	21.8	1.324	5.0		
	63AI	211.1	1.597	6.1	0.369	1.4		
	63AD	295.7	2.238	8.5	0.517	2.0		
	64	234.7	1.777	6.8	0.411	1.6		
	65	169.1	1.280	4.9	0.296	1.1		
	66	76.5	0.579	2.2	0.134	0.5		
	67	12.7	0.096	0.4	0.022	0.1		
	68	59.8	0.452	1.7	0.105	0.4		
	69	172.4	1.305	5.0	0.301	1.1		
	70	747.6	5.659	21.6	1.308	5.0		
	71	1127.8	6.867	26.2				
8	71	744.2	4.531	17.3				
	72	691.3	5.232	19.9	1.209	4.6		
	73AI	141.7	1.073	4.1	0.248	0.9		
	73AD	178.3	1.349	5.1	0.312	1.2		
	74	155.1	1.174	4.5	0.271	1.0		
	75	135.4	1.025	3.9	0.237	0.9		
	76	119.1	0.901	3.4	0.208	0.8		
	77	107.4	0.813	3.1	0.188	0.7		
	78	76.1	0.576	2.2	0.133	0.5		
	79	41.2	0.312	1.2	0.072	0.3		
	80	84.0	0.636	2.4	0.147	0.6		
	81	140.5	0.856	3.3				

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	190.3	1.159	4.4				
	2	321.0	2.430	9.3	0.562	2.1		
	3	371.2	2.810	10.7	0.649	2.5		
	4	295.8	2.239	8.5	0.517	2.0		
	5	226.3	1.713	6.5	0.396	1.5		
	6	182.2	1.379	5.3	0.319	1.2		
	7	134.0	1.014	3.9	0.234	0.9		
	8	80.4	0.609	2.3	0.141	0.5		
	9	21.0	0.159	0.6	0.037	0.1		
	10	346.0	2.619	10.0	0.605	2.3		
	11	346.8	2.112	8.0				
2	11	247.0	1.504	5.7				
	12	472.2	3.574	13.6	0.826	3.1		
	13	85.2	0.645	2.5	0.149	0.6		
	14	131.0	0.991	3.8	0.229	0.9		
	15	53.4	0.404	1.5	0.093	0.4		
	16	5.3	0.040	0.2	0.009	0.0		
	17	57.2	0.433	1.7	0.100	0.4		
	18	97.7	0.739	2.8	0.171	0.7		
	19	151.0	1.143	4.4	0.264	1.0		
	20	400.8	3.033	11.6	0.701	2.7		
	21	157.4	0.958	3.7				
3	21	288.1	1.754	6.7				
	22	555.9	4.208	16.0	0.972	3.7		
	23AI	82.0	0.621	2.4	0.144	0.5		
	23AD	202.1	1.529	5.8	0.353	1.3		
	24	127.0	0.961	3.7	0.222	0.8		
	25	95.1	0.720	2.7	0.166	0.6		
	26	26.9	0.204	0.8	0.047	0.2		
	27	35.6	0.270	1.0	0.062	0.2		
	28	77.3	0.585	2.2	0.135	0.5		
	29	126.7	0.959	3.7	0.222	0.8		
	30	432.4	3.273	12.5	0.756	2.9		
	31	189.5	1.154	4.4				
4	31	260.1	1.584	6.0				
	32	486.9	3.685	14.0	0.852	3.2		
	33AI	68.7	0.520	2.0	0.120	0.5		
	33AD	187.1	1.416	5.4	0.327	1.2		
	34	111.9	0.847	3.2	0.196	0.7		
	35	53.6	0.405	1.5	0.094	0.4		
	36	17.0	0.129	0.5	0.030	0.1		
	37	45.0	0.340	1.3	0.079	0.3		
	38	86.6	0.655	2.5	0.151	0.6		
	39	134.8	1.020	3.9	0.236	0.9		
	40	425.1	3.217	12.3	0.744	2.8		
	41	182.9	1.114	4.2				
5	41	134.2	0.817	3.1				
	42	375.8	2.844	10.8	0.657	2.5		

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
	43AI	170.3	1.289	4.9	0.298	1.1		
	43AD	279.4	2.114	8.1	0.489	1.9		
	44	178.7	1.353	5.2	0.313	1.2		
	45	92.1	0.697	2.7	0.161	0.6		
	46	25.2	0.191	0.7	0.044	0.2		
	47	64.7	0.489	1.9	0.113	0.4		
	48	136.0	1.029	3.9	0.238	0.9		
	49	211.5	1.600	6.1	0.370	1.4		
	50	328.4	2.485	9.5	0.574	2.2		
	51	60.1	0.366	1.4				
6	51	122.0	0.743	2.8				
	52	377.0	2.854	10.9	0.660	2.5		
	53AI	155.2	1.175	4.5	0.272	1.0		
	53AD	264.3	2.000	7.6	0.462	1.8		
	54	163.2	1.236	4.7	0.286	1.1		
	55	76.7	0.580	2.2	0.134	0.5		
	56	18.2	0.138	0.5	0.032	0.1		
	57	108.3	0.820	3.1	0.189	0.7		
	58	163.4	1.237	4.7	0.286	1.1		
	59	239.5	1.813	6.9	0.419	1.6		
	60	395.6	2.994	11.4	0.692	2.6		
	61	127.5	0.777	3.0				
7	61	74.6	0.454	1.7				
	62	365.5	2.766	10.5	0.639	2.4		
	63AI	157.7	1.194	4.5	0.276	1.1		
	63AD	261.1	1.976	7.5	0.457	1.7		
	64	159.1	1.204	4.6	0.278	1.1		
	65	76.3	0.577	2.2	0.133	0.5		
	66	16.5	0.125	0.5	0.029	0.1		
	67	88.1	0.667	2.5	0.154	0.6		
	68	174.4	1.320	5.0	0.305	1.2		
	69	137.2	1.038	4.0	0.240	0.9		
	70	423.3	3.204	12.2	0.740	2.8		
	71	152.5	0.928	3.5				
8	71	357.2	2.175	8.3				
	72	374.4	2.834	10.8	0.655	2.5		
	73AI	69.1	0.523	2.0	0.121	0.5		
	73AD	24.5	0.185	0.7	0.043	0.2		
	74	83.9	0.635	2.4	0.147	0.6		
	75	137.4	1.040	4.0	0.240	0.9		
	76	185.6	1.405	5.4	0.325	1.2		
	77	229.7	1.739	6.6	0.402	1.5		
	78	299.2	2.265	8.6	0.523	2.0		
	79	374.7	2.836	10.8	0.655	2.5		
	80	356.6	2.699	10.3	0.624	2.4		
	81	256.9	1.564	6.0				

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	397.6	2.421	9.2				
	2	272.8	2.064	7.9	0.477	1.8		
	3	112.2	0.849	3.2	0.196	0.7		
	4	78.4	0.593	2.3	0.137	0.5		
	5	40.0	0.303	1.2	0.070	0.3		
	6	22.3	0.168	0.6	0.039	0.1		
	7	79.5	0.602	2.3	0.139	0.5		
	8	132.8	1.005	3.8	0.232	0.9		
	9	181.7	1.375	5.2	0.318	1.2		
	10	305.3	2.311	8.8	0.534	2.0		
	11	325.9	1.984	7.6				
2	11	590.2	3.593	13.7				
	12	273.3	2.068	7.9	0.478	1.8		
	13	127.6	0.966	3.7	0.223	0.9		
	14	135.7	1.027	3.9	0.237	0.9		
	15	81.4	0.616	2.3	0.142	0.5		
	16	59.9	0.453	1.7	0.105	0.4		
	17	38.5	0.291	1.1	0.067	0.3		
	18	21.6	0.164	0.6	0.038	0.1		
	19	95.7	0.724	2.8	0.167	0.6		
	20	260.3	1.970	7.5	0.455	1.7		
	21	600.9	3.659	13.9				
3	21	532.4	3.241	12.3				
	22	211.5	1.601	6.1	0.370	1.4		
	23AI	183.7	1.391	5.3	0.321	1.2		
	23AD	63.7	0.482	1.8	0.111	0.4		
	24	84.4	0.639	2.4	0.148	0.6		
	25	49.7	0.376	1.4	0.087	0.3		
	26	11.8	0.090	0.3	0.021	0.1		
	27	50.9	0.385	1.5	0.089	0.3		
	28	40.4	0.305	1.2	0.071	0.3		
	29	110.5	0.836	3.2	0.193	0.7		
	30	256.8	1.943	7.4	0.449	1.7		
	31	594.4	3.619	13.8				
4	31	524.7	3.195	12.2				
	32	204.6	1.549	5.9	0.358	1.4		
	33AI	187.7	1.420	5.4	0.328	1.3		
	33AD	69.2	0.524	2.0	0.121	0.5		
	34	104.3	0.789	3.0	0.182	0.7		
	35	68.0	0.515	2.0	0.119	0.5		
	36	33.9	0.257	1.0	0.059	0.2		
	37	33.4	0.253	1.0	0.058	0.2		
	38	20.2	0.153	0.6	0.035	0.1		
	39	90.1	0.682	2.6	0.158	0.6		
	40	280.9	2.126	8.1	0.491	1.9		
	41	575.8	3.506	13.4				
5	41	716.5	4.363	16.6				
	42	328.6	2.487	9.5	0.575	2.2		

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

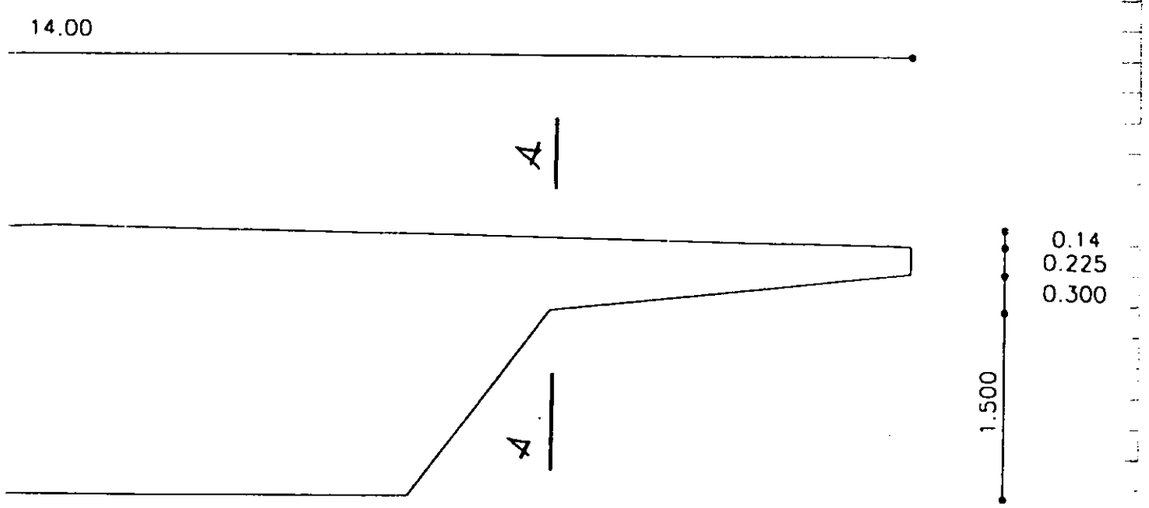
Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
	43AI	132.5	1.003	3.8	0.232	0.9		
	43AD	23.5	0.178	0.7	0.041	0.2		
	44	8.8	0.066	0.3	0.015	0.1		
	45	37.2	0.282	1.1	0.065	0.2		
	46	19.7	0.149	0.6	0.034	0.1		
	47	29.0	0.220	0.8	0.051	0.2		
	48	10.8	0.082	0.3	0.019	0.1		
	49	66.0	0.499	1.9	0.115	0.4		
	50	391.9	2.966	11.3	0.686	2.6		
	51	721.9	4.395	16.7				
6	51	733.8	4.468	17.0				
	52	331.4	2.508	9.6	0.580	2.2		
	53AI	126.4	0.957	3.6	0.221	0.8		
	53AD	17.4	0.131	0.5	0.030	0.1		
	54	15.2	0.115	0.4	0.027	0.1		
	55	26.1	0.198	0.8	0.046	0.2		
	56	12.8	0.097	0.4	0.022	0.1		
	57	36.1	0.273	1.0	0.063	0.2		
	58	72.8	0.551	2.1	0.127	0.5		
	59	62.4	0.472	1.8	0.109	0.4		
	60	399.5	3.023	11.5	0.699	2.7		
	61	729.4	4.441	16.9				
7	61	730.8	4.450	17.0				
	62	327.5	2.479	9.4	0.573	2.2		
	63AI	117.4	0.889	3.4	0.205	0.8		
	63AD	14.0	0.106	0.4	0.024	0.1		
	64	23.2	0.176	0.7	0.041	0.2		
	65	57.1	0.432	1.6	0.100	0.4		
	66	64.9	0.491	1.9	0.114	0.4		
	67	77.0	0.583	2.2	0.135	0.5		
	68	132.1	1.000	3.8	0.231	0.9		
	69	122.1	0.924	3.5	0.214	0.8		
	70	350.4	2.652	10.1	0.613	2.3		
	71	729.7	4.443	16.9				
8	71	335.6	2.043	7.8				
	72	296.8	2.247	8.6	0.519	2.0		
	73AI	207.2	1.568	6.0	0.362	1.4		
	73AD	162.6	1.230	4.7	0.284	1.1		
	74	113.8	0.861	3.3	0.199	0.8		
	75	60.7	0.459	1.7	0.106	0.4		
	76	3.6	0.027	0.1	0.006	0.0		
	77	58.8	0.445	1.7	0.103	0.4		
	78	97.3	0.737	2.8	0.170	0.6		
	79	131.3	0.994	3.8	0.230	0.9		
	80	260.3	1.970	7.5	0.455	1.7		
	81	352.0	2.143	8.2				

ESTUDIO DE LA SECCION TRANSVERSAL

ARMADURA DEL VOLADIZO

ARMADURA DEL VOLADIZO (Sección A-A)



a) POR FLEXIÓN DE VOLADIZO

LOSA DE VOLADIZO	$\mu = \frac{0.225+0.584}{2} \times 2.50 \times \frac{2.96^2}{2}$	= 4.76 mt/m
IMPOSTA	$\mu = 0.325 \times 2.96$	= 0.96 mt/m
BARANDILLA	$\mu = 0.05 \times 2.96$	= 0.15 mt/m
ACERA	$\mu = 0.198 \times 2.50$	= 0.50 mt/m
REDUCCIÓN CARGA	$\mu = 0.30 \times 2.06$	= 0.62 mt/m.

BARANDA BALAST	$\mu = 0.198 \times 0.50$	= 0.10
SOBRECARGA 3/A CAT	$\mu = 0.50 \times 1.25 \times 2.50$	= 1.56
	TOTAL	= 8.59 mt/m

$M' = 8.59 \times 1.6 = 13.75$ mt.

CANTO DISPONIBLE = 0.225+0.30+2.96×0.02 = 0.584

CANTO UTIL = 0.55 m

$U_c = \frac{4000}{1.5} \times 1.00 \times 0.55 = 1467$ tm

$U_s = 1467 \left(1 - \sqrt{1 - \frac{2 \times 1375}{0.55 \times 1467}}\right) = 25.21$

$\omega = 25.2 \times 1.15 / 51 = 5.7$ cm/m.

HIPOTESIS DE DESCARGUIAMIENTO

SEGUN U.I.C 776-1

CASO A: DESCARRILAMIENTO DE COCHES DE VIAJEROS O MERCANCIAS LIGEROS, LOS VEHICULOS DESCARRILADOS QUEDAN EN LA ZONA DE LA VIA SOBRE EL TABLERO A) DOS CARGAS LINEALES DE 1.5 T/ML

ARMADURA DE LAS TRAVIESAS SOBRE PILAS

intecsa
INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS S.A

PROYECTO: _____ HOJA ___ DE ___

FECHA _____

EJECUTANTE: _____

PARRILLA DE ANCLAJES

PANTALLA 24b36

$\omega = \frac{24 \times 19.97 \times 0.3 \times 1.6 \times 1.15}{51} = 5187 \text{ cm}^2/\text{anc}$

Se dispone 12 Ø25 en cada dirección

PAR 12 Ø0.5 = 25.9 cm²/dirección

Se dispone 8Ø10 en cada dirección

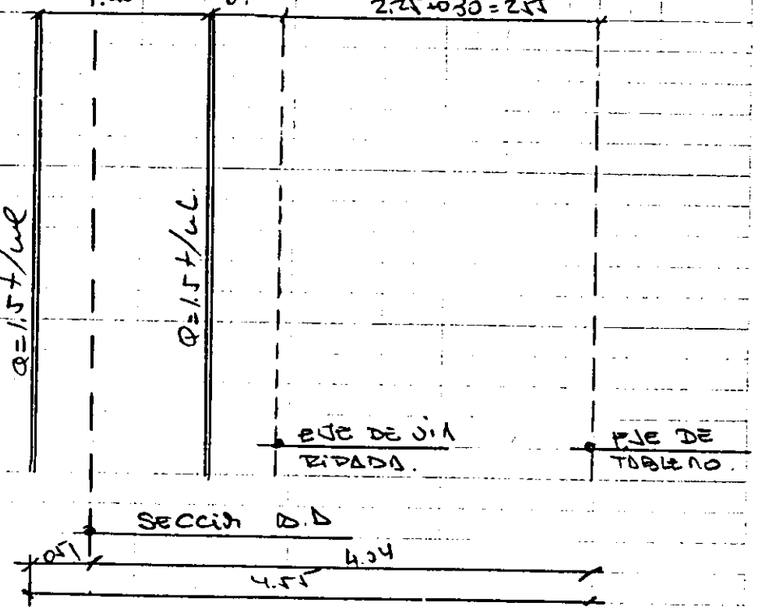
intecsa
INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS S.A.

PROYECTO: _____ HOJA ___ DE ___

FECHA _____

EJECUTANTE: _____

DISTANCIAS ENTRE EJES 1.40 m DE UNA ZONA DE 20 METROS A UN LADO Y A OTRO DE LA VÍA (VER ESQUEMA)



$M = 8.59 + 0.51 \times 1.50 = 9.36$ mt/ml

b) UNA CARGA LINEAL DE 10.0T ACTUANDO EN UNA ZONA DE 20 METROS, A UN LADO Y OTRO DEL EJE DE LA VÍA

$M = 8.59 + \frac{10}{11} = 11.77$ mt/ml

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INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS S.A.

PROYECTO: _____ HOJA ___ DE ___

FECHA _____

EJECUTANTE: _____

CASO B: DESCARRILAMIENTO DE LOCOMOTORAS O VEHICULOS PESADOS, NO VOLADOS, PERO CARGADO EN EQUILIBRIO EN EL BORDE DEL PUENTE

a) DOS CARGAS LINEALES DE 5.0 t/ml CADA UNA DE ELLAS SEPARADAS 1.4 m UNA DE OTRA EN UNA ZONA DE 2.0 m A UN LADO Y OTRO DE LA VÍA

$M = 8.59 + 0.51 \times 5 = 11.14$ mt

b) UNA CARGA LINEAL DE 20.0T ACTUANDO EN UNA ZONA DE 2.0 m A UN LADO Y OTRO DE LA VÍA

$M = 8.59 + \frac{20}{11} = 14.96$ mt/ml

DISEÑO ESTRUCTURAL

SE CONSIDERA $\gamma = 1.0$

$M' = 14.96$ mt/ml

$V_C = 14.67 t$

$V_S = 14.67 \left(1 - \sqrt{1 - \frac{2 \times 14.67}{0,55 \times 14.67}}\right) = 26.9 t$

$w = 26.9 \times 1.15 / 5,1 = 6.0 t/m$

B) POR RASANTE DE ALA

EN VANOS DE 21.0 m

ENTRECIOS DE APOYO $w = 21.3 t/m$

ENTRECIO CENTRAL $w = 10.0 t/m$

EN VANOS DE 28.0 m

ENTRECIOS DE APOYO $w = 25 t/m$

ENTRECIO CENTRAL $w = 13.6 t/m$

EN VANOS DE 30.0 metros

ENTRECIOS DE APOYO $w = 21,9 t/m$

ENTRECIO CENTRAL $w = 14.4 t/m$

ARMADURA A DISPONER

EN VANOS DE 21.0 m

ENTRECIO DE APOYOS

$w_S = \Phi 20/15 = 20.93 t/m > 6.0 t/m$

$w_i = \Phi 16/15 = 13.4 t/m$

COMPROBACION $20.93 + 13.47 > 21.30 + 6.0 t \cdot 21.3 t$

ENTRECIO CENTRAL

$w_S = \Phi 16/15 = 13.47 t/m > 6.0 t/m$

$w_i = \Phi 12/15 = 7,47 t/m$

COMPROBACION $13.47 + 7.47 > 6.0 t + 10.0 = 16 t$

EN VANOS DE 28.0 m

ENTRECIO DE APOYOS

$w_S = \Phi 20/15 = 20.93 t/m > 6.0 t/m$

$w_i = \Phi 16/15 = 13,47 t/m$

COMPROBACION $20.93 + 13.47) 25.0 + 6.0 t = 31.0 t$

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PROYECTO: HOJA DE
FECHA
EJECUTANTE:

EN TERCIO CENTRAL

$w_s = \phi 16/15 = 13{,}47\ cm^2/ml \quad > 6{,}37\ cm^2/ml$

$w_i = \phi 16/15 = 13{,}47\ cm^2/ml$

COMPROBACIÓN $13{,}47 + 13{,}47 > 11{,}46 + 6{,}37 = 23{,}53$

EN VANOS DE 30,0 m

EN TERCIO DE APOYOS

$w_s = \phi 20/15 = 20{,}93\ cm^2/ml \quad > 6{,}37$

$w_i = \phi 16/15 = 13{,}47\ cm^2/ml$

COMPROBACIÓN $20{,}93 + 13{,}47 > 6{,}37 + 27{,}9 = 33{,}97$

EN TERCIO CENTRAL

$w_s = \phi 16/15 = 13{,}47\ cm^2/ml \quad > 6{,}37\ cm^2/ml$

$w_i = \phi 16/15 = 13{,}47\ cm^2/ml$

COMPROBACIÓN $13{,}47 + 13{,}47 > 6{,}37 + 14 = 20{,}37$

Valen EN TODOS LOS VANOS

TERCIOS DE APOYO $w_s = \phi 16/15$ $w_i = \phi 16/15$

TERCIO CENTRAL $w_s = \phi 16/15$ $w_i = \phi 16/15$

ARMADURA DEL CAJON

intecsa
INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS S.A

PROYECTO: HOJA DE
FECHA
EJECUTANTE:

ARMADURA DE CONTORNO

A LO LARGO DE TODA LA SECCION LONGITUDINAL SE DISPONE 3,5,2 cm/m. (PRÓXIMA A LA ARMADURA mínima)

SE DISPONEN $(2\phi16 + 2\phi12)/30 \Rightarrow 11.2$ cm/m ✓

LAS ZONAS MACIZADAS SE ARMAN APARTE.

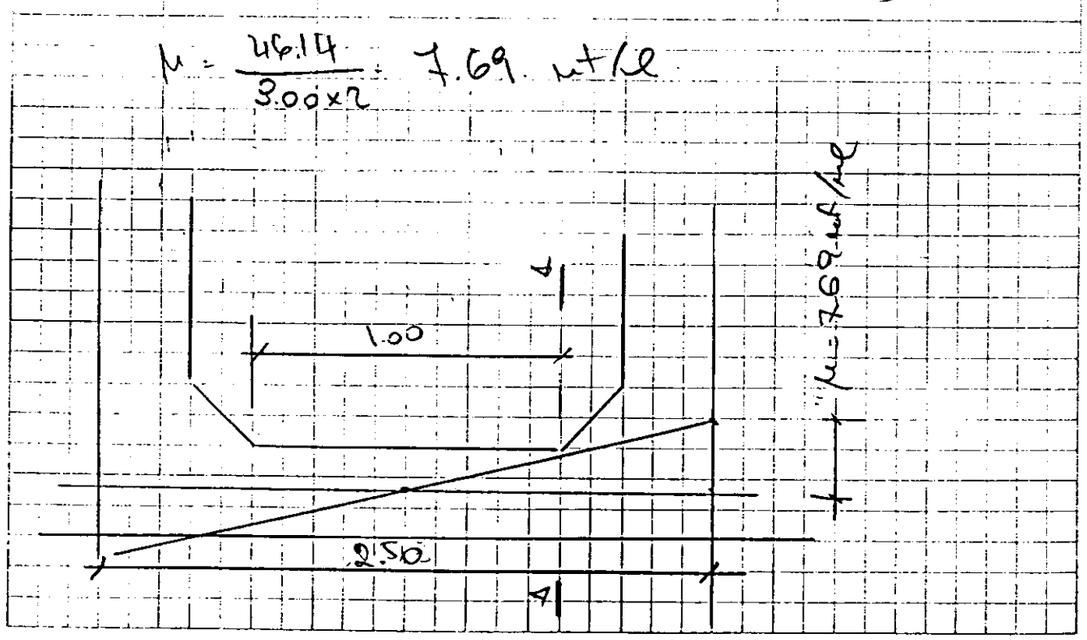
ARMADURA POR FLEXIÓN TRANSVERSAL

VER CALCULO ORDENADOR

μ_{max}: 46.14 mt

en cada tabla (suponemos empotrada)

$\mu = \frac{46.14}{3.00 \times 2} = 7.69$ mt/m



CASO DE CARGA DIRECTAMENTE APLICADA en la losa:

$q = 0.30 \times 2.50 + 0.40 \times 1.80 + 3.00 = 4.47$ t/m.

$\lambda = 23 \times 10^{-2} \cdot V = 33 \times 10^{-2} \times 200 = 66$.

En empotramiento ($L_1 = 2.50$ $L_2 = 1.64$)

$M = \left[7.69 \times \frac{0.50 \times 2}{2.50} + 4.47 \times \frac{1.64^2}{12}\right] \times 1.66 = 6.76$ mt/m

$\mu' = 6.76 \times 1.5 = 10.14$ mt/m

$A_c = \frac{4000}{1.5} \times 0.27 = 720$ k.

$A_S = 720\left(1 - \sqrt{1 - \frac{2 \times 10.14}{0.27 \times 720}}\right) \cdot 38.6$ t/m

$w = \frac{38.6 \times 1.15}{5.1} = 8.70$ cm/m.

Se dispone $\phi 16/15 = 2.02 \times 6.66 \cdot 13.46$ cm/m

En centro de vano ($L_1 = 2.50$ $L_2 = 1.64$).

$M = \left[7.69 \times \frac{0.50 \times 2}{2.50} + 4.47 \times \frac{1.64^2}{8}\right] \times 1.66 = 7.60$ mt/m

$\mu' = 7.60 \times 1.5 = 11.40$ mt/m

$A_1 = 720\left(1 - \sqrt{1 - \frac{2 \times 11.40}{0.27 \times 720}}\right) = 43.53$ t/m.

$w = 43.53 \times 1.15 / 5.1 = 9.81$ cm/m (vale)

```
*************************************************
*                                               *
*          S T A A D - III                      *
*          Revision 17.0a                       *
*          Proprietary Program of               *
*          RESEARCH ENGINEERS, Inc.             *
*          Date=    JUN  2, 1999                *
*          Time=    15:36:28                    *
*                                               *
*************************************************
```

```
 1. STAAD FLOOR LAV MADRID-ZARAGOZA. LOSA VANOS 1*21+28*3+30*3+21
 2. *FLEXION TRANSVERSAL
 3. UNIT METER MTON
 4. JOINT COORDINATES
 5. 101    0.000   0.000  -3.750   110  27.000   0.000  -3.750
 6. 111   30.000   0.000  -3.750   120  57.000   0.000  -3.750
 7. 121   60.000   0.000  -3.750   131  90.000   0.000  -3.750
 8. 201    0.000   0.000  -0.995   210  27.000   0.000  -0.995
 9. 211   30.000   0.000  -0.995   220  57.000   0.000  -0.995
10. 221   60.000   0.000  -0.995   231  90.000   0.000  -0.995
11. 301    0.000   0.000   0.995   310  27.000   0.000   0.995
12. 311   30.000   0.000   0.995   320  57.000   0.000   0.995
13. 321   60.000   0.000   0.995   331  90.000   0.000   0.995
14. 401    0.000   0.000   3.750   410  27.000   0.000   3.750
15. 411   30.000   0.000   3.750   420  57.000   0.000   3.750
16. 421   60.000   0.000   3.750   431  90.000   0.000   3.750
17. 10001  0.000   0.000  -1.800
18. 10002 30.000   0.000  -1.800
19. 10003 60.000   0.000  -1.800
20. 10004 90.000   0.000  -1.800
21. 10011  0.000   0.000   1.800
22. 10012 30.000   0.000   1.800
23. 10013 60.000   0.000   1.800
24. 10014 90.000   0.000   1.800
25. MEMBER INCIDENCES
26.    101  101  102
27.    R    29   1    1
 8.    RA   3    100  100
29.    1101 101  201
30.    R    30   1    1
31.    1201 201  301
32.    R    30   1    1
33.    1301 301  401
34.    R    30   1    1
35. 10001  101   10001
36. 10002  10001 201
37. 10011  111   10002
38. 10012  10002 211
39. 10021  121   10003
40. 10022  10003 221
41. 10031  131   10004
42. 10032  10004 231
43. 10101  301   10011
44. 10102  10011 401
45. 10111  311   10012
46. 10112  10012 411
47. 10121  321   10013
```



```
*FLEXION TRANSVERSAL
48. 10122  10013 421
49. 10131  331   10014
50. 10132  10014 431
51. DELETE MEMBER 1101 1111 1121 1131 1301 1311 1321 1331
52. MEMBER PROPERTY
53. 101  TO  130  PR  AX  3.3985  IX  0.2923  IZ  0.5577
54. 201  TO  230  PR  AX  2.1590  IX  0.2923  IZ  2.1712
55. 301  TO  330  PR  AX  2.1590  IX  0.2923  IZ  2.1712
56. 401  TO  430  PR  AX  3.3985  IX  0.2923  IZ  0.5577
57. 1102 TO 1110  PR  AX  1.8000  IX  0.0267  IZ  0.0135
58. 1112 TO 1120  PR  AX  1.8000  IX  0.0267  IZ  0.0135
59. 1122 TO 1130  PR  AX  1.8000  IX  0.0267  IZ  0.0135
60. 1201 TO 1231  PR  AX  1.8000  IX  0.0267  IZ  0.0135
61. 1302 TO 1310  PR  AX  1.8000  IX  0.0267  IZ  0.0135
62. 1312 TO 1320  PR  AX  1.8000  IX  0.0267  IZ  0.0135
63. 1322 TO 1330  PR  AX  1.8000  IX  0.0267  IZ  0.0135
64. 10001   10002 PR  AX  1.8000  IX  0.0267  IZ  0.0135
65. 10011   10012 PR  AX  1.8000  IX  0.0267  IZ  0.0135
66. 10021   10022 PR  AX  1.8000  IX  0.0267  IZ  0.0135
67. 10031   10032 PR  AX  1.8000  IX  0.0267  IZ  0.0135
68. 10101   10102 PR  AX  1.8000  IX  0.0267  IZ  0.0135
69. 10111   10112 PR  AX  1.8000  IX  0.0267  IZ  0.0135
70. 10121   10122 PR  AX  1.8000  IX  0.0267  IZ  0.0135
71. 10131   10132 PR  AX  1.8000  IX  0.0267  IZ  0.0135
72. CONSTANTS
73. E   3250000.  ALL
74. DEN  7.85      ALL
75. POI  0.15      ALL
76. SUPPORTS
77. 10001           FIXED  BUT FX MX
78. 10011           FIXED  BUT FX MX
79. 10002           PINNED
80. 10012           PINNED
81. 10003           PINNED
82. 10013           PINNED
83. 10004           FIXED  BUT FX MX
84. 10014           FIXED  BUT FX MX
85. LOADING 1 UN TREN EN VANO DE 3*30 M CON RIPADO 30 CM (VIA 1)
86. MEMBER LOAD
87. *TREN SOBRE VIA 1
88. *SOBRECARGA DE 0.40 EN ACERA CORRESPONDIENTE
89. 101 TO 130  UNI  GY  -6.775
90. 201 TO 230  UNI  GY  -5.225
91. 101 TO 130  UNI  GY  -0.60
92. 101 TO 130  UMOM GX  -1.50
93. LOADING 2 UN TREN EN VANO DE 3*30 M CON RIPADO 30 CM (VIA 2)
94. MEMBER LOAD
95. *TREN SOBRE VIA 2
96. *SOBRECARGA DE 0.40 EN ACERA CORRESPONDIENTE
97. 301 TO 330  UNI  GY  -7.840
98. 401 TO 430  UNI  GY  -4.16
99. 401 TO 430  UNI  GY  -0.60
100. 401 TO 430  UMOM GX   1.50
101. LOADING COMBINATION 3
102. 1 1.00 2 1.00
103. PERFORM ANALISIS
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 132/ 221/ 8
ORIGINAL/FINAL BAND-WIDTH = 124/ 6
TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 384
SIZE OF STIFFNESS MATRIX = 8064 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 12.48 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX. 15:36:32
++ PROCESSING GLOBAL STIFFNESS MATRIX. 15:36:32
++ PROCESSING TRIANGULAR FACTORIZATION. 15:36:32
++ CALCULATING JOINT DISPLACEMENTS. 15:36:32
++ CALCULATING MEMBER FORCES. 15:36:32

104. LOAD LIST ALL
105. PRINT MEMBER FORCES LIST 1116 1216 1316

MEMBER END FORCES STRUCTURE TYPE = FLOOR
ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1116	1	116	0.00	-11.11	0.00	0.00	0.00	5.01
		216	0.00	11.11	0.00	0.00	0.00	-35.63
	2	116	0.00	-1.72	0.00	0.00	0.00	1.42
		216	0.00	1.72	0.00	0.00	0.00	-6.16
	3	116	0.00	-12.83	0.00	0.00	0.00	6.43
		216	0.00	12.83	0.00	0.00	0.00	-41.78
1216	1	216	0.00	-6.23	0.00	0.00	0.00	14.93
		316	0.00	6.23	0.00	0.00	0.00	-27.32
	2	216	0.00	8.88	0.00	0.00	0.00	19.18
		316	0.00	-8.88	0.00	0.00	0.00	-1.51
	3	216	0.00	2.65	0.00	0.00	0.00	34.10
		316	0.00	-2.65	0.00	0.00	0.00	-28.83
1316	1	316	0.00	3.21	0.00	0.00	0.00	10.35
		416	0.00	-3.21	0.00	0.00	0.00	-1.52
	2	316	0.00	4.76	0.00	0.00	0.00	18.25
		416	0.00	-4.76	0.00	0.00	0.00	-5.15
	3	316	0.00	7.96	0.00	0.00	0.00	28.60
		416	0.00	-7.96	0.00	0.00	0.00	6.67

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

106. PRINT MEMBER FORCES LIST 1113 1213 1313

...MBER END FORCES STRUCTURE TYPE = FLOOR

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1113	1	113	0.00	-10.76	0.00	-1.51	0.00	16.49
		213	0.00	10.76	0.00	1.51	0.00	-46.14
	2	113	0.00	-0.95	0.00	0.88	0.00	-2.69
		213	0.00	0.95	0.00	-0.88	0.00	0.07
	3	113	0.00	-11.71	0.00	-0.64	0.00	13.81
		213	0.00	11.71	0.00	0.64	0.00	-46.07
1213	1	213	0.00	19.17	0.00	-5.16	0.00	36.78
		313	0.00	-19.17	0.00	5.16	0.00	1.37
	2	213	0.00	-11.21	0.00	4.08	0.00	-4.21
		313	0.00	11.21	0.00	-4.08	0.00	-18.09
	3	213	0.00	7.96	0.00	-1.08	0.00	32.57
		313	0.00	-7.96	0.00	1.08	0.00	-16.72
1313	1	313	0.00	2.39	0.00	-1.16	0.00	2.16
		413	0.00	-2.39	0.00	1.16	0.00	4.42
	2	313	0.00	4.35	0.00	1.23	0.00	26.81
		413	0.00	-4.35	0.00	-1.23	0.00	-14.82
	3	313	0.00	6.74	0.00	0.07	0.00	28.98
		413	0.00	-6.74	0.00	-0.07	0.00	-10.40

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

107. PLOT BEND FILE
108. PLOT DISP FILE
109. FINISH

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

**** DATE= JUN 2,1999 TIME= 15:36:45 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

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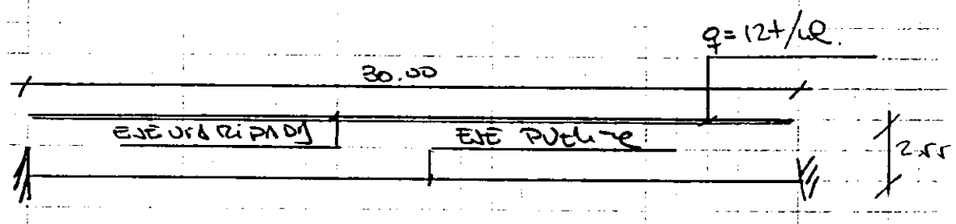
PROYECTO: HOJA DE
FECHA
EJECUTANTE:

EFECTO DE LA TORSIÓN

Se considera a efectos de torsión como empotrado en las líneas

La máxima torsión aparece en la viga central (la más excéntrica) + sobrecarga de 500 kg/m² en ambos

Sobre un vano de 30.00



$\mu_T = 12 \times 2.55 \times 15 + 0.40 \times 1.50 \times (7 - 0.75) \times 15 =$

$= 459 + 56 = 515\ mt.$

$\mu'_T = 515 \times 1.6 = 824\ mt$

Aplicando EHE

$$\frac{l_e}{J} \leq \frac{\Delta}{J} = \frac{\left(\frac{8.58+5.78}{2}\right) \times 2.10}{2\left(\frac{8.58+5.78}{2} + 2.10\right)} = \frac{14.553}{18.06} = 0.80 > 0.$$

$$\Delta e = \left(\frac{8.08+5.78}{2} - 0.15\right)(2.10 - 0.15) = 6.78 \times 1.95 = 13.22\ m^2$$

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PROYECTO: _____ HOJA ___ DE ___

FECHA _____

EJECUTANTE: _____

$T_{U_1} = 1.2 \times 13.22 \times 0.30 \times \frac{1}{1+1} \times 0.66 \times \frac{4000}{1.5} =$

$= 3805 > 824$ kg

ARMADURA TRABAJANDO

$T_{U_2} = \frac{2 \times 13.22 \times A_t}{0.15} \times 4.0 = 824$

$A_T = 1.16 \rightarrow \phi 16/15$

ARMADURA LONGITUDINAL

$T_{U_3} = \frac{2 \times 13.22 \times A_L}{1.06} \times 4.0 = 824$

$A_L = 1.41 \cdot 2$ (TOTALES) $= 1.8$ cm²/m $\rightarrow \phi 16/15$

COMPROBACIÓN A FATIGA

La comprobación a fatiga consiste en limitar la variación de tensión en el acero W efecto de la carga móvil a 950 kg/cm² en los voladizos y a 1825 kg/cm² para el resto de la sección transversal

En efecto:

Según U.I.C. 774-1 R (APB)

$$\Delta\sigma_{ADM} = \frac{\Delta f_{sk} \cdot r_a \cdot r_m}{\gamma_m \gamma_f} \cdot \frac{1}{\kappa_T \lambda_T \beta_T}$$

Siendo:

$\Delta f_{sk} = 180$ N/mm² (biestencia del acero a la fatiga)

$r_a = 1$ (coef reducción empalmes de barras)

$r_m = 1$ (coef reducción W nº ciclos de carga

$\gamma_m = 1.26$ (coef seguridad W fatiga)

$\gamma_f = 1.12$ (coef seguridad de cargas)

$\lambda_T = 1.20$ (coef tráfico)

$K_f = 1.12$ (intensidad de tráfico)

$\beta_T = 1.0$ (tablero con dos vías de circulación)

$$\Delta\sigma_u = \frac{120 \times 1.0 \times 1.0 \times 1.0}{1.26 \times 1.12 \times 1.12 \times 1.20 \times 1} = 950 \text{ kg/cm}^2$$

En el caso de momentos positivos, en centro de vano de losa tenemos

$K_D = 1.0$ $\quad K_u = 1.0$ $\quad \gamma_u = 1.26$ $\quad \gamma_F = 1.12$

$\lambda_T = 0.80$ $\quad K_T = 1.12$ $\quad \beta_T = 0.78$

$$\Delta\sigma_u = \frac{180 \times 1.0 \times 1.0 \times 1.0}{1.26 \times 1.12 \times 1.12 \times 0.8 \times 0.78} = 1825 \text{ kg/cm}^2$$

a) La sobrecarga de uso (camión) no afecta al voladizo, lo mismo se cumple la condición de fatiga

b) En los anchos transversales la anchura

de sección a un momento

$$\mu = 3.0 \times \frac{1.993^2}{12} = 0.99 \text{ mt}$$

$$\Delta\sigma = \frac{0.99}{0.27 \times 6.66 \times 1.12} = 0.49 \text{ t/m}^2 = 490 \text{ kg/m}^2$$

c) En cuanto a los anchos longitudinales, la máxima variación de tensiones en el hormigón es:

PARA EL MOMENTO

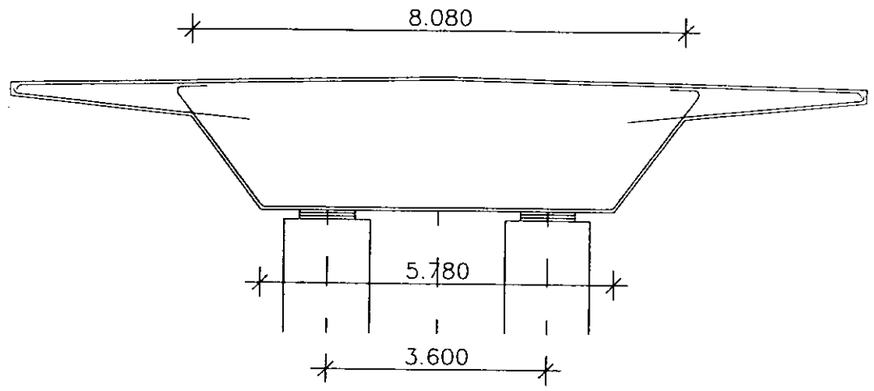
$\Delta\sigma_u = 14 \text{ kg/cm}^2$

Y PARA EL ACERO

$$\Delta\sigma_H = 14 \frac{E_A}{E_H} = 14 \times \frac{21 \times 10^6}{200.000\sqrt{500}} = 388 \text{ kg/cm}^2$$

se cumplen las condiciones de fatiga

TRANSVERSAL SOBRE PILA



$Q_{max} = 201.7$ t

$q = \frac{201.7}{8.08} = 25$ t/ml

SOBRE APOYOS

$V = 4.04 - 1.80 - 2.24$ m

$M = 25 \times \frac{2.24^2}{2} = 62.7$ mt

$M' = 62.7 \times 1.6 = 100.3$ mt

$A_c = \frac{1000}{1.5} \times 80 \times 2.05 = 109400$ cm²

$A_S = 16400 \left(1 - \sqrt{1 - \frac{2 \times 100.3}{2.05 \times 16400}}\right) = 4.97$ t

$\omega = 4.97 \times 1.15 / 5.1 = 1.12$ cm² 2φ25 ✓

$Q = 25.0 \times 2.24 = 56$ t

$Q' = 56.0 \times 1.6 = 89.6$ t

$T_b = 5 \sqrt{\frac{400}{1.5}} \times 2.05 \times 3 = 50.2$ t

$\omega_t = \frac{89.6 - 50.2}{0.9 \times 4.2 \times 2.05} = 5.08$ cm²/ml

4 cadas 16/30 → $4 \times 2 \times 2.02 \times 3.33 = 53.7$ cm²

EN EL VANO

$M = 25.0 \times \frac{3.60^2}{8} = 40.5$ mt

$M' = 1.6 \times 40.5 = 64.8$ mt

$A_S = 16400 \left(1 - \sqrt{1 - \frac{2 \times 64.8}{2.05 \times 16400}}\right) = 3.19$ t

$\omega = 3.19 \times 1.15 / 5.1 = 0.72$ cm² 2φ20

$Q = 25.0 \times 1.80 = 45.0 < 56.0$ t

PANTALLAS APOYOS

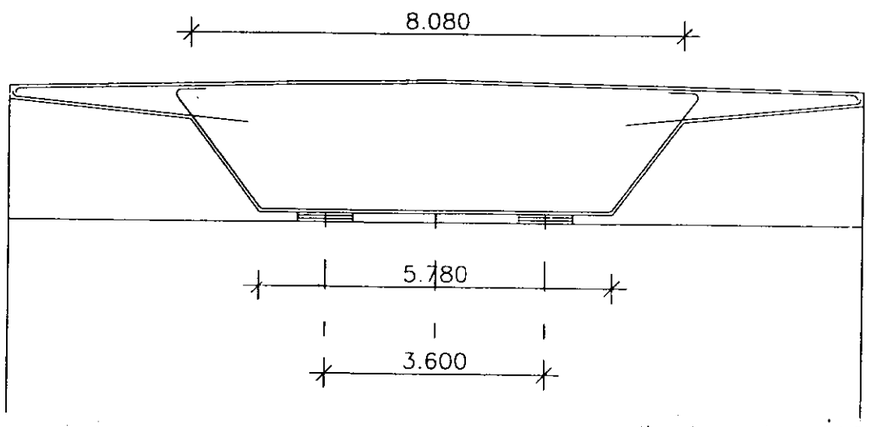
$\omega = \frac{201.7 \times 0.5 \times 0.3 \times 1.6 \times 1.15}{5.1} = 10.9$ cm²

6 diam 3 capas 8φ25 (11.8 cm²)

5 diam 3 capas de 10φ25 (en cada una de las pantallas)

ARMADURA DE LAS TRAVIESAS SOBRE ESTRIBOS

TRAVIESAS SOBRE ESTRIBOS



$Q_{tot} = 679$ t

$q = \frac{679}{8.08} = 84$ t/m

SOBRE APOYOS

$M = 84 \times \frac{2.24^2}{2} = 211$ mt

$M' = 211 \times 1.6 = 337$ mt

$A_C = \frac{4000}{1.5} \times 2.5 \times 2.05 = 13666$ t

$A_S = 13666 \left(1 - \sqrt{1 - \frac{2 \times 337}{2.05 \times 13666}}\right) = 165$ t

$\omega = 165 \times 1.15 / 5.1 = 37$ cm² 12Ø20 ✓

$Q = 84 \times 2.24 = 188$ t

$Q' = 188 \times 1.6 = 301$ t

$T_b = \pi \sqrt{\frac{400}{1.5} \times 2.05 \times 2.50} = 418$ t > Q

$W_{t\,min} = 0.02 \times \frac{4000}{1.5} \times 2.5 \times \frac{1}{4.2} = 31.7$ cm²/m

3 cb 16/30 ⇒ $3 \times 2 \times 2.52 \times 3.33 = 40.4$ cm²

EN VANO

$M = 84 \times \frac{3.60^2}{8} = 136$ mt

$M' = 136 \times 1.6 = 218$ mt

$A_S = 13666 \left(1 - \sqrt{1 - \frac{2 \times 218}{2.25 \times 13666}}\right) = 106.7$ t

$\omega = 106.7 \times 1.15 / 5.1 = 24$ cm² 12Ø20

$Q = 1.80 \times 84 = 151$

$Q' = 151 \times 1.6 = 242$ t < 301 t

PANTALLA APOYOS

$\omega = \frac{679 \times 0.5 \times 0.3 \times 1.6 \times 1.15}{5.1} = 36.7$ cm²

↓ de qué 8 cav de 6Ø16 (36.36 cm²)

↓ dicen 3 ap de 10Ø16 (hace cuña los horquillas)

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PROYECTO: _____ HOJA ___ DE ___

_____ FECHA _____

EJECUTANTE: _____

CORTE DE LA TORRE AL TABLERO

$N' = 3201$

$M_{UCG} = 2 \times 6.094 + 5.331 = 17.339$ m

$e = 8.40$

$\bar{c} = \frac{3201}{3.40 \times 17.339} = 49.8 \text{ t/m2} = 5 \text{ kg/cm}^2$

$f_{cv} = \sqrt{\frac{400}{1.5}} = 81 \text{ t/m}^2 = 8.1 \text{ kg/cm}^2$

(no obstante lo dicho anteriormente)

$w = \frac{3201}{0.9 \times 4.2 \times 17.339} = 48.8 \text{ cm}^2/\text{m}$ de viga

se dispone ϕ #16/25

$2.02 \times 7 \times 4 = 56 \text{ cm}^2$

APARATOS DE APOYO

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PROYECTO: _____ HOJA ___ DE ___

_____ FECHA _____

EJECUTANTE: _____

EFECTO DE LA RETRACCION

Se calcula la construccion de un tunel en dos sentidos. Humedad relativa 50%

Segun caracteristicas de seccion

A = 11.025 m2

U = 2x14.00 + 2x2.165 + 6x1.50 + 2x1.64 + 2x0.70

+ 2x1.40 = 42.8 m

e = 1.5 $\frac{2 \times 11.025}{42.8}$ = 0.77 m

Se toma

$\varepsilon_t = \beta_t \times \varepsilon_{01} \times \varepsilon_{02} = \beta_t \times 32 \times 0.75 \times 10^{-5} = 24 \times 10^{-5} \times \beta_t$

para β_t se toman los valores de la siguiente tabla

t	100	200	300	400
β_t	0.10	0.15	0.20	0.30

Bust3lon

3/

REACCIONES SOBRE APOYOS (EN SERVICIO)

APOYO	LV	DIST	P.PR	PRET	C.PERM	TEMP	DESC+	DESC-	SC EP75+	SC EP75-	SC UIC+	SC UIC-	TOT CP	TOT SC +	TOT SC -	MAX	MIN
EST-1	0.00	440.00	224.77	95.88	87.91	34.19	0.00	0.00	236.24	-55.35	188.25	-45.53	408.56	270.43	-55.35	678.99	353.21
PILA 1	21.00	419.00	796.54	-100.29	316.13	-40.47	0.00	0.00	667.44	-66.48	533.25	-54.13	1012.38	667.44	-106.95	1679.82	905.43
PILA 2	28.00	391.00	828.73	3.69	329.47	8.03	0.00	0.00	729.39	-64.40	566.89	-52.79	1161.89	737.42	-64.40	1899.31	1097.49
PILA 3	28.00	363.00	809.67	5.12	320.94	-2.35	0.00	0.00	731.88	-74.62	569.76	-60.82	1135.73	731.88	-76.97	1867.61	1058.76
PILA 4	28.00	335.00	853.48	5.99	337.99	0.00	0.00	0.00	731.88	-74.62	569.76	-60.82	1197.46	731.88	-74.62	1929.34	1122.84
PILA 5	28.00	307.00	853.48	5.99	337.99	0.00	0.00	0.00	731.88	-74.62	569.76	-60.82	1197.46	731.88	-74.62	1929.34	1122.84
PILA 6	28.00	279.00	853.48	5.99	337.99	0.00	0.00	0.00	731.88	-74.62	569.76	-60.82	1197.46	731.88	-74.62	1929.34	1122.84
PILA 7	28.00	251.00	853.48	5.99	337.99	0.00	0.00	0.00	731.88	-74.62	569.76	-60.82	1197.46	731.88	-74.62	1929.34	1122.84
PILA 8	28.00	223.00	853.48	5.99	337.99	0.00	0.00	0.00	731.88	-74.62	569.76	-60.82	1197.46	731.88	-74.62	1929.34	1122.84
PILA 9	28.00	195.00	853.48	5.99	337.99	0.00	0.00	0.00	731.88	-74.62	569.76	-60.82	1197.46	731.88	-74.62	1929.34	1122.84
PILA 10	28.00	167.00	853.48	5.99	337.99	0.00	0.00	0.00	731.88	-74.62	569.76	-60.82	1197.46	731.88	-74.62	1929.34	1122.84
PILA 11	28.00	139.00	853.48	5.99	337.99	0.00	0.00	0.00	731.88	-74.62	569.76	-60.82	1197.46	731.88	-74.62	1929.34	1122.84
PILA 12	28.00	111.00	853.48	5.99	337.99	1.15	0.00	0.00	731.88	-74.62	569.76	-60.82	1197.46	731.88	-74.62	1929.34	1122.84
PILA 13	30.00	81.00	881.42	-9.76	349.99	-2.14	0.00	0.00	758.20	-67.43	603.63	-53.46	1221.65	759.35	-67.43	1956.81	1130.03
PILA 14	30.00	51.00	893.10	-10.61	353.37	7.22	0.00	0.00	778.16	-65.30	602.03	-54.76	1235.86	781.45	-67.02	2017.31	1168.84
PILA 15	30.00	21.00	821.79	-86.41	329.43	-39.60	0.00	0.00	774.23	-67.02	553.07	-58.81	1064.81	700.30	-111.42	1765.11	953.40
EST-2	21.00	0.00	221.55	96.40	84.70	33.96	0.00	0.00	238.58	-65.43	189.31	-53.09	402.65	272.54	-65.43	675.19	337.22

ACCIONES. REOLOGICAS (EN SERVIC 1

Eh = 4000000 ΔT° = 15.0 μ = 0.05

APOYO	X	H	RCP	RSC	RHMAX	$I_{(PILA)}$	$Smin_{(NEOP)}$	DIMENSIONES APOYOS	$\delta_{(TAB)}$	$\delta_{(PILA)}$	$\delta_{(TEFL)}$	RH	$RH_{(ACUM)}$
EST 1	0.000	0.000	408.560	270.43	20.43	1000000	0.2263	2 AP. "POT" PARA 400 T	0.000		0.000	0.00	0.00
PILA 1	21.000	7.000	1012.380	667.44	50.62	0.3558	0.5599	2 AP. "POT" PARA 1000 T	0.004	0.004	0.000	47.05	897.04
PILA 2	49.000	7.000	1161.890	737.42	58.09	0.3558	0.6331	2 AP. "POT" PARA 1000 T	0.009	0.005	0.004	58.09	849.99
PILA 3	77.000	7.000	1135.730	731.88	56.79	0.3558	0.6225	2 AP. "POT" PARA 1000 T	0.014	0.005	0.009	56.79	791.39
PILA 4	105.000	7.000	1197.460	731.88	59.87	0.3558	0.6431	2 AP. "POT" PARA 1000 T	0.019	0.005	0.014	59.87	735.11
PILA 5	133.000	7.000	1197.460	731.88	59.87	0.3558	0.6431	2 AP. "POT" PARA 1000 T	0.024	0.005	0.019	59.87	675.23
PILA 6	161.000	7.000	1197.460	731.88	59.87	0.3558	0.6431	2 AP. "POT" PARA 1000 T	0.029	0.005	0.024	59.87	615.36
PILA 7	189.000	7.000	1197.460	731.88	59.87	0.3558	0.6431	2 AP. "POT" PARA 1000 T	0.034	0.005	0.029	59.87	555.49
PILA 8	217.000	7.000	1197.460	731.88	59.87	0.3558	0.6431	2 AP. "POT" PARA 1000 T	0.039	0.005	0.034	59.87	495.61
PILA 9	245.000	7.000	1197.460	731.88	59.87	0.3558	0.6431	2 AP. "POT" PARA 1000 T	0.044	0.005	0.039	59.87	435.74
PILA 10	273.000	7.000	1197.460	731.88	59.87	0.3558	0.6431	2 AP. "POT" PARA 1000 T	0.049	0.005	0.044	59.87	375.87
PILA 11	301.000	7.000	1197.460	731.88	59.87	0.3558	0.6431	2 AP. "POT" PARA 1000 T	0.054	0.005	0.049	59.87	315.99
PILA 12	329.000	7.000	1197.460	759.35	59.87	0.3558	0.6523	2 AP. "POT" PARA 1000 T	0.059	0.005	0.054	59.87	256.12
PILA 13	359.000	7.000	1221.650	778.16	61.08	0.3558	0.6666	2 AP. "POT" PARA 1250 T	0.065	0.005	0.060	61.08	196.25
PILA 14	389.000	7.000	1235.860	781.45	61.79	0.3558	0.6724	2 AP. "POT" PARA 1250 T	0.070	0.005	0.065	61.79	135.17
PILA 15	419.000	7.000	1064.810	700.30	53.24	0.3558	0.5884	2 AP. "POT" PARA 1000 T	0.075	0.004	0.071	53.24	73.37
EST 2	440.000	0.000	402.650	272.54	20.13	0	0.2251	2 AP. "POT" PARA 400 T	0.079		0.079	20.13	20.13

EVALUACION DEL FRENADO

VANO	APOYOS	LONG	EP75		UIC	
			QCARG	FREN	QCARG	FRE
1	E1-P1	440.00	5814.00	726.75	5000.00	1250.00
2	P1-P2	419.00	5814.00	726.75	5000.00	1250.00
3	P2-P3	391.00	5814.00	726.75	5000.00	1250.00
4	P3-P4	363.00	5814.00	726.75	5000.00	1250.00
5	P4-P5	335.00	5814.00	726.75	5000.00	1250.00
6	P5-P6	307.00	5814.00	726.75	5000.00	1250.00
7	P6-P7	279.00	5415.00	676.88	4561.60	1140.40
8	P7-P8	251.00	4883.00	610.38	4113.60	1028.40
9	P8-P9	223.00	4351.00	543.88	3665.60	916.40
10	P9-P10	195.00	3819.00	477.38	3217.60	804.40
11	P10-P11	167.00	3287.00	410.88	2769.60	692.40
12	P11-P12	139.00	2755.00	344.38	2321.60	580.40
13	P12-P13	111.00	2223.00	277.88	1873.60	468.40
14	P13-P14	81.00	1653.00	206.63	1393.60	348.40
15	P14-P15	51.00	1083.00	135.38	913.60	228.40
16	P15-E2	21.00	478.80	59.85	433.60	108.40

ACC. CARRIL

APOYO	LONG	F
EST-1	440.00	220.00
PILA 1	419.00	220.00
PILA 2	391.00	220.00
PILA 3	363.00	220.00
PILA 4	335.00	220.00
PILA 5	307.00	220.00
PILA 6	279.00	220.00
PILA 7	251.00	220.00
PILA 8	223.00	220.00
PILA 9	195.00	220.00
PILA 10	167.00	220.00
PILA 11	139.00	219.00
PILA 12	111.00	191.00
PILA 13	81.00	161.00
PILA 14	51.00	131.00
PILA 15	21.00	101.00

DISTRIBUCION DE FUERZAS REOLOGICAS, TEMPERATURA, INTERACCION CARRIL-ESTRUCTURA Y FRENADO, SEGUN VANOS (EN SERVICIO)

(valores sin mayorar)

COMBINACION CASI PERMANENTE

[5] = ([1] + 0.50 * [2]) + 0.30 * [3]

[6] = ([1] + 0.50 * [2]) + 0.30 * [4]

COMBINACION FRECUENTE

[9] = ([1] + 0.50 * [2]) + 0.60 * [7]

[10] = ([1] + 0.50 * [2]) + 0.60 * [8]

COMBINACION POCO PROBABLE

[13] = ([1] + 0.60 * [2]) + [11]

[14] = ([1] + 0.60 * [2]) + [12]

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
VANO	R+T	CARRIL	FREN	FREN	MAX	MAX	FREN	FREN	MAX	MAX	FREN	FREN	MAX	MAX
			EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC
1	897.04	220.00	726.75	1250.00	1225.06	1382.04	726.75	1250.00	1443.09	1757.04	726.75	1250.00	1755.79	2279.04
2	849.99	220.00	726.75	1250.00	1178.01	1334.99	726.75	1250.00	1396.04	1709.99	726.75	1250.00	1708.74	2231.99
3	791.89	220.00	726.75	1250.00	1119.92	1276.89	726.75	1250.00	1337.94	1651.89	726.75	1250.00	1650.64	2173.89
4	735.11	220.00	726.75	1250.00	1063.13	1220.11	726.75	1250.00	1281.16	1595.11	726.75	1250.00	1593.86	2117.11
5	675.23	220.00	726.75	1250.00	1003.26	1160.23	726.75	1250.00	1221.28	1535.23	726.75	1250.00	1533.98	2057.23
6	615.36	220.00	726.75	1250.00	943.38	1100.36	726.75	1250.00	1161.41	1475.36	726.75	1250.00	1474.11	1997.36
7	555.49	220.00	676.88	1140.40	868.35	1007.61	676.88	1140.40	1071.61	1349.73	676.88	1140.40	1364.36	1827.89
8	495.61	220.00	610.38	1028.40	788.73	914.13	610.38	1028.40	971.84	1222.65	610.38	1028.40	1237.99	1656.01
9	435.74	220.00	543.88	916.40	708.90	820.66	543.88	916.40	872.07	1095.58	543.88	916.40	1111.62	1484.14
10	375.87	220.00	477.38	804.40	629.08	727.19	477.38	804.40	772.29	968.51	477.38	804.40	985.24	1312.27
11	315.99	220.00	410.88	692.40	549.26	633.71	410.88	692.40	672.52	841.43	410.88	692.40	858.87	1140.39
12	256.12	219.00	344.38	580.40	468.93	539.74	344.38	580.40	572.25	713.86	344.38	580.40	731.90	967.92
13	196.25	191.00	277.88	468.40	375.11	432.27	277.88	468.40	458.47	572.79	277.88	468.40	588.72	779.25
14	135.17	161.00	206.63	348.40	277.65	320.19	206.63	348.40	339.64	424.71	206.63	348.40	438.39	580.17
15	73.37	131.00	135.38	228.40	179.49	207.39	135.38	228.40	220.10	275.91	135.38	228.40	287.35	380.37
16	20.13	101.00	59.85	108.40	88.59	103.15	59.85	108.40	106.54	135.67	59.85	108.40	140.58	189.13

DISTRIBUCION DE FUERZAS REOLOGICAS, TEMPERATURA, INTERACCION CARRIL-ESTRUCTURA Y FRENADO, SEGUN VANOS (EN SERVICIO) (valores mayorados)

COMBINACION CASI PERMANENTE

[5'] = 1.35 * ([1] + 0.50 * [2]) +1.45 * 0.30 * [3]

[6'] = 1.35 * ([1] + 0.50 * [2]) +1.45 * 0.30 * [4]

COMBINACION FRECUENTE

[9'] = 1.35 * ([1] + 0.50 * [2]) + 1.45 * 0.60 * [7]

[10'] = 1.35 * ([1] + 0.50 * [2]) +1.45 * 0.60 * [8]

COMBINACION POCO PROBABLE

[13'] = 1.35 * ([1] + 0.60 * [2]) +1.45 * [11]

[14'] =1.35 * ([1] + 0.60 * [2]) + 1.45 * [12]

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
VANO	R+T	CARRIL	FREN	FREN	MAX	MAX	FREN	FREN	MAX	MAX	FREN	FREN	MAX	MAX
			EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC
1	897.04	220.00	726.75	1250.00	1675.64	1903.25	726.75	1250.00	1991.78	2447.00	726.75	1250.00	2442.99	3201.70
2	849.99	220.00	726.75	1250.00	1612.12	1839.73	726.75	1250.00	1928.25	2383.48	726.75	1250.00	2379.47	3138.18
3	791.89	220.00	726.75	1250.00	1533.69	1761.30	726.75	1250.00	1849.83	2305.05	726.75	1250.00	2301.04	3059.75
4	735.11	220.00	726.75	1250.00	1457.03	1684.64	726.75	1250.00	1773.16	2228.39	726.75	1250.00	2224.38	2983.09
5	675.23	220.00	726.75	1250.00	1376.20	1603.81	726.75	1250.00	1692.34	2147.56	726.75	1250.00	2143.55	2902.26
6	615.36	220.00	726.75	1250.00	1295.37	1522.99	726.75	1250.00	1611.51	2066.74	726.75	1250.00	2062.72	2821.44
7	555.49	220.00	676.88	1140.40	1192.85	1394.48	676.88	1140.40	1487.29	1890.55	676.88	1140.40	1909.58	2581.69
8	495.61	220.00	610.38	1028.40	1083.09	1264.93	610.38	1028.40	1348.60	1712.29	610.38	1028.40	1732.32	2338.46
9	435.74	220.00	543.88	916.40	973.34	1135.38	543.88	916.40	1209.92	1534.02	543.88	916.40	1555.07	2095.23
10	375.87	220.00	477.38	804.40	863.58	1005.84	477.38	804.40	1071.24	1355.75	477.38	804.40	1377.81	1852.00
11	315.99	220.00	410.88	692.40	753.82	876.29	410.88	692.40	932.55	1177.48	410.88	692.40	1200.56	1608.77
12	256.12	219.00	344.38	580.40	643.39	746.06	344.38	580.40	793.20	998.54	344.38	580.40	1022.50	1364.73
13	196.25	191.00	277.88	468.40	514.74	597.61	277.88	468.40	635.61	801.37	277.88	468.40	822.56	1098.83
14	135.17	161.00	206.63	348.40	381.03	442.70	206.63	348.40	470.91	594.26	206.63	348.40	612.49	818.06
15	73.37	131.00	135.38	228.40	246.37	286.83	135.38	228.40	305.25	386.19	135.38	228.40	401.46	536.34
16	20.13	101.00	59.85	108.40	121.39	142.51	59.85	108.40	147.42	189.66	59.85	108.40	195.77	266.17

DEF. POR TEMPERATURA

DEF. POR RETRACCION

VANO	LUZ	TEMP (+)		TEMP(-)		T	Bt	B(infinito)	DE 0 A T	DE T A INFINITO	DE 0 A INFINITO
	(M)	PARC (MM)	ACUM (MM)	PARC (MM)	ACUM (MM)	(DIAS)	A TIEMPO T	A T INFINITO	PARC (MM)	PARC (MM)	ACUM (MM)
1	21.00	3.2	3.2	-3.2	-3.2	240	0.149	1.000	0.8	4.3	5.0
2	28.00	4.2	7.4	-4.2	-7.4	225	0.136	1.000	0.9	5.8	11.0
3	28.00	4.2	11.6	-4.2	-11.6	210	0.124	1.000	0.8	5.9	16.1
4	28.00	4.2	15.8	-4.2	-15.8	195	0.114	1.000	0.8	6.0	21.2
5	28.00	4.2	20.0	-4.2	-20.0	180	0.112	1.000	0.8	6.0	26.4
6	28.00	4.2	24.2	-4.2	-24.2	165	0.110	1.000	0.7	6.0	31.6
7	28.00	4.2	28.4	-4.2	-28.4	150	0.108	1.000	0.7	6.0	36.9
8	28.00	4.2	32.6	-4.2	-32.6	135	0.105	1.000	0.7	6.0	42.1
9	28.00	4.2	36.8	-4.2	-36.8	120	0.103	1.000	0.7	6.0	47.4
10	28.00	4.2	41.0	-4.2	-41.0	105	0.101	1.000	0.7	6.0	52.6
11	28.00	4.2	45.2	-4.2	-45.2	90	0.090	1.000	0.6	6.1	57.9
12	28.00	4.2	49.4	-4.2	-49.4	75	0.075	1.000	0.5	6.2	63.3
13	30.00	4.5	53.9	-4.5	-53.9	60	0.060	1.000	0.4	6.8	69.2
14	30.00	4.5	58.4	-4.5	-58.4	45	0.045	1.000	0.3	6.9	75.3
15	30.00	4.5	62.9	-4.5	-62.9	30	0.030	1.000	0.2	7.0	81.4
16	21.00	3.2	66.0	-3.2	-66.0	15	0.015	1.000	0.1	5.0	85.5

DEFORMACIONES POR FLUENCIA

VANO	LUZ	Nº CABLES	ESPESOR	TIEMPO	Bt	Br	Φ_o		DE 0 A T	DE T A INFINITO	DE 0 A INFINITO
	(M)	(UD)	(CM)	(DIAS)			A TIEMPO T	A T INFINITO	PARC (MM)	PARC (MM)	ACUM (MM)
1	21.00	288	75	240	0.200	0.920	0.768	2.900	2.1	5.8	7.9
2	28.00	288	75	225	0.190	0.900	0.740	2.960	2.7	8.5	17.1
3	28.00	288	75	210	0.180	0.880	0.712	2.988	2.6	11.1	23.8
4	28.00	288	75	195	0.170	0.870	0.688	3.012	2.5	13.6	33.0
5	28.00	288	75	180	0.160	0.860	0.664	3.036	2.4	16.0	44.7
6	28.00	288	75	165	0.150	0.850	0.640	3.060	2.3	18.4	58.7
7	28.00	288	75	150	0.140	0.840	0.616	3.084	2.2	20.6	75.0
8	28.00	288	75	135	0.130	0.820	0.588	3.112	2.1	22.8	93.3
9	28.00	288	75	120	0.120	0.800	0.560	3.140	2.0	24.8	113.8
10	28.00	288	75	105	0.110	0.780	0.532	3.168	1.9	26.8	136.1
11	28.00	288	75	90	0.100	0.760	0.504	3.196	1.8	28.6	160.3
12	28.00	288	75	75	0.090	0.730	0.472	3.228	1.7	30.3	186.2
13	30.00	312	75	60	0.080	0.690	0.436	3.264	1.8	32.2	214.2
14	30.00	312	75	45	0.070	0.650	0.400	3.300	1.7	33.8	243.6
15	30.00	312	75	30	0.060	0.580	0.352	3.348	1.5	35.3	274.5
16	21.00	264	75	15	0.050	0.480	0.292	3.408	0.7	36.1	305.5

RESUMEN DEFORMACIONES LONGITUDINALES

APOYO	TEMP +	TEMP -	RET	FLU	TOTAL	
	(MM)	(MM)	(MM)	(MM)	(MAX)	(MIN)
EST 1	0.0	0.0	0.0	0.0	0.0	0.0
PILA 1	3.2	-3.2	5.0	7.9	16.1	9.8
PILA 2	7.4	-7.4	11.0	17.1	35.4	20.7
PILA 3	11.6	-11.6	16.1	23.8	51.4	28.3
PILA 4	15.8	-15.8	21.2	33.0	70.0	38.5
PILA 5	20.0	-20.0	26.4	44.7	91.1	51.2
PILA 6	24.2	-24.2	31.6	58.7	114.5	66.2
PILA 7	28.4	-28.4	36.9	75.0	140.2	83.5
PILA 8	32.6	-32.6	42.1	93.3	168.0	102.9
PILA 9	36.8	-36.8	47.4	113.8	197.9	124.4
PILA 10	41.0	-41.0	52.6	136.1	229.7	147.8
PILA 11	45.2	-45.2	57.9	160.3	263.4	173.1
PILA 12	49.4	-49.4	63.3	186.2	298.9	200.2
PILA 13	53.9	-53.9	69.2	214.2	337.3	229.6
PILA 14	58.4	-58.4	75.3	243.6	377.2	260.5
PILA 15	62.9	-62.9	81.4	274.5	418.7	293.0
EST 2	66.0	-66.0	85.5	305.5	456.9	324.9

CARACTERISTICAS DE LOS APOYOS

(VALORES POR APOYO Y FUSTE)

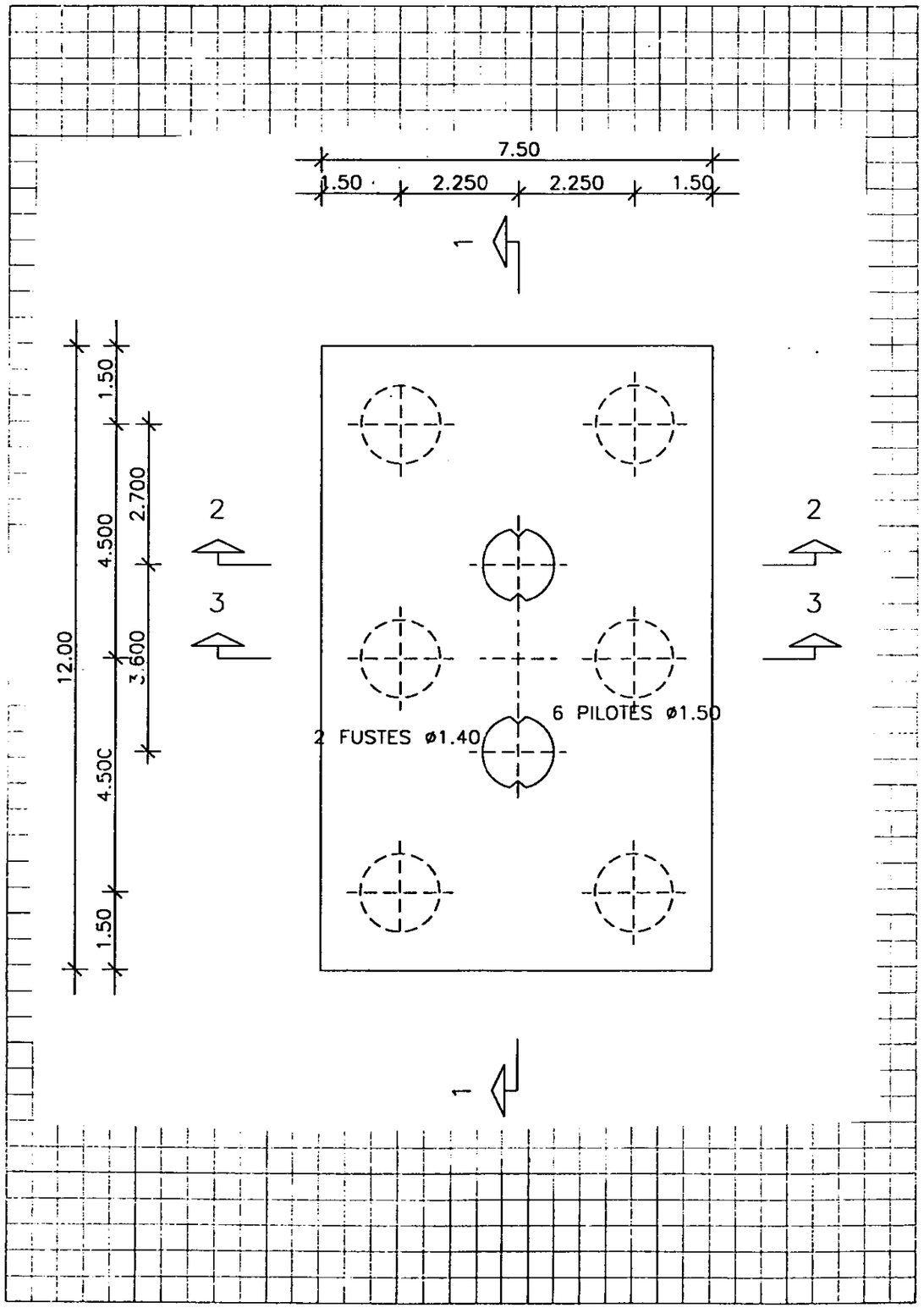
APOYO	R.VERTICAL	GIRO	ΦB	ACORT	ALARG	R.TRANSVERSAL	LONG CHAPA			ANCH CHAPA
	(TON)	(RAD)	(MM)	(MM)	(MM)	(TON)	L1(MM)	L2(MM)	L1+L2 (MM)	(MM)
EST 1	400	0.0180	525	0	0	40	450	450	900	725
PILA 1	1000	0.0110	824	16	3	60	600	600	1200	1025
PILA 2	1000	0.0110	824	35	7	60	600	600	1200	1025
PILA 3	1000	0.0110	824	51	12	60	650	600	1250	1025
PILA 4	1000	0.0110	824	70	16	60	650	600	1250	1025
PILA 5	1000	0.0110	824	91	20	60	700	600	1300	1025
PILA 6	1000	0.0110	824	114	24	60	700	600	1300	1025
PILA 7	1000	0.0110	824	140	28	60	750	600	1350	1025
PILA 8	1000	0.0110	824	168	33	60	750	600	1350	1025
PILA 9	1000	0.0110	824	198	37	60	800	600	1400	1025
PILA 10	1000	0.0110	824	230	41	60	800	650	1450	1025
PILA 11	1000	0.0110	824	263	45	60	850	650	1500	1025
PILA 12	1000	0.0110	824	299	49	60	900	650	1550	1025
PILA 13	1250	0.0110	924	337	54	60	950	700	1650	1125
PILA 14	1250	0.0110	927	377	58	60	1000	700	1700	1125
PILA 15	1000	0.0110	825	419	63	60	1000	650	1650	1025
EST 2	400	0.0180	518	457	66	40	900	500	1400	725

ΦB = DIAMETRO EXTERIOR CAZOLETA (mm)

L1 = LONGITUD DESDE CENTRO APOYO A EXTREMO LADO ESTRIBO NO ANCLADO (EST.2) (mm)

L2 = LONGITUD DESDE CENTRO APOYO A EXTREMO LADO ESTRIBO ANCLADO (EST.1) (mm)

CALCULO DE LAS PILAS



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PROYECTO: HOJA DE
FECHA
EJECUTANTE:

CENTRO DE ESFUERZOS CONTABLES DEL TABLERO

$$Z_g = \frac{\Sigma J_{xi} d_i}{J_x}$$

$J_x = 114\,995\ m^4$

CAJON TABLA SUPERIOR

$J_y = \frac{1}{12}(8.08)^3 \times 0.41 = 18.023$

$d_i = 0.705$

$J_x d_i = 369$

CAJON TABLA INFERIOR

$J_y = \frac{1}{12} \times 5.78^3 \times 0.35 = 5.632$

$d_i = 2.015$

$J_x d_i = 11.349$

ALMAS

$J_y = \left(\frac{0.65^3}{12} \times 2.16 + 0.65 \times 2.16 \times 8.16^2\right) \times 2 = 28.138$

$d_i = 1.83$

$J_x d_i = 45.960$

JOLADI20S

$I_1 = \left(\frac{1}{12} 2.96^3 \times 0.35 + 2.96 \times 0.30 \times (1.31 + 1.48)^2\right) \times 2 = 5.562$

$d_i = 0.175$

$\sum d_i = 9.73$

Luego

$\varepsilon_{EC} = \frac{3.69 + 11.349 + 47.860 + 9.73}{114.995} = 0.62$

Calculo de la viga

$A_{eff} = 1.493\ m^2$

Se anula a la viga circular de R

$R = \sqrt{\frac{1.493 \times 4}{\pi}} = 1.38\ m$

$J = \frac{\pi \times 1.38^4}{64} = 0.1779\ m^4$

$\lambda = \sqrt{\frac{0.1779}{1.493}} = 0.345$

$35 \times 0.345 = 12.07\ m$

Si la longitud de pandeo es mayor a 12 m

no se considera pandeo y por ello

$L_g = 12\ m / 2 = 6.35\ m$

A EFECTOS DE CALCULO $L_0 = 6.35$ m.

ACCIONES SOBRE LAS PILAS.

Selección:

DEL JUCAPM $\mu_{ax} = \pm 78.162$ t

Incluido los coeficientes de excentricidad e

impacto hipótesis a dicho calculo

$\mu_{ax} = \frac{\pm 78.162}{1.15 \times 1.17} = 173$ ton

DEL CALCULO DEL EMPARRILLADO SUPERIOR SE DE-

DUCE

$K = \frac{R_{max}}{\Sigma R}$

Estribos nº 1 (1 tm) sobre vía exterior

$K = \frac{511.48 \times 2}{511.42 - 99.34} = 2.47$ $\quad R = \frac{173 \times 2.47}{2 \times 2} = 354$ ton

Estribos 2 (1 tm) sobre vía interior

$K = \frac{447.71 \times 2}{447.71 - 94.16} = 2.17$ $\quad R = \frac{173 \times 2.17}{2 \times 2} = 311$ ton

En hipótesis 3 (Dos tm)

$K = \frac{476.92 \times 2}{476.92 + 349.37} = 1.15$ $\quad R = \frac{173 \times 1.15}{2} = 99$

A TODOS LOS EFECTOS SE TOMA

Para 1 hip (V1) $R_{max} = 354$ ton

$R_{min} = \frac{173}{2} - 354 = -61.5$ ton

Para 1 hip (N2) $R_{max} = 311$ ton

$R_{min} = \frac{173}{2} - 311 = -24.5$ ton

Para 2 hip $R_{max} = 329$ t

$R_{min} = 173 - 329 = 244$ ton

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PROYECTO: HOJA DE
FECHA
EJECUTANTE:

ACCIONES VERTICALES (POR EJE)

POR PESO PROPIO: $0.5 \times 893.10 = 446.55$ t

POR PRETENSADO: $-0.5 \times 10.61 = -5.31$ t

POR CARGA PERM: $0.5 \times 353.37 = 176.68$ t

POR SOBRECARGA: $354.0 = 354$ t

TOTAL 972 ton

Se han vuelto aplicar por 180 ton.

ACCIONES LONGITUDINALES

Se tuvo en la vía $\mu = 0.05 \times CP$

$F_L = 0.05(446.55 + 176.68) = 31.16$ t / fuste

ACCIONES TRANSVERSALES

FUERZA CENTRIFUGA

a) PARA TREN ESPECIAL $V = 200$ km/hr

$$F_C = Q \frac{V^2}{127 R}$$

$Q = 10$ t/m

$R = 1250$ mts

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PROYECTO: HOJA DE
FECHA
EJECUTANTE:

$$F_C = 10 \times \frac{200^2}{127 \times 1250} = 0.43 \text{ t/ml/via}$$

b) PARA TREN U.I.C $L = 30.00$ m

$$F_F = Q \times l \times \frac{V^2}{127 R} = 8 \times 0.45 \times \frac{300^2}{127 \times 1250} = 0.35 \text{ t/ml/via}$$

VALORES A CONSIDERAR

$F_C = 0.43$ t/ml/via $\rightarrow 0.43 \times 30 = 12.9$ t/via.

M (respecto a c.e.c)

$M = 0.43(1.8 + 0.7 + 0.62) \times 30 = 49.25$ mt/via.

$$\Delta N = \frac{30(1.34 + 0.43 \times 1.77)}{36} = 17.5 \text{ t/via}$$

ACCION DEL VIENTO

a) En vacio

$q_h = 2165 + 0.7 - 1 \times 10 = 3.56$.

$q_v = 3.56 \times 0.2 = 0.71$ t/ml. $\rightarrow 0.71 \times 30 = 21.3$ t/via

Momento a c.e.c

$$z = \frac{0.7 \times 0.35 + 2 \times 1 \times 0.50 - 2.165 \times 1.08}{0.7 + 2 \times 1 \times 2.165} + 0.62 = 0.39 \text{ m}$$

$M_V = 21.3 \times 0.39 = 8.30$ mt/via

$\Delta H = \frac{30(0{,}28+0{,}71 \times 1{,}77)}{3{,}60} = 12{,}8$ t/hasta

DESCENSO $h = 3{,}50$ (SUMAR A LO ANTERIOR)

$f_v = 3{,}50 \times 0{,}20 = 0{,}7$ t/l/vez $\rightarrow 0{,}7 \times 30 = 21{,}0$ t/vez

volvido a cel

$\Sigma = 1{,}8 + 0{,}7 + 0{,}62 = 3{,}12$

$M = 3{,}12 \times 0{,}7 \times 30 = 65{,}52$ mt/vez

$\Delta H = \frac{30(2{,}18+0{,}70 \times 1{,}77)}{3{,}60} = 28{,}50$ t/hasta

CON DOS TIROS

$f_v = 0{,}7 \times 1{,}20 = 0{,}84$ t/vez $\rightarrow 0{,}84 \times 30 = 25{,}2$ t

$M = 2{,}18 \times 1{,}20 = 2{,}62$ t/vez $\rightarrow 2{,}62 \times 30 = 67{,}86$ mt

$\Delta H = 28{,}50 \times 1{,}2 = 34{,}5$ t/hasta

EFECTO LADO

DISM Δ tiro

$F_H = 10$ T/vez

$d = 0{,}70 + 0{,}62 = 1{,}32$ m

$f_m = 1{,}32 \times 10 = 13{,}2$ mt/vez

$\Delta H = \frac{13{,}2+6 \times 1{,}77}{3{,}60} = 8{,}58$ t/hasta

PASAN 2 tiros

$F = 20$ t

$M = 13{,}2 \times 2 = 26{,}4$ mt

$\Delta H = 8{,}58 \times 2 = 17{,}16$ ton/hasta

HIPOTESIS I PP en vacio

CARGAS ACTUANTES (VALORES POR FUSTE)

VERTICAL PESO FUSTE = 23.4 ton ✓

PESO PROPIO LOSA = 446.55 t ✓

CARGAS PERMANENTES = 176.62 t ✓

ΔN VIENTO LATERAL = 12.80 t ✓

$N' = 1.35(23.4 + 446.55 + 176.62) +$

$+ 1.50 \times 12.80 = 873 + 19 = 892\ t$ ✓

LONGITUDINALES: NOZ TEFLONES = 31.16 t

$F'_L = 1.35 \times 31.16 = 42\ t$

TRANSVERSALES: viento lateral $= 0.5 \times 30 \times 0.71 = 10.65\ t$

$F'_T = 10.65 \times 1.5 = 16$ ton

VALORES PARA DIMENSIONAMIENTO

$N' = 892\ t$ / fuste

$F' = \sqrt{42^2 + 16^2} = 45$ ton

$M' = 45 \times 6.35 = 286$ mt / fuste.

$\Delta c = \frac{0.9 \times 3000}{1.5} \times 1.93 = 2677\ t$

$\nu = \frac{892}{2677} = 0.33$

$\mu = \frac{286}{1.38 \times 2677} = 0.08$

$\omega = 0.03$

HIPOTESIS II Puente cargado con trenes

CARGAS ACTUANTES.

VERTICALES PESO FUSTE = 23.4 t ✓

P. PROPIO LOSA = 446.55 t ✓

C. PERMANENTES = 176.62 t ✓

SOBRECARGA = 329.0 t ✓

ΔN (EFECTO LAT.) = 17.16 t ✓

ΔN (F_c centrifuga) $= 2 \times 19.5 = 35.0\ t$

$N' = 1.35(23.4 + 446.55 + 176.62) +$

$+ 1.5(329.0 + 17.16 + 35.0) = 1465\ t$

LONGITUDINALES. NOZ TEFLONES = 31.16 t

$F'_L = 1.35 \times 31.16 = 42\ t$ ✓

TRANSVERSAL. EFECTO LAZO = 20 x 0.5 = 10.0 t.

FZA CENTRIFUGA 129 x 2 x 0.5 = 192 t

$F'_T = 1.5 \times (10.0 + 12.9) = 34.35$

VALORES PARA DIMENSIONAMIENTO

$N' = 1445$ t / fuste

$F' = \sqrt{42^2 + 34.35^2} = 54$ ton

$W' = 54 \times 6.35 = 344$ mton

$Ac = 2687$ t

$\nu = \frac{1445}{2687} = 0.54$

$\mu = \frac{344}{1.38 \times 2687} = 0.09$

$\omega = 0.07$

HIPOTESIS III PP con 2 hielos + viento

VERTICAL	PESO FUSTE	= 23 t
	PESO PROPIO CABLE	= 446.55 t
	CADENAS	= 176.82 t
	SOBRECARGA	= 329.0 t
	ΔN (EFECTO LAZO)	= 17.16 t

ΔN (FZA CENTRIFUGA) = 35.0 t

ΔN (VIENTO TRANSV.) = 12.9 + 34.5

$N' = 1.35(23.1 + 446.55 + 176.82) +$

$+ 1.5(329.0 + 17.16 + 35.0) +$

$+ 1.50 \times 0.6 \times (12.9 + 34.5) = 1486$ t

LONGITUDINAL (POR TEFLON) = 31.16 t

$F'_L = 31.16 \times 1.35 = 42$ t

TRANSVERSAL VIENTO LATERAL $(0.71 + 0.84) \times \frac{30}{2} = 23.25$

EFECTO LAZO $0.50 \times 20 = 10$ t

FZ CENTRIFUGA $30 \times 0.43 \times 2.0 \times 0.5 = 12.9$

$F'_T = 1.5(10 + 12.9) + 0.6 \times 1.5 \times 0.5 \times 23.25 = 44.8$

VALORES PARA DIMENSIONAMIENTO

$N' = 1486$ t

$F' = \sqrt{42^2 + 44.8^2} = 61.41$ t

$M' = 61.45 \times 6.35 = 390$ mt.

$Ac = 2687$ t

$\nu = \frac{1429}{2687} = 0.55$

$\mu = \frac{396}{1.38 \times 2687} = 0.11$

$\omega = 0.16$

HIPOTESIS IV

Igual que la HIPOTESIS II pero con un sismo tal

$N' = 1.35(237 + 446.55 + 176.68) + 1.5(354 + 197.5 + 858) =$

$= 873 + 570 = 1443\ t$

$F'_L = 1.35 \times 31.16 = 42\ t$

$F'_T = 1.5(5.0 + 6.45) = 17\ t$

VALORS PANA DIMENSIONAMIENTO

$N' = 1443\ t$ / h_x

$F' = \sqrt{42^2 + 17^2} = 45\ tm$

$M' = 45 \times 6.35 = 286\ mt$

$A_C = 2687\ t_m$

$\nu = \frac{1443}{2687} = 0.54$

$\mu = \frac{286}{1.38 \times 2687} = 0.07$

$\omega = 0.18$

HIPOTESIS IV

Igual que la hipotesis III pero con un sismo tal

$N' = 1.35(237 + 446.55 + 176.68) + 1.5(354 + 197.5 + 858) +$

$+ 1.5 \times 0.6 \times (12.8 + 28.50) = 873 + 570 + 37 = 1480\ t.$

LONGITUDINALES (POZ TEFIDA) = 31.16 t $F_L = 42.0$

TRANSVERSALES: VIENTO NATIONAL $(0.7 + 0.71) \times \frac{30}{2} = 21.15\ t$

EFECTO MAZO $0.50 \times 10 = 5.0\ t_m$

Excentricidad $0.43 \times 30 \times 0.50 = 6.45\ t.$

$F'_T = (5 + 6.45) \times 1.5 + 0.6 \times 1.5 \times 0.5 \times 21.15 = 26.70\ t$

VALORS PANA DIMENSIONAMIENTO.

$N' = 1480\ t$

$F' = \sqrt{42^2 + 26.70^2} = 50.0\ t$

$M' = 50.0 \times 6.35 = 317.5\ mt$

$A_C = 2687$

$\nu = \frac{1480}{2687} = 0.55$

$\mu = \frac{317}{1.38 \times 2687} = 0.09$

$\omega = 0.05$

Se dispone como armadura longitudinal del fuste

$w = 0.12 \times 2637 \times \frac{1.15}{5.1} = 1092 \rightarrow 20\phi 25$

Se disponen $22\phi 25 \rightarrow 108\,cm^2$

area $\phi_\mu = \frac{25}{4} = 6.25\,mm$

$s_{p\,max} = 15 \times 20 = 30\,cm$.

$w_{t\,min} = 0.02 \times \frac{3000}{1.5} \times 140 / 4.2 = 1333\,cm^2/m$

con area $\phi 12$ (2 ud)

$h = \frac{13.3}{4 \times 1.12} = 2.96\,m$ $\quad s_p = 0.33$

Se dispone $2c\phi 12/30$

ENCEPADOS $2.5 \times 9.0 \times 18.50$

$P_z = 2.5 \times 7.5 \times 12 \times 2.50 = 562\,ton$

En hipótesis I

$N_{TOT} = 562 + 2(237 + 446.55 + 1766.8 + 12.80) = 1891\,t$

$M_L = 3116\,(6.35 + 2.50) \times 2 = 551\,mt$

$M_T = 1065\,(6.35 + 2.50) \times 2 = 189\,mt$

$Q = \frac{1891}{6} \pm \frac{551}{3 \times 4.50} \pm \frac{189}{2 \times 9.00} = 313 \pm 41 \pm 10$

$Q_{max} = 364\,ton$

$Q_{min} = 262\,ton$

En hipótesis II

$N_{TOT} = 562 + 2(237 + 446.55 + 1766.8 + 329 + 1116 + 35) =$

$= 2618\,ton$

$M_L = 3116\,(6.35 + 2.50) \times 2 = 551\,mt$

$M_T = 2912\,(6.35 + 2.50) \times 2 = 517\,mt$

$Q = \frac{2618}{6} \pm \frac{551}{3 \times 4.5} \pm \frac{517}{2 \times 9} = 436 \pm 41 \pm 29$

$Q_{max} = 477$ ton

$Q_{min} = 395$ ton.

Estribos III

$N_{\pi} = 562 + 2(237 + 446.55 + 176.67 + 329.0 + 192.16 + 35.0 + 12.9 + 34.5) = 2712$

$M_L = 31.16\,(6.35 + 2.50) \times 2 = 551$ mt

$M_T = 2\,(6.35 + 2.50)(23.25 + 10 + 12.9) = 816$ mt

$Q = \frac{2712}{6} \pm \frac{551}{3 \times 4.5} \pm \frac{816}{9 \times 2} = 452 \pm 41 \pm 45$

$Q_{max} = 538$ ton

$Q_{min} = 366$ ton

ANCHURA DEL ESTRIBO

Sección 1

$M = 225 \times 551 \times 3 - 1200 \times 2.50 \times 2.50 \times \frac{4.15^2}{2} = 3095$ mt

equivale a $3095 / 12 = 258$ mt/ml

Sección 2

$M = 2 \times 551 \times 2.70 - 75 \times 2.50 \times 2.50 \times \frac{4.95^2}{2} = 2509$ mt

equivale a $2509 / 1.50 = 335$ mt/ml

Sección 3

$M = 2 \times 551 \times 4.50 - 75 \times 2.50 \times 2.50 \times \frac{6.75^2}{2} - 1075 \times 1.8$

$= 5139 - 1067 - 1935 = 2137$ mt

equivale a $2137 / 1.5 = 295$ mt/ml

Anchura del estribo (sección 2-3)

$M = 335 \times 1.6 = 536$

$h = \frac{2509}{1.5} \times 1.00 \times 0.40 = 4000$

$h = 4000 \left(1 - \sqrt{1 - \frac{2 \times 536}{2.40 \times 4000}}\right) = 230$ t/ml

$w = 230 \times 1.15 / 5.1 = 51.8$ cm²/ml Ø32/15

Armadura mínima

$w = 0.04 V_c \times \frac{1.15}{5.1} = 0.04 \times 4000 \times \frac{1.15}{5.1} = 36$ cm²/ml

Armadura reducida

$w = 0.3 \times 51.8 = 15.54$ cm²/ml → Ø16/15

CENTRO

Sección 1

$Q = 3 \times 371 - 12 \times 2.50 \times 1.50 \times 2.50 = 1731 - 112 = 1619$ t

equivale a $1620 / 12 = 135$ t/ml

Sección 2

$Q = 2 \times 371 - 4.50 \times 2.50 \times 2.50 \times 4.20 = 1142 - 197 = 945$ t

equivale a $945 / 450 = 176$ t/ml

$T_b = 5 \sqrt{\frac{250}{1.5}} \times 100 \times 2.40 = 155$ t/ml >

$w_t = \frac{176 \times 1.6 - 155}{0.9 \times 4.7 \times 2.4} = 5.13$ cm²/m²

$w_{t\,mi.} = 0.02 \times \frac{2500}{1.5} \times 1.0 \times \frac{1}{4.2} = 9.93$ cm²/ml

Armadura real Cuadrícula e Ø16/0.60/0.60 = 9.35 cm²/m²

PREZONAMIENTO

Q = 1619 ton

$w_L = 31.16 \times 6.35 = 198$ mt

$w_T = (23.25 + 10 + 17.9) 6.35 = 293$ mt

$w_{TOT} = \sqrt{198^2 + 293^2} = 354$ mt

$\alpha = 1 - \frac{\Delta}{1 + \frac{2}{3}\sqrt{\frac{1.40 + 2.40}{1.40 + 2.40}}} = 0.40$

$A_c = 4 \times 3.80 \times 2.40 = 22.6$ m²

$J_c = \frac{2.4 \times 3.8^3}{6} + \frac{3.8 \times 2.4^3}{6} + \frac{2.4 \times 3.8 \times 3.8^2}{2} =$

$= 20.5 + 8.75 + 65.8 = 96.1$

$\frac{1619 \times 1.5}{28.6} + 0.4 \frac{354 \times 1.5}{96.5} \times 1.9 = 56 + 4 = 60$ t/m²

$2 f_{cv} = 2 \times 5 \times \sqrt{\frac{250}{1.5}} = 129$ t/m² > 60 t/m²

COMPROBACION FCy VIENTO CON FLEXION HORIZONTAL SOBRE EL TABLERO

En los tajos

ϕ 1.38 $S = 1.149\ m^2$

$I = 0.1779\ m^4$

$f = \frac{PL^3}{3EI}$

$K = \frac{P}{f} = \frac{3EI}{L^3} = \frac{3 \times 3.5 \times 10^6}{7^3} = 30612\ T/m$

POR DOS FUSTES $61.225\ T/m$

CARGAS ACTUANTES:

VER HIPOTESIS EN CALCULO DE PILAS.

a). FZA CENTRIFUGA $0.43 \times 2 = 0.86\ t/ml$

b) VIENTO $0.71 + 0.84 = 1.55\ t/ml$.

CARACTERISTICAS DE LA SECCION

$S = 10.986$

$I = 128.1293$

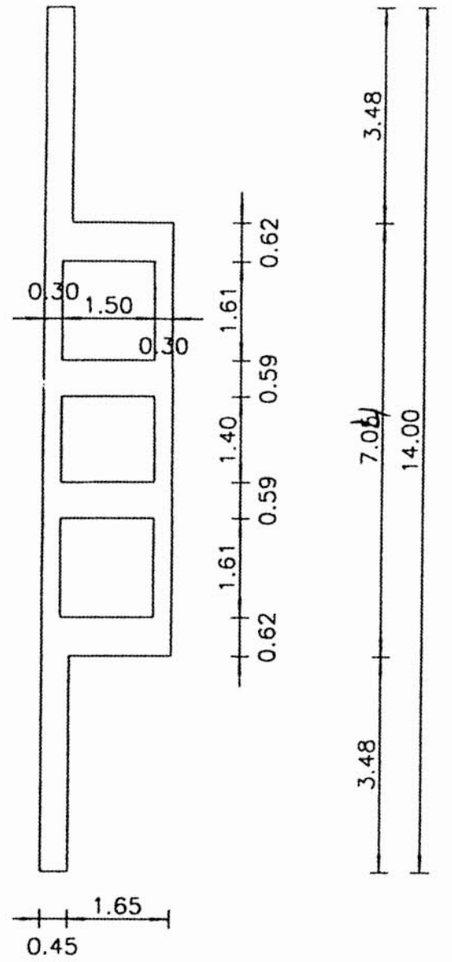
$V_s = 7.00$

$V_i = 7.00$

$C_T = 14.00$

$K_s = 0.055$

$K_i = 0.055$



```
*************************************************
*                                               *
*           S T A A D - III                     *
*           Revision 17.0a                      *
*           Proprietary Program of              *
*           RESEARCH ENGINEERS, Inc.            *
*           Date=    AUG 17, 1999               *
*           Time=    12:12:51                   *
*                                               *
*************************************************
```

```
1. STAAD PLANE VIADUCTO 4
2. *FLEXION HORIZONTAL VIENT F.CENTRIFUGA
3. JOINT COORDINATES
4.    1   0.000     0.000
5.    2  21.000     0.000
6.    3  49.000     0.000
7.    4  77.000     0.000
8.    5 105.000     0.000
9.    6 133.000     0.000
10.   7 161.000     0.000
      8 189.000     0.000
12.   9 217.000     0.000
13.  10 245.000     0.000
14.  11 273.000     0.000
15.  12 301.000     0.000
16.  13 329.000     0.000
17.  14 359.000     0.000
18.  15 389.000     0.000
19.  16 419.000     0.000
20.  17 430.000     0.000
21. MEMBER INCIDENCES
22.    1     1    2
23.    R    15    1    1
24. MEMBER PROPERTY
25. *TABLERO
26. 1 TO 16 PR AX 10.9865 IZ 128.2903
27. CONSTANT
28. E  3500000.    ALL
29. POI 0.15
     EN 2.50
3.  SUPPORT
2. 1              PINNED
3. 2 TO 16        FIXED BUT MZ KFY  61225
4. 17             FIXED BUT FX MZ
5. LOADING 1 FUERZA CENTRIFUGA
6. MEMBER LOAD
7. 1 TO 16  UNI  GY  0.86
8. LOADING 2 VIENTO
. MEMBER LOAD
. 1 TO 16  UNI  GY  1.55
. PERFORM ANALISIS
```


P R O B L E M S T A T I S T I C S

```
 NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    17/   16/   17
 ORIGINAL/FINAL BAND-WIDTH =     1/    1
 TOTAL PRIMARY LOAD CASES  =     2, TOTAL DEGREES OF FREEDOM =    33
 SIZE OF STIFFNESS MATRIX =      132 DOUBLE PREC. WORDS
 TOTAL REQUIRED DISK SPACE =   12.03 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX.              12:12:53
++ PROCESSING GLOBAL STIFFNESS MATRIX.               12:12:53
++ PROCESSING TRIANGULAR FACTORIZATION.              12:12:53
++ CALCULATING JOINT DISPLACEMENTS.                  12:12:53
++ CALCULATING MEMBER  FORCES.                       12:12:53

 42. LOAD LIST ALL
 43. PRINT MEMBER FORCES ALL
```

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP INCH

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	0.00	-13.10	0.00	0.00	0.00	0.00
		2	0.00	-4.96	0.00	0.00	0.00	-85.52
	2	1	0.00	-23.62	0.00	0.00	0.00	0.00
		2	0.00	-8.93	0.00	0.00	0.00	-154.14
2	1	2	0.00	-9.69	0.00	0.00	0.00	85.52
		3	0.00	-14.39	0.00	0.00	0.00	-19.62
	2	2	0.00	-17.46	0.00	0.00	0.00	154.14
		3	0.00	-25.94	0.00	0.00	0.00	-35.36
3	1	3	0.00	-9.82	0.00	0.00	0.00	19.62
		4	0.00	-14.26	0.00	0.00	0.00	42.48
	2	3	0.00	-17.70	0.00	0.00	0.00	35.36
		4	0.00	-25.70	0.00	0.00	0.00	76.56
4	1	4	0.00	-11.36	0.00	0.00	0.00	-42.48
		5	0.00	-12.72	0.00	0.00	0.00	61.55
	2	4	0.00	-20.47	0.00	0.00	0.00	-76.56
		5	0.00	-22.93	0.00	0.00	0.00	110.94
5	1	5	0.00	-12.06	0.00	0.00	0.00	-61.55
		6	0.00	-12.02	0.00	0.00	0.00	60.88
	2	5	0.00	-21.74	0.00	0.00	0.00	-110.94
		6	0.00	-21.66	0.00	0.00	0.00	109.72
6	1	6	0.00	-12.16	0.00	0.00	0.00	-60.88
		7	0.00	-11.92	0.00	0.00	0.00	57.52
	2	6	0.00	-21.92	0.00	0.00	0.00	-109.72
		7	0.00	-21.48	0.00	0.00	0.00	103.66
7	1	7	0.00	-12.10	0.00	0.00	0.00	-57.52
		8	0.00	-11.98	0.00	0.00	0.00	55.83
	2	7	0.00	-21.81	0.00	0.00	0.00	-103.66
		8	0.00	-21.59	0.00	0.00	0.00	100.63
8	1	8	0.00	-12.06	0.00	0.00	0.00	-55.83
		9	0.00	-12.02	0.00	0.00	0.00	55.38
	2	8	0.00	-21.73	0.00	0.00	0.00	-100.63
		9	0.00	-21.67	0.00	0.00	0.00	99.81
9	1	9	0.00	-12.01	0.00	0.00	0.00	-55.38
		10	0.00	-12.07	0.00	0.00	0.00	56.15
	2	9	0.00	-21.65	0.00	0.00	0.00	-99.81
		10	0.00	-21.75	0.00	0.00	0.00	101.20
10	1	10	0.00	-11.90	0.00	0.00	0.00	-56.15
		11	0.00	-12.18	0.00	0.00	0.00	59.94

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP INCH

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	2	10	0.00	-21.46	0.00	0.00	0.00	-101.20
		11	0.00	-21.94	0.00	0.00	0.00	108.03
11	1	11	0.00	-11.78	0.00	0.00	0.00	-59.94
		12	0.00	-12.30	0.00	0.00	0.00	67.16
	2	11	0.00	-21.24	0.00	0.00	0.00	-108.03
		12	0.00	-22.16	0.00	0.00	0.00	121.04
12	1	12	0.00	-12.11	0.00	0.00	0.00	-67.16
		13	0.00	-11.97	0.00	0.00	0.00	65.27
	2	12	0.00	-21.82	0.00	0.00	0.00	-121.04
		13	0.00	-21.58	0.00	0.00	0.00	117.64
13	1	13	0.00	-13.89	0.00	0.00	0.00	-65.27
		14	0.00	-11.91	0.00	0.00	0.00	35.53
	2	13	0.00	-25.04	0.00	0.00	0.00	-117.64
		14	0.00	-21.46	0.00	0.00	0.00	64.04
14	1	14	0.00	-15.51	0.00	0.00	0.00	-35.53
		15	0.00	-10.29	0.00	0.00	0.00	-42.85
	2	14	0.00	-27.96	0.00	0.00	0.00	-64.04
		15	0.00	-18.54	0.00	0.00	0.00	-77.22
15	1	15	0.00	-14.14	0.00	0.00	0.00	42.85
		16	0.00	-11.66	0.00	0.00	0.00	-80.11
	2	15	0.00	-25.49	0.00	0.00	0.00	77.22
		16	0.00	-21.01	0.00	0.00	0.00	-144.39
16	1	16	0.00	2.55	0.00	0.00	0.00	80.11
		17	0.00	-12.01	0.00	0.00	0.00	0.00
	2	16	0.00	4.60	0.00	0.00	0.00	144.38
		17	0.00	-21.65	0.00	0.00	0.00	0.00

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

44. PRINT REACC ALL

'PPORT REACTIONS -UNIT KIP INCH STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	0.00	-13.10	0.00	0.00	0.00	0.00
	2	0.00	-23.62	0.00	0.00	0.00	0.00
2	1	0.00	-14.64	0.00	0.00	0.00	0.00
	2	0.00	-26.39	0.00	0.00	0.00	0.00
3	1	0.00	-24.22	0.00	0.00	0.00	0.00
	2	0.00	-43.64	0.00	0.00	0.00	0.00
4	1	0.00	-25.62	0.00	0.00	0.00	0.00
	2	0.00	-46.17	0.00	0.00	0.00	0.00
5	1	0.00	-24.79	0.00	0.00	0.00	0.00
	2	0.00	-44.67	0.00	0.00	0.00	0.00
6	1	0.00	-24.18	0.00	0.00	0.00	0.00
	2	0.00	-43.57	0.00	0.00	0.00	0.00
7	1	0.00	-24.02	0.00	0.00	0.00	0.00
	2	0.00	-43.29	0.00	0.00	0.00	0.00
8	1	0.00	-24.04	0.00	0.00	0.00	0.00
	2	0.00	-43.32	0.00	0.00	0.00	0.00
9	1	0.00	-24.04	0.00	0.00	0.00	0.00
	2	0.00	-43.32	0.00	0.00	0.00	0.00
10	1	0.00	-23.97	0.00	0.00	0.00	0.00
	2	0.00	-43.21	0.00	0.00	0.00	0.00
11	1	0.00	-23.96	0.00	0.00	0.00	0.00
	2	0.00	-43.18	0.00	0.00	0.00	0.00
12	1	0.00	-24.41	0.00	0.00	0.00	0.00
	2	0.00	-43.99	0.00	0.00	0.00	0.00
13	1	0.00	-25.86	0.00	0.00	0.00	0.00
	2	0.00	-46.61	0.00	0.00	0.00	0.00
14	1	0.00	-27.42	0.00	0.00	0.00	0.00
	2	0.00	-49.42	0.00	0.00	0.00	0.00
15	1	0.00	-24.43	0.00	0.00	0.00	0.00
	2	0.00	-44.03	0.00	0.00	0.00	0.00
16	1	0.00	-9.11	0.00	0.00	0.00	0.00
	2	0.00	-16.41	0.00	0.00	0.00	0.00
17	1	0.00	-12.01	0.00	0.00	0.00	0.00
	2	0.00	-21.65	0.00	0.00	0.00	0.00

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

45. PLOT DIS FILE
46. PLOT BEN FILE
47. FINISH

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

**** DATE= AUG 17,1999 TIME= 12:12:54 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

HOJA ___ DE ___
FECHA ___

a) Sobre TABLERO

Máximo momento de flexión horizontal

$\mu = 85.52 + 0.6 \times 154.14 = 178$ mt

$\Delta\sigma = \frac{178.100}{128.2903} \times f = 9.71$ t/m2 = 0.9 kg/cm2

Se admite

b) Sobre estribo 1.

Máxima reacción

POR FUERZA CENT. : 13.10 tn

POR VIENTO : 23.62 tn

Combinación

$R_{max} = 13.10 + 0.6 \times 0.5 \times 23.62 = 20.18$ tn

c) Sobre estribo 2

Máxima reacción

POR FUERZA CENT = 12.01 tn

POR VIENTO = 21.62 tn.

HOJA ___ DE ___
FECHA ___

COMBINACIÓN

$P_{px} = 12.01 + 0.60 \times 0.50 \times 21.62 = 18.50$ ton

d) SOLO PILAS

MÁXIMA REACCIÓN.

POR FUERZA CENTRÍFUGA = 29.42 t

POR VIENTO = 49.42 t.

Combinación.

$P_{ex} = 27.42 + 0.6 \times 0.50 \times 49.42 = 42.24$ t.

e) VALORES TOMADOS EN EL CÁLCULO EN PILAS.

$F_H = (12.9 + 0.6 \times 0.5 \times 23.25) \times 2 = 39.75$ (vale)

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INTERNACIONAL DE INGENIERÍA Y ESTUDIOS TÉCNICOS S.A.

PROYECTO: ___ HOJA ___ DE ___
FECHA ___
EJECUTANTE: ___

COMPROBACIÓN DE PILAS 5 y 6 $G_H = 8.60$ t

HIPÓTESIS I

$N' = 892 + 10.46 = 902$ t

$P' = 45$ ton

$\delta' = \frac{45 \times 8.60^3}{3 \times 36 \times 10^6 \times 0.1779} = 0.011$ $\quad \delta \geq \frac{0.015}{1.30} = 0.01$

$W' = 45 \times 8.60 + 0.011 \times 902 = 387 + 10 = 397$ t

Se cumple $L_p = L_o$ (no hay pandeo)

$A_C = 2687$ t

$\nu = \frac{902}{2687} = 0.34$

$\nu = \frac{397}{1.38 \times 2687} = 0.11$

$\omega = 0.10$

HIPÓTESIS II

$N' = 1445 + 10.46 = 1455$ t

$F' = 54$ t

$\delta = 0.011 \times \frac{54}{45} = 0.013$

$W' = 54 \times 8.60 + 0.013 \times 1455 = 464 + 19 = 483$ t

Ac = 7687 t

$\gamma = \frac{1475}{7687} = 0.54$

$\mu = \frac{483}{1.38 \times 7687} = 0.13$

$\omega = 0.24$

HIPOTESIS III

N' = 1486 + 10 = 1496 t

F' = 61.45

$\delta = 0.011 \times \frac{61.45}{45} = 0.015$

W' = 61.45 x 8.60 + 0.015 x 1496 - 528 + 27 = 550 t

Ac = 7687

$\gamma = \frac{1496}{7687} = 0.56$

$\mu = \frac{550}{1.38 \times 7687} = 0.15$

$\omega = 0.30$

HIPOTESIS IV

N' = 1443 + 10 = 1453 t

F' = 45 t

$\delta = 0.011 \mu$

W' = 45 x 8.60 + 0.011 x 1453 = 387 + 16 = 403 t

$\gamma = \frac{1453}{7687} = 0.54$

$\mu = \frac{403}{1.38 \times 7687} = 0.11$

$\omega = 0.14$

HIPOTESIS V

N' = 1480 + 10.46 = 1490 t

F' = 50 t

$\delta = 0.011 \times \frac{50}{45} = 0.012$

W' = 50 x 8.60 + 0.012 x 1490 = 430 + 18 = 448 t

$\gamma = \frac{1490}{7687} = 0.55$

$\mu = \frac{448}{1.38 \times 7687} = 0.12$

$\omega = 0.14$

ANALISIS LONGITUDINAL

$V_L = 0.30 \times 7687 \times 1 t/s = 182.12$ 22532

COMPROBACION DE LOS TUCEDANOS DE cj

PILA S46

HIPOTESIS I

$N_{cm} = 1881 + 2 \times 10.48 = 1902$ ton

$M_L = 31.16 (8.60 + 2.50) \times 2 + 0.011 \times \frac{962}{1.35} \times 2 = 707$

$M_T = 10.65 (8.60 + 2.50) \times 2 = 236$ m

$Q = \frac{1902}{6} \pm \frac{707}{3 \times 4.50} \pm \frac{236}{2 \times 9.00} = 317 \pm 52 \pm 13$

$Q_{max} = 317 + 52 + 13 = 382$ ton

$Q_{min} = 317 - 52 - 13 = 252$ ton

HIPOTESIS II

$N_{cm} = 2815 + 2 \times 10.48 = 2835$

$M_L = 31.16 (8.60 + 2.50) \times 2 + 0.015 \times \frac{1455}{1.35} \times 2 = 724$

$M_T = 20.7 (8.60 + 2.50) \times 2 = 648$ m

$Q = \frac{2835}{6} \pm \frac{724}{3 \times 4.50} \pm \frac{648}{2 \times 9.00} = 472 \pm 53 \pm 36$

$Q_{max} = 561$ t

$Q_{min} = 383$ t

HIPOTESIS III

$N_{cm} = 2712 + 2 \times 10.48 = 2733$ t

$M_L = 31.16 (8.60 + 2.50) \times 2 + 2 \times 14.96 \times 0.011 = 737$

$M_T = 2 (8.60 + 2.50) (23.25 + 10 + 12.9) = 932$ m t

$Q = \frac{2733}{6} \pm \frac{737}{3 \times 4.50} \pm \frac{932}{2 \times 9.00} = 455 \pm 55 \pm 52$

$Q_{max} = 562$ ton

$Q_{min} = 348$ t

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PROYECTO: _____ HOJA ___ DE ___

_____ FECHA _____

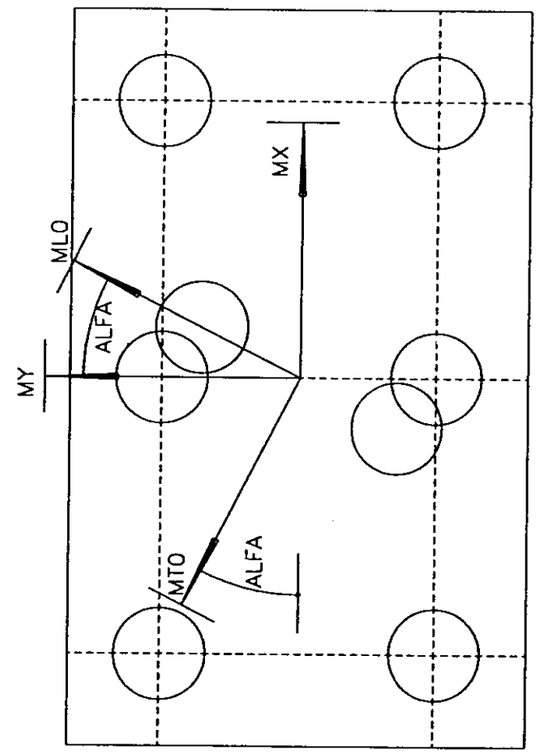
EJECUTANTE: _____

ARMADO DE LOS ENCEPADOS V76

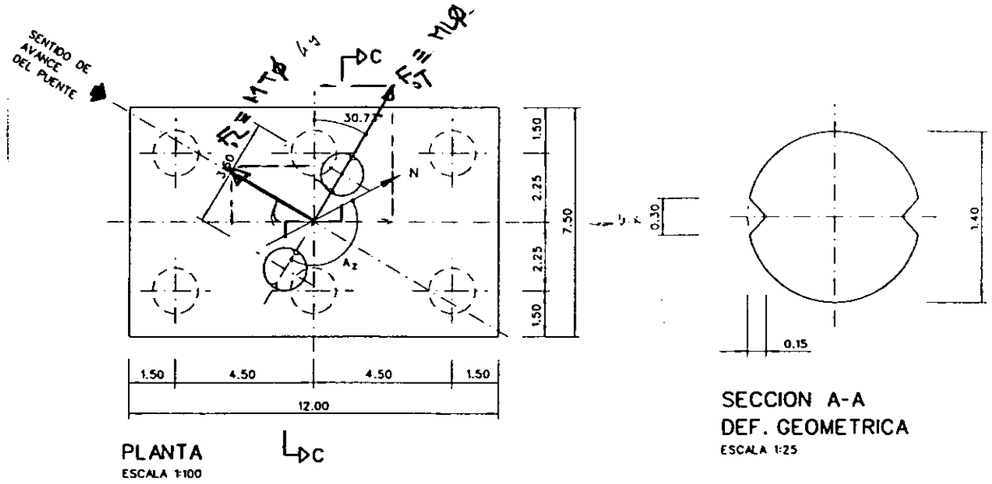
$K = \frac{59.0}{57.1} = 1.03$

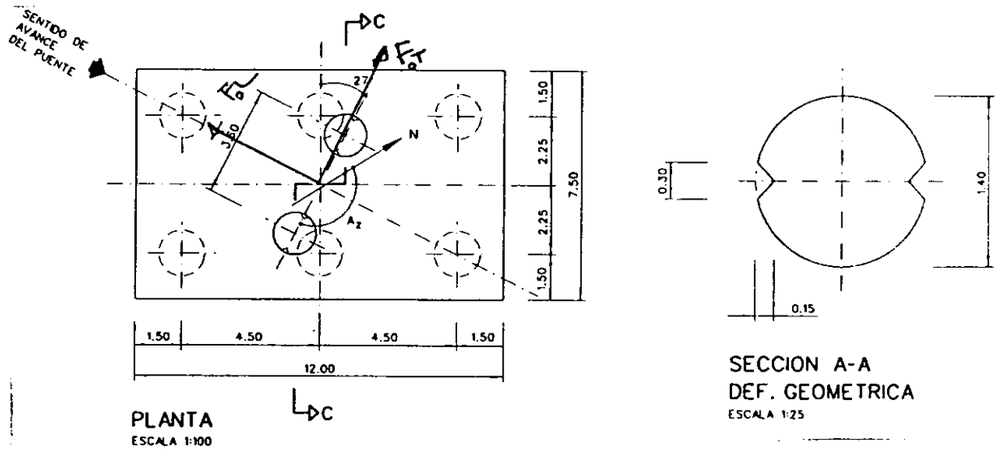
$W_i = 40.9 \times 1.03 = 42.1\ cm^2 \rightarrow$ Ø32/17.5 = 45.9 cm²

$W_s = 12.25 \times 1.03 = 12.62\ cm^2 \rightarrow$ Ø20/17.5



COMPROBACION PILAS 12 y 13.





CARGAS MAXIMAS Y MINIMAS EN PILOTES EN PILAS 12 Y 13

PILA 12	HIPOT	N	ML0	MT0	MX	MY	QMAX	QMIN
ALFA	1	1881	551	189	119	570	354	273
30.73	2	2618	551	517	-163	738	489	383
0.5363	3	2712	551	816	-420	891	533	371

PILA 13	HIPOT	N	ML0	MT0	MX	MY	QMAX	QMIN
ALFA	1	1881	551	189	82	577	352	275
27	2	2618	551	517	-211	726	492	380
0.4712	3	2712	551	816	-477	861	535	369

CALCULO DE LAS ARMADURAS DEL ENCEPADO (12)

$Q_{max} = 552\ t$

$M = 2 \times 552 \times 4.50 = 4968\ mt$

$M' = 4968 \times 1.6 / 7.50 = 1060\ mt/ml$

$\sigma_c = \frac{2000}{1.5} \times 4.00 \times 2.40 = 4000\ t/m^2$

$\Delta S = 4000 \left(1 - \sqrt{1 - \frac{2 \times 1060}{2.40 \times 4000}}\right) = 469\ t/m$

$W = 469 \times 1.15 / 5.1 = 106\ cm^2/ml \qquad W_{min} = 61.2\ cm^2/ml$

8 ø de 25 con ø 32/15

8 ø de reparto $N' = 496\ mt/ml \rightarrow$ 10ø32/15

$\theta = 552 \times 2 = 1104$

$\theta' = 1104 \times 1.6 = 1766\ t$

$T_b = 5 \sqrt{\frac{250}{1.5}} \times 2.40 \times 7.50 = 1161\ t$

$w_t = \frac{1766 - 1161}{0.9 \times 4.2 \times 2.4} = 66\ cm^2/ml$

$W_{tmin} = 0.02 \times \frac{2500}{1.5} \times 4.00 \frac{1}{4.2} = 193\ cm^2/m^2$

$\varnothing$ c ø16/60/60 $\rightarrow \frac{2 \times 2.2}{0.60 \times 0.60} = 11.2\ cm^2/m^2$

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 **************************************************
 *                                                *
 *          S T A A D - III                       *
 *          Revision 17.0a                        *
 *          Proprietary Program of                *
 *          RESEARCH ENGINEERS, Inc.              *
 *          Date=    JUN  2, 1999                 *
 *          Time=    15:34:58                     *
 *                                                *
 **************************************************
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```
 1. STAAD FLOOR LAV MADRID-ZARAGOZA. LOSA VANOS 1*21+28*3+30*3+21
 2. *REACCIONES VERTICALES SOBRE LAS PILAS
 3. UNIT METER MTON
 4. JOINT COORDINATES
 5. 101    0.000   0.000  -3.750   110  27.000   0.000  -3.750
 6. 111   30.000   0.000  -3.750   120  57.000   0.000  -3.750
 7. 121   60.000   0.000  -3.750   131  90.000   0.000  -3.750
 8. 201    0.000   0.000  -0.995   210  27.000   0.000  -0.995
 9. 211   30.000   0.000  -0.995   220  57.000   0.000  -0.995
10. 221   60.000   0.000  -0.995   231  90.000   0.000  -0.995
11. 301    0.000   0.000   0.995   310  27.000   0.000   0.995
12. 311   30.000   0.000   0.995   320  57.000   0.000   0.995
13. 321   60.000   0.000   0.995   331  90.000   0.000   0.995
14. 401    0.000   0.000   3.750   410  27.000   0.000   3.750
15. 411   30.000   0.000   3.750   420  57.000   0.000   3.750
16. 421   60.000   0.000   3.750   431  90.000   0.000   3.750
17. 10001  0.000   0.000  -1.800
18. 10002 30.000   0.000  -1.800
19. 10003 60.000   0.000  -1.800
20. 10004 90.000   0.000  -1.800
21. 10011  0.000   0.000   1.800
22. 10012 30.000   0.000   1.800
23. 10013 60.000   0.000   1.800
24. 10014 90.000   0.000   1.800
25. MEMBER INCIDENCES
26.    101  101  102
27.    R    29   1    1
28.    RA   3    100  100
29.    1101 101  201
30.    R    30   1    1
31.    1201 201  301
32.    R    30   1    1
33.    1301 301  401
34.    R    30   1    1
35. 10001  101   10001
36. 10002  10001 201
37. 10011  111   10002
38. 10012  10002 211
39. 10021  121   10003
40. 10022  10003 221
41. 10031  131   10004
42. 10032  10004 231
43. 10101  301   10011
44. 10102  10011 401
45. 10111  311   10012
46. 10112  10012 411
47. 10121  321   10013
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*REACCIONES VERTICALES SOBRE LAS PILAS
48. 10122  10013 421
49. 10131  331   10014
50. 10132  10014 431
51. DELETE MEMBER 1101 1111 1121 1131 1301 1311 1321 1331
52. MEMBER PROPERTY
53. 101  TO  130  PR  AX  3.3985  IX  0.2923  IZ  0.5577
54. 201  TO  230  PR  AX  2.1590  IX  0.2923  IZ  2.1712
55. 301  TO  330  PR  AX  2.1590  IX  0.2923  IZ  2.1712
56. 401  TO  430  PR  AX  3.3985  IX  0.2923  IZ  0.5577
57. 1102 TO 1110  PR  AX  1.8000  IX  0.0267  IZ  0.0135
58. 1112 TO 1120  PR  AX  1.8000  IX  0.0267  IZ  0.0135
59. 1122 TO 1130  PR  AX  1.8000  IX  0.0267  IZ  0.0135
60. 1201 TO 1231  PR  AX  1.8000  IX  0.0267  IZ  0.0135
61. 1302 TO 1310  PR  AX  1.8000  IX  0.0267  IZ  0.0135
62. 1312 TO 1320  PR  AX  1.8000  IX  0.0267  IZ  0.0135
63. 1322 TO 1330  PR  AX  1.8000  IX  0.0267  IZ  0.0135
64. 10001   10002 PR  AX  1.8000  IX  0.0267  IZ  0.0135
65. 10011   10012 PR  AX  1.8000  IX  0.0267  IZ  0.0135
66. 10021   10022 PR  AX  1.8000  IX  0.0267  IZ  0.0135
67. 10031   10032 PR  AX  1.8000  IX  0.0267  IZ  0.0135
68. 10101   10102 PR  AX  1.8000  IX  0.0267  IZ  0.0135
69. 10111   10112 PR  AX  1.8000  IX  0.0267  IZ  0.0135
70. 10121   10122 PR  AX  1.8000  IX  0.0267  IZ  0.0135
71. 10131   10132 PR  AX  1.8000  IX  0.0267  IZ  0.0135
72. CONSTANTS
73. E   3250000.  ALL
74. DEN  7.85      ALL
75. POI  0.15      ALL
76. SUPPORTS
77. 10001          FIXED  BUT FX MX
78. 10011          FIXED  BUT FX MX
79. 10002          PINNED
80. 10012          PINNED
81. 10003          PINNED
82. 10013          PINNED
83. 10004          FIXED  BUT FX MX
84. 10014          FIXED  BUT FX MX
85. LOADING 1 UN TREN EN VANO DE 3*30 M CON RIPADO 30 CM (VIA 1)
86. MEMBER LOAD
87. *TREN SOBRE VIA 1
88. *SOBRECARGA DE 0.40 EN ACERA CORRESPONDIENTE
89. 101 TO 130  UNI  GY  -6.775
90. 201 TO 230  UNI  GY  -5.225
91. 101 TO 130  UNI  GY  -0.60
92. 101 TO 130  UMOM GX  -1.50
93. LOADING 2 UN TREN EN VANO DE 3*30 M CON RIPADO 30 CM (VIA 2)
94. MEMBER LOAD
95. *TREN SOBRE VIA 2
96. *SOBRECARGA DE 0.40 EN ACERA CORRESPONDIENTE
97. 301 TO 330  UNI  GY  -7.840
98. 401 TO 430  UNI  GY  -4.160
99. 401 TO 430  UNI  GY   -0.60
100. 401 TO 430  UMOM GX    1.50
101. LOADING COMBINATION 3
102. 1 1.00 2 1.00
103. PERFORM ANALISIS
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 132/ 221/ 8
ORIGINAL/FINAL BAND-WIDTH = 124/ 6
TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 384
SIZE OF STIFFNESS MATRIX = 8064 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 12.48 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX. 15:35: 1
++ PROCESSING GLOBAL STIFFNESS MATRIX. 15:35: 1
++ PROCESSING TRIANGULAR FACTORIZATION. 15:35: 2
++ CALCULATING JOINT DISPLACEMENTS. 15:35: 2
++ CALCULATING MEMBER FORCES. 15:35: 2

104. LOAD LIST ALL
105. PRINT REACC LIST ALL

** ERROR *** ABOVE LINE CONTAINS ERRONEOUS DATA.

DATA-CHECK MODE IS ENTERED.

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = FLOOR

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
10001	1	0.00	201.46	0.00	0.00	0.00	54.05
	2	0.00	-21.32	0.00	0.00	0.00	12.00
	3	0.00	180.14	0.00	0.00	0.00	66.05
10011	1	0.00	-47.60	0.00	0.00	0.00	7.25
	2	0.00	175.18	0.00	0.00	0.00	49.10
	3	0.00	127.58	0.00	0.00	0.00	56.35
10002	1	0.00	511.48	0.00	0.00	0.00	0.00
	2	0.00	-34.56	0.00	0.00	0.00	0.00
	3	0.00	476.92	0.00	0.00	0.00	0.00
10012	1	0.00	-98.34	0.00	0.00	0.00	0.00
	2	0.00	447.71	0.00	0.00	0.00	0.00
	3	0.00	349.37	0.00	0.00	0.00	0.00
10003	1	0.00	511.48	0.00	0.00	0.00	0.00
	2	0.00	-34.56	0.00	0.00	0.00	0.00
	3	0.00	476.92	0.00	0.00	0.00	0.00
10013	1	0.00	-98.34	0.00	0.00	0.00	0.00
	2	0.00	447.71	0.00	0.00	0.00	0.00
	3	0.00	349.37	0.00	0.00	0.00	0.00
10004	1	0.00	201.46	0.00	0.00	0.00	-54.05
	2	0.00	-21.32	0.00	0.00	0.00	-12.00
	3	0.00	180.14	0.00	0.00	0.00	-66.05
10014	1	0.00	-47.60	0.00	0.00	0.00	-7.25
	2	0.00	175.18	0.00	0.00	0.00	-49.10
	3	0.00	127.58	0.00	0.00	0.00	-56.35

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

106. PLOT BEND FILE
107. PLOT DISP FILE
108. FINISH

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

**** DATE= JUN 2,1999 TIME= 15:35:11 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

CALCULO DE LOS ESTRIBOS

ESTRIBO 1 (ANCLADO)

intecsa
INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS S.A

PROYECTO: HOJA DE
FECHA
EJECUTANTE:

ANCLAJE DEL TABLERO

Según cálculos anteriores

$N = 2279$ ton

$\frac{N_p - N}{S} = 100\ t/m^2$

$\frac{N_p + N}{S} = 1500\ t/m^2$

$\frac{2N}{S} = 1400 \qquad S = \frac{2 \times 2279}{1400} = 3{,}25\ m^2$

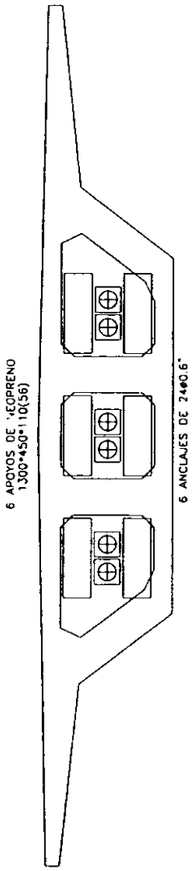
$N_p = 100 \times 3{,}25 + 2279 = 2604\ t$

6 DISPUESTOS $6 \times 24\ \phi 26 = 6 \times 24 \times 26{,}58 \times 0{,}65 = 2487$

$S = \frac{2487 + 2279}{1500} = 3{,}18\ m^2 \quad \phi 2{,}00\ m\ (3{,}14\ m^2)$

$\sigma_{max} = \frac{2487 + 2279}{3{,}14} = 152\ t/m^2$

$\sigma_{min} = \frac{2487 - 2279}{3{,}14} = 66\ t/m^2 = 6{,}6\ t/cm^2$



ESTUDIO DEL ANCLAJE

N' = 320 t

Seccion 1-1

d = 1,15 → 1,50

M' = 320 x 1,50 = 480 mt

Se considera un metro a cada lado

b = 8,48

μ' = 480 / 8,48 = 56,6 mt/ml

$\Delta c = \frac{2500}{1.5} \times 1.90 \times 1.00 = 3167$ t

$\Delta s = 3167 \left(1 - \sqrt{1 - \frac{2 \times 566}{1.90 \times 3167}}\right) = 313$ t

w = 313 x 1,15 / 5,1 = 70,6 cm²

8 Φ 32 / ml

Q' = 320 / 8,48 = 37,5 ton/ml

$\tau = 5 \sqrt{\frac{250}{1.5}} \times 1.90 \times 1.00 = 12,3$ kg/cm²

$w_t = \frac{37,5 - 12,3}{0,9 \times 1,9 \times 4,2} = 3,52$ cm²/ml

6 ramas Φ16/20/20

Seccion 2-2

EMPUJE DE TIERRA

$M = \frac{1}{2} 1,8 \times 8,50 \times \frac{1}{3} \times \frac{1}{3} 8,50 \times 8,50 = 61,4$ mt/ml

M' = 1,6 x 61,4 = 98,3 mt/ml

SOBRECARGA

$M = 300 \times \frac{1}{3} \times \frac{8,50^2}{2} = 36,1$ mt/ml

M' = 1,6 x 36,1 = 57,8 mt/ml

ANCLAJE

μ' = 320 x 1,40 = 2368 mt/4 hileras

Se toma un metro todo a cada lado

μ' = 23687 / 14 = 1691 mt/ml

μ'_{TOTAL} = 98,3 + 57,8 + 1691 = 1847 mt

$\Delta c = \frac{2500}{1.5} \times 1.00 \times 4,60 = 7666$ ton/m

$\Delta s = 7666 \left(1 - \sqrt{1 - \frac{2 \times 1847}{4,60 \times 7666}}\right) = 412$ t/ml

w = 412 x 1,15 / 5,1 = 93 cm²/ml

2 ramas Φ32/15 → 2 x 6,66 x 8,04 = 107 cm²

CONTINUE

$Q' = \left(\frac{1}{2} 1.8 \times 8.50 \times \frac{1}{3} \times 8.50 + 3.00 \times \frac{1}{3} \times 8.50\right) \times 1.6$

$+ 320 l/l4.00 = 48.3 + 228.6 = 276.9$ t/ml

$T_b = \sqrt{\frac{250}{15}} \times 4.00 \times 4.60 = 29.6$

$w_t = \frac{296.9 - 29.6}{0.9 \times 4.2 \times 4.60} = 15$

$w_{tmin} = 0.02 \times \frac{250}{15} \times 4.00 \times 1.00 \times \frac{1}{4.2} = 19.7$ kg

Con Ø25 / 50/50/50

PANELLS

$w = 320 l \times 0.3 \times \frac{1}{4.2} = 228$ a 5.00 m

Equivalent a $\frac{228}{5} = 45.6$ m²/ml

CORTINA MARGEN DE DUCHAJE

$Q' = \left(\frac{1}{2} 1.8 \times 2.765 \times \frac{1}{3} 2.765 + 3.00 \times \frac{1}{3} \times 2.765\right) \times 1.6 +$

$+ 320 l/4.00 = 6.08 + 800 = 806$ t/ml

$T_b = 5\sqrt{\frac{250}{15}} \times 1.00 \times 2.40 = 155$ Tn/m

$w_t = \frac{803 - 155}{0.9 \times 4.2 \times 2.4} = 71$ m²/ml

Es doble ## Ø25/25/25/25

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PROYECTO: _____ HOJA ___ DE ___

FECHA _____

EJECUTANTE: _____

CARACTERISTICAS DE LAS BARRAS

PILOTES ϕ 1.50 $S = \frac{\pi \times 1.50^2}{4} = 1.7662$ (x5)

$I = \frac{\pi \times 1.50^4}{64} = 0.2484$ (x5)

ESTRIBO 21x2.50 $S = 21 \times 2.50 = 52.50$

$I = 21 \times \frac{2.50^3}{12} = 27.3437$

MURO 14.00x4.50 $S = 63.00$

$I = \frac{1}{12} 14 \times 4.50^3 = 106.31$

MURETE 14.00x2.00 $S = 28.00$

$I = \frac{1}{12} 14 \times 2.00^3 = 9.333$

CARGAS DE BARRAS

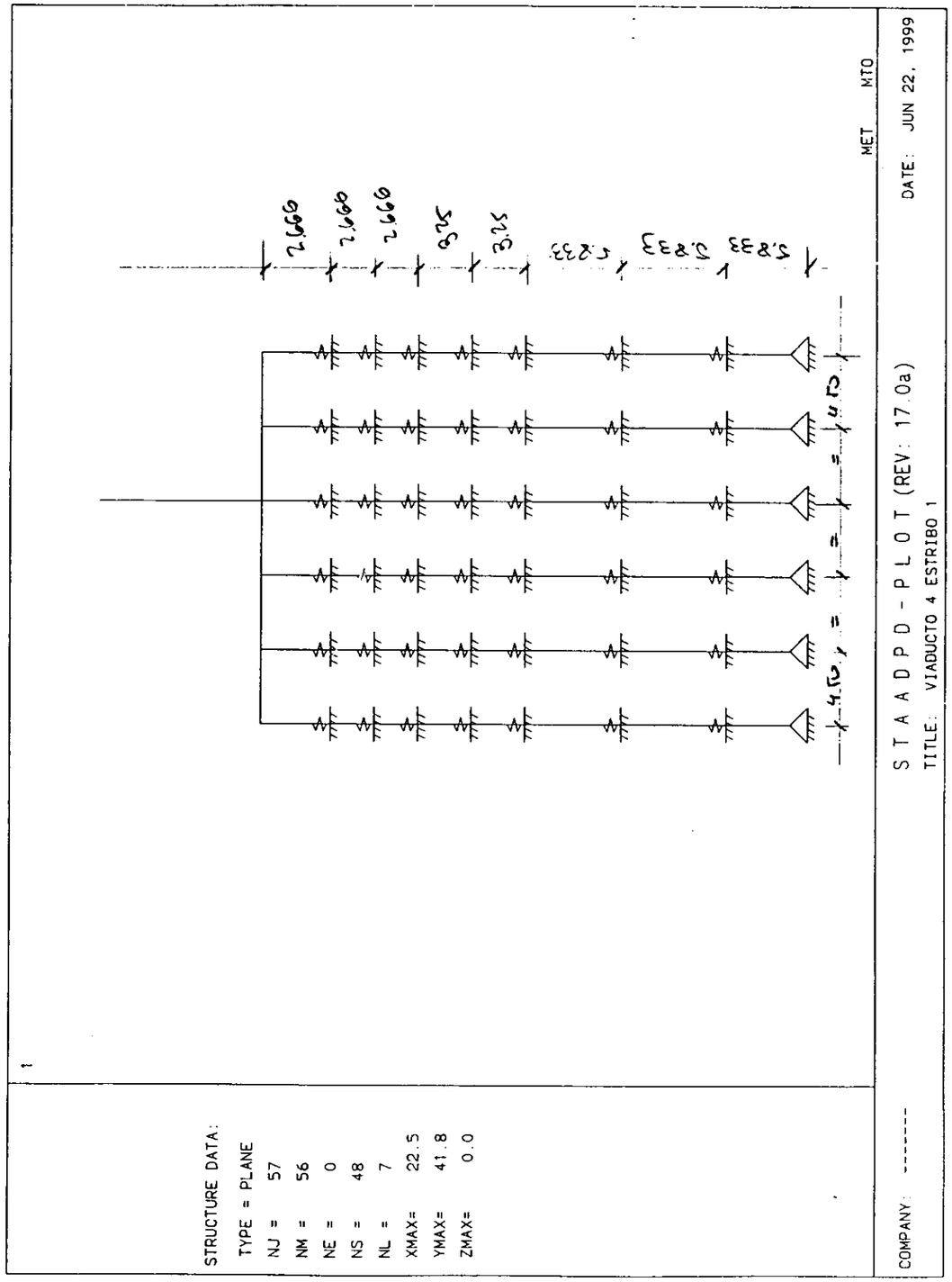
HORMIGON $\rho = 2.50$ t/m3

TIERRA $\rho = 2.00$ t/m3

coeficiente de empuje: (MTOP 8.19)

C/permanente 1.35

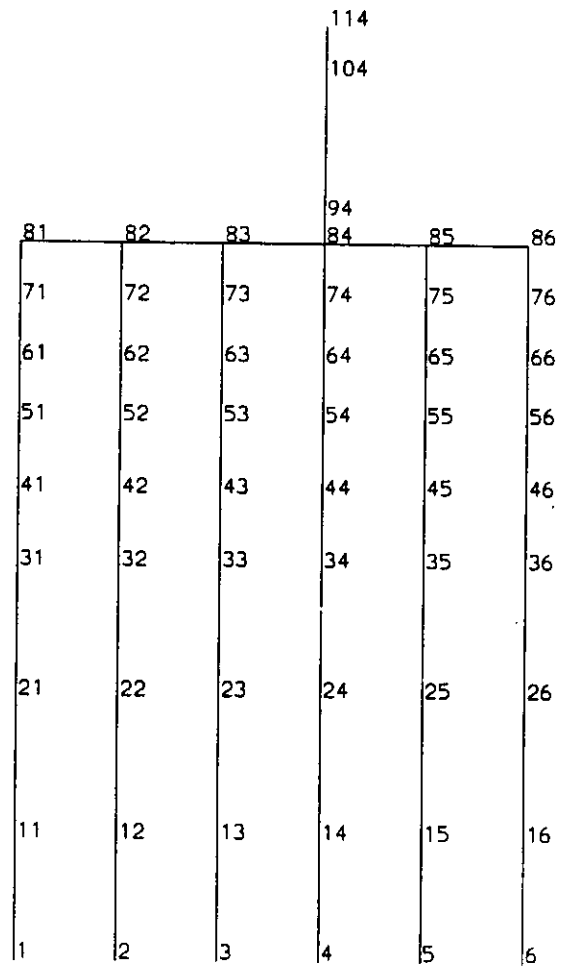
Sobrecarga 1.50



STRUCTURE DATA:

TYPE = PLANE
NJ = 57
NM = 56
NE = 0
NS = 48
NL = 7
XMAX= 22.5
YMAX= 41.8
ZMAX= 0.0

1



NUOS

MET MTO

COMPANY: -------

S T A A D P D - P L O T (REV: 17.0a)

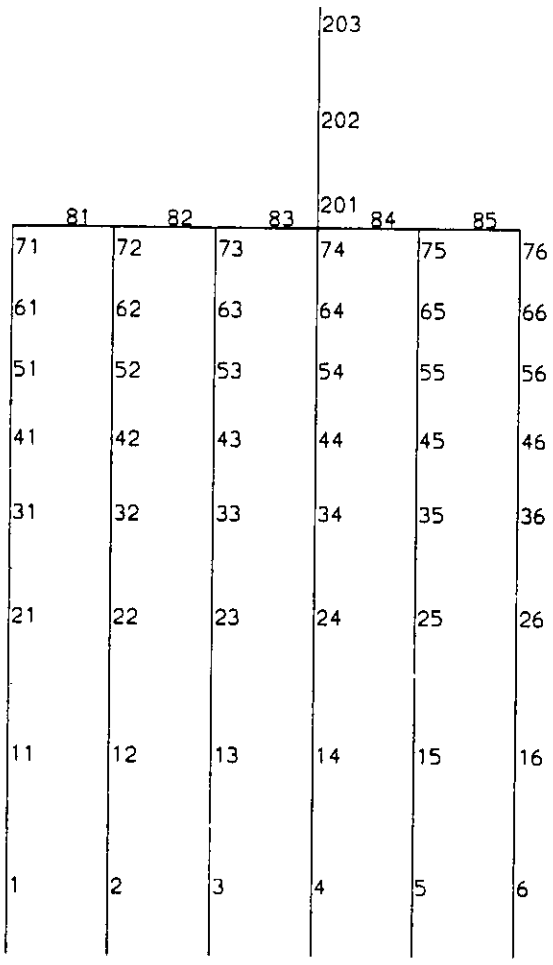
TITLE: VIADUCTO 4 ESTRIBO 1

DATE: JUN 22, 1999

STRUCTURE DATA:

TYPE = PLANE
NJ = 57
NM = 56
NE = 0
NS = 48
NL = 7
XMAX= 22.5
YMAX= 41.8
ZMAX= 0.0

1



BNS

MET MTO

COMPANY: -------

S T A A D P D - P L O T (REV: 17.0a)

TITLE: VIADUCTO 4 ESTRIBO 1

DATE: JUN 22, 1999

```
 *************************************************
 *                                               *
 *           S T A A D - III                     *
 *           Revision 17.0a                      *
 *           Proprietary Program of              *
 *           RESEARCH ENGINEERS, Inc.            *
 *           Date=    JUN 24, 1999               *
 *           Time=     8:24:42                   *
 *                                               *
 *************************************************

  1. STAAD PLANE VIADUCTO 4 ESTRIBO 1
  2. *EFECTOS CARGAS GRAVITATORIAS
  3. UNIT MTO MET
  4. JOINT COORDINATES
  5.   1   0.000  -32.000   0.0   6  22.50  -32.000  0.0
  6.  11   0.000  -26.166   0.0  16  22.50  -26.166  0.0
  7.  21   0.000  -20.333   0.0  26  22.50  -20.333  0.0
  8.  31   0.000  -14.500   0.0  36  22.50  -14.500  0.0
  9.  41   0.000  -11.250   0.0  46  22.50  -11.250  0.0
 10.  51   0.000   -8.000   0.0  56  22.50   -8.000  0.0
 11.  61   0.000   -5.333   0.0  66  22.50   -5.333  0.0
 12.  71   0.000   -2.666   0.0  76  22.50   -2.666  0.0
 13.  81   0.000    0.000   0.0  86  22.50    0.000  0.0
 14.  94  13.500    1.250   0.0
 15. 104  13.500    7.500   0.0
 16. 114  13.500    9.750   0.0
 17. MEMBER INCIDENCES
 18.   1    1    11
 19.   R    7    10   10
 20.   RA   5    1    1
 21.   81   81   82
 22.   82   82   83
 23.   83   83   84
 24.   84   84   85
 25.   85   85   86
 26.   201  84   94
 27.   202  94   104
 28.   203  104  114
 29. MEMBER PROPERTY
 30. *PILOTES
 31. 1 11 21 31 41 51 61 71  PR AX  8.831 IZ  1.24189
 32. 2 12 22 32 42 52 62 72  PR AX  8.831 IZ  1.24189
 33. 3 13 23 33 43 53 63 73  PR AX  8.831 IZ  1.24189
 34. 4 14 24 34 44 54 64 74  PR AX  8.831 IZ  1.24189
 35. 5 15 25 35 45 55 65 75  PR AX  8.831 IZ  1.24189
 36. 6 16 26 36 46 56 66 76  PR AX  8.831 IZ  1.24189
 37. *ENCEPADO
 38. 81 TO 85                PR AX 52.500 IZ  27.3437
 39. *MURO
 40. 201                     PR AX  1.000 IZ 500.0000
 41. 202                     PR AX 63.000 IZ 106.3100
 42. 203                     PR AX 28.500 IZ   9.3300
 43. CONSTANT
 44. E  3250000.   ALL
 45. POI 0.15
 46. DEN 2.50
 47. SUPPORT
```



```
 48. 1 TO 6          PINNED
 49. 11 TO 16        FIXED BUT FY MZ KFX  291666
 50. 21 TO 26        FIXED BUT FY MZ KFX  291666
 51. 31 TO 36        FIXED BUT FY MZ KFX  152833
 52. 41 TO 46        FIXED BUT FY MZ KFX   14000
 53. 51 TO 56        FIXED BUT FY MZ KFX    9267
 54. 61 TO 66        FIXED BUT FY MZ KFX    4533
 55. 71 TO 76        FIXED BUT FY MZ KFX    4533
 56. *EFECTOS CARGAS GRAVITATORIAS
 57. LOADING 1 PESO PROPIO
 58. SELF            Y -1.0
 59. LOADING 2 PESO  Y EMPUJE DE TIERRAS (PARA B=14.00)
 60. MEMBER LOAD
 61. 81 TO 84        UNI GY -238.00
 62. 51 61 71        UNI GX   93.00
 63. 52 62 72        UNI GX   46.55
 64. 202             TRA GX   21.50   0.00
 65. 203             TRA GX   77.50  21.50
 66. JOINT LOAD
 67. 104             FY -353.00
 68. LOADING 3 SOBRECARGA
 69. MEMBER LOAD
 70. 81 TO 84        UNI GY  -42.00
 71. 202             UNI GX   14.00
 72. 203             UNI GX   14.00
 73. JOINT LOAD
 74. 104             FY -325.00
 75. LOADING 4 ANCLAJE DEL TABLERO (+)
 76. MEMBER LOAD
 77. 203             CON GX  2279.00
 78. LOADING 5 ANCLAJE DEL TABLERO (-)
 79. MEMBER LOAD
 80. 203             CON GX -2279.00
 81. LOADING COMBINATION 6
 82. 1 1.0 2 1.0 3 1.0 4 1.0
 83. LOADING COMBINATION 7
 84. 1 1.0 2 1.0 3 1.0 5 1.0
 85. LOADING COMBINATION 8
 86. 1 1.35 2 1.35 3 1.50 4 1.50
 87. LOADING COMBINATION 9
 88. 1 1.35 2 1.35 3 1.50 5 1.50
 89. PERFORM ANALISIS


      P R O B L E M   S T A T I S T I C S
      -----------------------------------

 NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    57/   56/   48
 ORIGINAL/FINAL BAND-WIDTH =     6/    6
 TOTAL PRIMARY LOAD CASES  =     5, TOTAL DEGREES OF FREEDOM =   159
 SIZE OF STIFFNESS MATRIX =    3339 DOUBLE PREC. WORDS
 TOTAL REQUIRED DISK SPACE =   12.16 MEGA-BYTES


++ PROCESSING ELEMENT STIFFNESS MATRIX.              8:24:44
++ PROCESSING GLOBAL STIFFNESS MATRIX.               8:24:44
++ PROCESSING TRIANGULAR FACTORIZATION.              8:24:44
++ CALCULATING JOINT DISPLACEMENTS.                  8:24:44
```

++ CALCULATING MEMBER FORCES. 8:24:44

90. LOAD LIST 6 7 8 9
91. PRINT MEMBER FORCES LIST 71 72 73 74 75 76

MEMBER END FORCES STRUCTURE TYPE = PLANE
ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
71	6	71	449.07	219.11	0.00	0.00	0.00	-1599.90
		81	-390.21	28.82	0.00	0.00	0.00	1853.54
	7	71	1739.89	-558.27	0.00	0.00	0.00	833.98
		81	-1681.03	806.21	0.00	0.00	0.00	-2652.82
	8	71	521.48	356.64	0.00	0.00	0.00	-2348.81
		81	-442.02	-21.93	0.00	0.00	0.00	2853.42
	9	71	2457.72	-809.44	0.00	0.00	0.00	1301.99
		81	-2378.26	1144.15	0.00	0.00	0.00	-3906.11
72	6	72	1045.97	401.47	0.00	0.00	0.00	-1710.09
		82	-987.11	-277.37	0.00	0.00	0.00	2614.99
	7	72	2419.80	-385.26	0.00	0.00	0.00	784.39
		82	-2360.95	509.36	0.00	0.00	0.00	-1976.92
	8	72	1335.49	603.63	0.00	0.00	0.00	-2502.83
		82	-1256.03	-436.09	0.00	0.00	0.00	3888.79
	9	72	3396.24	-576.46	0.00	0.00	0.00	1238.89
		82	-3316.78	744.00	0.00	0.00	0.00	-2999.07
73	6	73	1479.49	574.64	0.00	0.00	0.00	-1756.51
		83	-1420.63	-574.64	0.00	0.00	0.00	3288.49
	7	73	2928.81	-197.74	0.00	0.00	0.00	640.13
		83	-2869.95	197.74	0.00	0.00	0.00	-1167.30
	8	73	1925.43	836.44	0.00	0.00	0.00	-2558.89
		83	-1845.97	-836.44	0.00	0.00	0.00	4788.83
	9	73	4099.42	-322.13	0.00	0.00	0.00	1036.07
		83	-4019.96	322.13	0.00	0.00	0.00	-1894.86
74	6	74	2366.21	550.62	0.00	0.00	0.00	-1595.99
		84	-2307.35	-550.62	0.00	0.00	0.00	3063.96
	7	74	2345.84	-147.38	0.00	0.00	0.00	303.81
		84	-2286.98	147.38	0.00	0.00	0.00	-696.72
	8	74	3238.13	798.65	0.00	0.00	0.00	-2306.26
		84	-3158.67	-798.65	0.00	0.00	0.00	4435.45
	9	74	3207.57	-248.35	0.00	0.00	0.00	543.46
		84	-3128.11	248.35	0.00	0.00	0.00	-1205.56
75	6	75	2688.56	599.60	0.00	0.00	0.00	-1922.58
		85	-2629.70	-599.60	0.00	0.00	0.00	3521.12
	7	75	951.89	-159.76	0.00	0.00	0.00	386.45
		85	-893.03	159.76	0.00	0.00	0.00	-812.38
	8	75	3791.66	869.88	0.00	0.00	0.00	-2781.25
		85	-3712.20	-869.88	0.00	0.00	0.00	5100.36
	9	75	1186.65	-269.17	0.00	0.00	0.00	682.28
		85	-1107.20	269.17	0.00	0.00	0.00	-1399.89
76	6	76	2142.80	603.16	0.00	0.00	0.00	-1947.24
		86	-2083.95	-603.16	0.00	0.00	0.00	3555.26

EMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	7	76	-214.15	-160.99	0.00	0.00	0.00	394.84
		86	273.01	160.99	0.00	0.00	0.00	-824.03
	8	76	3082.30	875.08	0.00	0.00	0.00	-2817.26
		86	-3002.84	-875.08	0.00	0.00	0.00	5150.21
	9	76	-453.13	-271.14	0.00	0.00	0.00	695.87
		86	532.59	271.14	0.00	0.00	0.00	-1418.72

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

92. PRINT MEMBER FORCES LIST 51 52 53 54 55 56

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
51	6	51	566.83	474.89	0.00	0.00	0.00	-99.32
		61	-507.95	-226.85	0.00	0.00	0.00	1035.09
	7	51	1857.66	3.67	0.00	0.00	0.00	-539.43
		61	-1798.77	244.36	0.00	0.00	0.00	218.46
	8	51	680.45	677.88	0.00	0.00	0.00	-98.54
		61	-600.96	-343.03	0.00	0.00	0.00	1459.93
	9	51	2616.69	-28.95	0.00	0.00	0.00	-758.71
		61	-2537.21	363.79	0.00	0.00	0.00	234.98
52	6	52	1163.73	414.30	0.00	0.00	0.00	118.59
		62	-1104.85	-290.16	0.00	0.00	0.00	820.81
	7	52	2537.56	-64.55	0.00	0.00	0.00	-304.18
		62	-2478.68	188.70	0.00	0.00	0.00	-33.53
	8	52	1494.46	596.75	0.00	0.00	0.00	194.13
		62	-1414.97	-429.15	0.00	0.00	0.00	1173.92
	9	52	3555.22	-121.53	0.00	0.00	0.00	-440.03
		62	-3475.73	289.13	0.00	0.00	0.00	-107.59
53	6	53	1597.25	345.65	0.00	0.00	0.00	356.10
		63	-1538.37	-345.65	0.00	0.00	0.00	565.74
	7	53	3046.57	-121.18	0.00	0.00	0.00	-96.75
		63	-2987.69	121.18	0.00	0.00	0.00	-226.44
	8	53	2084.41	503.26	0.00	0.00	0.00	516.81
		63	-2004.92	-503.26	0.00	0.00	0.00	825.37
	9	53	4258.40	-196.99	0.00	0.00	0.00	-162.47
		63	-4178.91	196.99	0.00	0.00	0.00	-362.90
54	6	54	2483.97	325.73	0.00	0.00	0.00	404.17
		64	-2425.09	-325.73	0.00	0.00	0.00	464.55
	7	54	2463.60	-79.43	0.00	0.00	0.00	-197.31
		64	-2404.72	79.43	0.00	0.00	0.00	-14.55
	8	54	3397.10	471.91	0.00	0.00	0.00	592.47
		64	-3317.61	-471.91	0.00	0.00	0.00	666.12
	9	54	3366.55	-135.84	0.00	0.00	0.00	-309.76
		64	-3287.06	135.84	0.00	0.00	0.00	-52.53
55	6	55	2806.32	366.30	0.00	0.00	0.00	306.72
		65	-2747.44	-366.30	0.00	0.00	0.00	670.20
	7	55	1069.65	-89.70	0.00	0.00	0.00	-172.64
		65	-1010.77	89.70	0.00	0.00	0.00	-66.58
	8	55	3950.63	530.92	0.00	0.00	0.00	450.73
		65	-3871.14	-530.92	0.00	0.00	0.00	965.22
	9	55	1345.63	-153.08	0.00	0.00	0.00	-268.31
		65	-1266.14	153.08	0.00	0.00	0.00	-139.96
56	6	56	2260.57	369.31	0.00	0.00	0.00	298.98
		66	-2201.69	-369.31	0.00	0.00	0.00	685.95

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	7	56	-96.39	-90.73	0.00	0.00	0.00	-170.04
		66	155.27	90.73	0.00	0.00	0.00	-71.93
	8	56	3241.28	535.31	0.00	0.00	0.00	439.44
		66	-3161.79	-535.31	0.00	0.00	0.00	988.22
	9	56	-294.15	-154.74	0.00	0.00	0.00	-264.09
		66	373.64	154.74	0.00	0.00	0.00	-148.61

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

93. PRINT MEMBER FORCES LIST 31 32 33 34 35 36

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
31	6	31	710.33	190.75	0.00	0.00	0.00	1543.65
		41	-638.58	-190.75	0.00	0.00	0.00	-923.72
	7	31	2001.16	46.38	0.00	0.00	0.00	-283.53
		41	-1929.41	-46.38	0.00	0.00	0.00	434.26
	8	31	874.18	268.68	0.00	0.00	0.00	2227.20
		41	-777.32	-268.68	0.00	0.00	0.00	-1353.99
	9	31	2810.42	52.12	0.00	0.00	0.00	-513.57
		41	-2713.56	-52.12	0.00	0.00	0.00	682.98
32	6	32	1307.23	149.30	0.00	0.00	0.00	1459.30
		42	-1235.48	-149.30	0.00	0.00	0.00	-974.06
	7	32	2681.07	0.56	0.00	0.00	0.00	-384.07
		42	-2609.32	-0.56	0.00	0.00	0.00	385.87
	8	32	1688.19	213.11	0.00	0.00	0.00	2114.73
		42	-1591.33	-213.11	0.00	0.00	0.00	-1422.12
	9	32	3748.95	-10.01	0.00	0.00	0.00	-650.32
		42	-3652.08	10.01	0.00	0.00	0.00	617.78
33	6	33	1740.75	103.12	0.00	0.00	0.00	1358.52
		43	-1669.00	-103.12	0.00	0.00	0.00	-1023.37
	7	33	3190.08	-38.50	0.00	0.00	0.00	-460.88
		43	-3118.33	38.50	0.00	0.00	0.00	335.77
	8	33	2278.14	150.29	0.00	0.00	0.00	1977.07
		43	-2181.27	-150.29	0.00	0.00	0.00	-1488.64
	9	33	4452.13	-62.15	0.00	0.00	0.00	-752.04
		43	-4355.26	62.15	0.00	0.00	0.00	550.06
34	6	34	2627.47	91.47	0.00	0.00	0.00	1317.87
		44	-2555.72	-91.47	0.00	0.00	0.00	-1020.61
	7	34	2607.11	-14.07	0.00	0.00	0.00	-375.55
		44	-2535.35	14.07	0.00	0.00	0.00	329.81
	8	34	3590.83	131.94	0.00	0.00	0.00	1913.09
		44	-3493.97	-131.94	0.00	0.00	0.00	-1484.30
	9	34	3560.28	-26.37	0.00	0.00	0.00	-627.04
		44	-3463.42	26.37	0.00	0.00	0.00	541.33
35	6	35	2949.82	115.18	0.00	0.00	0.00	1400.94
		45	-2878.07	-115.18	0.00	0.00	0.00	-1026.62
	7	35	1213.15	-20.07	0.00	0.00	0.00	-396.56
		45	-1141.40	20.07	0.00	0.00	0.00	331.32
	8	35	4144.36	166.42	0.00	0.00	0.00	2033.92
		45	-4047.50	-166.42	0.00	0.00	0.00	-1493.04
	9	35	1539.36	-36.45	0.00	0.00	0.00	-662.33
		45	-1442.50	36.45	0.00	0.00	0.00	543.86
36	6	36	2404.07	116.98	0.00	0.00	0.00	1406.82
		46	-2332.32	-116.98	0.00	0.00	0.00	-1026.64

EMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	7	36	47.12	-20.69	0.00	0.00	0.00	-398.59
		46	24.64	20.69	0.00	0.00	0.00	331.36
	8	36	3435.01	169.05	0.00	0.00	0.00	2042.50
		46	-3338.14	-169.05	0.00	0.00	0.00	-1493.08
	9	36	-100.42	-37.44	0.00	0.00	0.00	-665.62
		46	197.29	37.44	0.00	0.00	0.00	543.93

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

94. PRINT MEMBER FORCES LIST 11 12 13 14 15 16

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
11	6	11	967.89	-58.39	0.00	0.00	0.00	-76.86
		21	-839.11	58.39	0.00	0.00	0.00	-263.71
	7	11	2258.71	2.24	0.00	0.00	0.00	20.27
		21	-2129.94	-2.24	0.00	0.00	0.00	-7.19
	8	11	1221.88	-83.56	0.00	0.00	0.00	-111.39
		21	-1048.03	83.56	0.00	0.00	0.00	-376.02
	9	11	3158.12	7.38	0.00	0.00	0.00	34.30
		21	-2984.27	-7.38	0.00	0.00	0.00	8.76
12	6	12	1564.79	-51.96	0.00	0.00	0.00	-75.00
		22	-1436.01	51.96	0.00	0.00	0.00	-228.10
	7	12	2938.62	9.52	0.00	0.00	0.00	22.75
		22	-2809.85	-9.52	0.00	0.00	0.00	32.80
	8	12	2035.89	-74.96	0.00	0.00	0.00	-108.94
		22	-1862.04	74.96	0.00	0.00	0.00	-328.33
	9	12	4096.65	17.27	0.00	0.00	0.00	37.69
		22	-3922.80	-17.27	0.00	0.00	0.00	63.03
13	6	13	1998.31	-44.64	0.00	0.00	0.00	-72.53
		23	-1869.53	44.64	0.00	0.00	0.00	-187.84
	7	13	3447.63	15.51	0.00	0.00	0.00	24.34
		23	-3318.86	-15.51	0.00	0.00	0.00	66.13
	8	13	2625.84	-64.98	0.00	0.00	0.00	-105.54
		23	-2451.99	64.98	0.00	0.00	0.00	-273.51
	9	13	4799.83	25.24	0.00	0.00	0.00	39.77
		23	-4625.98	-25.24	0.00	0.00	0.00	107.44
14	6	14	2885.03	-42.41	0.00	0.00	0.00	-71.01
		24	-2756.25	42.41	0.00	0.00	0.00	-176.36
	7	14	2864.66	10.84	0.00	0.00	0.00	21.14
		24	-2735.88	-10.84	0.00	0.00	0.00	42.06
	8	14	3938.53	-61.48	0.00	0.00	0.00	-103.15
		24	-3764.68	61.48	0.00	0.00	0.00	-255.44
	9	14	3907.98	18.39	0.00	0.00	0.00	35.08
		24	-3734.13	-18.39	0.00	0.00	0.00	72.20
15	6	15	3207.38	-46.95	0.00	0.00	0.00	-74.13
		25	-3078.60	46.95	0.00	0.00	0.00	-199.74
	7	15	1470.71	11.99	0.00	0.00	0.00	21.93
		25	-1341.93	-11.99	0.00	0.00	0.00	47.98
	8	15	4492.06	-68.08	0.00	0.00	0.00	-107.69
		25	-4318.21	68.08	0.00	0.00	0.00	-289.45
	9	15	1887.06	20.32	0.00	0.00	0.00	36.41
		25	-1713.21	-20.32	0.00	0.00	0.00	82.13
16	6	16	2661.63	-47.29	0.00	0.00	0.00	-74.34
		26	-2532.85	47.29	0.00	0.00	0.00	-201.48

'MBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	7	16	304.67	12.10	0.00	0.00	0.00	22.00
		26	-175.89	-12.10	0.00	0.00	0.00	48.57
	8	16	3782.71	-68.57	0.00	0.00	0.00	-107.99
		26	-3608.86	68.57	0.00	0.00	0.00	-291.98
	9	16	247.28	20.51	0.00	0.00	0.00	36.53
		26	-73.43	-20.51	0.00	0.00	0.00	83.09

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

95. PRINT MEMBER FORCES LIST 81 82 83 84 85

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
81	6	81	28.82	390.21	0.00	0.00	0.00	-1853.54
		82	-28.82	1460.42	0.00	0.00	0.00	-554.43
	7	81	806.16	1681.03	0.00	0.00	0.00	2652.81
		82	-806.16	169.59	0.00	0.00	0.00	747.94
	8	81	-21.93	442.02	0.00	0.00	0.00	-2853.42
		82	21.93	2084.68	0.00	0.00	0.00	-842.56
	9	81	1144.09	2378.26	0.00	0.00	0.00	3906.11
		82	-1144.09	148.44	0.00	0.00	0.00	1110.98
82	6	82	-248.49	-473.31	0.00	0.00	0.00	-2060.56
		83	248.49	2323.94	0.00	0.00	0.00	-4233.24
	7	82	1315.55	2191.35	0.00	0.00	0.00	1228.98
		83	-1315.55	-340.73	0.00	0.00	0.00	4468.20
	8	82	-457.94	-828.65	0.00	0.00	0.00	-3046.22
		83	457.94	3355.35	0.00	0.00	0.00	-6367.77
	9	82	1888.12	3168.34	0.00	0.00	0.00	1888.08
		83	-1888.12	-641.65	0.00	0.00	0.00	6684.39
83	6	83	-823.20	-903.31	0.00	0.00	0.00	944.75
		84	823.20	2753.93	0.00	0.00	0.00	-9173.55
	7	83	1513.30	3210.68	0.00	0.00	0.00	-3300.90
		84	-1513.30	-1360.06	0.00	0.00	0.00	13585.07
	8	83	-1294.48	-1509.38	0.00	0.00	0.00	1578.94
		84	1294.48	4036.07	0.00	0.00	0.00	-14056.20
	9	83	2210.27	4661.61	0.00	0.00	0.00	-4789.54
		84	-2210.27	-2134.92	0.00	0.00	0.00	20081.73
84	6	84	1202.83	-2272.39	0.00	0.00	0.00	-15362.16
		85	-1202.83	4123.02	0.00	0.00	0.00	972.48
	7	84	-320.82	1821.23	0.00	0.00	0.00	4952.65
		85	320.82	29.40	0.00	0.00	0.00	-921.03
	8	84	1745.06	-3391.00	0.00	0.00	0.00	-22412.75
		85	-1745.06	5917.69	0.00	0.00	0.00	1468.19
	9	84	-540.41	2749.44	0.00	0.00	0.00	8059.47
		85	540.41	-222.74	0.00	0.00	0.00	-1372.07
85	6	85	603.16	-1493.32	0.00	0.00	0.00	-4493.59
		86	-603.16	2083.95	0.00	0.00	0.00	-3555.26
	7	85	-161.04	863.63	0.00	0.00	0.00	1733.40
		86	161.04	-273.01	0.00	0.00	0.00	824.03
	8	85	875.09	-2205.50	0.00	0.00	0.00	-6568.54
		86	-875.09	3002.84	0.00	0.00	0.00	-5150.22
	9	85	-271.21	1329.94	0.00	0.00	0.00	2771.95
		86	271.21	-532.59	0.00	0.00	0.00	1418.72

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

96. PRINT MEMBER FORCES LIST 202 203

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
202	6	94	1822.68	2576.55	0.00	0.00	0.00	18250.99
		104	-838.31	-2421.87	0.00	0.00	0.00	-2701.06
	7	94	1822.68	-1981.42	0.00	0.00	0.00	-15364.17
		104	-838.31	2136.11	0.00	0.00	0.00	2426.87
	8	94	2509.37	3838.04	0.00	0.00	0.00	27235.84
		104	-1180.46	-3616.09	0.00	0.00	0.00	-4036.34
	9	94	2509.37	-2998.91	0.00	0.00	0.00	-23186.91
		104	-1180.46	3220.87	0.00	0.00	0.00	3655.55
203	6	104	160.32	2421.86	0.00	0.00	0.00	2700.87
		114	0.00	0.02	0.00	0.00	0.00	-0.06
	7	104	160.32	-2136.13	0.00	0.00	0.00	-2426.72
		114	0.00	0.01	0.00	0.00	0.00	0.06
	8	104	216.43	3616.08	0.00	0.00	0.00	4036.06
		114	-0.01	0.02	0.00	0.00	0.00	-0.09
	9	104	216.43	-3220.91	0.00	0.00	0.00	-3655.33
		114	-0.01	0.01	0.00	0.00	0.00	0.08

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

97. PRINT REACC ALL

_JPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	6	-13.17	1096.69	0.00	0.00	0.00	0.00
	7	3.47	2387.52	0.00	0.00	0.00	0.00
	8	-19.09	1395.76	0.00	0.00	0.00	0.00
	9	5.88	3332.01	0.00	0.00	0.00	0.00
2	6	-12.86	1693.59	0.00	0.00	0.00	0.00
	7	3.90	3067.42	0.00	0.00	0.00	0.00
	8	-18.67	2209.77	0.00	0.00	0.00	0.00
	9	6.46	4270.53	0.00	0.00	0.00	0.00
3	6	-12.43	2127.11	0.00	0.00	0.00	0.00
	7	4.17	3576.43	0.00	0.00	0.00	0.00
	8	-18.09	2799.72	0.00	0.00	0.00	0.00
	9	6.82	4973.71	0.00	0.00	0.00	0.00
4	6	-12.17	3013.83	0.00	0.00	0.00	0.00
	7	3.62	2993.46	0.00	0.00	0.00	0.00
	8	-17.68	4112.41	0.00	0.00	0.00	0.00
	9	6.01	4081.86	0.00	0.00	0.00	0.00
5	6	-12.71	3336.18	0.00	0.00	0.00	0.00
	7	3.76	1599.51	0.00	0.00	0.00	0.00
	8	-18.46	4665.94	0.00	0.00	0.00	0.00
	9	6.24	2060.94	0.00	0.00	0.00	0.00
6	6	-12.74	2790.43	0.00	0.00	0.00	0.00
	7	3.77	433.47	0.00	0.00	0.00	0.00
	8	-18.51	3956.59	0.00	0.00	0.00	0.00
	9	6.26	421.16	0.00	0.00	0.00	0.00
11	6	71.56	0.00	0.00	0.00	0.00	0.00
	7	-5.72	0.00	0.00	0.00	0.00	0.00
	8	102.65	0.00	0.00	0.00	0.00	0.00
	9	-13.26	0.00	0.00	0.00	0.00	0.00
12	6	64.82	0.00	0.00	0.00	0.00	0.00
	7	-13.42	0.00	0.00	0.00	0.00	0.00
	8	93.64	0.00	0.00	0.00	0.00	0.00
	9	-23.73	0.00	0.00	0.00	0.00	0.00
13	6	57.07	0.00	0.00	0.00	0.00	0.00
	7	-19.68	0.00	0.00	0.00	0.00	0.00
	8	83.08	0.00	0.00	0.00	0.00	0.00
	9	-32.05	0.00	0.00	0.00	0.00	0.00
14	6	54.58	0.00	0.00	0.00	0.00	0.00
	7	-14.46	0.00	0.00	0.00	0.00	0.00
	8	79.16	0.00	0.00	0.00	0.00	0.00
	9	-24.41	0.00	0.00	0.00	0.00	0.00
15	6	59.66	0.00	0.00	0.00	0.00	0.00
	7	-15.74	0.00	0.00	0.00	0.00	0.00
	8	86.54	0.00	0.00	0.00	0.00	0.00
	9	-26.56	0.00	0.00	0.00	0.00	0.00
16	6	60.03	0.00	0.00	0.00	0.00	0.00
	7	-15.87	0.00	0.00	0.00	0.00	0.00
	8	87.08	0.00	0.00	0.00	0.00	0.00
	9	-26.77	0.00	0.00	0.00	0.00	0.00
21	6	161.04	0.00	0.00	0.00	0.00	0.00
	7	-47.60	0.00	0.00	0.00	0.00	0.00

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
	8	233.80	0.00	0.00	0.00	0.00	0.00
	9	-79.15	0.00	0.00	0.00	0.00	0.00
22	6	159.11	0.00	0.00	0.00	0.00	0.00
	7	-50.70	0.00	0.00	0.00	0.00	0.00
	8	231.29	0.00	0.00	0.00	0.00	0.00
	9	-83.42	0.00	0.00	0.00	0.00	0.00
23	6	156.06	0.00	0.00	0.00	0.00	0.00
	7	-52.17	0.00	0.00	0.00	0.00	0.00
	8	227.07	0.00	0.00	0.00	0.00	0.00
	9	-85.27	0.00	0.00	0.00	0.00	0.00
24	6	153.29	0.00	0.00	0.00	0.00	0.00
	7	-46.34	0.00	0.00	0.00	0.00	0.00
	8	222.71	0.00	0.00	0.00	0.00	0.00
	9	-76.73	0.00	0.00	0.00	0.00	0.00
25	6	158.98	0.00	0.00	0.00	0.00	0.00
	7	-47.77	0.00	0.00	0.00	0.00	0.00
	8	230.98	0.00	0.00	0.00	0.00	0.00
	9	-79.15	0.00	0.00	0.00	0.00	0.00
26	6	159.35	0.00	0.00	0.00	0.00	0.00
	7	-47.91	0.00	0.00	0.00	0.00	0.00
	8	231.53	0.00	0.00	0.00	0.00	0.00
	9	-79.36	0.00	0.00	0.00	0.00	0.00
31	6	-410.18	0.00	0.00	0.00	0.00	0.00
	7	3.46	0.00	0.00	0.00	0.00	0.00
	8	-586.04	0.00	0.00	0.00	0.00	0.00
	9	34.42	0.00	0.00	0.00	0.00	0.00
32	6	-360.38	0.00	0.00	0.00	0.00	0.00
	7	59.66	0.00	0.00	0.00	0.00	0.00
	8	-519.37	0.00	0.00	0.00	0.00	0.00
	9	110.70	0.00	0.00	0.00	0.00	0.00
33	6	-303.82	0.00	0.00	0.00	0.00	0.00
	7	106.17	0.00	0.00	0.00	0.00	0.00
	8	-442.34	0.00	0.00	0.00	0.00	0.00
	9	172.66	0.00	0.00	0.00	0.00	0.00
34	6	-287.16	0.00	0.00	0.00	0.00	0.00
	7	71.25	0.00	0.00	0.00	0.00	0.00
	8	-416.12	0.00	0.00	0.00	0.00	0.00
	9	121.49	0.00	0.00	0.00	0.00	0.00
35	6	-321.11	0.00	0.00	0.00	0.00	0.00
	7	79.83	0.00	0.00	0.00	0.00	0.00
	8	-465.49	0.00	0.00	0.00	0.00	0.00
	9	135.92	0.00	0.00	0.00	0.00	0.00
36	6	-323.62	0.00	0.00	0.00	0.00	0.00
	7	80.69	0.00	0.00	0.00	0.00	0.00
	8	-469.16	0.00	0.00	0.00	0.00	0.00
	9	137.31	0.00	0.00	0.00	0.00	0.00
41	6	-124.03	0.00	0.00	0.00	0.00	0.00
	7	14.02	0.00	0.00	0.00	0.00	0.00
	8	-178.25	0.00	0.00	0.00	0.00	0.00
	9	28.82	0.00	0.00	0.00	0.00	0.00

JPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
42	6	-113.92	0.00	0.00	0.00	0.00	0.00
	7	25.69	0.00	0.00	0.00	0.00	0.00
	8	-164.73	0.00	0.00	0.00	0.00	0.00
	9	44.68	0.00	0.00	0.00	0.00	0.00
43	6	-102.19	0.00	0.00	0.00	0.00	0.00
	7	35.05	0.00	0.00	0.00	0.00	0.00
	8	-148.74	0.00	0.00	0.00	0.00	0.00
	9	57.11	0.00	0.00	0.00	0.00	0.00
44	6	-98.21	0.00	0.00	0.00	0.00	0.00
	7	26.69	0.00	0.00	0.00	0.00	0.00
	8	-142.47	0.00	0.00	0.00	0.00	0.00
	9	44.88	0.00	0.00	0.00	0.00	0.00
45	6	-106.33	0.00	0.00	0.00	0.00	0.00
	7	28.75	0.00	0.00	0.00	0.00	0.00
	8	-154.29	0.00	0.00	0.00	0.00	0.00
	9	48.33	0.00	0.00	0.00	0.00	0.00
46	6	-106.92	0.00	0.00	0.00	0.00	0.00
	7	28.95	0.00	0.00	0.00	0.00	0.00
	8	-155.14	0.00	0.00	0.00	0.00	0.00
	9	48.66	0.00	0.00	0.00	0.00	0.00
51	6	-160.10	0.00	0.00	0.00	0.00	0.00
	7	28.69	0.00	0.00	0.00	0.00	0.00
	8	-230.94	0.00	0.00	0.00	0.00	0.00
	9	52.25	0.00	0.00	0.00	0.00	0.00
52	6	-151.08	0.00	0.00	0.00	0.00	0.00
	7	39.41	0.00	0.00	0.00	0.00	0.00
	8	-218.91	0.00	0.00	0.00	0.00	0.00
	9	66.83	0.00	0.00	0.00	0.00	0.00
53	6	-140.34	0.00	0.00	0.00	0.00	0.00
	7	47.64	0.00	0.00	0.00	0.00	0.00
	8	-204.23	0.00	0.00	0.00	0.00	0.00
	9	77.73	0.00	0.00	0.00	0.00	0.00
54	6	-136.06	0.00	0.00	0.00	0.00	0.00
	7	38.67	0.00	0.00	0.00	0.00	0.00
	8	-197.51	0.00	0.00	0.00	0.00	0.00
	9	64.59	0.00	0.00	0.00	0.00	0.00
55	6	-144.79	0.00	0.00	0.00	0.00	0.00
	7	40.88	0.00	0.00	0.00	0.00	0.00
	8	-210.21	0.00	0.00	0.00	0.00	0.00
	9	68.30	0.00	0.00	0.00	0.00	0.00
56	6	-145.41	0.00	0.00	0.00	0.00	0.00
	7	41.09	0.00	0.00	0.00	0.00	0.00
	8	-211.11	0.00	0.00	0.00	0.00	0.00
	9	68.64	0.00	0.00	0.00	0.00	0.00
61	6	-108.94	0.00	0.00	0.00	0.00	0.00
	7	26.23	0.00	0.00	0.00	0.00	0.00
	8	-157.68	0.00	0.00	0.00	0.00	0.00
	9	45.08	0.00	0.00	0.00	0.00	0.00
62	6	-105.36	0.00	0.00	0.00	0.00	0.00
	7	30.76	0.00	0.00	0.00	0.00	0.00

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
	8	-152.93	0.00	0.00	0.00	0.00	0.00
	9	51.26	0.00	0.00	0.00	0.00	0.00
63	6	-100.84	0.00	0.00	0.00	0.00	0.00
	7	33.93	0.00	0.00	0.00	0.00	0.00
	8	-146.73	0.00	0.00	0.00	0.00	0.00
	9	55.42	0.00	0.00	0.00	0.00	0.00
64	6	-98.50	0.00	0.00	0.00	0.00	0.00
	7	29.02	0.00	0.00	0.00	0.00	0.00
	8	-143.06	0.00	0.00	0.00	0.00	0.00
	9	48.23	0.00	0.00	0.00	0.00	0.00
65	6	-103.28	0.00	0.00	0.00	0.00	0.00
	7	30.23	0.00	0.00	0.00	0.00	0.00
	8	-150.01	0.00	0.00	0.00	0.00	0.00
	9	50.26	0.00	0.00	0.00	0.00	0.00
66	6	-103.61	0.00	0.00	0.00	0.00	0.00
	7	30.35	0.00	0.00	0.00	0.00	0.00
	8	-150.49	0.00	0.00	0.00	0.00	0.00
	9	50.45	0.00	0.00	0.00	0.00	0.00
71	6	-131.35	0.00	0.00	0.00	0.00	0.00
	7	39.64	0.00	0.00	0.00	0.00	0.00
	8	-190.76	0.00	0.00	0.00	0.00	0.00
	9	65.72	0.00	0.00	0.00	0.00	0.00
72	6	-130.10	0.00	0.00	0.00	0.00	0.00
	7	41.65	0.00	0.00	0.00	0.00	0.00
	8	-189.15	0.00	0.00	0.00	0.00	0.00
	9	68.48	0.00	0.00	0.00	0.00	0.00
73	6	-128.15	0.00	0.00	0.00	0.00	0.00
	7	42.63	0.00	0.00	0.00	0.00	0.00
	8	-186.45	0.00	0.00	0.00	0.00	0.00
	9	69.72	0.00	0.00	0.00	0.00	0.00
74	6	-126.39	0.00	0.00	0.00	0.00	0.00
	7	38.92	0.00	0.00	0.00	0.00	0.00
	8	-183.68	0.00	0.00	0.00	0.00	0.00
	9	64.28	0.00	0.00	0.00	0.00	0.00
75	6	-130.02	0.00	0.00	0.00	0.00	0.00
	7	39.83	0.00	0.00	0.00	0.00	0.00
	8	-188.95	0.00	0.00	0.00	0.00	0.00
	9	65.82	0.00	0.00	0.00	0.00	0.00
76	6	-130.24	0.00	0.00	0.00	0.00	0.00
	7	39.91	0.00	0.00	0.00	0.00	0.00
	8	-189.28	0.00	0.00	0.00	0.00	0.00
	9	65.95	0.00	0.00	0.00	0.00	0.00

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

```
 98. PLOT  DIS FILE
 99. PLOT  BEN FILE
100. FINISH
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********** END OF STAAD-III **********

**** DATE= JUN 24,1999 TIME= 8:24:48 ****

****

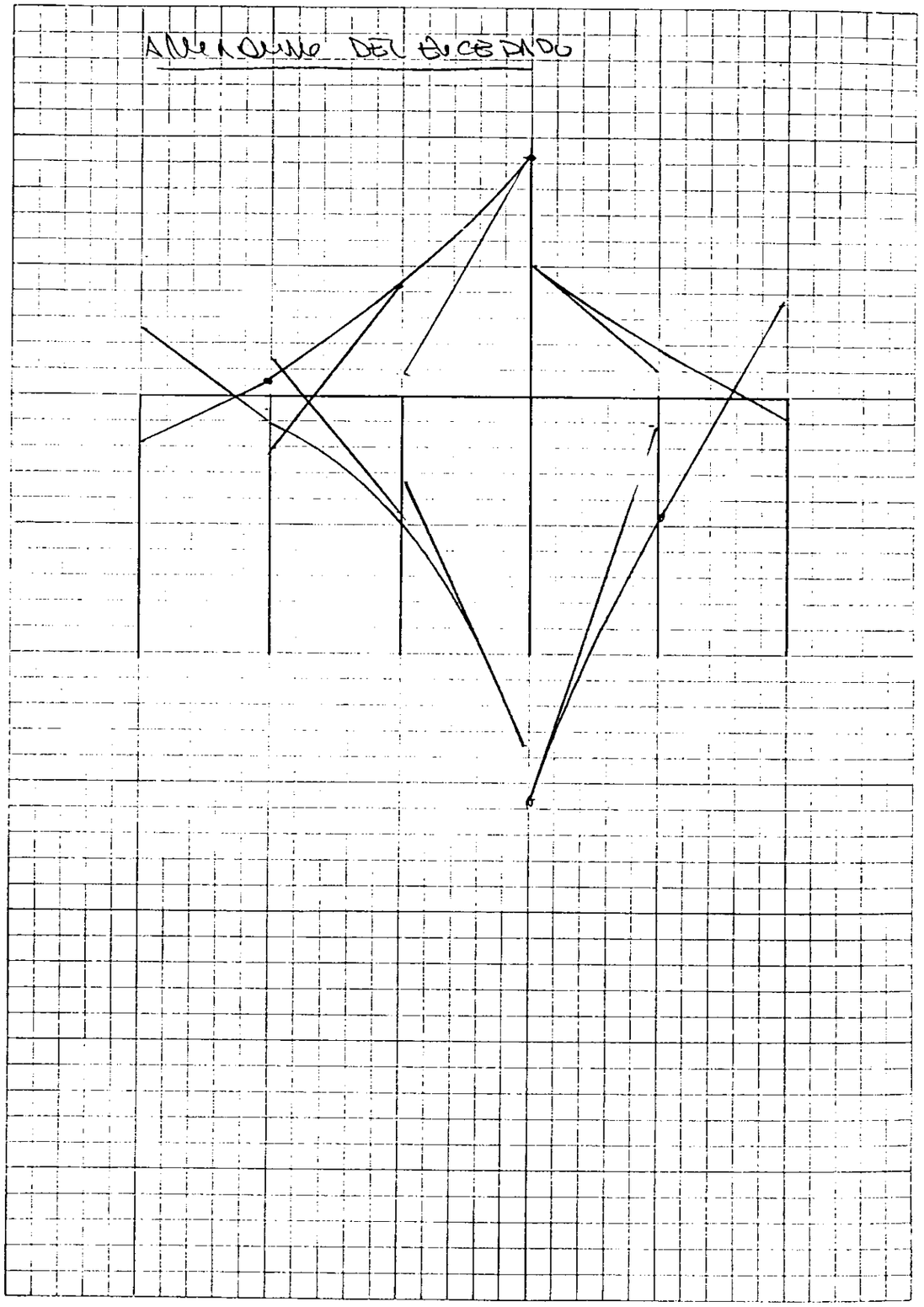
```
*  FOR  QUESTIONS REGARDING THIS VERSION OF PROGRAM   *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
*******************************************************
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INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS S.A

PROYECTO: _____ HOJA ___ DE ___

_____ FECHA _____

EJECUTANTE: _____



ARMADURA INFERIOR

$M = 15362$ mt

$M' = 15362 \times 1.6 / 21 = 1170$ mt/ml

$\Delta c = \frac{2500}{15} \times 500 \times 290 = 4833$ ton

$\Delta s = 4833\left(1 - \sqrt{1 - \frac{2 \times 1170}{290 \times 4833}}\right) = 422$ ton/ml

$W_i = 422 \times 1.15 / 5.1 = 95$ cm²/ml.

Se dispone $2 \times \phi 32 / 15$

ARMADURA SUPERIOR

$M = 13585$ mt

$M' = 13585 \times 1.6 / 21 = 1035$ mt

$\Delta c = 4833$

$\Delta s = 4833\left(1 - \sqrt{1 - \frac{2 \times 1035}{290 \times 4833}}\right) = 371$ ton/ml.

$W_s = 371 \times 1.15 / 5.1 = 83.6$ cm²

Se dispone $2 \times \phi 32 / 15$

CONTINUE

$Q_{max} = 4123$

$Q' = 4123 \times 1.6 = 6596$

$T_0 = 5\sqrt{\frac{250}{15} \times 290 \times 21} = 3931$

$W_{tmin} = 0.02 \times \frac{2500}{1.5} \times \frac{2100}{420} = 167$ cm²

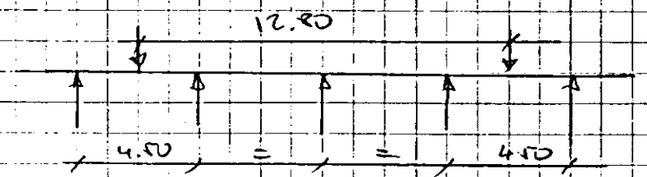
$T_a = \frac{6596 - 3931}{0.9 \times 2.9 \times 4.2} = 243$ cm²/ml $= 11.6$ cm²/m²

Con el $W_{t\,min}$ se aplanta:

$167 = \frac{Q' - 3931}{0.9 \times 2.9 \times 4.2} \rightarrow Q' = 5761 \rightarrow Q = 3600$ t.

$W_{tm} = \phi 16 / 60/60 \rightarrow \frac{2 \times 2.32}{0.6 \times 0.6} = 11.22$

ARMADURA TRANSVERSAL A CORTANTE

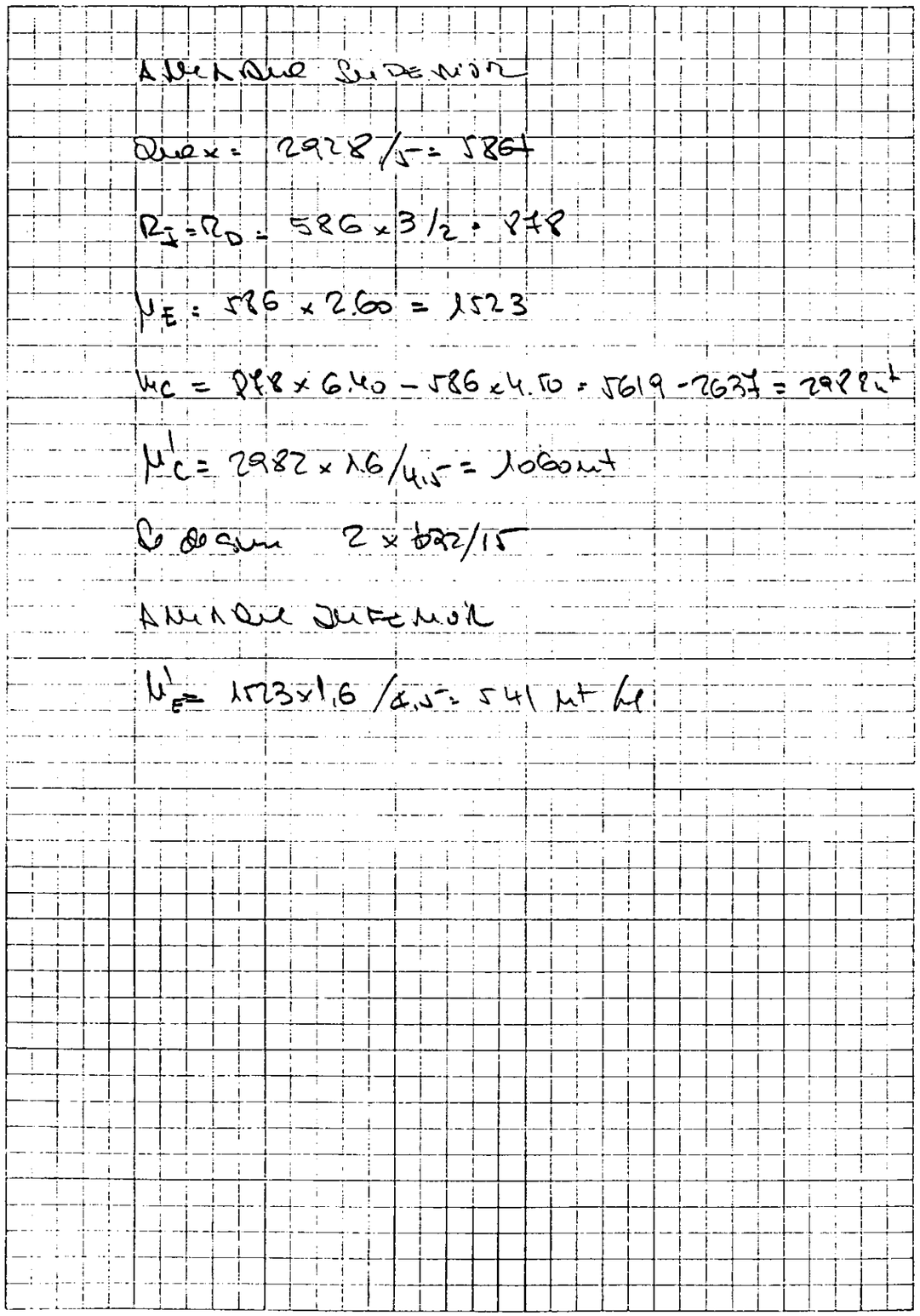


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PROYECTO: _____ HOJA ___ DE ___

FECHA _____

EJECUTANTE: _____



VIADUCTO 4 - ESTRIBO 1 - ARMADURAS DE PILOTES

HIPOTESIS 8	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25	
BARRA 71	-442	2853	-88	571	0.04	0.18	0.42	201	25	41	
BARRA 72	-1256	3888	-251	778	0.12	0.24	0.64	306	38	62	
BARRA 73	-1845	4788	-369	958	0.17	0.30	0.83	397	49	81	
BARRA 74	-3158	4435	-632	887	0.30	0.28	0.74	354	44	72	
BARRA 75	-3712	5100	-742	1020	0.35	0.32	0.88	421	52	86	
BARRA 76	-3002	5150	-600	1030	0.28	0.32	0.88	421	52	86	52Φ32

HIPOTESIS 9	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25	
BARRA 71	-2378	3906	-476	781	0.22	0.25	0.64	306	38	62	
BARRA 72	-3316	2999	-663	600	0.31	0.19	0.40	191	24	39	
BARRA 73	-4019	1894	-804	379	0.38	0.12	0.14	67	14	18	
BARRA 74	-3128	1205	-626	241	0.30	0.08	0.04	19	14	18	
BARRA 75	-1107	1399	-221	280	0.10	0.09	0.13	62	14	18	
BARRA 76	532	1418	106	284	0.05	0.09	0.16	76	14	18	52Φ32

HIPOTESIS 8	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25	
BARRA 51	-601	1459	-120	292	0.06	0.09	0.19	91	14	18	
BARRA 52	-1404	1173	-281	235	0.13	0.07	0.07	33	14	18	
BARRA 53	-2004	825	-401	165	0.19	0.05	0.04	19	14	18	
BARRA 54	-3317	666	-663	133	0.31	0.04	0.04	19	14	18	
BARRA 55	-3817	965	-763	193	0.36	0.06	0.04	19	14	18	
BARRA 56	-3161	988	-632	198	0.30	0.06	0.04	19	14	18	

HIPOTESIS 9	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25	
BARRA 51	-2537	234	-507	47	0.24	0.01	0.04	19	14	18	
BARRA 52	-3475	107	-695	21	0.33	0.01	0.04	19	14	18	
BARRA 53	-4178	362	-836	72	0.39	0.02	0.04	19	14	18	
BARRA 54	-3287	52	-657	10	0.31	0.00	0.04	19	14	18	
BARRA 55	-1266	139	-253	28	0.12	0.01	0.04	19	14	18	
BARRA 56	373	148	75	30	0.04	0.01	0.04	19	14	18	26Φ32

HIPOTESIS 8	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25	
BARRA 31	-777	1353	-155	271	0.07	0.09	0.17	81	14	18	
BARRA 32	-1591	1422	-318	284	0.15	0.09	0.12	57	14	18	
BARRA 33	-2181	1488	-436	298	0.21	0.09	0.08	38	14	18	
BARRA 34	-3493	1484	-699	297	0.33	0.09	0.04	19	14	18	
BARRA 35	-4047	1493	-809	299	0.38	0.09	0.04	19	14	18	
BARRA 36	-3338	1493	-668	299	0.31	0.09	0.04	19	14	18	

HIPOTESIS 9	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25	
BARRA 31	-2713	682	-543	136	0.26	0.04	0.04	19	14	18	
BARRA 32	-3652	617	-730	123	0.34	0.04	0.04	19	14	18	
BARRA 33	-4355	550	-871	110	0.41	0.03	0.04	19	14	18	
BARRA 34	-3463	541	-693	108	0.33	0.03	0.04	19	14	18	
BARRA 35	-1442	543	-288	109	0.14	0.03	0.04	19	14	18	
BARRA 36	197	543	39	109	0.02	0.03	0.04	19	14	18	26Φ25

ν = N' / 5 / 2120

μ= M' / 5 / 1.5 / 2120

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PROYECTO: _____ HOJA ___ DE ___

FECHA _____

EJECUTANTE: _____

CORTANTES

BARRA 1/276

$Q^1 = 1144/5 = 228\ t$

$T_b = C\sqrt{\frac{2000 \times 0.9}{1.5}} \times H \times \frac{1.4^2}{4} = 84\ t$

$W_t = \frac{228-84}{0.9 \times 4.2 \times 1.4} = 27.2\ t/ml$

BARRES 1276

$Q^1 = 677/5 = 135\ t$

$T_b = 84\ t$

$W_t = \frac{135-84}{0.9 \times 4.2 \times 1.4} = 9.6\ t/ml.$

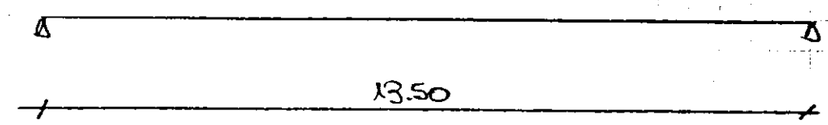
BARRA 3136

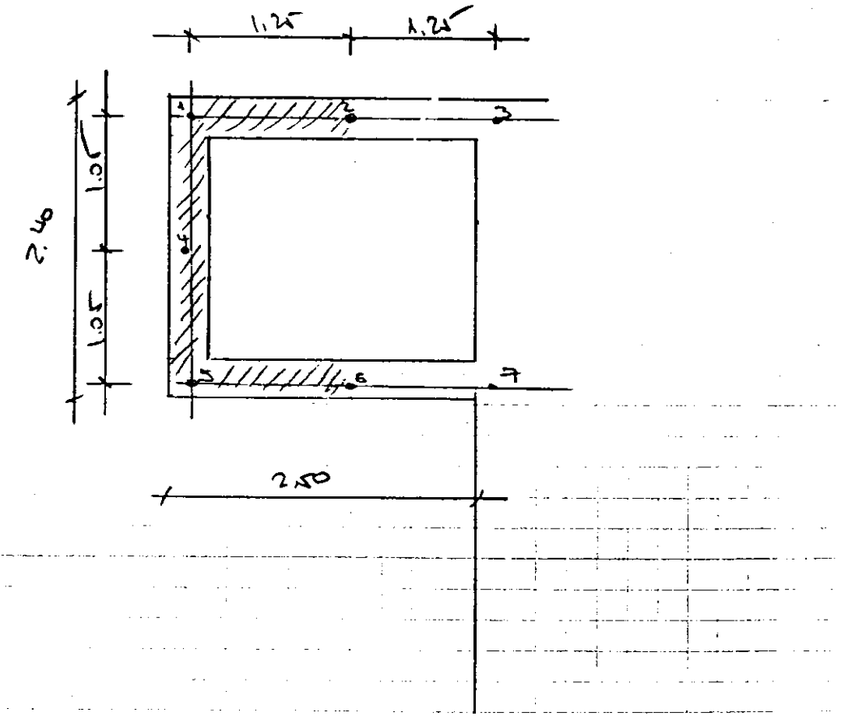
$Q^1 = 268/5 = 52\ t$

$T_b = 84\ t > Q^1$

$W_{tt} = 0.02 \times \frac{2000 \times 0.9}{1.15} \times 1.4 \frac{1}{4.2} = 8.2\ t/ml$

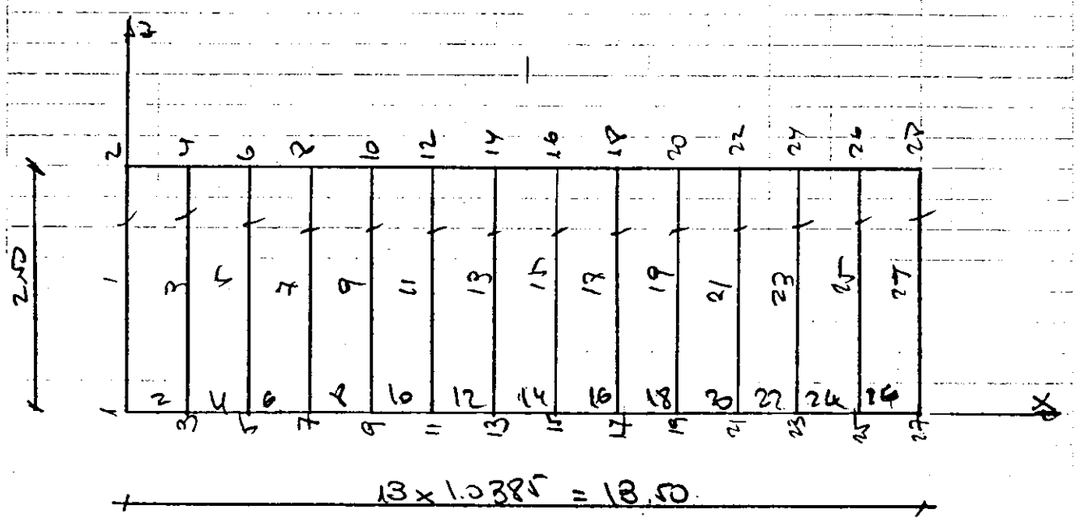
ARMADURA GALERIA





Fulgosa PROYECTO: HOJA ___ DE ___ FECHA ___

COMO TABLERO APOYADO



$J_1 = 2\left(\frac{1}{12} 0.20^3 \times 1.038\right) = 0.0047\ m^4$

$A_2 = (1.25 + 2.16 + 1.25) \times 0.30 = 1.38\ m^2$

$J_2 = \frac{1}{12}\left(1.25 \times 2.40^3 - 1.16 \times 1.80^3\right) = 0.9054\ m^4$

Coef. impacto

$$I = \frac{114\sqrt{13.50}}{3.6 - 1.16\sqrt{13.50} + 13.50} = \frac{418.86}{10.13} = 41$$

$J_{x1} = (1.38 \times 0.30) = 0.27 \times 0.30^3 \times 1.038 = 0.00756$

$J_{x2} = (2.40 \times 0.30) = 0.30 \times 0.30^3 \times 2.40 = 0.01944$

```
*************************************************
*                                               *
*           S T A A D - III                     *
*           Revision 17.0a                      *
*           Proprietary Program of              *
*           RESEARCH ENGINEERS, Inc.            *
*           Date=     AUG 24, 1999              *
*           Time=     10:36:12                  *
*                                               *
*************************************************
```

```
 1. STAAD FLOOR LAV MADRID-ZARAGOZA. ESTRIBO 1
 2. *GALERIA
 3. UNIT METER MTON
 4. JOINT COORDINATES
 5. 1      0.000   0.000   0.000
 6. 2      0.000   0.000  -2.500
 7. 3      1.038   0.000   0.000
 8. 4      1.038   0.000  -2.500
 9. 5      2.076   0.000   0.000
10. 6      2.076   0.000  -2.500
11. 7      3.110   0.000   0.000
12. 8      3.110   0.000  -2.500
13. 9      4.152   0.000   0.000
14. 10     4.152   0.000  -2.500
15. 11     5.190   0.000   0.000
16. 12     5.190   0.000  -2.500
17. 13     6.228   0.000   0.000
18. 14     6.228   0.000  -2.500
19. 15     7.266   0.000   0.000
20. 16     7.266   0.000  -2.500
21. 17     8.304   0.000   0.000
22. 18     8.304   0.000  -2.500
23. 19     9.342   0.000   0.000
24. 20     9.342   0.000  -2.500
25. 21    10.380   0.000   0.000
26. 22    10.380   0.000  -2.500
27. 23    11.418   0.000   0.000
28. 24    11.418   0.000  -2.500
29. 25    12.456   0.000   0.000
30. 26    12.456   0.000  -2.500
31. 27    13.500   0.000   0.000
32. 28    13.500   0.000  -2.500
33. MEMBER INCIDENCES
34. 1   1   2
35. R   13  2  2
36. 2   1   3
37. R   12  2  2
38. MEMBER PROPERTY
39.   1  3  5  7  9  11 13  PRIS AX  0.62  IX  0.00756  IZ  0.0047
40.   15 17 19 21 23 25 27  PRIS AX  0.62  IX  0.00756  IZ  0.0047
41.   2  4  6  8  10 12 14  PRIS AX  1.38  IX  0.01944  IZ  0.9054
42.   16 18 20 22 24 26     PRIS AX  1.38  IX  0.01944  IZ  0.9054
43. CONSTANTS
44. E   3250000.  ALL
45. SUPPORTS
46. 2  4  6  8  10 12 14 16  FIXED
47. 18 20 22 24 26 28        FIXED
```

```
*GALERIA
48. 1  27                    FIXED BUT MZ
49. LOADING 1 PESO PROPIO
50. MEMBER LOAD
51. 1 3 5 7 9 11 13 15      UNI GY  -1.557
52. 17 19 21 23 25 27       UNI GY  -1.557
53. 2 4 6 8 10 12 14        UNI GY  -1.800
54. 16 18 20 22 24 26       UNI GY  -1.800
55. LOADING 2 BALASTO + SOBRECARGA
56. MEMBER LOAD
57. 1 3 5 7 9 11 13 15      UNI GY  -3.114
58. 17 19 21 23 25 27       UNI GY  -3.114
59. LOADING COMBINATION 3
60. 1   1.00   2   1.41
61. PERFORM ANALISIS

        P R O B L E M   S T A T I S T I C S
        -----------------------------------

 NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    28/   27/   16
 ORIGINAL/FINAL BAND-WIDTH =    2/    2
 TOTAL PRIMARY LOAD CASES  =    2, TOTAL DEGREES OF FREEDOM =    38
 SIZE OF STIFFNESS MATRIX =     228 DOUBLE PREC. WORDS
 TOTAL REQUIRED DISK SPACE =   12.04 MEGA-BYTES


++ PROCESSING ELEMENT STIFFNESS MATRIX.          10:36:14
++ PROCESSING GLOBAL STIFFNESS MATRIX.           10:36:14
++ PROCESSING TRIANGULAR FACTORIZATION.          10:36:14
++ CALCULATING JOINT DISPLACEMENTS.              10:36:14
++ CALCULATING MEMBER  FORCES.                   10:36:15

62. LOAD LIST 3
63. PRINT MEMBER FORCES LIST 1 3 5 7 9 11 13 15
```


*GALERIA

MEMBER END FORCES STRUCTURE TYPE = FLOOR

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	3	1	0.00	7.43	0.00	0.88	0.00	3.10
		2	0.00	7.43	0.00	-0.88	0.00	-3.10
3	3	3	0.00	5.70	0.00	0.85	0.00	1.10
		4	0.00	9.17	0.00	-0.85	0.00	-5.44
5	3	5	0.00	4.64	0.00	0.76	0.00	0.17
		6	0.00	10.23	0.00	-0.76	0.00	-7.15
7	3	7	0.00	3.94	0.00	0.63	0.00	-0.28
		8	0.00	10.93	0.00	-0.63	0.00	-8.46
9	3	9	0.00	3.45	0.00	0.47	0.00	-0.52
		10	0.00	11.42	0.00	-0.47	0.00	-9.44
11	3	11	0.00	3.14	0.00	0.29	0.00	-0.64
		12	0.00	11.73	0.00	-0.29	0.00	-10.10
13	3	13	0.00	2.99	0.00	0.10	0.00	-0.69
		14	0.00	11.88	0.00	-0.10	0.00	-10.43
15	3	15	0.00	2.99	0.00	-0.10	0.00	-0.69
		16	0.00	11.88	0.00	0.10	0.00	-10.43

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

64. PRINT MEMBER FORCES LIST 2 4 6 8 10 12 14
```

MEMBER END FORCES STRUCTURE TYPE = FLOOR

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
2	3	1	0.00	36.02	0.00	-0.85	0.00	0.88
		3	0.00	-34.16	0.00	0.85	0.00	35.55
4	3	3	0.00	28.45	0.00	-1.96	0.00	-34.70
		5	0.00	-26.59	0.00	1.96	0.00	63.27
6	3	5	0.00	21.94	0.00	-2.13	0.00	-62.51
		7	0.00	-20.08	0.00	2.13	0.00	84.23
8	3	7	0.00	16.14	0.00	-1.85	0.00	-83.60
		9	0.00	-14.26	0.00	1.85	0.00	99.44
10	3	9	0.00	10.81	0.00	-1.33	0.00	-98.97
		11	0.00	-8.94	0.00	1.33	0.00	109.22
12	3	11	0.00	5.80	0.00	-0.69	0.00	-108.93
		13	0.00	-3.94	0.00	0.69	0.00	113.98
14	3	13	0.00	0.95	0.00	0.00	0.00	-113.88
		15	0.00	0.92	0.00	0.00	0.00	113.90

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

65. PRINT REACC ALL

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = FLOOR

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
2	3	0.00	7.43	0.00	-3.10	0.00	0.88
4	3	0.00	9.17	0.00	-5.44	0.00	0.85
6	3	0.00	10.23	0.00	-7.15	0.00	0.76
8	3	0.00	10.93	0.00	-8.46	0.00	0.63
10	3	0.00	11.42	0.00	-9.44	0.00	0.47
12	3	0.00	11.73	0.00	-10.10	0.00	0.29
14	3	0.00	11.88	0.00	-10.43	0.00	0.10
16	3	0.00	11.88	0.00	-10.43	0.00	-0.10
18	3	0.00	11.73	0.00	-10.10	0.00	-0.29
20	3	0.00	11.42	0.00	-9.44	0.00	-0.47
22	3	0.00	10.93	0.00	-8.47	0.00	-0.63
24	3	0.00	10.23	0.00	-7.16	0.00	-0.76
26	3	0.00	9.17	0.00	-5.45	0.00	-0.84
28	3	0.00	7.43	0.00	-3.10	0.00	-0.88
1	3	0.00	43.46	0.00	2.24	0.00	0.00
27	3	0.00	43.42	0.00	2.24	0.00	0.00

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

66. PLOT BEND FILE
67. PLOT DISP FILE
68. FINISH

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

**** DATE= AUG 24,1999 TIME= 10:36:17 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

Momentos en losa 1-3-5 ---

$\mu = 10.43 \times 0.5 \times \frac{1}{1.032} = 5.02$ mt/m (2 tableros)

$\mu' = 5.02 \times 1.5 = 7.53$ mt/m

$A_c = \frac{2500}{1.5} \times 0.27 \times 1.00 = 450$ ton.

$A_s = 450 \left(1 - \sqrt{1 - \frac{2 \times 7.53}{0.27 \times 450}}\right) = 28.81$ t/m

$w = 28.81 \times 1.15 / 5.1 = 6.50$ cm²/m

Se dispone $\phi 16/20 : 10.10$ cm²/m

Momentos en viga

$\mu = 1139.0$ mt

$\mu' = 1.5 \times 1139.0 = 1709.8$ mt

$A_c = \frac{2500}{1.15} \times 1.25 \times 2.10 = 4375$ ton ($\omega_1 \leq 930$)

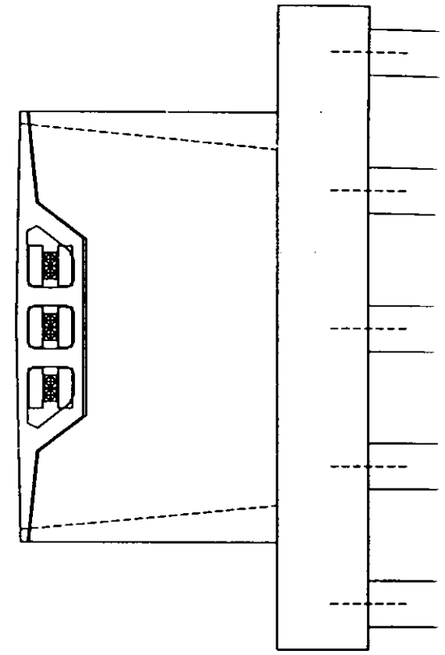
$A_s = 4375 \left(1 - \sqrt{1 - \frac{2 \times 1709.18}{2.10 \times 4375}}\right) = 81.80$ ton/m

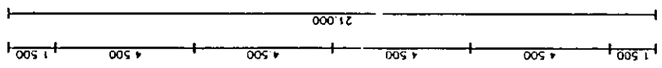
$w = 81.80 \times 1.15 / 5.1 = 18.4$ cm²/m.

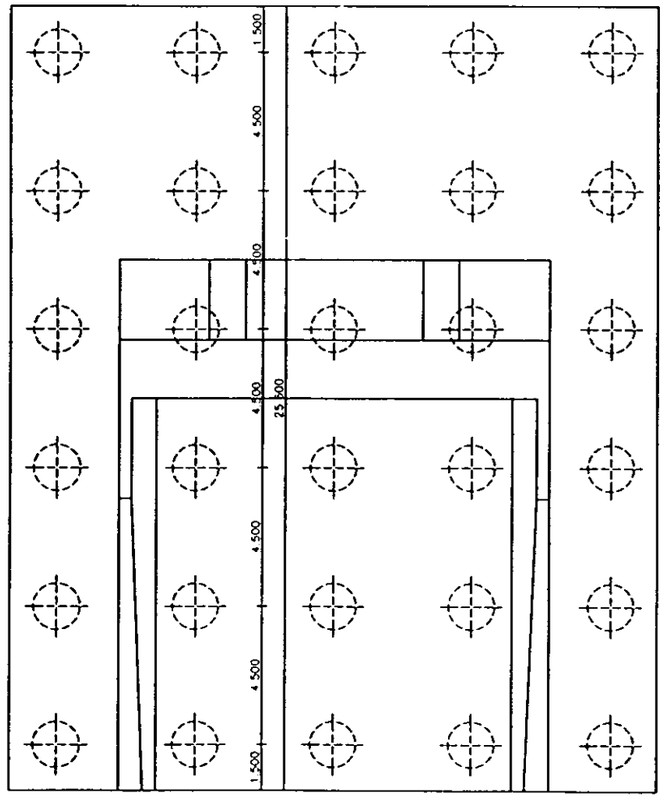
Se dispone $\phi 16/20$ (cara sup + cara inf)

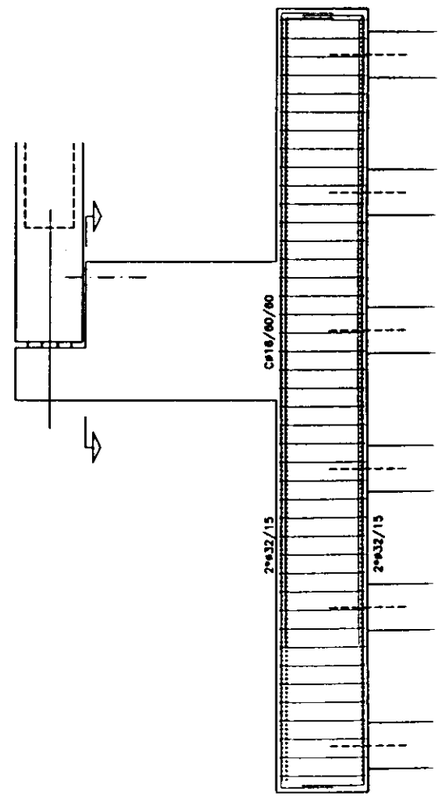
$2.52 \times 5 \times 1.25 \times 2 = 25.25$ cm²/m.











ESTRIBO 2 (DESLIZANTE)

```
250.0,5100.0,0.04,1
1.800,30.0,0.00,3.00,0.00,0.00,1
VIADUCTO ↓ (MEJORADA). ESTRIBO 2
  7.22,337.97,20.13,40.00,101.391,0.0,0.0
     2.40,0.40,5.55,0.50,2.165,0.40,14.00,0.0,2.50,8.50,00.0,3
```

CALCULO DE ESTRIBOS. VERSION 09-01-1996

PROGRAMA PROPIEDAD DE INTECSA

VIADUCTO ↓ (MEJORADA). ESTRIBO 2

CARACTERISTICAS DEL RELLENO

PESO ESPECIFICO (TN/M3)	=	1.80
ANGULO DE ROZAMIENTO FI	=	30.00
ANGULO ROZAMIENTO TERRENO-MURO	=	.00
SOBRECARGA (TN/M2)	=	3.00
COEFICIENTE DE EMPUJE ACTIVO	=	.333

CARACTERISTICAS DE LOS MATERIALES

RESISTENCIA CARACTERISTICA DEL HORMIGON	=	250. KG/CM2
LIMITE ELASTICO DEL ACERO	=	5100. KG/CM2
RECUBRIMIENTO DE LAS ARMADURAS	=	.040 M

CARGAS SOBRE EL ESTRIBO

CARGA VERTICAL DE TABLERO PESO PROPIO Y CARGA PERMANENTE	337.2 TN
CARGA VERTICAL DE SOBRECARGAS	338.0 TN
FUERZA LONGITUDINAL DE FRENADO RETRACCION Y TEMPERATURA	20.1 TN
FUERZA TRANSVERSAL DE VIENTO	40.0 TN
MOMENTO TRANSVERSAL DE SOBRECARGAS	101.4 MT
FUERZA LONGITUDINAL DE SISMO	.0 TN
FUERZA TRANSVERSAL DE SISMO	.0 TN

GEOMETRIA DEL ESTRIBO
=====================

ANCHURA DEL ESTRIBO	B	= 14.00
ESVIAJE (GRADOS SEXAGESIMALES)	BETA	= .00

ALZADO DEL ESTRIBO

ESPESOR DEL FALDON	A3	= .40
ALTURA DEL FALDON	A6	= 2.16
DISTANCIA DE APOYO A BORDE ESTRIBO	A5	= .50
ESPESOR DEL ESTRIBO	A2	= 2.40
ESPESOR DE LAS ALETAS	A7	= .40
ALTURA TOTAL DEL ESTRIBO	H + C	= 11.00
ALTURA DE TIERRAS	H	= 8.50

ZAPATA

VUELO DELANTERO	A1	= 5.55
VUELO TRASERO	A4	= 5.55
LONGITUD TOTAL	L	= 13.50
CANTO	C	= 2.50
RESGUARDO SOBRE ZAPATA		= 0.30
TENSION MEDIA PEDIDA SOBRE TERRENO		= LIBRE

ARMADURAS DEL ALZADO

TRASDOS. U(CALCULO)= -1.6CM2/M	ZONA INFERIOR	AV.= 35.5 CM2/M	(FI 25 A .125 M)
		AH.= 19.3 CM2/M	(FI 20 A .150 M)
	4.9 M. SUPERIORES	AV.= 17.7 CM2/M	(FI 25 A .250 M)
		AH.= 19.3 CM2/M	(FI 20 A .150 M)
INTRADOS		AV.= 7.7 CM2/M	(FI 16 A .250 M)
		AH.= 19.3 CM2/M	(FI 20 A .150 M)
FALDON	TRASDOS	AV.= 5.4 CM2/M	(FI 12 A .200 M)
		AH.= 46.8 CM2/M	(FI 25 A .100 M)
	INTRADOS	AV.= 5.4 CM2/M	(FI 12 A .200 M)
		AH.= 2.1 CM2/M	(FI 8 A .200 M)
ALETAS	TRASDOS	AV.= 27.3 CM2/M	(FI 25 A .175 M)
		AH.= 43.0 CM2/M	(FI 25 A .100 M)
	INTRADOS	AV.= 13.7 CM2/M	(FI 20 A .225 M)
		AH.= 21.5 CM2/M	(FI 20 A .125 M)

ESTRIBO CON RELLENO DE TIERRAS Y SIN TABLERO
==========

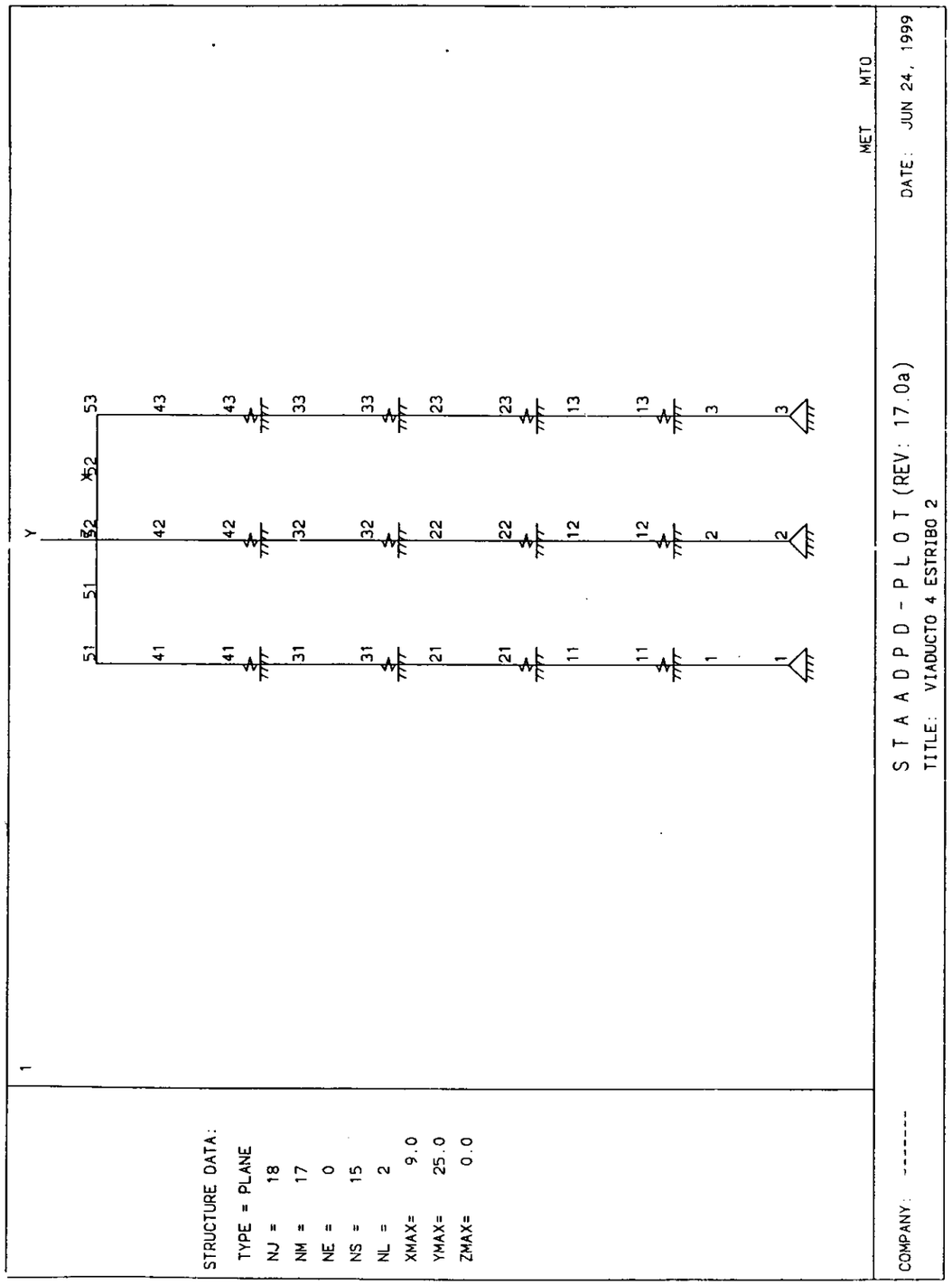
ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	=	3165.6 TN.
MOMENTO LONGITUDINAL	=	-2972.0 M.T.
EMPUJE LONGITUDINAL	=	662.2 TN.

ESTRIBO CON PUENTE EN SERVICIO
==========

ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	=	3840.8 TN.
MOMENTO LONGITUDINAL	=	-2321.5 M,T.
EMPUJE LONGITUDINAL	=	682.3 TN.
MOMENTO TRANSVERSAL	=	454.8 M.T.



intecsa
INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS S.A

PROYECTO: HOJA DE
FECHA
EJECUTANTE:

VIADUCTO 4 - ESTRIBO 2

POR RELLENO TIPO S/T

$F_x = -682$

$F_y = -3165$

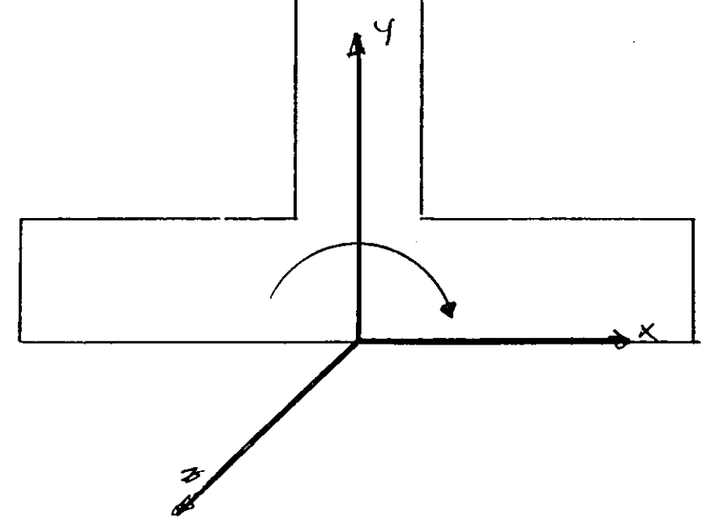
$M_z = -2972$

EN SERVICIO

$F_x = -692$

$F_y = -3480$

$M_z = -2321$



```
 ************************************************
 *                                              *
 *          S T A A D - III                     *
 *          Revision 17.0a                      *
 *          Proprietary Program of              *
 *          RESEARCH ENGINEERS, Inc.            *
 *          Date=    JUL 22, 1999               *
 *          Time=    11:32: 3                   *
 *                                              *
 ************************************************

  1. STAAD PLANE VIADUCTO 4 ESTRIBO 2
  2. *EFECTOS CARGAS GRAVITATORIAS
  3. UNIT MTO MET
  4. JOINT COORDINATES
  5.    1  -5.250   -25.000
  6.    2   0.000   -25.000
  7.    3   5.250   -25.000
  8.   11  -5.250   -20.000
  9.   12   0.000   -20.000
 10.   13   5.250   -20.000
 11.   21  -5.250   -15.000
 12.   22   0.000   -15.000
 13.   23   5.250   -15.000
 14.   31  -5.250   -10.000
 15.   32   0.000   -10.000
 16.   33   5.250   -10.000
 17.   41  -5.250    -5.000
 18.   42   0.000    -5.000
 19.   43   5.250    -5.000
 20.   51  -5.250     0.000
 21.   52   0.000     0.000
 22.   53   5.250     0.000
 23. MEMBER INCIDENCES
 24.    1     1    11
 25.    R     4    10   10
 26.    2     2    12
 27.    R     4    10   10
 28.    3     3    13
 29.    R     4    10   10
 30.   51    51    52
 31.   52    52    53
 32. MEMBER PROPERTY
 33. *PILOTES  3 * 3 PILOTES
 34. 1 11 21 31 41      PR AX  5.298 IZ  0.74513
 35. 2 12 22 32 42      PR AX  5.298 IZ  0.74513
 36. 3 13 23 33 43      PR AX  5.298 IZ  0.74513
 37. *ENCEPADO (1.5+4.5+4.5+1.5)*2.5
 38. 51 52              PR AX 30.000 IZ  15.6257
 39. CONSTANT
 40. E  3250000.   ALL
 41. POI 0.15
 42. DEN 2.50
 43. SUPPORT
 44. 1 2 3         PINNED
 45. 11 12 13      FIXED BUT FY MZ KFX  202500
 46. 21 22 23      FIXED BUT FY MZ KFX  202500
 47. 31 32 33      FIXED BUT FY MZ KFX  103800
```



```
*EFECTOS CARGAS GRAVITATORIAS
48. 41 42 43      FIXED BUT FY MZ KFX    5100
49. LOADING 1 RELLENO DE TIERRAS Y SIN TABLERO
50. JOINT LOAD
51. *PROCEDENTE DE CALCULO DE ESTRIBO
52. 52            FX  -662
53. 52            FY -3168
54. 52            MZ -2972
55. MEMBER LOAD
56. *EMPUJE DE TIERRAS SOBRE PILOTES
57. 43            UNI GX -64.80
58. 42            UNI GX -32.40
59. LOADING 2 PUENTE EN SERVICIO
60. JOINT LOAD
61. *PROCEDENTE DE CALCULO DE ESTRIBO
62. 52            FX  -682
63. 52            FY -3840
64. 52            MZ -2321
65. MEMBER LOAD
66. *EMPUJE DE TIERRAS SOBRE PILOTES
67. 43            UNI GX -64.80
68. 42            UNI GX -32.40
69. LOADING COMBINATION 3
70. 1 1.50
71. LOADING COMBINATION 4
72. 2 1.50
73. PERFORM ANALISIS

      P R O B L E M   S T A T I S T I C S
      -----------------------------------

   NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    18/   17/   15
   ORIGINAL/FINAL BAND-WIDTH =     3/    2
   TOTAL PRIMARY LOAD CASES  =     2, TOTAL DEGREES OF FREEDOM =    48
   SIZE OF STIFFNESS MATRIX =     432 DOUBLE PREC. WORDS
   TOTAL REQUIRED DISK SPACE =   12.03 MEGA-BYTES


++ PROCESSING ELEMENT STIFFNESS MATRIX.            11:32: 4
++ PROCESSING GLOBAL STIFFNESS MATRIX.             11:32: 4
 + PROCESSING TRIANGULAR FACTORIZATION.            11:32: 4
++ CALCULATING JOINT DISPLACEMENTS.                11:32: 4
++ CALCULATING MEMBER  FORCES.                     11:32: 5

 74. LOAD LIST  1 2 3 4
 75. PRINT MEMBER FORCES LIST  41 42 43
```

EMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
41	1	41	1142.09	-377.21	0.00	0.00	0.00	347.68
		51	-1142.09	377.21	0.00	0.00	0.00	-2233.75
	2	41	1399.72	-388.52	0.00	0.00	0.00	364.39
		51	-1399.72	388.52	0.00	0.00	0.00	-2306.97
	3	41	1713.13	-565.82	0.00	0.00	0.00	521.52
		51	-1713.13	565.82	0.00	0.00	0.00	-3350.62
	4	41	2099.59	-582.77	0.00	0.00	0.00	546.58
		51	-2099.59	582.77	0.00	0.00	0.00	-3460.46
42	1	42	1395.39	-390.07	0.00	0.00	0.00	401.47
		52	-1395.39	228.07	0.00	0.00	0.00	-1946.81
	2	42	1696.06	-395.81	0.00	0.00	0.00	400.02
		52	-1696.06	233.81	0.00	0.00	0.00	-1974.09
	3	42	2093.09	-585.10	0.00	0.00	0.00	602.20
		52	-2093.09	342.10	0.00	0.00	0.00	-2920.21
	4	42	2544.09	-593.72	0.00	0.00	0.00	600.03
		52	-2544.09	350.72	0.00	0.00	0.00	-2961.14
43	1	43	630.52	-380.72	0.00	0.00	0.00	383.59
		53	-630.52	56.72	0.00	0.00	0.00	-1477.18
	2	43	744.21	-383.67	0.00	0.00	0.00	373.02
		53	-744.21	59.67	0.00	0.00	0.00	-1481.37
	3	43	945.78	-571.08	0.00	0.00	0.00	575.39
		53	-945.78	85.08	0.00	0.00	0.00	-2215.77
	4	43	1116.32	-575.50	0.00	0.00	0.00	559.53
		53	-1116.32	89.50	0.00	0.00	0.00	-2222.05

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

76. PRINT MEMBER FORCES LIST 31 32 33

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
31	1	31	1142.09	-292.80	0.00	0.00	0.00	-1116.30
		41	-1142.09	292.80	0.00	0.00	0.00	-347.68
	2	31	1399.72	-301.87	0.00	0.00	0.00	-1144.96
		41	-1399.72	301.87	0.00	0.00	0.00	-364.39
	3	31	1713.13	-439.19	0.00	0.00	0.00	-1674.45
		41	-1713.13	439.19	0.00	0.00	0.00	-521.51
	4	31	2099.59	-452.80	0.00	0.00	0.00	-1717.43
		41	-2099.59	452.80	0.00	0.00	0.00	-546.59
32	1	32	1395.39	-304.77	0.00	0.00	0.00	-1122.40
		42	-1395.39	304.77	0.00	0.00	0.00	-401.47
	2	32	1696.06	-308.91	0.00	0.00	0.00	-1144.55
		42	-1696.06	308.91	0.00	0.00	0.00	-400.02
	3	32	2093.09	-457.16	0.00	0.00	0.00	-1683.61
		42	-2093.09	457.16	0.00	0.00	0.00	-602.20
	4	32	2544.09	-463.37	0.00	0.00	0.00	-1716.82
		42	-2544.09	463.37	0.00	0.00	0.00	-600.03
33	1	33	630.52	-297.07	0.00	0.00	0.00	-1101.78
		43	-630.52	297.07	0.00	0.00	0.00	-383.59
	2	33	744.21	-298.73	0.00	0.00	0.00	-1120.64
		43	-744.21	298.73	0.00	0.00	0.00	-373.02
	3	33	945.78	-445.61	0.00	0.00	0.00	-1652.67
		43	-945.78	445.61	0.00	0.00	0.00	-575.39
	4	33	1116.32	-448.10	0.00	0.00	0.00	-1680.95
		43	-1116.32	448.10	0.00	0.00	0.00	-559.53

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

77. PRINT MEMBER FORCES LIST 21 22 23

EMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
21	1	21	1142.09	147.50	0.00	0.00	0.00	-378.79
		31	-1142.09	-147.50	0.00	0.00	0.00	1116.30
	2	21	1399.72	151.06	0.00	0.00	0.00	-389.64
		31	-1399.72	-151.06	0.00	0.00	0.00	1144.95
	3	21	1713.13	221.25	0.00	0.00	0.00	-568.19
		31	-1713.13	-221.25	0.00	0.00	0.00	1674.45
	4	21	2099.59	226.59	0.00	0.00	0.00	-584.46
		31	-2099.59	-226.59	0.00	0.00	0.00	1717.43
22	1	22	1395.39	146.81	0.00	0.00	0.00	-388.36
		32	-1395.39	-146.81	0.00	0.00	0.00	1122.40
	2	22	1696.06	149.98	0.00	0.00	0.00	-394.67
		32	-1696.06	-149.98	0.00	0.00	0.00	1144.55
	3	22	2093.09	220.21	0.00	0.00	0.00	-582.55
		32	-2093.09	-220.21	0.00	0.00	0.00	1683.61
	4	22	2544.09	224.96	0.00	0.00	0.00	-592.01
		32	-2544.09	-224.96	0.00	0.00	0.00	1716.82
23	1	23	630.52	144.41	0.00	0.00	0.00	-379.71
		33	-630.52	-144.41	0.00	0.00	0.00	1101.78
	2	23	744.21	147.38	0.00	0.00	0.00	-383.73
		33	-744.21	-147.38	0.00	0.00	0.00	1120.64
	3	23	945.78	216.62	0.00	0.00	0.00	-569.56
		33	-945.78	-216.62	0.00	0.00	0.00	1652.67
	4	23	1116.32	221.07	0.00	0.00	0.00	-575.60
		33	-1116.32	-221.07	0.00	0.00	0.00	1680.95

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

78. PRINT MEMBER FORCES LIST 11 12 13

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
11	1	11	1142.09	80.12	0.00	0.00	0.00	21.81
		21	-1142.09	-80.12	0.00	0.00	0.00	378.79
	2	11	1399.72	82.36	0.00	0.00	0.00	22.16
		21	-1399.72	-82.36	0.00	0.00	0.00	389.64
	3	11	1713.13	120.18	0.00	0.00	0.00	32.71
		21	-1713.13	-120.18	0.00	0.00	0.00	568.19
	4	11	2099.59	123.54	0.00	0.00	0.00	33.24
		21	-2099.59	-123.54	0.00	0.00	0.00	584.46
12	1	12	1395.39	81.78	0.00	0.00	0.00	20.51
		22	-1395.39	-81.78	0.00	0.00	0.00	388.36
	2	12	1696.06	83.17	0.00	0.00	0.00	21.17
		22	-1696.06	-83.17	0.00	0.00	0.00	394.67
	3	12	2093.09	122.66	0.00	0.00	0.00	30.77
		22	-2093.09	-122.66	0.00	0.00	0.00	582.55
	4	12	2544.09	124.75	0.00	0.00	0.00	31.76
		22	-2544.09	-124.75	0.00	0.00	0.00	592.01
13	1	13	630.52	80.03	0.00	0.00	0.00	20.42
		23	-630.52	-80.03	0.00	0.00	0.00	379.71
	2	13	744.21	80.99	0.00	0.00	0.00	21.24
		23	-744.21	-80.99	0.00	0.00	0.00	383.73
	3	13	945.78	120.04	0.00	0.00	0.00	30.63
		23	-945.78	-120.04	0.00	0.00	0.00	569.57
	4	13	1116.32	121.49	0.00	0.00	0.00	31.86
		23	-1116.32	-121.49	0.00	0.00	0.00	575.60

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

79. PRINT MEMBER FORCES LIST 1 2 3

'EMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	1142.09	-4.36	0.00	0.00	0.00	0.00
		11	-1142.09	4.36	0.00	0.00	0.00	-21.81
	2	1	1399.72	-4.43	0.00	0.00	0.00	0.00
		11	-1399.72	4.43	0.00	0.00	0.00	-22.16
	3	1	1713.13	-6.54	0.00	0.00	0.00	0.00
		11	-1713.13	6.54	0.00	0.00	0.00	-32.71
	4	1	2099.59	-6.65	0.00	0.00	0.00	0.00
		11	-2099.59	6.65	0.00	0.00	0.00	-33.24
2	1	2	1395.39	-4.10	0.00	0.00	0.00	0.00
		12	-1395.39	4.10	0.00	0.00	0.00	-20.51
	2	2	1696.06	-4.23	0.00	0.00	0.00	0.00
		12	-1696.06	4.23	0.00	0.00	0.00	-21.17
	3	2	2093.09	-6.15	0.00	0.00	0.00	0.00
		12	-2093.09	6.15	0.00	0.00	0.00	-30.77
	4	2	2544.09	-6.35	0.00	0.00	0.00	0.00
		12	-2544.09	6.35	0.00	0.00	0.00	-31.76
3	1	3	630.52	-4.08	0.00	0.00	0.00	0.00
		13	-630.52	4.08	0.00	0.00	0.00	-20.42
	2	3	744.21	-4.25	0.00	0.00	0.00	0.00
		13	-744.21	4.25	0.00	0.00	0.00	-21.24
	3	3	945.78	-6.13	0.00	0.00	0.00	0.00
		13	-945.78	6.13	0.00	0.00	0.00	-30.63
	4	3	1116.32	-6.37	0.00	0.00	0.00	0.00
		13	-1116.32	6.37	0.00	0.00	0.00	-31.86

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

80. PRINT MEMBER FORCES LIST 51 52

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
51	1	51	377.24	1142.09	0.00	0.00	0.00	2233.75
		52	-377.24	-1142.09	0.00	0.00	0.00	3762.21
	2	51	388.51	1399.72	0.00	0.00	0.00	2306.97
		52	-388.51	-1399.72	0.00	0.00	0.00	5041.58
	3	51	565.86	1713.13	0.00	0.00	0.00	3350.62
		52	-565.86	-1713.13	0.00	0.00	0.00	5643.32
	4	51	582.77	2099.59	0.00	0.00	0.00	3460.46
		52	-582.77	-2099.59	0.00	0.00	0.00	7562.37
52	1	52	-56.72	-630.52	0.00	0.00	0.00	-4787.41
		53	56.72	630.52	0.00	0.00	0.00	1477.18
	2	52	-59.62	-744.21	0.00	0.00	0.00	-5388.49
		53	59.62	744.21	0.00	0.00	0.00	1481.37
	3	52	-85.08	-945.78	0.00	0.00	0.00	-7181.11
		53	85.08	945.78	0.00	0.00	0.00	2215.77
	4	52	-89.44	-1116.32	0.00	0.00	0.00	-8082.73
		53	89.44	1116.32	0.00	0.00	0.00	2222.05

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

81. PRINT REACC ALL

JPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	4.36	1142.09	0.00	0.00	0.00	0.00
	2	4.43	1399.72	0.00	0.00	0.00	0.00
	3	6.54	1713.13	0.00	0.00	0.00	0.00
	4	6.65	2099.59	0.00	0.00	0.00	0.00
2	1	4.10	1395.39	0.00	0.00	0.00	0.00
	2	4.23	1696.06	0.00	0.00	0.00	0.00
	3	6.15	2093.09	0.00	0.00	0.00	0.00
	4	6.35	2544.09	0.00	0.00	0.00	0.00
3	1	4.08	630.52	0.00	0.00	0.00	0.00
	2	4.25	744.21	0.00	0.00	0.00	0.00
	3	6.13	945.78	0.00	0.00	0.00	0.00
	4	6.37	1116.32	0.00	0.00	0.00	0.00
11	1	-84.48	0.00	0.00	0.00	0.00	0.00
	2	-86.79	0.00	0.00	0.00	0.00	0.00
	3	-126.72	0.00	0.00	0.00	0.00	0.00
	4	-130.19	0.00	0.00	0.00	0.00	0.00
12	1	-85.88	0.00	0.00	0.00	0.00	0.00
	2	-87.40	0.00	0.00	0.00	0.00	0.00
	3	-128.82	0.00	0.00	0.00	0.00	0.00
	4	-131.11	0.00	0.00	0.00	0.00	0.00
13	1	-84.11	0.00	0.00	0.00	0.00	0.00
	2	-85.24	0.00	0.00	0.00	0.00	0.00
	3	-126.17	0.00	0.00	0.00	0.00	0.00
	4	-127.86	0.00	0.00	0.00	0.00	0.00
21	1	-67.38	0.00	0.00	0.00	0.00	0.00
	2	-68.70	0.00	0.00	0.00	0.00	0.00
	3	-101.07	0.00	0.00	0.00	0.00	0.00
	4	-103.06	0.00	0.00	0.00	0.00	0.00
22	1	-65.03	0.00	0.00	0.00	0.00	0.00
	2	-66.81	0.00	0.00	0.00	0.00	0.00
	3	-97.55	0.00	0.00	0.00	0.00	0.00
	4	-100.21	0.00	0.00	0.00	0.00	0.00
23	1	-64.39	0.00	0.00	0.00	0.00	0.00
	2	-66.39	0.00	0.00	0.00	0.00	0.00
	3	-96.58	0.00	0.00	0.00	0.00	0.00
	4	-99.58	0.00	0.00	0.00	0.00	0.00
31	1	440.30	0.00	0.00	0.00	0.00	0.00
	2	452.93	0.00	0.00	0.00	0.00	0.00
	3	660.45	0.00	0.00	0.00	0.00	0.00
	4	679.40	0.00	0.00	0.00	0.00	0.00
32	1	451.58	0.00	0.00	0.00	0.00	0.00
	2	458.89	0.00	0.00	0.00	0.00	0.00
	3	677.37	0.00	0.00	0.00	0.00	0.00
	4	688.33	0.00	0.00	0.00	0.00	0.00
33	1	441.49	0.00	0.00	0.00	0.00	0.00
	2	446.11	0.00	0.00	0.00	0.00	0.00
	3	662.23	0.00	0.00	0.00	0.00	0.00
	4	669.17	0.00	0.00	0.00	0.00	0.00
41	1	84.42	0.00	0.00	0.00	0.00	0.00
	2	86.65	0.00	0.00	0.00	0.00	0.00

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
	3	126.63	0.00	0.00	0.00	0.00	0.00
	4	129.97	0.00	0.00	0.00	0.00	0.00
42	1	85.29	0.00	0.00	0.00	0.00	0.00
	2	86.90	0.00	0.00	0.00	0.00	0.00
	3	127.94	0.00	0.00	0.00	0.00	0.00
	4	130.35	0.00	0.00	0.00	0.00	0.00
43	1	83.64	0.00	0.00	0.00	0.00	0.00
	2	84.94	0.00	0.00	0.00	0.00	0.00
	3	125.46	0.00	0.00	0.00	0.00	0.00
	4	127.41	0.00	0.00	0.00	0.00	0.00

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

82. PLOT DIS FILE
83. PLOT BEN FILE
84. FINISH

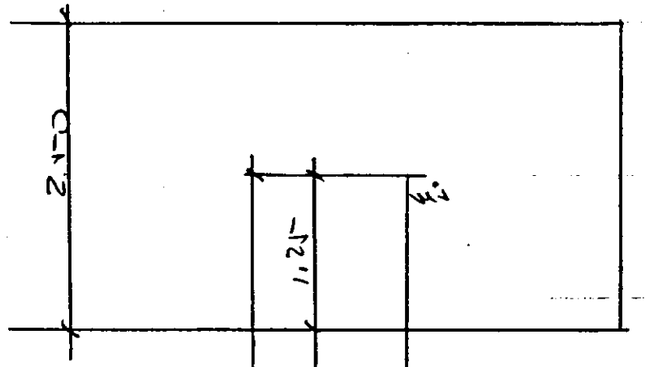
********** END OF STAAD-III **********

**** DATE= JUL 22,1999 TIME= 11:32: 6 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

NOTA.

LOS VALORES SOMBREADOS CORRESPONDEN A VALORES REDUCIDOS DE CADA MEDIDOR DE SOLAPO



$h_D = h_i + \frac{h_j - h_i}{5} \times 3.75$

$h_D = 521 + 0.75(3350 - 521) = 2642$

$h_D = 602 + 0.75(2926 - 602) = 2340$

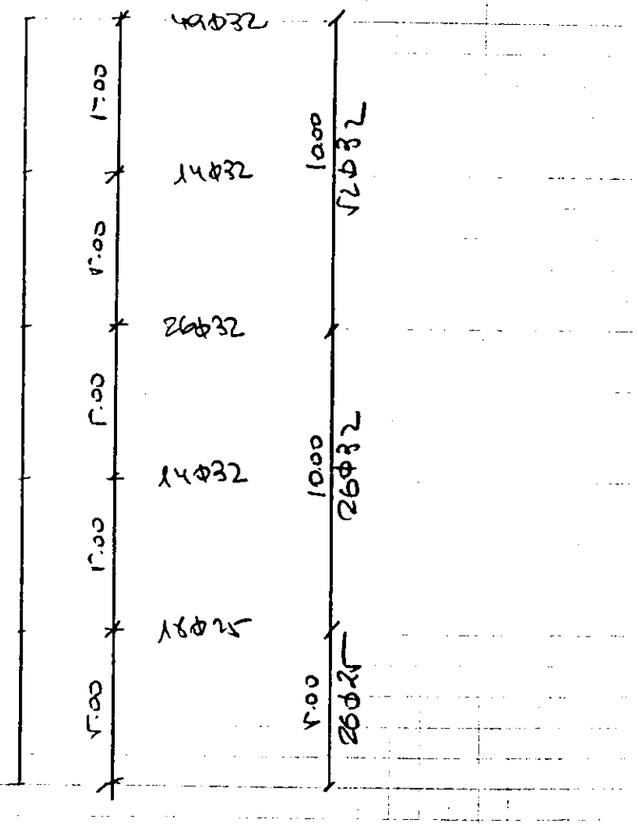
$h_D = 575 + 0.75(2715 - 575) = 1825$

$h_D = 546 + 0.75(3460 - 546) = 2731$

$h_D = 600 + 0.75(2961 - 600) = 2370$

$h_D = 559 + 0.75(2227 - 559) = 1809$

DISPOSICIÓN DE ARMADURAS.



CENTROS (PILOTES)

$Q'_{max} = 513/3 = 171$ t/pilote (BORING 41-47-48)

$T_b = 84$ t.

$w_4 = \frac{171-84}{0.9 \times 4.2 \times 14} = 1.47$ t/m². 1cb16/15

$Q_{max} = 408/3 = 136$ t/tubo (BORING 31-32-33)

$T_b = 84$ t.

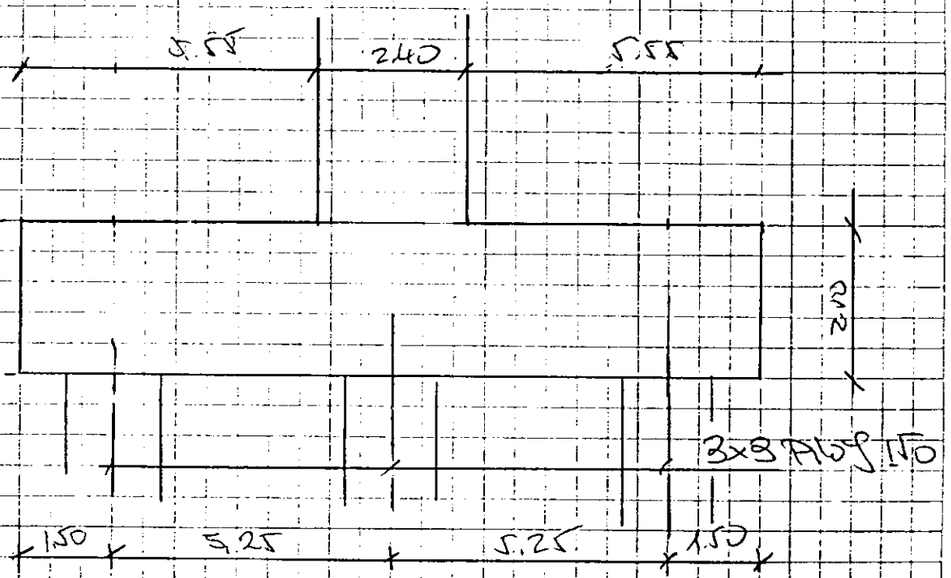
$w_4 = \frac{136-84}{0.9 \times 4.2 \times 14} = 0.98$ t/m².

$w_{4\,min} = 0.02 \times \frac{2000 \times 0.9}{1.5} \times 14/4.2 = 8.0$ t/m².

ENCEPADO

LADO CENTRO DE PILOTE

$N = \frac{1156}{3} + \frac{454}{3 \times 1.50} = 385 + 1.4 = 599$ t.



MOMENTO FLECTOR

$M = 5.55 - 1.50 - 0.15 \times 2.40 = 4.41$ m

$M' = 1.5 \times 4.41 \times 599 = 3896$ mt

$D = 1.50 + 4.41 + 4.41 = 10.32$. 36 > 14.00

$w' = 3 \times 3896/14 = 835$ mt/m²

intecsa
INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS S.A.

PROYECTO: HOJA DE
FECHA
EJECUTANTE:

$A_c = \frac{2000}{1,5} \times 1,00 \times 2,40 = 4000$ t/m

$A_s = 4000\left(1 - \sqrt{1 - \frac{2 \times 835}{2,40 \times 4000}}\right) = 364$ to/ml

$w = 364 \times 1,15 / 5_1 = 82$ cm²/ml 2 cavi Ø32/20

$Q = 3 \times 589 \times 1,5 = 2650$ ton

$Q' = 2650 / 14 = 189$ t/ml

$T_b = 5\sqrt{250 \times 1,00 \times 240} = 155$ t

$w_t = \frac{189 - 155}{0,9 \times 4,2 \times 2,4} = 3,30$ cm²/m²

$w_{t,m} = 0,07 \times \frac{2500}{1,5} \times 1,00 = \frac{1}{42} = 49,7$ kg/m²

1 staffa Ø16/40/80

Momento sul Pilastro

$M = (2,5 \times 2,5 + 8,50 \times 1,8 + 3) \times \frac{5,92}{2} = \frac{630}{14} \times 4,41 =$

$= 428 - 198 = 230$ mt/ml

$M' = 230 \times 1,6 = 368$ mt/ml

$A_c = 4000$ t/m

intecsa
INTERNACIONALE DI INGEGNERIA E STUDI TECNICI S.A.

PROYECTO: HOJA DE
FECHA
EJECUTANTE:

$A_s = 4000\left(1 - \sqrt{1 - \frac{2 \times 368}{2,4 \times 4000}}\right) = 156$ t

$w = 156 \times 1,15 / 5_1 = 35$ cm²/ml Ø25/15

COMPROBACIÓN DE LOS PILOTES PARA LA REACCIÓN SOBRE APOYOS HASTA LADO TIERRA

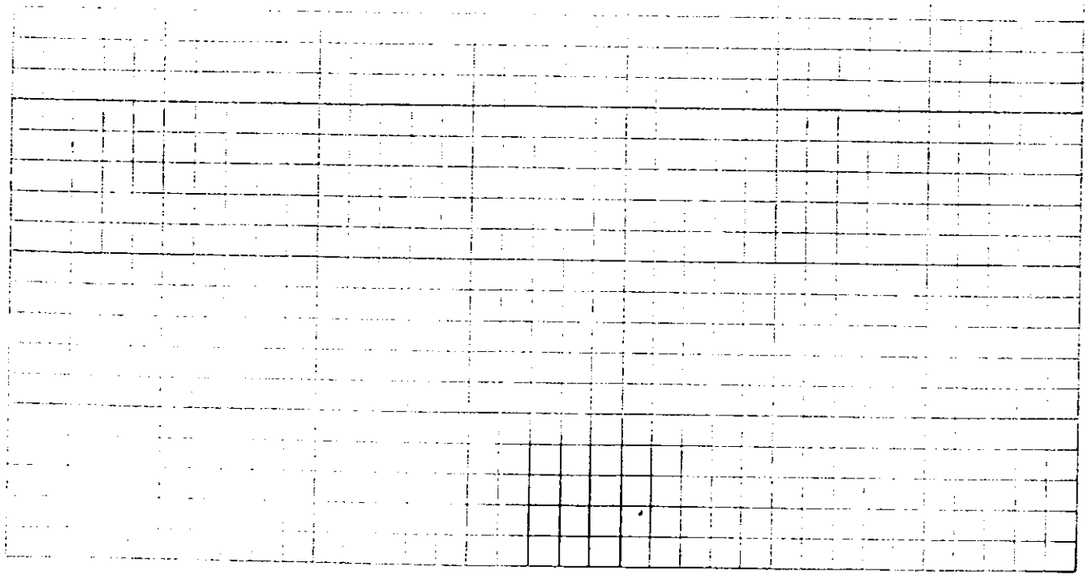
$F_x = -682 + 2 \times 1340 = 655{,}20\ t$

$F_1 = -3480\ t$

$M_2 = -2321 - 2 \times 1340 \times (2{,}50 + 2{,}50 - 2{,}00) =$

$-2321 - 241 = -2562\ mt$

no hay inversión de momentos y el valor superior a la hipótesis de montaje.



VIADUCTO 4

PRUEBA DE CARGA

La estructura se ha modelizado como una viga continua de las siguientes características:

- Luces: 21.00, 11x28.00, 3x30.00, 21.00 m
- Sección transversal (A): 11.045 m^2
- Momento de inercia (I): 5.4311 m^4
- Resistencia característica del hormigón (f_{ck}): 400 kp/cm^2
- Módulo de elasticidad (E): $3.8x10^6$ t/m^2

El tren de cargas ha consistido en 6 camiones no articulados de 3 ejes y 26 t de peso total (tipo *dumper*), agrupados en dos bloques de tres vehículos en fondo con las cajas enfrentadas. Con dicho tren recorriendo la estructura, se han calculado* las líneas de influencia de las flechas y momentos en centros de vano, y de las reacciones en los apoyos. Los ejes de cada camión transmiten cargas de 7.0 t (eje delantero) y 9.5 t (cada eje del tándem trasero), siendo los interejes de 3.90 y 1.35 m. El tren de cargas completo queda definido por los siguientes parámetros:

- Cargas: 21, 28.5, 28.5, 28.5, 28.5, 21 t
- Interejes: 3.90, 1.35, 3.00, 1.35, 3.90 m

Se ha calculado**, así mismo, el valor del período de vibración correspondiente a la frecuencia principal de vibración libre de la estructura.

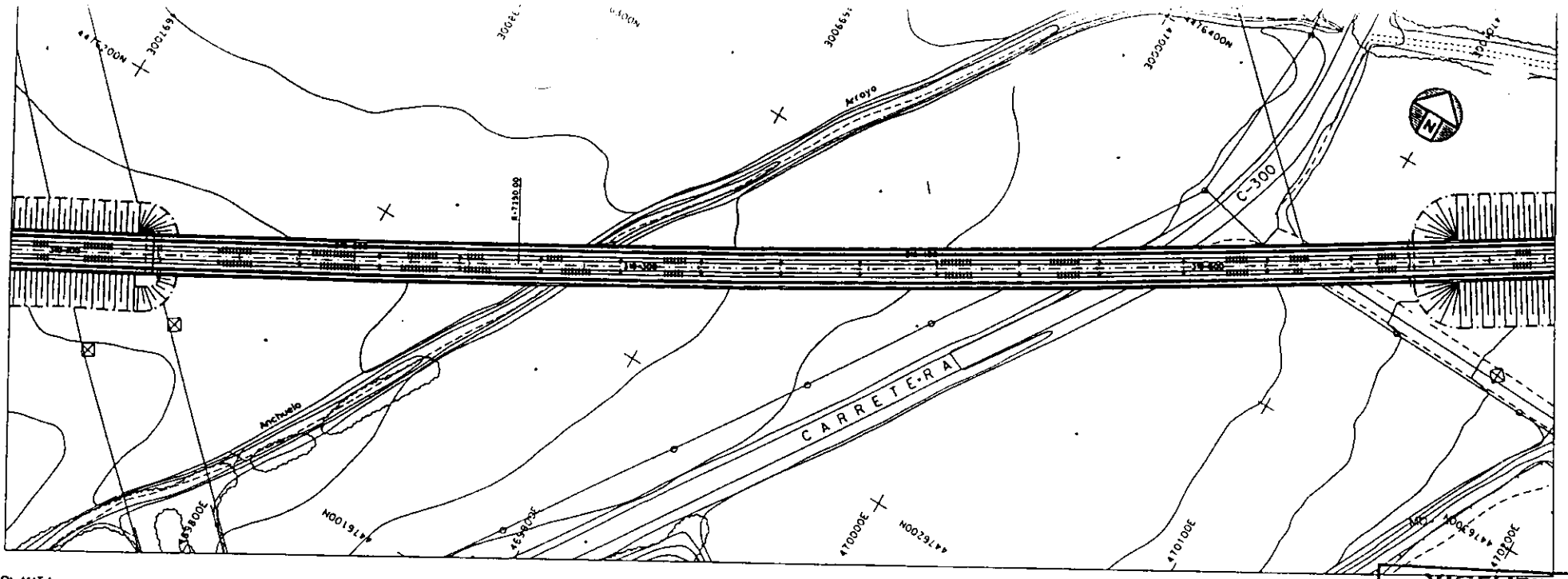
Los resultados previstos son los siguientes:

Vano	Abscisa de carga [m]	Flecha [mm]	Momento flector [mt]
1	16.75	-0.85	425
3	22.25	-1.55	512
7	19.25	-1.56	513
11	22.25	-1.56	513
14	20.25	-1.94	562
16	16.25	-0.88	450

Flechas previstas en viaducto 4

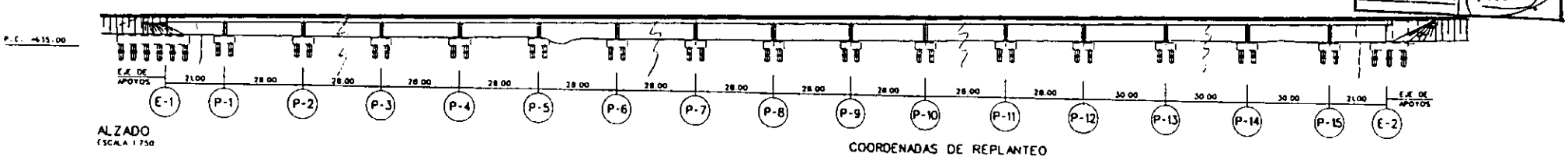
La frecuencia principal de vibración es de 5.59 Hz, correspondiente a un período de 0.1789 s.

* Con el programa Merlin, de Kinesia
** Con el programa SAP 80

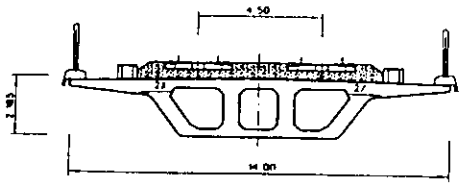


PLANTA
ESCALA 1/750

VIGENTE
FECHA: 12-07-1999
RESPONSABLE:
CODIGO: P.P. 2.9.4.1.B



ALZADO
ESCALA 1/750



SECCION TRANSVERSAL TIPO
ESCALA 1/100

COORDENADAS DE REPLANTEO

	D.D.	X	Y	Az
E-1	310+131.80	469.739,598	4.476.146,676	168.1770 g
P-1	310+152.80	469.758,014	4.476.156,768	167.9829 g
P-2	310+180.80	469.782,523	4.476.170,307	167.7473 g
P-3	310+208.80	469.806,980	4.476.183,941	167.5012 g
P-4	310+236.80	469.831,384	4.476.197,669	167.2557 g
P-5	310+264.80	469.855,734	4.476.211,491	167.0097 g
P-6	310+292.80	469.880,031	4.476.225,407	166.7640 g
P-7	310+320.80	469.904,274	4.476.239,417	166.5177 g
P-8	310+348.80	469.928,463	4.476.253,520	166.2715 g

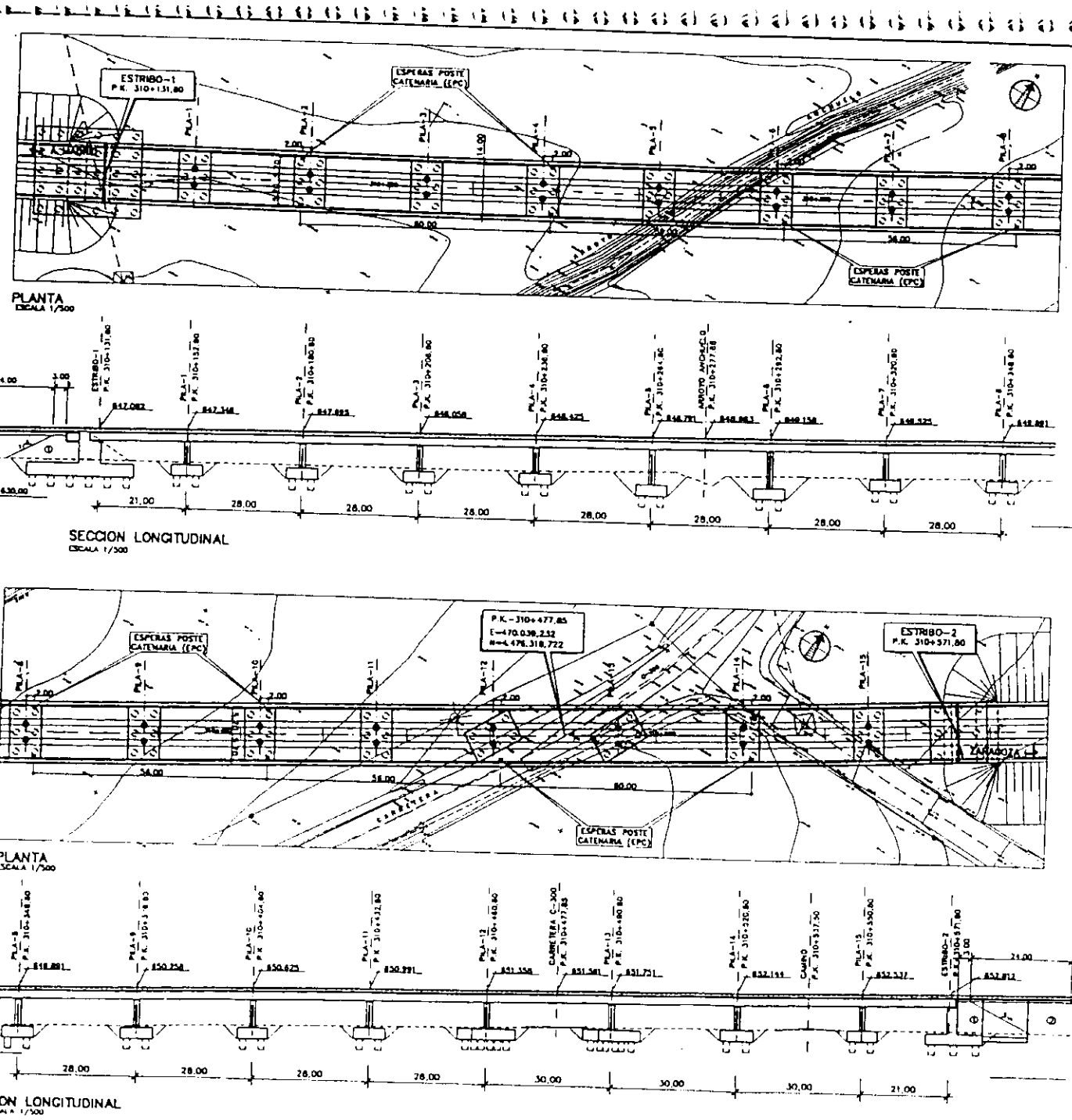
	D.D.	X	Y	Az
P-9	310+376.80	469.952,597	4.476.267,717	166.0261 g
P-10	310+404.80	469.976,676	4.476.282.007	165.7799 g
P-11	310+432.80	470.000,700	4.476.296,390	165.5343 g
P-12	310+460.80	470.024,668	4.476.310,865	165.2881 g
P-13	310+490.80	470.050,286	4.476.326,477	165.0251 g
P-14	310+520.80	470.075,839	4.476.342,195	164.7615 g
P-15	310+550.80	470.101,325	4.476.358,018	164.4980 g
E-2	310+571.80	470.119,126	4.476.369,157	164.3129 g

12 JUL. 1999

GIF	TITULO: PROYECTO CONSTRUCTIVO LINEA DE ALTA VELOCIDAD MADRID-BARCELONA-FRONTERA FRANCESA TRAMO: MADRID-ZARAGOZA SUBTRAMO 8: PLATAFORMA (MODIFICADO Nº 2)	EL INGENIERO DIRECTOR DEL PROYECTO: Fdo.: D. JOSE MANUEL CARBONELL	EL INGENIERO AUTOR: Fdo.: D.	AUTOR: U.T.E. Dragados TECSA	CONFORME POR EL CONTRATISTA: Fdo.: D. ALVARO FERNANDEZ COSTA	ESCALA: 1/750 1/100	FECHA: JUNIO 1999

TITULO DEL PLANO: ESTRUCTURA P.K. 310+477,85 PLANO GENERAL VIADUCTO 4

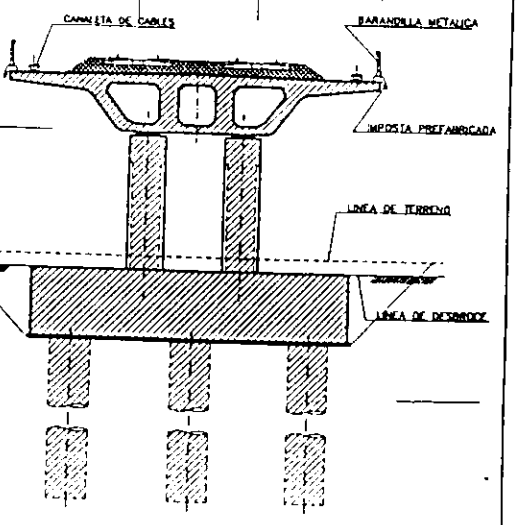
Nº DE PLANO: 2.9.4 B Hoja 1 de



PLANTA
ESCALA 1/500

VIGENTE
FECHA: 25-1-2000
RESPONSABLE:
CODIGO: P.P. 2.9.4.2.C

SECCION LONGITUDINAL
ESCALA 1/500



SECCION TRANSVERSAL
ESCALA 1/100

PLANTA
ESCALA 1/500

SECCION LONGITUDINAL
ESCALA 1/500

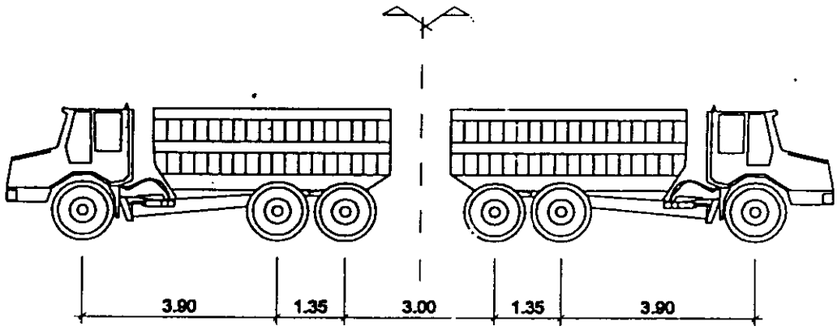
①	SUELO ESTABILIZADO CON CEMENTO
②	ZAHORRAS COMPACTADAS

GIF	TITULO: PROYECTO CONSTRUCTIVO LINEA DE ALTA VELOCIDAD MADRID-BARCELONA-FRONTERA FRANCESA TRAMO: MADRID-ZARAGOZA SUBTRAMO 8: PLATAFORMA (MODIFICADO Nº 2)	EL INGENIERO DIRECTOR DEL PROYECTO: Fdo.: D. JOSE MANUEL CARBONELL	AUTOR: U.T.E. DRAGADOS – TECSA	CONFORME POR EL CONTRATISTA: Fdo.: D. ALVARO FERNANDEZ COSTA	ESCALA: 1:500 1:100	FECHA: ENERO 2000

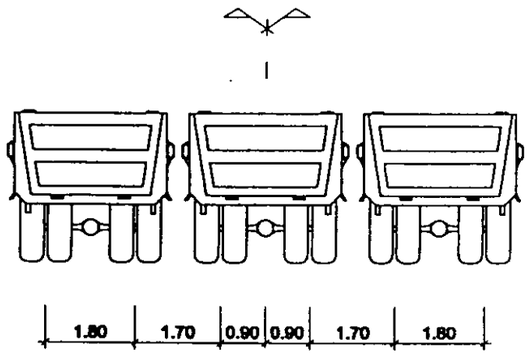
TITULO DEL PLANO: P.K.-310+477,85 SECCIONES LONGITUDINALES VIADUCTO 4

Nº DE PLANO: 2.9.4 C

DISPOSICION DE CAMIONES EN TODOS LOS VANOS

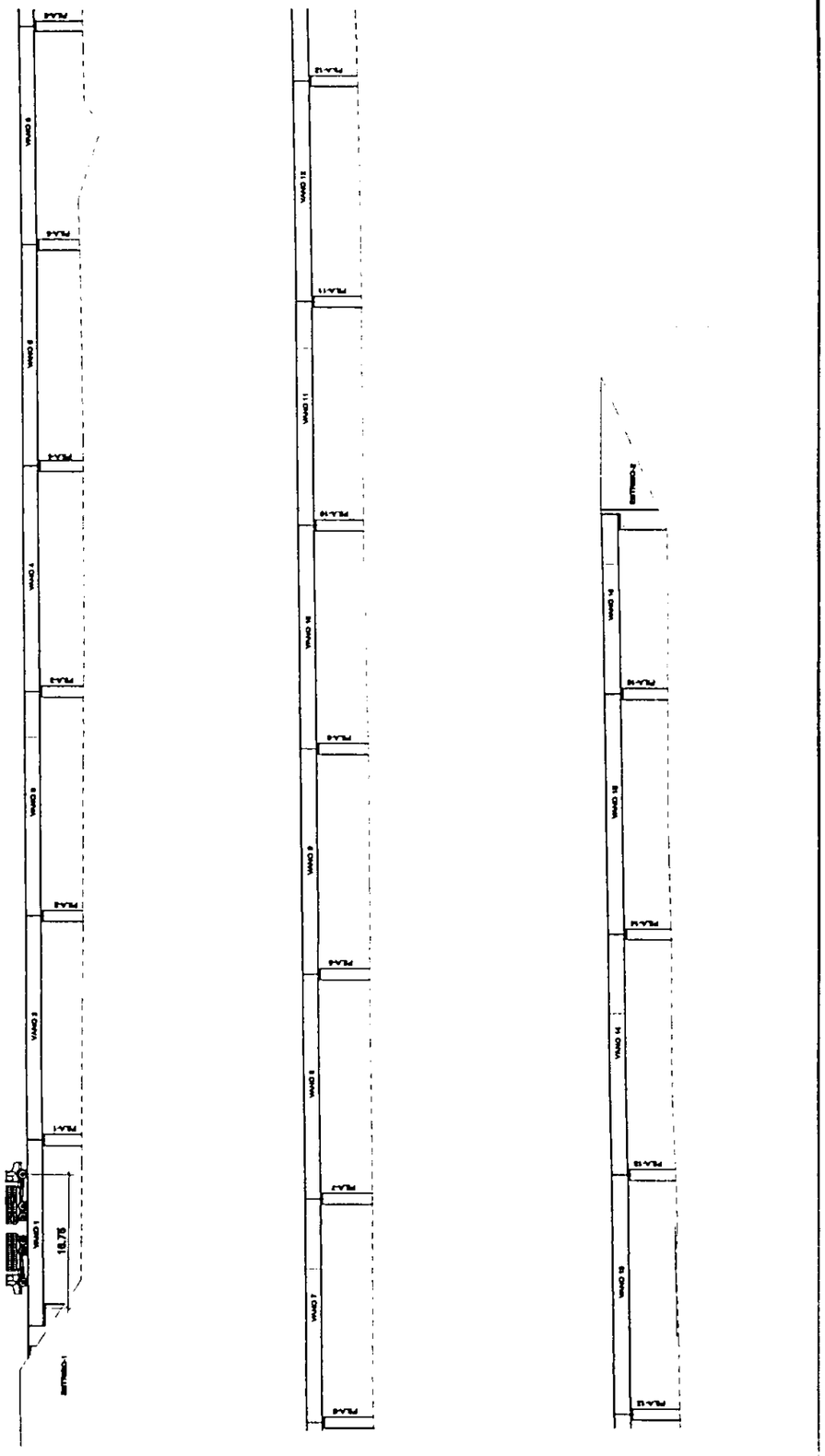


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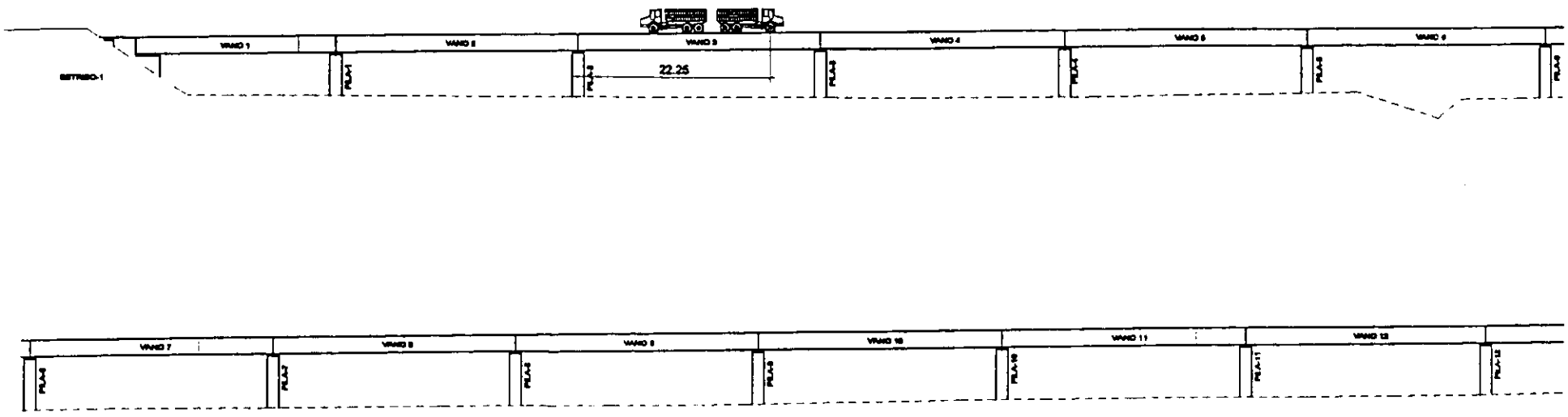


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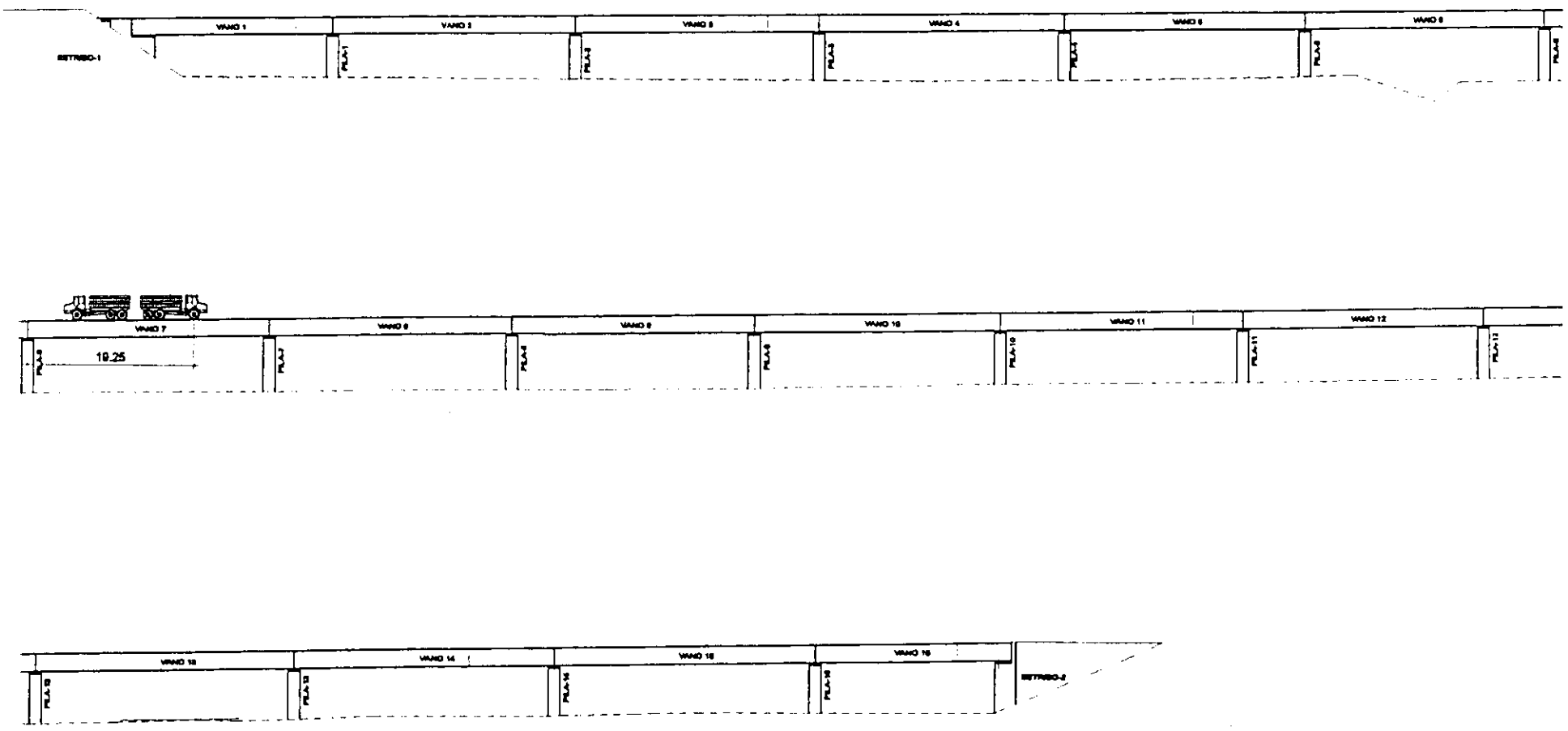
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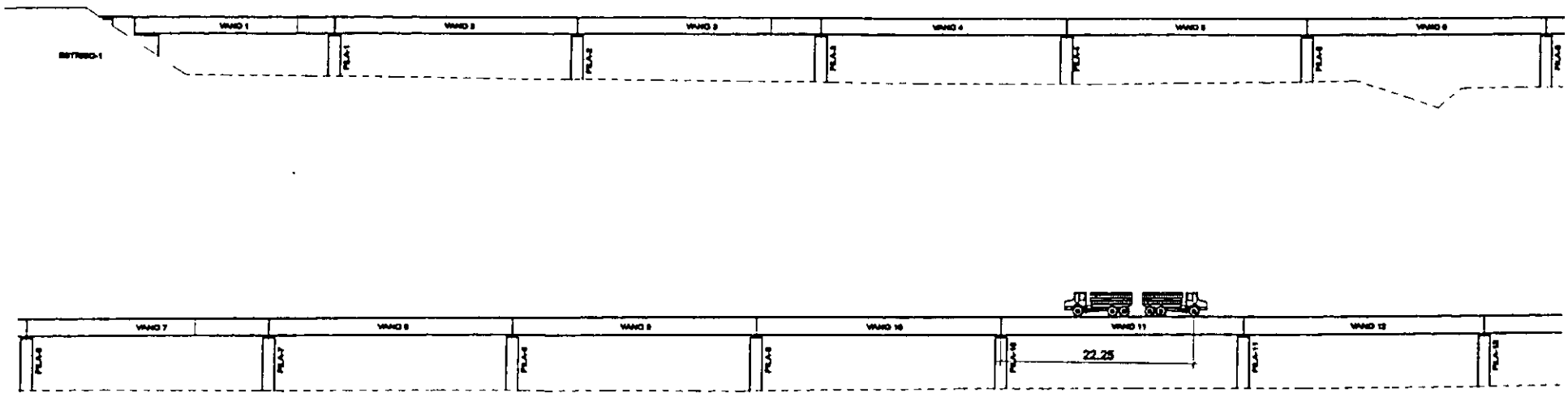
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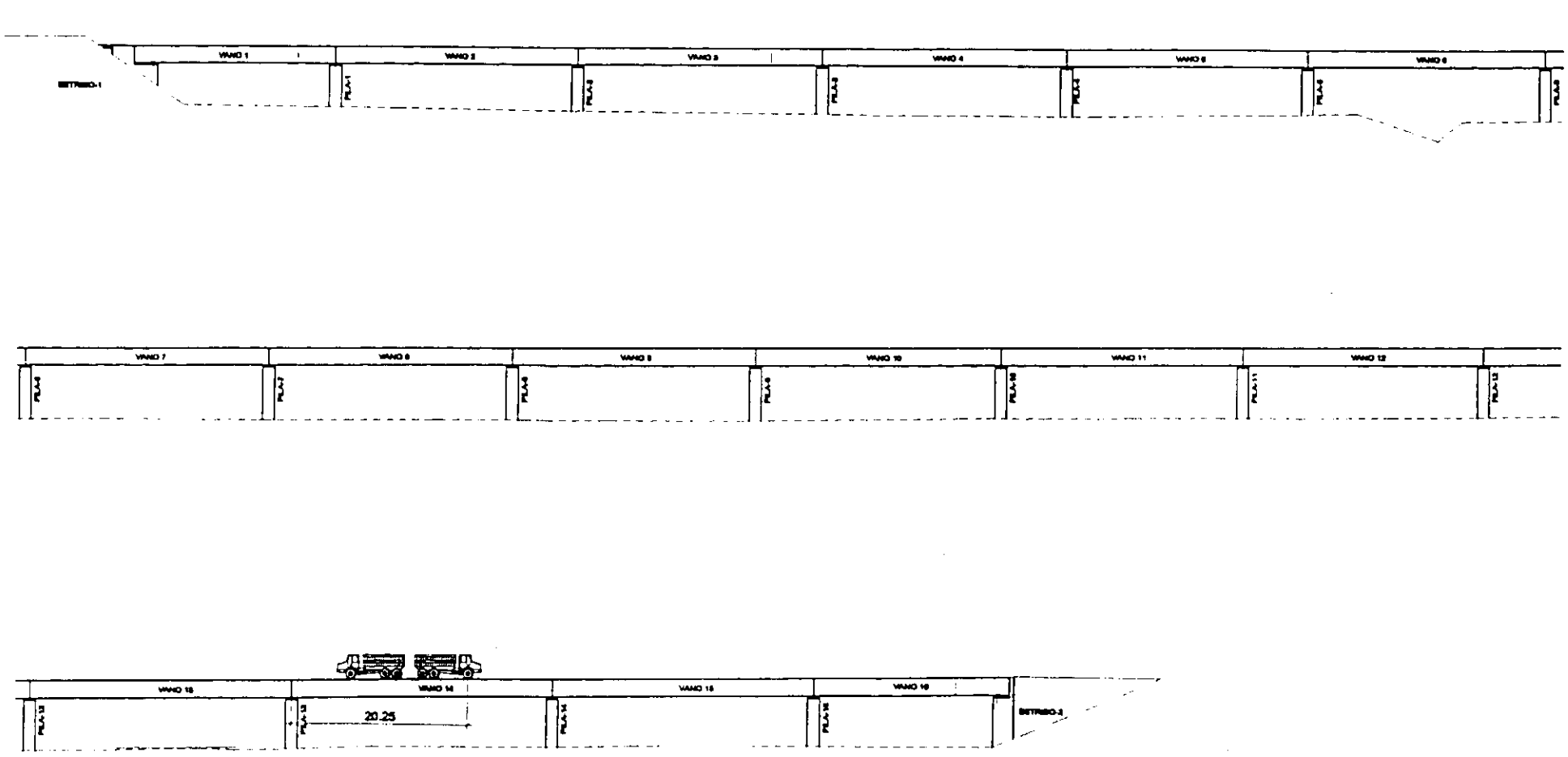
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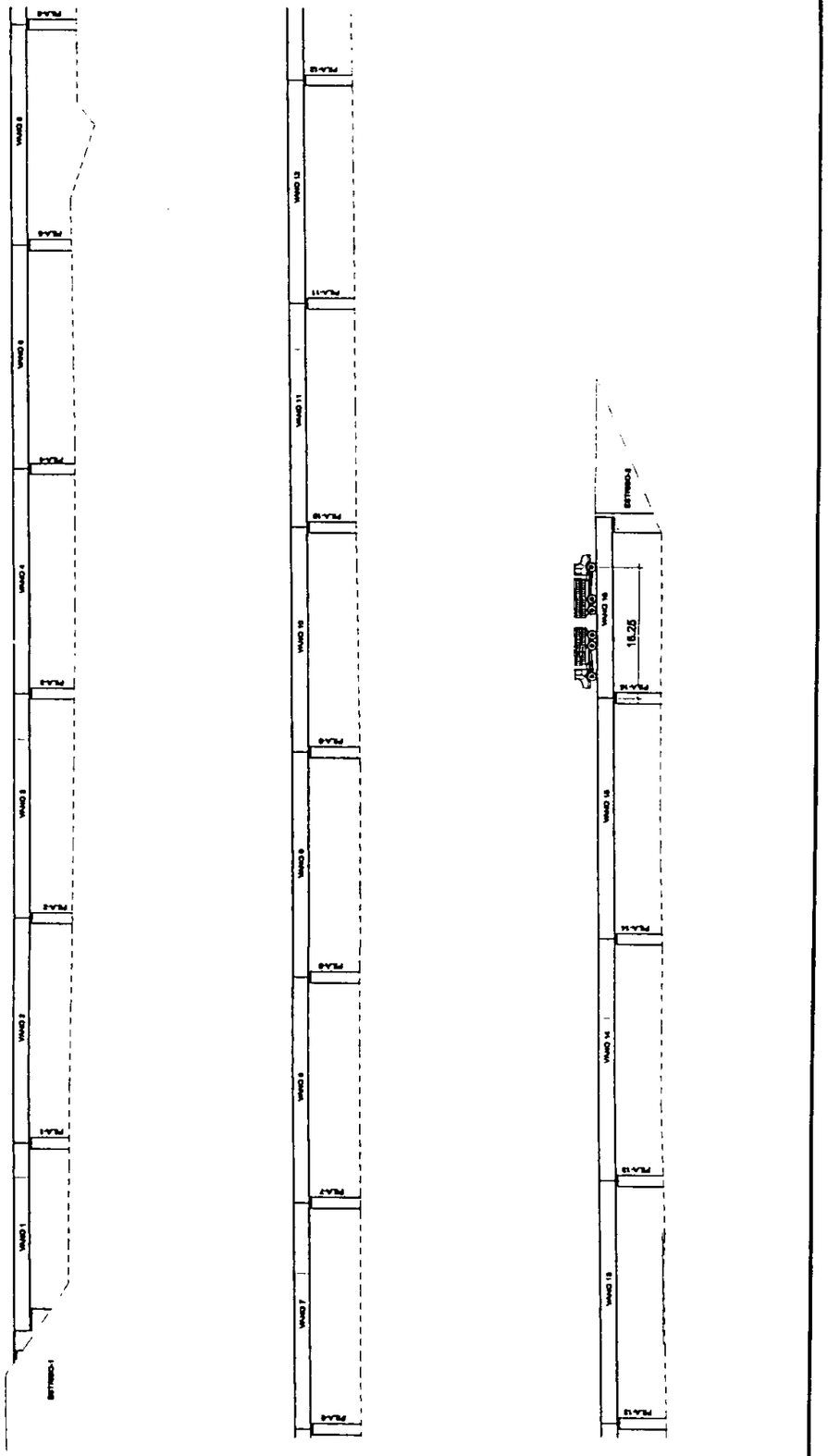
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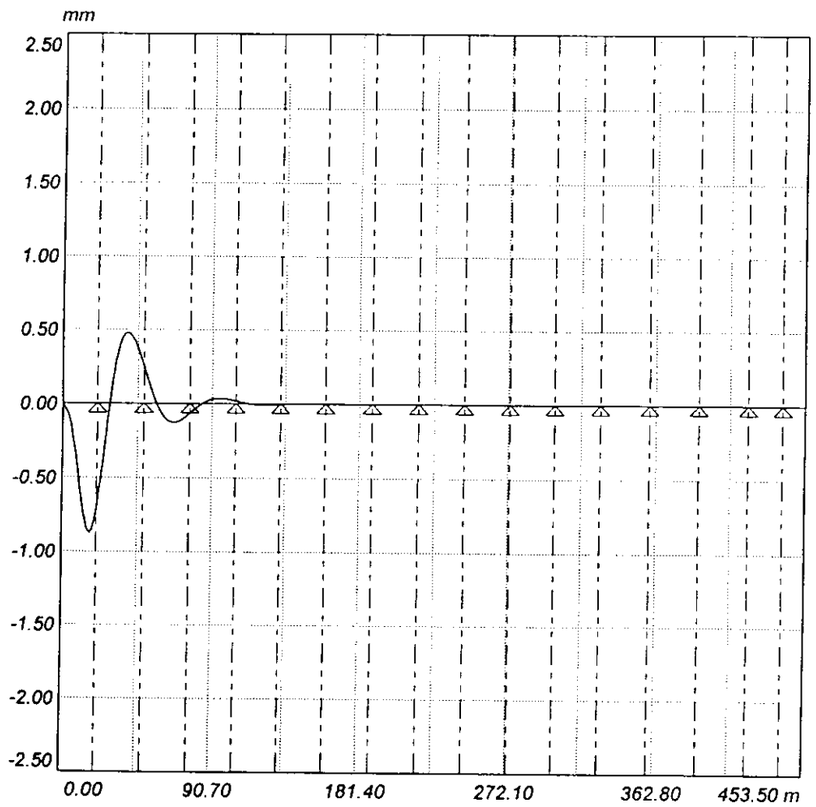
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VIADUCTO 4
SAP80 V85.02

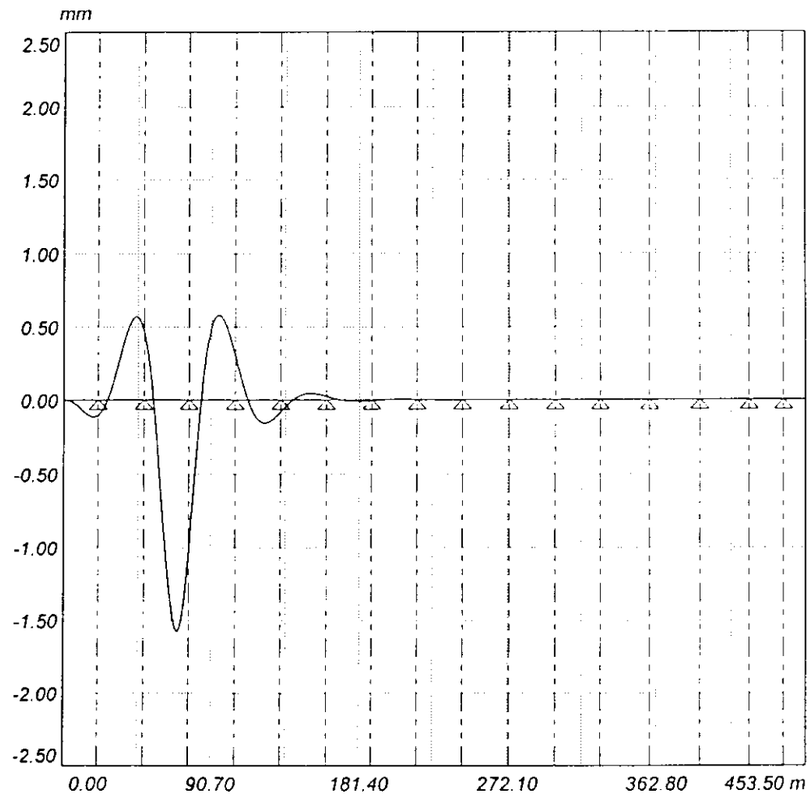
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Viaducto 4
Flecha en vano 1 (línea de influencia)
3+3 Camiones 26t

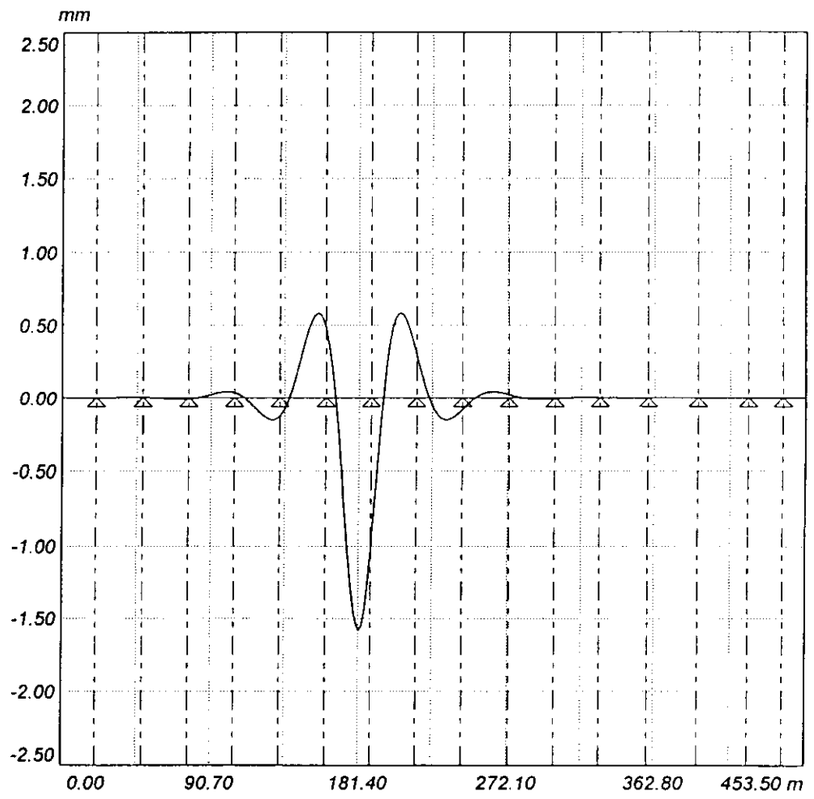


Kinesia

Viaducto 4
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3+3 Camiones 26t

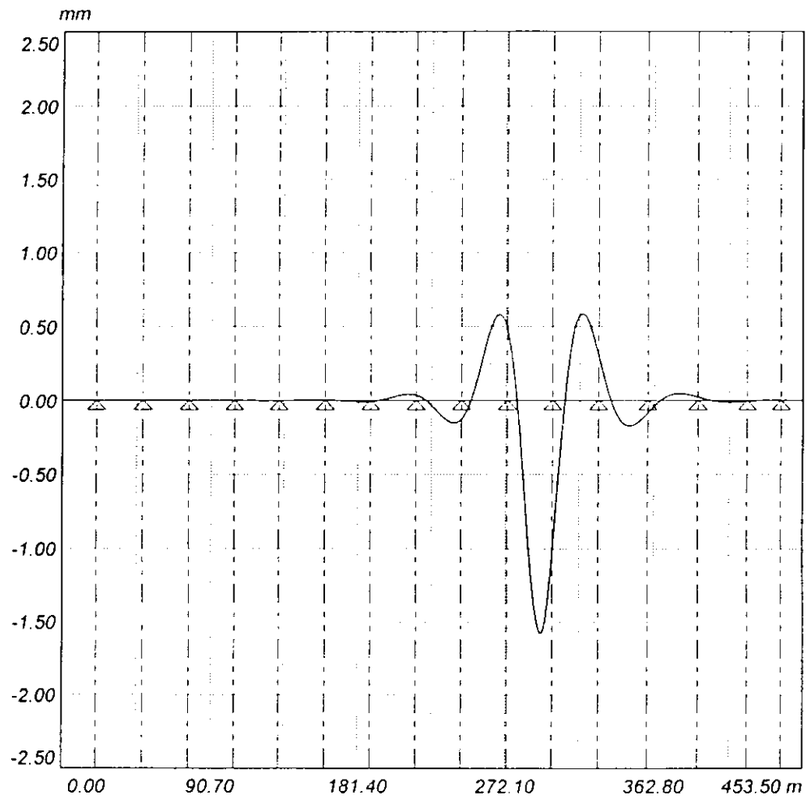


Viaducto 4
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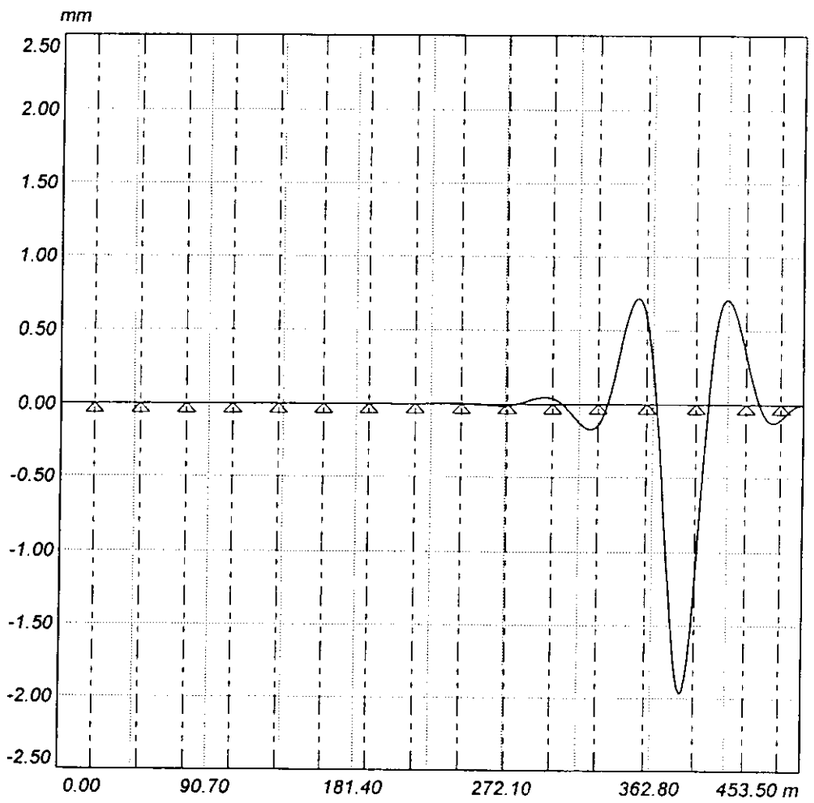


Kinesia

Viaducto 4
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3+3 Camiones 26t

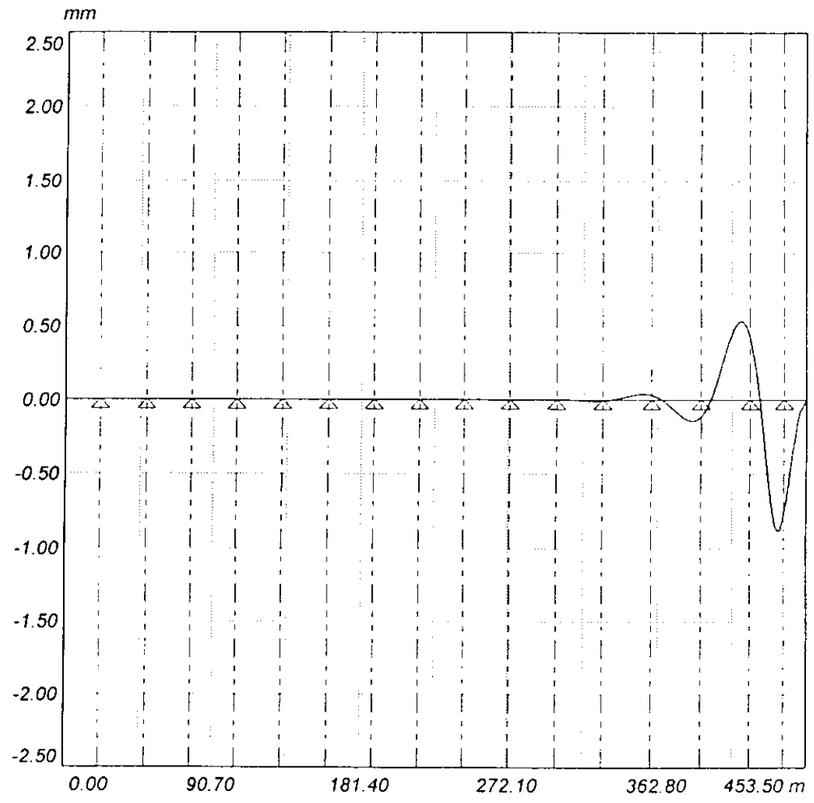


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3+3 Camiones 26t

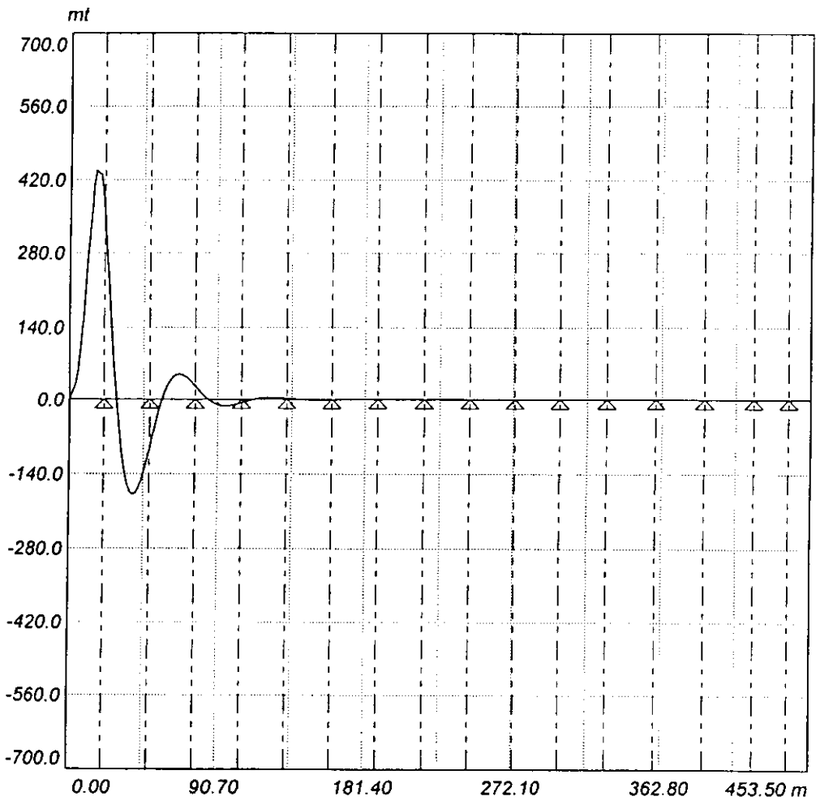


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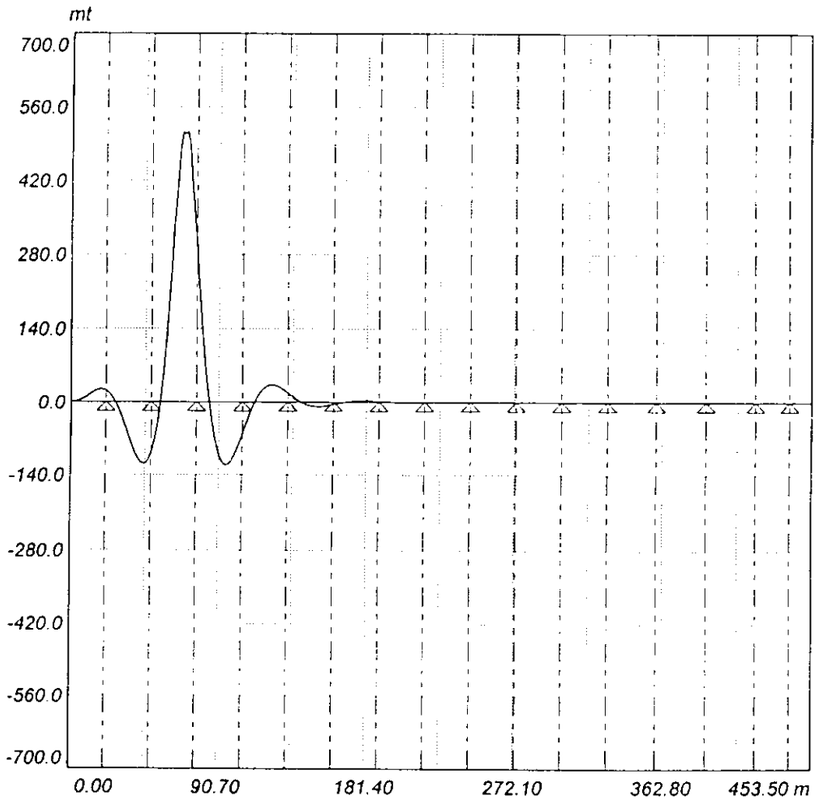


Viaducto 4
Momento en vano 1 (línea de influencia)
3+3 Camiones 26t

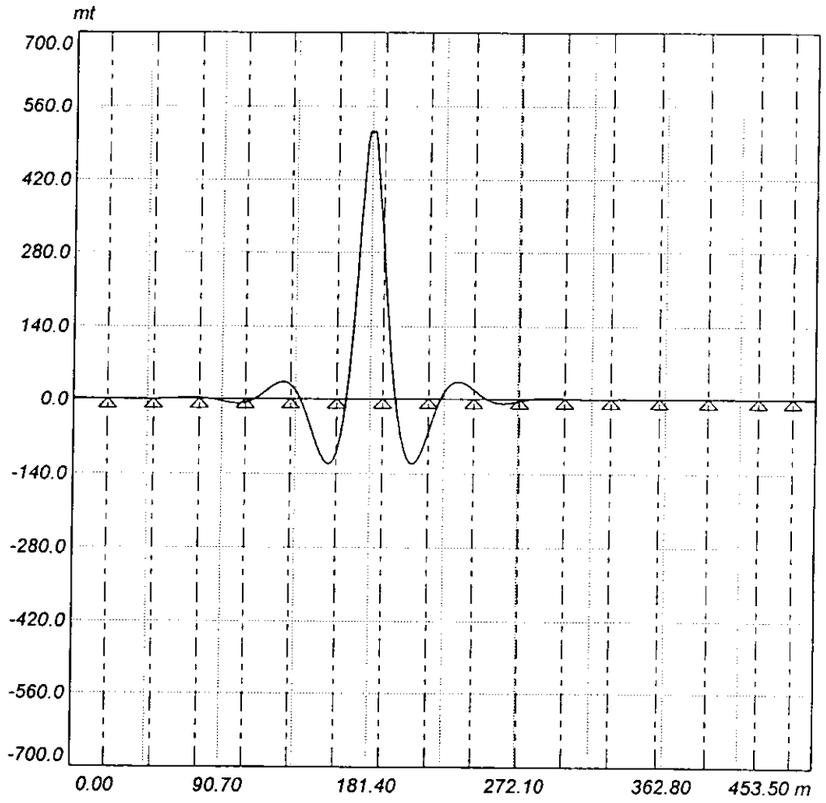


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Viaducto 4
Momento en vano 3 (línea de influencia)
3+3 Camiones 26t

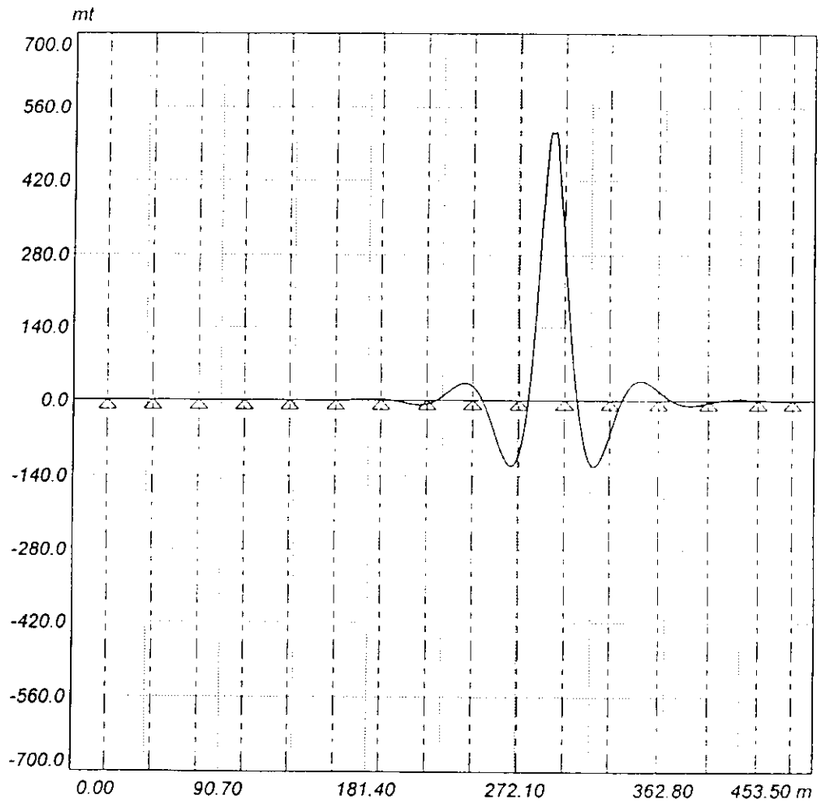


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Momento en vano 7 (línea de influencia)
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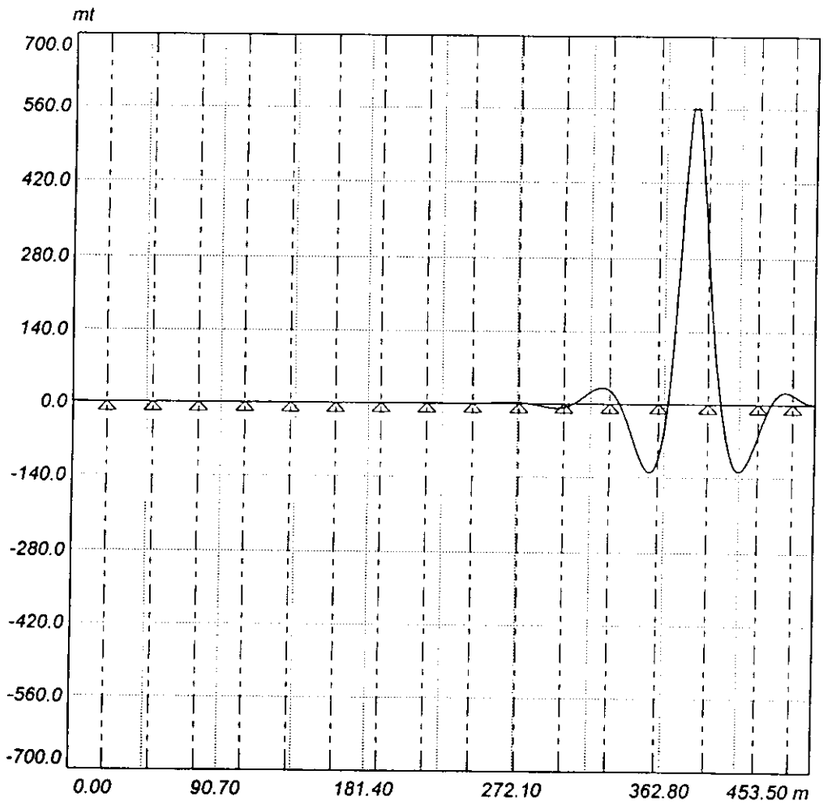


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Momento en vano 11 (línea de influencia)
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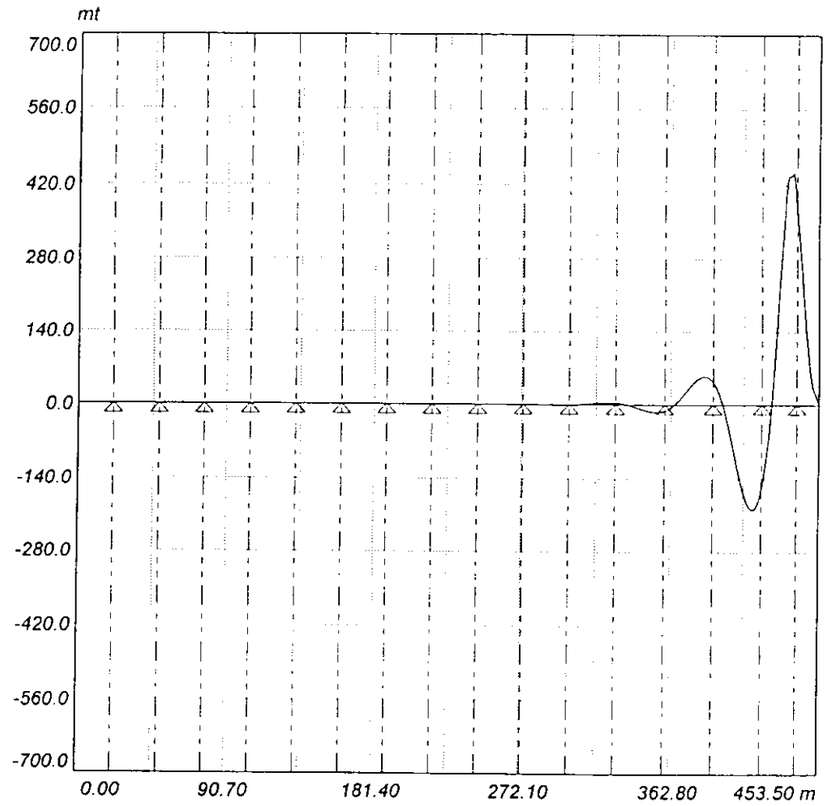


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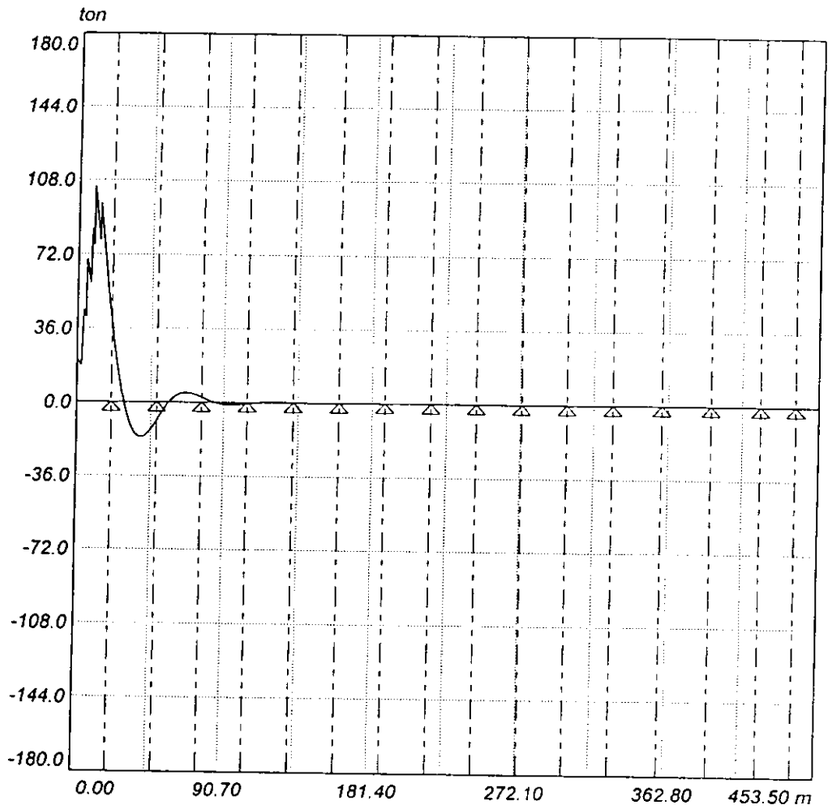


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Viaducto 4
Momento en vano 16 (línea de influencia)
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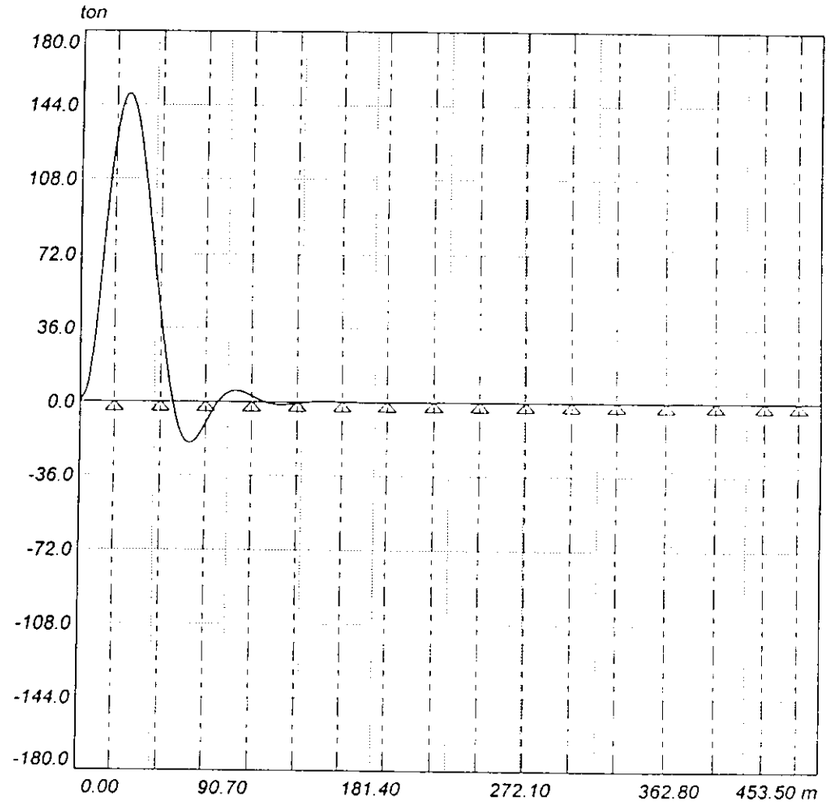


Viaducto 4
Reacción en apoyo 1 (línea de influencia)
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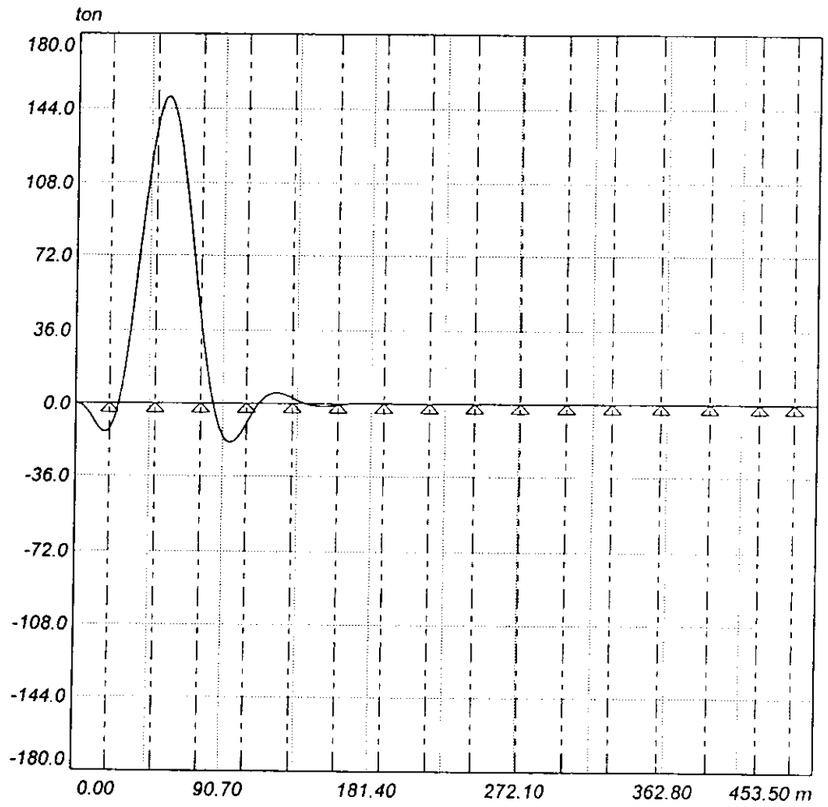


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Viaducto 4
Reacción en apoyo 2 (línea de influencia)
3+3 Camiones 26t

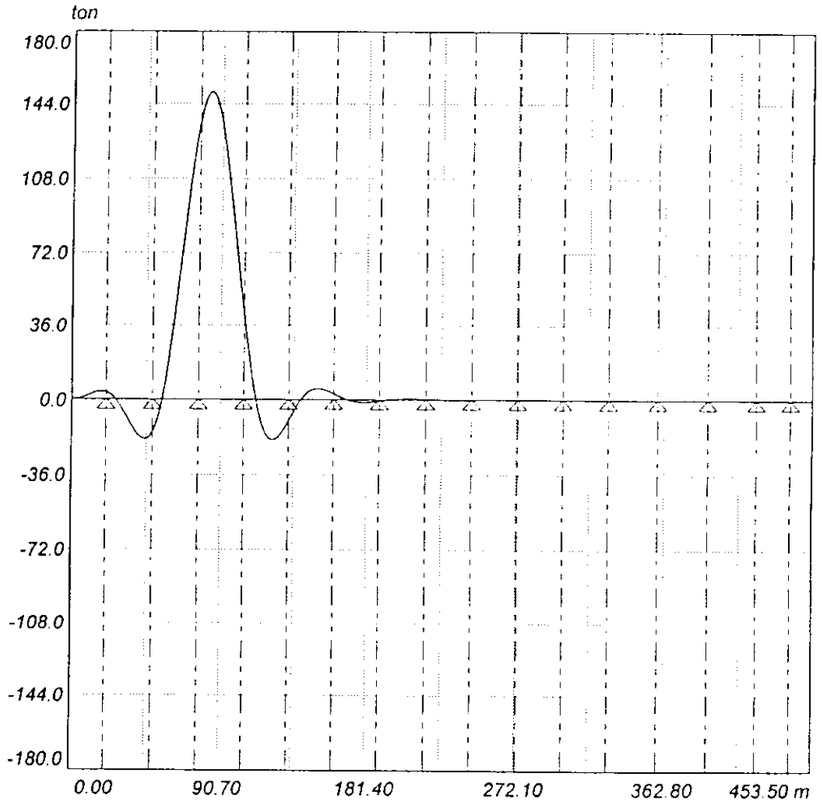


Viaducto 4
Reacción en apoyo 3 (línea de influencia)
3+3 Camiones 26t

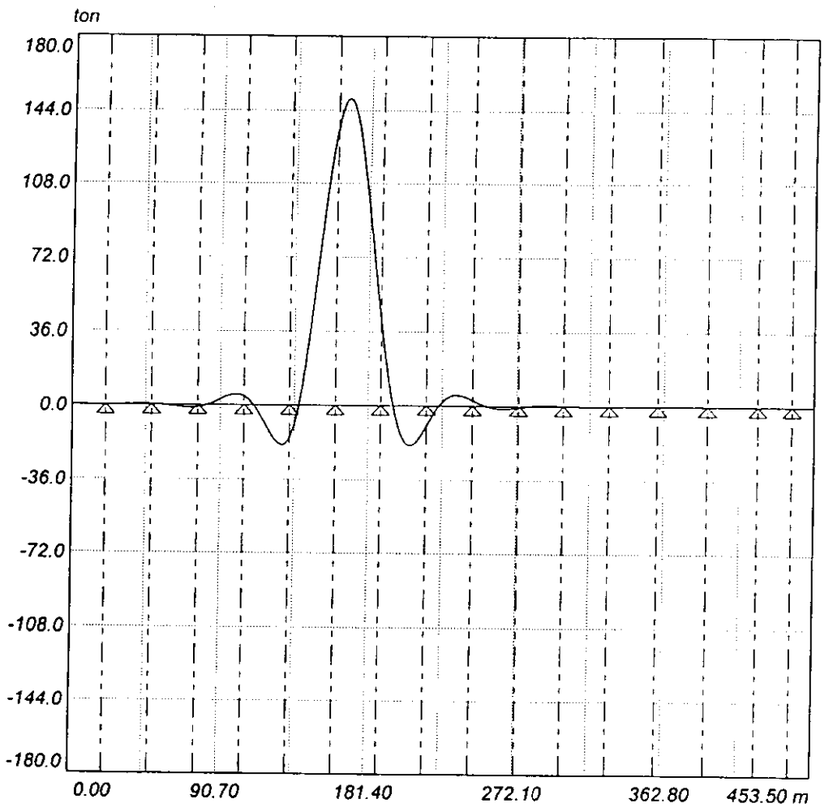


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Reacción en apoyo 4 (línea de influencia)
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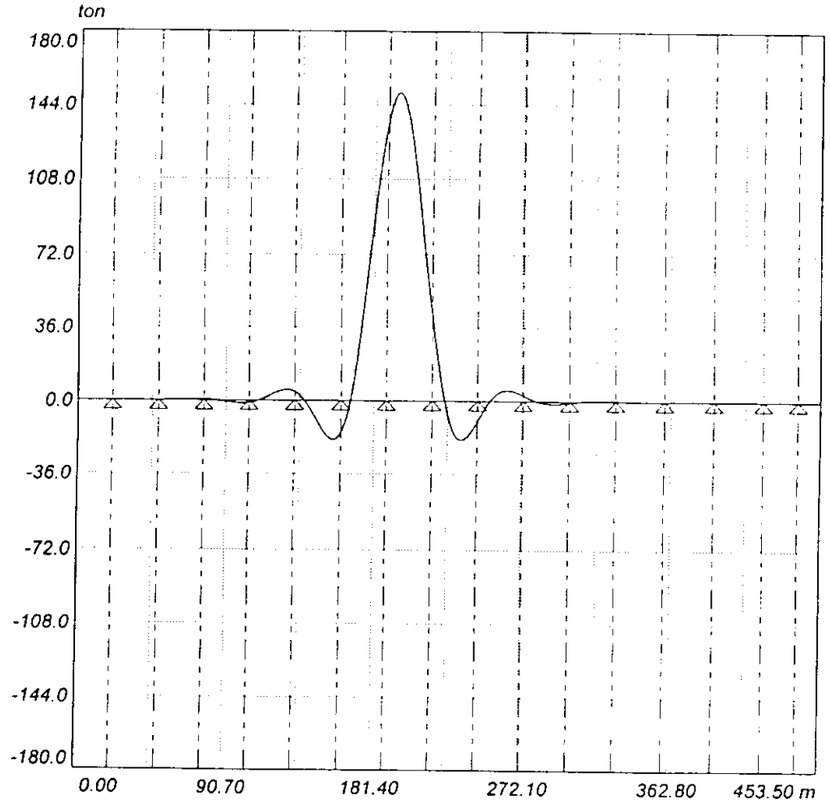


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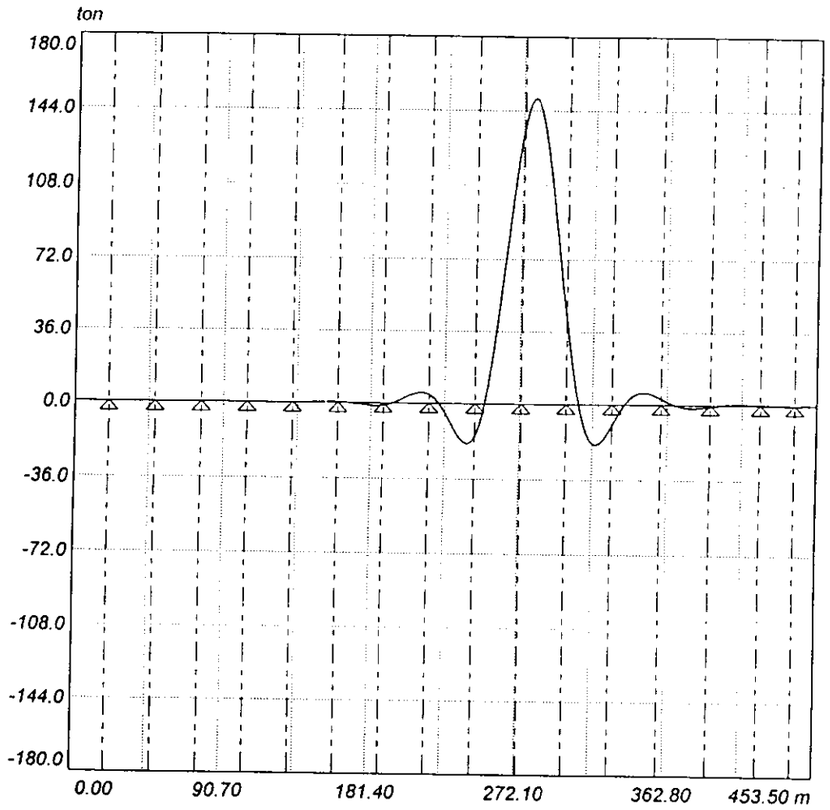


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Viaducto 4
Reacción en apoyo 8 (línea de influencia)
3+3 Camiones 26t

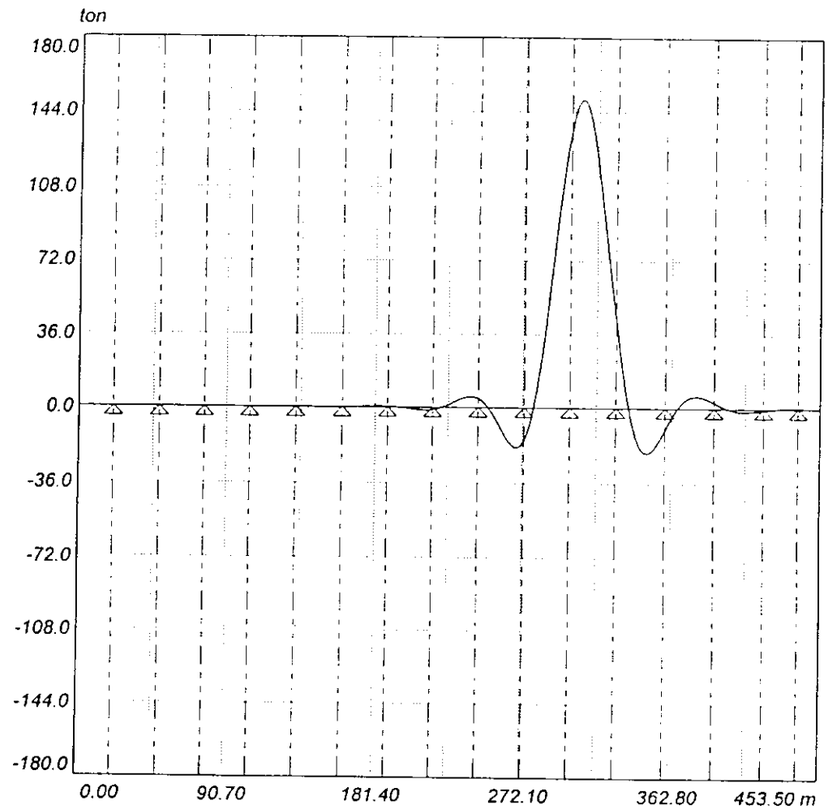


Viaducto 4
Reacción en apoyo 11 (línea de influencia)
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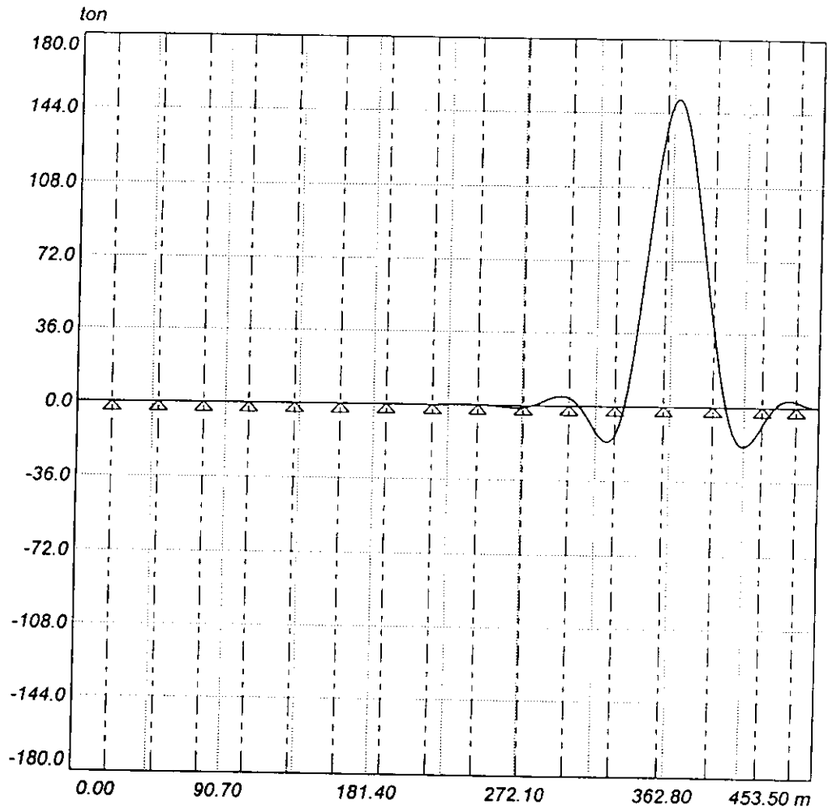


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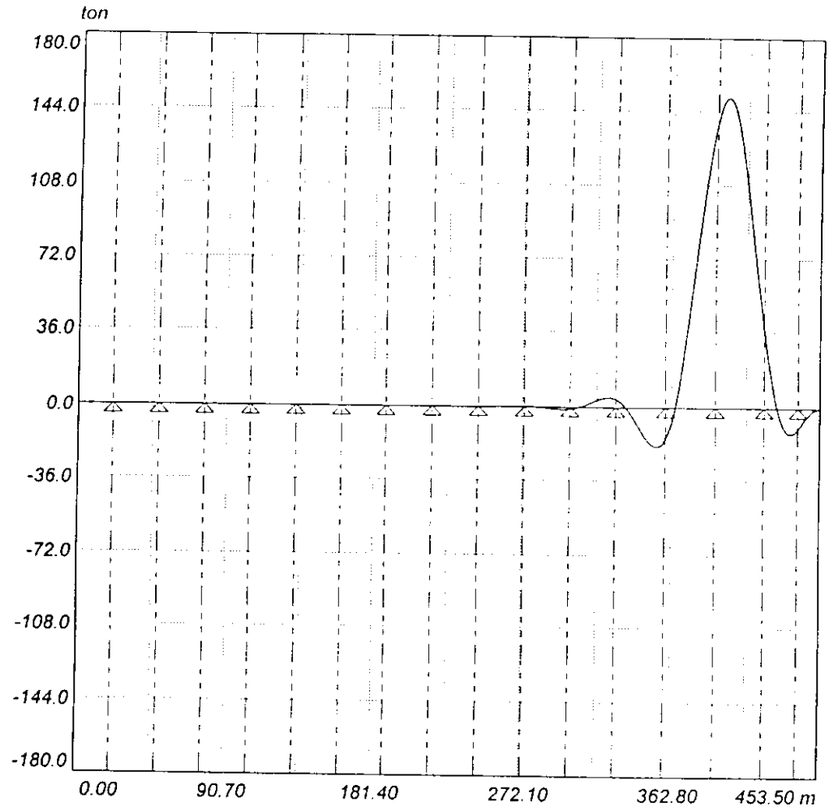
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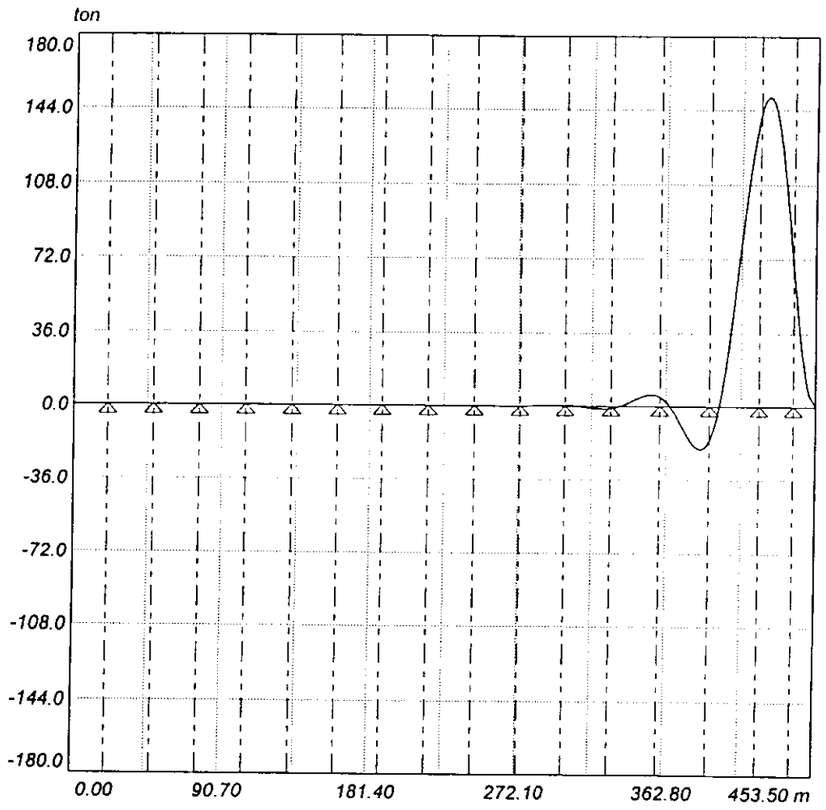
Viaducto 4
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3+3 Camiones 26t



Viaducto 4
Reacción en apoyo 15 (línea de influencia)
3+3 Camiones 26t

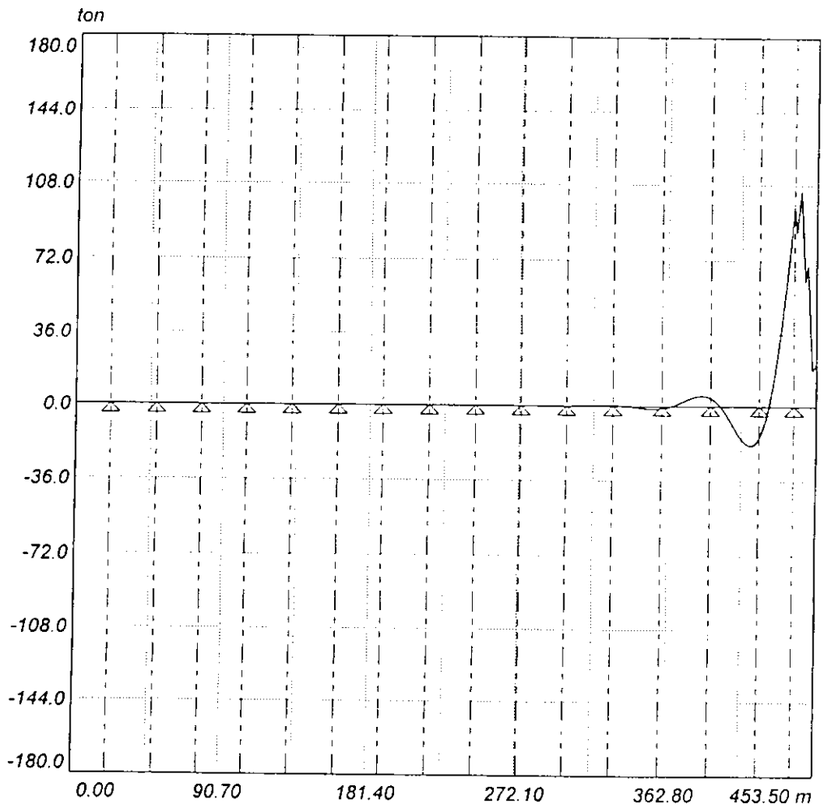


Viaducto 4
Reacción en apoyo 16 (línea de influencia)
3+3 Camiones 26t



Kinesia

Viaducto 4
Reacción en apoyo 17 (línea de influencia)
3+3 Camiones 26t



PROCESO CONSTRUCTIVO

La construcción del viaducto comienza con la ejecución de los pilotes, encamisando los 15 m superiores, constituidos por el aluvial, obteniéndose un rendimiento de unos 100 m de pilotes al día. Finalizados los pilotes se procede a la ejecución de los encepados. Para la excavación de los encepados de las pilas 5, 6, 12 y 13, se realizó una hinca de carriles para mejorar la estabilidad de la excavación, dado que las pilas 5 y 6 están junto el arroyo Anchuelo y las pilas 12 y 13 junto a la carretera. Con objeto a minimizar el riesgo sobre la carretera se ejecutó un desvío provisional de ésta.

Ejecutados los cimientos se procede a levantar los alzados tanto de estribos como de pilas, utilizando un juego de dos encofrados para el fuste de los mismos con acabado machiembrado en todos los paramentos vistos. Finalizada esta tarea se comienza con las labores necesarias para poder realizar el tablero que se ha hormigonado en 15 fases.

Para cada fase el proceso constructivo es el siguiente: ejecución de la cimentación de la cimbra, constituida por la paquete de zahorra artificial, de espesor entre 30 y 50 m compactada hasta obtener una carga de cimentación de 2,5 kg/cm^2, de modo que la cimbra no sufra ningún cimiento durante el proceso de hormigonado. Realizado este asiento de cimbra se procede al montaje de la misma, sobre la que se dispone el encofrado con todos sus elementos auxiliares.

Acabado éste se disponen los aligeramientos y las armaduras tanto activas como pasivas y se procede al hormigonado. A los 2 días se rompen probetas y con resistencias superiores a 250 kg/cm^2 se desencofran las alas de la sección y a los 3 días y siempre que se tenga la resistencia exigida se tesa la fase y se desencofra el fondo del tablero. A efectos de minimizar el tiempo de construcción del tablero se simultánean actividades de dos fases, de modo que disponiendo de dos módulos de cimbra y enconfrado se han realizado hormigones cada ocho días.

Finalizado el tablero se realiza el anclaje de estribo 1 y se ejecutan las tareas de remate consistentes en ejecutar la canaleta para comunicaciones, impermeabilizar el tablero y disponer la barandilla y ejecutar las juntas.

Resumen del control de calidad

RESUMEN DEL CONTROL DE CALIDAD

ÍNDICE

Cuadro resumen de ensayos de hormigón
Parte de tesado

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-4 P.P.I. Nº 20

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS 7 días		RESISTENCIAS 28 días		RESISTENCIAS 90 días		M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est	OBSERVACIONES
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
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121	177	05/08/99	Encepado P-2	03010402	H-250	6	Blanda	2	171	3	234	1		100	02/09/99	II AL 42,5 R	206	
122	178	05/08/99	Encepado P-2	03010402	H-250	6	Blanda	2	264	3	320	1		100	02/09/99	II AL 42,5 R	250	
122	179	05/08/99	Encepado P-2	03010402	H-250	8	Blanda	2	225	3	284	1		100	02/09/99	II AL 42,5 R	250	
137	198	11/08/99	Encepado P-3	03010402	H-250	7	Blanda	2	244	3	312	1		100	08/09/99	II AL 42,5 R	255	
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138	201	11/08/99	Encepado P-3	03010402	H-250	9	Blanda	2	252	3	278	1		100	08/09/99	II AL 42,5 R	245	
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FECHA FIRMA NOMBRE. Ana Mª Martín Herrrero

CARGO: Jefe de Laboratorio

[ ] LOTE DE f. est < 0,9 fck

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CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-4 P.P.I. Nº 20

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS 7 días		RESISTENCIAS 28 días		RESISTENCIAS 90 días		M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est	OBSERVACIONES
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES MEDIA	Nº	RES MEDIA	Nº	RES. MEDIA					
230	351	01/09/99	Encepado P-9	03010402	H-250	7	Blanda	2	243	3	326	1		100	29/09/99	I 42,5 S/SR	285	
230	352	01/09/99	Encepado P-9	03010402	H-250	8	Blanda	2	225	3	324	1		100	29/09/99	I 42,5 S/SR	285	
231	353	01/09/99	Encepado P-9	03010402	H-250	10	Fluida	2	210	3	299	1		100	29/09/99	I 42,5 S/SR	258	
231	354	01/09/99	Encepado P-9	03010402	H-250	10	Fluida	2	213	3	293	1		100	29/09/99	I 42,5 S/SR	258	
246	374	03/09/99	Encepado P-10	03010402	H-250	10	Fluida			3	299	1		100	01/10/99	I 42,5 S/SR	263	
246	375	03/09/99	Encepado P-10	03010402	H-250	10	Fluida			3	309	1		100	01/10/99	I 42,5 S/SR	263	
248	376	03/09/99	Encepado P-10	03010402	H-250	8	Blanda			3	313	1		100	01/10/99	I 42,5 S/SR	275	
248	377	03/09/99	Encepado P-10	03010402	H-250	7	Blanda			3	339	1		100	01/10/99	I 42,5 S/SR	275	
248	378	03/09/99	Encepado P-10	03010402	H-250	8	Blanda			3	379	1		100	01/10/99	I 42,5 S/SR	317	
248	381	03/09/99	Encepado P-10	03010402	H-250	10	Fluida			3	360	1		100	01/10/99	I 42,5 S/SR	317	
241	405	08/09/99	Encepado P-11	03010402	H-250	9	Blanda			3	296	1		100	06/10/99	I 42,5 S/SR	260	
266	406	08/09/99	Encepado P-11	03010402	H-250	8	Blanda			3	203	1		100	06/10/99	I 42,5 S/SR	162	
267	407	08/09/99	Encepado P-11	03010402	H-250	7	Blanda			3	304	1		100	06/10/99	I 42,5 S/SR	267	
266	408	08/09/99	Encepado P-11	03010402	H-250	9	Blanda			3	184	1		100	06/10/99	I 42,5 S/SR	162	
267	409	08/09/99	Encepado P-11	03010402	H-250	8	Blanda			3	303	1		100	06/10/99	I 42,5 S/SR	267	
308	462	17/09/99	Encepado P-6	03010402	H-250	8	Blanda			3	301			100	15/10/99	I 42,5 S/SR	265	
308	463	17/09/99	Encepado P-6	03010402	H-250	10	Fluida			3	335			100	15/10/99	I 42,5 S/SR	265	
309	464	17/09/99	Encepado P-6	03010402	H-250	8	Blanda			3	309			100	15/10/99	I 42,5 S/SR	272	
309	465	17/09/99	Encepado P-6	03010402	H-250	7	Blanda			3	322			100	15/10/99	I 42,5 S/SR	272	
326	487	23/09/99	Encepado E-1	03010402	H-250	6	Blanda			3	332			100	21/10/99	I 42,5 S/SR	253	
326	488	23/09/99	Encepado E-1	03010402	H-250	6	Blanda			3	288			100	21/10/99	I 42,5 S/SR	253	
327	489	23/09/99	Encepado E-1	03010402	H-250	7	Blanda			3	293			100	21/10/99	I 42,5 S/SR	258	
327	490	23/09/99	Encepado E-1	03010402	H-250	7	Blanda			3	299			100	21/10/99	I 42,5 S/SR	258	
328	491	23/09/99	Encepado E-1	03010402	H-250	7	Blanda			3	294			100	21/10/99	I 42,5 S/SR	236	
328	492	23/09/99	Encepado E-1	03010402	H-250	8	Blanda			3	268			100	21/10/99	I 42,5 S/SR	236	
329	493	23/09/99	Encepado E-1	03010402	H-250	6	Blanda			3	342			100	21/10/99	I 42,5 S/SR	301	
329	494	23/09/99	Encepado E-1	03010402	H-250	7	Blanda			3	350			100	21/10/99	I 42,5 S/SR	301	
330	495	23/09/99	Encepado E-1	03010402	H-250	7	Blanda			3	383			100	21/10/99	I 42,5 S/SR	299	
330	496	23/09/99	Encepado E-1	03010402	H-250	10	Fluida			3	340			100	21/10/99	I 42,5 S/SR	299	
331	497	23/09/99	Encepado E-1	03010402	H-250	5	Blanda			3	383			100	21/10/99	I 42,5 S/SR	283	
331	498	23/09/99	Encepado E-1	03010402	H-250	8	Blanda			3	322			100	21/10/99	I 42,5 S/SR	283	
332	499	23/09/99	Encepado E-1	03010402	H-250	8	Blanda			3	363			100	22/10/99	I 42,5 S/SR	319	

FECHA FIRMA NOMBRE. Ana Mª Martín Herrero

CARGO: Jefe de Laboratorio

[ ] LOTE DE f. est < 0,9 fck

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-4 P.P.I. Nº 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS 7 días		RESISTENCIAS 28 días		RESISTENCIAS 90 días		M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIONES
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
332	500	24/09/99	E-1 Encepado	03010402	H-250	9	Blanda			3	341			100	22/10/99	I 42,5 S/SR	319	
333	501	24/09/99	E-1 Encepado	03010402	H-250	8	Blanda			3	351			100	22/10/99	I 42,5 S/SR	268	
333	502	24/09/99	E-1 Encepado	03010402	H-250	9	Blanda			3	305			100	22/10/99	I 42,5 S/SR	268	
334	503	24/09/99	E-1 Encepado	03010402	H-250	7	Blanda			3	368			100	22/10/99	I 42,5 S/SR	285	
334	504	24/09/99	E-1 Encepado	03010402	H-250	6	Blanda			3	324			100	22/10/99	I 42,5 S/SR	285	
335	505	24/09/99	E-1 Encepado	03010402	H-250	7	Blanda			3	295			100	22/10/99	I 42,5 S/SR	260	
335	506	24/09/99	E-1 Encepado	03010402	H-250	8	Blanda			3	311			100	22/10/99	I 42,5 S/SR	260	
336	507	24/09/99	E-1 Encepado	03010402	H-250	7	Blanda			3	338			100	22/10/99	I 42,5 S/SR	297	
336	508	24/09/99	E-1 Encepado	03010402	H-250	7	Blanda			3	347			100	22/10/99	I 42,5 S/SR	297	
337	509	24/09/99	E-1 Encepado	03010402	H-250	7	Blanda			3	359			100	22/10/99	I 42,5 S/SR	316	
337	510	24/09/99	E-1 Encepado	03010402	H-250	6	Blanda			3	383			100	22/10/99	I 42,5 S/SR	316	
353	529	30/09/99	P-5 Encepado	03010402	H-250	8	Blanda			3	342			100	28/10/99	I 42,5 S/SR	234	
353	530	30/09/99	P-5 Encepado	03010402	H-250	7	Blanda			3	266			100	28/10/99	I 42,5 S/SR	234	
354	531	30/09/99	P-5 Encepado	03010402	H-250	10	Fluida			3	282			100	28/10/99	I 42,5 S/SR	209	
354	532	30/09/99	P-5 Encepado	03010402	H-250	10	Fluida			3	237			100	28/10/99	I 42,5 S/SR	209	
351	538	30/09/99	Pila 1,d	03010403	H-300	6	Blanda			3	400			16	28/10/99	II AL 42,5 R	297	
368	549	04/10/99	Pila 2,d	03010403	H-300	7	Blanda			3	381			16	02/11/99	II AL 42,5 R	346	
368	551	04/10/99	Pila 2,i	03010403	H-300	7	Blanda			3	346			16	02/11/99	II AL 42,5 R	346	
385	571	07/10/99	P-14 Encepado	03010402	H-250	10	Fluida			3	291			100	04/11/99	I 42,5 S/SR	231	
385	572	07/10/99	P-14 Encepado	03010402	H-250	8	Blanda			3	263			100	04/11/99	I 42,5 S/SR	231	
386	573	07/10/99	P-14 Encepado	03010402	H-250	7	Blanda			3	283			100	04/11/99	I 42,5 S/SR	249	
386	574	07/10/99	P-14 Encepado	03010402	H-250	10	Fluida			3	320			100	04/11/99	I 42,5 S/SR	249	
387	575	07/10/99	P-14 Encepado	03010402	H-250	6	Blanda			3	337			100	04/11/99	I 42,5 S/SR	246	
395	588	08/10/99	Pila 3,i	03010403	H-300	5	Blanda	2	324	3	365			16	05/11/99	II AL 42,5 R	349	
395	589	08/10/99	Pila 3,d	03010403	H-300	6	Blanda	2	299	3	349			16	05/11/99	II AL 42,5 R	349	
356	590	13/10/99	P-15 Encepado	03010402	H-250	7	Blanda			3	304			100	10/11/99	I 42,5 S/SR	264	
396	591	13/10/99	P-15 Encepado	03010402	H-250	8	Blanda			3	291			100	10/11/99	I 42,5 S/SR	256	
396	592	13/10/99	P-15 Encepado	03010402	H-250	6	Blanda			3	327			100	10/11/99	I 42,5 S/SR	256	
397	593	13/10/99	P-15 Encepado	03010402	H-250	7	Blanda			3	304			100	10/11/99	I 42,5 S/SR	268	
397	594	13/10/99	P-15 Encepado	03010402	H-250	8	Blanda			3	337			100	10/11/99	I 42,5 S/SR	268	
404	601	13/10/99	Pila 4,i	03010403	H-300	10	Fluida	2	250	3	343			16	10/11/99	II AL 42,5 R	343	
404	602	13/10/99	Pila 4,d	03010403	H-300	6	Fluida	2	362	3	385			16	10/11/99	II AL 42,5 R	343	

FECHA FIRMA NOMBRE: Ana Mª Martín Herrero

CARGO: Jefe de Laboratorio

LOTE DE f est < 0,9 fck

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-4 P.P.I. Nº 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS 7 días		RESISTENCIAS 28 días		RESISTENCIAS 90 días		M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f est	OBSERVACIÓN
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
413	614	18/10/99	E-2 Encepado	03010402	H-250	8	Blanda			3	359			100	15/11/99	I 42,5 S/SR	316	
413	615	18/10/99	E-2 Encepado	03010402	H-250	8	Blanda			3	381			100	15/11/99	I 42,5 S/SR	316	
414	616	18/10/99	E-2 Encepado	03010402	H-250	10	Fluida			3	352			100	15/11/99	I 42,5 S/SR	297	
414	617	18/10/99	E-2 Encepado	03010402	H-250	10	Fluida			3	337			100	15/11/99	I 42,5 S/SR	297	
415	619	18/10/99	E-2 Encepado	03010402	H-250	9	Blanda			3	321			100	15/11/99	I 42,5 S/SR	282	
415	620	18/10/99	E-2 Encepado	03010402	H-250	7	Blanda			3	377			100	15/11/99	I 42,5 S/SR	282	
416	624	18/10/99	E-2 Encepado	03010402	H-250	7	Blanda			3	368			100	15/11/99	I 42,5 S/SR	320	
422	629	19/10/99	P-13 Encepado	03010402	H-250	7	Blanda			3	323			100	16/11/99	I 42,5 S/SR	266	
422	630	19/10/99	P-13 Encepado	03010402	H-250	7	Blanda			3	302			100	16/11/99	I 42,5 S/SR	266	
423	631	19/10/99	P-13 Encepado	03010402	H-250	8	Blanda			3	309			100	16/11/99	I 42,5 S/SR	272	
423	632	19/10/99	P-13 Encepado	03010402	H-250	8	Blanda			3	323			100	16/11/99	I 42,5 S/SR	272	
424	633	19/10/99	P-13 Encepado	03010402	H-250	8	Blanda			3	333			100	18/11/99	I 42,5 S/SR	293	
428	636	21/10/99	Pila 9,d	03010403	H-300	8	Blanda	2	322	3	367			16	18/11/99	II AL 42,5 R	337	
428	637	21/10/99	Pila 9,i	03010403	H-300	9	Blanda	2	358	3	337			16	18/11/99	II AL 42,5 R	337	
433	647	25/10/99	E-2 Zap aletas	03010402	H-250	7	Blanda			3	288			100	22/11/99	I 42,5 S/SR	242	
433	648	25/10/99	E-2 Zap aletas	03010402	H-250	5	Blanda			3	275			100	22/11/99	I 42,5 S/SR	242	
434	649	25/10/99	E-2 Zap aletas	03010402	H-250	7	Blanda			3	319			86	22/11/99	I 42,5 S/SR	247	
434	650	25/10/99	E-2 Zap aletas	03010402	H-250	7	Blanda			3	281			86	22/11/99	I 42,5 S/SR	247	
435	651	25/10/99	Pila 10,i	03010403	H-300	6	Blanda	2	340	3	386			8	22/11/99	II AL 42,5 R	386	
443	665	28/10/99	Pila 11,d	03010403	H-300	6	Blanda			3	370			16	25/11/99	II AL 42,5 R	366	
443	666	28/10/99	Pila 11,i	03010403	H-300	6	Blanda			3	366			16	25/11/99	II AL 42,5 R	366	
453	682	03/11/99	Pila 13,d	03010403	H-300	9	Blanda			3	317			8	01/12/99	II AL 42,5 R	317	
456	686	04/11/99	E-1 Aleta 1	03010403	H-250	8	Blanda			3	275			100	02/12/99	II AL 42,5 R	242	
456	687	04/11/99	E-1 Alzado	03010403	H-250	6	Blanda			3	298			100	02/12/99	II AL 42,5 R	242	
457	688	04/11/99	E-1 Alzado	03010403	H-250	7	Blanda			3	284			100	02/12/99	II AL 42,5 R	250	
457	689	04/11/99	E-1 Alzado	03010403	H-250	7	Blanda			3	292			100	02/12/99	II AL 42,5 R	250	
458	690	04/11/99	E-1 Alzado	03010403	H-250	6	Blanda			3	285			100	02/12/99	II AL 42,5 R	251	
458	692	04/11/99	E-1 Alzado	03010403	H-250	6	Blanda			3	310			100	02/12/99	II AL 42,5 R	251	
471	710	12/11/99	Pila 12,i	03010403	H-300	9	Blanda			3	403			8	10/12/99	II AL 42,5 R	403	
475	715	17/11/99	Pila 14,d	03010403	H-300	5	Blanda			3	396			16	14/12/99	II AL 42,5 R	323	
475	716	17/11/99	Pila 14,i	03010403	H-300	9	Blanda			3	323			16	14/12/99	II AL 42,5 R	323	
476	717	17/11/99	E-1 Alzado	03010403	H-250	7	Blanda			3	294			100	14/12/99	II AL 42,5 R	242	

FECHA FIRMA NOMBRE Ana Mª Martín Herrero

CARGO Jefe de Laboratorio

LOTE DE f est < 0,9 fck

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-4 P P I Nº 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f est.	OBSERVACIÓN
										28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	DIA	RES MEDIA	Nº	RES MEDIA	Nº	RES. MEDIA					
476	719	17/11/99	E-1 Alzado	03010403	H-250	6	Blanda			3	275			100	14/12/99	I 42,5 S/SR	242	
479	721	19/11/99	Pila 15,d	03010403	H-300	6	Blanda			3	406			8	16/12/99	II AL 42,5 R	406	
487	737	25/11/99	Pila 4,i	03010403	H-300	6	Blanda			3	415			8	23/12/99	II AL 42,5 R	415	
489	739	29/11/99	Pila 6,d	03010403	H-300	8	Blanda			3	388			8	27/12/99	II AL 42,5 R	388	
493	745	01/12/99	Pila 5,d	03010403	H-300	9	Blanda			3	425			8	29/12/99	II AL 42,5 R	425	
495	749	03/01/99	Pila 5,i	03010403	H-300	10	Fluida			3	381			8	29/12/99	II AL 42,5 R	381	
513	783	22/12/99	E-2 Alzado 1ª f	03010403	H-250	7	Blanda			3	293			100	19/01/00	II AL 42,5 R	198	
513	784	22/12/99	E-2 Alzado 1ª f	03010403	H-250	8	Blanda			3	225			100	19/01/00	II AL 42,5 R	198	
514	785	22/12/99	E-2 Alzado 1ª f	03010403	H-250	9	Blanda			3	332			100	19/01/00	II AL 42,5 R	241	
579	904	27/01/00	E-2 Alzado 2ª f	03010403	H-250	10	Fluida	4	220	3	330			100	24/02/00	II AL 42,5 R	282	
729	1158	14/03/00	E-2/ Aleta,d	03010403	H-250	8	Blanda			3	302			100	19/04/00	I 42,5 S/SR	239	

FECHA FIRMA NOMBRE Ana Mª Martín Herrero

CARGO Jefe de Laboratorio

LOTE DE f est < 0,9 fck

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO: V-4 Pilotes P.P.I. Nº 16

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA* f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. EST	Nº	RES. MEDIA					
20	38	24/06/99	P-1 Pilote 6	03010401	H-200	14	Fluida	2	176		235			50	01/07/99	I 42,5 R/SR	211	*Resistencia estimada a 28 días
21	40	25/06/99	P-1 Pilote 3	03010401	H-200	15	Fluida	2	138		184			50	02/07/99	I 42,5 R/SR	166	
22	42	28/06/99	P-1 Pilote 2	03010401	H-200	13	Fluida	2	185		247			50	05/07/99	I 42,5 R/SR	222	
23	43	29/06/99	P-1 Pilote 5	03010401	H-200	12	Fluida	2	172		229			50	06/07/99	I 42,5 R/SR	206	
25	45	29/06/99	P-1 Pilote 1	03010401	H-200	14	Fluida	2	193		257			50	06/07/99	I 42,5 R/SR	232	
26	46	30/06/99	P-2 Pilote 1	03010401	H-200	15	Fluida	2	153		204			50	07/07/99	I 42,5 R/SR	184	
27	48	30/06/99	P-2 Pilote 4	03010401	H-200	10	Fluida	2	219		292			50	07/07/99	I 42,5 R/SR	263	
28	49	01/07/99	P-1 Pilote 4	03010401	H-200	13	Fluida	2	159		212			50	08/07/99	I 42,5 R/SR	191	
30	52	01/07/99	P-2 Pilote 5	03010401	H-200	10	Fluida	2	204		272			50	08/07/99	I 42,5 R/SR	245	
31	53	02/07/99	P-3 Pilote 3	03010401	H-200	13	Fluida	2	176		235			50	09/07/99	I 42,5 R/SR	211	
32	54	02/07/99	P-3 Pilote 6	03010401	H-200	10	Fluida	2	205		273			50	09/07/99	I 42,5 R/SR	246	
33	56	05/07/99	P-2 Pilote 6	03010401	H-200	13	Fluida	2	216		288			50	12/07/99	I 42,5 R/SR	259	
36	59	05/07/99	P-2 Pilote 3	03010401	H-200	15	Fluida	2	202		269			50	12/07/99	I 42,5 R/SR	242	
37	60	06/07/99	P-3 Pilote 1	03010401	H-200	12	Fluida	2	174		232			50	13/07/99	I 42,5 R/SR	209	
38	61	06/07/99	P-2 Pilote 4	03010401	H-200	14	Fluida	2	210		280			50	13/07/99	I 42,5 R/SR	252	
39	62	06/07/99	P-3 Pilote 5	03010401	H-200	15	Fluida	2	201		268			50	13/07/99	I 42,5 R/SR	241	
40	64	07/07/99	P-4 Pilote 1	03010401	H-200	15	Fluida	2	170		227			50	14/07/99	I 42,5 R/SR	204	
41	65	07/07/99	P-4 Pilote 4	03010401	H-200	15	Fluida	2	194		259			50	14/07/99	I 42,5 R/SR	233	
42	66	08/07/99	P-4 Pilote 5	03010401	H-200	15	Fluida	2	161		215			50	15/07/99	I 42,5 R/SR	193	
43	67	08/07/99	P-3 Pilote 2	03010401	H-200	14	Fluida	2	171		228			50	15/07/99	I 42,5 R/SR	205	
44	68	08/07/99	P-2 Pilote 2	03010401	H-200	15	Fluida	2	204		272			50	15/07/99	I 42,5 R/SR	245	
45	69	09/07/99	P-5 Pilote 5	03010401	H-200	10	Fluida	2	188		251			50	16/07/99	I 42,5 R/SR	226	
46	70	09/07/99	P-5 Pilote 4	03010401	H-200	11	Fluida	2	198		264			50	16/07/99	I 42,5 R/SR	238	
47	71	12/07/99	P-5 Pilote 1	03010401	H-200	15	Fluida	2	183		244			50	19/07/99	I 42,5 R/SR	220	
49	74	12/07/99	P-4 Pilote 3	03010401	H-200	11	Fluida	2	171		228			50	19/07/99	I 42,5 R/SR	205	
50	75	12/07/99	P-4 Pilote 6	03010401	H-200	10	Fluida	2	200		267			50	19/07/99	I 42,5 R/SR	240	
51	76	13/07/99	P-5 Pilote 2	03010401	H-200	15	Fluida	2	152		203			50	20/07/99	I 42,5 R/SR	182	
52	78	13/07/99	P-5 Pilote 3	03010401	H-200	15	Fluida	2	163		217			50	20/07/99	I 42,5 R/SR	196	
53	79	13/07/99	P-4 Pilote 2	03010401	H-200	15	Fluida	2	170		227			50	20/07/99	I 42,5 R/SR	204	
55	80	14/07/99	P-6 Pilote 6	03010401	H-200	15	Fluida	2	170		227			50	21/07/99	I 42,5 R/SR	204	
56	81	14/07/99	P-6 Pilote2	03010401	H-200	12	Fluida	2	185		247			50	21/07/99	I 42,5 R/SR	222	
58	84	14/07/99	P-6 Pilote 3	03010401	H-200	14	Fluida	2	180		240			50	21/07/99	I 42,5 R/SR	216	

FECHA: FIRMA: NOMBRE: Ana Mª Martín Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO: V-4 Pilotes

P.P.I. Nº 16

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA* f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. EST	Nº	RES. MEDIA					
59	85	15/07/99	P-7 Pilote 6	03010401	H-200	15	Fluida	2	183		244			50	22/07/99	I 42,5 R/SR	220	*Resistencia estimada a 28 días
60	87	15/07/99	P-7 Pilote 3	03010401	H-200	11	Fluida	2	204		272			50	22/07/99	I 42,5 R/SR	245	
61	88	15/07/99	P-7 Pilote2	03010401	H-200	15	Fluida	2	177		236			50	22/07/99	I 42,5 R/SR	212	
62	89	16/07/99	P-6 Pilote 4	03010401	H-200	12	Fluida	2	159		212			50	23/07/99	I 42,5 R/SR	191	
63	90	16/07/99	P-6 Pilote 1	03010401	H-200	12	Fluida	2	186		248			50	23/07/99	I 42,5 R/SR	223	
64	93	16/07/99	P-6 Pilote 5	03010401	H-200	15	Fluida	2	175		233			50	23/07/99	I 42,5 R/SR	210	
67	96	19/07/99	P-7 Pilote 5	03010401	H-200	11	Fluida	2	246		328			50	26/07/99	I 42,5 R/SR	295	
68	97	19/07/99	P-7 Pilote 4	03010401	H-200	13	Fluida	2	216		288			50	26/07/99	I 42,5 R/SR	259	
69	98	19/07/99	P-7 Pilote 1	03010401	H-200	14	Fluida	2	208		277			50	26/07/99	I 42,5 R/SR	250	
72	112	20/07/99	P-8 Pilote 4	03010401	H-200	14	Fluida	2	220		293			50	27/07/99	I 42,5 R/SR	264	
73	117	20/07/99	P-8 Pilote 5	03010401	H-200	14	Fluida	2	176		235			50	27/07/99	I 42,5 R/SR	211	
76	125	21/07/99	P-8 Pilote 1	03010401	H-200	15	Fluida	2	156		208			50	28/07/99	I 42,5 R/SR	187	
79	127	22/07/99	P-9 Pilote 4	03010401	H-200	13	Fluida	2	191		255			50	29/07/99	I 42,5 R/SR	229	
80	129	22/07/99	P-9 Pilote 5	03010401	H-200	15	Fluida	2	150		200			50	29/07/99	I 42,5 R/SR	180	
81	130	22/07/99	P-8 Pilote 6	03010401	H-200	15	Fluida	2	202		269			50	29/07/99	I 42,5 R/SR	242	
82	132	23/07/99	P-8 Pilote 3	03010401	H-200	15	Fluida	2	184		245			50	30/07/99	I 42,5 R/SR	221	
84	134	26/07/99	P-9 Pilote 6	03010401	H-200	13	Fluida	2	195		260			50	02/08/99	I 42,5 R/SR	234	
85	135	26/07/99	P-9 Pilote 6	03010401	H-200	14	Fluida	2	219		292			50	02/08/99	I 42,5 R/SR	263	
86	164	02/08/99	E-1 Pilote 18	03010401	H-200	10	Fluida	2	231		308			50	09/08/99	I 42,5 R/SR	277	
87	136	26/07/99	P-10 Pilote 5	03010401	H-200	11	Fluida	2	267		356			50	02/08/99	I 42,5 R/SR	320	
88	138	26/07/99	P-10 Pilote 4	03010401	H-200	13	Fluida	2	228		304			50	02/08/99	I 42,5 R/SR	274	
91	139	27/07/99	P-9 Pilote 2	03010401	H-200	15	Fluida	2	217		289			50	03/08/99	I 42,5 R/SR	260	
93	142	27/07/99	P-9 Pilote 3	03010401	H-200	13	Fluida	2	247		329			50	03/08/99	I 42,5 R/SR	296	
95	144	28/07/99	P-10 Pilote 3	03010401	H-200	7	Blanda	2	181		241			50	04/08/99	I 42,5 R/SR	212	
96	146	28/07/99	P-11 Pilote 5	03010401	H-200	13	Fluida	2	227		303			50	04/08/99	I 42,5 R/SR	272	
98	148	28/07/99	P-10 Pilote 6	03010401	H-200	15	Fluida	2	191		255			50	04/08/99	I 42,5 R/SR	224	
99	149	29/07/99	P-11 Pilote 4	03010401	H-200	10	Fluida	2	182		243			50	05/08/99	I 42,5 R/SR	214	
101	151	29/07/99	P-11 Pilote 1	03010401	H-200	11	Fluida	2	247		329			50	05/08/99	I 42,5 R/SR	290	
102	154	29/07/99	P-10 Pilote 1	03010401	H-200	15	Fluida	2	202		269			50	05/08/99	I 42,5 R/SR	237	
105	157	30/07/99	E-1 Pilote 26	03010401	H-200	14	Fluida	2	268		357			50	06/08/99	I 42,5 R/SR	314	
107	159	30/07/99	E-1 Pilote 28	03010401	H-200	15	Fluida	2	213		284			50	06/08/99	I 42,5 R/SR	250	
109	162	02/08/99	E-1 Pilote 30	03010401	H-200	12	Fluida	2	288		384			50	09/08/99	I 42,5 R/SR	338	
110	163	02/08/99	E-1 Pilote 18	03010401	H-200	12	Fluida	2	251		335			50	09/08/99	I 42,5 R/SR	295	

FECHA: FIRMA: NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-4 Pilotes

P.P.I. Nº 16

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES ESTIM	Nº	RES. MEDIA					
112	166	03/08/99	E-1 Pilote 6	03010401	H-200	15	Fluida	2	119		159			50	10/08/99	I 42,5 S/SR	140	
113	167	03/08/99	E-1 Pilote 6	03010401	H-200	12	Fluida	2	232		309			50	10/08/99	I 42,5 S/SR	272	
117	171	04/08/99	E-1 Pilote 27	03010401	H-200	15	Fluida	2	146		195			50	11/08/99	I 42,5 S/SR	171	
119	174	04/08/99	E-1 Pilote 24	03010401	H-200	13	Fluida	2	315		420			50	11/08/99	I 42,5 S/SR	370	
123	180	05/08/99	E-1 Pilote 29	03010401	H-200	16	Fluida	2	255		340			50	12/08/99	I 42,5 S/SR	299	
127	185	06/08/99	P-11 Pilote 2	03010401	H-200	13	Fluida	2	218		291			50	13/08/99	I 42,5 S/SR	256	
128	186	09/08/99	P-11 Pilote 3	03010401	H-200	15	Fluida	2	217		289			50	16/08/99	I 42,5 S/SR	255	
130	188	09/08/99	P-12 Pilote 5	03010401	H-200	15	Fluida	2	227		303			50	16/08/99	I 42,5 S/SR	266	
132	190	10/08/99	P-12 Pilote 4	03010401	H-200	14	Fluida	2	189		252			50	17/08/99	I 42,5 S/SR	222	
136	197	10/08/99	P-14 Pilote 4	03010401	H-200	15	Fluida	2	196		261			50	17/08/99	I 42,5 S/SR	230	
140	203	12/08/99	P-12 Pilote 2	03010401	H-200	15	Fluida	2	178		237			50	19/08/99	I 42,5 S/SR	209	
144	208	13/08/99	P-12 Pilote 6	03010401	H-200	14	Fluida	2	206		275			50	20/08/99	I 42,5 S/SR	242	
148	214	17/08/99	P-5 Pilote 6	03010401	H-200	14	Fluida	2	253		337			50	24/08/99	I 42,5 S/SR	297	
149	227	18/08/99	E-1 Pilote 19	03010401	H-200	15	Fluida	2	255		340			50	25/08/99	I 42,5 S/SR	299	
153	231	18/08/99	E-1 Pilote 23	03010401	H-200	18	Fluida	2	244		325			50	25/08/99	I 42,5 S/SR	286	
154	232	18/08/99	E-1 Pilote 23	03010401	H-200	17	Fluida	2	254		339			50	25/08/99	I 42,5 S/SR	298	
157	238	19/08/99	E-1 Pilote 21	03010401	H-200	14	Fluida	2	211		281			50	26/08/99	I 42,5 S/SR	248	
158	239	19/08/99	E-1 Pilote 21	03010401	H-200	15	Fluida	2	206		275			50	26/08/99	I 42,5 S/SR	242	
159	240	19/08/99	E-1 Pilote 21	03010401	H-200	15	Fluida	2	213		284			50	26/08/99	I 42,5 S/SR	250	
163	245	19/08/99	E-1 Pilote 14	03010401	H-200	15	Fluida	2	170		227			50	26/08/99	I 42,5 S/SR	199	
168	251	19/08/99	E-1 Pilote 11	03010401	H-200	13	Fluida	2	207		276			50	26/08/99	I 42,5 S/SR	243	
169	252	19/08/99	E-1 Pilote 11	03010401	H-200	10	Fluida	2	197		263			50	26/08/99	I 42,5 S/SR	231	
170	253	19/08/99	E-1 Pilote 11	03010401	H-200	15	Fluida	2	210		280			50	26/08/99	I 42,5 S/SR	246	
175	261	20/08/99	E-1 Pilote 22	03010401	H-200	12	Fluida	2	205		273			50	27/08/99	I 42,5 S/SR	241	
179	265	23/08/99	E-1 Pilote 17	03010401	H-200	15	Fluida	2	166		221			50	30/08/99	I 42,5 S/SR	195	
182	270	23/08/99	E-1 Pilote 13	03010401	H-200	15	Fluida	2	196		261			50	30/08/99	I 42,5 S/SR	230	
183	271	23/08/99	E-1 Pilote 13	03010401	H-200	15	Fluida	2	214		285			50	30/08/99	I 42,5 S/SR	251	
186	276	24/08/99	E-1 Pilote 20	03010401	H-200	14	Fluida	2	195		260			50	31/08/99	I 42,5 S/SR	229	
192	285	24/08/99	E-1 Pilote 16	03010401	H-200	15	Fluida	2	217		289			50	31/08/99	I 42,5 S/SR	255	
195	289	24/08/99	E-1 Pilote 5	03010401	H-200	14	Fluida	2	198		264			50	31/08/99	I 42,5 S/SR	232	
198	295	25/08/99	E-1 Pilote 7	03010401	H-200	15	Fluida	2	197		263			50	01/09/99	I 42,5 S/SR	231	
199	296	25/08/99	E-1 Pilote 7	03010401	H-200	15	Fluida	2	197		263			50	01/09/99	I 42,5 S/SR	231	

FECHA: FIRMA: NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-4 Pilotes **P.P.I. Nº** 16

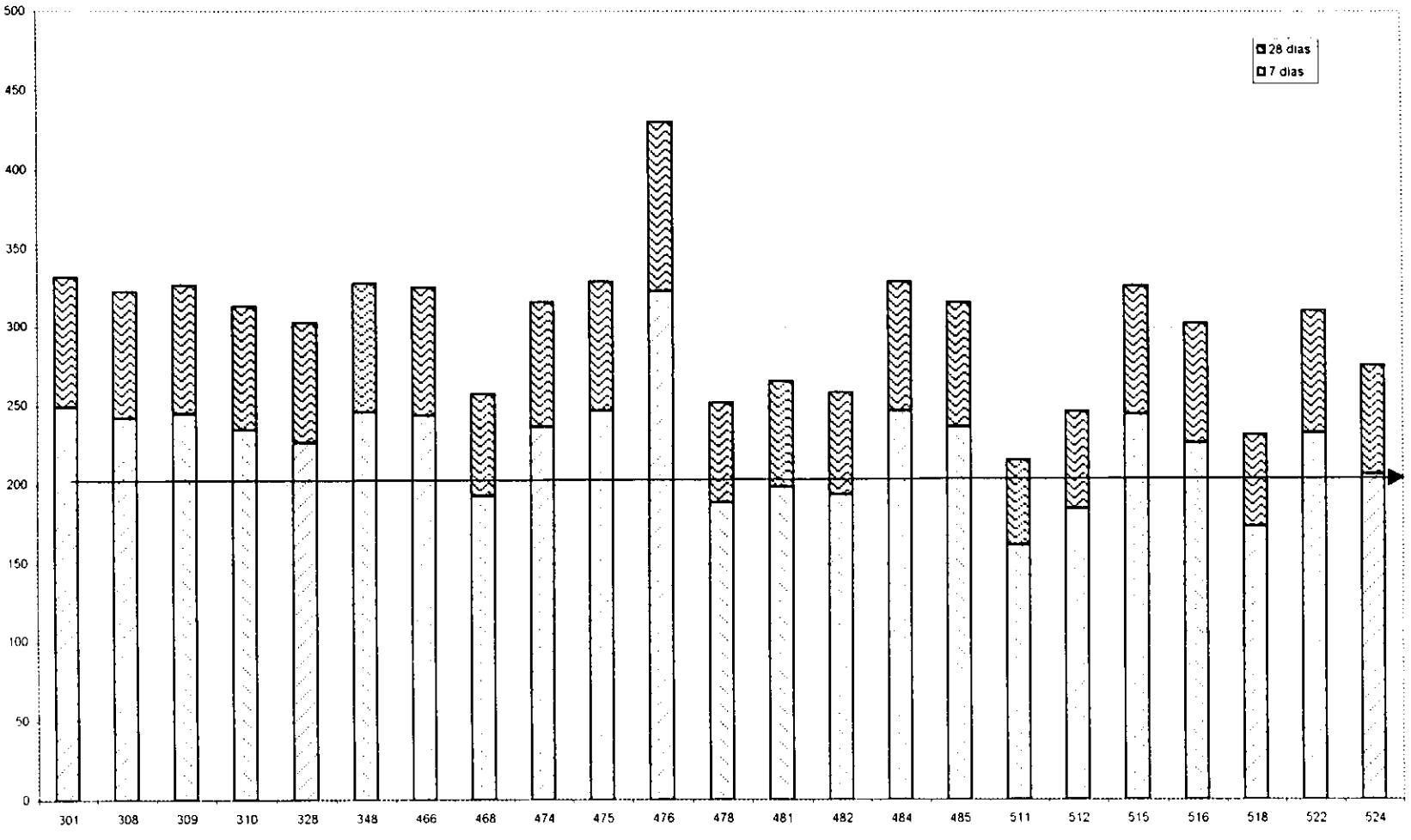
IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES ESTIM	Nº	RES. MEDIA					
202	301	26/08/99	E-1 Pilote 2	03010401	H-200	14	Fluida	2	249		332			50	01/09/99	I 42,5 S/SR	292	
206	308	26/08/99	E-1 Pilote 8	03010401	H-200	15	Fluida	2	242		323			50	01/09/99	I 42,5 S/SR	284	
207	309	26/08/99	E-1 Pilote 8	03010401	H-200	15	Fluida	2	245		327			50	02/09/99	I 42,5 S/SR	287	
208	310	26/08/99	E-1 Pilote 8	03010401	H-200	15	Fluida	2	235		313			50	02/09/99	I 42,5 S/SR	276	
217	328	30/08/99	E-1 Pilote 9	03010401	H-200	15	Fluida	2	227		303			50	06/09/99	I 42,5 S/SR	266	
228	348	31/08/99	E-1 Pilote 3	03010401	H-200	10	Fluida	2	246		328			50	07/09/99	I 42,5 S/SR	289	
310	466	17/09/99	P-15 Pilote 4	03010401	H-200	15	Fluida	2	244		325			50	24/09/99	I 42,5 S/SR	286	
312	468	17/09/99	P-15 Pilote	03010401	H-200	15	Fluida	2	193		257			50	24/09/99	I 42,5 S/SR	226	
315	474	20/09/99	P-15 Pilote 1	03010401	H-200	15	Fluida	2	237		316			50	27/09/99	I 42,5 S/SR	278	
316	475	20/09/99	P-14 Pilote 2	03010401	H-200	15	Fluida	2	247		329			50	27/09/99	I 42,5 S/SR	290	
317	476	21/09/99	P-15 Pilote 2	03010401	H-200	13	Fluida	2	323		431			50	28/09/99	I 42,5 S/SR	379	
318	478	21/09/99	P-15 Pilote 6	03010401	H-200	12	Fluida	2	189		252			50	28/09/99	I 42,5 S/SR	222	
320	481	22/09/99	E-2 Pilote 2	03010401	H-200	15	Fluida	2	199		265			50	29/09/99	I 42,5 S/SR	233	
321	482	22/09/99	P-15 Pilote 15	03010401	H-200	15	Fluida	2	194		259			50	29/09/99	I 42,5 S/SR	228	
323	484	22/09/99	E-2 Pilote 3	03010401	H-200	15	Fluida	2	247		329			50	29/09/99	I 42,5 S/SR	290	
324	485	23/09/99	E-2 Pilote 5	03010401	H-200	15	Fluida	2	237		316			50	30/09/99	I 42,5 S/SR	278	
338	511	24/09/99	E-2 Pilote 9	03010401	H-200	15	Fluida	2	162		216			50	01/10/99	I 42,5 S/SR	190	
339	512	24/09/99	E-2 Pilote 6	3010401	H-200	15	Fluida	2	185		247			50	01/10/99	I 42,5 S/SR	217	
341	515	27/09/99	P-13 Pilote 2	03010401	H-200	15	Fluida	2	245		327			50	04/10/99	I 42,5 S/SR	287	
342	516	27/09/99	P-13 Pilote 6	03010401	H-200	15	Fluida	2	227		303			50	04/10/99	I 42,5 S/SR	266	
344	518	28/09/99	P-13 Pilote 1	03010401	H-200	15	Fluida	2	174		232			50	05/10/99	I 42,5 S/SR	204	
347	522	28/09/99	P-13 Pilote 2	03010401	H-200	15	Fluida	2	233		311			50	05/10/99	I 42,5 S/SR	273	
349	524	28/09/99	P-13 Pilote 1	03010401	H-200	15	Fluida	2	207		276			50	05/10/99	I 42,5 S/SR	243	

FECHA: FIRMA: NOMBRE: Ana Mª Martin Herrrero

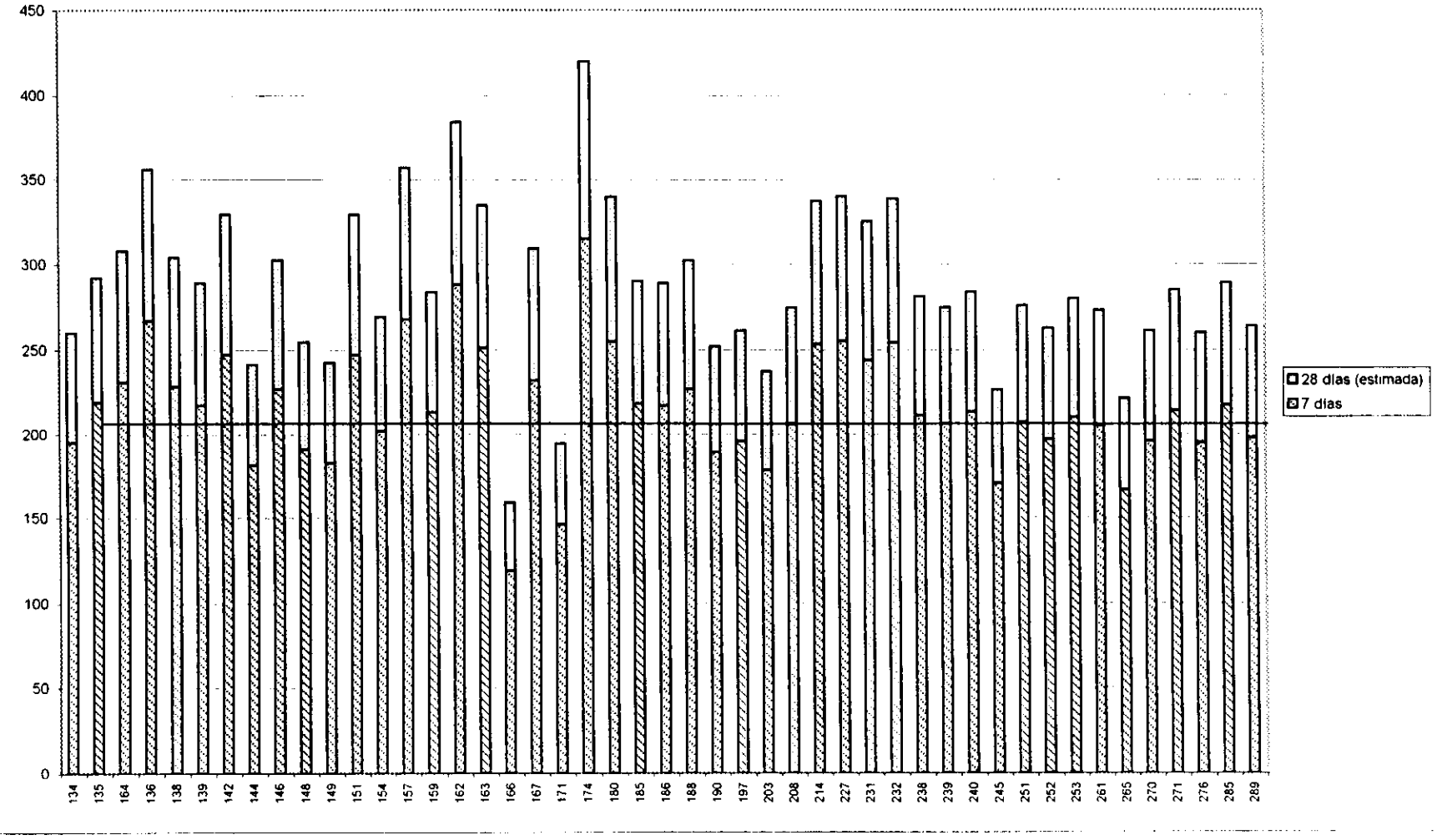
CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

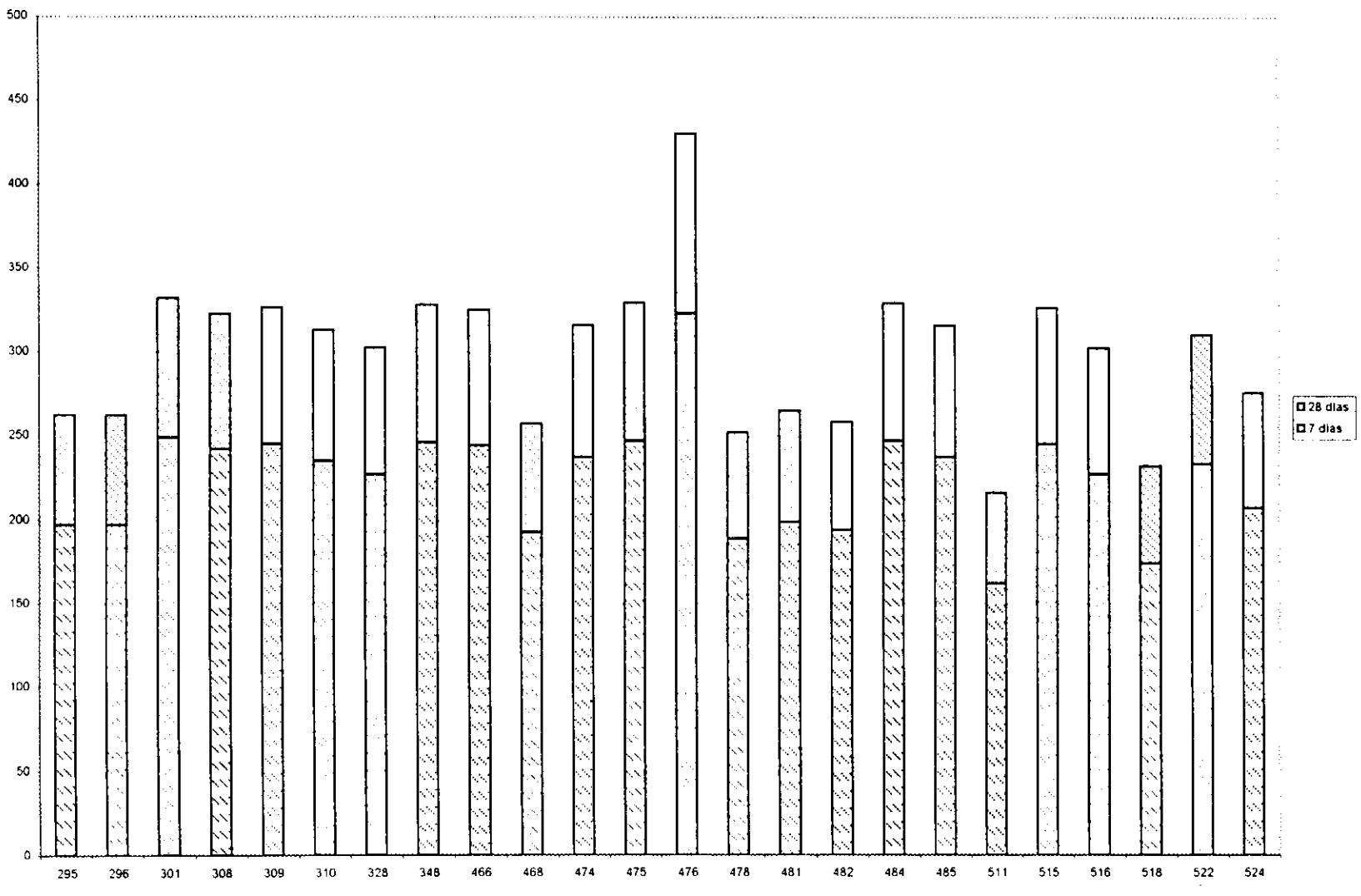
RESISTENCIA DEL HORMIGÓN
V-4 Pilotes



Resistencia del hormigón
V-4 (pilotes)



RESISTENCIA DEL HORMIGON
V-4 Pilotes



MEKANO-4	PARTE DE TESADO
	FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 4 - FASE 1
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	22/01/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	--
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	--

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	99	126	205		10	90	168	190				333.0	
5	24/0,6"	425	95	125	207		20	97	181	202				342.3	
7	24/0,6"	425	95	123	201		11	87	166	184				324.9	
1	24/0,6"	425	100	124	202		22	90	140	190				314.4	
4	24/0,6"	425	95	124	206		30	103	184	208				336.5	
6	24/0,6"	425	109	147	220		24	101	193	215				351.6	
8	24/0,6"	425	107	141	217		27	95	177	200				329.5	
2	24/0,6"	425	97	123	202		30	91	172	197				316.7	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	63	95	166		10	74	151		12	77	110	384.8	
12	12/0,6"	540	60	86	159		10	72	146		11	83	111	376.9	
13	12/0,6"	540	61	88	157		10	80	151		17	83	114	375.8	
14	12/0,6"	540	66	95	177		10	60	134		9	81	111	379.1	
19	12/0,6"	540	74	99	167		20	81	154		14	79	113	366.8	
20	12/0.6"	540	52	84	161		10	90	131		9	78	110	372.4	
21	12/0.6"	540	57	90	158		17	73	147		19	80	115	367.9	
22	12/0.6"	540	58	86	155		17	74	147		14	84	116	370.1	
17	12/0.6"	540	75	104	173		2	71	145		8	84	111	387.0	
18	12/0.6"	540	59	77	157		14	72	148		16	81	112	369.0	
23	12/0,6"	540	52	88	177		18	73	119		27	51	82	316.1	
24	12/0,6"	540	48	80	153		24	65	145		22	77	105	347.6	
9	12/0.6"	540	52	78	151		30	61	140		20	65	96	320.6	
10	12/0.6"	540	43	72	122		11	62	138		14	70	120	351.0	
15	12/0.6"	540	70	98	167		7	77	144		9	82	115	382.5	
16	12/0,6"	540	64	93	163		24	72	144		8	83	118	370.1	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	333	0	333						333	312	6.7
5	342	0	342						342	312	9.7
7	325	0	325						325	312	4.1
1	314	0	314						314	312	0.8
4	337	0	337						337	312	7.9
6	352	0	352						352	312	13
8	330	0	330						330	312	5.6
2	317	0	317						317	312	1.5
11	385	0	385						385	389	-1.1
12	377	0	377						377	389	-3.1
13	376	0	376						376	389	-3.4
14	379	0	379						379	389	-2.5
19	367	0	367						367	389	-5.7
23	316	0	316						316	389	-19
24	348	0	348						348	389	-11
9	321	0	321						321	389	-18
10	351	0	351						351	389	-9.8
15	383	0	383						383	389	-1.7
16	370	0	370						370	389	-4.9

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	13	%
Diferencia negativa maxima.....=	-18.7	%
DIFERENCIA MEDIA.....=	-1.6	%

Datos según el alargamiento de proyecto.

MEKANO-4	PARTE DE TESADO
	FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 4 - FASE 2
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	17/2/00 - 18/2/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	--
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	--

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	70	86	132		25	46	95	119				181.6	
5	24/0,6"	425	47	67	112		22	51	92	110				178.2	
7	24/0,6"	425	52	67	111		29	72	119	134				191.0	
1	24/0,6"	425	52	69	115		18	55	100	112				182.8	
4	24/0,6"	425	53	69	115		17	55	101	111				181.6	
6	24/0,6"	425	55	72	115		18	49	94	105				171.2	
8	24/0,6"	425	49	69	111		17	56	103	112				182.8	
2	24/0,6"	425	46	64	109		13	55	101	110				186.3	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	31	48	83		26	64	100		27	68	82	203.6	
	12/0,6"	540	32	47	83		21	63	98		33	71	89	207.0	
13	12/0,6"	540	35	55	87		21	57	96		24	61	78	203.6	
14	12/0,6"	540	37	52	91		24	65	101		25	67	84	213.8	
19	12/0,6"	540	32	48	82		22	57	84		24	62	72	180.0	
20	12/0,6"	540	33	47	82		20	57	92		22	62	77	198.0	
21	12/0,6"	540	37	49	84		21	59	93		19	56	71	192.4	
22	12/0,6"	540	32	48	86		13	46	83		23	59	72	194.6	
17	12/0,6"	540	47	62	102		23	58	95		28	61	84	205.9	
18	12/0,6"	540	32	46	83		23	60	97		24	63	79	202.5	
23	12/0,6"	540	32	49	82		25	59	97		28	64	79	194.6	
24	12/0,6"	540	30	43	80		22	59	97		25	63	82	204.8	
9	12/0,6"	540	41	56	91		37	73	117		38	74	89	203.6	
10	12/0,6"	540	34	52	86		27	63	99		29	66	82	199.1	
15	12/0,6"	540	31	47	84		25	63	101		32	71	86	205.9	
16	12/0,6"	540	39	59	67		21	57	95		22	61	77	176.6	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	182	0	182						182	159	14.2
5	178	0	178						178	159	12.0
7	191	0	191						191	159	20.1
1	183	0	183						183	159	15.0
4	182	0	182						182	159	14.2
6	171	0	171						171	159	7.7
8	183	0	183						183	159	15.0
2	186	0	186						186	159	17.2
11	204	0	204						204	199	2.1
12	207	0	207						207	199	3.8
13	204	0	204						204	199	2.1
14	214	0	214						214	199	7.1
19	180	0	180						180	199	-9.8
20	198	0	198						198	199	-0.7
21	192	0	192						192	199	-3.6
22	195	0	195						195	199	-2.4
17	206	0	206						206	199	3.2
18	203	0	203						203	199	1.5
23	195	0	195						195	199	-2.4
24	205	0	205						205	199	2.6
9	204	0	204						204	199	2.1
10	199	0	199						199	199	-0.2
15	206	0	206						206	199	3.2
16	177	0	177						177	199	-11

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	20.1	%
Diferencia negativa maxima.....=	-11.5	%
DIFERENCIA MEDIA.....=	4.7	%

Datos según el alargamiento de proyecto.

MEKANO-4	PARTE DE TESADO
	FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 4 - FASE 3
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	3/03/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	--
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	--

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	65	85	135		12	54	104	119				206.1	
5	24/0,6"	425	74	92	139		14	51	97	110				187.5	
7	24/0,6"	425	61	79	123		10	52	95	111				189.8	
1	24/0,6"	425	68	89	136		24	47	92	105				173.5	
4	24/0,6"	425	57	76	126		20	50	96	106				180.5	
6	24/0,6"	425	72	89	137		15	47	91	102				177.0	
8	24/0,6"	425		24	71		17	48	91	101				171.3	
2	24/0,6"	425	60	78	127		7	51	96	103				189.8	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	54	78	108		23	61	101		22	60	89	223.9	
[illegible]	12/0,6"	540	45	61	100		22	58	98		25	66	90	220.5	
13	12/0,6"	540	40	56	91		23	64	98		24	64	89	214.9	
14	12/0,6"	540	36	56	91		40	79	117		50	87	115	221.6	
19	12/0,6"	540	37	52	88		21	58	94		17	59	83	213.8	
20	12/0.6"	540	30	45	85		10	45	82		18	59	77	209.3	
21	12/0.6"	540	29	49	84		16	52	89		19	59	87	220.5	
22	12/0.6"	540	40	54	88		16	54	90		16	58	81	210.4	
17	12/0.6"	540	36	61	97		45	60	100		42	57	84	177.8	
18	12/0.6"	540	38	51	102		27	61	92		21	53	81	212.6	
23	12/0,6"	540	43	56	95		25	61	100		25	68	87	212.6	
24	12/0,6"	540	38	54	91		18	55	96		23	65	92	225.0	
9	12/0.6"	540	60	82	128		37	51	89		44	62	90	186.8	
10	12/0.6"	540	46	61	98		44	61	100		35	67	85	177.8	
15	12/0.6"	540	43	57	95		24	59	99		26	65	89	213.8	
16	12/0,6"	540	31	46	84		24	63	99		28	68	94	218.3	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	206	0	206						206	161	28.0
5	187	0	187						187	161	16.4
7	190	0	190						190	161	17.9
1	173	0	173						173	161	7.8
4	180	0	180						180	161	12.1
6	177	0	177						177	161	9.9
8	171	0	171						171	161	6.4
2	190	0	190						190	161	17.9
11	224	0	224						224	199	12.5
12	221	0	221						221	199	10.5
13	215	0	215						215	199	7.7
14	222	0	222						222	199	11.1
19	214	0	214						214	199	7.1
20	209	0	209						209	199	4.9
21	221	0	221						221	199	10.5
22	210	0	210						210	199	5.5
17	178	0	178						178	199	-11
18	213	0	213						213	199	6.6
23	213	0	213						213	199	6.6
24	225	0	225						225	199	12.8
9	187	0	187						187	199	-6.4
10	178	0	178						178	199	-11
15	214	0	214						214	199	7.1
16	218	0	218						218	199	9

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	28.0	%
Diferencia negativa maxima.....=	-10.9	%
DIFERENCIA MEDIA.....=	8.4	%

Datos según el alargamiento de proyecto.

MEKANO-4	PARTE DE TESADO
	FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 4 - FASE 4
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	13/3/00 - 14/3/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	--
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	--

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	51	70	107		6	50	94	103				178.2	
5	24/0,6"	425	44	61	106		6	52	102	--				185.9	
7	24/0,6"	425	52	75	121		19	56	102	111				187.5	
1	24/0,6"	425	56	77	122		9	49	95	103				186.3	
4	24/0,6"	425	52	72	126		9	49	107	--				202.4	
6	24/0,6"	425	62	81	131		18	56	104	113				191.0	
8	24/0,6"	425	61	79	124		10	52	97	104				181.8	
2	24/0,6"	425	69	90	135		7	50	101	112				199.1	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	35	49	87		33	62	101		35	62	83	189.0	
12	12/0,6"	540	42	55	96		30	66	106		33	77	--	197.7	
13	12/0,6"	540	39	56	94		25	61	96		30	67	83	201.4	
14	12/0,6"	540	44	52	92		21	60	96		26	71	100	221.6	
19	12/0,6"	540	36	52	89		21	57	97		26	64	85	211.5	
20	12/0.6"	540	36	52	89		23	60	98		30	71	100	222.8	
21	12/0.6"	540	38	52	91		22	60	99		25	64	97	227.3	
22	12/0.6"	540	43	59	94		23	58	95		21	62	83	208.1	
17	12/0.6"	540	38	55	89		26	63	100		23	64	89	214.9	
18	12/0.6"	540	22	36	75		16	54	93		21	60	82	214.9	
23	12/0,6"	540	33	47	85		23	62	99		25	68	99	227.3	
24	12/0,6"	540	38	50	87		25	64	100		27	63	89	209.3	
9	12/0.6"	540	49	65	101		23	63	99		31	77	97	218.3	
10	12/0.6"	540	37	51	89		28	64	102		31	82	--	201.1	
15	12/0.6"	540	35	50	87		24	63	101		27	67	97	223.9	
16	12/0,6"	540	50	60	98		25	81	99		25	66	91	211.5	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	178	0	178						178	161	10.7
5	186	0	186						186	161	15.5
7	187	0	187						187	161	16.4
1	186	0	186						186	161	15.7
4	202	0	202						202	161	25.7
6	191	0	191						191	161	18.6
8	182	0	182						182	161	12.9
2	199	0	199						199	161	23.7
11	189	0	189						189	199	-5.0
12	198	0	198						198	199	-0.9
13	201	0	201						201	199	0.9
14	222	0	222						222	199	11.1
19	212	0	212						212	199	6.0
20	223	0	223						223	199	11.7
21	227	0	227						227	199	13.9
22	208	0	208						208	199	4.3
17	215	0	215						215	199	8
18	215	0	215						215	199	7.7
23	227	0	227						227	199	13.9
24	209	0	209						209	199	4.9
9	218	0	218						218	199	9.4
10	201	0	201						201	199	1
15	224	0	224						224	199	12.2
16	212	0	212						212	199	6

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....	25.7	%
Diferencia negativa maxima.....	-5.0	%
DIFERENCIA MEDIA.....	10.2	%

Datos según el alargamiento de proyecto.

MEKANO-4	PARTE DE TESADO
	FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 4 - FASE 5
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	22/3/00 - 23/3/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	--
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	--

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	38	53	106		7	49	97	108				196.78	
5	24/0,6"	425	41	57	95		10	60	105	115				185.14	
7	24/0,6"	425	62	90	135		12	53	96	118				208.42	
1	24/0,6"	425	60	135	124		12	54	97	111				189.79	
4	24/0,6"	425	63	80	130		14	51	99	106				185.14	
6	24/0,6"	425	39	62	111		10	49	94	105				194.45	
8	24/0,6"	425	62	82	126		17	50	93	102				173.49	
2	24/0,6"	425	16	21	36		14	22	44	47				61.71	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	19	32	55		31	50	70		30	52	64	122.6	
12	12/0,6"	540	42	61	96		39	65	100		37	68	85	183.4	
13	12/0,6"	540	66	80	119		26	61	101		31	67	84	203.6	
14	12/0,6"	540	31	49	86		28	65	103		34	71	88	207.0	
22	12/0,6"	540	52	62	106		22	57	97		26	63	78	203.6	
20	12/0.6"	540	59	76	114		28	57	95		27	67	94	212.6	
21	12/0.6"	540	45	82	105		25	61	100		30	70	85	213.8	
19	12/0.6"	540	32	50	89		26	56	94		28	66	81	200.3	
17	12/0.6"	540	47	63	103		29	54	94		29	66	84	198.0	
18	12/0.6"	540	46	60	93		27	58	96		31	68	89	195.8	
23	12/0,6"	540	32	47	86		22	57	95		28	66	81	202.5	
24	12/0,6"	540	62	79	114		23	60	96		25	64	77	199.1	
9	12/0.6"	540	40	56	97		21	60	98		29	67	90	219.4	
10	12/0.6"	540	46	65	101		26	59	99		29	75	104	228.4	
5	12/0.6"	540	32	49	85		22	54	95		27	66	82	203.6	
16	12/0,6"	540	52	69	105		25	58	95		29	64	79	194.6	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1 Tesa	Rete	Total		Alargamientos fase 2 Tesa	Rete	Total		Alarg Total	Alarg Teor	Difer %
3	197	0	197						197	185	6.2
5	185	0	185						185	185	0.0
7	208	0	208						208	185	12.5
1	190	0	190						190	185	2.5
4	185	0	185						185	185	0.0
6	194	0	194						194	185	5.0
8	173	0	173						173	185	-6.3
2	61.7	0	61.7						62	185	-66.7
11	123	0	123						123	201	-38.9
12	183	0	183						183	201	-8.6
13	204	0	204						204	201	1.5
14	207	0	207						207	201	3.1
22	204	0	204						204	201	1.5
20	213	0	213						213	201	5.9
21	214	0	214						214	201	6.5
19	200	0	200						200	201	-0.2
17	198	0	198						198	201	-1.3
18	196	0	196						196	201	-2.5
23	203	0	203						203	201	0.9
24	199	0	199						199	201	-0.8
9	219	0	219						219	201	9.3
10	228	0	228						228	201	13.8
15	204	0	204						204	201	1.5
16	195	0	195						195	201	-3.0

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	13.8	%
Diferencia negativa maxima.....=	-66.7	%
DIFERENCIA MEDIA.....=	-2.4	%

Datos según el alargamiento calculado por MK4.

Dado el escaso alargamiento de los tendones nº 2 y nº 11, se ha procedido una vez finalizado el tesado a comprobar la carga a la que habían despegado los tendones, confirmando que estos están tensados a la carga indicada en proyecto.

MEKANO-4

PARTE DE TESADO

FT-60

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 4 - FASE 6
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	4/04/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	6	23	68		20	53	96	103				168.84	
5	24/0,6"	425	73	96	139		24	68	109	124				193.29	
7	24/0,6"	425	131	150	191		24	65	111	122				183.97	
1	24/0,6"	425	143	161	202		24	70	108	118				178.15	
4	24/0,6"	425	109	128	172		24	67	114	123				188.63	
6	24/0,6"	425	70	88	136		23	67	114	122				192.12	
8	24/0,6"	425	103	122	167		21	62	109	117				186.30	
2	24/0,6"	425	94	111	157		25	71	115	127				192.12	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200	a	200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	70	87	124	54	19	57	95	76	23	62	77	207.00	
12	12/0,6"	540	89	105	141	52	24	62	99	75	26	68	86	210.38	
13	12/0,6"	540	35	53	86	51	18	55	93	75	23	63	80	205.88	
14	12/0,6"	540	29	45	82	53	20	55	94	74	26	65	90	214.88	
22	12/0,6"	540	114	128	165	51	28	62	100	72	29	67	92	209.25	
20	12/0.6"	540	33	47	86	53	21	60	97	76	26	62	86	212.63	
21	12/0.6"	540	28	43	80	52	19	58	95	76	23	66	87	216.00	
19	12/0.6"	540	31	47	86	55	30	61	97	67	31	65	89	202.50	
17	12/0.6"	540	25	42	78	53	33	56	97	64	24	61	85	200.25	
18	12/0.6"	540	40	58	94	54	28	65	101	73	34	88	106	223.88	
23	12/0,6"	540	34	50	87	53	22	56	93	71	23	64	89	213.75	
24	12/0,6"	540	30	47	84	54	22	56	94	72	27	69	95	218.25	
9	12/0.6"	540	72	88	123	51	20	56	94	74	25	63	86	209.25	
10	12/0.6"	540	55	64	103	48	22	57	96	74	25	63	85	204.75	
15	12/0.6"	540	27	44	81	54	22	57	92	70	25	63	83	204.75	
16	12/0,6"	540	67	84	120	53	28	60	95	67	30	68	81	192.38	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1 Tesa	Rete	Total		Alargamientos fase 2 Tesa	Rete	Total		Alarg Total	Alarg Teor	Difer %
3	168.84	0	168.836						168.84	185.2	-8.8
5	193.29	0	193.288						193.29	185.2	4.4
7	183.97	0	183.973						183.97	185.2	-0.7
1	178.15	0	178.151						178.15	185.2	-3.8
4	188.63	0	188.63						188.63	185.2	1.8
6	192.12	0	192.123						192.12	185.2	3.7
8	186.3	0	186.301						186.3	185.2	0.6
2	192.12	0	192.123						192.12	185.2	3.7
11	207	0	207						207	200.7	3.1
12	210.38	0	210.375						210.38	200.7	4.8
13	205.88	0	205.875						205.88	200.7	2.6
14	214.88	0	214.875						214.88	200.7	7.1
22	209.25	0	209.25						209.25	200.7	4.3
20	212.63	0	212.625						212.63	200.7	5.9
21	216	0	216						216	200.7	7.6
19	202.5	0	202.5						202.5	200.7	0.9
17	200.25	0	200.25						200.25	200.7	-0.2
18	223.88	0	223.875						223.88	200.7	11.5
23	213.75	0	213.75						213.75	200.7	6.5
24	218.25	0	218.25						218.25	200.7	8.7
9	209.25	0	209.25						209.25	200.7	4.3
10	204.75	0	204.75						204.75	200.7	2.0
15	204.75	0	204.75						204.75	200.7	2.0
16	192.38	0	192.375						192.38	200.7	-4.1

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	11.5	%
Diferencia negativa maxima.....=	-8.8	%
DIFERENCIA MEDIA.....=	2.8	%

Datos según el alargamiento calculado por MK4.

Los resultados, desde nuestro punto de vista son normales y aceptables.

MEKANO-4

PARTE DE TESADO

FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 4 - FASE 7
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	14/04/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	113 / 154
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-9
Número de central	18

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	45	69	112		7	45	90	99				185.1	
5	24/0,6"	425	70	88	134		8	50	95	104				186.3	
7	24/0,6"	425	60	83	126		15	61	101	112				189.8	
1	24/0,6"	425	88	108	153		5	48	95	104				191.0	
4	24/0,6"	425	75	93	140		10	54	96	109				191.0	
6	24/0,6"	425	65	86	133		5	45	91	101				191.0	.
8	24/0,6"	425	106	125	170		6	47	90	99				182.8	
2	24/0,6"	425	60	79	124		7	48	93	101				184.0	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	41	61	95		19	55	94		22	63	84	214.9	
12	12/0,6"	540	40	56	96		21	56	96		28	67	86	212.6	
13	12/0,6"	540	37	52	91		21	59	95		26	66	89	214.9	
14	12/0,6"	540	29	46	82		27	62	99		26	66	89	211.5	
22	12/0,6"	540	29	45	81		21	54	92		23	65	82	204.8	
20	12/0.6"	540	33	49	88		23	61	99		24	65	92	223.9	
21	12/0.6"	540	31	48	83		27	62	99		25	65	84	205.9	
19	12/0.6"	540	33	50	82		23	61	99		25	65	95	219.4	
17	12/0.6"	540	32	47	85		18	55	92		26	74	86	210.4	
18	12/0.6"	540	28	42	78		17	39	78		16	55	70	185.6	
23	12/0,6"	540	25	40	78		10	40	78		10	58	85	220.5	
24	12/0,6"	540	36	51	87		20	56	92		25	65	89	210.4	
9	12/0.6"	540	46	58	91		27	60	95		29	72	102	209.3	
10	12/0.6"	540	36	52	89		19	39	77		14	46	67	184.5	
15	12/0.6"	540	31	49	85		8	40	76		11	45	63	195.8	
16	12/0,6"	540	32	49	84		22	60	94		25	65	82	203.6	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	####	0	185						185	185	0.0
5	186	0	186						186	185	0.6
7	190	0	190						190	185	2.5
1	191	0	191						191	185	3.1
4	191	0	191						191	185	3.1
6	191	0	191						191	185	3.1
8	183	0	183						183	185	-1.3
2	184	0	184						184	185	-0.7
11	215	0	215						215	201	7.0
12	213	0	213						213	201	5.9
13	215	0	215						215	201	7.1
14	212	0	212						212	201	5.4
22	205	0	205						205	201	2.0
20	224	0	224						224	201	11.5
21	206	0	206						206	201	2.6
19	219	0	219						219	201	9.3
17	210	0	210						210	201	4.8
18	186	0	186						186	201	-7.5
23	221	0	221						221	201	9.9
24	210	0	210						210	201	4.8
9	209	0	209						209	201	4.3
10	185	0	185						185	201	-8.1
15	196	0	196						196	201	-2.5
16	204	0	204						204	201	1.5

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	11.5	%
Diferencia negativa maxima.....=	-8.1	%
DIFERENCIA MEDIA.....=	2.8	%

Datos según el alargamiento calculado por MK4.

Los resultados, desde nuestro punto de vista son normales y aceptables.

MEKANO-4	PARTE DE TESADO
	FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 4 - FASE 8
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	26/04/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	113 / 154
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-9
Número de central	18

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	63	84	129		5	50	92	102				189.8	
5	24/0,6"	425	61	82	123		4	46	92	99				182.8	
7	24/0,6"	425	78	96	141		5	46	89	95				178.2	
1	24/0,6"	425	54	71	114		5	47	88	97				177.0	
4	24/0,6"	425	56	70	120		7	50	94	103				186.3	
6	24/0,6"	425	44	63	106		5	48	90	100				182.8	
8	24/0,6"	425	58	75	117		13	54	95	102				172.3	
2	24/0,6"	425	85	103	147		6	49	89	97				178.2	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	35	52	89		23	58	96		27	64	81	203.6	
12	12/0,6"	540	41	58	95		25	63	100		26	66	81	207.0	
13	12/0,6"	540	47	64	103		23	61	97		32	74	90	211.5	
14	12/0,6"	540	35	51	87		26	62	100		28	68	81	201.4	
22	12/0,6"	540	32	52	86		23	60	97		25	60	76	201.4	
20	12/0.6"	540	34	51	86		22	61	98		26	66	83	208.1	
21	12/0.6"	540	31	49	86		25	65	101		29	66	81	205.9	
19	12/0.6"	540	36	54	87		19	58	95		27	65	80	202.5	
17	12/0.6"	540	33	52	85		24	61	99		26	67	84	208.1	
24	12/0,6"	540	39	52	91		26	56	93		28	65	79	191.3	
9	12/0.6"	540	36	52	89		27	66	107		31	66	83	208.1	
16	12/0,6"	540	40	55	93		22	60	95		27	67	82	203.6	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1 Tesa	Rete	Total		Alargamientos fase 2 Tesa	Rete	Total		Alarg Total	Alarg Teor	Difer %
3	190	0	190						190	185	2.5
5	183	0	183						183	185	-1.3
7	178	0	178						178	185	-3.8
1	177	0	177						177	185	-4.4
4	186	0	186						186	185	0.6
6	183	0	183						183	185	-1.3
8	172	0	172						172	185	-7.0
2	178	0	178						178	185	-3.8
11	204	0	204						204	201	1.4
12	207	0	207						207	201	3.1
13	212	0	212						212	201	5.4
14	201	0	201						201	201	0.3
22	201	0	201						201	201	0.3
20	208	0	208						208	201	3.7
21	206	0	206						206	201	2.6
19	203	0	203						203	201	0.9
17	208	0	208						208	201	3.7
24	191	0	191						191	201	-4.7
9	208	0	208						208	201	3.7
16	204	0	204						204	201	1.5

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	5.4	%
Diferencia negativa maxima.....=	-7.0	%
DIFERENCIA MEDIA.....=	0.2	%

Datos según el alargamiento calculado por MK4.

Los resultados, desde nuestro punto de vista son normales y aceptables.

MEKANO-4

PARTE DE TESADO

FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 4 - FASE 9
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	8/05/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	113 / 154
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-9
Número de central	18

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	41	59	106		20	59	103	115				186.3	
5	24/0,6"	425	61	81	127		3	4	89	101				191.0	
7	24/0,6"	425	65	84	127		6	49	90	104				186.3	
1	24/0,6"	425	45	60	104		5	49	93	105				185.1	
4	24/0,6"	425	63	81	125		15	59	103	114				187.5	
6	24/0,6"	425	52	74	119		5	47	94	104				193.3	
8	24/0,6"	425	49	67	112		5	45	93	103				187.5	
2	24/0,6"	425	57	76	121		13	53	109					188.2	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	42	59	95		26	62	100		38	82	104	217.1	
12	12/0,6"	540	41	55	91		20	58	95		29	70	97	217.1	
13	12/0,6"	540	36	52	89		28	65	105		24	67	91	221.6	
14	12/0,6"	540	44	57	95		24	60	95		37	75	94	201.4	
22	12/0,6"	540	31	47	83		25	61	98		29	71	95	214.9	
20	12/0.6"	540	33	50	83		23	58	95		29	72	94	210.4	
21	12/0.6"	540	34	48	86		18	56	93		27	72	96	220.5	
19	12/0.6"	540	32	46	82		24	59	97		29	70	91	208.1	
17	12/0.6"	540	32	44	82		18	56	92		24	65	86	209.3	
24	12/0,6"	540	32	44	81		23	60	97		26	66	83	202.5	
9	12/0.6"	540	40	55	90		26	61	99		29	67	87	203.6	
16	12/0,6"	540	36	51	86		29	62	99		30	69	86	198.0	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	186	0	186						186	185	0.6
5	191	0	191						191	185	3.1
7	186	0	186						186	185	0.6
1	185	0	185						185	185	0.0
4	187	0	187						187	185	1.2
6	193	0	193						193	185	4.4
8	187	0	187						187	185	1.2
2	188	0	188						188	185	1.6
11	217	0	217						217	201	8.2
12	217	0	217						217	201	8.2
13	222	0	222						222	201	10.4
14	201	0	201						201	201	0.3
22	215	0	215						215	201	7.1
20	210	0	210						210	201	4.8
21	221	0	221						221	201	9.9
19	208	0	208						208	201	3.7
17	209	0	209						209	201	4.3
24	203	0	203						203	201	0.9
9	204	0	204						204	201	1.5
16	198	0	198						198	201	-1.3

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	10.4	%
Diferencia negativa maxima.....=	-1.3	%
DIFERENCIA MEDIA.....=	3.5	%

Datos según el alargamiento calculado por MK4.

Los resultados, desde nuestro punto de vista son normales y aceptables.

MEKANO-4	PARTE DE TESADO
	FT-60-5

ora:	AVE MADRID -ZARAGOZA
structura:	VIADUCTO 4 - FASE 10
ntratista:	Ute Lav Mejorada-Anchuelo
calidad:	Madrid
cha:	17/5/00 - 18/5/00
se de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	113 / 154
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-9
Número de central	18

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

endón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	44	63	106		3	45	90	99				184.0	--
5	24/0,6"	425	56	75	120		8	49	94	102				184.0	--
7	24/0,6"	425	66	80	127		7	48	93	101				180.5	--
1	24/0,6"	425	93	113	158		5	48	92	99				185.1	--
4	24/0,6"	425	46	61	108		5	47	93	102				185.1	--
6	24/0,6"	425	73	91	138		5	50	97	108				195.6	--
8	24/0,6"	425	62	82	126		5	43	85	93				177.0	--
2	24/0,6"	425	80	101	144		10	52	94	103				184.7	--

endón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	47	63	102		24	61	99		28	67	84	209.3	--
12	12/0,6"	540	29	49	83		22	59	97		27	65	87	212.6	--
13	12/0,6"	540	47	62	104		21	57	96		31	72	94	219.4	--
14	12/0,6"	540	63	77	116		25	62	99		29	68	84	204.8	--
22	12/0,6"	540	30	46	84		22	59	98		35	69	98	217.1	--
20	12/0.6"	540	30	45	83		18	57	90		31	68	100	218.3	--
21	12/0.6"	540	48	65	103		20	58	95		25	69	92	221.6	--
19	12/0.6"	540	38	51	89		22	58	96		24	72	93	218.3	--
17	12/0.6"	540	32	48	85		18	57	96		22	60	75	207.0	--
24	12/0,6"	540	36	59	89		23	60	95		28	68	93	213.8	--
9	12/0.6"	540	48	65	102		25	63	100		32	69	85	204.8	--
16	12/0,6"	540	50	65	100		28	65	100		35	74	95	204.8	--

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	184		184						184	185	-0.7
5	184		184						184	185	-0.7
7	180		180						180	185	-2.6
1	185		185						185	185	0.0
4	185		185						185	185	0.0
6	196		196						196	185	5.6
8	177		177						177	185	-4.4
2	185		185						185	185	-0.3
11	209		209						209	201	4.2
12	213		213						213	201	5.9
13	219		219						219	201	9.3
14	205		205						205	201	2.0
22	217		217						217	201	8.2
20	218		218						218	201	8.7
21	222		222						222	201	10.4
19	218		218						218	201	8.7
17	207		207						207	201	3.1
24	214		214						214	201	6.5
9	205		205						205	201	2.0
16	205		205						205	201	2.0

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	10.4	%
Diferencia negativa maxima.....=	-4.4	%
DIFERENCIA MEDIA.....=	3.4	%

Datos según el alargamiento calculado por MK4.

Los resultados, desde nuestro punto de vista son normales y aceptables.

MEKANO-4	PARTE DE TESADO
	FT-60-5

bra:	AVE MADRID -ZARAGOZA
structura:	VIADUCTO 4 - FASE 11
ontratista:	Ute Lav Mejorada-Anchuelo
ocalidad:	Madrid
echa:	29/05/00
ase de tesado:	Unica

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	113 / 154
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	34

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

endón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	340	400	425			TES mm	RET mm
3	24/0,6"	425	63	84	124		21	62	--	108	115			180.5	--
5	24/0,6"	425	59	77	124		21	65	--	107	116			186.3	--
7	24/0,6"	425	71	87	134		25	70	--	112	122			186.3	--
1	24/0,6"	425	62	79	123		20	63	116					190.6	--
4	24/0,6"	425	68	86	130		24	68	--	112	121			185.1	--
6	24/0,6"	425	62	81	125		25	66	--	110	120			184.0	--
8	24/0,6"	425	80	97	141		26	67	--	112	121			181.6	--
2	24/0,6"	425	70	86	133		23	66	--	108	120			186.3	--

endón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	29	44	82		21	59	97		26	65	81	207.0	--
12	12/0,6"	540	35	51	88		20	59	97		25	64	79	207.0	--
13	12/0,6"	540	34	51	86		23	60	98		27	65	79	201.4	--
14	12/0,6"	540	37	50	85		23	59	96		25	62	77	194.6	--
22	12/0,6"	540	35	51	90		27	65	104		34	71	89	210.4	--
20	12/0.6"	540	35	51	87		15	37	76		12	44	81	204.8	--
21	12/0.6"	540	29	44	81		15	41	80		15	45	79	203.6	--
19	12/0.6"	540	35	51	89		22	61	99		29	66	82	207.0	--
17	12/0.6"	540	37	50	88		22	59	95		26	61	77	196.9	--
24	12/0,6"	540	34	49	86		24	80	96		26	61	80	200.3	--
9	12/0.6"	540	39	56	91		26	66	101		30	67	83	202.5	--
16	12/0,6"	540	40	57	94		24	61	97		25	64	79	203.6	--

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	180		180						180	188	-4.2
5	186		186						186	188	-1.1
7	186		186						186	188	-1.1
1	191		191						191	188	1.2
4	185		185						185	188	-1.7
6	184		184						184	188	-2.3
8	182		182						182	188	-3.5
2	186		186						186	188	-1.1
11	207		207						207	204	1.7
12	207		207						207	204	1.7
13	201		201						201	204	-1.1
14	195		195						195	204	-4.4
22	210		210						210	204	3.3
20	205		205						205	204	0.6
21	204		204						204	204	0.0
19	207		207						207	204	1.7
17	197		197						197	204	-3.3
24	200		200						200	204	-1.6
9	203		203						203	204	-0.5
16	204		204						204	204	0.0

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	3.3	%
Diferencia negativa maxima.....=	-4.4	%
DIFERENCIA MEDIA.....=	-0.8	%

Datos según el alargamiento calculado por MK4.

Los resultados, desde nuestro punto de vista son normales y aceptables.

MEKANO-4	PARTE DE TESADO
	FT-60-5

bra:	AVE MADRID -ZARAGOZA
structura:	VIADUCTO 4 - FASE 12
ontratista:	Ute Lav Mejorada-Anchuelo
calidad:	Madrid
echa:	12/06/00
ase de tesado:	Unica

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	113 / 154
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	34

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	41	64	113		4	55	101	110				207.3	--
5	24/0,6"	425	49	70	119		7	54	99	110				201.4	--
7	24/0,6"	425	52	70	117		6	50	96	106				192.1	--
1	24/0,6"	425	47	66	112		9	54	100	110				193.3	--
4	24/0,6"	425	49	68	117		5	54	104	113				204.9	--
6	24/0,6"	425	50	68	110		7	52	102	112				192.1	--
8	24/0,6"	425	54	74	120		6	51	99	108				195.6	--
2	24/0,6"	425	51	69	117		11	58	103	113				197.6	--

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	43	59	97		30	71	109		30	70	88	214.9	--
12	12/0,6"	540	47	62	102		30	70	109		27	68	85	216.0	--
13	12/0,6"	540	39	54	95		26	65	105		27	67	84	216.0	--
14	12/0,6"	540	56	71	112		24	63	104		24	65	82	218.3	--
22	12/0,6"	540	38	53	92		26	65	102		29	66	82	205.9	--
19	12/0.6"	540	37	54	92		20	57	97		24	63	79	210.4	--
17	12/0.6"	540	35	52	90		28	68	108		26	66	84	217.1	--
24	12/0.6"	540	41	58	98		21	58	98		26	65	81	212.6	--
9	12/0.6"	540	39	50	90		25	67	105		28	68	85	211.5	--
16	12/0,6"	540	46	61	99		27	66	106		25	66	81	211.5	--
25	12/0.6"	540	38	54	92		22	62	101		26	65	81	211.5	--
26	12/0,6"	540	48	65	103		29	67	107		27	67	81	210.4	--

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	207		207						207	199	4.1
5	201		201						201	199	1.2
7	192		192						192	199	-3.5
1	193		193						193	199	-2.9
4	205		205						205	199	2.9
6	192		192						192	199	-3.5
8	196		196						196	199	-1.7
2	198		198						198	199	-0.7
11	215		215						215	215	0.0
12	216		216						216	215	0.6
13	216		216						216	215	0.6
14	218		218						218	215	1.6
22	206		206						206	215	-4.2
19	210		210						210	215	-2.1
17	217		217						217	215	1.1
24	213		213						213	215	-1.0
9	212		212						212	215	-1.5
16	212		212						212	215	-1.5
25	212		212						212	215	-1.5
26	210		210						210	215	-2.1

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	4.1	%
Diferencia negativa maxima.....=	-4.2	%
DIFERENCIA MEDIA.....=	-0.7	%

Datos según el alargamiento calculado por MK4.

Los resultados, desde nuestro punto de vista son normales y aceptables.

MEKANO-4	PARTE DE TESADO
	FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 4 - FASE 13
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	19/06/00
Fase de tesado:	Unica

Técnico Sr.	Jordi Gallego
Tipo de gato	M-7 y M-3
Número de gato	113 / 154
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	34

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	52	72	121		13	60	110	123				208.4	--
5	24/0,6"	425	48	68	117		5	52	101	114				207.3	--
7	24/0,6"	425	55	76	123		9	55	103	115				202.6	--
1	24/0,6"	425	54	73	122		12	58	105	119				203.8	--
4	24/0,6"	425	51	72	121		8	55	105	116				207.3	--
6	24/0,6"	425	51	71	120		9	56	107	119				208.4	--
8	24/0,6"	425	52	73	119		8	54	101	114				201.4	--
2	24/0,6"	425	53	73	122		9	55	104	117				206.1	--

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	49	66	104		24	62	102		26	65	83	213.8	--
12	12/0,6"	540	51	67	106		27	65	107		27	68	86	218.3	--
13	12/0,6"	540	36	54	93		29	68	106		31	70	88	214.9	--
14	12/0,6"	540	47	63	102		33	71	111		26	66	83	213.8	--
22	12/0,6"	540	52	68	104		23	62	101		24	65	83	212.6	--
19	12/0.6"	540	56	71	110		25	64	105		24	65	82	216.0	--
17	12/0.6"	540	37	53	91		23	62	102		25	66	83	214.9	--
24	12/0.6"	540	39	55	95		20	58	97		26	64	82	212.6	--
9	12/0.6"	540	49	65	105		23	63	102		28	69	86	217.1	--
16	12/0,6"	540	45	60	99		35	72	114		33	73	91	214.9	--
25	12/0.6"	540	42	57	98		25	64	104		26	65	82	214.9	--
26	12/0,6"	540	49	64	102		28	66	104		28	66	83	207.0	--

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Difer %
	Tesa	Rete	Total		Tesa	Rete	Total				
3	208		208						208	199	4.7
5	207		207						207	199	4.1
7	203		203						203	199	1.8
1	204		204						204	199	2.3
4	207		207						207	199	4.1
6	208		208						208	199	4.7
8	201		201						201	199	1.2
2	206		206						206	199	3.5
11	214		214						214	215	-0.5
12	218		218						218	215	1.6
13	215		215						215	215	0.0
14	214		214						214	215	-0.5
22	213		213						213	215	-1.0
19	216		216						216	215	0.6
17	215		215						215	215	0.0
24	213		213						213	215	-1.0
9	217		217						217	215	1.1
16	215		215						215	215	0.0
25	215		215						215	215	0.0
26	207		207						207	215	-3.6

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	4.7	%
Diferencia negativa maxima.....=	-3.6	%
DIFERENCIA MEDIA.....=	1.2	%

Datos según el alargamiento calculado por MK4.

Los resultados, desde nuestro punto de vista son normales y aceptables.

MEKANO-4

PARTE DE TESADO

FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 4 - FASE 14
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	3/07/00
Fase de tesado:	Unica

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	113 / 154
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	34

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100		100	200		200	300	400	425		TES mm	RET mm
5	24/0,6"	425	0	28		0	72		5	73	144	163		300.4	--
Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100		100	200	300	400		400	425		TES mm	RET mm
1	24/0,6"	425	133	161		2	73	143	211		14	30		294.6	--
Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400	425				TES mm	RET mm
3	24/0,6"	425	98	126	196		9	79	152	168				299.2	--
7	24/0,6"	425	74	103	169		6	72	138	157				286.4	--
4	24/0,6"	425	73	99	173		20	112	171	186				309.7	--
6	24/0,6"	425	78	102	174		7	76	146	160				289.9	--
8	24/0,6"	425	74	104	176		6	72	141	156				293.4	--
2	24/0,6"	425	74	103	173		6	76	143	157				291.1	--

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
			60	100	200		200	300	400		400	500	540	TES mm	RET mm
11	12/0,6"	540	53	78	138		10	63	120		11	68	92	310.5	--
12	12/0,6"	540	50	73	135		8	55	113		10	68	92	306.0	--
13	12/0,6"	540	53	77	137		9	59	121		10	65	89	309.4	--
14	12/0,6"	540	59	81	141		8	67	124		12	67	89	309.4	--
22	12/0,6"	540	64	86	145		5	61	121		10	65	91	312.8	--
19	12/0.6"	540	53	76	134		6	61	122		10	65	89	310.5	--
17	12/0.6"	540	55	78	136		6	60	121		10	61	88	308.3	--
24	12/0.6"	540	49	75	135		7	61	122		11	67	92	317.3	--
9	12/0.6"	540	55	78	135		10	63	125		12	66	93	310.5	--
16	12/0,6"	540	55	79	136		7	61	121		11	62	91	309.4	--
25	12/0.6"	540	53	77	137		12	68	129		10	66	92	318.4	--
26	12/0,6"	540	52	72	131		9	66	126		11	67	92	311.6	--

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1 Tesa	Rete	Total		Alargamientos fase 2 Tesa	Rete	Total		Alarg Total	Alarg Teor	Difer %
5	300		300						300	299	0.5
1	295		295						295	299	-1.4
3	299		299						299	299	0.1
7	286		286						286	299	-4.2
4	310		310						310	299	3.6
6	290		290						290	299	-3.0
8	293		293						293	299	-1.8
2	291		291						291	299	-2.6
11	311		311						311	326	-4.8
12	306		306						306	326	-6.2
13	309		309						309	326	-5.1
14	309		309						309	326	-5.1
22	313		313						313	326	-4.1
19	311		311						311	326	-4.8
17	308		308						308	326	-5.5
24	317		317						317	326	-2.7
9	311		311						311	326	-4.8
16	309		309						309	326	-5.1
25	318		318						318	326	-2.4
26	312		312						312	326	-4.4

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	3.6	%
Diferencia negativa maxima.....=	-6.2	%
DIFERENCIA MEDIA.....=	-3.2	%

Datos según el alargamiento calculado por MK4.

Los resultados, desde nuestro punto de vista son normales y aceptables.

Accesos y elementos para mantenimiento

ACCESOS Y ELEMENTOS PARA MANTENIMIENTO

Los mismos elementos que requieren un mantenimiento son los aparatos de apoyo que habrá que sustituirles cuando haya finalizado su vida útil. A todos ellos se accede desde la carretera que se salva con este viaducto. Dado que el tablero está anclado en el estribo 1, para poder sustituir estos aparatos de apoyo es necesario liberar este anclaje antes de levantar el tablero, para ello se ha dejado visitable el trasdós del estribo mediante una puerta metálica en el lado derecho del mencionado estribo que permite el acceso con los elementos necesarios.

Viaducto 5

VIADUCTO 5

ÍNDICE

- DESCRIPCIÓN Y DEFINICIÓN GEOMÉTRICA
- CÁLCULOS
- PROCESO CONSTRUCTIVO
- RESUMEN DEL CONTROL DE CALIDAD
- ACCESOS Y ELEMENTOS PARA MANTENIMIENTO

Descripción y Definición geométrica

DESCRIPCIÓN DE LA ESTRUCTURA Y DEFINICIÓN GEOMÉTRICA

La estructura que se estudia en esta nota de cálculo es uno de los viaductos que aparecen en la traza, en concreto el situado entre los PP.KK. 312+945 y 313+011, denominado como Viaducto 5 y que cruza sobre la carretera M-204.

Consiste en una viga continua de hormigón pretensado de tres vanos con luces de 20+26+20 m. La sección es una losa aligerada de canto y ancho constante, con valores de 1,90 y 14,00 m respectivamente. Tiene tres aligeramientos circulares de 1,40 m de diámetro y se apoya en cada eje de pilas y estribos mediante dos aparatos de apoyo que lo empotran a torsión. Estos aparatos de apoyo son en todo caso deslizantes, tipo Pot con la distribución y características que a continuación se incia:

	Tipo Apoyo	F_V (KH)	F_H (KN)	Ct (mm)	C- (mm)	GIRO (Rad)
E1	(2) B1122-G2	3920	392	88	130	0,018
P1	(2) B1122-G	9800	588	105	105	0,011
P2	(2) B1122-G4	9800	588	105	105	0,011
E2	(2) B1122-G2	3920	392	80	130	0,018

Cada eje de pilas consta de dos fustes cilíndricos con sección transversal ciruclar de diámetros 1,40 m, que se empotran en un encepado. A las pilas se las ha dotado de un rehundido lateral con el único fin de mejorar su aspecto estético, y su cimentación se ha resuelto del siguiente modo:

El encepado de ambas pilas tiene unas dimensiones de 12,0 x 7,50 x 2,50 m y se apoya sobre 6 pilotes de 1,50 m de diámetro, y de longitudes 34,00 m en la pila 1 y 30,50 m en la pila 2.

El tablero está anclado de estribo 1 mediante 3 cables de 12 Ø 0,6” inyectados con grasa y la carga horizontal debida al frenado la transmite mediante seis apoyos de neopreno zunchado de 300 x 400 x 96. Este anclaje es visitable, de modo que se puede destesar para realizar la sustitución de los aparatos de apoyo.

Este estribo está cimentado mediante un encepado de dimensiones 21,0 x 16,50 x 3,00 que se apoya en 20 pilotes de diámetro 1,50 m y longitud 30,00 m. El estribo dispone de dos contrafuertes que transmiten al encepado las cargas horizontales que recibe del tablero.

Al existir la unión entre el estribo y el tablero no hay movimiento horizontal, por lo que no es necesaria una junta de dilatación. Se ha dispuesto no obstante un sistema para evitar que el balasto entre por la junta existente y que consiste en dos chapas embebidas en el estribo y en el tablero, la del estribo de dimensiones 200 x 10 x 6 600 (2 ud), anclada mediante pernos Ø 20 cada 0,50 m y la del tablero de dimensiones 300 x 15 x 6 600 (2 ud) anclada mediante pernos Ø 20 cada 0,50 m. Sobre ellas se dispone una chapa de 470 x 15 x 6 600 atornillada a los pernos del estribo, y se ha sellado la junta entre chapas con mastic, de modo que no entre agua y chorree en el parámetro del estribo.

El estribo dos está cimentado mediante un encepado de dimensiones 21,00 x 14,00 x 2,50 m que se apoya en quince pilotes con diámetro 1,50 m y longitud 27,00 m.

En este estribo sí existe movimiento entre tablero y estribo, por lo que se ha dispuesto una junta consistente en el mismo sistema que la del estribo 1 y de idénticas dimensiones de modo que la chapa superior desliza sobre la del tablero cuando esta se mueve.

Sobre el tablero se han dispuesto dos canaletas de comunicaciones, ejecutadas “in situ” con armadura presente desde el tablero y la impermeabilización, consistente en una emulsión de brea-epoxi con una dotación de 2 kg/m^2. No se ha dispuesto imposta, haciéndose la barandilla directamente sobre el voladizo del tablero.

CALIDADES DE LOS MATERIALES

A continuación se detallan las calidades de cada uno de los materiales utilizados.

a) Hormigones

Tablero	H-400	fck ≥ 400 kp/cm^2
Alzados de pilas	H-300	fck ≥ 300 kp/cm^2
Encepados y estribos	H-250	fck ≥ 250 kp/cm^2
Pilotes	H-200	fck ≥ 200 kp/cm^2

b) Acero pasivo

AEH-500 N fck ≥ 500 kp/cm^2

c) Acero activo

A-190 SE fck ≥ 14000 kp/cm^2

Cálculos

CÁLCULOS

ÍNDICE

- ESTUDIO DEL TABLERO

  Características geométricas y mecánicas de la sección transversal

  Cálculo de los coeficientes de excentricidad e impacto

  Cálculo del pretensado longitudinal

  Comprobación de fisuración por tensiones normales

  Reacciones, Giros y Desplazamientos

  Comprobación a rotura

  Comprobación a cortante

  Comprobación a rasante

  Estudio de la sección transversal. Armadura de voladizo

  Armadura de la losa

  Armadura de las traviesas sobre pilas

  Armadura de las traviesas sobre estribos

- APARATOS DE APOYO
- CÁLCULO DE LAS PILAS
- CÁLCULO DE LOS ESTRIBOS

ESTUDIO DEL TABLERO

CARACTERISTICAS GEOMETRICAS Y MECANICAS DE LA SECCION TRANSVERSAL

```
1
4,  1.899
 0.000, 14.000, 0.140, 0.000
   000, 14.000, 0.259, 0.140
    )0,  8.100, 0.300, 0.399
8.100,  6.200, 1.200, 0.699
1
3,  1.200,  0.999
2
1
0
```


CALCULO DE CARACTERISTICAS MECANICAS

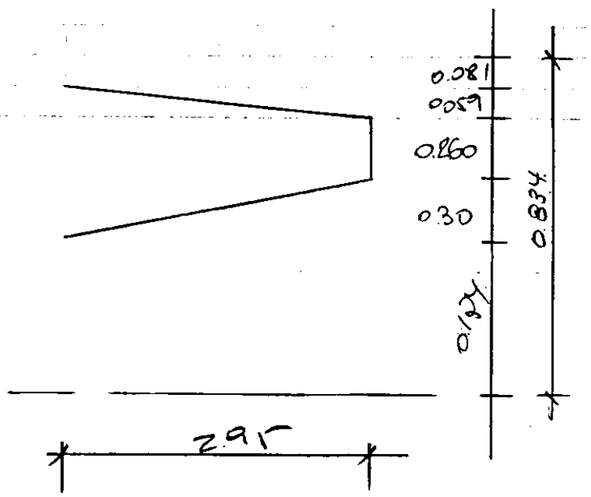
BASE SUPERIOR	BASE INFERIOR	ALTURA	D.A B.SUP.
.000	14.000	.140	.000
14.000	14.000	.259	.140
14.000	8.100	.300	.399
8.100	6.200	1.200	.699

NUMERO DE FILAS CON ALIGERAMIENTOS CIRCULARES 1

FILA	N0. DE HUECOS	DIAMETRO	D.A BORDE SUP.
1	3	1.200	.999

AREA (M2)	INERCIA (M4)	V.SUP (M)	V.INF (M)	CANTO (M)	W.SUP (M-3)	W.INF (M-3)	C. EQ. N
16.501	4.7065	.834	1.065	1.899	.177	.226	1.0
13.108	4.2849	.791	1.108	1.899	.185	.259	.0

MOMENTO ESTATICO DEL ALA.



$$Me = \frac{1}{2} 0059 \times 2.95 \left(0134 + 0.300 + 0260 + 0.020\right) +$$

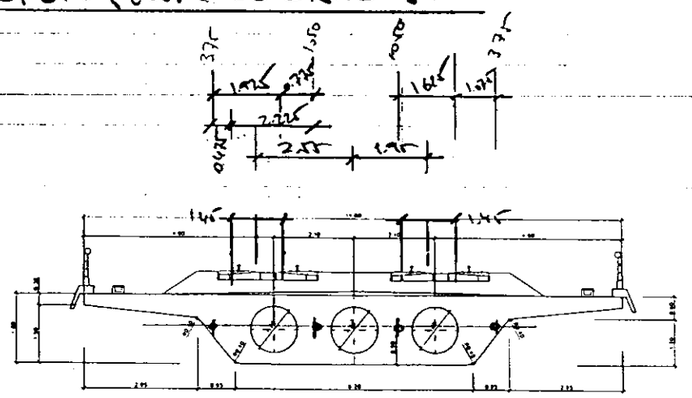
$$+ 0.260 \times 2.95 \left(0.134 + 0.300 + 0.130\right) +$$

$$+ \frac{1}{2} 0.30 \times 2.95 \left(0.134 + 0200\right) =$$

$$= 0064 + 04326 + 0.1478 = 0.6125 \ \mu^3$$

CALCULO DE LOS COEFICIENTES DE EXCENTRICIDAD E IMPACTO

DISPOSITION DE CHARGE



Zone N11-120

$$Q = 6\left(\frac{2.225}{2.70} + \frac{0.275}{2.70}\right) = 6.67 \text{ t/ml}$$

Zone N211-270

$$Q = 6\left(\frac{0.475}{2.70} + \frac{1.925}{2.70}\right) = 5.33 \text{ t/ml}$$

Zone N911-370

$$Q = 6\left(\frac{1.575}{2.70} + \frac{2.70}{2.70}\right) = 8.39 \text{ t/ml}$$

Sur

$$Q = 6\left(\frac{1.525}{2.70} + \frac{0}{2.70}\right) = 3.61 \text{ t/ml}$$

CARACTERISTIQUES MOMENT CENTRAUX

$$S_0 = 1.899 \times 2.10 - H \times \frac{1.20^2}{4} = 3.98 - 1.13 = 2.85 \text{ m}^2$$

$$I_0 = \frac{1}{12} 2.10 \times 1.899^3 - H \times \frac{1.20^4}{64} = 1.197 - 0.101 = 1.096$$

$$I_G = 1.096 + 2.85\left(1.065 - \frac{1.899}{2}\right)^2 = 1.134$$

MOMENTS LATERAUX

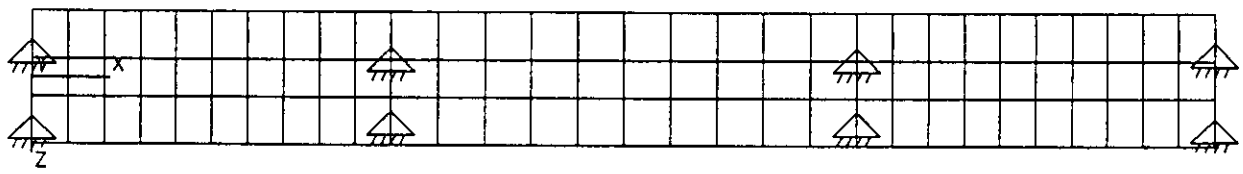
$$I = 0.5\left(4.2249 - 2 \times 1.134\right) = 1.008 \text{ m}^4$$

$$S = 0.5\left(13.108 - 2 \times 2.85\right) = 3.704 \text{ m}^2$$

STRUCTURE DATA:

TYPE = FLOOR
NJ = 132
NM = 221
NE = 0
NS = 8
NL = 1
XMAX= 66.0
YMAX= 0.0
ZMAX= 7.5

1



METE MTON

COMPANY: -------

S T A A D P D - P L O T (REV: 17.0a)

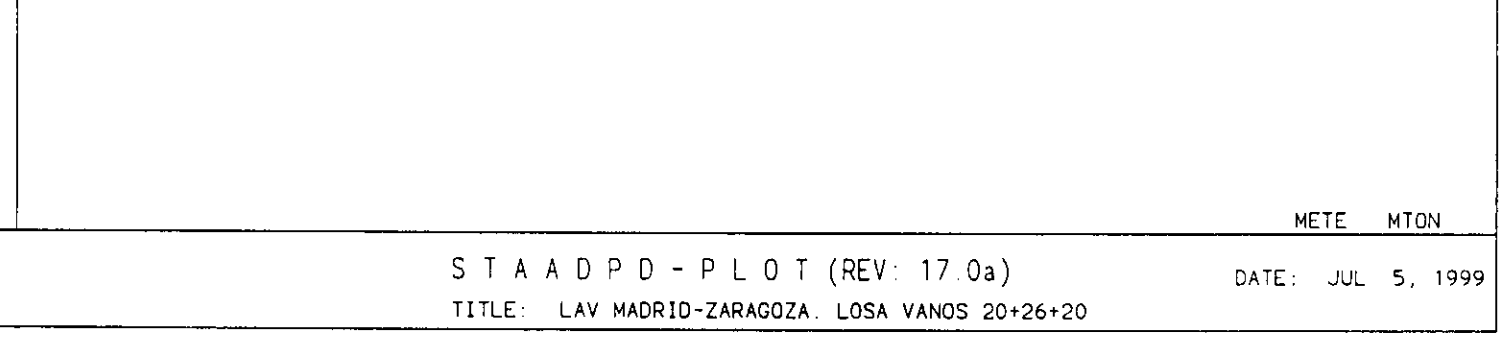
TITLE: LAV MADRID-ZARAGOZA. LOSA VANOS 20+26+20

DATE: JUL 5, 1999

STRUCTURE DATA:

TYPE = FLOOR
NJ = 132
NM = 221
NE = 0
NS = 8
NL = 1
XMAX= 66.0
YMAX= 0.0
ZMAX= 7.5

1



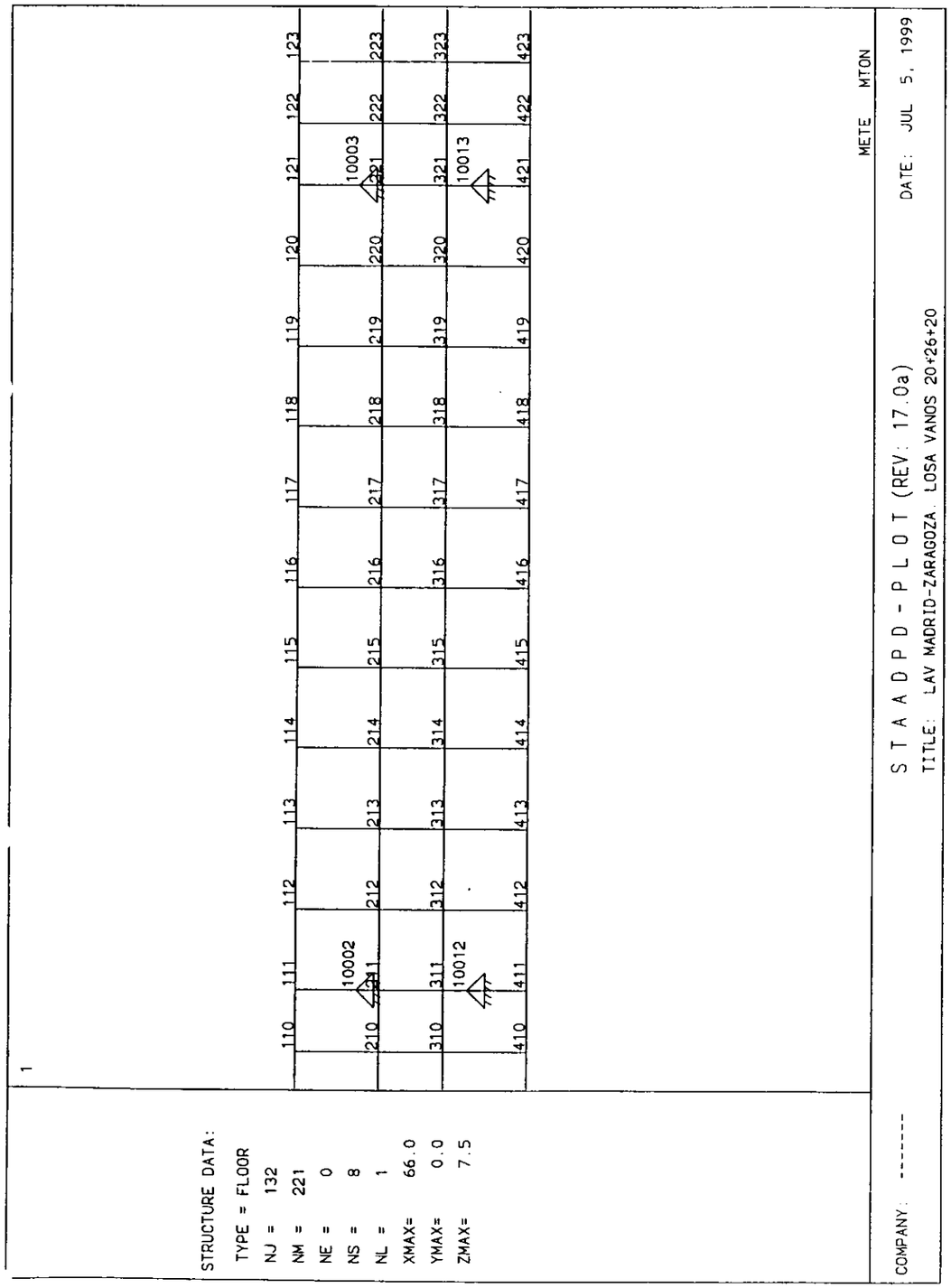
METE MTON

COMPANY: -------

S T A A D P D - P L O T (REV: 17.0a)

TITLE: LAV MADRID-ZARAGOZA. LOSA VANOS 20+26+20

DATE: JUL 5, 1999




```
*************************************************
*                                               *
*           S T A A D - III                     *
*           Revision 17.0a                      *
*           Proprietary Program of              *
*           RESEARCH ENGINEERS, Inc.            *
*           Date=    JUL  6, 1999               *
*           Time=     7:35:10                   *
*                                               *
*************************************************

 1. STAAD FLOOR LAV MADRID-ZARAGOZA. LOSA VANOS 20+26+20
 2. *REPARTO TRANSVERSAL
 3. UNIT METER MTON
 4. JOINT COORDINATES
 5. 101    0.000   0.000  -3.750   110  18.000   0.000  -3.750
 6. 111   20.000   0.000  -3.750   120  43.400   0.000  -3.750
 7. 121   46.000   0.000  -3.750   131  66.000   0.000  -3.750
 8. 201    0.000   0.000  -1.050   210  18.000   0.000  -1.050
 9. 211   20.000   0.000  -1.050   220  43.400   0.000  -1.050
10. 221   46.000   0.000  -1.050   231  66.000   0.000  -1.050
11. 301    0.000   0.000   1.050   310  18.000   0.000   1.050
12. 311   20.000   0.000   1.050   320  43.400   0.000   1.050
13. 321   46.000   0.000   1.050   331  66.000   0.000   1.050
14. 401    0.000   0.000   3.750   410  18.000   0.000   3.750
15. 411   20.000   0.000   3.750   420  43.400   0.000   3.750
16. 421   46.000   0.000   3.750   431  66.000   0.000   3.750
17. 10001  0.000   0.000  -2.150
18. 10002 20.000   0.000  -1.800
19. 10003 46.000   0.000  -1.800
20. 10004 66.000   0.000  -2.150
21. 10011  0.000   0.000   2.150
22. 10012 20.000   0.000   1.800
23. 10013 46.000   0.000   1.800
24. 10014 66.000   0.000   2.150
25. MEMBER INCIDENCES
26.    101  101  102
27.    R    29   1    1
28.    RA   3    100  100
29.    1101 101  201
30.    R    30   1    1
31.    1201 201  301
32.    R    30   1    1
33.    1301 301  401
34.    R    30   1    1
35. 10001  101   10001
36. 10002  10001 201
37. 10011  111   10002
38. 10012  10002 211
39. 10021  121   10003
40. 10022  10003 221
41. 10031  131   10004
42. 10032  10004 231
43. 10101  301   10011
44. 10102  10011 401
45. 10111  311   10012
46. 10112  10012 411
47. 10121  321   10013
```

```
*REPARTO TRANSVERSAL
48. 10122  10013 421
49. 10131  131   10014
 0. 10132  10014 431
51. DELETE MEMBER 1101 1111 1121 1131 1301 1311 1321 1331
52. MEMBER PROPERTY
53. 101  TO  130  PR  AX  3.7040  IX  0.1829  IZ  1.0080
54. 201  TO  230  PR  AX  2.8500  IX  0.1829  IZ  1.1340
55. 301  TO  330  PR  AX  2.8500  IX  0.1829  IZ  1.1340
56. 401  TO  430  PR  AX  3.7040  IX  0.1829  IZ  1.0080
57. 1102 TO 1110  PR  AX  1.4000  IX  0.0340  IZ  0.0143
58. 1112 TO 1120  PR  AX  1.4000  IX  0.0340  IZ  0.0143
59. 1122 TO 1130  PR  AX  1.4000  IX  0.0340  IZ  0.0143
60. 1201 TO 1231  PR  AX  1.4000  IX  0.0340  IZ  0.0143
61. 1302 TO 1310  PR  AX  1.4000  IX  0.0340  IZ  0.0143
62. 1312 TO 1320  PR  AX  1.4000  IX  0.0340  IZ  0.0143
63. 1322 TO 1330  PR  AX  1.4000  IX  0.0340  IZ  0.0143
64. 10001   10002 PR  AX  1.4000  IX  0.0340  IZ  0.0143
65. 10011   10012 PR  AX  1.4000  IX  0.0340  IZ  0.0143
66. 10021   10022 PR  AX  1.4000  IX  0.0340  IZ  0.0143
67. 10031   10032 PR  AX  1.4000  IX  0.0340  IZ  0.0143
68. 10101   10102 PR  AX  1.4000  IX  0.0340  IZ  0.0143
69. 10111   10112 PR  AX  1.4000  IX  0.0340  IZ  0.0143
70. 10121   10122 PR  AX  1.4000  IX  0.0340  IZ  0.0143
71. 10131   10132 PR  AX  1.4000  IX  0.0340  IZ  0.0143
72. CONSTANTS
73. E   3250000.  ALL
74. DEN  7.85      ALL
75. POI  0.15      ALL
76. SUPPORTS
77. 10001 TO 10004    PINNED
78. 10011 TO 10014    PINNED
79. LOADING 1 DOS TRENES EN VANO DE 26.0 M CON RIPADO 30 CM
80. MEMBER LOAD
81. *TREN SOBRE UNA VIA
82. 111 TO 120  UNI GY  -6.67
83. 211 TO 220  UNI GY  -5.33
84. *TREN SOBRE OTRA VIA
85. 311 TO 320  UNI GY  -8.39
86. 411 TO 420  UNI GY  -3.61
87. PERFORM ANALISIS


      P R O B L E M   S T A T I S T I C S
      -----------------------------------

   NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =   132/  221/    8
   ORIGINAL/FINAL BAND-WIDTH =  124/    6
   TOTAL PRIMARY LOAD CASES  =    1, TOTAL DEGREES OF FREEDOM =   388
   SIZE OF STIFFNESS MATRIX =    8148 DOUBLE PREC. WORDS
   TOTAL REQUIRED DISK SPACE =   12.46 MEGA-BYTES


++ PROCESSING ELEMENT STIFFNESS MATRIX.              7:35:12
++ PROCESSING GLOBAL STIFFNESS MATRIX.               7:35:13
++ PROCESSING TRIANGULAR FACTORIZATION.              7:35:13
++ CALCULATING JOINT DISPLACEMENTS.                  7:35:13
++ CALCULATING MEMBER  FORCES.                       7:35:13

  88. LOAD LIST 1
```



```
*REPARTO TRANSVERSAL
89. PRINT MEMBER FORCES LIST 115 215 315 415
```

MBER END FORCES STRUCTURE TYPE = FLOOR

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
115	1	115	0.00	16.07	0.00	-1.55	0.00	-263.36
		116	0.00	1.27	0.00	1.55	0.00	282.60
215	1	215	0.00	16.41	0.00	0.41	0.00	-325.70
		216	0.00	-2.56	0.00	-0.41	0.00	350.36
315	1	315	0.00	19.89	0.00	1.69	0.00	-294.81
		316	0.00	1.92	0.00	-1.69	0.00	318.16
415	1	415	0.00	10.54	0.00	2.69	0.00	-201.27
		416	0.00	-1.15	0.00	-2.69	0.00	216.46

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

90. PRINT MEMBER FORCES LIST 111 211 311 411

MEMBER END FORCES STRUCTURE TYPE = FLOOR

ALL UNITS ARE -- MTON METE

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
111	1	111	0.00	63.36	0.00	-9.24	0.00	150.58
		112	0.00	-46.02	0.00	9.24	0.00	-8.40
211	1	211	0.00	110.05	0.00	23.85	0.00	335.68
		212	0.00	-96.19	0.00	-23.85	0.00	-67.56
311	1	311	0.00	94.59	0.00	-10.23	0.00	270.00
		312	0.00	-72.78	0.00	10.23	0.00	-52.42
411	1	411	0.00	44.51	0.00	14.99	0.00	110.82
		412	0.00	-35.13	0.00	-14.99	0.00	-7.29

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

91. PRINT JOI DIS LIST 116 216 316 416

INT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = FLOOR

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
116	1	0.00000	-0.72318	0.00000	-0.00074	0.00000	0.00000
216	1	0.00000	-0.56433	0.00000	-0.00037	0.00000	0.00000
316	1	0.00000	-0.52073	0.00000	-0.00008	0.00000	0.00000
416	1	0.00000	-0.51288	0.00000	0.00007	0.00000	0.00000

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

92. PRINT REACC ALL

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = FLOOR

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
10001	1	0.00	-22.45	0.00	0.00	0.00	0.00
10002	1	0.00	208.37	0.00	0.00	0.00	0.00
10003	1	0.00	210.50	0.00	0.00	0.00	0.00
10004	1	0.00	-24.07	0.00	0.00	0.00	0.00
10011	1	0.00	-20.91	0.00	0.00	0.00	0.00
10012	1	0.00	147.49	0.00	0.00	0.00	0.00
10013	1	0.00	143.68	0.00	0.00	0.00	0.00
10014	1	0.00	-18.62	0.00	0.00	0.00	0.00

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

93. PLOT BEND FILE
94. PLOT DISP FILE
95. FINISH

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

**** DATE= JUL 6,1999 TIME= 7:35:22 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

REPARTO TRANSVERSAL EN CENTRO DE VANO

BARRA	μ_i	I	μ_i/I	$\Delta \frac{\mu_i/I}{\Sigma \mu_i/I}$
115	282.60	1.0080	280	1.033
215	330.36	1.1340	309	1.140
815	818.16	1.1340	280	1.033
415	216.46	1.0080	215	0.79
TOTAL	1167.57	4.2849	1084	4.00

REPARTO TRANSVERSAL EN APOYOS

111	-110.58	1.0080	149	0.75
211	-335.68	1.1340	296	1.49
311	-270.00	1.1340	238	1.20
411	-110.92	1.0080	110	0.55
TOTAL	-867.58	4.2849	793	4.00

$\gamma_{exc\ vano} = 1.140$

$\gamma_{exc\ ap} = 1.490$

CÁLCULO DEL COEFICIENTE DE IMPACTO

a) SEGÚN IAP-98

$$I = 65 \frac{\mu}{1 - \mu + \mu^2}$$

$$\mu = \frac{VT}{2L}$$

$V = 200\ km/hor = 55.55\ m/seg$

$E = 38 \times 10^6\ t/m^2$

$I = 4.2849\ m^4$

$$\mu = \frac{1}{9.81}\left(13.108 \times 2.50 + 14 \times 0.83\right) = 4.52$$

$$f = 1.57 \sqrt{\frac{EI}{WL}} = 1.57 \sqrt{\frac{3.8 \times 10^6 \times 4.2849}{4.52 \times 264}} = 4.40$$

$T = 1/f = 0.23\ seg$

$$\mu = \frac{55.55 \times 0.23}{2 \times 26} = 0.24$$

$$I = 65 \frac{0.24}{1 - 0.24 + 0.24^2} = 19 \qquad \phi_{26} = 1.19$$

$$f = 1.57 \sqrt{\frac{38 \times 10^6 \times 4.2849}{4.52 \times 264}} = 4.45$$

$T = 0.13\ seg$

$$\mu = \frac{55.55 \times 0.13}{2 \times 26} = 0.18$$

$$J = 65\ \frac{018}{1-0.18+0.18^2} = 13 \qquad \phi_{20} = 1.13$$

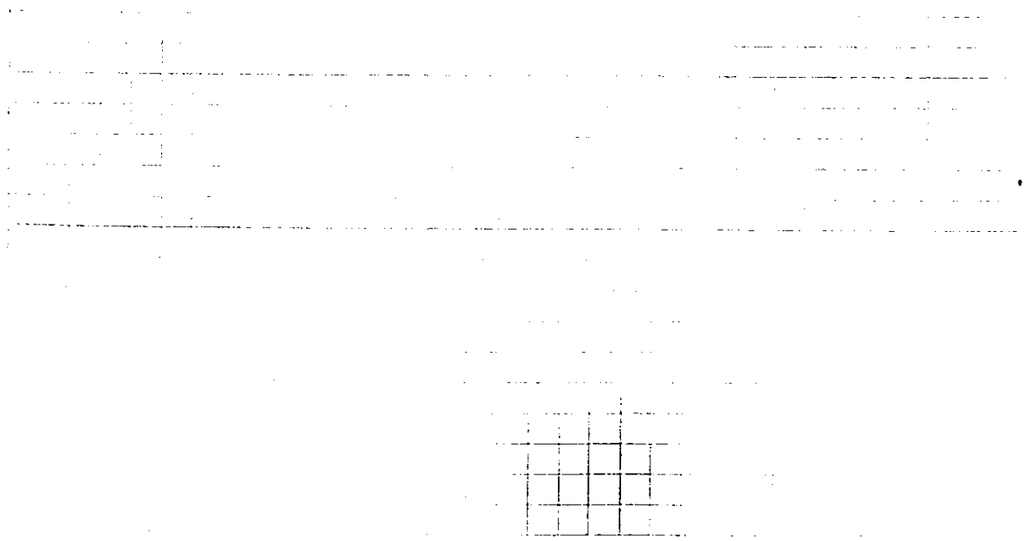
b) Pour VIC

Flambement flexion

$$\phi = \frac{1.44}{\sqrt{L_\phi} - 0.2} + 0.22 < 1.67$$

si $L_\phi = 26$ $\quad \phi = 1,11$

si $L_\phi = 20$ $\quad \phi = 1.16$



CALCULO DEL PRETENSADO LONGITUDINAL

CALCULO DEL PRETENSADO

```
3 2
  0  1  9 2.0
     1  9 2.6
1 2   1 10 2.0
2
1  23 0  0  1
23 31 1  1  1
16.501 4.7065 0.834 1.065 14.00
13.108 4.2849 0.791 1.108 14.00
1
1 1
9 2
1 1
1
9 2
1 1
1
9 2
1 1
400 2.5
1 2 0 2
  2
    0.0  0.000012
1.14  1.49
1.5  1.19  1.13  2
4 0.005
1
1.1 0.9
0.00025 .04 2.5
19000 190 75 24
4 0 3
1 11
0.0000    -0.791    -0.102
8.0000    -1.200     0.000
17.750    -0.550     0.133
20.000    -0.400     0.000
22.850    -0.689    -0.203
33.000    -1.720     0.000
43.150    -0.689     0.203
46.000    -0.400     0.000
  250     -0.550    -0.133
  .00     -1.200     0.000
66.00     -0.791     0.102
1  2
0.0000    -0.211     0.000
66.000    -0.211     0.000
1  2
0.0000    -1.750     0.000
66.000    -1.750     0.000
1 3834.0 27456. 0.21 0.006 0 1 31  1 23 1
1 3834.0 27456. 0.21 0.006 2 1 31 23 31 2
2  959.0  6864. 0.21 0.006 0 1 31  1 31 1
3  959.0  6864. 0.21 0.006 0 1 31  1 31 1
2.000 1.000
```

Programa general de puentes continuos (V1-0)

Proyecto : LAV MADRID-ZARAGOZA. VIADUCTO 5. LOSA VANOS 20+26+20

Definicion geometrica de vanos

	Longitud
Vano 1	20.0000 m
Vano 2	26.0000 m
Vano 3	20.0000 m

Definicion de cargas

Cargas muertas ..... = 0.830 t/m2

Tren RENFE/U.I.C. :

Coef. de excent. en centro de vano	1.140
Coef. de excent. en apoyo	1.490
Ancho de aceras	1.500 m
Coef. de impacto para tren de RENFE	1.190
Coef. de impacto para tren de U.I.C.	1.130
Numero de vias	2

Temperatura :

Coef. de dilatacion termica de 1E-04
Gradiente lineal termico entre ..... 5.000 y 0.000 grad

Descensos de apoyos (Lentos) :

Hip. 1 Apoyo 1 descenso de 0.005 m.
Hip. 2 Apoyo 11 descenso de 0.005 m.
Hip. 3 Apoyo 21 descenso de 0.005 m.
Hip. 4 Apoyo 31 descenso de 0.005 m.

Caracteristicas de los materiales

Resistencia caracteristica del hormigon ..... =	400.00	kg/cm2
Densidad del hormigon ..... =	2.50	t/m3
Modulo de elasticidad del acero de pretensar .. =	19000.00	kg/mm2
Tension de rotura de los cables ..... =	190.00	kg/mm2
Porcentaje a que se tesan los cables ..... =	75.	%
Retraccion del hormigon ..... =	0.00025	
Coeficiente de relajacion del acero ..... =	0.04000	
Coeficiente de fluencia del hormigon ..... =	2.50000	
Coef. de ponderacion para pretensado inicial .. =	1.1000	
Coef. de ponderacion para pretensado final .. =	0.9000	

Definicion de secciones de la estructura final

Vano	Sec	X	Y(Vs)	Vi	Area	Inercia	Ancho
1	1	0.000	0.834	1.065	16.501	4.706500	14.000
	2	2.000	0.791	1.108	13.108	4.284900	14.000
	3	4.000	0.791	1.108	13.108	4.284900	14.000
	4	6.000	0.791	1.108	13.108	4.284900	14.000
	5	8.000	0.791	1.108	13.108	4.284900	14.000
	6	10.000	0.791	1.108	13.108	4.284900	14.000
	7	12.000	0.791	1.108	13.108	4.284900	14.000
	8	14.000	0.791	1.108	13.108	4.284900	14.000
	9	16.000	0.791	1.108	13.108	4.284900	14.000
	10	18.000	0.791	1.108	13.108	4.284900	14.000
	11	20.000	0.834	1.065	16.501	4.706500	14.000
2	11	20.000	0.834	1.065	16.501	4.706500	14.000
	12	22.600	0.791	1.108	13.108	4.284900	14.000
	13	25.200	0.791	1.108	13.108	4.284900	14.000
	14	27.800	0.791	1.108	13.108	4.284900	14.000
	15	30.400	0.791	1.108	13.108	4.284900	14.000
	16	33.000	0.791	1.108	13.108	4.284900	14.000
	17	35.600	0.791	1.108	13.108	4.284900	14.000
	18	38.200	0.791	1.108	13.108	4.284900	14.000
	19	40.800	0.791	1.108	13.108	4.284900	14.000
	20	43.400	0.791	1.108	13.108	4.284900	14.000
	21	46.000	0.834	1.065	16.501	4.706500	14.000
3	21	46.000	0.834	1.065	16.501	4.706500	14.000
	22	48.000	0.791	1.108	13.108	4.284900	14.000
	23	50.000	0.791	1.108	13.108	4.284900	14.000
	24	52.000	0.791	1.108	13.108	4.284900	14.000
	25	54.000	0.791	1.108	13.108	4.284900	14.000
	26	56.000	0.791	1.108	13.108	4.284900	14.000
	27	58.000	0.791	1.108	13.108	4.284900	14.000
	28	60.000	0.791	1.108	13.108	4.284900	14.000
	29	62.000	0.791	1.108	13.108	4.284900	14.000
	30	64.000	0.791	1.108	13.108	4.284900	14.000
	31	66.000	0.834	1.065	16.501	4.706500	14.000

Definicion de estados de la estructura

	Numero de secciones	Numero de secciones activas
Estado 1	23	de 1 a 23
Estado 2	31	de 23 a 31

Cable Numero 1 (Pertenece a familia 1)

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 23 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.791	-0.10200
2	8.000	-1.200	0.00000
3	17.750	-0.550	0.13300
4	20.000	-0.400	0.00000
5	22.850	-0.689	-0.20300
6	33.000	-1.720	0.00000
7	43.150	-0.689	0.20300
8	46.000	-0.400	0.00000
9	48.250	-0.550	-0.13300
10	56.000	-1.200	0.00000
11	66.000	-0.791	0.10200

Cable Numero 2 (Pertenece a familia 2)

Definicion general

Seccion inicial ..... = 23 (Pasiva)
Seccion final ..... = 31 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.791	-0.10200
2	8.000	-1.200	0.00000
3	17.750	-0.550	0.13300
4	20.000	-0.400	0.00000
5	22.850	-0.689	-0.20300
6	33.000	-1.720	0.00000
7	43.150	-0.689	0.20300
8	46.000	-0.400	0.00000
9	48.250	-0.550	-0.13300
10	56.000	-1.200	0.00000
11	66.000	-0.791	0.10200

Cable Numero 3 (Pertenece a familia 1)

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 31 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-0.211	0.00000
2	66.000	-0.211	0.00000

Cable Numero 4 (Pertenece a familia 1)

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 31 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Puntos Singulares del trazado

Pto.	X	Y	Pend
1	0.000	-1.750	0.00000
2	66.000	-1.750	0.00000

Esfuerzos acumulados por peso propio

Estado 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-224.15	-4.02
	1	2	374.36	-150.13	-4.02
	2	3	609.12	-84.61	0.00
	3	4	712.80	-19.07	0.00
	4	5	685.40	46.47	0.00
	5	6	526.92	112.01	0.00
	6	7	237.36	177.55	0.00
	7	8	-183.27	243.09	0.00
	8	9	-734.99	308.63	0.00
	9	10	-1417.79	374.17	0.00
	10	11	-2240.19	448.11	-8.84
2	11	11	-2240.19	-512.74	-7.68
	11	12	-1032.00	-416.51	-7.68
	12	13	-59.71	-331.36	0.00
	13	14	691.05	-246.15	0.00
	14	15	1220.29	-160.95	0.00
	15	16	1528.01	-75.75	0.00
	16	17	1614.19	9.45	0.00
	17	18	1478.86	94.65	0.00
	18	19	1121.99	179.86	0.00
	19	20	543.61	265.06	0.00
	20	21	-270.67	361.26	-5.18
3	21	21	-270.68	-139.55	-2.20
	21	22	-65.54	-65.53	-2.20
	22	23	0.00	0.00	0.00

Esfuerzos acumulados por peso propio

Estado 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-233.91	-4.23
	1	2	393.90	-159.89	-4.23
	2	3	648.20	-94.38	0.00
	3	4	771.42	-28.84	0.00
	4	5	763.56	36.70	0.00
	5	6	624.62	102.24	0.00
	6	7	354.60	167.78	0.00
	7	8	-46.50	233.32	0.00
	8	9	-578.68	298.86	0.00
	9	10	-1241.94	364.40	0.00
	10	11	-2044.80	438.35	-8.63
2	11	11	-2044.80	-478.91	-7.12
	11	12	-924.59	-382.68	-7.12
	12	13	-40.28	-297.52	0.00
	13	14	622.51	-212.32	0.00
	14	15	1063.78	-127.11	0.00
	15	16	1283.51	-41.91	0.00
	16	17	1281.73	43.29	0.00
	17	18	1058.42	128.49	0.00
	18	19	613.58	213.69	0.00
	19	20	-52.79	298.90	0.00
	20	21	-955.04	395.09	-5.74
3	21	21	-955.05	-383.87	-7.46
	21	22	-261.16	-309.85	-7.46
	22	23	293.12	-244.37	0.00
	23	24	716.33	-178.83	0.00
	24	25	1008.45	-113.29	0.00
	25	26	1169.49	-47.75	0.00
	26	27	1199.46	17.79	0.00
	27	28	1098.34	83.33	0.00
	28	29	866.15	148.87	0.00
	29	30	502.87	214.41	0.00
	30	31	0.00	288.39	-5.40

Esfuerzos acumulados por peso propio

Estructura completa estado inicial

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-233.91	-4.23
	1	2	393.90	-159.89	-4.23
	2	3	648.20	-94.38	0.00
	3	4	771.42	-28.84	0.00
	4	5	763.56	36.70	0.00
	5	6	624.62	102.24	0.00
	6	7	354.60	167.78	0.00
	7	8	-46.50	233.32	0.00
	8	9	-578.68	298.86	0.00
	9	10	-1241.94	364.40	0.00
	10	11	-2044.80	438.35	-8.63
2	11	11	-2044.80	-478.91	-7.12
	11	12	-924.59	-382.68	-7.12
	12	13	-40.28	-297.52	0.00
	13	14	622.51	-212.32	0.00
	14	15	1063.78	-127.11	0.00
	15	16	1283.51	-41.91	0.00
	16	17	1281.73	43.29	0.00
	17	18	1058.42	128.49	0.00
	18	19	613.58	213.69	0.00
	19	20	-52.79	298.90	0.00
	20	21	-955.04	395.09	-5.74
3	21	21	-955.05	-383.87	-7.46
	21	22	-261.16	-309.85	-7.46
	22	23	293.12	-244.37	0.00
	23	24	716.33	-178.83	0.00
	24	25	1008.45	-113.29	0.00
	25	26	1169.49	-47.75	0.00
	26	27	1199.46	17.79	0.00
	27	28	1098.34	83.33	0.00
	28	29	866.15	148.87	0.00
	29	30	502.87	214.41	0.00
	30	31	0.00	288.39	-5.40

Esfuerzos acumulados por peso propio

Estructura completa estado final

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-245.02	-4.47
	1	2	416.11	-171.00	-4.47
	2	3	692.63	-105.49	0.00
	3	4	838.06	-39.95	0.00
	4	5	852.42	25.59	0.00
	5	6	735.70	91.13	0.00
	6	7	487.89	156.67	0.00
	7	8	109.01	222.21	0.00
	8	9	-400.96	287.75	0.00
	9	10	-1042.00	353.29	0.00
	10	11	-1822.64	427.24	-8.39
2	11	11	-1822.64	-440.44	-6.49
	11	12	-802.46	-344.21	-6.49
	12	13	-18.18	-259.05	0.00
	13	14	544.58	-173.84	0.00
	14	15	885.81	-88.64	0.00
	15	16	1005.52	-3.44	0.00
	16	17	903.70	81.76	0.00
	17	18	580.36	166.96	0.00
	18	19	35.49	252.17	0.00
	19	20	-730.90	337.37	0.00
	20	21	-1733.19	433.56	-6.37
3	21	21	-1733.19	-422.77	-8.29
	21	22	-961.49	-348.75	-8.29
	22	23	-329.40	-283.28	0.00
	23	24	171.62	-217.74	0.00
	24	25	541.56	-152.20	0.00
	25	26	780.42	-86.66	0.00
	26	27	888.20	-21.12	0.00
	27	28	864.90	44.42	0.00
	28	29	710.52	109.96	0.00
	29	30	425.06	175.50	0.00
	30	31	0.00	249.49	-4.57

Esfuerzos debidos a cargas muertas

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	-84.46	-1.57
	1	2	145.70	-61.22	-1.57
	2	3	244.92	-37.99	0.00
	3	4	297.65	-14.75	0.00
	4	5	303.90	8.49	0.00
	5	6	263.68	31.73	0.00
	6	7	176.97	54.97	0.00
	7	8	43.78	78.21	0.00
	8	9	-135.88	101.45	0.00
	9	10	-362.03	124.69	0.00
	10	11	-634.67	147.91	-2.93
2	11	11	-634.67	-151.05	-2.25
	11	12	-281.18	-120.83	-2.25
	12	13	-6.25	-90.64	0.00
	13	14	190.13	-60.42	0.00
	14	15	307.96	-30.21	0.00
	15	16	347.23	0.00	0.00
	16	17	307.96	30.21	0.00
	17	18	190.13	60.42	0.00
	18	19	-6.25	90.64	0.00
	19	20	-281.18	120.85	0.00
	20	21	-634.67	151.05	-2.25
3	21	21	-634.67	-147.91	-2.93
	21	22	-362.03	-124.67	-2.93
	22	23	-135.88	-101.45	0.00
	23	24	43.78	-78.21	0.00
	24	25	176.97	-54.97	0.00
	25	26	263.68	-31.73	0.00
	26	27	303.90	-8.49	0.00
	27	28	297.65	14.75	0.00
	28	29	244.92	37.99	0.00
	29	30	145.70	61.23	0.00
	30	31	0.00	84.46	-1.57

Esfuerzos por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
1	1	1	0.00	-30.13	-0.65	0.00	0.00
	1	2	60.28	-30.13	-0.65	-1.12	1.55
	2	3	120.55	-30.14	0.00	-2.23	3.12
	3	4	180.83	-30.14	0.00	-3.34	4.68
	4	5	241.11	-30.14	0.00	-4.45	6.23
	5	6	301.38	-30.14	0.00	-5.56	7.79
	6	7	361.66	-30.14	0.00	-6.68	9.35
	7	8	421.93	-30.14	0.00	-7.79	10.91
	8	9	482.21	-30.14	0.00	-8.90	12.47
	9	10	542.49	-30.14	0.00	-10.01	14.03
	10	11	602.77	-30.13	0.65	-10.68	13.64
2	11	11	602.77	0.00	0.00	-10.68	13.64
	11	12	602.77	0.00	0.00	-11.13	15.59
	12	13	602.76	0.00	0.00	-11.13	15.59
	13	14	602.76	0.00	0.00	-11.13	15.59
	14	15	602.76	0.00	0.00	-11.13	15.59
	15	16	602.76	0.00	0.00	-11.13	15.59
	16	17	602.76	0.00	0.00	-11.13	15.59
	17	18	602.76	0.00	0.00	-11.13	15.59
	18	19	602.76	0.00	0.00	-11.13	15.59
	19	20	602.76	0.00	0.00	-11.13	15.59
	20	21	602.77	0.00	0.00	-10.68	13.64
3	21	21	602.77	30.13	0.65	-10.68	13.64
	21	22	542.49	30.13	0.65	-10.01	14.03
	22	23	482.21	30.14	0.00	-8.90	12.47
	23	24	421.93	30.14	0.00	-7.79	10.91
	24	25	361.66	30.14	0.00	-6.68	9.35
	25	26	301.38	30.14	0.00	-5.56	7.79
	26	27	241.11	30.14	0.00	-4.45	6.23
	27	28	180.83	30.14	0.00	-3.34	4.68
	28	29	120.55	30.14	0.00	-2.23	3.12
	29	30	60.28	30.14	0.00	-1.11	1.56
	30	31	0.00	30.13	-0.65	0.00	0.00

Envolvente de cortantes por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
1	1	1	MAX	0.00	12.22	0.26	0.00	0.00
		1	MIN	0.00	-12.22	-0.26	0.00	0.00
	1	2	MAX	-24.45	12.22	0.26	0.45	-0.63
		2	MIN	24.45	-12.22	-0.26	-0.45	0.63
	2	3	MAX	-48.90	12.22	0.00	0.90	-1.26
		3	MIN	48.90	-12.22	0.00	-0.90	1.26
	3	4	MAX	-73.34	12.22	0.00	1.35	-1.90
		4	MIN	73.34	-12.22	0.00	-1.35	1.90
	4	5	MAX	-97.79	12.22	0.00	1.81	-2.53
		5	MIN	97.79	-12.22	0.00	-1.81	2.53
	5	6	MAX	-122.24	12.22	0.00	2.26	-3.16
		6	MIN	122.24	-12.22	0.00	-2.26	3.16
	6	7	MAX	-146.69	12.22	0.00	2.71	-3.79
		7	MIN	146.69	-12.22	0.00	-2.71	3.79
	7	8	MAX	-171.13	12.22	0.00	3.16	-4.43
		8	MIN	171.13	-12.22	0.00	-3.16	4.43
	8	9	MAX	-195.58	12.22	0.00	3.61	-5.06
		9	MIN	195.58	-12.22	0.00	-3.61	5.06
	9	10	MAX	-220.03	12.22	0.00	4.06	-5.69
		10	MIN	220.03	-12.22	0.00	-4.06	5.69
	10	11	MAX	-244.48	12.22	-0.26	4.33	-5.53
		11	MIN	244.48	-12.22	0.26	-4.33	5.53
2	11	11	MAX	244.48	18.80	0.31	-4.33	5.53
		11	MIN	-244.48	-18.80	-0.31	4.33	-5.53
	11	12	MAX	195.58	18.80	0.31	-3.61	5.06
		12	MIN	-195.58	-18.80	-0.31	3.61	-5.06
	12	13	MAX	146.69	18.81	0.00	-2.71	3.79
		13	MIN	-146.69	-18.81	0.00	2.71	-3.79
	13	14	MAX	97.79	18.81	0.00	-1.81	2.53
		14	MIN	-97.79	-18.81	0.00	1.81	-2.53
	14	15	MAX	48.90	18.81	0.00	-0.90	1.26
		15	MIN	-48.90	-18.81	0.00	0.90	-1.26
	15	16	MAX	0.00	18.81	0.00	0.00	0.00
		16	MIN	0.00	-18.81	0.00	0.00	0.00
	16	17	MAX	-48.90	18.81	0.00	0.90	-1.26
		17	MIN	48.90	-18.81	0.00	-0.90	1.26
	17	18	MAX	-97.79	18.81	0.00	1.81	-2.53
		18	MIN	97.79	-18.81	0.00	-1.81	2.53
	18	19	MAX	-146.69	18.81	0.00	2.71	-3.79
		19	MIN	146.69	-18.81	0.00	-2.71	3.79
	19	20	MAX	-195.58	18.81	0.00	3.61	-5.06
		20	MIN	195.58	-18.81	0.00	-3.61	5.06
	20	21	MAX	-244.48	18.80	-0.31	4.33	-5.53
		21	MIN	244.48	-18.80	0.31	-4.33	5.53

Envolvente de cortantes por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
3	21	21	MAX	244.48	12.22	0.26	-4.33	5.53
		21	MIN	-244.48	-12.22	-0.26	4.33	-5.53
	21	22	MAX	220.03	12.22	0.26	-4.06	5.69
		22	MIN	-220.03	-12.22	-0.26	4.06	-5.69
	22	23	MAX	195.58	12.22	0.00	-3.61	5.06
		23	MIN	-195.58	-12.22	0.00	3.61	-5.06
	23	24	MAX	171.13	12.22	0.00	-3.16	4.43
		24	MIN	-171.13	-12.22	0.00	3.16	-4.43
	24	25	MAX	146.69	12.22	0.00	-2.71	3.79
		25	MIN	-146.69	-12.22	0.00	2.71	-3.79
	25	26	MAX	122.24	12.22	0.00	-2.26	3.16
		26	MIN	-122.24	-12.22	0.00	2.26	-3.16
	26	27	MAX	97.79	12.22	0.00	-1.81	2.53
		27	MIN	-97.79	-12.22	0.00	1.81	-2.53
	27	28	MAX	73.34	12.22	0.00	-1.35	1.90
		28	MIN	-73.34	-12.22	0.00	1.35	-1.90
	28	29	MAX	48.90	12.22	0.00	-0.90	1.26
		29	MIN	-48.90	-12.22	0.00	0.90	-1.26
	29	30	MAX	24.45	12.22	0.00	-0.45	0.63
		30	MIN	-24.45	-12.22	0.00	0.45	-0.63
	30	31	MAX	0.00	12.22	-0.26	0.00	0.00
		31	MIN	0.00	-12.22	0.26	0.00	0.00

Envolvente de momentos por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
1	1	1	MAX	0.00	-12.22	-0.26	0.00	0.00
		1	MIN	0.00	12.22	0.26	0.00	0.00
	1	2	MAX	24.45	-12.22	-0.26	-0.45	0.63
		2	MIN	-24.45	12.22	0.26	0.45	-0.63
	2	3	MAX	48.90	-12.22	0.00	-0.90	1.26
		3	MIN	-48.90	12.22	0.00	0.90	-1.26
	3	4	MAX	73.34	-12.22	0.00	-1.35	1.90
		4	MIN	-73.34	12.22	0.00	1.35	-1.90
	4	5	MAX	97.79	-12.22	0.00	-1.81	2.53
		5	MIN	-97.79	12.22	0.00	1.81	-2.53
	5	6	MAX	122.24	-12.22	0.00	-2.26	3.16
		6	MIN	-122.24	12.22	0.00	2.26	-3.16
	6	7	MAX	146.69	-12.22	0.00	-2.71	3.79
		7	MIN	-146.69	12.22	0.00	2.71	-3.79
	7	8	MAX	171.13	-12.22	0.00	-3.16	4.43
		8	MIN	-171.13	12.22	0.00	3.16	-4.43
	8	9	MAX	195.58	-12.22	0.00	-3.61	5.06
		9	MIN	-195.58	12.22	0.00	3.61	-5.06
	9	10	MAX	220.03	-12.22	0.00	-4.06	5.69
		10	MIN	-220.03	12.22	0.00	4.06	-5.69
	10	11	MAX	244.48	-12.22	0.26	-4.33	5.53
		11	MIN	-244.48	12.22	-0.26	4.33	-5.53
2	11	11	MAX	244.48	18.80	0.31	-4.33	5.53
		11	MIN	-244.48	-18.80	-0.31	4.33	-5.53
	11	12	MAX	195.58	18.80	0.31	-3.61	5.06
		12	MIN	-195.58	-18.80	-0.31	3.61	-5.06
	12	13	MAX	146.69	18.81	0.00	-2.71	3.79
		13	MIN	-146.69	-18.81	0.00	2.71	-3.79
	13	14	MAX	108.56	13.49	0.00	-2.00	2.81
		14	MIN	-108.56	-13.49	0.00	2.00	-2.81
	14	15	MAX	76.81	0.00	0.00	-1.42	1.99
		15	MIN	-76.81	0.00	0.00	1.42	-1.99
	15	16	MAX	76.81	0.00	0.00	-1.42	1.99
		16	MIN	-76.81	0.00	0.00	1.42	-1.99
	16	17	MAX	76.81	0.00	0.00	-1.42	1.99
		17	MIN	-76.81	0.00	0.00	1.42	-1.99
	17	18	MAX	108.56	-13.49	0.00	-2.00	2.81
		18	MIN	-108.56	13.49	0.00	2.00	-2.81
	18	19	MAX	146.69	-18.81	0.00	-2.71	3.79
		19	MIN	-146.69	18.81	0.00	2.71	-3.79
	19	20	MAX	195.58	-18.81	0.00	-3.61	5.06
		20	MIN	-195.58	18.81	0.00	3.61	-5.06
	20	21	MAX	244.48	-18.80	0.31	-4.33	5.53
		21	MIN	-244.48	18.80	-0.31	4.33	-5.53

Envolvente de momentos por descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)	Ten.Sup. (kg/cm2)	Ten.Inf. (kg/cm2)
3	21	21	MAX	244.48	12.22	0.26	-4.33	5.53
		21	MIN	-244.48	-12.22	-0.26	4.33	-5.53
	21	22	MAX	220.03	12.22	0.26	-4.06	5.69
		22	MIN	-220.03	-12.22	-0.26	4.06	-5.69
	22	23	MAX	195.58	12.22	0.00	-3.61	5.06
		23	MIN	-195.58	-12.22	0.00	3.61	-5.06
	23	24	MAX	171.13	12.22	0.00	-3.16	4.43
		24	MIN	-171.13	-12.22	0.00	3.16	-4.43
	24	25	MAX	146.69	12.22	0.00	-2.71	3.79
		25	MIN	-146.69	-12.22	0.00	2.71	-3.79
	25	26	MAX	122.24	12.22	0.00	-2.26	3.16
		26	MIN	-122.24	-12.22	0.00	2.26	-3.16
	26	27	MAX	97.79	12.22	0.00	-1.81	2.53
		27	MIN	-97.79	-12.22	0.00	1.81	-2.53
	27	28	MAX	73.34	12.22	0.00	-1.35	1.90
		28	MIN	-73.34	-12.22	0.00	1.35	-1.90
	28	29	MAX	48.90	12.22	0.00	-0.90	1.26
		29	MIN	-48.90	-12.22	0.00	0.90	-1.26
	29	30	MAX	24.45	12.22	0.00	-0.45	0.63
		30	MIN	-24.45	-12.22	0.00	0.45	-0.63
	30	31	MAX	0.00	12.22	-0.26	0.00	0.00
		31	MIN	0.00	-12.22	0.26	0.00	0.00

Envolvente de cortantes por paso de ferrocarril (RENFE)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	81.84	1.18
		1	MIN	0.00	-389.79	-4.99
	1	2	MAX	-156.02	78.01	0.00
		2	MIN	659.95	-288.39	0.00
	2	3	MAX	-296.67	74.17	0.00
		3	MIN	1096.73	-195.14	0.00
	3	4	MAX	-421.92	70.32	0.00
		4	MIN	1334.96	-110.08	0.00
	4	5	MAX	-531.80	66.48	0.00
		5	MIN	1399.23	-33.22	0.00
	5	6	MAX	436.91	96.04	0.00
		6	MIN	113.91	-11.39	0.00
	6	7	MAX	524.08	168.86	0.00
		7	MIN	145.08	-12.09	0.00
	7	8	MAX	122.21	253.57	0.00
		8	MIN	179.05	-12.79	0.00
	8	9	MAX	-485.02	346.47	0.00
		9	MIN	215.82	-13.49	0.00
	9	10	MAX	-1322.18	447.58	0.00
		10	MIN	255.39	-14.19	0.00
	10	11	MAX	-2413.90	556.78	-7.40
		11	MIN	297.76	-14.89	0.21
2	11	11	MAX	297.76	51.56	0.57
		11	MIN	-2510.52	-610.16	-6.14
	11	12	MAX	156.00	49.14	0.00
		12	MIN	-1021.03	-473.47	0.00
	12	13	MAX	26.83	46.72	0.00
		13	MIN	66.06	-347.38	0.00
	13	14	MAX	-89.73	44.30	0.00
		14	MIN	792.34	-231.94	0.00
	14	15	MAX	-193.70	41.88	0.00
		15	MIN	1199.36	-127.16	0.00
	15	16	MAX	1027.46	39.45	0.00
		16	MIN	-285.07	-39.45	0.00
	16	17	MAX	1199.36	127.16	0.00
		17	MIN	-193.70	-41.88	0.00
	17	18	MAX	792.34	231.94	0.00
		18	MIN	-89.73	-44.30	0.00
	18	19	MAX	66.06	347.38	0.00
		19	MIN	26.83	-46.72	0.00
	19	20	MAX	-1021.03	473.47	0.00
		20	MIN	156.00	-49.14	0.00
	20	21	MAX	-2510.52	610.16	-6.14
		21	MIN	297.76	-51.56	0.57
3	21	21	MAX	297.76	14.89	0.21
		21	MIN	-2413.90	-556.78	-7.40
	21	22	MAX	255.39	14.19	0.00
		22	MIN	-1322.18	-447.58	0.00

Envolvente de cortantes por paso de ferrocarril (RENFE)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	215.82	13.49	0.00
		23	MIN	-485.02	-346.47	0.00
	23	24	MAX	179.05	12.79	0.00
		24	MIN	122.21	-253.57	0.00
	24	25	MAX	145.08	12.09	0.00
		25	MIN	524.08	-168.86	0.00
	25	26	MAX	113.91	11.39	0.00
		26	MIN	436.91	-96.04	0.00
	26	27	MAX	1399.23	33.22	0.00
		27	MIN	-531.80	-66.48	0.00
	27	28	MAX	1334.96	110.08	0.00
		28	MIN	-421.92	-70.32	0.00
	28	29	MAX	1096.73	195.14	0.00
		29	MIN	-296.67	-74.17	0.00
	29	30	MAX	659.95	288.39	0.00
		30	MIN	-156.02	-78.01	0.00
	30	31	MAX	0.00	389.79	-4.99
		31	MIN	0.00	-81.84	1.18

Envolvente de momentos por paso de ferrocarril (RENFE)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-389.79	-4.99
		1	MIN	0.00	81.84	1.18
	1	2	MAX	659.95	-288.32	-4.99
		2	MIN	-156.02	77.99	1.18
	2	3	MAX	1096.73	-195.14	0.00
		3	MIN	-296.67	74.17	0.00
	3	4	MAX	1334.96	-110.08	0.00
		4	MIN	-421.92	70.32	0.00
	4	5	MAX	1399.23	-33.22	0.00
		5	MIN	-531.80	66.48	0.00
	5	6	MAX	1314.12	35.45	0.00
		6	MIN	-626.29	62.63	0.00
	6	7	MAX	1248.72	108.47	0.00
		7	MIN	-797.70	66.48	0.00
	7	8	MAX	1016.52	189.69	0.00
		8	MIN	-984.49	70.32	0.00
	8	9	MAX	592.95	279.10	0.00
		9	MIN	-1186.67	74.17	0.00
	9	10	MAX	255.39	-14.19	0.00
		10	MIN	-1526.72	398.11	0.00
	10	11	MAX	297.76	-14.89	0.21
		11	MIN	-2510.52	490.70	-6.55
2	11	11	MAX	297.76	51.56	0.57
		11	MIN	-2510.52	-610.16	-6.14
	11	12	MAX	156.00	49.14	0.57
		12	MIN	-1113.79	-411.10	-5.32
	12	13	MAX	676.39	-269.13	0.00
		13	MIN	-702.01	-46.72	0.00
	13	14	MAX	1253.27	-194.85	0.00
		14	MIN	-550.43	-44.30	0.00
	14	15	MAX	1543.91	-92.10	0.00
		15	MIN	-448.14	-14.30	0.00
	15	16	MAX	1567.39	0.00	0.00
		16	MIN	-396.36	-6.41	0.00
	16	17	MAX	1543.91	92.10	0.00
		17	MIN	-448.14	14.30	0.00
	17	18	MAX	1253.27	194.85	0.00
		18	MIN	-550.43	44.30	0.00
	18	19	MAX	676.39	269.13	0.00
		19	MIN	-702.01	46.72	0.00
	19	20	MAX	156.00	-49.14	0.00
		20	MIN	-1113.79	411.17	0.00
	20	21	MAX	297.76	-51.56	0.57
		21	MIN	-2510.52	610.16	-6.14
3	21	21	MAX	297.76	14.89	0.21
		21	MIN	-2510.52	-490.70	-6.55
	21	22	MAX	255.39	14.19	0.21
		22	MIN	-1526.72	-398.01	-6.55

Envolvente de momentos por paso de ferrocarril (RENFE)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	592.95	-279.10	0.00
		23	MIN	-1186.67	-74.17	0.00
	23	24	MAX	1016.52	-189.69	0.00
		24	MIN	-984.49	-70.32	0.00
	24	25	MAX	1248.72	-108.47	0.00
		25	MIN	-797.70	-66.48	0.00
	25	26	MAX	1314.12	-35.45	0.00
		26	MIN	-626.29	-62.63	0.00
	26	27	MAX	1399.23	33.22	0.00
		27	MIN	-531.80	-66.48	0.00
	27	28	MAX	1334.96	110.08	0.00
		28	MIN	-421.92	-70.32	0.00
	28	29	MAX	1096.73	195.14	0.00
		29	MIN	-296.67	-74.17	0.00
	29	30	MAX	659.95	288.39	0.00
		30	MIN	-156.02	-78.01	0.00
	30	31	MAX	0.00	389.79	1.18
		31	MIN	0.00	-81.84	-4.99

Envolvente de cortantes por paso de ferrocarril (UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	68.03	0.98
		1	MIN	0.00	-304.99	-4.01
	1	2	MAX	-129.70	64.85	0.00
		2	MIN	530.09	-239.37	0.00
	2	3	MAX	-246.62	61.65	0.00
		3	MIN	910.28	-178.75	0.00
	3	4	MAX	-350.74	58.46	0.00
		4	MIN	1155.76	-123.20	0.00
	4	5	MAX	-442.08	55.26	0.00
		5	MIN	1270.12	-30.59	0.00
	5	6	MAX	263.52	76.71	0.00
		6	MIN	101.60	-10.16	0.00
	6	7	MAX	626.36	147.19	0.00
		7	MIN	129.40	-10.78	0.00
	7	8	MAX	228.06	246.54	0.00
		8	MIN	159.71	-11.41	0.00
	8	9	MAX	-328.33	308.84	0.00
		9	MIN	192.50	-12.03	0.00
	9	10	MAX	-1046.41	376.20	0.00
		10	MIN	227.80	-12.65	0.00
	10	11	MAX	-1941.39	448.54	-6.08
		11	MIN	265.58	-13.28	0.19
2	11	11	MAX	265.58	45.99	0.51
		11	MIN	-2005.09	-464.17	-4.76
	11	12	MAX	139.14	43.83	0.00
		12	MIN	-847.38	-375.66	0.00
	12	13	MAX	23.93	41.67	0.00
		13	MIN	40.46	-293.68	0.00
	13	14	MAX	-80.04	39.51	0.00
		14	MIN	684.12	-218.28	0.00
	14	15	MAX	-172.77	37.35	0.00
		15	MIN	1113.20	-162.59	0.00
	15	16	MAX	713.77	35.19	0.00
		16	MIN	713.77	-35.19	0.00
	16	17	MAX	1113.21	162.59	0.00
		17	MIN	-172.77	-37.35	0.00
	17	18	MAX	684.12	218.28	0.00
		18	MIN	-80.04	-39.51	0.00
	18	19	MAX	40.46	293.68	0.00
		19	MIN	23.93	-41.67	0.00
	19	20	MAX	-847.38	375.66	0.00
		20	MIN	139.14	-43.83	0.00
	20	21	MAX	-2005.09	464.17	-4.76
		21	MIN	265.58	-45.99	0.51
3	21	21	MAX	265.58	13.28	0.19
		21	MIN	-1941.39	-448.54	-6.08
	21	22	MAX	227.80	12.65	0.00
		22	MIN	-1046.41	-376.20	0.00

Envolvente de cortantes por paso de ferrocarril (UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	192.50	12.03	0.00
		23	MIN	-328.33	-308.84	0.00
	23	24	MAX	159.71	11.41	0.00
		24	MIN	228.06	-246.54	0.00
	24	25	MAX	129.40	10.78	0.00
		25	MIN	626.36	-147.19	0.00
	25	26	MAX	101.60	10.16	0.00
		26	MIN	263.52	-76.71	0.00
	26	27	MAX	1270.12	30.59	0.00
		27	MIN	-442.08	-55.26	0.00
	27	28	MAX	1155.76	123.20	0.00
		28	MIN	-350.74	-58.46	0.00
	28	29	MAX	910.28	178.75	0.00
		29	MIN	-246.62	-61.65	0.00
	29	30	MAX	530.09	239.37	0.00
		30	MIN	-129.70	-64.85	0.00
	30	31	MAX	0.00	304.99	-4.01
		31	MIN	0.00	-68.03	0.98

Envolvente de momentos por paso de ferrocarril (UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-304.99	-4.01
		1	MIN	0.00	68.03	0.98
	1	2	MAX	530.09	-239.37	0.00
		2	MIN	-129.70	64.83	0.98
	2	3	MAX	910.28	-178.75	0.00
		3	MIN	-246.62	61.65	0.00
	3	4	MAX	1155.76	-123.20	0.00
		4	MIN	-350.74	58.46	0.00
	4	5	MAX	1270.12	-30.59	0.00
		5	MIN	-442.08	55.26	0.00
	5	6	MAX	1202.76	35.59	0.00
		6	MIN	-520.63	52.06	0.00
	6	7	MAX	1119.03	106.14	0.00
		7	MIN	-663.12	55.26	0.00
	7	8	MAX	836.10	203.11	0.00
		8	MIN	-818.40	58.46	0.00
	8	9	MAX	404.57	263.03	0.00
		9	MIN	-986.46	61.65	0.00
	9	10	MAX	227.80	-12.65	0.00
		10	MIN	-1257.67	300.86	-4.94
	10	11	MAX	265.58	-13.28	0.19
		11	MIN	-2005.09	369.58	-4.94
2	11	11	MAX	265.58	45.99	0.51
		11	MIN	-2005.09	-464.17	-4.76
	11	12	MAX	139.14	43.83	0.51
		12	MIN	-955.21	-310.79	-4.01
	12	13	MAX	490.60	-235.97	0.00
		13	MIN	-626.15	-41.67	0.00
	13	14	MAX	1024.08	-190.93	0.00
		14	MIN	-490.95	-39.51	0.00
	14	15	MAX	1367.32	-136.73	0.00
		15	MIN	-366.99	-37.35	0.00
	15	16	MAX	1417.04	0.00	0.00
		16	MIN	-254.27	35.19	0.00
	16	17	MAX	1367.32	136.73	0.00
		17	MIN	-366.99	37.35	0.00
	17	18	MAX	1024.08	190.93	0.00
		18	MIN	-490.95	39.51	0.00
	18	19	MAX	490.60	235.97	0.00
		19	MIN	-626.15	41.67	0.00
	19	20	MAX	139.14	-43.83	0.00
		20	MIN	-955.21	310.79	-4.01
	20	21	MAX	265.58	-45.99	0.51
		21	MIN	-2005.09	464.17	-4.76
3	21	21	MAX	265.58	13.28	0.19
		21	MIN	-2005.09	-369.58	-4.94
	21	22	MAX	227.80	12.65	0.19
		22	MIN	-1257.67	-300.86	-4.94

Envolvente de momentos por paso de ferrocarril (UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	404.57	-263.03	0.00
		23	MIN	-986.46	-61.65	0.00
	23	24	MAX	836.10	-203.11	0.00
		24	MIN	-818.40	-58.46	0.00
	24	25	MAX	1119.03	-106.14	0.00
		25	MIN	-663.12	-55.26	0.00
	25	26	MAX	1202.76	-35.59	0.00
		26	MIN	-520.63	-52.06	0.00
	26	27	MAX	1270.12	30.59	0.00
		27	MIN	-442.08	-55.26	0.00
	27	28	MAX	1155.76	123.20	0.00
		28	MIN	-350.74	-58.46	0.00
	28	29	MAX	910.28	178.75	0.00
		29	MIN	-246.62	-61.65	0.00
	29	30	MAX	530.09	239.37	0.00
		30	MIN	-129.70	-64.85	0.00
	30	31	MAX	0.00	304.99	0.98
		31	MIN	0.00	-68.03	-4.01

Envolvente de cortantes por ferrocarril (RENFE/UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	81.84	1.18
		1	MIN	0.00	-389.79	-4.99
	1	2	MAX	-156.02	78.01	0.00
		2	MIN	659.95	-288.39	0.00
	2	3	MAX	-296.67	74.17	0.00
		3	MIN	1096.73	-195.14	0.00
	3	4	MAX	-421.92	70.32	0.00
		4	MIN	1155.76	-123.20	0.00
	4	5	MAX	-531.80	66.48	0.00
		5	MIN	1399.23	-33.22	0.00
	5	6	MAX	436.91	96.04	0.00
		6	MIN	113.91	-11.39	0.00
	6	7	MAX	524.08	168.86	0.00
		7	MIN	145.08	-12.09	0.00
	7	8	MAX	122.21	253.57	0.00
		8	MIN	179.05	-12.79	0.00
	8	9	MAX	-485.02	346.47	0.00
		9	MIN	215.82	-13.49	0.00
	9	10	MAX	-1322.18	447.58	0.00
		10	MIN	255.39	-14.19	0.00
	10	11	MAX	-883.13	556.78	-7.40
		11	MIN	-909.94	-14.89	0.21
2	11	11	MAX	-883.13	51.56	0.57
		11	MIN	-909.94	-610.16	-6.14
	11	12	MAX	156.00	49.14	0.00
		12	MIN	-1021.03	-473.47	0.00
	12	13	MAX	26.83	46.72	0.00
		13	MIN	66.06	-347.38	0.00
	13	14	MAX	-89.73	44.30	0.00
		14	MIN	792.34	-231.94	0.00
	14	15	MAX	-193.70	41.88	0.00
		15	MIN	1113.20	-162.59	0.00
	15	16	MAX	1027.46	39.45	0.00
		16	MIN	-285.07	-39.45	0.00
	16	17	MAX	1113.21	162.59	0.00
		17	MIN	-193.70	-41.88	0.00
	17	18	MAX	792.34	231.94	0.00
		18	MIN	-89.73	-44.30	0.00
	18	19	MAX	66.06	347.38	0.00
		19	MIN	26.83	-46.72	0.00
	19	20	MAX	-1021.03	473.47	0.00
		20	MIN	156.00	-49.14	0.00
	20	21	MAX	-909.94	610.16	-6.14
		21	MIN	-883.13	-51.56	0.57
3	21	21	MAX	-909.94	14.89	0.21
		21	MIN	-883.13	-556.78	-7.40
	21	22	MAX	255.39	14.19	0.00
		22	MIN	-1322.18	-447.58	0.00

Envolvente de cortantes por ferrocarril (RENFE/UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	215.82	13.49	0.00
		23	MIN	-485.02	-346.47	0.00
	23	24	MAX	179.05	12.79	0.00
		24	MIN	122.21	-253.57	0.00
	24	25	MAX	145.08	12.09	0.00
		25	MIN	524.08	-168.86	0.00
	25	26	MAX	113.91	11.39	0.00
		26	MIN	436.91	-96.04	0.00
	26	27	MAX	1399.23	33.22	0.00
		27	MIN	-531.80	-66.48	0.00
	27	28	MAX	1155.76	123.20	0.00
		28	MIN	-421.92	-70.32	0.00
	28	29	MAX	1096.73	195.14	0.00
		29	MIN	-296.67	-74.17	0.00
	29	30	MAX	659.95	288.39	0.00
		30	MIN	-156.02	-78.01	0.00
	30	31	MAX	0.00	389.79	-4.99
		31	MIN	0.00	-81.84	1.18

Envolvente de momentos por ferrocarril (RENFE/UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-304.99	-4.01
		1	MIN	0.00	68.03	0.98
	1	2	MAX	659.95	-288.32	-4.99
		2	MIN	-156.02	77.99	1.18
	2	3	MAX	1096.73	-195.14	0.00
		3	MIN	-296.67	74.17	0.00
	3	4	MAX	1334.96	-110.08	0.00
		4	MIN	-421.92	70.32	0.00
	4	5	MAX	1399.23	-33.22	0.00
		5	MIN	-531.80	66.48	0.00
	5	6	MAX	1314.12	35.45	0.00
		6	MIN	-626.29	62.63	0.00
	6	7	MAX	1248.72	108.47	0.00
		7	MIN	-797.70	66.48	0.00
	7	8	MAX	1016.52	189.69	0.00
		8	MIN	-984.49	70.32	0.00
	8	9	MAX	592.95	279.10	0.00
		9	MIN	-1186.67	74.17	0.00
	9	10	MAX	255.39	-14.19	0.00
		10	MIN	-1526.72	398.11	0.00
	10	11	MAX	270.80	-14.89	0.21
		11	MIN	-2144.10	490.70	-6.55
2	11	11	MAX	270.80	51.56	0.57
		11	MIN	-2144.10	-610.16	-6.14
	11	12	MAX	156.00	49.14	0.57
		12	MIN	-1113.79	-411.10	-5.32
	12	13	MAX	676.39	-269.13	0.00
		13	MIN	-702.01	-46.72	0.00
	13	14	MAX	1253.27	-194.85	0.00
		14	MIN	-550.43	-44.30	0.00
	14	15	MAX	1543.91	-92.10	0.00
		15	MIN	-448.14	-14.30	0.00
	15	16	MAX	1567.39	0.00	0.00
		16	MIN	-396.36	-6.41	0.00
	16	17	MAX	1543.91	92.10	0.00
		17	MIN	-448.14	14.30	0.00
	17	18	MAX	1253.27	194.85	0.00
		18	MIN	-550.43	44.30	0.00
	18	19	MAX	676.39	269.13	0.00
		19	MIN	-702.01	46.72	0.00
	19	20	MAX	156.00	-49.14	0.00
		20	MIN	-1113.79	411.17	0.00
	20	21	MAX	270.80	-51.56	0.57
		21	MIN	-2144.09	610.16	-6.14
3	21	21	MAX	270.80	14.89	0.21
		21	MIN	-2144.09	-490.70	-6.55
	21	22	MAX	255.39	14.19	0.21
		22	MIN	-1526.72	-398.01	-6.55

Envolvente de momentos por ferrocarril (RENFE/UIC)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	592.95	-279.10	0.00
		23	MIN	-1186.67	-74.17	0.00
	23	24	MAX	1016.52	-189.69	0.00
		24	MIN	-984.49	-70.32	0.00
	24	25	MAX	1248.72	-108.47	0.00
		25	MIN	-797.70	-66.48	0.00
	25	26	MAX	1314.12	-35.45	0.00
		26	MIN	-626.29	-62.63	0.00
	26	27	MAX	1399.23	33.22	0.00
		27	MIN	-531.80	-66.48	0.00
	27	28	MAX	1334.96	110.08	0.00
		28	MIN	-421.92	-70.32	0.00
	28	29	MAX	1096.73	195.14	0.00
		29	MIN	-296.67	-74.17	0.00
	29	30	MAX	659.95	288.39	0.00
		30	MIN	-156.02	-78.01	0.00
	30	31	MAX	0.00	304.99	0.98
		31	MIN	0.00	-68.03	-4.01

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	81.84	1.18
		1	MIN	0.00	-419.92	-5.64
	1	2	MAX	-156.02	78.01	0.00
		2	MIN	720.22	-318.53	-0.65
	2	3	MAX	-296.67	74.17	0.00
		3	MIN	1217.28	-225.28	0.00
	3	4	MAX	-421.92	70.32	0.00
		4	MIN	1336.58	-153.33	0.00
	4	5	MAX	-531.80	66.48	0.00
		5	MIN	1640.33	-63.35	0.00
	5	6	MAX	436.91	96.04	0.00
		6	MIN	415.29	-41.53	0.00
	6	7	MAX	524.08	168.86	0.00
		7	MIN	506.74	-42.23	0.00
	7	8	MAX	122.21	253.57	0.00
		8	MIN	600.99	-42.93	0.00
	8	9	MAX	-485.02	346.47	0.00
		9	MIN	698.04	-43.63	0.00
	9	10	MAX	-1322.18	447.58	0.00
		10	MIN	797.88	-44.33	0.00
	10	11	MAX	-581.74	556.78	-7.40
		11	MIN	-619.29	-45.02	0.86
2	11	11	MAX	-581.74	51.56	0.57
		11	MIN	-619.29	-610.16	-6.14
	11	12	MAX	758.76	49.14	0.00
		12	MIN	-1021.03	-473.47	0.00
	12	13	MAX	629.60	46.72	0.00
		13	MIN	66.06	-347.38	0.00
	13	14	MAX	513.03	44.30	0.00
		14	MIN	792.34	-231.94	0.00
	14	15	MAX	409.06	41.88	0.00
		15	MIN	1113.20	-162.59	0.00
	15	16	MAX	1630.22	39.45	0.00
		16	MIN	-285.07	-39.45	0.00
	16	17	MAX	1715.97	162.59	0.00
		17	MIN	-193.70	-41.88	0.00
	17	18	MAX	1395.10	231.94	0.00
		18	MIN	-89.73	-44.30	0.00
	18	19	MAX	668.83	347.38	0.00
		19	MIN	26.83	-46.72	0.00
	19	20	MAX	-418.27	473.47	0.00
		20	MIN	156.00	-49.14	0.00
	20	21	MAX	-317.91	610.16	-6.14
		21	MIN	-883.13	-51.56	0.57
3	21	21	MAX	-317.91	45.02	0.86
		21	MIN	-883.13	-556.78	-7.40
	21	22	MAX	797.88	44.32	0.65
		22	MIN	-1322.18	-447.58	0.00

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	698.04	43.63	0.00
		23	MIN	-485.02	-346.47	0.00
	23	24	MAX	600.99	42.93	0.00
		24	MIN	122.21	-253.57	0.00
	24	25	MAX	506.74	42.23	0.00
		25	MIN	524.08	-168.86	0.00
	25	26	MAX	415.29	41.53	0.00
		26	MIN	436.91	-96.04	0.00
	26	27	MAX	1640.33	63.35	0.00
		27	MIN	-531.80	-66.48	0.00
	27	28	MAX	1336.58	153.33	0.00
		28	MIN	-421.92	-70.32	0.00
	28	29	MAX	1217.28	225.28	0.00
		29	MIN	-296.67	-74.17	0.00
	29	30	MAX	720.22	318.53	0.00
		30	MIN	-156.02	-78.01	0.00
	30	31	MAX	0.00	419.92	-5.64
		31	MIN	0.00	-81.84	1.18

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-335.13	-4.66
		1	MIN	0.00	68.03	0.98
	1	2	MAX	720.22	-318.45	-5.64
		2	MIN	-156.02	77.99	1.18
	2	3	MAX	1217.28	-225.28	0.00
		3	MIN	-296.67	74.17	0.00
	3	4	MAX	1515.79	-140.22	0.00
		4	MIN	-421.92	70.32	0.00
	4	5	MAX	1640.33	-63.35	0.00
		5	MIN	-531.80	66.48	0.00
	5	6	MAX	1615.50	5.31	0.00
		6	MIN	-626.29	62.63	0.00
	6	7	MAX	1610.38	78.33	0.00
		7	MIN	-797.70	66.48	0.00
	7	8	MAX	1438.46	159.55	0.00
		8	MIN	-984.49	70.32	0.00
	8	9	MAX	1075.16	248.96	0.00
		9	MIN	-1186.67	74.17	0.00
	9	10	MAX	797.88	-44.33	0.00
		10	MIN	-1526.72	398.11	0.00
	10	11	MAX	862.83	-45.02	0.86
		11	MIN	-2144.10	490.70	-6.55
2	11	11	MAX	862.83	51.56	0.57
		11	MIN	-2144.10	-610.16	-6.14
	11	12	MAX	758.76	49.14	0.57
		12	MIN	-1113.79	-411.10	-5.32
	12	13	MAX	1279.16	-269.13	0.00
		13	MIN	-702.01	-46.72	0.00
	13	14	MAX	1856.03	-194.85	0.00
		14	MIN	-550.43	-44.30	0.00
	14	15	MAX	2146.67	-92.10	0.00
		15	MIN	-448.14	-14.30	0.00
	15	16	MAX	2170.15	0.00	0.00
		16	MIN	-396.36	-6.41	0.00
	16	17	MAX	2146.67	92.10	0.00
		17	MIN	-448.14	14.30	0.00
	17	18	MAX	1856.03	194.85	0.00
		18	MIN	-550.43	44.30	0.00
	18	19	MAX	1279.16	269.13	0.00
		19	MIN	-702.01	46.72	0.00
	19	20	MAX	758.76	-49.14	0.00
		20	MIN	-1113.79	411.17	0.00
	20	21	MAX	862.83	-51.56	0.57
		21	MIN	-2144.09	610.16	-6.14
3	21	21	MAX	862.83	45.02	0.86
		21	MIN	-2144.09	-490.70	-6.55
	21	22	MAX	797.88	44.32	0.86
		22	MIN	-1526.72	-398.01	-6.55

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	1075.16	-248.96	0.00
		23	MIN	-1186.67	-74.17	0.00
	23	24	MAX	1438.46	-159.55	0.00
		24	MIN	-984.49	-70.32	0.00
	24	25	MAX	1610.38	-78.33	0.00
		25	MIN	-797.70	-66.48	0.00
	25	26	MAX	1615.50	-5.31	0.00
		26	MIN	-626.29	-62.63	0.00
	26	27	MAX	1640.33	63.35	0.00
		27	MIN	-531.80	-66.48	0.00
	27	28	MAX	1515.79	140.22	0.00
		28	MIN	-421.92	-70.32	0.00
	28	29	MAX	1217.28	225.28	0.00
		29	MIN	-296.67	-74.17	0.00
	29	30	MAX	720.22	318.53	0.00
		30	MIN	-156.02	-78.01	0.00
	30	31	MAX	0.00	335.13	0.33
		31	MIN	0.00	-68.03	-4.01

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	94.06	1.44
		1	MIN	0.00	-432.14	-5.90
	1	2	MAX	-180.47	90.23	0.26
		2	MIN	744.67	-330.75	-0.91
	2	3	MAX	-345.56	86.39	0.00
		3	MIN	1266.18	-237.50	0.00
	3	4	MAX	-495.27	82.55	0.00
		4	MIN	1409.93	-165.56	0.00
	4	5	MAX	-629.59	78.70	0.00
		5	MIN	1738.12	-75.58	0.00
	5	6	MAX	314.67	108.26	0.00
		6	MIN	537.53	-53.75	0.00
	6	7	MAX	377.39	181.08	0.00
		7	MIN	653.43	-54.45	0.00
	7	8	MAX	-48.93	265.79	0.00
		8	MIN	772.12	-55.15	0.00
	8	9	MAX	-680.60	358.70	0.00
		9	MIN	893.62	-55.85	0.00
	9	10	MAX	-1542.21	459.80	0.00
		10	MIN	1017.91	-56.55	0.00
	10	11	MAX	-584.09	569.00	-7.67
		11	MIN	-616.95	-57.24	1.13
2	11	11	MAX	-584.09	70.36	0.88
		11	MIN	-616.95	-628.96	-6.45
	11	12	MAX	954.34	67.95	0.31
		12	MIN	-1216.61	-492.27	-0.31
	12	13	MAX	776.28	65.53	0.00
		13	MIN	-80.62	-366.18	0.00
	13	14	MAX	610.82	63.10	0.00
		14	MIN	694.55	-250.75	0.00
	14	15	MAX	457.96	60.68	0.00
		15	MIN	1064.31	-181.40	0.00
	15	16	MAX	1630.22	58.26	0.00
		16	MIN	-285.07	-58.26	0.00
	16	17	MAX	1667.07	181.40	0.00
		17	MIN	-144.81	-60.68	0.00
	17	18	MAX	1297.31	250.75	0.00
		18	MIN	8.06	-63.10	0.00
	18	19	MAX	522.14	366.18	0.00
		19	MIN	173.52	-65.53	0.00
	19	20	MAX	-613.85	492.28	0.00
		20	MIN	351.58	-67.95	0.00
	20	21	MAX	-315.57	628.96	-6.45
		21	MIN	-885.47	-70.36	0.88
3	21	21	MAX	-315.57	57.24	1.13
		21	MIN	-885.47	-569.00	-7.67
	21	22	MAX	1017.91	56.54	0.91
		22	MIN	-1542.21	-459.80	-0.26

Envolvente de cortantes por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	893.62	55.85	0.00
		23	MIN	-680.60	-358.70	0.00
	23	24	MAX	772.12	55.15	0.00
		24	MIN	-48.93	-265.79	0.00
	24	25	MAX	653.43	54.45	0.00
		25	MIN	377.39	-181.08	0.00
	25	26	MAX	537.53	53.75	0.00
		26	MIN	314.67	-108.26	0.00
	26	27	MAX	1738.12	75.58	0.00
		27	MIN	-629.59	-78.70	0.00
	27	28	MAX	1409.93	165.56	0.00
		28	MIN	-495.27	-82.55	0.00
	28	29	MAX	1266.18	237.50	0.00
		29	MIN	-345.56	-86.39	0.00
	29	30	MAX	744.67	330.76	0.00
		30	MIN	-180.47	-90.24	0.00
	30	31	MAX	0.00	432.14	-5.90
		31	MIN	0.00	-94.06	1.44

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	MAX	0.00	-347.35	-4.92
		1	MIN	0.00	80.25	1.25
	1	2	MAX	744.67	-330.67	-5.90
		2	MIN	-180.47	90.22	1.44
	2	3	MAX	1266.18	-237.50	0.00
		3	MIN	-345.56	86.39	0.00
	3	4	MAX	1589.13	-152.44	0.00
		4	MIN	-495.27	82.55	0.00
	4	5	MAX	1738.12	-75.58	0.00
		5	MIN	-629.59	78.70	0.00
	5	6	MAX	1737.74	-6.91	0.00
		6	MIN	-748.53	74.85	0.00
	6	7	MAX	1757.06	66.11	0.00
		7	MIN	-944.39	78.70	0.00
	7	8	MAX	1609.59	147.32	0.00
		8	MIN	-1155.63	82.55	0.00
	8	9	MAX	1270.74	236.74	0.00
		9	MIN	-1382.25	86.39	0.00
	9	10	MAX	1017.91	-56.55	0.00
		10	MIN	-1746.75	410.33	0.00
	10	11	MAX	1096.26	-57.24	1.13
		11	MIN	-2377.52	502.92	-6.82
2	11	11	MAX	1096.26	70.36	0.88
		11	MIN	-2377.52	-628.96	-6.45
	11	12	MAX	954.34	67.94	0.88
		12	MIN	-1309.37	-429.91	-5.63
	12	13	MAX	1425.84	-250.33	0.00
		13	MIN	-848.69	-65.53	0.00
	13	14	MAX	1964.59	-181.36	0.00
		14	MIN	-658.99	-57.79	0.00
	14	15	MAX	2223.48	-92.10	0.00
		15	MIN	-524.94	-14.30	0.00
	15	16	MAX	2246.96	0.00	0.00
		16	MIN	-473.17	-6.41	0.00
	16	17	MAX	2223.48	92.10	0.00
		17	MIN	-524.94	14.30	0.00
	17	18	MAX	1964.59	181.36	0.00
		18	MIN	-658.99	57.79	0.00
	18	19	MAX	1425.84	250.33	0.00
		19	MIN	-848.69	65.53	0.00
	19	20	MAX	954.34	-67.95	0.00
		20	MIN	-1309.37	429.97	0.00
	20	21	MAX	1096.26	-70.36	0.88
		21	MIN	-2377.52	628.96	-6.45
3	21	21	MAX	1096.26	57.24	1.13
		21	MIN	-2377.52	-502.92	-6.82
	21	22	MAX	1017.91	56.54	1.13
		22	MIN	-1746.75	-410.23	-6.82

Envolvente de momentos por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Barra	Nudo		Momento (m x t)	Cortante (t)	Axil (t)
	22	23	MAX	1270.74	-236.74	0.00
		23	MIN	-1382.25	-86.39	0.00
	23	24	MAX	1609.59	-147.32	0.00
		24	MIN	-1155.63	-82.55	0.00
	24	25	MAX	1757.06	-66.11	0.00
		25	MIN	-944.39	-78.70	0.00
	25	26	MAX	1737.74	6.91	0.00
		26	MIN	-748.53	-74.85	0.00
	26	27	MAX	1738.12	75.58	0.00
		27	MIN	-629.59	-78.70	0.00
	27	28	MAX	1589.13	152.44	0.00
		28	MIN	-495.27	-82.55	0.00
	28	29	MAX	1266.18	237.50	0.00
		29	MIN	-345.56	-86.39	0.00
	29	30	MAX	744.67	330.76	0.00
		30	MIN	-180.47	-90.24	0.00
	30	31	MAX	0.00	347.35	0.07
		31	MIN	0.00	-80.25	-3.75

Cable Numero 1

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 23 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 1

Se.	X	Y (s)	Y (i)	Pend.
1	0.000	0.791	1.108	-0.1020
2	2.000	0.970	0.929	-0.0766
3	4.000	1.098	0.801	-0.0512
4	6.000	1.174	0.725	-0.0256
5	8.000	1.200	0.699	0.0000
6	10.000	1.173	0.726	0.0274
7	12.000	1.090	0.809	0.0548
8	14.000	0.953	0.946	0.0821
9	16.000	0.762	1.137	0.1093
10	18.000	0.519	1.380	0.1183
11	20.000	0.400	1.499	0.0000
12	22.600	0.640	1.259	-0.1851
13	25.200	1.111	0.788	-0.1561
14	27.800	1.449	0.450	-0.1041
15	30.400	1.652	0.247	-0.0521
16	33.000	1.720	0.179	0.0000
17	35.600	1.652	0.247	0.0521
18	38.200	1.449	0.450	0.1041
19	40.800	1.111	0.788	0.1561
20	43.400	0.640	1.259	0.1851
21	46.000	0.400	1.499	0.0000
22	48.000	0.519	1.380	-0.1183
23	50.000	0.774	1.125	-0.1212

Cable Numero 2

Definicion general

Seccion inicial ..... = 23 (Pasiva)
Seccion final ..... = 31 (Activa)

Fuerza de Pretensado ..... = 3834.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 2

Se.	X	Y (s)	Y (i)	Pend.
23	50.000	0.774	1.125	-0.1212
24	52.000	0.992	0.907	-0.0947
25	54.000	1.143	0.756	-0.0543
26	56.000	1.200	0.699	0.0000
27	58.000	1.190	0.709	0.0107
28	60.000	1.154	0.745	0.0263
29	62.000	1.082	0.817	0.0467
30	64.000	0.964	0.935	0.0719
31	66.000	0.791	1.108	0.1020

Cable Numero 3

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 31 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 3

Se.	X	Y (s)	Y (i)	Pend.
1	0.000	0.211	1.688	0.0000
2	2.000	0.211	1.688	0.0000
3	4.000	0.211	1.688	0.0000
4	6.000	0.211	1.688	0.0000
5	8.000	0.211	1.688	0.0000
6	10.000	0.211	1.688	0.0000
7	12.000	0.211	1.688	0.0000
8	14.000	0.211	1.688	0.0000
9	16.000	0.211	1.688	0.0000
10	18.000	0.211	1.688	0.0000
11	20.000	0.211	1.688	0.0000
12	22.600	0.211	1.688	0.0000
13	25.200	0.211	1.688	0.0000
14	27.800	0.211	1.688	0.0000
15	30.400	0.211	1.688	0.0000
16	33.000	0.211	1.688	0.0000
17	35.600	0.211	1.688	0.0000
18	38.200	0.211	1.688	0.0000
19	40.800	0.211	1.688	0.0000
20	43.400	0.211	1.688	0.0000
21	46.000	0.211	1.688	0.0000
22	48.000	0.211	1.688	0.0000
23	50.000	0.211	1.688	0.0000
24	52.000	0.211	1.688	0.0000
25	54.000	0.211	1.688	0.0000
26	56.000	0.211	1.688	0.0000
27	58.000	0.211	1.688	0.0000
28	60.000	0.211	1.688	0.0000
29	62.000	0.211	1.688	0.0000
30	64.000	0.211	1.688	0.0000
31	66.000	0.211	1.688	0.0000

Cable Numero 4

Definicion general

Seccion inicial ..... = 1 (Activa)
Seccion final ..... = 31 (Activa)

Fuerza de Pretensado ..... = 959.0000
Coef. rozamiento (mu) ..... = 0.2100
Coef. desviacion parasita (k/mu).. = 0.0060

Replanteo del cable : 4

Se.	X	Y (s)	Y (i)	Pend.
1	0.000	1.750	0.149	0.0000
2	2.000	1.750	0.149	0.0000
3	4.000	1.750	0.149	0.0000
4	6.000	1.750	0.149	0.0000
5	8.000	1.750	0.149	0.0000
6	10.000	1.750	0.149	0.0000
7	12.000	1.750	0.149	0.0000
8	14.000	1.750	0.149	0.0000
9	16.000	1.750	0.149	0.0000
10	18.000	1.750	0.149	0.0000
11	20.000	1.750	0.149	0.0000
12	22.600	1.750	0.149	0.0000
13	25.200	1.750	0.149	0.0000
14	27.800	1.750	0.149	0.0000
15	30.400	1.750	0.149	0.0000
16	33.000	1.750	0.149	0.0000
17	35.600	1.750	0.149	0.0000
18	38.200	1.750	0.149	0.0000
19	40.800	1.750	0.149	0.0000
20	43.400	1.750	0.149	0.0000
21	46.000	1.750	0.149	0.0000
22	48.000	1.750	0.149	0.0000
23	50.000	1.750	0.149	0.0000
24	52.000	1.750	0.149	0.0000
25	54.000	1.750	0.149	0.0000
26	56.000	1.750	0.149	0.0000
27	58.000	1.750	0.149	0.0000
28	60.000	1.750	0.149	0.0000
29	62.000	1.750	0.149	0.0000
30	64.000	1.750	0.149	0.0000
31	66.000	1.750	0.149	0.0000

Definicion esfuerzos unitarios cable : 1

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
1	3834.000	-389.049	3814.210
2	3804.199	-290.704	3793.076
3	3774.479	-192.954	3769.544
4	3744.866	-95.989	3743.635
5	3715.386	0.000	3715.386
6	3684.742	101.090	3683.355
7	3654.447	199.986	3648.971
8	3624.526	296.514	3612.377
9	3595.005	390.521	3573.731
10	3557.581	418.021	3532.937
11	3461.938	0.000	3461.938
12	3317.980	-615.706	3260.353
13	3263.406	-514.156	3222.649
14	3246.816	-344.512	3228.486
15	3293.810	-176.061	3289.102
16	3341.940	0.000	3341.940
17	3390.772	181.244	3385.925
18	3439.851	364.995	3420.431
19	3488.960	549.692	3445.385
20	3547.306	658.261	3485.696
21	3701.213	0.000	3701.213
22	3803.467	-446.913	3777.119
23	3834.000	-461.261	3806.152

Alargamiento del cable ..... 339.3 mm.

Definicion esfuerzos unitarios cable : 2

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
23	3586.140	-431.442	3560.093
24	3615.029	-340.727	3598.936
25	3654.851	-198.088	3649.479
26	3706.035	0.000	3706.035
27	3723.746	39.857	3723.533
28	3745.350	98.304	3744.059
29	3770.898	175.744	3766.801
30	3800.438	272.563	3790.652
31	3834.000	389.049	3814.210

Alargamiento del cable ..... 113.8 mm.

Definicion esfuerzos unitarios cable : 3

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
1	959.000	0.000	959.000
2	956.586	0.000	956.586
3	954.179	0.000	954.179
4	951.777	0.000	951.777
5	949.382	0.000	949.382
6	946.992	0.000	946.992
7	944.609	0.000	944.609
8	942.232	0.000	942.232
9	939.860	0.000	939.860
10	937.495	0.000	937.495
11	935.135	0.000	935.135
12	932.077	0.000	932.077
13	929.028	0.000	929.028
14	925.990	0.000	925.990
15	922.961	0.000	922.961
16	919.942	0.000	919.942
17	922.961	0.000	922.961
18	925.990	0.000	925.990
19	929.028	0.000	929.028
20	932.077	0.000	932.077
21	935.135	0.000	935.135
22	937.495	0.000	937.495
23	939.860	0.000	939.860
24	942.232	0.000	942.232
25	944.609	0.000	944.609
26	946.992	0.000	946.992
27	949.382	0.000	949.382
28	951.777	0.000	951.777
29	954.179	0.000	954.179
30	956.586	0.000	956.586
31	959.000	0.000	959.000

Alargamiento del cable ..... 475.4 mm.

Definicion esfuerzos unitarios cable : 4

Se.	Acciones del cable Esf.un. (t)	Proy.v. (t)	Proy.h. (t)
1	959.000	0.000	959.000
2	956.586	0.000	956.586
3	954.179	0.000	954.179
4	951.777	0.000	951.777
5	949.382	0.000	949.382
6	946.992	0.000	946.992
7	944.609	0.000	944.609
8	942.232	0.000	942.232
9	939.860	0.000	939.860
10	937.495	0.000	937.495
11	935.135	0.000	935.135
12	932.077	0.000	932.077
13	929.028	0.000	929.028
14	925.990	0.000	925.990
15	922.961	0.000	922.961
16	919.942	0.000	919.942
17	922.961	0.000	922.961
18	925.990	0.000	925.990
19	929.028	0.000	929.028
20	932.077	0.000	932.077
21	935.135	0.000	935.135
22	937.495	0.000	937.495
23	939.860	0.000	939.860
24	942.232	0.000	942.232
25	944.609	0.000	944.609
26	946.992	0.000	946.992
27	949.382	0.000	949.382
28	951.777	0.000	951.777
29	954.179	0.000	954.179
30	956.586	0.000	956.586
31	959.000	0.000	959.000

Alargamiento del cable ..... 317.0 mm.

Esfuerzos unitarios debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-91.91	426.0	-5764.8
		2	-842.81	327.1	-5736.7
	2	2	-842.95	203.7	-5744.5
		3	-1145.77	105.9	-5716.2
	3	3	-1145.78	105.9	-5716.2
		4	-1250.63	9.0	-5685.5
	4	4	-1250.63	9.0	-5685.5
		5	-1160.25	-87.0	-5652.4
	5	5	-1160.25	-87.0	-5652.4
		6	-871.13	-188.1	-5615.6
	6	6	-871.13	-188.1	-5615.6
		7	-382.96	-287.0	-5576.5
	7	7	-382.96	-287.0	-5576.5
		8	297.41	-383.5	-5535.1
	8	8	297.41	-383.5	-5535.1
		9	1162.46	-477.5	-5491.7
	9	9	1162.46	-477.5	-5491.7
		10	2196.11	-505.0	-5446.2
	10	10	2195.73	-622.0	-5434.5
		11	2992.72	-202.4	-5367.8
2	11	11	2994.25	142.9	-5368.1
		12	1744.43	755.1	-5150.2
	12	12	1743.29	669.8	-5162.8
		13	50.59	568.3	-5119.0
	13	13	50.59	568.3	-5119.0
		14	-1208.70	398.6	-5118.7
	14	14	-1208.70	398.6	-5118.7
		15	-2075.00	230.2	-5173.3
	15	15	-2075.00	230.2	-5173.3
		16	-2494.42	54.1	-5220.1
	16	16	-2494.42	54.1	-5220.1
		17	-2442.49	-127.1	-5270.1
	17	17	-2442.49	-127.1	-5270.1
		18	-1902.16	-310.9	-5310.7
	18	18	-1902.16	-310.9	-5310.7
		19	-868.10	-495.6	-5341.7
	19	19	-868.10	-495.6	-5341.7
		20	650.57	-604.2	-5388.1
	20	20	649.40	-696.8	-5387.4
		21	1688.91	-35.0	-5598.2
3	21	21	1689.67	120.6	-5608.9
		22	1029.38	569.1	-5679.9
	22	22	1029.78	446.9	-5690.4
		23	64.84	461.3	-5724.2

Esfuerzos unitarios debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	6.9	0.1
		2	-13.89	6.9	0.1
	2	2	-13.89	6.9	0.0
		3	-27.77	6.9	0.0
	3	3	-27.77	6.9	0.0
		4	-41.66	6.9	0.0
	4	4	-41.66	6.9	0.0
		5	-55.54	6.9	0.0
	5	5	-55.54	6.9	0.0
		6	-69.43	6.9	0.0
	6	6	-69.43	6.9	0.0
		7	-83.32	6.9	0.0
	7	7	-83.32	6.9	0.0
		8	-97.20	6.9	0.0
	8	8	-97.20	6.9	0.0
		9	-111.09	6.9	0.0
	9	9	-111.09	6.9	0.0
		10	-124.98	6.9	0.0
	10	10	-124.98	6.9	-0.2
		11	-138.86	6.9	-0.2
2	11	11	-138.86	-24.0	-0.4
		12	-76.34	-24.0	-0.4
	12	12	-76.34	-24.0	0.0
		13	-13.81	-24.0	0.0
	13	13	-13.81	-24.0	0.0
		14	48.71	-24.0	0.0
	14	14	48.71	-24.0	0.0
		15	111.24	-24.0	0.0
	15	15	111.24	-24.0	0.0
		16	173.76	-24.0	0.0
	16	16	173.76	-24.0	0.0
		17	236.29	-24.0	0.0
	17	17	236.29	-24.0	0.0
		18	298.81	-24.0	0.0
	18	18	298.81	-24.0	0.0
		19	361.34	-24.0	0.0
	19	19	361.34	-24.0	0.0
		20	423.86	-24.0	0.0
	20	20	423.86	-24.0	0.4
		21	486.39	-24.0	0.4
3	21	21	486.39	24.3	0.5
		22	437.75	24.3	0.5
	22	22	437.75	24.3	0.0
		23	389.11	24.3	0.0
	23	23	449.76	455.8	-3560.1
		24	-383.42	365.0	-3598.9
	24	24	-383.42	365.0	-3598.9
		25	-994.27	222.4	-3649.5

Esfuerzos unitarios debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-994.27	222.4	-3649.5
		26	-1272.57	24.3	-3706.0
	26	26	-1272.57	24.3	-3706.0
		27	-1291.52	-15.5	-3723.5
	27	27	-1291.52	-15.5	-3723.5
		28	-1213.00	-74.0	-3744.1
	28	28	-1213.00	-74.0	-3744.1
		29	-998.29	-151.4	-3766.8
	29	29	-998.29	-151.4	-3766.8
		30	-607.51	-248.2	-3790.7
	30	30	-607.39	-329.7	-3784.5
		31	164.13	-446.6	-3805.6

Esfuerzos unitarios en estructura total debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-91.91	434.3	-5726.3
		2	-859.47	335.4	-5698.3
	2	2	-859.60	212.8	-5706.2
		3	-1180.73	115.1	-5677.9
	3	3	-1180.73	115.1	-5677.9
		4	-1303.89	18.1	-5647.2
	4	4	-1303.89	18.1	-5647.2
		5	-1231.80	-77.9	-5614.1
	5	5	-1231.80	-77.9	-5614.1
		6	-960.99	-179.0	-5577.3
	6	6	-960.99	-179.0	-5577.3
		7	-491.12	-277.9	-5538.2
	7	7	-491.11	-277.9	-5538.2
		8	170.95	-374.4	-5496.8
	8	8	170.95	-374.4	-5496.8
		9	1017.70	-468.4	-5453.5
	9	9	1017.70	-468.4	-5453.5
		10	2033.06	-495.9	-5407.9
	10	10	2032.67	-612.0	-5396.5
		11	2809.72	-192.5	-5329.7
2	11	11	2811.25	110.9	-5330.3
		12	1644.69	723.1	-5112.5
	12	12	1643.54	638.4	-5124.5
		13	32.46	536.9	-5080.7
	13	13	32.46	536.9	-5080.7
		14	-1145.21	367.2	-5080.5
	14	14	-1145.21	367.2	-5080.5
		15	-1929.89	198.8	-5135.0
	15	15	-1929.89	198.8	-5135.0
		16	-2267.70	22.7	-5181.8
	16	16	-2267.70	22.7	-5181.8
		17	-2134.15	-158.5	-5231.8
	17	17	-2134.15	-158.5	-5231.8
		18	-1512.20	-342.3	-5272.4
	18	18	-1512.20	-342.3	-5272.4
		19	-396.53	-527.0	-5303.4
	19	19	-396.53	-527.0	-5303.4
		20	1203.76	-635.5	-5349.8
	20	20	1202.59	-727.6	-5348.7
		21	2322.07	-65.7	-5559.4
3	21	21	2322.83	168.1	-5569.6
		22	1567.53	616.6	-5640.6
	22	22	1567.93	495.2	-5652.1
		23	506.34	509.6	-5685.9
	23	23	441.50	48.3	-1879.7
		24	344.01	48.3	-1884.5
	24	24	344.01	48.3	-1884.5
		25	246.51	48.3	-1889.2

Esfuerzos unitarios en estructura total debidos al cable 1

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	246.51	48.3	-1889.2
		26	149.01	48.3	-1894.0
	26	26	149.01	48.3	-1894.0
		27	51.51	48.3	-1898.8
	27	27	51.51	48.3	-1898.8
		28	-46.00	48.3	-1903.6
	28	28	-46.00	48.3	-1903.6
		29	-143.50	48.3	-1908.4
	29	29	-143.50	48.3	-1908.4
		30	-241.01	48.3	-1913.2
	30	30	-241.04	7.1	-1913.8
		31	-256.08	7.2	-1918.6

Esfuerzos unitarios en estructura total debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	0.00	6.9	0.1
		2	-13.89	6.9	0.1
	2	2	-13.89	6.9	0.0
		3	-27.77	6.9	0.0
	3	3	-27.77	6.9	0.0
		4	-41.66	6.9	0.0
	4	4	-41.66	6.9	0.0
		5	-55.54	6.9	0.0
	5	5	-55.54	6.9	0.0
		6	-69.43	6.9	0.0
	6	6	-69.43	6.9	0.0
		7	-83.32	6.9	0.0
	7	7	-83.32	6.9	0.0
		8	-97.20	6.9	0.0
	8	8	-97.20	6.9	0.0
		9	-111.09	6.9	0.0
	9	9	-111.09	6.9	0.0
		10	-124.98	6.9	0.0
	10	10	-124.98	6.9	-0.2
		11	-138.86	6.9	-0.2
2	11	11	-138.86	-24.0	-0.4
		12	-76.34	-24.0	-0.4
	12	12	-76.34	-24.0	0.0
		13	-13.81	-24.0	0.0
	13	13	-13.81	-24.0	0.0
		14	48.71	-24.0	0.0
	14	14	48.71	-24.0	0.0
		15	111.24	-24.0	0.0
	15	15	111.24	-24.0	0.0
		16	173.76	-24.0	0.0
	16	16	173.76	-24.0	0.0
		17	236.29	-24.0	0.0
	17	17	236.29	-24.0	0.0
		18	298.81	-24.0	0.0
	18	18	298.81	-24.0	0.0
		19	361.34	-24.0	0.0
	19	19	361.34	-24.0	0.0
		20	423.86	-24.0	0.0
	20	20	423.86	-24.0	0.4
		21	486.39	-24.0	0.4
3	21	21	486.39	24.3	0.5
		22	437.75	24.3	0.5
	22	22	437.75	24.3	0.0
		23	389.11	24.3	0.0
	23	23	449.76	455.8	-3560.1
		24	-383.42	365.0	-3598.9
	24	24	-383.42	365.0	-3598.9
		25	-994.27	222.4	-3649.5

Esfuerzos unitarios en estructura total debidos al cable 2

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-994.27	222.4	-3649.5
		26	-1272.57	24.3	-3706.0
	26	26	-1272.57	24.3	-3706.0
		27	-1291.52	-15.5	-3723.5
	27	27	-1291.52	-15.5	-3723.5
		28	-1213.00	-74.0	-3744.1
	28	28	-1213.00	-74.0	-3744.1
		29	-998.29	-151.4	-3766.8
	29	29	-998.29	-151.4	-3766.8
		30	-607.51	-248.2	-3790.7
	30	30	-607.39	-329.7	-3784.5
		31	164.13	-446.6	-3805.6

Coeficientes para perdidas de pretensado

Coef. de retraccion del hormigon ..... = 0.00025
Coef. de relajacion del acero ..... = 0.04000
Coef. de fluencia del hormigon ..... = 2.50000

Coef. medio de perdidas elasticas instantaneas ..... = 0.99313
Coef. medio de perdidas diferidas ..... = 0.89173
Coef. medio de perdidas totales ..... = 0.88561

Coef. de ponderacion para pretensado inicial (Pti) ... = 1.10000
Coef. de ponderacion para pretensado final (Ptf) ... = 0.90000

Nota: (*) Resultados de tensiones sin ponderar

Comprobacion de tensiones

Estado 1 Pretensado de 3834. tn Familia 1
Estado 2 Pretensado de 3834. tn Familia 2
Estado 3 Pretensado de 959. tn Familia 1
Estado 4 Pretensado de 959. tn Familia 1

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto
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Esfuerzos de pretensado Est. Inicial (*coef. perdidas elasticas)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-91.28	430.0	-5725.1
		2	-850.82	331.8	-5697.2
	2	2	-850.95	209.2	-5705.1
		3	-1165.49	112.1	-5676.9
	3	3	-1165.49	112.1	-5676.9
		4	-1283.41	15.8	-5646.4
	4	4	-1283.41	15.8	-5646.4
		5	-1207.44	-79.5	-5613.6
	5	5	-1207.44	-79.5	-5613.6
		6	-934.10	-179.9	-5577.1
	6	6	-934.10	-179.9	-5577.1
		7	-463.07	-278.1	-5538.2
	7	7	-463.07	-278.1	-5538.2
		8	198.83	-374.0	-5497.1
	8	8	198.83	-374.0	-5497.1
		9	1044.15	-467.4	-5454.0
	9	9	1044.15	-467.4	-5454.0
		10	2056.91	-494.7	-5408.8
	10	10	2056.54	-610.8	-5397.4
		11	2834.26	-194.2	-5331.1
2	11	11	2835.78	118.0	-5331.6
		12	1656.63	726.0	-5115.2
	12	12	1655.50	641.3	-5127.3
		13	36.52	540.5	-5083.8
	13	13	36.52	540.5	-5083.8
		14	-1152.02	372.0	-5083.6
	14	14	-1152.02	372.0	-5083.6
		15	-1950.28	204.7	-5137.8
	15	15	-1950.28	204.7	-5137.8
		16	-2304.72	29.9	-5184.3
	16	16	-2304.72	29.9	-5184.3
		17	-2191.05	-150.1	-5233.9
	17	17	-2191.05	-150.1	-5233.9
		18	-1592.34	-332.6	-5274.2
	18	18	-1592.34	-332.6	-5274.2
		19	-503.28	-516.1	-5305.0
	19	19	-503.28	-516.1	-5305.0
		20	1067.05	-623.9	-5351.1
	20	20	1065.89	-715.9	-5350.1
		21	2160.36	-58.6	-5559.3
3	21	21	2161.11	143.9	-5569.9
		22	1457.05	589.4	-5640.4
	22	22	1457.45	468.0	-5651.3
		23	450.83	482.2	-5684.8
	23	23	446.67	452.6	-5440.5
		24	-380.79	362.5	-5479.0
	24	24	-380.79	362.5	-5479.0
		25	-987.44	220.9	-5529.2

Esfuerzos de pretensado Est. Inicial (*coef. perdidas elasticas)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-987.44	220.9	-5529.2
		26	-1263.83	24.2	-5585.4
	26	26	-1263.83	24.2	-5585.4
		27	-1282.65	-15.4	-5602.8
	27	27	-1282.65	-15.4	-5602.8
		28	-1204.67	-73.5	-5623.2
	28	28	-1204.67	-73.5	-5623.2
		29	-991.43	-150.4	-5645.8
	29	29	-991.43	-150.4	-5645.8
		30	-603.34	-246.5	-5669.4
	30	30	-603.22	-368.3	-5662.9
		31	244.91	-484.5	-5683.8

Esfuerzos de pretensado Est. Final (*coef. perdidas totales)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
1	1	1	-81.39	390.2	-5074.0
		2	-772.24	302.6	-5049.1
	2	2	-772.36	194.0	-5056.3
		3	-1067.72	107.4	-5031.2
	3	3	-1067.72	107.4	-5031.2
		4	-1187.76	21.5	-5004.0
	4	4	-1187.76	21.5	-5004.0
		5	-1134.89	-63.5	-4974.7
	5	5	-1134.89	-63.5	-4974.7
		6	-906.02	-153.0	-4942.1
	6	6	-906.02	-153.0	-4942.1
		7	-500.86	-240.6	-4907.5
	7	7	-500.86	-240.6	-4907.5
		8	74.50	-326.1	-4870.8
	8	8	74.50	-326.1	-4870.8
		9	813.43	-409.3	-4832.4
	9	9	813.43	-409.3	-4832.4
		10	1701.67	-433.7	-4792.1
	10	10	1701.33	-536.6	-4782.1
		11	2378.64	-165.0	-4723.0
2	11	11	2379.99	79.2	-4723.7
		12	1396.20	621.4	-4530.7
	12	12	1395.18	546.4	-4541.1
		13	17.83	456.4	-4502.3
	13	13	17.83	456.4	-4502.3
		14	-975.69	306.2	-4502.1
	14	14	-975.69	306.2	-4502.1
		15	-1621.17	157.0	-4550.4
	15	15	-1621.17	157.0	-4550.4
		16	-1870.89	1.1	-4591.9
	16	16	-1870.89	1.1	-4591.9
		17	-1703.18	-159.4	-4636.2
	17	17	-1703.18	-159.4	-4636.2
		18	-1102.94	-322.1	-4672.1
	18	18	-1102.94	-322.1	-4672.1
		19	-65.44	-485.7	-4699.6
	19	19	-65.44	-485.7	-4699.6
		20	1401.22	-581.9	-4740.7
	20	20	1400.19	-663.4	-4739.3
		21	2441.17	-77.3	-4925.9
3	21	21	2441.84	166.9	-4934.9
		22	1736.77	564.2	-4997.8
	22	22	1737.13	456.6	-5008.3
		23	760.92	469.3	-5038.2
	23	23	757.21	442.9	-4820.3
		24	-59.92	362.6	-4858.6
	24	24	-59.92	362.6	-4858.6
		25	-680.15	236.3	-4907.2

Esfuerzos de pretensado Est. Final (*coef. perdidas totales)

V.	Barra	Nudo	Momento (m x t)	Cortante (t)	Axil (t)
	25	25	-680.15	236.3	-4907.2
		26	-1005.87	60.8	-4961.2
	26	26	-1005.87	60.8	-4961.2
		27	-1101.91	25.5	-4980.6
	27	27	-1101.91	25.5	-4980.6
		28	-1111.63	-26.2	-5002.6
	28	28	-1111.63	-26.2	-5002.6
		29	-1000.75	-94.8	-5026.7
	29	29	-1000.75	-94.8	-5026.7
		30	-733.94	-180.6	-5051.7
	30	30	-733.86	-289.2	-5046.7
		31	-56.82	-392.7	-5069.3

Tensiones en Construccion (kg/cm2) Estado 1

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
1	1	-33.	-37.	-36.	-40.	0.	0.	-36.	-40.
	2	-28.	-65.	-31.	-72.	-7.	10.	-38.	-62.
	3	-22.	-73.	-25.	-80.	-11.	16.	-36.	-64.
	4	-20.	-75.	-22.	-83.	-13.	18.	-35.	-64.
	5	-22.	-73.	-24.	-80.	-13.	18.	-36.	-62.
	6	-27.	-65.	-29.	-71.	-10.	14.	-39.	-58.
	7	-35.	-52.	-39.	-57.	-4.	6.	-43.	-51.
	8	-47.	-34.	-52.	-38.	3.	-5.	-49.	-42.
	9	-63.	-12.	-69.	-13.	13.	-19.	-56.	-32.
	10	-81.	15.	-90.	17.	26.	-36.	-64.	-20.
	11	-85.	35.	-93.	38.	34.	-43.	-60.	-5.
2	11	-85.	35.	-94.	38.	34.	-43.	-60.	-5.
	12	-71.	6.	-78.	6.	19.	-27.	-59.	-20.
	13	-40.	-37.	-44.	-41.	1.	-2.	-43.	-43.
	14	-17.	-70.	-18.	-77.	-13.	18.	-31.	-59.
	15	-1.	-92.	-1.	-102.	-22.	31.	-24.	-70.
	16	6.	-104.	7.	-114.	-28.	39.	-21.	-75.
	17	5.	-103.	5.	-113.	-30.	41.	-24.	-71.
	18	-5.	-89.	-6.	-98.	-27.	38.	-33.	-60.
	19	-25.	-63.	-27.	-69.	-21.	29.	-48.	-40.
	20	-53.	-24.	-58.	-27.	-10.	14.	-68.	-13.
	21	-63.	4.	-70.	5.	2.	-3.	-68.	2.
3	21	-63.	4.	-70.	5.	2.	-3.	-68.	2.
	22	-62.	-17.	-68.	-18.	1.	-2.	-67.	-20.
	23A	-45.	-42.	-49.	-46.	0.	0.	-49.	-46.

Tensiones en Construccion (kg/cm2) Estado 2

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pti F.Sup	Pti F.Inf	Pi F.Sup	Pi F.Inf	Pti+Pi F.Sup	Pti+Pi F.Inf
1	1	-33.	-37.	-36.	-40.	0.	0.	-36.	-40.
	2	-28.	-65.	-31.	-72.	-7.	10.	-38.	-62.
	3	-22.	-73.	-24.	-81.	-12.	17.	-36.	-64.
	4	-19.	-76.	-21.	-84.	-14.	20.	-35.	-64.
	5	-21.	-74.	-23.	-81.	-14.	20.	-37.	-62.
	6	-25.	-67.	-28.	-73.	-11.	16.	-39.	-57.
	7	-34.	-54.	-37.	-60.	-7.	9.	-44.	-51.
	8	-46.	-37.	-50.	-40.	1.	-1.	-49.	-42.
	9	-61.	-15.	-67.	-16.	11.	-15.	-56.	-31.
	10	-79.	12.	-87.	13.	23.	-32.	-64.	-19.
	11	-83.	32.	-91.	35.	31.	-39.	-60.	-4.
2	11	-83.	32.	-91.	35.	31.	-39.	-60.	-4.
	12	-70.	4.	-77.	4.	17.	-24.	-60.	-20.
	13	-39.	-38.	-43.	-42.	1.	-1.	-43.	-43.
	14	-18.	-69.	-19.	-75.	-11.	16.	-31.	-59.
	15	-3.	-90.	-4.	-99.	-20.	27.	-23.	-71.
	16	3.	-99.	3.	-109.	-24.	33.	-20.	-76.
	17	1.	-97.	1.	-106.	-23.	33.	-23.	-73.
	18	-11.	-81.	-12.	-90.	-19.	27.	-31.	-62.
	19	-31.	-53.	-34.	-59.	-11.	16.	-46.	-43.
	20	-61.	-13.	-67.	-15.	1.	-1.	-66.	-16.
	21	-72.	15.	-79.	17.	12.	-16.	-67.	1.
3	21	-72.	15.	-79.	17.	12.	-16.	-67.	1.
	22	-70.	-5.	-77.	-6.	5.	-7.	-72.	-13.
	23	-51.	-31.	-56.	-34.	-5.	8.	-61.	-26.
	24	-35.	-52.	-38.	-57.	-13.	18.	-51.	-38.
	25	-24.	-68.	-26.	-74.	-18.	26.	-45.	-49.
	26	-19.	-75.	-21.	-83.	-21.	30.	-43.	-53.
	27	-19.	-76.	-21.	-84.	-22.	31.	-43.	-53.
	28	-21.	-74.	-23.	-81.	-20.	28.	-43.	-53.
	29	-25.	-69.	-27.	-76.	-16.	22.	-43.	-53.
	30	-32.	-59.	-35.	-65.	-9.	13.	-45.	-52.
	31	-39.	-29.	-43.	-32.	0.	0.	-43.	-32.

Tensiones en Servicio (kg/cm2) Estado inicial

V.	Sec	Pti (*) F.Sup	Pti (*) F.Inf	Pi+Pti F.Sup	Pi+Pti F.Inf	Pi+Pti+M F.Sup	Pi+Pti+M F.Inf	Pi+Pti+M+Sp F.Sup	Pi+Pti+M+Sp F.Inf	Pi+Pti+M+Sn F.Sup	Pi+Pti+M+Sn F.Inf
1	1	-33.	-37.	-36.	-40.	-36.	-40.	-36.	-41.	-36.	-40.
	2	-28.	-65.	-38.	-62.	-41.	-58.	-54.	-40.	-38.	-62.
	3	-22.	-73.	-36.	-64.	-40.	-58.	-63.	-26.	-35.	-65.
	4	-19.	-76.	-36.	-64.	-41.	-56.	-69.	-17.	-33.	-67.
	5	-21.	-74.	-37.	-62.	-42.	-54.	-73.	-11.	-32.	-68.
	6	-25.	-67.	-39.	-57.	-44.	-50.	-74.	-9.	-33.	-67.
	7	-34.	-54.	-44.	-50.	-47.	-46.	-77.	-4.	-32.	-67.
	8	-46.	-37.	-49.	-42.	-50.	-41.	-77.	-3.	-32.	-66.
	9	-61.	-15.	-56.	-31.	-54.	-35.	-74.	-7.	-32.	-65.
	10	-79.	12.	-64.	-19.	-58.	-28.	-72.	-8.	-29.	-68.
	11	-83.	32.	-60.	-5.	-50.	-17.	-66.	3.	-12.	-65.
2	11	-83.	32.	-60.	-5.	-50.	-17.	-66.	3.	-12.	-65.
	12	-70.	4.	-60.	-20.	-54.	-27.	-68.	-7.	-34.	-56.
	13	-39.	-38.	-43.	-43.	-43.	-43.	-66.	-10.	-30.	-61.
	14	-18.	-69.	-31.	-59.	-34.	-54.	-69.	-6.	-24.	-69.
	15	-3.	-90.	-23.	-71.	-29.	-63.	-68.	-8.	-21.	-75.
	16	3.	-99.	-20.	-76.	-27.	-67.	-67.	-11.	-19.	-77.
	17	1.	-97.	-23.	-73.	-29.	-65.	-68.	-10.	-21.	-77.
	18	-11.	-81.	-31.	-62.	-35.	-57.	-69.	-9.	-25.	-72.
	19	-31.	-53.	-46.	-43.	-46.	-43.	-69.	-10.	-33.	-61.
	20	-61.	-13.	-66.	-16.	-60.	-23.	-74.	-4.	-40.	-52.
	21	-72.	15.	-67.	1.	-57.	-12.	-72.	8.	-19.	-60.
3	21	-72.	15.	-67.	1.	-57.	-12.	-73.	8.	-19.	-60.
	22	-70.	-5.	-72.	-13.	-66.	-22.	-80.	-1.	-37.	-62.
	23AI	-52.	-32.	-62.	-27.	-60.	-31.	-80.	-3.	-38.	-62.
	23AD	-50.	-30.	-60.	-25.	-58.	-29.	-77.	-1.	-36.	-60.
	24	-35.	-52.	-51.	-38.	-52.	-37.	-79.	0.	-34.	-63.
	25	-24.	-68.	-45.	-48.	-48.	-44.	-78.	-2.	-34.	-64.
	26	-19.	-75.	-43.	-53.	-48.	-46.	-77.	-4.	-36.	-62.
	27	-19.	-76.	-43.	-52.	-49.	-45.	-79.	-2.	-39.	-58.
	28	-21.	-74.	-43.	-53.	-48.	-45.	-76.	-6.	-41.	-56.
	29	-25.	-69.	-43.	-53.	-48.	-47.	-70.	-15.	-42.	-55.
	30	-32.	-59.	-45.	-52.	-47.	-48.	-61.	-29.	-44.	-52.
	31	-39.	-29.	-43.	-32.	-43.	-32.	-43.	-32.	-43.	-32.

Tensiones en Servicio (kg/cm2) Estado final

V.	Sec	Ptf (*) F.Sup	Ptf (*) F.Inf	Pf+Ptf+M F.Sup	Pf+Ptf+M F.Inf	Pf+Ptf+M+Sp F.Sup	Pf+Ptf+M+Sp F.Inf	Pf+Ptf+M+Sn F.Sup	Pf+Ptf+M+Sn F.Inf
1	1	-29.	-33.	-26.	-29.	-26.	-29.	-26.	-29.
	2	-24.	-59.	-32.	-38.	-46.	-19.	-29.	-43.
	3	-19.	-66.	-34.	-35.	-57.	-2.	-28.	-44.
	4	-16.	-69.	-36.	-33.	-65.	8.	-26.	-45.
	5	-17.	-67.	-37.	-31.	-69.	14.	-25.	-47.
	6	-21.	-61.	-37.	-29.	-69.	16.	-24.	-49.
	7	-28.	-50.	-38.	-28.	-70.	17.	-20.	-53.
	8	-39.	-35.	-38.	-28.	-67.	14.	-16.	-58.
	9	-52.	-16.	-37.	-28.	-60.	5.	-11.	-64.
	10	-68.	7.	-35.	-30.	-54.	-3.	-3.	-75.
	11	-71.	25.	-27.	-24.	-46.	0.	15.	-78.
2	11	-71.	25.	-27.	-24.	-46.	0.	15.	-78.
	12	-60.	1.	-34.	-27.	-52.	-2.	-10.	-61.
	13	-35.	-34.	-31.	-31.	-57.	6.	-15.	-53.
	14	-16.	-60.	-28.	-35.	-65.	16.	-16.	-52.
	15	-5.	-77.	-26.	-38.	-67.	19.	-17.	-52.
	16	0.	-83.	-25.	-40.	-67.	18.	-17.	-52.
	17	-4.	-79.	-26.	-40.	-67.	17.	-16.	-54.
	18	-15.	-64.	-28.	-38.	-64.	13.	-16.	-55.
	19	-35.	-38.	-32.	-33.	-58.	4.	-16.	-55.
	20	-62.	0.	-37.	-26.	-55.	-1.	-13.	-60.
	21	-73.	25.	-30.	-22.	-50.	2.	12.	-76.
3	21	-73.	25.	-31.	-22.	-50.	2.	12.	-76.
	22	-70.	7.	-39.	-28.	-58.	-2.	-7.	-73.
	23AI	-52.	-19.	-39.	-29.	-62.	4.	-13.	-65.
	23AD	-51.	-17.	-37.	-28.	-61.	5.	-12.	-63.
	24	-36.	-39.	-36.	-29.	-66.	12.	-15.	-59.
	25	-25.	-55.	-36.	-31.	-68.	14.	-18.	-55.
	26	-19.	-64.	-37.	-30.	-69.	14.	-23.	-50.
	27	-18.	-66.	-38.	-29.	-70.	16.	-26.	-45.
	28	-18.	-67.	-37.	-30.	-67.	11.	-28.	-43.
	29	-20.	-64.	-36.	-33.	-59.	0.	-29.	-42.
	30	-25.	-57.	-33.	-37.	-47.	-18.	-30.	-42.
	31	-30.	-32.	-27.	-29.	-27.	-29.	-27.	-29.

Resumen de tracciones maximas en Construccion (kg/cm2)

Seccion 21 T = 2. Estado 1 F.Inf. Hipot. Pi+Pti

Resumen de compresiones maximas en Construccion (kg/cm2)

Seccion	16	T =	-76. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	17	T =	-73. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	22	T =	-72. Estado	2	F.Sup. Hipot. Pi+Pti
Seccion	15	T =	-71. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	20	T =	-68. Estado	1	F.Sup. Hipot. Pi+Pti
Seccion	21	T =	-68. Estado	1	F.Sup. Hipot. Pi+Pti
Seccion	4	T =	-64. Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	10	T =	-64. Estado	2	F.Sup. Hipot. Pi+Pti
Seccion	3	T =	-64. Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	18	T =	-62. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	5	T =	-62. Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	2	T =	-62. Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	23	T =	-61. Estado	2	F.Sup. Hipot. Pi+Pti
Seccion	11	T =	-60. Estado	2	F.Sup. Hipot. Pi+Pti
Seccion	12	T =	-60. Estado	2	F.Sup. Hipot. Pi+Pti
Seccion	14	T =	-59. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	6	T =	-58. Estado	1	F.Inf. Hipot. Pi+Pti
Seccion	9	T =	-56. Estado	2	F.Sup. Hipot. Pi+Pti
Seccion	29	T =	-53. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	28	T =	-53. Estado	2	F.Inf. Hipot. Pi+Pti
Seccion	26	T =	-53. Estado	2	F.Inf. Hipot. Pi+Pti

Resumen de tracciones maximas en Servicio (kg/cm2)

Seccion	15	T =	19.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	16	T =	18.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	17	T =	17.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	7	T =	17.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	14	T =	16.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	27	T =	16.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	6	T =	16.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	11	T =	15.	Estado final	F.Sup.	Hipot. Pf+Ptf+M+Sn
Seccion	25	T =	14.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	26	T =	14.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	5	T =	14.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	8	T =	14.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	18	T =	13.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	24	T =	12.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	21	T =	12.	Estado final	F.Sup.	Hipot. Pf+Ptf+M+Sn
Seccion	28	T =	11.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	4	T =	8.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	13	T =	6.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	23	T =	5.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	9	T =	5.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp
Seccion	19	T =	4.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sp

Resumen de compresiones maximas en Servicio (kg/cm2)

Seccion	22	T =	-80.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	23	T =	-80.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	27	T =	-79.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	24	T =	-79.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	11	T =	-78.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sn
Seccion	25	T =	-78.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	26	T =	-77.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	16	T =	-77.	Estado inicial	F.Inf.	Hipot. Pi+Pti+M+Sn
Seccion	17	T =	-77.	Estado inicial	F.Inf.	Hipot. Pi+Pti+M+Sn
Seccion	8	T =	-77.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	7	T =	-77.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	28	T =	-76.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	21	T =	-76.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sn
Seccion	10	T =	-75.	Estado final	F.Inf.	Hipot. Pf+Ptf+M+Sn
Seccion	15	T =	-75.	Estado inicial	F.Inf.	Hipot. Pi+Pti+M+Sn
Seccion	20	T =	-74.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	6	T =	-74.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	9	T =	-74.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	5	T =	-73.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp
Seccion	18	T =	-72.	Estado inicial	F.Inf.	Hipot. Pi+Pti+M+Sn
Seccion	29	T =	-70.	Estado inicial	F.Sup.	Hipot. Pi+Pti+M+Sp

Tensiones en Servicio (kg/cm2) Estado final (SOLO JPFT)

V.	Sec	Ptf (*) F.Sup	Ptf (*) F.Inf	Pf+Ptf+M F.Sup	Pf+Ptf+M F.Inf	Pf+Ptf+M+Sp F.Sup	Pf+Ptf+M+Sp F.Inf	Pf+Ptf+M+Sn F.Sup	Pf+Ptf+M+Sn F.Inf
1	1	-25.	-44.	-22.	-39.	-22.	-39.	-22.	-39.
	2	-21.	-71.	-29.	-49.	-41.	-32.	-26.	-53.
	3	-16.	-77.	-32.	-45.	-52.	-17.	-26.	-53.
	4	-15.	-79.	-34.	-41.	-59.	-7.	-26.	-52.
	5	-16.	-76.	-36.	-38.	-62.	-2.	-26.	-52.
	6	-21.	-68.	-37.	-36.	-62.	-2.	-26.	-52.
	7	-29.	-56.	-38.	-34.	-62.	-1.	-24.	-54.
	8	-40.	-40.	-39.	-32.	-58.	-6.	-21.	-58.
	9	-54.	-19.	-39.	-31.	-50.	-16.	-17.	-62.
	10	-71.	5.	-38.	-32.	-43.	-25.	-10.	-71.
	11	-75.	25.	-30.	-25.	-35.	-19.	8.	-73.
2	11	-75.	25.	-30.	-25.	-35.	-19.	8.	-73.
	12	-65.	0.	-38.	-28.	-41.	-24.	-18.	-57.
	13	-39.	-35.	-35.	-32.	-47.	-15.	-22.	-50.
	14	-21.	-61.	-32.	-36.	-55.	-3.	-22.	-50.
	15	-9.	-78.	-30.	-39.	-59.	0.	-22.	-51.
	16	-5.	-85.	-29.	-42.	-58.	-1.	-22.	-52.
	17	-8.	-81.	-30.	-42.	-58.	-2.	-21.	-53.
	18	-19.	-66.	-32.	-40.	-55.	-7.	-22.	-54.
	19	-39.	-40.	-35.	-35.	-48.	-18.	-22.	-53.
	20	-66.	-3.	-41.	-28.	-43.	-24.	-20.	-57.
	21	-76.	24.	-33.	-24.	-38.	-18.	4.	-73.
3	21	-76.	24.	-34.	-24.	-38.	-18.	4.	-73.
	22	-73.	3.	-41.	-32.	-46.	-25.	-13.	-71.
	23AI	-55.	-24.	-40.	-34.	-51.	-18.	-19.	-64.
	23AD	-53.	-22.	-39.	-32.	-50.	-16.	-17.	-62.
	24	-37.	-44.	-37.	-34.	-56.	-8.	-19.	-60.
	25	-25.	-62.	-36.	-37.	-59.	-5.	-21.	-58.
	26	-19.	-72.	-36.	-38.	-60.	-4.	-25.	-54.
	27	-16.	-76.	-37.	-37.	-63.	-1.	-27.	-51.
	28	-15.	-77.	-35.	-40.	-60.	-5.	-28.	-50.
	29	-17.	-76.	-33.	-44.	-53.	-15.	-27.	-51.
	30	-21.	-70.	-29.	-49.	-42.	-32.	-27.	-53.
	31	-25.	-44.	-22.	-39.	-22.	-39.	-22.	-39.

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Tensiones en Servicio (kg/cm2) Estado final (SOLO U.I.C.)

V.	Sec	Ptf (*) F.Sup	Ptf (*) F.Inf	Pf+Ptf+M F.Sup	Pf+Ptf+M F.Inf	Pf+Ptf+M+Sp F.Sup	Pf+Ptf+M+Sp F.Inf	Pf+Ptf+M+Sn F.Sup	Pf+Ptf+M+Sn F.Inf
1	1	-25.	-44.	-22.	-39.	-22.	-39.	-22.	-39.
	2	-21.	-71.	-29.	-49.	-39.	-35.	-27.	-53.
	3	-16.	-77.	-32.	-45.	-49.	-21.	-27.	-51.
	4	-15.	-79.	-34.	-41.	-55.	-11.	-28.	-50.
	5	-16.	-76.	-36.	-38.	-59.	-5.	-28.	-50.
	6	-21.	-68.	-37.	-36.	-60.	-5.	-28.	-49.
	7	-29.	-56.	-38.	-34.	-59.	-5.	-26.	-51.
	8	-40.	-40.	-39.	-32.	-55.	-10.	-24.	-53.
	9	-54.	-19.	-39.	-31.	-47.	-21.	-21.	-57.
	10	-71.	5.	-38.	-32.	-43.	-26.	-15.	-64.
	11	-75.	25.	-30.	-25.	-35.	-19.	0.	-64.
2	11	-75.	25.	-30.	-25.	-35.	-19.	0.	-64.
	12	-65.	0.	-38.	-28.	-41.	-24.	-21.	-53.
	13	-39.	-35.	-35.	-32.	-44.	-19.	-23.	-48.
	14	-21.	-61.	-32.	-36.	-51.	-9.	-23.	-48.
	15	-9.	-78.	-30.	-39.	-56.	-4.	-23.	-49.
	16	-5.	-85.	-29.	-42.	-55.	-5.	-25.	-48.
	17	-8.	-81.	-30.	-42.	-55.	-7.	-23.	-51.
	18	-19.	-66.	-32.	-40.	-51.	-13.	-23.	-52.
	19	-39.	-40.	-35.	-35.	-44.	-22.	-24.	-51.
	20	-66.	-3.	-41.	-28.	-43.	-25.	-23.	-53.
	21	-76.	24.	-33.	-24.	-38.	-18.	-3.	-63.
3	21	-76.	24.	-34.	-24.	-38.	-19.	-3.	-63.
	22	-73.	3.	-41.	-32.	-46.	-26.	-18.	-64.
	23AI	-55.	-24.	-40.	-34.	-48.	-23.	-22.	-59.
	23AD	-53.	-22.	-39.	-32.	-46.	-21.	-21.	-57.
	24	-37.	-44.	-37.	-34.	-53.	-13.	-22.	-55.
	25	-25.	-62.	-36.	-37.	-57.	-8.	-24.	-54.
	26	-19.	-72.	-36.	-38.	-58.	-7.	-27.	-51.
	27	-16.	-76.	-37.	-37.	-60.	-4.	-29.	-49.
	28	-15.	-77.	-35.	-40.	-57.	-10.	-29.	-49.
	29	-17.	-76.	-33.	-44.	-50.	-20.	-28.	-50.
	30	-21.	-70.	-29.	-49.	-39.	-35.	-27.	-52.
	31	-25.	-44.	-22.	-39.	-22.	-39.	-22.	-39.

COMPROBACION DE FISURACION POR TENSIONES NORMALES

CONTROL TENSIONES LONGITUDINALES
COMBINACION CASI PERMANENTE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.30						0.00									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-26	-29	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	2	2	-24	-27	-28	-31
	-32	-38	0	1	-1	2	1	1	1	1	-13	17	3	-4	1	1	-10	6	2	-4	2	2	-29	-29	-38	-42
3	-34	-35	1	1	-2	3	1	1	1	1	-20	28	6	-8	1	1	-17	24	5	-6	2	2	-29	-22	-44	-40
4	-36	-33	1	2	-3	5	1	1	1	1	-25	34	8	-11	1	1	-21	30	6	-9	2	2	-31	-17	-48	-40
5	-37	-31	2	3	-4	6	1	1	1	1	-26	36	10	-14	1	1	-23	33	8	-12	2	2	-30	-12	-51	-40
6	-37	-29	2	3	-6	8	1	1	1	1	-25	34	11	-16	1	1	-23	31	9	-13	2	2	-30	-10	-51	-39
7	-38	-28	3	4	-7	9	1	1	1	1	-24	33	14	-20	1	1	-21	29	12	-17	2	2	-29	-8	-54	-40
8	-38	-28	3	4	-8	11	1	1	1	1	-19	26	18	-26	1	1	-16	22	15	-21	2	2	-28	-9	-53	-42
9	-37	-28	4	5	-9	12	1	1	1	1	-11	15	22	-31	1	1	-8	10	18	-26	2	2	-25	-11	-51	-44
10	-35	-30	4	6	-10	14	1	1	1	1	-5	7	28	-39	1	1	-5	6	23	-32	2	2	-21	-13	-47	-50
11	-27	-24	4	6	-11	14	1	1	1	1	-5	6	38	-48	1	1	-5	6	30	-39	2	2	-10	-7	-40	-46
11	-27	-24	4	6	-11	14	1	1	1	1	-5	6	38	-48	1	1	-5	6	30	-39	1	1	-10	-7	-40	-46
12	-34	-27	4	5	-11	16	1	1	1	1	-3	4	20	-29	1	1	-3	4	17	-25	2	2	-22	-11	-46	-43
13	-31	-31	3	4	-11	16	1	1	1	1	-12	17	13	-18	1	1	-9	13	12	-16	2	2	-22	-12	-45	-42
14	-28	-35	2	3	-11	16	1	1	1	1	-23	33	10	-14	1	1	-19	27	9	-12	2	2	-21	-12	-44	-44
15	-26	-38	1	2	-11	16	1	1	1	1	-29	39	8	-12	1	1	-26	35	7	-10	2	2	-21	-15	-43	-45
16	-25	-40	1	2	-11	16	1	1	1	1	-29	41	7	-10	1	1	-26	37	4	-6	2	2	-20	-16	-42	-47
17	-26	-40	1	2	-11	16	1	1	1	1	-28	40	9	-11	1	1	-25	35	7	-9	2	2	-21	-16	-43	-47
18	-28	-38	2	3	-11	16	1	1	1	1	-23	33	10	-14	1	1	-19	27	9	-12	2	2	-21	-15	-44	-47
19	-32	-33	3	4	-11	16	1	1	1	1	-13	17	13	-18	1	1	-9	13	11	-6	2	2	-23	-14	-46	-44
20	-37	-26	4	5	-11	16	1	1	1	1	-2	4	21	-29	1	1	-2	3	18	-25	2	2	-25	-10	-49	-42
21	-30	-22	4	6	-11	14	1	1	1	1	-5	6	37	-49	1	1	-5	6	30	-39	1	1	-13	-5	-43	-45
	-31	-22	4	6	-11	14	1	1	0	0	-4	6	38	-49	0	0	-4	5	31	-39	1	1	-15	-7	-42	-43
	-39	-28	4	6	-10	14	1	1	0	0	-5	7	28	-39	0	0	-5	6	23	-32	1	1	-20	-12	-50	-46
23	-39	-29	4	5	-10	12	1	1	0	0	-11	16	21	-30	0	0	-8	11	18	-25	1	1	-28	-13	-52	-44
23	-37	-28	4	5	-9	12	1	1	0	0	-11	16	22	-30	0	0	-7	11	18	-25	1	1	-26	-12	-49	-43
24	-36	-29	3	5	-8	11	1	1	0	0	-19	26	18	-26	0	0	-16	21	15	-21	1	1	-27	-10	-49	-42
25	-36	-31	3	4	-7	9	1	1	0	0	-23	32	15	-21	0	0	-21	29	12	-27	1	1	-28	-12	-50	-42
26	-37	-30	2	4	-6	8	1	1	0	0	-24	34	11	-16	0	0	-22	31	9	-13	1	1	-31	-11	-49	-39
27	-38	-29	2	3	-4	6	1	1	0	0	-29	36	10	-14	0	0	-23	33	8	-12	1	1	-33	-12	-50	-37
28	-37	-30	1	3	-3	5	1	1	0	0	-25	35	7	-10	0	0	-22	30	6	-9	1	1	-33	-14	-49	-37
29	-36	-33	1	2	-2	3	1	1	0	0	-20	29	6	-7	0	0	-27	24	5	-6	1	1	-33	-20	-46	-38
30	-33	-37	0	1	-1	2	1	1	6	6	-12	17	2	-4	0	0	-10	14	2	-3	1	1	-26	-24	-46	-45
31	-27	-29	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	1	1	-23	-25	-35	-33

CONTROL TENSIONES LONGITUDINALES
COMBINACION FRECUENTE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.60						0.00									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-26	-29	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	2	2	-24	-27	-28	-31
2	-32	-38	0	1	-1	2	1	1	1	1	-13	17	3	-4	1	1	-10	6	2	-4	2	2	-28	-24	-42	-44
3	-34	-35	1	1	-2	3	1	1	1	1	-20	28	6	-8	1	1	-17	24	5	-6	2	2	-27	-14	-50	-43
4	-36	-33	1	2	-3	5	1	1	1	1	-25	34	8	-11	1	1	-21	30	6	-9	2	2	-28	-6	-56	-44
5	-37	-31	2	3	-4	6	1	1	1	1	-26	36	10	-14	1	1	-23	33	8	-12	2	2	-27	-1	-59	-45
6	-37	-29	2	3	-6	8	1	1	1	1	-25	34	11	-16	1	1	-23	31	9	-13	2	2	-26	1	-59	-44
7	-38	-28	3	4	-7	9	1	1	1	1	-24	33	14	-20	1	1	-21	29	12	-17	2	2	-25	2	-61	-46
8	-38	-28	3	4	-8	11	1	1	1	1	-19	26	18	-26	1	1	-16	22	15	-21	2	2	-22	-1	-59	-50
9	-37	-28	4	5	-9	12	1	1	1	1	-11	15	22	-31	1	1	-8	10	18	-26	2	2	-18	-6	-54	-54
10	-35	-30	4	6	-10	14	1	1	1	1	-5	7	28	-39	1	1	-5	6	23	-32	2	2	-12	-11	-49	-62
11	-27	-24	4	6	-11	14	1	1	1	1	-5	6	38	-48	1	1	-5	6	30	-39	2	2	2	-5	-42	-61
11	-27	-24	4	6	-11	14	1	1	1	1	-5	6	38	-48	1	1	-5	6	30	-39	1	1	2	-5	-42	-61
12	-34	-27	4	5	-11	16	1	1	1	1	-3	4	20	-29	1	1	-3	4	17	-25	2	2	-16	-10	-47	-52
13	-31	-31	3	4	-11	16	1	1	1	1	-12	17	13	-18	1	1	-9	13	12	-16	2	2	-18	-7	-49	-48
14	-28	-35	2	3	-11	16	1	1	1	1	-23	33	10	-14	1	1	-19	27	9	-12	2	2	-18	-2	-51	-49
15	-26	-38	1	2	-11	16	1	1	1	1	-29	39	8	-12	1	1	-26	35	7	-10	2	2	-18	-3	-52	-49
16	-25	-40	1	2	-11	16	1	1	1	1	-29	41	7	-10	1	1	-26	37	4	-6	2	2	-18	-3	-51	-50
17	-26	-40	1	2	-11	16	1	1	1	1	-28	40	9	-11	1	1	-25	35	7	-9	2	2	-18	-4	-51	-51
18	-28	-38	2	3	-11	16	1	1	1	1	-23	33	10	-14	1	1	-19	27	9	-12	2	2	-18	-5	-51	-52
19	-32	-33	3	4	-11	16	1	1	1	1	-13	17	13	-18	1	1	-9	13	11	-6	2	2	-19	-9	-50	-50
20	-37	-26	4	5	-11	16	1	1	1	1	-2	4	21	-29	1	1	-2	3	18	-25	2	2	-18	-9	-50	-51
21	-30	-22	4	6	-11	14	1	1	1	1	-5	6	37	-48	1	1	-5	6	30	-39	1	1	-2	-3	-45	-60
21	-31	-22	4	6	-11	14	1	1	0	0	-4	6	38	-49	0	0	-4	5	31	-39	1	1	-4	-5	-44	-58
22	-39	-28	4	6	-10	14	1	1	0	0	-5	7	28	-39	0	0	-5	6	23	-32	1	1	-18	-10	-52	-58
23	-39	-29	4	5	-10	12	1	1	0	0	-11	16	21	-30	0	0	-8	11	18	-25	1	1	-22	-8	-55	-53
23	-37	-28	4	5	-9	12	1	1	0	0	-11	16	22	-30	0	0	-7	11	18	-25	1	1	-19	-7	-53	-52
24	-36	-29	3	5	-8	11	1	1	0	0	-19	26	18	-26	0	0	-16	21	15	-21	1	1	-22	-2	-55	-50
25	-36	-31	3	4	-7	9	1	1	0	0	-23	32	15	-21	0	0	-21	29	12	-27	1	1	-24	-3	-57	-48
26	-37	-30	2	4	-6	8	1	1	0	0	-24	34	11	-16	0	0	-22	31	9	-13	1	1	-28	-1	-57	-44
27	-38	-29	2	3	-4	6	1	1	0	0	-29	36	10	-14	0	0	-23	33	8	-12	1	1	-30	-1	-60	-41
28	-37	-30	1	3	-3	5	1	1	0	0	-25	35	7	-10	0	0	-22	30	6	-9	1	1	-31	-3	-55	-40
29	-36	-33	1	2	-2	3	1	1	0	0	-20	29	6	-7	0	0	-27	24	5	-6	1	1	-31	-12	-51	-40
30	-33	-37	0	1	-1	2	1	1	6	6	-12	17	2	-4	0	0	-10	14	2	-3	1	1	-26	-19	-47	-46
31	-27	-29	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	1	1	-23	-25	-31	-33

CONTROL TENSIONES LONGITUDINALES
COMBINACION POCO PROBABLE IPF75
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.60		0.60				1.00						0.00									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
	-26	-29	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	2	2	-23	-26	-29	-32
-	-32	-38	0	1	-1	2	1	1	1	1	-13	17	3	-4	1	1	-10	6	2	-4	2	2	-26	-16	-48	-46
3	-34	-35	1	1	-2	3	1	1	1	1	-20	28	6	-8	1	1	-17	24	5	-6	2	2	-24	-2	-59	-47
4	-36	-33	1	2	-3	5	1	1	1	1	-25	34	8	-11	1	1	-21	30	6	-9	2	2	-24	9	-66	-49
5	-37	-31	2	3	-4	6	1	1	1	1	-26	36	10	-14	1	1	-23	33	8	-12	2	2	-22	14	-70	-51
6	-37	-29	2	3	-6	8	1	1	1	1	-25	34	11	-16	1	1	-23	31	9	-13	2	2	-21	15	-70	-51
7	-38	-28	3	4	-7	9	1	1	1	1	-24	33	14	-20	1	1	-21	29	12	-17	2	2	-18	17	-72	-55
8	-38	-28	3	4	-8	11	1	1	1	1	-19	26	18	-26	1	1	-16	22	15	-21	2	2	-14	11	-67	-61
9	-37	-28	4	5	-9	12	1	1	1	1	-11	15	22	-31	1	1	-8	10	18	-26	2	2	-8	2	-60	-67
10	-35	-30	4	6	-10	14	1	1	1	1	-5	7	28	-39	1	1	-5	6	23	-32	2	2	0	-6	-53	-78
11	-27	-24	4	6	-11	14	1	1	1	1	-5	6	38	-48	1	1	-5	6	30	-39	2	2	18	-1	-45	-81
11	-27	-24	4	6	-11	14	1	1	1	1	-5	6	38	-48	1	1	-5	6	30	-39	1	1	18	-1	-45	-81
12	-34	-27	4	5	-11	16	1	1	1	1	-3	4	20	-29	1	1	-3	4	17	-25	2	2	-7	-6	-50	-64
13	-31	-31	3	4	-11	16	1	1	1	1	-12	17	13	-18	1	1	-9	13	12	-16	2	2	-12	2	-55	-56
14	-28	-35	2	3	-11	16	1	1	1	1	-23	33	10	-14	1	1	-19	27	9	-12	2	2	-13	13	-62	-55
15	-26	-38	1	2	-11	16	1	1	1	1	-29	39	8	-12	1	1	-26	35	7	-10	2	2	-14	15	-65	-55
16	-25	-40	1	2	-11	16	1	1	1	1	-29	41	7	-10	1	1	-26	37	4	-6	2	2	-14	15	-64	-55
17	-26	-40	1	2	-11	16	1	1	1	1	-28	40	9	-11	1	1	-25	35	7	-9	2	2	-13	14	-64	-56
18	-28	-38	2	3	-11	16	1	1	1	1	-23	33	10	-14	1	1	-19	27	9	-12	2	2	-13	10	-62	-58
19	-32	-33	3	4	-11	16	1	1	1	1	-13	17	13	-18	1	1	-9	13	11	-6	2	2	-13	0	-57	-58
20	-37	-26	4	5	-11	16	1	1	1	1	-2	4	21	-29	1	1	-2	3	18	-25	2	2	-9	-5	-52	-63
21	-30	-22	4	6	-11	14	1	1	1	1	-5	6	37	-49	1	1	-5	6	30	-39	1	1	14	1	-48	-80
	-31	-22	4	6	-11	14	1	1	0	0	-4	6	38	-49	0	0	-4	5	31	-39	1	1	12	-1	-46	-78
22	-39	-28	4	6	-10	14	1	1	0	0	-5	7	28	-39	0	0	-5	6	23	-32	1	1	-6	-6	-55	-74
23	-39	-29	4	5	-10	12	1	1	0	0	-11	16	21	-30	0	0	-8	11	18	-25	1	1	-13	0	-61	-65
23	-37	-28	4	5	-9	12	1	1	0	0	-11	16	22	-30	0	0	-7	11	18	-25	1	1	-10	1	-58	-64
24	-36	-29	3	5	-8	11	1	1	0	0	-19	26	18	-26	0	0	-16	21	15	-21	1	1	-14	9	-63	-61
25	-36	-31	3	4	-7	9	1	1	0	0	-23	32	15	-21	0	0	-21	29	12	-27	1	1	-17	11	-67	-57
26	-37	-30	2	4	-6	8	1	1	0	0	-24	34	11	-16	0	0	-22	31	9	-13	1	1	-23	13	-67	-51
27	-38	-29	2	3	-4	6	1	1	0	0	-29	36	10	-14	0	0	-23	33	8	-12	1	1	-25	14	-72	-47
28	-37	-30	1	3	-3	5	1	1	0	0	-25	35	7	-10	0	0	-22	30	6	-9	1	1	-28	12	-65	-44
29	-36	-33	1	2	-2	3	1	1	0	0	-20	29	6	-7	0	0	-27	24	5	-6	1	1	-28	0	-59	-43
30	-33	-37	0	1	-1	2	1	1	6	6	-12	17	2	-4	0	0	-10	14	2	-3	1	1	-25	-12	-52	-48
31	-27	-29	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	1	1	-23	-25	-31	-33

CONTROL TENSIONES LONGITUDINALES
COMBINACION CASI PERMANENTE UIC
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.00						0.30									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-26	-29	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	2	2	-24	-27	-28	-31
2	-32	-38	0	1	-1	2	1	1	1	1	-13	17	3	-4	1	1	-10	6	2	-4	2	2	-30	-32	-38	-42
3	-34	-35	1	1	-2	3	1	1	1	1	-20	28	6	-8	1	1	-17	24	5	-6	2	2	-31	-23	-43	-40
4	-36	-33	1	2	-3	5	1	1	1	1	-25	34	8	-11	1	1	-21	30	6	-9	2	2	-33	-17	-47	-40
5	-37	-31	2	3	-4	6	1	1	1	1	-26	36	10	-14	1	1	-23	33	8	-12	2	2	-33	-13	-50	-40
6	-37	-29	2	3	-6	8	1	1	1	1	-25	34	11	-16	1	1	-23	31	9	-13	2	2	-33	-11	-51	-38
7	-38	-28	3	4	-7	9	1	1	1	1	-24	33	14	-20	1	1	-21	29	12	-17	2	2	-33	-9	-53	-39
8	-38	-28	3	4	-8	11	1	1	1	1	-19	26	18	-26	1	1	-16	22	15	-21	2	2	-33	-10	-52	-40
9	-37	-28	4	5	-9	12	1	1	1	1	-11	15	22	-31	1	1	-8	10	18	-26	2	2	-31	-12	-50	-43
10	-35	-30	4	6	-10	14	1	1	1	1	-5	7	28	-39	1	1	-5	6	23	-32	2	2	-29	-13	-48	-48
11	-27	-24	4	6	-11	14	1	1	1	1	-5	6	38	-48	1	1	-5	6	30	-39	2	2	-21	-7	-40	-44
11	-27	-24	4	6	-11	14	1	1	1	1	-5	6	38	-48	1	1	-5	6	30	-39	1	1	-21	-7	-40	-44
12	-34	-27	4	5	-11	16	1	1	1	1	-3	4	20	-29	1	1	-3	4	17	-25	2	2	-28	-11	-47	-42
13	-31	-31	3	4	-11	16	1	1	1	1	-12	17	13	-18	1	1	-9	13	12	-16	2	2	-26	-13	-44	-42
14	-28	-35	2	3	-11	16	1	1	1	1	-23	33	10	-14	1	1	-19	27	9	-12	2	2	-24	-14	-43	-44
15	-26	-38	1	2	-11	16	1	1	1	1	-29	39	8	-12	1	1	-26	35	7	-10	2	2	-23	-15	-42	-45
16	-25	-40	1	2	-11	16	1	1	1	1	-29	41	7	-10	1	1	-26	37	4	-6	2	2	-22	-17	-41	-46
17	-26	-40	1	2	-11	16	1	1	1	1	-28	40	9	-11	1	1	-25	35	7	-9	2	2	-23	-17	-42	-47
18	-28	-38	2	3	-11	16	1	1	1	1	-23	33	10	-14	1	1	-19	27	9	-12	2	2	-24	-17	-43	-47
19	-32	-33	3	4	-11	16	1	1	1	1	-13	17	13	-18	1	1	-9	13	11	-6	2	2	-27	-15	-45	-41
20	-37	-26	4	5	-11	16	1	1	1	1	-2	4	21	-29	1	1	-2	3	18	-25	2	2	-31	-10	-49	-41
21	-30	-22	4	6	-11	14	1	1	1	1	-5	6	37	-49	1	1	-5	6	30	-39	1	1	-24	-5	-43	-42
21	-31	-22	4	6	-11	14	1	1	0	0	-4	6	38	-49	0	0	-4	5	31	-39	1	1	-26	-7	-13	-41
22	-39	-28	4	6	-10	14	1	1	0	0	-5	7	28	-39	0	0	-5	6	23	-32	1	1	-34	-12	-50	-44
23	-39	-29	4	5	-10	12	1	1	0	0	-11	16	21	-30	0	0	-8	11	18	-25	1	1	-34	-14	-51	-42
23	-37	-28	4	5	-9	12	1	1	0	0	-11	16	22	-30	0	0	-7	11	18	-25	1	1	-32	-13	-48	-41
24	-36	-29	3	5	-8	11	1	1	0	0	-19	26	18	-26	0	0	-16	21	15	-21	1	1	-32	-11	-49	-41
25	-36	-31	3	4	-7	9	1	1	0	0	-23	32	15	-21	0	0	-21	29	12	-27	1	1	-32	-13	-50	-44
26	-37	-30	2	4	-6	8	1	1	0	0	-24	34	11	-16	0	0	-22	31	9	-13	1	1	-34	-12	-49	-39
27	-38	-29	2	3	-4	6	1	1	0	0	-29	36	10	-14	0	0	-23	33	8	-12	1	1	-35	-12	-50	-36
28	-37	-30	1	3	-3	5	1	1	0	0	-25	35	7	-10	0	0	-22	30	6	-9	1	1	-35	-15	-47	-37
29	-36	-33	1	2	-2	3	1	1	0	0	-20	29	6	-7	0	0	-27	24	5	-6	1	1	-34	-22	-47	-38
30	-33	-37	0	1	-1	2	1	1	6	6	-12	17	2	-4	0	0	-10	14	2	-3	1	1	-27	-24	-43	-45
31	-27	-29	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	1	1	-23	-25	-31	-33

CONTROL TENSIONES LONGITUDINALES
COMBINACION FRECUENTE UIC
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.50		0.50				0.00						0.60									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-26	-29	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	2	2	-23	-26	-29	-32
	-32	-38	0	1	-1	2	1	1	1	1	-13	17	3	-4	1	1	-10	6	2	-4	2	2	-29	-30	-41	-44
3	-34	-35	1	1	-2	3	1	1	1	1	-20	28	6	-8	1	1	-17	24	5	-6	2	2	-30	-15	-49	-42
4	-36	-33	1	2	-3	5	1	1	1	1	-25	34	8	-11	1	1	-21	30	6	-9	2	2	-32	-8	-54	-43
5	-37	-31	2	3	-4	6	1	1	1	1	-26	36	10	-14	1	1	-23	33	8	-12	2	2	-32	-3	-58	-44
6	-37	-29	2	3	-6	8	1	1	1	1	-25	34	11	-16	1	1	-23	31	9	-13	2	2	-32	-1	-59	-43
7	-38	-28	3	4	-7	9	1	1	1	1	-24	33	14	-20	1	1	-21	29	12	-17	2	2	-32	1	-60	-45
8	-38	-28	3	4	-8	11	1	1	1	1	-19	26	18	-26	1	1	-16	22	15	-21	2	2	-32	-3	-57	-47
9	-37	-28	4	5	-9	12	1	1	1	1	-11	15	22	-31	1	1	-8	10	18	-26	2	2	-30	-8	-53	-51
10	-35	-30	4	6	-10	14	1	1	1	1	-5	7	28	-39	1	1	-5	6	23	-32	2	2	-28	-11	-50	-58
11	-27	-24	4	6	-11	14	1	1	1	1	-5	6	38	-48	1	1	-5	6	30	-39	2	2	-20	-5	-42	-56
11	-27	-24	4	6	-11	14	1	1	1	1	-5	6	38	-48	1	1	-5	6	30	-39	1	1	-21	-5	-42	-56
12	-34	-27	4	5	-11	16	1	1	1	1	-3	4	20	-29	1	1	-3	4	17	-25	2	2	-27	-9	-48	-50
13	-31	-31	3	4	-11	16	1	1	1	1	-12	17	13	-18	1	1	-9	13	12	-16	2	2	-25	-9	-48	-47
14	-28	-35	2	3	-11	16	1	1	1	1	-23	33	10	-14	1	1	-19	27	9	-12	2	2	-23	-5	-50	-48
15	-26	-38	1	2	-11	16	1	1	1	1	-29	39	8	-12	1	1	-26	35	7	-10	2	2	-22	-4	-51	-49
16	-25	-40	1	2	-11	16	1	1	1	1	-29	41	7	-10	1	1	-26	37	4	-6	2	2	-21	-5	-50	-48
17	-26	-40	1	2	-11	16	1	1	1	1	-28	40	9	-11	1	1	-25	35	7	-9	2	2	-22	-6	-50	-50
18	-28	-38	2	3	-11	16	1	1	1	1	-23	33	10	-14	1	1	-19	27	9	-12	2	2	-23	-8	-50	-51
19	-32	-33	3	4	-11	16	1	1	1	1	-13	17	13	-18	1	1	-9	13	11	-6	2	2	-26	-11	-49	-43
20	-37	-26	4	5	-11	16	1	1	1	1	-2	4	21	-29	1	1	-2	3	18	-25	2	2	-30	-9	-50	-49
21	-30	-22	4	6	-11	14	1	1	1	1	-5	6	37	-49	1	1	-5	6	30	-39	1	1	-24	-3	-45	-54
	-31	-22	4	6	-11	14	1	1	0	0	-4	6	38	-49	0	0	-4	5	31	-39	1	1	-26	-5	-44	-53
	-39	-28	4	6	-10	14	1	1	0	0	-5	7	28	-39	0	0	-5	6	23	-32	1	1	-34	-10	-52	-54
23	-39	-29	4	5	-10	12	1	1	0	0	-11	16	21	-30	0	0	-8	11	18	-25	1	1	-34	-10	-54	-50
23	-37	-28	4	5	-9	12	1	1	0	0	-11	16	22	-30	0	0	-7	11	18	-25	1	1	-32	-9	-51	-49
24	-36	-29	3	5	-8	11	1	1	0	0	-19	26	18	-26	0	0	-16	21	15	-21	1	1	-32	-5	-54	-48
25	-36	-31	3	4	-7	9	1	1	0	0	-23	32	15	-21	0	0	-21	29	12	-27	1	1	-32	-4	-56	-52
26	-37	-30	2	4	-6	8	1	1	0	0	-24	34	11	-16	0	0	-22	31	9	-13	1	1	-34	-2	-56	-43
27	-38	-29	2	3	-4	6	1	1	0	0	-29	36	10	-14	0	0	-23	33	8	-12	1	1	-35	-2	-57	-40
28	-37	-30	1	3	-3	5	1	1	0	0	-25	35	7	-10	0	0	-22	30	6	-9	1	1	-35	-5	-54	-40
29	-36	-33	1	2	-2	3	1	1	0	0	-20	29	6	-7	0	0	-27	24	5	-6	1	1	-34	-14	-55	-40
30	-33	-37	0	1	-1	2	1	1	6	6	-12	17	2	-4	0	0	-10	14	2	-3	1	1	-26	-20	-46	-46
31	-27	-29	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	1	1	-22	-24	-32	-34

CONTROL TENSIONES LONGITUDINALES
COMBINACION POCO PROBABLE UIC
EN SERVICIO. ESTADO FINAL

VALORES DE TENSIONES EN KG/CM2

					0.60		0.60				0.00						1.00									
	PUENTE		DESC.		GRAD		COACC		ROZAM.		SOBRECARGA IPF75						SOBRECARGA U.I.C.						TRACC		COMP	
	VACIO		APOYOS		TERM		CARRIL		TEFL		SOB (+)		SOB (-)		FREN		SOB (+)		SOB (-)		FREN		MAX		MAX	
	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI	FS	FI
1	-26	-29	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	2	2	-22	-25	-30	-33
2	-32	-38	0	1	-1	2	1	1	1	1	-13	17	3	-4	1	1	-10	6	2	-4	2	2	-28	-26	-46	-47
3	-34	-35	1	1	-2	3	1	1	1	1	-20	28	6	-8	1	1	-17	24	5	-6	2	2	-29	-5	-57	-46
4	-36	-33	1	2	-3	5	1	1	1	1	-25	34	8	-11	1	1	-21	30	6	-9	2	2	-31	6	-63	-48
5	-37	-31	2	3	-4	6	1	1	1	1	-26	36	10	-14	1	1	-23	33	8	-12	2	2	-31	12	-68	-50
6	-37	-29	2	3	-6	8	1	1	1	1	-25	34	11	-16	1	1	-23	31	9	-13	2	2	-31	13	-69	-49
7	-38	-28	3	4	-7	9	1	1	1	1	-24	33	14	-20	1	1	-21	29	12	-17	2	2	-31	14	-70	-53
8	-38	-28	3	4	-8	11	1	1	1	1	-19	26	18	-26	1	1	-16	22	15	-21	2	2	-31	8	-65	-57
9	-37	-28	4	5	-9	12	1	1	1	1	-11	15	22	-31	1	1	-8	10	18	-26	2	2	-29	-2	-58	-63
10	-35	-30	4	6	-10	14	1	1	1	1	-5	7	28	-39	1	1	-5	6	23	-32	2	2	-27	-6	-54	-72
11	-27	-24	4	6	-11	14	1	1	1	1	-5	6	38	-48	1	1	-5	6	30	-39	2	2	-19	0	-46	-73
11	-27	-24	4	6	-11	14	1	1	1	1	-5	6	38	-48	1	1	-5	6	30	-39	1	1	-20	-1	-45	-72
12	-34	-27	4	5	-11	16	1	1	1	1	-3	4	20	-29	1	1	-3	4	17	-25	2	2	-26	-5	-51	-61
13	-31	-31	3	4	-11	16	1	1	1	1	-12	17	13	-18	1	1	-9	13	12	-16	2	2	-24	-1	-53	-55
14	-28	-35	2	3	-11	16	1	1	1	1	-23	33	10	-14	1	1	-19	27	9	-12	2	2	-22	8	-59	-54
15	-26	-38	1	2	-11	16	1	1	1	1	-29	39	8	-12	1	1	-26	35	7	-10	2	2	-21	12	-63	-54
16	-25	-40	1	2	-11	16	1	1	1	1	-29	41	7	-10	1	1	-26	37	4	-6	2	2	-20	12	-62	-52
17	-26	-40	1	2	-11	16	1	1	1	1	-28	40	9	-11	1	1	-25	35	7	-9	2	2	-21	10	-62	-55
18	-28	-38	2	3	-11	16	1	1	1	1	-23	33	10	-14	1	1	-19	27	9	-12	2	2	-22	5	-59	-57
19	-32	-33	3	4	-11	16	1	1	1	1	-13	17	13	-18	1	1	-9	13	11	-6	2	2	-25	-3	-54	-47
20	-37	-26	4	5	-11	16	1	1	1	1	-2	4	21	-29	1	1	-2	3	18	-25	2	2	-29	-5	-53	-60
21	-30	-22	4	6	-11	14	1	1	1	1	-5	6	37	-49	1	1	-5	6	30	-39	1	1	-23	1	-48	-70
21	-31	-22	4	6	-11	14	1	1	0	0	-4	6	38	-49	0	0	-4	5	31	-39	1	1	-25	-1	-47	-69
22	-39	-28	4	6	-10	14	1	1	0	0	-5	7	28	-39	0	0	-5	6	23	-32	1	1	-33	-6	-56	-68
23	-39	-29	4	5	-10	12	1	1	0	0	-11	16	21	-30	0	0	-8	11	18	-25	1	1	-33	-4	-59	-61
23	-37	-28	4	5	-9	12	1	1	0	0	-11	16	22	-30	0	0	-7	11	18	-25	1	1	-31	-3	-55	-60
24	-36	-29	3	5	-8	11	1	1	0	0	-19	26	18	-26	0	0	-16	21	15	-21	1	1	-31	5	-61	-57
25	-36	-31	3	4	-7	9	1	1	0	0	-23	32	15	-21	0	0	-21	29	12	-27	1	1	-31	9	-66	-64
26	-37	-30	2	4	-6	8	1	1	0	0	-24	34	11	-16	0	0	-22	31	9	-13	1	1	-33	11	-66	-49
27	-38	-29	2	3	-4	6	1	1	0	0	-29	36	10	-14	0	0	-23	33	8	-12	1	1	-34	12	-67	-46
28	-37	-30	1	3	-3	5	1	1	0	0	-25	35	7	-10	0	0	-22	30	6	-9	1	1	-34	8	-63	-44
29	-36	-33	1	2	-2	3	1	1	0	0	-20	29	6	-7	0	0	-27	24	5	-6	1	1	-33	-4	-67	-43
30	-33	-37	0	1	-1	2	1	1	6	6	-12	17	2	-4	0	0	-10	14	2	-3	1	1	-26	-14	-51	-48
31	-27	-29	0	0	0	0	1	1	3	3	0	0	0	0	0	0	0	0	0	0	1	1	-22	-24	-32	-34

VIADUCTO 5
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE CONSTRUCCION

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI
1	1	0.403	0.712	1.900	0	0		0.00		0.00
	2	0.387	0.623	1.900	0	0		0.00		0.00
	3	0.387	0.623	1.900	0	0		0.00		0.00
	4	0.387	0.623	1.900	0	0		0.00		0.00
	5	0.387	0.623	1.900	0	0		0.00		0.00
	6	0.387	0.623	1.900	0	0		0.00		0.00
	7	0.387	0.623	1.900	0	0		0.00		0.00
	8	0.387	0.623	1.900	0	0		0.00		0.00
	9	0.387	0.623	1.900	0	0		0.00		0.00
	10	0.387	0.623	1.900	0	0		0.00		0.00
	11	0.403	0.712	1.900	0	0		0.00		0.00
2	11	0.403	0.712	1.900	0	0		0.00		0.00
	12	0.387	0.623	1.900	0	0		0.00		0.00
	13	0.387	0.623	1.900	0	0		0.00		0.00
	14	0.387	0.623	1.900	0	0		0.00		0.00
	15	0.387	0.623	1.900	0	0		0.00		0.00
	16	0.387	0.623	1.900	0	0		0.00		0.00
	17	0.387	0.623	1.900	0	0		0.00		0.00
	18	0.387	0.623	1.900	0	0		0.00		0.00
	19	0.387	0.623	1.900	0	0		0.00		0.00
	20	0.387	0.623	1.900	0	0		0.00		0.00
	21	0.403	0.712	1.900	-68	2		0.00	0.054	2.71
3	21	0.403	0.712	1.900	-68	2		0.00	0.054	2.71
	22	0.387	0.623	1.900	0	0		0.00		0.00
	23	0.387	0.623	1.900	0	0		0.00		0.00
	24	0.387	0.623	1.900	0	0		0.00		0.00
	25	0.387	0.623	1.900	0	0		0.00		0.00
	26	0.387	0.623	1.900	0	0		0.00		0.00
	27	0.387	0.623	1.900	0	0		0.00		0.00
	28	0.387	0.623	1.900	0	0		0.00		0.00
	29	0.387	0.623	1.900	0	0		0.00		0.00
	30	0.387	0.623	1.900	0	0		0.00		0.00
	31	0.403	0.712	1.900	0	0		0.00		0.00

VIADUCTO 5
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE SERVICIO - ESTADO INICIAL

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI	F. SUP	F. INF	HS	ACTS	HI	ACTI
1	1	0.403	0.712	1.900	0	0					0	0				
	2	0.387	0.623	1.900	0	0					0	0				
	3	0.387	0.623	1.900	0	0					0	0				
	4	0.387	0.623	1.900	0	0					0	0				
	5	0.387	0.623	1.900	0	0					0	0				
	6	0.387	0.623	1.900	0	0					0	0				
	7	0.387	0.623	1.900	0	0					0	0				
	8	0.387	0.623	1.900	0	0					0	0				
	9	0.387	0.623	1.900	0	0					0	0				
	10	0.387	0.623	1.900	0	0					0	0				
	11	0.403	0.712	1.900	-66	3			0.083	4.13	0	0				
2	11	0.403	0.712	1.900	-66	3			0.083	4.13	0	0				
	12	0.387	0.623	1.900	0	0					0	0				
	13	0.387	0.623	1.900	0	0					0	0				
	14	0.387	0.623	1.900	0	0					0	0				
	15	0.387	0.623	1.900	0	0					0	0				
	16	0.387	0.623	1.900	0	0					0	0				
	17	0.387	0.623	1.900	0	0					0	0				
	18	0.387	0.623	1.900	0	0					0	0				
	19	0.387	0.623	1.900	0	0					0	0				
	20	0.387	0.623	1.900	0	0					0	0				
	21	0.403	0.712	1.900	-72	8			0.190	9.50	0	0				
3	21	0.403	0.712	1.900	-73	8			0.188	9.38	0	0				
	22	0.387	0.623	1.900	-72	3			0.076	3.80	0	0				
	23	0.387	0.623	1.900	-73	3			0.075	3.75	0	0				
	24	0.387	0.623	1.900	-70	4			0.103	5.14	0	0				
	25	0.387	0.623	1.900	0	0					0	0				
	26	0.387	0.623	1.900	0	0					0	0				
	27	0.387	0.623	1.900	0	0					0	0				
	28	0.387	0.623	1.900	0	0					0	0				
	29	0.387	0.623	1.900	0	0					0	0				
	30	0.387	0.623	1.900	0	0					0	0				
	31	0.403	0.712	1.900	0	0					0	0				

VIADUCTO 5
ARMADURA PASIVA COMPLEMENTARIA EN ZONA TRACCIONADA
EN FASE DE SERVICIO - ESTADO FINAL

VANO	SECC	WS/BS	WI/BI	CANTO	F. SUP	F. INF	HS	ACTS	HI	ACTI	F. SUP	F. INF	HS	ACTS	HI	ACTI
1	1	0.403	0.712	1.900	0	0										
	2	0.387	0.623	1.900	0	0					0	0				
	3	0.387	0.623	1.900	0	0					0	0				
	4	0.387	0.623	1.900	-65	8			0.208	10.41	0	0				
	5	0.387	0.623	1.900	-69	14			0.320	16.02	0	0				
	6	0.387	0.623	1.900	-69	16			0.358	17.88	0	0				
	7	0.387	0.623	1.900	-70	17			0.371	18.56	0	0				
	8	0.387	0.623	1.900	-67	14			0.328	16.42	0	0				
	9	0.387	0.623	1.900	-60	5			0.146	7.31	0	0				
	10	0.387	0.623	1.900	0	0					0	0				
	11	0.403	0.712	1.900	0	0					15	-78	0.306	15.32		
2	11	0.403	0.712	1.900	0	0					15	-78	0.306	15.32		
	12	0.387	0.623	1.900	0	0					0	0				
	13	0.387	0.623	1.900	-57	6			0.181	9.05	0	0				
	14	0.387	0.623	1.900	-65	16			0.375	18.77	0	0				
	15	0.387	0.623	1.900	-67	19			0.420	20.99	0	0				
	16	0.387	0.623	1.900	-67	18			0.402	20.12	0	0				
	17	0.387	0.623	1.900	-67	17			0.385	19.23	0	0				
	18	0.387	0.623	1.900	-64	13			0.321	16.04	0	0				
	19	0.387	0.623	1.900	-58	4			0.123	6.13	0	0				
	20	0.387	0.623	1.900	0	0					0	0				
	21	0.403	0.712	1.900	-50	2			0.073	3.65	12	-76	0.259	12.95		
3	21	0.403	0.712	1.900	-50	2			0.073	3.65	12	-76	0.259	12.95		
	22	0.387	0.623	1.900	0	0					0	0				
	23	0.387	0.623	1.900	-62	4			0.115	5.76	0	0				
	24	0.387	0.623	1.900	-61	5			0.144	7.20	0	0				
	25	0.387	0.623	1.900	-66	12			0.292	14.62	0	0				
	26	0.387	0.623	1.900	-68	14			0.324	16.22	0	0				
	27	0.387	0.623	1.900	-69	14			0.320	16.02	0	0				
	28	0.387	0.623	1.900	-70	16			0.353	17.67	0	0				
	29	0.387	0.623	1.900	-67	11			0.268	13.40	0	0				
	30	0.387	0.623	1.900	0	0					0	0				
	31	0.403	0.712	1.900	0	0					0	0				

REACCIONES, GIROS Y DESPLAZAMIENTOS

Reacciones y giros acumulados por peso propio

Estructura completa estado inicial

Apoyo	Reaccion (t)	Giro (rad*1000)
1	233.94	-0.004475
11	917.37	-0.002663
21	779.06	0.007610
31	288.43	0.008378

Reacciones y giros acumulados por peso propio

Estructura completa estado final

Apoyo	Reaccion (t)	Giro (rad*1000)
1	245.05	-0.005268
11	867.79	-0.001097
21	856.44	0.001503
31	249.52	0.005588

Reacciones y giros debidos a cargas muertas

Apoyo	Reaccion (t)	Giro (rad*1000)
1	84.47	-0.001880
11	298.99	-0.000337
21	298.99	0.000337
31	84.47	0.001880

Reacciones y giros por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

Apoyo	Reaccion (t)	Giro (rad*1000)
1	30.14	0.003311
11	-30.14	-0.001206
21	-30.14	0.001206
31	30.14	-0.003311

Reacciones y giros debidos a descenso lento de apoyos

Para estado final (nulos para estado inicial)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	2.753	-2.733	0.0005530	-0.0005530
11	6.693	-6.937	0.0002370	-0.0002371
21	6.693	-6.937	0.0002371	-0.0002370
31	2.753	-2.733	0.0005530	-0.0005530

Reacciones y giros por paso de ferrocarril (RENFE)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	219.880	-46.167	0.0032899	-0.0069045
11	620.966	-37.479	0.0050789	-0.0065136
21	620.966	-37.479	0.0065136	-0.0050789
31	219.880	-46.167	0.0069045	-0.0032899

Reacciones y giros por paso de ferrocarril (UIC)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	181.183	-40.416	0.0028798	-0.0062657
11	501.783	-35.204	0.0043371	-0.0057020
21	501.783	-35.204	0.0057020	-0.0043371
31	181.183	-40.416	0.0062657	-0.0028798

Reacciones y giros por ferrocarril (RENFE/UIC)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	219.880	-46.167	0.0032899	-0.0069045
11	620.966	-37.479	0.0050789	-0.0065136
21	620.966	-37.479	0.0065136	-0.0050789
31	219.880	-46.167	0.0069045	-0.0032899

Reacciones y giros por sobrecarga total
(+descensos lentos estructura inicial+temperatura)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	250.018	-46.167	0.0066008	-0.0069045
11	620.966	-67.617	0.0050789	-0.0077196
21	620.966	-67.617	0.0077196	-0.0050789
31	250.018	-46.167	0.0069045	-0.0066008

Reacciones y giros por sobrecarga total
(+descensos lentos estructura final+temperatura)

Apoyo	Reaccion (t) maxima	Reaccion (t) minima	Giro(rad*1000) maximo	Giro(rad*1000) minimo
1	252.771	-48.900	0.0071538	-0.0074575
11	627.659	-74.554	0.0053159	-0.0079567
21	627.659	-74.554	0.0079567	-0.0053159
31	252.771	-48.900	0.0074575	-0.0071538

Reacciones y giros por pretensado (*coef. perdidas elasticas)

Estructura completa estado inicial

Apoyo	Reaccion (t)	Giro (rad*1000)
1	79.52	0.007703
11	-109.38	0.004647
21	5.70	-0.008275
31	24.15	-0.008542

Reacciones y giros por pretensado (*coef. perdidas totales)

Estructura completa estado final

Apoyo	Reaccion (t)	Giro (rad*1000)
1	63.47	0.007387
11	-64.58	0.003107
21	-59.72	-0.003331
31	60.83	-0.007404

Desplazamientos y giros acumulados por peso propio

Estructura completa estado inicial

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	-0.004475
	2	-0.000496	-0.004047
	3	-0.000900	-0.002906
	4	-0.001147	-0.001361
	5	-0.001207	0.000307
	6	-0.001083	0.001817
	7	-0.000807	0.002890
	8	-0.000448	0.003243
	9	-0.000102	0.002597
	10	0.000098	0.000668
	11	0.000000	-0.002663
2	11	0.000000	-0.002663
	12	-0.000723	-0.006552
	13	-0.001826	-0.007847
	14	-0.002954	-0.006983
	15	-0.003830	-0.004581
	16	-0.004273	-0.001260
	17	-0.004191	0.002367
	18	-0.003584	0.005679
	19	-0.002545	0.008060
	20	-0.001259	0.008892
	21	0.000000	0.007610
3	21	0.000000	0.007610
	22	0.000789	0.006391
	23	0.001513	0.006451
	24	-0.002051	-0.005061
	25	-0.002530	-0.003189
	26	-0.002763	-0.000831
	27	-0.002712	0.001731
	28	-0.002369	0.004218
	29	-0.001759	0.006348
	30	-0.000939	0.007838
	31	0.000000	0.008378

Desplazamientos y giros acumulados por peso propio

Estructura completa estado final

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	-0.005268
	2	-0.000586	-0.004816
	3	-0.001074	-0.003604
	4	-0.001395	-0.001941
	5	-0.001512	-0.000106
	6	-0.001423	0.001620
	7	-0.001156	0.002954
	8	-0.000772	0.003618
	9	-0.000363	0.003329
	10	-0.000056	0.001806
	11	0.000000	-0.001097
2	11	0.000000	-0.001097
	12	-0.000453	-0.004527
	13	-0.001236	-0.005620
	14	-0.002034	-0.004835
	15	-0.002614	-0.002790
	16	-0.002833	-0.000103
	17	-0.002643	0.002609
	18	-0.002085	0.004728
	19	-0.001295	0.005638
	20	-0.000497	0.004719
	21	0.000000	0.001503
3	21	0.000000	0.001503
	22	0.000001	-0.001226
	23	-0.000231	-0.002587
	24	-0.000903	-0.003767
	25	-0.001297	-0.002979
	26	-0.001561	-0.001539
	27	-0.001636	0.000273
	28	-0.001495	0.002176
	29	-0.001145	0.003887
	30	-0.000622	0.005128
	31	0.000000	0.005588

Desplazamientos y giros debidos a cargas muertas

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	-0.001880
	2	-0.000209	-0.001723
	3	-0.000384	-0.001295
	4	-0.000500	-0.000705
	5	-0.000544	-0.000052
	6	-0.000513	0.000564
	7	-0.000419	0.001045
	8	-0.000283	0.001290
	9	-0.000137	0.001199
	10	-0.000025	0.000674
	11	0.000000	-0.000337
2	11	0.000000	-0.000337
	12	-0.000151	-0.001536
	13	-0.000418	-0.001918
	14	-0.000690	-0.001644
	15	-0.000886	-0.000932
	16	-0.000957	0.000000
	17	-0.000886	0.000932
	18	-0.000690	0.001644
	19	-0.000418	0.001918
	20	-0.000151	0.001536
	21	0.000000	0.000337
3	21	0.000000	0.000337
	22	-0.000025	-0.000674
	23	-0.000137	-0.001199
	24	-0.000283	-0.001290
	25	-0.000419	-0.001045
	26	-0.000513	-0.000564
	27	-0.000544	0.000052
	28	-0.000500	0.000705
	29	-0.000384	0.001295
	30	-0.000209	0.001723
	31	0.000000	0.001880

Desplazamientos y giros por temperatura (Gradiente termico de 5.00 gr.)

Para Gradiente termico de 0.00 * 0.00

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	0.003311
	2	0.000319	0.002281
	3	0.000528	0.001382
	4	0.000641	0.000614
	5	0.000674	-0.000026
	6	0.000640	-0.000536
	7	0.000556	-0.000916
	8	0.000435	-0.001169
	9	0.000293	-0.001292
	10	0.000144	-0.001285
	11	0.000000	-0.001206
2	11	0.000000	-0.001206
	12	-0.000167	-0.001028
	13	-0.000301	-0.000771
	14	-0.000396	-0.000515
	15	-0.000454	-0.000257
	16	-0.000473	0.000000
	17	-0.000454	0.000257
	18	-0.000396	0.000515
	19	-0.000301	0.000771
	20	-0.000167	0.001028
	21	0.000000	0.001206
3	21	0.000000	0.001206
	22	0.000144	0.001285
	23	0.000293	0.001292
	24	0.000435	0.001169
	25	0.000556	0.000916
	26	0.000640	0.000536
	27	0.000674	0.000026
	28	0.000641	-0.000614
	29	0.000528	-0.001382
	30	0.000319	-0.002281
	31	0.000000	-0.003311

Desplazamientos y giros debidos a descenso lento de apoyos

Para estado final (nulos para estado inicial)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	-0.000410	0.006737	-0.006737
	2	0.000012	-0.000423	0.000547	-0.000547
	3	0.000024	-0.000434	0.000530	-0.000530
	4	0.000034	-0.000445	0.000501	-0.000501
	5	0.000042	-0.000452	0.000459	-0.000459
	6	0.000047	-0.000457	0.000407	-0.000407
	7	0.000048	-0.000458	0.000353	-0.000353
	8	0.000045	-0.000455	0.000329	-0.000329
	9	0.000036	-0.000446	0.000302	-0.000302
	10	0.000021	-0.000432	0.000270	-0.000270
	11	0.000000	-0.000410	0.000237	-0.000237
2	11	0.000000	-0.000410	0.002887	-0.002889
	12	0.000032	-0.000442	0.000287	-0.000287
	13	0.000057	-0.000467	0.000340	-0.000340
	14	0.000075	-0.000485	0.000370	-0.000370
	15	0.000085	-0.000496	0.000387	-0.000387
	16	0.000089	-0.000499	0.000402	-0.000402
	17	0.000085	-0.000496	0.000387	-0.000387
	18	0.000075	-0.000485	0.000370	-0.000370
	19	0.000057	-0.000467	0.000340	-0.000340
	20	0.000032	-0.000442	0.000287	-0.000287
	21	0.000000	-0.000410	0.000237	-0.000237
3	21	0.000000	-0.000410	0.002889	-0.002887
	22	0.000021	-0.000432	0.000270	-0.000270
	23	0.000036	-0.000446	0.000302	-0.000302
	24	0.000045	-0.000455	0.000329	-0.000329
	25	0.000048	-0.000458	0.000353	-0.000353
	26	0.000047	-0.000457	0.000407	-0.000407
	27	0.000042	-0.000452	0.000459	-0.000459
	28	0.000034	-0.000445	0.000501	-0.000501
	29	0.000024	-0.000434	0.000530	-0.000530
	30	0.000012	-0.000423	0.000547	-0.000547
	31	0.000000	-0.000410	0.000553	-0.000553

Desplazamientos y giros por paso de ferrocarril (RENFE)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	0.000000	0.003290	-0.006905
	2	0.000775	-0.000373	0.003196	-0.006487
	3	0.001458	-0.000725	0.002899	-0.005320
	4	0.001974	-0.001030	0.002405	-0.003632
	5	0.002278	-0.001268	0.001712	-0.001634
	6	0.002345	-0.001415	0.001258	-0.000150
	7	0.002176	-0.001448	0.002450	-0.000269
	8	0.001796	-0.001346	0.004112	-0.001555
	9	0.001254	-0.001085	0.005241	-0.003039
	10	0.000623	-0.000642	0.005625	-0.004721
	11	0.000000	0.000000	0.005079	-0.006514
2	11	0.000000	0.000000	0.005079	-0.006514
	12	0.001101	-0.000658	0.003791	-0.007936
	13	0.002276	-0.001134	0.002625	-0.007575
	14	0.003289	-0.001447	0.001752	-0.005822
	15	0.003965	-0.001618	0.001354	-0.003295
	16	0.004202	-0.001658	0.000874	-0.000874
	17	0.003965	-0.001618	0.003295	-0.001354
	18	0.003289	-0.001447	0.005822	-0.001752
	19	0.002276	-0.001134	0.007575	-0.002625
	20	0.001101	-0.000658	0.007936	-0.003791
	21	0.000000	0.000000	0.006514	-0.005079
3	21	0.000000	0.000000	0.006514	-0.003079
	22	0.000623	-0.000642	0.004721	-0.005625
	23	0.001254	-0.001085	0.003039	-0.005241
	24	0.001796	-0.001346	0.001555	-0.004112
	25	0.002176	-0.001448	0.000269	-0.002450
	26	0.002345	-0.001415	0.000150	-0.001258
	27	0.002278	-0.001268	0.001634	-0.001712
	28	0.001974	-0.001030	0.003632	-0.002405
	29	0.001458	-0.000725	0.005320	-0.002899
	30	0.000775	-0.000373	0.006487	-0.003196
	31	0.000000	0.000000	0.006905	-0 003290

Desplazamientos y giros por paso de ferrocarril (UIC)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	0.000000	0.002880	-0.006266
	2	0.000705	-0.000327	0.002798	-0.005917
	3	0.001330	-0.000634	0.002538	-0.004911
	4	0.001811	-0.000902	0.002105	-0.003405
	5	0.002097	-0.001110	0.001497	-0.001531
	6	0.002156	-0.001239	0.001058	-0.000140
	7	0.001989	-0.001268	0.002395	-0.000234
	8	0.001622	-0.001178	0.003913	-0.001361
	9	0.001115	-0.000950	0.004828	-0.002660
	10	0.000544	-0.000562	0.005004	-0.004133
	11	0.000000	0.000000	0.004337	-0.005702
2	11	0.000000	0.000000	0.004337	-0.005702
	12	0.000967	-0.000541	0.002964	-0.007011
	13	0.002015	-0.000888	0.001721	-0.006824
	14	0.002938	-0.001064	0.001525	-0.005379
	15	0.003571	-0.001099	0.001272	-0.003096
	16	0.003796	-0.001022	0.000820	-0.000820
	17	0.003571	-0.001099	0.003096	-0.001272
	18	0.002938	-0.001064	0.005379	-0.001525
	19	0.002015	-0.000888	0.006824	-0.001721
	20	0.000967	-0.000541	0.007011	-0.002964
	21	0.000000	0.000000	0.005702	-0.004337
3	21	0.000000	0.000000	0.005702	-0.004337
	22	0.000544	-0.000562	0.004133	-0.005004
	23	0.001115	-0.000950	0.002660	-0.004828
	24	0.001622	-0.001178	0.001361	-0.003913
	25	0.001989	-0.001268	0.000234	-0.002395
	26	0.002156	-0.001239	0.000140	-0.001058
	27	0.002097	-0.001110	0.001531	-0.001497
	28	0.001811	-0.000902	0.003405	-0.002105
	29	0.001330	-0.000634	0.004911	-0.002538
	30	0.000705	-0.000327	0.005917	-0.002798
	31	0.000000	0.000000	0.006266	-0.002880

Desplazamientos y giros por ferrocarril (RENFE/UIC)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	0.000000	0.003290	-0.006905
	2	0.000775	-0.000373	0.003196	-0.006487
	3	0.001458	-0.000725	0.002899	-0.005320
	4	0.001974	-0.001030	0.002405	-0.003632
	5	0.002278	-0.001268	0.001712	-0.001634
	6	0.002345	-0.001415	0.001258	-0.000150
	7	0.002176	-0.001448	0.002450	-0.000269
	8	0.001796	-0.001346	0.004112	-0.001555
	9	0.001254	-0.001085	0.005241	-0.003039
	10	0.000623	-0.000642	0.005625	-0.004721
	11	0.000000	0.000000	0.005079	-0.006514
2	11	0.000000	0.000000	0.005079	-0.006514
	12	0.001101	-0.000658	0.003791	-0.007936
	13	0.002276	-0.001134	0.002625	-0.007575
	14	0.003289	-0.001447	0.001752	-0.005822
	15	0.003965	-0.001618	0.001354	-0.003295
	16	0.004202	-0.001658	0.000874	-0.000874
	17	0.003965	-0.001618	0.003295	-0.001354
	18	0.003289	-0.001447	0.005822	-0.001752
	19	0.002276	-0.001134	0.007575	-0.002625
	20	0.001101	-0.000658	0.007936	-0.003791
	21	0.000000	0.000000	0.006514	-0.005079
3	21	0.000000	0.000000	0.006514	-0.005079
	22	0.000623	-0.000642	0.004721	-0.005625
	23	0.001254	-0.001085	0.003039	-0.005241
	24	0.001796	-0.001346	0.001555	-0.004112
	25	0.002176	-0.001448	0.000269	-0.002450
	26	0.002345	-0.001415	0.000150	-0.001258
	27	0.002278	-0.001268	0.001634	-0.001712
	28	0.001974	-0.001030	0.003632	-0.002405
	29	0.001458	-0.000725	0.005320	-0.002899
	30	0.000775	-0.000373	0.006487	-0.003196
	31	0.000000	0.000000	0.006905	-0.003290

Desplazamientos y giros por sobrecarga total

(+descensos lentos estructura inicial+temperatura)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	0.000000	0.003290	-0.010215
	2	0.001094	-0.000373	0.003196	-0.008768
	3	0.001985	-0.000725	0.002899	-0.006702
	4	0.002615	-0.001030	0.002405	-0.004246
	5	0.002952	-0.001268	0.001738	-0.001634
	6	0.002985	-0.001415	0.001794	-0.000150
	7	0.002732	-0.001448	0.003367	-0.000269
	8	0.002231	-0.001346	0.005281	-0.001555
	9	0.001547	-0.001085	0.006533	-0.003039
	10	0.000767	-0.000642	0.006910	-0.004721
	11	0.000000	0.000000	0.006285	-0.006514
2	11	0.000000	0.000000	0.006285	-0.006514
	12	0.001101	-0.000825	0.004819	-0.007936
	13	0.002276	-0.001435	0.003396	-0.007575
	14	0.003289	-0.001844	0.002267	-0.005822
	15	0.003965	-0.002072	0.001611	-0.003295
	16	0.004202	-0.002131	0.000874	-0.000874
	17	0.003965	-0.002072	0.003295	-0.001611
	18	0.003289	-0.001844	0.005822	-0.002267
	19	0.002276	-0.001435	0.007575	-0.003396
	20	0.001101	-0.000825	0.007936	-0.004819
	21	0.000000	0.000000	0.006514	-0.006285
3	21	0.000000	0.000000	0.006514	-0.006285
	22	0.000767	-0.000642	0.004721	-0.006910
	23	0.001547	-0.001085	0.003039	-0.006533
	24	0.002231	-0.001346	0.001555	-0.005281
	25	0.002732	-0.001448	0.000269	-0.003367
	26	0.002985	-0.001415	0.000150	-0.001794
	27	0.002952	-0.001268	0.001634	-0.001738
	28	0.002615	-0.001030	0.004246	-0.002405
	29	0.001985	-0.000725	0.006702	-0.002899
	30	0.001094	-0.000373	0.008768	-0.003196
	31	0.000000	0.000000	0.010215	-0.003290

Desplazamientos y giros por sobrecarga total

(+descensos lentos estructura final+temperatura)

V.	Nud	D.Vertical maximo (m)	D.Vertical minimo (m)	Giro maximo (rad*1000)	Giro minimo (rad*1000)
1	1	0.000000	-0.000410	0.003843	-0.010768
	2	0.001107	-0.000796	0.003743	-0.009316
	3	0.002009	-0.001159	0.003429	-0.007232
	4	0.002650	-0.001475	0.002906	-0.004747
	5	0.002994	-0.001720	0.002198	-0.002093
	6	0.003032	-0.001872	0.002201	-0.000557
	7	0.002780	-0.001907	0.003720	-0.000622
	8	0.002275	-0.001801	0.005611	-0.001885
	9	0.001582	-0.001531	0.006834	-0.003340
	10	0.000788	-0.001074	0.007180	-0.004991
	11	0.000000	-0.000410	0.006522	-0.006751
2	11	0.000000	-0.000410	0.006522	-0.006751
	12	0.001133	-0.001267	0.005106	-0.008223
	13	0.002333	-0.001902	0.003736	-0.007914
	14	0.003363	-0.002329	0.002637	-0.006193
	15	0.004050	-0.002567	0.001997	-0.003682
	16	0.004291	-0.002631	0.001276	-0.001276
	17	0.004050	-0.002567	0.003682	-0.001997
	18	0.003363	-0.002329	0.006193	-0.002637
	19	0.002333	-0.001902	0.007914	-0.003736
	20	0.001133	-0.001267	0.008223	-0.005106
	21	0.000000	-0.000410	0.006751	-0.006522
3	21	0.000000	-0.000410	0.006751	-0.006522
	22	0.000788	-0.001074	0.004991	-0.007180
	23	0.001582	-0.001531	0.003340	-0.006834
	24	0.002275	-0.001801	0.001885	-0.005611
	25	0.002780	-0.001907	0.000622	-0.003720
	26	0.003032	-0.001872	0.000557	-0.002201
	27	0.002994	-0.001720	0.002093	-0.002198
	28	0.002650	-0.001475	0.004747	-0.002906
	29	0.002009	-0.001159	0.007232	-0.003429
	30	0.001107	-0.000796	0.009316	-0.003743
	31	0.000000	-0.000410	0.010768	-0.003843

Desplazamientos y giros por pretensado (*coef. perdidas elasticas)

Estructura completa estado inicial

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	0.007703
	2	0.000835	0.006689
	3	0.001481	0.004477
	4	0.001843	0.001799
	5	0.001892	-0.000922
	6	0.001646	-0.003271
	7	0.001172	-0.004820
	8	0.000587	-0.005155
	9	0.000052	-0.003874
	10	-0.000223	-0.000563
	11	0.000000	0.004647
2	11	0.000000	0.004647
	12	0.001212	0.011138
	13	0.003097	0.013404
	14	0.005008	0.011698
	15	0.006446	0.007225
	16	0.007082	0.001135
	17	0.006769	-0.005292
	18	0.005556	-0.010728
	19	0.003690	-0.013815
	20	0.001627	-0.013127
	21	0.000000	-0.008275
3	21	0.000000	-0.008275
	22	-0.000714	-0.004351
	23	-0.001074	-0.002297
	24	0.001806	0.005548
	25	0.002366	0.004006
	26	0.002687	0.001487
	27	0.002700	-0.001264
	28	0.002399	-0.003961
	29	0.001804	-0.006356
	30	0.000967	-0.008117
	31	0.000000	-0.008542

Desplazamientos y giros por pretensado (*coef. perdidas totales)

Estructura completa estado final

V.	Nud	D.Vertical (m)	Giro (rad*1000)
1	1	0.000000	0.007387
	2	0.000803	0.006468
	3	0.001435	0.004451
	4	0.001806	0.001986
	5	0.001887	-0.000550
	6	0.001692	-0.002783
	7	0.001275	-0.004340
	8	0.000737	-0.004842
	9	0.000219	-0.003936
	10	-0.000097	-0.001253
	11	0.000000	0.003107
2	11	0.000000	0.003107
	12	0.000901	0.008590
	13	0.002371	0.010479
	14	0.003856	0.009007
	15	0.004942	0.005255
	16	0.005361	0.000246
	17	0.005010	-0.004879
	18	0.003961	-0.008936
	19	0.002462	-0.010713
	20	0.000946	-0.008939
	21	0.000000	-0.003331
3	21	0.000000	-0.003331
	22	-0.000116	0.001142
	23	0.000190	0.003826
	24	0.000914	0.005104
	25	0.001462	0.004242
	26	0.001846	0.002341
	27	0.001986	0.000062
	28	0.001856	-0.002337
	29	0.001454	-0.004638
	30	0.000808	-0.006545
	31	0.000000	-0.007404

COMPROBACION A ROTURA

```
LAV MADRID - ZARAGOZA. LOSA VANOS 16+23+23+16
5100.  1.15  19000.  1.10  400.  1.5  1.5  1.5
2
  954  6.414  0.025
       2.814  0.025
2
4  1  11 21  31                      1
6  2 -10 12 -20 22 -30                2
1
0.6425
2
4  1  11 21  31                         1  1
6  2 -10 12 -20  22 -30                 1  1
2
5    0
1    9   3.100  0.000
2    8   4.050  1.200
3    7   7.000  1.500
4    6   7.000  1.760
5    0   0.000  1.900
5    2
1    9   3.100  0.000
     8   4.050  1.200
     7   7.000  1.500
     6   7.000  1.760
5    0   0.000  1.900
1    3   1.200  2.100   0.900
2    0   1.200  0.000   0.900
2
4   1   11  21   31                          1
6   2  -10  12  -20  22  -30                 2
1
3
7   1
1   3  4  5  6  7  9
3  -1
1   3   2
3  -1
9   8   7
1
2   1   -31 1
1
    7  -0.025   2
1   4   2   7     1.12  0. 0.
2   3   2   15    1.12  0. 0.
4   5   1   35    2.02  0. 0.
5   6   1   35    2.02  0. 0.
7   8   2   15    1.12  0. 0.
8   9   2   7     1.12  0. 0.
9   1   1   30    2.02  0. 0.
1
2   1  -31  1  1
6
595   442   226  -226  -442  -595
3
2   1  -11  2  1  6
2  11  -21  2  2  5
2  21  -31  2  3  4
```


Calculo de Comprobacion a Rotura

Datos generales

Limite elastico del acero pasivo	=	5100.00	kg/cm2
Coeficiente del acero pasivo	=	1.15	
Limite elastico de acero activo	=	19000.00	kg/cm2
Coeficiente del acero activo	=	1.10	
Resistencia caracteristica del hormigon	=	400.00	kg/cm2
Coeficiente del hormigon	=	1.50	
Coef. mayoracion Cargas muertas y Peso propio	=	1.50	
Coef. mayoracion Sobrecargas	=	1.50	

Calculo de Comprobacion a Rotura

Tipo de seccion 1

Definicion de puntos

Pt	X	Y	Pt	X	Y	Pt	X	Y
1	3.100	0.0000	2	4.050	1.2000	3	7.000	1.5000
4	7.000	1.7600	5	0.000	1.9000	6	-7.000	1.7600
7	-7.000	1.5000	8	-4.050	1.2000	9	-3.100	0.0000

Tipo de seccion 2

Definicion de puntos

Pt	X	Y	Pt	X	Y	Pt	X	Y
1	3.100	0.0000	2	4.050	1.2000	3	7.000	1.5000
4	7.000	1.7600	5	0.000	1.9000	6	-7.000	1.7600
7	-7.000	1.5000	8	-4.050	1.2000	9	-3.100	0.0000

Definicion de inclusiones circulares

In	X	Y	D	In	X	Y	D
1	2.100	0.900	1.200	2	0.000	0.900	1.200
3	-2.100	0.900	1.200				

Calculo de Comprobacion a Rotura

Definicion de circuitos

Tipo de circuito 1

Circuito 1 : Numero de vertices 7 (Clave 1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	1	2	3	3	4	4	5	5	6	6	7
7	9										

Circuito 2 : Numero de vertices 3 (Clave -1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	1	2	3	3	2						

Circuito 3 : Numero de vertices 3 (Clave -1)

Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt	Vr	Pt
1	9	2	8	3	7						

Calculo de Comprobacion a Rotura

Definicion de armaduras pasivas

Tipo de armadura 1

Pi	Pf	Nr	A.(cm2)	Pi	Pf	Nr	A.(cm2)	Pi	Pf	Nr	A.(cm2)
1	2	7	1.12	2	3	15	1.12	4	5	35	2.02
5	6	35	2.02	7	8	15	1.12	8	9	7	1.12
9	1	30	2.02								

Definicion de axiles de calculo

Axil	Axil	Axil	Axil
0.00	595.00	442.00	226.00
-226.00	-442.00	-595.00	

Calculo de Comprobacion a Rotura

Datos secciones/secc.-circuitos-armaduras

V.	Sec	T. Seccion	T. Circuito	T. Arm. 1	T. Arm. 2	T. Arm. 3
1	1	1	1	1		
	2	2	1	1		
	3	2	1	1		
	4	2	1	1		
	5	2	1	1		
	6	2	1	1		
	7	2	1	1		
	8	2	1	1		
	9	2	1	1		
	10	2	1	1		
	11	1	1	1		
2	11	1	1	1		
	12	2	1	1		
	13	2	1	1		
	14	2	1	1		
	15	2	1	1		
	16	2	1	1		
	17	2	1	1		
	18	2	1	1		
	19	2	1	1		
	20	2	1	1		
	21	1	1	1		
3	21	1	1	1		
	22	2	1	1		
	23AI	2	1	1		
	23AD	2	1	1		
	24	2	1	1		
	25	2	1	1		
	26	2	1	1		
	27	2	1	1		
	28	2	1	1		
	29	2	1	1		
	30	2	1	1		
	31	1	1	1		

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento P. propio (m x t)	Momento C.muertas (m x t)	Momento Sobre.(+) (m x t)	Momento Sobre.(-) (m x t)	Momento Hip. Pret (m x t)
1	1	0.00	0.00	0.00	0.00	0.00
	2	416.11	145.70	684.39	-180.47	126.83
	3	692.63	244.92	1145.63	-345.56	253.78
	4	838.06	297.65	1408.30	-495.27	380.72
	5	852.42	303.90	1497.02	-629.59	507.67
	6	735.70	263.68	1436.36	-748.53	634.62
	7	487.89	176.97	1395.40	-944.39	761.57
	8	109.01	43.78	1187.66	-1155.63	888.51
	9	-400.96	-135.88	788.53	-1382.25	1015.46
	10	-1042.00	-362.03	475.42	-1746.75	1142.41
	11	-1543.95	-537.72	504.23	-2377.52	1269.48
2	11	-1543.95	-537.72	504.23	-2377.52	1269.48
	12	-802.46	-281.18	351.58	-1309.37	1266.48
	13	-18.18	-6.25	823.08	-848.69	1263.61
	14	544.58	190.13	1361.83	-658.99	1260.74
	15	885.81	307.96	1620.71	-524.94	1257.87
	16	1005.52	347.23	1644.19	-473.17	1254.99
	17	903.70	307.96	1620.71	-524.94	1252.12
	18	580.36	190.13	1361.83	-658.99	1249.25
	19	35.49	-6.25	823.08	-848.69	1246.37
	20	-730.90	-281.18	351.58	-1309.37	1243.50
	21	-1458.54	-537.72	504.23	-2377.52	1240.75
3	21	-1458.54	-537.72	504.23	-2377.52	1240.75
	22	-961.49	-362.03	475.42	-1746.75	1118.98
	23AI	-329.39	-135.88	788.53	-1382.25	997.33
	23AD	-329.39	-135.88	788.53	-1382.25	997.33
	24	171.62	43.78	1187.66	-1155.63	875.74
	25	541.56	176.97	1395.40	-944.39	754.15
	26	780.42	263.68	1436.36	-748.53	632.57
	27	888.20	303.90	1497.02	-629.59	510.98
	28	864.90	297.65	1408.30	-495.27	389.39
	29	710.52	244.92	1145.63	-345.56	267.79
	30	425.06	145.70	684.39	-180.47	146.18
	31	0.00	0.00	0.00	0.00	24.57

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
1	1	0.	0.	0.	6037.	-6790.	-	-
		595.			5709.	-6491.	-	-
		-595.			6355.	-7082.	-	-
	2	0.	2009.	712.	7023.	-5832.	3.5	-
		595.			6727.	-5495.	3.3	-
		-595.			7310.	-6153.	3.6	-
	3	0.	3404.	1167.	7697.	-5261.	2.3	-
		595.			7390.	-4899.	2.2	-
		-595.			7993.	-5606.	2.3	-
	4	0.	4235.	1379.	8061.	-4934.	1.9	-
		595.			7755.	-4556.	1.8	-
		-595.			8358.	-5281.	2.0	-
	5	0.	4538.	1349.	8183.	-4826.	1.8	-
		595.			7877.	-4443.	1.7	-
		-595.			8480.	-5172.	1.9	-
	6	0.	4352.	1074.	8053.	-4938.	1.9	-
		595.			7746.	-4560.	1.8	-
		-595.			8349.	-5281.	1.9	-
	7	0.	3928.	266.	7663.	-5283.	2.0	-
		595.			7356.	-4920.	1.9	-
		-595.			7960.	-5628.	2.0	-
	8	0.	2988.	-705.	6881.	-5887.	2.3	8.4
		595.			6582.	-5551.	2.2	7.9
		-595.			7169.	-6208.	2.4	8.8
	9	0.	1495.	-1965.	5846.	-6788.	3.9	3.5
		595.			5541.	-6495.	3.7	3.3
		-595.			6142.	-7071.	4.1	3.6
	10	0.	-365.	-3698.	4716.	-8025.	-	2.2
		595.			4400.	-7789.	-	2.1
		-595.			5015.	-8255.	-	2.2
	11	0.	-1224.	-5546.	4196.	-8868.	-	1.6
		442.			3939.	-8622.	-	1.6
		-442.			4448.	-9035.	-	1.6
2	11	0.	-1224.	-5546.	4196.	-8868.	-	1.6
		442.			3939.	-8622.	-	1.6
		-442.			4448.	-9035.	-	1.6
	12	0.	42.	-2450.	5237.	-7303.	-	3.0
		442.			5005.	-7104.	-	2.9
		-442.			5462.	-7497.	-	3.1
	13	0.	2588.	-172.	7783.	-5069.	3.0	-
		442.			7565.	-4814.	2.9	-
		-442.			7997.	-5318.	3.1	-
	14	0.	4532.	1500.	9475.	-3767.	2.1	-
		442.			9248.	-3435.	2.0	-
		-442.			9697.	-4089.	2.1	-
	15	0.	5605.	2387.	10464.	-3230.	1.9	-
		442.			10237.	-2858.	1.8	-
		-442.			10685.	-3597.	1.9	-
	16	0.	5876.	2700.	10795.	-3094.	1.8	-
		442.			10567.	-2712.	1.8	-
		-442.			11016.	-3471.	1.9	-

Calculo de Comprobacion a Rotura

Nota:Los momentos de carga en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Axil (t)	Momento(+) Mayorado (m x t) (1)	Momento(-) Mayorado (m x t) (2)	Momento(+) Rotura (m x t) (3)	Momento(-) Rotura (m x t) (4)	(3) / (1)	(4) / (2)
	17	0.	5626.	2407.	10464.	-3225.	1.9	-
		442.			10237.	-2855.	1.8	-
		-442.			10685.	-3589.	1.9	-
	18	0.	4573.	1541.	9475.	-3776.	2.1	-
		442.			9248.	-3450.	2.0	-
		-442.			9697.	-4094.	2.1	-
	19	0.	2649.	-107.	7832.	-5114.	3.0	-
		442.			7605.	-4840.	2.9	-
		-442.			8054.	-5361.	3.0	-
	20	0.	128.	-2363.	5270.	-7356.	-	3.1
		442.			5040.	-7158.	-	3.0
		-442.			5495.	-7549.	-	3.2
	21	0.	-1121.	-5444.	4225.	-8891.	-	1.6
		226.			4096.	-8755.	-	1.6
		-226.			4354.	-9023.	-	1.7
3	21	0.	-1121.	-5444.	4225.	-8891.	-	1.6
		226.			4096.	-8755.	-	1.6
		-226.			4351.	-9023.	-	1.7
	22	0.	-265.	-3598.	4740.	-8091.	-	2.2
		226.			4622.	-8002.	-	2.2
		-226.			4857.	-8179.	-	2.3
	23AI	0.	1582.	-1874.	3350.	-5636.	2.1	3.0
		226.			3222.	-5519.	2.0	2.9
		-226.			3476.	-5750.	2.2	3.1
	23AD	0.	1582.	-1874.	5904.	-6727.	3.7	3.6
		226.			5789.	-6615.	3.7	3.5
		-226.			6017.	-6836.	3.8	3.6
	24	0.	3068.	-622.	7100.	-5710.	2.3	9.2
		226.			6988.	-5581.	2.3	9.0
		-226.			7210.	-5836.	2.4	9.4
	25	0.	4000.	340.	7915.	-5057.	2.0	-
		226.			7800.	-4917.	1.9	-
		-226.			8029.	-5194.	2.0	-
	26	0.	4417.	1139.	8183.	-4825.	1.9	-
		226.			8068.	-4683.	1.8	-
		-226.			8297.	-4959.	1.9	-
	27	0.	4596.	1406.	8136.	-4867.	1.8	-
		226.			8021.	-4725.	1.7	-
		-226.			8250.	-5002.	1.8	-
	28	0.	4285.	1429.	7965.	-5019.	1.9	-
		226.			7850.	-4879.	1.8	-
		-226.			8079.	-5156.	1.9	-
	29	0.	3446.	1209.	7622.	-5329.	2.2	-
		226.			7507.	-5194.	2.2	-
		-226.			7736.	-5461.	2.2	-
	30	0.	2044.	746.	6990.	-5857.	3.4	-
		226.			6879.	-5731.	3.4	-
		-226.			7100.	-5981.	3.5	-
	31	0.	22.	22.	6037.	-6790.	-	-
		226.			5913.	-6677.	-	-
		-226.			6159.	-6902.	-	-

COMPROBACION A CORTANTE

Calculo de Comprobacion a Cortante

Datos generales

Limite elastico del acero pasivo	=	5100.00	kg/cm2
Coeficiente del acero pasivo	=	1.15	
Limite elastico de acero activo	=	19000.00	kg/cm2
Coeficiente del acero activo	=	1.10	
Resistencia caracteristica del hormigon	=	400.00	kg/cm2
Coeficiente del hormigon	=	1.50	
Coef. mayoracion Cargas muertas y Peso propio	=	1.50	
Coef. mayoracion Sobrecargas	=	1.50	

Calculo de Comprobacion a Cortante

Datos secciones/anchos-recubrimientos

V.	Sec	Ancho Seccion m	Ancho Eficaz m	Recubrimiento m
1	1	6.854	6.414	0.025
	2	3.254	2.814	0.025
	3	3.254	2.814	0.025
	4	3.254	2.814	0.025
	5	3.254	2.814	0.025
	6	3.254	2.814	0.025
	7	3.254	2.814	0.025
	8	3.254	2.814	0.025
	9	3.254	2.814	0.025
	10	3.254	2.814	0.025
	11	6.854	6.414	0.025
2	11	6.854	6.414	0.025
	12	3.254	2.814	0.025
	13	3.254	2.814	0.025
	14	3.254	2.814	0.025
	15	3.254	2.814	0.025
	16	3.254	2.814	0.025
	17	3.254	2.814	0.025
	18	3.254	2.814	0.025
	19	3.254	2.814	0.025
	20	3.254	2.814	0.025
	21	6.854	6.414	0.025
3	21	6.854	6.414	0.025
	22	3.254	2.814	0.025
	23AI	3.254	2.814	0.025
	23AD	3.254	2.814	0.025
	24	3.254	2.814	0.025
	25	3.254	2.814	0.025
	26	3.254	2.814	0.025
	27	3.254	2.814	0.025
	28	3.254	2.814	0.025
	29	3.254	2.814	0.025
	30	3.254	2.814	0.025
	31	6.854	6.414	0.025

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-73.26	41.7	-4573.5	1296.26	-26.	-29.	AB AB	87.0
	2	-123.05	10.5	-4551.8	-1184.22	-32.	-38.	AB AB	41.3
	3	-72.97	11.0	-4528.1	-910.34	-33.	-36.	AB AB	41.3
	4	-108.31	61.2	-4503.6	-792.19	-32.	-37.	AB AB	41.3
	5	-231.30	112.1	-4477.3	-828.89	-30.	-40.	AB AB	41.3
	6	1155.65	209.0	-4447.9	-1022.75	-55.	-4.	AB AB	41.3
	7	1112.61	372.6	-4416.7	-1374.49	-54.	-5.	AB AB	41.3
	8	222.85	555.9	-4383.8	-1878.70	-38.	-28.	AB AB	41.3
	9	-1094.07	753.5	-4349.2	551.05	-13.	-61.	AB AB	41.3
	10	-2888.02	970.0	-4317.1	-260.26	20.	-108.	AB AB	49.7
	11	-1857.86	1109.0	-4279.2	-1002.37	7.	-68.	AB AB	87.0
2	11	-1856.65	-341.2	-4263.1	-1003.42	7.	-68.	AB AB	87.0
	12	1062.18	-70.2	-4088.6	-51.72	-51.	-4.	AB AB	41.3
	13	1143.84	-15.4	-4052.1	-1690.63	-52.	-1.	AB AB	41.3
	14	1140.18	18.8	-4051.9	-796.38	-52.	-1.	AB AB	41.3
	15	1018.54	54.1	-4095.4	-233.42	-50.	-5.	AB AB	41.3
	16	2790.66	83.2	-4132.7	-24.08	-83.	41.	AB C	41.3
	17	2785.24	296.6	-4172.5	-191.50	-83.	40.	AB C	41.3
	18	2109.06	427.3	-4204.9	-745.08	-71.	22.	AB AB	41.3
	19	768.18	626.3	-4229.6	-1689.04	-46.	-12.	AB AB	41.3
	20	-1178.25	865.3	-4272.7	-2.05	-11.	-63.	AB AB	41.3
	21	-1270.68	1245.6	-4455.9	-1009.74	-4.	-56.	AB AB	87.0
3	21	-1270.08	-262.2	-4456.6	-1008.17	-5.	-56.	AB AB	87.0
	22	1104.83	-166.0	-4510.5	-234.81	-55	-6.	AB AB	41.3
	23AI	1327.33	-70.9	-4534.4	-2558.74	-59.	0.	AB AB	41.3
	23AD	1324.00	-94.7	-4338.3	-2474.35	-58.	1.	AB AB	41.3
	24	1427.37	-34.9	-4372.7	-1753.17	-60.	4.	AB AB	41.3
	25	1445.81	-16.5	-4416.5	-1213.05	-60.	4.	AB AB	41.3
	26	1467.16	-42.2	-4465.1	-939.97	61.	4.	AB AB	41.3
	27	3403.62	91.9	-4482.5	-860.74	-97.	54.	AB C	41.3
	28	2858.25	313.5	-4502.4	-860.20	-87.	40.	AB C	41.3
	29	2431.74	492.8	-4524.0	-968.93	-79.	28.	AB C	41.3
	30	1312.64	639.8	-4549.6	-1217.49	-59.	-1.	AB AB	41.3
	31	-51.13	649.8	-4580.4	-1509.18	-27.	-29.	AB AB	87.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-73.26	-635.2	-4584.5	1296.26	-26.	-29.	AB AB	87.0
	2	1264.66	-621.0	-4552.6	-1184.22	-58.	-2.	AB AB	41.3
	3	2344.64	-474.8	-4528.1	-910.34	-78.	26.	AB C	41.3
	4	2749.48	-311.0	-4503.6	-792.19	-85.	37.	AB C	41.3
	5	3320.27	-119.4	-4477.3	-828.89	-95.	52.	AB C	41.3
	6	1489.94	-34.0	-4447.9	-1022.75	-61.	5.	AB AB	41.3
	7	1526.66	19.3	-4416.7	-1374.49	-62.	6.	AB AB	41.3
	8	1454.42	74.4	-4383.8	-1878.70	-60.	4.	AB AB	41.3
	9	1267.25	131.6	-4349.2	-2529.44	-57.	0.	AB AB	41.3
	10	952.17	195.5	-4316.2	-260.26	-51.	-8.	AB AB	41.3
	11	-1907.15	287.1	-4266.0	-1002.37	8.	-69.	AB AB	87.0
2	11	-1905.94	-1275.9	-4274.1	-1003.42	8.	-69.	AB AB	87.0
	12	-2194.26	-910.5	-4089.1	-51.72	9.	-88.	AB AB	44.9
	13	-141.52	-663.0	-4052.1	1179.43	-28.	-35.	AB AB	41.3
	14	1265.77	-451.9	-4051.9	-796.38	-54.	2.	AB AB	41.3
	15	1928.07	-309.1	-4095.4	-233.42	-67.	19.	AB AB	41.3
	16	-82.28	-91.6	-4132.7	-24.08	-30.	-34.	AB AB	41.3
	17	67.42	-66.5	-4172.5	-191.50	-33.	-30.	AB AB	41.3
	18	175.18	-43.5	-4204.9	-745.08	-35.	-28.	AB AB	41.3
	19	245.25	-21.2	-4229.6	-1689.04	-37.	-26.	AB AB	41.3
	20	269.89	25.0	-4272.2	-2.05	-38.	-26.	AB AB	41.3
	21	-2125.54	310.9	-4444.9	-1009.74	11.	-75.	AB AB	87.0
3	21	-2124.94	-1084.1	-4469.8	-1008.17	11.	-75.	AB AB	87.0
	22	-2735.35	-940.5	-4511.4	-234.81	16.	-105.	AB AB	46.4
	23AI	-1033.99	-692.8	-4534.4	652.96	-16.	-61.	AB AB	41.3
	23AD	-1037.33	-716.5	-4338.3	598.44	-14.	-60.	AB AB	41.3
	24	195.79	-516.3	-4372.7	-1753.17	-37.	-28.	AB AB	41.3
	25	1031.76	-369.8	-4416.5	-1213.05	-53.	-7.	AB AB	41.3
	26	1132.87	-285.2	-4465.1	-939.97	-55.	-5.	AB AB	41.3
	27	-147.95	-139.5	-4482.5	-860.74	-31.	-38.	AB AB	41.3
	28	0.45	-58.7	-4502.4	-860.20	-34.	-34.	AB AB	41.3
	29	14.13	7.0	-4524.0	-968.93	-35.	-34.	AB AB	41.3
	30	-75.07	8.3	-4548.7	-1217.49	-33.	-37.	AB AB	41.3
	31	-51.14	-27.1	-4569.4	1273.02	-27.	-29.	AB AB	87.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-89.53	263.4	-5584.6	1584.32	-32.	-36.	AB AB	87.0
	2	-614.60	199.5	-5560.5	-1447.38	-31.	-58.	AB AB	41.3
	3	-849.04	118.6	-5534.3	-1112.64	-27.	-64.	AB AB	41.3
	4	-1027.29	98.3	-5504.4	-968.24	-23.	-69.	AB AB	41.3
	5	-1152.07	78.9	-5472.2	-1013.09	-20.	-72.	AB AB	41.3
	6	374.83	104.7	-5436.3	-1250.03	-48.	-32.	AB AB	41.3
	7	613.52	197.5	-5398.2	-1679.94	-53.	-25.	AB AB	41.3
	8	146.07	310.4	-5357.9	-2296.19	-44.	-37.	AB AB	41.3
	9	-609.28	438.1	-5315.7	673.50	-29.	-56.	AB AB	41.3
	10	-1705.30	586.2	-5271.1	-318.09	-9.	-84.	AB AB	41.3
	11	-133.13	719.6	-5217.0	-1225.12	-29.	-35.	AB AB	87.0
2	11	-131.64	47.4	-5202.6	-1226.40	-29.	-35.	AB AB	87.0
	12	1991.50	325.6	-4993.2	-63.21	-75.	13.	AB AB	41.3
	13	1162.06	285.7	-4952.5	-2066.32	-59.	-8.	AB AB	41.3
	14	504.22	220.6	-4952.3	-973.35	-47.	-25.	AB AB	41.3
	15	-21.95	156.8	-5005.5	-285.29	-38.	-39.	AB AB	41.3
	16	1604.83	85.5	-5051.0	-29.43	-68.	3.	AB AB	41.3
	17	1717.61	197.5	-5099.8	-234.06	-71.	6.	AB AB	41.3
	18	1426.18	226.4	-5139.3	-910.65	-66.	-2.	AB AB	41.3
	19	737.54	323.5	-5169.5	-2064.39	-53.	-20.	AB AB	41.3
	20	-290.86	465.9	-5218.1	-2.50	-34.	-47.	AB AB	41.3
	21	415.31	856.7	-5435.9	-1234.13	-40.	-24.	AB AB	87.0
3	21	416.04	128.6	-5436.8	-1232.20	-40.	-24.	AB AB	87.0
	22	2246.34	220.1	-5507.7	-286.99	-83.	16.	AB AB	41.3
	23AI	1758.69	253.8	-5542.1	-3127.35	-75.	3.	AB AB	41.3
	23AD	1754.60	224.7	-5302.4	-3024.21	-73.	5.	AB AB	41.3
	24	1286.14	215.2	-5344.4	-2142.76	-65.	-8.	AB AB	41.3
	25	878.66	155.1	-5397.9	-1482.61	-57.	-18.	AB AB	41.3
	26	639.52	41.0	-5457.3	-1148.85	-53.	-25.	AB AB	41.3
	27	2467.98	114.8	-5478.6	-1052.01	-87.	22.	AB AB	41.3
	28	1938.39	272.7	-5502.9	-1051.35	-78.	8.	AB AB	41.3
	29	1658.33	385.1	-5529.3	-1184.25	-73.	1.	AB AB	41.3
	30	823.40	450.8	-5557.6	-1488.04	-58.	-21.	AB AB	41.3
	31	-62.50	427.2	-5590.6	-1844.55	-33.	-35.	AB AB	87.0

Calculo de Comprobacion a Cortante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-89.53	-413.5	-5595.7	1584.32	-32.	-36.	AB AB	87.0
	2	773.11	-432.0	-5561.4	-1447.38	-57.	-22.	AB AB	41.3
	3	1568.57	-367.2	-5534.3	-1112.64	-71.	-2.	AB AB	41.3
	4	1830.51	-273.9	-5504.4	-968.24	-76.	5.	AB AB	41.3
	5	2399.50	-152.5	-5472.2	-1013.09	-86.	20.	AB AB	41.3
	6	709.11	-138.4	-5436.3	-1250.03	-55.	-23.	AB AB	41.3
	7	1027.57	-155.8	-5398.2	-1679.94	-60.	-15.	AB AB	41.3
	8	1377.65	-171.0	-5357.9	-2296.19	-66.	-5.	AB AB	41.3
	9	1752.04	-183.7	-5315.7	-3091.54	-73.	5.	AB AB	41.3
	10	2134.89	-188.3	-5270.2	-318.09	-80.	15.	AB AB	41.3
	11	-182.42	-102.4	-5203.8	-1225.12	-28.	-36.	AB AB	87.0
2	11	-180.94	-887.3	-5213.6	-1226.40	-28.	-36.	AB AB	87.0
	12	-1264.94	-514.7	-4993.7	-63.21	-15.	-71.	AB AB	41.3
	13	-123.30	-361.9	-4952.5	1441.52	-36.	-41.	AB AB	41.3
	14	629.81	-250.1	-4952.3	-973.35	-49.	-21.	AB AB	41.3
	15	887.57	-206.3	-5005.5	-285.29	-55.	-15.	AB AB	41.3
	16	-1268.11	-89.3	-5051.0	-29.43	-15.	-71.	AB AB	41.3
	17	-1000.21	-165.6	-5099.8	-234.06	-20.	65.	AB AB	41.3
	18	-507.70	-244.4	-5139.3	-910.65	-30.	-52.	AB AB	41.3
	19	214.61	-324.0	-5169.5	-2064.39	-43.	-34.	AB AB	41.3
	20	1157.28	-374.4	-5217.6	-2.50	-61.	-10.	AB AB	41.3
	21	-439.55	-77.9	-5424.9	-1234.13	-25.	-43.	AB AB	87.0
3	21	-438.82	-693.3	-5450.0	-1232.20	-25.	-43.	AB AB	87.0
	22	-1593.85	-554.4	-5508.6	-286.99	-12.	-83.	AB AB	41.3
	23AI	-602.64	-368.1	-5542.1	798.06	-31.	-58.	AB AB	41.3
	23AD	-606.72	-397.1	-5302.4	731.42	-29.	-56.	AB AB	41.3
	24	54.57	-266.2	-5344.4	-2142.76	-42.	-39.	AB AB	41.3
	25	464.61	-198.2	-5397.9	-1482.61	-50.	-29.	AB AB	41.3
	26	305.24	-202.0	-5457.3	-1148.85	-47.	-34.	AB AB	41.3
	27	-1083.60	-116.6	-5478.6	-1052.01	-22.	-70.	AB AB	41.3
	28	-919.40	-99.4	-5502.9	-1051.35	-25.	-66.	AB AB	41.3
	29	-759.28	-100.7	-5529.3	-1184.25	-28.	-62.	AB AB	41.3
	30	-564.31	-180.7	-5556.7	-1488.04	-32.	-57.	AB AB	41.3
	31	-62.50	-249.7	-5579.6	1555.91	-33.	-35.	AB AB	87.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-73.26	-598.5	-4583.0	1296.26	-26.	-29.	AB AB	87.0
	2	1264.66	-620.9	-4560.1	-1184.22	-58.	-2.	AB AB	41.3
	3	2344.64	-474.8	-4528.1	-910.34	-78.	26.	AB C	41.3
	4	3018.29	-291.3	-4503.6	-792.19	-90.	44.	AB C	41.3
	5	3320.27	-119.4	-4477.3	-828.89	-95.	52.	AB C	41.3
	6	3290.26	36.2	-4447.9	-1022.75	-95.	51.	AB C	41.3
	7	3182.11	200.1	-4416.7	-1374.49	-92.	49.	AB C	41.3
	8	2710.62	378.2	-4383.8	-1878.70	-83.	37.	AB C	41.3
	9	1832.94	570.5	-4349.2	-2529.44	-67.	14.	AB AB	41.3
	10	952.17	195.5	-4316.2	-260.26	-51.	-8.	AB AB	41.3
	11	662.66	287.1	-4266.0	-1002.37	-38.	-11.	AB AB	87.0
2	11	663.88	-341.2	-4263.1	-1003.42	-38.	-11.	AB AB	87.0
	12	1062.18	-70.2	-4087.8	-51.72	-51.	-4.	AB AB	41.3
	13	2118.18	-489.2	-4052.1	-1690.63	-70.	24.	AB AB	41.3
	14	3170.83	-347.8	-4051.9	-796.38	-89.	51.	AB C	41.3
	15	3666.82	-175.1	-4095.4	-233.42	-99.	64.	AB C	41.3
	16	3715.76	-4.2	-4132.7	-24.08	-100.	65.	AB C	41.3
	17	3619.85	162.6	-4172.5	-191.50	-99.	62.	AB C	41.3
	18	3109.98	323.2	-4204.9	-745.08	-89.	48.	AB C	41.3
	19	2123.73	452.6	-4229.6	-1689.04	-71.	23.	AB AB	41.3
	20	1174.04	25.0	-4272.2	-2.05	-54.	-2.	AB AB	41.3
	21	847.06	310.9	-4444.9	-1009.74	-42.	-8.	AB AB	87.0
3	21	847.66	-262.2	-4456.6	-1008.17	-42.	-8.	AB AB	87.0
	22	1104.83	-166.0	-4510.2	-234.81	-55.	-6.	AB AB	41.3
	23AI	1893.02	-509.8	-4534.4	-2558.74	-70.	14.	AB AB	41.3
	23AD	1889.68	-533.6	-4338.3	-2474.35	-68.	16.	AB AB	41.3
	24	2683.57	-338.6	-4372.7	-1753.17	-83.	36.	AB C	41.3
	25	3101.26	-197.3	-4416.5	-1213.05	-91.	47.	AB C	41.3
	26	3267.48	-112.5	-4465.1	-939.97	-94.	50.	AB C	41.3
	27	3403.62	91.9	-4482.5	-860.74	-97.	54.	AB C	41.3
	28	3127.05	293.8	-4502.4	-860.20	-92.	47.	AB C	41.3
	29	2431.74	492.8	-4524.0	-968.93	-79.	28.	AB C	41.3
	30	1312.64	639.8	-4549.6	-1217.49	-59.	-1.	AB AB	41.3
	31	-51.13	613.2	-4571.5	-1509.18	-27.	-29.	AB AB	87.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-73.26	35.7	-4573.8	1296.26	-26.	-29.	AB AB	87.0
	2	-123.05	10.4	-4550.0	-1184.22	-32.	-38.	AB AB	41.3
	3	-72.97	11.0	-4528.1	-910.34	-33.	-36.	AB AB	41.3
	4	-108.31	61.2	-4503.6	-792.19	-32.	-37.	AB AB	41.3
	5	-231.30	112.1	-4477.3	-828.89	-30.	-40.	AB AB	41.3
	6	-439.16	158.9	-4447.9	-1022.75	-26.	-45.	AB AB	41.3
	7	-870.07	219.0	-4416.7	1753.83	-18.	-56.	AB AB	41.3
	8	-1437.20	281.0	-4383.8	1226.28	-7.	-71.	AB AB	41.3
	9	-2146.55	345.0	-4349.2	551.05	6.	-89.	AB AB	41.3
	10	-3194.83	895.8	-4317.1	-260.26	26.	-116.	C AB	42.9
	11	-4548.02	1027.6	-4277.9	-1002.37	55.	-129.	C AB	87.0
2	11	-4546.80	-1224.6	-4274.1	-1003.42	55.	-129.	C AB	87.0
	12	-2333.40	-817.0	-4097.1	-51.72	12.	-92.	AB AB	41.3
	13	-1293.63	-212.0	-4052.1	1179.43	-7.	-64.	AB AB	41.3
	14	-764.53	-162.5	-4051.9	-796.38	-17.	-51.	AB AB	41.3
	15	-455.81	-58.4	-4095.4	-233.42	-23.	-43.	AB AB	41.3
	16	-364.42	-13.8	-4132.7	-24.08	-25.	-41.	AB AB	41.3
	17	-502.78	45.9	-4172.5	-191.50	-23.	-45.	AB AB	41.3
	18	-825.39	137.8	-4204.9	-745.08	-17.	-53.	AB AB	41.3
	19	-1288.07	175.4	-4229.6	1306.76	-8.	-66.	AB AB	41.3
	20	-2221.54	771.9	-4272.7	-2.05	8.	-90.	AB AB	41.3
	21	-4363.62	1194.4	-4455.9	-1009.74	50.	-126.	C AB	87.0
3	21	-4363.02	-1002.7	-4468.5	-1008.17	50.	-126.	C AB	87.0
	22	-3042.16	-866.2	-4521.2	-234.81	22.	-113.	AB AB	41.3
	23AI	-2086.46	-284.3	-4534.4	652.96	4.	-89.	AB AB	41.3
	23AD	-2089.80	-308.1	-4338.3	598.44	5.	-87.	AB AB	41.3
	24	-1464.26	-241.4	-4372.7	1344.01	-6.	-71.	AB AB	41.3
	25	-950.92	-216.2	-4416.5	1915.13	-16.	-58.	AB AB	41.3
	26	-461.94	-235.1	-4465.1	-939.97	-26.	-46.	AB AB	41.3
	27	-147.95	-139.5	-4482.5	-860.74	-31.	-38.	AB AB	41.3
	28	0.45	-58.7	-4502.4	-860.20	-34.	-34.	AB AB	41.3
	29	14.13	7.0	-4524.0	-968.93	-35.	-34.	AB AB	41.3
	30	-75.07	8.3	-4548.7	-1217.49	-33.	-37.	AB AB	41.3
	31	-51.14	-21.1	-4577.2	1273.02	-27.	-29.	AB AB	87.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-89.53	-376.8	-5594.2	1584.32	-32.	-36.	AB AB	87.0
	2	773.11	-431.9	-5568.9	-1447.38	-57.	-22.	AB AB	41.3
	3	1568.57	-367.2	-5534.3	-1112.64	-71.	-2.	AB AB	41.3
	4	2099.31	-254.2	-5504.4	-968.24	-81.	12.	AB AB	41.3
	5	2399.50	-152.5	-5472.2	-1013.09	-86.	20.	AB AB	41.3
	6	2509.43	-68.1	-5436.3	-1250.03	-88.	23.	AB AB	41.3
	7	2683.02	25.0	-5398.2	-1679.94	-91.	28.	AB C	41.3
	8	2633.85	132.7	-5357.9	-2296.19	-89.	27.	AB C	41.3
	9	2317.73	255.1	-5315.7	-3091.54	-83.	19.	AB AB	41.3
	10	2134.89	-188.3	-5270.2	-318.09	-80.	15.	AB AB	41.3
	11	2387.39	-102.4	-5203.8	-1225.12	-74.	22.	AB AB	87.0
2	11	2388.88	47.4	-5202.6	-1226.40	-74.	23.	AB AB	87.0
	12	1991.50	325.6	-4992.4	-63.21	-75.	13.	AB AB	41.3
	13	2136.40	-188.1	-4952.5	-2066.32	-77.	17.	AB AB	41.3
	14	2534.87	-146.0	-4952.3	-973.35	-85.	28.	AB C	41.3
	15	2626.32	-72.4	-5005.5	-285.29	-87.	30.	AB C	41.3
	16	2529.93	-1.9	-5051.0	-29.43	-85.	27.	AB C	41.3
	17	2552.21	63.6	-5099.8	-234.06	-86.	27.	AB C	41.3
	18	2427.10	122.3	-5139.3	-910.65	-84.	24.	AB AB	41.3
	19	2093.10	149.7	-5169.5	-2064.39	-78.	15.	AB AB	41.3
	20	2061.42	-374.4	-5217.6	-2.50	-78.	13.	AB AB	41.3
	21	2533.05	-77.9	-5424.9	-1234.13	-78.	24.	AB C	87.0
3	21	2533.79	128.6	-5436.8	-1232.20	-78.	24.	AB AB	87.0
	22	2246.34	220.1	-5507.4	-286.99	-83.	16.	AB AB	41.3
	23AI	2324.38	-185.1	-5542.1	-3127.35	-85.	18.	AB AB	41.3
	23AD	2320.29	-214.2	-5302.4	-3024.21	-83.	20.	AB AB	41.3
	24	2542.34	-88.5	-5344.4	-2142.76	-88.	25.	AB C	41.3
	25	2534.11	-25.7	-5397.9	-1482.61	-88.	24.	AB AB	41.3
	26	2439.85	-29.3	-5457.3	-1148.85	-87.	21.	AB AB	41.3
	27	2467.98	114.8	-5478.6	-1052.01	-87.	22.	AB AB	41.3
	28	2207.20	253.1	-5502.9	-1051.35	-83.	15.	AB AB	41.3
	29	1658.33	385.1	-5529.3	-1184.25	-73.	1.	AB AB	41.3
	30	823.40	450.8	-5557.6	-1488.04	-58.	-21.	AB AB	41.3
	31	-62.50	390.6	-5581.7	-1844.55	-33.	-35.	AB AB	87.0

Calculo de Comprobacion a Cortante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos y los momentos de cargas en pilas
estan calculados a +/- 0.75 del canto

V.	Sec	Momento (m x t)	Cortante (t)	Axil (t)	Mom.Dec. (m x t)	T. Sup kg/cm2	T. Inf kg/cm2	Clase	Armad cm2/m
1	1	-89.53	257.4	-5584.9	1584.32	-32.	-36.	AB AB	87.0
	2	-614.60	199.4	-5558.7	-1447.38	-31.	-58.	AB AB	41.3
	3	-849.04	118.6	-5534.3	-1112.64	-27.	-64.	AB AB	41.3
	4	-1027.29	98.3	-5504.4	-968.24	-23.	-69.	AB AB	41.3
	5	-1152.07	78.9	-5472.2	-1013.09	-20.	-72.	AB AB	41.3
	6	-1219.98	54.6	-5436.3	-1250.03	-19.	-73.	AB AB	41.3
	7	-1369.16	43.9	-5398.2	2143.57	-16.	-77.	AB AB	41.3
	8	-1513.98	35.5	-5357.9	1498.79	-13.	-80.	AB AB	41.3
	9	-1661.76	29.6	-5315.7	673.50	-10.	-84.	AB AB	41.3
	10	-2012.11	512.0	-5271.1	-318.09	-3.	-92.	AB AB	41.3
	11	-2823.29	638.2	-5215.7	-1225.12	18.	-95.	AB AB	87.0
2	11	-2821.80	-836.0	-5213.6	-1226.40	18.	-95.	AB AB	87.0
	12	-1404.08	-421.1	-5001.7	-63.21	-12.	-74.	AB AB	41.3
	13	-1275.40	89.1	-4952.5	1441.52	-14.	-71.	AB AB	41.3
	14	-1400.50	39.3	-4952.3	-973.35	-12.	-74.	AB AB	41.3
	15	-1496.31	44.3	-5005.5	-285.29	-11.	-77.	AB AB	41.3
	16	-1550.25	-11.5	-5051.0	-29.43	-10.	-79.	AB AB	41.3
	17	-1570.41	-53.1	-5099.8	-234.06	-10.	-80.	AB AB	41.3
	18	-1508.27	-63.0	-5139.3	-910.65	-11.	-78.	AB AB	41.3
	19	-1318.71	-127.5	-5169.5	1597.15	-15.	-74.	AB AB	41.3
	20	-1334.15	372.4	-5218.1	-2.50	-15.	-74.	AB AB	41.3
	21	-2677.63	805.5	-5435.9	-1234.13	15.	-94.	AB AB	87.0
3	21	-2676.90	-611.8	-5448.7	-1232.20	14.	-94.	AB AB	87.0
	22	-1900.66	-480.0	-5518.5	-286.99	-7.	-91.	AB AB	41.3
	23AI	-1655.11	40.4	-5542.1	798.06	-12.	-85.	AB AB	41.3
	23AD	-1659.19	11.4	-5302.4	731.42	-10.	-83.	AB AB	41.3
	24	-1605.48	8.7	-5344.4	1642.68	-11.	-82.	AB AB	41.3
	25	-1518.07	-44.6	-5397.9	2340.71	-13.	-80.	AB AB	41.3
	26	-1289.57	-151.9	-5457.3	-1148.85	-18.	-75.	AB AB	41.3
	27	-1083.60	-116.6	-5478.6	-1052.01	-22.	-70.	AB AB	41.3
	28	-919.40	-99.4	-5502.9	-1051.35	-25.	-66.	AB AB	41.3
	29	-759.28	-100.7	-5529.3	-1184.25	-28.	-62.	AB AB	41.3
	30	-564.31	-180.7	-5556.7	-1488.04	-32.	-57.	AB AB	41.3
	31	-62.50	-243.7	-5587.4	1555.91	-33.	-35.	AB AB	87.0

COMPROBACION A RASANTE

Calculo de Comprobacion a Rasante

Datos generales

Limite elastico del acero pasivo	=	5100.00	kg/cm2
Coeficiente del acero pasivo	=	1.15	
Limite elastico de acero activo	=	19000.00	kg/cm2
Coeficiente del acero activo	=	1.10	
Resistencia caracteristica del hormigon	=	400.00	kg/cm2
Coeficiente del hormigon	=	1.50	
Coef. mayoracion Cargas muertas y Peso propio .	=	1.50	
Coef. mayoracion Sobrecargas	=	1.50	

Calculo de Comprobacion a Rasante

Datos secciones/momentos estaticos

V.	Sec	M.Estatico m3	M.Estatico m3	M.Estatico m3
1	1	0.642		
	2	0.642		
	3	0.642		
	4	0.642		
	5	0.642		
	6	0.642		
	7	0.642		
	8	0.642		
	9	0.642		
	10	0.642		
	11	0.642		
2	11	0.642		
	12	0.642		
	13	0.642		
	14	0.642		
	15	0.642		
	16	0.642		
	17	0.642		
	18	0.642		
	19	0.642		
	20	0.642		
	21	0.642		
3	21	0.642		
	22	0.642		
	23AI	0.642		
	23AD	0.642		
	24	0.642		
	25	0.642		
	26	0.642		
	27	0.642		
	28	0.642		
	29	0.642		
	30	0.642		
	31	0.642		

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	41.7	0.356	1.4				
	2	10.5	0.098	0.4				
	3	11.0	0.103	0.4				
	4	61.2	0.573	2.2				
	5	112.1	1.050	4.0				
	6	209.0	1.959	7.5				
	7	372.6	3.492	13.3				
	8	555.9	5.209	19.8				
	9	753.5	7.061	26.9				
	10	970.0	9.090	34.6				
	11	1109.0	9.462	36.0				
2	11	341.2	2.911	11.1				
	12	70.2	0.658	2.5				
	13	15.4	0.145	0.6				
	14	18.8	0.177	0.7				
	15	54.1	0.507	1.9				
	16	83.2	0.780	3.0				
	17	296.6	2.780	10.6				
	18	427.3	4.004	15.3				
	19	626.3	5.870	22.4				
	20	865.3	8.109	30.9				
	21	1245.6	10.628	40.5				
3	21	262.2	2.237	8.5				
	22	166.0	1.556	5.9				
	23AI	70.9	0.665	2.5				
	23AD	94.7	0.887	3.4				
	24	34.9	0.327	1.2				
	25	16.5	0.154	0.6				
	26	42.2	0.396	1.5				
	27	91.9	0.861	3.3				
	28	313.5	2.938	11.2				
	29	492.8	4.619	17.6				
	30	639.8	5.996	22.8				
	31	649.8	5.545	21.1				

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	635.2	5.419	20.6				
	2	621.0	5.820	22.2				
	3	474.8	4.450	17.0				
	4	311.0	2.915	11.1				
	5	119.4	1.119	4.3				
	6	34.0	0.319	1.2				
	7	19.3	0.181	0.7				
	8	74.4	0.698	2.7				
	9	131.6	1.234	4.7				
	10	195.5	1.832	7.0				
	11	287.1	2.449	9.3				
2	11	1275.9	10.886	41.5				
	12	910.5	8.533	32.5				
	13	663.0	6.213	23.7				
	14	451.9	4.235	16.1				
	15	309.1	2.896	11.0				
	16	91.6	0.858	3.3				
	17	66.5	0.623	2.4				
	18	43.5	0.408	1.6				
	19	21.2	0.199	0.8				
	20	25.0	0.234	0.9				
	21	310.9	2.653	10.1				
3	21	1084.1	9.250	35.2				
	22	940.5	8.814	33.6				
	23AI	692.8	6.492	24.7				
	23AD	716.5	6.715	25.6				
	24	516.3	4.839	18.4				
	25	369.8	3.465	13.2				
	26	285.2	2.673	10.2				
	27	139.5	1.307	5.0				
	28	58.7	0.550	2.1				
	29	7.0	0.066	0.2				
	30	8.3	0.078	0.3				
	31	27.1	0.231	0.9				

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	263.4	2.248	8.6				
	2	199.5	1.869	7.1				
	3	118.6	1.112	4.2				
	4	98.3	0.921	3.5				
	5	78.9	0.739	2.8				
	6	104.7	0.981	3.7				
	7	197.5	1.851	7.0				
	8	310.4	2.909	11.1				
	9	438.1	4.105	15.6				
	10	586.2	5.494	20.9				
	11	719.6	6.139	23.4				
2	11	47.4	0.404	1.5				
	12	325.6	3.052	11.6				
	13	285.7	2.677	10.2				
	14	220.6	2.068	7.9				
	15	156.8	1.469	5.6				
	16	85.5	0.801	3.1				
	17	197.5	1.851	7.1				
	18	226.4	2.122	8.1				
	19	323.5	3.032	11.6				
	20	465.9	4.366	16.6				
	21	856.7	7.310	27.8				
3	21	128.6	1.098	4.2				
	22	220.1	2.063	7.9				
	23AI	253.8	2.378	9.1				
	23AD	224.7	2.106	8.0				
	24	215.2	2.017	7.7				
	25	155.1	1.454	5.5				
	26	41.0	0.384	1.5				
	27	114.8	1.076	4.1				
	28	272.7	2.556	9.7				
	29	385.1	3.609	13.7				
	30	450.8	4.225	16.1				
	31	427.2	3.645	13.9				

Calculo de Comprobacion a Rasante (Q(max/min) -- Momentos)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	413.5	3.528	13.4				
	2	432.0	4.049	15.4				
	3	367.2	3.442	13.1				
	4	273.9	2.567	9.8				
	5	152.5	1.429	5.4				
	6	138.4	1.297	4.9				
	7	155.8	1.460	5.6				
	8	171.0	1.603	6.1				
	9	183.7	1.722	6.6				
	10	188.3	1.765	6.7				
	11	102.4	0.874	3.3				
2	11	887.3	7.570	28.8				
	12	514.7	4.824	18.4				
	13	361.9	3.392	12.9				
	14	250.1	2.344	8.9				
	15	206.3	1.934	7.4				
	16	89.3	0.837	3.2				
	17	165.6	1.552	5.9				
	18	244.4	2.290	8.7				
	19	324.0	3.037	11.6				
	20	374.4	3.509	13.4				
	21	77.9	0.665	2.5				
3	21	693.3	5.916	22.5				
	22	554.4	5.195	19.8				
	23AI	368.1	3.449	13.1				
	23AD	397.1	3.721	14.2				
	24	266.2	2.495	9.5				
	25	198.2	1.857	7.1				
	26	202.0	1.893	7.2				
	27	116.6	1.093	4.2				
	28	99.4	0.932	3.5				
	29	100.7	0.944	3.6				
	30	180.7	1.693	6.5				
	31	249.7	2.130	8.1				

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	598.5	5.106	19.5				
	2	620.9	5.819	22.2				
	3	474.8	4.450	17.0				
	4	291.3	2.730	10.4				
	5	119.4	1.119	4.3				
	6	36.2	0.340	1.3				
	7	200.1	1.875	7.1				
	8	378.2	3.544	13.5				
	9	570.5	5.347	20.4				
	10	195.5	1.832	7.0				
	11	287.1	2.449	9.3				
2	11	341.2	2.911	11.1				
	12	70.2	0.658	2.5				
	13	489.2	4.585	17.5				
	14	347.8	3.260	12.4				
	15	175.1	1.641	6.3				
	16	4.2	0.039	0.1				
	17	162.6	1.524	5.8				
	18	323.2	3.029	11.5				
	19	452.6	4.241	16.2				
	20	25.0	0.234	0.9				
	21	310.9	2.653	10.1				
3	21	262.2	2.237	8.5				
	22	166.0	1.556	5.9				
	23AI	509.8	4.778	18.2				
	23AD	533.6	5.001	19.0				
	24	338.6	3.173	12.1				
	25	197.3	1.849	7.0				
	26	112.5	1.054	4.0				
	27	91.9	0.861	3.3				
	28	293.8	2.753	10.5				
	29	492.8	4.619	17.6				
	30	639.8	5.996	22.8				
	31	613.2	5.232	19.9				

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 1.5*Ppf+1.5*Cm +0.9*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	35.7	0.305	1.2				
	2	10.4	0.098	0.4				
	3	11.0	0.103	0.4				
	4	61.2	0.573	2.2				
	5	112.1	1.050	4.0				
	6	158.9	1.489	5.7				
	7	219.0	2.052	7.8				
	8	281.0	2.633	10.0				
	9	345.0	3.233	12.3				
	10	895.8	8.395	32.0				
	11	1027.6	8.768	33.4				
2	11	1224.6	10.448	39.8				
	12	817.0	7.656	29.2				
	13	212.0	1.987	7.6				
	14	162.5	1.523	5.8				
	15	58.4	0.547	2.1				
	16	13.8	0.129	0.5				
	17	45.9	0.431	1.6				
	18	137.8	1.292	4.9				
	19	175.4	1.643	6.3				
	20	771.9	7.234	27.6				
	21	1194.4	10.191	38.8				
3	21	1002.7	8.555	32.6				
	22	866.2	8.118	30.9				
	23AI	284.3	2.664	10.1				
	23AD	308.1	2.887	11.0				
	24	241.4	2.263	8.6				
	25	216.2	2.026	7.7				
	26	235.1	2.204	8.4				
	27	139.5	1.307	5.0				
	28	58.7	0.550	2.1				
	29	7.0	0.066	0.2				
	30	8.3	0.078	0.3				
	31	21.1	0.180	0.7				

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(+)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	376.8	3.215	12.2				
	2	431.9	4.048	15.4				
	3	367.2	3.442	13.1				
	4	254.2	2.382	9.1				
	5	152.5	1.429	5.4				
	6	68.1	0.638	2.4				
	7	25.0	0.234	0.9				
	8	132.7	1.244	4.7				
	9	255.1	2.391	9.1				
	10	188.3	1.765	6.7				
	11	102.4	0.874	3.3				
2	11	47.4	0.404	1.5				
	12	325.6	3.052	11.6				
	13	188.1	1.763	6.7				
	14	146.0	1.369	5.2				
	15	72.4	0.678	2.6				
	16	1.9	0.018	0.1				
	17	63.6	0.596	2.3				
	18	122.3	1.146	4.4				
	19	149.7	1.403	5.3				
	20	374.4	3.509	13.4				
	21	77.9	0.665	2.5				
3	21	128.6	1.098	4.2				
	22	220.1	2.063	7.9				
	23AI	185.1	1.735	6.6				
	23AD	214.2	2.007	7.6				
	24	88.5	0.829	3.2				
	25	25.7	0.241	0.9				
	26	29.3	0.274	1.0				
	27	114.8	1.076	4.1				
	28	253.1	2.372	9.0				
	29	385.1	3.609	13.7				
	30	450.8	4.225	16.1				
	31	390.6	3.333	12.7				

Calculo de Comprobacion a Rasante (M(max/min) -- Cortante)

Hipotesis : 0.9*Ppf+0.9*Cm +1.1*Ptf+1.5*S(-)
Nota : Los cortantes en apoyos estan calculados a +/- 0.75 del canto

V.	Sec	Vrd t.	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m	b(min) cm	Armad cm2/m
1	1	257.4	2.196	8.4				
	2	199.4	1.869	7.1				
	3	118.6	1.112	4.2				
	4	98.3	0.921	3.5				
	5	78.9	0.739	2.8				
	6	54.6	0.511	1.9				
	7	43.9	0.411	1.6				
	8	35.5	0.333	1.3				
	9	29.6	0.278	1.1				
	10	512.0	4.798	18.3				
	11	638.2	5.445	20.7				
2	11	836.0	7.133	27.2				
	12	421.1	3.947	15.0				
	13	89.1	0.835	3.2				
	14	39.3	0.368	1.4				
	15	44.3	0.415	1.6				
	16	11.5	0.108	0.4				
	17	53.1	0.498	1.9				
	18	63.0	0.591	2.2				
	19	127.5	1.195	4.6				
	20	372.4	3.490	13.3				
	21	805.5	6.873	26.2				
3	21	611.8	5.220	19.9				
	22	480.0	4.499	17.1				
	23AI	40.4	0.379	1.4				
	23AD	11.4	0.106	0.4				
	24	8.7	0.081	0.3				
	25	44.6	0.418	1.6				
	26	151.9	1.424	5.4				
	27	116.6	1.093	4.2				
	28	99.4	0.932	3.5				
	29	100.7	0.944	3.6				
	30	180.7	1.693	6.5				
	31	243.7	2.079	7.9				

ESTUDIO DE LA SECCION TRANSVERSAL

ARMADURA DEL VOLADIZO

ANALISIS DEL SOLADIZO

a) POR FLEXION

Se acepta la calculada en el producto 4

$w = 6.0 \, t/ml$

b) POR CORTANTE DE ALA

EN VANOS DE 20.00 m

EN TERCIO DE APOYO 33.6 t/ml

EN TERCIO CENTRAL 25.6 t/ml

EN VANOS DE 26.00 m

EN TERCIO DE APOYO 32.5 t/ml

EN TERCIO CENTRAL 16.1 t/ml

ARMADO DISPUESTO

EN TODOS LOS VANOS

EN TERCIO DE APOYO

$W_s = \phi 20/15 \rightarrow 20.93 > 6.0$ t

$W_i = \phi 20/15 \rightarrow 20.93$

COMPROBACION $\rightarrow (20.93 + 20.93) 33.6 + 6.0$ t

ARMADURA DE LA LOSA

ARMADURA DE LA LOSA

ARMADURA DE CORTADURA

A lo largo de la recta alineada

$\omega = 41{,}3\ cm^2/m$

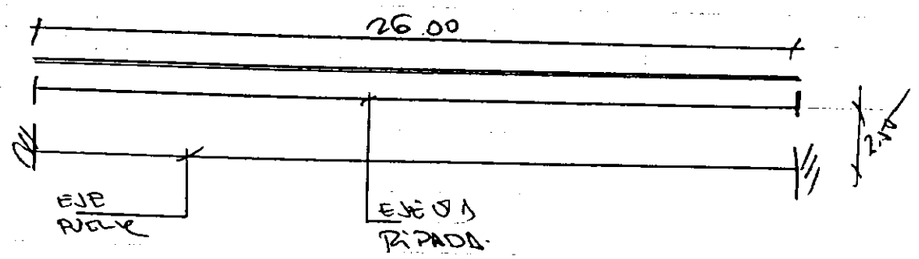
6 ramas $(2\phi 16 + 2\phi 12)/30 = 41.86\ cm^2/m$.

EFECTO DE LA TORSIÓN

Se considera a efectos de torsión como empotrado en los lados

La máxima torsión aparece con la vía cargada, la más excéntrica + sobrecarga de $400\ kg/m^2$ en aceras.

Sobre el vano de 26.00 m



$M_T = 12 \times 2.55 \times 13 + 0.40 \times 1.50 \left(\frac{4}{3} - 0.75\right) \times 13 =$

$= 398 + 49 = 447\ m\cdot t$

$M' = 447 \times 1.6 = 715\ m\cdot t$.

APLICANDO EHE

$\frac{e}{d} \leq \frac{A}{U} = \frac{\frac{9.06 + 6.20}{2} \times 1.90}{2\left(\frac{9.06 + 6.20}{2} + 1.90\right)} = \frac{14.49}{19.06} = 0.76 > 0.30$

$e = \left(\frac{9.06 + 6.20}{2} - 0.15\right)(1.90 - 0.15) = 7.48 \times 1.75 = 13.09$

$T_{U_1} = 12 \times 13.09 \times 0.30 \times \frac{1}{1+1} \times 0.60 \times \frac{4000}{1.5} = 377\ m$

$377 > 715\ m$.

$T_{U_2} = \frac{2 \times 13.09 \times A_t}{0.15} \times 4.00 = 715$

$A_t = 1.02\ cm^2 \quad \rightarrow \phi 12/15$

$T_{U_3} = \frac{2 \times 13.09 \times A_L}{19.06} \times \frac{5.1}{1.15} = 715$

$A_L = 11\ cm^2$ totales $\rightarrow$ $6.18\ cm^2/m \rightarrow \phi 12/15$

COMPROBACIÓN A FATIGA

La comprobación a fatiga consiste en limitar la variación de tensión en el acero por efecto de la carga móvil a 950 kg/cm² en los voladizos y a 1825 kg/cm² para el resto de la sección transversal

En efecto:

Según U.I.C. 774-1 R (ΔPB)

$$\Delta\sigma_{SDN} = \frac{\Delta f_{sk} \cdot \gamma_a \cdot \gamma_u}{\gamma_m \gamma_f} \cdot \frac{1}{K_T \lambda_T \beta_T}$$

Siendo:

Δf_{sk} = 180 N/mm² (Resistencia del acero a la fatiga)

K_Δ = 1 (coef reducción embalses de barras)

K_N = 1 (coef reducción por nº ciclos de carga

γ_m = 1.26 (coef seguridad por fatiga)

γ_f = 1.12 (coef seguridad de cargas)

λ_T = 1.20 (coef tráfico)

K_T = 1.12 (intensidad de tráfico)

β_T = 1.0 (tablero con dos vías de circulación)

$$\Delta\sigma_N = \frac{180 \times 1.0 \times 1.0 \times 1.0}{1.26 \times 1.12 \times 1.12 \times 1.20 \times 1} = 950 \text{ kg/cm}^2$$

En el caso de momentos positivos, en centro de vano de losa superior

K_Δ = 1.0 K_N = 1.0 γ_m = 1.26 γ_f = 1.12

λ_T = 0.80 K_T = 1.12 β_T = 0.78

$$\Delta\sigma_N = \frac{180 \times 1.0 \times 1.0 \times 1.0}{1.26 \times 1.12 \times 1.12 \times 0.8 \times 0.78} = 1925 \text{ kg/cm}^2$$

a) La sobrecarga de uso (vanguardia) no afecta al voladizo, por lo tanto se cumple la condición de fatiga

b) En las zonas transversales la armadura

ate sometida a un momento

$$\mu = 3.0 \times \frac{2.15^2}{12} = 1.10 \text{ tnt.}$$

$$\Delta\sigma = \frac{1.10}{0.27 \times 6.66 \times 1.12} = 0.54 \text{ t/cm}^2 = 540 \text{ kg/cm}^2$$

c) en cuanto a las anclas longitudinales, la maxima variacion de tensiones en el hormigon es:

PARA EL MOMENTO

$\Delta\sigma_M = 54 \text{ kg/cm}^2$

Y PARA EL ESFUERZO

$$\Delta\sigma_N = f_H \frac{E_A}{E_H} = 55 \times \frac{21 \times 10^6}{200.000\sqrt{400}} = 288 \text{ kg/cm}^2$$

se cumplen las condiciones de fatiga

ARMADURA DE LAS TRAVIESAS SOBRE PILAS

PROYECTO

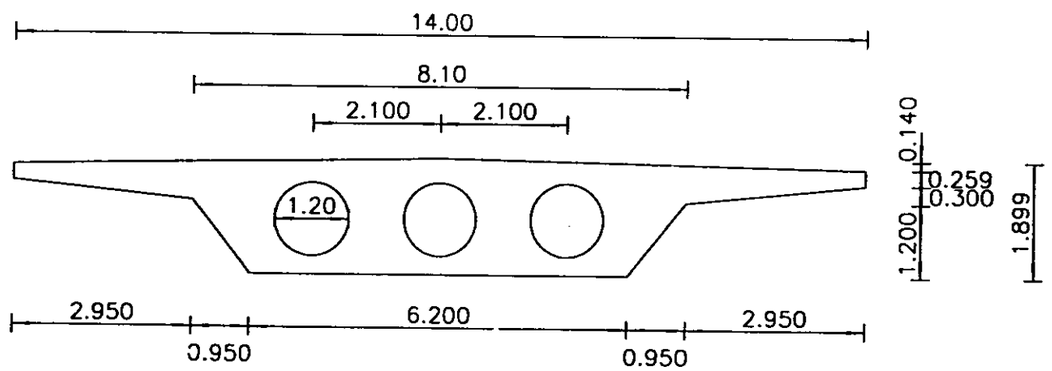
HOJA ___ DE ___

FECHA

CÁLCULO

TRAVIESAS SOBRE D.L.M

$Q_{max} = 1716$ ton



$q = \frac{1716}{8.10} = 212$ t/ml

Solicitaciones

$v = 4.05 - 1.80 = 2.25$

$M = 212 \times 2.25^2/2 = 537$ mt

$M' = 537 \times 1.6 = 858$ mt

$\phi_c = \frac{4000}{1.5} \times 300 \times 1.80 = 1440$ t

$\phi_s = 14400\left(1 - \sqrt{1 - \frac{2 \times 858}{1.80 \times 14400}}\right) = 485$ t

$\omega = 485 \times 1.15 / 5.1 = 109$ cm² → 2+φ25

$Q = 212 \times 2.25 = 477$ t

$Q' = 477 \times 1.6 = 763$ t

$T_b = \sqrt{\frac{400}{1.5}} \times 3.00 \times 1.80 = 441$ t

$T_a = \frac{763 - 441}{0.9 \times 1.80 \times 4.2} = 47$ cm²/ml

4 cφ16/30 → $4 \times 2 \times 2.52 \times 3.33 = 53.8$ cm²/ml

EN EL VANO

$M = 212 \times \frac{3.60^2}{8} = 343$ mt

$M' = 1.6 \times 343 = 549$ mt

$\phi_s = 14400\left(1 - \sqrt{1 - \frac{2 \times 549}{4.8 \times 14400}}\right) = 308$ t

$\omega = 308 \times 1.15 / 5.1 = 70$ cm² → 2+φ20

$Q = 212 \times 1.80 = 381 < 477$ t

PANTALLAS APOYOS

$\omega = \frac{1716 \times 0.5 \times 0.3 \times 1.6 \times 1.15}{5.1} = 93$ cm²

2 ambas caras de 8φ25

ARMADURA DE LAS TRAVIESAS SOBRE ESTRIBOS

TRAVIESA SOBRE ESTRIBO

Qmax = 675 ton

$q = \frac{675}{8.10} = 84$ t/ml

Sobrecargas

$\mu = 84 \times \frac{2.25^2}{2} = 211$ mt

$\mu' = 211 \times 1.6 = 337$ mt

$\phi_c = \frac{4000}{1.5} \times 1.50 \times 1.80 = 7200$ t

$\phi_s = 7200 \left(1 - \sqrt{1 - \frac{2 \times 337}{1.8 \times 7200}}\right) = 189$

$w = 189 \times 1.17 / 5_1 = 43 cm^2$ 14 ⌀ 20

$Q = 84 \times 2.25 = 189$ t

$Q' = 189 \times 1.6 = 302$ ton

$T_{ro} = 5 \sqrt{\frac{400}{1.5}} \times 1.50 \times 1.80 = 220$

$w_{min} = 31.7 \, cm^2/ml$

$w_t = \frac{302 - 220}{0.9 \times 4.2 \times 1.8} = 12 cm^2/m < 31.7$

3 cercos ⌀16/30 $= 3 \times 2 \times 2.52 \times 3.33$

TM UMO

$\mu = 84 \times \frac{3.60^2}{2} = 136$ mt

$\mu' = 136 \times 1.6 = 218$ mt

$\phi_s = 12000 \left(1 - \sqrt{1 - \frac{2 \times 218}{1.80 \times 12000}}\right) = 122$ t

$w = 122 \times 1.17 / 5_1 = 27 cm^2$ 14 ⌀ 20

$Q = 1.80 \times 84 = 151$ t

$Q' = 151 \times 1.6 = 242 < 302$

PANTALLA ADOSADA

$w = \frac{67 \times 0.7 \times 0.3 \times 1.6 \times 1.17}{5.1} = 36.6 cm^2$

6 capas de 6 ⌀ 16

APARATOS DE APOYO

REACCIONES SOBRE APOYOS (EN SERVICIO)

APOYO	LV	DIST	P.PR	PRET	C.PERM	TEMP	DESC+	DESC-	SC EP75+	SC EP75-	SC UIC+	SC UIC-	TOT CP	TOT SC +	TOT SC -	MAX	MIN
EST-1	0.00	66.00	245.05	63.47	84.47	30.14	2.75	-2.73	219.88	-46.17	181.18	-40.42	392.99	252.77	-48.90	645.76	344.09
PILA 1	20.00	46.00	867.79	-64.58	298.99	-30.14	6.93	-6.93	620.97	-37.48	501.78	-35.20	1102.20	627.90	-74.55	1730.10	1027.65
PILA 2	26.00	20.00	856.44	-59.72	298.99	-30.14	6.93	-6.93	620.97	-37.48	501.78	-35.20	1095.71	627.90	-74.55	1723.61	1021.16
EST-2	20.00	0.00	249.52	60.83	84.47	30.14	2.75	-2.73	219.88	-46.17	181.18	-40.42	394.82	252.77	-48.90	647.59	345.92

ACCIONES. REOLOGICAS (EN SERVICIO)

Eh = 4000000 ΔT° = 15.0 μ = 0.05

APOYO	X	H	RCP	RSC	RHMAX	$I_{(PILA)}$	$Smin_{(NEOP)}$	DIMENSIONES APOYOS	$\delta_{(TAB)}$	$\delta_{(PILA)}$	$\delta_{(TEFL)}$	RH	$RH_{(ACUM)}$
EST 1	0.000	0.000	392.99	252.77	19.65	0	0.2153	2 AP. "POT" PARA 400 T	0.000		0.000	19.65	138.99
PILA 1	20.000	7.000	1102.20	627.90	55.11	0.3558	0.5767	2 AP. "POT" PARA 1000 T	0.004	0.004	0.000	44.81	119.34
PILA 2	46.000	7.000	1095.71	627.90	54.79	0.3558	0.5745	2 AP. "POT" PARA 1000 T	0.008	0.004	0.004	54.79	74.53
EST 2	66.000	0.000	394.82	252.77	19.74	0	0.2159	2 AP. "POT" PARA 400 T	0.012		0.012	19.74	19.74

EVALUACION DEL FRENADO

VANO	APOYOS	LONG	EP75		UIC	
			QCARG	FREN	QCARG	FRE
1	E1-P1	66.00	1368.00	171.00	1153.60	288.40
2	P1-P2	46.00	988.00	123.50	833.60	208.40
3	P2-E2	20.00	456.00	57.00	417.60	104.40

ACC. CARRIL

APOYO	LONG	F
E1-P1	66.00	146.00
P1-P2	46.00	126.00
P2-E2	20.00	100.00

DISTRIBUCION DE FUERZAS REOLOGICAS, TEMPERATURA, INTERACCION CARRIL-ESTRUCTURA Y FRENADO, SEGUN VANOS (EN SERVICIO) (valores sin mayorar)

COMBINACION CASI PERMANENTE

[5] = ([1] + 0.50 * [2]) + 0.30 * [3]

[6] = ([1] + 0.50 * [2]) + 0.30 * [4]

COMBINACION FRECUENTE

[9] = ([1] + 0.50 * [2]) + 0.60 * [7]

[10] = ([1] + 0.50 * [2]) + 0.60 * [8]

COMBINACION POCO PROBABLE

[13] = ([1] + 0.60 * [2]) + [11]

[14] = ([1] + 0.60 * [2]) + [12]

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
VANO	R+T	CARRIL	FREN	FREN	MAX	MAX	FREN	FREN	MAX	MAX	FREN	FREN	MAX	MAX
			EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC
1	119.34	146.00	171.00	288.40	243.64	278.86	171.00	288.40	294.94	365.38	171.00	288.40	377.94	495.34
2	74.53	126.00	123.50	208.40	174.58	200.05	123.50	208.40	211.63	262.57	123.50	208.40	273.63	358.53
3	19.74	100.00	57.00	104.40	86.84	101.06	57.00	104.40	103.94	132.38	57.00	104.40	136.74	184.14

DISTRIBUCION DE FUERZAS REOLOGICAS, TEMPERATURA, INTERACCION CARRIL-ESTRUCTURA Y FRENADO, SEGUN VANOS (EN SERVICIO) (valores mayorados)

COMBINACION CASI PERMANENTE

[5'] = 1.35 * ([1] + 0.50 * [2]) +1.45 * 0.30 * [3]

[6'] = 1.35 * ([1] + 0.50 * [2]) +1.45 * 0.30 * [4]

COMBINACION FRECUENTE

[9'] = 1.35 * ([1] + 0.50 * [2]) + 1.45 * 0.60 * [7]

[10'] = 1.35 * ([1] + 0.50 * [2]) +1.45 * 0.60 * [8]

COMBINACION POCO PROBABLE

[13'] = 1.35 * ([1] + 0.60 * [2]) +1.45 * [11]

[14'] =1.35 * ([1] + 0.60 * [2]) + 1.45 * [12]

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
VANO	R+T	CARRIL	FREN	FREN	MAX	MAX	FREN	FREN	MAX	MAX	FREN	FREN	MAX	MAX
			EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC	EP75	UIC
1	119.34	146.00	171.00	288.40	334.04	385.11	171.00	288.40	408.43	510.57	171.00	288.40	527.32	697.55
2	74.53	126.00	123.50	208.40	239.38	276.31	123.50	208.40	293.11	366.97	123.50	208.40	381.75	504.85
3	19.74	100.00	57.00	104.40	118.95	139.56	57.00	104.40	143.74	184.98	57.00	104.40	190.30	259.03

DEF. POR TEMPERATURA

DEF. POR RETRACCION

VANO	LUZ	TEMP (+)		TEMP(-)		T	Bt	B(infinito)	DE 0 A T	DE T A INFINITO	DE 0 A INFINITO
	(M)	PARC (MM)	ACUM (MM)	PARC (MM)	ACUM (MM)	(DIAS)	A TIEMPO T	A T INFINITO	PARC (MM)	PARC (MM)	ACUM (MM)
1	20.00	3.0	3.0	-3.0	-3.0	45	0.045	1.000	0.2	4.6	4.8
2	26.00	3.9	6.9	-3.9	-6.9	30	0.030	1.000	0.2	6.1	10.8
3	20.00	3.0	9.9	-3.0	-9.9	15	0.150	1.000	0.7	4.1	15.4

DEFORMACIONES POR FLUENCIA

VANO	LUZ	Nº CABLES	ESPESOR	TIEMPO	Bt	Br	Φ_o		DE 0 A T	DE T A INFINITO	DE 0 A INFINITO
	(M)	(UD)	(CM)	(DIAS)			A TIEMPO T	A T INFINITO	PARC (MM)	PARC (MM)	ACUM (MM)
1	20.00	288	75	240	0.070	0.650	0.400	3.160	1.0	7.2	8.2
2	26.00	288	75	225	0.060	0.580	0.352	3.348	1.2	8.4	16.8
3	20.00	288	75	210	0.050	0.480	0.292	3.408	0.8	9.1	25.5

RESUMEN DEFORMACIONES LONGITUDINALES

APOYO	TEMP +	TEMP -	RET	FLU	TOTAL	
	(MM)	(MM)	(MM)	(MM)	(MAX)	(MIN)
EST 1	0.0	0.0	0.0	0.0	0.0	0.0
PILA 1	3.0	-3.0	4.8	8.2	16.0	10.0
PILA 2	6.9	-6.9	10.8	16.8	34.5	20.7
EST 2	9.9	-9.9	15.4	25.5	50.8	31.0

CARACTERISTICAS DE LOS APOYOS

(VALORES POR APOYO Y FUSTE)

APOYO	R.VERTICAL	GIRO	ΦB	ACORT	ALARG	R.TRANSVERSAL	LONG CHAPA			ANCH CHAPA
	(TON)	(RAD)	(MM)	(MM)	(MM)	(TON)	L1(MM)	L2(MM)	L1+L2 (MM)	(MM)
EST 1	400	0.0180	525	0	0	40	450	450	900	725
PILA 1	1000	0.0110	824	16	3	60	600	600	1200	1025
PILA 2	1000	0.0110	824	34	7	60	600	600	1200	1025
EST 2	400	0.0180	525	51	10	40	500	450	950	725

ΦB = DIAMETRO EXTERIOR CAZOLETA (mm)

L1 = LONGITUD DESDE CENTRO APOYO A EXTREMO LADO ESTRIBO NO ANCLADO (EST.2) (mm)

L2 = LONGITUD DESDE CENTRO APOYO A EXTREMO LADO ESTRIBO ANCLADO (EST.1) (mm)

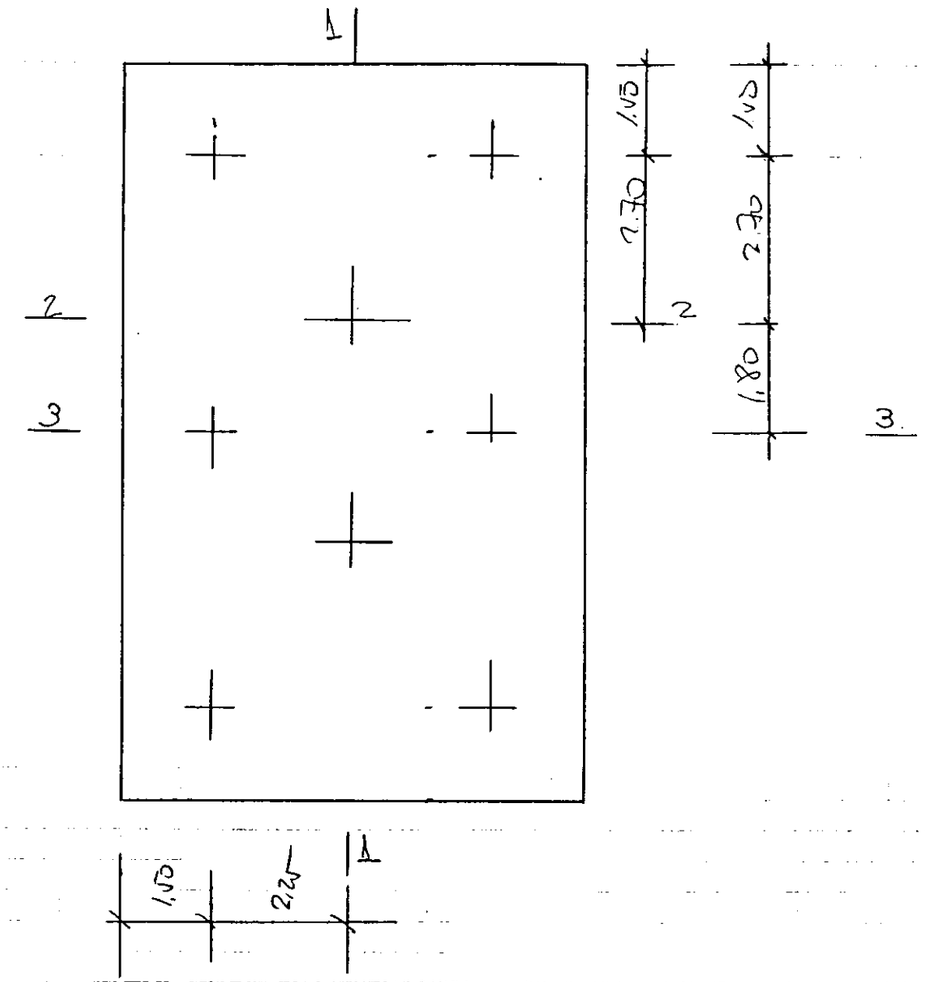
CALCULO DE LAS PILAS

CALCULO DE LOS PILAS COMO

ESFUERZOS DE PROYECTO BASE

Y ENCEPADO DE 6 PILOTES Φ 1.50m.

DIMENSIONES DEL ENCEPADO



ENCEPADO 4.50 x 12.00 x 2.50

P= 562.50 Tn

PILOTES + ENCEPADO 796.7 Tn

Sección 1.1

$M = 3 \times 596 t \times 2.25 - 1200 \times 2.5 \times 7.5 \times \frac{3.75^2}{2} =$

$= 4027 - 577 = 3500$ mt

$M' = 1.6 \times 3500 = 5600$ mt.

$b = (1.50 + 0.75 + 2.25) \times 2 + 1.50 + 2 \times 2.25 = > 12.00$

$w' = \frac{5600}{12} = 467$ mt/ml

$V_c = \frac{2500}{1.5} \times 2.40 \times 1.00 = 4000$ ton

$V_S = 4000 \left(1 - \sqrt{1 - \frac{2 \times 467}{2.40 \times 4000}}\right) = 500$ t/ml

Sección 2.2

$M = 2 \times 596.7 \times 2.50 - 4.50 \times 7.50 \times 2.50 \times \frac{4.25^2}{2} =$

$= 3222 - 413 = 2809$ mt

$M' = 2809 \times 1.6 = 4494$ mt.

$b = (1.50 + 0.75 + 2.50) \times 2 = 7.50$

$w' = 4494 / 7.50 = 600$ mt/ml

$V_S = 4000 \left(1 - \sqrt{1 - \frac{2 \times 600}{2.40 \times 4000}}\right) = 252$ t/ml

Sección 3.3

$M = 2 \times 596.7 \times 4.50 - 1034 \times 1.80 - 1.50 \times 2.50 \times 2.50 \times \frac{6.00^2}{2} =$

$= 5370 - 1861 - 843 = 2656$

$M' = 2656 \times 1.6 = 4249$ mt

$W' = 4249 / 1.50 = 566$ mt/ml

La viga $V_S = 252$ t/ml

$W = 252 \times 1.15 / 5.1 = 58$ cm²/ml → Ø32/12.5

Armadura superior

$W = 58 \times 0.3 = 19.4$ cm² Ø25/25

Cortante

$V_{ctu} = 0.02 \times \frac{2500}{1.5} \times 4.00 \times \frac{1}{4.2} = 19.7$ t/ml

Se dispone como mínimo Horq. Ø16/30/60

$W_t = 2.07 \frac{1}{0.30} \times \frac{1}{0.60} = 11.22$ cm²/ml

Cortante que absorbe este acero y hormigón

$T_D = 0.9 \times 11.22 \times 2.4 \times 4.2 = 101.8$ ton/m

$T_2 = 5 \sqrt{\frac{250}{1.5}} \times 2.4 \times 1 = 154.9$ ton/m

a Sección 1.1

$Q = 3 \times 596.7 - 12 \times 2.5 \times 2.5 \times 3.75 = 1790 - 281 = 1509$

$\frac{e'}{b} = \frac{188 \times 1.6}{12} = 31 < 101.3 + 154.9$

E Sección 22

$Q = 2 \times 596.7 - 4.50 \times 2.50 \times 2.50 \times 4.20 =$

$= 1193 - 197 - 996\ t < 1509$

E Sección 33

$Q = 2 \times 596.7 - 1.50 \times 2.50 \times 2.50 \times 600 - 1034 =$

$= 1193 - 281 - 1034 = -177 < 1509.$

B Siguen bien 46/30/60

COMPROBACIÓN DE PILOTES

HIPÓTESIS 1

PESO DEL ENCEPADO

$P_E = 4.50 \times 12.00 \times 2.50 \times 2.50 = 562\ ton$

$N = 562 + 2(237 + 433.9 - 32.29 - 149.50 + 260) =$

$= 1717\ ton$

$M_L = 2 \times 29.55 \times (6 + 2.50) = 468\ mt$

$M_T = 2 \times 665 \times (6 + 2.50) = 113\ mt$

PILOTE MÁS CARGADO

$Q = \frac{1717}{6} \pm \frac{468}{3 \times 4.50} \pm \frac{113}{2 \times 9.00} = 286 \pm 35 \pm 6$

$Q_{max} = 327\ ton$

$Q_{min} = 245\ ton$

HIPÓTESIS 2

$N = 562 + 2(237 + 433.9 - 32.29 + 149.50 + 3.47 + 282 + 14.92)$

$= 2291.$

$M_L = 2 \times 29.55 \times (6 + 2.50) = 469\ mt$

$W_T = 2(8.50 + 19.78) \times 8,50 = 480$ mt

PILOTE MÁS CARGADO

$Q = \frac{2291}{6} \pm \frac{468}{3 \times 4.5} \pm \frac{480}{2 \times 9.00} = 382 + 35 \pm 26 =$

$Q_{max} = 443$ ton

$Q_{min} = 321$ ton

HIPOTESIS III

$N = 562 + 2(237 + 433,9 - 32,79 + 149,50 + 8,50 + 282 + 19)$

$= 2330$ t

$W_L = 2 \times 27.55 \times (2.50 + 6.00) = 468$ mt

$W_T = 2 \times (8,50 + 19.78 + 13.30) \times 8.50 = 707$ mt

PILOTE MÁS CARGADO

$Q = \frac{2330}{6} \pm \frac{467}{3 \times 4.5} \pm \frac{707}{2 \times 9} = 388 \pm 35 \pm 39$

$Q_{max} = 462$ t

$Q_{min} = 314$ t

De las hipotesis, el pilote mas cargado es el solera $Q_{max} = 462$ ton < 586 ton

CALCULO DE LOS FUSTES

PARA EL CALCULO DE LOS FUSTES SE CONSIDERAN LAS CARGAS PROCEDENTES DEL CALCULO DE "FLEXION LONGITUDINAL".

AREA DEL FUSTE 1.493 m^2

$R_{eq} = 1.38$ m.

$I = 0.1479\ m^4$

$\lambda = 0,345$ m^{-1}

ALTURA MAXIMA DE FUSTES $L_{max} = 6.86$

PARA PANDEO TRANSVERSAL fijación con empotrado-articulado

$L_p = 0.7\ L_{max} = 0.7 \times 6.86 = 4.80 < 35 \times 0.345 = 12.07$ m

PARA PANDEO LONGITUDINAL se considera también empotrado-articulado pero añadiendo al momento $M = V \times \delta$ siendo δ el desplazamiento de la

pile ante la máxima solicitación longitudinal. Esto es

$F_L = 0.5 \times 55.11 = 27.6$ t

$\delta = \frac{PL^3}{3EI} = \frac{27.6 \times 6.86^3}{3 \times 3.5 \times 10^6 \times 0.1779} = 0.007$ m.

El resorte vertical es excentricidad es

$\mu = 1 \times 0.007$

ACCION DE LAS SOBRECARGAS SOBRE LAS PILAS.

DEL "JUCAPU"

R_{max} (DE SOBRECARGAS) = 62.90 t.

Incluyendo los coeficientes de excentricidad calculados en el "JUCAPU"

$R_{max\ media} = \frac{62.97}{1.19 \times 2} = 26.0$ ton/pile

DEL CALCULO DEL EMPARRILLADO PLANO SE DEDUCE

$K = \frac{R_{max}}{\Sigma R}$

En hipótesis 1 (1 tren en vía exterior)

$K = \frac{398.76 \times 2}{398.76 + 5.04} = 2.46$ $\quad R = \frac{462 \times 2.46}{2 \times 2} = 284$ t

En hipótesis 2 (1 tren en la otra vía)

$K = \frac{2 \times 346.76}{346.76 - 14.65} = 2.11$ $\quad R = \frac{462 \times 2.11}{4} = 243$ t

En hipótesis 3 (2 trenes)

$K = \frac{2 \times 391.49}{391.49 + 25.17} = 1.22$ $\quad R = \frac{462 \times 1.22}{2} = 282$ t

En todas las alternativas

Para 1 tren (V1) $R_{max} = 284$ ton

$R_m = 260 - 284 = -24$

Pac 2 tes (V2) $R_{max} = 243t$

$R_{in} = \frac{AG2}{2} - 243 = -12t$

Pac 2 tes ($V_1 + V_2$) $R_{max} = 282t$

$R_{in} = AG2 - 282 = 180t$

ACCIONS VERTICALS (POR FUSTE)

POR PES PROPI = $0.5 \times 867,79 = 433.9t$

POR PRETENSAT = $-0.5 \times 64,58 = -32.29t$

POR CARGA PERM = $0.5 \times 298.99 = 149.50t$

POR DESCENSO AP = $0.5 \times 6.93 = 3.47t$

POR GRAD. TERMIC = —

POR SOBRECARGA = 284 ton.

TOTAL = 229 ton

ACCIONS LONGITUDINALS

Se suma a la vida $\mu = 0.05 \times CP$

$F_L = 0.05 \times (433,9 - 32.29 + 149.50) = 27,64$ / fuste

ACCIONS TRANSVERSALS

FUERZA CENTRIFUGA

a) PARA TREN ICE 4T $V = 200 km/h$

$F_C = Q \cdot \frac{V^2}{127R}$

$Q = 10 t/ml$

$R = 1250 m$

$F_C = 10 \times \frac{200^2}{127 \times 1250} = 0.43 t/ml/via$

b) Para Tte U.I.C $L = 30.00$ $V = 300 km/h$

$F_C = Q \times f \times \frac{V^2}{127 R} = 8 \times 0.45 \times \frac{300^2}{127 \times 1250} = 0.35 t/ml/via$

Valor a considerar en los ml

$F_C = 0.43 \times \frac{20+76}{2} = 9.89 t/via$ (mi 2 hastil)

Momento respecto a c.d.g.

$\mu = 9.89 (1.8 + 0.7 + 0.761) = 32,25 mt/via$

$\Delta u = \frac{32.25}{3.60} = 8.96 t/via$

ACCIÓN DEL VIENTO

$h = 1.90 + 1.00 = 2.90$

$f_V = 2.90 \times 0.20 = 0.58 t/ml \rightarrow 0.58 \times 23 = 13.3 t/ml$

Referido a c.d.g

$M_V = 13.30 \times (1.80 - 1.108) = 9.20 mt$

$\Delta u = \frac{9.20}{3.60} = 2.60 t/Ante$

b) En SERVICIO

$l_1 = 2.90 + 3.50 = 6.40 m$

$f_V = 6.40 \times 0.20 = 1.28 t/ml \rightarrow 1.28 \times 23 = 29.44 t$

Referido a c.d.g

$\mu = 29.44 \times \left(\frac{6.40}{2} - 1.108\right) = 61,6 mt/via$

$\Delta u = \frac{61.6}{3.60} = 17.10 t$

Con dos tren

$f_V = 2.90 \times 0.20 + 3.50 \times 0.20 \times 1.20 = 0.58 + 0.84 = 1.42 t$

equivale a $1.42 \times 23 = 32.7 t$

$M = 32.7 \times (3.20 - 1.108) = 68.40 mt$

$\Delta u = \frac{68.40}{3.60} = 19.0 t/via$

EFECTO LAZO

PARA 1 tren

$F_L = 10 T/via$

$d = 0.50 + 0.834 = 1.534 m$

$\mu = 10 \times 1.532 = 15.32 mt$

$\Delta u = \frac{15.32}{3.60} = 4.25 t$

DANE 2 Tens

F = 20 t

ΔV = 8.20 ton

HIPOTESIS 1 (PP + VACIO)

CARGAS ACTUANTES (VALORES POR FUSTE)

VERTICALES

PES FUSTE = 29.4 ton

P. LOSA = 436.9 t

PRETENSADO = -32.79 t

C. DE RUM. = 149.10 t

DESC. APOYOS = 3.47

Grad térmico = —

VIENTO LATERAL = 12.8 t.

$N' = 1.35(23.4 + 436.9 - 32.79 + 149.10) + 1.50 \times 2.6 =$

$= 776.4 = 780$ ton

LONGITUDINALES (Noz. teflon) = 21.5 t

TRANSVERSALES viato lateral = $0.5 \times 133 = 66.5$ t.

VALORES PARA DIMENSIONAMIENTO

N' = 780 ton

$F' = \sqrt{(1.50 \times 21.5)^2 + (1.5 \times 66.5)^2} = 42.51$ t

$M' = 42.51 \times 6.86 + 480 \times 0.005 = 295.5$ M.

$Ac = 2687$ t

$$\nu = \frac{480}{2687} = 0.30$$

$$\mu = \frac{295.5}{1.38 \times 2687} = 0.08$$

$\Big\} \omega = 0.04$

HIPOTESIS II PUENTE CARGADO con 2 trenes

CARGAS ACTUANTES.

VERTICALES PESO FUSTE = 237 t.

P. LOSA = 433.9 t

DIFERENCIADO = -32.29 t

C PERMAN = 149.50

DISC DOLOR = 3.47

Grad térmico = ——

Sobrecarga = 282 ton.

Fza centrífuga = 17.97 t

$\rightarrow$ $N' = 1.35(237 + 4339 - 32.29 + 149.50) + 1.5(3 \times 7 + 282 + 17.97) =$

$= 826 + 455 = 1281$ ton

LONGITUDINAL DOS TRENES 27.77 ton

$F'_L = 27.77 \times 1.50 = 41$ ton

TRANSVERSAL EFECTO LAZO + FZA CENTRIFUGA

$F'_T = (8.50 + 19.78) \times 1.5 = 42.42$ ton

VALORES PARA DIMENSIONAMIENTO

$N' = 1281$ ton.

$F' = \sqrt{41^2 + 42.42^2} = 59$ ton

$M' = 59 \times 6.86 + 1281 \times 0.005 = 405 + 6 = 411$ M

$Ac = 2687$ t

$$\nu = \frac{1281}{2687} = 0.48$$

$$\mu = \frac{411}{1.38 \times 2687} = 0.11$$

$\Big\} \omega = 0.12$

HIPOTESIS III (PTE con 2 trenes + viento)

VERTICALES PESO FUSTE = 237 t

P LOSA = 433.9 t.

Diferencial = -32.29 t

C PERM = 149.50 t

Desc. Adotos = 3.47 t

Grad térmico = ——

Sobrecarga = 2.82 t

Fz centrífuga = 8,96 t.

Vento = 19.0 t.

$N' = 1.35\left(23.7 + 433.9 - 32.29 + 149.5\right) + 1.5\left(8.50 + 2.82\right) +$

$+ 1.5 \times 0.6\left(19.0\right) = 716 + 435 + 17 = 1228\ t$

Longitudinais Dois freios = 24.55 t.

$F'_L = 24.55 \times 1.5 = 41.0\ t$

Transversais E. Lazo + Fcent + 0,6 Vento

$F'_T = (8.50 + 19.78) \times 1.50 + 1.50 \times 0.6 \times 13.30 =$

$= 42.42 + 12 = 54.42$ ton.

Valores para dimensionamento

$N' = 1228\ t.$

$F' = \sqrt{41^2 + 54.42^2} = 68.1\ t$

$\mu' = 68.1 \times 6.86 + 1228 \times 0.005 = 473\ \mu t$

$Dc = 2687\ t$

$\gamma = \frac{1274}{2687} = 0.46$

$\mu = \frac{443}{1.38 \times 2687} = 0.13$

$\left.\begin{matrix}\\\\\end{matrix}\right\} \omega = 0.16$

Hipótese IV : Igual que Hc II mas con

1 solo tren

$N' = 1.35\left(23.7 + 433.9 - 32.79 + 149.50\right) + 1.5\left(8.96 + 4.25 + 3.47 + 2.84\right) = 716 + 406 = 1182$ ton

$F'_L = 24.55 \times 1.50 = 41\ t$

$F'_T = \left(4.25 + 9.89\right) \times 1.5 = 21.21$

Valores para dimensionamiento

$N' = 1182$ ton

$F' = \sqrt{41^2 + 21.21^2} = 46\ t$

$\mu' = 46 \times 6.86 + 1182 \times 0.005 = 315 + 6 = 321\ \mu t$

$Dc = 2687\ t$

$\gamma = \frac{1182}{2687} = 0.44$

$\mu = \frac{321}{1.38 \times 2687} = 0.09$

$\left.\begin{matrix}\\\\\end{matrix}\right\} 0.04$

HIPOTESIS I Igual que la III en columnas.

$N = 1.35(237 + 4239 - 32.29 + 149.5) + 1.5(4.25 + 2.84)$

$+ 1.5 \times 0.6(11.16) = 776 + 432 + 15 = 1223\,t.$

$F'_L = 24.55 \times 1.5 = 41.0$ ton

$F'_T = (4.25 + 9.89) \times 1.50 + 1.50 \times 0.6 \times 14.12 = 34.46$ t

Valores para dimensionamiento

$N' = 1273$ t

$F' = \sqrt{41.2 + 34.46^2} = 53.6$ ton

$M' = 53.6 \times 6.86 + 1273 \times 0.005 \cdot 368 + 6 = 374$ m·t

$A_c = 2687$ t

$\gamma = \frac{1273}{2687} = 0.45$

$\mu = \frac{374}{1.33 \times 2687} = 0.10$ $\Big\}$ $\omega = 0.07$

Se dispone como armadura longitudinal

$\omega = 0.16 \times 2687 \times 1.15 / 5 = 96\,cm^2 \rightarrow 22\phi 25$

Es decir la mitad dispuesta en cada una de las líneas límite del diagrama.

```
*************************************************
*                                               *
*           S T A A D - III                     *
*           Revision 17.0a                      *
*           Proprietary Program of              *
*           RESEARCH ENGINEERS, Inc.            *
*           Date=    JUL 19, 1999               *
*           Time=    10:22:45                   *
*                                               *
*************************************************
```

```
 1. STAAD FLOOR LAV MADRID-ZARAGOZA. LOSA VANOS 20+26+20
 2. *REACCIONES VERTICALES SOBRE LAS PILAS
 3. UNIT METER MTON
 4. JOINT COORDINATES
 5. 101    0.000   0.000  -3.750   110  18.000   0.000  -3.750
 6. 111   20.000   0.000  -3.750   120  43.400   0.000  -3.750
 7. 121   46.000   0.000  -3.750   131  66.000   0.000  -3.750
 8. 201    0.000   0.000  -1.050   210  18.000   0.000  -1.050
 9. 211   20.000   0.000  -1.050   220  43.400   0.000  -1.050
10. 221   46.000   0.000  -1.050   231  66.000   0.000  -1.050
11. 301    0.000   0.000   1.050   310  18.000   0.000   1.050
12. 311   20.000   0.000   1.050   320  43.400   0.000   1.050
13. 321   46.000   0.000   1.050   331  66.000   0.000   1.050
14. 401    0.000   0.000   3.750   410  18.000   0.000   3.750
15. 411   20.000   0.000   3.750   420  43.400   0.000   3.750
16. 421   46.000   0.000   3.750   431  66.000   0.000   3.750
17. 10001  0.000   0.000  -2.150
18. 10002 20.000   0.000  -1.800
19. 10003 46.000   0.000  -1.800
20. 10004 66.000   0.000  -2.150
21. 10011  0.000   0.000   2.150
22. 10012 20.000   0.000   1.800
23. 10013 46.000   0.000   1.800
24. 10014 66.000   0.000   2.150
25. MEMBER INCIDENCES
26.    101  101  102
27.    R    29   1    1
28.    RA   3    100  100
29.    1101 101  201
30.    R    30   1    1
31.    1201 201  301
32.    R    30   1    1
33.    1301 301  401
34.    R    30   1    1
35. 10001  101   10001
36. 10002  10001 201
37. 10011  111   10002
38. 10012  10002 211
39. 10021  121   10003
40. 10022  10003 221
41. 10031  131   10004
42. 10032  10004 231
43. 10101  301   10011
44. 10102  10011 401
45. 10111  311   10012
46. 10112  10012 411
47. 10121  321   10013
```

```
*REACCIONES VERTICALES SOBRE LAS PILAS
48. 10122  10013 421
49. 10131  131   10014
50. 10132  10014 431
51. DELETE MEMBER 1101 1111 1121 1131 1301 1311 1321 1331
52. MEMBER PROPERTY
53. 101  TO  130  PR  AX  3.7040  IX  0.1829  IZ  1.0080
54. 201  TO  230  PR  AX  2.8500  IX  0.1829  IZ  1.1340
55. 301  TO  330  PR  AX  2.8500  IX  0.1829  IZ  1.1340
56. 401  TO  430  PR  AX  3.7040  IX  0.1829  IZ  1.0080
57. 1102 TO 1110  PR  AX  1.4000  IX  0.0340  IZ  0.0143
58. 1112 TO 1120  PR  AX  1.4000  IX  0.0340  IZ  0.0143
59. 1122 TO 1130  PR  AX  1.4000  IX  0.0340  IZ  0.0143
60. 1201 TO 1231  PR  AX  1.4000  IX  0.0340  IZ  0.0143
61. 1302 TO 1310  PR  AX  1.4000  IX  0.0340  IZ  0.0143
62. 1312 TO 1320  PR  AX  1.4000  IX  0.0340  IZ  0.0143
63. 1322 TO 1330  PR  AX  1.4000  IX  0.0340  IZ  0.0143
64. 10001   10002 PR  AX  1.4000  IX  0.0340  IZ  0.0143
65. 10011   10012 PR  AX  1.4000  IX  0.0340  IZ  0.0143
66. 10021   10022 PR  AX  1.4000  IX  0.0340  IZ  0.0143
67. 10031   10032 PR  AX  1.4000  IX  0.0340  IZ  0.0143
68. 10101   10102 PR  AX  1.4000  IX  0.0340  IZ  0.0143
69. 10111   10112 PR  AX  1.4000  IX  0.0340  IZ  0.0143
70. 10121   10122 PR  AX  1.4000  IX  0.0340  IZ  0.0143
71. 10131   10132 PR  AX  1.4000  IX  0.0340  IZ  0.0143
72. CONSTANTS
73. E   3250000.  ALL
74. DEN  7.85      ALL
75. POI  0.15      ALL
76. SUPPORTS
77. 10001 TO 10004    PINNED
78. 10011 TO 10014    PINNED
79. LOADING 1 UN TREN A TODO LO LARGO CON RIPADO DE 30 CM (VIA 1)
80. MEMBER LOAD
81. *TREN SOBRE VIA 1
82. *SOBRECARGA DE 0.40 EN ACERA CORRESPONDIENTE
83. 101 TO 130  UNI GY  -6.775
84. 201 TO 230  UNI GY  -5.225
85. 101 TO 130  UNI GY  -0.600
86. 101 TO 130  UMOM GX -1.500
87. LOADING 2 UN TREN A TODO LO LARGO CON RIPADO DE 30 CM (VIA 2)
88. MEMBER LOAD
89. *TREN SOBRE VIA 2
90. *SOBRECARGA DE 0.40 EN ACERA CORRESPONDIENTE
91. 301 TO 330  UNI GY  -7.840
92. 401 TO 430  UNI GY  -4.160
93. 401 TO 430  UNI GY  -0.600
94. 401 TO 430  UMOM GX -1.500
95. LOADING COMBINATION 3
96. 1  1.00  2  1.00
97. PERFORM ANALISIS
```


*REACCIONES VERTICALES SOBRE LAS PILAS

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 132/ 221/ 8
ORIGINAL/FINAL BAND-WIDTH = 124/ 6
TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 388
SIZE OF STIFFNESS MATRIX = 8148 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 12.48 MEGA-BYTES

```
++ PROCESSING ELEMENT STIFFNESS MATRIX.          10:22:49
++ PROCESSING GLOBAL STIFFNESS MATRIX.           10:22:49
++ PROCESSING TRIANGULAR FACTORIZATION.          10:22:49
++ CALCULATING JOINT DISPLACEMENTS.              10:22:49
++ CALCULATING MEMBER  FORCES.                   10:22:49

  98. LOAD LIST ALL
  99. PRINT REACC ALL
```

JPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = FLOOR

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
10001	1	0.00	113.74	0.00	0.00	0.00	0.00
	2	0.00	-0.72	0.00	0.00	0.00	0.00
	3	0.00	113.03	0.00	0.00	0.00	0.00
10002	1	0.00	398.76	0.00	0.00	0.00	0.00
	2	0.00	-7.27	0.00	0.00	0.00	0.00
	3	0.00	391.49	0.00	0.00	0.00	0.00
10003	1	0.00	398.87	0.00	0.00	0.00	0.00
	2	0.00	-17.65	0.00	0.00	0.00	0.00
	3	0.00	381.22	0.00	0.00	0.00	0.00
10004	1	0.00	113.47	0.00	0.00	0.00	0.00
	2	0.00	7.28	0.00	0.00	0.00	0.00
	3	0.00	120.75	0.00	0.00	0.00	0.00
10011	1	0.00	-21.02	0.00	0.00	0.00	0.00
	2	0.00	93.92	0.00	0.00	0.00	0.00
	3	0.00	72.91	0.00	0.00	0.00	0.00
10012	1	0.00	-75.07	0.00	0.00	0.00	0.00
	2	0.00	327.24	0.00	0.00	0.00	0.00
	3	0.00	252.17	0.00	0.00	0.00	0.00
10013	1	0.00	-77.21	0.00	0.00	0.00	0.00
	2	0.00	346.26	0.00	0.00	0.00	0.00
	3	0.00	269.06	0.00	0.00	0.00	0.00
10014	1	0.00	-19.95	0.00	0.00	0.00	0.00
	2	0.00	82.52	0.00	0.00	0.00	0.00
	3	0.00	62.58	0.00	0.00	0.00	0.00

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

100. PLOT BEND FILE
101. PLOT DISP FILE
102. FINISH

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

**** DATE= JUL 19,1999 TIME= 10:23: 1 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

CALCULO DE LOS ESTRIBOS

ESTRIBO 1 (ANCLADO)

250.0,5100.0,0.04,1
1.80,30.0,0.00,3.00,0.00,0.00,1
VIADUCTO 5. ESTRIBO 1
364.37,310.78,495.00,40.00,101.39,0.00,0.00
3.40,5.20,2.50,7.90,1.00,2.00,0.40,14.00,0.0,2.50,9.50,0.0,3
250.0,5100.0,0.04,1
1.80,30.0,0.00,3.00,0.00,0.00,1
VIADUCTO 5. ESTRIBO 1
364.37,310.78,495.00,40.00,101.39,0.00,0.00
3.40,5.20,2.50,7.90,1.00,2.00,0.40,14.00,0.0,2.50,9.50,0.0,3

MECANISMO DE AUCLAVE

N = 495 ton

Se desea 3x12806 ≅ 3x12x16.5 = 594 ton.

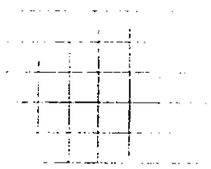
Hay

N = 495 + 594 = 1089

Se dejan colocados 181 ton

y diseño 300x200x96 (C9)





CALCULO DE ESTRIBOS. VERSION 09-01-1996

PROGRAMA PROPIEDAD DE INTECSA

VIADUCTO 5. ESTRIBO 1

CARACTERISTICAS DEL RELLENO

PESO ESPECIFICO (TN/M3)	= 1.80
ANGULO DE ROZAMIENTO FI	= 30.00
ANGULO ROZAMIENTO TERRENO-MURO	= .00
SOBRECARGA (TN/M2)	= 3.00
COEFICIENTE DE EMPUJE ACTIVO	= .333

CARACTERISTICAS DE LOS MATERIALES

RESISTENCIA CARACTERISTICA DEL HORMIGON	= 250. KG/CM2
LIMITE ELASTICO DEL ACERO	= 5100. KG/CM2
RECUBRIMIENTO DE LAS ARMADURAS	= .040 M

CARGAS SOBRE EL ESTRIBO

CARGA VERTICAL DE TABLERO PESO PROPIO Y CARGA PERMANENTE	364.4 TN
CARGA VERTICAL DE SOBRECARGAS	310.8 TN
FUERZA LONGITUDINAL DE FRENADO RETRACCION Y TEMPERATURA	495.0 TN
FUERZA TRANSVERSAL DE VIENTO	40.0 TN
MOMENTO TRANSVERSAL DE SOBRECARGAS	101.4 MT
FUERZA LONGITUDINAL DE SISMO	.0 TN
FUERZA TRANSVERSAL DE SISMO	.0 TN

GEOMETRIA DEL ESTRIBO

ANCHURA DEL ESTRIBO	B	= 14.00
ESVIAJE (GRADOS SEXAGESIMALES)	BETA	= .00

ALZADO DEL ESTRIBO

ESPESOR DEL FALDON	A3	= 2.50
ALTURA DEL FALDON	A6	= 2.00
DISTANCIA DE APOYO A BORDE ESTRIBO	A5	= 1.00
ESPESOR DEL ESTRIBO	A2	= 5.20
ESPESOR DE LAS ALETAS	A7	= .40
ALTURA TOTAL DEL ESTRIBO	H + C	= 12.00
ALTURA DE TIERRAS	H	= 9.50

ZAPATA

VUELO DELANTERO	A1	= 3.40
VUELO TRASERO	A4	= 7.90
LONGITUD TOTAL	L	= 16.50
CANTO	C	= 2.50
RESGUARDO SOBRE ZAPATA		= 0.30
TENSION MEDIA PEDIDA SOBRE TERRENO		= LIBRE

ESTRIBO CON RELLENO DE TIERRAS Y SIN TABLERO
==========

ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	=	5206.8 TN.
MOMENTO LONGITUDINAL	=	-2903.2 M.T.
EMPUJE LONGITUDINAL	=	772.8 TN.

ESTRIBO CON PUENTE EN SERVICIO
==========

ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	=	5882.0 TN.
MOMENTO LONGITUDINAL	=	4646.1 M,T.
EMPUJE LONGITUDINAL	=	1267.8 TN.
MOMENTO TRANSVERSAL	=	501.4 M.T.

ANNEAUX DE MUR

h=9.00

$P_1 = \frac{2.0}{3} \times 9 = 6.0$ t/ml

$P_2 = \frac{3.00}{3} = 1.0$ t/ml

Q = 495 t

$\mu = \frac{1}{2} 6.00 \times \frac{9^2}{3} + 1.00 \times \frac{9^2}{2} + 495 \times 8 =$

$= 81.00 + 40.50 + 3960.0 = 4082$ mt

equivalente à

$\mu = \frac{4082}{14} = 292$ mt/ml $\mu' = 292 \times 1.6 = 467$ mt

carto = 5,20

$A_c = \frac{2500}{1.5} \times 5.10 \times 1.00 = 8500$

$A_S = 8500 \left(1 - \sqrt{1 - \frac{2 \times 467}{5.10 \times 8500}}\right) = 92.0$ t

$\omega = 92 \times 1.15 / 5_1 = 20.7$ cm²

$\omega_{min} = 0.9 \times 10^{-3} \times 510 \times 100 = 45.9$ cm²

le ferraillage $\phi 32/15$ en aval cours.

Partie supérieure

appui 2.50

$P_1 = \frac{2.0}{3} \times 2 = 1.33$ t/ml

$P_2 = \frac{3.00}{3} = 1.0$ t/ml

Q = 495 t

$\mu = \frac{1}{2} 1.33 \times \frac{2^2}{2} + 1.00 \times \frac{3.0^2}{2} + 495 \times 1.00 =$

$= 1.33 + 4.50 + 495 = 501$ mt

$\mu' = 501 \times 1.6 / 14 = 57$ mt/ml

$A_c = \frac{2500}{1.5} \times 2.40 \times 100 = 4000$

$A_S = 4000 \left(1 - \sqrt{1 - \frac{2 \times 57}{2.4 \times 4000}}\right) = 23.8$ t

$\omega = 23.8 \times 1.15 / 5_1 = 5.4$ cm²/ml

$\omega_m = 0.9 \times 10^{-3} \times 240 \times 100 = 21.6$ cm² $\phi 25/15$

ARMATURE DEL RICOPRIO (E1)

Dito µ N CARICO

$Q = \frac{2281}{5} = 456$ t.

$V = 3.40 - 1.50 + 0.15 \times 5.20 = 2.68$

$\mu = 456 \times 5 \times 268 / 2100 = 291$ µt/ml

$\mu' = 291 \times 1.6 = 465$ µt

$A_c = \frac{2500}{1.5} \times 290 \times 1.00 = 4833$

$A_S = 4833 \left(1 - \sqrt{1 - \frac{2 \times 465}{290 \times 4833}}\right) = 16.2$ t

$\omega = 163 \times 1.15 / 5.1 = 36.8$ cm²/ml → Ø32/20

CONTINUE

$Q = 456 \times 5 / 21.00 = 108$ t/ml

$Q' = 108 \times 1.6 = 174$ t/ml

$T_b = 5 \sqrt{\frac{20}{1.5}} \times 2.90 \times 1.00 = 187$

$\omega_{min} = 0.02 \times \frac{2500}{1.5} \times \frac{1}{4.2} = 7.9$ cm²/ml

Si dessus horiz. Ø16/40/40.

ARMATURE SUPERIOR

$V = 7.90 + 0.15 \times 5.20 = 8.68$

$\mu = \frac{38.12 \times (8.68 - 1.50)}{21.00} + (2.5 \times 3.00 + 9.00 \times 1.80 + 3) \times \frac{8.68^2}{2}$

$= 13 + 1006 = 1019$ mt/ml

$\mu' = 1019 \times 1.6 = 1630$ mt

$A_c = \frac{2500}{1.5} \times 2.9 \times 1.0 = 4833$

$A_S = 4833 \left(1 - \sqrt{1 - \frac{2 \times 1630}{2.90 \times 4833}}\right) = 600$ t.

$\omega = 600 \times 1.15 / 5.1 = 135$ cm²

Si dessus 2 cadre Ø 32/125

CONTINUE

$Q = \frac{38.12}{21} + 26.7 \times 8.62 = 232$ t.

$Q' = 232 \times 1.6 = 371$ t.

$T_b = 5 \sqrt{\frac{250}{1.5}} \times 2.9 \times 1.0 = 187$ t.

$\omega_1 = \frac{371 - 187}{0.9 \times 4.2 \times 2.9} = 16.8$ cm²/ml → HA16/30/3

ARMATURE DE REPARTO

$\omega_R = 135/4 = 33.75$ → Ø25/15

VIADUCTO 5 ESTRIBO 1

RELLENO TIERRAS S/T

$F_x = +772$

$F_y = -5206$

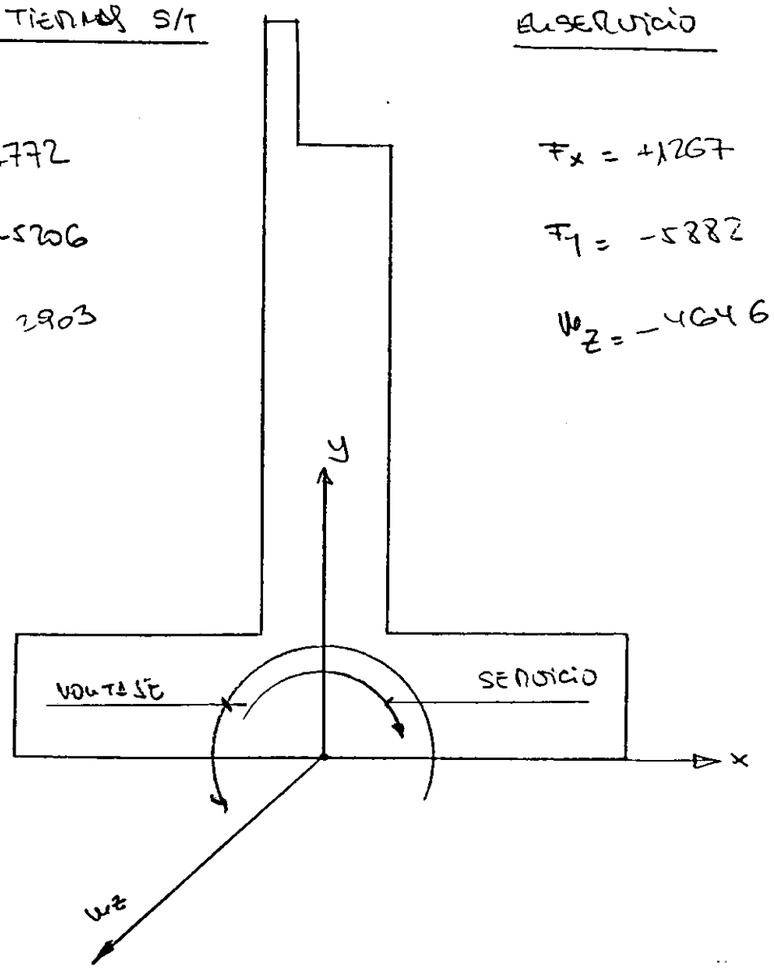
$\mu_z = 2903$

SERVICIO

$F_x = +1267$

$F_y = -5882$

$M_z = -4646$




```
*************************************************
*                                               *
*           S T A A D - III                     *
*           Revision 17.0a                      *
*           Proprietary Program of              *
*           RESEARCH ENGINEERS, Inc.            *
*           Date=    JUL 23, 1999               *
*           Time=    10: 0:34                   *
*                                               *
*************************************************
```

```
 1. STAAD PLANE VIADUCTO 5 ESTRIBO 1
 2. *EFECTOS CARGAS GRAVITATORIAS
 3. UNIT MTO MET
 4. JOINT COORDINATES
 5.   1  -6.750   -30.750
 6.   2  -2.250   -30.750
 7.   3   2.250   -30.750
 8.   4   6.750   -30.750
 9.  11  -6.750   -26.500
10.  12  -2.250   -26.500
11.  13   2.250   -26.500
12.  14   6.750   -26.500
13.  21  -6.750   -22.250
14.  22  -2.250   -22.250
15.  23   2.250   -22.250
16.  24   6.750   -22.250
17.  31  -6.750   -18.000
18.  32  -2.250   -18.000
19.  33   2.250   -18.000
20.  34   6.750   -18.000
21.  41  -6.750   -14.000
22.  42  -2.250   -14.000
23.  43   2.250   -14.000
24.  44   6.750   -14.000
25.  51  -6.750   -10.500
26.  52  -2.250   -10.500
27.  53   2.250   -10.500
28.  54   6.750   -10.500
29.  61  -6.750    -7.000
30.  62  -2.250    -7.000
31.  63   2.250    -7.000
32.  64   6.750    -7.000
33.  71  -6.750    -3.500
34.  72  -2.250    -3.500
35.  73   2.250    -3.500
36.  74   6.750    -3.500
37.  81  -6.750     0.000
38.  82  -2.250     0.000
39.  83   2.250     0.000
40.  84   6.750     0.000
41. MEMBER INCIDENCES
42.   1    1    11
43.   R    7    10   10
44.   2    2    12
45.   R    7    10   10
46.   3    3    13
47.   R    7    10   10
```

```
*EFECTOS CARGAS GRAVITATORIAS
48.    4     4     14
49.    R     7     10    10
50.    81    81    82
 1.    82    82    83
52.    83    83    84
53. MEMBER PROPERTY
54. *PILOTES  5 * 4 PILOTES
55. 1 11 21 31 41 51 61 71 PR AX  8.827 IZ  1.24200
56. 2 12 22 32 42 52 62 72 PR AX  8.827 IZ  1.24200
57. 3 13 23 33 43 53 63 73 PR AX  8.827 IZ  1.24200
58. 4 14 24 34 44 54 64 74 PR AX  8.827 IZ  1.24200
59. *ENCEPADO (1.5+4*4.5+1.5)*2.5
60. 81 82 83                    PR AX 52.500 IZ  27.3433
61. CONSTANT
62. E  3250000.   ALL
63. POI 0.15
64. DEN 2.50
65. SUPPORT
66. 1  2  3  4   PINNED
67. 11 12 13 14  FIXED BUT FY MZ KFX  306000
68. 21 22 23 24  FIXED BUT FY MZ KFX  306000
69. 31 32 33 34  FIXED BUT FY MZ KFX  155250
 0. 41 42 43 44  FIXED BUT FY MZ KFX   19250
 1. 51 52 53 54  FIXED BUT FY MZ KFX   19250
72. 61 62 63 64  FIXED BUT FY MZ KFX    7180
73. 71 72 73 74  FIXED BUT FY MZ KFX    5950
74. LOADING 1 RELLENO DE TIERRAS Y SIN TABLERO
75. MEMBER LOAD
76. *PROCEDENTE DE CALCULO DE ESTRIBO
77. 82       CON  GX   772
78. 82       CON  GY -5206
79. 82       CMOM GZ  2903
80. MEMBER LOAD
81. *EMPUJE DE TIERRAS SOBRE PILOTES
82. 71 61    UNI GX  123.50
83. 72 62    UNI GX   61.75
84. LOADING 2 PUENTE EN SERVICIO
85. MEMBER LOAD
86. *PROCEDENTE DE CALCULO DE ESTRIBO
87. 82       CON  GX  1267
88. 82       CON  GY -5882
89. 82       CMOM GZ -4664
 ). MEMBER LOAD
91. *EMPUJE DE TIERRAS SOBRE PILOTES
92. 71 61    UNI GX  123.50
93. 72 62    UNI GX   61.75
94. LOADING COMBINATION 3  ESFUERZOS NAYORADOS
95. 1 1.50
96. LOADING COMBINATION 4  ESFUERZOS MAYORADOS
97. 2 1.50
98. PERFORM ANALISIS
```


P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 36/ 35/ 32
ORIGINAL/FINAL BAND-WIDTH = 4/ 3
TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 100
SIZE OF STIFFNESS MATRIX = 1200 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 12.08 MEGA-BYTES

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++ PROCESSING ELEMENT STIFFNESS MATRIX.            10: 0:37
++ PROCESSING GLOBAL STIFFNESS MATRIX.             10: 0:37
++ PROCESSING TRIANGULAR FACTORIZATION.            10: 0:37
++ CALCULATING JOINT DISPLACEMENTS.                10: 0:37
++ CALCULATING MEMBER  FORCES.                     10: 0:37

 99. LOAD LIST  1 2 3 4
100. PRINT MEMBER FORCES LIST  71 72 73 74
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MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
71	1	71	517.65	142.70	0.00	0.00	0.00	-1174.55
		81	-517.65	289.55	0.00	0.00	0.00	917.55
	2	71	-38.10	265.19	0.00	0.00	0.00	-1434.12
		81	38.10	167.06	0.00	0.00	0.00	1605.83
	3	71	776.48	214.05	0.00	0.00	0.00	-1761.82
		81	-776.48	434.33	0.00	0.00	0.00	1376.33
	4	71	-57.15	397.78	0.00	0.00	0.00	-2151.18
		81	57.15	250.59	0.00	0.00	0.00	2408.75
72	1	72	1617.99	305.54	0.00	0.00	0.00	-1143.05
		82	-1617.99	-89.41	0.00	0.00	0.00	1834.21
	2	72	1538.33	425.15	0.00	0.00	0.00	-1385.19
		82	-1538.33	-209.03	0.00	0.00	0.00	2495.00
	3	72	2426.98	458.31	0.00	0.00	0.00	-1714.57
		82	-2426.98	-134.12	0.00	0.00	0.00	2751.31
	4	72	2307.49	637.73	0.00	0.00	0.00	-2077.78
		82	-2307.49	-313.54	0.00	0.00	0.00	3742.50
73	1	73	1756.00	486.09	0.00	0.00	0.00	-1218.22
		83	-1756.00	-486.09	0.00	0.00	0.00	2919.54
	2	73	2292.64	609.97	0.00	0.00	0.00	-1486.05
		83	-2292.64	-609.97	0.00	0.00	0.00	3620.97
	3	73	2634.00	729.14	0.00	0.00	0.00	-1827.33
		83	-2634.00	-729.14	0.00	0.00	0.00	4379.31
	4	73	3438.95	914.96	0.00	0.00	0.00	-2229.08
		83	-3438.95	-914.96	0.00	0.00	0.00	5431.45
74	1	74	1314.36	486.06	0.00	0.00	0.00	-1218.86
		84	-1314.36	-486.06	0.00	0.00	0.00	2920.05
	2	74	2089.14	615.06	0.00	0.00	0.00	-1517.58
		84	-2089.14	-615.06	0.00	0.00	0.00	3670.28
	3	74	1971.55	729.09	0.00	0.00	0.00	-1828.29
		84	-1971.55	-729.09	0.00	0.00	0.00	4380.08
	4	74	3133.71	922.59	0.00	0.00	0.00	-2276.37
		84	-3133.71	-922.59	0.00	0.00	0.00	5505.42

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

101. PRINT MEMBER FORCES LIST 61 62 63 64

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
61	1	61	517.65	427.01	0.00	0.00	0.00	-436.44
		71	-517.65	5.24	0.00	0.00	0.00	1174.55
	2	61	-38.10	510.71	0.00	0.00	0.00	-403.09
		71	38.10	-78.46	0.00	0.00	0.00	1434.13
	3	61	776.48	640.52	0.00	0.00	0.00	-654.66
		71	-776.48	7.85	0.00	0.00	0.00	1761.83
	4	61	-57.15	766.06	0.00	0.00	0.00	-604.64
		71	57.15	-117.69	0.00	0.00	0.00	2151.19
62	1	62	1617.98	376.43	0.00	0.00	0.00	-203.75
		72	-1617.98	-160.31	0.00	0.00	0.00	1143.05
	2	62	1538.33	457.61	0.00	0.00	0.00	-161.78
		72	-1538.33	-241.48	0.00	0.00	0.00	1385.19
	3	62	2426.98	564.65	0.00	0.00	0.00	-305.62
		72	-2426.98	-240.46	0.00	0.00	0.00	1714.57
	4	62	2307.49	686.41	0.00	0.00	0.00	-242.67
		72	-2307.49	-362.22	0.00	0.00	0.00	2077.78
63	1	63	1756.00	341.33	0.00	0.00	0.00	-23.58
		73	-1756.00	-341.33	0.00	0.00	0.00	1218.24
	2	63	2292.64	426.24	0.00	0.00	0.00	5.79
		73	-2292.64	-426.24	0.00	0.00	0.00	1486.05
	3	63	2634.00	512.00	0.00	0.00	0.00	-35.37
		73	-2634.00	-512.00	0.00	0.00	0.00	1827.35
	4	63	3438.95	639.36	0.00	0.00	0.00	8.69
		73	-3438.95	-639.36	0.00	0.00	0.00	2229.08
64	1	64	1314.36	341.34	0.00	0.00	0.00	-24.16
		74	-1314.36	-341.34	0.00	0.00	0.00	1218.85
	2	64	2089.14	430.73	0.00	0.00	0.00	-10.00
		74	-2089.14	-430.73	0.00	0.00	0.00	1517.57
	3	64	1971.54	512.01	0.00	0.00	0.00	-36.23
		74	-1971.54	-512.01	0.00	0.00	0.00	1828.28
	4	64	3133.71	646.10	0.00	0.00	0.00	-15.00
		74	-3133.71	-646.10	0.00	0.00	0.00	2276.35

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

102. PRINT MEMBER FORCES LIST 51 52 53 54

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
51	1	51	517.65	293.19	0.00	0.00	0.00	589.73
		61	-517.65	-293.19	0.00	0.00	0.00	436.44
	2	51	-38.10	344.92	0.00	0.00	0.00	804.14
		61	38.10	-344.92	0.00	0.00	0.00	403.09
	3	51	776.48	439.79	0.00	0.00	0.00	884.60
		61	-776.48	-439.79	0.00	0.00	0.00	654.67
	4	51	-57.15	517.39	0.00	0.00	0.00	1206.21
		61	57.15	-517.39	0.00	0.00	0.00	604.64
52	1	52	1617.98	249.73	0.00	0.00	0.00	670.31
		62	-1617.98	-249.73	0.00	0.00	0.00	203.76
	2	52	1538.33	299.44	0.00	0.00	0.00	886.28
		62	-1538.33	-299.44	0.00	0.00	0.00	161.78
	3	52	2426.97	374.60	0.00	0.00	0.00	1005.47
		62	-2426.97	-374.60	0.00	0.00	0.00	305.63
	4	52	2307.49	449.17	0.00	0.00	0.00	1329.41
		62	-2307.49	-449.17	0.00	0.00	0.00	242.67
53	1	53	1756.00	218.67	0.00	0.00	0.00	741.77
		63	-1756.00	-218.67	0.00	0.00	0.00	23.58
	2	53	2292.64	271.37	0.00	0.00	0.00	955.59
		63	-2292.64	-271.37	0.00	0.00	0.00	-5.79
	3	53	2634.00	328.01	0.00	0.00	0.00	1112.66
		63	-2634.00	-328.01	0.00	0.00	0.00	35.37
	4	53	3438.96	407.06	0.00	0.00	0.00	1433.39
		63	-3438.96	-407.06	0.00	0.00	0.00	-8.69
54	1	54	1314.36	218.71	0.00	0.00	0.00	741.33
		64	-1314.36	-218.71	0.00	0.00	0.00	24.16
	2	54	2089.14	274.99	0.00	0.00	0.00	952.47
		64	-2089.14	-274.99	0.00	0.00	0.00	10.01
	3	54	1971.54	328.07	0.00	0.00	0.00	1112.00
		64	-1971.54	-328.07	0.00	0.00	0.00	36.24
	4	54	3133.71	412.49	0.00	0.00	0.00	1428.71
		64	-3133.71	-412.49	0.00	0.00	0.00	15.01

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

103. PRINT MEMBER FORCES LIST 41 42 43 44

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
41	1	41	517.65	80.62	0.00	0.00	0.00	871.89
		51	-517.65	-80.62	0.00	0.00	0.00	-589.73
	2	41	-38.10	85.60	0.00	0.00	0.00	1103.75
		51	38.10	-85.60	0.00	0.00	0.00	-804.14
	3	41	776.48	120.92	0.00	0.00	0.00	1307.83
		51	-776.48	-120.92	0.00	0.00	0.00	-884.60
	4	41	-57.15	128.40	0.00	0.00	0.00	1655.62
		51	57.15	-128.40	0.00	0.00	0.00	-1206.21
42	1	42	1617.98	54.60	0.00	0.00	0.00	861.42
		52	-1617.98	-54.60	0.00	0.00	0.00	-670.32
	2	42	1538.33	58.56	0.00	0.00	0.00	1091.25
		52	-1538.33	-58.56	0.00	0.00	0.00	-886.27
	3	42	2426.98	81.90	0.00	0.00	0.00	1292.14
		52	-2426.98	-81.90	0.00	0.00	0.00	-1005.47
	4	42	2307.49	87.85	0.00	0.00	0.00	1636.88
		52	-2307.49	-87.85	0.00	0.00	0.00	-1329.41
43	1	43	1756.00	34.85	0.00	0.00	0.00	863.75
		53	-1756.00	-34.85	0.00	0.00	0.00	-741.77
	2	43	2292.64	40.32	0.00	0.00	0.00	1096.69
		53	-2292.64	-40.32	0.00	0.00	0.00	-955.59
	3	43	2634.00	52.28	0.00	0.00	0.00	1295.63
		53	-2634.00	-52.28	0.00	0.00	0.00	-1112.65
	4	43	3438.95	60.47	0.00	0.00	0.00	1645.04
		53	-3438.95	-60.47	0.00	0.00	0.00	-1433.39
44	1	44	1314.36	34.90	0.00	0.00	0.00	863.49
		54	-1314.36	-34.90	0.00	0.00	0.00	-741.33
	2	44	2089.14	42.18	0.00	0.00	0.00	1100.11
		54	-2089.14	-42.18	0.00	0.00	0.00	-952.47
	3	44	1971.54	52.36	0.00	0.00	0.00	1295.24
		54	-1971.54	-52.36	0.00	0.00	0.00	-1111.99
	4	44	3133.71	63.27	0.00	0.00	0.00	1650.17
		54	-3133.71	-63.27	0.00	0.00	0.00	-1428.71

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

104. PRINT MEMBER FORCES LIST 31 32 33 34

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
31	1	31	517.65	-12.96	0.00	0.00	0.00	820.03
		41	-517.65	12.96	0.00	0.00	0.00	-871.89
	2	31	-38.10	-26.71	0.00	0.00	0.00	996.92
		41	38.10	26.71	0.00	0.00	0.00	-1103.75
	3	31	776.48	-19.45	0.00	0.00	0.00	1230.04
		41	-776.48	19.45	0.00	0.00	0.00	-1307.83
	4	31	-57.15	-40.06	0.00	0.00	0.00	1495.38
		41	57.15	40.06	0.00	0.00	0.00	-1655.62
32	1	32	1617.99	-28.48	0.00	0.00	0.00	747.51
		42	-1617.99	28.48	0.00	0.00	0.00	-861.42
	2	32	1538.33	-42.72	0.00	0.00	0.00	920.39
		42	-1538.33	42.72	0.00	0.00	0.00	-1091.25
	3	32	2426.98	-42.72	0.00	0.00	0.00	1121.26
		42	-2426.98	42.72	0.00	0.00	0.00	-1292.14
	4	32	2307.49	-64.07	0.00	0.00	0.00	1380.58
		42	-2307.49	64.07	0.00	0.00	0.00	-1636.87
33	1	33	1756.00	-41.01	0.00	0.00	0.00	699.72
		43	-1756.00	41.01	0.00	0.00	0.00	-863.75
	2	33	2292.63	-54.53	0.00	0.00	0.00	878.58
		43	-2292.63	54.53	0.00	0.00	0.00	-1096.69
	3	33	2634.00	-61.51	0.00	0.00	0.00	1049.58
		43	-2634.00	61.51	0.00	0.00	0.00	-1295.62
	4	33	3438.95	-81.79	0.00	0.00	0.00	1317.87
		43	-3438.95	81.79	0.00	0.00	0.00	-1645.04
34	1	34	1314.36	-40.96	0.00	0.00	0.00	699.67
		44	-1314.36	40.96	0.00	0.00	0.00	-863.49
	2	34	2089.14	-53.61	0.00	0.00	0.00	885.67
		44	-2089.14	53.61	0.00	0.00	0.00	-1100.11
	3	34	1971.55	-61.43	0.00	0.00	0.00	1049.50
		44	-1971.55	61.43	0.00	0.00	0.00	-1295.24
	4	34	3133.71	-80.41	0.00	0.00	0.00	1328.51
		44	-3133.71	80.41	0.00	0.00	0.00	-1650.17

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

105. PRINT MEMBER FORCES LIST 21 22 23 24

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
21	1	21	517.65	-143.27	0.00	0.00	0.00	211.13
		31	-517.65	143.27	0.00	0.00	0.00	-820.03
	2	21	-38.10	-176.37	0.00	0.00	0.00	247.33
		31	38.10	176.37	0.00	0.00	0.00	-996.92
	3	21	776.48	-214.91	0.00	0.00	0.00	316.69
		31	-776.48	214.91	0.00	0.00	0.00	-1230.04
	4	21	-57.15	-264.56	0.00	0.00	0.00	370.99
		31	57.15	264.56	0.00	0.00	0.00	-1495.38
22	1	22	1617.98	-133.95	0.00	0.00	0.00	178.24
		32	-1617.98	133.95	0.00	0.00	0.00	-747.51
	2	22	1538.33	-166.46	0.00	0.00	0.00	212.93
		32	-1538.33	166.46	0.00	0.00	0.00	-920.39
	3	22	2426.98	-200.92	0.00	0.00	0.00	267.36
		32	-2426.98	200.92	0.00	0.00	0.00	-1121.26
	4	22	2307.49	-249.69	0.00	0.00	0.00	319.40
		32	-2307.49	249.69	0.00	0.00	0.00	-1380.58
23	1	23	1756.00	-128.26	0.00	0.00	0.00	154.60
		33	-1756.00	128.26	0.00	0.00	0.00	-699.72
	2	23	2292.63	-161.66	0.00	0.00	0.00	191.52
		33	-2292.63	161.66	0.00	0.00	0.00	-878.58
	3	23	2634.00	-192.40	0.00	0.00	0.00	231.90
		33	-2634.00	192.40	0.00	0.00	0.00	-1049.58
	4	23	3438.95	-242.49	0.00	0.00	0.00	287.28
		33	-3438.95	242.49	0.00	0.00	0.00	-1317.86
24	1	24	1314.36	-128.24	0.00	0.00	0.00	154.63
		34	-1314.36	128.24	0.00	0.00	0.00	-699.67
	2	24	2089.14	-162.69	0.00	0.00	0.00	194.23
		34	-2089.14	162.69	0.00	0.00	0.00	-885.67
	3	24	1971.55	-192.37	0.00	0.00	0.00	231.94
		34	-1971.55	192.37	0.00	0.00	0.00	-1049.50
	4	24	3133.71	-244.04	0.00	0.00	0.00	291.34
		34	-3133.71	244.04	0.00	0.00	0.00	-1328.51

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

106. PRINT MEMBER FORCES LIST 11 12 13 14

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
11	1	11	517.65	-54.45	0.00	0.00	0.00	-20.30
		21	-517.65	54.45	0.00	0.00	0.00	-211.13
	2	11	-38.10	-64.75	0.00	0.00	0.00	-27.87
		21	38.10	64.75	0.00	0.00	0.00	-247.33
	3	11	776.48	-81.68	0.00	0.00	0.00	-30.46
		21	-776.48	81.68	0.00	0.00	0.00	-316.69
	4	11	-57.15	-97.13	0.00	0.00	0.00	-41.81
		21	57.15	97.13	0.00	0.00	0.00	-370.99
12	1	12	1617.98	-47.43	0.00	0.00	0.00	-23.36
		22	-1617.98	47.43	0.00	0.00	0.00	-178.24
	2	12	1538.33	-57.39	0.00	0.00	0.00	-30.99
		22	-1538.33	57.39	0.00	0.00	0.00	-212.93
	3	12	2426.98	-71.15	0.00	0.00	0.00	-35.04
		22	-2426.98	71.15	0.00	0.00	0.00	-267.36
	4	12	2307.49	-86.09	0.00	0.00	0.00	-46.49
		22	-2307.49	86.09	0.00	0.00	0.00	-319.40
13	1	13	1756.00	-42.50	0.00	0.00	0.00	-26.05
		23	-1756.00	42.50	0.00	0.00	0.00	-154.60
	2	13	2292.63	-52.97	0.00	0.00	0.00	-33.59
		23	-2292.63	52.97	0.00	0.00	0.00	-191.52
	3	13	2634.00	-63.76	0.00	0.00	0.00	-39.07
		23	-2634.00	63.76	0.00	0.00	0.00	-231.90
	4	13	3438.95	-79.45	0.00	0.00	0.00	-50.38
		23	-3438.95	79.45	0.00	0.00	0.00	-287.28
14	1	14	1314.36	-42.51	0.00	0.00	0.00	-26.03
		24	-1314.36	42.51	0.00	0.00	0.00	-154.63
	2	14	2089.14	-53.57	0.00	0.00	0.00	-33.46
		24	-2089.14	53.57	0.00	0.00	0.00	-194.23
	3	14	1971.54	-63.76	0.00	0.00	0.00	-39.04
		24	-1971.54	63.76	0.00	0.00	0.00	-231.94
	4	14	3133.71	-80.36	0.00	0.00	0.00	-50.19
		24	-3133.71	80.36	0.00	0.00	0.00	-291.35

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

107. PRINT MEMBER FORCES LIST 1 2 3 4

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	517.65	4.78	0.00	0.00	0.00	0.00
		11	-517.65	-4.78	0.00	0.00	0.00	20.30
	2	1	-38.10	6.56	0.00	0.00	0.00	0.00
		11	38.10	-6.56	0.00	0.00	0.00	27.87
	3	1	776.48	7.17	0.00	0.00	0.00	0.00
		11	-776.48	-7.17	0.00	0.00	0.00	30.46
	4	1	-57.15	9.84	0.00	0.00	0.00	0.00
		11	57.15	-9.84	0.00	0.00	0.00	41.81
2	1	2	1617.98	5.50	0.00	0.00	0.00	0.00
		12	-1617.98	-5.50	0.00	0.00	0.00	23.36
	2	2	1538.33	7.29	0.00	0.00	0.00	0.00
		12	-1538.33	-7.29	0.00	0.00	0.00	30.99
	3	2	2426.98	8.24	0.00	0.00	0.00	0.00
		12	-2426.98	-8.24	0.00	0.00	0.00	35.04
	4	2	2307.49	10.94	0.00	0.00	0.00	0.00
		12	-2307.49	-10.94	0.00	0.00	0.00	46.49
3	1	3	1756.00	6.13	0.00	0.00	0.00	0.00
		13	-1756.00	-6.13	0.00	0.00	0.00	26.05
	2	3	2292.63	7.90	0.00	0.00	0.00	0.00
		13	-2292.63	-7.90	0.00	0.00	0.00	33.59
	3	3	2634.00	9.19	0.00	0.00	0.00	0.00
		13	-2634.00	-9.19	0.00	0.00	0.00	39.07
	4	3	3438.95	11.85	0.00	0.00	0.00	0.00
		13	-3438.95	-11.85	0.00	0.00	0.00	50.38
4	1	4	1314.36	6.12	0.00	0.00	0.00	0.00
		14	-1314.36	-6.12	0.00	0.00	0.00	26.03
	2	4	2089.14	7.87	0.00	0.00	0.00	0.00
		14	-2089.14	-7.87	0.00	0.00	0.00	33.46
	3	4	1971.54	9.19	0.00	0.00	0.00	0.00
		14	-1971.54	-9.19	0.00	0.00	0.00	39.04
	4	4	3133.71	11.81	0.00	0.00	0.00	0.00
		14	-3133.71	-11.81	0.00	0.00	0.00	50.19

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

108. PRINT MEMBER FORCES LIST 81 82 83

"EMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
81	1	81	289.49	517.65	0.00	0.00	0.00	-917.55
		82	-289.49	-517.65	0.00	0.00	0.00	3246.98
	2	81	167.20	-38.10	0.00	0.00	0.00	-1605.83
		82	-167.20	38.10	0.00	0.00	0.00	1434.37
	3	81	434.24	776.48	0.00	0.00	0.00	-1376.33
		82	-434.24	-776.48	0.00	0.00	0.00	4870.47
	4	81	250.80	-57.15	0.00	0.00	0.00	-2408.74
		82	-250.80	57.15	0.00	0.00	0.00	2151.55
82	1	82	200.22	2135.64	0.00	0.00	0.00	-5081.19
		83	-972.22	3070.36	0.00	0.00	0.00	75.05
	2	82	-41.96	1500.23	0.00	0.00	0.00	-3929.36
		83	-1225.04	4381.77	0.00	0.00	0.00	2109.88
	3	82	300.34	3203.45	0.00	0.00	0.00	-7621.79
		83	-1458.34	4605.54	0.00	0.00	0.00	112.58
	4	82	-62.93	2250.34	0.00	0.00	0.00	-5894.04
		83	-1837.57	6572.66	0.00	0.00	0.00	3164.82
83	1	83	486.26	-1314.36	0.00	0.00	0.00	-2994.58
		84	-486.26	1314.36	0.00	0.00	0.00	-2920.06
	2	83	614.98	-2089.14	0.00	0.00	0.00	-5730.84
		84	-614.98	2089.14	0.00	0.00	0.00	-3670.29
	3	83	729.39	-1971.55	0.00	0.00	0.00	-4491.87
		84	-729.39	1971.55	0.00	0.00	0.00	-4380.08
	4	83	922.47	-3133.71	0.00	0.00	0.00	-8596.26
		84	-922.47	3133.71	0.00	0.00	0.00	-5505.44

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

109. PRINT REACC ALL

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	-4.78	517.65	0.00	0.00	0.00	0.00
	2	-6.56	-38.10	0.00	0.00	0.00	0.00
	3	-7.17	776.48	0.00	0.00	0.00	0.00
	4	-9.84	-57.15	0.00	0.00	0.00	0.00
2	1	-5.50	1617.98	0.00	0.00	0.00	0.00
	2	-7.29	1538.33	0.00	0.00	0.00	0.00
	3	-8.24	2426.98	0.00	0.00	0.00	0.00
	4	-10.94	2307.49	0.00	0.00	0.00	0.00
3	1	-6.13	1756.00	0.00	0.00	0.00	0.00
	2	-7.90	2292.63	0.00	0.00	0.00	0.00
	3	-9.19	2634.00	0.00	0.00	0.00	0.00
	4	-11.85	3438.95	0.00	0.00	0.00	0.00
4	1	-6.12	1314.36	0.00	0.00	0.00	0.00
	2	-7.87	2089.14	0.00	0.00	0.00	0.00
	3	-9.19	1971.54	0.00	0.00	0.00	0.00
	4	-11.81	3133.71	0.00	0.00	0.00	0.00
11	1	59.23	0.00	0.00	0.00	0.00	0.00
	2	71.31	0.00	0.00	0.00	0.00	0.00
	3	88.85	0.00	0.00	0.00	0.00	0.00
	4	106.97	0.00	0.00	0.00	0.00	0.00
12	1	52.93	0.00	0.00	0.00	0.00	0.00
	2	64.69	0.00	0.00	0.00	0.00	0.00
	3	79.40	0.00	0.00	0.00	0.00	0.00
	4	97.03	0.00	0.00	0.00	0.00	0.00
13	1	48.63	0.00	0.00	0.00	0.00	0.00
	2	60.87	0.00	0.00	0.00	0.00	0.00
	3	72.95	0.00	0.00	0.00	0.00	0.00
	4	91.31	0.00	0.00	0.00	0.00	0.00
14	1	48.63	0.00	0.00	0.00	0.00	0.00
	2	61.45	0.00	0.00	0.00	0.00	0.00
	3	72.95	0.00	0.00	0.00	0.00	0.00
	4	92.17	0.00	0.00	0.00	0.00	0.00
21	1	88.82	0.00	0.00	0.00	0.00	0.00
	2	111.62	0.00	0.00	0.00	0.00	0.00
	3	133.22	0.00	0.00	0.00	0.00	0.00
	4	167.43	0.00	0.00	0.00	0.00	0.00
22	1	86.51	0.00	0.00	0.00	0.00	0.00
	2	109.07	0.00	0.00	0.00	0.00	0.00
	3	129.77	0.00	0.00	0.00	0.00	0.00
	4	163.60	0.00	0.00	0.00	0.00	0.00
23	1	85.76	0.00	0.00	0.00	0.00	0.00
	2	108.69	0.00	0.00	0.00	0.00	0.00
	3	128.64	0.00	0.00	0.00	0.00	0.00
	4	163.04	0.00	0.00	0.00	0.00	0.00
24	1	85.74	0.00	0.00	0.00	0.00	0.00
	2	109.12	0.00	0.00	0.00	0.00	0.00
	3	128.61	0.00	0.00	0.00	0.00	0.00
	4	163.68	0.00	0.00	0.00	0.00	0.00
31	1	-130.31	0.00	0.00	0.00	0.00	0.00
	2	-149.67	0.00	0.00	0.00	0.00	0.00

'PPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
	3	-195.46	0.00	0.00	0.00	0.00	0.00
	4	-224.50	0.00	0.00	0.00	0.00	0.00
32	1	-105.47	0.00	0.00	0.00	0.00	0.00
	2	-123.74	0.00	0.00	0.00	0.00	0.00
	3	-158.20	0.00	0.00	0.00	0.00	0.00
	4	-185.62	0.00	0.00	0.00	0.00	0.00
33	1	-87.26	0.00	0.00	0.00	0.00	0.00
	2	-107.13	0.00	0.00	0.00	0.00	0.00
	3	-130.88	0.00	0.00	0.00	0.00	0.00
	4	-160.70	0.00	0.00	0.00	0.00	0.00
34	1	-87.29	0.00	0.00	0.00	0.00	0.00
	2	-109.08	0.00	0.00	0.00	0.00	0.00
	3	-130.93	0.00	0.00	0.00	0.00	0.00
	4	-163.62	0.00	0.00	0.00	0.00	0.00
41	1	-93.58	0.00	0.00	0.00	0.00	0.00
	2	-112.31	0.00	0.00	0.00	0.00	0.00
	3	-140.37	0.00	0.00	0.00	0.00	0.00
	4	-168.46	0.00	0.00	0.00	0.00	0.00
42	1	-83.08	0.00	0.00	0.00	0.00	0.00
	2	-101.28	0.00	0.00	0.00	0.00	0.00
	3	-124.63	0.00	0.00	0.00	0.00	0.00
	4	-151.92	0.00	0.00	0.00	0.00	0.00
43	1	-75.86	0.00	0.00	0.00	0.00	0.00
	2	-94.84	0.00	0.00	0.00	0.00	0.00
	3	-113.79	0.00	0.00	0.00	0.00	0.00
	4	-142.27	0.00	0.00	0.00	0.00	0.00
44	1	-75.86	0.00	0.00	0.00	0.00	0.00
	2	-95.79	0.00	0.00	0.00	0.00	0.00
	3	-113.79	0.00	0.00	0.00	0.00	0.00
	4	-143.69	0.00	0.00	0.00	0.00	0.00
51	1	-212.58	0.00	0.00	0.00	0.00	0.00
	2	-259.32	0.00	0.00	0.00	0.00	0.00
	3	-318.86	0.00	0.00	0.00	0.00	0.00
	4	-388.98	0.00	0.00	0.00	0.00	0.00
52	1	-195.13	0.00	0.00	0.00	0.00	0.00
	2	-240.88	0.00	0.00	0.00	0.00	0.00
	3	-292.69	0.00	0.00	0.00	0.00	0.00
	4	-361.32	0.00	0.00	0.00	0.00	0.00
53	1	-183.82	0.00	0.00	0.00	0.00	0.00
	2	-231.06	0.00	0.00	0.00	0.00	0.00
	3	-275.73	0.00	0.00	0.00	0.00	0.00
	4	-346.58	0.00	0.00	0.00	0.00	0.00
54	1	-183.80	0.00	0.00	0.00	0.00	0.00
	2	-232.81	0.00	0.00	0.00	0.00	0.00
	3	-275.71	0.00	0.00	0.00	0.00	0.00
	4	-349.22	0.00	0.00	0.00	0.00	0.00
61	1	-133.82	0.00	0.00	0.00	0.00	0.00
	2	-165.78	0.00	0.00	0.00	0.00	0.00
	3	-200.73	0.00	0.00	0.00	0.00	0.00
	4	-248.68	0.00	0.00	0.00	0.00	0.00

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
62	1	-126.70	0.00	0.00	0.00	0.00	0.00
	2	-158.16	0.00	0.00	0.00	0.00	0.00
	3	-190.05	0.00	0.00	0.00	0.00	0.00
	4	-237.25	0.00	0.00	0.00	0.00	0.00
63	1	-122.66	0.00	0.00	0.00	0.00	0.00
	2	-154.87	0.00	0.00	0.00	0.00	0.00
	3	-183.99	0.00	0.00	0.00	0.00	0.00
	4	-232.31	0.00	0.00	0.00	0.00	0.00
64	1	-122.64	0.00	0.00	0.00	0.00	0.00
	2	-155.74	0.00	0.00	0.00	0.00	0.00
	3	-183.95	0.00	0.00	0.00	0.00	0.00
	4	-233.60	0.00	0.00	0.00	0.00	0.00
71	1	-147.93	0.00	0.00	0.00	0.00	0.00
	2	-186.73	0.00	0.00	0.00	0.00	0.00
	3	-221.90	0.00	0.00	0.00	0.00	0.00
	4	-280.09	0.00	0.00	0.00	0.00	0.00
72	1	-145.23	0.00	0.00	0.00	0.00	0.00
	2	-183.67	0.00	0.00	0.00	0.00	0.00
	3	-217.85	0.00	0.00	0.00	0.00	0.00
	4	-275.50	0.00	0.00	0.00	0.00	0.00
73	1	-144.76	0.00	0.00	0.00	0.00	0.00
	2	-183.74	0.00	0.00	0.00	0.00	0.00
	3	-217.13	0.00	0.00	0.00	0.00	0.00
	4	-275.60	0.00	0.00	0.00	0.00	0.00
74	1	-144.71	0.00	0.00	0.00	0.00	0.00
	2	-184.33	0.00	0.00	0.00	0.00	0.00
	3	-217.07	0.00	0.00	0.00	0.00	0.00
	4	-276.50	0.00	0.00	0.00	0.00	0.00

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

110. PLOT DIS FILE
111. PLOT BEN FILE
112. FINISH

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

**** DATE= JUL 23,1999 TIME= 10: 0:39 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

PROYECTO:

EJERCICIO:

HOJA DE

FECHA

NOTA: los valores nombrados corresponden a valores a la altura de la cara inferior del encepado $\kappa = \frac{3.00}{4.25} = 0.70$

$\mu_0 = -1761 + 0.70(1276 + 1761) = 435$ m·t

$\mu_0 = 1714 + 0.70(2751 - 1714) = 2440$ m·t

$\mu_0 = 1827 + 0.70(4379 - 1827) = 3163$ m·t

$\mu_0 = 1828 + 0.70(4380 - 1828) = 3614$ m·t

$\mu_0 = 2151 + 0.70(2408 - 2151) = 2330$ m·t

$\mu_0 = 2077 + 0.70(3742 - 2077) = 3242$ m·t

$\mu_0 = 2229 + 0.70(5431 - 2229) = 4470$ m·t

$\mu_0 = 2276 + 0.70(5505 - 2276) = 4536$ m·t

VIADUCTO 5 - ESTRIBO 1 - ARMADURAS DE PILOTES

HIPOTESIS 3	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 71	-776	435	-155	87	0.07	0.03	0.04	19	14	18
BARRA 72	-2426	2440	-485	488	0.23	0.15	0.30	143	18	29
BARRA 73	-2634	3163	-527	633	0.25	0.20	0.45	215	27	44
BARRA 74	-1971	3614	-394	723	0.19	0.23	0.58	277	34	56

HIPOTESIS 4	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 71	57	2330	11	466	0.01	0.15	0.40	191	24	39
BARRA 72	-2307	3242	-461	648	0.22	0.20	0.47	225	28	46
BARRA 73	-3438	4470	-688	894	0.32	0.28	0.74	354	44	72
BARRA 74	-3133	4536	-627	907	0.30	0.29	0.82	392	49	80

HIPOTESIS 3	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 51	-776	654	-155	131	0.07	0.04	0.04	19	14	18
BARRA 52	-2426	305	-485	61	0.23	0.02	0.04	19	14	18
BARRA 53	-2634	35	-527	7	0.25	0.00	0.04	19	14	18
BARRA 54	-1971	36	-394	7	0.19	0.00	0.04	19	14	18

HIPOTESIS 4	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 51	57	604	11	121	0.01	0.04	0.04	19	14	18
BARRA 52	-2307	242	-461	48	0.22	0.02	0.04	19	14	18
BARRA 53	-3438	8	-688	2	0.32	0.00	0.04	19	14	18
BARRA 54	-3133	15	-627	3	0.30	0.00	0.04	19	14	18

HIPOTESIS 3	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 31	-776	1307	-155	261	0.07	0.08	0.13	62	14	18
BARRA 32	-2426	1292	-485	258	0.23	0.08	0.04	19	14	18
BARRA 33	-2634	1295	-527	259	0.25	0.08	0.04	19	14	18
BARRA 34	-1971	1295	-394	259	0.19	0.08	0.04	19	14	18

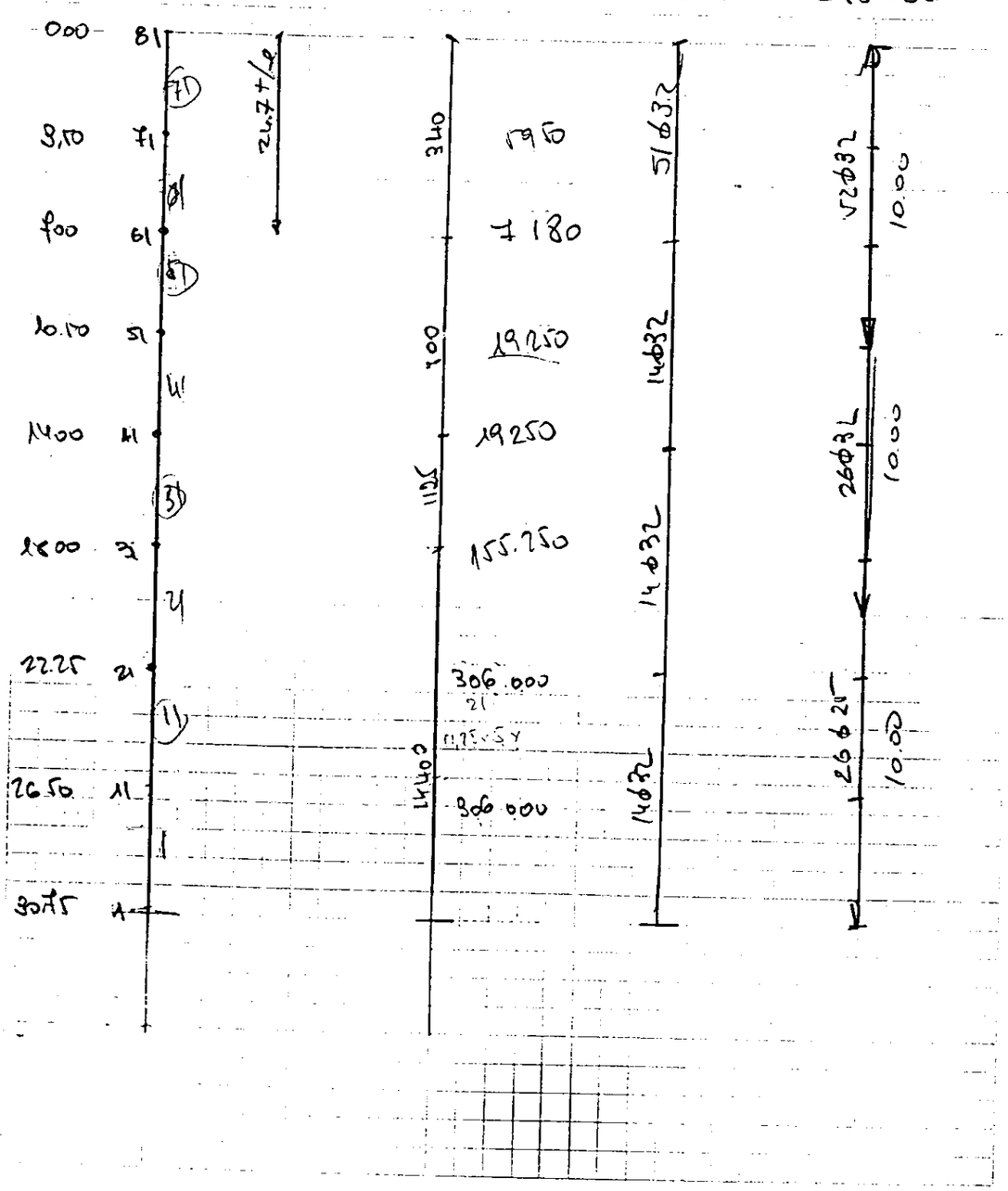
HIPOTESIS 4	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 31	57	1655	11	331	0.01	0.10	0.26	124	15	25
BARRA 32	-2307	1636	-461	327	0.22	0.10	0.04	19	14	18
BARRA 33	-3438	1645	-688	329	0.32	0.10	0.04	19	14	18
BARRA 34	-3133	1650	-627	330	0.30	0.10	0.04	19	14	18

HIPOTESIS 3	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	-776	316	-155	63	0.07	0.02	0.04	19	14	18
BARRA 12	-2426	267	-485	53	0.23	0.02	0.04	19	14	18
BARRA 13	-2634	231	-527	46	0.25	0.01	0.04	19	14	18
BARRA 14	-1971	231	-394	46	0.19	0.01	0.04	19	14	18

HIPOTESIS 4	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 11	57	370	11	74	0.01	0.02	0.04	19	14	18
BARRA 12	-2307	319	-461	64	0.22	0.02	0.04	19	14	18
BARRA 13	-3438	287	-688	57	0.32	0.02	0.04	19	14	18
BARRA 14	-3133	291	-627	58	0.30	0.02	0.04	19	14	18

$\nu = N' / 5 / 2120$

$\mu = M' / 5 / 1.5 / 2120$



COMPROBACIÓN DE LOS TUBOS POR UNA ACCIÓN SOBRE APOYO USANDO TIERRA

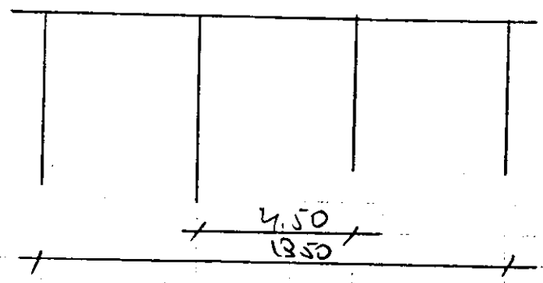
$F_x = 1264 - 2 \times 495 = 274$

$F_y = -5882$

$M_z = -4046 + 2 \times 495 \left(9.50 + 3.00 - 2.00 \right) =$

$-4646 + 9900 = 5254$

La máxima presión sobre tubos >



$5254 = \Delta Q \times 13.50 + \Delta Q \times \frac{2.25}{6.75} \times 4.50 = 15\ \Delta Q$

$\Delta Q = 350\ t$ (por cada tubo)

$Q = \frac{5882}{20} + \frac{350}{5} = 294 + 70 = 364\ t < 458\ t$

ESTRIBO 2 (DESLIZANTE)

```
250.0,5100.0,0.04,1
1.80,30.0,0.00,3.00,0.00,0.00,1
VIADUCTO 5. ESTRIBO 2
    .37,310.78,20.88,40.00,101.39,0.00,0.00
      1.70,0.40,5.90,0.50,2.00,0.40,14.00,0.0,2.50,9.00,0.0,3
```

CALCULO DE ESTRIBOS. VERSION 09-01-1996

PROGRAMA PROPIEDAD DE INTECSA

VIADUCTO 5. ESTRIBO 2

CARACTERISTICAS DEL RELLENO

PESO ESPECIFICO (TN/M3)	=	1.80
ANGULO DE ROZAMIENTO FI	=	30.00
ANGULO ROZAMIENTO TERRENO-MURO	=	.00
SOBRECARGA (TN/M2)	=	3.00
COEFICIENTE DE EMPUJE ACTIVO	=	.333

CARACTERISTICAS DE LOS MATERIALES

RESISTENCIA CARACTERISTICA DEL HORMIGON	=	250. KG/CM2
LIMITE ELASTICO DEL ACERO	=	5100. KG/CM2
RECUBRIMIENTO DE LAS ARMADURAS	=	.040 M

CARGAS SOBRE EL ESTRIBO

CARGA VERTICAL DE TABLERO PESO PROPIO Y CARGA PERMANENTE	364.4 TN
CARGA VERTICAL DE SOBRECARGAS	310.8 TN
FUERZA LONGITUDINAL DE FRENADO RETRACCION Y TEMPERATURA	20.9 TN
FUERZA TRANSVERSAL DE VIENTO	40.0 TN
MOMENTO TRANSVERSAL DE SOBRECARGAS	101.4 MT
FUERZA LONGITUDINAL DE SISMO	.0 TN
FUERZA TRANSVERSAL DE SISMO	.0 TN

GEOMETRIA DEL ESTRIBO
=====================

ANCHURA DEL ESTRIBO	. B	= 14.00
ESVIAJE (GRADOS SEXAGESIMALES)	BETA	= .00

ALZADO DEL ESTRIBO

ESPESOR DEL FALDON	A3	= .40
ALTURA DEL FALDON	A6	= 2.00
DISTANCIA DE APOYO A BORDE ESTRIBO	A5	= .50
ESPESOR DEL ESTRIBO	A2	= 1.70
ESPESOR DE LAS ALETAS	A7	= .40
ALTURA TOTAL DEL ESTRIBO	H + C	= 11.50
ALTURA DE TIERRAS	H	= 9.00

ZAPATA

VUELO DELANTERO	A1	= 5.90
VUELO TRASERO	A4	= 5.90
LONGITUD TOTAL	L	= 13.50
CANTO	C	= 2.50
RESGUARDO SOBRE ZAPATA		= 0.30
TENSION MEDIA PEDIDA SOBRE TERRENO		= LIBRE

ARMADURAS DEL ALZADO

TRASDOS.	ZONA INFERIOR	AV.= 25.0 CM2/M	(FI 20 A	.125 M)
U(CALCULO)= 1.2CM2/M		AH.= 13.7 CM2/M	(FI 20 A	.225 M)
	4.6 M. SUPERIORES	AV.= 12.5 CM2/M	(FI 20 A	.250 M)
		AH.= 13.7 CM2/M	(FI 20 A	.225 M)
INTRADOS		AV.= 5.5 CM2/M	(FI 12 A	.200 M)
		AH.= 13.7 CM2/M	(FI 20 A	.225 M)
FALDON	TRASDOS	AV.= 5.4 CM2/M	(FI 12 A	.200 M)
		AH.= 52.0 CM2/M	(FI 25 A	.087 M)
	INTRADOS	AV.= 5.4 CM2/M	(FI 12 A	.200 M)
		AH.= 2.1 CM2/M	(FI 8 A	.200 M)
ALETAS	TRASDOS	AV.= 32.4 CM2/M	(FI 25 A	.150 M)
		AH.= 52.4 CM2/M	(FI 25 A	.087 M)
	INTRADOS	AV.= 16.2 CM2/M	(FI 20 A	.175 M)
		AH.= 26.2 CM2/M	(FI 25 A	.175 M)

ESTRIBO CON RELLENO DE TIERRAS Y SIN TABLERO
==========

ACCIONES EN CENTRO DE ENCEPADO SIN SISMO.

AXIL	=	3211.7 TN.
MOMENTO LONGITUDINAL	=	-2989.7 M.T.
EMPUJE LONGITUDINAL	=	716.5 TN.

intecsa
INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS S.A.

PROYECTO: ____ HOJA ____ DI
FECHA ____
EJECUTANTE: ____

VIADUCTO 5. ESTRIBO 2

Con RELLENO TIERRAS Y S/T

$F_x = -716$

$F_y = -3211$

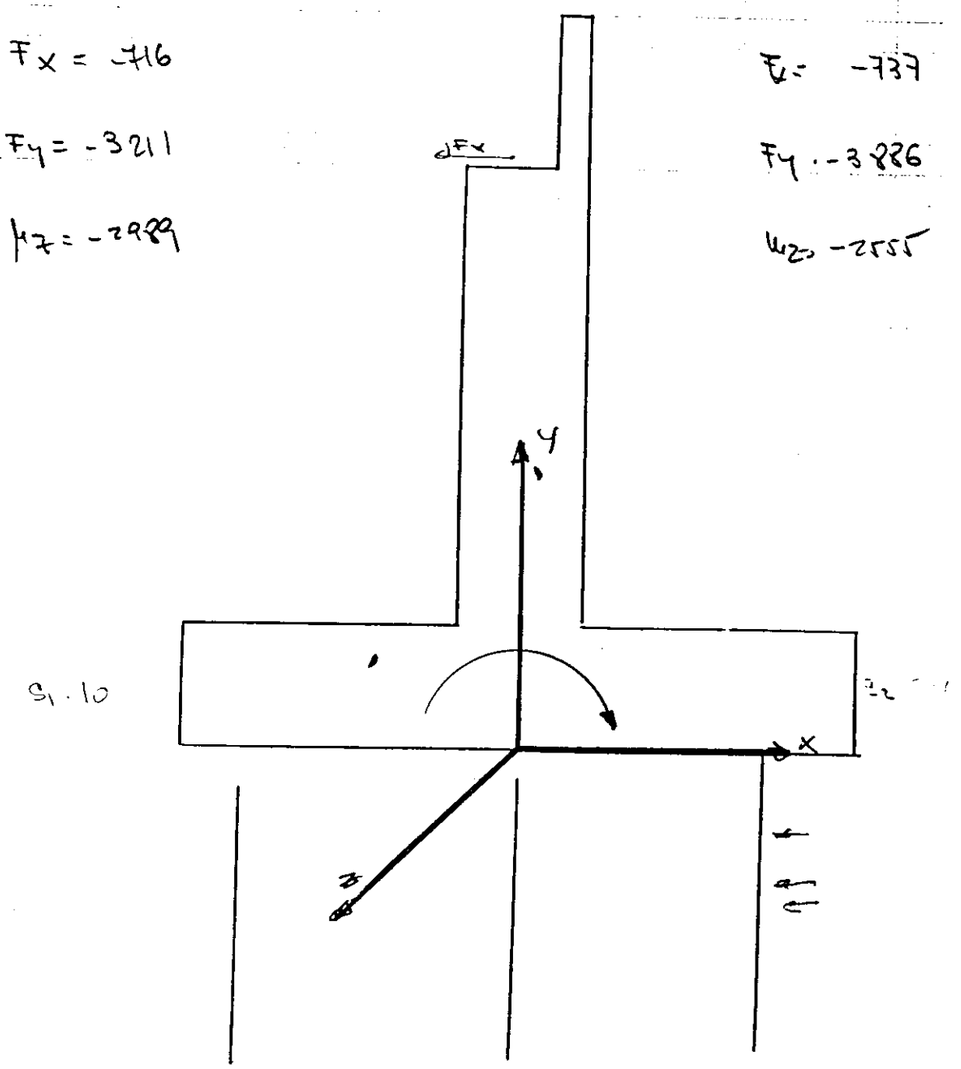
$M_z = -2989$

En SERVICIO

$F_x = -737$

$F_y = -3826$

$M_z = -2555$



```
 **************************************************
 *                                                *
 *          S T A A D - III                       *
 *          Revision 17.0a                        *
 *          Proprietary Program of                *
 *          RESEARCH ENGINEERS, Inc.              *
 *          Date=    JUL 22, 1999                 *
 *          Time=    10:44:26                     *
 *                                                *
 **************************************************

 1. STAAD PLANE VIADUCTO 5 ESTRIBO 2
 2. *EFECTOS CARGAS GRAVITATORIAS
 3. UNIT MTO MET
 4. JOINT COORDINATES
 5.   1  -5.500   -27.000
 6.   2   0.000   -27.000
 7.   3   5.500   -27.000
 8.  11  -5.500   -23.000
 9.  12   0.000   -23.000
10.  13   5.500   -23.000
11.  21  -5.500   -19.000
12.  22   0.000   -19.000
13.  23   5.500   -19.000
14.  31  -5.500   -15.000
15.  32   0.000   -15.000
16.  33   5.500   -15.000
17.  41  -5.500   -11.000
18.  42   0.000   -11.000
19.  43   5.500   -11.000
20.  51  -5.500    -7.000
21.  52   0.000    -7.000
22.  53   5.500    -7.000
23.  61  -5.500    -3.500
24.  62   0.000    -3.500
25.  63   5.500    -3.500
26.  71  -5.500    -0.000
27.  72   0.000    -0.000
28.  73   5.500    -0.000
29. MEMBER INCIDENCES
30.   1    1    11
31.   R    6    10   10
32.   2    2    12
33.   R    6    10   10
34.   3    3    13
35.   R    6    10   10
36.   71   71   72
37.   72   72   73
38. MEMBER PROPERTY
39. *PILOTES  5 * 3 PILOTES
40. 1 11 21 31 41 51 61  PR AX  8.827 IZ  1.24200
41. 2 12 22 32 42 52 62  PR AX  8.827 IZ  1.24200
42. 3 13 23 33 43 53 63  PR AX  8.827 IZ  1.24200
43. *ENCEPADO (1.5+4*4.5+1.5)*2.5
44. 71 72                PR AX 52.500 IZ  27.3433
45. CONSTANT
46. E  3250000.   ALL
47. POI 0.15
```



```
*EFECTOS CARGAS GRAVITATORIAS
48. DEN 2.50
49. SUPPORT
50. 1 2 3          PINNED
51. 11 12 13       FIXED BUT FY MZ KFX  200000
52. 21 22 23       FIXED BUT FY MZ KFX  200000
53. 31 32 33       FIXED BUT FY MZ KFX  200000
54. 41 42 43       FIXED BUT FY MZ KFX  108000
55. 51 52 53       FIXED BUT FY MZ KFX   11000
56. 61 62 63       FIXED BUT FY MZ KFX    6000
57. LOADING 1 RELLENO DE TIERRAS Y SIN TABLERO
58. JOINT LOAD
59. *PROCEDENTE DE CALCULO DE ESTRIBO
60. 72             FY -3211
61. 72             FX  -716
62. 72             MZ -2989
63. MEMBER LOAD
64. *EMPUJE DE TIERRAS SOBRE PILOTES
65. 63 53          UNI GX -131.0
66. 62 52          UNI GX  -65.0
67. LOADING 2 PUENTE EN SERVICIO
68. JOINT LOAD
69. *PROCEDENTE DE CALCULO DE ESTRIBO
70. 72             FY -3886
71. 72             FX  -737
72. 72             MZ -2555
73. MEMBER LOAD
74. *EMPUJE DE TIERRAS SOBRE PILOTES
75. 63 53          UNI GX -131.0
76. 62 52          UNI GX  -65.0
77. LOADING COMBINATION 3  ESFUERZOS NAYORADOS
78. 1 1.50
79. LOADING COMBINATION 4  ESFUERZOS MAYORADOS
80. 2 1.50
81. PERFORM ANALISIS


      P R O B L E M   S T A T I S T I C S
      -----------------------------------

 NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    24/   23/   21
 ORIGINAL/FINAL BAND-WIDTH =     3/    2
 TOTAL PRIMARY LOAD CASES  =     2, TOTAL DEGREES OF FREEDOM =    66
 SIZE OF STIFFNESS MATRIX =      594 DOUBLE PREC. WORDS
 TOTAL REQUIRED DISK SPACE =   12.05 MEGA-BYTES


++ PROCESSING ELEMENT STIFFNESS MATRIX.              10:44:28
++ PROCESSING GLOBAL STIFFNESS MATRIX.               10:44:28
++ PROCESSING TRIANGULAR FACTORIZATION.              10:44:28
++ CALCULATING JOINT DISPLACEMENTS.                  10:44:28
++ CALCULATING MEMBER  FORCES.                       10:44:28

82. LOAD LIST  1 2 3 4
83. PRINT MEMBER FORCES LIST  61 62 63
```

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
61	1	61	1396.60	-619.40	0.00	0.00	0.00	1415.90
		71	-1396.60	619.40	0.00	0.00	0.00	-3583.81
	2	61	1632.17	-630.57	0.00	0.00	0.00	1450.15
		71	-1632.17	630.57	0.00	0.00	0.00	-3657.14
	3	61	2094.91	-929.10	0.00	0.00	0.00	2123.86
		71	-2094.91	929.10	0.00	0.00	0.00	-5375.71
	4	61	2448.26	-945.85	0.00	0.00	0.00	2175.23
		71	-2448.26	945.85	0.00	0.00	0.00	-5485.71
62	1	62	1371.52	-475.80	0.00	0.00	0.00	1548.05
		72	-1371.52	248.30	0.00	0.00	0.00	-2815.22
	2	62	1674.64	-482.28	0.00	0.00	0.00	1558.15
		72	-1674.64	254.78	0.00	0.00	0.00	-2848.02
	3	62	2057.27	-713.70	0.00	0.00	0.00	2322.07
		72	-2057.27	372.45	0.00	0.00	0.00	-4222.83
	4	62	2511.96	-723.42	0.00	0.00	0.00	2337.23
		72	-2511.96	382.17	0.00	0.00	0.00	-4272.03
63	1	63	442.88	-306.80	0.00	0.00	0.00	1564.02
		73	-442.88	-151.70	0.00	0.00	0.00	-1835.43
	2	63	579.19	-310.16	0.00	0.00	0.00	1558.12
		73	-579.19	-148.34	0.00	0.00	0.00	-1841.29
	3	63	664.32	-460.19	0.00	0.00	0.00	2346.03
		73	-664.32	-227.56	0.00	0.00	0.00	-2753.14
	4	63	868.78	-465.24	0.00	0.00	0.00	2337.18
		73	-868.78	-222.51	0.00	0.00	0.00	-2761.94

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

84. PRINT MEMBER FORCES LIST 51 52 53

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
51	1	51	1396.60	-481.72	0.00	0.00	0.00	-270.12
		61	-1396.60	481.72	0.00	0.00	0.00	-1415.91
	2	51	1632.17	-490.81	0.00	0.00	0.00	-267.67
		61	-1632.17	490.81	0.00	0.00	0.00	-1450.15
	3	51	2094.90	-722.58	0.00	0.00	0.00	-405.17
		61	-2094.90	722.58	0.00	0.00	0.00	-2123.86
	4	51	2448.26	-736.21	0.00	0.00	0.00	-401.51
		61	-2448.26	736.21	0.00	0.00	0.00	-2175.22
52	1	52	1371.52	-562.18	0.00	0.00	0.00	-21.45
		62	-1371.52	334.68	0.00	0.00	0.00	-1548.04
	2	52	1674.64	-566.99	0.00	0.00	0.00	-28.20
		62	-1674.64	339.49	0.00	0.00	0.00	-1558.16
	3	52	2057.27	-843.27	0.00	0.00	0.00	-32.18
		62	-2057.27	502.02	0.00	0.00	0.00	-2322.06
	4	52	2511.96	-850.49	0.00	0.00	0.00	-42.30
		62	-2511.96	509.24	0.00	0.00	0.00	-2337.23
53	1	53	442.88	-622.82	0.00	0.00	0.00	186.52
		63	-442.88	164.32	0.00	0.00	0.00	-1564.02
	2	53	579.18	-624.80	0.00	0.00	0.00	173.69
		63	-579.18	166.30	0.00	0.00	0.00	-1558.12
	3	53	664.32	-934.23	0.00	0.00	0.00	279.78
		63	-664.32	246.48	0.00	0.00	0.00	-2346.03
	4	53	868.78	-937.21	0.00	0.00	0.00	260.53
		63	-868.78	249.46	0.00	0.00	0.00	-2337.19

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

85. PRINT MEMBER FORCES LIST 41 42 43

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
41	1	41	1396.60	-328.39	0.00	0.00	0.00	-1583.67
		51	-1396.60	328.39	0.00	0.00	0.00	270.11
	2	41	1632.17	-334.98	0.00	0.00	0.00	-1607.60
		51	-1632.17	334.98	0.00	0.00	0.00	267.67
	3	41	2094.90	-492.59	0.00	0.00	0.00	-2375.51
		51	-2094.90	492.59	0.00	0.00	0.00	405.17
	4	41	2448.26	-502.47	0.00	0.00	0.00	-2411.40
		51	-2448.26	502.47	0.00	0.00	0.00	401.51
42	1	42	1371.51	-398.69	0.00	0.00	0.00	-1616.23
		52	-1371.51	398.69	0.00	0.00	0.00	21.45
	2	42	1674.64	-401.77	0.00	0.00	0.00	-1635.27
		52	-1674.64	401.77	0.00	0.00	0.00	28.20
	3	42	2057.27	-598.04	0.00	0.00	0.00	-2424.34
		52	-2057.27	598.04	0.00	0.00	0.00	32.18
	4	42	2511.96	-602.65	0.00	0.00	0.00	-2452.91
		52	-2511.96	602.65	0.00	0.00	0.00	42.30
43	1	43	442.88	-452.77	0.00	0.00	0.00	-1624.55
		53	-442.88	452.77	0.00	0.00	0.00	-186.52
	2	43	579.18	-453.51	0.00	0.00	0.00	-1640.34
		53	-579.18	453.51	0.00	0.00	0.00	-173.69
	3	43	664.32	-679.15	0.00	0.00	0.00	-2436.83
		53	-664.32	679.15	0.00	0.00	0.00	-279.79
	4	43	868.78	-680.26	0.00	0.00	0.00	-2460.50
		53	-868.78	680.26	0.00	0.00	0.00	-260.53

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

86. PRINT MEMBER FORCES LIST 31 32 33

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
31	1	31	1396.60	162.02	0.00	0.00	0.00	-935.58
		41	-1396.60	-162.02	0.00	0.00	0.00	1583.67
	2	31	1632.17	164.06	0.00	0.00	0.00	-951.34
		41	-1632.17	-164.06	0.00	0.00	0.00	1607.60
	3	31	2094.90	243.03	0.00	0.00	0.00	-1403.38
		41	-2094.90	-243.03	0.00	0.00	0.00	2375.51
	4	31	2448.26	246.10	0.00	0.00	0.00	-1427.01
		41	-2448.26	-246.10	0.00	0.00	0.00	2411.40
32	1	32	1371.52	149.53	0.00	0.00	0.00	-1018.10
		42	-1371.52	-149.53	0.00	0.00	0.00	1616.23
	2	32	1674.64	151.70	0.00	0.00	0.00	-1028.48
		42	-1674.64	-151.70	0.00	0.00	0.00	1635.27
	3	32	2057.27	224.30	0.00	0.00	0.00	-1527.15
		42	-2057.27	-224.30	0.00	0.00	0.00	2424.35
	4	32	2511.96	227.55	0.00	0.00	0.00	-1542.72
		42	-2511.96	-227.55	0.00	0.00	0.00	2452.91
33	1	33	442.88	137.35	0.00	0.00	0.00	-1075.14
		43	-442.88	-137.35	0.00	0.00	0.00	1624.55
	2	33	579.19	139.60	0.00	0.00	0.00	-1081.94
		43	-579.19	-139.60	0.00	0.00	0.00	1640.33
	3	33	664.32	206.03	0.00	0.00	0.00	-1612.72
		43	-664.32	-206.03	0.00	0.00	0.00	2436.82
	4	33	868.78	209.40	0.00	0.00	0.00	-1622.91
		43	-868.78	-209.40	0.00	0.00	0.00	2460.50

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

87. PRINT MEMBER FORCES LIST 21 22 23

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
21	1	21	1396.60	186.87	0.00	0.00	0.00	-188.11
		31	-1396.60	-186.87	0.00	0.00	0.00	935.58
	2	21	1632.17	189.91	0.00	0.00	0.00	-191.70
		31	-1632.17	-189.91	0.00	0.00	0.00	951.34
	3	21	2094.90	280.30	0.00	0.00	0.00	-282.16
		31	-2094.90	-280.30	0.00	0.00	0.00	1403.38
	4	21	2448.26	284.86	0.00	0.00	0.00	-287.55
		31	-2448.26	-284.86	0.00	0.00	0.00	1427.01
22	1	22	1371.52	199.18	0.00	0.00	0.00	-221.38
		32	-1371.52	-199.18	0.00	0.00	0.00	1018.10
	2	22	1674.64	201.31	0.00	0.00	0.00	-223.24
		32	-1674.64	-201.31	0.00	0.00	0.00	1028.48
	3	22	2057.27	298.77	0.00	0.00	0.00	-332.08
		32	-2057.27	-298.77	0.00	0.00	0.00	1527.15
	4	22	2511.96	301.96	0.00	0.00	0.00	-334.86
		32	-2511.96	-301.96	0.00	0.00	0.00	1542.72
23	1	23	442.88	207.14	0.00	0.00	0.00	-246.60
		33	-442.88	-207.14	0.00	0.00	0.00	1075.14
	2	23	579.18	208.66	0.00	0.00	0.00	-247.30
		33	-579.18	-208.66	0.00	0.00	0.00	1081.94
	3	23	664.32	310.71	0.00	0.00	0.00	-369.89
		33	-664.32	-310.71	0.00	0.00	0.00	1612.72
	4	23	868.78	312.99	0.00	0.00	0.00	-370.95
		33	-868.78	-312.99	0.00	0.00	0.00	1622.91

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

88. PRINT MEMBER FORCES LIST 11 12 13

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
11	1	11	1396.60	56.96	0.00	0.00	0.00	39.72
		21	-1396.60	-56.96	0.00	0.00	0.00	188.11
	2	11	1632.17	57.97	0.00	0.00	0.00	40.18
		21	-1632.17	-57.97	0.00	0.00	0.00	191.70
	3	11	2094.90	85.44	0.00	0.00	0.00	59.58
		21	-2094.90	-85.44	0.00	0.00	0.00	282.16
	4	11	2448.26	86.96	0.00	0.00	0.00	60.27
		21	-2448.26	-86.96	0.00	0.00	0.00	287.55
12	1	12	1371.52	64.12	0.00	0.00	0.00	35.08
		22	-1371.52	-64.12	0.00	0.00	0.00	221.38
	2	12	1674.64	64.72	0.00	0.00	0.00	35.63
		22	-1674.64	-64.72	0.00	0.00	0.00	223.24
	3	12	2057.27	96.17	0.00	0.00	0.00	52.62
		22	-2057.27	-96.17	0.00	0.00	0.00	332.08
	4	12	2511.96	97.08	0.00	0.00	0.00	53.45
		22	-2511.96	-97.08	0.00	0.00	0.00	334.86
13	1	13	442.88	69.35	0.00	0.00	0.00	30.80
		23	-442.88	-69.35	0.00	0.00	0.00	246.60
	2	13	579.19	69.68	0.00	0.00	0.00	31.41
		23	-579.19	-69.68	0.00	0.00	0.00	247.30
	3	13	664.32	104.02	0.00	0.00	0.00	46.19
		23	-664.32	-104.02	0.00	0.00	0.00	369.89
	4	13	868.78	104.52	0.00	0.00	0.00	47.12
		23	-868.78	-104.52	0.00	0.00	0.00	370.95

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

89. PRINT MEMBER FORCES LIST 1 2 3

*EMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	1	1	1396.60	-9.93	0.00	0.00	0.00	0.00
		11	-1396.60	9.93	0.00	0.00	0.00	-39.72
	2	1	1632.17	-10.05	0.00	0.00	0.00	0.00
		11	-1632.17	10.05	0.00	0.00	0.00	-40.18
	3	1	2094.90	-14.90	0.00	0.00	0.00	0.00
		11	-2094.90	14.90	0.00	0.00	0.00	-59.58
	4	1	2448.26	-15.07	0.00	0.00	0.00	0.00
		11	-2448.26	15.07	0.00	0.00	0.00	-60.27
2	1	2	1371.52	-8.77	0.00	0.00	0.00	0.00
		12	-1371.52	8.77	0.00	0.00	0.00	-35.08
	2	2	1674.64	-8.91	0.00	0.00	0.00	0.00
		12	-1674.64	8.91	0.00	0.00	0.00	-35.63
	3	2	2057.27	-13.16	0.00	0.00	0.00	0.00
		12	-2057.27	13.16	0.00	0.00	0.00	-52.62
	4	2	2511.96	-13.36	0.00	0.00	0.00	0.00
		12	-2511.96	13.36	0.00	0.00	0.00	-53.45
3	1	3	442.88	-7.70	0.00	0.00	0.00	0.00
		13	-442.88	7.70	0.00	0.00	0.00	-30.80
	2	3	579.19	-7.85	0.00	0.00	0.00	0.00
		13	-579.19	7.85	0.00	0.00	0.00	-31.41
	3	3	664.32	-11.55	0.00	0.00	0.00	0.00
		13	-664.32	11.55	0.00	0.00	0.00	-46.19
	4	3	868.78	-11.78	0.00	0.00	0.00	0.00
		13	-868.78	11.78	0.00	0.00	0.00	-47.12

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

90. PRINT MEMBER FORCES LIST 71 72

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTO MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
71	1	71	619.39	1396.60	0.00	0.00	0.00	3583.81
		72	-619.39	-1396.60	0.00	0.00	0.00	4097.51
	2	71	630.56	1632.17	0.00	0.00	0.00	3657.14
		72	-630.56	-1632.17	0.00	0.00	0.00	5319.81
	3	71	929.09	2094.90	0.00	0.00	0.00	5375.71
		72	-929.09	-2094.90	0.00	0.00	0.00	6146.26
	4	71	945.83	2448.26	0.00	0.00	0.00	5485.72
		72	-945.83	-2448.26	0.00	0.00	0.00	7979.71
72	1	72	151.81	-442.88	0.00	0.00	0.00	-4271.27
		73	-151.81	442.88	0.00	0.00	0.00	1835.42
	2	72	148.33	-579.18	0.00	0.00	0.00	-5026.79
		73	-148.33	579.18	0.00	0.00	0.00	1841.29
	3	72	227.71	-664.32	0.00	0.00	0.00	-6406.91
		73	-227.71	664.32	0.00	0.00	0.00	2753.14
	4	72	222.49	-868.77	0.00	0.00	0.00	-7540.19
		73	-222.49	868.77	0.00	0.00	0.00	2761.93

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

91. PRINT REACC ALL

UPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	1	9.93	1396.60	0.00	0.00	0.00	0.00
	2	10.05	1632.17	0.00	0.00	0.00	0.00
	3	14.90	2094.90	0.00	0.00	0.00	0.00
	4	15.07	2448.26	0.00	0.00	0.00	0.00
2	1	8.77	1371.52	0.00	0.00	0.00	0.00
	2	8.91	1674.64	0.00	0.00	0.00	0.00
	3	13.16	2057.27	0.00	0.00	0.00	0.00
	4	13.36	2511.96	0.00	0.00	0.00	0.00
3	1	7.70	442.88	0.00	0.00	0.00	0.00
	2	7.85	579.19	0.00	0.00	0.00	0.00
	3	11.55	664.32	0.00	0.00	0.00	0.00
	4	11.78	868.78	0.00	0.00	0.00	0.00
11	1	-66.89	0.00	0.00	0.00	0.00	0.00
	2	-68.02	0.00	0.00	0.00	0.00	0.00
	3	-100.33	0.00	0.00	0.00	0.00	0.00
	4	-102.02	0.00	0.00	0.00	0.00	0.00
12	1	-72.89	0.00	0.00	0.00	0.00	0.00
	2	-73.63	0.00	0.00	0.00	0.00	0.00
	3	-109.33	0.00	0.00	0.00	0.00	0.00
	4	-110.44	0.00	0.00	0.00	0.00	0.00
13	1	-77.05	0.00	0.00	0.00	0.00	0.00
	2	-77.53	0.00	0.00	0.00	0.00	0.00
	3	-115.57	0.00	0.00	0.00	0.00	0.00
	4	-116.29	0.00	0.00	0.00	0.00	0.00
21	1	-129.91	0.00	0.00	0.00	0.00	0.00
	2	-131.94	0.00	0.00	0.00	0.00	0.00
	3	-194.87	0.00	0.00	0.00	0.00	0.00
	4	-197.91	0.00	0.00	0.00	0.00	0.00
22	1	-135.06	0.00	0.00	0.00	0.00	0.00
	2	-136.59	0.00	0.00	0.00	0.00	0.00
	3	-202.59	0.00	0.00	0.00	0.00	0.00
	4	-204.89	0.00	0.00	0.00	0.00	0.00
23	1	-137.79	0.00	0.00	0.00	0.00	0.00
	2	-138.98	0.00	0.00	0.00	0.00	0.00
	3	-206.68	0.00	0.00	0.00	0.00	0.00
	4	-208.48	0.00	0.00	0.00	0.00	0.00
31	1	24.85	0.00	0.00	0.00	0.00	0.00
	2	25.85	0.00	0.00	0.00	0.00	0.00
	3	37.27	0.00	0.00	0.00	0.00	0.00
	4	38.77	0.00	0.00	0.00	0.00	0.00
32	1	49.65	0.00	0.00	0.00	0.00	0.00
	2	49.61	0.00	0.00	0.00	0.00	0.00
	3	74.47	0.00	0.00	0.00	0.00	0.00
	4	74.42	0.00	0.00	0.00	0.00	0.00
33	1	69.79	0.00	0.00	0.00	0.00	0.00
	2	69.06	0.00	0.00	0.00	0.00	0.00
	3	104.68	0.00	0.00	0.00	0.00	0.00
	4	103.60	0.00	0.00	0.00	0.00	0.00
41	1	490.41	0.00	0.00	0.00	0.00	0.00
	2	499.05	0.00	0.00	0.00	0.00	0.00

SUPPORT REACTIONS -UNIT MTO MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
	3	735.62	0.00	0.00	0.00	0.00	0.00
	4	748.57	0.00	0.00	0.00	0.00	0.00
42	1	548.23	0.00	0.00	0.00	0.00	0.00
	2	553.47	0.00	0.00	0.00	0.00	0.00
	3	822.34	0.00	0.00	0.00	0.00	0.00
	4	830.20	0.00	0.00	0.00	0.00	0.00
43	1	590.12	0.00	0.00	0.00	0.00	0.00
	2	593.10	0.00	0.00	0.00	0.00	0.00
	3	885.18	0.00	0.00	0.00	0.00	0.00
	4	889.65	0.00	0.00	0.00	0.00	0.00
51	1	153.33	0.00	0.00	0.00	0.00	0.00
	2	155.82	0.00	0.00	0.00	0.00	0.00
	3	229.99	0.00	0.00	0.00	0.00	0.00
	4	233.74	0.00	0.00	0.00	0.00	0.00
52	1	163.48	0.00	0.00	0.00	0.00	0.00
	2	165.23	0.00	0.00	0.00	0.00	0.00
	3	245.22	0.00	0.00	0.00	0.00	0.00
	4	247.84	0.00	0.00	0.00	0.00	0.00
53	1	170.05	0.00	0.00	0.00	0.00	0.00
	2	171.30	0.00	0.00	0.00	0.00	0.00
	3	255.08	0.00	0.00	0.00	0.00	0.00
	4	256.95	0.00	0.00	0.00	0.00	0.00
61	1	137.68	0.00	0.00	0.00	0.00	0.00
	2	139.76	0.00	0.00	0.00	0.00	0.00
	3	206.52	0.00	0.00	0.00	0.00	0.00
	4	209.64	0.00	0.00	0.00	0.00	0.00
62	1	141.13	0.00	0.00	0.00	0.00	0.00
	2	142.78	0.00	0.00	0.00	0.00	0.00
	3	211.69	0.00	0.00	0.00	0.00	0.00
	4	214.18	0.00	0.00	0.00	0.00	0.00
63	1	142.47	0.00	0.00	0.00	0.00	0.00
	2	143.85	0.00	0.00	0.00	0.00	0.00
	3	213.71	0.00	0.00	0.00	0.00	0.00
	4	215.77	0.00	0.00	0.00	0.00	0.00

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

92. PLOT DIS FILE
93. PLOT BEN FILE
94. FINISH

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

**** DATE= JUL 22,1999 TIME= 10:44:30 ****

****
* FOR QUESTIONS REGARDING THIS VERSION OF PROGRAM *
* TEL:(0454) 281-080, FAX:(0454)-415-866 THORNBURY UK *
* 10, St.MARY ST, St.MARY CENTRE,THORNBURY,BRISTOL,UK *
****

VIADUCTO 5 - ESTRIBO 2 - ARMADURAS DE PILOTES

HIPOTESIS 3	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 61	-2094	4204	-419	841	0.20	0.26	0.68	325	40	66
BARRA 62	-2057	3538	-411	708	0.19	0.22	0.53	253	32	52
BARRA 63	-664	2606	-133	521	0.06	0.16	0.45	215	27	44

HIPOTESIS 4	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 61	-2448	4293	-490	859	0.23	0.27	0.72	344	43	70
BARRA 62	-2511	3575	-502	715	0.24	0.22	0.54	258	32	53
BARRA 63	-868	2608	-174	522	0.08	0.16	0.38	182	23	37

HIPOTESIS 3	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 41	-2094	405	-419	81	0.20	0.03	0.04	19	14	18
BARRA 42	-2057	32	-411	6	0.19	0.00	0.04	19	14	18
BARRA 43	-664	-279	-133	-56	0.06	0.02	0.04	19	14	18

HIPOTESIS 4	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 41	-2448	401	-490	80	0.23	0.03	0.04	19	14	18
BARRA 42	-2511	42	-502	8	0.24	0.00	0.04	19	14	18
BARRA 43	-868	260	-174	52	0.08	0.02	0.04	19	14	18

HIPOTESIS 3	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-2094	1403	-419	281	0.20	0.09	0.05	24	14	18
BARRA 22	-2057	1527	-411	305	0.19	0.10	0.12	57	14	18
BARRA 23	-664	1612	-133	322	0.06	0.10	0.26	124	15	25

HIPOTESIS 4	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 21	-2448	1427	-490	285	0.23	0.09	0.04	19	14	18
BARRA 22	-2511	1542	-502	308	0.24	0.10	0.07	33	14	18
BARRA 23	-868	1622	-174	324	0.08	0.10	0.26	124	15	25

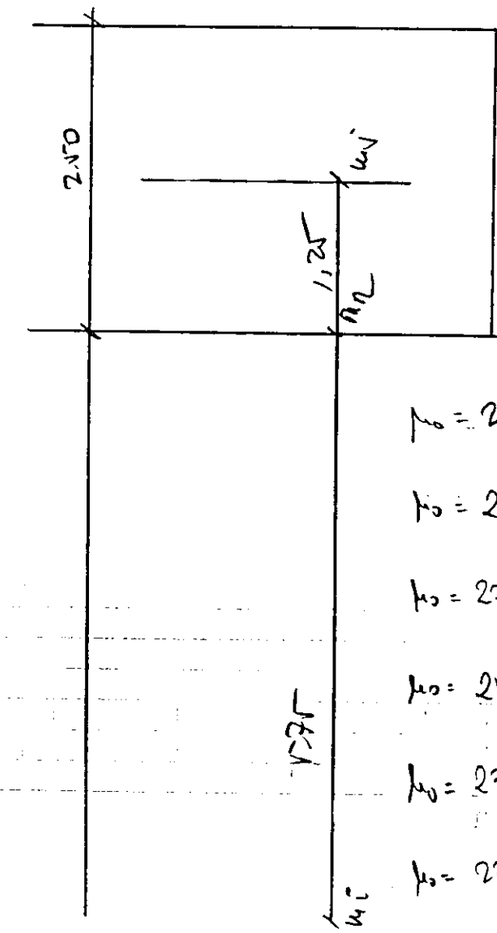
HIPOTESIS 3	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-2094	282	-419	56	0.20	0.02	0.04	19	14	18
BARRA 2	-2057	332	-411	66	0.19	0.02	0.04	19	14	18
BARRA 3	-664	369	-133	74	0.06	0.02	0.04	19	14	18

HIPOTESIS 4	N'	M'	N'/5	M'/5	ν	μ	ω	cm2	CON Φ32	CON Φ25
BARRA 1	-2448	287	-490	57	0.23	0.02	0.04	19	14	18
BARRA 2	-2511	334	-502	67	0.24	0.02	0.04	19	14	18
BARRA 3	-868	370	-174	74	0.08	0.02	0.04	19	14	18

$\nu = N' / 5 / 2120$

$\mu = M' / 5 / 1.5 / 2120$

LOS VALORES SOMBREADOS CORRESPONDEN A UNO DE LOS PILOTES ADYACENTES



$$M_Q = M_i + \frac{M_j - M_i}{3,50} \times 2,25$$

$M_0 = 2123 + (2375 - 2123) \times 0,64 = 4204$

$M_0 = 2322 + (4222 - 2322) \times 0,64 = 3538$

$M_0 = 2346 + (2753 - 2346) \times 0,64 = 2606$

$M_0 = 2175 + (5425 - 2175) \times 0,64 = 4293$

$M_0 = 2337 + (4277 - 2337) \times 0,64 = 3575$

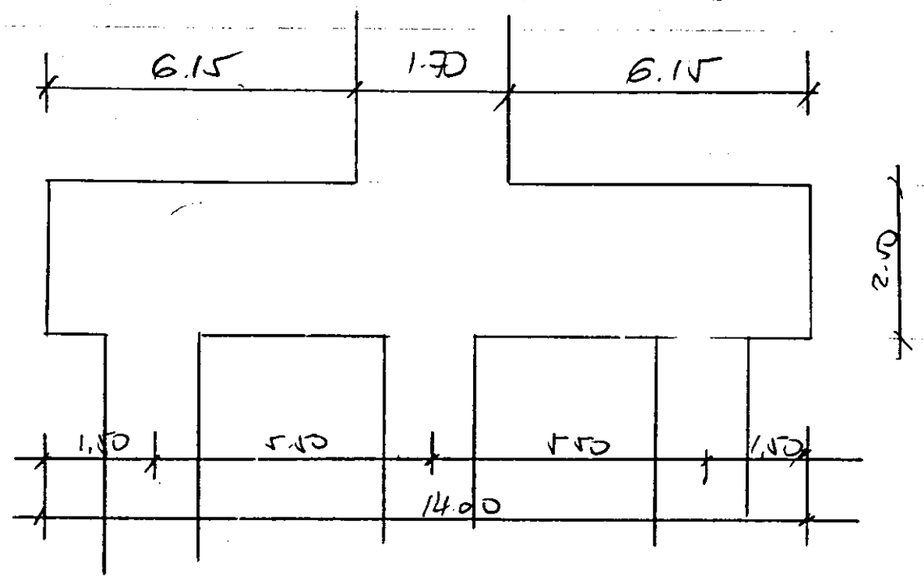
$M_0 = 2337 + (2761 - 2337) \times 0,64 = 2608$

ARMADURAS DEL ENCEPADO

330+12 = 342 / 2 x Ø32/20 Ø25/20

ARMADURA DE TIRO

$N = \frac{1674}{5} + \frac{481}{3 \times 13.50} = 335 + 12 = 347\ t$



$Q_{ex} = 347\ t$

ARMADURA INFERIOR

$v = 6.15 - 1.50 + 0.15 \times 1.70 = 4.90\ m$

$M' = 1.6 \times 4.90 \times 347 = 2720\ mt/milote$

$\mu' = \frac{2720}{(2.25+1.50)} = 725\ mt/ml$

$A_c = 4000\ t/m$

$A_s = 4000 \left(1 - \sqrt{1 - \frac{2 \times 725}{2.40 \times 4000}}\right) = 314\ t/ml$

$\omega = 314 \times 1.15 / 5.1 = 71\ cm^2/ml$ 2 capas Ø32/20

$Q' = 1.6 \times 347 = 555\ t/milote$

$Q = \frac{555}{374} = 148\ t/ml$

$T_b = \sqrt{\frac{250}{1.5}} \times 4.00 \times 2.40 = 155\ t$

$\omega_t = \frac{148 - 155}{0.9 \times 4.2 \times 2.4} < 0$

$A_{s\mu} = 0.002 \times \frac{2500}{15} \times 100 \times \frac{1}{2.2} = 19\ cm^2/m$

Se disponen horquillas Ø16/40/40

ARMADURA TRANSVERSAL ($\omega \geq \frac{71}{4} = 17.8\ cm^2/ml$)

$v = 3.50 - 1.50 + 0.15 \times 1.70 = 2.18$

$\mu = 347 \times 2.18 = 756\ mt/milote$

$\mu' = \frac{756}{1.50 + 2.18} = 231\ mt/ml$

$A_c = 4000\ t$

$A_s = 4000 \left(1 - \sqrt{1 - \frac{2 \times 231}{2.40 \times 4000}}\right) = 97\ t$

$\omega = 97 \times 1.15 / 5.1 = 22\ cm^2/ml$

Se dispone $\Phi 25/20 \rightarrow 4{,}91 \times 5 = 24{,}55\ cm^2/ml$

ARMADURA SUPERIOR

$q = 2{,}5 \times 2{,}5 + 1{,}8 \times 9{,}50 + 3 = 6{,}25 + 17{,}10 + 3 = 26{,}35\ t/m^2$

$Q = \frac{442}{5} = 88\ t$

$\mu = 2635 \times \frac{(6{,}15 + 0{,}25)^2}{2} - \frac{5 \times 88 \times (6{,}15 - 1{,}50 + 0{,}25)}{21} =$

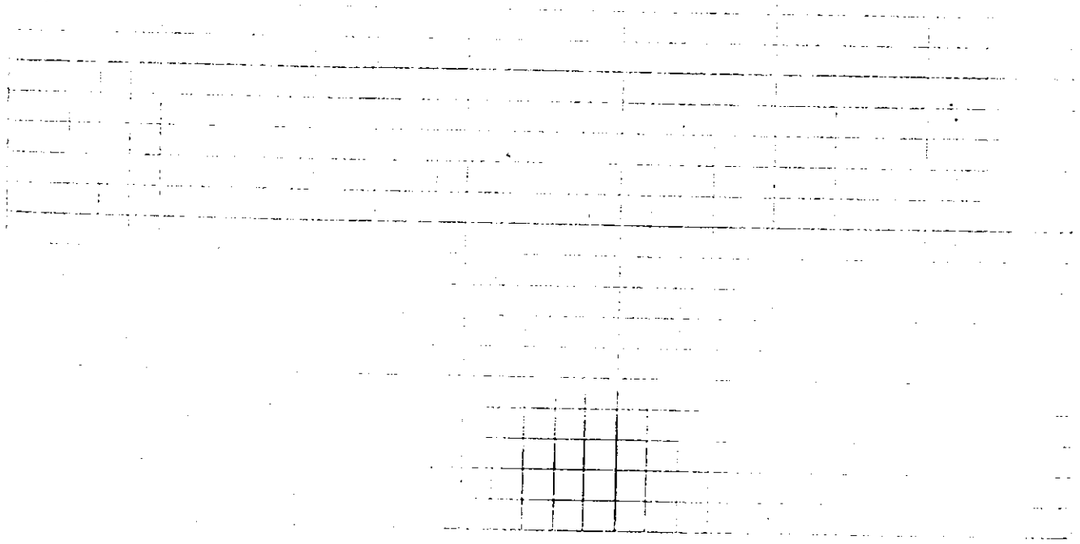
$= 540 - 103 = 437\ mt/m.$

$\mu' = 437 \times 1{,}6 = 699\ mt/m$

$Ac = 4000$

$Ds = 4000 \left(1 - \sqrt{1 - \frac{2 \times 699}{2{,}4 \times 4000}}\right) = 302\ t/m$

$U = 302 \times 1{,}17 / 5_1 = 68\ cm^2/m \quad$ 2 cada $\Phi 32/20$



COMPROBACIÓN DE LOS PILOTES PARA UNA REACCIÓN SOBRE APOYOS TRAS LODOTIENTE

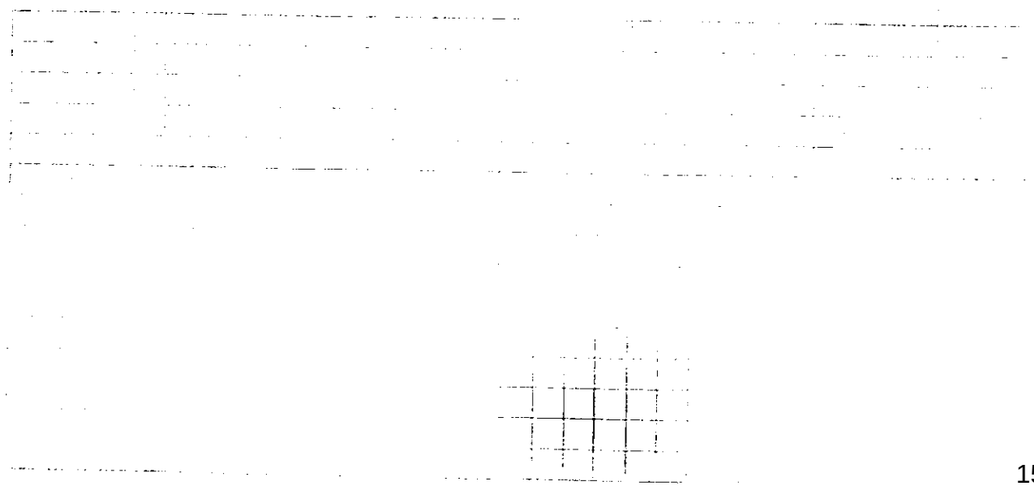
$F_y = -737 + 2 \times 20{,}88 = -695\ t$

$F_1 = -3886\ ton$

$M_z = -2555 - 2 \times 20{,}88 \left(9{,}00 + 2{,}50 - 2{,}00\right) =$

$-2555 - 397 = -2951\ mt$

No hay mayor de momentos y de valores superior al de la hipótesis de montaje



PROCESO CONSTRUCTIVO

La construcción del viaducto comienza con la ejecución de los pilotes donde el estribo 2 hacia el estribo 1 excavándose en este caso con lodos bentoníticos. Una vez ejecutados los pilotes se procede a la ejecución de los encepados. Para la excavación de los encepados de los pilotes 1 y 2 se realizó hinca de carriles con objeto de minimizar la afección sobre la carretera y un desvío provisional de ésta.

Ejecutados los cimientos se procede a levantar los alzados tanto de estribos como de pilas, utilizando un juego de dos encofrados para el fuste de los mismos con acabado machiembrado en todos los paramentos vistos.

Finalizada esta tarea se comienza con las labores necesarias para poder realizar el tablero que se ha hormigonado en dos fases y que han sido:

Ejecución de la cimbra cuajada cimentada en una losa de hormigón en masa y que salva la carretera mediante unas vigas metálicas apoyadas en unas torres. Sobre esta cimbra se dispone el encofrado que va del estribo 1 hasta 4,60 m después de la pila 2. Una vez hormigonada esta fase y tras comprobar que el hormigón ha alcanzado la resistencia requerida se procede al tesado a los tres días y se monta la armadura de esta segunda fase, se hormigonea y se tensa. Tras esto se realiza el anclaje del tablero del estribo 1.

Finalizado el tablero se desmonta la cimbra y se ejecutan las tareas de remate consistentes en ejecutar la canaleta para comunicaciones, impermeabilizar el tablero y disponer la barandilla y ejecutar las juntas.

Resumen del control de calidad

RESUMEN DEL CONTROL DE CALIDAD

ÍNDICE

Cuadro resumen de ensayos de hormigón
Parte de tesado
Proyecto de prueba de carga

SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-5

P.P.I. Nº 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f est	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
240	367	02/09/99	P-2 Encepado	03010502	H-250	10	Fluida			3	326			100	30/09/99	I 42,5 S/SR	268	
240	368	02/09/99	P-2 Encepado	03010502	H-250	10	Fluida			3	305			100	30/09/99	I 42,5 S/SR	268	
241	369	02/09/99	P-2 Encepado	03010502	H-250	10	Fluida			3	322			100	06/10/99	I 42,5 S/SR	260	
296	441	15/09/99	E-2 Encepado	03010502	H-250	8	Blanda			3	285			100	13/10/99	I 42,5 S/SR	250	
296	442	15/09/99	E-2 Encepado	03010502	H-250	6	Blanda			3	314			100	13/10/99	I 42,5 S/SR	250	
297	443	15/09/99	E-2 Encepado	03010502	H-250	6	Blanda			3	308			100	13/10/99	I 42,5 S/SR	271	
297	444	15/09/99	E-2 Encepado	03010502	H-250	7	Blanda			3	278			100	13/10/99	I 42,5 S/SR	271	
298	445	15/09/99	E-2 Encepado	03010502	H-250	7	Blanda			3	312			100	13/10/99	I 42,5 S/SR	245	
298	446	15/09/99	E-2 Encepado	03010502	H-250	8	Blanda			3	320			100	13/10/99	I 42,5 S/SR	245	
299	447	15/09/99	E-2 Encepado	03010502	H-250	8	Blanda			3	293			100	13/10/99	I 42,5 S/SR	258	
299	448	15/09/99	E-2 Encepado	03010502	H-250	7	Blanda			3	324			100	13/10/99	I 42,5 S/SR	258	
300	451	15/09/99	E-2 Encepado	03010502	H-250	10	Fluida			3	262			100	13/10/99	I 42,5 S/SR	230	
300	452	15/09/99	E-2 Encepado	03010502	H-250	10	Fluida			3	261			100	13/10/99	I 42,5 S/SR	230	
301	454	15/09/99	E-2 Encepado	03010502	H-250	10	Fluida			3	320			100	13/10/99	I 42,5 S/SR	259	
301	455	15/09/99	E-2 Encepado	03010502	H-250	8	Blanda			3	294			100	13/10/99	I 42,5 S/SR	259	
304	456	15/09/99	E-2 Encepado	03010502	H-250	10	Fluida			3	242			100	13/10/99	I 42,5 S/SR	213	
304	457	15/09/99	E-2 Encepado	03010502	H-250	8	Blanda			3	275			100	13/10/99	I 42,5 S/SR	213	
274	513	27/09/99	Pila 2,i	03010503	H-300	7	Blanda			3	373			8	25/10/99	II AL 45,2 R	373	
351	527	29/09/99	Pila 2,d	03010503	H-300	10	Fluida			3	338			8	27/10/99	II AL 45,2 R	297	
362	541	04/10/99	E-2 Alzado	03010503	H-250	7	Blanda			3	251			100	02/11/99	I 42,5 S/SR	220	
362	542	04/10/99	E-2 Alzado	03010503	H-250	8	Blanda			3	250			100	02/11/99	I 42,5 S/SR	220	
363	543	04/10/99	E-2 Alzado	03010503	H-250	7	Blanda			3	382			100	02/11/99	I 42,5 S/SR	268	
363	544	04/10/99	E-2 Alzado	03010503	H-250	6	Blanda			3	304			100	02/11/99	I 42,5 S/SR	268	
364	545	04/10/99	E-2 Alzado	03010503	H-250	8	Blanda			3	306			70	02/11/99	I 42,5 S/SR	217	
364	550	04/10/99	E-2 Alzado	03010503	H-250	8	Blanda			3	247			70	02/11/99	I 42,5 S/SR	217	
381	564	06/10/99	E-1 Encepado	03010502	H-250	8	Blanda			3	327			100	03/11/99	I 42,5 S/SR	288	
381	565	06/10/99	E-1 Encepado	03010502	H-250	5	Blanda			3	379			100	03/11/99	I 42,5 S/SR	288	
382	566	06/10/99	E-1 Encepado	03010502	H-250	8	Blanda			3	311			100	03/11/99	I 42,5 S/SR	274	
382	567	06/10/99	E-1 Encepado	03010502	H-250	10	Fluida			3	330			100	03/11/99	I 42,5 S/SR	274	
383	568	06/10/99	E-1 Encepado	03010502	H-250	8	Blanda			3	338			100	03/11/99	I 42,5 S/SR	287	
383	569	06/10/99	E-1 Encepado	03010502	H-250	8	Blanda			3	326			100	03/11/99	I 42,5 S/SR	287	
416	618	18/10/99	E-2 Alzado 2	03010503	H-250	7	Blanda			3	364			100	15/11/99	I 42,5 S/SR	320	

FECHA FIRMA

NOMBRE Ana Mª Martín Herrrero

CARGO Jefe de Laboratorio

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SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-5

P.P.I. Nº 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f est	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
442	664	26/10/99	Pila 1,d	03010503	H-300	6	Blanda	2	343	3	376			16	25/11/99	II AL 45,2 R	376	
442	667	28/10/99	Pila 1,i	03010503	H-300	7	Blanda			3	377			16	25/11/99	II AL 45,2 R	376	
480	722	22/11/99	E-1 Alzado	03010503	H-250	12	Fluida			3	325			100	20/12/99	II AL 45,2 R	257	
480	723	22/11/99	E-1 Alzado	03010503	H-250	15	Fluida			3	292			100	20/12/99	II AL 45,2 R	257	
481	724	22/11/99	E-1 Alzado	03010503	H-250	12	Fluida			3	323			100	20/12/99	II AL 45,2 R	269	
481	725	22/11/99	E-1 Alzado	03010503	H-250	12	Fluida			3	306			100	20/12/99	II AL 45,2 R	269	
482	726	22/11/99	E-1 Alzado	03010503	H-250	12	Fluida			3	344			100	20/12/99	II AL 45,2 R	263	
482	727	22/11/99	E-1 Alzado	03010503	H-250	12	Fluida			3	299			100	20/12/99	II AL 45,2 R	263	
483	728	22/11/99	E-1 Alzado	03010503	H-250	11	Fluida			3	309			100	20/12/99	II AL 45,2 R	272	
483	729	22/11/99	E-1 Alzado	03010503	H-250	12	Fluida			3	310			100	20/12/99	II AL 45,2 R	272	
484	730	22/11/99	E-1 Alzado	03010503	H-250	12	Fluida			3	370			100	20/12/99	II AL 45,2 R	300	
484	731	22/11/99	E-1 Alzado	03010503	H-250	12	Fluida			3	341			100	20/12/99	II AL 45,2 R	300	
488	738	26/11/99	E-1 Alzado 2ºF	03010503	H-250	10	Fluida			3	302			100	06/01/00	II AL 45,2 R	266	

FECHA FIRMA

NOMBRE Ana Mª Martín Herrrero

CARGO Jefe de Laboratorio

LOTE DE f est < 0,9 fck

244 884

244 883

H-200 serie

SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO : V-5 Pilotes

P P I Nº 16

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f est	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. EST.	Nº	RES. MEDIA					
71	111	20/07/99	P-2 Pilote 1	03010501	H-200	15	fluida	2	244		325			50	27/07/99	I 42,5 R/SR	293	
75	124	21/07/99	P-2 Pilote 4	03010501	H-200	18	fluida	2	184		245			50	28/07/99	I 42,5 R/SR	221	
77	126	21/07/99	P-2 Pilote 5	03010501	H-200	17	fluida	2	192		256			50	28/07/99	I 42,5 R/SR	230	
83	133	23/07/99	E-2 Pilote 2	03010501	H-200	20	fluida	2	182		243			50	29/07/99	I 42,5 R/SR	218	
92	140	27/07/99	P-2 Pilote 3	03010501	H-200	19	fluida	2	198		264			50	03/08/99	I 42,5 R/SR	238	
94	143	28/07/99	E-2 Pilote 1	03010501	H-200	18	fluida	2	209		279			50	04/08/99	I 42,5 R/SR	245	
97	147	28/07/99	P-2 Pilote 6	03010501	H-200	17	fluida	2	205		273			50	04/08/99	I 42,5 R/SR	241	
103	155	29/07/99	P-2 Pilote 2	03010501	H-200	16	fluida	2	208		277			50	05/08/99	I 42,5 R/SR	244	
108	160	30/07/99	E-2 Pilote 15	03010501	H-200	16	fluida	2	247		329			50	06/08/99	I 42,5 R/SR	290	
111	165	02/08/99	E-2 Pilote 4	03010501	H-200	18	fluida	2	207		276			50	09/08/99	I 42,5 R/SR	243	
114	168	03/08/99	E-2 Pilote 3	03010501	H-200	17	fluida	2	200		267			50	10/08/99	I 42,5 R/SR	235	
118	172	04/08/99	E-2 Pilote 12	03010501	H-200	18	fluida	2	248		331			50	11/08/99	I 42,5 R/SR	291	
120	175	04/08/99	E-2 Pilote 10	03010501	H-200	19	fluida	2	348		464			50	11/08/99	I 42,5 R/SR	408	
124	181	05/08/99	E-2 Pilote 6	03010501	H-200	19	fluida	2	178		237			50	12/08/99	I 42,5 R/SR	209	
126	184	06/04/99	E-2 Pilote 14	03010501	H-200	19	fluida	2	226		301			50	13/08/99	I 42,5 R/SR	265	
129	187	09/08/99	E-2 Pilote 13	03010501	H-200	19	fluida	2	246		328			50	16/08/99	I 42,5 R/SR	289	
135	195	10/08/99	E-2 Pilote 5	03010501	H-200	19	fluida	2	207		276			50	17/08/99	I 42,5 R/SR	243	
142	205	12/08/99	E-2 Pilote 7	03010501	H-200	19	fluida	2	222		296			50	19/08/99	I 42,5 R/SR	260	
151	229	18/08/99	E-1 Pilote 13	03010501	H-200	18	fluida	2	236		315			50	25/08/99	I 42,5 R/SR	277	
152	230	18/08/99	E-1 Pilote 13	03010501	H-200	17	fluida	2	234		312			50	25/08/99	I 42,5 R/SR	275	
161	243	19/08/99	E-2 Pilote 7	03010501	H-200	18	fluida	2	230		307			50	26/08/99	I 42,5 R/SR	270	
162	244	19/08/99	E-2 Pilote 7	03010501	H-200	16	fluida	2	235		313			50	26/08/99	I 42,5 R/SR	276	
167	250	19/08/99	E-1 Pilote 17	03010501	H-200	18	fluida	2	213		284			50	26/08/99	I 42,5 R/SR	250	
174	260	20/08/99	E-1 Pilote 15	03010501	H-200	16	fluida	2	239		319			50	27/08/99	I 42,5 R/SR	280	
189	280	24/08/99	E-1 Pilote 14	03010501	H-200	19	fluida	2	181		241			50	31/08/99	I 42,5 R/SR	212	
194	288	24/08/99	E-1 Pilote 3	03010501	H-200	18	fluida	2	197		263			50	31/08/99	I 42,5 R/SR	231	
203	302	26/08/99	E-1 Pilote 12	03010501	H-200	18	fluida	2	241		321			50	02/09/99	I 42,5 R/SR	283	
215	326	30/08/99	E-1 Pilote 20	03010501	H-200	18	fluida	2	205		273			50	06/09/99	I 42,5 R/SR	241	
216	327	30/08/99	E-1 Pilote 20	03010501	H-200	19	fluida	2	226		301			50	06/09/99	I 42,5 R/SR	265	
224	343	31/08/99	E-1 Pilote 18	03010501	H-200	20	fluida	2	207		276			50	07/09/99	I 42,5 R/SR	243	
225	344	31/08/99	E-1 Pilote 18	03010501	H-200	16	fluida	2	200		267			50	07/09/99	I 42,5 R/SR	235	
233	356	01/09/99	E-1 Pilote 12	03010501	H-200	20	fluida	2	235		313			50	07/09/99	I 42,5 R/SR	276	

FECHA FIRMA

NOMBRE Ana Mª Martín Herrrero

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SAITEC SYNCONSULT S.L.

UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO : V-5 Pilotes

P P I Nº 16

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f est	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. EST.	Nº	RES. MEDIA					
234	357	01/09/99	E-1 Pilote 12	03010501	H-200	18	fluida	2	237		316			50	08/09/99	I 42,5 R/SR	278	
236	361	02/09/99	E-1 Pilote 5	03010501	H-200	18	fluida	2	221		295			50	09/09/99	I 42,5 R/SR	259	
237	362	02/09/99	E-1 Pilote 5	03010501	H-200	20	fluida	2	251		335			50	09/09/99	I 42,5 R/SR	295	
244	372	03/09/99	E-1 Pilote 19	03010501	H-200	20	fluida	2	184		245			50	10/09/99	I 42,5 R/SR	216	
245	373	03/09/99	E-1 Pilote 19	03010501	H-200	20	fluida	2	189		252			50	10/09/99	I 42,5 R/SR	222	
256	388	06/09/99	P-1 Pilote 3	03010501	H-200	20	fluida	2	212		283			50	13/09/99	I 42,5 R/SR	249	
257	389	06/09/99	P-1 Pilote 3	03010501	H-200	19	fluida	2	244		325			50	13/09/99	I 42,5 R/SR	286	
263	397	07/09/99	E-1 Pilote 6	03010501	H-200	18	fluida	2	206		275			50	14/09/99	I 42,5 R/SR	242	
269	401	08/09/99	P-1 Pilote 4	03010501	H-200	20	fluida	2	194		259			50	15/09/99	I 42,5 R/SR	228	
275	414	09/09/99	E-1 Pilote 9	03010501	H-200	20	fluida	2	261		348			50	16/09/99	I 42,5 R/SR	306	
286	429	13/09/99	P-1 Pilote 5	03010501	H-200	18	fluida	2	206		275			50	20/09/99	I 42,5 R/SR	242	
289	433	14/09/99	E-2 Pilote 4	03010501	H-200	15	fluida	2	206		275			50	21/09/99	I 42,5 R/SR	242	
290	434	14/09/99	P-1 Pilote 1	03010501	H-200	15	fluida	2	243		324			50	21/09/99	I 42,5 R/SR	285	
350	525	29/09/99	E-1 Pilote 10	03010501	H-200	15	fluida	2	206		275			50	06/10/99	I 42,5 R/SR	242	
352	528	29/09/99	E-1 Pilote 8	03010501	H-200	16	fluida	2	207		276			50	06/10/99	I 42,5 R/SR	243	

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UNION TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO V-5 Tablero

P.P.I. Nº 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f est	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES MEDIA	Nº	RES MEDIA	Nº	RES MEDIA					
525	803	29/12/99	Tablero 1º	03010505	H-400	14	Fluida			3	432			100	26/01/00	II AL 45,2 R	380	
525	804	29/12/99	Tablero 1º	03010505	H-400	12	Fluida			3	468			100	26/01/00	II AL 45,2 R	380	
526	805	29/12/99	Tablero 1º	03010505	H-400	14	Fluida			3	355			100	26/01/00	II AL 45,2 R	312	
526	806	29/12/99	Tablero 1º	03010505	H-400	15	Fluida			3	413			100	26/01/00	II AL 45,2 R	312	
527	807	29/12/99	Tablero 1º	03010505	H-400	14	Fluida			3	472			100	26/01/00	II AL 45,2 R	385	
527	808	29/12/99	Tablero 1º	03010505	H-400	13	Fluida			3	438			100	26/01/00	II AL 45,2 R	385	
528	809	29/12/99	Tablero 1º	03010505	H-400	15	Fluida			3	409			100	26/01/00	II AL 45,2 R	360	
528	810	29/12/99	Tablero 1º	03010505	H-400	12	Fluida			3	450			100	26/01/00	II AL 45,2 R	360	
529	811	29/12/99	Tablero 1º	03010505	H-400	14	Fluida			3	422			100	26/01/00	II AL 45,2 R	371	
529	812	29/12/99	Tablero 1º	03010505	H-400	11	Fluida			3	428			100	26/01/00	II AL 45,2 R	371	
530	813	29/12/99	Tablero 1º	03010505	H-400	14	Fluida			3	425			100	26/01/00	II AL 45,2 R	374	
530	814	29/12/99	Tablero 1º	03010505	H-400	13	Fluida			3	426			100	26/01/00	II AL 45,2 R	374	
573	891	26/01/00	Tablero 2º	03010505	H-400	12	Fluida			3	438			100	23/02/00	II AL 45,2 R	363	
573	892	26/01/00	Tablero 2º	03010505	H-400	12	Fluida			3	413			100	23/02/00	II AL 45,2 R	363	
574	893	26/01/00	Tablero 2º	03010505	H-400	11	Fluida			3	493			100	23/02/00	II AL 45,2 R	411	
574	898	26/01/00	Tablero 2º	03010505	H-400	12	Fluida			3	467			100	23/02/00	II AL 45,2 R	411	

FECHA FIRMA

NOMBRE Ana Mª Martín Herrero

CARGO Jefe de Laboratorio

LOTE DE f est < 0,9 fck

RI 'MEN DE RESULTADOS

Número Tendón	Alargamientos fase 1 Tesa	Rete	Total		Alargamientos fase 2 Tesa	Rete	Total		Alarg Total	Alarg Teor	Difer %
1	319	0	319						319	311	2.6
6	264	0	264						264	311	-15
3	309	0	309						309	311	-0.8
4	335	0	335						335	311	7.8
5	289	0	289						289	311	-7.2
2	308	0	308						308	311	-1.1
7	324	0	324						324	311	4.1
8	313	0	313						313	311	0.7
9	322	0	322						322	326	-1.3
10	317	0	317						317	326	-2.7
11	329	0	329						329	326	0.8
12	307	0	307						307	326	-5.8
13	320	0	320						320	326	-2
14	294	0	294						294	326	-9.9
15	321	0	321						321	326	-1.6
16	323	0	323						323	326	-1

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....= 8 %
Diferencia negativa maxima.....= -15.0 %
DIFERENCIA MEDIA.....= -2.0 %

El alargamiento teórico ha sido calculado por MK4.
El alargamiento obtenido está dentro del rango de valores esperables.
Por lo tanto, desde nuestro punto de vista, la operación de tesado puede darse por correcta y concluida.

MEKANO-4	PARTE DE TESADO
	FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 5, FASE 1
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	Enero 2000
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	--
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	--

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm) 60	150	200		200	250	300	350	400	425		Alargamientos TES mm	RET mm
1	24/0,6"	425	100	170	205		10	46	81	118	155	179		319.0	
6	24/0,6"	425	79	134	176		40	57	83	125	155	170		264.3	
3	24/0,6"	425	72	132	174		10	55	80	113	157	173		308.6	
4	24/0,6"	425	112	183	222		12	50	88	127	169	190		335.3	
5	24/0,6"	425	90	168	196		20	46	83	120	145			288.8	
2	24/0,6"	425	100	161	198		12	55	86	124	160			307.5	
7	24/0,6"	425	86	156	193		10	46	84	122	162	181		323.7	
8	24/0,6"	425	90	150	190		25	65	103	140	165	194		313.2	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm) 60	150	200	250	250	300	350	400	450	500	540	Alargamientos TES mm	RET mm
9	12/0,6"	540	38	97	128	160	0	20	55	84	115	147	164	321.8	
10	12/0,6"	540	47	95	125	154	0	25	53	88	120	155	175	317.3	
11	12/0,6"	540	44	90	125	156	0	25	60	91	120	154	180	328.5	
12	12/0,6"	540	42	90	122	153	0	17	50	74	109	137	162	307.1	
13	12/0,6"	540	66	114	142	174	0	330	64	95	124	155	176	319.5	
14	12/0,6"	540	51	96	122	155	0	20	50	80	108	137	157	293.6	
15	12/0,6"	540	54	98	129	160	0	29	60	90	120	150	179	320.6	
16	12/0,6"	540	44	100	130	161	0	20	51	80	114	145	170	322.9	

OBSERVACIONES :

EL TENDON N° 5 TIENE 3 TORONES ROTOS
EL TENDON N° 2 TIENE 2 TORONES ROTOS.

LOS TENDONES N° 3 Y 5 SE TENSARON DESDE LADO PLACA EMPALM
EL RESTO SE TENSARON DESDE EL ESTRIBO.

2	161	0	161						161	144	11
7	174	0	174						174	144	21
8	186	0	186						186	144	29
9	131	0	131						131	116	13
10	134	0	134						134	116	15
11	136	0	136						136	116	17
12	136	0	136						136	116	17
13	137	0	137						137	116	18
14	147	0	147						147	116	27
15	160	0	160						160	116	38
16	147	0	147						147	116	27

Diferencias porcentuales entre los alargamientos reales y los teoricos

Diferencia positiva maxima.....=	38	%
Diferencia negativa maxima.....=	1.5	%
DIFERENCIA MEDIA.....=	16.6	%

El alargamiento teórico ha sido calculado por MK4.
El alargamiento obtenido está dentro del rango de valores esperables.
Por lo tanto, desde nuestro punto de vista, la operación de tesado puede darse por correcta y concluida.

MEKANO-4 | **PARTE DE TESADO**

FT-60-5

Obra:	AVE MADRID -ZARAGOZA
Estructura:	VIADUCTO 5, FASE 2
Contratista:	Ute Lav Mejorada-Anchuelo
Localidad:	Madrid
Fecha:	29/01/00
Fase de tesado:	única

Técnico Sr.	Mino López
Tipo de gato	M-7 y M-3
Número de gato	--
Area de presión gato	1099,525 y 433,527 cm2
Tipo de central	BPT-11
Número de central	--

Manómetro utilizado	Central
Unidades presión en manómetro	Bar

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
				100	200	300	400	425						TES mm	RET mm
1	24/0,6"	425		43	75	105	146	163						156.9	
6	24/0,6"	425		43	74	105	143	156						147.8	
3	24/0,6"	425		55	84	115	154	175						156.9	
4	24/0,6"	425		43	75	106	150	165						159.5	
5	24/0,6"	425		40	70	100	140	152						146.5	
2	24/0,6"	425		42	78	107	150	165						160.8	
7	24/0,6"	425		44	74	105	152	177						173.9	
8	24/0,6"	425		47	77	108	172	189						185.7	

Tendón	Tipo	Presión tesado (BAR)	Lecturas de carrera de embolo (mm)											Alargamientos	
				100	200	300	400	500	540					TES mm	RET mm
9	12/0,6"	540		34	51	78	104	122	141					131.3	
10	12/0,6"	540		28	52	74	98	124	137					133.8	
11	12/0,6"	540		32	56	82	103	127	143					136.2	
12	12/0,6"	540		38	53	85	109	134	149					136.2	
13	12/0,6"	540		32	52	76	100	125	144					137.5	
14	12/0,6"	540		28	52	75	98	125	148					147.3	
15	12/0,6"	540		28	52	77	102	132	158					159.5	
16	12/0,6"	540		30	52	77	100	126	150					147.3	

RESUMEN DE RESULTADOS

Número Tendón	Alargamientos fase 1				Alargamientos fase 2				Alarg Total	Alarg Teor	Dif er %
	Tesa	Rete	Total		Tesa	Rete	Total				
1	157	0	157						157	144	8.7
6	148	0	148						148	144	2.4
3	157	0	157						157	144	8.7
4	160	0	160						160	144	11
5	146	0	146						146	144	1.5

VIADUCTO 5

PRUEBA DE CARGA

La estructura se ha modelizado como una viga continua de las siguientes características:

- Luces: 20.00, 26.00, 20.00 m
- Sección transversal (A): 13.108 m^2
- Momento de inercia (I): 4.2849 m^4
- Resistencia característica del hormigón (f_{ck}): 400 kp/cm^2
- Módulo de elasticidad (E): $3.8x10^6$ t/m^2

El tren de cargas ha consistido en 6 camiones no articulados de 3 ejes y 26 t de peso total (tipo *dumper*), agrupados en dos bloques de tres vehículos en fondo con las cajas enfrentadas. Con dicho tren recorriendo la estructura, se han calculado* las líneas de influencia de las flechas y momentos en centros de vano, y de las reacciones en los apoyos. Los ejes de cada camión transmiten cargas de 7 t (eje delantero) y 9.5 t (cada eje del tándem trasero), siendo los interejes de 3.90 y 1.35 m. El tren de cargas completo queda definido por los siguientes parámetros:

- Cargas: 21, 28.5, 28.5, 28.5, 28.5, 21 t
- Interejes: 3.90, 1.35, 3.00, 1.35, 3.90 m

Se ha calculado**, así mismo, el valor del período de vibración correspondiente a la frecuencia principal de vibración libre de la estructura.

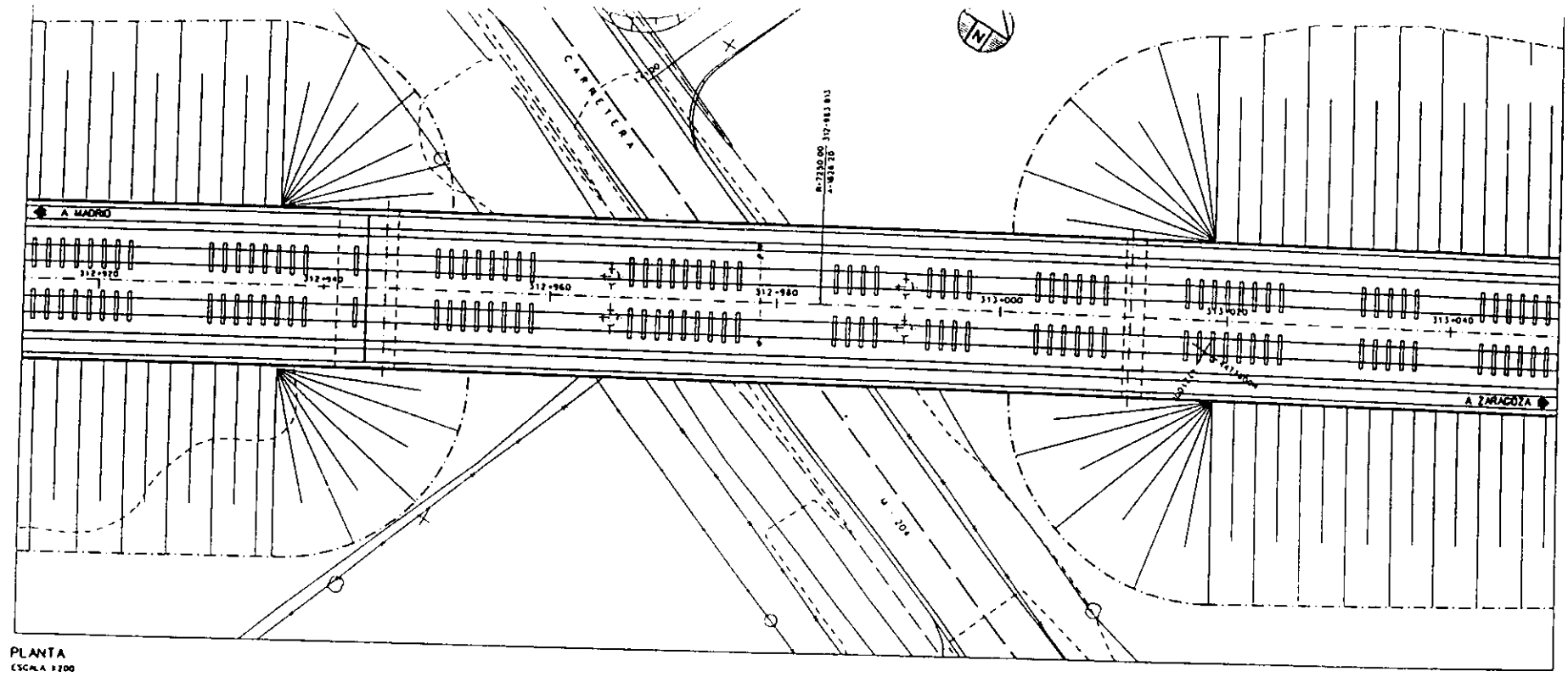
Los resultados previstos son los siguientes:

Vano	Abscisa de carga [m]	Flecha [mm]	Momento flector [mt]
1	15.25	-0.91	405
2	21.25	-1.48	449
3	18.25	-0.91	405

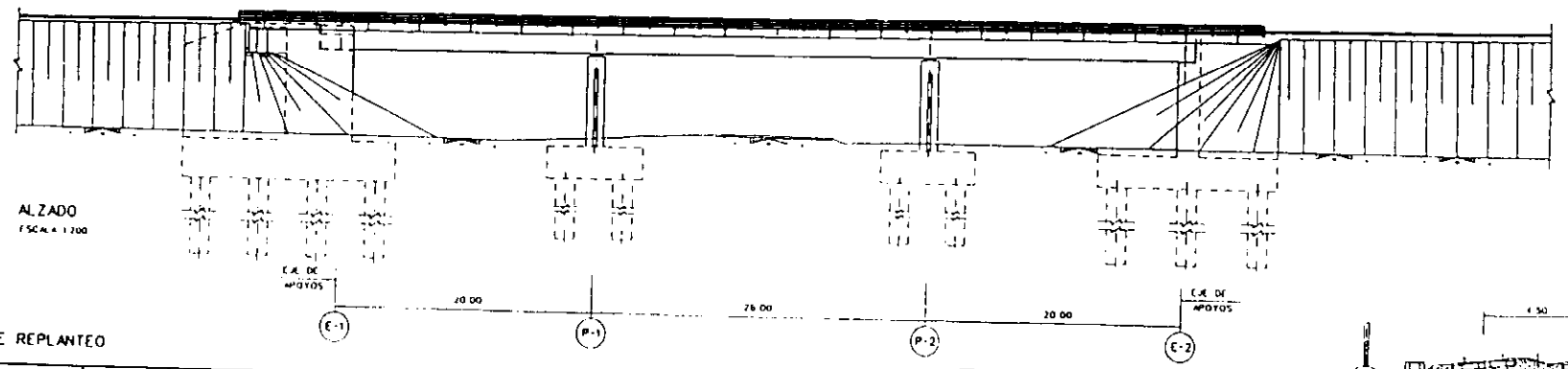
Flechas previstas en viaducto 5

La frecuencia principal de vibración es de 6.75 Hz, correspondiente a un período de 0.1482 s.

* Con el programa Merlin, de Kinesia
** Con el programa SAP 80



PLANTA
ESCALA 1:200

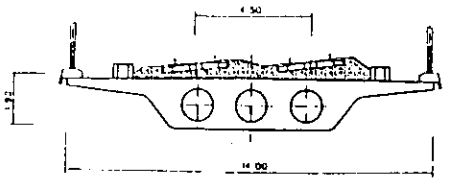


ALZADO
ESCALA 1:200

COORDENADAS DE REPLANTEO

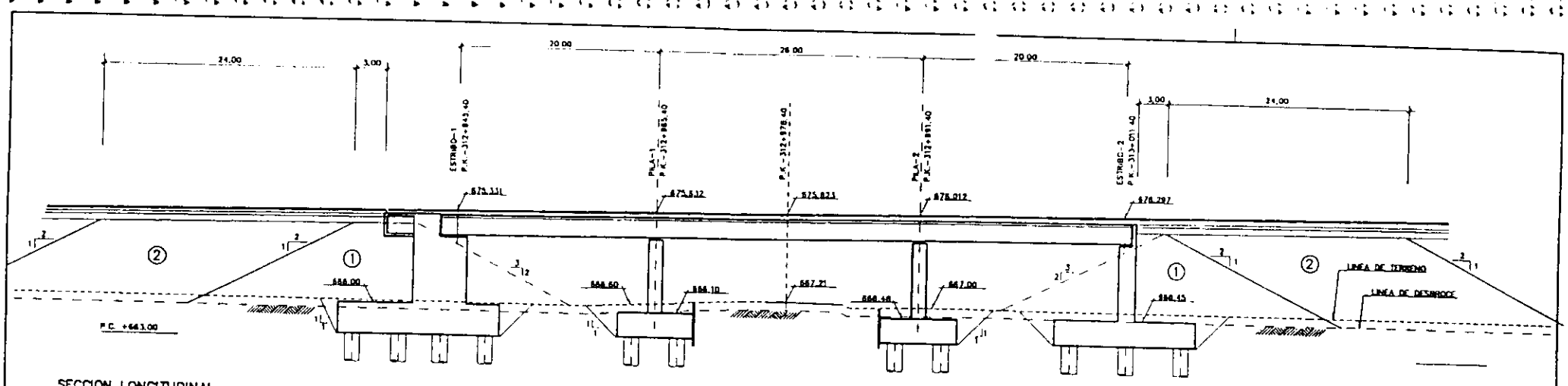
	D.O	X	Y	Az
E-1	312+845.400	472.038.248	4.477.765.065	165 4235 g
P-1	312+965.400	472.053.383	4.477.775.377	165 5872 g
P-2	312+991.400	472.075.702	4.477.788.713	165 7924 g
E-2	313+011.400	472.092.903	4.477.798.917	166 0054 g

VIGENTE
FECHA: 3-8-99
RESPONSABLE:
CODIGO: P.F. 2.9.5.1-A



SECCION TRANSVERSAL TIPO
ESCALA 1:100

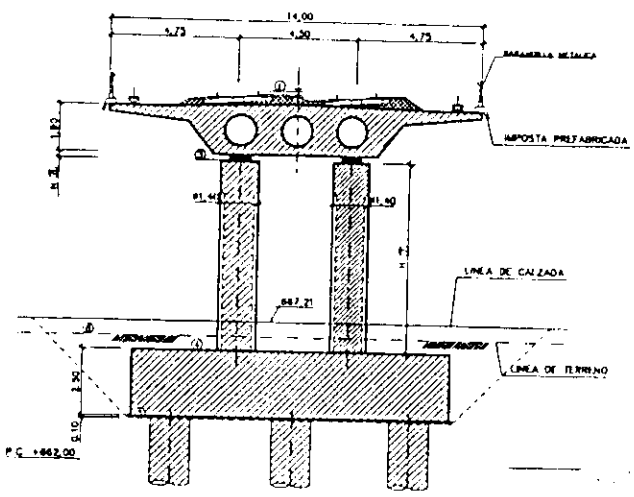
GIF	PROYECTO CONSTRUCTIVO LINEA DE ALTA VELOCIDAD MADRID-BARCELONA-FRONTERA FRANCESA TRAMO: MADRID-ZARAGOZA SUBTRAMO 8 PLATAFORMA (MODIFICADO Nº 2)	EL INGENIERO DIRECTOR DEL PROYECTO Fdo.: D. JOSE MANUEL CARBONELL	EL INGENIERO AUTOR Fdo.: D.	Autor U.T.E. Dragados TECSA	CONFORME POR EL CONTRATISTA Fdo.: D. ALVARO FERNANDEZ COSTA	ESCALA 1:200 1:100	FECHA JUNIO 1999	TITULO DEL PLANO ESTRUCTURA P.K. 312+978,40 PLANO GENERAL VIADUCTO 5	Nº DE PLANO 2.9.5.1 Hoja 1 de



SECCION LONGITUDINAL
ESCALA 1/200

①	SUELO ESTABILIZADO CON CEMENTO
②	ZAHORRAS COMPACTADAS

	①	②	③	④	⑤	⑥	⑦	⑧
	RASANTE	CORONACION TABLERO	CORONACION PILA	CORONACION ZAPATA	FONDO EXCAVACION	TERRENO	H PILAS	ALTURA N (mm)
ESTRIBO-1	875.331	874.861	872.583	886.00	883.00	886.20	6.583	178
PILA-1	875.832	874.982	872.866	886.10	883.50	886.80	6.768	194
PILA-2	876.012	875.342	873.248	886.48	883.88	887.00	6.768	194
ESTRIBO-2	876.297	875.827	873.548	886.45	883.95	886.70	7.099	178



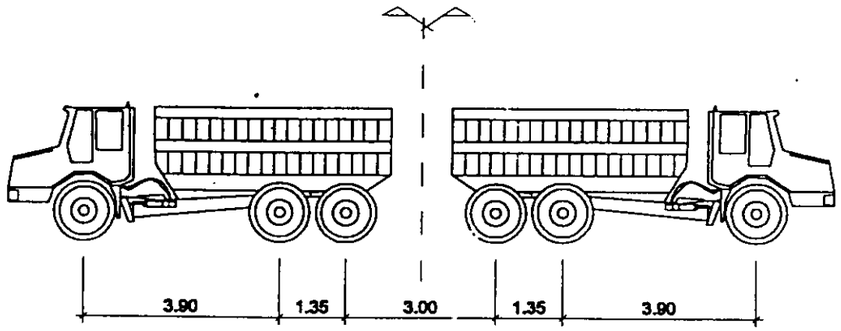
SECCION TRANSVERSAL
ESCALA 1/100

VIGENTE
FECHA: 25-1-200
RESPONSABLE:
CODIGO: P.F. 2.9.5.3-D

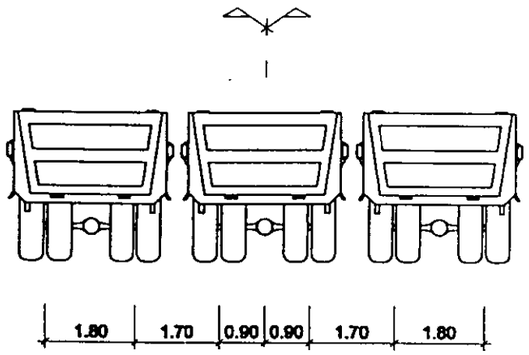
GIF	TITULO PROYECTO CONSTRUCTIVO LINEA DE ALTA VELOCIDAD MADRID-BARCELONA-FRONTERA FRANCESA TRAMO: MADRID-ZARAGOZA	EL INGENIERO DIRECTOR DEL PROYECTO	AUTOR U.T.E. DRAGADOS - TECSA	CONFORME POR EL CONTRATISTA	ESCALA 1:200 1:100	FECHA ENERO 2000

TITULO DEL PLANO P.K. 312+978,40 SECC. LONGITUDINAL Y TRANSVERSAL | Nº DE PLANO 2.9.5.3

DISPOSICION DE CAMIONES EN TODOS LOS VANOS

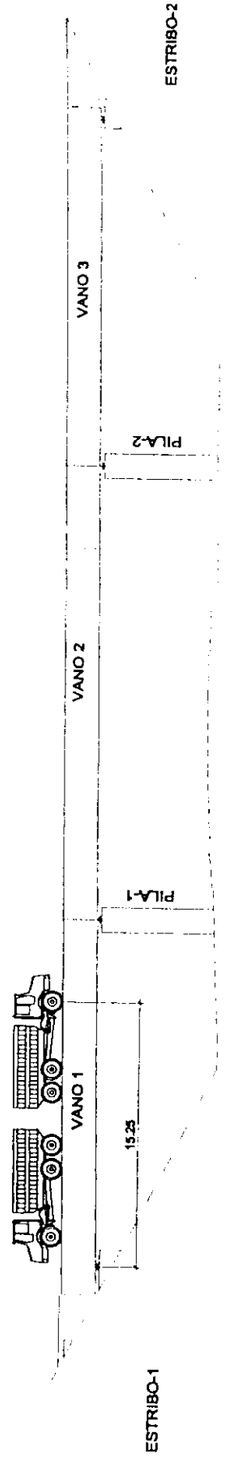


LONGITUDINALMENTE

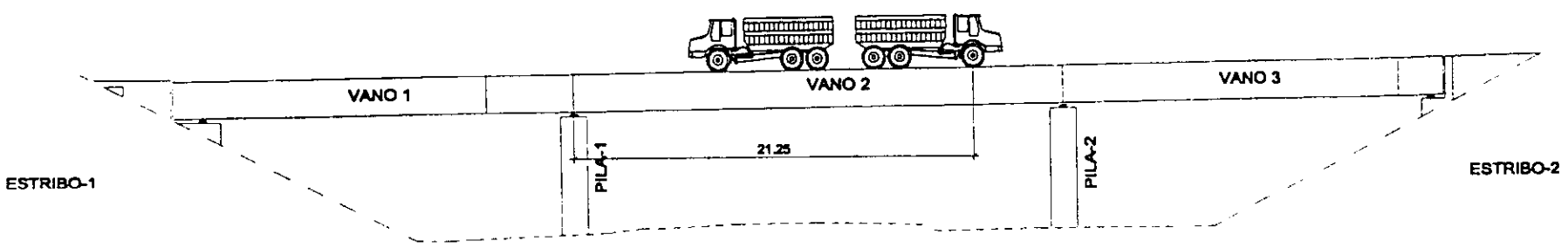


TRANSVERSALMENTE

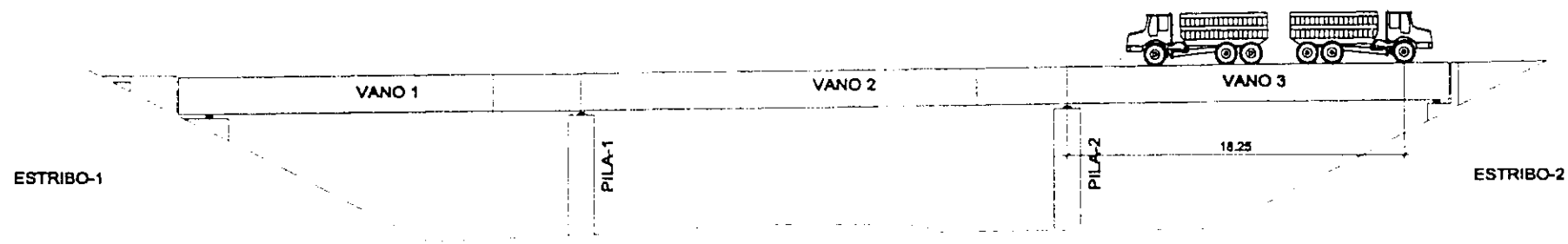
PRUEBA DE CARGA VIADUCTO Nº 5



PRUEBA DE CARGA VIADUCTO Nº 5



PRUEBA DE CARGA VIADUCTO Nº 5



```
V  )UCTO 5
SAP80 V85.02

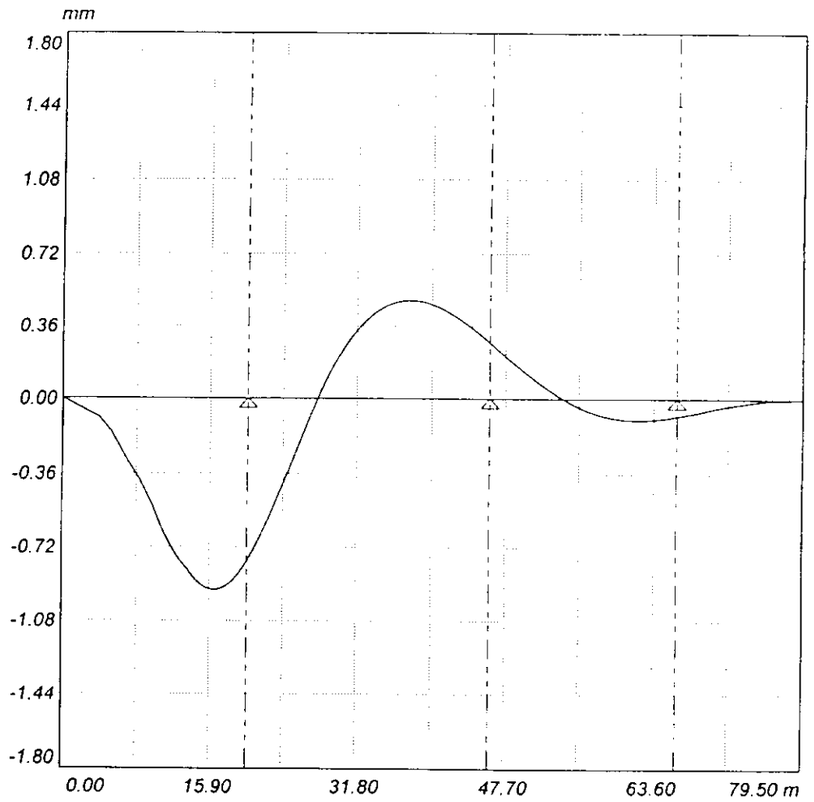
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* * *  E V A L U A T I O N   O F   E I G E N V A L U E S  * * *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *


 NUMBER OF EQUATIONS              =  130
 HALF BAND WIDTH                  =    3
 NUMBER OF MASSES                 =   63
 NUMBER OF VALUES TO BE EVALUATED=    1
 SIZE OF SUBSPACE                 =    2
 NUMBER OF ITERATIONS PER SHIFT   =    2

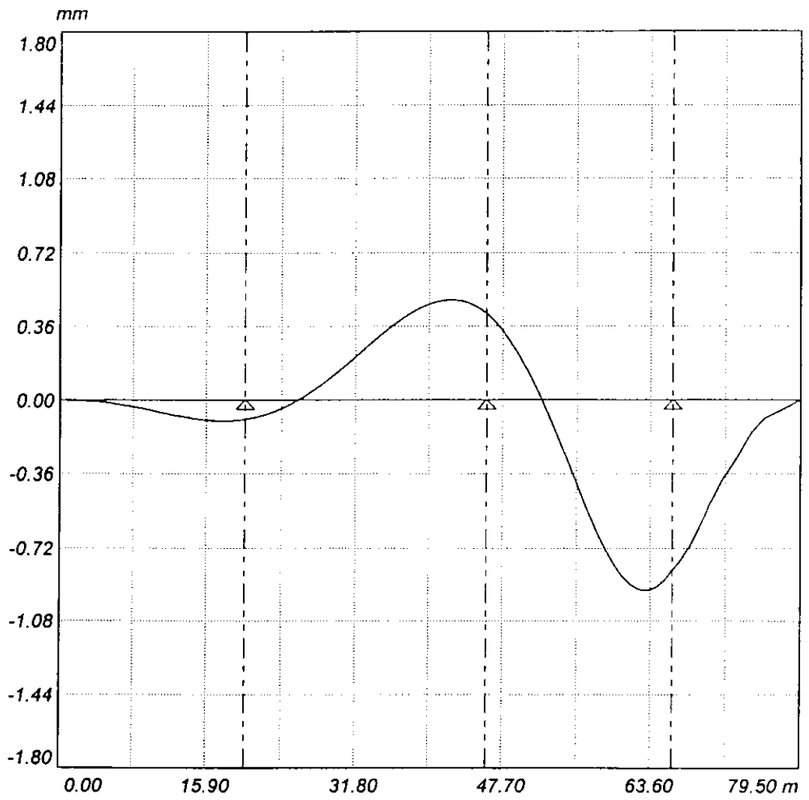

    CURRENT # BELOW ITER
      SHIFT   SHIFT    #          APPROXIMATIONS OF NEXT 4 EIGENVALUES
-.10000E+01       0
                      1  .2275904E+04 .5802891E+04 .0000000E+00 .0000000E+00
                      2  .1837942E+04 .5261524E+04 .2275904E+04 .5802891E+04
 .16541E+04       0
                      3  .1796911E+04 .4851256E+04 .1837942E+04 .5261524E+04
                      4  .1796862E+04 .4660713E+04 .1796911E+04 .4851256E+04
 .16172E+04       0
                      5  .1796862E+04 .4588344E+04 .1796862E+04 .4660713E+04

                                    EIGENVALUE #  1  =     .179686E+04
                                    PERIOD (SECONDS) =        .148225
```

Viaducto 5
Flecha en vano 1 (línea de influencia)
3+3 Camiones 26 t

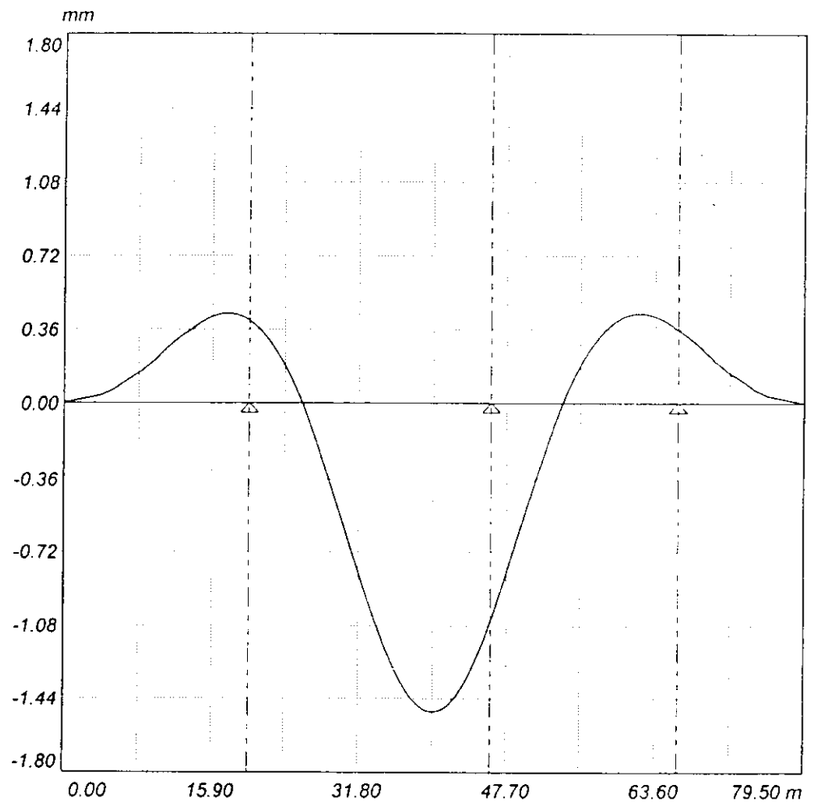


Viaducto 5
Flecha en vano 3 (línea de influencia)
3+3 Camiones 26 t

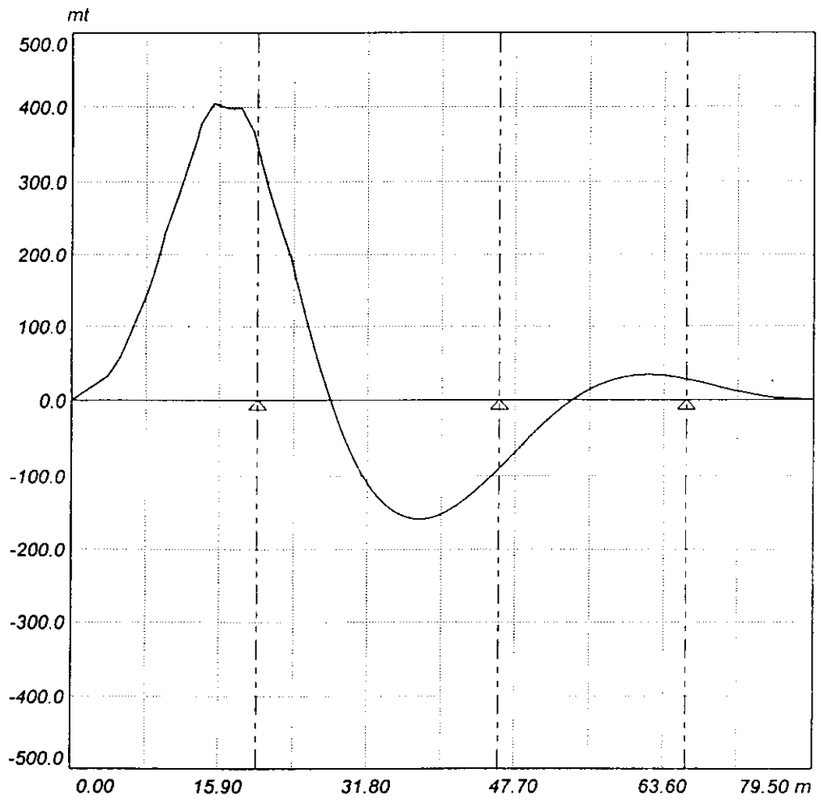


Kinesia

Viaducto 5
Flecha en vano 2 (línea de influencia)
3+3 Camiones 26 t

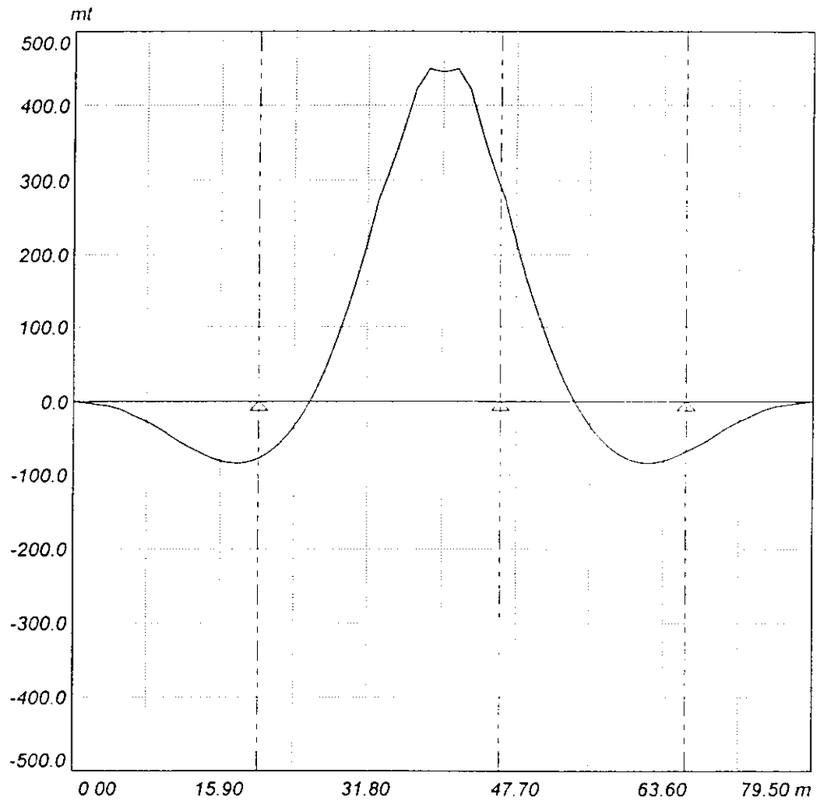


Viaducto 5
Momento en vano 1 (línea de influencia)
3+3 Camiones 26 t

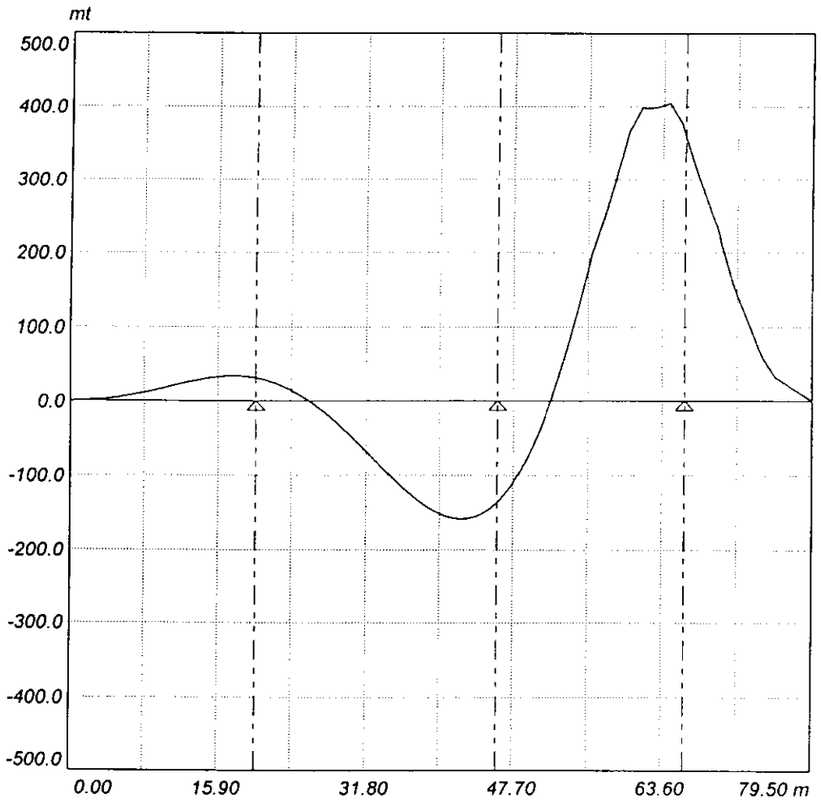


Kinesia

Viaducto 5
Momento en vano 2 (línea de influencia)
3+3 Camiones 26 t

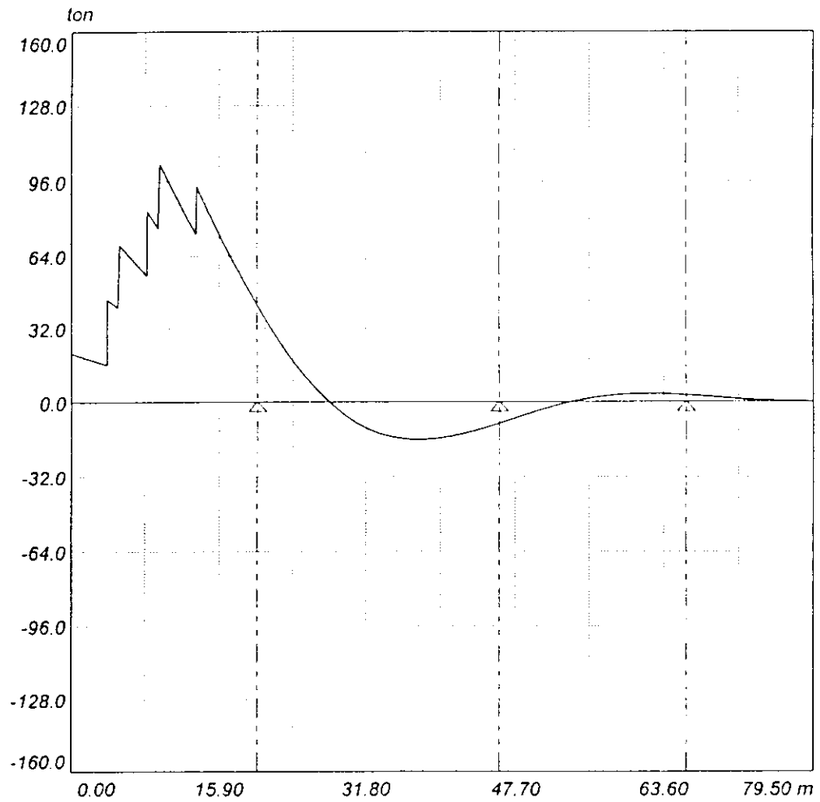


Viaducto 5
Momento en vano 3 (línea de influencia)
3+3 Camiones 26 t

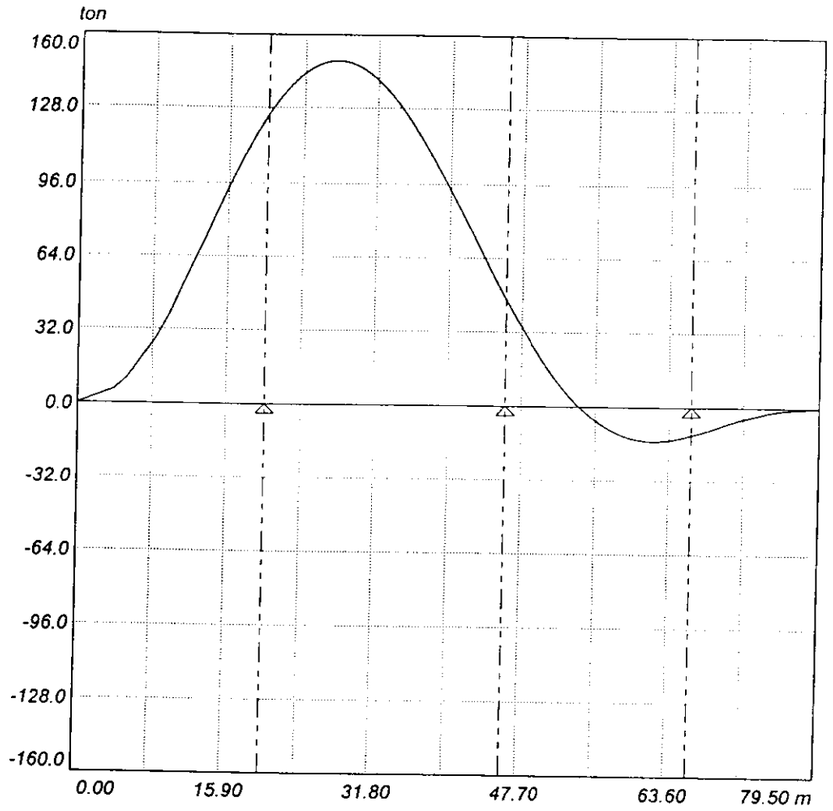


Kinesia

Viaducto 5
Reacción en apoyo 1 (línea de influencia)
3+3 Camiones 26 t

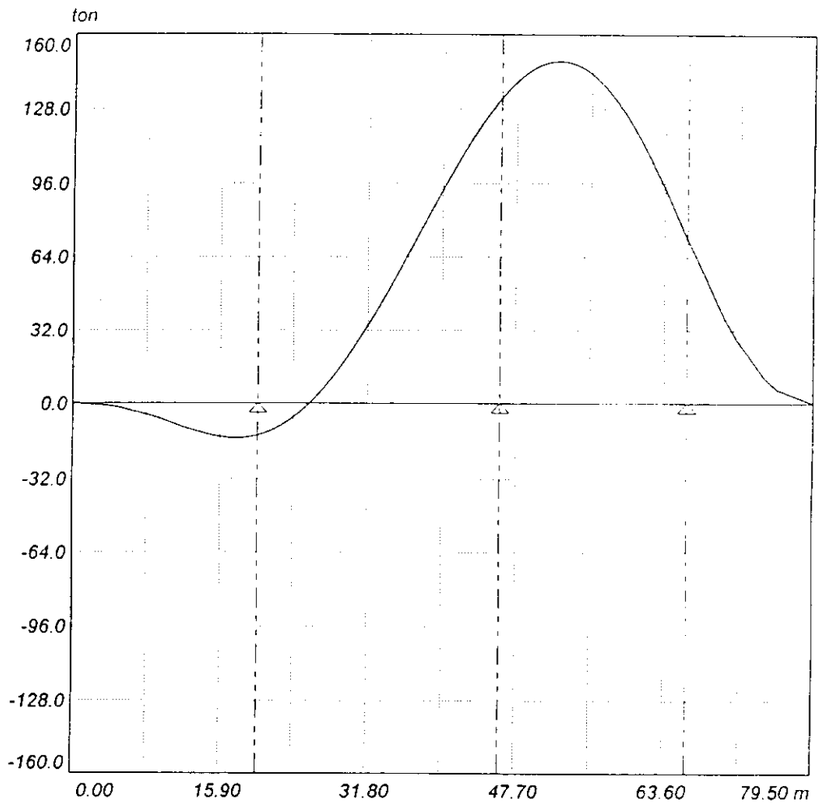


Viaducto 5
Reacción en apoyo 2 (línea de influencia)
3+3 Camiones 26 t

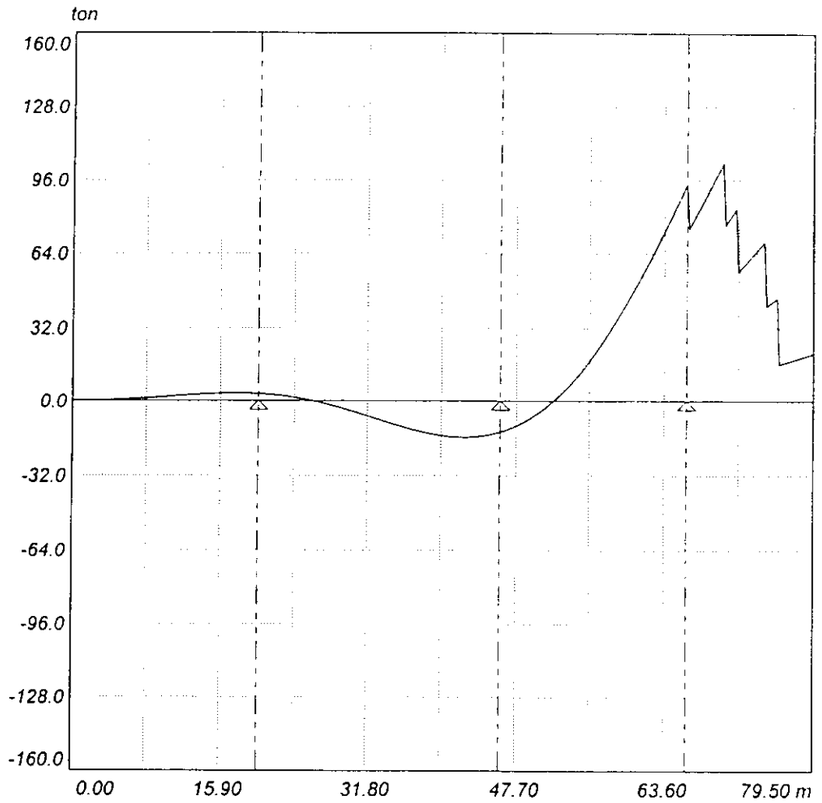


Kinesia

Viaducto 5
Reacción en apoyo 3 (línea de influencia)
3+3 Camiones 26 t



Viaducto 5
Reacción en apoyo 4 (línea de influencia)
3+3 Camiones 26 t



Accesos y elementos para mantenimiento

ACCESOS Y ELEMENTOS PARA MANTENIMIENTO

Los mismos elementos que requieren un mantenimiento son los aparatos de apoyo que habrá que sustituirles cuando haya finalizado su vida útil. a todos ellos se accede desde la carretera M-204, que es la que se salva con este viaducto. Dado que el tablero está anclado en el estribo 1, para poder sustituir estos aparatos de apoyo es necesario liberar este anclaje antes de levantar el tablero, para ello se ha dejado visitable el trasdós del estribo mediante una puerta metálica en el lado derecho del mencionado estribo que permite el acceso con los elementos necesarios.

Paso Superior 1 (P.K. 300+700)

PASO SUPERIOR 1 (P.K. 300+700)

ÍNDICE

- DESCRIPCIÓN Y CÁLCULOS
- RESUMEN DEL CONTROL DE CALIDAD

ÍNDICE

1. **Descripción General**
2. **Hipótesis de cálculo y proceso de construcción**
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1. DESCRIPCION GENERAL

El paso superior 1 del P.K. 300 + 700 está constituida por tres vanos de 13 + 17 + 13 = 43 m.

La sección transversal tiene una distribución de calzadas de 1.35 + 3.05 + 3.05 + 1.35 = 8.80 .

La planta es recta y lleva pendientes decrecientes del 2 % en los dos sentidos, respecto del eje.

La estructura es de hormigón armado con sección trapezoidal aligerada, con una base de 3.00 m. de ancho y voladizos de 2.60 m., terminados en 0.18 m de espesor. El canto mínimo de la losa es de 1.10 m.

Los aligeramientos son tres de seccion circular de 0.60 m de diámetro.

Las dos pilas intermedias son de fuste único de 1.00 m. de diámetro y se empotran en el tablero.
Las zapatas de las pilas son de 4.00 x 4.00 x 1.50 m para una tensión admisible de 3.5 kp/cm^2

Los estribos son del tipo convencional con aletas voladas.

La separación de los dos apoyos elastoméricos dispuestos en los estribos es de 6.80 m para garantizar la estabilidad transversal del tablero.

La zapata del estribo es común a todo él, con una sección longitudinal de 5.50 x 1.00 m. y transversal de 9.20 m. y altura de muro de 8.50 m.

Lleva aceras prefabricadas con barandilla y defensa elástica,así como valla antivandálica. Dichas aceras vuelan 0.30 m desde el borde de la losa.

Finalmente, se han dispuesto losas de transición de 5.00 x 0.30 m. de sección.

2. HIPOTESIS DE CALCULO Y PROCESO DE CONSTRUCCION .

Inicialmente, se estudia el tablero como emparrillado a fin de obtener el coeficiente de reparto transversal y los esfuerzos transversales de flexión, cortante y torsión.

Con el coeficiente de reparto transversal aplicado a la sobrecarga de tráfico, se calcula longitudinalmente el puente como pórtico, formado por viga-tablero,apoyado en los estribos y pilas y se determinan las secciones de armaduras pasivas longitudinales en primer lugar.

Las armaduras de cortante longitudinal y las de flexión y cortante transversal, se determinan por medio de los esfuerzos obtenidos anteriormente, en especial en las inmediaciones de los apoyos.

A partir de los valores anteriores, se calculan las pilas de soporte único con consideración del efecto de pandeo y sometidas a viento, frenado y térmicas y reológica.

Los estribos estarán sometidos a las cargas transmitidas por el tablero, tanto verticales como horizontales y las de empuje de tierras, para las hipótesis pésimas.

De acuerdo con la Norma sismorresistente NCS- 94, para esta zona y tipo de obra no es preciso la comprobación por el sismo.

Las acciones consideradas en el cálculo, han sido las de peso propio, cargas permanentes tanto de pavimentos como aceras, barandillas, etc., y sobrecargas de tráfico, así como de temperatura y reológicas.
Para el estudio del emparrillado se usó el programa TREBOL II, programa este de reconocida solvencia.

Al resolver la estructura como viga – losa con dos pilas empotradas y apoyada en los estribos, se apeló al programa PFRAME- STRES1 de la Universidad de Berkeley.

Dicho programa permite introducir cargas tanto horizontales, como verticales, puntuales ó repartidas, así como del tipo de las térmicas ó asimiladas.

En el caso que se considera, se hicieron las siguientes hipótesis :
Area de la sección :

- 8.2x 0.041 = 0.336 m2/m
- 8.2x 0.18 = 1.476 m2/m
- 5.85x0.123 = 0.720 m2/m
- 3.25x0.797 = 2.590 m2/m
- 3x0.785x0.36 =-0.845 m2/m

■

Area total aligerada: 4.277 m2/m

Peso propio 2.5x4.277=	10.692 t/m		
Pavimento 0.2x 6.1	=	1.220 t/m	
Aceras 2x2.5x0.40	=	2.000 t/m	
Barreras,barandillasy vallas: 2x0.21=0.420 t/m			14.332 t/m

- Peso propio + pavimento + aceras = 14.332 t/m
- Sobrecarga de tráfico : 0.40 t/m2, vanos 1 y 3 y carro de 60 t en vano1 .
- Sobrecarga de tráfico : 0.40 t/m2 y carro de 60 t en vano 2.
- Sobrecarga de tráfico :0.40 t/m2 en vano 1 y 0.40 t/m2 y carro de 60 t en vano 2.
- Viento en pilas 1 y 2.
- Efecto de temperatura ó asimilado: 25° para retracción y 40ª para temperatura propiamente dicha.

Facilmente se obtuvieron los combinaciones mas desfavorables para hallar los esfuerzos que luego llevaron a las armaduras.

Dichos esfuerzos se compararon con los obtenidos con los de la viga-losa apoyada en las pilas y dieron unos resultados muy similares dada la pequeña rigidez relativa de estas.

En el cálculo de las pilas se hizo uso de la hipótesis desfavorable de frenado y deformación de apoyos extremos en sentido longitudinal y viento transversal sobre tablero y pila.

Como expresión de acción del viento, se adoptó la clásica de 200 kg/m2, consecuencia aproximada de la fórmula: pv= 154x(2-0.7xc),para c =1.

Para la altura de cálculo del tablero, se consideró 3 m, resultado por exceso de sumar el canto de la losa con dos veces la acera y dos veces el efecto virtual de las barandillas.

En los estribos se tomó como angulo de rozamiento interno $\varphi = 30°$, densidad de las tierras $\gamma = 2$ t/m3 y sobrecarga en el trasdós 1 t/m2 y con un programa propio en QBASIC , se obtuvieron los coeficientes de estabilidad y los esfuerzos y las armaduras en las secciones principales.

La junta de dilatación en los estribos será por tanto para una longitud total de 44 m : 0.65x44 = 28.6 mm.

Para la determinación de las reacciones transmitidas por el tablero, se consideró los efectos de frenado y de deformación de los apoyos para los horizontales y para los verticales los hallados en los cálculos anteriores.

Se recomienda como proceso de construcción ,una vez ejecutados pilas y estribos, cimbrar todo el tablero y hormigonarlo de una vez (200 m3).

El descimbrado se realizará, primero los laterales y luego el vano central.

3. NORMATIVA CONSIDERADA

Para el cálculo de esta estructura se ha considerado la siguiente Normas:

Instrucción relativa a las acciones a considerar en los puentes de ferrocarril, IPF- 75

Instrucción relativa a las acciones a considerar en el proyecto de puentes de carretera, IAP- 96.

Instrucción para el proyecto y la ejecución de obras de hormigón en masa o armado (EH-91).

Instrucción para el proyecto y la ejecución de obras de hormigón pretensado (EP-93).

Norma de Construcción Sismorresistente NCS - 94.

4. RESISTENCIA DE LOS MATERIALES Y COEFICIENTE DE SEGURIDAD

Resistencia del hormigón H-300 para armar en fustes de pilas y losa_ tablero:

$f_{ck} = 300$ Kp/cm^2 ; $\gamma_c = 1.5$

Resistencia del hormigón H-250 en el resto de las estructuras, cimentaciones y estribos:

$f_{ck} = 250$ Kp/cm^2 ; $\gamma_c = 1.5$

Acero en armaduras pasivas AEH-500:

$f_{yk} = 5100$ Kp/cm^2 ; $\gamma_s = 1.15$

Coeficiente de seguridad de acciones:

Tablero y pilas: $\gamma_f = 1.5$
Resto: $\gamma_f = 1.6$

5. TABLERO

5.1. DESCRIPCION GENERAL

Está formado por tres vanos de hormigón armado.

Inicialmente, se hace un cálculo de emparrillado para determinar el coeficiente de reparto transversal, así como los esfuerzos locales en la losa. Con el coeficiente de reparto se estudia la losa como pórtico en un plano formado por el tablero como viga empotrada en las pilas cilindricas y apoyada en los estribos.

Se calculan, a continuación, las secciones en el sentido longitudinal y transversal y se determinan las hipótesis extremas.

Las armaduras pasivas se obtienen para las flexiones, los esfuerzos cortantes y se realiza la comprobación de la torsión.

Finalmente se estudiará especialmente las secciones en apoyos.

5.2. CALCULO LONGITUDINAL

Flexión en el centro del primer vano:

M = 364 mt

$A = f_{cd} \times bd\,(1 - (1 - 2 \times \gamma_f \times M/f_{cd}/b/d^2)^{1/2})/f_{cd}$

$f_{cd} = 3000/1.5 = 2000\ t/m^2$

$f_{yd} = 5.1/1.15 = 4.43\ t/cm^2$

$\gamma_f = 1.50$

b = 3 m

d = 1.1 m.

$A = 117\ cm^2 \rightarrow$

Flexión sobre la pila:

Ma = -555 mt

Aa = 182 cm2

En el centro del segundo vano:

Mc = 431 mt

Ac = 139 cm2

5.3. ESFUERZO CORTANTE LONGITUDINAL

Apoyos extremos:

V = 1.5 x 146.78 = 220 t

$V_c = 5 \times 200^{1/2}$ X 3.00 X 1.1 = 233 t > V

Apoyos interiores:

V = 1.5 X 228 = 342 t

$A_t = (342\text{-}233)/0.9/1.1/4.2 \times 0.20 = 5.24\ cm^2/0.20$

5.4. ESTUDIO TRANSVERSAL

- Cálculo de riostra en los apoyos extremos:

Flexión:

p = 100/ 8.2= 12.27 t/m

M = 12.27 x 6.8 ^2 /8+30x2.4 = 143 mt

$A = 48.68\ cm^2$

Cortante:

V = 1.5 x(12.27x 3.0 + 60x4.5/ 6) = 123 t

$V_c = 5 \times 200^{1/2} \times 1.06 = 75$ t

$A = (123\text{-}\ 75)/0.9/1.06/4.2/5 = 2.39\ cm^2 \rightarrow 3\ c\ \phi\ 10/0.2$

- Cálculo transversal sobre pilas

Flexión:

p = 402/3 = 134 t/m

$M = 134 \times 1.5^2/2 = 151$ mt,

En dos metros:

$A = 47.5$ cm^2

Esfuerzo cortante:

$V = 1.5 \times 134 \times 1 = 201$ t

$V_c = 5 \times 200^{1/2} \times 2 \times 1.1 = 155$ t

$A_t = (201 - 155)/0.9/1.1/4.2/5 = 2.18$ cm^2/0.2

- Torsión

$T_d = 1.5 \times (21.5 \times 0.4 \times 4.4^2/2 + 60 \times 2.9) = 385$ mt

$A_e = 2.89$ m^2

$T_{ul} = 0.36 \times 3000/1.5 \times 2.89 \times 0.192 = 399$ mt $> T_d$

Armadura transversal

$A_t = 385/2/2.89/4.2/5 = 3.17$ cm^2/0.20

Armadura longitudinal

$A_l = 3.17/4.43 \times 4.2 = 3.00$ cm^2/0.25

Estabilidad de apoyos extremos

Con carro ladeado.- Por torsión:

$R = \pm 385/1.5/6.8 = \pm 38$ t

Cargas verticales

$V = 88+60 = 148$ t

R = 148/2 ± 38

$R_1 = 112$ t

$R_2 = 36$ t

Voladizos transversales

$M = 2.5 \times (0.18 \times 2 + 0.35) \times 2.35^2/6 + 0.6 \times 2.45^2/2 + .75 \times 1.5 \times (4.4 - 1.35/2 - 1.75) + 20/1.5 \times 1.15 = 20.98$ mt/m

$A = 24.24$ cm^2/m

$V = 1.5 \times (0.53 \times 2.5 \times 2.35/2 + 0.6 \times 2.45/2 + 1.125 + 10/15) = 15.12$ t/m

$V_c = 2.5 \times 200^{1/2} \times 0.32 \times (1 + 50 \times 0.00861) = 16.19$ t > V

5.5. EMPARRILLADO

A continuación, y por medio del programa TREBOL II se efectúa el cálculo del emparrillado necesario para la determinación del coeficiente de reparto transversal introducido en el cálculo longitudinal del tablero y la obtención de los esfuerzos para la disposición de las armaduras transversales y de torsión.

Se ha discretizado la losa disponiendo un total de 3 barras haces longitudinales más las de borde, y tramos transversales cada 1.75 m. aproximadamente, excepto en la zona de apoyos en la que se ha realizado una discretización mayor para poder analizar los efectos locales.

La discretización de las cargas superficiales se ha realizado asignando el área de influencia a nodos y las lineales y puntuales como cargas en barras.

En los resultados del programa se pueden observar las características y cargas asignadas a cada uno de las barras.

Fecha 28 - 6 - 98

T I T U L O D E L A O B R A

Paso Superior P.K. 300+700

P R O P I E D A D

P R O Y E C T O

Programa T R E B O L - II Paso Superior P.K. 300+700
TOOL S.A.

M A T E R I A L E S

No.	Mod.Young	Mod.Poisson	Peso espec.	Coef.Dilataci¢n
1	3290896.500	0.200	2.500	0.000010

Hormig¢n rest. caract. Fck = 300 Kp./cm2.

S E C C I O N E S

Unidades en m.

No.	Tipo.	Ancho.	Canto.
1	Rectg.	2.200	0.220
2	Rectg.	0.500	1.100
3	Rectg.	3.000	1.100
4	Rectg.	4.000	0.220
5	Rectg.	2.375	0.220
6	Rectg.	2.875	0.220

C A R A C T E R I S T I C A S R E S I S T E N T E S S E C C I O N E S

Unidades en m.

No.	Area.	Mmto.In.	S.Cortante	M.I.Tors.
1	4.840E-01	1.952E-03	4.033E-01	7.809E-03
2	5.500E-01	5.546E-02	4.583E-01	3.419E-02
3	3.300E+00	3.327E-01	2.750E+00	1.056E+00
4	8.800E-01	3.549E-03	7.333E-01	1.420E-02
5	5.225E-01	2.107E-03	4.354E-01	8.430E-03
6	6.325E-01	2.551E-03	5.271E-01	1.020E-02

N U D O S

Unidades en m.

Nudo.	X.	Y.
1	-0.000	1.100
2	0.000	7.100
3	0.250	0.000
4	0.250	1.100
5	0.250	4.100
6	0.250	7.100
7	0.250	8.200
8	1.000	1.100
9	1.000	4.100
10	1.000	7.100
11	5.000	1.100
12	5.000	4.100
13	5.000	7.100
14	9.000	1.100
15	9.000	4.100
16	9.000	7.100
17	13.000	1.100
18	13.000	4.100
19	13.000	7.100
20	17.000	1.100
21	17.000	4.100
22	17.000	7.100
23	21.000	1.100
24	21.000	4.100
25	21.000	7.100
26	25.000	1.100

Nudo.	X.	Y.
27	25.000	4.100
28	25.000	7.100
29	29.000	1.100
30	29.000	4.100
31	29.000	7.100
32	33.000	1.100
33	33.000	4.100
34	33.000	7.100
35	37.000	1.100
36	37.000	4.100
37	37.000	7.100
38	41.000	1.100
39	41.000	4.100
40	41.000	7.100
41	42.750	-0.000
42	42.750	1.100
43	42.750	4.100
44	42.750	7.100
45	42.750	8.200
46	43.000	1.100
47	43.000	7.100

B A R R A S

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
1	4	8	1	1	1	0.75	907.5
2	1	4	1	1	1	0.25	302.5
3	44	47	1	1	1	0.25	302.5
4	2	6	1	1	1	0.25	302.5
5	6	7	1	2	1	1.10	1512.5
6	5	6	1	2	1	3.00	4125.0
7	3	4	1	2	1	1.10	1512.5
8	42	46	1	1	1	0.25	302.5
9	40	44	1	1	1	1.75	2117.5
10	41	42	1	2	1	1.10	1512.5
11	42	43	1	2	1	3.00	4125.0
12	44	45	1	2	1	1.10	1512.5
13	4	5	1	2	1	3.00	4125.0
14	43	44	1	2	1	3.00	4125.0
15	5	9	1	3	1	0.75	6187.5
16	17	20	1	1	1	4.00	4840.0
17	16	19	1	1	1	4.00	4840.0
18	18	21	1	3	1	4.00	33000.0
19	17	18	1	4	1	3.00	6600.0
20	18	19	1	4	1	3.00	6600.0
21	14	17	1	1	1	4.00	4840.0
22	13	16	1	1	1	4.00	4840.0
23	15	18	1	3	1	4.00	33000.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
24	14	15	1	4	1	3.00	6600.0
25	15	16	1	4	1	3.00	6600.0
26	11	14	1	1	1	4.00	4840.0
27	10	13	1	1	1	4.00	4840.0
28	12	15	1	3	1	4.00	33000.0
29	11	12	1	4	1	3.00	6600.0
30	12	13	1	4	1	3.00	6600.0
31	8	11	1	1	1	4.00	4840.0
32	6	10	1	1	1	0.75	907.5
33	9	12	1	3	1	4.00	33000.0
34	8	9	1	5	1	3.00	3918.7
35	9	10	1	5	1	3.00	3918.7
36	20	23	1	1	1	4.00	4840.0
37	19	22	1	1	1	4.00	4840.0
38	21	24	1	3	1	4.00	33000.0
39	20	21	1	4	1	3.00	6600.0
40	21	22	1	4	1	3.00	6600.0
41	23	26	1	1	1	4.00	4840.0
42	22	25	1	1	1	4.00	4840.0
43	24	27	1	3	1	4.00	33000.0
44	23	24	1	4	1	3.00	6600.0
45	24	25	1	4	1	3.00	6600.0
46	26	29	1	1	1	4.00	4840.0
47	25	28	1	1	1	4.00	4840.0
48	27	30	1	3	1	4.00	33000.0
49	26	27	1	4	1	3.00	6600.0
50	27	28	1	4	1	3.00	6600.0
51	29	32	1	1	1	4.00	4840.0
52	28	31	1	1	1	4.00	4840.0
53	30	33	1	3	1	4.00	33000.0
54	29	30	1	4	1	3.00	6600.0
55	30	31	1	4	1	3.00	6600.0
56	32	35	1	1	1	4.00	4840.0
57	31	34	1	1	1	4.00	4840.0
58	33	36	1	3	1	4.00	33000.0
59	32	33	1	4	1	3.00	6600.0
60	33	34	1	4	1	3.00	6600.0
61	35	38	1	1	1	4.00	4840.0
62	34	37	1	1	1	4.00	4840.0
63	36	39	1	3	1	4.00	33000.0
64	35	36	1	4	1	3.00	6600.0
65	36	37	1	4	1	3.00	6600.0
66	38	42	1	1	1	1.75	2117.5
67	37	40	1	1	1	4.00	4840.0
68	39	43	1	3	1	1.75	14437.5
69	38	39	1	6	1	3.00	4743.7
70	39	40	1	6	1	3.00	4743.8

Peso Total (kg) = 613359.8
Clase 1... = Barra Emp.- Emp.

Clase 2... = Barra Art.- Emp.
Clase 3... = Barra Emp.- Art.
Clase 4... = Barra Art.- Art.

CONDICIONES DE CONTORNO

Nudo No.	Giro.s./eje X	Despl.s/eje Z	Giro.s./eje Y
1	Lib.	Imp.	Imp.
2	Lib.	Imp.	Imp.
18	Imp.	Imp.	Imp.
30	Imp.	Imp.	Imp.
46	Lib.	Imp.	Imp.
47	Lib.	Imp.	Imp.

C A R G A S G E N E R A L E S

Temperatura de referencia (construcci¢n). = 0

Hip¢tesis.		Temperatura	Peso propio.
1	G	0.000	NO
2	Q-1	0.000	NO
3	t1	0.000	NO

C A R G A S E N N U D O S

Unidades en Mp. y M*Mp.

Hip¢tesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
1	1	0.000	-0.763	0.000
	2	0.000	-0.763	0.000
	3	0.000	-1.663	0.000
	4	0.000	-3.024	0.000
	5	0.000	-5.527	0.000
	6	0.000	-3.024	0.000
	7	0.000	-1.663	0.000
	8	0.000	-17.562	0.000
	9	0.000	-21.019	0.000
	10	0.000	-17.562	0.000
	11	0.000	-30.680	0.000
	12	0.000	-35.400	0.000
	13	0.000	-30.680	0.000
	14	0.000	-30.680	0.000
	15	0.000	-35.400	0.000
	16	0.000	-30.680	0.000

Hip¢tesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
	17	0.000	-30.680	0.000
	18	0.000	-35.400	0.000
	19	0.000	-30.680	0.000
	20	0.000	-30.680	0.000
	21	0.000	-35.400	0.000
	22	0.000	-30.680	0.000
	23	0.000	-30.680	0.000
	24	0.000	-35.400	0.000
	25	0.000	-30.680	0.000
	26	0.000	-30.680	0.000
	27	0.000	-35.400	0.000
	28	0.000	-30.680	0.000
	29	0.000	-30.680	0.000
	30	0.000	-35.400	0.000
	31	0.000	-30.680	0.000
	32	0.000	-30.680	0.000
	33	0.000	-35.400	0.000
	34	0.000	-30.680	0.000
	35	0.000	-30.680	0.000
	36	0.000	-35.400	0.000
	37	0.000	-30.680	0.000
	38	0.000	-21.771	0.000
	39	0.000	-25.444	0.000
	40	0.000	-21.771	0.000
	41	0.000	-2.101	0.000
	42	0.000	-6.047	0.000
	43	0.000	-9.952	0.000
	44	0.000	-6.048	0.000
	45	0.000	-2.101	0.000
	46	0.000	-0.763	0.000
	47	0.000	-0.763	0.000
2	1	0.000	-0.103	0.000
	2	0.000	-0.103	0.000
	3	0.000	-0.226	0.000
	4	0.000	-0.410	0.000
	5	0.000	-0.749	0.000
	6	0.000	-0.410	0.000
	7	0.000	-0.226	0.000
	8	0.000	-2.381	0.000
	9	0.000	-2.850	0.000
	10	0.000	-2.381	0.000
	11	0.000	-4.160	0.000
	12	0.000	-4.800	0.000
	13	0.000	-4.160	0.000
	14	0.000	-4.160	0.000
	15	0.000	-4.800	0.000
	16	0.000	-4.160	0.000
	17	0.000	-4.160	0.000
	18	0.000	-4.800	0.000
	19	0.000	-4.160	0.000

Hip¢tesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
	20	0.000	-4.160	0.000
	21	0.000	-4.800	0.000
	22	0.000	-4.160	0.000
	23	0.000	-4.160	0.000
	24	0.000	-4.800	0.000
	25	0.000	-4.160	0.000
	26	0.000	-4.160	0.000
	27	0.000	-4.800	0.000
	28	0.000	-4.160	0.000
	29	0.000	-4.160	0.000
	30	0.000	-4.800	0.000
	31	0.000	-4.160	0.000
	32	0.000	-4.160	0.000
	33	0.000	-4.800	0.000
	34	0.000	-4.160	0.000
	35	0.000	-4.160	0.000
	36	0.000	-4.800	0.000
	37	0.000	-4.160	0.000
	38	0.000	-2.952	0.000
	39	0.000	-3.450	0.000
	40	0.000	-2.952	0.000
	41	0.000	-0.285	0.000
	42	0.000	-0.820	0.000
	43	0.000	-1.349	0.000
	44	0.000	-0.820	0.000
	45	0.000	-0.285	0.000
	46	0.000	-0.103	0.000
	47	0.000	-0.103	0.000

C A R G A S E N B A R R A S

Unidades en M. y Mp.

Hip.	Barra.	Carga.	Angl.	P1.	P2.	Ai.	A2.
3	41	Punt.	-	10.000		2.000	
	44	Punt.	-	20.000		1.500	
	45	Punt.	-	20.000		1.500	
	47	Punt.	-	10.000		2.000	

C O M B I N A C I O N E S

Comb.	Hip.1	Hip.2	Hip.3
1	1.000	-	-
2	1.000	1.000	1.000

MOVIMIENTOS

Nudo.	Hipótesis.	Giro. X.	Despl. Z.	Giro. Y.
1	Mínimos.	-.0007322699	0.0000000000	0.0000000000
	Máximos.	-.0006452057	0.0000000000	0.0000000000
2	Mínimos.	0.0006452063	0.0000000000	0.0000000000
	Máximos.	0.0007322705	0.0000000000	0.0000000000
3	Mínimos.	-.0007260088	0.0005494327	0.0008976264
	Máximos.	-.0006396922	0.0006235158	0.0010190456
4	Mínimos.	-.0007322699	-.0001740840	0.0008976264
	Máximos.	-.0006452057	-.0001533395	0.0010190456
5	Mínimos.	-.0000000002	-.0018851848	0.0006316126
	Máximos.	-.0000000001	-.0016609295	0.0007168471
6	Mínimos.	0.0006452063	-.0001740815	0.0008976234
	Máximos.	0.0007322705	-.0001533373	0.0010190421
7	Mínimos.	0.0006396927	0.0005494374	0.0008976234
	Máximos.	0.0007260093	0.0006235211	0.0010190421
8	Mínimos.	0.0002322425	-.0020757180	0.0030843692
	Máximos.	0.0002643516	-.0018280919	0.0035023412
9	Mínimos.	-.0000000002	-.0024237558	0.0005983459
	Máximos.	-.0000000002	-.0021354693	0.0006790700
10	Mínimos.	-.0002643529	-.0020757162	0.0030843737
	Máximos.	-.0002322436	-.0018280903	0.0035023463
11	Mínimos.	0.0075438567	-.0220572613	0.0027709070
	Máximos.	0.0085691838	-.0194240417	0.0031466621
12	Mínimos.	-.0000000005	-.0040789796	0.0000107134
	Máximos.	-.0000000005	-.0035941622	0.0000120422
13	Mínimos.	-.0085692024	-.0220573153	0.0027709182
	Máximos.	-.0075438726	-.0194240902	0.0031466747
14	Mínimos.	0.0109378817	-.0278137196	-.0000021218
	Máximos.	0.0124418708	-.0244800318	0.0000085208
15	Mínimos.	-.0000000006	-.0023761690	-.0007253480
	Máximos.	-.0000000005	-.0020940728	-.0006391894
16	Mínimos.	-.0124419052	-.0278138127	-.0000021176
	Máximos.	-.0109379115	-.0244801138	0.0000085256
17	Mínimos.	0.0118939290	-.0276184529	0.0000855070

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
	M ximos.	0.0136934193	-.0240701456	0.0002571577
18	M¡nimos.	0.0000000000	0.0000000000	0.0000000000
	M ximos.	0.0000000000	0.0000000000	0.0000000000
19	M¡nimos.	-.0136934621	-.0276185628	0.0000855086
	M ximos.	-.0118939653	-.0240702406	0.0002571600
20	M¡nimos.	0.0117602125	-.0315542631	0.0006100711
	M ximos.	0.0142253656	-.0258603022	0.0015106094
21	M¡nimos.	-.0000000016	-.0031099457	0.0007000770
	M ximos.	-.0000000013	-.0022552619	0.0009906648
22	M¡nimos.	-.0142254140	-.0315543935	0.0006100732
	M ximos.	-.0117602525	-.0258604120	0.0015106136
23	M¡nimos.	0.0116633428	-.0377629325	-.0000007075
	M ximos.	0.0154250599	-.0273212381	0.0007703110
24	M¡nimos.	-.0000000022	-.0055769077	-.0000000795
	M ximos.	-.0000000018	-.0039386838	0.0000131968
25	M¡nimos.	-.0154251130	-.0377630852	-.0000007062
	M ximos.	-.0116633875	-.0273213610	0.0007703137
26	M¡nimos.	0.0117637143	-.0339701548	-.0019900021
	M ximos.	0.0152586866	-.0258575529	-.0006086513
27	M¡nimos.	-.0000000017	-.0031610462	-.0009978567
	M ximos.	-.0000000014	-.0022548726	-.0007000386
28	M¡nimos.	-.0152587434	-.0339703113	-.0019900033
	M ximos.	-.0117637608	-.0258576795	-.0006086507
29	M¡nimos.	0.0119547322	-.0283229146	-.0004307631
	M ximos.	0.0140976552	-.0241623111	-.0000217950
30	M¡nimos.	0.0000000000	0.0000000000	0.0000000000
	M ximos.	0.0000000000	0.0000000000	0.0000000000
31	M¡nimos.	-.0140977148	-.0283230729	-.0004307644
	M ximos.	-.0119547825	-.0241624471	-.0000217946
32	M¡nimos.	0.0112273619	-.0289109275	0.0003541689
	M ximos.	0.0128308693	-.0253758505	0.0003558508
33	M¡nimos.	-.0000000015	-.0028584779	0.0008088609
	M ximos.	-.0000000013	-.0025205603	0.0009172660
4	M¡nimos.	-.0128309224	-.0289110783	0.0003541648
	M ximos.	-.0112274084	-.0253759827	0.0003558476

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
35	M¡nimos.	0.0087029673	-.0260302871	-.0021459546
	M ximos.	0.0098946467	-.0229162946	-.0018859607
36	M¡nimos.	-.0000000019	-.0053207907	0.0001122118
	M ximos.	-.0000000017	-.0046908585	0.0001275066
37	M¡nimos.	-.0098946849	-.0260304008	-.0021459702
	M ximos.	-.0087030008	-.0229163952	-.0018859743
38	M¡nimos.	0.0018693199	-.0077903359	-.0052972003
	M ximos.	0.0021250695	-.0068607638	-.0046647233
39	M¡nimos.	-.0000000015	-.0037649211	-.0007946968
	M ximos.	-.0000000013	-.0033186963	-.0007005958
40	M¡nimos.	-.0021250781	-.0077903601	-.0052972203
	M ximos.	-.0018693275	-.0068607852	-.0046647410
41	M¡nimos.	-.0008317019	0.0006244929	-.0012407580
	M ximos.	-.0007332127	0.0007082522	-.0010931841
42	M¡nimos.	-.0008396091	-.0002053442	-.0012407580
	M ximos.	-.0007401758	-.0001809176	-.0010931841
43	M¡nimos.	-.0000000013	-.0021804278	-.0009440123
	M ximos.	-.0000000012	-.0019219242	-.0008321271
44	M¡nimos.	0.0007401750	-.0002053445	-.0012407601
	M ximos.	0.0008396082	-.0001809179	-.0010931860
45	M¡nimos.	0.0007332119	0.0006244921	-.0012407601
	M ximos.	0.0008317009	0.0007082512	-.0010931860
46	M¡nimos.	-.0008396091	0.0000000000	0.0000000000
	M ximos.	-.0007401758	0.0000000000	0.0000000000
47	M¡nimos.	0.0007401750	0.0000000000	0.0000000000
	M ximos.	0.0008396082	0.0000000000	0.0000000000

ESFUERZOS EN SISTEMA DE EJES LOCAL

Reducci¢n de I.Torsional en hormig¢n: Vigas 0 %, Losas 0 %

BARRA : 1 (4,8) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-6.263	-26.580	-28.699	
	m¡n.	-7.114	-30.184	-32.590	
	Cort.m x.	-6.263	-26.580	-28.699	
	m¡n.	-7.114	-30.184	-32.590	
	Flec.m x.	-6.263	-26.580	-28.699	
	m¡n.	-7.114	-30.184	-32.590	

Flecha Tot. el s. m x =0.000174

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	-6.263	-26.580	-8.763	
	m¡n.	-7.114	-30.184	-9.952	
	Cort.m x.	-6.263	-26.580	-8.763	
	m¡n.	-7.114	-30.184	-9.952	
	Flec.m x.	-6.263	-26.580	-8.763	
	m¡n.	-7.114	-30.184	-9.952	

Flecha Tot. el s. m x =0.002076

BARRA : 2 (1,4) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-62.830	-30.920	
	m¡n.	-0.000	-71.333	-35.103	
	Flec.m x.	0.000	-62.830	-30.920	
	m¡n.	-0.000	-71.333	-35.103	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	0.000	-62.830	-15.213	
	m¡n.	-0.000	-71.333	-17.270	
	Flec.m x.	0.000	-62.830	-15.213	
	m¡n.	-0.000	-71.333	-17.270	

Flecha Tot. el s. m x =0.000174

BARRA : 3 (44,47) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	76.750	-22.290	
	m¡n.	0.000	67.616	-19.640	
	Flec.m x.	0.000	67.616	-19.640	
	m¡n.	0.000	76.750	-22.290	

Flecha Tot. el s. m x =0.000205

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	0.000	76.750	-41.478	
	m¡n.	0.000	67.616	-36.544	
	Flec.m x.	0.000	67.616	-36.544	
	m¡n.	0.000	76.750	-41.478	

BARRA : 4 (2,6) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-62.830	-30.920	
	m¡n.	0.000	-71.333	-35.103	
	Flec.m x.	0.000	-62.830	-30.920	
	m¡n.	0.000	-71.333	-35.103	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	0.000	-62.830	-15.213	
	m¡n.	0.000	-71.333	-17.270	
	Flec.m x.	0.000	-62.830	-15.213	

m¡n.	0.000	-71.333	-17.270

Flecha Tot. el s. m x =0.000174

BARRA : 5 (6,7) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-1.663	-1.830	
	m¡n.	0.000	-1.889	-2.078	
	Flec.m x.	0.000	-1.663	-1.830	
	m¡n.	0.000	-1.889	-2.078	

Flecha Tot. el s. m x =0.000174

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10	Cort.m x.	0.000	-1.663	0.000	
	m¡n.	0.000	-1.889	0.000	

Flecha Tot. el s. m x =-.000622

BARRA : 6 (5,6) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-13.486	31.563	86.596	
	m¡n.	-15.320	35.827	98.288	
	Cort.m x.	-15.320	35.827	98.288	
	m¡n.	-13.486	31.563	86.596	
	Flec.m x.	-15.320	35.827	98.288	
	m¡n.	-13.486	31.563	86.596	

Flecha Tot. el s. m x =0.001885

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-13.486	31.563	-8.093	
	m¡n.	-15.320	35.827	-9.192	
	Cort.m x.	-15.320	35.827	-9.192	

m¡n.	-13.486	31.563	-8.093
Flec.m x.	-13.486	31.563	-8.093
m¡n.	-15.320	35.827	-9.192

Flecha Tot. el s. m x =0.000174

BARRA : 7 (3,4) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	1.889	-0.000	
	m¡n.	0.000	1.663	-0.000	

Flecha Tot. el s. m x =-.000622

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10	Cort.m x.	0.000	1.889	-2.078	
	m¡n.	0.000	1.663	-1.830	
	Flec.m x.	0.000	1.663	-1.830	
	m¡n.	0.000	1.889	-2.078	

Flecha Tot. el s. m x =0.000174

BARRA : 8 (42,46) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	76.750	-22.290	
	m¡n.	0.000	67.616	-19.640	
	Flec.m x.	0.000	67.616	-19.640	
	m¡n.	0.000	76.750	-22.290	

Flecha Tot. el s. m x =0.000205

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	0.000	76.750	-41.478	
	m¡n.	0.000	67.616	-36.544	
	Flec.m x.	0.000	67.616	-36.544	

	m¡n.	0.000	76.750	-41.478	

BARRA : 9 (40,44) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-7.983	22.587	6.652	
	m¡n.	-9.069	25.649	7.552	
	Cort.m x.	-9.069	25.649	7.552	
	m¡n.	-7.983	22.587	6.652	
	Flec.m x.	-9.069	25.649	7.552	
	m¡n.	-7.983	22.587	6.652	

Flecha Tot. el s. m x =0.007790

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	-7.983	22.587	-32.874	
	m¡n.	-9.069	25.649	-37.334	
	Cort.m x.	-9.069	25.649	-37.334	
	m¡n.	-7.983	22.587	-32.874	
	Flec.m x.	-7.983	22.587	-32.874	
	m¡n.	-9.069	25.649	-37.334	

Flecha Tot. el s. m x =0.000205

BARRA : 10 (41,42) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	2.385	-0.000	
	m¡n.	0.000	2.101	-0.000	

Flecha Tot. el s. m x =-.000706

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10	Cort.m x.	0.000	2.385	-2.624	
	m¡n.	0.000	2.101	-2.311	
	Flec.m x.	0.000	2.101	-2.311	
	m¡n.	0.000	2.385	-2.624	

Flecha Tot. el s. m x =0.000205

BARRA : 11 (42,43) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-13.235	-36.882	-10.293	
	m¡n.	-15.044	-41.848	-11.693	
	Cort.m x.	-13.235	-36.882	-10.293	
	m¡n.	-15.044	-41.848	-11.693	
	Flec.m x.	-13.235	-36.882	-10.293	
	m¡n.	-15.044	-41.848	-11.693	

Flecha Tot. el s. m x =0.000205

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-13.235	-36.882	100.352	
	m¡n.	-15.044	-41.848	113.850	
	Cort.m x.	-13.235	-36.882	100.352	
	m¡n.	-15.044	-41.848	113.850	
	Flec.m x.	-15.044	-41.848	113.850	
	m¡n.	-13.235	-36.882	100.352	

Flecha Tot. el s. m x =0.002180

BARRA : 12 (44,45) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-2.101	-2.311	
	m¡n.	0.000	-2.385	-2.624	
	Flec.m x.	0.000	-2.101	-2.311	
	m¡n.	0.000	-2.385	-2.624	

Flecha Tot. el s. m x =0.000205

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10	Cort.m x.	0.000	-2.101	-0.000	
	m¡n.	0.000	-2.385	-0.000	

Flecha Tot. el s. m x =-.000706

BARRA : 13 (4,5) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	15.320	-35.827	-9.192	
	m¡n.	13.486	-31.563	-8.093	
	Cort.m x.	13.486	-31.563	-8.093	
	m¡n.	15.320	-35.827	-9.192	
	Flec.m x.	13.486	-31.563	-8.093	
	m¡n.	15.320	-35.827	-9.192	

Flecha Tot. el s. m x =0.000174

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	15.320	-35.827	98.288	
	m¡n.	13.486	-31.563	86.596	
	Cort.m x.	13.486	-31.563	86.596	
	m¡n.	15.320	-35.827	98.288	
	Flec.m x.	15.320	-35.827	98.288	
	m¡n.	13.486	-31.563	86.596	

Flecha Tot. el s. m x =0.001885

BARRA : 14 (43,44) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	15.044	41.848	113.850	
	m¡n.	13.235	36.882	100.352	
	Cort.m x.	15.044	41.848	113.850	
	m¡n.	13.235	36.882	100.352	
	Flec.m x.	15.044	41.848	113.850	
	m¡n.	13.235	36.882	100.352	

Flecha Tot. el s. m x =0.002180

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	15.044	41.848	-11.693	
	m¡n.	13.235	36.882	-10.294	
	Cort.m x.	15.044	41.848	-11.693	
	m¡n.	13.235	36.882	-10.294	
	Flec.m x.	13.235	36.882	-10.294	
	m¡n.	15.044	41.848	-11.693	

Flecha Tot. el s. m x =0.000205

BARRA : 15 (5,9) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-57.599	26.972	
	m¡n.	0.000	-65.376	30.641	
	Flec.m x.	0.000	-65.376	30.641	
	m¡n.	0.000	-57.599	26.972	

Flecha Tot. el s. m x =0.001885

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Cort.m x.	0.000	-57.599	70.171	
	m¡n.	0.000	-65.376	79.673	
	Flec.m x.	0.000	-65.376	79.673	
	m¡n.	0.000	-57.599	70.171	

Flecha Tot. el s. m x =0.002424

BARRA : 16 (17,20) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.179	-0.476	-1.795	
	m¡n.	-0.712	-0.478	-2.969	
	Cort.m x.	0.179	-0.476	-1.795	
	m¡n.	-0.712	-0.478	-2.969	
	Flec.m x.	0.179	-0.476	-1.795	
	m¡n.	-0.712	-0.478	-2.969	

Flecha Tot. el s. m x =0.027618

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.179	-0.476	0.110	
	m¡n.	-0.712	-0.478	-1.057	
	Cort.m x.	0.179	-0.476	0.110	
	m¡n.	-0.712	-0.478	-1.057	
	Flec.m x.	0.179	-0.476	0.110	
	m¡n.	-0.712	-0.478	-1.057	

Flecha Tot. el s. m x =0.031554

BARRA : 17 (16,19) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.675	0.868	1.336	
	m¡n.	1.280	0.689	1.237	
	Cort.m x.	1.675	0.868	1.336	
	m¡n.	1.280	0.689	1.237	
	Flec.m x.	1.675	0.868	1.336	
	m¡n.	1.280	0.689	1.237	

Flecha Tot. el s. m x =0.027814

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	1.675	0.868	-2.135	
	m¡n.	1.280	0.689	-1.518	
	Cort.m x.	1.675	0.868	-2.135	
	m¡n.	1.280	0.689	-1.518	
	Flec.m x.	1.280	0.689	-1.518	
	m¡n.	1.675	0.868	-2.135	

Flecha Tot. el s. m x =0.027619

BARRA : 18 (18,21) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-144.171	-479.996	
	m¡n.	0.000	-190.285	-651.775	
	Flec.m x.	0.000	-144.171	-479.996	
	m¡n.	0.000	-190.285	-651.775	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-144.171	96.688	
	m¡n.	0.000	-190.285	109.364	
	Flec.m x.	0.000	-190.285	109.364	
	m¡n.	0.000	-144.171	96.688	

Flecha Tot. el s. m x =0.003110

BARRA : 19 (17,18) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.834	36.186	0.963	
	m¡n.	0.277	31.845	1.459	
	Cort.m x.	0.834	36.186	0.963	
	m¡n.	0.277	31.845	1.459	
	Flec.m x.	0.277	31.845	1.459	
	m¡n.	0.834	36.186	0.963	

Flecha Tot. el s. m x =0.027618

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.834	36.186	-107.594	
	m¡n.	0.277	31.845	-94.077	
	Cort.m x.	0.834	36.186	-107.594	
	m¡n.	0.277	31.845	-94.077	
	Flec.m x.	0.277	31.845	-94.077	
	m¡n.	0.834	36.186	-107.594	

BARRA : 20 (18,19) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.277	-31.845	-94.077	
	m¡n.	-0.834	-36.186	-107.594	
	Cort.m x.	-0.277	-31.845	-94.077	
	m¡n.	-0.834	-36.186	-107.594	
	Flec.m x.	-0.277	-31.845	-94.077	
	m¡n.	-0.834	-36.186	-107.594	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.277	-31.845	1.459	
	m¡n.	-0.834	-36.186	0.963	
	Cort.m x.	-0.277	-31.845	1.459	
	m¡n.	-0.834	-36.186	0.963	
	Flec.m x.	-0.277	-31.845	1.459	
	m¡n.	-0.834	-36.186	0.963	

Flecha Tot. el s. m x =0.027619

BARRA : 21 (14,17) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.280	0.689	1.236	
	m¡n.	-1.675	0.868	1.336	
	Cort.m x.	-1.675	0.868	1.336	
	m¡n.	-1.280	0.689	1.236	
	Flec.m x.	-1.675	0.868	1.336	
	m¡n.	-1.280	0.689	1.236	

Flecha Tot. el s. m x =0.027814

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-1.280	0.689	-1.518	
	m¡n.	-1.675	0.868	-2.135	
	Cort.m x.	-1.675	0.868	-2.135	
	m¡n.	-1.280	0.689	-1.518	

Flec.m x.	-1.280	0.689	-1.518
m¡n.	-1.675	0.868	-2.135

Flecha Tot. el s. m x =0.027618

BARRA : 22 (13,16) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	5.183	0.661	6.363	
	m¡n.	4.543	0.575	5.604	
	Cort.m x.	5.183	0.661	6.363	
	m¡n.	4.543	0.575	5.604	
	Flec.m x.	5.183	0.661	6.363	
	m¡n.	4.543	0.575	5.604	

Flecha Tot. el s. m x =0.022057

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	5.183	0.661	3.717	
	m¡n.	4.543	0.575	3.304	
	Cort.m x.	5.183	0.661	3.717	
	m¡n.	4.543	0.575	3.304	
	Flec.m x.	5.183	0.661	3.717	
	m¡n.	4.543	0.575	3.304	

Flecha Tot. el s. m x =0.027814

BARRA : 23 (15,18) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	156.035	113.497	
	m¡n.	-0.000	137.526	100.066	
	Flec.m x.	-0.000	156.035	113.497	
	m¡n.	-0.000	137.526	100.066	

Flecha Tot. el s. m x =0.002376

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	156.035	-510.641	
	m¡n.	-0.000	137.526	-450.037	
	Flec.m x.	-0.000	137.526	-450.037	
	m¡n.	-0.000	156.035	-510.641	

BARRA : 24 (14,15) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.381	34.634	3.508	
	m¡n.	2.067	30.566	3.263	
	Cort.m x.	2.381	34.634	3.508	
	m¡n.	2.067	30.566	3.263	
	Flec.m x.	2.381	34.634	3.508	
	m¡n.	2.067	30.566	3.263	

Flecha Tot. el s. m x =0.027814

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	2.381	34.634	-100.393	
	m¡n.	2.067	30.566	-88.436	
	Cort.m x.	2.381	34.634	-100.393	
	m¡n.	2.067	30.566	-88.436	
	Flec.m x.	2.067	30.566	-88.436	
	m¡n.	2.381	34.634	-100.393	

Flecha Tot. el s. m x =0.002376

BARRA : 25 (15,16) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.067	-30.566	-88.436	
	m¡n.	-2.381	-34.634	-100.393	
	Cort.m x.	-2.067	-30.566	-88.436	
	m¡n.	-2.381	-34.634	-100.393	
	Flec.m x.	-2.067	-30.566	-88.436	
	m¡n.	-2.381	-34.634	-100.393	

Flecha Tot. el s. m x =0.002376

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-2.067	-30.566	3.263	
	m¡n.	-2.381	-34.634	3.508	
	Cort.m x.	-2.067	-30.566	3.263	
	m¡n.	-2.381	-34.634	3.508	
	Flec.m x.	-2.381	-34.634	3.508	
	m¡n.	-2.067	-30.566	3.263	

Flecha Tot. el s. m x =0.027814

BARRA : 26 (11,14) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.543	0.575	5.604	
	m¡n.	-5.183	0.661	6.363	
	Cort.m x.	-5.183	0.661	6.363	
	m¡n.	-4.543	0.575	5.604	
	Flec.m x.	-5.183	0.661	6.363	
	m¡n.	-4.543	0.575	5.604	

Flecha Tot. el s. m x =0.022057

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-4.543	0.575	3.304	
	m¡n.	-5.183	0.661	3.717	
	Cort.m x.	-5.183	0.661	3.717	
	m¡n.	-4.543	0.575	3.304	
	Flec.m x.	-5.183	0.661	3.717	
	m¡n.	-4.543	0.575	3.304	

Flecha Tot. el s. m x =0.027814

BARRA : 27 (10,13) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	11.115	-7.981	-15.391	
	m¡n.	9.786	-7.028	-13.553	
	Cort.m x.	9.786	-7.028	-13.553	
	m¡n.	11.115	-7.981	-15.391	
	Flec.m x.	9.786	-7.028	-13.553	
	m¡n.	11.115	-7.981	-15.391	

Flecha Tot. el s. m x =0.002076

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	11.115	-7.981	16.534	
	m¡n.	9.786	-7.028	14.560	
	Cort.m x.	9.786	-7.028	14.560	
	m¡n.	11.115	-7.981	16.534	
	Flec.m x.	11.115	-7.981	16.534	
	m¡n.	9.786	-7.028	14.560	

Flecha Tot. el s. m x =0.022057

BARRA : 28 (12,15) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	46.567	295.003	
	m¡n.	0.000	40.993	259.904	
	Flec.m x.	0.000	46.567	295.003	
	m¡n.	0.000	40.993	259.904	

Flecha Tot. el s. m x =0.004079

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	46.567	108.735	
	m¡n.	0.000	40.993	95.932	
	Flec.m x.	0.000	46.567	108.735	
	m¡n.	0.000	40.993	95.932	

Flecha Tot. el s. m x =0.002376

BARRA : 29 (11,12) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	10.171	26.197	5.932	
	m¡n.	8.956	23.077	5.243	
	Cort.m x.	10.171	26.197	5.932	
	m¡n.	8.956	23.077	5.243	
	Flec.m x.	10.171	26.197	5.932	
	m¡n.	8.956	23.077	5.243	

Flecha Tot. el s. m x =0.022057

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	10.171	26.197	-72.660	
	m¡n.	8.956	23.077	-63.987	
	Cort.m x.	10.171	26.197	-72.660	
	m¡n.	8.956	23.077	-63.987	
	Flec.m x.	8.956	23.077	-63.987	
	m¡n.	10.171	26.197	-72.660	

Flecha Tot. el s. m x =0.004079

BARRA : 30 (12,13) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-8.956	-23.077	-63.987	
	m¡n.	-10.171	-26.197	-72.660	
	Cort.m x.	-8.956	-23.077	-63.987	
	m¡n.	-10.171	-26.197	-72.660	
	Flec.m x.	-8.956	-23.077	-63.987	
	m¡n.	-10.171	-26.197	-72.660	

Flecha Tot. el s. m x =0.004079

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-8.956	-23.077	5.243	
	m¡n.	-10.171	-26.197	5.932	
	Cort.m x.	-8.956	-23.077	5.243	
	m¡n.	-10.171	-26.197	5.932	
	Flec.m x.	-10.171	-26.197	5.932	
	m¡n.	-8.956	-23.077	5.243	

Flecha Tot. el s. m x =0.022057

BARRA : 31 (8,11) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-9.786	-7.028	-13.553	
	m¡n.	-11.115	-7.981	-15.391	
	Cort.m x.	-9.786	-7.028	-13.553	
	m¡n.	-11.115	-7.981	-15.391	
	Flec.m x.	-9.786	-7.028	-13.553	
	m¡n.	-11.115	-7.981	-15.391	

Flecha Tot. el s. m x =0.002076

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-9.786	-7.028	14.560	
	m¡n.	-11.115	-7.981	16.533	
	Cort.m x.	-9.786	-7.028	14.560	
	m¡n.	-11.115	-7.981	16.533	
	Flec.m x.	-11.115	-7.981	16.533	
	m¡n.	-9.786	-7.028	14.560	

Flecha Tot. el s. m x =0.022057

BARRA : 32 (6,10) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	7.114	-30.184	-32.590	
	m¡n.	6.263	-26.580	-28.699	
	Cort.m x.	6.263	-26.580	-28.699	
	m¡n.	7.114	-30.184	-32.590	
	Flec.m x.	6.263	-26.580	-28.699	
	m¡n.	7.114	-30.184	-32.590	

Flecha Tot. el s. m x =0.000174

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	7.114	-30.184	-9.952	
	m¡n.	6.263	-26.580	-8.763	
	Cort.m x.	6.263	-26.580	-8.763	
	m¡n.	7.114	-30.184	-9.952	
	Flec.m x.	6.263	-26.580	-8.763	
	m¡n.	7.114	-30.184	-9.952	

Flecha Tot. el s. m x =0.002076

BARRA : 33 (9,12) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-40.561	79.749	
	m¡n.	0.000	-46.028	90.551	
	Flec.m x.	0.000	-46.028	90.551	
	m¡n.	0.000	-40.561	79.749	

Flecha Tot. el s. m x =0.002424

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-40.561	241.993	
	m¡n.	0.000	-46.028	274.662	
	Flec.m x.	0.000	-46.028	274.662	
	m¡n.	0.000	-40.561	241.993	

Flecha Tot. el s. m x =0.004079

BARRA : 34 (8,9) Sec. 5 Rect. /238,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	5.439	-2.260	-4.001	
	m¡n.	4.789	-1.990	-3.522	
	Cort.m x.	4.789	-1.990	-3.522	
	m¡n.	5.439	-2.260	-4.001	
	Flec.m x.	4.789	-1.990	-3.522	
	m¡n.	5.439	-2.260	-4.001	

Flecha Tot. el s. m x =0.002076

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	5.439	-2.260	2.779	
	m¡n.	4.789	-1.990	2.449	
	Cort.m x.	4.789	-1.990	2.449	
	m¡n.	5.439	-2.260	2.779	
	Flec.m x.	5.439	-2.260	2.779	
	m¡n.	4.789	-1.990	2.449	

Flecha Tot. el s. m x =0.002424

BARRA : 35 (9,10) Sec. 5 Rect. /238,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.789	1.990	2.449	
	m¡n.	-5.439	2.260	2.779	
	Cort.m x.	-5.439	2.260	2.779	
	m¡n.	-4.789	1.990	2.449	
	Flec.m x.	-5.439	2.260	2.779	
	m¡n.	-4.789	1.990	2.449	

Flecha Tot. el s. m x =0.002424

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-4.789	1.990	-3.523	
	m¡n.	-5.439	2.260	-4.001	
	Cort.m x.	-5.439	2.260	-4.001	

m¡n.	-4.789	1.990	-3.523
Flec.m x.	-4.789	1.990	-3.523
m¡n.	-5.439	2.260	-4.001

Flecha Tot. el s. m x =0.002076

BARRA : 36 (20,23) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.130	-0.289	0.402	
	m¡n.	-1.606	-1.967	-2.744	
	Cort.m x.	0.130	-0.289	0.402	
	m¡n.	-1.606	-1.967	-2.744	
	Flec.m x.	0.130	-0.289	0.402	
	m¡n.	-1.606	-1.967	-2.744	

Flecha Tot. el s. m x =0.031554

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.130	-0.289	1.559	
	m¡n.	-1.606	-1.967	5.122	
	Cort.m x.	0.130	-0.289	1.559	
	m¡n.	-1.606	-1.967	5.122	
	Flec.m x.	-1.606	-1.967	5.122	
	m¡n.	0.130	-0.289	1.559	

Flecha Tot. el s. m x =0.037763

BARRA : 37 (19,22) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.712	-0.478	-2.969	
	m¡n.	-0.179	-0.476	-1.795	
	Cort.m x.	-0.179	-0.476	-1.795	
	m¡n.	0.712	-0.478	-2.969	
	Flec.m x.	-0.179	-0.476	-1.795	
	m¡n.	0.712	-0.478	-2.969	

Flecha Tot. el s. m x =0.027619

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.712	-0.478	-1.057	
	m¡n.	-0.179	-0.476	0.110	
	Cort.m x.	-0.179	-0.476	0.110	
	m¡n.	0.712	-0.478	-1.057	
	Flec.m x.	-0.179	-0.476	0.110	
	m¡n.	0.712	-0.478	-1.057	

Flecha Tot. el s. m x =0.031554

BARRA : 38 (21,24) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-47.786	96.104	
	m¡n.	0.000	-77.428	112.738	
	Flec.m x.	0.000	-77.428	112.738	
	m¡n.	0.000	-47.786	96.104	

Flecha Tot. el s. m x =0.003110

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-47.786	287.247	
	m¡n.	0.000	-77.428	422.448	
	Flec.m x.	0.000	-77.428	422.448	
	m¡n.	0.000	-47.786	287.247	

Flecha Tot. el s. m x =0.005577

BARRA : 39 (20,21) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.687	36.329	-0.894	
	m¡n.	-0.292	30.493	-0.049	
	Cort.m x.	1.687	36.329	-0.894	
	m¡n.	-0.292	30.493	-0.049	

Flec.m x.	-0.292	30.493	-0.049	
m¡n.	1.687	36.329	-0.894	

Flecha Tot. el s. m x =0.031554

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	1.687	36.329	-109.879	
	m¡n.	-0.292	30.493	-91.527	
	Cort.m x.	1.687	36.329	-109.879	
	m¡n.	-0.292	30.493	-91.527	
	Flec.m x.	-0.292	30.493	-91.527	
	m¡n.	1.687	36.329	-109.879	

Flecha Tot. el s. m x =0.003110

BARRA : 40 (21,22) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.292	-30.493	-91.528	
	m¡n.	-1.687	-36.329	-109.879	
	Cort.m x.	0.292	-30.493	-91.528	
	m¡n.	-1.687	-36.329	-109.879	
	Flec.m x.	0.292	-30.493	-91.528	
	m¡n.	-1.687	-36.329	-109.879	

Flecha Tot. el s. m x =0.003110

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.292	-30.493	-0.049	
	m¡n.	-1.687	-36.329	-0.894	
	Cort.m x.	0.292	-30.493	-0.049	
	m¡n.	-1.687	-36.329	-0.894	
	Flec.m x.	0.292	-30.493	-0.049	
	m¡n.	-1.687	-36.329	-0.894	

Flecha Tot. el s. m x =0.031554

BARRA : 41 (23,26) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.223	-3.384	2.666	
	m¡n.	-0.134	0.293	1.561	
	Cort.m x.	-0.134	0.293	1.561	
	m¡n.	0.223	-3.384	2.666	
	Flec.m x.	0.223	-3.384	2.666	
	m¡n.	-0.134	0.293	1.561	

Flecha Tot. el s. m x =0.037763

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.223	6.616	-3.799	
	m¡n.	-0.134	0.293	0.391	
	Cort.m x.	0.223	6.616	-3.799	
	m¡n.	-0.134	0.293	0.391	
	Flec.m x.	-0.134	0.293	0.391	
	m¡n.	0.223	6.616	-3.799	

Flecha Tot. el s. m x =0.033970

BARRA : 42 (22,25) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.606	-1.967	-2.744	
	m¡n.	-0.130	-0.289	0.402	
	Cort.m x.	-0.130	-0.289	0.402	
	m¡n.	1.606	-1.967	-2.744	
	Flec.m x.	-0.130	-0.289	0.402	
	m¡n.	1.606	-1.967	-2.744	

Flecha Tot. el s. m x =0.031554

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	1.606	-1.967	5.122	
	m¡n.	-0.130	-0.289	1.559	
	Cort.m x.	-0.130	-0.289	1.559	

m¡n.	1.606	-1.967	5.122	
Flec.m x.	1.606	-1.967	5.122	
m¡n.	-0.130	-0.289	1.559	

Flecha Tot. el s. m x =0.037763

BARRA : 43 (24,27) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	75.287	427.361	
	m¡n.	-0.000	47.811	287.243	
	Flec.m x.	-0.000	75.287	427.361	
	m¡n.	-0.000	47.811	287.243	

Flecha Tot. el s. m x =0.005577

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	75.287	126.214	
	m¡n.	-0.000	47.811	96.000	
	Flec.m x.	-0.000	75.287	126.214	
	m¡n.	-0.000	47.811	96.000	

Flecha Tot. el s. m x =0.003161

BARRA : 44 (23,24) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.457	36.257	1.828	
	m¡n.	-0.002	30.098	-0.264	
	Cort.m x.	2.457	36.257	1.828	
	m¡n.	-0.002	30.098	-0.264	
	Flec.m x.	2.457	36.257	1.828	
	m¡n.	-0.002	30.098	-0.264	

Flecha Tot. el s. m x =0.037763

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	2.457	56.257	-136.943	
	m¡n.	-0.002	30.098	-90.559	
	Cort.m x.	2.457	56.257	-136.943	
	m¡n.	-0.002	30.098	-90.559	
	Flec.m x.	-0.002	30.098	-90.559	
	m¡n.	2.457	56.257	-136.943	

Flecha Tot. el s. m x =0.005577

BARRA : 45 (24,25) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.002	-30.098	-90.559	
	m¡n.	-2.457	-56.257	-136.944	
	Cort.m x.	0.002	-30.098	-90.559	
	m¡n.	-2.457	-56.257	-136.944	
	Flec.m x.	0.002	-30.098	-90.559	
	m¡n.	-2.457	-56.257	-136.944	

Flecha Tot. el s. m x =0.005577

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.002	-30.098	-0.264	
	m¡n.	-2.457	-36.257	1.828	
	Cort.m x.	0.002	-30.098	-0.264	
	m¡n.	-2.457	-36.257	1.828	
	Flec.m x.	-2.457	-36.257	1.828	
	m¡n.	0.002	-30.098	-0.264	

Flecha Tot. el s. m x =0.037763

BARRA : 46 (26,29) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.554	0.962	-0.580	
	m¡n.	-0.256	0.519	0.095	
	Cort.m x.	1.554	0.962	-0.580	
	m¡n.	-0.256	0.519	0.095	
	Flec.m x.	-0.256	0.519	0.095	
	m¡n.	1.554	0.962	-0.580	

Flecha Tot. el s. m x =0.033970

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	1.554	0.962	-4.429	
	m¡n.	-0.256	0.519	-1.980	
	Cort.m x.	1.554	0.962	-4.429	
	m¡n.	-0.256	0.519	-1.980	
	Flec.m x.	-0.256	0.519	-1.980	
	m¡n.	1.554	0.962	-4.429	

Flecha Tot. el s. m x =0.028323

BARRA : 47 (25,28) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.134	0.293	1.561	
	m¡n.	-0.223	-3.384	2.666	
	Cort.m x.	0.134	0.293	1.561	
	m¡n.	-0.223	-3.384	2.666	
	Flec.m x.	-0.223	-3.384	2.666	
	m¡n.	0.134	0.293	1.561	

Flecha Tot. el s. m x =0.037763

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.134	0.293	0.391	
	m¡n.	-0.223	6.616	-3.799	
	Cort.m x.	-0.223	6.616	-3.799	
	m¡n.	0.134	0.293	0.391	
	Flec.m x.	0.134	0.293	0.391	
	m¡n.	-0.223	6.616	-3.799	

Flecha Tot. el s. m x =0.033970

BARRA : 48 (27,30) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	196.475	119.775	
	m¡n.	-0.000	144.118	96.593	
	Flec.m x.	-0.000	196.475	119.775	
	m¡n.	-0.000	144.118	96.593	

Flecha Tot. el s. m x =0.003161

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	196.475	-666.124	
	m¡n.	-0.000	144.118	-479.880	
	Flec.m x.	-0.000	144.118	-479.880	
	m¡n.	-0.000	196.475	-666.124	

BARRA : 49 (26,27) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.297	30.454	-0.121	
	m¡n.	-3.219	40.494	1.331	
	Cort.m x.	-3.219	40.494	1.331	
	m¡n.	0.297	30.454	-0.121	
	Flec.m x.	-3.219	40.494	1.331	
	m¡n.	0.297	30.454	-0.121	

Flecha Tot. el s. m x =0.033970

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.297	30.454	-91.483	
	m¡n.	-3.219	40.494	-120.151	
	Cort.m x.	-3.219	40.494	-120.151	
	m¡n.	0.297	30.454	-91.483	
	Flec.m x.	0.297	30.454	-91.483	
	m¡n.	-3.219	40.494	-120.151	

Flecha Tot. el s. m x =0.003161

BARRA : 50 (27,28) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.219	-40.494	-120.151	
	m¡n.	-0.297	-30.454	-91.483	
	Cort.m x.	-0.297	-30.454	-91.483	
	m¡n.	3.219	-40.494	-120.151	
	Flec.m x.	-0.297	-30.454	-91.483	
	m¡n.	3.219	-40.494	-120.151	

Flecha Tot. el s. m x =0.003161

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	3.219	-40.494	1.331	
	m¡n.	-0.297	-30.454	-0.121	
	Cort.m x.	-0.297	-30.454	-0.121	
	m¡n.	3.219	-40.494	1.331	
	Flec.m x.	3.219	-40.494	1.331	
	m¡n.	-0.297	-30.454	-0.121	

Flecha Tot. el s. m x =0.033970

BARRA : 51 (29,32) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.695	-0.885	-3.031	
	m¡n.	0.974	-0.651	-1.909	
	Cort.m x.	0.974	-0.651	-1.909	
	m¡n.	1.695	-0.885	-3.031	
	Flec.m x.	0.974	-0.651	-1.909	
	m¡n.	1.695	-0.885	-3.031	

Flecha Tot. el s. m x =0.028323

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	1.695	-0.885	0.510	
	m¡n.	0.974	-0.651	0.696	
	Cort.m x.	0.974	-0.651	0.696	
	m¡n.	1.695	-0.885	0.510	
	Flec.m x.	0.974	-0.651	0.696	
	m¡n.	1.695	-0.885	0.510	

Flecha Tot. el s. m x =0.028911

BARRA : 52 (28,31) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.256	0.519	0.095	
	m¡n.	-1.554	0.962	-0.580	
	Cort.m x.	-1.554	0.962	-0.580	
	m¡n.	0.256	0.519	0.095	
	Flec.m x.	0.256	0.519	0.095	
	m¡n.	-1.554	0.962	-0.580	

Flecha Tot. el s. m x =0.033970

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.256	0.519	-1.980	
	m¡n.	-1.554	0.962	-4.429	
	Cort.m x.	-1.554	0.962	-4.429	
	m¡n.	0.256	0.519	-1.980	
	Flec.m x.	0.256	0.519	-1.980	
	m¡n.	-1.554	0.962	-4.429	

Flecha Tot. el s. m x =0.028323

BARRA : 53 (30,33) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-152.218	-525.872	
	m¡n.	0.000	-172.637	-596.386	
	Flec.m x.	0.000	-152.218	-525.872	
	m¡n.	0.000	-172.637	-596.386	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-152.218	83.002	
	m¡n.	0.000	-172.637	94.162	
	Flec.m x.	0.000	-172.637	94.162	
	m¡n.	0.000	-152.218	83.002	

Flecha Tot. el s. m x =0.002858

BARRA : 54 (29,30) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.071	31.850	1.229	
	m¡n.	-1.398	36.687	0.142	
	Cort.m x.	-1.398	36.687	0.142	
	m¡n.	-0.071	31.850	1.229	
	Flec.m x.	-0.071	31.850	1.229	
	m¡n.	-1.398	36.687	0.142	

Flecha Tot. el s. m x =0.028323

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.071	31.850	-94.321	
	m¡n.	-1.398	36.687	-109.920	
	Cort.m x.	-1.398	36.687	-109.920	
	m¡n.	-0.071	31.850	-94.321	
	Flec.m x.	-0.071	31.850	-94.321	
	m¡n.	-1.398	36.687	-109.920	

BARRA : 55 (30,31) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.398	-36.687	-109.920	
	m¡n.	0.071	-31.850	-94.321	
	Cort.m x.	0.071	-31.850	-94.321	
	m¡n.	1.398	-36.687	-109.920	
	Flec.m x.	0.071	-31.850	-94.321	
	m¡n.	1.398	-36.687	-109.920	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	1.398	-36.687	0.142	
	m¡n.	0.071	-31.850	1.229	
	Cort.m x.	0.071	-31.850	1.229	
	m¡n.	1.398	-36.687	0.142	
	Flec.m x.	0.071	-31.850	1.229	
	m¡n.	1.398	-36.687	0.142	

Flecha Tot. el s. m x =0.028323

BARRA : 56 (32,35) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.930	-0.839	2.337	
	m¡n.	3.379	-0.717	2.166	
	Cort.m x.	3.379	-0.717	2.166	
	m¡n.	3.930	-0.839	2.337	
	Flec.m x.	3.930	-0.839	2.337	
	m¡n.	3.379	-0.717	2.166	

Flecha Tot. el s. m x =0.028911

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	3.930	-0.839	5.694	
	m¡n.	3.379	-0.717	5.035	
	Cort.m x.	3.379	-0.717	5.035	
	m¡n.	3.930	-0.839	5.694	
	Flec.m x.	3.930	-0.839	5.694	
	m¡n.	3.379	-0.717	5.035	

Flecha Tot. el s. m x =0.026030

BARRA : 57 (31,34) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.974	-0.651	-1.909	
	m¡n.	-1.695	-0.885	-3.031	
	Cort.m x.	-0.974	-0.651	-1.909	
	m¡n.	-1.695	-0.885	-3.031	
	Flec.m x.	-0.974	-0.651	-1.909	
	m¡n.	-1.695	-0.885	-3.031	

Flecha Tot. el s. m x =0.028323

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.974	-0.651	0.696	
	m¡n.	-1.695	-0.885	0.510	
	Cort.m x.	-0.974	-0.651	0.696	
	m¡n.	-1.695	-0.885	0.510	
	Flec.m x.	-0.974	-0.651	0.696	
	m¡n.	-1.695	-0.885	0.510	

Flecha Tot. el s. m x =0.028911

BARRA : 58 (33,36) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-55.327	80.062	
	m¡n.	0.000	-62.849	90.508	
	Flec.m x.	0.000	-62.849	90.508	
	m¡n.	0.000	-55.327	80.062	

Flecha Tot. el s. m x =0.002858

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-55.327	301.369	
	m¡n.	0.000	-62.849	341.903	
	Flec.m x.	0.000	-62.849	341.903	
	m¡n.	0.000	-55.327	301.369	

Flecha Tot. el s. m x =0.005321

BARRA : 59 (32,33) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.470	30.746	2.405	
	m¡n.	-1.827	34.794	2.234	
	Cort.m x.	-1.827	34.794	2.234	
	m¡n.	-1.470	30.746	2.405	
	Flec.m x.	-1.470	30.746	2.405	
	m¡n.	-1.827	34.794	2.234	

Flecha Tot. el s. m x =0.028911

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-1.470	30.746	-89.833	
	m¡n.	-1.827	34.794	-102.148	
	Cort.m x.	-1.827	34.794	-102.148	
	m¡n.	-1.470	30.746	-89.833	
	Flec.m x.	-1.470	30.746	-89.833	
	m¡n.	-1.827	34.794	-102.148	

Flecha Tot. el s. m x =0.002858

BARRA : 60 (33,34) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.827	-34.794	-102.149	
	m¡n.	1.470	-30.746	-89.833	
	Cort.m x.	1.470	-30.746	-89.833	
	m¡n.	1.827	-34.794	-102.149	

Flec.m x.	1.470	-30.746	-89.833	
m¡n.	1.827	-34.794	-102.149	

Flecha Tot. el s. m x =0.002858

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	1.827	-34.794	2.234	
	m¡n.	1.470	-30.746	2.405	
	Cort.m x.	1.470	-30.746	2.405	
	m¡n.	1.827	-34.794	2.234	
	Flec.m x.	1.470	-30.746	2.405	
	m¡n.	1.827	-34.794	2.234	

Flecha Tot. el s. m x =0.028911

BARRA : 61 (35,38) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	10.399	4.005	13.071	
	m¡n.	9.146	3.528	11.518	
	Cort.m x.	10.399	4.005	13.071	
	m¡n.	9.146	3.528	11.518	
	Flec.m x.	10.399	4.005	13.071	
	m¡n.	9.146	3.528	11.518	

Flecha Tot. el s. m x =0.026030

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	10.399	4.005	-2.948	
	m¡n.	9.146	3.528	-2.593	
	Cort.m x.	10.399	4.005	-2.948	
	m¡n.	9.146	3.528	-2.593	
	Flec.m x.	9.146	3.528	-2.593	
	m¡n.	10.399	4.005	-2.948	

Flecha Tot. el s. m x =0.007790

BARRA : 62 (34,37) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.379	-0.717	2.166	
	m¡n.	-3.930	-0.839	2.337	
	Cort.m x.	-3.379	-0.717	2.166	
	m¡n.	-3.930	-0.839	2.337	
	Flec.m x.	-3.930	-0.839	2.337	
	m¡n.	-3.379	-0.717	2.166	

Flecha Tot. el s. m x =0.028911

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-3.379	-0.717	5.035	
	m¡n.	-3.930	-0.839	5.694	
	Cort.m x.	-3.379	-0.717	5.035	
	m¡n.	-3.930	-0.839	5.694	
	Flec.m x.	-3.930	-0.839	5.694	
	m¡n.	-3.379	-0.717	5.035	

Flecha Tot. el s. m x =0.026030

BARRA : 63 (36,39) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	37.343	327.150	
	m¡n.	-0.000	32.943	288.402	
	Flec.m x.	-0.000	37.343	327.150	
	m¡n.	-0.000	32.943	288.402	

Flecha Tot. el s. m x =0.005321

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	37.343	177.777	
	m¡n.	-0.000	32.943	156.628	
	Flec.m x.	-0.000	37.343	177.777	
	m¡n.	-0.000	32.943	156.628	

Flecha Tot. el s. m x =0.003765

BARRA : 64 (35,36) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-6.483	26.435	5.767	
	m¡n.	-7.376	29.996	6.469	
	Cort.m x.	-7.376	29.996	6.469	
	m¡n.	-6.483	26.435	5.767	
	Flec.m x.	-7.376	29.996	6.469	
	m¡n.	-6.483	26.435	5.767	

Flecha Tot. el s. m x =0.026030

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-6.483	26.435	-73.537	
	m¡n.	-7.376	29.996	-83.519	
	Cort.m x.	-7.376	29.996	-83.519	
	m¡n.	-6.483	26.435	-73.537	
	Flec.m x.	-6.483	26.435	-73.537	
	m¡n.	-7.376	29.996	-83.519	

Flecha Tot. el s. m x =0.005321

BARRA : 65 (36,37) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	7.376	-29.996	-83.519	
	m¡n.	6.483	-26.435	-73.538	
	Cort.m x.	6.483	-26.435	-73.538	
	m¡n.	7.376	-29.996	-83.519	
	Flec.m x.	6.483	-26.435	-73.538	
	m¡n.	7.376	-29.996	-83.519	

Flecha Tot. el s. m x =0.005321

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	7.376	-29.996	6.469	
	m¡n.	6.483	-26.435	5.767	
	Cort.m x.	6.483	-26.435	5.767	
	m¡n.	7.376	-29.996	6.469	
	Flec.m x.	7.376	-29.996	6.469	
	m¡n.	6.483	-26.435	5.767	

Flecha Tot. el s. m x =0.026030

BARRA : 66 (38,42) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	9.069	25.649	7.552	
	m¡n.	7.983	22.586	6.652	
	Cort.m x.	9.069	25.649	7.552	
	m¡n.	7.983	22.586	6.652	
	Flec.m x.	9.069	25.649	7.552	
	m¡n.	7.983	22.586	6.652	

Flecha Tot. el s. m x =0.007790

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	9.069	25.649	-37.334	
	m¡n.	7.983	22.586	-32.874	
	Cort.m x.	9.069	25.649	-37.334	
	m¡n.	7.983	22.586	-32.874	
	Flec.m x.	7.983	22.586	-32.874	
	m¡n.	9.069	25.649	-37.334	

Flecha Tot. el s. m x =0.000205

BARRA : 67 (37,40) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-9.146	3.528	11.518	
	m¡n.	-10.399	4.005	13.071	
	Cort.m x.	-10.399	4.005	13.071	
	m¡n.	-9.146	3.528	11.518	
	Flec.m x.	-10.399	4.005	13.071	
	m¡n.	-9.146	3.528	11.518	

Flecha Tot. el s. m x =0.026030

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-9.146	3.528	-2.593	
	m¡n.	-10.399	4.005	-2.948	
	Cort.m x.	-10.399	4.005	-2.948	
	m¡n.	-9.146	3.528	-2.593	
	Flec.m x.	-9.146	3.528	-2.593	
	m¡n.	-10.399	4.005	-2.948	

Flecha Tot. el s. m x =0.007790

BARRA : 68 (39,43) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	72.394	156.777	
	m¡n.	-0.000	63.811	138.139	
	Flec.m x.	-0.000	72.394	156.777	
	m¡n.	-0.000	63.811	138.139	

Flecha Tot. el s. m x -0.003765

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Cort.m x.	-0.000	72.394	30.088	
	m¡n.	-0.000	63.811	26.470	
	Flec.m x.	-0.000	72.394	30.088	
	m¡n.	-0.000	63.811	26.470	

Flecha Tot. el s. m x =0.002180

BARRA : 69 (38,39) Sec. 6 Rect. /288,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-9.245	2.712	-1.163	
	m¡n.	-10.500	3.078	-1.329	
	Cort.m x.	-10.500	3.078	-1.329	
	m¡n.	-9.245	2.712	-1.163	
	Flec.m x.	-9.245	2.712	-1.163	
	m¡n.	-10.500	3.078	-1.329	

Flecha Tot. el s. m x =0.007790

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-9.245	2.712	-9.299	
	m¡n.	-10.500	3.078	-10.565	
	Cort.m x.	-10.500	3.078	-10.565	
	m¡n.	-9.245	2.712	-9.299	
	Flec.m x.	-9.245	2.712	-9.299	
	m¡n.	-10.500	3.078	-10.565	

Flecha Tot. el s. m x =0.003765

BARRA : 70 (39,40) Sec. 6 Rect. /288,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	10.500	-3.078	-10.565	
	m¡n.	9.245	-2.712	-9.299	
	Cort.m x.	9.245	-2.712	-9.299	
	m¡n.	10.500	-3.078	-10.565	
	Flec.m x.	9.245	-2.712	-9.299	
	m¡n.	10.500	-3.078	-10.565	

Flecha Tot. el s. m x =0.003765

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	10.500	-3.078	-1.329	
	m¡n.	9.245	-2.712	-1.163	
	Cort.m x.	9.245	-2.712	-1.163	

m¡n.	10.500	-3.078	-1.329
Flec.m x.	9.245	-2.712	-1.163
m¡n.	10.500	-3.078	-1.329

Flecha Tot. el s. m x =0.007790

REACCIONES
==========

(Combinaciones con coeficientes unidad - servicio)

Nudo.	Hip¢tesis.	Momento X.	Fuerza Z.	Momento Y.
1	M ximos	0.000	72.200	-30.920
	M¡nimos	-0.000	63.593	-35.103
2	M ximos	0.000	72.200	-30.920
	M¡nimos	0.000	63.593	-35.103
18	M ximos	0.001	458.891	-30.514
	M¡nimos	0.001	380.787	-142.803
30	M ximos	0.001	482.687	72.533
	M¡nimos	0.001	395.437	-45.850
46	M ximos	0.000	77.616	41.478
	M¡nimos	-0.000	68.379	36.544
47	M ximos	0.000	77.616	41.478
	M¡nimos	-0.000	68.379	36.544

5.6. CALCULO DE LA VIGA-LOSA

En consecuencia con lo anterior, se considera el tablero como viga de tres vanos apoyados en los estribos y empotrados en las pilas.

Se adjuntan los cálculos realizados de la estructura resultante.

El programa efectúa el cálculo de los esfuerzos en las hipótesis extremas,que han sido utilizados ya anteriormente, para el cálculo de las armaduras .

LAVPAS 1
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[GEOMETRY]

# MEMBERS	# JOINTS	# RESTRIC. JOINTS	E [Kg/cm2]	THERMAL C.
8	9	4	300000	0

JOINT COORDINATES

JOINT #	X [mt]	Y [mt]
1	13.00	0.00
2	30.00	0.00
3	0.00	12.10
4	6.50	12.10
5	13.00	12.10
6	21.50	12.10
7	30.00	12.10
8	36.50	12.10
9	43.00	12.10

TYPES OF SECTIONS

TYPE #	PROPERTIES (I,A)
1	0.04900000 - 0.78500003
2	0.55699998 - 4.30499980

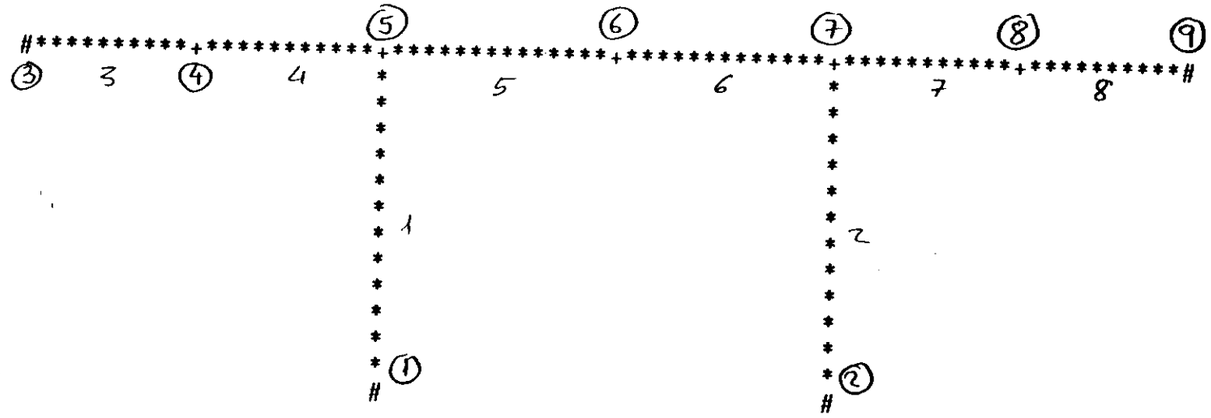
MEMBER INFORMATION, ORIENTATION AND PROPERTIES

MB #	End J	End K	TYPE	Inert [mt4]	Area [mt2]	Length	SIN	COS
1	1	5	1	0.04900000	0.78500003	12.10	1.000	0.000
2	2	7	1	0.04900000	0.78500003	12.10	1.000	0.000
3	3	4	2	0.55699998	4.30499980	6.50	0.000	1.000
4	4	5	2	0.55699998	4.30499980	6.50	0.000	1.000
5	5	6	2	0.55699998	4.30499980	8.50	0.000	1.000
6	6	7	2	0.55699998	4.30499980	8.50	0.000	1.000
7	7	8	2	0.55699998	4.30499980	6.50	0.000	1.000
8	8	9	2	0.55699998	4.30499980	6.50	0.000	1.000

RESTRICTED JOINTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	1	1	1
2	1	1	1
3	0	1	0
9	0	1	0

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CASE --> [DEAD LOAD]

GROUP # : 1 VERTICAL LOADS

3 4 7 8

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	14333	14333	0	6.5		

GROUP # : 2 VERTICAL LOADS

5 6

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	14333	14333	0	8.5		

LAVPAS 1
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CASE --> [DEAD LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.000050	0.000000	-0.000472
4	0.000050	0.181614	0.000007
5	0.000050	0.122896	-0.000125
6	-0.000000	0.362590	0.000000
7	-0.000050	0.122896	0.000125
8	-0.000050	0.181613	-0.000007
9	-0.000050	0.000000	0.000472

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-239190	-753	3035
	5	-239190	-753	-6072
2	2	-239190	753	-3035
	7	-239190	753	6072
3	3	0	68969	-0
	4	0	-24195	145516
4	4	0	-24195	145516
	5	0	-117360	-314538
5	5	-753	121831	-320610
	6	-753	0	197170
6	6	-753	-0	197170
	7	-753	-121831	-320610
7	7	-0	117360	-314538
	8	-0	24195	145516
8	8	-0	24195	145516
	9	-0	-68969	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-753	239190	3035
2	753	239190	-3035
3	0	68969	0
9	0	68969	0

LAVPAS 1
JUN 98

CASE --> [LIVE LOAD]

GROUP # : 1 VERTICAL LOADS

3

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5
2				

Point Loads : 2

Point X	P
5	20000
6.5	20000

GROUP # : 2 VERTICAL LOADS

4

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5

Point Loads : 1

Point X	P
1.5	20000

GROUP # : 3 VERTICAL LOADS

7 8

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5

Point Loads : 0

Point X	P

LAVPAS 1
JUN 98

CASE --> [LIVE LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.046075	0.000000	-0.000465
4	-0.046075	0.193188	0.000004
5	-0.046075	0.033023	0.000296
6	-0.045988	-0.071717	-0.000018
7	-0.045901	0.010158	-0.000144
8	-0.045901	0.073304	0.000003
9	-0.045901	0.000000	0.000180

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-64271	1322	-4406
	5	-64271	1322	11587
2	2	-19770	-1322	6253
	7	-19770	-1322	-9740
3	3	0	45830	0
	4	0	-17050	193536
4	4	0	-17050	193536
	5	0	-59930	-91648
5	5	1322	4341	-80061
	6	1322	4341	-43160
6	6	1322	4341	-43160
	7	1322	4341	-6260
7	7	-0	24111	-16000
	8	-0	1231	66360
8	8	0	1231	66360
	9	0	-21649	-0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	1322	64271	-4406
2	-1322	19770	6253
3	0	45830	0
9	0	21649	0

LAVPAS 1
JUN 98

CASE --> [WIND LOAD]

GROUP # : 1 HORIZONTAL LOADS

1 2

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. Y	Final Y	Point Y	P
1	200	200	0	12.1		

LAVPAS 1
JUN 98

CASE --> [WIND LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.124525	0.000000	0.000003
4	0.124525	-0.001280	0.000001
5	0.124525	-0.000096	-0.000005
6	0.124525	-0.000000	0.000002
7	0.124525	0.000096	-0.000005
8	0.124525	0.001280	0.000001
9	0.124525	0.000000	0.000003

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	188	2420	-9821
	5	188	-0	4819
2	2	-188	2420	-9821
	7	-188	-0	4819
3	3	0	-150	-0
	4	0	-150	-975
4	4	0	-150	-975
	5	0	-150	-1949
5	5	0	-338	2870
	6	0	-338	0
6	6	0	-338	-0
	7	0	-338	-2870
7	7	0	-150	1949
	8	0	-150	975
8	8	2	-150	975
	9	2	-150	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	2420	-188	-9821
2	2420	188	-9821
3	0	-150	0
9	0	150	0

LAVPAS 1
JUN 98

CASE --> [SEISMIC LOAD]

GROUP # : 1 VERTICAL LOADS

3 4

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	6.5		

GROUP # : 2 VERTICAL LOADS

5

Dist. Loads : 1 # Point Loads : 2

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	8.5	7	20000
2					8.5	20000

GROUP # : 3 VERTICAL LOADS

6

Dist. Loads : 1 # Point Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	8.5	1.5	20000

LAVPAS 1
JUN 98

CASE --> [SEISMIC LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.024550	0.000000	-0.000028
4	-0.024550	0.004096	0.000012
5	-0.024550	0.049872	-0.000252
6	-0.024666	0.299363	-0.000007
7	-0.024782	0.034346	0.000334
8	-0.024782	-0.057790	-0.000012
9	-0.024782	0.000000	-0.000127

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-97065	-1765	7612
	5	-97065	-1765	-13745
2	2	-66847	1765	-6622
	7	-66847	1765	14736
3	3	0	10811	-0
	4	0	-12069	-4091
4	4	0	-12069	-4091
	5	0	-34949	-156903
5	5	-1765	62115	-170648
	6	-1765	-7805	200171
6	6	-1765	-7805	200171
	7	-1765	-57725	-133329
7	7	0	9123	-118593
	8	0	9123	-59296
8	8	0	9123	-59296
	9	0	9123	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-1765	97065	7612
2	1765	66847	-6622
3	0	10811	0
9	0	-9123	0

LAVPAS 1
JUN 98

CASE --> [SEISMIC LOAD]

GROUP # : 1 VERTICAL LOADS

5

Dist. Loads : 1 # Point Loads : 2

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	8.5	7	20000
2					8.5	20000

GROUP # : 2 VERTICAL LOADS

6

Dist. Loads : 1 # Point Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	8.5	1.5	20000

LAVPAS 1
JUN 98

CASE --> [SEISMIC LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.000138	0.000000	0.000133
4	0.000138	-0.060560	0.000013
5	0.000138	0.035689	-0.000349
6	0.000000	0.316711	0.000000
7	-0.000138	0.035689	0.000349
8	-0.000138	-0.060560	-0.000013
9	-0.000138	0.000000	-0.000133

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-69461	-2102	8474
	5	-69461	-2102	-16957
2	2	-69461	2102	-8474
	7	-69461	2102	16957
3	3	0	-9541	-0
	4	0	-9541	-62019
4	4	0	-9541	-62019
	5	0	-9541	-124038
5	5	-2102	59920	-140994
	6	-2102	-10000	211166
6	6	-2102	-10000	211166
	7	-2102	-59920	-140994
7	7	0	9541	-124038
	8	0	9541	-62019
8	8	0	9541	-62019
	9	0	9541	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-2102	69461	8474
2	2102	69461	-8474
3	0	-9541	0
9	0	-9541	0

LAVPAS 1
JUN 98

CASE --> [TEMPERATURE]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.552069	0.000000	-0.000026
4	-0.552069	0.012394	-0.000006
5	-0.552069	-0.000800	0.000053
6	0.000091	-0.023371	0.000000
7	0.552250	-0.000800	-0.000053
8	0.552250	0.012396	0.000006
9	0.552250	0.000000	0.000026

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	1557	-5177	31967
	5	1557	-5177	-30677
2	2	1557	5179	-31978
	7	1557	5179	30687
3	3	0	1557	0
	4	0	1557	10120
4	4	0	1557	10120
	5	0	1557	20240
5	5	-5178	-0	-10437
	6	-5178	-0	-10440
6	6	-5179	-0	-10440
	7	-5179	-0	-10443
7	7	0	-1557	20244
	8	0	-1557	10122
8	8	0	-1557	10122
	9	0	-1557	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-5177	-1557	31967
2	5179	-1557	-31978
3	0	1557	0
9	0	1557	0

LAVPAS 1
JUN 98

CASE --> [TEMPERATURE]

GROUP # : 1

5

THERMAL C. : .00001

Uniform 'T' Change : 65 Linear Gradient 'T'/H : 0

GROUP # : 2

6

THERMAL C. : .00001

Uniform 'T' Change : 65 Linear Gradient 'T'/H : 0

6. PILAS

6.1. DESCRIPCION GENERAL

Se trata de soportes empotrados en el tablero y en la zapata.

La sección es circular con un diámetro de 1 m.

Las cargas verticales son las del tablero, cargas permanentes y sobrecargas tanto de frenado como la transmitida por la deformación de apoyos debida a las acciones térmicas y reológicas

El viento afecta a tablero y pila.

Con estas acciones se calculan los esfuerzos en soportes y zapatas y se determinan sus armaduras.

En la zapata se hallarán las tensiones en el suelo (< 3.5 kp/cm^2).

6.2. CARGAS

Verticales (h = 11.5 m.)

Reacciones máximas

Peso propio:	225 t	
Carga muerta:	58 t	283 t
Sobrecarga:	119 t	402 t
Soporte:		
2.5 x 0.785 x 11.5x 1 =	22 t	424 t

Horizontal

Frenado: $F_1 = 119/20 = 5.95\ t < 6$

Deformación : $\Delta = 0.65 \times 8.5 = 5.5$ mm.

$F_2 = 0.0055/(11.5^3/6/3/10^6/(\pi \times 0.5^4/4)) =$

$= 3.2$t

$F = 6 + 3.2 = 9.2$ t

Viento:

Tablero: 0.2 x 3 x 15 = 9 t

Soporte: 0.2 x 11.5x 1 = 2.3t

6.3. PANDEO

Esfuerzos en arranque:

$M_x = 9 \times 12.1 + 2.3 \times 5.75 = 122.12$ m

$M_y = 9.2 \times 11.5/2 = 52.9$ mt

$N = 424 \times 0.9 = 382$ t

$M = 0.9 \times (M_x^2 + M_y)^{1/2} = 120$ mt

$e_o = 0.315 \times 0.6 = 0.188$ m

$e_a = (0.85 + 4000/12000) \times (20 \times 0.188 + 1)/(10 \times 0.188 + 1) \times 11.5^2/0.25 \times 10^4 = 0.104$ m

$e = 0.188 + 0.104 = 0.292$ m < 0.315 m $\quad f_{cd} = 1800$ t/m^2

$M = 0.315 \times 382 = 120$ mt

$\mu = 1.5 \times 119/1800/0.785/1 = 0.135$

$\nu = 0.9 \times 382/1800/0.785/1 = 0.243\ (0.405)$

$A = 0.20 \times 1800 \times 0.785/4 = 71$ cm$^2 \rightarrow 15\ \phi\ 25$

6.4. ZAPATAS

$M_x = 9 \times 13.6 + 2.3 \times 7.25 = 147.28$ mt

$e_x = 0.338$ m $\rightarrow l_x = 2 - e_x = 1.662$m

$M_y = 9.2 \times 13/2 = 59.8$ mt

$e_y = 0.137$ m $\rightarrow l_y = 2 - e_y = 1.863$ m

$N = 382 + 2.5 \times 4 \times 4 \times 1.5 * .9 = 436$ t

$\sigma = N/4/(l_x)/l_y = 35$ t/m^2

$< 1.25 \times 30$ t/m2 $= 37.5$ t/m2

$M = (35 - 3{,}75) \times 1.65^2/2 = 42.54$ mt

$A_{min.} = 22{,}5\ cm^2/m$

$V = 1.6 \times 31.25 \times 0.9 = 45$ t/m

$V_c = 5 \times 167^{1/2} \times 1.45 = 93{,}7$ t/m > V

7. ESTRIBOS

7.1. SIN PUENTE

DATOS

Muro H = 8.5 m.

Puntera	A = 1.5 m
Espesor del muro	B = 1,50m
Talón	C = 2.5 m
Espesor de zapata	D = 1.00 m
Angulo de rozamiento interno	$\phi = 30°$
Densidad de las tierras	$\gamma = 2$ t/m^3
Sobrecarga equivalente de tierras	$H_0 = 0.5$ m
Fuerza vertical en cabeza	R = 0 t/m
Fuerza horizontal en cabeza	F = 0 t/m
Momento exterior en cabeza	$M_0 = 0$ mt/m
Resistencia minorada del hormigón	$F_c = 1500$ t/m^2
Resistencia minorada del acero	$F_y = 4.43$ t/cm^2
Coeficiente de seg. de acciones	$\gamma_f = 1.6$
Coeficiente sísmico	SM = 0

RESULTADOS

Coeficiente de seguridad al deslizamiento	$C_s = 1.64$
Coeficiente de seguridad al vuelco	$C_v = 3.37$
Presión en el terreno	$\sigma = 21.4$ t/m^2
Momento en arranque de muro	$M_m = 80.3$ mt/m
Armadura en arranque de muro	$A_m = 20.8$ cm^2/m
Momento en puntera	$M_p = 21.3$ mt/m
Armadura en puntera	$A_p = 8.2$ cm$_2$/ m
Momento en talón	$M_t = 49.0$ mt/m
Armadura en talón	$A_t = 19.2$ cm^2/m

7.2. CON PUENTE

DATOS

Muro H = 8.5 m

Puntera	A = 1.50 m
Espesor del muro	B = 1,50 m
Talón	C = 2.50 m
Espesor de zapata	D = 1.00 m
Angulo de rozamiento interno	$\phi = 30°$
Densidad de las tierras	$\gamma = 2$ t/m^3
Sobrecarga equivalente de tierras	$H_0 = 0.50$ m
Fuerza vertical en cabeza	R = 20 t/m
Fuerza horizontal en cabeza	F = 2 t/m
Momento exterior en cabeza	$M_0 = 0$ mt/m
Resistencia minorada del hormigón	$F_c = 1500$ t/m^2
Resistencia minorada del acero	$F_y = 4.43$ t/cm^2
Coeficiente de seg. de acciones	$\gamma_f = 1.6$
Coeficiente sísmico	SM = 0

RESULTADOS

Coeficiente de seguridad al deslizamiento	$C_s = 1,87$
Coeficiente de seguridad al vuelco	$C_v = 3,60$
Presión en el terreno	$\sigma = 28,6$ t/m2
Momento en arranque de muro	$M_m = 97.3$ mt/m
Armadura en arranque de muro	$A_m = 25.32$ cm^2/m
Momento en puntera	$M_p = 29.3$ mt/m
Armadura en puntera	$A_p = 11.36$ cm$_2$/ m
Momento en talón	$M_t = 55.9$ mt/m
Armadura en talón	$A_t = 22.0$ cm^2/m

7.3. ALETAS.

Lal =7.5 x 5.5 m

Malmax= 2/3x2x(5.5-1)^2/2x2.25 = 30.4 mt/m d=.76 m

Aalmax = 14.85 cm2/m

7.4 APOYOS ELASTOMÉRICOS.

Deformación por retracción y térmica :

Le = (.25 + .40(40°))xL = 14 mm

Reacciones extremas:

Rmax= 112 t
Rmin = 36 t

Para un apoyo de 300x400x56

σ max= 112/0.12 /10=93.3 kg/cm2 < 150 kg/cm2
σ min = 36/0.12/10= 30 kg/cm^2 = 30 kg/cm2

Altura del apoyo : 14/.7 =20 mm< 56 mm

8. PRUEBA DE CARGA

8.1. CALCULO DE LA CARGA

Como tren de cargas de la prueba se utiliza una carga uniformemente distribuida de valor:

q = 0.75 (0.4 + 120/(BxL))

Vanos 1 y 3

B = 13.00 m.
L = 8,8 m.
q = 0.75 (0.4 + 120/(13.00 x 8.80)) = 1.09 t/m^2

Por tanto, la carga total:

Q = 1.09 x 13.00 x 8.80 = 124 t.

Se utilizan camiones de 33 t. de carga total, por tanto el número máximo será:

N = 124/33 → 3 camiones. Sólo caben dos camiones.

Vano 2

B = 17 m.
L = 8.80 m.
$q = 0.75 (0.4 + 120/(17 \times 8.80)) = 0.9$ t/m²

Por tanto, la carga total:

$Q = 0.9 \times 17 \times 8.80 = 135$ t.

Se utilizan camiones de 33 t. de carga total, por tanto el número máximo será:

N = 135/33 → 4 camiones.

8.2. MEDICION DE FLECHAS.

Vanos 1 y 3

$f_{Máx} = 0.00191$m.

Vano 2

$f_{Máx} = 0.00770$m.

Estas flechas son debidas sólo a la sobrecarga de camiones.

8.3. ESFUERZOS.

Vanos 1 y 3

$M_{máx} = 19.13$ mt/m

Vanos 2 y 3

$M_{máx} = 18.16$ mt/m

8.4. REACCIONES.

$R_{Máx} = 145$ t.

A continuación se presentan los resultados del cálculo del emparrillado relativos a la prueba de carga.

Fecha 28 - 6 - 98

T I T U L O D E L A O B R A

Paso Superior P.K. 300+700. Prueba de Carga

P R O P I E D A D

P R O Y E C T O

Programa T R E B O L - II Paso Superior P.K. 300+700. Prueba de Ca
TOOL S.A.

M A T E R I A L E S

No.	Mod.Young	Mod.Poisson	Peso espec.	Coef.Dilatación
1	3290896.500	0.200	2.500	0.000010

Hormigón rest. caract. Fck = 300 Kp./cm2.

S E C C I O N E S

Unidades en m.

No.	Tipo.	Ancho.	Canto.
1	Rectg.	2.200	0.220

No.	Tipo.	Ancho.	Canto.
2	Rectg.	0.500	1.100

No.	Tipo.	Ancho.	Canto.
3	Rectg.	3.000	1.100

No.	Tipo.	Ancho.	Canto.
4	Rectg.	4.000	0.220

No.	Tipo.	Ancho.	Canto.
5	Rectg.	2.375	0.220

No.	Tipo.	Ancho.	Canto.
6	Rectg.	2.875	0.220

C A R A C T E R I S T I C A S R E S I S T E N T E S S E C C I O N E S

Unidades en m.

No.	Area.	Mmto.In.	S.Cortante	M.I.Tors.
1	4.840E-01	1.952E-03	4.033E-01	7.809E-03
2	5.500E-01	5.546E-02	4.583E-01	3.419E-02
3	3.300E+00	3.327E-01	2.750E+00	1.056E+00
4	8.800E-01	3.549E-03	7.333E-01	1.420E-02
5	5.225E-01	2.107E-03	4.354E-01	8.430E-03
6	6.325E-01	2.551E-03	5.271E-01	1.020E-02

N U D O S

Unidades en m.

Nudo.	X.	Y.
1	-0.000	1.100
2	0.000	7.100
3	0.250	0.000
4	0.250	1.100
5	0.250	4.100
6	0.250	7.100
7	0.250	8.200
8	1.000	1.100
9	1.000	4.100
10	1.000	7.100
11	5.000	1.100
12	5.000	4.100
13	5.000	7.100
14	9.000	1.100
15	9.000	4.100
16	9.000	7.100
17	13.000	1.100
18	13.000	4.100
19	13.000	7.100
20	17.000	1.100
21	17.000	4.100
22	17.000	7.100
23	21.000	1.100
24	21.000	4.100
25	21.000	7.100
26	25.000	1.100

Nudo.	X.	Y.
27	25.000	4.100
28	25.000	7.100
29	29.000	1.100
30	29.000	4.100
31	29.000	7.100
32	33.000	1.100
33	33.000	4.100
34	33.000	7.100
35	37.000	1.100
36	37.000	4.100
37	37.000	7.100
38	41.000	1.100
39	41.000	4.100
40	41.000	7.100
41	42.750	-0.000
42	42.750	1.100
43	42.750	4.100
44	42.750	7.100
45	42.750	8.200
46	43.000	1.100
47	43.000	7.100

B A R R A S

Barra	Nudo inf.	Nudo sup.	Clase	Sección	Material	Long.(m)	Peso(kg)
1	4	8	1	1	1	0.75	907.5
2	1	4	1	1	1	0.25	302.5
3	44	47	1	1	1	0.25	302.5
4	2	6	1	1	1	0.25	302.5
5	6	7	1	2	1	1.10	1512.5
6	5	6	1	2	1	3.00	4125.0
7	3	4	1	2	1	1.10	1512.5
8	42	46	1	1	1	0.25	302.5
9	40	44	1	1	1	1.75	2117.5
10	41	42	1	2	1	1.10	1512.5
11	42	43	1	2	1	3.00	4125.0
12	44	45	1	2	1	1.10	1512.5
13	4	5	1	2	1	3.00	4125.0
14	43	44	1	2	1	3.00	4125.0
15	5	9	1	3	1	0.75	6187.5
16	17	20	1	1	1	4.00	4840.0
17	16	19	1	1	1	4.00	4840.0
18	18	21	1	3	1	4.00	33000.0
19	17	18	1	4	1	3.00	6600.0
20	18	19	1	4	1	3.00	6600.0
21	14	17	1	1	1	4.00	4840.0
22	13	16	1	1	1	4.00	4840.0
23	15	18	1	3	1	4.00	33000.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
24	14	15	1	4	1	3.00	6600.0
25	15	16	1	4	1	3.00	6600.0
26	11	14	1	1	1	4.00	4840.0
27	10	13	1	1	1	4.00	4840.0
28	12	15	1	3	1	4.00	33000.0
29	11	12	1	4	1	3.00	6600.0
30	12	13	1	4	1	3.00	6600.0
31	8	11	1	1	1	4.00	4840.0
32	6	10	1	1	1	0.75	907.5
33	9	12	1	3	1	4.00	33000.0
34	8	9	1	5	1	3.00	3918.7
35	9	10	1	5	1	3.00	3918.7
36	20	23	1	1	1	4.00	4840.0
37	19	22	1	1	1	4.00	4840.0
38	21	24	1	3	1	4.00	33000.0
39	20	21	1	4	1	3.00	6600.0
40	21	22	1	4	1	3.00	6600.0
41	23	26	1	1	1	4.00	4840.0
42	22	25	1	1	1	4.00	4840.0
43	24	27	1	3	1	4.00	33000.0
44	23	24	1	4	1	3.00	6600.0
45	24	25	1	4	1	3.00	6600.0
46	26	29	1	1	1	4.00	4840.0
47	25	28	1	1	1	4.00	4840.0
48	27	30	1	3	1	4.00	33000.0
49	26	27	1	4	1	3.00	6600.0
50	27	28	1	4	1	3.00	6600.0
51	29	32	1	1	1	4.00	4840.0
52	28	31	1	1	1	4.00	4840.0
53	30	33	1	3	1	4.00	33000.0
54	29	30	1	4	1	3.00	6600.0
55	30	31	1	4	1	3.00	6600.0
56	32	35	1	1	1	4.00	4840.0
57	31	34	1	1	1	4.00	4840.0
58	33	36	1	3	1	4.00	33000.0
59	32	33	1	4	1	3.00	6600.0
60	33	34	1	4	1	3.00	6600.0
61	35	38	1	1	1	4.00	4840.0
62	34	37	1	1	1	4.00	4840.0
63	36	39	1	3	1	4.00	33000.0
64	35	36	1	4	1	3.00	6600.0
65	36	37	1	4	1	3.00	6600.0
66	38	42	1	1	1	1.75	2117.5
67	37	40	1	1	1	4.00	4840.0
68	39	43	1	3	1	1.75	14437.5
69	38	39	1	6	1	3.00	4743.7
70	39	40	1	6	1	3.00	4743.8

Peso Total (kg) = 613359.8
Clase 1... = Barra Emp.- Emp.

Clase 2... = Barra Art.- Emp.
Clase 3... = Barra Emp.- Art.
Clase 4... = Barra Art.- Art.

CONDICIONES DE CONTORNO

Nudo No.	Giro.s./eje X	Despl.s/eje Z	Giro.s./eje Y
1	Lib.	Imp.	Imp.
2	Lib.	Imp.	Imp.
18	Imp.	Imp.	Imp.
30	Imp.	Imp.	Imp.
46	Lib.	Imp.	Imp.
47	Lib.	Imp.	Imp.

C A R G A S G E N E R A L E S

Temperatura de referencia (construcci¢n). = 0

Hip¢tesis.		Temperatura	Peso propio.
1	c-1	0.000	NO

C A R G A S E N B A R R A S

Unidades en M. y Mp.

Hip.	Barra.	Carga.	Angl.	P1.	P2.	A1.	A2.
1	24	Punt.	-	5.000		1.750	
	25	Punt.	-	5.000		1.250	
	28	Punt.	-	10.000		1.500	
	33	Punt.	-	10.000		2.000	
	38	Punt.	-	10.000		2.000	
	44	Punt.	-	5.000		1.750	
	45	Punt.	-	5.000		1.250	
	49	Punt.	-	5.000		1.750	
	50	Punt.	-	5.000		1.250	
	58	Punt.	-	10.000		2.500	
	63	Punt.	-	10.000		2.500	
	64	Punt.	-	5.000		1.750	
	65	Punt.	-	5.000		1.250	

C O M B I N A C I O N E S

Comb.	Hip.1
1	1.000

MOVIMIENTOS

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
1	C 1	-.0001278028	0.0000000000	0.0000000000
2	C 1	0.0001278028	0.0000000000	0.0000000000
3	C 1	-.0001278028	0.0001281699	0.0000699442
4	C 1	-.0001278028	-.0000124132	0.0000699442
5	C 1	-.0000000000	-.0002932311	0.0000825880
6	C 1	0.0001278028	-.0000124130	0.0000699438
7	C 1	0.0001278028	0.0001281705	0.0000699438
8	C 1	-.0001220293	-.0000810313	0.0001058451
9	C 1	-.0000000000	-.0003569050	0.0000807894
10	C 1	0.0001220293	-.0000810310	0.0001058449
11	C 1	0.0000137795	-.0005758652	0.0000941703
12	C 1	-.0000000000	-.0005431409	-.0000054210
13	C 1	-.0000137794	-.0005758650	0.0000941704
14	C 1	0.0001206060	-.0007606047	-.0000750059
15	C 1	-.0000000000	-.0003024402	-.0000972127
16	C 1	-.0001206058	-.0007606047	-.0000750059
17	C 1	0.0001247816	-.0002535723	-.0000576804
18	C 1	0.0000000000	0.0000000000	0.0000000000
19	C 1	-.0001247817	-.0002535728	-.0000576804
20	C 1	0.0001115219	-.0004590702	0.0001391291
21	C 1	-.0000000000	-.0002526025	0.0000867494
22	C 1	-.0001115222	-.0004590710	0.0001391292
23	C 1	0.0001981815	-.0010788891	0.0000656044
24	C 1	-.0000000000	-.0004703316	-.0000014206
25	C 1	-.0001981817	-.0010788906	0.0000656045

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
26	C 1	0.0002128904	-.0009026961	-.0001376843
27	C 1	-.0000000000	-.0002619902	-.0000835186
28	C 1	-.0002128906	-.0009026980	-.0001376844
29	C 1	0.0001406565	-.0002782963	-.0000588936
30	C 1	0.0000000000	0.0000000000	0.0000000000
31	C 1	-.0001406569	-.0002782976	-.0000588937
32	C 1	0.0000919455	-.0005377265	0.0001601492
33	C 1	-.0000000001	-.0003557039	0.0001290791
34	C 1	-.0000919459	-.0005377278	0.0001601493
35	C 1	0.0000580173	-.0010875660	-.0000080953
36	C 1	-.0000000001	-.0007513469	0.0000306902
37	C 1	-.0000580174	-.0010875677	-.0000080955
38	C 1	-.0000998589	-.0003492957	-.0002298052
39	C 1	-.0000000001	-.0005605022	-.0001084521
40	C 1	0.0000998587	-.0003492960	-.0002298055
41	C 1	-.0001496243	0.0001471143	-.0001046397
42	C 1	-.0001496243	-.0000174724	-.0001046397
43	C 1	-.0000000002	-.0003474238	-.0001227696
44	C 1	0.0001496242	-.0000174724	-.0001046397
45	C 1	0.0001496242	0.0001471142	-.0001046397
46	C 1	-.0001496243	0.0000000000	0.0000000000
47	C 1	0.0001496242	0.0000000000	0.0000000000

ESFUERZOS EN SISTEMA DE EJES LOCAL

Reducci¢n de I.Torsional en hormig¢n: Vigas 0 %, Losas 0 %

BARRA : 1 (4,8) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.041	-0.395	-0.456	
	m¡n.	-0.041	-0.395	-0.456	
	Cort.m x.	-0.041	-0.395	-0.456	
	m¡n.	-0.041	-0.395	-0.456	
	Flec.m x.	-0.041	-0.395	-0.456	
	m¡n.	-0.041	-0.395	-0.456	

Flecha Tot. el s. m x =0.000012

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	-0.041	-0.395	-0.159	
	m¡n.	-0.041	-0.395	-0.159	
	Cort.m x.	-0.041	-0.395	-0.159	
	m¡n.	-0.041	-0.395	-0.159	
	Flec.m x.	-0.041	-0.395	-0.159	
	m¡n.	-0.041	-0.395	-0.159	

Flecha Tot. el s. m x =0.000081

BARRA : 2 (1,4) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-5.606	-2.498	
	m¡n.	0.000	-5.606	-2.498	
	Flec.m x.	0.000	-5.606	-2.498	
	m¡n.	0.000	-5.606	-2.498	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	0.000	-5.606	-1.097	
	m¡n.	0.000	-5.606	-1.097	
	Flec.m x.	0.000	-5.606	-1.097	
	m¡n.	0.000	-5.606	-1.097	

Flecha Tot. el s. m x =0.000012

BARRA : 3 (44,47) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	6.709	-1.850	
	m¡n.	0.000	6.709	-1.850	
	Flec.m x.	0.000	6.709	-1.850	
	m¡n.	0.000	6.709	-1.850	

Flecha Tot. el s. m x =0.000017

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	0.000	6.709	-3.528	
	m¡n.	0.000	6.709	-3.528	
	Flec.m x.	0.000	6.709	-3.528	
	m¡n.	0.000	6.709	-3.528	

BARRA : 4 (2,6) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-5.606	-2.498	
	m¡n.	0.000	-5.606	-2.498	
	Flec.m x.	0.000	-5.606	-2.498	
	m¡n.	0.000	-5.606	-2.498	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	0.000	-5.606	-1.097	
	m¡n.	0.000	-5.606	-1.097	
	Flec.m x.	0.000	-5.606	-1.097	

m¡n.	0.000	-5.606	-1.097

Flecha Tot. el s. m x =0.000012

BARRA : 5 (6,7) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Flecha Tot. el s. m x =0.000012

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10					

Flecha Tot. el s. m x =-.000128

BARRA : 6 (5,6) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.641	5.211	15.591	
	m¡n.	0.641	5.211	15.591	
	Cort.m x.	0.641	5.211	15.591	
	m¡n.	0.641	5.211	15.591	
	Flec.m x.	0.641	5.211	15.591	
	m¡n.	0.641	5.211	15.591	

Flecha Tot. el s. m x =0.000293

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.641	5.211	-0.041	
	m¡n.	0.641	5.211	-0.041	
	Cort.m x.	0.641	5.211	-0.041	
	m¡n.	0.641	5.211	-0.041	
	Flec.m x.	0.641	5.211	-0.041	
	m¡n.	0.641	5.211	-0.041	

Flecha Tot. el s. m x =0.000012

BARRA : 7 (3,4) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Flecha Tot. el s. m x =-.000128

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10					

Flecha Tot. el s. m x =0.000012

BARRA : 8 (42,46) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	6.709	-1.850	
	m¡n.	0.000	6.709	-1.850	
	Flec.m x.	0.000	6.709	-1.850	
	m¡n.	0.000	6.709	-1.850	

Flecha Tot. el s. m x =0.000017

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	0.000	6.709	-3.528	
	m¡n.	0.000	6.709	-3.528	
	Flec.m x.	0.000	6.709	-3.528	
	m¡n.	0.000	6.709	-3.528	

BARRA : 9 (40,44) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.152	0.539	0.012	
	m¡n.	-0.152	0.539	0.012	
	Cort.m x.	-0.152	0.539	0.012	
	m¡n.	-0.152	0.539	0.012	
	Flec.m x.	-0.152	0.539	0.012	
	m¡n.	-0.152	0.539	0.012	

Flecha Tot. el s. m x =0.000349

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	-0.152	0.539	-0.931	
	m¡n.	-0.152	0.539	-0.931	
	Cort.m x.	-0.152	0.539	-0.931	
	m¡n.	-0.152	0.539	-0.931	
	Flec.m x.	-0.152	0.539	-0.931	
	m¡n.	-0.152	0.539	-0.931	

Flecha Tot. el s. m x =0.000017

BARRA : 10 (41,42) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Flecha Tot. el s. m x =-.000147

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10					

Flecha Tot. el s. m x =0.000017

BARRA : 11 (42,43) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.919	-6.170	-0.152	
	m¡n.	0.919	-6.170	-0.152	
	Cort.m x.	0.919	-6.170	-0.152	
	m¡n.	0.919	-6.170	-0.152	
	Flec.m x.	0.919	-6.170	-0.152	
	m¡n.	0.919	-6.170	-0.152	

Flecha Tot. el s. m x =0.000017

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.919	-6.170	18.357	
	m¡n.	0.919	-6.170	18.357	
	Cort.m x.	0.919	-6.170	18.357	
	m¡n.	0.919	-6.170	18.357	
	Flec.m x.	0.919	-6.170	18.357	
	m¡n.	0.919	-6.170	18.357	

Flecha Tot. el s. m x =0.000347

BARRA : 12 (44,45) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Flecha Tot. el s. m x =0.000017

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10					

Flecha Tot. el s. m x =-.000147

BARRA : 13 (4,5) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.641	-5.211	-0.041	
	m¡n.	-0.641	-5.211	-0.041	
	Cort.m x.	-0.641	-5.211	-0.041	
	m¡n.	-0.641	-5.211	-0.041	
	Flec.m x.	-0.641	-5.211	-0.041	
	m¡n.	-0.641	-5.211	-0.041	

Flecha Tot. el s. m x =0.000012

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.641	-5.211	15.591	
	m¡n.	-0.641	-5.211	15.591	
	Cort.m x.	-0.641	-5.211	15.591	
	m¡n.	-0.641	-5.211	15.591	
	Flec.m x.	-0.641	-5.211	15.591	
	m¡n.	-0.641	-5.211	15.591	

Flecha Tot. el s. m x =0.000293

BARRA : 14 (43,44) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.919	6.170	18.357	
	m¡n.	-0.919	6.170	18.357	
	Cort.m x.	-0.919	6.170	18.357	
	m¡n.	-0.919	6.170	18.357	
	Flec.m x.	-0.919	6.170	18.357	
	m¡n.	-0.919	6.170	18.357	

Flecha Tot. el s. m x =0.000347

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.919	6.170	-0.152	
	m¡n.	-0.919	6.170	-0.152	
	Cort.m x.	-0.919	6.170	-0.152	

m¡n.	-0.919	6.170	-0.152
Flec.m x.	-0.919	6.170	-0.152
m¡n.	-0.919	6.170	-0.152

Flecha Tot. el s. m x =0.000017

BARRA : 15 (5,9) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	-10.422	-1.282	
	m¡n.	-0.000	-10.422	-1.282	
	Flec.m x.	-0.000	-10.422	-1.282	
	m¡n.	-0.000	-10.422	-1.282	

Flecha Tot. el s. m x =0.000293

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Cort.m x.	-0.000	-10.422	6.534	
	m¡n.	-0.000	-10.422	6.534	
	Flec.m x.	-0.000	-10.422	6.534	
	m¡n.	-0.000	-10.422	6.534	

Flecha Tot. el s. m x =0.000357

BARRA : 16 (17,20) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.018	-0.051	-0.418	
	m¡n.	0.018	-0.051	-0.418	
	Cort.m x.	0.018	-0.051	-0.418	
	m¡n.	0.018	-0.051	-0.418	
	Flec.m x.	0.018	-0.051	-0.418	
	m¡n.	0.018	-0.051	-0.418	

Flecha Tot. el s. m x =0.000254

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.018	-0.051	-0.214	
	m¡n.	0.018	-0.051	-0.214	
	Cort.m x.	0.018	-0.051	-0.214	
	m¡n.	0.018	-0.051	-0.214	
	Flec.m x.	0.018	-0.051	-0.214	
	m¡n.	0.018	-0.051	-0.214	

Flecha Tot. el s. m x =0.000459

BARRA : 17 (16,19) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.006	0.289	0.549	
	m¡n.	0.006	0.289	0.549	
	Cort.m x.	0.006	0.289	0.549	
	m¡n.	0.006	0.289	0.549	
	Flec.m x.	0.006	0.289	0.549	
	m¡n.	0.006	0.289	0.549	

Flecha Tot. el s. m x =0.000761

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.006	0.289	-0.605	
	m¡n.	0.006	0.289	-0.605	
	Cort.m x.	0.006	0.289	-0.605	
	m¡n.	0.006	0.289	-0.605	
	Flec.m x.	0.006	0.289	-0.605	
	m¡n.	0.006	0.289	-0.605	

Flecha Tot. el s. m x =0.000254

BARRA : 18 (18,21) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-13.337	-50.422	
	m¡n.	0.000	-13.337	-50.422	
	Flec.m x.	0.000	-13.337	-50.422	
	m¡n.	0.000	-13.337	-50.422	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-13.337	2.925	
	m¡n.	0.000	-13.337	2.925	
	Flec.m x.	0.000	-13.337	2.925	
	m¡n.	0.000	-13.337	2.925	

Flecha Tot. el s. m x =0.000253

BARRA : 19 (17,18) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.187	0.339	0.023	
	m¡n.	-0.187	0.339	0.023	
	Cort.m x.	-0.187	0.339	0.023	
	m¡n.	-0.187	0.339	0.023	
	Flec.m x.	-0.187	0.339	0.023	
	m¡n.	-0.187	0.339	0.023	

Flecha Tot. el s. m x =0.000254

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.187	0.339	-0.995	
	m¡n.	-0.187	0.339	-0.995	
	Cort.m x.	-0.187	0.339	-0.995	
	m¡n.	-0.187	0.339	-0.995	
	Flec.m x.	-0.187	0.339	-0.995	
	m¡n.	-0.187	0.339	-0.995	

BARRA : 20 (18,19) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.187	-0.339	-0.995	
	m¡n.	0.187	-0.339	-0.995	
	Cort.m x.	0.187	-0.339	-0.995	
	m¡n.	0.187	-0.339	-0.995	
	Flec.m x.	0.187	-0.339	-0.995	
	m¡n.	0.187	-0.339	-0.995	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.187	-0.339	0.023	
	m¡n.	0.187	-0.339	0.023	
	Cort.m x.	0.187	-0.339	0.023	
	m¡n.	0.187	-0.339	0.023	
	Flec.m x.	0.187	-0.339	0.023	
	m¡n.	0.187	-0.339	0.023	

Flecha Tot. el s. m x =0.000254

BARRA : 21 (14,17) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.006	0.289	0.549	
	m¡n.	-0.006	0.289	0.549	
	Cort.m x.	-0.006	0.289	0.549	
	m¡n.	-0.006	0.289	0.549	
	Flec.m x.	-0.006	0.289	0.549	
	m¡n.	-0.006	0.289	0.549	

Flecha Tot. el s. m x =0.000761

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.006	0.289	-0.605	
	m¡n.	-0.006	0.289	-0.605	
	Cort.m x.	-0.006	0.289	-0.605	
	m¡n.	-0.006	0.289	-0.605	
	Flec.m x.	-0.006	0.289	-0.605	
	m¡n.	-0.006	0.289	-0.605	

Flecha Tot. el s. m x =0.000254

BARRA : 22 (13,16) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.143	-0.175	-0.078	
	m¡n.	0.143	-0.175	-0.078	
	Cort.m x.	0.143	-0.175	-0.078	
	m¡n.	0.143	-0.175	-0.078	
	Flec.m x.	0.143	-0.175	-0.078	
	m¡n.	0.143	-0.175	-0 078	

Flecha Tot. el s. m x =0.000576

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.143	-0.175	0.621	
	m¡n.	0.143	-0.175	0.621	
	Cort.m x.	0.143	-0.175	0.621	
	m¡n.	0.143	-0.175	0.621	
	Flec.m x.	0.143	-0.175	0.621	
	m¡n.	0.143	-0.175	0.621	

Flecha Tot. el s. m x =0.000761

BARRA : 23 (15,18) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	18.211	9.809	
	m¡n.	-0.000	18.211	9.809	
	Flec.m x.	-0.000	18.211	9.809	
	m¡n.	-0.000	18.211	9.809	

Flecha Tot. el s. m x =0.000302

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	18.211	-63.036	
	m¡n.	-0.000	18.211	-63.036	
	Flec.m x.	-0.000	18.211	-63.036	
	m¡n.	-0.000	18.211	-63.036	

BARRA : 24 (14,15) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.072	-0.463	0.137	
	m¡n.	0.072	-0.463	0.137	
	Cort.m x.	0.072	-0.463	0.137	
	m¡n.	0.072	-0.463	0.137	
	Flec.m x.	0.072	-0.463	0.137	
	m¡n.	0.072	-0.463	0.137	

Flecha Tot. el s. m x =0.000761

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.072	4.537	-4.722	
	m¡n.	0.072	4.537	-4.722	
	Cort.m x.	0.072	4.537	-4.722	
	m¡n.	0.072	4.537	-4.722	
	Flec.m x.	0.072	4.537	-4.722	
	m¡n.	0.072	4.537	-4.722	

Flecha Tot. el s. m x =0.000302

BARRA : 25 (15,16) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.072	-4.537	-4.722	
	m¡n.	-0.072	-4.537	-4.722	
	Cort.m x.	-0.072	-4.537	-4.722	
	m¡n.	-0.072	-4.537	-4.722	
	Flec.m x.	-0.072	-4.537	-4.722	
	m¡n.	-0.072	-4.537	-4.722	

Flecha Tot. el s. m x =0.000302

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.072	0.463	0.137	
	m¡n.	-0.072	0.463	0.137	
	Cort.m x.	-0.072	0.463	0.137	
	m¡n.	-0.072	0.463	0.137	
	Flec.m x.	-0.072	0.463	0.137	
	m¡n.	-0.072	0.463	0.137	

Flecha Tot. el s. m x =0.000761

BARRA : 26 (11,14) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.143	-0.175	-0.078	
	m¡n.	-0.143	-0.175	-0.078	
	Cort.m x.	-0.143	-0.175	-0.078	
	m¡n.	-0.143	-0.175	-0.078	
	Flec.m x.	-0.143	-0.175	-0.078	
	m¡n.	-0.143	-0.175	-0.078	

Flecha Tot. el s. m x =0.000576

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.143	-0.175	0.621	
	m¡n.	-0.143	-0.175	0.621	
	Cort.m x.	-0.143	-0.175	0.621	
	m¡n.	-0.143	-0.175	0.621	
	Flec.m x.	-0.143	-0.175	0.621	
	m¡n.	-0.143	-0.175	0.621	

Flecha Tot. el s. m x =0.000761

BARRA : 27 (10,13) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.182	-0.113	-0.208	
	m¡n.	0.182	-0.113	-0.208	
	Cort.m x.	0.182	-0.113	-0.208	
	m¡n.	0.182	-0.113	-0.208	
	Flec.m x.	0.182	-0.113	-0.208	
	m¡n.	0.182	-0.113	-0.208	

Flecha Tot. el s. m x =0.000081

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.182	-0.113	0.245	
	m¡n.	0.182	-0.113	0.245	
	Cort.m x.	0.182	-0.113	0.245	
	m¡n.	0.182	-0.113	0.245	
	Flec.m x.	0.182	-0.113	0.245	
	m¡n.	0.182	-0.113	0.245	

Flecha Tot. el s. m x =0.000576

BARRA : 28 (12,15) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	-0.862	31.218	
	m¡n.	-0.000	-0.862	31.218	
	Flec.m x.	-0.000	-0.862	31.218	
	m¡n.	-0.000	-0.862	31.218	

Flecha Tot. el s. m x =0.000543

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	9.138	9.665	
	m¡n.	-0.000	9.138	9.665	
	Flec.m x.	-0.000	9.138	9.665	
	m¡n.	-0.000	9.138	9.665	

Flecha Tot. el s. m x =0.000302

BARRA : 29 (11,12) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.323	0.062	0.039	
	m¡n.	0.323	0.062	0.039	
	Cort.m x.	0.323	0.062	0.039	
	m¡n.	0.323	0.062	0.039	
	Flec.m x.	0.323	0.062	0.039	
	m¡n.	0.323	0.062	0.039	

Flecha Tot. el s. m x =0.000576

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.323	0.062	-0.146	
	m¡n.	0.323	0.062	-0.146	
	Cort.m x.	0.323	0.062	-0.146	
	m¡n.	0.323	0.062	-0.146	
	Flec.m x.	0.323	0.062	-0.146	
	m¡n.	0.323	0.062	-0.146	

Flecha Tot. el s. m x =0.000543

BARRA : 30 (12,13) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.323	-0.062	-0.146	
	m¡n.	-0.323	-0.062	-0.146	
	Cort.m x.	-0.323	-0.062	-0.146	
	m¡n.	-0.323	-0.062	-0.146	
	Flec.m x.	-0.323	-0.062	-0.146	
	m¡n.	-0.323	-0.062	-0.146	

Flecha Tot. el s. m x =0.000543

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.323	-0.062	0.039	
	m¡n.	-0.323	-0.062	0.039	
	Cort.m x.	-0.323	-0.062	0.039	
	m¡n.	-0.323	-0.062	0.039	
	Flec.m x.	-0.323	-0.062	0.039	
	m¡n.	-0.323	-0.062	0.039	

Flecha Tot. el s. m x =0.000576

BARRA : 31 (8,11) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.182	-0.113	-0.208	
	m¡n.	-0.182	-0.113	-0.208	
	Cort.m x.	-0.182	-0.113	-0.208	
	m¡n.	-0.182	-0.113	-0.208	
	Flec.m x.	-0.182	-0.113	-0.208	
	m¡n.	-0.182	-0.113	-0.208	

Flecha Tot. el s. m x =0.000081

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.182	-0.113	0.245	
	m¡n.	-0.182	-0.113	0.245	
	Cort.m x.	-0.182	-0.113	0.245	
	m¡n.	-0.182	-0.113	0.245	
	Flec.m x.	-0.182	-0.113	0.245	
	m¡n.	-0.182	-0.113	0.245	

Flecha Tot. el s. m x =0.000576

BARRA : 32 (6,10) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.041	-0.395	-0.456	
	m¡n.	0.041	-0.395	-0.456	
	Cort.m x.	0.041	-0.395	-0.456	
	m¡n.	0.041	-0.395	-0.456	
	Flec.m x.	0.041	-0.395	-0.456	
	m¡n.	0.041	-0.395	-0.456	

Flecha Tot. el s. m x =0.000012

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	0.041	-0.395	-0.159	
	m¡n.	0.041	-0.395	-0.159	
	Cort.m x.	0.041	-0.395	-0.159	
	m¡n.	0.041	-0.395	-0.159	
	Flec.m x.	0.041	-0.395	-0.159	
	m¡n.	0.041	-0.395	-0.159	

Flecha Tot. el s. m x =0.000081

BARRA : 33 (9,12) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	-10.985	6.631	
	m¡n.	-0.000	-10.985	6.631	
	Flec.m x.	-0.000	-10.985	6.631	
	m¡n.	-0.000	-10.985	6.631	

Flecha Tot. el s. m x =0.000357

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	-0.985	30.571	
	m¡n.	-0.000	-0.985	30.571	
	Flec.m x.	-0.000	-0.985	30.571	
	m¡n.	-0.000	-0.985	30.571	

Flecha Tot. el s. m x =0.000543

BARRA : 34 (8,9) Sec. 5 Rect. /238,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.048	-0.282	-0.141	
	m¡n.	0.048	-0.282	-0.141	
	Cort.m x.	0.048	-0.282	-0.141	
	m¡n.	0.048	-0.282	-0.141	
	Flec.m x.	0.048	-0.282	-0.141	
	m¡n.	0.048	-0.282	-0.141	

Flecha Tot. el s. m x =0.000081

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.048	-0.282	0.705	
	m¡n.	0.048	-0.282	0.705	
	Cort.m x.	0.048	-0.282	0.705	
	m¡n.	0.048	-0.282	0.705	
	Flec.m x.	0.048	-0.282	0.705	
	m¡n.	0.048	-0.282	0.705	

Flecha Tot. el s. m x =0.000357

BARRA : 35 (9,10) Sec. 5 Rect. /238,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.048	0.282	0.705	
	m¡n.	-0.048	0.282	0.705	
	Cort.m x.	-0.048	0.282	0.705	
	m¡n.	-0.048	0.282	0.705	
	Flec.m x.	-0.048	0.282	0.705	
	m¡n.	-0.048	0.282	0.705	

Flecha Tot. el s. m x =0.000357

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.048	0.282	-0.141	
	m¡n.	-0.048	0.282	-0.141	
	Cort.m x.	-0.048	0.282	-0.141	

m¡n.	-0.048	0.282	-0.141
Flec.m x.	-0.048	0.282	-0.141
m¡n.	-0.048	0.282	-0.141

Flecha Tot. el s. m x =0.000081

BARRA : 36 (20,23) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.116	-0.251	-0.384	
	m¡n.	-0.116	-0.251	-0.384	
	Cort.m x.	-0.116	-0.251	-0.384	
	m¡n.	-0.116	-0.251	-0.384	
	Flec.m x.	-0.116	-0.251	-0.384	
	m¡n.	-0.116	-0.251	-0.384	

Flecha Tot. el s. m x =0.000459

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.116	-0.251	0.620	
	m¡n.	-0.116	-0.251	0.620	
	Cort.m x.	-0.116	-0.251	0.620	
	m¡n.	-0.116	-0.251	0.620	
	Flec.m x.	-0.116	-0.251	0.620	
	m¡n.	-0.116	-0.251	0.620	

Flecha Tot. el s. m x =0.001079

BARRA : 37 (19,22) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.018	-0.051	-0.418	
	m¡n.	-0.018	-0.051	-0.418	
	Cort.m x.	-0.018	-0.051	-0.418	
	m¡n.	-0.018	-0.051	-0.418	
	Flec.m x.	-0.018	-0.051	-0.418	
	m¡n.	-0.018	-0.051	-0.418	

Flecha Tot. el s. m x =0.000254

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.018	-0.051	-0.214	
	m¡n.	-0.018	-0.051	-0.214	
	Cort.m x.	-0.018	-0.051	-0.214	
	m¡n.	-0.018	-0.051	-0.214	
	Flec.m x.	-0.018	-0.051	-0.214	
	m¡n.	-0.018	-0.051	-0.214	

Flecha Tot. el s. m x =0.000459

BARRA : 38 (21,24) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-12.936	3.265	
	m¡n.	0.000	-12.936	3.265	
	Flec.m x.	0.000	-12.936	3.265	
	m¡n.	0.000	-12.936	3.265	

Flecha Tot. el s. m x =0.000253

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-2.936	35.010	
	m¡n.	0.000	-2.936	35.010	
	Flec.m x.	0.000	-2.936	35.010	
	m¡n.	0.000	-2.936	35.010	

Flecha Tot. el s. m x =0.000470

BARRA : 39 (20,21) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.170	0.200	-0.134	
	m¡n.	0.170	0.200	-0.134	
	Cort.m x.	0.170	0.200	-0.134	
	m¡n.	0.170	0.200	-0.134	

Flec.m x.	0.170	0.200	-0.134
m¡n.	0.170	0.200	-0.134

Flecha Tot. el s. m x =0.000459

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.170	0.200	-0.735	
	m¡n.	0.170	0.200	-0.735	
	Cort.m x.	0.170	0.200	-0.735	
	m¡n.	0.170	0.200	-0.735	
	Flec.m x.	0.170	0.200	-0.735	
	m¡n.	0.170	0.200	-0.735	

Flecha Tot. el s. m x =0.000253

BARRA : 40 (21,22) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.170	-0.200	-0.735	
	m¡n.	-0.170	-0.200	-0.735	
	Cort.m x.	-0.170	-0.200	-0.735	
	m¡n.	-0.170	-0.200	-0.735	
	Flec.m x.	-0.170	-0.200	-0.735	
	m¡n.	-0.170	-0.200	-0.735	

Flecha Tot. el s. m x =0.000253

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.170	-0.200	-0.134	
	m¡n.	-0.170	-0.200	-0.134	
	Cort.m x.	-0.170	-0.200	-0.134	
	m¡n.	-0.170	-0.200	-0.134	
	Flec.m x.	-0.170	-0.200	-0.134	
	m¡n.	-0.170	-0.200	-0.134	

Flecha Tot. el s. m x =0.000459

BARRA : 41 (23,26) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.020	0.038	0.403	
	m¡n.	-0.020	0.038	0.403	
	Cort.m x.	-0.020	0.038	0.403	
	m¡n.	-0.020	0.038	0.403	
	Flec.m x.	-0.020	0.038	0.403	
	m¡n.	-0.020	0.038	0.403	

Flecha Tot. el s. m x =0.001079

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.020	0.038	0.250	
	m¡n.	-0.020	0.038	0.250	
	Cort.m x.	-0.020	0.038	0.250	
	m¡n.	-0.020	0.038	0.250	
	Flec.m x.	-0.020	0.038	0.250	
	m¡n.	-0.020	0.038	0.250	

Flecha Tot. el s. m x =0.000903

BARRA : 42 (22,25) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.116	-0.251	-0.384	
	m¡n.	0.116	-0.251	-0.384	
	Cort.m x.	0.116	-0.251	-0.384	
	m¡n.	0.116	-0.251	0.384	
	Flec.m x.	0.116	-0.251	-0.384	
	m¡n.	0.116	-0.251	-0.384	

Flecha Tot. el s. m x =0.000459

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.116	-0.251	0.620	
	m¡n.	0.116	-0.251	0.620	
	Cort.m x.	0.116	-0.251	0.620	

m¡n.	0.116	-0.251	0.620
Flec.m x.	0.116	-0.251	0.620
m¡n.	0.116	-0.251	0.620

Flecha Tot. el s. m x =0.001079

BARRA : 43 (24,27) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	6.485	35.445	
	m¡n.	-0.000	6.485	35.445	
	Flec.m x.	-0.000	6.485	35.445	
	m¡n.	-0.000	6.485	35.445	

Flecha Tot. el s. m x =0.000470

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	6.485	9.506	
	m¡n.	-0.000	6.485	9.506	
	Flec.m x.	-0.000	6.485	9.506	
	m¡n.	-0.000	6.485	9.506	

Flecha Tot. el s. m x =0.000262

BARRA : 44 (23,24) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.217	-0.289	0.096	
	m¡n.	0.217	-0.289	0.096	
	Cort.m x.	0.217	-0.289	0.096	
	m¡n.	0.217	-0.289	0.096	
	Flec.m x.	0.217	-0.289	0.096	
	m¡n.	0.217	-0.289	0.096	

Flecha Tot. el s. m x =0.001079

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.217	4.711	-5.285	
	m¡n.	0.217	4.711	-5.285	
	Cort.m x.	0.217	4.711	-5.285	
	m¡n.	0.217	4.711	-5.285	
	Flec.m x.	0.217	4.711	-5.285	
	m¡n.	0.217	4.711	-5.285	

Flecha Tot. el s. m x =0.000470

BARRA : 45 (24,25) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.217	-4.711	-5.285	
	m¡n.	-0.217	-4.711	-5.285	
	Cort.m x.	-0.217	-4.711	-5.285	
	m¡n.	-0.217	-4.711	-5.285	
	Flec.m x.	-0.217	-4.711	-5.285	
	m¡n.	-0.217	-4.711	-5.285	

Flecha Tot. el s. m x =0.000470

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.217	0.289	0.096	
	m¡n.	-0.217	0.289	0.096	
	Cort.m x.	-0.217	0.289	0.096	
	m¡n.	-0.217	0.289	0.096	
	Flec.m x.	-0.217	0.289	0.096	
	m¡n.	-0.217	0.289	0.096	

Flecha Tot. el s. m x =0.001079

BARRA : 46 (26,29) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.097	0.276	0.426	
	m¡n.	0.097	0.276	0.426	
	Cort.m x.	0.097	0.276	0.426	
	m¡n.	0.097	0.276	0.426	
	Flec.m x.	0.097	0.276	0.426	
	m¡n.	0.097	0.276	0.426	

Flecha Tot. el s. m x =0.000903

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.097	0.276	-0.679	
	m¡n.	0.097	0.276	-0.679	
	Cort.m x.	0.097	0.276	-0.679	
	m¡n.	0.097	0.276	-0.679	
	Flec.m x.	0.097	0.276	-0.679	
	m¡n.	0.097	0.276	-0.679	

Flecha Tot. el s. m x =0.000278

BARRA : 47 (25,28) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.020	0.038	0.403	
	m¡n.	0.020	0.038	0.403	
	Cort.m x.	0.020	0.038	0.403	
	m¡n.	0.020	0.038	0.403	
	Flec.m x.	0.020	0.038	0.403	
	m¡n.	0.020	0.038	0.403	

Flecha Tot. el s. m x =0.001079

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.020	0.038	0.250	
	m¡n.	0.020	0.038	0.250	
	Cort.m x.	0.020	0.038	0.250	
	m¡n.	0.020	0.038	0.250	
	Flec.m x.	0.020	0.038	0.250	
	m¡n.	0.020	0.038	0.250	

Flecha Tot. el s. m x =0.000903

BARRA : 48 (27,30) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	16.009	9.154	
	m¡n.	-0.000	16.009	9.154	
	Flec.m x.	-0.000	16.009	9.154	
	m¡n.	-0.000	16.009	9.154	

Flecha Tot. el s. m x =0.000262

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	16.009	-54.882	
	m¡n.	-0.000	16.009	-54.882	
	Flec.m x.	-0.000	16.009	-54.882	
	m¡n.	-0.000	16.009	-54.882	

BARRA : 49 (26,27) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.176	-0.238	0.116	
	m¡n.	-0.176	-0.238	0.116	
	Cort.m x.	-0.176	-0.238	0.116	
	m¡n.	-0.176	-0.238	0.116	
	Flec.m x.	-0.176	-0.238	0.116	
	m¡n.	-0.176	-0.238	0.116	

Flecha Tot. el s. m x =0.000903

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.176	4.762	-5.420	
	m¡n.	-0.176	4.762	-5.420	
	Cort.m x.	-0.176	4.762	-5.420	
	m¡n.	-0.176	4.762	-5.420	
	Flec.m x.	-0.176	4.762	-5.420	
	m¡n.	-0.176	4.762	-5.420	

Flecha Tot. el s. m x =0.000262

BARRA : 50 (27,28) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.176	-4.762	-5.420	
	m¡n.	0.176	-4.762	-5.420	
	Cort.m x.	0.176	-4.762	-5.420	
	m¡n.	0.176	-4.762	-5.420	
	Flec.m x.	0.176	-4.762	-5.420	
	m¡n.	0.176	-4.762	-5.420	

Flecha Tot. el s. m x =0.000262

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.176	0.238	0.116	
	m¡n.	0.176	0.238	0.116	
	Cort.m x.	0.176	0.238	0.116	
	m¡n.	0.176	0.238	0.116	
	Flec.m x.	0.176	0.238	0.116	
	m¡n.	0.176	0.238	0.116	

Flecha Tot. el s. m x =0.000903

BARRA : 51 (29,32) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.065	-0.068	-0.488	
	m¡n.	0.065	-0.068	-0.488	
	Cort.m x.	0.065	-0.068	-0.488	
	m¡n.	0.065	-0.068	-0.488	
	Flec.m x.	0.065	-0.068	-0.488	
	m¡n.	0.065	-0.068	-0.488	

Flecha Tot. el s. m x =0.000278

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.065	-0.068	-0.216	
	m¡n.	0.065	-0.068	-0.216	
	Cort.m x.	0.065	-0.068	-0.216	
	m¡n.	0.065	-0.068	-0.216	
	Flec.m x.	0.065	-0.068	-0.216	
	m¡n.	0.065	-0.068	-0.216	

Flecha Tot. el s. m x =0.000538

BARRA : 52 (28,31) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.097	0.276	0.426	
	m¡n.	-0.097	0.276	0.426	
	Cort.m x.	-0.097	0.276	0.426	
	m¡n.	-0.097	0.276	0.426	
	Flec.m x.	-0.097	0.276	0.426	
	m¡n.	-0.097	0.276	0.426	

Flecha Tot. el s. m x =0.000903

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.097	0.276	-0.679	
	m¡n.	-0.097	0.276	-0.679	
	Cort.m x.	-0.097	0.276	-0.679	
	m¡n.	-0.097	0.276	-0.679	
	Flec.m x.	-0.097	0.276	-0.679	
	m¡n.	-0.097	0.276	-0.679	

Flecha Tot. el s. m x =0.000278

BARRA : 53 (30,33) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-16.446	-68.229	
	m¡n.	0.000	-16.446	-68.229	
	Flec.m x.	0.000	-16.446	-68.229	
	m¡n.	0.000	-16.446	-68.229	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-16.446	-2.445	
	m¡n.	0.000	-16.446	-2.445	
	Flec.m x.	0.000	-16.446	-2.445	
	m¡n.	0.000	-16.446	-2.445	

Flecha Tot. el s. m x =0.000356

BARRA : 54 (29,30) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.191	0.344	-0.031	
	m¡n.	-0.191	0.344	-0.031	
	Cort.m x.	-0.191	0.344	-0.031	
	m¡n.	-0.191	0.344	-0.031	
	Flec.m x.	-0.191	0.344	-0.031	
	m¡n.	-0.191	0.344	-0.031	

Flecha Tot. el s. m x =0.000278

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.191	0.344	-1.064	
	m¡n.	-0.191	0.344	-1.064	
	Cort.m x.	-0.191	0.344	-1.064	
	m¡n.	-0.191	0.344	-1.064	
	Flec.m x.	-0.191	0.344	-1.064	
	m¡n.	-0.191	0.344	-1.064	

BARRA : 55 (30,31) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.191	-0.344	-1.064	
	m¡n.	0.191	-0.344	-1.064	
	Cort.m x.	0.191	-0.344	-1.064	
	m¡n.	0.191	-0.344	-1.064	
	Flec.m x.	0.191	-0.344	-1.064	
	m¡n.	0.191	-0.344	-1.064	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.191	-0.344	-0.031	
	m¡n.	0.191	-0.344	-0.031	
	Cort.m x.	0.191	-0.344	-0.031	
	m¡n.	0.191	-0.344	-0.031	
	Flec.m x.	0.191	-0.344	-0.031	
	m¡n.	0.191	-0.344	-0.031	

Flecha Tot. el s. m x =0.000278

BARRA : 56 (32,35) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.045	-0.293	-0.317	
	m¡n.	0.045	-0.293	-0.317	
	Cort.m x.	0.045	-0.293	-0.317	
	m¡n.	0.045	-0.293	-0.317	
	Flec.m x.	0.045	-0.293	-0.317	
	m¡n.	0.045	-0.293	-0.317	

Flecha Tot. el s. m x =0.000538

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.045	-0.293	0.857	
	m¡n.	0.045	-0.293	0.857	
	Cort.m x.	0.045	-0.293	0.857	
	m¡n.	0.045	-0.293	0.857	
	Flec.m x.	0.045	-0.293	0.857	
	m¡n.	0.045	-0.293	0.857	

Flecha Tot. el s. m x =0.001088

BARRA : 57 (31,34) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.065	-0.068	-0.488	
	m¡n.	-0.065	-0.068	-0.488	
	Cort.m x.	-0.065	-0.068	-0.488	
	m¡n.	-0.065	-0.068	-0.488	
	Flec.m x.	-0.065	-0.068	-0.488	
	m¡n.	-0.065	-0.068	-0.488	

Flecha Tot. el s. m x =0.000278

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.065	-0.068	-0.216	
	m¡n.	-0.065	-0.068	-0.216	
	Cort.m x.	-0.065	-0.068	-0.216	
	m¡n.	-0.065	-0.068	-0.216	
	Flec.m x.	-0.065	-0.068	-0.216	
	m¡n.	-0.065	-0.068	-0.216	

Flecha Tot. el s. m x =0.000538

BARRA : 58 (33,36) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-15.995	-2.243	
	m¡n.	0.000	-15.995	-2.243	
	Flec.m x.	0.000	-15.995	-2.243	
	m¡n.	0.000	-15.995	-2.243	

Flecha Tot. el s. m x =0.000356

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-5.995	46.738	
	m¡n.	0.000	-5.995	46.738	
	Flec.m x.	0.000	-5.995	46.738	
	m¡n.	0.000	-5.995	46.738	

Flecha Tot. el s. m x =0.000751

BARRA : 59 (32,33) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.101	0.225	-0.020	
	m¡n.	0.101	0.225	-0.020	
	Cort.m x.	0.101	0.225	-0.020	
	m¡n.	0.101	0.225	-0.020	
	Flec.m x.	0.101	0.225	-0.020	
	m¡n.	0.101	0.225	-0.020	

Flecha Tot. el s. m x =0.000538

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.101	0.225	-0.696	
	m¡n.	0.101	0.225	-0.696	
	Cort.m x.	0.101	0.225	-0.696	
	m¡n.	0.101	0.225	-0.696	
	Flec.m x.	0.101	0.225	-0.696	
	m¡n.	0.101	0.225	-0.696	

Flecha Tot. el s. m x =0.000356

BARRA : 60 (33,34) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.101	-0.225	-0.696	
	m¡n.	-0.101	-0.225	-0.696	
	Cort.m x.	-0.101	-0.225	-0.696	
	m¡n.	-0.101	-0.225	-0.696	

Flec.m x.	-0.101	-0.225	-0.696
m¡n.	-0.101	-0.225	-0.696

Flecha Tot. el s. m x =0.000356

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.101	-0.225	-0.020	
	m¡n.	-0.101	-0.225	-0.020	
	Cort.m x.	-0.101	-0.225	-0.020	
	m¡n.	-0.101	-0.225	-0.020	
	Flec.m x.	-0.101	-0.225	-0.020	
	m¡n.	-0.101	-0.225	-0.020	

Flecha Tot. el s. m x =0.000538

BARRA : 61 (35,38) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.211	0.313	0.983	
	m¡n.	0.211	0.313	0.983	
	Cort.m x.	0.211	0.313	0.983	
	m¡n.	0.211	0.313	0.983	
	Flec.m x.	0.211	0.313	0.983	
	m¡n.	0.211	0.313	0.983	

Flecha Tot. el s. m x =0.001088

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.211	0.313	-0.271	
	m¡n.	0.211	0.313	-0.271	
	Cort.m x.	0.211	0.313	-0.271	
	m¡n.	0.211	0.313	-0.271	
	Flec.m x.	0.211	0.313	-0.271	
	m¡n.	0.211	0.313	-0.271	

Flecha Tot. el s. m x =0.000349

BARRA : 62 (34,37) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.045	-0.293	-0.317	
	m¡n.	-0.045	-0.293	-0.317	
	Cort.m x.	-0.045	-0.293	-0.317	
	m¡n.	-0.045	-0.293	-0.317	
	Flec.m x.	-0.045	-0.293	-0.317	
	m¡n.	-0.045	-0.293	-0.317	

Flecha Tot. el s. m x =0.000538

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.045	-0.293	0.857	
	m¡n.	-0.045	-0.293	0.857	
	Cort.m x.	-0.045	-0.293	0.857	
	m¡n.	-0.045	-0.293	0.857	
	Flec.m x.	-0.045	-0.293	0.857	
	m¡n.	-0.045	-0.293	0.857	

Flecha Tot. el s. m x =0.001088

BARRA : 63 (36,39) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	2.791	46.486	
	m¡n.	0.000	2.791	46.486	
	Flec.m x.	0.000	2.791	46.486	
	m¡n.	0.000	2.791	46.486	

Flecha Tot. el s. m x =0.000751

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	12.791	20.322	
	m¡n.	0.000	12.791	20.322	
	Flec.m x.	0.000	12.791	20.322	
	m¡n.	0.000	12.791	20.322	

Flecha Tot. el s. m x =0.000561

BARRA : 64 (35,36) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.126	-0.607	0.166	
	m¡n.	-0.126	-0.607	0.166	
	Cort.m x.	-0.126	-0.607	0.166	
	m¡n.	-0.126	-0.607	0.166	
	Flec.m x.	-0.126	-0.607	0.166	
	m¡n.	-0.126	-0.607	0.166	

Flecha Tot. el s. m x =0.001088

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.126	4.393	-4.264	
	m¡n.	-0.126	4.393	-4.264	
	Cort.m x.	-0.126	4.393	-4.264	
	m¡n.	-0.126	4.393	-4.264	
	Flec.m x.	-0.126	4.393	-4.264	
	m¡n.	-0.126	4.393	-4.264	

Flecha Tot. el s. m x =0.000751

BARRA : 65 (36,37) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.126	-4.393	-4.264	
	m¡n.	0.126	-4.393	-4.264	
	Cort.m x.	0.126	-4.393	-4.264	
	m¡n.	0.126	-4.393	-4.264	
	Flec.m x.	0.126	-4.393	-4.264	
	m¡n.	0.126	-4.393	-4.264	

Flecha Tot. el s. m x =0.000751

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.126	0.607	0.166	
	m¡n.	0.126	0.607	0.166	
	Cort.m x.	0.126	0.607	0.166	
	m¡n.	0.126	0.607	0.166	
	Flec.m x.	0.126	0.607	0.166	
	m¡n.	0.126	0.607	0.166	

Flecha Tot. el s. m x =0.001088

BARRA : 66 (38,42) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.152	0.539	0.012	
	m¡n.	0.152	0.539	0.012	
	Cort.m x.	0.152	0.539	0.012	
	m¡n.	0.152	0.539	0.012	
	Flec.m x.	0.152	0.539	0.012	
	m¡n.	0.152	0.539	0.012	

Flecha Tot. el s. m x =0.000349

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	0.152	0.539	-0.931	
	m¡n.	0.152	0.539	-0.931	
	Cort.m x.	0.152	0.539	-0.931	
	m¡n.	0.152	0.539	-0.931	
	Flec.m x.	0.152	0.539	-0.931	
	m¡n.	0.152	0.539	-0.931	

Flecha Tot. el s. m x =0.000017

BARRA : 67 (37,40) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.211	0.313	0.983	
	m¡n.	-0.211	0.313	0.983	
	Cort.m x.	-0.211	0.313	0.983	
	m¡n.	-0.211	0.313	0.983	
	Flec.m x.	-0.211	0.313	0.983	
	m¡n.	-0.211	0.313	0.983	

Flecha Tot. el s. m x =0.001088

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.211	0.313	-0.271	
	m¡n.	-0.211	0.313	-0.271	
	Cort.m x.	-0.211	0.313	-0.271	
	m¡n.	-0.211	0.313	-0.271	
	Flec.m x.	-0.211	0.313	-0.271	
	m¡n.	-0.211	0.313	-0.271	

Flecha Tot. el s. m x =0.000349

BARRA : 68 (39,43) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	12.340	19.756	
	m¡n.	0.000	12.340	19.756	
	Flec.m x.	0.000	12.340	19.756	
	m¡n.	0.000	12.340	19.756	

Flecha Tot. el s. m x =0.000561

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Cort.m x.	0.000	12.340	-1.838	
	m¡n.	0.000	12.340	-1.838	
	Flec.m x.	0.000	12.340	-1.838	
	m¡n.	0.000	12.340	-1.838	

Flecha Tot. el s. m x =0.000347

BARRA : 69 (38,39) Sec. 6 Rect. /288,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.283	-0.226	-0.059	
	m¡n.	-0.283	-0.226	-0.059	
	Cort.m x.	-0.283	-0.226	-0.059	
	m¡n.	-0.283	-0.226	-0.059	
	Flec.m x.	-0.283	-0.226	-0.059	
	m¡n.	-0.283	-0.226	-0.059	

Flecha Tot. el s. m x =0.000349

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.283	-0.226	0.618	
	m¡n.	-0.283	-0.226	0.618	
	Cort.m x.	-0.283	-0.226	0.618	
	m¡n.	-0.283	-0.226	0.618	
	Flec.m x.	-0.283	-0.226	0.618	
	m¡n.	-0.283	-0.226	0.618	

Flecha Tot. el s. m x =0.000561

BARRA : 70 (39,40) Sec. 6 Rect. /288,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.283	0.226	0.618	
	m¡n.	0.283	0.226	0.618	
	Cort.m x.	0.283	0.226	0.618	
	m¡n.	0.283	0.226	0.618	
	Flec.m x.	0.283	0.226	0.618	
	m¡n.	0.283	0.226	0.618	

Flecha Tot. el s. m x =0.000561

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.283	0.226	-0.059	
	m¡n.	0.283	0.226	-0.059	
	Cort.m x.	0.283	0.226	-0.059	

m¡n.	0.283	0.226	-0.059
Flec.m x.	0.283	0.226	-0.059
m¡n.	0.283	0.226	-0.059

Flecha Tot. el s. m x =0.000349

REACCIONES
==========
(Combinaciones con coeficientes unidad - servicio)

Nudo.	Hip¢tesis.	Momento X.	Fuerza Z.	Momento Y.
1	C 1	0.000	5.606	-2.498
2	C 1	0.000	5.606	-2.498
18	C 1	0.000	32.227	12.987
30	C 1	0.000	33.143	-12.965
46	C 1	-0.000	6.709	3.528
47	C 1	0.000	6.709	3.528

Resumen del control de calidad

RESUMEN DEL CONTROL DE CALIDAD

RESUMEN DE ENSAYOS DE HORMIGÓN

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO P.S. 1

P.P.I. Nº 20

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
515	786	23/12/99	Zap pilas	03020103	H-250	6	Blanda			3	408			70	20/01/00	I 42,5 R/SR	280	
515	787	23/12/99	Zap pilas	03020103	H-250	8	Blanda			3	318			70	20/01/00	I 42,5 R/SR	280	
521	797	28/12/99	Zap E-d	03020103	H-250	8	Blanda			3	369			100	25/01/00	I 42,5 R/SR	297	
521	798	28/12/99	Zap E-i	03020103	H-250	7	Blanda			3	338			100	25/01/00	I 42,5 R/SR	297	
560	872	21/01/00	Pila izq	03020104	H-300	9	Blanda			3	369			12	18/02/00	II AL 42,5 R	369	
604	938	02/02/00	E-d Alzado	03020103	H-250	9	Blanda			3	268			100	01/03/00	II AL 42,5 R	210	
604	939	02/02/00	E-d Alzado	03020103	H-250	8	Blanda			3	239			100	01/03/00	II AL 42,5 R	210	
667	1042	16/02/00	E-i Alzado	03020103	H-250	8	Blanda			3	266			100	15/03/00	II AL 42,5 R	231	
667	1043	16/02/00	E-i Alzado	03020103	H-250	10	Fluida			3	262			100	15/03/00	II AL 42,5 R	231	
712	1127	03/03/00	Tablero	03020106	H-300	12	Fluida			3	473			100	31/03/00	II AL 42,5 R	319	
712	1128	03/03/00	Tablero	03020106	H-300	10	Fluida			3	362			100	31/03/00	II AL 42,5 R	319	
713	1129	03/03/00	Tablero	03020106	H-300	12	Fluida			3	316			100	31/03/00	II AL 42,5 R	278	
713	1130	03/03/00	Tablero	03020106	H-300	12	Fluida			3	345			100	31/03/00	II AL 42,5 R	278	

FECHA:

FIRMA:

NOMBRE: Ana Mª Martín Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

Paso Superior 2 (P.K. 306+000)

PASO SUPERIOR 2 (P.K. 306+000)

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- RESUMEN DEL CONTROL DE CALIDAD

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1. DESCRIPCION GENERAL

El paso superior 2 del P.K. 306 + 000 está constituida por tres vanos de 13 + 17 + 13 = 43 m.

La sección transversal tiene una distribución de calzadas de 1.35 + 3.05 + 3.05 + 1.35 = 8.80 .

La planta es recta y lleva pendientes decrecientes del 2 % en los dos sentidos, respecto del eje.

La estructura es de hormigón armado con sección trapezoidal aligerada, con una base de 3.00 m. de ancho y voladizos de 2.60 m., terminados en 0.18 m de espesor. El canto mínimo de la losa es de 1.10 m.

Los aligeramientos son tres de seccion circular de 0.60 m de diámetro.

Las dos pilas intermedias son de fuste único de 1.00 m. de diámetro y se empotran en el tablero.
Las zapatas de las pilas son de 4.00 x 4.00 x 1.50 m para una tensión admisible de 3.0 kp/cm^2

Los estribos son del tipo convencional con aletas voladas.
El estribo izquierdo tiene 8.5 m de altura y el derecho 6.5 m por la pendiente del 3.5 % de la rasante.

La separación de los dos apoyos elastoméricos dispuestos en los estribos es de 6.80 m para garantizar la estabilidad transversal del tablero.

La zapata del estribo es común a todo él con una latitud de 9.20 m. La sección longitudinal del estribo izquierdo es de 5.50 x 1.00 m. y altura de muro de 8.50 m. y la del derecho de 4.5 m para una altura de 6.5 m.

Lleva aceras prefabricadas con barandilla y defensa elástica,así como valla antivandálica. Dichas aceras vuelan 0.30 m desde el borde de la losa.

Finalmente, se han dispuesto losas de transición de 5.00 x 0.30 m. de sección.

2. HIPOTESIS DE CALCULO Y PROCESO DE CONSTRUCCION .

Inicialmente, se estudia el tablero como emparrillado a fin de obtener el coeficiente de reparto transversal y los esfuerzos transversales de flexión, cortante y torsión.

Con el coeficiente de reparto transversal aplicado a la sobrecarga de tráfico, se calcula longitudinalmente el puente como pórtico, formado por viga-tablero,apoyado en los estribos y pilas y se determinan las secciones de armaduras pasivas longitudinales en primer lugar.

Las armaduras de cortante longitudinal y las de flexión y cortante transversal, se determinan por medio de los esfuerzos obtenidos anteriormente, en especial en las inmediaciones de los apoyos.

A partir de los valores anteriores, se calculan las pilas de soporte único con consideración del efecto de pandeo y sometidas a viento, frenado y acciones térmicas y de retracción.

Los estribos estarán sometidos a las cargas transmitidas por el tablero, tanto verticales como horizontales y las de empuje de tierras, para las hipótesis pésimas.

De acuerdo con la Norma sismorresistente NCS- 94, para esta zona y tipo de obra no es preciso la comprobación por el sismo.

Para la determinación de las acciones consideradas en el tablero y resto de la estructura y los programas de cálculo utilizados, se deberá atener a lo indicado en el Paso superior 1.

Igualmente para lo dicho sobre el sistema de construcción recomendado.

3. NORMATIVA CONSIDERADA

Para el cálculo de esta estructura se ha considerado la siguiente

Normas:

Instrucción relativa a las acciones a considerar en los puentes de ferrocarril, IPF- 75

Instrucción relativa a las acciones a considerar en el proyecto de puentes de carretera, IAP- 96.

Instrucción para el proyecto y la ejecución de obras de hormigón en masa o armado (EH-91).

Instrucción para el proyecto y la ejecución de obras de hormigón pretensado (EP-93).

Norma de Construcción Sismorresistente NCS - 94.

4. RESISTENCIA DE LOS MATERIALES Y COEFICIENTE DE SEGURIDAD

Resistencia del hormigón H-300 para armar en fustes de pilas y losa_ tablero:

$f_{ck} = 300$ Kp/cm^2 ; $\gamma_c = 1.5$

Resistencia del hormigón H-250 en el resto de las estructuras, cimentaciones y estribos:

$f_{ck} = 250$ Kp/cm^2 ; $\gamma_c = 1.5$

Acero en armaduras pasivas AEH-500:

$f_{yk} = 5100$ Kp/cm^2 ; $\gamma_s = 1.15$

Coeficiente de seguridad de acciones:

Tablero y pilas: $\gamma_f = 1.5$
Resto: $\gamma_f = 1.6$

5. TABLERO

5.1. DESCRIPCION GENERAL

Está formado por tres vanos de hormigón armado.

Inicialmente, se hace un cálculo de emparrillado para determinar el coeficiente de reparto transversal, así como los esfuerzos locales en la losa. Con el coeficiente de reparto se estudia la losa como pórtico en un plano formado por el tablero como viga empotrada en las pilas cilindricas y apoyada en los estribos.

Se calculan, a continuación, las secciones en el sentido longitudinal y transversal y se determinan las hipótesis extremas.

Las armaduras pasivas se obtienen para las flexiones, los esfuerzos cortantes y se realiza la comprobación de la torsión.

Finalmente se estudiará especialmente las secciones en apoyos.

5.2. CALCULO LONGITUDINAL

Flexión en el centro del primer vano:

M = 364 mt

$A = f_{cd} \times bd\,(1 - (1 - 2 \times \gamma_f \times M/f_{cd}/b/d^2)^{1/2})/f_{cd}$

$f_{cd} = 3000/1.5 = 2000\ t/m^2$

$f_{yd} = 5.1/1.15 = 4.43\ t/cm^2$

$\gamma_f = 1.50$

b = 3 m

d = 1.1 m.

$A = 117\ cm^2 \rightarrow$

Flexión sobre la pila:

Ma = -555 mt

Aa = 182 cm2

En el centro del segundo vano:

Mc = 431 mt

Ac = 139 cm2

5.3. ESFUERZO CORTANTE LONGITUDINAL

Apoyos extremos:

V = 1.5 x 146.78 = 220 t

$V_c = 5 \times 200^{1/2} \times 3.00 \times 1.1 = 233\ t > V$

Apoyos interiores:

V = 1.5 X 228 = 342 t

$A_t = (342-233)/0.9/1.1/4.2 \times 0.20 = 5.24\ cm^2/0.20$

5.4. ESTUDIO TRANSVERSAL

- Cálculo de riostra en los apoyos extremos:

Flexión:

p = 100/ 8.2= 12.27 t/m

M = 12.27 x 6.8 ^2 /8+30x2.4 = 143 mt

$A = 48.68\ cm^2$

Cortante:

V = 1.5 x(12.27x 3.0 + 60x4.5/ 6) = 123 t

$V_c = 5 \times 200^{1/2} \times 1.06 = 75$ t

$A = (123- 75)/0.9/1.06/4.2/5 = 2.39\ cm^2 \rightarrow 3\ c\ \phi\ 10/0.2$

- Cálculo transversal sobre pilas

Flexión:

p = 402/3 = 134 t/m

$M = 134 \times 1.5^2/2 = 151$ mt,

En dos metros:

$A = 47.5$ cm^2

Esfuerzo cortante:

$V = 1.5 \times 134x\ 1 = 201$ t

$V_c = 5 \times 200^{1/2} \times 2 \times 1.1 = 155$ t

$A_t = (201 - 155)/0.9/1.1/4.2/5 = 2.18$ cm^2/0.2

- Torsión

$T_d = 1.5 \times (21.5 \times 0.4 \times 4.4^2/2 + 60 \times 2.9) = 385$ mt

$A_e = 2.89$ m^2

$T_{u1} = 0.36 \times 3000/1.5 \times 2.89 \times 0.192 = 399$ mt $> T_d$

Armadura transversal

$A_t = 385/2/2.89/4.2/5 = 3.17$ cm^2/0.20

Armadura longitudinal

$A_l = 3.17/4.43 \times 4.2 = 3.00$ cm^2/0.25

Estabilidad de apoyos extremos

Con carro ladeado.- Por torsión:

$R = \pm 385/1.5/6.8 = \pm 38$ t

Cargas verticales

$V = 88+60 = 148$ t

R = 148/2 ± 37

$R_1 = 112$ t

$R_2 = 36$ t

Voladizos transversales

$M = 2.5 \times (0.18 \times 2 + 0.35) \times 2.35^2/6 + 0.6 \times 2.45^2/2 + .75 \times 1.5x(4.4-1.35/2-1.75)+ 20/1.5 \times 1.15 = 20.98$ mt/m

$A = 24.24$ cm^2/m

$V = 1.5 \times (0.53 \times 2.5 \times 2.35/2 + 0.6 \times 2.45/2 + 1.125 + 10/15) = 15.12$ t/m

$V_c = 2.5 \times 200^{1/2} \times 0.32 \times (1 + 50 \times 0.00861) = 16.19$ t >V

5.5. EMPARRILLADO

A continuación, y por medio del programa TREBOL II se efectúa el cálculo del emparrillado necesario para la determinación del coeficiente de reparto transversal introducido en el cálculo longitudinal del tablero y la obtención de los esfuerzos para la disposición de las armaduras transversales y de torsión.

Se ha discretizado la losa disponiendo un total de 3 barras haces longitudinales más las de borde, y tramos transversales cada 1.75 m. aproximadamente, excepto en la zona de apoyos en la que se ha realizado una discretización mayor para poder analizar los efectos locales.

La discretización de las cargas superficiales se ha realizado asignando el área de influencia a nodos y las lineales y puntuales como cargas en barras.

En los resultados del programa se pueden observar las características y cargas asignadas a cada uno de las barras.

Programa T R E B O L -II Paso Superior P.K. 306+000
TOOL S.A.

MOVIMIENTOS
==========

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
1	M¡nimos.	0.0000000000	0.0000000000	0.0000000000
	M ximos.	0.0000000000	0.0000000000	0.0000000000
2	M¡nimos.	0.0000000000	0.0000000000	0.0000000000
	M ximos.	0.0000000000	0.0000000000	0.0000000000
3	M¡nimos.	-.0005059473	0.0003457893	0.0008443503
	M ximos.	-.0004457950	0.0003923970	0.0009585586
4	M¡nimos.	-.0005117441	-.0001632101	0.0008443503
	M ximos.	-.0004508996	-.0001437619	0.0009585586
5	M¡nimos.	-.0000000022	-.0015047349	0.0006075119
	M ximos.	-.0000000018	-.0013257221	0.0006894939
6	M¡nimos.	0.0004509006	-.0001632081	0.0008443483
	M ximos.	0.0005117452	-.0001437601	0.0009585563
7	M¡nimos.	0.0004457961	0.0003457936	0.0008443483
	M ximos.	0.0005059485	0.0003924019	0.0009585563
8	M¡nimos.	0.0003289849	-.0019285709	0.0028560541
	M ximos.	0.0003740913	-.0016985018	0.0032430862
9	M¡nimos.	-.0000000028	-.0020231055	0.0005771923
	M ximos.	-.0000000024	-.0017824630	0.0006550632
10	M¡nimos.	-.0003740921	-.0019285716	0.0028560616
	M ximos.	-.0003289857	-.0016985023	0.0032430945
11	M¡nimos.	0.0070209769	-.0203793254	0.0025641471
	M ximos.	0.0079752002	-.0179463997	0.0029118648
12	M¡nimos.	-.0000000064	-.0036604186	0.0000313875
	M ximos.	-.0000000055	-.0032253547	0.0000355147
13	M¡nimos.	-.0079752281	-.0203794073	0.0025641629
	M ximos.	-.0070210001	-.0179464724	0.0029118832
14	M¡nimos.	0.0101335403	-.0257281978	0.0000063205
	M ximos.	0.0115269125	-.0226444565	0.0000172914
15	M¡nimos.	-.0000000098	-.0021662610	-.0006560864
	M ximos.	-.0000000084	-.0019090907	-.0005781566
16	M¡nimos.	-.0115269627	-.0257283412	0.0000063281
	M ximos.	-.0101335840	-.0226445813	0.0000173004
17	M¡nimos.	0.0110125262	-.0255705528	0.0000807312

Fecha 28 - 6 - 98

T I T U L O D E L A O B R A

Paso Superior P.K. 306+000

P R O P I E D A D

P R O Y E C T O

M A T E R I A L E S

No.	Mod.Young	Mod.Poisson	Peso espec.	Coef.Dilataci¢n
1	3290896.500	0.200	2.500	0.000010

Hormig¢n rest. caract. Fck = 300 Kp./cm2.

S E C C I O N E S

Unidades en m.

No.	Tipo.	Ancho.	Canto.
1	Rectg.	2.200	0.220
2	Rectg.	0.500	1.100
3	Rectg.	3.000	1.100
4	Rectg.	4.000	0.220
5	Rectg.	2.375	0.220
	Rectg.	2.875	0.220

C A R A C T E R I S T I C A S R E S I S T E N T E S S E C C I O N E S

Unidades en m.

No.	Area.	Mmto.In.	S.Cortante	M.I.Tors.
1	4.840E-01	1.952E-03	4.033E-01	7.809E-03
2	5.500E-01	5.546E-02	4.583E-01	3.419E-02
3	3.300E+00	3.327E-01	2.750E+00	1.056E+00
4	8.800E-01	3.549E-03	7.333E-01	1.420E-02
5	5.225E-01	2.107E-03	4.354E-01	8.430E-03
6	6.325E-01	2.551E-03	5.271E-01	1.020E-02

N U D O S

Unidades en m.

Nudo.	X.	Y.
1	-0.000	1.100
2	0.000	7.100
3	0.250	0.000
4	0.250	1.100
5	0.250	4.100
6	0.250	7.100
7	0.250	8.200
8	1.000	1.100
9	1.000	4.100
10	1.000	7.100
11	5.000	1.100
12	5.000	4.100
13	5.000	7.100
14	9.000	1.100
15	9.000	4.100
16	9.000	7.100
17	13.000	1.100
18	13.000	4.100
19	13.000	7.100
20	17.000	1.100
21	17.000	4.100
22	17.000	7.100
23	21.000	1.100
24	21.000	4.100
25	21.000	7.100
26	25.000	1.100

TOOL S.A.

Nudo.	X.	Y.
27	25.000	4.100
28	25.000	7.100
29	29.000	1.100
30	29.000	4.100
31	29.000	7.100
32	33.000	1.100
33	33.000	4.100
34	33.000	7.100
35	37.000	1.100
36	37.000	4.100
37	37.000	7.100
38	41.000	1.100
39	41.000	4.100
40	41.000	7.100
41	42.750	-0.000
42	42.750	1.100
43	42.750	4.100
44	42.750	7.100
45	42.750	8.200
46	43.000	1.100
47	43.000	7.100

B A R R A S

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
1	4	8	1	1	1	0.75	907.5
2	1	4	1	1	1	0.25	302.5
3	44	47	1	1	1	0.25	302.5
4	2	6	1	1	1	0.25	302.5
5	6	7	1	2	1	1.10	1512.5
6	5	6	1	2	1	3.00	4125.0
[illegible]	3	4	1	2	1	1.10	1512.5
[illegible]	42	46	1	1	1	0.25	302.5
9	40	44	1	1	1	1.75	2117.5
10	41	42	1	2	1	1.10	1512.5
11	42	43	1	2	1	3.00	4125.0
12	44	45	1	2	1	1.10	1512.5
13	4	5	1	2	1	3.00	4125.0
14	43	44	1	2	1	3.00	4125.0
15	5	9	1	3	1	0.75	6187.5
16	17	20	1	1	1	4.00	4840.0
17	16	19	1	1	1	4.00	4840.0
18	18	21	1	3	1	4.00	33000.0
19	17	18	1	4	1	3.00	6600.0
20	18	19	1	4	1	3.00	6600.0
21	14	17	1	1	1	4.00	4840.0
22	13	16	1	1	1	4.00	4840.0
23	15	18	1	3	1	4.00	33000.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
24	14	15	1	4	1	3.00	6600.0
25	15	16	1	4	1	3.00	6600.0
26	11	14	1	1	1	4.00	4840.0
27	10	13	1	1	1	4.00	4840.0
28	12	15	1	3	1	4.00	33000.0
29	11	12	1	4	1	3.00	6600.0
30	12	13	1	4	1	3.00	6600.0
31	8	11	1	1	1	4.00	4840.0
32	6	10	1	1	1	0.75	907.5
33	9	12	1	3	1	4.00	33000.0
34	8	9	1	5	1	3.00	3918.7
35	9	10	1	5	1	3.00	3918.7
36	20	23	1	1	1	4.00	4840.0
37	19	22	1	1	1	4.00	4840.0
38	21	24	1	3	1	4.00	33000.0
39	20	21	1	4	1	3.00	6600.0
40	21	22	1	4	1	3.00	6600.0
41	23	26	1	1	1	4.00	4840.0
42	22	25	1	1	1	4.00	4840.0
43	24	27	1	3	1	4.00	33000.0
44	23	24	1	4	1	3.00	6600.0
45	24	25	1	4	1	3.00	6600.0
46	26	29	1	1	1	4.00	4840.0
47	25	28	1	1	1	4.00	4840.0
48	27	30	1	3	1	4.00	33000.0
49	26	27	1	4	1	3.00	6600.0
50	27	28	1	4	1	3.00	6600.0
51	29	32	1	1	1	4.00	4840.0
52	28	31	1	1	1	4.00	4840.0
53	30	33	1	3	1	4.00	33000.0
54	29	30	1	4	1	3.00	6600.0
55	30	31	1	4	1	3.00	6600.0
56	32	35	1	1	1	4.00	4840.0
57	31	34	1	1	1	4.00	4840.0
58	33	36	1	3	1	4.00	33000.0
59	32	33	1	4	1	3.00	6600.0
60	33	34	1	4	1	3.00	6600.0
61	35	38	1	1	1	4.00	4840.0
62	34	37	1	1	1	4.00	4840.0
63	36	39	1	3	1	4.00	33000.0
64	35	36	1	4	1	3.00	6600.0
65	36	37	1	4	1	3.00	6600.0
66	38	42	1	1	1	1.75	2117.5
67	37	40	1	1	1	4.00	4840.0
68	39	43	1	3	1	1.75	14437.5
69	38	39	1	6	1	3.00	4743.7
70	39	40	1	6	1	3.00	4743.8

Peso Total (kg) = 613359.8
Clase 1... = Barra Emp.- Emp.

Clase 2... = Barra Art.- Emp.
Clase 3... = Barra Emp.- Art.
ase 4... = Barra Art.- Art.

CONDICIONES DE CONTORNO

Nudo No.	Giro.s./eje X	Despl.s/eje Z	Giro.s./eje Y
1	Imp.	Imp.	Imp.
2	Imp.	Imp.	Imp.
18	Lib.	Imp.	Imp.
30	Lib.	Imp.	Imp.
46	Lib.	Imp.	Imp.
47	Lib.	Imp.	Imp.

C A R G A S G E N E R A L E S

Temperatura de referencia (construcci¢n). = 0

Hip¢tesis.		Temperatura	Peso propio.
1	G	0.000	NO
2	Q-1	0.000	NO
3	t1	0.000	NO

C A R G A S E N N U D O S

Unidades en Mp. y M*Mp.

Hip¢tesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
1	1	0.000	-0.763	0.000
	2	0.000	-0.763	0.000
	3	0.000	-1.663	0.000
	4	0.000	-3.024	0.000
	5	0.000	-5.527	0.000
	6	0.000	-3.024	0.000
	7	0.000	-1.663	0.000
	8	0.000	-17.562	0.000
	9	0.000	-21.019	0.000
	10	0.000	-17.562	0.000
	11	0.000	-30.680	0.000
	12	0.000	-35.400	0.000
	13	0.000	-30.680	0.000
	14	0.000	-30.680	0.000
	15	0.000	-35.400	0.000
	16	0.000	-30.680	0.000

Hip¢tesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
	17	0.000	-30.680	0.000
	18	0.000	-35.400	0.000
	19	0.000	-30.680	0.000
	20	0.000	-30.680	0.000
	21	0.000	-35.400	0.000
	22	0.000	-30.680	0.000
	23	0.000	-30.680	0.000
	24	0.000	-35.400	0.000
	25	0.000	-30.680	0.000
	26	0.000	-30.680	0.000
	27	0.000	-35.400	0.000
	28	0.000	-30.680	0.000
	29	0.000	-30.680	0.000
	30	0.000	-35.400	0.000
	31	0.000	-30.680	0.000
	32	0.000	-30.680	0.000
	33	0.000	-35.400	0.000
	34	0.000	-30.680	0.000
	35	0.000	-30.680	0.000
	36	0.000	-35.400	0.000
	37	0.000	-30.680	0.000
	38	0.000	-21.771	0.000
	39	0.000	-25.444	0.000
	40	0.000	-21.771	0.000
	41	0.000	-2.101	0.000
	42	0.000	-6.047	0.000
	43	0.000	-9.952	0.000
	44	0.000	-6.048	0.000
	45	0.000	-2.101	0.000
	46	0.000	-0.763	0.000
	47	0.000	-0.763	0.000
2	1	0.000	-0.103	0.000
	2	0.000	-0.103	0.000
	3	0.000	-0.226	0.000
	4	0.000	-0.410	0.000
	5	0.000	-0.749	0.000
	6	0.000	-0.410	0.000
	7	0.000	-0.226	0.000
	8	0.000	-2.381	0.000
	9	0.000	-2.850	0.000
	10	0.000	-2.381	0.000
	11	0.000	-4.150	0.000
	12	0.000	-4.800	0.000
	13	0.000	-4.160	0.000
	14	0.000	-4.160	0.000
	15	0.000	-4.800	0.000
	16	0.000	-4.160	0.000
	17	0.000	-4.160	0.000
	18	0.000	-4.800	0.000
	19	0.000	-4.160	0.000

Hipótesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
	20	0.000	-4.160	0.000
	21	0.000	-4.800	0.000
	22	0.000	-4.160	0.000
	23	0.000	-4.160	0.000
	24	0.000	-4.800	0.000
	25	0.000	-4.160	0.000
	26	0.000	-4.160	0.000
	27	0.000	-4.800	0.000
	28	0.000	-4.160	0.000
	29	0.000	-4.160	0.000
	30	0.000	-4.800	0.000
	31	0.000	-4.160	0.000
	32	0.000	-4.160	0.000
	33	0.000	-4.800	0.000
	34	0.000	-4.160	0 000
	35	0.000	-4.160	0.000
	36	0.000	-4.800	0.000
	37	0.000	-4.160	0.000
	38	0.000	-2.952	0.000
	39	0.000	-3.450	0.000
	40	0.000	-2.952	0.000
	41	0.000	-0.285	0.000
	42	0.000	-0.820	0.000
	43	0.000	-1.349	0.000
	44	0.000	-0.820	0.000
	45	0.000	-0.285	0.000
	46	0.000	-0.103	0.000
	47	0.000	-0.103	0.000

C A R G A S E N B A R R A S

Unidades en M. y Mp.

H	Barra.	Carga.	Angl.	P1.	P2.	A1.	A2.
3	41	Punt.	-	10.000		2.000	
	44	Punt.	-	20.000		1.500	
	45	Punt.	-	20.000		1.500	
	47	Punt.	-	10.000		2.000	

C O M B I N A C I O N E S

Comb.	Hip.1	Hip.2	Hip.3
1	1.000	-	-
2	1.000	1.000	1.000

TOOL S.A.

MOVIMIENTOS
==========

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
1	M¡nimos.	0.0000000000	0.0000000000	0.0000000000
	M ximos.	0.0000000000	0.0000000000	0.0000000000
2	M¡nimos.	0.0000000000	0.0000000000	0.0000000000
	M ximos.	0.0000000000	0.0000000000	0.0000000000
3	M¡nimos.	-.0005464857	0.0003734952	0.0009120028
	M ximos.	-.0004815138	0.0004238373	0.0010353618
4	M¡nimos.	-.0005527468	-.0001762871	0.0009120028
	M ximos.	-.0004870273	-.0001552806	0.0010353618
5	M¡nimos.	-.0000000023	-.0016252996	0.0006561879
	M ximos.	-.0000000019	-.0014319436	0.0007447386
6	M¡nimos.	0.0004870283	-.0001762849	0.0009120005
	M ximos.	0.0005527480	-.0001552787	0.0010353595
7	M¡nimos.	0.0004815148	0.0003734997	0.0009120005
	M ximos.	0.0005464869	0.0004238424	0.0010353595
8	M¡nimos.	0.0003553444	-.0020830950	0.0030848915
	M ximos.	0.0004040649	-.0018345920	0.0035029340
9	M¡nimos.	-.0000000029	-.0021852036	0.0006234390
	M ximos.	-.0000000025	-.0019252802	0.0007075492
10	M¡nimos.	-.0004040657	-.0020830957	0.0030848994
	M ximos.	-.0003553452	-.0018345924	0.0035029429
11	M¡nimos.	0.0075835227	-.0220121909	0.0027695957
	M ximos.	0.0086142020	-.0193843301	0.0031451739
12	M¡nimos.	-.0000000068	-.0039537037	0.0000339024
	M ximos.	-.0000000058	-.0034837811	0.0000383603
13	M¡nimos.	-.0086142300	-.0220122766	0.0027696125
	M ximos.	-.0075835469	-.0193844046	0.0031451930
14	M¡nimos.	0.0109454757	-.0277896337	0.0000068271
	M ximos.	0.0124504892	-.0244588125	0.0000186771
15	M¡nimos.	-.0000000104	-.0023398292	-.0007086543
	M ximos.	-.0000000089	-.0020620537	-.0006244805
16	M¡nimos.	-.0124505423	-.0277897865	0.0000068353
	M ximos.	-.0109455213	-.0244589429	0.0000186867
1	M¡nimos.	0.0118948892	-.0276193582	0.0000871997

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
	M ximos.	0.0136945089	-.0240709446	0.0002590788
18	M¡nimos.	-.0000000134	0.0000000000	0.0000000000
	M ximos.	-.0000000114	0.0000000000	0.0000000000
19	M¡nimos.	-.0136945741	-.0276195444	0.0000872036
	M ximos.	-.0118949451	-.0240711048	0.0002590839
20	M¡nimos.	0.0117609277	-.0315559767	0.0006096974
	M ximos.	0.0142261777	-.0258618146	0.0015101853
21	M¡nimos.	-.0000000155	-.0031099892	0.0007000843
	M ximos.	-.0000000132	-.0022553005	0.0009906731
22	M¡nimos.	-.0142262531	-.0315561928	0.0006097003
	M ximos.	-.0117609911	-.0258619953	0.0015101903
23	M¡nimos.	0.0116635300	-.0377633199	-.0000008501
	M ximos.	0.0154252723	-.0273215827	0.0007701492
24	M¡nimos.	-.0000000166	-.0055769561	-.0000000839
	M ximos.	-.0000000141	-.0039387266	0.0000131918
25	M¡nimos.	-.0154253552	-.0377635621	-.0000008482
	M ximos.	-.0116635999	-.0273217782	0.0007701525
26	M¡nimos.	0.0117637375	-.0339701846	-.0019900338
	M ximos.	0.0152587118	-.0258575808	-.0006086792
27	M¡nimos.	-.0000000166	-.0031610648	-.0009978644
	M ximos.	-.0000000142	-.0022548893	-.0007000454
28	M¡nimos.	-.0152587993	-.0339704342	-.0019900347
	M ximos.	-.0117638102	-.0258577857	-.0006086784
29	M¡nimos.	0.0119547276	-.0283228811	-.0004307668
	M ximos.	0.0140976496	-.0241622832	-.0000217982
30	M¡nimos.	-.0000000155	0.0000000000	0.0000000000
	M ximos.	-.0000000132	0.0000000000	0.0000000000
31	M¡nimos.	-.0140977362	-.0283231270	-.0004307703
	M ximos.	-.0119548012	-.0241624936	-.0000217998
32	M¡nimos.	0.0112273535	-.0289108958	0.0003541708
	M ximos.	0.0128308591	-.0253758226	0.0003558524
33	M¡nimos.	-.0000000131	-.0028584776	0.0008088609
	M ximos.	-.0000000112	-.0025205601	0.0009172660
34	M¡nimos.	-.0128309363	-.0289111175	0.0003541620
	M ximos.	-.0112274196	-.0253760144	0.0003558451

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
35	M¡nimos.	0.0087029617	-.0260302648	-.0021459514
	M ximos.	0.0098946402	-.0229162760	-.0018859579
36	M¡nimos.	-.0000000097	-.0053207907	0.0001122118
	M ximos.	-.0000000083	-.0046908585	0.0001275066
37	M¡nimos.	-.0098946914	-.0260304213	-.0021459735
	M ximos.	-.0087030064	-.0229164120	-.0018859771
38	M¡nimos.	0.0018693195	-.0077903313	-.0052971966
	M ximos.	0.0021250690	-.0068607596	-.0046647200
39	M¡nimos.	-.0000000055	-.0037649211	-.0007946967
	M ximos.	-.0000000048	-.0033186963	-.0007005958
40	M¡nimos.	-.0021250788	-.0077903648	-.0052972240
	M ximos.	-.0018693281	-.0068607894	-.0046647443
41	M¡nimos.	-.0008317010	0.0006244923	-.0012407574
	M ximos.	-.0007332120	0.0007082514	-.0010931836
42	M¡nimos.	-.0008396082	-.0002053440	-.0012407574
	M ximos.	-.0007401750	-.0001809175	-.0010931836
43	M¡nimos.	-.0000000038	-.0021804278	-.0009440122
	M ximos.	-.0000000033	-.0019219242	-.0008321271
44	M¡nimos.	0.0007401757	-.0002053446	-.0012407607
	M ximos.	0.0008396091	-.0001809180	-.0010931864
45	M¡nimos.	0.0007332126	0.0006244927	-.0012407607
	M ximos.	0.0008317017	0.0007082519	-.0010931864
46	M¡nimos.	.0008396082	0.0000000000	0.0000000000
	M ximos.	-.0007401750	0.0000000000	0.0000000000
47	M¡nimos.	0.0007401757	0.0000000000	0.0000000000
	M ximos.	0.0008396091	0.0000000000	0.0000000000

ESFUERZOS EN SISTEMA DE EJES LOCAL

Reducci¢n de I.Torsional en hormig¢n: Vigas 0 %, Losas 0 %

BARRA : 1 (4,8) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-6.013	-26.430	-28.523	
	m¡n.	-6.830	-30.013	-32.391	
	Cort.m x.	-6.013	-26.430	-28.523	
	m¡n.	-6.830	-30.013	-32.391	
	Flec.m x.	-6.013	-26.430	-28.523	
	m¡n.	-6.830	-30.013	-32.391	

Flecha Tot. el s. m x =0.000176

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	-6.013	-26.430	-8.701	
	m¡n.	-6.830	-30.013	-9.881	
	Cort.m x.	-6.013	-26.430	-8.701	
	m¡n.	-6.830	-30.013	-9.881	
	Flec.m x.	-6.013	-26.430	-8.701	
	m¡n.	-6.830	-30.013	-9.881	

Flecha Tot. el s. m x =0.002083

BARRA : 2 (1,4) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	11.837	-71.583	-35.554	
	m¡n.	10.429	-63.050	-31.317	
	Cort.m x.	10.429	-63.050	-31.317	
	m¡n.	11.837	-71.583	-35.554	
	Flec.m x.	10.429	-63.050	-31.317	
	m¡n.	11.837	-71.583	-35.554	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Tor. m x.	11.837	-71.583	-17.658	
	m¡n.	10.429	-63.050	-15.554	
	Cort.m x.	10.429	-63.050	-15.554	
	m¡n.	11.837	-71.583	-17.658	
	Flec.m x.	10.429	-63.050	-15.554	
	m¡n.	11.837	-71.583	-17.658	

Flecha Tot. el s. m x =0.000176

BARRA : 3 (44,47) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	76.750	-22.290	
	m¡n.	0.000	67.617	-19.640	
	Flec.m x.	0.000	67.617	-19.640	
	m¡n.	0.000	76.750	-22.290	

Flecha Tot. el s. m x =0.000205

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	0.000	76.750	-41.478	
	m¡n.	0.000	67.617	-36.544	
	Flec.m x.	0.000	67.617	-36.544	
	m¡n.	0.000	76.750	-41.478	

BARRA : 4 (2,6) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-10.429	-63.051	-31.317	
	m¡n.	-11.837	-71.583	-35.554	
	Cort.m x.	-10.429	-63.051	-31.317	
	m¡n.	-11.837	-71.583	-35.554	
	Flec.m x.	-10.429	-63.051	-31.317	
	m¡n.	-11.837	-71.583	-35.554	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Tor. m x.	-10.429	-63.051	-15.555	
	m¡n.	-11.837	-71.583	-17.658	
	Cort.m x.	-10.429	-63.051	-15.555	
	m¡n.	-11.837	-71.583	-17.658	
	Flec.m x.	-10.429	-63.051	-15.555	
	m¡n.	-11.837	-71.583	-17.658	

Flecha Tot. el s. m x =0.000176

BARRA : 5 (6,7) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-1.663	-1.830	
	m¡n.	0.000	-1.889	-2.078	
	Flec.m x.	0.000	-1.663	-1.830	
	m¡n.	0.000	-1.889	-2.078	

Flecha Tot. el s. m x =0.000176

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10	Cort.m x.	0.000	-1.663	0.000	
	m¡n.	0.000	-1.889	0.000	

Flecha Tot. el s. m x =-.000422

BARRA : 6 (5,6) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-12.969	31.934	77.530	
	m¡n.	-14.733	36.248	87.998	
	Cort.m x.	-14.733	36.248	87.998	
	m¡n.	-12.969	31.934	77.530	
	Flec.m x.	-14.733	36.248	87.998	
	m¡n.	-12.969	31.934	77.530	

Flecha Tot. el s. m x =0.001625

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-12.969	31.934	-18.272	
	m¡n.	-14.733	36.248	-20.744	
	Cort.m x.	-14.733	36.248	-20.744	
	m¡n.	-12.969	31.934	-18.272	
	Flec.m x.	-12.969	31.934	-18.272	
	m¡n.	-14.733	36.248	-20.744	

Flecha Tot. el s. m x =0.000176

BARRA : 7 (3,4) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	1.889	-0.000	
	m¡n.	0.000	1.663	-0.000	

Flecha Tot. el s. m x =-.000422

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10	Cort.m x.	0.000	1.889	-2.078	
	m¡n.	0.000	1.663	-1.830	
	Flec.m x.	0.000	1.663	-1.830	
	m¡n.	0.000	1.889	-2.078	

Flecha Tot. el s. m x =0.000176

BARRA : 8 (42,40) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	76.750	-22.290	
	m¡n.	0.000	67.616	-19.640	
	Flec.m x.	0.000	67.616	-19.640	
	m¡n.	0.000	76.750	-22.290	

Flecha Tot. el s. m x =0.000205

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	0.000	76.750	-41.478	
	m¡n.	0.000	67.616	-36.544	
	Flec.m x.	0.000	67.616	-36.544	
	m¡n.	0.000	76.750	-41.478	

BARRA : 9 (40,44) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-7.983	22.587	6.652	
	m¡n.	-9.069	25.649	7.552	
	Cort.m x.	-9.069	25.649	7.552	
	m¡n.	-7.983	22.587	6.652	
	Flec.m x.	-9.069	25.649	7.552	
	m¡n.	-7.983	22.587	6.652	

Flecha Tot. el s. m x =0.007790

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	-7.983	22.587	-32.874	
	m¡n.	-9.069	25.649	-37.334	
	Cort.m x.	-9.069	25.649	-37.334	
	m¡n.	-7.983	22.587	-32.874	
	Flec.m x.	-7.983	22.587	-32.874	
	m¡n.	-9.069	25.649	-37.334	

Flecha Tot. el s. m x =0.000205

BARRA : 10 (41,42) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	2.385	-0.000	
	m¡n.	0.000	2.101	-0.000	

Flecha Tot. el s. m x =-.000706

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10	Cort.m x.	0.000	2.385	-2.624	
	m¡n.	0.000	2.101	-2.311	
	Flec.m x.	0.000	2.101	-2.311	
	m¡n.	0.000	2.385	-2.624	

Flecha Tot. el s. m x =0.000205

BARRA : 11 (42,43) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-13.235	-36.882	-10.293	
	m¡n.	-15.044	-41.848	-11.693	
	Cort.m x.	-13.235	-36.882	-10.293	
	m¡n.	-15.044	-41.848	-11.693	
	Flec.m x.	-13.235	-36.882	-10.293	
	m¡n.	-15.044	-41.848	-11.693	

Flecha Tot. el s. m x =0.000205

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-13.235	-36.882	100.352	
	m¡n.	-15.044	-41.848	113.850	
	Cort.m x.	-13.235	-36.882	100.352	
	m¡n.	-15.044	-41.848	113.850	
	Flec.m x.	-15.044	-41.848	113.850	
	m¡n.	-13.235	-36.882	100.352	

Flecha Tot. el s. m x =0.002180

BARRA : 12 (44,45) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-2.101	-2.311	
	m¡n.	0.000	-2.385	-2.624	
	Flec.m x.	0.000	-2.101	-2.311	

	m¡n.	0.000	-2.385	-2.624	

Flecha Tot. el s. m x =0.000205

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10	Cort.m x.	0.000	-2.101	-0.000	
	m¡n.	0.000	-2.385	-0.000	

Flecha Tot. el s. m x =-.000706

BARRA : 13 (4,5) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	14.734	-36.247	-20.744	
	m¡n.	12.969	-31.934	-18.272	
	Cort.m x.	12.969	-31.934	-18.272	
	m¡n.	14.734	-36.247	-20.744	
	Flec.m x.	12.969	-31.934	-18.272	
	m¡n.	14.734	-36.247	-20.744	

Flecha Tot. el s. m x =0.000176

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	14.734	-36.247	87.998	
	m¡n.	12.969	-31.934	77.529	
	Cort.m x.	12.969	-31.934	77.529	
	m¡n.	14.734	-36.247	87.998	
	Flec.m x.	14.734	-36.247	87.998	
	m¡n.	12.969	-31.934	77.529	

Flecha Tot. el s. m x =0.001625

BARRA : 14 (43,44) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	15.044	41.848	113.850	
	m¡n.	13.235	36.882	100.352	
	Cort.m x.	15.044	41.848	113.850	
	m¡n.	13.235	36.882	100.352	
	Flec.m x.	15.044	41.848	113.850	
	m¡n.	13.235	36.882	100.352	

Flecha Tot. el s. m x =0.002180

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	15.044	41.848	-11.693	
	m¡n.	13.235	36.882	-10.294	
	Cort.m x.	15.044	41.848	-11.693	
	m¡n.	13.235	36.882	-10.294	
	Flec.m x.	13.235	36.882	-10.294	
	m¡n.	15.044	41.848	-11.693	

Flecha Tot. el s. m x =0.000205

BARRA : 15 (5,9) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.001	-58.340	25.938	
	m¡n.	0.001	-66.218	29.467	
	Flec.m x.	0.001	-66.218	29.467	
	m¡n.	0.001	-58.340	25.938	

Flecha Tot. el s. m x =0.001625

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Cort.m x.	0.001	-58.340	69.693	
	m¡n.	0.001	-66.218	79.131	
	Flec.m x.	0.001	-66.218	79.131	
	m¡n.	0.001	-58.340	69.693	

Flecha Tot. el s. m x =0.002185

BARRA : 16 (17,20) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.179	-0.474	-1.787	
	m¡n.	-0.712	-0.475	-2.960	
	Cort.m x.	0.179	-0.474	-1.787	
	m¡n.	-0.712	-0.475	-2.960	
	Flec.m x.	0.179	-0.474	-1.787	
	m¡n.	-0.712	-0.475	-2.960	

Flecha Tot. el s. m x =0.027619

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.179	-0.474	0.109	
	m¡n.	-0.712	-0.475	-1.059	
	Cort.m x.	0.179	-0.474	0.109	
	m¡n.	-0.712	-0.475	-1.059	
	Flec.m x.	0.179	-0.474	0.109	
	m¡n.	-0.712	-0.475	-1.059	

Flecha Tot. el s. m x =0.031556

BARRA : 17 (16,19) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.665	0.867	1.347	
	m¡n.	1.271	0.688	1.246	
	Cort.m x.	1.665	0.867	1.347	
	m¡n.	1.271	0.688	1.246	
	Flec.m x.	1.665	0.867	1.347	
	m¡n.	1.271	0.688	1.246	

Flecha Tot. el s. m x =0.027790

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	1.665	0.867	-2.119	
	m¡n.	1.271	0.688	-1.505	
	Cort.m x.	1.665	0.867	-2.119	
	m¡n.	1.271	0.688	-1.505	
	Flec.m x.	1.271	0.688	-1.505	
	m¡n.	1.665	0.867	-2.119	

Flecha Tot. el s. m x =0.027620

BARRA : 18 (18,21) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-144.175	-480.007	
	m¡n.	0.000	-190.289	-651.787	
	Flec.m x.	0.000	-144.175	-480.007	
	m¡n.	0.000	-190.289	-651.787	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-144.175	96.695	
	m¡n.	0.000	-190.289	109.371	
	Flec.m x.	0.000	-190.289	109.371	
	m¡n.	0.000	-144.175	96.695	

Flecha Tot. el s. m x =0.003110

BARRA : 19 (17,18) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.841	36.182	0.953	
	m¡n.	0.283	31.842	1.450	
	Cort.m x.	0.841	36.182	0.953	
	m¡n.	0.283	31.842	1.450	
	Flec.m x.	0.283	31.842	1.450	
	m¡n.	0.841	36.182	0.953	

Flecha Tot. el s. m x =0.027619

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.841	36.182	-107.593	
	m¡n.	0.283	31.842	-94.076	
	Cort.m x.	0.841	36.182	-107.593	
	m¡n.	0.283	31.842	-94.076	
	Flec.m x.	0.283	31.842	-94.076	
	m¡n.	0.841	36.182	-107.593	

BARRA : 20 (18,19) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.283	-31.842	-94.076	
	m¡n.	-0.841	-36.182	-107.593	
	Cort.m x.	-0.283	-31.842	-94.076	
	m¡n.	-0.841	-36.182	-107.593	
	Flec.m x.	-0.283	-31.842	-94.076	
	m¡n.	-0.841	-36.182	-107.593	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.283	-31.842	1.450	
	m¡n.	-0.841	-36.182	0.953	
	Cort.m x.	-0.283	-31.842	1.450	
	m¡n.	-0.841	-36.182	0.953	
	Flec.m x.	-0.283	-31.842	1.450	
	m¡n.	-0.841	-36.182	0.953	

Flecha Tot. el s. m x =0.027620

BARRA : 21 (14,17) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.271	0.688	1.246	
	m¡n.	-1.665	0.867	1.347	
	Cort.m x.	-1.665	0.867	1.347	
	m¡n.	-1.271	0.688	1.246	
	Flec.m x.	-1.665	0.867	1.347	
	m¡n.	-1.271	0.688	1.246	

Flecha Tot. el s. m x =0.027790

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-1.271	0.688	-1.505	
	m¡n.	-1.665	0.867	-2.120	
	Cort.m x.	-1.665	0.867	-2.120	
	m¡n.	-1.271	0.688	-1.505	
	Flec.m x.	-1.271	0.688	-1.505	
	m¡n.	-1.665	0.867	-2.120	

Flecha Tot. el s. m x =0.027619

BARRA : 22 (13,16) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	5.134	0.657	6.336	
	m¡n.	4.500	0.571	5.580	
	Cort.m x.	5.134	0.657	6.336	
	m¡n.	4.500	0.571	5.580	
	Flec.m x.	5.134	0.657	6.336	
	m¡n.	4.500	0.571	5.580	

Flecha Tot. el s. m x =0.022012

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	5.134	0.657	3.707	
	m¡n.	4.500	0.571	3.295	
	Cort.m x.	5.134	0.657	3.707	
	m¡n.	4.500	0.571	3.295	
	Flec.m x.	5.134	0.657	3.707	
	m¡n.	4.500	0.571	3.295	

Flecha Tot. el s. m x =0.027790

BARRA : 23 (15,18) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.001	155.537	117.071	
	m¡n.	0.001	137.087	103.216	
	Flec.m x.	0.001	155.537	117.071	
	m¡n.	0.001	137.087	103.216	

Flecha Tot. el s. m x =0.002340

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.001	155.537	-505.076	
	m¡n.	0.001	137.087	-445.133	
	Flec.m x.	0.001	137.087	-445.133	
	m¡n.	0.001	155.537	-505.076	

BARRA : 24 (14,15) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.360	34.630	3.469	
	m¡n.	2.048	30.563	3.229	
	Cort.m x.	2.360	34.630	3.469	
	m¡n.	2.048	30.563	3.229	
	Flec.m x.	2.360	34.630	3.469	
	m¡n.	2.048	30.563	3.229	

Flecha Tot. el s. m x =0.027790

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	2.360	34.630	-100.422	
	m¡n.	2.048	30.563	-88.461	
	Cort.m x.	2.360	34.630	-100.422	
	m¡n.	2.048	30.563	-88.461	
	Flec.m x.	2.048	30.563	-88.461	
	m¡n.	2.360	34.630	-100.422	

Flecha Tot. el s. m x =0.002340

BARRA : 25 (15,16) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.048	-30.564	-88.462	
	m¡n.	-2.360	-34.630	-100.422	
	Cort.m x.	-2.048	-30.564	-88.462	
	m¡n.	-2.360	-34.630	-100.422	
	Flec.m x.	-2.048	-30.564	-88.462	
	m¡n.	-2.360	-34.630	-100.422	

Flecha Tot. el s. m x =0.002340

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-2.048	-30.564	3.229	
	m¡n.	-2.360	-34.630	3.469	
	Cort.m x.	-2.048	-30.564	3.229	
	m¡n.	-2.360	-34.630	3.469	
	Flec.m x.	-2.360	-34.630	3.469	
	m¡n.	-2.048	-30.564	3.229	

Flecha Tot. el s. m x =0.027790

BARRA : 26 (11,14) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.500	0.571	5.580	
	m¡n.	-5.134	0.657	6.336	
	Cort.m x.	-5.134	0.657	6.336	
	m¡n.	-4.500	0.571	5.580	
	Flec.m x.	-5.134	0.657	6.336	
	m¡n.	-4.500	0.571	5.580	

Flecha Tot. el s. m x =0.022012

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-4.500	0.571	3.295	
	m¡n.	-5.134	0.657	3.707	
	Cort.m x.	-5.134	0.657	3.707	

m¡n.	-4.500	0.571	3.295
Flec.m x.	-5.134	0.657	3.707
m¡n.	-4.500	0.571	3.295

Flecha Tot. el s. m x =0.027790

BARRA : 27 (10,13) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	10.988	-7.921	-15.267	
	m¡n.	9.674	-6.975	-13.443	
	Cort.m x.	9.674	-6.975	-13.443	
	m¡n.	10.988	-7.921	-15.267	
	Flec.m x.	9.674	-6.975	-13.443	
	m¡n.	10.988	-7.921	-15.267	

Flecha Tot. el s. m x =0.002083

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	10.988	-7.921	16.416	
	m¡n.	9.674	-6.975	14.456	
	Cort.m x.	9.674	-6.975	14.456	
	m¡n.	10.988	-7.921	16.416	
	Flec.m x.	10.988	-7.921	16.416	
	m¡n.	9.674	-6.975	14.456	

Flecha Tot. el s. m x =0.022012

BARRA : 28 (12,15) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.001	46.076	296.656	
	m¡n.	0.001	40.560	261.360	
	Flec.m x.	0.001	46.076	296.656	
	m¡n.	0.001	40.560	261.360	

Flecha Tot. el s. m x =0.003954

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.001	46.076	112.352	
	m¡n.	0.001	40.560	99.119	
	Flec.m x.	0.001	46.076	112.352	
	m¡n.	0.001	40.560	99.119	

Flecha Tot. el s. m x =0.002340

BARRA : 29 (11,12) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	10.080	26.262	5.854	
	m¡n.	8.876	23.134	5.175	
	Cort.m x.	10.080	26.262	5.854	
	m¡n.	8.876	23.134	5.175	
	Flec.m x.	10.080	26.262	5.854	
	m¡n.	8.876	23.134	5.175	

Flecha Tot. el s. m x =0.022012

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	10.080	26.262	-72.933	
	m¡n.	8.876	23.134	-64.227	
	Cort.m x.	10.080	26.262	-72.933	
	m¡n.	8.876	23.134	-64.227	
	Flec.m x.	8.876	23.134	-64.227	
	m¡n.	10.080	26.262	-72.933	

Flecha Tot el s. m x =0.003954

BARRA : 30 (12,13) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-8.876	-23.134	-64.228	
	m¡n.	-10.080	-26.262	-72.933	
	Cort.m x.	-8.876	-23.134	-64.228	
	m¡n.	-10.080	-26.262	-72.933	

Flec.m x.	-8.876	-23.134	-64.228
m¡n.	-10.080	-26.262	-72.933

Flecha Tot. el s. m x =0.003954

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-8.876	-23.134	5.175	
	m¡n.	-10.080	-26.262	5.854	
	Cort.m x.	-8.876	-23.134	5.175	
	m¡n.	-10.080	-26.262	5.854	
	Flec.m x.	-10.080	-26.262	5.854	
	m¡n.	-8.876	-23.134	5.175	

Flecha Tot. el s. m x =0.022012

BARRA : 31 (8,11) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-9.674	-6.975	-13.443	
	m¡n.	-10.988	-7.921	-15.267	
	Cort.m x.	-9.674	-6.975	-13.443	
	m¡n.	-10.988	-7.921	-15.267	
	Flec.m x.	-9.674	-6.975	-13.443	
	m¡n.	-10.988	-7.921	-15.267	

Flecha Tot. el s. m x =0.002083

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-9.674	-6.975	14.456	
	m¡n.	-10.988	-7.921	16.416	
	Cort.m x.	-9.674	-6.975	14.456	
	m¡n.	-10.988	-7.921	16.416	
	Flec.m x.	-10.988	-7.921	16.416	
	m¡n.	-9.674	-6.975	14.456	

Flecha Tot. el s. m x =0.022012

BARRA : 32 (6,10) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	6.830	-30.013	-32.392	
	m¡n.	6.013	-26.430	-28.524	
	Cort.m x.	6.013	-26.430	-28.524	
	m¡n.	6.830	-30.013	-32.392	
	Flec.m x.	6.013	-26.430	-28.524	
	m¡n.	6.830	-30.013	-32.392	

Flecha Tot. el s. m x =0.000176

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	6.830	-30.013	-9.882	
	m¡n.	6.013	-26.430	-8.701	
	Cort.m x.	6.013	-26.430	-8.701	
	m¡n.	6.830	-30.013	-9.882	
	Flec.m x.	6.013	-26.430	-8.701	
	m¡n.	6.830	-30.013	-9.882	

Flecha Tot. el s. m x =0.002083

BARRA : 33 (9,12) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.001	-41.108	79.177	
	m¡n.	0.001	-46.648	89.901	
	Flec.m x.	0.001	-46.648	89.901	
	m¡n.	0.001	-41.108	79.177	

Flecha Tot. el s. m x =0.002185

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.001	-41.108	243.608	
	m¡n.	0.001	-46.648	276.495	
	Flec.m x.	0.001	-46.648	276.495	
	m¡n.	0.001	-41.108	243.608	

Flecha Tot. el s. m x =0.003954

BARRA : 34 (8,9) Sec. 5 Rect. /238,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	5.385	-2.150	-4.159	
	m¡n.	4.742	-1.893	-3.661	
	Cort.m x.	4.742	-1.893	-3.661	
	m¡n.	5.385	-2.150	-4.159	
	Flec.m x.	4.742	-1.893	-3.661	
	m¡n.	5.385	-2.150	-4.159	

Flecha Tot. el s. m x =0.002083

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	5.385	-2.150	2.290	
	m¡n.	4.742	-1.893	2.018	
	Cort.m x.	4.742	-1.893	2.018	
	m¡n.	5.385	-2.150	2.290	
	Flec.m x.	5.385	-2.150	2.290	
	m¡n.	4.742	-1.893	2.018	

Flecha Tot. el s. m x =0.002185

BARRA : 35 (9,10) Sec. 5 Rect. /238,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.742	1.893	2.018	
	m¡n.	-5.385	2.150	2.290	
	Cort.m x.	-5.385	2.150	2.290	
	m¡n.	-4.742	1.893	2.018	
	Flec.m x.	-5.385	2.150	2.290	
	m¡n.	-4.742	1.893	2.018	

Flecha Tot. el s. m x =0.002185

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-4.742	1.893	-3.661	
	m¡n.	-5.385	2.150	-4.159	
	Cort.m x.	-5.385	2.150	-4.159	
	m¡n.	-4.742	1.893	-3.661	
	Flec.m x.	-4.742	1.893	-3.661	
	m¡n.	-5.385	2.150	-4.159	

Flecha Tot. el s. m x =0.002083

BARRA : 36 (20,23) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.130	-0.289	0.402	
	m¡n.	-1.605	-1.966	-2.744	
	Cort.m x.	0.130	-0.289	0.402	
	m¡n.	-1.605	-1.966	-2.744	
	Flec.m x.	0.130	-0.289	0.402	
	m¡n.	-1.605	-1.966	-2.744	

Flecha Tot. el s. m x =0.031556

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.130	-0.289	1.559	
	m¡n.	-1.605	-1.966	5.121	
	Cort.m x.	0.130	-0.289	1.559	
	m¡n.	-1.605	-1.966	5.121	
	Flec.m x.	-1.605	-1.966	5.121	
	m¡n.	0.130	-0.289	1.559	

Flecha Tot. el s. m x =0.037763

BARRA : 37 (19,22) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.712	-0.475	-2.960	
	m¡n.	-0.179	-0.474	-1.787	
	Cort.m x.	-0.179	-0.474	-1.787	
	m¡n.	0.712	-0.475	-2.960	
	Flec.m x.	-0.179	-0.474	-1.787	
	m¡n.	0.712	-0.475	-2.960	

Flecha Tot. el s. m x =0.027620

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.712	-0.475	-1.059	
	m¡n.	-0.179	-0.474	0.109	
	Cort.m x.	-0.179	-0.474	0.109	
	m¡n.	0.712	-0.475	-1.059	
	Flec.m x.	-0.179	-0.474	0.109	
	m¡n.	0.712	-0.475	-1.059	

Flecha Tot. el s. m x =0.031556

BARRA : 38 (21,24) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-47.785	96.108	
	m¡n.	0.000	-77.427	112.742	
	Flec.m x.	0.000	-77.427	112.742	
	m¡n.	0.000	-47.785	96.108	

Flecha Tot. el s. m x =0.003110

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-47.785	287.250	
	m¡n.	0.000	-77.427	422.451	
	Flec.m x.	0.000	-77.427	422.451	
	m¡n.	0.000	-47.785	287.250	

Flecha Tot. el s. m x =0.005577

BARRA : 39 (20,21) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.686	36.331	-0.893	
	m¡n.	-0.293	30.495	-0.049	
	Cort.m x.	1.686	36.331	-0.893	
	m¡n.	-0.293	30.495	-0.049	
	Flec.m x.	-0.293	30.495	-0.049	
	m¡n.	1.686	36.331	-0.893	

Flecha Tot. el s. m x =0.031556

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	1.686	36.331	-109.886	
	m¡n.	-0.293	30.495	-91.534	
	Cort.m x.	1.686	36.331	-109.886	
	m¡n.	-0.293	30.495	-91.534	
	Flec.m x.	-0.293	30.495	-91.534	
	m¡n.	1.686	36.331	-109.886	

Flecha Tot. el s. m x =0.003110

BARRA : 40 (21,22) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.293	-30.495	-91.534	
	m¡n.	-1.686	-36.331	-109.886	
	Cort.m x.	0.293	-30.495	-91.534	
	m¡n.	-1.686	-36.331	-109.886	
	Flec.m x.	0.293	-30.495	-91.534	
	m¡n.	-1.686	-36.331	-109.886	

Flecha Tot. el s. m x =0.003110

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.293	-30.495	-0.049	
	m¡n.	-1.686	-36.331	-0.893	
	Cort.m x.	0.293	-30.495	-0.049	

m¡n.	-1.686	-36.331	-0.893
Flec.m x.	0.293	-30.495	-0.049
m¡n.	-1.686	-36.331	-0.893

Flecha Tot. el s. m x =0.031556

BARRA : 41 (23,26) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.223	-3.384	2.665	
	m¡n.	-0.134	0.293	1.561	
	Cort.m x.	-0.134	0.293	1.561	
	m¡n.	0.223	-3.384	2.665	
	Flec.m x.	0.223	-3.384	2.665	
	m¡n.	-0.134	0.293	1.561	

Flecha Tot. el s. m x =0.037763

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.223	6.616	-3.799	
	m¡n.	-0.134	0.293	0.391	
	Cort.m x.	0.223	6.616	-3.799	
	m¡n.	-0.134	0.293	0.391	
	Flec.m x.	-0.134	0.293	0.391	
	m¡n.	0.223	6.616	-3.799	

Flecha Tot. el s. m x =0.033970

BARRA : 42 (22,25) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.605	-1.966	-2.744	
	m¡n.	-0.130	-0.289	0.402	
	Cort.m x.	-0.130	-0.289	0.402	
	m¡n.	1.605	-1.966	-2.744	
	Flec.m x.	-0.130	-0.289	0.402	
	m¡n.	1.605	-1.966	-2.744	

Flecha Tot. el s. m x =0.031556

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	1.605	-1.966	5.121	
	m¡n.	-0.130	-0.289	1.559	
	Cort.m x.	-0.130	-0.289	1.559	
	m¡n.	1.605	-1.966	5.121	
	Flec.m x.	1.605	-1.966	5.121	
	m¡n.	-0.130	-0.289	1.559	

Flecha Tot. el s. m x =0.037764

BARRA : 43 (24,27) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	75.288	427.363	
	m¡n.	0.000	47.811	287.245	
	Flec.m x.	-0.000	75.288	427.363	
	m¡n.	0.000	47.811	287.245	

Flecha Tot. el s. m x =0.005577

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	75.288	126.213	
	m¡n.	0.000	47.811	96.000	
	Flec.m x.	-0.000	75.288	126.213	
	m¡n.	0.000	47.811	96.000	

Flecha Tot. el s. m x =0.003161

BARRA : 44 (23,24) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.456	36.257	1.828	
	m¡n.	-0.002	30.098	-0.264	
	Cort.m x.	2.456	36.257	1.828	
	m¡n.	-0.002	30.098	-0.264	

Flec.m x.	2.456	36.257	1.828	
m¡n.	-0.002	30.098	-0.264	

Flecha Tot. el s. m x =0.037763

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	2.456	56.257	-136.945	
	m¡n.	-0.002	30.098	-90.560	
	Cort.m x.	2.456	56.257	-136.945	
	m¡n.	-0.002	30.098	-90.560	
	Flec.m x.	-0.002	30.098	-90.560	
	m¡n.	2.456	56.257	-136.945	

Flecha Tot. el s. m x =0.005577

BARRA : 45 (24,25) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.002	-30.098	-90.560	
	m¡n.	-2.456	-56.257	-136.945	
	Cort.m x.	0.002	-30.098	-90.560	
	m¡n.	-2.456	-56.257	-136.945	
	Flec.m x.	0.002	-30.098	-90.560	
	m¡n.	-2.456	-56.257	-136.945	

Flecha Tot. el s. m x =0.005577

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.002	-30.098	-0.264	
	m¡n.	-2.456	-36.257	1.828	
	Cort.m x.	0.002	-30.098	-0.264	
	m¡n.	-2.456	-36.257	1.828	
	Flec.m x.	-2.456	-36.257	1.828	
	m¡n.	0.002	-30.098	-0.264	

Flecha Tot. el s. m x =0.037764

BARRA : 46 (26,29) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.554	0.962	-0.580	
	m¡n.	-0.256	0.519	0.095	
	Cort.m x.	1.554	0.962	-0.580	
	m¡n.	-0.256	0.519	0.095	
	Flec.m x.	-0.256	0.519	0.095	
	m¡n.	1.554	0.962	-0.580	

Flecha Tot. el s. m x =0.033970

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	1.554	0.962	-4.429	
	m¡n.	-0.256	0.519	-1.980	
	Cort.m x.	1.554	0.962	-4.429	
	m¡n.	-0.256	0.519	-1.980	
	Flec.m x.	-0.256	0.519	-1.980	
	m¡n.	1.554	0.962	-4.429	

Flecha Tot. el s. m x =0.028323

BARRA : 47 (25,28) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.134	0.293	1.561	
	m¡n.	-0.223	-3.384	2.665	
	Cort.m x.	0.134	0.293	1.561	
	m¡n.	-0.223	-3.384	2.665	
	Flec.m x.	-0.223	-3.384	2.665	
	m¡n.	0.134	0.293	1.561	

Flecha Tot. el s. m x =0.037764

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.134	0.293	0.391	
	m¡n.	-0.223	6.616	-3.799	
	Cort.m x.	-0.223	6.616	-3.799	

m¡n.	0.134	0.293	0.391	
Flec.m x.	0.134	0.293	0.391	
m¡n.	-0.223	6.616	-3.799	

Flecha Tot. el s. m x =0.033970

BARRA : 48 (27,30) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	196.476	119.774	
	m¡n.	-0.000	144.119	96.593	
	Flec.m x.	-0.000	196.476	119.774	
	m¡n.	-0.000	144.119	96.593	

Flecha Tot. el s. m x =0.003161

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	196.476	-666.128	
	m¡n.	-0.000	144.119	-479.883	
	Flec.m x.	-0.000	144.119	-479.883	
	m¡n.	-0.000	196.476	-666.128	

BARRA : 49 (26,27) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.296	30.454	-0.121	
	m¡n.	-3.219	40.494	1.331	
	Cort.m x.	-3.219	40.494	1.331	
	m¡n.	0.296	30.454	-0.121	
	Flec.m x.	-3.219	40.494	1.331	
	m¡n.	0.296	30.454	-0.121	

Flecha Tot. el s. m x =0.033970

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.296	30.454	-91.483	
	m¡n.	-3.219	40.494	-120.151	
	Cort.m x.	-3.219	40.494	-120.151	
	m¡n.	0.296	30.454	-91.483	
	Flec.m x.	0.296	30.454	-91.483	
	m¡n.	-3.219	40.494	-120.151	

Flecha Tot. el s. m x =0.003161

BARRA : 50 (27,28) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.219	-40.494	-120.151	
	m¡n.	-0.296	-30.454	-91.483	
	Cort.m x.	-0.296	-30.454	-91.483	
	m¡n.	3.219	-40.494	-120.151	
	Flec.m x.	-0.296	-30.454	-91.483	
	m¡n.	3.219	-40.494	-120.151	

Flecha Tot. el s. m x =0.003161

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	3.219	-40.494	1.331	
	m¡n.	-0.296	-30.454	-0.122	
	Cort.m x.	-0.296	-30.454	-0.122	
	m¡n.	3.219	-40.494	1.331	
	Flec.m x.	3.219	-40.494	1.331	
	m¡n.	-0.296	-30.454	-0.122	

Flecha Tot. el s. m x =0.033970

BARRA : 51 (29,32) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.695	-0.885	-3.031	
	m¡n.	0.974	-0.651	-1.909	
	Cort.m x.	0.974	-0.651	-1.909	
	m¡n.	1.695	-0.885	-3.031	
	Flec.m x.	0.974	-0.651	-1.909	
	m¡n.	1.695	-0.885	-3.031	

Flecha Tot. el s. m x =0.028323

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	1.695	-0.885	0.510	
	m¡n.	0.974	-0.651	0.696	
	Cort.m x.	0.974	-0.651	0.696	
	m¡n.	1.695	-0.885	0.510	
	Flec.m x.	0.974	-0.651	0.696	
	m¡n.	1.695	-0.885	0.510	

Flecha Tot. el s. m x =0.028911

BARRA : 52 (28,31) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.256	0.519	0.095	
	m¡n.	-1.554	0.962	-0.580	
	Cort.m x.	-1.554	0.962	-0.580	
	m¡n.	0.256	0.519	0.095	
	Flec.m x.	0.256	0.519	0.095	
	m¡n	-1.554	0.962	-0.580	

Flecha Tot. el s. m x =0.033970

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.256	0.519	-1.980	
	m¡n.	-1.554	0.962	-4.429	
	Cort.m x.	-1.554	0.962	-4.429	
	m¡n.	0.256	0.519	-1.980	
	Flec.m x.	0.256	0.519	-1.980	
	m¡n.	-1.554	0.962	-4.429	

Flecha Tot. el s. m x =0.028323

BARRA : 53 (30,33) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	-152.218	-525.872	
	m¡n.	-0.001	-172.637	-596.386	
	Flec.m x.	-0.000	-152.218	-525.872	
	m¡n.	-0.001	-172.637	-596.386	
Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	-152.218	83.002	
	m¡n.	-0.001	-172.637	94.162	
	Flec.m x.	-0.001	-172.637	94.162	
	m¡n.	-0.000	-152.218	83.002	

Flecha Tot. el s. m x =0.002858

BARRA : 54 (29,30) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.071	31.850	1.229	
	m¡n.	-1.398	36.687	0.142	
	Cort.m x.	-1.398	36.687	0.142	
	m¡n.	-0.071	31.850	1.229	
	Flec.m x.	-0.071	31.850	1.229	
	m¡n.	-1.398	36.687	0.142	

Flecha Tot. el s. m x =0.028323

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.071	31.850	-94.321	
	m¡n.	-1.398	36.687	-109.920	
	Cort.m x.	-1.398	36.687	-109.920	
	m¡n.	-0.071	31.850	-94.321	
	Flec.m x.	-0.071	31.850	-94.321	
	m¡n.	-1.398	36.687	-109.920	

BARRA : 55 (30,31) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.398	-36.687	-109.920	
	m¡n.	0.071	-31.850	-94.321	
	Cort.m x.	0.071	-31.850	-94.321	
	m¡n.	1.398	-36.687	-109.920	
	Flec.m x.	0.071	-31.850	-94.321	
	m¡n.	1.398	-36.687	-109.920	
Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	1.398	-36.687	0.142	
	m¡n.	0.071	-31.850	1.229	
	Cort.m x.	0.071	-31.850	1.229	
	m¡n.	1.398	-36.687	0.142	
	Flec.m x.	0.071	-31.850	1.229	
	m¡n.	1.398	-36.687	0.142	

Flecha Tot. el s. m x =0.028323

BARRA : 56 (32,35) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.930	-0.839	2.337	
	m¡n.	3.379	-0.717	2.166	
	Cort.m x.	3.379	-0.717	2.166	
	m¡n.	3.930	-0.839	2.337	
	Flec.m x.	3.930	-0.839	2.337	
	m¡n.	3.379	-0.717	2.166	

Flecha Tot. el s. m x =0.028911

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	3.930	-0.839	5.694	
	m¡n.	3.379	-0.717	5.035	
	Cort.m x.	3.379	-0.717	5.035	
	m¡n.	3.930	-0.839	5.694	

Flec.m x.	3.930	-0.839	5.694
m¡n.	3.379	-0.717	5.035

Flecha Tot. el s. m x =0.026030

BARRA : 57 (31,34) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.974	-0.651	-1.909	
	m¡n.	-1.695	-0.885	-3.031	
	Cort.m x.	-0.974	-0.651	-1.909	
	m¡n.	-1.695	-0.885	-3.031	
	Flec.m x.	-0.974	-0.651	-1.909	
	m¡n.	-1.695	-0.885	-3.031	

Flecha Tot. el s. m x =0.028323

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.974	-0.651	0.696	
	m¡n.	-1.695	-0.885	0.510	
	Cort.m x.	-0.974	-0.651	0.696	
	m¡n.	-1.695	-0.885	0.510	
	Flec.m x.	-0.974	-0.651	0.696	
	m¡n.	-1.695	-0.885	0.510	

Flecha Tot. el s. m x =0.028911

BARRA : 58 (33,36) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.001	-55.327	80.062	
	m¡n.	-0.001	-62.849	90.508	
	Flec.m x.	-0.001	-62.849	90.508	
	m¡n.	-0.001	-55.327	80.062	

Flecha Tot. el s. m x =0.002858

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.001	-55.327	301.369	
	m¡n.	-0.001	-62.849	341.903	
	Flec.m x.	-0.001	-62.849	341.903	
	m¡n.	-0.001	-55.327	301.369	

Flecha Tot. el s. m x =0.005321

BARRA : 59 (32,33) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.470	30.746	2.405	
	m¡n.	-1.827	34.794	2.234	
	Cort.m x.	-1.827	34.794	2.234	
	m¡n.	-1.470	30.746	2.405	
	Flec.m x.	-1.470	30.746	2.405	
	m¡n.	-1.827	34.794	2.234	

Flecha Tot. el s. m x =0.028911

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-1.470	30.746	-89.833	
	m¡n.	-1.827	34.794	-102.148	
	Cort.m x.	-1.827	34.794	-102.148	
	m¡n.	-1.470	30.746	-89.833	
	Flec.m x.	-1.470	30.746	-89.833	
	m¡n.	-1.827	34.794	-102.148	

Flecha Tot. el s. m x =0.002858

BARRA : 60 (33,34) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.827	-34.794	-102.149	
	m¡n.	1.470	-30.746	-89.833	
	Cort.m x.	1.470	-30.746	-89.833	
	m¡n.	1.827	-34.794	-102.149	

Flec.m x.	1.470	-30.746	-89.833
m¡n.	1.827	-34.794	-102.149

Flecha Tot. el s. m x =0.002858

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	1.827	-34.794	2.234	
	m¡n.	1.470	-30.746	2.405	
	Cort.m x.	1.470	-30.746	2.405	
	m¡n.	1.827	-34.794	2.234	
	Flec.m x.	1.470	-30.746	2.405	
	m¡n.	1.827	-34.794	2.234	

Flecha Tot. el s. m x =0.028911

BARRA : 61 (35,38) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	10.399	4.005	13.071	
	m¡n.	9.146	3.528	11.518	
	Cort.m x.	10.399	4.005	13.071	
	m¡n.	9.146	3.528	11.518	
	Flec.m x.	10.399	4.005	13.071	
	m¡n.	9.146	3.528	11.518	

Flecha Tot. el s. m x =0.026030

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	10.399	4.005	-2.948	
	m¡n.	9.146	3.528	-2.593	
	Cort.m x.	10.399	4.005	-2.948	
	m¡n.	9.146	3.528	-2.593	
	Flec.m x.	9.146	3.528	-2.593	
	m¡n.	10.399	4.005	-2.948	

Flecha Tot. el s. m x =0.007790

BARRA : 62 (34,37) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.379	-0.717	2.166	
	m¡n.	-3.930	-0.839	2.337	
	Cort.m x.	-3.379	-0.717	2.166	
	m¡n.	-3.930	-0.839	2.337	
	Flec.m x.	-3.930	-0.839	2.337	
	m¡n.	-3.379	-0.717	2.166	

Flecha Tot. el s. m x =0.028911

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-3.379	-0.717	5.035	
	m¡n.	-3.930	-0.839	5.694	
	Cort.m x.	-3.379	-0.717	5.035	
	m¡n.	-3.930	-0.839	5.694	
	Flec.m x.	-3.930	-0.839	5.694	
	m¡n.	-3.379	-0.717	5.035	

Flecha Tot. el s. m x =0.026030

BARRA : 63 (36,39) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.001	37.343	327.150	
	m¡n.	-0.001	32.943	288.402	
	Flec.m x.	-0.001	37.343	327.150	
	m¡n.	-0.001	32.943	288.402	

Flecha Tot. el s. m x =0.005321

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.001	37.343	177.777	
	m¡n.	-0.001	32.943	156.628	
	Flec.m x.	-0.001	37.343	177.777	
	m¡n.	-0.001	32.943	156.628	

Flecha Tot. el s. m x =0.003765

BARRA : 64 (35,36) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-6.483	26.435	5.767	
	m¡n.	-7.376	29.996	6.469	
	Cort.m x.	-7.376	29.996	6.469	
	m¡n.	-6.483	26.435	5.767	
	Flec.m x.	-7.376	29.996	6.469	
	m¡n.	-6.483	26.435	5.767	

Flecha Tot. el s. m x =0.026030

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-6.483	26.435	-73.537	
	m¡n.	-7.376	29.996	-83.519	
	Cort.m x.	-7.376	29.996	-83.519	
	m¡n.	-6.483	26.435	-73.537	
	Flec.m x.	-6.483	26.435	-73.537	
	m¡n.	-7.376	29.996	-83.519	

Flecha Tot. el s. m x =0.005321

BARRA : 65 (36,37) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	7.376	-29.996	-83.519	
	m¡n.	6.483	-26.435	-73.538	
	Cort.m x.	6.483	-26.435	-73.538	
	m¡n.	7.376	-29.996	-83.519	
	Flec.m x.	6.483	-26.435	-73.538	
	m¡n.	7.376	-29.996	-83.519	

Flecha Tot. el s. m x =0.005321

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	7.376	-29.996	6.469	
	m¡n.	6.483	-26.435	5.767	
	Cort.m x.	6.483	-26.435	5.767	
	m¡n.	7.376	-29.996	6.469	
	Flec.m x.	7.376	-29.996	6.469	
	m¡n.	6.483	-26.435	5.767	

Flecha Tot. el s. m x =0.026030

BARRA : 66 (38,42) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	9.069	25.649	7.552	
	m¡n.	7.983	22.586	6.652	
	Cort.m x.	9.069	25.649	7.552	
	m¡n.	7.983	22.586	6.652	
	Flec.m x.	9.069	25.649	7.552	
	m¡n.	7.983	22.586	6.652	

Flecha Tot. el s. m x =0.007790

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	9.069	25.649	-37.334	
	m¡n.	7.983	22.586	-32.874	
	Cort.m x.	9.069	25.649	-37.334	
	m¡n.	7.983	22.586	-32.874	
	Flec.m x.	7.983	22.586	-32.874	
	m¡n.	9.069	25.649	-37.334	

Flecha Tot. el s. m x =0.000205

BARRA : 67 (37,40) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-9.146	3.528	11.518	
	m¡n.	-10.399	4.005	13.071	
	Cort.m x.	-10.399	4.005	13.071	
	m¡n.	-9.146	3.528	11.518	
	Flec.m x.	-10.399	4.005	13.071	
	m¡n.	-9.146	3.528	11.518	

Flecha Tot. el s. m x =0.026030

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-9.146	3.528	-2.593	
	m¡n.	-10.399	4.005	-2.948	
	Cort.m x.	-10.399	4.005	-2.948	
	m¡n.	-9.146	3.528	-2.593	
	Flec.m x.	-9.146	3.528	-2.593	
	m¡n.	-10.399	4.005	-2.948	

Flecha Tot. el s. m x =0.007790

BARRA : 68 (39,43) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.001	72.394	156.777	
	m¡n.	-0.001	63.811	138.139	
	Flec.m x.	-0.001	72.394	156.777	
	m¡n.	-0.001	63.811	138.139	

Flecha Tot. el s. m x =0.003765

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Cort.m x.	-0.001	72.394	30.088	
	m¡n.	-0.001	63.811	26.470	
	Flec.m x.	-0.001	72.394	30.088	
	m¡n.	-0.001	63.811	26.470	

Flecha Tot. el s. m x =0.002180

BARRA : 69 (38,39) Sec. 6 Rect. /288,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-9.245	2.712	-1.163	
	m¡n.	-10.500	3.078	-1.329	
	Cort.m x.	-10.500	3.078	-1.329	
	m¡n.	-9.245	2.712	-1.163	
	Flec.m x.	-9.245	2.712	-1.163	
	m¡n.	-10.500	3.078	-1.329	

Flecha Tot. el s. m x =0.007790

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-9.245	2.712	-9.299	
	m¡n.	-10.500	3.078	-10.565	
	Cort.m x.	-10.500	3.078	-10.565	
	m¡n.	-9.245	2.712	-9.299	
	Flec.m x.	-9.245	2.712	-9.299	
	m¡n.	-10.500	3.078	-10.565	

Flecha Tot. el s. m x =0.003765

BARRA : 70 (39,40) Sec. 6 Rect. /288,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	10.500	-3.078	-10.565	
	m¡n.	9.245	-2.712	-9.299	
	Cort.m x.	9.245	-2.712	-9.299	
	m¡n.	10.500	-3.078	-10.565	
	Flec.m x.	9.245	-2.712	-9.299	
	m¡n.	10.500	-3.078	-10.565	

Flecha Tot. el s. m x =0.003765

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	10.500	-3.078	-1.329	
	m¡n.	9.245	-2.712	-1.163	
	Cort.m x.	9.245	-2.712	-1.163	

m¡n.	10.500	-3.078	-1.329
Flec.m x.	9.245	-2.712	-1.163
m¡n.	10.500	-3.078	-1.329

Flecha Tot. el s. m x =0.007790

REACCIONES
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(Combinaciones con coeficientes unidad - servicio)

Nudo.	Hip¢tesis.	Momento X.	Fuerza Z.	Momento Y.
1	M ximos	11.837	72.450	-31.317
	M¡nimos	10.429	63.813	-35.554
2	M ximos	-10.429	72.450	-31.317
	M¡nimos	-11.837	63.814	-35.554
18	M ximos	-0.000	458.390	-35.439
	M¡nimos	-0.000	380.346	-148.392
30	M ximos	0.000	482.687	72.537
	M¡nimos	0.000	395.437	-45.847
46	M ximos	-0.000	77.616	41.478
	M¡nimos	-0.000	68.379	36.544
47	M ximos	-0.000	77.616	41.478
	M¡nimos	-0.000	68.380	36.544

Programa T R E B O L - II Paso Superior P.K. 306+000
TOOL S.A.

REACCIONES
==========
(Combinaciones con coeficientes unidad - servicio)

Nudo.	Hipótesis.	Momento X.	Fuerza Z.	Momento Y.
1	M ximos	11.837	72.450	-31.317
	M¡nimos	10.429	63.813	-35.554
2	M ximos	-10.429	72.450	-31.317
	M¡nimos	-11.837	63.814	-35.554
18	M ximos	-0.000	458.390	-35.439
	M¡nimos	-0.000	380.346	-148.392
30	M ximos	0.000	482.687	72.537
	M¡nimos	0.000	395.437	-45.847
46	M ximos	0.000	77.616	41.478
	M¡nimos	0.000	68.379	36.544
47	M ximos	0.000	77.616	41.478
	M¡nimos	0.000	68.380	36.544

5.6. CALCULO DE LA VIGA-LOSA

En consecuencia con lo anterior, se considera el tablero como viga de tres vanos apoyados en los estribos y empotrados en las pilas.

Se adjuntan los cálculos realizados de la estructura resultante.

El programa efectúa el cálculo de los esfuerzos en las hipótesis extremas,que han sido utilizados ya anteriormente, para el cálculo de las armaduras .

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[GEOMETRY]

# MEMBERS	# JOINTS	# RESTRIC. JOINTS	E [Kg/cm2]	THERMAL C.
8	9	4	300000	.00001

JOINT COORDINATES

JOINT #	X [mt]	Y [mt]
1	13.00	0.00
2	30.00	0.00
3	0.00	11.10
4	6.50	11.10
5	13.00	11.10
6	21.50	11.10
7	30.00	11.10
8	36.50	11.10
9	43.00	11.10

TYPES OF SECTIONS

TYPE #	PROPERTIES (I,A)		
1	0.04900000	-	0.78500003
2	0.55699998	-	4.30000020

MEMBER INFORMATION, ORIENTATION AND PROPERTIES

MEMB #	End J	End K	TYPE	Inert [mt4]	Area [mt2]	Length	SIN	COS
1	1	5	1	0.04900000	0.78500003	11.10	1.000	0.000
2	2	7	1	0.04900000	0.78500003	11.10	1.000	0.000
3	3	4	2	0.55699998	4.30000020	6.50	0.000	1.000
4	4	5	2	0.55699998	4.30000020	6.50	0.000	1.000
5	5	6	2	0.55699998	4.30000020	8.50	0.000	1.000
6	6	7	2	0.55699998	4.30000020	8.50	0.000	1.000
7	7	8	2	0.55699998	4.30000020	6.50	0.000	1.000
8	8	9	2	0.55699998	4.30000020	6.50	0.000	1.000

RESTRICTED JOINTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	1	1	1
2	1	1	1
3	0	1	0
9	0	1	0

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CASE --> [DEAD LOAD]

GROUP # : 1 VERTICAL LOAI

3 4 7 8

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	14333	14333	0	6.5		

GROUP # : 2 VERTICAL LOAD

5 6

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	14333	14333	0	8.5		

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CASE --> [DEAD LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.000056	0.000000	-0.000463
4	0.000056	0.176014	0.000015
5	0.000056	0.112770	-0.000119
6	-0.000000	0.350089	0.000000
7	-0.000056	0.112770	0.000119
8	-0.000056	0.176014	-0.000015
9	-0.000056	0.000000	0.000463

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-239255	-854	3159
	5	-239255	-854	-6322
2	2	-239255	854	-3159
	7	-239255	854	6322
3	3	0	68904	-0
	4	0	-24260	145091
4	4	0	-24261	145092
	5	0	-117425	-315387
5	5	-854	121831	-321709
	6	-854	0	196071
6	6	-854	0	196071
	7	-854	-121830	-321709
7	7	0	117425	-315386
	8	0	24260	145091
8	8	0	24261	145091
	9	0	-68904	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-854	239255	3159
2	854	239255	-3159
3	0	68904	0
9	0	68904	0

LAVPAS2
JUNIO 1998

CASE --> [LIVE LOAD]

GROUP # : 1 VERTICAL LOAI

3

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5
2				

Point Loads : 2

Point X	P
5	20000
6.5	20000

GROUP # : 2 VERTICAL LOAD

4

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5

Point Loads : 1

Point X	P
1.5	20000

GROUP # : 3 VERTICAL LOADS

7 8

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5

Point Loads : 0

Point X	P

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CASE --> [LIVE LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.042044	0.000000	-0.000462
4	-0.042044	0.191078	0.000007
5	-0.042044	0.030358	0.000294
6	-0.041941	-0.073180	-0.000019
7	-0.041837	0.009310	-0.000143
8	-0.041837	0.072663	0.000002
9	-0.041837	0.000000	0.000179

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-64409	1565	-4789
	5	-64409	1565	12587
2	2	-19753	-1565	6790
	7	-19753	-1565	-10585
3	3	0	45736	0
	4	0	-17144	192921
4	4	0	-17144	192921
	5	0	-60024	-92878
5	5	1565	4384	-80291
	6	1565	4384	-43025
6	6	1565	4384	-43025
	7	1565	4384	-5759
7	7	0	24137	-16344
	8	0	1257	66188
8	8	0	1257	66188
	9	0	-21623	-0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	1565	64409	-4789
2	-1565	19753	6790
3	0	45736	0
9	0	21623	0

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CASE --> [WIND LOAD]

GROUP # : 1 HORIZONTAL LOAD

1 2

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. Y	Final Y	Point Y	P
1	200	200	0	11.1		

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CASE --> [WIND LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.088380	0.000000	0.000002
4	0.088380	-0.001071	0.000001
5	0.088380	-0.000075	-0.000004
6	0.088380	0.000000	0.000002
7	0.088380	0.000075	-0.000004
8	0.088380	0.001071	0.000001
9	0.088380	0.000000	0.000002

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	158	2220	-8269
	5	158	-0	4052
2	2	-158	2220	-8269
	7	-158	-0	4052
3	3	0	-126	-0
	4	0	-126	-818
4	4	0	-126	-818
	5	0	-126	-1636
5	5	0	-284	2416
	6	0	-284	-0
6	6	0	-284	0
	7	0	-284	-2416
7	7	-0	-126	1636
	8	-0	-126	818
8	8	0	-126	818
	9	0	-126	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	2220	-158	-8269
2	2220	158	-8269
3	0	-126	0
9	0	126	0

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CASE --> [SEISMIC LOAD]

GROUP # : 1 VERTICAL LOADS

3 4

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	6.5		

GROUP # : 2 VERTICAL LOADS

5

Dist. Loads : 1 # Point Loads : 2

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	8.5	7	20000
2					8.5	20000

GROUP # : 3 VERTICAL LOADS

6

Dist. Loads : 1 # Point Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	8.5	1.5	20000

LAVPAS2
JUNIO 1998

CASE --> [SEISMIC LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.022329	0.000000	-0.000025
4	-0.022329	0.002088	0.000016
5	-0.022329	0.045762	-0.000249
6	-0.022466	0.294319	-0.000008
7	-0.022602	0.031469	0.000330
8	-0.022602	-0.058808	-0.000014
9	-0.022602	0.000000	-0.000129

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-97089	-2071	8195
	5	-97089	-2071	-14792
2	2	-66766	2071	-7123
	7	-66766	2071	15864
3	3	0	10816	-0
	4	0	-12064	-4054
4	4	0	-12064	-4054
	5	0	-34944	-156828
5	5	-2071	62145	-171621
	6	-2071	-7775	199454
6	6	-2071	-7775	199454
	7	-2071	-57695	-133791
7	7	0	9071	-117927
	8	0	9071	-58963
8	8	0	9071	-58963
	9	0	9071	-0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-2071	97089	8195
2	2071	66766	-7123
3	0	10816	0
9	0	-9071	0

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CASE --> [SEISMIC LOAD]

GROUP # : 1 VERTICAL LOAI

5

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	8.5
2				

Point Loads : 2

Point X	P
7	20000
8.5	20000

GROUP # : 2 VERTICAL LOAD

6

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	8.5

Point Loads : 1

Point X	P
1.5	20000

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CASE --> [SEISMIC LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.000163	0.000000	0.000135
4	0.000163	-0.061679	0.000015
5	0.000163	0.032719	-0.000345
6	0.000000	0.312130	0.000000
7	-0.000163	0.032719	0.000345
8	-0.000163	-0.061679	-0.000015
9	-0.000163	0.000000	-0.000135

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-69417	-2470	9135
	5	-69417	-2470	-18281
2	2	-69417	2470	-9135
	7	-69417	2470	18281
3	3	0	-9497	-0
	4	0	-9497	-61729
4	4	0	-9497	-61729
	5	0	-9497	-123458
5	5	-2470	59920	-141739
	6	-2470	-10000	210421
6	6	-2470	-10000	210421
	7	-2470	-59920	-141739
7	7	0	9497	-123458
	8	0	9497	-61729
8	8	0	9497	-61729
	9	0	9497	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-2470	69417	9135
2	2470	69417	-9135
3	0	-9497	0
9	0	-9497	0

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CASE --> [TEMPERATURE]

GROUP # : 1

5

THERMAL C. : .00001

Uniform 'T' Change : 65 Linear Gradient 'T'/H : 0

GROUP # : 2

6

THERMAL C. : .00001

Uniform 'T' Change : 65 Linear Gradient 'T'/H : 0

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JUNIO 1998

CASE --> [TEMPERATURE]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.552052	0.000000	-0.000030
4	-0.552052	0.014669	-0.000007
5	-0.552052	-0.000866	0.000063
6	0.000009	-0.027481	0.000000
7	0.552069	-0.000866	-0.000063
8	0.552069	0.014669	0.000007
9	0.552069	0.000000	0.000030

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	1838	-6672	37860
	5	1838	-6672	-36201
2	2	1838	6672	-37861
	7	1838	6672	36203
3	3	0	1838	0
	4	0	1838	11945
4	4	0	1838	11945
	5	0	1838	23891
5	5	-6673	-0	-12310
	6	-6673	-0	-12311
6	6	-6674	-0	-12311
	7	-6674	-0	-12311
7	7	0	-1838	23891
	8	0	-1838	11946
8	8	0	-1838	11946
	9	0	-1838	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-6672	-1838	37860
2	6672	-1838	-37861
3	0	1838	0
9	0	1838	0

6. PILAS

6.1. DESCRIPCION GENERAL

Se trata de soportes empotrados en el tablero y en la zapata.

La sección es circular con un diámetro de 1 m.

Las cargas verticales son las del tablero, cargas permanentes y sobrecargas tanto de frenado como la transmitida por la deformación de apoyos debida a las acciones térmicas y reológicas

El viento afecta a tablero y pila.

Con estas acciones se calculan los esfuerzos en soportes y zapatas y se determinan sus armaduras.

En la zapata se hallarán las tensiones en el suelo (< 3.5 kp/cm^2).

6.2. CARGAS

Verticales (h = 10.5 m.)

Reacciones máximas

Peso propio:	225 t	
Carga muerta:	58 t	283 t
Sobrecarga:	119 t	402 t
Soporte:		
2.5 x 0.785 x 10.5x 1 =	21 t	423 t

Horizontal

Frenado: $F_1 = 119/20 = 5.95\ t < 6$

Deformación : $\Delta = 0.65 \times 8.5 = 5.5$ mm.

$F_2 = 0.0055/(10.5^3/6/3/10^6/(\pi \times 0.5^4/4)) =$

$= 4.2$ t

$F = 6 + 4.2 = 10.2$ t

Viento:

Tablero: 0.2 x 3 x 15 = 9 t

Soporte: 0.2 x 10.5x 1 = 2.1t

6.3. PANDEO

Esfuerzos en arranque:

$M_x = 9 \times 11.1 + 2.1 \times 5.25 = 111$ m

$M_y = 10.2 \times 10.5/2 = 53.5$ mt

$N = 423 \times 0.9 = 381$ t

$M = 0.9 \times (M_x^2 + M_y)^{1/2} = 111$ mt

$e_o = 0.291 \times 0.6 = 0.175$ m

$e_a = (0.85 + 4000/12000) \times (20 \times 0.175 + 1)/(10 \times 0.175 + +1) \times 10.5^2/0.25 \times 10^4 = 0.086$ m

$e = 0.175 + 0.086 = 0.261$ m < 0.291 m $\quad f_{cd} = 1800$ t/m^2

$M = 0.33 \times 382 = 126$ mt

$\mu = 1.5 \times 111/1800/0.785/1 = 0.118$

$\nu = 0.9 \times 381/1800/0.785/1 = 0.243$ (0.405)

$A = 0.16 \times 1800 \times 0.785/4 = 60$ cm$^2 \rightarrow 12\ \phi\ 25$

6.4. ZAPATAS

$M_x = 9 \times 12.6 + 2.1 \times 6.75 = 128$ mt

$e_x = 0.294$ m $\rightarrow l_x = 2 - e_x = 1.705$m

$M_y = 10.2 \times 13/2 = 66.3$ mt

$e_y = 0.152$m $\rightarrow l_y = 2 - e_y = 1.847$ m

$N = 381 + 2.5 \times 4 \times 4 \times 1.5 * .9 = 435$ t

$\sigma = N/4/(l_x)/l_y = 34$ t/m^2

$< 1.25 \times 30$ t/m2 $= 37.5$ t/m2

$M = (34 - 3{,}75) \times 1.65^2/2 = 41.2$ mt

$A_{min.} = 22{,}5$ cm^2/m

$V = 1.6 \times 30.25 \times 0.9 = 43.6$ t/m

$V_c = 5 \times 167^{1/2} \times 1.45 = 93{,}7$ t/m $> V$

7. ESTRIBOS

7.1.1 **SIN** PUENTE

	E.Izquierdo	E.derecho
DATOS		
Muro	H = 8.5 m.	H = 6.50 m
Puntera	A = 1.5 m	A= 1.00 m
Espesor del muro	B = 1,50m	B= 1.50 m
Talón	C = 2.5 m	C =2.00 m
Espesor de zapata	D = 1.00 m	D = 1.00 m
Angulo de rozamiento interno	$\phi = 30°$	
Densidad de las tierras	$\gamma = 2$ t/m^3	
Sobrecarga equivalente de tierras	$H_0 = 0.5$ m	
Fuerza vertical en cabeza	R = 0 t/m	
Fuerza horizontal en cabeza	F = 0 t/m	
Momento exterior en cabeza	$M_0 = 0$ mt/m	
Resistencia minorada del hormigón	$F_c = 1500$ t/m^2	
Resistencia minorada del acero	$F_y = 4.43$ t/cm^2	
Coeficiente de seg. de acciones	$\gamma_f = 1.6$	
Coeficiente sísmico	SM = 0	

RESULTADOS		
Coeficiente de seguridad al deslizamiento	$C_s = 1.64$	1.791
Coeficiente de seguridad al vuelco	$C_v = 3.37$	3.11
Presión en el terreno	$\sigma = 21.4$ t/m^2	18.33 t/m2
Momento en arranque de muro	$M_m = 80.3$ mt/m	37.55mt/m
Armadura en arranque de muro	$A_m = 20.8$ cm^2/m	9.4cm2/m
Momento en puntera	$M_p = 21.3$ mt/m	7.91mt/m
Armadura en puntera	$A_p = 8.2$ cm$_2$/ m	3.0cm2/m
Momento en talón	$M_t = 49.0$ mt/m	24 mt/m
Armadura en talón	$A_t = 19.2$ cm^2/m	9.6mt/m

7.1.2. CON PUENTE

DATOS	***E.izquierdo***	***E.derecho***
Muro	***H = 8.5 m***	***H=6.5 m***
Puntera	A = 1.50 m	A= 1.00 m
Espesor del muro	B = 1,50 m	B=1.50 m
Talón	C = 2.50 m	C=2.00 m
Espesor de zapata	D = 1.00 m	D =1.00 m
Angulo de rozamiento interno	$\phi = 30°$	
Densidad de las tierras	$\gamma = 2$ t/m^3	
Sobrecarga equivalente de tierras	$H_0 = 0.50$ m	
Fuerza vertical en cabeza	R = 20 t/m	
Fuerza horizontal en cabeza	F = 2 t/m	
Momento exterior en cabeza	$M_0 = 0$ mt/m	
Resistencia minorada del hormigón	$F_c = 1500$ t/m^2	
Resistencia minorada del acero	$F_y = 4.43$ t/cm^2	
Coeficiente de seg. de acciones	$\gamma_f = 1.6$	
Coeficiente sísmico	SM = 0	

RESULTADOS		
Coeficiente de seguridad al deslizamiento	$C_s = 1,87$	2.133
Coeficiente de seguridad al vuelco	$C_v = 3,60$	2.874
Presión en el terreno	$\sigma = 28,6$ t/m2	27.6t/m2
Momento en arranque de muro	$M_m = 97.3$ mt/m	50.1mt/m
Armadura en arranque de muro	$A_m = 25.32$ cm^2/m	10.1cm2/m
Momento en puntera	$M_p = 29.3$ mt/m	12.6mt/m
Armadura en puntera	$A_p = 11.36$ cm$_2$/ m	4.8 cm2/m
Momento en talón	$M_t = 55.9$ mt/m	30 mt/m
Armadura en talón	$A_t = 22.0$ cm^{2}m	10.2cm2/m

7.3. ALETAS.

Lal izq: 7.5 x 5.5 m

Malmaxizq= 2/3x2x(5.5-1)^2/2x2.25 = 30.4 mt/m d=.76 m

Aalmaxizq = 14.85 cm2/m

Laldrecha : 5x4 m

Maldrecha =0.75x2x(4-1)^2= 13.5 mt/m

Aaldrecha = 6.49 cm2/m

7.4 APOYOS ELASTOMÉRICOS.

Deformación por retracción y térmica :

Le = (.25 + .40(40°))xL = 14 mm

Reacciones extremas:

Rmax= 112 t
Rmin = 38 t

Para un apoyo de 300x400x56

σ max= 112/0.12 /10=93.3 kg/cm2 < 150 kg/cm2
σ min = 36/0.12/10= 30 kg/cm^2 = 30 kg/cm2

Altura del apoyo : 14/.7 =20 mm< 56 mm

8. PRUEBA DE CARGA

8.1. CALCULO DE LA CARGA

Como tren de cargas de la prueba se utiliza una carga uniformemente distribuida de valor:

$q = 0.75 (0.4 + 120/(BxL))$

Vanos 1 y 3

B = 13.00 m.
L = 8,8 m.
$q = 0.75 (0.4 + 120/(13.00 \times 8.80)) = 1.09$ t/m^2

Por tanto, la carga total:

Q = 1.09 x 13.00 x 8.80 = 124 t.

Se utilizan camiones de 33 t. de carga total, por tanto el número máximo será:

N = 124/33 → 3 camiones. Sólo caben dos camiones.

Vano 2

B = 17 m.
L = 8.80 m.
$q = 0.75 (0.4 + 120/(17 \times 8.80)) = 0.9$ t/m^2

Por tanto, la carga total:

Q = 0.9 x 17 x 8.80 = 135 t.

Se utilizan camiones de 33 t. de carga total, por tanto el número máximo será:

N = 135/33 → 4 camiones.

8.2. MEDICION DE FLECHAS.

Vanos 1 y 3

$f_{Máx} = 0.00191$m.

Vano 2

$f_{Máx} = 0.00770$m.

Estas flechas son debidas sólo a la sobrecarga de camiones.

8.3. ESFUERZOS.

Vanos 1 y 3

$M_{máx}$ = 19.13 mt/m

Vanos 2 y 3

$M_{máx}$ = 18.16 mt/m

8.4. REACCIONES.

$R_{Máx}$ = 145 t.

A continuación se presentan los resultados del cálculo del emparrillado relativos a la prueba de carga.

Fecha 28 - 6 - 98

T I T U L O D E L A O B R A
==========

Paso Superior P.K. 306+000. Prueba de Carga

P R O P I E D A D
==========

P R O Y E C T O
==========

M A T E R I A L E S

No.	Mod.Young	Mod.Poisson	Peso espec.	Coef.Dilataci¢n
1	3290896.500	0.200	2.500	0.000010

Hormig¢n rest. caract. Fck = 300 Kp./cm2.

S E C C I O N E S

Unidades en m.

No.	Tipo.	Ancho.	Canto.
1	Rectg.	2.200	0.220
2	Rectg.	0.500	1.100
3	Rectg.	3.000	1.100
4	Rectg.	4.000	0.220
5	Rectg.	2.375	0.220
6	Rectg.	2.875	0.220

C A R A C T E R I S T I C A S R E S I S T E N T E S S E C C I O N E S

Unidades en m.

No.	Area.	Mmto.In.	S.Cortante	M.I.Tors.
1	4.840E-01	1.952E-03	4.033E-01	7.809E-03
2	5.500E-01	5.546E-02	4.583E-01	3.419E-02
3	3.300E+00	3.327E-01	2.750E+00	1.056E+00
4	8.800E-01	3.549E-03	7.333E-01	1.420E-02
5	5.225E-01	2.107E-03	4.354E-01	8.430E-03
6	6.325E-01	2.551E-03	5.271E-01	1.020E-02

N U D O S

Unidades en m.

Nudo.	X.	Y.
1	-0.000	1.100
2	0.000	7.100
3	0.250	0.000
4	0.250	1.100
5	0.250	4.100
6	0.250	7.100
7	0.250	8.200
8	1.000	1.100
9	1.000	4.100
10	1.000	7.100
11	5.000	1.100
12	5.000	4.100
13	5.000	7.100
14	9.000	1.100
15	9.000	4.100
16	9.000	7.100
17	13.000	1.100
18	13.000	4.100
19	13.000	7.100
20	17.000	1.100
21	17.000	4.100
22	17.000	7.100
23	21.000	1.100
24	21.000	4.100
25	21.000	7.100
26	25.000	1.100

Nudo.	X.	Y.
27	25.000	4.100
28	25.000	7.100
29	29.000	1.100
30	29.000	4.100
31	29.000	7.100
32	33.000	1.100
33	33.000	4.100
34	33.000	7.100
35	37.000	1.100
36	37.000	4.100
37	37.000	7.100
38	41.000	1.100
39	41.000	4.100
40	41.000	7.100
41	42.750	-0.000
42	42.750	1.100
43	42.750	4.100
44	42.750	7.100
45	42.750	8.200
46	43.000	1.100
47	43.000	7.100

B A R R A S
==========

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
1	4	8	1	1	1	0.75	907.5
2	1	4	1	1	1	0.25	302.5
3	44	47	1	1	1	0.25	302.5
4	2	6	1	1	1	0.25	302.5
5	6	7	1	2	1	1.10	1512.5
6	5	6	1	2	1	3.00	4125.0
7	3	4	1	2	1	1.10	1512.5
8	42	46	1	1	1	0.25	302.5
9	40	44	1	1	1	1.75	2117.5
10	41	42	1	2	1	1.10	1512.5
11	42	43	1	2	1	3.00	4125.0
12	44	45	1	2	1	1.10	1512.5
13	4	5	1	2	1	3.00	4125.0
14	43	44	1	2	1	3.00	4125.0
15	5	9	1	3	1	0.75	6187.5
16	17	20	1	1	1	4.00	4840.0
17	16	19	1	1	1	4.00	4840.0
18	18	21	1	3	1	4.00	33000.0
19	17	18	1	4	1	3.00	6600.0
20	18	19	1	4	1	3.00	6600.0
21	14	17	1	1	1	4.00	4840.0
22	13	16	1	1	1	4.00	4840.0
23	15	18	1	3	1	4.00	33000.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
24	14	15	1	4	1	3.00	6600.0
25	15	16	1	4	1	3.00	6600.0
26	11	14	1	1	1	4.00	4840.0
27	10	13	1	1	1	4.00	4840.0
28	12	15	1	3	1	4.00	33000.0
29	11	12	1	4	1	3.00	6600.0
30	12	13	1	4	1	3.00	6600.0
31	8	11	1	1	1	4.00	4840.0
32	6	10	1	1	1	0.75	907.5
33	9	12	1	3	1	4.00	33000.0
34	8	9	1	5	1	3.00	3918.7
35	9	10	1	5	1	3.00	3918.7
36	20	23	1	1	1	4.00	4840.0
37	19	22	1	1	1	4.00	4840.0
38	21	24	1	3	1	4.00	33000.0
39	20	21	1	4	1	3.00	6600.0
40	21	22	1	4	1	3.00	6600.0
41	23	26	1	1	1	4.00	4840.0
42	22	25	1	1	1	4.00	4840.0
43	24	27	1	3	1	4.00	33000.0
44	23	24	1	4	1	3.00	6600.0
45	24	25	1	4	1	3.00	6600.0
46	26	29	1	1	1	4.00	4840.0
47	25	28	1	1	1	4.00	4840.0
48	27	30	1	3	1	4.00	33000.0
49	26	27	1	4	1	3.00	6600.0
50	27	28	1	4	1	3.00	6600.0
51	29	32	1	1	1	4.00	4840.0
52	28	31	1	1	1	4.00	4840.0
53	30	33	1	3	1	4.00	33000.0
54	29	30	1	4	1	3.00	6600.0
55	30	31	1	4	1	3.00	6600.0
56	32	35	1	1	1	4.00	4840.0
57	31	34	1	1	1	4.00	4840.0
58	33	36	1	3	1	4.00	33000.0
59	32	33	1	4	1	3.00	6600.0
60	33	34	1	4	1	3.00	6600.0
61	35	38	1	1	1	4.00	4840.0
62	34	37	1	1	1	4.00	4840.0
63	36	39	1	3	1	4.00	33000.0
64	35	36	1	4	1	3.00	6600.0
65	36	37	1	4	1	3.00	6600.0
66	38	42	1	1	1	1.75	2117.5
67	37	40	1	1	1	4.00	4840.0
68	39	43	1	3	1	1.75	14437.5
69	38	39	1	6	1	3.00	4743.7
70	39	40	1	6	1	3.00	4743.8

Peso Total (kg) = 613359.8
Clase 1... = Barra Emp.- Emp.

Clase 2... = Barra Art.- Emp.
Clase 3... = Barra Emp.- Art.
Clase 4... = Barra Art.- Art.

CONDICIONES DE CONTORNO

Nudo No.	Giro.s./eje X	Despl.s/eje Z	Giro.s./eje Y
1	Imp.	Imp.	Imp.
2	Imp.	Imp.	Imp.
18	Lib.	Imp.	Imp.
30	Lib.	Imp.	Imp.
46	Lib.	Imp.	Imp.
47	Lib.	Imp.	Imp.

C A R G A S G E N E R A L E S

Temperatura de referencia (construcci¢n). = 0

Hip¢tesis.		Temperatura	Peso propio.
1	c-1	0.000	NO

C A R G A S E N B A R R A S

Unidades en M. y Mp.

Hip.	Barra.	Carga.	Angl.	P1.	P2.	A1.	A2.
1	24	Punt.	-	5.000		1.750	
	25	Punt.	-	5.000		1.250	
	28	Punt.	-	10.000		1.500	
	33	Punt.	-	10.000		2.000	
	38	Punt.	-	10.000		2.000	
	44	Punt.	-	5.000		1.750	
	45	Punt.	-	5.000		1.250	
	49	Punt.	-	5.000		1.750	
	50	Punt.	-	5.000		1.250	
	58	Punt.	-	10.000		2.500	
	63	Punt.	-	10.000		2.500	
	64	Punt.	-	5.000		1.750	
	65	Punt.	-	5.000		1.250	

C O M B I N A C I O N E S

Comb.	Hip.1
1	1.000

MOVIMIENTOS
==========

Nudo.	Hipótesis.	Giro. X.	Despl. Z.	Giro. Y.
1	C 1	0.0000000000	0.0000000000	0.0000000000
2	C 1	0.0000000000	0.0000000000	0.0000000000
3	C 1	-.0000964708	0.0000933202	0.0000727919
4	C 1	-.0000964708	-.0000127978	0.0000727919
5	C 1	-.0000000000	-.0002478734	0.0000874559
6	C 1	0.0000964707	-.0000127976	0.0000727916
7	C 1	0.0000964707	0.0000933206	0.0000727916
8	C 1	-.0000976452	-.0000823191	0.0001059489
9	C 1	-.0000000000	-.0003152706	0.0000857598
10	C 1	0.0000976453	-.0000823187	0.0001059488
11	C 1	0.0000216373	-.0005680015	0.0000939110
12	C 1	-.0000000001	-.0005212766	-.0000008277
13	C 1	-.0000216373	-.0005680016	0.0000939112
14	C 1	0.0001221117	-.0007564061	-.0000732330
15	C 1	-.0000000001	-.0002960979	-.0000942992
16	C 1	-.0001221117	-.0007564067	-.0000732328
17	C 1	0.0001249736	-.0002537368	-.0000573449
18	C 1	-.0000000001	0.0000000000	0.0000000000
19	C 1	-.0001249740	-.0002537381	-.0000573448
20	C 1	0.0001116657	-.0004593761	0.0001390551
21	C 1	-.0000000002	-.0002526102	0.0000867508
22	C 1	-.0001116663	-.0004593779	0.0001390553
23	C 1	0.0001982208	-.0010789639	0.0000655762
24	C 1	-.0000000002	-.0004703401	-.0000014215
25	C 1	-.0001982214	-.0010789665	0.0000655764

Nudo.	Hipótesis.	Giro. X.	Despl. Z.	Giro. Y.
26	C 1	0.0002128974	-.0009027086	-.0001376898
27	C 1	-.0000000002	-.0002619936	-.0000835199
28	C 1	-.0002128981	-.0009027118	-.0001376898
29	C 1	0.0001406575	-.0002782973	-.0000588944
30	C 1	-.0000000002	0.0000000000	0.0000000000
31	C 1	-.0001406584	-.0002783000	-.0000588946
32	C 1	0.0000919455	-.0005377262	0.0001601492
33	C 1	-.0000000002	-.0003557038	0.0001290791
34	C 1	-.0000919463	-.0005377286	0.0001601492
35	C 1	0.0000580172	-.0010875657	-.0000080953
36	C 1	-.0000000002	-.0007513469	0.0000306902
37	C 1	-.0000580176	-.0010875680	-.0000080955
38	C 1	-.0000998589	-.0003492956	-.0002298052
39	C 1	-.0000000002	-.0005605022	-.0001084521
40	C 1	0.0000998587	-.0003492960	-.0002298056
41	C 1	-.0001496243	0.0001471143	-.0001046397
42	C 1	-.0001496243	-.0000174724	-.0001046397
43	C 1	-.0000000002	-.0003474238	.0001227696
44	C 1	0.0001496242	-.0000174724	-.0001046397
45	C 1	0.0001496242	0.0001471142	-.0001046397
46	C 1	-.0001496243	0.0000000000	0.0000000000
47	C 1	0.0001496242	0.0000000000	0.0000000000

ESFUERZOS EN SISTEMA DE EJES LOCAL

Reducci¢n de I.Torsional en hormig¢n: Vigas 0 %, Losas 0 %

BARRA : 1 (4,8) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.008	-0.365	-0.421	
	m¡n.	0.008	-0.365	-0.421	
	Cort.m x.	0.008	-0.365	-0.421	
	m¡n.	0.008	-0.365	-0.421	
	Flec.m x.	0.008	-0.365	-0.421	
	m¡n.	0.008	-0.365	-0.421	

Flecha Tot. el s. m x =0.000013

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	0.008	-0.365	-0.147	
	m¡n.	0.008	-0.365	-0.147	
	Cort.m x.	0.008	-0.365	-0.147	
	m¡n.	0.008	-0.365	-0.147	
	Flec.m x.	0.008	-0.365	-0.147	
	m¡n.	0.008	-0.365	-0.147	

Flecha Tot. el s. m x =0.000082

BARRA : 2 (1,4) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.066	-5.649	-2.577	
	m¡n.	2.066	-5.649	-2.577	
	Cort.m x.	2.066	-5.649	-2.577	
	m¡n.	2.066	-5.649	-2.577	
	Flec.m x.	2.066	-5.649	-2.577	
	m¡n.	2.066	-5.649	-2.577	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Tor. m x.	2.066	-5.649	-1.164	
	m¡n.	2.066	-5.649	-1.164	
	Cort.m x.	2.066	-5.649	-1.164	
	m¡n.	2.066	-5.649	-1.164	
	Flec.m x.	2.066	-5.649	-1.164	
	m¡n.	2.066	-5.649	-1.164	

Flecha Tot. el s. m x =0.000013

BARRA : 3 (44,47) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	6.709	-1.850	
	m¡n.	0.000	6.709	-1.850	
	Flec.m x.	0.000	6.709	-1.850	
	m¡n.	0.000	6.709	-1.850	

Flecha Tot. el s. m x =0.000017

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	0.000	6.709	-3.528	
	m¡n.	0.000	6.709	-3.528	
	Flec.m x.	0.000	6.709	-3.528	
	m¡n.	0.000	6.709	-3.528	

BARRA : 4 (2,6) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.066	-5.649	-2.577	
	m¡n.	-2.066	-5.649	-2.577	
	Cort.m x.	-2.066	-5.649	-2.577	
	m¡n.	-2.066	-5.649	-2.577	
	Flec.m x.	-2.066	-5.649	-2.577	
	m¡n.	-2.066	-5.649	-2.577	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Tor. m x.	-2.066	-5.649	-1.164	
	m¡n.	-2.066	-5.649	-1.164	
	Cort.m x.	-2.066	-5.649	-1.164	
	m¡n.	-2.066	-5.649	-1.164	
	Flec.m x.	-2.066	-5.649	-1.164	
	m¡n.	-2.066	-5.649	-1.164	

Flecha Tot. el s. m x =0.000013

BARRA : 5 (6,7) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Flecha Tot. el s. m x =0.000013

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10					

Flecha Tot. el s. m x =-.000093

BARRA : 6 (5,6) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.743	5.284	13.795	
	m¡n.	0.743	5.284	13.795	
	Cort.m x.	0.743	5.284	13.795	
	m¡n.	0.743	5.284	13.795	
	Flec.m x.	0.743	5.284	13.795	
	m¡n.	0.743	5.284	13.795	

Flecha Tot. el s. m x =0.000248

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.743	5.284	-2.057	
	m¡n.	0.743	5.284	-2.057	
	Cort.m x.	0.743	5.284	-2.057	
	m¡n.	0.743	5.284	-2.057	
	Flec.m x.	0.743	5.284	-2.057	
	m¡n.	0.743	5.284	-2.057	

Flecha Tot. el s. m x =0.000013

BARRA : 7 (3,4) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Flecha Tot. el s. m x =-.000093

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10					

Flecha Tot. el s. m x =0.000013

BARRA : 8 (42,46) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	6.709	-1.850	
	m¡n.	0.000	6.709	-1.850	
	Flec.m x.	0.000	6.709	-1.850	
	m¡n.	0.000	6.709	-1.850	

Flecha Tot. el s. m x =0.000017

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	0.000	6.709	-3.528	
	m¡n.	0.000	6.709	-3.528	
	Flec.m x.	0.000	6.709	-3.528	

	m¡n.	0.000	6.709	-3.528

BARRA : 9 (40,44) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.152	0.539	0.012	
	m¡n.	-0.152	0.539	0.012	
	Cort.m x.	-0.152	0.539	0.012	
	m¡n.	-0.152	0.539	0.012	
	Flec.m x.	-0.152	0.539	0.012	
	m¡n.	-0.152	0.539	0.012	

Flecha Tot. el s. m x =0.000349

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	-0.152	0.539	-0.931	
	m¡n.	-0.152	0.539	-0.931	
	Cort.m x.	-0.152	0.539	-0.931	
	m¡n.	-0.152	0.539	-0.931	
	Flec.m x.	-0.152	0.539	-0.931	
	m¡n.	-0.152	0.539	-0.931	

Flecha Tot. el s. m x =0.000017

BARRA : 10 (41,42) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Flecha Tot. el s. m x =-.000147

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10					

Flecha Tot. el s. m x =0.000017

BARRA : 11 (42,43) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.919	-6.170	-0.152	
	m¡n.	0.919	-6.170	-0.152	
	Cort.m x.	0.919	-6.170	-0.152	
	m¡n.	0.919	-6.170	-0.152	
	Flec.m x.	0.919	-6.170	-0.152	
	m¡n.	0.919	-6.170	-0.152	

Flecha Tot. el s. m x =0.000017

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.919	-6.170	18.357	
	m¡n.	0.919	-6.170	18.357	
	Cort.m x.	0.919	-6.170	18.357	
	m¡n.	0.919	-6.170	18.357	
	Flec.m x.	0.919	-6.170	18.357	
	m¡n.	0.919	-6.170	18.357	

Flecha Tot. el s. m x =0.000347

BARRA : 12 (44,45) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Flecha Tot. el s. m x =0.000017

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.10					

Flecha Tot. el s. m x =-.000147

BARRA : 13 (4,5) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.743	-5.284	-2.057	
	m¡n.	-0.743	-5.284	-2.057	
	Cort.m x.	-0.743	-5.284	-2.057	
	m¡n.	-0.743	-5.284	-2.057	
	Flec.m x.	-0.743	-5.284	-2.057	
	m¡n.	-0.743	-5.284	-2.057	

Flecha Tot. el s. m x =0.000013

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.743	-5.284	13.795	
	m¡n.	-0.743	-5.284	13.795	
	Cort.m x.	-0.743	-5.284	13.795	
	m¡n.	-0.743	-5.284	13.795	
	Flec.m x.	-0.743	-5.284	13.795	
	m¡n.	-0.743	-5.284	13.795	

Flecha Tot. el s. m x =0.000248

BARRA : 14 (43,44) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.919	6.170	18.357	
	m¡n.	-0.919	6.170	18.357	
	Cort.m x.	-0.919	6.170	18.357	
	m¡n.	-0.919	6.170	18.357	
	Flec.m x.	-0.919	6.170	18.357	
	m¡n.	-0.919	6.170	18.357	

Flecha Tot. el s. m x =0.000347

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.919	6.170	-0.152	
	m¡n.	-0.919	6.170	-0.152	
	Cort.m x.	-0.919	6.170	-0.152	

m¡n.	-0.919	6.170	-0.152	
Flec.m x.	-0.919	6.170	-0.152	
m¡n.	-0.919	6.170	-0.152	

Flecha Tot. el s. m x =0.000017

BARRA : 15 (5,9) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-10.568	-1.487	
	m¡n.	0.000	-10.568	-1.487	
	Flec.m x.	0.000	-10.568	-1.487	
	m¡n.	0.000	-10.568	-1.487	

Flecha Tot. el s. m x =0.000248

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Cort.m x.	0.000	-10.568	6.440	
	m¡n.	0.000	-10.568	6.440	
	Flec.m x.	0.000	-10.568	6.440	
	m¡n.	0.000	-10.568	6.440	

Flecha Tot. el s. m x =0.000315

BARRA : 16 (17,20) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.018	-0.050	0.416	
	m¡n.	0.018	-0.050	-0.416	
	Cort.m x.	0.018	-0.050	-0.416	
	m¡n.	0.018	-0.050	-0.416	
	Flec.m x.	0.018	-0.050	-0.416	
	m¡n.	0.018	-0.050	-0.416	

Flecha Tot. el s. m x =0.000254

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.018	-0.050	-0.215	
	m¡n.	0.018	-0.050	-0.215	
	Cort.m x.	0.018	-0.050	-0.215	
	m¡n.	0.018	-0.050	-0.215	
	Flec.m x.	0.018	-0.050	-0.215	
	m¡n.	0.018	-0.050	-0.215	

Flecha Tot. el s. m x =0.000459

BARRA : 17 (16,19) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.004	0.288	0.551	
	m¡n.	0.004	0.288	0.551	
	Cort.m x.	0.004	0.288	0.551	
	m¡n.	0.004	0.288	0.551	
	Flec.m x.	0.004	0.288	0.551	
	m¡n.	0.004	0.288	0.551	

Flecha Tot. el s. m x =0.000756

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.004	0.288	-0.602	
	m¡n.	0.004	0.288	-0.602	
	Cort.m x.	0.004	0.288	-0.602	
	m¡n.	0.004	0.288	-0.602	
	Flec.m x.	0.004	0.288	-0.602	
	m¡n.	0.004	0.288	-0.602	

Flecha Tot. el s. m x =0.000254

BARRA : 18 (18,21) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-13.338	-50.424	
	m¡n.	0.000	-13.338	-50.424	
	Flec.m x.	0.000	-13.338	-50.424	
	m¡n.	0.000	-13.338	-50.424	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-13.338	2.926	
	m¡n.	0.000	-13.338	2.926	
	Flec.m x.	0.000	-13.338	2.926	
	m¡n.	0.000	-13.338	2.926	

Flecha Tot. el s. m x =0.000253

BARRA : 19 (17,18) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.186	0.339	0.022	
	m¡n.	-0.186	0.339	0.022	
	Cort.m x.	-0.186	0.339	0.022	
	m¡n.	-0.186	0.339	0.022	
	Flec.m x.	-0.186	0.339	0.022	
	m¡n.	-0.186	0.339	0.022	

Flecha Tot. el s. m x =0.000254

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.186	0.339	-0.995	
	m¡n.	-0.186	0.339	-0.995	
	Cort.m x.	-0.186	0.339	-0.995	
	m¡n.	-0.186	0.339	-0.995	
	Flec.m x.	-0.186	0.339	-0.995	
	m¡n.	-0.186	0.339	-0.995	

BARRA : 20 (18,19) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.186	-0.339	-0.995	
	m¡n.	0.186	-0.339	-0.995	
	Cort.m x.	0.186	-0.339	-0.995	
	m¡n.	0.186	-0.339	-0.995	
	Flec.m x.	0.186	-0.339	-0.995	
	m¡n.	0.186	-0.339	-0.995	
3.00	Tor. m x.	0.186	-0.339	0.022	
	m¡n.	0.186	-0.339	0.022	
	Cort.m x.	0.186	-0.339	0.022	
	m¡n.	0.186	-0.339	0.022	
	Flec.m x.	0.186	-0.339	0.022	
	m¡n.	0.186	-0.339	0.022	

Flecha Tot. el s. m x =0.000254

BARRA : 21 (14,17) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.004	0.288	0.551	
	m¡n.	-0.004	0.288	0.551	
	Cort.m x.	-0.004	0.288	0.551	
	m¡n.	-0.004	0.288	0.551	
	Flec.m x.	-0.004	0.288	0.551	
	m¡n.	-0.004	0.288	0.551	

Flecha Tot. el s. m x =0.000756

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.004	0.288	-0.602	
	m¡n.	-0.004	0.288	-0.602	
	Cort.m x.	-0.004	0.288	-0.602	
	m¡n.	-0.004	0.288	-0.602	
	Flec.m x.	-0.004	0.288	-0.602	
	m¡n.	-0.004	0.288	-0.602	

Flecha Tot. el s. m x =0.000254

BARRA : 22 (13,16) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.134	-0.176	-0.083	
	m¡n.	0.134	-0.176	-0.083	
	Cort.m x.	0.134	-0.176	-0.083	
	m¡n.	0.134	-0.176	-0.083	
	Flec.m x.	0.134	-0.176	-0.083	
	m¡n.	0.134	-0.176	-0.083	

Flecha Tot. el s. m x =0.000568

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.134	-0.176	0.620	
	m¡n.	0.134	-0.176	0.620	
	Cort.m x.	0.134	-0.176	0.620	
	m¡n.	0.134	-0.176	0.620	
	Flec.m x.	0.134	-0.176	0.620	
	m¡n.	0.134	-0.176	0.620	

Flecha Tot. el s. m x =0.000756

BARRA : 23 (15,18) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	18.124	10.433	
	m¡n.	0.000	18.124	10.433	
	Flec.m x.	0.000	18.124	10.433	
	m¡n.	0.000	18.124	10.433	

Flecha Tot. el s. m x =0.000296

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	18.124	-62.064	
	m¡n.	0.000	18.124	-62.064	
	Flec.m x.	0.000	18.124	-62.064	
	m¡n.	0.000	18.124	-62.064	

BARRA : 24 (14,15) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.068	-0.464	0.131	
	m¡n.	0.068	-0.464	0.131	
	Cort.m x.	0.068	-0.464	0.131	
	m¡n.	0.068	-0.464	0.131	
	Flec.m x.	0.068	-0.464	0.131	
	m¡n.	0.068	-0.464	0.131	

Flecha Tot. el s. m x =0.000756

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.068	4.536	-4.727	
	m¡n.	0.068	4.536	-4.727	
	Cort.m x.	0.068	4.536	-4.727	
	m¡n.	0.068	4.536	-4.727	
	Flec.m x.	0.068	4.536	-4.727	
	m¡n.	0.068	4.536	-4.727	

Flecha Tot. el s. m x =0.000296

BARRA : 25 (15,16) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.068	-4.536	-4.727	
	m¡n.	-0.068	-4.536	-4.727	
	Cort.m x.	-0.068	-4.536	-4.727	
	m¡n.	-0.068	-4.536	-4.727	
	Flec.m x.	-0.068	-4.536	-4.727	
	m¡n.	-0.068	-4.536	-4.727	

Flecha Tot. el s. m x =0.000296

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.068	0.464	0.131	
	m¡n.	-0.068	0.464	0.131	
	Cort.m x.	-0.068	0.464	0.131	
	m¡n.	-0.068	0.464	0.131	
	Flec.m x.	-0.068	0.464	0.131	
	m¡n.	-0.068	0.464	0.131	

Flecha Tot. el s. m x =0.000756

BARRA : 26 (11,14) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.134	-0.176	-0.083	
	m¡n.	-0.134	-0.176	-0.083	
	Cort.m x.	-0.134	-0.176	-0.083	
	m¡n.	-0.134	-0.176	-0.083	
	Flec.m x.	-0.134	-0.176	-0.083	
	m¡n.	-0.134	-0.176	-0.083	

Flecha Tot. el s. m x =0.000568

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.134	-0.176	0.620	
	m¡n.	-0.134	-0.176	0.620	
	Cort.m x.	-0.134	-0.176	0.620	
	m¡n.	-0.134	-0.176	0.620	
	Flec.m x.	-0.134	-0.176	0.620	
	m¡n.	-0.134	-0.176	0.620	

Flecha Tot. el s. m x =0.000756

BARRA : 27 (10,13) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.160	-0.103	-0.186	
	m¡n.	0.160	-0.103	-0.186	
	Cort.m x.	0.160	-0.103	-0.186	
	m¡n.	0.160	-0.103	-0.186	
	Flec.m x.	0.160	-0.103	-0.186	
	m¡n.	0.160	-0.103	-0.186	

Flecha Tot. el s. m x =0.000082

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.160	-0.103	0.225	
	m¡n.	0.160	-0.103	0.225	
	Cort.m x.	0.160	-0.103	0.225	
	m¡n.	0.160	-0.103	0.225	
	Flec.m x.	0.160	-0.103	0.225	
	m¡n.	0.160	-0.103	0.225	

Flecha Tot. el s. m x =0.000568

BARRA : 28 (12,15) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-0.948	31.506	
	m¡n.	0.000	-0.948	31.506	
	Flec.m x.	0.000	-0.948	31.506	
	m¡n.	0.000	-0.948	31.506	

Flecha Tot. el s. m x =0.000521

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	9.052	10.297	
	m¡n.	0.000	9.052	10.297	
	Flec.m x.	0.000	9.052	10.297	
	m¡n.	0.000	9.052	10.297	

Flecha Tot. el s. m x =0.000296

BARRA : 29 (11,12) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.307	0.073	0.025	
	m¡n.	0.307	0.073	0.025	
	Cort.m x.	0.307	0.073	0.025	
	m¡n.	0.307	0.073	0.025	
	Flec.m x.	0.307	0.073	0.025	
	m¡n.	0.307	0.073	0.025	

Flecha Tot. el s. m x =0.000568

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.307	0.073	-0.194	
	m¡n.	0.307	0.073	-0.194	
	Cort.m x.	0.307	0.073	-0.194	
	m¡n.	0.307	0.073	-0.194	
	Flec.m x.	0.307	0.073	-0.194	
	m¡n.	0.307	0.073	-0.194	

Flecha Tot. el s. m x =0.000521

BARRA : 30 (12,13) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.307	-0.073	-0.194	
	m¡n.	-0.307	-0.073	-0.194	
	Cort.m x.	-0.307	-0.073	-0.194	
	m¡n.	-0.307	-0.073	-0.194	
	Flec.m x.	-0.307	-0.073	-0.194	
	m¡n.	-0.307	-0.073	-0.194	

Flecha Tot. el s. m x =0.000521

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.307	-0.073	0.025	
	m¡n.	-0.307	-0.073	0.025	
	Cort.m x.	-0.307	-0.073	0.025	
	m¡n.	-0.307	-0.073	0.025	
	Flec.m x.	-0.307	-0.073	0.025	
	m¡n.	-0.307	-0.073	0.025	

Flecha Tot. el s. m x =0.000568

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BARRA : 31 (8,11) Sec. 1 Rect. /220,22/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.160	-0.103	-0.186	
	m¡n.	-0.160	-0.103	-0.186	
	Cort.m x.	-0.160	-0.103	-0.186	
	m¡n.	-0.160	-0.103	-0.186	
	Flec.m x.	-0.160	-0.103	-0.186	
	m¡n.	-0.160	-0.103	-0.186	

Flecha Tot. el s. m x =0.000082

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.160	-0.103	0.225	
	m¡n.	-0.160	-0.103	0.225	
	Cort.m x.	-0.160	-0.103	0.225	
	m¡n.	-0.160	-0.103	0.225	
	Flec.m x.	-0.160	-0.103	0.225	
	m¡n.	-0.160	-0.103	0.225	

Flecha Tot. el s. m x =0.000568

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BARRA : 32 (6,10) Sec. 1 Rect. /220,22/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.008	-0.365	-0.421	
	m¡n.	-0.008	-0.365	-0.421	
	Cort.m x.	-0.008	-0.365	-0.421	
	m¡n.	-0.008	-0.365	-0.421	
	Flec.m x.	-0.008	-0.365	-0.421	
	m¡n.	-0.008	-0.365	-0.421	

Flecha Tot. el s. m x =0.000013

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	-0.008	-0.365	-0.147	
	m¡n.	-0.008	-0.365	-0.147	
	Cort.m x.	-0.008	-0.365	-0.147	
	m¡n.	-0.008	-0.365	-0.147	
	Flec.m x.	-0.008	-0.365	-0.147	
	m¡n.	-0.008	-0.365	-0.147	

Flecha Tot. el s. m x =0.000082

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BARRA : 33 (9,12) Sec. 3 Rect. /300,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-11.094	6.517	
	m¡n.	0.000	-11.094	6.517	
	Flec.m x.	0.000	-11.094	6.517	
	m¡n.	0.000	-11.094	6.517	

Flecha Tot. el s. m x =0.000315

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-1.094	30.891	
	m¡n.	0.000	-1.094	30.891	
	Flec.m x.	0.000	-1.094	30.891	
	m¡n.	0.000	-1.094	30.891	

Flecha Tot. el s. m x =0.000521

BARRA : 34 (8,9) Sec. 5 Rect. /238,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.039	-0.263	-0.168	
	m¡n.	0.039	-0.263	-0.168	
	Cort.m x.	0.039	-0.263	-0.168	
	m¡n.	0.039	-0.263	-0.168	
	Flec.m x.	0.039	-0.263	-0.168	
	m¡n.	0.039	-0.263	-0.168	

Flecha Tot. el s. m x =0.000082

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.039	-0.263	0.619	
	m¡n.	0.039	-0.263	0.619	
	Cort.m x.	0.039	-0.263	0.619	
	m¡n.	0.039	-0.263	0.619	
	Flec.m x.	0.039	-0.263	0.619	
	m¡n.	0.039	-0.263	0.619	

Flecha Tot. el s. m x =0.000315

BARRA : 35 (9,10) Sec. 5 Rect. /238,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.039	0.263	0.619	
	m¡n.	-0.039	0.263	0.619	
	Cort.m x.	-0.039	0.263	0.619	
	m¡n.	-0.039	0.263	0.619	
	Flec.m x.	-0.039	0.263	0.619	
	m¡n.	-0.039	0.263	0.619	

Flecha Tot. el s. m x =0.000315

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.039	0.263	-0.168	
	m¡n.	-0.039	0.263	-0.168	
	Cort.m x.	-0.039	0.263	-0.168	

m¡n.	-0.039	0.263	-0.168
Flec.m x.	-0.039	0.263	-0.168
m¡n.	-0.039	0.263	-0.168

Flecha Tot. el s. m x =0.000082

BARRA : 36 (20,23) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.116	-0.251	-0.384	
	m¡n.	-0.116	-0.251	-0.384	
	Cort.m x.	-0.116	-0.251	-0.384	
	m¡n.	-0.116	-0.251	-0.384	
	Flec.m x.	-0.116	-0.251	-0.384	
	m¡n.	-0.116	-0.251	-0.384	

Flecha Tot. el s. m x =0.000459

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.116	-0.251	0.620	
	m¡n.	-0.116	-0.251	0.620	
	Cort.m x.	-0.116	-0.251	0.620	
	m¡n.	-0.116	-0.251	0.620	
	Flec.m x.	-0.116	-0.251	0.620	
	m¡n.	-0.116	-0.251	0.620	

Flecha Tot. el s. m x =0.001079

BARRA : 37 (19,22) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.018	-0.050	-0.416	
	m¡n.	-0.018	-0.050	-0.416	
	Cort.m x.	-0.018	-0.050	-0.416	
	m¡n.	-0.018	-0.050	-0.416	
	Flec.m x.	-0.018	-0.050	-0.416	
	m¡n.	-0.018	-0.050	-0.416	

Flecha Tot. el s. m x =0.000254

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.018	-0.050	-0.215	
	m¡n.	-0.018	-0.050	-0.215	
	Cort.m x.	-0.018	-0.050	-0.215	
	m¡n.	-0.018	-0.050	-0.215	
	Flec.m x.	-0.018	-0.050	-0.215	
	m¡n.	-0.018	-0.050	-0.215	

Flecha Tot. el s. m x =0.000459

BARRA : 38 (21,24) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-12.936	3.266	
	m¡n.	0.000	-12.936	3.266	
	Flec.m x.	0.000	-12.936	3.266	
	m¡n.	0.000	-12.936	3.266	

Flecha Tot. el s. m x =0.000253

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	-2.936	35.011	
	m¡n.	0.000	-2.936	35.011	
	Flec.m x.	0.000	-2.936	35.011	
	m¡n.	0.000	-2.936	35.011	

Flecha Tot. el s. m x =0.000470

BARRA : 39 (20,21) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.170	0.201	-0.134	
	m¡n.	0.170	0.201	-0.134	
	Cort.m x.	0.170	0.201	-0.134	
	m¡n.	0.170	0.201	-0.134	

Flec.m x.	0.170	0.201	-0.134	
m¡n.	0.170	0.201	-0.134	

Flecha Tot. el s. m x =0.000459

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.170	0.201	-0.736	
	m¡n.	0.170	0.201	-0.736	
	Cort.m x.	0.170	0.201	-0.736	
	m¡n.	0.170	0.201	-0.736	
	Flec.m x.	0.170	0.201	-0.736	
	m¡n.	0.170	0.201	-0.736	

Flecha Tot. el s. m x =0.000253

BARRA : 40 (21,22) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.170	-0.201	-0.736	
	m¡n.	-0.170	-0.201	-0.736	
	Cort.m x.	-0.170	-0.201	-0.736	
	m¡n.	-0.170	-0.201	-0.736	
	Flec.m x.	-0.170	-0.201	-0.736	
	m¡n.	-0.170	-0.201	-0.736	

Flecha Tot. el s. m x =0.000253

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.170	-0.201	-0.134	
	m¡n.	-0.170	-0.201	-0.134	
	Cort.m x.	-0.170	-0.201	-0.134	
	m¡n.	-0.170	-0.201	-0.134	
	Flec.m x.	-0.170	-0.201	-0.134	
	m¡n.	-0.170	-0.201	-0.134	

Flecha Tot. el s. m x =0.000459

BARRA : 41 (23,26) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.020	0.038	0.403	
	m¡n.	-0.020	0.038	0.403	
	Cort.m x.	-0.020	0.038	0.403	
	m¡n.	-0.020	0.038	0.403	
	Flec.m x.	-0.020	0.038	0.403	
	m¡n.	-0.020	0.038	0.403	

Flecha Tot. el s. m x =0.001079

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.020	0.038	0.250	
	m¡n.	-0.020	0.038	0.250	
	Cort.m x.	-0.020	0.038	0.250	
	m¡n.	-0.020	0.038	0.250	
	Flec.m x.	-0.020	0.038	0.250	
	m¡n.	-0.020	0.038	0.250	

Flecha Tot. el s. m x =0.000903

BARRA : 42 (22,25) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.116	-0.251	-0.384	
	m¡n.	0.116	-0.251	-0.384	
	Cort.m x.	0.116	-0.251	-0.384	
	m¡n.	0.116	-0.251	-0.384	
	Flec.m x.	0.116	-0.251	-0.384	
	m¡n.	0.116	-0.251	-0.384	

Flecha Tot. el s. m x =0.000459

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.116	-0.251	0.620	
	m¡n.	0.116	-0.251	0.620	
	Cort.m x.	0.116	-0.251	0.620	

m¡n.	0.116	-0.251	0.620	
Flec.m x.	0.116	-0.251	0.620	
m¡n.	0.116	-0.251	0.620	

Flecha Tot. el s. m x =0.001079

BARRA : 43 (24,27) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	6.485	35.445	
	m¡n.	0.000	6.485	35.445	
	Flec.m x.	0.000	6.485	35.445	
	m¡n.	0.000	6.485	35.445	

Flecha Tot. el s. m x =0.000470

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	6.485	9.505	
	m¡n.	0.000	6.485	9.505	
	Flec.m x.	0.000	6.485	9.505	
	m¡n.	0.000	6.485	9.505	

Flecha Tot. el s. m x =0.000262

BARRA : 44 (23,24) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.217	0.289	0.096	
	m¡n.	0.217	-0.289	0.096	
	Cort.m x.	0.217	-0.289	0.096	
	m¡n.	0.217	-0.289	0.096	
	Flec.m x.	0.217	-0.289	0.096	
	m¡n.	0.217	-0.289	0.096	

Flecha Tot. el s. m x =0.001079

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.217	4.711	-5.286	
	m¡n.	0.217	4.711	-5.286	
	Cort.m x.	0.217	4.711	-5.286	
	m¡n.	0.217	4.711	-5.286	
	Flec.m x.	0.217	4.711	-5.286	
	m¡n.	0.217	4.711	-5.286	

Flecha Tot. el s. m x =0.000470

BARRA : 45 (24,25) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.217	-4.711	-5.286	
	m¡n.	-0.217	-4.711	-5.286	
	Cort.m x.	-0.217	-4.711	-5.286	
	m¡n.	-0.217	-4.711	-5.286	
	Flec.m x.	-0.217	-4.711	-5.286	
	m¡n.	-0.217	-4.711	-5.286	

Flecha Tot. el s. m x =0.000470

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.217	0.289	0.096	
	m¡n.	-0.217	0.289	0.096	
	Cort.m x.	-0.217	0.289	0.096	
	m¡n.	-0.217	0.289	0.096	
	Flec.m x.	-0.217	0.289	0.096	
	m¡n.	-0.217	0.289	0.096	

Flecha Tot. el s. m x =0.001079

BARRA : 46 (26,29) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.097	0.276	0.426	
	m¡n.	0.097	0.276	0.426	
	Cort.m x.	0.097	0.276	0.426	
	m¡n.	0.097	0.276	0.426	
	Flec.m x.	0.097	0.276	0.426	
	m¡n.	0.097	0.276	0.426	

Flecha Tot. el s. m x =0.000903

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.097	0.276	-0.679	
	m¡n.	0.097	0.276	-0.679	
	Cort.m x.	0.097	0.276	-0.679	
	m¡n.	0.097	0.276	-0.679	
	Flec.m x.	0.097	0.276	-0.679	
	m¡n.	0.097	0.276	-0.679	

Flecha Tot. el s. m x =0.000278

BARRA : 47 (25,28) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.020	0.038	0.403	
	m¡n.	0.020	0.038	0.403	
	Cort.m x.	0.020	0.038	0.403	
	m¡n.	0.020	0.038	0.403	
	Flec.m x.	0.020	0.038	0.403	
	m¡n.	0.020	0.038	0.403	

Flecha Tot. el s. m x =0.001079

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.020	0.038	0.250	
	m¡n.	0.020	0.038	0.250	
	Cort.m x.	0.020	0.038	0.250	
	m¡n.	0.020	0.038	0.250	
	Flec.m x.	0.020	0.038	0.250	
	m¡n.	0.020	0.038	0.250	

Flecha Tot. el s. m x =0.000903

BARRA : 48 (27,30) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	16.009	9.154	
	m¡n.	0.000	16.009	9.154	
	Flec.m x.	0.000	16.009	9.154	
	m¡n.	0.000	16.009	9.154	

Flecha Tot. el s. m x =0.000262

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	0.000	16.009	-54.883	
	m¡n.	0.000	16.009	-54.883	
	Flec.m x.	0.000	16.009	-54.883	
	m¡n.	0.000	16.009	-54.883	

BARRA : 49 (26,27) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.176	-0.238	0.116	
	m¡n.	-0.176	-0.238	0.116	
	Cort.m x.	-0.176	-0.238	0.116	
	m¡n.	-0.176	-0.238	0.116	
	Flec.m x.	-0.176	-0.238	0.116	
	m¡n.	-0.176	-0.238	0.116	

Flecha Tot. el s. m x =0.000903

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.176	4.762	-5.420	
	m¡n.	-0.176	4.762	-5.420	
	Cort.m x.	-0.176	4.762	-5.420	
	m¡n.	-0.176	4.762	-5.420	
	Flec.m x.	-0.176	4.762	-5.420	
	m¡n.	-0.176	4.762	-5.420	

Flecha Tot. el s. m x =0.000262

BARRA : 50 (27,28) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.176	-4.762	-5.420	
	m¡n.	0.176	-4.762	-5.420	
	Cort.m x.	0.176	-4.762	-5.420	
	m¡n.	0.176	-4.762	-5.420	
	Flec.m x.	0.176	-4.762	-5.420	
	m¡n.	0.176	-4.762	-5.420	

Flecha Tot. el s. m x =0.000262

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.176	0.238	0.116	
	m¡n.	0.176	0.238	0.116	
	Cort.m x.	0.176	0.238	0.116	
	m¡n.	0.176	0.238	0.116	
	Flec.m x.	0.176	0.238	0.116	
	m¡n.	0.176	0.238	0.116	

Flecha Tot. el s. m x =0.000903

BARRA : 51 (29,32) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.065	-0.068	-0.488	
	m¡n.	0.065	-0.068	-0.488	
	Cort.m x.	0.065	-0.068	-0.488	
	m¡n.	0.065	-0.068	-0.488	
	Flec.m x.	0.065	-0.068	-0.488	
	m¡n.	0.065	-0.068	-0.488	

Flecha Tot. el s. m x =0.000278

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.065	-0.068	-0.216	
	m¡n.	0.065	-0.068	-0.216	
	Cort.m x.	0.065	-0.068	-0.216	
	m¡n.	0.065	-0.068	-0.216	
	Flec.m x.	0.065	-0.068	-0.216	
	m¡n.	0.065	-0.068	-0.216	

Flecha Tot. el s. m x =0.000538

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BARRA : 52 (28,31) Sec. 1 Rect. /220,22/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.097	0.276	0.426	
	m¡n.	-0.097	0.276	0.426	
	Cort.m x.	-0.097	0.276	0.426	
	m¡n.	-0.097	0.276	0.426	
	Flec.m x.	-0.097	0.276	0.426	
	m¡n.	-0.097	0.276	0.426	

Flecha Tot. el s. m x =0.000903

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.097	0.276	-0.679	
	m¡n.	-0.097	0.276	-0.679	
	Cort.m x.	-0.097	0.276	-0.679	
	m¡n.	-0.097	0.276	-0.679	
	Flec.m x.	-0.097	0.276	-0.679	
	m¡n.	0.097	0.276	-0.679	

Flecha Tot. el s. m x =0.000278

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BARRA : 53 (30,33) Sec. 3 Rect. /300,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	-16.446	-68.229	
	m¡n.	-0.000	-16.446	-68.229	
	Flec.m x.	-0.000	-16.446	-68.229	
	m¡n.	-0.000	-16.446	-68.229	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	-16.446	-2.445	
	m¡n.	-0.000	-16.446	-2.445	
	Flec.m x.	-0.000	-16.446	-2.445	
	m¡n.	-0.000	-16.446	-2.445	

Flecha Tot. el s. m x =0.000356

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BARRA : 54 (29,30) Sec. 4 Rect. /400,22/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.191	0.344	-0.031	
	m¡n.	-0.191	0.344	-0.031	
	Cort.m x.	-0.191	0.344	-0.031	
	m¡n.	-0.191	0.344	-0.031	
	Flec.m x.	-0.191	0.344	-0.031	
	m¡n.	-0.191	0.344	-0.031	

Flecha Tot. el s. m x =0.000278

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.191	0.344	-1.064	
	m¡n.	-0.191	0.344	-1.064	
	Cort.m x.	-0.191	0.344	-1.064	
	m¡n.	-0.191	0.344	-1.064	
	Flec.m x.	-0.191	0.344	-1.064	
	m¡n.	-0.191	0.344	-1.064	

BARRA : 55 (30,31) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.191	-0.344	-1.064	
	m¡n.	0.191	-0.344	-1.064	
	Cort.m x.	0.191	-0.344	-1.064	
	m¡n.	0.191	-0.344	-1.064	
	Flec.m x.	0.191	-0.344	-1.064	
	m¡n.	0.191	-0.344	-1.064	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.191	-0.344	-0.031	
	m¡n.	0.191	-0.344	-0.031	
	Cort.m x.	0.191	-0.344	-0.031	
	m¡n.	0.191	-0.344	-0.031	
	Flec.m x.	0.191	-0.344	-0.031	
	m¡n.	0.191	-0.344	-0.031	

Flecha Tot. el s. m x =0.000278

BARRA : 56 (32,35) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.045	-0.293	-0.317	
	m¡n.	0.045	-0.293	-0.317	
	Cort.m x.	0.045	-0.293	-0.317	
	m¡n.	0.045	-0.293	-0.317	
	Flec.m x.	0.045	-0.293	-0.317	
	m¡n.	0.045	-0.293	-0.317	

Flecha Tot. el s. m x =0.000538

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.045	-0.293	0.857	
	m¡n.	0.045	-0.293	0.857	
	Cort.m x.	0.045	-0.293	0.857	
	m¡n.	0.045	-0.293	0.857	
	Flec.m x.	0.045	-0.293	0.857	
	m¡n.	0.045	-0.293	0.857	

Flecha Tot. el s. m x =0.001088

BARRA : 57 (31,34) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.065	-0.068	-0.488	
	m¡n.	-0.065	-0.068	-0.488	
	Cort.m x.	-0.065	-0.068	-0.488	
	m¡n.	-0.065	-0.068	-0.488	
	Flec.m x.	-0.065	-0.068	-0.488	
	m¡n.	-0.065	-0.068	-0.488	

Flecha Tot. el s. m x =0.000278

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.065	-0.068	-0.216	
	m¡n.	-0.065	-0.068	-0.216	
	Cort.m x.	-0.065	-0.068	-0.216	
	m¡n.	-0.065	-0.068	-0.216	
	Flec.m x.	-0.065	-0.068	-0.216	
	m¡n.	-0.065	-0.068	-0.216	

Flecha Tot. el s. m x =0.000538

BARRA : 58 (33,36) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	-15.995	-2.243	
	m¡n.	-0.000	-15.995	-2.243	
	Flec.m x.	-0.000	-15.995	-2.243	
	m¡n.	-0.000	-15.995	-2.243	

Flecha Tot. el s. m x =0.000356

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	-5.995	46.738	
	m¡n.	-0.000	-5.995	46.738	
	Flec.m x.	-0.000	-5.995	46.738	
	m¡n.	-0.000	-5.995	46.738	

Flecha Tot. el s. m x =0.000751

BARRA : 59 (32,33) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.101	0.225	-0.020	
	m¡n.	0.101	0.225	-0.020	
	Cort.m x.	0.101	0.225	-0.020	
	m¡n.	0.101	0.225	-0.020	
	Flec.m x.	0.101	0.225	-0.020	
	m¡n.	0.101	0.225	-0.020	

Flecha Tot. el s. m x =0.000538

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.101	0.225	-0.696	
	m¡n.	0.101	0.225	-0.696	
	Cort.m x.	0.101	0.225	-0.696	
	m¡n.	0.101	0.225	-0.696	
	Flec.m x.	0.101	0.225	-0.696	
	m¡n.	0.101	0.225	-0.696	

Flecha Tot. el s. m x =0.000356

BARRA : 60 (33,34) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.101	-0.225	-0.696	
	m¡n.	-0.101	-0.225	-0.696	
	Cort.m x.	-0.101	-0.225	-0.696	
	m¡n.	-0.101	-0.225	-0.696	

Flec.m x.	-0.101	-0.225	-0.696	
m¡n.	-0.101	-0.225	-0.696	

Flecha Tot. el s. m x =0.000356

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.101	-0.225	-0.020	
	m¡n.	-0.101	-0.225	-0.020	
	Cort.m x.	-0.101	-0.225	-0.020	
	m¡n.	-0.101	-0.225	-0.020	
	Flec.m x.	-0.101	-0.225	-0.020	
	m¡n.	-0.101	-0.225	-0.020	

Flecha Tot. el s. m x =0.000538

BARRA : 61 (35,38) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.211	0.313	0.983	
	m¡n.	0.211	0.313	0.983	
	Cort.m x.	0.211	0.313	0.983	
	m¡n.	0.211	0.313	0.983	
	Flec.m x.	0.211	0.313	0.983	
	m¡n.	0.211	0.313	0.983	

Flecha Tot. el s. m x =0.001088

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	0.211	0.313	-0.271	
	m¡n.	0.211	0.313	-0.271	
	Cort.m x.	0.211	0.313	-0.271	
	m¡n.	0.211	0.313	-0.271	
	Flec.m x.	0.211	0.313	-0.271	
	m¡n.	0.211	0.313	-0.271	

Flecha Tot. el s. m x =0.000349

BARRA : 62 (34,37) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.045	-0.293	-0.317	
	m¡n.	-0.045	-0.293	-0.317	
	Cort.m x.	-0.045	-0.293	-0.317	
	m¡n.	-0.045	-0.293	-0.317	
	Flec.m x.	-0.045	-0.293	-0.317	
	m¡n.	-0.045	-0.293	-0.317	

Flecha Tot. el s. m x =0.000538

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.045	-0.293	0.857	
	m¡n.	-0.045	-0.293	0.857	
	Cort.m x.	-0.045	-0.293	0.857	
	m¡n.	-0.045	-0.293	0.857	
	Flec.m x.	-0.045	-0.293	0.857	
	m¡n.	-0.045	-0.293	0.857	

Flecha Tot. el s. m x =0.001088

BARRA : 63 (36,39) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	2.791	46.486	
	m¡n.	-0.000	2.791	46.486	
	Flec.m x.	-0.000	2.791	46.486	
	m¡n.	-0.000	2.791	46.486	

Flecha Tot. el s. m x =0.000751

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Cort.m x.	-0.000	12.791	20.322	
	m¡n.	-0.000	12.791	20.322	
	Flec.m x.	-0.000	12.791	20.322	
	m¡n.	-0.000	12.791	20.322	

Flecha Tot. el s. m x =0.000561

BARRA : 64 (35,36) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.126	-0.607	0.166	
	m¡n.	-0.126	-0.607	0.166	
	Cort.m x.	-0.126	-0.607	0.166	
	m¡n.	-0.126	-0.607	0.166	
	Flec.m x.	-0.126	-0.607	0.166	
	m¡n.	-0.126	-0.607	0.166	

Flecha Tot. el s. m x =0.001088

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.126	4.393	-4.264	
	m¡n.	-0.126	4.393	-4.264	
	Cort.m x.	-0.126	4.393	-4.264	
	m¡n.	-0.126	4.393	-4.264	
	Flec.m x.	-0.126	4.393	-4.264	
	m¡n.	-0.126	4.393	-4.264	

Flecha Tot. el s. m x =0.000751

BARRA : 65 (36,37) Sec. 4 Rect. /400,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.126	-4.393	-4.264	
	m¡n.	0.126	-4.393	-4.264	
	Cort.m x.	0.126	-4.393	-4.264	
	m¡n.	0.126	-4.393	-4.264	
	Flec.m x.	0.126	-4.393	-4.264	
	m¡n.	0.126	-4.393	-4.264	

Flecha Tot. el s. m x =0.000751

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.126	0.607	0.166	
	m¡n.	0.126	0.607	0.166	
	Cort.m x.	0.126	0.607	0.166	
	m¡n.	0.126	0.607	0.166	
	Flec.m x.	0.126	0.607	0.166	
	m¡n.	0.126	0.607	0.166	

Flecha Tot. el s. m x =0.001088

BARRA : 66 (38,42) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.152	0.539	0.012	
	m¡n.	0.152	0.539	0.012	
	Cort.m x.	0.152	0.539	0.012	
	m¡n.	0.152	0.539	0.012	
	Flec.m x.	0.152	0.539	0.012	
	m¡n.	0.152	0.539	0.012	

Flecha Tot. el s. m x =0.000349

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	0.152	0.539	-0.931	
	m¡n.	0.152	0.539	-0.931	
	Cort.m x.	0.152	0.539	-0.931	
	m¡n.	0.152	0.539	-0.931	
	Flec.m x.	0.152	0.539	-0.931	
	m¡n.	0.152	0.539	-0.931	

Flecha Tot. el s. m x =0.000017

BARRA : 67 (37,40) Sec. 1 Rect. /220,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.211	0.313	0.983	
	m¡n.	-0.211	0.313	0.983	
	Cort.m x.	-0.211	0.313	0.983	
	m¡n.	-0.211	0.313	0.983	
	Flec.m x.	-0.211	0.313	0.983	
	m¡n.	-0.211	0.313	0.983	

Flecha Tot. el s. m x =0.001088

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
4.00	Tor. m x.	-0.211	0.313	-0.271	
	m¡n.	-0.211	0.313	-0.271	
	Cort.m x.	-0.211	0.313	-0.271	
	m¡n.	-0.211	0.313	-0.271	
	Flec.m x.	-0.211	0.313	-0.271	
	m¡n.	-0.211	0.313	-0.271	

Flecha Tot. el s. m x =0.000349

BARRA : 68 (39,43) Sec. 3 Rect. /300,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	12.340	19.756	
	m¡n.	-0.000	12.340	19.756	
	Flec.m x.	-0.000	12.340	19.756	
	m¡n.	-0.000	12.340	19.756	

Flecha Tot. el s. m x =0.000561

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Cort.m x.	-0.000	12.340	-1.838	
	m¡n.	-0.000	12.340	-1.838	
	Flec.m x.	-0.000	12.340	-1.838	
	m¡n.	-0.000	12.340	-1.838	

Flecha Tot. el s. m x =0.000347

BARRA : 69 (38,39) Sec. 6 Rect. /288,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.283	-0.226	-0.059	
	m¡n.	-0.283	-0.226	-0.059	
	Cort.m x.	-0.283	-0.226	-0.059	
	m¡n.	-0.283	-0.226	-0.059	
	Flec.m x.	-0.283	-0.226	-0.059	
	m¡n.	-0.283	-0.226	-0.059	

Flecha Tot. el s. m x =0.000349

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.283	-0.226	0.618	
	m¡n.	-0.283	-0.226	0.618	
	Cort.m x.	-0.283	-0.226	0.618	
	m¡n.	-0.283	-0.226	0.618	
	Flec.m x.	-0.283	-0.226	0.618	
	m¡n.	-0.283	-0.226	0.618	

Flecha Tot. el s. m x =0.000561

BARRA : 70 (39,40) Sec. 6 Rect. /288,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.283	0.226	0.618	
	m¡n.	0.283	0.226	0.618	
	Cort.m x.	0.283	0.226	0.618	
	m¡n.	0.283	0.226	0.618	
	Flec.m x.	0.283	0.226	0.618	
	m¡n.	0.283	0.226	0.618	

Flecha Tot. el s. m x =0.000561

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.283	0.226	-0.059	
	m¡n.	0.283	0.226	-0.059	
	Cort.m x.	0.283	0.226	-0.059	

m¡n.	0.283	0.226	-0.059
Flec.m x.	0.283	0.226	-0.059
m¡n.	0.283	0.226	-0.059

Flecha Tot. el s. m x =0.000349

REACCIONES
==========

(Combinaciones con coeficientes unidad - servicio)

Nudo.	Hip¢tesis.	Momento X.	Fuerza Z.	Momento Y.
1	C 1	2.066	5.649	-2.577
2	C 1	-2.066	5.649	-2.577
18	C 1	-0.000	32.140	12.012
30	C 1	-0.000	33.144	-12.964
46	C 1	-0.000	6.709	3.528
47	C 1	-0.000	6.709	3.528

Resumen del control de calidad

RESUMEN DEL CONTROL DE CALIDAD

Cuadro resumen de ensayos de hormigón

Ensayo de placa con carga

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO P.S. 2

P.P.I. Nº 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
637	994	10/02/00	E-i Zapata	03020203	H-250	10	Fluida			3	342			100	09/03/00	I 42,5 S/SR	301	
637	995	10/02/00	E-d Zapata	03020203	H-250	5	Blanda			3	358			100	09/03/00	I 42,5 S/SR	301	
700	1103	29/02/00	E-d Alzado	03020203	H-250	6	Blanda			3	293			100	28/03/00	I 42,5 S/SR	250	
700	1104	29/02/00	E-d Alzado	03020203	H-250	7	Blanda			3	284			100	28/03/00	I 42,5 S/SR	250	
709	1122	02/03/00	E-i Alzado	03020203	H-250	8	Blanda			3	263			100	31/03/00	I 42,5 S/SR	231	
709	1123	02/03/00	E-i Alzado	03020203	H-250	8	Blanda			3	331			100	31/03/00	I 42,5 S/SR	231	
758	1216	24/03/00	Tablero	03020206	H-300	8	Blanda			3	362			100	24/04/00	II AL 42,5 R	304	
758	1217	24/03/00	Tablero	03020206	H-300	8	Blanda			3	346			100	24/04/00	II AL 42,5 R	304	

FECHA:

FIRMA:

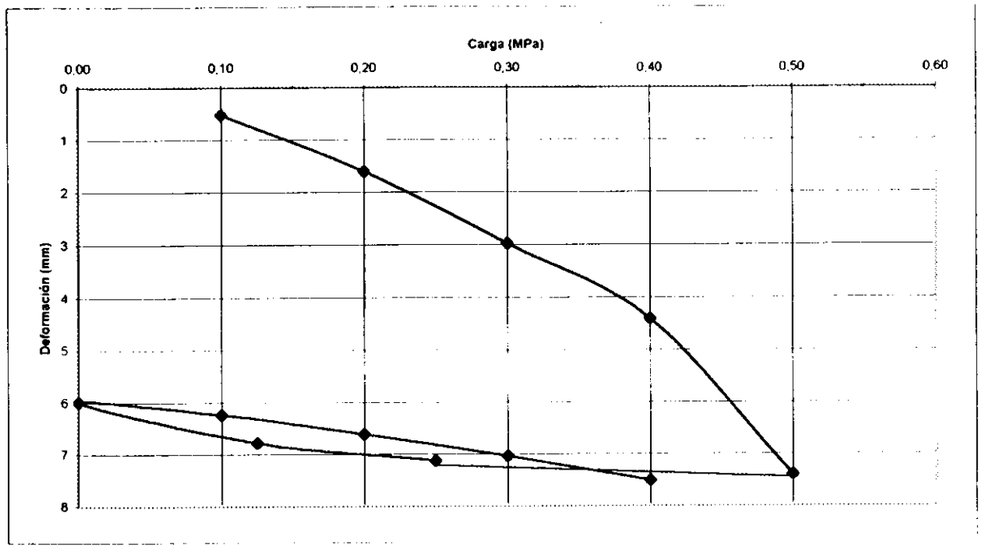
NOMBRE: Ana Mª Martín Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

SAITEC SYNCONSULT S.L. UNIÓN TEMPORAL DE EMPRESAS	**ENSAYO DE PLACA CON CARGA** (DIN 18 134) OBRA: **LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA** **SUB-TRAMO III**

LOCALIZACIÓN	P.S. 2 / E-d Trasdos		
CÓDIGO DE TRAMIFICACIÓN:	03020202		**PK** 306+000
FECHA:	05/05/00	**REF. MUESTRA:**	RE-08/ 33



Módulos			Especifi.
	Mpa	Kg/cm2	kg/cm2
Ev1	16,3	166,4	
Ev2	53,1	541,7	800
Ev2/Ev1	3,3		

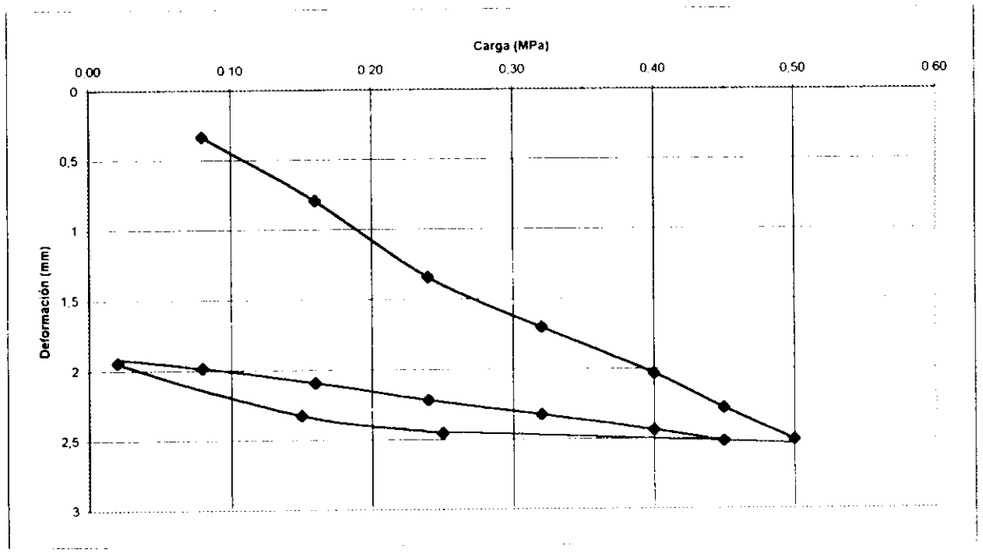
OBSERVACIONES

No cumple el P.P.T.P. No se aprueba la capa

Fecha	**Firma**	**Cargo**	JEFE DE LABORATORIO
		Nombre	ANA MARTIN HERRERO

SAITEC SYNCONSULT S.L. UNIÓN TEMPORAL DE EMPRESAS	**ENSAYO DE PLACA CON CARGA** (DIN 18 134) OBRA: **LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA** **SUB-TRAMO III**

LOCALIZACION	P.S. 2 / E-d Trasdos		
CÓDIGO DE TRAMIFICACIÓN:	03020202		**PK** 306+000
FECHA:	12/05/00	**REF. MUESTRA:**	RE-08/



Módulos			Especifi.
	Mpa	Kg/cm2	kg/cm2
Ev1	42	426	
Ev2	158	1609	800
Ev2/Ev1	3,78		

OBSERVACIONES

Fecha	**Firma**	**Cargo**	JEFE DE LABORATORIO
		Nombre	ANA MARTIN HERRERO

Paso Superior 3 (P.K. 307+037)

PASO SUPERIOR 3

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DESCRIPCIÓN Y CÁLCULOS

RESUMEN DEL CONTROL DE CALIDAD

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1. DESCRIPCION GENERAL

El paso superior 3 del P.K. 307 + 037 está constituida por tres vanos de 13 + 17 + 13 = 43 m.

La sección transversal tiene una distribución de calzadas de 1.35 + 3.05 + 3.05 + 1.35 = 8.80 .

La planta es recta y lleva pendientes decrecientes del 2 % en los dos sentidos, respecto del eje.

La estructura es de hormigón armado con sección trapezoidal aligerada, con una base de 3.00 m. de ancho y voladizos de 2.60 m., terminados en 0.18 m de espesor. El canto mínimo de la losa es de 1.10 m.

Los aligeramientos son tres de seccion circular de 0.60 m de diámetro.

Las dos pilas intermedias son de fuste único de 1.00 m. de diámetro y se empotran en el tablero.
Las zapatas de las pilas son de 4.00 x 4.00 x 1.50 m para una tensión admisible de 3.0 kp/cm^2

Los estribos son del tipo convencional con aletas voladas.
Tienen una altura de 6.5 m desde la rasante.

La separación de los dos apoyos elastoméricos dispuestos en los estribos es de 6.80 m para garantizar la estabilidad transversal del tablero.

La zapata del estribo es común a todo él con una latitud de 9.20 m. La dimensión longitudinal es de 4.5 m para una altura de 6.5 m.

Lleva aceras prefabricadas con barandilla y defensa elástica,así como valla antivandálica. Dichas aceras vuelan 0.30 m desde el borde de la losa.

Finalmente, se han dispuesto losas de transición de 5.00 x 0.30 m. de sección.

2. HIPOTESIS DE CALCULO Y PROCESO DE CONSTRUCCION .

Inicialmente, se estudia el tablero como emparrillado a fin de obtener el coeficiente de reparto transversal y los esfuerzos transversales de flexión, cortante y torsión.

Con el coeficiente de reparto transversal aplicado a la sobrecarga de tráfico, se calcula longitudinalmente el puente como pórtico, formado por viga-tablero,apoyado en los estribos y pilas y se determinan las secciones de armaduras pasivas longitudinales en primer lugar.

Las armaduras de cortante longitudinal y las de flexión y cortante transversal, se determinan por medio de los esfuerzos obtenidos anteriormente, en especial en las inmediaciones de los apoyos.

A partir de los valores anteriores, se calculan las pilas de soporte único con consideración del efecto de pandeo y sometidas a viento, frenado y acciones térmicas y de retracción.

Los estribos estarán sometidos a las cargas transmitidas por el tablero, tanto verticales como horizontales y las de empuje de tierras, para las hipótesis pésimas.

De acuerdo con la Norma sismorresistente NCS- 94, para esta zona y tipo de obra no es preciso la comprobación por el sismo.

La exposición de las acciones consideradas y los programas de cálculo usados ha sido indicada para el Paso superior 1, anteriormente, ya que sus características geométricas son similares.

El procedimiento constructivo es asimismo semejante.

3. NORMATIVA CONSIDERADA

Para el cálculo de esta estructura se ha considerado la siguiente

Normas:

Instrucción relativa a las acciones a considerar en los puentes de ferrocarril, IPF- 75

Instrucción relativa a las acciones a considerar en el proyecto de puentes de carretera, IAP- 96.

Instrucción para el proyecto y la ejecución de obras de hormigón en masa o armado (EH-91).

Instrucción para el proyecto y la ejecución de obras de hormigón pretensado (EP-93).

Norma de Construcción Sismorresistente NCS - 94.

4. RESISTENCIA DE LOS MATERIALES Y COEFICIENTE DE SEGURIDAD

Resistencia del hormigón H-300 para armar en fustes de pilas y losa_ tablero:

$f_{ck} = 300$ Kp/cm^2 ; $\gamma_c = 1.5$

Resistencia del hormigón H-250 en el resto de las estructuras, cimentaciones y estribos:

$f_{ck} = 250$ Kp/cm^2 ; $\gamma_c = 1.5$

Acero en armaduras pasivas AEH-500:

$f_{yk} = 5100$ Kp/cm^2 ; $\gamma_s = 1.15$

Coeficiente de seguridad de acciones:

Tablero y pilas: $\gamma_f = 1.5$
Resto: $\gamma_f = 1.6$

5. TABLERO

5.1. DESCRIPCION GENERAL

Está formado por tres vanos de hormigón armado.

Inicialmente, se hace un cálculo de emparrillado para determinar el coeficiente de reparto transversal, así como los esfuerzos locales en la losa. Con el coeficiente de reparto se estudia la losa como pórtico en un plano formado por el tablero como viga empotrada en las pilas cilindricas y apoyada en los estribos.

Se calculan, a continuación, las secciones en el sentido longitudinal y transversal y se determinan las hipótesis extremas.

Las armaduras pasivas se obtienen para las flexiones, los esfuerzos cortantes y se realiza la comprobación de la torsión.

Finalmente se estudiará especialmente las secciones en apoyos.

5.2. CALCULO LONGITUDINAL

Flexión en el centro del primer vano:

M = 364 mt

$A = f_{cd} \times bd\,(1 - (1 - 2 \times \gamma_f \times M/f_{cd}/b/d^2)^{1/2})/f_{cd}$

$f_{cd} = 3000/1.5 = 2000\ t/m^2$

$f_{yd} = 5.1/1.15 = 4.43\ t/cm^2$

$\gamma_f = 1.50$

b = 3 m

d = 1.1 m.

$A = 117\ cm^2 \rightarrow$

Flexión sobre la pila:

Ma = -555 mt

Aa = 182 cm2

En el centro del segundo vano:

Mc = 431 mt

Ac = 139 cm2

5.3. ESFUERZO CORTANTE LONGITUDINAL

Apoyos extremos:

V = 1.5 x 146.78 = 220 t

$V_c = 5 \times 200^{1/2} \times 3.00 \times 1.1 = 233\ t > V$

Apoyos interiores:

V = 1.5 X 228 = 342 t

$A_t = (342-233)/0.9/1.1/4.2 \times 0.20 = 5.24\ cm^2/0.20$

5.4. ESTUDIO TRANSVERSAL

- Cálculo de riostra en los apoyos extremos:

Flexión:

p = 100/ 8.2= 12.27 t/m

M = 12.27 x 6.8^2 /8+30x2.4 = 143 mt

$A = 48.68\ cm^2$

Cortante:

V = 1.5 x(12.27x 3.0 + 60x4.5/ 6) = 123 t

$V_c = 5 \times 200^{1/2} \times 1.06 = 75$ t

$A = (123- 75)/0.9/1.06/4.2/5 = 2.39\ cm^2 \rightarrow 3\ c\ \phi\ 10/0.2$

- Cálculo transversal sobre pilas

Flexión:

p = 402/3 = 134 t/m

$M = 134 \times 1.5^2/2 = 151$ mt,

En dos metros:

$A = 47.5$ cm^2

Esfuerzo cortante:

$V = 1.5 \times 134 \times 1 = 201$ t

$V_c = 5 \times 200^{1/2} \times 2 \times 1.1 = 155$ t

$A_t = (201 - 155)/0.9/1.1/4.2/5 = 2.18$ cm^2/0.2

- Torsión

$T_d = 1.5 \times (21.5 \times 0.4 \times 4.4^2/2 + 60 \times 2.9) = 385$ mt

$A_e = 2.89$ m^2

$T_{ul} = 0.36 \times 3000/1.5 \times 2.89 \times 0.192 = 399$ mt $> T_d$

Armadura transversal

$A_t = 385/2/2.89/4.2/5 = 3.17$ cm^2/0.20

Armadura longitudinal

$A_l = 3.17/4.43 \times 4.2 = 3.00$ cm^2/0.25

Estabilidad de apoyos extremos

Con carro ladeado.- Por torsión:

$R = \pm 385/1.5/7 = \pm 37$ t

Cargas verticales

$V = 88+60 = 148$ t

R = 148/2 ± 37

$R_1 = 111$t

$R_2 = 37$ t

Voladizos transversales

$M = 2.5 \times (0.18 \times 2 + 0.35) \times 2.35^2/6 + 0.6 \times 2.45^2/2 + .75 \times 1.5 \times (4.4 - 1.35/2 - 1.75) + 20/1.5 \times 1.15 = 20.98$ mt/m

$A = 24.24$ cm^2/m

$V = 1.5 \times (0.53 \times 2.5 \times 2.35/2 + 0.6 \times 2.45/2 + 1.125 + 10/15) = 15.12$ t/m

$V_c = 2.5 \times 200^{1/2} \times 0.32 \times (1 + 50 \times 0.00861) = 16.19$ t $> V$

5.5. EMPARRILLADO

A continuación, y por medio del programa TREBOL II se efectúa el cálculo del emparrillado necesario para la determinación del coeficiente de reparto transversal introducido en el cálculo longitudinal del tablero y la obtención de los esfuerzos para la disposición de las armaduras transversales y de torsión.

Se ha discretizado la losa disponiendo un total de 3 barras haces longitudinales más las de borde, y tramos transversales cada 1.75 m. aproximadamente, excepto en la zona de apoyos en la que se ha realizado una discretización mayor para poder analizar los efectos locales.

La discretización de las cargas superficiales se ha realizado asignando el área de influencia a nodos y las lineales y puntuales como cargas en barras.

En los resultados del programa se pueden observar las características y cargas asignadas a cada uno de las barras.

5.6. CALCULO DE LA VIGA-LOSA

En consecuencia con lo anterior, se considera el tablero como viga de tres vanos apoyados en los estribos y empotrados en las pilas.

Se adjuntan los cálculos realizados de la estructura resultante.

El programa efectúa el cálculo de los esfuerzos en las hipótesis extremas,que han sido utilizados ya anteriormente, para el cálculo de las armaduras .

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[GEOMETRY]

# MEMBERS	# JOINTS	# RESTRIC. JOINTS	E [Kg/cm2]	THERMAL C.
8	9	4	300000	.00001

JOINT COORDINATES

JOINT #	X [mt]	Y [mt]
1	13.00	0.00
2	30.00	0.00
3	0.00	11.10
4	6.50	11.10
5	13.00	11.10
6	21.50	11.10
7	30.00	11.10
8	36.50	11.10
9	43.00	11.10

TYPES OF SECTIONS

TYPE #	PROPERTIES (I,A)
1	0.04900000 - 0.78500003
2	0.55699998 - 4.30000020

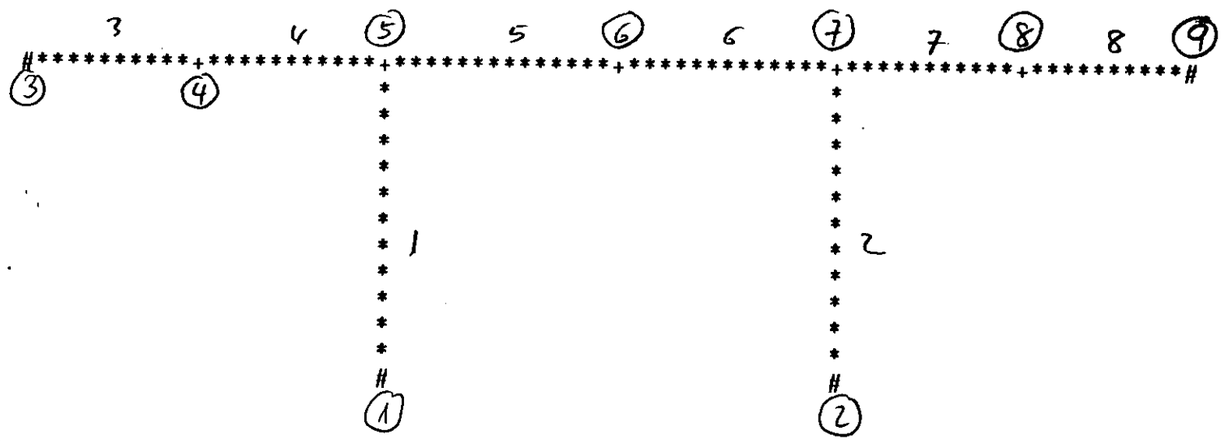
MEMBER INFORMATION, ORIENTATION AND PROPERTIES

MEMB #	End J	End K	TYPE	Inert [mt4]	Area [mt2]	Length	SIN	COS
1	1	5	1	0.04900000	0.78500003	11.10	1.000	0.000
2	2	7	1	0.04900000	0.78500003	11.10	1.000	0.000
3	3	4	2	0.55699998	4.30000020	6.50	0.000	1.000
4	4	5	2	0.55699998	4.30000020	6.50	0.000	1.000
5	5	6	2	0.55699998	4.30000020	8.50	0.000	1.000
6	6	7	2	0.55699998	4.30000020	8.50	0.000	1.000
7	7	8	2	0.55699998	4.30000020	6.50	0.000	1.000
8	8	9	2	0.55699998	4.30000020	6.50	0.000	1.000

RESTRICTED JOINTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	1	1	1
2	1	1	1
3	0	1	0
9	0	1	0

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CASE --> [DEAD LOAD]

GROUP # : 1 — VERTICAL LOADS

3 4 7 8

Dist. Loads : 1 — # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	14333	14333	0	6.5		

GROUP # : 2 — VERTICAL LOADS

5 6

Dist. Loads : 1 — # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	14333	14333	0	8.5		

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CASE --> [DEAD LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.000056	0.000000	-0.000463
4	0.000056	0.176014	0.000015
5	0.000056	0.112770	-0.000119
6	-0.000000	0.350089	0.000000
7	-0.000056	0.112770	0.000119
8	-0.000056	0.176014	-0.000015
9	-0.000056	0.000000	0.000463

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-239255	-854	3159
	5	-239255	-854	-6322
2	2	-239255	854	-3159
	7	-239255	854	6322
3	3	0	68904	-0
	4	0	-24260	145091
4	4	0	-24261	145092
	5	0	-117425	-315387
5	5	-854	121831	-321709
	6	-854	0	196071
6	6	-854	0	196071
	7	-854	-121830	-321709
7	7	0	117425	-315386
	8	0	24260	145091
8	8	0	24261	145091
	9	0	-68904	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-854	239255	3159
2	854	239255	-3159
3	0	68904	0
9	0	68904	0

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CASE --> [LIVE LOAD]

GROUP # : 1 VERTICAL LOADS

3

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5

Point Loads : 2

Point X	P
5	20000
6.5	20000

GROUP # : 2 VERTICAL LOADS

4

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5

Point Loads : 1

Point X	P
1.5	20000

GROUP # : 3 VERTICAL LOADS

7 8

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5

Point Loads : 0

Point X	P

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CASE --> [LIVE LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.042044	0.000000	-0.000462
4	-0.042044	0.191078	0.000007
5	-0.042044	0.030358	0.000294
6	-0.041941	-0.073180	-0.000019
7	-0.041837	0.009310	-0.000143
8	-0.041837	0.072663	0.000002
9	-0.041837	0.000000	0.000179

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-64409	1565	-4789
	5	-64409	1565	12587
2	2	-19753	-1565	6790
	7	-19753	-1565	-10585
3	3	0	45736	0
	4	0	-17144	192921
4	4	0	-17144	192921
	5	0	-60024	-92878
5	5	1565	4384	-80291
	6	1565	4384	-43025
6	6	1565	4384	-43025
	7	1565	4384	-5759
7	7	0	24137	-16344
	8	0	1257	66188
8	8	0	1257	66188
	9	0	-21623	-0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	1565	64409	-4789
2	-1565	19753	6790
3	0	45736	0
9	0	21623	0

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CASE --> [WIND LOAD]

GROUP # : 1 HORIZONTAL LOADS

1 2

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. Y	Final Y	Point Y	P
1	200	200	0	11.1		

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CASE --> [WIND LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.088380	0.000000	0.000002
4	0.088380	-0.001071	0.000001
5	0.088380	-0.000075	-0.000004
6	0.088380	0.000000	0.000002
7	0.088380	0.000075	-0.000004
8	0.088380	0.001071	0.000001
9	0.088380	0.000000	0.000002

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	158	2220	-8269
	5	158	-0	4052
2	2	-158	2220	-8269
	7	-158	-0	4052
3	3	0	-126	-0
	4	0	-126	-818
4	4	0	-126	-818
	5	0	-126	-1636
5	5	0	-284	2416
	6	0	-284	-0
6	6	0	-284	0
	7	0	-284	-2416
7	7	-0	-126	1636
	8	-0	-126	818
8	8	0	-126	818
	9	0	-126	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	2220	-158	-8269
2	2220	158	-8269
3	0	-126	0
9	0	126	0

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CASE --> [SEISMIC LOAD]

GROUP # : 1 — VERTICAL LOADS

5

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	8.5
2				

Point Loads : 2

Point X	P
7	20000
8.5	20000

GROUP # : 2 — VERTICAL LOADS

6

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	8.5

Point Loads : 1

Point X	P
1.5	20000

GROUP # : 3 — VERTICAL LOADS

3 4

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5

Point Loads : 0

Point X	P

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CASE --> [SEISMIC LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.000163	0.000000	0.000135
4	0.000163	-0.061679	0.000015
5	0.000163	0.032719	-0.000345
6	0.000000	0.312130	0.000000
7	-0.000163	0.032719	0.000345
8	-0.000163	-0.061679	-0.000015
9	-0.000163	0.000000	-0.000135

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-69417	-2470	9135
	5	-69417	-2470	-18281
2	2	-69417	2470	-9135
	7	-69417	2470	18281
3	3	0	-9497	-0
	4	0	-9497	-61729
4	4	0	-9497	-61729
	5	0	-9497	-123458
5	5	-2470	59920	-141739
	6	-2470	-10000	210421
6	6	-2470	-10000	210421
	7	-2470	-59920	-141739
7	7	0	9497	-123458
	8	0	9497	-61729
8	8	0	9497	-61729
	9	0	9497	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-2470	69417	9135
2	2470	69417	-9135
3	0	-9497	0
9	0	-9497	0

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CASE --> [SEISMIC LOAD]

GROUP # : 1 VERTICAL LOADS

5

Dist. Loads : 1 # Point Loads : 2

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	8.5	7	20000
2					8.5	20000

GROUP # : 2 VERTICAL LOADS

6

Dist. Loads : 1 # Point Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	8.5	1.5	20000

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CASE --> [SEISMIC LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.000163	0.000000	0.000135
4	0.000163	-0.061679	0.000015
5	0.000163	0.032719	-0.000345
6	0.000000	0.312130	0.000000
7	-0.000163	0.032719	0.000345
8	-0.000163	-0.061679	-0.000015
9	-0.000163	0.000000	-0.000135

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-69417	-2470	9135
	5	-69417	-2470	-18281
2	2	-69417	2470	-9135
	7	-69417	2470	18281
3	3	0	-9497	-0
	4	0	-9497	-61729
4	4	0	-9497	-61729
	5	0	-9497	-123458
5	5	-2470	59920	-141739
	6	-2470	-10000	210421
6	6	-2470	-10000	210421
	7	-2470	-59920	-141739
7	7	0	9497	-123458
	8	0	9497	-61729
8	8	0	9497	-61729
	9	0	9497	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-2470	69417	9135
2	2470	69417	-9135
3	0	-9497	0
9	0	-9497	0

LAVPAS3
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CASE --> [TEMPERATURE]

GROUP # : 1

5

THERMAL C. : .00001

Uniform 'T' Change : 65 Linear Gradient 'T'/H : 0

GROUP # : 2

6

THERMAL C. : .00001

Uniform 'T' Change : 65 Linear Gradient 'T'/H : 0

LAVPAS3
JUNIO 1998

CASE --> [TEMPERATURE]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.552052	0.000000	-0.000030
4	-0.552052	0.014669	-0.000007
5	-0.552052	-0.000866	0.000063
6	0.000009	-0.027481	0.000000
7	0.552069	-0.000866	-0.000063
8	0.552069	0.014669	0.000007
9	0.552069	0.000000	0.000030

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	1838	-6672	37860
	5	1838	-6672	-36201
2	2	1838	6672	-37861
	7	1838	6672	36203
3	3	0	1838	0
	4	0	1838	11945
4	4	0	1838	11945
	5	0	1838	23891
5	5	-6673	-0	-12310
	6	-6673	-0	-12311
6	6	-6674	-0	-12311
	7	-6674	-0	-12311
7	7	0	-1838	23891
	8	0	-1838	11946
8	8	0	-1838	11946
	9	0	-1838	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-6672	-1838	37860
2	6672	-1838	-37861
3	0	1838	0
9	0	1838	0

6. PILAS

6.1. DESCRIPCION GENERAL

Se trata de soportes empotrados en el tablero y en la zapata.

La sección es circular con un diámetro de 1 m.

Las cargas verticales son las del tablero, cargas permanentes y sobrecargas tanto de frenado como la transmitida por la deformación de apoyos debida a las acciones térmicas y reológicas

El viento afecta a tablero y pila.

Con estas acciones se calculan los esfuerzos en soportes y zapatas y se determinan sus armaduras.

En la zapata se hallarán las tensiones en el suelo (< 3.5 kp/cm^2).

6.2. CARGAS

Verticales (h = 10.5 m.)

Reacciones máximas

Peso propio:	225 t	
Carga muerta:	58 t	283 t
Sobrecarga:	119 t	402 t
Soporte:		
2.5 x 0.785 x 10.5x 1 =	21 t	423 t

Horizontal

Frenado: $F_1 = 119/20 = 5.95\ t < 6$

Deformación : $\Delta = 0.65 \times 8.5 = 5.5$ mm.

$F_2 = 0.0055/(10.5^3/6/3/10^6/(\pi \times 0.5^4/4)) =$

$= 4.2$ t

$F = 6 + 4.2 = 10.2$ t

Viento:

Tablero: 0.2 x 3 x 15 = 9 t

Soporte: 0.2 x 10.5x 1 = 2.1t

6.3. PANDEO

Esfuerzos en arranque:

$M_x = 9 \times 11.1 + 2.1 \times 5.25 = 111$ m

$M_y = 10.2 \times 10.5/2 = 53.5$ mt

$N = 423 \times 0.9 = 381$ t

$M = 0.9 \times (M_x^2 + M_y)^{1/2} = 111$ mt

$e_o = 0.291 \times 0.6 = 0.175$ m

$e_a = (0.85 + 4000/12000) \times (20 \times 0.175 + 1)/(10 \times 0.175 + +1) \times 10.5^2/0.25 \times 10^4 = 0.086$ m

$e = 0.175 + 0.086 = 0.261$ m < 0.291 m $\quad f_{cd} = 1800$ t/m^2

$M = 0.33 \times 382 = 126$ mt

$\mu = 1.5 \times 111/1800/0.785/1 = 0.118$

$\nu = 0.9 \times 381/1800/0.785/1 = 0.243\ (0.405)$

$A = 0.16 \times 1800 \times 0.785/4 = 60$ cm$^2 \rightarrow 12\ \phi\ 25$

6.4. ZAPATAS

$M_x = 9 \times 12.6 + 2.1 \times 6.75 = 128$ mt

$e_x = 0.294$ m $\rightarrow l_x = 2 - e_x = 1.705$m

$M_y = 10.2 \times 13/2 = 66.3$ mt

$e_y = 0.152$m $\rightarrow l_y = 2 - e_y = 1.847$ m

$N = 381 + 2.5 \times 4 \times 4 \times 1.5 * .9 = 435$ t

$\sigma = N/4/(l_x)/l_y = 34$ t/m^2

$< 1.25 \times 30$ t/m2 $= 37.5$ t/m2

$M = (34 - 3{,}75) \times 1.65^2/2 = 41.2$ mt

$A_{min.} = 22{,}5$ cm^2/m

$V = 1.6 \times 30.25 \times 0.9 = 43.6$ t/m

$V_c = 5 \times 167^{1/2} \times 1.45 = 93{,}7$ t/m > V

7. ESTRIBOS

7.1.1 **SIN** PUENTE

DATOS

Muro	H = 6.50 m
Puntera	A= 1.00 m
Espesor del muro	B= 1.50 m
Talón	C =2.00 m
Espesor de zapata	D = 1.00 m
Angulo de rozamiento interno	$\phi = 30°$
Densidad de las tierras	$\gamma = 2$ t/m^3
Sobrecarga equivalente de tierras	$H_0 = 0.5$ m
Fuerza vertical en cabeza	R = 0 t/m
Fuerza horizontal en cabeza	F = 0 t/m
Momento exterior en cabeza	$M_0 = 0$ mt/m
Resistencia minorada del hormigón	$F_c = 1500$ t/m^2
Resistencia minorada del acero	$F_y = 4.43$ t/cm^2
Coeficiente de seg. de acciones	$\gamma_f = 1.6$
Coeficiente sísmico	SM = 0

RESULTADOS

Coeficiente de seguridad al deslizamiento	$C_s = 1.791$
Coeficiente de seguridad al vuelco	$C_v = 3.11$
Presión en el terreno	$\sigma =$ 18.33 t/m2
Momento en arranque de muro	M_m=37.55mt/m
Armadura en arranque de muro	A_m =9.4cm2/m
Momento en puntera	M_p = 7.91mt/m
Armadura en puntera	A_p = 3.0cm2/m
Momento en talón	M_t = 24 mt/m
Armadura en talón	A_t = 9.6mt/m

7.1.2. CON PUENTE

DATOS

Muro	***H = 6.5 m***
Puntera	A = 1.00 m
Espesor del muro	B =1.50 m
Talón	C =2.00 m
Espesor de zapata	D =1.00 m
Angulo de rozamiento interno	$\phi = 30^o$
Densidad de las tierras	$\gamma = 2$ t/m^3
Sobrecarga equivalente de tierras	H_0= 0.50 m
Fuerza vertical en cabeza	R = 20 t/m
Fuerza horizontal en cabeza	F = 1 t/m
Momento exterior en cabeza	M_0 = 0 mt/m
Resistencia minorada del hormigón	F_c = 1500 t/m^2
Resistencia minorada del acero	F_y = 4.43 t/cm^2
Coeficiente de seg. de acciones	γ_f = 1.6
Coeficiente sísmico	SM = 0

RESULTADOS

Coeficiente de seguridad al deslizamiento	C_s = 2.133
Coeficiente de seguridad al vuelco	C_v =2.874
Presión en el terreno	σ = 27.6 t/m2
Momento en arranque de muro	M_m = 50.1 mt/m
Armadura en arranque de muro	A_m = 10.1 cm2/m
Momento en puntera	M_p = 12.6mt/m
Armadura en puntera	A_p = 4.8 cm2/m
Momento en talón	M_t = 30 mt/m
Armadura en talón	A_t = 10.2cm2/m

7.3. ALETAS.

Lal: 5x4 m

Malmax =0.75x2x(4-1)^2= 13.5 mt/m

Aalmax = 6.49 cm2/m

7.4 APOYOS ELASTOMÉRICOS.

Deformación por retracción y térmica :

Le = (.25 + .40(40°))xL = 14 mm

Reacciones extremas:

Rmax= 112 t
Rmin = 36 t

Para un apoyo de 300x400x56

σ max= 112/0.12 /10=93.3 kg/cm2 < 150 kg/cm2
σ min = 36/0.12/10= 30 kg/cm^2 = 30 kg/cm2

Altura del apoyo : 14/0.7 =20 mm< 56 mm

8. PRUEBA DE CARGA

8.1. CALCULO DE LA CARGA

Como tren de cargas de la prueba se utiliza una carga uniformemente distribuida de valor:

q = 0.75 (0.4 + 120/(BxL))

Vanos 1 y 3

B = 13.00 m.
L = 8,8 m.
q = 0.75 (0.4 + 120/(13.00 x 8.80)) = 1.09 t/m^2

Por tanto, la carga total:

$Q = 1.09 \times 13.00 \times 8.80 = 124$ t.

Se utilizan camiones de 33 t. de carga total, por tanto el número máximo será:

$N = 124/33 \rightarrow 3$ camiones. Sólo caben dos camiones.

Vano 2

$B = 17$ m.
$L = 8.80$ m.
$q = 0.75\ (0.4 + 120/(17 \times 8.80)) = 0.9$ t/m^2

Por tanto, la carga total:

$Q = 0.9 \times 17 \times 8.80 = 135$ t.

Se utilizan camiones de 33 t. de carga total, por tanto el número máximo será:

$N = 135/33 \rightarrow 4$ camiones.

8.2. MEDICION DE FLECHAS.

Vanos 1 y 3

$f_{Máx} = 0.00191$m.

Vano 2

$f_{Máx} = 0.00770$m.

Estas flechas son debidas sólo a la sobrecarga de camiones.

8.3. ESFUERZOS.

Vanos 1 y 3

$M_{máx} = 19.13$ mt/m

Vanos 2 y 3

$M_{máx} = 18.16$ mt/m

8.4. REACCIONES.

$R_{Máx} = 145$ t.

A continuación se presentan los resultados del cálculo del emparrillado relativos a la prueba de carga.

Resumen del control de calidad

RESUMEN DEL CONTROL DE CALIDAD

Cuadro resumen de ensayos de hormigón

ASAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO P.S. 3

P.P.I. Nº 20

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
346	520	28/09/99	Zap E,d	03020303	H-250	10	Fluida			3	323			100	26/10/99	I 42,5 S/SR	246	
346	521	28/09/99	Zap E,i	03020303	H-250	7	Blanda			3	280			100	26/10/99	I 42,5 S/SR	246	
372	555	05/10/99	Zap P,d	03020303	H-250	8	Blanda			3	300			100	05/11/99	I 42,5 S/SR	264	
471	709	12/11/99	Pila dcha	03020304	H-300	7	Blanda			3	422			16	10/12/99	II AL 42,5 R	403	
520	795	28/12/99	E-d Alzado	03020303	H-250	8	Blanda			3	333			100	25/01/00	I 42,5 S/SR	291	
520	796	28/12/99	E-d Alzado	03020303	H-250	7	Blanda			3	331			100	25/01/00	I 42,5 S/SR	291	
543	838	13/01/00	E-i Alzado	03020303	H-250	7	Blanda			3	324			90	10/02/00	I 42,5 S/SR	265	
543	839	13/01/00	E-i Alzado	03020303	H-250	7	Blanda			3	301			90	10/02/00	I 42,5 S/SR	265	
623	971	08/02/00	Tablero	03020306	H-300	7	Blanda			3	375			100	07/03/00	II AL 42,5 R	316	
623	972	08/02/00	Tablero	03020306	H-300	6	Blanda			3	359			100	07/03/00	II AL 42,5 R	316	
624	973	08/02/00	Tablero	03020306	H-300	7	Blanda			3	365			95	07/03/00	II AL 42,5 R	319	
624	974	08/02/00	Tablero	03020306	H-300	6	Blanda			3	362			95	13/03/00	II AL 42,5 R	319	

FECHA:

FIRMA:

NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

Paso Superior 4 (P.K. 307+520)

PASO SUPERIOR 4

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RESUMEN DEL CONTROL DE CALIDAD

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1. DESCRIPCION GENERAL

El paso superior 4 del P.K. 307+520 está constituida por tres vanos de 13 + 17 + 13 = 43 m.

La sección transversal tiene una distribución de calzadas de 1.35 + 10 + 1.35 = 12.7 m .

La planta es recta y lleva pendientes decrecientes del 2 % en los dos sentidos, respecto del eje.

La estructura es de hormigón armado con sección trapezoidal aligerada, con una base de 6.00 m. de ancho y voladizos de 2.80 m., terminados en 0.18 m de espesor. El canto mínimo de la losa es de 1.10 m.

Los aligeramientos son cinco de seccion circular de 0.60 m de diámetro.

Las dos pilas intermedias son de fuste único de 1.00 m. de diámetro y se empotran en el tablero.
Las zapatas de las pilas son de 6.00 x 4.00 x 1.50 m para una tensión admisible de 3.5 kp/cm^2

Los estribos son del tipo convencional con aletas voladas.

La separación de los dos apoyos elastoméricos dispuestos en los estribos es de 8.00 m para garantizar la estabilidad transversal del tablero.

La zapata del estribo es común a todo él, con una sección longitudinal de 4.50 x 1.00 m. y transversal de 13.1 m. y altura de muro de 6.50 m.

Lleva aceras prefabricadas con barandilla y defensa elástica,así como valla antivandálica. Dichas aceras vuelan 0.30 m desde el borde de la losa.

Finalmente, se han dispuesto losas de transición de 5.00 x 0.30 m. de sección.

2. HIPOTESIS DE CALCULO Y PROCESO DE CONSTRUCCION .

Inicialmente, se estudia el tablero como emparrillado a fin de obtener el coeficiente de reparto transversal y los esfuerzos transversales de flexión, cortante y torsión.

Con el coeficiente de reparto transversal aplicado a la sobrecarga de tráfico, se calcula longitudinalmente el puente como pórtico, formado por viga-tablero,apoyado en los estribos y pilas y se determinan las secciones de armaduras pasivas longitudinales en primer lugar.

Las armaduras de cortante longitudinal y las de flexión y cortante transversal, se determinan por medio de los esfuerzos obtenidos anteriormente, en especial en las inmediaciones de los apoyos.

A partir de los valores anteriores, se calculan las pilas de soporte único con consideración del efecto de pandeo y sometidas a viento, frenado y térmicas y reológica.

Los estribos estarán sometidos a las cargas transmitidas por el tablero, tanto verticales como horizontales y las de empuje de tierras, para las hipótesis pésimas.

De acuerdo con la Norma sismorresistente NCS- 94, para esta zona y tipo de obra no es preciso la comprobación por el sismo.

En cuanto a la determinación de las acciones consideradas,al ser el tablero mas ancho, tanto su peso propio como como el resto de sus cargas, quedarán Modificadas de esta forma:

Area de la sección aligerada:

12.10x0.0605	= 0.732 m2 /m
12.10x0.18	= 2.178 "
9.30x0.164	= 1.522 "
6.25x0.756	= 4.725 "
- 5x0.785x0.36	=-1.413 "

Area total : 7.744 m2 /m

Peso propio 2.5x 7.744	=	19.360 t / m	
Pavimento 0.2x10.00	=	2.000 "	
Aceras 2x 1.00	=	2.000 "	
Resto:Barandillas,etc	=	0.250 "	23.261 t / m

De igual forma que en los Pasos superiores 1, 2, 3 y 6, se han usados los programas TREBOL II y PFRAME y se hicieron las mismas hipótesis de carga.

Los estribos y el procedimiento constructivo se realizarán de similar manera.

3. NORMATIVA CONSIDERADA

Para el cálculo de esta estructura se ha considerado la siguiente

Normas:

Instrucción relativa a las acciones a considerar en los puentes de ferrocarril, IPF- 75

Instrucción relativa a las acciones a considerar en el proyecto de puentes de carretera, IAP- 96.

Instrucción para el proyecto y la ejecución de obras de hormigón en masa o armado (EH-91).

Instrucción para el proyecto y la ejecución de obras de hormigón pretensado (EP-93).

Norma de Construcción Sismorresistente NCS - 94.

4. RESISTENCIA DE LOS MATERIALES Y COEFICIENTE DE SEGURIDAD

Resistencia del hormigón H-300 para armar en fustes de pilas y losa_ tablero:

$f_{ck} = 300$ Kp/cm^2 ; $\gamma_c = 1.5$

Resistencia del hormigón H-250 en el resto de las estructuras, cimentaciones y estribos:

$f_{ck} = 250$ Kp/cm^2 ; $\gamma_c = 1.5$

Acero en armaduras pasivas AEH-500:

$f_{yk} = 5100$ Kp/cm^2 ; $\gamma_s = 1.15$

Coeficiente de seguridad de acciones:

Tablero y pilas: $\gamma_f = 1.5$
Resto: $\gamma_f = 1.6$

5. TABLERO

5.1. DESCRIPCION GENERAL

Está formado por tres vanos de hormigón armado.

Inicialmente, se hace un cálculo de emparrillado para determinar el coeficiente de reparto transversal, así como los esfuerzos locales en la losa. Con el coeficiente de reparto se estudia la losa como pórtico en un plano formado por el tablero como viga empotrada en las pilas cilíndricas y apoyada en los estribos.

Se calculan, a continuación, las secciones en el sentido longitudinal y transversal y se determinan las hipótesis extremas.

Las armaduras pasivas se obtienen para las flexiones, los esfuerzos cortantes y se realiza la comprobación de la torsión.

Finalmente se estudiará especialmente las secciones en apoyos.

5.2. CALCULO LONGITUDINAL

Flexión en el centro del primer vano:

M = 455 mt

$A = f_{cd} \times bd\,(1 - (1 - 2 \times \gamma_f \times M/f_{cd}/b/d^2)^{1/2})/f_{cd}$

$f_{cd} = 3000/1.5 = 2000\ t/m^2$

$f_{yd} = 5.1/1.15 = 4.43\ t/cm^2$

$\gamma_f = 1.50$

b = 6 m

d = 1.1 m.

$A = 160\ cm^2 \rightarrow$

Flexión sobre la pila:

Ma = -746 mt

Aa = 250 cm2

En el centro del segundo vano:

Mc = 551 mt

Ac = 181cm2

5.3. ESFUERZO CORTANTE LONGITUDINAL

Apoyos extremos:

V = 1.5 x 202 = 302 t

$V_c = 5 \times 200^{1/2} \times 6.00 \times 1.1 = 466\ t > V$

Apoyos interiores:

V = 1.5 X 303 = 455 t

A 1 m del apoyo :

Vl= 1.5x (215+48) = 394 t

Vcl= 5x200 ^.5x3.25x1.1= 253 t

$A_{tl} = (394-253)/0.9/1.1/4.2 \times 0.20 = 6.782\ cm^2/0.20$

5.4. ESTUDIO TRANSVERSAL

- **Cálculo de riostra en los apoyos extremos:**

Flexión:

p = 142/ 9= 15.7 t/m

M = 15.7 x 8^2 /8+30x3 = 216 mt

$A = 72\ cm^2$

Cortante:

V = 1.5 x(15.7x 3.5 + 60x5.5/ 7) = 153 t

$V_c = 5 \times 200^{1/2} \times 1.06 = 75$ t

$A = (153- 75)/0.9/1.06/4.2/5 = 3.9\ cm^2 \rightarrow 3\ c\ \phi\ 10/0.2$

- **Cálculo transversal sobre pilas**

Flexión:

p = 540/6 = 90.15 t/m

M = 90.15 x 2.15^2/2 = 209 mt,

En dos metros:

A = 76 cm^2

Esfuerzo cortante:

V = 1.5 x 90.15x 2 = 270 t

$V_c = 5 \times 200^{1/2} \times 2 \times 1.1 = 155$ t

A_t = (270 - 155)/0.9/1.1/4.2/5 = 5.53 cm^2/0.2

- Torsión

T_d = 1.5 x (21.5 x 0.4 x 6.35^2/2 + 60 x 4.85) =696 mt

A_c = 5.56 m^2

T_{ul} = 0.36 x 3000/1.5 x 5.56 x 0.192 = 768 mt > T_d

Armadura transversal

A_t = 696/2/5.56/4.2/5 = 2.98 cm^2/0.20

Armadura longitudinal

A_l = 2.98/4.43 x 4.2 = 2.82 cm^2/0.25

Estabilidad de apoyos extremos

Con carro ladeado.- Por torsión:

R = ± 696/1.5/8= ± 58 t

Cargas verticales

V = 142+60 = 202 t

R = 202/2 ± 58

R_1 = 159 t

R_2 = 42 t

Voladizos transversales

M = 2.5 x (0.18 x 2 + 0.4) x 2.8^2/6 + 0.6 x 2.95^2/2 + .75 x 1.5x(6.35-1.35/2-3.25)+ 20/1.5 x 1 = 21.16 mt/m

A = 21.29 cm^2/m

E. cortante:

V = 1.5 x (0.58 x 2.5 x 2.8/2 + 0.6 x 2.95/2 + 1.125 + 10/15) = 16.06 t/m

$V_c = 2.5 \times 200^{1/2} \times 0.36 \times (1 + 50 \times 0.0075) = 17.5$ t > V

5.5. EMPARRILLADO

A continuación, y por medio del programa TREBOL II se efectúa el cálculo del emparrillado necesario para la determinación del coeficiente de reparto transversal introducido en el cálculo longitudinal del tablero y la obtención de los esfuerzos para la disposición de las armaduras transversales y de torsión.

Se ha discretizado la losa disponiendo un total de 3 barras haces longitudinales más las de borde, y tramos transversales cada 1.75 m. aproximadamente, excepto en la zona de apoyos en la que se ha realizado una discretización mayor para poder analizar los efectos locales.

La discretización de las cargas superficiales se ha realizado asignando el área de influencia a nodos y las lineales y puntuales como cargas en barras.

En los resultados del programa se pueden observar las características y cargas asignadas a cada uno de las barras.

Programa T R E B O L - II Paso Superior P.K. 307+520
TOOL S.A.

Fecha 28 - 6 - 98

T I T U L O D E L A O B R A
==========

Paso Superior P.K. 307+520

P R O P I E D A D
==========

P R O Y E C T O
==========

Programa T R E B O L - II Paso Superior P.K. 307+520
TOOL S.A.

M A T E R I A L E S

No.	Mod.Young	Mod.Poisson	Peso espec.	Coef.Dilataci¢n
1	3290896.500	0.200	2.500	0.000010

Hormig¢n rest. caract. Fck = 300 Kp./cm2.

S E C C I O N E S

Unidades en m.

No.	Tipo.	Ancho.	Canto.
1	Rectg.	2.100	0.220
2	Rectg.	0.500	1.100
3	Rectg.	2.000	1.100
4	Rectg.	2.500	1.100
5	Rectg.	1.375	0.220
6	Rectg.	1.875	0.220

C A R A C T E R I S T I C A S R E S I S T E N T E S S E C C I O N E S

Unidades en m.

No.	Area.	Mmto.In.	S.Cortante	M.I.Tors.
1	4.620E-01	1.863E-03	3.850E-01	7.454E-03
2	5.500E-01	5.546E-02	4.583E-01	3.419E-02
3	2.200E+00	2.218E-01	1.833E+00	6.131E-01
4	2.750E+00	2.773E-01	2.292E+00	8.363E-01
5	3.025E-01	1.220E-03	2.521E-01	4.880E-03
6	4.125E-01	1.664E-03	3.438E-01	6.655E-03

N U D O S

Unidades en m.

Nudo.	X.	Y.
1	0.000	1.050
2	0.000	11.050
3	0.250	0.000
4	0.250	1.050
5	0.250	4.050
6	0.250	6.050
7	0.250	8.050
8	0.250	11.050
9	0.250	12.100
10	1.000	1.050
11	1.000	4.050
12	1.000	6.050
13	1.000	8.050
14	1.000	11.050
15	3.000	1.050
16	3.000	4.050
17	3.000	6.050
18	3.000	8.050
19	3.000	11.050
20	5.000	1.050
21	5.000	4.050
22	5.000	6.050
23	5.000	8.050
24	5.000	11.050
25	7.000	1.050
26	7.000	4.050

Nudo.	X.	Y.
27	7.000	6.050
28	7.000	8.050
29	7.000	11.050
30	9.000	1.050
31	9.000	4.050
32	9.000	6.050
33	9.000	8.050
34	9.000	11.050
35	11.000	1.050
36	11.000	4.050
37	11.000	6.050
38	11.000	8.050
39	11.000	11.050
40	13.000	1.050
41	13.000	4.050
42	13.000	6.050
43	13.000	8.050
44	13.000	11.050
45	15.000	1.050
46	15.000	4.050
47	15.000	6.050
48	15.000	8.050
49	15.000	11.050
50	17.000	1.050
51	17.000	4.050
52	17.000	6.050
53	17.000	8.050
54	17.000	11.050
55	19.000	1.050
56	19.000	4.050
57	19.000	6.050
58	19.000	8.050
59	19.000	11.050
60	21.000	1.050
61	21.000	4.050
62	21.000	6.050
63	21.000	8.050
64	21.000	11.050
65	23.000	1.050
66	23.000	4.050
67	23.000	6.050
68	23.000	8.050
69	23.000	11.050
70	25.000	1.050
71	25.000	4.050
72	25.000	6.050
73	25.000	8.050
74	25.000	11.050
75	27.000	1.050
76	27.000	4.050

Nudo.	X.	Y.
77	27.000	6.050
78	27.000	8.050
79	27.000	11.050
80	29.000	1.050
81	29.000	4.050
82	29.000	6.050
83	29.000	8.050
84	29.000	11.050
85	31.000	1.050
86	31.000	4.050
87	31.000	6.050
88	31.000	8.050
89	31.000	11.050
90	33.000	1.050
91	33.000	4.050
92	33.000	6.050
93	33.000	8.050
94	33.000	11.050
95	35.000	1.050
96	35.000	4.050
97	35.000	6.050
98	35.000	8.050
99	35.000	11.050
100	37.000	1.050
101	37.000	4.050
102	37.000	6.050
103	37.000	8.050
104	37.000	11.050
105	39.000	1.050
106	39.000	4.050
107	39.000	6.050
108	39.000	8.050
109	39.000	11.050
110	41.000	1.050
111	41.000	4.050
112	41.000	6.050
113	41.000	8.050
114	41.000	11.050
115	42.750	-0.000
116	42.750	1.050
117	42.750	4.050
118	42.750	6.050
119	42.750	8.050
120	42.750	11.050
121	42.750	12.100
122	43.000	1.050
123	43.000	11.050

B A R R A S

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
1	120	123	1	1	1	0.25	288.8
2	1	4	1	1	1	0.25	288.8
3	2	8	1	1	1	0.25	288.7
4	4	10	1	1	1	0.75	866.3
5	8	9	1	2	1	1.05	1443.8
6	7	8	1	2	1	3.00	4125.0
7	3	4	1	2	1	1.05	1443.8
8	116	122	1	1	1	0.25	288.8
9	114	120	1	1	1	1.75	2021.3
10	115	116	1	2	1	1.05	1443.8
11	116	117	1	2	1	3.00	4125.0
12	120	121	1	2	1	1.05	1443.8
13	5	6	1	2	1	2.00	2750.0
14	118	119	1	2	1	2.00	2750.0
15	6	12	1	3	1	0.75	4125.0
16	6	7	1	2	1	2.00	2750.0
17	119	120	1	2	1	3.00	4125.0
18	7	13	1	4	1	0.75	5156.3
19	4	5	1	2	1	3.00	4125.0
20	117	118	1	2	1	2.00	2750.0
21	5	11	1	4	1	0.75	5156.3
22	40	45	1	1	1	2.00	2310.0
23	39	44	1	1	1	2.00	2310.0
24	41	46	1	4	1	2.00	13750.0
25	42	47	1	3	1	2.00	11000.0
26	43	48	1	4	1	2.00	13750.0
27	40	41	1	3	1	3.00	16500.0
28	41	42	1	3	1	2.00	11000.0
29	42	43	1	3	1	2.00	11000.0
30	43	44	1	3	1	3.00	16500.0
31	35	40	1	1	1	2.00	2310.0
32	34	39	1	1	1	2.00	2310.0
33	36	41	1	4	1	2.00	13750.0
34	37	42	1	3	1	2.00	11000.0
35	38	43	1	4	1	2.00	13750.0
36	35	36	1	3	1	3.00	16500.0
37	36	37	1	3	1	2.00	11000.0
38	37	38	1	3	1	2.00	11000.0
39	38	39	1	3	1	3.00	16500.0
40	30	35	1	1	1	2.00	2310.0
41	29	34	1	1	1	2.00	2310.0
42	31	36	1	4	1	2.00	13750.0
43	32	37	1	3	1	2.00	11000.0
44	33	38	1	4	1	2.00	13750.0
45	30	31	1	3	1	3.00	16500.0
46	31	32	1	3	1	2.00	11000.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
47	32	33	1	3	1	2.00	11000.0
48	33	34	1	3	1	3.00	16500.0
49	25	30	1	1	1	2.00	2310.0
50	24	29	1	1	1	2.00	2310.0
51	26	31	1	4	1	2.00	13750.0
52	27	32	1	3	1	2.00	11000.0
53	28	33	1	4	1	2.00	13750.0
54	25	26	1	3	1	3.00	16500.0
55	26	27	1	3	1	2.00	11000.0
56	27	28	1	3	1	2.00	11000.0
57	28	29	1	3	1	3.00	16500.0
58	20	25	1	1	1	2.00	2310.0
59	19	24	1	1	1	2.00	2310.0
60	21	26	1	4	1	2.00	13750.0
61	22	27	1	3	1	2.00	11000.0
62	23	28	1	4	1	2.00	13750.0
63	20	21	1	3	1	3.00	16500.0
64	21	22	1	3	1	2.00	11000.0
65	22	23	1	3	1	2.00	11000.0
66	23	24	1	3	1	3.00	16500.0
67	15	20	1	1	1	2.00	2310.0
68	14	19	1	1	1	2.00	2310.0
69	16	21	1	4	1	2.00	13750.0
70	17	22	1	3	1	2.00	11000.0
71	18	23	1	4	1	2.00	13750.0
72	15	16	1	3	1	3.00	16500.0
73	16	17	1	3	1	2.00	11000.0
74	17	18	1	3	1	2.00	11000.0
75	18	19	1	3	1	3.00	16500.0
76	10	15	1	1	1	2.00	2310.0
77	8	14	1	1	1	0.75	866.3
78	11	16	1	4	1	2.00	13750.0
79	12	17	1	3	1	2.00	11000.0
80	13	18	1	4	1	2.00	13750.0
81	10	11	1	5	1	3.00	2268.7
82	11	12	1	5	1	2.00	1512.5
83	12	13	1	5	1	2.00	1512.5
84	13	14	1	5	1	3.00	2268.7
85	45	50	1	1	1	2.00	2310.0
86	44	49	1	1	1	2.00	2310.0
87	46	51	1	4	1	2.00	13750.0
88	47	52	1	3	1	2.00	11000.0
89	48	53	1	4	1	2.00	13750.0
90	45	46	1	3	1	3.00	16500.0
91	46	47	1	3	1	2.00	11000.0
92	47	48	1	3	1	2.00	11000.0
93	48	49	1	3	1	3.00	16500.0
94	50	55	1	1	1	2.00	2310.0
95	49	54	1	1	1	2.00	2310.0
	51	56	1	4	1	2.00	13750.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
97	52	57	1	3	1	2.00	11000.0
98	53	58	1	4	1	2.00	13750.0
99	50	51	1	3	1	3.00	16500.0
100	51	52	1	3	1	2.00	11000.0
101	52	53	1	3	1	2.00	11000.0
102	53	54	1	3	1	3.00	16500.0
103	55	60	1	1	1	2.00	2310.0
104	54	59	1	1	1	2.00	2310.0
105	56	61	1	4	1	2.00	13750.0
106	57	62	1	3	1	2.00	11000.0
107	58	63	1	4	1	2.00	13750.0
108	55	56	1	3	1	3.00	16500.0
109	56	57	1	3	1	2.00	11000.0
110	57	58	1	3	1	2.00	11000.0
111	58	59	1	3	1	3.00	16500.0
112	60	65	1	1	1	2.00	2310.0
113	59	64	1	1	1	2.00	2310.0
114	61	66	1	4	1	2.00	13750.0
115	62	67	1	3	1	2.00	11000.0
116	63	68	1	4	1	2.00	13750.0
117	60	61	1	3	1	3.00	16500.0
118	61	62	1	3	1	2.00	11000.0
119	62	63	1	3	1	2.00	11000.0
120	63	64	1	3	1	3.00	16500.0
121	65	70	1	1	1	2.00	2310.0
122	64	69	1	1	1	2.00	2310.0
123	66	71	1	4	1	2.00	13750.0
124	67	72	1	3	1	2.00	11000.0
125	68	73	1	4	1	2.00	13750.0
126	65	66	1	3	1	3.00	16500.0
127	66	67	1	3	1	2.00	11000.0
128	67	68	1	3	1	2.00	11000.0
129	68	69	1	3	1	3.00	16500.0
130	70	75	1	1	1	2.00	2310.0
131	69	74	1	1	1	2.00	2310.0
132	71	76	1	4	1	2.00	13750.0
133	72	77	1	3	1	2.00	11000.0
134	73	78	1	4	1	2.00	13750.0
135	70	71	1	3	1	3.00	16500.0
136	71	72	1	3	1	2.00	11000.0
137	72	73	1	3	1	2.00	11000.0
138	73	74	1	3	1	3.00	16500.0
139	75	80	1	1	1	2.00	2310.0
140	74	79	1	1	1	2.00	2310.0
141	76	81	1	4	1	2.00	13750.0
142	77	82	1	3	1	2.00	11000.0
143	78	83	1	4	1	2.00	13750.0
144	75	76	1	3	1	3.00	16500.0
145	76	77	1	3	1	2.00	11000.0
146	77	78	1	3	1	2.00	11000.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
147	78	79	1	3	1	3.00	16500.0
148	80	85	1	1	1	2.00	2310.0
149	79	84	1	1	1	2.00	2310.0
150	81	86	1	4	1	2.00	13750.0
151	82	87	1	3	1	2.00	11000.0
152	83	88	1	4	1	2.00	13750.0
153	80	81	1	3	1	3.00	16500.0
154	81	82	1	3	1	2.00	11000.0
155	82	83	1	3	1	2.00	11000.0
156	83	84	1	3	1	3.00	16500.0
157	85	90	1	1	1	2.00	2310.0
158	84	89	1	1	1	2.00	2310.0
159	86	91	1	4	1	2.00	13750.0
160	87	92	1	3	1	2.00	11000.0
161	88	93	1	4	1	2.00	13750.0
162	85	86	1	3	1	3.00	16500.0
163	86	87	1	3	1	2.00	11000.0
64	87	88	1	3	1	2.00	11000.0
165	88	89	1	3	1	3.00	16500.0
166	90	95	1	1	1	2.00	2310.0
167	89	94	1	1	1	2.00	2310.0
168	91	96	1	4	1	2.00	13750.0
169	92	97	1	3	1	2.00	11000.0
170	93	98	1	4	1	2.00	13750.0
171	90	91	1	3	1	3.00	16500.0
172	91	92	1	3	1	2.00	11000.0
173	92	93	1	3	1	2.00	11000.0
174	93	94	1	3	1	3.00	16500.0
175	95	100	1	1	1	2.00	2310.0
176	94	99	1	1	1	2.00	2310.0
177	96	101	1	4	1	2.00	13750.0
178	97	102	1	3	1	2.00	11000.0
179	98	103	1	4	1	2.00	13750.0
0	95	96	1	3	1	3.00	16500.0
181	96	97	1	3	1	2.00	11000.0
182	97	98	1	3	1	2.00	11000.0
183	98	99	1	3	1	3.00	16500.0
184	100	105	1	1	1	2.00	2310.0
185	99	104	1	1	1	2.00	2310.0
186	101	106	1	4	1	2.00	13750.0
187	102	107	1	3	1	2.00	11000.0
188	103	108	1	4	1	2.00	13750.0
189	100	101	1	3	1	3.00	16500.0
190	101	102	1	3	1	2.00	11000.0
191	102	103	1	3	1	2.00	11000.0
192	103	104	1	3	1	3.00	16500.0
193	105	110	1	1	1	2.00	2310.0
194	104	109	1	1	1	2.00	2310.0
195	106	111	1	4	1	2.00	13750.0
196	107	112	1	3	1	2.00	11000.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
197	108	113	1	4	1	2.00	13750.0
198	105	106	1	3	1	3.00	16500.0
199	106	107	1	3	1	2.00	11000.0
200	107	108	1	3	1	2.00	11000.0
201	108	109	1	3	1	3.00	16500.0
202	110	116	1	1	1	1.75	2021.3
203	109	114	1	1	1	2.00	2310.0
204	111	117	1	4	1	1.75	12031.2
205	112	118	1	3	1	1.75	9625.0
206	113	119	1	4	1	1.75	12031.2
207	110	111	1	6	1	3.00	3093.7
208	111	112	1	6	1	2.00	2062.5
209	112	113	1	6	1	2.00	2062.5
210	113	114	1	6	1	3.00	3093.8

Peso Total (kg) = 2013605
Clase 1... = Barra Emp.- Emp.
Clase 2... = Barra Art.- Emp.
Clase 3... = Barra Emp.- Art.
Clase 4... = Barra Art.- Art.

CONDICIONES DE CONTORNO

Nudo No.	Giro.s./eje X	Despl.s/eje Z	Giro.s./eje Y
4	Lib.	Imp.	Imp.
8	Lib.	Imp.	Imp.
42	Imp.	Imp.	Imp.
82	Imp.	Imp.	Imp.
116	Lib.	Imp.	Imp.
120	Lib.	Imp.	Imp.

C A R G A S G E N E R A L E S

Temperatura de referencia (construcci¢n). = 0

Hip¢tesis.		Temperatura	Peso propio.
1	G	0.000	NO
2	Q-1	0.000	NO
3	T-1	0.000	NO

C A R G A S E N N U D O S

Unidades en Mp. y M*Mp.

Hipótesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
1	1	0.000	-0.754	0.000
	2	0.000	-0.754	0.000
	3	0.000	-1.532	0.000
	4	0.000	-2.987	0.000
	5	0.000	-4.607	0.000
	6	0.000	-3.688	0.000
	7	0.000	-4.607	0.000
	8	0.000	-2.987	0.000
	9	0.000	-1.532	0.000
	10	0.000	-9.774	0.000
	11	0.000	-10.141	0.000
	12	0.000	-8.113	0.000
	13	0.000	-10.141	0.000
	14	0.000	-9.774	0.000
	15	0.000	-15.045	0.000
	16	0.000	-14.750	0.000
	17	0.000	-11.800	0.000
	18	0.000	-14.750	0.000
	19	0.000	-15.045	0.000
	20	0.000	-15.045	0.000
	21	0.000	-14.750	0.000
	22	0.000	-11.800	0.000
	23	0.000	-14.750	0.000
	24	0.000	-15.045	0.000
	25	0.000	-15.045	0.000
	26	0.000	-14.750	0.000
	27	0.000	-11.800	0.000
	28	0.000	-14.750	0.000
	29	0.000	-15.045	0.000
	30	0.000	-15.045	0.000
	31	0.000	-14.750	0.000
	32	0.000	-11.800	0.000
	33	0.000	-14.750	0.000
	34	0.000	-15.045	0.000
	35	0.000	-15.045	0.000
	36	0.000	-14.750	0.000
	37	0.000	-11.800	0.000
	38	0.000	-14.750	0.000
	39	0.000	-15.045	0.000
	40	0.000	-15.045	0.000
	41	0.000	-14.750	0.000
	42	0.000	-11.800	0.000
	43	0.000	-14.750	0.000
	44	0.000	-15.045	0.000
	45	0.000	-15.045	0.000

Hipótesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
	46	0.000	-14.750	0.000
	47	0.000	-11.800	0.000
	48	0.000	-14.750	0.000
	49	0.000	-15.045	0.000
	50	0.000	-15.045	0.000
	51	0.000	-14.750	0.000
	52	0.000	-11.800	0.000
	53	0.000	-14.750	0.000
	54	0.000	-15.045	0.000
	55	0.000	-15.045	0.000
	56	0.000	-14.750	0.000
	57	0.000	-11.800	0.000
	58	0.000	-14.750	0.000
	59	0.000	-15.045	0.000
	60	0.000	-15.045	0.000
	61	0.000	-14.750	0.000
	62	0.000	-11.800	0.000
	63	0.000	-14.750	0.000
	64	0.000	-15.045	0.000
	65	0.000	-15.045	0.000
	66	0.000	-14.750	0.000
	67	0.000	-11.800	0.000
	68	0.000	-14.750	0.000
	69	0.000	-15.045	0.000
	70	0.000	-15.045	0.000
	71	0.000	-14.750	0.000
	72	0.000	-11.800	0.000
	73	0.000	-14.750	0.000
	74	0.000	-15.045	0.000
	75	0.000	-15.045	0.000
	76	0.000	-14.750	0.000
	77	0.000	-11.800	0.000
	78	0.000	-14.750	0.000
	79	0.000	-15.045	0.000
	80	0.000	-15.045	0.000
	81	0.000	-14.750	0.000
	82	0.000	-11.800	0.000
	83	0.000	-14.750	0.000
	84	0.000	-15.045	0.000
	85	0.000	-15.045	0.000
	86	0.000	-14.750	0.000
	87	0.000	-11.800	0.000
	88	0.000	-14.750	0.000
	89	0.000	-15.045	0.000
	90	0.000	-15.045	0.000
	91	0.000	-14.750	0.000
	92	0.000	-11.800	0.000
	93	0.000	-14.750	0.000
	94	0.000	-15.045	0.000
	95	0.000	-15.045	0.000

Hip¢tesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
	96	0.000	-14.750	0.000
	97	0.000	-11.800	0.000
	98	0.000	-14.750	0.000
	99	0.000	-15.045	0.000
	100	0.000	-15.045	0.000
	101	0.000	-14.750	0.000
	102	0.000	-11.800	0.000
	103	0.000	-14.750	0.000
	104	0.000	-15.045	0.000
	105	0.000	-15.045	0.000
	106	0.000	-14.750	0.000
	107	0.000	-11.800	0.000
	108	0.000	-14.750	0.000
	109	0.000	-15.045	0.000
	110	0.000	-13.861	0.000
	111	0.000	-13.828	0.000
	112	0.000	-11.063	0.000
	113	0.000	-13.828	0.000
	114	0.000	-13.861	0.000
	115	0.000	-1.981	0.000
	116	0.000	-5.974	0.000
	117	0.000	-8.295	0.000
	118	0.000	-6.638	0.000
	119	0.000	-8.295	0.000
	120	0.000	-5.974	0.000
	121	0.000	-1.981	0.000
	122	0.000	-0.754	0.000
	123	0.000	-0.754	0.000
2	1	0.000	-0.102	0.000
	2	0.000	-0.102	0.000
	3	0.000	-21.708	0.000
	4	0.000	-0.405	0.000
	5	0.000	-0.625	0.000
	6	0.000	-0.506	0.000
	7	0.000	-0.625	0.000
	8	0.000	-0.405	0.000
	9	0.000	-21.708	0.000
	10	0.000	-1.325	0.000
	11	0.000	-1.375	0.000
	12	0.000	-1.100	0.000
	13	0.000	-1.375	0.000
	14	0.000	-1.325	0.000
	15	0.000	-2.040	0.000
	16	0.000	-2.000	0.000
	17	0.000	-1.600	0.000
	18	0.000	-2.000	0.000
	19	0.000	-2.040	0.000
	20	0.000	-2.040	0.000
	21	0.000	-2.000	0.000
	22	0.000	-1.600	0.000

Hip¢tesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
	23	0.000	-2.000	0.000
	24	0.000	-2.040	0.000
	25	0.000	-2.040	0.000
	26	0.000	-2.000	0.000
	27	0.000	-1.600	0.000
	28	0.000	-2.000	0.000
	29	0.000	-2.040	0.000
	30	0.000	-2.040	0.000
	31	0.000	-2.000	0.000
	32	0.000	-1.600	0.000
	33	0.000	-2.000	0.000
	34	0.000	-2.040	0.000
	35	0.000	-2.040	0.000
	36	0.000	-2.000	0.000
	37	0.000	-1.600	0.000
	38	0.000	-2.000	0.000
	39	0.000	-2.040	0.000
	40	0.000	-2.040	0.000
	41	0.000	-2.000	0.000
	42	0.000	-1.600	0.000
	43	0.000	-2.000	0.000
	44	0.000	-2.040	0.000
	45	0.000	-2.040	0.000
	46	0.000	-2.000	0.000
	47	0.000	-1.600	0.000
	48	0.000	-2.000	0.000
	49	0.000	-2.040	0.000
	50	0.000	-2.040	0.000
	51	0.000	-2.000	0.000
	52	0.000	-1.600	0.000
	53	0.000	-2.000	0.000
	54	0.000	-2.040	0.000
	55	0.000	-2.040	0.000
	56	0.000	-2.000	0.000
	57	0.000	-1.600	0.000
	58	0.000	-2.000	0.000
	59	0.000	-2.040	0.000
	60	0.000	-2.040	0.000
	61	0.000	-2.000	0.000
	62	0.000	-1.600	0.000
	63	0.000	-2.000	0.000
	64	0.000	-2.040	0.000
	65	0.000	-2.040	0.000
	66	0.000	-2.000	0.000
	67	0.000	-1.600	0.000
	68	0.000	-2.000	0.000
	69	0.000	-2.040	0.000
	70	0.000	-2.040	0.000
	71	0.000	-2.000	0.000
	72	0.000	-1.600	0.000

Hipótesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
	73	0.000	-2.000	0.000
	74	0.000	-2.040	0.000
	75	0.000	-2.040	0.000
	76	0.000	-2.000	0.000
	77	0.000	-1.600	0.000
	78	0.000	-2.000	0.000
	79	0.000	-2.040	0.000
	80	0.000	-2.040	0.000
	81	0.000	-2.000	0.000
	82	0.000	-1.600	0.000
	83	0.000	-2.000	0.000
	84	0.000	-2.040	0.000
	85	0.000	-2.040	0.000
	86	0.000	-2.000	0.000
	87	0.000	-1.600	0.000
	88	0.000	-2.000	0.000
	89	0.000	-2.040	0.000
	90	0.000	-2.040	0.000
	91	0.000	-2.000	0.000
	92	0.000	-1.600	0.000
	93	0.000	-2.000	0.000
	94	0.000	-2.040	0.000
	95	0.000	-2.040	0.000
	96	0.000	-2.000	0.000
	97	0.000	-1.600	0.000
	98	0.000	-2.000	0.000
	99	0.000	-2.040	0.000
	100	0.000	-2.040	0.000
	101	0.000	-2.000	0.000
	102	0.000	-1.600	0.000
	103	0.000	-2.000	0.000
	104	0.000	-2.040	0.000
	105	0.000	-2.040	0.000
	106	0.000	-2.000	0.000
	107	0.000	-1.600	0.000
	108	0.000	-2.000	0.000
	109	0.000	-2.040	0.000
	110	0.000	-1.879	0.000
	111	0.000	-1.875	0.000
	112	0.000	-1.500	0.000
	113	0.000	-1.875	0.000
	114	0.000	-1.879	0.000
	115	0.000	-21.769	0.000
	116	0.000	-0.810	0.000
	117	0.000	-1.125	0.000
	118	0.000	-0.900	0.000
	119	0.000	-1.125	0.000
	120	0.000	-0.810	0.000
	121	0.000	-21.769	0.000
	122	0.000	-0.102	0.000

Hipótesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
3	123	0.000	-0.102	0.000
	56	0.000	-10.000	0.000
	58	0.000	-10.000	0.000
	61	0.000	-10.000	0.000
	63	0.000	-10.000	0.000
	66	0.000	-10.000	0.000
	68	0.000	-10.000	0.000

C O M B I N A C I O N E S

Comb.	Hip.1	Hip.2	Hip.3
1	1.000	-	-
2	1.000	1.000	1.000

MOVIMIENTOS
==========

do.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
1	M¡nimos.	-.0018857853	-.0000011329	-.0000043642
	M ximos.	-.0017747232	-.0000009976	-.0000038431
2	M¡nimos.	0.0017747227	-.0000011329	-.0000043641
	M ximos.	0.0018857855	-.0000009976	-.0000038430
3	M¡nimos.	-.0018811590	0.0017754980	0.0000000000
	M ximos.	-.0017045306	0.0019742772	0.0000000000
4	M¡nimos.	-.0018857853	0.0000000000	0.0000000000
	M ximos.	-.0017747232	0.0000000000	0.0000000000
5	M¡nimos.	- 0005866772	-.0046695857	0.0000703237
	M ximos.	-.0005682184	-.0046430253	0.0001318282
6	M¡nimos.	-.0000000007	-.0052939570	-.0000752303
	M ximos.	-.0000000006	-.0052388450	-.0000223065
7	M¡nimos.	0.0005682172	-.0046695876	0.0000703240
	M ximos.	0.0005866761	-.0046430277	0.0001318286
8	M¡nimos.	0.0017747227	0.0000000000	0.0000000000
	M ximos.	0.0018857855	0.0000000000	0.0000000000
9	M¡nimos.	0.0017045296	0.0017755039	0.0000000000
	M ximos.	0.0018811591	0.0019742849	0.0000000002
10	M¡nimos.	-.0015018681	-.0009434961	0.0019026805
	M ximos.	-.0014495867	-.0008936485	0.0020012097
11	M¡nimos.	-.0004652225	-.0047830483	0.0000676780
	M ximos.	-.0004531010	-.0047079730	0.0001299472
12	M¡nimos.	-.0000000007	-.0052695777	-.0000996639
	M ximos.	-.0000000007	-.0051747803	-.0000490259
13	M¡nimos.	0.0004530998	-.0047830511	0.0000676783
	M ximos.	0.0004652213	-.0047079758	0.0001299476
14	M¡nimos.	0.0014495851	-.0009435005	0.0019026846
	M ximos.	0.0015018668	-.0008936527	0.0020012141
15	M¡nimos.	-.0001176648	-.0046321964	0.0000445009
	M ximos.	-.0001002250	-.0043998794	0.0000915831
16	M¡nimos.	-.0001384991	-.0049513467	-.0000677144
	M ximos.	-.0001333027	-.0047611645	-.0000234956
17	M¡nimos.	-.0000000008	-.0050937929	-.0001610977

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
	M ximos.	-.0000000008	-.0049079279	-.0001231320
18	M¡nimos.	0.0001333011	-.0049513495	-.0000677143
	M ximos.	0.0001384976	-.0047611673	-.0000234955
19	M¡nimos.	0.0001002233	-.0046322048	0.0000445011
	M ximos.	0.0001176632	-.0043998873	0.0000915834
20	M¡nimos.	0.0000980240	-.0049536233	-.0002760089
	M ximos.	0.0001233905	-.0046389974	-.0002633952
21	M¡nimos.	0.0000213427	-.0046539572	-.0003067032
	M ximos.	0.0000348150	-.0044058585	-.0002955710
22	M¡nimos.	-.0000000008	-.0046181474	-.0003528102
	M ximos.	-.0000000008	-.0043842928	-.0003442746
23	M¡nimos.	-.0000348167	-.0046539609	-.0003067032
	M ximos.	-.0000213443	-.0044058617	-.0002955710
24	M¡nimos.	-.0001233924	-.0049536321	-.0002760089
	M ximos.	-.0000980257	-.0046390058	-.0002633951
25	M¡nimos.	0.0001897903	-.0043674181	-.0005348084
	M ximos.	0.0002204365	-.0040499195	-.0005143675
26	M¡nimos.	0.0001023448	-.0037864374	-.0005515874
	M ximos.	0.0001205957	-.0035508783	-.0005301102
27	M¡nimos.	-.0000000008	-.0036604770	-.0005802676
	M ximos.	-.0000000007	-.0034440125	-.0005571319
28	M¡nimos.	-.0001205973	-.0037864407	-.0005515874
	M ximos.	-.0001023463	-.0035508813	-.0005301103
29	M¡nimos.	-.0002204384	-.0043674270	-.0005348084
	M ximos.	-.0001897920	-.0040499279	-.0005143676
30	M¡nimos.	0.0002558535	-.0032994740	-.0006500687
	M ximos.	0.0002923079	-.0030323002	-.0006128626
31	M¡nimos.	0.0001625357	-.0025084531	-.0006652291
	M ximos.	0.0001859251	-.0023400704	-.0006265311
32	M¡nimos.	-.0000000007	-.0023095326	-.0007039191
	M ximos.	-.0000000006	-.0021649515	-.0006623823
33	M¡nimos.	-.0001859266	-.0025084561	-.0006652293
	M ximos.	-.0001625371	-.0023400732	-.0006265313
34	M¡nimos.	-.0002923096	-.0032994826	-.0006500690
	M ximos.	-.0002558551	-.0030323081	-.0006128628

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
35	M¡nimos.	0.0003327508	-.0022944135	-.0004884038
	M ximos.	0.0003799865	-.0020700616	-.0004674731
36	M¡nimos.	0.0002400192	-.0012401261	-.0005058739
	M ximos.	0.0002736767	-.0011464909	-.0004821157
37	M¡nimos.	-.0000000005	-.0008903528	-.0005996132
	M ximos.	-.0000000005	-.0008339193	-.0005637725
38	M¡nimos.	-.0002736781	-.0012401284	-.0005058740
	M ximos.	-.0002400205	-.0011464930	-.0004821159
39	M¡nimos.	-.0003799882	-.0022944217	-.0004884040
	M ximos.	-.0003327524	-.0020700688	-.0004674733
40	M¡nimos.	0.0003962297	-.0019572310	-.0000454381
	M ximos.	0.0004598529	-.0016776823	-.0000018645
41	M¡nimos.	0.0003174674	-.0006483093	-.0000451406
	M ximos.	0.0003709065	-.0005515838	-.0000031039
42	M¡nimos.	0.0000000000	0.0000000000	0.0000000000
	M ximos.	0.0000000000	0.0000000000	0.0000000000
43	M¡nimos.	-.0003709081	-.0006483114	-.0000451405
	M ximos.	-.0003174687	-.0005515856	-.0000031038
44	M¡nimos.	-.0004598548	-.0019572396	-.0000454379
	M ximos.	-.0003962314	-.0016776900	-.0000018644
45	M¡nimos.	0.0003327767	-.0023003004	0.0003270733
	M ximos.	0.0003900011	-.0018490819	0.0004618825
3	M¡nimos.	0.0002376824	-.0012170839	0.0003393233
	M ximos.	0.0002823932	-.0009274823	0.0004757676
47	M¡nimos.	-.0000000006	-.0008600018	0.0004115269
	M ximos.	-.0000000006	-.0006347544	0.0005637454
48	M¡nimos.	-.0002823950	-.0012170868	0.0003393237
	M ximos.	-.0002376839	-.0009274848	0.0004757681
49	M¡nimos.	-.0003900032	-.0023003099	0.0003270737
	M ximos.	-.0003327786	-.0018490906	0.0004618830
50	M¡nimos.	0.0002755892	-.0032516443	0.0004073955
	M ximos.	0.0003216691	-.0025151030	0.0005648317
51	M¡nimos.	0.0001796717	-.0023751031	0.0004145879
	M ximos.	0.0002122940	-.0017659077	0.0005731477

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
52	M¡nimos.	-.0000000009	-.0021481037	0.0004364468
	M ximos.	-.0000000008	-.0015756997	0.0006003770
53	M¡nimos.	-.0002122961	-.0023751073	0.0004145882
	M ximos.	-.0001796735	-.0017659111	0.0005731480
54	M¡nimos.	-.0003216715	-.0032516562	0.0004073959
	M ximos.	-.0002755913	-.0025151134	0.0005648321
55	M¡nimos.	0.0002491122	-.0041683782	0.0002577766
	M ximos.	0.0002897559	-.0031639526	0.0003601293
56	M¡nimos.	0.0001553604	-.0033848810	0.0002602834
	M ximos.	0.0001836075	-.0024923589	0.0003628303
57	M¡nimos.	-.0000000011	-.0031888667	0.0002657992
	M ximos.	-.0000000010	-.0023296794	0.0003687168
58	M¡nimos.	-.0001836099	-.0033848856	0.0002602836
	M ximos.	-.0001553625	-.0024923631	0.0003628306
59	M¡nimos.	-.0002897586	-.0041683912	0.0002577768
	M ximos.	-.0002491146	-.0031639643	0.0003601296
60	M¡nimos.	0.0002420060	-.0045244456	-.0000065368
	M ximos.	0.0002814708	-.0034143548	-.0000058231
61	M¡nimos.	0.0001490571	-.0037649008	-.0000064829
	M ximos.	0.0001763769	-.0027633936	-.0000057749
62	M¡nimos.	-.0000000012	-.0035750959	-.0000064436
	M ximos.	-.0000000011	-.0026066685	-.0000057398
63	M¡nimos.	-.0001763794	-.0037649055	-.0000064829
	M ximos.	-.0001490593	-.0027633978	-.0000057749
64	M¡nimos.	-.0002814737	-.0045244601	-.0000065368
	M ximos.	-.0002420086	-.0034143673	-.0000058230
65	M¡nimos.	0.0002489126	-.0041428329	-.0003704048
	M ximos.	0.0002895328	-.0031411943	-.0002669312
66	M¡nimos.	0.0001551654	-.0033600021	-.0003729946
	M ximos.	0.0001833894	-.0024701967	-.0002693388
67	M¡nimos.	-.0000000012	-.0031642709	-.0003785806
	M ximos.	-.0000000010	-.0023077696	-.0002745867
68	M¡nimos.	-.0001833919	-.0033600067	-.0003729948
	M ximos.	-.0001551676	-.0024702006	-.0002693389
69	M¡nimos.	-.0002895356	-.0041428469	-.0003704050

Nudo.	Hipótesis.	Giro. X.	Despl. Z.	Giro. Y.
	Máximos.	-.0002489151	-.0031412067	-.0002669314
70	Mínimos.	0.0002752634	-.0032117330	-.0005666200
	Máximos.	0.0003213063	-.0024795379	-.0004089935
71	Mínimos.	0.0001791896	-.0023364355	-.0005749728
	Máximos.	0.0002117554	-.0017314577	-.0004162180
72	Mínimos.	-.0000000010	-.0021112966	-.0006010093
	Máximos.	-.0000000009	-.0015429090	-.0004370129
73	Mínimos.	-.0002117576	-.0023364397	-.0005749731
	Máximos.	-.0001791916	-.0017314614	-.0004162183
74	Mínimos.	-.0003213089	-.0032117460	-.0005666205
	Máximos.	-.0002752658	-.0024795493	-.0004089939
75	Mínimos.	0.0003339428	-.0022733377	-.0004477056
	Máximos.	0.0003913167	-.0018250260	-.0003144566
76	Mínimos.	0.0002380730	-.0011869230	-.0004625441
	Máximos.	0.0002828388	-.0009005952	-.0003275555
77	Mínimos.	-.0000000007	-.0008353386	-.0005518976
	Máximos.	-.0000000006	-.0006127763	-.0004009748
78	Mínimos.	-.0002828407	-.0011869263	-.0004625444
	Máximos.	-.0002380747	-.0009005981	-.0003275558
79	Mínimos.	-.0003913189	-.0022733489	-.0004477059
	Máximos.	-.0003339448	-.0018250360	-.0003144569
80	Mínimos.	0.0004046260	-.0020071482	0.0000493648
	Máximos.	0.0004692808	-.0017220799	0.0000877345
81	Mínimos.	0.0003263086	-.0006694935	0.0000490498
	Máximos.	0.0003808412	-.0005703978	0.0000860469
82	Mínimos.	0.0000000000	0.0000000000	0.0000000000
	Máximos.	0.0000000000	0.0000000000	0.0000000000
83	Mínimos.	-.0003808431	-.0006694963	0.0000490500
	Máximos.	-.0003263103	-.0005704003	0.0000860470
84	Mínimos.	-.0004692831	-.0020071596	0.0000493650
	Máximos.	-.0004046280	-.0017220899	0.0000877347
85	Mínimos.	0.0003434459	-.0025180459	0.0005736909
	Máximos.	0.0003919298	-.0022693353	0.0006075953
	Mínimos.	0.0002509854	-.0014276395	0.0005882411
	Máximos.	0.0002859341	-.0013134292	0.0006249823

Nudo.	Hipótesis.	Giro. X.	Despl. Z.	Giro. Y.
87	Mínimos.	-.0000000009	-.0010539739	0.0006749149
	Máximos.	-.0000000008	-.0009795426	0.0007244045
88	Mínimos.	-.0002859364	-.0014276435	0.0005882417
	Máximos.	-.0002509874	-.0013134328	0.0006249830
89	Mínimos.	-.0003919325	-.0025180590	0.0005736916
	Máximos.	-.0003434483	-.0022693470	0.0006075960
90	Mínimos.	0.0002645242	-.0038140572	0.0007641675
	Máximos.	0.0003018379	-.0034913379	0.0008195934
91	Mínimos.	0.0001705442	-.0029950577	0.0007776326
	Máximos.	0.0001947337	-.0027736579	0.0008345704
92	Mínimos.	-.0000000013	-.0027853583	0.0008156502
	Máximos.	-.0000000012	-.0025887678	0.0008757730
93	Mínimos.	-.0001947366	-.0029950631	0.0007776332
	Máximos.	-.0001705468	-.0027736628	0.0008345711
94	Mínimos.	-.0003018412	-.0038140733	0.0007641682
	Máximos.	-.0002645272	-.0034913525	0.0008195942
95	Mínimos.	0.0002001972	-.0052492609	0.0006782693
	Máximos.	0.0002316155	-.0048377728	0.0007179194
96	Mínimos.	0.0001115479	-.0046358607	0.0006924010
	Máximos.	0.0001304831	-.0043085520	0.0007329976
97	Mínimos.	-.0000000016	-.0044993064	0.0007175964
	Máximos.	-.0000000015	-.0041918163	0.0007597998
98	Mínimos.	-.0001304865	-.0046358672	0.0006924015
	Máximos.	-.0001115511	-.0043085581	0.0007329981
99	Mínimos.	-.0002316193	-.0052492791	0.0006782698
	Máximos.	-.0002002007	-.0048377896	0.0007179199
100	Mínimos.	0.0001199503	-.0062166280	0.0004218931
	Máximos.	0.0001466886	-.0057703406	0.0004252549
101	Mínimos.	0.0000380739	-.0058519566	0.0004459282
	Máximos.	0.0000526019	-.0054760328	0.0004503650
102	Mínimos.	-.0000000018	-.0057958085	0.0004866818
	Máximos.	-.0000000017	-.0054353541	0.0004933717
103	Mínimos.	-.0000526056	-.0058519640	0.0004459285
	Máximos.	-.0000380773	-.0054760398	0.0004503652

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
104	M¡nimos.	-.0001466927	-.0062166476	0.0004218934
	M ximos.	-.0001199541	-.0057703587	0.0004252552
105	M¡nimos.	-.0000264882	-.0063225375	0.0000488132
	M ximos.	-.0000037706	-.0059246323	0.0000855654
106	M¡nimos.	-.0001081067	-.0064050970	0.0001111200
	M ximos.	-.0001011124	-.0060625593	0.0001478369
107	M¡nimos.	-.0000000020	-.0065102861	0.0002077692
	M ximos.	-.0000000018	-.0061744084	0.0002384905
108	M¡nimos.	0.0001011085	-.0064051049	0.0001111201
	M ximos.	0.0001081030	-.0060625668	0.0001478370
109	M¡nimos.	0.0000037664	-.0063225580	0.0000488131
	M ximos.	0.0000264843	-.0059246509	0.0000855653
0	M¡nimos.	-.0011827904	-.0036033860	-.0024450528
	M ximos.	-.0011495741	-.0033533468	-.0022942482
111	M¡nimos.	-.0004769076	-.0062999642	-.0001578461
	M ximos.	-.0004635688	-.0060696611	-.0000898882
112	M¡nimos.	-.0000000020	-.0067807734	0.0000641300
	M ximos.	-.0000000019	-.0065313075	0.0001172094
113	M¡nimos.	0.0004635653	-.0062999716	-.0001578459
	M ximos.	0.0004769039	-.0060696686	-.0000898881
114	M¡nimos.	0.0011495729	-.0036033955	-.0024450605
	M ximos.	0.0011827891	-.0033533559	-.0022942552
115	M¡nimos.	-.0023343191	0.0022793228	0.0000000000
	M ximos.	-.0021846618	0.0024498196	0.0000000000
116	M¡nimos.	-.0023403019	0.0000000000	0.0000000000
	M ximos.	-.0022563948	0.0000000000	0.0000000000
117	M¡nimos.	-.0008037118	-.0059188940	-.0002084917
	M ximos.	-.0007724918	-.0058188676	-.0001364440
118	M¡nimos.	-.0000000021	-.0067939134	-.0000291926
	M ximos.	-.0000000020	-.0066495589	0.0000334670
119	M¡nimos.	0.0007724883	-.0059189023	-.0002084916
	M ximos.	0.0008037082	-.0058188755	-.0001364439
120	M¡nimos.	0.0022563953	0.0000000000	0.0000000000
	M ximos.	0.0023403023	0.0000000000	0.0000000000
121	M¡nimos.	0.0021846620	0.0022793235	0.0000000000

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
	M ximos.	0.0023343195	0.0024498205	0.0000000000
122	M¡nimos.	-.0023403019	-.0000011329	0.0000038430
	M ximos.	-.0022563948	-.0000009976	0.0000043641
123	M¡nimos.	0.0022563953	-.0000011329	0.0000038430
	M ximos.	0.0023403023	-.0000009976	0.0000043641

ESFUERZOS EN SISTEMA DE EJES LOCAL

Reducci¢n de I.Torsional en hormig¢n: Vigas 0 %, Losas 0 %

BARRA : 1 (120,123) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-0.754	-0.189	
	m¡n.	0.000	-0.856	-0.214	
	Flec.m x.	0.000	-0.754	-0.189	
	m¡n.	0.000	-0.856	-0.214	
0.25	Cort.m x.	0.000	-0.754	0.000	
	m¡n.	0.000	-0.856	0.000	

Flecha Tot. el s. m x =0.000001

BARRA : 2 (1,4) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	0.856	-0.000	
	m¡n.	-0.000	0.754	-0.000	
0.25	Cort.m x.	-0.000	0.856	-0.214	
	m¡n.	-0.000	0.754	-0.189	
	Flec.m x.	-0.000	0.754	-0.189	
	m¡n.	-0.000	0.856	-0.214	

Flecha Tot. el s. m x =0.000001

BARRA : 3 (2,8) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	0.856	-0.000	
	m¡n.	-0.000	0.754	-0.000	

Flecha Tot. el s. m x =0.000001

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25	Cort.m x.	-0.000	0.856	-0.214	
	m¡n.	-0.000	0.754	-0.189	
	Flec.m x.	-0.000	0.754	-0.189	
	m¡n.	-0.000	0.856	-0.214	

BARRA : 4 (4,10) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.215	-26.985	-26.482	
	m¡n.	-2.616	-25.182	-25.000	
	Cort.m x.	-2.616	-25.182	-25.000	
	m¡n.	-2.215	-26.985	-26.482	
	Flec.m x.	-2.616	-25.182	-25.000	
	m¡n.	-2.215	-26.985	-26.482	
0.75	Tor. m x.	-2.215	-26.985	-6.243	
	m¡n.	-2.616	-25.182	-6.114	
	Cort.m x.	-2.616	-25.182	-6.114	
	m¡n.	-2.215	-26.985	-6.243	
	Flec.m x.	-2.616	-25.182	-6.114	
	m¡n.	-2.215	-26.985	-6.243	

Flecha Tot. el s. m x =0.000943

BARRA : 5 (8,9) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-1.532	-1.608	
	m¡n.	0.000	-23.239	-24.401	
	Flec.m x.	0.000	-1.532	-1.608	
	m¡n.	0.000	-23.239	-24.401	
1.05	Cort.m x.	0.000	-1.532	-0.000	
	m¡n.	0.000	-23.239	-0.000	

Flecha Tot. el s. m x =-.001973

BARRA : 6 (7,8) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	6.683	65.928	171.169	
	m¡n.	3.565	56.253	164.535	
	Cort.m x.	6.683	65.928	171.169	
	m¡n.	3.565	56.253	164.535	
	Flec.m x.	6.683	65.928	171.169	
	m¡n.	3.565	56.253	164.535	

Flecha Tot. el s. m x =0.004670

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	6.683	65.928	-26.617	
	m¡n.	3.565	56.253	-4.224	
	Cort.m x.	6.683	65.928	-26.617	
	m¡n.	3.565	56.253	-4.224	
	Flec.m x.	3.565	56.253	-4.224	
	m¡n.	6.683	65.928	-26.617	

BARRA : 7 (3,4) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	23.239	-0.000	
	m¡n.	0.000	1.532	-0.000	

Flecha Tot. el s. m x =-.001973

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.05	Cort.m x.	0.000	23.239	-24.401	
	m¡n.	0.000	1.532	-1.608	
	Flec.m x.	0.000	1.532	-1.608	
	m¡n.	0.000	23.239	-24.401	

BARRA : 8 (116,122) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-0.754	-0.189	
	m¡n.	0.000	-0.856	-0.214	
	Flec.m x.	0.000	-0.754	-0.189	
	m¡n.	0.000	-0.856	-0.214	
0.25	Cort.m x.	0.000	-0.754	0.000	
	m¡n.	0.000	-0.856	0.000	

Flecha Tot. el s. m x =0.000001

BARRA : 9 (114,120) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.232	19.226	8.255	
	m¡n.	-3.380	17.675	7.426	
	Cort.m x.	-3.232	19.226	8.255	

m¡n.	-3.380	17.675	7.426
Flec.m x.	-3.232	19.226	8.255
m¡n.	-3.380	17.675	7.426

Flecha Tot. el s. m x =0.003603

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	-3.232	19.226	-25.391	
	m¡n.	-3.380	17.675	-23.505	
	Cort.m x.	-3.232	19.226	-25.391	
	m¡n.	-3.380	17.675	-23.505	
	Flec.m x.	-3.380	17.675	-23.505	
	m¡n.	-3.232	19.226	-25.391	

BARRA : 10 (115,116) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	23.749	0.000	
	m¡n.	0.000	1.981	0.000	

Flecha Tot. el s. m x =-.002449

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.05	Cort.m x.	0.000	23.749	-24.937	
	m¡n.	0.000	1.981	-2.080	
	Flec.m x.	0.000	1.981	-2.080	
	m¡n.	0.000	23.749	-24.937	

BARRA : 11 (116,117) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	10.570	-77.696	-28.169	
	m¡n.	6.917	-67.226	-5.460	
	Cort.m x.	6.917	-67.226	-5.460	
	m¡n.	10.570	-77.696	28.169	
	Flec.m x.	6.917	-67.226	-5.460	
	m¡n.	10.570	-77.696	-28.169	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	10.570	-77.696	204.920	
	m¡n.	6.917	-67.226	196.218	
	Cort.m x.	6.917	-67.226	196.218	
	m¡n.	10.570	-77.696	204.920	
	Flec.m x.	10.570	-77.696	204.920	
	m¡n.	6.917	-67.226	196.218	

Flecha Tot. el s. m x =0.005919

BARRA : 12 (120,121) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-1.981	-2.080	
	m¡n.	0.000	-23.749	-24.937	
	Flec.m x.	0.000	-1.981	-2.080	
	m¡n.	0.000	-23.749	-24.937	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.05	Cort.m x.	0.000	-1.981	0.000	
	m¡n.	0.000	-23.749	0.000	

Flecha Tot. el s. m x =-.002449

BARRA : 13 (5,6) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	11.721	-5.515	48.022	
	m¡n.	11.069	-4.038	47.814	
	Cort.m x.	11.069	-4.038	47.814	
	m¡n.	11.721	-5.515	48.022	
	Flec.m x.	11.721	-5.515	48.022	
	m¡n.	11.069	-4.038	47.814	

Flecha Tot. el s. m x =0.004670

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	11.721	-5.515	59.051	
	m¡n.	11.069	-4.038	55.890	
	Cort.m x.	11.069	-4.038	55.890	
	m¡n.	11.721	-5.515	59.051	
	Flec.m x.	11.721	-5.515	59.051	
	m¡n.	11.069	-4.038	55.890	

Flecha Tot. el s. m x =0.005294

BARRA : 14 (118,119) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	13.635	10.432	83.774	
	m¡n.	12.921	8.514	79.007	
	Cort.m x.	13.635	10.432	83.774	
	m¡n.	12.921	8.514	79.007	
	Flec.m x.	13.635	10.432	83.774	
	m¡n.	12.921	8.514	79.007	

Flecha Tot. el s. m x =0.006794

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	13.635	10.432	62.910	
	m¡n.	12.921	8.514	61.978	
	Cort.m x.	13.635	10.432	62.910	
	m¡n.	12.921	8.514	61.978	
	Flec.m x.	13.635	10.432	62.910	
	m¡n.	12.921	8.514	61.978	

Flecha Tot. el s. m x =0.005919

BARRA : 15 (6,12) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-4.389	22.137	
	m¡n.	0.000	-6.842	23.442	
	Flec.m x.	0.000	-6.842	23.442	
	m¡n.	0.000	-4.389	22.137	

Flecha Tot. el s. m x =0.005294

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Cort.m x.	0.000	-4.389	25.429	
	m¡n.	0.000	-6.842	28.574	
	Flec.m x.	0.000	-6.842	28.574	
	m¡n.	0.000	-4.389	25.429	

Flecha Tot. el s. m x =0.005270

BARRA : 16 (6,7) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-11.069	4.038	55.890	
	m¡n.	-11.721	5.515	59.051	
	Cort.m x.	-11.721	5.515	59.051	
	m¡n.	-11.069	4.038	55.890	
	Flec.m x.	-11.721	5.515	59.051	
	m¡n.	-11.069	4.038	55.890	

Flecha Tot. el s. m x =0.005294

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-11.069	4.038	47.814	
	m¡n.	-11.721	5.515	48.022	
	Cort.m x.	-11.721	5.515	48.022	
	m¡n.	-11.069	4.038	47.814	
	Flec.m x.	-11.721	5.515	48.022	
	m¡n.	-11.069	4.038	47.814	

Flecha Tot. el s. m x =0.004670

BARRA : 17 (119,120) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-6.917	67.226	196.218	
	m¡n.	-10.570	77.696	204.920	
	Cort.m x.	-10.570	77.696	204.920	
	m¡n.	-6.917	67.226	196.218	
	Flec.m x.	-10.570	77.696	204.920	
	m¡n.	-6.917	67.226	196.218	

Flecha Tot. el s. m x =0.005919

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-6.917	67.226	-5.460	
	m¡n.	-10.570	77.696	-28.169	
	Cort.m x.	-10.570	77.696	-28.169	
	m¡n.	-6.917	67.226	-5.460	
	Flec.m x.	-6.917	67.226	-5.460	
	m¡n.	-10.570	77.696	-28.169	

BARRA : 18 (7,13) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	123.147	-55.182	-18.404	
	m¡n.	116.721	-47.608	-14.634	
	Cort.m x.	116.721	-47.608	-14.634	
	m¡n.	123.147	-55.182	-18.404	
	Flec.m x.	116.721	-47.608	-14.634	
	m¡n.	123.147	-55.182	-18.404	

Flecha Tot. el s. m x =0.004670

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	123.147	-55.182	22.982	
	m¡n.	116.721	-47.608	21.072	
	Cort.m x.	116.721	-47.608	21.072	
	m¡n.	123.147	-55.182	22.982	
	Flec.m x.	123.147	-55.182	22.982	
	m¡n.	116.721	-47.608	21.072	

Flecha Tot. el s. m x =0.004783

BARRA : 19 (4,5) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.565	-56.253	-4.224	
	m¡n.	-6.683	-65.928	-26.617	
	Cort.m x.	-3.565	-56.253	-4.224	
	m¡n.	-6.683	-65.928	-26.617	
	Flec.m x.	-3.565	-56.253	-4.224	
	m¡n.	-6.683	-65.928	-26.617	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-3.565	-56.253	164.535	
	m¡n.	-6.683	-65.928	171.168	
	Cort.m x.	-3.565	-56.253	164.535	
	m¡n.	-6.683	-65.928	171.168	
	Flec.m x.	-6.683	-65.928	171.168	
	m¡n.	-3.565	-56.253	164.535	

Flecha Tot. el s. m x =0.004670

BARRA : 20 (117,118) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-12.921	-8.514	61.978	
	m¡n.	-13.635	-10.432	62.909	
	Cort.m x.	-12.921	-8.514	61.978	
	m¡n.	-13.635	-10.432	62.909	
	Flec.m x.	-13.635	-10.432	62.909	
	m¡n.	-12.921	-8.514	61.978	

Flecha Tot. el s. m x =0.005919

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-12.921	-8.514	79.007	
	m¡n.	-13.635	-10.432	83.774	
	Cort.m x.	-12.921	-8.514	79.007	
	m¡n.	-13.635	-10.432	83.774	
	Flec.m x.	-13.635	-10.432	83.774	
	m¡n.	-12.921	-8.514	79.007	

Flecha Tot. el s. m x =0.006794

BARRA : 21 (5,11) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-116.721	-47.608	-14.634	
	m¡n.	-123.147	-55.182	-18.404	
	Cort.m x.	-116.721	-47.608	-14.634	
	m¡n.	-123.147	-55.182	-18.404	
	Flec.m x.	-116.721	-47.608	-14.634	
	m¡n.	-123.147	-55.182	-18.404	

Flecha Tot. el s. m x =0.004670

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	-116.721	-47.608	21.072	
	m¡n.	-123.147	-55.182	22.982	
	Cort.m x.	-116.721	-47.608	21.072	
	m¡n.	-123.147	-55.182	22.982	
	Flec.m x.	-123.147	-55.182	22.982	
	m¡n.	-116.721	-47.608	21.072	

Flecha Tot. el s. m x =0.004783

BARRA : 22 (40,45) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.178	1.040	-0.382	
	m¡n.	0.162	0.980	-0.162	
	Cort.m x.	0.178	1.040	-0.382	
	m¡n.	0.162	0.980	-0.162	
	Flec.m x.	0.162	0.980	-0.162	
	m¡n.	0.178	1.040	-0.382	

Flecha Tot. el s. m x =0.001957

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.178	1.040	-2.461	
	m¡n.	0.162	0.980	-2.122	
	Cort.m x.	0.178	1.040	-2.461	
	m¡n.	0.162	0.980	-2.122	
	Flec.m x.	0.162	0.980	-2.122	
	m¡n.	0.178	1.040	-2.461	

Flecha Tot. el s. m x =0.002300

BARRA : 23 (39,44) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.204	-1.361	-2.853	
	m¡n.	0.162	-1.071	-2.365	
	Cort.m x.	0.162	-1.071	-2.365	
	m¡n.	0.204	-1.361	-2.853	
	Flec.m x.	0.162	-1.071	-2.365	
	m¡n.	0.204	-1.361	-2.853	

Flecha Tot. el s. m x =0.002294

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.204	-1.361	-0.131	
	m¡n.	0.162	-1.071	-0.223	
	Cort.m x.	0.162	-1.071	-0.223	
	m¡n.	0.204	-1.361	-0.131	
	Flec.m x.	0.204	-1.361	-0.131	
	m¡n.	0.162	-1.071	-0.223	

Flecha Tot. el s. m x =0.001957

BARRA : 24 (41,46) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	33.655	-70.306	-288.801	
	m¡n.	30.336	-59.776	-235.195	
	Cort.m x.	30.336	-59.776	-235.195	
	m¡n.	33.655	-70.306	-288.801	
	Flec.m x.	30.336	-59.776	-235.195	
	m¡n.	33.655	-70.306	-288.801	

Flecha Tot. el s. m x =0.000648

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	33.655	-70.306	-148.188	
	m¡n.	30.336	-59.776	-115.643	
	Cort.m x.	30.336	-59.776	-115.643	
	m¡n.	33.655	-70.306	-148.188	
	Flec.m x.	30.336	-59.776	-115.643	
	m¡n.	33.655	-70.306	-148.188	

Flecha Tot. el s. m x =0.001217

BARRA : 25 (42,47) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-130.635	-280.849	
	m¡n.	0.000	-173.372	-379.148	
	Flec.m x.	0.000	-130.635	-280.849	
	m¡n.	0.000	-173.372	-379.148	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-130.635	-19.579	
	m¡n.	0.000	-173.372	-32.403	
	Flec.m x.	0.000	-130.635	-19.579	
	m¡n.	0.000	-173.372	-32.403	

Flecha Tot. el s. m x =0.000860

BARRA : 26 (43,48) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-30.336	-59.776	-235.195	
	m¡n.	-33.655	-70.307	-288.801	
	Cort.m x.	-30.336	-59.776	-235.195	
	m¡n.	-33.655	-70.307	-288.801	
	Flec.m x.	-30.336	-59.776	-235.195	
	m¡n.	-33.655	-70.307	-288.801	

Flecha Tot. el s. m x =0.000648

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-30.336	-59.776	-115.643	
	m¡n.	-33.655	-70.307	-148.188	
	Cort.m x.	-30.336	-59.776	-115.643	
	m¡n.	-33.655	-70.307	-148.188	
	Flec.m x.	-30.336	-59.776	-115.643	
	m¡n.	-33.655	-70.307	-148.188	

Flecha Tot. el s. m x =0.001217

BARRA : 27 (40,41) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.251	14.685	0.383	
	m¡n.	-0.060	12.994	0.324	
	Cort.m x.	0.251	14.685	0.383	
	m¡n.	-0.060	12.994	0.324	
	Flec.m x.	0.251	14.685	0.383	
	m¡n.	-0.060	12.994	0.324	

Flecha Tot. el s. m x =0.001957

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.251	14.685	-43.672	
	m¡n.	-0.060	12.994	-38.657	
	Cort.m x.	0.251	14.685	-43.672	
	m¡n.	-0.060	12.994	-38.657	
	Flec.m x.	-0.060	12.994	-38.657	
	m¡n.	0.251	14.685	-43.672	

Flecha Tot. el s. m x =0.000648

BARRA : 28 (41,42) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.944	162.339	26.952	
	m¡n.	-13.731	137.007	21.127	
	Cort.m x.	-0.944	162.339	26.952	
	m¡n.	-13.731	137.007	21.127	
	Flec.m x.	-0.944	162.339	26.952	
	m¡n.	-13.731	137.007	21.127	

Flecha Tot. el s. m x =0.000648

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.944	162.339	-297.726	
	m¡n.	-13.731	137.007	-252.888	
	Cort.m x.	-0.944	162.339	-297.726	
	m¡n.	-13.731	137.007	-252.888	
	Flec.m x.	-13.731	137.007	-252.888	
	m¡n.	-0.944	162.339	-297.726	

BARRA : 29 (42,43) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	13.731	-137.008	-252.889	
	m¡n.	0.944	-162.339	-297.726	
	Cort.m x.	13.731	-137.008	-252.889	
	m¡n.	0.944	-162.339	-297.726	
	Flec.m x.	13.731	-137.008	-252.889	

	m¡n.	0.944	-162.339	-297.726	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	13.731	-137.008	21.127	
	m¡n.	0.944	-162.339	26.952	
	Cort.m x.	13.731	-137.008	21.127	
	m¡n.	0.944	-162.339	26.952	
	Flec.m x.	0.944	-162.339	26.952	
	m¡n.	13.731	-137.008	21.127	

Flecha Tot. el s. m x =0.000648

BARRA : 30 (43,44) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.060	-12.994	-38.657	
	m¡n.	-0.251	-14.685	-43.672	
	Cort.m x.	0.060	-12.994	-38.657	
	m¡n.	-0.251	-14.685	-43.672	
	Flec.m x.	0.060	-12.994	-38.657	
	m¡n.	-0.251	-14.685	-43.672	

Flecha Tot. el s. m x =0.000648

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.060	-12.994	0.324	
	m¡n.	-0.251	-14.685	0.383	
	Cort.m x.	0.060	-12.994	0.324	
	m¡n.	-0.251	-14.685	0.383	
	Flec.m x.	-0.251	-14.685	0.383	
	m¡n.	0.060	-12.994	0.324	

Flecha Tot. el s. m x =0.001957

BARRA : 31 (35,40) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.162	-1.071	-2.365	
	m¡n.	-0.204	-1.361	-2.853	
	Cort.m x.	-0.162	-1.071	-2.365	
	m¡n.	-0.204	-1.361	-2.853	
	Flec.m x.	-0.162	-1.071	-2.365	
	m¡n.	-0.204	-1.361	-2.853	

Flecha Tot. el s. m x =0.002294

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.162	-1.071	-0.223	
	m¡n.	-0.204	-1.361	-0.131	
	Cort.m x.	-0.162	-1.071	-0.223	
	m¡n.	-0.204	-1.361	-0.131	
	Flec.m x.	-0.204	-1.361	-0.131	
	m¡n.	-0.162	-1.071	-0.223	

Flecha Tot. el s. m x =0.001957

BARRA : 32 (34,39) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.224	-1.186	-1.682	
	m¡n.	0.196	-1.050	-1.496	
	Cort.m x.	0.196	-1.050	-1.496	
	m¡n.	0.224	-1.186	-1.682	
	Flec.m x.	0.196	-1.050	-1.496	
	m¡n.	0.224	-1.186	-1.682	

Flecha Tot. el s. m x =0.003299

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.224	-1.186	0.690	
	m¡n.	0.196	-1.050	0.604	
	Cort.m x.	0.196	-1.050	0.604	

m¡n.	0.224	-1.186	0.690
Flec.m x.	0.224	-1.186	0.690
m¡n.	0.196	-1.050	0.604

Flecha Tot. el s. m x =0.002294

BARRA : 33 (36,41) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-29.448	49.487	-149.891	
	m¡n.	-36.969	60.598	-168.801	
	Cort.m x.	-36.969	60.598	-168.801	
	m¡n.	-29.448	49.487	-149.891	
	Flec.m x.	-29.448	49.487	-149.891	
	m¡n.	-36.969	60.598	-168.801	

Flecha Tot. el s. m x =0.001240

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-29.448	49.487	-248.866	
	m¡n.	-36.969	60.598	-289.996	
	Cort.m x.	-36.969	60.598	-289.996	
	m¡n.	-29.448	49.487	-248.866	
	Flec.m x.	-29.448	49.487	-248.866	
	m¡n.	-36.969	60.598	-289.996	

Flecha Tot. el s. m x =0.000648

BARRA : 34 (37,42) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	170.144	-48.724	
	m¡n.	-0.000	158.093	-47.693	
	Flec.m x.	-0.000	158.093	-47.693	
	m¡n.	-0.000	170.144	-48.724	

Flecha Tot. el s. m x =0.000890

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	170.144	-389.012	
	m¡n.	-0.000	158.093	-363.878	
	Flec.m x.	-0.000	158.093	-363.878	
	m¡n.	-0.000	170.144	-389.012	

BARRA : 35 (38,43) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	36.969	60.598	-168.801	
	m¡n.	29.448	49.488	-149.891	
	Cort.m x.	36.969	60.598	-168.801	
	m¡n.	29.448	49.488	-149.891	
	Flec.m x.	29.448	49.488	-149.891	
	m¡n.	36.969	60.598	-168.801	

Flecha Tot. el s. m x =0.001240

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	36.969	60.598	-289.996	
	m¡n.	29.448	49.488	-248.866	
	Cort.m x.	36.969	60.598	-289.996	
	m¡n.	29.448	49.488	-248.866	
	Flec.m x.	29.448	49.488	-248.866	
	m¡n.	36.969	60.598	-289.996	

Flecha Tot. el s. m x =0.000648

BARRA : 36 (35,36) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.543	17.260	0.020	
	m¡n.	2.969	15.067	0.034	
	Cort.m x.	3.543	17.260	0.020	
	m¡n.	2.969	15.067	0.034	
	Flec.m x.	2.969	15.067	0.034	
	m¡n.	3.543	17.260	0.020	

Flecha Tot. el s. m x =0.002294

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	3.543	17.260	-51.760	
	m¡n.	2.969	15.067	-45.166	
	Cort.m x.	3.543	17.260	-51.760	
	m¡n.	2.969	15.067	-45.166	
	Flec.m x.	2.969	15.067	-45.166	
	m¡n.	3.543	17.260	-51.760	

Flecha Tot. el s. m x =0.001240

BARRA : 37 (36,37) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	28.514	44.533	-55.364	
	m¡n.	24.838	42.459	-45.152	
	Cort.m x.	28.514	44.533	-55.364	
	m¡n.	24.838	42.459	-45.152	
	Flec.m x.	24.838	42.459	-45.152	
	m¡n.	28.514	44.533	-55.364	

Flecha Tot. el s. m x =0.001240

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	28.514	44.533	-144.429	
	m¡n.	24.838	42.459	-130.070	
	Cort.m x.	28.514	44.533	-144.429	
	m¡n.	24.838	42.459	-130.070	
	Flec.m x.	24.838	42.459	-130.070	
	m¡n.	28.514	44.533	-144.429	

Flecha Tot. el s. m x =0.000890

BARRA : 38 (37,38) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-24.838	-42.459	-130.070	
	m¡n.	-28.514	-44.533	-144.429	
	Cort.m x.	-24.838	-42.459	-130.070	
	m¡n.	-28.514	-44.533	-144.429	
	Flec.m x.	-24.838	-42.459	-130.070	
	m¡n.	-28.514	-44.533	-144.429	

Flecha Tot. el s. m x =0.000890

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-24.838	-42.459	-45.152	
	m¡n.	-28.514	-44.533	-55.364	
	Cort.m x.	-24.838	-42.459	-45.152	
	m¡n.	-28.514	-44.533	-55.364	
	Flec.m x.	-24.838	-42.459	-45.152	
	m¡n.	-28.514	-44.533	-55.364	

Flecha Tot. el s. m x =0.001240

BARRA : 39 (38,39) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.969	-15.067	-45.166	
	m¡n.	-3.543	-17.260	-51.760	
	Cort.m x.	-2.969	-15.067	-45.166	
	m¡n.	-3.543	-17.260	-51.760	
	Flec.m x.	-2.969	-15.067	-45.166	
	m¡n.	-3.543	-17.260	-51.760	

Flecha Tot. el s. m x =0.001240

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-2.969	-15.067	0.034	
	m¡n.	-3.543	-17.260	0.020	
	Cort.m x.	-2.969	-15.067	0.034	

m¡n.	-3.543	-17.260	0.020
Flec.m x.	-2.969	-15.067	0.034
m¡n.	-3.543	-17.260	0.020

Flecha Tot. el s. m x =0.002294

BARRA : 40 (30,35) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.196	-1.050	-1.496	
	m¡n.	-0.224	-1.186	-1.682	
	Cort.m x.	-0.196	-1.050	-1.496	
	m¡n.	-0.224	-1.186	-1.682	
	Flec.m x.	-0.196	-1.050	-1.496	
	m¡n.	-0.224	-1.186	-1.682	

Flecha Tot. el s. m x =0.003299

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.196	-1.050	0.604	
	m¡n.	-0.224	-1.186	0.690	
	Cort.m x.	-0.196	-1.050	0.604	
	m¡n.	-0.224	-1.186	0.690	
	Flec.m x.	-0.224	-1.186	0.690	
	m¡n.	-0.196	-1.050	0.604	

Flecha Tot. el s. m x =0.002294

BARRA : 41 (29,34) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.184	-1.039	-0.686	
	m¡n.	0.169	-0.974	-0.672	
	Cort.m x.	0.169	-0.974	-0.672	
	m¡n.	0.184	-1.039	-0.686	
	Flec.m x.	0.169	-0.974	-0.672	
	m¡n.	0.184	-1.039	-0.686	

Flecha Tot. el s. m x =0.004367

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.184	-1.039	1.393	
	m¡n.	0.169	-0.974	1.276	
	Cort.m x.	0.169	-0.974	1.276	
	m¡n.	0.184	-1.039	1.393	
	Flec.m x.	0.184	-1.039	1.393	
	m¡n.	0.169	-0.974	1.276	

Flecha Tot. el s. m x =0.003299

BARRA : 42 (31,36) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-29.461	62.129	-3.763	
	m¡n.	-33.365	71.121	-1.588	
	Cort.m x.	-33.365	71.121	-1.588	
	m¡n.	-29.461	62.129	-3.763	
	Flec.m x.	-33.365	71.121	-1.588	
	m¡n.	-29.461	62.129	-3.763	

Flecha Tot. el s. m x =0.002508

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-29.461	62.129	-128.022	
	m¡n.	-33.365	71.121	-143.830	
	Cort.m x.	-33.365	71.121	-143.830	
	m¡n.	-29.461	62.129	-128.022	
	Flec.m x.	-29.461	62.129	-128.022	
	m¡n.	-33.365	71.121	-143.830	

Flecha Tot. el s. m x =0.001240

BARRA : 43 (32,37) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	67.678	29.605	
	m¡n.	-0.000	61.375	25.381	
	Flec.m x.	-0.000	67.678	29.605	
	m¡n.	-0.000	61.375	25.381	

Flecha Tot. el s. m x =0.002310

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	67.678	-105.751	
	m¡n.	-0.000	61.375	-97.369	
	Flec.m x.	-0.000	61.375	-97.369	
	m¡n.	-0.000	67.678	-105.751	

Flecha Tot. el s. m x =0.000890

BARRA : 44 (33,38) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	33.365	71.121	-1.588	
	m¡n.	29.461	62.130	-3.763	
	Cort.m x.	33.365	71.121	-1.588	
	m¡n.	29.461	62.130	-3.763	
	Flec.m x.	33.365	71.121	-1.588	
	m¡n.	29.461	62.130	-3.763	

Flecha Tot. el s. m x =0.002508

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	33.365	71.121	-143.830	
	m¡n.	29.461	62.130	-128.022	
	Cort.m x.	33.365	71.121	-143.830	
	m¡n.	29.461	62.130	-128.022	
	Flec.m x.	29.461	62.130	-128.022	
	m¡n.	33.365	71.121	-143.830	

Flecha Tot. el s. m x =0.001240

BARRA : 45 (30,31) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.074	17.231	-0.040	
	m¡n.	2.772	15.120	-0.028	
	Cort.m x.	3.074	17.231	-0.040	
	m¡n.	2.772	15.120	-0.028	
	Flec.m x.	2.772	15.120	-0.028	
	m¡n.	3.074	17.231	-0.040	

Flecha Tot. el s. m x =0.003299

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	3.074	17.231	-51.735	
	m¡n.	2.772	15.120	-45.389	
	Cort.m x.	3.074	17.231	-51.735	
	m¡n.	2.772	15.120	-45.389	
	Flec.m x.	2.772	15.120	-45.389	
	m¡n.	3.074	17.231	-51.735	

Flecha Tot. el s. m x =0.002508

BARRA : 46 (31,32) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	11.769	7.606	-60.260	
	m¡n.	10.905	7.364	-51.964	
	Cort.m x.	11.769	7.606	-60.260	
	m¡n.	10.905	7.364	-51.964	
	Flec.m x.	10.905	7.364	-51.964	
	m¡n.	11.769	7.606	-60.260	

Flecha Tot. el s. m x =0.002508

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	11.769	7.606	-75.471	
	m¡n.	10.905	7.364	-66.692	
	Cort.m x.	11.769	7.606	-75.471	
	m¡n.	10.905	7.364	-66.692	
	Flec.m x.	10.905	7.364	-66.692	
	m¡n.	11.769	7.606	-75.471	

Flecha Tot. el s. m x =0.002310

BARRA : 47 (32,33) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-10.905	-7.364	-66.692	
	m¡n.	-11.769	-7.605	-75.471	
	Cort.m x.	-10.905	-7.364	-66.692	
	m¡n.	-11.769	-7.605	-75.471	
	Flec.m x.	-10.905	-7.364	-66.692	
	m¡n.	-11.769	-7.605	-75.471	

Flecha Tot. el s. m x =0.002310

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-10.905	-7.364	-51.964	
	m¡n.	-11.769	-7.605	-60.260	
	Cort.m x.	-10.905	-7.364	-51.964	
	m¡n.	-11.769	-7.605	-60.260	
	Flec.m x.	-10.905	-7.364	-51.964	
	m¡n.	-11.769	-7.605	-60.260	

Flecha Tot. el s. m x =0.002508

BARRA : 48 (33,34) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.772	-15.120	-45.389	
	m¡n.	-3.074	-17.231	-51.735	
	Cort.m x.	-2.772	-15.120	-45.389	
	m¡n.	-3.074	-17.231	-51.735	
	Flec.m x.	-2.772	-15.120	-45.389	
	m¡n.	-3.074	-17.231	-51.735	

Flecha Tot. el s. m x =0.002508

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-2.772	-15.120	-0.028	
	m¡n.	-3.074	-17.231	-0.040	
	Cort.m x.	-2.772	-15.120	-0.028	
	m¡n.	-3.074	-17.231	-0.040	
	Flec.m x.	-2.772	-15.120	-0.028	
	m¡n.	-3.074	-17.231	-0.040	

Flecha Tot. el s. m x =0.003299

BARRA : 49 (25,30) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.169	-0.974	-0.672	
	m¡n.	-0.184	-1.039	-0.686	
	Cort.m x.	-0.169	-0.974	-0.672	
	m¡n.	-0.184	-1.039	-0.686	
	Flec.m x.	-0.169	-0.974	-0.672	
	m¡n.	-0.184	-1.039	-0.686	

Flecha Tot. el s. m x =0.004367

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.169	-0.974	1.276	
	m¡n.	-0.184	-1.039	1.393	
	Cort.m x.	-0.169	-0.974	1.276	
	m¡n.	-0.184	-1.039	1.393	
	Flec.m x.	-0.184	-1.039	1.393	
	m¡n.	-0.169	-0.974	1.276	

Flecha Tot. el s. m x =0.003299

BARRA : 50 (24,29) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.248	-1.884	-1.052	
	m¡n.	0.234	-1.789	-1.058	
	Cort.m x.	0.234	-1.789	-1.058	
	m¡n.	0.248	-1.884	-1.052	
	Flec.m x.	0.248	-1.884	-1.052	
	m¡n.	0.234	-1.789	-1.058	

Flecha Tot. el s. m x =0.004954

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.248	-1.884	2.717	
	m¡n.	0.234	-1.789	2.520	
	Cort.m x.	0.234	-1.789	2.520	
	m¡n.	0.248	-1.884	2.717	
	Flec.m x.	0.248	-1.884	2.717	
	m¡n.	0.234	-1.789	2.520	

Flecha Tot. el s. m x =0.004367

BARRA : 51 (26,31) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-22.886	39.623	83.617	
	m¡n.	-24.840	44.745	96.596	
	Cort.m x.	-24.840	44.745	96.596	
	m¡n.	-22.886	39.623	83.617	
	Flec.m x.	-24.840	44.745	96.596	
	m¡n.	-22.886	39.623	83.617	

Flecha Tot. el s. m x =0.003786

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-22.886	39.623	4.371	
	m¡n.	-24.840	44.745	7.106	
	Cort.m x.	-24.840	44.745	7.106	
	m¡n.	-22.886	39.623	4.371	
	Flec.m x.	-24.840	44.745	7.106	
	m¡n.	-22.886	39.623	4.371	

Flecha Tot. el s. m x =0.002508

BARRA : 52 (27,32) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	39.067	84.202	
	m¡n.	-0.000	34.847	73.265	
	Flec.m x.	-0.000	39.067	84.202	
	m¡n.	-0.000	34.847	73.265	

Flecha Tot. el s. m x =0.003660

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	39.067	6.068	
	m¡n.	-0.000	34.847	3.571	
	Flec.m x.	-0.000	39.067	6.068	
	m¡n.	-0.000	34.847	3.571	

Flecha Tot. el s. m x =0.002310

BARRA : 53 (28,33) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	24.840	44.745	96.596	
	m¡n.	22.886	39.623	83.617	
	Cort.m x.	24.840	44.745	96.596	
	m¡n.	22.886	39.623	83.617	
	Flec.m x.	24.840	44.745	96.596	
	m¡n.	22.886	39.623	83.617	

Flecha Tot. el s. m x =0.003786

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	24.840	44.745	7.106	
	m¡n.	22.886	39.623	4.371	
	Cort.m x.	24.840	44.745	7.106	
	m¡n.	22.886	39.623	4.371	
	Flec.m x.	24.840	44.745	7.106	
	m¡n.	22.886	39.623	4.371	

Flecha Tot. el s. m x =0.002508

BARRA : 54 (25,26) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.403	16.240	0.064	
	m¡n.	3.192	14.230	0.066	
	Cort.m x.	3.403	16.240	0.064	
	m¡n.	3.192	14.230	0.066	
	Flec.m x.	3.192	14.230	0.066	
	m¡n.	3.403	16.240	0.064	

Flecha Tot. el s. m x =0.004367

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	3.403	16.240	-48.656	
	m¡n.	3.192	14.230	-42.624	
	Cort.m x.	3.403	16.240	-48.656	
	m¡n.	3.192	14.230	-42.624	
	Flec.m x.	3.192	14.230	-42.624	
	m¡n.	3.403	16.240	-48.656	

Flecha Tot. el s. m x =0.003786

BARRA : 55 (26,27) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	8.724	3.140	-40.880	
	m¡n.	8.219	2.646	-34.711	
	Cort.m x.	8.724	3.140	-40.880	
	m¡n.	8.219	2.646	-34.711	
	Flec.m x.	8.219	2.646	-34.711	
	m¡n.	8.724	3.140	-40.880	

Flecha Tot. el s. m x =0.003786

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	8.724	3.140	-47.160	
	m¡n.	8.219	2.646	-40.004	
	Cort.m x.	8.724	3.140	-47.160	
	m¡n.	8.219	2.646	-40.004	
	Flec.m x.	8.219	2.646	-40.004	
	m¡n.	8.724	3.140	-47.160	

Flecha Tot. el s. m x =0.003660

BARRA : 56 (27,28) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-8.219	-2.646	-40.004	
	m¡n.	-8.724	-3.140	-47.160	
	Cort.m x.	-8.219	-2.646	-40.004	
	m¡n.	-8.724	-3.140	-47.160	
	Flec.m x.	-8.219	-2.646	-40.004	
	m¡n.	-8.724	-3.140	-47.160	

Flecha Tot. el s. m x =0.003660

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-8.219	-2.646	-34.711	
	m¡n.	-8.724	-3.140	-40.880	
	Cort.m x.	-8.219	-2.646	-34.711	

m¡n.	-8.724	-3.140	-40.880
Flec.m x.	-8.219	-2.646	-34.711
m¡n.	-8.724	-3.140	-40.880

Flecha Tot. el s. m x =0.003786

BARRA : 57 (28,29) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.192	-14.230	-42.624	
	m¡n.	-3.403	-16.240	-48.656	
	Cort.m x.	-3.192	-14.230	-42.624	
	m¡n.	-3.403	-16.240	-48.656	
	Flec.m x.	-3.192	-14.230	-42.624	
	m¡n.	-3.403	-16.240	-48.656	

Flecha Tot. el s. m x =0.003786

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-3.192	-14.230	0.066	
	m¡n.	-3.403	-16.240	0.064	
	Cort.m x.	-3.192	-14.230	0.066	
	m¡n.	-3.403	-16.240	0.064	
	Flec.m x.	-3.192	-14.230	0.066	
	m¡n.	-3.403	-16.240	0.064	

Flecha Tot. el s. m x =0.004367

BARRA : 58 (20,25) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.234	-1.789	-1.058	
	m¡n.	-0.248	-1.884	-1.052	
	Cort.m x.	-0.234	-1.789	-1.058	
	m¡n.	-0.248	-1.884	-1.052	
	Flec.m x.	-0.248	-1.884	-1.052	
	m¡n.	-0.234	-1.789	-1.058	

Flecha Tot. el s. m x =0.004954

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.234	-1.789	2.520	
	m¡n.	-0.248	-1.884	2.717	
	Cort.m x.	-0.234	-1.789	2.520	
	m¡n.	-0.248	-1.884	2.717	
	Flec.m x.	-0.248	-1.884	2.717	
	m¡n.	-0.234	-1.789	2.520	

Flecha Tot. el s. m x =0.004367

BARRA : 59 (19,24) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.571	-4.384	-3.296	
	m¡n.	0.551	-4.183	-3.200	
	Cort.m x.	0.551	-4.183	-3.200	
	m¡n.	0.571	-4.384	-3.296	
	Flec.m x.	0.551	-4.183	-3.200	
	m¡n.	0.571	-4.384	-3.296	

Flecha Tot. el s. m x =0.004632

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.571	-4.384	5.473	
	m¡n.	0.551	-4.183	5.166	
	Cort.m x.	0.551	-4.183	5.166	
	m¡n.	0.571	-4.384	5.473	
	Flec.m x.	0.571	-4.384	5.473	
	m¡n.	0.551	-4.183	5.166	

Flecha Tot. el s. m x =0.004954

BARRA : 60 (21,26) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-30.799	13.290	115.223	
	m¡n.	-32.616	14.895	131.707	
	Cort.m x.	-32.616	14.895	131.707	
	m¡n.	-30.799	13.290	115.223	
	Flec.m x.	-32.616	14.895	131.707	
	m¡n.	-30.799	13.290	115.223	

Flecha Tot. el s. m x =0.004654

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-30.799	13.290	88.644	
	m¡n.	-32.616	14.895	101.917	
	Cort.m x.	-32.616	14.895	101.917	
	m¡n.	-30.799	13.290	88.644	
	Flec.m x.	-32.616	14.895	101.917	
	m¡n.	-30.799	13.290	88.644	

Flecha Tot. el s. m x =0.003786

BARRA : 61 (22,27) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	19.387	105.528	
	m¡n.	-0.000	17.754	92.335	
	Flec.m x.	-0.000	19.387	105.528	
	m¡n.	-0.000	17.754	92.335	

Flecha Tot. el s. m x =0.004618

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	19.387	66.754	
	m¡n.	-0.000	17.754	56.826	
	Flec.m x.	-0.000	19.387	66.754	
	m¡n.	-0.000	17.754	56.826	

Flecha Tot. el s. m x =0.003660

BARRA : 62 (23,28) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	32.616	14.895	131.707	
	m¡n.	30.799	13.290	115.223	
	Cort.m x.	32.616	14.895	131.707	
	m¡n.	30.799	13.290	115.223	
	Flec.m x.	32.616	14.895	131.707	
	m¡n.	30.799	13.290	115.223	

Flecha Tot. el s. m x =0.004654

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	32.616	14.895	101.917	
	m¡n.	30.799	13.290	88.644	
	Cort.m x.	32.616	14.895	101.917	
	m¡n.	30.799	13.290	88.644	
	Flec.m x.	32.616	14.895	101.917	
	m¡n.	30.799	13.290	88.644	

Flecha Tot. el s. m x =0.003786

BARRA : 63 (20,21) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	6.525	14.585	0.323	
	m¡n.	6.224	12.651	0.317	
	Cort.m x.	6.525	14.585	0.323	
	m¡n.	6.224	12.651	0.317	
	Flec.m x.	6.525	14.585	0.323	
	m¡n.	6.224	12.651	0.317	

Flecha Tot. el s. m x =0.004954

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	6.525	14.585	-43.432	
	m¡n.	6.224	12.651	-37.636	
	Cort.m x.	6.525	14.585	-43.432	
	m¡n.	6.224	12.651	-37.636	
	Flec.m x.	6.224	12.651	-37.636	
	m¡n.	6.525	14.585	-43.432	

Flecha Tot. el s. m x =0.004654

BARRA : 64 (21,22) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	14.815	0.583	-12.126	
	m¡n.	14.025	0.131	-7.660	
	Cort.m x.	14.815	0.583	-12.126	
	m¡n.	14.025	0.131	-7.660	
	Flec.m x.	14.025	0.131	-7.660	
	m¡n.	14.815	0.583	-12.126	

Flecha Tot. el s. m x =0.004654

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	14.815	0.583	-13.291	
	m¡n.	14.025	0.131	-7.922	
	Cort.m x.	14.815	0.583	-13.291	
	m¡n.	14.025	0.131	-7.922	
	Flec.m x.	14.025	0.131	-7.922	
	m¡n.	14.815	0.583	-13.291	

Flecha Tot. el s. m x =0.004618

BARRA : 65 (22,23) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-14.025	-0.131	-7.922	
	m¡n.	-14.815	-0.583	-13.291	
	Cort.m x.	-14.025	-0.131	-7.922	
	m¡n.	-14.815	-0.583	-13.291	
	Flec.m x.	-14.025	-0.131	-7.922	
	m¡n.	-14.815	-0.583	-13.291	

Flecha Tot. el s. m x =0.004618

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-14.025	-0.131	-7.660	
	m¡n.	-14.815	-0.583	-12.126	
	Cort.m x.	-14.025	-0.131	-7.660	
	m¡n.	-14.815	-0.583	-12.126	
	Flec.m x.	-14.025	-0.131	-7.660	
	m¡n.	-14.815	-0.583	-12.126	

Flecha Tot. el s. m x =0.004654

BARRA : 66 (23,24) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-6.224	-12.651	-37.637	
	m¡n.	-6.525	-14.585	-43.432	
	Cort.m x.	-6.224	-12.651	-37.637	
	m¡n.	-6.525	-14.585	-43.432	
	Flec.m x.	-6.224	-12.651	-37.637	
	m¡n.	-6.525	-14.585	-43.432	

Flecha Tot. el s. m x =0.004654

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-6.224	-12.651	0.317	
	m¡n.	-6.525	-14.585	0.323	
	Cort.m x.	-6.224	-12.651	0.317	
	m¡n.	-6.525	-14.585	0.323	
	Flec.m x.	-6.525	-14.585	0.323	
	m¡n.	-6.224	-12.651	0.317	

Flecha Tot. el s. m x =0.004954

BARRA : 67 (15,20) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.551	-4.183	-3.200	
	m¡n.	-0.571	-4.384	-3.296	
	Cort.m x.	-0.551	-4.183	-3.200	
	m¡n.	-0.571	-4.384	-3.296	
	Flec.m x.	-0.551	-4.183	-3.200	
	m¡n.	-0.571	-4.384	-3.296	

Flecha Tot. el s. m x =0.004632

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.551	-4.183	5.166	
	m¡n.	-0.571	-4.384	5.473	
	Cort.m x.	-0.551	-4.183	5.166	
	m¡n.	-0.571	-4.384	5.473	
	Flec.m x.	-0.571	-4.384	5.473	
	m¡n.	-0.551	-4.183	5.166	

Flecha Tot. el s. m x =0.004954

BARRA : 68 (14,19) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.537	-13.858	-8.160	
	m¡n.	3.448	-14.185	-8.330	
	Cort.m x.	3.537	-13.858	-8.160	
	m¡n.	3.448	-14.185	-8.330	
	Flec.m x.	3.537	-13.858	-8.160	
	m¡n.	3.448	-14.185	-8.330	

Flecha Tot. el s. m y =0.000944

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	3.537	-13.858	19.555	
	m¡n.	3.448	-14.185	20.041	
	Cort.m x.	3.537	-13.858	19.555	
	m¡n.	3.448	-14.185	20.041	
	Flec.m x.	3.448	-14.185	20.041	
	m¡n.	3.537	-13.858	19.555	

Flecha Tot. el s. m x =0.004632

BARRA : 69 (16,21) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-60.776	-13.981	95.063	
	m¡n.	-63.922	-15.857	108.282	
	Cort.m x.	-60.776	-13.981	95.063	
	m¡n.	-63.922	-15.857	108.282	
	Flec.m x.	-63.922	-15.857	108.282	
	m¡n.	-60.776	-13.981	95.063	

Flecha Tot. el s. m x =0.004951

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-60.776	-13.981	123.024	
	m¡n.	-63.922	-15.857	139.997	
	Cort.m x.	-60.776	-13.981	123.024	
	m¡n.	-63.922	-15.857	139.997	
	Flec.m x.	-63.922	-15.857	139.997	
	m¡n.	-60.776	-13.981	123.024	

Flecha Tot. el s. m x =0.004654

BARRA : 70 (17,22) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	5.692	75.670	
	m¡n.	0.000	4.821	85.542	
	Flec.m x.	0.000	4.821	85.542	
	m¡n.	0.000	5.692	75.670	

Flecha Tot. el s. m x =0.005094

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	5.692	64.286	
	m¡n.	0.000	4.821	75.899	
	Flec.m x.	0.000	4.821	75.899	
	m¡n.	0.000	5.692	64.286	

Flecha Tot. el s. m x =0.004618

BARRA : 71 (18,23) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	63.922	-15.857	108.282	
	m¡n.	60.776	-13.980	95.063	
	Cort.m x.	60.776	-13.980	95.063	
	m¡n.	63.922	-15.857	108.282	
	Flec.m x.	63.922	-15.857	108.282	
	m¡n.	60.776	-13.980	95.063	

Flecha Tot. el s. m x =0.004951

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	63.922	-15.857	139.997	
	m¡n.	60.776	-13.980	123.024	
	Cort.m x.	60.776	-13.980	123.024	
	m¡n.	63.922	-15.857	139.997	
	Flec.m x.	63.922	-15.857	139.997	
	m¡n.	60.776	-13.980	123.024	

Flecha Tot. el s. m x =0.004654

BARRA : 72 (15,16) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	23.336	7.284	2.876	
	m¡n.	22.756	5.370	2.986	
	Cort.m x.	23.336	7.284	2.876	
	m¡n.	22.756	5.370	2.986	
	Flec.m x.	22.756	5.370	2.986	
	m¡n.	23.336	7.284	2.876	

Flecha Tot. el s. m x =0.004632

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	23.336	7.284	-18.975	
	m¡n.	22.756	5.370	-13.125	
	Cort.m x.	23.336	7.284	-18.975	
	m¡n.	22.756	5.370	-13.125	
	Flec.m x.	22.756	5.370	-13.125	
	m¡n.	23.336	7.284	-18.975	

Flecha Tot. el s. m x =0.004951

BARRA : 73 (16,17) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	30.307	-5.351	43.307	
	m¡n.	28.405	-4.836	45.718	
	Cort.m x.	28.405	-4.836	45.718	
	m¡n.	30.307	-5.351	43.307	
	Flec.m x.	28.405	-4.836	45.718	
	m¡n.	30.307	-5.351	43.307	

Flecha Tot. el s. m x =0.004951

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	30.307	-5.351	54.008	
	m¡n.	28.405	-4.836	55.390	
	Cort.m x.	28.405	-4.836	55.390	

m¡n.	30.307	-5.351	54.008
Flec.m x.	28.405	-4.836	55.390
m¡n.	30.307	-5.351	54.008

Flecha Tot. el s. m x =0.005094

BARRA : 74 (17,18) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-28.405	4.836	55.390	
	m¡n.	-30.307	5.351	54.008	
	Cort.m x.	-30.307	5.351	54.008	
	m¡n.	-28.405	4.836	55.390	
	Flec.m x.	-28.405	4.836	55.390	
	m¡n.	-30.307	5.351	54.008	

Flecha Tot. el s. m x =0.005094

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-28.405	4.836	45.718	
	m¡n.	-30.307	5.351	43.307	
	Cort.m x.	-30.307	5.351	43.307	
	m¡n.	-28.405	4.836	45.718	
	Flec.m x.	-28.405	4.836	45.718	
	m¡n.	-30.307	5.351	43.307	

Flecha Tot. el s. m x =0.004951

BARRA : 75 (18,19) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-22.756	-5.370	-13.126	
	m¡n.	-23.336	-7.284	-18.975	
	Cort.m x.	-22.756	-5.370	-13.126	
	m¡n.	-23.336	-7.284	-18.975	
	Flec.m x.	-22.756	-5.370	-13.126	
	m¡n.	-23.336	-7.284	-18.975	

Flecha Tot. el s. m x =0.004951

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-22.756	-5.370	2.986	
	m¡n.	-23.336	-7.284	2.876	
	Cort.m x.	-22.756	-5.370	2.986	
	m¡n.	-23.336	-7.284	2.876	
	Flec.m x.	-22.756	-5.370	2.986	
	m¡n.	-23.336	-7.284	2.876	

Flecha Tot. el s. m x =0.004632

BARRA : 76 (10,15) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.448	-14.185	-8.330	
	m¡n.	-3.537	-13.858	-8.160	
	Cort.m x.	-3.537	-13.858	-8.160	
	m¡n.	-3.448	-14.185	-8.330	
	Flec.m x.	-3.537	-13.858	-8.160	
	m¡n.	-3.448	-14.185	-8.330	

Flecha Tot. el s. m x =0.000943

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-3.448	-14.185	20.041	
	m¡n.	-3.537	-13.858	19.555	
	Cort.m x.	-3.537	-13.858	19.555	
	m¡n.	-3.448	-14.185	20.041	
	Flec.m x.	-3.448	-14.185	20.041	
	m¡n.	-3.537	-13.858	19.555	

Flecha Tot. el s. m x =0.004632

BARRA : 77 (8,14) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.616	-25.182	-25.000	
	m¡n.	2.215	-26.985	-26.482	
	Cort.m x.	2.616	-25.182	-25.000	
	m¡n.	2.215	-26.985	-26.482	
	Flec.m x.	2.616	-25.182	-25.000	
	m¡n.	2.215	-26.985	-26.482	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	2.616	-25.182	-6.114	
	m¡n.	2.215	-26.985	-6.243	
	Cort.m x.	2.616	-25.182	-6.114	
	m¡n.	2.215	-26.985	-6.243	
	Flec.m x.	2.616	-25.182	-6.114	
	m¡n.	2.215	-26.985	-6.243	

Flecha Tot. el s. m x =0.000944

BARRA : 78 (11,16) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-119.619	-38.937	22.839	
	m¡n.	-126.204	-45.242	24.769	
	Cort.m x.	-119.619	-38.937	22.839	
	m¡n.	-126.204	-45.242	24.769	
	Flec.m x.	-126.204	-45.242	24.769	
	m¡n.	-119.619	-38.937	22.839	

Flecha Tot. el s. m x =0.004783

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-119.619	-38.937	100.712	
	m¡n.	-126.204	-45.242	115.253	
	Cort.m x.	-119.619	-38.937	100.712	
	m¡n.	-126.204	-45.242	115.253	
	Flec.m x.	-126.204	-45.242	115.253	
	m¡n.	-119.619	-38.937	100.712	

Flecha Tot. el s. m x =0.004951

BARRA : 79 (12,17) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	3.564	25.989	
	m¡n.	0.000	2.123	29.173	
	Flec.m x.	0.000	2.123	29.173	
	m¡n.	0.000	3.564	25.989	

Flecha Tot. el s. m x =0.005270

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	3.564	18.860	
	m¡n.	0.000	2.123	24.927	
	Flec.m x.	0.000	2.123	24.927	
	m¡n.	0.000	3.564	18.860	

Flecha Tot. el s. m x =0.005094

BARRA : 80 (13,18) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	126.204	-45.242	24.769	
	m¡n.	119.619	-38.937	22.839	
	Cort.m x.	119.619	-38.937	22.839	
	m¡n.	126.204	-45.242	24.769	
	Flec.m x.	126.204	-45.242	24.769	
	m¡n.	119.619	-38.937	22.839	

Flecha Tot. el s. m x =0.004783

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	126.204	-45.242	115.253	
	m¡n.	119.619	-38.937	100.712	
	Cort.m x.	119.619	-38.937	100.712	
	m¡n.	126.204	-45.242	115.253	
	Flec.m x.	126.204	-45.242	115.253	
	m¡n.	119.619	-38.937	100.712	

Flecha Tot. el s. m x =0.004951

BARRA : 81 (10,11) Sec. 5 Rect. /138,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.087	-1.700	-1.232	
	m¡n.	2.047	-1.550	-0.921	
	Cort.m x.	2.047	-1.550	-0.921	
	m¡n.	2.087	-1.700	-1.232	
	Flec.m x.	2.047	-1.550	-0.921	
	m¡n.	2.087	-1.700	-1.232	

Flecha Tot. el s. m x =0.000943

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	2.087	-1.700	3.867	
	m¡n.	2.047	-1.550	3.728	
	Cort.m x.	2.047	-1.550	3.728	
	m¡n.	2.087	-1.700	3.867	
	Flec.m x.	2.087	-1.700	3.867	
	m¡n.	2.047	-1.550	3.728	

Flecha Tot. el s. m x =0.004783

BARRA : 82 (11,12) Sec. 5 Rect. /138,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.299	-0.124	0.810	
	m¡n.	0.280	-0.080	0.830	
	Cort.m x.	0.280	-0.080	0.830	
	m¡n.	0.299	-0.124	0.810	
	Flec.m x.	0.280	-0.080	0.830	
	m¡n.	0.299	-0.124	0.810	

Flecha Tot. el s. m x =0.004783

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.299	-0.124	1.058	
	m¡n.	0.280	-0.080	0.989	
	Cort.m x.	0.280	-0.080	0.989	
	m¡n.	0.299	-0.124	1.058	
	Flec.m x.	0.299	-0.124	1.058	
	m¡n.	0.280	-0.080	0.989	

Flecha Tot. el s. m x =0.005270

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BARRA : 83 (12,13) Sec. 5 Rect. /138,22/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.280	0.080	0.989	
	m¡n.	-0.299	0.124	1.058	
	Cort.m x.	-0.299	0.124	1.058	
	m¡n.	-0.280	0.080	0.989	
	Flec.m x.	-0.299	0.124	1.058	
	m¡n.	-0.280	0.080	0.989	

Flecha Tot. el s. m x =0.005270

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.280	0.080	0.830	
	m¡n.	-0.299	0.124	0.810	
	Cort.m x.	-0.299	0.124	0.810	
	m¡n.	-0.280	0.080	0.830	
	Flec.m x.	-0.280	0.080	0.830	
	m¡n.	-0.299	0.124	0.810	

Flecha Tot. el s. m x =0.004783

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BARRA : 84 (13,14) Sec. 5 Rect. /138,22/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.047	1.550	3.728	
	m¡n.	-2.087	1.700	3.867	
	Cort.m x.	-2.087	1.700	3.867	
	m¡n.	-2.047	1.550	3.728	
	Flec.m x.	-2.087	1.700	3.867	
	m¡n.	-2.047	1.550	3.728	

Flecha Tot. el s. m x =0.004783

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-2.047	1.550	-0.921	
	m¡n.	-2.087	1.700	-1.232	
	Cort.m x.	-2.087	1.700	-1.232	
	m¡n.	-2.047	1.550	-0.921	
	Flec.m x.	-2.047	1.550	-0.921	
	m¡n.	-2.087	1.700	-1.232	

Flecha Tot. el s. m x =0.000944

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BARRA : 85 (45,50) Sec. 1 Rect. /210,22/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.175	0.670	0.354	
	m¡n.	0.146	0.608	0.362	
	Cort.m x.	0.175	0.670	0.354	
	m¡n.	0.146	0.608	0.362	
	Flec.m x.	0.146	0.608	0.362	
	m¡n.	0.175	0.670	0.354	

Flecha Tot. el s. m x =0.002300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.175	0.670	-0.986	
	m¡n.	0.146	0.608	-0.855	
	Cort.m x.	0.175	0.670	-0.986	
	m¡n.	0.146	0.608	-0.855	
	Flec.m x.	0.146	0.608	-0.855	
	m¡n.	0.175	0.670	-0.986	

Flecha Tot. el s. m x =0.003252

BARRA : 86 (44,49) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.162	0.980	-0.162	
	m¡n.	-0.178	1.040	-0.382	
	Cort.m x.	-0.178	1.040	-0.382	
	m¡n.	-0.162	0.980	-0.162	
	Flec.m x.	-0.162	0.980	-0.162	
	m¡n.	-0.178	1.040	-0.382	

Flecha Tot. el s. m x =0.001957

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.162	0.980	-2.122	
	m¡n.	-0.178	1.040	-2.461	
	Cort.m x.	-0.178	1.040	-2.461	
	m¡n.	-0.162	0.980	-2.122	
	Flec.m x.	-0.162	0.980	-2.122	
	m¡n.	-0.178	1.040	-2.461	

Flecha Tot. el s. m x =0.002300

BARRA : 87 (46,51) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	26.653	-79.811	-124.242	
	m¡n.	22.057	-61.823	-96.164	
	Cort.m x.	22.057	-61.823	-96.164	
	m¡n.	26.653	-79.811	-124.242	
	Flec.m x.	22.057	-61.823	-96.164	
	m¡n.	26.653	-79.811	-124.242	

Flecha Tot. el s. m x =0.001217

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	26.653	-79.811	35.380	
	m¡n.	22.057	-61.823	27.482	
	Cort.m x.	22.057	-61.823	27.482	
	m¡n.	26.653	-79.811	35.380	
	Flec.m x.	26.653	-79.811	35.380	
	m¡n.	22.057	-61.823	27.482	

Flecha Tot. el s. m x =0.002375

BARRA : 88 (47,52) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-54.408	-63.504	
	m¡n.	0.000	-72.554	-85.925	
	Flec.m x.	0.000	-54.408	-63.504	
	m¡n.	0.000	-72.554	-85.925	

Flecha Tot. el s. m x =0.000869

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-54.408	45.312	
	m¡n.	0.000	-72.554	59.183	
	Flec.m x.	0.000	-72.554	59.183	
	m¡n.	0.000	-54.408	45.312	

Flecha Tot. el s. m x =0.002148

BARRA : 89 (48,53) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-22.057	-61.823	-96.164	
	m¡n.	-26.653	-79.811	-124.243	
	Cort.m x.	-22.057	-61.823	-96.164	
	m¡n.	-26.653	-79.811	-124.243	
	Flec.m x.	-22.057	-61.823	-96.164	
	m¡n.	-26.653	-79.811	-124.243	

Flecha Tot. el s. m x =0.001217

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-22.057	-61.823	27.483	
	m¡n.	-26.653	-79.811	35.380	
	Cort.m x.	-22.057	-61.823	27.483	
	m¡n.	-26.653	-79.811	35.380	
	Flec.m x.	-26.653	-79.811	35.380	
	m¡n.	-22.057	-61.823	27.483	

Flecha Tot. el s. m x =0.002375

BARRA : 90 (45,46) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.484	15.416	-0.016	
	m¡n.	-2.816	17.455	-0.004	
	Cort.m x.	-2.816	17.455	-0.004	
	m¡n.	-2.484	15.416	-0.016	
	Flec.m x.	-2.816	17.455	-0.004	
	m¡n.	-2.484	15.416	-0.016	

Flecha Tot. el s. m x =0.002300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-2.484	15.416	-46.265	
	m¡n.	-2.816	17.455	-52.368	
	Cort.m x.	-2.816	17.455	-52.368	

m¡n.	-2.484	15.416	-46.265
Flec.m x.	-2.484	15.416	-46.265
m¡n.	-2.816	17.455	-52.368

Flecha Tot. el s. m x =0.001217

BARRA : 91 (46,47) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-21.963	32.214	-54.544	
	m¡n.	-26.761	43.709	-59.369	
	Cort.m x.	-26.761	43.709	-59.369	
	m¡n.	-21.963	32.214	-54.544	
	Flec.m x.	-21.963	32.214	-54.544	
	m¡n.	-26.761	43.709	-59.369	

Flecha Tot. el s. m x =0.001217

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-21.963	32.214	-118.971	
	m¡n.	-26.761	43.709	-146.787	
	Cort.m x.	-26.761	43.709	-146.787	
	m¡n.	-21.963	32.214	-118.971	
	Flec.m x.	-21.963	32.214	-118.971	
	m¡n.	-26.761	43.709	-146.787	

Flecha Tot. el s. m x =0.000860

BARRA : 92 (47,48) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	26.761	-43.709	-146.787	
	m¡n.	21.963	-32.214	-118.972	
	Cort.m x.	21.963	-32.214	-118.972	
	m¡n.	26.761	-43.709	-146.787	
	Flec.m x.	21.963	-32.214	-118.972	
	m¡n.	26.761	-43.709	-146.787	

Flecha Tot. el s. m x =0.000860

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	26.761	-43.709	-59.369	
	m¡n.	21.963	-32.214	-54.545	
	Cort.m x.	21.963	-32.214	-54.545	
	m¡n.	26.761	-43.709	-59.369	
	Flec.m x.	21.963	-32.214	-54.545	
	m¡n.	26.761	-43.709	-59.369	

Flecha Tot. el s. m x =0.001217

BARRA : 93 (48,49) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.816	-17.455	-52.368	
	m¡n.	2.484	-15.416	-46.265	
	Cort.m x.	2.484	-15.416	-46.265	
	m¡n.	2.816	-17.455	-52.368	
	Flec.m x.	2.484	-15.416	-46.265	
	m¡n.	2.816	-17.455	-52.368	

Flecha Tot. el s. m x =0.001217

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	2.816	-17.455	-0.004	
	m¡n.	2.484	-15.416	-0.016	
	Cort.m x.	2.484	-15.416	-0.016	
	m¡n.	2.816	-17.455	-0.004	
	Flec.m x.	2.816	-17.455	-0.004	
	m¡n.	2.484	-15.416	-0.016	

Flecha Tot. el s. m x =0.002300

BARRA : 94 (50,55) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.082	0.073	0.701	
	m¡n.	0.068	0.145	0.604	
	Cort.m x.	0.068	0.145	0.604	
	m¡n.	0.082	0.073	0.701	
	Flec.m x.	0.082	0.073	0.701	
	m¡n.	0.068	0.145	0.604	

Flecha Tot. el s. m x =0.003252

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.082	0.073	0.555	
	m¡n.	0.068	0.145	0.314	
	Cort.m x.	0.068	0.145	0.314	
	m¡n.	0.082	0.073	0.555	
	Flec.m x.	0.082	0.073	0.555	
	m¡n.	0.068	0.145	0.314	

Flecha Tot. el s. m x =0.004168

BARRA : 95 (49,54) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.146	0.608	0.362	
	m¡n.	-0.175	0.670	0.354	
	Cort.m x.	-0.175	0.670	0.354	
	m¡n.	-0.146	0.608	0.362	
	Flec.m x.	-0.146	0.608	0.362	
	m¡n.	-0.175	0.670	0.354	

Flecha Tot. el s. m x =0.002300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.146	0.608	-0.855	
	m¡n.	-0.175	0.670	-0.986	
	Cort.m x.	-0.175	0.670	-0.986	

m¡n.	-0.146	0.608	-0.855
Flec.m x.	-0.146	0.608	-0.855
m¡n.	-0.175	0.670	-0.986

Flecha Tot. el s. m x =0.003252

BARRA : 96 (51,56) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	10.907	-53.986	41.976	
	m¡n.	9.244	-37.731	32.673	
	Cort.m x.	9.244	-37.731	32.673	
	m¡n.	10.907	-53.986	41.976	
	Flec.m x.	10.907	-53.986	41.976	
	m¡n.	9.244	-37.731	32.673	

Flecha Tot. el s. m x =0.002375

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	10.907	-53.986	149.947	
	m¡n.	9.244	-37.731	108.136	
	Cort.m x.	9.244	-37.731	108.136	
	m¡n.	10.907	-53.986	149.947	
	Flec.m x.	10.907	-53.986	149.947	
	m¡n.	9.244	-37.731	108.136	

Flecha Tot. el s. m x =0.003385

BARRA : 97 (52,57) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-30.275	32.014	
	m¡n.	0.000	-41.942	42.618	
	Flec.m x.	0.000	-41.942	42.618	
	m¡n.	0.000	-30.275	32.014	

Flecha Tot. el s. m x =0.002148

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-30.275	92.564	
	m¡n.	0.000	-41.942	126.501	
	Flec.m x.	0.000	-41.942	126.501	
	m¡n.	0.000	-30.275	92.564	

Flecha Tot. el s. m x =0.003189

BARRA : 98 (53,58) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-9.244	-37.731	32.673	
	m¡n.	-10.907	-53.986	41.976	
	Cort.m x.	-9.244	-37.731	32.673	
	m¡n.	-10.907	-53.986	41.976	
	Flec.m x.	-10.907	-53.986	41.976	
	m¡n.	-9.244	-37.731	32.673	

Flecha Tot. el s. m x =0.002375

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-9.244	-37.731	108.136	
	m¡n.	-10.907	-53.986	149.947	
	Cort.m x.	-9.244	-37.731	108.136	
	m¡n.	-10.907	-53.986	149.947	
	Flec.m x.	-10.907	-53.986	149.947	
	m¡n.	-9.244	-37.731	108.136	

Flecha Tot. el s. m x =0.003385

BARRA : 99 (50,51) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.459	15.508	-0.078	
	m¡n.	-1.686	17.682	-0.093	
	Cort.m x.	-1.686	17.682	-0.093	
	m¡n.	-1.459	15.508	-0.078	

Flec.m x.	-1.459	15.508	-0.078
m¡n.	-1.686	17.682	-0.093

Flecha Tot. el s. m x =0.003252

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-1.459	15.508	-46.603	
	m¡n.	-1.686	17.682	-53.138	
	Cort.m x.	-1.686	17.682	-53.138	
	m¡n.	-1.459	15.508	-46.603	
	Flec.m x.	-1.459	15.508	-46.603	
	m¡n.	-1.686	17.682	-53.138	

Flecha Tot. el s. m x =0.002375

BARRA : 100 (51,52) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-6.649	6.166	-59.417	
	m¡n.	-8.283	8.606	-68.885	
	Cort.m x.	-8.283	8.606	-68.885	
	m¡n.	-6.649	6.166	-59.417	
	Flec.m x.	-6.649	6.166	-59.417	
	m¡n.	-8.283	8.606	-68.885	

Flecha Tot. el s. m x =0.002375

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-6.649	6.166	-71.750	
	m¡n.	-8.283	8.606	-86.097	
	Cort.m x.	-8.283	8.606	-86.097	
	m¡n.	-6.649	6.166	-71.750	
	Flec.m x.	-6.649	6.166	-71.750	
	m¡n.	-8.283	8.606	-86.097	

Flecha Tot. el s. m x =0.002148

BARRA : 101 (52,53) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	8.282	-8.606	-86.097	
	m¡n.	6.649	-6.166	-71.750	
	Cort.m x.	6.649	-6.166	-71.750	
	m¡n.	8.282	-8.606	-86.097	
	Flec.m x.	6.649	-6.166	-71.750	
	m¡n.	8.282	-8.606	-86.097	

Flecha Tot. el s. m x =0.002148

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	8.282	-8.606	-68.885	
	m¡n.	6.649	-6.166	-59.417	
	Cort.m x.	6.649	-6.166	-59.417	
	m¡n.	8.282	-8.606	-68.885	
	Flec.m x.	6.649	-6.166	-59.417	
	m¡n.	8.282	-8.606	-68.885	

Flecha Tot. el s. m x =0.002375

BARRA : 102 (53,54) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.686	-17.682	-53.139	
	m¡n.	1.459	-15.508	-46.603	
	Cort.m x.	1.459	-15.508	-46.603	
	m¡n.	1.686	-17.682	-53.139	
	Flec.m x.	1.459	-15.508	-46.603	
	m¡n.	1.686	-17.682	-53.139	

Flecha Tot. el s. m x =0.002375

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	1.686	-17.682	-0.093	
	m¡n.	1.459	-15.508	-0.078	
	Cort.m x.	1.459	-15.508	-0.078	

m¡n.	1.686	-17.682	-0.093
Flec.m x.	1.459	-15.508	-0.078
m¡n.	1.686	-17.682	-0.093

Flecha Tot. el s. m x =0.003252

BARRA : 103 (55,60) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.021	-0.022	1.102	
	m¡n.	0.018	0.014	0.822	
	Cort.m x.	0.018	0.014	0.822	
	m¡n.	0.021	-0.022	1.102	
	Flec.m x.	0.021	-0.022	1.102	
	m¡n.	0.018	0.014	0.822	

Flecha Tot. el s. m x =0.004168

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.021	-0.022	1.146	
	m¡n.	0.018	0.014	0.794	
	Cort.m x.	0.018	0.014	0.794	
	m¡n.	0.021	-0.022	1.146	
	Flec.m x.	0.021	-0.022	1.146	
	m¡n.	0.018	0.014	0.794	

Flecha Tot. el s. m x =0.004524

BARRA : 104 (54,59) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.068	0.145	0.604	
	m¡n.	-0.082	0.073	0.701	
	Cort.m x.	-0.068	0.145	0.604	
	m¡n.	-0.082	0.073	0.701	
	Flec.m x.	-0.082	0.073	0.701	
	m¡n.	-0.068	0.145	0.604	

Flecha Tot. el s. m x =0.003252

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.068	0.145	0.314	
	m¡n.	-0.082	0.073	0.555	
	Cort.m x.	-0.068	0.145	0.314	
	m¡n.	-0.082	0.073	0.555	
	Flec.m x.	-0.082	0.073	0.555	
	m¡n.	-0.068	0.145	0.314	

Flecha Tot. el s. m x =0.004168

BARRA : 105 (56,61) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.749	-17.317	151.190	
	m¡n.	2.397	-12.089	109.305	
	Cort.m x.	2.397	-12.089	109.305	
	m¡n.	2.749	-17.317	151.190	
	Flec.m x.	2.749	-17.317	151.190	
	m¡n.	2.397	-12.089	109.305	

Flecha Tot. el s. m x =0.003385

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	2.749	-17.317	185.823	
	m¡n.	2.397	-12.089	133.483	
	Cort.m x.	2.397	-12.089	133.483	
	m¡n.	2.749	-17.317	185.823	
	Flec.m x.	2.749	-17.317	185.82	
	m¡n.	2.397	-12.089	133.483	

Flecha Tot. el s. m x =0.003765

BARRA : 106 (57,62) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-9.907	89.209	
	m¡n.	0.000	-14.019	122.920	
	Flec.m x.	0.000	-14.019	122.920	
	m¡n.	0.000	-9.907	89.209	

Flecha Tot. el s. m x =0.003189

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-9.907	109.023	
	m¡n.	0.000	-14.019	150.958	
	Flec.m x.	0.000	-14.019	150.958	
	m¡n.	0.000	-9.907	109.023	

Flecha Tot. el s. m x =0.003575

BARRA : 107 (58,63) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.397	-12.089	109.305	
	m¡n.	-2.749	-17.317	151.190	
	Cort.m x.	-2.397	-12.089	109.305	
	m¡n.	-2.749	-17.317	151.190	
	Flec.m x.	-2.749	-17.317	151.190	
	m¡n.	-2.397	-12.089	109.305	

Flecha Tot. el s. m x =0.003385

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-2.397	-12.089	133.483	
	m¡n.	-2.749	-17.317	185.823	
	Cort.m x.	-2.397	-12.089	133.483	
	m¡n.	-2.749	-17.317	185.823	
	Flec.m x.	-2.749	-17.317	185.823	
	m¡n.	-2.397	-12.089	133.483	

Flecha Tot. el s. m x =0.003765

BARRA : 108 (55,56) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.508	15.176	-0.050	
	m¡n.	-0.548	17.180	-0.060	
	Cort.m x.	-0.548	17.180	-0.060	
	m¡n.	-0.508	15.176	-0.050	
	Flec.m x.	-0.508	15.176	-0.050	
	m¡n.	-0.548	17.180	-0.060	

Flecha Tot. el s. m x =0.004168

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.508	15.176	-45.578	
	m¡n.	-0.548	17.180	-51.601	
	Cort.m x.	-0.548	17.180	-51.601	
	m¡n.	-0.508	15.176	-45.578	
	Flec.m x.	-0.508	15.176	-45.578	
	m¡n.	-0.548	17.180	-51.601	

Flecha Tot. el s. m x =0.003385

BARRA : 109 (56,57) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.678	4.284	-52.425	
	m¡n.	-1.791	7.261	-59.759	
	Cort.m x.	-1.791	7.261	-59.759	
	m¡n.	-1.678	4.284	-52.425	
	Flec.m x.	-1.678	4.284	-52.425	
	m¡n.	-1.791	7.261	-59.759	

Flecha Tot. el s. m x =0.003385

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.678	4.284	-60.993	
	m¡n.	-1.791	7.261	-74.281	
	Cort.m x.	-1.791	7.261	-74.281	
	m¡n.	-1.678	4.284	-60.993	
	Flec.m x.	-1.678	4.284	-60.993	
	m¡n.	-1.791	7.261	-74.281	

Flecha Tot. el s. m x =0.003189

BARRA : 110 (57,58) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.790	-7.261	-74.281	
	m¡n.	1.678	-4.284	-60.993	
	Cort.m x.	1.678	-4.284	-60.993	
	m¡n.	1.790	-7.261	-74.281	
	Flec.m x.	1.678	-4.284	-60.993	
	m¡n.	1.790	-7.261	-74.281	

Flecha Tot. el s. m x =0.003189

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.790	-7.261	-59.759	
	m¡n.	1.678	-4.284	-52.425	
	Cort.m x.	1.678	-4.284	-52.425	
	m¡n.	1.790	-7.261	-59.759	
	Flec.m x.	1.678	-4.284	-52.425	
	m¡n.	1.790	-7.261	-59.759	

Flecha Tot. el s. m x =0.003385

BARRA : 111 (58,59) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.548	-17.180	-51.601	
	m¡n.	0.508	-15.176	-45.578	
	Cort.m x.	0.508	-15.176	-45.578	
	m¡n.	0.548	-17.180	-51.601	
	Flec.m x.	0.508	-15.176	-45.578	
	m¡n.	0.548	-17.180	-51.601	

Flecha Tot. el s. m x =0.003385

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.548	-17.180	-0.060	
	m¡n.	0.508	-15.176	-0.050	
	Cort.m x.	0.508	-15.176	-0.050	
	m¡n.	0.548	-17.180	-0.060	
	Flec.m x.	0.508	-15.176	-0.050	
	m¡n.	0.548	-17.180	-0.060	

Flecha Tot. el s. m x =0.004168

BARRA : 112 (60,65) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.018	0.004	0.804	
	m¡n.	-0.021	0.042	1.157	
	Cort.m x.	-0.021	0.042	1.157	
	m¡n.	-0.018	0.004	0.804	
	Flec.m x.	-0.021	0.042	1.157	
	m¡n.	-0.018	0.004	0.804	

Flecha Tot. el s. m x =0.004524

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.018	0.004	0.797	
	m¡n.	-0.021	0.042	1.074	
	Cort.m x.	-0.021	0.042	1.074	
	m¡n.	-0.018	0.004	0.797	
	Flec.m x.	-0.021	0.042	1.074	
	m¡n.	-0.018	0.004	0.797	

Flecha Tot. el s. m x =0.004143

BARRA : 113 (59,64) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.018	0.014	0.822	
	m¡n.	-0.021	-0.022	1.102	
	Cort.m x.	-0.018	0.014	0.822	
	m¡n.	-0.021	-0.022	1.102	
	Flec.m x.	-0.021	-0.022	1.102	
	m¡n.	-0.018	0.014	0.822	

Flecha Tot. el s. m x =0.004168

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.018	0.014	0.794	
	m¡n.	-0.021	-0.022	1.146	
	Cort.m x.	-0.018	0.014	0.794	
	m¡n.	-0.021	-0.022	1.146	
	Flec.m x.	-0.021	-0.022	1.146	
	m¡n.	-0.018	0.014	0.794	

Flecha Tot. el s. m x =0.004524

BARRA : 114 (61,66) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.323	13.228	133.484	
	m¡n.	-2.666	18.596	185.824	
	Cort.m x.	-2.666	18.596	185.824	
	m¡n.	-2.323	13.228	133.484	
	Flec.m x.	-2.666	18.596	185.824	
	m¡n.	-2.323	13.228	133.484	

Flecha Tot. el s. m x =0.003765

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-2.323	13.228	107.028	
	m¡n.	-2.666	18.596	148.632	
	Cort.m x.	-2.666	18.596	148.632	
	m¡n.	-2.323	13.228	107.028	
	Flec.m x.	-2.666	18.596	148.632	
	m¡n.	-2.323	13.228	107.028	

Flecha Tot. el s. m x =0.003360

BARRA : 115 (62,67) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	15.099	150.935	
	m¡n.	-0.000	10.869	109.002	
	Flec.m x.	-0.000	15.099	150.935	
	m¡n.	-0.000	10.869	109.002	

Flecha Tot. el s. m x =0.003575

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	15.099	120.737	
	m¡n.	-0.000	10.869	87.264	
	Flec.m x.	-0.000	15.099	120.737	
	m¡n.	-0.000	10.869	87.264	

Flecha Tot. el s. m x =0.003164

BARRA : 116 (63,68) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.666	18.596	185.824	
	m¡n.	2.323	13.228	133.484	
	Cort.m x.	2.666	18.596	185.824	
	m¡n.	2.323	13.228	133.484	
	Flec.m x.	2.666	18.596	185.824	
	m¡n.	2.323	13.228	133.484	

Flecha Tot. el s. m x =0.003765

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	2.666	18.596	148.632	
	m¡n.	2.323	13.228	107.028	
	Cort.m x.	2.666	18.596	148.632	
	m¡n.	2.323	13.228	107.028	
	Flec.m x.	2.666	18.596	148.632	
	m¡n.	2.323	13.228	107.028	

Flecha Tot. el s. m x =0.003360

BARRA : 117 (60,61) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.010	15.055	-0.036	
	m¡n.	-0.011	17.021	-0.042	
	Cort.m x.	-0.011	17.021	-0.042	
	m¡n.	-0.010	15.055	-0.036	
	Flec.m x.	-0.010	15.055	-0.036	
	m¡n.	-0.011	17.021	-0.042	

Flecha Tot. el s. m x =0.004524

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.010	15.055	-45.201	
	m¡n.	-0.011	17.021	-51.106	
	Cort.m x.	-0.011	17.021	-51.106	
	m¡n.	-0.010	15.055	-45.201	
	Flec.m x.	-0.010	15.055	-45.201	
	m¡n.	-0.011	17.021	-51.106	

Flecha Tot. el s. m x =0.003765

BARRA : 118 (61,62) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.011	4.488	-49.920	
	m¡n.	-0.012	7.859	-56.522	
	Cort.m x.	-0.012	7.859	-56.522	
	m¡n.	-0.011	4.488	-49.920	
	Flec.m x.	-0.011	4.488	-49.920	
	m¡n.	-0.012	7.859	-56.522	

Flecha Tot. el s. m x =0.003765

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.011	4.488	-58.897	
	m¡n.	-0.012	7.859	-72.240	
	Cort.m x.	-0.012	7.859	-72.240	
	m¡n.	-0.011	4.488	-58.897	
	Flec.m x.	-0.011	4.488	58.897	
	m¡n.	-0.012	7.859	-72.240	

Flecha Tot. el s. m x =0.003575

BARRA : 119 (62,63) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.012	-7.859	-72.240	
	m¡n.	0.011	-4.488	-58.897	
	Cort.m x.	0.011	-4.488	-58.897	
	m¡n.	0.012	-7.859	-72.240	
	Flec.m x.	0.011	-4.488	-58.897	
	m¡n.	0.012	-7.859	-72.240	

Flecha Tot. el s. m x =0.003575

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.012	-7.859	-56.522	
	m¡n.	0.011	-4.488	-49.921	
	Cort.m x.	0.011	-4.488	-49.921	

m¡n.	0.012	-7.859	-56.522
Flec.m x.	0.011	-4.488	-49.921
m¡n.	0.012	-7.859	-56.522

Flecha Tot. el s. m x =0.003765

BARRA : 120 (63,64) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.011	-17.021	-51.106	
	m¡n.	0.010	-15.055	-45.201	
	Cort.m x.	0.010	-15.055	-45.201	
	m¡n.	0.011	-17.021	-51.106	
	Flec.m x.	0.010	-15.055	-45.201	
	m¡n.	0.011	-17.021	-51.106	

Flecha Tot. el s. m x =0.003765

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.011	-17.021	-0.042	
	m¡n.	0.010	-15.055	-0.036	
	Cort.m x.	0.010	-15.055	-0.036	
	m¡n.	0.011	-17.021	-0.042	
	Flec.m x.	0.010	-15.055	-0.036	
	m¡n.	0.011	-17.021	-0.042	

Flecha Tot. el s. m x =0.004524

BARRA : 121 (65,70) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.067	-0.127	0.309	
	m¡n.	-0.081	-0.053	0.549	
	Cort.m x.	-0.081	-0.053	0.549	
	m¡n.	-0.067	-0.127	0.309	
	Flec.m x.	-0.081	-0.053	0.549	
	m¡n.	-0.067	-0.127	0.309	

Flecha Tot. el s. m x =0.004143

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.067	-0.127	0.562	
	m¡n.	-0.081	-0.053	0.654	
	Cort.m x.	-0.081	-0.053	0.654	
	m¡n.	-0.067	-0.127	0.562	
	Flec.m x.	-0.081	-0.053	0.654	
	m¡n.	-0.067	-0.127	0.562	

Flecha Tot. el s. m x =0.003212

BARRA : 122 (64,69) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.021	0.042	1.157	
	m¡n.	0.018	0.004	0.804	
	Cort.m x.	0.021	0.042	1.157	
	m¡n.	0.018	0.004	0.804	
	Flec.m x.	0.021	0.042	1.157	
	m¡n.	0.018	0.004	0.804	

Flecha Tot. el s. m x =0.004524

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.021	0.042	1.074	
	m¡n.	0.018	0.004	0.797	
	Cort.m x.	0.021	0.042	1.074	
	m¡n.	0.018	0.004	0.797	
	Flec.m x.	0.021	0.042	1.074	
	m¡n.	0.018	0.004	0.797	

Flecha Tot. el s. m x =0.004143

BARRA : 123 (66,71) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-9.135	38.903	105.920	
	m¡n.	-10.785	55.302	147.458	
	Cort.m x.	-10.785	55.302	147.458	
	m¡n.	-9.135	38.903	105.920	
	Flec.m x.	-10.785	55.302	147.458	
	m¡n.	-9.135	38.903	105.920	

Flecha Tot. el s. m x =0.003360

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-9.135	38.903	28.113	
	m¡n.	-10.785	55.302	36.855	
	Cort.m x.	-10.785	55.302	36.855	
	m¡n.	-9.135	38.903	28.113	
	Flec.m x.	-10.785	55.302	36.855	
	m¡n.	-9.135	38.903	28.113	

Flecha Tot. el s. m x =0.002336

BARRA : 124 (67,72) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	42.945	124.135	
	m¡n.	-0.000	31.169	90.457	
	Flec.m x.	-0.000	42.945	124.135	
	m¡n.	-0.000	31.169	90.457	

Flecha Tot. el s. m x =0.003164

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	42.945	38.245	
	m¡n.	-0.000	31.169	28.119	
	Flec.m x.	-0.000	42.945	38.245	
	m¡n.	-0.000	31.169	28.119	

Flecha Tot. el s. m x =0.002111

BARRA : 125 (68,73) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	10.785	55.302	147.458	
	m¡n.	9.135	38.903	105.920	
	Cort.m x.	10.785	55.302	147.458	
	m¡n.	9.135	38.903	105.920	
	Flec.m x.	10.785	55.302	147.458	
	m¡n.	9.135	38.903	105.920	

Flecha Tot. el s. m x =0.003360

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	10.785	55.302	36.855	
	m¡n.	9.135	38.903	28.113	
	Cort.m x.	10.785	55.302	36.855	
	m¡n.	9.135	38.903	28.113	
	Flec.m x.	10.785	55.302	36.855	
	m¡n.	9.135	38.903	28.113	

Flecha Tot. el s. m x =0.002336

BARRA : 126 (65,66) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.525	17.179	-0.061	
	m¡n.	0.488	15.175	-0.050	
	Cort.m x.	0.525	17.179	-0.061	
	m¡n.	0.488	15.175	-0.050	
	Flec.m x.	0.488	15.175	-0.050	
	m¡n.	0.525	17.179	-0.061	

Flecha Tot. el s. m x =0.004143

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.525	17.179	-51.598	
	m¡n.	0.488	15.175	-45.576	
	Cort.m x.	0.525	17.179	-51.598	
	m¡n.	0.488	15.175	-45.576	
	Flec.m x.	0.488	15.175	-45.576	
	m¡n.	0.525	17.179	-51.598	

Flecha Tot. el s. m x =0.003360

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BARRA : 127 (66,67) Sec. 3 Rect. /200,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.699	7.223	-59.717	
	m¡n.	1.596	4.250	-52.388	
	Cort.m x.	1.699	7.223	-59.717	
	m¡n.	1.596	4.250	-52.388	
	Flec.m x.	1.596	4.250	-52.388	
	m¡n.	1.699	7.223	-59.717	

Flecha Tot. el s. m x =0.003360

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.699	7.223	-74.164	
	m¡n.	1.596	4.250	-60.888	
	Cort.m x.	1.699	7.223	-74.164	
	m¡n.	1.596	4.250	-60.888	
	Flec.m x.	1.596	4.250	-60.888	
	m¡n.	1.699	7.223	-74.164	

Flecha Tot. el s. m x =0.003164

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BARRA : 128 (67,68) Sec. 3 Rect. /200,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.596	-4.250	-60.888	
	m¡n.	-1.699	-7.223	-74.164	
	Cort.m x.	-1.596	-4.250	-60.888	
	m¡n.	-1.699	-7.223	-74.164	
	Flec.m x.	-1.596	-4.250	-60.888	
	m¡n.	-1.699	-7.223	-74.164	

Flecha Tot. el s. m x =0.003164

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.596	-4.250	-52.388	
	m¡n.	-1.699	-7.223	-59.717	
	Cort.m x.	-1.596	-4.250	-52.388	
	m¡n.	-1.699	-7.223	-59.717	
	Flec.m x.	-1.596	-4.250	-52.388	
	m¡n.	-1.699	-7.223	-59.717	

Flecha Tot. el s. m x =0.003360

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BARRA : 129 (68,69) Sec. 3 Rect. /200,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.488	-15.175	-45.576	
	m¡n.	-0.525	-17.179	-51.598	
	Cort.m x.	-0.488	-15.175	-45.576	
	m¡n.	-0.525	-17.179	-51.598	
	Flec.m x.	-0.488	-15.175	-45.576	
	m¡n.	-0.525	-17.179	-51.598	

Flecha Tot. el s. m x =0.003360

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.488	-15.175	-0.050	
	m¡n.	-0.525	-17.179	-0.061	
	Cort.m x.	-0.488	-15.175	-0.050	
	m¡n.	-0.525	-17.179	-0.061	
	Flec.m x.	-0.488	-15.175	-0.050	
	m¡n.	-0.525	-17.179	-0.061	

Flecha Tot. el s. m x =0.004143

BARRA : 130 (70,75) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.150	-0.613	-0.903	
	m¡n.	-0.179	-0.675	-1.040	
	Cort.m x.	-0.150	-0.613	-0.903	
	m¡n.	-0.179	-0.675	-1.040	
	Flec.m x.	-0.150	-0.613	-0.903	
	m¡n.	-0.179	-0.675	-1.040	

Flecha Tot. el s. m x =0.003212

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.150	-0.613	0.323	
	m¡n.	-0.179	-0.675	0.310	
	Cort.m x.	-0.150	-0.613	0.323	
	m¡n.	-0.179	-0.675	0.310	
	Flec.m x.	-0.150	-0.613	0.323	
	m¡n.	-0.179	-0.675	0.310	

Flecha Tot. el s. m x =0.002273

BARRA : 131 (69,74) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.081	-0.053	0.549	
	m¡n.	0.067	-0.127	0.309	
	Cort.m x.	0.081	-0.053	0.549	
	m¡n.	0.067	-0.127	0.309	
	Flec.m x.	0.081	-0.053	0.549	
	m¡n.	0.067	-0.127	0.309	

Flecha Tot. el s. m x =0.004143

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.081	-0.053	0.654	
	m¡n.	0.067	-0.127	0.562	
	Cort.m x.	0.081	-0.053	0.654	
	m¡n.	0.067	-0.127	0.562	
	Flec.m x.	0.081	-0.053	0.654	
	m¡n.	0.067	-0.127	0.562	

Flecha Tot. el s. m x =0.003212

BARRA : 132 (71,76) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-22.389	63.707	23.253	
	m¡n.	-27.028	81.926	30.629	
	Cort.m x.	-27.028	81.926	30.629	
	m¡n.	-22.389	63.707	23.253	
	Flec.m x.	-27.028	81.926	30.629	
	m¡n.	-22.389	63.707	23.253	

Flecha Tot. el s. m x =0.002336

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-22.389	63.707	-104.161	
	m¡n.	-27.028	81.926	-133.224	
	Cort.m x.	-27.028	81.926	-133.224	
	m¡n.	-22.389	63.707	-104.161	
	Flec.m x.	-22.389	63.707	-104.161	
	m¡n.	-27.028	81.926	-133.224	

Flecha Tot. el s. m x =0.001187

BARRA : 133 (72,77) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	72.011	54.084	
	m¡n.	-0.000	53.924	40.770	
	Flec.m x.	-0.000	72.011	54.084	
	m¡n.	-0.000	53.924	40.770	

Flecha Tot. el s. m x =0.002111

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	72.011	-89.937	
	m¡n.	-0.000	53.924	-67.079	
	Flec.m x.	-0.000	53.924	-67.079	
	m¡n.	-0.000	72.011	-89.937	

Flecha Tot. el s. m x =0.000835

BARRA : 134 (73,78) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	27.028	81.926	30.629	
	m¡n.	22.389	63.707	23.253	
	Cort.m x.	27.028	81.926	30.629	
	m¡n.	22.389	63.707	23.253	
	Flec.m x.	27.028	81.926	30.629	
	m¡n.	22.389	63.707	23.253	

Flecha Tot. el s. m x =0.002336

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	27.028	81.926	-133.224	
	m¡n.	22.389	63.707	-104.161	
	Cort.m x.	27.028	81.926	-133.224	
	m¡n.	22.389	63.707	-104.161	
	Flec.m x.	22.389	63.707	-104.161	
	m¡n.	27.028	81.926	-133.224	

Flecha Tot. el s. m x =0.001187

BARRA : 135 (70,71) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.694	17.707	-0.098	
	m¡n.	1.465	15.531	-0.083	
	Cort.m x.	1.694	17.707	-0.098	
	m¡n.	1.465	15.531	-0.083	
	Flec.m x.	1.465	15.531	-0.083	
	m¡n.	1.694	17.707	-0.098	

Flecha Tot. el s. m x =0.003212

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	1.694	17.707	-53.219	
	m¡n.	1.465	15.531	-46.675	
	Cort.m x.	1.694	17.707	-53.219	
	m¡n.	1.465	15.531	-46.675	
	Flec.m x.	1.465	15.531	-46.675	
	m¡n.	1.694	17.707	-53.219	

Flecha Tot. el s. m x =0.002336

BARRA : 136 (71,72) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	7.920	7.833	-69.462	
	m¡n.	6.325	5.478	-59.930	
	Cort.m x.	7.920	7.833	-69.462	
	m¡n.	6.325	5.478	-59.930	
	Flec.m x.	6.325	5.478	-59.930	
	m¡n.	7.920	7.833	-69.462	

Flecha Tot. el s. m x =0.002336

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	7.920	7.833	-85.127	
	m¡n.	6.325	5.478	-70.885	
	Cort.m x.	7.920	7.833	-85.127	

m¡n.	6.325	5.478	-70.885
Flec.m x.	6.325	5.478	-70.885
m¡n.	7.920	7.833	-85.127

Flecha Tot. el s. m x =0.002111

BARRA : 137 (72,73) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-6.325	-5.478	-70.885	
	m¡n.	-7.920	-7.833	-85.127	
	Cort.m x.	-6.325	-5.478	-70.885	
	m¡n.	-7.920	-7.833	-85.127	
	Flec.m x.	-6.325	-5.478	-70.885	
	m¡n.	-7.920	-7.833	-85.127	

Flecha Tot. el s. m x =0.002111

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-6.325	-5.478	-59.930	
	m¡n.	-7.920	-7.833	-69.462	
	Cort.m x.	-6.325	-5.478	-59.930	
	m¡n.	-7.920	-7.833	-69.462	
	Flec.m x.	-6.325	-5.478	-59.930	
	m¡n.	-7.920	-7.833	-69.462	

Flecha Tot. el s. m x =0.002336

BARRA : 138 (73,74) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.465	-15.531	-46.675	
	m¡n.	-1.694	-17.707	-53.219	
	Cort.m x.	-1.465	-15.531	-46.675	
	m¡n.	-1.694	-17.707	-53.219	
	Flec.m x.	-1.465	-15.531	-46.675	
	m¡n.	-1.694	-17.707	-53.219	

Flecha Tot. el s. m x =0.002336

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-1.465	-15.531	-0.083	
	m¡n.	-1.694	-17.707	-0.098	
	Cort.m x.	-1.465	-15.531	-0.083	
	m¡n.	-1.694	-17.707	-0.098	
	Flec.m x.	-1.465	-15.531	-0.083	
	m¡n.	-1.694	-17.707	-0.098	

Flecha Tot. el s. m x =0.003212

BARRA : 139 (75,80) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.181	-1.100	-2.333	
	m¡n.	-0.199	-1.175	-2.699	
	Cort.m x.	-0.181	-1.100	-2.333	
	m¡n.	-0.199	-1.175	-2.699	
	Flec.m x.	-0.181	-1.100	-2.333	
	m¡n.	-0.199	-1.175	-2.699	

Flecha Tot. el s. m x =0.002273

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.181	-1.100	-0.133	
	m¡n.	-0.199	-1.175	-0.349	
	Cort.m x.	-0.181	-1.100	-0.133	
	m¡n.	-0.199	-1.175	-0.349	
	Flec.m x.	-0.181	-1.100	-0.133	
	m¡n.	-0.199	-1.175	-0.349	

Flecha Tot. el s. m x =0.002007

BARRA : 140 (74,79) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.179	-0.675	-1.040	
	m¡n.	0.150	-0.613	-0.903	
	Cort.m x.	0.150	-0.613	-0.903	
	m¡n.	0.179	-0.675	-1.040	
	Flec.m x.	0.150	-0.613	-0.903	
	m¡n.	0.179	-0.675	-1.040	

Flecha Tot. el s. m x =0.003212

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.179	-0.675	0.310	
	m¡n.	0.150	-0.613	0.323	
	Cort.m x.	0.150	-0.613	0.323	
	m¡n.	0.179	-0.675	0.310	
	Flec.m x	0.150	-0.613	0.323	
	m¡n.	0.179	-0.675	0.310	

Flecha Tot. el s. m x =0.002273

BARRA : 141 (76,81) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-33.549	64.877	-123.837	
	m¡n.	-37.263	76.030	-157.394	
	Cort.m x.	-37.263	76.030	-157.394	
	m¡n.	-33.549	64.877	-123.837	
	Flec.m x.	-33.549	64.877	-123.837	
	m¡n.	-37.263	76.030	-157.394	

Flecha Tot. el s. m x =0.001187

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-33.549	64.877	-253.591	
	m¡n.	-37.263	76.030	-309.454	
	Cort.m x.	-37.263	76.030	-309.454	

m¡n.	-33.549	64.877	-253.591	
Flec.m x.	-33.549	64.877	-253.591	
m¡n.	-37.263	76.030	-309.454	

Flecha Tot. el s. m x =0.000669

BARRA : 142 (77,82) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	165.873	-35.578	
	m¡n.	-0.000	123.948	-22.413	
	Flec.m x.	-0.000	123.948	-22.413	
	m¡n.	-0.000	165.873	-35.578	

Flecha Tot. el s. m x =0.000835

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	165.873	-367.324	
	m¡n.	-0.000	123.948	-270.310	
	Flec.m x.	-0.000	123.948	-270.310	
	m¡n.	-0.000	165.873	-367.324	

BARRA : 143 (78,83) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	37.263	76.030	-157.394	
	m¡n.	33.549	64.877	-123.837	
	Cort.m x.	37.263	76.030	-157.394	
	m¡n.	33.549	64.877	-123.837	
	Flec.m x.	33.549	64.877	-123.837	
	m¡n.	37.263	76.030	-157.394	

Flecha Tot. el s. m x =0.001187

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	37.263	76.030	-309.455	
	m¡n.	33.549	64.877	-253.591	
	Cort.m x.	37.263	76.030	-309.455	
	m¡n.	33.549	64.877	-253.591	
	Flec.m x.	33.549	64.877	-253.591	
	m¡n.	37.263	76.030	-309.455	

Flecha Tot. el s. m x =0.000669

BARRA : 144 (75,76) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.009	17.585	-0.020	
	m¡n.	2.656	15.532	-0.031	
	Cort.m x.	3.009	17.585	-0.020	
	m¡n.	2.656	15.532	-0.031	
	Flec.m x.	3.009	17.585	-0.020	
	m¡n.	2.656	15.532	-0.031	

Flecha Tot. el s. m x =0.002273

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	3.009	17.585	-52.774	
	m¡n.	2.656	15.532	-46.628	
	Cort.m x.	3.009	17.585	-52.774	
	m¡n.	2.656	15.532	-46.628	
	Flec.m x.	2.656	15.532	-46.628	
	m¡n.	3.009	17.585	-52.774	

Flecha Tot. el s. m x =0.001187

BARRA : 145 (76,77) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	27.180	40.231	-63.010	
	m¡n.	22.333	29.112	-57.788	
	Cort.m x.	27.180	40.231	-63.010	
	m¡n.	22.333	29.112	-57.788	
	Flec.m x.	22.333	29.112	-57.788	
	m¡n.	27.180	40.231	-63.010	

Flecha Tot. el s. m x =0.001187

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	27.180	40.231	-143.472	
	m¡n.	22.333	29.112	-116.013	
	Cort.m x.	27.180	40.231	-143.472	
	m¡n.	22.333	29.112	-116.013	
	Flec.m x.	22.333	29.112	-116.013	
	m¡n.	27.180	40.231	-143.472	

Flecha Tot. el s. m x =0.000835

BARRA : 146 (77,78) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-22.333	-29.112	-116.013	
	m¡n.	-27.179	-40.231	-143.472	
	Cort.m x.	-22.333	-29.112	-116.013	
	m¡n.	-27.179	-40.231	-143.472	
	Flec.m x.	-22.333	-29.112	-116.013	
	m¡n.	-27.179	-40.231	-143.472	

Flecha Tot. el s. m x =0.000835

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-22.333	-29.112	-57.789	
	m¡n.	-27.179	-40.231	-63.010	
	Cort.m x.	-22.333	-29.112	-57.789	
	m¡n.	-27.179	-40.231	-63.010	
	Flec.m x.	-22.333	-29.112	-57.789	
	m¡n.	-27.179	-40.231	-63.010	

Flecha Tot. el s. m x =0.001187

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BARRA : 147 (78,79) Sec. 3 Rect. /200,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.656	-15.532	-46.628	
	m¡n.	-3.009	-17.585	-52.775	
	Cort.m x.	-2.656	-15.532	-46.628	
	m¡n.	-3.009	-17.585	-52.775	
	Flec.m x.	-2.656	-15.532	-46.628	
	m¡n.	-3.009	-17.585	-52.775	

Flecha Tot. el s. m x =0.001187

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-2.656	-15.532	-0.031	
	m¡n.	-3.009	-17.585	-0.020	
	Cort.m x.	-2.656	-15.532	-0.031	
	m¡n.	-3.009	-17.585	-0.020	
	Flec.m x.	-3.009	-17.585	-0.020	
	m¡n.	-2.656	-15.532	-0.031	

Flecha Tot. el s. m x =0.002273

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BARRA : 148 (80,85) Sec. 1 Rect. /210,22/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.198	1.298	-0.413	
	m¡n.	0.156	1.015	-0.475	
	Cort.m x.	0.198	1.298	-0.413	
	m¡n.	0.156	1.015	-0.475	
	Flec.m x.	0.198	1.298	-0.413	
	m¡n.	0.156	1.015	-0.475	

Flecha Tot. el s. m x =0.002007

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.198	1.298	-3.010	
	m¡n.	0.156	1.015	-2.505	
	Cort.m x.	0.198	1.298	-3.010	
	m¡n.	0.156	1.015	-2.505	
	Flec.m x.	0.156	1.015	-2.505	
	m¡n.	0.198	1.298	-3.010	

Flecha Tot. el s. m x =0.002518

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BARRA : 149 (79,84) Sec. 1 Rect. /210,22/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.199	-1.175	-2.699	
	m¡n.	0.181	-1.100	-2.333	
	Cort.m x.	0.181	-1.100	-2.333	
	m¡n.	0.199	-1.175	-2.699	
	Flec.m x.	0.181	-1.100	-2.333	
	m¡n.	0.199	-1.175	-2.699	

Flecha Tot. el s. m x =0.002273

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.199	-1.175	-0.349	
	m¡n.	0.181	-1.100	-0.133	
	Cort.m x.	0.181	-1.100	-0.133	
	m¡n.	0.199	-1.175	-0.349	
	Flec.m x.	0.181	-1.100	-0.133	
	m¡n.	0.199	-1.175	-0.349	

Flecha Tot. el s. m x =0.002007

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BARRA : 150 (81,86) Sec. 4 Rect. /250,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	36.086	-61.530	-324.310	
	m¡n.	28.640	-50.287	-279.422	
	Cort.m x.	28.640	-50.287	-279.422	
	m¡n.	36.086	-61.530	-324.310	
	Flec.m x.	28.640	-50.287	-279.422	
	m¡n.	36.086	-61.530	-324.310	

Flecha Tot. el s. m x =0.000669

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	36.086	-61.530	-201.250	
	m¡n.	28.640	-50.287	-178.849	
	Cort.m x.	28.640	-50.287	-178.849	
	m¡n.	36.086	-61.530	-201.250	
	Flec.m x.	28.640	-50.287	-178.849	
	m¡n.	36.086	-61.530	-201.250	

Flecha Tot. el s. m x =0.001428

BARRA : 151 (82,87) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-178.271	-424.626	
	m¡n.	0.000	-192.867	-457.286	
	Flec.m x.	0.000	-178.271	-424.626	
	m¡n.	0.000	-192.867	-457.286	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-178.271	-68.083	
	m¡n.	0.000	-192.867	-71.551	
	Flec.m x.	0.000	-178.271	-68.083	
	m¡n.	0.000	-192.867	-71.551	

Flecha Tot. el s. m x =0.001054

BARRA : 152 (83,88) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-28.640	-50.287	-279.423	
	m¡n.	-36.086	-61.531	-324.311	
	Cort.m x.	-28.640	-50.287	-279.423	
	m¡n.	-36.086	-61.531	-324.311	
	Flec.m x.	-28.640	-50.287	-279.423	
	m¡n.	-36.086	-61.531	-324.311	

Flecha Tot. el s. m x =0.000669

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-28.640	-50.287	-178.849	
	m¡n.	-36.086	-61.531	-201.250	
	Cort.m x.	-28.640	-50.287	-178.849	
	m¡n.	-36.086	-61.531	-201.250	
	Flec.m x.	-28.640	-50.287	-178.849	
	m¡n.	-36.086	-61.531	-201.250	

Flecha Tot. el s. m x =0.001428

BARRA : 153 (80,81) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.342	12.930	0.337	
	m¡n.	0.064	14.612	0.397	
	Cort.m x.	0.064	14.612	0.397	
	m¡n.	0.342	12.930	0.337	
	Flec.m x.	0.064	14.612	0.397	
	m¡n.	0.342	12.930	0.337	

Flecha Tot. el s. m x =0.002007

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.342	12.930	-38.453	
	m¡n.	0.064	14.612	-43.439	
	Cort.m x.	0.064	14.612	-43.439	

m¡n.	0.342	12.930	-38.453
Flec.m x.	0.342	12.930	-38.453
m¡n.	0.064	14.612	-43.439

Flecha Tot. el s. m x =0.000669

BARRA : 154 (81,82) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	26.174	142.844	23.736	
	m¡n.	14.920	168.922	29.910	
	Cort.m x.	14.920	168.922	29.910	
	m¡n.	26.174	142.844	23.736	
	Flec.m x.	14.920	168.922	29.910	
	m¡n.	26.174	142.844	23.736	

Flecha Tot. el s. m x =0.000669

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	26.174	142.844	-261.951	
	m¡n.	14.920	168.922	-307.935	
	Cort.m x.	14.920	168.922	-307.935	
	m¡n.	26.174	142.844	-261.951	
	Flec.m x.	26.174	142.844	-261.951	
	m¡n.	14.920	168.922	-307.935	

BARRA : 155 (82,83) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-14.920	-168.923	-307.936	
	m¡n.	-26.174	-142.844	-261.952	
	Cort.m x.	-26.174	-142.844	-261.952	
	m¡n.	-14.920	-168.923	-307.936	
	Flec.m x.	-26.174	-142.844	-261.952	
	m¡n.	-14.920	-168.923	-307.936	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-14.920	-168.923	29.909	
	m¡n.	-26.174	-142.844	23.736	
	Cort.m x.	-26.174	-142.844	23.736	
	m¡n.	-14.920	-168.923	29.909	
	Flec.m x.	-14.920	-168.923	29.909	
	m¡n.	-26.174	-142.844	23.736	

Flecha Tot. el s. m x =0.000669

BARRA : 156 (83,84) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.064	-14.612	-43.439	
	m¡n.	-0.342	-12.930	-38.453	
	Cort.m x.	-0.342	-12.930	-38.453	
	m¡n.	-0.064	-14.612	-43.439	
	Flec.m x.	-0.342	-12.930	-38.453	
	m¡n.	-0.064	-14.612	-43.439	

Flecha Tot. el s. m x =0.000669

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.064	-14.612	0.397	
	m¡n.	-0.342	-12.930	0.337	
	Cort.m x.	-0.342	-12.930	0.337	
	m¡n.	-0.064	-14.612	0.397	
	Flec.m x.	-0.064	-14.612	0.397	
	m¡n.	-0.342	-12.930	0.337	

Flecha Tot. el s. m x =0.002007

BARRA : 157 (85,90) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.230	1.166	0.516	
	m¡n.	0.202	1.030	0.446	
	Cort.m x.	0.230	1.166	0.516	
	m¡n.	0.202	1.030	0.446	
	Flec.m x.	0.230	1.166	0.516	
	m¡n.	0.202	1.030	0.446	

Flecha Tot. el s. m x =0.002518

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.230	1.166	-1.816	
	m¡n.	0.202	1.030	-1.614	
	Cort.m x.	0.230	1.166	-1.816	
	m¡n.	0.202	1.030	-1.614	
	Flec.m x.	0.202	1.030	-1.614	
	m¡n.	0.230	1.166	-1.816	

Flecha Tot. el s. m x =0.003814

BARRA : 158 (84,89) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.156	1.015	-0.475	
	m¡n.	-0.198	1.298	-0.413	
	Cort.m x.	-0.198	1.298	-0.413	
	m¡n.	-0.156	1.015	-0.475	
	Flec.m x.	-0.198	1.298	-0.413	
	m¡n.	-0.156	1.015	-0.475	

Flecha Tot. el s. m x =0.002007

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.156	1.015	-2.505	
	m¡n.	-0.198	1.298	-3.010	
	Cort.m x.	-0.198	1.298	-3.010	
	m¡n.	-0.156	1.015	-2.505	
	Flec.m x.	-0.156	1.015	-2.505	
	m¡n.	-0.198	1.298	-3.010	

Flecha Tot. el s. m x =0.002518

BARRA : 159 (86,91) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	34.677	-78.905	-174.534	
	m¡n.	30.586	-69.022	-155.435	
	Cort.m x.	30.586	-69.022	-155.435	
	m¡n.	34.677	-78.905	-174.534	
	Flec.m x.	30.586	-69.022	-155.435	
	m¡n.	34.677	-78.905	-174.534	

Flecha Tot. el s. m x =0.001428

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	34.677	-78.905	-16.724	
	m¡n.	30.586	-69.022	-17.392	
	Cort.m x.	30.586	-69.022	-17.392	
	m¡n.	34.677	-78.905	-16.724	
	Flec.m x.	34.677	-78.905	-16.724	
	m¡n.	30.586	-69.022	-17.392	

Flecha Tot. el s. m x =0.002995

BARRA : 160 (87,92) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-69.441	-120.812	
	m¡n.	0.000	-76.784	-132.035	
	Flec.m x.	0.000	-69.441	-120.812	
	m¡n.	0.000	-76.784	-132.035	

Flecha Tot. el s. m x =0.001054

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-69.441	18.071	
	m¡n.	0.000	-76.784	21.532	
	Flec.m x.	0.000	-76.784	21.532	
	m¡n.	0.000	-69.441	18.071	

Flecha Tot. el s. m x =0.002785

BARRA : 161 (88,93) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-30.586	-69.022	-155.435	
	m¡n.	-34.676	-78.905	-174.534	
	Cort.m x.	-30.586	-69.022	-155.435	
	m¡n.	-34.676	-78.905	-174.534	
	Flec.m x.	-30.586	-69.022	-155.435	
	m¡n.	-34.676	-78.905	-174.534	

Flecha Tot. el s. m x =0.001428

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-30.586	-69.022	-17.391	
	m¡n.	-34.676	-78.905	-16.723	
	Cort.m x.	-30.586	-69.022	-17.391	
	m¡n.	-34.676	-78.905	-16.723	
	Flec.m x.	-34.676	-78.905	-16.723	
	m¡n.	-30.586	-69.022	-17.391	

Flecha Tot. el s. m x =0.002995

BARRA : 162 (85,86) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.951	15.030	0.045	
	m¡n.	-3.526	17.217	0.033	
	Cort.m x.	-3.526	17.217	0.033	
	m¡n.	-2.951	15.030	0.045	

Flec.m x.	-2.951	15.030	0.045	
m¡n.	-3.526	17.217	0.033	

Flecha Tot. el s. m x =0.002518

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-2.951	15.030	-45.045	
	m¡n.	-3.526	17.217	-51.619	
	Cort.m x.	-3.526	17.217	-51.619	
	m¡n.	-2.951	15.030	-45.045	
	Flec.m x.	-2.951	15.030	-45.045	
	m¡n.	-3.526	17.217	-51.619	

Flecha Tot. el s. m x =0.001428

BARRA : 163 (86,87) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-26.364	48.515	-43.099	
	m¡n.	-30.242	51.342	-53.029	
	Cort.m x.	-30.242	51.342	-53.029	
	m¡n.	-26.364	48.515	-43.099	
	Flec.m x.	-26.364	48.515	-43.099	
	m¡n.	-30.242	51.342	-53.029	

Flecha Tot. el s. m x =0.001428

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-26.364	48.515	-140.129	
	m¡n.	-30.242	51.342	-155.713	
	Cort.m x.	-30.242	51.342	-155.713	
	m¡n.	-26.364	48.515	-140.129	
	Flec.m x.	-26.364	48.515	-140.129	
	m¡n.	-30.242	51.342	-155.713	

Flecha Tot. el s. m x =0.001054

BARRA : 164 (87,88) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	30.242	-51.342	-155.713	
	m¡n.	26.364	-48.515	-140.129	
	Cort.m x.	26.364	-48.515	-140.129	
	m¡n.	30.242	-51.342	-155.713	
	Flec.m x.	26.364	-48.515	-140.129	
	m¡n.	30.242	-51.342	-155.713	

Flecha Tot. el s. m x =0.001054

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	30.242	-51.342	-53.029	
	m¡n.	26.364	-48.515	-43.099	
	Cort.m x.	26.364	-48.515	-43.099	
	m¡n.	30.242	-51.342	-53.029	
	Flec.m x.	26.364	-48.515	-43.099	
	m¡n.	30.242	-51.342	-53.029	

Flecha Tot. el s. m x =0.001428

BARRA : 165 (88,89) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.526	-17.217	-51.619	
	m¡n.	2.951	-15.030	-45.045	
	Cort.m x.	2.951	-15.030	-45.045	
	m¡n.	3.526	-17.217	-51.619	
	Flec.m x.	2.951	-15.030	-45.045	
	m¡n.	3.526	-17.217	-51.619	

Flecha Tot. el s. m x =0.001428

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	3.526	-17.217	0.033	
	m¡n.	2.951	-15.030	0.045	
	Cort.m x.	2.951	-15.030	0.045	

m¡n.	3.526	-17.217	0.033
Flec.m x.	2.951	-15.030	0.045
m¡n.	3.526	-17.217	0.033

Flecha Tot. el s. m x =0.002518

BARRA : 166 (90,95) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.179	0.909	1.221	
	m¡n.	0.164	0.853	1.117	
	Cort.m x.	0.179	0.909	1.221	
	m¡n.	0.164	0.853	1.117	
	Flec.m x.	0.179	0.909	1.221	
	m¡n.	0.164	0.853	1.117	

Flecha Tot. el s. m x =0.003814

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.179	0.909	-0.598	
	m¡n.	0.164	0.853	-0.590	
	Cort.m x.	0.179	0.909	-0.598	
	m¡n.	0.164	0.853	-0.590	
	Flec.m x.	0.164	0.853	-0.590	
	m¡n.	0.179	0.909	-0.598	

Flecha Tot. el s. m x =0.005249

BARRA : 167 (89,94) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.202	1.030	0.446	
	m¡n.	-0.230	1.166	0.516	
	Cort.m x.	-0.230	1.166	0.516	
	m¡n.	-0.202	1.030	0.446	
	Flec.m x.	-0.230	1.166	0.516	
	m¡n.	-0.202	1.030	0.446	

Flecha Tot. el s. m x =0.002518

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.202	1.030	-1.614	
	m¡n.	-0.230	1.166	-1.816	
	Cort.m x.	-0.230	1.166	-1.816	
	m¡n.	-0.202	1.030	-1.614	
	Flec.m x.	-0.202	1.030	-1.614	
	m¡n.	-0.230	1.166	-1.816	

Flecha Tot. el s. m x =0.003814

BARRA : 168 (91,96) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	24.430	-53.572	-7.228	
	m¡n.	22.432	-47.446	-8.558	
	Cort.m x.	22.432	-47.446	-8.558	
	m¡n.	24.430	-53.572	-7.228	
	Flec.m x.	24.430	-53.572	-7.228	
	m¡n.	22.432	-47.446	-8.558	

Flecha Tot. el s. m x =0.002995

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	24.430	-53.572	99.917	
	m¡n.	22.432	-47.446	86.335	
	Cort.m x.	22.432	-47.446	86.335	
	m¡n.	24.430	-53.572	99.917	
	Flec.m x.	24.430	-53.572	99.917	
	m¡n.	22.432	-47.446	86.335	

Flecha Tot. el s. m x =0.004636

BARRA : 169 (92,97) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-40.849	-5.058	
	m¡n.	0.000	-45.866	-3.534	
	Flec.m x.	0.000	-45.866	-3.534	
	m¡n.	0.000	-40.849	-5.058	

Flecha Tot. el s. m x =0.002785

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-40.849	76.640	
	m¡n.	0.000	-45.866	88.198	
	Flec.m x.	0.000	-45.866	88.198	
	m¡n.	0.000	-40.849	76.640	

Flecha Tot. el s. m x =0.004499

BARRA : 170 (93,98) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-22.432	-47.447	-8.558	
	m¡n.	-24.429	-53.572	-7.228	
	Cort.m x.	-22.432	-47.447	-8.558	
	m¡n.	-24.429	-53.572	-7.228	
	Flec.m x.	-24.429	-53.572	-7.228	
	m¡n.	-22.432	-47.447	-8.558	

Flecha Tot. el s. m x =0.002995

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-22.432	-47.447	86.335	
	m¡n.	-24.429	-53.572	99.917	
	Cort.m x.	-22.432	-47.447	86.335	
	m¡n.	-24.429	-53.572	99.917	
	Flec.m x.	-24.429	-53.572	99.917	
	m¡n.	-22.432	-47.447	86.335	

Flecha Tot. el s. m x =0.004636

BARRA : 171 (90,91) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.731	15.221	-0.037	
	m¡n.	-3.037	17.342	-0.051	
	Cort.m x.	-3.037	17.342	-0.051	
	m¡n.	-2.731	15.221	-0.037	
	Flec.m x.	-2.731	15.221	-0.037	
	m¡n.	-3.037	17.342	-0.051	

Flecha Tot. el s. m x =0.003814

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-2.731	15.221	-45.702	
	m¡n.	-3.037	17.342	-52.075	
	Cort.m x.	-3.037	17.342	-52.075	
	m¡n.	-2.731	15.221	-45.702	
	Flec.m x.	-2.731	15.221	-45.702	
	m¡n.	-3.037	17.342	-52.075	

Flecha Tot. el s. m x =0.002995

BARRA : 172 (91,92) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-11.564	8.396	-53.856	
	m¡n.	-12.533	8.759	-62.322	
	Cort.m x.	-12.533	8.759	-62.322	
	m¡n.	-11.564	8.396	-53.856	
	Flec.m x.	-11.564	8.396	-53.856	
	m¡n.	-12.533	8.759	-62.322	

Flecha Tot. el s. m x =0.002995

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-11.564	8.396	-70.648	
	m¡n.	-12.533	8.759	-79.840	
	Cort.m x.	-12.533	8.759	-79.840	
	m¡n.	-11.564	8.396	-70.648	
	Flec.m x.	-11.564	8.396	-70.648	
	m¡n.	-12.533	8.759	-79.840	

Flecha Tot. el s. m x =0.002785

BARRA : 173 (92,93) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	12.533	-8.759	-79.840	
	m¡n.	11.564	-8.396	-70.648	
	Cort.m x.	11.564	-8.396	-70.648	
	m¡n.	12.533	-8.759	-79.840	
	Flec.m x.	11.564	-8.396	-70.648	
	m¡n.	12.533	-8.759	-79.840	

Flecha Tot. el s. m x =0.002785

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	12.533	-8.759	-62.323	
	m¡n.	11.564	-8.396	-53.856	
	Cort.m x.	11.564	-8.396	-53.856	
	m¡n.	12.533	-8.759	-62.323	
	Flec.m x.	11.564	-8.396	-53.856	
	m¡n.	12.533	-8.759	-62.323	

Flecha Tot. el s. m x =0.002995

BARRA : 174 (93,94) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.037	-17.342	-52.076	
	m¡n.	2.731	-15.221	-45.702	
	Cort.m x.	2.731	-15.221	-45.702	
	m¡n.	3.037	-17.342	-52.076	
	Flec.m x.	2.731	-15.221	-45.702	
	m¡n.	3.037	-17.342	-52.076	

Flecha Tot. el s. m x =0.002995

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	3.037	-17.342	-0.051	
	m¡n.	2.731	-15.221	-0.037	
	Cort.m x.	2.731	-15.221	-0.037	
	m¡n.	3.037	-17.342	-0.051	
	Flec.m x.	2.731	-15.221	-0.037	
	m¡n.	3.037	-17.342	-0.051	

Flecha Tot. el s. m x =0.003814

BARRA : 175 (95,100) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.217	1.563	2.460	
	m¡n.	0.205	1.490	2.276	
	Cort.m x.	0.217	1.563	2.460	
	m¡n.	0.205	1.490	2.276	
	Flec.m x.	0.217	1.563	2.460	
	m¡n.	0.205	1.490	2.276	

Flecha Tot. el s. m x =0.005249

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.217	1.563	-0.665	
	m¡n.	0.205	1.490	-0.704	
	Cort.m x.	0.217	1.563	-0.665	
	m¡n.	0.205	1.490	-0.704	
	Flec.m x.	0.217	1.563	-0.665	
	m¡n.	0.205	1.490	-0.704	

Flecha Tot. el s. m x =0.006217

BARRA : 176 (94,99) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.164	0.853	1.117	
	m¡n.	-0.179	0.909	1.221	
	Cort.m x.	-0.179	0.909	1.221	
	m¡n.	-0.164	0.853	1.117	
	Flec.m x.	-0.179	0.909	1.221	
	m¡n.	-0.164	0.853	1.117	

Flecha Tot. el s. m x =0.003814

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.164	0.853	-0.590	
	m¡n.	-0.179	0.909	-0.598	
	Cort.m x.	-0.179	0.909	-0.598	
	m¡n.	-0.164	0.853	-0.590	
	Flec.m x.	-0.164	0.853	-0.590	
	m¡n.	-0.179	0.909	-0.598	

Flecha Tot. el s. m x =0.005249

BARRA : 177 (96,101) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	29.612	-23.945	105.012	
	m¡n.	27.937	-21.325	91.133	
	Cort.m x.	27.937	-21.325	91.133	
	m¡n.	29.612	-23.945	105.012	
	Flec.m x.	29.612	-23.945	105.012	
	m¡n.	27.937	-21.325	91.133	

Flecha Tot. el s. m x =0.004636

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	29.612	-23.945	152.901	
	m¡n.	27.937	-21.325	133.783	
	Cort.m x.	27.937	-21.325	133.783	
	m¡n.	29.612	-23.945	152.901	
	Flec.m x.	29.612	-23.945	152.901	
	m¡n.	27.937	-21.325	133.783	

Flecha Tot. el s. m x =0.005852

BARRA : 178 (97,102) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-22.975	61.312	
	m¡n.	0.000	-25.358	71.893	
	Flec.m x.	0.000	-25.358	71.893	
	m¡n.	0.000	-22.975	61.312	

Flecha Tot. el s. m x =0.004499

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-22.975	107.262	
	m¡n.	0.000	-25.358	122.608	
	Flec.m x.	0.000	-25.358	122.608	
	m¡n.	0.000	-22.975	107.262	

Flecha Tot. el s. m x =0.005796

BARRA : 179 (98,103) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-27.936	-21.325	91.133	
	m¡n.	-29.612	-23.945	105.012	
	Cort.m x.	-27.936	-21.325	91.133	
	m¡n.	-29.612	-23.945	105.012	
	Flec.m x.	-29.612	-23.945	105.012	
	m¡n.	-27.936	-21.325	91.133	

Flecha Tot. el s. m x =0.004636

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-27.936	-21.325	133.783	
	m¡n.	-29.612	-23.945	152.901	
	Cort.m x.	-27.936	-21.325	133.783	
	m¡n.	-29.612	-23.945	152.901	
	Flec.m x.	-29.612	-23.945	152.901	
	m¡n.	-27.936	-21.325	133.783	

Flecha Tot. el s. m x =0.005852

BARRA : 180 (95,96) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.866	14.409	0.041	
	m¡n.	-3.058	16.432	0.038	
	Cort.m x.	-3.058	16.432	0.038	
	m¡n.	-2.866	14.409	0.041	
	Flec.m x.	-2.866	14.409	0.041	
	m¡n.	-3.058	16.432	0.038	

Flecha Tot. el s. m x =0.005249

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-2.866	14.409	-43.185	
	m¡n.	-3.058	16.432	-49.257	
	Cort.m x.	-3.058	16.432	-49.257	
	m¡n.	-2.866	14.409	-43.185	
	Flec.m x.	-2.866	14.409	-43.185	
	m¡n.	-3.058	16.432	-49.257	

Flecha Tot. el s. m x =0.004636

BARRA : 181 (96,97) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-7.664	3.037	-37.680	
	m¡n.	-8.153	3.554	-44.075	
	Cort.m x.	-8.153	3.554	-44.075	
	m¡n.	-7.664	3.037	-37.680	
	Flec.m x.	-7.664	3.037	-37.680	
	m¡n.	-8.153	3.554	-44.075	

Flecha Tot. el s. m x =0.004636

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-7.664	3.037	-43.754	
	m¡n.	-8.153	3.554	-51.183	
	Cort.m x.	-8.153	3.554	-51.183	
	m¡n.	-7.664	3.037	-43.754	
	Flec.m x.	-7.664	3.037	-43.754	
	m¡n.	-8.153	3.554	-51.183	

Flecha Tot. el s. m x =0.004499

BARRA : 182 (97,98) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	8.153	-3.554	-51.183	
	m¡n.	7.664	-3.037	-43.754	
	Cort.m x.	7.664	-3.037	-43.754	
	m¡n.	8.153	-3.554	-51.183	
	Flec.m x.	7.664	-3.037	-43.754	
	m¡n.	8.153	-3.554	-51.183	

Flecha Tot. el s. m x =0.004499

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	8.153	-3.554	-44.075	
	m¡n.	7.664	-3.037	-37.680	
	Cort.m x.	7.664	-3.037	-37.680	

m¡n.	8.153	-3.554	-44.075
Flec.m x.	7.664	-3.037	-37.680
m¡n.	8.153	-3.554	-44.075

Flecha Tot. el s. m x =0.004636

BARRA : 183 (98,99) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.058	-16.432	-49.258	
	m¡n.	2.866	-14.409	-43.185	
	Cort.m x.	2.866	-14.409	-43.185	
	m¡n.	3.058	-16.432	-49.258	
	Flec.m x.	2.866	-14.409	-43.185	
	m¡n.	3.058	-16.432	-49.258	

Flecha Tot. el s. m x =0.004636

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	3.058	-16.432	0.038	
	m¡n.	2.866	-14.409	0.041	
	Cort.m x.	2.866	-14.409	0.041	
	m¡n.	3.058	-16.432	0.038	
	Flec.m x.	2.866	-14.409	0.041	
	m¡n.	3.058	-16.432	0.038	

Flecha Tot. el s. m x =0.005249

BARRA : 184 (100,105) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.384	3.272	4.427	
	m¡n.	0.374	3.139	4.170	
	Cort.m x.	0.384	3.272	4.427	
	m¡n.	0.374	3.139	4.170	
	Flec.m x.	0.384	3.272	4.427	
	m¡n.	0.374	3.139	4.170	

Flecha Tot. el s. m x =0.006217

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.384	3.272	-2.118	
	m¡n.	0.374	3.139	-2.108	
	Cort.m x.	0.384	3.272	-2.118	
	m¡n.	0.374	3.139	-2.108	
	Flec.m x.	0.374	3.139	-2.108	
	m¡n.	0.384	3.272	-2.118	

Flecha Tot. el s. m x =0.006323

BARRA : 185 (99,104) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.205	1.490	2.276	
	m¡n.	-0.217	1.563	2.460	
	Cort.m x.	-0.217	1.563	2.460	
	m¡n.	-0.205	1.490	2.276	
	Flec.m x.	-0.217	1.563	2.460	
	m¡n.	-0.205	1.490	2.276	

Flecha Tot. el s. m x =0.005249

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.205	1.490	-0.704	
	m¡n.	-0.217	1.563	-0.665	
	Cort.m x.	-0.217	1.563	-0.665	
	m¡n.	-0.205	1.490	-0.704	
	Flec.m x.	-0.217	1.563	-0.665	
	m¡n.	-0.205	1.490	-0.704	

Flecha Tot. el s. m x =0.006217

BARRA : 186 (101,106) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	58.446	6.104	160.891	
	m¡n.	55.581	5.295	141.305	
	Cort.m x.	58.446	6.104	160.891	
	m¡n.	55.581	5.295	141.305	
	Flec.m x.	58.446	6.104	160.891	
	m¡n.	55.581	5.295	141.305	

Flecha Tot. el s. m x =0.005852

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	58.446	6.104	148.683	
	m¡n.	55.581	5.295	130.715	
	Cort.m x.	58.446	6.104	148.683	
	m¡n.	55.581	5.295	130.715	
	Flec.m x.	58.446	6.104	148.683	
	m¡n.	55.581	5.295	130.715	

Flecha Tot. el s. m x =0.006405

BARRA : 187 (102,107) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-7.805	96.444	
	m¡n.	0.000	-8.124	82.470	
	Flec.m x.	0.000	-7.805	96.444	
	m¡n.	0.000	-8.124	82.470	

Flecha Tot. el s. m x =0.005796

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-7.805	112.054	
	m¡n.	0.000	-8.124	98.718	
	Flec.m x.	0.000	-7.805	112.054	
	m¡n.	0.000	-8.124	98.718	

Flecha Tot. el s. m x =0.006510

BARRA : 188 (103,108) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-55.581	5.295	141.305	
	m¡n.	-58.446	6.104	160.891	
	Cort.m x.	-58.446	6.104	160.891	
	m¡n.	-55.581	5.295	141.305	
	Flec.m x.	-58.446	6.104	160.891	
	m¡n.	-55.581	5.295	141.305	

Flecha Tot. el s. m x =0.005852

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-55.581	5.295	130.715	
	m¡n.	-58.446	6.104	148.683	
	Cort.m x.	-58.446	6.104	148.683	
	m¡n.	-55.581	5.295	130.715	
	Flec.m x.	-58.446	6.104	148.683	
	m¡n.	-55.581	5.295	130.715	

Flecha Tot. el s. m x =0.006405

BARRA : 189 (100,101) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.874	13.396	0.169	
	m¡n.	-5.092	15.375	0.167	
	Cort.m x.	-5.092	15.375	0.167	
	m¡n.	-4.874	13.396	0.169	
	Flec.m x.	-4.874	13.396	0.169	
	m¡n.	-5.092	15.375	0.167	

Flecha Tot. el s. m x =0.006217

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-4.874	13.396	-40.017	
	m¡n.	-5.092	15.375	-45.958	
	Cort.m x.	-5.092	15.375	-45.958	
	m¡n.	-4.874	13.396	-40.017	
	Flec.m x.	-4.874	13.396	-40.017	
	m¡n.	-5.092	15.375	-45.958	

Flecha Tot. el s. m x =0.005852

BARRA : 190 (101,102) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-12.396	1.526	-12.373	
	m¡n.	-13.082	2.076	-17.125	
	Cort.m x.	-13.082	2.076	-17.125	
	m¡n.	-12.396	1.526	-12.373	
	Flec.m x.	-12.396	1.526	-12.373	
	m¡n.	-13.082	2.076	-17.125	

Flecha Tot. el s. m x =0.005852

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-12.396	1.526	-15.424	
	m¡n.	-13.082	2.076	-21.278	
	Cort.m x.	-13.082	2.076	-21.278	
	m¡n.	-12.396	1.526	-15.424	
	Flec.m x.	-12.396	1.526	-15.424	
	m¡n.	-13.082	2.076	-21.278	

Flecha Tot. el s. m x =0.005796

BARRA : 191 (102,103) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	13.082	-2.076	-21.278	
	m¡n.	12.396	-1.526	-15.424	
	Cort.m x.	12.396	-1.526	-15.424	
	m¡n.	13.082	-2.076	-21.278	
	Flec.m x.	12.396	-1.526	-15.424	
	m¡n.	13.082	-2.076	-21.278	

Flecha Tot. el s. m x =0.005796

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	13.082	-2.076	-17.125	
	m¡n.	12.396	-1.526	-12.373	
	Cort.m x.	12.396	-1.526	-12.373	
	m¡n.	13.082	-2.076	-17.125	
	Flec.m x.	12.396	-1.526	-12.373	
	m¡n.	13.082	-2.076	-17.125	

Flecha Tot. el s. m x =0.005852

BARRA : 192 (103,104) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	5.092	-15.375	-45.958	
	m¡n.	4.874	-13.396	-40.017	
	Cort.m x.	4.874	-13.396	-40.017	
	m¡n.	5.092	-15.375	-45.958	
	Flec.m x.	4.874	-13.396	-40.017	
	m¡n.	5.092	-15.375	-45.958	

Flecha Tot. el s. m x =0.005852

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	5.092	-15.375	0.167	
	m¡n.	4.874	-13.396	0.169	
	Cort.m x.	4.874	-13.396	0.169	
	m¡n.	5.092	-15.375	0.167	
	Flec.m x.	4.874	-13.396	0.169	
	m¡n.	5.092	-15.375	0.167	

Flecha Tot. el s. m x =0.006217

BARRA : 193 (105,110) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.954	3.223	10.520	
	m¡n.	2.928	2.870	10.517	
	Cort.m x.	2.954	3.223	10.520	
	m¡n.	2.928	2.870	10.517	
	Flec.m x.	2.954	3.223	10.520	
	m¡n.	2.928	2.870	10.517	

Flecha Tot. el s. m x =0.006323

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	2.954	3.223	4.074	
	m¡n.	2.928	2.870	4.776	
	Cort.m x.	2.954	3.223	4.074	
	m¡n.	2.928	2.870	4.776	
	Flec.m x.	2.928	2.870	4.776	
	m¡n.	2.954	3.223	4.074	

Flecha Tot. el s. m x =0.003603

BARRA : 194 (104,109) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.374	3.139	4.170	
	m¡n.	-0.384	3.272	4.427	
	Cort.m x.	-0.384	3.272	4.427	
	m¡n.	-0.374	3.139	4.170	
	Flec.m x.	-0.384	3.272	4.427	
	m¡n.	-0.374	3.139	4.170	

Flecha Tot. el s. m x =0.006217

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.374	3.139	-2.108	
	m¡n.	-0.384	3.272	-2.118	
	Cort.m x.	-0.384	3.272	-2.118	
	m¡n.	-0.374	3.139	-2.108	
	Flec.m x.	-0.374	3.139	-2.108	
	m¡n.	-0.384	3.272	-2.118	

Flecha Tot. el s. m x =0.006323

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BARRA : 195 (106,111) Sec. 4 Rect. /250,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	142.886	42.726	165.447	
	m¡n.	135.155	37.195	145.662	
	Cort.m x.	142.886	42.726	165.447	
	m¡n.	135.155	37.195	145.662	
	Flec.m x.	142.886	42.726	165.447	
	m¡n.	135.155	37.195	145.662	

Flecha Tot. el s. m x =0.006405

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	142.886	42.726	79.995	
	m¡n.	135.155	37.195	71.271	
	Cort.m x.	142.886	42.726	79.995	
	m¡n.	135.155	37.195	71.271	
	Flec.m x.	142.886	42.726	79.995	
	m¡n.	135.155	37.195	71.271	

Flecha Tot. el s. m x =0.006300

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BARRA : 196 (107,112) Sec. 3 Rect. /200,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	0.826	53.257	
	m¡n.	0.000	-0.702	43.568	
	Flec.m x.	0.000	0.826	53.257	
	m¡n.	0.000	-0.702	43.568	

Flecha Tot. el s. m x =0.006510

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	0.826	51.604	
	m¡n.	0.000	-0.702	44.971	
	Flec.m x.	0.000	0.826	51.604	
	m¡n.	0.000	-0.702	44.971	

Flecha Tot. el s. m x =0.006781

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BARRA : 197 (108,113) Sec. 4 Rect. /250,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-135.155	37.195	145.662	
	m¡n.	-142.886	42.726	165.447	
	Cort.m x.	-142.886	42.726	165.447	
	m¡n.	-135.155	37.195	145.662	
	Flec.m x.	-142.886	42.726	165.447	
	m¡n.	-135.155	37.195	145.662	

Flecha Tot. el s. m x =0.006405

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-135.155	37.195	71.271	
	m¡n.	-142.886	42.726	79.995	
	Cort.m x.	-142.886	42.726	79.995	
	m¡n.	-135.155	37.195	71.271	
	Flec.m x.	-142.886	42.726	79.995	
	m¡n.	-135.155	37.195	71.271	

Flecha Tot. el s. m x =0.006300

BARRA : 198 (105,106) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-12.628	14.961	2.580	
	m¡n.	-12.635	17.487	2.543	
	Cort.m x.	-12.635	17.487	2.543	
	m¡n.	-12.628	14.961	2.580	
	Flec.m x.	-12.628	14.961	2.580	
	m¡n.	-12.635	17.487	2.543	

Flecha Tot. el s. m x =0.006323

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-12.628	14.961	-42.303	
	m¡n.	-12.635	17.487	-49.918	
	Cort.m x.	-12.635	17.487	-49.918	
	m¡n.	-12.628	14.961	-42.303	
	Flec.m x.	-12.628	14.961	-42.303	
	m¡n.	-12.635	17.487	-49.918	

Flecha Tot. el s. m x =0.006405

BARRA : 199 (106,107) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-27.575	-2.189	37.271	
	m¡n.	-29.399	-2.385	34.522	
	Cort.m x.	-27.575	-2.189	37.271	
	m¡n.	-29.399	-2.385	34.522	
	Flec.m x.	-27.575	-2.189	37.271	
	m¡n.	-29.399	-2.385	34.522	

Flecha Tot. el s. m x =0.006405

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-27.575	-2.189	41.649	
	m¡n.	-29.399	-2.385	39.291	
	Cort.m x.	-27.575	-2.189	41.649	

m¡n.	-29.399	-2.385	39.291
Flec.m x.	-27.575	-2.189	41.649
m¡n.	-29.399	-2.385	39.291

Flecha Tot. el s. m x =0.006510

BARRA : 200 (107,108) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	29.399	2.384	39.291	
	m¡n.	27.575	2.189	41.649	
	Cort.m x.	29.399	2.384	39.291	
	m¡n.	27.575	2.189	41.649	
	Flec.m x.	27.575	2.189	41.649	
	m¡n.	29.399	2.384	39.291	

Flecha Tot. el s. m x =0.006510

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	29.399	2.384	34.522	
	m¡n.	27.575	2.189	37.271	
	Cort.m x.	29.399	2.384	34.522	
	m¡n.	27.575	2.189	37.271	
	Flec.m x.	27.575	2.189	37.271	
	m¡n.	29.399	2.384	34.522	

Flecha Tot. el s. m x =0.006405

BARRA : 201 (108,109) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	12.635	-17.487	-49.918	
	m¡n.	12.628	-14.961	-42.303	
	Cort.m x.	12.628	-14.961	-42.303	
	m¡n.	12.635	-17.487	-49.918	
	Flec.m x.	12.628	-14.961	-42.303	
	m¡n.	12.635	-17.487	-49.918	

Flecha Tot. el s. m x =0.006405

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	12.635	-17.487	2.543	
	m¡n.	12.628	-14.961	2.580	
	Cort.m x.	12.628	-14.961	2.580	
	m¡n.	12.635	-17.487	2.543	
	Flec.m x.	12.628	-14.961	2.580	
	m¡n.	12.635	-17.487	2.543	

Flecha Tot. el s. m x =0.006323

BARRA : 202 (110,116) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.380	17.675	7.426	
	m¡n.	3.232	19.226	8.255	
	Cort.m x.	3.232	19.226	8.255	
	m¡n.	3.380	17.675	7.426	
	Flec.m x.	3.232	19.226	8.255	
	m¡n.	3.380	17.675	7.426	

Flecha Tot. el s. m x =0.003603

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	3.380	17.675	-23.505	
	m¡n.	3.232	19.226	-25.391	
	Cort.m x.	3.232	19.226	-25.391	
	m¡n.	3.380	17.675	-23.505	
	Flec.m x.	3.380	17.675	-23.505	
	m¡n.	3.232	19.226	-25.391	

BARRA : 203 (109,114) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.928	2.870	10.517	
	m¡n.	-2.954	3.223	10.520	
	Cort.m x.	-2.954	3.223	10.520	

	m¡n.	-2.928	2.870	10.517	
	Flec.m x.	-2.954	3.223	10.520	
	m¡n.	-2.928	2.870	10.517	

Flecha Tot. el s. m x =0.006323

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-2.928	2.870	4.776	
	m¡n.	-2.954	3.223	4.074	
	Cort.m x.	-2.954	3.223	4.074	
	m¡n.	-2.928	2.870	4.776	
	Flec.m x.	-2.928	2.870	4.776	
	m¡n.	-2.954	3.223	4.074	

Flecha Tot. el s. m x =0.003603

BARRA : 204 (111,117) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	142.010	57.844	77.023	
	m¡n.	134.240	50.417	68.391	
	Cort.m x.	142.010	57.844	77.023	
	m¡n.	134.240	50.417	68.391	
	Flec.m x.	142.010	57.844	77.023	
	m¡n.	134.240	50.417	68.391	

Flecha Tot. el s. m x =0.006300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	142.010	57.844	-24.205	
	m¡n.	134.240	50.417	-19.838	
	Cort.m x.	142.010	57.844	-24.205	
	m¡n.	134.240	50.417	-19.838	
	Flec.m x.	134.240	50.417	-19.838	
	m¡n.	142.010	57.844	-24.205	

Flecha Tot. el s. m x =0.005919

BARRA : 205 (112,118) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	13.327	50.591	
	m¡n.	0.000	10.391	44.026	
	Flec.m x.	0.000	13.327	50.591	
	m¡n.	0.000	10.391	44.026	

Flecha Tot. el s. m x =0.006781

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Cort.m x.	0.000	13.327	27.270	
	m¡n.	0.000	10.391	25.842	
	Flec.m x.	0.000	13.327	27.270	
	m¡n.	0.000	10.391	25.842	

Flecha Tot. el s. m x =0.006794

BARRA : 206 (113,119) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-134.240	50.417	68.391	
	m¡n.	-142.010	57.844	77.023	
	Cort.m x.	-142.010	57.844	77.023	
	m¡n.	-134.240	50.417	68.391	
	Flec.m x.	-142.010	57.844	77.023	
	m¡n.	-134.240	50.417	68.391	

Flecha Tot. el s. m x =0.006300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	-134.240	50.417	-19.838	
	m¡n.	-142.010	57.844	-24.205	
	Cort.m x.	-142.010	57.844	-24.205	
	m¡n.	-134.240	50.417	-19.838	
	Flec.m x.	-134.240	50.417	-19.838	
	m¡n.	-142.010	57.844	-24.205	

Flecha Tot. el s. m x =0.005919

BARRA : 207 (110,111) Sec. 6 Rect. /188,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.353	-0.591	0.426	
	m¡n.	-3.479	-0.616	0.304	
	Cort.m x.	-3.353	-0.591	0.426	
	m¡n.	-3.479	-0.616	0.304	
	Flec.m x.	-3.353	-0.591	0.426	
	m¡n.	-3.479	-0.616	0.304	

Flecha Tot. el s. m x =0.003603

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-3.353	-0.591	2.200	
	m¡n.	-3.479	-0.616	2.151	
	Cort.m x.	-3.353	-0.591	2.200	
	m¡n.	-3.479	-0.616	2.151	
	Flec.m x.	-3.353	-0.591	2.200	
	m¡n.	-3.479	-0.616	2.151	

Flecha Tot. el s. m x =0.006300

BARRA : 208 (111,112) Sec. 6 Rect. /188,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.472	0.015	1.284	
	m¡n.	-0.506	-0.031	1.275	
	Cort.m x.	-0.472	0.015	1.284	
	m¡n.	-0.506	-0.031	1.275	
	Flec.m x.	-0.472	0.015	1.284	
	m¡n.	-0.506	-0.031	1.275	

Flecha Tot. el s. m x =0.006300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.472	0.015	1.254	
	m¡n.	-0.506	-0.031	1.337	
	Cort.m x.	-0.472	0.015	1.254	
	m¡n.	-0.506	-0.031	1.337	
	Flec.m x.	-0.506	-0.031	1.337	
	m¡n.	-0.472	0.015	1.254	

Flecha Tot. el s. m x =0.006781

BARRA : 209 (112,113) Sec. 6 Rect. /188,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.506	0.031	1.337	
	m¡n.	0.472	-0.015	1.254	
	Cort.m x.	0.506	0.031	1.337	
	m¡n.	0.472	-0.015	1.254	
	Flec.m x.	0.506	0.031	1.337	
	m¡n.	0.472	-0.015	1.254	

Flecha Tot. el s. m x =0.006781

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.506	0.031	1.275	
	m¡n.	0.472	-0.015	1.284	
	Cort.m x.	0.506	0.031	1.275	
	m¡n.	0.472	-0.015	1.284	
	Flec.m x.	0.472	-0.015	1.284	
	m¡n.	0.506	0.031	1.275	

Flecha Tot. el s. m x =0.006300

BARRA : 210 (113,114) Sec. 6 Rect. /188,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.479	0.616	2.151	
	m¡n.	3.353	0.591	2.200	
	Cort.m x.	3.479	0.616	2.151	
	m¡n.	3.353	0.591	2.200	
	Flec.m x.	3.353	0.591	2.200	
	m¡n.	3.479	0.616	2.151	

Flecha Tot. el s. m x =0.006300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	3.479	0.616	0.304	
	m¡n.	3.353	0.591	0.426	
	Cort.m x.	3.479	0.616	0.304	
	m¡n.	3.353	0.591	0.426	
	Flec.m x.	3.353	0.591	0.426	
	m¡n.	3.479	0.616	0.304	

Flecha Tot. el s. m x =0.003603

REACCIONES
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(Combinaciones con coeficientes unidad - servicio)

Nudo.	Hip¢tesis.	Momento X.	Fuerza Z.	Momento Y.
4	M ximos	-0.000	120.401	-28.377
	M¡nimos	-0.000	86.707	-32.951
8	M ximos	-0.000	120.401	-28.377
	M¡nimos	-0.000	86.708	-32.951
42	M ximos	0.001	681.594	110.491
	M¡nimos	0.001	574.543	11.752
82	M ximos	0.002	709.985	-119.802
	M¡nimos	0.002	599.707	-206.663
16	M ximos	-0.000	128.312	35.746
	M¡nimos	-0.000	93.610	30.234
120	M ximos	-0.000	128.312	35.746
	M¡nimos	-0.000	93.610	30.234

5.6. CALCULO DE LA VIGA-LOSA

En consecuencia con lo anterior, se considera el tablero como viga de tres vanos apoyados en los estribos y empotrados en las pilas.

Se adjuntan los cálculos realizados de la estructura resultante.

El programa efectúa el cálculo de los esfuerzos en las hipótesis extremas,que han sido utilizados ya anteriormente, para el cálculo de las armaduras .

LAVPAS4
JUNIO 1998

[GEOMETRY]

# MEMBERS	# JOINTS	# RESTRIC. JOINTS	E [Kg/cm2]	THERMAL C.
8	9	4	300000	.00001

JOINT COORDINATES

JOINT #	X [mt]	Y [mt]
1	13.00	0.00
2	30.00	0.00
3	0.00	11.10
4	6.50	11.10
5	13.00	11.10
6	21.50	11.10
7	30.00	11.10
8	36.50	11.10
9	43.00	11.10

TYPES OF SECTIONS

TYPE #	PROPERTIES (I,A)
1	0.04900000 - 0.78500003
2	0.82200003 - 7.71999980

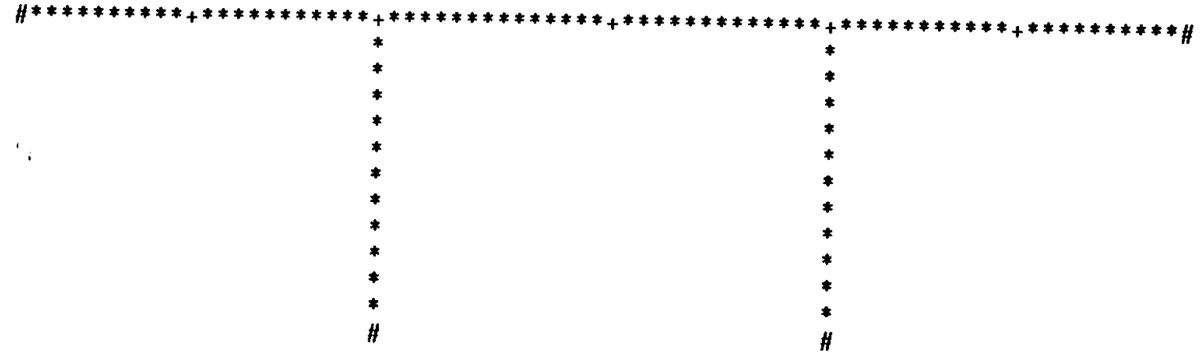
MEMBER INFORMATION, ORIENTATION AND PROPERTIES

MEMB #	End J	End K	TYPE	Inert [mt4]	Area [mt2]	Length	SIN	COS
1	1	5	1	0.04900000	0.78500003	11.10	1.000	0.000
2	2	7	1	0.04900000	0.78500003	11.10	1.000	0.000
3	3	4	2	0.82200003	7.71999980	6.50	0.000	1.000
4	4	5	2	0.82200003	7.71999980	6.50	0.000	1.000
5	5	6	2	0.82200003	7.71999980	8.50	0.000	1.000
6	6	7	2	0.82200003	7.71999980	8.50	0.000	1.000
7	7	8	2	0.82200003	7.71999980	6.50	0.000	1.000
8	8	9	2	0.82200003	7.71999980	6.50	0.000	1.000

RESTRICTED JOINTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	1	1	1
2	1	1	1
3	0	1	0
9	0	1	0

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JUNIO 1998



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CASE --> [DEAD LOAD]

GROUP # : 1 VERTICAL LOADS

3 4 7 8

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	23555	23555	0	6.5		

GROUP # : 2 VERTICAL LOADS

5 6

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	23555	23555	0	8.5		

LAVPAS4
JUNIO 1998

CASE --> [DEAD LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.000043	0.000000	-0.000568
4	0.000043	0.229042	-0.000030
5	0.000043	0.185048	-0.000165
6	-0.000000	0.463016	-0.000000
7	-0.000043	0.185048	0.000165
8	-0.000043	0.229042	0.000030
9	-0.000043	0.000000	0.000568

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-392602	-1182	4373
	5	-392602	-1182	-8748
2	2	-392602	1182	-4373
	7	-392602	1182	8748
3	3	0	113830	-0
	4	0	-39277	242296
4	4	0	-39277	242296
	5	0	-192385	-510607
5	5	-1182	200218	-519355
	6	-1182	-0	331569
6	6	-1182	0	331569
	7	-1182	-200218	-519355
7	7	0	192385	-510607
	8	0	39277	242296
8	8	-0	39277	242296
	9	-0	-113830	-0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-1182	392602	4373
2	1182	392602	-4373
3	0	113830	0
9	0	113830	0

LAVPAS4
JUNIO 1998

CASE --> [LIVE LOAD]

GROUP # : 1 VERTICAL LOADS

3

Dist. Loads : 1 # Point Loads : 2

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	5080	5080	0	6.5	5	20000
2					6.5	20000

GROUP # : 2 VERTICAL LOADS

4

Dist. Loads : 1 # Point Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	5080	5080	0	6.5	1.5	20000

GROUP # : 3 VERTICAL LOADS

7 8

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	5080	5080	0	6.5		

LAVPAS4
JUNIO 1998

CASE --> [LIVE LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.029308	0.000000	-0.000377
4	-0.029308	0.157806	-0.000005
5	-0.029308	0.035243	0.000236
6	-0.029260	-0.052872	-0.000008
7	-0.029212	0.014577	-0.000130
8	-0.029212	0.072425	0.000005
9	-0.029212	0.000000	0.000176

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-74773	1310	-4146
	5	-74773	1310	10390
2	2	-30927	-1310	5542
	7	-30927	-1310	-8993
3	3	0	55421	0
	4	0	-17599	222919
4	4	0	-17599	222919
	5	0	-70619	-98791
5	5	1310	4154	-88402
	6	1310	4154	-53097
6	6	1310	4154	-53097
	7	1310	4154	-17792
7	7	-0	35080	-26785
	8	-0	2060	93923
8	8	0	2060	93922
	9	0	-30960	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	1310	74773	-4146
2	-1310	30927	5542
3	0	55421	0
9	0	30960	0

LAVPAS4
JUNIO 1998

CASE --> [WIND LOAD]

GROUP # : 1 HORIZONTAL LOADS

1 2

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. Y	Final Y	Point Y	P
1	200	200	0	11.1		

LAVPAS4
JUNIO 1998

CASE --> [WIND LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.087645	0.000000	0.000002
4	0.087645	-0.000747	0.000000
5	0.087645	-0.000074	-0.000003
6	0.087645	-0.000000	0.000001
7	0.087645	0.000074	-0.000003
8	0.087645	0.000747	0.000000
9	0.087645	0.000000	0.000002

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	156	2220	-8252
	5	156	0	4069
2	2	-156	2220	-8252
	7	-156	0	4069
3	3	0	-128	0
	4	0	-128	-829
4	4	0	-128	-829
	5	0	-128	-1658
5	5	0	-284	2411
	6	0	-284	-0
6	6	0	-284	-0
	7	0	-284	-2411
7	7	0	-128	1658
	8	0	-128	829
8	8	0	-128	829
	9	0	-128	-0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	2220	-156	-8252
2	2220	156	-8252
3	0	-128	0
9	0	128	0

LAVPAS4
JUNIO 1998

CASE --> [SEISMIC LOAD]

GROUP # : 1 VERTICAL LOADS

5

Dist. Loads : 1 # Point Loads : 2

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	5080	5080	0	8.5	7	20000
2					8.5	20000

GROUP # : 2 VERTICAL LOADS

6

Dist. Loads : 1 # Point Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	5080	5080	0	8.5	1.5	20000

GROUP # : 3 VERTICAL LOADS

3 4

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	5080	5080	0	6.5		

LAVPAS4
JUNIO 1998

CASE --> [SEISMIC LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.022706	0.000000	-0.000065
4	-0.022706	0.023447	-0.000003
5	-0.022706	0.058434	-0.000194
6	-0.022768	0.251982	-0.000003
7	-0.022830	0.038184	0.000276
8	-0.022830	-0.041118	-0.000002
9	-0.022830	0.000000	-0.000094

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-123975	-1684	6773
	5	-123975	-1684	-11920
2	2	-81012	1684	-5686
	7	-81012	1684	13007
3	3	0	18225	0
	4	0	-14795	11150
4	4	0	-14795	11150
	5	0	-47815	-192330
5	5	-1684	76161	-204250
	6	-1684	-7019	229602
6	6	-1684	-7019	229602
	7	-1684	-70199	-153576
7	7	0	10813	-140570
	8	0	10813	-70285
8	8	0	10813	-70285
	9	0	10813	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-1684	123975	6773
2	1684	81012	-5686
3	0	18225	0
9	0	-10813	0

LAVPAS4
JUNIO 1998

CASE --> [SEISMIC LOAD]

GROUP # : 1 VERTICAL LOADS

5

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	5080	5080	0	8.5
2				

Point Loads : 2

Point X	P
7	20000
8.5	20000

GROUP # : 2 VERTICAL LOADS

6

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	5080	5080	0	8.5

Point Loads : 1

Point X	P
1.5	20000

LAVPAS4
JUNIO 1998

CASE --> [SEISMIC LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.000064	0.000000	0.000085
4	0.000064	-0.037311	0.000002
5	0.000064	0.032789	-0.000246
6	-0.000000	0.227032	-0.000000
7	-0.000065	0.032789	0.000246
8	-0.000065	-0.037311	-0.000002
9	-0.000065	0.000000	-0.000085

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-69565	-1757	6499
	5	-69565	-1757	-13003
2	2	-69565	1757	-6499
	7	-69565	1757	13003
3	3	0	-9645	0
	4	0	-9645	-62692
4	4	0	-9645	-62692
	5	0	-9645	-125384
5	5	-1757	59920	-138388
	6	-1757	-10000	213773
6	6	-1757	-10000	213773
	7	-1757	-59920	-138387
7	7	0	9645	-125385
	8	0	9645	-62692
8	8	0	9645	-62692
	9	0	9645	-0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-1757	69565	6499
2	1757	69565	-6499
3	0	-9645	0
9	0	-9645	0

LAVPAS4
JUNIO 1998

CASE --> [TEMPERATURE]

GROUP # : 1

5

THERMAL C. : .00001

Uniform 'T' Change : 65 Linear Gradient 'T'/H : 0

GROUP # : 2

6

THERMAL C. : .00001

Uniform 'T' Change : 65 Linear Gradient 'T'/H : 0

LAVPAS4
JUNIO 1998

CASE --> [TEMPERATURE]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.552261	0.000000	-0.000021
4	-0.552261	0.010057	-0.000005
5	-0.552261	-0.000889	0.000044
6	-0.000011	-0.019489	-0.000000
7	0.552239	-0.000889	-0.000044
8	0.552239	0.010057	0.000005
9	0.552239	0.000000	0.000021

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	1886	-6810	38374
	5	1886	-6810	-37215
2	2	1886	6810	-38373
	7	1886	6810	37214
3	3	0	1886	-0
	4	0	1886	12259
4	4	0	1886	12259
	5	0	1886	24517
5	5	-6809	0	-12698
	6	-6809	0	-12697
6	6	-6810	0	-12697
	7	-6810	0	-12697
7	7	0	-1886	24517
	8	0	-1886	12258
8	8	3	-1886	12258
	9	3	-1886	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-6810	-1886	38374
2	6810	-1886	-38373
3	0	1886	0
9	0	1886	0

6. PILAS

6.1. DESCRIPCION GENERAL

Se trata de soportes empotrados en el tablero y en la zapata.

La sección es circular con un diámetro de 1 m.

Las cargas verticales son las del tablero, cargas permanentes y sobrecargas tanto de frenado como la transmitida por la deformación de apoyos debida a las acciones térmicas y reológicas

El viento afecta a tablero y pila.

Con estas acciones se calculan los esfuerzos en soportes y zapatas y se determinan sus armaduras.

En la zapata se hallarán las tensiones en el suelo (< 3.5 kp/cm^2).

6.2. CARGAS

Verticales (h = 10.5 m.)

Reacciones máximas

Peso propio:	324 t	
Carga muerta:	71 t	395 t
Sobrecarga:	178 t	572 t
Soporte:		
2.5 x 0.785 x 10.5x 1 =	21 t	593 t

Horizontal

Frenado: $F_1 = 178/20 = 8.9$ t

Deformación : $\Delta = 1.2 \times 8.5 = 10.2$ mm.

$F_2 = 0.0102/(10.5^3/6/3/10^6/(\pi \times 0.5^4/4)) =$

$= 7.78$ t

$F = 8.9 + 7.8 = 16.7$ t

Viento:

Tablero: 0.2 x 3 x 15 = 9 t

Soporte: 0.2 x 10.5x 1 = 2.1t

6.3. PANDEO

Esfuerzos en arranque:

$M_x = 9 \times 11.1 + 2.1 \times 5.25 = 111$m

$M_y = 16.7 \times 10.5/2 = 87.7$ mt

$N = 593 \times 0.9 = 534$ t

$M = 0.9 \times (M_x^2 + M_y)^{1/2} = 127.3$ mt

$e_o = 0.238 \times 0.6 = 0.143$m

$e_a = (0.85 + 4000/12000) \times (20 \times 0.143 + 1)/(10 \times 0.143 + +1) \times 10.5^2/0.25 \times 10^4 = 0.083$ m

$e = 0.143 + 0.083 = 0.226$ m < 0.238 m $\quad f_{cd} = 1800$ t/m^2

$M = 0.238 \times 534 = 127.3$ mt

$\mu = 1.5 \times 127.3/1800/0.785/1 = 0.135$

$\nu = 0.9 \times 534/1800/0.785/1 = 0.34$ (0.567)

$A = 0.25 \times 1800 \times 0.785/4 = 95$ cm$^2 \rightarrow 20\ \phi\ 25$

6.4. ZAPATAS

$M_x = 9 \times 12.6 + 2.1 \times 6.75 = 127.57$ mt

$e_x = 0.204$ m $\rightarrow l_x = 3 - e_x = 1.667$m

$M_y = 16.7 \times 12/2 = 100$ mt

$e_y = 0.160$ m $\rightarrow l_y = 2 - e_y = 1.84$ m

$N = 534 + 2.5 \times 4 \times 6 \times 1.5 = 624$ t

$\sigma = N/4/(l_x)/l_y = 30$ t/m^2

$Mx = (30 - 3{,}75) \times 1.65^2/2 = 35.7$ mt/m

$A_{min.}$ = 22,5 cm^2/m

My = 26.25x2.65^2/2= 92,17 mt/m

Ay= 23.29 cm2/m

V = 1.6 x 26.25x1.9 = 80 t/m

$V_c = 5 \times 167^{1/2} \times 1.45 = 93{,}7$ t/m > V

7. ESTRIBOS

7.1. SIN PUENTE

DATOS

Muro H = 6.5 m.

Puntera	A = 1 m
Espesor del muro	B = 1,50m
Talón	C = 2 m
Espesor de zapata	D = 1 m
Angulo de rozamiento interno	$\phi = 30°$
Densidad de las tierras	$\gamma = 2$ t/m^3
Sobrecarga equivalente de tierras	$H_0 = 0.5$ m
Fuerza vertical en cabeza	R = 0 t/m
Fuerza horizontal en cabeza	F = 0 t/m
Momento exterior en cabeza	M_0 = 0 mt/m
Resistencia minorada del hormigón	$F_c = 1500$ t/m^2
Resistencia minorada del acero	$F_y = 4.43$ t/cm^2
Coeficiente de seg. de acciones	$\gamma_f = 1.6$
Coeficiente sísmico	SM = 0

RESULTADOS

Coeficiente de seguridad al deslizamiento	$C_s = 1.79$
Coeficiente de seguridad al vuelco	$C_v = 3.52$
Presión en el terreno	σ =18.3 t/m^2
Momento en arranque de muro	M_m=37.55 mt/m
Armadura en arranque de muro	A_m =9.6 cm^2/m
Momento en puntera	M_p = 7.9 mt/m
Armadura en puntera	A_p = 3.0 cm_2/ m
Momento en talón	M_t = 25.0 mt/m
Armadura en talón	A_t = 9.7 cm^2/m

7.2. CON PUENTE

DATOS

Muro H = 6.5 m

Puntera	A = 1.00 m
Espesor del muro	B = 1,50 m
Talón	C = 2.00 m
Espesor de zapata	D = 1.00 m
Angulo de rozamiento interno	$\phi = 30°$
Densidad de las tierras	$\gamma = 2$ t/m^3
Sobrecarga equivalente de tierras	$H_0 = 0.50$ m
Fuerza vertical en cabeza	R = 20 t/m
Fuerza horizontal en cabeza	F = 1 t/m
Momento exterior en cabeza	$M_0 = 0$ mt/m
Resistencia minorada del hormigón	$F_c = 1500$ t/m^2
Resistencia minorada del acero	$F_y = 4.43$ t/cm^2
Coeficiente de seg. de acciones	$\gamma_f = 1.6$
Coeficiente sísmico	SM = 0

RESULTADOS

Coeficiente de seguridad al deslizamiento	$C_s = 2.13$
Coeficiente de seguridad al vuelco	$C_v = 3,86$
Presión en el terreno	$\sigma =$ t/m2
Momento en arranque de muro	$M_m = 42.85$ mt/m
Armadura en arranque de muro	$A_m = 10$ cm^2/m
Momento en puntera	$M_p = 12.6$ mt/m
Armadura en puntera	$A_p = 4.81$ cm$_2$/ m
Momento en talón	$M_t = 26.9$ mt/m
Armadura en talón	$A_t = 10.1$ cm^2/m

7.3 . ALETAS.

Lmax = 5.25 x 4m

Malmax = 2/3x2x(4-1)^2/2x2.25= 13.5 mt/m

d=.76 m
Aal = 7.1 cm2/m

7.4. APOYOS ELASTOMÉRICOS.

Deformación máxima por retracción y dilatación térmica:

Le (mm)= (0.25 + 0.40 (40° C))xL = 0.65x21.5 = 14 mm.
Reacción max:
Rmax= 159 t
Rmin = 42 t
Para un apoyo de 300x400x56:
σ max = 159/.12 =1325 t/m2 = 132.5 kg/cm2 < 150 kg/cm2
σ min = 42/.12 = 350 t/m2 = 35 kg/cm2 > 30 kg/cm2

Altura del apoyo > 14/.7 = 20 mm.

8. PRUEBA DE CARGA

8.1. CALCULO DE LA CARGA

Como tren de cargas de la prueba se utiliza una carga uniformemente distribuida de valor:

q = 0.75 (0.4 + 120/(BxL))

Vanos 1 y 3

B = 13.00 m.
L = 12.7 m.
q = 0.75 (0.4 + 120/(13.00 x 12.7)) = .845 t/m^2

Por tanto, la carga total:

Q = .845 x 13.00 x 12.7 = 140 t.

Se utilizan camiones de 33 t. de carga total, por tanto el número máximo será:

N = 140/33 → 4 camiones. Sólo caben dos camiones.

Vano 2

B = 17 m.
L = 12.7 m.
$q = 0.75\ (0.4 + 120/(17 \times 12.7)) = 0.72\ t/m^2$

Por tanto, la carga total:

$Q = 0.72 \times 17 \times 12.27 = 150$ t.

Se utilizan camiones de 33 t. de carga total, por tanto el número máximo será:

$N = 150/33 \rightarrow 4$ camiones.

8.2. MEDICION DE FLECHAS.

Vanos 1 y 3

$f_{Máx} = 0.0015$m.

Vano 2

$f_{Máx} = 0.0020$m.

Estas flechas son debidas sólo a la sobrecarga de camiones.

8.3. ESFUERZOS.

Vanos 1 y 3

$M_{máx} = 11.82$ mt/m

Vanos 2 y 3

$M_{máx} = 14.52$ mt/m

8.4. REACCIONES.

$R_{Máx} = 154$ t.

A continuación se presentan los resultados del cálculo del emparrillado relativos a la prueba de carga.

TOOL S.A.

Fecha 28 - 6 - 98

T I T U L O D E L A O B R A

Paso Superior P.K. 307+520. Prueba de Carga

P R O P I E D A D

P R O Y E C T O

M A T E R I A L E S

No.	Mod.Young	Mod.Poisson	Peso espec.	Coef.Dilataci¢n
1	3290896.500	0.200	2.500	0.000010

Hormig¢n rest. caract. Fck = 300 Kp./cm2.

S E C C I O N E S

Unidades en m.

No.	Tipo.	Ancho.	Canto.
1	Rectg.	2.100	0.220
2	Rectg.	0.500	1.100
3	Rectg.	2.000	1.100
4	Rectg.	2.500	1.100
5	Rectg.	1.375	0.220
6	Rectg.	1.875	0.220

C A R A C T E R I S T I C A S R E S I S T E N T E S S E C C I O N E S

Unidades en m.

No.	Area.	Mmto.In.	S.Cortante	M.I.Tors.
1	4.620E-01	1.863E-03	3.850E-01	7.454E-03
2	5.500E-01	5.546E-02	4.583E-01	3.419E-02
3	2.200E+00	2.218E-01	1.833E+00	6.131E-01
4	2.750E+00	2.773E-01	2.292E+00	8.363E-01
5	3.025E-01	1.220E-03	2.521E-01	4.880E-03
6	4.125E-01	1.664E-03	3.438E-01	6.655E-03

N U D O S

Unidades en m.

Nudo.	X.	Y.
1	0.000	1.050
2	0.000	11.050
3	0.250	0.000
4	0.250	1.050
5	0.250	4.050
6	0.250	6.050
7	0.250	8.050
8	0.250	11.050
9	0.250	12.100
10	1.000	1.050
11	1.000	4.050
12	1.000	6.050
13	1.000	8.050
14	1.000	11.050
15	3.000	1.050
16	3.000	4.050
17	3.000	6.050
18	3.000	8.050
19	3.000	11.050
20	5.000	1.050
21	5.000	4.050
22	5.000	6.050
23	5.000	8.050
24	5.000	11.050
25	7.000	1.050
26	7.000	4.050

Nudo.	X.	Y.
27	7.000	6.050
28	7.000	8.050
29	7.000	11.050
30	9.000	1.050
31	9.000	4.050
32	9.000	6.050
33	9.000	8.050
34	9.000	11.050
35	11.000	1.050
36	11.000	4.050
37	11.000	6.050
38	11.000	8.050
39	11.000	11.050
40	13.000	1.050
41	13.000	4.050
42	13.000	6.050
43	13.000	8.050
44	13.000	11.050
45	15.000	1.050
46	15.000	4.050
47	15.000	6.050
48	15.000	8.050
49	15.000	11.050
50	17.000	1.050
51	17.000	4.050
52	17.000	6.050
53	17.000	8.050
54	17.000	11.050
55	19.000	1.050
56	19.000	4.050
57	19.000	6.050
58	19.000	8.050
59	19.000	11.050
60	21.000	1.050
61	21.000	4.050
62	21.000	6.050
63	21.000	8.050
64	21.000	11.050
65	23.000	1.050
66	23.000	4.050
67	23.000	6.050
68	23.000	8.050
69	23.000	11.050
70	25.000	1.050
71	25.000	4.050
72	25.000	6.050
73	25.000	8.050
74	25.000	11.050
75	27.000	1.050
76	27.000	4.050

Nudo.	X.	Y.
77	27.000	6.050
78	27.000	8.050
79	27.000	11.050
80	29.000	1.050
81	29.000	4.050
82	29.000	6.050
83	29.000	8.050
84	29.000	11.050
85	31.000	1.050
86	31.000	4.050
87	31.000	6.050
88	31.000	8.050
89	31.000	11.050
90	33.000	1.050
91	33.000	4.050
92	33.000	6.050
93	33.000	8.050
94	33.000	11.050
95	35.000	1.050
96	35.000	4.050
97	35.000	6.050
98	35.000	8.050
99	35.000	11.050
100	37.000	1.050
101	37.000	4.050
102	37.000	6.050
103	37.000	8.050
104	37.000	11.050
105	39.000	1.050
106	39.000	4.050
107	39.000	6.050
108	39.000	8.050
109	39.000	11.050
110	41.000	1.050
111	41.000	4.050
112	41.000	6.050
113	41.000	8.050
114	41.000	11.050
115	42.750	-0.000
116	42.750	1.050
117	42.750	4.050
118	42.750	6.050
119	42.750	8.050
120	42.750	11.050
121	42.750	12.100
122	43.000	1.050
123	43.000	11.050

B A R R A S

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
1	120	123	1	1	1	0.25	288.8
2	1	4	1	1	1	0.25	288.8
3	2	8	1	1	1	0.25	288.7
4	4	10	1	1	1	0.75	866.3
5	8	9	1	2	1	1.05	1443.8
6	7	8	1	2	1	3.00	4125.0
7	3	4	1	2	1	1.05	1443.8
8	116	122	1	1	1	0.25	288.8
9	114	120	1	1	1	1.75	2021.3
10	115	116	1	2	1	1.05	1443.8
11	116	117	1	2	1	3.00	4125.0
12	120	121	1	2	1	1.05	1443.8
13	5	6	1	2	1	2.00	2750.0
14	118	119	1	2	1	2.00	2750.0
15	6	12	1	3	1	0.75	4125.0
16	6	7	1	2	1	2.00	2750.0
17	119	120	1	2	1	3.00	4125.0
18	7	13	1	4	1	0.75	5156.3
19	4	5	1	2	1	3.00	4125.0
20	117	118	1	2	1	2.00	2750.0
21	5	11	1	4	1	0.75	5156.3
22	40	45	1	1	1	2.00	2310.0
23	39	44	1	1	1	2.00	2310.0
24	41	46	1	4	1	2.00	13750.0
25	42	47	1	3	1	2.00	11000.0
26	43	48	1	4	1	2.00	13750.0
27	40	41	1	3	1	3.00	16500.0
28	41	42	1	3	1	2.00	11000.0
29	42	43	1	3	1	2.00	11000.0
30	43	44	1	3	1	3.00	16500.0
31	35	40	1	1	1	2.00	2310.0
32	34	39	1	1	1	2.00	2310.0
33	36	41	1	4	1	2.00	13750.0
34	37	42	1	3	1	2.00	11000.0
35	38	43	1	4	1	2.00	13750.0
36	35	36	1	3	1	3.00	16500.0
37	36	37	1	3	1	2.00	11000.0
38	37	38	1	3	1	2.00	11000.0
39	38	39	1	3	1	3.00	16500.0
40	30	35	1	1	1	2.00	2310.0
41	29	34	1	1	1	2.00	2310.0
42	31	36	1	4	1	2.00	13750.0
43	32	37	1	3	1	2.00	11000.0
44	33	38	1	4	1	2.00	13750.0
45	30	31	1	3	1	3.00	16500.0
	31	32	1	3	1	2.00	11000.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
47	32	33	1	3	1	2.00	11000.0
48	33	34	1	3	1	3.00	16500.0
49	25	30	1	1	1	2.00	2310.0
50	24	29	1	1	1	2.00	2310.0
51	26	31	1	4	1	2.00	13750.0
52	27	32	1	3	1	2.00	11000.0
53	28	33	1	4	1	2.00	13750.0
54	25	26	1	3	1	3.00	16500.0
55	26	27	1	3	1	2.00	11000.0
56	27	28	1	3	1	2.00	11000.0
57	28	29	1	3	1	3.00	16500.0
58	20	25	1	1	1	2.00	2310.0
59	19	24	1	1	1	2.00	2310.0
60	21	26	1	4	1	2.00	13750.0
61	22	27	1	3	1	2.00	11000.0
62	23	28	1	4	1	2.00	13750.0
63	20	21	1	3	1	3.00	16500.0
64	21	22	1	3	1	2.00	11000.0
65	22	23	1	3	1	2.00	11000.0
66	23	24	1	3	1	3.00	16500.0
67	15	20	1	1	1	2.00	2310.0
68	14	19	1	1	1	2.00	2310.0
69	16	21	1	4	1	2.00	13750.0
70	17	22	1	3	1	2.00	11000.0
71	18	23	1	4	1	2.00	13750.0
72	15	16	1	3	1	3.00	16500.0
73	16	17	1	3	1	2.00	11000.0
74	17	18	1	3	1	2.00	11000.0
75	18	19	1	3	1	3.00	16500.0
76	10	15	1	1	1	2.00	2310.0
77	8	14	1	1	1	0.75	866.3
78	11	16	1	4	1	2.00	13750.0
79	12	17	1	3	1	2.00	11000.0
80	13	18	1	4	1	2.00	13750.0
81	10	11	1	5	1	3.00	2268.7
82	11	12	1	5	1	2.00	1512.5
83	12	13	1	5	1	2.00	1512.5
84	13	14	1	5	1	3.00	2268.7
85	45	50	1	1	1	2.00	2310.0
86	44	49	1	1	1	2.00	2310.0
87	46	51	1	4	1	2.00	13750.0
88	47	52	1	3	1	2.00	11000.0
89	48	53	1	4	1	2.00	13750.0
90	45	46	1	3	1	3.00	16500.0
91	46	47	1	3	1	2.00	11000.0
92	47	48	1	3	1	2.00	11000.0
93	48	49	1	3	1	3.00	16500.0
94	50	55	1	1	1	2.00	2310.0
95	49	54	1	1	1	2.00	2310.0
96	51	56	1	4	1	2.00	13750.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
97	52	57	1	3	1	2.00	11000.0
98	53	58	1	4	1	2.00	13750.0
99	50	51	1	3	1	3.00	16500.0
100	51	52	1	3	1	2.00	11000.0
101	52	53	1	3	1	2.00	11000.0
102	53	54	1	3	1	3.00	16500.0
103	55	60	1	1	1	2.00	2310.0
104	54	59	1	1	1	2.00	2310.0
105	56	61	1	4	1	2.00	13750.0
106	57	62	1	3	1	2.00	11000.0
107	58	63	1	4	1	2.00	13750.0
108	55	56	1	3	1	3.00	16500.0
109	56	57	1	3	1	2.00	11000.0
110	57	58	1	3	1	2.00	11000.0
111	58	59	1	3	1	3.00	16500.0
112	60	65	1	1	1	2.00	2310.0
13	59	64	1	1	1	2.00	2310.0
114	61	66	1	4	1	2.00	13750.0
115	62	67	1	3	1	2.00	11000.0
116	63	68	1	4	1	2.00	13750.0
117	60	61	1	3	1	3.00	16500.0
118	61	62	1	3	1	2.00	11000.0
119	62	63	1	3	1	2.00	11000.0
120	63	64	1	3	1	3.00	16500.0
121	65	70	1	1	1	2.00	2310.0
122	64	69	1	1	1	2.00	2310.0
123	66	71	1	4	1	2.00	13750.0
124	67	72	1	3	1	2.00	11000.0
125	68	73	1	4	1	2.00	13750.0
126	65	66	1	3	1	3.00	16500.0
127	66	67	1	3	1	2.00	11000.0
128	67	68	1	3	1	2.00	11000.0
129	68	69	1	3	1	3.00	16500.0
130	70	75	1	1	1	2.00	2310.0
131	69	74	1	1	1	2.00	2310.0
132	71	76	1	4	1	2.00	13750.0
133	72	77	1	3	1	2.00	11000.0
134	73	78	1	4	1	2.00	13750.0
135	70	71	1	3	1	3.00	16500.0
136	71	72	1	3	1	2.00	11000.0
137	72	73	1	3	1	2.00	11000.0
138	73	74	1	3	1	3.00	16500.0
139	75	80	1	1	1	2.00	2310.0
140	74	79	1	1	1	2.00	2310.0
141	76	81	1	4	1	2.00	13750.0
142	77	82	1	3	1	2.00	11000.0
143	78	83	1	4	1	2.00	13750.0
144	75	76	1	3	1	3.00	16500.0
145	76	77	1	3	1	2.00	11000.0
6	77	78	1	3	1	2.00	11000.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
147	78	79	1	3	1	3.00	16500.0
148	80	85	1	1	1	2.00	2310.0
149	79	84	1	1	1	2.00	2310.0
150	81	86	1	4	1	2.00	13750.0
151	82	87	1	3	1	2.00	11000.0
152	83	88	1	4	1	2.00	13750.0
153	80	81	1	3	1	3.00	16500.0
154	81	82	1	3	1	2.00	11000.0
155	82	83	1	3	1	2.00	11000.0
156	83	84	1	3	1	3.00	16500.0
157	85	90	1	1	1	2.00	2310.0
158	84	89	1	1	1	2.00	2310.0
159	86	91	1	4	1	2.00	13750.0
160	87	92	1	3	1	2.00	11000.0
161	88	93	1	4	1	2.00	13750.0
162	85	86	1	3	1	3.00	16500.0
163	86	87	1	3	1	2.00	11000.0
164	87	88	1	3	1	2.00	11000.0
165	88	89	1	3	1	3.00	16500.0
166	90	95	1	1	1	2.00	2310.0
167	89	94	1	1	1	2.00	2310.0
168	91	96	1	4	1	2.00	13750.0
169	92	97	1	3	1	2.00	11000.0
170	93	98	1	4	1	2.00	13750.0
171	90	91	1	3	1	3.00	16500.0
172	91	92	1	3	1	2.00	11000.0
173	92	93	1	3	1	2.00	11000.0
174	93	94	1	3	1	3.00	16500.0
175	95	100	1	1	1	2.00	2310.0
176	94	99	1	1	1	2.00	2310.0
177	96	101	1	4	1	2.00	13750.0
178	97	102	1	3	1	2.00	11000.0
179	98	103	1	4	1	2.00	13750.0
180	95	96	1	3	1	3.00	16500.0
181	96	97	1	3	1	2.00	11000.0
182	97	98	1	3	1	2.00	11000.0
183	98	99	1	3	1	3.00	16500.0
184	100	105	1	1	1	2.00	2310.0
185	99	104	1	1	1	2.00	2310.0
186	101	106	1	4	1	2.00	13750.0
187	102	107	1	3	1	2.00	11000.0
188	103	108	1	4	1	2.00	13750.0
189	100	101	1	3	1	3.00	16500.0
190	101	102	1	3	1	2.00	11000.0
191	102	103	1	3	1	2.00	11000.0
192	103	104	1	3	1	3.00	16500.0
193	105	110	1	1	1	2.00	2310.0
194	104	109	1	1	1	2.00	2310.0
195	106	111	1	4	1	2.00	13750.0
196	107	112	1	3	1	2.00	11000.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
197	108	113	1	4	1	2.00	13750.0
198	105	106	1	3	1	3.00	16500.0
199	106	107	1	3	1	2.00	11000.0
200	107	108	1	3	1	2.00	11000.0
201	108	109	1	3	1	3.00	16500.0
202	110	116	1	1	1	1.75	2021.3
203	109	114	1	1	1	2.00	2310.0
204	111	117	1	4	1	1.75	12031.2
205	112	118	1	3	1	1.75	9625.0
206	113	119	1	4	1	1.75	12031.2
207	110	111	1	6	1	3.00	3093.7
208	111	112	1	6	1	2.00	2062.5
209	112	113	1	6	1	2.00	2062.5
210	113	114	1	6	1	3.00	3093.8

Peso Total (kg) = 2013605
Clase 1... = Barra Emp.- Emp.
Clase 2... = Barra Art.- Emp.
Clase 3... = Barra Emp.- Art.
Clase 4... = Barra Art.- Art.

CONDICIONES DE CONTORNO
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Nudo No.	Giro.s./eje X	Despl.s/eje Z	Giro.s./eje Y
4	Lib.	Imp.	Imp.
8	Lib.	Imp.	Imp.
42	Imp.	Imp.	Imp.
82	Imp.	Imp.	Imp.
116	Lib.	Imp.	Imp.
120	Lib.	Imp.	Imp.

C A R G A S G E N E R A L E S
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Temperatura de referencia (construcci¢n). = 0

Hip¢tesis.		Temperatura	Peso propio.
1	C-1	0.000	NO

C A R G A S E N N U D O S
==========

Unidades en Mp. y M*Mp.

Hip¢tesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
1	21	0.000	-5.000	0.000
	23	0.000	-5.000	0.000
	31	0.000	-5.000	0.000
	33	0.000	-5.000	0.000
	36	0.000	-5.000	0.000
	38	0.000	-5.000	0.000
	56	0.000	-5.000	0.000
	58	0.000	-5.000	0.000
	66	0.000	-5.000	0.000
	68	0.000	-5.000	0.000
	71	0.000	-5.000	0.000
	73	0.000	-5.000	0.000
	91	0.000	-5.000	0.000
	93	0.000	-5.000	0.000
	96	0.000	-5.000	0.000
	98	0.000	-5.000	0.000
	106	0.000	-5.000	0.000
	108	0.000	-5.000	0.000

C O M B I N A C I O N E S
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Comb.	Hip.1
1	1.000

MOVIMIENTOS
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do.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
1	C 1	-.0000848789	0.0000000000	0.0000000000
2	C 1	0.0000848788	0.0000000000	0.0000000000
3	C 1	-.0000848789	0.0000891228	0.0000000000
4	C 1	-.0000848789	0.0000000000	0.0000000000
5	C 1	-.0000276261	-.0002095514	0.0000148287
6	C 1	-.0000000000	-.0002383944	0.0000094940
7	C 1	0.0000276261	-.0002095515	0.0000148287
8	C 1	0.0000848788	0.0000000000	0.0000000000
9	C 1	0.0000848788	0.0000891231	0.0000000000
10	C 1	-.0000709300	-.0000366494	0.0000832241
11	C 1	-.0000229728	-.0002213864	0.0000150996
12	C 1	-.0000000000	-.0002452743	0.0000085233
13	C 1	0.0000229728	-.0002213865	0.0000150996
14	C 1	0.0000709299	-.0000366495	0.0000832242
15	C 1	-.0000135818	-.0002108011	0.0000140457
16	C 1	-.0000101982	-.0002484722	0.0000088705
17	C 1	-.0000000000	-.0002589281	0.0000045039
18	C 1	0.0000101982	-.0002484722	0.0000088705
19	C 1	0.0000135818	-.0002108012	0.0000140457
20	C 1	-.0000037046	-.0002431084	-.0000059628
21	C 1	-.0000028053	-.0002534587	-.0000074333
22	C 1	-.0000000000	-.0002549450	-.0000096289
23	C 1	0.0000028053	-.0002534588	-.0000074333
24	C 1	0.0000037046	-.0002431085	-.0000059628
25	C 1	0.0000009213	-.0002214593	-.0000245034

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
26	C 1	0.0000009803	-.0002186409	-.0000253411
27	C 1	-.0000000000	-.0002169663	-.0000268538
28	C 1	-.0000009803	-.0002186409	-.0000253412
29	C 1	-.0000009213	-.0002214595	-.0000245034
30	C 1	0.0000045901	-.0001687135	-.0000361665
31	C 1	0.0000047076	-.0001548540	-.0000369685
32	C 1	-.0000000000	-.0001476510	-.0000395771
33	C 1	-.0000047076	-.0001548540	-.0000369685
34	C 1	-.0000045901	-.0001687136	-.0000361665
35	C 1	0.0000090115	-.0001040866	-.0000340959
36	C 1	0.0000092687	-.0000768338	-.0000347635
37	C 1	-.0000000000	-.0000608010	-.0000393975
38	C 1	-.0000092687	-.0000768338	-.0000347636
39	C 1	-.0000090116	-.0001040867	-.0000340959
40	C 1	0.0000119468	-.0000634575	-.0000077604
41	C 1	0.0000126362	-.0000270057	-.0000074061
42	C 1	0.0000000000	0.0000000000	0.0000000000
43	C 1	-.0000126362	-.0000270057	-.0000074061
44	C 1	-.0000119468	-.0000634576	-.0000077604
45	C 1	0.0000072506	-.0000660705	0.0000202663
46	C 1	0.0000068493	-.0000446532	0.0000210813
47	C 1	-.0000000000	-.0000355630	0.0000253487
48	C 1	-.0000068493	-.0000446532	0.0000210813
49	C 1	-.0000072506	-.0000660706	0.0000202663
50	C 1	0.0000040257	-.0001148137	0.0000313273
51	C 1	0.0000036848	-.0001030260	0.0000316121

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
52	C 1	-.0000000000	-.0000988875	0.0000322434
53	C 1	-.0000036848	-.0001030261	0.0000316121
54	C 1	-.0000040257	-.0001148138	0.0000313273
55	C 1	0.0000028010	-.0001722823	0.0000231532
56	C 1	0.0000029366	-.0001637791	0.0000231695
57	C 1	-.0000000000	-.0001592202	0.0000232642
58	C 1	-.0000029366	-.0001637791	0.0000231695
59	C 1	-.0000028010	-.0001722824	0.0000231532
60	C 1	0.0000028365	-.0002001536	0.0000044458
61	C 1	0.0000026924	-.0001917642	0.0000043484
62	C 1	-.0000000000	-.0001882380	0.0000041734
63	C 1	-.0000026925	-.0001917642	0.0000043484
64	C 1	-.0000028366	-.0002001537	0.0000044458
65	C 1	0.0000034223	-.0001906770	-.0000167195
66	C 1	0.0000035690	-.0001802987	-.0000169174
67	C 1	-.0000000000	-.0001747214	-.0000176027
68	C 1	-.0000035690	-.0001802988	-.0000169174
69	C 1	-.0000034223	-.0001906770	-.0000167195
70	C 1	0.0000049758	-.0001411787	-.0000327132
71	C 1	0.0000049751	-.0001262653	-.0000330259
72	C 1	-.0000000000	-.0001192134	-.0000338014
73	C 1	-.0000049751	-.0001262653	-.0000330259
74	C 1	-.0000049758	-.0001411788	-.0000327132
75	C 1	0.0000083637	-.0000813942	-.0000266675
76	C 1	0.0000079721	-.0000566268	-.0000273529
77	C 1	-.0000000000	-.0000456804	-.0000314740

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
78	C 1	-.0000079721	-.0000566268	-.0000273529
79	C 1	-.0000083637	-.0000813943	-.0000266675
80	C 1	0.0000128197	-.0000681907	0.0000069255
81	C 1	0.0000135503	-.0000290839	0.0000067747
82	C 1	0.0000000000	0.0000000000	0.0000000000
83	C 1	-.0000135503	-.0000290839	0.0000067747
84	C 1	-.0000128198	-.0000681908	0.0000069255
85	C 1	0.0000092489	-.0001166330	0.0000467793
86	C 1	0.0000091101	-.0000889948	0.0000475306
87	C 1	-.0000000000	-.0000743028	0.0000526269
88	C 1	-.0000091101	-.0000889948	0.0000475307
89	C 1	-.0000092489	-.0001166382	0.0000467793
90	C 1	0.0000045156	-.0002203469	0.0000594303
91	C 1	0.0000046387	-.0002067062	0.0000601432
92	C 1	-.0000000000	-.0001995842	0.0000621423
93	C 1	-.0000046388	-.0002067063	0.0000601432
94	C 1	-.0000045156	-.0002203472	0.0000594303
95	C 1	0.0000005054	-.0003212412	0.0000463512
96	C 1	0.0000009611	-.0003193487	0.0000472813
97	C 1	-.0000000000	-.0003165171	0.0000492451
98	C 1	-.0000009612	-.0003193489	0.0000472813
99	C 1	-.0000005054	-.0003212416	0.0000463512
100	C 1	-.0000047378	-.0003781463	0.0000235227
101	C 1	-.0000040978	-.0003918013	0.0000251938
102	C 1	-.0000000000	-.0003954036	0.0000278369
103	C 1	0.0000040977	-.0003918015	0.0000251938

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
104	C 1	0.0000047377	-.0003781468	0.0000235227
105	C 1	-.0000157788	-.0003741359	-.0000039949
106	C 1	-.0000130730	-.0004188151	0.0000013176
107	C 1	-.0000000001	-.0004306905	0.0000066367
108	C 1	0.0000130729	-.0004188153	0.0000013176
109	C 1	0.0000157787	-.0003741364	-.0000039949
110	C 1	-.0000920747	-.0001702465	-.0001394767
111	C 1	-.0000334166	-.0003985554	-.0000166507
112	C 1	-.0000000001	-.0004312793	-.0000044661
113	C 1	0.0000334164	-.0003985557	-.0000166507
114	C 1	0.0000920746	-.0001702467	-.0001394769
115	C 1	-.0001461685	0.0001534770	0.0000000000
116	C 1	-.0001461685	0.0000000000	0.0000000000
117	C 1	-.0000508625	-.0003634515	-.0000192800
118	C 1	-.0000000001	-.0004175154	-.0000098639
119	C 1	0.0000508623	-.0003634518	-.0000192800
120	C 1	0.0001461685	0.0000000000	0.0000000000
121	C 1	0.0001461685	0.0001534770	0.0000000000
122	C 1	-.0001461685	0.0000000000	0.0000000000
123	C 1	0.0001461685	0.0000000000	0.0000000000

ESFUERZOS EN SISTEMA DE EJES LOCAL

Reducci¢n de I.Torsional en hormig¢n: Vigas 0 %, Losas 0 %

BARRA : 1 (120,123) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					
0.25					

BARRA : 2 (1,4) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					
0.25					

BARRA : 3 (2,8) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					
0.25					

BARRA : 4 (4,10) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.095	-0.760	-0.966	
	m¡n.	-0.095	-0.760	-0.966	
	Cort.m x.	-0.095	-0.760	-0.966	
	m¡n.	-0.095	-0.760	-0.966	
	Flec.m x.	-0.095	-0.760	-0.966	
	m¡n.	-0.095	-0.760	-0.966	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	-0.095	-0.760	-0.395	
	m¡n.	-0.095	-0.760	-0.395	
	Cort.m x.	-0.095	-0.760	-0.395	
	m¡n.	-0.095	-0.760	-0.395	
	Flec.m x.	-0.095	-0.760	-0.395	
	m¡n.	-0.095	-0.760	-0.395	

Flecha Tot. el s. m x =0.000037

BARRA : 5 (8,9) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.05					

Flecha Tot. el s. m x =-.000089

BARRA : 6 (7,8) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.752	2.385	7.061	
	m¡n.	0.752	2.385	7.061	
	Cort.m x.	0.752	2.385	7.061	

m¡n.	0.752	2.385	7.061
Flec.m x.	0.752	2.385	7.061
m¡n.	0.752	2.385	7.061

Flecha Tot. el s. m x =0.000210

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.752	2.385	-0.095	
	m¡n.	0.752	2.385	-0.095	
	Cort.m x.	0.752	2.385	-0.095	
	m¡n.	0.752	2.385	-0.095	
	Flec.m x.	0.752	2.385	-0.095	
	m¡n.	0.752	2.385	-0.095	

BARRA : 7 (3,4) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Flecha Tot. el s. m x =-.000089

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.05					

BARRA : 8 (116,122) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.25					

BARRA : 9 (114,120) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.158	0.633	0.065	
	m¡n.	-0.158	0.633	0.065	
	Cort.m x.	-0.158	0.633	0.065	
	m¡n.	-0.158	0.633	0.065	
	Flec.m x.	-0.158	0.633	0.065	
	m¡n.	-0.158	0.633	0.065	

Flecha Tot. el s. m x =0.000170

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	-0.158	0.633	-1.043	
	m¡n.	-0.158	0.633	-1.043	
	Cort.m x.	-0.158	0.633	-1.043	
	m¡n.	-0.158	0.633	-1.043	
	Flec.m x.	-0.158	0.633	-1.043	
	m¡n.	-0.158	0.633	-1.043	

BARRA : 10 (115,116) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Flecha Tot. el s. m x =-.000153

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.05					

BARRA : 11 (116,117) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.977	-3.971	-0.158	
	m¡n.	0.977	-3.971	-0.158	
	Cort.m x.	0.977	-3.971	-0.158	

m¡n.	0.977	-3.971	-0.158	
Flec.m x.	0.977	-3.971	-0.158	
m¡n.	0.977	-3.971	-0.158	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.977	-3.971	11.754	
	m¡n.	0.977	-3.971	11.754	
	Cort.m x.	0.977	-3.971	11.754	
	m¡n.	0.977	-3.971	11.754	
	Flec.m x.	0.977	-3.971	11.754	
	m¡n.	0.977	-3.971	11.754	

Flecha Tot. el s. m x =0.000363

BARRA : 12 (120,121) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00					

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.05					

Flecha Tot. el s. m x =-.000153

BARRA : 13 (5,6) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.406	-0.178	2.343	
	m¡n.	0.406	-0.178	2.343	
	Cort.m x.	0.406	-0.178	2.343	
	m¡n.	0.406	-0.178	2.343	
	Flec.m x.	0.406	-0.178	2.343	
	m¡n.	0.406	-0.178	2.343	

Flecha Tot. el s. m x =0.000210

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.406	-0.178	2.699	
	m¡n.	0.406	-0.178	2.699	
	Cort.m x.	0.406	-0.178	2.699	
	m¡n.	0.406	-0.178	2.699	
	Flec.m x.	0.406	-0.178	2.699	
	m¡n.	0.406	-0.178	2.699	

Flecha Tot. el s. m x =0.000238

BARRA : 14 (118,119) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.716	0.468	5.110	
	m¡n.	0.716	0.468	5.110	
	Cort.m x.	0.716	0.468	5.110	
	m¡n.	0.716	0.468	5.110	
	Flec.m x.	0.716	0.468	5.110	
	m¡n.	0.716	0.468	5.110	

Flecha Tot. el s. m x =0.000418

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.716	0.468	4.173	
	m¡n.	0.716	0.468	4.173	
	Cort.m x.	0.716	0.468	4.173	
	m¡n.	0.716	0.468	4.173	
	Flec.m x.	0.716	0.468	4.173	
	m¡n.	0.716	0.468	4.173	

Flecha Tot. el s. m x =0.000363

BARRA : 15 (6,12) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	-0.356	0.811	
	m¡n.	-0.000	-0.356	0.811	
	Flec.m x.	-0.000	-0.356	0.811	
	m¡n.	-0.000	-0.356	0.811	

Flecha Tot. el s. m x =0.000238

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Cort.m x.	-0.000	-0.356	1.078	
	m¡n.	-0.000	-0.356	1.078	
	Flec.m x.	-0.000	-0.356	1.078	
	m¡n.	-0.000	-0.356	1.078	

Flecha Tot. el s. m x =0.000245

BARRA : 16 (6,7) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.406	0.178	2.699	
	m¡n.	-0.406	0.178	2.699	
	Cort.m x.	-0.406	0.178	2.699	
	m¡n.	-0.406	0.178	2.699	
	Flec.m x.	-0.406	0.178	2.699	
	m¡n.	-0.406	0.178	2.699	

Flecha Tot. el s. m x =0.000238

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.406	0.178	2.343	
	m¡n.	-0.406	0.178	2.343	
	Cort.m x.	-0.406	0.178	2.343	
	m¡n.	-0.406	0.178	2.343	
	Flec.m x.	-0.406	0.178	2.343	
	m¡n.	-0.406	0.178	2.343	

Flecha Tot. el s. m x =0.000210

BARRA : 17 (119,120) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.977	3.971	11.754	
	m¡n.	-0.977	3.971	11.754	
	Cort.m x.	-0.977	3.971	11.754	
	m¡n.	-0.977	3.971	11.754	
	Flec.m x.	-0.977	3.971	11.754	
	m¡n.	-0.977	3.971	11.754	

Flecha Tot. el s. m x =0.000363

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.977	3.971	-0.158	
	m¡n.	-0.977	3.971	-0.158	
	Cort.m x.	-0.977	3.971	-0.158	
	m¡n.	-0.977	3.971	-0.158	
	Flec.m x.	-0.977	3.971	-0.158	
	m¡n.	-0.977	3.971	-0.158	

BARRA : 18 (7,13) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	4.718	-2.207	-1.157	
	m¡n.	4.718	-2.207	-1.157	
	Cort.m x.	4.718	-2.207	-1.157	
	m¡n.	4.718	-2.207	-1.157	
	Flec.m x.	4.718	-2.207	-1.157	
	m¡n.	4.718	-2.207	-1.157	

Flecha Tot. el s. m x =0.000210

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	4.718	-2.207	0.498	
	m¡n.	4.718	-2.207	0.498	
	Cort.m x.	4.718	-2.207	0.498	
	m¡n.	4.718	-2.207	0.498	
	Flec.m x.	4.718	-2.207	0.498	
	m¡n.	4.718	-2.207	0.498	

Flecha Tot. el s. m x =0.000221

BARRA : 19 (4,5) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.752	-2.385	-0.095	
	m¡n.	-0.752	-2.385	-0.095	
	Cort.m x.	-0.752	-2.385	-0.095	
	m¡n.	-0.752	-2.385	-0.095	
	Flec.m x.	-0.752	-2.385	-0.095	
	m¡n.	-0.752	-2.385	-0.095	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.752	-2.385	7.061	
	m¡n.	-0.752	-2.385	7.061	
	Cort.m x.	-0.752	-2.385	7.061	
	m¡n.	-0.752	-2.385	7.061	
	Flec.m x.	-0.752	-2.385	7.061	
	m¡n.	-0.752	-2.385	7.061	

Flecha Tot. el s. m x =0.000210

BARRA : 20 (117,118) Sec. 2 Rect. /50,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.716	0.468	4.173	
	m¡n.	-0.716	-0.468	4.173	
	Cort.m x.	-0.716	-0.468	4.173	
	m¡n.	-0.716	-0.468	4.173	
	Flec.m x.	-0.716	-0.468	4.173	
	m¡n.	-0.716	-0.468	4.173	

Flecha Tot. el s. m x =0.000363

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.716	-0.468	5.110	
	m¡n.	-0.716	-0.468	5.110	
	Cort.m x.	-0.716	-0.468	5.110	
	m¡n.	-0.716	-0.468	5.110	
	Flec.m x.	-0.716	-0.468	5.110	
	m¡n.	-0.716	-0.468	5.110	

Flecha Tot. el s. m x =0.000418

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BARRA : 21 (5,11) Sec. 4 Rect. /250,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.718	-2.207	-1.157	
	m¡n.	-4.718	-2.207	-1.157	
	Cort.m x.	-4.718	-2.207	-1.157	
	m¡n.	-4.718	-2.207	-1.157	
	Flec.m x.	-4.718	-2.207	-1.157	
	m¡n.	-4.718	-2.207	-1.157	

Flecha Tot. el s. m x =0.000210

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	-4.718	-2.207	0.498	
	m¡n.	-4.718	-2.207	0.498	
	Cort.m x.	-4.718	-2.207	0.498	
	m¡n.	-4.718	-2.207	0.498	
	Flec.m x.	-4.718	-2.207	0.498	
	m¡n.	-4.718	-2.207	0.498	

Flecha Tot. el s. m x =0.000221

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BARRA : 22 (40,45) Sec. 1 Rect. /210,22/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.012	0.088	0.002	
	m¡n.	0.012	0.088	0.002	
	Cort.m x.	0.012	0.088	0.002	
	m¡n.	0.012	0.088	0.002	
	Flec.m x.	0.012	0.088	0.002	
	m¡n.	0.012	0.088	0.002	

Flecha Tot. el s. m x =0.000063

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.012	0.088	-0.174	
	m¡n.	0.012	0.088	-0.174	
	Cort.m x.	0.012	0.088	-0.174	
	m¡n.	0.012	0.088	-0.174	
	Flec.m x.	0.012	0.088	-0.174	
	m¡n.	0.012	0.088	-0.174	

Flecha Tot. el s. m x =0.000066

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BARRA : 23 (39,44) Sec. 1 Rect. /210,22/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.007	-0.011	-0.092	
	m¡n.	0.007	-0.011	-0.092	
	Cort.m x.	0.007	-0.011	-0.092	
	m¡n.	0.007	-0.011	-0.092	
	Flec.m x.	0.007	-0.011	-0.092	
	m¡n.	0.007	-0.011	-0.092	

Flecha Tot. el s. m x =0.000104

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.007	-0.011	-0.070	
	m¡n.	0.007	-0.011	-0.070	
	Cort.m x.	0.007	-0.011	-0.070	
	m¡n.	0.007	-0.011	-0.070	
	Flec.m x.	0.007	-0.011	-0.070	
	m¡n.	0.007	-0.011	-0.070	

Flecha Tot. el s. m x =0.000063

BARRA : 24 (41,46) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.200	-2.906	-15.904	
	m¡n.	2.200	-2.906	-15.904	
	Cort.m x.	2.200	-2.906	-15.904	
	m¡n.	2.200	-2.906	-15.904	
	Flec.m x.	2.200	-2.906	-15.904	
	m¡n.	2.200	-2.906	-15.904	

Flecha Tot. el s. m x =0.000027

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	2.200	-2.906	-10.092	
	m¡n.	2.200	-2.906	-10.092	
	Cort.m x.	2.200	-2.906	-10.092	
	m¡n.	2.200	-2.906	-10.092	
	Flec.m x.	2.200	-2.906	-10.092	
	m¡n.	2.200	-2.906	-10.092	

Flecha Tot. el s. m x =0.000045

BARRA : 25 (42,47) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-5.977	-15.230	
	m¡n.	0.000	-5.977	-15.230	
	Flec.m x.	0.000	-5.977	-15.230	
	m¡n.	0.000	-5.977	-15.230	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-5.977	-3.275	
	m¡n.	0.000	-5.977	-3.275	
	Flec.m x.	0.000	-5.977	-3.275	
	m¡n.	0.000	-5.977	-3.275	

Flecha Tot. el s. m x =0.000036

BARRA : 26 (43,48) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.200	-2.906	-15.904	
	m¡n.	-2.200	-2.906	-15.904	
	Cort.m x.	-2.200	-2.906	-15.904	
	m¡n.	-2.200	-2.906	-15.904	
	Flec.m x.	-2.200	-2.906	-15.904	
	m¡n.	-2.200	-2.906	-15.904	

Flecha Tot. el s. m x =0.000027

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-2.200	-2.906	-10.092	
	m¡n.	-2.200	-2.906	-10.092	
	Cort.m x.	-2.200	-2.906	-10.092	
	m¡n.	-2.200	-2.906	-10.092	
	Flec.m x.	-2.200	-2.906	-10.092	
	m¡n.	-2.200	-2.906	-10.092	

Flecha Tot. el s. m x =0.000045

BARRA : 27 (40,41) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.072	-0.099	0.019	
	m¡n.	-0.072	-0.099	0.019	
	Cort.m x.	-0.072	-0.099	0.019	
	m¡n.	-0.072	-0.099	0.019	
	Flec.m x.	-0.072	-0.099	0.019	
	m¡n.	-0.072	-0.099	0.019	

Flecha Tot. el s. m x =0.000063

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.072	-0.099	0.316	
	m¡n.	-0.072	-0.099	0.316	
	Cort.m x.	-0.072	-0.099	0.316	
	m¡n.	-0.072	-0.099	0.316	
	Flec.m x.	-0.072	-0.099	0.316	
	m¡n.	-0.072	-0.099	0.316	

Flecha Tot. el s. m x =0.000027

BARRA : 28 (41,42) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.253	8.409	3.797	
	m¡n.	-2.253	8.409	3.797	
	Cort.m x.	-2.253	8.409	3.797	
	m¡n.	-2.253	8.409	3.797	
	Flec.m x.	-2.253	8.409	3.797	
	m¡n.	-2.253	8.409	3.797	

Flecha Tot. el s. m x =0.000027

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-2.253	8.409	-13.022	
	m¡n.	-2.253	8.409	-13.022	
	Cort.m x.	-2.253	8.409	-13.022	
	m¡n.	-2.253	8.409	-13.022	
	Flec.m x.	-2.253	8.409	-13.022	
	m¡n.	-2.253	8.409	-13.022	

BARRA : 29 (42,43) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.253	-8.409	-13.022	
	m¡n.	2.253	-8.409	-13.022	
	Cort.m x.	2.253	-8.409	-13.022	
	m¡n.	2.253	-8.409	-13.022	
	Flec.m x.	2.253	-8.409	-13.022	

	m¡n.	2.253	-8.409	-13.022	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	2.253	-8.409	3.797	
	m¡n.	2.253	-8.409	3.797	
	Cort.m x.	2.253	-8.409	3.797	
	m¡n.	2.253	-8.409	3.797	
	Flec.m x.	2.253	-8.409	3.797	
	m¡n.	2.253	-8.409	3.797	

Flecha Tot. el s. m x =0.000027

BARRA : 30 (43,44) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.072	0.099	0.316	
	m¡n.	0.072	0.099	0.316	
	Cort.m x.	0.072	0.099	0.316	
	m¡n.	0.072	0.099	0.316	
	Flec.m x.	0.072	0.099	0.316	
	m¡n.	0.072	0.099	0.316	

Flecha Tot. el s. m x =0.000027

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.072	0.099	0.019	
	m¡n.	0.072	0.099	0.019	
	Cort.m x.	0.072	0.099	0.019	
	m¡n.	0.072	0.099	0.019	
	Flec.m x.	0.072	0.099	0.019	
	m¡n.	0.072	0.099	0.019	

Flecha Tot. el s. m x =0.000063

BARRA : 31 (35,40) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.007	-0.011	-0.092	
	m¡n.	-0.007	-0.011	-0.092	
	Cort.m x.	-0.007	-0.011	-0.092	
	m¡n.	-0.007	-0.011	-0.092	
	Flec.m x.	-0.007	-0.011	-0.092	
	m¡n.	-0.007	-0.011	-0.092	

Flecha Tot. el s. m x =0.000104

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.007	-0.011	-0.070	
	m¡n.	-0.007	-0.011	-0.070	
	Cort.m x.	-0.007	-0.011	-0.070	
	m¡n.	-0.007	-0.011	-0.070	
	Flec.m x.	-0.007	-0.011	-0.070	
	m¡n.	-0.007	-0.011	-0.070	

Flecha Tot. el s. m x =0.000063

BARRA : 32 (34,39) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.011	-0.050	-0.056	
	m¡n.	0.011	-0.050	-0.056	
	Cort.m x.	0.011	-0.050	-0.056	
	m¡n.	0.011	-0.050	-0.056	
	Flec.m x.	0.011	-0.050	-0.056	
	m¡n.	0.011	-0.050	-0.056	

Flecha Tot. el s. m x =0.000169

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.011	-0.050	0.044	
	m¡n.	0.011	-0.050	0.044	
	Cort.m x.	0.011	-0.050	0.044	

m¡n.	0.011	-0.050	0.044
Flec.m x.	0.011	-0.050	0.044
m¡n.	0.011	-0.050	0.044

Flecha Tot. el s. m x =0.000104

BARRA : 33 (36,41) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.280	5.602	-6.880	
	m¡n.	-1.280	5.602	-6.880	
	Cort.m x.	-1.280	5.602	-6.880	
	m¡n.	-1.280	5.602	-6.880	
	Flec.m x.	-1.280	5.602	-6.880	
	m¡n.	-1.280	5.602	-6.880	

Flecha Tot. el s. m x =0.000077

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.280	5.602	-18.085	
	m¡n.	-1.280	5.602	-18.085	
	Cort.m x.	-1.280	5.602	-18.085	
	m¡n.	-1.280	5.602	-18.085	
	Flec.m x.	-1.280	5.602	-18.085	
	m¡n.	-1.280	5.602	-18.085	

Flecha Tot. el s. m x =0.000027

BARRA : 34 (37,42) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	12.526	-1.855	
	m¡n.	-0.000	12.526	-1.855	
	Flec.m x.	-0.000	12.526	-1.855	
	m¡n.	-0.000	12.526	-1.855	

Flecha Tot. el s. m x =0.000061

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	12.526	-26.906	
	m¡n.	-0.000	12.526	-26.906	
	Flec.m x.	-0.000	12.526	-26.906	
	m¡n.	-0.000	12.526	-26.906	

BARRA : 35 (38,43) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.280	5.602	-6.880	
	m¡n.	1.280	5.602	-6.880	
	Cort.m x.	1.280	5.602	-6.880	
	m¡n.	1.280	5.602	-6.880	
	Flec.m x.	1.280	5.602	-6.880	
	m¡n.	1.280	5.602	-6.880	

Flecha Tot. el s. m x =0.000077

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.280	5.602	-18.085	
	m¡n.	1.280	5.602	-18.085	
	Cort.m x.	1.280	5.602	-18.085	
	m¡n.	1.280	5.602	-18.085	
	Flec.m x.	1.280	5.602	-18.085	
	m¡n.	1.280	5.602	-18.085	

Flecha Tot. el s. m x =0.000027

BARRA : 36 (35,36) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.135	-0.039	0.004	
	m¡n.	0.135	-0.039	0.004	
	Cort.m x.	0.135	-0.039	0.004	
	m¡n.	0.135	-0.039	0.004	
	Flec.m x.	0.135	-0.039	0.004	
	m¡n.	0.135	-0.039	0.004	

Flecha Tot. el s. m x =0.000104

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.135	-0.039	0.121	
	m¡n.	0.135	-0.039	0.121	
	Cort.m x.	0.135	-0.039	0.121	
	m¡n.	0.135	-0.039	0.121	
	Flec.m x.	0.135	-0.039	0.121	
	m¡n.	0.135	-0.039	0.121	

Flecha Tot. el s. m x =0.000077

BARRA : 37 (36,37) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.410	3.958	0.575	
	m¡n.	1.410	3.958	0.575	
	Cort.m x.	1.410	3.958	0.575	
	m¡n.	1.410	3.958	0.575	
	Flec.m x.	1.410	3.958	0.575	
	m¡n.	1.410	3.958	0.575	

Flecha Tot. el s. m x =0.000077

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.410	3.958	-7.342	
	m¡n.	1.410	3.958	-7.342	
	Cort.m x.	1.410	3.958	-7.342	
	m¡n.	1.410	3.958	-7.342	
	Flec.m x.	1.410	3.958	-7.342	
	m¡n.	1.410	3.958	-7.342	

Flecha Tot. el s. m x =0.000061

BARRA : 38 (37,38) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.410	-3.958	-7.342	
	m¡n.	-1.410	-3.958	-7.342	
	Cort.m x.	-1.410	-3.958	-7.342	
	m¡n.	-1.410	-3.958	-7.342	
	Flec.m x.	-1.410	-3.958	-7.342	
	m¡n.	-1.410	-3.958	-7.342	

Flecha Tot. el s. m x =0.000061

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.410	-3.958	0.575	
	m¡n.	-1.410	-3.958	0.575	
	Cort.m x.	-1.410	-3.958	0.575	
	m¡n.	-1.410	-3.958	0.575	
	Flec.m x.	-1.410	-3.958	0.575	
	m¡n.	-1.410	-3.958	0.575	

Flecha Tot. el s. m x =0.000077

BARRA : 39 (38,39) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.135	0.039	0.121	
	m¡n.	-0.135	0.039	0.121	
	Cort.m x.	-0.135	0.039	0.121	
	m¡n.	-0.135	0.039	0.121	
	Flec.m x.	-0.135	0.039	0.121	
	m¡n.	-0.135	0.039	0.121	

Flecha Tot. el s. m x =0.000077

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.135	0.039	0.004	
	m¡n.	-0.135	0.039	0.004	
	Cort.m x.	-0.135	0.039	0.004	

m¡n.	-0.135	0.039	0.004
Flec.m x.	-0.135	0.039	0.004
m¡n.	-0.135	0.039	0.004

Flecha Tot. el s. m x =0.000104

BARRA : 40 (30,35) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.011	-0.050	-0.056	
	m¡n.	-0.011	-0.050	-0.056	
	Cort.m x.	-0.011	-0.050	-0.056	
	m¡n.	-0.011	-0.050	-0.056	
	Flec.m x.	-0.011	-0.050	-0.056	
	m¡n.	-0.011	-0.050	-0.056	

Flecha Tot. el s. m x =0.000169

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.011	-0.050	0.044	
	m¡n.	-0.011	-0.050	0.044	
	Cort.m x.	-0.011	-0.050	0.044	
	m¡n.	-0.011	-0.050	0.044	
	Flec.m x.	-0.011	-0.050	0.044	
	m¡n.	-0.011	-0.050	0.044	

Flecha Tot. el s. m x =0.000104

BARRA : 41 (29,34) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.009	-0.070	-0.035	
	m¡n.	0.009	-0.070	-0.035	
	Cort.m x.	0.009	-0.070	-0.035	
	m¡n.	0.009	-0.070	-0.035	
	Flec.m x.	0.009	-0.070	-0.035	
	m¡n.	0.009	-0.070	-0.035	

Flecha Tot. el s. m x =0.000221

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.009	-0.070	0.106	
	m¡n.	0.009	-0.070	0.106	
	Cort.m x.	0.009	-0.070	0.106	
	m¡n.	0.009	-0.070	0.106	
	Flec.m x.	0.009	-0.070	0.106	
	m¡n.	0.009	-0.070	0.106	

Flecha Tot. el s. m x =0.000169

BARRA : 42 (31,36) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.734	4.600	3.594	
	m¡n.	-1.734	4.600	3.594	
	Cort.m x.	-1.734	4.600	3.594	
	m¡n.	-1.734	4.600	3.594	
	Flec.m x.	-1.734	4.600	3.594	
	m¡n.	-1.734	4.600	3.594	

Flecha Tot. el s. m x =0.000155

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.734	4.600	-5.606	
	m¡n.	-1.734	4.600	-5.606	
	Cort.m x.	-1.734	4.600	-5.606	
	m¡n.	-1.734	4.600	-5.606	
	Flec.m x.	-1.734	4.600	-5.606	
	m¡n.	-1.734	4.600	-5.606	

Flecha Tot. el s. m x =0.000077

BARRA : 43 (32,37) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	4.609	4.543	
	m¡n.	-0.000	4.609	4.543	
	Flec.m x.	-0.000	4.609	4.543	
	m¡n.	-0.000	4.609	4.543	

Flecha Tot. el s. m x =0.000148

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	4.609	-4.674	
	m¡n.	-0.000	4.609	-4.674	
	Flec.m x.	-0.000	4.609	-4.674	
	m¡n.	-0.000	4.609	-4.674	

Flecha Tot. el s. m x =0.000061

BARRA : 44 (33,38) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.734	4.600	3.594	
	m¡n.	1.734	4.600	3.594	
	Cort.m x.	1.734	4.600	3.594	
	m¡n.	1.734	4.600	3.594	
	Flec.m x.	1.734	4.600	3.594	
	m¡n.	1.734	4.600	3.594	

Flecha Tot. el s. m x =0.000155

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.734	4.600	-5.606	
	m¡n.	1.734	4.600	-5.606	
	Cort.m x.	1.734	4.600	-5.606	
	m¡n.	1.734	4.600	5.606	
	Flec.m x.	1.734	4.600	-5.606	
	m¡n.	1.734	4.600	-5.606	

Flecha Tot. el s. m x =0.000077

BARRA : 45 (30,31) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.163	-0.020	-0.002	
	m¡n.	0.163	-0.020	-0.002	
	Cort.m x.	0.163	-0.020	-0.002	
	m¡n.	0.163	-0.020	-0.002	
	Flec.m x.	0.163	-0.020	-0.002	
	m¡n.	0.163	-0.020	-0.002	

Flecha Tot. el s. m x =0.000169

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.163	-0.020	0.059	
	m¡n.	0.163	-0.020	0.059	
	Cort.m x.	0.163	-0.020	0.059	
	m¡n.	0.163	-0.020	0.059	
	Flec.m x.	0.163	-0.020	0.059	
	m¡n.	0.163	-0.020	0.059	

Flecha Tot. el s. m x =0.000155

BARRA : 46 (31,32) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.793	1.460	-0.258	
	m¡n.	0.793	1.460	-0.258	
	Cort.m x.	0.793	1.460	-0.258	
	m¡n.	0.793	1.460	-0.258	
	Flec.m x.	0.793	1.460	-0.258	
	m¡n.	0.793	1.460	-0.258	

Flecha Tot. el s. m x =0.000155

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.793	1.460	-3.179	
	m¡n.	0.793	1.460	-3.179	
	Cort.m x.	0.793	1.460	-3.179	
	m¡n.	0.793	1.460	-3.179	
	Flec.m x.	0.793	1.460	-3.179	
	m¡n.	0.793	1.460	-3.179	

Flecha Tot. el s. m x =0.000148

BARRA : 47 (32,33) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.793	-1.460	-3.179	
	m¡n.	-0.793	-1.460	-3.179	
	Cort.m x.	-0.793	-1.460	-3.179	
	m¡n.	-0.793	-1.460	-3.179	
	Flec.m x.	-0.793	-1.460	-3.179	
	m¡n.	-0.793	-1.460	-3.179	

Flecha Tot. el s. m x =0.000148

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.793	-1.460	-0.258	
	m¡n.	-0.793	-1.460	-0.258	
	Cort.m x.	-0.793	-1.460	-0.258	
	m¡n.	-0.793	-1.460	-0.258	
	Flec.m x.	-0.793	-1.460	-0.258	
	m¡n.	-0.793	-1.460	-0.258	

Flecha Tot. el s. m x =0.000155

BARRA : 48 (33,34) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.163	0.020	0.059	
	m¡n.	-0.163	0.020	0.059	
	Cort.m x.	-0.163	0.020	0.059	
	m¡n.	-0.163	0.020	0.059	
	Flec.m x.	-0.163	0.020	0.059	
	m¡n.	-0.163	0.020	0.059	

Flecha Tot. el s. m x =0.000155

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.163	0.020	-0.002	
	m¡n.	-0.163	0.020	-0.002	
	Cort.m x.	-0.163	0.020	-0.002	
	m¡n.	-0.163	0.020	-0.002	
	Flec.m x.	-0.163	0.020	-0.002	
	m¡n.	-0.163	0.020	-0.002	

Flecha Tot. el s. m x =0.000169

BARRA : 49 (25,30) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.009	-0.070	-0.035	
	m¡n.	-0.009	-0.070	-0.035	
	Cort.m x.	-0.009	-0.070	-0.035	
	m¡n.	-0.009	-0.070	-0.035	
	Flec.m x.	-0.009	-0.070	-0.035	
	m¡n.	-0.009	-0.070	-0.035	

Flecha Tot. el s. m x =0.000221

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.009	-0.070	0.106	
	m¡n.	-0.009	-0.070	0.106	
	Cort.m x.	-0.009	-0.070	0.106	
	m¡n.	-0.009	-0.070	0.106	
	Flec.m x.	-0.009	-0.070	0.106	
	m¡n.	-0.009	-0.070	0.106	

Flecha Tot. el s. m x =0.000169

BARRA : 50 (24,29) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.012	-0.078	-0.022	
	m¡n.	0.012	-0.078	-0.022	
	Cort.m x.	0.012	-0.078	-0.022	
	m¡n.	0.012	-0.078	-0.022	
	Flec.m x.	0.012	-0.078	-0.022	
	m¡n.	0.012	-0.078	-0.022	

Flecha Tot. el s. m x =0.000243

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.012	-0.078	0.135	
	m¡n.	0.012	-0.078	0.135	
	Cort.m x.	0.012	-0.078	0.135	
	m¡n.	0.012	-0.078	0.135	
	Flec.m x.	0.012	-0.078	0.135	
	m¡n.	0.012	-0.078	0.135	

Flecha Tot. el s. m x =0.000221

BARRA : 51 (26,31) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.417	1.081	6.386	
	m¡n.	-1.417	1.081	6.386	
	Cort.m x.	-1.417	1.081	6.386	
	m¡n.	-1.417	1.081	6.386	
	Flec.m x.	-1.417	1.081	6.386	
	m¡n.	-1.417	1.081	6.386	

Flecha Tot. el s. m x =0.000219

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.417	1.081	4.225	
	m¡n.	-1.417	1.081	4.225	
	Cort.m x.	-1.417	1.081	4.225	
	m¡n.	-1.417	1.081	4.225	
	Flec.m x.	-1.417	1.081	4.225	
	m¡n.	-1.417	1.081	4.225	

Flecha Tot. el s. m x =0.000155

BARRA : 52 (27,32) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	1.688	6.332	
	m¡n.	-0.000	1.688	6.332	
	Flec.m x.	-0.000	1.688	6.332	
	m¡n.	-0.000	1.688	6.332	

Flecha Tot. el s. m x =0.000217

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	1.688	2.956	
	m¡n.	-0.000	1.688	2.956	
	Flec.m x.	-0.000	1.688	2.956	
	m¡n.	-0.000	1.688	2.956	

Flecha Tot. el s. m x =0.000148

BARRA : 53 (28,33) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.417	1.081	6.386	
	m¡n.	1.417	1.081	6.386	
	Cort.m x.	1.417	1.081	6.386	
	m¡n.	1.417	1.081	6.386	
	Flec.m x.	1.417	1.081	6.386	
	m¡n.	1.417	1.081	6.386	

Flecha Tot. el s. m x =0.000219

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.417	1.081	4.225	
	m¡n.	1.417	1.081	4.225	
	Cort.m x.	1.417	1.081	4.225	
	m¡n.	1.417	1.081	4.225	
	Flec.m x.	1.417	1.081	4.225	
	m¡n.	1.417	1.081	4.225	

Flecha Tot. el s. m x =0.000155

BARRA : 54 (25,26) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.170	-0.008	0.002	
	m¡n.	0.170	-0.008	0.002	
	Cort.m x.	0.170	-0.008	0.002	
	m¡n.	0.170	-0.008	0.002	
	Flec.m x.	0.170	-0.008	0.002	
	m¡n.	0.170	-0.008	0.002	

Flecha Tot. el s. m x =0.000221

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.170	-0.008	0.026	
	m¡n.	0.170	-0.008	0.026	
	Cort.m x.	0.170	-0.008	0.026	
	m¡n.	0.170	-0.008	0.026	
	Flec.m x.	0.170	-0.008	0.026	
	m¡n.	0.170	-0.008	0.026	

Flecha Tot. el s. m x =0.000219

BARRA : 55 (26,27) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.460	0.406	0.048	
	m¡n.	0.460	0.406	0.048	
	Cort.m x.	0.460	0.406	0.048	
	m¡n.	0.460	0.406	0.048	
	Flec.m x.	0.460	0.406	0.048	
	m¡n.	0.460	0.406	0.048	

Flecha Tot. el s. m x =0.000219

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.460	0.406	-0.764	
	m¡n.	0.460	0.406	-0.764	
	Cort.m x.	0.460	0.406	-0.764	
	m¡n.	0.460	0.406	-0.764	
	Flec.m x.	0.460	0.406	-0.764	
	m¡n.	0.460	0.406	-0.764	

Flecha Tot. el s. m x =0.000217

BARRA : 56 (27,28) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.460	-0.406	-0.764	
	m¡n.	-0.460	-0.406	-0.764	
	Cort.m x.	-0.460	-0.406	-0.764	
	m¡n.	-0.460	-0.406	-0.764	
	Flec.m x.	-0.460	-0.406	-0.764	
	m¡n.	-0.460	-0.406	-0.764	

Flecha Tot. el s. m x =0.000217

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.460	-0.406	0.048	
	m¡n.	-0.460	-0.406	0.048	
	Cort.m x.	-0.460	-0.406	0.048	

m¡n.	-0.460	-0.406	0.048
Flec.m x.	-0.460	-0.406	0.048
m¡n.	-0.460	-0.406	0.048

Flecha Tot. el s. m x =0.000219

BARRA : 57 (28,29) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.170	0.008	0.026	
	m¡n.	-0.170	0.008	0.026	
	Cort.m x.	-0.170	0.008	0.026	
	m¡n.	-0.170	0.008	0.026	
	Flec.m x.	-0.170	0.008	0.026	
	m¡n.	-0.170	0.008	0.026	

Flecha Tot. el s. m x =0.000219

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.170	0.008	0.002	
	m¡n.	-0.170	0.008	0.002	
	Cort.m x.	-0.170	0.008	0.002	
	m¡n.	-0.170	0.008	0.002	
	Flec.m x.	-0.170	0.008	0.002	
	m¡n.	-0.170	0.008	0.002	

Flecha Tot. el s. m x =0.000221

BARRA : 58 (20,25) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.012	-0.078	-0.022	
	m¡n.	-0.012	-0.078	-0.022	
	Cort.m x.	-0.012	-0.078	-0.022	
	m¡n.	-0.012	-0.078	-0.022	
	Flec.m x.	-0.012	-0.078	-0.022	
	m¡n.	-0.012	-0.078	-0.022	

Flecha Tot. el s. m x =0.000243

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.012	-0.078	0.135	
	m¡n.	-0.012	-0.078	0.135	
	Cort.m x.	-0.012	-0.078	0.135	
	m¡n.	-0.012	-0.078	0.135	
	Flec.m x.	-0.012	-0.078	0.135	
	m¡n.	-0.012	-0.078	0.135	

Flecha Tot. el s. m x =0.000221

BARRA : 59 (19,24) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.025	-0.215	-0.154	
	m¡n.	0.025	-0.215	-0.154	
	Cort.m x.	0.025	-0.215	-0.154	
	m¡n.	0.025	-0.215	-0.154	
	Flec.m x.	0.025	-0.215	-0.154	
	m¡n.	0.025	-0.215	-0.154	

Flecha Tot. el s. m x =0.000211

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.025	-0.215	0.277	
	m¡n.	0.025	-0.215	0.277	
	Cort.m x.	0.025	-0.215	0.277	
	m¡n.	0.025	-0.215	0.277	
	Flec.m x.	0.025	-0.215	0.277	
	m¡n.	0.025	-0.215	0.277	

Flecha Tot. el s. m x =0.000243

BARRA : 60 (21,26) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.439	1.495	9.666	
	m¡n.	-1.439	1.495	9.666	
	Cort.m x.	-1.439	1.495	9.666	
	m¡n.	-1.439	1.495	9.666	
	Flec.m x.	-1.439	1.495	9.666	
	m¡n.	-1.439	1.495	9.666	

Flecha Tot. el s. m x =0.000253

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.439	1.495	6.676	
	m¡n.	-1.439	1.495	6.676	
	Cort.m x.	-1.439	1.495	6.676	
	m¡n.	-1.439	1.495	6.676	
	Flec.m x.	-1.439	1.495	6.676	
	m¡n.	-1.439	1.495	6.676	

Flecha Tot. el s. m x =0.000219

BARRA : 61 (22,27) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	0.875	7.163	
	m¡n.	-0.000	0.875	7.163	
	Flec.m x.	-0.000	0.875	7.163	
	m¡n.	-0.000	0.875	7.163	

Flecha Tot. el s. m x =0.000255

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	0.875	5.412	
	m¡n.	-0.000	0.875	5.412	
	Flec.m x.	-0.000	0.875	5.412	
	m¡n.	-0.000	0.875	5.412	

Flecha Tot. el s. m x =0.000217

BARRA : 62 (23,28) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.439	1.495	9.666	
	m¡n.	1.439	1.495	9.666	
	Cort.m x.	1.439	1.495	9.666	
	m¡n.	1.439	1.495	9.666	
	Flec.m x.	1.439	1.495	9.666	
	m¡n.	1.439	1.495	9.666	

Flecha Tot. el s. m x =0.000253

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.439	1.495	6.676	
	m¡n.	1.439	1.495	6.676	
	Cort.m x.	1.439	1.495	6.676	
	m¡n.	1.439	1.495	6.676	
	Flec.m x.	1.439	1.495	6.676	
	m¡n.	1.439	1.495	6.676	

Flecha Tot. el s. m x =0.000219

BARRA : 63 (20,21) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.298	-0.137	0.013	
	m¡n.	0.298	-0.137	0.013	
	Cort.m x.	0.298	-0.137	0.013	
	m¡n.	0.298	-0.137	0.013	
	Flec.m x.	0.298	-0.137	0.013	
	m¡n.	0.298	-0.137	0.013	

Flecha Tot. el s. m x =0.000243

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.298	-0.137	0.424	
	m¡n.	0.298	-0.137	0.424	
	Cort.m x.	0.298	-0.137	0.424	
	m¡n.	0.298	-0.137	0.424	
	Flec.m x.	0.298	-0.137	0.424	
	m¡n.	0.298	-0.137	0.424	

Flecha Tot. el s. m x =0.000253

BARRA : 64 (21,22) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.668	0.772	1.796	
	m¡n.	0.668	0.772	1.796	
	Cort.m x.	0.668	0.772	1.796	
	m¡n.	0.668	0.772	1.796	
	Flec.m x.	0.668	0.772	1.796	
	m¡n.	0.668	0.772	1.796	

Flecha Tot. el s. m x =0.000253

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.668	0.772	0.252	
	m¡n.	0.668	0.772	0.252	
	Cort.m x.	0.668	0.772	0.252	
	m¡n.	0.668	0.772	0.252	
	Flec.m x.	0.668	0.772	0.252	
	m¡n.	0.668	0.772	0.252	

Flecha Tot. el s. m x =0.000255

BARRA : 65 (22,23) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.668	-0.772	0.252	
	m¡n.	-0.668	-0.772	0.252	
	Cort.m x.	-0.668	-0.772	0.252	
	m¡n.	-0.668	-0.772	0.252	
	Flec.m x.	-0.668	-0.772	0.252	
	m¡n.	-0.668	-0.772	0.252	

Flecha Tot. el s. m x =0.000255

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.668	-0.772	1.796	
	m¡n.	-0.668	-0.772	1.796	
	Cort.m x.	-0.668	-0.772	1.796	
	m¡n.	-0.668	-0.772	1.796	
	Flec.m x.	-0.668	-0.772	1.796	
	m¡n.	-0.668	-0.772	1.796	

Flecha Tot. el s. m x =0.000253

BARRA : 66 (23,24) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.298	0.137	0.424	
	m¡n.	-0.298	0.137	0.424	
	Cort.m x.	-0.298	0.137	0.424	
	m¡n.	-0.298	0.137	0.424	
	Flec.m x.	-0.298	0.137	0.424	
	m¡n.	-0.298	0.137	0.424	

Flecha Tot. el s. m x =0.000253

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.298	0.137	0.013	
	m¡n.	-0.298	0.137	0.013	
	Cort.m x.	-0.298	0.137	0.013	
	m¡n.	-0.298	0.137	0.013	
	Flec.m x.	-0.298	0.137	0.013	
	m¡n.	-0.298	0.137	0.013	

Flecha Tot. el s. m x =0.000243

BARRA : 67 (15,20) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.025	-0.215	-0.154	
	m¡n.	-0.025	-0.215	-0.154	
	Cort.m x.	-0.025	-0.215	-0.154	
	m¡n.	-0.025	-0.215	-0.154	
	Flec.m x.	-0.025	-0.215	-0.154	
	m¡n.	-0.025	-0.215	-0.154	

Flecha Tot. el s. m x =0.000211

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.025	-0.215	0.277	
	m¡n.	-0.025	-0.215	0.277	
	Cort.m x.	-0.025	-0.215	0.277	
	m¡n.	-0.025	-0.215	0.277	
	Flec.m x.	-0.025	-0.215	0.277	
	m¡n.	-0.025	-0.215	0.277	

Flecha Tot. el s. m x =0.000243

BARRA : 68 (14,19) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.147	-0.683	-0.471	
	m¡n.	0.147	-0.683	-0.471	
	Cort.m x.	0.147	-0.683	-0.471	
	m¡n.	0.147	-0.683	-0.471	
	Flec.m x.	0.147	-0.683	-0.471	
	m¡n.	0.147	-0.683	-0.471	

Flecha Tot. el s. m x =0.000037

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.147	-0.683	0.895	
	m¡n.	0.147	-0.683	0.895	
	Cort.m x.	0.147	-0.683	0.895	
	m¡n.	0.147	-0.683	0.895	
	Flec.m x.	0.147	-0.683	0.895	
	m¡n.	0.147	-0.683	0.895	

Flecha Tot. el s. m x =0.000211

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BARRA : 69 (16,21) Sec. 4 Rect. /250,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.811	-2.596	4.843	
	m¡n.	-2.811	-2.596	4.843	
	Cort.m x.	-2.811	-2.596	4.843	
	m¡n.	-2.811	-2.596	4.843	
	Flec.m x.	-2.811	-2.596	4.843	
	m¡n.	-2.811	-2.596	4.843	

Flecha Tot. el s. m x =0.000248

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-2.811	-2.596	10.035	
	m¡n.	-2.811	-2.596	10.035	
	Cort.m x.	-2.811	-2.596	10.035	
	m¡n.	-2.811	-2.596	10.035	
	Flec.m x.	-2.811	-2.596	10.035	
	m¡n.	-2.811	-2.596	10.035	

Flecha Tot. el s. m x =0.000253

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BARRA : 70 (17,22) Sec. 3 Rect. /200,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	-0.668	4.490	
	m¡n.	-0.000	-0.668	4.490	
	Flec.m x.	-0.000	-0.668	4.490	
	m¡n.	-0.000	-0.668	4.490	

Flecha Tot. el s. m x =0.000259

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	-0.668	5.827	
	m¡n.	-0.000	-0.668	5.827	
	Flec.m x.	-0.000	-0.668	5.827	
	m¡n.	-0.000	-0.668	5.827	

Flecha Tot. el s. m x =0.000255

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BARRA : 71 (18,23) Sec. 4 Rect. /250,110/ cm H-300

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.811	-2.596	4.843	
	m¡n.	2.811	-2.596	4.843	
	Cort.m x.	2.811	-2.596	4.843	
	m¡n.	2.811	-2.596	4.843	
	Flec.m x.	2.811	-2.596	4.843	
	m¡n.	2.811	-2.596	4.843	

Flecha Tot. el s. m x =0.000248

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	2.811	-2.596	10.035	
	m¡n.	2.811	-2.596	10.035	
	Cort.m x.	2.811	-2.596	10.035	
	m¡n.	2.811	-2.596	10.035	
	Flec.m x.	2.811	-2.596	10.035	
	m¡n.	2.811	-2.596	10.035	

Flecha Tot. el s. m x =0.000253

BARRA : 72 (15,16) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.049	-0.468	0.121	
	m¡n.	1.049	-0.468	0.121	
	Cort.m x.	1.049	-0.468	0.121	
	m¡n.	1.049	-0.468	0.121	
	Flec.m x.	1.049	-0.468	0.121	
	m¡n.	1.049	-0.468	0.121	

Flecha Tot. el s. m x =0.000211

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	1.049	-0.468	1.525	
	m¡n.	1.049	-0.468	1.525	
	Cort.m x.	1.049	-0.468	1.525	
	m¡n.	1.049	-0.468	1.525	
	Flec.m x.	1.049	-0.468	1.525	
	m¡n.	1.049	-0.468	1.525	

Flecha Tot. el s. m x =0.000248

BARRA : 73 (16,17) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.328	-0.151	3.572	
	m¡n.	1.328	-0.151	3.572	
	Cort.m x.	1.328	-0.151	3.572	
	m¡n.	1.328	-0.151	3.572	
	Flec.m x.	1.328	-0.151	3.572	
	m¡n.	1.328	-0.151	3.572	

Flecha Tot. el s. m x =0.000248

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.328	-0.151	3.873	
	m¡n.	1.328	-0.151	3.873	
	Cort.m x.	1.328	-0.151	3.873	

m¡n.	1.328	-0.151	3.873	
Flec.m x.	1.328	-0.151	3.873	
m¡n.	1.328	-0.151	3.873	

Flecha Tot. el s. m x =0.000259

BARRA : 74 (17,18) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.328	0.151	3.873	
	m¡n.	-1.328	0.151	3.873	
	Cort.m x.	-1.328	0.151	3.873	
	m¡n.	-1.328	0.151	3.873	
	Flec.m x.	-1.328	0.151	3.873	
	m¡n.	-1.328	0.151	3.873	

Flecha Tot. el s. m x =0.000259

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.328	0.151	3.572	
	m¡n.	-1.328	0.151	3.572	
	Cort.m x.	-1.328	0.151	3.572	
	m¡n.	-1.328	0.151	3.572	
	Flec.m x.	-1.328	0.151	3.572	
	m¡n.	-1.328	0.151	3.572	

Flecha Tot. el s. m x =0.000248

BARRA : 75 (18,19) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.049	0.468	1.525	
	m¡n.	-1.049	0.468	1.525	
	Cort.m x.	-1.049	0.468	1.525	
	m¡n.	-1.049	0.468	1.525	
	Flec.m x.	-1.049	0.468	1.525	
	m¡n.	-1.049	0.468	1.525	

Flecha Tot. el s. m x =0.000248

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-1.049	0.468	0.121	
	m¡n.	-1.049	0.468	0.121	
	Cort.m x.	-1.049	0.468	0.121	
	m¡n.	-1.049	0.468	0.121	
	Flec.m x.	-1.049	0.468	0.121	
	m¡n.	-1.049	0.468	0.121	

Flecha Tot. el s. m x =0.000211

BARRA : 76 (10,15) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.147	-0.683	-0.471	
	m¡n.	-0.147	-0.683	-0.471	
	Cort.m x.	-0.147	-0.683	-0.471	
	m¡n.	-0.147	-0.683	-0.471	
	Flec.m x.	-0.147	-0.683	-0.471	
	m¡n.	-0.147	-0.683	-0.471	

Flecha Tot. el s. m x =0.000037

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.147	-0.683	0.895	
	m¡n.	-0.147	-0.683	0.895	
	Cort.m x.	-0.147	-0.683	0.895	
	m¡n.	-0.147	-0.683	0.895	
	Flec.m x.	-0.147	-0.683	0.895	
	m¡n.	-0.147	-0.683	0.895	

Flecha Tot. el s. m x =0.000211

BARRA : 77 (8,14) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.095	-0.760	-0.966	
	m¡n.	0.095	-0.760	-0.966	
	Cort.m x.	0.095	-0.760	-0.966	
	m¡n.	0.095	-0.760	-0.966	
	Flec.m x.	0.095	-0.760	-0.966	
	m¡n.	0.095	-0.760	-0.966	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.75	Tor. m x.	0.095	-0.760	-0.395	
	m¡n.	0.095	-0.760	-0.395	
	Cort.m x.	0.095	-0.760	-0.395	
	m¡n.	0.095	-0.760	-0.395	
	Flec.m x.	0.095	-0.760	-0.395	
	m¡n.	0.095	-0.760	-0.395	

Flecha Tot. el s. m x =0.000037

BARRA : 78 (11,16) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.857	-2.279	0.563	
	m¡n.	-4.857	-2.279	0.563	
	Cort.m x.	-4.857	-2.279	0.563	
	m¡n.	-4.857	-2.279	0.563	
	Flec.m x.	-4.857	-2.279	0.563	
	m¡n.	-4.857	-2.279	0.563	

Flecha Tot. el s. m x =0.000221

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-4.857	-2.279	5.121	
	m¡n.	-4.857	-2.279	5.121	
	Cort.m x.	-4.857	-2.279	5.121	
	m¡n.	-4.857	-2.279	5.121	
	Flec.m x.	-4.857	-2.279	5.121	
	m¡n.	-4.857	-2.279	5.121	

Flecha Tot. el s. m x =0.000248

BARRA : 79 (12,17) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	-0.367	1.100	
	m¡n.	-0.000	-0.367	1.100	
	Flec.m x.	-0.000	-0.367	1.100	
	m¡n.	-0.000	-0.367	1.100	

Flecha Tot. el s. m x =0.000245

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	-0.367	1.834	
	m¡n.	-0.000	-0.367	1.834	
	Flec.m x.	-0.000	-0.367	1.834	
	m¡n.	-0.000	-0.367	1.834	

Flecha Tot. el s. m x =0.000259

BARRA : 80 (13,18) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	4.857	-2.279	0.563	
	m¡n.	4.857	-2.279	0.563	
	Cort.m x.	4.857	-2.279	0.563	
	m¡n.	4.857	-2.279	0.563	
	Flec.m x.	4.857	-2.279	0.563	
	m¡n.	4.857	-2.279	0.563	

Flecha Tot. el s. m x =0.000221

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	4.857	-2.279	5.121	
	m¡n.	4.857	-2.279	5.121	
	Cort.m x.	4.857	-2.279	5.121	
	m¡n.	4.857	-2.279	5.121	
	Flec.m x.	4.857	-2.279	5.121	
	m¡n.	4.857	-2.279	5.121	

Flecha Tot. el s. m x =0.000248

BARRA : 81 (10,11) Sec. 5 Rect. /138,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.076	-0.077	-0.051	
	m¡n.	0.076	-0.077	-0.051	
	Cort.m x.	0.076	-0.077	-0.051	
	m¡n.	0.076	-0.077	-0.051	
	Flec.m x.	0.076	-0.077	-0.051	
	m¡n.	0.076	-0.077	-0.051	

Flecha Tot. el s. m x =0.000037

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.076	-0.077	0.180	
	m¡n.	0.076	-0.077	0.180	
	Cort.m x.	0.076	-0.077	0.180	
	m¡n.	0.076	-0.077	0.180	
	Flec.m x.	0.076	-0.077	0.180	
	m¡n.	0.076	-0.077	0.180	

Flecha Tot. el s. m x =0.000221

BARRA : 82 (11,12) Sec. 5 Rect. /138,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.011	-0.005	0.041	
	m¡n.	0.011	-0.005	0.041	
	Cort.m x.	0.011	-0.005	0.041	
	m¡n.	0.011	-0.005	0.041	
	Flec.m x.	0.011	-0.005	0.041	
	m¡n.	0.011	-0.005	0.041	

Flecha Tot. el s. m x =0.000221

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.011	-0.005	0.051	
	m¡n.	0.011	-0.005	0.051	
	Cort.m x.	0.011	-0.005	0.051	
	m¡n.	0.011	-0.005	0.051	
	Flec.m x.	0.011	-0.005	0.051	
	m¡n.	0.011	-0.005	0.051	

Flecha Tot. el s. m x =0.000245

BARRA : 83 (12,13) Sec. 5 Rect. /138,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.011	0.005	0.051	
	m¡n.	-0.011	0.005	0.051	
	Cort.m x.	-0.011	0.005	0.051	
	m¡n.	-0.011	0.005	0.051	
	Flec.m x.	-0.011	0.005	0.051	
	m¡n.	-0.011	0.005	0.051	

Flecha Tot. el s. m x =0.000245

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.011	0.005	0.041	
	m¡n.	-0.011	0.005	0.041	
	Cort.m x.	-0.011	0.005	0.041	
	m¡n.	-0.011	0.005	0.041	
	Flec.m x.	-0.011	0.005	0.041	
	m¡n.	-0.011	0.005	0.041	

Flecha Tot. el s. m x =0.000221

BARRA : 84 (13,14) Sec. 5 Rect. /138,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.076	0.077	0.180	
	m¡n.	-0.076	0.077	0.180	
	Cort.m x.	-0.076	0.077	0.180	
	m¡n.	-0.076	0.077	0.180	
	Flec.m x.	-0.076	0.077	0.180	
	m¡n.	-0.076	0.077	0.180	

Flecha Tot. el s. m x =0.000221

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.076	0.077	-0.051	
	m¡n.	-0.076	0.077	-0.051	
	Cort.m x.	-0.076	0.077	-0.051	
	m¡n.	-0.076	0.077	-0.051	
	Flec.m x.	-0.076	0.077	-0.051	
	m¡n.	-0.076	0.077	-0.051	

Flecha Tot. el s. m x =0.000037

BARRA : 85 (45,50) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.008	0.025	-0.009	
	m¡n.	0.008	0.025	-0.009	
	Cort.m x.	0.008	0.025	-0.009	
	m¡n.	0.008	0.025	-0.009	
	Flec.m x.	0.008	0.025	-0.009	
	m¡n.	0.008	0.025	-0.009	

Flecha Tot. el s. m x =0.000066

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.008	0.025	-0.059	
	m¡n.	0.008	0.025	-0.059	
	Cort.m x.	0.008	0.025	-0.059	
	m¡n.	0.008	0.025	-0.059	
	Flec.m x.	0.008	0.025	-0.059	
	m¡n.	0.008	0.025	-0.059	

Flecha Tot. el s. m x =0.000115

BARRA : 86 (44,49) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.012	0.088	0.002	
	m¡n.	-0.012	0.088	0.002	
	Cort.m x.	-0.012	0.088	0.002	
	m¡n.	-0.012	0.088	0.002	
	Flec.m x.	-0.012	0.088	0.002	
	m¡n.	-0.012	0.088	0.002	

Flecha Tot. el s. m x =0.000063

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.012	0.088	-0.174	
	m¡n.	-0.012	0.088	-0.174	
	Cort.m x.	-0.012	0.088	-0.174	
	m¡n.	-0.012	0.088	-0.174	
	Flec.m x.	-0.012	0.088	-0.174	
	m¡n.	-0.012	0.088	-0.174	

Flecha Tot. el s. m x =0.000066

BARRA : 87 (46,51) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.203	-4.155	-8.959	
	m¡n.	1.203	-4.155	-8.959	
	Cort.m x.	1.203	-4.155	-8.959	
	m¡n.	1.203	-4.155	-8.959	
	Flec.m x.	1.203	-4.155	-8.959	
	m¡n.	1.203	-4.155	-8.959	

Flecha Tot. el s. m x =0.000045

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.203	-4.155	-0.650	
	m¡n.	1.203	-4.155	-0.650	
	Cort.m x.	1.203	-4.155	-0.650	
	m¡n.	1.203	-4.155	-0.650	
	Flec.m x.	1.203	-4.155	-0.650	
	m¡n.	1.203	-4.155	-0.650	

Flecha Tot. el s. m x =0.000103

BARRA : 88 (47,52) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-3.355	-5.871	
	m¡n.	0.000	-3.355	-5.871	
	Flec.m x.	0.000	-3.355	-5.871	
	m¡n.	0.000	-3.355	-5.871	

Flecha Tot. el s. m x =0.000036

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-3.355	0.838	
	m¡n.	0.000	-3.355	0.838	
	Flec.m x.	0.000	-3.355	0.838	
	m¡n.	0.000	-3.355	0.838	

Flecha Tot. el s. m x =0.000099

BARRA : 89 (48,53) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.203	-4.155	-8.959	
	m¡n.	-1.203	-4.155	-8.959	
	Cort.m x.	-1.203	-4.155	-8.959	
	m¡n.	-1.203	-4.155	-8.959	
	Flec.m x.	-1.203	-4.155	-8.959	
	m¡n.	-1.203	-4.155	-8.959	

Flecha Tot. el s. m x =0.000045

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.203	-4.155	-0.650	
	m¡n.	-1.203	-4.155	-0.650	
	Cort.m x.	-1.203	-4.155	-0.650	
	m¡n.	-1.203	-4.155	-0.650	
	Flec.m x.	-1.203	-4.155	-0.650	
	m¡n.	-1.203	-4.155	-0.650	

Flecha Tot. el s. m x =0.000103

BARRA : 90 (45,46) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.165	0.063	-0.004	
	m¡n.	-0.165	0.063	-0.004	
	Cort.m x.	-0.165	0.063	-0.004	
	m¡n.	-0.165	0.063	-0.004	
	Flec.m x.	-0.165	0.063	-0.004	
	m¡n.	-0.165	0.063	-0.004	

Flecha Tot. el s. m x =0.000066

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.165	0.063	-0.192	
	m¡n.	-0.165	0.063	-0.192	
	Cort.m x.	-0.165	0.063	-0.192	

m¡n.	-0.165	0.063	-0.192
Flec.m x.	-0.165	0.063	-0.192
m¡n.	-0.165	0.063	-0.192

Flecha Tot. el s. m x =0.000045

BARRA : 91 (46,47) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.298	1.311	-1.189	
	m¡n.	-1.298	1.311	-1.189	
	Cort.m x.	-1.298	1.311	-1.189	
	m¡n.	-1.298	1.311	-1.189	
	Flec.m x.	-1.298	1.311	-1.189	
	m¡n.	-1.298	1.311	-1.189	

Flecha Tot. el s. m x =0.000045

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.298	1.311	-3.811	
	m¡n.	-1.298	1.311	-3.811	
	Cort.m x.	-1.298	1.311	-3.811	
	m¡n.	-1.298	1.311	-3.811	
	Flec.m x.	-1.298	1.311	-3.811	
	m¡n.	-1.298	1.311	-3.811	

Flecha Tot. el s. m x =0.000036

BARRA : 92 (47,48) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.298	-1.311	-3.811	
	m¡n.	1.298	-1.311	-3.811	
	Cort.m x.	1.298	-1.311	-3.811	
	m¡n.	1.298	-1.311	-3.811	
	Flec.m x.	1.298	-1.311	-3.811	
	m¡n.	1.298	-1.311	-3.811	

Flecha Tot. el s. m x =0.000036

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.298	-1.311	-1.189	
	m¡n.	1.298	-1.311	-1.189	
	Cort.m x.	1.298	-1.311	-1.189	
	m¡n.	1.298	-1.311	-1.189	
	Flec.m x.	1.298	-1.311	-1.189	
	m¡n.	1.298	-1.311	-1.189	

Flecha Tot. el s. m x =0.000045

BARRA : 93 (48,49) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.165	-0.063	-0.192	
	m¡n.	0.165	-0.063	-0.192	
	Cort.m x.	0.165	-0.063	-0.192	
	m¡n.	0.165	-0.063	-0.192	
	Flec.m x.	0.165	-0.063	-0.192	
	m¡n.	0.165	-0.063	-0.192	

Flecha Tot. el s. m x =0.000045

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.165	-0.063	-0.004	
	m¡n.	0.165	-0.063	-0.004	
	Cort.m x.	0.165	-0.063	-0.004	
	m¡n.	0.165	-0.063	-0.004	
	Flec.m x.	0.165	-0.063	-0.004	
	m¡n.	0.165	-0.063	-0.004	

Flecha Tot. el s. m x =0.000066

BARRA : 94 (50,55) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.003	-0.027	-0.001	
	m¡n.	0.003	-0.027	-0.001	
	Cort.m x.	0.003	-0.027	-0.001	
	m¡n.	0.003	-0.027	-0.001	
	Flec.m x.	0.003	-0.027	-0.001	
	m¡n.	0.003	-0.027	-0.001	

Flecha Tot. el s. m x =0.000115

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.003	-0.027	0.052	
	m¡n.	0.003	-0.027	0.052	
	Cort.m x.	0.003	-0.027	0.052	
	m¡n.	0.003	-0.027	0.052	
	Flec.m x.	0.003	-0.027	0.052	
	m¡n.	0.003	-0.027	0.052	

Flecha Tot. el s. m x =0.000172

BARRA : 95 (49,54) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.008	0.025	-0.009	
	m¡n.	-0.008	0.025	-0.009	
	Cort.m x.	-0.008	0.025	-0.009	
	m¡n.	-0.008	0.025	-0.009	
	Flec.m x.	-0.008	0.025	-0.009	
	m¡n.	-0.008	0.025	-0.009	

Flecha Tot. el s. m x =0.000066

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.008	0.025	-0.059	
	m¡n.	-0.008	0.025	-0.059	
	Cort.m x.	-0.008	0.025	-0.059	

m¡n.	-0.008	0.025	-0.059
Flec.m x.	-0.008	0.025	-0.059
m¡n.	-0.008	0.025	-0.059

Flecha Tot. el s. m x =0.000115

BARRA : 96 (51,56) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.284	-4.368	-0.516	
	m¡n.	0.284	-4.368	-0.516	
	Cort.m x.	0.284	-4.368	-0.516	
	m¡n.	0.284	-4.368	-0.516	
	Flec.m x.	0.284	-4.368	-0.516	
	m¡n.	0.284	-4.368	-0.516	

Flecha Tot. el s. m x =0.000103

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.284	-4.368	8.220	
	m¡n.	0.284	-4.368	8.220	
	Cort.m x.	0.284	-4.368	8.220	
	m¡n.	0.284	-4.368	8.220	
	Flec.m x.	0.284	-4.368	8.220	
	m¡n.	0.284	-4.368	8.220	

Flecha Tot. el s. m x =0.000164

BARRA : 97 (52,57) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-2.824	0.454	
	m¡n.	0.000	-2.824	0.454	
	Flec.m x.	0.000	-2.824	0.454	
	m¡n.	0.000	-2.824	0.454	

Flecha Tot. el s. m x =0.000099

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-2.824	6.101	
	m¡n.	0.000	-2.824	6.101	
	Flec.m x.	0.000	-2.824	6.101	
	m¡n.	0.000	-2.824	6.101	

Flecha Tot. el s. m x =0.000159

BARRA : 98 (53,58) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.284	-4.368	-0.516	
	m¡n.	-0.284	-4.368	-0.516	
	Cort.m x.	-0.284	-4.368	-0.516	
	m¡n.	-0.284	-4.368	-0.516	
	Flec.m x.	-0.284	-4.368	-0.516	
	m¡n.	-0.284	-4.368	-0.516	

Flecha Tot. el s. m x =0.000103

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.284	-4.368	8.220	
	m¡n.	-0.284	-4.368	8.220	
	Cort.m x.	-0.284	-4.368	8.220	
	m¡n.	-0.284	-4.368	8.220	
	Flec.m x.	-0.284	-4.368	8.220	
	m¡n.	-0.284	-4.368	8.220	

Flecha Tot. el s. m x =0.000164

BARRA : 99 (50,51) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.058	0.052	-0.005	
	m¡n.	-0.058	0.052	-0.005	
	Cort.m x.	-0.058	0.052	-0.005	
	m¡n.	-0.058	0.052	-0.005	

Flec.m x.	-0.058	0.052	-0.005
m¡n.	-0.058	0.052	-0.005

Flecha Tot. el s. m x =0.000115

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.058	0.052	-0.161	
	m¡n.	-0.058	0.052	-0.161	
	Cort.m x.	-0.058	0.052	-0.161	
	m¡n.	-0.058	0.052	-0.161	
	Flec.m x.	-0.058	0.052	-0.161	
	m¡n.	-0.058	0.052	-0.161	

Flecha Tot. el s. m x =0.000103

BARRA : 100 (51,52) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.192	0.266	-1.080	
	m¡n.	-0.192	0.266	-1.080	
	Cort.m x.	-0.192	0.266	-1.080	
	m¡n.	-0.192	0.266	-1.080	
	Flec.m x.	-0.192	0.266	-1.080	
	m¡n.	-0.192	0.266	-1.080	

Flecha Tot. el s. m x =0.000103

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.192	0.266	-1.611	
	m¡n.	-0.192	0.266	-1.611	
	Cort.m x.	-0.192	0.266	-1.611	
	m¡n.	-0.192	0.266	-1.611	
	Flec.m x.	-0.192	0.266	-1.611	
	m¡n.	-0.192	0.266	-1.611	

Flecha Tot. el s. m x =0.000099

BARRA : 101 (52,53) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.192	-0.266	-1.611	
	m¡n.	0.192	-0.266	-1.611	
	Cort.m x.	0.192	-0.266	-1.611	
	m¡n.	0.192	-0.266	-1.611	
	Flec.m x.	0.192	-0.266	-1.611	
	m¡n.	0.192	-0.266	-1.611	

Flecha Tot. el s. m x =0.000099

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.192	-0.266	-1.080	
	m¡n.	0.192	-0.266	-1.080	
	Cort.m x.	0.192	-0.266	-1.080	
	m¡n.	0.192	-0.266	-1.080	
	Flec.m x.	0.192	-0.266	-1.080	
	m¡n.	0.192	-0.266	-1.080	

Flecha Tot. el s. m x =0.000103

BARRA : 102 (53,54) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.058	-0.052	-0.161	
	m¡n.	0.058	-0.052	-0.161	
	Cort.m x.	0.058	-0.052	-0.161	
	m¡n.	0.058	-0.052	-0.161	
	Flec.m x.	0.058	-0.052	-0.161	
	m¡n.	0.058	-0.052	-0.161	

Flecha Tot. el s. m x =0.000103

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.058	-0.052	-0.005	
	m¡n.	0.058	-0.052	-0.005	
	Cort.m x.	0.058	-0.052	-0.005	

m¡n.	0.058	-0.052	-0.005
Flec.m x.	0.058	-0.052	-0.005
m¡n.	0.058	-0.052	-0.005

Flecha Tot. el s. m x =0.000115

BARRA : 103 (55,60) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	-0.002	0.055	
	m¡n.	-0.000	-0.002	0.055	
	Flec.m x.	-0.000	-0.002	0.055	
	m¡n.	-0.000	-0.002	0.055	

Flecha Tot. el s. m x =0.000172

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	-0.002	0.060	
	m¡n.	-0.000	-0.002	0.060	
	Flec.m x.	-0.000	-0.002	0.060	
	m¡n.	-0.000	-0.002	0.060	

Flecha Tot. el s. m x =0.000200

BARRA : 104 (54,59) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.003	-0.027	-0.001	
	m¡n.	-0.003	-0.027	-0.001	
	Cort.m x.	-0.003	-0.027	-0.001	
	m¡n.	-0.003	-0.027	-0.001	
	Flec.m x.	-0.003	-0.027	-0.001	
	m¡n.	-0.003	-0.027	-0.001	

Flecha Tot. el s. m x =0.000115

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.003	-0.027	0.052	
	m¡n.	-0.003	-0.027	0.052	
	Cort.m x.	-0.003	-0.027	0.052	
	m¡n.	-0.003	-0.027	0.052	
	Flec.m x.	-0.003	-0.027	0.052	
	m¡n.	-0.003	-0.027	0.052	

Flecha Tot. el s. m x =0.000172

BARRA : 105 (56,61) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.093	-0.342	8.246	
	m¡n.	0.093	-0.342	8.246	
	Cort.m x.	0.093	-0.342	8.246	
	m¡n.	0.093	-0.342	8.246	
	Flec.m x.	0.093	-0.342	8.246	
	m¡n.	0.093	-0.342	8.246	

Flecha Tot. el s. m x =0.000164

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.093	-0.342	8.929	
	m¡n.	0.093	-0.342	8.929	
	Cort.m x.	0.093	-0.342	8.929	
	m¡n.	0.093	-0.342	8.929	
	Flec.m x.	0.093	-0.342	8.929	
	m¡n.	0.093	-0.342	8.929	

Flecha Tot. el s. m x =0.000192

BARRA : 106 (57,62) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-0.925	6.044	
	m¡n.	0.000	-0.925	6.044	
	Flec.m x.	0.000	-0.925	6.044	
	m¡n.	0.000	-0.925	6.044	

Flecha Tot. el s. m x =0.000159

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-0.925	7.893	
	m¡n.	0.000	-0.925	7.893	
	Flec.m x.	0.000	-0.925	7.893	
	m¡n.	0.000	-0.925	7.893	

Flecha Tot. el s. m x =0.000188

BARRA : 107 (58,63) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.093	-0.342	8.246	
	m¡n.	-0.093	-0.342	8.246	
	Cort.m x.	-0.093	-0.342	8.246	
	m¡n.	-0.093	-0.342	8.246	
	Flec.m x.	-0.093	-0.342	8.246	
	m¡n.	-0.093	-0.342	8.246	

Flecha Tot. el s. m x =0.000164

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.093	-0.342	8.929	
	m¡n.	-0.093	-0.342	8.929	
	Cort.m x.	-0.093	-0.342	8.929	
	m¡n.	-0.093	-0.342	8.929	
	Flec.m x.	-0.093	-0.342	8.929	
	m¡n.	-0.093	-0.342	8.929	

Flecha Tot. el s. m x =0.000192

BARRA : 108 (55,56) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.003	-0.024	-0.003	
	m¡n.	-0.003	-0.024	-0.003	
	Cort.m x.	-0.003	-0.024	-0.003	
	m¡n.	-0.003	-0.024	-0.003	
	Flec.m x.	-0.003	-0.024	-0.003	
	m¡n.	-0.003	-0.024	-0.003	

Flecha Tot. el s. m x =0.000172

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.003	-0.024	0.069	
	m¡n.	-0.003	-0.024	0.069	
	Cort.m x.	-0.003	-0.024	0.069	
	m¡n.	-0.003	-0.024	0.069	
	Flec.m x.	-0.003	-0.024	0.069	
	m¡n.	-0.003	-0.024	0.069	

Flecha Tot. el s. m x =0.000164

BARRA : 109 (56,57) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.029	0.949	-0.122	
	m¡n.	-0.029	0.949	-0.122	
	Cort.m x.	-0.029	0.949	-0.122	
	m¡n.	-0.029	0.949	-0.122	
	Flec.m x.	-0.029	0.949	-0.122	
	m¡n.	-0.029	0.949	-0.122	

Flecha Tot. el s. m x =0.000164

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.029	0.949	-2.021	
	m¡n.	-0.029	0.949	-2.021	
	Cort.m x.	-0.029	0.949	-2.021	

m¡n.	-0.029	0.949	-2.021
Flec.m x.	-0.029	0.949	-2.021
m¡n.	-0.029	0.949	-2.021

Flecha Tot. el s. m x =0.000159

BARRA : 110 (57,58) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.029	-0.949	-2.021	
	m¡n.	0.029	-0.949	-2.021	
	Cort.m x.	0.029	-0.949	-2.021	
	m¡n.	0.029	-0.949	-2.021	
	Flec.m x.	0.029	-0.949	-2.021	
	m¡n.	0.029	-0.949	-2.021	

Flecha Tot. el s. m x =0.000159

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.029	-0.949	-0.122	
	m¡n.	0.029	-0.949	-0.122	
	Cort.m x.	0.029	-0.949	-0.122	
	m¡n.	0.029	-0.949	-0.122	
	Flec.m x.	0.029	-0.949	-0.122	
	m¡n.	0.029	-0.949	-0.122	

Flecha Tot. el s. m x =0.000164

BARRA : 111 (58,59) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.003	0.024	0.069	
	m¡n.	0.003	0.024	0.069	
	Cort.m x.	0.003	0.024	0.069	
	m¡n.	0.003	0.024	0.069	
	Flec.m x.	0.003	0.024	0.069	
	m¡n.	0.003	0.024	0.069	

Flecha Tot. el s. m x =0.000164

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.003	0.024	-0.003	
	m¡n.	0.003	0.024	-0.003	
	Cort.m x.	0.003	0.024	-0.003	
	m¡n.	0.003	0.024	-0.003	
	Flec.m x.	0.003	0.024	-0.003	
	m¡n.	0.003	0.024	-0.003	

Flecha Tot. el s. m x =0.000172

BARRA : 112 (60,65) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.001	-0.025	0.040	
	m¡n.	-0.001	-0.025	0.040	
	Cort.m x.	-0.001	-0.025	0.040	
	m¡n.	-0.001	-0.025	0.040	
	Flec.m x.	-0.001	-0.025	0.040	
	m¡n.	-0.001	-0.025	0.040	

Flecha Tot. el s. m x =0.000200

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.001	-0.025	0.090	
	m¡n.	-0.001	-0.025	0.090	
	Cort.m x.	-0.001	-0.025	0.090	
	m¡n.	-0.001	-0.025	0.090	
	Flec.m x.	-0.001	-0.025	0.090	
	m¡n.	-0.001	-0.025	0.090	

Flecha Tot. el s. m x =0.000191

BARRA : 113 (59,64) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-0.002	0.055	
	m¡n.	0.000	-0.002	0.055	
	Flec.m x.	0.000	-0.002	0.055	
	m¡n.	0.000	-0.002	0.055	

Flecha Tot. el s. m x =0.000172

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-0.002	0.060	
	m¡n.	0.000	-0.002	0.060	
	Flec.m x.	0.000	-0.002	0.060	
	m¡n.	0.000	-0.002	0.060	

Flecha Tot. el s. m x =0.000200

BARRA : 114 (61,66) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.333	-0.807	8.896	
	m¡n.	-0.333	-0.807	8.896	
	Cort.m x.	-0.333	-0.807	8.896	
	m¡n.	-0.333	-0.807	8.896	
	Flec.m x.	-0.333	-0.807	8.896	
	m¡n.	-0.333	-0.807	8.896	

Flecha Tot. el s. m x =0.000192

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.333	-0.807	10.510	
	m¡n.	-0.333	-0.807	10.510	
	Cort.m x.	-0.333	-0.807	10.510	
	m¡n.	-0.333	-0.807	10.510	
	Flec.m x.	-0.333	-0.807	10.510	
	m¡n.	-0.333	-0.807	10.510	

Flecha Tot. el s. m x =0.000180

BARRA : 115 (62,67) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	0.051	8.000	
	m¡n.	-0.000	0.051	8.000	
	Flec.m x.	-0.000	0.051	8.000	
	m¡n.	-0.000	0.051	8.000	

Flecha Tot. el s. m x =0.000188

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	0.051	7.898	
	m¡n.	-0.000	0.051	7.898	
	Flec.m x.	-0.000	0.051	7.898	
	m¡n.	-0.000	0.051	7.898	

Flecha Tot. el s. m x =0.000175

BARRA : 116 (63,68) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.333	-0.807	8.896	
	m¡n.	0.333	-0.807	8.896	
	Cort.m x.	0.333	-0.807	8.896	
	m¡n.	0.333	-0.807	8.896	
	Flec.m x.	0.333	-0.807	8.896	
	m¡n.	0.333	-0.807	8.896	

Flecha Tot. el s. m x =0.000192

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.333	-0.807	10.510	
	m¡n.	0.333	-0.807	10.510	
	Cort.m x.	0.333	-0.807	10.510	

m¡n.	0.333	-0.807	10.510
Flec.m x.	0.333	-0.807	10.510
m¡n.	0.333	-0.807	10.510

Flecha Tot. el s. m x =0.000180

BARRA : 117 (60,61) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.020	0.022	-0.001	
	m¡n.	0.020	0.022	-0.001	
	Cort.m x.	0.020	0.022	-0.001	
	m¡n.	0.020	0.022	-0.001	
	Flec.m x.	0.020	0.022	-0.001	
	m¡n.	0.020	0.022	-0.001	

Flecha Tot. el s. m x =0.000200

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.020	0.022	-0.069	
	m¡n.	0.020	0.022	-0.069	
	Cort.m x.	0.020	0.022	-0.069	
	m¡n.	0.020	0.022	-0.069	
	Flec.m x.	0.020	0.022	-0.069	
	m¡n.	0.020	0.022	-0.069	

Flecha Tot. el s. m x =0.000192

BARRA : 118 (61,62) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.053	0.488	-0.495	
	m¡n.	0.053	0.488	-0.495	
	Cort.m x.	0.053	0.488	-0.495	
	m¡n.	0.053	0.488	-0.495	
	Flec.m x.	0.053	0.488	-0.495	
	m¡n.	0.053	0.488	-0.495	

Flecha Tot. el s. m x =0.000192

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.053	0.488	-1.471	
	m¡n.	0.053	0.488	-1.471	
	Cort.m x.	0.053	0.488	-1.471	
	m¡n.	0.053	0.488	-1.471	
	Flec.m x.	0.053	0.488	-1.471	
	m¡n.	0.053	0.488	-1.471	

Flecha Tot. el s. m x =0.000188

BARRA : 119 (62,63) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.053	-0.488	-1.471	
	m¡n.	-0.053	-0.488	-1.471	
	Cort.m x.	-0.053	-0.488	-1.471	
	m¡n.	-0.053	-0.488	-1.471	
	Flec.m x.	-0.053	-0.488	-1.471	
	m¡n.	-0.053	-0.488	-1.471	

Flecha Tot. el s. m x =0.000188

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.053	-0.488	-0.495	
	m¡n.	-0.053	-0.488	-0.495	
	Cort.m x.	-0.053	-0.488	-0.495	
	m¡n.	-0.053	-0.488	-0.495	
	Flec.m x.	-0.053	-0.488	-0.495	
	m¡n.	-0.053	-0.488	-0.495	

Flecha Tot. el s. m x =0.000192

BARRA : 120 (63,64) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.020	-0.022	-0.069	
	m¡n.	-0.020	-0.022	-0.069	
	Cort.m x.	-0.020	-0.022	-0.069	
	m¡n.	-0.020	-0.022	-0.069	
	Flec.m x.	-0.020	-0.022	-0.069	
	m¡n.	-0.020	-0.022	-0.069	

Flecha Tot. el s. m x =0.000192

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.020	-0.022	-0.001	
	m¡n.	-0.020	-0.022	-0.001	
	Cort.m x.	-0.020	-0.022	-0.001	
	m¡n.	-0.020	-0.022	-0.001	
	Flec.m x.	-0.020	-0.022	-0.001	
	m¡n.	-0.020	-0.022	-0.001	

Flecha Tot. el s. m x =0.000200

BARRA : 121 (65,70) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.004	0.001	0.050	
	m¡n.	-0.004	0.001	0.050	
	Flec.m x.	-0.004	0.001	0.050	
	m¡n.	-0.004	0.001	0.050	

Flecha Tot. el s. m x =0.000191

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.004	0.001	0.048	
	m¡n.	-0.004	0.001	0.048	
	Flec.m x.	-0.004	0.001	0.048	
	m¡n.	-0.004	0.001	0.048	

Flecha Tot. el s. m x =0.000141

BARRA : 122 (64,69) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.001	-0.025	0.040	
	m¡n.	0.001	-0.025	0.040	
	Cort.m x.	0.001	-0.025	0.040	
	m¡n.	0.001	-0.025	0.040	
	Flec.m x.	0.001	-0.025	0.040	
	m¡n.	0.001	-0.025	0.040	

Flecha Tot. el s. m x =0.000200

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.001	-0.025	0.090	
	m¡n.	0.001	-0.025	0.090	
	Cort.m x.	0.001	-0.025	0.090	
	m¡n.	0.001	-0.025	0.090	
	Flec.m x.	0.001	-0.025	0.090	
	m¡n.	0.001	-0.025	0.090	

Flecha Tot. el s. m x =0.000191

BARRA : 123 (66,71) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.535	2.992	10.342	
	m¡n.	-0.535	2.992	10.342	
	Cort.m x.	-0.535	2.992	10.342	
	m¡n.	-0.535	2.992	10.342	
	Flec.m x.	-0.535	2.992	10.342	
	m¡n.	-0.535	2.992	10.342	

Flecha Tot. el s. m x =0.000180

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.535	2.992	4.358	
	m¡n.	-0.535	2.992	4.358	
	Cort.m x.	-0.535	2.992	4.358	
	m¡n.	-0.535	2.992	4.358	
	Flec.m x.	-0.535	2.992	4.358	
	m¡n.	-0.535	2.992	4.358	

Flecha Tot. el s. m x =0.000126

BARRA : 124 (67,72) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	2.402	8.314	
	m¡n.	-0.000	2.402	8.314	
	Flec.m x.	-0.000	2.402	8.314	
	m¡n.	-0.000	2.402	8.314	

Flecha Tot. el s. m x =0.000175

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	2.402	3.511	
	m¡n.	-0.000	2.402	3.511	
	Flec.m x.	-0.000	2.402	3.511	
	m¡n.	-0.000	2.402	3.511	

Flecha Tot. el s. m x =0.000119

BARRA : 125 (68,73) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.535	2.992	10.342	
	m¡n.	0.535	2.992	10.342	
	Cort.m x.	0.535	2.992	10.342	
	m¡n.	0.535	2.992	10.342	
	Flec.m x.	0.535	2.992	10.342	
	m¡n.	0.535	2.992	10.342	

Flecha Tot. el s. m x =0.000180

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.535	2.992	4.358	
	m¡n.	0.535	2.992	4.358	
	Cort.m x.	0.535	2.992	4.358	
	m¡n.	0.535	2.992	4.358	
	Flec.m x.	0.535	2.992	4.358	
	m¡n.	0.535	2.992	4.358	

Flecha Tot. el s. m x =0.000126

BARRA : 126 (65,66) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.040	-0.025	-0.002	
	m¡n.	0.040	-0.025	-0.002	
	Cort.m x.	0.040	-0.025	-0.002	
	m¡n.	0.040	-0.025	-0.002	
	Flec.m x.	0.040	-0.025	-0.002	
	m¡n.	0.040	-0.025	-0.002	

Flecha Tot. el s. m x =0.000191

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.040	-0.025	0.074	
	m¡n.	0.040	-0.025	0.074	
	Cort.m x.	0.040	-0.025	0.074	
	m¡n.	0.040	-0.025	0.074	
	Flec.m x.	0.040	-0.025	0.074	
	m¡n.	0.040	-0.025	0.074	

Flecha Tot. el s. m x =0.000180

BARRA : 127 (66,67) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.208	1.175	-0.127	
	m¡n.	0.208	1.175	-0.127	
	Cort.m x.	0.208	1.175	-0.127	
	m¡n.	0.208	1.175	-0.127	
	Flec.m x.	0.208	1.175	-0.127	
	m¡n.	0.208	1.175	-0.127	

Flecha Tot. el s. m x =0.000180

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.208	1.175	-2.478	
	m¡n.	0.208	1.175	-2.478	
	Cort.m x.	0.208	1.175	-2.478	
	m¡n.	0.208	1.175	-2.478	
	Flec.m x.	0.208	1.175	-2.478	
	m¡n.	0.208	1.175	-2.478	

Flecha Tot. el s. m x =0.000175

BARRA : 128 (67,68) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.208	-1.175	-2.478	
	m¡n.	-0.208	-1.175	-2.478	
	Cort.m x.	-0.208	-1.175	-2.478	
	m¡n.	-0.208	-1.175	-2.478	
	Flec.m x.	-0.208	-1.175	-2.478	
	m¡n.	-0.208	-1.175	-2.478	

Flecha Tot. el s. m x =0.000175

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.208	-1.175	-0.127	
	m¡n.	-0.208	-1.175	-0.127	
	Cort.m x.	-0.208	-1.175	-0.127	

m¡n.	-0.208	-1.175	-0.127
Flec.m x.	-0.208	-1.175	-0.127
m¡n.	-0.208	-1.175	-0.127

Flecha Tot. el s. m x =0.000180

BARRA : 129 (68,69) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.040	0.025	0.074	
	m¡n.	-0.040	0.025	0.074	
	Cort.m x.	-0.040	0.025	0.074	
	m¡n.	-0.040	0.025	0.074	
	Flec.m x.	-0.040	0.025	0.074	
	m¡n.	-0.040	0.025	0.074	

Flecha Tot. el s. m x =0.000180

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.040	0.025	-0.002	
	m¡n.	-0.040	0.025	-0.002	
	Cort.m x.	-0.040	0.025	-0.002	
	m¡n.	-0.040	0.025	-0.002	
	Flec.m x.	-0.040	0.025	-0.002	
	m¡n.	-0.040	0.025	-0.002	

Flecha Tot. el s. m x =0.000191

BARRA : 130 (70,75) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.009	0.004	-0.015	
	m¡n.	-0.009	0.004	-0.015	
	Cort.m x.	-0.009	0.004	-0.015	
	m¡n.	-0.009	0.004	-0.015	
	Flec.m x.	-0.009	0.004	-0.015	
	m¡n.	-0.009	0.004	-0.015	

Flecha Tot. el s. m x =0.000141

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.009	0.004	-0.022	
	m¡n.	-0.009	0.004	-0.022	
	Cort.m x.	-0.009	0.004	-0.022	
	m¡n.	-0.009	0.004	-0.022	
	Flec.m x.	-0.009	0.004	-0.022	
	m¡n.	-0.009	0.004	-0.022	

Flecha Tot. el s. m x =0.000081

BARRA : 131 (69,74) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.004	0.001	0.050	
	m¡n.	0.004	0.001	0.050	
	Flec.m x.	0.004	0.001	0.050	
	m¡n.	0.004	0.001	0.050	

Flecha Tot. el s. m x =0.000191

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.004	0.001	0.048	
	m¡n.	0.004	0.001	0.048	
	Flec.m x.	0.004	0.001	0.048	
	m¡n.	0.004	0.001	0.048	

Flecha Tot. el s. m x =0.000141

BARRA : 132 (71,76) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.140	6.774	4.185	
	m¡n.	-1.140	6.774	4.185	
	Cort.m x.	-1.140	6.774	4.185	
	m¡n.	-1.140	6.774	4.185	

Flec.m x.	-1.140	6.774	4.185	
m¡n.	-1.140	6.774	4.185	

Flecha Tot. el s. m x =0.000126

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.140	6.774	-9.362	
	m¡n.	-1.140	6.774	-9.362	
	Cort.m x.	-1.140	6.774	-9.362	
	m¡n.	-1.140	6.774	-9.362	
	Flec.m x.	-1.140	6.774	-9.362	
	m¡n.	-1.140	6.774	-9.362	

Flecha Tot. el s. m x =0.000057

BARRA : 133 (72,77) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	4.832	3.983	
	m¡n.	-0.000	4.832	3.983	
	Flec.m x.	-0.000	4.832	3.983	
	m¡n.	-0.000	4.832	3.983	

Flecha Tot. el s. m x =0.000119

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	4.832	-5.682	
	m¡n.	-0.000	4.832	-5.682	
	Flec.m x.	-0.000	4.832	-5.682	
	m¡n.	-0.000	4.832	-5.682	

Flecha Tot. el s. m x =0.000046

BARRA : 134 (73,78) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.140	6.774	4.185	
	m¡n.	1.140	6.774	4.185	
	Cort.m x.	1.140	6.774	4.185	
	m¡n.	1.140	6.774	4.185	
	Flec.m x.	1.140	6.774	4.185	
	m¡n.	1.140	6.774	4.185	

Flecha Tot. el s. m x =0.000126

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.140	6.774	-9.362	
	m¡n.	1.140	6.774	-9.362	
	Cort.m x.	1.140	6.774	-9.362	
	m¡n.	1.140	6.774	-9.362	
	Flec.m x.	1.140	6.774	-9.362	
	m¡n.	1.140	6.774	-9.362	

Flecha Tot. el s. m x =0.000057

BARRA : 135 (70,71) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.063	-0.003	-0.005	
	m¡n.	0.063	-0.003	-0.005	
	Cort.m x.	0.063	-0.003	-0.005	
	m¡n.	0.063	-0.003	-0.005	
	Flec.m x.	0.063	-0.003	-0.005	
	m¡n.	0.063	-0.003	-0.005	

Flecha Tot. el s. m x =0.000141

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.063	-0.003	0.004	
	m¡n.	0.063	-0.003	0.004	
	Cort.m x.	0.063	-0.003	0.004	

m¡n.	0.063	-0.003	0.004
Flec.m x.	0.063	-0.003	0.004
m¡n.	0.063	-0.003	0.004

Flecha Tot. el s. m x =0.000126

BARRA : 136 (71,72) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.236	1.215	-0.601	
	m¡n.	0.236	1.215	-0.601	
	Cort.m x.	0.236	1.215	-0.601	
	m¡n.	0.236	1.215	-0.601	
	Flec.m x.	0.236	1.215	-0.601	
	m¡n.	0.236	1.215	-0.601	

Flecha Tot. el s. m x =0.000126

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.236	1.215	-3.031	
	m¡n.	0.236	1.215	-3.031	
	Cort.m x.	0.236	1.215	-3.031	
	m¡n.	0.236	1.215	-3.031	
	Flec.m x.	0.236	1.215	-3.031	
	m¡n.	0.236	1.215	-3.031	

Flecha Tot. el s. m x =0.000119

BARRA : 137 (72,73) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.236	-1.215	-3.031	
	m¡n.	-0.236	-1.215	-3.031	
	Cort.m x.	-0.236	-1.215	-3.031	
	m¡n.	-0.236	-1.215	-3.031	
	Flec.m x.	-0.236	-1.215	-3.031	
	m¡n.	-0.236	-1.215	-3.031	

Flecha Tot. el s. m x =0.000119

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.236	-1.215	-0.601	
	m¡n.	-0.236	-1.215	-0.601	
	Cort.m x.	-0.236	-1.215	-0.601	
	m¡n.	-0.236	-1.215	-0.601	
	Flec.m x.	-0.236	-1.215	-0.601	
	m¡n.	-0.236	-1.215	-0.601	

Flecha Tot. el s. m x =0.000126

BARRA : 138 (73,74) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.063	0.003	0.004	
	m¡n.	-0.063	0.003	0.004	
	Cort.m x.	-0.063	0.003	0.004	
	m¡n.	-0.063	0.003	0.004	
	Flec.m x.	-0.063	0.003	0.004	
	m¡n.	-0.063	0.003	0.004	

Flecha Tot. el s. m x =0.000126

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.063	0.003	-0.005	
	m¡n.	-0.063	0.003	-0.005	
	Cort.m x.	-0.063	0.003	-0.005	
	m¡n.	-0.063	0.003	-0.005	
	Flec.m x.	-0.063	0.003	-0.005	
	m¡n.	-0.063	0.003	-0.005	

Flecha Tot. el s. m x =0.000141

BARRA : 139 (75,80) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.011	-0.058	-0.161	
	m¡n.	-0.011	-0.058	-0.161	
	Cort.m x.	-0.011	-0.058	-0.161	
	m¡n.	-0.011	-0.058	-0.161	
	Flec.m x.	-0.011	-0.058	-0.161	
	m¡n.	-0.011	-0.058	-0.161	

Flecha Tot. el s. m x =0.000081

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.011	-0.058	-0.045	
	m¡n.	-0.011	-0.058	-0.045	
	Cort.m x.	-0.011	-0.058	-0.045	
	m¡n.	-0.011	-0.058	-0.045	
	Flec.m x.	-0.011	-0.058	-0.045	
	m¡n.	-0.011	-0.058	-0.045	

Flecha Tot. el s. m x =0.000068

BARRA : 140 (74,79) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.009	0.004	-0.015	
	m¡n.	0.009	0.004	-0.015	
	Cort.m x.	0.009	0.004	-0.015	
	m¡n.	0.009	0.004	-0.015	
	Flec.m x.	0.009	0.004	-0.015	
	m¡n.	0.009	0.004	-0.015	

Flecha Tot. el s. m x =0.000141

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.009	0.004	-0.022	
	m¡n.	0.009	0.004	-0.022	
	Cort.m x.	0.009	0.004	-0.022	

m¡n.	0.009	0.004	-0.022
Flec.m x.	0.009	0.004	-0.022
m¡n.	0.009	0.004	-0.022

Flecha Tot. el s. m x =0.000081

BARRA : 141 (76,81) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.121	5.095	-10.477	
	m¡n.	-2.121	5.095	-10.477	
	Cort.m x.	-2.121	5.095	-10.477	
	m¡n.	-2.121	5 095	-10.477	
	Flec.m x.	-2.121	5.095	-10.477	
	m¡n.	-2.121	5.095	-10.477	

Flecha Tot. el s. m x =0.000057

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-2.121	5.095	-20.666	
	m¡n.	-2.121	5.095	-20.666	
	Cort.m x.	-2.121	5.095	-20.666	
	m¡n.	-2.121	5.095	-20.666	
	Flec.m x.	-2.121	5.095	-20.666	
	m¡n.	-2.121	5.095	-20.666	

Flecha Tot. el s. m x =0.000029

BARRA : 142 (77,82) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	-0.000	8.314	-3.175	
	m¡n.	-0.000	8.314	-3.175	
	Flec.m x.	-0.000	8.314	-3.175	
	m¡n.	-0.000	8.314	-3.175	

Flecha Tot. el s. m x =0.000046

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	-0.000	8.314	-19.802	
	m¡n.	-0.000	8.314	-19.802	
	Flec.m x.	-0.000	8.314	-19.802	
	m¡n.	-0.000	8.314	-19.802	

BARRA : 143 (78,83) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.121	5.095	-10.477	
	m¡n.	2.121	5.095	-10.477	
	Cort.m x.	2.121	5.095	-10.477	
	m¡n.	2.121	5.095	-10.477	
	Flec.m x.	2.121	5.095	-10.477	
	m¡n.	2.121	5.095	-10.477	

Flecha Tot. el s. m x =0.000057

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	2.121	5.095	-20.666	
	m¡n.	2.121	5.095	-20.666	
	Cort.m x.	2.121	5.095	-20.666	
	m¡n.	2.121	5.095	-20.666	
	Flec.m x.	2.121	5.095	-20.666	
	m¡n.	2.121	5.095	-20.666	

Flecha Tot. el s. m x =0.000029

BARRA : 144 (75,76) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.139	0.062	-0.003	
	m¡n.	0.139	0.062	-0.003	
	Cort.m x.	0.139	0.062	-0.003	
	m¡n.	0.139	0.062	-0.003	
	Flec.m x.	0.139	0.062	-0.003	
	m¡n.	0.139	0.062	-0.003	

Flecha Tot. el s. m x =0.000081

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.139	0.062	-0.188	
	m¡n.	0.139	0.062	-0.188	
	Cort.m x.	0.139	0.062	-0.188	
	m¡n.	0.139	0.062	-0.188	
	Flec.m x.	0.139	0.062	-0.188	
	m¡n.	0.139	0.062	-0.188	

Flecha Tot. el s. m x =0.000057

BARRA : 145 (76,77) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.254	1.741	-1.169	
	m¡n.	1.254	1.741	-1.169	
	Cort.m x.	1.254	1.741	-1.169	
	m¡n.	1.254	1.741	-1.169	
	Flec.m x.	1.254	1.741	-1.169	
	m¡n.	1.254	1.741	-1.169	

Flecha Tot. el s. m x =0.000057

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.254	1.741	-4.651	
	m¡n.	1.254	1.741	-4.651	
	Cort.m x.	1.254	1.741	-4.651	
	m¡n.	1.254	1.741	-4.651	
	Flec.m x.	1.254	1.741	-4.651	
	m¡n.	1.254	1.741	-4.651	

Flecha Tot. el s. m x =0.000046

BARRA : 146 (77,78) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.254	-1.741	-4.651	
	m¡n.	-1.254	-1.741	-4.651	
	Cort.m x.	-1.254	-1.741	-4.651	
	m¡n.	-1.254	-1.741	-4.651	
	Flec.m x.	-1.254	-1.741	-4.651	
	m¡n.	-1.254	-1.741	-4.651	

Flecha Tot. el s. m x =0.000046

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.254	-1.741	-1.169	
	m¡n.	-1.254	-1.741	-1.169	
	Cort.m x.	-1.254	-1.741	-1.169	
	m¡n.	-1.254	-1.741	-1.169	
	Flec.m x.	-1.254	-1.741	-1.169	
	m¡n.	-1.254	-1.741	-1.169	

Flecha Tot. el s. m x =0.000057

BARRA : 147 (78,79) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.139	-0.062	-0.188	
	m¡n.	-0.139	-0.062	-0.188	
	Cort.m x.	-0.139	-0.062	-0.188	
	m¡n.	-0.139	-0.062	-0.188	
	Flec.m x.	-0.139	-0.062	-0.188	
	m¡n.	-0.139	-0.062	-0.188	

Flecha Tot. el s. m x =0.000057

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.139	-0.062	-0.003	
	m¡n.	-0.139	-0.062	-0.003	
	Cort.m x.	-0.139	-0.062	-0.003	

m¡n.	-0.139	-0.062	-0.003
Flec.m x.	-0.139	-0.062	-0.003
m¡n.	-0.139	-0.062	-0.003

Flecha Tot. el s. m x =0.000081

BARRA : 148 (80,85) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.009	0.047	-0.075	
	m¡n.	0.009	0.047	-0.075	
	Cort.m x.	0.009	0.047	-0.075	
	m¡n.	0.009	0.047	-0.075	
	Flec.m x.	0.009	0.047	-0.075	
	m¡n.	0.009	0.047	-0.075	

Flecha Tot. el s. m x =0.000068

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.009	0.047	-0.169	
	m¡n.	0.009	0.047	-0.169	
	Cort.m x.	0.009	0.047	-0.169	
	m¡n.	0.009	0.047	-0.169	
	Flec.m x.	0.009	0.047	-0.169	
	m¡n.	0.009	0.047	-0.169	

Flecha Tot. el s. m x =0.000117

BARRA : 149 (79,84) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.011	-0.058	-0.161	
	m¡n.	0.011	-0.058	-0.161	
	Cort.m x.	0.011	-0.058	-0.161	
	m¡n.	0.011	-0.058	-0.161	
	Flec.m x.	0.011	-0.058	-0.161	
	m¡n.	0.011	-0.058	-0.161	

Flecha Tot. el s. m x =0.000081

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.011	-0.058	-0.045	
	m¡n.	0.011	-0.058	-0.045	
	Cort.m x.	0.011	-0.058	-0.045	
	m¡n.	0.011	-0.058	-0.045	
	Flec.m x.	0.011	-0.058	-0.045	
	m¡n.	0.011	-0.058	-0.045	

Flecha Tot. el s. m x =0.000068

BARRA : 150 (81,86) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.688	-4.101	-22.696	
	m¡n.	1.688	-4.101	-22.696	
	Cort.m x.	1.688	-4.101	-22.696	
	m¡n.	1.688	-4.101	-22.696	
	Flec.m x.	1.688	-4.101	-22.696	
	m¡n.	1.688	-4.101	-22.696	

Flecha Tot. el s. m x =0.000029

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.688	-4.101	-14.495	
	m¡n.	1.688	-4.101	-14.495	
	Cort.m x.	1.688	-4.101	-14.495	
	m¡n.	1.688	-4.101	-14.495	
	Flec.m x.	1.688	-4.101	-14.495	
	m¡n.	1.688	-4.101	-14.495	

Flecha Tot. el s. m x =0.000089

BARRA : 151 (82,87) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-12.685	-31.895	
	m¡n.	0.000	-12.685	-31.895	
	Flec.m x.	0.000	-12.685	-31.895	
	m¡n.	0.000	-12.685	-31.895	
2.00	Cort.m x.	0.000	-12.685	-6.525	
	m¡n.	0.000	-12.685	-6.525	
	Flec.m x.	0.000	-12.685	-6.525	
	m¡n.	0.000	-12.685	-6.525	

Flecha Tot. el s. m x =0.000074

BARRA : 152 (83,88) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.688	-4.101	-22.696	
	m¡n.	-1.688	-4.101	-22.696	
	Cort.m x.	-1.688	-4.101	-22.696	
	m¡n.	-1.688	-4.101	-22.696	
	Flec.m x.	-1.688	-4.101	-22.696	
	m¡n.	-1.688	-4.101	-22.696	

Flecha Tot. el s. m x =0.000029

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.688	-4.101	-14.495	
	m¡n.	-1.688	-4.101	-14.495	
	Cort.m x.	-1.688	-4.101	-14.495	
	m¡n.	-1.688	-4.101	-14.495	
	Flec.m x.	-1.688	-4.101	-14.495	
	m¡n.	-1.688	-4.101	-14.495	

Flecha Tot. el s. m x =0.000089

BARRA : 153 (80,81) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.031	-0.105	0.021	
	m¡n.	0.031	-0.105	0.021	
	Cort.m x.	0.031	-0.105	0.021	
	m¡n.	0.031	-0.105	0.021	
	Flec.m x.	0.031	-0.105	0.021	
	m¡n.	0.031	-0.105	0.021	

Flecha Tot. el s. m x =0.000068

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.031	-0.105	0.335	
	m¡n.	0.031	-0.105	0.335	
	Cort.m x.	0.031	-0.105	0.335	
	m¡n.	0.031	-0.105	0.335	
	Flec.m x.	0.031	-0.105	0.335	
	m¡n.	0.031	-0.105	0.335	

Flecha Tot. el s. m x =0.000029

BARRA : 154 (81,82) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.061	9.090	4.144	
	m¡n.	2.061	9.090	4.144	
	Cort.m x.	2.061	9.090	4.144	
	m¡n.	2.061	9.090	4.144	
	Flec.m x.	2.061	9.090	4.144	
	m¡n.	2.061	9.090	4.144	

Flecha Tot. el s. m x =0.000029

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	2.061	9.090	-14.036	
	m¡n.	2.061	9.090	-14.036	
	Cort.m x.	2.061	9.090	-14.036	

m¡n.	2.061	9.090	-14.036
Flec.m x.	2.061	9.090	-14.036
m¡n.	2.061	9.090	-14.036

BARRA : 155 (82,83) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.061	-9.090	-14.037	
	m¡n.	-2.061	-9.090	-14.037	
	Cort.m x.	-2.061	-9.090	-14.037	
	m¡n.	-2.061	-9.090	-14.037	
	Flec.m x.	-2.061	-9.090	-14.037	
	m¡n.	-2.061	-9.090	-14.037	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-2.061	-9.090	4.144	
	m¡n.	-2.061	-9.090	4.144	
	Cort.m x.	-2.061	-9.090	4.144	
	m¡n.	-2.061	-9.090	4.144	
	Flec.m x.	-2.061	-9.090	4.144	
	m¡n.	-2.061	-9.090	4.144	

Flecha Tot. el s. m x =0.000029

BARRA : 156 (83,84) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.031	0.105	0.335	
	m¡n.	-0.031	0.105	0.335	
	Cort.m x.	-0.031	0.105	0.335	
	m¡n.	-0.031	0.105	0.335	
	Flec.m x.	-0.031	0.105	0.335	
	m¡n.	-0.031	0.105	0.335	

Flecha Tot. el s. m x =0.000029

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.031	0.105	0.021	
	m¡n.	-0.031	0.105	0.021	
	Cort.m x.	-0.031	0.105	0.021	
	m¡n.	-0.031	0.105	0.021	
	Flec.m x.	-0.031	0.105	0.021	
	m¡n.	-0.031	0.105	0.021	

Flecha Tot. el s. m x =0.000068

BARRA : 157 (85,90) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.012	0.022	-0.017	
	m¡n.	0.012	0.022	-0.017	
	Cort.m x.	0.012	0.022	-0.017	
	m¡n.	0.012	0.022	-0.017	
	Flec.m x.	0.012	0.022	-0.017	
	m¡n.	0.012	0.022	-0.017	

Flecha Tot. el s. m x =0.000117

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.012	0.022	-0.061	
	m¡n.	0.012	0.022	-0.061	
	Cort.m x.	0.012	0.022	-0.061	
	m¡n.	0.012	0.022	-0.061	
	Flec.m x.	0.012	0.022	-0.061	
	m¡n.	0.012	0.022	-0.061	

Flecha Tot. el s. m x =0.000220

BARRA : 158 (84,89) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.009	0.047	-0.075	
	m¡n.	-0.009	0.047	-0.075	
	Cort.m x.	-0.009	0.047	-0.075	
	m¡n.	-0.009	0.047	-0.075	
	Flec.m x.	-0.009	0.047	-0.075	
	m¡n.	-0.009	0.047	-0.075	

Flecha Tot. el s. m x =0.000068

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.009	0.047	-0.169	
	m¡n.	-0.009	0.047	-0.169	
	Cort.m x.	-0.009	0.047	-0.169	
	m¡n.	-0.009	0.047	-0.169	
	Flec.m x.	-0.009	0.047	-0.169	
	m¡n.	-0.009	0.047	-0.169	

Flecha Tot. el s. m x =0.000117

BARRA : 159 (86,91) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.700	-7.343	-13.097	
	m¡n.	1.700	-7.343	-13.097	
	Cort.m x.	1.700	-7.343	-13.097	
	m¡n.	1.700	-7.343	-13.097	
	Flec.m x.	1.700	-7.343	-13.097	
	m¡n.	1.700	-7.343	-13.097	

Flecha Tot. el s. m x =0.000089

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.700	-7.343	1.588	
	m¡n.	1.700	-7.343	1.588	
	Cort.m x.	1.700	-7.343	1.588	
	m¡n.	1.700	-7.343	1.588	
	Flec.m x.	1.700	-7.343	1.588	
	m¡n.	1.700	-7.343	1.588	

Flecha Tot. el s. m x =0.000207

BARRA : 160 (87,92) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-6.152	-9.625	
	m¡n.	0.000	-6.152	-9.625	
	Flec.m x.	0.000	-6.152	-9.625	
	m¡n.	0.000	-6.152	-9.625	

Flecha Tot. el s. m x =0.000074

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-6.152	2.679	
	m¡n.	0.000	-6.152	2.679	
	Flec.m x.	0.000	-6.152	2.679	
	m¡n.	0.000	-6.152	2.679	

Flecha Tot. el s. m x =0.000200

BARRA : 161 (88,93) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.700	-7.343	-13.097	
	m¡n.	-1.700	-7.343	-13.097	
	Cort.m x.	-1.700	-7.343	-13.097	
	m¡n.	-1.700	-7.343	-13.097	
	Flec.m x.	-1.700	-7.343	-13.097	
	m¡n.	-1.700	-7.343	-13.097	

Flecha Tot. el s. m x =0.000089

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.700	-7.343	1.588	
	m¡n.	-1.700	-7.343	1.588	
	Cort.m x.	-1.700	-7.343	1.588	

m¡n.	-1.700	-7.343	1.588
Flec.m x.	-1.700	-7.343	1.588
m¡n.	-1.700	-7.343	1.588

Flecha Tot. el s. m x =0.000207

BARRA : 162 (85,86) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.152	0.025	0.003	
	m¡n.	-0.152	0.025	0.003	
	Cort.m x.	-0.152	0.025	0.003	
	m¡n.	-0.152	0.025	0.003	
	Flec.m x.	-0.152	0.025	0.003	
	m¡n.	-0.152	0.025	0.003	

Flecha Tot. el s. m x =0.000117

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.152	0.025	-0.071	
	m¡n.	-0.152	0.025	-0.071	
	Cort.m x.	-0.152	0.025	-0.071	
	m¡n.	-0.152	0.025	-0.071	
	Flec.m x.	-0.152	0.025	-0.071	
	m¡n.	-0.152	0.025	-0.071	

Flecha Tot. el s. m x =0.000089

BARRA : 163 (86,87) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.550	3.267	-0.059	
	m¡n.	-1.550	3.267	-0.059	
	Cort.m x.	-1.550	3.267	-0.059	
	m¡n.	-1.550	3.267	-0.059	
	Flec.m x.	-1.550	3.267	-0.059	
	m¡n.	-1.550	3.267	-0.059	

Flecha Tot. el s. m x =0.000089

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.550	3.267	-6.592	
	m¡n.	-1.550	3.267	-6.592	
	Cort.m x.	-1.550	3.267	-6.592	
	m¡n.	-1.550	3.267	-6.592	
	Flec.m x.	-1.550	3.267	-6.592	
	m¡n.	-1.550	3.267	-6.592	

Flecha Tot. el s. m x =0.000074

BARRA : 164 (87,88) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.550	-3.267	-6.592	
	m¡n.	1.550	-3.267	-6.592	
	Cort.m x.	1.550	-3.267	-6.592	
	m¡n.	1.550	-3.267	-6.592	
	Flec.m x.	1.550	-3.267	-6.592	
	m¡n.	1.550	-3.267	-6.592	

Flecha Tot. el s. m x =0.000074

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.550	-3.267	-0.059	
	m¡n.	1.550	-3.267	-0.059	
	Cort.m x.	1.550	-3.267	-0.059	
	m¡n.	1.550	-3.267	-0.059	
	Flec.m x.	1.550	-3.267	-0.059	
	m¡n.	1.550	-3.267	-0.059	

Flecha Tot. el s. m x =0.000089

BARRA : 165 (88,89) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.152	-0.025	-0.071	
	m¡n.	0.152	-0.025	-0.071	
	Cort.m x.	0.152	-0.025	-0.071	
	m¡n.	0.152	-0.025	-0.071	
	Flec.m x.	0.152	-0.025	-0.071	
	m¡n.	0.152	-0.025	-0.071	

Flecha Tot. el s. m x =0.000089

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.152	-0.025	0.003	
	m¡n.	0.152	-0.025	0.003	
	Cort.m x.	0.152	-0.025	0.003	
	m¡n.	0.152	-0.025	0.003	
	Flec.m x.	0.152	-0.025	0.003	
	m¡n.	0.152	-0.025	0.003	

Flecha Tot. el s. m x =0.000117

BARRA : 166 (90,95) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.010	0.043	0.084	
	m¡n.	0.010	0.043	0.084	
	Cort.m x.	0.010	0.043	0.084	
	m¡n.	0.010	0.043	0.084	
	Flec.m x.	0.010	0.043	0.084	
	m¡n.	0.010	0.043	0.084	

Flecha Tot. el s. m x =0.000220

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.010	0.043	-0.003	
	m¡n.	0.010	0.043	-0.003	
	Cort.m x.	0.010	0.043	-0.003	

m¡n.	0.010	0.043	-0.003
Flec.m x.	0.010	0.043	-0.003
m¡n.	0.010	0.043	-0.003

Flecha Tot. el s. m x =0.000321

BARRA : 167 (89,94) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.012	0.022	-0.017	
	m¡n.	-0.012	0.022	-0.017	
	Cort.m x.	-0.012	0.022	-0.017	
	m¡n.	-0.012	0.022	-0.017	
	Flec.m x.	-0.012	0.022	-0.017	
	m¡n.	-0.012	0.022	-0.017	

Flecha Tot. el s. m x =0.000117

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.012	0.022	-0.061	
	m¡n.	-0.012	0.022	-0.061	
	Cort.m x.	-0.012	0.022	-0.061	
	m¡n.	-0.012	0.022	-0.061	
	Flec.m x.	-0.012	0.022	-0.061	
	m¡n.	-0.012	0.022	-0.061	

Flecha Tot. el s. m x =0.000220

BARRA : 168 (91,96) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.398	-3.817	2.051	
	m¡n.	1.398	-3.817	2.051	
	Cort.m x.	1.398	-3.817	2.051	
	m¡n.	1.398	-3.817	2.051	
	Flec.m x.	1.398	-3.817	2.051	
	m¡n.	1.398	-3.817	2.051	

Flecha Tot. el s. m x =0.000207

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.398	-3.817	9.686	
	m¡n.	1.398	-3.817	9.686	
	Cort.m x.	1.398	-3.817	9.686	
	m¡n.	1.398	-3.817	9.686	
	Flec.m x.	1.398	-3.817	9.686	
	m¡n.	1.398	-3.817	9.686	

Flecha Tot. el s. m x =0.000319

BARRA : 169 (92,97) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-3.245	1.462	
	m¡n.	0.000	-3.245	1.462	
	Flec.m x.	0.000	-3.245	1.462	
	m¡n.	0.000	-3.245	1.462	

Flecha Tot. el s. m x =0.000200

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-3.245	7.953	
	m¡n.	0.000	-3.245	7.953	
	Flec.m x.	0.000	-3.245	7.953	
	m¡n.	0.000	-3.245	7.953	

Flecha Tot. el s. m x =0.000317

BARRA : 170 (93,98) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.398	-3.817	2.051	
	m¡n.	-1.398	-3.817	2.051	
	Cort.m x.	-1.398	-3.817	2.051	
	m¡n.	-1.398	-3.817	2.051	

Flec.m x.	-1.398	-3.817	2.051
m¡n.	-1.398	-3.817	2.051

Flecha Tot. el s. m x =0.000207

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.398	-3.817	9.686	
	m¡n.	-1.398	-3.817	9.686	
	Cort.m x.	-1.398	-3.817	9.686	
	m¡n.	-1.398	-3.817	9.686	
	Flec.m x.	-1.398	-3.817	9.686	
	m¡n.	-1.398	-3.817	9.686	

Flecha Tot. el s. m x =0.000319

BARRA : 171 (90,91) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.145	-0.021	-0.002	
	m¡n.	-0.145	-0.021	-0.002	
	Cort.m x.	-0.145	-0.021	-0.002	
	m¡n.	-0.145	-0.021	-0.002	
	Flec.m x.	-0.145	-0.021	-0.002	
	m¡n.	-0.145	-0.021	-0.002	

Flecha Tot. el s. m x =0.000220

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.145	-0.021	0.062	
	m¡n.	-0.145	-0.021	0.062	
	Cort.m x.	-0.145	-0.021	0.062	
	m¡n.	-0.145	-0.021	0.062	
	Flec.m x.	-0.145	-0.021	0.062	
	m¡n.	-0.145	-0.021	0.062	

Flecha Tot. el s. m x =0.000207

BARRA : 172 (91,92) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.608	1.453	-0.240	
	m¡n.	-0.608	1.453	-0.240	
	Cort.m x.	-0.608	1.453	-0.240	
	m¡n.	-0.608	1.453	-0.240	
	Flec.m x.	-0.608	1.453	-0.240	
	m¡n.	-0.608	1.453	-0.240	

Flecha Tot. el s. m x =0.000207

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.608	1.453	-3.146	
	m¡n.	-0.608	1.453	-3.146	
	Cort.m x.	-0.608	1.453	-3.146	
	m¡n.	-0.608	1.453	-3.146	
	Flec.m x.	-0.608	1.453	-3.146	
	m¡n.	-0.608	1.453	-3.146	

Flecha Tot. el s. m x =0.000200

BARRA : 173 (92,93) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.608	-1.453	-3.146	
	m¡n.	0.608	-1.453	-3.146	
	Cort.m x.	0.608	-1.453	-3.146	
	m¡n.	0.608	-1.453	-3.146	
	Flec.m x.	0.608	-1.453	-3.146	
	m¡n.	0.608	-1.453	-3.146	

Flecha Tot. el s. m x =0.000200

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.608	-1.453	-0.240	
	m¡n.	0.608	-1.453	-0.240	
	Cort.m x.	0.608	-1.453	-0.240	

m¡n.	0.608	-1.453	-0.240
Flec.m x.	0.608	-1.453	-0.240
m¡n.	0.608	-1.453	-0.240

Flecha Tot. el s. m x =0.000207

BARRA : 174 (93,94) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.145	0.021	0.062	
	m¡n.	0.145	0.021	0.062	
	Cort.m x.	0.145	0.021	0.062	
	m¡n.	0.145	0.021	0.062	
	Flec.m x.	0.145	0.021	0.062	
	m¡n.	0.145	0.021	0.062	

Flecha Tot. el s. m x =0.000207

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.145	0.021	-0.002	
	m¡n.	0.145	0.021	-0.002	
	Cort.m x.	0.145	0.021	-0.002	
	m¡n.	0.145	0.021	-0.002	
	Flec.m x.	0.145	0.021	-0.002	
	m¡n.	0.145	0.021	-0.002	

Flecha Tot. el s. m x =0.000220

BARRA : 175 (95,100) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.013	0.115	0.185	
	m¡n.	0.013	0.115	0.185	
	Cort.m x.	0.013	0.115	0.185	
	m¡n.	0.013	0.115	0.185	
	Flec.m x.	0.013	0.115	0.185	
	m¡n.	0.013	0.115	0.185	

Flecha Tot. el s. m x =0.000321

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.013	0.115	-0.045	
	m¡n.	0.013	0.115	-0.045	
	Cort.m x.	0.013	0.115	-0.045	
	m¡n.	0.013	0.115	-0.045	
	Flec.m x.	0.013	0.115	-0.045	
	m¡n.	0.013	0.115	-0.045	

Flecha Tot. el s. m x =0.000378

BARRA : 176 (94,99) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.010	0.043	0.084	
	m¡n.	-0.010	0.043	0.084	
	Cort.m x.	-0.010	0.043	0.084	
	m¡n.	-0.010	0.043	0.084	
	Flec.m x.	-0.010	0.043	0.084	
	m¡n.	-0.010	0.043	0.084	

Flecha Tot. el s. m x =0.000220

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.010	0.043	-0.003	
	m¡n.	-0.010	0.043	-0.003	
	Cort.m x.	-0.010	0.043	-0.003	
	m¡n.	-0.010	0.043	-0.003	
	Flec.m x.	-0.010	0.043	-0.003	
	m¡n.	-0.010	0.043	-0.003	

Flecha Tot. el s. m x =0.000321

BARRA : 177 (96,101) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.924	0.016	10.094	
	m¡n.	1.924	0.016	10.094	
	Cort.m x.	1.924	0.016	10.094	
	m¡n.	1.924	0.016	10.094	
	Flec.m x.	1.924	0.016	10.094	
	m¡n.	1.924	0.016	10.094	

Flecha Tot. el s. m x =0.000319

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.924	0.016	10.061	
	m¡n.	1.924	0.016	10.061	
	Cort.m x.	1.924	0.016	10.061	
	m¡n.	1.924	0.016	10.061	
	Flec.m x.	1.924	0.016	10.061	
	m¡n.	1.924	0.016	10.061	

Flecha Tot. el s. m x =0.000392

BARRA : 178 (97,102) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-1.056	6.758	
	m¡n.	0.000	-1.056	6.758	
	Flec.m x.	0.000	-1.056	6.758	
	m¡n.	0.000	-1.056	6.758	

Flecha Tot. el s. m x =0.000317

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-1.056	8.870	
	m¡n.	0.000	-1.056	8.870	
	Flec.m x.	0.000	-1.056	8.870	
	m¡n.	0.000	-1.056	8.870	

Flecha Tot. el s. m x =0.000395

BARRA : 179 (98,103) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.923	0.016	10.094	
	m¡n.	-1.923	0.016	10.094	
	Cort.m x.	-1.923	0.016	10.094	
	m¡n.	-1.923	0.016	10.094	
	Flec.m x.	-1.923	0.016	10.094	
	m¡n.	-1.923	0.016	10.094	

Flecha Tot. el s. m x =0.000319

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.923	0.016	10.061	
	m¡n.	-1.923	0.016	10.061	
	Cort.m x.	-1.923	0.016	10.061	
	m¡n.	-1.923	0.016	10.061	
	Flec.m x.	-1.923	0.016	10.061	
	m¡n.	-1.923	0.016	10.061	

Flecha Tot. el s. m x =0.000392

BARRA : 180 (95,96) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.189	-0.072	0.003	
	m¡n.	-0.189	-0.072	0.003	
	Cort.m x.	-0.189	-0.072	0.003	
	m¡n.	-0.189	-0.072	0.003	
	Flec.m x.	-0.189	-0.072	0.003	
	m¡n.	-0.189	-0.072	0.003	

Flecha Tot. el s. m x =0.000321

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.189	-0.072	0.219	
	m¡n.	-0.189	-0.072	0.219	
	Cort.m x.	-0.189	-0.072	0.219	
	m¡n.	-0.189	-0.072	0.219	
	Flec.m x.	-0.189	-0.072	0.219	
	m¡n.	-0.189	-0.072	0.219	

Flecha Tot. el s. m x =0.000319

BARRA : 181 (96,97) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.597	1.095	0.744	
	m¡n.	-0.597	1.095	0.744	
	Cort.m x.	-0.597	1.095	0.744	
	m¡n.	-0.597	1.095	0.744	
	Flec.m x.	-0.597	1.095	0.744	
	m¡n.	-0.597	1.095	0.744	

Flecha Tot. el s. m x =0.000319

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.597	1.095	-1.445	
	m¡n.	-0.597	1.095	-1.445	
	Cort.m x.	-0.597	1.095	-1.445	
	m¡n.	-0.597	1.095	-1.445	
	Flec.m x.	-0.597	1.095	-1.445	
	m¡n.	-0.597	1.095	-1.445	

Flecha Tot. el s. m x =0.000317

BARRA : 182 (97,98) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.597	-1.095	-1.445	
	m¡n.	0.597	-1.095	-1.445	
	Cort.m x.	0.597	-1.095	-1.445	
	m¡n.	0.597	-1.095	-1.445	
	Flec.m x.	0.597	-1.095	-1.445	
	m¡n.	0.597	-1.095	-1.445	

Flecha Tot. el s. m x =0.000317

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.597	-1.095	0.744	
	m¡n.	0.597	-1.095	0.744	
	Cort.m x.	0.597	-1.095	0.744	
	m¡n.	0.597	-1.095	0.744	
	Flec.m x.	0.597	-1.095	0.744	
	m¡n.	0.597	-1.095	0.744	

Flecha Tot. el s. m x =0.000319

BARRA : 183 (98,99) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.189	0.072	0.219	
	m¡n.	0.139	0.072	0.219	
	Cort.m x.	0.189	0.072	0.219	
	m¡n.	0.189	0.072	0.219	
	Flec.m x.	0.189	0.072	0.219	
	m¡n.	0.189	0.072	0.219	

Flecha Tot. el s. m x =0.000319

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.189	0.072	0.003	
	m¡n.	0.189	0.072	0.003	
	Cort.m x.	0.189	0.072	0.003	
	m¡n.	0.189	0.072	0.003	
	Flec.m x.	0.189	0.072	0.003	
	m¡n.	0.189	0.072	0.003	

Flecha Tot. el s. m x =0.000321

BARRA : 184 (100,105) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.028	0.209	0.294	
	m¡n.	0.028	0.209	0.294	
	Cort.m x.	0.028	0.209	0.294	
	m¡n.	0.028	0.209	0.294	
	Flec.m x.	0.028	0.209	0.294	
	m¡n.	0.028	0.209	0.294	

Flecha Tot. el s. m x =0.000378

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.028	0.209	-0.125	
	m¡n.	0.028	0.209	-0.125	
	Cort.m x.	0.028	0.209	-0.125	
	m¡n.	0.028	0.209	-0.125	
	Flec.m x.	0.028	0.209	-0.125	
	m¡n.	0.028	0.209	-0.125	

Flecha Tot. el s. m x =0.000374

BARRA : 185 (99,104) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.013	0.115	0.185	
	m¡n.	-0.013	0.115	0.185	
	Cort.m x.	-0.013	0.115	0.185	
	m¡n.	-0.013	0.115	0.185	
	Flec.m x.	-0.013	0.115	0.185	
	m¡n.	-0.013	0.115	0.185	

Flecha Tot. el s. m x =0.000321

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.013	0.115	-0.045	
	m¡n.	-0.013	0.115	-0.045	
	Cort.m x.	-0.013	0.115	-0.045	
	m¡n.	-0.013	0.115	-0.045	
	Flec.m x.	-0.013	0.115	-0.045	
	m¡n.	-0.013	0.115	-0.045	

Flecha Tot. el s. m x =0.000378

BARRA : 186 (101,106) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.413	-0.368	10.526	
	m¡n.	3.413	-0.368	10.526	
	Cort.m x.	3.413	-0.368	10.526	
	m¡n.	3.413	-0.368	10.526	
	Flec.m x.	3.413	-0.368	10.526	
	m¡n.	3.413	-0.368	10.526	

Flecha Tot. el s. m x =0.000392

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	3.413	-0.368	11.262	
	m¡n.	3.413	-0.368	11.262	
	Cort.m x.	3.413	-0.368	11.262	
	m¡n.	3.413	-0.368	11.262	
	Flec.m x.	3.413	-0.368	11.262	
	m¡n.	3.413	-0.368	11.262	

Flecha Tot. el s. m x =0.000419

BARRA : 187 (102,107) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	-0.476	7.262	
	m¡n.	0.000	-0.476	7.262	
	Flec.m x.	0.000	-0.476	7.262	
	m¡n.	0.000	-0.476	7.262	

Flecha Tot. el s. m x =0.000395

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	-0.476	8.214	
	m¡n.	0.000	-0.476	8.214	
	Flec.m x.	0.000	-0.476	8.214	
	m¡n.	0.000	-0.476	8.214	

Flecha Tot. el s. m x =0.000431

BARRA : 188 (103,108) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.413	-0.368	10.526	
	m¡n.	-3.413	-0.368	10.526	
	Cort.m x.	-3.413	-0.368	10.526	
	m¡n.	-3.413	-0.368	10.526	
	Flec.m x.	-3.413	-0.368	10.526	
	m¡n.	-3.413	-0.368	10.526	

Flecha Tot. el s. m x =0.000392

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-3.413	-0.368	11.262	
	m¡n.	-3.413	-0.368	11.262	
	Cort.m x.	-3.413	-0.368	11.262	
	m¡n.	-3.413	-0.368	11.262	
	Flec.m x.	-3.413	-0.368	11.262	
	m¡n.	-3.413	-0.368	11.262	

Flecha Tot. el s. m x =0.000419

BARRA : 189 (100,101) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.339	-0.094	0.015	
	m¡n.	-0.339	-0.094	0.015	
	Cort.m x.	-0.339	-0.094	0.015	
	m¡n.	-0.339	-0.094	0.015	
	Flec.m x.	-0.339	-0.094	0.015	
	m¡n.	-0.339	-0.094	0.015	

Flecha Tot. el s. m x =0.000378

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.339	-0.094	0.297	
	m¡n.	-0.339	-0.094	0.297	
	Cort.m x.	-0.339	-0.094	0.297	
	m¡n.	-0.339	-0.094	0.297	
	Flec.m x.	-0.339	-0.094	0.297	
	m¡n.	-0.339	-0.094	0.297	

Flecha Tot. el s. m x =0.000392

BARRA : 190 (101,102) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.804	0.290	1.786	
	m¡n.	-0.804	0.290	1.786	
	Cort.m x.	-0.804	0.290	1.786	
	m¡n.	-0.804	0.290	1.786	
	Flec.m x.	-0.804	0.290	1.786	
	m¡n.	-0.804	0.290	1.786	

Flecha Tot. el s. m x =0.000392

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.804	0.290	1.206	
	m¡n.	-0.804	0.290	1.206	
	Cort.m x.	-0.804	0.290	1.206	

m¡n.	-0.804	0.290	1.206
Flec.m x.	-0.804	0.290	1.206
m¡n.	-0.804	0.290	1.206

Flecha Tot. el s. m x =0.000395

BARRA : 191 (102,103) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.804	-0.290	1.206	
	m¡n.	0.804	-0.290	1.206	
	Cort.m x.	0.804	-0.290	1.206	
	m¡n.	0.804	-0.290	1.206	
	Flec.m x.	0.804	-0.290	1.206	
	m¡n.	0.804	-0.290	1.206	

Flecha Tot. el s. m x =0.000395

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.804	-0.290	1.786	
	m¡n.	0.804	-0.290	1.786	
	Cort.m x.	0.804	-0.290	1.786	
	m¡n.	0.804	-0.290	1.786	
	Flec.m x.	0.804	-0.290	1.786	
	m¡n.	0.804	-0.290	1.786	

Flecha Tot. el s. m x =0.000392

BARRA : 192 (103,104) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.339	0.094	0.297	
	m¡n.	0.339	0.094	0.297	
	Cort.m x.	0.339	0.094	0.297	
	m¡n.	0.339	0.094	0.297	
	Flec.m x.	0.339	0.094	0.297	
	m¡n.	0.339	0.094	0.297	

Flecha Tot. el s. m x =0.000392

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.339	0.094	0.015	
	m¡n.	0.339	0.094	0.015	
	Cort.m x.	0.339	0.094	0.015	
	m¡n.	0.339	0.094	0.015	
	Flec.m x.	0.339	0.094	0.015	
	m¡n.	0.339	0.094	0.015	

Flecha Tot. el s. m x =0.000378

BARRA : 193 (105,110) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.195	0.537	0.952	
	m¡n.	0.195	0.537	0.952	
	Cort.m x.	0.195	0.537	0.952	
	m¡n.	0.195	0.537	0.952	
	Flec.m x.	0.195	0.537	0.952	
	m¡n.	0.195	0.537	0.952	

Flecha Tot. el s. m x =0.000374

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.195	0.537	-0.122	
	m¡n.	0.195	0.537	-0.122	
	Cort.m x.	0.195	0.537	-0.122	
	m¡n.	0.195	0.537	-0.122	
	Flec.m x.	0.195	0.537	-0.122	
	m¡n.	0.195	0.537	-0.122	

Flecha Tot. el s. m x =0.000170

BARRA : 194 (104,109) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.028	0.209	0.294	
	m¡n.	-0.028	0.209	0.294	
	Cort.m x.	-0.028	0.209	0.294	
	m¡n.	-0.028	0.209	0.294	
	Flec.m x.	-0.028	0.209	0.294	
	m¡n.	-0.028	0.209	0.294	

Flecha Tot. el s. m x =0.000378

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.028	0.209	-0.125	
	m¡n.	-0.028	0.209	-0.125	
	Cort.m x.	-0.028	0.209	-0.125	
	m¡n.	-0.028	0.209	-0.125	
	Flec.m x.	-0.028	0.209	-0.125	
	m¡n.	-0.028	0.209	-0.125	

Flecha Tot. el s. m x =0.000374

BARRA : 195 (106,111) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	7.735	3.604	11.802	
	m¡n.	7.735	3.604	11.802	
	Cort.m x.	7.735	3.604	11.802	
	m¡n.	7.735	3.604	11.802	
	Flec.m x.	7.735	3.604	11.802	
	m¡n.	7.735	3.604	11.802	

Flecha Tot. el s. m x =0.000419

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	7.735	3.604	4.595	
	m¡n.	7.735	3.604	4.595	
	Cort.m x.	7.735	3.604	4.595	

m¡n.	7.735	3.604	4.595
Flec.m x.	7.735	3.604	4.595
m¡n.	7.735	3.604	4.595

Flecha Tot. el s. m x =0.000399

BARRA : 196 (107,112) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	0.926	4.978	
	m¡n.	0.000	0.926	4.978	
	Flec.m x.	0.000	0.926	4.978	
	m¡n.	0.000	0.926	4.978	

Flecha Tot. el s. m x =0.000431

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Cort.m x.	0.000	0.926	3.127	
	m¡n.	0.000	0.926	3.127	
	Flec.m x.	0.000	0.926	3.127	
	m¡n.	0.000	0.926	3.127	

Flecha Tot. el s. m x =0.000431

BARRA : 197 (108,113) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-7.735	3.604	11.802	
	m¡n.	-7.735	3.604	11.802	
	Cort.m x.	-7.735	3.604	11.802	
	m¡n.	-7.735	3.604	11.802	
	Flec.m x.	-7.735	3.604	11.802	
	m¡n.	-7.735	3.604	11.802	

Flecha Tot. el s. m x =0.000419

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-7.735	3.604	4.595	
	m¡n.	-7.735	3.604	4.595	
	Cort.m x.	-7.735	3.604	4.595	
	m¡n.	-7.735	3.604	4.595	
	Flec.m x.	-7.735	3.604	4.595	
	m¡n.	-7.735	3.604	4.595	

Flecha Tot. el s. m x =0.000399

BARRA : 198 (105,106) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.077	-0.328	0.167	
	m¡n.	-1.077	-0.328	0.167	
	Cort.m x.	-1.077	-0.328	0.167	
	m¡n.	-1.077	-0.328	0.167	
	Flec.m x.	-1.077	-0.328	0.167	
	m¡n.	-1.077	-0.328	0.167	

Flecha Tot. el s. m x =0.000374

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-1.077	-0.328	1.150	
	m¡n.	-1.077	-0.328	1.150	
	Cort.m x.	-1.077	-0.328	1.150	
	m¡n.	-1.077	-0.328	1.150	
	Flec.m x.	-1.077	-0.328	1.150	
	m¡n.	-1.077	-0.328	1.150	

Flecha Tot. el s. m x =0.000419

BARRA : 199 (106,107) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.618	0.701	5.473	
	m¡n.	-1.618	0.701	5.473	
	Cort.m x.	-1.618	0.701	5.473	
	m¡n.	-1.618	0.701	5.473	
	Flec.m x.	-1.618	0.701	5.473	
	m¡n.	-1.618	0.701	5.473	

Flecha Tot. el s. m x =0.000419

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.618	0.701	4.071	
	m¡n.	-1.618	0.701	4.071	
	Cort.m x.	-1.618	0.701	4.071	
	m¡n.	-1.618	0.701	4.071	
	Flec.m x.	-1.618	0.701	4.071	
	m¡n.	-1.618	0.701	4.071	

Flecha Tot. el s. m x =0.000431

BARRA : 200 (107,108) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.618	-0.701	4.071	
	m¡n.	1.618	-0.701	4.071	
	Cort.m x.	1.618	-0.701	4.071	
	m¡n.	1.618	-0.701	4.071	
	Flec.m x.	1.618	-0.701	4.071	
	m¡n.	1.618	-0.701	4.071	

Flecha Tot. el s. m x =0.000431

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.618	-0.701	5.473	
	m¡n.	1.618	-0.701	5.473	
	Cort.m x.	1.618	-0.701	5.473	
	m¡n.	1.618	-0.701	5.473	
	Flec.m x.	1.618	-0.701	5.473	
	m¡n.	1.618	-0.701	5.473	

Flecha Tot. el s. m x =0.000419

BARRA : 201 (108,109) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.077	0.328	1.150	
	m¡n.	1.077	0.328	1.150	
	Cort.m x.	1.077	0.328	1.150	
	m¡n.	1.077	0.328	1.150	
	Flec.m x.	1.077	0.328	1.150	
	m¡n.	1.077	0.328	1.150	

Flecha Tot. el s. m x =0.000419

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	1.077	0.328	0.167	
	m¡n.	1.077	0.328	0.167	
	Cort.m x.	1.077	0.328	0.167	
	m¡n.	1.077	0.328	0.167	
	Flec.m x.	1.077	0.328	0.167	
	m¡n.	1.077	0.328	0.167	

Flecha Tot. el s. m x =0.000374

BARRA : 202 (110,116) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.158	0.633	0.065	
	m¡n.	0.158	0.633	0.065	
	Cort.m x.	0.158	0.633	0.065	
	m¡n.	0.158	0.633	0.065	
	Flec.m x.	0.158	0.633	0.065	
	m¡n.	0.158	0.633	0.065	

Flecha Tot. el s. m x =0.000170

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	0.158	0.633	-1.043	
	m¡n.	0.158	0.633	-1.043	
	Cort.m x.	0.158	0.633	-1.043	
	m¡n.	0.158	0.633	-1.043	
	Flec.m x.	0.158	0.633	-1.043	
	m¡n.	0.158	0.633	-1.043	

BARRA : 203 (109,114) Sec. 1 Rect. /210,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.195	0.537	0.952	
	m¡n.	-0.195	0.537	0.952	
	Cort.m x.	-0.195	0.537	0.952	
	m¡n.	-0.195	0.537	0.952	
	Flec.m x.	-0.195	0.537	0.952	
	m¡n.	-0.195	0.537	0.952	

Flecha Tot. el s. m x =0.000374

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.195	0.537	-0.122	
	m¡n.	-0.195	0.537	-0.122	
	Cort.m x.	-0.195	0.537	-0.122	
	m¡n.	-0.195	0.537	-0.122	
	Flec.m x.	-0.195	0.537	-0.122	
	m¡n.	-0.195	0.537	-0.122	

Flecha Tot. el s. m x =0.000170

BARRA : 204 (111,117) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	7.581	3.502	4.436	
	m¡n.	7.581	3.502	4.436	
	Cort.m x.	7.581	3.502	4.436	
	m¡n.	7.581	3.502	4.436	
	Flec.m x.	7.581	3.502	4.436	

	m¡n.	7.581	3.502	4.436	

Flecha Tot. el s. m x =0.000399

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	7.581	3.502	-1.693	
	m¡n.	7.581	3.502	-1.693	
	Cort.m x.	7.581	3.502	-1.693	
	m¡n.	7.581	3.502	-1.693	
	Flec.m x.	7.581	3.502	-1.693	
	m¡n.	7.581	3.502	-1.693	

Flecha Tot. el s. m x =0.000363

BARRA : 205 (112,118) Sec. 3 Rect. /200,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.000	0.937	3.071	
	m¡n.	0.000	0.937	3.071	
	Flec.m x.	0.000	0.937	3.071	
	m¡n.	0.000	0.937	3.071	

Flecha Tot. el s. m x =0.000431

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Cort.m x.	0.000	0.937	1.432	
	m¡n.	0.000	0.937	1.432	
	Flec.m x.	0.000	0.937	1.432	
	m¡n.	0.000	0.937	1.432	

Flecha Tot. el s. m x =0.000418

BARRA : 206 (113,119) Sec. 4 Rect. /250,110/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-7.581	3.502	4.436	
	m¡n.	-7.581	3.502	4.436	
	Cort.m x.	-7.581	3.502	4.436	
	m¡n.	-7.581	3.502	4.436	
	Flec.m x.	-7.581	3.502	4.436	
	m¡n.	-7.581	3.502	4.436	

Flecha Tot. el s. m x =0.000399

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.75	Tor. m x.	-7.581	3.502	-1.693	
	m¡n.	-7.581	3.502	-1.693	
	Cort.m x.	-7.581	3.502	-1.693	
	m¡n.	-7.581	3.502	-1.693	
	Flec.m x.	-7.581	3.502	-1.693	
	m¡n.	-7.581	3.502	-1.693	

Flecha Tot. el s. m x =0.000363

BARRA : 207 (110,111) Sec. 6 Rect. /188,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.187	-0.096	-0.037	
	m¡n.	-0.187	-0.096	-0.037	
	Cort.m x.	-0.187	-0.096	-0.037	
	m¡n.	-0.187	-0.096	-0.037	
	Flec.m x.	-0.187	-0.096	-0.037	
	m¡n.	-0.187	-0.096	-0.037	

Flecha Tot. el s. m x =0.000170

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	-0.187	-0.096	0.251	
	m¡n.	-0.187	-0.096	0.251	
	Cort.m x.	-0.187	-0.096	0.251	

m¡n.	-0.187	-0.096	0.251
Flec.m x.	-0.187	-0.096	0.251
m¡n.	-0.187	-0.096	0.251

Flecha Tot. el s. m x =0.000399

BARRA : 208 (111,112) Sec. 6 Rect. /188,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.028	0.005	0.097	
	m¡n.	-0.028	0.005	0.097	
	Cort.m x.	-0.028	0.005	0.097	
	m¡n.	-0.028	0.005	0.097	
	Flec.m x.	-0.028	0.005	0.097	
	m¡n.	-0.028	0.005	0.097	

Flecha Tot. el s. m x =0.000399

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.028	0.005	0.086	
	m¡n.	-0.028	0.005	0.086	
	Cort.m x.	-0.028	0.005	0.086	
	m¡n.	-0.028	0.005	0.086	
	Flec.m x.	-0.028	0.005	0.086	
	m¡n.	-0.028	0.005	0.086	

Flecha Tot. el s. m x =0.000431

BARRA : 209 (112,113) Sec. 6 Rect. /188,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.028	-0.005	0.086	
	m¡n.	0.028	-0.005	0.086	
	Cort.m x.	0.028	-0.005	0.086	
	m¡n.	0.028	-0.005	0.086	
	Flec.m x.	0.028	-0.005	0.086	
	m¡n.	0.028	-0.005	0.086	

Flecha Tot. el s. m x =0.000431

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.028	-0.005	0.097	
	m¡n.	0.028	-0.005	0.097	
	Cort.m x.	0.028	-0.005	0.097	
	m¡n.	0.028	-0.005	0.097	
	Flec.m x.	0.028	-0.005	0.097	
	m¡n.	0.028	-0.005	0.097	

Flecha Tot. el s. m x =0.000399

BARRA : 210 (113,114) Sec. 6 Rect. /188,22/ cm H-300

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.187	0.096	0.251	
	m¡n.	0.187	0.096	0.251	
	Cort.m x.	0.187	0.096	0.251	
	m¡n.	0.187	0.096	0.251	
	Flec.m x.	0.187	0.096	0.251	
	m¡n.	0.187	0.096	0.251	

Flecha Tot. el s. m x =0.000399

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.00	Tor. m x.	0.187	0.096	-0.037	
	m¡n.	0.187	0.096	-0.037	
	Cort.m x.	0.187	0.096	-0.037	
	m¡n.	0.187	0.096	-0.037	
	Flec.m x.	0.187	0.096	-0.037	
	m¡n.	0.187	0.096	-0.037	

Flecha Tot. el s. m x =0.000170

REACCIONES

(Combinaciones con coeficientes unidad - servicio)

Nudo.	Hip¢tesis.	Momento X.	Fuerza Z.	Momento Y.
4	C 1	-0.000	3.146	-1.717
8	C 1	-0.000	3.146	-1.717
42	C 1	0.000	35.321	16.182
82	C 1	0.000	39.179	-16.214
116	C 1	-0.000	4.604	2.020
120	C 1	-0.000	4.604	2.020

Resumen del control de calidad

RESUMEN DEL CONTROL DE CALIDAD

Cuadro resumen de ensayos de hormigón

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO P.S. 4

P.P.I. Nº 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
372	577	08/10/99	Zap P,d y P,i	03020403	H-250	7	Blanda			3	308			100	05/11/99	II AL 42,5 R	264	
516	788	23/12/99	P-d	03020404	H-300	6	Blanda			3	402			13	20/01/00	II AL 42,5 R	402	
533	819	04/01/00	P-i	03020404	H-300	7	Blanda			3	349			13	01/02/00	II AL 42,5 R	349	
734	1168	16/03/00	E-i Alzado	03020403	H-250	9	Blanda			3	281			100	13/04/00	II AL 42,5 R	244	
734	1169	16/03/00	E-i Alzado	03020403	H-250	9	Blanda			3	277			100	13/04/00	II AL 42,5 R	244	
770	1239	29/03/00	E-d Alzado	03020403	H-250	8	Blanda			3	264			100	26/04/00	II AL 42,5 R	232	
770	1240	29/03/00	E-d Alzado	03020403	H-250	9	Blanda			3	290			100	26/04/00	II AL 42,5 R	232	
823	1345	28/04/00	Tablero	03020406	H-300	10	Fluida			3	343			100	26/05/00	II AL 42,5 R	302	
823	1346	28/04/00	Tablero	03020406	H-300	11	Fluida			3	366			100	26/05/00	II AL 42,5 R	302	
824	1347	28/04/00	Tablero	03020406	H-300	12	Fluida			3	385			100	26/05/00	II AL 42,5 R	339	
824	1348	28/04/00	Tablero	03020406	H-300	11	Fluida			3	389			100	26/05/00	II AL 42,5 R	339	
825	1349	28/04/00	Tablero	03020406	H-300	14	Fluida			3	395			100	26/05/00	II AL 42,5 R	314	
825	1350	28/04/00	Tablero	03020406	H-300	13	Fluida			3	357			100	26/05/00	II AL 42,5 R	314	

FECHA:

FIRMA:

NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

Paso Superior 5 (P.K. 308+588)

PASO SUPERIOR 5

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DESCRIPCIÓN Y CÁLCULOS

RESUMEN DEL CONTROL DE CALIDAD

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1. DESCRIPCIÓN GENERAL

El paso superior 5 del p.k. 308+588 está constituido por tres vanos de 18+26+18=62 m y resuelve la intersección a la M-300 con la traza.

La sección transversal tiene una distribución de calzadas de 1,7 + 4,00 + 4,00 + 1,7 = 11,40 m.

La planta es recta; pero con un esviaje de 138,58 g.

La estructura es de hormigón pretensado en obra con sección trapezoidal aligerada, con una base de 4,5 m. de ancho y voladizos de 3,15 m, terminados en 0,18 de espesor. El espesor máximo de la losa es de 1,208 m y el anchos total de la losa de 11,08 m. Lleva tres aligeramientos de 0,65 m de diámetros.

Las aceras prefabricadas de 1,20 m llevan barandilla y valla antivandálica además de barrera rígida.

Las dos pilas intermedias son de fuste único de 1,00 m de diámetro sobre apoyos de elastomético.

La zapata es de 5,00 x 5,00 x 1,50 m para tensión admisible de 3,5 kp/cm^2.

Los estribos son del tipo convencional con aleta voladas.

La separación de los dos apoyos elastoméricos es de 7,90 m para garantizar la estabilidad transversal del tablero.

La zapata del estribo es común a todo él, con una sección longitudinal de 4,5 x 1,50 m y transversal de 14 m paralelamente a la vía y altura de muro de 6,50 m.

Finalmente, se han dispuesto losas de transición de 5,00 x 0,30 m de sección.

Se han dejado preparados estribos y alzadas de pilas para una posible ampliación con la carretera por parte de la Comunidad de Madrid, de modo que la afección a la L.A.V. sea mínima teniendo que disponerse únicamente vigas prefabricadas para conseguir la ampliación.

2. HIPOTESIS DE CALCULO Y PROCESO DE CONSTRUCCION.

Inicialmente, se estudia el tablero como emparrillado a fin de obtener el coeficiente de reparto transversal y los esfuerzos transversales de flexión, cortante y torsión.

Con el coeficiente de reparto transversal aplicado a la sobrecarga de tráfico, se calcula longitudinalmente el puente como viga y se comprueban las secciones sometidas al pretensado según fases de construcción, obteniéndose el coeficiente de seguridad en rotura correspondiente.

Las armaduras de cortante longitudinal y las de flexión y cortante transversal, se determinan por medio de los esfuerzos obtenidos anteriormente, en especial en las inmediaciones de los apoyos.

A partir de los valores anteriores, se calculan las pilas de soporte único con consideración del efecto de pandeo y sometidas a viento, frenado, deformación de apoyos y sismo, si ha lugar.

Los estribos estarán sometidos a las cargas transmitidas por el tablero, tanto verticales como horizontales y las de empuje de tierras, así como las de sismo si fuera preciso para la hipótesis pésima.

En cuanto a las acciones consideradas, las de peso propio se hallan en el Programa PUENTE de Díaz del Valle, si bien aquí se indican:

Area aligerada de tablero :

10.80x 0.054	= 0.583	m2 /m
10.80x 0.18	= 2.178	"
7.65x 0.157	= 1.201	"
4.25x 0.763	= 3.243	"
-5x0.785x0.65x0.65	=-1.658	"

Area total aligerada : 5.313 m2/m

Peso propio: 2.5x5.313 = 13.282 t / m
Pavimento: 0.20x8.00 = 1.600 "
Aceras: 2x1.00 = 2.000 "
Resto: barandillas,etc = 0.750 " 17.632 t/m

Peso propio + pavimento + aceras + resto = 17.632 t/m

Con el programa PRETENSA igualmente de Díaz del Valle se estudia la acción del pretensado en las distintas fases con los siguientes datos:

6 tendones de 24 ϕ 0.6 "

Tensión de rotura 19000 kg /cm2

Tensión inicial 14250 kg /cm2

Relajación a las 1000 h 2%

Retracción del hormigón 0.00025

Fluencia del hormigón φ t =2.4

Coeficientes de rozamiento μ =0.21 ; k = 0.006

Diámetro de la vaina: 110 mm

Penetración de la cuña: 5 mm.

Para el cálculo de las pilas, se ha considerado la coacción del apoyo elastomérico y su efecto en el pandeo, así como el frenado y el viento transversal con el coeficiente minoración correspondiente .

Para el desarrollo del emparrillado, como en el caso de los Pasos superiores 1, 2, 3, 4 y 6, se ha utilizado el programa TREBOL II.

Los estribos se estudiaron de forma similar a los Pasos anteriores,así como el procedimiento constructivo, que en este caso queda modificado unicamente por la fase de tesado.

3. NORMATIVA CONSIDERADA

Para el cálculo de esta estructura se ha considerado la siguiente Normativa:

Instrucción relativa a las acciones a considerar en el proyecto de los puentes de ferrocarril IPF-75.

Instrucción relativa a las acciones a considerar en el proyecto de puentes de carretera IAC-94.

Instrucción para el proyecto y la ejecución de obras de hormigón en masa o armado (EH-91).

Instrucción para el proyecto y la ejecución de obras de hormigón pretensado (EP-93).

Norma de Construcción Sismorresistente NCS - 94.

Debido a la situación y el tipo de obra no es de aplicación esta última Norma.

RESISTENCIA DE LOS MATERIALES Y COEFICIENTE DE SEGURIDAD

Resistencia del hormigón H-400 para pretensar en obra:

$f_{ck} = 400$ Kp/cm^2 ; $\gamma_c = 1.5$

Resistencia del hormigón H-300 para armar en fustes de pilas:

$f_{ck} = 300$ Kp/cm^2 ; $\gamma_c = 1.5$

Resistencia del hormigón H-250 en el resto de las estructuras, cimentaciones y estribos:

$f_{ck} = 250$ Kp/cm^2 ; $\gamma_c = 1.5$

Acero en armaduras pasivas AEH-500:

$f_{yk} = 5100$ Kp/cm^2 ; $\gamma_s = 1.15$

Acero en armaduras activas:

$f_{yk} = 17100$ Kp/cm^2 ; $\gamma_s = 1.10$

Coeficiente de seguridad de acciones:

Tablero y pilas: $\gamma_f = 1.5$ Resto de obra: $\gamma_f = 1.6$

5. TABLERO

5.1. DESCRIPCION GENERAL

Está formado por tres vanos de hormigón pretensado.

Inicialmente, se hace un cálculo de emparrillado para determinar el coeficiente de reparto transversal, así como los esfuerzos locales en la losa. Con el coeficiente de reparto se puede estudiar la losa como viga continua.

Se calculan, a continuación, las secciones en el sentido longitudinal y se determinan las armaduras activas, así como las tensiones en las fibras extremas, según fases de construcción y servicio.

Como complemento se comprueba el coeficiente de seguridad a rotura (> 1.50).

Las armaduras pasivas se obtienen como consecuencia de los esfuerzos cortantes y de flexión transversal y de torsión.

Se estudiarán especialmente las secciones en apoyos.

5.2. CALCULO LONGITUDINAL EN ROTURA

Flexión máxima:

M = 769+242+459 = 1470 mt

$A = f_{cd} \times bd\,(1 - (1 - 2 \times \gamma_f \times M/f_{cd}/b/d^2)^{1/2})/f_{cd}$

$f_{cd} = 4000/1.5 = 2667$ t/m^2

$f_{yd} = 17.1/1.1 = 15.54$ t/cm^2

$\gamma_f = 1.50$

b = 4 m

d = 1 m.

A =158 cm^2 → 4.7x 24 ϕ 0.6''.Se han dispuesto 6x24ϕ.6"

5.3. ESFUERZO CORTANTE LONGITUDINAL

Apoyos extremos:

V = 1.5 x (212- 0.75 X 6 X 33.6 X 0.08 X 19) = - 26.76 t

$V_c = 5 \times 267^{1/2} \times 4 \times 1.06 = 347 \text{ t} > V$

Apoyos interiores

$\sigma_{bt} = 4.5 \times 400^{2/3} = 244 \text{ t/m}^2$

V = 1.5 X (195 + 61 + 147) = 604 t

cotag $\alpha = (1 + (0.8 \times 6 \times 14.25 \times 33.6)/244 \times 7.09)^{1/2} = 1.53$

$A_t = (604\text{-}347)/0.9/1.06/4.2 \times 0.20 /1.53 = 8.4 \text{ cm}^2/0.20$

5.4. ESTUDIO TRANSVERSAL

- Cálculo de riostra en los apoyos extremos:

Flexión:

p = (93+29+54)/ 8.9= 15.28 t/m

M = 15,28 x 7.9 ^2 /8 +30x2.95 = 208 mt

$A = 63.2 \text{ cm}^2$

Cortante:

V = 1.5 x 15.28x 3.2 = 73.3 t

$V_c = 5 \times 267^{1/2} \times 1.06 = 87 \text{ t} > v$

A min = .02x30000x0.20/4.2 = 2.85 cm^2 /0.2→ 3c ϕ 10/0.2

- Cálculo transversal sobre pilas

Flexión:

p = (374+117+170)/4 = 165.25 t/m

$M = 165.25 \times 1.85^2/2 = 282.78 \text{ mt}$

$A = 86.4 \text{ cm}^2$

En dos metros de ancho

Esfuerzo cortante:

V = 1.5 x 165.25x 1.35 = 335 t

$V_c = 5 \times 267^{1/2} \times 2 \times 1.1 = 180 \text{ t}$

$A_t = (335 - 180)/0.9/1.1/4.2/5 = 7.45 \text{ cm}^2/0.2$

- Torsión

$T_d = 1.5 \times (31 \times 0.4 \times 5.4^2/2 + 60 \times 2.5) = 496 \text{ mt}$

$A_e = 3.73 \text{ m}^2$

$T_{u1} = 0.36 \times 4000/1.5 \times 3.73 \times 0.183 = 655 \text{ mt} > T_d$

Armadura transversal

$A_t = 496/2/3.73/4.2/5 = 3.16 \text{ cm}^2/0.20$

Armadura longitudinal

$A_l = 3.16/4.43 \times 4.2 = 3.0 \text{ cm}^2/0.2$

Estabilidad de apoyos extremos

Con carro ladeado.- Por torsión:

$R = \pm 496/1.5/7.9 = \pm 42 \text{ t}$

Cargas verticales

V = 212 t

R = 212/2 ± 42

$R_1 = 148 \text{ t}$

$R_2 = 64 \text{ t}$

Voladizos transversales

$M = 2.5 \times (0.18 \times 2 + 0.4) \times 3.15^2/6 + 0.4 \times 3.45^2/2 +$
.2x1.75^2/2+2.85x.75x1.2+.5x2 + 10/1.5 x1.25 = 17.73 mt/m

$A = 17.28 \text{ cm}^2/\text{m}$

V = 1.5 x (0.58 x 2.5 x 3.15/2 + 0.4 x 3.45 +.2x1.75+.9+ 0.5 + 10/15) =

= 18.12 t/m

$\rho = (5 \times (4.91 + 1.12))/4000 = 0.00754$

$V_c = 2.5 \times 267^{1/2} \times 0.36 \times (1 + 50 \times 0.00754) = 20.24 > V$

5.5. EMPARRILLADO

A continuación, y por medio del programa TREBOL II se efectúa el cálculo del emparrillado necesario para la determinación del coeficiente de reparto transversal introducido en el cálculo longitudinal del tablero y la obtención de los esfuerzos para la disposición de las armaduras transversales y de torsión.

Se ha discretizado la losa disponiendo un total de 3 barras haces longitudinales más las de borde, y tramos transversales cada 1.75 m. aproximadamente, excepto en la zona de apoyos en la que se ha realizado una discretización mayor para poder analizar los efectos locales.

La discretización de las cargas superficiales se ha realizado asignando el área de influencia a nodos y las lineales y puntuales como cargas en barras.

En los resultados del programa se pueden observar las características y cargas asignadas a cada uno de las barras.

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T I T U L O D E L A O B R A

Paso Superior P.K. 308+588

P R O P I E D A D

P R O Y E C T O

M A T E R I A L E S

No.	Mod.Young	Mod.Poisson	Peso espec.	Coef.Dilataci¢n
1	3800000.000	0.200	2.500	0.000010

Hormig¢n rest. caract. Fck = 400 Kp./cm2.

S E C C I O N E S

Unidades en m.

No.	Tipo.	Ancho.	Canto.
1	Rectg.	3.150	0.220
2	Rectg.	0.500	1.100
3	Rectg.	3.031	0.220
4	Rectg.	3.825	1.100
5	Rectg.	2.000	0.220
6	Rectg.	1.576	0.220
7	Rectg.	1.653	0.220
8	Rectg.	3.254	0.220
9	Rectg.	1.893	0.220

No.	Tipo.	Ancho.	Canto.
10	Rectg.	1.071	0.220

C A R A C T E R I S T I C A S R E S I S T E N T E S S E C C I O N E S

Unidades en m.

No.	Area.	Mmto.In.	S.Cortante	M.I.Tors.
1	6.930E-01	2.795E-03	5.775E-01	1.118E-02
2	5.500E-01	5.546E-02	4.583E-01	3.419E-02
3	6.668E-01	2.690E-03	5.557E-01	1.076E-02
4	4.207E+00	4.243E-01	3.506E+00	1.411E+00
5	4.400E-01	1.775E-03	3.667E-01	7.099E-03
6	3.468E-01	1.399E-03	2.890E-01	5.595E-03
7	3.637E-01	1.467E-03	3.031E-01	5.868E-03
8	7.159E-01	2.888E-03	5.966E-01	1.155E-02
9	4.165E-01	1.680E-03	3.471E-01	6.720E-03
10	2.356E-01	9.502E-04	1.963E-01	3.282E-03

N U D O S

Unidades en m.

Nudo.	X.	Y.
1	-4.747	9.225
2	-3.440	6.829
3	-3.440	9.225
4	-2.593	5.276
5	-1.440	3.163
6	-1.440	5.276
7	-1.440	9.225
8	-0.574	1.575
9	0.560	1.575
10	0.560	5.276
11	0.560	9.225
12	2.560	1.575
13	2.560	5.276
14	2.560	9.225

Nudo.	X.	Y.
15	4.560	1.575
16	4.560	5.276
17	4.560	9.225
18	6.560	1.575
19	6.560	5.276
20	6.560	9.225
21	8.560	1.575
22	8.560	5.276
23	8.560	9.225
24	10.560	1.575
25	10.560	5.276
26	10.560	9.225
27	12.560	1.575
28	12.560	5.276
29	12.560	9.225
30	14.560	1.575
31	14.560	5.276
32	14.560	9.225
33	16.560	1.575
34	16.560	5.276
35	16.560	9.225
36	18.560	1.575
37	18.560	5.276
38	18.560	9.225
39	20.560	1.575
40	20.560	5.276
41	20.560	9.225
42	22.560	1.575
43	22.560	5.276
44	22.560	9.225
45	24.560	1.575
46	24.560	5.276
47	24.560	9.225
48	26.560	1.575
49	26.560	5.276
50	26.560	9.225
51	28.560	1.575
52	28.560	5.276
53	28.560	9.225
54	30.560	1.575
55	30.560	5.276
56	30.560	9.225
57	32.560	1.575
58	32.560	5.276
59	32.560	9.225
60	34.560	1.575
61	34.560	5.276
62	34.560	9.225
63	36.560	1.575
64	36.560	5.276

Nudo.	X.	Y.
65	36.560	9.225
66	38.560	1.575
67	38.560	5.276
68	38.560	9.225
69	40.560	1.575
70	40.560	5.276
71	40.560	9.225
72	42.560	1.575
73	42.560	5.276
74	42.560	9.225
75	44.560	1.575
76	44.560	5.276
77	44.560	9.225
78	46.560	1.575
79	46.560	5.276
80	46.560	9.225
81	48.560	1.575
82	48.560	5.276
83	48.560	9.225
84	50.560	1.575
85	50.560	5.276
86	50.560	9.225
87	52.560	1.575
88	52.560	5.276
89	52.560	9.225
90	54.560	1.575
91	54.560	5.276
92	54.560	9.225
93	55.833	9.225
94	56.560	1.575
95	56.560	5.276
96	56.560	8.083
97	58.346	5.276
98	58.560	1.575
99	58.560	4.941
100	60.560	1.575
101	60.560	1.798
102	60.701	1.575

B A R R A S
==========

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
1	8	9	1	1	1	1.13	1964.6
2	92	93	1	1	1	1.27	2206.5
3	5	8	1	2	1	1.81	2486.8
4	101	102	1	2	1	0.26	363.0
5	2	4	1	2	1	1.77	2433.0
6	96	97	1	2	1	3.33	4575.6
7	4	6	1	4	1	1.15	12124.8
8	30	33	1	1	1	2.00	3465.0
9	29	32	1	1	1	2.00	3465.0
10	31	34	1	4	1	2.00	21037.5
11	30	31	1	5	1	3.70	4071.1
12	31	32	1	5	1	3.95	4343.9
13	27	30	1	1	1	2.00	3465.0
14	26	29	1	1	1	2.00	3465.0
15	28	31	1	4	1	2.00	21037.5
16	27	28	1	5	1	3.70	4071.1
17	28	29	1	5	1	3.95	4343.9
18	24	27	1	1	1	2.00	3465.0
19	23	26	1	1	1	2.00	3465.0
20	25	28	1	4	1	2.00	21037.5
21	24	25	1	5	1	3.70	4071.1
22	25	26	1	5	1	3.95	4343.9
23	21	24	1	1	1	2.00	3465.0
24	20	23	1	1	1	2.00	3465.0
25	22	25	1	4	1	2.00	21037.5
26	21	22	1	5	1	3.70	4071.1
27	22	23	1	5	1	3.95	4343.9
28	18	21	1	1	1	2.00	3465.0
29	17	20	1	1	1	2.00	3465.0
30	19	22	1	4	1	2.00	21037.5
31	18	19	1	5	1	3.70	4071.1
32	19	20	1	5	1	3.95	4343.9
33	15	18	1	1	1	2.00	3465.0
34	14	17	1	1	1	2.00	3465.0
35	16	19	1	4	1	2.00	21037.5
36	15	16	1	5	1	3.70	4071.1
37	16	17	1	5	1	3.95	4343.9
38	12	15	1	1	1	2.00	3465.0
39	11	14	1	1	1	2.00	3465.0
40	13	16	1	4	1	2.00	21037.5
41	12	13	1	5	1	3.70	4071.1
42	13	14	1	5	1	3.95	4343.9
43	9	12	1	1	1	2.00	3465.0
44	7	11	1	1	1	2.00	3465.0
45	10	13	1	4	1	2.00	21037.5
46	9	10	1	5	1	3.70	4071.1

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
47	10	11	1	5	1	3.95	4343.9
48	4	5	1	2	1	2.41	3309.9
49	3	7	1	1	1	2.00	3465.0
50	6	10	1	4	1	2.00	21037.5
51	5	6	1	6	1	2.11	1832.2
52	6	7	1	5	1	3.95	4343.9
53	1	2	1	2	1	2.73	3752.1
54	1	3	1	1	1	1.31	2263.8
55	2	3	1	7	1	2.40	2178.4
56	33	36	1	1	1	2.00	3465.0
57	32	35	1	1	1	2.00	3465.0
58	34	37	1	4	1	2.00	21037.5
59	33	34	1	5	1	3.70	4071.1
60	34	35	1	5	1	3.95	4343.9
61	36	39	1	1	1	2.00	3465.0
62	35	38	1	1	1	2.00	3465.0
63	37	40	1	4	1	2.00	21037.5
64	36	37	1	5	1	3.70	4071.1
65	37	38	1	5	1	3.95	4343.9
66	39	42	1	1	1	2.00	3465.0
67	38	41	1	1	1	2.00	3465.0
68	40	43	1	4	1	2.00	21037.5
69	39	40	1	5	1	3.70	4071.1
70	40	41	1	5	1	3.95	4343.9
71	42	45	1	1	1	2.00	3465.0
72	41	44	1	1	1	2.00	3465.0
73	43	46	1	4	1	2.00	21037.5
74	42	43	1	5	1	3.70	4071.1
75	43	44	1	5	1	3.95	4343.9
76	45	48	1	1	1	2.00	3465.0
77	44	47	1	1	1	2.00	3465.0
78	46	49	1	4	1	2.00	21037.5
79	45	46	1	5	1	3.70	4071.1
80	46	47	1	5	1	3.95	4343.9
81	48	51	1	1	1	2.00	3465.0
82	47	50	1	1	1	2.00	3465.0
83	49	52	1	4	1	2.00	21037.5
84	48	49	1	5	1	3.70	4071.1
85	49	50	1	5	1	3.95	4343.9
86	51	54	1	1	1	2.00	3465.0
87	50	53	1	1	1	2.00	3465.0
88	52	55	1	4	1	2.00	21037.5
89	51	52	1	5	1	3.70	4071.1
90	52	53	1	5	1	3.95	4343.9
91	54	57	1	1	1	2.00	3465.0
92	53	56	1	1	1	2.00	3465.0
93	55	58	1	4	1	2.00	21037.5
94	54	55	1	5	1	3.70	4071.1
95	55	56	1	5	1	3.95	4343.9
96	57	60	1	1	1	2.00	3465.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
97	56	59	1	1	1	2.00	3465.0
98	58	61	1	4	1	2.00	21037.5
99	57	58	1	5	1	3.70	4071.1
100	58	59	1	5	1	3.95	4343.9
101	60	63	1	1	1	2.00	3465.0
102	59	62	1	1	1	2.00	3465.0
103	61	64	1	4	1	2.00	21037.5
104	60	61	1	5	1	3.70	4071.1
105	61	62	1	5	1	3.95	4343.9
106	63	66	1	1	1	2.00	3465.0
107	62	65	1	1	1	2.00	3465.0
108	64	67	1	4	1	2.00	21037.5
109	63	64	1	5	1	3.70	4071.1
110	64	65	1	5	1	3.95	4343.9
111	66	69	1	1	1	2.00	3465.0
112	65	68	1	1	1	2.00	3465.0
113	67	70	1	4	1	2.00	21037.5
114	66	67	1	5	1	3.70	4071.1
115	67	68	1	5	1	3.95	4343.9
116	69	72	1	1	1	2.00	3465.0
117	68	71	1	1	1	2.00	3465.0
118	70	73	1	4	1	2.00	21037.5
119	69	70	1	5	1	3.70	4071.1
120	70	71	1	5	1	3.95	4343.9
121	72	75	1	1	1	2.00	3465.0
122	71	74	1	1	1	2.00	3465.0
123	73	76	1	4	1	2.00	21037.5
124	72	73	1	5	1	3.70	4071.1
125	73	74	1	5	1	3.95	4343.9
126	75	78	1	1	1	2.00	3465.0
127	74	77	1	1	1	2.00	3465.0
128	76	79	1	4	1	2.00	21037.5
129	75	76	1	5	1	3.70	4071.1
130	76	77	1	5	1	3.95	4343.9
131	78	81	1	1	1	2.00	3465.0
132	77	80	1	1	1	2.00	3465.0
133	79	82	1	4	1	2.00	21037.5
134	78	79	1	5	1	3.70	4071.1
135	79	80	1	5	1	3.95	4343.9
136	81	84	1	1	1	2.00	3465.0
137	80	83	1	1	1	2.00	3465.0
138	82	85	1	4	1	2.00	21037.5
139	81	82	1	5	1	3.70	4071.1
140	82	83	1	5	1	3.95	4343.9
141	84	87	1	1	1	2.00	3465.0
142	83	86	1	1	1	2.00	3465.0
143	85	88	1	4	1	2.00	21037.5
144	84	85	1	5	1	3.70	4071.1
145	85	86	1	5	1	3.95	4343.9
146	87	90	1	1	1	2.00	3465.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
147	86	89	1	1	1	2.00	3465.0
148	88	91	1	4	1	2.00	21037.5
149	87	88	1	5	1	3.70	4071.1
150	88	89	1	5	1	3.95	4343.9
151	90	94	1	1	1	2.00	3465.0
152	89	92	1	1	1	2.00	3465.0
153	91	95	1	4	1	2.00	21037.5
154	90	91	1	5	1	3.70	4071.1
155	91	92	1	5	1	3.95	4343.9
156	94	98	1	1	1	2.00	3465.0
157	93	96	1	2	1	1.35	1860.5
158	95	97	1	4	1	1.79	18792.6
159	94	95	1	5	1	3.70	4071.1
160	95	96	1	9	1	2.81	2923.5
161	98	100	1	1	1	2.00	3465.0
162	97	99	1	2	1	0.40	546.6
163	98	99	1	5	1	3.37	3702.2
164	100	102	1	1	1	0.14	245.6
165	99	101	1	2	1	3.73	5122.2
166	100	101	1	10	1	0.22	131.2

Peso Total (kg) = 1131373
Clase 1... = Barra Emp.- Emp.
Clase 2... = Barra Art.- Emp.
Clase 3... = Barra Emp.- Art.
Clase 4... = Barra Art.- Art.

CONDICIONES DE CONTORNO

Nudo No.	Giro.s./eje X	Despl.s/eje Z	Giro.s./eje Y
1	24644.00000	Imp.	24644.34570
8	24644.00000	Imp.	24644.00000
31	Imp.	Imp.	Imp.
70	Imp.	Imp.	Imp.
93	24644.34570	Imp.	24644.34570
102	24644.34570	Imp.	24644.34570

C A R G A S G E N E R A L E S

Temperatura de referencia (construcci¢n). = 0

Hip¢tesis.		Temperatura	Peso propio.
1	G	0.000	NO
2	Q-1	0.000	NO
3	T-1	0.000	NO

C A R G A S E N N U D O S

Unidades en Mp. y M*Mp.

Hip¢tesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
1	1	0.000	-9.655	0.000
	2	0.000	-10.398	0.000
	3	0.000	-13.524	0.000
	4	0.000	-5.049	0.000
	5	0.000	-9.238	0.000
	6	0.000	-13.608	0.000
	7	0.000	-19.876	0.000
	8	0.000	-5.218	0.000
	9	0.000	-15.529	0.000
	10	0.000	-21.585	0.000
	11	0.000	-20.942	0.000
	12	0.000	-20.210	0.000
	13	0.000	-22.567	0.000
	14	0.000	-20.942	0.000
	15	0.000	-20.210	0.000
	16	0.000	-22.567	0.000
	17	0.000	-20.942	0.000
	18	0.000	-20.210	0.000
	19	0.000	-22.567	0.000
	20	0.000	-20.942	0.000
	21	0.000	-20.210	0.000
	22	0.000	-22.567	0.000
	23	0.000	-20.942	0.000
	24	0.000	-20.210	0.000
	25	0.000	-22.567	0.000
	26	0.000	-20.942	0.000
	27	0.000	-20.210	0.000
	28	0.000	-22.567	0.000
	29	0.000	-20.942	0.000
	30	0.000	-20.210	0.000
	31	0.000	-22.567	0.000

Hip¢tesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
	32	0.000	-20.942	0.000
	33	0.000	-20.210	0.000
	34	0.000	-22.567	0.000
	35	0.000	-20.942	0.000
	36	0.000	-20.210	0.000
	37	0.000	-22.567	0.000
	38	0.000	-20.942	0.000
	39	0.000	-20.210	0.000
	40	0.000	-22.567	0.000
	41	0.000	-20.942	0.000
	42	0.000	-20.210	0.000
	43	0.000	-22.567	0.000
	44	0.000	-20.942	0.000
	45	0.000	-20.210	0.000
	46	0.000	-22.567	0.000
	47	0.000	-20.942	0.000
	48	0.000	-20.210	0.000
	49	0.000	-22.567	0.000
	50	0.000	-20.942	0.000
	51	0.000	-20.210	0.000
	52	0.000	-22.567	0.000
	53	0.000	-20.942	0.000
	54	0.000	-20.210	0.000
	55	0.000	-22.567	0.000
	56	0.000	-20.942	0.000
	57	0.000	-20.210	0.000
	58	0.000	-22.567	0.000
	59	0.000	-20.942	0.000
	60	0.000	-20.210	0.000
	61	0.000	-22.567	0.000
	62	0.000	-20.942	0.000
	63	0.000	-20.210	0.000
	64	0.000	-22.567	0.000
	65	0.000	-20.942	0.000
	66	0.000	-20.210	0.000
	67	0.000	-22.567	0.000
	68	0.000	-20.942	0.000
	69	0.000	-20.210	0.000
	70	0.000	-22.567	0.000
	71	0.000	-20.942	0.000
	72	0.000	-20.210	0.000
	73	0.000	-22.567	0.000
	74	0.000	-20.942	0.000
	75	0.000	-20.210	0.000
	76	0.000	-22.567	0.000
	77	0.000	-20.942	0.000
	78	0.000	-20.210	0.000
	79	0.000	-22.567	0.000
	80	0.000	-20.942	0.000
	81	0.000	-20.210	0.000

Hipótesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
	82	0.000	-22.567	0.000
	83	0.000	-20.942	0.000
	84	0.000	-20.210	0.000
	85	0.000	-22.567	0.000
	86	0.000	-20.942	0.000
	87	0.000	-20.210	0.000
	88	0.000	-22.567	0.000
	89	0.000	-20.942	0.000
	90	0.000	-20.210	0.000
	91	0.000	-21.893	0.000
	92	0.000	-16.632	0.000
	93	0.000	-4.775	0.000
	94	0.000	-20.141	0.000
	95	0.000	-17.905	0.000
	96	0.000	-10.830	0.000
	97	0.000	-4.630	0.000
	98	0.000	-18.815	0.000
	99	0.000	-9.502	0.000
	100	0.000	-5.327	0.000
	101	0.000	-4.564	0.000
	102	0.000	-5.290	0.000
2	1	0.000	-1.161	0.000
	2	0.000	-1.410	0.000
	3	0.000	-1.834	0.000
	4	0.000	-0.685	0.000
	5	0.000	-1.253	0.000
	6	0.000	-1.845	0.000
	7	0.000	-2.695	0.000
	8	0.000	-0.708	0.000
	9	0.000	-2.106	0.000
	10	0.000	-2.927	0.000
	11	0.000	-2.840	0.000
	12	0.000	-2.740	0.000
	13	0.000	-3.060	0.000
	14	0.000	-2.840	0.000
	15	0.000	-2.740	0.000
	16	0.000	-3.060	0.000
	17	0.000	-2.840	0.000
	18	0.000	-2.740	0.000
	19	0.000	-3.060	0.000
	20	0.000	-2.840	0.000
	21	0.000	-2.740	0.000
	22	0.000	-3.060	0.000
	23	0.000	-2.840	0.000
	24	0.000	-2.740	0.000
	25	0.000	-3.060	0.000
	26	0.000	-2.840	0.000
	27	0.000	-2.740	0.000
	28	0.000	-3.060	0.000
	29	0.000	-2.840	0.000

Hipótesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
	30	0.000	-2.740	0.000
	31	0.000	-3.060	0.000
	32	0.000	-2.840	0.000
	33	0.000	-2.740	0.000
	34	0.000	-3.060	0.000
	35	0.000	-2.840	0.000
	36	0.000	-2.740	0.000
	37	0.000	-3.060	0.000
	38	0.000	-2.840	0.000
	39	0.000	-2.740	0.000
	40	0.000	-3.060	0.000
	41	0.000	-2.840	0.000
	42	0.000	-2.740	0.000
	43	0.000	-3.060	0.000
	44	0.000	-2.840	0.000
	45	0.000	-2.740	0.000
	46	0.000	-3.060	0.000
	47	0.000	-2.840	0.000
	48	0.000	-2.740	0.000
	49	0.000	-3.060	0.000
	50	0.000	-2.840	0.000
	51	0.000	-2.740	0.000
	52	0.000	-3.060	0.000
	53	0.000	-2.840	0.000
	54	0.000	-2.740	0.000
	55	0.000	-3.060	0.000
	56	0.000	-2.840	0.000
	57	0.000	-2.740	0.000
	58	0.000	-3.060	0.000
	59	0.000	-2.840	0.000
	60	0.000	-2.740	0.000
	61	0.000	-3.060	0.000
	62	0.000	-2.840	0.000
	63	0.000	-2.740	0.000
	64	0.000	-3.060	0.000
	65	0.000	-2.840	0.000
	66	0.000	-2.740	0.000
	67	0.000	-3.060	0.000
	68	0.000	-2.840	0.000
	69	0.000	-2.740	0.000
	70	0.000	-3.060	0.000
	71	0.000	-2.840	0.000
	72	0.000	-2.740	0.000
	73	0.000	-3.060	0.000
	74	0.000	-2.840	0.000
	75	0.000	-2.740	0.000
	76	0.000	-3.060	0.000
	77	0.000	-2.840	0.000
	78	0.000	-2.740	0.000
	79	0.000	-3.060	0.000

Hip¢tesis.	Nudo.	Momento X.	Fuerza Z.	Momento Y.
	80	0.000	-2.840	0.000
	81	0.000	-2.740	0.000
	82	0.000	-3.060	0.000
	83	0.000	-2.840	0.000
	84	0.000	-2.740	0.000
	85	0.000	-3.060	0.000
	86	0.000	-2.840	0.000
	87	0.000	-2.740	0.000
	88	0.000	-3.060	0.000
	89	0.000	-2.840	0.000
	90	0.000	-2.740	0.000
	91	0.000	-2.969	0.000
	92	0.000	-2.255	0.000
	93	0.000	-0.647	0.000
	94	0.000	-2.731	0.000
	95	0.000	-2.428	0.000
	96	0.000	-1.469	0.000
	97	0.000	-0.628	0.000
	98	0.000	-2.551	0.000
	99	0.000	-1.288	0.000
	100	0.000	-0.722	0.000
	101	0.000	-0.619	0.000
	102	0.000	-0.570	0.000

C A R G A S E N B A R R A S

Unidades en M. y Mp.

Hip.	Barra.	Carga.	Angl.	P1.	P2.	A1.	A2.
1	1	Punt.	-	1.088		1.118	
	2	Punt.	-	1.090		0.023	
	8	Punt.	-	1.088		1.212	
	8	Punt.	-	1.088		0.125	
	9	Punt.	-	1.090		1.707	
	9	Punt.	-	1.090		0.618	
	13	Punt.	-	1.088		1.037	
	14	Punt.	-	1.090		1.528	
	14	Punt.	-	1.090		0.438	
	18	Punt.	-	1.088		1.949	
	18	Punt.	-	1.088		0.861	
	19	Punt.	-	1.090		1.349	
	19	Punt.	-	1.090		0.259	
	23	Punt.	-	1.088		1.774	
	23	Punt.	-	1.088		0.686	
	24	Punt.	-	1.090		1.170	
	24	Punt.	-	1.090		0.080	
	28	Punt.	-	1.088		1.598	
	28	Punt.	-	1.088		0.511	
	29	Punt.	-	1.090		0.990	

Hip.	Barra.	Carga.	Angl.	P1.	P2.	A1.	A2.
	33	Punt.	-	1.088		1.423	
	33	Punt.	-	1.088		0.335	
	34	Punt.	-	1.090		1.901	
	34	Punt.	-	1.090		0.811	
	38	Punt.	-	1.088		1.247	
	38	Punt.	-	1.088		0.160	
	39	Punt.	-	1.090		1.722	
	39	Punt.	-	1.090		0.632	
	43	Punt.	-	1.088		1.072	
	44	Punt.	-	1.090		1.542	
	44	Punt.	-	1.090		0.453	
	49	Punt.	-	1.090		1.363	
	49	Punt.	-	1.090		0.273	
	54	Punt.	-	1.090		0.491	
	56	Punt.	-	1.088		1.388	
	56	Punt.	-	1.088		0.300	
	57	Punt.	-	1.090		1.886	
	57	Punt.	-	1.090		0.797	
	61	Punt.	-	1.088		1.563	
	61	Punt.	-	1.088		0.475	
	62	Punt.	-	1.090		0.976	
	66	Punt.	-	1.088		1.739	
	66	Punt.	-	1.088		0.651	
	67	Punt.	-	1.090		1.155	
	67	Punt.	-	1.090		0.066	
	71	Punt.	-	1.088		1.914	
	71	Punt.	-	1.088		0.826	
	72	Punt.	-	1.090		1.335	
	72	Punt.	-	1.090		0.245	
	76	Punt.	-	1.088		1.002	
	77	Punt.	-	1.090		1.514	
	77	Punt.	-	1.090		0.424	
	81	Punt.	-	1.088		1.177	
	81	Punt.	-	1.088		0.089	
	82	Punt.	-	1.090		1.693	
	82	Punt.	-	1.090		0.603	
	86	Punt.	-	1.088		1.353	
	86	Punt.	-	1.088		0.265	
	87	Punt.	-	1.090		1.872	
	87	Punt.	-	1.090		0.783	
	91	Punt.	-	1.088		1.528	
	91	Punt.	-	1.088		0.440	
	92	Punt.	-	1.090		0.962	
	96	Punt.	-	1.088		1.704	
	96	Punt.	-	1.088		0.616	
	97	Punt.	-	1.090		1.141	
	97	Punt.	-	1.090		0.051	
	101	Punt.	-	1.088		1.879	
	101	Punt.	-	1.088		0.791	
	102	Punt.	-	1.090		1.320	

Hip.	Barra.	Carga.	Angl.	P1.	P2.	A1.	A2.
	102	Punt.	-	1.090		0.231	
	106	Punt.	-	1.088		0.967	
	107	Punt.	-	1.090		1.499	
	107	Punt.	-	1.090		0.410	
	111	Punt.	-	1.088		1.142	
	111	Punt.	-	1.088		0.054	
	112	Punt.	-	1.090		1.679	
	112	Punt.	-	1.090		0.589	
	116	Punt.	-	1.088		1.318	
	116	Punt.	-	1.088		0.230	
	117	Punt.	-	1.090		1.858	
	117	Punt.	-	1.090		0.768	
	121	Punt.	-	1.088		1.493	
	121	Punt.	-	1.088		0.405	
	122	Punt.	-	1.090		0.948	
	126	Punt.	-	1.088		1.668	
	126	Punt.	-	1.088		0.581	
	127	Punt.	-	1.090		1.127	
	127	Punt.	-	1.090		0.037	
	131	Punt.	-	1.088		1.844	
	131	Punt.	-	1.088		0.756	
	132	Punt.	-	1.090		1.306	
	132	Punt.	-	1.090		0.216	
	136	Punt.	-	1.088		0.932	
	137	Punt.	-	1.090		1.485	
	137	Punt.	-	1.090		0.396	
	141	Punt.	-	1.088		1.107	
	141	Punt.	-	1.088		0.019	
	142	Punt.	-	1.090		1.664	
	142	Punt.	-	1.090		0.575	
	146	Punt.	-	1.088		1.282	
	146	Punt.	-	1.088		0.195	
	147	Punt.	-	1.090		1.844	
	147	Punt.	-	1.090		0.754	
	151	Punt.	-	1.088		1.458	
	151	Punt.	-	1.088		0.370	
	152	Punt.	-	1.090		0.933	
	156	Punt.	-	1.088		1.633	
	156	Punt.	-	1.088		0.546	
	161	Punt.	-	1.088		1.809	
	161	Punt.	-	1.088		0.721	
3	84	Punt.	-	10.000		1.575	
	85	Punt.	-	10.000		2.374	
	89	Punt.	-	10.000		1.575	
	90	Punt.	-	10.000		2.374	
	94	Punt.	-	10.000		1.575	
	95	Punt.	-	10.000		2.374	

C O M B I N A C I O N E S

Comb.	Hip.1	Hip.2	Hip.3
1	1.000	-	-
2	1.000	1.000	1.000

MOVIMIENTOS
==========

..udo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
1	M¡nimos.	0.0005692499	0.0000000000	0.0031410186
	M ximos.	0.0006493995	0.0000000000	0.0035367960
2	M¡nimos.	0.0000210237	-.0058724997	0.0025118140
	M ximos.	0.0000299936	-.0051964633	0.0028293175
3	M¡nimos.	-.0031156559	-.0101733245	0.0095296372
	M ximos.	-.0027821877	-.0090457499	0.0107145831
4	M¡nimos.	-.0014349099	-.0069332798	0.0014008470
	M ximos.	-.0012750324	-.0061325310	0.0015773767
5	M¡nimos.	-.0027184905	-.0035284460	0.0009721017
	M ximos.	-.0024084572	-.0031181225	0.0010900460
6	M¡nimos.	-.0014767642	-.0087214503	0.0013021156
	M ximos.	-.0013122732	-.0077204588	0.0014662737
7	M¡nimos.	-.0097548300	-.0359430090	0.0115747601
	M ximos.	-.0086890347	-.0319654122	0.0130142421
8	M¡nimos.	-.0025623387	0.0000000000	0.0011729446
	M ximos.	-.0022687356	0.0000000000	0.0013149558
9	M¡nimos.	-.0002268987	-.0058291382	0.0069382642
	M ximos.	-.0001869003	-.0051885773	0.0077964682
10	M¡nimos.	-.0014965410	-.0113097066	0.0009269805
	M ximos.	-.0013298974	-.0100191068	0.0010434601
1	M¡nimos.	-.0166568272	-.0597862937	0.0088548753
	M ximos.	-.0148290051	-.0531713516	0.0099558933
12	M¡nimos.	0.0052926950	-.0255222246	0.0088822413
	M ximos.	0.0059289839	-.0227111652	0.0099824890
13	M¡nimos.	-.0014228839	-.0127895307	0.0003444887
	M ximos.	-.0012644395	-.0113345664	0.0003867376
14	M¡nimos.	-.0220680255	-.0759909078	0.0053203516
	M ximos.	-.0196427163	-.0675856844	0.0059799389
15	M¡nimos.	0.0108803110	-.0434468202	0.0064076926
	M ximos.	0.0122083230	-.0386620574	0.0071986690
16	M¡nimos.	-.0012714267	-.0127942609	-.0003894801
	M ximos.	-.0011298117	-.0113416482	-.0003440524
17	M¡nimos.	-.0256725568	-.0846721530	0.0023911686

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
	M ximos.	-.0228492599	-.0753128827	0.0026840023
18	M¡nimos.	0.0152828116	-.0546996370	0.0034411880
	M ximos.	0.0171565227	-.0486823320	0.0038615931
19	M¡nimos.	-.0010683346	-.0112338755	-.0011269948
	M ximos.	-.0009492890	-.0099602789	-.0009984038
20	M¡nimos.	-.0278398376	-.0876744464	0.0003586592
	M ximos.	-.0247764196	-.0779928789	0.0003972987
21	M¡nimos.	0.0183085576	-.0599915683	0.0012963522
	M ximos.	0.0205594655	-.0534022972	0.0014511261
22	M¡nimos.	-.0008321145	-.0083610071	-.0016458690
	M ximos.	-.0007393344	-.0074142343	-.0014589741
23	M¡nimos.	-.0290868636	-.0870375037	-.0009166364
	M ximos.	-.0258815065	-.0774349645	-.0008128997
24	M¡nimos.	0.0202721991	-.0616026931	0.0002168340
	M ximos.	0.0227757413	-.0548397936	0.0002476512
25	M¡nimos.	-.0005728946	-.0047989646	-.0017580964
	M ximos.	-.0005089638	-.0042561125	-.0015589509
26	M¡nimos.	-.0298464559	-.0846700743	-.0013169429
	M ximos.	-.0265437141	-.0753223896	-.0011828552
27	M¡nimos.	0.0215334557	-.0619135983	0.0001080029
	M ximos.	0.0242197569	-.0550843105	0.0001584667
28	M¡nimos.	-.0002951807	-.0015503870	-.0012733882
	M ximos.	-.0002622025	-.0013751722	-.0011294051
29	M¡nimos.	-.0303916745	-.0823859200	-.0008359642
	M ximos.	-.0269953851	-.0732339397	-.0007933064
30	M¡nimos.	0.0222887546	-.0629564673	0.0007415513
	M ximos.	0.0251249727	-.0558814928	0.0009506440
31	M¡nimos.	0.0000000000	0.0000000000	0.0000000000
	M ximos.	0.0000000000	0.0000000000	0.0000000000
32	M¡nimos.	-.0307865907	-.0818707496	0.0002328504
	M ximos.	-.0272806287	-.0725985989	0.0004125033
33	M¡nimos.	0.0225498416	-.0661030933	0.0017141128
	M ximos.	0.0254967939	-.0583429895	0.0021945306
34	M¡nimos.	-.0000901190	-.0026252016	0.0018325589
	M ximos.	-.0000755671	-.0021466508	0.0022503170

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
35	M¡nimos.	-.0308103617	-.0842973813	0.0014903599
	M ximos.	-.0272072181	-.0743419975	0.0019964152
36	M¡nimos.	0.0224741306	-.0715704784	0.0024426265
	M ximos.	0.0255253315	-.0625628605	0.0032016796
37	M¡nimos.	-.0001641249	-.0085861869	0.0027450505
	M ximos.	-.0001369689	-.0069845608	0.0033965632
38	M¡nimos.	-.0306834597	-.0895928293	0.0023769736
	M ximos.	-.0269544683	-.0782880113	0.0032098694
39	M¡nimos.	0.0222964603	-.0785256177	0.0026543310
	M ximos.	0.0255233645	-.0677438751	0.0036535722
10	M¡nimos.	-.0002231721	-.0158692058	0.0029088065
	M ximos.	-.0001853473	-.0128458887	0.0036320647
41	M¡nimos.	-.0306543894	-.0966983810	0.0026614296
	M ximos.	-.0266998801	-.0834197775	0.0037828125
42	M¡nimos.	0.0221367236	-.0858047381	0.0023291502
	M ximos.	0.0256564468	-.0728053153	0.0035191441
43	M¡nimos.	-.0002676098	-.0228429381	0.0024918858
	M ximos.	-.0002212155	-.0184018686	0.0031464889
44	M¡nimos.	-.0308266841	-.1043146178	0.0023586447
	M ximos.	-.0265138987	-.0885225087	0.0037150064
45	M¡nimos.	0.0220315214	-.0922778100	0.0015769419
	M ximos.	0.0259042680	-.0767683908	0.0028277677
46	M¡nimos.	-.0002973884	-.0282539297	0.0016607271
	M ximos.	-.0002448249	-.0226579066	0.0021289273
47	M¡nimos.	-.0311249979	-.1112070307	0.0015999784
	M ximos.	-.0264020637	-.0925412774	0.0030338247
48	M¡nimos.	0.0219833329	-.0966803581	0.0005591916
	M ximos.	0.0259459428	-.0789329633	0.0013632327
49	M¡nimos.	-.0003122539	-.0312291067	0.0005811455
	M ximos.	-.0002563022	-.0249514692	0.0007719238
50	M¡nimos.	-.0311685596	-.1159681082	0.0005595636
	M ximos.	-.0263487585	-.0947333351	0.0014877713
1	M¡nimos.	0.0219893195	-.0974128172	-.0006723871
	M ximos.	0.0260687154	-.0789424554	-.0005476894

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
52	M¡nimos.	-.0003119992	-.0312920026	-.0007130206
	M ximos.	-.0002557041	-.0249513853	-.0005812294
53	M¡nimos.	-.0312838778	-.1168033481	-.0007062363
	M ximos.	-.0263399780	-.0947178677	-.0005772878
54	M¡nimos.	0.0220534243	-.0940664560	-.0025930097
	M ximos.	0.0260310434	-.0768032372	-.0015608121
55	M¡nimos.	-.0002964996	-.0284152105	-.0020963314
	M ximos.	-.0002430427	-.0226576645	-.0016607984
56	M¡nimos.	-.0311987773	-.1132182479	-.0027908110
	M ximos.	-.0263707396	-.0924855918	-.0016251853
57	M¡nimos.	0.0221886057	-.0875148252	-.0037123291
	M ximos.	0.0260941964	-.0728888139	-.0022967043
58	M¡nimos.	-.0002658735	-.0230326615	-.0031483895
	M ximos.	-.0002183028	-.0184015129	-.0024919286
59	M¡nimos.	-.0311825629	-.1061366349	-.0040173628
	M ximos.	-.0264428649	-.0883938149	-.0024063501
60	M¡nimos.	0.0224100761	-.0798171386	-.0038328022
	M ximos.	0.0259843785	-.0679328218	-.0025809912
61	M¡nimos.	-.0002203681	-.0160275828	-.0036574560
	M ximos.	-.0001814662	-.0128454976	-.0029088028
62	M¡nimos.	-.0308881979	-.0977492929	-.0041989884
	M ximos.	-.0265525933	-.0831442922	-.0027602811
63	M¡nimos.	0.0227132197	-.0726590306	-.0032065439
	M ximos.	0.0260166451	-.0629850700	-.0022785559
64	M¡nimos.	-.0001604205	-.0086806901	-.0034302135
	M ximos.	-.0001325699	-.0069842460	-.0027449918
65	M¡nimos.	-.0306329168	-.0897548273	-.0036683544
	M ximos.	-.0266620107	-.0777143985	-.0025793917
66	M¡nimos.	0.0230295658	-.0674498230	-.0019175586
	M ximos.	0.0261676237	-.0592662916	-.0013669974
67	M¡nimos.	-.0000866274	-.0026556670	-.0022755994
	M ximos.	-.0000718481	-.0021465123	-.0018324768
68	M¡nimos.	-.0303559564	-.0834174156	-.0025839903
	M ximos.	-.0266509913	-.0731794015	-.0018847379
69	M¡nimos.	0.0231860504	-.0652693510	-.0002520058

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
	M ximos.	0.0262048580	-.0578145497	-.0000692316
70	M¡nimos.	0.0000000000	0.0000000000	0.0000000000
	M ximos.	0.0000000000	0.0000000000	0.0000000000
71	M¡nimos.	-.0297580138	-.0795300454	-.0012916137
	M ximos.	-.0262804851	-.0703340545	-.0009457972
72	M¡nimos.	0.0230376311	-.0662081391	0.0010343725
	M ximos.	0.0259454753	-.0588516593	0.0011004232
73	M¡nimos.	0.0002029655	-.0016431831	0.0012049591
	M ximos.	0.0002279621	-.0014576802	0.0013583722
74	M¡nimos.	-.0285720732	-.0778037086	-.0005043143
	M ximos.	-.0253337994	-.0690771937	-.0003649746
75	M¡nimos.	0.0227842275	-.0691779554	0.0015622749
	M ximos.	0.0256158337	-.0615556948	0.0017426162
76	M¡nimos.	0.0004151825	-.0051297778	0.0016879438
	M ximos.	0.0004664690	-.0045501105	0.0019033190
77	M¡nimos.	-.0267642047	-.0766861439	-.0007145842
	M ximos.	-.0237822756	-.0681881085	-.0006083936
78	M¡nimos.	0.0224404093	-.0726512223	0.0014228339
	M ximos.	0.0252120495	-.0646519065	0.0016028576
79	M¡nimos.	0.0006339577	-.0090255775	0.0016192991
	M ximos.	0.0007124301	-.0080045722	0.0018264897
80	M¡nimos.	-.0240563322	-.0738754719	-.0021831952
	M ximos.	-.0213990826	-.0657168478	-.0019370246
81	M¡nimos.	0.0218583625	-.0750747249	0.0006219638
	M ximos.	0.0245528203	-.0667976812	0.0007060522
82	M¡nimos.	0.0008528499	-.0122778815	0.0011675893
	M ximos.	0.0009585707	-.0108873192	0.0013176979
83	M¡nimos.	-.0200064145	-.0667049736	-.0049878689
	M ximos.	-.0178069994	-.0593406968	-.0044381204
84	M¡nimos.	0.0207512379	-.0749157518	-.0009578787
	M ximos.	0.0233079176	-.0666449443	-.0008569542
85	M¡nimos.	0.0010591004	-.0142118949	0.0004988456
	M ximos.	0.0011905293	-.0126000810	0.0005640361
5	M¡nimos.	-.0142741185	-.0527090207	-.0087583922
	M ximos.	-.0127120810	-.0468882136	-.0077918987

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
87	M¡nimos.	0.0187093988	-.0705395490	-.0034660180
	M ximos.	0.0210136827	-.0627443194	-.0030858447
88	M¡nimos.	0.0012305500	-.0145212756	-.0002555469
	M ximos.	0.0013833792	-.0128714861	-.0002282035
89	M¡nimos.	-.0071505737	-.0312751867	-.0118232826
	M ximos.	-.0063768262	-.0278220400	-.0105166864
90	M¡nimos.	0.0152912959	-.0601806045	-.0068151616
	M ximos.	0.0171727259	-.0535259210	-.0060631800
91	M¡nimos.	0.0013357815	-.0132410740	-.0009824900
	M ximos.	0.0015017816	-.0117329089	-.0008729841
92	M¡nimos.	-.0002016019	-.0078818267	-.0094961468
	M ximos.	-.0001940940	-.0070135305	-.0084480662
93	M¡nimos.	0.0024549100	0.0000000000	-.0013326756
	M ximos.	0.0027717280	0.0000000000	-.0011892394
94	M¡nimos.	0.0103343455	-.0425601602	-.0103789372
	M ximos.	0.0116020534	-.0378513113	-.0092321094
95	M¡nimos.	0.0013496160	-.0106872469	-.0014976080
	M ximos.	0.0015174127	-.0094646635	-.0013299340
96	M¡nimos.	0.0026896878	-.0026796185	-.0010545552
	M ximos.	0.0030356238	-.0023675845	-.0009417486
97	M¡nimos.	0.0013007801	-.0077401418	-.0017172586
	M ximos.	0.0014625479	-.0068476833	-.0015250039
98	M¡nimos.	0.0046052353	-.0193289816	-.0115916701
	M ximos.	0.0051647346	-.0171878785	-.0103099830
99	M¡nimos.	0.0009434244	-.0077217286	-.0020761178
	M ximos.	0.0010587197	-.0068323235	-.0018433372
100	M¡nimos.	-.0003180319	-.0005844577	-.0045301006
	M ximos.	-.0002740354	-.0005191591	-.0040248767
101	M¡nimos.	-.0006593775	-.0006882186	-.0036220392
	M ximos.	-.0005778720	-.0006093887	-.0032161351
102	M¡nimos.	-.0006273832	0.0000000000	-.0036094619
	M ximos.	-.0005496008	0.0000000000	-.0032051806

ESFUERZOS EN SISTEMA DE EJES LOCAL

Reducci¢n de I.Torsional en hormig¢n: Vigas 0 %, Losas 0 %

BARRA : 1 (8,9) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-16.250	-46.504	-80.368	
	m¡n.	-18.229	-52.297	-90.361	
	Cort.m x.	-16.250	-46.504	-80.368	
	m¡n.	-18.229	-52.297	-90.361	
	Flec.m x.	-16.250	-46.504	-80.368	
	m¡n.	-18.229	-52.297	-90.361	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.13	Tor. m x.	-16.250	-45.416	-27.652	
	m¡n.	-18.229	-51.209	-31.075	
	Cort.m x.	-16.250	-45.416	-27.652	
	m¡n.	-18.229	-51.209	-31.075	
	Flec.m x.	-16.250	-45.416	-27.652	
	m¡n.	-18.229	-51.209	-31.075	

Flecha Tot. el s. m x =0.005829

BARRA : 2 (92,93) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-18.410	48.719	-28.845	
	m¡n.	-20.664	54.943	-32.425	
	Cort.m x.	-20.664	54.943	-32.425	
	m¡n.	-18.410	48.719	-28.845	
	Flec.m x.	-18.410	48.719	-28.845	
	m¡n.	-20.664	54.943	-32.425	

Flecha Tot. el s. m x =0.007882

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.27	Tor. m x.	-18.410	49.808	-92.254	
	m¡n.	-20.664	56.033	-103.763	
	Cort.m x.	-20.664	56.033	-103.763	
	m¡n.	-18.410	49.808	-92.254	
	Flec.m x.	-18.410	49.808	-92.254	
	m¡n.	-20.664	56.033	-103.763	

BARRA : 3 (5,8) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	11.912	78.148	42.145	
	m¡n.	10.624	69.107	36.993	
	Cort.m x.	11.912	78.148	42.145	
	m¡n.	10.624	69.107	36.993	
	Flec.m x.	11.912	78.148	42.145	
	m¡n.	10.624	69.107	36.993	

Flecha Tot. el s. m x =0.003528

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.81	Tor. m x.	11.912	78.148	-99.191	
	m¡n.	10.624	69.107	-87.992	
	Cort.m x.	11.912	78.148	-99.191	
	m¡n.	10.624	69.107	-87.992	
	Flec.m x.	10.624	69.107	-87.992	
	m¡n.	11.912	78.148	-99.191	

BARRA : 4 (101,102) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.949	77.304	-13.526	
	m¡n.	-4.367	87.179	-15.424	
	Cort.m x.	-4.367	87.179	-15.424	
	m¡n.	-3.949	77.304	-13.526	
	Flec.m x.	-3.949	77.304	-13.526	
	m¡n.	-4.367	87.179	-15.424	

Flecha Tot. el s. m x =0.000688

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.26	Tor. m x.	-3.949	77.304	-33.937	
	m¡n.	-4.367	87.179	-38.443	
	Cort.m x.	-4.367	87.179	-38.443	
	m¡n.	-3.949	77.304	-33.937	
	Flec.m x.	-3.949	77.304	-33.937	
	m¡n.	-4.367	87.179	-38.443	

BARRA : 5 (2,4) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-35.203	-54.531	150.623	
	m¡n.	-39.461	-61.578	170.082	
	Cort.m x.	-35.203	-54.531	150.623	
	m¡n.	-39.461	-61.578	170.082	
	Flec.m x.	-39.461	-61.578	170.082	
	m¡n.	-35.203	-54.531	150.623	

Flecha Tot. el s. m x =0.005872

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.77	Tor. m x.	-35.203	-54.531	247.115	
	m¡n.	-39.461	-61.578	279.043	
	Cort.m x.	-35.203	-54.531	247.115	
	m¡n.	-39.461	-61.578	279.043	
	Flec.m x.	-39.461	-61.578	279.043	
	m¡n.	-35.203	-54.531	247.115	

Flecha Tot. el s. m x =0.006933

BARRA : 6 (96,97) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	15.064	-63.802	0.420	
	m¡n.	13.383	-56.481	0.060	
	Cort.m x.	13.383	-56.481	0.060	

m¡n.	15.064	-63.802	0.420	
Flec.m x.	15.064	-63.802	0.420	
m¡n.	13.383	-56.481	0.060	

Flecha Tot. el s. m x =0.002680

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.33	Tor. m x.	15.064	-63.802	212.736	
	m¡n.	13.383	-56.481	188.015	
	Cort.m x.	13.383	-56.481	188.015	
	m¡n.	15.064	-63.802	212.736	
	Flec.m x.	15.064	-63.802	212.736	
	m¡n.	13.383	-56.481	188.015	

Flecha Tot. el s. m x =0.007740

BARRA : 7 (4,6) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	48.782	-118.520	87.084	
	m¡n.	43.405	-104.955	77.599	
	Cort.m x.	43.405	-104.955	77.599	
	m¡n.	48.782	-118.520	87.084	
	Flec.m x.	48.782	-118.520	87.084	
	m¡n.	43.405	-104.955	77.599	

Flecha Tot. el s. m x =0.006933

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.15	Tor. m x.	48.782	-118.520	223.700	
	m¡n.	43.405	-104.955	198.578	
	Cort.m x.	43.405	-104.955	198.578	
	m¡n.	48.782	-118.520	223.700	
	Flec.m x.	48.782	-118.520	223.700	
	m¡n.	43.405	-104.955	198.578	

Flecha Tot. el s. m x =0.008721

BARRA : 8 (30,33) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.155	-1.539	-5.578	
	m¡n.	-1.646	-1.471	-6.952	
	Cort.m x.	-1.646	-1.471	-6.952	
	m¡n.	-1.155	-1.539	-5.578	
	Flec.m x.	-1.155	-1.539	-5.578	
	m¡n.	-1.646	-1.471	-6.952	

Flecha Tot. el s. m x =0.062956

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.155	0.637	-5.398	
	m¡n.	-1.646	0.704	-6.906	
	Cort.m x.	-1.646	0.704	-6.906	
	m¡n.	-1.155	0.637	-5.398	
	Flec.m x.	-1.155	0.637	-5.398	
	m¡n.	-1.646	0.704	-6.906	

Flecha Tot. el s. m x =0.066103

BARRA : 9 (29,32) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.748	0.506	-5.580	
	m¡n.	1.262	0.248	-4.658	
	Cort.m x.	1.748	0.506	-5.580	
	m¡n.	1.262	0.248	-4.658	
	Flec.m x.	1.262	0.248	-4.658	
	m¡n.	1.748	0.506	-5.580	

Flecha Tot. el s. m x =0.082386

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.748	2.686	-8.418	
	m¡n.	1.262	2.427	-6.978	
	Cort.m x.	1.748	2.686	-8.418	

m¡n.	1.262	2.427	-6.978
Flec.m x.	1.262	2.427	-6.978
m¡n.	1.748	2.686	-8.418

Flecha Tot. el s. m x =0.081871

BARRA : 10 (31,34) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	60.536	-484.487	-2298.438	
	m¡n.	50.761	-405.921	-1883.122	
	Cort.m x.	50.761	-405.921	-1883.122	
	m¡n.	60.536	-484.487	-2298.438	
	Flec.m x.	50.761	-405.921	-1883.122	
	m¡n.	60.536	-484.487	-2298.438	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	60.536	-484.487	-1329.464	
	m¡n.	50.761	-405.921	-1071.281	
	Cort.m x.	50.761	-405.921	-1071.281	
	m¡n.	60.536	-484.487	-1329.464	
	Flec.m x.	50.761	-405.921	-1071.281	
	m¡n.	60.536	-484.487	-1329.464	

Flecha Tot. el s. m x =0.002625

BARRA : 11 (30,31) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.444	26.016	2.361	
	m¡n.	1.126	23.129	2.187	
	Cort.m x.	1.444	26.016	2.361	
	m¡n.	1.126	23.129	2.187	
	Flec.m x.	1.444	26.016	2.361	
	m¡n.	1.126	23.129	2.187	

Flecha Tot. el s. m x =0.062956

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	1.444	26.016	-93.923	
	m¡n.	1.126	23.129	-83.414	
	Cort.m x.	1.444	26.016	-93.923	
	m¡n.	1.126	23.129	-83.414	
	Flec.m x.	1.126	23.129	-83.414	
	m¡n.	1.444	26.016	-93.923	

BARRA : 12 (31,32) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.331	-24.398	-94.762	
	m¡n.	-0.587	-27.459	-106.791	
	Cort.m x.	-0.331	-24.398	-94.762	
	m¡n.	-0.587	-27.459	-106.791	
	Flec.m x.	-0.331	-24.398	-94.762	
	m¡n.	-0.587	-27.459	-106.791	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.331	-24.398	1.587	
	m¡n.	-0.587	-27.459	1.643	
	Cort.m x.	-0.331	-24.398	1.587	
	m¡n.	-0.587	-27.459	1.643	
	Flec.m x.	-0.587	-27.459	1.643	
	m¡n.	-0.331	-24.398	1.587	

Flecha Tot. el s. m x =0.081871

BARRA : 13 (27,30) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.343	0.292	-2.820	
	m¡n.	-4.006	0.506	-3.449	
	Cort.m x.	-4.006	0.506	-3.449	
	m¡n.	-3.343	0.292	-2.820	
	Flec.m x.	-3.343	0.292	-2.820	
	m¡n.	-4.006	0.506	-3.449	

Flecha Tot. el s. m x =0.061914

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-3.343	1.380	-4.452	
	m¡n.	-4.006	1.594	-5.508	
	Cort.m x.	-4.006	1.594	-5.508	
	m¡n.	-3.343	1.380	-4.452	
	Flec.m x.	-3.343	1.380	-4.452	
	m¡n.	-4.006	1.594	-5.508	

Flecha Tot. el s. m x =0.062956

BARRA : 14 (26,29) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.413	0.912	-0.917	
	m¡n.	1.999	0.620	-0.724	
	Cort.m x.	2.413	0.912	-0.917	
	m¡n.	1.999	0.620	-0.724	
	Flec.m x.	1.999	0.620	-0.724	
	m¡n.	2.413	0.912	-0.917	

Flecha Tot. el s. m x =0.084670

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	2.413	3.091	-4.957	
	m¡n.	1.999	2.799	-4.180	
	Cort.m x.	2.413	3.091	-4.957	
	m¡n.	1.999	2.799	-4.180	
	Flec.m x.	1.999	2.799	-4.180	
	m¡n.	2.413	3.091	-4.957	

Flecha Tot. el s. m x =0.082386

BARRA : 15 (28,31) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-176.132	317.619	-592.779	
	m¡n.	-198.284	357.982	-668.479	
	Cort.m x.	-198.284	357.982	-668.479	
	m¡n.	-176.132	317.619	-592.779	
	Flec.m x.	-176.132	317.619	-592.779	
	m¡n.	-198.284	357.982	-668.479	

Flecha Tot. el s. m x =0.001550

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-176.132	317.619	-1228.017	
	m¡n.	-198.284	357.982	-1384.443	
	Cort.m x.	-198.284	357.982	-1384.443	
	m¡n.	-176.132	317.619	-1228.017	
	Flec.m x.	-176.132	317.619	-1228.017	
	m¡n.	-198.284	357.982	-1384.443	

BARRA : 16 (27,28) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.174	25.428	2.385	
	m¡n.	1.879	22.672	2.239	
	Cort.m x.	2.174	25.428	2.385	
	m¡n.	1.879	22.672	2.239	
	Flec.m x.	2.174	25.428	2.385	
	m¡n.	1.879	22.672	2.239	

Flecha Tot. el s. m x =0.061914

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	2.174	25.428	-91.724	
	m¡n.	1.879	22.672	-81.669	
	Cort.m x.	2.174	25.428	-91.724	
	m¡n.	1.879	22.672	-81.669	
	Flec.m x.	1.879	22.672	-81.669	
	m¡n.	2.174	25.428	-91.724	

Flecha Tot. el s. m x =0.001550

BARRA : 17 (28,29) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.478	-23.494	-92.041	
	m¡n.	-0.623	-26.367	-103.457	
	Cort.m x.	-0.478	-23.494	-92.041	
	m¡n.	-0.623	-26.367	-103.457	
	Flec.m x.	-0.478	-23.494	-92.041	
	m¡n.	-0.623	-26.367	-103.457	

Flecha Tot. el s. m x =0.001550

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.478	-23.494	0.737	
	m¡n.	-0.623	-26.367	0.665	
	Cort.m x.	-0.478	-23.494	0.737	
	m¡n.	-0.623	-26.367	0.665	
	Flec.m x.	-0.478	-23.494	0.737	
	m¡n.	-0.623	-26.367	0.665	

Flecha Tot. el s. m x =0.082386

BARRA : 18 (24,27) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-5.582	0.578	1.510	
	m¡n.	-6.391	0.808	1.634	
	Cort.m x.	-6.391	0.808	1.634	
	m¡n.	-5.582	0.578	1.510	
	Flec.m x.	-6.391	0.808	1.634	
	m¡n.	-5.582	0.578	1.510	

Flecha Tot. el s. m x =0.061603

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-5.582	2.754	-0.941	
	m¡n.	-6.391	2.983	-1.275	
	Cort.m x.	-6.391	2.983	-1.275	
	m¡n.	-5.582	2.754	-0.941	
	Flec.m x.	-5.582	2.754	-0.941	
	m¡n.	-6.391	2.983	-1.275	

Flecha Tot. el s. m x =0.061914

BARRA : 19 (23,26) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.362	0.750	3.817	
	m¡n.	2.931	0.488	3.393	
	Cort.m x.	3.362	0.750	3.817	
	m¡n.	2.931	0.488	3.393	
	Flec.m x.	3.362	0.750	3.817	
	m¡n.	2.931	0.488	3.393	

Flecha Tot. el s. m x =0.087038

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	3.362	2.929	-0.289	
	m¡n.	2.931	2.667	-0.188	
	Cort.m x.	3.362	2.929	-0.289	
	m¡n.	2.931	2.667	-0.188	
	Flec.m x.	2.931	2.667	-0.188	
	m¡n.	3.362	2.929	-0.289	

Flecha Tot. el s. m x =0.084670

BARRA : 20 (25,28) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-165.759	248.886	-97.365	
	m¡n.	-186.551	280.559	-110.157	
	Cort.m x.	-186.551	280.559	-110.157	
	m¡n.	-165.759	248.886	-97.365	
	Flec.m x.	-165.759	248.886	-97.365	
	m¡n.	-186.551	280.559	-110.157	

Flecha Tot. el s. m x =0.004799

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-165.759	248.886	-595.137	
	m¡n.	-186.551	280.559	-671.276	
	Cort.m x.	-186.551	280.559	-671.276	
	m¡n.	-165.759	248.886	-595.137	
	Flec.m x.	-165.759	248.886	-595.137	
	m¡n.	-186.551	280.559	-671.276	

Flecha Tot. el s. m x =0.001550

BARRA : 21 (24,25) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.046	24.838	3.418	
	m¡n.	2.696	22.143	3.108	
	Cort.m x.	3.046	24.838	3.418	
	m¡n.	2.696	22.143	3.108	
	Flec.m x.	3.046	24.838	3.418	
	m¡n.	2.696	22.143	3.108	

Flecha Tot. el s. m x =0.061603

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	3.046	24.838	-88.507	
	m¡n.	2.696	22.143	-78.841	
	Cort.m x.	3.046	24.838	-88.507	
	m¡n.	2.696	22.143	-78.841	
	Flec.m x.	2.696	22.143	-78.841	
	m¡n.	3.046	24.838	-88.507	

Flecha Tot. el s. m x =0.004799

BARRA : 22 (25,26) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.535	-22.989	-89.851	
	m¡n.	-0.628	-25.799	-100.930	
	Cort.m x.	-0.535	-22.989	-89.851	
	m¡n.	-0.628	-25.799	-100.930	
	Flec.m x.	-0.535	-22.989	-89.851	
	m¡n.	-0.628	-25.799	-100.930	

Flecha Tot. el s. m x =0.004799

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.535	-22.989	0.932	
	m¡n.	-0.628	-25.799	0.949	
	Cort.m x.	-0.535	-22.989	0.932	
	m¡n.	-0.628	-25.799	0.949	
	Flec.m x.	-0.628	-25.799	0.949	
	m¡n.	-0.535	-22.989	0.932	

Flecha Tot. el s. m x =0.084670

BARRA : 23 (21,24) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-8.690	0.335	6.551	
	m¡n.	-9.808	0.519	7.394	
	Cort.m x.	-9.808	0.519	7.394	
	m¡n.	-8.690	0.335	6.551	
	Flec.m x.	-9.808	0.519	7.394	
	m¡n.	-8.690	0.335	6.551	

Flecha Tot. el s. m x =0.059992

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-8.690	2.510	4.206	
	m¡n.	-9.808	2.695	4.680	
	Cort.m x.	-9.808	2.695	4.680	
	m¡n.	-8.690	2.510	4.206	
	Flec.m x.	-9.808	2.695	4.680	
	m¡n.	-8.690	2.510	4.206	

Flecha Tot. el s. m x =0.061603

BARRA : 24 (20,23) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	5.519	0.318	8.488	
	m¡n.	4.891	0.104	7.518	
	Cort.m x.	5.519	0.318	8.488	
	m¡n.	4.891	0.104	7.518	
	Flec.m x.	5.519	0.318	8.488	
	m¡n.	4.891	0.104	7.518	

Flecha Tot. el s. m x =0.087674

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	5.519	2.498	4.855	
	m¡n.	4.891	2.283	4.313	
	Cort.m x.	5.519	2.498	4.855	
	m¡n.	4.891	2.283	4.313	
	Flec.m x.	5.519	2.498	4.855	
	m¡n.	4.891	2.283	4.313	

Flecha Tot. el s. m x =0.087038

BARRA : 25 (22,25) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-154.749	181.187	261.777	
	m¡n.	-174.128	204.296	294.761	
	Cort.m x.	-174.128	204.296	294.761	
	m¡n.	-154.749	181.187	261.777	
	Flec.m x.	-174.128	204.296	294.761	
	m¡n.	-154.749	181.187	261.777	

Flecha Tot. el s. m x =0.008361

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-154.749	181.187	-100.597	
	m¡n.	-174.128	204.296	-113.830	
	Cort.m x.	-174.128	204.296	-113.830	
	m¡n.	-154.749	181.187	-100.597	
	Flec.m x.	-154.749	181.187	-100.597	
	m¡n.	-174.128	204.296	-113.830	

Flecha Tot. el s. m x =0.004799

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BARRA : 26 (21,22) Sec. 5 Rect. /200,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	4.703	23.902	5.252	
	m¡n.	4.184	21.296	4.700	
	Cort.m x.	4.703	23.902	5.252	
	m¡n.	4.184	21.296	4.700	
	Flec.m x.	4.703	23.902	5.252	
	m¡n.	4.184	21.296	4.700	

Flecha Tot. el s. m x =0.059992

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	4.703	23.902	-83.209	
	m¡n.	4.184	21.296	-74.116	
	Cort.m x.	4.703	23.902	-83.209	
	m¡n.	4.184	21.296	-74.116	
	Flec.m x.	4.184	21.296	-74.116	
	m¡n.	4.703	23.902	-83.209	

Flecha Tot. el s. m x =0.008361

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BARRA : 27 (22,23) Sec. 5 Rect. /200,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.919	-22.738	-87.831	
	m¡n.	-1.038	-25.529	-98.659	
	Cort.m x.	-0.919	-22.738	-87.831	
	m¡n.	-1.038	-25.529	-98.659	
	Flec.m x.	-0.919	-22.738	-87.831	
	m¡n.	-1.038	-25.529	-98.659	

Flecha Tot. el s. m x =0.008361

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.919	-22.738	1.960	
	m¡n.	-1.038	-25.529	2.157	
	Cort.m x.	-0.919	-22.738	1.960	
	m¡n.	-1.038	-25.529	2.157	
	Flec.m x.	-1.038	-25.529	2.157	
	m¡n.	-0.919	-22.738	1.960	

Flecha Tot. el s. m x =0.087038

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BARRA : 28 (18,21) Sec. 1 Rect. /315,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-13.391	-0.755	11.283	
	m¡n.	-15.060	-0.705	12.743	
	Cort.m x.	-15.060	-0.705	12.743	
	m¡n.	-13.391	-0.755	11.283	
	Flec.m x.	-15.060	-0.705	12.743	
	m¡n.	-13.391	-0.755	11.283	

Flecha Tot. el s. m x =0.054700

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-13.391	1.421	10.735	
	m¡n.	-15.060	1.470	12.097	
	Cort.m x.	-15.060	1.470	12.097	
	m¡n.	-13.391	1.421	10.735	
	Flec.m x.	-15.060	1.470	12.097	
	m¡n.	-13.391	1.421	10.735	

Flecha Tot. el s. m x =0.059992

BARRA : 29 (17,20) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	9.591	0.664	13.086	
	m¡n.	8.529	0.523	11.594	
	Cort.m x.	9.591	0.664	13.086	
	m¡n.	8.529	0.523	11.594	
	Flec.m x.	9.591	0.664	13.086	
	m¡n.	8.529	0.523	11.594	

Flecha Tot. el s. m x =0.084672

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	9.591	1.754	10.658	
	m¡n.	8.529	1.612	9.449	
	Cort.m x.	9.591	1.754	10.658	
	m¡n.	8.529	1.612	9.449	
	Flec.m x.	9.591	1.754	10.658	
	m¡n.	8.529	1.612	9.449	

Flecha Tot. el s. m x =0.087674

BARRA : 30 (19,22) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-141.035	114.586	485.845	
	m¡n.	-158.678	129.237	547.494	
	Cort.m x.	-158.678	129.237	547.494	
	m¡n.	-141.035	114.586	485.845	
	Flec.m x.	-158.678	129.237	547.494	
	m¡n.	-141.035	114.586	485.845	

Flecha Tot. el s. m x =0.011234

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-141.035	114.586	256.674	
	m¡n.	-158.678	129.237	289.020	
	Cort.m x.	-158.678	129.237	289.020	
	m¡n.	-141.035	114.586	256.674	
	Flec.m x.	-158.678	129.237	289.020	
	m¡n.	-141.035	114.586	256.674	

Flecha Tot. el s. m x =0.008361

BARRA : 31 (18,19) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	7.575	21.641	6.839	
	m¡n.	6.741	19.276	6.093	
	Cort.m x.	7.575	21.641	6.839	
	m¡n.	6.741	19.276	6.093	
	Flec.m x.	7.575	21.641	6.839	
	m¡n.	6.741	19.276	6.093	

Flecha Tot. el s. m x =0.054700

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	7.575	21.641	-73.255	
	m¡n.	6.741	19.276	-65.247	
	Cort.m x.	7.575	21.641	-73.255	
	m¡n.	6.741	19.276	-65.247	
	Flec.m x.	6.741	19.276	-65.247	
	m¡n.	7.575	21.641	-73.255	

Flecha Tot. el s. m x =0.011234

BARRA : 32 (19,20) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.931	-22.450	-85.018	
	m¡n.	-2.169	-25.217	-95.508	
	Cort.m x.	-1.931	-22.450	-85.018	
	m¡n.	-2.169	-25.217	-95.508	
	Flec.m x.	-1.931	-22.450	-85.018	
	m¡n.	-2.169	-25.217	-95.508	

Flecha Tot. el s. m x =0.011234

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-1.931	-22.450	3.638	
	m¡n.	-2.169	-25.217	4.073	
	Cort.m x.	-1.931	-22.450	3.638	
	m¡n.	-2.169	-25.217	4.073	
	Flec.m x.	-2.169	-25.217	4.073	
	m¡n.	-1.931	-22.450	3.638	

Flecha Tot. el s. m x =0.087674

BARRA : 33 (15,18) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-19.484	-3.865	12.734	
	m¡n.	-21.899	-4.190	14.376	
	Cort.m x.	-19.484	-3.865	12.734	
	m¡n.	-21.899	-4.190	14.376	
	Flec.m x.	-21.899	-4.190	14.376	
	m¡n.	-19.484	-3.865	12.734	

Flecha Tot. el s. m x =0.043447

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-19.484	-1.689	18.024	
	m¡n.	-21.899	-2.015	20.318	
	Cort.m x.	-19.484	-1.689	18.024	
	m¡n.	-21.899	-2.015	20.318	
	Flec.m x.	-21.899	-2.015	20.318	
	m¡n.	-19.484	-1.689	18.024	

Flecha Tot. el s. m x =0.054700

BARRA : 34 (14,17) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	15.952	-0.972	16.920	
	m¡n.	14.191	-0.947	14.997	
	Cort.m x.	14.191	-0.947	14.997	
	m¡n.	15.952	-0.972	16.920	
	Flec.m x.	15.952	-0.972	16.920	
	m¡n.	14.191	-0.947	14.997	

Flecha Tot. el s. m x =0.075991

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	15.952	1.208	17.459	
	m¡n.	14.191	1.233	15.487	
	Cort.m x.	14.191	1.233	15.487	
	m¡n.	15.952	1.208	17.459	
	Flec.m x.	15.952	1.208	17.459	
	m¡n.	14.191	1.233	15.487	

Flecha Tot. el s. m x =0.084672

BARRA : 35 (16,19) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-121.264	50.292	577.756	
	m¡n.	-136.425	56.751	651.253	
	Cort.m x.	-136.425	56.751	651.253	
	m¡n.	-121.264	50.292	577.756	
	Flec.m x.	-136.425	56.751	651.253	
	m¡n.	-121.264	50.292	577.756	

Flecha Tot. el s. m x =0.012794

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-121.264	50.292	477.172	
	m¡n.	-136.425	56.751	537.750	
	Cort.m x.	-136.425	56.751	537.750	
	m¡n.	-121.264	50.292	477.172	
	Flec.m x.	-136.425	56.751	537.750	
	m¡n.	-121.264	50.292	477.172	

Flecha Tot. el s. m x =0.011234

BARRA : 36 (15,16) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	11.522	16.457	5.891	
	m¡n.	10.252	14.660	5.245	
	Cort.m x.	11.522	16.457	5.891	
	m¡n.	10.252	14.660	5.245	
	Flec.m x.	11.522	16.457	5.891	
	m¡n.	10.252	14.660	5.245	

Flecha Tot. el s. m x =0.043447

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	11.522	16.457	-55.015	
	m¡n.	10.252	14.660	-49.013	
	Cort.m x.	11.522	16.457	-55.015	
	m¡n.	10.252	14.660	-49.013	
	Flec.m x.	10.252	14.660	-49.013	
	m¡n.	11.522	16.457	-55.015	

Flecha Tot. el s. m x =0.012794

BARRA : 37 (16,17) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.892	-21.652	-79.843	
	m¡n.	-4.374	-24.325	-89.700	
	Cort.m x.	-3.892	-21.652	-79.843	
	m¡n.	-4.374	-24.325	-89.700	
	Flec.m x.	-3.892	-21.652	-79.843	
	m¡n.	-4.374	-24.325	-89.700	

Flecha Tot. el s. m x =0.012794

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-3.892	-21.652	5.662	
	m¡n.	-4.374	-24.325	6.361	
	Cort.m x.	-3.892	-21.652	5.662	
	m¡n.	-4.374	-24.325	6.361	
	Flec.m x.	-4.374	-24.325	6.361	
	m¡n.	-3.892	-21.652	5.662	

Flecha Tot. el s. m x =0.084672

BARRA : 38 (12,15) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-24.728	-11.590	2.627	
	m¡n.	-27.790	-12.860	2.999	
	Cort.m x.	-24.728	-11.590	2.627	
	m¡n.	-27.790	-12.860	2.999	
	Flec.m x.	-27.790	-12.860	2.999	
	m¡n.	-24.728	-11.590	2.627	

Flecha Tot. el s. m x =0.025522

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-24.728	-9.415	22.986	
	m¡n.	-27.790	-10.684	25.898	
	Cort.m x.	-24.728	-9.415	22.986	
	m¡n.	-27.790	-10.684	25.898	
	Flec.m x.	-27.790	-10.684	25.898	
	m¡n.	-24.728	-9.415	22.986	

Flecha Tot. el s. m x =0.043447

BARRA : 39 (11,14) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	23.948	-5.028	16.619	
	m¡n.	21.303	-4.571	14.731	
	Cort.m x.	21.303	-4.571	14.731	
	m¡n.	23.948	-5.028	16.619	
	Flec.m x.	23.948	-5.028	16.619	
	m¡n.	21.303	-4.571	14.731	

Flecha Tot. el s. m x =0.059786

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	23.948	-2.848	24.879	
	m¡n.	21.303	-2.391	22.078	
	Cort.m x.	21.303	-2.391	22.078	
	m¡n.	23.948	-2.848	24.879	
	Flec.m x.	23.948	-2.848	24.879	
	m¡n.	21.303	-2.391	22.078	

Flecha Tot. el s. m x =0.075991

BARRA : 40 (13,16) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-90.435	-8.588	546.435	
	m¡n.	-101.740	-9.658	616.040	
	Cort.m x.	-90.435	-8.588	546.435	
	m¡n.	-101.740	-9.658	616.040	
	Flec.m x.	-101.740	-9.658	616.040	
	m¡n.	-90.435	-8.588	546.435	

Flecha Tot. el s. m x =0.012790

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-90.435	-8.588	563.612	
	m¡n.	-101.740	-9.658	635.357	
	Cort.m x.	-90.435	-8.588	563.612	
	m¡n.	-101.740	-9.658	635.357	
	Flec.m x.	-101.740	-9.658	635.357	
	m¡n.	-90.435	-8.588	563.612	

Flecha Tot. el s. m x =0.012794

BARRA : 41 (12,13) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	14.571	6.944	-0.546	
	m¡n.	12.964	6.198	-0.478	
	Cort.m x.	14.571	6.944	-0.546	
	m¡n.	12.964	6.198	-0.478	
	Flec.m x.	12.964	6.198	-0.478	
	m¡n.	14.571	6.944	-0.546	

Flecha Tot. el s. m x =0.025522

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	14.571	6.944	-26.246	
	m¡n.	12.964	6.198	-23.418	
	Cort.m x.	14.571	6.944	-26.246	
	m¡n.	12.964	6.198	-23.418	
	Flec.m x.	12.964	6.198	-23.418	
	m¡n.	14.571	6.944	-26.246	

Flecha Tot. el s. m x =0.012790

BARRA : 42 (13,14) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-7.081	-19.497	-69.882	
	m¡n.	-7.960	-21.905	-78.507	
	Cort.m x.	-7.081	-19.497	-69.882	
	m¡n.	-7.960	-21.905	-78.507	
	Flec.m x.	-7.081	-19.497	-69.882	
	m¡n.	-7.960	-21.905	-78.507	

Flecha Tot. el s. m x =0.012790

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-7.081	-19.497	7.113	
	m¡n.	-7.960	-21.905	7.996	
	Cort.m x.	-7.081	-19.497	7.113	
	m¡n.	-7.960	-21.905	7.996	
	Flec.m x.	-7.960	-21.905	7.996	
	m¡n.	-7.081	-19.497	7.113	

Flecha Tot. el s. m x =0.075991

BARRA : 43 (9,12) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-24.250	-26.690	-36.779	
	m¡n.	-27.243	-29.954	-41.329	
	Cort.m x.	-24.250	-26.690	-36.779	
	m¡n.	-27.243	-29.954	-41.329	
	Flec.m x.	-24.250	-26.690	-36.779	
	m¡n.	-27.243	-29.954	-41.329	

Flecha Tot. el s. m x =0.005829

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-24.250	-25.602	15.591	
	m¡n.	-27.243	-28.867	17.570	
	Cort.m x.	-24.250	-25.602	15.591	
	m¡n.	-27.243	-28.867	17.570	
	Flec.m x.	-27.243	-28.867	17.570	
	m¡n.	-24.250	-25.602	15.591	

Flecha Tot. el s. m x =0.025522

BARRA : 44 (7,11) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	30.545	-14.535	2.416	
	m¡n.	27.173	-13.044	2.110	
	Cort.m x.	27.173	-13.044	2.110	
	m¡n.	30.545	-14.535	2.416	
	Flec.m x.	30.545	-14.535	2.416	
	m¡n.	27.173	-13.044	2.110	

Flecha Tot. el s. m x =0.035943

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	30.545	-12.356	29.302	
	m¡n.	27.173	-10.865	26.013	
	Cort.m x.	27.173	-10.865	26.013	
	m¡n.	30.545	-12.356	29.302	
	Flec.m x.	30.545	-12.356	29.302	
	m¡n.	27.173	-10.865	26.013	

Flecha Tot. el s. m x =0.059786

BARRA : 45 (10,13) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-43.971	-56.851	412.688	
	m¡n.	-49.478	-64.135	465.240	
	Cort.m x.	-43.971	-56.851	412.688	
	m¡n.	-49.478	-64.135	465.240	
	Flec.m x.	-49.478	-64.135	465.240	
	m¡n.	-43.971	-56.851	412.688	

Flecha Tot. el s. m x =0.011310

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-43.971	-56.851	526.390	
	m¡n.	-49.478	-64.135	593.510	
	Cort.m x.	-43.971	-56.851	526.390	
	m¡n.	-49.478	-64.135	593.510	
	Flec.m x.	-49.478	-64.135	593.510	
	m¡n.	-43.971	-56.851	526.390	

Flecha Tot. el s. m x =0.012790

BARRA : 46 (9,10) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	10.254	-3.621	-9.014	
	m¡n.	9.128	-3.198	-8.001	
	Cort.m x.	9.128	-3.198	-8.001	
	m¡n.	10.254	-3.621	-9.014	
	Flec.m x.	9.128	-3.198	-8.001	
	m¡n.	10.254	-3.621	-9.014	

Flecha Tot. el s. m x =0.005829

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	10.254	-3.621	4.387	
	m¡n.	9.128	-3.198	3.835	
	Cort.m x.	9.128	-3.198	3.835	
	m¡n.	10.254	-3.621	4.387	
	Flec.m x.	10.254	-3.621	4.387	
	m¡n.	9.128	-3.198	3.835	

Flecha Tot. el s. m x =0.011310

BARRA : 47 (10,11) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-11.282	-14.648	-51.974	
	m¡n.	-12.683	-16.453	-58.376	
	Cort.m x.	-11.282	-14.648	-51.974	
	m¡n.	-12.683	-16.453	-58.376	
	Flec.m x.	-11.282	-14.648	-51.974	
	m¡n.	-12.683	-16.453	-58.376	

Flecha Tot. el s. m x =0.011310

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-11.282	-14.648	5.869	
	m¡n.	-12.683	-16.453	6.598	
	Cort.m x.	-11.282	-14.648	5.869	
	m¡n.	-12.683	-16.453	6.598	
	Flec.m x.	-12.683	-16.453	6.598	
	m¡n.	-11.282	-14.648	5.869	

Flecha Tot. el s. m x =0.059786

BARRA : 48 (4,5) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	13.630	62.675	194.518	
	m¡n.	12.136	55.472	171.851	
	Cort.m x.	13.630	62.675	194.518	
	m¡n.	12.136	55.472	171.851	
	Flec.m x.	13.630	62.675	194.518	
	m¡n.	12.136	55.472	171.851	

Flecha Tot. el s. m x =0.006933

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.41	Tor. m x.	13.630	62.675	43.647	
	m¡n.	12.136	55.472	38.320	
	Cort.m x.	13.630	62.675	43.647	
	m¡n.	12.136	55.472	38.320	
	Flec.m x.	13.630	62.675	43.647	
	m¡n.	12.136	55.472	38.320	

Flecha Tot. el s. m x =0.003528

BARRA : 49 (3,7) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	29.382	-32.715	-44.006	
	m¡n.	26.141	-29.242	-39.181	
	Cort.m x.	26.141	-29.242	-39.181	
	m¡n.	29.382	-32.715	-44.006	
	Flec.m x.	26.141	-29.242	-39.181	
	m¡n.	29.382	-32.715	-44.006	

Flecha Tot. el s. m x =0.010173

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	29.382	-30.536	18.850	
	m¡n.	26.141	-27.063	16.728	
	Cort.m x.	26.141	-27.063	16.728	
	m¡n.	29.382	-30.536	18.850	
	Flec.m x.	29.382	-30.536	18.850	
	m¡n.	26.141	-27.063	16.728	

Flecha Tot. el s. m x =0.035943

BARRA : 50 (6,10) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	13.285	-101.479	239.345	
	m¡n.	11.839	-89.886	212.505	
	Cort.m x.	11.839	-89.886	212.505	
	m¡n.	13.285	-101.479	239.345	
	Flec.m x.	13.285	-101.479	239.345	
	m¡n.	11.839	-89.886	212.505	

Flecha Tot. el s. m x =0.008721

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	13.285	-101.479	442.303	
	m¡n.	11.839	-89.886	392.278	
	Cort.m x.	11.839	-89.886	392.278	
	m¡n.	13.285	-101.479	442.303	
	Flec.m x.	13.285	-101.479	442.303	
	m¡n.	11.839	-89.886	392.278	

Flecha Tot. el s. m x =0.011310

BARRA : 51 (5,6) Sec. 6 Rect. /158,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.692	-4.397	-1.889	
	m¡n.	-0.789	-4.982	-2.141	
	Cort.m x.	-0.692	-4.397	-1.889	
	m¡n.	-0.789	-4.982	-2.141	
	Flec.m x.	-0.692	-4.397	-1.889	
	m¡n.	-0.789	-4.982	-2.141	

Flecha Tot. el s. m x =0.003528

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.11	Tor. m x.	-0.692	-4.397	7.403	
	m¡n.	-0.789	-4.982	8.388	
	Cort.m x.	-0.692	-4.397	7.403	
	m¡n.	-0.789	-4.982	8.388	
	Flec.m x.	-0.789	-4.982	8.388	
	m¡n.	-0.692	-4.397	7.403	

Flecha Tot. el s. m x =0.008721

BARRA : 52 (6,7) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-14.619	-5.857	-24.163	
	m¡n.	-16.434	-6.570	-27.110	
	Cort.m x.	-14.619	-5.857	-24.163	
	m¡n.	-16.434	-6.570	-27.110	
	Flec.m x.	-14.619	-5.857	-24.163	
	m¡n.	-16.434	-6.570	-27.110	

Flecha Tot. el s. m x =0.008721

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-14.619	-5.857	-1.032	
	m¡n.	-16.434	-6.570	-1.163	
	Cort.m x.	-14.619	-5.857	-1.032	
	m¡n.	-16.434	-6.570	-1.163	
	Flec.m x.	-14.619	-5.857	-1.032	
	m¡n.	-16.434	-6.570	-1.163	

Flecha Tot. el s. m x =0.035943

BARRA : 53 (1,2) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-18.655	-67.504	-31.664	
	m¡n.	-20.883	-76.260	-35.890	
	Cort.m x.	-18.655	-67.504	-31.664	
	m¡n.	-20.883	-76.260	-35.890	
	Flec.m x.	-18.655	-67.504	-31.664	
	m¡n.	-20.883	-76.260	-35.890	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.73	Tor. m x.	-18.655	-67.504	152.540	
	m¡n.	-20.883	-76.260	172.207	
	Cort.m x.	-18.655	-67.504	152.540	
	m¡n.	-20.883	-76.260	172.207	
	Flec.m x.	-20.883	-76.260	172.207	
	m¡n.	-18.655	-67.504	152.540	

Flecha Tot. el s. m x =0.005872

BARRA : 54 (1,3) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	25.504	-46.289	-88.310	
	m¡n.	22.702	-41.281	-78.623	
	Cort.m x.	22.702	-41.281	-78.623	
	m¡n.	25.504	-46.289	-88.310	
	Flec.m x.	22.702	-41.281	-78.623	
	m¡n.	25.504	-46.289	-88.310	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.31	Tor. m x.	25.504	-45.199	-28.714	
	m¡n.	22.702	-40.191	-25.571	
	Cort.m x.	22.702	-40.191	-25.571	
	m¡n.	25.504	-45.199	-28.714	
	Flec.m x.	22.702	-40.191	-25.571	
	m¡n.	25.504	-45.199	-28.714	

Flecha Tot. el s. m x =0.010173

BARRA : 55 (2,3) Sec. 7 Rect. /165,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-13.610	-2.575	-9.608	
	m¡n.	-15.292	-2.873	-10.762	
	Cort.m x.	-13.610	-2.575	-9.608	
	m¡n.	-15.292	-2.873	-10.762	
	Flec.m x.	-13.610	-2.575	-9.608	

	m¡n.	-15.292	-2.873	-10.762

Flecha Tot. el s. m x =0.005872

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.40	Tor. m x.	-13.610	-2.575	-3.439	
	m¡n.	-15.292	-2.873	-3.879	
	Cort.m x.	-13.610	-2.575	-3.439	
	m¡n.	-15.292	-2.873	-3.879	
	Flec.m x.	-13.610	-2.575	-3.439	
	m¡n.	-15.292	-2.873	-3.879	

Flecha Tot. el s. m x =0.010173

BARRA : 56 (33,36) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.335	-2.237	-5.218	
	m¡n.	-0.126	-2.361	-6.822	
	Cort.m x.	0.335	-2.237	-5.218	
	m¡n.	-0.126	-2.361	-6.822	
	Flec.m x.	0.335	-2.237	-5.218	
	m¡n.	-0.126	-2.361	-6.822	

Flecha Tot. el s. m x =0.066103

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.335	-0.062	-3.259	
	m¡n.	-0.126	-0.185	-4.615	
	Cort.m x.	0.335	-0.062	-3.259	
	m¡n.	-0.126	-0.185	-4.615	
	Flec.m x.	0.335	-0.062	-3.259	
	m¡n.	-0.126	-0.185	-4.615	

Flecha Tot. el s. m x =0.071570

BARRA : 57 (32,35) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.105	-0.991	-9.005	
	m¡n.	-0.325	-1.029	-7.310	
	Cort.m x.	0.105	-0.991	-9.005	
	m¡n.	-0.325	-1.029	-7.310	
	Flec.m x.	-0.325	-1.029	-7.310	
	m¡n.	0.105	-0.991	-9.005	

Flecha Tot. el s. m x =0.081871

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.105	1.188	-8.457	
	m¡n.	-0.325	1.150	-6.686	
	Cort.m x.	0.105	1.188	-8.457	
	m¡n.	-0.325	1.150	-6.686	
	Flec.m x.	-0.325	1.150	-6.686	
	m¡n.	0.105	1.188	-8.457	

Flecha Tot. el s. m x =0.084297

BARRA : 58 (34,37) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	49.713	-405.937	-1329.910	
	m¡n.	41.246	-336.401	-1071.948	
	Cort.m x.	41.246	-336.401	-1071.948	
	m¡n.	49.713	-405.937	-1329.910	
	Flec.m x.	41.246	-336.401	-1071.948	
	m¡n.	49.713	-405.937	-1329.910	

Flecha Tot. el s. m x =0.002625

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	49.713	-405.937	-518.037	
	m¡n.	41.246	-336.401	-399.146	
	Cort.m x.	41.246	-336.401	-399.146	

m¡n.	49.713	-405.937	-518.037
Flec.m x.	41.246	-336.401	-399.146
m¡n.	49.713	-405.937	-518.037

Flecha Tot. el s. m x =0.008586

BARRA : 59 (33,34) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.085	26.016	1.519	
	m¡n.	-0.180	23.084	1.491	
	Cort.m x.	-0.085	26.016	1.519	
	m¡n.	-0.180	23.084	1.491	
	Flec.m x.	-0.085	26.016	1.519	
	m¡n.	-0.180	23.084	1.491	

Flecha Tot. el s. m x =0.066103

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.085	26.016	-94.765	
	m¡n.	-0.180	23.084	-83.944	
	Cort.m x.	-0.085	26.016	-94.765	
	m¡n.	-0.180	23.084	-83.944	
	Flec.m x.	-0.180	23.084	-83.944	
	m¡n.	-0.085	26.016	-94.765	

Flecha Tot. el s. m x =0.002625

BARRA : 60 (34,35) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.487	-23.868	-93.459	
	m¡n.	0.361	-26.907	-105.589	
	Cort.m x.	0.487	-23.868	-93.459	
	m¡n.	0.361	-26.907	-105.589	
	Flec.m x.	0.487	-23.868	-93.459	
	m¡n.	0.361	-26.907	-105.589	

Flecha Tot. el s. m x =0.002625

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.487	-23.868	0.794	
	m¡n.	0.361	-26.907	0.667	
	Cort.m x.	0.487	-23.868	0.794	
	m¡n.	0.361	-26.907	0.667	
	Flec.m x.	0.487	-23.868	0.794	
	m¡n.	0.361	-26.907	0.667	

Flecha Tot. el s. m x =0.084297

BARRA : 61 (36,39) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.786	-2.360	-2.800	
	m¡n.	0.009	-2.603	-4.319	
	Cort.m x.	0.786	-2.360	-2.800	
	m¡n.	0.009	-2.603	-4.319	
	Flec.m x.	0.786	-2.360	-2.800	
	m¡n.	0.009	-2.603	-4.319	

Flecha Tot. el s. m x =0.071570

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.786	-0.184	-0.214	
	m¡n.	0.009	-0.428	-1.246	
	Cort.m x.	0.786	-0.184	-0.214	
	m¡n.	0.009	-0.428	-1.246	
	Flec.m x.	0.786	-0.184	-0.214	
	m¡n.	0.009	-0.428	-1.246	

Flecha Tot. el s. m x =0.078526

BARRA : 62 (35,38) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.562	-1.937	-8.096	
	m¡n.	-1.119	-1.776	-6.199	
	Cort.m x.	-1.119	-1.776	-6.199	
	m¡n.	-0.562	-1.937	-8.096	
	Flec.m x.	-1.119	-1.776	-6.199	
	m¡n.	-0.562	-1.937	-8.096	

Flecha Tot. el s. m x =0.084297

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.562	-0.848	-5.337	
	m¡n.	-1.119	-0.686	-3.763	
	Cort.m x.	-1.119	-0.686	-3.763	
	m¡n.	-0.562	-0.848	-5.337	
	Flec.m x.	-1.119	-0.686	-3.763	
	m¡n.	-0.562	-0.848	-5.337	

Flecha Tot. el s. m x =0.089593

BARRA : 63 (37,40) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	39.664	-328.764	-518.599	
	m¡n.	32.498	-268.127	-400.129	
	Cort.m x.	32.498	-268.127	-400.129	
	m¡n.	39.664	-328.764	-518.599	
	Flec.m x.	32.498	-268.127	-400.129	
	m¡n.	39.664	-328.764	-518.599	

Flecha Tot. el s. m x =0.008586

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	39.664	-328.764	138.929	
	m¡n.	32.498	-268.127	136.126	
	Cort.m x.	32.498	-268.127	136.126	

m¡n.	39.664	-328.764	138.929
Flec.m x.	39.664	-328.764	138.929
m¡n.	32.498	-268.127	136.126

Flecha Tot. el s. m x =0.015869

BARRA : 64 (36,37) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.296	25.369	0.135	
	m¡n.	-0.459	22.509	0.451	
	Cort.m x.	-0.296	25.369	0.135	
	m¡n.	-0.459	22.509	0.451	
	Flec.m x.	-0.459	22.509	0.451	
	m¡n.	-0.296	25.369	0.135	

Flecha Tot. el s. m x =0.071570

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.296	25.369	-93.755	
	m¡n.	-0.459	22.509	-82.853	
	Cort.m x.	-0.296	25.369	-93.755	
	m¡n.	-0.459	22.509	-82.853	
	Flec.m x.	-0.459	22.509	-82.853	
	m¡n.	-0.296	25.369	-93.755	

Flecha Tot. el s. m x =0.008586

BARRA : 65 (37,38) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.524	-23.198	-91.601	
	m¡n.	0.266	-26.176	-103.803	
	Cort.m x.	0.524	-23.198	-91.601	
	m¡n.	0.266	-26.176	-103.803	
	Flec.m x.	0.524	-23.198	-91.601	
	m¡n.	0.266	-26.176	-103.803	

Flecha Tot. el s. m x =0.008586

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.524	-23.198	0.008	
	m¡n.	0.266	-26.176	-0.433	
	Cort.m x.	0.524	-23.198	0.008	
	m¡n.	0.266	-26.176	-0.433	
	Flec.m x.	0.524	-23.198	0.008	
	m¡n.	0.266	-26.176	-0.433	

Flecha Tot. el s. m x =0.089593

BARRA : 66 (39,42) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.707	-2.068	0.172	
	m¡n.	-0.589	-2.506	-1.279	
	Cort.m x.	0.707	-2.068	0.172	
	m¡n.	-0.589	-2.506	-1.279	
	Flec.m x.	0.707	-2.068	0.172	
	m¡n.	-0.589	-2.506	-1.279	

Flecha Tot. el s. m x =0.078526

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.707	0.107	2.557	
	m¡n.	-0.589	-0.331	1.982	
	Cort.m x.	0.707	0.107	2.557	
	m¡n.	-0.589	-0.331	1.982	
	Flec.m x.	0.707	0.107	2.557	
	m¡n.	-0.589	-0.331	1.982	

Flecha Tot. el s. m x =0.085805

BARRA : 67 (38,41) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.129	-3.242	-5.071	
	m¡n.	-1.127	-2.942	-3.239	
	Cort.m x.	-1.127	-2.942	-3.239	
	m¡n.	-0.129	-3.242	-5.071	
	Flec.m x.	-1.127	-2.942	-3.239	
	m¡n.	-0.129	-3.242	-5.071	

Flecha Tot. el s. m x =0.089593

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.129	-1.063	-1.615	
	m¡n.	-1.127	-0.763	-0.383	
	Cort.m x.	-1.127	-0.763	-0.383	
	m¡n.	-0.129	-1.063	-1.615	
	Flec.m x.	-1.127	-0.763	-0.383	
	m¡n.	-0.129	-1.063	-1.615	

Flecha Tot. el s. m x =0.096698

BARRA : 68 (40,43) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	29.851	-252.240	139.177	
	m¡n.	24.094	-200.687	135.387	
	Cort.m x.	24.094	-200.687	135.387	
	m¡n.	29.851	-252.240	139.177	
	Flec.m x.	29.851	-252.240	139.177	
	m¡n.	24.094	-200.687	135.387	

Flecha Tot. el s. m x =0.015869

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	29.851	-252.240	643.656	
	m¡n.	24.094	-200.687	536.761	
	Cort.m x.	24.094	-200.687	536.761	

m¡n.	29.851	-252.240	643.656
Flec.m x.	29.851	-252.240	643.656
m¡n.	24.094	-200.687	536.761

Flecha Tot. el s. m x =0.022843

BARRA : 69 (39,40) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.033	25.029	-0.598	
	m¡n.	-0.386	22.094	-0.079	
	Cort.m x.	0.033	25.029	-0.598	
	m¡n.	-0.386	22.094	-0.079	
	Flec.m x.	-0.386	22.094	-0.079	
	m¡n.	0.033	25.029	-0.598	

Flecha Tot. el s. m x =0.078526

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.033	25.029	-93.230	
	m¡n.	-0.386	22.094	-81.851	
	Cort.m x.	0.033	25.029	-93.230	
	m¡n.	-0.386	22.094	-81.851	
	Flec.m x.	-0.386	22.094	-81.851	
	m¡n.	0.033	25.029	-93.230	

Flecha Tot. el s. m x =0.015869

BARRA : 70 (40,41) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.352	-22.778	-90.254	
	m¡n.	-0.215	-25.868	-103.044	
	Cort.m x.	0.352	-22.778	-90.254	
	m¡n.	-0.215	-25.868	-103.044	
	Flec.m x.	0.352	-22.778	-90.254	
	m¡n.	-0.215	-25.868	-103.044	

Flecha Tot. el s. m x =0.015869

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.352	-22.778	-0.304	
	m¡n.	-0.215	-25.868	-0.891	
	Cort.m x.	0.352	-22.778	-0.304	
	m¡n.	-0.215	-25.868	-0.891	
	Flec.m x.	0.352	-22.778	-0.304	
	m¡n.	-0.215	-25.868	-0.891	

Flecha Tot. el s. m x =0.096698

BARRA : 71 (42,45) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.466	-1.567	2.804	
	m¡n.	-1.097	-2.632	1.416	
	Cort.m x.	0.466	-1.567	2.804	
	m¡n.	-1.097	-2.632	1.416	
	Flec.m x.	0.466	-1.567	2.804	
	m¡n.	-1.097	-2.632	1.416	

Flecha Tot. el s. m x =0.085805

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.466	0.608	4.569	
	m¡n.	-1.097	-0.457	5.311	
	Cort.m x.	0.466	0.608	4.569	
	m¡n.	-1.097	-0.457	5.311	
	Flec.m x.	-1.097	-0.457	5.311	
	m¡n.	0.466	0.608	4.569	

Flecha Tot. el s. m x =0.092278

BARRA : 72 (41,44) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.763	-3.149	-1.829	
	m¡n.	-0.823	-2.599	-0.031	
	Cort.m x.	-0.823	-2.599	-0.031	
	m¡n.	0.763	-3.149	-1.829	
	Flec.m x.	-0.823	-2.599	-0.031	
	m¡n.	0.763	-3.149	-1.829	

Flecha Tot. el s. m x =0.096698

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.763	-0.970	1.832	
	m¡n.	-0.823	-0.420	2.529	
	Cort.m x.	-0.823	-0.420	2.529	
	m¡n.	0.763	-0.970	1.832	
	Flec.m x.	-0.823	-0.420	2.529	
	m¡n.	0.763	-0.970	1.832	

Flecha Tot. el s. m x =0.104315

BARRA : 73 (43,46) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	20.003	-175.212	645.031	
	m¡n.	15.859	-133.661	536.325	
	Cort.m x.	15.859	-133.661	536.325	
	m¡n.	20.003	-175.212	645.031	
	Flec.m x.	20.003	-175.212	645.031	
	m¡n.	15.859	-133.661	536.325	

Flecha Tot. el s. m x =0.022843

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	20.003	-175.212	995.455	
	m¡n.	15.859	-133.661	803.647	
	Cort.m x.	15.859	-133.661	803.647	

m¡n.	20.003	-175.212	995.455	
Flec.m x.	20.003	-175.212	995.455	
m¡n.	15.859	-133.661	803.647	

Flecha Tot. el s. m x =0.028254

BARRA : 74 (42,43) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.566	25.252	-0.508	
	m¡n.	-0.247	21.885	-0.241	
	Cort.m x.	0.566	25.252	-0.508	
	m¡n.	-0.247	21.885	-0.241	
	Flec.m x.	-0.247	21.885	-0.241	
	m¡n.	0.566	25.252	-0.508	

Flecha Tot. el s. m x =0.085805

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.566	25.252	-93.967	
	m¡n.	-0.247	21.885	-81.237	
	Cort.m x.	0.566	25.252	-93.967	
	m¡n.	-0.247	21.885	-81.237	
	Flec.m x.	-0.247	21.885	-81.237	
	m¡n.	0.566	25.252	-93.967	

Flecha Tot. el s. m x =0.022843

BARRA : 75 (43,44) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.190	-22.574	-89.472	
	m¡n.	-0.809	-26.147	-103.814	
	Cort.m x.	0.190	-22.574	-89.472	
	m¡n.	-0.809	-26.147	-103.814	
	Flec.m x.	0.190	-22.574	-89.472	
	m¡n.	-0.809	-26.147	-103.814	

Flecha Tot. el s. m x =0.022843

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.190	-22.574	-0.328	
	m¡n.	-0.809	-26.147	-0.558	
	Cort.m x.	0.190	-22.574	-0.328	
	m¡n.	-0.809	-26.147	-0.558	
	Flec.m x.	0.190	-22.574	-0.328	
	m¡n.	-0.809	-26.147	-0.558	

Flecha Tot. el s. m x =0.104315

BARRA : 76 (45,48) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.213	-0.980	4.696	
	m¡n.	-0.184	-3.799	4.249	
	Cort.m x.	0.213	-0.980	4.696	
	m¡n.	-0.184	-3.799	4.249	
	Flec.m x.	0.213	-0.980	4.696	
	m¡n.	-0.184	-3.799	4.249	

Flecha Tot. el s. m x =0.092278

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.213	0.108	5.570	
	m¡n.	-0.184	-2.712	10.762	
	Cort.m x.	0.213	0.108	5.570	
	m¡n.	-0.184	-2.712	10.762	
	Flec.m x.	-0.184	-2.712	10.762	
	m¡n.	0.213	0.108	5.570	

Flecha Tot. el s. m x =0.096680

BARRA : 77 (44,47) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.320	-3.336	1.023	
	m¡n.	-0.495	-2.051	2.719	
	Cort.m x.	-0.495	-2.051	2.719	
	m¡n.	1.320	-3.336	1.023	
	Flec.m x.	-0.495	-2.051	2.719	
	m¡n.	1.320	-3.336	1.023	

Flecha Tot. el s. m x =0.104315

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.320	-1.157	5.447	
	m¡n.	-0.495	0.128	4.574	
	Cort.m x.	-0.495	0.128	4.574	
	m¡n.	1.320	-1.157	5.447	
	Flec.m x.	1.320	-1.157	5.447	
	m¡n.	-0.495	0.128	4.574	

Flecha Tot. el s. m x =0.111207

BARRA : 78 (46,49) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	9.986	-96.058	997.804	
	m¡n.	7.710	-66.803	803.433	
	Cort.m x.	7.710	-66.803	803.433	
	m¡n.	9.986	-96.058	997.804	
	Flec.m x.	9.986	-96.058	997.804	
	m¡n.	7.710	-66.803	803.433	

Flecha Tot. el s. m x =0.028254

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	9.986	-96.058	1189.921	
	m¡n.	7.710	-66.803	937.039	
	Cort.m x.	7.710	-66.803	937.039	

m¡n.	9.986	-96.058	1189.921
Flec.m x.	9.986	-96.058	1189.921
m¡n.	7.710	-66.803	937.039

Flecha Tot. el s. m x =0.031229

BARRA : 79 (45,46) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.061	26.293	0.912	
	m¡n.	-0.127	21.799	-0.252	
	Cort.m x.	1.061	26.293	0.912	
	m¡n.	-0.127	21.799	-0.252	
	Flec.m x.	1.061	26.293	0.912	
	m¡n.	-0.127	21.799	-0.252	

Flecha Tot. el s. m x =0.092278

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	1.061	26.293	-96.399	
	m¡n.	-0.127	21.799	-80.929	
	Cort.m x.	1.061	26.293	-96.399	
	m¡n.	-0.127	21.799	-80.929	
	Flec.m x.	-0.127	21.799	-80.929	
	m¡n.	1.061	26.293	-96.399	

Flecha Tot. el s. m x =0.028254

BARRA : 80 (46,47) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.086	-22.492	-89.079	
	m¡n.	-1.288	-27.233	-106.416	
	Cort.m x.	0.086	-22.492	-89.079	
	m¡n.	-1.288	-27.233	-106.416	
	Flec.m x.	0.086	-22.492	-89.079	
	m¡n.	-1.288	-27.233	-106.416	

Flecha Tot. el s. m x =0.028254

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.086	-22.492	-0.259	
	m¡n.	-1.288	-27.233	1.127	
	Cort.m x.	0.086	-22.492	-0.259	
	m¡n.	-1.288	-27.233	1.127	
	Flec.m x.	-1.288	-27.233	1.127	
	m¡n.	0.086	-22.492	-0.259	

Flecha Tot. el s. m x =0.111207

BARRA : 81 (48,51) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.026	-1.451	5.604	
	m¡n.	-0.543	-2.123	9.864	
	Cort.m x.	-0.026	-1.451	5.604	
	m¡n.	-0.543	-2.123	9.864	
	Flec.m x.	-0.543	-2.123	9.864	
	m¡n.	-0.026	-1.451	5.604	

Flecha Tot. el s. m x =0.096680

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.026	0.724	5.533	
	m¡n.	-0.543	0.053	11.137	
	Cort.m x.	-0.026	0.724	5.533	
	m¡n.	-0.543	0.053	11.137	
	Flec.m x.	-0.543	0.053	11.137	
	m¡n.	-0.026	0.724	5.533	

Flecha Tot. el s. m x =0.097413

BARRA : 82 (47,50) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.193	-4.608	4.160	
	m¡n.	-0.236	-1.422	4.661	
	Cort.m x.	-0.236	-1.422	4.661	
	m¡n.	0.193	-4.608	4.160	
	Flec.m x.	-0.236	-1.422	4.661	
	m¡n.	0.193	-4.608	4.160	

Flecha Tot. el s. m x =0.111207

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.193	-2.429	11.519	
	m¡n.	-0.236	0.758	5.648	
	Cort.m x.	-0.236	0.758	5.648	
	m¡n.	0.193	-2.429	11.519	
	Flec.m x.	0.193	-2.429	11.519	
	m¡n.	-0.236	0.758	5.648	

Flecha Tot. el s. m x =0.115968

BARRA : 83 (49,52) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.171	-5.157	1191.837	
	m¡n.	-0.402	0.001	936.975	
	Cort.m x.	-0.402	0.001	936.975	
	m¡n.	-0.171	-5.157	1191.837	
	Flec.m x.	-0.171	-5.157	1191.837	
	m¡n.	-0.402	0.001	936.975	

Flecha Tot. el s. m x =0.031229

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.171	-5.157	1202.150	
	m¡n.	-0.402	0.001	936.974	
	Cort.m x.	-0.402	0.001	936.974	

m¡n.	-0.171	-5.157	1202.150
Flec.m x.	-0.171	-5.157	1202.150
m¡n.	-0.402	0.001	936.974

Flecha Tot. el s. m x =0.031292

BARRA : 84 (48,49) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.898	22.362	-0.359	
	m¡n.	-0.033	21.769	-0.240	
	Cort.m x.	0.898	22.362	-0.359	
	m¡n.	-0.033	21.769	-0.240	
	Flec.m x.	-0.033	21.769	-0.240	
	m¡n.	0.898	22.362	-0.359	

Flecha Tot. el s. m x =0.096680

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.898	32.362	-104.381	
	m¡n.	-0.033	21.769	-80.808	
	Cort.m x.	0.898	32.362	-104.381	
	m¡n.	-0.033	21.769	-80.808	
	Flec.m x.	-0.033	21.769	-80.808	
	m¡n.	0.898	32.362	-104.381	

Flecha Tot. el s. m x =0.031229

BARRA : 85 (49,50) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.031	-22.467	-88.919	
	m¡n.	-1.019	-32.912	-114.538	
	Cort.m x.	0.031	-22.467	-88.919	
	m¡n.	-1.019	-32.912	-114.538	
	Flec.m x.	0.031	-22.467	-88.919	
	m¡n.	-1.019	-32.912	-114.538	

Flecha Tot. el s. m x =0.031229

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.031	-22.467	-0.197	
	m¡n.	-1.019	-22.912	-0.318	
	Cort.m x.	0.031	-22.467	-0.197	
	m¡n.	-1.019	-22.912	-0.318	
	Flec.m x.	0.031	-22.467	-0.197	
	m¡n.	-1.019	-22.912	-0.318	

Flecha Tot. el s. m x =0.115968

BARRA : 86 (51,54) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.167	-0.057	11.075	
	m¡n.	-0.284	-0.831	5.482	
	Cort.m x.	0.167	-0.057	11.075	
	m¡n.	-0.284	-0.831	5.482	
	Flec.m x.	0.167	-0.057	11.075	
	m¡n.	-0.284	-0.831	5.482	

Flecha Tot. el s. m x =0.097413

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.167	2.118	8.598	
	m¡n.	-0.284	1.345	4.552	
	Cort.m x.	0.167	2.118	8.598	
	m¡n.	-0.284	1.345	4.552	
	Flec.m x.	0.167	2.118	8.598	
	m¡n.	-0.284	1.345	4.552	

Flecha Tot. el s. m x =0.094066

BARRA : 87 (50,53) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.510	-1.559	10.501	
	m¡n.	-0.039	-0.767	5.678	
	Cort.m x.	-0.039	-0.767	5.678	
	m¡n.	0.510	-1.559	10.501	
	Flec.m x.	0.510	-1.559	10.501	
	m¡n.	-0.039	-0.767	5.678	

Flecha Tot. el s. m x =0.115968

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.510	0.620	12.153	
	m¡n.	-0.039	1.412	5.747	
	Cort.m x.	-0.039	1.412	5.747	
	m¡n.	0.510	0.620	12.153	
	Flec.m x.	0.510	0.620	12.153	
	m¡n.	-0.039	1.412	5.747	

Flecha Tot. el s. m x =0.116803

BARRA : 88 (52,55) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-8.505	66.804	937.031	
	m¡n.	-10.412	87.153	1202.222	
	Cort.m x.	-10.412	87.153	1202.222	
	m¡n.	-8.505	66.804	937.031	
	Flec.m x.	-10.412	87.153	1202.222	
	m¡n.	-8.505	66.804	937.031	

Flecha Tot. el s. m x =0.031292

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-8.505	66.804	803.422	
	m¡n.	-10.412	87.153	1027.915	
	Cort.m x.	-10.412	87.153	1027.915	

m¡n.	-8.505	66.804	803.422
Flec.m x.	-10.412	87.153	1027.915
m¡n.	-8.505	66.804	803.422

Flecha Tot. el s. m x =0.028415

BARRA : 89 (51,52) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.062	23.060	0.710	
	m¡n.	0.051	21.765	-0.257	
	Cort.m x.	0.062	23.060	0.710	
	m¡n.	0.051	21.765	-0.257	
	Flec.m x.	0.062	23.060	0.710	
	m¡n.	0.051	21.765	-0.257	

Flecha Tot. el s. m x =0.097413

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.062	33.060	-105.896	
	m¡n.	0.051	21.765	-80.810	
	Cort.m x.	0.062	33.060	-105.896	
	m¡n.	0.051	21.765	-80.810	
	Flec.m x.	0.051	21.765	-80.810	
	m¡n.	0.062	33.060	-105.896	

Flecha Tot. el s. m x =0.031292

BARRA : 90 (52,53) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.006	-22.471	-88.913	
	m¡n.	-0.010	-33.622	-116.137	
	Cort.m x.	-0.006	-22.471	-88.913	
	m¡n.	-0.010	-33.622	-116.137	
	Flec.m x.	-0.006	-22.471	-88.913	
	m¡n.	-0.010	-33.622	-116.137	

Flecha Tot. el s. m x =0.031292

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.006	-22.471	-0.175	
	m¡n.	-0.010	-23.622	0.887	
	Cort.m x.	-0.006	-22.471	-0.175	
	m¡n.	-0.010	-23.622	0.887	
	Flec.m x.	-0.010	-23.622	0.887	
	m¡n.	-0.006	-22.471	-0.175	

Flecha Tot. el s. m x =0.116803

BARRA : 91 (54,57) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.279	2.686	9.352	
	m¡n.	-0.598	-0.230	4.400	
	Cort.m x.	-0.279	2.686	9.352	
	m¡n.	-0.598	-0.230	4.400	
	Flec.m x.	-0.279	2.686	9.352	
	m¡n.	-0.598	-0.230	4.400	

Flecha Tot. el s. m x =0.094066

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.279	4.861	1.771	
	m¡n.	-0.598	1.946	2.650	
	Cort.m x.	-0.279	4.861	1.771	
	m¡n.	-0.598	1.946	2.650	
	Flec.m x.	-0.598	1.946	2.650	
	m¡n.	-0.279	4.861	1.771	

Flecha Tot. el s. m x =0.087515

BARRA : 92 (53,56) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.136	-0.117	5.742	
	m¡n.	-0.377	0.780	12.144	
	Cort.m x.	-0.377	0.780	12.144	
	m¡n.	0.136	-0.117	5.742	
	Flec.m x.	-0.377	0.780	12.144	
	m¡n.	0.136	-0.117	5.742	

Flecha Tot. el s. m x =0.116803

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.136	0.972	4.845	
	m¡n.	-0.377	1.869	9.453	
	Cort.m x.	-0.377	1.869	9.453	
	m¡n.	0.136	0.972	4.845	
	Flec.m x.	-0.377	1.869	9.453	
	m¡n.	0.136	0.972	4.845	

Flecha Tot. el s. m x =0.113218

BARRA : 93 (55,58) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-16.619	133.661	803.624	
	m¡n.	-20.573	178.122	1026.172	
	Cort.m x.	-20.573	178.122	1026.172	
	m¡n.	-16.619	133.661	803.624	
	Flec.m x.	-20.573	178.122	1026.172	
	m¡n.	-16.619	133.661	803.624	

Flecha Tot. el s. m x =0.028415

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-16.619	133.661	536.301	
	m¡n.	-20.573	178.122	669.927	
	Cort.m x.	-20.573	178.122	669.927	

m¡n.	-16.619	133.661	536.301
Flec.m x.	-20.573	178.122	669.927
m¡n.	-16.619	133.661	536.301

Flecha Tot. el s. m x =0.023033

BARRA : 94 (54,55) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.152	21.785	-0.315	
	m¡n.	-0.754	22.383	-0.446	
	Cort.m x.	-0.754	22.383	-0.446	
	m¡n.	0.152	21.785	-0.315	
	Flec.m x.	0.152	21.785	-0.315	
	m¡n.	-0.754	22.383	-0.446	

Flecha Tot. el s. m x =0.094066

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.152	21.785	-80.940	
	m¡n.	-0.754	32.383	-104.546	
	Cort.m x.	-0.754	32.383	-104.546	
	m¡n.	0.152	21.785	-80.940	
	Flec.m x.	0.152	21.785	-80.940	
	m¡n.	-0.754	32.383	-104.546	

Flecha Tot. el s. m x =0.028415

BARRA : 95 (55,56) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.988	-32.958	-114.707	
	m¡n.	-0.051	-22.505	-89.054	
	Cort.m x.	-0.051	-22.505	-89.054	
	m¡n.	0.988	-32.958	-114.707	
	Flec.m x.	-0.051	-22.505	-89.054	
	m¡n.	0.988	-32.958	-114.707	

Flecha Tot. el s. m x =0.028415

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.988	-22.958	-0.305	
	m¡n.	-0.051	-22.505	-0.183	
	Cort.m x.	-0.051	-22.505	-0.183	
	m¡n.	0.988	-22.958	-0.305	
	Flec.m x.	-0.051	-22.505	-0.183	
	m¡n.	0.988	-22.958	-0.305	

Flecha Tot. el s. m x =0.113218

BARRA : 96 (57,60) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.486	1.442	2.627	
	m¡n.	-0.980	0.299	2.354	
	Cort.m x.	0.486	1.442	2.627	
	m¡n.	-0.980	0.299	2.354	
	Flec.m x.	0.486	1.442	2.627	
	m¡n.	-0.980	0.299	2.354	

Flecha Tot. el s. m x =0.087515

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.486	3.618	-2.086	
	m¡n.	-0.980	2.474	-0.072	
	Cort.m x.	0.486	3.618	-2.086	
	m¡n.	-0.980	2.474	-0.072	
	Flec.m x.	-0.980	2.474	-0.072	
	m¡n.	0.486	3.618	-2.086	

Flecha Tot. el s. m x =0.079817

BARRA : 97 (56,59) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.319	-0.590	4.794	
	m¡n.	-0.072	2.693	10.442	
	Cort.m x.	-0.072	2.693	10.442	
	m¡n.	0.319	-0.590	4.794	
	Flec.m x.	-0.072	2.693	10.442	
	m¡n.	0.319	-0.590	4.794	

Flecha Tot. el s. m x =0.113218

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.319	1.589	2.915	
	m¡n.	-0.072	4.872	1.997	
	Cort.m x.	-0.072	4.872	1.997	
	m¡n.	0.319	1.589	2.915	
	Flec.m x.	0.319	1.589	2.915	
	m¡n.	-0.072	4.872	1.997	

Flecha Tot. el s. m x =0.106137

BARRA : 98 (58,61) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-24.745	200.683	536.720	
	m¡n.	-30.568	257.482	667.834	
	Cort.m x.	-30.568	257.482	667.834	
	m¡n.	-24.745	200.683	536.720	
	Flec.m x.	-30.568	257.482	667.834	
	m¡n.	-24.745	200.683	536.720	

Flecha Tot. el s. m x =0.023033

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-24.745	200.683	135.354	
	m¡n.	-30.568	257.482	152.869	
	Cort.m x.	-30.568	257.482	152.869	

m¡n.	-24.745	200.683	135.354
Flec.m x.	-30.568	257.482	152.869
m¡n.	-24.745	200.683	135.354

Flecha Tot. el s. m x =0.016028

BARRA : 99 (57,58) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.296	21.857	-0.382	
	m¡n.	-0.856	26.370	0.766	
	Cort.m x.	-0.856	26.370	0.766	
	m¡n.	0.296	21.857	-0.382	
	Flec.m x.	-0.856	26.370	0.766	
	m¡n.	0.296	21.857	-0.382	

Flecha Tot. el s. m x =0.087515

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.296	21.857	-81.275	
	m¡n.	-0.856	26.370	-96.829	
	Cort.m x.	-0.856	26.370	-96.829	
	m¡n.	0.296	21.857	-81.275	
	Flec.m x.	0.296	21.857	-81.275	
	m¡n.	-0.856	26.370	-96.829	

Flecha Tot. el s. m x =0.023033

BARRA : 100 (58,59) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.237	-27.363	-106.824	
	m¡n.	-0.122	-22.597	-89.401	
	Cort.m x.	-0.122	-22.597	-89.401	
	m¡n.	1.237	-27.363	-106.824	
	Flec.m x.	-0.122	-22.597	-89.401	
	m¡n.	1.237	-27.363	-106.824	

Flecha Tot. el s. m x =0.023033

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	1.237	-27.363	1.231	
	m¡n.	-0.122	-22.597	-0.166	
	Cort.m x.	-0.122	-22.597	-0.166	
	m¡n.	1.237	-27.363	1.231	
	Flec.m x.	1.237	-27.363	1.231	
	m¡n.	-0.122	-22.597	-0.166	

Flecha Tot. el s. m x =0.106137

BARRA : 101 (60,63) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.143	1.105	-1.819	
	m¡n.	-1.342	0.635	-0.570	
	Cort.m x.	-0.143	1.105	-1.819	
	m¡n.	-1.342	0.635	-0.570	
	Flec.m x.	-1.342	0.635	-0.570	
	m¡n.	-0.143	1.105	-1.819	

Flecha Tot. el s. m x =0.079817

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.143	3.281	-5.476	
	m¡n.	-1.342	2.810	-3.286	
	Cort.m x.	-0.143	3.281	-5.476	
	m¡n.	-1.342	2.810	-3.286	
	Flec.m x.	-1.342	2.810	-3.286	
	m¡n.	-0.143	3.281	-5.476	

Flecha Tot. el s. m x =0.072659

BARRA : 102 (59,62) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.486	-0.065	2.793	
	m¡n.	-1.303	1.291	3.234	
	Cort.m x.	-1.303	1.291	3.234	
	m¡n.	0.486	-0.065	2.793	
	Flec.m x.	-1.303	1.291	3.234	
	m¡n.	0.486	-0.065	2.793	

Flecha Tot. el s. m x =0.106137

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.486	2.114	0.255	
	m¡n.	-1.303	3.470	-2.016	
	Cort.m x.	-1.303	3.470	-2.016	
	m¡n.	0.486	2.114	0.255	
	Flec.m x.	0.486	2.114	0.255	
	m¡n.	-1.303	3.470	-2.016	

Flecha Tot. el s. m x =0.097749

BARRA : 103 (61,64) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-32.846	268.109	136.063	
	m¡n.	-40.269	335.010	151.833	
	Cort.m x.	-40.269	335.010	151.833	
	m¡n.	-32.846	268.109	136.063	
	Flec.m x.	-40.269	335.010	151.833	
	m¡n.	-32.846	268.109	136.063	

Flecha Tot. el s. m x =0.016028

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-32.846	268.109	-400.155	
	m¡n.	-40.269	335.010	-518.187	
	Cort.m x.	-40.269	335.010	-518.187	

m¡n.	-32.846	268.109	-400.155
Flec.m x.	-32.846	268.109	-400.155
m¡n.	-40.269	335.010	-518.187

Flecha Tot. el s. m x =0.008681

BARRA : 104 (60,61) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.498	22.050	-0.361	
	m¡n.	-0.266	25.463	-0.629	
	Cort.m x.	-0.266	25.463	-0.629	
	m¡n.	0.498	22.050	-0.361	
	Flec.m x.	0.498	22.050	-0.361	
	m¡n.	-0.266	25.463	-0.629	

Flecha Tot. el s. m x =0.079817

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.498	22.050	-81.969	
	m¡n.	-0.266	25.463	-94.869	
	Cort.m x.	-0.266	25.463	-94.869	
	m¡n.	0.498	22.050	-81.969	
	Flec.m x.	0.498	22.050	-81.969	
	m¡n.	-0.266	25.463	-94.869	

Flecha Tot. el s. m x =0.016028

BARRA : 105 (61,62) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.771	-26.436	-104.570	
	m¡n.	-0.211	-22.808	-90.070	
	Cort.m x.	-0.211	-22.808	-90.070	
	m¡n.	0.771	-26.436	-104.570	
	Flec.m x.	-0.211	-22.808	-90.070	
	m¡n.	0.771	-26.436	-104.570	

Flecha Tot. el s. m x =0.016028

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.771	-26.436	-0.173	
	m¡n.	-0.211	-22.808	0.001	
	Cort.m x.	-0.211	-22.808	0.001	
	m¡n.	0.771	-26.436	-0.173	
	Flec.m x.	-0.211	-22.808	0.001	
	m¡n.	0.771	-26.436	-0.173	

Flecha Tot. el s. m x =0.097749

BARRA : 106 (63,66) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.668	0.739	-5.816	
	m¡n.	-1.400	0.556	-3.994	
	Cort.m x.	-0.668	0.739	-5.816	
	m¡n.	-1.400	0.556	-3.994	
	Flec.m x.	-1.400	0.556	-3.994	
	m¡n.	-0.668	0.739	-5.816	

Flecha Tot. el s. m x =0.072659

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.668	1.827	-8.418	
	m¡n.	-1.400	1.644	-6.231	
	Cort.m x.	-0.668	1.827	-8.418	
	m¡n.	-1.400	1.644	-6.231	
	Flec.m x.	-1.400	1.644	-6.231	
	m¡n.	-0.668	1.827	-8.418	

Flecha Tot. el s. m x =0.067450

BARRA : 107 (62,65) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.484	0.247	0.044	
	m¡n.	-1.130	0.815	-1.246	
	Cort.m x.	-1.130	0.815	-1.246	
	m¡n.	0.484	0.247	0.044	
	Flec.m x.	0.484	0.247	0.044	
	m¡n.	-1.130	0.815	-1.246	

Flecha Tot. el s. m x =0.097749

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.484	2.427	-2.729	
	m¡n.	-1.130	2.995	-5.154	
	Cort.m x.	-1.130	2.995	-5.154	
	m¡n.	0.484	2.427	-2.729	
	Flec.m x.	0.484	2.427	-2.729	
	m¡n.	-1.130	2.995	-5.154	

Flecha Tot. el s. m x =0.089755

BARRA : 108 (64,67) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-40.789	336.355	-399.211	
	m¡n.	-49.570	412.533	-518.186	
	Cort.m x.	-49.570	412.533	-518.186	
	m¡n.	-40.789	336.355	-399.211	
	Flec.m x.	-40.789	336.355	-399.211	
	m¡n.	-49.570	412.533	-518.186	

Flecha Tot. el s. m x =0.008681

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-40.789	336.355	-1071.921	
	m¡n.	-49.570	412.533	-1343.252	
	Cort.m x.	-49.570	412.533	-1343.252	

m¡n.	-40.789	336.355	-1071.921
Flec.m x.	-40.789	336.355	-1071.921
m¡n.	-49.570	412.533	-1343.252

Flecha Tot. el s. m x =0.002656

BARRA : 109 (63,64) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.708	22.464	-0.058	
	m¡n.	0.340	25.492	-0.525	
	Cort.m x.	0.340	25.492	-0.525	
	m¡n.	0.708	22.464	-0.058	
	Flec.m x.	0.708	22.464	-0.058	
	m¡n.	0.340	25.492	-0.525	

Flecha Tot. el s. m x =0.072659

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.708	22.464	-83.198	
	m¡n.	0.340	25.492	-94.871	
	Cort.m x.	0.340	25.492	-94.871	
	m¡n.	0.708	22.464	-83.198	
	Flec.m x.	0.708	22.464	-83.198	
	m¡n.	0.340	25.492	-94.871	

Flecha Tot. el s. m x =0.008681

BARRA : 110 (64,65) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.339	-26.404	-104.172	
	m¡n.	-0.236	-23.215	-91.142	
	Cort.m x.	-0.236	-23.215	-91.142	
	m¡n.	0.339	-26.404	-104.172	
	Flec.m x.	-0.236	-23.215	-91.142	
	m¡n.	0.339	-26.404	-104.172	

Flecha Tot. el s. m x =0.008681

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.339	-26.404	0.096	
	m¡n.	-0.236	-23.215	0.533	
	Cort.m x.	-0.236	-23.215	0.533	
	m¡n.	0.339	-26.404	0.096	
	Flec.m x.	-0.236	-23.215	0.533	
	m¡n.	0.339	-26.404	0.096	

Flecha Tot. el s. m x =0.089755

BARRA : 111 (66,69) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.165	-1.346	-8.962	
	m¡n.	-0.693	-1.275	-6.938	
	Cort.m x.	-0.693	-1.275	-6.938	
	m¡n.	-0.165	-1.346	-8.962	
	Flec.m x.	-0.693	-1.275	-6.938	
	m¡n.	-0.165	-1.346	-8.962	

Flecha Tot. el s. m x =0.067450

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.165	0.829	-9.319	
	m¡n.	-0.693	0.900	-7.437	
	Cort.m x.	-0.693	0.900	-7.437	
	m¡n.	-0.165	0.829	-9.319	
	Flec.m x.	-0.693	0.900	-7.437	
	m¡n.	-0.165	0.829	-9.319	

Flecha Tot. el s. m x =0.065269

BARRA : 112 (65,68) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.049	0.154	-2.965	
	m¡n.	-1.226	0.373	-4.816	
	Cort.m x.	-1.226	0.373	-4.816	
	m¡n.	-0.049	0.154	-2.965	
	Flec.m x.	-0.049	0.154	-2.965	
	m¡n.	-1.226	0.373	-4.816	

Flecha Tot. el s. m x =0.089755

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.049	2.333	-5.160	
	m¡n.	-1.226	2.552	-7.449	
	Cort.m x.	-1.226	2.552	-7.449	
	m¡n.	-0.049	2.333	-5.160	
	Flec.m x.	-0.049	2.333	-5.160	
	m¡n.	-1.226	2.552	-7.449	

Flecha Tot. el s. m x =0.083417

BARRA : 113 (67,70) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-48.263	405.846	-1071.289	
	m¡n.	-58.191	491.183	-1343.147	
	Cort.m x.	-58.191	491.183	-1343.147	
	m¡n.	-48.263	405.846	-1071.289	
	Flec.m x.	-48.263	405.846	-1071.289	
	m¡n.	-58.191	491.183	-1343.147	

Flecha Tot. el s. m x =0.002656

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-48.263	405.846	-1882.981	
	m¡n.	-58.191	491.183	-2325.513	
	Cort.m x.	-58.191	491.183	-2325.513	

m¡n.	-48.263	405.846	-1882.981	
Flec.m x.	-48.263	405.846	-1882.981	
m¡n.	-58.191	491.183	-2325.513	

BARRA : 114 (66,67) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.707	23.130	0.707	
	m¡n.	0.544	26.124	0.503	
	Cort.m x.	0.544	26.124	0.503	
	m¡n.	0.707	23.130	0.707	
	Flec.m x.	0.707	23.130	0.707	
	m¡n.	0.544	26.124	0.503	

Flecha Tot. el s. m x =0.067450

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.707	23.130	-84.896	
	m¡n.	0.544	26.124	-96.181	
	Cort.m x.	0.544	26.124	-96.181	
	m¡n.	0.707	23.130	-84.896	
	Flec.m x.	0.707	23.130	-84.896	
	m¡n.	0.544	26.124	-96.181	

Flecha Tot. el s. m x =0.002656

BARRA : 115 (67,68) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.439	-26.899	-104.803	
	m¡n.	0.074	-23.793	-92.370	
	Cort.m x.	0.074	-23.793	-92.370	
	m¡n.	0.439	-26.899	-104.803	
	Flec.m x.	0.074	-23.793	-92.370	
	m¡n.	0.439	-26.899	-104.803	

Flecha Tot. el s. m x =0.002656

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.439	-26.899	1.421	
	m¡n.	0.074	-23.793	1.591	
	Cort.m x.	0.074	-23.793	1.591	
	m¡n.	0.439	-26.899	1.421	
	Flec.m x.	0.074	-23.793	1.591	
	m¡n.	0.439	-26.899	1.421	

Flecha Tot. el s. m x =0.083417

BARRA : 116 (69,72) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.148	-2.733	-8.936	
	m¡n.	0.657	-2.449	-7.332	
	Cort.m x.	0.657	-2.449	-7.332	
	m¡n.	1.148	-2.733	-8.936	
	Flec.m x.	0.657	-2.449	-7.332	
	m¡n.	1.148	-2.733	-8.936	

Flecha Tot. el s. m x =0.065269

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.148	-0.557	-6.139	
	m¡n.	0.657	-0.274	-5.101	
	Cort.m x.	0.657	-0.274	-5.101	
	m¡n.	1.148	-0.557	-6.139	
	Flec.m x.	0.657	-0.274	-5.101	
	m¡n.	1.148	-0.557	-6.139	

Flecha Tot. el s. m x =0.066208

BARRA : 117 (68,71) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.640	-0.518	-5.086	
	m¡n.	-2.646	-0.565	-7.010	
	Cort.m x.	-1.640	-0.518	-5.086	
	m¡n.	-2.646	-0.565	-7.010	
	Flec.m x.	-1.640	-0.518	-5.086	
	m¡n.	-2.646	-0.565	-7.010	

Flecha Tot. el s. m x =0.083417

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.640	1.661	-5.546	
	m¡n.	-2.646	1.614	-7.377	
	Cort.m x.	-1.640	1.661	-5.546	
	m¡n.	-2.646	1.614	-7.377	
	Flec.m x.	-1.640	1.661	-5.546	
	m¡n.	-2.646	1.614	-7.377	

Flecha Tot. el s. m x =0.079530

BARRA : 118 (70,73) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-136.340	-326.606	-1297.907	
	m¡n.	-153.131	-368.078	-1463.043	
	Cort.m x.	-136.340	-326.606	-1297.907	
	m¡n.	-153.131	-368.078	-1463.043	
	Flec.m x.	-136.340	-326.606	-1297.907	
	m¡n.	-153.131	-368.078	-1463.043	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-136.340	-326.606	-644.695	
	m¡n.	-153.131	-368.078	-726.888	
	Cort.m x.	-136.340	-326.606	-644.695	
	m¡n.	-153.131	-368.078	-726.888	
	Flec.m x.	-136.340	-326.606	-644.695	
	m¡n.	-153.131	-368.078	-726.888	

Flecha Tot. el s. m x =0.001643

BARRA : 119 (69,70) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.105	23.560	1.349	
	m¡n.	-0.383	26.513	1.313	
	Cort.m x.	-0.383	26.513	1.313	
	m¡n.	-0.105	23.560	1.349	
	Flec.m x.	-0.105	23.560	1.349	
	m¡n.	-0.383	26.513	1.313	

Flecha Tot. el s. m x =0.065269

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.105	23.560	-85.846	
	m¡n.	-0.383	26.513	-96.811	
	Cort.m x.	-0.383	26.513	-96.811	
	m¡n.	-0.105	23.560	-85.846	
	Flec.m x.	-0.105	23.560	-85.846	
	m¡n.	-0.383	26.513	-96.811	

BARRA : 120 (70,71) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.838	-27.055	-104.238	
	m¡n.	1.346	-24.021	-92.308	
	Cort.m x.	1.346	-24.021	-92.308	
	m¡n.	1.838	-27.055	-104.238	
	Flec.m x.	1.346	-24.021	-92.308	
	m¡n.	1.838	-27.055	-104.238	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	1.838	-27.055	2.602	
	m¡n.	1.346	-24.021	2.550	
	Cort.m x.	1.346	-24.021	2.550	
	m¡n.	1.838	-27.055	2.602	
	Flec.m x.	1.838	-27.055	2.602	
	m¡n.	1.346	-24.021	2.550	

Flecha Tot. el s. m x =0.079530

BARRA : 121 (72,75) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.459	-3.098	-5.747	
	m¡n.	1.121	-2.799	-4.841	
	Cort.m x.	1.121	-2.799	-4.841	
	m¡n.	1.459	-3.098	-5.747	
	Flec.m x.	1.121	-2.799	-4.841	
	m¡n.	1.459	-3.098	-5.747	

Flecha Tot. el s. m x =0.066208

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.459	-0.923	-1.837	
	m¡n.	1.121	-0.624	-1.529	
	Cort.m x.	1.121	-0.624	-1.529	
	m¡n.	1.459	-0.923	-1.837	
	Flec.m x.	1.121	-0.624	-1.529	
	m¡n.	1.459	-0.923	-1.837	

Flecha Tot. el s. m x =0.069178

BARRA : 122 (71,74) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.190	-1.418	-4.200	
	m¡n.	-5.248	-1.659	-5.538	
	Cort.m x.	-4.190	-1.418	-4.200	
	m¡n.	-5.248	-1.659	-5.538	
	Flec.m x.	-4.190	-1.418	-4.200	
	m¡n.	-5.248	-1.659	-5.538	

Flecha Tot. el s. m x =0.079530

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-4.190	-0.328	-2.512	
	m¡n.	-5.248	-0.569	-3.367	
	Cort.m x.	-4.190	-0.328	-2.512	
	m¡n.	-5.248	-0.569	-3.367	
	Flec.m x.	-4.190	-0.328	-2.512	
	m¡n.	-5.248	-0.569	-3.367	

Flecha Tot. el s. m x =0.077804

BARRA : 123 (73,76) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-142.554	-257.861	-647.188	
	m¡n.	-160.214	-290.656	-729.930	
	Cort.m x.	-142.554	-257.861	-647.188	
	m¡n.	-160.214	-290.656	-729.930	
	Flec.m x.	-142.554	-257.861	-647.188	
	m¡n.	-160.214	-290.656	-729.930	

Flecha Tot. el s. m x =0.001643

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-142.554	-257.861	-131.467	
	m¡n.	-160.214	-290.656	-148.618	
	Cort.m x.	-142.554	-257.861	-131.467	
	m¡n.	-160.214	-290.656	-148.618	
	Flec.m x.	-142.554	-257.861	-131.467	
	m¡n.	-160.214	-290.656	-148.618	

Flecha Tot. el s. m x =0.005130

BARRA : 124 (72,73) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.259	22.736	0.465	
	m¡n.	-0.392	25.492	0.311	
	Cort.m x.	-0.392	25.492	0.311	
	m¡n.	-0.259	22.736	0.465	
	Flec.m x.	-0.259	22.736	0.465	
	m¡n.	-0.392	25.492	0.311	

Flecha Tot. el s. m x =0.066208

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.259	22.736	-83.681	
	m¡n.	-0.392	25.492	-94.033	
	Cort.m x.	-0.392	25.492	-94.033	
	m¡n.	-0.259	22.736	-83.681	
	Flec.m x.	-0.259	22.736	-83.681	
	m¡n.	-0.392	25.492	-94.033	

Flecha Tot. el s. m x =0.001643

BARRA : 125 (73,74) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.651	-26.302	-101.116	
	m¡n.	2.234	-23.442	-89.895	
	Cort.m x.	2.234	-23.442	-89.895	
	m¡n.	2.651	-26.302	-101.116	
	Flec.m x.	2.234	-23.442	-89.895	
	m¡n.	2.651	-26.302	-101.116	

Flecha Tot. el s. m x =0.001643

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	2.651	-26.302	2.752	
	m¡n.	2.234	-23.442	2.677	
	Cort.m x.	2.234	-23.442	2.677	
	m¡n.	2.651	-26.302	2.752	
	Flec.m x.	2.651	-26.302	2.752	
	m¡n.	2.234	-23.442	2.677	

Flecha Tot. el s. m x =0.077804

BARRA : 126 (75,78) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.787	-2.913	-1.593	
	m¡n.	1.522	-2.656	-1.338	
	Cort.m x.	1.522	-2.656	-1.338	
	m¡n.	1.787	-2.913	-1.593	
	Flec.m x.	1.522	-2.656	-1.338	
	m¡n.	1.787	-2.913	-1.593	

Flecha Tot. el s. m x =0.069178

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.787	-0.738	2.328	
	m¡n.	1.522	-0.481	2.070	
	Cort.m x.	1.522	-0.481	2.070	
	m¡n.	1.787	-0.738	2.328	
	Flec.m x.	1.787	-0.738	2.328	
	m¡n.	1.522	-0.481	2.070	

Flecha Tot. el s. m x =0.072651

BARRA : 127 (74,77) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-6.866	-2.828	-0.278	
	m¡n.	-8.001	-3.090	-0.716	
	Cort.m x.	-6.866	-2.828	-0.278	
	m¡n.	-8.001	-3.090	-0.716	
	Flec.m x.	-6.866	-2.828	-0.278	
	m¡n.	-8.001	-3.090	-0.716	

Flecha Tot. el s. m x =0.077804

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-6.866	-0.649	2.288	
	m¡n.	-8.001	-0.911	2.374	
	Cort.m x.	-6.866	-0.649	2.288	
	m¡n.	-8.001	-0.911	2.374	
	Flec.m x.	-8.001	-0.911	2.374	
	m¡n.	-6.866	-0.649	2.288	

Flecha Tot. el s. m x =0.076686

BARRA : 128 (76,79) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-146.960	-190.259	-134.925	
	m¡n.	-165.222	-214.519	-152.588	
	Cort.m x.	-146.960	-190.259	-134.925	
	m¡n.	-165.222	-214.519	-152.588	
	Flec.m x.	-146.960	-190.259	-134.925	
	m¡n.	-165.222	-214.519	-152.588	

Flecha Tot. el s. m x =0.005130

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-146.960	-190.259	245.593	
	m¡n.	-165.222	-214.519	276.450	
	Cort.m x.	-146.960	-190.259	245.593	
	m¡n.	-165.222	-214.519	276.450	
	Flec.m x.	-165.222	-214.519	276.450	
	m¡n.	-146.960	-190.259	245.593	

Flecha Tot. el s. m x =0.009026

BARRA : 129 (75,76) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.191	22.243	0.400	
	m¡n.	-0.244	24.941	0.328	
	Cort.m x.	-0.244	24.941	0.328	
	m¡n.	-0.191	22.243	0.400	
	Flec.m x.	-0.191	22.243	0.400	
	m¡n.	-0.244	24.941	0.328	

Flecha Tot. el s. m x =0.069178

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.191	22.243	-81.919	
	m¡n.	-0.244	24.941	-91.980	
	Cort.m x.	-0.244	24.941	-91.980	
	m¡n.	-0.191	22.243	-81.919	
	Flec.m x.	-0.191	22.243	-81.919	
	m¡n.	-0.244	24.941	-91.980	

Flecha Tot. el s. m x =0.005130

BARRA : 130 (76,77) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.726	-25.568	-96.987	
	m¡n.	3.268	-22.792	-86.325	
	Cort.m x.	3.268	-22.792	-86.325	
	m¡n.	3.726	-25.568	-96.987	
	Flec.m x.	3.268	-22.792	-86.325	
	m¡n.	3.726	-25.568	-96.987	

Flecha Tot. el s. m x =0.005130

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	3.726	-25.568	3.983	
	m¡n.	3.268	-22.792	3.681	
	Cort.m x.	3.268	-22.792	3.681	
	m¡n.	3.726	-25.568	3.983	
	Flec.m x.	3.726	-25.568	3.983	
	m¡n.	3.268	-22.792	3.681	

Flecha Tot. el s. m x =0.076686

BARRA : 131 (78,81) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.917	-2.522	2.668	
	m¡n.	2.576	-2.312	2.368	
	Cort.m x.	2.576	-2.312	2.368	
	m¡n.	2.917	-2.522	2.668	
	Flec.m x.	2.917	-2.522	2.668	
	m¡n.	2.576	-2.312	2.368	

Flecha Tot. el s. m x =0.072651

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	2.917	-0.347	6.189	
	m¡n.	2.576	-0.137	5.470	
	Cort.m x.	2.576	-0.137	5.470	
	m¡n.	2.917	-0.347	6.189	
	Flec.m x.	2.917	-0.347	6.189	
	m¡n.	2.576	-0.137	5.470	

Flecha Tot. el s. m x =0.075075

BARRA : 132 (77,80) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-10.547	-2.498	5.555	
	m¡n.	-11.984	-2.698	6.099	
	Cort.m x.	-10.547	-2.498	5.555	
	m¡n.	-11.984	-2.698	6.099	
	Flec.m x.	-11.984	-2.698	6.099	
	m¡n.	-10.547	-2.498	5.555	

Flecha Tot. el s. m x =0.076686

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-10.547	-0.319	7.852	
	m¡n.	-11.984	-0.519	8.795	
	Cort.m x.	-10.547	-0.319	7.852	
	m¡n.	-11.984	-0.519	8.795	
	Flec.m x.	-11.984	-0.519	8.795	
	m¡n.	-10.547	-0.319	7.852	

Flecha Tot. el s. m x =0.073875

BARRA : 133 (79,82) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-147.038	-123.884	240.233	
	m¡n.	-165.342	-139.726	270.404	
	Cort.m x.	-147.038	-123.884	240.233	
	m¡n.	-165.342	-139.726	270.404	
	Flec.m x.	-165.342	-139.726	270.404	
	m¡n.	-147.038	-123.884	240.233	

Flecha Tot. el s. m x =0.009026

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-147.038	-123.884	488.001	
	m¡n.	-165.342	-139.726	549.856	
	Cort.m x.	-147.038	-123.884	488.001	
	m¡n.	-165.342	-139.726	549.856	
	Flec.m x.	-165.342	-139.726	549.856	
	m¡n.	-147.038	-123.884	488.001	

Flecha Tot. el s. m x =0.012278

BARRA : 134 (78,79) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.298	22.042	1.054	
	m¡n.	-0.340	24.735	1.130	
	Cort.m x.	-0.340	24.735	1.130	
	m¡n.	-0.298	22.042	1.054	
	Flec.m x.	-0.340	24.735	1.130	
	m¡n.	-0.298	22.042	1.054	

Flecha Tot. el s. m x =0.072651

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.298	22.042	-80.523	
	m¡n.	-0.340	24.735	-90.414	
	Cort.m x.	-0.340	24.735	-90.414	
	m¡n.	-0.298	22.042	-80.523	
	Flec.m x.	-0.298	22.042	-80.523	
	m¡n.	-0.340	24.735	-90.414	

Flecha Tot. el s. m x =0.009026

BARRA : 135 (79,80) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	5.706	-24.430	-90.535	
	m¡n.	5.061	-21.765	-80.602	
	Cort.m x.	5.061	-21.765	-80.602	
	m¡n.	5.706	-24.430	-90.535	
	Flec.m x.	5.061	-21.765	-80.602	
	m¡n.	5.706	-24.430	90.535	

Flecha Tot. el s. m x =0.009026

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	5.706	-24.430	5.939	
	m¡n.	5.061	-21.765	5.350	
	Cort.m x.	5.061	-21.765	5.350	
	m¡n.	5.706	-24.430	5.939	
	Flec.m x.	5.706	-24.430	5.939	
	m¡n.	5.061	-21.765	5.350	

Flecha Tot. el s. m x =0.073875

BARRA : 136 (81,84) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	5.509	-2.029	7.118	
	m¡n.	4.900	-1.866	6.299	
	Cort.m x.	4.900	-1.866	6.299	
	m¡n.	5.509	-2.029	7.118	
	Flec.m x.	5.509	-2.029	7.118	
	m¡n.	4.900	-1.866	6.299	

Flecha Tot. el s. m x =0.075075

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	5.509	-0.941	10.014	
	m¡n.	4.900	-0.778	8.868	
	Cort.m x.	4.900	-0.778	8.868	
	m¡n.	5.509	-0.941	10.014	
	Flec.m x.	5.509	-0.941	10.014	
	m¡n.	4.900	-0.778	8.868	

Flecha Tot. el s. m x =0.074916

BARRA : 137 (80,83) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-15.897	-1.143	12.913	
	m¡n.	-17.923	-1.167	14.501	
	Cort.m x.	-15.897	-1.143	12.913	
	m¡n.	-17.923	-1.167	14.501	
	Flec.m x.	-17.923	-1.167	14.501	
	m¡n.	-15.897	-1.143	12.913	

Flecha Tot. el s. m x =0.073875

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-15.897	1.037	12.889	
	m¡n.	-17.923	1.012	14.526	
	Cort.m x.	-15.897	1.037	12.889	
	m¡n.	-17.923	1.012	14.526	
	Flec.m x.	-17.923	1.012	14.526	
	m¡n.	-15.897	1.037	12.889	

Flecha Tot. el s. m x =0.066705

BARRA : 138 (82,85) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-138.547	-59.870	479.195	
	m¡n.	-155.816	-67.562	539.954	
	Cort.m x.	-138.547	-59.870	479.195	
	m¡n.	-155.816	-67.562	539.954	
	Flec.m x.	-155.816	-67.562	539.954	
	m¡n.	-138.547	-59.870	479.195	

Flecha Tot. el s. m x =0.012278

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-138.547	-59.870	598.935	
	m¡n.	-155.816	-67.562	675.079	
	Cort.m x.	-138.547	-59.870	598.935	
	m¡n.	-155.816	-67.562	675.079	
	Flec.m x.	-155.816	-67.562	675.079	
	m¡n.	-138.547	-59.870	598.935	

Flecha Tot. el s. m x =0.014212

BARRA : 139 (81,82) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.829	21.939	2.324	
	m¡n.	-0.929	24.633	2.592	
	Cort.m x.	-0.929	24.633	2.592	
	m¡n.	-0.829	21.939	2.324	
	Flec.m x.	-0.929	24.633	2.592	
	m¡n.	-0.829	21.939	2.324	

Flecha Tot. el s. m x =0.075075

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.829	21.939	-78.874	
	m¡n.	-0.929	24.633	-88.576	
	Cort.m x.	-0.929	24.633	-88.576	
	m¡n.	-0.829	21.939	-78.874	
	Flec.m x.	-0.829	21.939	-78.874	
	m¡n.	-0.929	24.633	-88.576	

Flecha Tot. el s. m x =0.012278

BARRA : 140 (82,83) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	8.973	-21.903	-79.049	
	m¡n.	7.977	-19.507	-70.382	
	Cort.m x.	7.977	-19.507	-70.382	
	m¡n.	8.973	-21.903	-79.049	
	Flec.m x.	7.977	-19.507	-70.382	
	m¡n.	8.973	-21.903	-79.049	

Flecha Tot. el s. m x =0.012278

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	8.973	-21.903	7.446	
	m¡n.	7.977	-19.507	6.651	
	Cort.m x.	7.977	-19.507	6.651	
	m¡n.	8.973	-21.903	7.446	
	Flec.m x.	8.973	-21.903	7.446	
	m¡n.	7.977	-19.507	6.651	

Flecha Tot. el s. m x =0.066705

BARRA : 141 (84,87) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	10.153	-2.279	12.325	
	m¡n.	9.036	-2.194	10.927	
	Cort.m x.	9.036	-2.194	10.927	
	m¡n.	10.153	-2.279	12.325	
	Flec.m x.	10.153	-2.279	12.325	
	m¡n.	9.036	-2.194	10.927	

Flecha Tot. el s. m x =0.074916

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	10.153	-0.103	13.757	
	m¡n.	9.036	-0.018	12.188	
	Cort.m x.	9.036	-0.018	12.188	
	m¡n.	10.153	-0.103	13.757	
	Flec.m x.	10.153	-0.103	13.757	
	m¡n.	9.036	-0.018	12.188	

Flecha Tot. el s. m x =0.070540

BARRA : 142 (83,86) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-22.548	2.472	20.867	
	m¡n.	-25.369	2.891	23.499	
	Cort.m x.	-25.369	2.891	23.499	
	m¡n.	-22.548	2.472	20.867	
	Flec.m x.	-25.369	2.891	23.499	
	m¡n.	-22.548	2.472	20.867	

Flecha Tot. el s. m x =0.066705

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-22.548	4.651	14.004	
	m¡n.	-25.369	5.070	15.798	
	Cort.m x.	-25.369	5.070	15.798	
	m¡n.	-22.548	4.651	14.004	
	Flec.m x.	-25.369	5.070	15.798	
	m¡n.	-22.548	4.651	14.004	

Flecha Tot. el s. m x =0.052709

BARRA : 143 (85,88) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-115.169	-0.986	585.078	
	m¡n.	-129.545	-1.153	659.501	
	Cort.m x.	-115.169	-0.986	585.078	
	m¡n.	-129.545	-1.153	659.501	
	Flec.m x.	-129.545	-1.153	659.501	
	m¡n.	-115.169	-0.986	585.078	

Flecha Tot. el s. m x =0.014212

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-115.169	-0.986	587.051	
	m¡n.	-129.545	-1.153	661.808	
	Cort.m x.	-115.169	-0.986	587.051	
	m¡n.	-129.545	-1.153	661.808	
	Flec.m x.	-129.545	-1.153	661.808	
	m¡n.	-115.169	-0.986	587.051	

Flecha Tot. el s. m x =0.014521

BARRA : 144 (84,85) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.059	21.626	4.137	
	m¡n.	-2.311	24.288	4.644	
	Cort.m x.	-2.311	24.288	4.644	
	m¡n.	-2.059	21.626	4.137	
	Flec.m x.	-2.311	24.288	4.644	
	m¡n.	-2.059	21.626	4.137	

Flecha Tot. el s. m x =0.074916

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-2.059	21.626	-75.900	
	m¡n.	-2.311	24.288	-85.246	
	Cort.m x.	-2.311	24.288	-85.246	
	m¡n.	-2.059	21.626	-75.900	
	Flec.m x.	-2.059	21.626	-75.900	
	m¡n.	-2.311	24.288	-85.246	

Flecha Tot. el s. m x =0.014212

BARRA : 145 (85,86) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	13.267	-16.493	-58.975	
	m¡n.	11.798	-14.690	-52.523	
	Cort.m x.	11.798	-14.690	-52.523	
	m¡n.	13.267	-16.493	-58.975	
	Flec.m x.	11.798	-14.690	-52.523	
	m¡n.	13.267	-16.493	-58.975	

Flecha Tot. el s. m x =0.014212

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	13.267	-16.493	6.157	
	m¡n.	11.798	-14.690	5.489	
	Cort.m x.	11.798	-14.690	5.489	
	m¡n.	13.267	-16.493	6.157	
	Flec.m x.	13.267	-16.493	6.157	
	m¡n.	11.798	-14.690	5.489	

Flecha Tot. el s. m x =0.052709

BARRA : 146 (87,90) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	16.998	-0.181	18.631	
	m¡n.	15.127	-0.310	16.528	
	Cort.m x.	16.998	-0.181	18.631	
	m¡n.	15.127	-0.310	16.528	
	Flec.m x.	16.998	-0.181	18.631	
	m¡n.	15.127	-0.310	16.528	

Flecha Tot. el s. m x =0.070540

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	16.998	1.994	16.249	
	m¡n.	15.127	1.865	14.404	
	Cort.m x.	16.998	1.994	16.249	
	m¡n.	15.127	1.865	14.404	
	Flec.m x.	16.998	1.994	16.249	
	m¡n.	15.127	1.865	14.404	

Flecha Tot. el s. m x =0.060181

BARRA : 147 (86,89) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-28.037	10.903	25.803	
	m¡n.	-31.526	12.359	29.065	
	Cort.m x.	-31.526	12.359	29.065	
	m¡n.	-28.037	10.903	25.803	
	Flec.m x.	-31.526	12.359	29.065	
	m¡n.	-28.037	10.903	25.803	

Flecha Tot. el s. m x =0.052709

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-28.037	13.082	2.469	
	m¡n.	-31.526	14.538	2.819	
	Cort.m x.	-31.526	14.538	2.819	
	m¡n.	-28.037	13.082	2.469	
	Flec.m x.	-31.526	14.538	2.819	
	m¡n.	-28.037	13.082	2.469	

Flecha Tot. el s. m x =0.031275

BARRA : 148 (88,91) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-70.688	48.321	568.070	
	m¡n.	-79.536	54.492	640.471	
	Cort.m x.	-79.536	54.492	640.471	
	m¡n.	-70.688	48.321	568.070	
	Flec.m x.	-79.536	54.492	640.471	
	m¡n.	-70.688	48.321	568.070	

Flecha Tot. el s. m x =0.014521

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-70.688	48.321	471.428	
	m¡n.	-79.536	54.492	531.487	
	Cort.m x.	-79.536	54.492	531.487	
	m¡n.	-70.688	48.321	471.428	
	Flec.m x.	-79.536	54.492	531.487	
	m¡n.	-70.688	48.321	471.428	

Flecha Tot. el s. m x =0.013241

BARRA : 149 (87,88) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.339	20.502	6.091	
	m¡n.	-4.875	23.029	6.845	
	Cort.m x.	-4.875	23.029	6.845	
	m¡n.	-4.339	20.502	6.091	
	Flec.m x.	-4.875	23.029	6.845	
	m¡n.	-4.339	20.502	6.091	

Flecha Tot. el s. m x =0.070540

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-4.339	20.502	-69.789	
	m¡n.	-4.875	23.029	-78.384	
	Cort.m x.	-4.875	23.029	-78.384	
	m¡n.	-4.339	20.502	-69.789	
	Flec.m x.	-4.339	20.502	-69.789	
	m¡n.	-4.875	23.029	-78.384	

Flecha Tot. el s. m x =0.014521

BARRA : 150 (88,89) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	16.462	-6.990	-28.374	
	m¡n.	14.641	-6.238	-25.307	
	Cort.m x.	14.641	-6.238	-25.307	
	m¡n.	16.462	-6.990	-28.374	
	Flec.m x.	14.641	-6.238	-25.307	
	m¡n.	16.462	-6.990	-28.374	

Flecha Tot. el s. m x =0.014521

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	16.462	-6.990	-0.773	
	m¡n.	14.641	-6.238	-0.675	
	Cort.m x.	14.641	-6.238	-0.675	
	m¡n.	16.462	-6.990	-0.773	
	Flec.m x.	14.641	-6.238	-0.675	
	m¡n.	16.462	-6.990	-0.773	

Flecha Tot. el s. m x =0.031275

BARRA : 151 (90,94) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	24.653	5.378	25.106	
	m¡n.	21.937	4.654	22.285	
	Cort.m x.	24.653	5.378	25.106	
	m¡n.	21.937	4.654	22.285	
	Flec.m x.	24.653	5.378	25.106	
	m¡n.	21.937	4.654	22.285	

Flecha Tot. el s. m x =0.060181

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	24.653	7.553	11.988	
	m¡n.	21.937	6.829	10.615	
	Cort.m x.	24.653	7.553	11.988	
	m¡n.	21.937	6.829	10.615	
	Flec.m x.	24.653	7.553	11.988	
	m¡n.	21.937	6.829	10.615	

Flecha Tot. el s. m x =0.042560

BARRA : 152 (89,92) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-27.362	27.786	17.111	
	m¡n.	-30.753	31.330	19.281	
	Cort.m x.	-30.753	31.330	19.281	
	m¡n.	-27.362	27.786	17.111	
	Flec.m x.	-30.753	31.330	19.281	
	m¡n.	-27.362	27.786	17.111	

Flecha Tot. el s. m x =0.031275

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-27.362	28.876	-39.625	
	m¡n.	-30.753	32.420	-44.541	
	Cort.m x.	-30.753	32.420	-44.541	
	m¡n.	-27.362	28.876	-39.625	
	Flec.m x.	-27.362	28.876	-39.625	
	m¡n.	-30.753	32.420	-44.541	

Flecha Tot. el s. m x =0.007882

BARRA : 153 (91,95) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-9.293	84.426	452.767	
	m¡n.	-10.500	95.285	510.515	
	Cort.m x.	-10.500	95.285	510.515	
	m¡n.	-9.293	84.426	452.767	
	Flec.m x.	-10.500	95.285	510.515	
	m¡n.	-9.293	84.426	452.767	

Flecha Tot. el s. m x =0.013241

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-9.293	84.426	283.916	
	m¡n.	-10.500	95.285	319.945	
	Cort.m x.	-10.500	95.285	319.945	
	m¡n.	-9.293	84.426	283.916	
	Flec.m x.	-10.500	95.285	319.945	
	m¡n.	-9.293	84.426	283.916	

Flecha Tot. el s. m x =0.010687

BARRA : 154 (90,91) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-7.881	17.422	6.810	
	m¡n.	-8.857	19.568	7.655	
	Cort.m x.	-8.857	19.568	7.655	
	m¡n.	-7.881	17.422	6.810	
	Flec.m x.	-8.857	19.568	7.655	
	m¡n.	-7.881	17.422	6.810	

Flecha Tot. el s. m x =0.060181

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-7.881	17.422	-57.668	
	m¡n.	-8.857	19.568	-64.764	
	Cort.m x.	-8.857	19.568	-64.764	
	m¡n.	-7.881	17.422	-57.668	
	Flec.m x.	-7.881	17.422	-57.668	
	m¡n.	-8.857	19.568	-64.764	

Flecha Tot. el s. m x =0.013241

BARRA : 155 (91,92) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	12.116	3.636	4.271	
	m¡n.	10.780	3.211	3.727	
	Cort.m x.	12.116	3.636	4.271	
	m¡n.	10.780	3.211	3.727	
	Flec.m x.	12.116	3.636	4.271	
	m¡n.	10.780	3.211	3.727	

Flecha Tot. el s. m x =0.013241

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	12.116	3.636	-10.089	
	m¡n.	10.780	3.211	-8.952	
	Cort.m x.	12.116	3.636	-10.089	
	m¡n.	10.780	3.211	-8.952	
	Flec.m x.	10.780	3.211	-8.952	
	m¡n.	12.116	3.636	-10.089	

Flecha Tot. el s. m x =0.007882

BARRA : 156 (94,98) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	28.489	18.422	25.474	
	m¡n.	25.350	16.278	22.614	
	Cort.m x.	28.489	18.422	25.474	
	m¡n.	25.350	16.278	22.614	
	Flec.m x.	28.489	18.422	25.474	
	m¡n.	25.350	16.278	22.614	

Flecha Tot. el s. m x =0.042560

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	28.489	20.597	-13.350	
	m¡n.	25.350	18.454	-11.923	
	Cort.m x.	28.489	20.597	-13.350	
	m¡n.	25.350	18.454	-11.923	
	Flec.m x.	25.350	18.454	-11.923	
	m¡n.	28.489	20.597	-13.350	

Flecha Tot. el s. m x =0.019329

BARRA : 157 (93,96) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	12.066	-81.599	-113.137	
	m¡n.	10.741	-72.166	-100.368	
	Cort.m x.	10.741	-72.166	-100.368	
	m¡n.	12.066	-81.599	-113.137	
	Flec.m x.	10.741	-72.166	-100.368	
	m¡n.	12.066	-81.599	-113.137	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.35	Tor. m x.	12.066	-81.599	-2.728	
	m¡n.	10.741	-72.166	-2.723	
	Cort.m x.	10.741	-72.166	-2.723	
	m¡n.	12.066	-81.599	-2.728	
	Flec.m x.	10.741	-72.166	-2.723	
	m¡n.	12.066	-81.599	-2.728	

Flecha Tot. el s. m x =0.002680

BARRA : 158 (95,97) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	41.257	122.122	307.298	
	m¡n.	36.724	108.167	272.652	
	Cort.m x.	41.257	122.122	307.298	
	m¡n.	36.724	108.167	272.652	
	Flec.m x.	41.257	122.122	307.298	
	m¡n.	36.724	108.167	272.652	

Flecha Tot. el s. m x =0.010687

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.79	Tor. m x.	41.257	122.122	89.118	
	m¡n.	36.724	108.167	79.402	
	Cort.m x.	41.257	122.122	89.118	
	m¡n.	36.724	108.167	79.402	
	Flec.m x.	41.257	122.122	89.118	
	m¡n.	36.724	108.167	79.402	

Flecha Tot. el s. m x =0.007740

BARRA : 159 (94,95) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-11.999	10.691	3.413	
	m¡n.	-13.486	12.003	3.835	
	Cort.m x.	-13.486	12.003	3.835	
	m¡n.	-11.999	10.691	3.413	
	Flec.m x.	-13.486	12.003	3.835	
	m¡n.	-11.999	10.691	3.413	

Flecha Tot. el s. m x =0.042560

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-11.999	10.691	-36.156	
	m¡n.	-13.486	12.003	-40.587	
	Cort.m x.	-13.486	12.003	-40.587	
	m¡n.	-11.999	10.691	-36.156	
	Flec.m x.	-11.999	10.691	-36.156	
	m¡n.	-13.486	12.003	-40.587	

Flecha Tot. el s. m x =0.010687

BARRA : 160 (95,96) Sec. 9 Rect. /189,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.736	4.854	9.861	
	m¡n.	-0.840	5.498	11.171	
	Cort.m x.	-0.840	5.498	11.171	
	m¡n.	-0.736	4.854	9.861	
	Flec.m x.	-0.840	5.498	11.171	
	m¡n.	-0.736	4.854	9.861	

Flecha Tot. el s. m x =0.010687

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.81	Tor. m x.	-0.736	4.854	-3.767	
	m¡n.	-0.840	5.498	-4.266	
	Cort.m x.	-0.840	5.498	-4.266	
	m¡n.	-0.736	4.854	-3.767	
	Flec.m x.	-0.736	4.854	-3.767	
	m¡n.	-0.840	5.498	-4.266	

Flecha Tot. el s. m x =0.002680

BARRA : 161 (98,100) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	24.264	39.585	2.538	
	m¡n.	21.598	35.138	2.214	
	Cort.m x.	24.264	39.585	2.538	
	m¡n.	21.598	35.138	2.214	
	Flec.m x.	24.264	39.585	2.538	
	m¡n.	21.598	35.138	2.214	

Flecha Tot. el s. m x =0.019329

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	24.264	41.761	-78.231	
	m¡n.	21.598	37.313	-69.660	
	Cort.m x.	24.264	41.761	-78.231	
	m¡n.	21.598	37.313	-69.660	
	Flec.m x.	21.598	37.313	-69.660	
	m¡n.	24.264	41.761	-78.231	

Flecha Tot. el s. m x =0.000584

BARRA : 162 (97,99) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-33.889	56.317	261.626	
	m¡n.	-37.971	63.578	295.389	
	Cort.m x.	-37.971	63.578	295.389	
	m¡n.	-33.889	56.317	261.626	
	Flec.m x.	-37.971	63.578	295.389	
	m¡n.	-33.889	56.317	261.626	

Flecha Tot. el s. m x =0.007740

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.40	Tor. m x.	-33.889	56.317	239.239	
	m¡n.	-37.971	63.578	270.115	
	Cort.m x.	-37.971	63.578	270.115	
	m¡n.	-33.889	56.317	239.239	
	Flec.m x.	-37.971	63.578	270.115	
	m¡n.	-33.889	56.317	239.239	

Flecha Tot. el s. m x =0.007722

BARRA : 163 (98,99) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-14.137	2.132	-3.752	
	m¡n.	-15.889	2.379	-4.224	
	Cort.m x.	-15.889	2.379	-4.224	
	m¡n.	-14.137	2.132	-3.752	
	Flec.m x.	-14.137	2.132	-3.752	
	m¡n.	-15.889	2.379	-4.224	

Flecha Tot. el s. m x =0.019329

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.37	Tor. m x.	-14.137	2.132	-10.926	
	m¡n.	-15.889	2.379	-12.230	
	Cort.m x.	-15.889	2.379	-12.230	
	m¡n.	-14.137	2.132	-10.926	
	Flec.m x.	-14.137	2.132	-10.926	
	m¡n.	-15.889	2.379	-12.230	

Flecha Tot. el s. m x =0.007722

BARRA : 164 (100,102) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	19.316	42.561	-65.965	
	m¡n.	17.206	37.851	-58.736	
	Cort.m x.	19.316	42.561	-65.965	
	m¡n.	17.206	37.851	-58.736	
	Flec.m x.	17.206	37.851	-58.736	
	m¡n.	19.316	42.561	-65.965	

Flecha Tot. el s. m x =0.000584

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.14	Tor. m x.	19.316	42.561	-71.998	
	m¡n.	17.206	37.851	-64.101	
	Cort.m x.	19.316	42.561	-71.998	
	m¡n.	17.206	37.851	-64.101	
	Flec.m x.	17.206	37.851	-64.101	
	m¡n.	19.316	42.561	-71.998	

BARRA : 165 (99,101) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-16.096	67.950	240.867	
	m¡n.	-18.000	76.747	271.903	
	Cort.m x.	-18.000	76.747	271.903	
	m¡n.	-16.096	67.950	240.867	
	Flec.m x.	-18.000	76.747	271.903	
	m¡n.	-16.096	67.950	240.867	

Flecha Tot. el s. m x =0.007722

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.73	Tor. m x.	-16.096	67.950	-12.266	
	m¡n.	-18.000	76.747	-14.000	
	Cort.m x.	-18.000	76.747	-14.000	
	m¡n.	-16.096	67.950	-12.266	
	Flec.m x.	-16.096	67.950	12.266	
	m¡n.	-18.000	76.747	-14.000	

Flecha Tot. el s. m x =0.000688

BARRA : 166 (100,101) Sec. 10 Rect. /107,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-10.925	4.790	-4.392	
	m¡n.	-12.266	5.250	-4.948	
	Cort.m x.	-12.266	5.250	-4.948	
	m¡n.	-10.925	4.790	-4.392	
	Flec.m x.	-10.925	4.790	-4.392	
	m¡n.	-12.266	5.250	-4.948	

Flecha Tot. el s. m x =0.000584

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.22	Tor. m x.	-10.925	4.790	-5.459	
	m¡n.	-12.266	5.250	-6.118	
	Cort.m x.	-12.266	5.250	-6.118	
	m¡n.	-10.925	4.790	-5.459	
	Flec.m x.	-10.925	4.790	-5.459	
	m¡n.	-12.266	5.250	-6.118	

Flecha Tot. el s. m x =0.000688

REACCIONES

(Combinaciones con coeficientes unidad - servicio)

Nudo.	Hip¢tesis.	Momento X.	Fuerza Z.	Momento Y.
1	M ximos	-14.029	133.365	-77.408
	M¡nimos	-16.004	118.440	-87.162
8	M ximos	63.146	136.371	-28.906
	M¡nimos	55.911	120.829	-32.406
31	M ximos	271.689	921.570	-656.562
	M¡nimos	238.241	793.634	-916.026
70	M ximos	-81.614	938.456	864.691
	M¡nimos	-87.513	802.600	586.525
93	M ximos	-60.500	143.055	32.843
	M¡nimos	-68.307	126.749	29.308
102	M ximos	15.461	135.600	88.953
	M¡nimos	13.545	120.444	78.990

5.6. CALCULO DE LA VIGA-LOSA

En consecuencia con lo anterior, se considera el tablero como viga de tres vanos apoyados en los estribos y empotrados en las pilas.

Se adjuntan los cálculos realizados de la estructura resultante.

El programa efectúa el cálculo de los esfuerzos en las hipótesis extremas,que han sido utilizados ya anteriormente, para el cálculo de las armaduras .

MATRIZ DE FLEXIBILIDAD
****

5.719E-06 1.698E-06
1.698E-06 5.719E-06

MATRIZ INVERSA DE FLEXIBILIDAD
****

1.918E+05 -5.692E+04
-5.692E+04 1.918E+05

LINEAS DE INFLUENCIA EN APOYOS INTERMEDIOS
****

L.I. DEBIDAS A UNA FUERZA UNIDAD:
==========

FUERZA VANO	EN SECC.	Mf EN APOYO2	Mf EN APOYO3
1	1	-0.000	0.000
1	2	-0.202	0.060
1	3	-0.402	0.119
1	4	-0.595	0.177
1	5	-0.779	0.231
1	6	-0.951	0.282
1	7	-1.107	0.329
1	8	-1.246	0.370
1	9	-1.363	0.405
1	10	-1.456	0.432
1	11	-1.521	0.452
1	12	-1.556	0.462
1	13	-1.558	0.462
1	14	-1.523	0.452
1	15	-1.448	0.430
1	16	-1.331	0.395
1	17	-1.168	0.347
1	18	-0.957	0.284
1	19	-0.694	0.206
1	20	-0.376	0.112
1	21	0.000	0.000
2	1	-0.000	-0.000
2	2	-0.659	-0.189
2	3	-1.199	-0.408
2	4	-1.628	-0.648
2	5	-1.955	-0.901
2	6	-2.188	-1.159
2	7	-2.336	-1.414
2	8	-2.405	-1.656
2	9	-2.406	-1.879
3	10	0.462	-1.556
3	11	0.452	-1.521
3	12	0.432	-1.456
3	13	0.405	-1.363
3	14	0.370	-1.246
3	15	0.329	-1.107
3	16	0.282	-0.951
3	17	0.231	-0.779
3	18	0.177	-0.595
3	19	0.119	-0.402
3	20	0.060	-0.202
3	21	0.000	0.000

L.I. DEBIDAS A UN VANO CARGADO UNIFORMEMENTE:
==========

VANO CARGADO	Mf EN APOYO2	Mf EN APOYO3
1	-18.254	5.418
2	-38.683	-38.683
3	5.418	-18.254

ESFUERZOS DEBIDOS AL PESO PROPIO (PP) Y A LA SUPERESTRUCTURA (SE)

VANO	SECC.	Mf (PP) (txm)	Q (PP) (t.)	Mf (SE) (txm)	Q (SE) (t.)
1	1	0.00	92.87	0.00	28.94
1	2	77.03	78.30	24.14	24.70
1	3	141.45	64.86	44.47	20.47
1	4	193.77	51.41	60.98	16.23
1	5	233.99	37.97	73.67	11.99
1	6	262.12	24.52	82.56	7.75
1	7	278.14	11.08	87.62	3.51
1	8	282.06	-2.37	88.87	-0.73
1	9	273.88	-15.81	86.31	-4.97
1	10	253.60	-29.26	79.93	-9.21
1	11	221.22	-42.70	69.73	-13.45
1	12	176.74	-56.15	55.72	-17.69
1	13	120.16	-69.59	37.90	-21.92
1	14	51.48	-83.04	16.26	-26.16
1	15	-29.31	-96.48	-9.20	-30.40
1	16	-122.19	-109.93	-38.47	-34.64
1	17	-227.17	-123.37	-71.55	-38.88
1	18	-344.26	-136.81	-108.45	-43.12
1	19	-473.44	-150.26	-149.17	-47.36
1	20	-614.72	-163.70	-193.70	-51.60
1	21	-768.61	-178.27	-242.05	-55.84
2	1	-768.61	195.82	-242.05	61.23
2	2	-527.72	174.78	-166.43	55.11
2	3	-313.12	155.36	-98.77	48.98
2	4	-123.77	135.94	-39.07	42.86
2	5	40.33	116.52	12.67	36.74
2	6	179.19	97.10	56.45	30.61
2	7	292.79	77.68	92.27	24.49
2	8	381.16	58.26	120.13	18.37

2	9	444.27	38.84	140.03	12.25
2	10	482.14	19.42	151.97	6.12
2	11	494.77	0.00	155.95	-0.00
2	12	482.14	-19.42	151.97	-6.12
2	13	444.27	-38.84	140.03	-12.25
2	14	381.16	-58.26	120.13	-18.37
2	15	292.79	-77.68	92.27	-24.49
2	16	179.19	-97.10	56.45	-30.61
2	17	40.33	-116.52	12.67	-36.74
2	18	-123.77	-135.94	-39.07	-42.86
2	19	-313.12	-155.36	-98.77	-48.98
2	20	-527.72	-174.78	-166.43	-55.11
2	21	-768.61	-195.82	-242.04	-61.23
3	1	-768.61	178.27	-242.04	55.84
3	2	-614.72	163.70	-193.70	51.60
3	3	-473.44	150.26	-149.17	47.36
3	4	-344.26	136.81	-108.45	43.12
3	5	-227.17	123.37	-71.55	38.88
3	6	-122.19	109.93	-38.47	34.64
3	7	-29.31	96.48	-9.20	30.40
3	8	51.48	83.04	16.26	26.16
3	9	120.16	69.59	37.90	21.92
3	10	176.74	56.15	55.72	17.69
3	11	221.22	42.70	69.73	13.45
3	12	253.60	29.26	79.93	9.21
3	13	273.88	15.81	86.31	4.97
3	14	282.06	2.37	88.87	0.73
3	15	278.14	-11.08	87.62	-3.51
3	16	262.12	-24.52	82.55	-7.75
3	17	233.99	-37.97	73.67	-11.99
3	18	193.77	-51.41	60.98	-16.23
3	19	141.45	-64.86	44.47	-20.47
3	20	77.03	-78.30	24.14	-24.70
3	21	0.00	-92.87	0.00	-28.94

ESFUERZOS DEBIDOS A LA SOBRECARGA REPARTIDA (SR)

FLECTORES MAXIMOS Y CORTANTES CONCOMITANTES :

VANO	SECC.	Mf+(SR) (txm)	Q (SR) (t.)	Mf-(SR) (txm)	Q (SR) (t.)
1	1	0.00	35.81	-0.00	-9.26
1	2	30.48	31.92	-8.33	-9.26
1	3	57.45	28.03	-16.67	-9.26
1	4	80.93	24.14	-25.00	-9.26
1	5	100.91	20.26	-33.34	-9.26

1	6	117.39	16.37	-41.67	-9.26
1	7	130.37	12.48	-50.01	-9.26
1	8	139.85	8.59	-58.34	-9.26
1	9	145.84	4.70	-66.68	-9.26
1	10	148.32	0.82	-75.01	-9.26
1	11	147.30	-3.07	-83.35	-9.26
1	12	142.79	-6.96	-91.68	-9.26
1	13	134.77	-10.85	-100.02	-9.26
1	14	123.26	-14.74	-108.35	-9.26
1	15	108.25	-18.62	-116.68	-9.26
1	16	89.74	-22.51	-125.02	-9.26
1	17	67.73	-26.40	-133.35	-9.26
1	18	45.32	-20.82	-144.79	-18.73
1	19	31.34	-11.89	-168.16	-31.55
1	20	24.43	-5.94	-202.09	-41.39
1	21	23.35	1.30	-245.35	-52.51
2	1	23.35	-3.92	-245.35	60.08
2	2	21.65	1.32	-174.29	49.23
2	3	27.87	10.24	-118.46	34.69
2	4	44.42	16.52	-80.25	22.79
2	5	71.58	24.11	-59.96	9.59
2	6	107.09	28.08	-55.31	0.00
2	7	139.94	22.46	-55.31	0.00
2	8	165.49	16.85	-55.31	0.00
2	9	183.75	11.23	-55.31	0.00
2	10	194.70	5.62	-55.31	0.00
2	11	198.35	-0.00	-55.31	0.00
2	12	194.70	-5.62	-55.31	0.00
2	13	183.75	-11.23	-55.31	0.00
2	14	165.49	-16.85	-55.31	0.00
2	15	139.94	-22.46	-55.31	0.00
2	16	107.09	-28.08	-55.31	0.00
2	17	71.58	-24.11	-59.96	-9.59
2	18	44.42	-16.52	-80.25	-22.79
2	19	27.87	-10.24	-118.46	-34.69
2	20	21.65	-1.32	-174.29	-49.23
2	21	23.35	3.92	-245.35	-60.08
3	1	23.35	-1.30	-245.35	52.51
3	2	24.43	5.94	-202.09	41.39
3	3	31.34	11.89	-168.16	31.55
3	4	45.32	20.82	-144.79	18.73
3	5	67.73	26.40	-133.35	9.26
3	6	89.74	22.51	-125.02	9.26
3	7	108.25	18.62	-116.68	9.26
3	8	123.26	14.74	-108.35	9.26
3	9	134.77	10.85	-100.02	9.26
3	10	142.79	6.96	-91.68	9.26
3	11	147.30	3.07	-83.35	9.26
3	12	148.32	-0.82	-75.01	9.26
3	13	145.84	-4.70	-66.68	9.26

3	14	139.85	-8.59	-58.34	9.26
3	15	130.37	-12.48	-50.01	9.26
3	16	117.39	-16.37	-41.67	9.26
3	17	100.91	-20.26	-33.34	9.26
3	18	80.93	-24.14	-25.00	9.26
3	19	57.45	-28.03	-16.67	9.26
3	20	30.48	-31.92	-8.33	9.26
3	21	0.00	-35.81	-0.00	9.26

CORTANTES MAXIMOS Y FLECTORES CONCOMITANTES :

VANO	SECC.	Q+(SR) (t.)	Mf (SR) (txm)	Q-(SR) (t.)	Mf (SR) (txm)
1	1	35.81	0.00	-9.26	-0.00
1	2	32.04	28.83	-9.38	-6.69
1	3	28.51	51.31	-9.74	-10.53
1	4	25.21	68.07	-10.33	-12.14
1	5	22.15	79.75	-11.16	-12.18
1	6	19.33	86.97	-12.22	-11.25
1	7	16.73	90.34	-13.51	-9.98
1	8	14.36	90.47	-15.03	-8.96
1	9	12.21	87.93	-16.77	-8.77
1	10	10.28	83.27	-18.73	-9.97
1	11	8.56	77.05	-20.89	-13.09
1	12	7.05	69.76	-23.27	-18.65
1	13	5.73	61.89	-25.84	-27.13
1	14	4.61	53.88	-28.60	-38.97
1	15	3.66	46.15	-31.55	-54.58
1	16	2.89	39.06	-34.67	-74.34
1	17	2.29	32.96	-37.95	-98.58
1	18	1.84	28.12	-41.39	-127.59
1	19	1.53	24.78	-44.97	-161.60
1	20	1.35	23.15	-48.68	-200.81
1	21	1.30	23.35	-52.51	-245.35
2	1	60.08	-245.35	-3.92	23.35
2	2	54.56	-172.58	-4.01	19.93
2	3	49.23	-110.30	-4.30	19.71
2	4	44.12	-58.28	-4.81	22.45
2	5	39.27	-16.09	-5.57	27.72
2	6	34.69	16.84	-6.61	34.94
2	7	30.41	41.24	-7.94	43.39
2	8	26.44	57.94	-9.59	52.24
2	9	22.79	67.88	-11.56	60.55
2	10	19.47	72.06	-13.86	67.33
2	11	16.50	71.52	-16.50	71.52
2	12	13.86	67.33	-19.47	72.06
2	13	11.56	60.55	-22.79	67.88
2	14	9.59	52.24	-26.44	57.94

2	15	7.94	43.39	-30.41	41.24
2	16	6.61	34.94	-34.69	16.84
2	17	5.57	27.72	-39.27	-16.09
2	18	4.81	22.45	-44.12	-58.28
2	19	4.30	19.71	-49.23	-110.30
2	20	4.01	19.93	-54.56	-172.58
2	21	3.92	23.35	-60.08	-245.35
3	1	52.51	-245.35	-1.30	23.35
3	2	48.68	-200.81	-1.35	23.15
3	3	44.97	-161.60	-1.53	24.78
3	4	41.39	-127.59	-1.84	28.12
3	5	37.95	-98.58	-2.29	32.96
3	6	34.67	-74.34	-2.89	39.06
3	7	31.55	-54.58	-3.66	46.15
3	8	28.60	-38.97	-4.61	53.88
3	9	25.84	-27.13	-5.73	61.89
3	10	23.27	-18.65	-7.05	69.76
3	11	20.89	-13.09	-8.56	77.05
3	12	18.73	-9.97	-10.28	83.27
3	13	16.77	-8.77	-12.21	87.93
3	14	15.03	-8.96	-14.36	90.47
3	15	13.51	-9.98	-16.73	90.34
3	16	12.22	-11.25	-19.33	86.97
3	17	11.16	-12.18	-22.15	79.75
3	18	10.33	-12.14	-25.21	68.07
3	19	9.74	-10.53	-28.51	51.31
3	20	9.38	-6.69	-32.04	28.83
3	21	9.26	-0.00	-35.81	0.00

ESFUERZOS DEBIDOS AL PASEO DEL CARRO (CA)

FLECTORES MAXIMOS Y CORTANTES CONCOMITANTES :

VANO	SECC.	Mf+(CA) (txm)	Q (CA) (t.)	XCARRO (m.)	Mf-(CA) (txm)	Q (CA) (t.)	XCARRO (m.)
1	1	0.00	0.00	0.00	0.00	0.00	0.00
1	2	67.30	74.78	1.00	-10.69	-11.88	26.00
1	3	123.78	68.77	2.00	-21.39	-11.88	26.00
1	4	169.62	62.82	3.00	-32.08	-11.88	26.00
1	5	208.16	32.82	3.00	-42.78	-11.88	26.00
1	6	241.39	26.98	4.00	-53.47	-11.88	26.00
1	7	265.67	26.98	4.00	-64.17	-11.88	26.00
1	8	283.82	21.24	5.00	-74.86	-11.88	26.00
1	9	292.62	15.64	6.00	-85.56	-11.88	26.00
1	10	292.65	10.20	7.00	-96.25	-11.88	26.00
1	11	286.83	-19.80	7.00	-106.95	-11.88	26.00

1	12	276.91	-25.06	8.00	-117.64	-11.88	26.00
1	13	259.63	-30.13	9.00	-128.34	-11.88	26.00
1	14	235.83	-34.97	10.00	-139.03	-11.88	26.00
1	15	206.31	-39.58	11.00	-149.72	-11.88	26.00
1	16	171.99	-13.93	12.00	-160.42	-11.88	26.00
1	17	132.45	-43.93	12.00	-171.11	-11.88	26.00
1	18	90.78	-47.99	13.00	-181.81	-11.88	26.00
1	19	46.65	-51.75	14.00	-192.50	-11.88	26.00
1	20	38.71	2.26	50.00	-203.20	-11.88	26.00
1	21	40.75	2.26	50.00	-213.89	-11.88	26.00
2	1	40.75	-6.85	50.00	-213.89	59.41	26.00
2	2	31.85	-6.85	50.00	-143.15	51.24	28.00
2	3	67.33	23.78	19.00	-119.48	6.85	9.00
2	4	120.06	47.77	21.00	-110.58	6.85	9.00
2	5	173.92	44.45	22.00	-101.68	6.85	9.00
2	6	222.82	40.92	23.00	-92.78	6.85	9.00
2	7	259.49	33.36	25.00	-83.87	6.85	9.00
2	8	293.70	29.41	26.00	-74.97	6.85	9.00
2	9	320.14	25.36	27.00	-66.07	6.85	9.00
2	10	332.72	-8.76	28.00	-57.17	6.85	9.00
2	11	334.17	12.92	30.00	-48.27	6.85	9.00
2	12	332.72	8.76	31.00	-57.17	-6.85	50.00
2	13	320.14	-25.36	32.00	-66.07	-6.85	50.00
2	14	293.70	-29.41	33.00	-74.97	-6.85	50.00
2	15	259.49	-33.36	34.00	-83.87	-6.85	50.00
2	16	222.82	-10.92	36.00	-92.78	-6.85	50.00
2	17	173.92	-44.45	37.00	-101.68	-6.85	50.00
2	18	120.06	-47.77	38.00	-110.58	-6.85	50.00
2	19	67.33	-23.78	40.00	-119.48	-6.85	50.00
2	20	31.85	6.85	9.00	-143.15	-51.24	31.00
2	21	40.75	6.85	9.00	-213.89	-59.41	33.00
3	1	40.75	-2.26	9.00	-213.89	11.88	33.00
3	2	38.71	-2.26	9.00	-203.20	11.88	33.00
3	3	46.65	51.75	45.00	-192.50	11.88	33.00
3	4	90.78	47.99	46.00	-181.81	11.88	33.00
3	5	132.45	43.93	47.00	-171.11	11.88	33.00
3	6	171.99	43.93	47.00	-160.42	11.88	33.00
3	7	206.31	39.58	48.00	-149.72	11.88	33.00
3	8	235.83	34.97	49.00	-139.03	11.88	33.00
3	9	259.63	30.13	50.00	-128.34	11.88	33.00
3	10	276.91	25.06	51.00	-117.64	11.88	33.00
3	11	286.83	19.80	52.00	-106.95	11.88	33.00
3	12	292.65	-10.20	52.00	-96.25	11.88	33.00
3	13	292.62	-15.64	53.00	-85.56	11.88	33.00
3	14	283.82	-21.24	54.00	-74.86	11.88	33.00
3	15	265.67	-26.98	55.00	-64.17	11.88	33.00
3	16	241.39	-26.98	55.00	-53.47	11.88	33.00
3	17	208.16	-32.82	56.00	-42.78	11.88	33.00
3	18	169.62	-62.82	56.00	-32.08	11.88	33.00
3	19	123.78	-68.77	57.00	-21.39	11.88	33.00

3	20	67.30	-74.78	58.00	-10.69	11.88	33.00
3	21	0.00	0.00	0.00	-0.00	-62.82	56.00

CORTANTES MAXIMOS Y FLECTORES CONCOMITANTES :

VANO	SECC.	Q +(CA) (t.)	Mf (CA) (txm)	XCARRO (m.)	Q-(CA) (t.)	Mf (CA) (txm)	XCARRO (m.)
1	1	80.85	0.00	0.00	-11.88	0.00	26.00
1	2	74.78	67.30	1.00	-11.88	-10.69	26.00
	3	68.77	123.78	2.00	-11.88	-21.39	26.00
1	4	62.82	169.62	3.00	-11.88	-32.08	26.00
1	5	56.98	205.11	4.00	-11.88	-42.78	26.00
1	6	51.24	230.59	5.00	-15.22	156.51	1.00
1	7	45.64	246.47	6.00	-21.23	200.33	2.00
1	8	40.20	253.28	7.00	-27.18	233.78	3.00
1	9	34.94	251.57	8.00	-33.02	257.22	4.00
1	10	29.87	241.97	9.00	-38.76	271.06	5.00
1	11	29.87	268.86	9.00	-38.76	236.17	5.00
1	12	25.03	247.78	10.00	-44.36	235.86	6.00
1	13	20.42	220.56	11.00	-49.80	227.19	7.00
1	14	16.07	188.05	12.00	-55.06	210.80	8.00
1	15	12.01	151.35	13.00	-60.13	187.40	9.00
1	16	8.25	111.38	14.00	-64.97	157.89	10.00
1	17	4.81	69.24	15.00	-69.58	123.07	11.00
1	18	2.26	34.64	50.00	-73.93	83.92	12.00
1	19	2.26	36.68	50.00	-77.99	41.59	13.00
1	20	2.26	38.71	50.00	-81.75	-2.92	14.00
1	21	2.26	40.75	50.00	-81.75	-76.50	14.00
2	1	86.39	-62.17	18.00	-6.85	40.75	50.00
2	2	80.89	-25.34	20.00	-6.85	31.85	50.00
2	3	77.77	45.96	21.00	-6.85	22.95	50.00
2	4	74.45	113.14	22.00	-6.85	14.05	50.00
2	5	67.21	145.48	24.00	-9.11	137.13	20.00
2	6	63.36	201.12	25.00	-12.23	169.26	21.00
2	7	59.41	249.47	26.00	-15.55	196.48	22.00
2	8	51.24	256.51	28.00	-22.79	263.59	24.00
2	9	47.08	286.76	29.00	-26.64	277.23	25.00
2	10	42.92	308.38	30.00	-30.59	283.16	26.00
2	11	38.76	321.33	31.00	-34.64	281.07	27.00
2	12	30.59	283.16	33.00	-42.92	308.38	29.00
2	13	26.64	277.23	34.00	-47.08	286.76	30.00
2	14	22.79	263.59	35.00	-51.24	256.51	31.00
2	15	15.55	196.48	37.00	-59.41	249.47	33.00
2	16	12.23	169.26	38.00	-63.36	201.12	34.00
2	17	9.11	137.14	39.00	-67.21	145.48	35.00
2	18	6.85	14.05	9.00	-74.45	113.14	37.00
2	19	6.85	22.95	9.00	-77.77	45.96	38.00

2	20	6.85	31.85	9.00	-80.89	-25.34	39.00
2	21	6.85	40.75	9.00	-83.78	-99.50	40.00
3	1	85.19	-48.45	44.00	-2.26	40.75	9.00
3	2	81.75	-2.92	45.00	-2.26	38.71	9.00
3	3	77.99	41.59	46.00	-2.26	36.68	9.00
3	4	73.93	83.92	47.00	-2.26	34.64	9.00
3	5	69.58	123.07	48.00	-4.81	69.24	44.00
3	6	64.97	157.89	49.00	-8.25	111.38	45.00
3	7	60.13	187.40	50.00	-12.01	151.35	46.00
3	8	55.06	210.80	51.00	-16.07	188.05	47.00
3	9	49.80	227.19	52.00	-20.42	220.56	48.00
3	10	44.36	235.86	53.00	-25.03	247.78	49.00
3	11	44.36	275.78	53.00	-25.03	225.26	49.00
3	12	38.76	271.06	54.00	-29.87	241.97	50.00
3	13	33.02	257.22	55.00	-34.94	251.57	51.00
3	14	27.18	233.78	56.00	-40.20	253.28	52.00
3	15	21.23	200.33	57.00	-45.64	246.47	53.00
3	16	15.22	156.51	58.00	-51.24	230.59	54.00
3	17	11.88	-42.78	33.00	-56.98	205.11	55.00
3	18	11.88	-32.08	33.00	-62.82	169.62	56.00
3	19	11.88	-21.39	33.00	-68.77	123.78	57.00
3	20	11.88	-10.69	33.00	-74.78	67.30	58.00
3	21	11.88	0.00	33.00	-74.78	-0.00	58.00

ESFUERZOS DEBIDOS A LA SOBRECARGA TOTAL (SC)=(SR)+(CA)

FLECTORES MAXIMOS Y CORTANTES CONCOMITANTES :

VANO	SECC.	Mf+(SC) (txm)	Q (SC) (t.)	Mf-(SC) (txm)	Q (SC) (t.)
1	1	0.00	35.81	-0.00	-9.26
1	2	97.78	106.70	-19.03	-21.14
1	3	181.23	96.80	-38.06	-21.14
1	4	250.55	86.97	-57.09	-21.14
1	5	309.07	53.08	-76.12	-21.14
1	6	358.78	43.34	-95.15	-21.14
1	7	396.04	39.45	-114.18	-21.14
1	8	423.68	29.83	-133.20	-21.14
1	9	438.46	20.35	-152.23	-21.14
1	10	440.97	11.02	-171.26	-21.14
1	11	434.13	-22.87	-190.29	-21.14
1	12	419.70	-32.02	-209.32	-21.14
1	13	394.40	-40.98	-228.35	-21.14
1	14	359.10	-49.71	-247.38	-21.14
1	15	314.56	-58.20	-266.41	-21.14
1	16	261.72	-36.44	-285.44	-21.14

1	17	200.18	-70.33	-304.47	-21.14
1	18	136.10	-68.81	-326.60	-30.61
1	19	77.99	-63.64	-360.66	-43.43
1	20	63.14	-3.67	-405.28	-53.27
1	21	64.10	3.56	-459.24	-64.39
2	1	64.10	-10.77	-459.24	119.49
2	2	53.50	-5.53	-317.44	100.46
2	3	95.20	34.02	-237.94	41.54
2	4	164.47	64.29	-190.83	29.64
2	5	245.50	68.55	-161.63	16.44
2	6	329.91	69.00	-148.09	6.85
2	7	399.43	55.82	-139.19	6.85
2	8	459.20	46.25	-130.28	6.85
2	9	503.88	36.59	-121.38	6.85
2	10	527.42	-3.15	-112.48	6.85
2	11	532.52	12.92	-103.58	6.85
2	12	527.42	3.15	-112.48	-6.85
2	13	503.88	-36.59	-121.38	-6.85
2	14	459.20	-46.25	-130.28	-6.85
2	15	399.43	-55.82	-139.19	-6.85
2	16	329.91	-39.00	-148.09	-6.85
2	17	245.50	-68.55	-161.63	-16.44
2	18	164.47	-64.29	-190.83	-29.64
2	19	95.20	-34.02	-237.94	-41.54
2	20	53.50	5.53	-317.44	-100.46
2	21	64.10	10.77	-459.24	-119.49
3	1	64.10	-3.56	-459.24	64.39
3	2	63.14	3.67	-405.28	53.27
3	3	77.99	63.64	-360.66	43.43
3	4	136.10	68.81	-326.60	30.61
3	5	200.18	70.33	-304.47	21.14
3	6	261.72	66.44	-285.44	21.14
3	7	314.56	58.20	-266.41	21.14
3	8	359.10	49.71	-247.38	21.14
3	9	394.40	40.98	-228.35	21.14
3	10	419.70	32.02	-209.32	21.14
3	11	434.13	22.87	-190.29	21.14
3	12	440.97	-11.02	-171.26	21.14
3	13	438.46	-20.35	-152.23	21.14
3	14	423.68	-29.83	-133.20	21.14
3	15	396.04	-39.45	-114.18	21.14
3	16	358.78	-43.34	-95.15	21.14
3	17	309.07	-53.08	-76.12	21.14
3	18	250.55	-86.97	-57.09	21.14
3	19	181.23	-96.80	-38.06	21.14
3	20	97.78	-106.70	-19.03	21.14
3	21	0.00	-35.81	-0.00	-53.56

CORTANTES MAXIMOS Y FLECTORES CONCOMITANTES :

VANO	SECC.	Q+(SC) (t.)	Mf (SC) (txm)	Q-(SC) (t.)	Mf (SC) (txm)
1	1	116.65	0.00	-21.14	-0.00
1	2	106.82	96.14	-21.26	-17.39
1	3	97.27	175.09	-21.62	-31.92
1	4	88.04	237.69	-22.21	-44.23
1	5	79.13	284.86	-23.04	-54.96
1	6	70.57	317.56	-27.44	145.26
1	7	62.37	336.81	-34.75	190.35
1	8	54.56	343.75	-42.21	224.82
1	9	47.15	339.49	-49.79	248.45
1	10	40.15	325.25	-57.48	261.09
1	11	38.43	345.91	-59.65	223.08
1	12	32.08	317.54	-67.63	217.20
1	13	26.15	282.44	-75.64	200.06
1	14	20.68	241.94	-83.66	171.83
1	15	15.67	197.49	-91.67	132.82
1	16	11.14	150.44	-99.64	83.54
1	17	7.10	102.20	-107.53	24.49
1	18	4.10	62.75	-115.31	-43.67
1	19	3.79	61.46	-122.96	-120.01
1	20	3.62	61.86	-130.43	-203.74
1	21	3.56	64.10	-134.26	-321.85
2	1	146.47	-307.52	-10.77	64.10
2	2	135.45	-197.92	-10.86	51.78
2	3	127.00	-64.34	-11.15	42.66
2	4	118.57	54.86	-11.66	36.49
2	5	106.48	129.38	-14.68	164.85
2	6	98.05	217.96	-18.84	204.20
2	7	89.81	290.71	-23.50	239.87
2	8	77.68	314.45	-32.38	315.83
2	9	69.87	354.64	-38.20	337.78
2	10	62.39	380.44	-44.45	350.48
2	11	55.26	392.85	-51.14	352.59
2	12	44.45	350.48	-62.39	380.44
2	13	38.20	337.78	-69.87	354.64
2	14	32.38	315.83	-77.68	314.45
2	15	23.50	239.87	-89.81	290.71
2	16	18.84	204.20	-98.05	217.96
2	17	14.68	164.85	-106.48	129.38
2	18	11.66	36.49	-118.57	54.86
2	19	11.15	42.66	-127.00	-64.34
2	20	10.86	51.78	-135.45	-197.92
2	21	10.77	64.10	-143.87	-344.85
3	1	137.70	-293.80	-3.56	64.10
3	2	130.43	-203.74	-3.62	61.86

3	3	122.96	-120.01	-3.79	61.46
3	4	115.31	-43.67	-4.10	62.75
3	5	107.53	24.49	-7.10	102.20
3	6	99.64	83.54	-11.14	150.44
3	7	91.67	132.82	-15.67	197.49
3	8	83.66	171.83	-20.68	241.94
3	9	75.64	200.06	-26.15	282.44
3	10	67.63	217.20	-32.08	317.54
3	11	65.25	262.69	-33.59	302.31
3	12	57.48	261.09	-40.15	325.25
3	13	49.79	248.45	-47.15	339.49
3	14	42.21	224.82	-54.56	343.75
3	15	34.75	190.35	-62.37	336.81
3	16	27.44	145.26	-70.57	317.56
3	17	23.04	-54.96	-79.13	284.86
3	18	22.21	-44.23	-88.04	237.69
3	19	21.62	-31.92	-97.27	175.09
3	20	21.26	-17.39	-106.82	96.14
3	21	21.14	-0.00	-110.59	-0.00

R E A C C I O N E S

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\POYO	R PP (t.)	R SE (t.)	R+SR (t.)	R-SR (t.)	R+CA (t.)	R-CA (t.)	R+SC (t.)	R-SC (t.)
1	92.87	28.94	35.81	-9.26	53.90	-7.92	89.71	-17.18
2	374.09	117.07	112.59	-5.22	57.59	-4.57	170.18	-9.79
3	374.09	117.07	112.59	-5.22	56.79	-4.57	169.39	-9.79
4	92.87	28.94	35.81	-9.26	53.90	-7.92	89.71	-17.18

IBM

Ordenador Personal

P R O G R A M A

P R E T E N S A

PRETENSADO DE TABLEROS DE PUENTES

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P R O Y E C T O : LAVPAS5

Referencia ..... :

Fecha ..... :

D A T O S G E N E R A L E S

MODULO DE ELASTICIDAD DEL ACERO DE PRETENSAR (Kp/mm²)...= 19000.0

RESISTENCIA CARACTERISTICA DEL HORMIGON (Kp/cm²) :

a) EN EL MOMENTO DEL TESADO ..... FCJ =350.0

b) AL COMENZAR A ACTUAR LA CARGA PERMANENTE... FCJ1 =280.0

RETRACCION DEL HORMIGON ..... = 0.00025

COEFICIENTE DE FLUENCIA DEL HORMIGON..... = 2.40

RELAJACION DEL ACERO A LAS 1000 h. ..... = 0.02

FAMILIA DE CABLES N° 1

NUMERO DE CABLES DE LA FAMILIA ..... = 6

AREA DE LA SECCION DE CADA CABLE ..... = 3360 mm²

DIAMETRO DE LAS VAINAS ..... = 11.0 cm

ANCLAJE ACTIVO EN LA SECCION N° 1 DEL VANO N° 1

ANCLAJE ACTIVO EN LA SECCION N° 21 DEL VANO N° 3

TENSION INICIAL EN ANCLAJE ..... = 143. Kp/mm²

COEFICIENTE DE ROZAMIENTO ..... = 0.210

DESVIACIONES PARASITAS .....= 0.006

PENETRACION DE CUÑAS ..... = 5.0 mm.

VANO	SECC	X (m.)	YSUP (m.)	YINF (m.)	PDTE -	EXCT (m.)	T.INI (Kp/mm²)
1	1	0.000	0.600	0.608	-0.030	-0.096	126.9
1	2	0.900	0.626	0.582	-0.027	-0.156	127.2
1	3	1.800	0.649	0.559	-0.025	-0.180	127.4
1	4	2.700	0.670	0.538	-0.022	-0.201	127.6
1	5	3.600	0.689	0.519	-0.019	-0.219	127.8
1	6	4.500	0.705	0.503	-0.016	-0.235	128.0
1	7	5.400	0.718	0.490	-0.014	-0.249	128.2
1	8	6.300	0.729	0.479	-0.011	-0.260	128.5
1	9	7.200	0.738	0.470	-0.008	-0.269	128.7
1	10	8.100	0.745	0.463	-0.006	-0.275	128.9
1	11	9.000	0.748	0.459	-0.003	-0.279	129.1
1	12	9.900	0.750	0.458	-0.000	-0.281	129.3
1	13	10.800	0.738	0.470	0.029	-0.269	130.3
1	14	11.700	0.697	0.511	0.062	-0.228	131.3
1	15	12.600	0.626	0.582	0.095	-0.157	132.4
1	16	13.500	0.526	0.682	0.128	-0.057	133.4
1	17	14.400	0.402	0.806	0.132	0.068	133.7
1	18	15.300	0.298	0.910	0.099	0.171	134.2
1	19	16.200	0.224	0.984	0.066	0.245	133.1
1	20	17.100	0.180	1.028	0.033	0.290	132.1
1	21	18.000	0.165	1.043	0.000	0.339	131.0
2	1	0.000	0.165	1.043	0.000	0.339	131.0
2	2	1.300	0.201	1.007	-0.056	0.268	129.3
2	3	2.600	0.310	0.898	-0.111	0.160	127.6
2	4	3.900	0.468	0.740	-0.117	0.001	127.2
2	5	5.200	0.609	0.599	-0.100	-0.140	126.6
2	6	6.500	0.729	0.479	-0.083	-0.259	125.9

VANO	SECC	X (m.)	YSUP (m.)	YINF (m.)	PDTE -	EXCT (m.)	T.INI (Kp/mm²)
2	7	7.800	0.826	0.382	-0.067	-0.357	125.3
2	8	9.100	0.902	0.306	-0.050	-0.433	124.7
2	9	10.400	0.957	0.251	-0.033	-0.487	124.0
2	10	11.700	0.989	0.219	-0.017	-0.520	123.4
2	11	13.000	1.000	0.208	0.000	-0.531	122.7
2	12	14.300	0.989	0.219	0.017	-0.520	123.4
2	13	15.600	0.957	0.251	0.033	-0.487	124.0
2	14	16.900	0.902	0.306	0.050	-0.433	124.7
2	15	18.200	0.826	0.382	0.067	-0.357	125.3
2	16	19.500	0.729	0.479	0.084	-0.259	125.9
2	17	20.800	0.609	0.599	0.100	-0.140	126.6
2	18	22.100	0.468	0.740	0.117	0.001	127.2
2	19	23.400	0.310	0.898	0.111	0.160	127.6
2	20	24.700	0.201	1.007	0.056	0.268	129.3
2	21	26.000	0.165	1.043	0.000	0.339	131.0
3	1	0.000	0.165	1.043	0.000	0.339	131.0
3	2	0.900	0.180	1.028	-0.033	0.290	132.1
3	3	1.800	0.224	0.984	-0.066	0.245	133.1
3	4	2.700	0.298	0.910	-0.099	0.171	134.2
3	5	3.600	0.402	0.806	-0.132	0.068	133.7
3	6	4.500	0.526	0.682	-0.128	-0.057	133.4
3	7	5.400	0.626	0.582	-0.095	-0.157	132.4
3	8	6.300	0.697	0.511	-0.062	-0.228	131.3
3	9	7.200	0.738	0.470	-0.029	-0.269	130.3
3	10	8.100	0.750	0.458	0.000	-0.281	129.3
3	11	9.000	0.748	0.459	0.003	-0.279	129.1
3	12	9.900	0.745	0.463	0.006	-0.275	128.9
3	13	10.800	0.738	0.470	0.008	-0.269	128.7
3	14	11.700	0.729	0.479	0.011	-0.260	128.5
3	15	12.600	0.718	0.490	0.014	-0.249	128.2
3	16	13.500	0.705	0.503	0.016	-0.235	128.0
3	17	14.400	0.689	0.519	0.019	-0.219	127.8
3	18	15.300	0.670	0.538	0.022	-0.201	127.6
3	19	16.200	0.649	0.559	0.025	-0.180	127.4
3	20	17.100	0.626	0.582	0.027	-0.156	127.2
3	21	18.000	0.600	0.608	0.030	-0.096	126.9

LONGITUD CABLE = 62.13 m. ALARGAMIENTO CABLE = 419 mm.

ACCION RESULTANTE DEL PRETENSADO INICIAL

MOM. HIPER. DE PRETENSADO INICIAL:

APOYO N° 2 : M.HIP = 375.1 txm

APOYO N° 3 : M.HIP = 375.1 txm

VANO	SECC	T.MEDIA (kp/mm²)	AXIL (t.)	MOMENTO (txm)	CORTANTE (t.)
1	1	126.9	2558.9	-246.9	-150.1
1	2	127.1	2563.2	-382.0	-98.3
1	3	127.4	2567.5	-423.8	-43.2
1	4	127.6	2571.9	-459.7	-36.5
1	5	127.8	2576.3	-489.5	-29.7
1	6	128.0	2580.6	-513.1	-22.9
1	7	128.2	2585.0	-530.6	-16.0
1	8	128.4	2589.4	-542.0	-9.2
1	9	128.7	2593.8	-547.1	-2.3
1	10	128.9	2598.2	-546.1	4.7
1	11	129.1	2602.7	-538.7	11.7
1	12	129.3	2607.1	-525.1	32.1
1	13	130.3	2626.3	-481.0	92.2
1	14	131.3	2647.5	-359.0	180.4
1	15	132.4	2668.8	-156.3	271.2
1	16	133.4	2690.1	129.1	354.7
1	17	133.7	2695.2	482.1	362.7
1	18	134.2	2705.6	782.0	285.4
1	19	133.1	2684.0	995.8	192.0
1	20	132.1	2662.6	1127.6	151.9
1	21	131.0	2641.3	1269.2	157.4
2	1	131.0	2641.3	1269.2	-149.9
2	2	129.3	2606.3	1074.3	-185.9
2	3	127.6	2572.1	785.9	-267.6
2	4	127.2	2564.9	378.6	-295.2
2	5	126.6	2551.8	18.5	-254.4
2	6	125.9	2538.7	-282.9	-209.5
2	7	125.3	2525.7	-526.2	-165.3
2	8	124.6	2512.7	-712.5	-121.7
2	9	124.0	2499.8	-842.6	-78.8
2	10	123.4	2486.9	-917.3	-36.5
2	11	122.7	2474.2	-937.5	0.0
2	12	123.4	2486.9	-917.3	36.5
2	13	124.0	2499.8	-842.6	78.8
2	14	124.6	2512.7	-712.5	121.7
2	15	125.3	2525.7	-526.2	165.3
2	16	125.9	2538.7	-282.8	209.5
2	17	126.6	2551.8	18.5	254.4
2	18	127.2	2564.9	378.6	295.2

VANO	SECC	T.MEDIA (Kp/mm²)	AXIL (t.)	MOMENTO (txm)	CORTANTE (t.)
2	19	127.6	2572.1	785.9	267.6
2	20	129.3	2606.3	1074.3	185.9
2	21	131.0	2641.3	1269.2	149.9
3	1	131.0	2641.3	1269.2	-157.4
3	2	132.1	2662.6	1127.6	-151.9
3	3	133.1	2684.0	995.8	-192.0
3	4	134.2	2705.6	782.0	-285.4
3	5	133.7	2695.2	482.1	-362.7
3	6	133.4	2690.1	129.1	-354.7
3	7	132.4	2668.8	-156.3	-271.2
3	8	131.3	2647.5	-359.0	-180.4
3	9	130.3	2626.3	-481.0	-92.2
3	10	129.3	2607.1	-525.1	-32.1
3	11	129.1	2602.7	-538.7	-11.7
3	12	128.9	2598.2	-546.1	-4.7
3	13	128.7	2593.8	-547.1	2.3
3	14	128.4	2589.4	-542.0	9.2
3	15	128.2	2585.0	-530.6	16.0
3	16	128.0	2580.6	-513.1	22.9
3	17	127.8	2576.3	-489.5	29.7
3	18	127.6	2571.9	-459.7	36.5
3	19	127.4	2567.5	-423.8	43.2
3	20	127.1	2563.2	-382.0	98.3
3	21	126.9	2558.9	-246.9	150.1

ACCION RESULTANTE DEL PRETENSADO PERMANENTE
****

MOM. HIPER. DE PRETENSADO PERMANENTE :

APOYO N° 2 : M.HIP = 329.2 txm

APOYO N° 3 : M.HIP = 329.2 txm

VANO	SECC	T.MEDIA (kp/mm²)	AXIL (t.)	MOMENTO (txm)	CORTANTE (t.)
1	1	113.9	2296.6	-221.6	-130.4
1	2	112.8	2273.1	-338.9	-86.0
1	3	113.0	2277.6	-376.3	-38.7
1	4	113.2	2282.4	-408.5	-32.7
1	5	113.4	2287.0	-435.3	-26.7
1	6	113.6	2291.1	-456.5	-20.5
1	7	113.8	2294.6	-472.2	-14.2
1	8	114.0	2297.3	-482.1	-7.8
1	9	114.0	2299.0	-486.3	-1.4
1	10	114.1	2299.7	-484.6	5.1
1	11	114.1	2299.5	-477.1	11.6
1	12	114.0	2298.2	-463.7	29.1
1	13	114.8	2314.1	-424.6	80.2
1	14	116.2	2342.3	-319.4	156.7
1	15	117.9	2376.8	-142.6	238.9
1	16	119.5	2408.5	110.6	315.9
1	17	119.5	2408.8	426.0	322.3
1	18	119.1	2400.4	690.7	250.2
1	19	117.4	2365.9	876.4	167.4
1	20	116.3	2345.5	992.1	137.9
1	21	116.6	2350.1	1124.8	147.4
2	1	116.6	2350.1	1124.8	-139.5
2	2	113.6	2289.3	943.4	-166.2
2	3	112.8	2274.8	692.5	-235.0
2	4	113.7	2292.7	332.3	-262.6
2	5	113.3	2284.8	9.9	-226.8
2	6	112.3	2263.5	-257.4	-184.0
2	7	110.9	2235.7	-468.6	-141.8
2	8	109.5	2206.7	-626.0	-101.7
2	9	108.2	2180.6	-733.0	-64.3
2	10	107.1	2159.9	-793.3	-29.3
2	11	106.4	2145.9	-809.3	-0.0
2	12	107.1	2159.9	-793.3	29.3
2	13	108.2	2180.6	-733.0	64.3
2	14	109.5	2206.7	-626.0	101.7
2	15	110.9	2235.7	-468.6	141.8
2	16	112.3	2263.5	-257.4	184.0
2	17	113.3	2284.8	9.9	226.8
2	18	113.7	2292.7	332.3	262.6

VANO	SECC	T.MEDIA (Kp/mm²)	AXIL (t.)	MOMENTO (txm)	CORTANTE (t.)
2	19	112.8	2274.8	692.5	235.0
2	20	113.6	2289.3	943.4	166.2
2	21	116.6	2350.1	1124.8	139.5
3	1	116.6	2350.1	1124.7	-147.4
3	2	116.3	2345.5	992.1	-137.9
3	3	117.4	2365.9	876.4	-167.4
3	4	119.1	2400.4	690.7	-250.2
3	5	119.5	2408.8	426.0	-322.3
3	6	119.5	2408.5	110.6	-315.9
3	7	117.9	2376.8	-142.6	-238.9
3	8	116.2	2342.3	-319.4	-156.7
3	9	114.8	2314.1	-424.6	-80.2
3	10	114.0	2298.2	-463.7	-29.1
3	11	114.1	2299.5	-477.1	-11.6
3	12	114.1	2299.7	-484.6	-5.1
3	13	114.0	2299.0	-486.3	1.4
3	14	114.0	2297.3	-482.1	7.8
3	15	113.8	2294.6	-472.2	14.2
3	16	113.6	2291.1	-456.5	20.5
3	17	113.4	2287.0	-435.3	26.7
3	18	113.2	2282.4	-408.5	32.7
3	19	113.0	2277.6	-376.3	38.7
3	20	112.8	2273.1	-338.9	86.0
3	21	113.9	2296.6	-221.6	130.4

TENSIONES NORMALES DE (PP+PRET.INICIAL) SOBRE SECC. NETAS

VANO	SECC	M.PP (txm)	N.PI (t.)	M.PI (txm)	σsup (t/m²)	σinf (t/m²)
1	1	0.0	2558.9	-246.9	212.5	583.4
1	2	77.0	2563.2	-382.0	232.7	737.7
1	3	141.5	2567.5	-423.8	247.9	715.6
1	4	193.8	2571.9	-459.7	259.2	699.7
1	5	234.0	2576.3	-489.5	266.7	689.8
1	6	262.1	2580.6	-513.1	270.3	686.0
1	7	278.1	2585.0	-530.6	270.1	688.3
1	8	282.1	2589.4	-542.0	266.0	696.6
1	9	273.9	2593.8	-547.1	258.2	710.8
1	10	253.6	2598.2	-546.1	246.6	731.0
1	11	221.2	2602.7	-538.7	231.2	757.1
1	12	176.7	2607.1	-525.1	212.1	789.0
1	13	120.2	2626.3	-481.0	207.2	804.9
1	14	51.5	2647.5	-359.0	245.1	754.5
1	15	-29.3	2668.8	-156.3	327.1	634.6
1	16	-122.2	2690.1	129.1	454.6	443.2
1	17	-227.2	2695.2	482.1	615.1	192.9
1	18	-344.3	2705.6	782.0	734.6	9.5
1	19	-473.4	2684.0	995.8	785.4	-79.8
1	20	-614.7	2662.6	1127.6	775.7	-73.8
1	21	-768.6	2641.3	1269.2	692.4	-59.7
2	1	-768.6	2641.3	1269.2	692.4	-59.7
2	2	-527.7	2606.3	1074.3	788.0	-117.3
2	3	-313.1	2572.1	785.9	734.8	-48.4
2	4	-123.8	2564.9	378.6	593.2	171.2
2	5	40.3	2551.8	18.5	464.9	367.5
2	6	179.2	2538.7	-282.9	358.1	529.8
2	7	292.8	2525.7	-526.2	272.4	659.1
2	8	381.2	2512.7	-712.5	207.2	756.1
2	9	444.3	2499.8	-842.6	161.9	821.7
2	10	482.1	2486.9	-917.3	136.1	856.9
2	11	494.8	2474.2	-937.5	129.0	862.4
2	12	482.1	2486.9	-917.3	136.1	856.9
2	13	444.3	2499.8	-842.6	161.9	821.7
2	14	381.2	2512.7	-712.5	207.2	756.1
2	15	292.8	2525.7	-526.2	272.4	659.1
2	16	179.2	2538.7	-282.8	358.1	529.8
2	17	40.3	2551.8	18.5	464.9	367.5
2	18	-123.8	2564.9	378.6	593.2	171.2
2	19	-313.1	2572.1	785.9	734.8	-48.4
2	20	-527.7	2606.3	1074.3	788.0	-117.3
2	21	-768.6	2641.3	1269.2	692.4	-59.7
3	1	-768.6	2641.3	1269.2	692.4	-59.7
3	2	-614.7	2662.6	1127.6	775.7	-73.8
3	3	-473.4	2684.0	995.8	785.4	-79.8
3	4	-344.3	2705.6	782.0	734.6	9.5
3	5	-227.2	2695.2	482.1	615.1	192.9

VANO	SECC	M.PP (txm)	N.PI (t.)	M.PI (txm)	σsup (t/m²)	σinf (t/m²)
3	6	-122.2	2690.1	129.1	454.6	443.2
3	7	-29.3	2668.8	-156.3	327.1	634.6
3	8	51.5	2647.5	-359.0	245.1	754.5
3	9	120.2	2626.3	-481.0	207.2	804.9
3	10	176.7	2607.1	-525.1	212.1	789.0
3	11	221.2	2602.7	-538.7	231.2	757.1
3	12	253.6	2598.2	-546.1	246.6	731.0
3	13	273.9	2593.8	-547.1	258.2	710.8
3	14	282.1	2589.4	-542.0	266.0	696.6
3	15	278.1	2585.0	-530.6	270.1	688.3
3	16	262.1	2580.6	-513.1	270.3	686.0
3	17	234.0	2576.3	-489.5	266.7	689.8
3	18	193.8	2571.9	-459.7	259.2	699.7
3	19	141.5	2567.5	-423.8	247.9	715.6
3	20	77.0	2563.2	-382.0	232.7	737.7
3	21	0.0	2558.9	-246.9	212.5	583.4

TENSIONES NORMALES EN FASE PERMANENTE (FASE INIC.+SE+PERD.DIF)

VANO	SECC	D.NP (t.)	D.MP (txm)	M.SE (txm)	σsup (t/m²)	σinf (t/m²)
1	1	-262.2	25.3	0.0	191.4	524.3
1	2	-290.1	26.6	24.1	228.5	622.6
1	3	-289.9	14.6	44.5	259.7	575.9
1	4	-289.5	1.8	61.0	284.1	539.9
1	5	-289.3	-11.6	73.7	301.7	514.6
1	6	-289.5	-25.7	82.6	312.5	499.7
1	7	-290.4	-40.3	87.6	316.6	495.1
1	8	-292.1	-55.3	88.9	313.9	500.6
1	9	-294.8	-70.8	86.3	304.6	516.1
1	10	-298.5	-86.7	79.9	288.6	541.5
1	11	-303.2	-103.0	69.7	266.0	576.8
1	12	-308.8	-119.7	55.7	236.8	622.1
1	13	-312.1	-141.2	37.9	216.7	660.0
1	14	-305.2	-174.3	16.3	231.1	648.6
1	15	-292.0	-216.8	-9.2	282.1	582.2
1	16	-281.6	-265.4	-38.5	371.7	454.6
1	17	-286.4	-319.4	-71.6	486.3	275.3
1	18	-305.2	-371.1	-108.5	557.4	161.7
1	19	-318.2	-415.6	-149.2	563.7	139.2
1	20	-317.1	-448.2	-193.7	517.1	205.8
1	21	-291.2	-473.7	-242.0	415.9	235.2
2	1	-291.2	-473.7	-242.0	415.9	235.2
2	2	-317.1	-460.2	-166.4	548.8	130.6
2	3	-297.2	-422.6	-98.8	563.6	97.5
2	4	-272.2	-375.5	-39.1	493.7	213.0
2	5	-267.1	-337.8	12.7	423.7	319.6
2	6	-275.2	-303.8	56.5	365.7	403.2
2	7	-290.0	-271.6	92.3	320.9	464.1
2	8	-306.0	-242.7	120.1	288.6	504.9
2	9	-319.2	-219.6	140.0	267.7	528.7
2	10	-327.1	-205.1	152.0	256.7	538.7
2	11	-328.2	-201.0	155.9	254.4	536.8
2	12	-327.1	-205.1	152.0	256.7	538.7
2	13	-319.2	-219.6	140.0	267.7	528.7
2	14	-306.0	-242.7	120.1	288.6	504.9
2	15	-290.0	-271.6	92.3	320.9	464.1
2	16	-275.2	-303.8	56.5	365.7	403.2
2	17	-267.1	-337.8	12.7	423.7	319.6
2	18	-272.2	-375.5	-39.1	493.7	213.0
2	19	-297.2	-422.6	-98.8	563.6	97.5
2	20	-317.1	-460.2	-166.4	548.8	130.6
2	21	-291.2	-473.7	-242.0	415.9	235.2
3	1	-291.2	-473.7	-242.0	415.9	235.2
3	2	-317.1	-448.2	-193.7	517.1	205.8
3	3	-318.2	-415.6	-149.2	563.7	139.2
3	4	-305.2	-371.1	-108.5	557.4	161.7

VANO	SECC	D.NP (t.)	D.MP (txm)	M.SE (txm)	σsup (t/m²)	σinf (t/m²)
3	5	-286.4	-319.4	-71.6	486.3	275.3
3	6	-281.6	-265.4	-38.5	371.7	454.6
3	7	-292.0	-216.8	-9.2	282.1	582.2
3	8	-305.2	-174.3	16.3	231.1	648.6
3	9	-312.1	-141.2	37.9	216.7	660.0
3	10	-308.8	-119.7	55.7	236.8	622.1
3	11	-303.2	-103.0	69.7	266.0	576.8
3	12	-298.5	-86.7	79.9	288.6	541.5
3	13	-294.8	-70.8	86.3	304.6	516.1
3	14	-292.1	-55.3	88.9	313.9	500.6
3	15	-290.4	-40.3	87.6	316.6	495.1
3	16	-289.5	-25.7	82.6	312.5	499.7
3	17	-289.3	-11.6	73.7	301.7	514.6
3	18	-289.5	1.8	61.0	284.1	539.9
3	19	-289.9	14.6	44.5	259.7	575.9
3	20	-290.1	26.6	24.1	228.5	622.6
3	21	-262.2	25.3	0.0	191.4	524.3

TENSIONES NORMALES EN FASE DE SERVICIO (FASE PERM.+SC)

VANO	SECC	M.SC+ (txm)	M.SC- (txm)	σsup+ (t/m²)	σinf+ (t/m²)	σsup- (t/m²)	σinf- (t/m²)
1	1	0.0	-0.0	191.4	524.3	191.4	524.3
1	2	97.8	-19.0	291.6	524.4	216.2	641.8
1	3	181.2	-38.1	376.6	394.1	235.1	614.0
1	4	250.6	-57.1	445.7	289.1	247.3	597.1
1	5	309.1	-76.1	501.0	205.7	252.6	590.7
1	6	358.8	-95.1	543.7	141.8	251.2	594.6
1	7	396.0	-114.2	571.7	100.5	243.0	608.9
1	8	423.7	-133.2	586.7	79.0	228.1	633.2
1	9	438.5	-152.2	586.8	80.2	206.6	667.5
1	10	441.0	-171.3	572.4	103.4	178.4	711.7
1	11	434.1	-190.3	545.3	145.7	143.6	765.8
1	12	419.7	-209.3	506.8	205.4	102.1	829.9
1	13	394.4	-228.4	470.6	267.9	69.7	887.0
1	14	359.1	-247.4	462.6	290.1	71.6	895.6
1	15	314.6	-266.4	485.2	266.2	110.2	849.8
1	16	261.7	-285.4	540.5	190.1	187.6	743.0
1	17	200.2	-304.5	614.7	72.4	291.0	583.9
1	18	136.1	-326.6	644.0	23.9	349.7	492.4
1	19	78.0	-360.7	613.0	60.4	336.1	503.4
1	20	63.1	-405.3	556.7	142.2	262.7	614.1
1	21	64.1	-459.2	454.9	179.5	136.2	634.3
2	1	64.1	-459.2	454.9	179.5	136.2	634.3
2	2	53.5	-317.4	582.5	76.6	349.0	450.8
2	3	95.2	-237.9	624.3	1.1	412.1	338.5
2	4	164.5	-190.8	599.5	46.4	370.8	406.2
2	5	245.5	-161.6	582.2	72.7	319.4	482.2
2	6	329.9	-148.1	578.2	74.9	270.3	550.6
2	7	399.4	-139.2	576.8	71.2	231.7	601.0
2	8	459.2	-130.3	581.1	58.3	205.7	631.6
2	9	503.9	-121.4	586.9	43.1	190.8	645.7
2	10	527.4	-112.5	589.6	33.2	185.7	646.5
2	11	532.5	-103.6	590.1	27.5	189.1	635.9
2	12	527.4	-112.5	589.6	33.2	185.7	646.5
2	13	503.9	-121.4	586.9	43.1	190.8	645.7
2	14	459.2	-130.3	581.1	58.3	205.7	631.6
2	15	399.4	-139.2	576.8	71.2	231.7	601.0
2	16	329.9	-148.1	578.2	74.9	270.3	550.6
2	17	245.5	-161.6	582.2	72.7	319.4	482.2
2	18	164.5	-190.8	599.5	46.4	370.8	406.2
2	19	95.2	-237.9	624.3	1.1	412.1	338.5
2	20	53.5	-317.4	582.5	76.6	349.0	450.8
2	21	64.1	-459.2	454.9	179.5	136.2	634.3
3	1	64.1	-459.2	454.9	179.5	136.2	634.3
3	2	63.1	-405.3	556.7	142.2	262.7	614.1
3	3	78.0	-360.7	613.0	60.4	336.1	503.4
3	4	136.1	-326.6	644.0	23.9	349.7	492.4

VANO	SECC	M.SC+ (txm)	M.SC- (txm)	σsup+ (t/m²)	σinf+ (t/m²)	σsup- (t/m²)	σinf- (t/m²)
3	5	200.2	-304.5	614.7	72.4	291.0	583.9
3	6	261.7	-285.4	540.5	190.1	187.6	743.1
3	7	314.6	-266.4	485.2	266.2	110.2	849.8
3	8	359.1	-247.4	462.6	290.1	71.6	895.6
3	9	394.4	-228.4	470.6	267.9	69.7	887.0
3	10	419.7	-209.3	506.8	205.4	102.1	829.9
3	11	434.1	-190.3	545.3	145.7	143.6	765.8
3	12	441.0	-171.3	572.4	103.4	178.4	711.7
3	13	438.5	-152.2	586.8	80.2	206.6	667.5
3	14	423.7	-133.2	586.7	79.0	228.1	633.2
3	15	396.0	-114.2	571.7	100.5	243.0	608.9
3	16	358.8	-95.1	543.7	141.8	251.2	594.6
3	17	309.1	-76.1	501.0	205.7	252.6	590.7
3	18	250.6	-57.1	445.7	289.1	247.3	597.1
3	19	181.2	-38.1	376.6	394.1	235.1	614.0
3	20	97.8	-19.0	291.6	524.4	216.2	641.8
3	21	0.0	-0.0	191.4	524.3	191.4	524.3

FLECHAS EN EL CENTRO DE LOS VANOS
****

VANO	SECC	fPP (mm)	fSE (mm)	fPRET (mm)	FTOTAL (mm)
1	11	1.86	0.59	-4.53	-2.08
2	11	9.22	2.90	-14.27	-2.15
3	11	1.86	0.59	-4.53	-2.08

GIROS EN LOS APOYOS (x1000)
****

VANO	SECC	θPP (RAD)	θSE (RAD)	θPRET (RAD)	θTOTAL (RAD)
1	1	0.51	0.16	-1.20	-0.52
1	21	0.38	0.12	-0.40	0.09
2	1	0.38	0.12	-0.40	0.09
2	21	-0.38	-0.12	0.40	-0.09
3	1	-0.38	-0.12	0.40	-0.09
3	21	-0.51	-0.16	1.20	0.52

6. PILAS

6.1. DESCRIPCION GENERAL

Se trata de soportes aislados con un apoyo elastomérico arriba y empotradas en la zapata.

La sección es circular con un diámetro de 1 m.

Las cargas verticales son las del tablero, cargas permanentes y sobrecargas tanto de frenado como la transmitida por la deformación de apoyos.

El viento afecta a tablero y pila.

Con estas acciones se calculan los esfuerzos en soportes y zapatas y se determinan sus armaduras.

Previamente, se obtendrá la esbeltez de cálculo habida cuenta la coacción del apoyo elastomérico.

En la zapata se hallarán las tensiones en el suelo (<3.5 kp/cm^2).

6.2. CARGAS

Verticales (h = 10.5 m.)

Reacciones máximas

Peso propio:	374 t	
Carga muerta:	117t	491 t
Sobrecarga:	170 t	661 t
Soporte:		
2.5 x 0.785 x 10.5 =	21 t	682 t

Horizontal

Frenado: $F_1 = 170/20 = 8.5$ t

Deformación apoyos: $\Delta = 1.2 \times 13 = 15.6$ mm. $\rightarrow$ 800 x 36

$F_2 = 0.0156/(10.5^3/3/10^6/(\pi \times 0.5^4/4) + 0.036/78.5/0.8^2) =$

$= 4.67$ t

$F = 8.5 + 4.14 = 12.64$ t

Viento:

Tablero: 0.2 x 3 x 21.5 = 12.9t

Soporte: 0.2 x 10.5x 1 = 2.1 t

6.3. LONGITUD DE PANDEO DE CALCULO

$V = GS/e = 78.5 \times 0.8^2/0.036 = 1395$ t/m

$K = V/(EI/L^3) = 1395/(3 \times 10^6 \times \pi \times 0.5^4/4/10.5^3) = 10.97$

- K sen $\xi/\xi^3 + (K/\xi^2 - 1) \cos \xi = 0$

$\xi = 3.255$ $\beta = \pi/3.255 = .965$

$l_o = 10.5 \times .965 = 10.13$ m.

6.4. ESFUERZOS EN ARRANQUE

$M_x = 12.9 \times 11. + 2.1 \times 5.25 = 153$ m

$M_y = 12.64 \times 10.5 = 133$ mt

$N = 682 \times 0.9 = 614$ t

$M = 0.9 \times (M_x^2 + M_y)^{1/2} = 182.3$ mt

$e_o = 0.297 \times 0.6 = 0.178$ m

$e_a = (0.85 + 4000/12000) \times (20 \times 0.178 + 1.1)/(10 \times 0.178 + 1.1) \times 10.13^2/0.25 \times 10^4 = 0.08$ m

$e = 0.178 + 0.08 = 0.186$ m < 0.297 m $\quad f_{cd} = 1800$ t/m^2

$M = 182.3$ mt

$\mu = 1.5 \times 182.3/1800/0.785 = 0.193$

$\nu = 0.9 \times 614/1800/0.785 = 0.391$ (0.651)

$A = 0.42 \times 1800 \times 0.785/4 = 148.6$ cm$^2 \rightarrow 32\ \phi\ 25$

6.5. ZAPATAS

M_x = 12.9x 12.5+ 2.1 x 6.75 = 175.42 mt
e_x = 0.262 m → l_x = 2.5- e_x = 2.243m

M_y = 12.64 x 12 = 151.68 mt
e_y = 0.226 m → l_y = 2.5 - e_y = 2.273 m

N = 614 + 2.5 x 5 x 5 x 1.5x.9 = 670 t

$\sigma = N/4/(l_x)/l_y = 33\ t/m^2$

$M = (33 - 3{,}75) \times 2{,}115^2/2 = 65.42$ mt

$A_{min.} = 22{,}5\ cm^2/m$

V = 1.6 x 29.25x1.365 = 63.82 t/m

$V_c = 5 \times 167^{1/2} \times 1.45 = 93{,}7$ t/m > V

6.3 .Apoyos elastoméricos.

Deformacion horizontal por dilatación térmica y retracción, acortamiento por el pretensado y fluencia del hormigón:

$\Delta = (.4+.25+.15+.36) \times L <> 1.2xL$ (mm).

En este caso: Δ = 1.2x13 = 15.6 mm → /.7 = 22.42 mm, espesor mínimo.

Reacciones:

R max = 661 t
R min = 374 t

Para un apoyo ϕ 800X56:

σ = 661/.785/.64 /10 =131.5 kg/ cm2 < 150 kg / cm2
σ = 374/.785/.64/10 = 74.4 kg/ cm2 > 30 kg / cm2

7. ESTRIBOS

7.1. SIN PUENTE

DATOS

Muro H = 6.5 m.

Puntera	A = 1,00 m
Espesor del muro	B = 1,50m
Talón	C = 2,00 m
Espesor de zapata	D = 1.00 m
Angulo de rozamiento interno	$\phi = 30°$
Densidad de las tierras	$\gamma = 2\ t/m^3$
Sobrecarga equivalente de tierras	H_0 = 0.5 m
Fuerza vertical en cabeza	R = 0 t/m
Fuerza horizontal en cabeza	F = 0 t/m
Momento exterior en cabeza	M_0 = 0 mt/m
Resistencia minorada del hormigón	$F_c = 1500\ t/m^2$
Resistencia minorada del acero	$F_y = 4.43\ t/cm^2$
Coeficiente de seg. de acciones	γ_f = 1.6
Coeficiente sísmico	SM = 0

RESULTADOS

Coeficiente de seguridad al deslizamiento	C_s = 1.79
Coeficiente de seguridad al vuelco	C_v = 3.11
Presión en el terreno	$\sigma = 18.33\ t/m^2$
Momento en arranque de muro	M_m =37.55 mt/m
Armadura en arranque de muro	A_m = 9.4 cm^2/m
Momento en puntera	M_p = 7.9 mt/m
Armadura en puntera	A_p = 3.0 cm_2/ m
Momento en talón	M_t = 24 mt/m
Armadura en talón	A_t = 9.6 cm^2/m

7.2. CON PUENTE

DATOS

Muro H = 6.5 m

Puntera	A = 1,00 m
Espesor del muro	B = 1,50 m
Talón	C = 2,00 m
Espesor de zapata	D = 1,00 m
Angulo de rozamiento interno	$\phi = 30^o$
Densidad de las tierras	$\gamma = 2$ t/m^3
Sobrecarga equivalente de tierras	$H_0 = 0.50$ m
Fuerza vertical en cabeza	R = 16.3 t/m
Fuerza horizontal en cabeza	F = 1.7 t/m
Momento exterior en cabeza	$M_0 = 0$ mt/m
Resistencia minorada del hormigón	$F_c = 1500$ t/m^2
Resistencia minorada del acero	$F_y = 4.43$ t/cm^2
Coeficiente de seg. de acciones	$\gamma_f = 1.6$
Coeficiente sismico	SM = 0

RESULTADOS

Coeficiente de seguridad al deslizamiento	$C_s = 2.07$
Coeficiente de seguridad al vuelco	$C_v = 2.88$
Presión en el terreno	$\sigma = 26$ t/m2
Momento en arranque de muro	$M_m = 48.6$ mt/m
Armadura en arranque de muro	$A_m = 10.1$ cm^2/m
Momento en puntera	$M_p = 11.7$ mt/m
Armadura en puntera	$A_p = 4.5$ cm$_2$/ m
Momento en talón	$M_t = 30.3$ mt/m
Armadura en talón	$A_t = 10.2$ cm^2/m

7.3. ALETAS.

Lal: 7x4

Mal max = 2/3x2x(4-1)^2x2.25/2 = 13.5 mt/m

Aal max = 6.49 cm2 /m

7.4. APOYOS ELASTOMÉRICOS.

Deformación max Δ : 1.2x31 = 37.2 mm → /.7 = 53.1 < 56 mm

R max = 153 t → σ = 127.5 kg /cm2 < 150 kg/cm2

R min = 59 t → σ = 49.1 kg /cm2 > 30 kg/cm2

8. PRUEBA DE CARGA

8.1. CALCULO DE LA CARGA

Como tren de cargas de la prueba se utiliza una carga uniformemente distribuida de valor:

$q = 0.75 (0.4 + 120/(BxL))$

Vanos 1 y 3

B = 18.00 m.
L = 11.4 m.
$q = 0.75 (0.4 + 120/(11.40 \times 18)) = 0.74$ t/m^2

Por tanto, la carga total:

$Q = 0.74x11.4x18 = 152$ t.

Se utilizan camiones de 33 t. de carga total, por tanto el número máximo será:

N = 152/33 → 4 camiones. Sólo caben dos camiones.

Vano 2

B = 26 m.
L = 11.4 m.
$q = 0.75 (0.4 + 120/(26 \times 11.4)) = 0.603$ t/m^2

Por tanto, la carga total:

$Q = 0.603x26x11.4 = 179$ t

Se utilizan camiones de 33 t. de carga total, por tanto el número máximo será:

$N = 179/33 \rightarrow 5$ camiones.

8.2. MEDICION DE FLECHAS.

Vanos 1 y 3

$f_{Máx} = 0.0033$ m.

Vano 2

$f_{Máx} = 0.0045$ m.

Estas flechas son debidas sólo a la sobrecarga de camiones.

8.3. ESFUERZOS.

Vanos 1 y 3

$M_{máx} = 325.5$ mt/m

Vanos 2

$M_{máx} = 400$ mt/m

M min = -344 mt/m

8.4. REACCIONES.

$R_{Máx} = 127.5$ t

A continuación se presentan los resultados del cálculo del emparrillado relativos a la prueba de carga.

Fecha 28 - 6 - 98

T I T U L O D E L A O B R A

Paso Superior P.K. 308+588. Prueba de Carga

P R O P I E D A D

P R O Y E C T O

M A T E R I A L E S

No.	Mod.Young	Mod.Poisson	Peso espec.	Coef.Dilataci¢n
1	3800000.000	0.200	2.500	0.000010

Hormig¢n rest. caract. Fck = 400 Kp./cm2.

S E C C I O N E S

Unidades en m.

No.	Tipo.	Ancho.	Canto.
1	Rectg.	3.150	0.220
2	Rectg.	0.500	1.100
3	Rectg.	3.031	0.220
4	Rectg.	3.825	1.100
5	Rectg.	2.000	0.220
6	Rectg.	1.576	0.220
7	Rectg.	1.653	0.220
8	Rectg.	3.254	0.220
9	Rectg.	1.893	0.220

No.	Tipo.	Ancho.	Canto.
10	Rectg.	1.071	0.220

C A R A C T E R I S T I C A S R E S I S T E N T E S S E C C I O N E S

Unidades en m.

No.	Area.	Mmto.In.	S.Cortante	M.I.Tors.
1	6.930E-01	2.795E-03	5.775E-01	1.118E-02
2	5.500E-01	5.546E-02	4.583E-01	3.419E-02
3	6.668E-01	2.690E-03	5.557E-01	1.076E-02
4	4.207E+00	4.243E-01	3.506E+00	1.411E+00
5	4.400E-01	1.775E-03	3.667E-01	7.099E-03
6	3.468E-01	1.399E-03	2.890E-01	5.595E-03
7	3.637E-01	1.467E-03	3.031E-01	5.868E-03
8	7.159E-01	2.888E-03	5.966E-01	1.155E-02
9	4.165E-01	1.680E-03	3.471E-01	6.720E-03
10	2.356E-01	9.502E-04	1.963E-01	3.282E-03

N U D O S

Unidades en m.

Nudo.	X.	Y.
1	-4.747	9.225
2	-3.440	6.829
3	-3.440	9.225
4	-2.593	5.276
5	-1.440	3.163
6	-1.440	5.276
7	-1.440	9.225
8	-0.574	1.575
9	0.560	1.575
10	0.560	5.276
11	0.560	9.225
12	2.560	1.575
13	2.560	5.276
14	2.560	9.225

Nudo.	X.	Y.
15	4.560	1.575
16	4.560	5.276
17	4.560	9.225
18	6.560	1.575
19	6.560	5.276
20	6.560	9.225
21	8.560	1.575
22	8.560	5.276
23	8.560	9.225
24	10.560	1.575
25	10.560	5.276
26	10.560	9.225
27	12.560	1.575
28	12.560	5.276
29	12.560	9.225
30	14.560	1.575
31	14.560	5.276
32	14.560	9.225
33	16.560	1.575
34	16.560	5.276
35	16.560	9.225
36	18.560	1.575
37	18.560	5.276
38	18.560	9.225
39	20.560	1.575
40	20.560	5.276
41	20.560	9.225
42	22.560	1.575
43	22.560	5.276
44	22.560	9.225
45	24.560	1.575
46	24.560	5.276
47	24.560	9.225
48	26.560	1.575
49	26.560	5.276
50	26.560	9.225
51	28.560	1.575
52	28.560	5.276
53	28.560	9.225
54	30.560	1.575
55	30.560	5.276
56	30.560	9.225
57	32.560	1.575
58	32.560	5.276
59	32.560	9.225
60	34.560	1.575
61	34.560	5.276
62	34.560	9.225
63	36.560	1.575
64	36.560	5.276

Nudo.	X.	Y.
65	36.560	9.225
66	38.560	1.575
67	38.560	5.276
68	38.560	9.225
69	40.560	1.575
70	40.560	5.276
71	40.560	9.225
72	42.560	1.575
73	42.560	5.276
74	42.560	9.225
75	44.560	1.575
76	44.560	5.276
77	44.560	9.225
78	46.560	1.575
79	46.560	5.276
80	46.560	9.225
81	48.560	1.575
82	48.560	5.276
83	48.560	9.225
84	50.560	1.575
85	50.560	5.276
86	50.560	9.225
87	52.560	1.575
88	52.560	5.276
89	52.560	9.225
90	54.560	1.575
91	54.560	5.276
92	54.560	9.225
93	55.833	9.225
94	56.560	1.575
95	56.560	5.276
96	56.560	8.083
97	58.346	5.276
98	58.560	1.575
99	58.560	4.941
100	60.560	1.575
101	60.560	1.798
102	60.701	1.575

B A R R A S
==========

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
1	8	9	1	1	1	1.13	1964.6
2	92	93	1	1	1	1.27	2206.5
3	5	8	1	2	1	1.81	2486.8
4	101	102	1	2	1	0.26	363.0
5	2	4	1	2	1	1.77	2433.0
6	96	97	1	2	1	3.33	4575.6
7	4	6	1	4	1	1.15	12124.8
8	30	33	1	1	1	2.00	3465.0
9	29	32	1	1	1	2.00	3465.0
10	31	34	1	4	1	2.00	21037.5
11	30	31	1	5	1	3.70	4071.1
12	31	32	1	5	1	3.95	4343.9
13	27	30	1	1	1	2.00	3465.0
14	26	29	1	1	1	2.00	3465.0
15	28	31	1	4	1	2.00	21037.5
16	27	28	1	5	1	3.70	4071.1
17	28	29	1	5	1	3.95	4343.9
18	24	27	1	1	1	2.00	3465.0
19	23	26	1	1	1	2.00	3465.0
20	25	28	1	4	1	2.00	21037.5
21	24	25	1	5	1	3.70	4071.1
22	25	26	1	5	1	3.95	4343.9
23	21	24	1	1	1	2.00	3465.0
24	20	23	1	1	1	2.00	3465.0
25	22	25	1	4	1	2.00	21037.5
26	21	22	1	5	1	3.70	4071.1
27	22	23	1	5	1	3.95	4343.9
28	18	21	1	1	1	2.00	3465.0
29	17	20	1	1	1	2.00	3465.0
0	19	22	1	4	1	2.00	21037.5
31	18	19	1	5	1	3.70	4071.1
32	19	20	1	5	1	3.95	4343.9
33	15	18	1	1	1	2.00	3465.0
34	14	17	1	1	1	2.00	3465.0
35	16	19	1	4	1	2.00	21037.5
36	15	16	1	5	1	3.70	4071.1
37	16	17	1	5	1	3.95	4343.9
38	12	15	1	1	1	2.00	3465.0
39	11	14	1	1	1	2.00	3465.0
40	13	16	1	4	1	2.00	21037.5
41	12	13	1	5	1	3.70	4071.1
42	13	14	1	5	1	3.95	4343.9
43	9	12	1	1	1	2.00	3465.0
44	7	11	1	1	1	2.00	3465.0
45	10	13	1	4	1	2.00	21037.5
	9	10	1	5	1	3.70	4071.1

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
47	10	11	1	5	1	3.95	4343.9
48	4	5	1	2	1	2.41	3309.9
49	3	7	1	1	1	2.00	3465.0
50	6	10	1	4	1	2.00	21037.5
51	5	6	1	6	1	2.11	1832.2
52	6	7	1	5	1	3.95	4343.9
53	1	2	1	2	1	2.73	3752.1
54	1	3	1	1	1	1.31	2263.8
55	2	3	1	7	1	2.40	2178.4
56	33	36	1	1	1	2.00	3465.0
57	32	35	1	1	1	2.00	3465.0
58	34	37	1	4	1	2.00	21037.5
59	33	34	1	5	1	3.70	4071.1
60	34	35	1	5	1	3.95	4343.9
61	36	39	1	1	1	2.00	3465.0
62	35	38	1	1	1	2.00	3465.0
63	37	40	1	4	1	2.00	21037.5
64	36	37	1	5	1	3.70	4071.1
65	37	38	1	5	1	3.95	4343.9
66	39	42	1	1	1	2.00	3465.0
67	38	41	1	1	1	2.00	3465.0
68	40	43	1	4	1	2.00	21037.5
69	39	40	1	5	1	3.70	4071.1
70	40	41	1	5	1	3.95	4343.9
71	42	45	1	1	1	2.00	3465.0
72	41	44	1	1	1	2.00	3465.0
73	43	46	1	4	1	2.00	21037.5
74	42	43	1	5	1	3.70	4071.1
75	43	44	1	5	1	3.95	4343.9
76	45	48	1	1	1	2.00	3465.0
77	44	47	1	1	1	2.00	3465.0
78	46	49	1	4	1	2.00	21037.5
79	45	46	1	5	1	3.70	4071.1
80	46	47	1	5	1	3.95	4343.9
81	48	51	1	1	1	2.00	3465.0
82	47	50	1	1	1	2.00	3465.0
83	49	52	1	4	1	2.00	21037.5
84	48	49	1	5	1	3.70	4071.1
85	49	50	1	5	1	3.95	4343.9
86	51	54	1	1	1	2.00	3465.0
87	50	53	1	1	1	2.00	3465.0
88	52	55	1	4	1	2.00	21037.5
89	51	52	1	5	1	3.70	4071.1
90	52	53	1	5	1	3.95	4343.9
91	54	57	1	1	1	2.00	3465.0
92	53	56	1	1	1	2.00	3465.0
93	55	58	1	4	1	2.00	21037.5
94	54	55	1	5	1	3.70	4071.1
95	55	56	1	5	1	3.95	4343.9
96	57	60	1	1	1	2.00	3465.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
97	56	59	1	1	1	2.00	3465.0
98	58	61	1	4	1	2.00	21037.5
99	57	58	1	5	1	3.70	4071.1
100	58	59	1	5	1	3.95	4343.9
101	60	63	1	1	1	2.00	3465.0
102	59	62	1	1	1	2.00	3465.0
103	61	64	1	4	1	2.00	21037.5
104	60	61	1	5	1	3.70	4071.1
105	61	62	1	5	1	3.95	4343.9
106	63	66	1	1	1	2.00	3465.0
107	62	65	1	1	1	2.00	3465.0
108	64	67	1	4	1	2.00	21037.5
109	63	64	1	5	1	3.70	4071.1
110	64	65	1	5	1	3.95	4343.9
111	66	69	1	1	1	2.00	3465.0
112	65	68	1	1	1	2.00	3465.0
113	67	70	1	4	1	2.00	21037.5
114	66	67	1	5	1	3.70	4071.1
115	67	68	1	5	1	3.95	4343.9
116	69	72	1	1	1	2.00	3465.0
117	68	71	1	1	1	2.00	3465.0
118	70	73	1	4	1	2.00	21037.5
119	69	70	1	5	1	3.70	4071.1
120	70	71	1	5	1	3.95	4343.9
121	72	75	1	1	1	2.00	3465.0
122	71	74	1	1	1	2.00	3465.0
123	73	76	1	4	1	2.00	21037.5
124	72	73	1	5	1	3.70	4071.1
125	73	74	1	5	1	3.95	4343.9
126	75	78	1	1	1	2.00	3465.0
127	74	77	1	1	1	2.00	3465.0
128	76	79	1	4	1	2.00	21037.5
129	75	76	1	5	1	3.70	4071.1
130	76	77	1	5	1	3.95	4343.9
131	78	81	1	1	1	2.00	3465.0
132	77	80	1	1	1	2.00	3465.0
133	79	82	1	4	1	2.00	21037.5
134	78	79	1	5	1	3.70	4071.1
135	79	80	1	5	1	3.95	4343.9
136	81	84	1	1	1	2.00	3465.0
137	80	83	1	1	1	2.00	3465.0
138	82	85	1	4	1	2.00	21037.5
139	81	82	1	5	1	3.70	4071.1
140	82	83	1	5	1	3.95	4343.9
141	84	87	1	1	1	2.00	3465.0
142	83	86	1	1	1	2.00	3465.0
143	85	88	1	4	1	2.00	21037.5
144	84	85	1	5	1	3.70	4071.1
145	85	86	1	5	1	3.95	4343.9
146	87	90	1	1	1	2.00	3465.0

Barra	Nudo inf.	Nudo sup.	Clase	Secci¢n	Material	Long.(m)	Peso(kg)
147	86	89	1	1	1	2.00	3465.0
148	88	91	1	4	1	2.00	21037.5
149	87	88	1	5	1	3.70	4071.1
150	88	89	1	5	1	3.95	4343.9
151	90	94	1	1	1	2.00	3465.0
152	89	92	1	1	1	2.00	3465.0
153	91	95	1	4	1	2.00	21037.5
154	90	91	1	5	1	3.70	4071.1
155	91	92	1	5	1	3.95	4343.9
156	94	98	1	1	1	2.00	3465.0
157	93	96	1	2	1	1.35	1860.5
158	95	97	1	4	1	1.79	18792.6
159	94	95	1	5	1	3.70	4071.1
160	95	96	1	9	1	2.81	2923.5
161	98	100	1	1	1	2.00	3465.0
162	97	99	1	2	1	0.40	546.6
163	98	99	1	5	1	3.37	3702.2
164	100	102	1	1	1	0.14	245.6
165	99	101	1	2	1	3.73	5122.2
166	100	101	1	10	1	0.22	131.2

Peso Total (kg) = 1131373
Clase 1... = Barra Emp.- Emp.
Clase 2... = Barra Art.- Emp.
Clase 3... = Barra Emp.- Art.
Clase 4... = Barra Art.- Art.

CONDICIONES DE CONTORNO

Nudo No.	Giro.s./eje X	Despl.s/eje Z	Giro.s./eje Y
1	24644.00000	Imp.	24644.34570
8	24644.00000	Imp.	24644.00000
31	Imp.	Imp.	Imp.
70	Imp.	Imp.	Imp.
93	24644.34570	Imp.	24644.34570
102	24644.34570	Imp.	24644.34570

C A R G A S G E N E R A L E S

Temperatura de referencia (construcci¢n). = 0

Hip¢tesis.		Temperatura	Peso propio.
1	C-1	0.000	NO

C A R G A S E N B A R R A S

Unidades en M. y Mp.

Hip.	Barra.	Carga.	Angl.	P1.	P2.	A1.	A2.
1	21	Punt.	-	5.000		1.575	
	22	Punt.	-	5.000		2.374	
	26	Punt.	-	5.000		1.575	
	27	Punt.	-	5.000		2.374	
	36	Punt.	-	5.000		1.575	
	37	Punt.	-	5.000		2.374	
	69	Punt.	-	5.000		1.575	
	70	Punt.	-	5.000		2.374	
	79	Punt.	-	5.000		1.575	
	80	Punt.	-	5.000		2.374	
	84	Punt.	-	5.000		1.575	
	85	Punt.	-	5.000		2.374	
	94	Punt.	-	5.000		1.575	
	95	Punt.	-	5.000		2.374	
	99	Punt.	-	5.000		1.575	
	100	Punt.	-	5.000		2.374	
	109	Punt.	-	5.000		1.575	
	110	Punt.	-	5.000		2.374	
	129	Punt.	-	5.000		1.575	
	130	Punt.	-	5.000		2.374	
	134	Punt.	-	5.000		1.575	
	135	Punt.	-	5.000		2.374	
	144	Punt.	-	5.000		1.575	
	145	Punt.	-	5.000		2.374	

C O M B I N A C I O N E S

Comb.	Hip.1
1	1.000

MOVIMIENTOS

ıdo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
1	C 1	0.0000254503	0.0000000000	0.0001045179
2	C 1	0.0000024570	-.0001981675	0.0001068625
3	C 1	-.0000310320	-.0002107749	0.0002081241
4	C 1	-.0000508205	-.0002531238	0.0000857244
5	C 1	-.0001096382	-.0001385680	0.0000536535
6	C 1	-.0000507625	-.0003525334	0.0000841572
7	C 1	-.0001628916	-.0007504955	0.0003159232
8	C 1	-.0001048007	0.0000000000	0.0000547438
9	C 1	-.0000436499	-.0002109802	0.0002918470
10	C 1	-.0000497892	-.0005114675	0.0000704804
11	C 1	-.0003519056	-.0014808860	0.0004008159
12	C 1	0.0001510309	-.0010384365	0.0004745834
13	C 1	-.0000468344	-.0006282843	0.0000420615
14	C 1	-.0005550686	-.0023621123	0.0004518466
15	C 1	0.0002835696	-.0019588452	0.0003624909
16	C 1	-.0000419824	-.0006735097	-.0000002957
17	C 1	-.0006374372	-.0032019846	0.0003133251
18	C 1	0.0005834149	-.0024889503	0.0001966145
19	C 1	-.0000356600	-.0006247568	-.0000468345
20	C 1	-.0009029320	-.0036257331	0.0001463038
21	C 1	0.0005761192	-.0027592594	0.0000153883
22	C 1	-.0000281210	-.0004886550	-.0000854476
23	C 1	-.0008361535	-.0037908447	-.0000424070
24	C 1	0.0005745039	-.0024896846	-.0002738664
25	C 1	-.0000195832	-.0002909314	-.0001024509

Nudo.	Hip¢tesis.	Giro. X.	Despl. Z.	Giro. Y.
26	C 1	-.0007970280	-.0033794788	-.0003541692
27	C 1	0.0006303303	-.0018052233	-.0003214051
28	C 1	-.0000101857	-.0000949603	-.0000779133
29	C 1	-.0008432107	-.0025264202	-.0003979842
30	C 1	0.0005780704	-.0013635037	-.0000888814
31	C 1	0.0000000000	0.0000000000	0.0000000000
32	C 1	-.0007770951	-.0019650983	-.0001255774
33	C 1	0.0005696943	-.0014864006	0.0002130556
34	C 1	-.0000051885	-.0001747933	0.0001537549
35	C 1	-.0007605514	-.0020646763	0.0002264776
36	C 1	0.0006215952	-.0021854911	0.0004599072
37	C 1	-.0000097317	-.0005898230	0.0002409436
38	C 1	-.0008158716	-.0028348034	0.0005129999
39	C 1	0.0006272212	-.0031990751	0.0004799817
40	C 1	-.0000136016	-.0011138610	0.0002639494
41	C 1	-.0008249913	-.0039744019	0.0005439353
42	C 1	0.0008563282	-.0040788967	0.0004270418
43	C 1	-.0000167243	-.0016247799	0.0002330610
44	C 1	-.0010902314	-.0049787592	0.0004868371
45	C 1	0.0008499197	-.0048905048	0.0003193434
46	C 1	-.0000189333	-.0020298853	0.0001604143
47	C 1	-.0010908273	-.0059023909	0.0003643747
48	C 1	0.0009143010	-.0052728616	0.0000603835
49	C 1	-.0000201516	-.0022554700	0.0000597132
50	C 1	-.0011711514	-.0063464441	0.0000760215
51	C 1	0.0010501238	-.0052333302	-.0000440464

Nudo.	Hipótesis.	Giro. X.	Despl. Z.	Giro. Y.
52	C 1	-.0000203097	-.0022659122	-.0000484484
53	C 1	-.0013283377	-.0063183052	-.0000439160
54	C 1	0.0009251055	-.0051031653	-.0001392321
55	C 1	-.0000193488	-.0020642802	-.0001496623
56	C 1	-.0011828425	-.0061775814	-.0001541102
57	C 1	0.0008756374	-.0045887437	-.0003698066
58	C 1	-.0000173199	-.0016752883	-.0002295281
59	C 1	-.0011185497	-.0056042559	-.0004126871
60	C 1	0.0009053902	-.0037226966	-.0004284966
61	C 1	-.0000142822	-.0011623098	-.0002674681
62	C 1	-.0011424526	-.0046323412	-.0004843509
63	C 1	0.0007115792	-.0029083556	-.0004116500
64	C 1	-.0000102980	-.0006267783	-.0002497713
65	C 1	-.0009124830	-.0037025753	-.0004708757
66	C 1	0.0007520595	-.0021167479	-.0003083714
67	C 1	-.0000055166	-.0001892031	-.0001641842
68	C 1	-.0009451811	-.0027921514	-.0003600730
69	C 1	0.0007436308	-.0017990847	0.0000062435
70	C 1	0.0000000000	0.0000000000	0.0000000000
71	C 1	-.0009187203	-.0023949901	-.0000190143
72	C 1	0.0007618731	-.0021200581	0.0002868465
73	C 1	0.0000045934	-.0000972934	0.0000799347
74	C 1	-.0009091716	-.0026862931	0.0002792375
75	C 1	0.0006925278	-.0027819190	0.0002850905
76	C 1	0.0000098981	-.0002989880	0.0001059494
77	C 1	-.0007856602	-.0033183210	0.0002537869

Nudo.	Hipótesis.	Giro. X.	Despl. Z.	Giro. Y.
78	C 1	0.0007096659	-.0031162242	0.0000362323
79	C 1	0.0000158633	-.0005049201	0.0000899792
80	C 1	-.0007478002	-.0035267409	-.0000592218
81	C 1	0.0007613123	-.0029915948	-.0001056912
82	C 1	0.0000223455	-.0006508202	0.0000519185
83	C 1	-.0007315554	-.0031362281	-.0002675276
84	C 1	0.0005287210	-.0026843313	-.0002378189
85	C 1	0.0000290167	-.0007099428	0.0000053843
86	C 1	-.0003756992	-.0024388845	-.0004578468
87	C 1	0.0004664084	-.0020261651	-.0003549361
88	C 1	0.0000352026	-.0006744937	-.0000375874
89	C 1	-.0002122011	-.0013071415	-.0005792869
90	C 1	0.0003018392	-.0013397417	-.0003095399
91	C 1	0.0000400884	-.0005655480	-.0000673092
92	C 1	0.0000203736	-.0002904120	-.0003667882
93	C 1	0.0001059965	0.0000000000	-.0000535983
94	C 1	0.0001515696	-.0007745282	-.0002482462
95	C 1	0.0000431022	-.0004111369	-.0000830367
96	C 1	0.0001152987	-.0000984528	-.0000471247
97	C 1	0.0000447274	-.0002569424	-.0000861601
98	C 1	0.0000438766	-.0003271146	-.0001920635
99	C 1	0.0000318397	-.0002495392	-.0000917881
100	C 1	-.0000186270	-.0000146175	-.0001065414
101	C 1	-.0000219686	-.0000195336	-.0001004128
102	C 1	-.0000214651	0.0000000000	-.0000981437

ESFUERZOS EN SISTEMA DE EJES LOCAL

Reducci¢n de I.Torsional en hormig¢n: Vigas 0 %, Losas 0 %

BARRA : 1 (8,9) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.477	-1.141	-2.868	
	m¡n.	-0.477	-1.141	-2.868	
	Cort.m x.	-0.477	-1.141	-2.868	
	m¡n.	-0.477	-1.141	-2.868	
	Flec.m x.	-0.477	-1.141	-2.868	
	m¡n.	-0.477	-1.141	-2.868	
1.13	Tor. m x.	-0.477	-1.141	-1.574	
	m¡n.	-0.477	-1.141	-1.574	
	Cort.m x.	-0.477	-1.141	-1.574	
	m¡n.	-0.477	-1.141	-1.574	
	Flec.m x.	-0.477	-1.141	-1.574	
	m¡n.	-0.477	-1.141	-1.574	

Flecha Tot. el s. m x =0.000211

BARRA : 2 (92,93) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.595	1.291	-1.790	
	m¡n.	-0.595	1.291	-1.790	
	Cort.m x.	-0.595	1.291	-1.790	
	m¡n.	-0.595	1.291	-1.790	
	Flec.m x.	-0.595	1.291	-1.790	
	m¡n.	-0.595	1.291	-1.790	

Flecha Tot. el s. m x =0.000290

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.27	Tor. m x.	-0.595	1.291	-3.434	
	m¡n.	-0.595	1.291	-3.434	
	Cort.m x.	-0.595	1.291	-3.434	
	m¡n.	-0.595	1.291	-3.434	
	Flec.m x.	-0.595	1.291	-3.434	
	m¡n.	-0.595	1.291	-3.434	

BARRA : 3 (5,8) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.132	3.160	2.302	
	m¡n.	-0.132	3.160	2.302	
	Cort.m x.	-0.132	3.160	2.302	
	m¡n.	-0.132	3.160	2.302	
	Flec.m x.	-0.132	3.160	2.302	
	m¡n.	-0.132	3.160	2.302	

Flecha Tot. el s. m x =0.000139

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.81	Tor. m x.	-0.132	3.160	-3.414	
	m¡n.	-0.132	3.160	-3.414	
	Cort.m x.	-0.132	3.160	-3.414	
	m¡n.	-0.132	3.160	-3.414	
	Flec.m x.	-0.132	3.160	-3.414	
	m¡n.	-0.132	3.160	-3.414	

BARRA : 4 (101,102) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.093	1.678	-1.090	
	m¡n.	1.093	1.678	-1.090	
	Cort.m x.	1.093	1.678	-1.090	
	m¡n.	1.093	1.678	-1.090	
	Flec.m x.	1.093	1.678	-1.090	
	m¡n.	1.093	1.678	-1.090	

Flecha Tot. el s. m x =0.000020

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.26	Tor. m x.	1.093	1.678	-1.533	
	m¡n.	1.093	1.678	-1.533	
	Cort.m x.	1.093	1.678	-1.533	
	m¡n.	1.093	1.678	-1.533	
	Flec.m x.	1.093	1.678	-1.533	
	m¡n.	1.093	1.678	-1.533	

BARRA : 5 (2,4) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.690	-2.361	4.687	
	m¡n.	0.690	-2.361	4.687	
	Cort.m x.	0.690	-2.361	4.687	
	m¡n.	0.690	-2.361	4.687	
	Flec.m x.	0.690	-2.361	4.687	
	m¡n.	0.690	-2.361	4.687	

Flecha Tot. el s. m x =0.000198

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.77	Tor. m x.	0.690	-2.361	8.865	
	m¡n.	0.690	-2.361	8.865	
	Cort.m x.	0.690	-2.361	8.865	
	m¡n.	0.690	-2.361	8.865	
	Flec.m x.	0.690	-2.361	8.865	
	m¡n.	0.690	-2.361	8.865	

Flecha Tot. el s. m x =0.000253

BARRA : 6 (96,97) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.262	-2.762	0.502	
	m¡n.	0.262	-2.762	0.502	
	Cort.m x.	0.262	-2.762	0.502	

m¡n.	0.262	-2.762	0.502	
Flec.m x.	0.262	-2.762	0.502	
m¡n.	0.262	-2.762	0.502	

Flecha Tot. el s. m x =0.000098

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.33	Tor. m x.	0.262	-2.762	9.694	
	m¡n.	0.262	-2.762	9.694	
	Cort.m x.	0.262	-2.762	9.694	
	m¡n.	0.262	-2.762	9.694	
	Flec.m x.	0.262	-2.762	9.694	
	m¡n.	0.262	-2.762	9.694	

Flecha Tot. el s. m x =0.000257

BARRA : 7 (4,6) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.068	-5.230	-0.822	
	m¡n.	-0.068	-5.230	-0.822	
	Cort.m x.	-0.068	-5.230	-0.822	
	m¡n.	-0.068	-5.230	-0.822	
	Flec.m x.	-0.068	-5.230	-0.822	
	m¡n.	-0.068	-5.230	-0.822	

Flecha Tot. el s. m x =0.000253

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.15	Tor. m x.	-0.068	-5.230	5.206	
	m¡n.	-0.068	-5.230	5.206	
	Cort.m x.	-0.068	-5.230	5.206	
	m¡n.	-0.068	-5.230	5.206	
	Flec.m x.	-0.068	-5.230	5.206	
	m¡n.	-0.068	-5.230	5.206	

Flecha Tot. el s. m x =0.000353

BARRA : 8 (30,33) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.037	0.020	-1.584	
	m¡n.	0.037	0.020	-1.584	
	Cort.m x.	0.037	0.020	-1.584	
	m¡n.	0.037	0.020	-1.584	
	Flec.m x.	0.037	0.020	-1.584	
	m¡n.	0.037	0.020	-1.584	

Flecha Tot. el s. m x =0.001364

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.037	0.020	-1.623	
	m¡n.	0.037	0.020	-1.623	
	Cort.m x.	0.037	0.020	-1.623	
	m¡n.	0.037	0.020	-1.623	
	Flec.m x.	0.037	0.020	-1.623	
	m¡n.	0.037	0.020	-1.623	

Flecha Tot. el s. m x =0.001486

BARRA : 9 (29,32) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.293	0.581	-0.865	
	m¡n.	-0.293	0.581	-0.865	
	Cort.m x.	-0.293	0.581	-0.865	
	m¡n.	-0.293	0.581	-0.865	
	Flec.m x.	-0.293	0.581	-0.865	
	m¡n.	-0.293	0.581	-0.865	

Flecha Tot. el s. m x =0.002526

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.293	0.581	-2.028	
	m¡n.	-0.293	0.581	-2.028	
	Cort.m x.	-0.293	0.581	-2.028	

m¡n.	-0.293	0.581	-2.028
Flec.m x.	-0.293	0.581	-2.028
m¡n.	-0.293	0.581	-2.028

Flecha Tot. el s. m x =0.001965

BARRA : 10 (31,34) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.485	-27.189	-151.129	
	m¡n.	3.485	-27.189	-151.129	
	Cort.m x.	3.485	-27.189	-151.129	
	m¡n.	3.485	-27.189	-151.129	
	Flec.m x.	3.485	-27.189	-151.129	
	m¡n.	3.485	-27.189	-151.129	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	3.485	-27.189	-96.750	
	m¡n.	3.485	-27.189	-96.750	
	Cort.m x.	3.485	-27.189	-96.750	
	m¡n.	3.485	-27.189	-96.750	
	Flec.m x.	3.485	-27.189	-96.750	
	m¡n.	3.485	-27.189	-96.750	

Flecha Tot. el s. m x =0.000175

BARRA : 11 (30,31) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.135	0.464	-0.194	
	m¡n.	-0.135	0.464	-0.194	
	Cort.m x.	-0.135	0.464	-0.194	
	m¡n.	-0.135	0.464	-0.194	
	Flec.m x.	-0.135	0.464	-0.194	
	m¡n.	-0.135	0.464	-0.194	

Flecha Tot. el s. m x =0.001364

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.135	0.464	-1.912	
	m¡n.	-0.135	0.464	-1.912	
	Cort.m x.	-0.135	0.464	-1.912	
	m¡n.	-0.135	0.464	-1.912	
	Flec.m x.	-0.135	0.464	-1.912	
	m¡n.	-0.135	0.464	-1.912	

BARRA : 12 (31,32) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.179	-0.561	-2.435	
	m¡n.	0.179	-0.561	-2.435	
	Cort.m x.	0.179	-0.561	-2.435	
	m¡n.	0.179	-0.561	-2.435	
	Flec.m x.	0.179	-0.561	-2.435	
	m¡n.	0.179	-0.561	-2.435	
3.95	Tor. m x.	0.179	-0.561	-0.219	
	m¡n.	0.179	-0.561	-0.219	
	Cort.m x.	0.179	-0.561	-0.219	
	m¡n.	0.179	-0.561	-0.219	
	Flec.m x.	0.179	-0.561	-0.219	
	m¡n.	0.179	-0.561	-0.219	

Flecha Tot. el s. m x =0.001965

BARRA : 13 (27,30) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.231	0.484	-0.751	
	m¡n.	0.231	0.484	-0.751	
	Cort.m x.	0.231	0.484	-0.751	
	m¡n.	0.231	0.484	-0.751	
	Flec.m x.	0.231	0.484	-0.751	
	m¡n.	0.231	0.484	-0.751	

Flecha Tot. el s. m x =0.001805

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.231	0.484	-1.719	
	m¡n.	0.231	0.484	-1.719	
	Cort.m x.	0.231	0.484	-1.719	
	m¡n.	0.231	0.484	-1.719	
	Flec.m x.	0.231	0.484	-1.719	
	m¡n.	0.231	0.484	-1.719	

Flecha Tot. el s. m x =0.001364

BARRA : 14 (26,29) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.204	1.554	1.786	
	m¡n.	0.204	1.554	1.786	
	Cort.m x.	0.204	1.554	1.786	
	m¡n.	0.204	1.554	1.786	
	Flec.m x.	0.204	1.554	1.786	
	m¡n.	0.204	1.554	1.786	

Flecha Tot. el s. m x =0.003379

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.204	1.554	-1.321	
	m¡n.	0.204	1.554	-1.321	
	Cort.m x.	0.204	1.554	-1.321	
	m¡n.	0.204	1.554	-1.321	
	Flec.m x.	0.204	1.554	-1.321	
	m¡n.	0.204	1.554	-1.321	

Flecha Tot. el s. m x =0.002526

BARRA : 15 (28,31) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-6.842	22.031	-40.774	
	m¡n.	-6.842	22.031	-40.774	
	Cort.m x.	-6.842	22.031	-40.774	
	m¡n.	-6.842	22.031	-40.774	
	Flec.m x.	-6.842	22.031	-40.774	
	m¡n.	-6.842	22.031	-40.774	

Flecha Tot. el s. m x =0.000095

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-6.842	22.031	-84.836	
	m¡n.	-6.842	22.031	-84.836	
	Cort.m x.	-6.842	22.031	-84.836	
	m¡n.	-6.842	22.031	-84.836	
	Flec.m x.	-6.842	22.031	-84.836	
	m¡n.	-6.842	22.031	-84.836	

BARRA : 16 (27,28) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.370	0.889	0.478	
	m¡n.	-0.370	0.889	0.478	
	Cort.m x.	-0.370	0.889	0.478	
	m¡n.	-0.370	0.889	0.478	
	Flec.m x.	-0.370	0.889	0.478	
	m¡n.	-0.370	0.889	0.478	

Flecha Tot. el s. m x =0.001805

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.370	0.889	-2.813	
	m¡n.	-0.370	0.889	-2.813	
	Cort.m x.	-0.370	0.889	-2.813	
	m¡n.	-0.370	0.889	-2.813	
	Flec.m x.	-0.370	0.889	-2.813	
	m¡n.	-0.370	0.889	-2.813	

Flecha Tot. el s. m x =0.000095

BARRA : 17 (28,29) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.455	-0.972	-3.342	
	m¡n.	0.455	-0.972	-3.342	
	Cort.m x.	0.455	-0.972	-3.342	
	m¡n.	0.455	-0.972	-3.342	
	Flec.m x.	0.455	-0.972	-3.342	
	m¡n.	0.455	-0.972	-3.342	

Flecha Tot. el s. m x =0.000095

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.455	-0.972	0.497	
	m¡n.	0.455	-0.972	0.497	
	Cort.m x.	0.455	-0.972	0.497	
	m¡n.	0.455	-0.972	0.497	
	Flec.m x.	0.455	-0.972	0.497	
	m¡n.	0.455	-0.972	0.497	

Flecha Tot. el s. m x =0.002526

BARRA : 18 (24,27) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.247	1.373	1.626	
	m¡n.	-0.247	1.373	1.626	
	Cort.m x.	-0.247	1.373	1.626	
	m¡n.	-0.247	1.373	1.626	
	Flec.m x.	-0.247	1.373	1.626	
	m¡n.	-0.247	1.373	1.626	

Flecha Tot. el s. m x =0.002490

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.247	1.373	-1.121	
	m¡n.	-0.247	1.373	-1.121	
	Cort.m x.	-0.247	1.373	-1.121	
	m¡n.	-0.247	1.373	-1.121	
	Flec.m x.	-0.247	1.373	-1.121	
	m¡n.	-0.247	1.373	-1.121	

Flecha Tot. el s. m x =0.001805

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BARRA : 19 (23,26) Sec. 1 Rect. /315,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.173	0.228	1.883	
	m¡n.	-0.173	0.228	1.883	
	Cort.m x.	-0.173	0.228	1.883	
	m¡n.	-0.173	0.228	1.883	
	Flec.m x.	-0.173	0.228	1.883	
	m¡n.	-0.173	0.228	1.883	

Flecha Tot. el s. m x =0.003791

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.173	0.228	1.428	
	m¡n.	-0.173	0.228	1.428	
	Cort.m x.	-0.173	0.228	1.428	
	m¡n.	-0.173	0.228	1.428	
	Flec.m x.	-0.173	0.228	1.428	
	m¡n.	-0.173	0.228	1.428	

Flecha Tot. el s. m x =0.003379

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BARRA : 20 (25,28) Sec. 4 Rect. /383,110/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-6.313	20.169	0.390	
	m¡n.	-6.313	20.169	0.390	
	Cort.m x.	-6.313	20.169	0.390	
	m¡n.	-6.313	20.169	0.390	
	Flec.m x.	-6.313	20.169	0.390	
	m¡n.	-6.313	20.169	0.390	

Flecha Tot. el s. m x =0.000291

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-6.313	20.169	-39.949	
	m¡n.	-6.313	20.169	-39.949	
	Cort.m x.	-6.313	20.169	-39.949	
	m¡n.	-6.313	20.169	-39.949	
	Flec.m x.	-6.313	20.169	-39.949	
	m¡n.	-6.313	20.169	-39.949	

Flecha Tot. el s. m x =0.000095

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BARRA : 21 (24,25) Sec. 5 Rect. /200,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.260	-1.202	-0.254	
	m¡n.	-0.260	-1.202	-0.254	
	Cort.m x.	-0.260	-1.202	-0.254	
	m¡n.	-0.260	-1.202	-0.254	
	Flec.m x.	-0.260	-1.202	-0.254	
	m¡n.	-0.260	-1.202	-0.254	

Flecha Tot. el s. m x =0.002490

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.260	3.798	-6.435	
	m¡n.	-0.260	3.798	-6.435	
	Cort.m x.	-0.260	3.798	-6.435	
	m¡n.	-0.260	3.798	-6.435	
	Flec.m x.	-0.260	3.798	-6.435	
	m¡n.	-0.260	3.798	-6.435	

Flecha Tot. el s. m x =0.000291

BARRA : 22 (25,26) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.358	-3.674	-7.012	
	m¡n.	0.358	-3.674	-7.012	
	Cort.m x.	0.358	-3.674	-7.012	
	m¡n.	0.358	-3.674	-7.012	
	Flec.m x.	0.358	-3.674	-7.012	
	m¡n.	0.358	-3.674	-7.012	

Flecha Tot. el s. m x =0.000291

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.358	1.326	-0.378	
	m¡n.	0.358	1.326	-0.378	
	Cort.m x.	0.358	1.326	-0.378	
	m¡n.	0.358	1.326	-0.378	
	Flec.m x.	0.358	1.326	-0.378	
	m¡n.	0.358	1.326	-0.378	

Flecha Tot. el s. m x =0.003379

BARRA : 23 (21,24) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.007	0.171	1.707	
	m¡n.	0.007	0.171	1.707	
	Cort.m x.	0.007	0.171	1.707	
	m¡n.	0.007	0.171	1.707	
	Flec.m x.	0.007	0.171	1.707	
	m¡n.	0.007	0.171	1.707	

Flecha Tot. el s. m x =0.002759

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.007	0.171	1.365	
	m¡n.	0.007	0.171	1.365	
	Cort.m x.	0.007	0.171	1.365	
	m¡n.	0.007	0.171	1.365	
	Flec.m x.	0.007	0.171	1.365	
	m¡n.	0.007	0.171	1.365	

Flecha Tot. el s. m x =0.002490

BARRA : 24 (20,23) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.296	-0.942	0.060	
	m¡n.	-0.296	-0.942	0.060	
	Cort.m x.	-0.296	-0.942	0.060	
	m¡n.	-0.296	-0.942	0.060	
	Flec.m x.	-0.296	-0.942	0.060	
	m¡n.	-0.296	-0.942	0.060	

Flecha Tot. el s. m x =0.003626

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.296	-0.942	1.945	
	m¡n.	-0.296	-0.942	1.945	
	Cort.m x.	-0.296	-0.942	1.945	
	m¡n.	-0.296	-0.942	1.945	
	Flec.m x.	-0.296	-0.942	1.945	
	m¡n.	-0.296	-0.942	1.945	

Flecha Tot. el s. m x =0.003791

BARRA : 25 (22,25) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-5.735	12.698	26.404	
	m¡n.	-5.735	12.698	26.404	
	Cort.m x.	-5.735	12.698	26.404	
	m¡n.	-5.735	12.698	26.404	
	Flec.m x.	-5.735	12.698	26.404	
	m¡n.	-5.735	12.698	26.404	

Flecha Tot. el s. m x =0.000489

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-5.735	12.698	1.009	
	m¡n.	-5.735	12.698	1.009	
	Cort.m x.	-5.735	12.698	1.009	
	m¡n.	-5.735	12.698	1.009	
	Flec.m x.	-5.735	12.698	1.009	
	m¡n.	-5.735	12.698	1.009	

Flecha Tot. el s. m x =0.000291

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BARRA : 26 (21,22) Sec. 5 Rect. /200,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.153	-1.068	-0.025	
	m¡n.	0.153	-1.068	-0.025	
	Cort.m x.	0.153	-1.068	-0.025	
	m¡n.	0.153	-1.068	-0.025	
	Flec.m x.	0.153	-1.068	-0.025	
	m¡n.	0.153	-1.068	-0.025	

Flecha Tot. el s. m x =0.002759

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.153	3.932	-6.701	
	m¡n.	0.153	3.932	-6.701	
	Cort.m x.	0.153	3.932	-6.701	
	m¡n.	0.153	3.932	-6.701	
	Flec.m x.	0.153	3.932	-6.701	
	m¡n.	0.153	3.932	-6.701	

Flecha Tot. el s. m x =0.000489

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BARRA : 27 (22,23) Sec. 5 Rect. /200,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.061	-3.830	-7.372	
	m¡n.	-0.061	-3.830	-7.372	
	Cort.m x.	-0.061	-3.830	-7.372	
	m¡n.	-0.061	-3.830	-7.372	
	Flec.m x.	-0.061	-3.830	-7.372	
	m¡n.	-0.061	-3.830	-7.372	

Flecha Tot. el s. m x =0.000489

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.061	1.170	-0.122	
	m¡n.	-0.061	1.170	-0.122	
	Cort.m x.	-0.061	1.170	-0.122	
	m¡n.	-0.061	1.170	-0.122	
	Flec.m x.	-0.061	1.170	-0.122	
	m¡n.	-0.061	1.170	-0.122	

Flecha Tot. el s. m x =0.003791

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BARRA : 28 (18,21) Sec. 1 Rect. /315,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.032	-0.898	0.065	
	m¡n.	0.032	-0.898	0.065	
	Cort.m x.	0.032	-0.898	0.065	
	m¡n.	0.032	-0.898	0.065	
	Flec.m x.	0.032	-0.898	0.065	
	m¡n.	0.032	-0.898	0.065	

Flecha Tot. el s. m x =0.002489

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.032	-0.898	1.860	
	m¡n.	0.032	-0.898	1.860	
	Cort.m x.	0.032	-0.898	1.860	
	m¡n.	0.032	-0.898	1.860	
	Flec.m x.	0.032	-0.898	1.860	
	m¡n.	0.032	-0.898	1.860	

Flecha Tot. el s. m x =0.002759

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BARRA : 29 (17,20) Sec. 1 Rect. /315,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.175	0.552	1.439	
	m¡n.	1.175	0.552	1.439	
	Cort.m x.	1.175	0.552	1.439	
	m¡n.	1.175	0.552	1.439	
	Flec.m x.	1.175	0.552	1.439	
	m¡n.	1.175	0.552	1.439	

Flecha Tot. el s. m x =0.003202

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.175	0.552	0.335	
	m¡n.	1.175	0.552	0.335	
	Cort.m x.	1.175	0.552	0.335	
	m¡n.	1.175	0.552	0.335	
	Flec.m x.	1.175	0.552	0.335	
	m¡n.	1.175	0.552	0.335	

Flecha Tot. el s. m x =0.003626

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BARRA : 30 (19,22) Sec. 4 Rect. /383,110/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-5.064	4.936	36.062	
	m¡n.	-5.064	4.936	36.062	
	Cort.m x.	-5.064	4.936	36.062	
	m¡n.	-5.064	4.936	36.062	
	Flec.m x.	-5.064	4.936	36.062	
	m¡n.	-5.064	4.936	36.062	

Flecha Tot. el s. m x =0.000625

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-5.064	4.936	26.189	
	m¡n.	-5.064	4.936	26.189	
	Cort.m x.	-5.064	4.936	26.189	
	m¡n.	-5.064	4.936	26.189	
	Flec.m x.	-5.064	4.936	26.189	
	m¡n.	-5.064	4.936	26.189	

Flecha Tot. el s. m x =0.000489

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BARRA : 31 (18,19) Sec. 5 Rect. /200,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.370	1.344	1.359	
	m¡n.	0.370	1.344	1.359	
	Cort.m x.	0.370	1.344	1.359	
	m¡n.	0.370	1.344	1.359	
	Flec.m x.	0.370	1.344	1.359	
	m¡n.	0.370	1.344	1.359	

Flecha Tot. el s. m x =0.002489

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.370	1.344	-3.615	
	m¡n.	0.370	1.344	-3.615	
	Cort.m x.	0.370	1.344	-3.615	
	m¡n.	0.370	1.344	-3.615	
	Flec.m x.	0.370	1.344	-3.615	
	m¡n.	0.370	1.344	-3.615	

Flecha Tot. el s. m x =0.000625

BARRA : 32 (19,20) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.275	-1.495	-4.433	
	m¡n.	-0.275	-1.495	-4.433	
	Cort.m x.	-0.275	-1.495	-4.433	
	m¡n.	-0.275	-1.495	-4.433	
	Flec.m x.	-0.275	-1.495	-4.433	
	m¡n.	-0.275	-1.495	-4.433	

Flecha Tot. el s. m x =0.000625

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.275	-1.495	1.471	
	m¡n.	-0.275	-1.495	1.471	
	Cort.m x.	-0.275	-1.495	1.471	
	m¡n.	-0.275	-1.495	1.471	
	Flec.m x.	-0.275	-1.495	1.471	
	m¡n.	-0.275	-1.495	1.471	

Flecha Tot. el s. m x =0.003626

BARRA : 33 (15,18) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.327	0.446	1.327	
	m¡n.	-1.327	0.446	1.327	
	Cort.m x.	-1.327	0.446	1.327	
	m¡n.	-1.327	0.446	1.327	
	Flec.m x.	-1.327	0.446	1.327	
	m¡n.	-1.327	0.446	1.327	

Flecha Tot. el s. m x =0.001959

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.327	0.446	0.434	
	m¡n.	-1.327	0.446	0.434	
	Cort.m x.	-1.327	0.446	0.434	
	m¡n.	-1.327	0.446	0.434	
	Flec.m x.	-1.327	0.446	0.434	
	m¡n.	-1.327	0.446	0.434	

Flecha Tot. el s. m x =0.002489

BARRA : 34 (14,17) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.365	-1.150	-0.414	
	m¡n.	0.365	-1.150	-0.414	
	Cort.m x.	0.365	-1.150	-0.414	
	m¡n.	0.365	-1.150	-0.414	
	Flec.m x.	0.365	-1.150	-0.414	
	m¡n.	0.365	-1.150	-0.414	

Flecha Tot. el s. m x =0.002362

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.365	-1.150	1.886	
	m¡n.	0.365	-1.150	1.886	
	Cort.m x.	0.365	-1.150	1.886	
	m¡n.	0.365	-1.150	1.886	
	Flec.m x.	0.365	-1.150	1.886	
	m¡n.	0.365	-1.150	1.886	

Flecha Tot. el s. m x =0.003202

BARRA : 35 (16,19) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.247	2.097	39.612	
	m¡n.	-4.247	2.097	39.612	
	Cort.m x.	-4.247	2.097	39.612	
	m¡n.	-4.247	2.097	39.612	
	Flec.m x.	-4.247	2.097	39.612	
	m¡n.	-4.247	2.097	39.612	

Flecha Tot. el s. m x =0.000674

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-4.247	2.097	35.417	
	m¡n.	-4.247	2.097	35.417	
	Cort.m x.	-4.247	2.097	35.417	
	m¡n.	-4.247	2.097	35.417	
	Flec.m x.	-4.247	2.097	35.417	
	m¡n.	-4.247	2.097	35.417	

Flecha Tot. el s. m x =0.000625

BARRA : 36 (15,16) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.551	-1.729	-0.740	
	m¡n.	0.551	-1.729	-0.740	
	Cort.m x.	0.551	-1.729	-0.740	
	m¡n.	0.551	-1.729	-0.740	
	Flec.m x.	0.551	-1.729	-0.740	
	m¡n.	0.551	-1.729	-0.740	

Flecha Tot. el s. m x =0.001959

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.551	3.271	-4.970	
	m¡n.	0.551	3.271	-4.970	
	Cort.m x.	0.551	3.271	-4.970	
	m¡n.	0.551	3.271	-4.970	
	Flec.m x.	0.551	3.271	-4.970	
	m¡n.	0.551	3.271	-4.970	

Flecha Tot. el s. m x =0.000674

BARRA : 37 (16,17) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.446	-3.298	-5.957	
	m¡n.	-0.446	-3.298	-5.957	
	Cort.m x.	-0.446	-3.298	-5.957	
	m¡n.	-0.446	-3.298	-5.957	
	Flec.m x.	-0.446	-3.298	-5.957	
	m¡n.	-0.446	-3.298	-5.957	

Flecha Tot. el s. m x =0.000674

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.446	1.702	-0.810	
	m¡n.	-0.446	1.702	-0.810	
	Cort.m x.	-0.446	1.702	-0.810	
	m¡n.	-0.446	1.702	-0.810	
	Flec.m x.	-0.446	1.702	-0.810	
	m¡n.	-0.446	1.702	-0.810	

Flecha Tot. el s. m x =0.003202

BARRA : 38 (12,15) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.587	-1.283	-0.688	
	m¡n.	-0.587	-1.283	-0.688	
	Cort.m x.	-0.587	-1.283	-0.688	
	m¡n.	-0.587	-1.283	-0.688	
	Flec.m x.	-0.587	-1.283	-0.688	
	m¡n.	-0.587	-1.283	-0.688	

Flecha Tot. el s. m x =0.001038

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.587	-1.283	1.878	
	m¡n.	-0.587	-1.283	1.878	
	Cort.m x.	-0.587	-1.283	1.878	
	m¡n.	-0.587	-1.283	1.878	
	Flec.m x.	-0.587	-1.283	1.878	
	m¡n.	-0.587	-1.283	1.878	

Flecha Tot. el s. m x =0.001959

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BARRA : 39 (11,14) Sec. 1 Rect. /315,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.899	-0.440	-0.711	
	m¡n.	0.899	-0.440	-0.711	
	Cort.m x.	0.899	-0.440	-0.711	
	m¡n.	0.899	-0.440	-0.711	
	Flec.m x.	0.899	-0.440	-0.711	
	m¡n.	0.899	-0.440	-0.711	

Flecha Tot. el s. m x =0.001481

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.899	-0.440	0.169	
	m¡n.	0.899	-0.440	0.169	
	Cort.m x.	0.899	-0.440	0.169	
	m¡n.	0.899	-0.440	0.169	
	Flec.m x.	0.899	-0.440	0.169	
	m¡n.	0.899	-0.440	0.169	

Flecha Tot. el s. m x =0.002362

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BARRA : 40 (13,16) Sec. 4 Rect. /383,110/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.259	-4.471	29.673	
	m¡n.	-3.259	-4.471	29.673	
	Cort.m x.	-3.259	-4.471	29.673	
	m¡n.	-3.259	-4.471	29.673	
	Flec.m x.	-3.259	-4.471	29.673	
	m¡n.	-3.259	-4.471	29.673	

Flecha Tot. el s. m x =0.000628

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-3.259	-4.471	38.614	
	m¡n.	-3.259	-4.471	38.614	
	Cort.m x.	-3.259	-4.471	38.614	
	m¡n.	-3.259	-4.471	38.614	
	Flec.m x.	-3.259	-4.471	38.614	
	m¡n.	-3.259	-4.471	38.614	

Flecha Tot. el s. m x =0.000674

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BARRA : 41 (12,13) Sec. 5 Rect. /200,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.657	0.343	0.275	
	m¡n.	0.657	0.343	0.275	
	Cort.m x.	0.657	0.343	0.275	
	m¡n.	0.657	0.343	0.275	
	Flec.m x.	0.657	0.343	0.275	
	m¡n.	0.657	0.343	0.275	

Flecha Tot. el s. m x =0.001038

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.657	0.343	-0.996	
	m¡n.	0.657	0.343	-0.996	
	Cort.m x.	0.657	0.343	-0.996	
	m¡n.	0.657	0.343	-0.996	
	Flec.m x.	0.657	0.343	-0.996	
	m¡n.	0.657	0.343	-0.996	

Flecha Tot. el s. m x =0.000628

BARRA : 42 (13,14) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.583	-0.710	-2.270	
	m¡n.	-0.583	-0.710	-2.270	
	Cort.m x.	-0.583	-0.710	-2.270	
	m¡n.	-0.583	-0.710	-2.270	
	Flec.m x.	-0.583	-0.710	-2.270	
	m¡n.	-0.583	-0.710	-2.270	

Flecha Tot. el s. m x =0.000628

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.583	-0.710	0.535	
	m¡n.	-0.583	-0.710	0.535	
	Cort.m x.	-0.583	-0.710	0.535	
	m¡n.	-0.583	-0.710	0.535	
	Flec.m x.	-0.583	-0.710	0.535	
	m¡n.	-0.583	-0.710	0.535	

Flecha Tot. el s. m x =0.002362

BARRA : 43 (9,12) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.862	-0.940	-1.910	
	m¡n.	-0.862	-0.940	-1.910	
	Cort.m x.	-0.862	-0.940	-1.910	
	m¡n.	-0.862	-0.940	-1.910	
	Flec.m x.	-0.862	-0.940	-1.910	
	m¡n.	-0.862	-0.940	-1.910	

Flecha Tot. el s. m x =0.000211

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.862	-0.940	-0.031	
	m¡n.	-0.862	-0.940	-0.031	
	Cort.m x.	-0.862	-0.940	-0.031	
	m¡n.	-0.862	-0.940	-0.031	
	Flec.m x.	-0.862	-0.940	-0.031	
	m¡n.	-0.862	-0.940	-0.031	

Flecha Tot. el s. m x =0.001038

BARRA : 44 (7,11) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.836	-0.210	-0.661	
	m¡n.	0.836	-0.210	-0.661	
	Cort.m x.	0.836	-0.210	-0.661	
	m¡n.	0.836	-0.210	-0.661	
	Flec.m x.	0.836	-0.210	-0.661	
	m¡n.	0.836	-0.210	-0.661	

Flecha Tot. el s. m x =0.000750

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.836	-0.210	-0.241	
	m¡n.	0.836	-0.210	-0.241	
	Cort.m x.	0.836	-0.210	-0.241	
	m¡n.	0.836	-0.210	-0.241	
	Flec.m x.	0.836	-0.210	-0.241	
	m¡n.	0.836	-0.210	-0.241	

Flecha Tot. el s. m x =0.001481

BARRA : 45 (10,13) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.985	-5.525	17.383	
	m¡n.	-1.985	-5.525	17.383	
	Cort.m x.	-1.985	-5.525	17.383	
	m¡n.	-1.985	-5.525	17.383	
	Flec.m x.	-1.985	-5.525	17.383	
	m¡n.	-1.985	-5.525	17.383	

Flecha Tot. el s. m x =0.000511

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.985	-5.525	28.433	
	m¡n.	-1.985	-5.525	28.433	
	Cort.m x.	-1.985	-5.525	28.433	
	m¡n.	-1.985	-5.525	28.433	
	Flec.m x.	-1.985	-5.525	28.433	
	m¡n.	-1.985	-5.525	28.433	

Flecha Tot. el s. m x =0.000628

BARRA : 46 (9,10) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.336	-0.202	-0.384	
	m¡n.	0.336	-0.202	-0.384	
	Cort.m x.	0.336	-0.202	-0.384	
	m¡n.	0.336	-0.202	-0.384	
	Flec.m x.	0.336	-0.202	-0.384	
	m¡n.	0.336	-0.202	-0.384	

Flecha Tot. el s. m x =0.000211

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.336	-0.202	0.362	
	m¡n.	0.336	-0.202	0.362	
	Cort.m x.	0.336	-0.202	0.362	
	m¡n.	0.336	-0.202	0.362	
	Flec.m x.	0.336	-0.202	0.362	
	m¡n.	0.336	-0.202	0.362	

Flecha Tot. el s. m x =0.000511

BARRA : 47 (10,11) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.470	-0.230	-0.969	
	m¡n.	-0.470	-0.230	-0.969	
	Cort.m x.	-0.470	-0.230	-0.969	
	m¡n.	-0.470	-0.230	-0.969	
	Flec.m x.	-0.470	-0.230	-0.969	
	m¡n.	-0.470	-0.230	-0.969	

Flecha Tot. el s. m x =0.000511

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.470	-0.230	-0.063	
	m¡n.	-0.470	-0.230	-0.063	
	Cort.m x.	-0.470	-0.230	-0.063	
	m¡n.	-0.470	-0.230	-0.063	
	Flec.m x.	-0.470	-0.230	-0.063	
	m¡n.	-0.470	-0.230	-0.063	

Flecha Tot. el s. m x =0.001481

BARRA : 48 (4,5) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Cort.m x.	0.001	2.869	9.318	
	m¡n.	0.001	2.869	9.318	
	Flec.m x.	0.001	2.869	9.318	
	m¡n.	0.001	2.869	9.318	

Flecha Tot. el s. m x =0.000253

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.41	Cort.m x.	0.001	2.869	2.412	
	m¡n.	0.001	2.869	2.412	
	Flec.m x.	0.001	2.869	2.412	
	m¡n.	0.001	2.869	2.412	

Flecha Tot. el s. m x =0.000139

BARRA : 49 (3,7) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.584	-0.241	-0.814	
	m¡n.	0.584	-0.241	-0.814	
	Cort.m x.	0.584	-0.241	-0.814	
	m¡n.	0.584	-0.241	-0.814	
	Flec.m x.	0.584	-0.241	-0.814	
	m¡n.	0.584	-0.241	-0.814	

Flecha Tot. el s. m x =0.000211

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.584	-0.241	-0.331	
	m¡n.	0.584	-0.241	-0.331	
	Cort.m x.	0.584	-0.241	-0.331	
	m¡n.	0.584	-0.241	-0.331	
	Flec.m x.	0.584	-0.241	-0.331	
	m¡n.	0.584	-0.241	-0.331	

Flecha Tot. el s. m x =0.000750

BARRA : 50 (6,10) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.654	-5.553	5.472	
	m¡n.	-0.654	-5.553	5.472	
	Cort.m x.	-0.654	-5.553	5.472	
	m¡n.	-0.654	-5.553	5.472	

Flec.m x.	-0.654	-5.553	5.472	
m¡n.	-0.654	-5.553	5.472	

Flecha Tot. el s. m x =0.000353

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.654	-5.553	16.577	
	m¡n.	-0.654	-5.553	16.577	
	Cort.m x.	-0.654	-5.553	16.577	
	m¡n.	-0.654	-5.553	16.577	
	Flec.m x.	-0.654	-5.553	16.577	
	m¡n.	-0.654	-5.553	16.577	

Flecha Tot. el s. m x =0.000511

BARRA : 51 (5,6) Sec. 6 Rect. /158,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.064	-0.292	-0.160	
	m¡n.	-0.064	-0.292	-0.160	
	Cort.m x.	-0.064	-0.292	-0.160	
	m¡n.	-0.064	-0.292	-0.160	
	Flec.m x.	-0.064	-0.292	-0.160	
	m¡n.	-0.064	-0.292	-0.160	

Flecha Tot. el s. m x =0.000139

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.11	Tor. m x.	-0.064	-0.292	0.456	
	m¡n.	-0.064	-0.292	0.456	
	Cort.m x.	-0.064	-0.292	0.456	
	m¡n.	-0.064	-0.292	0.456	
	Flec.m x.	-0.064	-0.292	0.456	
	m¡n.	-0.064	-0.292	0.456	

Flecha Tot. el s. m x =0.000353

BARRA : 52 (6,7) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.330	0.031	-0.130	
	m¡n.	-0.330	0.031	-0.130	
	Cort.m x.	-0.330	0.031	-0.130	
	m¡n.	-0.330	0.031	-0.130	
	Flec.m x.	-0.330	0.031	-0.130	
	m¡n.	-0.330	0.031	-0.130	

Flecha Tot. el s. m x =0.000353

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.330	0.031	-0.253	
	m¡n.	-0.330	0.031	-0.253	
	Cort.m x.	-0.330	0.031	-0.253	
	m¡n.	-0.330	0.031	-0.253	
	Flec.m x.	-0.330	0.031	-0.253	
	m¡n.	-0.330	0.031	-0.253	

Flecha Tot. el s. m x =0.000750

BARRA : 53 (1,2) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.841	-2.258	-1.609	
	m¡n.	0.841	-2.258	-1.609	
	Cort.m x.	0.841	-2.258	-1.609	
	m¡n.	0.841	-2.258	-1.609	
	Flec.m x.	0.841	-2.258	-1.609	
	m¡n.	0.841	-2.258	-1.609	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.73	Tor. m x.	0.841	-2.258	4.553	
	m¡n	0.841	-2.258	4.553	
	Cort.m x.	0.841	-2.258	4.553	
	m¡n.	0.841	-2.258	4.553	
	Flec.m x.	0.841	-2.258	4.553	
	m¡n.	0.841	-2.258	4.553	

Flecha Tot. el s. m x =0.000198

BARRA : 54 (1,3) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.383	-0.344	-1.067	
	m¡n.	0.383	-0.344	-1.067	
	Cort.m x.	0.383	-0.344	-1.067	
	m¡n.	0.383	-0.344	-1.067	
	Flec.m x.	0.383	-0.344	-1.067	
	m¡n.	0.383	-0.344	-1.067	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.31	Tor. m x.	0.383	-0.344	-0.617	
	m¡n.	0.383	-0.344	-0.617	
	Cort.m x.	0.383	-0.344	-0.617	
	m¡n.	0.383	-0.344	-0.617	
	Flec.m x.	0.383	-0.344	-0.617	
	m¡n.	0.383	-0.344	-0.617	

Flecha Tot. el s. m x =0.000211

BARRA : 55 (2,3) Sec. 7 Rect. /165,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.196	0.103	0.045	
	m¡n.	-0.196	0.103	0.045	
	Cort.m x.	-0.196	0.103	0.045	
	m¡n.	-0.196	0.103	0.045	
	Flec.m x.	-0.196	0.103	0.045	
	m¡n.	-0.196	0.103	0.045	

Flecha Tot. el s. m x =0.000198

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.40	Tor. m x.	-0.196	0.103	-0.201	
	m¡n.	-0.196	0.103	-0.201	
	Cort.m x.	-0.196	0.103	-0.201	
	m¡n.	-0.196	0.103	-0.201	
	Flec.m x.	-0.196	0.103	-0.201	
	m¡n.	-0.196	0.103	-0.201	

Flecha Tot. el s. m x =0.000211

BARRA : 56 (33,36) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.230	-0.402	-1.713	
	m¡n.	-0.230	-0.402	-1.713	
	Cort.m x.	-0.230	-0.402	-1.713	
	m¡n.	-0.230	-0.402	-1.713	
	Flec.m x.	-0.230	-0.402	-1.713	
	m¡n.	-0.230	-0.402	-1.713	

Flecha Tot. el s. m x =0.001486

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.230	-0.402	-0.909	
	m¡n.	-0.230	-0.402	-0.909	
	Cort.m x.	-0.230	-0.402	-0.909	
	m¡n.	-0.230	-0.402	-0.909	
	Flec.m x.	-0.230	-0.402	-0.909	
	m¡n.	-0.230	-0.402	-0.909	

Flecha Tot. el s. m x =0.002185

BARRA : 57 (32,35) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.073	0.020	-1.849	
	m¡n.	-0.073	0.020	-1.849	
	Cort.m x.	-0.073	0.020	-1.849	
	m¡n.	-0.073	0.020	-1.849	
	Flec.m x.	-0.073	0.020	-1.849	
	m¡n.	-0.073	0.020	-1.849	

Flecha Tot. el s. m x =0.001965

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.073	0.020	-1.890	
	m¡n.	-0.073	0.020	-1.890	
	Cort.m x.	-0.073	0.020	-1.890	
	m¡n.	-0.073	0.020	-1.890	
	Flec.m x.	-0.073	0.020	-1.890	
	m¡n.	-0.073	0.020	-1.890	

Flecha Tot. el s. m x =0.002065

BARRA : 58 (34,37) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	3.052	-26.275	-96.557	
	m¡n.	3.052	-26.275	-96.557	
	Cort.m x.	3.052	-26.275	-96.557	
	m¡n.	3.052	-26.275	-96.557	
	Flec.m x.	3.052	-26.275	-96.557	
	m¡n.	3.052	-26.275	-96.557	

Flecha Tot. el s. m x =0.000175

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	3.052	-26.275	-44.006	
	m¡n.	3.052	-26.275	-44.006	
	Cort.m x.	3.052	-26.275	-44.006	
	m¡n.	3.052	-26.275	-44.006	
	Flec.m x.	3.052	-26.275	-44.006	
	m¡n.	3.052	-26.275	-44.006	

Flecha Tot. el s. m x =0.000590

BARRA : 59 (33,34) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.090	0.422	-0.267	
	m¡n.	0.090	0.422	-0.267	
	Cort.m x.	0.090	0.422	-0.267	
	m¡n.	0.090	0.422	-0.267	
	Flec.m x.	0.090	0.422	-0.267	
	m¡n.	0.090	0.422	-0.267	

Flecha Tot. el s. m x =0.001486

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.090	0.422	-1.828	
	m¡n.	0.090	0.422	-1.828	
	Cort.m x.	0.090	0.422	-1.828	
	m¡n.	0.090	0.422	-1.828	
	Flec.m x.	0.090	0.422	-1.828	
	m¡n.	0.090	0.422	-1.828	

Flecha Tot. el s. m x =0.000175

BARRA : 60 (34,35) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.103	-0.492	-2.262	
	m¡n.	-0.103	-0.492	-2.262	
	Cort.m x.	-0.103	-0.492	-2.262	
	m¡n.	-0.103	-0.492	-2.262	
	Flec.m x.	-0.103	-0.492	-2.262	
	m¡n.	-0.103	-0.492	-2.262	

Flecha Tot. el s. m x =0.000175

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.103	-0.492	-0.318	
	m¡n.	-0.103	-0.492	-0.318	
	Cort.m x.	-0.103	-0.492	-0.318	
	m¡n.	-0.103	-0.492	-0.318	
	Flec.m x.	-0.103	-0.492	-0.318	
	m¡n.	-0.103	-0.492	-0.318	

Flecha Tot. el s. m x =0.002065

BARRA : 61 (36,39) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.025	-1.135	-1.241	
	m¡n.	-0.025	-1.135	-1.241	
	Cort.m x.	-0.025	-1.135	-1.241	
	m¡n.	-0.025	-1.135	-1.241	
	Flec.m x.	-0.025	-1.135	-1.241	
	m¡n.	-0.025	-1.135	-1.241	

Flecha Tot. el s. m x =0.002185

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.025	-1.135	1.028	
	m¡n.	-0.025	-1.135	1.028	
	Cort.m x.	-0.025	-1.135	1.028	
	m¡n.	-0.025	-1.135	1.028	
	Flec.m x.	-0.025	-1.135	1.028	
	m¡n.	-0.025	-1.135	1.028	

Flecha Tot. el s. m x =0.003199

BARRA : 62 (35,38) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.245	-0.472	-1.994	
	m¡n.	0.245	-0.472	-1.994	
	Cort.m x.	0.245	-0.472	-1.994	
	m¡n.	0.245	-0.472	-1.994	
	Flec.m x.	0.245	-0.472	-1.994	
	m¡n.	0.245	-0.472	-1.994	

Flecha Tot. el s. m x =0.002065

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.245	-0.472	-1.050	
	m¡n.	0.245	-0.472	-1.050	
	Cort.m x.	0.245	-0.472	-1.050	
	m¡n.	0.245	-0.472	-1.050	
	Flec.m x.	0.245	-0.472	-1.050	
	m¡n.	0.245	-0.472	-1.050	

Flecha Tot. el s. m x =0.002835

BARRA : 63 (37,40) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.600	-24.742	-43.287	
	m¡n.	2.600	-24.742	-43.287	
	Cort.m x.	2.600	-24.742	-43.287	
	m¡n.	2.600	-24.742	-43.287	
	Flec.m x.	2.600	-24.742	-43.287	
	m¡n.	2.600	-24.742	-43.287	

Flecha Tot. el s. m x =0.000590

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	2.600	-24.742	6.197	
	m¡n.	2.600	-24.742	6.197	
	Cort.m x.	2.600	-24.742	6.197	
	m¡n.	2.600	-24.742	6.197	
	Flec.m x.	2.600	-24.742	6.197	
	m¡n.	2.600	-24.742	6.197	

Flecha Tot. el s. m x =0.001114

BARRA : 64 (36,37) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.332	0.732	0.205	
	m¡n.	0.332	0.732	0.205	
	Cort.m x.	0.332	0.732	0.205	
	m¡n.	0.332	0.732	0.205	
	Flec.m x.	0.332	0.732	0.205	
	m¡n.	0.332	0.732	0.205	

Flecha Tot. el s. m x =0.002185

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.332	0.732	-2.506	
	m¡n.	0.332	0.732	-2.506	
	Cort.m x.	0.332	0.732	-2.506	
	m¡n.	0.332	0.732	-2.506	
	Flec.m x.	0.332	0.732	-2.506	
	m¡n.	0.332	0.732	-2.506	

Flecha Tot. el s. m x =0.000590

BARRA : 65 (37,38) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.387	-0.801	-2.958	
	m¡n.	-0.387	-0.801	-2.958	
	Cort.m x.	-0.387	-0.801	-2.958	
	m¡n.	-0.387	-0.801	-2.958	
	Flec.m x.	-0.387	-0.801	-2.958	
	m¡n.	-0.387	-0.801	-2.958	

Flecha Tot. el s. m x =0.000590

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.387	-0.801	0.204	
	m¡n.	-0.387	-0.801	0.204	
	Cort.m x.	-0.387	-0.801	0.204	
	m¡n.	-0.387	-0.801	0.204	
	Flec.m x.	-0.387	-0.801	0.204	
	m¡n.	-0.387	-0.801	0.204	

Flecha Tot. el s. m x =0.002835

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BARRA : 66 (39,42) Sec. 1 Rect. /315,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.014	0.419	0.700	
	m¡n.	-1.014	0.419	0.700	
	Cort.m x.	-1.014	0.419	0.700	
	m¡n.	-1.014	0.419	0.700	
	Flec.m x.	-1.014	0.419	0.700	
	m¡n.	-1.014	0.419	0.700	

Flecha Tot. el s. m x =0.003199

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.014	0.419	-0.138	
	m¡n.	-1.014	0.419	-0.138	
	Cort.m x.	-1.014	0.419	-0.138	
	m¡n.	-1.014	0.419	-0.138	
	Flec.m x.	-1.014	0.419	-0.138	
	m¡n.	-1.014	0.419	-0.138	

Flecha Tot. el s. m x =0.004079

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BARRA : 67 (38,41) Sec. 1 Rect. /315,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.040	-1.273	-1.437	
	m¡n.	0.040	-1.273	-1.437	
	Cort.m x.	0.040	-1.273	-1.437	
	m¡n.	0.040	-1.273	-1.437	
	Flec.m x.	0.040	-1.273	-1.437	
	m¡n.	0.040	-1.273	-1.437	

Flecha Tot. el s. m x =0.002835

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.040	-1.273	1.108	
	m¡n.	0.040	-1.273	1.108	
	Cort.m x.	0.040	-1.273	1.108	
	m¡n.	0.040	-1.273	1.108	
	Flec.m x.	0.040	-1.273	1.108	
	m¡n.	0.040	-1.273	1.108	

Flecha Tot. el s. m x =0.003974

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BARRA : 68 (40,43) Sec. 4 Rect. /383,110/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	2.098	-17.975	6.924	
	m¡n.	2.098	-17.975	6.924	
	Cort.m x.	2.098	-17.975	6.924	
	m¡n.	2.098	-17.975	6.924	
	Flec.m x.	2.098	-17.975	6.924	
	m¡n.	2.098	-17.975	6.924	

Flecha Tot. el s. m x =0.001114

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	2.098	-17.975	42.874	
	m¡n.	2.098	-17.975	42.874	
	Cort.m x.	2.098	-17.975	42.874	
	m¡n.	2.098	-17.975	42.874	
	Flec.m x.	2.098	-17.975	42.874	
	m¡n.	2.098	-17.975	42.874	

Flecha Tot. el s. m x =0.001625

BARRA : 69 (39,40) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.328	-1.553	-0.989	
	m¡n.	0.328	-1.553	-0.989	
	Cort.m x.	0.328	-1.553	-0.989	
	m¡n.	0.328	-1.553	-0.989	
	Flec.m x.	0.328	-1.553	-0.989	
	m¡n.	0.328	-1.553	-0.989	

Flecha Tot. el s. m x =0.003199

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.328	3.447	-5.870	
	m¡n.	0.328	3.447	-5.870	
	Cort.m x.	0.328	3.447	-5.870	
	m¡n.	0.328	3.447	-5.870	
	Flec.m x.	0.328	3.447	-5.870	
	m¡n.	0.328	3.447	-5.870	

Flecha Tot. el s. m x =0.001114

BARRA : 70 (40,41) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.398	-3.321	-6.372	
	m¡n.	-0.398	-3.321	-6.372	
	Cort.m x.	-0.398	-3.321	-6.372	
	m¡n.	-0.398	-3.321	-6.372	
	Flec.m x.	-0.398	-3.321	-6.372	
	m¡n.	-0.398	-3.321	-6.372	

Flecha Tot. el s. m x =0.001114

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.398	1.679	-1.133	
	m¡n.	-0.398	1.679	-1.133	
	Cort.m x.	-0.398	1.679	-1.133	
	m¡n.	-0.398	1.679	-1.133	
	Flec.m x.	-0.398	1.679	-1.133	
	m¡n.	-0.398	1.679	-1.133	

Flecha Tot. el s. m x =0.003974

BARRA : 71 (42,45) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.028	-1.004	-0.432	
	m¡n.	0.028	-1.004	-0.432	
	Cort.m x.	0.028	-1.004	-0.432	
	m¡n.	0.028	-1.004	-0.432	
	Flec.m x.	0.028	-1.004	-0.432	
	m¡n.	0.028	-1.004	-0.432	

Flecha Tot. el s. m x =0.004079

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.028	-1.004	1.576	
	m¡n.	0.028	-1.004	1.576	
	Cort.m x.	0.028	-1.004	1.576	
	m¡n.	0.028	-1.004	1.576	
	Flec.m x.	0.028	-1.004	1.576	
	m¡n.	0.028	-1.004	1.576	

Flecha Tot. el s. m x =0.004891

BARRA : 72 (41,44) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.174	0.407	0.710	
	m¡n.	1.174	0.407	0.710	
	Cort.m x.	1.174	0.407	0.710	
	m¡n.	1.174	0.407	0.710	
	Flec.m x.	1.174	0.407	0.710	
	m¡n.	1.174	0.407	0.710	

Flecha Tot. el s. m x =0.003974

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.174	0.407	-0.103	
	m¡n.	1.174	0.407	-0.103	
	Cort.m x.	1.174	0.407	-0.103	
	m¡n.	1.174	0.407	-0.103	
	Flec.m x.	1.174	0.407	-0.103	
	m¡n.	1.174	0.407	-0.103	

Flecha Tot. el s. m x =0.004979

BARRA : 73 (43,46) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.484	-15.030	43.529	
	m¡n.	1.484	-15.030	43.529	
	Cort.m x.	1.484	-15.030	43.529	
	m¡n.	1.484	-15.030	43.529	
	Flec.m x.	1.484	-15.030	43.529	
	m¡n.	1.484	-15.030	43.529	

Flecha Tot. el s. m x =0.001625

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.484	-15.030	73.590	
	m¡n.	1.484	-15.030	73.590	
	Cort.m x.	1.484	-15.030	73.590	
	m¡n.	1.484	-15.030	73.590	
	Flec.m x.	1.484	-15.030	73.590	
	m¡n.	1.484	-15.030	73.590	

Flecha Tot. el s. m x =0.002030

BARRA : 74 (42,43) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.295	1.423	1.042	
	m¡n.	0.295	1.423	1.042	
	Cort.m x.	0.295	1.423	1.042	
	m¡n.	0.295	1.423	1.042	
	Flec.m x.	0.295	1.423	1.042	
	m¡n.	0.295	1.423	1.042	

Flecha Tot. el s. m x =0.004079

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.295	1.423	-4.224	
	m¡n.	0.295	1.423	-4.224	
	Cort.m x.	0.295	1.423	-4.224	
	m¡n.	0.295	1.423	-4.224	
	Flec.m x.	0.295	1.423	-4.224	
	m¡n.	0.295	1.423	-4.224	

Flecha Tot. el s. m x =0.001625

BARRA : 75 (43,44) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.361	-1.522	-4.838	
	m¡n.	-0.361	-1.522	-4.838	
	Cort.m x.	-0.361	-1.522	-4.838	
	m¡n.	-0.361	-1.522	-4.838	
	Flec.m x.	-0.361	-1.522	-4.838	
	m¡n.	-0.361	-1.522	-4.838	

Flecha Tot. el s. m x =0.001625

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.361	-1.522	1.171	
	m¡n.	-0.361	-1.522	1.171	
	Cort.m x.	-0.361	-1.522	1.171	
	m¡n.	-0.361	-1.522	1.171	
	Flec.m x.	-0.361	-1.522	1.171	
	m¡n.	-0.361	-1.522	1.171	

Flecha Tot. el s. m x =0.004979

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BARRA : 76 (45,48) Sec. 1 Rect. /315,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.285	-0.040	1.335	
	m¡n.	-0.285	-0.040	1.335	
	Cort.m x.	-0.285	-0.040	1.335	
	m¡n.	-0.285	-0.040	1.335	
	Flec.m x.	-0.285	-0.040	1.335	
	m¡n.	-0.285	-0.040	1.335	

Flecha Tot. el s. m x =0.004891

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.285	-0.040	1.416	
	m¡n.	-0.285	-0.040	1.416	
	Cort.m x.	-0.285	-0.040	1.416	
	m¡n.	-0.285	-0.040	1.416	
	Flec.m x.	-0.285	-0.040	1.416	
	m¡n.	-0.285	-0.040	1.416	

Flecha Tot. el s. m x =0.005273

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BARRA : 77 (44,47) Sec. 1 Rect. /315,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.003	-1.115	-0.465	
	m¡n.	0.003	-1.115	-0.465	
	Cort.m x.	0.003	-1.115	-0.465	
	m¡n.	0.003	-1.115	-0.465	
	Flec.m x.	0.003	-1.115	-0.465	
	m¡n.	0.003	-1.115	-0.465	

Flecha Tot. el s. m x =0.004979

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.003	-1.115	1.765	
	m¡n.	0.003	-1.115	1.765	
	Cort.m x.	0.003	-1.115	1.765	
	m¡n.	0.003	-1.115	1.765	
	Flec.m x.	0.003	-1.115	1.765	
	m¡n.	0.003	-1.115	1.765	

Flecha Tot. el s. m x =0.005902

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BARRA : 78 (46,49) Sec. 4 Rect. /383,110/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.818	-7.053	74.121	
	m¡n.	0.818	-7.053	74.121	
	Cort.m x.	0.818	-7.053	74.121	
	m¡n.	0.818	-7.053	74.121	
	Flec.m x.	0.818	-7.053	74.121	
	m¡n.	0.818	-7.053	74.121	

Flecha Tot. el s. m x =0.002030

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.818	-7.053	88.226	
	m¡n.	0.818	-7.053	88.226	
	Cort.m x.	0.818	-7.053	88.226	
	m¡n.	0.818	-7.053	88.226	
	Flec.m x.	0.818	-7.053	88.226	
	m¡n.	0.818	-7.053	88.226	

Flecha Tot. el s. m x =0.002255

BARRA : 79 (45,46) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.241	-0.964	-0.313	
	m¡n.	0.241	-0.964	-0.313	
	Cort.m x.	0.241	-0.964	-0.313	
	m¡n.	0.241	-0.964	-0.313	
	Flec.m x.	0.241	-0.964	-0.313	
	m¡n.	0.241	-0.964	-0.313	

Flecha Tot. el s. m x =0.004891

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.241	4.036	-7.377	
	m¡n.	0.241	4.036	-7.377	
	Cort.m x.	0.241	4.036	-7.377	
	m¡n.	0.241	4.036	-7.377	
	Flec.m x.	0.241	4.036	-7.377	
	m¡n.	0.241	4.036	-7.377	

Flecha Tot. el s. m x =0.002030

BARRA : 80 (46,47) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.290	-3.941	-8.042	
	m¡n.	-0.290	-3.941	-8.042	
	Cort.m x.	-0.290	-3.941	-8.042	
	m¡n.	-0.290	-3.941	-8.042	
	Flec.m x.	-0.290	-3.941	-8.042	
	m¡n.	-0.290	-3.941	-8.042	

Flecha Tot. el s. m x =0.002030

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.290	1.059	-0.353	
	m¡n.	-0.290	1.059	-0.353	
	Cort.m x.	-0.290	1.059	-0.353	
	m¡n.	-0.290	1.059	-0.353	
	Flec.m x.	-0.290	1.059	-0.353	
	m¡n.	-0.290	1.059	-0.353	

Flecha Tot. el s. m x =0.005902

BARRA : 81 (48,51) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.601	0.860	1.415	
	m¡n.	-0.601	0.860	1.415	
	Cort.m x.	-0.601	0.860	1.415	
	m¡n.	-0.601	0.860	1.415	
	Flec.m x.	-0.601	0.860	1.415	
	m¡n.	-0.601	0.860	1.415	

Flecha Tot. el s. m x =0.005273

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.601	0.860	-0.306	
	m¡n.	-0.601	0.860	-0.306	
	Cort.m x.	-0.601	0.860	-0.306	
	m¡n.	-0.601	0.860	-0.306	
	Flec.m x.	-0.601	0.860	-0.306	
	m¡n.	-0.601	0.860	-0.306	

Flecha Tot. el s. m x =0.005233

BARRA : 82 (47,50) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.355	-0.056	1.475	
	m¡n.	0.355	-0.056	1.475	
	Cort.m x.	0.355	-0.056	1.475	
	m¡n.	0.355	-0.056	1.475	
	Flec.m x.	0.355	-0.056	1.475	
	m¡n.	0.355	-0.056	1.475	

Flecha Tot. el s. m x =0.005902

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.355	-0.056	1.588	
	m¡n.	0.355	-0.056	1.588	
	Cort.m x.	0.355	-0.056	1.588	
	m¡n.	0.355	-0.056	1.588	
	Flec.m x.	0.355	-0.056	1.588	
	m¡n.	0.355	-0.056	1.588	

Flecha Tot. el s. m x =0.006346

BARRA : 83 (49,52) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.106	1.063	88.251	
	m¡n.	0.106	1.063	88.251	
	Cort.m x.	0.106	1.063	88.251	
	m¡n.	0.106	1.063	88.251	
	Flec.m x.	0.106	1.063	88.251	
	m¡n.	0.106	1.063	88.251	

Flecha Tot. el s. m x =0.002255

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.106	1.063	86.125	
	m¡n.	0.106	1.063	86.125	
	Cort.m x.	0.106	1.063	86.125	
	m¡n.	0.106	1.063	86.125	
	Flec.m x.	0.106	1.063	86.125	
	m¡n.	0.106	1.063	86.125	

Flecha Tot. el s. m x =0.002266

BARRA : 84 (48,49) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.001	-0.901	-0.316	
	m¡n.	0.001	-0.901	-0.316	
	Cort.m x.	0.001	-0.901	-0.316	
	m¡n.	0.001	-0.901	-0.316	
	Flec.m x.	0.001	-0.901	-0.316	
	m¡n.	0.001	-0.901	-0.316	

Flecha Tot. el s. m x =0.005273

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.001	4.099	-7.613	
	m¡n.	0.001	4.099	-7.613	
	Cort.m x.	0.001	4.099	-7.613	
	m¡n.	0.001	4.099	-7.613	
	Flec.m x.	0.001	4.099	-7.613	
	m¡n.	0.001	4.099	-7.613	

Flecha Tot. el s. m x =0.002255

BARRA : 85 (49,50) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.023	-4.016	-8.325	
	m¡n.	-0.023	-4.016	-8.325	
	Cort.m x.	-0.023	-4.016	-8.325	
	m¡n.	-0.023	-4.016	-8.325	
	Flec.m x.	-0.023	-4.016	-8.325	
	m¡n.	-0.023	-4.016	-8.325	

Flecha Tot. el s. m x =0.002255

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.023	0.984	-0.340	
	m¡n.	-0.023	0.984	-0.340	
	Cort.m x.	-0.023	0.984	-0.340	
	m¡n.	-0.023	0.984	-0.340	
	Flec.m x.	-0.023	0.984	-0.340	
	m¡n.	-0.023	0.984	-0.340	

Flecha Tot. el s. m x =0.006346

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BARRA : 86 (51,54) Sec. 1 Rect. /315,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.553	-0.818	-0.312	
	m¡n.	0.553	-0.818	-0.312	
	Cort.m x.	0.553	-0.818	-0.312	
	m¡n.	0.553	-0.818	-0.312	
	Flec.m x.	0.553	-0.818	-0.312	
	m¡n.	0.553	-0.818	-0.312	

Flecha Tot. el s. m x =0.005233

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.553	-0.818	1.323	
	m¡n.	0.553	-0.818	1.323	
	Cort.m x.	0.553	-0.818	1.323	
	m¡n.	0.553	-0.818	1.323	
	Flec.m x.	0.553	-0.818	1.323	
	m¡n.	0.553	-0.818	1.323	

Flecha Tot. el s. m x =0.005103

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BARRA : 87 (50,53) Sec. 1 Rect. /315,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.696	0.927	1.564	
	m¡n.	0.696	0.927	1.564	
	Cort.m x.	0.696	0.927	1.564	
	m¡n.	0.696	0.927	1.564	
	Flec.m x.	0.696	0.927	1.564	
	m¡n.	0.696	0.927	1.564	

Flecha Tot. el s. m x =0.006346

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.696	0.927	-0.291	
	m¡n.	0.696	0.927	-0.291	
	Cort.m x.	0.696	0.927	-0.291	
	m¡n.	0.696	0.927	-0.291	
	Flec.m x.	0.696	0.927	-0.291	
	m¡n.	0.696	0.927	-0.291	

Flecha Tot. el s. m x =0.006318

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BARRA : 88 (52,55) Sec. 4 Rect. /383,110/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.645	4.551	86.138	
	m¡n.	-0.645	4.551	86.138	
	Cort.m x.	-0.645	4.551	86.138	
	m¡n.	-0.645	4.551	86.138	
	Flec.m x.	-0.645	4.551	86.138	
	m¡n.	-0.645	4.551	86.138	

Flecha Tot. el s. m x =0.002266

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.645	4.551	77.037	
	m¡n.	-0.645	4.551	77.037	
	Cort.m x.	-0.645	4.551	77.037	
	m¡n.	-0.645	4.551	77.037	
	Flec.m x.	-0.645	4.551	77.037	
	m¡n.	-0.645	4.551	77.037	

Flecha Tot. el s. m x =0.002064

BARRA : 89 (51,52) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.007	1.678	1.154	
	m¡n.	0.007	1.678	1.154	
	Cort.m x.	0.007	1.678	1.154	
	m¡n.	0.007	1.678	1.154	
	Flec.m x.	0.007	1.678	1.154	
	m¡n.	0.007	1.678	1.154	

Flecha Tot. el s. m x =0.005233

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.007	1.678	-5.055	
	m¡n.	0.007	1.678	-5.055	
	Cort.m x.	0.007	1.678	-5.055	
	m¡n.	0.007	1.678	-5.055	
	Flec.m x.	0.007	1.678	-5.055	
	m¡n.	0.007	1.678	-5.055	

Flecha Tot. el s. m x =0.002266

BARRA : 90 (52,53) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.006	-1.810	-5.807	
	m¡n.	-0.006	-1.810	-5.807	
	Cort.m x.	-0.006	-1.810	-5.807	
	m¡n.	-0.006	-1.810	-5.807	
	Flec.m x.	-0.006	-1.810	-5.807	
	m¡n.	-0.006	-1.810	-5.807	

Flecha Tot. el s. m x =0.002266

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.006	-1.810	1.340	
	m¡n.	-0.006	-1.810	1.340	
	Cort.m x.	-0.006	-1.810	1.340	
	m¡n.	-0.006	-1.810	1.340	
	Flec.m x.	-0.006	-1.810	1.340	
	m¡n.	-0.006	-1.810	1.340	

Flecha Tot. el s. m x =0.006318

BARRA : 91 (54,57) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.219	0.083	1.307	
	m¡n.	0.219	0.083	1.307	
	Cort.m x.	0.219	0.083	1.307	
	m¡n.	0.219	0.083	1.307	
	Flec.m x.	0.219	0.083	1.307	
	m¡n.	0.219	0.083	1.307	

Flecha Tot. el s. m x =0.005103

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.219	0.083	1.142	
	m¡n.	0.219	0.083	1.142	
	Cort.m x.	0.219	0.083	1.142	
	m¡n.	0.219	0.083	1.142	
	Flec.m x.	0.219	0.083	1.142	
	m¡n.	0.219	0.083	1.142	

Flecha Tot. el s. m x =0.004589

BARRA : 92 (53,56) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.644	-0.882	-0.297	
	m¡n.	-0.644	-0.882	-0.297	
	Cort.m x.	-0.644	-0.882	-0.297	
	m¡n.	-0.644	-0.882	-0.297	
	Flec.m x.	-0.644	-0.882	-0.297	
	m¡n.	-0.644	-0.882	-0.297	

Flecha Tot. el s. m x =0.006318

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.644	-0.882	1.467	
	m¡n.	-0.644	-0.882	1.467	
	Cort.m x.	-0.644	-0.882	1.467	
	m¡n.	-0.644	-0.882	1.467	
	Flec.m x.	-0.644	-0.882	1.467	
	m¡n.	-0.644	-0.882	1.467	

Flecha Tot. el s. m x =0.006178

BARRA : 93 (55,58) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.363	12.667	77.046	
	m¡n.	-1.363	12.667	77.046	
	Cort.m x.	-1.363	12.667	77.046	
	m¡n.	-1.363	12.667	77.046	
	Flec.m x.	-1.363	12.667	77.046	
	m¡n.	-1.363	12.667	77.046	

Flecha Tot. el s. m x =0.002064

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.363	12.667	51.711	
	m¡n.	-1.363	12.667	51.711	
	Cort.m x.	-1.363	12.667	51.711	
	m¡n.	-1.363	12.667	51.711	
	Flec.m x.	-1.363	12.667	51.711	
	m¡n.	-1.363	12.667	51.711	

Flecha Tot. el s. m x =0.001675

BARRA : 94 (54,55) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.016	-0.901	-0.334	
	m¡n.	0.016	-0.901	-0.334	
	Cort.m x.	0.016	-0.901	-0.334	
	m¡n.	0.016	-0.901	-0.334	
	Flec.m x.	0.016	-0.901	-0.334	
	m¡n.	0.016	-0.901	-0.334	

Flecha Tot. el s. m x =0.005103

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.016	4.099	-7.631	
	m¡n.	0.016	4.099	-7.631	
	Cort.m x.	0.016	4.099	-7.631	
	m¡n.	0.016	4.099	-7.631	
	Flec.m x.	0.016	4.099	-7.631	
	m¡n.	0.016	4.099	-7.631	

Flecha Tot. el s. m x =0.002064

BARRA : 95 (55,56) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.006	-4.017	-8.349	
	m¡n.	0.006	-4.017	-8.349	
	Cort.m x.	0.006	-4.017	-8.349	
	m¡n.	0.006	-4.017	-8.349	
	Flec.m x.	0.006	-4.017	-8.349	
	m¡n.	0.006	-4.017	-8.349	

Flecha Tot. el s. m x =0.002064

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.006	0.983	-0.359	
	m¡n.	0.006	0.983	-0.359	
	Cort.m x.	0.006	0.983	-0.359	
	m¡n.	0.006	0.983	-0.359	
	Flec.m x.	0.006	0.983	-0.359	
	m¡n.	0.006	0.983	-0.359	

Flecha Tot. el s. m x =0.006178

BARRA : 96 (57,60) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.132	1.043	1.355	
	m¡n.	-0.132	1.043	1.355	
	Cort.m x.	-0.132	1.043	1.355	
	m¡n.	-0.132	1.043	1.355	
	Flec.m x.	-0.132	1.043	1.355	
	m¡n.	-0.132	1.043	1.355	

Flecha Tot. el s. m x =0.004589

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.132	1.043	-0.731	
	m¡n.	-0.132	1.043	-0.731	
	Cort.m x.	-0.132	1.043	-0.731	
	m¡n.	-0.132	1.043	-0.731	
	Flec.m x.	-0.132	1.043	-0.731	
	m¡n.	-0.132	1.043	-0.731	

Flecha Tot. el s. m x =0.003723

BARRA : 97 (56,59) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.285	0.101	1.474	
	m¡n.	-0.285	0.101	1.474	
	Cort.m x.	-0.285	0.101	1.474	
	m¡n.	-0.285	0.101	1.474	
	Flec.m x.	-0.285	0.101	1.474	
	m¡n.	-0.285	0.101	1.474	

Flecha Tot. el s. m x =0.006178

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.285	0.101	1.273	
	m¡n.	-0.285	0.101	1.273	
	Cort.m x.	-0.285	0.101	1.273	
	m¡n.	-0.285	0.101	1.273	
	Flec.m x.	-0.285	0.101	1.273	
	m¡n.	-0.285	0.101	1.273	

Flecha Tot. el s. m x =0.005604

BARRA : 98 (58,61) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.041	20.655	51.238	
	m¡n.	-2.041	20.655	51.238	
	Cort.m x.	-2.041	20.655	51.238	
	m¡n.	-2.041	20.655	51.238	
	Flec.m x.	-2.041	20.655	51.238	
	m¡n.	-2.041	20.655	51.238	

Flecha Tot. el s. m x =0.001675

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-2.041	20.655	9.928	
	m¡n.	-2.041	20.655	9.928	
	Cort.m x.	-2.041	20.655	9.928	
	m¡n.	-2.041	20.655	9.928	
	Flec.m x.	-2.041	20.655	9.928	
	m¡n.	-2.041	20.655	9.928	

Flecha Tot. el s. m x =0.001162

BARRA : 99 (57,58) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.213	-0.960	-0.351	
	m¡n.	-0.213	-0.960	-0.351	
	Cort.m x.	-0.213	-0.960	-0.351	
	m¡n.	-0.213	-0.960	-0.351	
	Flec.m x.	-0.213	-0.960	-0.351	
	m¡n.	-0.213	-0.960	-0.351	

Flecha Tot. el s. m x =0.004589

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.213	4.040	-7.427	
	m¡n.	-0.213	4.040	-7.427	
	Cort.m x.	-0.213	4.040	-7.427	
	m¡n.	-0.213	4.040	-7.427	
	Flec.m x.	-0.213	4.040	-7.427	
	m¡n.	-0.213	4.040	-7.427	

Flecha Tot. el s. m x =0.001675

BARRA : 100 (58,59) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.261	-3.948	-8.105	
	m¡n.	0.261	-3.948	-8.105	
	Cort.m x.	0.261	-3.948	-8.105	
	m¡n.	0.261	-3.948	-8.105	
	Flec.m x.	0.261	-3.948	-8.105	
	m¡n.	0.261	-3.948	-8.105	

Flecha Tot. el s. m x =0.001675

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.261	1.052	-0.390	
	m¡n.	0.261	1.052	-0.390	
	Cort.m x.	0.261	1.052	-0.390	
	m¡n.	0.261	1.052	-0.390	
	Flec.m x.	0.261	1.052	-0.390	
	m¡n.	0.261	1.052	-0.390	

Flecha Tot. el s. m x =0.005604

BARRA : 101 (60,63) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.858	-0.397	-0.487	
	m¡n.	0.858	-0.397	-0.487	
	Cort.m x.	0.858	-0.397	-0.487	
	m¡n.	0.858	-0.397	-0.487	
	Flec.m x.	0.858	-0.397	-0.487	
	m¡n.	0.858	-0.397	-0.487	

Flecha Tot. el s. m x =0.003723

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.858	-0.397	0.308	
	m¡n.	0.858	-0.397	0.308	
	Cort.m x.	0.858	-0.397	0.308	
	m¡n.	0.858	-0.397	0.308	
	Flec.m x.	0.858	-0.397	0.308	
	m¡n.	0.858	-0.397	0.308	

Flecha Tot. el s. m x =0.002908

BARRA : 102 (59,62) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.106	1.153	1.533	
	m¡n.	0.106	1.153	1.533	
	Cort.m x.	0.106	1.153	1.533	
	m¡n.	0.106	1.153	1.533	
	Flec.m x.	0.106	1.153	1.533	
	m¡n.	0.106	1.153	1.533	

Flecha Tot. el s. m x =0.005604

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.106	1.153	-0.772	
	m¡n.	0.106	1.153	-0.772	
	Cort.m x.	0.106	1.153	-0.772	
	m¡n.	0.106	1.153	-0.772	
	Flec.m x.	0.106	1.153	-0.772	
	m¡n.	0.106	1.153	-0.772	

Flecha Tot. el s. m x =0.004632

BARRA : 103 (61,64) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.676	23.640	9.375	
	m¡n.	-2.676	23.640	9.375	
	Cort.m x.	-2.676	23.640	9.375	
	m¡n.	-2.676	23.640	9.375	
	Flec.m x.	-2.676	23.640	9.375	
	m¡n.	-2.676	23.640	9.375	

Flecha Tot. el s. m x =0.001162

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-2.676	23.640	-37.905	
	m¡n.	-2.676	23.640	-37.905	
	Cort.m x.	-2.676	23.640	-37.905	
	m¡n.	-2.676	23.640	-37.905	
	Flec.m x.	-2.676	23.640	-37.905	
	m¡n.	-2.676	23.640	-37.905	

Flecha Tot. el s. m x =0.000627

BARRA : 104 (60,61) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.245	1.440	0.989	
	m¡n.	-0.245	1.440	0.989	
	Cort.m x.	-0.245	1.440	0.989	
	m¡n.	-0.245	1.440	0.989	
	Flec.m x.	-0.245	1.440	0.989	
	m¡n.	-0.245	1.440	0.989	

Flecha Tot. el s. m x =0.003723

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.245	1.440	-4.341	
	m¡n.	-0.245	1.440	-4.341	
	Cort.m x.	-0.245	1.440	-4.341	
	m¡n.	-0.245	1.440	-4.341	
	Flec.m x.	-0.245	1.440	-4.341	
	m¡n.	-0.245	1.440	-4.341	

Flecha Tot. el s. m x =0.001162

BARRA : 105 (61,62) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.309	1.545	-4.977	
	m¡n.	0.309	-1.545	-4.977	
	Cort.m x.	0.309	-1.545	-4.977	
	m¡n.	0.309	-1.545	-4.977	
	Flec.m x.	0.309	-1.545	-4.977	
	m¡n.	0.309	-1.545	-4.977	

Flecha Tot. el s. m x =0.001162

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.309	-1.545	1.124	
	m¡n.	0.309	-1.545	1.124	
	Cort.m x.	0.309	-1.545	1.124	
	m¡n.	0.309	-1.545	1.124	
	Flec.m x.	0.309	-1.545	1.124	
	m¡n.	0.309	-1.545	1.124	

Flecha Tot. el s. m x =0.004632

BARRA : 106 (63,66) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.179	1.102	0.554	
	m¡n.	-0.179	1.102	0.554	
	Cort.m x.	-0.179	1.102	0.554	
	m¡n.	-0.179	1.102	0.554	
	Flec.m x.	-0.179	1.102	0.554	
	m¡n.	-0.179	1.102	0.554	

Flecha Tot. el s. m x =0.002908

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.179	1.102	-1.651	
	m¡n.	-0.179	1.102	-1.651	
	Cort.m x.	-0.179	1.102	-1.651	
	m¡n.	-0.179	1.102	-1.651	
	Flec.m x.	-0.179	1.102	-1.651	
	m¡n.	-0.179	1.102	-1.651	

Flecha Tot. el s. m x =0.002117

BARRA : 107 (62,65) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.018	-0.392	-0.464	
	m¡n.	-1.018	-0.392	-0.464	
	Cort.m x.	-1.018	-0.392	-0.464	
	m¡n.	-1.018	-0.392	-0.464	
	Flec.m x.	-1.018	-0.392	-0.464	
	m¡n.	-1.018	-0.392	-0.464	

Flecha Tot. el s. m x =0.004632

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.018	-0.392	0.320	
	m¡n.	-1.018	-0.392	0.320	
	Cort.m x.	-1.018	-0.392	0.320	
	m¡n.	-1.018	-0.392	0.320	
	Flec.m x.	-1.018	-0.392	0.320	
	m¡n.	-1.018	-0.392	0.320	

Flecha Tot. el s. m x =0.003703

BARRA : 108 (64,67) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.212	30.525	-38.466	
	m¡n.	-3.212	30.525	-38.466	
	Cort.m x.	-3.212	30.525	-38.466	
	m¡n.	-3.212	30.525	-38.466	
	Flec.m x.	-3.212	30.525	-38.466	
	m¡n.	-3.212	30.525	-38.466	

Flecha Tot. el s. m x =0.000627

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-3.212	30.525	-99.516	
	m¡n.	-3.212	30.525	-99.516	
	Cort.m x.	-3.212	30.525	-99.516	
	m¡n.	-3.212	30.525	-99.516	
	Flec.m x.	-3.212	30.525	-99.516	
	m¡n.	-3.212	30.525	-99.516	

Flecha Tot. el s. m x =0.000189

BARRA : 109 (63,64) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.246	-1.499	-1.037	
	m¡n.	-0.246	-1.499	-1.037	
	Cort.m x.	-0.246	-1.499	-1.037	
	m¡n.	-0.246	-1.499	-1.037	
	Flec.m x.	-0.246	-1.499	-1.037	
	m¡n.	-0.246	-1.499	-1.037	

Flecha Tot. el s. m x =0.002908

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.246	3.501	-6.118	
	m¡n.	-0.246	3.501	-6.118	
	Cort.m x.	-0.246	3.501	-6.118	
	m¡n.	-0.246	3.501	-6.118	
	Flec.m x.	-0.246	3.501	-6.118	
	m¡n.	-0.246	3.501	-6.118	

Flecha Tot. el s. m x =0.000627

BARRA : 110 (64,65) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.315	-3.385	-6.653	
	m¡n.	0.315	-3.385	-6.653	
	Cort.m x.	0.315	-3.385	-6.653	
	m¡n.	0.315	-3.385	-6.653	
	Flec.m x.	0.315	-3.385	-6.653	
	m¡n.	0.315	-3.385	-6.653	

Flecha Tot. el s. m x =0.000627

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.315	1.615	-1.162	
	m¡n.	0.315	1.615	-1.162	
	Cort.m x.	0.315	1.615	-1.162	
	m¡n.	0.315	1.615	-1.162	
	Flec.m x.	0.315	1.615	-1.162	
	m¡n.	0.315	1.615	-1.162	

Flecha Tot. el s. m x =0.003703

BARRA : 111 (66,69) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.037	0.239	-1.432	
	m¡n.	0.037	0.239	-1.432	
	Cort.m x.	0.037	0.239	-1.432	
	m¡n.	0.037	0.239	-1.432	
	Flec.m x.	0.037	0.239	-1.432	
	m¡n.	0.037	0.239	-1.432	

Flecha Tot. el s. m x =0.002117

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.037	0.239	-1.910	
	m¡n.	0.037	0.239	-1.910	
	Cort.m x.	0.037	0.239	-1.910	
	m¡n.	0.037	0.239	-1.910	
	Flec.m x.	0.037	0.239	-1.910	
	m¡n.	0.037	0.239	-1.910	

Flecha Tot. el s. m x =0.001799

BARRA : 112 (65,68) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.145	1.223	0.635	
	m¡n.	0.145	1.223	0.635	
	Cort.m x.	0.145	1.223	0.635	
	m¡n.	0.145	1.223	0.635	
	Flec.m x.	0.145	1.223	0.635	
	m¡n.	0.145	1.223	0.635	

Flecha Tot. el s. m x =0.003703

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.145	1.223	-1.812	
	m¡n.	0.145	1.223	-1.812	
	Cort.m x.	0.145	1.223	-1.812	
	m¡n.	0.145	1.223	-1.812	
	Flec.m x.	0.145	1.223	-1.812	
	m¡n.	0.145	1.223	-1.812	

Flecha Tot. el s. m x =0.002792

BARRA : 113 (67,70) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.706	32.333	-100.013	
	m¡n.	-3.706	32.333	-100.013	
	Cort.m x.	-3.706	32.333	-100.013	
	m¡n.	-3.706	32.333	-100.013	
	Flec.m x.	-3.706	32.333	-100.013	
	m¡n.	-3.706	32.333	-100.013	

Flecha Tot. el s. m x =0.000189

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-3.706	32.333	-164.680	
	m¡n.	-3.706	32.333	-164.680	
	Cort.m x.	-3.706	32.333	-164.680	
	m¡n.	-3.706	32.333	-164.680	
	Flec.m x.	-3.706	32.333	-164.680	
	m¡n.	-3.706	32.333	-164.680	

BARRA : 114 (66,67) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.219	0.863	0.216	
	m¡n.	-0.219	0.863	0.216	
	Cort.m x.	-0.219	0.863	0.216	
	m¡n.	-0.219	0.863	0.216	
	Flec.m x.	-0.219	0.863	0.216	
	m¡n.	-0.219	0.863	0.216	

Flecha Tot. el s. m x =0.002117

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.219	0.863	-2.977	
	m¡n.	-0.219	0.863	-2.977	
	Cort.m x.	-0.219	0.863	-2.977	
	m¡n.	-0.219	0.863	-2.977	
	Flec.m x.	-0.219	0.863	-2.977	
	m¡n.	-0.219	0.863	-2.977	

Flecha Tot. el s. m x =0.000189

BARRA : 115 (67,68) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.279	-0.945	-3.471	
	m¡n.	0.279	-0.945	-3.471	
	Cort.m x.	0.279	-0.945	-3.471	
	m¡n.	0.279	-0.945	-3.471	
	Flec.m x.	0.279	-0.945	-3.471	
	m¡n.	0.279	-0.945	-3.471	

Flecha Tot. el s. m x =0.000189

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.279	-0.945	0.262	
	m¡n.	0.279	-0.945	0.262	
	Cort.m x.	0.279	-0.945	0.262	

m¡n.	0.279	-0.945	0.262
Flec.m x.	0.279	-0.945	0.262
m¡n.	0.279	-0.945	0.262

Flecha Tot. el s. m x =0.002792

BARRA : 116 (69,72) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.081	-0.429	-1.919	
	m¡n.	-0.081	-0.429	-1.919	
	Cort.m x.	-0.081	-0.429	-1.919	
	m¡n.	-0.081	-0.429	-1.919	
	Flec.m x.	-0.081	-0.429	-1.919	
	m¡n.	-0.081	-0.429	-1.919	

Flecha Tot. el s. m x =0.001799

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.081	-0.429	-1.061	
	m¡n.	-0.081	-0.429	-1.061	
	Cort.m x.	-0.081	-0.429	-1.061	
	m¡n.	-0.081	-0.429	-1.061	
	Flec.m x.	-0.081	-0.429	-1.061	
	m¡n.	-0.081	-0.429	-1.061	

Flecha Tot. el s. m x =0.002120

BARRA : 117 (68,71) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.117	0.278	-1.533	
	m¡n.	-0.117	0.278	-1.533	
	Cort.m x.	-0.117	0.278	-1.533	
	m¡n.	-0.117	0.278	-1.533	
	Flec.m x.	-0.117	0.278	-1.533	
	m¡n.	-0.117	0.278	-1.533	

Flecha Tot. el s. m x =0.002792

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.117	0.278	-2.089	
	m¡n.	-0.117	0.278	-2.089	
	Cort.m x.	-0.117	0.278	-2.089	
	m¡n.	-0.117	0.278	-2.089	
	Flec.m x.	-0.117	0.278	-2.089	
	m¡n.	-0.117	0.278	-2.089	

Flecha Tot. el s. m x =0.002395

BARRA : 118 (70,73) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.086	-22.434	-86.868	
	m¡n.	-3.086	-22.434	-86.868	
	Cort.m x.	-3.086	-22.434	-86.868	
	m¡n.	-3.086	-22.434	-86.868	
	Flec.m x.	-3.086	-22.434	-86.868	
	m¡n.	-3.086	-22.434	-86.868	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-3.086	-22.434	-42.001	
	m¡n.	-3.086	-22.434	-42.001	
	Cort.m x.	-3.086	-22.434	-42.001	
	m¡n.	-3.086	-22.434	-42.001	
	Flec.m x.	-3.086	-22.434	-42.001	
	m¡n.	-3.086	-22.434	-42.001	

Flecha Tot. el s. m x =0.000097

BARRA : 119 (69,70) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.009	0.668	-0.118	
	m¡n.	0.009	0.668	-0.118	
	Cort.m x.	0.009	0.668	-0.118	

m¡n.	0.009	0.668	-0.118
Flec.m x.	0.009	0.668	-0.118
m¡n.	0.009	0.668	-0.118

Flecha Tot. el s. m x =0.001799

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.009	0.668	-2.592	
	m¡n.	0.009	0.668	-2.592	
	Cort.m x.	0.009	0.668	-2.592	
	m¡n.	0.009	0.668	-2.592	
	Flec.m x.	0.009	0.668	-2.592	
	m¡n.	0.009	0.668	-2.592	

BARRA : 120 (70,71) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.027	-0.757	-3.063	
	m¡n.	0.027	-0.757	-3.063	
	Cort.m x.	0.027	-0.757	-3.063	
	m¡n.	0.027	-0.757	-3.063	
	Flec.m x.	0.027	-0.757	-3.063	
	m¡n.	0.027	-0.757	-3.063	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.027	-0.757	-0.075	
	m¡n.	0.027	-0.757	-0.075	
	Cort.m x.	0.027	-0.757	-0.075	
	m¡n.	0.027	-0.757	-0.075	
	Flec.m x.	0.027	-0.757	-0.075	
	m¡n.	0.027	-0.757	-0.075	

Flecha Tot. el s. m x =0.002395

BARRA : 121 (72,75) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.307	-1.384	-1.375	
	m¡n.	0.307	-1.384	-1.375	
	Cort.m x.	0.307	-1.384	-1.375	
	m¡n.	0.307	-1.384	-1.375	
	Flec.m x.	0.307	-1.384	-1.375	
	m¡n.	0.307	-1.384	-1.375	

Flecha Tot. el s. m x =0.002120

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.307	-1.384	1.394	
	m¡n.	0.307	-1.384	1.394	
	Cort.m x.	0.307	-1.384	1.394	
	m¡n.	0.307	-1.384	1.394	
	Flec.m x.	0.307	-1.384	1.394	
	m¡n.	0.307	-1.384	1.394	

Flecha Tot. el s. m x =0.002782

BARRA : 122 (71,74) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.042	-0.478	-2.062	
	m¡n.	-0.042	-0.478	-2.062	
	Cort.m x.	-0.042	-0.478	-2.062	
	m¡n.	-0.042	-0.478	-2.062	
	Flec.m x.	-0.042	-0.478	-2.062	
	m¡n.	-0.042	-0.478	-2.062	

Flecha Tot. el s. m x =0.002395

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.042	-0.478	-1.105	
	m¡n.	-0.042	-0.478	-1.105	
	Cort.m x.	-0.042	-0.478	-1.105	

m¡n.	-0.042	-0.478	-1.105
Flec.m x.	-0.042	-0.478	-1.105
m¡n.	-0.042	-0.478	-1.105

Flecha Tot. el s. m x =0.002686

BARRA : 123 (73,76) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.563	-20.433	-41.403	
	m¡n.	-3.563	-20.433	-41.403	
	Cort.m x.	-3.563	-20.433	-41.403	
	m¡n.	-3.563	-20.433	-41.403	
	Flec.m x.	-3.563	-20.433	-41.403	
	m¡n.	-3.563	-20.433	-41.403	

Flecha Tot. el s. m x =0.000097

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-3.563	-20.433	-0.537	
	m¡n.	-3.563	-20.433	-0.537	
	Cort.m x.	-3.563	-20.433	-0.537	
	m¡n.	-3.563	-20.433	-0.537	
	Flec.m x.	-3.563	-20.433	-0.537	
	m¡n.	-3.563	-20.433	-0.537	

Flecha Tot. el s. m x =0.000299

BARRA : 124 (72,73) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.314	0.955	0.388	
	m¡n.	0.314	0.955	0.388	
	Cort.m x.	0.314	0.955	0.388	
	m¡n.	0.314	0.955	0.388	
	Flec.m x.	0.314	0.955	0.388	
	m¡n.	0.314	0.955	0.388	

Flecha Tot. el s. m x =0.002120

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.314	0.955	-3.147	
	m¡n.	0.314	0.955	-3.147	
	Cort.m x.	0.314	0.955	-3.147	
	m¡n.	0.314	0.955	-3.147	
	Flec.m x.	0.314	0.955	-3.147	
	m¡n.	0.314	0.955	-3.147	

Flecha Tot. el s. m x =0.000097

BARRA : 125 (73,74) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.284	-1.046	-3.625	
	m¡n.	-0.284	-1.046	-3.625	
	Cort.m x.	-0.284	-1.046	-3.625	
	m¡n.	-0.284	-1.046	-3.625	
	Flec.m x.	-0.284	-1.046	-3.625	
	m¡n.	-0.284	-1.046	-3.625	

Flecha Tot. el s. m x =0.000097

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.284	-1.046	0.504	
	m¡n.	-0.284	-1.046	0.504	
	Cort.m x.	-0.284	-1.046	0.504	
	m¡n.	-0.284	-1.046	0.504	
	Flec.m x.	-0.284	-1.046	0.504	
	m¡n.	-0.284	-1.046	0.504	

Flecha Tot. el s. m x =0.002686

BARRA : 126 (75,78) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.076	-0.200	1.122	
	m¡n.	-0.076	-0.200	1.122	
	Cort.m x.	-0.076	-0.200	1.122	
	m¡n.	-0.076	-0.200	1.122	
	Flec.m x.	-0.076	-0.200	1.122	
	m¡n.	-0.076	-0.200	1.122	

Flecha Tot. el s. m x =0.002782

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.076	-0.200	1.521	
	m¡n.	-0.076	-0.200	1.521	
	Cort.m x.	-0.076	-0.200	1.521	
	m¡n.	-0.076	-0.200	1.521	
	Flec.m x.	-0.076	-0.200	1.521	
	m¡n.	-0.076	-0.200	1.521	

Flecha Tot. el s. m x =0.003116

BARRA : 127 (74,77) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.547	-1.524	-1.389	
	m¡n.	-0.547	-1.524	-1.389	
	Cort.m x.	-0.547	-1.524	-1.389	
	m¡n.	-0.547	-1.524	-1.389	
	Flec.m x.	-0.547	-1.524	-1.389	
	m¡n.	-0.547	-1.524	-1.389	

Flecha Tot. el s. m x =0.002686

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.547	-1.524	1.659	
	m¡n.	-0.547	-1.524	1.659	
	Cort.m x.	-0.547	-1.524	1.659	
	m¡n.	-0.547	-1.524	1.659	
	Flec.m x.	-0.547	-1.524	1.659	
	m¡n.	-0.547	-1.524	1.659	

Flecha Tot. el s. m x =0.003318

BARRA : 128 (76,79) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.007	-12.928	-0.055	
	m¡n.	-4.007	-12.928	-0.055	
	Cort.m x.	-4.007	-12.928	-0.055	
	m¡n.	-4.007	-12.928	-0.055	
	Flec.m x.	-4.007	-12.928	-0.055	
	m¡n.	-4.007	-12.928	-0.055	

Flecha Tot. el s. m x =0.000299

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-4.007	-12.928	25.802	
	m¡n.	-4.007	-12.928	25.802	
	Cort.m x.	-4.007	-12.928	25.802	
	m¡n.	-4.007	-12.928	25.802	
	Flec.m x.	-4.007	-12.928	25.802	
	m¡n.	-4.007	-12.928	25.802	

Flecha Tot. el s. m x =0.000505

BARRA : 129 (75,76) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.272	-1.185	-0.383	
	m¡n.	0.272	-1.185	-0.383	
	Cort.m x.	0.272	-1.185	-0.383	
	m¡n.	0.272	-1.185	-0.383	
	Flec.m x.	0.272	-1.185	-0.383	
	m¡n.	0.272	-1.185	-0.383	

Flecha Tot. el s. m x =0.002782

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	0.272	3.815	-6.629	
	m¡n.	0.272	3.815	-6.629	
	Cort.m x.	0.272	3.815	-6.629	
	m¡n.	0.272	3.815	-6.629	
	Flec.m x.	0.272	3.815	-6.629	
	m¡n.	0.272	3.815	-6.629	

Flecha Tot. el s. m x =0.000299

BARRA : 130 (76,77) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.210	-3.689	-7.072	
	m¡n.	-0.210	-3.689	-7.072	
	Cort.m x.	-0.210	-3.689	-7.072	
	m¡n.	-0.210	-3.689	-7.072	
	Flec.m x.	-0.210	-3.689	-7.072	
	m¡n.	-0.210	-3.689	-7.072	

Flecha Tot. el s. m x =0.000299

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	-0.210	1.311	-0.379	
	m¡n.	-0.210	1.311	-0.379	
	Cort.m x.	-0.210	1.311	-0.379	
	m¡n.	-0.210	1.311	-0.379	
	Flec.m x.	-0.210	1.311	-0.379	
	m¡n.	-0.210	1.311	-0.379	

Flecha Tot. el s. m x =0.003318

BARRA : 131 (78,81) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.229	0.849	1.603	
	m¡n.	-0.229	0.849	1.603	
	Cort.m x.	-0.229	0.849	1.603	
	m¡n.	-0.229	0.849	1.603	
	Flec.m x.	-0.229	0.849	1.603	
	m¡n.	-0.229	0.849	1.603	

Flecha Tot. el s. m x =0.003116

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.229	0.849	-0.096	
	m¡n.	-0.229	0.849	-0.096	
	Cort.m x.	-0.229	0.849	-0.096	
	m¡n.	-0.229	0.849	-0.096	
	Flec.m x.	-0.229	0.849	-0.096	
	m¡n.	-0.229	0.849	-0.096	

Flecha Tot. el s. m x =0.002992

BARRA : 132 (77,80) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.168	-0.213	1.449	
	m¡n.	-0.168	-0.213	1.449	
	Cort.m x.	-0.168	-0.213	1.449	
	m¡n.	-0.168	-0.213	1.449	
	Flec.m x.	-0.168	-0.213	1.449	
	m¡n.	-0.168	-0.213	1.449	

Flecha Tot. el s. m x =0.003318

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.168	-0.213	1.876	
	m¡n.	-0.168	-0.213	1.876	
	Cort.m x.	-0.168	-0.213	1.876	

m¡n.	-0.168	-0.213	1.876
Flec.m x.	-0.168	-0.213	1.876
m¡n.	-0.168	-0.213	1.876

Flecha Tot. el s. m x =0.003527

BARRA : 133 (79,82) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.354	-5.172	25.508	
	m¡n.	-4.354	-5.172	25.508	
	Cort.m x.	-4.354	-5.172	25.508	
	m¡n.	-4.354	-5.172	25.508	
	Flec.m x.	-4.354	-5.172	25.508	
	m¡n.	-4.354	-5.172	25.508	

Flecha Tot. el s. m x =0.000505

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-4.354	-5.172	35.853	
	m¡n.	-4.354	-5.172	35.853	
	Cort.m x.	-4.354	-5.172	35.853	
	m¡n.	-4.354	-5.172	35.853	
	Flec.m x.	-4.354	-5.172	35.853	
	m¡n.	-4.354	-5.172	35.853	

Flecha Tot. el s. m x =0.000651

BARRA : 134 (78,79) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.082	-1.049	-0.153	
	m¡n.	-0.082	-1.049	-0.153	
	Cort.m x.	-0.082	-1.049	-0.153	
	m¡n.	-0.082	-1.049	-0.153	
	Flec.m x.	-0.082	-1.049	-0.153	
	m¡n.	-0.082	-1.049	-0.153	

Flecha Tot. el s. m x =0.003116

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.082	3.951	-6.899	
	m¡n.	-0.082	3.951	-6.899	
	Cort.m x.	-0.082	3.951	-6.899	
	m¡n.	-0.082	3.951	-6.899	
	Flec.m x.	-0.082	3.951	-6.899	
	m¡n.	-0.082	3.951	-6.899	

Flecha Tot. el s. m x =0.000505

BARRA : 135 (79,80) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.212	-3.805	-7.247	
	m¡n.	0.212	-3.805	-7.247	
	Cort.m x.	0.212	-3.805	-7.247	
	m¡n.	0.212	-3.805	-7.247	
	Flec.m x.	0.212	-3.805	-7.247	
	m¡n.	0.212	-3.805	-7.247	

Flecha Tot. el s. m x =0.000505

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.212	1.195	-0.096	
	m¡n.	0.212	1.195	-0.096	
	Cort.m x.	0.212	1.195	-0.096	
	m¡n.	0.212	1.195	-0.096	
	Flec.m x.	0.212	1.195	-0.096	
	m¡n.	0.212	1.195	-0.096	

Flecha Tot. el s. m x =0.003527

BARRA : 136 (81,84) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.029	-0.558	0.144	
	m¡n.	1.029	-0.558	0.144	
	Cort.m x.	1.029	-0.558	0.144	
	m¡n.	1.029	-0.558	0.144	
	Flec.m x.	1.029	-0.558	0.144	
	m¡n.	1.029	-0.558	0.144	

Flecha Tot. el s. m x =0.002992

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	1.029	-0.558	1.260	
	m¡n.	1.029	-0.558	1.260	
	Cort.m x.	1.029	-0.558	1.260	
	m¡n.	1.029	-0.558	1.260	
	Flec.m x.	1.029	-0.558	1.260	
	m¡n.	1.029	-0.558	1.260	

Flecha Tot. el s. m x =0.002684

BARRA : 137 (80,83) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.072	0.982	2.088	
	m¡n.	-0.072	0.982	2.088	
	Cort.m x.	-0.072	0.982	2.088	
	m¡n.	-0.072	0.982	2.088	
	Flec.m x.	-0.072	0.982	2.088	
	m¡n.	-0.072	0.982	2.088	

Flecha Tot. el s. m x =0.003527

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.072	0.982	0.125	
	m¡n.	-0.072	0.982	0.125	
	Cort.m x.	-0.072	0.982	0.125	
	m¡n.	-0.072	0.982	0.125	
	Flec.m x.	-0.072	0.982	0.125	
	m¡n.	-0.072	0.982	0.125	

Flecha Tot. el s. m x =0.003136

BARRA : 138 (82,85) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.481	-2.352	35.159	
	m¡n.	-4.481	-2.352	35.159	
	Cort.m x.	-4.481	-2.352	35.159	
	m¡n.	-4.481	-2.352	35.159	
	Flec.m x.	-4.481	-2.352	35.159	
	m¡n.	-4.481	-2.352	35.159	

Flecha Tot. el s. m x =0.000651

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-4.481	-2.352	39.862	
	m¡n.	-4.481	-2.352	39.862	
	Cort.m x.	-4.481	-2.352	39.862	
	m¡n.	-4.481	-2.352	39.862	
	Flec.m x.	-4.481	-2.352	39.862	
	m¡n.	-4.481	-2.352	39.862	

Flecha Tot. el s. m x =0.000710

BARRA : 139 (81,82) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.239	1.407	1.258	
	m¡n.	-0.239	1.407	1.258	
	Cort.m x.	-0.239	1.407	1.258	
	m¡n.	-0.239	1.407	1.258	
	Flec.m x.	-0.239	1.407	1.258	
	m¡n.	-0.239	1.407	1.258	

Flecha Tot. el s. m x =0.002992

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.239	1.407	-3.951	
	m¡n.	-0.239	1.407	-3.951	
	Cort.m x.	-0.239	1.407	-3.951	
	m¡n.	-0.239	1.407	-3.951	
	Flec.m x.	-0.239	1.407	-3.951	
	m¡n.	-0.239	1.407	-3.951	

Flecha Tot. el s. m x =0.000651

BARRA : 140 (82,83) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.455	-1.413	-4.078	
	m¡n.	0.455	-1.413	-4.078	
	Cort.m x.	0.455	-1.413	-4.078	
	m¡n.	0.455	-1.413	-4.078	
	Flec.m x.	0.455	-1.413	-4.078	
	m¡n.	0.455	-1.413	-4.078	

Flecha Tot. el s. m x =0.000651

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.455	-1.413	1.503	
	m¡n.	0.455	-1.413	1.503	
	Cort.m x.	0.455	-1.413	1.503	
	m¡n.	0.455	-1.413	1.503	
	Flec.m x.	0.455	-1.413	1.503	
	m¡n.	0.455	-1.413	1.503	

Flecha Tot. el s. m x =0.003136

BARRA : 141 (84,87) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.276	1.007	1.629	
	m¡n.	0.276	1.007	1.629	
	Cort.m x.	0.276	1.007	1.629	
	m¡n.	0.276	1.007	1.629	
	Flec.m x.	0.276	1.007	1.629	
	m¡n.	0.276	1.007	1.629	

Flecha Tot. el s. m x =0.002684

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.276	1.007	-0.385	
	m¡n.	0.276	1.007	-0.385	
	Cort.m x.	0.276	1.007	-0.385	
	m¡n.	0.276	1.007	-0.385	
	Flec.m x.	0.276	1.007	-0.385	
	m¡n.	0.276	1.007	-0.385	

Flecha Tot. el s. m x =0.002026

BARRA : 142 (83,86) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.575	-0.432	0.579	
	m¡n.	-1.575	-0.432	0.579	
	Cort.m x.	-1.575	-0.432	0.579	
	m¡n.	-1.575	-0.432	0.579	
	Flec.m x.	-1.575	-0.432	0.579	
	m¡n.	-1.575	-0.432	0.579	

Flecha Tot. el s. m x =0.003136

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.575	-0.432	1.442	
	m¡n.	-1.575	-0.432	1.442	
	Cort.m x.	-1.575	-0.432	1.442	

m¡n.	-1.575	-0.432	1.442
Flec.m x.	-1.575	-0.432	1.442
m¡n.	-1.575	-0.432	1.442

Flecha Tot. el s. m x =0.002439

BARRA : 143 (85,88) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-4.155	4.195	38.834	
	m¡n.	-4.155	4.195	38.834	
	Cort.m x.	-4.155	4.195	38.834	
	m¡n.	-4.155	4.195	38.834	
	Flec.m x.	-4.155	4.195	38.834	
	m¡n.	-4.155	4.195	38.834	

Flecha Tot. el s. m x =0.000710

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-4.155	4.195	30.444	
	m¡n.	-4.155	4.195	30.444	
	Cort.m x.	-4.155	4.195	30.444	
	m¡n.	-4.155	4.195	30.444	
	Flec.m x.	-4.155	4.195	30.444	
	m¡n.	-4.155	4.195	30.444	

Flecha Tot. el s. m x =0.000674

BARRA : 144 (84,85) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.369	-1.565	-0.754	
	m¡n.	-0.369	-1.565	-0.754	
	Cort.m x.	-0.369	-1.565	-0.754	
	m¡n.	-0.369	-1.565	-0.754	
	Flec.m x.	-0.369	-1.565	-0.754	
	m¡n.	-0.369	-1.565	-0.754	

Flecha Tot. el s. m x =0.002684

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.369	3.435	-5.591	
	m¡n.	-0.369	3.435	-5.591	
	Cort.m x.	-0.369	3.435	-5.591	
	m¡n.	-0.369	3.435	-5.591	
	Flec.m x.	-0.369	3.435	-5.591	
	m¡n.	-0.369	3.435	-5.591	

Flecha Tot. el s. m x =0.000710

BARRA : 145 (85,86) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.659	-3.112	-5.265	
	m¡n.	0.659	-3.112	-5.265	
	Cort.m x.	0.659	-3.112	-5.265	
	m¡n.	0.659	-3.112	-5.265	
	Flec.m x.	0.659	-3.112	-5.265	
	m¡n.	0.659	-3.112	-5.265	

Flecha Tot. el s. m x =0.000710

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.659	1.888	-0.851	
	m¡n.	0.659	1.888	-0.851	
	Cort.m x.	0.659	1.888	-0.851	
	m¡n.	0.659	1.888	-0.851	
	Flec.m x.	0.659	1.888	-0.851	
	m¡n.	0.659	1.888	-0.851	

Flecha Tot. el s. m x =0.002439

BARRA : 146 (87,90) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.728	0.338	0.097	
	m¡n.	0.728	0.338	0.097	
	Cort.m x.	0.728	0.338	0.097	
	m¡n.	0.728	0.338	0.097	
	Flec.m x.	0.728	0.338	0.097	
	m¡n.	0.728	0.338	0.097	

Flecha Tot. el s. m x =0.002026

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.728	0.338	-0.579	
	m¡n.	0.728	0.338	-0.579	
	Cort.m x.	0.728	0.338	-0.579	
	m¡n.	0.728	0.338	-0.579	
	Flec.m x.	0.728	0.338	-0.579	
	m¡n.	0.728	0.338	-0.579	

Flecha Tot. el s. m x =0.001340

BARRA : 147 (86,89) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.724	1.457	2.101	
	m¡n.	-0.724	1.457	2.101	
	Cort.m x.	-0.724	1.457	2.101	
	m¡n.	-0.724	1.457	2.101	
	Flec.m x.	-0.724	1.457	2.101	
	m¡n.	-0.724	1.457	2.101	

Flecha Tot. el s. m x =0.002439

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-0.724	1.457	-0.812	
	m¡n.	-0.724	1.457	-0.812	
	Cort.m x.	-0.724	1.457	-0.812	

m¡n.	-0.724	1.457	-0.812
Flec.m x.	-0.724	1.457	-0.812
m¡n.	-0.724	1.457	-0.812

Flecha Tot. el s. m x =0.001307

BARRA : 148 (88,91) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-3.282	5.233	29.191	
	m¡n.	-3.282	5.233	29.191	
	Cort.m x.	-3.282	5.233	29.191	
	m¡n.	-3.282	5.233	29.191	
	Flec.m x.	-3.282	5.233	29.191	
	m¡n.	-3.282	5.233	29.191	

Flecha Tot. el s. m x =0.000674

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-3.282	5.233	18.725	
	m¡n.	-3.282	5.233	18.725	
	Cort.m x.	-3.282	5.233	18.725	
	m¡n.	-3.282	5.233	18.725	
	Flec.m x.	-3.282	5.233	18.725	
	m¡n.	-3.282	5.233	18.725	

Flecha Tot. el s. m x =0.000566

BARRA : 149 (87,88) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.482	0.669	0.453	
	m¡n.	-0.482	0.669	0.453	
	Cort.m x.	-0.482	0.669	0.453	
	m¡n.	-0.482	0.669	0.453	
	Flec.m x.	-0.482	0.669	0.453	
	m¡n.	-0.482	0.669	0.453	

Flecha Tot. el s. m x =0.002026

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.482	0.669	-2.024	
	m¡n.	-0.482	0.669	-2.024	
	Cort.m x.	-0.482	0.669	-2.024	
	m¡n.	-0.482	0.669	-2.024	
	Flec.m x.	-0.482	0.669	-2.024	
	m¡n.	-0.482	0.669	-2.024	

Flecha Tot. el s. m x =0.000674

BARRA : 150 (88,89) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.771	-0.369	-1.151	
	m¡n.	0.771	-0.369	-1.151	
	Cort.m x.	0.771	-0.369	-1.151	
	m¡n.	0.771	-0.369	-1.151	
	Flec.m x.	0.771	-0.369	-1.151	
	m¡n.	0.771	-0.369	-1.151	

Flecha Tot. el s. m x =0.000674

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.771	-0.369	0.306	
	m¡n.	0.771	-0.369	0.306	
	Cort.m x.	0.771	-0.369	0.306	
	m¡n.	0.771	-0.369	0.306	
	Flec.m x.	0.771	-0.369	0.306	
	m¡n.	0.771	-0.369	0.306	

Flecha Tot. el s. m x =0.001307

BARRA : 151 (90,94) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.665	0.114	-0.211	
	m¡n.	0.665	0.114	-0.211	
	Cort.m x.	0.665	0.114	-0.211	
	m¡n.	0.665	0.114	-0.211	
	Flec.m x.	0.665	0.114	-0.211	
	m¡n.	0.665	0.114	-0.211	

Flecha Tot. el s. m x =0.001340

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.665	0.114	-0.440	
	m¡n.	0.665	0.114	-0.440	
	Cort.m x.	0.665	0.114	-0.440	
	m¡n.	0.665	0.114	-0.440	
	Flec.m x.	0.665	0.114	-0.440	
	m¡n.	0.665	0.114	-0.440	

Flecha Tot. el s. m x =0.000775

BARRA : 152 (89,92) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.029	1.088	-0.041	
	m¡n.	-1.029	1.088	-0.041	
	Cort.m x.	-1.029	1.088	-0.041	
	m¡n.	-1.029	1.088	-0.041	
	Flec.m x.	-1.029	1.088	-0.041	
	m¡n.	-1.029	1.088	-0.041	

Flecha Tot. el s. m x =0.001307

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-1.029	1.088	-2.216	
	m¡n.	-1.029	1.088	-2.216	
	Cort.m x.	-1.029	1.088	-2.216	

m¡n.	-1.029	1.088	-2.216
Flec.m x.	-1.029	1.088	-2.216
m¡n.	-1.029	1.088	-2.216

Flecha Tot. el s. m x =0.000290

BARRA : 153 (91,95) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-2.024	5.254	17.931	
	m¡n.	-2.024	5.254	17.931	
	Cort.m x.	-2.024	5.254	17.931	
	m¡n.	-2.024	5.254	17.931	
	Flec.m x.	-2.024	5.254	17.931	
	m¡n.	-2.024	5.254	17.931	

Flecha Tot. el s. m x =0.000566

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	-2.024	5.254	7.424	
	m¡n.	-2.024	5.254	7.424	
	Cort.m x.	-2.024	5.254	7.424	
	m¡n.	-2.024	5.254	7.424	
	Flec.m x.	-2.024	5.254	7.424	
	m¡n.	-2.024	5.254	7.424	

Flecha Tot. el s. m x =0.000411

BARRA : 154 (90,91) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.368	0.224	-0.063	
	m¡n.	-0.368	0.224	-0.063	
	Cort.m x.	-0.368	0.224	-0.063	
	m¡n.	-0.368	0.224	-0.063	
	Flec.m x.	-0.368	0.224	-0.063	
	m¡n.	-0.368	0.224	-0.063	

Flecha Tot. el s. m x =0.001340

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.368	0.224	-0.891	
	m¡n.	-0.368	0.224	-0.891	
	Cort.m x.	-0.368	0.224	-0.891	
	m¡n.	-0.368	0.224	-0.891	
	Flec.m x.	-0.368	0.224	-0.891	
	m¡n.	-0.368	0.224	-0.891	

Flecha Tot. el s. m x =0.000566

BARRA : 155 (91,92) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.426	0.203	0.367	
	m¡n.	0.426	0.203	0.367	
	Cort.m x.	0.426	0.203	0.367	
	m¡n.	0.426	0.203	0.367	
	Flec.m x.	0.426	0.203	0.367	
	m¡n.	0.426	0.203	0.367	

Flecha Tot. el s. m x =0.000566

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.95	Tor. m x.	0.426	0.203	-0.434	
	m¡n.	0.426	0.203	-0.434	
	Cort.m x.	0.426	0.203	-0.434	
	m¡n.	0.426	0.203	-0.434	
	Flec.m x.	0.426	0.203	-0.434	
	m¡n.	0.426	0.203	-0.434	

Flecha Tot. el s. m x =0.000290

BARRA : 156 (94,98) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.477	0.109	-0.189	
	m¡n.	0.477	0.109	-0.189	
	Cort.m x.	0.477	0.109	-0.189	
	m¡n.	0.477	0.109	-0.189	
	Flec.m x.	0.477	0.109	-0.189	
	m¡n.	0.477	0.109	-0.189	

Flecha Tot. el s. m x =0.000775

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.477	0.109	-0.408	
	m¡n.	0.477	0.109	-0.408	
	Cort.m x.	0.477	0.109	-0.408	
	m¡n.	0.477	0.109	-0.408	
	Flec.m x.	0.477	0.109	-0.408	
	m¡n.	0.477	0.109	-0.408	

Flecha Tot. el s. m x =0.000327

BARRA : 157 (93,96) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.061	-3.069	-3.840	
	m¡n.	0.061	-3.069	-3.840	
	Cort.m x.	0.061	-3.069	-3.840	
	m¡n.	0.061	-3.069	-3.840	
	Flec.m x.	0.061	-3.069	-3.840	
	m¡n.	0.061	-3.069	-3.840	

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.35	Tor. m x.	0.061	-3.069	0.313	
	m¡n.	0.061	-3.069	0.313	
	Cort.m x.	0.061	-3.069	0.313	
	m¡n.	0.061	-3.069	0.313	
	Flec.m x.	0.061	-3.069	0.313	
	m¡n.	0.061	-3.069	0.313	

Flecha Tot. el s. m x =0.000098

BARRA : 158 (95,97) Sec. 4 Rect. /383,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-1.222	4.951	7.241	
	m¡n.	-1.222	4.951	7.241	
	Cort.m x.	-1.222	4.951	7.241	
	m¡n.	-1.222	4.951	7.241	
	Flec.m x.	-1.222	4.951	7.241	
	m¡n.	-1.222	4.951	7.241	

Flecha Tot. el s. m x =0.000411

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
1.79	Tor. m x.	-1.222	4.951	-1.605	
	m¡n.	-1.222	4.951	-1.605	
	Cort.m x.	-1.222	4.951	-1.605	
	m¡n.	-1.222	4.951	-1.605	
	Flec.m x.	-1.222	4.951	-1.605	
	m¡n.	-1.222	4.951	-1.605	

Flecha Tot. el s. m x =0.000257

BARRA : 159 (94,95) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.251	0.005	-0.188	
	m¡n.	-0.251	0.005	-0.188	
	Cort.m x.	-0.251	0.005	-0.188	
	m¡n.	-0.251	0.005	-0.188	
	Flec.m x.	-0.251	0.005	-0.188	
	m¡n.	-0.251	0.005	-0.188	

Flecha Tot. el s. m x =0.000775

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.70	Tor. m x.	-0.251	0.005	-0.207	
	m¡n.	-0.251	0.005	-0.207	
	Cort.m x.	-0.251	0.005	-0.207	
	m¡n.	-0.251	0.005	-0.207	
	Flec.m x.	-0.251	0.005	-0.207	
	m¡n.	-0.251	0.005	-0.207	

Flecha Tot. el s. m x =0.000411

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BARRA : 160 (95,96) Sec. 9 Rect. /189,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.068	0.307	0.596	
	m¡n.	-0.068	0.307	0.596	
	Cort.m x.	-0.068	0.307	0.596	
	m¡n.	-0.068	0.307	0.596	
	Flec.m x.	-0.068	0.307	0.596	
	m¡n.	-0.068	0.307	0.596	

Flecha Tot. el s. m x =0.000411

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.81	Tor. m x.	-0.068	0.307	-0.267	
	m¡n.	-0.068	0.307	-0.267	
	Cort.m x.	-0.068	0.307	-0.267	
	m¡n.	-0.068	0.307	-0.267	
	Flec.m x.	-0.068	0.307	-0.267	
	m¡n.	-0.068	0.307	-0.267	

Flecha Tot. el s. m x =0.000098

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BARRA : 161 (98,100) Sec. 1 Rect. /315,22/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.277	0.214	-0.240	
	m¡n.	0.277	0.214	-0.240	
	Cort.m x.	0.277	0.214	-0.240	
	m¡n.	0.277	0.214	-0.240	
	Flec.m x.	0.277	0.214	-0.240	
	m¡n.	0.277	0.214	-0.240	

Flecha Tot. el s. m x =0.000327

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
2.00	Tor. m x.	0.277	0.214	-0.668	
	m¡n.	0.277	0.214	-0.668	
	Cort.m x.	0.277	0.214	-0.668	
	m¡n.	0.277	0.214	-0.668	
	Flec.m x.	0.277	0.214	-0.668	
	m¡n.	0.277	0.214	-0.668	

Flecha Tot. el s. m x =0.000015

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BARRA : 162 (97,99) Sec. 2 Rect. /50,110/ cm H-400

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Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.959	2.189	7.801	
	m¡n.	0.959	2.189	7.801	
	Cort.m x.	0.959	2.189	7.801	
	m¡n.	0.959	2.189	7.801	
	Flec.m x.	0.959	2.189	7.801	
	m¡n.	0.959	2.189	7.801	

Flecha Tot. el s. m x =0.000257

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.40	Tor. m x.	0.959	2.189	6.931	
	m¡n.	0.959	2.189	6.931	
	Cort.m x.	0.959	2.189	6.931	
	m¡n.	0.959	2.189	6.931	
	Flec.m x.	0.959	2.189	6.931	
	m¡n.	0.959	2.189	6.931	

Flecha Tot. el s. m x =0.000250

BARRA : 163 (98,99) Sec. 5 Rect. /200,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.167	-0.105	-0.200	
	m¡n.	-0.167	-0.105	-0.200	
	Cort.m x.	-0.167	-0.105	-0.200	
	m¡n.	-0.167	-0.105	-0.200	
	Flec.m x.	-0.167	-0.105	-0.200	
	m¡n.	-0.167	-0.105	-0.200	

Flecha Tot. el s. m x =0.000327

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.37	Tor. m x.	-0.167	-0.105	0.152	
	m¡n.	-0.167	-0.105	0.152	
	Cort.m x.	-0.167	-0.105	0.152	
	m¡n.	-0.167	-0.105	0.152	
	Flec.m x.	-0.167	-0.105	0.152	
	m¡n.	-0.167	-0.105	0.152	

Flecha Tot. el s. m x =0.000250

BARRA : 164 (100,102) Sec. 1 Rect. /315,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	0.177	0.620	-0.585	
	m¡n.	0.177	0.620	-0.585	
	Cort.m x.	0.177	0.620	-0.585	
	m¡n.	0.177	0.620	-0.585	
	Flec.m x.	0.177	0.620	-0.585	
	m¡n.	0.177	0.620	-0.585	

Flecha Tot. el s. m x =0.000015

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.14	Tor. m x.	0.177	0.620	-0.673	
	m¡n.	0.177	0.620	-0.673	
	Cort.m x.	0.177	0.620	-0.673	
	m¡n.	0.177	0.620	-0.673	
	Flec.m x.	0.177	0.620	-0.673	
	m¡n.	0.177	0.620	-0.673	

BARRA : 165 (99,101) Sec. 2 Rect. /50,110/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	1.019	2.085	6.713	
	m¡n.	1.019	2.085	6.713	
	Cort.m x.	1.019	2.085	6.713	
	m¡n.	1.019	2.085	6.713	
	Flec.m x.	1.019	2.085	6.713	
	m¡n.	1.019	2.085	6.713	

Flecha Tot. el s. m x =0.000250

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
3.73	Tor. m x.	1.019	2.085	-1.053	
	m¡n.	1.019	2.085	-1.053	
	Cort.m x.	1.019	2.085	-1.053	
	m¡n.	1.019	2.085	-1.053	
	Flec.m x.	1.019	2.085	-1.053	
	m¡n.	1.019	2.085	-1.053	

Flecha Tot. el s. m x =0.000020

BARRA : 166 (100,101) Sec. 10 Rect. /107,22/ cm H-400

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.00	Tor. m x.	-0.083	-0.406	-0.099	
	m¡n.	-0.083	-0.406	-0.099	
	Cort.m x.	-0.083	-0.406	-0.099	
	m¡n.	-0.083	-0.406	-0.099	
	Flec.m x.	-0.083	-0.406	-0.099	

		m¡n.	-0.083	-0.406	-0.099

Flecha Tot. el s. m x =0.000015

Secci¢n	Hip¢tesis	Torsor	Cortante	Flector	Flecha
0.22	Tor. m x.	-0.083	-0.406	-0.009	
	m¡n.	-0.083	-0.406	-0.009	
	Cort.m x.	-0.083	-0.406	-0.009	
	m¡n.	-0.083	-0.406	-0.009	
	Flec.m x.	-0.083	-0.406	-0.009	
	m¡n.	-0.083	-0.406	-0.009	

Flecha Tot. el s. m x =0.000020

REACCIONES

(Combinaciones con coeficientes unidad - servicio)

Nudo.	Hip¢tesis.	Momento X.	Fuerza Z.	Momento Y.
1	C 1	-0.627	2.602	-2.576
8	C 1	2.583	4.302	-1.349
31	C 1	10.850	50.245	-65.980
70	C 1	1.091	56.192	77.830
93	C 1	-2.612	4.360	1.321
102	C 1	0.529	2.299	2.419

Resumen del control de calidad

RESUMEN DEL CONTROL DE CALIDAD

Cuadro resumen de ensayos de hormigón

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO P.S. 5

P.P.I. Nº 20

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
847	1393	18/05/00	E-1,i Zap	03020503	H-250	12	Fluida			3	354			100	16/06/00	I 42,5 R/SR	174	
847	1395	19/05/00	P-1,I Zap	03020503	H-250	8	Blanda			2	198	1		100	16/06/00	I 42,5 R/SR	174	
850	1399	22/05/00	E-1,d Zap 2ª	03020503	H-250	15	Fluida			3	276			100	22/06/00	I 42,5 R/SR	216	
850	1400	23/05/00	E-1,i Zap 2ª	03020503	H-250	11	Fluida			3	246			100	22/06/00	I 42,5 R/SR	216	
854	1411	29/05/00	P-1,d	03020504	H-300	8	Blanda			3	330			8	26/06/00	II AL 42,5 R	330	
857	1417	01/06/00	E-1,d Alz	03020503	H-250	5	Blanda			3	303			100	29/06/00	II AL 42,5 R	257	
857	1418	01/06/00	E-1,d Alz	03020503	H-250	6	Blanda			3	292			100	29/06/00	II AL 42,5 R	257	
858	1419	01/06/00	E-1,d Alz	03020503	H-250	9	Blanda			3	275			100	03/07/00	II AL 42,5 R	242	
858	1424	05/06/00	E-1,i Alz	03020503	H-250	8	Blanda			3	279			100	03/07/00	II AL 42,5 R	242	
860	1425	05/06/00	E-1,i Alz	03020503	H-250	9	Blanda			3	222			100	03/07/00	II AL 42,5 R	195	
860	1426	05/06/00	E-1,i Alz	03020503	H-250	7	Blanda			3	291			100	03/07/00	II AL 42,5 R	195	Se guarda una probeta a 90 días
874	1449	13/06/00	E-2,d Alz 2ª	03020503	H-250	8	Blanda			3	249			100	11/07/00	II AL 42,5 R	205	
874	1450	13/06/00	E-2,d Alz 2ª	03020503	H-250	6	Blanda			3	233			100	11/07/00	II AL 42,5 R	205	
875	1451	13/06/00	E-2,d Alz 2ª	03020503	H-250	9	Blanda			3	258			100	17/07/00	II AL 42,5 R	227	
875	1458	19/06/00	E-2,i Alz 2ª	03020503	H-250	7	Blanda			3	261			100	17/07/00	II AL 42,5 R	227	
879	1459	19/06/00	E-2,i Alz 2ª	03020503	H-250	8	Blanda			3	210			100	17/07/00	II AL 42,5 R	185	
879	1460	19/06/00	E-2,i Alz 2ª	03020503	H-250	8	Blanda			3	223			100	17/07/00	II AL 42,5 R	185	
887	1475	03/07/00	Tablero	03020506	H-400	12	Fluida	2	408	3	439			100	31/08/00	II AL 42,5 R	348	
887	1476	03/07/00	Tablero	03020506	H-400	12	Fluida	2	291	3	396			100	31/08/00	II AL 42,5 R	348	
888	1477	03/07/00	Tablero	03020506	H-400	15	Fluida	2	391	3	465			100	31/08/00	II AL 42,5 R	409	
888	1478	03/07/00	Tablero	03020506	H-400	15	Fluida	2	447	3	482			100	31/08/00	II AL 42,5 R	409	
889	1479	03/07/00	Tablero	03020506	H-400	16	Fluida	2	403	3	490			100	31/08/00	II AL 42,5 R	431	
889	1480	03/07/00	Tablero	03020506	H-400	10	Fluida	2	402	3	504			100	31/08/00	II AL 42,5 R	431	

FECHA:

FIRMA:

NOMBRE: Ana Mª Martín Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

PASO SUPERIOR 6

PASO SUPERIOR 6

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RESUMEN DEL CONTROL DE CALIDAD

Descripción y Cálculos

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1. DESCRIPCION GENERAL

El paso superior 6 del P.K. 316 + 460 está constituido por tres vanos de 13 + 17 + 13 = 43 m.

La sección transversal tiene una distribución de calzadas de 1.35 + 3.05 + 3.05 + 1.35 = 8.80 .

La planta es recta y lleva pendientes decrecientes del 2 % en los dos sentidos, respecto del eje.

La estructura es de hormigón armado con sección trapezoidal aligerada, con una base de 3.00 m. de ancho y voladizos de 2.60 m., terminados en 0.18 m de espesor. El canto mínimo de la losa es de 1.10 m.

Los aligeramientos son tres de seccion circular de 0.60 m de diámetro.

Las dos pilas intermedias son de fuste único de 1.00 m. de diámetro y se empotran en el tablero.
Las zapatas de las pilas son de 4.00 x 4.00 x 1.50 m para una tensión admisible de 3.0 kp/cm^2

Los estribos son del tipo convencional con aletas voladas.
Los estribos tienen 6.5 m de altura y la sección 4.50x1.00 m.

La separación de los dos apoyos elastoméricos dispuestos en los estribos es de 6.80 m para garantizar la estabilidad transversal del tablero.

La zapata del estribo es común a todo él con una latitud de 9.20 m. La dimensión longitudinal es de 4.5 m para una altura de 6.5 m.

Lleva aceras prefabricadas con barandilla y defensa elástica,así como valla antivandálica. Dichas aceras vuelan 0.30 m desde el borde de la losa.

Finalmente, se han dispuesto losas de transición de 5.00 x 0.30 m. de sección.

2. HIPOTESIS DE CALCULO Y PROCESO DE CONSTRUCCION .

Inicialmente, se estudia el tablero como emparrillado a fin de obtener el coeficiente de reparto transversal y los esfuerzos transversales de flexión, cortante y torsión.

Con el coeficiente de reparto transversal aplicado a la sobrecarga de tráfico, se calcula longitudinalmente el puente como pórtico, formado por viga-tablero,apoyado en los estribos y pilas y se determinan las secciones de armaduras pasivas longitudinales en primer lugar.

Las armaduras de cortante longitudinal y las de flexión y cortante transversal, se determinan por medio de los esfuerzos obtenidos anteriormente, en especial en las inmediaciones de los apoyos.

A partir de los valores anteriores, se calculan las pilas de soporte único con consideración del efecto de pandeo y sometidas a viento, frenado y acciones térmicas y de retracción.

Los estribos estarán sometidos a las cargas transmitidas por el tablero, tanto verticales como horizontales y las de empuje de tierras, para las hipótesis pésimas.

De acuerdo con la Norma sismorresistente NCS- 94, para esta zona y tipo de obra no es preciso la comprobación por el sismo.

De las acciones y los programas de cálculo, vale lo dicho en el Paso superior 1 y los Pasos superiores 2 y 3, que igualmente tendrían un procedimiento constructivo análogo.

3. NORMATIVA CONSIDERADA

Para el cálculo de esta estructura se ha considerado la siguiente

Normas:

Instrucción relativa a las acciones a considerar en los puentes de ferrocarril, IPF- 75

Instrucción relativa a las acciones a considerar en el proyecto de puentes de carretera, IAP- 96.

Instrucción para el proyecto y la ejecución de obras de hormigón en masa o armado (EH-91).

Instrucción para el proyecto y la ejecución de obras de hormigón pretensado (EP-93).

Norma de Construcción Sismorresistente NCS - 94.

4. RESISTENCIA DE LOS MATERIALES Y COEFICIENTE DE SEGURIDAD

Resistencia del hormigón H-300 para armar en fustes de pilas y losa_ tablero:

$f_{ck} = 300$ Kp/cm^2 ; $\gamma_c = 1.5$

Resistencia del hormigón H-250 en el resto de las estructuras, cimentaciones y estribos:

$f_{ck} = 250$ Kp/cm^2 ; $\gamma_c = 1.5$

Acero en armaduras pasivas AEH-500:

$f_{yk} = 5100$ Kp/cm^2 ; $\gamma_s = 1.15$

Coeficiente de seguridad de acciones:

Tablero y pilas: $\gamma_f = 1.5$
Resto: $\gamma_f = 1.6$

5. TABLERO

5.1. DESCRIPCION GENERAL

Está formado por tres vanos de hormigón armado.

Inicialmente, se hace un cálculo de emparrillado para determinar el coeficiente de reparto transversal, así como los esfuerzos locales en la losa. Con el coeficiente de reparto se estudia la losa como pórtico en un plano formado por el tablero como viga empotrada en las pilas cilindricas y apoyada en los estribos.

Se calculan, a continuación, las secciones en el sentido longitudinal y transversal y se determinan las hipótesis extremas.

Las armaduras pasivas se obtienen para las flexiones, los esfuerzos cortantes y se realiza la comprobación de la torsión.

Finalmente se estudiará especialmente las secciones en apoyos.

5.2. CALCULO LONGITUDINAL

Flexión en el centro del primer vano:

M = 364 mt

$A = f_{cd} \times bd\,(1 - (1 - 2 \times \gamma_f \times M/f_{cd}/b/d^2)^{1/2})/f_{cd}$

$f_{cd} = 3000/1.5 = 2000\ t/m^2$

$f_{yd} = 5.1/1.15 = 4.43\ t/cm^2$

$\gamma_f = 1.50$

b = 3 m

d = 1.1 m.

$A = 117\ cm^2 \rightarrow$

Flexión sobre la pila:

Ma = -555 mt

Aa = 182 cm2

En el centro del segundo vano:

Mc = 431 mt

Ac = 139 cm2

5.3. ESFUERZO CORTANTE LONGITUDINAL

Apoyos extremos:

V = 1.5 x 146.78 = 220 t

$V_c = 5 \times 200^{1/2} \times 3.00 \times 1.1 = 233\ t > V$

Apoyos interiores:

V = 1.5 X 228 = 342 t

$A_t = (342-233)/0.9/1.1/4.2 \times 0.20 = 5.24\ cm^2/0.20$

5.4. ESTUDIO TRANSVERSAL

- Cálculo de riostra en los apoyos extremos:

Flexión:

p = 100/ 8.2= 12.27 t/m

M = 12.27 x 6.8 ^2 /8+30x2.4 = 143 mt

$A = 48.68\ cm^2$

Cortante:

V = 1.5 x(12.27x 3.0 + 60x4.5/ 6) = 123 t

$V_c = 5 \times 200^{1/2} \times 1.06 = 75\ t$

$A = (123- 75)/0.9/1.06/4.2/5 = 2.39\ cm^2 \rightarrow 3\ c\ \phi\ 10/0.2$

- Cálculo transversal sobre pilas

Flexión:

p = 402/3 = 134 t/m

$M = 134 \times 1.5^2/2 = 151$ mt,

En dos metros:

$A = 47.5$ cm^2

Esfuerzo cortante:

$V = 1.5 \times 134 \times 1 = 201$ t

$V_c = 5 \times 200^{1/2} \times 2 \times 1.1 = 155$ t

$A_t = (201 - 155)/0.9/1.1/4.2/5 = 2.18$ cm^2/0.2

- Torsión

$T_d = 1.5 \times (21.5 \times 0.4 \times 4.4^2/2 + 60 \times 2.9) = 385$ mt

$A_e = 2.89$ m^2

$T_{ul} = 0.36 \times 3000/1.5 \times 2.89 \times 0.192 = 399$ mt $> T_d$

Armadura transversal

$A_t = 385/2/2.89/4.2/5 = 3.17$ cm^2/0.20

Armadura longitudinal

$A_l = 3.17/4.43 \times 4.2 = 3.00$ cm^2/0.25

Estabilidad de apoyos extremos

Con carro ladeado.- Por torsión:

$R = \pm 385/1.5/6.8 = \pm 38$ t

Cargas verticales

$V = 88+60 = 148$ t

R = 148/2 ± 38

$R_1 = 112$ t

$R_2 = 36$ t

Voladizos transversales

$M = 2.5 \times (0.18 \times 2 + 0.35) \times 2.35^2/6 + 0.6 \times 2.45^2/2 + .75 \times 1.5 \times (4.4 - 1.35/2 - 1.75) + 20/1.5 \times 1.15 = 20.98$ mt/m

$A = 24.24$ cm^2/m

$V = 1.5 \times (0.53 \times 2.5 \times 2.35/2 + 0.6 \times 2.45/2 + 1.125 + 10/15) = 15.12$ t/m

$V_c = 2.5 \times 200^{1/2} \times 0.32 \times (1 + 50 \times 0.00861) = 16.19$ t $> V$

5.5. EMPARRILLADO

A continuación, y por medio del programa TREBOL II se efectúa el cálculo del emparrillado necesario para la determinación del coeficiente de reparto transversal introducido en el cálculo longitudinal del tablero y la obtención de los esfuerzos para la disposición de las armaduras transversales y de torsión.

Se ha discretizado la losa disponiendo un total de 3 barras haces longitudinales más las de borde, y tramos transversales cada 1.75 m. aproximadamente, excepto en la zona de apoyos en la que se ha realizado una discretización mayor para poder analizar los efectos locales.

La discretización de las cargas superficiales se ha realizado asignando el área de influencia a nodos y las lineales y puntuales como cargas en barras.

En los resultados del programa se pueden observar las características y cargas asignadas a cada uno de las barras.

5.6. CALCULO DE LA VIGA-LOSA

En consecuencia con lo anterior, se considera el tablero como viga de tres vanos apoyados en los estribos y empotrados en las pilas.

Se adjuntan los cálculos realizados de la estructura resultante.

El programa efectúa el cálculo de los esfuerzos en las hipótesis extremas,que han sido utilizados ya anteriormente, para el cálculo de las armaduras .

2. CÁLCULOS

LAVPAS6
JUNIO 1998

[GEOMETRY]

# MEMBERS	# JOINTS	# RESTRIC. JOINTS	E [Kg/cm2]	THERMAL C.
8	9	4	300000	.00001

JOINT COORDINATES

JOINT #	X [mt]	Y [mt]
1	13.00	0.00
2	30.00	0.00
3	0.00	11.10
4	6.50	11.10
5	13.00	11.10
6	21.50	11.10
7	30.00	11.10
8	36.50	11.10
9	43.00	11.10

TYPES OF SECTIONS

TYPE #	PROPERTIES (I,A)
1	0.04900000 - 0.78500003
2	0.55699998 - 4.30000020

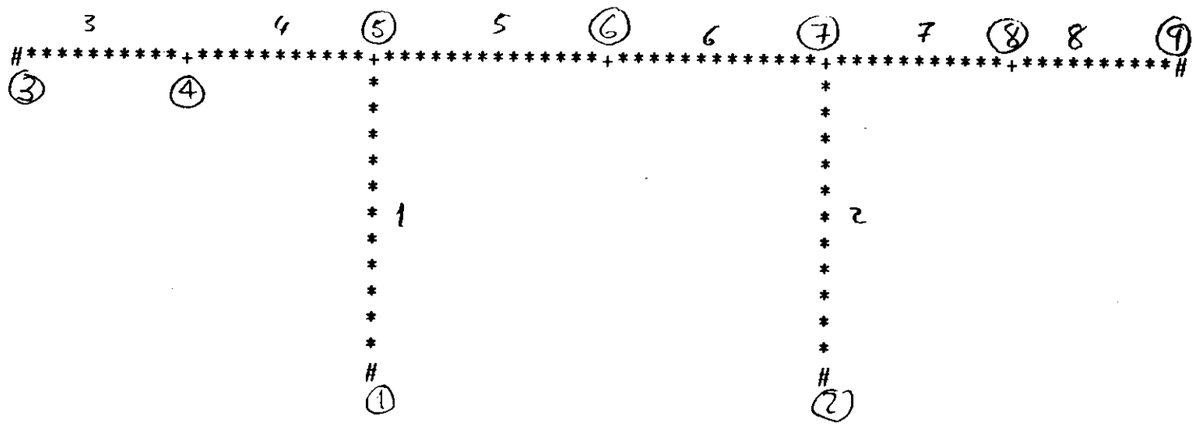
MEMBER INFORMATION, ORIENTATION AND PROPERTIES

MEMB #	End J	End K	TYPE	Inert [mt4]	Area [mt2]	Length	SIN	COS
1	1	5	1	0.04900000	0.78500003	11.10	1.000	0.000
2	2	7	1	0.04900000	0.78500003	11.10	1.000	0.000
3	3	4	2	0.55699998	4.30000020	6.50	0.000	1.000
4	4	5	2	0.55699998	4.30000020	6.50	0.000	1.000
5	5	6	2	0.55699998	4.30000020	8.50	0.000	1.000
6	6	7	2	0.55699998	4.30000020	8.50	0.000	1.000
7	7	8	2	0.55699998	4.30000020	6.50	0.000	1.000
8	8	9	2	0.55699998	4.30000020	6.50	0.000	1.000

RESTRICTED JOINTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	1	1	1
2	1	1	1
3	0	1	0
9	0	1	0

LAVPAS6
JUNIO 1998



LAVPAS6
JUNIO 1998 CASE --> [DEAD LOAD]

GROUP # : 1 VERTICAL LOADS

3 4 7 8

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	14333	14333	0	6.5		

GROUP # : 2 VERTICAL LOADS

5 6

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	14333	14333	0	8.5		

LAVPAS6
JUNIO 1998 CASE --> [DEAD LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.000056	0.000000	-0.000463
4	0.000056	0.176014	0.000015
5	0.000056	0.112770	-0.000119
6	-0.000000	0.350089	0.000000
7	-0.000056	0.112770	0.000119
8	-0.000056	0.176014	-0.000015
9	-0.000056	0.000000	0.000463

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-239255	-854	3159
	5	-239255	-854	-6322
2	2	-239255	854	-3159
	7	-239255	854	6322
3	3	0	68904	-0
	4	0	-24260	145091
4	4	0	-24261	145092
	5	0	-117425	-315387
5	5	-854	121831	-321709
	6	-854	0	196071
6	6	-854	0	196071
	7	-854	-121830	-321709
7	7	0	117425	-315386
	8	0	24260	145091
8	8	0	24261	145091
	9	0	-68904	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-854	239255	3159
2	854	239255	-3159
3	0	68904	0
9	0	68904	0

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CASE --> [LIVE LOAD]

GROUP # : 1 — VERTICAL LOADS

3

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5

Point Loads : 2

Point X	P
5	20000
6.5	20000

GROUP # : 2 — VERTICAL LOADS

4

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5

Point Loads : 1

Point X	P
1.5	20000

GROUP # : 3 — VERTICAL LOADS

7 8

Dist. Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X
1	3520	3520	0	6.5

Point Loads : 0

Point X	P

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CASE --> [LIVE LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.042044	0.000000	-0.000462
4	-0.042044	0.191078	0.000007
5	-0.042044	0.030358	0.000294
6	-0.041941	-0.073180	-0.000019
7	-0.041837	0.009310	-0.000143
8	-0.041837	0.072663	0.000002
9	-0.041837	0.000000	0.000179

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-64409	1565	-4789
	5	-64409	1565	12587
2	2	-19753	-1565	6790
	7	-19753	-1565	-10585
3	3	0	45736	0
	4	0	-17144	192921
4	4	0	-17144	192921
	5	0	-60024	-92878
5	5	1565	4384	-80291
	6	1565	4384	-43025
6	6	1565	4384	-43025
	7	1565	4384	-5759
7	7	0	24137	-16344
	8	0	1257	66188
8	8	0	1257	-66188
	9	0	-21623	-0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	1565	64409	-4789
2	-1565	19753	6790
3	0	45736	0
9	0	21623	0

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CASE --> [WIND LOAD]

GROUP # : 1 HORIZONTAL LOADS

1 2

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. Y	Final Y	Point Y	P
1	200	200	0	11.1		

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CASE --> [WIND LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.088380	0.000000	0.000002
4	0.088380	-0.001071	0.000001
5	0.088380	-0.000075	-0.000004
6	0.088380	0.000000	0.000002
7	0.088380	0.000075	-0.000004
8	0.088380	0.001071	0.000001
9	0.088380	0.000000	0.000002

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	158	2220	-8269
	5	158	-0	4052
2	2	-158	2220	-8269
	7	-158	-0	4052
3	3	0	-126	-0
	4	0	-126	-818
4	4	0	-126	-818
	5	0	-126	-1636
5	5	0	-284	2416
	6	0	-284	-0
6	6	0	-284	0
	7	0	-284	-2416
7	7	-0	-126	1636
	8	-0	-126	818
8	8	0	-126	818
	9	0	-126	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	2220	-158	-8269
2	2220	158	-8269
3	0	-126	0
9	0	126	0

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CASE --> [SEISMIC LOAD]

GROUP # : 1 VERTICAL LOADS

5

Dist. Loads : 1 # Point Loads : 2

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	8.5	7	20000
2					8.5	20000

GROUP # : 2 VERTICAL LOADS

6

Dist. Loads : 1 # Point Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	8.5	1.5	20000

GROUP # : 3 VERTICAL LOADS

3 4

Dist. Loads : 1 # Point Loads : 0

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	6.5		

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CASE --> [SEISMIC LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.022329	0.000000	-0.000025
4	-0.022329	0.002088	0.000016
5	-0.022329	0.045762	-0.000249
6	-0.022466	0.294319	-0.000008
7	-0.022602	0.031469	0.000330
8	-0.022602	-0.058808	-0.000014
9	-0.022602	0.000000	-0.000129

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-97089	-2071	8195
	5	-97089	-2071	-14792
2	2	-66766	2071	-7123
	7	-66766	2071	15864
3	3	0	10816	-0
	4	0	-12064	-4054
4	4	0	-12064	-4054
	5	0	-34944	-156828
5	5	-2071	62145	-171621
	6	-2071	-7775	199454
6	6	-2071	-7775	199454
	7	-2071	-57695	-133791
7	7	0	9071	-117927
	8	0	9071	-58963
8	8	0	9071	-58963
	9	0	9071	-0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-2071	97089	8195
2	2071	66766	-7123
3	0	10816	0
9	0	-9071	0

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CASE --> [SEISMIC LOAD]

GROUP # : 1 VERTICAL LOADS

5

Dist. Loads : 1 # Point Loads : 2

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	8.5	7	20000
2					8.5	20000

GROUP # : 2 VERTICAL LOADS

6

Dist. Loads : 1 # Point Loads : 1

ORDER #	Init. W	Final W	Init. X	Final X	Point X	P
1	3520	3520	0	8.5	1.5	20000

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CASE --> [SEISMIC LOAD]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	0.000163	0.000000	0.000135
4	0.000163	-0.061679	0.000015
5	0.000163	0.032719	-0.000345
6	0.000000	0.312130	0.000000
7	-0.000163	0.032719	0.000345
8	-0.000163	-0.061679	-0.000015
9	-0.000163	0.000000	-0.000135

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	-69417	-2470	9135
	5	-69417	-2470	-18281
2	2	-69417	2470	-9135
	7	-69417	2470	18281
3	3	0	-9497	-0
	4	0	-9497	-61729
4	4	0	-9497	-61729
	5	0	-9497	-123458
5	5	-2470	59920	-141739
	6	-2470	-10000	210421
6	6	-2470	-10000	210421
	7	-2470	-59920	-141739
7	7	0	9497	-123458
	8	0	9497	-61729
8	8	0	9497	-61729
	9	0	9497	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-2470	69417	9135
2	2470	69417	-9135
3	0	-9497	0
9	0	-9497	0

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CASE --> [TEMPERATURE]

GROUP # : 1

5

THERMAL C. : .00001

Uniform 'T' Change : 65 Linear Gradient 'T'/H : 0

GROUP # : 2

6

THERMAL C. : .00001

Uniform 'T' Change : 65 Linear Gradient 'T'/H : 0

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JUNIO 1998

CASE --> [TEMPERATURE]

JOINT DISPLACEMENTS

JOINT #	X Disp.	Y Disp.	Z Rot.
1	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000
3	-0.552052	0.000000	-0.000030
4	-0.552052	0.014669	-0.000007
5	-0.552052	-0.000866	0.000063
6	0.000009	-0.027481	0.000000
7	0.552069	-0.000866	-0.000063
8	0.552069	0.014669	0.000007
9	0.552069	0.000000	0.000030

MEMBER END-ACTIONS

MEMBER	END	Axial F.	Shear F.	Moment
1	1	1838	-6672	37860
	5	1838	-6672	-36201
2	2	1838	6672	-37861
	7	1838	6672	36203
3	3	0	1838	0
	4	0	1838	11945
4	4	0	1838	11945
	5	0	1838	23891
5	5	-6673	-0	-12310
	6	-6673	-0	-12311
6	6	-6674	-0	-12311
	7	-6674	-0	-12311
7	7	0	-1838	23891
	8	0	-1838	11946
8	8	0	-1838	11946
	9	0	-1838	0

SUPPORT ACTIONS

JOINT #	Horiz F.	Vert F.	Moment
1	-6672	-1838	37860
2	6672	-1838	-37861
3	0	1838	0
9	0	1838	0

6. PILAS

6.1. DESCRIPCION GENERAL

Se trata de soportes empotrados en el tablero y en la zapata.

La sección es circular con un diámetro de 1 m.

Las cargas verticales son las del tablero, cargas permanentes y sobrecargas tanto de frenado como la transmitida por la deformación de apoyos debida a las acciones térmicas y reológicas

El viento afecta a tablero y pila.

Con estas acciones se calculan los esfuerzos en soportes y zapatas y se determinan sus armaduras.

En la zapata se hallarán las tensiones en el suelo (< 3.5 kp/cm^2).

6.2. CARGAS

Verticales (h = 10.5 m.)

Reacciones máximas

Peso propio:	225 t	
Carga muerta:	58 t	283 t
Sobrecarga:	119 t	402 t
Soporte:		
2.5 x 0.785 x 10.5x 1 =	21 t	423 t

Horizontal

Frenado: $F_1 = 119/20 = 5.95\ t < 6$

Deformación : $\Delta = 0.65 \times 8.5 = 5.5$ mm.

$F_2 = 0.0055/(10.5^3/6/3/10^6/(\pi \times 0.5^4/4)) =$

$= 4.2$ t

$F = 6 + 4.2 = 10.2$ t

Viento:

Tablero: 0.2 x 3 x 15 = 9 t

Soporte: 0.2 x 10.5x 1 = 2.1t

6.3. PANDEO

Esfuerzos en arranque:

$M_x = 9 \times 11.1 + 2.1 \times 5.25 = 111$ m

$M_y = 10.2 \times 10.5/2 = 53.5$ mt

$N = 423 \times 0.9 = 381$ t

$M = 0.9 \times (M_x^2 + M_y)^{1/2} = 111$ mt

$e_o = 0.291 \times 0.6 = 0.175$ m

$e_a = (0.85 + 4000/12000) \times (20 \times 0.175 + 1)/(10 \times 0.175 + +1) \times 10.5^2/0.25 \times 10^4 = 0.086$ m

$e = 0.175 + 0.086 = 0.261$ m < 0.291 m $\quad f_{cd} = 1800$ t/m^2

$M = 0.33 \times 382 = 126$ mt

$\mu = 1.5 \times 111/1800/0.785/1 = 0.118$

$\nu = 0.9 \times 381/1800/0.785/1 = 0.243\ (0.405)$

$A = 0.16 \times 1800 \times 0.785/4 = 60$ cm$^2 \rightarrow 12\ \phi\ 25$

6.4. ZAPATAS

$M_x = 9 \times 12.6 + 2.1 \times 6.75 = 128$ mt

$e_x = 0.294$ m $\rightarrow l_x = 2 - e_x = 1.705$m

$M_y = 10.2 \times 13/2 = 66.3$ mt

$e_y = 0.152$m $\rightarrow l_y = 2 - e_y = 1.847$ m

$N = 381 + 2.5 \times 4 \times 4 \times 1.5 * .9 = 435$ t

$\sigma = N/4/(l_x)/l_y = 34$ t/m^2

$< 1.25 \times 30$ t/m2 $= 37.5$ t/m2

$M = (34 - 3{,}75) \times 1.65^2/2 = 41.2$ mt

$A_{min.} = 22{,}5$ cm^2/m

$V = 1.6 \times 30.25 \times 0.9 = 43.6$ t/m

$V_c = 5 \times 167^{1/2} \times 1.45 = 93{,}7$ t/m > V

7. ESTRIBOS

7.1.1 **SIN** PUENTE

DATOS

Muro	H = 6.50 m
Puntera	A= 1.00 m
Espesor del muro	B= 1.50 m
Talón	C =2.00 m
Espesor de zapata	D = 1.00 m
Angulo de rozamiento interno	$\phi = 30°$
Densidad de las tierras	$\gamma = 2$ t/m^3
Sobrecarga equivalente de tierras	$H_0 = 0.5$ m
Fuerza vertical en cabeza	R = 0 t/m
Fuerza horizontal en cabeza	F = 0 t/m
Momento exterior en cabeza	$M_0 = 0$ mt/m
Resistencia minorada del hormigón	$F_c = 1500$ t/m^2
Resistencia minorada del acero	$F_y = 4.43$ t/cm^2
Coeficiente de seg. de acciones	$\gamma_f = 1.6$
Coeficiente sísmico	SM = 0

RESULTADOS

Coeficiente de seguridad al deslizamiento	$C_s = 1.791$
Coeficiente de seguridad al vuelco	$C_v = 3.11$
Presión en el terreno	$\sigma = {}^{18.33\ t/m2}$
Momento en arranque de muro	M_m=37.55mt/m
Armadura en arranque de muro	A_m =9.4cm2/m
Momento en puntera	M_p = 7.91mt/m
Armadura en puntera	A_p = 3.0cm2/m
Momento en talón	M_t = 24 mt/m
Armadura en talón	A_t = 9.6mt/m

7.1.2. CON PUENTE

DATOS

Muro	***H = 6.5 m***
Puntera	A = 1.00 m
Espesor del muro	B =1.50 m
Talón	C =2.00 m
Espesor de zapata	D =1.00 m
Angulo de rozamiento interno	$\phi = 30°$
Densidad de las tierras	$\gamma = 2$ t/m^3
Sobrecarga equivalente de tierras	$H_0 = 0.50$ m
Fuerza vertical en cabeza	R = 20 t/m
Fuerza horizontal en cabeza	F = 1 t/m
Momento exterior en cabeza	$M_0 = 0$ mt/m
Resistencia minorada del hormigón	$F_c = 1500$ t/m^2
Resistencia minorada del acero	$F_y = 4.43$ t/cm^2
Coeficiente de seg. de acciones	$\gamma_f = 1.6$
Coeficiente sísmico	SM = 0

RESULTADOS

Coeficiente de seguridad al deslizamiento	$C_s = 2.133$
Coeficiente de seguridad al vuelco	$C_v = 2.874$
Presión en el terreno	$\sigma = 27.6$ t/m2
Momento en arranque de muro	$M_m = 50.1$ mt/m
Armadura en arranque de muro	$A_m = 10.1$ cm2/m
Momento en puntera	$M_p = 12.6$mt/m
Armadura en puntera	$A_p = 4.8$ cm2/m
Momento en talón	$M_t = 30$ mt/m
Armadura en talón	$A_t = 10.2$cm2/m

7.3. ALETAS.

Lal: 5x4 m

Malmax =0.75x2x(4-1)^2= 13.5 mt/m

Aalmax = 14.85 cm2/m

7.4 APOYOS ELASTOMÉRICOS.

Deformación por retracción y térmica :

Le = (.25 + .40(40°))xL = 14 mm

Reacciones extremas:

Rmax= 112 t
Rmin = 38 t

Para un apoyo de 300x400x56

σ max= 112/0.12 /10=93.3 kg/cm2 < 150 kg/cm2
σ min = 36/0.12/10= 30 kg/cm^2 = 30 kg/cm2

Altura del apoyo : 14/.7 =20 mm< 56 mm

8. PRUEBA DE CARGA

8.1. CALCULO DE LA CARGA

Como tren de cargas de la prueba se utiliza una carga uniformemente distribuida de valor:

q = 0.75 (0.4 + 120/(BxL))

Vanos 1 y 3

B = 13.00 m.
L = 8,8 m.
q = 0.75 (0.4 + 120/(13.00 x 8.80)) = 1.09 t/m^2

Por tanto, la carga total:

$Q = 1.09 \times 13.00 \times 8.80 = 124$ t.

Se utilizan camiones de 33 t. de carga total, por tanto el número máximo será:

$N = 124/33 \rightarrow 3$ camiones. Sólo caben dos camiones.

Vano 2

B = 17 m.
L = 8.80 m.
$q = 0.75\ (0.4 + 120/(17 \times 8.80)) = 0.9$ t/m^2

Por tanto, la carga total:

$Q = 0.9 \times 17 \times 8.80 = 135$ t.

Se utilizan camiones de 33 t. de carga total, por tanto el número máximo será:

$N = 135/33 \rightarrow 4$ camiones.

8.2. MEDICION DE FLECHAS.

Vanos 1 y 3

$f_{Máx} = 0.00191$m.

Vano 2

$f_{Máx} = 0.00770$m.

Estas flechas son debidas sólo a la sobrecarga de camiones.

8.3. ESFUERZOS.

Vanos 1 y 3

$M_{máx} = 19.13$ mt/m

Vanos 2 y 3

$M_{máx} = 18.16$ mt/m

8.4. REACCIONES.

$R_{Máx} = 145$ t.

A continuación se presentan los resultados del cálculo del emparrillado relativos a la prueba de carga.

RESUMEN CONTROL CALIDAD

RESUMEN DEL CONTROL DE CALIDAD

Cuadro resumen de ensayos de hormigón

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO PS- 6

P.P.I. Nº 20

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	Nº	RES. MEDIA	Nº	RES. MEDIA	Nº	RES. MEDIA					
200	298	26/08/99	Zap pila d	03020603	H-250	10	Fluida	2	188	3	255	1		100	23/09/99	I 42,5 S/SR	225	
201	299	26/08/99	Zap pila i	03020603	H-250	9	Blanda	2	236	3	285	1		100	23/09/99	I 42,5 S/SR	249	
200	300	26/08/99	Zap E-d	03020603	H-250	8	Blanda	2	244	3	323	1		100	23/09/99	I 42,5 S/SR	225	
274	412	09/09/99	Pila dcha	03020604	H-300	10	Blanda			3	278			8	07/10/99	II AL 42,5 R	278	
421	627	19/10/99	Alzado E,d	03020603	H-250	7	Blanda			3	288			100	16/11/99	I 42,5 S/SR	253	
421	628	19/10/99	Alzado E,d	03020603	H-250	7	Blanda			3	299			100	16/11/99	I 42,5 S/SR	253	
485	733	24/11/99	Alzado E,i	03020603	H-250	9	Blanda			3	300			100	22/12/99	II AL 42,5 R	264	
485	734	24/11/99	Alzado E,i	03020603	H-250	6	Blanda			3	307			100	22/12/99	II AL 42,5 R	264	
505	767	20/12/99	Tablero	03020603	H-300	10	Fluida			3	309			90	17/01/00	II AL 42,5 R	272	
505	768	20/12/99	Tablero	03020603	H-300	12	Fluida			3	424			90	17/01/00	II AL 42,5 R	272	
506	769	20/12/99	Tablero	03020603	H-300	10	Fluida			3	377			90	17/01/00	II AL 42,5 R	271	
506	770	20/12/99	Tablero	03020603	H-300	12	Fluida			3	308			90	17/01/00	II AL 42,5 R	271	

FECHA: FIRMA:

NOMBRE: Ana Mª Martín Herrrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

PASO INFERIOR 1

PASO INFERIOR 1

ÍNDICE

1. DESCRIPCIÓN Y DEFINICIÓN
2. CÁLCULOS
3. RESUMEN DEL CONTROL DE CALIDAD

1. DESCRIPCIÓN Y DEFINICIÓN

CALCULO DE MARCOS CERRADOS UNICELULARES

El siguiente programa calcula los esfuerzos en un marco cerrado unicelular a partir de las dimensiones geométricas del mismo y sometido a las acciones de su peso propio, del terreno y de las sobrecargas de uso. A partir de estros esfuerzos el programa arma las secciones a flexocompresión simple y comprueba la resistencia a cortante de las mismas, así como las tensiones máximas transmitidas al terreno.

DATOS GEOMÉTRICOS

Gálibo vertical (GV):	6,60	m.
Gálibo horizontal (GH):	8,00	m.
Espesor de dintel (ED):	0,80	m.
Espesor de solera (ESOL):	1,00	m.
Espesor de hastial (EH):	0,80	m.
Longitud cartela dintel:	1,00	m.
Canto adicional cartela:	0,50	m.

DATOS DEL TERRENO

Altura de tierras sobre el dintel (HT):	3,00	m.
Peso específico de las tierras (γ):	2.10	T/m³
Coeficiente de balasto (K):	5000	T/m³
Empuje activo del terreno (λ_a):	0.33	
Empuje al reposo del terreno (λ_r):	0.50	

SOBRECARGAS DE USO

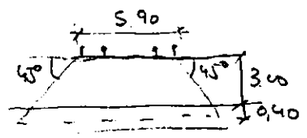
Carretera:

Sobrecarga uniforme:	0.4	T/m²
Vehículo pesado:	60	T.
Sobrecarga en trasdós:	1.0	T/m²

Ferrocarril:

Sobrecarga uniforme tren tipo B (abierto a 45° hasta plano medio del dintel): 2,47 T/m²
Sobrecarga en trasdós: 3.0 T/m²

Sobrecarga:
2 Trenes de 12 T/m.



Coeficiente de impacto:

$$\phi = \frac{1{,}14\sqrt{L}}{3{,}10 - 1{,}76\sqrt{L} + L} = \frac{1{,}14\sqrt{3{,}80}}{3{,}10 - 1{,}76\sqrt{3{,}80} + 8{,}80} = 50{,}63\% = 0{,}506$$

$$\frac{24 \times 1{,}206}{8{,}80} = 3{,}47\ \text{T/m}^2$$

DATOS DE LOS MATERIALES

Hormigón:

f_{ck}:	250	kg/cm²
γ_c:	1.50	

Acero:

f_{yk}:	5100	kg/cm²
γ_s:	1.15	

Recubrimiento mecánico de armaduras: 4 cm.

COEFICIENTES DE MAYORACION DE ACCIONES

Peso propio marco:
- Efecto desfavorable: $\gamma_{pp1} = 1.60$
- Efecto favorable: $\gamma_{pp2} = 0.90$

Acción de las tierras (Peso y empuje):
- Efecto desfavorable: $\gamma_{t1} = 1.60$
- Efecto favorable: $\gamma_{t2} = 0.90$

Sobrecargas de uso:
- Efecto desfavorable: $\gamma_{sc1} = 1.60$
- Efecto favorable: $\gamma_{sc2} = 0$

HIPÓTESIS DE CALCULO

Se consideran las siguientes hipótesis de cálculo:

H1: Peso propio marco.
H2: Peso de tierras.
H3: Empuje activo de tierras.
H4: Empuje al reposo de tierras.
H5: Sobrecargas de uso.

Esta última hipótesis de sobrecargas de uso tiene los siguientes componentes:

- Sobrecarga uniforme.(400 kg/m² en carretera y tren tipo B en ferrocarril)
- Vehiculo pesado. Esta acción se asimila a una sobrecarga uniforme, abriendo a 45° hasta el centro de gravedad del dintel. Si el vehículo tiene de dimensiones en planta AxB, la carga equivalente será:

$$\frac{Q}{(A + 2 \times HT + ED)\,(B + 2 \times HT + ED)}$$

- Sobrecarga en el trasdós. Empuje debido a la sobrecarga en el trasdós con el coeficiente de empuje al reposo.

COMBINACIONES DE HIPÓTESIS

Se consideran las siguientes combinaciones de hipótesis:

C1: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C2: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C3: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C4: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C5: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C6: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C7: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$
C8: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$

Con estas combinaciones se obtienen los esfuerzos pésimos en las barras del modelo.

ARMADO DEL MARCO

Con los esfuerzos pésimos obtenidos anteriormente, se arman las secciones definidas en el modelo de cálculo a flexocompresión simple. Se obtienen asimismo las armaduras a disponer por cuantía mínima geométrica.

COMPROBACIÓN A CORTANTE

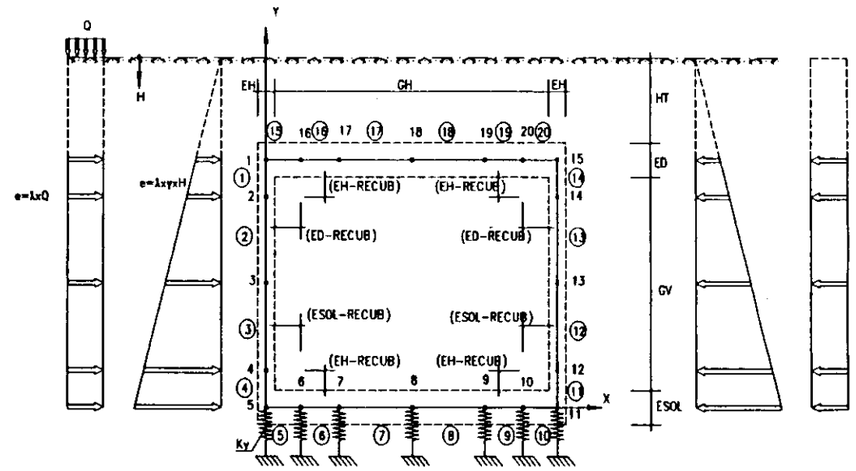
Se realiza la comprobación a cortante de las secciones para verificar si la contribución a cortante del hormigón es suficiente para absorber el cortante de cálculo hallado. Si no se cumple esta condición se obtiene la armadura necesaria.
Para la comprobación a cortante se han introducido en el modelo nudos a una distancia de un canto útil del paramento para verificar en ellos el cortante de cálculo y no en los nudos extremos.

COMPROBACIÓN DE TENSIONES SOBRE EL TERRENO

Para el cálculo de la tensión máxima transmitida al terreno se obtiene el movimiento máximo vertical en los nudos de la solera. La tensión será por tanto:

$$\sigma = K_{balasto} \times \delta_{max}$$

A continuación figuran los resultados del cálculo.



MODELO DE CALCULO

2. CÁLCULOS

CARACTERISTICAS DE LOS NUDOS

Nudo	Coordenadas X	Coordenadas Y	coacc xyz	Constantes Muelles Kx	Constantes Muelles Ky	Constantes Muelles Kz
1	0.000	7.250				
2	0.000	6.340				
3	0.000	3.800				
4	0.000	1.260				
5	0.000	0.000			5.400E+03	
6	1.360	0.000			5.500E+03	
7	2.200	0.000			7.600E+03	
8	4.400	0.000	100		1.100E+04	
9	6.600	0.000			7.600E+03	
10	7.440	0.000			5.500E+03	
11	8.800	0.000			5.400E+03	
12	8.800	1.260				
13	8.800	3.800				
14	8.800	6.340				
15	8.800	7.250				
16	1.160	7.440				
17	1.400	7.500				
18	4.400	7.500				
19	7.400	7.500				
20	7.640	7.440				

CARACTERISTICAS DE LAS BARRAS

Barra	Nd	Nf	I	A	E
1	1	2	0.042667	0.800000	3.004E+06
2	2	3	0.042667	0.800000	3.004E+06
3	3	4	0.042667	0.800000	3.004E+06
4	4	5	0.042667	0.800000	3.004E+06
5	5	6	0.083333	1.000000	3.004E+06
6	6	7	0.083333	1.000000	3.004E+06
7	7	8	0.083333	1.000000	3.004E+06
8	8	9	0.083333	1.000000	3.004E+06
9	9	10	0.083333	1.000000	3.004E+06
10	10	11	0.083333	1.000000	3.004E+06
11	11	12	0.042667	0.800000	3.004E+06
12	12	13	0.042667	0.800000	3.004E+06
13	13	14	0.042667	0.800000	3.004E+06
14	14	15	0.042667	0.800000	3.004E+06
15	1	16	0.113969	1.110000	3.004E+06
16	16	17	0.053005	0.860000	3.004E+06
17	17	18	0.042667	0.800000	3.004E+06
18	18	19	0.042667	0.800000	3.004E+06
19	19	20	0.053005	0.860000	3.004E+06
20	20	15	0.113969	1.110000	3.004E+06

CARGAS EN BARRAS

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
1	1	Q unif	2.000	0.000	0.000	270.00
	2	Q unif	2.000	0.000	0.000	270.00
	3	Q unif	2.000	0.000	0.000	270.00
	4	Q unif	2.000	0.000	0.000	270.00
	5	Q unif	2.500	0.000	0.000	270.00
	6	Q unif	2.500	0.000	0.000	270.00
	7	Q unif	2.500	0.000	0.000	270.00
	8	Q unif	2.500	0.000	0.000	270.00
	9	Q unif	2.500	0.000	0.000	270.00
	10	Q unif	2.500	0.000	0.000	270.00
	11	Q unif	2.000	0.000	0.000	270.00
	12	Q unif	2.000	0.000	0.000	270.00
	13	Q unif	2.000	0.000	0.000	270.00
	14	Q unif	2.000	0.000	0.000	270.00
	15	Q unif	2.775	0.000	0.000	270.00
	16	Q unif	2.150	0.000	0.000	270.00
	17	Q unif	2.000	0.000	0.000	270.00
	18	Q unif	2.000	0.000	0.000	270.00
	19	Q unif	2.150	0.000	0.000	270.00
	20	Q unif	2.775	0.000	0.000	270.00
2	15	Q unif	6.300	0.000	0.000	270.00
	16	Q unif	6.300	0.000	0.000	270.00
	17	Q unif	6.300	0.000	0.000	270.00
	18	Q unif	6.300	0.000	0.000	270.00
	19	Q unif	6.300	0.000	0.000	270.00
	20	Q unif	6.300	0.000	0.000	270.00
3	1	Q unif	2.758	0.000	0.000	0.00
	2	Q unif	4.040	0.000	0.000	0.00
	3	Q unif	5.800	0.000	0.000	0.00
	4	Q unif	7.117	0.000	0.000	0.00
	11	Q unif	7.117	0.000	0.000	180.00
	12	Q unif	5.800	0.000	0.000	180.00
	13	Q unif	4.040	0.000	0.000	180.00
	14	Q unif	2.758	0.000	0.000	180.00
4	1	Q unif	4.179	0.000	0.000	0.00
	2	Q unif	6.121	0.000	0.000	0.00
	3	Q unif	8.788	0.000	0.000	0.00
	4	Q unif	10.783	0.000	0.000	0.00
	11	Q unif	10.783	0.000	0.000	180.00
	12	Q unif	8.788	0.000	0.000	180.00
	13	Q unif	6.121	0.000	0.000	180.00
	14	Q unif	4.179	0.000	0.000	180.00

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
5	1	Q unif	1.500	0.000	0.000	0.00
	2	Q unif	1.500	0.000	0.000	0.00
	3	Q unif	1.500	0.000	0.000	0.00
	4	Q unif	1.500	0.000	0.000	0.00
	11	Q unif	1.500	0.000	0.000	180.00
	12	Q unif	1.500	0.000	0.000	180.00
	13	Q unif	1.500	0.000	0.000	180.00
	14	Q unif	1.500	0.000	0.000	180.00
6	15	Q unif	2.470	0.000	0.000	270.00
	16	Q unif	2.470	0.000	0.000	270.00
	17	Q unif	2.470	0.000	0.000	270.00
	18	Q unif	2.470	0.000	0.000	270.00
	19	Q unif	2.470	0.000	0.000	270.00
	20	Q unif	2.470	0.000	0.000	270.00
7	15	Q unif	0.000	0.000	0.000	270.00
	16	Q unif	0.000	0.000	0.000	270.00
	17	Q unif	0.000	0.000	0.000	270.00
	18	Q unif	0.000	0.000	0.000	270.00
	19	Q unif	0.000	0.000	0.000	270.00
	20	Q unif	0.000	0.000	0.000	270.00

HIPOTESIS COMPUESTAS

Hipotesis compuesta 1

PESO PROPIO MARCO
Tipo : Acciones permanentes
Hipotesis basicas : 1

Hipotesis compuesta 2

PESO TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 2

Hipotesis compuesta 3

EMPUJE ACTIVO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 3

Hipotesis compuesta 4

EMPUJE REPOSO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 4

Hipotesis compuesta 5

SOBRECARGAS DE USO
Tipo : Sobrecargas compatibles
Hipotesis basicas : 5 6 7

COMBINACIONES

Combinacion 1

C1

Hip.comp.	Coeficiente
1	1.600
2	1.600
3	1.600
5	1.600

Combinacion 2

C2

Hip.comp.	Coeficiente
1	0.900
2	1.600
3	1.600
5	1.600

Combinacion 3

C3

Hip.comp.	Coeficiente
1	1.600
2	0.900
3	0.900
5	1.600

Combinacion 4

C4

Hip.comp.	Coeficiente
1	0.900
2	0.900
3	0.900
5	1.600

Combinacion 5

C5

Hip.comp.	Coeficiente
1	1.600
2	1.600
4	1.600
5	1.600

Combinacion 6

C6

Hip.comp.	Coeficiente
1	0.900
2	1.600
4	1.600
5	1.600

Combinacion 7

C7

Hip.comp.	Coeficiente
1	1.600
2	0.900
4	0.900
5	1.600

Combinacion 8

C8

Hip.comp.	Coeficiente
1	0.900
2	0.900
4	0.900
5	1.600

MOVIMIENTOS HIPOTESIS COMPUESTAS (*1000)

Nudo	Hip		Dx	Dy	Wz
1	1	Dx+	-0.057	-1.961	-0.222
		Dx-	-0.057	-1.961	-0.222
		Dy+	-0.057	-1.961	-0.222
		Dy-	-0.057	-1.961	-0.222
		Wz+	-0.057	-1.961	-0.222
		Wz-	-0.057	-1.961	-0.222
	2	Dx+	-0.136	-1.871	-0.540
		Dx-	-0.136	-1.871	-0.540
		Dy+	-0.136	-1.871	-0.540
		Dy-	-0.136	-1.871	-0.540
		Wz+	-0.136	-1.871	-0.540
		Wz-	-0.136	-1.871	-0.540
	3	Dx+	0.092	0.305	0.295
		Dx-	0.092	0.305	0.295
		Dy+	0.092	0.305	0.295
		Dy-	0.092	0.305	0.295
		Wz+	0.092	0.305	0.295
		Wz-	0.092	0.305	0.295
	4	Dx+	0.140	0.462	0.447
		Dx-	0.140	0.462	0.447
		Dy+	0.140	0.462	0.447
		Dy-	0.140	0.462	0.447
		Wz+	0.140	0.462	0.447
		Wz-	0.140	0.462	0.447
	5	Dx+	0.030	0.088	0.094
		Dx-	-0.053	-0.733	-0.212
		Dy+	0.030	0.088	0.094
		Dy-	-0.053	-0.733	-0.212
		Wz+	0.030	0.088	0.094
		Wz-	-0.053	-0.733	-0.212
2	1	Dx+	-0.235	-1.957	-0.168
		Dx-	-0.235	-1.957	-0.168
		Dy+	-0.235	-1.957	-0.168
		Dy-	-0.235	-1.957	-0.168
		Wz+	-0.235	-1.957	-0.168
		Wz-	-0.235	-1.957	-0.168
	2	Dx+	-0.545	-1.860	-0.362
		Dx-	-0.545	-1.860	-0.362
		Dy+	-0.545	-1.860	-0.362
		Dy-	-0.545	-1.860	-0.362

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.545	-1.860	-0.362
		Wz-	-0.545	-1.860	-0.362
	3	Dx+	0.371	0.305	0.303
		Dx-	0.371	0.305	0.303
		Dy+	0.371	0.305	0.303
		Dy-	0.371	0.305	0.303
		Wz+	0.371	0.305	0.303
		Wz-	0.371	0.305	0.303
	4	Dx+	0.562	0.462	0.460
		Dx-	0.562	0.462	0.460
		Dy+	0.562	0.462	0.460
		Dy-	0.562	0.462	0.460
		Wz+	0.562	0.462	0.460
		Wz-	0.562	0.462	0.460
	5	Dx+	0.118	0.088	0.095
		Dx-	-0.214	-0.729	-0.142
		Dy+	0.118	0.088	0.095
		Dy-	-0.214	-0.729	-0.142
		Wz+	0.118	0.088	0.095
		Wz-	-0.214	-0.729	-0.142
3	1	Dx+	-0.463	-1.942	-0.009
		Dx-	-0.463	-1.942	-0.009
		Dy+	-0.463	-1.942	-0.009
		Dy-	-0.463	-1.942	-0.009
		Wz+	-0.463	-1.942	-0.009
		Wz-	-0.463	-1.942	-0.009
	2	Dx+	-0.922	-1.831	0.042
		Dx-	-0.922	-1.831	0.042
		Dy+	-0.922	-1.831	0.042
		Dy-	-0.922	-1.831	0.042
		Wz+	-0.922	-1.831	0.042
		Wz-	-0.922	-1.831	0.042
	3	Dx+	0.840	0.305	0.012
		Dx-	0.840	0.305	0.012
		Dy+	0.840	0.305	0.012
		Dy-	0.840	0.305	0.012
		Wz+	0.840	0.305	0.012
		Wz-	0.840	0.305	0.012
	4	Dx+	1.272	0.462	0.019
		Dx-	1.272	0.462	0.019
		Dy+	1.272	0.462	0.019
		Dy-	1.272	0.462	0.019
		Wz+	1.272	0.462	0.019
		Wz-	1.272	0.462	0.019

Nudo	Hip		Dx	Dy	Wz
	5	Dx+	0.255	0.088	-0.001
		Dx-	-0.361	-0.718	0.017
		Dy+	0.255	0.088	-0.001
		Dy-	-0.361	-0.718	0.017
		Wz+	-0.361	-0.718	0.017
		Wz-	0.255	0.088	-0.001
4	1	Dx+	-0.266	-1.921	0.166
		Dx-	-0.266	-1.921	0.166
		Dy+	-0.266	-1.921	0.166
		Dy-	-0.266	-1.921	0.166
		Wz+	-0.266	-1.921	0.166
		Wz-	-0.266	-1.921	0.166
	2	Dx+	-0.447	-1.801	0.308
		Dx-	-0.447	-1.801	0.308
		Dy+	-0.447	-1.801	0.308
		Dy-	-0.447	-1.801	0.308
		Wz+	-0.447	-1.801	0.308
		Wz-	-0.447	-1.801	0.308
	3	Dx+	0.405	0.305	-0.303
		Dx-	0.405	0.305	-0.303
		Dy+	0.405	0.305	-0.303
		Dy-	0.405	0.305	-0.303
		Wz+	0.405	0.305	-0.303
		Wz-	0.405	0.305	-0.303
	4	Dx+	0.614	0.462	-0.459
		Dx-	0.614	0.462	-0.459
		Dy+	0.614	0.462	-0.459
		Dy-	0.614	0.462	-0.459
		Wz+	0.614	0.462	-0.459
		Wz-	0.614	0.462	-0.459
	5	Dx+	0.117	0.088	-0.090
		Dx-	-0.175	-0.706	0.121
		Dy+	0.117	0.088	-0.090
		Dy-	-0.175	-0.706	0.121
		Wz+	-0.175	-0.706	0.121
		Wz-	0.117	0.088	-0.090
5	1	Dx+	0.000	-1.909	0.258
		Dx-	0.000	-1.909	0.258
		Dy+	0.000	-1.909	0.258
		Dy-	0.000	-1.909	0.258
		Wz+	0.000	-1.909	0.258
		Wz-	0.000	-1.909	0.258
	2	Dx+	-0.004	-1.787	0.389
		Dx-	-0.004	-1.787	0.389

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.004	-1.787	0.389
		Dy-	-0.004	-1.787	0.389
		Wz+	-0.004	-1.787	0.389
		Wz-	-0.004	-1.787	0.389
	3	Dx+	0.033	0.305	-0.250
		Dx-	0.033	0.305	-0.250
		Dy+	0.033	0.305	-0.250
		Dy-	0.033	0.305	-0.250
		Wz+	0.033	0.305	-0.250
		Wz-	0.033	0.305	-0.250
	4	Dx+	0.050	0.462	-0.379
		Dx-	0.050	0.462	-0.379
		Dy+	0.050	0.462	-0.379
		Dy-	0.050	0.462	-0.379
		Wz+	0.050	0.462	-0.379
		Wz-	0.050	0.462	-0.379
	5	Dx+	0.009	0.088	-0.072
		Dx-	-0.002	-0.700	0.153
		Dy+	0.009	0.088	-0.072
		Dy-	-0.002	-0.700	0.153
		Wz+	-0.002	-0.700	0.153
		Wz-	0.009	0.088	-0.072
6	1	Dx+	0.000	-1.548	0.254
		Dx-	0.000	-1.548	0.254
		Dy+	0.000	-1.548	0.254
		Dy-	0.000	-1.548	0.254
		Wz+	0.000	-1.548	0.254
		Wz-	0.000	-1.548	0.254
	2	Dx+	-0.003	-1.264	0.357
		Dx-	-0.003	-1.264	0.357
		Dy+	-0.003	-1.264	0.357
		Dy-	-0.003	-1.264	0.357
		Wz+	-0.003	-1.264	0.357
		Wz-	-0.003	-1.264	0.357
	3	Dx+	0.023	0.027	-0.160
		Dx-	0.023	0.027	-0.160
		Dy+	0.023	0.027	-0.160
		Dy-	0.023	0.027	-0.160
		Wz+	0.023	0.027	-0.160
		Wz-	0.023	0.027	-0.160
	4	Dx+	0.034	0.040	-0.243
		Dx-	0.034	0.040	-0.243
		Dy+	0.034	0.040	-0.243
		Dy-	0.034	0.040	-0.243

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.034	0.040	-0.243
		Wz-	0.034	0.040	-0.243
	5	Dx+	0.006	0.008	-0.046
		Dx-	-0.001	-0.496	0.140
		Dy+	0.006	0.008	-0.046
		Dy-	-0.001	-0.496	0.140
		Wz+	-0.001	-0.496	0.140
		Wz-	0.006	0.008	-0.046
7	1	Dx+	0.000	-1.355	0.201
		Dx-	0.000	-1.355	0.201
		Dy+	0.000	-1.355	0.201
		Dy-	0.000	-1.355	0.201
		Wz+	0.000	-1.355	0.201
		Wz-	0.000	-1.355	0.201
	2	Dx+	-0.002	-0.994	0.280
		Dx-	-0.002	-0.994	0.280
		Dy+	-0.002	-0.994	0.280
		Dy-	-0.002	-0.994	0.280
		Wz+	-0.002	-0.994	0.280
		Wz-	-0.002	-0.994	0.280
	3	Dx+	0.016	-0.087	-0.111
		Dx-	0.016	-0.087	-0.111
		Dy+	0.016	-0.087	-0.111
		Dy-	0.016	-0.087	-0.111
		Wz+	0.016	-0.087	-0.111
		Wz-	0.016	-0.087	-0.111
	4	Dx+	0.025	-0.132	-0.169
		Dx-	0.025	-0.132	-0.169
		Dy+	0.025	-0.132	-0.169
		Dy-	0.025	-0.132	-0.169
		Wz+	0.025	-0.132	-0.169
		Wz-	0.025	-0.132	-0.169
	5	Dx+	0.004	-0.025	-0.032
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.000	0.000
		Dy-	0.003	-0.415	0.078
		Wz+	-0.001	-0.390	0.110
		Wz-	0.004	-0.025	-0.032
8	1	Dx+	0.000	-1.122	-0.000
		Dx-	0.000	-1.122	-0.000
		Dy+	0.000	-1.122	-0.000
		Dy-	0.000	-1.122	-0.000
		Wz+	0.000	-1.122	-0.000
		Wz-	0.000	-1.122	-0.000

Nudo	Hip		Dx	Dy	Wz
	2	Dx+	0.000	-0.674	-0.000
		Dx-	0.000	-0.674	-0.000
		Dy+	0.000	-0.674	-0.000
		Dy-	0.000	-0.674	-0.000
		Wz+	0.000	-0.674	-0.000
		Wz-	0.000	-0.674	-0.000
	3	Dx+	-0.000	-0.205	-0.000
		Dx-	-0.000	-0.205	-0.000
		Dy+	-0.000	-0.205	-0.000
		Dy-	-0.000	-0.205	-0.000
		Wz+	-0.000	-0.205	-0.000
		Wz-	-0.000	-0.205	-0.000
	4	Dx+	-0.000	-0.311	-0.000
		Dx-	-0.000	-0.311	-0.000
		Dy+	-0.000	-0.311	-0.000
		Dy-	-0.000	-0.311	-0.000
		Wz+	-0.000	-0.311	-0.000
		Wz-	-0.000	-0.311	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.000	0.000
		Dy-	0.000	-0.324	-0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
9	1	Dx+	-0.000	-1.355	-0.201
		Dx-	-0.000	-1.355	-0.201
		Dy+	-0.000	-1.355	-0.201
		Dy-	-0.000	-1.355	-0.201
		Wz+	-0.000	-1.355	-0.201
		Wz-	-0.000	-1.355	-0.201
	2	Dx+	0.002	-0.994	-0.280
		Dx-	0.002	-0.994	-0.280
		Dy+	0.002	-0.994	-0.280
		Dy-	0.002	-0.994	-0.280
		Wz+	0.002	-0.994	-0.280
		Wz-	0.002	-0.994	-0.280
	3	Dx+	-0.016	-0.087	0.111
		Dx-	-0.016	-0.087	0.111
		Dy+	-0.016	-0.087	0.111
		Dy-	-0.016	-0.087	0.111
		Wz+	-0.016	-0.087	0.111
		Wz-	-0.016	-0.087	0.111
	4	Dx+	-0.025	-0.132	0.169
		Dx-	-0.025	-0.132	0.169

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.025	-0.132	0.169
		Dy-	-0.025	-0.132	0.169
		Wz+	-0.025	-0.132	0.169
		Wz-	-0.025	-0.132	0.169
	5	Dx+	0.000	0.000	0.000
		Dx-	-0.004	-0.025	0.032
		Dy+	0.000	0.000	0.000
		Dy-	-0.003	-0.415	-0.078
		Wz+	-0.004	-0.025	0.032
		Wz-	0.001	-0.390	-0.110
10	1	Dx+	-0.000	-1.548	-0.254
		Dx-	-0.000	-1.548	-0.254
		Dy+	-0.000	-1.548	-0.254
		Dy-	-0.000	-1.548	-0.254
		Wz+	-0.000	-1.548	-0.254
		Wz-	-0.000	-1.548	-0.254
	2	Dx+	0.003	-1.264	-0.357
		Dx-	0.003	-1.264	-0.357
		Dy+	0.003	-1.264	-0.357
		Dy-	0.003	-1.264	-0.357
		Wz+	0.003	-1.264	-0.357
		Wz-	0.003	-1.264	-0.357
	3	Dx+	-0.023	0.027	0.160
		Dx-	-0.023	0.027	0.160
		Dy+	-0.023	0.027	0.160
		Dy-	-0.023	0.027	0.160
		Wz+	-0.023	0.027	0.160
		Wz-	-0.023	0.027	0.160
	4	Dx+	-0.034	0.040	0.243
		Dx-	-0.034	0.040	0.243
		Dy+	-0.034	0.040	0.243
		Dy-	-0.034	0.040	0.243
		Wz+	-0.034	0.040	0.243
		Wz-	-0.034	0.040	0.243
	5	Dx+	0.001	-0.496	-0.140
		Dx-	-0.006	0.008	0.046
		Dy+	-0.006	0.008	0.046
		Dy-	0.001	-0.496	-0.140
		Wz+	-0.006	0.008	0.046
		Wz-	0.001	-0.496	-0.140
11	1	Dx+	-0.000	-1.909	-0.258
		Dx-	-0.000	-1.909	-0.258
		Dy+	-0.000	-1.909	-0.258
		Dy-	-0.000	-1.909	-0.258

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.000	-1.909	-0.258
		Wz-	-0.000	-1.909	-0.258
	2	Dx+	0.004	-1.787	-0.389
		Dx-	0.004	-1.787	-0.389
		Dy+	0.004	-1.787	-0.389
		Dy-	0.004	-1.787	-0.389
		Wz+	0.004	-1.787	-0.389
		Wz-	0.004	-1.787	-0.389
	3	Dx+	-0.033	0.305	0.250
		Dx-	-0.033	0.305	0.250
		Dy+	-0.033	0.305	0.250
		Dy-	-0.033	0.305	0.250
		Wz+	-0.033	0.305	0.250
		Wz-	-0.033	0.305	0.250
	4	Dx+	-0.050	0.462	0.379
		Dx-	-0.050	0.462	0.379
		Dy+	-0.050	0.462	0.379
		Dy-	-0.050	0.462	0.379
		Wz+	-0.050	0.462	0.379
		Wz-	-0.050	0.462	0.379
	5	Dx+	0.002	-0.700	-0.153
		Dx-	-0.009	0.088	0.072
		Dy+	-0.009	0.088	0.072
		Dy-	0.002	-0.700	-0.153
		Wz+	-0.009	0.088	0.072
		Wz-	0.002	-0.700	-0.153
12	1	Dx+	0.266	-1.921	-0.166
		Dx-	0.266	-1.921	-0.166
		Dy+	0.266	-1.921	-0.166
		Dy-	0.266	-1.921	-0.166
		Wz+	0.266	-1.921	-0.166
		Wz-	0.266	-1.921	-0.166
	2	Dx+	0.447	-1.801	-0.308
		Dx-	0.447	-1.801	-0.308
		Dy+	0.447	-1.801	-0.308
		Dy-	0.447	-1.801	-0.308
		Wz+	0.447	-1.801	-0.308
		Wz-	0.447	-1.801	-0.308
	3	Dx+	-0.405	0.305	0.303
		Dx-	-0.405	0.305	0.303
		Dy+	-0.405	0.305	0.303
		Dy-	-0.405	0.305	0.303
		Wz+	-0.405	0.305	0.303
		Wz-	-0.405	0.305	0.303

Nudo	Hip		Dx	Dy	Wz
	4	Dx+	-0.614	0.462	0.459
		Dx-	-0.614	0.462	0.459
		Dy+	-0.614	0.462	0.459
		Dy-	-0.614	0.462	0.459
		Wz+	-0.614	0.462	0.459
		Wz-	-0.614	0.462	0.459
	5	Dx+	0.175	-0.706	-0.121
		Dx-	-0.117	0.088	0.090
		Dy+	-0.117	0.088	0.090
		Dy-	0.175	-0.706	-0.121
		Wz+	-0.117	0.088	0.090
		Wz-	0.175	-0.706	-0.121
13	1	Dx+	0.463	-1.942	0.009
		Dx-	0.463	-1.942	0.009
		Dy+	0.463	-1.942	0.009
		Dy-	0.463	-1.942	0.009
		Wz+	0.463	-1.942	0.009
		Wz-	0.463	-1.942	0.009
	2	Dx+	0.922	-1.831	-0.042
		Dx-	0.922	-1.831	-0.042
		Dy+	0.922	-1.831	-0.042
		Dy-	0.922	-1.831	-0.042
		Wz+	0.922	-1.831	-0.042
		Wz-	0.922	-1.831	-0.042
	3	Dx+	-0.840	0.305	-0.012
		Dx-	-0.840	0.305	-0.012
		Dy+	-0.840	0.305	-0.012
		Dy-	-0.840	0.305	-0.012
		Wz+	-0.840	0.305	-0.012
		Wz-	-0.840	0.305	-0.012
	4	Dx+	-1.272	0.462	-0.019
		Dx-	-1.272	0.462	-0.019
		Dy+	-1.272	0.462	-0.019
		Dy-	-1.272	0.462	-0.019
		Wz+	-1.272	0.462	-0.019
		Wz-	-1.272	0.462	-0.019
	5	Dx+	0.361	-0.718	-0.017
		Dx-	-0.255	0.088	0.001
		Dy+	-0.255	0.088	0.001
		Dy-	0.361	-0.718	-0.017
		Wz+	-0.255	0.088	0.001
		Wz-	0.361	-0.718	-0.017
14	1	Dx+	0.235	-1.957	0.168
		Dx-	0.235	-1.957	0.168

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.235	-1.957	0.168
		Dy-	0.235	-1.957	0.168
		Wz+	0.235	-1.957	0.168
		Wz-	0.235	-1.957	0.168
	2	Dx+	0.545	-1.860	0.362
		Dx-	0.545	-1.860	0.362
		Dy+	0.545	-1.860	0.362
		Dy-	0.545	-1.860	0.362
		Wz+	0.545	-1.860	0.362
		Wz-	0.545	-1.860	0.362
	3	Dx+	-0.371	0.305	-0.303
		Dx-	-0.371	0.305	-0.303
		Dy+	-0.371	0.305	-0.303
		Dy-	-0.371	0.305	-0.303
		Wz+	-0.371	0.305	-0.303
		Wz-	-0.371	0.305	-0.303
	4	Dx+	-0.562	0.462	-0.460
		Dx-	-0.562	0.462	-0.460
		Dy+	-0.562	0.462	-0.460
		Dy-	-0.562	0.462	-0.460
		Wz+	-0.562	0.462	-0.460
		Wz-	-0.562	0.462	-0.460
	5	Dx+	0.214	-0.729	0.142
		Dx-	-0.118	0.088	-0.095
		Dy+	-0.118	0.088	-0.095
		Dy-	0.214	-0.729	0.142
		Wz+	0.214	-0.729	0.142
		Wz-	-0.118	0.088	-0.095
15	1	Dx+	0.057	-1.961	0.222
		Dx-	0.057	-1.961	0.222
		Dy+	0.057	-1.961	0.222
		Dy-	0.057	-1.961	0.222
		Wz+	0.057	-1.961	0.222
		Wz-	0.057	-1.961	0.222
	2	Dx+	0.136	-1.871	0.540
		Dx-	0.136	-1.871	0.540
		Dy+	0.136	-1.871	0.540
		Dy-	0.136	-1.871	0.540
		Wz+	0.136	-1.871	0.540
		Wz-	0.136	-1.871	0.540
	3	Dx+	-0.092	0.305	-0.295
		Dx-	-0.092	0.305	-0.295
		Dy+	-0.092	0.305	-0.295
		Dy-	-0.092	0.305	-0.295

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.092	0.305	-0.295
		Wz-	-0.092	0.305	-0.295
	4	Dx+	-0.140	0.462	-0.447
		Dx-	-0.140	0.462	-0.447
		Dy+	-0.140	0.462	-0.447
		Dy-	-0.140	0.462	-0.447
		Wz+	-0.140	0.462	-0.447
		Wz-	-0.140	0.462	-0.447
	5	Dx+	0.053	-0.733	0.212
		Dx-	-0.030	0.088	-0.094
		Dy+	-0.030	0.088	-0.094
		Dy-	0.053	-0.733	0.212
		Wz+	0.053	-0.733	0.212
		Wz-	-0.030	0.088	-0.094
16	1	Dx+	-0.014	-2.226	-0.230
		Dx-	-0.014	-2.226	-0.230
		Dy+	-0.014	-2.226	-0.230
		Dy-	-0.014	-2.226	-0.230
		Wz+	-0.014	-2.226	-0.230
		Wz-	-0.014	-2.226	-0.230
	2	Dx+	-0.031	-2.530	-0.581
		Dx-	-0.031	-2.530	-0.581
		Dy+	-0.031	-2.530	-0.581
		Dy-	-0.031	-2.530	-0.581
		Wz+	-0.031	-2.530	-0.581
		Wz-	-0.031	-2.530	-0.581
	3	Dx+	0.034	0.630	0.266
		Dx-	0.034	0.630	0.266
		Dy+	0.034	0.630	0.266
		Dy-	0.034	0.630	0.266
		Wz+	0.034	0.630	0.266
		Wz-	0.034	0.630	0.266
	4	Dx+	0.052	0.954	0.403
		Dx-	0.052	0.954	0.403
		Dy+	0.052	0.954	0.403
		Dy-	0.052	0.954	0.403
		Wz+	0.052	0.954	0.403
		Wz-	0.052	0.954	0.403
	5	Dx+	0.012	0.192	0.085
		Dx-	-0.012	-0.992	-0.228
		Dy+	0.012	0.192	0.085
		Dy-	-0.012	-0.992	-0.228
		Wz+	0.012	0.192	0.085
		Wz-	-0.012	-0.992	-0.228

Nudo	Hip		Dx	Dy	Wz
17	1	Dx+	-0.000	-2.281	-0.225
		Dx-	-0.000	-2.281	-0.225
		Dy+	-0.000	-2.281	-0.225
		Dy-	-0.000	-2.281	-0.225
		Wz+	-0.000	-2.281	-0.225
		Wz-	-0.000	-2.281	-0.225
	2	Dx+	0.003	-2.669	-0.576
		Dx-	0.003	-2.669	-0.576
		Dy+	0.003	-2.669	-0.576
		Dy-	0.003	-2.669	-0.576
		Wz+	0.003	-2.669	-0.576
		Wz-	0.003	-2.669	-0.576
	3	Dx+	0.017	0.691	0.250
		Dx-	0.017	0.691	0.250
		Dy+	0.017	0.691	0.250
		Dy-	0.017	0.691	0.250
		Wz+	0.017	0.691	0.250
		Wz-	0.017	0.691	0.250
	4	Dx+	0.026	1.048	0.379
		Dx-	0.026	1.048	0.379
		Dy+	0.026	1.048	0.379
		Dy-	0.026	1.048	0.379
		Wz+	0.026	1.048	0.379
		Wz-	0.026	1.048	0.379
	5	Dx+	0.008	-0.835	-0.146
		Dx-	0.000	0.000	0.000
		Dy+	0.006	0.212	0.080
		Dy-	0.001	-1.047	-0.226
		Wz+	0.006	0.212	0.080
		Wz-	0.001	-1.047	-0.226
18	1	Dx+	0.000	-2.672	-0.000
		Dx-	0.000	-2.672	-0.000
		Dy+	0.000	-2.672	-0.000
		Dy-	0.000	-2.672	-0.000
		Wz+	0.000	-2.672	-0.000
		Wz-	0.000	-2.672	-0.000
	2	Dx+	0.000	-3.699	-0.000
		Dx-	0.000	-3.699	-0.000
		Dy+	0.000	-3.699	-0.000
		Dy-	0.000	-3.699	-0.000
		Wz+	0.000	-3.699	-0.000
		Wz-	0.000	-3.699	-0.000
	3	Dx+	0.000	1.066	-0.000
		Dx-	0.000	1.066	-0.000

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.000	1.066	-0.000
		Dy-	0.000	1.066	-0.000
		Wz+	0.000	1.066	-0.000
		Wz-	0.000	1.066	-0.000
	4	Dx+	0.000	1.615	-0.000
		Dx-	0.000	1.615	-0.000
		Dy+	0.000	1.615	-0.000
		Dy-	0.000	1.615	-0.000
		Wz+	0.000	1.615	-0.000
		Wz-	0.000	1.615	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.331	-0.000
		Dy-	0.000	-1.450	-0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
19	1	Dx+	0.000	-2.281	0.225
		Dx-	0.000	-2.281	0.225
		Dy+	0.000	-2.281	0.225
		Dy-	0.000	-2.281	0.225
		Wz+	0.000	-2.281	0.225
		Wz-	0.000	-2.281	0.225
	2	Dx+	-0.003	-2.669	0.576
		Dx-	-0.003	-2.669	0.576
		Dy+	-0.003	-2.669	0.576
		Dy-	-0.003	-2.669	0.576
		Wz+	-0.003	-2.669	0.576
		Wz-	-0.003	-2.669	0.576
	3	Dx+	-0.017	0.691	-0.250
		Dx-	-0.017	0.691	-0.250
		Dy+	-0.017	0.691	-0.250
		Dy-	-0.017	0.691	-0.250
		Wz+	-0.017	0.691	-0.250
		Wz-	-0.017	0.691	-0.250
	4	Dx+	-0.026	1.048	-0.379
		Dx-	-0.026	1.048	-0.379
		Dy+	-0.026	1.048	-0.379
		Dy-	-0.026	1.048	-0.379
		Wz+	-0.026	1.048	-0.379
		Wz-	-0.026	1.048	-0.379
	5	Dx+	0.000	0.000	0.000
		Dx-	-0.008	-0.835	0.146
		Dy+	-0.006	0.212	-0.080
		Dy-	-0.001	-1.047	0.226

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.001	-1.047	0.226
		Wz-	-0.006	0.212	-0.080
20	1	Dx+	0.014	-2.226	0.230
		Dx-	0.014	-2.226	0.230
		Dy+	0.014	-2.226	0.230
		Dy-	0.014	-2.226	0.230
		Wz+	0.014	-2.226	0.230
		Wz-	0.014	-2.226	0.230
	2	Dx+	0.031	-2.530	0.581
		Dx-	0.031	-2.530	0.581
		Dy+	0.031	-2.530	0.581
		Dy-	0.031	-2.530	0.581
		Wz+	0.031	-2.530	0.581
		Wz-	0.031	-2.530	0.581
	3	Dx+	-0.034	0.630	-0.266
		Dx-	-0.034	0.630	-0.266
		Dy+	-0.034	0.630	-0.266
		Dy-	-0.034	0.630	-0.266
		Wz+	-0.034	0.630	-0.266
		Wz-	-0.034	0.630	-0.266
	4	Dx+	-0.052	0.954	-0.403
		Dx-	-0.052	0.954	-0.403
		Dy+	-0.052	0.954	-0.403
		Dy-	-0.052	0.954	-0.403
		Wz+	-0.052	0.954	-0.403
		Wz-	-0.052	0.954	-0.403
	5	Dx+	0.012	-0.992	0.228
		Dx-	-0.012	0.192	-0.085
		Dy+	-0.012	0.192	-0.085
		Dy-	0.012	-0.992	0.228
		Wz+	0.012	-0.992	0.228
		Wz-	-0.012	0.192	-0.085

ESFUERZOS PESIMOS

Barra	Extremo	Comb		N	Q	M
1	Dorsal	4	N+	-33.89	14.81	36.86
		1	N-	-77.73	28.05	82.08
		6	Q+	-70.88	47.85	86.25
		3	Q-	-40.75	14.60	42.05
		5	M+	-77.73	47.64	91.44
		4	M-	-33.89	14.81	36.86
1	Frontal	4	N+	-35.53	12.55	24.42
		1	N-	-80.64	24.03	58.38
		6	Q+	-72.51	39.58	46.47
		3	Q-	-43.66	12.34	29.79
		1	M+	-80.64	24.03	58.38
		8	M-	-35.53	23.74	19.48
2	Dorsal	4	N+	-35.53	12.55	24.42
		1	N-	-80.64	24.03	58.38
		6	Q+	-72.51	39.58	46.47
		3	Q-	-43.66	12.34	29.79
		1	M+	-80.64	24.03	58.38
		8	M-	-35.53	23.74	19.48
2	Frontal	4	N+	-40.10	3.31	4.27
		1	N-	-88.77	7.61	18.20
		6	Q+	-77.09	8.83	-4.68
		3	Q-	-51.79	2.88	0.13
		3	M+	-69.27	4.83	20.78
		6	M-	-59.61	6.88	-25.32
3	Dorsal	4	N+	-40.10	3.31	4.27
		1	N-	-88.77	7.61	18.20
		6	Q+	-77.09	8.83	-4.68
		3	Q-	-51.79	2.88	0.13
		3	M+	-69.27	4.83	20.78
		6	M-	-59.61	6.88	-25.32
3	Frontal	4	N+	-44.67	-9.95	12.70
		1	N-	-96.90	-15.96	28.80
		4	Q+	-62.15	-8.23	18.93
		5	Q-	-79.42	-35.14	16.73
		1	M+	-96.90	-15.96	28.80
		8	M-	-44.67	-22.53	8.66
4	Dorsal	4	N+	-44.67	-9.95	12.70
		1	N-	-96.90	-15.96	28.80
		4	Q+	-62.15	-8.23	18.93
		5	Q-	-79.42	-35.14	16.73

Barra	Extremo	Comb		N	Q	M
		1	M+	-96.90	-15.96	28.80
		8	M-	-44.67	-22.53	8.66
4	Frontal	4	N+	-46.94	-18.02	30.31
		1	N-	-100.93	-30.31	57.96
		4	Q+	-64.42	-16.30	34.38
		5	Q-	-83.45	-59.90	76.60
		5	M+	-100.93	-58.18	80.66
		4	M-	-46.94	-18.02	30.31
5	Dorsal	4	N+	-16.30	41.89	34.38
		5	N-	-59.90	56.27	76.60
		5	Q+	-58.18	67.70	80.66
		4	Q-	-18.02	30.46	30.31
		5	M+	-58.18	67.70	80.66
		4	M-	-18.02	30.46	30.31
5	Frontal	4	N+	-16.30	44.95	-24.67
		5	N-	-59.90	61.71	-3.63
		5	Q+	-58.18	73.14	-15.10
		4	Q-	-18.02	33.52	-13.19
		6	M+	-59.69	49.54	4.62
		1	M-	-30.31	71.02	-34.93
6	Dorsal	4	N+	-16.30	26.80	-24.67
		5	N-	-59.90	37.38	-3.63
		5	Q+	-58.18	44.45	-15.10
		4	Q-	-18.02	19.73	-13.19
		6	M+	-59.69	31.18	4.62
		1	M-	-30.31	42.14	-34.93
6	Frontal	4	N+	-16.30	28.69	-47.97
		5	N-	-59.90	40.74	-36.44
		5	Q+	-58.18	47.81	-53.85
		4	Q-	-18.02	21.62	-30.56
		8	M+	-37.78	23.28	-17.68
		1	M-	-30.31	45.50	-71.74
7	Dorsal	4	N+	-16.30	7.28	-47.97
		5	N-	-59.90	10.26	-36.44
		5	Q+	-58.18	12.59	-53.85
		4	Q-	-18.02	4.96	-30.56
		8	M+	-37.78	6.00	-17.68
		1	M-	-30.31	11.13	-71.74
7	Frontal	4	N+	-16.30	12.23	-69.43
		5	N-	-59.90	19.06	-68.70
		5	Q+	-58.18	21.39	-91.22
		4	Q-	-18.02	9.91	-46.91
		8	M+	-37.78	10.95	-36.33
		1	M-	-30.31	19.93	-105.92

Barra	Extremo	Comb		N	Q	M
8	Dorsal	4	N+	-16.30	-12.23	-69.43
		5	N-	-59.90	-19.06	-68.70
		4	Q+	-18.02	-9.91	-46.91
		5	Q-	-58.18	-21.39	-91.22
		8	M+	-37.78	-10.95	-36.33
		1	M-	-30.31	-19.93	-105.92
8	Frontal	4	N+	-16.30	-7.28	-47.97
		5	N-	-59.90	-10.26	-36.44
		4	Q+	-18.02	-4.96	-30.56
		5	Q-	-58.18	-12.59	-53.85
		8	M+	-37.78	-6.00	-17.68
		1	M-	-30.31	-11.13	-71.74
9	Dorsal	4	N+	-16.30	-28.69	-47.97
		5	N-	-59.90	-40.74	-36.44
		4	Q+	-18.02	-21.62	-30.56
		5	Q-	-58.18	-47.81	-53.85
		8	M+	-37.78	-23.28	-17.68
		1	M-	-30.31	-45.50	-71.74
9	Frontal	4	N+	-16.30	-26.80	-24.67
		5	N-	-59.90	-37.38	-3.63
		4	Q+	-18.02	-19.73	-13.19
		5	Q-	-58.18	-44.45	-15.10
		6	M+	-59.69	-31.18	4.62
		1	M-	-30.31	-42.14	-34.93
10	Dorsal	4	N+	-16.30	-44.95	-24.67
		5	N-	-59.90	-61.71	-3.63
		4	Q+	-18.02	-33.52	-13.19
		5	Q-	-58.18	-73.14	-15.10
		6	M+	-59.69	-49.54	4.62
		1	M-	-30.31	-71.02	-34.93
10	Frontal	4	N+	-16.30	-41.89	34.38
		5	N-	-59.90	-56.27	76.60
		4	Q+	-18.02	-30.46	30.31
		5	Q-	-58.18	-67.70	80.66
		5	M+	-58.18	-67.70	80.66
		4	M-	-18.02	-30.46	30.31
11	Dorsal	4	N+	-46.94	18.02	30.31
		5	N-	-100.93	48.83	72.50
		5	Q+	-83.45	59.90	76.60
		4	Q-	-64.42	16.30	34.38
		5	M+	-100.93	58.18	80.66
		4	M-	-46.94	18.02	30.31
11	Frontal	4	N+	-44.67	9.95	12.70
		5	N-	-96.90	27.09	24.67

Barra	Extremo	Comb		N	Q	M
		5	Q+	-79.42	35.14	16.73
		4	Q-	-62.15	8.23	18.93
		1	M+	-96.90	15.96	28.80
		8	M-	-44.67	22.53	8.66
12	Dorsal	4	N+	-44.67	9.95	12.70
		5	N-	-96.90	27.09	24.67
		5	Q+	-79.42	35.14	16.73
		4	Q-	-62.15	8.23	18.93
		1	M+	-96.90	15.96	28.80
		8	M-	-44.67	22.53	8.66
12	Frontal	4	N+	-40.10	-3.31	4.27
		1	N-	-88.77	-7.61	18.20
		3	Q+	-51.79	-2.88	0.13
		6	Q-	-77.09	-8.83	-4.68
		3	M+	-69.27	-4.83	20.78
		6	M-	-59.61	-6.88	-25.32
13	Dorsal	4	N+	-40.10	-3.31	4.27
		1	N-	-88.77	-7.61	18.20
		3	Q+	-51.79	-2.88	0.13
		6	Q-	-77.09	-8.83	-4.68
		3	M+	-69.27	-4.83	20.78
		6	M-	-59.61	-6.88	-25.32
13	Frontal	4	N+	-35.53	-12.55	24.42
		1	N-	-80.64	-24.03	58.38
		3	Q+	-43.66	-12.34	29.79
		6	Q-	-72.51	-39.58	46.47
		1	M+	-80.64	-24.03	58.38
		8	M-	-35.53	-23.74	19.48
14	Dorsal	4	N+	-35.53	-12.55	24.42
		1	N-	-80.64	-24.03	58.38
		3	Q+	-43.66	-12.34	29.79
		6	Q-	-72.51	-39.58	46.47
		1	M+	-80.64	-24.03	58.38
		8	M-	-35.53	-23.74	19.48
14	Frontal	4	N+	-33.89	-14.81	36.86
		1	N-	-77.73	-28.05	82.08
		3	Q+	-40.75	-14.60	42.05
		6	Q-	-70.88	-47.85	86.25
		5	M+	-77.73	-47.64	91.44
		4	M-	-33.89	-14.81	36.86
15	Dorsal	4	N+	-20.09	-31.05	-36.86
		5	N-	-59.58	-69.01	-91.44
		8	Q+	-34.44	-28.70	-43.64
		1	Q-	-40.24	-72.18	-82.08

Barra	Extremo	Comb		N	Q	M
		4	M+	-20.09	-31.05	-36.86
		5	M-	-59.58	-69.01	-91.44
15	Frontal	4	N+	-18.54	-21.58	-5.93
		5	N-	-56.07	-47.58	-22.92
		8	Q+	-32.89	-19.23	-15.47
		1	Q-	-36.73	-50.75	-9.83
		3	M+	-22.85	-38.51	-3.74
		6	M-	-51.76	-30.65	-25.10
16	Dorsal	4	N+	-20.26	-19.97	-5.93
		5	N-	-59.80	-42.79	-22.92
		8	Q+	-34.37	-16.45	-15.47
		1	Q-	-40.80	-47.54	-9.83
		3	M+	-25.95	-36.49	-3.74
		6	M-	-54.11	-26.27	-25.10
16	Frontal	4	N+	-19.80	-18.15	-1.21
		5	N-	-58.75	-38.60	-12.85
		8	Q+	-33.91	-14.62	-11.63
		1	Q-	-39.75	-43.35	1.41
		3	M+	-25.16	-33.36	4.90
		6	M-	-53.39	-23.39	-18.96
17	Dorsal	3	N+	-14.60	-26.61	1.33
		6	N-	-47.85	-47.50	-15.39
		4	Q+	-14.81	-22.41	-1.21
		1	Q-	-28.05	-51.70	1.41
		3	M+	-16.32	-38.47	4.90
		6	M-	-46.12	-35.64	-18.96
17	Frontal	3	N+	-14.60	0.00	41.24
		6	N-	-47.85	0.00	55.85
		5	Q+	-37.87	0.00	48.80
		4	Q-	-14.81	0.00	32.40
		1	M+	-28.05	0.00	78.96
		8	M-	-29.35	0.00	21.99
18	Dorsal	3	N+	-14.60	0.00	41.24
		6	N-	-47.85	0.00	55.85
		5	Q+	-37.87	0.00	48.80
		4	Q-	-14.81	0.00	32.40
		1	M+	-28.05	0.00	78.96
		8	M-	-29.35	0.00	21.99
18	Frontal	3	N+	-14.60	26.61	1.33
		6	N-	-47.85	47.50	-15.39
		1	Q+	-28.05	51.70	1.41
		4	Q-	-14.81	22.41	-1.21
		3	M+	-16.32	38.47	4.90
		6	M-	-46.12	35.64	-18.96

Barra	Extremo	Comb		N	Q	M
19	Dorsal	4	N+	-19.80	18.15	-1.21
		5	N-	-58.75	38.60	-12.85
		1	Q+	-39.75	43.35	1.41
		8	Q-	-33.91	14.62	-11.63
		3	M+	-25.16	33.36	4.90
		6	M-	-53.39	23.39	-18.96
19	Frontal	4	N+	-20.26	19.97	-5.93
		5	N-	-59.80	42.79	-22.92
		1	Q+	-40.79	47.54	-9.83
		8	Q-	-34.37	16.45	-15.47
		3	M+	-25.95	36.49	-3.74
		6	M-	-54.11	26.27	-25.10
20	Dorsal	4	N+	-18.54	21.58	-5.93
		5	N-	-56.07	47.58	-22.92
		1	Q+	-36.73	50.75	-9.83
		8	Q-	-32.89	19.23	-15.47
		3	M+	-22.85	38.51	-3.74
		6	M-	-51.76	30.65	-25.10
20	Frontal	4	N+	-20.09	31.05	-36.86
		5	N-	-59.58	69.01	-91.44
		1	Q+	-40.24	72.18	-82.08
		8	Q-	-34.44	28.70	-43.64
		4	M+	-20.09	31.05	-36.86
		5	M-	-59.58	69.01	-91.44

ARMADURA DEL DINTEL

NUDO	Nd	Md	As c.i.	As c.s.
15	-20.09	-36.86	0.00	4.34
	-59.58	-91.44	0.00	10.01
	-20.09	-36.86	0.00	4.34
	-59.58	-91.44	0.00	10.01
16	-20.26	-5.93	0.00	0.00
	-59.80	-22.92	0.00	0.00
	-25.95	-3.74	0.00	0.00
	-54.11	-25.10	0.00	0.29
17	-14.60	1.33	0.00	0.00
	-47.85	-15.39	0.00	0.00
	-16.32	4.90	0.00	0.00
	-46.12	-18.96	0.00	0.35
18	-14.60	41.24	10.85	0.00
	-47.85	55.85	11.78	0.00
	-28.05	78.96	21.45	0.00
	-29.35	21.99	3.21	0.00

ARMADURA DE SOLERA

NUDO	Nd	Md	As c.i.	As c.s.
5	-16.30	34.38	6.30	0.00
	-59.90	76.60	11.85	0.00
	-58.18	80.66	13.06	0.00
	-18.02	30.31	5.12	0.00
6	-16.30	-24.67	0.00	3.96
	-59.90	-3.63	0.00	0.00
	-59.69	4.62	0.00	0.00
	-30.31	-34.93	0.00	4.83
7	-16.30	-47.97	0.00	9.60
	-59.90	-36.44	0.00	1.85
	-37.78	-17.68	0.00	0.00
	-30.31	-71.74	0.00	13.89
8	-16.30	-69.43	0.00	14.87
	-59.90	-68.70	0.00	9.86
	-37.78	-36.33	0.00	4.33
	-30.31	-105.92	0.00	22.51

ARMADURA DE HASTIAL

NUDO	Nd	Md	As c.i.	As c.e.
1	-33.89	36.86	0.00	7.35
	-77.73	82.08	0.00	17.52
	-77.73	91.44	0.00	20.76
	-33.89	36.86	0.00	7.35
2	-35.53	24.42	0.00	3.28
	-80.64	58.38	0.00	9.21
	-80.64	58.38	0.00	9.21
	-35.53	19.48	0.00	1.75
3	-40.10	4.27	0.00	0.00
	-88.77	18.20	0.00	0.00
	-69.27	20.78	0.00	0.00
	-59.61	-25.32	0.83	0.00
4	-44.67	12.70	0.00	0.00
	-96.90	28.80	0.00	0.00
	-96.90	28.80	0.00	0.00
	-44.67	8.66	0.00	0.00
5	-46.94	30.31	0.00	3.83
	-100.93	57.96	0.00	6.93
	-100.93	80.66	0.00	14.68
	-46.94	30.31	0.00	3.83

RESUMEN DE ARMADURAS

ARMADURA DEL DINTEL

NUDO	As c.i.	As c.s.
15	0.00	10.01
16	0.00	0.29
17	0.00	0.35
18	21.45	0.00

Cuantía mínima geométrica: 6.00 cm²/m

AF \DURA DE SOLERA

NUDO	As c.i.	As c.s.
5	13.06	0.00
6	0.00	4.83
7	0.00	13.89
8	0.00	22.51

Cuantía mínima geométrica: 7.50 cm²/m

ARMADURA DE HASTIAL

NUDO	As c.i.	As c.e.
1	0.00	20.76
2	0.00	9.21
?	0.83	0.00
	0.00	0.00
5	0.00	14.68

Cuantía mínima geométrica vertical: 3.60 cm²/m
Cuantía mínima geométrica horizontal: 6.40 cm²/m

?ROBACION A CORTANTE

?EL

)	Vd max.	Vcu	As
=			
	47.54	56.80	0.00
	48.70	49.06	0.00
	0.00	49.06	0.00

ERA

= 61.97 T/m.

O	Vd max.	As
=		
	58.80	0.00
	30.20	0.00
	5.74	0.00

TIAL

= 46.54 T/m.

O	Vd max.	As
=		
	39.58	0.00
	8.83	0.00
	35.14	0.00

(PROBACION DE TENSIONES SOBRE EL TERRENO

ısión transmitida al terreno en nudo 5: 2.05 kp/cm²

Estructura: P.I. Nº 1 **Cálculo:** ALETAS. H=8.40 M.

DEFINICION GEOMETRICA

Altura total	8.40	m
Ancho superior	1.00	m
Ancho inferior	1.00	m
Longitud zarpa delantera	1.20	m
Longitud zarpa trasera	3.50	m
Canto zapata	1.00	m
Canto tacón cotra deslizamiento.....	0.00	m

ACCIONES ACTUANTES

Altura de tierras	0.00	m
Altura tierras en intradós	0.50	m
Sobrecarga en el trasdós	0.00	t/m²

DATOS TERRENO

Densidad	1.90	t/m³
Coeficiente empuje activo	0.41	
¿Considera empuje pasivo? (s/n)	n	
Angulo de rozamiento	30	º

OTROS DATOS

Recubrimiento	5	cm
fck	250	Kp/cm²
fyk	5100	Kp/cm²
Gamma C	1.5	
Gamma S	1.15	
Gamma F desf.....	1.6	
Gamma F fav.....	0.9	
Canto útil muro	95	cm
Canto útil zapata	95	cm
Densidad hormigón	2.5	t/m³

Muro:

A flex =	**28.70**	cm²/m.l.
A cort =	**0.00**	cm²/m.l.

Zapata (puntera):

A flex =	**8.31**	cm²/m.l.
Cumple cortante?	**SI**	

Zapata (talón):

A flex =	**26.29**	cm²/m.l.
Cumple cortante?	**SI**	

DESLIZA?	1.55	NO
VUELCA?	2.75	NO
SIGM_BAR	**22.44**	t/m²
SIGM_MAX	**29.73**	t/m²
SIGM_MIN	**2.64**	t/m²

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 21.00 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 76.95 mt
H = 27.48 t

RESUMEN:

HIP	N	M	H
P.P.	21.00	0.00	0.00
TIERRAS	0.00	76.95	27.48

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	21.00	76.95	27.48

Tomando los coeficientes de seguridad:

Gamma DESF 1.6
Gamma FAV 0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	18.90	123.12	6.96	28.7
1.2.	33.60	123.12	4.11	27.2

Armadura a disponer:

A = 28.7 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 43.97 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 61.32 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 1 **Cálculo:** ALETAS. H=8.40 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 35.25 t
M = 24.15 mt
H = 0.00 t

Debido a las tierras:

N = 57.00 t
M = 49.18 mt
H = 34.42 t

RESUMEN:

HIP	N	M	H
P.P.	35.25	24.15	0.00
TIERRAS	57.00	49.18	34.42

SEGURIDAD AL DESLIZAMIENTO:

N = 92.25 t
H = 34.42 t GAMMA = 1.55 O.K.
mu = 0.58
Epasivo= 0.00 t

SEGURIDAD AL VUELCO:

Mvolc = 107.84 mt
Mest = 296.96 mt GAMMA = 2.75 O.K.

Estructura: P.I. Nº 1 **Cálculo:** ALETAS. H=8.40 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	92.25	73.33	34.42

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	29.73	2.64

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	22.44

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -106.64 mt

Anec = 26.29 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 35.26 mt

Anec = 8.31 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 39.82 t
Vlim = 61.32 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 28.48 t
Vlim = 122.64 t

Vd < Vlim ? O.K.

Estructura: P.I. Nº 1 **Cálculo:** ALETAS. H=4.70 M.

DEFINICION GEOMETRICA

Altura total	4.70	m
Ancho superior	0.50	m
Ancho inferior	0.50	m
Longitud zarpa delantera	0.70	m
Longitud zarpa trasera	2.00	m
Canto zapata	0.50	m
Canto tacón cotra deslizamiento.....	0.00	m

ACCIONES ACTUANTES

Altura de tierras	0.00	m
Altura tierras en intradós	0.50	m
Sobrecarga en el trasdós	0.00	t/m²

DATOS TERRENO

Densidad	1.90	t/m³
Coeficiente empuje activo	0.41	
¿Considera empuje pasivo? (s/n)	n	
Angulo de rozamiento	30	°

OTROS DATOS

Recubrimiento	5	cm
fck	250	Kp/cm²
fyk	5100	Kp/cm²
Gamma C	1.5	
Gamma S	1.15	
Gamma F desf.....	1.6	
Gamma F fav.....	0.9	
Canto útil muro	45	cm
Canto útil zapata	45	cm
Densidad hormigón	2.5	t/m³

Muro:

A flex =	**10.54**	cm²/m.l.
A cort =	**0.00**	cm²/m.l.

Zapata (puntera):

A flex =	**3.03**	cm²/m.l.
Cumple cortante?		**SI**

Zapata (talón):

A flex =	**9.49**	cm²/m.l.
Cumple cortante?		**SI**

DESLIZA?	1.56	**NO**
VUELCA?	2.81	**NO**
SIGM_BAR	**12.16**	t/m²
SIGM_MAX	**16.06**	t/m²
SIGM_MIN	**1.69**	t/m²

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 5.88 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 13.48 mt
H = 8.60 t

RESUMEN:

HIP	N	M	H
P.P.	5.88	0.00	0.00
TIERRAS	0.00	13.48	8.60

Estructura: P.I. Nº 1 **Cálculo:** ALETAS. H=4.70 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	5.88	13.48	8.60

Tomando los coeficientes de seguridad:

Gamma DESF 1.6
Gamma FAV 0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	5.29	21.57	4.28	10.5
1.2.	9.40	21.57	2.49	10.1

Armadura a disponer:

A = 10.5 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 13.77 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 29.05 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 1 **Cálculo:** ALETAS. H=4.70 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 9.88 t
M = 3.82 mt
H = 0.00 t

Debido a las tierras:

N = 18.53 t
M = 8.45 mt
H = 10.53 t

RESUMEN:

HIP	N	M	H
P.P.	9.88	3.82	0.00
TIERRAS	18.53	8.45	10.53

SEGURIDAD AL DESLIZAMIENTO:

N = 28.40 t
H = 10.53 t GAMMA = 1.56 O.K.
mu = 0.58
Epasivo= 0.00 t

SEGURIDAD AL VUELCO:

Mvolc = 18.26 mt
Mest = 51.27 mt GAMMA = 2.81 O.K.

Estructura: P.I. Nº 1 **Cálculo:** ALETAS. H=4.70 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	28.40	12.27	10.53

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	16.06	1.69

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	12.16

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -18.50 mt

Anec = 9.49 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 6.11 mt

Anec = 3.03 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 12.43 t
Vlim = 29.05 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 9.72 t
Vlim = 58.09 t

Vd < Vlim ? O.K.

3. RESUMEN CONTROL CALIDAD

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO: P.I. 1

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFICA	TIPO	CONO ABRAMS	CONSIS-TENCIA	N º	RES. MEDIA	N º	RES. MEDIA	N º	RES. MEDIA					
5	9	31/05/99	Losa inf m.i	03030103	H-250	7	Blanda	2	225	3	249	1	283	84	22/06/99	II/AL 42,5 R	224	
5	10	31/05/99	Losa inf m.i	03030103	H-250	9	Blanda	2	200	3	250	1	255	84	22/06/99	II/AL 42,5 R	224	
6	11	02/06/99	Zap ale 3 y 4 (1ª)	03030103	H-250	8	Blanda	2	201	3	251	1	262	100	30/06/99	II/AL 42,5 R	212	
6	12	02/06/99	Zap ale 3 y 4 (1ª)	03030103	H-250	10	Fluida	2	156	3	235	1	289	100	30/06/99	II/AL 42,5 R	212	
7	13	02/06/99	Losa inf m.d	03030103	H-250	10	Fluida	2	195	3	272	1	304	100	30/06/99	II/AL 42,5 R	225	
7	14	02/06/99	Losa inf m.d	03030103	H-250	10	Fluida	2	211	3	250	1	281	100	30/06/99	II/AL 42,5 R	225	
8	15	03/06/99	Zap ale 1 y 2 (2ª)	03030103	H-250	7	Blanda	2	236	3	279	1	337	84	01/07/99	II/AL 42,5 R	251	
8	16	03/06/99	Zap ale 1 y 2 (2ª)	03030103	H-250	10	Fluida	2	225	3	286	1	315	84	01/07/99	II/AL 42,5 R	251	
9	18	07/06/99	Zap ale 3 y 4 (2º)	03030103	H-250	7	Blanda	2	220	3	280	1	292	98	07/07/99	II/AL 42,5 R	243	
9	19	09/06/99	Zap ale 2 (2º)	03030103	H-250	8	Blanda	2	227	3	270	1	306	98	07/07/99	II/AL 42,5 R	243	
10	20	09/06/99	Alzado 2,i	03030103	H-250	7	Blanda	2	252	3	293	1	314	100	08/07/99	II/AL 42,5 R	237	
10	21	10/06/99	Alzado 1,i	03030103	H-250	7	Blanda	2	212	3	263	1	292	100	08/07/99	II/AL 42,5 R	237	
11	22	16/06/99	Alzado 2,d	03030103	H-250	8	Blanda	2	217	3	259	1	294	80	14/07/99	II/AL 42,5 R	208	
11	24	16/06/99	Aleta 3 (2ª)	03030103	H-250	6	Blanda	2	198	3	231	1	244	80	14/07/99	II/AL 42,5 R	208	
15	29	18/06/99	Alzado 1,d	03030103	H-250	7	Blanda	2	251	3	293	1	322	85	16/07/99	II/AL 42,5 R	264	
15	30	18/06/99	Aleta 1 (2ª)	03030103	H-250	6	Blanda	2	267	3	303	1	330	85	16/07/99	II/AL 42,5 R	264	
18	35	23/06/99	Aleta 4 (1ª)	03030103	H-250	9	Blanda	2	199	3	243	1	263	100	26/07/99	II/AL 42,5 R	219	
18	41	28/06/99	Aleta 3 (1ª)	03030103	H-250	6	Blanda	2	223	3	289	1	364	100	26/07/99	II/AL 42,5 R	219	
29	50	01/07/99	Losa sup m,i	03030103	H-250	9	Blanda	2	245	3	298	1	308	98	29/07/99	II/AL 42,5 R	268	
29	51	01/07/99	Losa sup m,i	03030103	H-250	7	Blanda	2	248	3	298	1	324	98	29/07/99	II/AL 42,5 R	268	
34	55	05/07/99	Aleta 2 (2ª)	03030103	H-250	7	Blanda	2	262	3	309	1	309	72	04/08/99	II/AL 42,5 R	275	
35	57	05/07/99	Losa sup m,d	03030103	H-250	7	Blanda	2	269	3	335	1	344	96	02/08/99	II/AL 42,5 R	279	
35	58	05/07/99	Losa sup m,d	03030103	H-250	10	Fluida	2	267	3	310	1	316	96	02/08/99	II/AL 42,5 R	279	
34	63	07/07/99	Aleta 1 (1ª)	03030103	H-250	6	Blanda	2	236	3	305	1	318	72	04/08/99	II/AL 42,5 R	275	
48	72	12/07/99	Aleta 2 (1ª)	03030103	H-250	6	Blanda	2	271	3	322	1	340	52	09/08/99	II/AL 42,5 R	290	
48	73	12/07/99	Aleta 2 (1ª)	03030103	H-250	9	Blanda	2	273	3	352	1	376	52	09/08/99	II/AL 42,5 R	290	

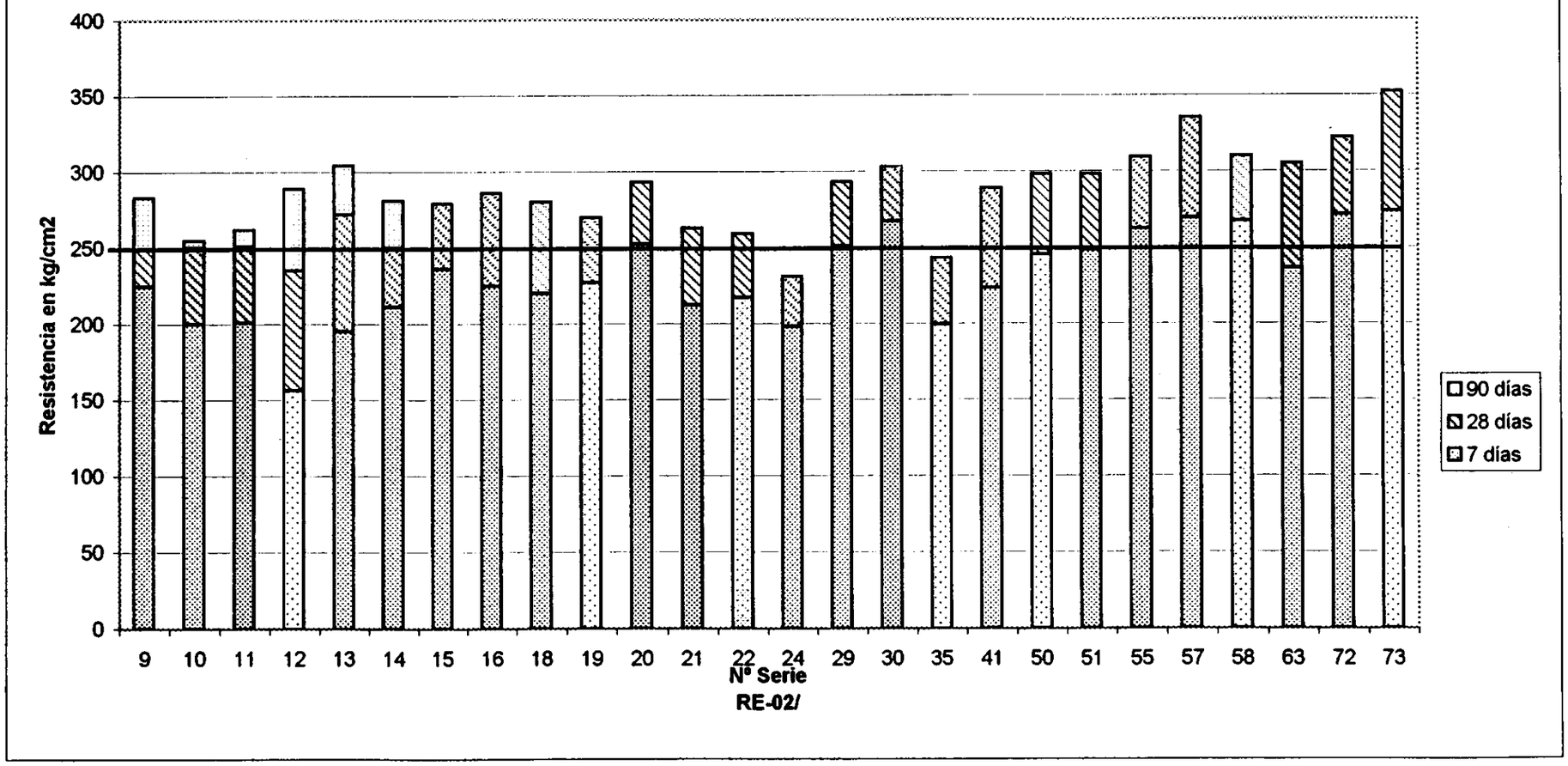
FECHA: **FIRMA:**

NOMBRE: Ana Mª Martín Herrero

CARGO: Jefe de laboratorio

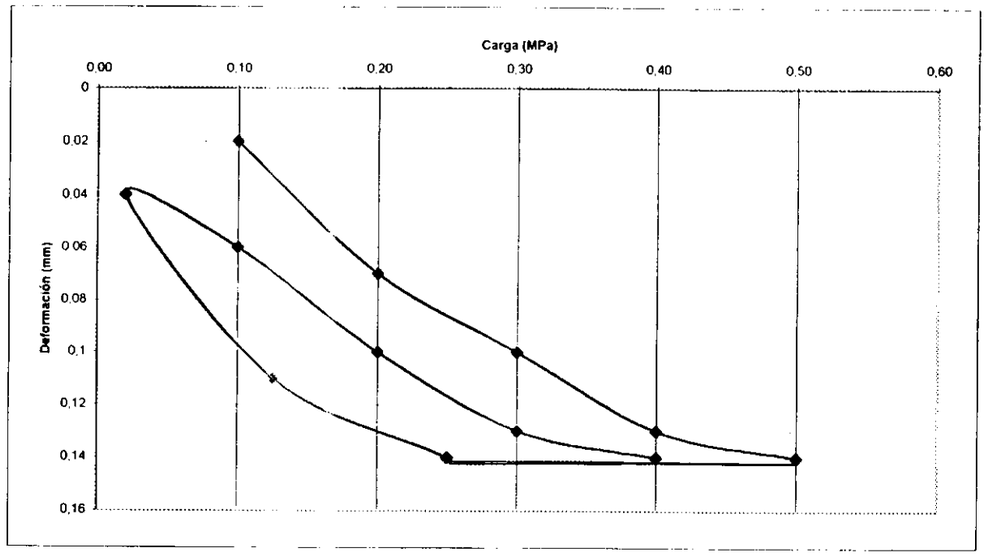
LOTE DE f. est. < 0,9 fck

Resistencia del hormigón
P.I. 1



esaitec SYNCONSULT S.L. UNION TEMPORAL DE EMPRESAS	**ENSAYO DE PLACA CON CARGA** (DIN 18 134) OBRA: **LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA** **SUB-TRAMO III**

LOCALIZACION	P.I. 1 Cuña de transición 1		
CÓDIGO DE TRAMIFICACIÓN:	03030103		**PK** 304+450
FECHA:	24/11/99	**REF. MUESTRA:**	RE-08/ 16



Módulos			Especifi.
	kp/cm2	Mpa	kp/cm2
Ev1	6426	630	
Ev2	8497	833	1600
Ev2/Ev1	1,3	1,3	

OBSERVACIONES

Fecha	**Firma**	**Cargo**	JEFE DE LABORATORIO
		Nombre	ANA MARTIN HERRERO

CARGAS	COMP 1	COMP 2	COMP 3	MEDIAS	Asientos							
Mpa	mm	mm	mm	mm	mm	B1	B2	B3	B4	AO	A1	A2
0.01	0	0	0	0								
0.10	0.02	0.02	0,02	0.02	0.02	0,10	0.01	0,001	0,0001	0,02	0,002	0,0002
0.20	0.05	0.08	0.08	0.07	0.07	0,20	0.04	0,008	0,0016	0,07	0,014	0,0028
0.30	0.1	0.1	0,1	0.1	0.1	0,30	0,09	0,027	0,0081	0,1	0,03	0,009
0.40	0,13	0,13	0.13	0.13	0.13	0,40	0,16	0,064	0,0256	0,13	0,052	0,0208
0.50	0.14	0.14	0,1	0.14	0.14	0,50	0,25	0,125	0,0625	0,14	0,07	0,035
						0,00	0	0	0	0	0	0
						0,00	0	0	0	0	0	0
						0,00	0	0	0	0	0	0
						0,00	0	0	0	0	0	0
						0,00	0	0	0	0	0	0
						1,50	**0,55**	**0,23**	**0,10**	**0,46**	**0,17**	**0,07**
0,25	0,14	0,14	0,13	0,14	0,14							
0,13	0,11	0,11	0,11	0,11	0,11							
0,02	0,04	0,04	0,04	0,04	0,04							
0.10	0.06	0.06	0,06	0,06	0,06	0,10	0,01	0,001	0,0001	0,06	0,006	0,0006
0.20	0,1	0,1	0.1	0,1	0.1	0,20	0,04	0,008	0,0016	0,1	0,02	0,004
0.30	0,13	0,13	0,13	0,13	0,13	0,30	0,09	0,027	0,0081	0,13	0,039	0,0117
0.40	0,14	0,14	0,14	0,14	0,14	0,40	0,16	0,064	0,0256	0,14	0,056	0,0224
						0,00	0	0	0	0	0	0
						0,00	0	0	0	0	0	0
						0,00	0	0	0	0	0	0
						0,00	0	0	0	0	0	0
						0,00	0	0	0	0	0	0
						0,00	0	0	0	0	0	0
						1,00	**0,30**	**0,10**	**0,04**	**0,43**	**0,12**	**0,04**

	1° CICLO	2° CICLO
n	5.00	4
B1	1,50	1,00
B2	0,55	0,30
B3	0,23	0,10
B4	0,10	0,04
A0	0,46	0,43
A1	0,17	0,12
A2	0,07	0,04
X	0 3	0,27
Y	0,6	0,5
a2	-0,57143	-0,75
a1	0,64286	0,645
a0	-0,038	0,0025
E	630	833,333

E1 E2	1,32275

PASO INFERIOR 2

PASO INFERIOR 2

ÍNDICE

1. DESCRIPCIÓN Y DEFINICIÓN
2. CÁLCULOS
3. RESUMEN DEL CONTROL DE CALIDAD

1. DESCRIPCIÓN Y DEFINICIÓN

CALCULO DE MARCOS CERRADOS UNICELULARES

El siguiente programa calcula los esfuerzos en un marco cerrado unicelular a partir de las dimensiones geométricas del mismo y sometido a las acciones de su peso propio, del terreno y de las sobrecargas de uso. A partir de estros esfuerzos el programa arma las secciones a flexocompresión simple y comprueba la resistencia a cortante de las mismas, así como las tensiones máximas transmitidas al terreno.

DATOS GEOMÉTRICOS

Gálibo vertical (GV):	4,30	m.
Gálibo horizontal (GH):	9,50	m.
Espesor de dintel (ED):	0,70	m.
Espesor de solera (ESOL):	1,00	m.
Espesor de hastial (EH):	0,70	m.
Longitud cartela dintel:	1,00	m.
Canto adicional cartela:	0,50	m.

DATOS DEL TERRENO

Altura de tierras sobre el dintel (HT):	1,30	m.
Peso específico de las tierras (γ):	2.10	T/m³
Coeficiente de balasto (K):	5000	T/m³
Empuje activo del terreno (λ_a):	0.33	
Empuje al reposo del terreno (λ_r):	0.50	

SOBRECARGAS DE USO

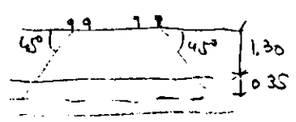
Carretera:

Sobrecarga uniforme:	0.4	T/m²
Vehículo pesado:	60	T.
Sobrecarga en trasdós:	1.0	T/m²

Ferrocarril:

Sobrecarga uniforme tren tipo B (abierto a 45° hasta plano medio del dintel): 3,76 T/m²
Sobrecarga en trasdós: 3.0 T/m²

Sobrecarga:
2 Trenes de 12 T/ω.



Coeficiente de impacto:

$$\phi_0 = \frac{114\sqrt{L}}{3,10 - 1,76\sqrt{L} + L} = \frac{114\sqrt{10,20}}{3,10 - 1,76\sqrt{10,20} + 10,20} = 47,41\% = 0,4741$$

$$\phi_{red} = 0,4741 - \frac{1,30 - 1,0}{10,20} = 944 \qquad q = \frac{24 \times 1,44}{(5,90 + 2 \times 1,65)} = 3,76$$

DATOS DE LOS MATERIALES

Hormigón:
- f_{ck}: 250 kg/cm²
- γ_c: 1.50

Acero:
- f_{yk}: 5100 kg/cm²
- γ_s: 1.15

Recubrimiento mecánico de armaduras: 4 cm.

COEFICIENTES DE MAYORACION DE ACCIONES

Peso propio marco:
- Efecto desfavorable: $\gamma_{pp1} = 1.60$
- Efecto favorable: $\gamma_{pp2} = 0.90$

Acción de las tierras (Peso y empuje):
- Efecto desfavorable: $\gamma_{t1} = 1.60$
- Efecto favorable: $\gamma_{t2} = 0.90$

Sobrecargas de uso:
- Efecto desfavorable: $\gamma_{sc1} = 1.60$
- Efecto favorable: $\gamma_{sc2} = 0$

HIPÓTESIS DE CALCULO

Se consideran las siguientes hipótesis de cálculo:

H1: Peso propio marco.
H2: Peso de tierras.
H3: Empuje activo de tierras.
H4: Empuje al reposo de tierras.
H5: Sobrecargas de uso.

Esta última hipótesis de sobrecargas de uso tiene los siguientes componentes:

- Sobrecarga uniforme.(400 kg/m² en carretera y tren tipo B en ferrocarril)
- Vehiculo pesado. Esta acción se asimila a una sobrecarga uniforme, abriendo a 45° hasta el centro de gravedad del dintel. Si el vehículo tiene de dimensiones en planta AxB, la carga equivalente será:

$$\frac{Q}{(A + 2 \times HT + ED)\,(B + 2 \times HT + ED)}$$

- Sobrecarga en el trasdós. Empuje debido a la sobrecarga en el trasdós con el coeficiente de empuje al reposo.

COMBINACIONES DE HIPÓTESIS

Se consideran las siguientes combinaciones de hipótesis:

C1: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C2: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C3: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C4: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C5: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C6: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C7: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$
C8: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$

Con estas combinaciones se obtienen los esfuerzos pésimos en las barras del modelo.

ARMADO DEL MARCO

Con los esfuerzos pésimos obtenidos anteriormente, se arman las secciones definidas en el modelo de cálculo a flexocompresión simple. Se obtienen asimismo las armaduras a disponer por cuantía mínima geométrica.

COMPROBACIÓN A CORTANTE

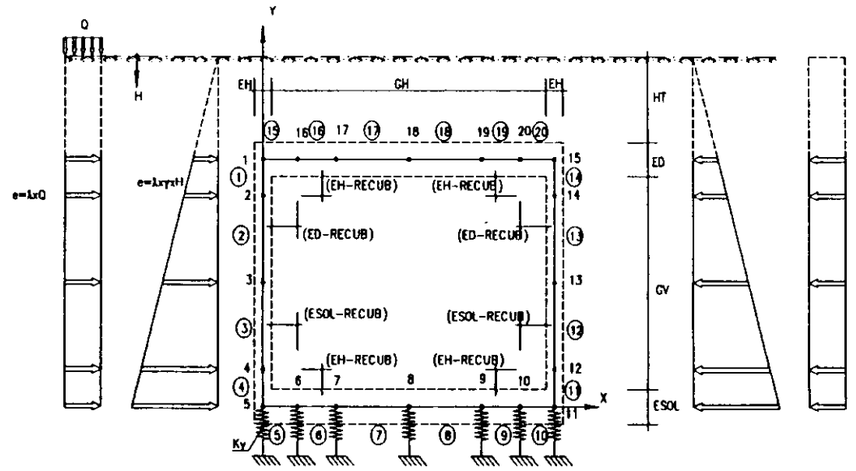
Se realiza la comprobación a cortante de las secciones para verificar si la contribución a cortante del hormigón es suficiente para absorber el cortante de cálculo hallado. Si no se cumple esta condición se obtiene la armadura necesaria.
Para la comprobación a cortante se han introducido en el modelo nudos a una distancia de un canto útil del paramento para verificar en ellos el cortante de cálculo y no en los nudos extremos.

COMPROBACIÓN DE TENSIONES SOBRE EL TERRENO

Para el cálculo de la tensión máxima transmitida al terreno se obtiene el movimiento máximo vertical en los nudos de la solera. La tensión será por tanto:

$$\sigma = K_{balasto} \times \delta_{max}$$

A continuación figuran los resultados del cálculo.



MODELO DE CALCULO

2. CÁLCULOS

CARACTERISTICAS DE LOS NUDOS

Nudo	Coordenadas X	Coordenadas Y	coacc xyz	Constantes Muelles Kx	Constantes Muelles Ky	Constantes Muelles Kz
1	0.000	4.900				
2	0.000	4.100				
3	0.000	2.650				
4	0.000	1.200				
5	0.000	0.000			5.124E+03	
6	1.350	0.000			6.375E+03	
7	2.550	0.000			9.376E+03	
8	5.100	0.000	100		1.275E+04	
9	7.650	0.000			9.376E+03	
10	8.850	0.000			6.375E+03	
11	10.200	0.000			5.124E+03	
12	10.200	1.200				
13	10.200	2.650				
14	10.200	4.100				
15	10.200	4.900				
16	1.050	5.075				
17	1.350	5.150				
18	5.100	5.150				
19	8.850	5.150				
20	9.150	5.075				

CARACTERISTICAS DE LAS BARRAS

Barra	Nd	Nf	I	A	E
1	1	2	0.028583	0.700000	3.004E+06
2	2	3	0.028583	0.700000	3.004E+06
3	3	4	0.028583	0.700000	3.004E+06
4	4	5	0.028583	0.700000	3.004E+06
5	5	6	0.083333	1.000000	3.004E+06
6	6	7	0.083333	1.000000	3.004E+06
7	7	8	0.083333	1.000000	3.004E+06
8	8	9	0.083333	1.000000	3.004E+06
9	9	10	0.083333	1.000000	3.004E+06
10	10	11	0.083333	1.000000	3.004E+06
11	11	12	0.028583	0.700000	3.004E+06
12	12	13	0.028583	0.700000	3.004E+06
13	13	14	0.028583	0.700000	3.004E+06
14	14	15	0.028583	0.700000	3.004E+06
15	1	16	0.089767	1.025100	3.004E+06
16	16	17	0.038805	0.775100	3.004E+06
17	17	18	0.028583	0.700000	3.004E+06
18	18	19	0.028583	0.700000	3.004E+06
19	19	20	0.038805	0.775100	3.004E+06
20	20	15	0.089767	1.025100	3.004E+06

CARGAS EN BARRAS

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
1	1	Q unif	1.750	0.000	0.000	270.00
	2	Q unif	1.750	0.000	0.000	270.00
	3	Q unif	1.750	0.000	0.000	270.00
	4	Q unif	1.750	0.000	0.000	270.00
	5	Q unif	2.500	0.000	0.000	270.00
	6	Q unif	2.500	0.000	0.000	270.00
	7	Q unif	2.500	0.000	0.000	270.00
	8	Q unif	2.500	0.000	0.000	270.00
	9	Q unif	2.500	0.000	0.000	270.00
	10	Q unif	2.500	0.000	0.000	270.00
	11	Q unif	1.750	0.000	0.000	270.00
	12	Q unif	1.750	0.000	0.000	270.00
	13	Q unif	1.750	0.000	0.000	270.00
	14	Q unif	1.750	0.000	0.000	270.00
	15	Q unif	2.563	0.000	0.000	270.00
	16	Q unif	1.938	0.000	0.000	270.00
	17	Q unif	1.750	0.000	0.000	270.00
	18	Q unif	1.750	0.000	0.000	270.00
	19	Q unif	1.938	0.000	0.000	270.00
	20	Q unif	2.563	0.000	0.000	270.00
2	15	Q unif	2.730	0.000	0.000	270.00
	16	Q unif	2.730	0.000	0.000	270.00
	17	Q unif	2.730	0.000	0.000	270.00
	18	Q unif	2.730	0.000	0.000	270.00
	19	Q unif	2.730	0.000	0.000	270.00
	20	Q unif	2.730	0.000	0.000	270.00
3	1	Q unif	1.507	0.000	0.000	0.00
	2	Q unif	2.373	0.000	0.000	0.00
	3	Q unif	3.379	0.000	0.000	0.00
	4	Q unif	4.297	0.000	0.000	0.00
	11	Q unif	4.297	0.000	0.000	180.00
	12	Q unif	3.379	0.000	0.000	180.00
	13	Q unif	2.373	0.000	0.000	180.00
	14	Q unif	1.507	0.000	0.000	180.00
4	1	Q unif	2.284	0.000	0.000	0.00
	2	Q unif	3.596	0.000	0.000	0.00
	3	Q unif	5.119	0.000	0.000	0.00
	4	Q unif	6.510	0.000	0.000	0.00
	11	Q unif	6.510	0.000	0.000	180.00
	12	Q unif	5.119	0.000	0.000	180.00
	13	Q unif	3.596	0.000	0.000	180.00
	14	Q unif	2.284	0.000	0.000	180.00

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
5	1	Q unif	1.500	0.000	0.000	0.00
	2	Q unif	1.500	0.000	0.000	0.00
	3	Q unif	1.500	0.000	0.000	0.00
	4	Q unif	1.500	0.000	0.000	0.00
	11	Q unif	1.500	0.000	0.000	180.00
	12	Q unif	1.500	0.000	0.000	180.00
	13	Q unif	1.500	0.000	0.000	180.00
	14	Q unif	1.500	0.000	0.000	180.00
6	15	Q unif	3.760	0.000	0.000	270.00
	16	Q unif	3.760	0.000	0.000	270.00
	17	Q unif	3.760	0.000	0.000	270.00
	18	Q unif	3.760	0.000	0.000	270.00
	19	Q unif	3.760	0.000	0.000	270.00
	20	Q unif	3.760	0.000	0.000	270.00
7	15	Q unif	0.000	0.000	0.000	270.00
	16	Q unif	0.000	0.000	0.000	270.00
	17	Q unif	0.000	0.000	0.000	270.00
	18	Q unif	0.000	0.000	0.000	270.00
	19	Q unif	0.000	0.000	0.000	270.00
	20	Q unif	0.000	0.000	0.000	270.00

HIPOTESIS COMPUESTAS

Hipotesis compuesta 1

PESO PROPIO MARCO
Tipo : Acciones permanentes
Hipotesis basicas : 1

Hipotesis compuesta 2

PESO TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 2

Hipotesis compuesta 3

EMPUJE ACTIVO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 3

Hipotesis compuesta 4

EMPUJE REPOSO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 4

Hipotesis compuesta 5

SOBRECARGAS DE USO
Tipo : Sobrecargas compatibles
Hipotesis basicas : 5 6 7

COMBINACIONES

Combinacion 1

C1

Hip.comp.	Coeficiente
1	1.600
2	1.600
3	1.600
5	1.600

Combinacion 2

C2

Hip.comp.	Coeficiente
1	0.900
2	1.600
3	1.600
5	1.600

Combinacion 3

C3

Hip.comp.	Coeficiente
1	1.600
2	0.900
3	0.900
5	1.600

Combinacion 4

C4

Hip.comp.	Coeficiente
1	0.900
2	0.900
3	0.900
5	1.600

Combinacion 5

C5

Hip.comp.	Coeficiente
1	1.600
2	1.600
4	1.600
5	1.600

Combinacion 6

C6

Hip.comp.	Coeficiente
1	0.900
2	1.600
4	1.600
5	1.600

Combinacion 7

C7

Hip.comp.	Coeficiente
1	1.600
2	0.900
4	0.900
5	1.600

Combinacion 8

C8

Hip.comp.	Coeficiente
1	0.900
2	0.900
4	0.900
5	1.600

MOVIMIENTOS HIPOTESIS COMPUESTAS (*1000)

Nudo	Hip		Dx	Dy	Wz
1	1	Dx+	-0.071	-1.671	-0.275
		Dx-	-0.071	-1.671	-0.275
		Dy+	-0.071	-1.671	-0.275
		Dy-	-0.071	-1.671	-0.275
		Wz+	-0.071	-1.671	-0.275
		Wz-	-0.071	-1.671	-0.275
	2	Dx+	-0.092	-1.006	-0.363
		Dx-	-0.092	-1.006	-0.363
		Dy+	-0.092	-1.006	-0.363
		Dy-	-0.092	-1.006	-0.363
		Wz+	-0.092	-1.006	-0.363
		Wz-	-0.092	-1.006	-0.363
	3	Dx+	0.035	0.107	0.098
		Dx-	0.035	0.107	0.098
		Dy+	0.035	0.107	0.098
		Dy-	0.035	0.107	0.098
		Wz+	0.035	0.107	0.098
		Wz-	0.035	0.107	0.098
	4	Dx+	0.053	0.161	0.149
		Dx-	0.053	0.161	0.149
		Dy+	0.053	0.161	0.149
		Dy-	0.053	0.161	0.149
		Wz+	0.053	0.161	0.149
		Wz-	0.053	0.161	0.149
	5	Dx+	0.020	0.052	0.053
		Dx-	-0.107	-1.179	-0.426
		Dy+	0.020	0.052	0.053
		Dy-	-0.107	-1.179	-0.426
		Wz+	0.020	0.052	0.053
		Wz-	-0.107	-1.179	-0.426
2	1	Dx+	-0.247	-1.667	-0.168
		Dx-	-0.247	-1.667	-0.168
		Dy+	-0.247	-1.667	-0.168
		Dy-	-0.247	-1.667	-0.168
		Wz+	-0.247	-1.667	-0.168
		Wz-	-0.247	-1.667	-0.168
	2	Dx+	-0.316	-1.000	-0.202
		Dx-	-0.316	-1.000	-0.202
		Dy+	-0.316	-1.000	-0.202
		Dy-	-0.316	-1.000	-0.202

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.316	-1.000	-0.202
		Wz-	-0.316	-1.000	-0.202
	3	Dx+	0.112	0.107	0.088
		Dx-	0.112	0.107	0.088
		Dy+	0.112	0.107	0.088
		Dy-	0.112	0.107	0.088
		Wz+	0.112	0.107	0.088
		Wz-	0.112	0.107	0.088
	4	Dx+	0.170	0.161	0.133
		Dx-	0.170	0.161	0.133
		Dy+	0.170	0.161	0.133
		Dy-	0.170	0.161	0.133
		Wz+	0.170	0.161	0.133
		Wz-	0.170	0.161	0.133
	5	Dx+	0.061	0.052	0.046
		Dx-	-0.370	-1.173	-0.237
		Dy+	0.061	0.052	0.046
		Dy-	-0.370	-1.173	-0.237
		Wz+	0.061	0.052	0.046
		Wz-	-0.370	-1.173	-0.237
3	1	Dx+	-0.363	-1.658	0.005
		Dx-	-0.363	-1.658	0.005
		Dy+	-0.363	-1.658	0.005
		Dy-	-0.363	-1.658	0.005
		Wz+	-0.363	-1.658	0.005
		Wz-	-0.363	-1.658	0.005
	2	Dx+	-0.431	-0.991	0.030
		Dx-	-0.431	-0.991	0.030
		Dy+	-0.431	-0.991	0.030
		Dy-	-0.431	-0.991	0.030
		Wz+	-0.431	-0.991	0.030
		Wz-	-0.431	-0.991	0.030
	3	Dx+	0.186	0.107	0.005
		Dx-	0.186	0.107	0.005
		Dy+	0.186	0.107	0.005
		Dy-	0.186	0.107	0.005
		Wz+	0.186	0.107	0.005
		Wz-	0.186	0.107	0.005
	4	Dx+	0.282	0.161	0.008
		Dx-	0.282	0.161	0.008
		Dy+	0.282	0.161	0.008
		Dy-	0.282	0.161	0.008
		Wz+	0.282	0.161	0.008
		Wz-	0.282	0.161	0.008

Nudo	Hip		Dx	Dy	Wz
	5	Dx+	0.096	0.052	-0.001
		Dx-	-0.505	-1.161	0.035
		Dy+	0.096	0.052	-0.001
		Dy-	-0.505	-1.161	0.035
		Wz+	-0.505	-1.161	0.035
		Wz-	0.000	0.000	0.000
4	1	Dx+	-0.246	-1.648	0.151
		Dx-	-0.246	-1.648	0.151
		Dy+	-0.246	-1.648	0.151
		Dy-	-0.246	-1.648	0.151
		Wz+	-0.246	-1.648	0.151
		Wz-	-0.246	-1.648	0.151
	2	Dx+	-0.268	-0.981	0.182
		Dx-	-0.268	-0.981	0.182
		Dy+	-0.268	-0.981	0.182
		Dy-	-0.268	-0.981	0.182
		Wz+	-0.268	-0.981	0.182
		Wz-	-0.268	-0.981	0.182
	3	Dx+	0.124	0.107	-0.083
		Dx-	0.124	0.107	-0.083
		Dy+	0.124	0.107	-0.083
		Dy-	0.124	0.107	-0.083
		Wz+	0.124	0.107	-0.083
		Wz-	0.124	0.107	-0.083
	4	Dx+	0.188	0.161	-0.126
		Dx-	0.188	0.161	-0.126
		Dy+	0.188	0.161	-0.126
		Dy-	0.188	0.161	-0.126
		Wz+	0.188	0.161	-0.126
		Wz-	0.188	0.161	-0.126
	5	Dx+	0.061	0.052	-0.043
		Dx-	-0.314	-1.150	0.213
		Dy+	0.061	0.052	-0.043
		Dy-	-0.314	-1.150	0.213
		Wz+	-0.314	-1.150	0.213
		Wz-	0.061	0.052	-0.043
5	1	Dx+	-0.002	-1.638	0.253
		Dx-	-0.002	-1.638	0.253
		Dy+	-0.002	-1.638	0.253
		Dy-	-0.002	-1.638	0.253
		Wz+	-0.002	-1.638	0.253
		Wz-	-0.002	-1.638	0.253
	2	Dx+	-0.006	-0.973	0.247
		Dx-	-0.006	-0.973	0.247

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.006	-0.973	0.247
		Dy-	-0.006	-0.973	0.247
		Wz+	-0.006	-0.973	0.247
		Wz-	-0.006	-0.973	0.247
	3	Dx+	0.016	0.107	-0.077
		Dx-	0.016	0.107	-0.077
		Dy+	0.016	0.107	-0.077
		Dy-	0.016	0.107	-0.077
		Wz+	0.016	0.107	-0.077
		Wz-	0.016	0.107	-0.077
	4	Dx+	0.025	0.161	-0.116
		Dx-	0.025	0.161	-0.116
		Dy+	0.025	0.161	-0.116
		Dy-	0.025	0.161	-0.116
		Wz+	0.025	0.161	-0.116
		Wz-	0.025	0.161	-0.116
	5	Dx+	0.007	0.052	-0.037
		Dx-	-0.006	-1.141	0.290
		Dy+	0.007	0.052	-0.037
		Dy-	-0.006	-1.141	0.290
		Wz+	-0.006	-1.141	0.290
		Wz-	0.007	0.052	-0.037
6	1	Dx+	-0.001	-1.290	0.248
		Dx-	-0.001	-1.290	0.248
		Dy+	-0.001	-1.290	0.248
		Dy-	-0.001	-1.290	0.248
		Wz+	-0.001	-1.290	0.248
		Wz-	-0.001	-1.290	0.248
	2	Dx+	-0.004	-0.644	0.229
		Dx-	-0.004	-0.644	0.229
		Dy+	-0.004	-0.644	0.229
		Dy-	-0.004	-0.644	0.229
		Wz+	-0.004	-0.644	0.229
		Wz-	-0.004	-0.644	0.229
	3	Dx+	0.012	0.021	-0.051
		Dx-	0.012	0.021	-0.051
		Dy+	0.012	0.021	-0.051
		Dy-	0.012	0.021	-0.051
		Wz+	0.012	0.021	-0.051
		Wz-	0.012	0.021	-0.051
	4	Dx+	0.018	0.032	-0.077
		Dx-	0.018	0.032	-0.077
		Dy+	0.018	0.032	-0.077
		Dy-	0.018	0.032	-0.077

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.018	0.032	-0.077
		Wz-	0.018	0.032	-0.077
	5	Dx+	0.005	0.010	-0.025
		Dx-	-0.005	-0.755	0.269
		Dy+	0.005	0.010	-0.025
		Dy-	-0.005	-0.755	0.269
		Wz+	-0.005	-0.755	0.269
		Wz-	0.005	0.010	-0.025
7	1	Dx+	-0.001	-1.026	0.186
		Dx-	-0.001	-1.026	0.186
		Dy+	-0.001	-1.026	0.186
		Dy-	-0.001	-1.026	0.186
		Wz+	-0.001	-1.026	0.186
		Wz-	-0.001	-1.026	0.186
	2	Dx+	-0.003	-0.401	0.170
		Dx-	-0.003	-0.401	0.170
		Dy+	-0.003	-0.401	0.170
		Dy-	-0.003	-0.401	0.170
		Wz+	-0.003	-0.401	0.170
		Wz-	-0.003	-0.401	0.170
	3	Dx+	0.008	-0.028	-0.031
		Dx-	0.008	-0.028	-0.031
		Dy+	0.008	-0.028	-0.031
		Dy-	0.008	-0.028	-0.031
		Wz+	0.008	-0.028	-0.031
		Wz-	0.008	-0.028	-0.031
	4	Dx+	0.012	-0.042	-0.048
		Dx-	0.012	-0.042	-0.048
		Dy+	0.012	-0.042	-0.048
		Dy-	0.012	-0.042	-0.048
		Wz+	0.012	-0.042	-0.048
		Wz-	0.012	-0.042	-0.048
	5	Dx+	0.004	-0.014	-0.015
		Dx-	-0.003	-0.470	0.200
		Dy+	0.000	0.000	0.000
		Dy-	0.000	-0.484	0.184
		Wz+	-0.003	-0.470	0.200
		Wz-	0.004	-0.014	-0.015
8	1	Dx+	0.000	-0.780	-0.000
		Dx-	0.000	-0.780	-0.000
		Dy+	0.000	-0.780	-0.000
		Dy-	0.000	-0.780	-0.000
		Wz+	0.000	-0.780	-0.000
		Wz-	0.000	-0.780	-0.000

Nudo	Hip		Dx	Dy	Wz
	2	Dx+	0.000	-0.178	-0.000
		Dx-	0.000	-0.178	-0.000
		Dy+	0.000	-0.178	-0.000
		Dy-	0.000	-0.178	-0.000
		Wz+	0.000	-0.178	-0.000
		Wz-	0.000	-0.178	-0.000
	3	Dx+	-0.000	-0.066	-0.000
		Dx-	-0.000	-0.066	-0.000
		Dy+	-0.000	-0.066	-0.000
		Dy-	-0.000	-0.066	-0.000
		Wz+	-0.000	-0.066	-0.000
		Wz-	-0.000	-0.066	-0.000
	4	Dx+	-0.000	-0.099	-0.000
		Dx-	-0.000	-0.099	-0.000
		Dy+	-0.000	-0.099	-0.000
		Dy-	-0.000	-0.099	-0.000
		Wz+	-0.000	-0.099	-0.000
		Wz-	-0.000	-0.099	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.000	0.000
		Dy-	0.000	-0.241	-0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
9	1	Dx+	0.001	-1.026	-0.186
		Dx-	0.001	-1.026	-0.186
		Dy+	0.001	-1.026	-0.186
		Dy-	0.001	-1.026	-0.186
		Wz+	0.001	-1.026	-0.186
		Wz-	0.001	-1.026	-0.186
	2	Dx+	0.003	-0.401	-0.170
		Dx-	0.003	-0.401	-0.170
		Dy+	0.003	-0.401	-0.170
		Dy-	0.003	-0.401	-0.170
		Wz+	0.003	-0.401	-0.170
		Wz-	0.003	-0.401	-0.170
	3	Dx+	-0.008	-0.028	0.031
		Dx-	-0.008	-0.028	0.031
		Dy+	-0.008	-0.028	0.031
		Dy-	-0.008	-0.028	0.031
		Wz+	-0.008	-0.028	0.031
		Wz-	-0.008	-0.028	0.031
	4	Dx+	-0.012	-0.042	0.048
		Dx-	-0.012	-0.042	0.048

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.012	-0.042	0.048
		Dy-	-0.012	-0.042	0.048
		Wz+	-0.012	-0.042	0.048
		Wz-	-0.012	-0.042	0.048
	5	Dx+	0.003	-0.470	-0.200
		Dx-	-0.004	-0.014	0.015
		Dy+	0.000	0.000	0.000
		Dy-	-0.000	-0.484	-0.184
		Wz+	-0.004	-0.014	0.015
		Wz-	0.003	-0.470	-0.200
10	1	Dx+	0.001	-1.290	-0.248
		Dx-	0.001	-1.290	-0.248
		Dy+	0.001	-1.290	-0.248
		Dy-	0.001	-1.290	-0.248
		Wz+	0.001	-1.290	-0.248
		Wz-	0.001	-1.290	-0.248
	2	Dx+	0.004	-0.644	-0.229
		Dx-	0.004	-0.644	-0.229
		Dy+	0.004	-0.644	-0.229
		Dy-	0.004	-0.644	-0.229
		Wz+	0.004	-0.644	-0.229
		Wz-	0.004	-0.644	-0.229
	3	Dx+	-0.012	0.021	0.051
		Dx-	-0.012	0.021	0.051
		Dy+	-0.012	0.021	0.051
		Dy-	-0.012	0.021	0.051
		Wz+	-0.012	0.021	0.051
		Wz-	-0.012	0.021	0.051
	4	Dx+	-0.018	0.032	0.077
		Dx-	-0.018	0.032	0.077
		Dy+	-0.018	0.032	0.077
		Dy-	-0.018	0.032	0.077
		Wz+	-0.018	0.032	0.077
		Wz-	-0.018	0.032	0.077
	5	Dx+	0.005	-0.755	-0.269
		Dx-	-0.005	0.010	0.025
		Dy+	-0.005	0.010	0.025
		Dy-	0.005	-0.755	-0.269
		Wz+	-0.005	0.010	0.025
		Wz-	0.005	-0.755	-0.269
11	1	Dx+	0.002	-1.638	-0.253
		Dx-	0.002	-1.638	-0.253
		Dy+	0.002	-1.638	-0.253
		Dy-	0.002	-1.638	-0.253

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.002	-1.638	-0.253
		Wz-	0.002	-1.638	-0.253
	2	Dx+	0.006	-0.973	-0.247
		Dx-	0.006	-0.973	-0.247
		Dy+	0.006	-0.973	-0.247
		Dy-	0.006	-0.973	-0.247
		Wz+	0.006	-0.973	-0.247
		Wz-	0.006	-0.973	-0.247
	3	Dx+	-0.016	0.107	0.077
		Dx-	-0.016	0.107	0.077
		Dy+	-0.016	0.107	0.077
		Dy-	-0.016	0.107	0.077
		Wz+	-0.016	0.107	0.077
		Wz-	-0.016	0.107	0.077
	4	Dx+	-0.025	0.161	0.116
		Dx-	-0.025	0.161	0.116
		Dy+	-0.025	0.161	0.116
		Dy-	-0.025	0.161	0.116
		Wz+	-0.025	0.161	0.116
		Wz-	-0.025	0.161	0.116
	5	Dx+	0.006	-1.141	-0.290
		Dx-	-0.007	0.052	0.037
		Dy+	-0.007	0.052	0.037
		Dy-	0.006	-1.141	-0.290
		Wz+	-0.007	0.052	0.037
		Wz-	0.006	-1.141	-0.290
12	1	Dx+	0.246	-1.648	-0.151
		Dx-	0.246	-1.648	-0.151
		Dy+	0.246	-1.648	-0.151
		Dy-	0.246	-1.648	-0.151
		Wz+	0.246	-1.648	-0.151
		Wz-	0.246	-1.648	-0.151
	2	Dx+	0.268	-0.981	-0.182
		Dx-	0.268	-0.981	-0.182
		Dy+	0.268	-0.981	-0.182
		Dy-	0.268	-0.981	-0.182
		Wz+	0.268	-0.981	-0.182
		Wz-	0.268	-0.981	-0.182
	3	Dx+	-0.124	0.107	0.083
		Dx-	-0.124	0.107	0.083
		Dy+	-0.124	0.107	0.083
		Dy-	-0.124	0.107	0.083
		Wz+	-0.124	0.107	0.083
		Wz-	-0.124	0.107	0.083

Nudo	Hip		Dx	Dy	Wz
	4	Dx+	-0.188	0.161	0.126
		Dx-	-0.188	0.161	0.126
		Dy+	-0.188	0.161	0.126
		Dy-	-0.188	0.161	0.126
		Wz+	-0.188	0.161	0.126
		Wz-	-0.188	0.161	0.126
	5	Dx+	0.314	-1.150	-0.213
		Dx-	-0.061	0.052	0.043
		Dy+	-0.061	0.052	0.043
		Dy-	0.314	-1.150	-0.213
		Wz+	-0.061	0.052	0.043
		Wz-	0.314	-1.150	-0.213
13	1	Dx+	0.363	-1.658	-0.005
		Dx-	0.363	-1.658	-0.005
		Dy+	0.363	-1.658	-0.005
		Dy-	0.363	-1.658	-0.005
		Wz+	0.363	-1.658	-0.005
		Wz-	0.363	-1.658	-0.005
	2	Dx+	0.431	-0.991	-0.030
		Dx-	0.431	-0.991	-0.030
		Dy+	0.431	-0.991	-0.030
		Dy-	0.431	-0.991	-0.030
		Wz+	0.431	-0.991	-0.030
		Wz-	0.431	-0.991	-0.030
	3	Dx+	-0.186	0.107	-0.005
		Dx-	-0.186	0.107	-0.005
		Dy+	-0.186	0.107	-0.005
		Dy-	-0.186	0.107	-0.005
		Wz+	-0.186	0.107	-0.005
		Wz-	-0.186	0.107	-0.005
	4	Dx+	-0.282	0.161	-0.008
		Dx-	-0.282	0.161	-0.008
		Dy+	-0.282	0.161	-0.008
		Dy-	-0.282	0.161	-0.008
		Wz+	-0.282	0.161	-0.008
		Wz-	-0.282	0.161	-0.008
	5	Dx+	0.505	-1.161	-0.035
		Dx-	-0.096	0.052	0.001
		Dy+	-0.096	0.052	0.001
		Dy-	0.505	-1.161	-0.035
		Wz+	0.000	0.000	0.000
		Wz-	0.505	-1.161	-0.035
14	1	Dx+	0.247	-1.667	0.168
		Dx-	0.247	-1.667	0.168

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.247	-1.667	0.168
		Dy-	0.247	-1.667	0.168
		Wz+	0.247	-1.667	0.168
		Wz-	0.247	-1.667	0.168
	2	Dx+	0.316	-1.000	0.202
		Dx-	0.316	-1.000	0.202
		Dy+	0.316	-1.000	0.202
		Dy-	0.316	-1.000	0.202
		Wz+	0.316	-1.000	0.202
		Wz-	0.316	-1.000	0.202
	3	Dx+	-0.112	0.107	-0.088
		Dx-	-0.112	0.107	-0.088
		Dy+	-0.112	0.107	-0.088
		Dy-	-0.112	0.107	-0.088
		Wz+	-0.112	0.107	-0.088
		Wz-	-0.112	0.107	-0.088
	4	Dx+	-0.170	0.161	-0.133
		Dx-	-0.170	0.161	-0.133
		Dy+	-0.170	0.161	-0.133
		Dy-	-0.170	0.161	-0.133
		Wz+	-0.170	0.161	-0.133
		Wz-	-0.170	0.161	-0.133
	5	Dx+	0.370	-1.173	0.237
		Dx-	-0.061	0.052	-0.046
		Dy+	-0.061	0.052	-0.046
		Dy-	0.370	-1.173	0.237
		Wz+	0.370	-1.173	0.237
		Wz-	-0.061	0.052	-0.046
15	1	Dx+	0.071	-1.671	0.275
		Dx-	0.071	-1.671	0.275
		Dy+	0.071	-1.671	0.275
		Dy-	0.071	-1.671	0.275
		Wz+	0.071	-1.671	0.275
		Wz-	0.071	-1.671	0.275
	2	Dx+	0.092	-1.006	0.363
		Dx-	0.092	-1.006	0.363
		Dy+	0.092	-1.006	0.363
		Dy-	0.092	-1.006	0.363
		Wz+	0.092	-1.006	0.363
		Wz-	0.092	-1.006	0.363
	3	Dx+	-0.035	0.107	-0.098
		Dx-	-0.035	0.107	-0.098
		Dy+	-0.035	0.107	-0.098
		Dy-	-0.035	0.107	-0.098

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.035	0.107	-0.098
		Wz-	-0.035	0.107	-0.098
	4	Dx+	-0.053	0.161	-0.149
		Dx-	-0.053	0.161	-0.149
		Dy+	-0.053	0.161	-0.149
		Dy-	-0.053	0.161	-0.149
		Wz+	-0.053	0.161	-0.149
		Wz-	-0.053	0.161	-0.149
	5	Dx+	0.107	-1.179	0.426
		Dx-	-0.020	0.052	-0.053
		Dy+	-0.020	0.052	-0.053
		Dy-	0.107	-1.179	0.426
		Wz+	0.107	-1.179	0.426
		Wz-	-0.020	0.052	-0.053
16	1	Dx+	-0.021	-1.978	-0.303
		Dx-	-0.021	-1.978	-0.303
		Dy+	-0.021	-1.978	-0.303
		Dy-	-0.021	-1.978	-0.303
		Wz+	-0.021	-1.978	-0.303
		Wz-	-0.021	-1.978	-0.303
	2	Dx+	-0.025	-1.417	-0.411
		Dx-	-0.025	-1.417	-0.411
		Dy+	-0.025	-1.417	-0.411
		Dy-	-0.025	-1.417	-0.411
		Wz+	-0.025	-1.417	-0.411
		Wz-	-0.025	-1.417	-0.411
	3	Dx+	0.017	0.207	0.094
		Dx-	0.017	0.207	0.094
		Dy+	0.017	0.207	0.094
		Dy-	0.017	0.207	0.094
		Wz+	0.017	0.207	0.094
		Wz-	0.017	0.207	0.094
	4	Dx+	0.025	0.314	0.142
		Dx-	0.025	0.314	0.142
		Dy+	0.025	0.314	0.142
		Dy-	0.025	0.314	0.142
		Wz+	0.025	0.314	0.142
		Wz-	0.025	0.314	0.142
	5	Dx+	0.010	0.107	0.051
		Dx-	-0.029	-1.661	-0.482
		Dy+	0.010	0.107	0.051
		Dy-	-0.029	-1.661	-0.482
		Wz+	0.010	0.107	0.051
		Wz-	-0.029	-1.661	-0.482

Nudo	Hip		Dx	Dy	Wz
17	1	Dx+	0.002	-2.070	-0.309
		Dx-	0.002	-2.070	-0.309
		Dy+	0.002	-2.070	-0.309
		Dy-	0.002	-2.070	-0.309
		Wz+	0.002	-2.070	-0.309
		Wz-	0.002	-2.070	-0.309
	2	Dx+	0.006	-1.543	-0.423
		Dx-	0.006	-1.543	-0.423
		Dy+	0.006	-1.543	-0.423
		Dy-	0.006	-1.543	-0.423
		Wz+	0.006	-1.543	-0.423
		Wz-	0.006	-1.543	-0.423
	3	Dx+	0.009	0.235	0.089
		Dx-	0.009	0.235	0.089
		Dy+	0.009	0.235	0.089
		Dy-	0.009	0.235	0.089
		Wz+	0.009	0.235	0.089
		Wz-	0.009	0.235	0.089
	4	Dx+	0.014	0.356	0.135
		Dx-	0.014	0.356	0.135
		Dy+	0.014	0.356	0.135
		Dy-	0.014	0.356	0.135
		Wz+	0.014	0.356	0.135
		Wz-	0.014	0.356	0.135
	5	Dx+	0.013	-1.687	-0.448
		Dx-	0.000	0.000	0.000
		Dy+	0.006	0.122	0.048
		Dy-	0.007	-1.808	-0.496
		Wz+	0.006	0.122	0.048
		Wz-	0.007	-1.808	-0.496
18	1	Dx+	0.000	-2.817	0.000
		Dx-	0.000	-2.817	0.000
		Dy+	0.000	-2.817	0.000
		Dy-	0.000	-2.817	0.000
		Wz+	0.000	-2.817	0.000
		Wz-	0.000	-2.817	0.000
	2	Dx+	0.000	-2.598	0.000
		Dx-	0.000	-2.598	0.000
		Dy+	0.000	-2.598	0.000
		Dy-	0.000	-2.598	0.000
		Wz+	0.000	-2.598	0.000
		Wz-	0.000	-2.598	0.000
	3	Dx+	0.000	0.401	-0.000
		Dx-	0.000	0.401	-0.000

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.000	0.401	-0.000
		Dy-	0.000	0.401	-0.000
		Wz+	0.000	0.401	-0.000
		Wz-	0.000	0.401	-0.000
	4	Dx+	0.000	0.608	-0.000
		Dx-	0.000	0.608	-0.000
		Dy+	0.000	0.608	-0.000
		Dy-	0.000	0.608	-0.000
		Wz+	0.000	0.608	-0.000
		Wz-	0.000	0.608	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.212	-0.000
		Dy-	0.000	-3.045	0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
19	1	Dx+	-0.002	-2.070	0.309
		Dx-	-0.002	-2.070	0.309
		Dy+	-0.002	-2.070	0.309
		Dy-	-0.002	-2.070	0.309
		Wz+	-0.002	-2.070	0.309
		Wz-	-0.002	-2.070	0.309
	2	Dx+	-0.006	-1.543	0.423
		Dx-	-0.006	-1.543	0.423
		Dy+	-0.006	-1.543	0.423
		Dy-	-0.006	-1.543	0.423
		Wz+	-0.006	-1.543	0.423
		Wz-	-0.006	-1.543	0.423
	3	Dx+	-0.009	0.235	-0.089
		Dx-	-0.009	0.235	-0.089
		Dy+	-0.009	0.235	-0.089
		Dy-	-0.009	0.235	-0.089
		Wz+	-0.009	0.235	-0.089
		Wz-	-0.009	0.235	-0.089
	4	Dx+	-0.014	0.356	-0.135
		Dx-	-0.014	0.356	-0.135
		Dy+	-0.014	0.356	-0.135
		Dy-	-0.014	0.356	-0.135
		Wz+	-0.014	0.356	-0.135
		Wz-	-0.014	0.356	-0.135
	5	Dx+	0.000	0.000	0.000
		Dx-	-0.013	-1.687	0.448
		Dy+	-0.006	0.122	-0.048
		Dy-	-0.007	-1.808	0.496

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.007	-1.808	0.496
		Wz-	-0.006	0.122	-0.048
20	1	Dx+	0.021	-1.978	0.303
		Dx-	0.021	-1.978	0.303
		Dy+	0.021	-1.978	0.303
		Dy-	0.021	-1.978	0.303
		Wz+	0.021	-1.978	0.303
		Wz-	0.021	-1.978	0.303
	2	Dx+	0.025	-1.417	0.411
		Dx-	0.025	-1.417	0.411
		Dy+	0.025	-1.417	0.411
		Dy-	0.025	-1.417	0.411
		Wz+	0.025	-1.417	0.411
		Wz-	0.025	-1.417	0.411
	3	Dx+	-0.017	0.207	-0.094
		Dx-	-0.017	0.207	-0.094
		Dy+	-0.017	0.207	-0.094
		Dy-	-0.017	0.207	-0.094
		Wz+	-0.017	0.207	-0.094
		Wz-	-0.017	0.207	-0.094
	4	Dx+	-0.025	0.314	-0.142
		Dx-	-0.025	0.314	-0.142
		Dy+	-0.025	0.314	-0.142
		Dy-	-0.025	0.314	-0.142
		Wz+	-0.025	0.314	-0.142
		Wz-	-0.025	0.314	-0.142
	5	Dx+	0.029	-1.661	0.482
		Dx-	-0.010	0.107	-0.051
		Dy+	-0.010	0.107	-0.051
		Dy-	0.029	-1.661	0.482
		Wz+	0.029	-1.661	0.482
		Wz-	-0.010	0.107	-0.051

ESFUERZOS PESIMOS

Barra	Extremo	Comb		N	Q	M
1	Dorsal	4	N+	-21.49	8.50	28.15
		1	N-	-64.44	21.20	85.02
		5	Q+	-64.44	30.58	86.12
		4	Q-	-21.49	8.50	28.15
		5	M+	-64.44	30.58	86.12
		4	M-	-21.49	8.50	28.15
1	Frontal	4	N+	-22.75	7.42	21.78
		1	N-	-66.68	19.27	68.84
		5	Q+	-66.68	25.74	63.60
		4	Q-	-22.75	7.42	21.78
		1	M+	-66.68	19.27	68.84
		8	M-	-22.75	12.47	17.58
2	Dorsal	4	N+	-22.75	7.42	21.78
		1	N-	-66.68	19.27	68.84
		5	Q+	-66.68	25.74	63.60
		4	Q-	-22.75	7.42	21.78
		1	M+	-66.68	19.27	68.84
		8	M-	-22.75	12.47	17.58
2	Frontal	4	N+	-25.03	4.32	13.27
		1	N-	-70.74	13.77	44.88
		5	Q+	-70.74	14.16	39.88
		4	Q-	-25.03	4.07	8.23
		1	M+	-70.74	13.77	44.88
		8	M-	-25.03	4.30	5.42
3	Dorsal	4	N+	-25.03	4.32	13.27
		1	N-	-70.74	13.77	44.88
		5	Q+	-70.74	14.16	39.88
		4	Q-	-25.03	4.07	8.23
		1	M+	-70.74	13.77	44.88
		8	M-	-25.03	4.30	5.42
3	Frontal	4	N+	-27.32	-0.09	10.20
		1	N-	-74.80	5.92	30.60
		3	Q+	-65.01	6.75	28.20
		6	Q-	-37.11	-8.28	7.79
		1	M+	-74.80	5.92	30.60
		8	M-	-27.32	-5.86	6.55
4	Dorsal	4	N+	-27.32	-0.09	10.20
		1	N-	-74.80	5.92	30.60
		3	Q+	-65.01	6.75	28.20
		6	Q-	-37.11	-8.28	7.79

Barra	Extremo	Comb		N	Q	M
		1	M+	-74.80	5.92	30.60
		8	M-	-27.32	-5.86	6.55
4	Frontal	4	N+	-29.21	-4.73	13.09
		1	N-	-78.16	-2.32	28.44
		3	Q+	-68.37	2.11	22.89
		6	Q-	-39.00	-23.65	26.95
		5	M+	-78.16	-16.82	36.74
		4	M-	-29.21	-4.73	13.09
5	Dorsal	3	N+	2.11	41.59	22.89
		6	N-	-23.65	25.22	26.95
		5	Q+	-16.82	49.15	36.74
		4	Q-	-4.73	17.66	13.09
		5	M+	-16.82	49.15	36.74
		4	M-	-4.73	17.66	13.09
5	Frontal	3	N+	2.11	46.99	-36.88
		6	N-	-23.65	28.25	-9.14
		5	Q+	-16.82	54.55	-33.23
		4	Q-	-4.73	20.69	-12.79
		8	M+	-15.77	21.37	-7.26
		1	M-	-2.32	53.67	-40.35
6	Dorsal	3	N+	2.11	22.55	-36.88
		6	N-	-23.65	14.71	-9.14
		5	Q+	-16.82	27.55	-33.23
		4	Q-	-4.73	9.71	-12.79
		8	M+	-15.77	10.56	-7.26
		1	M-	-2.32	26.45	-40.35
6	Frontal	3	N+	2.11	27.35	-66.83
		6	N-	-23.65	17.41	-28.42
		5	Q+	-16.82	32.35	-69.18
		4	Q-	-4.73	12.42	-26.07
		8	M+	-15.77	13.26	-21.56
		1	M-	-2.32	31.26	-74.99
7	Dorsal	3	N+	2.11	1.28	-66.83
		6	N-	-23.65	1.89	-28.42
		6	Q+	-17.57	4.02	-57.06
		3	Q-	-3.98	-0.85	-38.19
		8	M+	-15.77	0.65	-21.56
		1	M-	-2.32	2.36	-74.99
7	Frontal	3	N+	2.11	11.48	-83.09
		6	N-	-23.65	7.63	-40.56
		5	Q+	-16.82	13.24	-89.92
		4	Q-	-4.73	5.87	-33.72
		8	M+	-15.77	6.39	-30.55
		1	M-	-2.32	12.56	-94.02

Barra	Extremo	Comb		N	Q	M
8	Dorsal	3	N+	2.11	-11.48	-83.09
		6	N-	-23.65	-7.63	-40.56
		4	Q+	-4.73	-5.87	-33.72
		5	Q-	-16.82	-13.24	-89.92
		8	M+	-15.77	-6.39	-30.55
		1	M-	-2.32	-12.56	-94.02
8	Frontal	3	N+	2.11	-1.28	-66.83
		6	N-	-23.65	-1.89	-28.42
		3	Q+	-3.98	0.85	-38.19
		6	Q-	-17.57	-4.02	-57.06
		8	M+	-15.77	-0.65	-21.56
		1	M-	-2.32	-2.36	-74.99
9	Dorsal	3	N+	2.11	-27.35	-66.83
		6	N-	-23.65	-17.41	-28.42
		4	Q+	-4.73	-12.42	-26.07
		5	Q-	-16.82	-32.35	-69.18
		8	M+	-15.77	-13.26	-21.56
		1	M-	-2.32	-31.26	-74.99
9	Frontal	3	N+	2.11	-22.55	-36.88
		6	N-	-23.65	-14.71	-9.14
		4	Q+	-4.73	-9.71	-12.79
		5	Q-	-16.82	-27.55	-33.23
		8	M+	-15.77	-10.56	-7.26
		1	M-	-2.32	-26.45	-40.35
10	Dorsal	3	N+	2.11	-46.99	-36.88
		6	N-	-23.65	-28.25	-9.14
		4	Q+	-4.73	-20.69	-12.79
		5	Q-	-16.82	-54.55	-33.23
		8	M+	-15.77	-21.37	-7.26
		1	M-	-2.32	-53.67	-40.35
10	Frontal	3	N+	2.11	-41.59	22.89
		6	N-	-23.65	-25.22	26.95
		4	Q+	-4.73	-17.66	13.09
		5	Q-	-16.82	-49.15	36.74
		5	M+	-16.82	-49.15	36.74
		4	M-	-4.73	-17.66	13.09
11	Dorsal	4	N+	-29.21	4.73	13.09
		1	N-	-78.16	2.32	28.44
		6	Q+	-39.00	23.65	26.95
		3	Q-	-68.37	-2.11	22.89
		5	M+	-78.16	16.82	36.74
		4	M-	-29.21	4.73	13.09
11	Frontal	4	N+	-27.32	0.09	10.20
		1	N-	-74.80	-5.92	30.60

Barra	Extremo	Comb		N	Q	M
		6	Q+	-37.11	8.28	7.79
		3	Q-	-65.01	-6.75	28.20
		1	M+	-74.80	-5.92	30.60
		8	M-	-27.32	5.86	6.55
12	Dorsal	4	N+	-27.32	0.09	10.20
		1	N-	-74.80	-5.92	30.60
		6	Q+	-37.11	8.28	7.79
		3	Q-	-65.01	-6.75	28.20
		1	M+	-74.80	-5.92	30.60
		8	M-	-27.32	5.86	6.55
12	Frontal	4	N+	-25.03	-4.32	13.27
		1	N-	-70.74	-13.77	44.88
		4	Q+	-25.03	-4.07	8.23
		5	Q-	-70.74	-14.16	39.88
		1	M+	-70.74	-13.77	44.88
		8	M-	-25.03	-4.30	5.42
13	Dorsal	4	N+	-25.03	-4.32	13.27
		1	N-	-70.74	-13.77	44.88
		4	Q+	-25.03	-4.07	8.23
		5	Q-	-70.74	-14.16	39.88
		1	M+	-70.74	-13.77	44.88
		8	M-	-25.03	-4.30	5.42
13	Frontal	4	N+	-22.75	-7.42	21.78
		1	N-	-66.68	-19.27	68.84
		4	Q+	-22.75	-7.42	21.78
		5	Q-	-66.68	-25.74	63.60
		1	M+	-66.68	-19.27	68.84
		8	M-	-22.75	-12.47	17.58
14	Dorsal	4	N+	-22.75	-7.42	21.78
		1	N-	-66.68	-19.27	68.84
		4	Q+	-22.75	-7.42	21.78
		5	Q-	-66.68	-25.74	63.60
		1	M+	-66.68	-19.27	68.84
		8	M-	-22.75	-12.47	17.58
14	Frontal	4	N+	-21.49	-8.50	28.15
		1	N-	-64.44	-21.20	85.02
		4	Q+	-21.49	-8.50	28.15
		5	Q-	-64.44	-30.58	86.12
		5	M+	-64.44	-30.58	86.12
		4	M-	-21.49	-8.50	28.15
15	Dorsal	4	N+	-11.92	-19.80	-28.15
		5	N-	-40.76	-58.53	-86.12
		8	Q+	-19.35	-18.56	-28.98
		1	Q-	-31.50	-60.08	-85.02

Barra	Extremo	Comb		N	Q	M
		4	M+	-11.92	-19.80	-28.15
		5	M-	-40.76	-58.53	-86.12
15	Frontal	4	N+	-11.09	-14.80	-9.74
		5	N-	-38.38	-44.27	-31.43
		8	Q+	-18.52	-13.56	-11.89
		1	Q-	-29.13	-45.81	-28.69
		4	M+	-11.09	-14.80	-9.74
		5	M-	-38.38	-44.27	-31.43
16	Dorsal	4	N+	-12.23	-13.87	-9.74
		5	N-	-41.79	-41.07	-31.43
		8	Q+	-19.54	-12.04	-11.89
		1	Q-	-32.69	-43.34	-28.69
		4	M+	-12.23	-13.87	-9.74
		5	M-	-41.79	-41.07	-31.43
16	Frontal	4	N+	-11.92	-12.61	-5.64
		5	N-	-40.85	-37.29	-19.30
		8	Q+	-19.22	-10.78	-8.35
		1	Q-	-31.74	-39.56	-15.85
		4	M+	-11.92	-12.61	-5.64
		5	M-	-40.85	-37.29	-19.30
17	Dorsal	4	N+	-8.50	-15.12	-5.64
		5	N-	-30.58	-45.08	-19.30
		4	Q+	-8.50	-15.12	-5.64
		1	Q-	-21.20	-45.08	-15.85
		4	M+	-8.50	-15.12	-5.64
		5	M-	-30.58	-46.08	-19.30
17	Frontal	4	N+	-8.50	0.00	22.71
		5	N-	-30.58	0.00	67.10
		5	Q+	-19.35	0.00	38.70
		4	Q-	-8.50	0.00	22.71
		1	M+	-21.20	0.00	70.55
		8	M-	-16.04	0.00	20.00
18	Dorsal	4	N+	-8.50	0.00	22.71
		5	N-	-30.58	0.00	67.10
		5	Q+	-19.35	0.00	38.70
		4	Q-	-8.50	0.00	22.71
		1	M+	-21.20	0.00	70.55
		8	M-	-16.04	0.00	20.00
18	Frontal	4	N+	-8.50	15.12	-5.64
		5	N-	-30.58	46.08	-19.30
		1	Q+	-21.20	46.08	-15.85
		4	Q-	-8.50	15.12	-5.64
		4	M+	-8.50	15.12	-5.64
		5	M-	-30.58	46.08	-19.30

Barra	Extremo	Comb		N	Q	M
19	Dorsal	4	N+	-11.92	12.61	-5.64
		5	N-	-40.85	37.29	-19.30
		1	Q+	-31.74	39.56	-15.85
		8	Q-	-19.22	10.78	-8.35
		4	M+	-11.92	12.61	-5.64
		5	M-	-40.85	37.29	-19.30
19	Frontal	4	N+	-12.23	13.87	-9.74
		5	N-	-41.79	41.07	-31.43
		1	Q+	-32.69	43.34	-28.69
		8	Q-	-19.54	12.04	-11.89
		4	M+	-12.23	13.87	-9.74
		5	M-	-41.79	41.07	-31.43
20	Dorsal	4	N+	-11.09	14.80	-9.74
		5	N-	-38.38	44.27	-31.43
		1	Q+	-29.13	45.81	-28.69
		8	Q-	-18.52	13.56	-11.89
		4	M+	-11.09	14.80	-9.74
		5	M-	-38.38	44.27	-31.43
20	Frontal	4	N+	-11.92	19.80	-28.15
		5	N-	-40.76	58.53	-86.12
		1	Q+	-31.50	60.08	-85.02
		8	Q-	-19.35	18.56	-28.98
		4	M+	-11.92	19.80	-28.15
		5	M-	-40.76	58.53	-86.12

ARMADURA DEL DINTEL

NUDO	Nd	Md	As c.i.	As c.s.
15	-11.92	-28.15	0.00	4.00
	-40.76	-86.12	0.00	12.09
	-11.92	-28.15	0.00	4.00
	-40.76	-86.12	0.00	12.09
16	-12.23	-9.74	0.00	1.23
	-41.79	-31.43	0.00	3.90
	-12.23	-9.74	0.00	1.23
	-41.79	-31.43	0.00	3.90
17	-8.50	-5.64	0.00	0.87
	-30.58	-19.30	0.00	2.96
	-8.50	-5.64	0.00	0.87
	-30.58	-19.30	0.00	2.96
18	-8.50	22.71	6.50	0.00
	-30.58	67.10	19.50	0.00
	-21.20	70.55	21.68	0.00
	-16.04	20.00	4.77	0.00

ARMADURA DE SOLERA

NUDO	Nd	Md	As c.i.	As c.s.
5	2.11	22.89	4.96	0.00
	-23.65	26.95	3.52	0.00
	-16.82	36.74	6.53	0.00
	-4.73	13.09	2.44	0.00
6	2.11	-36.88	0.00	8.18
	-23.65	-9.14	0.00	0.00
	-15.77	-7.26	0.00	0.00
	-2.32	-40.35	0.00	8.96
7	2.11	-66.83	0.00	15.16
	-23.65	-28.42	0.00	3.86
	-15.77	-21.56	0.00	3.14
	-2.32	-74.99	0.00	17.07
8	2.11	-83.09	0.00	19.01
	-23.65	-40.56	0.00	6.67
	-15.77	-30.55	0.00	5.22
	-2.32	-94.02	0.00	21.60

ARMADURA DE HASTIAL

NUDO	Nd	Md	As c.i.	As c.e.
1	-21.49	28.15	0.00	6.94
	-64.44	85.02	0.00	23.13
	-64.44	86.12	0.00	23.55
	-21.49	28.15	0.00	6.94
2	-22.75	21.78	0.00	4.66
	-66.68	68.84	0.00	16.81
	-66.68	68.84	0.00	16.81
	-22.75	17.58	0.00	3.25
3	-25.03	13.27	0.00	1.56
	-70.74	44.88	0.00	7.66
	-70.74	44.88	0.00	7.66
	-25.03	5.42	0.00	0.00
4	-27.32	10.20	0.00	0.29
	-74.80	30.60	0.00	2.19
	-74.80	30.60	0.00	2.19
	-27.32	6.55	0.00	0.00
5	-29.21	13.09	0.00	1.05
	-78.16	28.44	0.00	1.09
	-78.16	36.74	0.00	4.01
	-29.21	13.09	0.00	1.05

RESUMEN DE ARMADURAS

ARMADURA DEL DINTEL

NUDO	As c.i.	As c.s.
15	0.00	12.09
16	0.00	3.90
17	0.00	2.96
18	21.68	0.00

Cuantía mínima geométrica: 5.25 cm²/m

ARMADURA DE SOLERA

NUDO	As c.i.	As c.s.
5	6.53	0.00
6	0.00	8.96
7	0.00	17.07
8	0.00	21.60

Cuantía mínima geométrica: 7.50 cm²/m

ARMADURA DE HASTIAL

NUDO	As c.i.	As c.e.
1	0.00	23.55
2	0.00	16.81
3	0.00	7.66
4	0.00	2.19
5	0.00	4.01

Cuantía mínima geométrica vertical: 3.15 cm²/m
Cuantía mínima geométrica horizontal: 5.60 cm²/m

COMPROBACION A CORTANTE

DINTEL

NUDO	Vd max.	Vcu	As
16	43.34	54.85	0.00
17	45.08	45.16	0.00
18	0.00	45.16	0.00

SOLERA

Vcu= 64.52 T/m.

NUDO	Vd max.	As
6	41.05	0.00
7	18.19	0.00
8	3.69	0.00

HASTIAL

Vcu= 42.84 T/m.

NUDO	Vd max.	As
2	25.74	0.00
3	14.16	0.00
4	8.28	0.00

COMPROBACION DE TENSIONES SOBRE EL TERRENO

Tensión transmitida al terreno en nudo 5: 1.82 kp/cm²

Estructura: P.I. Nº 2 **Cálculo:** ALETAS. H=5.73 M.

DEFINICION GEOMETRICA

Altura total	5.73	m
Ancho superior	0.60	m
Ancho inferior	0.60	m
Longitud zarpa delantera	1.00	m
Longitud zarpa trasera	2.70	m
Canto zapata	1.00	m
Canto tacón cotra deslizamiento.....	0.00	m

ACCIONES ACTUANTES

Altura de tierras	0.00	m
Altura tierras en intradós	0.50	m
Sobrecarga en el trasdós	0.00	t/m²

DATOS TERRENO

Densidad	1.90	t/m³
Coeficiente empuje activo	0.44	
¿Considera empuje pasivo? (s/n)	n	
Angulo de rozamiento	30	°

OTROS DATOS

Recubrimiento	5	cm
fck	250	Kp/cm²
fyk	5100	Kp/cm²
Gamma C	1.5	
Gamma S	1.15	
Gamma F desf.....	1.6	
Gamma F fav.....	0.9	
Canto útil muro	55	cm
Canto útil zapata	95	cm
Densidad hormigón	2.5	t/m³

Muro:

A flex =	17.22	cm²/m.l.
A cort =	0.00	cm²/m.l.

Zapata (puntera):

A flex =	3.46	cm²/m.l.
Cumple cortante?	SI	

Zapata (talón):

A flex =	10.28	cm²/m.l.
Cumple cortante?	SI	

DESLIZA?	1.52	NO
VUELCA?	2.85	NO
SIGM_BAR	15.66	t/m²
SIGM_MAX	20.64	t/m²
SIGM_MIN	2.47	t/m²

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 8.60 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 26.21 mt
H = 13.72 t

RESUMEN:

HIP	N	M	H
P.P.	8.60	0.00	0.00
TIERRAS	0.00	26.21	13.72

Estructura: P.I. Nº 2 **Cálculo:** ALETAS. H=5.73 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	8.60	26.21	13.72

Tomando los coeficientes de seguridad:

Gamma DESF	1.6
Gamma FAV	0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	7.74	41.94	5.67	17.2
1.2.	13.75	41.94	3.30	16.6

Armadura a disponer:

A = 17.2 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 21.96 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 35.50 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 2 **Cálculo:** ALETAS. H=5.73 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 19.35 t
M = 7.31 mt
H = 0.00 t

Debido a las tierras:

N = 30.34 t
M = 20.68 mt
H = 18.93 t

RESUMEN:

HIP	N	M	H
P.P.	19.35	7.31	0.00
TIERRAS	30.34	20.68	18.93

SEGURIDAD AL DESLIZAMIENTO:

N = 49.69 t
H = 18.93 t GAMMA = 1.52 O.K.
mu = 0.58
Epasivo= 0.00 t

SEGURIDAD AL VUELCO:

Mvolc = 42.47 mt
Mest = 121.00 mt GAMMA = 2.85 O.K.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	49.69	27.99	18.93

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	20.64	2.47

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	15.66

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -43.41 mt

Anec = 10.28 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 14.90 mt

Anec = 3.46 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 20.21 t
Vlim = 61.32 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 13.51 t
Vlim = 122.64 t

Vd < Vlim ? O.K.

3. RESUMEN CONTROL CALIDAD

ASAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO: P.I. 2

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFICA.	TIPO	CONO ABRAMS	CONSIS-TENCIA	N°	RES. MEDIA	N°	RES. MEDIA	N°	RES. MEDIA					
1	1	24/05/99	Losa inf m.i.	03030203	H-250	8	Blanda	2	181	3	277	1	291	100	21/6/99	II/AL 42,5 R	228	
1	2	24/05/99	Losa inf m.i.	03030203	H-250	14	Fluida	2	182	3	253	1	277	100	21/6/99	II/AL 42,5 R	228	
2	3	24/05/99	Zap aletas 1y2	03030203	H-250	9	Blanda	2	184	3	254	1	260	75	28/6/99	II/AL 42,5 R	218	
3	4	25/05/99	Losa inf m.i.	03030203	H-250	7	Blanda	2	203	3	261	1	274	90	2/7/99	II/AL 42,5 R	210	
4	5	25/05/99	Losa inf m.d.	03030203	H-250	10	Fluida	2	220	3	253	1	310	84	29/6/99	II/AL 42,5 R	228	
4	6	25/05/99	Losa inf m.d.	03030203	H-250	10	Fluida	2	215	3	258	1	294	84	29/6/99	II/AL 42,5 R	228	
2	7	27/05/99	Zap aletas 3y4	03030203	H-250	7	Blanda	2	179	3	242	1	289	72	28/6/99	II/AL 42,5 R	218	
3	8	31/05/99	Alzado 1i y 2i	03030203	H-250	10	Fluida	2	170	3	226	1	256	90	2/7/99	II/AL 42,5 R	210	
3	17	04/06/99	Alzado 1d y 2d	03030203	H-250	10	Fluida	2	208	3	254	1	262	90	2/7/99	II/AL 42,5 R	210	
12	23	16/06/99	Losa sup m,i	03030203	H-250	10	Fluida	2	167	3	228	1	246	100	19/7/99	II/AL 42,5 R	205	
16	25	16/06/99	Aleta 1 y 2	03030203	H-250	7	Blanda	2	228	3	264	1	273	60	22/7/99	II/AL 42,5 R	231	
12	31	21/06/99	Losa sup m,d	03030203	H-250	10	Fluida	2	190	3	243	1	274	100	19/7/99	II/AL 42,5 R	205	
16	36	24/06/99	Aleta 3 y 4	03030203	H-250	8	Blanda	2	196	3	257	1	276	60	22/7/99	II/AL 42,5 R	231	

FECHA:

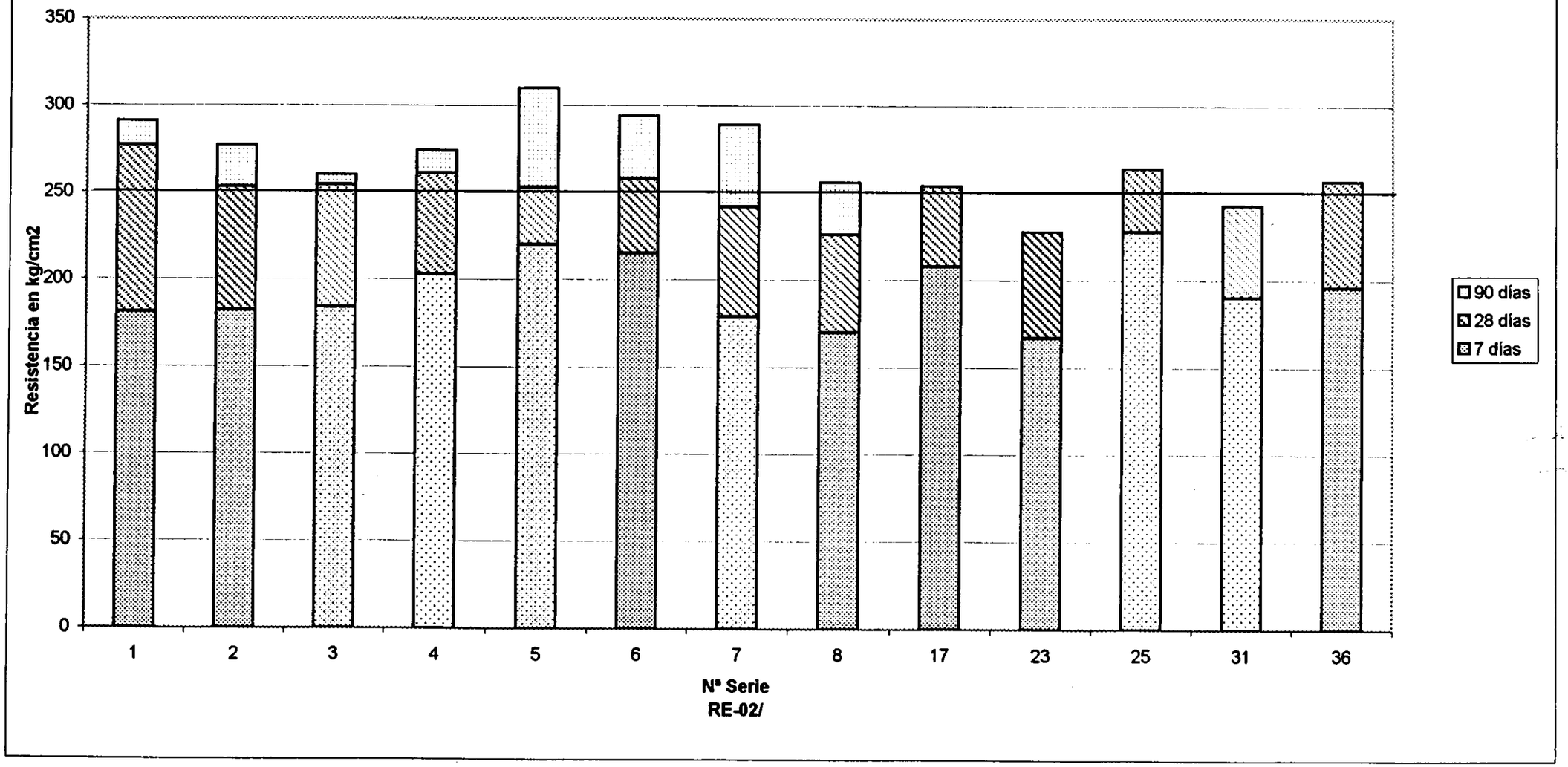
FIRMA:

NOMBRE: Ana Mª Martín Herrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

Resistencia del hormigón
P.I. 2



PASO INFERIOR 3

PASO INFERIOR 3

ÍNDICE

1. DESCRIPCIÓN Y DEFINICIÓN
2. CÁLCULOS
3. RESUMEN DEL CONTROL DE CALIDAD

1. DESCRIPCIÓN Y DEFINICIÓN

1. INTRODUCCIÓN Y OBJETO

Se redacta el presente documento, con el fin de justificar el cálculo realizado para el paso inferior nº 3, en el P.K. 311+076, del Proyecto Constructivo: "*Línea de Alta Velocidad. Madrid – Barcelona - Frontera Francesa. Tramo: Madrid – Zaragoza. Subtramo III. Plataforma*".

Dicho paso inferior consiste en un marco, que reduce su altura interior de 6,28 m a 6,00 m y el espesor de la losa superior de 0,90 m a 0,80 m, respecto al proyecto original.

2. BASES DE CÁLCULO

2.1. INSTRUCCIONES Y NORMAS APLICADAS

Las Instrucciones y Normas aplicadas han sido las siguientes:

- "Instrucción para el proyecto y la ejecución de obras de hormigón en masa o armado" de 28 de Junio de 1991 (EH-91).

- "Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril", de 25 de Junio de 1975.

Los niveles de calidad y controles adoptados han sido los siguientes:

- Hormigones	Control normal	$\gamma_c = 1,50$
- Acero de armar	Control normal	$\gamma_s = 1,15$

En cuanto a la ejecución, el tipo de control será normal y el coeficiente de mayoración de acciones de 1,6 en todos los elementos estructurales.

2.2. CARACTERÍSTICAS DE LOS MATERIALES

- **Hormigones**

En Marco y muros	$f_{ck} = 250$ kg/cm^2

- **Acero de armar**

En todos los elementos	$f_{yk} > 5.100$ kg/cm^2

2.3. ACCIONES A CONSIDERAR

Los pesos y acciones considerados son los siguientes:

- **Hormigones**

. Peso propio 2,500 t/m^3

- **Cargas permanentes**

. Imposta + acera + barandilla: 0,575 t/m
. Conducto cableado: 0,300 t/m
. Traviesa por via: 0,520 t/m
. Carril por via: 0,120 t/m
. Hormigón de recrecido: 0,617 t/m

. Balasto: (0,20 + 0,782) x 0,50 x 0,90 = 0,442
(0,782 + 0,772) x 0,50 x 0,505 = 0,392
(0,552 + 0,500) x 0,50 x 2,625 = 1,381
(0,720 + 0,700) x 0,50 x 0,9375 = 0,666
Σ = 2,881 m^2

- **Sobrecarga**

Se considera la sobrecarga de la "Instrucción de acciones" consistente en una sobrecarga uniforme repartida de 12 t/m extendida en una longitud de 15 o 30 metros, seguidas de otras sobrecargas uniformemente repartidas de 10 y 1 t/m.

- **Empuje de tierras**

. Peso tierras 2,00 t/m^3
. Coeficiente de empuje $\lambda = 0,50$
. Sobrecarga en trasdós 3,00 t/m^2

- **Sismo**

La obra se encuentra situada en una zona donde la aceleración sísmica básica es igual a 0,4g, por lo que no es necesaria la consideración de las acciones sísmicas.

- **Impacto**

Para velocidades inferiores o iguales a 200 km/h se tiene en cuenta las prescripciones del Ministerio de Fomento "Instrucción relativa a las acciones a considerar en el proyecto de puentes de ferrocarril".

$$I = 65\,\frac{\mu}{1-\mu+\mu^2}$$

v = 200 km/h = 55,56 m/s

masa:

p.p. losa = 0,50 x 2,50 x 14,00 = 17,50 t/m

c. permanentes = 2 x (0,575 + 0,30 + 0,52 + 0,12 + 0,248 + 4,61 + 0,188) =

= 13,122 t/m

Tren = 12,00 t/m

$$m = \frac{17,50 + 13,122 + 2 \times 12,00}{9,80} = 5,57$$

L = 5,50 m

$E = 10 \times 19000 \times \sqrt{250} = 3 \times 10^6$ t/m^2

Inercia:

$$I = \frac{1}{12}\,14,00 \times 0,50^3 = 0,145833\ m^4$$

$$f = 1,57\sqrt{\frac{E \times I}{m \times L^4}} = 1,57\sqrt{\frac{3 \times 10^6 \times 0,145833}{5,57 \times 5,50^4}} = 14,55$$

T = 0,069

$$\mu = \frac{v\ T}{2L}$$

$$\mu = \frac{55{,}56 \times 0{,}069}{2 \times 5{,}50} = 0{,}349$$

$$I = 65\ \frac{0{,}349}{1 - 0{,}349 + 0{,}349^2} = 29{,}35$$

por tanto el coeficiente de impacto será 1,29

3. PÓRTICO

3.1. GENERALIDADES

El cálculo del pórtico, se resuelve mediante el programa de cálculo electrónico "STAAD".

3.2. BASES E HIPÓTESIS DE CÁLCULO

Se proyecta con la hipótesis que tiene en cuenta la sobrecarga del tren tipo B de la instrucción española IPF-75 ya que es la hipótesis más pésima comparándola con los trenes de los modelos UIC tipos 71 y SW/2.

Las características de los materiales utilizados, así como los coeficientes de mayoración de esfuerzos y de minoración de resistencias han sido definidos anteriormente.

Así mismo, también al inicio se definen las características del terreno circundante.

La determinación de los valores de las cargas actuantes se realiza como sigue:

- Las cargas verticales debidas a pesos propios y cargas muertas, se determinan en función del espesor y densidad de los elementos, rellenos, etc.., considerados.

- Los valores de los empujes horizontales se determinan a partir del coeficiente de empuje al reposo.

  $E_h = \gamma \cdot K_r \cdot H$, siendo:

  E_h = empuje a la altura H (t/m)
  γ = densidad (t/m^3)
  K_r = coef. empuje al reposo = 1 - sen ϕ
  ϕ = ángulo rozamiento interno tierras
  H = altura considerada (m)

- Los valores verticales de sobrecargas son:

  Tren = 12,00 t/m

El estudio de esfuerzos se realiza para una franja de anchura 1,00 m.

La determinación de las cargas que afectan a la citada banda son: en el caso de cargas repartidas el valor de la carga por el ancho de la banda; en el caso de cargas puntuales, la fracción que actúa, se ha calculado a partir del ancho de banda eficaz correspondiente, para un valor K = 2/3, de acuerdo con lo especificado en la Instrucción EH-91.

Las hipótesis consideradas para el cálculo son las que a continuación se relacionan:

H-1) Peso de la estructura + Cargas permanentes

H-2) Empuje de tierras (sin sobrecarga)

H-3) Empuje de tierras (en servicio)

H-4 Empuje lateral para s_c = 3 t/m^2 (lado izq.)

H-5) Empuje lateral para s_c = 3 t/m^2 (lado dcho.)

H-6) Empuje lateral para un desnivel de relleno entre hastiales de 2,0 m y una sobrecarga por compactación de 2 t/m^2.

H-7) Sobrecarga de tren

H-8 a H-13). Distintas combinaciones posibles de las siete hipótesis simples.

A partir de los resultados obtenidos para las distintas combinaciones citadas, se determina la armadura necesaria en cada elemento, para los esfuerzos pésimos.

El armado de las distintas secciones se realiza de acuerdo con la EH-91.

3.3. RESULTADOS

Los resultados facilitados son los que a continuación se indican:

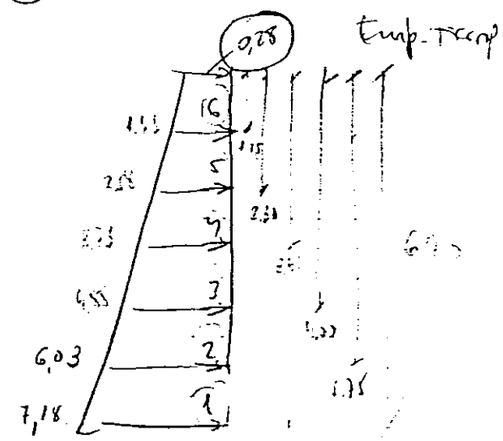
a) Obtención de esfuerzos y listado de los mismos, en todas las secciones características de la estructura.

b) Cálculo y listado de los desplazamientos de todos los nudos.

c) Reacciones.

(1) p.p. + impalc

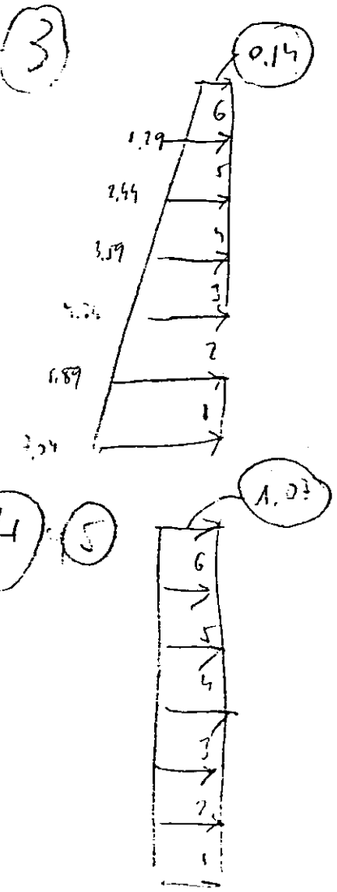
(2)



Temp. Term (fin Sbalzo)

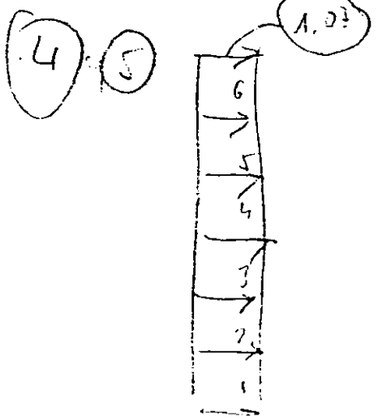
$q = 0{,}5 \times 2{,}11 \times H = H$

(3)

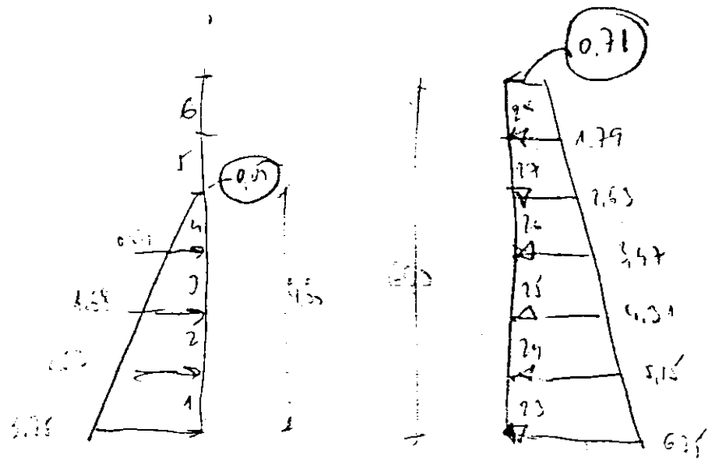


Temp. Term (fin Servizio)

(4) (5)



(6) Compressione di 2T/m²



(7) Tzzzz

2. CÁLCULOS

```
 *************************************************
 *                                               *
 *          S T A A D - III                      *
 *          Revision 17.0a                       *
 *          Proprietary Program of               *
 *          RESEARCH ENGINEERS, Inc.             *
 *          Date=    MAY  7, 1999                *
 *          Time=     9:47:21                    *
 *                                               *
 *************************************************

 1. STAAD PLANE
 2. UNIT MET MTON
 3. *MARCO DEL A V E (ZARAGOZA)
 4. *MARCO  DE 10.58 X 6.00
 5. JOINT COORDINATES
 6.   1   0.00 0.00 ; 2   0.00 1.15 ; 3  0.00 2.30  ; 4  0.00 3.45
 7.   5   0.00 4.60 ; 6   0.00 5.75 ; 7  0.00 6.90  ; 8  1.4225 6.90
 8.   9 2.845 6.90 ; 10 4.2675 6.90 ; 11 5.69 6.90  ; 12 7.1125 6.90
 9.  13 8.535 6.90 ; 14 9.9575 6.90 ; 15 11.38 6.90 ; 16 1.4225 0.00
10.  17 2.845 0.00 ; 18 4.2675 0.00 ; 19 5.69  0.00 ; 20 7.1125 0.00
11.  21 8.535 0.00 ; 22 9.9575 0.00 ; 23 11.38 0.00 ; 24 11.38  1.15
12.  25 11.38 2.30 ; 26 11.38  3.45 ; 27 11.38 4.60 ; 28 11.38  5.75
13. MEMBER INCIDENC
14.  1   1  2   14
15.  15  1  16
16.  16 16  17  27
17.  28 28  15
18. MEMBER PROPERTIES
19.  1 TO 6 7 TO 14 23 TO 28     PRIS  AX 0.80   IZ 0.042666
20. 15 TO 22                     PRIS  AX 1.00   IZ 0.083333
21. CONSTANS
22. E  3000000.    ALL
23. DEN  2.5       ALL
24. SUPPORTS
25.  1                    FIX  BUT     MZ KFY 2216.0
26.  16 TO 22             FIX  BUT  FX MZ KFY 2845.0
27.  23                   FIX  BUT  FX MZ KFY 2216.0
28. LOADING 1   PESO PROPIO+ COEFICIENTE DE IMPACTO
29. MEMBER LOAD
30.  1 TO 6  23 TO 28   UNIF GY -2.00
31.  7 TO 14            UNIF GY -2.00
32. 15 TO 22            UNIF GY -2.50
33.  7 TO 14            UNIF GY -1.29
34. LOADING 2  EMPUJE DE TIERRAS  (SIN SOBRECARGA)
35. MEMBER LOAD
36. 1                    TRAP GX  7.18   6.03
37. 2                    TRAP GX  6.03   4.88
38. 3                    TRAP GX  4.88   3.73
39. 4                    TRAP GX  3.73   2.58
40. 5                    TRAP GX  2.58   1.43
41. 6                    TRAP GX  1.43   0.28
42. 23                   TRAP GX -7.18  -6.03
43. 24                   TRAP GX -6.03  -4.88
44. 25                   TRAP GX -4.88  -3.75
45. 26                   TRAP GX -3.75  -2.58
46. 27                   TRAP GX -2.58  -1.43
47. 28                   TRAP GX -1.43  -0.28
```



```
48. LOADING 3   EMPUJE DE TIERRAS  (EN SERVICIO )
49. MEMBER LOAD
50. 1                    TRAP GX  7.04   5.89
51. 2                    TRAP GX  5.89   4.74
52. 3                    TRAP GX  4.74   3.59
53. 4                    TRAP GX  3.59   2.44
54. 5                    TRAP GX  2.44   1.29
55. 6                    TRAP GX  1.29   0.14
56. 23                   TRAP GX -7.04  -5.89
57. 24                   TRAP GX -5.89  -4.74
58. 25                   TRAP GX -4.74  -3.59
59. 26                   TRAP GX -3.59  -2.44
60. 27                   TRAP GX -2.44  -1.29
61. 28                   TRAP GX -1.29  -0.14
62. LOADING 4  EMPUJE DE SOBRECARGA DE 3.00T/M2 (IZQDA)
63. MEMBER LOAD
64. 1              TRAP GX   1.07
65. 2              TRAP GX   1.07
66. 3              TRAP GX   1.07
67. 4              TRAP GX   1.07
68. 5              TRAP GX   1.07
69. 6              TRAP GX   1.07
70. LOADING 5  EMPUJE DE SOBRECARGA DE 3.00T/M2  (DRCHA)
71. MEMBER LOAD
72. 23                   TRAP GX -1.07
73. 24                   TRAP GX -1.07
74. 25                   TRAP GX -1.07
75. 26                   TRAP GX -1.07
76. 27                   TRAP GX -1.07
77. 28                   TRAP GX -1.07
78. LOADING 6  COMPACTADOR  DE 2.00T/M2
79. MEMBER LOAD
80. 1                    TRAP GX  3.75   2.52
81. 2                    TRAP GX  2.52   1.68
82. 3                    TRAP GX  1.68   0.84
83. 4                    TRAP GX  0.84   0.00
84. 23                   TRAP GX -6.75  -5.15
85. 24                   TRAP GX -5.15  -4.31
86. 25                   TRAP GX -4.31  -3.47
87. 26                   TRAP GX -3.47  -2.63
88. 27                   TRAP GX -2.63  -1.79
89. 28                   TRAP GX -1.79  -0.71
90. LOADING 7  SOBRECARGA DEL TREN
91. MEMBER LOAD
92. 7 TO 14              UNIF GY -2.73
93. LOAD COMB  8   ( 1 + 6)
94.   1  1.0   6  1.6
95. LOAD COMB  9   ( 1 + 2 + 4 )
96.   1  1.0   2  1.6  4  1.6
97. LOAD COMB  10  (1 + 2 + 4 + 5 )
98.   1  1.0   2  1.6  4  1.6  5  1.6
99. LOAD COMB  11  (1 + 3 + 7 )
100.  1  1.44  3  1.0  7  1.6
101. LOAD COMB  12  (1 + 2 + 4 + 7 )
102.  1  1.44  2  1.6  4  1.6  7  1.6
103. LOAD COMB  13  (1 + 2 + 4 + 5 + 7 )
104.  1  1.44  2  1.6  4  1.6  5  1.6  7  1.6
105. PERFOORM ANALYSIS
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 28/ 28/ 9
ORIGINAL/FINAL BAND-WIDTH = 15/ 2
TOTAL PRIMARY LOAD CASES = 7, TOTAL DEGREES OF FREEDOM = 83
SIZE OF STIFFNESS MATRIX = 747 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 12.07 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX. 9:47:22
++ PROCESSING GLOBAL STIFFNESS MATRIX. 9:47:22
++ PROCESSING TRIANGULAR FACTORIZATION. 9:47:22
++ CALCULATING JOINT DISPLACEMENTS. 9:47:22
++ CALCULATING MEMBER FORCES. 9:47:22

106. LOAD LIST 8 TO 13
107. PRINT MEM FOR

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
1	8	1	34.81	4.68	0.00	0.00	0.00	3.32
		2	-32.51	1.09	0.00	0.00	0.00	-1.48
	9	1	32.04	32.02	0.00	0.00	0.00	43.41
		2	-29.74	-19.01	0.00	0.00	0.00	-14.49
	10	1	32.70	30.51	0.00	0.00	0.00	37.40
		2	-30.40	-17.50	0.00	0.00	0.00	-10.21
	11	1	71.68	13.96	0.00	0.00	0.00	51.78
		2	-68.37	-6.53	0.00	0.00	0.00	-40.13
	12	1	71.20	29.11	0.00	0.00	0.00	64.88
		2	-67.89	-16.10	0.00	0.00	0.00	-39.30
	13	1	71.86	27.59	0.00	0.00	0.00	58.86
		2	-68.55	-14.58	0.00	0.00	0.00	-35.03
2	8	2	32.51	-1.09	0.00	0.00	0.00	1.48
		3	-30.21	4.96	0.00	0.00	0.00	-5.10
	9	2	29.74	19.01	0.00	0.00	0.00	14.49
		3	-27.44	-8.12	0.00	0.00	0.00	0.70
	10	2	30.40	17.50	0.00	0.00	0.00	10.21
		3	-28.10	-6.60	0.00	0.00	0.00	3.23
	11	2	68.37	6.53	0.00	0.00	0.00	40.13
		3	-65.06	-0.41	0.00	0.00	0.00	-36.26
	12	2	67.89	16.10	0.00	0.00	0.00	39.30
		3	-64.57	-5.20	0.00	0.00	0.00	-27.47
	13	2	68.55	14.58	0.00	0.00	0.00	35.03
		3	-65.24	-3.69	0.00	0.00	0.00	-24.94
3	8	3	30.21	-4.96	0.00	0.00	0.00	5.10
		4	-27.91	7.28	0.00	0.00	0.00	-12.29
	9	3	27.44	8.12	0.00	0.00	0.00	-0.70
		4	-25.14	0.66	0.00	0.00	0.00	4.57
	10	3	28.10	6.60	0.00	0.00	0.00	-3.23
		4	-25.80	-2.17	0.00	0.00	0.00	5.36
	11	3	65.06	0.41	0.00	0.00	0.00	36.26
		4	-61.75	4.38	0.00	0.00	0.00	-38.67
	12	3	64.57	5.20	0.00	0.00	0.00	27.47
		4	-61.26	3.57	0.00	0.00	0.00	-26.95
	13	3	65.24	3.69	0.00	0.00	0.00	24.94
		4	-61.93	5.09	0.00	0.00	0.00	-26.16
4	8	4	27.91	-7.28	0.00	0.00	0.00	12.29
		5	-25.61	8.05	0.00	0.00	0.00	-21.24
	9	4	25.13	-0.66	0.00	0.00	0.00	-4.57
		5	-22.83	7.32	0.00	0.00	0.00	-0.43
	10	4	25.80	-2.17	0.00	0.00	0.00	-5.36
		5	-23.50	8.83	0.00	0.00	0.00	-1.38
	11	4	61.74	-4.38	0.00	0.00	0.00	38.67
		5	-58.43	7.84	0.00	0.00	0.00	-45.82

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	12	4	61.26	-3.57	0.00	0.00	0.00	26.95
		5	-57.95	10.23	0.00	0.00	0.00	-35.31
	13	4	61.92	-5.09	0.00	0.00	0.00	26.16
		5	-58.61	11.75	0.00	0.00	0.00	-36.25
5	8	5	25.61	-8.05	0.00	0.00	0.00	21.24
		6	-23.31	8.05	0.00	0.00	0.00	-30.50
	9	5	22.84	-7.32	0.00	0.00	0.00	0.43
		6	-20.54	11.86	0.00	0.00	0.00	-11.88
	10	5	23.50	-8.83	0.00	0.00	0.00	1.38
		6	-21.20	13.38	0.00	0.00	0.00	-14.57
	11	5	58.44	-7.84	0.00	0.00	0.00	45.82
		6	-55.12	9.99	0.00	0.00	0.00	-56.20
	12	5	57.95	-10.23	0.00	0.00	0.00	35.31
		6	-54.64	14.78	0.00	0.00	0.00	-50.10
	13	5	58.61	-11.75	0.00	0.00	0.00	36.25
		6	-55.30	16.29	0.00	0.00	0.00	-52.80
6	8	6	23.31	-8.05	0.00	0.00	0.00	30.50
		7	-21.01	8.05	0.00	0.00	0.00	-39.76
	9	6	20.54	-11.86	0.00	0.00	0.00	11.88
		7	-18.24	14.29	0.00	0.00	0.00	-27.33
	10	6	21.20	-13.38	0.00	0.00	0.00	14.57
		7	-18.90	15.81	0.00	0.00	0.00	-31.77
	11	6	55.12	-9.99	0.00	0.00	0.00	56.20
		7	-51.81	10.81	0.00	0.00	0.00	-68.29
	12	6	54.64	-14.78	0.00	0.00	0.00	50.10
		7	-51.33	17.21	0.00	0.00	0.00	-68.91
	13	6	55.30	-16.29	0.00	0.00	0.00	52.80
		7	-51.99	18.72	0.00	0.00	0.00	-73.35
7	8	7	8.05	21.01	0.00	0.00	0.00	39.76
		8	-8.05	-16.33	0.00	0.00	0.00	-13.20
	9	7	14.29	18.24	0.00	0.00	0.00	27.33
		8	-14.29	-13.56	0.00	0.00	0.00	-4.72
	10	7	15.81	18.90	0.00	0.00	0.00	31.77
		8	-15.81	-14.22	0.00	0.00	0.00	-8.21
	11	7	10.81	51.81	0.00	0.00	0.00	68.29
		8	-10.81	-38.86	0.00	0.00	0.00	-3.80
	12	7	17.21	51.33	0.00	0.00	0.00	68.91
		8	-17.21	-38.37	0.00	0.00	0.00	-5.11
	13	7	18.72	51.99	0.00	0.00	0.00	73.35
		8	-18.72	-39.04	0.00	0.00	0.00	-8.60
8	8	8	8.05	16.33	0.00	0.00	0.00	13.20
		9	-8.05	-11.65	0.00	0.00	0.00	6.69
	9	8	14.29	13.56	0.00	0.00	0.00	4.72
		9	-14.29	-8.88	0.00	0.00	0.00	11.23
	10	8	15.81	14.22	0.00	0.00	0.00	8.21
		9	-15.81	-9.54	0.00	0.00	0.00	8.68

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	11	8	10.81	38.86	0.00	0.00	0.00	3.80
		9	-10.81	-25.91	0.00	0.00	0.00	42.27
	12	8	17.21	38.37	0.00	0.00	0.00	5.11
		9	-17.21	-25.42	0.00	0.00	0.00	40.26
	13	8	18.72	39.04	0.00	0.00	0.00	8.60
		9	-18.72	-26.08	0.00	0.00	0.00	37.71
9	8	9	8.05	11.65	0.00	0.00	0.00	-6.69
		10	-8.05	-6.97	0.00	0.00	0.00	19.93
	9	9	14.29	8.88	0.00	0.00	0.00	-11.23
		10	-14.29	-4.20	0.00	0.00	0.00	20.53
	10	9	15.81	9.54	0.00	0.00	0.00	-8.68
		10	-15.81	-4.86	0.00	0.00	0.00	18.92
	11	9	10.81	25.91	0.00	0.00	0.00	-42.27
		10	-10.81	-12.95	0.00	0.00	0.00	69.90
	12	9	17.21	25.42	0.00	0.00	0.00	-40.26
		10	-17.21	-12.47	0.00	0.00	0.00	67.21
	13	9	18.72	26.08	0.00	0.00	0.00	-37.71
		10	-18.72	-13.13	0.00	0.00	0.00	65.60
10	8	10	8.05	6.97	0.00	0.00	0.00	-19.93
		11	-8.05	-2.29	0.00	0.00	0.00	26.51
	9	10	14.29	4.20	0.00	0.00	0.00	-20.53
		11	-14.29	0.48	0.00	0.00	0.00	23.17
	10	10	15.81	4.86	0.00	0.00	0.00	-18.92
		11	-15.81	-0.18	0.00	0.00	0.00	22.50
	11	10	10.81	12.95	0.00	0.00	0.00	-69.90
		11	-10.81	0.00	0.00	0.00	0.00	79.12
	12	10	17.21	12.47	0.00	0.00	0.00	-67.21
		11	-17.21	0.48	0.00	0.00	0.00	75.73
	13	10	18.72	13.13	0.00	0.00	0.00	-65.60
		11	-18.72	-0.18	0.00	0.00	0.00	75.07
11	8	11	8.05	2.29	0.00	0.00	0.00	-26.51
		12	-8.05	2.39	0.00	0.00	0.00	26.44
	9	11	14.29	-0.48	0.00	0.00	0.00	-23.17
		12	-14.29	5.16	0.00	0.00	0.00	19.15
	10	11	15.81	0.18	0.00	0.00	0.00	-22.50
		12	-15.81	4.50	0.00	0.00	0.00	19.43
	11	11	10.81	0.00	0.00	0.00	0.00	-79.12
		12	-10.81	12.95	0.00	0.00	0.00	69.90
	12	11	17.21	-0.48	0.00	0.00	0.00	-75.73
		12	-17.21	13.44	0.00	0.00	0.00	65.83
	13	11	18.72	0.18	0.00	0.00	0.00	-75.07
		12	-18.72	12.77	0.00	0.00	0.00	66.11
12	8	12	8.05	-2.39	0.00	0.00	0.00	-26.44
		13	-8.05	7.07	0.00	0.00	0.00	19.70
	9	12	14.29	-5.16	0.00	0.00	0.00	-19.15
		13	-14.29	9.84	0.00	0.00	0.00	8.48

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	10	12	15.81	-4.50	0.00	0.00	0.00	-19.43
		13	-15.81	9.18	0.00	0.00	0.00	9.70
	11	12	10.81	-12.95	0.00	0.00	0.00	-69.90
		13	-10.81	25.90	0.00	0.00	0.00	42.27
	12	12	17.21	-13.44	0.00	0.00	0.00	-65.83
		13	-17.21	26.39	0.00	0.00	0.00	37.51
	13	12	18.72	-12.77	0.00	0.00	0.00	-66.11
		13	-18.72	25.73	0.00	0.00	0.00	38.73
13	8	13	8.05	-7.07	0.00	0.00	0.00	-19.70
		14	-8.05	11.75	0.00	0.00	0.00	6.31
	9	13	14.29	-9.84	0.00	0.00	0.00	-8.48
		14	-14.29	14.52	0.00	0.00	0.00	-8.86
	10	13	15.81	-9.18	0.00	0.00	0.00	-9.70
		14	-15.81	13.86	0.00	0.00	0.00	-6.70
	11	13	10.81	-25.91	0.00	0.00	0.00	-42.27
		14	-10.81	38.86	0.00	0.00	0.00	-3.80
	12	13	17.21	-26.39	0.00	0.00	0.00	-37.51
		14	-17.21	39.34	0.00	0.00	0.00	-9.25
	13	13	18.72	-25.73	0.00	0.00	0.00	-38.73
		14	-18.72	38.68	0.00	0.00	0.00	-7.09
14	8	14	8.05	-11.75	0.00	0.00	0.00	-6.31
		15	-8.05	16.43	0.00	0.00	0.00	-13.74
	9	14	14.29	-14.52	0.00	0.00	0.00	8.86
		15	-14.29	19.20	0.00	0.00	0.00	-32.85
	10	14	15.81	-13.86	0.00	0.00	0.00	6.70
		15	-15.81	18.54	0.00	0.00	0.00	-29.74
	11	14	10.81	-38.86	0.00	0.00	0.00	3.80
		15	-10.81	51.81	0.00	0.00	0.00	-68.29
	12	14	17.21	-39.34	0.00	0.00	0.00	9.25
		15	-17.21	52.30	0.00	0.00	0.00	-74.42
	13	14	18.72	-38.68	0.00	0.00	0.00	7.08
		15	-18.72	51.63	0.00	0.00	0.00	-71.32
15	8	1	30.74	-20.21	0.00	0.00	0.00	-3.32
		16	-30.74	23.77	0.00	0.00	0.00	-27.96
	9	1	26.92	-22.52	0.00	0.00	0.00	-43.41
		16	-26.92	26.08	0.00	0.00	0.00	8.85
	10	1	32.09	-22.22	0.00	0.00	0.00	-37.40
		16	-32.09	25.78	0.00	0.00	0.00	3.26
	11	1	13.96	-48.75	0.00	0.00	0.00	-51.78
		16	-13.96	53.87	0.00	0.00	0.00	-21.21
	12	1	24.01	-49.55	0.00	0.00	0.00	-64.88
		16	-24.01	54.67	0.00	0.00	0.00	-9.25
	13	1	29.17	-49.25	0.00	0.00	0.00	-58.86
		16	-29.17	54.37	0.00	0.00	0.00	-14.84
16	8	16	30.74	-8.69	0.00	0.00	0.00	27.96
		17	-30.74	12.24	0.00	0.00	0.00	-42.85

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	9	16	26.92	-14.75	0.00	0.00	0.00	-8.85
		17	-26.92	18.31	0.00	0.00	0.00	-14.67
	10	16	32.09	-13.66	0.00	0.00	0.00	-3.26
		17	-32.09	17.21	0.00	0.00	0.00	-18.70
	11	16	13.96	-29.35	0.00	0.00	0.00	21.21
		17	-13.96	34.47	0.00	0.00	0.00	-66.60
	12	16	24.01	-30.92	0.00	0.00	0.00	9.24
		17	-24.01	36.05	0.00	0.00	0.00	-56.88
	13	16	29.17	-29.83	0.00	0.00	0.00	14.83
		17	-29.17	34.95	0.00	0.00	0.00	-60.91
17	8	17	30.74	-0.25	0.00	0.00	0.00	42.85
		18	-30.74	3.81	0.00	0.00	0.00	-45.73
	9	17	26.92	-8.13	0.00	0.00	0.00	14.67
		18	-26.92	11.69	0.00	0.00	0.00	-28.76
	10	17	32.09	-6.56	0.00	0.00	0.00	18.70
		18	-32.09	10.11	0.00	0.00	0.00	-30.55
	11	17	13.96	-14.50	0.00	0.00	0.00	66.60
		18	-13.96	19.62	0.00	0.00	0.00	-90.87
	12	17	24.01	-16.26	0.00	0.00	0.00	56.88
		18	-24.01	21.38	0.00	0.00	0.00	-83.65
	13	17	29.17	-14.68	0.00	0.00	0.00	60.91
		18	-29.17	19.80	0.00	0.00	0.00	-85.44
18	8	18	30.74	6.03	0.00	0.00	0.00	45.73
		19	-30.74	-2.48	0.00	0.00	0.00	-39.68
	9	18	26.92	-2.36	0.00	0.00	0.00	28.76
		19	-26.92	5.92	0.00	0.00	0.00	-34.66
	10	18	32.09	-0.54	0.00	0.00	0.00	30.55
		19	-32.09	4.10	0.00	0.00	0.00	-33.85
	11	18	13.96	-2.76	0.00	0.00	0.00	90.87
		19	-13.96	7.88	0.00	0.00	0.00	-98.44
	12	18	24.01	-4.33	0.00	0.00	0.00	83.65
		19	-24.01	9.45	0.00	0.00	0.00	-93.45
	13	18	29.17	-2.51	0.00	0.00	0.00	85.44
		19	-29.17	7.63	0.00	0.00	0.00	-92.65
19	8	19	30.74	11.17	0.00	0.00	0.00	39.68
		20	-30.74	-7.62	0.00	0.00	0.00	-26.31
	9	19	26.92	3.17	0.00	0.00	0.00	34.66
		20	-26.92	0.39	0.00	0.00	0.00	-32.68
	10	19	32.09	5.06	0.00	0.00	0.00	33.85
		20	-32.09	-1.50	0.00	0.00	0.00	-29.19
	11	19	13.96	7.88	0.00	0.00	0.00	98.44
		20	-13.96	-2.76	0.00	0.00	0.00	-90.87
	12	19	24.01	6.70	0.00	0.00	0.00	93.45
		20	-24.01	-1.58	0.00	0.00	0.00	-87.56
	13	19	29.17	8.59	0.00	0.00	0.00	92.65
		20	-29.17	-3.47	0.00	0.00	0.00	-84.07
20	8	20	30.74	16.04	0.00	0.00	0.00	26.31
		21	-30.74	-12.49	0.00	0.00	0.00	-6.02

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	9	20	26.92	9.22	0.00	0.00	0.00	32.68
		21	-26.92	-5.67	0.00	0.00	0.00	-22.09
	10	20	32.09	10.97	0.00	0.00	0.00	29.19
		21	-32.09	-7.41	0.00	0.00	0.00	-16.11
	11	20	13.96	19.62	0.00	0.00	0.00	90.87
		21	-13.96	-14.50	0.00	0.00	0.00	-66.60
	12	20	24.01	18.92	0.00	0.00	0.00	87.56
		21	-24.01	-13.79	0.00	0.00	0.00	-64.30
	13	20	29.17	20.66	0.00	0.00	0.00	84.07
		21	-29.17	-15.54	0.00	0.00	0.00	-58.32
21	8	21	30.74	21.22	0.00	0.00	0.00	6.02
		22	-30.74	-17.66	0.00	0.00	0.00	21.63
	9	21	26.92	16.52	0.00	0.00	0.00	22.08
		22	-26.92	-12.96	0.00	0.00	0.00	-1.12
	10	21	32.09	17.83	0.00	0.00	0.00	16.11
		22	-32.09	-14.27	0.00	0.00	0.00	6.72
	11	21	13.96	34.47	0.00	0.00	0.00	66.60
		22	-13.96	-29.35	0.00	0.00	0.00	-21.21
	12	21	24.01	34.25	0.00	0.00	0.00	64.30
		22	-24.01	-29.13	0.00	0.00	0.00	-19.21
	13	21	29.17	35.57	0.00	0.00	0.00	58.32
		22	-29.17	-30.45	0.00	0.00	0.00	-11.37
22	8	22	30.74	26.79	0.00	0.00	0.00	-21.63
		23	-30.74	-23.23	0.00	0.00	0.00	57.21
	9	22	26.92	25.50	0.00	0.00	0.00	1.12
		23	-26.92	-21.94	0.00	0.00	0.00	32.62
	10	22	32.09	25.96	0.00	0.00	0.00	-6.72
		23	-32.09	-22.41	0.00	0.00	0.00	41.13
	11	22	13.96	53.87	0.00	0.00	0.00	21.21
		23	-13.96	-48.75	0.00	0.00	0.00	51.78
	12	22	24.01	54.09	0.00	0.00	0.00	19.21
		23	-24.01	-48.97	0.00	0.00	0.00	54.09
	13	22	29.17	54.55	0.00	0.00	0.00	11.37
		23	-29.17	-49.43	0.00	0.00	0.00	62.59
23	8	23	30.23	-30.74	0.00	0.00	0.00	-57.21
		24	-27.93	19.79	0.00	0.00	0.00	28.43
	9	23	33.00	-26.92	0.00	0.00	0.00	-32.62
		24	-30.70	14.77	0.00	0.00	0.00	8.85
	10	23	32.34	-32.09	0.00	0.00	0.00	-41.13
		24	-30.04	18.82	0.00	0.00	0.00	12.22
	11	23	71.68	-13.96	0.00	0.00	0.00	-51.78
		24	-68.37	6.53	0.00	0.00	0.00	40.13
	12	23	72.17	-24.01	0.00	0.00	0.00	-54.09
		24	-68.85	11.86	0.00	0.00	0.00	33.67
	13	23	71.50	-29.17	0.00	0.00	0.00	-62.59
		24	-68.19	15.91	0.00	0.00	0.00	37.04
24	8	24	27.93	-19.79	0.00	0.00	0.00	-28.43
		25	-25.63	11.09	0.00	0.00	0.00	10.83

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	9	24	30.70	-14.77	0.00	0.00	0.00	-8.85
		25	-28.40	4.73	0.00	0.00	0.00	-2.16
	10	24	30.04	-18.82	0.00	0.00	0.00	-12.22
		25	-27.74	7.67	0.00	0.00	0.00	-2.65
	11	24	68.37	-6.53	0.00	0.00	0.00	-40.13
		25	-65.06	0.41	0.00	0.00	0.00	36.26
	12	24	68.86	-11.86	0.00	0.00	0.00	-33.67
		25	-65.54	1.82	0.00	0.00	0.00	26.01
	13	24	68.19	-15.91	0.00	0.00	0.00	-37.04
		25	-64.88	4.76	0.00	0.00	0.00	25.52
25	8	25	25.63	-11.09	0.00	0.00	0.00	-10.83
		26	-23.33	3.93	0.00	0.00	0.00	2.34
	9	25	28.40	-4.73	0.00	0.00	0.00	2.16
		26	-26.10	-3.21	0.00	0.00	0.00	-2.84
	10	25	27.74	-7.67	0.00	0.00	0.00	2.65
		26	-25.44	-1.38	0.00	0.00	0.00	-5.90
	11	25	65.06	-0.41	0.00	0.00	0.00	-36.26
		26	-61.75	-4.38	0.00	0.00	0.00	38.67
	12	25	65.54	-1.82	0.00	0.00	0.00	-26.01
		26	-62.23	-6.12	0.00	0.00	0.00	28.68
	13	25	64.88	-4.76	0.00	0.00	0.00	-25.52
		26	-61.57	-4.30	0.00	0.00	0.00	25.62
26	8	26	23.33	-3.93	0.00	0.00	0.00	-2.34
		27	-21.03	-1.68	0.00	0.00	0.00	1.19
	9	26	26.10	3.21	0.00	0.00	0.00	2.84
		27	-23.80	-9.03	0.00	0.00	0.00	4.40
	10	26	25.44	1.38	0.00	0.00	0.00	5.90
		27	-23.14	-8.32	0.00	0.00	0.00	0.05
	11	26	61.75	4.38	0.00	0.00	0.00	-38.67
		27	-58.44	-7.84	0.00	0.00	0.00	45.82
	12	26	62.23	6.12	0.00	0.00	0.00	-28.68
		27	-58.92	-11.94	0.00	0.00	0.00	39.28
	13	26	61.57	4.30	0.00	0.00	0.00	-25.62
		27	-58.26	-11.23	0.00	0.00	0.00	34.92
27	8	27	21.03	1.68	0.00	0.00	0.00	-1.19
		28	-18.73	-5.75	0.00	0.00	0.00	5.61
	9	27	23.81	9.03	0.00	0.00	0.00	-4.40
		28	-21.51	-12.72	0.00	0.00	0.00	17.11
	10	27	23.14	8.32	0.00	0.00	0.00	-0.05
		28	-20.84	-13.12	0.00	0.00	0.00	12.74
	11	27	58.44	7.84	0.00	0.00	0.00	-45.82
		28	-55.12	-9.99	0.00	0.00	0.00	56.20
	12	27	58.92	11.95	0.00	0.00	0.00	-39.28
		28	-55.61	-15.63	0.00	0.00	0.00	55.34
	13	27	58.26	11.23	0.00	0.00	0.00	-34.92
		28	-54.95	-16.04	0.00	0.00	0.00	50.97
28	8	28	18.73	5.75	0.00	0.00	0.00	-5.61
		15	-16.43	-8.05	0.00	0.00	0.00	13.74

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- MTON MET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	9	28	21.50	12.72	0.00	0.00	0.00	-17.11
		15	-19.20	-14.29	0.00	0.00	0.00	32.85
	10	28	20.84	13.12	0.00	0.00	0.00	-12.74
		15	-18.54	-15.81	0.00	0.00	0.00	29.74
	11	28	55.12	9.99	0.00	0.00	0.00	-56.20
		15	-51.81	-10.81	0.00	0.00	0.00	68.29
	12	28	55.61	15.63	0.00	0.00	0.00	-55.34
		15	-52.30	-17.21	0.00	0.00	0.00	74.42
	13	28	54.95	16.04	0.00	0.00	0.00	-50.97
		15	-51.63	-18.72	0.00	0.00	0.00	71.32

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

108. PRINT JOIN DISP

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
1	8	0.00000	-0.65858	0.00000	0.00000	0.00000	0.00092
	9	0.00000	-0.42937	0.00000	0.00000	0.00000	0.00013
	10	0.00000	-0.47285	0.00000	0.00000	0.00000	0.00025
	11	0.00000	-1.03483	0.00000	0.00000	0.00000	0.00114
	12	0.00000	-0.97706	0.00000	0.00000	0.00000	0.00089
	13	0.00000	-1.02054	0.00000	0.00000	0.00000	0.00101
2	8	-0.10498	-0.66019	0.00000	0.00000	0.00000	0.00091
	9	0.00205	-0.43085	0.00000	0.00000	0.00000	-0.00012
	10	-0.01524	-0.47436	0.00000	0.00000	0.00000	0.00005
	11	-0.10622	-1.03818	0.00000	0.00000	0.00000	0.00073
	12	-0.07339	-0.98039	0.00000	0.00000	0.00000	0.00043
	13	-0.09068	-1.02391	0.00000	0.00000	0.00000	0.00060
3	8	-0.20797	-0.66169	0.00000	0.00000	0.00000	0.00088
	9	0.02025	-0.43222	0.00000	0.00000	0.00000	-0.00017
	10	-0.01874	-0.47576	0.00000	0.00000	0.00000	0.00003
	11	-0.17031	-1.04138	0.00000	0.00000	0.00000	0.00039
	12	-0.10498	-0.98357	0.00000	0.00000	0.00000	0.00014
	13	-0.14398	-1.02711	0.00000	0.00000	0.00000	0.00034
4	8	-0.30537	-0.66309	0.00000	0.00000	0.00000	0.00080
	9	0.03871	-0.43348	0.00000	0.00000	0.00000	-0.00014
	10	-0.02462	-0.47705	0.00000	0.00000	0.00000	0.00008
	11	-0.19639	-1.04442	0.00000	0.00000	0.00000	0.00006
	12	-0.10722	-0.98658	0.00000	0.00000	0.00000	-0.00010
	13	-0.17055	-1.03016	0.00000	0.00000	0.00000	0.00012
5	8	-0.38994	-0.66437	0.00000	0.00000	0.00000	0.00065
	9	0.05320	-0.43462	0.00000	0.00000	0.00000	-0.00012
	10	-0.03527	-0.47823	0.00000	0.00000	0.00000	0.00010
	11	-0.18211	-1.04730	0.00000	0.00000	0.00000	-0.00032
	12	-0.08086	-0.98944	0.00000	0.00000	0.00000	-0.00037
	13	-0.16932	-1.03305	0.00000	0.00000	0.00000	-0.00016
6	8	-0.45253	-0.66554	0.00000	0.00000	0.00000	0.00042
	9	0.06869	-0.43566	0.00000	0.00000	0.00000	-0.00017
	10	-0.04393	-0.47931	0.00000	0.00000	0.00000	0.00003
	11	-0.12020	-1.05002	0.00000	0.00000	0.00000	-0.00077
	12	-0.01746	-0.99214	0.00000	0.00000	0.00000	-0.00075
	13	-0.13009	-1.03578	0.00000	0.00000	0.00000	-0.00055
7	8	-0.48361	-0.66660	0.00000	0.00000	0.00000	0.00011
	9	0.09681	-0.43659	0.00000	0.00000	0.00000	-0.00034
	10	-0.03721	-0.48027	0.00000	0.00000	0.00000	-0.00017
	11	-0.00009	-1.05258	0.00000	0.00000	0.00000	-0.00133
	12	0.09805	-0.99467	0.00000	0.00000	0.00000	-0.00128
	13	-0.03596	-1.03835	0.00000	0.00000	0.00000	-0.00112
8	8	-0.48409	-0.67558	0.00000	0.00000	0.00000	-0.00018
	9	0.09596	-0.50061	0.00000	0.00000	0.00000	-0.00052
	10	-0.03814	-0.52355	0.00000	0.00000	0.00000	-0.00039
	11	-0.00073	-1.27795	0.00000	0.00000	0.00000	-0.00172
	12	0.09703	-1.21389	0.00000	0.00000	0.00000	-0.00168
	13	-0.03707	-1.23683	0.00000	0.00000	0.00000	-0.00155

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
9	8	-0.48457	-0.70630	0.00000	0.00000	0.00000	-0.00021
	9	0.09511	-0.57297	0.00000	0.00000	0.00000	-0.00047
	10	-0.03908	-0.58070	0.00000	0.00000	0.00000	-0.00038
	11	-0.00137	-1.51174	0.00000	0.00000	0.00000	-0.00149
	12	0.09601	-1.44362	0.00000	0.00000	0.00000	-0.00147
	13	-0.03818	-1.45135	0.00000	0.00000	0.00000	-0.00138
10	8	-0.48505	-0.72732	0.00000	0.00000	0.00000	-0.00006
	9	0.09427	-0.62846	0.00000	0.00000	0.00000	-0.00029
	10	-0.04002	-0.62500	0.00000	0.00000	0.00000	-0.00022
	11	-0.00201	-1.68115	0.00000	0.00000	0.00000	-0.00085
	12	0.09499	-1.61213	0.00000	0.00000	0.00000	-0.00085
	13	-0.03929	-1.60867	0.00000	0.00000	0.00000	-0.00078
11	8	-0.48552	-0.71771	0.00000	0.00000	0.00000	0.00021
	9	0.09342	-0.65236	0.00000	0.00000	0.00000	-0.00004
	10	-0.04095	-0.64026	0.00000	0.00000	0.00000	0.00001
	11	-0.00265	-1.74247	0.00000	0.00000	0.00000	0.00000
	12	0.09397	-1.67681	0.00000	0.00000	0.00000	-0.00004
	13	-0.04040	-1.66471	0.00000	0.00000	0.00000	0.00001
12	8	-0.48600	-0.66706	0.00000	0.00000	0.00000	0.00051
	9	0.09257	-0.64052	0.00000	0.00000	0.00000	0.00020
	10	-0.04189	-0.62083	0.00000	0.00000	0.00000	0.00025
	11	-0.00329	-1.68115	0.00000	0.00000	0.00000	0.00085
	12	0.09295	-1.62419	0.00000	0.00000	0.00000	0.00076
	13	-0.04151	-1.60450	0.00000	0.00000	0.00000	0.00082
13	8	-0.48648	-0.57549	0.00000	0.00000	0.00000	0.00077
	9	0.09172	-0.59928	0.00000	0.00000	0.00000	0.00036
	10	-0.04283	-0.57156	0.00000	0.00000	0.00000	0.00042
	11	-0.00393	-1.51174	0.00000	0.00000	0.00000	0.00149
	12	0.09193	-1.46993	0.00000	0.00000	0.00000	0.00135
	13	-0.04262	-1.44221	0.00000	0.00000	0.00000	0.00142
14	8	-0.48695	-0.45366	0.00000	0.00000	0.00000	0.00092
	9	0.09088	-0.54552	0.00000	0.00000	0.00000	0.00036
	10	-0.04376	-0.50784	0.00000	0.00000	0.00000	0.00044
	11	-0.00457	-1.27795	0.00000	0.00000	0.00000	0.00172
	12	0.09091	-1.25880	0.00000	0.00000	0.00000	0.00153
	13	-0.04373	-1.22112	0.00000	0.00000	0.00000	0.00161
15	8	-0.48743	-0.32273	0.00000	0.00000	0.00000	0.00088
	9	0.09003	-0.50664	0.00000	0.00000	0.00000	0.00014
	10	-0.04470	-0.45558	0.00000	0.00000	0.00000	0.00025
	11	-0.00521	-1.05258	0.00000	0.00000	0.00000	0.00133
	12	0.08989	-1.06472	0.00000	0.00000	0.00000	0.00108
	13	-0.04484	-1.01366	0.00000	0.00000	0.00000	0.00119
16	8	-0.00146	-0.53006	0.00000	0.00000	0.00000	0.00085
	9	-0.00128	-0.39805	0.00000	0.00000	0.00000	0.00028
	10	-0.00152	-0.42600	0.00000	0.00000	0.00000	0.00037
	11	-0.00066	-0.86194	0.00000	0.00000	0.00000	0.00123
	12	-0.00114	-0.83458	0.00000	0.00000	0.00000	0.00105
	13	-0.00138	-0.86253	0.00000	0.00000	0.00000	0.00114

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
17	8	-0.00292	-0.42162	0.00000	0.00000	0.00000	0.00066
	9	-0.00255	-0.35774	0.00000	0.00000	0.00000	0.00027
	10	-0.00304	-0.37453	0.00000	0.00000	0.00000	0.00033
	11	-0.00132	-0.70199	0.00000	0.00000	0.00000	0.00098
	12	-0.00228	-0.69551	0.00000	0.00000	0.00000	0.00086
	13	-0.00277	-0.71231	0.00000	0.00000	0.00000	0.00093
18	8	-0.00437	-0.34590	0.00000	0.00000	0.00000	0.00041
	9	-0.00383	-0.32769	0.00000	0.00000	0.00000	0.00014
	10	-0.00456	-0.33649	0.00000	0.00000	0.00000	0.00019
	11	-0.00199	-0.59262	0.00000	0.00000	0.00000	0.00054
	12	-0.00342	-0.59918	0.00000	0.00000	0.00000	0.00047
	13	-0.00415	-0.60798	0.00000	0.00000	0.00000	0.00052
19	8	-0.00583	-0.30565	0.00000	0.00000	0.00000	0.00017
	9	-0.00511	-0.31947	0.00000	0.00000	0.00000	-0.00003
	10	-0.00609	-0.32168	0.00000	0.00000	0.00000	0.00001
	11	-0.00265	-0.55405	0.00000	0.00000	0.00000	0.00000
	12	-0.00455	-0.56777	0.00000	0.00000	0.00000	-0.00003
	13	-0.00553	-0.56998	0.00000	0.00000	0.00000	0.00001
20	8	-0.00729	-0.29619	0.00000	0.00000	0.00000	-0.00002
	9	-0.00638	-0.33790	0.00000	0.00000	0.00000	-0.00022
	10	-0.00761	-0.33286	0.00000	0.00000	0.00000	-0.00016
	11	-0.00331	-0.59262	0.00000	0.00000	0.00000	-0.00054
	12	-0.00569	-0.60939	0.00000	0.00000	0.00000	-0.00055
	13	-0.00692	-0.60435	0.00000	0.00000	0.00000	-0.00049
21	8	-0.00875	-0.30675	0.00000	0.00000	0.00000	-0.00011
	9	-0.00766	-0.38127	0.00000	0.00000	0.00000	-0.00038
	10	-0.00913	-0.36619	0.00000	0.00000	0.00000	-0.00029
	11	-0.00397	-0.70199	0.00000	0.00000	0.00000	-0.00098
	12	-0.00683	-0.71905	0.00000	0.00000	0.00000	-0.00097
	13	-0.00830	-0.70396	0.00000	0.00000	0.00000	-0.00089
22	8	-0.01020	-0.32084	0.00000	0.00000	0.00000	-0.00006
	9	-0.00894	-0.44078	0.00000	0.00000	0.00000	-0.00044
	10	-0.01065	-0.41090	0.00000	0.00000	0.00000	-0.00032
	11	-0.00463	-0.86193	0.00000	0.00000	0.00000	-0.00123
	12	-0.00797	-0.87731	0.00000	0.00000	0.00000	-0.00121
	13	-0.00968	-0.84742	0.00000	0.00000	0.00000	-0.00108
23	8	-0.01166	-0.31602	0.00000	0.00000	0.00000	0.00016
	9	-0.01021	-0.49913	0.00000	0.00000	0.00000	-0.00035
	10	-0.01217	-0.44826	0.00000	0.00000	0.00000	-0.00018
	11	-0.00530	-1.03483	0.00000	0.00000	0.00000	-0.00114
	12	-0.00911	-1.04683	0.00000	0.00000	0.00000	-0.00111
	13	-0.01107	-0.99596	0.00000	0.00000	0.00000	-0.00093
24	8	-0.05458	-0.31742	0.00000	0.00000	0.00000	0.00054
	9	0.01767	-0.50066	0.00000	0.00000	0.00000	-0.00017
	10	-0.00741	-0.44976	0.00000	0.00000	0.00000	0.00005
	11	0.10092	-1.03818	0.00000	0.00000	0.00000	-0.00073
	12	0.09422	-1.05021	0.00000	0.00000	0.00000	-0.00072
	13	0.06913	-0.99931	0.00000	0.00000	0.00000	-0.00050

JOINT DISPLACEMENT (CM RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
25	8	-0.12784	-0.31870	0.00000	0.00000	0.00000	0.00071
	9	0.03532	-0.50207	0.00000	0.00000	0.00000	-0.00015
	10	-0.01648	-0.45114	0.00000	0.00000	0.00000	0.00008
	11	0.16501	-1.04138	0.00000	0.00000	0.00000	-0.00039
	12	0.16166	-1.05343	0.00000	0.00000	0.00000	-0.00046
	13	0.10986	-1.00249	0.00000	0.00000	0.00000	-0.00023
26	8	-0.21306	-0.31987	0.00000	0.00000	0.00000	0.00076
	9	0.05430	-0.50338	0.00000	0.00000	0.00000	-0.00018
	10	-0.02382	-0.45242	0.00000	0.00000	0.00000	0.00004
	11	0.19109	-1.04442	0.00000	0.00000	0.00000	-0.00006
	12	0.20134	-1.05649	0.00000	0.00000	0.00000	-0.00022
	13	0.12322	-1.00552	0.00000	0.00000	0.00000	-0.00001
27	8	-0.30134	-0.32093	0.00000	0.00000	0.00000	0.00077
	9	0.07554	-0.50458	0.00000	0.00000	0.00000	-0.00018
	10	-0.02585	-0.45358	0.00000	0.00000	0.00000	0.00001
	11	0.17681	-1.04730	0.00000	0.00000	0.00000	0.00032
	12	0.21070	-1.05939	0.00000	0.00000	0.00000	0.00008
	13	0.10932	-1.00839	0.00000	0.00000	0.00000	0.00026
28	8	-0.39132	-0.32189	0.00000	0.00000	0.00000	0.00080
	9	0.09175	-0.50566	0.00000	0.00000	0.00000	-0.00008
	10	-0.02851	-0.45464	0.00000	0.00000	0.00000	0.00006
	11	0.11491	-1.05002	0.00000	0.00000	0.00000	0.00077
	12	0.17901	-1.06213	0.00000	0.00000	0.00000	0.00050
	13	0.05875	-1.01111	0.00000	0.00000	0.00000	0.00064

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

109. PRINT SUP REA

SUPPORT REACTIONS -UNIT MTON MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	8	26.06	14.59	0.00	0.00	0.00	0.00
	9	-5.10	9.51	0.00	0.00	0.00	0.00
	10	1.58	10.48	0.00	0.00	0.00	0.00
	11	0.00	22.93	0.00	0.00	0.00	0.00
	12	-5.10	21.65	0.00	0.00	0.00	0.00
	13	1.58	22.62	0.00	0.00	0.00	0.00
16	8	0.00	15.08	0.00	0.00	0.00	0.00
	9	0.00	11.32	0.00	0.00	0.00	0.00
	10	0.00	12.12	0.00	0.00	0.00	0.00
	11	0.00	24.52	0.00	0.00	0.00	0.00
	12	0.00	23.74	0.00	0.00	0.00	0.00
	13	0.00	24.54	0.00	0.00	0.00	0.00
17	8	0.00	12.00	0.00	0.00	0.00	0.00
	9	0.00	10.18	0.00	0.00	0.00	0.00
	10	0.00	10.66	0.00	0.00	0.00	0.00
	11	0.00	19.97	0.00	0.00	0.00	0.00
	12	0.00	19.79	0.00	0.00	0.00	0.00
	13	0.00	20.27	0.00	0.00	0.00	0.00
18	8	0.00	9.84	0.00	0.00	0.00	0.00
	9	0.00	9.32	0.00	0.00	0.00	0.00
	10	0.00	9.57	0.00	0.00	0.00	0.00
	11	0.00	16.86	0.00	0.00	0.00	0.00
	12	0.00	17.05	0.00	0.00	0.00	0.00
	13	0.00	17.30	0.00	0.00	0.00	0.00
19	8	0.00	8.70	0.00	0.00	0.00	0.00
	9	0.00	9.09	0.00	0.00	0.00	0.00
	10	0.00	9.15	0.00	0.00	0.00	0.00
	11	0.00	15.76	0.00	0.00	0.00	0.00
	12	0.00	16.15	0.00	0.00	0.00	0.00
	13	0.00	16.22	0.00	0.00	0.00	0.00
20	8	0.00	8.43	0.00	0.00	0.00	0.00
	9	0.00	9.61	0.00	0.00	0.00	0.00
	10	0.00	9.47	0.00	0.00	0.00	0.00
	11	0.00	16.86	0.00	0.00	0.00	0.00
	12	0.00	17.34	0.00	0.00	0.00	0.00
	13	0.00	17.19	0.00	0.00	0.00	0.00
21	8	0.00	8.73	0.00	0.00	0.00	0.00
	9	0.00	10.85	0.00	0.00	0.00	0.00
	10	0.00	10.42	0.00	0.00	0.00	0.00
	11	0.00	19.97	0.00	0.00	0.00	0.00
	12	0.00	20.46	0.00	0.00	0.00	0.00
	13	0.00	20.03	0.00	0.00	0.00	0.00
22	8	0.00	9.13	0.00	0.00	0.00	0.00
	9	0.00	12.54	0.00	0.00	0.00	0.00
	10	0.00	11.69	0.00	0.00	0.00	0.00
	11	0.00	24.52	0.00	0.00	0.00	0.00
	12	0.00	24.96	0.00	0.00	0.00	0.00
	13	0.00	24.11	0.00	0.00	0.00	0.00
23	8	0.00	7.00	0.00	0.00	0.00	0.00
	9	0.00	11.06	0.00	0.00	0.00	0.00

SUPPORT REACTIONS -UNIT MTON MET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
	10	0.00	9.93	0.00	0.00	0.00	0.00
	11	0.00	22.93	0.00	0.00	0.00	0.00
	12	0.00	23.20	0.00	0.00	0.00	0.00
	13	0.00	22.07	0.00	0.00	0.00	0.00

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

110. PRINT FORC ENV ALL FR NS 0.5

MEMBER FORCE ENVELOPE

ALL UNITS ARE MTON MET

MEMB	DISTANCE		FY	LD	MZ	LD	FZ	LD	MY	LD
1	0.00	MAX.	32.02	9	64.88	12	0.00	13	0.00	13
		MIN.	4.68	8	3.32	8	0.00	13	0.00	13
	0.57	MAX.	24.97	9	50.22	12	0.00	13	0.00	13
		MIN.	1.51	8	1.57	8	0.00	13	0.00	13
	1.15	MAX.	19.01	9	40.13	11	0.00	13	0.00	13
		MIN.	-1.09	8	1.48	8	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 1,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	32.02	0.00	9	64.88	0.00	12			
	0.00	0.00	8	0.00	0.00	8	71.86 C	0.00	1
MIN.	-1.09	1.15	8	1.48	1.15	8			
	0.00	1.15	13	0.00	1.15	13	29.74 C	1.15	

2	0.00	MAX.	19.01	9	40.13	11	0.00	13	0.00	13
		MIN.	-1.09	8	1.48	8	0.00	13	0.00	13
	0.57	MAX.	13.02	9	37.32	11	0.00	13	0.00	13
		MIN.	-3.22	8	1.92	10	0.00	13	0.00	13
	1.15	MAX.	8.12	9	36.26	11	0.00	13	0.00	13
		MIN.	-4.96	8	-3.23	10	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 2,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	19.01	0.00	9	40.13	0.00	11			
	0.00	0.00	8	0.00	0.00	8	68.55 C	0.00	1
MIN.	-4.96	1.15	8	-3.23	1.15	10			
	0.00	1.15	13	0.00	1.15	13	27.44 C	1.15	

3	0.00	MAX.	8.12	9	36.26	11	0.00	13	0.00	13
		MIN.	-4.96	8	-3.23	10	0.00	13	0.00	13
	0.57	MAX.	3.19	9	36.78	11	0.00	13	0.00	13
		MIN.	-6.31	8	-5.56	10	0.00	13	0.00	13
	1.15	MAX.	-0.66	9	38.67	11	0.00	13	0.00	13
		MIN.	-7.28	8	-5.36	10	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 3,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	8.12	0.00	9	38.67	1.15	11			
	0.00	0.00	8	0.00	0.00	8	65.24 C	0.00	1
MIN.	-7.28	1.15	8	-5.56	0.57	10			
	0.00	1.15	13	0.00	1.15	13	25.14 C	1.15	

4	0.00	MAX.	-0.66	9	38.67	11	0.00	13	0.00	13
		MIN.	-7.28	8	-5.36	10	0.00	13	0.00	13
	0.57	MAX.	-4.53	9	41.75	11	0.00	13	0.00	13
		MIN.	-8.96	13	-3.03	9	0.00	13	0.00	13
	1.15	MAX.	-7.32	9	45.82	11	0.00	13	0.00	13
		MIN.	-11.75	13	0.43	9	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 4,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	-0.66	0.00	9	45.82	1.15	11			
	0.00	0.00	8	0.00	0.00	8	61.92 C	0.00	1
MIN.	-11.75	1.15	13	-5.36	0.00	10			
	0.00	1.15	13	0.00	1.15	13	22.83 C	1.15	

5	0.00	MAX.	-7.32	9	45.82	11	0.00	13	0.00	13
		MIN.	-11.75	13	0.43	9	0.00	13	0.00	13
	0.57	MAX.	-8.05	8	50.70	11	0.00	13	0.00	13
		MIN.	-14.56	13	5.50	9	0.00	13	0.00	13
	1.15	MAX.	-8.05	8	56.20	11	0.00	13	0.00	13
		MIN.	-16.29	13	11.88	9	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 5,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	-7.32	0.00	9	56.20	1.15	11			
	0.00	0.00	8	0.00	0.00	8	58.61 C	0.00	1
MIN.	-16.29	1.15	13	0.43	0.00	9			
	0.00	1.15	13	0.00	1.15	13	20.54 C	1.15	

6	0.00	MAX.	-8.05	8	56.20	11	0.00	13	0.00	13
		MIN.	-16.29	13	11.88	9	0.00	13	0.00	13
	0.57	MAX.	-8.05	8	62.72	13	0.00	13	0.00	13
		MIN.	-18.05	13	19.26	9	0.00	13	0.00	13
	1.15	MAX.	-8.05	8	73.35	13	0.00	13	0.00	13

		MIN.	-18.72	13	27.33	9	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 6,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	-8.05	0.00	8	73.35	1.15	13			
	0.00	0.00	8	0.00	0.00	8	55.30 C	0.00	1
MIN.	-18.72	1.15	13	11.88	0.00	9			
	0.00	1.15	13	0.00	1.15	13	18.24 C	1.15	

7	0.00	MAX.	51.99	13	73.35	13	0.00	13	0.00	13
		MIN.	18.24	9	27.33	9	0.00	13	0.00	13
	0.71	MAX.	45.51	13	38.67	13	0.00	13	0.00	13
		MIN.	15.90	9	15.20	9	0.00	13	0.00	13
	1.42	MAX.	39.04	13	13.20	8	0.00	13	0.00	13
		MIN.	13.56	9	3.80	11	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 7,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	51.99	0.00	13	73.35	0.00	13			
	0.00	0.00	8	0.00	0.00	8	18.72 C	0.00	1
MIN.	13.56	1.42	9	3.80	1.42	11			
	0.00	1.42	13	0.00	1.42	13	8.05 C	1.42	

8	0.00	MAX.	39.04	13	13.20	8	0.00	13	0.00	13
		MIN.	13.56	9	3.80	11	0.00	13	0.00	13
	0.71	MAX.	32.56	13	2.42	8	0.00	13	0.00	13
		MIN.	11.22	9	-21.54	11	0.00	13	0.00	13
	1.42	MAX.	26.08	13	-6.69	8	0.00	13	0.00	13
		MIN.	8.88	9	-42.27	11	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 8,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	39.04	0.00	13	13.20	0.00	8			
	0.00	0.00	8	0.00	0.00	8	18.72 C	0.00	1
MIN.	8.88	1.42	9	-42.27	1.42	11			
	0.00	1.42	13	0.00	1.42	13	8.05 C	1.42	

9	0.00	MAX.	26.08	13	-6.69	8	0.00	13	0.00	13
		MIN.	8.88	9	-42.27	11	0.00	13	0.00	13
	0.71	MAX.	19.61	13	-14.14	8	0.00	13	0.00	13
		MIN.	6.54	9	-58.39	11	0.00	13	0.00	13

	1.42	MAX.	13.13	13	-18.92	10	0.00	13	0.00	13
		MIN.	4.20	9	-69.90	11	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 9,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	26.08	0.00	13	-6.69	0.00	8			
	0.00	0.00	8	0.00	0.00	8	18.72 C	0.00	1
MIN.	4.20	1.42	9	-69.90	1.42	11			
	0.00	1.42	13	0.00	1.42	13	8.05 C	1.42	

10	0.00	MAX.	13.13	13	-18.92	10	0.00	13	0.00	13
		MIN.	4.20	9	-69.90	11	0.00	13	0.00	13
	0.71	MAX.	6.66	13	-21.54	10	0.00	13	0.00	13
		MIN.	1.86	9	-76.81	11	0.00	13	0.00	13
	1.42	MAX.	2.29	8	-22.50	10	0.00	13	0.00	13
		MIN.	-0.48	9	-79.12	11	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 10,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	13.13	0.00	13	-18.92	0.00	10			
	0.00	0.00	8	0.00	0.00	8	18.72 C	0.00	1
MIN.	-0.48	1.42	9	-79.12	1.42	11			
	0.00	1.42	13	0.00	1.42	13	8.05 C	1.42	

11	0.00	MAX.	2.29	8	-22.50	10	0.00	13	0.00	13
		MIN.	-0.48	9	-79.12	11	0.00	13	0.00	13
	0.71	MAX.	-0.05	8	-21.80	10	0.00	13	0.00	13
		MIN.	-6.96	12	-76.81	11	0.00	13	0.00	13
	1.42	MAX.	-2.39	8	-19.15	9	0.00	13	0.00	13
		MIN.	-13.44	12	-69.90	11	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 11,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	2.29	0.00	8	-19.15	1.42	9			
	0.00	0.00	8	0.00	0.00	8	18.72 C	0.00	1
MIN.	-13.44	1.42	12	-79.12	0.00	11			
	0.00	1.42	13	0.00	1.42	13	8.05 C	1.42	

12	0.00	MAX.	-2.39	8	-19.15	9	0.00	13	0.00	13
		MIN.	-13.44	12	-69.90	11	0.00	13	0.00	13
	0.71	MAX.	-4.73	8	-14.65	9	0.00	13	0.00	13

		MIN.	-19.91	12	-58.39	11	0.00	13	0.00	13
	1.42	MAX.	-7.07	8	-8.48	9	0.00	13	0.00	13
		MIN.	-26.39	12	-42.27	11	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 12,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	-2.39	0.00	8	-8.48	1.42	9			
	0.00	0.00	8	0.00	0.00	8	18.72 C	0.00	1
MIN.	-26.39	1.42	12	-69.90	0.00	11			
	0.00	1.42	13	0.00	1.42	13	8.05 C	1.42	

13	0.00	MAX.	-7.07	8	-8.48	9	0.00	13	0.00	13
		MIN.	-26.39	12	-42.27	11	0.00	13	0.00	13
	0.71	MAX.	-9.41	8	-0.64	9	0.00	13	0.00	13
		MIN.	-32.87	12	-21.54	11	0.00	13	0.00	13
	1.42	MAX.	-11.75	8	9.25	12	0.00	13	0.00	13
		MIN.	-39.34	12	-6.31	8	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 13,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	-7.07	0.00	8	9.25	1.42	12			
	0.00	0.00	8	0.00	0.00	8	18.72 C	0.00	1
MIN.	-39.34	1.42	12	-42.27	0.00	11			
	0.00	1.42	13	0.00	1.42	13	8.05 C	1.42	

14	0.00	MAX.	-11.75	8	9.25	12	0.00	13	0.00	13
		MIN.	-39.34	12	-6.31	8	0.00	13	0.00	13
	0.71	MAX.	-14.09	8	39.53	12	0.00	13	0.00	13
		MIN.	-45.82	12	2.88	8	0.00	13	0.00	13
	1.42	MAX.	-16.43	8	74.42	12	0.00	13	0.00	13
		MIN.	-52.30	12	13.74	8	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 14,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	-11.75	0.00	8	74.42	1.42	12			
	0.00	0.00	8	0.00	0.00	8	18.72 C	0.00	1
MIN.	-52.30	1.42	12	-6.31	0.00	8			
	0.00	1.42	13	0.00	1.42	13	8.05 C	1.42	

15	0.00	MAX.	-20.21	8	-3.32	8	0.00	13	0.00	13
		MIN.	-49.55	12	-64.88	12	0.00	13	0.00	13

	0.71	MAX.	-21.99	8	11.69	8	0.00	13	0.00 13
		MIN.	-52.11	12	-28.73	12	0.00	13	0.00 13
	1.42	MAX.	-23.77	8	27.96	8	0.00	13	0.00 13
		MIN.	-54.67	12	-8.85	9	0.00	13	0.00 13

MAX/MIN FORCES FOR MEMBER 15,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	-20.21	0.00	8	27.96	1.42	8			
	0.00	0.00	8	0.00	0.00	8	32.09 C	0.00	1
MIN.	-54.67	1.42	12	-64.88	0.00	12			
	0.00	1.42	13	0.00	1.42	13	13.96 C	1.42	1

16	0.00	MAX.	-8.69	8	27.96	8	0.00	13	0.00 13
		MIN.	-30.92	12	-8.85	9	0.00	13	0.00 13
	0.71	MAX.	-10.47	8	42.99	11	0.00	13	0.00 13
		MIN.	-33.49	12	2.28	9	0.00	13	0.00 13
	1.42	MAX.	-12.24	8	66.60	11	0.00	13	0.00 13
		MIN.	-36.05	12	14.67	9	0.00	13	0.00 13

MAX/MIN FORCES FOR MEMBER 16,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	-8.69	0.00	8	66.60	1.42	11			
	0.00	0.00	8	0.00	0.00	8	32.09 C	0.00	1
MIN.	-36.05	1.42	12	-8.85	0.00	9			
	0.00	1.42	13	0.00	1.42	13	13.96 C	1.42	1

17	0.00	MAX.	-0.25	8	66.60	11	0.00	13	0.00 13
		MIN.	-16.26	12	14.67	9	0.00	13	0.00 13
	0.71	MAX.	-2.03	8	77.82	11	0.00	13	0.00 13
		MIN.	-18.82	12	21.08	9	0.00	13	0.00 13
	1.42	MAX.	-3.81	8	90.87	11	0.00	13	0.00 13
		MIN.	-21.38	12	28.76	9	0.00	13	0.00 13

MAX/MIN FORCES FOR MEMBER 17,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	-0.25	0.00	8	90.87	1.42	11			
	0.00	0.00	8	0.00	0.00	8	32.09 C	0.00	1
MIN.	-21.38	1.42	12	14.67	0.00	9			
	0.00	1.42	13	0.00	1.42	13	13.96 C	1.42	1

18	0.00	MAX.	6.03	8	90.87	11	0.00	13	0.00 13

		MIN.	-4.33	12	28.76	9	0.00	13	0.00 13
	0.71	MAX.	4.26	8	93.74	11	0.00	13	0.00 13
		MIN.	-6.89	12	31.08	9	0.00	13	0.00 13
	1.42	MAX.	2.48	8	98.44	11	0.00	13	0.00 13
		MIN.	-9.45	12	33.85	10	0.00	13	0.00 13

MAX/MIN FORCES FOR MEMBER 18,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	6.03	0.00	8	98.44	1.42	11			
	0.00	0.00	8	0.00	0.00	8	32.09 C	0.00	1
MIN.	-9.45	1.42	12	28.76	0.00	9			
	0.00	1.42	13	0.00	1.42	13	13.96 C	1.42	1

19	0.00	MAX.	11.17	8	98.44	11	0.00	13	0.00 13
		MIN.	3.17	9	33.85	10	0.00	13	0.00 13
	0.71	MAX.	9.40	8	93.74	11	0.00	13	0.00 13
		MIN.	1.39	9	30.89	10	0.00	13	0.00 13
	1.42	MAX.	7.62	8	90.87	11	0.00	13	0.00 13
		MIN.	-0.39	9	26.31	8	0.00	13	0.00 13

MAX/MIN FORCES FOR MEMBER 19,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	11.17	0.00	8	98.44	0.00	11			
	0.00	0.00	8	0.00	0.00	8	32.09 C	0.00	1
MIN.	-0.39	1.42	9	26.31	1.42	8			
	0.00	1.42	13	0.00	1.42	13	13.96 C	1.42	1

20	0.00	MAX.	20.66	13	90.87	11	0.00	13	0.00 13
		MIN.	9.22	9	26.31	8	0.00	13	0.00 13
	0.71	MAX.	18.10	13	77.82	11	0.00	13	0.00 13
		MIN.	7.45	9	15.53	8	0.00	13	0.00 13
	1.42	MAX.	15.54	13	66.60	11	0.00	13	0.00 13
		MIN.	5.67	9	6.02	8	0.00	13	0.00 13

MAX/MIN FORCES FOR MEMBER 20,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	20.66	0.00	13	90.87	0.00	11			
	0.00	0.00	8	0.00	0.00	8	32.09 C	0.00	1
MIN.	5.67	1.42	9	6.02	1.42	8			
	0.00	1.42	13	0.00	1.42	13	13.96 C	1.42	1

21	0.00	MAX.	35.57	13	66.60	11	0.00	13	0.00	13
		MIN.	16.52	9	6.02	8	0.00	13	0.00	13
	0.71	MAX.	33.01	13	42.99	11	0.00	13	0.00	13
		MIN.	14.74	9	-8.44	8	0.00	13	0.00	13
	1.42	MAX.	30.45	13	21.21	11	0.00	13	0.00	13
		MIN.	12.96	9	-21.63	8	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 21,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	35.57	0.00	13	66.60	0.00	11			
	0.00	0.00	8	0.00	0.00	8	32.09 C	0.00	1
MIN.	12.96	1.42	9	-21.63	1.42	8			
	0.00	1.42	13	0.00	1.42	13	13.96 C	1.42	1

22	0.00	MAX.	54.55	13	21.21	11	0.00	13	0.00	13
		MIN.	25.50	9	-21.63	8	0.00	13	0.00	13
	0.71	MAX.	51.99	13	-16.20	11	0.00	13	0.00	13
		MIN.	23.72	9	-40.05	8	0.00	13	0.00	13
	1.42	MAX.	49.43	13	-32.62	9	0.00	13	0.00	13
		MIN.	21.94	9	-62.59	13	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 22,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	54.55	0.00	13	21.21	0.00	11			
	0.00	0.00	8	0.00	0.00	8	32.09 C	0.00	1
MIN.	21.94	1.42	9	-62.59	1.42	13			
	0.00	1.42	13	0.00	1.42	13	13.96 C	1.42	1

23	0.00	MAX.	-13.96	11	-32.62	9	0.00	13	0.00	13
		MIN.	-32.09	10	-62.59	13	0.00	13	0.00	13
	0.57	MAX.	-10.08	11	-18.99	9	0.00	13	0.00	13
		MIN.	-24.98	10	-47.91	13	0.00	13	0.00	13
	1.15	MAX.	-6.53	11	-8.85	9	0.00	13	0.00	13
		MIN.	-19.79	8	-40.13	11	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 23,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD

MAX.	-6.53	1.15	11	-8.85	1.15	9				
	0.00	0.00	8	0.00	0.00	8	72.17 C	0.00	1	
MIN.	-32.09	0.00	10	-62.59	0.00	13				
	0.00	1.15	13	0.00	1.15	13	27.93 C	1.15		

24	0.00	MAX.	-6.53	11	-8.85	9	0.00	13	0.00	13
		MIN.	-19.79	8	-40.13	11	0.00	13	0.00	13
	0.57	MAX.	-3.31	11	-1.90	9	0.00	13	0.00	13
		MIN.	-15.25	8	-37.32	11	0.00	13	0.00	13
	1.15	MAX.	-0.41	11	2.65	10	0.00	13	0.00	13
		MIN.	-11.09	8	-36.26	11	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 24,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	-0.41	1.15	11	2.65	1.15	10			
	0.00	0.00	8	0.00	0.00	8	68.86 C	0.00	1
MIN.	-19.79	0.00	8	-40.13	0.00	11			
	0.00	1.15	13	0.00	1.15	13	25.63 C	1.15	

25	0.00	MAX.	-0.41	11	2.65	10	0.00	13	0.00	13
		MIN.	-11.09	8	-36.26	11	0.00	13	0.00	13
	0.57	MAX.	2.41	12	5.57	10	0.00	13	0.00	13
		MIN.	-7.32	8	-36.78	11	0.00	13	0.00	13
	1.15	MAX.	6.12	12	5.90	10	0.00	13	0.00	13
		MIN.	-3.93	8	-38.67	11	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 25,AMONGST ALL SECT LOCATIONS

	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	6.12	1.15	I2	5.90	1.15	10			
	0.00	0.00	8	0.00	0.00	8	65.54 C	0.00	1
MIN.	-11.09	0.00	8	-38.67	1.15	11			
	0.00	1.15	13	0.00	1.15	13	23.33 C	1.15	

26	0.00	MAX.	6.12	12	5.90	10	0.00	13	0.00	13
		MIN.	-3.93	8	-38.67	11	0.00	13	0.00	13
	0.57	MAX.	9.30	12	3.92	10	0.00	13	0.00	13
		MIN.	-0.93	8	-41.75	11	0.00	13	0.00	13
	1.15	MAX.	11.94	12	-0.05	10	0.00	13	0.00	13
		MIN.	1.68	8	-45.82	11	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 26, AMONGST ALL SECT LOCATIONS	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	11.94	1.15	12	5.90	0.00	10			
	0.00	0.00	8	0.00	0.00	8	62.23 C	0.00	1
MIN.	-3.93	0.00	8	-45.82	1.15	11			
	0.00	1.15	13	0.00	1.15	13	21.03 C	1.15	

27	0.00	MAX.	11.95	12	-0.05	10	0.00	13	0.00	13
		MIN.	1.68	8	-45.82	11	0.00	13	0.00	13
	0.57	MAX.	14.11	13	-2.82	8	0.00	13	0.00	13
		MIN.	3.91	8	-50.70	11	0.00	13	0.00	13
	1.15	MAX.	16.04	13	-5.61	8	0.00	13	0.00	13
		MIN.	5.75	8	-56.20	11	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 27, AMONGST ALL SECT LOCATIONS	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	16.04	1.15	13	-0.05	0.00	10			
	0.00	0.00	8	0.00	0.00	8	58.92 C	0.00	1
MIN.	1.68	0.00	8	-56.20	1.15	11			
	0.00	1.15	13	0.00	1.15	13	18.73 C	1.15	

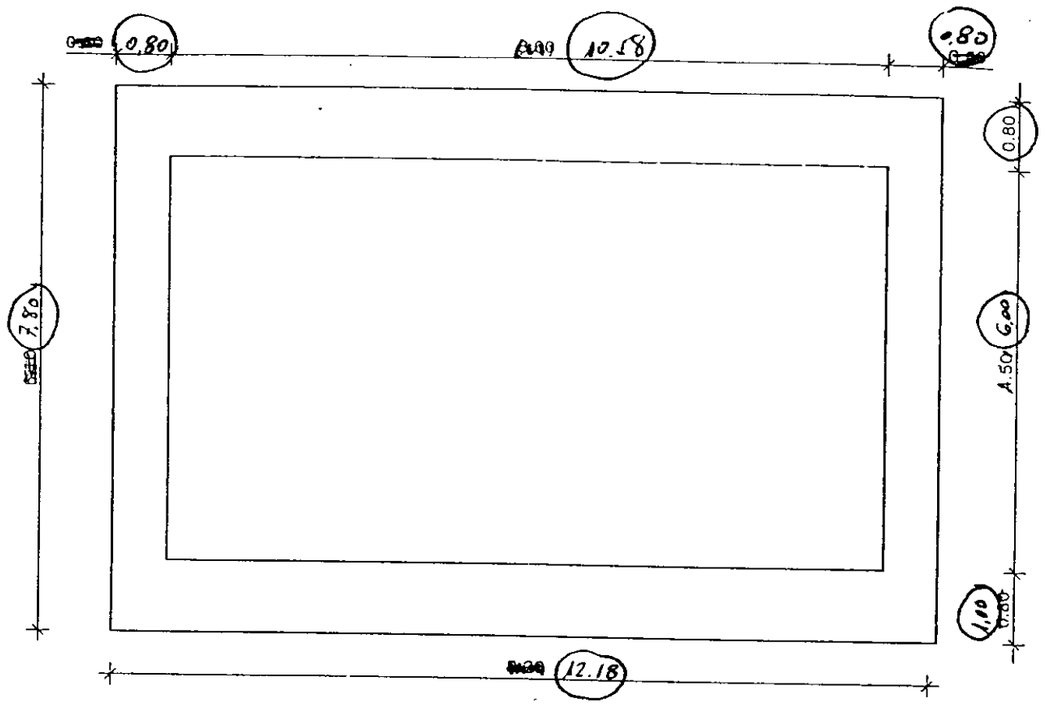
28	0.00	MAX.	16.04	13	-5.61	8	0.00	13	0.00	13
		MIN.	5.75	8	-56.20	11	0.00	13	0.00	13
	0.57	MAX.	17.86	13	-9.35	8	0.00	13	0.00	13
		MIN.	7.15	8	-64.65	12	0.00	13	0.00	13
	1.15	MAX.	18.72	13	-13.74	8	0.00	13	0.00	13
		MIN.	8.05	8	-74.42	12	0.00	13	0.00	13

MAX/MIN FORCES FOR MEMBER 28, AMONGST ALL SECT LOCATIONS	FY/ FZ	DIST	LD	MZ/ MY	DIST	LD	FX	DIST	LD
MAX.	18.72	1.15	13	-5.61	0.00	8			
	0.00	0.00	8	0.00	0.00	8	55.61 C	0.00	1
MIN.	5.75	0.00	8	-74.42	1.15	12			
	0.00	1.15	13	0.00	1.15	13	16.43 C	1.15	

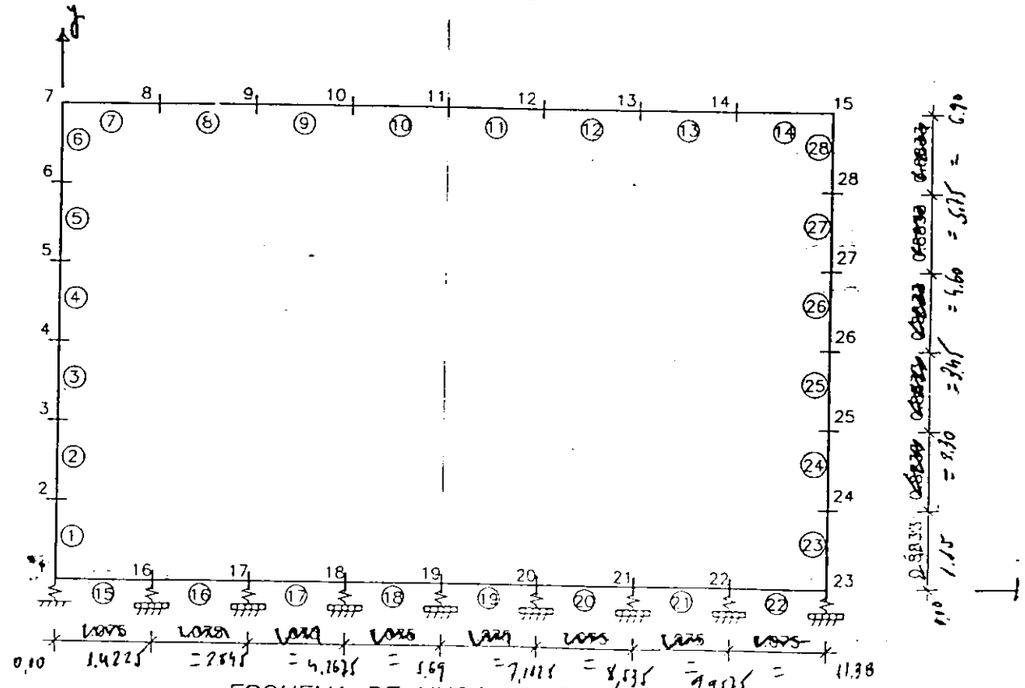
********** END OF FORCE ENVELOPE FROM INTERNAL STORAGE **********

111. FINISH

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



DEFINICION GEOMETRICA



ESQUEMA DE NUDOS Y BARRAS

Esfuerzos

LOSA SUPERIOR espesor = 0,80

Barra 7 Nudo 7 (Extremo izqdo)

M_d = 73.35 mt
N_d = 18.72 t
V_d = 51.99 t

Barra 10 Nudo 11 (Centro)

M_d = 79.17 mt
N_d = 10.81 t
V_d = 0.00 t

Barra 14 Nudo 15 (Extremo dcho)

M_d = 74.42 mt
N_d = 17.21 t
V_d = 52.36 t

Dimensionado LOSA SUPERIOR e = 0,80 m

$V_c = \frac{250}{1.5} \times 0.75 = 125.0$ t

$V_c \times d = 937.50$ mt $0.00 \times V_c = 0.0$ t

* A Flexión Simple

Extremo (izqdo)

Pore M_d = 73.35 mt.

$V_s = 1250 \left(1 - \sqrt{1 - \frac{2 \times M_d}{937.50}}\right) = 101.75$ t

A_s = 23 cm²/m → 10 ⌀ 20 / m

Centro

Pore M_d = 79.17 mt

$V_s = 1250 \left(1 - \sqrt{1 - \frac{2 \times M_d}{937.5}}\right) = 110.36$ t

A_s = 24.88 cm²/m 10 ⌀ 20 / m

Extremo (dcho)

Pore M_d = 74.42 mt.

$V_s = 1250 \left(1 - \sqrt{1 - \frac{2 \times M_d}{937.5}}\right) = 103.51$ t

A_s = 23.34 cm²/m 10 ⌀ 20 / m

LOSA SUPERIOR

A Cortante (Extremos)

$V_{cu} = 64.55 \times 0.75 = 48.41$ t.

$V_d = 52.30$ t.

A un canto del borde del apoyo

$V_{cu} > V_d$

Esfuerzos

LOSA INFERIOR esfuer = 1.00

Barra 15 Nudo 1 (Extremo izqdo)

$M_d = 64.88$ mt
$N_d = 24.01$ t
$V_d = 49.55$ t

Barra 18 Nudo 19 (Centro)

$M_d = 98.44$ mt
$N_d = 13.96$ t
$V_d = 7.88$ t

Barra 22 Nudo 23 (Extremo dcho)

$M_d = 67.59$ mt
$N_d = 29.17$ t
$V_d = 65.43$ t

Dimensionado

Losa inferior e = 1,00 m.

$V_c = \frac{2m}{1,5} \times 0,95 = 1583,33$ t.

$V_c \times d = 1504,17$ mt. $0,04 V_c = 63,33$ t.

* A flexión simple

Extremo (izqda) y Extremo (dcha)

Para $M_d = 64,88$ mt.

$U_s = 1583,33 \left(1 - \sqrt{1 - \frac{2 \times M_d}{1504,17}}\right) = 69,83$ t.

$A_s = 15,75$ cm²/m

Centro

Para $M_d = 98,44$ mt.

$U_s = 1583,33 \left(1 - \sqrt{1 - \frac{2 \times M_d}{1504,17}}\right) = 107,26$ t.

$A_s = 24,18$ cm²/m 18 ø 12 c/m

?

Losa inferior

* A cortante (extremos)

$V_{cu} = 64,55 \times 0,95 = 61,32$ t.

$V_d = 49,55$ t.

$V_{cu} > V_d$

Esfuerzos

Muro (Izdo) esfuer 0,80

Barra 1 Nudo 1 (Base)
$M_d = 64,88$ mt
$N_d = 71,20$ t
$V_d = 29,11$ t

Barra 3 Nudo 4 (centro)
$M_d = 38,67$ mt
$N_d = 61,75$ t
$V_d = 4,38$ t

Barra 6 Nudo 7 (Cabeza)
$M_d = 7,35$ mt
$N_d = 51,99$ t
$V_d = 18,72$

Muro (dcho)

Barra 23 Nudo 23 (Base)
$M_d = 62,59$ mt
$N_d = 71,50$ t
$V_d = 25,17$ t

Barra 25 Nudo 26 (centro)
$M_d = 38,67$ mt
$N_d = 61,75$ t
$V_d = 4,38$ t

Barra 28 Nudo 15 (Cabeza)
$M_d = 24,22$ mt
$N_d = 52,20$ t
$V_d = 17,71$ t

Dimensionado

Muro $e = 0,80$ m

$V_c = 0,9 \frac{25 m}{1,5} \times 0,75 = 11,25$ t

$V_{cx d} = 843,75$ mt

$0,45 V_c = 506,25$ t

$0,04 \times U_c = 45$ t

Base

- A Flexión Compuesta

$U_{s_2} = 5 k_{10} l_m$; $5 \times 0,79 = 3,95 \times \frac{5,1}{1,15} = 17,52$ t

$e_0 = \frac{M_d}{N_d} = \frac{64,88}{71,20} = 0,91$ m $e = 0,91 + \frac{0,70}{2} = 1,26$ m

$N_d \times e = 89,71$ mt

Con $N_d - U_{s_2} < 0,45 \times U_c$

$U_{s_1} = 11,25 \left(1 - \sqrt{1 - \frac{2 \times (89,71 - 17,26)}{843,75}}\right) + 17,52 - 71,20 = 54,81$ t

$A_s = 12,36$ cm²/m → $8 \phi 20$ /m

Armad exterior

- A Cortante

$V_{cu} = 48,11$ t

$V_d = 29,11$ t

$V_{cu} > V_d$

intecsa
INTERNACIONAL DE INGENIERIA Y ESTUDIOS TECNICOS, S.A

PROYECTO: _____ HOJA ___ DE ___

FECHA _____

EJECUTANTE: _____

Cabeza

- A Flexion Compuesto

$M_d = 5 \cdot 7 \cdot 10 \cdot 1,4 = 17,52\ t.$

$e_0 = \frac{73,35}{51,99} = 1,41\ m$ $\quad e = 1,41 + 0,35 = 1,76\ m$

$N_d \times e = 91,52\ mt$

Cam de $N_d = \mu_s < 0,45 \cdot U_c$

$\mu_s = 1,25\left(1 - \sqrt{1 - \frac{2 \times (91,52 - 12,16)}{84 b_1 f}}\right) + 1,25 \cdot 2 - 51,99 = 76,70\ t.$

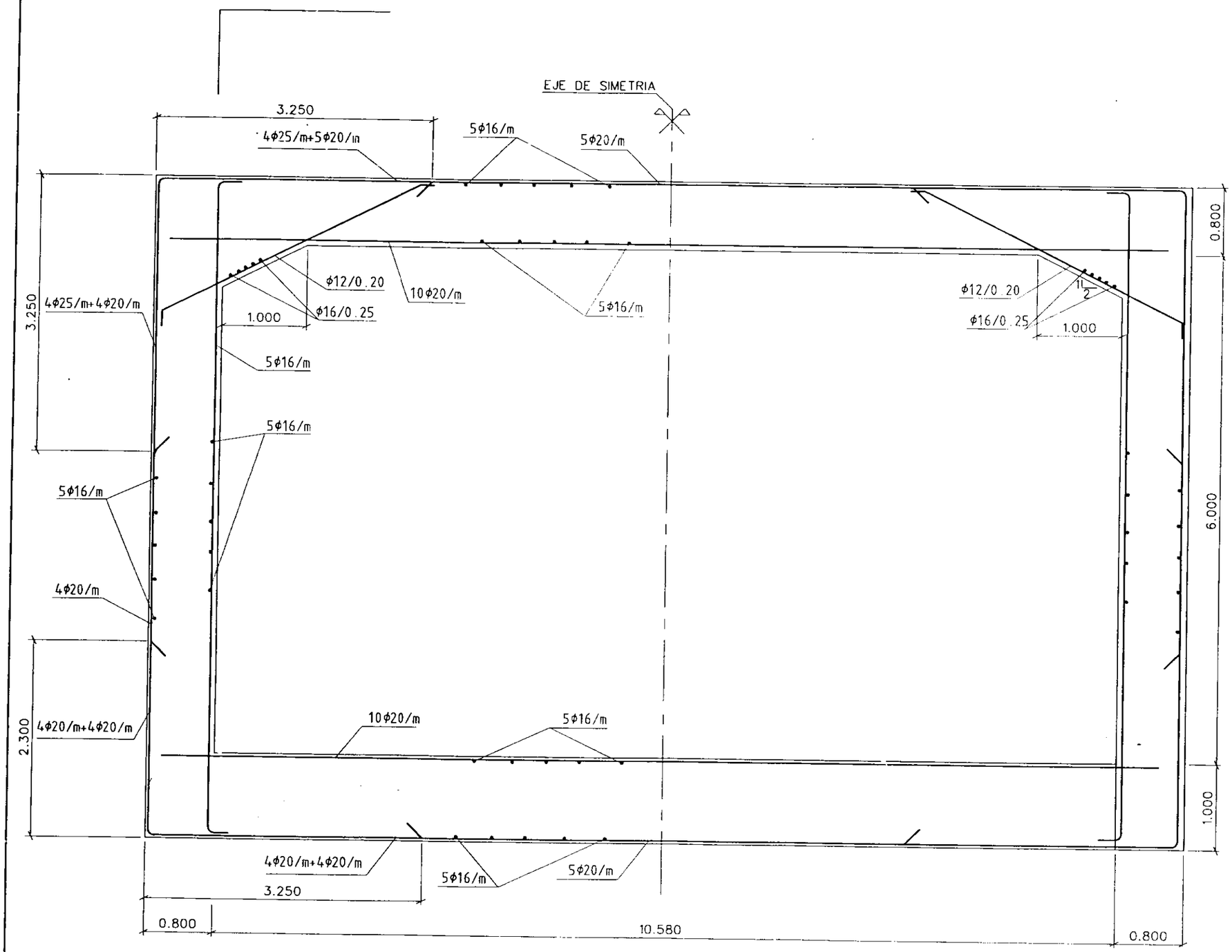
$A_s = 17,30\ cm^2/m$ $\quad 4 \phi 25/m$

Centro

$M_d = 17,52\ t$ $\quad e_0 = \frac{38,67}{61,75} = 0,63\ m$ $\quad e = 0,98\ m$ $\quad N_d \times e = 60,52\ mt$

$\mu_s = 1,25\left(1 - \sqrt{1 - \frac{2 \times (60,52 - 12,16)}{84 b_1 f}}\right) + 17,52 - 61,75 = < 0,45 \times U_c$

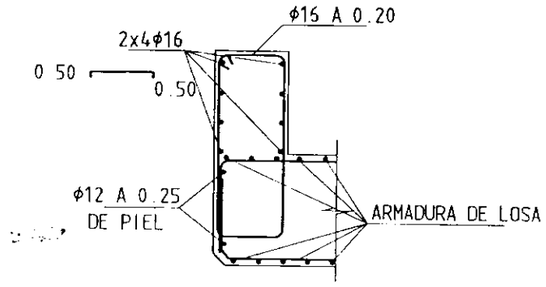
$A_s = \frac{0,45 \times U_c}{5,1} \times 1,15 = 10,15\ cm^2/m$ $\quad 5 \phi 20/m$



ARMADURA DE MARCO (SECCION PARALELA A LA ALINEACION DE LAS VIAS)

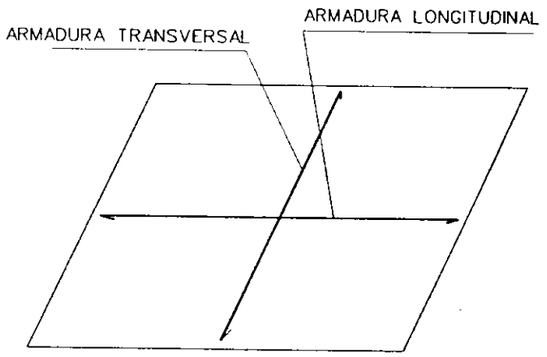
ESCALA 1:25

(*): LONGITUD DE SOLAPE 016=0.60



ARMADURA BORDE DE LOSA

ESCALA 1:25



ESQUEMA DE DISPOSICION DE ARMADURAS EN DINTEL Y SOLERA DE MARCO

SIN ESCALA

CONTROL DE CALIDAD

MATERIAL	DEFINICION		NIVEL DE CONTROL	COEFICIENTE DE SEGURIDAD
HORMIGON	NIVELACION	H-150	NORMAL	γ_c=1.50
	MARCO	H-250	NORMAL	γ_c=1.50
	MUROS ACOMPAÑAMIENTO	H-250	NORMAL	γ_c=1.50
ACERO	ARMADURAS PASIVAS	AEH-500	NORMAL	γ_s=1.15
EJECUCION	TODOS LOS ELEMENTOS		NORMAL	γ_f=1.60

NOTAS :

LOS RECUBRIMIENTOS DE LAS ARMADURAS SERAN DE 3.0 CM
LOS EMPALMES DE BARRAS SE HARAN POR SOLAPE TAL COMO INDICA LA INSTRUCCION EH-91

EDICION	FECHA	MODIFICACION
3	12-07-99	CARTELAS
2	07-07-99	ARMADURAS Y CAMBIO DE VUELO
1	12-05-99	DIMENSIONES Y ARMADURAS

GIF Gestor de Infraestructuras Ferroviarias

TITULO
PROYECTO CONSTRUCTIVO
LINEA DE ALTA VELOCIDAD
MADRID-BARCELONA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA
SUBTRAMO III. PLATAFORMA (MODIFICADO Nº 2)

EL INGENIERO DIRECTOR DEL PROYECTO
Fdo.: D. JOSE MANUEL CARBONELL

EL INGENIERO AUTOR:
Fdo.: D.

AUTOR U.T.E. Dragados TECSA

CONFORME POR EL CONTRATISTA
Fdo.: D. ALVARO FERNADEZ COTA

ESCALA 1:25

FECHA JUNIO 1999

TITULO DEL PLANO
ARMADURA DE MARCO
PASO INFERIOR 3

Nº DE PLANO 2.9.14

Hoja 4 de 7

30970012.DGN 12-05-1.999

3. RESUMEN CONTROL CALIDAD

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO P.I. 3

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	N°	RES. MEDIA	N°	RES. MEDIA	N°	RES. MEDIA					
100	150	29/07/99	Losa inf m,d	03030303	H-250	5	Blanda	2	246	3	302	1		100	26/08/99	II AL 42,5 R	255	
100	152	29/07/99	Losa inf m,d	03030303	H-250	9	Blanda	2	192	3	290	1		100	26/08/99	II AL 42,5 R	255	
106	158	30/07/99	Zap aleta 3 y 4	03030303	H-250	7	Blanda	2	266	3	336	1		96	30/08/99	II AL 42,5 R	270	
106	161	02/08/99	Zap aleta 1 y 2	03030303	H-250	6	Blanda	2	252	3	307	1		96	30/08/99	II AL 42,5 R	270	
115	169	03/08/99	Losa inf m,i	03030303	H-250	9	Blanda	2	249	3	297	1		100	31/08/99	II AL 42,5 R	261	
115	170	03/08/99	Losa inf m,i	03030303	H-250	5	Blanda	2	261	3	329	1		100	31/08/99	II AL 42,5 R	261	
131	189	10/08/99	Alzado 1,d	03030303	H-250	6	Blanda	2	230	3	261	1		96	16/09/99	II AL 42,5 R	230	
214	329	30/08/99	Losa sup m,d	03030303	H-250	8	Blanda	2	218	3	308	1		99	27/09/99	II AL 42,5 R	235	
218	330	30/08/99	Losa sup m,d	03030303	H-250	9	Blanda	2	230	3	269	1		99	27/09/99	II AL 42,5 R	237	
218	331	30/08/99	Losa sup m,d	03030303	H-250	6	Blanda	2	282	3	301	1		99	27/09/99	II AL 42,5 R	237	
223	341	31/08/99	Aleta 3 1ª	03030303	H-250	5	Blanda	2	208	3	289	1		100	28/09/99	II AL 42,5 R	230	
223	342	31/08/99	Aleta 3 1ª	03030303	H-250	10	Fluida	2	223	3	261	1		100	28/09/99	II AL 42,5 R	230	
238	363	02/09/99	Losa sup m,i	03030303	H-250	6	Blanda	2	209	3	259	1		100	30/09/99	II AL 42,5 R	228	
238	364	02/09/99	Losa sup m,i	03030303	H-250	7	Blanda	2	289	3	348	1		100	30/09/99	II AL 42,5 R	228	
261	404	07/09/99	Aleta 3	03030303	H-250	5	Blanda			3	334			100	06/10/99	II AL 42,5 R	294	
282	424	10/09/99	Aleta 2 2º	03030303	H-250	5	Blanda			3	272			100	11/10/99	II AL 42,5 R	239	
282	428	13/09/99	Aleta 4 2ª	03030303	H-250	6	Blanda			3	352			100	11/10/99	II AL 42,5 R	239	
311	467	17/09/99	Aletas 3 y 4	03030303	H-250	5	Blanda			3	355			100	18/10/99	II AL 42,5 R	312	

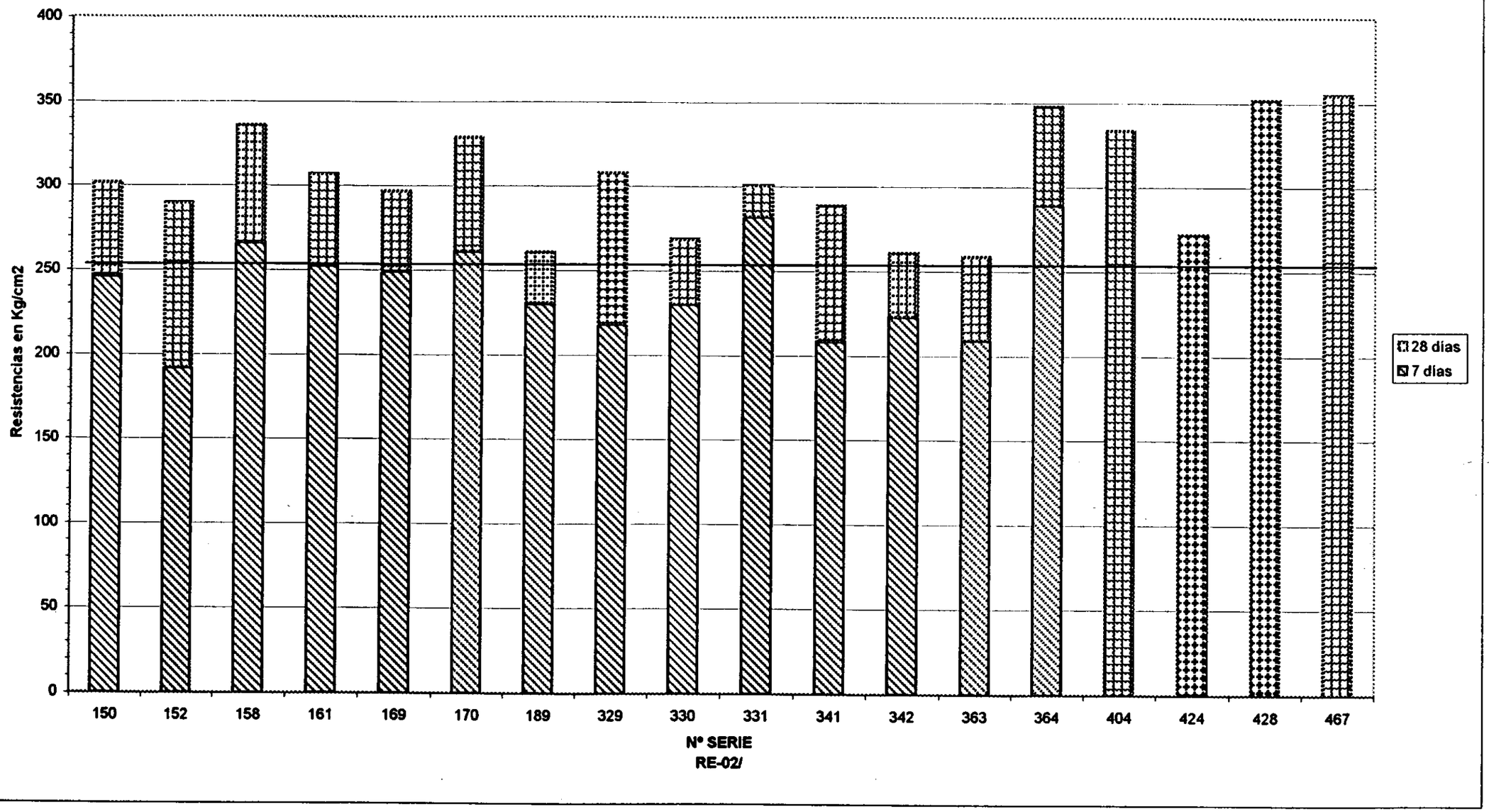
FECHA: FIRMA:

NOMBRE: Ana Mª Martín Herrrero

CARGO: Jefe de Laboratorio

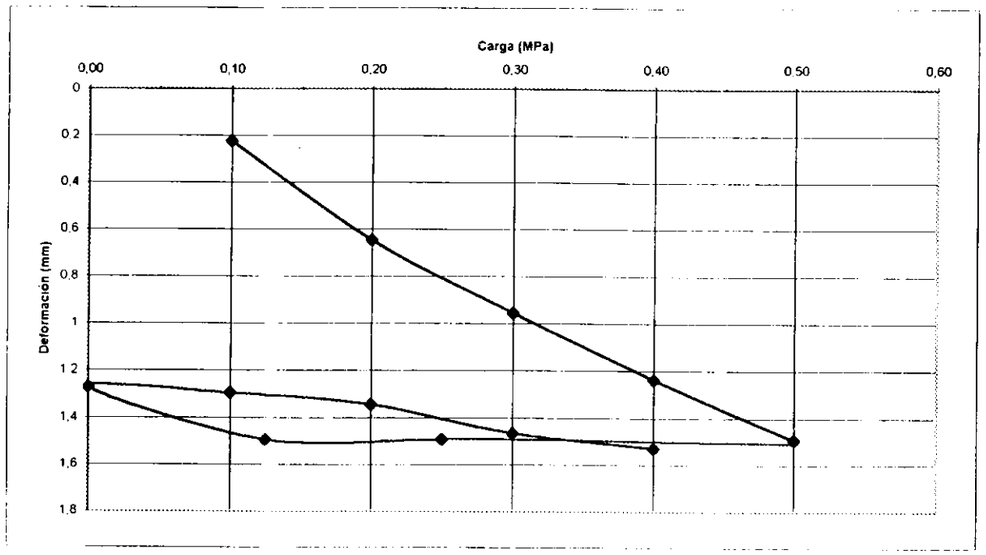
LOTE DE f. est. < 0,9 fck

RESISTENCIA DEL HORMIGON
P.I. 3



SAITEC SYNCONSULT S.L. UNIÓN TEMPORAL DE EMPRESAS	**ENSAYO DE PLACA CON CARGA** (DIN 18 134) OBRA: **LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA** **SUB-TRAMO III**

LOCALIZACIÓN	P.I. 3 Cuña de transición 2		
CÓDIGO DE TRAMIFICACIÓN:	03030303		**PK 311+076**
FECHA:	24/11/1999	**REF. MUESTRA:**	RE-08/ 15



	Módulos		Especifi.
	kp/cm2	Mpa	kp/cm2
Ev1	677	66	
Ev2	2799	274	1600
Ev2/Ev1	4,1	4,1	

OBSERVACIONES

Fecha	Firma	Cargo
		JEFE DE LABORATORIO
		Nombre: ANA MARTIN HERRERO

CARGAS Mpa	COMP 1 mm	COMP 2 mm	COMP 3 mm	MEDIAS mm	Asientos mm	B1	B2	B3	B4	AO	A1	A2
0,02	0,03	0,02	0,05	0,033333								
0,10	0,2	0,17	0,4	0,256667	0,223333	0,10	0,01	0,001	0,0001	0,2233333	0,0223333	0,0022333
0,20	0,6	0,56	0,88	0,68	0,646667	0,20	0,04	0,008	0,0016	0,6466667	0,1293333	0,0258667
0,30	0,88	0,86	1,23	0,99	0,956667	0,30	0,09	0,027	0,0081	0,9566667	0,287	0,0861
0,40	1,14	1,15	1,52	1,27	1,236667	0,40	0,16	0,064	0,0256	1,2366667	0,4946667	0,1978667
0,50	1,37	1,4	1,8	1,523333	1,49	0,50	0,25	0,125	0,0625	1,49	0,745	0,3725
						1,50	**0,55**	**0,23**	**0,10**	**4,55**	**1,68**	**0,68**
0,25	1,37	1,4	1,8	1,523333	1,49							
0,13	1,4	1,38	1,8	1,526667	1,493333							
0,00	1,21	1,1	1,6	1,303333	1,27							
0,10	1,21	1,18	1,6	1,33	1,296667	0,10	0,01	0,001	0,0001	1,2966667	0,1296667	0,0129667
0,20	1,26	1,27	1,6	1,376667	1,343333	0,20	0,04	0,008	0,0016	1,3433333	0,2686667	0,0537333
0,30	1,35	1,38	1,78	1,496667	1,463333	0,30	0,09	0,027	0,0081	1,4633333	0,439	0,1317
0,40	1,41	1,43	1,85	1,563333	1,53	0,40	0,16	0,064	0,0256	1,53	0,612	0,2448
						1,00	**0,30**	**0,10**	**0,04**	**5,63**	**1,45**	**0,44**

	1º CICLO	2º CICLO
n	5,00	4
B1	1,50	1,00
B2	0,55	0,30
B3	0,23	0,10
B4	0,10	0,04
A0	4,55	5,63
A1	1,68	1,45
A2	0,68	0,44
X	3,12333	0,82
Y	0,6	0,5
a2	-2,64286	0,5
a1	4,70905	0,57
a0	-0,21133	1,22833
E	66,4183	274,39
	677,5	2799

E1/E2	4,13124

PASO INFERIOR 4

PASO INFERIOR 4

ÍNDICE

1. DESCRIPCIÓN Y DEFINICIÓN
2. CÁLCULOS
3. RESUMEN DEL CONTROL DE CALIDAD

1. DESCRIPCIÓN Y DEFINICIÓN

CALCULO DE MARCOS CERRADOS UNICELULARES

El siguiente programa calcula los esfuerzos en un marco cerrado unicelular a partir de las dimensiones geométricas del mismo y sometido a las acciones de su peso propio, del terreno y de las sobrecargas de uso. A partir de estros esfuerzos el programa arma las secciones a flexocompresión simple y comprueba la resistencia a cortante de las mismas, así como las tensiones máximas transmitidas al terreno.

DATOS GEOMÉTRICOS

Gálibo vertical (GV):	5,90	m.
Gálibo horizontal (GH):	8,00	m.
Espesor de dintel (ED):	0,70	m.
Espesor de solera (ESOL):	1,00	m.
Espesor de hastial (EH):	0,70	m.
Longitud cartela dintel:	1,00	m.
Canto adicional cartela:	0,50	m.

DATOS DEL TERRENO

Altura de tierras sobre el dintel (HT):	1,80	m.
Peso específico de las tierras (γ):	2.10	T/m³
Coeficiente de balasto (K):	5000	T/m³
Empuje activo del terreno (λ_a):	0.33	
Empuje al reposo del terreno (λ_r):	0.50	

SOBRECARGAS DE USO

Carretera:

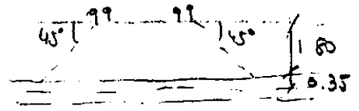
Sobrecarga uniforme:	0.4	T/m²
Vehículo pesado:	60	T.
Sobrecarga en trasdós:	1.0	T/m²

Ferrocarril:

Sobrecarga uniforme tren tipo B (abierto a 45º hasta plano medio del dintel): 3,36 T/m²
Sobrecarga en trasdós: 3.0 T/m²

Sobrecarga:

2 Trenes 12T/m.



Coef. de impacto:

$$\phi_o = \frac{1{,}14\sqrt{8{,}70}}{3{,}10 - 1{,}76\sqrt{8{,}70} + 8{,}70} = 50{,}88\% = 0{,}51 \qquad \phi_{red} = 0{,}51 - \frac{1{,}80 - 1{,}00}{10{,}00} = 0{,}43$$

$$q = \frac{2 \times 12 \times 1{,}43}{(5{,}90 + 2 \times 2{,}15)} = 3{,}36\ T/m^2$$

DATOS DE LOS MATERIALES

Hormigón:
- f_{ck}: 250 kg/cm²
- γ_c: 1.50

Acero:
- f_{yk}: 5100 kg/cm²
- γ_s: 1.15

Recubrimiento mecánico de armaduras: 4 cm.

COEFICIENTES DE MAYORACION DE ACCIONES

Peso propio marco:
- Efecto desfavorable: $\gamma_{pp1} = 1.60$
- Efecto favorable: $\gamma_{pp2} = 0.90$

Acción de las tierras (Peso y empuje):
- Efecto desfavorable: $\gamma_{t1} = 1.60$
- Efecto favorable: $\gamma_{t2} = 0.90$

Sobrecargas de uso:
- Efecto desfavorable: $\gamma_{sc1} = 1.60$
- Efecto favorable: $\gamma_{sc2} = 0$

HIPÓTESIS DE CALCULO

Se consideran las siguientes hipótesis de cálculo:

H1: Peso propio marco.
H2: Peso de tierras.
H3: Empuje activo de tierras.
H4: Empuje al reposo de tierras.
H5: Sobrecargas de uso.

Esta última hipótesis de sobrecargas de uso tiene los siguientes componentes:

- Sobrecarga uniforme.(400 kg/m² en carretera y tren tipo B en ferrocarril)
- Vehiculo pesado. Esta acción se asimila a una sobrecarga uniforme, abriendo a 45° hasta el centro de gravedad del dintel. Si el vehículo tiene de dimensiones en planta AxB, la carga equivalente será:

$$\frac{Q}{(A + 2 \times HT + ED)\ (B + 2 \times HT + ED)}$$

- Sobrecarga en el trasdós. Empuje debido a la sobrecarga en el trasdós con el coeficiente de empuje al reposo.

COMBINACIONES DE HIPÓTESIS

Se consideran las siguientes combinaciones de hipótesis:

C1: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C2: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C3: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C4: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C5: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C6: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C7: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$
C8: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$

Con estas combinaciones se obtienen los esfuerzos pésimos en las barras del modelo.

ARMADO DEL MARCO

Con los esfuerzos pésimos obtenidos anteriormente, se arman las secciones definidas en el modelo de cálculo a flexocompresión simple. Se obtienen asimismo las armaduras a disponer por cuantía mínima geométrica.

COMPROBACIÓN A CORTANTE

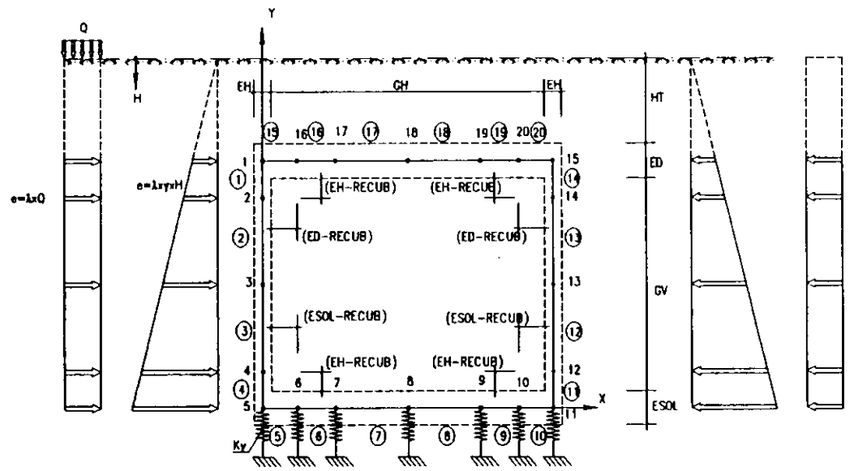
Se realiza la comprobación a cortante de las secciones para verificar si la contribución a cortante del hormigón es suficiente para absorber el cortante de cálculo hallado. Si no se cumple esta condición se obtiene la armadura necesaria.
Para la comprobación a cortante se han introducido en el modelo nudos a una distancia de un canto útil del paramento para verificar en ellos el cortante de cálculo y no en los nudos extremos.

COMPROBACIÓN DE TENSIONES SOBRE EL TERRENO

Para el cálculo de la tensión máxima transmitida al terreno se obtiene el movimiento máximo vertical en los nudos de la solera. La tensión será por tanto:

$$\sigma = K_{balasto} \times \delta_{max}$$

A continuación figuran los resultados del cálculo.



MODELO DE CALCULO

2. CÁLCULOS

CARACTERISTICAS DE LOS NUDOS

Nudo	Coordenadas X	Coordenadas Y	coacc xyz	Constantes Muelles Kx	Constantes Muelles Ky	Constantes Muelles Kz
1	0.000	6.500				
2	0.000	5.740				
3	0.000	3.450				
4	0.000	1.160				
5	0.000	0.000			5.025E+03	
6	1.310	0.000			5.438E+03	
7	2.175	0.000			7.600E+03	
8	4.350	0.000	100		1.088E+04	
9	6.525	0.000			7.600E+03	
10	7.390	0.000			5.438E+03	
11	8.700	0.000			5.025E+03	
12	8.700	1.160				
13	8.700	3.450				
14	8.700	5.740				
15	8.700	6.500				
16	1.010	6.665				
17	1.350	6.750				
18	4.350	6.750				
19	7.350	6.750				
20	7.690	6.665				

CARACTERISTICAS DE LAS BARRAS

Barra	Nd	Nf	I	A	E
1	1	2	0.028583	0.700000	3.004E+06
2	2	3	0.028583	0.700000	3.004E+06
3	3	4	0.028583	0.700000	3.004E+06
4	4	5	0.028583	0.700000	3.004E+06
5	5	6	0.083333	1.000000	3.004E+06
6	6	7	0.083333	1.000000	3.004E+06
7	7	8	0.083333	1.000000	3.004E+06
8	8	9	0.083333	1.000000	3.004E+06
9	9	10	0.083333	1.000000	3.004E+06
10	10	11	0.083333	1.000000	3.004E+06
11	11	12	0.028583	0.700000	3.004E+06
12	12	13	0.028583	0.700000	3.004E+06
13	13	14	0.028583	0.700000	3.004E+06
14	14	15	0.028583	0.700000	3.004E+06
15	1	16	0.092393	1.035000	3.004E+06
16	16	17	0.040311	0.785000	3.004E+06
17	17	18	0.028583	0.700000	3.004E+06
18	18	19	0.028583	0.700000	3.004E+06
19	19	20	0.040311	0.785000	3.004E+06
20	20	15	0.092393	1.035000	3.004E+06

CARGAS EN BARRAS

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
1	1	Q unif	1.750	0.000	0.000	270.00
	2	Q unif	1.750	0.000	0.000	270.00
	3	Q unif	1.750	0.000	0.000	270.00
	4	Q unif	1.750	0.000	0.000	270.00
	5	Q unif	2.500	0.000	0.000	270.00
	6	Q unif	2.500	0.000	0.000	270.00
	7	Q unif	2.500	0.000	0.000	270.00
	8	Q unif	2.500	0.000	0.000	270.00
	9	Q unif	2.500	0.000	0.000	270.00
	10	Q unif	2.500	0.000	0.000	270.00
	11	Q unif	1.750	0.000	0.000	270.00
	12	Q unif	1.750	0.000	0.000	270.00
	13	Q unif	1.750	0.000	0.000	270.00
	14	Q unif	1.750	0.000	0.000	270.00
	15	Q unif	2.588	0.000	0.000	270.00
	16	Q unif	1.963	0.000	0.000	270.00
	17	Q unif	1.750	0.000	0.000	270.00
	18	Q unif	1.750	0.000	0.000	270.00
	19	Q unif	1.963	0.000	0.000	270.00
	20	Q unif	2.588	0.000	0.000	270.00
2	15	Q unif	3.780	0.000	0.000	270.00
	16	Q unif	3.780	0.000	0.000	270.00
	17	Q unif	3.780	0.000	0.000	270.00
	18	Q unif	3.780	0.000	0.000	270.00
	19	Q unif	3.780	0.000	0.000	270.00
	20	Q unif	3.780	0.000	0.000	270.00
3	1	Q unif	1.840	0.000	0.000	0.00
	2	Q unif	2.983	0.000	0.000	0.00
	3	Q unif	4.570	0.000	0.000	0.00
	4	Q unif	5.766	0.000	0.000	0.00
	11	Q unif	5.766	0.000	0.000	180.00
	12	Q unif	4.570	0.000	0.000	180.00
	13	Q unif	2.983	0.000	0.000	180.00
	14	Q unif	1.840	0.000	0.000	180.00
4	1	Q unif	2.788	0.000	0.000	0.00
	2	Q unif	4.520	0.000	0.000	0.00
	3	Q unif	6.925	0.000	0.000	0.00
	4	Q unif	8.736	0.000	0.000	0.00
	11	Q unif	8.736	0.000	0.000	180.00
	12	Q unif	6.925	0.000	0.000	180.00
	13	Q unif	4.520	0.000	0.000	180.00
	14	Q unif	2.788	0.000	0.000	180.00

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
5	1	Q unif	1.500	0.000	0.000	0.00
	2	Q unif	1.500	0.000	0.000	0.00
	3	Q unif	1.500	0.000	0.000	0.00
	4	Q unif	1.500	0.000	0.000	0.00
	11	Q unif	1.500	0.000	0.000	180.00
	12	Q unif	1.500	0.000	0.000	180.00
	13	Q unif	1.500	0.000	0.000	180.00
	14	Q unif	1.500	0.000	0.000	180.00
6	15	Q unif	3.360	0.000	0.000	270.00
	16	Q unif	3.360	0.000	0.000	270.00
	17	Q unif	3.360	0.000	0.000	270.00
	18	Q unif	3.360	0.000	0.000	270.00
	19	Q unif	3.360	0.000	0.000	270.00
	20	Q unif	3.360	0.000	0.000	270.00
7	15	Q unif	0.000	0.000	0.000	270.00
	16	Q unif	0.000	0.000	0.000	270.00
	17	Q unif	0.000	0.000	0.000	270.00
	18	Q unif	0.000	0.000	0.000	270.00
	19	Q unif	0.000	0.000	0.000	270.00
	20	Q unif	0.000	0.000	0.000	270.00

HIPOTESIS COMPUESTAS

Hipotesis compuesta 1

PESO PROPIO MARCO
Tipo : Acciones permanentes
Hipotesis basicas : 1

Hipotesis compuesta 2

ESO TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 2

Hipotesis compuesta 3

EMPUJE ACTIVO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 3

Hipotesis compuesta 4

EMPUJE REPOSO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 4

Hipotesis compuesta 5

SOBRECARGAS DE USO
Tipo : Sobrecargas compatibles
Hipotesis basicas : 5 6 7

COMBINACIONES

Combinacion 1

C1

Hip.comp.	Coeficiente
1	1.600
2	1.600
3	1.600
5	1.600

Combinacion 2

C2

Hip.comp.	Coeficiente
1	0.900
2	1.600
3	1.600
5	1.600

Combinacion 3

C3

Hip.comp.	Coeficiente
1	1.600
2	0.900
3	0.900
5	1.600

Combinacion 4

C4

Hip.comp.	Coeficiente
1	0.900
2	0.900
3	0.900
5	1.600

Combinacion 5

C5

Hip.comp.	Coeficiente
1	1.600
2	1.600
4	1.600
5	1.600

Combinacion 6

C6

Hip.comp.	Coeficiente
1	0.900
2	1.600
4	1.600
5	1.600

Combinacion 7

C7

Hip.comp.	Coeficiente
1	1.600
2	0.900
4	0.900
5	1.600

Combinacion 8

C8

Hip.comp.	Coeficiente
1	0.900
2	0.900
4	0.900
5	1.600

MOVIMIENTOS HIPOTESIS COMPUESTAS (*1000)

Nudo	Hip		Dx	Dy	Wz
1	1	Dx+	-0.062	-1.753	-0.243
		Dx-	-0.062	-1.753	-0.243
		Dy+	-0.062	-1.753	-0.243
		Dy-	-0.062	-1.753	-0.243
		Wz+	-0.062	-1.753	-0.243
		Wz-	-0.062	-1.753	-0.243
	2	Dx+	-0.106	-1.166	-0.422
		Dx-	-0.106	-1.166	-0.422
		Dy+	-0.106	-1.166	-0.422
		Dy-	-0.106	-1.166	-0.422
		Wz+	-0.106	-1.166	-0.422
		Wz-	-0.106	-1.166	-0.422
	3	Dx+	0.074	0.220	0.241
		Dx-	0.074	0.220	0.241
		Dy+	0.074	0.220	0.241
		Dy-	0.074	0.220	0.241
		Wz+	0.074	0.220	0.241
		Wz-	0.074	0.220	0.241
	4	Dx+	0.112	0.333	0.366
		Dx-	0.112	0.333	0.366
		Dy+	0.112	0.333	0.366
		Dy-	0.112	0.333	0.366
		Wz+	0.112	0.333	0.366
		Wz-	0.112	0.333	0.366
	5	Dx+	0.032	0.082	0.101
		Dx-	-0.094	-1.037	-0.375
		Dy+	0.032	0.082	0.101
		Dy-	-0.094	-1.037	-0.375
		Wz+	0.032	0.082	0.101
		Wz-	-0.094	-1.037	-0.375
2	1	Dx+	-0.223	-1.749	-0.180
		Dx-	-0.223	-1.749	-0.180
		Dy+	-0.223	-1.749	-0.180
		Dy-	-0.223	-1.749	-0.180
		Wz+	-0.223	-1.749	-0.180
		Wz-	-0.223	-1.749	-0.180
	2	Dx+	-0.373	-1.160	-0.283
		Dx-	-0.373	-1.160	-0.283
		Dy+	-0.373	-1.160	-0.283
		Dy-	-0.373	-1.160	-0.283

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.373	-1.160	-0.283
		Wz-	-0.373	-1.160	-0.283
	3	Dx+	0.263	0.220	0.245
		Dx-	0.263	0.220	0.245
		Dy+	0.263	0.220	0.245
		Dy-	0.263	0.220	0.245
		Wz+	0.263	0.220	0.245
		Wz-	0.263	0.220	0.245
	4	Dx+	0.398	0.333	0.372
		Dx-	0.398	0.333	0.372
		Dy+	0.398	0.333	0.372
		Dy-	0.398	0.333	0.372
		Wz+	0.398	0.333	0.372
		Wz-	0.398	0.333	0.372
	5	Dx+	0.110	0.082	0.100
		Dx-	-0.332	-1.031	-0.251
		Dy+	0.110	0.082	0.100
		Dy-	-0.332	-1.031	-0.251
		Wz+	0.110	0.082	0.100
		Wz-	-0.332	-1.031	-0.251
3	1	Dx+	-0.427	-1.736	-0.001
		Dx-	-0.427	-1.736	-0.001
		Dy+	-0.427	-1.736	-0.001
		Dy-	-0.427	-1.736	-0.001
		Wz+	-0.427	-1.736	-0.001
		Wz-	-0.427	-1.736	-0.001
	2	Dx+	-0.623	-1.142	0.041
		Dx-	-0.623	-1.142	0.041
		Dy+	-0.623	-1.142	0.041
		Dy-	-0.623	-1.142	0.041
		Wz+	-0.623	-1.142	0.041
		Wz-	-0.623	-1.142	0.041
	3	Dx+	0.604	0.220	0.009
		Dx-	0.604	0.220	0.009
		Dy+	0.604	0.220	0.009
		Dy-	0.604	0.220	0.009
		Wz+	0.604	0.220	0.009
		Wz-	0.604	0.220	0.009
	4	Dx+	0.915	0.333	0.014
		Dx-	0.915	0.333	0.014
		Dy+	0.915	0.333	0.014
		Dy-	0.915	0.333	0.014
		Wz+	0.915	0.333	0.014
		Wz-	0.915	0.333	0.014

Nudo	Hip		Dx	Dy	Wz
	5	Dx+	0.239	0.082	-0.003
		Dx-	-0.554	-1.015	0.037
		Dy+	0.239	0.082	-0.003
		Dy-	-0.554	-1.015	0.037
		Wz+	-0.554	-1.015	0.037
		Wz-	0.239	0.082	-0.003
4	1	Dx+	-0.237	-1.719	0.165
		Dx-	-0.237	-1.719	0.165
		Dy+	-0.237	-1.719	0.165
		Dy-	-0.237	-1.719	0.165
		Wz+	-0.237	-1.719	0.165
		Wz-	-0.237	-1.719	0.165
	2	Dx+	-0.291	-1.124	0.225
		Dx-	-0.291	-1.124	0.225
		Dy+	-0.291	-1.124	0.225
		Dy-	-0.291	-1.124	0.225
		Wz+	-0.291	-1.124	0.225
		Wz-	-0.291	-1.124	0.225
	3	Dx+	0.288	0.220	-0.241
		Dx-	0.288	0.220	-0.241
		Dy+	0.288	0.220	-0.241
		Dy-	0.288	0.220	-0.241
		Wz+	0.288	0.220	-0.241
		Wz-	0.288	0.220	-0.241
	4	Dx+	0.436	0.333	-0.365
		Dx-	0.436	0.333	-0.365
		Dy+	0.436	0.333	-0.365
		Dy-	0.436	0.333	-0.365
		Wz+	0.436	0.333	-0.365
		Wz-	0.436	0.333	-0.365
	5	Dx+	0.107	0.082	-0.093
		Dx-	-0.258	-0.999	0.200
		Dy+	0.107	0.082	-0.093
		Dy-	-0.258	-0.999	0.200
		Wz+	-0.258	-0.999	0.200
		Wz-	0.107	0.082	-0.093
5	1	Dx+	-0.000	-1.709	0.243
		Dx-	-0.000	-1.709	0.243
		Dy+	-0.000	-1.709	0.243
		Dy-	-0.000	-1.709	0.243
		Wz+	-0.000	-1.709	0.243
		Wz-	-0.000	-1.709	0.243
	2	Dx+	-0.003	-1.115	0.264
		Dx-	-0.003	-1.115	0.264

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.003	-1.115	0.264
		Dy-	-0.003	-1.115	0.264
		Wz+	-0.003	-1.115	0.264
		Wz-	-0.003	-1.115	0.264
	3	Dx+	0.024	0.220	-0.180
		Dx-	0.024	0.220	-0.180
		Dy+	0.024	0.220	-0.180
		Dy-	0.024	0.220	-0.180
		Wz+	0.024	0.220	-0.180
		Wz-	0.024	0.220	-0.180
	4	Dx+	0.036	0.333	-0.273
		Dx-	0.036	0.333	-0.273
		Dy+	0.036	0.333	-0.273
		Dy-	0.036	0.333	-0.273
		Wz+	0.036	0.333	-0.273
		Wz-	0.036	0.333	-0.273
	5	Dx+	0.008	0.082	-0.067
		Dx-	-0.003	-0.991	0.235
		Dy+	0.008	0.082	-0.067
		Dy-	-0.003	-0.991	0.235
		Wz+	-0.003	-0.991	0.235
		Wz-	0.008	0.082	-0.067
6	1	Dx+	-0.000	-1.390	0.229
		Dx-	-0.000	-1.390	0.229
		Dy+	-0.000	-1.390	0.229
		Dy-	-0.000	-1.390	0.229
		Wz+	-0.000	-1.390	0.229
		Wz-	-0.000	-1.390	0.229
	2	Dx+	-0.002	-0.780	0.235
		Dx-	-0.002	-0.780	0.235
		Dy+	-0.002	-0.780	0.235
		Dy-	-0.002	-0.780	0.235
		Wz+	-0.002	-0.780	0.235
		Wz-	-0.002	-0.780	0.235
	3	Dx+	0.017	0.026	-0.118
		Dx-	0.017	0.026	-0.118
		Dy+	0.017	0.026	-0.118
		Dy-	0.017	0.026	-0.118
		Wz+	0.017	0.026	-0.118
		Wz-	0.017	0.026	-0.118
	4	Dx+	0.025	0.039	-0.178
		Dx-	0.025	0.039	-0.178
		Dy+	0.025	0.039	-0.178
		Dy-	0.025	0.039	-0.178

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.025	0.039	-0.178
		Wz-	0.025	0.039	-0.178
	5	Dx+	0.005	0.010	-0.044
		Dx-	-0.002	-0.693	0.209
		Dy+	0.005	0.010	-0.044
		Dy-	-0.002	-0.693	0.209
		Wz+	-0.002	-0.693	0.209
		Wz-	0.005	0.010	-0.044
7	1	Dx+	-0.000	-1.212	0.178
		Dx-	-0.000	-1.212	0.178
		Dy+	-0.000	-1.212	0.178
		Dy-	-0.000	-1.212	0.178
		Wz+	-0.000	-1.212	0.178
		Wz-	-0.000	-1.212	0.178
	2	Dx+	-0.002	-0.598	0.181
		Dx-	-0.002	-0.598	0.181
		Dy+	-0.002	-0.598	0.181
		Dy-	-0.002	-0.598	0.181
		Wz+	-0.002	-0.598	0.181
		Wz-	-0.002	-0.598	0.181
	3	Dx+	0.012	-0.060	-0.081
		Dx-	0.012	-0.060	-0.081
		Dy+	0.012	-0.060	-0.081
		Dy-	0.012	-0.060	-0.081
		Wz+	0.012	-0.060	-0.081
		Wz-	0.012	-0.060	-0.081
	4	Dx+	0.018	-0.091	-0.122
		Dx-	0.018	-0.091	-0.122
		Dy+	0.018	-0.091	-0.122
		Dy-	0.018	-0.091	-0.122
		Wz+	0.018	-0.091	-0.122
		Wz-	0.018	-0.091	-0.122
	5	Dx+	0.004	-0.022	-0.030
		Dx-	-0.001	-0.532	0.161
		Dy+	0.000	0.000	0.000
		Dy-	0.002	-0.554	0.131
		Wz+	-0.001	-0.532	0.161
		Wz-	0.004	-0.022	-0.030
8	1	Dx+	0.000	-1.009	-0.000
		Dx-	0.000	-1.009	-0.000
		Dy+	0.000	-1.009	-0.000
		Dy-	0.000	-1.009	-0.000
		Wz+	0.000	-1.009	-0.000
		Wz-	0.000	-1.009	-0.000

Nudo	Hip		Dx	Dy	Wz
	2	Dx+	0.000	-0.394	-0.000
		Dx-	0.000	-0.394	-0.000
		Dy+	0.000	-0.394	-0.000
		Dy-	0.000	-0.394	-0.000
		Wz+	0.000	-0.394	-0.000
		Wz-	0.000	-0.394	-0.000
	3	Dx+	-0.000	-0.145	-0.000
		Dx-	-0.000	-0.145	-0.000
		Dy+	-0.000	-0.145	-0.000
		Dy-	-0.000	-0.145	-0.000
		Wz+	-0.000	-0.145	-0.000
		Wz-	-0.000	-0.145	-0.000
	4	Dx+	-0.000	-0.220	-0.000
		Dx-	-0.000	-0.220	-0.000
		Dy+	-0.000	-0.220	-0.000
		Dy-	-0.000	-0.220	-0.000
		Wz+	-0.000	-0.220	-0.000
		Wz-	-0.000	-0.220	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.000	0.000
		Dy-	0.000	-0.404	-0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
9	1	Dx+	0.000	-1.212	-0.178
		Dx-	0.000	-1.212	-0.178
		Dy+	0.000	-1.212	-0.178
		Dy-	0.000	-1.212	-0.178
		Wz+	0.000	-1.212	-0.178
		Wz-	0.000	-1.212	-0.178
	2	Dx+	0.002	-0.598	-0.181
		Dx-	0.002	-0.598	-0.181
		Dy+	0.002	-0.598	-0.181
		Dy-	0.002	-0.598	-0.181
		Wz+	0.002	-0.598	-0.181
		Wz-	0.002	-0.598	-0.181
	3	Dx+	-0.012	-0.060	0.081
		Dx-	-0.012	-0.060	0.081
		Dy+	-0.012	-0.060	0.081
		Dy-	-0.012	-0.060	0.081
		Wz+	-0.012	-0.060	0.081
		Wz-	-0.012	-0.060	0.081
	4	Dx+	-0.018	-0.091	0.122
		Dx-	-0.018	-0.091	0.122

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.018	-0.091	0.122
		Dy-	-0.018	-0.091	0.122
		Wz+	-0.018	-0.091	0.122
		Wz-	-0.018	-0.091	0.122
	5	Dx+	0.001	-0.532	-0.161
		Dx-	-0.004	-0.022	0.030
		Dy+	0.000	0.000	0.000
		Dy-	-0.002	-0.554	-0.131
		Wz+	-0.004	-0.022	0.030
		Wz-	0.001	-0.532	-0.161
10	1	Dx+	0.000	-1.390	-0.229
		Dx-	0.000	-1.390	-0.229
		Dy+	0.000	-1.390	-0.229
		Dy-	0.000	-1.390	-0.229
		Wz+	0.000	-1.390	-0.229
		Wz-	0.000	-1.390	-0.229
	2	Dx+	0.002	-0.780	-0.235
		Dx-	0.002	-0.780	-0.235
		Dy+	0.002	-0.780	-0.235
		Dy-	0.002	-0.780	-0.235
		Wz+	0.002	-0.780	-0.235
		Wz-	0.002	-0.780	-0.235
	3	Dx+	-0.017	0.026	0.118
		Dx-	-0.017	0.026	0.118
		Dy+	-0.017	0.026	0.118
		Dy-	-0.017	0.026	0.118
		Wz+	-0.017	0.026	0.118
		Wz-	-0.017	0.026	0.118
	4	Dx+	-0.025	0.039	0.178
		Dx-	-0.025	0.039	0.178
		Dy+	-0.025	0.039	0.178
		Dy-	-0.025	0.039	0.178
		Wz+	-0.025	0.039	0.178
		Wz-	-0.025	0.039	0.178
	5	Dx+	0.002	-0.693	-0.209
		Dx-	-0.005	0.010	0.044
		Dy+	-0.005	0.010	0.044
		Dy-	0.002	-0.693	-0.209
		Wz+	-0.005	0.010	0.044
		Wz-	0.002	-0.693	-0.209
11	1	Dx+	0.000	-1.709	-0.243
		Dx-	0.000	-1.709	-0.243
		Dy+	0.000	-1.709	-0.243
		Dy-	0.000	-1.709	-0.243

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.000	-1.709	-0.243
		Wz-	0.000	-1.709	-0.243
	2	Dx+	0.003	-1.115	-0.264
		Dx-	0.003	-1.115	-0.264
		Dy+	0.003	-1.115	-0.264
		Dy-	0.003	-1.115	-0.264
		Wz+	0.003	-1.115	-0.264
		Wz-	0.003	-1.115	-0.264
	3	Dx+	-0.024	0.220	0.180
		Dx-	-0.024	0.220	0.180
		Dy+	-0.024	0.220	0.180
		Dy-	-0.024	0.220	0.180
		Wz+	-0.024	0.220	0.180
		Wz-	-0.024	0.220	0.180
	4	Dx+	-0.036	0.333	0.273
		Dx-	-0.036	0.333	0.273
		Dy+	-0.036	0.333	0.273
		Dy-	-0.036	0.333	0.273
		Wz+	-0.036	0.333	0.273
		Wz-	-0.036	0.333	0.273
	5	Dx+	0.003	-0.991	-0.235
		Dx-	-0.008	0.082	0.067
		Dy+	-0.008	0.082	0.067
		Dy-	0.003	-0.991	-0.235
		Wz+	-0.008	0.082	0.067
		Wz-	0.003	-0.991	-0.235
12	1	Dx+	0.237	-1.719	-0.165
		Dx-	0.237	-1.719	-0.165
		Dy+	0.237	-1.719	-0.165
		Dy-	0.237	-1.719	-0.165
		Wz+	0.237	-1.719	-0.165
		Wz-	0.237	-1.719	-0.165
	2	Dx+	0.291	-1.124	-0.225
		Dx-	0.291	-1.124	-0.225
		Dy+	0.291	-1.124	-0.225
		Dy-	0.291	-1.124	-0.225
		Wz+	0.291	-1.124	-0.225
		Wz-	0.291	-1.124	-0.225
	3	Dx+	-0.288	0.220	0.241
		Dx-	-0.288	0.220	0.241
		Dy+	-0.288	0.220	0.241
		Dy-	-0.288	0.220	0.241
		Wz+	-0.288	0.220	0.241
		Wz-	-0.288	0.220	0.241

Nudo	Hip		Dx	Dy	Wz
	4	Dx+	-0.436	0.333	0.365
		Dx-	-0.436	0.333	0.365
		Dy+	-0.436	0.333	0.365
		Dy-	-0.436	0.333	0.365
		Wz+	-0.436	0.333	0.365
		Wz-	-0.436	0.333	0.365
	5	Dx+	0.258	-0.999	-0.200
		Dx-	-0.107	0.082	0.093
		Dy+	-0.107	0.082	0.093
		Dy-	0.258	-0.999	-0.200
		Wz+	-0.107	0.082	0.093
		Wz-	0.258	-0.999	-0.200
13	1	Dx+	0.427	-1.736	0.001
		Dx-	0.427	-1.736	0.001
		Dy+	0.427	-1.736	0.001
		Dy-	0.427	-1.736	0.001
		Wz+	0.427	-1.736	0.001
		Wz-	0.427	-1.736	0.001
	2	Dx+	0.623	-1.142	-0.041
		Dx-	0.623	-1.142	-0.041
		Dy+	0.623	-1.142	-0.041
		Dy-	0.623	-1.142	-0.041
		Wz+	0.623	-1.142	-0.041
		Wz-	0.623	-1.142	-0.041
	3	Dx+	-0.604	0.220	-0.009
		Dx-	-0.604	0.220	-0.009
		Dy+	-0.604	0.220	-0.009
		Dy-	-0.604	0.220	-0.009
		Wz+	-0.604	0.220	-0.009
		Wz-	-0.604	0.220	-0.009
	4	Dx+	-0.915	0.333	-0.014
		Dx-	-0.915	0.333	-0.014
		Dy+	-0.915	0.333	-0.014
		Dy-	-0.915	0.333	-0.014
		Wz+	-0.915	0.333	-0.014
		Wz-	-0.915	0.333	-0.014
	5	Dx+	0.554	-1.015	-0.037
		Dx-	-0.239	0.082	0.003
		Dy+	-0.239	0.082	0.003
		Dy-	0.554	-1.015	-0.037
		Wz+	-0.239	0.082	0.003
		Wz-	0.554	-1.015	-0.037
14	1	Dx+	0.223	-1.749	0.180
		Dx-	0.223	-1.749	0.180

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.223	-1.749	0.180
		Dy-	0.223	-1.749	0.180
		Wz+	0.223	-1.749	0.180
		Wz-	0.223	-1.749	0.180
	2	Dx+	0.373	-1.160	0.283
		Dx-	0.373	-1.160	0.283
		Dy+	0.373	-1.160	0.283
		Dy-	0.373	-1.160	0.283
		Wz+	0.373	-1.160	0.283
		Wz-	0.373	-1.160	0.283
	3	Dx+	-0.263	0.220	-0.245
		Dx-	-0.263	0.220	-0.245
		Dy+	-0.263	0.220	-0.245
		Dy-	-0.263	0.220	-0.245
		Wz+	-0.263	0.220	-0.245
		Wz-	-0.263	0.220	-0.245
	4	Dx+	-0.398	0.333	-0.372
		Dx-	-0.398	0.333	-0.372
		Dy+	-0.398	0.333	-0.372
		Dy-	-0.398	0.333	-0.372
		Wz+	-0.398	0.333	-0.372
		Wz-	-0.398	0.333	-0.372
	5	Dx+	0.332	-1.031	0.251
		Dx-	-0.110	0.082	-0.100
		Dy+	-0.110	0.082	-0.100
		Dy-	0.332	-1.031	0.251
		Wz+	0.332	-1.031	0.251
		Wz-	-0.110	0.082	-0.100
15	1	Dx+	0.062	-1.753	0.243
		Dx-	0.062	-1.753	0.243
		Dy+	0.062	-1.753	0.243
		Dy-	0.062	-1.753	0.243
		Wz+	0.062	-1.753	0.243
		Wz-	0.062	-1.753	0.243
	2	Dx+	0.106	-1.166	0.422
		Dx-	0.106	-1.166	0.422
		Dy+	0.106	-1.166	0.422
		Dy-	0.106	-1.166	0.422
		Wz+	0.106	-1.166	0.422
		Wz-	0.106	-1.166	0.422
	3	Dx+	-0.074	0.220	-0.241
		Dx-	-0.074	0.220	-0.241
		Dy+	-0.074	0.220	-0.241
		Dy-	-0.074	0.220	-0.241

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.074	0.220	-0.241
		Wz-	-0.074	0.220	-0.241
	4	Dx+	-0.112	0.333	-0.366
		Dx-	-0.112	0.333	-0.366
		Dy+	-0.112	0.333	-0.366
		Dy-	-0.112	0.333	-0.366
		Wz+	-0.112	0.333	-0.366
		Wz-	-0.112	0.333	-0.366
	5	Dx+	0.094	-1.037	0.375
		Dx-	-0.032	0.082	-0.101
		Dy+	-0.032	0.082	-0.101
		Dy-	0.094	-1.037	0.375
		Wz+	0.094	-1.037	0.375
		Wz-	-0.032	0.082	-0.101
16	1	Dx+	-0.021	-2.007	-0.256
		Dx-	-0.021	-2.007	-0.256
		Dy+	-0.021	-2.007	-0.256
		Dy-	-0.021	-2.007	-0.256
		Wz+	-0.021	-2.007	-0.256
		Wz-	-0.021	-2.007	-0.256
	2	Dx+	-0.035	-1.614	-0.455
		Dx-	-0.035	-1.614	-0.455
		Dy+	-0.035	-1.614	-0.455
		Dy-	-0.035	-1.614	-0.455
		Wz+	-0.035	-1.614	-0.455
		Wz-	-0.035	-1.614	-0.455
	3	Dx+	0.033	0.455	0.225
		Dx-	0.033	0.455	0.225
		Dy+	0.033	0.455	0.225
		Dy-	0.033	0.455	0.225
		Wz+	0.033	0.455	0.225
		Wz-	0.033	0.455	0.225
	4	Dx+	0.049	0.690	0.341
		Dx-	0.049	0.690	0.341
		Dy+	0.049	0.690	0.341
		Dy-	0.049	0.690	0.341
		Wz+	0.049	0.690	0.341
		Wz-	0.049	0.690	0.341
	5	Dx+	0.015	0.180	0.094
		Dx-	-0.031	-1.434	-0.404
		Dy+	0.015	0.180	0.094
		Dy-	-0.031	-1.434	-0.404
		Wz+	0.015	0.180	0.094
		Wz-	-0.031	-1.434	-0.404

Nudo	Hip		Dx	Dy	Wz
17	1	Dx+	0.000	-2.093	-0.252
		Dx-	0.000	-2.093	-0.252
		Dy+	0.000	-2.093	-0.252
		Dy-	0.000	-2.093	-0.252
		Wz+	0.000	-2.093	-0.252
		Wz-	0.000	-2.093	-0.252
	2	Dx+	0.003	-1.769	-0.456
		Dx-	0.003	-1.769	-0.456
		Dy+	0.003	-1.769	-0.456
		Dy-	0.003	-1.769	-0.456
		Wz+	0.003	-1.769	-0.456
		Wz-	0.003	-1.769	-0.456
	3	Dx+	0.013	0.529	0.209
		Dx-	0.013	0.529	0.209
		Dy+	0.013	0.529	0.209
		Dy-	0.013	0.529	0.209
		Wz+	0.013	0.529	0.209
		Wz-	0.013	0.529	0.209
	4	Dx+	0.020	0.801	0.316
		Dx-	0.020	0.801	0.316
		Dy+	0.020	0.801	0.316
		Dy-	0.020	0.801	0.316
		Wz+	0.020	0.801	0.316
		Wz-	0.020	0.801	0.316
	5	Dx+	0.009	-1.361	-0.317
		Dx-	0.000	0.000	0.000
		Dy+	0.006	0.211	0.088
		Dy-	0.003	-1.572	-0.405
		Wz+	0.006	0.211	0.088
		Wz-	0.003	-1.572	-0.405
18	1	Dx+	0.000	-2.541	-0.000
		Dx-	0.000	-2.541	-0.000
		Dy+	0.000	-2.541	-0.000
		Dy-	0.000	-2.541	-0.000
		Wz+	0.000	-2.541	-0.000
		Wz-	0.000	-2.541	-0.000
	2	Dx+	0.000	-2.601	-0.000
		Dx-	0.000	-2.601	-0.000
		Dy+	0.000	-2.601	-0.000
		Dy-	0.000	-2.601	-0.000
		Wz+	0.000	-2.601	-0.000
		Wz-	0.000	-2.601	-0.000
	3	Dx+	0.000	0.842	-0.000
		Dx-	0.000	0.842	-0.000

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.000	0.842	-0.000
		Dy-	0.000	0.842	-0.000
		Wz+	0.000	0.842	-0.000
		Wz-	0.000	0.842	-0.000
	4	Dx+	0.000	1.276	-0.000
		Dx-	0.000	1.276	-0.000
		Dy+	0.000	1.276	-0.000
		Dy-	0.000	1.276	-0.000
		Wz+	0.000	1.276	-0.000
		Wz-	0.000	1.276	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.343	-0.000
		Dy-	0.000	-2.312	0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
19	1	Dx+	-0.000	-2.093	0.252
		Dx-	-0.000	-2.093	0.252
		Dy+	-0.000	-2.093	0.252
		Dy-	-0.000	-2.093	0.252
		Wz+	-0.000	-2.093	0.252
		Wz-	-0.000	-2.093	0.252
	2	Dx+	-0.003	-1.769	0.456
		Dx-	-0.003	-1.769	0.456
		Dy+	-0.003	-1.769	0.456
		Dy-	-0.003	-1.769	0.456
		Wz+	-0.003	-1.769	0.456
		Wz-	-0.003	-1.769	0.456
	3	Dx+	-0.013	0.529	-0.209
		Dx-	-0.013	0.529	-0.209
		Dy+	-0.013	0.529	-0.209
		Dy-	-0.013	0.529	-0.209
		Wz+	-0.013	0.529	-0.209
		Wz-	-0.013	0.529	-0.209
	4	Dx+	-0.020	0.801	-0.316
		Dx-	-0.020	0.801	-0.316
		Dy+	-0.020	0.801	-0.316
		Dy-	-0.020	0.801	-0.316
		Wz+	-0.020	0.801	-0.316
		Wz-	-0.020	0.801	-0.316
	5	Dx+	0.000	0.000	0.000
		Dx-	-0.009	-1.361	0.317
		Dy+	-0.006	0.211	-0.088
		Dy-	-0.003	-1.572	0.405

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.003	-1.572	0.405
		Wz-	-0.006	0.211	-0.088
20	1	Dx+	0.021	-2.007	0.256
		Dx-	0.021	-2.007	0.256
		Dy+	0.021	-2.007	0.256
		Dy-	0.021	-2.007	0.256
		Wz+	0.021	-2.007	0.256
		Wz-	0.021	-2.007	0.256
	2	Dx+	0.035	-1.614	0.455
		Dx-	0.035	-1.614	0.455
		Dy+	0.035	-1.614	0.455
		Dy-	0.035	-1.614	0.455
		Wz+	0.035	-1.614	0.455
		Wz-	0.035	-1.614	0.455
	3	Dx+	-0.033	0.455	-0.225
		Dx-	-0.033	0.455	-0.225
		Dy+	-0.033	0.455	-0.225
		Dy-	-0.033	0.455	-0.225
		Wz+	-0.033	0.455	-0.225
		Wz-	-0.033	0.455	-0.225
	4	Dx+	-0.049	0.690	-0.341
		Dx-	-0.049	0.690	-0.341
		Dy+	-0.049	0.690	-0.341
		Dy-	-0.049	0.690	-0.341
		Wz+	-0.049	0.690	-0.341
		Wz-	-0.049	0.690	-0.341
	5	Dx+	0.031	-1.434	0.404
		Dx-	-0.015	0.180	-0.094
		Dy+	-0.015	0.180	-0.094
		Dy-	0.031	-1.434	0.404
		Wz+	0.031	-1.434	0.404
		Wz-	-0.015	0.180	-0.094

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Barra	Extremo	Comb		N	Q	M
1	Dorsal	4	N+	-22.61	10.46	24.71
		1	N-	-63.70	21.87	67.47
		5	Q+	-63.70	36.34	72.79
		4	Q-	-22.61	10.46	24.71
		5	M+	-63.70	36.34	72.79
		4	M-	-22.61	10.46	24.71
1	Frontal	4	N+	-23.80	9.20	17.24
		1	N-	-65.83	19.63	51.70
		5	Q+	-65.83	31.12	47.16
		4	Q-	-23.80	9.20	17.24
		1	M+	-65.83	19.63	51.70
		8	M-	-23.80	17.92	13.66
2	Dorsal	4	N+	-23.80	9.20	17.24
		1	N-	-65.83	19.63	51.70
		5	Q+	-65.83	31.12	47.16
		4	Q-	-23.80	9.20	17.24
		1	M+	-65.83	19.63	51.70
		8	M-	-23.80	17.92	13.66
2	Frontal	4	N+	-27.41	3.05	3.21
		1	N-	-72.24	8.70	19.26
		5	Q+	-72.24	9.40	9.03
		4	Q-	-27.41	2.72	-4.67
		3	M+	-60.67	6.50	21.29
		6	M-	-38.98	5.62	-16.93
3	Dorsal	4	N+	-27.41	3.05	3.21
		1	N-	-72.24	8.70	19.26
		5	Q+	-72.24	9.40	9.03
		4	Q-	-27.41	2.72	-4.67
		3	M+	-60.67	6.50	21.29
		6	M-	-38.98	5.62	-16.93
3	Frontal	4	N+	-31.02	-6.37	7.01
		1	N-	-78.66	-8.05	18.51
		3	Q+	-67.08	-2.92	17.20
		6	Q-	-42.59	-25.25	5.54
		1	M+	-78.66	-8.05	18.51
		8	M-	-31.02	-16.66	5.08
4	Dorsal	4	N+	-31.02	-6.37	7.01
		1	N-	-78.66	-8.05	18.51
		3	Q+	-67.08	-2.92	17.20
		6	Q-	-42.59	-25.25	5.54

Barra	Extremo	Comb		N	Q	M
		1	M+	-78.66	-8.05	18.51
		8	M-	-31.02	-16.66	5.08
4	Frontal	4	N+	-32.84	-12.39	17.89
		1	N-	-81.90	-18.75	34.05
		3	Q+	-70.33	-8.94	24.08
		6	Q-	-44.42	-44.25	45.84
		5	M+	-81.90	-40.80	52.03
		4	M-	-32.84	-12.39	17.89
5	Dorsal	3	N+	-8.94	44.57	24.08
		6	N-	-44.25	31.06	45.84
		5	Q+	-40.80	54.57	52.03
		4	Q-	-12.39	21.07	17.89
		5	M+	-40.80	54.57	52.03
		4	M-	-12.39	21.07	17.89
5	Frontal	3	N+	-8.94	49.81	-37.74
		6	N-	-44.25	34.01	3.23
		5	Q+	-40.80	59.81	-22.88
		4	Q-	-12.39	24.02	-11.64
		6	M+	-44.25	34.01	3.23
		1	M-	-18.75	58.24	-38.81
6	Dorsal	3	N+	-8.94	28.00	-37.74
		6	N-	-44.25	20.84	3.23
		5	Q+	-40.80	35.32	-22.88
		4	Q-	-12.39	13.52	-11.64
		6	M+	-44.25	20.84	3.23
		1	M-	-18.75	33.56	-38.81
6	Frontal	3	N+	-8.94	31.46	-63.46
		6	N-	-44.25	22.79	-15.64
		5	Q+	-40.80	38.78	-54.93
		4	Q-	-12.39	15.47	-24.18
		8	M+	-28.56	16.79	-13.44
		1	M-	-18.75	37.02	-69.33
7	Dorsal	3	N+	-8.94	5.76	-63.46
		6	N-	-44.25	5.85	-15.64
		5	Q+	-40.80	8.93	-54.93
		4	Q-	-12.39	2.68	-24.18
		8	M+	-28.56	3.51	-13.44
		1	M-	-18.75	7.81	-69.33
7	Frontal	3	N+	-8.94	14.46	-85.45
		6	N-	-44.25	10.74	-33.69
		5	Q+	-40.80	17.63	-83.81
		4	Q-	-12.39	7.57	-35.33
		8	M+	-28.56	8.41	-26.40
		1	M-	-18.75	16.51	-95.77

Barra	Extremo	Comb		N	Q	M
8	Dorsal	3	N+	-8.94	-14.46	-85.45
		6	N-	-44.25	-10.74	-33.69
		4	Q+	-12.39	-7.57	-35.33
		5	Q-	-40.80	-17.63	-83.81
		8	M+	-28.56	-8.41	-26.40
		1	M-	-18.75	-16.51	-95.77
8	Frontal	3	N+	-8.94	-5.76	-63.46
		6	N-	-44.25	-5.85	-15.64
		4	Q+	-12.39	-2.68	-24.18
		5	Q-	-40.80	-8.93	-54.93
		8	M+	-28.56	-3.51	-13.44
		1	M-	-18.75	-7.81	-69.33
9	Dorsal	3	N+	-8.94	-31.46	-63.46
		6	N-	-44.25	-22.79	-15.64
		4	Q+	-12.39	-15.47	-24.18
		5	Q-	-40.80	-38.78	-54.93
		8	M+	-28.56	-16.79	-13.44
		1	M-	-18.75	-37.02	-69.33
9	Frontal	3	N+	-8.94	-28.00	-37.74
		6	N-	-44.25	-20.84	3.23
		4	Q+	-12.39	-13.52	-11.64
		5	Q-	-40.80	-35.32	-22.88
		6	M+	-44.25	-20.84	3.23
		1	M-	-18.75	-33.56	-38.81
10	Dorsal	3	N+	-8.94	-49.81	-37.74
		6	N-	-44.25	-34.01	3.23
		4	Q+	-12.39	-24.02	-11.64
		5	Q-	-40.80	-59.81	-22.88
		6	M+	-44.25	-34.01	3.23
		1	M-	-18.75	-58.24	-38.81
10	Frontal	3	N+	-8.94	-44.57	24.08
		6	N-	-44.25	-31.06	45.84
		4	Q+	-12.39	-21.07	17.89
		5	Q-	-40.80	-54.57	52.03
		5	M+	-40.80	-54.57	52.03
		4	M-	-12.39	-21.07	17.89
11	Dorsal	4	N+	-32.84	12.39	17.89
		1	N-	-81.90	18.75	34.05
		6	Q+	-44.42	44.25	45.84
		3	Q-	-70.33	8.94	24.08
		5	M+	-81.90	40.80	52.03
		4	M-	-32.84	12.39	17.89
11	Frontal	4	N+	-31.02	6.37	7.01
		1	N-	-78.66	8.05	18.51

Barra	Extremo	Comb		N	Q	M
		6	Q+	-42.59	25.25	5.54
		3	Q-	-67.08	2.92	17.20
		1	M+	-78.66	8.05	18.51
		8	M-	-31.02	16.66	5.08
12	Dorsal	4	N+	-31.02	6.37	7.01
		1	N-	-78.66	8.05	18.51
		6	Q+	-42.59	25.25	5.54
		3	Q-	-67.08	2.92	17.20
		1	M+	-78.66	8.05	18.51
		8	M-	-31.02	16.66	5.08
12	Frontal	4	N+	-27.41	-3.05	3.21
		1	N-	-72.24	-8.70	19.26
		4	Q+	-27.41	-2.72	-4.67
		5	Q-	-72.24	-9.40	9.03
		3	M+	-60.67	-6.50	21.29
		6	M-	-38.98	-5.62	-16.93
13	Dorsal	4	N+	-27.41	-3.05	3.21
		1	N-	-72.24	-8.70	19.26
		4	Q+	-27.41	-2.72	-4.67
		5	Q-	-72.24	-9.40	9.03
		3	M+	-60.67	-6.50	21.29
		6	M-	-38.98	-5.62	-16.93
13	Frontal	4	N+	-23.80	-9.20	17.24
		1	N-	-65.83	-19.63	51.70
		4	Q+	-23.80	-9.20	17.24
		5	Q-	-65.83	-31.12	47.16
		1	M+	-65.83	-19.63	51.70
		8	M-	-23.80	-17.92	13.66
14	Dorsal	4	N+	-23.80	-9.20	17.24
		1	N-	-65.83	-19.63	51.70
		4	Q+	-23.80	-9.20	17.24
		5	Q-	-65.83	-31.12	47.16
		1	M+	-65.83	-19.63	51.70
		8	M-	-23.80	-17.92	13.66
14	Frontal	4	N+	-22.61	-10.46	24.71
		1	N-	-63.70	-21.87	67.47
		4	Q+	-22.61	-10.46	24.71
		5	Q-	-63.70	-36.34	72.79
		5	M+	-63.70	-36.34	72.79
		4	M-	-22.61	-10.46	24.71
15	Dorsal	4	N+	-13.97	-20.63	-24.71
		5	N-	-46.13	-57.01	-72.79
		8	Q+	-25.02	-18.82	-28.70
		1	Q-	-31.85	-59.35	-67.47

Barra	Extremo	Comb		N	Q	M
		4	M+	-13.97	-20.63	-24.71
		5	M-	-46.13	-57.01	-72.79
15	Frontal	4	N+	-13.02	-14.84	-6.56
		5	N-	-43.57	-41.29	-22.49
		8	Q+	-24.07	-13.03	-12.40
		1	Q-	-29.28	-43.63	-14.78
		3	M+	-13.86	-18.91	-6.50
		6	M-	-42.73	-37.22	-22.56
16	Dorsal	4	N+	-14.21	-13.71	-6.56
		5	N-	-46.84	-37.54	-22.49
		8	Q+	-25.07	-10.99	-12.40
		1	Q-	-32.80	-41.05	-14.78
		3	M+	-15.38	-17.70	-6.50
		6	M-	-45.67	-33.54	-22.56
16	Frontal	4	N+	-13.77	-11.95	-2.07
		5	N-	-45.60	-32.58	-10.20
		8	Q+	-24.63	-9.23	-8.86
		1	Q-	-31.56	-36.09	-1.26
		3	M+	-21.91	-30.33	1.73
		6	M-	-37.46	-14.21	-14.00
17	Dorsal	4	N+	-10.46	-14.93	-2.07
		5	N-	-36.34	-42.67	-10.20
		4	Q+	-10.46	-14.93	-2.07
		1	Q-	-21.87	-42.67	-1.26
		3	M+	-13.90	-34.73	1.73
		6	M-	-32.89	-22.87	-14.00
17	Frontal	4	N+	-10.46	0.00	20.33
		5	N-	-36.34	0.00	53.81
		5	Q+	-26.07	0.00	31.21
		4	Q-	-10.46	0.00	20.33
		1	M+	-21.87	0.00	62.75
		8	M-	-21.66	0.00	13.54
18	Dorsal	4	N+	-10.46	0.00	20.33
		5	N-	-36.34	0.00	53.81
		5	Q+	-26.07	0.00	31.21
		4	Q-	-10.46	0.00	20.33
		1	M+	-21.87	0.00	62.75
		8	M-	-21.66	0.00	13.54
18	Frontal	4	N+	-10.46	14.93	-2.07
		5	N-	-36.34	42.67	-10.20
		1	Q+	-21.87	42.67	-1.26
		4	Q-	-10.46	14.93	-2.07
		3	M+	-13.90	34.73	1.73
		6	M-	-32.89	22.87	-14.00

Barra	Extremo	Comb		N	Q	M
19	Dorsal	4	N+	-13.77	11.95	-2.07
		5	N-	-45.60	32.58	-10.20
		1	Q+	-31.56	36.09	-1.26
		8	Q-	-24.63	9.23	-8.86
		3	M+	-21.91	30.33	1.73
		6	M-	-37.46	14.21	-14.00
19	Frontal	4	N+	-14.21	13.71	-6.56
		5	N-	-46.84	37.54	-22.49
		1	Q+	-32.80	41.05	-14.78
		8	Q-	-25.07	10.99	-12.40
		3	M+	-15.38	17.70	-6.50
		6	M-	-45.67	33.54	-22.56
20	Dorsal	4	N+	-13.02	14.84	-6.56
		5	N-	-43.57	41.29	-22.49
		1	Q+	-29.28	43.63	-14.78
		8	Q-	-24.07	13.03	-12.40
		3	M+	-13.86	18.91	-6.50
		6	M-	-42.73	37.22	-22.56
20	Frontal	4	N+	-13.97	20.63	-24.71
		5	N-	-46.13	57.01	-72.79
		1	Q+	-31.85	59.35	-67.47
		8	Q-	-25.02	18.82	-28.70
		4	M+	-13.97	20.63	-24.71
		5	M-	-46.13	57.01	-72.79

ARMADURA DEL DINTEL

NUDO	Nd	Md	As c.i.	As c.s.
15	-13.97	-24.71	0.00	3.22
	-46.13	-72.79	0.00	9.21
	-13.97	-24.71	0.00	3.22
	-46.13	-72.79	0.00	9.21
16	-14.21	-6.56	0.00	0.12
	-46.84	-22.49	0.00	0.78
	-15.38	-6.50	0.00	0.00
	-45.67	-22.56	0.00	0.93
17	-10.46	-2.07	0.00	0.00
	-36.34	-10.20	0.00	0.00
	-13.90	1.73	0.00	0.00
	-32.89	-14.00	0.00	0.99
18	-10.46	20.33	5.83	0.00
	-36.34	53.81	15.14	0.00
	-21.87	62.75	20.09	0.00
	-21.66	13.54	2.14	0.00

ARMADURA DE SOLERA

NUDO	Nd	Md	As c.i.	As c.s.
5	-8.94	24.08	4.67	0.00
	-44.25	45.84	5.92	0.00
	-40.80	52.03	7.83	0.00
	-12.39	17.89	2.79	0.00
6	-8.94	-37.74	0.00	7.95
	-44.25	3.23	0.00	0.00
	-44.25	3.23	0.00	0.00
	-18.75	-38.81	0.00	7.09
7	-8.94	-63.46	0.00	14.22
	-44.25	-15.64	0.00	0.00
	-28.56	-13.44	0.00	0.00
	-18.75	-69.33	0.00	14.57
8	-8.94	-85.45	0.00	19.67
	-44.25	-33.69	0.00	2.95
	-28.56	-26.40	0.00	2.97
	-18.75	-95.77	0.00	21.19

ARMADURA DE HASTIAL

NUDO	Nd	Md	As c.i.	As c.e.
1	-22.61	24.71	0.00	6.02
	-63.70	67.47	0.00	17.74
	-63.70	72.79	0.00	19.88
	-22.61	24.71	0.00	6.02
2	-23.80	17.24	0.00	3.21
	-65.83	51.70	0.00	11.33
	-65.83	51.70	0.00	11.33
	-23.80	13.66	0.00	1.94
3	-27.41	3.21	0.00	0.00
	-72.24	19.26	0.00	0.00
	-60.67	21.29	0.00	0.47
	-38.98	-16.93	1.35	0.00
4	-31.02	7.01	0.00	0.00
	-78.66	18.51	0.00	0.00
	-78.66	18.51	0.00	0.00
	-31.02	5.08	0.00	0.00
5	-32.84	17.89	0.00	2.40
	-81.90	34.05	0.00	2.86
	-81.90	52.03	0.00	9.77
	-32.84	17.89	0.00	2.40

RESUMEN DE ARMADURAS

ARMADURA DEL DINTEL

NUDO	As c.i.	As c.s.
15	0.00	9.21
16	0.00	0.93
17	0.00	0.99
18	20.09	0.00

Cuantía mínima geométrica: 5.25 cm²/m

ARMADURA DE SOLERA

NUDO	As c.i.	As c.s.
5	7.83	0.00
6	0.00	7.95
7	0.00	14.57
8	0.00	21.19

Cuantía mínima geométrica: 7.50 cm²/m

ARMADURA DE HASTIAL

NUDO	As c.i.	As c.e.
1	0.00	19.88
2	0.00	11.33
3	1.35	0.47
4	0.00	0.00
5	0.00	9.77

Cuantía mínima geométrica vertical: 3.15 cm²/m
Cuantía mínima geométrica horizontal: 5.60 cm²/m

COMPROBACION A CORTANTE

DINTEL

NUDO	Vd max.	Vcu	As
16	41.05	53.58	0.00
17	42.60	42.60	0.00
18	0.00	42.60	0.00

SOLERA

Vcu= 61.97 T/m.

NUDO	Vd max.	As
6	47.57	0.00
7	23.86	0.00
8	5.03	0.00

HASTIAL

Vcu= 40.42 T/m.

NUDO	Vd max.	As
2	31.12	0.00
3	9.40	0.00
4	25.25	0.00

COMPROBACION DE TENSIONES SOBRE EL TERRENO

Tensión transmitida al terreno en nudo 5: 1.80 kp/cm²

Estructura: P.I. Nº 4 **Cálculo:** ALETAS. H=7.21 M.

DEFINICION GEOMETRICA

Altura total	7.21	m
Ancho superior	0.80	m
Ancho inferior	0.80	m
Longitud zarpa delantera	1.00	m
Longitud zarpa trasera	3.20	m
Canto zapata	1.00	m
Canto tacón cotra deslizamiento.....	0.00	m

ACCIONES ACTUANTES

Altura de tierras	0.00	m
Altura tierras en intradós	0.50	m
Sobrecarga en el trasdós	0.00	t/m²

DATOS TERRENO

Densidad	1.90	t/m³
Coeficiente empuje activo	0.41	
¿Considera empuje pasivo? (s/n)	n	
Angulo de rozamiento	30	º

OTROS DATOS

Recubrimiento	5	cm
fck	250	Kp/cm²
fyk	5100	Kp/cm²
Gamma C	1.5	
Gamma S	1.15	
Gamma F desf.....	1.6	
Gamma F fav.....	0.9	
Canto útil muro	75	cm
Canto útil zapata	95	cm
Densidad hormigón	2.5	t/m³

Muro:

A flex =	**23.22**	cm²/m.l.
A cort =	**0.00**	cm²/m.l.

Zapata (puntera):

A flex =	**4.97**	cm²/m.l.
Cumple cortante?	**SI**	

Zapata (talón):

A flex =	**18.27**	cm²/m.l.
Cumple cortante?	**SI**	

DESLIZA?	1.58	NO
VUELCA?	2.79	NO
SIGM_BAR	**19.94**	t/m²
SIGM_MAX	**26.42**	t/m²
SIGM_MIN	**2.27**	t/m²

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 14.42 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 48.66 mt
H = 20.25 t

RESUMEN:

HIP	N	M	H
P.P.	14.42	0.00	0.00
TIERRAS	0.00	48.66	20.25

Estructura: P.I. Nº 4 **Cálculo:** ALETAS. H=7.21 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	14.42	48.66	20.25

Tomando los coeficientes de seguridad:

Gamma DESF 1.6
Gamma FAV 0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	12.98	77.86	6.35	23.2
1.2.	23.07	77.86	3.72	22.2

Armadura a disponer:

A = 23.2 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 32.40 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 48.41 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 4 **Cálculo:** ALETAS. H=7.21 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 26.92 t
M = 15.86 mt
H = 0.00 t

Debido a las tierras:

N = 44.79 t
M = 34.45 mt
H = 26.25 t

RESUMEN:

HIP	N	M	H
P.P.	26.92	15.86	0.00
TIERRAS	44.79	34.45	26.25

SEGURIDAD AL DESLIZAMIENTO:

N = 71.71 t
H = 26.25 t GAMMA = 1.58 O.K.
mu = 0.58
Epasivo= 0.00 t

SEGURIDAD AL VUELCO:

Mvolc = 71.85 mt
Mest = 200.48 mt GAMMA = 2.79 O.K.

Estructura: P.I. Nº 4 **Cálculo:** ALETAS. H=7.21 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	71.71	50.32	26.25

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	26.42	2.27

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	19.94

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -75.54 mt

Anec = 18.27 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 21.28 mt

Anec = 4.97 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 30.60 t
Vlim = 61.32 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 18.23 t
Vlim = 122.64 t

Estructura: P.I. Nº 4 **Cálculo:** ALETAS. H=4.105 M.

DEFINICION GEOMETRICA

Altura total	4.11	m
Ancho superior	0.40	m
Ancho inferior	0.40	m
Longitud zarpa delantera	0.70	m
Longitud zarpa trasera	2.00	m
Canto zapata	0.50	m
Canto tacón cotra deslizamiento.....	0.00	m

ACCIONES ACTUANTES

Altura de tierras	0.00	m
Altura tierras en intradós	0.50	m
Sobrecarga en el trasdós	0.00	t/m²

DATOS TERRENO

Densidad	1.90	t/m³
Coeficiente empuje activo	0.41	
¿Considera empuje pasivo? (s/n)	n	
Angulo de rozamiento	30	°

OTROS DATOS

Recubrimiento	5	cm
fck	250	Kp/cm²
fyk	5100	Kp/cm²
Gamma C	1.5	
Gamma S	1.15	
Gamma F desf.....	1.6	
Gamma F fav.....	0.9	
Canto útil muro	35	cm
Canto útil zapata	45	cm
Densidad hormigón	2.5	t/m³

Muro:

A flex =	**9.17**	cm²/m.l.
A cort =	**0.00**	cm²/m.l.

Zapata (puntera):

A flex =	**2.19**	cm²/m.l.
Cumple cortante?	**SI**	

Zapata (talón):

A flex =	**6.65**	cm²/m.l.
Cumple cortante?	**SI**	

DESLIZA?	1.69	**NO**
VUELCA?	3.35	**NO**
SIGM_BAR	**9.82**	t/m²
SIGM_MAX	**12.59**	t/m²
SIGM_MIN	**3.05**	t/m²

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 4.11 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 8.98 mt
H = 6.56 t

RESUMEN:

HIP	N	M	H
P.P.	4.11	0.00	0.00
TIERRAS	0.00	8.98	6.56

Estructura: P.I. Nº 4 **Cálculo:** ALETAS. H=4.105 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	4.11	8.98	6.56

Tomando los coeficientes de seguridad:

Gamma DESF 1.6
Gamma FAV 0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	3.69	14.37	4.04	9.2
1.2.	6.57	14.37	2.34	8.8

Armadura a disponer:

A = 9.2 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 10.50 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 22.59 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 4 **Cálculo:** ALETAS. H=4.105 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 7.98 t
M = 2.67 mt
H = 0.00 t

Debido a las tierras:

N = 16.26 t
M = 4.97 mt
H = 8.26 t

RESUMEN:

HIP	N	M	H
P.P.	7.98	2.67	0.00
TIERRAS	16.26	4.97	8.26

SEGURIDAD AL DESLIZAMIENTO:

N = 24.24 t
H = 8.26 t
mu = 0.58
Epasivo= 0.00 t

GAMMA = 1.69 O.K.

SEGURIDAD AL VUELCO:

Mvolc = 12.68 mt
Mest = 42.46 mt

GAMMA = 3.35 O.K.

Estructura: P.I. Nº 4 **Cálculo:** ALETAS. H=4.105 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	24.24	7.64	8.26

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	12.59	3.05

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	9.82

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -13.17 mt

Anec = 6.65 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 4.45 mt

Anec = 2.19 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 8.96 t
Vlim = 29.05 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 7.34 t
Vlim = 58.09 t

3. RESUMEN CONTROL CALIDAD

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELLEMENTO: P.I. 4

IDENTIFICACIÓN DE LA MUESTRA			LOCALIZACIÓN DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CÓDIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	N º	RES. MEDIA	N º	RES. MEDIA	N º	RES. MEDIA					
57	82	14/07/99	Losa inf m.d.	03030403	H-250	6	Blanda	2	268	3	294	1	350	98	11/08/99	I/AL 42,5 R	265	
57	83	14/07/99	Losa inf mdi.	03030403	H-250	5	Blanda	2	280	3	306	1	360	98	11/08/99	I/AL 42,5 R	265	
65	91	16/07/99	Zap alet 1,2,4	03030403	H-250	6	Blanda	2	225	3	264	1		100	13/08/99	I/AL 42,5 R	230	
65	92	16/07/99	Zap alet 1,2,4	03030403	H-250	9	Blanda	2	199	3	256	1		100	13/08/99	I/AL 42,5 R	230	
70	99	20/07/99	Losa inf m.i.	03030403	H-250	9	Blanda	2	247	3	293	1		100	17/08/99	I/AL 42,5 R	245	
70	100	20/07/99	Losa inf m.i.	03030403	H-250	7	Blanda	2	246	3	278	1		100	17/08/99	I/AL 42,5 R	245	
78	128	22/07/99	Alzado 1,d	03030403	H-250	8	Blanda	2	228	3	275	1		93	20/08/99	I/AL 42,5 R	242	
78	131	23/07/99	Alzado 2,d	03030403	H-250	7	Blanda	2	224	3	292	1		93	20/08/99	I/AL 42,5 R	242	
90	141	27/07/99	Alzado 1,i	03030403	H-250	5	Blanda	2	273	3	300	1		70	25/08/99	I/AL 42,5 R	264	
90	145	28/07/99	Alzado 2,i	03030403	H-250	10	Fluida	2	296	3	323	1		70	25/08/99	I/AL 42,5 R	264	
133	191	10/08/99	Aleta 3 2ªf	03030403	H-250	9	Blanda	2	200	3	255	1		74	07/09/99	I/AL 42,5 R	225	
133	192	10/08/99	Losa sup m,i	03030403	H-250	5	Blanda	2	256	3	312	1		74	07/09/99	I/AL 42,5 R	225	
134	193	10/08/99	Losa sup m,i	03030403	H-250	7	Blanda	2	204	3	280	1		74	04/09/99	I/AL 42,5 R	246	
134	194	10/08/99	Losa sup m,i	03030403	H-250	6	Blanda	2	276	3	312	1		74	07/09/99	I/AL 42,5 R	246	
141	204	12/08/99	Aleta 2 1ªf	03030403	H-250	7	Blanda	2	214	3	273	1		100	23/09/99	I/AL 42,5 R	240	
141	297	26/08/99	Aleta 4 2ªf	03030403	H-250	7	Blanda	2	279	3	291	1		100	23/09/99	I/AL 42,5 R	240	

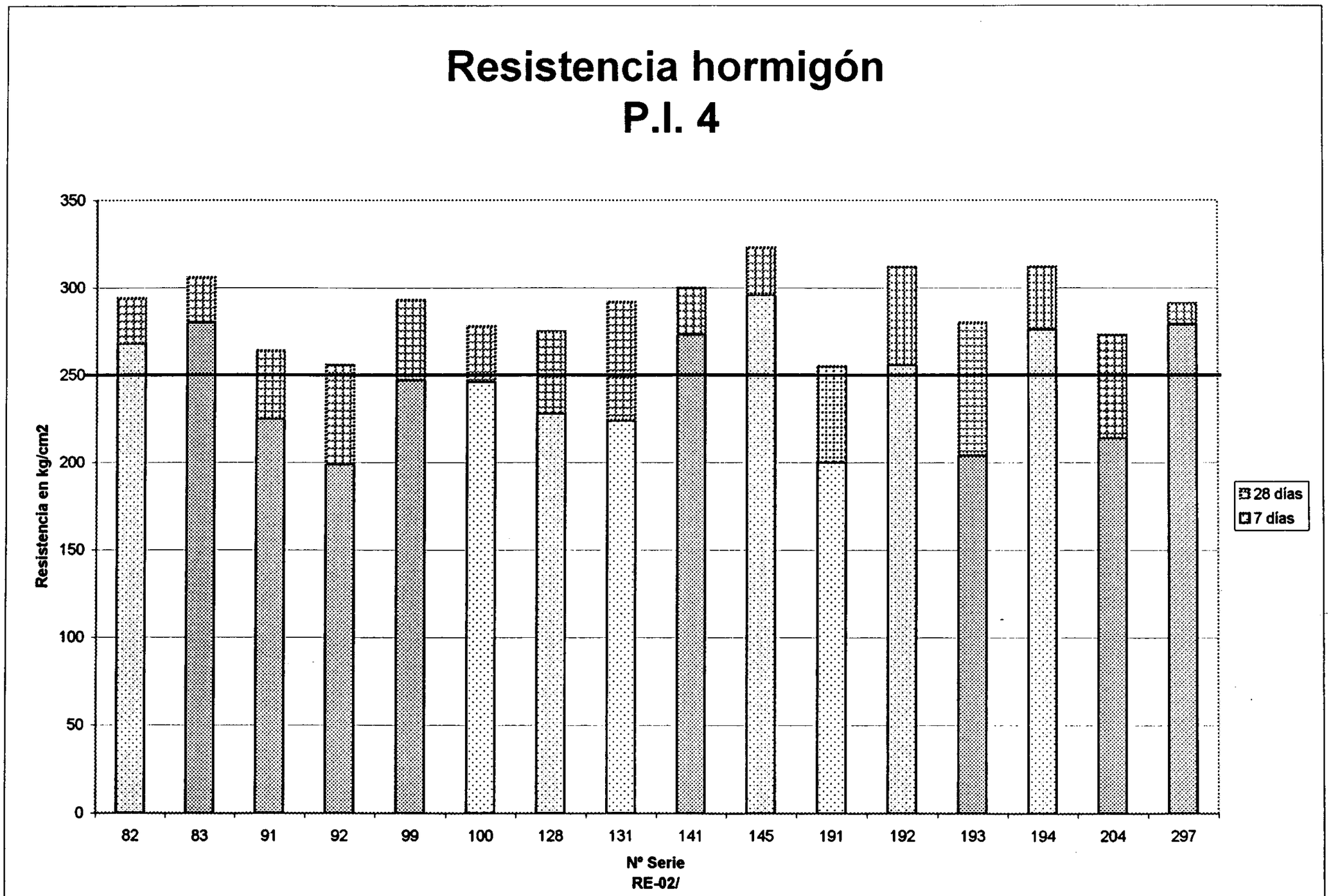
FECHA: FIRMA:

NOMBRE: Ana Mª Martín Herrrero

CARGO: Jefe de Laboratorio

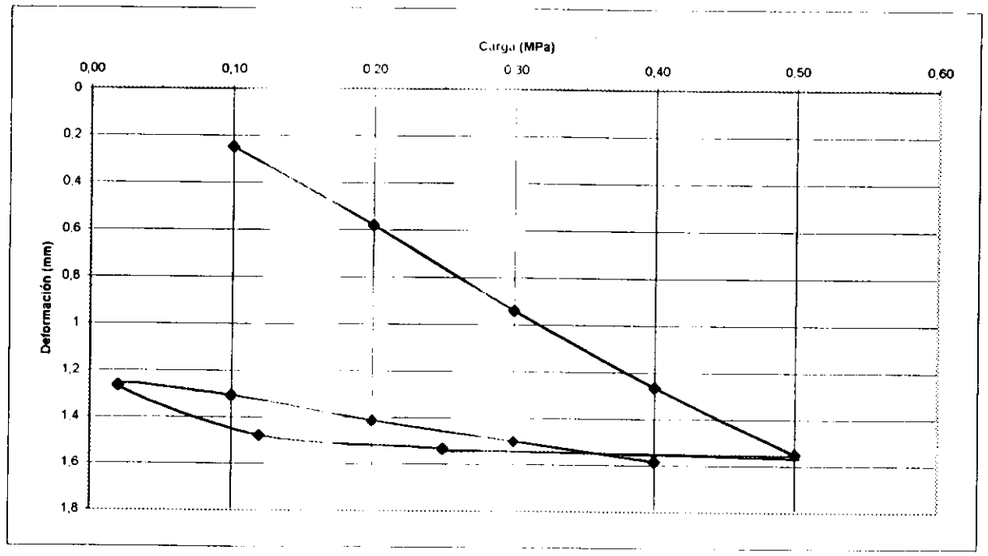
LOTE DE f. est. < 0,9 fck

Resistencia hormigón
P.I. 4



SAITEC SYNCONSULT S.A. UNION TEMPORAL DE EMPRESAS	**ENSAYO DE PLACA CON CARGA** (DIN 18 134) OBRA: **LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA** **SUB-TRAMO III**

LOCALIZACIÓN	P.I. 4 Cuña de Transición 2		
CÓDIGO DE TRAMIFICACIÓN:	03030402		**PK 311+860**
FECHA:	25/11/99	**REF. MUESTRA:**	RE-08/ 17



	Módulos		Especifi.
	Mpa	kg/cm2	
Ev1	67	**681**	
Ev2	245	**2504**	**1600**
Ev2/Ev1	3,7	**3,7**	

OBSERVACIONES

Densidad seca 2,061 kg/cm3
Humedad 4,70%

Fecha	**Firma**	Cargo	JEFE DE LABORATORIO
		Nombre	ANA MARTIN HERRERO

CARGAS	COMP 1	COMP 2	COMP 3		Asientos							
Mpa	mm	mm	mm		mm	B1	B2	B3	B4	AO	A1	A2
0,02	0	0	0,22	0								
0,10	0,18	0,03	0,76	0,5		1,25	0,10	0,01	0,001	0,0001	0,25	0,025	0,0025
0,20	0,37	0,2	1,39	0,65		1,158	0,20	0,04	0,008	0,0016	0,58	0,116	0,0232
0,30	0,61	0,48	1,95	1,013		0,94	0,30	0,09	0,027	0,0081	0,94	0,282	0,0846
0,40	0,81	0,73	2,47	1,236		1,263333	0,40	0,16	0,064	0,0256	1,2633333	0,5053333	0,2021333
0,50	1	0,94	2,93	1,4		1,55	0,50	0,25	0,125	0,0625	1,55	0,775	0,3875
							0,50	0	0	0	0	0	0
							0,00	0	0	0	0	0	0
							0,00	0	0	0	0	0	0
							0,00	0	0	0	0	0	0
							0,00	0	0	0	0	0	0
							1,50	**0,55**	**0,23**	**0,10**	**4,58**	**1,70**	**0,70**
0,25	1	0,94	2,88	1,4		1,5444444							
0,12	0,93	0,94	2,78	1,3		1,4777667							
0,02	0,75	0,79	2,47	1		1,2611333							
0,10	0,75	0,81	2,58	1,1		1,3777667	0,10	0,01	0,001	0,0001	1,3066667	0,1306667	0,0130667
0,20	0,86	0,89	2,71	1,3		1,4411333	0,20	0,04	0,008	0,0016	1,4133333	0,2826667	0,0565333
0,30	0,94	0,94	2,84	1,5		1,5	0,30	0,09	0,027	0,0081	1,5	0,45	0,135
0,40	1,02	1	2,95	1,6666		1,5533333	0,40	0,16	0,064	0,0256	1,5833333	0,6333333	0,2533333
							0,00	0	0	0	0	0	0
							0,00	0	0	0	0	0	0
							0,00	0	0	0	0	0	0
							0,00	0	0	0	0	0	0
							0,00	0	0	0	0	0	0
							1,30	**0,30**	**0,10**	**0,04**	**5,80**	**1,50**	**0,46**

	1° CICLO	2° CICLO
n	5,00	4
B1	1,50	1,00
B2	0,55	0,30
B3	0,23	0,10
B4	0,10	0,04
A0	4,58	5,80
A1	1,70	1,50
A2	0,70	0,46
X	3,28333	0,91667
Y	0,6	0,5
a2	-0,88095	-0,58333
a1	3,8119	1,20833
a0	-0,13	1,1925
E	66,7373	245,455

E1 = 367,92

PASO INFERIOR 5

PASO INFERIOR 5

ÍNDICE

1. DESCRIPCIÓN Y DEFINICIÓN
2. CÁLCULOS
3. RESUMEN DEL CONTROL DE CALIDAD

1. DESCRIPCIÓN Y DEFINICIÓN

CALCULO DE MARCOS CERRADOS UNICELULARES

El siguiente programa calcula los esfuerzos en un marco cerrado unicelular a partir de las dimensiones geométricas del mismo y sometido a las acciones de su peso propio, del terreno y de las sobrecargas de uso. A partir de estros esfuerzos el programa arma las secciones a flexocompresión simple y comprueba la resistencia a cortante de las mismas, así como las tensiones máximas transmitidas al terreno.

DATOS GEOMÉTRICOS

Gálibo vertical (GV):	6,54	m.
Gálibo horizontal (GH):	8,00	m.
Espesor de dintel (ED):	0,70	m.
Espesor de solera (ESOL):	1,00	m.
Espesor de hastial (EH):	0,70	m.
Longitud cartela dintel:	1,00	m.
Canto adicional cartela:	0,50	m.

DATOS DEL TERRENO

Altura de tierras sobre el dintel (HT):	1,00	m.
Peso específico de las tierras (γ):	2.10	T/m³
Coeficiente de balasto (K):	5000	T/m³
Empuje activo del terreno (λ_a):	0.33	
Empuje al reposo del terreno (λ_r):	0.50	

SOBRECARGAS DE USO

Carretera:

Sobrecarga uniforme:	0.4	T/m²
Vehículo pesado:	60	T.
Sobrecarga en trasdós:	1.0	T/m²

Ferrocarril:

Sobrecarga uniforme tren tipo B (abierto a 45º hasta plano medio del dintel): 2,85 T/m²
Sobrecarga en trasdós: 3.0 T/m²

Sobrecarga:
2 Trenes de 12T/m.



Coeficiente de impacto:

$$\phi_6 = \frac{114\sqrt{L}}{3,10 - 1,76\sqrt{L} + L} = \frac{114\sqrt{8,80}}{3,10 - 1,76\sqrt{8,80} + 8,80} = 50,63\% = 0,506$$

$$\phi_{red} = 0,506 - \frac{10 - 10}{10} = 0,506 \qquad q = \frac{24 \times 1,506}{(5,90 + 2 \times 3,40)} = 2,85\ T/m^2$$

DATOS DE LOS MATERIALES

Hormigón:
- f_{ck}: 250 kg/cm²
- γ_c: 1.50

Acero:
- f_{yk}: 5100 kg/cm²
- γ_s: 1.15

Recubrimiento mecánico de armaduras: 4 cm.

COEFICIENTES DE MAYORACION DE ACCIONES

Peso propio marco:
- Efecto desfavorable: $\gamma_{pp1} = 1.60$
- Efecto favorable: $\gamma_{pp2} = 0.90$

Acción de las tierras (Peso y empuje):
- Efecto desfavorable: $\gamma_{t1} = 1.60$
- Efecto favorable: $\gamma_{t2} = 0.90$

Sobrecargas de uso:
- Efecto desfavorable: $\gamma_{sc1} = 1.60$
- Efecto favorable: $\gamma_{sc2} = 0$

HIPÓTESIS DE CALCULO

Se consideran las siguientes hipótesis de cálculo:

- H1: Peso propio marco.
- H2: Peso de tierras.
- H3: Empuje activo de tierras.
- H4: Empuje al reposo de tierras.
- H5: Sobrecargas de uso.

Esta última hipótesis de sobrecargas de uso tiene los siguientes componentes:

- Sobrecarga uniforme.(400 kg/m² en carretera y tren tipo B en ferrocarril)
- Vehiculo pesado. Esta acción se asimila a una sobrecarga uniforme, abriendo a 45° hasta el centro de gravedad del dintel. Si el vehículo tiene de dimensiones en planta AxB, la carga equivalente será:

$$\frac{Q}{(A + 2 \times HT + ED)\,(B + 2 \times HT + ED)}$$

- Sobrecarga en el trasdós. Empuje debido a la sobrecarga en el trasdós con el coeficiente de empuje al reposo.

COMBINACIONES DE HIPÓTESIS

Se consideran las siguientes combinaciones de hipótesis:

C1: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C2: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C3: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C4: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C5: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C6: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C7: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$
C8: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$

Con estas combinaciones se obtienen los esfuerzos pésimos en las barras del modelo.

ARMADO DEL MARCO

Con los esfuerzos pésimos obtenidos anteriormente, se arman las secciones definidas en el modelo de cálculo a flexocompresión simple. Se obtienen asimismo las armaduras a disponer por cuantía mínima geométrica.

COMPROBACIÓN A CORTANTE

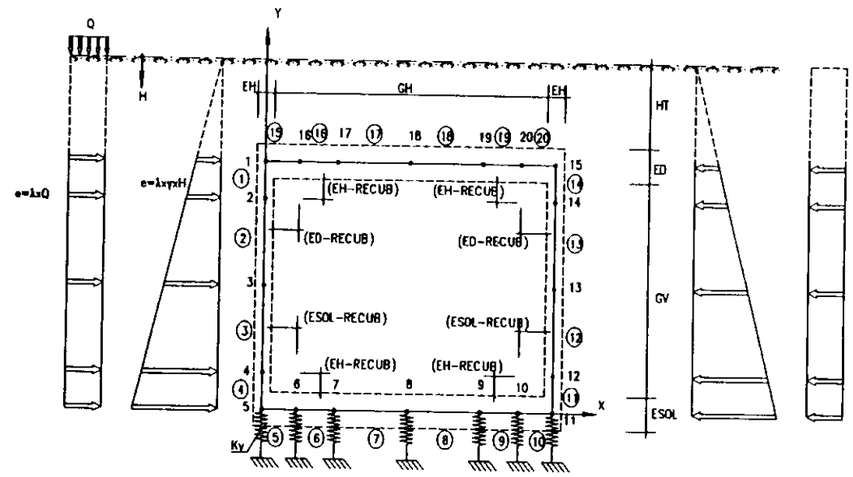
Se realiza la comprobación a cortante de las secciones para verificar si la contribución a cortante del hormigón es suficiente para absorber el cortante de cálculo hallado. Si no se cumple esta condición se obtiene la armadura necesaria.
Para la comprobación a cortante se han introducido en el modelo nudos a una distancia de un canto útil del paramento para verificar en ellos el cortante de cálculo y no en los nudos extremos.

COMPROBACIÓN DE TENSIONES SOBRE EL TERRENO

Para el cálculo de la tensión máxima transmitida al terreno se obtiene el movimiento máximo vertical en los nudos de la solera. La tensión será por tanto:

$$\sigma = K_{balasto} \times \delta_{max}$$

A continuación figuran los resultados del cálculo.



MODELO DE CALCULO

2. CÁLCULOS

CARACTERISTICAS DE LOS NUDOS

Nudo	Coordenadas X	Coordenadas Y	coacc xyz	Constantes Muelles Kx	Constantes Muelles Ky	Constantes Muelles Kz
1	0.000	7.140				
2	0.000	6.380				
3	0.000	3.770				
4	0.000	1.160				
5	0.000	0.000			5.025E+03	
6	1.310	0.000			5.438E+03	
7	2.175	0.000			7.600E+03	
8	4.350	0.000	100		1.088E+04	
9	6.525	0.000			7.600E+03	
10	7.390	0.000			5.438E+03	
11	8.700	0.000			5.025E+03	
12	8.700	1.160				
13	8.700	3.770				
14	8.700	6.380				
15	8.700	7.140				
16	1.010	7.305				
17	1.350	7.390				
18	4.350	7.390				
19	7.350	7.390				
20	7.690	7.305				

CARACTERISTICAS DE LAS BARRAS

Barra	Nd	Nf	I	A	E
1	1	2	0.028583	0.700000	3.004E+06
2	2	3	0.028583	0.700000	3.004E+06
3	3	4	0.028583	0.700000	3.004E+06
4	4	5	0.028583	0.700000	3.004E+06
5	5	6	0.083333	1.000000	3.004E+06
6	6	7	0.083333	1.000000	3.004E+06
7	7	8	0.083333	1.000000	3.004E+06
8	8	9	0.083333	1.000000	3.004E+06
9	9	10	0.083333	1.000000	3.004E+06
10	10	11	0.083333	1.000000	3.004E+06
11	11	12	0.028583	0.700000	3.004E+06
12	12	13	0.028583	0.700000	3.004E+06
13	13	14	0.028583	0.700000	3.004E+06
14	14	15	0.028583	0.700000	3.004E+06
15	1	16	0.092393	1.035000	3.004E+06
16	16	17	0.040311	0.785000	3.004E+06
17	17	18	0.028583	0.700000	3.004E+06
18	18	19	0.028583	0.700000	3.004E+06
19	19	20	0.040311	0.785000	3.004E+06
20	20	15	0.092393	1.035000	3.004E+06

CARGAS EN BARRAS

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
1	1	Q unif	1.750	0.000	0.000	270.00
	2	Q unif	1.750	0.000	0.000	270.00
	3	Q unif	1.750	0.000	0.000	270.00
	4	Q unif	1.750	0.000	0.000	270.00
	5	Q unif	2.500	0.000	0.000	270.00
	6	Q unif	2.500	0.000	0.000	270.00
	7	Q unif	2.500	0.000	0.000	270.00
	8	Q unif	2.500	0.000	0.000	270.00
	9	Q unif	2.500	0.000	0.000	270.00
	10	Q unif	2.500	0.000	0.000	270.00
	11	Q unif	1.750	0.000	0.000	270.00
	12	Q unif	1.750	0.000	0.000	270.00
	13	Q unif	1.750	0.000	0.000	270.00
	14	Q unif	1.750	0.000	0.000	270.00
	15	Q unif	2.588	0.000	0.000	270.00
	16	Q unif	1.963	0.000	0.000	270.00
	17	Q unif	1.750	0.000	0.000	270.00
	18	Q unif	1.750	0.000	0.000	270.00
	19	Q unif	1.963	0.000	0.000	270.00
	20	Q unif	2.588	0.000	0.000	270.00
2	15	Q unif	2.100	0.000	0.000	270.00
	16	Q unif	2.100	0.000	0.000	270.00
	17	Q unif	2.100	0.000	0.000	270.00
	18	Q unif	2.100	0.000	0.000	270.00
	19	Q unif	2.100	0.000	0.000	270.00
	20	Q unif	2.100	0.000	0.000	270.00
3	1	Q unif	1.286	0.000	0.000	0.00
	2	Q unif	2.540	0.000	0.000	0.00
	3	Q unif	4.349	0.000	0.000	0.00
	4	Q unif	5.655	0.000	0.000	0.00
	11	Q unif	5.655	0.000	0.000	180.00
	12	Q unif	4.349	0.000	0.000	180.00
	13	Q unif	2.540	0.000	0.000	180.00
	14	Q unif	1.286	0.000	0.000	180.00
4	1	Q unif	1.948	0.000	0.000	0.00
	2	Q unif	3.848	0.000	0.000	0.00
	3	Q unif	6.589	0.000	0.000	0.00
	4	Q unif	8.568	0.000	0.000	0.00
	11	Q unif	8.568	0.000	0.000	180.00
	12	Q unif	6.589	0.000	0.000	180.00
	13	Q unif	3.848	0.000	0.000	180.00
	14	Q unif	1.948	0.000	0.000	180.00

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
5	1	Q unif	1.500	0.000	0.000	0.00
	2	Q unif	1.500	0.000	0.000	0.00
	3	Q unif	1.500	0.000	0.000	0.00
	4	Q unif	1.500	0.000	0.000	0.00
	11	Q unif	1.500	0.000	0.000	180.00
	12	Q unif	1.500	0.000	0.000	180.00
	13	Q unif	1.500	0.000	0.000	180.00
	14	Q unif	1.500	0.000	0.000	180.00
6	15	Q unif	2.850	0.000	0.000	270.00
	16	Q unif	2.850	0.000	0.000	270.00
	17	Q unif	2.850	0.000	0.000	270.00
	18	Q unif	2.850	0.000	0.000	270.00
	19	Q unif	2.850	0.000	0.000	270.00
	20	Q unif	2.850	0.000	0.000	270.00
7	15	Q unif	0.000	0.000	0.000	270.00
	16	Q unif	0.000	0.000	0.000	270.00
	17	Q unif	0.000	0.000	0.000	270.00
	18	Q unif	0.000	0.000	0.000	270.00
	19	Q unif	0.000	0.000	0.000	270.00
	20	Q unif	0.000	0.000	0.000	270.00

HIPOTESIS COMPUESTAS

Hipotesis compuesta 1

PESO PROPIO MARCO
Tipo : Acciones permanentes
Hipotesis basicas : 1

Hipotesis compuesta 2

PESO TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 2

Hipotesis compuesta 3

EMPUJE ACTIVO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 3

Hipotesis compuesta 4

EMPUJE REPOSO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 4

Hipotesis compuesta 5

SOBRECARGAS DE USO
Tipo : Sobrecargas compatibles
Hipotesis basicas : 5 6 7

COMBINACIONES

Combinacion 1

C1

Hip.comp.	Coeficiente
1	1.600
2	1.600
3	1.600
5	1.600

Combinacion 2

C2

Hip.comp.	Coeficiente
1	0.900
2	1.600
3	1.600
5	1.600

Combinacion 3

C3

Hip.comp.	Coeficiente
1	1.600
2	0.900
3	0.900
5	1.600

Combinacion 4

C4

Hip.comp.	Coeficiente
1	0.900
2	0.900
3	0.900
5	1.600

Combinacion 5

C5

Hip.comp.	Coeficiente
1	1.600
2	1.600
4	1.600
5	1.600

Combinacion 6

C6

Hip.comp.	Coeficiente
1	0.900
2	1.600
4	1.600
5	1.600

Combinacion 7

C7

Hip.comp.	Coeficiente
1	1.600
2	0.900
4	0.900
5	1.600

Combinacion 8

C8

Hip.comp.	Coeficiente
1	0.900
2	0.900
4	0.900
5	1.600

MOVIMIENTOS HIPOTESIS COMPUESTAS (*1000)

Nudo	Hip		Dx	Dy	Wz
1	1	Dx+	-0.066	-1.836	-0.259
		Dx-	-0.066	-1.836	-0.259
		Dy+	-0.066	-1.836	-0.259
		Dy-	-0.066	-1.836	-0.259
		Wz+	-0.066	-1.836	-0.259
		Wz-	-0.066	-1.836	-0.259
	2	Dx+	-0.062	-0.655	-0.247
		Dx-	-0.062	-0.655	-0.247
		Dy+	-0.062	-0.655	-0.247
		Dy-	-0.062	-0.655	-0.247
		Wz+	-0.062	-0.655	-0.247
		Wz-	-0.062	-0.655	-0.247
	3	Dx+	0.081	0.249	0.272
		Dx-	0.081	0.249	0.272
		Dy+	0.081	0.249	0.272
		Dy-	0.081	0.249	0.272
		Wz+	0.081	0.249	0.272
		Wz-	0.081	0.249	0.272
	4	Dx+	0.122	0.377	0.413
		Dx-	0.122	0.377	0.413
		Dy+	0.122	0.377	0.413
		Dy-	0.122	0.377	0.413
		Wz+	0.122	0.377	0.413
		Wz-	0.122	0.377	0.413
	5	Dx+	0.039	0.100	0.127
		Dx-	-0.085	-0.888	-0.336
		Dy+	0.039	0.100	0.127
		Dy-	-0.085	-0.888	-0.336
		Wz+	0.039	0.100	0.127
		Wz-	-0.085	-0.888	-0.336
2	1	Dx+	-0.240	-1.832	-0.199
		Dx-	-0.240	-1.832	-0.199
		Dy+	-0.240	-1.832	-0.199
		Dy-	-0.240	-1.832	-0.199
		Wz+	-0.240	-1.832	-0.199
		Wz-	-0.240	-1.832	-0.199
	2	Dx+	-0.221	-0.651	-0.172
		Dx-	-0.221	-0.651	-0.172
		Dy+	-0.221	-0.651	-0.172
		Dy-	-0.221	-0.651	-0.172

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.221	-0.651	-0.172
		Wz-	-0.221	-0.651	-0.172
	3	Dx+	0.296	0.249	0.284
		Dx-	0.296	0.249	0.284
		Dy+	0.296	0.249	0.284
		Dy-	0.296	0.249	0.284
		Wz+	0.296	0.249	0.284
		Wz-	0.296	0.249	0.284
	4	Dx+	0.448	0.377	0.431
		Dx-	0.448	0.377	0.431
		Dy+	0.448	0.377	0.431
		Dy-	0.448	0.377	0.431
		Wz+	0.448	0.377	0.431
		Wz-	0.448	0.377	0.431
	5	Dx+	0.138	0.100	0.129
		Dx-	-0.301	-0.884	-0.234
		Dy+	0.138	0.100	0.129
		Dy-	-0.301	-0.884	-0.234
		Wz+	0.138	0.100	0.129
		Wz-	-0.301	-0.884	-0.234
3	1	Dx+	-0.499	-1.817	-0.001
		Dx-	-0.499	-1.817	-0.001
		Dy+	-0.499	-1.817	-0.001
		Dy-	-0.499	-1.817	-0.001
		Wz+	-0.499	-1.817	-0.001
		Wz-	-0.499	-1.817	-0.001
	2	Dx+	-0.393	-0.640	0.026
		Dx-	-0.393	-0.640	0.026
		Dy+	-0.393	-0.640	0.026
		Dy-	-0.393	-0.640	0.026
		Wz+	-0.393	-0.640	0.026
		Wz-	-0.393	-0.640	0.026
	3	Dx+	0.760	0.249	0.013
		Dx-	0.760	0.249	0.013
		Dy+	0.760	0.249	0.013
		Dy-	0.760	0.249	0.013
		Wz+	0.760	0.249	0.013
		Wz-	0.760	0.249	0.013
	4	Dx+	1.151	0.377	0.020
		Dx-	1.151	0.377	0.020
		Dy+	1.151	0.377	0.020
		Dy-	1.151	0.377	0.020
		Wz+	1.151	0.377	0.020
		Wz-	1.151	0.377	0.020

Nudo	Hip		Dx	Dy	Wz
	5	Dx+	0.331	0.100	-0.004
		Dx-	-0.533	-0.868	0.035
		Dy+	0.331	0.100	-0.004
		Dy-	-0.533	-0.868	0.035
		Wz+	-0.533	-0.868	0.035
		Wz-	0.331	0.100	-0.004
4	1	Dx+	-0.258	-1.796	0.183
		Dx-	-0.258	-1.796	0.183
		Dy+	-0.258	-1.796	0.183
		Dy-	-0.258	-1.796	0.183
		Wz+	-0.258	-1.796	0.183
		Wz-	-0.258	-1.796	0.183
	2	Dx+	-0.167	-0.628	0.132
		Dx-	-0.167	-0.628	0.132
		Dy+	-0.167	-0.628	0.132
		Dy-	-0.167	-0.628	0.132
		Wz+	-0.167	-0.628	0.132
		Wz-	-0.167	-0.628	0.132
	3	Dx+	0.328	0.249	-0.284
		Dx-	0.328	0.249	-0.284
		Dy+	0.328	0.249	-0.284
		Dy-	0.328	0.249	-0.284
		Wz+	0.328	0.249	-0.284
		Wz-	0.328	0.249	-0.284
	4	Dx+	0.497	0.377	-0.430
		Dx-	0.497	0.377	-0.430
		Dy+	0.497	0.377	-0.430
		Dy-	0.497	0.377	-0.430
		Wz+	0.497	0.377	-0.430
		Wz-	0.497	0.377	-0.430
	5	Dx+	0.133	0.100	-0.119
		Dx-	-0.227	-0.853	0.179
		Dy+	0.133	0.100	-0.119
		Dy-	-0.227	-0.853	0.179
		Wz+	-0.227	-0.853	0.179
		Wz-	0.133	0.100	-0.119
5	1	Dx+	-0.000	-1.785	0.261
		Dx-	-0.000	-1.785	0.261
		Dy+	-0.000	-1.785	0.261
		Dy-	-0.000	-1.785	0.261
		Wz+	-0.000	-1.785	0.261
		Wz-	-0.000	-1.785	0.261
	2	Dx+	-0.002	-0.623	0.150
		Dx-	-0.002	-0.623	0.150

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.002	-0.623	0.150
		Dy-	-0.002	-0.623	0.150
		Wz+	-0.002	-0.623	0.150
		Wz-	-0.002	-0.623	0.150
	3	Dx+	0.024	0.249	-0.204
		Dx-	0.024	0.249	-0.204
		Dy+	0.024	0.249	-0.204
		Dy-	0.024	0.249	-0.204
		Wz+	0.024	0.249	-0.204
		Wz-	0.024	0.249	-0.204
	4	Dx+	0.037	0.377	-0.309
		Dx-	0.037	0.377	-0.309
		Dy+	0.037	0.377	-0.309
		Dy-	0.037	0.377	-0.309
		Wz+	0.037	0.377	-0.309
		Wz-	0.037	0.377	-0.309
	5	Dx+	0.009	0.100	-0.082
		Dx-	-0.002	-0.846	0.204
		Dy+	0.009	0.100	-0.082
		Dy-	-0.002	-0.846	0.204
		Wz+	-0.002	-0.846	0.204
		Wz-	0.009	0.100	-0.082
6	1	Dx+	-0.000	-1.443	0.246
		Dx-	-0.000	-1.443	0.246
		Dy+	-0.000	-1.443	0.246
		Dy-	-0.000	-1.443	0.246
		Wz+	-0.000	-1.443	0.246
		Wz-	-0.000	-1.443	0.246
	2	Dx+	-0.001	-0.434	0.133
		Dx-	-0.001	-0.434	0.133
		Dy+	-0.001	-0.434	0.133
		Dy-	-0.001	-0.434	0.133
		Wz+	-0.001	-0.434	0.133
		Wz-	-0.001	-0.434	0.133
	3	Dx+	0.017	0.029	-0.133
		Dx-	0.017	0.029	-0.133
		Dy+	0.017	0.029	-0.133
		Dy-	0.017	0.029	-0.133
		Wz+	0.017	0.029	-0.133
		Wz-	0.017	0.029	-0.133
	4	Dx+	0.026	0.044	-0.202
		Dx-	0.026	0.044	-0.202
		Dy+	0.026	0.044	-0.202
		Dy-	0.026	0.044	-0.202

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.026	0.044	-0.202
		Wz-	0.026	0.044	-0.202
	5	Dx+	0.006	0.012	-0.054
		Dx-	-0.002	-0.589	0.180
		Dy+	0.006	0.012	-0.054
		Dy-	-0.002	-0.589	0.180
		Wz+	-0.002	-0.589	0.180
		Wz-	0.006	0.012	-0.054
7	1	Dx+	-0.000	-1.252	0.191
		Dx-	-0.000	-1.252	0.191
		Dy+	-0.000	-1.252	0.191
		Dy-	-0.000	-1.252	0.191
		Wz+	-0.000	-1.252	0.191
		Wz-	-0.000	-1.252	0.191
	2	Dx+	-0.001	-0.331	0.102
		Dx-	-0.001	-0.331	0.102
		Dy+	-0.001	-0.331	0.102
		Dy-	-0.001	-0.331	0.102
		Wz+	-0.001	-0.331	0.102
		Wz-	-0.001	-0.331	0.102
	3	Dx+	0.012	-0.068	-0.091
		Dx-	0.012	-0.068	-0.091
		Dy+	0.012	-0.068	-0.091
		Dy-	0.012	-0.068	-0.091
		Wz+	0.012	-0.068	-0.091
		Wz-	0.012	-0.068	-0.091
	4	Dx+	0.018	-0.103	-0.139
		Dx-	0.018	-0.103	-0.139
		Dy+	0.018	-0.103	-0.139
		Dy-	0.018	-0.103	-0.139
		Wz+	0.018	-0.103	-0.139
		Wz-	0.018	-0.103	-0.139
	5	Dx+	0.004	-0.027	-0.037
		Dx-	-0.001	-0.450	0.139
		Dy+	0.000	0.000	0.000
		Dy-	0.003	-0.477	0.102
		Wz+	-0.001	-0.450	0.139
		Wz-	0.004	-0.027	-0.037
8	1	Dx+	0.000	-1.035	-0.000
		Dx-	0.000	-1.035	-0.000
		Dy+	0.000	-1.035	-0.000
		Dy-	0.000	-1.035	-0.000
		Wz+	0.000	-1.035	-0.000
		Wz-	0.000	-1.035	-0.000

Nudo	Hip		Dx	Dy	Wz
	2	Dx+	0.000	-0.216	-0.000
		Dx-	0.000	-0.216	-0.000
		Dy+	0.000	-0.216	-0.000
		Dy-	0.000	-0.216	-0.000
		Wz+	0.000	-0.216	-0.000
		Wz-	0.000	-0.216	-0.000
	3	Dx+	-0.000	-0.164	-0.000
		Dx-	-0.000	-0.164	-0.000
		Dy+	-0.000	-0.164	-0.000
		Dy-	-0.000	-0.164	-0.000
		Wz+	-0.000	-0.164	-0.000
		Wz-	-0.000	-0.164	-0.000
	4	Dx+	-0.000	-0.249	-0.000
		Dx-	-0.000	-0.249	-0.000
		Dy+	-0.000	-0.249	-0.000
		Dy-	-0.000	-0.249	-0.000
		Wz+	-0.000	-0.249	-0.000
		Wz-	-0.000	-0.249	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.000	0.000
		Dy-	0.000	-0.360	-0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
9	1	Dx+	0.000	-1.252	-0.191
		Dx-	0.000	-1.252	-0.191
		Dy+	0.000	-1.252	-0.191
		Dy-	0.000	-1.252	-0.191
		Wz+	0.000	-1.252	-0.191
		Wz-	0.000	-1.252	-0.191
	2	Dx+	0.001	-0.331	-0.102
		Dx-	0.001	-0.331	-0.102
		Dy+	0.001	-0.331	-0.102
		Dy-	0.001	-0.331	-0.102
		Wz+	0.001	-0.331	-0.102
		Wz-	0.001	-0.331	-0.102
	3	Dx+	-0.012	-0.068	0.091
		Dx-	-0.012	-0.068	0.091
		Dy+	-0.012	-0.068	0.091
		Dy-	-0.012	-0.068	0.091
		Wz+	-0.012	-0.068	0.091
		Wz-	-0.012	-0.068	0.091
	4	Dx+	-0.018	-0.103	0.139
		Dx-	-0.018	-0.103	0.139

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.018	-0.103	0.139
		Dy-	-0.018	-0.103	0.139
		Wz+	-0.018	-0.103	0.139
		Wz-	-0.018	-0.103	0.139
	5	Dx+	0.001	-0.450	-0.139
		Dx-	-0.004	-0.027	0.037
		Dy+	0.000	0.000	0.000
		Dy-	-0.003	-0.477	-0.102
		Wz+	-0.004	-0.027	0.037
		Wz-	0.001	-0.450	-0.139
10	1	Dx+	0.000	-1.443	-0.246
		Dx-	0.000	-1.443	-0.246
		Dy+	0.000	-1.443	-0.246
		Dy-	0.000	-1.443	-0.246
		Wz+	0.000	-1.443	-0.246
		Wz-	0.000	-1.443	-0.246
	2	Dx+	0.001	-0.434	-0.133
		Dx-	0.001	-0.434	-0.133
		Dy+	0.001	-0.434	-0.133
		Dy-	0.001	-0.434	-0.133
		Wz+	0.001	-0.434	-0.133
		Wz-	0.001	-0.434	-0.133
	3	Dx+	-0.017	0.029	0.133
		Dx-	-0.017	0.029	0.133
		Dy+	-0.017	0.029	0.133
		Dy-	-0.017	0.029	0.133
		Wz+	-0.017	0.029	0.133
		Wz-	-0.017	0.029	0.133
	4	Dx+	-0.026	0.044	0.202
		Dx-	-0.026	0.044	0.202
		Dy+	-0.026	0.044	0.202
		Dy-	-0.026	0.044	0.202
		Wz+	-0.026	0.044	0.202
		Wz-	-0.026	0.044	0.202
	5	Dx+	0.002	-0.589	-0.180
		Dx-	-0.006	0.012	0.054
		Dy+	-0.006	0.012	0.054
		Dy-	0.002	-0.589	-0.180
		Wz+	-0.006	0.012	0.054
		Wz-	0.002	-0.589	-0.180
11	1	Dx+	0.000	-1.785	-0.261
		Dx-	0.000	-1.785	-0.261
		Dy+	0.000	-1.785	-0.261
		Dy-	0.000	-1.785	-0.261

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.000	-1.785	-0.261
		Wz-	0.000	-1.785	-0.261
	2	Dx+	0.002	-0.623	-0.150
		Dx-	0.002	-0.623	-0.150
		Dy+	0.002	-0.623	-0.150
		Dy-	0.002	-0.623	-0.150
		Wz+	0.002	-0.623	-0.150
		Wz-	0.002	-0.623	-0.150
	3	Dx+	-0.024	0.249	0.204
		Dx-	-0.024	0.249	0.204
		Dy+	-0.024	0.249	0.204
		Dy-	-0.024	0.249	0.204
		Wz+	-0.024	0.249	0.204
		Wz-	-0.024	0.249	0.204
	4	Dx+	-0.037	0.377	0.309
		Dx-	-0.037	0.377	0.309
		Dy+	-0.037	0.377	0.309
		Dy-	-0.037	0.377	0.309
		Wz+	-0.037	0.377	0.309
		Wz-	-0.037	0.377	0.309
	5	Dx+	0.002	-0.846	-0.204
		Dx-	-0.009	0.100	0.082
		Dy+	-0.009	0.100	0.082
		Dy-	0.002	-0.846	-0.204
		Wz+	-0.009	0.100	0.082
		Wz-	0.002	-0.846	-0.204
12	1	Dx+	0.258	-1.796	-0.183
		Dx-	0.258	-1.796	-0.183
		Dy+	0.258	-1.796	-0.183
		Dy-	0.258	-1.796	-0.183
		Wz+	0.258	-1.796	-0.183
		Wz-	0.258	-1.796	-0.183
	2	Dx+	0.167	-0.628	-0.132
		Dx-	0.167	-0.628	-0.132
		Dy+	0.167	-0.628	-0.132
		Dy-	0.167	-0.628	-0.132
		Wz+	0.167	-0.628	-0.132
		Wz-	0.167	-0.628	-0.132
	3	Dx+	-0.328	0.249	0.284
		Dx-	-0.328	0.249	0.284
		Dy+	-0.328	0.249	0.284
		Dy-	-0.328	0.249	0.284
		Wz+	-0.328	0.249	0.284
		Wz-	-0.328	0.249	0.284

Nudo	Hip		Dx	Dy	Wz
	4	Dx+	-0.497	0.377	0.430
		Dx-	-0.497	0.377	0.430
		Dy+	-0.497	0.377	0.430
		Dy-	-0.497	0.377	0.430
		Wz+	-0.497	0.377	0.430
		Wz-	-0.497	0.377	0.430
	5	Dx+	0.227	-0.853	-0.179
		Dx-	-0.133	0.100	0.119
		Dy+	-0.133	0.100	0.119
		Dy-	0.227	-0.853	-0.179
		Wz+	-0.133	0.100	0.119
		Wz-	0.227	-0.853	-0.179
13	1	Dx+	0.499	-1.817	0.001
		Dx-	0.499	-1.817	0.001
		Dy+	0.499	-1.817	0.001
		Dy-	0.499	-1.817	0.001
		Wz+	0.499	-1.817	0.001
		Wz-	0.499	-1.817	0.001
	2	Dx+	0.393	-0.640	-0.026
		Dx-	0.393	-0.640	-0.026
		Dy+	0.393	-0.640	-0.026
		Dy-	0.393	-0.640	-0.026
		Wz+	0.393	-0.640	-0.026
		Wz-	0.393	-0.640	-0.026
	3	Dx+	-0.760	0.249	-0.013
		Dx-	-0.760	0.249	-0.013
		Dy+	-0.760	0.249	-0.013
		Dy-	-0.760	0.249	-0.013
		Wz+	-0.760	0.249	-0.013
		Wz-	-0.760	0.249	-0.013
	4	Dx+	-1.151	0.377	-0.020
		Dx-	-1.151	0.377	-0.020
		Dy+	-1.151	0.377	-0.020
		Dy-	-1.151	0.377	-0.020
		Wz+	-1.151	0.377	-0.020
		Wz-	-1.151	0.377	-0.020
	5	Dx+	0.533	-0.868	-0.035
		Dx-	-0.331	0.100	0.004
		Dy+	-0.331	0.100	0.004
		Dy-	0.533	-0.868	-0.035
		Wz+	-0.331	0.100	0.004
		Wz-	0.533	-0.868	-0.035
14	1	Dx+	0.240	-1.832	0.199
		Dx-	0.240	-1.832	0.199

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.240	-1.832	0.199
		Dy-	0.240	-1.832	0.199
		Wz+	0.240	-1.832	0.199
		Wz-	0.240	-1.832	0.199
	2	Dx+	0.221	-0.651	0.172
		Dx-	0.221	-0.651	0.172
		Dy+	0.221	-0.651	0.172
		Dy-	0.221	-0.651	0.172
		Wz+	0.221	-0.651	0.172
		Wz-	0.221	-0.651	0.172
	3	Dx+	-0.296	0.249	-0.284
		Dx-	-0.296	0.249	-0.284
		Dy+	-0.296	0.249	-0.284
		Dy-	-0.296	0.249	-0.284
		Wz+	-0.296	0.249	-0.284
		Wz-	-0.296	0.249	-0.284
	4	Dx+	-0.448	0.377	-0.431
		Dx-	-0.448	0.377	-0.431
		Dy+	-0.448	0.377	-0.431
		Dy-	-0.448	0.377	-0.431
		Wz+	-0.448	0.377	-0.431
		Wz-	-0.448	0.377	-0.431
	5	Dx+	0.301	-0.884	0.234
		Dx-	-0.138	0.100	-0.129
		Dy+	-0.138	0.100	-0.129
		Dy-	0.301	-0.884	0.234
		Wz+	0.301	-0.884	0.234
		Wz-	-0.138	0.100	-0.129
15	1	Dx+	0.066	-1.836	0.259
		Dx-	0.066	-1.836	0.259
		Dy+	0.066	-1.836	0.259
		Dy-	0.066	-1.836	0.259
		Wz+	0.066	-1.836	0.259
		Wz-	0.066	-1.836	0.259
	2	Dx+	0.062	-0.655	0.247
		Dx-	0.062	-0.655	0.247
		Dy+	0.062	-0.655	0.247
		Dy-	0.062	-0.655	0.247
		Wz+	0.062	-0.655	0.247
		Wz-	0.062	-0.655	0.247
	3	Dx+	-0.081	0.249	-0.272
		Dx-	-0.081	0.249	-0.272
		Dy+	-0.081	0.249	-0.272
		Dy-	-0.081	0.249	-0.272

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.081	0.249	-0.272
		Wz-	-0.081	0.249	-0.272
	4	Dx+	-0.122	0.377	-0.413
		Dx-	-0.122	0.377	-0.413
		Dy+	-0.122	0.377	-0.413
		Dy-	-0.122	0.377	-0.413
		Wz+	-0.122	0.377	-0.413
		Wz-	-0.122	0.377	-0.413
	5	Dx+	0.085	-0.888	0.336
		Dx-	-0.039	0.100	-0.127
		Dy+	-0.039	0.100	-0.127
		Dy-	0.085	-0.888	0.336
		Wz+	0.085	-0.888	0.336
		Wz-	-0.039	0.100	-0.127
16	1	Dx+	-0.022	-2.105	-0.270
		Dx-	-0.022	-2.105	-0.270
		Dy+	-0.022	-2.105	-0.270
		Dy-	-0.022	-2.105	-0.270
		Wz+	-0.022	-2.105	-0.270
		Wz-	-0.022	-2.105	-0.270
	2	Dx+	-0.020	-0.916	-0.265
		Dx-	-0.020	-0.916	-0.265
		Dy+	-0.020	-0.916	-0.265
		Dy-	-0.020	-0.916	-0.265
		Wz+	-0.020	-0.916	-0.265
		Wz-	-0.020	-0.916	-0.265
	3	Dx+	0.034	0.514	0.253
		Dx-	0.034	0.514	0.253
		Dy+	0.034	0.514	0.253
		Dy-	0.034	0.514	0.253
		Wz+	0.034	0.514	0.253
		Wz-	0.034	0.514	0.253
	4	Dx+	0.052	0.779	0.383
		Dx-	0.052	0.779	0.383
		Dy+	0.052	0.779	0.383
		Dy-	0.052	0.779	0.383
		Wz+	0.052	0.779	0.383
		Wz-	0.052	0.779	0.383
	5	Dx+	0.017	0.224	0.118
		Dx-	-0.028	-1.243	-0.359
		Dy+	0.017	0.224	0.118
		Dy-	-0.028	-1.243	-0.359
		Wz+	0.017	0.224	0.118
		Wz-	-0.028	-1.243	-0.359

Nudo	Hip		Dx	Dy	Wz
17	1	Dx+	0.000	-2.196	-0.266
		Dx-	0.000	-2.196	-0.266
		Dy+	0.000	-2.196	-0.266
		Dy-	0.000	-2.196	-0.266
		Wz+	0.000	-2.196	-0.266
		Wz-	0.000	-2.196	-0.266
	2	Dx+	0.002	-1.006	-0.264
		Dx-	0.002	-1.006	-0.264
		Dy+	0.002	-1.006	-0.264
		Dy-	0.002	-1.006	-0.264
		Wz+	0.002	-1.006	-0.264
		Wz-	0.002	-1.006	-0.264
	3	Dx+	0.012	0.597	0.235
		Dx-	0.012	0.597	0.235
		Dy+	0.012	0.597	0.235
		Dy-	0.012	0.597	0.235
		Wz+	0.012	0.597	0.235
		Wz-	0.012	0.597	0.235
	4	Dx+	0.019	0.905	0.355
		Dx-	0.019	0.905	0.355
		Dy+	0.019	0.905	0.355
		Dy-	0.019	0.905	0.355
		Wz+	0.019	0.905	0.355
		Wz-	0.019	0.905	0.355
	5	Dx+	0.009	-1.103	-0.249
		Dx-	0.000	0.000	0.000
		Dy+	0.007	0.263	0.110
		Dy-	0.002	-1.365	-0.359
		Wz+	0.007	0.263	0.110
		Wz-	0.002	-1.365	-0.359
18	1	Dx+	0.000	-2.664	-0.000
		Dx-	0.000	-2.664	-0.000
		Dy+	0.000	-2.664	-0.000
		Dy-	0.000	-2.664	-0.000
		Wz+	0.000	-2.664	-0.000
		Wz-	0.000	-2.664	-0.000
	2	Dx+	0.000	-1.485	-0.000
		Dx-	0.000	-1.485	-0.000
		Dy+	0.000	-1.485	-0.000
		Dy-	0.000	-1.485	-0.000
		Wz+	0.000	-1.485	-0.000
		Wz-	0.000	-1.485	-0.000
	3	Dx+	0.000	0.949	-0.000
		Dx-	0.000	0.949	-0.000

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.000	0.949	-0.000
		Dy-	0.000	0.949	-0.000
		Wz+	0.000	0.949	-0.000
		Wz-	0.000	0.949	-0.000
	4	Dx+	0.000	1.438	-0.000
		Dx-	0.000	1.438	-0.000
		Dy+	0.000	1.438	-0.000
		Dy-	0.000	1.438	-0.000
		Wz+	0.000	1.438	-0.000
		Wz-	0.000	1.438	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.427	-0.000
		Dy-	0.000	-2.015	-0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
19	1	Dx+	-0.000	-2.196	0.266
		Dx-	-0.000	-2.196	0.266
		Dy+	-0.000	-2.196	0.266
		Dy-	-0.000	-2.196	0.266
		Wz+	-0.000	-2.196	0.266
		Wz-	-0.000	-2.196	0.266
	2	Dx+	-0.002	-1.006	0.264
		Dx-	-0.002	-1.006	0.264
		Dy+	-0.002	-1.006	0.264
		Dy-	-0.002	-1.006	0.264
		Wz+	-0.002	-1.006	0.264
		Wz-	-0.002	-1.006	0.264
	3	Dx+	-0.012	0.597	-0.235
		Dx-	-0.012	0.597	-0.235
		Dy+	-0.012	0.597	-0.235
		Dy-	-0.012	0.597	-0.235
		Wz+	-0.012	0.597	-0.235
		Wz-	-0.012	0.597	-0.235
	4	Dx+	-0.019	0.905	-0.355
		Dx-	-0.019	0.905	-0.355
		Dy+	-0.019	0.905	-0.355
		Dy-	-0.019	0.905	-0.355
		Wz+	-0.019	0.905	-0.355
		Wz-	-0.019	0.905	-0.355
	5	Dx+	0.000	0.000	0.000
		Dx-	-0.009	-1.103	0.249
		Dy+	-0.007	0.263	-0.110
		Dy-	-0.002	-1.365	0.359

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.002	-1.365	0.359
		Wz-	-0.007	0.263	-0.110
20	1	Dx+	0.022	-2.105	0.270
		Dx-	0.022	-2.105	0.270
		Dy+	0.022	-2.105	0.270
		Dy-	0.022	-2.105	0.270
		Wz+	0.022	-2.105	0.270
		Wz-	0.022	-2.105	0.270
	2	Dx+	0.020	-0.916	0.265
		Dx-	0.020	-0.916	0.265
		Dy+	0.020	-0.916	0.265
		Dy-	0.020	-0.916	0.265
		Wz+	0.020	-0.916	0.265
		Wz-	0.020	-0.916	0.265
	3	Dx+	-0.034	0.514	-0.253
		Dx-	-0.034	0.514	-0.253
		Dy+	-0.034	0.514	-0.253
		Dy-	-0.034	0.514	-0.253
		Wz+	-0.034	0.514	-0.253
		Wz-	-0.034	0.514	-0.253
	4	Dx+	-0.052	0.779	-0.383
		Dx-	-0.052	0.779	-0.383
		Dy+	-0.052	0.779	-0.383
		Dy-	-0.052	0.779	-0.383
		Wz+	-0.052	0.779	-0.383
		Wz-	-0.052	0.779	-0.383
	5	Dx+	0.028	-1.243	0.359
		Dx-	-0.017	0.224	-0.118
		Dy+	-0.017	0.224	-0.118
		Dy-	0.028	-1.243	0.359
		Wz+	0.028	-1.243	0.359
		Wz-	-0.017	0.224	-0.118

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Barra	Extremo	Comb		N	Q	M
1	Dorsal	4	N+	-15.99	9.03	18.25
		1	N-	-48.38	18.56	51.79
		5	Q+	-48.38	33.45	58.63
		4	Q-	-15.99	9.03	18.25
		5	M+	-48.38	33.45	58.63
		4	M-	-15.99	9.03	18.25
1	Frontal	4	N+	-17.19	8.15	11.73
		1	N-	-50.51	17.00	38.28
		5	Q+	-50.51	29.25	34.80
		4	Q-	-17.19	8.15	11.73
		1	M+	-50.51	17.00	38.28
		8	M-	-17.19	17.62	8.87
2	Dorsal	4	N+	-17.19	8.15	11.73
		1	N-	-50.51	17.00	38.28
		5	Q+	-50.51	29.25	34.80
		4	Q-	-17.19	8.15	11.73
		1	M+	-50.51	17.00	38.28
		8	M-	-17.19	17.62	8.87
2	Frontal	4	N+	-21.30	2.18	-1.76
		1	N-	-57.81	6.39	7.76
		5	Q+	-57.81	7.30	-3.16
		4	Q-	-21.30	1.80	-11.00
		3	M+	-51.38	4.81	13.53
		6	M-	-27.73	4.30	-27.69
3	Dorsal	4	N+	-21.30	2.18	-1.76
		1	N-	-57.81	6.39	7.76
		5	Q+	-57.81	7.30	-3.16
		4	Q-	-21.30	1.80	-11.00
		3	M+	-51.38	4.81	13.53
		6	M-	-27.73	4.30	-27.69
3	Frontal	4	N+	-25.41	-8.03	5.88
		1	N-	-65.12	-11.77	14.78
		3	Q+	-58.69	-5.41	14.32
		6	Q-	-31.84	-29.48	5.18
		1	M+	-65.12	-11.77	14.78
		6	M-	-31.84	-29.48	5.18
4	Dorsal	4	N+	-25.41	-8.03	5.88
		1	N-	-65.12	-11.77	14.78
		3	Q+	-58.69	-5.41	14.32
		6	Q-	-31.84	-29.48	5.18

Barra	Extremo	Comb		N	Q	M
		1	M+	-65.12	-11.77	14.78
		6	M-	-31.84	-29.48	5.18
4	Frontal	8	N+	-27.24	-21.73	25.28
		1	N-	-68.37	-22.27	34.53
		3	Q+	-61.94	-11.31	24.02
		6	Q-	-33.67	-48.17	50.21
		5	M+	-68.37	-45.55	55.61
		4	M-	-27.24	-13.94	18.62
5	Dorsal	3	N+	-11.31	39.09	24.02
		6	N-	-48.17	24.42	50.21
		5	Q+	-45.55	46.04	55.61
		4	Q-	-13.94	17.47	18.62
		5	M+	-45.55	46.04	55.61
		4	M-	-13.94	17.47	18.62
5	Frontal	3	N+	-11.31	44.33	-30.63
		6	N-	-48.17	27.37	16.29
		5	Q+	-45.55	51.28	-8.14
		4	Q-	-13.94	20.42	-6.20
		6	M+	-48.17	27.37	16.29
		3	M-	-11.31	44.33	-30.63
6	Dorsal	3	N+	-11.31	24.68	-30.63
		6	N-	-48.17	17.02	16.29
		5	Q+	-45.55	30.32	-8.14
		4	Q-	-13.94	11.38	-6.20
		6	M+	-48.17	17.02	16.29
		3	M-	-11.31	24.68	-30.63
6	Frontal	3	N+	-11.31	28.14	-53.47
		6	N-	-48.17	18.97	0.72
		5	Q+	-45.55	33.78	-35.87
		4	Q-	-13.94	13.33	-16.88
		6	M+	-48.17	18.97	0.72
		3	M-	-11.31	28.14	-53.47
7	Dorsal	3	N+	-11.31	4.72	-53.47
		6	N-	-48.17	4.79	0.72
		5	Q+	-45.55	7.48	-35.87
		4	Q-	-13.94	2.03	-16.88
		6	M+	-48.17	4.79	0.72
		3	M-	-11.31	4.72	-53.47
7	Frontal	3	N+	-11.31	13.42	-73.19
		6	N-	-48.17	9.69	-15.02
		5	Q+	-45.55	16.18	-61.59
		4	Q-	-13.94	6.93	-26.62
		6	M+	-48.17	9.69	-15.02
		1	M-	-22.27	14.87	-75.62

Barra	Extremo	Comb		N	Q	M
8	Dorsal	3	N+	-11.31	-13.42	-73.19
		6	N-	-48.17	-9.69	-15.02
		4	Q+	-13.94	-6.93	-26.62
		5	Q-	-45.55	-16.18	-61.59
		6	M+	-48.17	-9.69	-15.02
		1	M-	-22.27	-14.87	-75.62
8	Frontal	3	N+	-11.31	-4.72	-53.47
		6	N-	-48.17	-4.79	0.72
		4	Q+	-13.94	-2.03	-16.88
		5	Q-	-45.55	-7.48	-35.87
		6	M+	-48.17	-4.79	0.72
		3	M-	-11.31	-4.72	-53.47
9	Dorsal	3	N+	-11.31	-28.14	-53.47
		6	N-	-48.17	-18.97	0.72
		4	Q+	-13.94	-13.33	-16.88
		5	Q-	-45.55	-33.78	-35.87
		6	M+	-48.17	-18.97	0.72
		3	M-	-11.31	-28.14	-53.47
9	Frontal	3	N+	-11.31	-24.68	-30.63
		6	N-	-48.17	-17.02	16.29
		4	Q+	-13.94	-11.38	-6.20
		5	Q-	-45.55	-30.32	-8.14
		6	M+	-48.17	-17.02	16.29
		3	M-	-11.31	-24.68	-30.63
10	Dorsal	3	N+	-11.31	-44.33	-30.63
		6	N-	-48.17	-27.37	16.29
		4	Q+	-13.94	-20.42	-6.20
		5	Q-	-45.55	-51.28	-8.14
		6	M+	-48.17	-27.37	16.29
		3	M-	-11.31	-44.33	-30.63
10	Frontal	3	N+	-11.31	-39.09	24.02
		6	N-	-48.17	-24.42	50.21
		4	Q+	-13.94	-17.47	18.62
		5	Q-	-45.55	-46.04	55.61
		5	M+	-45.55	-46.04	55.61
		4	M-	-13.94	-17.47	18.62
11	Dorsal	4	N+	-27.24	13.94	18.62
		1	N-	-68.37	22.27	34.53
		6	Q+	-33.67	48.17	50.21
		3	Q-	-61.94	11.31	24.02
		5	M+	-68.37	45.55	55.61
		4	M-	-27.24	13.94	18.62
11	Frontal	4	N+	-25.41	8.03	5.88
		1	N-	-65.12	11.77	14.78

Barra	Extremo	Comb		N	Q	M
		6	Q+	-31.84	29.48	5.18
		3	Q-	-58.69	5.41	14.32
		1	M+	-65.12	11.77	14.78
		6	M-	-31.84	29.48	5.18
12	Dorsal	4	N+	-25.41	8.03	5.88
		1	N-	-65.12	11.77	14.78
		6	Q+	-31.84	29.48	5.18
		3	Q-	-58.69	5.41	14.32
		1	M+	-65.12	11.77	14.78
		6	M-	-31.84	29.48	5.18
12	Frontal	4	N+	-21.30	-2.18	-1.76
		1	N-	-57.81	-6.39	7.76
		4	Q+	-21.30	-1.80	-11.00
		5	Q-	-57.81	-7.30	-3.16
		3	M+	-51.38	-4.81	13.53
		6	M-	-27.73	-4.30	-27.69
13	Dorsal	4	N+	-21.30	-2.18	-1.76
		1	N-	-57.81	-6.39	7.76
		4	Q+	-21.30	-1.80	-11.00
		5	Q-	-57.81	-7.30	-3.16
		3	M+	-51.38	-4.81	13.53
		6	M-	-27.73	-4.30	-27.69
13	Frontal	4	N+	-17.19	-8.15	11.73
		1	N-	-50.51	-17.00	38.28
		4	Q+	-17.19	-8.15	11.73
		5	Q-	-50.51	-29.25	34.80
		1	M+	-50.51	-17.00	38.28
		8	M-	-17.19	-17.62	8.87
14	Dorsal	4	N+	-17.19	-8.15	11.73
		1	N-	-50.51	-17.00	38.28
		4	Q+	-17.19	-8.15	11.73
		5	Q-	-50.51	-29.25	34.80
		1	M+	-50.51	-17.00	38.28
		8	M-	-17.19	-17.62	8.87
14	Frontal	4	N+	-15.99	-9.03	18.25
		1	N-	-48.38	-18.56	51.79
		4	Q+	-15.99	-9.03	18.25
		5	Q-	-48.38	-33.45	58.63
		5	M+	-48.38	-33.45	58.63
		4	M-	-15.99	-9.03	18.25
15	Dorsal	4	N+	-11.49	-14.33	-18.25
		5	N-	-40.81	-42.35	-58.63
		8	Q+	-23.08	-12.44	-23.46
		1	Q-	-26.12	-44.75	-51.79

Barra	Extremo	Comb		N	Q	M
		4	M+	-11.49	-14.33	-18.25
		5	M-	-40.81	-42.35	-58.63
15	Frontal	4	N+	-10.79	-10.07	-5.77
		5	N-	-38.82	-30.17	-21:52
		8	Q+	-22.38	-8.17	-12.91
		1	Q-	-24.13	-32.57	-12.22
		3	M+	-11.57	-14.15	-5.44
		6	M-	-38.04	-26.09	-21.84
16	Dorsal	4	N+	-11.59	-9.14	-5.77
		5	N-	-41.19	-26.85	-21.52
		8	Q+	-22.99	-6.29	-12.91
		1	Q-	-26.74	-30.46	-12.22
		3	M+	-12.71	-13.14	-5.44
		6	M-	-40.07	-22.84	-21.84
16	Frontal	4	N+	-11.28	-7.90	-2.78
		5	N-	-40.25	-23.09	-12.77
		8	Q+	-22.67	-5.05	-10.92
		1	Q-	-25.80	-26.70	-2.20
		3	M+	-18.03	-24.10	1.61
		6	M-	-33.49	-6.89	-17.16
17	Dorsal	4	N+	-9.03	-10.39	-2.78
		5	N-	-33.45	-32.16	-12.77
		4	Q+	-9.03	-10.39	-2.78
		1	Q-	-18.56	-32.16	-2.20
		3	M+	-11.65	-27.75	1.61
		6	M-	-30.82	-14.80	-17.16
17	Frontal	4	N+	-9.03	0.00	12.81
		5	N-	-33.45	0.00	35.47
		5	Q+	-23.23	0.00	17.24
		4	Q-	-9.03	0.00	12.81
		1	M+	-18.56	0.00	46.04
		8	M-	-20.77	0.00	4.67
18	Dorsal	4	N+	-9.03	0.00	12.81
		5	N-	-33.45	0.00	35.47
		5	Q+	-23.23	0.00	17.24
		4	Q-	-9.03	0.00	12.81
		1	M+	-18.56	0.00	46.04
		8	M-	-20.77	0.00	4.67
18	Frontal	4	N+	-9.03	10.40	-2.78
		5	N-	-33.45	32.16	-12.77
		1	Q+	-18.56	32.16	-2.20
		4	Q-	-9.03	10.40	-2.78
		3	M+	-11.65	27.75	1.61
		6	M-	-30.82	14.81	-17.16

Barra	Extremo	Comb		N	Q	M
19	Dorsal	4	N+	-11.28	7.90	-2.78
		5	N-	-40.25	23.09	-12.77
		1	Q+	-25.80	26.70	-2.20
		8	Q-	-22.67	5.05	-10.92
		3	M+	-18.03	24.10	1.61
		6	M-	-33.49	6.89	-17.16
19	Frontal	4	N+	-11.59	9.14	-5.77
		5	N-	-41.19	26.85	-21.52
		1	Q+	-26.74	30.46	-12.22
		8	Q-	-22.99	6.29	-12.91
		3	M+	-12.71	13.14	-5.44
		6	M-	-40.07	22.84	-21.84
20	Dorsal	4	N+	-10.79	10.07	-5.77
		5	N-	-38.82	30.17	-21.52
		1	Q+	-24.13	32.57	-12.22
		8	Q-	-22.38	8.17	-12.91
		3	M+	-11.57	14.15	-5.44
		6	M-	-38.04	26.09	-21.84
20	Frontal	4	N+	-11.49	14.33	-18.25
		5	N-	-40.81	42.35	-58.63
		1	Q+	-26.12	44.75	-51.79
		8	Q-	-23.08	12.44	-23.46
		4	M+	-11.49	14.33	-18.25
		5	M-	-40.81	42.35	-58.63

ARMADURA DEL DINTEL

NUDO	Nd	Md	As c.i.	As c.s.
15	-11.49	-18.25	0.00	2.23
	-40.81	-58.63	0.00	6.94
	-11.49	-18.25	0.00	2.23
	-40.81	-58.63	0.00	6.94
16	-11.59	-5.77	0.00	0.21
	-41.19	-21.52	0.00	1.15
	-12.71	-5.44	0.00	0.00
	-40.07	-21.84	0.00	1.37
17	-9.03	-2.78	0.00	0.00
	-33.45	-12.77	0.00	0.49
	-11.65	1.61	0.00	0.00
	-30.82	-17.16	0.00	2.35
18	-9.03	12.81	3.36	0.00
	-33.45	35.47	8.65	0.00
	-18.56	46.04	14.19	0.00
	-20.77	4.67	0.00	0.00

ARMADURA DE SOLERA

NUDO	Nd	Md	As c.i.	As c.s.
5	-11.31	24.02	4.38	0.00
	-48.17	50.21	6.56	0.00
	-45.55	55.61	8.18	0.00
	-13.94	18.62	2.79	0.00
6	-11.31	-30.63	0.00	5.97
	-48.17	16.29	0.00	0.00
	-48.17	16.29	0.00	0.00
	-11.31	-30.63	0.00	5.97
7	-11.31	-53.47	0.00	11.50
	-48.17	0.72	0.00	0.00
	-48.17	0.72	0.00	0.00
	-11.31	-53.47	0.00	11.50
8	-11.31	-73.19	0.00	16.36
	-48.17	-15.02	0.00	0.00
	-48.17	-15.02	0.00	0.00
	-22.27	-75.62	0.00	15.74

ARMADURA DE HASTIAL

NUDO	Nd	Md	As c.i.	As c.e.
1	-15.99	18.25	0.00	4.47
	-48.38	51.79	0.00	13.21
	-48.38	58.63	0.00	15.85
	-15.99	18.25	0.00	4.47
2	-17.19	11.73	0.00	2.03
	-50.51	38.28	0.00	7.87
	-50.51	38.28	0.00	7.87
	-17.19	8.87	0.00	1.03
3	-21.30	-1.76	0.00	0.00
	-57.81	7.76	0.00	0.00
	-51.38	13.53	0.00	0.00
	-27.73	-27.69	6.51	0.00
4	-25.41	5.88	0.00	0.00
	-65.12	14.78	0.00	0.00
	-65.12	14.78	0.00	0.00
	-31.84	5.18	0.00	0.00
5	-27.24	25.28	0.00	5.69
	-68.37	34.53	0.00	4.51
	-68.37	55.61	0.00	12.58
	-27.24	18.62	0.00	3.30

RESUMEN DE ARMADURAS

ARMADURA DEL DINTEL

NUDO	As c.i.	As c.s.
15	0.00	6.94
16	0.00	1.37
17	0.00	2.35
18	14.19	0.00

Cuantía mínima geométrica: 5.25 cm²/m

ARMADURA DE SOLERA

NUDO	As c.i.	As c.s.
5	8.18	0.00
6	0.00	5.97
7	0.00	11.50
8	0.00	16.36

Cuantía mínima geométrica: 7.50 cm²/m

ARMADURA DE HASTIAL

NUDO	As c.i.	As c.e.
1	0.00	15.85
2	0.00	7.87
3	6.51	0.00
4	0.00	0.00
5	0.00	12.58

Cuantía mínima geométrica vertical: 3.15 cm²/m
Cuantía mínima geométrica horizontal: 5.60 cm²/m

COMPROBACION A CORTANTE

DINTEL

NUDO	Vd max.	Vcu	As
16	30.46	53.58	0.00
17	32.16	42.60	0.00
18	0.00	42.60	0.00

SOLERA

Vcu= 61.97 T/m.

NUDO	Vd max.	As
6	40.80	0.00
7	20.63	0.00
8	4.63	0.00

HASTIAL

Vcu= 40.42 T/m.

NUDO	Vd max.	As
2	29.25	0.00
3	7.30	0.00
4	29.48	0.00

COMPROBACION DE TENSIONES SOBRE EL TERRENO

Tensión transmitida al terreno en nudo 5: 1.50 kp/cm²

Estructura: P.I. Nº 5 **Cálculo:** ALETAS. H=7.84 M.

DEFINICION GEOMETRICA

Altura total	7.84	m
Ancho superior	0.80	m
Ancho inferior	0.80	m
Longitud zarpa delantera	1.20	m
Longitud zarpa trasera	3.20	m
Canto zapata	1.00	m
Canto tacón cotra deslizamiento.....	0.00	m

ACCIONES ACTUANTES

Altura de tierras	0.00	m
Altura tierras en intradós	0.50	m
Sobrecarga en el trasdós	0.00	t/m²

DATOS TERRENO

Densidad	1.90	t/m³
Coeficiente empuje activo	0.4	
¿Considera empuje pasivo? (s/n)	n	
Angulo de rozamiento	30	º

OTROS DATOS

Recubrimiento	5	cm
fck	250	Kp/cm²
fyk	5100	Kp/cm²
Gamma C	1.5	
Gamma S	1.15	
Gamma F desf.....	1.6	
Gamma F fav.....	0.9	
Canto útil muro	75	cm
Canto útil zapata	95	cm
Densidad hormigón	2.5	t/m³

Muro:

A flex =	**30.01**	cm²/m.l.
A cort =	**0.00**	cm²/m.l.

Zapata (puntera):

A flex =	**7.26**	cm²/m.l.
Cumple cortante?		**SI**

Zapata (talón):

A flex =	**21.19**	cm²/m.l.
Cumple cortante?		**SI**

DESLIZA?	1.51	**NO**
VUELCA?	2.63	**NO**
SIGM_BAR	**20.93**	t/m²
SIGM_MAX	**27.78**	t/m²
SIGM_MIN	**2.03**	t/m²

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 15.68 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 61.04 mt
H = 23.36 t

RESUMEN:

HIP	N	M	H
P.P.	15.68	0.00	0.00
TIERRAS	0.00	61.04	23.36

Estructura: P.I. Nº 5 **Cálculo:** ALETAS. H=7.84 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	15.68	61.04	23.36

Tomando los coeficientes de seguridad:

Gamma DESF 1.6
Gamma FAV 0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	14.11	97.66	7.27	30.0
1.2.	25.09	97.66	4.24	28.9

Armadura a disponer:

A = 30.0 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 37.37 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 48.41 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 5 **Cálculo:** ALETAS. H=7.84 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 28.68 t
M = 15.68 mt
H = 0.00 t

Debido a las tierras:

N = 48.81 t
M = 42.34 mt
H = 29.70 t

RESUMEN:

HIP	N	M	H
P.P.	28.68	15.68	0.00
TIERRAS	48.81	42.34	29.70

SEGURIDAD AL DESLIZAMIENTO:

N = 77.49 t
H = 29.70 t GAMMA = 1.51 O.K.
mu = 0.58
Epasivo= 0.00 t

SEGURIDAD AL VUELCO:

Mvolc = 87.50 mt
Mest = 230.49 mt GAMMA = 2.63 O.K.

Estructura: P.I. Nº 5 **Cálculo:** ALETAS. H=7.84 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	77.49	58.02	29.70

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	27.78	2.03

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	20.93

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -87.00 mt

Anec = 21.19 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 30.91 mt

Anec = 7.26 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 35.28 t
Vlim = 61.32 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 26.14 t
Vlim = 122.64 t

Estructura: P.I. Nº 5 **Cálculo:** ALETAS. H=4.42 M.

DEFINICION GEOMETRICA

Altura total	4.42	m
Ancho superior	0.40	m
Ancho inferior	0.40	m
Longitud zarpa delantera	0.70	m
Longitud zarpa trasera	2.00	m
Canto zapata	0.50	m
Canto tacón cotra deslizamiento.....	0.00	m

ACCIONES ACTUANTES

Altura de tierras	0.00	m
Altura tierras en intradós	0.50	m
Sobrecarga en el trasdós	0.00	t/m²

DATOS TERRENO

Densidad	1.90	t/m³
Coeficiente empuje activo	0.4	
¿Considera empuje pasivo? (s/n)	n	
Angulo de rozamiento	30	º

OTROS DATOS

Recubrimiento	5	cm
fck	250	Kp/cm²
fyk	5100	Kp/cm²
Gamma C	1.5	
Gamma S	1.15	
Gamma F desf.....	1.6	
Gamma F fav.....	0.9	
Canto útil muro	35	cm
Canto útil zapata	45	cm
Densidad hormigón	2.5	t/m³

Muro:		
A flex =	**11.41**	cm²/m.l.
A cort =	**0.00**	cm²/m.l.
Zapata (puntera):		
A flex =	**2.54**	cm²/m.l.
Cumple cortante?	**SI**	
Zapata (talón):		
A flex =	**8.07**	cm²/m.l.
Cumple cortante?	**SI**	
DESLIZA?	1.62	**NO**
VUELCA?	3.00	**NO**
SIGM_BAR	**10.94**	t/m²
SIGM_MAX	**14.30**	t/m²
SIGM_MIN	**2.32**	t/m²

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 4.42 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 10.94 mt
H = 7.42 t

RESUMEN:

HIP	N	M	H
P.P.	4.42	0.00	0.00
TIERRAS	0.00	10.94	7.42

Estructura: P.I. Nº 5 **Cálculo:** ALETAS. H=4.42 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	4.42	10.94	7.42

Tomando los coeficientes de seguridad:

Gamma DESF 1.6
Gamma FAV 0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	3.98	17.50	4.55	11.4
1.2.	7.07	17.50	2.62	11.1

Armadura a disponer:

A = 11.4 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 11.88 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 22.59 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 5 **Cálculo:** ALETAS. H=4.42 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 8.30 t
M = 2.87 mt
H = 0.00 t

Debido a las tierras:

N = 17.46 t
M = 6.72 mt
H = 9.20 t

RESUMEN:

HIP	N	M	H
P.P.	8.30	2.87	0.00
TIERRAS	17.46	6.72	9.20

SEGURIDAD AL DESLIZAMIENTO:

N = 25.76 t
H = 9.20 t GAMMA = 1.62 O.K.
mu = 0.58
Epasivo= 0.00 t

SEGURIDAD AL VUELCO:

Mvolc = 15.09 mt
Mest = 45.26 mt GAMMA = 3.00 O.K.

Estructura: P.I. Nº 5 **Cálculo:** ALETAS. H=4.42 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	25.76	9.60	9.20

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	14.30	2.32

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	10.94

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -15.85 mt

Anec = 8.07 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 5.14 mt

Anec = 2.54 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 10.75 t
Vlim = 29.05 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 8.50 t
Vlim = 58.09 t

3. RESUMEN CONTROL CALIDAD

SAITEC SYNCONSULT S.A.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO P.I. 5

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	N °	RES. MEDIA	N °	RES. MEDIA	N °	RES. MEDIA					
160	241	19/08/99	Losa inf m,d	03030503	H-250	8	Blanda	2	216	3	276	1		100	16/09/99	II AL 42,5 R	243	
160	242	19/08/99	Losa inf m,d	03030503	H-250	10	Fluida	2	221	3	297	1		100	16/09/99	II AL 42,5 R	243	
187	277	24/08/99	Zap aleta 1,d	03030503	H-250	7	Blanda	2	254	3	282	1		100	21/09/99	II AL 42,5 R	246	
188	278	24/08/99	Zap aleta 2,d	03030503	H-250	9	Blanda	2	206	3	276	1		92	23/09/99	II AL 42,5 R	243	
187	279	24/08/99	Losa inf m,i	03030503	H-250	10	Fluida	2	207	3	280	1		100	21/06/99	II AL 42,5 R	246	
226	360	01/09/99	Muro 2,d	03030503	H-250	10	Fluida			3	307			100	29/09/99	II AL 42,5 R	270	
261	395	07/09/99	Aleta 1 1ª	03030503	H-250	5	Blanda			3	359			100	06/10/99	II AL 42,5 R	294	
270	413	09/09/99	Aleta 3 y 4	03030503	H-250	5	Blanda			3	289			100	07/10/99	II AL 42,5 R	254	
285	427	13/09/99	Aleta 2 1ª	03030503	H-250	5	Blanda			3	301			100	13/10/99	II AL 42,5 R	225	
319	479	21/09/99	Losa sup m,i	03030503	H-250	10	Fluida	2	222	3	305			100	19/10/99	II AL 42,5 R	268	
319	480	21/09/99	Losa sup m,i	03030503	H-250	10	Fluida	2	261	3	310			100	19/10/99	II AL 42,5 R	268	

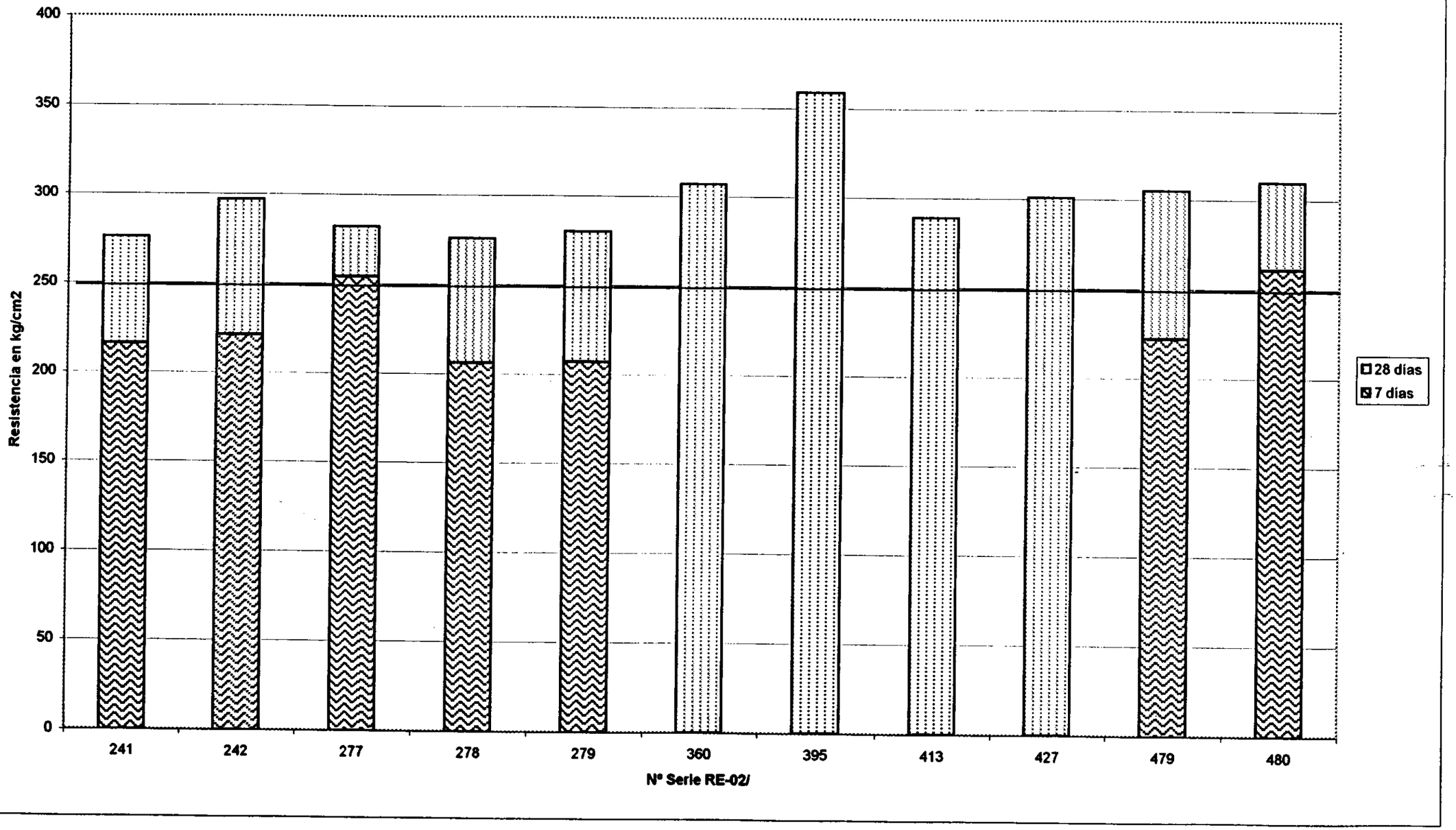
FECHA: FIRMA:

NOMBRE: Ana Mª Martín Herrrero

CARGO: Jefe de Laboratorio

LOTE DE f. est. < 0,9 fck

Resistencia del hormigón
P.I. 5



SAITEC / SYNCONSULT S.L. UNIÓN TEMPORAL DE EMPRESAS	**ENSAYO DE PLACA CON CARGA**
	OBRA: **LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA SUB-TRAMO III**

LOCALIZACIÓN	P.I. 5 Cimiento		
FECHA:	28/7/99	**REF. MUESTRA:**	RE-08/ 2

CARGA ESPECIFICA (Mpa)			LECTURA CUADRANTES			MEDIA	ASIENTO	DIFERENCIA
En nucleos	Subbases y bases	Coronaciones	(1)	(2)	(3)		mm	S (mm)
PRIMER CICLO DE CARGA								
0,02	0,02	0,02	71	62	80	71		
0,05	0,05	0,05	158	135	145	146	0,75	
0,1			454	421	483	453	3,82	
0,15	0,15	**0,15**	944		968	956	8,85	6,67
0,2			1282		1053	1168	10,97	
	0,25	**0,25**	1530		1390	1460	13,89	
	0,35	0,35	2330		1924	2127	20,56	
	0,45		3070		2562	2816	27,45	
DESGARGA								
	0,35		3070		2562	2816	27,45	
	0,25	0,25	3058		2549	2804	27,33	
0,15	0,15	0,15	3025		2515	2770	26,99	
0,1								
0,05	0,05	0,05	2956		2445	2701	26,30	
SEGUNDO CICLO DE CARGA								
0,1								
0,15	0,15	**0,15**	3072		2465	2769	26,98	
	0,25	**0,25**	3123		2513	2818	27,47	0,63
	0,35		3190		2572	2881	28,10	

	Mpa	kp/cm2
E1=30/S1	4,498	44,978
E2=30/S2	47,619	476,190

Observaciones

Fecha	Firma	Cargo
		Nombre

SAITEC / SYNCONSULT S.L. UNIÓN TEMPORAL DE EMPRESAS	**ENSAYO DE PLACA CON CARGA**
	OBRA: **LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA SUB-TRAMO III**

LOCALIZACIÓN	P.I. 5 cimentación	x	
FECHA:	30/7/99	**REF. MUESTRA:**	RE-08/ 3

CARGA ESPECIFICA (Mpa)			LECTURA CUADRANTES			MEDIA	ASIENTO	DIFERENCIA
En nucleos	Subbases y bases	Coronaciones	(1)	(2)	(3)	mm	mm	S (mm)
PRIMER CICLO DE CARGA								
0,02	0,02	0,02	0,5	0,78	0,58	0,62		
0,05	0,05	0,05	4,93	5,87	4,5	5,1	4,48	
0,1								
0,15	0,15	**0,15**	20,52	24,84	19,9	21,753	21,133	
0,2								
	0,25	**0,25**	33,83	40,8	35,5	36,71	36,09	
	0,35	0,35	50	50	41,8	47,267	46,647	10,557
	0,45							
DESGARGA								
	0,35							
	0,25	0,25						
0,15	0,15	0,15						
0,1								
0,05	0,05	0,05						
SEGUNDO CICLO DE CARGA								
0,1								
0,15	0,15	**0,15**						
	0,25	**0,25**						
	0,35							

	Mpa
E1=30/S1	2,84
E2=30/S2	

Observaciones

Con una carga de 0,35 Mpa los comparadores toman el límite de lectura, no hay recuperación
La placa con carga se realiza en la zona central de la excavación. Al pasar el camión se ve flanear el terreno.

Fecha	Firma	Cargo
		Nombre

SAITEC / SYNCONSULT S.L. UNIÓN TEMPORAL DE EMPRESAS	ENSAYO DE PLACA CON CARGA
	OBRA: LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA SUB-TRAMO III

LOCALIZACIÓN	P.I. 5 cimentación		
FECHA:	30/7/99	**REF. MUESTRA:**	RE-08/ 4

CARGA ESPECIFICA (Mpa)			LECTURA CUADRANTES			MEDIA	ASIENTO	DIFERENCIA
En nucleos	Subbases y bases	Coronaciones	(1)	(2)	(3)		mm	S (mm)
PRIMER CICLO DE CARGA								
0,02	0,02	0,02						
0,05	0,05	0,05	0,12	0,8	0,7	0,54		
0,1								
0,15	0,15	**0,15**	2,31	2,84	1,26	2,14	1,60	
0,2								
	0,25	**0,25**	5,19	4,74	3,45	4,46	3,92	3,41
	0,35	0,35	8,9	8,3	6,4	7,87	7,33	
	0,45		12,4	11,47	9,3	11,06	10,52	
DESGARGA								
	0,35		12,4	11,44	9,29	11,04	10,50	
	0,25	0,25	12,4	11,4	9,29	11,03	10,49	
0,15	0,15	0,15	12,25	11,22	9,12	10,86	10,32	
0,1								
0,05	0,05	0,05	11,71	10,72	8,6	10,34	9,80	
SEGUNDO CICLO DE CARGA								
0,1								
0,15	0,15	**0,15**	11,82	11,19	8,75	10,59	10,05	
	0,25	**0,25**	12,1	11,25	9	10,78	10,24	0,44
	0,35		12,62	11,58	9,48	11,23	10,69	

	Mpa	kg/cm2
E1=30/S1	8,80	88,0
E2=30/S2	68,18	682

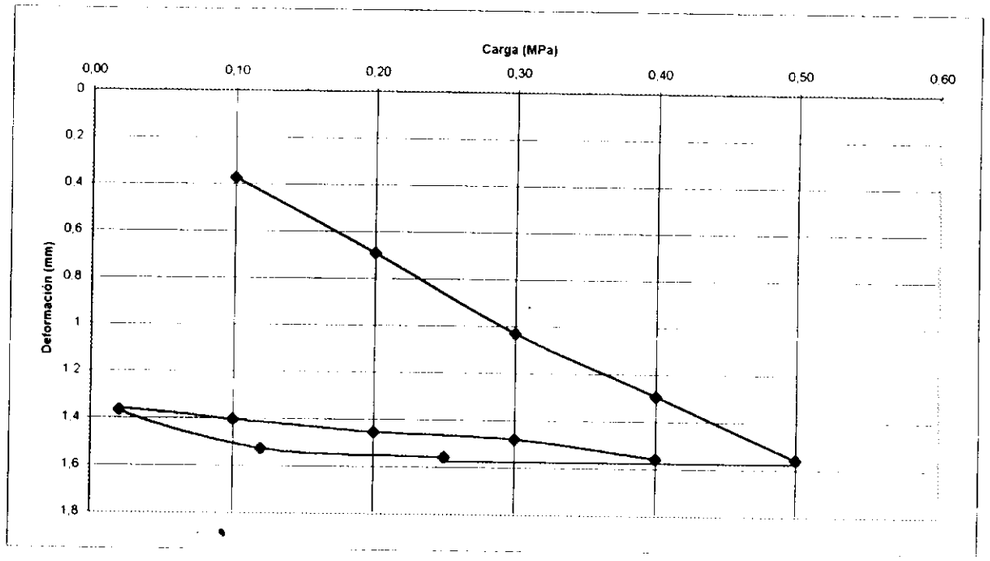
Observaciones

Esta zona contiene a grava (esta pegada la rampa de salida de vehiculos)

Fecha	Firma	Cargo
		Nombre

SAITEC / SYNCONSULT S.L. UNIÓN TEMPORAL DE EMPRESAS	ENSAYO DE PLACA CON CARGA (DIN 18 134)
	OBRA: LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA SUB-TRAMO III

LOCALIZACIÓN	P.I. 5 Cuña de transición 1 Capa 14ª		
CÓDIGO DE TRAMIFICACIÓN:	03030502		**PK** 312+488
FECHA:	25/11/99	**REF. MUESTRA:**	RE-08/ 18



Módulos			Especifi.
	Mpa	kg/cm2	
Ev1	73	740	
Ev2	462	4716	1600
Ev2/Ev1	6,4	6,4	

OBSERVACIONES

Fecha	Firma	Cargo
		JEFE DE LABORATORIO
		Nombre
		ANA MARTIN HERRERO

PASO INFERIOR 6

PASO INFERIOR 6

ÍNDICE

1. DESCRIPCIÓN Y DEFINICIÓN
2. CÁLCULOS
3. RESUMEN DEL CONTROL DE CALIDAD

1. DESCRIPCIÓN Y DEFINICIÓN

CALCULO DE MARCOS CERRADOS UNICELULARES

El siguiente programa calcula los esfuerzos en un marco cerrado unicelular a partir de las dimensiones geométricas del mismo y sometido a las acciones de su peso propio, del terreno y de las sobrecargas de uso. A partir de estros esfuerzos el programa arma las secciones a flexocompresión simple y comprueba la resistencia a cortante de las mismas, así como las tensiones máximas transmitidas al terreno.

DATOS GEOMÉTRICOS

Gálibo vertical (GV):	6,45	m.
Gálibo horizontal (GH):	8,00	m.
Espesor de dintel (ED):	0,70	m.
Espesor de solera (ESOL):	1,00	m.
Espesor de hastial (EH):	0,70	m.
Longitud cartela dintel:	1,00	m.
Canto adicional cartela:	0,50	m.

DATOS DEL TERRENO

Altura de tierras sobre el dintel (HT):	2,10	m.
Peso específico de las tierras (γ):	2.10	T/m³
Coeficiente de balasto (K):	5000	T/m³
Empuje activo del terreno (λ_a):	0.33	
Empuje al reposo del terreno (λ_r):	0.50	

SOBRECARGAS DE USO

Carretera:

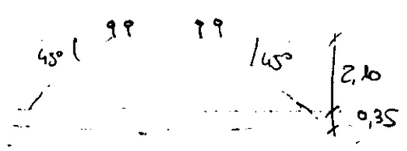
Sobrecarga uniforme:	0.4	T/m²
Vehículo pesado:	60	T.
Sobrecarga en trasdós:	1.0	T/m²

Ferrocarril:

Sobrecarga uniforme tren tipo B (abierto a 45º hasta plano medio del dintel): 3,11 T/m²
Sobrecarga en trasdós: 3.0 T/m²

Sobrecarga :

2 Tiras 12 T/m.



Coef. de impacto:

$$\phi_2 = \frac{1,14\sqrt{8,70}}{3,10 - 1,76\sqrt{8,70 + 3,70}} = 50,88\% \rightarrow 0,51$$

$$\phi_{red} = 0,51 - \frac{2,10 - 1,00}{10,00} = 0,40$$

$$q = \frac{24 \times 1,40}{(5,00 + 2 \cdot 2,10)} = 3,11\ T/m^2$$

DATOS DE LOS MATERIALES

Hormigón:

f_{ck}:	250	kg/cm²
γ_c:	1.50	

Acero:

f_{yk}:	5100	kg/cm²
γ_s:	1.15	

Recubrimiento mecánico de armaduras: 4 cm.

COEFICIENTES DE MAYORACION DE ACCIONES

Peso propio marco:
- Efecto desfavorable: $\gamma_{pp1} = 1.60$
- Efecto favorable: $\gamma_{pp2} = 0.90$

Acción de las tierras (Peso y empuje):
- Efecto desfavorable: $\gamma_{t1} = 1.60$
- Efecto favorable: $\gamma_{t2} = 0.90$

Sobrecargas de uso:
- Efecto desfavorable: $\gamma_{sc1} = 1.60$
- Efecto favorable: $\gamma_{sc2} = 0$

HIPÓTESIS DE CALCULO

Se consideran las siguientes hipótesis de cálculo:

H1: Peso propio marco.
H2: Peso de tierras.
H3: Empuje activo de tierras.
H4: Empuje al reposo de tierras.
H5: Sobrecargas de uso.

Esta última hipótesis de sobrecargas de uso tiene los siguientes componentes:

- Sobrecarga uniforme.(400 kg/m² en carretera y tren tipo B en ferrocarril)
- Vehiculo pesado. Esta acción se asimila a una sobrecarga uniforme, abriendo a 45° hasta el centro de gravedad del dintel. Si el vehículo tiene de dimensiones en planta AxB, la carga equivalente será:

$$\frac{Q}{(A + 2 \times HT + ED)\,(B + 2 \times HT + ED)}$$

- Sobrecarga en el trasdós. Empuje debido a la sobrecarga en el trasdós con el coeficiente de empuje al reposo.

COMBINACIONES DE HIPÓTESIS

Se consideran las siguientes combinaciones de hipótesis:

C1: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C2: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C3: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C4: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C5: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C6: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C7: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$
C8: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$

Con estas combinaciones se obtienen los esfuerzos pésimos en las barras del modelo.

ARMADO DEL MARCO

Con los esfuerzos pésimos obtenidos anteriormente, se arman las secciones definidas en el modelo de cálculo a flexocompresión simple. Se obtienen asimismo las armaduras a disponer por cuantía mínima geométrica.

COMPROBACIÓN A CORTANTE

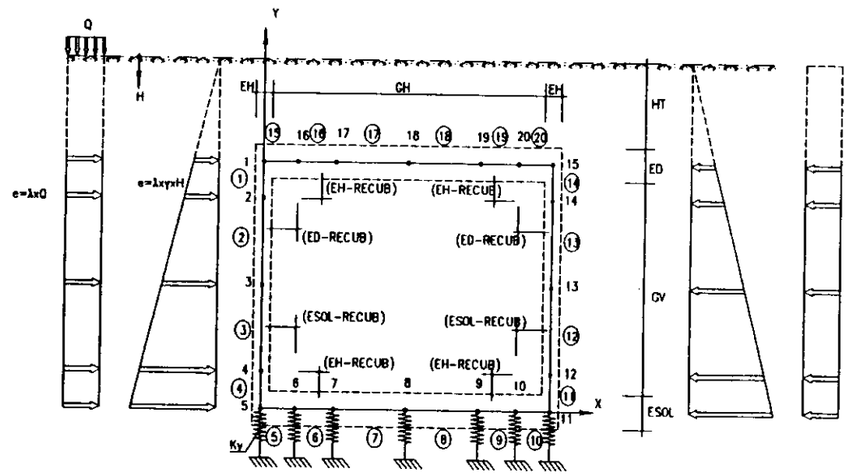
Se realiza la comprobación a cortante de las secciones para verificar si la contribución a cortante del hormigón es suficiente para absorber el cortante de cálculo hallado. Si no se cumple esta condición se obtiene la armadura necesaria.
Para la comprobación a cortante se han introducido en el modelo nudos a una distancia de un canto útil del paramento para verificar en ellos el cortante de cálculo y no en los nudos extremos.

COMPROBACIÓN DE TENSIONES SOBRE EL TERRENO

Para el cálculo de la tensión máxima transmitida al terreno se obtiene el movimiento máximo vertical en los nudos de la solera. La tensión será por tanto:

$$\sigma = K_{balasto} \times \delta_{max}$$

A continuación figuran los resultados del cálculo.



MODELO DE CALCULO

2. CÁLCULOS

CARACTERISTICAS DE LOS NUDOS

Nudo	Coordenadas X	Coordenadas Y	coacc xyz	Constantes Muelles Kx	Constantes Muelles Ky	Constantes Muelles Kz
1	0.000	7.050				
2	0.000	6.290				
3	0.000	3.725				
4	0.000	1.160				
5	0.000	0.000			5.025E+03	
6	1.310	0.000			5.438E+03	
7	2.175	0.000			7.600E+03	
8	4.350	0.000	100		1.088E+04	
9	6.525	0.000			7.600E+03	
10	7.390	0.000			5.438E+03	
11	8.700	0.000			5.025E+03	
12	8.700	1.160				
13	8.700	3.725				
14	8.700	6.290				
15	8.700	7.050				
16	1.010	7.215				
17	1.350	7.300				
18	4.350	7.300				
19	7.350	7.300				
20	7.690	7.215				

CARACTERISTICAS DE LAS BARRAS

Barra	Nd	Nf	I	A	E
1	1	2	0.028583	0.700000	3.004E+06
2	2	3	0.028583	0.700000	3.004E+06
3	3	4	0.028583	0.700000	3.004E+06
4	4	5	0.028583	0.700000	3.004E+06
5	5	6	0.083333	1.000000	3.004E+06
6	6	7	0.083333	1.000000	3.004E+06
7	7	8	0.083333	1.000000	3.004E+06
8	8	9	0.083333	1.000000	3.004E+06
9	9	10	0.083333	1.000000	3.004E+06
10	10	11	0.083333	1.000000	3.004E+06
11	11	12	0.028583	0.700000	3.004E+06
12	12	13	0.028583	0.700000	3.004E+06
13	13	14	0.028583	0.700000	3.004E+06
14	14	15	0.028583	0.700000	3.004E+06
15	1	16	0.092393	1.035000	3.004E+06
16	16	17	0.040311	0.785000	3.004E+06
17	17	18	0.028583	0.700000	3.004E+06
18	18	19	0.028583	0.700000	3.004E+06
19	19	20	0.040311	0.785000	3.004E+06
20	20	15	0.092393	1.035000	3.004E+06

CARGAS EN BARRAS

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
1	1	Q unif	1.750	0.000	0.000	270.00
	2	Q unif	1.750	0.000	0.000	270.00
	3	Q unif	1.750	0.000	0.000	270.00
	4	Q unif	1.750	0.000	0.000	270.00
	5	Q unif	2.500	0.000	0.000	270.00
	6	Q unif	2.500	0.000	0.000	270.00
	7	Q unif	2.500	0.000	0.000	270.00
	8	Q unif	2.500	0.000	0.000	270.00
	9	Q unif	2.500	0.000	0.000	270.00
	10	Q unif	2.500	0.000	0.000	270.00
	11	Q unif	1.750	0.000	0.000	270.00
	12	Q unif	1.750	0.000	0.000	270.00
	13	Q unif	1.750	0.000	0.000	270.00
	14	Q unif	1.750	0.000	0.000	270.00
	15	Q unif	2.588	0.000	0.000	270.00
	16	Q unif	1.963	0.000	0.000	270.00
	17	Q unif	1.750	0.000	0.000	270.00
	18	Q unif	1.750	0.000	0.000	270.00
	19	Q unif	1.963	0.000	0.000	270.00
	20	Q unif	2.588	0.000	0.000	270.00
2	15	Q unif	4.410	0.000	0.000	270.00
	16	Q unif	4.410	0.000	0.000	270.00
	17	Q unif	4.410	0.000	0.000	270.00
	18	Q unif	4.410	0.000	0.000	270.00
	19	Q unif	4.410	0.000	0.000	270.00
	20	Q unif	4.410	0.000	0.000	270.00
3	1	Q unif	2.048	0.000	0.000	0.00
	2	Q unif	3.287	0.000	0.000	0.00
	3	Q unif	5.064	0.000	0.000	0.00
	4	Q unif	6.355	0.000	0.000	0.00
	11	Q unif	6.355	0.000	0.000	180.00
	12	Q unif	5.064	0.000	0.000	180.00
	13	Q unif	3.287	0.000	0.000	180.00
	14	Q unif	2.048	0.000	0.000	180.00
4	1	Q unif	3.103	0.000	0.000	0.00
	2	Q unif	4.980	0.000	0.000	0.00
	3	Q unif	7.673	0.000	0.000	0.00
	4	Q unif	9.628	0.000	0.000	0.00
	11	Q unif	9.628	0.000	0.000	180.00
	12	Q unif	7.673	0.000	0.000	180.00
	13	Q unif	4.980	0.000	0.000	180.00
	14	Q unif	3.103	0.000	0.000	180.00

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
5	1	Q unif	1.500	0.000	0.000	0.00
	2	Q unif	1.500	0.000	0.000	0.00
	3	Q unif	1.500	0.000	0.000	0.00
	4	Q unif	1.500	0.000	0.000	0.00
	11	Q unif	1.500	0.000	0.000	180.00
	12	Q unif	1.500	0.000	0.000	180.00
	13	Q unif	1.500	0.000	0.000	180.00
	14	Q unif	1.500	0.000	0.000	180.00
6	15	Q unif	3.110	0.000	0.000	270.00
	16	Q unif	3.110	0.000	0.000	270.00
	17	Q unif	3.110	0.000	0.000	270.00
	18	Q unif	3.110	0.000	0.000	270.00
	19	Q unif	3.110	0.000	0.000	270.00
	20	Q unif	3.110	0.000	0.000	270.00
7	15	Q unif	0.000	0.000	0.000	270.00
	16	Q unif	0.000	0.000	0.000	270.00
	17	Q unif	0.000	0.000	0.000	270.00
	18	Q unif	0.000	0.000	0.000	270.00
	19	Q unif	0.000	0.000	0.000	270.00
	20	Q unif	0.000	0.000	0.000	270.00

HIPOTESIS COMPUESTAS

Hipotesis compuesta 1

PESO PROPIO MARCO
Tipo : Acciones permanentes
Hipotesis basicas : 1

Hipotesis compuesta 2

PESO TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 2

Hipotesis compuesta 3

EMPUJE ACTIVO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 3

Hipotesis compuesta 4

EMPUJE REPOSO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 4

Hipotesis compuesta 5

SOBRECARGAS DE USO
Tipo : Sobrecargas compatibles
Hipotesis basicas : 5 6 7

COMBINACIONES

Combinacion 1

C1

Hip.comp.	Coeficiente
1	1.600
2	1.600
3	1.600
5	1.600

Combinacion 2

C2

Hip.comp.	Coeficiente
1	0.900
2	1.600
3	1.600
5	1.600

Combinacion 3

C3

Hip.comp.	Coeficiente
1	1.600
2	0.900
3	0.900
5	1.600

Combinacion 4

C4

Hip.comp.	Coeficiente
1	0.900
2	0.900
3	0.900
5	1.600

Combinacion 5

C5

Hip.comp.	Coeficiente
1	1.600
2	1.600
4	1.600
5	1.600

Combinacion 6

C6

Hip.comp.	Coeficiente
1	0.900
2	1.600
4	1.600
5	1.600

Combinacion 7

C7

Hip.comp.	Coeficiente
1	1.600
2	0.900
4	0.900
5	1.600

Combinacion 8

C8

Hip.comp.	Coeficiente
1	0.900
2	0.900
4	0.900
5	1.600

MOVIMIENTOS HIPOTESIS COMPUESTAS (*1000)

Nudo	Hip		Dx	Dy	Wz
1	1	Dx+	-0.065	-1.824	-0.257
		Dx-	-0.065	-1.824	-0.257
		Dy+	-0.065	-1.824	-0.257
		Dy-	-0.065	-1.824	-0.257
		Wz+	-0.065	-1.824	-0.257
		Wz-	-0.065	-1.824	-0.257
	2	Dx+	-0.130	-1.373	-0.516
		Dx-	-0.130	-1.373	-0.516
		Dy+	-0.130	-1.373	-0.516
		Dy-	-0.130	-1.373	-0.516
		Wz+	-0.130	-1.373	-0.516
		Wz-	-0.130	-1.373	-0.516
	3	Dx+	0.097	0.290	0.324
		Dx-	0.097	0.290	0.324
		Dy+	0.097	0.290	0.324
		Dy-	0.097	0.290	0.324
		Wz+	0.097	0.290	0.324
		Wz-	0.097	0.290	0.324
	4	Dx+	0.147	0.439	0.492
		Dx-	0.147	0.439	0.492
		Dy+	0.147	0.439	0.492
		Dy-	0.147	0.439	0.492
		Wz+	0.147	0.439	0.492
		Wz-	0.147	0.439	0.492
	5	Dx+	0.038	0.098	0.123
		Dx-	-0.083	-0.872	-0.327
		Dy+	0.038	0.098	0.123
		Dy-	-0.083	-0.872	-0.327
		Wz+	0.038	0.098	0.123
		Wz-	-0.083	-0.872	-0.327
2	1	Dx+	-0.238	-1.821	-0.196
		Dx-	-0.238	-1.821	-0.196
		Dy+	-0.238	-1.821	-0.196
		Dy-	-0.238	-1.821	-0.196
		Wz+	-0.238	-1.821	-0.196
		Wz-	-0.238	-1.821	-0.196
	2	Dx+	-0.461	-1.366	-0.358
		Dx-	-0.461	-1.366	-0.358
		Dy+	-0.461	-1.366	-0.358
		Dy-	-0.461	-1.366	-0.358

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.461	-1.366	-0.358
		Wz-	-0.461	-1.366	-0.358
	3	Dx+	0.352	0.290	0.336
		Dx-	0.352	0.290	0.336
		Dy+	0.352	0.290	0.336
		Dy-	0.352	0.290	0.336
		Wz+	0.352	0.290	0.336
		Wz-	0.352	0.290	0.336
	4	Dx+	0.534	0.439	0.509
		Dx-	0.534	0.439	0.509
		Dy+	0.534	0.439	0.509
		Dy-	0.534	0.439	0.509
		Wz+	0.534	0.439	0.509
		Wz-	0.534	0.439	0.509
	5	Dx+	0.134	0.098	0.125
		Dx-	-0.293	-0.867	-0.227
		Dy+	0.134	0.098	0.125
		Dy-	-0.293	-0.867	-0.227
		Wz+	0.134	0.098	0.125
		Wz-	-0.293	-0.867	-0.227
3	1	Dx+	-0.488	-1.806	-0.001
		Dx-	-0.488	-1.806	-0.001
		Dy+	-0.488	-1.806	-0.001
		Dy-	-0.488	-1.806	-0.001
		Wz+	-0.488	-1.806	-0.001
		Wz-	-0.488	-1.806	-0.001
	2	Dx+	-0.811	-1.342	0.053
		Dx-	-0.811	-1.342	0.053
		Dy+	-0.811	-1.342	0.053
		Dy-	-0.811	-1.342	0.053
		Wz+	-0.811	-1.342	0.053
		Wz-	-0.811	-1.342	0.053
	3	Dx+	0.882	0.290	0.011
		Dx-	0.882	0.290	0.011
		Dy+	0.882	0.290	0.011
		Dy-	0.882	0.290	0.011
		Wz+	0.882	0.290	0.011
		Wz-	0.882	0.290	0.011
	4	Dx+	1.336	0.439	0.016
		Dx-	1.336	0.439	0.016
		Dy+	1.336	0.439	0.016
		Dy-	1.336	0.439	0.016
		Wz+	1.336	0.439	0.016
		Wz-	1.336	0.439	0.016

Nudo	Hip		Dx	Dy	Wz
	5	Dx+	0.317	0.098	-0.004
		Dx-	-0.515	-0.852	0.034
		Dy+	0.317	0.098	-0.004
		Dy-	-0.515	-0.852	0.034
		Wz+	-0.515	-0.852	0.034
		Wz-	0.317	0.098	-0.004
4	1	Dx+	-0.255	-1.785	0.181
		Dx-	-0.255	-1.785	0.181
		Dy+	-0.255	-1.785	0.181
		Dy-	-0.255	-1.785	0.181
		Wz+	-0.255	-1.785	0.181
		Wz-	-0.255	-1.785	0.181
	2	Dx+	-0.349	-1.319	0.276
		Dx-	-0.349	-1.319	0.276
		Dy+	-0.349	-1.319	0.276
		Dy-	-0.349	-1.319	0.276
		Wz+	-0.349	-1.319	0.276
		Wz-	-0.349	-1.319	0.276
	3	Dx+	0.381	0.290	-0.330
		Dx-	0.381	0.290	-0.330
		Dy+	0.381	0.290	-0.330
		Dy-	0.381	0.290	-0.330
		Wz+	0.381	0.290	-0.330
		Wz-	0.381	0.290	-0.330
	4	Dx+	0.577	0.439	-0.500
		Dx-	0.577	0.439	-0.500
		Dy+	0.577	0.439	-0.500
		Dy-	0.577	0.439	-0.500
		Wz+	0.577	0.439	-0.500
		Wz-	0.577	0.439	-0.500
	5	Dx+	0.129	0.098	-0.115
		Dx-	-0.222	-0.837	0.175
		Dy+	0.129	0.098	-0.115
		Dy-	-0.222	-0.837	0.175
		Wz+	-0.222	-0.837	0.175
		Wz-	0.129	0.098	-0.115
5	1	Dx+	-0.000	-1.774	0.259
		Dx-	-0.000	-1.774	0.259
		Dy+	-0.000	-1.774	0.259
		Dy-	-0.000	-1.774	0.259
		Wz+	-0.000	-1.774	0.259
		Wz-	-0.000	-1.774	0.259
	2	Dx+	-0.004	-1.308	0.314
		Dx-	-0.004	-1.308	0.314

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.004	-1.308	0.314
		Dy-	-0.004	-1.308	0.314
		Wz+	-0.004	-1.308	0.314
		Wz-	-0.004	-1.308	0.314
	3	Dx+	0.028	0.290	-0.237
		Dx-	0.028	0.290	-0.237
		Dy+	0.028	0.290	-0.237
		Dy-	0.028	0.290	-0.237
		Wz+	0.028	0.290	-0.237
		Wz-	0.028	0.290	-0.237
	4	Dx+	0.043	0.439	-0.360
		Dx-	0.043	0.439	-0.360
		Dy+	0.043	0.439	-0.360
		Dy-	0.043	0.439	-0.360
		Wz+	0.043	0.439	-0.360
		Wz-	0.043	0.439	-0.360
	5	Dx+	0.008	0.098	-0.080
		Dx-	-0.002	-0.831	0.200
		Dy+	0.008	0.098	-0.080
		Dy-	-0.002	-0.831	0.200
		Wz+	-0.002	-0.831	0.200
		Wz-	0.008	0.098	-0.080
6	1	Dx+	-0.000	-1.435	0.243
		Dx-	-0.000	-1.435	0.243
		Dy+	-0.000	-1.435	0.243
		Dy-	-0.000	-1.435	0.243
		Wz+	-0.000	-1.435	0.243
		Wz-	-0.000	-1.435	0.243
	2	Dx+	-0.002	-0.911	0.278
		Dx-	-0.002	-0.911	0.278
		Dy+	-0.002	-0.911	0.278
		Dy-	-0.002	-0.911	0.278
		Wz+	-0.002	-0.911	0.278
		Wz-	-0.002	-0.911	0.278
	3	Dx+	0.020	0.034	-0.155
		Dx-	0.020	0.034	-0.155
		Dy+	0.020	0.034	-0.155
		Dy-	0.020	0.034	-0.155
		Wz+	0.020	0.034	-0.155
		Wz-	0.020	0.034	-0.155
	4	Dx+	0.030	0.051	-0.235
		Dx-	0.030	0.051	-0.235
		Dy+	0.030	0.051	-0.235
		Dy-	0.030	0.051	-0.235

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.030	0.051	-0.235
		Wz-	0.030	0.051	-0.235
	5	Dx+	0.006	0.011	-0.052
		Dx-	-0.002	-0.578	0.177
		Dy+	0.006	0.011	-0.052
		Dy-	-0.002	-0.578	0.177
		Wz+	-0.002	-0.578	0.177
		Wz-	0.006	0.011	-0.052
7	1	Dx+	-0.000	-1.246	0.189
		Dx-	-0.000	-1.246	0.189
		Dy+	-0.000	-1.246	0.189
		Dy-	-0.000	-1.246	0.189
		Wz+	-0.000	-1.246	0.189
		Wz-	-0.000	-1.246	0.189
	2	Dx+	-0.002	-0.696	0.214
		Dx-	-0.002	-0.696	0.214
		Dy+	-0.002	-0.696	0.214
		Dy-	-0.002	-0.696	0.214
		Wz+	-0.002	-0.696	0.214
		Wz-	-0.002	-0.696	0.214
	3	Dx+	0.014	-0.079	-0.106
		Dx-	0.014	-0.079	-0.106
		Dy+	0.014	-0.079	-0.106
		Dy-	0.014	-0.079	-0.106
		Wz+	0.014	-0.079	-0.106
		Wz-	0.014	-0.079	-0.106
	4	Dx+	0.021	-0.120	-0.161
		Dx-	0.021	-0.120	-0.161
		Dy+	0.021	-0.120	-0.161
		Dy-	0.021	-0.120	-0.161
		Wz+	0.021	-0.120	-0.161
		Wz-	0.021	-0.120	-0.161
	5	Dx+	0.004	-0.027	-0.036
		Dx-	-0.001	-0.442	0.136
		Dy+	0.000	0.000	0.000
		Dy-	0.003	-0.469	0.100
		Wz+	-0.001	-0.442	0.136
		Wz-	0.004	-0.027	-0.036
8	1	Dx+	0.000	-1.031	-0.000
		Dx-	0.000	-1.031	-0.000
		Dy+	0.000	-1.031	-0.000
		Dy-	0.000	-1.031	-0.000
		Wz+	0.000	-1.031	-0.000
		Wz-	0.000	-1.031	-0.000

Nudo	Hip		Dx	Dy	Wz
	2	Dx+	0.000	-0.455	-0.000
		Dx-	0.000	-0.455	-0.000
		Dy+	0.000	-0.455	-0.000
		Dy-	0.000	-0.455	-0.000
		Wz+	0.000	-0.455	-0.000
		Wz-	0.000	-0.455	-0.000
	3	Dx+	-0.000	-0.191	-0.000
		Dx-	-0.000	-0.191	-0.000
		Dy+	-0.000	-0.191	-0.000
		Dy-	-0.000	-0.191	-0.000
		Wz+	-0.000	-0.191	-0.000
		Wz-	-0.000	-0.191	-0.000
	4	Dx+	-0.000	-0.289	-0.000
		Dx-	-0.000	-0.289	-0.000
		Dy+	-0.000	-0.289	-0.000
		Dy-	-0.000	-0.289	-0.000
		Wz+	-0.000	-0.289	-0.000
		Wz-	-0.000	-0.289	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.000	0.000
		Dy-	0.000	-0.353	-0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
9	1	Dx+	0.000	-1.246	-0.189
		Dx-	0.000	-1.246	-0.189
		Dy+	0.000	-1.246	-0.189
		Dy-	0.000	-1.246	-0.189
		Wz+	0.000	-1.246	-0.189
		Wz-	0.000	-1.246	-0.189
	2	Dx+	0.002	-0.696	-0.214
		Dx-	0.002	-0.696	-0.214
		Dy+	0.002	-0.696	-0.214
		Dy-	0.002	-0.696	-0.214
		Wz+	0.002	-0.696	-0.214
		Wz-	0.002	-0.696	-0.214
	3	Dx+	-0.014	-0.079	0.106
		Dx-	-0.014	-0.079	0.106
		Dy+	-0.014	-0.079	0.106
		Dy-	-0.014	-0.079	0.106
		Wz+	-0.014	-0.079	0.106
		Wz-	-0.014	-0.079	0.106
	4	Dx+	-0.021	-0.120	0.161
		Dx-	-0.021	-0.120	0.161

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.021	-0.120	0.161
		Dy-	-0.021	-0.120	0.161
		Wz+	-0.021	-0.120	0.161
		Wz-	-0.021	-0.120	0.161
	5	Dx+	0.001	-0.442	-0.136
		Dx-	-0.004	-0.027	0.036
		Dy+	0.000	0.000	0.000
		Dy-	-0.003	-0.469	-0.100
		Wz+	-0.004	-0.027	0.036
		Wz-	0.001	-0.442	-0.136
10	1	Dx+	0.000	-1.435	-0.243
		Dx-	0.000	-1.435	-0.243
		Dy+	0.000	-1.435	-0.243
		Dy-	0.000	-1.435	-0.243
		Wz+	0.000	-1.435	-0.243
		Wz-	0.000	-1.435	-0.243
	2	Dx+	0.002	-0.911	-0.278
		Dx-	0.002	-0.911	-0.278
		Dy+	0.002	-0.911	-0.278
		Dy-	0.002	-0.911	-0.278
		Wz+	0.002	-0.911	-0.278
		Wz-	0.002	-0.911	-0.278
	3	Dx+	-0.020	0.034	0.155
		Dx-	-0.020	0.034	0.155
		Dy+	-0.020	0.034	0.155
		Dy-	-0.020	0.034	0.155
		Wz+	-0.020	0.034	0.155
		Wz-	-0.020	0.034	0.155
	4	Dx+	-0.030	0.051	0.235
		Dx-	-0.030	0.051	0.235
		Dy+	-0.030	0.051	0.235
		Dy-	-0.030	0.051	0.235
		Wz+	-0.030	0.051	0.235
		Wz-	-0.030	0.051	0.235
	5	Dx+	0.002	-0.578	-0.177
		Dx-	-0.006	0.011	0.052
		Dy+	-0.006	0.011	0.052
		Dy-	0.002	-0.578	-0.177
		Wz+	-0.006	0.011	0.052
		Wz-	0.002	-0.578	-0.177
11	1	Dx+	0.000	-1.774	-0.259
		Dx-	0.000	-1.774	-0.259
		Dy+	0.000	-1.774	-0.259
		Dy-	0.000	-1.774	-0.259

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.000	-1.774	-0.259
		Wz-	0.000	-1.774	-0.259
	2	Dx+	0.004	-1.308	-0.314
		Dx-	0.004	-1.308	-0.314
		Dy+	0.004	-1.308	-0.314
		Dy-	0.004	-1.308	-0.314
		Wz+	0.004	-1.308	-0.314
		Wz-	0.004	-1.308	-0.314
	3	Dx+	-0.028	0.290	0.237
		Dx-	-0.028	0.290	0.237
		Dy+	-0.028	0.290	0.237
		Dy-	-0.028	0.290	0.237
		Wz+	-0.028	0.290	0.237
		Wz-	-0.028	0.290	0.237
	4	Dx+	-0.043	0.439	0.360
		Dx-	-0.043	0.439	0.360
		Dy+	-0.043	0.439	0.360
		Dy-	-0.043	0.439	0.360
		Wz+	-0.043	0.439	0.360
		Wz-	-0.043	0.439	0.360
	5	Dx+	0.002	-0.831	-0.200
		Dx-	-0.008	0.098	0.080
		Dy+	-0.008	0.098	0.080
		Dy-	0.002	-0.831	-0.200
		Wz+	-0.008	0.098	0.080
		Wz-	0.002	-0.831	-0.200
12	1	Dx+	0.255	-1.785	-0.181
		Dx-	0.255	-1.785	-0.181
		Dy+	0.255	-1.785	-0.181
		Dy-	0.255	-1.785	-0.181
		Wz+	0.255	-1.785	-0.181
		Wz-	0.255	-1.785	-0.181
	2	Dx+	0.349	-1.319	-0.276
		Dx-	0.349	-1.319	-0.276
		Dy+	0.349	-1.319	-0.276
		Dy-	0.349	-1.319	-0.276
		Wz+	0.349	-1.319	-0.276
		Wz-	0.349	-1.319	-0.276
	3	Dx+	-0.381	0.290	0.330
		Dx-	-0.381	0.290	0.330
		Dy+	-0.381	0.290	0.330
		Dy-	-0.381	0.290	0.330
		Wz+	-0.381	0.290	0.330
		Wz-	-0.381	0.290	0.330

Nudo	Hip		Dx	Dy	Wz
	4	Dx+	-0.577	0.439	0.500
		Dx-	-0.577	0.439	0.500
		Dy+	-0.577	0.439	0.500
		Dy-	-0.577	0.439	0.500
		Wz+	-0.577	0.439	0.500
		Wz-	-0.577	0.439	0.500
	5	Dx+	0.222	-0.837	-0.175
		Dx-	-0.129	0.098	0.115
		Dy+	-0.129	0.098	0.115
		Dy-	0.222	-0.837	-0.175
		Wz+	-0.129	0.098	0.115
		Wz-	0.222	-0.837	-0.175
13	1	Dx+	0.488	-1.806	0.001
		Dx-	0.488	-1.806	0.001
		Dy+	0.488	-1.806	0.001
		Dy-	0.488	-1.806	0.001
		Wz+	0.488	-1.806	0.001
		Wz-	0.488	-1.806	0.001
	2	Dx+	0.811	-1.342	-0.053
		Dx-	0.811	-1.342	-0.053
		Dy+	0.811	-1.342	-0.053
		Dy-	0.811	-1.342	-0.053
		Wz+	0.811	-1.342	-0.053
		Wz-	0.811	-1.342	-0.053
	3	Dx+	-0.882	0.290	-0.011
		Dx-	-0.882	0.290	-0.011
		Dy+	-0.882	0.290	-0.011
		Dy-	-0.882	0.290	-0.011
		Wz+	-0.882	0.290	-0.011
		Wz-	-0.882	0.290	-0.011
	4	Dx+	-1.336	0.439	-0.016
		Dx-	-1.336	0.439	-0.016
		Dy+	-1.336	0.439	-0.016
		Dy-	-1.336	0.439	-0.016
		Wz+	-1.336	0.439	-0.016
		Wz-	-1.336	0.439	-0.016
	5	Dx+	0.515	-0.852	-0.034
		Dx-	-0.317	0.098	0.004
		Dy+	-0.317	0.098	0.004
		Dy-	0.515	-0.852	-0.034
		Wz+	-0.317	0.098	0.004
		Wz-	0.515	-0.852	-0.034
14	1	Dx+	0.238	-1.821	0.196
		Dx-	0.238	-1.821	0.196

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.238	-1.821	0.196
		Dy-	0.238	-1.821	0.196
		Wz+	0.238	-1.821	0.196
		Wz-	0.238	-1.821	0.196
	2	Dx+	0.461	-1.366	0.358
		Dx-	0.461	-1.366	0.358
		Dy+	0.461	-1.366	0.358
		Dy-	0.461	-1.366	0.358
		Wz+	0.461	-1.366	0.358
		Wz-	0.461	-1.366	0.358
	3	Dx+	-0.352	0.290	-0.336
		Dx-	-0.352	0.290	-0.336
		Dy+	-0.352	0.290	-0.336
		Dy-	-0.352	0.290	-0.336
		Wz+	-0.352	0.290	-0.336
		Wz-	-0.352	0.290	-0.336
	4	Dx+	-0.534	0.439	-0.509
		Dx-	-0.534	0.439	-0.509
		Dy+	-0.534	0.439	-0.509
		Dy-	-0.534	0.439	-0.509
		Wz+	-0.534	0.439	-0.509
		Wz-	-0.534	0.439	-0.509
	5	Dx+	0.293	-0.867	0.227
		Dx-	-0.134	0.098	-0.125
		Dy+	-0.134	0.098	-0.125
		Dy-	0.293	-0.867	0.227
		Wz+	0.293	-0.867	0.227
		Wz-	-0.134	0.098	-0.125
15	1	Dx+	0.065	-1.824	0.257
		Dx-	0.065	-1.824	0.257
		Dy+	0.065	-1.824	0.257
		Dy-	0.065	-1.824	0.257
		Wz+	0.065	-1.824	0.257
		Wz-	0.065	-1.824	0.257
	2	Dx+	0.130	-1.373	0.516
		Dx-	0.130	-1.373	0.516
		Dy+	0.130	-1.373	0.516
		Dy-	0.130	-1.373	0.516
		Wz+	0.130	-1.373	0.516
		Wz-	0.130	-1.373	0.516
	3	Dx+	-0.097	0.290	-0.324
		Dx-	-0.097	0.290	-0.324
		Dy+	-0.097	0.290	-0.324
		Dy-	-0.097	0.290	-0.324

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.097	0.290	-0.324
		Wz-	-0.097	0.290	-0.324
	4	Dx+	-0.147	0.439	-0.492
		Dx-	-0.147	0.439	-0.492
		Dy+	-0.147	0.439	-0.492
		Dy-	-0.147	0.439	-0.492
		Wz+	-0.147	0.439	-0.492
		Wz-	-0.147	0.439	-0.492
	5	Dx+	0.083	-0.872	0.327
		Dx-	-0.038	0.098	-0.123
		Dy+	-0.038	0.098	-0.123
		Dy-	0.083	-0.872	0.327
		Wz+	0.083	-0.872	0.327
		Wz-	-0.038	0.098	-0.123
16	1	Dx+	-0.022	-2.091	-0.268
		Dx-	-0.022	-2.091	-0.268
		Dy+	-0.022	-2.091	-0.268
		Dy-	-0.022	-2.091	-0.268
		Wz+	-0.022	-2.091	-0.268
		Wz-	-0.022	-2.091	-0.268
	2	Dx+	-0.043	-1.918	-0.553
		Dx-	-0.043	-1.918	-0.553
		Dy+	-0.043	-1.918	-0.553
		Dy-	-0.043	-1.918	-0.553
		Wz+	-0.043	-1.918	-0.553
		Wz-	-0.043	-1.918	-0.553
	3	Dx+	0.042	0.606	0.302
		Dx-	0.042	0.606	0.302
		Dy+	0.042	0.606	0.302
		Dy-	0.042	0.606	0.302
		Wz+	0.042	0.606	0.302
		Wz-	0.042	0.606	0.302
	4	Dx+	0.063	0.918	0.457
		Dx-	0.063	0.918	0.457
		Dy+	0.063	0.918	0.457
		Dy-	0.063	0.918	0.457
		Wz+	0.063	0.918	0.457
		Wz-	0.063	0.918	0.457
	5	Dx+	0.017	0.218	0.115
		Dx-	-0.027	-1.218	-0.351
		Dy+	0.017	0.218	0.115
		Dy-	-0.027	-1.218	-0.351
		Wz+	0.017	0.218	0.115
		Wz-	-0.027	-1.218	-0.351

Nudo	Hip		Dx	Dy	Wz
17	1	Dx+	0.000	-2.182	-0.264
		Dx-	0.000	-2.182	-0.264
		Dy+	0.000	-2.182	-0.264
		Dy-	0.000	-2.182	-0.264
		Wz+	0.000	-2.182	-0.264
		Wz-	0.000	-2.182	-0.264
	2	Dx+	0.004	-2.106	-0.552
		Dx-	0.004	-2.106	-0.552
		Dy+	0.004	-2.106	-0.552
		Dy-	0.004	-2.106	-0.552
		Wz+	0.004	-2.106	-0.552
		Wz-	0.004	-2.106	-0.552
	3	Dx+	0.016	0.704	0.280
		Dx-	0.016	0.704	0.280
		Dy+	0.016	0.704	0.280
		Dy-	0.016	0.704	0.280
		Wz+	0.016	0.704	0.280
		Wz-	0.016	0.704	0.280
	4	Dx+	0.024	1.067	0.424
		Dx-	0.024	1.067	0.424
		Dy+	0.024	1.067	0.424
		Dy-	0.024	1.067	0.424
		Wz+	0.024	1.067	0.424
		Wz-	0.024	1.067	0.424
	5	Dx+	0.009	-1.082	-0.244
		Dx-	0.000	0.000	0.000
		Dy+	0.007	0.255	0.106
		Dy-	0.002	-1.337	-0.350
		Wz+	0.007	0.255	0.106
		Wz-	0.002	-1.337	-0.350
18	1	Dx+	0.000	-2.647	-0.000
		Dx-	0.000	-2.647	-0.000
		Dy+	0.000	-2.647	-0.000
		Dy-	0.000	-2.647	-0.000
		Wz+	0.000	-2.647	-0.000
		Wz-	0.000	-2.647	-0.000
	2	Dx+	0.000	-3.107	0.000
		Dx-	0.000	-3.107	0.000
		Dy+	0.000	-3.107	0.000
		Dy-	0.000	-3.107	0.000
		Wz+	0.000	-3.107	0.000
		Wz-	0.000	-3.107	0.000
	3	Dx+	0.000	1.124	-0.000
		Dx-	0.000	1.124	-0.000

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.000	1.124	-0.000
		Dy-	0.000	1.124	-0.000
		Wz+	0.000	1.124	-0.000
		Wz-	0.000	1.124	-0.000
	4	Dx+	0.000	1.703	-0.000
		Dx-	0.000	1.703	-0.000
		Dy+	0.000	1.703	-0.000
		Dy-	0.000	1.703	-0.000
		Wz+	0.000	1.703	-0.000
		Wz-	0.000	1.703	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.415	-0.000
		Dy-	0.000	-1.973	-0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
19	1	Dx+	-0.000	-2.182	0.264
		Dx-	-0.000	-2.182	0.264
		Dy+	-0.000	-2.182	0.264
		Dy-	-0.000	-2.182	0.264
		Wz+	-0.000	-2.182	0.264
		Wz-	-0.000	-2.182	0.264
	2	Dx+	-0.004	-2.106	0.552
		Dx-	-0.004	-2.106	0.552
		Dy+	-0.004	-2.106	0.552
		Dy-	-0.004	-2.106	0.552
		Wz+	-0.004	-2.106	0.552
		Wz-	-0.004	-2.106	0.552
	3	Dx+	-0.016	0.704	-0.280
		Dx-	-0.016	0.704	-0.280
		Dy+	-0.016	0.704	-0.280
		Dy-	-0.016	0.704	-0.280
		Wz+	-0.016	0.704	-0.280
		Wz-	-0.016	0.704	-0.280
	4	Dx+	-0.024	1.067	-0.424
		Dx-	-0.024	1.067	-0.424
		Dy+	-0.024	1.067	-0.424
		Dy-	-0.024	1.067	-0.424
		Wz+	-0.024	1.067	-0.424
		Wz-	-0.024	1.067	-0.424
	5	Dx+	0.000	0.000	0.000
		Dx-	-0.009	-1.082	0.244
		Dy+	-0.007	0.255	-0.106
		Dy-	-0.002	-1.337	0.350

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.002	-1.337	0.350
		Wz-	-0.007	0.255	-0.106
20	1	Dx+	0.022	-2.091	0.268
		Dx-	0.022	-2.091	0.268
		Dy+	0.022	-2.091	0.268
		Dy-	0.022	-2.091	0.268
		Wz+	0.022	-2.091	0.268
		Wz-	0.022	-2.091	0.268
	2	Dx+	0.043	-1.918	0.553
		Dx-	0.043	-1.918	0.553
		Dy+	0.043	-1.918	0.553
		Dy-	0.043	-1.918	0.553
		Wz+	0.043	-1.918	0.553
		Wz-	0.043	-1.918	0.553
	3	Dx+	-0.042	0.606	-0.302
		Dx-	-0.042	0.606	-0.302
		Dy+	-0.042	0.606	-0.302
		Dy-	-0.042	0.606	-0.302
		Wz+	-0.042	0.606	-0.302
		Wz-	-0.042	0.606	-0.302
	4	Dx+	-0.063	0.918	-0.457
		Dx-	-0.063	0.918	-0.457
		Dy+	-0.063	0.918	-0.457
		Dy-	-0.063	0.918	-0.457
		Wz+	-0.063	0.918	-0.457
		Wz-	-0.063	0.918	-0.457
	5	Dx+	0.027	-1.218	0.351
		Dx-	-0.017	0.218	-0.115
		Dy+	-0.017	0.218	-0.115
		Dy-	0.027	-1.218	0.351
		Wz+	0.027	-1.218	0.351
		Wz-	-0.017	0.218	-0.115

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Barra	Extremo	Comb		N	Q	M
1	Dorsal	4	N+	-25.09	12.22	27.85
		1	N-	-64.19	24.23	68.60
		5	Q+	-64.19	40.86	75.92
		4	Q-	-25.09	12.22	27.85
		5	M+	-64.19	40.86	75.92
		4	M-	-25.09	12.22	27.85
1	Frontal	4	N+	-26.28	10.82	19.09
		1	N-	-66.32	21.74	51.13
		5	Q+	-66.32	35.26	46.99
		4	Q-	-26.28	10.82	19.09
		1	M+	-66.32	21.74	51.13
		8	M-	-26.28	20.96	15.84
2	Dorsal	4	N+	-26.28	10.82	19.09
		1	N-	-66.32	21.74	51.13
		5	Q+	-66.32	35.26	46.99
		4	Q-	-26.28	10.82	19.09
		1	M+	-66.32	21.74	51.13
		8	M-	-26.28	20.96	15.84
2	Frontal	4	N+	-30.32	3.23	1.07
		1	N-	-73.50	8.25	12.67
		5	Q+	-73.50	9.04	-0.30
		4	Q-	-30.32	2.86	-7.98
		3	M+	-60.00	5.86	16.26
		6	M-	-43.83	6.05	-24.53
3	Dorsal	4	N+	-30.32	3.23	1.07
		1	N-	-73.50	8.25	12.67
		5	Q+	-73.50	9.04	-0.30
		4	Q-	-30.32	2.86	-7.98
		3	M+	-60.00	5.86	16.26
		6	M-	-43.83	6.05	-24.53
3	Frontal	4	N+	-34.36	-8.46	7.76
		1	N-	-80.69	-12.53	18.16
		3	Q+	-67.18	-5.84	16.23
		6	Q-	-47.87	-31.60	8.24
		1	M+	-80.69	-12.53	18.16
		8	M-	-34.36	-20.56	6.86
4	Dorsal	4	N+	-34.36	-8.46	7.76
		1	N-	-80.69	-12.53	18.16
		3	Q+	-67.18	-5.84	16.23
		6	Q-	-47.87	-31.60	8.24

Barra	Extremo	Comb		N	Q	M
		1	M+	-80.69	-12.53	18.16
		8	M-	-34.36	-20.56	6.86
4	Frontal	4	N+	-36.19	-15.09	21.42
		1	N-	-83.93	-24.33	39.54
		3	Q+	-70.43	-12.47	26.85
		6	Q-	-49.69	-52.25	56.87
		5	M+	-83.93	-49.63	62.30
		4	M-	-36.19	-15.09	21.42
5	Dorsal	3	N+	-12.47	44.88	26.85
		6	N-	-52.25	35.46	56.87
		5	Q+	-49.63	56.79	62.30
		4	Q-	-15.09	23.56	21.42
		5	M+	-49.63	56.79	62.30
		4	M-	-15.09	23.56	21.42
5	Frontal	3	N+	-12.47	50.12	-35.38
		6	N-	-52.25	38.41	8.48
		5	Q+	-49.63	62.03	-15.52
		4	Q-	-15.09	26.51	-11.37
		6	M+	-52.25	38.41	8.48
		1	M-	-24.33	60.04	-35.68
6	Dorsal	3	N+	-12.47	28.31	-35.38
		6	N-	-52.25	24.01	8.48
		5	Q+	-49.63	37.13	-15.52
		4	Q-	-15.09	15.19	-11.37
		6	M+	-52.25	24.01	8.48
		1	M-	-24.33	34.90	-35.68
6	Frontal	3	N+	-12.47	31.77	-61.37
		6	N-	-52.25	25.95	-13.13
		5	Q+	-49.63	40.59	-49.14
		4	Q-	-15.09	17.14	-25.36
		8	M+	-33.40	18.78	-11.95
		1	M-	-24.33	38.36	-67.36
7	Dorsal	3	N+	-12.47	5.94	-61.37
		6	N-	-52.25	7.19	-13.13
		5	Q+	-49.63	9.82	-49.14
		4	Q-	-15.09	3.31	-25.36
		8	M+	-33.40	4.35	-11.95
		1	M-	-24.33	8.40	-67.36
7	Frontal	3	N+	-12.47	14.64	-83.75
		6	N-	-52.25	12.08	-34.08
		5	Q+	-49.63	18.52	-79.95
		4	Q-	-15.09	8.21	-37.88
		8	M+	-33.40	9.25	-26.74
		1	M-	-24.33	17.10	-95.10

Barra	Extremo	Comb		N	Q	M
8	Dorsal	3	N+	-12.47	-14.64	-83.75
		6	N-	-52.25	-12.08	-34.08
		4	Q+	-15.09	-8.21	-37.88
		5	Q-	-49.63	-18.52	-79.95
		8	M+	-33.40	-9.25	-26.74
		1	M-	-24.33	-17.10	-95.10
8	Frontal	3	N+	-12.47	-5.94	-61.37
		6	N-	-52.25	-7.19	-13.13
		4	Q+	-15.09	-3.31	-25.36
		5	Q-	-49.63	-9.82	-49.14
		8	M+	-33.40	-4.35	-11.95
		1	M-	-24.33	-8.40	-67.36
9	Dorsal	3	N+	-12.47	-31.77	-61.37
		6	N-	-52.25	-25.95	-13.13
		4	Q+	-15.09	-17.14	-25.36
		5	Q-	-49.63	-40.59	-49.14
		8	M+	-33.40	-18.78	-11.95
		1	M-	-24.33	-38.36	-67.36
9	Frontal	3	N+	-12.47	-28.31	-35.38
		6	N-	-52.25	-24.01	8.48
		4	Q+	-15.09	-15.19	-11.37
		5	Q-	-49.63	-37.13	-15.52
		6	M+	-52.25	-24.01	8.48
		1	M-	-24.33	-34.90	-35.68
10	Dorsal	3	N+	-12.47	-50.12	-35.38
		6	N-	-52.25	-38.41	8.48
		4	Q+	-15.09	-26.51	-11.37
		5	Q-	-49.63	-62.03	-15.52
		6	M+	-52.25	-38.41	8.48
		1	M-	-24.33	-60.04	-35.68
10	Frontal	3	N+	-12.47	-44.88	26.85
		6	N-	-52.25	-35.46	56.87
		4	Q+	-15.09	-23.56	21.42
		5	Q-	-49.63	-56.79	62.30
		5	M+	-49.63	-56.79	62.30
		4	M-	-15.09	-23.56	21.42
11	Dorsal	4	N+	-36.19	15.09	21.42
		5	N-	-83.93	40.32	53.30
		6	Q+	-49.69	52.25	56.87
		3	Q-	-70.43	12.47	26.85
		5	M+	-83.93	49.63	62.30
		4	M-	-36.19	15.09	21.42
11	Frontal	4	N+	-34.36	8.46	7.76
		1	N-	-80.69	12.53	18.16

Barra	Extremo	Comb		N	Q	M
		6	Q+	-47.87	31.60	8.24
		3	Q-	-67.18	5.84	16.23
		1	M+	-80.69	12.53	18.16
		8	M-	-34.36	20.56	6.86
12	Dorsal	4	N+	-34.36	8.46	7.76
		1	N-	-80.69	12.53	18.16
		6	Q+	-47.87	31.60	8.24
		3	Q-	-67.18	5.84	16.23
		1	M+	-80.69	12.53	18.16
		8	M-	-34.36	20.56	6.86
12	Frontal	4	N+	-30.32	-3.23	1.07
		1	N-	-73.50	-8.25	12.67
		4	Q+	-30.32	-2.86	-7.98
		5	Q-	-73.50	-9.04	-0.30
		3	M+	-60.00	-5.86	16.26
		6	M-	-43.83	-6.05	-24.53
13	Dorsal	4	N+	-30.32	-3.23	1.07
		1	N-	-73.50	-8.25	12.67
		4	Q+	-30.32	-2.86	-7.98
		5	Q-	-73.50	-9.04	-0.30
		3	M+	-60.00	-5.86	16.26
		6	M-	-43.83	-6.05	-24.53
13	Frontal	4	N+	-26.28	-10.82	19.09
		1	N-	-66.32	-21.74	51.13
		4	Q+	-26.28	-10.82	19.09
		5	Q-	-66.32	-35.26	46.99
		1	M+	-66.32	-21.74	51.13
		8	M-	-26.28	-20.96	15.84
14	Dorsal	4	N+	-26.28	-10.82	19.09
		1	N-	-66.32	-21.74	51.13
		4	Q+	-26.28	-10.82	19.09
		5	Q-	-66.32	-35.26	46.99
		1	M+	-66.32	-21.74	51.13
		8	M-	-26.28	-20.96	15.84
14	Frontal	4	N+	-25.09	-12.22	27.85
		1	N-	-64.19	-24.23	68.60
		4	Q+	-25.09	-12.22	27.85
		5	Q-	-64.19	-40.86	75.92
		5	M+	-64.19	-40.86	75.92
		4	M-	-25.09	-12.22	27.85
15	Dorsal	4	N+	-16.11	-22.79	-27.85
		5	N-	-50.67	-56.77	-75.92
		8	Q+	-28.62	-20.74	-33.27
		1	Q-	-34.26	-59.45	-68.60

Barra	Extremo	Comb		N	Q	M
		4	M+	-16.11	-22.79	-27.85
		5	M-	-50.67	-56.77	-75.92
15	Frontal	4	N+	-15.07	-16.43	-7.78
		5	N-	-48.09	-40.93	-25.92
		8	Q+	-27.58	-14.38	-15.30
		1	Q-	-31.67	-43.62	-15.86
		3	M+	-15.86	-20.51	-7.49
		6	M-	-47.30	-36.85	-26.22
16	Dorsal	4	N+	-16.38	-15.12	-7.78
		5	N-	-51.32	-36.80	-25.92
		8	Q+	-28.68	-12.05	-15.30
		1	Q-	-35.18	-40.84	-15.86
		3	M+	-17.50	-19.12	-7.49
		6	M-	-50.19	-32.80	-26.22
16	Frontal	4	N+	-15.89	-13.17	-2.83
		5	N-	-50.07	-31.81	-13.90
		8	Q+	-28.19	-10.10	-11.42
		1	Q-	-33.94	-35.85	-2.42
		3	M+	-22.58	-29.14	1.39
		6	M-	-43.37	-15.85	-18.12
17	Dorsal	4	N+	-12.22	-16.63	-2.83
		5	N-	-40.86	-42.51	-13.90
		4	Q+	-12.22	-16.63	-2.83
		1	Q-	-24.23	-42.51	-2.42
		3	M+	-14.84	-33.75	1.39
		6	M-	-38.24	-25.89	-18.12
17	Frontal	4	N+	-12.22	0.00	22.12
		5	N-	-40.86	0.00	50.61
		5	Q+	-30.75	0.00	32.73
		4	Q-	-12.22	0.00	22.12
		1	M+	-24.23	0.00	62.09
		8	M-	-24.90	0.00	13.53
18	Dorsal	4	N+	-12.22	0.00	22.12
		5	N-	-40.86	0.00	50.61
		5	Q+	-30.75	0.00	32.73
		4	Q-	-12.22	0.00	22.12
		1	M+	-24.23	0.00	62.09
		8	M-	-24.90	0.00	13.53
18	Frontal	4	N+	-12.22	16.63	-2.83
		5	N-	-40.86	43.01	-13.90
		1	Q+	-24.23	43.01	-2.42
		4	Q-	-12.22	16.63	-2.83
		3	M+	-14.84	33.75	1.39
		6	M-	-38.24	25.89	-18.12

Barra	Extremo	Comb		N	Q	M
19	Dorsal	4	N+	-15.89	13.17	-2.83
		5	N-	-50.07	31.81	-13.90
		1	Q+	-33.94	35.85	-2.42
		8	Q-	-28.19	10.10	-11.42
		3	M+	-22.58	29.14	1.39
		6	M-	-43.37	15.85	-18.12
19	Frontal	4	N+	-16.38	15.12	-7.78
		5	N-	-51.32	36.80	-25.92
		1	Q+	-35.18	40.84	-15.86
		8	Q-	-28.68	12.05	-15.30
		3	M+	-17.50	19.12	-7.49
		6	M-	-50.19	32.80	-26.22
20	Dorsal	4	N+	-15.07	16.43	-7.78
		5	N-	-48.09	40.93	-25.92
		1	Q+	-31.67	43.62	-15.86
		8	Q-	-27.58	14.38	-15.30
		3	M+	-15.86	20.51	-7.49
		6	M-	-47.30	36.85	-26.22
20	Frontal	4	N+	-16.11	22.79	-27.85
		5	N-	-50.67	56.77	-75.92
		1	Q+	-34.26	59.45	-68.60
		8	Q-	-28.62	20.74	-33.27
		4	M+	-16.11	22.79	-27.85
		5	M-	-50.67	56.77	-75.92

ARMADURA DEL DINTEL

NUDO	Nd	Md	As c.i.	As c.s.
15	-16.11	-27.85	0.00	3.59
	-50.67	-75.92	0.00	9.34
	-16.11	-27.85	0.00	3.59
	-50.67	-75.92	0.00	9.34
16	-16.38	-7.78	0.00	0.20
	-51.32	-25.92	0.00	1.24
	-17.50	-7.49	0.00	0.00
	-50.19	-26.22	0.00	1.45
17	-12.22	-2.83	0.00	0.00
	-40.86	-13.90	0.00	0.04
	-14.84	1.39	0.00	0.00
	-38.24	-18.12	0.00	1.84
18	-12.22	22.12	6.26	0.00
	-40.86	50.61	13.44	0.00
	-24.23	62.09	19.58	0.00
	-24.90	13.53	1.75	0.00

ARMADURA DE SOLERA

NUDO	Nd	Md	As c.i.	As c.s.
5	-12.47	26.85	4.93	0.00
	-52.25	56.87	7.75	0.00
	-49.63	62.30	9.39	0.00
	-15.09	21.42	3.32	0.00
6	-12.47	-35.38	0.00	6.98
	-52.25	8.48	0.00	0.00
	-52.25	8.48	0.00	0.00
	-24.33	-35.68	0.00	5.70
7	-12.47	-61.37	0.00	13.31
	-52.25	-13.13	0.00	0.00
	-33.40	-11.95	0.00	0.00
	-24.33	-67.36	0.00	13.46
8	-12.47	-83.75	0.00	18.86
	-52.25	-34.08	0.00	2.14
	-33.40	-26.74	0.00	2.50
	-24.33	-95.10	0.00	20.41

ARMADURA DE HASTIAL

NUDO	Nd	Md	As c.i.	As c.e.
1	-25.09	27.85	0.00	6.87
	-64.19	68.60	0.00	18.14
	-64.19	75.92	0.00	21.10
	-25.09	27.85	0.00	6.87
2	-26.28	19.09	0.00	3.58
	-66.32	51.13	0.00	11.05
	-66.32	51.13	0.00	11.05
	-26.28	15.84	0.00	2.43
3	-30.32	1.07	0.00	0.00
	-73.50	12.67	0.00	0.00
	-60.00	16.26	0.00	0.00
	-43.83	-24.53	3.54	0.00
4	-34.36	7.76	0.00	0.00
	-80.69	18.16	0.00	0.00
	-80.69	18.16	0.00	0.00
	-34.36	6.86	0.00	0.00
5	-36.19	21.42	0.00	3.28
	-83.93	39.54	0.00	4.73
	-83.93	62.30	0.00	13.62
	-36.19	21.42	0.00	3.28

RESUMEN DE ARMADURAS

ARMADURA DEL DINTEL

NUDO	As c.i.	As c.s.
15	0.00	9.34
16	0.00	1.45
17	0.00	1.84
18	19.58	0.00

Cuantía mínima geométrica: 5.25 cm²/m

ARMADURA DE SOLERA

NUDO	As c.i.	As c.s.
5	9.39	0.00
6	0.00	6.98
7	0.00	13.46
8	0.00	20.41

Cuantía mínima geométrica: 7.50 cm²/m

ARMADURA DE HASTIAL

NUDO	As c.i.	As c.e.
1	0.00	21.10
2	0.00	11.05
3	3.54	0.00
4	0.00	0.00
5	0.00	13.62

Cuantía mínima geométrica vertical: 3.15 cm²/m
Cuantía mínima geométrica horizontal: 5.60 cm²/m

COMPROBACION A CORTANTE

DINTEL

NUDO	Vd max.	Vcu	As
16	40.84	53.58	0.00
17	42.51	42.60	0.00
18	0.00	42.60	0.00

SOLERA

Vcu= 61.97 T/m.

NUDO	Vd max.	As
6	49.58	0.00
7	25.21	0.00
8	5.16	0.00

HASTIAL

Vcu= 40.42 T/m.

NUDO	Vd max.	As
2	35.26	0.00
3	9.04	0.00
4	31.60	0.00

COMPROBACION DE TENSIONES SOBRE EL TERRENO

Tensión transmitida al terreno en nudo 5: 1.81 kp/cm²

Estructura: P.I. Nº 6 **Cálculo:** ALETAS. H=7.65 M.

DEFINICION GEOMETRICA

Altura total	7.65	m	**Muro:**		
Ancho superior	0.80	m	A flex =	**27.60**	cm²/m.l.
Ancho inferior	0.80	m	A cort =	**0.00**	cm²/m.l.
Longitud zarpa delantera	1.20	m	**Zapata (puntera):**		
Longitud zarpa trasera	3.20	m	A flex =	**6.87**	cm²/m.l.
Canto zapata	1.00	m	Cumple cortante?		**SI**
Canto tacón cotra deslizamiento.....	0.00	m	**Zapata (talón):**		
ACCIONES ACTUANTES			A flex =	**19.68**	cm²/m.l.
Altura de tierras	0.00	m	Cumple cortante?		**SI**
Altura tierras en intradós	0.50	m			
Sobrecarga en el trasdós	0.00	t/m²	DESLIZA?	1.54	**NO**
			VUELCA?	2.75	**NO**
DATOS TERRENO			SIGM_BAR	**20.00**	t/m²
			SIGM_MAX	**26.43**	t/m²
Densidad	1.90	t/m³	SIGM_MIN	**2.78**	t/m²
Coeficiente empuje activo	0.4				
¿Considera empuje pasivo? (s/n)	n				
Angulo de rozamiento	30	°			

OTROS DATOS

Recubrimiento	5	cm
fck	250	Kp/cm²
fyk	5100	Kp/cm²
Gamma C	1.5	
Gamma S	1.15	
Gamma F desf.....	1.6	
Gamma F fav.....	0.9	
Canto útil muro	75	cm
Canto útil zapata	95	cm
Densidad hormigón	2.5	t/m³

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 15.30 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 56.71 mt
H = 22.24 t

RESUMEN:

HIP	N	M	H
P.P.	15.30	0.00	0.00
TIERRAS	0.00	56.71	22.24

Estructura: P.I. Nº 6 **Cálculo:** ALETAS. H=7.65 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	15.30	56.71	22.24

Tomando los coeficientes de seguridad:

Gamma DESF 1.6
Gamma FAV 0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	13.77	90.73	6.94	27.6
1.2.	24.48	90.73	4.06	26.5

Armadura a disponer:

A = 27.6 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 35.58 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 48.41 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 6 **Cálculo:** ALETAS. H=7.65 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 28.30 t
M = 15.30 mt
H = 0.00 t

Debido a las tierras:

N = 47.65 t
M = 37.98 mt
H = 28.43 t

RESUMEN:

HIP	N	M	H
P.P.	28.30	15.30	0.00
TIERRAS	47.65	37.98	28.43

SEGURIDAD AL DESLIZAMIENTO:

N = 75.95 t
H = 28.43 t GAMMA = 1.54 O.K.
mu = 0.58
Epasivo= 0.00 t

SEGURIDAD AL VUELCO:

Mvolc = 81.98 mt
Mest = 225.72 mt GAMMA = 2.75 O.K.

Estructura: P.I. Nº 6 **Cálculo:** ALETAS. H=7.65 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	75.95	53.28	28.43

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	26.43	2.78

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	20.00

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -81.09 mt

Anec = 19.68 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 29.28 mt

Anec = 6.87 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 32.89 t
Vlim = 61.32 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 24.74 t
Vlim = 122.64 t

Estructura: P.I. Nº 6 **Cálculo:** ALETAS. H=4.325 M.

DEFINICION GEOMETRICA

Altura total	4.33	m
Ancho superior	0.40	m
Ancho inferior	0.40	m
Longitud zarpa delantera	0.70	m
Longitud zarpa trasera	2.00	m
Canto zapata	0.50	m
Canto tacón cotra deslizamiento.....	0.00	m

ACCIONES ACTUANTES

Altura de tierras	0.00	m
Altura tierras en intradós	0.50	m
Sobrecarga en el trasdós	0.00	t/m²

DATOS TERRENO

Densidad	1.90	t/m³
Coeficiente empuje activo	0.4	
¿Considera empuje pasivo? (s/n)	n	
Angulo de rozamiento	30	°

OTROS DATOS

Recubrimiento	5	cm
fck	250	Kp/cm²
fyk	5100	Kp/cm²
Gamma C	1.5	
Gamma S	1.15	
Gamma F desf.....	1.6	
Gamma F fav.....	0.9	
Canto útil muro	35	cm
Canto útil zapata	45	cm
Densidad hormigón	2.5	t/m³

Muro:

A flex =	**10.62**	cm²/m.l.
A cort =	**0.00**	cm²/m.l.

Zapata (puntera):

A flex =	**2.42**	cm²/m.l.
Cumple cortante?		**SI**

Zapata (talón):

A flex =	**7.55**	cm²/m.l.
Cumple cortante?		**SI**

DESLIZA?	1.65	**NO**
VUELCA?	3.12	**NO**
SIGM_BAR	**10.55**	t/m²
SIGM_MAX	**13.70**	t/m²
SIGM_MIN	**2.62**	t/m²

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 4.33 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 10.25 mt
H = 7.11 t

RESUMEN:

HIP	N	M	H
P.P.	4.33	0.00	0.00
TIERRAS	0.00	10.25	7.11

Estructura: P.I. Nº 6 **Cálculo:** ALETAS. H=4.325 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	4.33	10.25	7.11

Tomando los coeficientes de seguridad:

Gamma DESF 1.6
Gamma FAV 0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	3.89	16.40	4.36	10.6
1.2.	6.92	16.40	2.52	10.3

Armadura a disponer:

A = 10.6 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 11.37 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 22.59 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 6 **Cálculo:** ALETAS. H=4.325 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 8.20 t
M = 2.81 mt
H = 0.00 t

Debido a las tierras:

N = 17.10 t
M = 6.06 mt
H = 8.85 t

RESUMEN:

HIP	N	M	H
P.P.	8.20	2.81	0.00
TIERRAS	17.10	6.06	8.85

SEGURIDAD AL DESLIZAMIENTO:

N = 25.30 t
H = 8.85 t GAMMA = 1.65 O.K.
mu = 0.58
Epasivo= 0.00 t

SEGURIDAD AL VUELCO:

Mvolc = 14.23 mt
Mest = 44.41 mt GAMMA = 3.12 O.K.

Estructura: P.I. Nº 6 **Cálculo:** ALETAS. H=4.325 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	25.30	8.88	8.85

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	13.70	2.62

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	10.55

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -14.89 mt

Anec = 7.55 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 4.90 mt

Anec = 2.42 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 10.11 t
Vlim = 29.05 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 8.10 t
Vlim = 58.09 t

3. RESUMEN CONTROL CALIDAD

SAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO P.I. 6

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	N º	RES. MEDIA	N º	RES. MEDIA	N º	RES. MEDIA					
408	608	14/10/99	Losa inf m,i	03030603	H-250	6	Blanda			3	356			90	11/11/99	II AL 42,5 R	313	
408	609	14/10/99	Losa inf m,i	03030603	H-250	5	Blanda			3	403			90	11/11/99	II AL 42,5 R	313	
420	625	19/10/99	Zap ale 3 y1	03030603	H-250	7	Blanda			3	324			100	16/11/99	II AL 42,5 R	285	
420	626	19/10/99	Zap ale 3 y1	03030603	H-250	9	Blanda			3	386			100	16/11/99	II AL 42,5 R	285	
436	652	25/10/99	Alzado 2, d	03030603	H-250	7	Blanda			3	339			70	22/11/99	II AL 42,5 R	298	
436	653	25/10/99	Zap ale 3y1 2ª f	03030603	H-250	6	Blanda			3	379			70	22/11/99	II AL 42,5 R	298	
444	668	29/10/99	Alzado 2, i	03030603	H-250	7	Blanda			3	295			100	26/11/99	II AL 42,5 R	260	
444	669	29/10/99	Alzado 2, i	03030603	H-250	7	Blanda			3	361			100	26/11/99	II AL 42,5 R	260	
452	681	03/11/99	Aleta 3	03030603	H-250	6	Blanda			3	356			100	02/12/99	II AL 42,5 R	248	
452	685	04/11/99	Aleta 1	03030603	H-250	6	Blanda			3	282			100	02/12/99	II AL 42,5 R	248	
477	718	17/11/99	Losa sup m,d	03030603	H-250	6	Blanda			3	290			50	21/12/99	II AL 42,5 R	237	

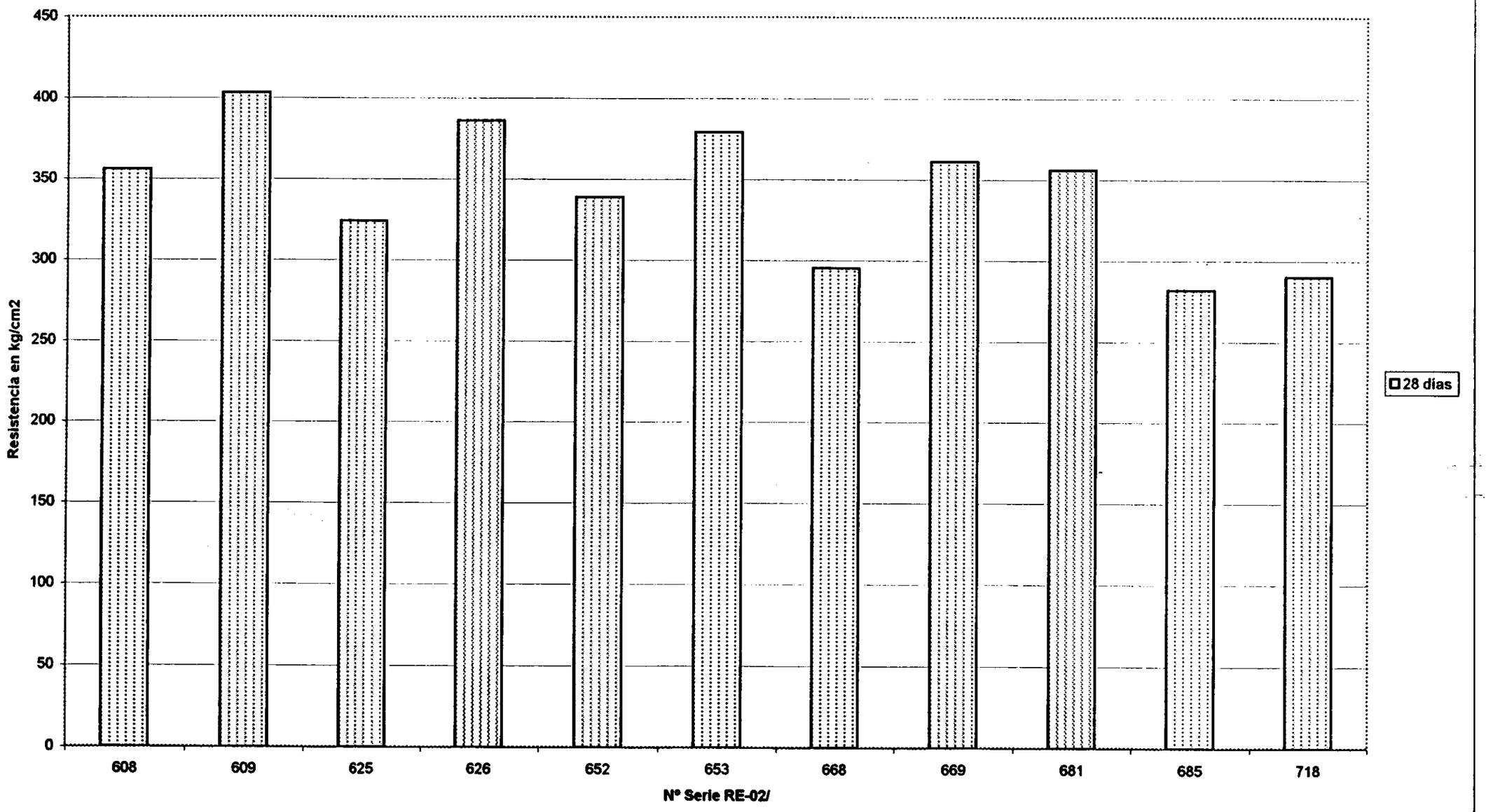
FECHA: FIRMA:

NOMBRE: Ana Mª Martin Herrero

CARGO: Jefe de Laboratorio

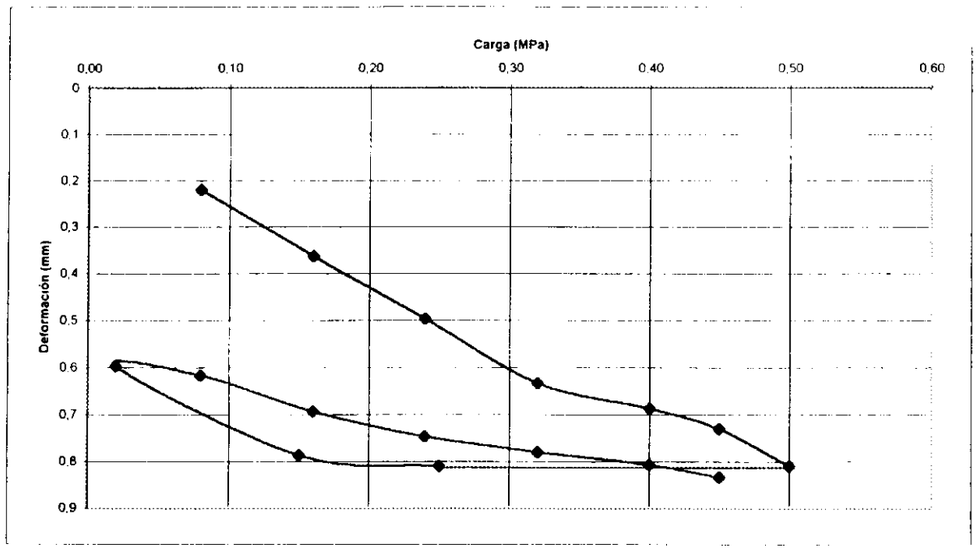
LOTE DE f. est. < 0,9 fck

Resistencia del hormigón
P.I. 6



SAITEC SYNCONSULT S.L. UNION TEMPORAL DE EMPRESAS	**ENSAYO DE PLACA CON CARGA** (DIN 18 134) OBRA: **LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA** **SUB-TRAMO III**

LOCALIZACIÓN	P.I. 6 Cuña de transición 1		
CÓDIGO DE TRAMIFICACIÓN:	03030602		**PK** 313+611
FECHA:	24/1/00	**REF. MUESTRA:**	RE-08/ 23



Módulos			Especif.
	Mpa	kg/cm2	kg/cm2
Ev1	152,2	1552,5	
Ev2	384,1	3917,5	1600
Ev2/Ev1	2,52		

OBSERVACIONES

Densidad seca: 2,142 kg/cm3
Humedad natural: 4,9 %

Fecha	Firma	Cargo
		JEFE DE LABORATORIO
		Nombre
		ANA MARTIN HERRERO

PASO INFERIOR 7

PASO INFERIOR 7

ÍNDICE

1. DESCRIPCIÓN Y DEFINICIÓN
2. CÁLCULOS
3. RESUMEN DEL CONTROL DE CALIDAD

1. DESCRIPCIÓN Y DEFINICIÓN

CALCULO DE MARCOS CERRADOS UNICELULARES

El siguiente programa calcula los esfuerzos en un marco cerrado unicelular a partir de las dimensiones geométricas del mismo y sometido a las acciones de su peso propio, del terreno y de las sobrecargas de uso. A partir de estros esfuerzos el programa arma las secciones a flexocompresión simple y comprueba la resistencia a cortante de las mismas, así como las tensiones máximas transmitidas al terreno.

DATOS GEOMÉTRICOS

Gálibo vertical (GV):	5,90	m.
Gálibo horizontal (GH):	8,00	m.
Espesor de dintel (ED):	0,70	m.
Espesor de solera (ESOL):	1,00	m.
Espesor de hastial (EH):	0,70	m.
Longitud cartela dintel:	1,00	m.
Canto adicional cartela:	0,50	m.

DATOS DEL TERRENO

Altura de tierras sobre el dintel (HT):	1,30	m.
Peso específico de las tierras (γ):	2.10	T/m³
Coeficiente de balasto (K):	5000	T/m³
Empuje activo del terreno (λ_a):	0.33	
Empuje al reposo del terreno (λ_r):	0.50	

SOBRECARGAS DE USO

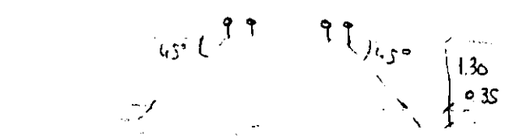
Carretera:

Sobrecarga uniforme:	0.4	T/m²
Vehículo pesado:	60	T.
Sobrecarga en trasdós:	1.0	T/m²

Ferrocarril:

Sobrecarga uniforme tren tipo B (abierto a 45º hasta plano medio del dintel): 2,61 T/m²
Sobrecarga en trasdós: 3.0 T/m²

Sobrecarga:
2 Trenes 12T/m.



Coef. de impacto.

$$\phi_o = \frac{1,14\sqrt{8,70}}{3,10 - 1,36\sqrt{8,70} + 8,20} = 50,88\% = 0,51$$

$$\phi_{red} = 0,51 - \frac{1,30 - 1,00}{10,00} = 0,48$$

$$q = \frac{24 \times 1,48}{\quad} = 3,86\ T/m^2$$

DATOS DE LOS MATERIALES

Hormigón:
- f_{ck}: 250 kg/cm²
- γ_c: 1.50

Acero:
- f_{yk}: 5100 kg/cm²
- γ_s: 1.15

Recubrimiento mecánico de armaduras: 4 cm.

COEFICIENTES DE MAYORACION DE ACCIONES

Peso propio marco:
- Efecto desfavorable: $\gamma_{pp1} = 1.60$
- Efecto favorable: $\gamma_{pp2} = 0.90$

Acción de las tierras (Peso y empuje):
- Efecto desfavorable: $\gamma_{t1} = 1.60$
- Efecto favorable: $\gamma_{t2} = 0.90$

Sobrecargas de uso:
- Efecto desfavorable: $\gamma_{sc1} = 1.60$
- Efecto favorable: $\gamma_{sc2} = 0$

HIPÓTESIS DE CALCULO

Se consideran las siguientes hipótesis de cálculo:

- H1: Peso propio marco.
- H2: Peso de tierras.
- H3: Empuje activo de tierras.
- H4: Empuje al reposo de tierras.
- H5: Sobrecargas de uso.

Esta última hipótesis de sobrecargas de uso tiene los siguientes componentes:

- Sobrecarga uniforme.(400 kg/m² en carretera y tren tipo B en ferrocarril)
- Vehiculo pesado. Esta acción se asimila a una sobrecarga uniforme, abriendo a 45° hasta el centro de gravedad del dintel. Si el vehículo tiene de dimensiones en planta AxB, la carga equivalente será:

$$\frac{Q}{(A + 2 \times HT + ED)\,(B + 2 \times HT + ED)}$$

- Sobrecarga en el trasdós. Empuje debido a la sobrecarga en el trasdós con el coeficiente de empuje al reposo.

COMBINACIONES DE HIPÓTESIS

Se consideran las siguientes combinaciones de hipótesis:

C1: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C2: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C3: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C4: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C5: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C6: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C7: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$
C8: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$

Con estas combinaciones se obtienen los esfuerzos pésimos en las barras del modelo.

ARMADO DEL MARCO

Con los esfuerzos pésimos obtenidos anteriormente, se arman las secciones definidas en el modelo de cálculo a flexocompresión simple. Se obtienen asimismo las armaduras a disponer por cuantía mínima geométrica.

COMPROBACIÓN A CORTANTE

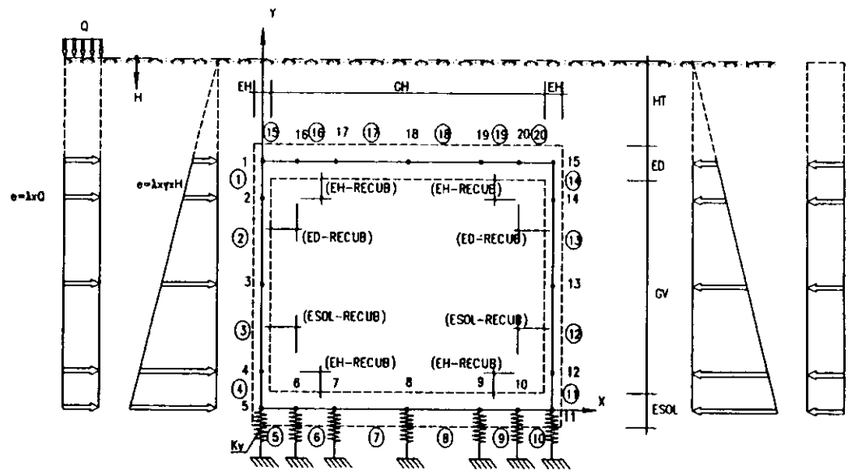
Se realiza la comprobación a cortante de las secciones para verificar si la contribución a cortante del hormigón es suficiente para absorber el cortante de cálculo hallado. Si no se cumple esta condición se obtiene la armadura necesaria.
Para la comprobación a cortante se han introducido en el modelo nudos a una distancia de un canto útil del paramento para verificar en ellos el cortante de cálculo y no en los nudos extremos.

COMPROBACIÓN DE TENSIONES SOBRE EL TERRENO

Para el cálculo de la tensión máxima transmitida al terreno se obtiene el movimiento máximo vertical en los nudos de la solera. La tensión será por tanto:

$$\sigma = K_{balasto} \times \delta_{max}$$

A continuación figuran los resultados del cálculo.



MODELO DE CALCULO

2. CÁLCULOS

CARACTERISTICAS DE LOS NUDOS

Nudo	Coordenadas X	Coordenadas Y	coacc xyz	Constantes Muelles Kx	Constantes Muelles Ky	Constantes Muelles Kz
1	0.000	6.500				
2	0.000	5.740				
3	0.000	3.450				
4	0.000	1.160				
5	0.000	0.000			5.025E+03	
6	1.310	0.000			5.438E+03	
7	2.175	0.000			7.600E+03	
8	4.350	0.000	100		1.088E+04	
9	6.525	0.000			7.600E+03	
10	7.390	0.000			5.438E+03	
11	8.700	0.000			5.025E+03	
12	8.700	1.160				
13	8.700	3.450				
14	8.700	5.740				
15	8.700	6.500				
16	1.010	6.665				
17	1.350	6.750				
18	4.350	6.750				
19	7.350	6.750				
20	7.690	6.665				

CARACTERISTICAS DE LAS BARRAS

Barra	Nd	Nf	I	A	E
1	1	2	0.028583	0.700000	3.004E+06
2	2	3	0.028583	0.700000	3.004E+06
3	3	4	0.028583	0.700000	3.004E+06
4	4	5	0.028583	0.700000	3.004E+06
5	5	6	0.083333	1.000000	3.004E+06
6	6	7	0.083333	1.000000	3.004E+06
7	7	8	0.083333	1.000000	3.004E+06
8	8	9	0.083333	1.000000	3.004E+06
9	9	10	0.083333	1.000000	3.004E+06
10	10	11	0.083333	1.000000	3.004E+06
11	11	12	0.028583	0.700000	3.004E+06
12	12	13	0.028583	0.700000	3.004E+06
13	13	14	0.028583	0.700000	3.004E+06
14	14	15	0.028583	0.700000	3.004E+06
15	1	16	0.092393	1.035000	3.004E+06
16	16	17	0.040311	0.785000	3.004E+06
17	17	18	0.028583	0.700000	3.004E+06
18	18	19	0.028583	0.700000	3.004E+06
19	19	20	0.040311	0.785000	3.004E+06
20	20	15	0.092393	1.035000	3.004E+06

CARGAS EN BARRAS

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
1	1	Q unif	1.750	0.000	0.000	270.00
	2	Q unif	1.750	0.000	0.000	270.00
	3	Q unif	1.750	0.000	0.000	270.00
	4	Q unif	1.750	0.000	0.000	270.00
	5	Q unif	2.500	0.000	0.000	270.00
	6	Q unif	2.500	0.000	0.000	270.00
	7	Q unif	2.500	0.000	0.000	270.00
	8	Q unif	2.500	0.000	0.000	270.00
	9	Q unif	2.500	0.000	0.000	270.00
	10	Q unif	2.500	0.000	0.000	270.00
	11	Q unif	1.750	0.000	0.000	270.00
	12	Q unif	1.750	0.000	0.000	270.00
	13	Q unif	1.750	0.000	0.000	270.00
	14	Q unif	1.750	0.000	0.000	270.00
	15	Q unif	2.588	0.000	0.000	270.00
	16	Q unif	1.963	0.000	0.000	270.00
	17	Q unif	1.750	0.000	0.000	270.00
	18	Q unif	1.750	0.000	0.000	270.00
	19	Q unif	1.963	0.000	0.000	270.00
	20	Q unif	2.588	0.000	0.000	270.00
2	15	Q unif	2.730	0.000	0.000	270.00
	16	Q unif	2.730	0.000	0.000	270.00
	17	Q unif	2.730	0.000	0.000	270.00
	18	Q unif	2.730	0.000	0.000	270.00
	19	Q unif	2.730	0.000	0.000	270.00
	20	Q unif	2.730	0.000	0.000	270.00
3	1	Q unif	1.493	0.000	0.000	0.00
	2	Q unif	2.637	0.000	0.000	0.00
	3	Q unif	4.224	0.000	0.000	0.00
	4	Q unif	5.419	0.000	0.000	0.00
	11	Q unif	5.419	0.000	0.000	180.00
	12	Q unif	4.224	0.000	0.000	180.00
	13	Q unif	2.637	0.000	0.000	180.00
	14	Q unif	1.493	0.000	0.000	180.00
4	1	Q unif	2.263	0.000	0.000	0.00
	2	Q unif	3.995	0.000	0.000	0.00
	3	Q unif	6.400	0.000	0.000	0.00
	4	Q unif	8.211	0.000	0.000	0.00
	11	Q unif	8.211	0.000	0.000	180.00
	12	Q unif	6.400	0.000	0.000	180.00
	13	Q unif	3.995	0.000	0.000	180.00
	14	Q unif	2.263	0.000	0.000	180.00

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
5	1	Q unif	1.500	0.000	0.000	0.00
	2	Q unif	1.500	0.000	0.000	0.00
	3	Q unif	1.500	0.000	0.000	0.00
	4	Q unif	1.500	0.000	0.000	0.00
	11	Q unif	1.500	0.000	0.000	180.00
	12	Q unif	1.500	0.000	0.000	180.00
	13	Q unif	1.500	0.000	0.000	180.00
	14	Q unif	1.500	0.000	0.000	180.00
6	15	Q unif	3.860	0.000	0.000	270.00
	16	Q unif	3.860	0.000	0.000	270.00
	17	Q unif	3.860	0.000	0.000	270.00
	18	Q unif	3.860	0.000	0.000	270.00
	19	Q unif	3.860	0.000	0.000	270.00
	20	Q unif	3.860	0.000	0.000	270.00
7	15	Q unif	0.000	0.000	0.000	270.00
	16	Q unif	0.000	0.000	0.000	270.00
	17	Q unif	0.000	0.000	0.000	270.00
	18	Q unif	0.000	0.000	0.000	270.00
	19	Q unif	0.000	0.000	0.000	270.00
	20	Q unif	0.000	0.000	0.000	270.00

HIPOTESIS COMPUESTAS

Hipotesis compuesta 1

PESO PROPIO MARCO
Tipo : Acciones permanentes
Hipotesis basicas : 1

Hipotesis compuesta 2

PESO TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 2

Hipotesis compuesta 3

EMPUJE ACTIVO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 3

Hipotesis compuesta 4

EMPUJE REPOSO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 4

Hipotesis compuesta 5

SOBRECARGAS DE USO
Tipo : Sobrecargas compatibles
Hipotesis basicas : 5 6 7

COMBINACIONES

Combinacion 1

C1

Hip.comp.	Coeficiente
1	1.600
2	1.600
3	1.600
5	1.600

Combinacion 2

C2

Hip.comp.	Coeficiente
1	0.900
2	1.600
3	1.600
5	1.600

Combinacion 3

C3

Hip.comp.	Coeficiente
1	1.600
2	0.900
3	0.900
5	1.600

Combinacion 4

C4

Hip.comp.	Coeficiente
1	0.900
2	0.900
3	0.900
5	1.600

Combinacion 5

C5

Hip.comp.	Coeficiente
1	1.600
2	1.600
4	1.600
5	1.600

Combinacion 6

C6

Hip.comp.	Coeficiente
1	0.900
2	1.600
4	1.600
5	1.600

Combinacion 7

C7

Hip.comp.	Coeficiente
1	1.600
2	0.900
4	0.900
5	1.600

Combinacion 8

C8

Hip.comp.	Coeficiente
1	0.900
2	0.900
4	0.900
5	1.600

MOVIMIENTOS HIPOTESIS COMPUESTAS (*1000)

Nudo	Hip		Dx	Dy	Wz
1	1	Dx+	-0.062	-1.753	-0.243
		Dx-	-0.062	-1.753	-0.243
		Dy+	-0.062	-1.753	-0.243
		Dy-	-0.062	-1.753	-0.243
		Wz+	-0.062	-1.753	-0.243
		Wz-	-0.062	-1.753	-0.243
	2	Dx+	-0.077	-0.842	-0.305
		Dx-	-0.077	-0.842	-0.305
		Dy+	-0.077	-0.842	-0.305
		Dy-	-0.077	-0.842	-0.305
		Wz+	-0.077	-0.842	-0.305
		Wz-	-0.077	-0.842	-0.305
	3	Dx+	0.067	0.201	0.218
		Dx-	0.067	0.201	0.218
		Dy+	0.067	0.201	0.218
		Dy-	0.067	0.201	0.218
		Wz+	0.067	0.201	0.218
		Wz-	0.067	0.201	0.218
	4	Dx+	0.101	0.304	0.330
		Dx-	0.101	0.304	0.330
		Dy+	0.101	0.304	0.330
		Dy-	0.101	0.304	0.330
		Wz+	0.101	0.304	0.330
		Wz-	0.101	0.304	0.330
	5	Dx+	0.032	0.082	0.101
		Dx-	-0.109	-1.191	-0.431
		Dy+	0.032	0.082	0.101
		Dy-	-0.109	-1.191	-0.431
		Wz+	0.032	0.082	0.101
		Wz-	-0.109	-1.191	-0.431
2	1	Dx+	-0.223	-1.749	-0.180
		Dx-	-0.223	-1.749	-0.180
		Dy+	-0.223	-1.749	-0.180
		Dy-	-0.223	-1.749	-0.180
		Wz+	-0.223	-1.749	-0.180
		Wz-	-0.223	-1.749	-0.180
	2	Dx+	-0.269	-0.838	-0.204
		Dx-	-0.269	-0.838	-0.204
		Dy+	-0.269	-0.838	-0.204
		Dy-	-0.269	-0.838	-0.204

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.269	-0.838	-0.204
		Wz-	-0.269	-0.838	-0.204
	3	Dx+	0.237	0.201	0.222
		Dx-	0.237	0.201	0.222
		Dy+	0.237	0.201	0.222
		Dy-	0.237	0.201	0.222
		Wz+	0.237	0.201	0.222
		Wz-	0.237	0.201	0.222
	4	Dx+	0.359	0.304	0.337
		Dx-	0.359	0.304	0.337
		Dy+	0.359	0.304	0.337
		Dy-	0.359	0.304	0.337
		Wz+	0.359	0.304	0.337
		Wz-	0.359	0.304	0.337
	5	Dx+	0.110	0.082	0.100
		Dx-	-0.381	-1.185	-0.289
		Dy+	0.110	0.082	0.100
		Dy-	-0.381	-1.185	-0.289
		Wz+	0.110	0.082	0.100
		Wz-	-0.381	-1.185	-0.289
3	1	Dx+	-0.427	-1.736	-0.001
		Dx-	-0.427	-1.736	-0.001
		Dy+	-0.427	-1.736	-0.001
		Dy-	-0.427	-1.736	-0.001
		Wz+	-0.427	-1.736	-0.001
		Wz-	-0.427	-1.736	-0.001
	2	Dx+	-0.450	-0.825	0.030
		Dx-	-0.450	-0.825	0.030
		Dy+	-0.450	-0.825	0.030
		Dy-	-0.450	-0.825	0.030
		Wz+	-0.450	-0.825	0.030
		Wz-	-0.450	-0.825	0.030
	3	Dx+	0.549	0.201	0.010
		Dx-	0.549	0.201	0.010
		Dy+	0.549	0.201	0.010
		Dy-	0.549	0.201	0.010
		Wz+	0.549	0.201	0.010
		Wz-	0.549	0.201	0.010
	4	Dx+	0.831	0.304	0.015
		Dx-	0.831	0.304	0.015
		Dy+	0.831	0.304	0.015
		Dy-	0.831	0.304	0.015
		Wz+	0.831	0.304	0.015
		Wz-	0.831	0.304	0.015

Nudo	Hip		Dx	Dy	Wz
	5	Dx+	0.239	0.082	-0.003
		Dx-	-0.636	-1.167	0.042
		Dy+	0.239	0.082	-0.003
		Dy-	-0.636	-1.167	0.042
		Wz+	-0.636	-1.167	0.042
		Wz-	0.239	0.082	-0.003
4	1	Dx+	-0.237	-1.719	0.165
		Dx-	-0.237	-1.719	0.165
		Dy+	-0.237	-1.719	0.165
		Dy-	-0.237	-1.719	0.165
		Wz+	-0.237	-1.719	0.165
		Wz-	-0.237	-1.719	0.165
	2	Dx+	-0.210	-0.812	0.163
		Dx-	-0.210	-0.812	0.163
		Dy+	-0.210	-0.812	0.163
		Dy-	-0.210	-0.812	0.163
		Wz+	-0.210	-0.812	0.163
		Wz-	-0.210	-0.812	0.163
	3	Dx+	0.263	0.201	-0.220
		Dx-	0.263	0.201	-0.220
		Dy+	0.263	0.201	-0.220
		Dy-	0.263	0.201	-0.220
		Wz+	0.263	0.201	-0.220
		Wz-	0.263	0.201	-0.220
	4	Dx+	0.398	0.304	-0.333
		Dx-	0.398	0.304	-0.333
		Dy+	0.398	0.304	-0.333
		Dy-	0.398	0.304	-0.333
		Wz+	0.398	0.304	-0.333
		Wz-	0.398	0.304	-0.333
	5	Dx+	0.107	0.082	-0.093
		Dx-	-0.297	-1.148	0.230
		Dy+	0.107	0.082	-0.093
		Dy-	-0.297	-1.148	0.230
		Wz+	-0.297	-1.148	0.230
		Wz-	0.107	0.082	-0.093
5	1	Dx+	-0.000	-1.709	0.243
		Dx-	-0.000	-1.709	0.243
		Dy+	-0.000	-1.709	0.243
		Dy-	-0.000	-1.709	0.243
		Wz+	-0.000	-1.709	0.243
		Wz-	-0.000	-1.709	0.243
	2	Dx+	-0.002	-0.805	0.191
		Dx-	-0.002	-0.805	0.191

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.002	-0.805	0.191
		Dy-	-0.002	-0.805	0.191
		Wz+	-0.002	-0.805	0.191
		Wz-	-0.002	-0.805	0.191
	3	Dx+	0.022	0.201	-0.165
		Dx-	0.022	0.201	-0.165
		Dy+	0.022	0.201	-0.165
		Dy-	0.022	0.201	-0.165
		Wz+	0.022	0.201	-0.165
		Wz-	0.022	0.201	-0.165
	4	Dx+	0.033	0.304	-0.250
		Dx-	0.033	0.304	-0.250
		Dy+	0.033	0.304	-0.250
		Dy-	0.033	0.304	-0.250
		Wz+	0.033	0.304	-0.250
		Wz-	0.033	0.304	-0.250
	5	Dx+	0.008	0.082	-0.067
		Dx-	-0.003	-1.139	0.270
		Dy+	0.008	0.082	-0.067
		Dy-	-0.003	-1.139	0.270
		Wz+	-0.003	-1.139	0.270
		Wz-	0.008	0.082	-0.067
6	1	Dx+	-0.000	-1.390	0.229
		Dx-	-0.000	-1.390	0.229
		Dy+	-0.000	-1.390	0.229
		Dy-	-0.000	-1.390	0.229
		Wz+	-0.000	-1.390	0.229
		Wz-	-0.000	-1.390	0.229
	2	Dx+	-0.002	-0.563	0.170
		Dx-	-0.002	-0.563	0.170
		Dy+	-0.002	-0.563	0.170
		Dy-	-0.002	-0.563	0.170
		Wz+	-0.002	-0.563	0.170
		Wz-	-0.002	-0.563	0.170
	3	Dx+	0.015	0.023	-0.108
		Dx-	0.015	0.023	-0.108
		Dy+	0.015	0.023	-0.108
		Dy-	0.015	0.023	-0.108
		Wz+	0.015	0.023	-0.108
		Wz-	0.015	0.023	-0.108
	4	Dx+	0.023	0.035	-0.163
		Dx-	0.023	0.035	-0.163
		Dy+	0.023	0.035	-0.163
		Dy-	0.023	0.035	-0.163

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.023	0.035	-0.163
		Wz-	0.023	0.035	-0.163
	5	Dx+	0.005	0.010	-0.044
		Dx-	-0.002	-0.796	0.240
		Dy+	0.005	0.010	-0.044
		Dy-	-0.002	-0.796	0.240
		Wz+	-0.002	-0.796	0.240
		Wz-	0.005	0.010	-0.044
7	1	Dx+	-0.000	-1.212	0.178
		Dx-	-0.000	-1.212	0.178
		Dy+	-0.000	-1.212	0.178
		Dy-	-0.000	-1.212	0.178
		Wz+	-0.000	-1.212	0.178
		Wz-	-0.000	-1.212	0.178
	2	Dx+	-0.001	-0.432	0.131
		Dx-	-0.001	-0.432	0.131
		Dy+	-0.001	-0.432	0.131
		Dy-	-0.001	-0.432	0.131
		Wz+	-0.001	-0.432	0.131
		Wz-	-0.001	-0.432	0.131
	3	Dx+	0.011	-0.055	-0.074
		Dx-	0.011	-0.055	-0.074
		Dy+	0.011	-0.055	-0.074
		Dy-	0.011	-0.055	-0.074
		Wz+	0.011	-0.055	-0.074
		Wz-	0.011	-0.055	-0.074
	4	Dx+	0.017	-0.083	-0.112
		Dx-	0.017	-0.083	-0.112
		Dy+	0.017	-0.083	-0.112
		Dy-	0.017	-0.083	-0.112
		Wz+	0.017	-0.083	-0.112
		Wz-	0.017	-0.083	-0.112
	5	Dx+	0.004	-0.022	-0.030
		Dx-	-0.002	-0.611	0.185
		Dy+	0.000	0.000	0.000
		Dy-	0.002	-0.633	0.155
		Wz+	-0.002	-0.611	0.185
		Wz-	0.004	-0.022	-0.030
8	1	Dx+	0.000	-1.009	-0.000
		Dx-	0.000	-1.009	-0.000
		Dy+	0.000	-1.009	-0.000
		Dy-	0.000	-1.009	-0.000
		Wz+	0.000	-1.009	-0.000
		Wz-	0.000	-1.009	-0.000

Nudo	Hip		Dx	Dy	Wz
	2	Dx+	0.000	-0.284	-0.000
		Dx-	0.000	-0.284	-0.000
		Dy+	0.000	-0.284	-0.000
		Dy-	0.000	-0.284	-0.000
		Wz+	0.000	-0.284	-0.000
		Wz-	0.000	-0.284	-0.000
	3	Dx+	-0.000	-0.133	-0.000
		Dx-	-0.000	-0.133	-0.000
		Dy+	-0.000	-0.133	-0.000
		Dy-	-0.000	-0.133	-0.000
		Wz+	-0.000	-0.133	-0.000
		Wz-	-0.000	-0.133	-0.000
	4	Dx+	-0.000	-0.201	-0.000
		Dx-	-0.000	-0.201	-0.000
		Dy+	-0.000	-0.201	-0.000
		Dy-	-0.000	-0.201	-0.000
		Wz+	-0.000	-0.201	-0.000
		Wz-	-0.000	-0.201	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.000	0.000
		Dy-	0.000	-0.456	-0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
9	1	Dx+	0.000	-1.212	-0.178
		Dx-	0.000	-1.212	-0.178
		Dy+	0.000	-1.212	-0.178
		Dy-	0.000	-1.212	-0.178
		Wz+	0.000	-1.212	-0.178
		Wz-	0.000	-1.212	-0.178
	2	Dx+	0.001	-0.432	-0.131
		Dx-	0.001	-0.432	-0.131
		Dy+	0.001	-0.432	-0.131
		Dy-	0.001	-0.432	-0.131
		Wz+	0.001	-0.432	-0.131
		Wz-	0.001	-0.432	-0.131
	3	Dx+	-0.011	-0.055	0.074
		Dx-	-0.011	-0.055	0.074
		Dy+	-0.011	-0.055	0.074
		Dy-	-0.011	-0.055	0.074
		Wz+	-0.011	-0.055	0.074
		Wz-	-0.011	-0.055	0.074
	4	Dx+	-0.017	-0.083	0.112
		Dx-	-0.017	-0.083	0.112

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.017	-0.083	0.112
		Dy-	-0.017	-0.083	0.112
		Wz+	-0.017	-0.083	0.112
		Wz-	-0.017	-0.083	0.112
	5	Dx+	0.002	-0.611	-0.185
		Dx-	-0.004	-0.022	0.030
		Dy+	0.000	0.000	0.000
		Dy-	-0.002	-0.633	-0.155
		Wz+	-0.004	-0.022	0.030
		Wz-	0.002	-0.611	-0.185
10	1	Dx+	0.000	-1.390	-0.229
		Dx-	0.000	-1.390	-0.229
		Dy+	0.000	-1.390	-0.229
		Dy-	0.000	-1.390	-0.229
		Wz+	0.000	-1.390	-0.229
		Wz-	0.000	-1.390	-0.229
	2	Dx+	0.002	-0.563	-0.170
		Dx-	0.002	-0.563	-0.170
		Dy+	0.002	-0.563	-0.170
		Dy-	0.002	-0.563	-0.170
		Wz+	0.002	-0.563	-0.170
		Wz-	0.002	-0.563	-0.170
	3	Dx+	-0.015	0.023	0.108
		Dx-	-0.015	0.023	0.108
		Dy+	-0.015	0.023	0.108
		Dy-	-0.015	0.023	0.108
		Wz+	-0.015	0.023	0.108
		Wz-	-0.015	0.023	0.108
	4	Dx+	-0.023	0.035	0.163
		Dx-	-0.023	0.035	0.163
		Dy+	-0.023	0.035	0.163
		Dy-	-0.023	0.035	0.163
		Wz+	-0.023	0.035	0.163
		Wz-	-0.023	0.035	0.163
	5	Dx+	0.002	-0.796	-0.240
		Dx-	-0.005	0.010	0.044
		Dy+	-0.005	0.010	0.044
		Dy-	0.002	-0.796	-0.240
		Wz+	-0.005	0.010	0.044
		Wz-	0.002	-0.796	-0.240
11	1	Dx+	0.000	-1.709	-0.243
		Dx-	0.000	-1.709	-0.243
		Dy+	0.000	-1.709	-0.243
		Dy-	0.000	-1.709	-0.243

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.000	-1.709	-0.243
		Wz-	0.000	-1.709	-0.243
	2	Dx+	0.002	-0.805	-0.191
		Dx-	0.002	-0.805	-0.191
		Dy+	0.002	-0.805	-0.191
		Dy-	0.002	-0.805	-0.191
		Wz+	0.002	-0.805	-0.191
		Wz-	0.002	-0.805	-0.191
	3	Dx+	-0.022	0.201	0.165
		Dx-	-0.022	0.201	0.165
		Dy+	-0.022	0.201	0.165
		Dy-	-0.022	0.201	0.165
		Wz+	-0.022	0.201	0.165
		Wz-	-0.022	0.201	0.165
	4	Dx+	-0.033	0.304	0.250
		Dx-	-0.033	0.304	0.250
		Dy+	-0.033	0.304	0.250
		Dy-	-0.033	0.304	0.250
		Wz+	-0.033	0.304	0.250
		Wz-	-0.033	0.304	0.250
	5	Dx+	0.003	-1.139	-0.270
		Dx-	-0.008	0.082	0.067
		Dy+	-0.008	0.082	0.067
		Dy-	0.003	-1.139	-0.270
		Wz+	-0.008	0.082	0.067
		Wz-	0.003	-1.139	-0.270
12	1	Dx+	0.237	-1.719	-0.165
		Dx-	0.237	-1.719	-0.165
		Dy+	0.237	-1.719	-0.165
		Dy-	0.237	-1.719	-0.165
		Wz+	0.237	-1.719	-0.165
		Wz-	0.237	-1.719	-0.165
	2	Dx+	0.210	-0.812	-0.163
		Dx-	0.210	-0.812	-0.163
		Dy+	0.210	-0.812	-0.163
		Dy-	0.210	-0.812	-0.163
		Wz+	0.210	-0.812	-0.163
		Wz-	0.210	-0.812	-0.163
	3	Dx+	-0.263	0.201	0.220
		Dx-	-0.263	0.201	0.220
		Dy+	-0.263	0.201	0.220
		Dy-	-0.263	0.201	0.220
		Wz+	-0.263	0.201	0.220
		Wz-	-0.263	0.201	0.220

Nudo	Hip		Dx	Dy	Wz
	4	Dx+	-0.398	0.304	0.333
		Dx-	-0.398	0.304	0.333
		Dy+	-0.398	0.304	0.333
		Dy-	-0.398	0.304	0.333
		Wz+	-0.398	0.304	0.333
		Wz-	-0.398	0.304	0.333
	5	Dx+	0.297	-1.148	-0.230
		Dx-	-0.107	0.082	0.093
		Dy+	-0.107	0.082	0.093
		Dy-	0.297	-1.148	-0.230
		Wz+	-0.107	0.082	0.093
		Wz-	0.297	-1.148	-0.230
13	1	Dx+	0.427	-1.736	0.001
		Dx-	0.427	-1.736	0.001
		Dy+	0.427	-1.736	0.001
		Dy-	0.427	-1.736	0.001
		Wz+	0.427	-1.736	0.001
		Wz-	0.427	-1.736	0.001
	2	Dx+	0.450	-0.825	-0.030
		Dx-	0.450	-0.825	-0.030
		Dy+	0.450	-0.825	-0.030
		Dy-	0.450	-0.825	-0.030
		Wz+	0.450	-0.825	-0.030
		Wz-	0.450	-0.825	-0.030
	3	Dx+	-0.549	0.201	-0.010
		Dx-	-0.549	0.201	-0.010
		Dy+	-0.549	0.201	-0.010
		Dy-	-0.549	0.201	-0.010
		Wz+	-0.549	0.201	-0.010
		Wz-	-0.549	0.201	-0.010
	4	Dx+	-0.831	0.304	-0.015
		Dx-	-0.831	0.304	-0.015
		Dy+	-0.831	0.304	-0.015
		Dy-	-0.831	0.304	-0.015
		Wz+	-0.831	0.304	-0.015
		Wz-	-0.831	0.304	-0.015
	5	Dx+	0.636	-1.167	-0.042
		Dx-	-0.239	0.082	0.003
		Dy+	-0.239	0.082	0.003
		Dy-	0.636	-1.167	-0.042
		Wz+	-0.239	0.082	0.003
		Wz-	0.636	-1.167	-0.042
14	1	Dx+	0.223	-1.749	0.180
		Dx-	0.223	-1.749	0.180

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.223	-1.749	0.180
		Dy-	0.223	-1.749	0.180
		Wz+	0.223	-1.749	0.180
		Wz-	0.223	-1.749	0.180
	2	Dx+	0.269	-0.838	0.204
		Dx-	0.269	-0.838	0.204
		Dy+	0.269	-0.838	0.204
		Dy-	0.269	-0.838	0.204
		Wz+	0.269	-0.838	0.204
		Wz-	0.269	-0.838	0.204
	3	Dx+	-0.237	0.201	-0.222
		Dx-	-0.237	0.201	-0.222
		Dy+	-0.237	0.201	-0.222
		Dy-	-0.237	0.201	-0.222
		Wz+	-0.237	0.201	-0.222
		Wz-	-0.237	0.201	-0.222
	4	Dx+	-0.359	0.304	-0.337
		Dx-	-0.359	0.304	-0.337
		Dy+	-0.359	0.304	-0.337
		Dy-	-0.359	0.304	-0.337
		Wz+	-0.359	0.304	-0.337
		Wz-	-0.359	0.304	-0.337
	5	Dx+	0.381	-1.185	0.289
		Dx-	-0.110	0.082	-0.100
		Dy+	-0.110	0.082	-0.100
		Dy-	0.381	-1.185	0.289
		Wz+	0.381	-1.185	0.289
		Wz-	-0.110	0.082	-0.100
15	1	Dx+	0.062	-1.753	0.243
		Dx-	0.062	-1.753	0.243
		Dy+	0.062	-1.753	0.243
		Dy-	0.062	-1.753	0.243
		Wz+	0.062	-1.753	0.243
		Wz-	0.062	-1.753	0.243
	2	Dx+	0.077	-0.842	0.305
		Dx-	0.077	-0.842	0.305
		Dy+	0.077	-0.842	0.305
		Dy-	0.077	-0.842	0.305
		Wz+	0.077	-0.842	0.305
		Wz-	0.077	-0.842	0.305
	3	Dx+	-0.067	0.201	-0.218
		Dx-	-0.067	0.201	-0.218
		Dy+	-0.067	0.201	-0.218
		Dy-	-0.067	0.201	-0.218

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.067	0.201	-0.218
		Wz-	-0.067	0.201	-0.218
	4	Dx+	-0.101	0.304	-0.330
		Dx-	-0.101	0.304	-0.330
		Dy+	-0.101	0.304	-0.330
		Dy-	-0.101	0.304	-0.330
		Wz+	-0.101	0.304	-0.330
		Wz-	-0.101	0.304	-0.330
	5	Dx+	0.109	-1.191	0.431
		Dx-	-0.032	0.082	-0.101
		Dy+	-0.032	0.082	-0.101
		Dy-	0.109	-1.191	0.431
		Wz+	0.109	-1.191	0.431
		Wz-	-0.032	0.082	-0.101
16	1	Dx+	-0.021	-2.007	-0.256
		Dx-	-0.021	-2.007	-0.256
		Dy+	-0.021	-2.007	-0.256
		Dy-	-0.021	-2.007	-0.256
		Wz+	-0.021	-2.007	-0.256
		Wz-	-0.021	-2.007	-0.256
	2	Dx+	-0.025	-1.165	-0.329
		Dx-	-0.025	-1.165	-0.329
		Dy+	-0.025	-1.165	-0.329
		Dy-	-0.025	-1.165	-0.329
		Wz+	-0.025	-1.165	-0.329
		Wz-	-0.025	-1.165	-0.329
	3	Dx+	0.029	0.414	0.203
		Dx-	0.029	0.414	0.203
		Dy+	0.029	0.414	0.203
		Dy-	0.029	0.414	0.203
		Wz+	0.029	0.414	0.203
		Wz-	0.029	0.414	0.203
	4	Dx+	0.044	0.627	0.308
		Dx-	0.044	0.627	0.308
		Dy+	0.044	0.627	0.308
		Dy-	0.044	0.627	0.308
		Wz+	0.044	0.627	0.308
		Wz-	0.044	0.627	0.308
	5	Dx+	0.015	0.180	0.094
		Dx-	-0.035	-1.648	-0.465
		Dy+	0.015	0.180	0.094
		Dy-	-0.035	-1.648	-0.465
		Wz+	0.015	0.180	0.094
		Wz-	-0.035	-1.648	-0.465

Nudo	Hip		Dx	Dy	Wz
17	1	Dx+	0.000	-2.093	-0.252
		Dx-	0.000	-2.093	-0.252
		Dy+	0.000	-2.093	-0.252
		Dy-	0.000	-2.093	-0.252
		Wz+	0.000	-2.093	-0.252
		Wz-	0.000	-2.093	-0.252
	2	Dx+	0.002	-1.278	-0.329
		Dx-	0.002	-1.278	-0.329
		Dy+	0.002	-1.278	-0.329
		Dy-	0.002	-1.278	-0.329
		Wz+	0.002	-1.278	-0.329
		Wz-	0.002	-1.278	-0.329
	3	Dx+	0.012	0.480	0.189
		Dx-	0.012	0.480	0.189
		Dy+	0.012	0.480	0.189
		Dy-	0.012	0.480	0.189
		Wz+	0.012	0.480	0.189
		Wz-	0.012	0.480	0.189
	4	Dx+	0.017	0.727	0.286
		Dx-	0.017	0.727	0.286
		Dy+	0.017	0.727	0.286
		Dy-	0.017	0.727	0.286
		Wz+	0.017	0.727	0.286
		Wz-	0.017	0.727	0.286
	5	Dx+	0.010	-1.595	-0.378
		Dx-	0.000	0.000	0.000
		Dy+	0.006	0.211	0.088
		Dy-	0.003	-1.806	-0.465
		Wz+	0.006	0.211	0.088
		Wz-	0.003	-1.806	-0.465
18	1	Dx+	0.000	-2.541	-0.000
		Dx-	0.000	-2.541	-0.000
		Dy+	0.000	-2.541	-0.000
		Dy-	0.000	-2.541	-0.000
		Wz+	0.000	-2.541	-0.000
		Wz-	0.000	-2.541	-0.000
	2	Dx+	0.000	-1.878	-0.000
		Dx-	0.000	-1.878	-0.000
		Dy+	0.000	-1.878	-0.000
		Dy-	0.000	-1.878	-0.000
		Wz+	0.000	-1.878	-0.000
		Wz-	0.000	-1.878	-0.000
	3	Dx+	0.000	0.763	-0.000
		Dx-	0.000	0.763	-0.000

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.000	0.763	-0.000
		Dy-	0.000	0.763	-0.000
		Wz+	0.000	0.763	-0.000
		Wz-	0.000	0.763	-0.000
	4	Dx+	0.000	1.156	-0.000
		Dx-	0.000	1.156	-0.000
		Dy+	0.000	1.156	-0.000
		Dy-	0.000	1.156	-0.000
		Wz+	0.000	1.156	-0.000
		Wz-	0.000	1.156	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.343	-0.000
		Dy-	0.000	-2.656	0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
19	1	Dx+	-0.000	-2.093	0.252
		Dx-	-0.000	-2.093	0.252
		Dy+	-0.000	-2.093	0.252
		Dy-	-0.000	-2.093	0.252
		Wz+	-0.000	-2.093	0.252
		Wz-	-0.000	-2.093	0.252
	2	Dx+	-0.002	-1.278	0.329
		Dx-	-0.002	-1.278	0.329
		Dy+	-0.002	-1.278	0.329
		Dy-	-0.002	-1.278	0.329
		Wz+	-0.002	-1.278	0.329
		Wz-	-0.002	-1.278	0.329
	3	Dx+	-0.012	0.480	-0.189
		Dx-	-0.012	0.480	-0.189
		Dy+	-0.012	0.480	-0.189
		Dy-	-0.012	0.480	-0.189
		Wz+	-0.012	0.480	-0.189
		Wz-	-0.012	0.480	-0.189
	4	Dx+	-0.017	0.727	-0.286
		Dx-	-0.017	0.727	-0.286
		Dy+	-0.017	0.727	-0.286
		Dy-	-0.017	0.727	-0.286
		Wz+	-0.017	0.727	-0.286
		Wz-	-0.017	0.727	-0.286
	5	Dx+	0.000	0.000	0.000
		Dx-	-0.010	-1.595	0.378
		Dy+	-0.006	0.211	-0.088
		Dy-	-0.003	-1.806	0.465

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.003	-1.806	0.465
		Wz-	-0.006	0.211	-0.088
20	1	Dx+	0.021	-2.007	0.256
		Dx-	0.021	-2.007	0.256
		Dy+	0.021	-2.007	0.256
		Dy-	0.021	-2.007	0.256
		Wz+	0.021	-2.007	0.256
		Wz-	0.021	-2.007	0.256
	2	Dx+	0.025	-1.165	0.329
		Dx-	0.025	-1.165	0.329
		Dy+	0.025	-1.165	0.329
		Dy-	0.025	-1.165	0.329
		Wz+	0.025	-1.165	0.329
		Wz-	0.025	-1.165	0.329
	3	Dx+	-0.029	0.414	-0.203
		Dx-	-0.029	0.414	-0.203
		Dy+	-0.029	0.414	-0.203
		Dy-	-0.029	0.414	-0.203
		Wz+	-0.029	0.414	-0.203
		Wz-	-0.029	0.414	-0.203
	4	Dx+	-0.044	0.627	-0.308
		Dx-	-0.044	0.627	-0.308
		Dy+	-0.044	0.627	-0.308
		Dy-	-0.044	0.627	-0.308
		Wz+	-0.044	0.627	-0.308
		Wz-	-0.044	0.627	-0.308
	5	Dx+	0.035	-1.648	0.465
		Dx-	-0.015	0.180	-0.094
		Dy+	-0.015	0.180	-0.094
		Dy-	0.035	-1.648	0.465
		Wz+	0.035	-1.648	0.465
		Wz-	-0.015	0.180	-0.094

ESFUERZOS PESIMOS
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Barra	Extremo	Comb		N	Q	M
1	Dorsal	4	N+	-18.47	8.97	20.28
		1	N-	-59.86	19.72	63.09
		5	Q+	-59.86	33.36	68.14
		4	Q-	-18.47	8.97	20.28
		5	M+	-59.86	33.36	68.14
		4	M-	-18.47	8.97	20.28
1	Frontal	4	N+	-19.67	7.95	13.85
		1	N-	-61.98	17.90	48.80
		5	Q+	-61.98	28.78	44.53
		4	Q-	-19.67	7.95	13.85
		1	M+	-61.98	17.90	48.80
		8	M-	-19.67	16.33	10.42
2	Dorsal	4	N+	-19.67	7.95	13.85
		1	N-	-61.98	17.90	48.80
		5	Q+	-61.98	28.78	44.53
		4	Q-	-19.67	7.95	13.85
		1	M+	-61.98	17.90	48.80
		8	M-	-19.67	16.33	10.42
2	Frontal	4	N+	-23.28	2.52	1.86
		1	N-	-68.40	8.24	18.87
		5	Q+	-68.40	8.98	9.57
		4	Q-	-23.28	2.19	-6.03
		3	M+	-60.04	6.45	21.95
		6	M-	-31.64	4.71	-18.41
3	Dorsal	4	N+	-23.28	2.52	1.86
		1	N-	-68.40	8.24	18.87
		5	Q+	-68.40	8.98	9.57
		4	Q-	-23.28	2.19	-6.03
		3	M+	-60.04	6.45	21.95
		6	M-	-31.64	4.71	-18.41
3	Frontal	4	N+	-26.88	-6.19	6.06
		1	N-	-74.81	-7.24	17.72
		3	Q+	-66.45	-2.26	17.14
		6	Q-	-35.24	-24.23	3.94
		1	M+	-74.81	-7.24	17.72
		6	M-	-35.24	-24.23	3.94
4	Dorsal	4	N+	-26.88	-6.19	6.06
		1	N-	-74.81	-7.24	17.72
		3	Q+	-66.45	-2.26	17.14
		6	Q-	-35.24	-24.23	3.94

Barra	Extremo	Comb		N	Q	M
		1	M+	-74.81	-7.24	17.72
		6	M-	-35.24	-24.23	3.94
4	Frontal	4	N+	-28.71	-11.85	16.52
		1	N-	-78.06	-17.29	31.95
		3	Q+	-69.70	-7.91	23.04
		6	Q-	-37.07	-42.26	42.51
		5	M+	-78.06	-38.32	49.03
		4	M-	-28.71	-11.85	16.52
5	Dorsal	3	N+	-7.91	44.07	23.04
		6	N-	-42.26	25.97	42.51
		5	Q+	-38.32	51.79	49.03
		4	Q-	-11.85	18.25	16.52
		5	M+	-38.32	51.79	49.03
		4	M-	-11.85	18.25	16.52
5	Frontal	3	N+	-7.91	49.31	-38.12
		6	N-	-42.26	28.92	6.55
		5	Q+	-38.32	57.03	-22.25
		4	Q-	-11.85	21.20	-9.32
		6	M+	-42.26	28.92	6.55
		3	M-	-7.91	49.31	-38.12
6	Dorsal	3	N+	-7.91	27.65	-38.12
		6	N-	-42.26	17.61	6.55
		5	Q+	-38.32	33.50	-22.25
		4	Q-	-11.85	11.76	-9.32
		6	M+	-42.26	17.61	6.55
		3	M-	-7.91	27.65	-38.12
6	Frontal	3	N+	-7.91	31.11	-63.54
		6	N-	-42.26	19.56	-9.52
		5	Q+	-38.32	36.96	-52.73
		4	Q-	-11.85	13.70	-20.33
		6	M+	-42.26	19.56	-9.52
		1	M-	-17.29	35.29	-66.41
7	Dorsal	3	N+	-7.91	5.61	-63.54
		6	N-	-42.26	4.73	-9.52
		5	Q+	-38.32	8.27	-52.73
		4	Q-	-11.85	2.08	-20.33
		6	M+	-42.26	4.73	-9.52
		1	M-	-17.29	7.20	-66.41
7	Frontal	3	N+	-7.91	14.31	-85.21
		6	N-	-42.26	9.63	-25.14
		5	Q+	-38.32	16.97	-80.17
		4	Q-	-11.85	6.98	-30.18
		8	M+	-27.44	7.78	-21.59
		1	M-	-17.29	15.90	-91.54

Barra	Extremo	Comb		N	Q	M
8	Dorsal	3	N+	-7.91	-14.31	-85.21
		6	N-	-42.26	-9.63	-25.14
		4	Q+	-11.85	-6.98	-30.18
		5	Q-	-38.32	-16.97	-80.17
		8	M+	-27.44	-7.78	-21.59
		1	M-	-17.29	-15.90	-91.54
8	Frontal	3	N+	-7.91	-5.61	-63.54
		6	N-	-42.26	-4.73	-9.52
		4	Q+	-11.85	-2.08	-20.33
		5	Q-	-38.32	-8.27	-52.73
		6	M+	-42.26	-4.73	-9.52
		1	M-	-17.29	-7.20	-66.41
9	Dorsal	3	N+	-7.91	-31.11	-63.54
		6	N-	-42.26	-19.56	-9.52
		4	Q+	-11.85	-13.70	-20.33
		5	Q-	-38.32	-36.96	-52.73
		6	M+	-42.26	-19.56	-9.52
		1	M-	-17.29	-35.29	-66.41
9	Frontal	3	N+	-7.91	-27.65	-38.12
		6	N-	-42.26	-17.61	6.55
		4	Q+	-11.85	-11.76	-9.32
		5	Q-	-38.32	-33.50	-22.25
		6	M+	-42.26	-17.61	6.55
		3	M-	-7.91	-27.65	-38.12
10	Dorsal	3	N+	-7.91	-49.31	-38.12
		6	N-	-42.26	-28.92	6.55
		4	Q+	-11.85	-21.20	-9.32
		5	Q-	-38.32	-57.03	-22.25
		6	M+	-42.26	-28.92	6.55
		3	M-	-7.91	-49.31	-38.12
10	Frontal	3	N+	-7.91	-44.07	23.04
		6	N-	-42.26	-25.97	42.51
		4	Q+	-11.85	-18.25	16.52
		5	Q-	-38.32	-51.79	49.03
		5	M+	-38.32	-51.79	49.03
		4	M-	-11.85	-18.25	16.52
11	Dorsal	4	N+	-28.71	11.85	16.52
		1	N-	-78.06	17.29	31.95
		6	Q+	-37.07	42.26	42.51
		3	Q-	-69.70	7.91	23.04
		5	M+	-78.06	38.32	49.03
		4	M-	-28.71	11.85	16.52
11	Frontal	4	N+	-26.88	6.19	6.06
		1	N-	-74.81	7.24	17.72

Barra	Extremo	Comb		N	Q	M
		6	Q+	-35.24	24.23	3.94
		3	Q-	-66.45	2.26	17.14
		1	M+	-74.81	7.24	17.72
		6	M-	-35.24	24.23	3.94
12	Dorsal	4	N+	-26.88	6.19	6.06
		1	N-	-74.81	7.24	17.72
		6	Q+	-35.24	24.23	3.94
		3	Q-	-66.45	2.26	17.14
		1	M+	-74.81	7.24	17.72
		6	M-	-35.24	24.23	3.94
12	Frontal	4	N+	-23.28	-2.52	1.86
		1	N-	-68.40	-8.24	18.87
		4	Q+	-23.28	-2.19	-6.03
		5	Q-	-68.40	-8.98	9.57
		3	M+	-60.04	-6.45	21.95
		6	M-	-31.64	-4.71	-18.41
13	Dorsal	4	N+	-23.28	-2.52	1.86
		1	N-	-68.40	-8.24	18.87
		4	Q+	-23.28	-2.19	-6.03
		5	Q-	-68.40	-8.98	9.57
		3	M+	-60.04	-6.45	21.95
		6	M-	-31.64	-4.71	-18.41
13	Frontal	4	N+	-19.67	-7.95	13.85
		1	N-	-61.98	-17.90	48.80
		4	Q+	-19.67	-7.95	13.85
		5	Q-	-61.98	-28.78	44.53
		1	M+	-61.98	-17.90	48.80
		8	M-	-19.67	-16.33	10.42
14	Dorsal	4	N+	-19.67	-7.95	13.85
		1	N-	-61.98	-17.90	48.80
		4	Q+	-19.67	-7.95	13.85
		5	Q-	-61.98	-28.78	44.53
		1	M+	-61.98	-17.90	48.80
		8	M-	-19.67	-16.33	10.42
14	Frontal	4	N+	-18.47	-8.97	20.28
		1	N-	-59.86	-19.72	63.09
		4	Q+	-18.47	-8.97	20.28
		5	Q-	-59.86	-33.36	68.14
		5	M+	-59.86	-33.36	68.14
		4	M-	-18.47	-8.97	20.28
15	Dorsal	4	N+	-11.83	-16.79	-20.28
		5	N-	-42.57	-53.69	-68.14
		8	Q+	-22.42	-15.06	-24.11
		1	Q-	-29.11	-55.89	-63.09

Barra	Extremo	Comb		N	Q	M
		4	M+	-11.83	-16.79	-20.28
		5	M-	-42.57	-53.69	-68.14
15	Frontal	4	N+	-11.05	-11.95	-5.57
		5	N-	-40.15	-38.86	-20.78
		8	Q+	-21.63	-10.22	-11.18
		1	Q-	-26.69	-41.06	-13.48
		3	M+	-11.88	-16.03	-5.51
		6	M-	-39.31	-34.79	-20.85
16	Dorsal	4	N+	-12.00	-10.99	-5.57
		5	N-	-43.23	-35.40	-20.78
		8	Q+	-22.41	-8.39	-11.18
		1	Q-	-30.00	-38.71	-13.48
		3	M+	-13.17	-14.99	-5.51
		6	M-	-42.06	-31.41	-20.85
16	Frontal	4	N+	-11.64	-9.56	-1.97
		5	N-	-42.07	-30.75	-9.19
		8	Q+	-22.05	-6.96	-8.49
		1	Q-	-28.84	-34.05	-0.73
		3	M+	-20.84	-30.14	2.19
		6	M-	-32.87	-10.16	-13.35
17	Dorsal	4	N+	-8.97	-12.10	-1.97
		5	N-	-33.36	-40.03	-9.19
		4	Q+	-8.97	-12.10	-1.97
		1	Q-	-19.72	-40.03	-0.73
		3	M+	-12.91	-34.30	2.19
		6	M-	-29.42	-17.83	-13.35
17	Frontal	4	N+	-8.97	0.00	16.17
		5	N-	-33.36	0.00	50.86
		5	Q+	-22.60	0.00	24.30
		4	Q-	-8.97	0.00	16.17
		1	M+	-19.72	0.00	59.32
		8	M-	-19.70	0.00	9.65
18	Dorsal	4	N+	-8.97	0.00	16.17
		5	N-	-33.36	0.00	50.86
		5	Q+	-22.60	0.00	24.30
		4	Q-	-8.97	0.00	16.17
		1	M+	-19.72	0.00	59.32
		8	M-	-19.70	0.00	9.65
18	Frontal	4	N+	-8.97	12.10	-1.97
		5	N-	-33.36	40.03	-9.19
		1	Q+	-19.72	40.03	-0.73
		4	Q-	-8.97	12.10	-1.97
		3	M+	-12.91	34.30	2.19
		6	M-	-29.42	17.83	-13.35

Barra	Extremo	Comb		N	Q	M
19	Dorsal	4	N+	-11.64	9.56	-1.97
		5	N-	-42.07	30.75	-9.19
		1	Q+	-28.84	34.05	-0.73
		8	Q-	-22.05	6.96	-8.49
		3	M+	-20.84	30.14	2.19
		6	M-	-32.87	10.16	-13.35
19	Frontal	4	N+	-12.00	10.99	-5.57
		5	N-	-43.23	35.40	-20.78
		1	Q+	-30.00	38.71	-13.48
		8	Q-	-22.41	8.39	-11.18
		3	M+	-13.17	14.99	-5.51
		6	M-	-42.06	31.41	-20.85
20	Dorsal	4	N+	-11.05	11.95	-5.57
		5	N-	-40.15	38.86	-20.78
		1	Q+	-26.69	41.06	-13.48
		8	Q-	-21.63	10.22	-11.18
		3	M+	-11.88	16.03	-5.51
		6	M-	-39.31	34.79	-20.85
20	Frontal	4	N+	-11.83	16.79	-20.28
		5	N-	-42.57	53.69	-68.14
		1	Q+	-29.11	55.89	-63.09
		8	Q-	-22.42	15.06	-24.11
		4	M+	-11.83	16.79	-20.28
		5	M-	-42.57	53.69	-68.14

ARMADURA DEL DINTEL

NUDO	Nd	Md	As c.i.	As c.s.
15	-11.83	-20.28	0.00	2.59
	-42.57	-68.14	0.00	8.66
	-11.83	-20.28	0.00	2.59
	-42.57	-68.14	0.00	8.66
16	-12.00	-5.57	0.00	0.11
	-43.23	-20.78	0.00	0.71
	-13.17	-5.51	0.00	0.00
	-42.06	-20.85	0.00	0.87
17	-8.97	-1.97	0.00	0.00
	-33.36	-9.19	0.00	0.00
	-12.91	2.19	0.00	0.00
	-29.42	-13.35	0.00	1.17
18	-8.97	16.17	4.54	0.00
	-33.36	50.86	14.35	0.00
	-19.72	59.32	19.02	0.00
	-19.70	9.65	1.00	0.00

ARMADURA DE SOLERA

NUDO	Nd	Md	As c.i.	As c.s.
5	-7.91	23.04	4.54	0.00
	-42.26	42.51	5.33	0.00
	-38.32	49.03	7.37	0.00
	-11.85	16.52	2.53	0.00
6	-7.91	-38.12	0.00	8.16
	-42.26	6.55	0.00	0.00
	-42.26	6.55	0.00	0.00
	-7.91	-38.12	0.00	8.16
7	-7.91	-63.54	0.00	14.36
	-42.26	-9.52	0.00	0.00
	-42.26	-9.52	0.00	0.00
	-17.29	-66.41	0.00	14.01
8	-7.91	-85.21	0.00	19.73
	-42.26	-25.14	0.00	1.10
	-27.44	-21.59	0.00	1.94
	-17.29	-91.54	0.00	20.28

ARMADURA DE HASTIAL

NUDO	Nd	Md	As c.i.	As c.e.
1	-18.47	20.28	0.00	4.90
	-59.86	63.09	0.00	16.40
	-59.86	68.14	0.00	18.40
	-18.47	20.28	0.00	4.90
2	-19.67	13.85	0.00	2.49
	-61.98	48.80	0.00	10.62
	-61.98	48.80	0.00	10.62
	-19.67	10.42	0.00	1.28
3	-23.28	1.86	0.00	0.00
	-68.40	18.87	0.00	0.00
	-60.04	21.95	0.00	0.78
	-31.64	-18.41	2.72	0.00
4	-26.88	6.06	0.00	0.00
	-74.81	17.72	0.00	0.00
	-74.81	17.72	0.00	0.00
	-35.24	3.94	0.00	0.00
5	-28.71	16.52	0.00	2.39
	-78.06	31.95	0.00	2.49
	-78.06	49.03	0.00	9.00
	-28.71	16.52	0.00	2.39

RESUMEN DE ARMADURAS

ARMADURA DEL DINTEL

NUDO	As c.i.	As c.s.
15	0.00	8.66
16	0.00	0.87
17	0.00	1.17
18	19.02	0.00

Cuantía mínima geométrica: 5.25 cm²/m

ARMADURA DE SOLERA

NUDO	As c.i.	As c.s.
5	7.37	0.00
6	0.00	8.16
7	0.00	14.36
8	0.00	20.28

Cuantía mínima geométrica: 7.50 cm²/m

ARMADURA DE HASTIAL

NUDO	As c.i.	As c.e.
1	0.00	18.40
2	0.00	10.62
3	2.72	0.78
4	0.00	0.00
5	0.00	9.00

Cuantía mínima geométrica vertical: 3.15 cm²/m
Cuantía mínima geométrica horizontal: 5.60 cm²/m

COMPROBACION A CORTANTE

DINTEL

NUDO	Vd max.	Vcu	As
16	38.71	53.58	0.00
17	40.03	42.60	0.00
18	0.00	42.60	0.00

SOLERA

Vcu= 61.97 T/m.

NUDO	Vd max.	As
6	45.27	0.00
7	22.62	0.00
8	5.00	0.00

HASTIAL

Vcu= 40.42 T/m.

NUDO	Vd max.	As
2	28.78	0.00
3	8.98	0.00
4	24.23	0.00

COMPROBACION DE TENSIONES SOBRE EL TERRENO

Tensión transmitida al terreno en nudo 5: 1.73 kp/cm²

Estructura: P.I. Nº 7 **Cálculo:** ALETAS. H=7.21 M.

DEFINICION GEOMETRICA

Altura total	7.21	m
Ancho superior	0.90	m
Ancho inferior	0.90	m
Longitud zarpa delantera	1.20	m
Longitud zarpa trasera	4.20	m
Canto zapata	1.00	m
Canto tacón cotra deslizamiento.....	0.00	m

ACCIONES ACTUANTES

Altura de tierras	0.00	m
Altura tierras en intradós	0.50	m
Sobrecarga en el trasdós	0.00	t/m²

DATOS TERRENO

Densidad	1.90	t/m³
Coeficiente empuje activo	0.54	
¿Considera empuje pasivo? (s/n)	n	
Angulo de rozamiento	30	º

OTROS DATOS

Recubrimiento	5	cm
fck	250	Kp/cm²
fyk	5100	Kp/cm²
Gamma C	1.5	
Gamma S	1.15	
Gamma F desf.....	1.6	
Gamma F fav.....	0.9	
Canto útil muro	85	cm
Canto útil zapata	95	cm
Densidad hormigón	2.5	t/m³

Muro:

A flex =	**27.11**	cm²/m.l.
A cort =	**0.00**	cm²/m.l.

Zapata (puntera):

A flex =	**6.34**	cm²/m.l.
Cumple cortante?		**SI**

Zapata (talón):

A flex =	**25.30**	cm²/m.l.
Cumple cortante?		**SI**

DESLIZA?	1.51	NO
VUELCA?	3.36	NO
SIGM_BAR	**18.35**	t/m²
SIGM_MAX	**23.71**	t/m²
SIGM_MIN	**5.06**	t/m²

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 16.22 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 64.09 mt
H = 26.67 t

RESUMEN:

HIP	N	M	H
P.P.	16.22	0.00	0.00
TIERRAS	0.00	64.09	26.67

Estructura: P.I. Nº 7 **Cálculo:** ALETAS. H=7.21 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	16.22	64.09	26.67

Tomando los coeficientes de seguridad:

Gamma DESF 1.6
Gamma FAV 0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	14.60	102.55	7.42	27.1
1.2.	25.96	102.55	4.35	25.9

Armadura a disponer:

A = 27.1 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 42.67 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 54.87 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 67 **Cálculo:** ALETAS. H=7.21 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 31.97 t
M = 24.33 mt
H = 0.00 t

Debido a las tierras:

N = 58.68 t
M = 37.35 mt
H = 34.58 t

RESUMEN:

HIP	N	M	H
P.P.	31.97	24.33	0.00
TIERRAS	58.68	37.35	34.58

SEGURIDAD AL DESLIZAMIENTO:

N = 90.65 t
H = 34.58 t GAMMA = 1.51 O.K.
mu = 0.58
Epasivo= 0.00 t

SEGURIDAD AL VUELCO:

Mvolc = 94.63 mt
Mest = 318.03 mt GAMMA = 3.36 O.K.

Estructura: P.I. Nº 67 **Cálculo:** ALETAS. H=7.21 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	90.65	61.69	34.58

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	23.71	5.06

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	18.35

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -102.86 mt

Anec = 25.30 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 27.06 mt

Anec = 6.34 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 32.89 t
Vlim = 61.32 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 22.26 t
Vlim = 122.64 t

Estructura: P.I. Nº 67 **Cálculo:** ALETAS. H=3.50 M.

DEFINICION GEOMETRICA

Altura total	3.50 m	**Muro:**	
Ancho superior	0.40 m	A flex =	**7.37** cm²/m.l.
Ancho inferior	0.40 m	A cort =	**0.00** cm²/m.l.
Longitud zarpa delantera	0.70 m	**Zapata (puntera):**	
Longitud zarpa trasera	2.00 m	A flex =	**1.87** cm²/m.l.
Canto zapata	0.50 m	Cumple cortante?	**SI**
Canto tacón cotra deslizamiento.....	0.00 m	**Zapata (talón):**	
ACCIONES ACTUANTES		A flex =	**5.74** cm²/m.l.
Altura de tierras	0.00 m	Cumple cortante?	**SI**
Altura tierras en intradós	0.50 m		
Sobrecarga en el trasdós	0.00 t/m²	DESLIZA?	1.50 **NO**
		VUELCA?	3.39 **NO**
DATOS TERRENO		SIGM_BAR	**8.66** t/m²
		SIGM_MAX	**11.12** t/m²
Densidad	1.90 t/m³	SIGM_MIN	**2.65** t/m²
Coeficiente empuje activo	0.54		
¿Considera empuje pasivo? (s/n)	n		
Angulo de rozamiento	30 °		

OTROS DATOS

Recubrimiento	5 cm
fck	250 Kp/cm²
fyk	5100 Kp/cm²
Gamma C	1.5
Gamma S	1.15
Gamma F desf.....	1.6
Gamma F fav.....	0.9
Canto útil muro	35 cm
Canto útil zapata	45 cm
Densidad hormigón	2.5 t/m³

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 3.50 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 7.33 mt
H = 6.28 t

RESUMEN:

HIP	N	M	H
P.P.	3.50	0.00	0.00
TIERRAS	0.00	7.33	6.28

Estructura: P.I. Nº 67 **Cálculo:** ALETAS. H=3.50 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	3.50	7.33	6.28

Tomando los coeficientes de seguridad:

Gamma DESF 1.6
Gamma FAV 0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	3.15	11.73	3.87	7.4
1.2.	5.60	11.73	2.24	7.1

Armadura a disponer:

A = 7.4 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 10.05 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 22.59 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 67 **Cálculo:** ALETAS. H=3.50 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 7.38 t
M = 2.28 mt
H = 0.00 t

Debido a las tierras:

N = 13.96 t
M = 4.50 mt
H = 8.21 t

RESUMEN:

HIP	N	M	H
P.P.	7.38	2.28	0.00
TIERRAS	13.96	4.50	8.21

SEGURIDAD AL DESLIZAMIENTO:

N = 21.34 t
H = 8.21 t GAMMA = 1.50 O.K.
mu = 0.58
Epasivo= 0.00 t

SEGURIDAD AL VUELCO:

Mvolc = 10.94 mt
Mest = 37.09 mt GAMMA = 3.39 O.K.

Estructura: P.I. Nº 67 **Cálculo:** ALETAS. H=3.50 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	21.34	6.78	8.21

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	11.12	2.65

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	8.66

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -11.43 mt

Anec = 5.74 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 3.81 mt

Anec = 1.87 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 7.77 t
Vlim = 29.05 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 6.28 t
Vlim = 58.09 t

3. RESUMEN CONTROL CALIDAD

ASAITEC SYNCONSULT S.L.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO: P.I. 7

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	N º	RES. MEDIA	N º	RES. MEDIA	N º	RES. MEDIA					
13	26	17/06/99	Losa inf m,d	03030703	H-250	5	Blanda	2	232	3	291	1	304	100	15/07/99	II/AL 42,5 R	262	
13	27	17/06/99	Losa inf m,d	03030703	H-250	6	Blanda	2	258	3	301	1	331	100	15/07/99	II/AL 42,5 R	262	
14	28	17/06/99	Zap aleta 1	03030703	H-250	6	Blanda	2	302	3	361	1	392	64	19/07/99	II/AL 42,5 R	232	
14	32	21/06/99	Zap aleta 2	03030703	H-250	10	Fluida	2	206	3	258	1	272	64	19/07/99	II/AL 42,5 R	232	
17	33	22/06/99	Losa inf m,i	03030703	H-250	5	Blanda	2	196	3	250	1	261	95	20/07/99	II/AL 42,5 R	221	
17	34	22/06/99	Zap aleta 4	03030703	H-250	10	Fluida	2	187	3	245	1	262	95	20/07/99	II/AL 42,5 R	221	
19	37	24/06/99	Alzado 2,d	03030703	H-250	8	Blanda	2	193	3	252	1	260	72	23/07/99	II/AL 42,5 R	227	
19	39	25/06/99	Alzado 1,d	03030703	H-250	10	Fluida	2	208	3	253	1	333	72	23/07/99	II/AL 42,5 R	227	
24	44	29/06/99	Alzado 2,i	03030703	H-250	10	Fluida	2	224	3	254	1	273	80	28/07/99	II/AL 42,5 R	229	
24	47	30/06/99	Alzado 1,i	03030703	H-250	6	Blanda	2	250	3	298	1	316	80	28/07/99	II/AL 42,5 R	229	
54	77	13/07/99	Losa sup m,d	03030703	H-250	9	Blanda	2	262	3	302	1	351	100	12/08/99	II/AL 42,5 R	248	
54	86	15/07/99	Los sup m,i	03030703	H-250	10	Fluida	2	215	3	276	1		100	12/08/99	II/AL 42,5 R	248	
66	94	19/07/99	Aleta 2 (1ª)	03030703	H-250	6	Blanda	2	214	3	256	1		61	16/08/99	II/AL 42,5 R	225	
66	95	19/07/99	Aleta 1 (1ª)	03030703	H-250	6	Blanda	2	206	3	256	1		61	16/08/99	II/AL 42,5 R	225	
74	115	21/07/99	Aleta 3 y 4 (1º)	03030703	H-250	6	Blanda	2	246	3	285	1		81	18/08/99	II/AL 42,5 R	251	
74	116	21/07/99	Aleta 3 y 4 (1º)	03030703	H-250	5	Blanda	2	242	3	287	1		81	18/08/99	II/AL 42,5 R	251	

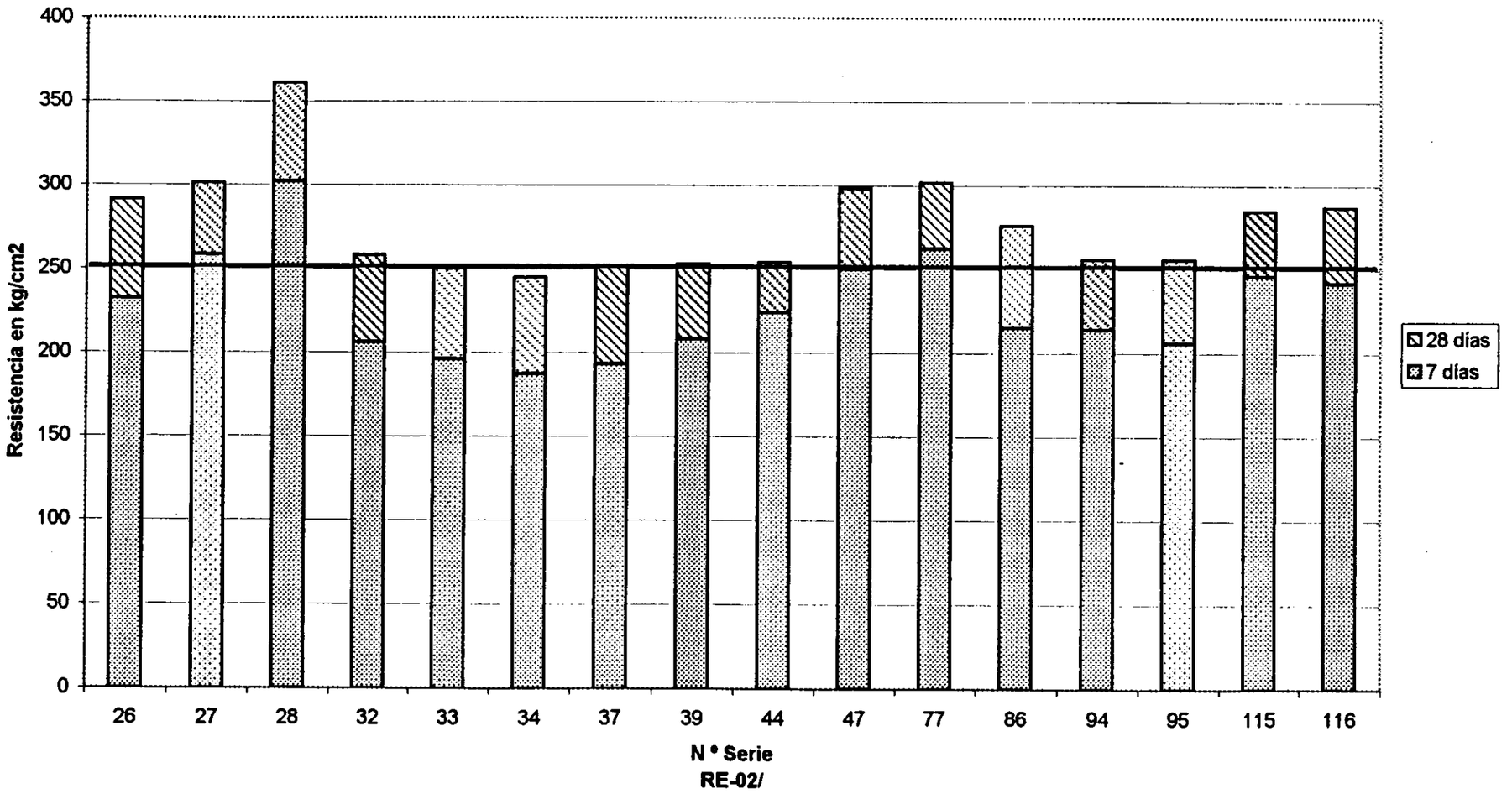
FECHA: FIRMA:

NOMBRE: Ana Mª Martín Herrrero

CARGO: Jefe de Laboratorio

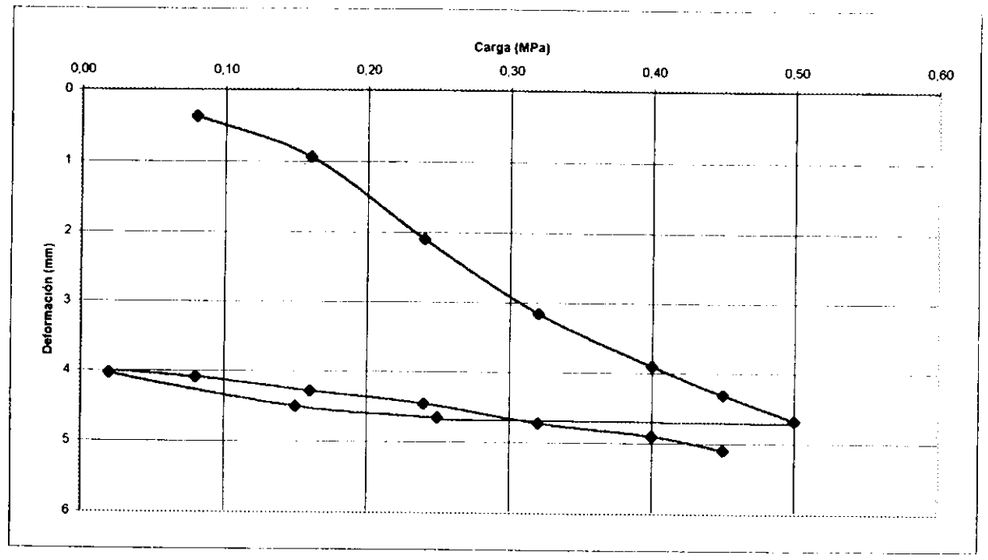
LOTE DE f. est. < 0,9 fck

RESISTENCIA HORMIGÓN
P.I. 7



esaitec SYNCONSULT S.L. UNIÓN TEMPORAL DE EMPRESAS	**ENSAYO DE PLACA CON CARGA** (DIN 18 134) OBRA: **LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA** **SUB-TRAMO III**

LOCALIZACIÓN	P.I. 7 Cuña de transición 2		
CÓDIGO DE TRAMIFICACIÓN:	03030702		**PK** 314+995
FECHA:	25/1/00	**REF. MUESTRA:**	RE-08/ 26



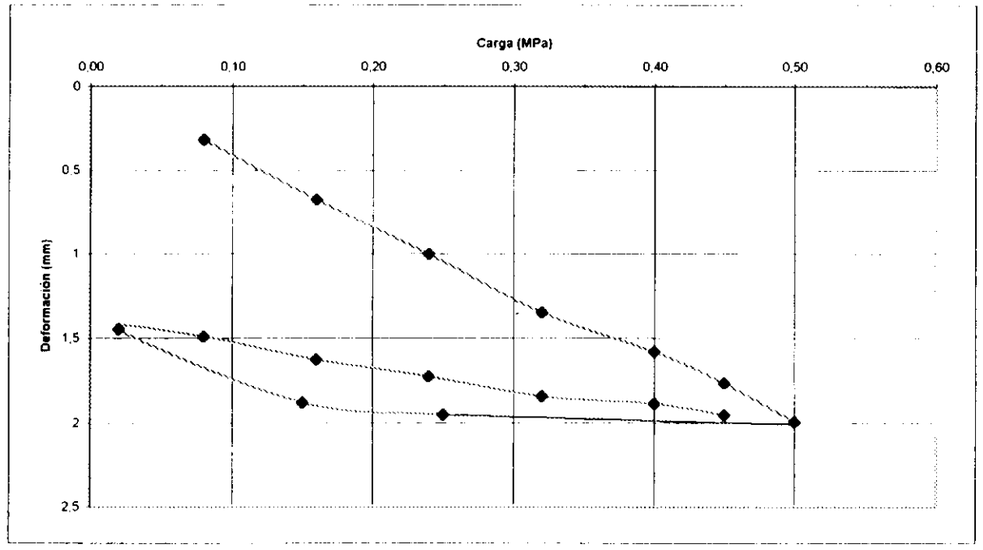
Módulos			Especifi.
	Mpa	Kg/cm2	kg/cm2
Ev1	20,1	204,9	
Ev2	84,9	866,2	1600
Ev2/Ev1	4,2		

OBSERVACIONES

Fecha	Firma	Cargo: JEFE DE LABORATORIO Nombre: ANA MARTIN HERRERO

esaitec SYNCONSULT S.L. UNIÓN TEMPORAL DE EMPRESAS	**ENSAYO DE PLACA CON CARGA** (DIN 18 134) OBRA: **LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA** **SUB-TRAMO III**

LOCALIZACIÓN	P.I. 7 Cuña de transición 2		
CÓDIGO DE TRAMIFICACIÓN:	03030702		**PK** 314+995
FECHA:	1/2/00	**REF. MUESTRA:**	RE-08/ 30



Módulos			Especifi.
	Mpa	Kg/cm2	kg/cm2
Ev1	56,1	572,6	
Ev2	177,9	1814,8	1600
Ev2/Ev1	3,17		

OBSERVACIONES

Fecha	Firma	Cargo: JEFE DE LABORATORIO Nombre: ANA MARTIN HERRERO

PASO INFERIOR 8

PASO INFERIOR 8

ÍNDICE

1. DESCRIPCIÓN Y DEFINICIÓN
2. CÁLCULOS
3. RESUMEN DEL CONTROL DE CALIDAD

1. DESCRIPCIÓN Y DEFINICIÓN

LINEA DE ALTA VELOCIDAD
MADRID-BARCELONA-FRONTERA FRANCESA
TRAMO: MADRID-ZARAGOZA
SUBTRAMO III – PLATAFORMA

CÁLCULO MARCO P.K. 314+030

1. INTRODUCCIÓN Y OBJETO

Se redacta el presente documento, con el fin de justificar el cálculo realizado para el paso inferior nº 8 en el P.K. 314+030.

Dicho paso inferior consiste en un marco de altura interior de 5,68 m y espesor de la losa superior de 0,70 m.

CALCULO DE MARCOS CERRADOS UNICELULARES

El siguiente programa calcula los esfuerzos en un marco cerrado unicelular a partir de las dimensiones geométricas del mismo y sometido a las acciones de su peso propio, del terreno y de las sobrecargas de uso. A partir de estros esfuerzos el programa arma las secciones a flexocompresión simple y comprueba la resistencia a cortante de las mismas, así como las tensiones máximas transmitidas al terreno.

DATOS GEOMÉTRICOS

Gálibo vertical (GV):	5,90	m.
Gálibo horizontal (GH):	8,00	m.
Espesor de dintel (ED):	0,70	m.
Espesor de solera (ESOL):	1,00	m.
Espesor de hastial (EH):	0,70	m.
Longitud cartela dintel:	1,00	m.
Canto adicional cartela:	0,50	m.

DATOS DEL TERRENO

Altura de tierras sobre el dintel (HT):	1,80	m.
Peso específico de las tierras (γ):	2.10	T/m³
Coeficiente de balasto (K):	5000	T/m³
Empuje activo del terreno (λ_a):	0.33	
Empuje al reposo del terreno (λ_r):	0.50	

SOBRECARGAS DE USO

Carretera:

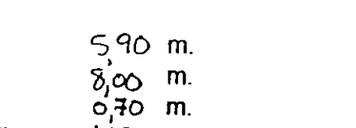
Sobrecarga uniforme:	0.4	T/m²
Vehículo pesado:	60	T.
Sobrecarga en trasdós:	1.0	T/m²

Ferrocarril:

Sobrecarga uniforme tren tipo B (abierto a 45° hasta plano medio del dintel): 3,36 T/m²
Sobrecarga en trasdós: 3.0 T/m²

Sobrecarga:

2 Trenes 12T/m.



Coef de impacto:

$$\phi_o = \frac{114\sqrt{8,70}}{3,10 - 1,76\sqrt{8,70} + 8,70} = 50,88\% = 0,51 \qquad \phi_{red} = 0,51 - \frac{1,80 - 1,00}{10,00} = 0,43$$

$$q = \frac{2 \times 12 \times 1,43}{(5,90 + 2 \times 2,15)} = 3,36\ T/m^2$$

DATOS DE LOS MATERIALES

Hormigón:

f_{ck}:	250	kg/cm²
γ_c:	1.50	

Acero:

f_{yk}:	5100	kg/cm²
γ_s:	1.15	

Recubrimiento mecánico de armaduras: 4 cm.

COEFICIENTES DE MAYORACION DE ACCIONES

Peso propio marco:
- Efecto desfavorable: $\gamma_{pp1} = 1.60$
- Efecto favorable: $\gamma_{pp2} = 0.90$

Acción de las tierras (Peso y empuje):
- Efecto desfavorable: $\gamma_{t1} = 1.60$
- Efecto favorable: $\gamma_{t2} = 0.90$

Sobrecargas de uso:
- Efecto desfavorable: $\gamma_{sc1} = 1.60$
- Efecto favorable: $\gamma_{sc2} = 0$

HIPÓTESIS DE CALCULO

Se consideran las siguientes hipótesis de cálculo:

H1: Peso propio marco.
H2: Peso de tierras.
H3: Empuje activo de tierras.
H4: Empuje al reposo de tierras.
H5: Sobrecargas de uso.

Esta última hipótesis de sobrecargas de uso tiene los siguientes componentes:

- Sobrecarga uniforme.(400 kg/m² en carretera y tren tipo B en ferrocarril)
- Vehiculo pesado. Esta acción se asimila a una sobrecarga uniforme, abriendo a 45° hasta el centro de gravedad del dintel. Si el vehículo tiene de dimensiones en planta AxB, la carga equivalente será:

$$\frac{Q}{(A + 2 \times HT + ED)\ (B + 2 \times HT + ED)}$$

- Sobrecarga en el trasdós. Empuje debido a la sobrecarga en el trasdós con el coeficiente de empuje al reposo.

COMBINACIONES DE HIPÓTESIS

Se consideran las siguientes combinaciones de hipótesis:

C1: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C2: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H3 + \gamma_{sc} \times H5$
C3: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C4: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H3 + \gamma_{sc} \times H5$
C5: $\gamma_{pp1} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C6: $\gamma_{pp2} \times H1 + \gamma_{t1} \times H2 + \gamma_{t1} \times H4 + \gamma_{sc} \times H5$
C7: $\gamma_{pp1} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$
C8: $\gamma_{pp2} \times H1 + \gamma_{t2} \times H2 + \gamma_{t2} \times H4 + \gamma_{sc} \times H5$

Con estas combinaciones se obtienen los esfuerzos pésimos en las barras del modelo.

ARMADO DEL MARCO

Con los esfuerzos pésimos obtenidos anteriormente, se arman las secciones definidas en el modelo de cálculo a flexocompresión simple. Se obtienen asimismo las armaduras a disponer por cuantía mínima geométrica.

COMPROBACIÓN A CORTANTE

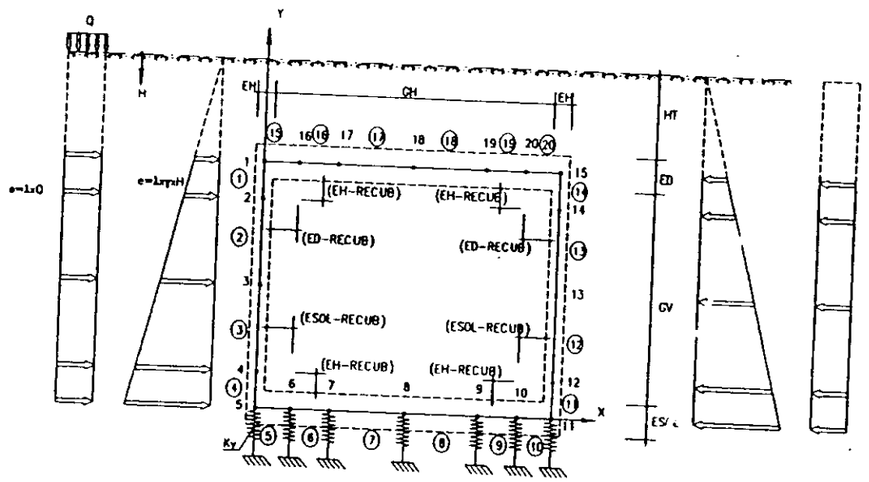
Se realiza la comprobación a cortante de las secciones para verificar si la contribución a cortante del hormigón es suficiente para absorber el cortante de cálculo hallado. Si no se cumple esta condición se obtiene la armadura necesaria.
Para la comprobación a cortante se han introducido en el modelo nudos a una distancia de un canto útil del paramento para verificar en ellos el cortante de cálculo y no en los nudos extremos.

COMPROBACIÓN DE TENSIONES SOBRE EL TERRENO

Para el cálculo de la tensión máxima transmitida al terreno se obtiene el movimiento máximo vertical en los nudos de la solera. La tensión será por tanto:

$$\sigma = K_{balasto} \times \delta_{max}$$

A continuación figuran los resultados del cálculo.



MODELO DE CALCULO

2. CÁLCULOS

CARACTERISTICAS DE LOS NUDOS

Nudo	Coordenadas X	Coordenadas Y	coacc xyz	Constantes Muelles Kx	Constantes Muelles Ky	Constantes Muelles Kz
1	0.000	6.500				
2	0.000	5.740				
3	0.000	3.450				
4	0.000	1.160				
5	0.000	0.000			5.025E+03	
6	1.310	0.000			5.438E+03	
7	2.175	0.000			7.600E+03	
8	4.350	0.000	100		1.088E+04	
9	6.525	0.000			7.600E+03	
10	7.390	0.000			5.438E+03	
11	8.700	0.000			5.025E+03	
12	8.700	1.160				
13	8.700	3.450				
14	8.700	5.740				
15	8.700	6.500				
16	1.010	6.665				
17	1.350	6.750				
18	4.350	6.750				
19	7.350	6.750				
20	7.690	6.665				

CARACTERISTICAS DE LAS BARRAS

Barra	Nd	Nf	I	A	E
1	1	2	0.028583	0.700000	3.004E+06
2	2	3	0.028583	0.700000	3.004E+06
3	3	4	0.028583	0.700000	3.004E+06
4	4	5	0.028583	0.700000	3.004E+06
5	5	6	0.083333	1.000000	3.004E+06
6	6	7	0.083333	1.000000	3.004E+06
7	7	8	0.083333	1.000000	3.004E+06
8	8	9	0.083333	1.000000	3.004E+06
9	9	10	0.083333	1.000000	3.004E+06
10	10	11	0.083333	1.000000	3.004E+06
11	11	12	0.028583	0.700000	3.004E+06
12	12	13	0.028583	0.700000	3.004E+06
13	13	14	0.028583	0.700000	3.004E+06
14	14	15	0.028583	0.700000	3.004E+06
15	1	16	0.092393	1.035000	3.004E+06
16	16	17	0.040311	0.785000	3.004E+06
17	17	18	0.028583	0.700000	3.004E+06
18	18	19	0.028583	0.700000	3.004E+06
19	19	20	0.040311	0.785000	3.004E+06
20	20	15	0.092393	1.035000	3.004E+06

CARGAS EN BARRAS

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
1	1	Q unif	1.750	0.000	0.000	270.00
	2	Q unif	1.750	0.000	0.000	270.00
	3	Q unif	1.750	0.000	0.000	270.00
	4	Q unif	1.750	0.000	0.000	270.00
	5	Q unif	2.500	0.000	0.000	270.00
	6	Q unif	2.500	0.000	0.000	270.00
	7	Q unif	2.500	0.000	0.000	270.00
	8	Q unif	2.500	0.000	0.000	270.00
	9	Q unif	2.500	0.000	0.000	270.00
	10	Q unif	2.500	0.000	0.000	270.00
	11	Q unif	1.750	0.000	0.000	270.00
	12	Q unif	1.750	0.000	0.000	270.00
	13	Q unif	1.750	0.000	0.000	270.00
	14	Q unif	1.750	0.000	0.000	270.00
	15	Q unif	2.588	0.000	0.000	270.00
	16	Q unif	1.963	0.000	0.000	270.00
	17	Q unif	1.750	0.000	0.000	270.00
	18	Q unif	1.750	0.000	0.000	270.00
	19	Q unif	1.963	0.000	0.000	270.00
	20	Q unif	2.588	0.000	0.000	270.00
2	15	Q unif	3.780	0.000	0.000	270.00
	16	Q unif	3.780	0.000	0.000	270.00
	17	Q unif	3.780	0.000	0.000	270.00
	18	Q unif	3.780	0.000	0.000	270.00
	19	Q unif	3.780	0.000	0.000	270.00
	20	Q unif	3.780	0.000	0.000	270.00
3	1	Q unif	1.840	0.000	0.000	0.00
	2	Q unif	2.983	0.000	0.000	0.00
	3	Q unif	4.570	0.000	0.000	0.00
	4	Q unif	5.766	0.000	0.000	0.00
	11	Q unif	5.766	0.000	0.000	180.00
	12	Q unif	4.570	0.000	0.000	180.00
	13	Q unif	2.983	0.000	0.000	180.00
	14	Q unif	1.840	0.000	0.000	180.00
4	1	Q unif	2.788	0.000	0.000	0.00
	2	Q unif	4.520	0.000	0.000	0.00
	3	Q unif	6.925	0.000	0.000	0.00
	4	Q unif	8.736	0.000	0.000	0.00
	11	Q unif	8.736	0.000	0.000	180.00
	12	Q unif	6.925	0.000	0.000	180.00
	13	Q unif	4.520	0.000	0.000	180.00
	14	Q unif	2.788	0.000	0.000	180.00

Hipotesis	Barra	Tipo	Carga	X1	X2	Ang
5	1	Q unif	1.500	0.000	0.000	0.00
	2	Q unif	1.500	0.000	0.000	0.00
	3	Q unif	1.500	0.000	0.000	0.00
	4	Q unif	1.500	0.000	0.000	0.00
	11	Q unif	1.500	0.000	0.000	180.00
	12	Q unif	1.500	0.000	0.000	180.00
	13	Q unif	1.500	0.000	0.000	180.00
	14	Q unif	1.500	0.000	0.000	180.00
6	15	Q unif	3.360	0.000	0.000	270.00
	16	Q unif	3.360	0.000	0.000	270.00
	17	Q unif	3.360	0.000	0.000	270.00
	18	Q unif	3.360	0.000	0.000	270.00
	19	Q unif	3.360	0.000	0.000	270.00
	20	Q unif	3.360	0.000	0.000	270.00
7	15	Q unif	0.000	0.000	0.000	270.00
	16	Q unif	0.000	0.000	0.000	270.00
	17	Q unif	0.000	0.000	0.000	270.00
	18	Q unif	0.000	0.000	0.000	270.00
	19	Q unif	0.000	0.000	0.000	270.00
	20	Q unif	0.000	0.000	0.000	270.00

HIPOTESIS COMPUESTAS

Hipotesis compuesta 1

PESO PROPIO MARCO
Tipo : Acciones permanentes
Hipotesis basicas : 1

Hipotesis compuesta 2

PESO TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 2

Hipotesis compuesta 3

EMPUJE ACTIVO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 3

Hipotesis compuesta 4

EMPUJE REPOSO DE TIERRAS
Tipo : Acciones permanentes
Hipotesis basicas : 4

Hipotesis compuesta 5

SOBRECARGAS DE USO
Tipo : Sobrecargas compatibles
Hipotesis basicas : 5 6 7

COMBINACIONES

Combinacion 1

C1

Hip.comp.	Coeficiente
1	1.600
2	1.600
3	1.600
5	1.600

Combinacion 2

C2

Hip.comp.	Coeficiente
1	0.900
2	1.600
3	1.600
5	1.600

Combinacion 3

C3

Hip.comp.	Coeficiente
1	1.600
2	0.900
3	0.900
5	1.600

Combinacion 4

C4

Hip.comp.	Coeficiente
1	0.900
2	0.900
3	0.900
5	1.600

Combinacion 5

C5

Hip.comp.	Coeficiente
1	1.600
2	1.600
4	1.600
5	1.600

Combinacion 6

C6

Hip.comp.	Coeficiente
1	0.900
2	1.600
4	1.600
5	1.600

Combinacion 7

C7

Hip.comp.	Coeficiente
1	1.600
2	0.900
4	0.900
5	1.600

Combinacion 8

C8

Hip.comp.	Coeficiente
1	0.900
2	0.900
4	0.900
5	1.600

MOVIMIENTOS HIPOTESIS COMPUESTAS (*1000)

Nudo	Hip		Dx	Dy	Wz
1	1	Dx+	-0.062	-1.753	-0.243
		Dx-	-0.062	-1.753	-0.243
		Dy+	-0.062	-1.753	-0.243
		Dy-	-0.062	-1.753	-0.243
		Wz+	-0.062	-1.753	-0.243
		Wz-	-0.062	-1.753	-0.243
	2	Dx+	-0.106	-1.166	-0.422
		Dx-	-0.106	-1.166	-0.422
		Dy+	-0.106	-1.166	-0.422
		Dy-	-0.106	-1.166	-0.422
		Wz+	-0.106	-1.166	-0.422
		Wz-	-0.106	-1.166	-0.422
	3	Dx+	0.074	0.220	0.241
		Dx-	0.074	0.220	0.241
		Dy+	0.074	0.220	0.241
		Dy-	0.074	0.220	0.241
		Wz+	0.074	0.220	0.241
		Wz-	0.074	0.220	0.241
	4	Dx+	0.112	0.333	0.366
		Dx-	0.112	0.333	0.366
		Dy+	0.112	0.333	0.366
		Dy-	0.112	0.333	0.366
		Wz+	0.112	0.333	0.366
		Wz-	0.112	0.333	0.366
	5	Dx+	0.032	0.082	0.101
		Dx-	-0.094	-1.037	-0.375
		Dy+	0.032	0.082	0.101
		Dy-	-0.094	-1.037	-0.375
		Wz+	0.032	0.082	0.101
		Wz-	-0.094	-1.037	-0.375
2	1	Dx+	-0.223	-1.749	-0.180
		Dx-	-0.223	-1.749	-0.180
		Dy+	-0.223	-1.749	-0.180
		Dy-	-0.223	-1.749	-0.180
		Wz+	-0.223	-1.749	-0.180
		Wz-	-0.223	-1.749	-0.180
	2	Dx+	-0.373	-1.160	-0.283
		Dx-	-0.373	-1.160	-0.283
		Dy+	-0.373	-1.160	-0.283
		Dy-	-0.373	-1.160	-0.283
		Wz+	-0.373	-1.160	-0.283
		Wz-	-0.373	-1.160	-0.283
	3	Dx+	0.263	0.220	0.245
		Dx-	0.263	0.220	0.245
		Dy+	0.263	0.220	0.245
		Dy-	0.263	0.220	0.245
		Wz+	0.263	0.220	0.245
		Wz-	0.263	0.220	0.245
	4	Dx+	0.398	0.333	0.372
		Dx-	0.398	0.333	0.372
		Dy+	0.398	0.333	0.372
		Dy-	0.398	0.333	0.372
		Wz+	0.398	0.333	0.372
		Wz-	0.398	0.333	0.372
	5	Dx+	0.110	0.082	0.100
		Dx-	-0.332	-1.031	-0.251
		Dy+	0.110	0.082	0.100
		Dy-	-0.332	-1.031	-0.251
		Wz+	0.110	0.082	0.100
		Wz-	-0.332	-1.031	-0.251
3	1	Dx+	-0.427	-1.736	-0.001
		Dx-	-0.427	-1.736	-0.001
		Dy+	-0.427	-1.736	-0.001
		Dy-	-0.427	-1.736	-0.001
		Wz+	-0.427	-1.736	-0.001
		Wz-	-0.427	-1.736	-0.001
	2	Dx+	-0.623	-1.142	0.041
		Dx-	-0.623	-1.142	0.041
		Dy+	-0.623	-1.142	0.041
		Dy-	-0.623	-1.142	0.041
		Wz+	-0.623	-1.142	0.041
		Wz-	-0.623	-1.142	0.041
	3	Dx+	0.604	0.220	0.009
		Dx-	0.604	0.220	0.009
		Dy+	0.604	0.220	0.009
		Dy-	0.604	0.220	0.009
		Wz+	0.604	0.220	0.009
		Wz-	0.604	0.220	0.009
	4	Dx+	0.915	0.333	0.014
		Dx-	0.915	0.333	0.014
		Dy+	0.915	0.333	0.014
		Dy-	0.915	0.333	0.014
		Wz+	0.915	0.333	0.014
		Wz-	0.915	0.333	0.014

Nudo	Hip		Dx	Dy	Wz
	5	Dx+	0.239	0.082	-0.003
		Dx-	-0.554	-1.015	0.037
		Dy+	0.239	0.082	-0.003
		Dy-	-0.554	-1.015	0.037
		Wz+	-0.554	-1.015	0.037
		Wz-	0.239	0.082	-0.003
4	1	Dx+	-0.237	-1.719	0.165
		Dx-	-0.237	-1.719	0.165
		Dy+	-0.237	-1.719	0.165
		Dy-	-0.237	-1.719	0.165
		Wz+	-0.237	-1.719	0.165
		Wz-	-0.237	-1.719	0.165
	2	Dx+	-0.291	-1.124	0.225
		Dx-	-0.291	-1.124	0.225
		Dy+	-0.291	-1.124	0.225
		Dy-	-0.291	-1.124	0.225
		Wz+	-0.291	-1.124	0.225
		Wz-	-0.291	-1.124	0.225
	3	Dx+	0.288	0.220	-0.241
		Dx-	0.288	0.220	-0.241
		Dy+	0.288	0.220	-0.241
		Dy-	0.288	0.220	-0.241
		Wz+	0.288	0.220	-0.241
		Wz-	0.288	0.220	-0.241
	4	Dx+	0.436	0.333	-0.365
		Dx-	0.436	0.333	-0.365
		Dy+	0.436	0.333	-0.365
		Dy-	0.436	0.333	-0.365
		Wz+	0.436	0.333	-0.365
		Wz-	0.436	0.333	-0.365
	5	Dx+	0.107	0.082	-0.093
		Dx-	-0.258	-0.999	0.200
		Dy+	0.107	0.082	-0.093
		Dy-	-0.258	-0.999	0.200
		Wz+	-0.258	-0.999	0.200
		Wz-	0.107	0.082	-0.093
5	1	Dx+	-0.000	-1.709	0.243
		Dx-	-0.000	-1.709	0.243
		Dy+	-0.000	-1.709	0.243
		Dy-	-0.000	-1.709	0.243
		Wz+	-0.000	-1.709	0.243
		Wz-	-0.000	-1.709	0.243
	2	Dx+	-0.003	-1.115	0.264
		Dx-	-0.003	-1.115	0.264

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.003	-1.115	0.264
		Dy-	-0.003	-1.115	0.264
		Wz+	-0.003	-1.115	0.264
		Wz-	-0.003	-1.115	0.264
	3	Dx+	0.024	0.220	-0.180
		Dx-	0.024	0.220	-0.180
		Dy+	0.024	0.220	-0.180
		Dy-	0.024	0.220	-0.180
		Wz+	0.024	0.220	-0.180
		Wz-	0.024	0.220	-0.180
	4	Dx+	0.036	0.333	-0.273
		Dx-	0.036	0.333	-0.273
		Dy+	0.036	0.333	-0.273
		Dy-	0.036	0.333	-0.273
		Wz+	0.036	0.333	-0.273
		Wz-	0.036	0.333	-0.273
	5	Dx+	0.008	0.082	-0.067
		Dx-	-0.003	-0.991	0.235
		Dy+	0.008	0.082	-0.067
		Dy-	-0.003	-0.991	0.235
		Wz+	-0.003	-0.991	0.235
		Wz-	0.008	0.082	-0.067
6	1	Dx+	-0.000	-1.390	0.229
		Dx-	-0.000	-1.390	0.229
		Dy+	-0.000	-1.390	0.229
		Dy-	-0.000	-1.390	0.229
		Wz+	-0.000	-1.390	0.229
		Wz-	-0.000	-1.390	0.229
	2	Dx+	-0.002	-0.780	0.235
		Dx-	-0.002	-0.780	0.235
		Dy+	-0.002	-0.780	0.235
		Dy-	-0.002	-0.780	0.235
		Wz+	-0.002	-0.780	0.235
		Wz-	-0.002	-0.780	0.235
	3	Dx+	0.017	0.026	-0.118
		Dx-	0.017	0.026	-0.118
		Dy+	0.017	0.026	-0.118
		Dy-	0.017	0.026	-0.118
		Wz+	0.017	0.026	-0.118
		Wz-	0.017	0.026	-0.118
	4	Dx+	0.025	0.039	-0.178
		Dx-	0.025	0.039	-0.178
		Dy+	0.025	0.039	-0.178
		Dy-	0.025	0.039	-0.178

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.025	0.039	-0.178
		Wz-	0.025	0.039	-0.178
	5	Dx+	0.005	0.010	-0.044
		Dx-	-0.002	-0.693	0.209
		Dy+	0.005	0.010	-0.044
		Dy-	-0.002	-0.693	0.209
		Wz+	-0.002	-0.693	0.209
		Wz-	0.005	0.010	-0.044
7	1	Dx+	-0.000	-1.212	0.178
		Dx-	-0.000	-1.212	0.178
		Dy+	-0.000	-1.212	0.178
		Dy-	-0.000	-1.212	0.178
		Wz+	-0.000	-1.212	0.178
		Wz-	-0.000	-1.212	0.178
	2	Dx+	-0.002	-0.598	0.181
		Dx-	-0.002	-0.598	0.181
		Dy+	-0.002	-0.598	0.181
		Dy-	-0.002	-0.598	0.181
		Wz+	-0.002	-0.598	0.181
		Wz-	-0.002	-0.598	0.181
	3	Dx+	0.012	-0.060	-0.081
		Dx-	0.012	-0.060	-0.081
		Dy+	0.012	-0.060	-0.081
		Dy-	0.012	-0.060	-0.081
		Wz+	0.012	-0.060	-0.081
		Wz-	0.012	-0.060	-0.081
	4	Dx+	0.018	-0.091	-0.122
		Dx-	0.018	-0.091	-0.122
		Dy+	0.018	-0.091	-0.122
		Dy-	0.018	-0.091	-0.122
		Wz+	0.018	-0.091	-0.122
		Wz-	0.018	-0.091	-0.122
	5	Dx+	0.004	-0.022	-0.030
		Dx-	-0.001	-0.532	0.161
		Dy+	0.000	0.000	0.000
		Dy-	0.002	-0.554	0.131
		Wz+	-0.001	-0.532	0.161
		Wz-	0.004	-0.022	-0.030
8	1	Dx+	0.000	-1.009	-0.000
		Dx-	0.000	-1.009	-0.000
		Dy+	0.000	-1.009	-0.000
		Dy-	0.000	-1.009	-0.000
		Wz+	0.000	-1.009	-0.000
		Wz-	0.000	-1.009	-0.000

Nudo	Hip		Dx	Dy	Wz
	2	Dx+	0.000	-0.394	-0.000
		Dx-	0.000	-0.394	-0.000
		Dy+	0.000	-0.394	-0.000
		Dy-	0.000	-0.394	-0.000
		Wz+	0.000	-0.394	-0.000
		Wz-	0.000	-0.394	-0.000
	3	Dx+	-0.000	-0.145	-0.000
		Dx-	-0.000	-0.145	-0.000
		Dy+	-0.000	-0.145	-0.000
		Dy-	-0.000	-0.145	-0.000
		Wz+	-0.000	-0.145	-0.000
		Wz-	-0.000	-0.145	-0.000
	4	Dx+	-0.000	-0.220	-0.000
		Dx-	-0.000	-0.220	-0.000
		Dy+	-0.000	-0.220	-0.000
		Dy-	-0.000	-0.220	-0.000
		Wz+	-0.000	-0.220	-0.000
		Wz-	-0.000	-0.220	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.000	0.000
		Dy-	0.000	-0.404	-0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
9	1	Dx+	0.000	-1.212	-0.178
		Dx-	0.000	-1.212	-0.178
		Dy+	0.000	-1.212	-0.178
		Dy-	0.000	-1.212	-0.178
		Wz+	0.000	-1.212	-0.178
		Wz-	0.000	-1.212	-0.178
	2	Dx+	0.002	-0.598	-0.181
		Dx-	0.002	-0.598	-0.181
		Dy+	0.002	-0.598	-0.181
		Dy-	0.002	-0.598	-0.181
		Wz+	0.002	-0.598	-0.181
		Wz-	0.002	-0.598	-0.181
	3	Dx+	-0.012	-0.060	0.081
		Dx-	-0.012	-0.060	0.081
		Dy+	-0.012	-0.060	0.081
		Dy-	-0.012	-0.060	0.081
		Wz+	-0.012	-0.060	0.081
		Wz-	-0.012	-0.060	0.081
	4	Dx+	-0.018	-0.091	0.122
		Dx-	-0.018	-0.091	0.122

Nudo	Hip		Dx	Dy	Wz
		Dy+	-0.018	-0.091	0.122
		Dy-	-0.018	-0.091	0.122
		Wz+	-0.018	-0.091	0.122
		Wz-	-0.018	-0.091	0.122
	5	Dx+	0.001	-0.532	-0.161
		Dx-	-0.004	-0.022	0.030
		Dy+	0.000	0.000	0.000
		Dy-	-0.002	-0.554	-0.131
		Wz+	-0.004	-0.022	0.030
		Wz-	0.001	-0.532	-0.161
10	1	Dx+	0.000	-1.390	-0.229
		Dx-	0.000	-1.390	-0.229
		Dy+	0.000	-1.390	-0.229
		Dy-	0.000	-1.390	-0.229
		Wz+	0.000	-1.390	-0.229
		Wz-	0.000	-1.390	-0.229
	2	Dx+	0.002	-0.780	-0.235
		Dx-	0.002	-0.780	-0.235
		Dy+	0.002	-0.780	-0.235
		Dy-	0.002	-0.780	-0.235
		Wz+	0.002	-0.780	-0.235
		Wz-	0.002	-0.780	-0.235
	3	Dx+	-0.017	0.026	0.118
		Dx-	-0.017	0.026	0.118
		Dy+	-0.017	0.026	0.118
		Dy-	-0.017	0.026	0.118
		Wz+	-0.017	0.026	0.118
		Wz-	-0.017	0.026	0.118
	4	Dx+	-0.025	0.039	0.178
		Dx-	-0.025	0.039	0.178
		Dy+	-0.025	0.039	0.178
		Dy-	-0.025	0.039	0.178
		Wz+	-0.025	0.039	0.178
		Wz-	-0.025	0.039	0.178
	5	Dx+	0.002	-0.693	-0.209
		Dx-	-0.005	0.010	0.044
		Dy+	-0.005	0.010	0.044
		Dy-	0.002	-0.693	-0.209
		Wz+	-0.005	0.010	0.044
		Wz-	0.002	-0.693	-0.209
11	1	Dx+	0.000	-1.709	-0.243
		Dx-	0.000	-1.709	-0.243
		Dy+	0.000	-1.709	-0.243
		Dy-	0.000	-1.709	-0.243

Nudo	Hip		Dx	Dy	Wz
		Wz+	0.000	-1.709	-0.243
		Wz-	0.000	-1.709	-0.243
	2	Dx+	0.003	-1.115	-0.264
		Dx-	0.003	-1.115	-0.264
		Dy+	0.003	-1.115	-0.264
		Dy-	0.003	-1.115	-0.264
		Wz+	0.003	-1.115	-0.264
		Wz-	0.003	-1.115	-0.264
	3	Dx+	-0.024	0.220	0.180
		Dx-	-0.024	0.220	0.180
		Dy+	-0.024	0.220	0.180
		Dy-	-0.024	0.220	0.180
		Wz+	-0.024	0.220	0.180
		Wz-	-0.024	0.220	0.180
	4	Dx+	-0.036	0.333	0.273
		Dx-	-0.036	0.333	0.273
		Dy+	-0.036	0.333	0.273
		Dy-	-0.036	0.333	0.273
		Wz+	-0.036	0.333	0.273
		Wz-	-0.036	0.333	0.273
	5	Dx+	0.003	-0.991	-0.235
		Dx-	-0.008	0.082	0.067
		Dy+	-0.008	0.082	0.067
		Dy-	0.003	-0.991	-0.235
		Wz+	-0.008	0.082	0.067
		Wz-	0.003	-0.991	-0.235
12	1	Dx+	0.237	-1.719	-0.165
		Dx-	0.237	-1.719	-0.165
		Dy+	0.237	-1.719	-0.165
		Dy-	0.237	-1.719	-0.165
		Wz+	0.237	-1.719	-0.165
		Wz-	0.237	-1.719	-0.165
	2	Dx+	0.291	-1.124	-0.225
		Dx-	0.291	-1.124	-0.225
		Dy+	0.291	-1.124	-0.225
		Dy-	0.291	-1.124	-0.225
		Wz+	0.291	-1.124	-0.225
		Wz-	0.291	-1.124	-0.225
	3	Dx+	-0.288	0.220	0.241
		Dx-	-0.288	0.220	0.241
		Dy+	-0.288	0.220	0.241
		Dy-	-0.288	0.220	0.241
		Wz+	-0.288	0.220	0.241
		Wz-	-0.288	0.220	0.241

Nudo	Hip		Dx	Dy	Wz
	4	Dx+	-0.436	0.333	0.365
		Dx-	-0.436	0.333	0.365
		Dy+	-0.436	0.333	0.365
		Dy-	-0.436	0.333	0.365
		Wz+	-0.436	0.333	0.365
		Wz-	-0.436	0.333	0.365
	5	Dx+	0.258	-0.999	-0.200
		Dx-	-0.107	0.082	0.093
		Dy+	-0.107	0.082	0.093
		Dy-	0.258	-0.999	-0.200
		Wz+	-0.107	0.082	0.093
		Wz-	0.258	-0.999	-0.200
13	1	Dx+	0.427	-1.736	0.001
		Dx-	0.427	-1.736	0.001
		Dy+	0.427	-1.736	0.001
		Dy-	0.427	-1.736	0.001
		Wz+	0.427	-1.736	0.001
		Wz-	0.427	-1.736	0.001
	2	Dx+	0.623	-1.142	-0.041
		Dx-	0.623	-1.142	-0.041
		Dy+	0.623	-1.142	-0.041
		Dy-	0.623	-1.142	-0.041
		Wz+	0.623	-1.142	-0.041
		Wz-	0.623	-1.142	-0.041
	3	Dx+	-0.604	0.220	-0.009
		Dx-	-0.604	0.220	-0.009
		Dy+	-0.604	0.220	-0.009
		Dy-	-0.604	0.220	-0.009
		Wz+	-0.604	0.220	-0.009
		Wz-	-0.604	0.220	-0.009
	4	Dx+	-0.915	0.333	-0.014
		Dx-	-0.915	0.333	-0.014
		Dy+	-0.915	0.333	-0.014
		Dy-	-0.915	0.333	-0.014
		Wz+	-0.915	0.333	-0.014
		Wz-	-0.915	0.333	-0.014
	5	Dx+	0.554	-1.015	-0.037
		Dx-	-0.239	0.082	0.003
		Dy+	-0.239	0.082	0.003
		Dy-	0.554	-1.015	-0.037
		Wz+	-0.239	0.082	0.003
		Wz-	0.554	-1.015	-0.037
14	1	Dx+	0.223	-1.749	0.180
		Dx-	0.223	-1.749	0.180

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.223	-1.749	0.180
		Dy-	0.223	-1.749	0.180
		Wz+	0.223	-1.749	0.180
		Wz-	0.223	-1.749	0.180
	2	Dx+	0.373	-1.160	0.283
		Dx-	0.373	-1.160	0.283
		Dy+	0.373	-1.160	0.283
		Dy-	0.373	-1.160	0.283
		Wz+	0.373	-1.160	0.283
		Wz-	0.373	-1.160	0.283
	3	Dx+	-0.263	0.220	-0.245
		Dx-	-0.263	0.220	-0.245
		Dy+	-0.263	0.220	-0.245
		Dy-	-0.263	0.220	-0.245
		Wz+	-0.263	0.220	-0.245
		Wz-	-0.263	0.220	-0.245
	4	Dx+	-0.398	0.333	-0.372
		Dx-	-0.398	0.333	-0.372
		Dy+	-0.398	0.333	-0.372
		Dy-	-0.398	0.333	-0.372
		Wz+	-0.398	0.333	-0.372
		Wz-	-0.398	0.333	-0.372
	5	Dx+	0.332	-1.031	0.251
		Dx-	-0.110	0.082	-0.100
		Dy+	-0.110	0.082	-0.100
		Dy-	0.332	-1.031	0.251
		Wz+	0.332	-1.031	0.251
		Wz-	-0.110	0.082	-0.100
15	1	Dx+	0.062	-1.753	0.243
		Dx-	0.062	-1.753	0.243
		Dy+	0.062	-1.753	0.243
		Dy-	0.062	-1.753	0.243
		Wz+	0.062	-1.753	0.243
		Wz-	0.062	-1.753	0.243
	2	Dx+	0.106	-1.166	0.422
		Dx-	0.106	-1.166	0.422
		Dy+	0.106	-1.166	0.422
		Dy-	0.106	-1.166	0.422
		Wz+	0.106	-1.166	0.422
		Wz-	0.106	-1.166	0.422
	3	Dx+	-0.074	0.220	-0.241
		Dx-	-0.074	0.220	-0.241
		Dy+	-0.074	0.220	-0.241
		Dy-	-0.074	0.220	-0.241

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.074	0.220	-0.241
		Wz-	-0.074	0.220	-0.241
	4	Dx+	-0.112	0.333	-0.366
		Dx-	-0.112	0.333	-0.366
		Dy+	-0.112	0.333	-0.366
		Dy-	-0.112	0.333	-0.366
		Wz+	-0.112	0.333	-0.366
		Wz-	-0.112	0.333	-0.366
	5	Dx+	0.094	-1.037	0.375
		Dx-	-0.032	0.082	-0.101
		Dy+	-0.032	0.082	-0.101
		Dy-	0.094	-1.037	0.375
		Wz+	0.094	-1.037	0.375
		Wz-	-0.032	0.082	-0.101
16	1	Dx+	-0.021	-2.007	-0.256
		Dx-	-0.021	-2.007	-0.256
		Dy+	-0.021	-2.007	-0.256
		Dy-	-0.021	-2.007	-0.256
		Wz+	-0.021	-2.007	-0.256
		Wz-	-0.021	-2.007	-0.256
	2	Dx+	-0.035	-1.614	-0.455
		Dx-	-0.035	-1.614	-0.455
		Dy+	-0.035	-1.614	-0.455
		Dy-	-0.035	-1.614	-0.455
		Wz+	-0.035	-1.614	-0.455
		Wz-	-0.035	-1.614	-0.455
	3	Dx+	0.033	0.455	0.225
		Dx-	0.033	0.455	0.225
		Dy+	0.033	0.455	0.225
		Dy-	0.033	0.455	0.225
		Wz+	0.033	0.455	0.225
		Wz-	0.033	0.455	0.225
	4	Dx+	0.049	0.690	0.341
		Dx-	0.049	0.690	0.341
		Dy+	0.049	0.690	0.341
		Dy-	0.049	0.690	0.341
		Wz+	0.049	0.690	0.341
		Wz-	0.049	0.690	0.341
	5	Dx+	0.015	0.180	0.094
		Dx-	-0.031	-1.434	-0.404
		Dy+	0.015	0.180	0.094
		Dy-	-0.031	-1.434	-0.404
		Wz+	0.015	0.180	0.094
		Wz-	-0.031	-1.434	-0.404

Nudo	Hip		Dx	Dy	Wz
17	1	Dx+	0.000	-2.093	-0.252
		Dx-	0.000	-2.093	-0.252
		Dy+	0.000	-2.093	-0.252
		Dy-	0.000	-2.093	-0.252
		Wz+	0.000	-2.093	-0.252
		Wz-	0.000	-2.093	-0.252
	2	Dx+	0.003	-1.769	-0.456
		Dx-	0.003	-1.769	-0.456
		Dy+	0.003	-1.769	-0.456
		Dy-	0.003	-1.769	-0.456
		Wz+	0.003	-1.769	-0.456
		Wz-	0.003	-1.769	-0.456
	3	Dx+	0.013	0.529	0.209
		Dx-	0.013	0.529	0.209
		Dy+	0.013	0.529	0.209
		Dy-	0.013	0.529	0.209
		Wz+	0.013	0.529	0.209
		Wz-	0.013	0.529	0.209
	4	Dx+	0.020	0.801	0.316
		Dx-	0.020	0.801	0.316
		Dy+	0.020	0.801	0.316
		Dy-	0.020	0.801	0.316
		Wz+	0.020	0.801	0.316
		Wz-	0.020	0.801	0.316
	5	Dx+	0.009	-1.361	-0.317
		Dx-	0.000	0.000	0.000
		Dy+	0.006	0.211	0.088
		Dy-	0.003	-1.572	-0.405
		Wz+	0.006	0.211	0.088
		Wz-	0.003	-1.572	-0.405
18	1	Dx+	0.000	-2.541	-0.000
		Dx-	0.000	-2.541	-0.000
		Dy+	0.000	-2.541	-0.000
		Dy-	0.000	-2.541	-0.000
		Wz+	0.000	-2.541	-0.000
		Wz-	0.000	-2.541	-0.000
	2	Dx+	0.000	-2.601	-0.000
		Dx-	0.000	-2.601	-0.000
		Dy+	0.000	-2.601	-0.000
		Dy-	0.000	-2.601	-0.000
		Wz+	0.000	-2.601	-0.000
		Wz-	0.000	-2.601	-0.000
	3	Dx+	0.000	0.842	-0.000
		Dx-	0.000	0.842	-0.000

Nudo	Hip		Dx	Dy	Wz
		Dy+	0.000	0.842	-0.000
		Dy-	0.000	0.842	-0.000
		Wz+	0.000	0.842	-0.000
		Wz-	0.000	0.842	-0.000
	4	Dx+	0.000	1.276	-0.000
		Dx-	0.000	1.276	-0.000
		Dy+	0.000	1.276	-0.000
		Dy-	0.000	1.276	-0.000
		Wz+	0.000	1.276	-0.000
		Wz-	0.000	1.276	-0.000
	5	Dx+	0.000	0.000	0.000
		Dx-	0.000	0.000	0.000
		Dy+	0.000	0.343	-0.000
		Dy-	0.000	-2.312	0.000
		Wz+	0.000	0.000	0.000
		Wz-	0.000	0.000	0.000
19	1	Dx+	-0.000	-2.093	0.252
		Dx-	-0.000	-2.093	0.252
		Dy+	-0.000	-2.093	0.252
		Dy-	-0.000	-2.093	0.252
		Wz+	-0.000	-2.093	0.252
		Wz-	-0.000	-2.093	0.252
	2	Dx+	-0.003	-1.769	0.456
		Dx-	-0.003	-1.769	0.456
		Dy+	-0.003	-1.769	0.456
		Dy-	-0.003	-1.769	0.456
		Wz+	-0.003	-1.769	0.456
		Wz-	-0.003	-1.769	0.456
	3	Dx+	-0.013	0.529	-0.209
		Dx-	-0.013	0.529	-0.209
		Dy+	-0.013	0.529	-0.209
		Dy-	-0.013	0.529	-0.209
		Wz+	-0.013	0.529	-0.209
		Wz-	-0.013	0.529	-0.209
	4	Dx+	-0.020	0.801	-0.316
		Dx-	-0.020	0.801	-0.316
		Dy+	-0.020	0.801	-0.316
		Dy-	-0.020	0.801	-0.316
		Wz+	-0.020	0.801	-0.316
		Wz-	-0.020	0.801	-0.316
	5	Dx+	0.000	0.000	0.000
		Dx-	-0.009	-1.361	0.317
		Dy+	-0.006	0.211	-0.088
		Dy-	-0.003	-1.572	0.405

Nudo	Hip		Dx	Dy	Wz
		Wz+	-0.003	-1.572	0.405
		Wz-	-0.006	0.211	-0.088
20	1	Dx+	0.021	-2.007	0.256
		Dx-	0.021	-2.007	0.256
		Dy+	0.021	-2.007	0.256
		Dy-	0.021	-2.007	0.256
		Wz+	0.021	-2.007	0.256
		Wz-	0.021	-2.007	0.256
	2	Dx+	0.035	-1.614	0.455
		Dx-	0.035	-1.614	0.455
		Dy+	0.035	-1.614	0.455
		Dy-	0.035	-1.614	0.455
		Wz+	0.035	-1.614	0.455
		Wz-	0.035	-1.614	0.455
	3	Dx+	-0.033	0.455	-0.225
		Dx-	-0.033	0.455	-0.225
		Dy+	-0.033	0.455	-0.225
		Dy-	-0.033	0.455	-0.225
		Wz+	-0.033	0.455	-0.225
		Wz-	-0.033	0.455	-0.225
	4	Dx+	-0.049	0.690	-0.341
		Dx-	-0.049	0.690	-0.341
		Dy+	-0.049	0.690	-0.341
		Dy-	-0.049	0.690	-0.341
		Wz+	-0.049	0.690	-0.341
		Wz-	-0.049	0.690	-0.341
	5	Dx+	0.031	-1.434	0.404
		Dx-	-0.015	0.180	-0.094
		Dy+	-0.015	0.180	-0.094
		Dy-	0.031	-1.434	0.404
		Wz+	0.031	-1.434	0.404
		Wz-	-0.015	0.180	-0.094

ESFUERZOS PESIMOS

Barra	Extremo	Comb		N	Q	M
1	Dorsal	4	N+	-22.61	10.46	24.71
		1	N-	-63.70	21.87	67.47
		5	Q+	-63.70	36.34	72.79
		4	Q-	-22.61	10.46	24.71
		5	M+	-63.70	36.34	72.79
		4	M-	-22.61	10.46	24.71
1	Frontal	4	N+	-23.80	9.20	17.24
		1	N-	-65.83	19.63	51.70
		5	Q+	-65.83	31.12	47.16
		4	Q-	-23.80	9.20	17.24
		1	M+	-65.83	19.63	51.70
		8	M-	-23.80	17.92	13.66
2	Dorsal	4	N+	-23.80	9.20	17.24
		1	N-	-65.83	19.63	51.70
		5	Q+	-65.83	31.12	47.16
		4	Q-	-23.80	9.20	17.24
		1	M+	-65.83	19.63	51.70
		8	M-	-23.80	17.92	13.66
2	Frontal	4	N+	-27.41	3.05	3.21
		1	N-	-72.24	8.70	19.26
		5	Q+	-72.24	9.40	9.03
		4	Q-	-27.41	2.72	-4.67
		3	M+	-60.67	6.50	21.29
		6	M-	-38.98	5.62	-16.93
3	Dorsal	4	N+	-27.41	3.05	3.21
		1	N-	-72.24	8.70	19.26
		5	Q+	-72.24	9.40	9.03
		4	Q-	-27.41	2.72	-4.67
		3	M+	-60.67	6.50	21.29
		6	M-	-38.98	5.62	-16.93
3	Frontal	4	N+	-31.02	-6.37	7.01
		1	N-	-78.66	-8.05	18.51
		3	Q+	-67.08	-2.92	17.20
		6	Q-	-42.59	-25.25	5.54
		1	M+	-78.66	-8.05	18.51
		8	M-	-31.02	-16.66	5.08
4	Dorsal	4	N+	-31.02	-6.37	7.01
		1	N-	-78.66	-8.05	18.51
		3	Q+	-67.08	-2.92	17.20
		6	Q-	-42.59	-25.25	5.54

Barra	Extremo	Comb		N	Q	M
		1	M+	-78.66	-8.05	18.51
		8	M-	-31.02	-16.66	5.08
4	Frontal	4	N+	-32.84	-12.39	17.89
		1	N-	-81.90	-18.75	34.05
		3	Q+	-70.33	-8.94	24.08
		6	Q-	-44.42	-44.25	45.84
		5	M+	-81.90	-40.80	52.03
		4	M-	-32.84	-12.39	17.89
5	Dorsal	3	N+	-8.94	44.57	24.08
		6	N-	-44.25	31.06	45.84
		5	Q+	-40.80	54.57	52.03
		4	Q-	-12.39	21.07	17.89
		5	M+	-40.80	54.57	52.03
		4	M-	-12.39	21.07	17.89
5	Frontal	3	N+	-8.94	49.81	-37.74
		6	N-	-44.25	34.01	3.23
		5	Q+	-40.80	59.81	-22.88
		4	Q-	-12.39	24.02	-11.64
		6	M+	-44.25	34.01	3.23
		1	M-	-18.75	58.24	-38.81
6	Dorsal	3	N+	-8.94	28.00	-37.74
		6	N-	-44.25	20.84	3.23
		5	Q+	-40.80	35.32	-22.88
		4	Q-	-12.39	13.52	-11.64
		6	M+	-44.25	20.84	3.23
		1	M-	-18.75	33.56	-38.81
6	Frontal	3	N+	-8.94	31.46	-63.46
		6	N-	-44.25	22.79	-15.64
		5	Q+	-40.80	38.76	-54.93
		4	Q-	-12.39	15.47	-24.18
		8	M+	-28.56	16.79	-13.44
		1	M-	-18.75	37.02	-69.33
7	Dorsal	3	N+	-8.94	5.76	-63.46
		6	N-	-44.25	5.85	-15.64
		5	Q+	-40.80	8.93	-54.93
		4	Q-	-12.39	2.68	-24.18
		8	M+	-28.56	3.51	-13.44
		1	M-	-18.75	7.81	-69.33
7	Frontal	3	N+	-8.94	14.46	-85.45
		6	N-	-44.25	10.74	-33.69
		5	Q+	-40.80	17.63	-83.81
		4	Q-	-12.39	7.57	-35.33
		8	M+	-28.56	8.41	-26.40
		1	M-	-18.75	16.51	-95.77

Barra	Extremo	Comb		N	Q	M
8	Dorsal	3	N+	-8.94	-14.46	-85.45
		6	N-	-44.25	-10.74	-33.69
		4	Q+	-12.39	-7.57	-35.33
		5	Q-	-40.80	-17.63	-83.81
		8	M+	-28.56	-8.41	-26.40
		1	M-	-18.75	-16.51	-95.77
8	Frontal	3	N+	-8.94	-5.76	-63.46
		6	N-	-44.25	-5.85	-15.64
		4	Q+	-12.39	-2.68	-24.18
		5	Q-	-40.80	-8.93	-54.93
		8	M+	-28.56	-3.51	-13.44
		1	M-	-18.75	-7.81	-69.33
9	Dorsal	3	N+	-8.94	-31.46	-63.46
		6	N-	-44.25	-22.79	-15.64
		4	Q+	-12.39	-15.47	-24.18
		5	Q-	-40.80	-38.78	-54.93
		8	M+	-28.56	-16.79	-13.44
		1	M-	-18.75	-37.02	-69.33
9	Frontal	3	N+	-8.94	-28.00	-37.74
		6	N-	-44.25	-20.84	3.23
		4	Q+	-12.39	-13.52	-11.64
		5	Q-	-40.80	-35.32	-22.88
		6	M+	-44.25	-20.84	3.23
		1	M-	-18.75	-33.56	-38.81
10	Dorsal	3	N+	-8.94	-49.81	-37.74
		6	N-	-44.25	-34.01	3.23
		4	Q+	-12.39	-24.02	-11.64
		5	Q-	-40.80	-59.81	-22.88
		6	M+	-44.25	-34.01	3.23
		1	M-	-18.75	-58.24	-38.81
10	Frontal	3	N+	-8.94	-44.57	24.08
		6	N-	-44.25	-31.06	45.84
		4	Q+	-12.39	-21.07	17.89
		5	Q-	-40.80	-54.57	52.03
		5	M+	-40.80	-54.57	52.03
		4	M-	-12.39	-21.07	17.89
11	Dorsal	4	N+	-32.84	12.39	17.89
		1	N-	-81.90	18.75	34.05
		6	Q+	-44.42	44.25	45.84
		3	Q-	-70.33	8.94	24.08
		5	M+	-81.90	40.80	52.03
		4	M-	-32.84	12.39	17.89
11	Frontal	4	N+	-31.02	6.37	7.01
		1	N-	-78.66	8.05	18.51

Barra	Extremo	Comb		N	Q	M
		6	Q+	-42.59	25.25	5.54
		3	Q-	-67.08	2.92	17.20
		1	M+	-78.66	8.05	18.51
		8	M-	-31.02	16.66	5.08
12	Dorsal	4	N+	-31.02	6.37	7.01
		1	N-	-78.66	8.05	18.51
		6	Q+	-42.59	25.25	5.54
		3	Q-	-67.08	2.92	17.20
		1	M+	-78.66	8.05	18.51
		8	M-	-31.02	16.66	5.08
12	Frontal	4	N+	-27.41	-3.05	3.21
		1	N-	-72.24	-8.70	19.26
		4	Q+	-27.41	-2.72	-4.67
		5	Q-	-72.24	-9.40	9.03
		3	M+	-60.67	-6.50	21.29
		6	M-	-38.98	-5.62	-16.93
13	Dorsal	4	N+	-27.41	-3.05	3.21
		1	N-	-72.24	-8.70	19.26
		4	Q+	-27.41	-2.72	-4.67
		5	Q-	-72.24	-9.40	9.03
		3	M+	-60.67	-6.50	21.29
		6	M-	-38.98	-5.62	-16.93
13	Frontal	4	N+	-23.80	-9.20	17.24
		1	N-	-65.83	-19.63	51.70
		4	Q+	-23.80	-9.20	17.24
		5	Q-	-65.83	-31.12	47.16
		1	M+	-65.83	-19.63	51.70
		8	M-	-23.80	-17.92	13.66
14	Dorsal	4	N+	-23.80	-9.20	17.24
		1	N-	-65.83	-19.63	51.70
		4	Q+	-23.80	-9.20	17.24
		5	Q-	-65.83	-31.12	47.16
		1	M+	-65.83	-19.63	51.70
		8	M-	-23.80	-17.92	13.66
14	Frontal	4	N+	-22.61	-10.46	24.71
		1	N-	-63.70	-21.87	67.47
		4	Q+	-22.61	-10.46	24.71
		5	Q-	-63.70	-36.34	72.79
		5	M+	-63.70	-36.34	72.79
		4	M-	-22.61	-10.46	24.71
15	Dorsal	4	N+	-13.97	-20.63	-24.71
		5	N-	-46.13	-57.01	-72.79
		8	Q+	-25.02	-18.82	-28.70
		1	Q-	-31.85	-59.35	-67.47

Barra	Extremo	Comb		N	Q	M
		4	M+	-13.97	-20.63	-24.71
		5	M-	-46.13	-57.01	-72.79
15	Frontal	4	N+	-13.02	-14.84	-6.56
		5	N-	-43.57	-41.29	-22.49
		8	Q+	-24.07	-13.03	-12.40
		1	Q-	-29.28	-43.63	-14.78
		3	M+	-13.86	-18.91	-6.50
		6	M-	-42.73	-37.22	-22.56
16	Dorsal	4	N+	-14.21	-13.71	-6.56
		5	N-	-46.84	-37.54	-22.49
		8	Q+	-25.07	-10.99	-12.40
		1	Q-	-32.80	-41.05	-14.78
		3	M+	-15.38	-17.70	-6.50
		6	M-	-45.67	-33.54	-22.56
16	Frontal	4	N+	-13.77	-11.95	-2.07
		5	N-	-45.60	-32.58	-10.20
		8	Q+	-24.63	-9.23	-8.86
		1	Q-	-31.56	-36.09	-1.26
		3	M+	-21.91	-30.33	1.73
		6	M-	-37.46	-14.21	-14.00
17	Dorsal	4	N+	-10.46	-14.93	-2.07
		5	N-	-36.34	-42.67	-10.20
		4	Q+	-10.46	-14.93	-2.07
		1	Q-	-21.87	-42.67	-1.26
		3	M+	-13.90	-34.73	1.73
		6	M-	-32.89	-22.87	-14.00
17	Frontal	4	N+	-10.46	0.00	20.33
		5	N-	-36.34	0.00	53.81
		5	Q+	-26.07	0.00	31.21
		4	Q-	-10.46	0.00	20.33
		1	M+	-21.87	0.00	62.75
		8	M-	-21.66	0.00	13.54
18	Dorsal	4	N+	-10.46	0.00	20.33
		5	N-	-36.34	0.00	53.81
		5	Q+	-26.07	0.00	31.21
		4	Q-	-10.46	0.00	20.33
		1	M+	-21.87	0.00	62.75
		8	M-	-21.66	0.00	13.54
18	Frontal	4	N+	-10.46	14.93	-2.07
		5	N-	-36.34	42.67	-10.20
		1	Q+	-21.87	42.67	-1.26
		4	Q-	-10.46	14.93	-2.07
		3	M+	-13.90	34.73	1.73
		6	M-	-32.89	22.87	-14.00

Barra	Extremo	Comb		N	Q	M
19	Dorsal	4	N+	-13.77	11.95	-2.07
		5	N-	-45.60	32.58	-10.20
		1	Q+	-31.56	36.09	-1.26
		8	Q-	-24.63	9.23	-8.86
		3	M+	-21.91	30.33	1.73
		6	M-	-37.46	14.21	-14.00
19	Frontal	4	N+	-14.21	13.71	-6.56
		5	N-	-46.84	37.54	-22.49
		1	Q+	-32.80	41.05	-14.78
		8	Q-	-25.07	10.99	-12.40
		3	M+	-15.38	17.70	-6.50
		6	M-	-45.67	33.54	-22.56
20	Dorsal	4	N+	-13.02	14.84	-6.56
		5	N-	-43.57	41.29	-22.49
		1	Q+	-29.28	43.63	-14.78
		8	Q-	-24.07	13.03	-12.40
		3	M+	-13.86	18.91	-6.50
		6	M-	-42.73	37.22	-22.56
20	Frontal	4	N+	-13.97	20.63	-24.71
		5	N-	-46.13	57.01	-72.79
		1	Q+	-31.85	59.35	-67.47
		8	Q-	-25.02	18.82	-28.70
		4	M+	-13.97	20.63	-24.71
		5	M-	-46.13	57.01	-72.79

ARMADURA DEL DINTEL

NUDO	Nd	Md	As c.i.	As c.s.
15	-13.97	-24.71	0.00	3.22
	-46.13	-72.79	0.00	9.21
	-13.97	-24.71	0.00	3.22
	-46.13	-72.79	0.00	9.21
16	-14.21	-6.56	0.00	0.12
	-46.84	-22.49	0.00	0.78
	-15.38	-6.50	0.00	0.00
	-45.67	-22.56	0.00	0.93
17	-10.46	-2.07	0.00	0.00
	-36.34	-10.20	0.00	0.00
	-13.90	1.73	0.00	0.00
	-32.89	-14.00	0.00	0.99
18	-10.46	20.33	5.83	0.00
	-36.34	53.81	15.14	0.00
	-21.87	62.75	20.09	0.00
	-21.66	13.54	2.14	0.00

ARMADURA DE SOLERA

NUDO	Nd	Md	As c.i.	As c.s.
5	-8.94	24.08	4.67	0.00
	-44.25	45.84	5.92	0.00
	-40.80	52.03	7.83	0.00
	-12.39	17.89	2.79	0.00
6	-8.94	-37.74	0.00	7.95
	-44.25	3.23	0.00	0.00
	-44.25	3.23	0.00	0.00
	-18.75	-38.81	0.00	7.09
7	-8.94	-63.46	0.00	14.22
	-44.25	-15.64	0.00	0.00
	-28.56	-13.44	0.00	0.00
	-18.75	-69.33	0.00	14.57
8	-8.94	-85.45	0.00	19.67
	-44.25	-33.69	0.00	2.95
	-28.56	-26.40	0.00	2.97
	-18.75	-95.77	0.00	21.19

ARMADURA DE HASTIAL

NUDO	Nd	Md	As c.i.	As c.e.
1	-22.61	24.71	0.00	6.02
	-63.70	67.47	0.00	17.74
	-63.70	72.79	0.00	19.88
	-22.61	24.71	0.00	6.02
2	-23.80	17.24	0.00	3.21
	-65.83	51.70	0.00	11.33
	-65.83	51.70	0.00	11.33
	-23.80	13.66	0.00	1.94
3	-27.41	3.21	0.00	0.00
	-72.24	19.26	0.00	0.00
	-60.67	21.29	0.00	0.47
	-38.98	-16.93	1.35	0.00
4	-31.02	7.01	0.00	0.00
	-78.66	18.51	0.00	0.00
	-78.66	18.51	0.00	0.00
	-31.02	5.08	0.00	0.00
5	-32.84	17.89	0.00	2.40
	-81.90	34.05	0.00	2.86
	-81.90	52.03	0.00	9.77
	-32.84	17.89	0.00	2.40

RESUMEN DE ARMADURAS

ARMADURA DEL DINTEL

NUDO	As c.i.	As c.s.
15	0.00	9.21
16	0.00	0.93
17	0.00	0.99
18	20.09	0.00

Cuantía mínima geométrica: 5.25 cm²/m

ARMADURA DE SOLERA

NUDO	As c.i.	As c.s.
5	7.83	0.00
6	0.00	7.95
7	0.00	14.57
8	0.00	21.19

Cuantía mínima geométrica: 7.50 cm²/m

ARMADURA DE HASTIAL

NUDO	As c.i.	As c.e.
1	0.00	19.88
2	0.00	11.33
3	1.35	0.47
4	0.00	0.00
5	0.00	9.77

Cuantía mínima geométrica vertical: 3.15 cm²/m
Cuantía mínima geométrica horizontal: 5.60 cm²/m

COMPROBACION A CORTANTE

DINTEL

NUDO	Vd max.	Vcu	As
16	41.05	53.58	0.00
17	42.60	42.60	0.00
18	0.00	42.60	0.00

SOLERA

Vcu= 61.97 T/m.

NUDO	Vd max.	As
6	47.57	0.00
7	23.86	0.00
8	5.03	0.00

HASTIAL

Vcu= 40.42 T/m.

NUDO	Vd max.	As
2	31.12	0.00
3	9.40	0.00
4	25.25	0.00

COMPROBACION DE TENSIONES SOBRE EL TERRENO

Tensión transmitida al terreno en nudo 5: 1.80 kp/cm²

Estructura: P.I. Nº 8 **Cálculo:** ALETAS. H=7.21 M.

DEFINICION GEOMETRICA

Altura total	7.21	m
Ancho superior	0.80	m
Ancho inferior	0.80	m
Longitud zarpa delantera	1.00	m
Longitud zarpa trasera	3.20	m
Canto zapata	1.00	m
Canto tacón cotra deslizamiento.....	0.00	m

ACCIONES ACTUANTES

Altura de tierras	0.00	m
Altura tierras en intradós	0.50	m
Sobrecarga en el trasdós	0.00	t/m²

DATOS TERRENO

Densidad	1.90	t/m³
Coeficiente empuje activo	0.41	
¿Considera empuje pasivo? (s/n)	n	
Angulo de rozamiento	30	°

OTROS DATOS

Recubrimiento	5	cm
fck	250	Kp/cm²
fyk	5100	Kp/cm²
Gamma C	1.5	
Gamma S	1.15	
Gamma F desf.....	1.6	
Gamma F fav.....	0.9	
Canto útil muro	75	cm
Canto útil zapata	95	cm
Densidad hormigón	2.5	t/m³

Muro:

A flex =	23.22	cm²/m.l.
A cort =	0.00	cm²/m.l.

Zapata (puntera):

A flex =	4.97	cm²/m.l.
Cumple cortante?	SI	

Zapata (talón):

A flex =	18.27	cm²/m.l.
Cumple cortante?	SI	

DESLIZA?	1.58	NO
VUELCA?	2.79	NO
SIGM_BAR	19.94	t/m²
SIGM_MAX	26.42	t/m²
SIGM_MIN	2.27	t/m²

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 14.42 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 48.66 mt
H = 20.25 t

RESUMEN:

HIP	N	M	H
P.P.	14.42	0.00	0.00
TIERRAS	0.00	48.66	20.25

Estructura: P.I. Nº 8 **Cálculo:** ALETAS. H=7.21 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	14.42	48.66	20.25

Tomando los coeficientes de seguridad:

Gamma DESF	1.6
Gamma FAV	0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	12.98	77.86	6.35	23.2
1.2.	23.07	77.86	3.72	22.2

Armadura a disponer:

A = 23.2 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 32.40 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 48.41 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 8 **Cálculo:** ALETAS. H=7.21 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 26.92 t
M = 15.86 mt
H = 0.00 t

Debido a las tierras:

N = 44.79 t
M = 34.45 mt
H = 26.25 t

RESUMEN:

HIP	N	M	H
P.P.	26.92	15.86	0.00
TIERRAS	44.79	34.45	26.25

SEGURIDAD AL DESLIZAMIENTO:

N = 71.71 t
H = 26.25 t
mu = 0.58
Epasivo= 0.00 t

GAMMA = 1.58 O.K.

SEGURIDAD AL VUELCO:

Mvolc = 71.85 mt
Mest = 200.48 mt

GAMMA = 2.79 O.K.

Estructura: P.I. Nº 8 **Cálculo:** ALETAS. H=7.21 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	71.71	50.32	26.25

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	26.42	2.27

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	19.94

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -75.54 mt

Anec = 18.27 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 21.28 mt

Anec = 4.97 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 30.60 t
Vlim = 61.32 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 18.23 t
Vlim = 122.64 t

Estructura: P.I. Nº 8 **Cálculo:** ALETAS. H=4.105 M.

DEFINICION GEOMETRICA

Altura total	4.11	m
Ancho superior	0.40	m
Ancho inferior	0.40	m
Longitud zarpa delantera	0.70	m
Longitud zarpa trasera	2.00	m
Canto zapata	0.50	m
Canto tacón cotra deslizamiento.....	0.00	m

ACCIONES ACTUANTES

Altura de tierras	0.00	m
Altura tierras en intradós	0.50	m
Sobrecarga en el trasdós	0.00	t/m²

DATOS TERRENO

Densidad	1.90	t/m³
Coeficiente empuje activo	0.41	
¿Considera empuje pasivo? (s/n)	n	
Angulo de rozamiento	30	º

OTROS DATOS

Recubrimiento	5	cm
fck	250	Kp/cm²
fyk	5100	Kp/cm²
Gamma C	1 5	
Gamma S	1.15	
Gamma F desf.....	1.6	
Gamma F fav.....	0.9	
Canto útil muro	35	cm
Canto útil zapata	45	cm
Densidad hormigón	2.5	t/m³

Muro:

A flex =	**9.17**	cm²/m.l.
A cort =	**0.00**	cm²/m.l.

Zapata (puntera):

A flex =	**2.19**	cm²/m.l.
Cumple cortante?	**SI**	

Zapata (talón):

A flex =	**6.65**	cm²/m.l.
Cumple cortante?	**SI**	

DESLIZA?	1.69	NO
VUELCA?	3.35	NO
SIGM_BAR	**9.82**	t/m²
SIGM_MAX	**12.59**	t/m²
SIGM_MIN	**3.05**	t/m²

CALCULO DE ESFUERZOS EN EL CENTRO DE GRAVEDAD DE LA BASE DEL MURO

Debido a peso propio muro:

N = 4.11 t
M = 0.00 mt
H = 0.00 t

Debido a las tierras:

N = 0.00 t
M = 8.98 mt
H = 6.56 t

RESUMEN:

HIP	N	M	H
P.P.	4.11	0.00	0.00
TIERRAS	0.00	8.98	6.56

Estructura: P.I. Nº 8 **Cálculo:** ALETAS. H=4.105 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	4.11	8.98	6.56

Tomando los coeficientes de seguridad:

Gamma DESF 1.6
Gamma FAV 0.9

HIP	N	M	et	cm²/m.l. A nec
1.1.	3.69	14.37	4.04	9.2
1.2.	6.57	14.37	2.34	8.8

Armadura a disponer:

A = 9.2 cm²/m.l.

COMPROBACION A CORTANTE

Vd = 10.50 t

Contribución del hormigón:

fcv = 6.45 Kp/cm²
Vcu = 22.59 t ===> NO NECESITA ARMADURA A CORTANTE

Armadura necesaria:

Anec= 0 cm²/m.l.

Estructura: P.I. Nº 8 **Cálculo:** ALETAS. H=4.105 M.

CALCULO DE LA CIMENTACION

Acciones en el centro de gravedad de la zapata:

Debido a peso propio muro y zapata:

N = 7.98 t
M = 2.67 mt
H = 0.00 t

Debido a las tierras:

N = 16.26 t
M = 4.97 mt
H = 8.26 t

RESUMEN:

HIP	N	M	H
P.P.	7.98	2.67	0.00
TIERRAS	16.26	4.97	8.26

SEGURIDAD AL DESLIZAMIENTO:

N = 24.24 t
H = 8.26 t
mu = 0.58
Epasivo= 0.00 t

GAMMA = 1.69 O.K.

SEGURIDAD AL VUELCO:

Mvolc = 12.68 mt
Mest = 42.46 mt

GAMMA = 3.35 O.K.

Estructura: P.I. Nº 8 **Cálculo:** ALETAS. H=4.105 M.

DEFINICION DE COMBINACIONES

C1 = P.P. + TIERRAS

Luego:

COMB	N	M	H
C1	24.24	7.64	8.26

TENSIONES DE PICO

COMB	SIGMA_1	SIGMA_2
C1	12.59	3.05

TENSIONES BARICENTRICAS

COMB	SIGMA_B
C1	9.82

ARMADURA A FLEXION DE ZARPA TRASERA

Md = -13.17 mt

Anec = 6.65 cm²/m.l.

ARMADURA A FLEXION DE ZARPA DELANTERA

Md = 4.45 mt

Anec = 2.19 cm²/m.l.

COMPROBACION A CORTANTE DE ZARPA TRASERA

Tipo: III

Vd = 8.96 t
Vlim = 29.05 t

Vd < Vlim ? O.K.

COMPROBACION A CORTANTE DE ZARPA DELANTERA

Tipo: I

Vd = 7.34 t
Vlim = 58.09 t

3. RESUMEN CONTROL CALIDAD

SAITEC SYNCONSULT S.A.

UNIÓN TEMPORAL DE EMPRESAS

CUADRO RESUMEN DE ENSAYOS DE HORMIGÓN

ELEMENTO P.I. 8

IDENTIFICACION DE LA MUESTRA			LOCALIZACION DE LA MUESTRA		HORMIGONES			RESISTENCIAS						M3 VERTIDO	FECHA FINAL LOTE	CEMENTO TIPO	RESISTENCIA ESTIMADA f. est.	OBSERVACIÓN
								7 días		28 días		90 días						
LOTE RE-07/	SERIE RE-02/	FECHA	PARTE	CODIGO TRAMIFIF.	TIPO	CONO ABRAMS	CONSIS-TENCIA	N°	RES. MEDIA	N°	RES. MEDIA	N°	RES. MEDIA					
125	182	06/08/99	Zap. Aleta 1	03030803	H-250	10	Blanda	2	285	3	375	1		100	03/09/99	II AI 42,5 R	274	
125	183	06/08/99	Zap. Aleta 1	03030803	H-250	2	Blanda	2	239	3	311	1		100	03/09/99	II AI 42,5 R	274	
143	206	13/08/99	Zap. Aleta 4	03030803	H-250	7	Blanda	2	206	3	282	1		81	09/09/99	II AI 42,5 R	246	
143	207	13/08/99	Zap. Aleta 4	03030803	H-250	9	Blanda	2	243	3	280	1		81	09/09/99	II AI 42,5 R	246	
156	236	19/08/99	Alzado 2,i	03030803	H-250	10	Fluida	2	192	3	245	1		100	16/09/99	II AI 42,5 R	216	
156	237	19/08/99	Alzado 2,i	03030803	H-250	7	Blanda	2	248	3	309	1		100	16/09/99	II AI 42,5 R	216	
176	261b	23/08/99	Alzado 1,d	03030803	H-250	10	Fluida	2	184	3	214	1		100	04/10/99	II AI 42,5 R	188	
258	390	06/09/99	Losa sup m,i	03030803	H-250	5	Blanda	2	303	3	367	1		100	04/10/99	II AI 42,5 R	268	
258	391	06/09/99	Losa sup m,i	03030803	H-250	10	Fluida	2	277	3	305	1		100	04/10/99	II AI 42,5 R	268	
270	400	08/09/99	losa sup m,D	03030803	H-250	8	Blanda	2	280	3	293	1		100	07/10/99	II AI 42,5 R	254	
285	453	15/09/99	Aletas 3 y 4	03030803	H-250	5	Blanda			3	256			100	13/10/99	II AI 42,5 R	225	
311	472	20/09/99	Aletas 1 y 2	03030803	H-250	5	Blanda			3	358			100	18/10/99	II AI 42,5 R	312	

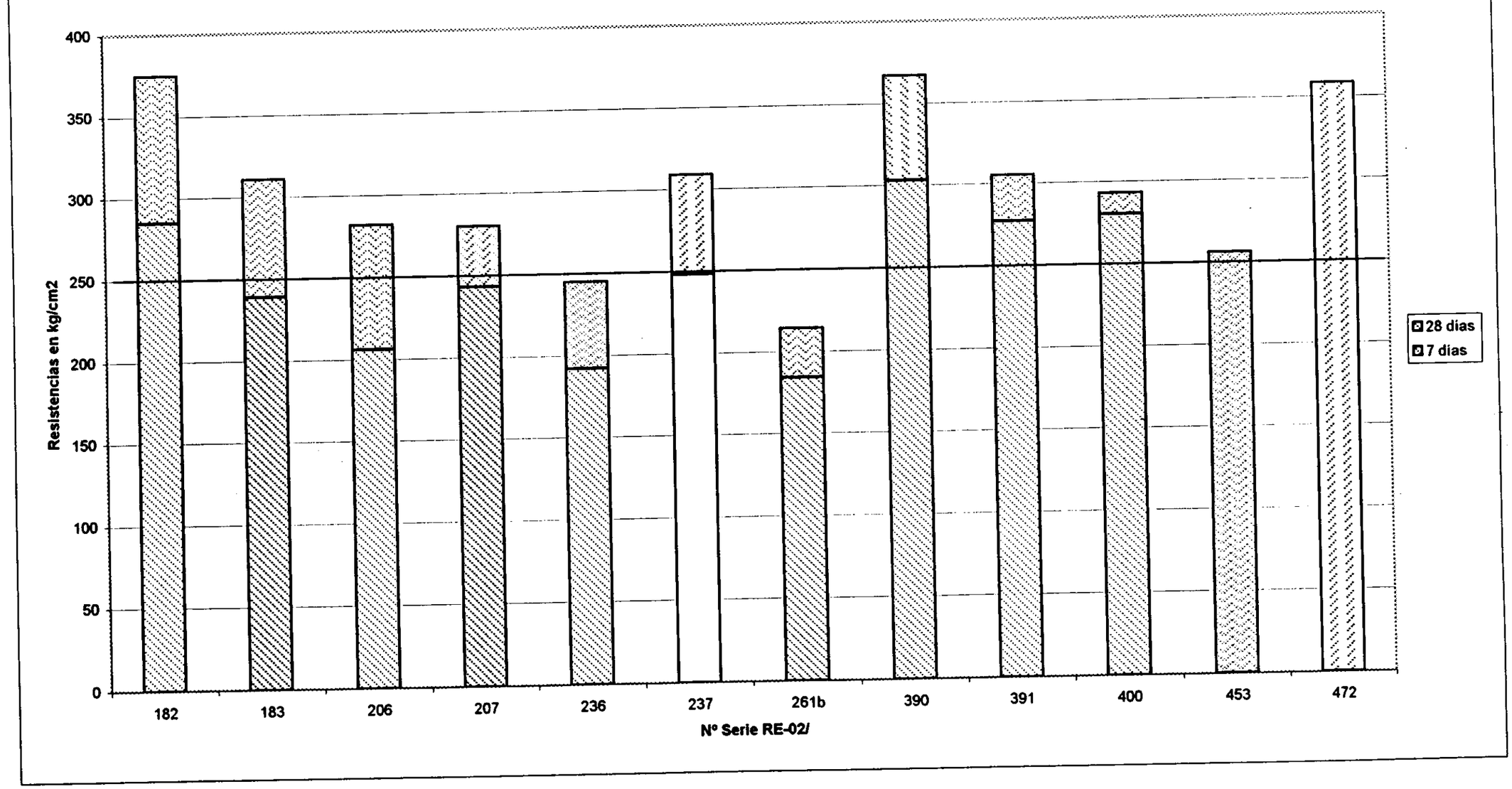
FECHA: FIRMA:

NOMBRE: Ana Mª Martín Herrrero

CARGO: Jefe de Laboratorio

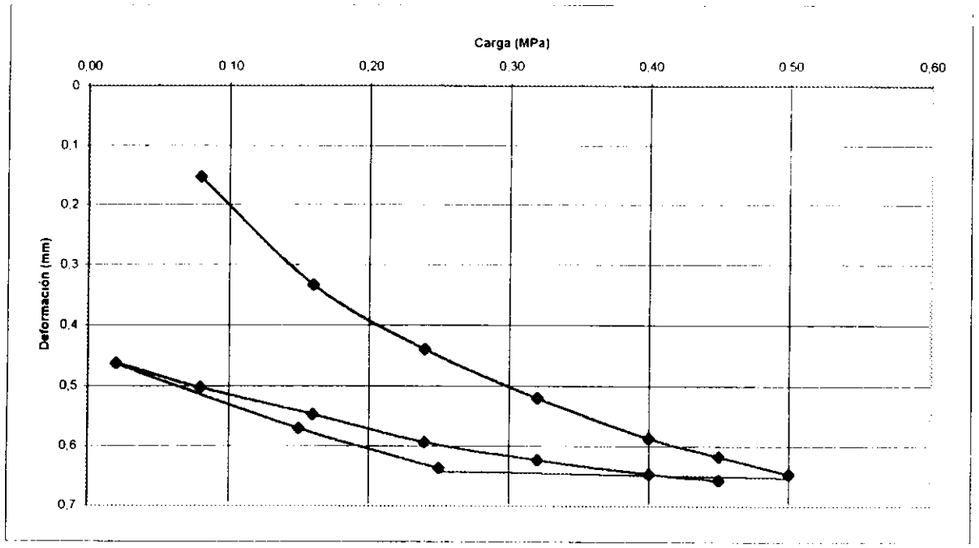
LOTE DE f. est. < 0,9 fck

Resistencia del hormigón
P.I. 8



SAITEC SYNCONSULT S.L. UNIÓN TEMPORAL DE EMPRESAS	**ENSAYO DE PLACA CON CARGA** (DIN 18 134) OBRA: **LINEA DE ALTA VELOCIDAD. TRAMO MADRID-ZARAGOZA** **SUB-TRAMO III**

LOCALIZACION	P.I. 8 Cuña de transición 1		
CÓDIGO DE TRAMIFICACIÓN:	03030802		**PK** 314+030
FECHA:	24/1/00	**REF. MUESTRA:**	RE-08/ 24



Módulos			Especifi.
	Mpa	Kg/cm2	kg/cm2
Ev1	173,5	1769,7	
Ev2	511,8	5220,7	1600
Ev2/Ev1	2,95		

OBSERVACIONES

Densidad seca: 2,004 kg/cm3
Humedad natural: 9,8 %

Fecha	Firma	Cargo
		JEFE DE LABORATORIO
		Nombre
		ANA MARTIN HERRERO

5. Proceso constructivo

5. Proceso Constructivo

El proceso constructivo seguido para la ejecución de cada una de las estructuras está recogido dentro de la documentación aportada en el estudio de cada de ellas.

6. Resumen del control de calidad

6. Resumen del control de calidad

El resumen del control de calidad para cada una de las estructuras está recogido dentro de la documentación aportada en el estudio de cada de ellas.

7. Accesos y elementos para mantenimiento

7. Accesos y elementos para mantenimiento

Los accesos y elementos para mantenimiento de cada una de las estructuras están recogidos dentro de la documentación aportada en el estudio de cada de ellas.

8. Recomendaciones para la conservación y mantenimiento

8. Recomendaciones para la conservación y mantenimiento

Las recomendaciones para la conservación y mantenimiento de cada una de las estructuras están recogidos dentro de la documentación aportada en el estudio de cada de ellas.

Movimientos previstos en las estructuras

En el momento de redactar este Proyecto Construido no se pudieron incorporar el contenido a que se refiere este epígrafe.