

**CONTRATO DE CONSULTORÍA Y ASISTENCIA  
PARA LA REALIZACIÓN DE PRUEBAS DE CARGA  
PARA LA RECEPCIÓN DE PUENTES DE LA  
LÍNEA DE ALTA VELOCIDAD  
MADRID-ZARAGOZA-BARCELONA-FRONTERA FRANCESA.  
TRAMO: PUENTE DE EBRO-LLEIDA.  
BASE DE MONTAGUT.**



**INFORME DE PRUEBA DE CARGA**

**SUBTRAMO VI  
Viaducto del Gallo  
29VI02**

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## **1.- INTRODUCCIÓN.**

### ***1.1.- INTRODUCCIÓN.***

A instancias del ente público Gestor de Infraestructuras Ferroviarias (GIF) se redacta el presente informe, que forma parte del conjunto de los trabajos relativos a la prestación de los servicios de Consultoría y Asistencia en la realización de las preceptivas Pruebas de Carga para la recepción de puentes en el tramo Madrid - Lleida, de la línea de Alta Velocidad Madrid - Zaragoza - Barcelona - Frontera Francesa, previas a la recepción y puesta en servicio de los mismos, cuyos términos se incluyen en el contrato suscrito por Tecnología e Investigación Ferroviaria, S.A. (TIFSA)

Los puentes sobre los que se ha actuado se encuentran situados en el trayecto Puente de Ebro - Lleida de la línea, correspondientes al montaje de la vía a partir de la base de trabajo de Montagut. Este informe en concreto se refiere al **Viaducto del Gallo** con identificación **29VI02** perteneciente al **Subtramo VI**.

Para la redacción de los trabajos objeto del contrato se han tenido en cuenta todas las normas, instrucciones y recomendaciones que estableció el ente público Gestor de Infraestructuras Ferroviarias (GIF)

### ***1.2.- ANTECEDENTES.***

La "Instrucción relativa a las acciones a considerar en el proyecto de puentes de ferrocarril" de fecha 25 de junio de 1975, reglamenta en su apartado 6, la metodología a realizar en las pruebas de carga de puentes, haciendo distinción entre las diferentes tipologías, metálicos y de fábrica, y teniendo en cuenta sus luces.

En dicho apartado se indica la necesidad de realizar pruebas de cargas estáticas y dinámicas en la recepción de obra nueva y se prescriben las condiciones para las pruebas de carga de obra en servicio.



Siguiendo la instrucción actual, se contempla la obligatoriedad de la realización de pruebas estáticas y dinámicas en puentes de nueva construcción, como el que se corresponde con el presente informe, para comprobar su comportamiento ante las cargas previstas y poder efectuar su recepción.

## **2.- OBJETO.**

El objeto del informe es presentar las actividades de prueba de carga desarrolladas en la obra de referencia, exponiendo los resultados obtenidos en la misma, al ser solicitada la estructura por un tren de cargas conocido circulando a distintas velocidades (pruebas dinámicas), así como en una posición conocida de velocidad nula (prueba estática), realizando su análisis, con el fin de emitir las conclusiones y recomendaciones oportunas, al contrastar los valores con los resultantes del cálculo teórico efectuado.

Las actividades desarrolladas consistieron en:

- Inspección preliminar de la estructura. Se realizó el día 17 de julio de 2001 con el objeto de analizar el estado actual de la estructura, y de los elementos de apoyo, en función de sus posibles defectos; así como determinar aquellas anomalías que puedan afectar al funcionamiento, durabilidad o estética de la estructura.
- Redacción del plan de pruebas. Con el objeto de definir el tren de cargas empleado y la instrumentación utilizada, así como efectuar una previsión de los resultados a obtener.
- Realización de la Prueba de Carga. Tuvo lugar el día 31 de julio y 2 de agosto de 2001
- Análisis de Resultados y Recomendaciones. Donde se estudia la relación entre las deformaciones obtenidas y las previstas, las frecuencias de vibración, el porcentaje y rapidez de deformación; y finalmente se establece un juicio sobre el comportamiento de la obra durante la prueba.

### **3.- DESCRIPCIÓN DE LA OBRA.**

La estructura objeto de la Prueba de Carga forma parte de las obras de construcción de la Línea de Alta Velocidad Madrid-Barcelona-F.Francesa, y pertenece al Subtramo VI del tramo Zaragoza-Lleida. Se encuentra situada en el PK 81+580.

Se trata de un puente continuo de hormigón pretensado de nueve vanos, con 33,20 metros de longitud entre ejes de apoyos para los vanos laterales y de 41,50 metros para el vano central, con lo que alcanza una longitud total de 356,9 metros.

La sección del tablero del puente está formada por parejas de vigas prefabricadas de tipo artesa pretensadas de 4,50 m de anchura y 1,80 m de canto, con una separación de 6 m entre ejes de vigas y completadas, para formar secciones compuestas, por una losa de hormigón armado de espesor variable desde 0,18 m en los bordes hasta 0,32 m en el centro, lo que determina una pendiente a dos aguas del 2% para desagüe del tablero.

El conjunto de ambas vigas se apoya en cada pila mediante una pieza cargadero de 10,10 m de anchura transversal máxima superior y 4,00 m en quiebro intermedio, con voladizos de 3,05 m entre vuelo máximo y quiebro, que presenta una variación lineal de sus paramentos frontales entre 3,00 m en final de fuste y 1,80 m en zona superior de cargadero. La transición entre final de fuste (sección romboidal de diagonales iguales) y zona intermedia en quiebro (sección rectangular) se produce mediante paramentos planos triangulares. La infraestructura viaria colocada en la actualidad, es la correspondiente a dos vías de F.C. de ancho internacional cuyos ejes distan entre sí 4,50 m.

La documentación facilitada por el GIF consistió en un CD-Rom en el que se incluye el Documento N°2 - Planos, del Proyecto Construido del Subtramo VI del tramo Puente de Ebro-Lleida de la línea de Alta Velocidad Madrid-Zaragoza-Barcelona-Frontera Francesa, en formato AutoCad, y una copia del Anejo de Cálculo de la estructura.

#### **4.- INSPECCIÓN PRELIMINAR.**

Durante los trabajos de Inspección Preliminar llevados a cabo el día 17 de julio de 2001, en la obra **Viaducto del Gallo (29VI02)** previos a la ejecución de la Prueba de Carga, se desprende un buen estado general de la estructura y sus diversos componentes, aunque con ciertos defectos con incidencia en la estética.

En cuanto a la coincidencia geométrica del proyecto con la obra, cabe decir que la obra ejecutada se corresponde con un modificado realizado en Noviembre de 1995, sustituyendo al proyecto original de INOCSA de Mayo de 1998.

En lo referente a los estribos, se apreciaron una serie de golpes y roturas, así como depósitos en coronación, con incidencia únicamente en la estética de la estructura.

El estado de las pilas es bueno, y salvo algún defecto leve referente a meteorización, o humedades y filtraciones, con repercusión estética, no se han apreciado daños. El estado de los aparatos de apoyo es también bueno y únicamente se ha apreciado un ligero desplazamiento respecto de su posición normal. No se apreciaron otros defectos.

El cajón de la estructura de tramos tiene un estado igualmente bueno, ya que sólo se apreciaron algunos defectos con incidencia en la estética de la estructura, tales como: meteorización y degradación, humedades y filtraciones, y juntas transversales degradadas.

En cuanto al resto de elementos, se observaron defectos en las barandillas con posible riesgo de evolución patológica, así como defectos con incidencia estética en, conducciones, canaletas, juntas de dilatación e impermeabilización.

Como resumen, podemos comentar que el estado general de la estructura es bueno, destacando únicamente los defectos con incidencia estética en los distintos elementos, ya que los defectos con riesgo de evolución patológica son poco importantes.

En el ANEJO 7 - Ficha de Seguimiento (Revisión 0), del presente informe pueden seguirse las fichas detalladas con indicación de los distintos defectos e incidencias observadas durante la inspección. Es preciso reseñar que el estado de la estructura antes y después de la prueba de carga sigue siendo el mismo, es decir, que no ha aparecido ningún defecto adicional.

## **5.- ANÁLISIS DEL PROYECTO DE LA ESTRUCTURA.**

La documentación facilitada por el GIF consistió en un CD-Rom en el que se incluye el Documento N°2 - Planos, del Proyecto Construido del Subtramo VI del tramo Puente de Ebro-Lleida de la línea de Alta Velocidad Madrid-Zaragoza-Barcelona-Frontera Francesa, en formato AutoCad, y una copia del Anejo de Cálculo de la estructura.

### ***5.1.- Definición completa de elementos.***

La sección del tablero del puente está formada por parejas de vigas prefabricadas de tipo artesa pretensadas de 4,50 m de anchura y 1,80 m de canto, con una separación de 6 m entre ejes de vigas y completadas, para formar secciones compuestas, por una losa de hormigón armado de espesor variable desde 0,18 m en los bordes hasta 0,32 m en el centro, lo que determina una pendiente a dos aguas del 2% para desagüe del tablero.

El conjunto de ambas vigas se apoya en cada pila mediante una pieza cargadero de 10,10 m de anchura transversal máxima superior y 4,00 m en quiebro intermedio, con voladizos de 3,05 m entre vuelo máximo y quiebro, que presenta una variación lineal de sus paramentos frontales entre 3,00 m en final de fuste y 1,80 m en zona superior de cargadero. La transición entre final de fuste (sección romboidal de diagonales iguales) y zona intermedia en quiebro (sección rectangular) se produce mediante paramentos planos triangulares.

### ***5.2.- Acciones consideradas.***

Las acciones consideradas en el cálculo de la estructura se ajustan a la Instrucción de Acciones en Puentes de Ferrocarril. Las hipótesis empleadas fueron las siguientes:

- Peso propio viga prefabricada: 3,557 t/m en centro de vano y 4,152 t/m en zona de apoyos.
- Peso propio losa de tablero completa: 8,56 t/m

- Carga muerta debida a: balasto (7,0 ton/m), vías y traviesas (1,50 ton/m), imposta + barandillas + aceras (1,60 ton/m), canaletas y cableado (0,35 ton/m), molduras y vanos (1,50 t/m)
- Sobrecarga RENFE: Tren tipo A: en cada vía 3 ejes de -30 t separados 1,50 m + los pares correspondientes a 30 cm de ripado de vías.
- Sobrecarga RENFE: Tren tipo B: Diversos trenes de cargas entre 12t/m y 1 t/m distribuidos en la dirección longitudinal.

El tren tipo A se ha usado para efectos locales y el tipo B para el cálculo global.

- Sobrecarga UIC: sobrecarga de tráfico de 8 t/m y tren de cuatro ejes con 25 toneladas por eje.
- Fuerzas de frenado y arranque de trenes.
- Acción del viento y de la temperatura ( $\Delta T \pm 20^\circ\text{C}$ )
- Efecto lazo.
- Acción sísmica: sólo se considera sismo horizontal.

Se estudiaron diversas combinaciones de estas cargas, disponiendo la sobrecarga sobre una vía o las dos, y con ripado de las vías 30 cm o vías centradas.

### ***5.3.- Modelización empleada.***

Para el **análisis longitudinal** de los diversos elementos estructurales se desarrolló un modelo tridimensional compuesto por 462 elementos y 391 nodos. Se modelizaron los siguientes aspectos:

- Elementos longitudinales: vigas prefabricadas longitudinales + tablero a efectos de flexión longitudinal, transversal y torsión.
- Elementos transversales: efecto global de la flexión transversal y torsión de la conexión del tablero con las vigas prefabricadas.
- Pilas y cabeceros: modelización de las condiciones de contorno en apoyos de pilas.

- Estribos: modelización de las flexibilidades de apoyos en estribo 2 y restricción de movimientos verticales en estribo 1.

El modelo descrito se ha empleado para el cálculo de esfuerzos fundamentalmente longitudinales, así como para el control de flechas y el análisis dinámico

Para el **análisis transversal** se ha empleado un modelo pórtico plano de la sección transversal del tablero. Se consideraron las cargas más desfavorables y los esfuerzos transversales debidos a movimientos globales de la estructura: desplazamientos y giros relativos entre vigas longitudinales.

#### **5.4.- Materiales y coeficientes de cálculo.**

Hay que reseñar que el proyecto constructivo fue calculado siguiendo los criterios incluidos en el EUROCÓDIGO 1.

En cuanto a la losa del tablero y el cargadero:

- Hormigón:  $f_{ck} \geq 350 \text{ kp/cm}^2$ ,  $\gamma = 1,50$
- Acero pasivo (AEH-500):  $f_{yk} \geq 5100 \text{ kp/cm}^2$ ,  $\gamma = 1,15$

En cuanto a las vigas prefabricadas:

- Hormigón:  $f_{ck} \geq 600 \text{ kp/cm}^2$ ,  $\gamma = 1,40$
- Acero pasivo (AEH-500):  $f_{yk} \geq 5100 \text{ kp/cm}^2$ ,  $\gamma = 1,15$
- Acero activo:  $f_{pk} \geq 17000 \text{ kp/cm}^2$ ,  $\gamma = 1,10$

#### **5.5.- Evaluación de la situación estructural.**

El cálculo de la estructura es correcto pero los coeficientes de seguridad en el hormigón y el acero de las vigas prefabricadas están basados en el EUROCÓDIGO 1 y no se ajustan a la EHE.

## **6.- PLAN DE PRUEBAS.**

Es preciso indicar que con anterioridad a la de este informe, se efectuó otra prueba de carga con objeto de realizar una recepción provisional de la obra y un primer análisis de la respuesta de la estructura frente a acciones estáticas y dinámicas. Aquella prueba se realizó con camiones cuando la infraestructura de vía no estaba todavía colocada.

La prueba de carga de la que es objeto el presente informe se realizó, por el contrario, con trenes, según se comenta en los siguientes apartados, en los que se hablará de acciones reproducidas, puntos de medida y equipos utilizados.

### ***6.1.-ACCIONES REPRODUCIDAS.***

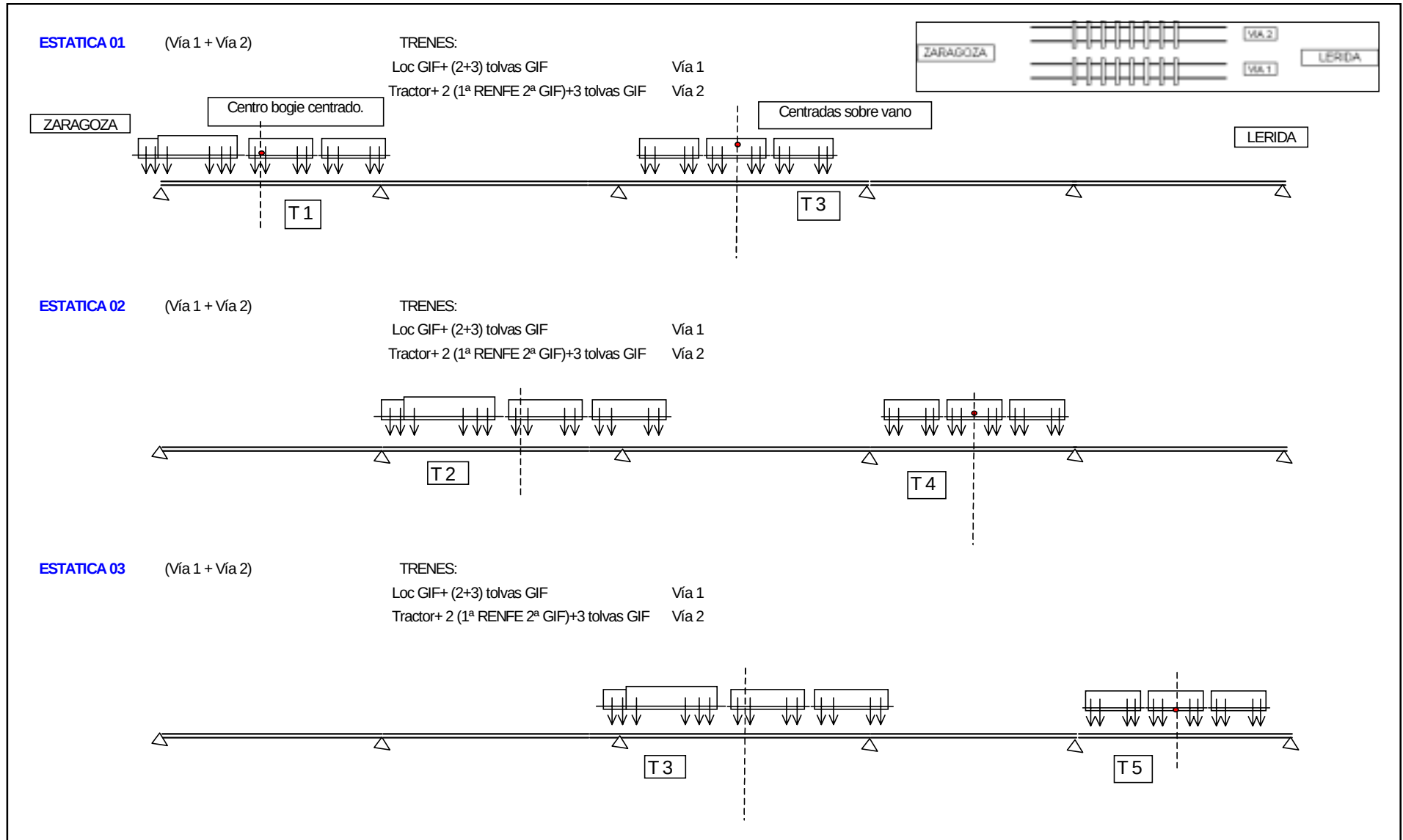
La prueba de carga contempla tanto acciones estáticas como dinámicas, con el fin de reproducir en la misma todo el abanico de posibles sollicitaciones a las que pueda estar sometido el puente a lo largo del tiempo.

Se emplearon diversos trenes de carga para las diversas pruebas, combinando una locomotora GIF (con un peso total de 120 ton repartidos entre sus seis ejes según 20 ton/eje), un tractor (con un peso total de 88 ton repartidos entre sus cuatro ejes según 22 ton/eje), una locomotora 319 (con un peso total de 112 ton repartidos entre sus seis ejes según 18.67 ton/eje), y diversas tolvas GIF (con un peso total de 80 ton repartidos entre sus cuatro ejes según 20 ton/eje), tolvas RENFE (con un peso total de 80 ton repartidos entre sus cuatro ejes según 20 ton/eje) y tolvas rumanas (con un peso total de 80 ton repartidos entre sus cuatro ejes según 20 ton/eje).

Las acciones que se pretenden reproducir, como se ha indicado anteriormente, son aquellas propias de la utilización de la obra y consisten en dos posiciones de carga estática y tres pruebas dinámicas a 5 km/h, 40 km/h y 80 km/h, así como una de frenado a 80 km/h. Se incluye a continuación, un croquis de la disposición de los trenes de cargas para las diferentes pruebas.

El plan de pruebas se desarrolló según el siguiente esquema:

### Croquis de la disposición de cargas en vanos 1-2-3-4-5





**Croquis de la disposición de cargas en vanos 1-2-3-4-5 (continuación)**

**ESTATICA 04**

(Vía 1 + Vía 2)

TRENES:

Loc GIF+ 5 tolvas GIF

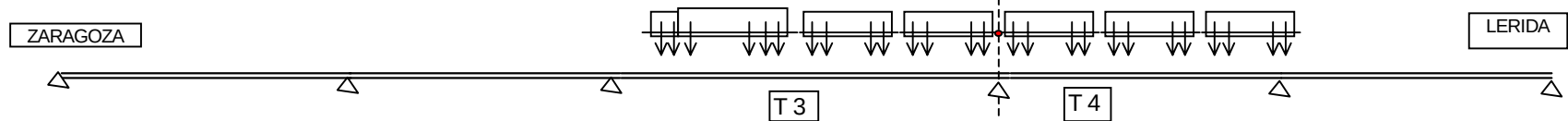
Vía 1

Tractor+ 5 tolvas (la 1ª RENFE, el resto GIF)

Vía 2



Último eje Tolva2 ó  
topes Tolva2-Tolva3



**DINAMICA 01**

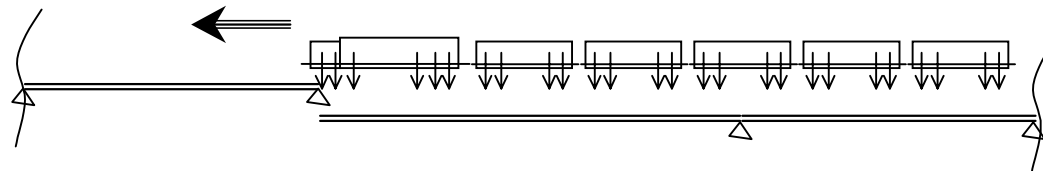
**DINAMICAS 11, 12, 13 y 14**

**DINAMICAS 21,22,23 y 24**

Loc GIF+ 5 tolvas (Vía 1) + Tractor + 5 tolvas (Vía 2)

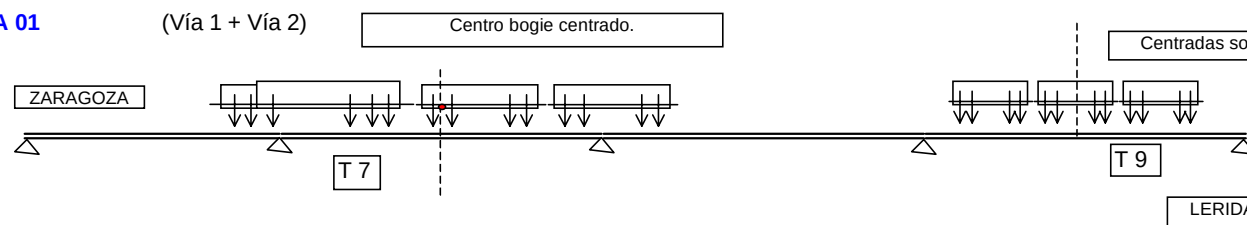
Loc GIF+ 5 tolvas (Vía 1)

Tractor+ 5 tolvas (Vía 2)



**ESTATICA 01**

(Vía 1 + Vía 2)



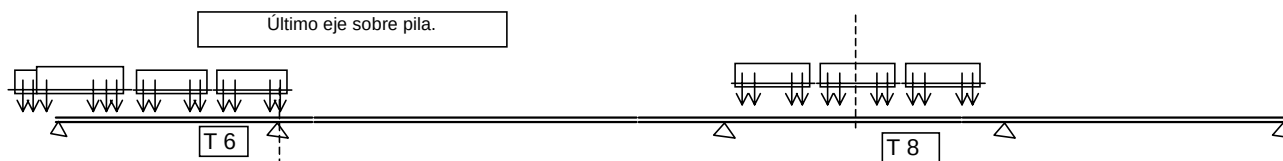
**TRENES:**

Loc 319+ 2 (RENFE)+3 (1ª rumana, resto RENFE) tolvas  
Loc GIF+ (2+3) tolvas GIF

Vía 1  
Vía 2

**ESTATICA 02**

(Vía 1 + Vía 2)



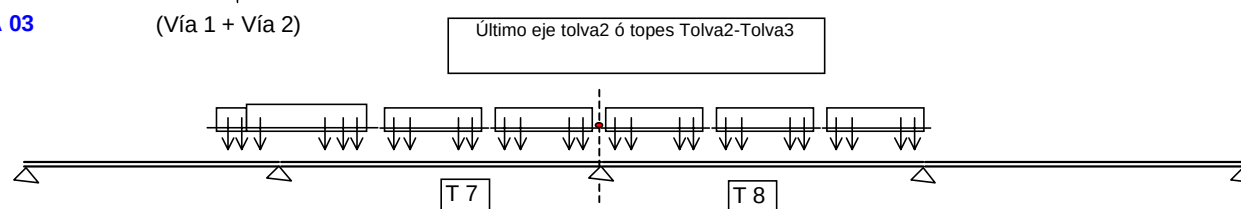
**TRENES:**

Loc 319+ 2 (RENFE)+3 (1ª rumana, resto RENFE) tolvas  
Loc GIF+ (2+3) tolvas GIF

Vía 1  
Vía 2

**ESTATICA 03**

(Vía 1 + Vía 2)



**TRENES:**

Loc 319+ 5 tolvas (la 3ª rumana, resto RENFE)  
Loc GIF+ 5 tolvas GIF

Vía 1  
Vía 2

**DINAMICA 01**

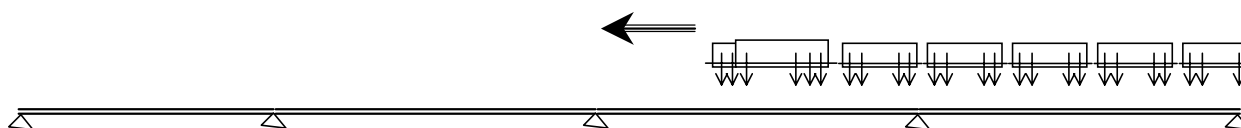
**DINAMICAS 11, 12, 13 y 14**

**DINAMICAS 21,22,23 y 24**

Loc GIF+ 5 tolvas (Vía 1) + Tractor + 5 tolvas (Vía 2)

Loc GIF+ 5 tolvas (Vía 1)

Tractor+ 5 tolvas (Vía 2)



## **6.2.- PUNTOS DE MEDIDA.**

El programa de instrumentación que se define recoge todas aquellas secciones en las que se ha considerado necesario conocer las tensiones y deformaciones producidas por las cargas actuantes.

Los puntos de medida se sitúan en los elementos y secciones fundamentales del tablero que compone la obra. En el ANEJO 3 - Croquis de instrumentación y Tren de Cargas, se señalan todos los puntos instrumentados, diferenciándolos según se trate de bandas extensométricas, transductores de desplazamiento o acelerómetros.

Con esta instrumentación se han buscado las medidas siguientes:

- Descensos verticales del tablero medidos en diversos puntos situados a lo largo de las secciones a  $L/2$  de cada uno de los vanos, excepto en el primer y noveno vanos, en que se ha medido a  $0.45L$  de los estribos.
- Descensos verticales junto a apoyos sobre los que descansa el tablero.
- Aceleraciones del tablero al paso del tren de carga, mediante dos acelerómetros, situados como el resto de aparatos en la sección de centro de vano, excepto en el primer vano, en que no se ha medido, y el noveno vano, en que se ha medido a  $0,45L$  del estribo.
- Deformaciones unitarias del hormigón en el sentido longitudinal y consecuentemente tensiones en éste, medidas en un punto por cada sección a  $L/2$  de cada vano, en la fibra inferior del tablero, excepto en el primer vano, en que se ha medido a  $0.45L$  del estribo. En el noveno vano no se ha medido.

La prueba de carga del viaducto completo se realizó en dos tandas. Para la prueba del tramo 1-2-3-4-5 se dispusieron: para medida de desplazamientos, 12 transductores para medida de flechas en el centro de vano y 9 transductores para medida de descensos en zona de apoyos; para medida de deformaciones unitarias, 7 galgas extensométricas. Por

último se han dispuesto 4 acelerómetros, con lo que el número total de puntos instrumentados en la primera fase fue de 32.

Para la prueba del tramo 6-7-8-9 se dispusieron: para medida de desplazamientos, 11 transductores para medida de flechas en el centro de vano y 9 transductores para medida de descensos en zona de apoyos; para medida de deformaciones unitarias, 6 galgas extensométricas. Por último se han dispuesto 4 acelerómetros, con lo que el número total de puntos instrumentados en esta fase fue de 30.

### **6.3.- EQUIPOS UTILIZADOS.**

Para la realización de pruebas de carga, el conjunto de los equipos de campo embarcados en furgonetas laboratorio, utilizados por TIFSA para la toma de datos experimentales en cada puente ó estructura, está constituido por los elementos que se relacionan a continuación, pudiéndose ver detalle de los equipos utilizados en campo, así como de los medios auxiliares empleados en la instrumentación en las fotografías finales que se presentan.

Debemos indicar que todos los equipos que se relacionan se encuentran en periodo vigente de verificación y/o calibración.

Comenzando por los elementos sensores, se utilizan galgas extensométricas para medida de deformaciones unitarias, transductores de desplazamiento para flechas y corrimientos en apoyos y acelerómetros para obtención de acelerogramas, con las siguientes características:

- **GALGAS EXTENSOMÉTRICAS (TML).** Resistencia nominal 120 ohmios y factor de galga 2,13. Longitud activa de 3 y 6 mm en estructuras metálicas y de 30 a 120 mm. en estructuras de hormigón, para medida de deformaciones unitarias y, por lo tanto, de tensiones.

- TRANSDUCTORES DE DESPLAZAMIENTO (RDP Electronics, ACT2000/C – TIPO inductivo): Recorrido 100 mm. Resolución virtualmente infinita. Linealidad +/- 0,1%.
- TRANSDUCTORES DE DESPLAZAMIENTO (Penny & Giles L C P U – TIPO potenciométrico): Recorrido 50 y 100 mm . Resolución virtualmente infinita. Linealidad +/- 0,5%.
- TRANSDUCTORES DE DESPLAZAMIENTO (Penny & Giles HLP190 - TIPO potenciométrico): Recorridos 100 mm (SA1100/4k); 50 mm (SA150/2k) y 25 mm (SA125/1k). Resolución virtualmente infinita. Linealidad de 0.05 % para los de 100 y +/- 0,075% para el resto.
- TRANSDUCTORES DE DESPLAZAMIENTO (SAN-EI E08-D3-30 Y E08-D3-50 - TIPO extensométrico). Recorridos de 30 y 50 mm. Resolución virtualmente infinita. Linealidad +/- 0,2%.
- TRANSDUCTORES DE DESPLAZAMIENTO (APEK HLS 10 - TIPO extensométrico): Recorrido de 10 mm. Resolución virtualmente infinita. Linealidad +/- 0,05%.
- ACELEROMETROS PIEZORRESISTIVOS (SENSOTEC JTF-AG111): Rango 10/50 g, sensibilidad 10 mV/g, linealidad +/- 1% de F.S. Respuesta en frecuencia desde DC a 250 Hz. Alimentación a 2,5 V. (rms).
- ACELEROMETROS CAPACITIVOS (PCB PIEZOTRONICS 3701): Rango 20 g, sensibilidad 100 mV/g, linealidad +/- 1% de F.S. Respuesta en frecuencia DC a 500 Hz. Alimentación 5 A 30 VDC.

El sistema de medida continúa con los acondicionadores de señal, que realizan el tratamiento y amplificación de las señales obtenidas en los diferentes sensores, generando salidas normalizadas para su registro posterior. El equipamiento utilizado es el siguiente:

- ACONDICIONADORES DE SEÑAL (SAN-EI 6 M 47-8): Excitación del puente 2,5 V., 5 K Hz. Salida  $\pm$  2V. Balanceo automático de puente. Relación señal ruido 50 dB (rms). Filtro pasabajos de tres polos. Corriente de alimentación 12 V. DC. Frecuencia de respuesta desde DC a 2 KHz. Realizan el acondicionamiento preciso para galgas extensométricas y transductores basados en extensometría.
- ACONDICIONADORES DE SEÑAL (SAN-EI AH 1108): Excitación del puente 2 V (rms), 5 K Hz. Salida +/- 5 V. Balanceo automático de puente. Relación señal ruido 58 dB (rms). Filtro pasabajos de tres polos. Alimentación AC/DC. Frecuencia de respuesta desde DC a 2 KHz. Acondicionamiento extensométrico.
- ACONDICIONADORES DE SEÑAL (KINOSSEL KI5000): Linealidad 0,1%. Estabilidad mayor que 0,05 % ° C<sup>-1</sup>. Filtros 10, 100 y 1000 Hz. Balanceo automático. Salida +/- 5 V. Alimentación en AC/DC. Acondicionamiento potenciométrico.
- ACONDICIONADORES DE SEÑAL (RDP Electronics, modular 600): Rack multicanal con, 12 tarjetas bicanal. Alimentación en AC, excitación configurable hasta 15 V DC. Display 5 dígitos, selector individual de los 24 canales, exactitud 0.1% F.S., linealidad +/- 0.05% F.S. Implementación de 11 tarjetas 611, STRAIN GAUGE & DC/DC (transductores potenciométricos y de tipo general con electrónica incorporada y extensométricos, mediante doble electrónica): 10 Rangos de señal de entrada 5mV a 10V; Salida +/- 10 V.; Ganancia x0.5 a x2000; Balanceo manual; Frecuencia de respuesta desde DC a 200 Hz. Se complementa con 1 tarjeta 621, LVDT & INDUCTIVE TRANSDUCER (Transductores de tipo general LVDT): 8 rangos de señal 12 mV a 4 V; salida +/- 10 V; Ganancia x1 a x2000; Balanceo manual; Frecuencia de respuesta desde DC a 500 Hz. Flat. Temperatura de compensación en todos los canales inferior a 0.005 % FS/°C.

Una vez realizado el tratamiento y amplificación de las señales obtenidas en los diferentes sensores, se realiza su control y registro mediante el siguiente equipamiento:

- **ORDENADORES DE CONTROL:**

- Microprocesadores Pentium II/III a distintas velocidades. Bus PCI (5 Zoc. PCI, 3 ISA, Green PC)
- Memoria RAM mínima de 64 Mb.
- Unidad de disco flexible de 3 ½
- Discos duro fijo primario superior 2 Gb. Controladora PCI-IDE.
- Unidad CD-ROM 24X (Mín). Controladora PCI-IDE.
- Monitor Super VGA COLOR. Tarjeta 2 Mb. PCI (1280-1024).
- Disco secundario removible superior a 2,01 Gb. (PCI-IDE).
- Tarjeta de red.

- **TARJETAS DE ADQUISICIÓN DE DATOS (National Instruments):**

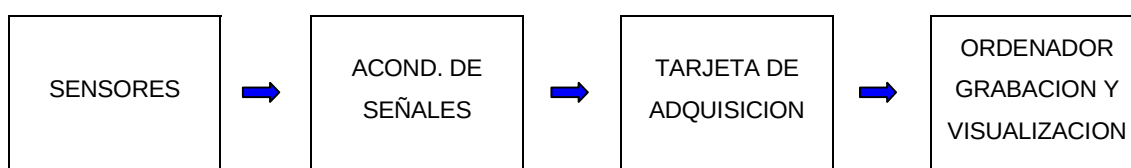
- Multifunción de alta velocidad AT-MIO-64 F-5 (2 Ud), con 64 canales de entrada analógica simple o 32 diferenciales.
- Velocidad máxima de muestreo de 200.000 muestras/seg.
- 8 líneas digitales I/O y tres relojes contadores.
- 2 canales de transferencia DMA.
- Ganancia programable: 0.5, 1, 2, 5,10, 20, 50,100.
- Convertidor A/D de 12 bits.
- Ocupación de un Slot ISA en ordenador de control.

- **TARJETAS DE ADQUISICIÓN DE DATOS (National Instruments):**

- Multifunción de alta velocidad AT-MIO-64 E-3 (1 Ud), con 64 canales de entrada analógica simple o 32 diferenciales.

- Resto de características igual que las anteriores pero con una Velocidad máxima de muestreo de 300.000 muestras/seg.

Como síntesis del sistema conjunto se puede presentar el siguiente esquema funcional explicativo:



La señal producida en cada punto instrumentado, galga extensométrica, transductor de desplazamiento o acelerómetro, es filtrada y amplificada por los acondicionadores de señal.

La estabilidad de las medidas con galgas extensométricas a largo plazo está asegurada por la disposición de puentes de Wheatstone completos en cada punto de medida, evitando así la aparición de todo problema de deriva.

Las señales amplificadas, analógicas, son captadas por las tarjetas de adquisición de datos e introducidas en el ordenador de control, que realiza registro de las mismas, así como el tratamiento y presentación de datos para la visualización y seguimiento de las pruebas realizadas.

Comentar por último que durante las pruebas se efectúa el control continuo de las condiciones de temperatura y humedad ambientales.

El software de presentación de datos en campo permite la visualización de las medidas netas correspondientes a cada punto de medida en unidades físicas escaladas, numérica y gráficamente, siendo en tiempo real para las pruebas estáticas e inmediatamente tras su finalización en las de carácter dinámico.



En gabinete, una vez recopilados los registros de calidad de los ensayos, se comprueban sobre los formularios todos los datos, identificando los puntos de medida, los traductores empleados, las calibraciones, los parámetros de adquisición (frecuencia muestreo y filtro), etc. Una vez realizado esto, en primer lugar las señales obtenidas mediante grabación digital en el ordenador de control son traducidas a magnitudes físicas y tiempos, y se prevvisualizan debidamente escaladas.

Posteriormente se hace el tratamiento y procesado completo hasta permitir dibujar en papel los registros escalados en coordenadas tiempo-magnitud para posibilitar su análisis e incorporación a los informes correspondientes.

Hay que señalar que se dispone de software específico para dicho tratamiento así como hojas de cálculo gráficas, tales como DADISP, o más generales como MATLAB.

Para tablas de presentación y como soporte informático de transmisión de resultados se utiliza un programa convencional con formato estándar de hoja de cálculo, por ejemplo como EXCEL.

En el caso de las medidas de aceleraciones se realiza además su estudio en frecuencias para la obtención de los modos fundamentales de vibración de la estructura, analizando los espectros obtenidos en cada prueba mediante la aplicación anterior.

Como equipos auxiliares se encuentran grupos electrógenos portátiles, 6.500 m de línea en bobinas de 25, 50 y 100 m de longitud, maquinaria portátil de limpieza, pulido y soldadura y pequeño herramental.

Hay que comentar que en el momento actual TIFSA dispone de la capacidad de hacer funcionar simultáneamente tres equipos de grabación (incluido personal técnico) con las tarjetas de adquisición anteriormente mencionadas, junto con un total de canales de 96, distribuidos entre 56 extensométricos, 16 potenciométricos y 22 mixtos.

El número total de transductores disponibles es de 78, de los cuales 64 son de desplazamiento (10, 25, 30, 50 y 100 mm), y 14 de aceleración (10, 20 y 50 Gs). Con ello la posibilidad de acometer pruebas de carga “especiales” por elevado número de puntos, o

pruebas habituales simultáneas, vendrá en general limitada por la disponibilidad de trenes de ensayo en lugar de por el equipamiento disponible.

En las diversas fotografías incluidas en el ANEJO 5 - Reportaje Fotográfico, del presente informe pueden observarse los equipos utilizados en campo y la disposición de bandas extensométricas y transductores de desplazamiento en distintos puntos de puentes y otras estructuras ensayadas.

#### **6.4.- RESULTADOS PREVISTOS.**

En el ANEJO 2 - Proyecto de Prueba de Carga, figura la relación de las flechas que cabe esperar durante los ensayos estáticos, así como la estimación de la frecuencia fundamental de oscilación de la estructura.

A continuación se expone el resumen de los valores calculados para las características de los materiales definidos en proyecto. Como criterio de signo se adopta que los descensos verticales son negativos y las deformaciones de tracción son positivas.

### ESTÁTICA Nº1 (VEHÍCULOS EN VANOS 1 Y 3)

(locomotora y 5 tolvas G.I.F. en vía 1-tractor U.T.E., tolva Renfe y 4 tolvas G.I.F. en vía 2)

| VANO | VIGA | POSICIÓN           | FLECHA (mm)                                     | MICRODEFORMACIONES |
|------|------|--------------------|-------------------------------------------------|--------------------|
| 1    | 1    | 0,45* LUZ          | -10,40 (NODO 4533)                              | 105                |
|      | 2    | 0,5 m ESTRIBO ZAR. | -0,56 (NODO 4524)                               | ---                |
|      |      | 0,45* LUZ          | -10,10 (NODO 4530)                              | 100                |
| 2    | 1    | 0,5 m VANO 1       | 0,40 (NODO 4561)                                | ---                |
|      |      | CENTRO DE VANO     | 8,84 (NODO 2691)<br>-----<br>8,49 (NODO 3223)   | -48                |
|      | 2    | 0,5 m VANO 1       | 0,38 (NODO 4558)                                | ---                |
|      |      | CENTRO DE VANO     | 8,59 (NODO 3755)                                | -49                |
| 3    | 1    | 0,5 m VANO 2       | -0,56 (NODO 4578)                               | ---                |
|      |      | CENTRO DE VANO     | -17,4 (NODO 2962)                               | 121                |
|      | 2    | 0,5 m VANO 2       | -0,56 (NODO 4575)                               | ---                |
|      |      | CENTRO DE VANO     | -17,4 (NODO 3760)                               | 121                |
| 4    | 1    | 0,5 m VANO 3       | 0,46 (NODO 4595)                                | ---                |
|      |      | CENTRO DE VANO     | 5,86 (NODO 2998)                                | -35                |
|      | 2    | 0,5 m VANO 3       | 0,46 (NODO 4592)                                | ---                |
|      |      | CENTRO DE VANO     | 5,86 (NODO 3796)                                | -35                |
| 5    | 1    | 0,5 m VANO 4       | -0,11 (NODO 4612)                               | ---                |
|      |      | CENTRO DE VANO     | -1,49 (NODO 3030)                               | 8                  |
|      | 2    | 0,5 m VANO 4       | -0,11 (NODO 4609)                               | ---                |
|      |      | CENTRO DE VANO     | -1,48 (NODO 3562)<br>-----<br>-1,50 (NODO 4094) | 8                  |
|      |      |                    |                                                 |                    |

**ESTÁTICA Nº2. (VEHÍCULOS EN VANOS 2 Y 4)**

(locomotora y 5 tolvas G.I.F. en vía 1-tractor U.T.E., tolva Renfe y 4 tolvas G.I.F. en vía 2)

| VANO | VIGA | POSICIÓN           | FLECHA (mm)                              | MICRODEFORMACIONES |
|------|------|--------------------|------------------------------------------|--------------------|
| 1    | 1    | 0,45* LUZ          | 4,93 (NODO 4533)                         | -39                |
|      | 2    | 0,5 m ESTRIBO ZAR. | 0,22 (NODO 4524)                         | ---                |
|      |      | 0,45* LUZ          | 4,89 (NODO 4530)                         | -38                |
| 2    | 1    | 0,5 m VANO 1       | -0,49 (NODO 4561)                        | ---                |
|      |      | CENTRO DE VANO     | -16,70 (NODO 2691)<br>-17,50 (NODO 3223) | 120                |
|      |      |                    |                                          |                    |
|      | 2    | 0,5 m VANO 1       | -0,49 (NODO 4558)                        | ---                |
|      |      | CENTRO DE VANO     | -16,80 (NODO 3755)                       | 116                |
| 3    | 1    | 0,5 m VANO 2       | 0,56 (NODO 4578)                         | ---                |
|      |      | CENTRO DE VANO     | 10,90 (NODO 2962)                        | -61                |
|      | 2    | 0,5 m VANO 2       | 0,59 (NODO 4575)                         | ---                |
|      |      | CENTRO DE VANO     | 10,90 (NODO 3760)                        | -61                |
| 4    | 1    | 0,5 m VANO 3       | -0,58 (NODO 4595)                        | ---                |
|      |      | CENTRO DE VANO     | -17,90 (NODO 2998)                       | 124                |
|      | 2    | 0,5 m VANO 3       | -0,58 (NODO 4592)                        | ---                |
|      |      | CENTRO DE VANO     | -17,90 (NODO 3796)                       | 124                |
| 5    | 1    | 0,5 m VANO 4       | 0,45 (NODO 4612)                         | ---                |
|      |      | CENTRO DE VANO     | 6,03 (NODO 3030)                         | -34                |
|      | 2    | 0,5 m VANO 4       | 0,45 (NODO 4609)                         | ---                |
|      |      | CENTRO DE VANO     | 5,95 (NODO 3562)<br>6,11 (NODO 4094)     | -34                |
| 6    | 1    | CENTRO DE VANO     | -1,54 (NODO 3109)                        | 9                  |
|      |      | 0,5 m VANO 7       | -0,03 (NODO 4629)                        | ---                |
|      | 2    | CENTRO DE VANO     | -1,54 (NODO 3907)                        | 9                  |
|      |      | 0,5 m VANO 7       | -0,03 (NODO 4626)                        | ---                |

**ESTÁTICA Nº3. (VEHÍCULOS EN VANOS 3 Y 5)**  
**(locomotora y 5 tolvas G.I.F. en vía 1-tractor U.T.E., tolva Renfe y 4 tolvas G.I.F. en vía 2)**

| VANO | VIGA | POSICIÓN          | FLECHA (mm)        | MICRODEFORMACIONES |
|------|------|-------------------|--------------------|--------------------|
| 1    | 1    | 0,45* LUZ         | -1,25 (NODO 4533)  | 10                 |
|      | 2    | 0,5 m ESTRIBO ZAR | -0,06 (NODO 4524)  | ---                |
|      |      | 0,45* LUZ         | -1,25 (NODO 4530)  | 10                 |
| 2    | 1    | 0,5 m VANO 1      | 0,12 (NODO 4561)   | ---                |
|      |      | CENTRO DE VANO    | 5,78 (NODO 2691)   | -32                |
|      |      |                   | 5,60 (NODO 3223)   |                    |
|      | 2    | 0,5 m VANO 1      | 0,12 (NODO 4558)   | ---                |
|      |      | CENTRO DE VANO    | 5,66 (NODO 3755)   | -32                |
| 3    | 1    | 0,5 m VANO 2      | -0,50 (NODO 4578)  | ---                |
|      |      | CENTRO DE VANO    | -17,30 (NODO 2962) | 120                |
|      | 2    | 0,5 m VANO 2      | -0,50 (NODO 4575)  | ---                |
|      |      | CENTRO DE VANO    | -17,00 (NODO 3760) | 120                |
| 4    | 1    | 0,5 m VANO 3      | 0,54 (NODO 4595)   | ---                |
|      |      | CENTRO DE VANO    | 11,00 (NODO 2998)  | -61                |
|      | 2    | 0,5 m VANO 3      | 0,54 (NODO 4592)   | ---                |
|      |      | CENTRO DE VANO    | 11,00 (NODO 3796)  | -61                |
| 5    | 1    | 0,5 m VANO 4      | -0,58 (NODO 4612)  | ---                |
|      |      | CENTRO DE VANO    | -17,80 (NODO 3030) | 123                |
|      | 2    | 0,5 m VANO 4      | -0,58 (NODO 4609)  | ---                |
|      |      | CENTRO DE VANO    | -18,3 (NODO 3562)  | 123                |
|      |      |                   | -17,40 (NODO 4094) |                    |
| 6    | 1    | CENTRO DE VANO    | 6,06 (NODO 3109)   | -33                |
|      |      | 0,5 m VANO 7      | 0,13 (NODO 4629)   | ---                |
|      | 2    | CENTRO DE VANO    | 6,06 (NODO 3907)   | -34                |
|      |      | 0,5 m VANO 7      | 0,13 (NODO 4626)   | ---                |

### ESTÁTICA Nº4. (VEHÍCULOS EN VANOS 3 Y 4)

(locomotora y 5 tolvas G.I.F. en vía 1-tractor U.T.E., tolva Renfe y 4 tolvas G.I.F. en vía 2)

| VANO | VIGA | POSICIÓN          | FLECHA (mm)        | MICRODEFORMACIONES |
|------|------|-------------------|--------------------|--------------------|
| 1    | 1    | 0,45* LUZ         | -0,87 (NODO 4533)  | 7                  |
|      | 2    | 0,5 m ESTRIBO ZAR | -0,04 (NODO 4524)  | ---                |
|      |      | 0,45* LUZ         | -0,87 (NODO 4530)  | 7                  |
| 2    | 1    | 0,5 m VANO 1      | 0,08 (NODO 4561)   | ---                |
|      |      | CENTRO DE VANO    | 4,07 (NODO 2691)   | -22                |
|      |      |                   | 3,87 (NODO 3223)   |                    |
|      | 2    | 0,5 m VANO 1      | 0,08 (NODO 4558)   | ---                |
|      |      | CENTRO DE VANO    | 3,97 (NODO 3755)   | -22                |
| 3    | 1    | 0,5 m VANO 2      | -0,35 (NODO 4578)  | ---                |
|      |      | CENTRO DE VANO    | -10,40 (NODO 2962) | 81                 |
|      | 2    | 0,5 m VANO 2      | -0,35 (NODO 4575)  | ---                |
|      |      | CENTRO DE VANO    | -10,20 (NODO 3760) | 76                 |
| 4    | 1    | 0,5 m VANO 3      | -0,03 (NODO 4595)  | ---                |
|      |      | CENTRO DE VANO    | -10,90 (NODO 2998) | 82                 |
|      | 2    | 0,5 m VANO 3      | -0,04 (NODO 4592)  | ---                |
|      |      | CENTRO DE VANO    | -10,90 (NODO 3796) | 82                 |
| 5    | 1    | 0,5 m VANO 4      | 0,31 (NODO 4612)   | ---                |
|      |      | CENTRO DE VANO    | 4,11 (NODO 3030)   | -23                |
|      | 2    | 0,5 m VANO 4      | 0,31 (NODO 4609)   | ---                |
|      |      | CENTRO DE VANO    | 4,02 (NODO 3562)   | -23                |
|      |      |                   | 4,21 (NODO 4094)   |                    |
| 6    | 1    | CENTRO DE VANO    | -1,05 (NODO 3109)  | 6                  |
|      |      | 0,5 m VANO 7      | -0,02 (NODO 4629)  | ---                |
|      | 2    | CENTRO DE VANO    | -1,05 (NODO 3907)  | 6                  |
|      |      | 0,5 m VANO 7      | -0,02 (NODO 4626)  | ---                |

**ESTÁTICA Nº5. (VEHÍCULOS EN VANOS 7 Y 9)**

(locomotora y 5 tolvas G.I.F. en vía 2-locomotora 319, 4 tolvas Renfe y una Rumana en vía 1)

|   | VIGA | POSICIÓN             | FLECHA (mm)                              | MICRODEFORMACIONES |
|---|------|----------------------|------------------------------------------|--------------------|
| 5 | 1    | 0,5 m VANO 4         | -0,03 (NODO 4612)                        | ---                |
|   |      | CENTRO DE VANO       | -1,41 (NODO 3030)                        | 8                  |
|   | 2    | 0,5 m VANO 4         | -0,03 (NODO 4609)                        | ---                |
|   |      | CENTRO DE VANO       | -1,43 (NODO 3562)<br>-1,39 (NODO 4094)   | 8                  |
| 6 | 1    | CENTRO DE VANO       | 5,50 (NODO 3109)                         | -31                |
|   |      | 0,5 m VANO 7         | 0,43 (NODO 4629)                         | ---                |
|   | 2    | CENTRO DE VANO       | 5,49 (NODO 3907)                         | -31                |
|   |      | 0,5 m VANO 7         | 0,43 (NODO 4626)                         | ---                |
| 7 | 1    | CENTRO DE VANO       | -16,30 (NODO 3063)                       | 113                |
|   |      | 0,5 m VANO 8         | -0,49 (NODO 4646)                        | ---                |
|   | 2    | CENTRO DE VANO       | -17,10 (NODO 3595)<br>-16,20 (NODO 4127) | 116                |
|   |      | 0,5 m VANO 8         | -0,51 (NODO 4643)                        | ---                |
| 8 | 1    | CENTRO DE VANO       | 8,73 (NODO 2819)<br>8,38 (NODO 3351)     | -49                |
|   |      | 0,5 m VANO 9         | 0,39 (NODO 3190)                         | ---                |
|   | 2    | CENTRO DE VANO       | 8,68 (NODO 3883)                         | -48                |
|   |      | CENTRO DE VANO (ALA) | 9,62 (NODO 4415)                         | ---                |
|   |      | 0,5 m VANO 9         | 0,40 (NODO 3988)                         | ---                |
| 9 | 1    | CENTRO DE VANO (ALA) | -8,14 (NODO 4692)                        | ---                |
|   |      | 0,5 m ESTRIBO 2      | -0,55 (NODO 4662)<br>-0,59 (NODO 4664)   | ---                |
|   | 2    | CENTRO DE VANO (ALA) | -8,35 (NODO 4691)                        | ---                |
|   |      | 0,5 m ESTRIBO 2      | -0,57 (NODO 4661)                        | ---                |

**ESTÁTICA N°6 (VEHÍCULOS EN VANOS 6 Y 8)**

(locomotora y 5 tolvas G.I.F. en vía 2-locomotora 319, 4 tolvas Renfe y una Rumana en vía 1)

| VANO | VIGA | POSICIÓN             | FLECHA (mm)                              | MICRODEFORMACIONES |
|------|------|----------------------|------------------------------------------|--------------------|
| 4    | 1    | 0,5 m VANO 3         | -0,03 (NODO 4595)                        | ---                |
|      |      | CENTRO DE VANO       | -1,45 (NODO 2998)                        | 8                  |
|      | 2    | 0,5 m VANO 3         | -0,03 (NODO 4592)                        | ---                |
|      |      | CENTRO DE VANO       | -1,45 (NODO 3796)                        | 8                  |
| 5    | 1    | 0,5 m VANO 4         | 0,01 (NODO 4612)                         | ---                |
|      |      | CENTRO DE VANO       | 5,68 (NODO 3030)                         | -32                |
|      | 2    | 0,5 m VANO 4         | 0,01 (NODO 4609)                         | ---                |
|      |      | CENTRO DE VANO       | 5,59 (NODO 3562)<br>5,76 (NODO 4094)     | -32                |
| 6    | 1    | CENTRO DE VANO       | -16,60 (NODO 3109)                       | 116                |
|      |      | 0,5 m VANO 7         | -0,52 (NODO 4629)                        | ---                |
|      | 2    | CENTRO DE VANO       | -16,90 (NODO 3907)                       | 120                |
|      |      | 0,5 m VANO 7         | -0,54 (NODO 4626)                        | ---                |
| 7    | 1    | CENTRO DE VANO       | 10,30 (NODO 3063)                        | -58                |
|      |      | 0,5 m VANO 8         | 0,51 (NODO 4646)                         | ---                |
|      | 2    | CENTRO DE VANO       | 10,20 (NODO 3595)<br>10,50 (NODO 4127)   | -57                |
|      |      | 0,5 m VANO 8         | 0,52 (NODO 4643)                         | ---                |
| 8    | 1    | CENTRO DE VANO       | -16,00 (NODO 2819)<br>-17,00 (NODO 3351) | 112                |
|      |      | 0,5 m VANO 9         | -0,46 (NODO 3190)                        | ---                |
|      |      | CENTRO DE VANO       | -16,80 (NODO 3883)                       | 116                |
|      | 2    | CENTRO DE VANO (ALA) | -15,10 (NODO 4415)                       | ---                |
|      |      | 0,5 m VANO 9         | -0,47 (NODO 3988)                        | ---                |
| 9    | 1    | CENTRO DE VANO (ALA) | 5,40 (NODO 4692)                         | ---                |
|      |      | 0,5 m ESTRIBO 2      | 0,22 (NODO 4662)<br>0,22 (NODO 4664)     | ---                |
|      |      | CENTRO DE VANO (ALA) | 5,36 (NODO 4691)                         | ---                |
|      | 2    | 0,5 m ESTRIBO 2      | 0,22 (NODO 4661)                         | ---                |



**ESTÁTICA Nº7 (VEHÍCULOS EN VANOS 7 Y 8)**

(locomotora y 5 tolvas G.I.F. en vía 2-locomotora 319, 4 tolvas Renfe y una Rumana en vía 1)

| VANO | VIGA | POSICIÓN             | FLECHA (mm)                             | MICRODEFORMACIONES |
|------|------|----------------------|-----------------------------------------|--------------------|
| 5    | 1    | 0,5 m VANO 4         | -0,02 (NODO 4612)                       | ---                |
|      |      | CENTRO DE VANO       | -0,90 (NODO 3030)                       | 5                  |
|      | 2    | 0,5 m VANO 4         | -0,02 (NODO 4609)                       | ---                |
|      |      | CENTRO DE VANO       | -0,93 (NODO 3562)<br>-0,89 (NODO 4094)  | 5                  |
| 6    | 1    | CENTRO DE VANO       | 3,51 (NODO 3109)                        | -21                |
|      |      | 0,5 m VANO 7         | 0,28 (NODO 4629)                        | ---                |
|      | 2    | CENTRO DE VANO       | 3,59 (NODO 3907)                        | -20                |
|      |      | 0,5 m VANO 7         | 0,30 (NODO 4626)                        | ---                |
| 7    | 1    | CENTRO DE VANO       | -9,94 (NODO 3063)                       | 76                 |
|      |      | 0,5 m VANO 8         | -0,03 (NODO 4646)                       | ---                |
|      | 2    | CENTRO DE VANO       | -10,90 (NODO 3595)<br>-9,88 (NODO 4127) | 80                 |
|      |      | 0,5 m VANO 8         | -0,03 (NODO 4643)                       | ---                |
| 8    | 1    | CENTRO DE VANO       | -9,35 (NODO 2819)<br>-10,40 (NODO 3351) | 112                |
|      |      | 0,5 m VANO 9         | -0,31 (NODO 3190)                       | ---                |
|      |      | CENTRO DE VANO       | -10,20 (NODO 3883)                      | 116                |
|      | 2    | CENTRO DE VANO (ALA) | -8,07 (NODO 4415)                       | ---                |
|      |      | 0,5 m VANO 9         | -0,33 (NODO 3988)                       | ---                |
| 9    | 1    | CENTRO DE VANO (ALA) | 3,95 (NODO 4692)                        | ---                |
|      |      | 0,5 m ESTRIBO 2      | 0,15 (NODO 4662)<br>0,15 (NODO 4664)    | ---                |
|      |      | CENTRO DE VANO (ALA) | 3,86 (NODO 4691)                        | ---                |
|      | 2    | 0,5 m ESTRIBO 2      | 0,15 (NODO 4661)                        | ---                |
|      |      |                      |                                         |                    |

**DINÁMICAS 11, 12, 13 Y 14**  
**(locomotora GIF y 5 tolvas G.I.F. en vía 1)**

| VANO | VIGA | POSICIÓN               | FLECHA (mm) Envolvente de las deformadas |
|------|------|------------------------|------------------------------------------|
| 1    | 1    | 0,45* LUZ              | -6,31 (NODO 4533)                        |
|      | 2    | 0,5 m ESTRIBO ZARAGOZA | -0,18 (NODO 4524)                        |
|      |      | 0,45* LUZ              | -3,82 (NODO 4530)                        |
| 2    | 1    | 0,5 m VANO 1           | -0,27 (NODO 4561)                        |
|      |      | CENTRO DE VANO         | -9,82 (NODO 2691)                        |
|      |      |                        | -9,92 (NODO 3223)                        |
|      | 2    | 0,5 m VANO 1           | -0,20 (NODO 4558)                        |
|      |      | CENTRO DE VANO         | -6,94 (NODO 3755)                        |
| 3    | 1    | 0,5 m VANO 2           | -0,26 (NODO 4578)                        |
|      |      | CENTRO DE VANO         | -9,93 (NODO 2962)                        |
|      | 2    | 0,5 m VANO 2           | -0,21 (NODO 4575)                        |
|      |      | CENTRO DE VANO         | -7,14 (NODO 3760)                        |
| 4    | 1    | 0,5 m VANO 3           | -0,25 (NODO 4595)                        |
|      |      | CENTRO DE VANO         | -9,82 (NODO 2998)                        |
|      | 2    | 0,5 m VANO 3           | -0,19 (NODO 4592)                        |
|      |      | CENTRO DE VANO         | -7,05 (NODO 3796)                        |
| 5    | 1    | 0,5 m VANO 4           | -0,25 (NODO 4612)                        |
|      |      | CENTRO DE VANO         | -9,80 (NODO 3030)                        |
|      | 2    | 0,5 m VANO 4           | -0,20 (NODO 4609)                        |
|      |      | CENTRO DE VANO         | -7,49 (NODO 3562)                        |
| 6    | 1    | CENTRO DE VANO         | -9,84 (NODO 3109)                        |
|      |      | 0,5 m VANO 7           | -0,26 (NODO 4629)                        |
|      | 2    | CENTRO DE VANO         | -7,02 (NODO 3907)                        |
|      |      | 0,5 m VANO 7           | -0,20 (NODO 4626)                        |

**DINÁMICAS 11, 12, 13 Y 14 (cont.)**  
**(locomotora GIF y 5 tolvas G.I.F. en vía 1)**

| VANO | VIGA | POSICIÓN             | FLECHA (mm)       |
|------|------|----------------------|-------------------|
| 7    | 1    | CENTRO DE VANO       | -9,91 (NODO 3063) |
|      |      | 0,5 m VANO 8         | -0,26 (NODO 4646) |
|      | 2    | CENTRO DE VANO       | -7,58 (NODO 3595) |
|      |      |                      | -6,58 (NODO 4127) |
|      |      | 0,5 m VANO 8         | -0,20 (NODO 4643) |
| 8    | 1    | CENTRO DE VANO       | -9,66 (NODO 2819) |
|      |      |                      | -9,67 (NODO 3351) |
|      |      | 0,5 m VANO 9         | -0,27 (NODO 3190) |
|      | 2    | CENTRO DE VANO       | -6,89 (NODO 3883) |
|      |      | CENTRO DE VANO (ALA) | -5,52 (NODO 4415) |
|      |      | 0,5 m VANO 9         | -0,20 (NODO 3988) |
| 9    | 1    | CENTRO DE VANO (ALA) | -4,84 (NODO 4692) |
|      |      | 0,5 m ESTRIBO 2      | -0,37 (NODO 4662) |
|      |      |                      | -0,38 (NODO 4664) |
|      | 2    | CENTRO DE VANO (ALA) | -2,34 (NODO 4691) |
|      |      | 0,5 m ESTRIBO 2      | -0,18 (NODO 4661) |

## DINÁMICA 21, 22, 23 Y 24

(Tractor UTE y 5 tolvas G.I.F. en vía 2)

| VANO | VIGA | POSICIÓN               | FLECHA (mm) Envolvente de las deformadas |
|------|------|------------------------|------------------------------------------|
| 1    | 1    | 0,45* LUZ              | -3,75 (NODO 4533)                        |
|      | 2    | 0,5 m ESTRIBO ZARAGOZA | -0,33 (NODO 4524)                        |
|      |      | 0,45* LUZ              | -6,14 (NODO 4530)                        |
| 2    | 1    | 0,5 m VANO 1           | -0,20 (NODO 4561)                        |
|      |      | CENTRO DE VANO         | -6,31 (NODO 2691)                        |
|      |      |                        | -7,29 (NODO 3223)                        |
|      | 2    | 0,5 m VANO 1           | -0,26 (NODO 4558)                        |
|      |      | CENTRO DE VANO         | -9,58 (NODO 3755)                        |
| 3    | 1    | 0,5 m VANO 2           | -0,20 (NODO 4578)                        |
|      |      | CENTRO DE VANO         | -6,91 (NODO 2962)                        |
|      | 2    | 0,5 m VANO 2           | -0,25 (NODO 4575)                        |
|      |      | CENTRO DE VANO         | -9,64 (NODO 3760)                        |
| 4    | 1    | 0,5 m VANO 3           | -0,19 (NODO 4595)                        |
|      |      | CENTRO DE VANO         | -6,89 (NODO 2998)                        |
|      | 2    | 0,5 m VANO 3           | -0,24 (NODO 4592)                        |
|      |      | CENTRO DE VANO         | -9,62 (NODO 3796)                        |
| 5    | 1    | 0,5 m VANO 4           | -0,19 (NODO 4612)                        |
|      |      | CENTRO DE VANO         | -6,88 (NODO 3030)                        |
|      | 2    | 0,5 m VANO 4           | -0,24 (NODO 4609)                        |
|      |      | CENTRO DE VANO         | -9,80 (NODO 3562)                        |
|      |      |                        | -9,65 (NODO 4094)                        |
| 6    | 1    | CENTRO DE VANO         | -6,89 (NODO 3109)                        |
|      |      | 0,5 m VANO 7           | -0,19 (NODO 4629)                        |
|      | 2    | CENTRO DE VANO         | -9,65 (NODO 3907)                        |
|      |      | 0,5 m VANO 7           | -0,25 (NODO 4626)                        |

# DINÁMICA 21, 22, 23 Y 24 (cont.)

(Tractor UTE y 5 tolvas G.I.F. en vía 2)

| VANO | VIGA | POSICIÓN             | FLECHA (mm)       |
|------|------|----------------------|-------------------|
| 7    | 1    | CENTRO DE VANO       | -6,96 (NODO 3063) |
|      |      | 0,5 m VANO 8         | -0,19 (NODO 4646) |
|      | 2    | CENTRO DE VANO       | -9,89 (NODO 3595) |
|      |      |                      | -9,75 (NODO 4127) |
|      |      | 0,5 m VANO 8         | -0,25 (NODO 4643) |
| 8    | 1    | CENTRO DE VANO       | -6,24 (NODO 2819) |
|      |      |                      | -7,22 (NODO 3351) |
|      |      | 0,5 m VANO 9         | -0,19 (NODO 3190) |
|      | 2    | CENTRO DE VANO       | -9,40 (NODO 3883) |
|      |      | CENTRO DE VANO (ALA) | -8,65 (NODO 4415) |
|      |      | 0,5 m VANO 9         | -0,26 (NODO 3988) |
| 9    | 1    | CENTRO DE VANO (ALA) | -2,29 (NODO 4692) |
|      |      | 0,5 m ESTRIBO 2      | -0,18 (NODO 4662) |
|      |      |                      | -0,19 (NODO 4664) |
|      | 2    | CENTRO DE VANO (ALA) | -4,71 (NODO 4691) |
|      |      | 0,5 m ESTRIBO 2      | -0,38 (NODO 4661) |

## DINÁMICA 01

(locomotora GIF y 5 tolvas G.I.F. en vía 1-Tractor UTE y 5 tolvas GIF en vía 2)

| VANO | VIGA | POSICIÓN               | FLECHA (mm) Envolvente de las |
|------|------|------------------------|-------------------------------|
| 1    | 1    | 0,45* LUZ              | -10,06 (NODO 4533)            |
|      | 2    | 0,5 m ESTRIBO ZARAGOZA | -0,51 (NODO 4524)             |
|      |      | 0,45* LUZ              | -9,96 (NODO 4530)             |
| 2    | 1    | 0,5 m VANO 1           | -0,47 (NODO 4561)             |
|      |      | CENTRO DE VANO         | -16,13 (NODO 2691)            |
|      |      |                        | -17,21 (NODO 3223)            |
|      | 2    | 0,5 m VANO 1           | -0,46 (NODO 4558)             |
|      |      | CENTRO DE VANO         | -16,52 (NODO 3755)            |
| 3    | 1    | 0,5 m VANO 2           | -0,46 (NODO 4578)             |
|      |      | CENTRO DE VANO         | -16,84 (NODO 2962)            |
|      | 2    | 0,5 m VANO 2           | -0,46 (NODO 4575)             |
|      |      | CENTRO DE VANO         | -16,74 (NODO 3760)            |
| 4    | 1    | 0,5 m VANO 3           | -0,44 (NODO 4595)             |
|      |      | CENTRO DE VANO         | -16,71 (NODO 2998)            |
|      | 2    | 0,5 m VANO 3           | -0,43 (NODO 4592)             |
|      |      | CENTRO DE VANO         | -16,67 (NODO 3796)            |
| 5    | 1    | 0,5 m VANO 4           | -0,44 (NODO 4612)             |
|      |      | CENTRO DE VANO         | -16,68 (NODO 3030)            |
|      | 2    | 0,5 m VANO 4           | -0,44 (NODO 4609)             |
|      |      | CENTRO DE VANO         | -17,29 (NODO 3562)            |
|      |      |                        | -16,16 (NODO 4094)            |
| 6    | 1    | CENTRO DE VANO         | -16,73 (NODO 3109)            |
|      |      | 0,5 m VANO 7           | -0,45 (NODO 4629)             |
|      | 2    | CENTRO DE VANO         | -16,67 (NODO 3907)            |
|      |      | 0,5 m VANO 7           | -0,45 (NODO 4626)             |

### DINÁMICA 01 (cont.)

(locomotora GIF y 5 tolvas G.I.F. en vía 1-Tractor UTE y 5 tolvas GIF en vía 2)

| VANO | VIGA | POSICIÓN             | FLECHA (mm)        |
|------|------|----------------------|--------------------|
| 7    | 1    | CENTRO DE VANO       | -16,87 (NODO 3063) |
|      |      | 0,5 m VANO 8         | -0,45 (NODO 4646)  |
|      | 2    | CENTRO DE VANO       | -17,47 (NODO 3595) |
|      |      |                      | -16,33 (NODO 4127) |
|      |      | 0,5 m VANO 8         | -0,45 (NODO 4643)  |
| 8    | 1    | CENTRO DE VANO       | -15,90 (NODO 2819) |
|      |      |                      | -16,89 (NODO 3351) |
|      |      | 0,5 m VANO 9         | -0,46 (NODO 3190)  |
|      | 2    | CENTRO DE VANO       | -16,29 (NODO 3883) |
|      |      | CENTRO DE VANO (ALA) | -14,17 (NODO 4415) |
|      |      | 0,5 m VANO 9         | -0,46 (NODO 3988)  |
| 9    | 1    | CENTRO DE VANO (ALA) | -7,13 (NODO 4692)  |
|      |      | 0,5 m ESTRIBO 2      | -0,55 (NODO 4662)  |
|      |      |                      | -0,57 (NODO 4664)  |
|      | 2    | CENTRO DE VANO (ALA) | -7,05 (NODO 4691)  |
|      |      | 0,5 m ESTRIBO 2      | -0,56 (NODO 4661)  |

El valor estimado para la frecuencia fundamental de flexión del tablero es de 2,23 Hz.

## **7.- PRUEBA DE CARGA.**

Durante los días previos a la realización de la prueba de carga se realizaron los trabajos previos de instrumentación del puente de acuerdo con el programa ya fijado al que nos hemos referido en apartados anteriores.

Finalizada la instrumentación se procedió a la verificación de todas las conexiones, comprobación del perfecto funcionamiento de los equipos de amplificación y registro y, por último, prueba del conjunto completo de instrumentos mediante la grabación de las señales producidas por la calibración automática de los equipos.

### ***7.1.-DESCRIPCIÓN.***

La prueba de carga del puente se realizó el día 18 de julio bajo la supervisión de D. Justo Carretero Pérez, Jefe de Instrumentación de la empresa TIFSA, adjudicataria de los trabajos, y de D. José Manuel Galindo Escribano, como representante del GIF.

Se emplearon diversos trenes de carga para las diversas pruebas, combinando una locomotora GIF (con un peso total de 120 ton repartidos entre sus seis ejes según 20 ton/eje), un tractor (con un peso total de 88 ton repartidos entre sus cuatro ejes según 22 ton/eje), una locomotora 319 (con un peso total de 112 ton repartidos entre sus seis ejes según 18.67 ton/eje), y diversas tolvas GIF (con un peso total de 80 ton repartidos entre sus cuatro ejes según 20 ton/eje), tolvas RENFE (con un peso total de 80 ton repartidos entre sus cuatro ejes según 20 ton/eje) y tolvas rumanas (con un peso total de 80 ton repartidos entre sus cuatro ejes según 20 ton/eje).

El plan de pruebas se desarrolló según dos etapas, estudiándose conjuntos de tramos consecutivos en días diferentes: de este modo, se realizaron por separado las pruebas en el tramo 1-2-3-4-5, por un lado, y en el 6-7-8-9, por otro. En cada una de las etapas se realizaron las siguientes pruebas, que se aprecian en los planos.

- Prueba estática N°1 (Estática 01). Para el tramo 1-2-3-4-5 la prueba se realiza con la locomotora GIF + 2 tolvas GIF situadas en el vano 1 del viaducto y 3 tolvas GIF en el



vano 3 del viaducto, por la Vía I, así como el tractor + 2 tolvas en el vano 1 del viaducto, la primera RENFE y la segunda GIF y 3 tolvas GIF en el vano 3 del viaducto, por la Vía II.

Para el tramo 6-7-8-9 la prueba se realiza con la locomotora GIF + 2 tolvas GIF situadas en el vano 7 del viaducto y 3 tolvas GIF en el vano 9 del viaducto, por la Vía II, así como la locomotora 319+ 2 tolvas RENFE en el vano 7 del viaducto y 3 tolvas en el vano 9 del viaducto, la primera rumana y las otras dos RENFE, por la Vía I. El tiempo aproximado de puesta en carga de los tableros es de 30 minutos y el tiempo de grabación de la recuperación en torno a los 2 minutos. El tiempo total de grabación es del orden de 37 minutos.

- Prueba estática N°2 (Estática 02). Para el tramo 1-2-3-4-5 la prueba se realiza con la locomotora GIF + 2 tolvas GIF situadas en el vano 2 del viaducto y 3 tolvas GIF en el vano 4 del viaducto, por la Vía I, así como el tractor + 2 tolvas en el vano 2 del viaducto, la primera RENFE y la segunda GIF y 3 tolvas GIF en el vano 4 del viaducto, por la Vía II .

Para el tramo 6-7-8-9 la prueba se realiza con la locomotora GIF + 2 tolvas GIF situadas en el vano 6 del viaducto y 3 tolvas GIF en el vano 8 del viaducto, por la Vía II, así como la locomotora 319+ 2 tolvas RENFE en el vano 6 del viaducto y 3 tolvas en el vano 8 del viaducto, la primera rumana y las otras dos RENFE, por la Vía I. El tiempo aproximado de puesta en carga de los tableros es de 28 minutos y el tiempo de grabación de la recuperación en torno a los 2 minutos. El tiempo total de grabación es del orden de 35 minutos.

- Prueba estática N°3 (Estática 03). Para el tramo 1-2-3-4-5 la prueba se realiza con la locomotora GIF + 2 tolvas GIF situadas en el vano 3 del viaducto y 3 tolvas GIF en el vano 5 del viaducto, por la Vía I, así como el tractor + 2 tolvas en el vano 3 del viaducto, la primera RENFE y la segunda GIF y 3 tolvas GIF en el vano 5 del viaducto, por la Vía II.

Para el tramo 6-7-8-9 la prueba se realiza con la locomotora GIF + 5 tolvas GIF situados en los vanos 7 y 8 del viaducto, por la Vía II, así como la locomotora 319 + 5 tolvas, la tercera de las cuales es rumana y el resto RENFE, situados en los vanos 7 y 8 del viaducto, por la Vía I. El tiempo aproximado de puesta en carga de los tableros es de 24 minutos y el tiempo de grabación de la recuperación en torno a los 2 minutos. El tiempo total de grabación es del orden de 30 minutos.

- Prueba estática N°4 (Estática 04). Para el tramo 1-2-3-4-5 la prueba se realiza con la locomotora GIF + 5 tolvas GIF situados en los vanos 3 y 4 del viaducto, por la Vía I, así como el tractor + 5 tolvas, la primera de las cuales es RENFE y el resto GIF, situados en los vanos 3 y 4 del viaducto, por la Vía II. El tiempo aproximado de puesta en carga de los tableros es de 21 minutos y el tiempo de grabación de la recuperación en torno a los 2 minutos. El tiempo total de grabación es del orden de 28 minutos.

El tramo 6-7-8-9 no se ensaya en esta prueba.

- **Prueba dinámica a 5 km/h (Dinámica 11)**, también denominada cuasi-estática, circulando la locomotora GIF + 5 tolvas por la Vía I.
- **Prueba dinámica a 5 km/h (Dinámica 21)**, también denominada cuasi-estática, circulando el tractor + 5 tolvas por la Vía II.
- **Prueba dinámica a 5 km/h (Dinámica 01)**, también denominada cuasi-estática, por ambas vías simultáneamente, circulando la locomotora GIF + 5 tolvas por la Vía I y el tractor + 5 tolvas por la Vía II.
- **Prueba dinámica a 40 km/h (Dinámica 12)**, circulando la locomotora GIF + 5 tolvas a 40 km/h por la Vía I.
- **Prueba dinámica a 80 km/h (Dinámica 13)**, circulando la locomotora GIF + 5 tolvas a 80 km/h por la Vía I.

- **Prueba de frenado a 80 km/h (Dinámica 14)**, circulando la locomotora GIF + 5 tolvas a 80 km/h por la Vía I y efectuando un frenado completo.
- **Prueba dinámica a 40 km/h (DIN22)**, circulando el tractor + 5 tolvas a 40 km/h por la Vía II.
- **Prueba dinámica a 80 km/h (DIN23)**, circulando el tractor + 5 tolvas a 80 km/h por la Vía II.
- **Prueba de frenado a 80 km/h (DIN24)**, circulando el tractor + 5 tolvas a 80 km/h por la Vía II y efectuando un frenado completo.

El sentido de circulación fue de Lérida a Zaragoza, procediéndose antes y después a calibrar los aparatos de medida para obtener una perfecta correlación entre la señal producida y el fenómeno físico que la origina.

Las pruebas llevadas a cabo durante el día 31 de julio de 2001, comenzaron a las 17 h 08 min, finalizando a las 21 h 18 min, con una duración de 4 hora y 10 min. y las llevadas a cabo durante el día 2 de agosto de 2001, comenzaron a las 15 h 02 min, finalizando a las 21 h 45 min, con una duración de 6 hora y 43 min.

Después de cada prueba dinámica se dejaba un tiempo mínimo de dos minutos para asegurar la recuperación total de la estructura y aprovechar para realizar un chequeo rápido de las medidas obtenidas.

La temperatura durante las pruebas osciló entre 31,5 y 34,5 °C y la humedad entre 31 y 34,6 %.

Por último, cabe señalar que al finalizar el ensayo se procedió a visualizar gráficamente los resultados para garantizar su correcta ejecución y comprobar si existía alguna anomalía en el funcionamiento resistente de la estructura.

## **7.2.- RESULTADOS OBTENIDOS.**

En el ANEJO 4 - Registro de Medidas, se adjuntan los gráficos correspondientes a todos los puntos de medida definidos de acuerdo con la numeración establecida en los planos de instrumentación.

Los resultados correspondientes a las pruebas estáticas se colocan en primer lugar, y tras ellos, se colocan los resultados de las pruebas dinámicas, facilitándose de esta forma la comprensión y el análisis comparativo entre los valores de cada una.

En cuanto a los registros del acelerómetro se agrupan los resultados de las pruebas dinámicas, y tras ellos se coloca espectro de frecuencias que se obtiene en gabinete, como representativo del tablero, seleccionado de la prueba en la que se consigue mejor excitación, una vez estudiados el conjunto de registros mediante el análisis individual de cada uno de sus espectros de frecuencias.

Las pruebas registradas se identifican de acuerdo con su carácter, estático, dinámico o de frenado, y adicionando un código que indica su orden o la velocidad a que han sido realizadas.

Las señales son grabadas en soporte digital e introducidas en un ordenador y una vez procesadas, se dibujan en coordenadas de tiempo y unidades del fenómeno físico medido.

Los valores medidos para cada transductor se presentan en las tablas comparativas que aparecen en los apartados siguientes del presente informe. Para las flechas dinámicas se recogen los valores máximos absolutos y en las pruebas estáticas aparecen los valores estabilizados. Los registros pueden consultarse en el ANEJO 4 - Registros de Medidas; mientras que en el ANEJO 3 - Esquema de Instrumentación y Tren de Cargas, se recoge un croquis con todos los puntos instrumentados. Los resultados vienen expresados en mm.

### **A) Resultados de las Prueba Estáticas.**

Los valores medidos durante la realización de las pruebas de carga para los transductores de desplazamiento instrumentados correspondientes a flechas son los que a se recogen en las tablas a continuación.

Dicho valor medido, se refiere a la flecha bruta, es decir, a la medida efectuada con transductores sin tener en cuenta los descensos de los apoyos por deformación de los apoyos. Dado que el acceso a dichos apoyos para la colocación de los sensores no fue posible por el reducido espacio existente entre viga y altar, estos se han dispuesto en la zona más próxima a unos 45 cm, a ras de los paramentos de estribos, lo que origina una cierta separación de los mismos. Las medidas tomadas en estos puntos serán trasladadas mediante una aproximación lineal al apoyo, haciendo una corrección para contrarrestar la deformación elástica de la estructura en estos puntos. A continuación se halla un descenso medio corregido para los apoyos.

El valor teórico de los apoyos se corresponde con la flecha teórica a la distancia real donde se disponen los transductores de apoyo. El valor neto de los mismos es precisamente el valor medido menos ese valor teórico. Este valor neto es el que se utiliza para calcular las flechas netas.

Dentro de la columna de los valores esperados, se incluyen aquellos obtenidos del cálculo teórico, teniendo en cuenta el módulo de elasticidad estático. Tanto para flechas como para galgas situadas en el centro de vano se presenta una columna complementaria de porcentajes alcanzados respecto a los esperados. También se añade para ellos una fila con los valores medios.

| ESTÁTICA 01 (Vanos 1-2-3-4-5) |        |    |              |                   |            |               |             |
|-------------------------------|--------|----|--------------|-------------------|------------|---------------|-------------|
| PUNTO                         | SECC   | UD | VALOR MEDIDO | DESCENSO NEOPRENO | VALOR NETO | VALOR TEÓRICO | % MED/TEOR* |
| P011                          | 0.45L  | mm | -8,91        | -0,16             | -8,75      | -10,40        | 84,2%       |
| P012                          | "      | "  | -8,24        | -0,16             | -8,08      | -10,10        | 80,0%       |
| MEDIA                         | "      | "  | -8,58        | -0,16             | -8,42      | -10,25        | 82,1%       |
| P021                          | L/2    | "  | 5,74         | -0,57             | 6,31       | 8,84          | 71,3%       |
| P022                          | "      | "  | 5,73         | -0,57             | 6,30       | 8,49          | 74,1%       |
| P023                          | "      | "  | 6,15         | -0,57             | 6,72       | 8,59          | 78,2%       |
| MEDIA                         | "      | "  | 5,94         | -0,57             | 6,51       | 8,54          | 76,2%       |
| P031                          | "      | "  | -16,89       | -0,67             | -16,22     | -17,40        | 93,2%       |
| P032                          | "      | "  | -16,06       | -0,67             | -15,39     | -17,40        | 88,4%       |
| MEDIA                         | "      | "  | -16,48       | -0,67             | -15,81     | -17,40        | 90,8%       |
| P041                          | "      | "  | 3,83         | -0,19             | 4,02       | 5,86          | 68,6%       |
| P042                          | "      | "  | 3,72         | -0,19             | 3,91       | 5,86          | 66,8%       |
| MEDIA                         | "      | "  | 3,78         | -0,19             | 3,97       | 5,86          | 67,7%       |
| P051                          | L/2    | mm | -0,94        | 0,01              | -0,95      | -1,49         | 63,8%       |
| P052                          | "      | "  | -0,84        | 0,01              | -0,85      | -1,48         | 57,4%       |
| P053                          | "      | "  | -0,85        | 0,01              | -0,86      | -1,50         | 57,3%       |
| MEDIA                         | "      | "  | -0,85        | 0,01              | -0,86      | -1,49         | 57,4%       |
| P014                          | Apoyos | mm | -0,66        |                   | -0,10      | -0,56         |             |
| P024                          | "      | "  | 0,16         |                   | -0,24      | 0,40          |             |
| P025                          | "      | "  | 0,25         |                   | -0,13      | 0,38          |             |
| MEDIA                         | "      | "  | 0,21         |                   | -0,19      | 0,39          |             |
| P033                          | "      | "  | -1,67        |                   | -1,11      | -0,56         |             |
| P034                          | "      | "  | -1,34        |                   | -0,78      | -0,56         |             |
| MEDIA                         | "      | "  | -1,51        |                   | -0,95      | -0,56         |             |
| P043                          | "      | "  | 0,09         |                   | -0,37      | 0,46          |             |
| P044                          | "      | "  | 0,04         |                   | -0,42      | 0,46          |             |
| MEDIA                         | "      | "  | 0,07         |                   | -0,40      | 0,46          |             |
| P054                          | Apoyos | mm | -0,10        |                   | 0,01       | -0,11         |             |
| P055                          | "      | "  | -0,10        |                   | 0,01       | -0,11         |             |
| MEDIA                         | "      | "  | -0,10        |                   | 0,01       | -0,11         |             |
| G011                          | 0.45L  | με | 88,41        |                   |            | 105,00        | 84,2%       |
| G022                          | L/2    | "  | -31,76       |                   |            | -49,00        | 64,8%       |
| G031                          | "      | "  | 93,31        |                   |            | 121,00        | 77,1%       |
| G032                          | "      | "  | 103,64       |                   |            | 121,00        | 85,7%       |
| MEDIA                         | "      | "  | 98,48        |                   |            | 121,00        | 81,4%       |
| G041                          | "      | "  | -21,82       |                   |            | -35,00        | 62,3%       |
| G042                          | "      | "  | -21,86       |                   |            | -35,00        | 62,5%       |
| MEDIA                         | "      | "  | -21,84       |                   |            | -35,00        | 62,4%       |
| G051                          | L/2    | με | 3,49         |                   |            | 8,00          | 43,6%       |

\* La diferencia entre el valor medido y el descenso de neoprenos se corresponde con el valor neto, que es el utilizado para la relación porcentual indicada en las tablas.

| ESTÁTICA 01 (Vanos 6-7-8-9) |        |    |              |                   |            |               |             |
|-----------------------------|--------|----|--------------|-------------------|------------|---------------|-------------|
| PUNTO                       | SECC   | UD | VALOR MEDIDO | DESCENSO NEOPRENO | VALOR NETO | VALOR TEÓRICO | % MED/TEOR* |
| P061                        | "      | "  | 3,61         | 0,34              | 3,27       | 5,50          | 59,5%       |
| P062                        | "      | "  | 3,56         | 0,34              | 3,22       | 5,49          | 58,7%       |
| MEDIA                       | "      | "  | 3,59         | 0,34              | 3,25       | 5,50          | 59,1%       |
| P071                        | "      | "  | -13,48       | -0,31             | -13,18     | -16,30        | 80,8%       |
| P072                        | "      | "  | -14,37       | -0,31             | -14,07     | -17,10        | 82,3%       |
| P073                        | "      | "  | -13,74       | -0,31             | -13,44     | -16,20        | 82,9%       |
| MEDIA                       | "      | "  | -14,06       | -0,31             | -13,75     | -16,65        | 82,6%       |
| P081                        | L/2    | mm | 4,67         | -0,50             | 5,17       | 8,73          | 59,2%       |
| P082                        | "      | "  | 5,46         | -0,50             | 5,96       | 8,38          | 71,1%       |
| P083                        | "      | "  | 5,02         | -0,50             | 5,52       | 8,68          | 63,6%       |
| P084                        | "      | "  | 5,74         | -0,50             | 6,24       | 9,62          | 64,8%       |
| MEDIA                       | "      | "  | 5,38         | -0,50             | 5,88       | 9,15          | 64,2%       |
| P091                        | 0,45L  | "  | -6,48        | 0,15              | -6,63      | -8,14         | 81,4%       |
| P092                        | "      | "  | -6,32        | 0,15              | -6,47      | -8,35         | 77,5%       |
| MEDIA                       | "      | "  | -6,40        | 0,15              | -6,55      | -8,25         | 79,4%       |
| P063                        | "      | "  | 0,29         |                   | 0,32       | -0,03         |             |
| P064                        | "      | "  | 0,33         |                   | 0,36       | -0,03         |             |
| MEDIA                       | "      | "  | 0,31         |                   | 0,34       |               |             |
| P074                        | "      | "  | -1,45        |                   | -0,96      | -0,49         |             |
| P075                        | "      | "  | -1,45        |                   | -0,94      | -0,51         |             |
| MEDIA                       | "      | "  | -1,45        |                   | -0,95      |               |             |
| P085                        | Apoyos | mm | 0,29         |                   | -0,10      | 0,39          |             |
| P086                        | "      | "  | 0,41         |                   | 0,01       | 0,40          |             |
| MEDIA                       | "      | "  | 0,35         |                   | -0,05      |               |             |
| P093                        | "      | "  | -0,52        |                   | 0,03       | -0,55         |             |
| P094                        | "      | "  | -0,66        |                   | -0,07      | -0,59         |             |
| P095                        | "      | "  | 0,49         |                   | 1,06       | -0,57         |             |
| MEDIA                       | "      | "  | -0,23        |                   | 0,34       |               |             |
| G061                        | "      | "  | -19,19       |                   |            | -31,00        | 61,9%       |
| G062                        | "      | "  | -20,83       |                   |            | -31,00        | 67,2%       |
| MEDIA                       | "      | "  | -20,01       |                   |            | -31,00        | 64,5%       |
| G071                        | "      | "  | 85,35        |                   |            | 113,00        | 75,5%       |
| G072                        | "      | "  | 81,05        |                   |            | 115,00        | 70,5%       |
| MEDIA                       | "      | "  | 83,20        |                   |            | 114,00        | 73,0%       |
| G081                        | L/2    | μe | -28,25       |                   |            | -49,00        | 57,7%       |
| G082                        | "      | "  | -29,31       |                   |            | -48,00        | 61,1%       |
| MEDIA                       | "      | "  | -28,78       |                   |            | -48,50        | 59,3%       |

\* La diferencia entre el valor medido y el descenso de neoprenos se corresponde con el valor neto, que es el utilizado para la relación porcentual indicada en las tablas.

| ESTÁTICA 02 (Vanos 1-2-3-4-5) |        |    |              |                   |            |               |             |
|-------------------------------|--------|----|--------------|-------------------|------------|---------------|-------------|
| PUNTO                         | SECC   | UD | VALOR MEDIDO | DESCENSO NEOPRENO | VALOR NETO | VALOR TEÓRICO | % MED/TEOR* |
| P011                          | 0.45L  | mm | 3,14         | -0,47             | 3,61       | 4,93          | 73,2%       |
| P012                          | "      | "  | 3,33         | -0,47             | 3,80       | 4,89          | 77,6%       |
| MEDIA                         | "      | "  | 3,24         | -0,47             | 3,70       | 4,91          | 75,4%       |
| P021                          | L/2    | "  | -14,50       | -0,30             | -14,20     | -16,70        | 85,0%       |
| P022                          | "      | "  | -15,08       | -0,30             | -14,78     | -17,50        | 84,5%       |
| P023                          | "      | "  | -14,57       | -0,30             | -14,27     | -16,80        | 84,9%       |
| MEDIA                         | "      | "  | -14,72       | -0,30             | -14,53     | -17,15        | 84,7%       |
| P031                          | "      | "  | 7,97         | 0,26              | 7,71       | 10,90         | 70,7%       |
| P032                          | "      | "  | 8,48         | 0,26              | 8,22       | 10,90         | 75,4%       |
| MEDIA                         | "      | "  | 8,23         | 0,26              | 7,97       | 10,90         | 73,1%       |
| P041                          | "      | "  | -14,55       | 0,01              | -14,56     | -17,90        | 81,3%       |
| P042                          | "      | "  | -13,77       | 0,01              | -13,78     | -17,90        | 77,0%       |
| MEDIA                         | "      | "  | -14,16       | 0,01              | -14,17     | -17,90        | 79,1%       |
| P051                          | L/2    | mm | 3,97         | 0,01              | 3,96       | 6,03          | 65,7%       |
| P052                          | "      | "  | 3,73         | 0,01              | 3,72       | 5,95          | 62,5%       |
| P053                          | "      | "  | 3,70         | 0,01              | 3,69       | 6,11          | 60,4%       |
| MEDIA                         | "      | "  | 3,80         | 0,01              | 3,71       | 6,03          | 61,4%       |
| P014                          | Apoyos | mm | 0,20         |                   | -0,02      | 0,22          |             |
| P024                          | "      | "  | -1,41        |                   | -0,92      | -0,49         |             |
| P025                          | "      | "  | -0,95        |                   | -0,46      | -0,49         |             |
| MEDIA                         | "      | "  | -1,18        |                   | -0,69      | -0,49         |             |
| P033                          | "      | "  | 0,48         |                   | -0,08      | 0,56          |             |
| P034                          | "      | "  | 0,85         |                   | 0,26       | 0,59          |             |
| MEDIA                         | "      | "  | 0,67         |                   | 0,09       | 0,58          |             |
| P043                          | "      | "  | -0,21        |                   | 0,37       | -0,58         |             |
| P044                          | "      | "  | -0,09        |                   | 0,49       | -0,58         |             |
| MEDIA                         | "      | "  | -0,15        |                   | 0,43       | -0,58         |             |
| P054                          | Apoyos | mm | -0,03        |                   | -0,48      | 0,45          |             |
| P055                          | "      | "  | 0,10         |                   | -0,35      | 0,45          |             |
| MEDIA                         | "      | "  | 0,04         |                   | -0,42      | 0,45          |             |
| G011                          | 0.45L  | με | -25,36       |                   |            | -39,00        | 65,0%       |
| G022                          | L/2    | "  | 83,94        |                   |            | 116,00        | 72,4%       |
| G031                          | "      | "  | -41,59       |                   |            | -61,00        | 68,2%       |
| G032                          | "      | "  | -48,36       |                   |            | -61,00        | 79,3%       |
| MEDIA                         | "      | "  | -44,98       |                   |            | -61,00        | 73,7%       |
| G041                          | "      | "  | 90,96        |                   |            | 124,00        | 73,4%       |
| G042                          | "      | "  | 94,10        |                   |            | 124,00        | 75,9%       |
| MEDIA                         | "      | "  | 92,53        |                   |            | 124,00        | 74,6%       |
| G051                          | L/2    | με | -19,57       |                   |            | -34,00        | 57,6%       |

\* La diferencia entre el valor medido y el descenso de neoprenos se corresponde con el valor neto, que es el utilizado para la relación porcentual indicada en las tablas.



| ESTÁTICA 02 (Vanos 6-7-8-9) |        |    |              |                   |            |               |             |
|-----------------------------|--------|----|--------------|-------------------|------------|---------------|-------------|
| PUNTO                       | SECC   | UD | VALOR MEDIDO | DESCENSO NEOPRENO | VALOR NETO | VALOR TEÓRICO | % MED/TEOR* |
| P061                        | L/2    | mm | -14,02       | -0,97             | -13,06     | -16,60        | 78,6%       |
| P062                        | "      | "  | -14,42       | -0,97             | -13,46     | -16,90        | 79,6%       |
| MEDIA                       | "      | "  | -14,22       | -0,97             | -13,26     | -16,75        | 79,1%       |
| P071                        | "      | "  | 6,61         | -0,46             | 7,07       | 10,30         | 68,7%       |
| P072                        | "      | "  | 6,67         | -0,46             | 7,13       | 10,20         | 69,9%       |
| P073                        | "      | "  | 6,79         | -0,46             | 7,25       | 10,50         | 69,1%       |
| MEDIA                       | "      | "  | 6,69         | -0,46             | 7,19       | 10,35         | 69,5%       |
| P081                        | L/2    | mm | -11,67       | -0,33             | -11,34     | -16,00        | 70,9%       |
| P082                        | "      | "  | -14,67       | -0,33             | -14,34     | -17,00        | 84,4%       |
| P083                        | "      | "  | -12,98       | -0,33             | -12,65     | -16,80        | 75,3%       |
| P084                        | "      | "  | -12,73       | -0,33             | -12,40     | -15,10        | 82,1%       |
| MEDIA                       | "      | "  | -13,01       | -0,33             | -12,53     | -15,95        | 78,5%       |
| P091                        | 0,45L  | "  | 3,14         | -0,43             | 3,57       | 5,40          | 66,1%       |
| P092                        | "      | "  | 3,27         | -0,43             | 3,70       | 5,36          | 69,1%       |
| MEDIA                       | "      | "  | 3,21         | -0,43             | 3,64       | 5,38          | 67,6%       |
| P063                        | Apoyos | "  | -1,47        |                   | -0,95      | -0,52         |             |
| P064                        | "      | "  | -1,52        |                   | -0,98      | -0,54         |             |
| MEDIA                       | "      | "  | -1,50        |                   | -0,97      | -0,53         |             |
| P074                        | "      | "  | 0,54         |                   | 0,03       | 0,51          |             |
| P075                        | "      | "  | 0,57         |                   | 0,05       | 0,52          |             |
| MEDIA                       | "      | "  | 0,56         |                   | 0,04       | 0,52          |             |
| P085                        | Apoyos | mm | -1,14        |                   | -0,68      | -0,46         |             |
| P086                        | "      | "  | -1,19        |                   | -0,72      | -0,47         |             |
| MEDIA                       | "      | "  | -1,17        |                   | -0,70      | -0,47         |             |
| P093                        | "      | "  | 0,21         |                   | -0,01      | 0,22          |             |
| P094                        | "      | "  | 0,17         |                   | -0,05      | 0,22          |             |
| P095                        | "      | "  | -0,21        |                   | -0,43      | 0,22          |             |
| MEDIA                       | "      | "  | 0,06         |                   | -0,16      | 0,22          |             |
| G061                        | L/2    | με | 80,78        |                   |            | 116,00        | 69,6%       |
| G062                        | "      | "  | 95,79        |                   |            | 120,00        | 79,8%       |
| MEDIA                       | "      | "  | 88,29        |                   |            | 118,00        | 74,8%       |
| G071                        | "      | "  | -35,77       |                   |            | -58,00        | 61,7%       |
| G072                        | "      | "  | -33,93       |                   |            | -57,00        | 59,5%       |
| MEDIA                       | "      | "  | -34,85       |                   |            | -57,50        | 60,6%       |
| G081                        | L/2    | με | 78,35        |                   |            | 112,00        | 70,0%       |
| G082                        | "      | "  | 84,14        |                   |            | 116,00        | 72,5%       |
| MEDIA                       | "      | "  | 81,25        |                   |            | 114,00        | 71,3%       |

\*La diferencia entre el valor medido y el descenso de neoprenos se corresponde con el valor neto, que es el utilizado para la relación porcentual indicada en las tablas.

| ESTÁTICA 03 (Vanos 1-2-3-4-5) |        |    |              |                   |            |               |             |
|-------------------------------|--------|----|--------------|-------------------|------------|---------------|-------------|
| PUNTO                         | SECC   | UD | VALOR MEDIDO | DESCENSO NEOPRENO | VALOR NETO | VALOR TEÓRICO | % MED/TEOR* |
| P011                          | 0.45L  | mm | -0,73        | 0,08              | -0,81      | -1,25         | 64,8%       |
| P012                          | "      | "  | -0,73        | 0,08              | -0,81      | -1,25         | 64,8%       |
| MEDIA                         | "      | "  | -0,73        | 0,08              | -0,81      | -1,25         | 64,8%       |
| P021                          | L/2    | "  | 3,65         | -0,42             | 4,07       | 5,78          | 70,5%       |
| P022                          | "      | "  | 3,74         | -0,42             | 4,16       | 5,60          | 74,3%       |
| P023                          | "      | "  | 4,14         | -0,42             | 4,56       | 5,66          | 80,6%       |
| MEDIA                         | "      | "  | 3,84         | -0,42             | 4,36       | 5,63          | 77,5%       |
| P031                          | "      | "  | -16,41       | -0,70             | -15,71     | -17,30        | 90,8%       |
| P032                          | "      | "  | -15,11       | -0,70             | -14,41     | -17,00        | 84,8%       |
| MEDIA                         | "      | "  | -15,76       | -0,70             | -15,06     | -17,15        | 87,8%       |
| P041                          | "      | "  | 6,94         | -0,34             | 7,28       | 11,00         | 66,2%       |
| P042                          | "      | "  | 7,07         | -0,34             | 7,41       | 11,00         | 67,3%       |
| MEDIA                         | "      | "  | 7,01         | -0,34             | 7,34       | 11,00         | 66,8%       |
| P051                          | L/2    | mm | -15,52       | 0,01              | -15,53     | -17,80        | 87,2%       |
| P052                          | "      | "  | -14,45       | 0,01              | -14,46     | -18,30        | 79,0%       |
| P053                          | "      | "  | -13,25       | 0,01              | -13,26     | -17,40        | 76,2%       |
| MEDIA                         | "      | "  | -14,41       | 0,01              | -13,86     | -17,85        | 77,6%       |
| P014                          | Apoyos | mm | -0,03        |                   | 0,03       | -0,06         |             |
| P024                          | "      | "  | 0,16         |                   | 0,04       | 0,12          |             |
| P025                          | "      | "  | 0,29         |                   | 0,17       | 0,12          |             |
| MEDIA                         | "      | "  | 0,23         |                   | 0,11       | 0,12          |             |
| P033                          | "      | "  | -1,77        |                   | -1,27      | -0,50         |             |
| P034                          | "      | "  | -1,13        |                   | -0,63      | -0,50         |             |
| MEDIA                         | "      | "  | -1,45        |                   | -0,95      | -0,50         |             |
| P043                          | "      | "  | 0,08         |                   | -0,46      | 0,54          |             |
| P044                          | "      | "  | 0,11         |                   | -0,43      | 0,54          |             |
| MEDIA                         | "      | "  | 0,10         |                   | -0,45      | 0,54          |             |
| P054                          | Apoyos | mm | -0,77        |                   | -0,19      | -0,58         |             |
| P055                          | "      | "  | -0,85        |                   | -0,27      | -0,58         |             |
| MEDIA                         | "      | "  | -0,81        |                   | -0,23      | -0,58         |             |
| G011                          | 0.45L  | με | 5,85         |                   |            | 10,00         | 58,5%       |
| G022                          | L/2    | "  | -21,49       |                   |            | -32,00        | 67,2%       |
| G031                          | "      | "  | 93,44        |                   |            | 120,00        | 77,9%       |
| G032                          | "      | "  | 94,54        |                   |            | 120,00        | 78,8%       |
| MEDIA                         | "      | "  | 93,99        |                   |            | 120,00        | 78,3%       |
| G041                          | "      | "  | -40,34       |                   |            | -61,00        | 66,1%       |
| G042                          | "      | "  | -41,73       |                   |            | -61,00        | 68,4%       |
| MEDIA                         | "      | "  | -41,04       |                   |            | -61,00        | 67,3%       |
| G051                          | L/2    | με | 79,82        |                   |            | 123,00        | 64,9%       |

\*La diferencia entre el valor medido y el descenso de neoprenos se corresponde con el valor neto, que es el utilizado para la relación porcentual indicada en las tablas.

| ESTÁTICA 03 (Vanos 6-7-8-9) |        |    |              |                   |            |               |             |
|-----------------------------|--------|----|--------------|-------------------|------------|---------------|-------------|
| PUNTO                       | SECC   | UD | VALOR MEDIDO | DESCENSO NEOPRENO | VALOR NETO | VALOR TEÓRICO | % MED/TEOR* |
| P061                        | L/2    | “  | 2,21         | -0,18             | 2,39       | 3,51          | 68,1%       |
| P062                        | “      | “  | 2,35         | -0,18             | 2,53       | 3,59          | 70,5%       |
| MEDIA                       | “      | “  | 2,28         | -0,18             | 2,46       | 3,55          | 69,3%       |
| P071                        | “      | “  | -9,58        | -0,60             | -8,98      | -9,94         | 90,4%       |
| P072                        | “      | “  | -10,61       | -0,60             | -10,01     | -10,90        | 91,9%       |
| P073                        | “      | “  | -9,97        | -0,60             | -9,37      | -9,88         | 94,9%       |
| MEDIA                       | “      | “  | -10,05       | -0,60             | -9,69      | -10,39        | 93,3%       |
| P081                        | L/2    | mm | -8,07        | -0,81             | -7,26      | -9,35         | 77,7%       |
| P082                        | “      | “  | -10,21       | -0,81             | -9,40      | -10,40        | 90,4%       |
| P083                        | “      | “  | -9,18        | -0,81             | -8,37      | -10,20        | 82,1%       |
| P084                        | “      | “  | -8,52        | -0,81             | -7,71      | -8,07         | 95,6%       |
| MEDIA                       | “      | “  | -9,00        | -0,81             | -8,04      | -9,14         | 88,0%       |
| P091                        | 0,45L  | “  | 2,38         | -0,39             | 2,77       | 3,95          | 70,2%       |
| P092                        | “      | “  | 2,45         | -0,39             | 2,84       | 3,86          | 73,6%       |
| MEDIA                       | “      | “  | 2,42         | -0,39             | 2,81       | 3,91          | 71,9%       |
| P063                        | Apoyos | “  | 0,06         |                   | -0,22      | 0,28          |             |
| P064                        | “      | “  | 0,16         |                   | -0,14      | 0,30          |             |
| MEDIA                       | “      | “  | 0,11         |                   | -0,18      | 0,29          |             |
| P074                        | “      | “  | -0,95        |                   | -0,92      | -0,03         |             |
| P075                        | “      | “  | -1,14        |                   | -1,11      | -0,03         |             |
| MEDIA                       | “      | “  | -1,05        |                   | -1,02      | -0,03         |             |
| P085                        | Apoyos | mm | -0,89        |                   | -0,58      | -0,31         |             |
| P086                        | “      | “  | -0,93        |                   | -0,62      | -0,31         |             |
| MEDIA                       | “      | “  | -0,91        |                   | -0,60      | -0,31         |             |
| P093                        | “      | “  | 0,16         |                   | 0,01       | 0,15          |             |
| P094                        | “      | “  | -0,13        |                   | -0,28      | 0,15          |             |
| P095                        | “      | “  | -0,13        |                   | -0,28      | 0,15          |             |
| MEDIA                       | “      | “  | -0,03        |                   | -0,18      | 0,15          |             |
| G061                        | L/2    | “  | -13,86       |                   |            | -21,00        | 66,0%       |
| G062                        | “      | “  | -14,36       |                   |            | -20,00        | 71,8%       |
| MEDIA                       | “      | “  | -14,11       |                   |            | -20,50        | 68,8%       |
| G071                        | “      | “  | 60,99        |                   |            | 76,00         | 80,3%       |
| G072                        | “      | “  | 64,68        |                   |            | 80,00         | 80,9%       |
| MEDIA                       | “      | “  | 62,84        |                   |            | 78,00         | 80,6%       |
| G081                        | L/2    | µε | 56,58        |                   |            | 112,00        | 50,5%       |
| G082                        | “      | “  | 63,04        |                   |            | 116,00        | 54,3%       |
| MEDIA                       | “      | “  | 59,81        |                   |            | 114,00        | 52,5%       |

\*La diferencia entre el valor medido y el descenso de neoprenos se corresponde con el valor neto, que es el utilizado para la relación porcentual indicada en las tablas.

| ESTÁTICA 04 (Vanos 1-2-3-4-5) |        |    |              |                   |            |               |             |
|-------------------------------|--------|----|--------------|-------------------|------------|---------------|-------------|
| PUNTO                         | SECC   | UD | VALOR MEDIDO | DESCENSO NEOPRENO | VALOR NETO | VALOR TEÓRICO | % MED/TEOR* |
| P011                          | 0.45L  | mm | -0,57        | 0,06              | -0,63      | -0,87         | 72,4%       |
| P012                          | "      | "  | -0,51        | 0,06              | -0,57      | -0,87         | 65,5%       |
| MEDIA                         | "      | "  | -0,54        | 0,06              | -0,60      | -0,87         | 69,0%       |
| P021                          | L/2    | "  | 2,72         | -0,38             | 3,10       | 4,07          | 76,1%       |
| P022                          | "      | "  | 2,81         | -0,38             | 3,19       | 3,87          | 82,4%       |
| P023                          | "      | "  | 3,13         | -0,38             | 3,51       | 3,97          | 88,4%       |
| MEDIA                         | "      | "  | 2,89         | -0,38             | 3,35       | 3,92          | 85,4%       |
| P031                          | "      | "  | -11,63       | -0,48             | -11,15     | -10,40        | 107,2%      |
| P032                          | "      | "  | -10,21       | -0,48             | -9,73      | -10,20        | 95,4%       |
| MEDIA                         | "      | "  | -10,92       | -0,48             | -10,44     | -10,30        | 101,3%      |
| P041                          | "      | "  | -10,43       | -0,59             | -9,84      | -10,90        | 90,3%       |
| P042                          | "      | "  | -9,64        | -0,59             | -9,05      | -10,90        | 83,0%       |
| MEDIA                         | "      | "  | -10,04       | -0,59             | -9,45      | -10,90        | 86,7%       |
| P051                          | L/2    | mm | 3,05         | 0,01              | 3,04       | 4,11          | 74,0%       |
| P052                          | "      | "  | 2,93         | 0,01              | 2,92       | 4,02          | 72,6%       |
| P053                          | "      | "  | 2,86         | 0,01              | 2,85       | 4,21          | 67,7%       |
| MEDIA                         | "      | "  | 2,95         | 0,01              | 2,89       | 4,12          | 70,1%       |
| P014                          | Apoyos | mm | -0,02        |                   | 0,02       | -0,04         |             |
| P024                          | "      | "  | 0,1          |                   | 0,02       | 0,08          |             |
| P025                          | "      | "  | 0,22         |                   | 0,14       | 0,08          |             |
| MEDIA                         | "      | "  | 0,16         |                   | 0,08       | 0,08          |             |
| P033                          | "      | "  | -1,52        |                   | -1,17      | -0,35         |             |
| P034                          | "      | "  | -0,85        |                   | -0,50      | -0,35         |             |
| MEDIA                         | "      | "  | -1,19        |                   | -0,84      | -0,35         |             |
| P043                          | "      | "  | -0,25        |                   | -0,22      | -0,03         |             |
| P044                          | "      | "  | -0,08        |                   | -0,04      | -0,04         |             |
| MEDIA                         | "      | "  | -0,17        |                   | -0,13      | -0,04         |             |
| P054                          | Apoyos | mm | -0,73        |                   | -1,04      | 0,31          |             |
| P055                          | "      | "  | -0,75        |                   | -1,06      | 0,31          |             |
| MEDIA                         | "      | "  | -0,74        |                   | -1,05      | 0,31          |             |
| G011                          | 0.45L  | με | 3,3          |                   |            | 7,00          | 47,1%       |
| G022                          | L/2    | "  | -16,9        |                   |            | -22,00        | 76,8%       |
| G031                          | "      | "  | 69,77        |                   |            | 81,00         | 86,1%       |
| G032                          | "      | "  | 63,82        |                   |            | 76,00         | 84,0%       |
| MEDIA                         | "      | "  | 66,80        |                   |            | 78,50         | 85,1%       |
| G041                          | "      | "  | 68,01        |                   |            | 82,00         | 82,9%       |
| G042                          | "      | "  | 69,72        |                   |            | 82,00         | 85,0%       |
| MEDIA                         | "      | "  | 68,87        |                   |            | 82,00         | 84,0%       |
| G051                          | L/2    | με | -14,11       |                   |            | -23,00        | 61,3%       |

\* La diferencia entre el valor medido y el descenso de neoprenos se corresponde con el valor neto, que es el utilizado para la relación porcentual indicada en las tablas.

### **B) Resultados de las pruebas dinámicas.**

En el siguiente cuadro se recogen los valores obtenidos durante las pruebas dinámicas. Los criterios son los mismos que los de la prueba estática teniendo en cuenta directamente el módulo dinámico, sin variación con la velocidad, y sin aplicar coeficiente de impacto alguno a los valores esperados.

| DINÁMICAS POR VÍA 1 (Vanos 1-2-3-4-5) |       |    |                  |              |       |       |       |                   |
|---------------------------------------|-------|----|------------------|--------------|-------|-------|-------|-------------------|
| PUNTO                                 | SECC  | UD | VALOR<br>TEÓRICO | VALOR MEDIDO |       |       |       | RELACIÓN<br>MEDIA |
|                                       |       |    |                  | DIN11        | DIN12 | DIN13 | DIN14 |                   |
| P011                                  | 0,45L | mm | -6,31            | -5,34        | -5,39 | -5,53 | -5,45 | 86,0%             |
| P012                                  | “     | “  | -3,82            | -3,03        | -3,05 | -3,25 | -3,16 | 81,7%             |
| MEDIA                                 |       |    | -5,07            | -4,19        | -4,22 | -4,39 | -4,31 | 84,4%             |
| P021                                  | L/2   | “  | -9,82            | -8,70        | -8,65 | -8,60 | -8,65 | 88,1%             |
| P022                                  | “     | “  | -9,92            | -7,33        | -7,37 | -7,36 | -7,35 | 74,1%             |
| P023                                  | “     | “  | -6,94            | -3,36        | -3,41 | -3,46 | -3,42 | 49,2%             |
| MEDIA                                 |       |    | -8,89            | -6,46        | -6,48 | -6,47 | -6,47 | 72,8%             |
| P031                                  | “     | “  | -9,93            | -9,52        | -9,45 | -9,51 | -9,51 | 95,6%             |
| P032                                  | “     | “  | -7,14            | -2,76        | -2,78 | -2,82 | -2,78 | 39,0%             |
| MEDIA                                 |       |    | -8,54            | -6,14        | -6,12 | -6,17 | -6,15 | 72,0%             |
| P041                                  | “     | “  | -9,82            | -7,87        | -7,76 | -7,74 | -7,82 | 79,4%             |
| P042                                  | “     | “  | -7,05            | -2,37        | -2,31 | -2,40 | -2,36 | 33,5%             |
| MEDIA                                 |       |    | -8,44            | -5,12        | -5,04 | -5,07 | -5,09 | 60,2%             |
| P051                                  | “     | “  | -9,80            | -8,30        | -8,17 | -8,26 | -8,29 | 84,2%             |
| P052                                  | “     | “  | -7,49            | -3,45        | -3,46 | -3,51 | -3,50 | 46,5%             |
| P053                                  | “     | “  | -6,51            | -2,74        | -2,65 | -2,75 | -2,66 | 41,5%             |
| MEDIA                                 |       |    | -7,93            | -4,83        | -4,76 | -4,84 | -4,82 | 60,7%             |

| DINÁMICA POR VÍA 1 (Vanos 6-7-8-9) |       |    |                  |              |                |
|------------------------------------|-------|----|------------------|--------------|----------------|
| PUNTO                              | SECC  | UD | VALOR<br>TEÓRICO | VALOR MEDIDO | RELACIÓN MEDIA |
|                                    |       |    |                  | DIN11        |                |
| P061                               | L/2   | mm | -9,84            | -6,83        | 69,4%          |
| P062                               | "     | "  | -7,02            | -2,07        | 29,5%          |
| MEDIA                              | "     | "  | -8,43            | -4,45        | 52,8%          |
| P071                               | "     | "  | -9,91            | -6,63        | 66,9%          |
| P072                               | "     | "  | -7,58            | -3,11        | 41,0%          |
| P073                               | "     | "  | -6,58            | -2,46        | 37,4%          |
| MEDIA                              | "     | "  | -7,08            | -2,79        | 39,3%          |
| P081                               | "     | "  | -9,66            | -6,12        | 63,4%          |
| P082                               | "     | "  | -9,67            | -6,32        | 65,4%          |
| P083                               | "     | "  | -6,89            | -2,73        | 39,6%          |
| P084                               | "     | "  | -5,52            | -2,98        | 54,0%          |
| MEDIA                              | "     | "  | -6,21            | -2,86        | 46,0%          |
| P091                               | 0,45L | "  | -4,84            | -3,68        | 76,0%          |
| P092                               | "     | "  | -2,34            | -1,56        | 66,7%          |
| MEDIA                              | "     | "  | -3,59            | -2,62        | 73,0%          |

| DINÁMICA POR VÍA 2 (Vanos 1-2-3-4-5) |       |    |                  |              |                |
|--------------------------------------|-------|----|------------------|--------------|----------------|
| PUNTO                                | SECC  | UD | VALOR<br>TEÓRICO | VALOR MEDIDO | RELACIÓN MEDIA |
|                                      |       |    |                  | DIN21        |                |
| P011                                 | 0,45L | mm | -3,75            | -3,38        | 90,1%          |
| P012                                 | “     | “  | -6,14            | -5,64        | 91,9%          |
| MEDIA                                |       | ”  | -4,95            | -4,51        | 91,2%          |
| P021                                 | L/2   | “  | -6,31            | -3,08        | 48,8%          |
| P022                                 | “     | “  | -7,29            | -5,09        | 69,8%          |
| P023                                 | “     | “  | -9,58            | -8,79        | 91,8%          |
| MEDIA                                |       | ”  | -7,73            | -5,65        | 73,2%          |
| P031                                 | “     | “  | -6,91            | -3,72        | 53,8%          |
| P032                                 | “     |    | -9,64            | -9,30        | 96,5%          |
| MEDIA                                |       | ”  | -8,28            | -6,51        | 78,7%          |
| P041                                 | “     | “  | -6,89            | -3,19        | 46,3%          |
| P042                                 | “     | “  | -9,62            | -7,72        | 80,2%          |
| MEDIA                                |       | ”  | -8,26            | -5,46        | 66,1%          |
| P051                                 | “     | “  | -6,88            | -3,14        | 45,6%          |
| P052                                 | “     | “  | -9,80            | -6,98        | 71,2%          |
| P053                                 | “     | “  | -9,65            | -8,52        | 88,3%          |
| MEDIA                                |       | ”  | -8,78            | -6,21        | 70,8%          |

| DINÁMICAS POR VÍA 2 (Vanos 5-7-8-9) |       |    |                  |              |       |       |       |                   |
|-------------------------------------|-------|----|------------------|--------------|-------|-------|-------|-------------------|
| PUNTO                               | SECC  | UD | VALOR<br>TEÓRICO | VALOR MEDIDO |       |       |       | RELACIÓN<br>MEDIA |
|                                     |       |    |                  | DIN21        | DIN22 | DIN23 | DIN24 |                   |
| P061                                | L/2   | mm | -6,89            | -2,48        | -2,69 | -2,47 | -2,67 | 37,4%             |
| P062                                | "     | "  | -9,65            | -8,00        | -8,47 | -8,08 | -8,47 | 85,5%             |
| MEDIA                               | "     |    | -8,27            | -5,24        | -5,58 | -5,28 | -5,57 | 65,5%             |
| P071                                | "     | "  | -6,96            | -2,79        | -3,01 | -3,01 | -2,85 | 41,9%             |
| P072                                | "     | "  | -9,89            | -7,20        | -7,42 | -7,49 | -7,24 | 74,2%             |
| P073                                | "     | "  | -9,75            | -8,59        | -8,88 | -8,93 | -8,70 | 90,0%             |
| MEDIA                               | "     |    | -9,82            | -7,90        | -8,15 | -8,21 | -7,97 | 82,0%             |
| P081                                | "     | "  | -6,24            | -2,56        | -2,74 | -2,72 | -2,69 | 42,9%             |
| P082                                | "     |    | -7,22            | -4,84        | -4,95 | -5,03 | -5,00 | 68,6%             |
| P083                                | "     |    | -9,40            | -7,25        | -7,38 | -7,36 | -7,40 | 78,2%             |
| P084                                | "     | "  | -8,65            | -8,39        | -8,40 | -8,52 | -8,57 | 97,9%             |
| MEDIA                               | "     |    | -9,03            | -7,82        | -7,89 | -7,94 | -7,99 | 87,6%             |
| P091                                | 0,45L | "  | -2,29            | -2,02        | -2,04 | -2,05 | 2,09  | 43,9%             |
| P092                                | "     | "  | -4,71            | -4,36        | -4,47 | -4,40 | -4,38 | 93,5%             |
| MEDIA                               | "     |    | -3,50            | -3,19        | -3,26 | -3,23 | -1,15 | 77,3%             |



| DINÁMICA POR AMBAS VÍAS (Vanos 1-2-3-4-5) |       |    |                  |              |                |
|-------------------------------------------|-------|----|------------------|--------------|----------------|
| PUNTO                                     | SECC  | UD | VALOR<br>TEÓRICO | VALOR MEDIDO | RELACIÓN MEDIA |
|                                           |       |    |                  | DIN01        |                |
| P011                                      | 0,45L | mm | -10,06           | -8,68        | 86,3%          |
| P012                                      | "     | "  | -9,96            | -8,57        | 86,0%          |
| MEDIA                                     |       | "  | -10,01           | -8,63        | 86,2%          |
| P021                                      | L/2   | "  | -16,13           | -11,69       | 72,5%          |
| P022                                      | "     | "  | -17,21           | -12,57       | 73,0%          |
| P023                                      | "     | "  | -16,52           | -12,36       | 74,8%          |
| MEDIA                                     |       | "  | -16,62           | -12,21       | 73,4%          |
| P031                                      | "     | "  | -16,84           | -12,97       | 77,0%          |
| P032                                      | "     |    | -16,74           | -12,15       | 72,6%          |
| MEDIA                                     |       | "  | -16,79           | -12,56       | 74,8%          |
| P041                                      | "     | "  | -16,71           | -10,88       | 65,1%          |
| P042                                      | "     | "  | -16,67           | -10,12       | 60,7%          |
| MEDIA                                     |       | "  | -16,69           | -10,50       | 62,9%          |
| P051                                      | "     | "  | -16,68           | -11,49       | 68,9%          |
| P052                                      | "     | "  | -17,29           | -10,59       | 61,2%          |
| P053                                      | "     | "  | -16,16           | -9,59        | 59,3%          |
| MEDIA                                     |       | "  | -16,71           | -10,56       | 63,2%          |

| DINÁMICA POR AMBAS VÍAS (Vanos 6-7-8-9) |       |    |                  |              |                |
|-----------------------------------------|-------|----|------------------|--------------|----------------|
| PUNTO                                   | SECC  | UD | VALOR<br>TEÓRICO | VALOR MEDIDO | RELACIÓN MEDIA |
|                                         |       |    |                  | DIN01        |                |
| P061                                    | L/2   | mm | -16,73           | -9,62        | 57,5%          |
| P062                                    | "     | "  | -16,67           | -10,26       | 61,5%          |
| MEDIA                                   | "     | "  | -16,70           | -9,94        | 59,5%          |
| P071                                    | "     | "  | -16,87           | -9,50        | 56,3%          |
| P072                                    | "     | "  | -17,47           | -10,56       | 60,4%          |
| P073                                    | "     | "  | -16,33           | -10,04       | 61,5%          |
| MEDIA                                   | "     | "  | -16,90           | -10,30       | 60,9%          |
| P081                                    | "     | "  | -15,90           | -8,93        | 56,2%          |
| P082                                    | "     | "  | -16,89           | -11,33       | 67,1%          |
| P083                                    | "     | "  | -16,29           | -10,29       | 63,2%          |
| P084                                    | "     | "  | -14,17           | -9,91        | 69,9%          |
| MEDIA                                   | "     | "  | -15,23           | -10,10       | 66,3%          |
| P091                                    | 0,45L | "  | -7,13            | -5,41        | 75,9%          |
| P092                                    | "     | "  | -7,05            | -5,80        | 82,3%          |
| MEDIA                                   | "     | "  | -7,09            | -5,61        | 79,1%          |

### C) Frecuencia propia de vibración.

El valor teórico de la frecuencia propia fundamental de vibración del tablero en flexión es de 2,23 Hz obtenida ésta en función del módulo de elasticidad estático del hormigón. Las frecuencias obtenidas de los espectros de los acelerómetros arrojan, para la de mayor amplitud, un valor de 3,70 Hz para el punto A031 auscultado.

Las frecuencias y amortiguamiento obtenidos de los espectros de los acelerómetros arrojan los valores que recogemos a continuación:

| PUNTO       | FRECUENCIA<br>(Hz) | AMORTIGUACIÓN |
|-------------|--------------------|---------------|
| <b>A022</b> | 3,70               | 1,30%         |
| <b>A031</b> | 3,70               | 1,47%         |
| <b>A042</b> | 3,70               | 2,48%         |
| <b>A051</b> | 3,61               | 1,65%         |
| <b>A062</b> | 4,02               | 1,72%         |
| <b>A071</b> | 4,02               | 1,32%         |
| <b>A082</b> | 4,02               | 1,30%         |
| <b>A091</b> | 4,02               | 1,48%         |

La zona temporal de análisis se corresponde con la de vibración residual libre de la estructura, una vez abandonada ésta por el tren de cargas y tomando siempre la parte final de la señal del acelerómetro.

Respecto al amortiguamiento de la estructura, señalar que se calculan en el mismo periodo temporal en el que se obtienen los espectros ya comentados para cálculo de las frecuencias. Se calculan directamente por el software utilizado para cálculo del espectro utilizando el método del ancho de banda.

Indicamos que los valores de amplitud que aparecen en los gráficos de los espectros, no tienen un significado físico o ingenieril, ya que corresponden solamente a los coeficientes de peso de los términos del desarrollo en serie de Fourier (FFT).

## **8.- ANÁLISIS DE LOS RESULTADOS.**

A la vista de los resultados obtenidos en la prueba de carga llevada a cabo, podemos realizar el siguiente análisis.

### **8.1.- PRUEBA ESTÁTICA.**

Todos los valores alcanzados, tanto en flechas como en deformaciones unitarias, son del orden de los habituales para este tipo de puentes y se consideran perfectamente admisibles. El porcentaje de recuperación es igualmente correcto, máxime cuando los valores absolutos son reducidos, obteniéndose dicha recuperación al tiempo de retirar la carga actuante.

El reparto transversal de flechas y deformaciones observado en la prueba en centro de vano, indica un comportamiento de la sección frente a las sobrecargas, bastante homogéneo a lo ancho de dicha sección. No se puede estudiar el reparto transversal de la sección mediante el estudio de las pruebas estáticas dado que en éstas se encuentran cargadas ambas vías.

La flecha neta máxima (es decir, descontado el descenso de los apoyos) alcanzada en la prueba, es de 16,22, medida en el punto P031, supone un valor respecto a su luz de cálculo, del orden de  $1/2.000$  que se considera normal. En valores medios la flecha de las vigas es del orden de un 25% menor de la esperada, lo que indica un buen comportamiento real del puente con relación al teórico. Hemos de tener en cuenta, que debido al pequeño rango de la medida que se realiza, ligeras variaciones de la medida originan importantes diferencias en el porcentaje.

En cuanto a la medida de deformaciones, los valores de deformaciones medidos son un 30% menores de lo esperados, valor que se encuentra también dentro de unos límites perfectamente admisibles. Es importante señalar que la medida de flecha integra una serie de características del hormigón, tales como microfisuras, heterogeneidades del hormigón etc., que la medida puntual de una banda no llega a homogeneizar. De ahí que

en algunos casos, los porcentajes obtenidos en deformación sean ligeramente diferentes a los porcentajes en flecha, como es el caso.

Se observa en ciertos vanos, si bien pequeña (no mayor del 6-7%), una diferencia en flechas y deformaciones entre los puntos situados en la Vía I y los de la Vía II. Este hecho puede ser debido sencillamente a la propia excentricidad de carga por ligero ripado en la colocación de las vías.

### **8.2.- PRUEBAS DINÁMICAS.**

En lo referente a las dinámicas efectuadas por ambas vías simultáneamente, los valores son del mismo orden que en el caso de las estáticas considerándose igualmente admisibles, y cabe hacer los mismos comentarios que en las estáticas. Las flechas medidas en las pruebas dinámicas manifiestan un orden de magnitud muy similar a las de la estática, y las recuperaciones son prácticamente totales e instantáneas nada más abandonar el tren el puente.

En cuanto a las dinámicas efectuadas solamente por una de las vías, se observa que independientemente de que se trate del tren de cargas circulando por la vía 1 o por la vía 2, los porcentajes de las flechas obtenidas respecto de las teóricas, son mucho mayores bajo la viga cargada que sobre la no cargada, lo que puede ser debido a un ripado hacia el exterior en la colocación de ambas vías.

Como en el apartado anterior, a partir de los registros obtenidos en campo podemos establecer un resumen respecto a los porcentajes que suponen los resultados obtenidos frente a los esperados para las pruebas dinámicas, incluida la de frenado.

La flecha máxima alcanzada en las pruebas dinámicas fue de 12,15 mm (punto P032 en la DIN 01), lo que supone una relación con la luz de cálculo del orden de  $1/2.600$ , que resulta un valor normal.

Definiendo el Coeficiente de Impacto como la relación entre los valores medios de flechas de cada tablero, obtenidos a cada velocidad y el de la prueba cuasi-estática, resulta de media 1,03 para las dinámicas por la vía 2 y de 1,01 para las dinámicas por la vía 1, lo

que indica que para las cargas actuantes apenas se consigue la aparición de algún efecto dinámico en la estructura. El hecho de que el ripado de la vía 2 hacia el exterior sea ligeramente mayor al de la vía 1, hecho que se puede apreciar al comparar entre sí las dinámicas, parece hacerse ligeramente más notorio a medida que aumenta la velocidad de la prueba.

Posteriormente, como resultado del análisis del espectro de frecuencia por el método del ancho eficaz de banda, se estiman los siguientes valores de decremento logarítmico y amortiguación.

Los decrementos logarítmicos se calculan a partir de la fórmula:

$$\frac{1}{(1-x)} \ln \frac{A_x}{A_i} \quad (i > x)$$

Esta fórmula está indicada cuando los registros son adecuados por su típica curva de amortiguamiento tras una buena excitación de la estructura. Asimismo se aplica de forma automatizada por el programa de dibujo de espectros, utilizando el método del Ancho de Banda, donde se sustituye la excitación armónica de la estructura por la originada por el tren de cargas en la prueba analizada.

Analizando las vibraciones residuales libres instrumentados, una vez abandonados éstos por el tren de cargas, se han obtenido valores medios del decremento logarítmico del orden de 0,10, oscilando entre 0,08 y 0,16 según el acelerómetro correspondiente.

Se ha estimado un porcentaje medio de un 1,60 %, respecto del amortiguamiento crítico, lo que supone un valor ligeramente inferior al normal.

| PUNTO | VELOCIDAD | Decremento log. | Amortiguación (%) |
|-------|-----------|-----------------|-------------------|
| A022  | 80 Km/h   | 0,08            | 1,30%             |
| A031  | 80 Km/h   | 0,09            | 1.47%             |
| A042  | 80 Km/h   | 0,16            | 2,48%             |
| A051  | 80 Km/h   | 0,10            | 1,65%             |

|      |         |      |       |
|------|---------|------|-------|
| A062 | 80 Km/h | 0,11 | 1,72% |
| A071 | 80 Km/h | 0,08 | 1.32% |
| A082 | 80 Km/h | 0,08 | 1,30% |
| A091 | 80 Km/h | 0,09 | 1.48% |

En los registros no se observa ningún comportamiento que pueda considerarse anormal desde el punto de vista de los fenómenos de amplificación dinámica.

## **9.- CONCLUSIONES Y RECOMENDACIONES.**

De acuerdo con lo expuesto en los apartados precedentes, podemos llegar a las siguientes conclusiones:

- a) Los valores máximos de las flechas alcanzadas en el centro del vano tanto en las pruebas estáticas como en las dinámicas por ambas vías, se ajustan a los previstos con ligeras variaciones dentro de los porcentajes habituales. En el caso de las flechas obtenemos para valores medios, medidas que están entre 60 y el 90% con respecto a los valores teóricos, lo que nos indica que la estructura se asemeja en general bien, al modelo teórico adoptado, pudiéndose considerar el comportamiento correcto.
- b) Se observa al analizar las dinámicas por una sola vía, un comportamiento transversal normal de la obra diferente al previsto, apreciándose que los porcentajes de flechas alcanzados respecto de los teóricos son mucho mayores en la viga cargada que en la no cargada, lo que puede ser debido a un ripado hacia el exterior de ambas vías.
- c) Los valores de las deformaciones unitarias en el hormigón toman valores porcentuales análogos a las flechas, considerándose igualmente correctos.
- d) Las recuperaciones obtenidas tanto en flechas como en deformaciones unitarias han sido siempre en valor medio superiores al 95%, contando con unos valores absolutos reducidos, y realizándose de una forma prácticamente instantánea.
- e) En las pruebas dinámicas apenas se observa aumento de flechas y deformaciones en los puntos instrumentados según aumenta la velocidad, debido en parte a las bajas velocidades alcanzadas y a un fuerte grosor de la capa de balasto que minimiza la aparición del coeficiente de impacto.
- f) De acuerdo con lo anterior las pruebas dinámicas se observan flechas de magnitud casi constante, y muy similar a las medidas en la prueba estática. Los



valores medios del coeficiente de impacto son de 1,01 para las dinámicas por la vía 1 y de 1,03 para las dinámicas por la vía 2.

- g) El comportamiento de los apoyos se considera correcto.
- h) Durante la realización de las pruebas no se apreció la aparición de fisuras o grietas, ni la aparición de otros daños de importancia.

Por todos estos motivos puede considerarse que el comportamiento de la obra durante la realización de los ensayos de carga ha sido correcto. Como reflexión final, debemos comentar que el estado general de la estructura es bueno, destacando únicamente los defectos con incidencia estética en los distintos elementos, ya que los defectos con riesgo de evolución patológica son poco importantes. Todo esto se comentada en el apartado 4 del presente informe, correspondiente a la Inspección Preliminar.

Madrid, octubre de 2001

EL JEFE DE INSTRUMENTACIÓN

INGENIERO DEL DPTO DE  
ESTRUCTURAS DE HORMIGÓN Y  
FÁBRICA

Fdo. Justo Carretero Pérez

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EL DIRECTOR DE INGENIERÍA CIVIL

EL JEFE DE ESTRUCTURAS DE  
HORMIGÓN Y FÁBRICA

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## **ANEJO 1: DOCUMENTACIÓN FACILITADA POR EL GIF**

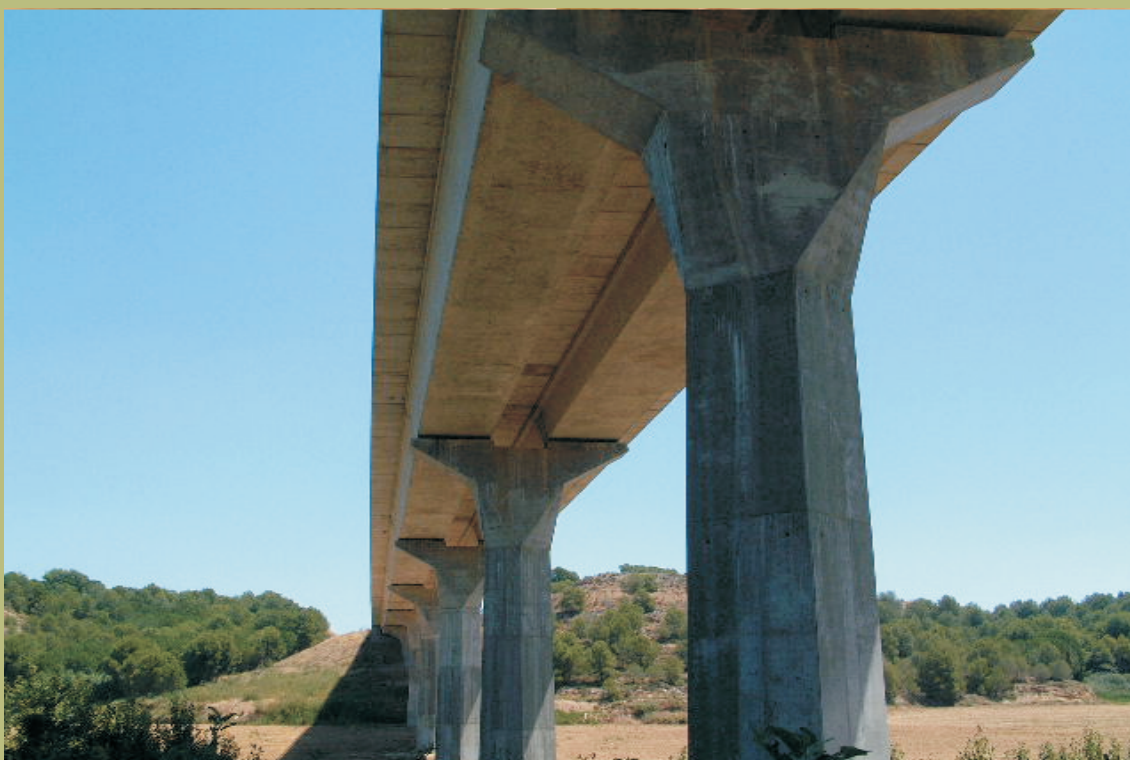
Madrid, Octubre de 2001

La documentación facilitada por el GIF consistió en un CD-Rom en el que se incluye el Documento N°2 - Planos, del Proyecto Construido del Subtramo VI del tramo Puente de Ebro-Lleida de la línea de Alta Velocidad Madrid-Zaragoza-Barcelona-Frontera Francesa, en formato AutoCad, y una copia del Anejo de Cálculo de la estructura.

## **ANEJO 2: PROYECTO DE PRUEBA DE CARGA**

Madrid, Octubre de 2001

**CONTRATO DE CONSULTORÍA Y ASISTENCIA  
PARA LA REALIZACIÓN DE PRUEBAS DE CARGA  
PARA LA RECEPCIÓN DE PUENTES DE LA  
LÍNEA DE ALTA VELOCIDAD  
MADRID-ZARAGOZA-BARCELONA-FRONTERA FRANCESA.  
TRAMO: PUENTE DE EBRO-LLEIDA.  
BASE DE MONTAGUT.**



**PROYECTO DE PRUEBA DE CARGA**

**SUBTRAMO VI  
Viaducto del Gallo  
29VI02**

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## **1.- INTRODUCCIÓN**

El presente documento tiene por objeto la especificación de la prueba de carga del **“VIADUCTO DEL VALL DEL GALLO (O.F. 616 – 3) PERTENECIENTE AL SUBTRAMO VI DEL TRAMO ZARAGOZA-LLEIDA DE LA LINEA DE ALTA VELOCIDAD MADRID-BARCELONA-FRONTIERA FRANCESA”**.

Dicha prueba se efectúa con objeto de analizar la respuesta de la estructura frente a acciones estáticas y dinámicas, y previamente a su puesta en servicio, de acuerdo con la “Instrucción relativa a las acciones a considerar en el Proyecto de Puentes de Ferrocarril”.

## **2.- DATOS SOBRE LA ESTRUCTURA**

La estructura objeto de la Prueba de Carga forma parte de las obras de construcción del Subtramo VI pertenecientes al tramo Zaragoza - Lleida de la línea de Alta Velocidad Madrid-Barcelona-Frontera Francesa, y es un puente continuo de hormigón pretensado de 9 vanos, siendo los vanos extremos de 33,20 m de luz entre ejes de apoyos y los siete centrales de 41,50 m.

La sección del tablero del puente está formada por parejas de vigas prefabricadas de tipo artesa pretensadas de 4,50 m de anchura y 1,80 m de canto, con una separación de 6 m entre ejes de vigas y completadas, para formar secciones compuestas, por una losa de hormigón armado de espesor variable desde 0,18 m en los bordes hasta 0,32 m en el centro, lo que determina una pendiente a dos aguas del 2% para desagüe del tablero.

El conjunto de ambas vigas se apoya en cada pila mediante una pieza cargadero de 10,10 m de anchura transversal máxima superior y 4,00 m en quiebro intermedio, con voladizos de 3,05 m entre vuelo máximo y quiebro, que presenta una variación lineal de sus paramentos frontales entre 3,00 m en final de fuste y 1,80 m en zona superior de



cargadero. La transición entre final de fuste (sección romboidal de diagonales iguales) y zona intermedia en quiebro (sección rectangular) se produce mediante paramentos planos triangulares.

### **3.- JUSTIFICACIÓN DE LA CARGA DE PRUEBA**

Para la realización de la Prueba de Carga se ha solicitado al Peticionario la prestación de una “locomotora G.I.F.”, un “tractor U.T.E.”, una “tolva Renfe”, una “tolva Rumana” y nueve “tolvas G.I.F.”. El peso total máximo de las cargas situadas sobre el tablero durante las pruebas estáticas será de 1008 t, (tren de cargas formado por locomotora G.I.F., tractor U.T.E. y diez tolvas G.I.F.).

Las características de los trenes de carga en lo que a geometría y peso por eje se refiere vienen expresadas en el Anejo 2C, donde se acompañan además los croquis con la disposición de cargas sobre la estructura durante las pruebas estáticas.

Las Pruebas de Cargas representan frente a las cargas de proyecto los porcentajes incluidos en la siguiente tabla:

#### **PORCENTAJES DE SOLICITACIÓN DE PRUEBA FRENTE A DISEÑO**

| <b>PARÁMETRO DE COMPARACIÓN</b> | <b>SOBRECARGA DE DISEÑO</b> | <b>CARGAS TOTALES</b> |
|---------------------------------|-----------------------------|-----------------------|
| CARGAS                          | 53%                         | 27%                   |
| M. FLECTOR NEGATIVO             | 56%                         | 29%                   |
| M. FLECTOR POSITIVO             | 64%                         | 37%                   |

El cálculo de los valores consignados se encuentra en el Anejo 2B del presente documento.

#### **4.- MEDIDAS A REALIZAR**

A continuación se exponen las medidas que se realizarán durante los ensayos de prueba de carga, mediante la instrumentación que se detalla en el croquis del Anejo 2C del presente documento.

##### **4.1. FLECHAS**

Los desplazamientos medidos serán los verticales, en las posiciones definidas en el Anejo 2C del presente documento.

La medida de las flechas será realizada mediante transductores de desplazamientos para la medida de desplazamientos, registrándose dichas medidas, tanto durante las pruebas estáticas como durante las dinámicas.

##### **4.2. ACELERACIONES**

Durante las pruebas dinámicas, se procederá a un registro de las aceleraciones verticales con objeto de evaluar la frecuencia fundamental de oscilación de la estructura.

La medida de las aceleraciones verticales se realizará mediante un acelerómetro piezoeléctrico o piezorresistivo integrado en la cadena de medida.

##### **4.3. OTRAS MEDIDAS**

Se procederá a un registro continuo de temperatura y humedad relativa ambiente, durante la realización de los ensayos.

#### **5.- PLAN DE CARGA Y PROGRAMACIÓN DEL ENSAYO**

##### **5.1. PRUEBAS ESTÁTICAS**

Para cada prueba estática se posicionarán los trenes de cargas según las disposiciones indicadas en los croquis del Anejo 2C del presente documento.

Las medidas serán realizadas de acuerdo con los escalones siguientes:

- ESCALÓN 0: Puesta a cero de los aparatos.
- ESCALÓN 1: Situación de la carga.
- ESCALÓN 2: Estabilización de las medidas. Se realizarán medidas continuas hasta comprobar la estabilización de las mismas.
- ESCALÓN 3: Descarga total y medida de la recuperación. Las lecturas se realizarán de una forma continua hasta alcanzar una recuperación del 80% en un intervalo de tiempo no superior al de mantenimiento de la carga.

## 5.2. PRUEBAS DINÁMICAS

Para las pruebas dinámicas se hará uso de los siguientes trenes de carga:

- DINÁMICAS 11, 12, 13 y 14: Locomotora GIF y 5 tolvas GIF en vía 1.
- DINÁMICAS 21, 22, 23 y 24: Tractor UTE y 5 tolvas GIF en vía 2.
- DINÁMICA 01: Locomotora GIF y 5 tolvas GIF en vía 1 y Tractor UTE y 5 tolvas GIF en vía 2.
  - Ensayo Cuasiestático: Paso de la composición por la estructura circulando a la velocidad de 5 km/h (paso de hombre).
  - Ensayo Dinámico Lento: Paso de la composición del ensayo anterior circulando en el mismo sentido y a la velocidad de 40 km/h.
  - Ensayo Dinámico Rápido: Paso de la composición circulando en el mismo sentido que en la prueba cuasi-estática y a la máxima velocidad posible.
  - Ensayo de Frenado: Paso de la composición circulando a la máxima velocidad posible y frenado justo sobre la estructura.

Las pruebas se realizarán normalmente en el siguiente orden:

- ESTÁTICA
- CUASIESTÁTICA
- DINÁMICA LENTA
- DINÁMICA RÁPIDA
- FRENADO

## **6.- PREVISIÓN DE RESULTADOS**

En el Anejo 2B del presente documento figura la relación de las flechas que cabe esperar durante los ensayos estáticos, así como la estimación de la frecuencia fundamental de oscilación.

A continuación se expone el resumen de los valores calculados para las características de los materiales definidos en proyecto. No se especifican valores de flechas y microdeformaciones para cada una de las dos vigas que componen la sección transversal del tablero porque las diferencias entre los valores obtenidos en las dos vigas, son despreciables teniendo en cuenta la sensibilidad de la instrumentación prevista.

Como criterio de signo se adopta que los descensos verticales son negativos y las deformaciones de tracción son positivas.

### ESTÁTICA Nº1 (VEHÍCULOS EN VANOS 1 Y 3)

(locomotora y 5 tolvas G.I.F. en vía 1-tractor U.T.E., tolva Renfe y 4 tolvas G.I.F. en vía 2)

| VANO | VIGA | POSICIÓN           | FLECHA (mm)        | MICRODEFORMACIONES |
|------|------|--------------------|--------------------|--------------------|
| 1    | 1    | 0,45* LUZ          | -10,40 (NODO 4533) | 105                |
|      | 2    | 0,5 m ESTRIBO ZAR. | -0,56 (NODO 4524)  | ---                |
|      |      | 0,45* LUZ          | -10,10 (NODO 4530) | 100                |
| 2    | 1    | 0,5 m VANO 1       | 0,40 (NODO 4561)   | ---                |
|      |      | CENTRO DE VANO     | 8,84 (NODO 2691)   | -48                |
|      |      |                    | 8,49 (NODO 3223)   |                    |
|      | 2    | 0,5 m VANO 1       | 0,38 (NODO 4558)   | ---                |
|      |      | CENTRO DE VANO     | 8,59 (NODO 3755)   | -49                |
| 3    | 1    | 0,5 m VANO 2       | -0,56 (NODO 4578)  | ---                |
|      |      | CENTRO DE VANO     | -17,4 (NODO 2962)  | 121                |
|      | 2    | 0,5 m VANO 2       | -0,56 (NODO 4575)  | ---                |
|      |      | CENTRO DE VANO     | -17,4 (NODO 3760)  | 121                |
| 4    | 1    | 0,5 m VANO 3       | 0,46 (NODO 4595)   | ---                |
|      |      | CENTRO DE VANO     | 5,86 (NODO 2998)   | -35                |
|      | 2    | 0,5 m VANO 3       | 0,46 (NODO 4592)   | ---                |
|      |      | CENTRO DE VANO     | 5,86 (NODO 3796)   | -35                |
| 5    | 1    | 0,5 m VANO 4       | -0,11 (NODO 4612)  | ---                |
|      |      | CENTRO DE VANO     | -1,49 (NODO 3030)  | 8                  |
|      | 2    | 0,5 m VANO 4       | -0,11 (NODO 4609)  | ---                |
|      |      | CENTRO DE VANO     | -1,48 (NODO 3562)  | 8                  |
|      |      |                    | -1,50 (NODO 4094)  |                    |

**ESTÁTICA Nº2. (VEHÍCULOS EN VANOS 2 Y 4)**  
**(locomotora y 5 tolvas G.I.F. en vía 1-tractor U.T.E., tolva Renfe y 4 tolvas G.I.F. en vía 2)**

| VANO | VIGA | POSICIÓN           | FLECHA (mm)                              | MICRODEFORMACIONES |
|------|------|--------------------|------------------------------------------|--------------------|
| 1    | 1    | 0,45* LUZ          | 4,93 (NODO 4533)                         | -39                |
|      | 2    | 0,5 m ESTRIBO ZAR. | 0,22 (NODO 4524)                         | ---                |
|      |      | 0,45* LUZ          | 4,89 (NODO 4530)                         | -38                |
| 2    | 1    | 0,5 m VANO 1       | -0,49 (NODO 4561)                        | ---                |
|      |      | CENTRO DE VANO     | -16,70 (NODO 2691)<br>-17,50 (NODO 3223) | 120                |
|      |      |                    |                                          |                    |
|      | 2    | 0,5 m VANO 1       | -0,49 (NODO 4558)                        | ---                |
|      |      | CENTRO DE VANO     | -16,80 (NODO 3755)                       | 116                |
| 3    | 1    | 0,5 m VANO 2       | 0,56 (NODO 4578)                         | ---                |
|      |      | CENTRO DE VANO     | 10,90 (NODO 2962)                        | -61                |
|      | 2    | 0,5 m VANO 2       | 0,59 (NODO 4575)                         | ---                |
|      |      | CENTRO DE VANO     | 10,90 (NODO 3760)                        | -61                |
| 4    | 1    | 0,5 m VANO 3       | -0,58 (NODO 4595)                        | ---                |
|      |      | CENTRO DE VANO     | -17,90 (NODO 2998)                       | 124                |
|      | 2    | 0,5 m VANO 3       | -0,58 (NODO 4592)                        | ---                |
|      |      | CENTRO DE VANO     | -17,90 (NODO 3796)                       | 124                |
| 5    | 1    | 0,5 m VANO 4       | 0,45 (NODO 4612)                         | ---                |
|      |      | CENTRO DE VANO     | 6,03 (NODO 3030)                         | -34                |
|      | 2    | 0,5 m VANO 4       | 0,45 (NODO 4609)                         | ---                |
|      |      | CENTRO DE VANO     | 5,95 (NODO 3562)<br>6,11 (NODO 4094)     | -34                |
| 6    | 1    | CENTRO DE VANO     | -1,54 (NODO 3109)                        | 9                  |
|      |      | 0,5 m VANO 7       | -0,03 (NODO 4629)                        | ---                |
|      | 2    | CENTRO DE VANO     | -1,54 (NODO 3907)                        | 9                  |
|      |      | 0,5 m VANO 7       | -0,03 (NODO 4626)                        | ---                |

**ESTÁTICA Nº3. (VEHÍCULOS EN VANOS 3 Y 5)**  
**(locomotora y 5 tolvas G.I.F. en vía 1-tractor U.T.E., tolva Renfe y 4 tolvas G.I.F. en vía 2)**

| VANO | VIGA | POSICIÓN          | FLECHA (mm)        | MICRODEFORMACIONES |
|------|------|-------------------|--------------------|--------------------|
| 1    | 1    | 0,45* LUZ         | -1,25 (NODO 4533)  | 10                 |
|      | 2    | 0,5 m ESTRIBO ZAR | -0,06 (NODO 4524)  | ---                |
|      |      | 0,45* LUZ         | -1,25 (NODO 4530)  | 10                 |
| 2    | 1    | 0,5 m VANO 1      | 0,12 (NODO 4561)   | ---                |
|      |      | CENTRO DE VANO    | 5,78 (NODO 2691)   | -32                |
|      |      |                   | 5,60 (NODO 3223)   |                    |
|      | 2    | 0,5 m VANO 1      | 0,12 (NODO 4558)   | ---                |
|      |      | CENTRO DE VANO    | 5,66 (NODO 3755)   | -32                |
| 3    | 1    | 0,5 m VANO 2      | -0,50 (NODO 4578)  | ---                |
|      |      | CENTRO DE VANO    | -17,30 (NODO 2962) | 120                |
|      | 2    | 0,5 m VANO 2      | -0,50 (NODO 4575)  | ---                |
|      |      | CENTRO DE VANO    | -17,00 (NODO 3760) | 120                |
| 4    | 1    | 0,5 m VANO 3      | 0,54 (NODO 4595)   | ---                |
|      |      | CENTRO DE VANO    | 11,00 (NODO 2998)  | -61                |
|      | 2    | 0,5 m VANO 3      | 0,54 (NODO 4592)   | ---                |
|      |      | CENTRO DE VANO    | 11,00 (NODO 3796)  | -61                |
| 5    | 1    | 0,5 m VANO 4      | -0,58 (NODO 4612)  | ---                |
|      |      | CENTRO DE VANO    | -17,80 (NODO 3030) | 123                |
|      | 2    | 0,5 m VANO 4      | -0,58 (NODO 4609)  | ---                |
|      |      | CENTRO DE VANO    | -18,3 (NODO 3562)  | 123                |
|      |      |                   | -17,40 (NODO 4094) |                    |
| 6    | 1    | CENTRO DE VANO    | 6,06 (NODO 3109)   | -33                |
|      |      | 0,5 m VANO 7      | 0,13 (NODO 4629)   | ---                |
|      | 2    | CENTRO DE VANO    | 6,06 (NODO 3907)   | -34                |
|      |      | 0,5 m VANO 7      | 0,13 (NODO 4626)   | ---                |

### ESTÁTICA Nº4. (VEHÍCULOS EN VANOS 3 Y 4)

(locomotora y 5 tolvas G.I.F. en vía 1-tractor U.T.E., tolva Renfe y 4 tolvas G.I.F. en vía 2)

| VANO | VIGA | POSICIÓN          | FLECHA (mm)        | MICRODEFORMACIONES |
|------|------|-------------------|--------------------|--------------------|
| 1    | 1    | 0,45* LUZ         | -0,87 (NODO 4533)  | 7                  |
|      | 2    | 0,5 m ESTRIBO ZAR | -0,04 (NODO 4524)  | ---                |
|      |      | 0,45* LUZ         | -0,87 (NODO 4530)  | 7                  |
| 2    | 1    | 0,5 m VANO 1      | 0,08 (NODO 4561)   | ---                |
|      |      | CENTRO DE VANO    | 4,07 (NODO 2691)   | -22                |
|      |      |                   | 3,87 (NODO 3223)   |                    |
|      | 2    | 0,5 m VANO 1      | 0,08 (NODO 4558)   | ---                |
|      |      | CENTRO DE VANO    | 3,97 (NODO 3755)   | -22                |
| 3    | 1    | 0,5 m VANO 2      | -0,35 (NODO 4578)  | ---                |
|      |      | CENTRO DE VANO    | -10,40 (NODO 2962) | 81                 |
|      | 2    | 0,5 m VANO 2      | -0,35 (NODO 4575)  | ---                |
|      |      | CENTRO DE VANO    | -10,20 (NODO 3760) | 76                 |
| 4    | 1    | 0,5 m VANO 3      | -0,03 (NODO 4595)  | ---                |
|      |      | CENTRO DE VANO    | -10,90 (NODO 2998) | 82                 |
|      | 2    | 0,5 m VANO 3      | -0,04 (NODO 4592)  | ---                |
|      |      | CENTRO DE VANO    | -10,90 (NODO 3796) | 82                 |
| 5    | 1    | 0,5 m VANO 4      | 0,31 (NODO 4612)   | ---                |
|      |      | CENTRO DE VANO    | 4,11 (NODO 3030)   | -23                |
|      | 2    | 0,5 m VANO 4      | 0,31 (NODO 4609)   | ---                |
|      |      | CENTRO DE VANO    | 4,02 (NODO 3562)   | -23                |
|      |      |                   | 4,21 (NODO 4094)   |                    |
| 6    | 1    | CENTRO DE VANO    | -1,05 (NODO 3109)  | 6                  |
|      |      | 0,5 m VANO 7      | -0,02 (NODO 4629)  | ---                |
|      | 2    | CENTRO DE VANO    | -1,05 (NODO 3907)  | 6                  |
|      |      | 0,5 m VANO 7      | -0,02 (NODO 4626)  | ---                |



### ESTÁTICA Nº5. (VEHÍCULOS EN VANOS 7 Y 9)

(locomotora y 5 tolvas G.I.F. en vía 2-locomotora 319, 4 tolvas Renfe y una Rumana en vía 1)

|   | VIGA | POSICIÓN             | FLECHA (mm)                              | MICRODEFORMACIONES |
|---|------|----------------------|------------------------------------------|--------------------|
| 5 | 1    | 0,5 m VANO 4         | -0,03 (NODO 4612)                        | ---                |
|   |      | CENTRO DE VANO       | -1,41 (NODO 3030)                        | 8                  |
|   | 2    | 0,5 m VANO 4         | -0,03 (NODO 4609)                        | ---                |
|   |      | CENTRO DE VANO       | -1,43 (NODO 3562)<br>-1,39 (NODO 4094)   | 8                  |
| 6 | 1    | CENTRO DE VANO       | 5,50 (NODO 3109)                         | -31                |
|   |      | 0,5 m VANO 7         | 0,43 (NODO 4629)                         | ---                |
|   | 2    | CENTRO DE VANO       | 5,49 (NODO 3907)                         | -31                |
|   |      | 0,5 m VANO 7         | 0,43 (NODO 4626)                         | ---                |
| 7 | 1    | CENTRO DE VANO       | -16,30 (NODO 3063)                       | 113                |
|   |      | 0,5 m VANO 8         | -0,49 (NODO 4646)                        | ---                |
|   | 2    | CENTRO DE VANO       | -17,10 (NODO 3595)<br>-16,20 (NODO 4127) | 116                |
|   |      | 0,5 m VANO 8         | -0,51 (NODO 4643)                        | ---                |
| 8 | 1    | CENTRO DE VANO       | 8,73 (NODO 2819)<br>8,38 (NODO 3351)     | -49                |
|   |      | 0,5 m VANO 9         | 0,39 (NODO 3190)                         | ---                |
|   | 2    | CENTRO DE VANO       | 8,68 (NODO 3883)                         | -48                |
|   |      | CENTRO DE VANO (ALA) | 9,62 (NODO 4415)                         | ---                |
|   |      | 0,5 m VANO 9         | 0,40 (NODO 3988)                         | ---                |
| 9 | 1    | CENTRO DE VANO (ALA) | -8,14 (NODO 4692)                        | ---                |
|   |      | 0,5 m ESTRIBO 2      | -0,55 (NODO 4662)<br>-0,59 (NODO 4664)   | ---                |
|   | 2    | CENTRO DE VANO (ALA) | -8,35 (NODO 4691)                        | ---                |
|   |      | 0,5 m ESTRIBO 2      | -0,57 (NODO 4661)                        | ---                |

### ESTÁTICA Nº6 (VEHÍCULOS EN VANOS 6 Y 8)

(locomotora y 5 tolvas G.I.F. en vía 2-locomotora 319, 4 tolvas Renfe y una Rumana en vía 1)

| VANO | VIGA | POSICIÓN             | FLECHA (mm)                              | MICRODEFORMACIONES |
|------|------|----------------------|------------------------------------------|--------------------|
| 4    | 1    | 0,5 m VANO 3         | -0,03 (NODO 4595)                        | ---                |
|      |      | CENTRO DE VANO       | -1,45 (NODO 2998)                        | 8                  |
|      | 2    | 0,5 m VANO 3         | -0,03 (NODO 4592)                        | ---                |
|      |      | CENTRO DE VANO       | -1,45 (NODO 3796)                        | 8                  |
| 5    | 1    | 0,5 m VANO 4         | 0,01 (NODO 4612)                         | ---                |
|      |      | CENTRO DE VANO       | 5,68 (NODO 3030)                         | -32                |
|      | 2    | 0,5 m VANO 4         | 0,01 (NODO 4609)                         | ---                |
|      |      | CENTRO DE VANO       | 5,59 (NODO 3562)<br>5,76 (NODO 4094)     | -32                |
| 6    | 1    | CENTRO DE VANO       | -16,60 (NODO 3109)                       | 116                |
|      |      | 0,5 m VANO 7         | -0,52 (NODO 4629)                        | ---                |
|      | 2    | CENTRO DE VANO       | -16,90 (NODO 3907)                       | 120                |
|      |      | 0,5 m VANO 7         | -0,54 (NODO 4626)                        | ---                |
| 7    | 1    | CENTRO DE VANO       | 10,30 (NODO 3063)                        | -58                |
|      |      | 0,5 m VANO 8         | 0,51 (NODO 4646)                         | ---                |
|      | 2    | CENTRO DE VANO       | 10,20 (NODO 3595)<br>10,50 (NODO 4127)   | -57                |
|      |      | 0,5 m VANO 8         | 0,52 (NODO 4643)                         | ---                |
| 8    | 1    | CENTRO DE VANO       | -16,00 (NODO 2819)<br>-17,00 (NODO 3351) | 112                |
|      |      | 0,5 m VANO 9         | -0,46 (NODO 3190)                        | ---                |
|      | 2    | CENTRO DE VANO       | -16,80 (NODO 3883)                       | 116                |
|      |      | CENTRO DE VANO (ALA) | -15,10 (NODO 4415)                       | ---                |
|      |      | 0,5 m VANO 9         | -0,47 (NODO 3988)                        | ---                |
| 9    | 1    | CENTRO DE VANO (ALA) | 5,40 (NODO 4692)                         | ---                |
|      |      | 0,5 m ESTRIBO 2      | 0,22 (NODO 4662)<br>0,22 (NODO 4664)     | ---                |
|      | 2    | CENTRO DE VANO (ALA) | 5,36 (NODO 4691)                         | ---                |
|      |      | 0,5 m ESTRIBO 2      | 0,22 (NODO 4661)                         | ---                |

### ESTÁTICA Nº7 (VEHÍCULOS EN VANOS 7 Y 8)

(locomotora y 5 tolvas G.I.F. en vía 2-locomotora 319, 4 tolvas Renfe y una Rumana en vía 1)

| VANO | VIGA | POSICIÓN             | FLECHA (mm)                             | MICRODEFORMACIONES |
|------|------|----------------------|-----------------------------------------|--------------------|
| 5    | 1    | 0,5 m VANO 4         | -0,02 (NODO 4612)                       | ---                |
|      |      | CENTRO DE VANO       | -0,90 (NODO 3030)                       | 5                  |
|      | 2    | 0,5 m VANO 4         | -0,02 (NODO 4609)                       | ---                |
|      |      | CENTRO DE VANO       | -0,93 (NODO 3562)<br>-0,89 (NODO 4094)  | 5                  |
| 6    | 1    | CENTRO DE VANO       | 3,51 (NODO 3109)                        | -21                |
|      |      | 0,5 m VANO 7         | 0,28 (NODO 4629)                        | ---                |
|      | 2    | CENTRO DE VANO       | 3,59 (NODO 3907)                        | -20                |
|      |      | 0,5 m VANO 7         | 0,30 (NODO 4626)                        | ---                |
| 7    | 1    | CENTRO DE VANO       | -9,94 (NODO 3063)                       | 76                 |
|      |      | 0,5 m VANO 8         | -0,03 (NODO 4646)                       | ---                |
|      | 2    | CENTRO DE VANO       | -10,90 (NODO 3595)<br>-9,88 (NODO 4127) | 80                 |
|      |      | 0,5 m VANO 8         | -0,03 (NODO 4643)                       | ---                |
| 8    | 1    | CENTRO DE VANO       | -9,35 (NODO 2819)<br>-10,40 (NODO 3351) | 112                |
|      |      | 0,5 m VANO 9         | -0,31 (NODO 3190)                       | ---                |
|      |      | CENTRO DE VANO       | -10,20 (NODO 3883)                      | 116                |
|      | 2    | CENTRO DE VANO (ALA) | -8,07 (NODO 4415)                       | ---                |
|      |      | 0,5 m VANO 9         | -0,33 (NODO 3988)                       | ---                |
| 9    | 1    | CENTRO DE VANO (ALA) | 3,95 (NODO 4692)                        | ---                |
|      |      | 0,5 m ESTRIBO 2      | 0,15 (NODO 4662)<br>0,15 (NODO 4664)    | ---                |
|      | 2    | CENTRO DE VANO (ALA) | 3,86 (NODO 4691)                        | ---                |
|      |      | 0,5 m ESTRIBO 2      | 0,15 (NODO 4661)                        | ---                |

**DINÁMICAS 11, 12, 13 Y 14**  
**(locomotora GIF y 5 tolvas G.I.F. en vía 1)**

| VANO | VIGA | POSICIÓN               | FLECHA (mm) Envolvente de las deformadas |
|------|------|------------------------|------------------------------------------|
| 1    | 1    | 0,45* LUZ              | -6,31 (NODO 4533)                        |
|      | 2    | 0,5 m ESTRIBO ZARAGOZA | -0,18 (NODO 4524)                        |
|      |      | 0,45* LUZ              | -3,82 (NODO 4530)                        |
| 2    | 1    | 0,5 m VANO 1           | -0,27 (NODO 4561)                        |
|      |      | CENTRO DE VANO         | -9,82 (NODO 2691)                        |
|      |      |                        | -9,92 (NODO 3223)                        |
|      | 2    | 0,5 m VANO 1           | -0,20 (NODO 4558)                        |
|      |      | CENTRO DE VANO         | -6,94 (NODO 3755)                        |
| 3    | 1    | 0,5 m VANO 2           | -0,26 (NODO 4578)                        |
|      |      | CENTRO DE VANO         | -9,93 (NODO 2962)                        |
|      | 2    | 0,5 m VANO 2           | -0,21 (NODO 4575)                        |
|      |      | CENTRO DE VANO         | -7,14 (NODO 3760)                        |
| 4    | 1    | 0,5 m VANO 3           | -0,25 (NODO 4595)                        |
|      |      | CENTRO DE VANO         | -9,82 (NODO 2998)                        |
|      | 2    | 0,5 m VANO 3           | -0,19 (NODO 4592)                        |
|      |      | CENTRO DE VANO         | -7,05 (NODO 3796)                        |
| 5    | 1    | 0,5 m VANO 4           | -0,25 (NODO 4612)                        |
|      |      | CENTRO DE VANO         | -9,80 (NODO 3030)                        |
|      | 2    | 0,5 m VANO 4           | -0,20 (NODO 4609)                        |
|      |      | CENTRO DE VANO         | -7,49 (NODO 3562)                        |
|      |      |                        | -6,51 (NODO 4094)                        |
| 6    | 1    | CENTRO DE VANO         | -9,84 (NODO 3109)                        |
|      |      | 0,5 m VANO 7           | -0,26 (NODO 4629)                        |
|      | 2    | CENTRO DE VANO         | -7,02 (NODO 3907)                        |
|      |      | 0,5 m VANO 7           | -0,20 (NODO 4626)                        |

**DINÁMICAS 11, 12, 13 Y 14 (cont.)**  
**(locomotora GIF y 5 tolvas G.I.F. en vía 1)**

| VANO | VIGA | POSICIÓN             | FLECHA (mm)       |
|------|------|----------------------|-------------------|
| 7    | 1    | CENTRO DE VANO       | -9,91 (NODO 3063) |
|      |      | 0,5 m VANO 8         | -0,26 (NODO 4646) |
|      | 2    | CENTRO DE VANO       | -7,58 (NODO 3595) |
|      |      |                      | -6,58 (NODO 4127) |
|      |      | 0,5 m VANO 8         | -0,20 (NODO 4643) |
| 8    | 1    | CENTRO DE VANO       | -9,66 (NODO 2819) |
|      |      |                      | -9,67 (NODO 3351) |
|      |      | 0,5 m VANO 9         | -0,27 (NODO 3190) |
|      | 2    | CENTRO DE VANO       | -6,89 (NODO 3883) |
|      |      | CENTRO DE VANO (ALA) | -5,52 (NODO 4415) |
|      |      | 0,5 m VANO 9         | -0,20 (NODO 3988) |
| 9    | 1    | CENTRO DE VANO (ALA) | -4,84 (NODO 4692) |
|      |      | 0,5 m ESTRIBO 2      | -0,37 (NODO 4662) |
|      |      |                      | -0,38 (NODO 4664) |
|      | 2    | CENTRO DE VANO (ALA) | -2,34 (NODO 4691) |
|      |      | 0,5 m ESTRIBO 2      | -0,18 (NODO 4661) |

## DINÁMICA 21, 22, 23 Y 24

(Tractor UTE y 5 tolvas G.I.F. en vía 2)

| VANO | VIGA | POSICIÓN               | FLECHA (mm) Envolvente |
|------|------|------------------------|------------------------|
| 1    | 1    | 0,45* LUZ              | -3,75 (NODO 4533)      |
|      | 2    | 0,5 m ESTRIBO ZARAGOZA | -0,33 (NODO 4524)      |
|      |      | 0,45* LUZ              | -6,14 (NODO 4530)      |
| 2    | 1    | 0,5 m VANO 1           | -0,20 (NODO 4561)      |
|      |      | CENTRO DE VANO         | -6,31 (NODO 2691)      |
|      |      |                        | -7,29 (NODO 3223)      |
|      | 2    | 0,5 m VANO 1           | -0,26 (NODO 4558)      |
|      |      | CENTRO DE VANO         | -9,58 (NODO 3755)      |
| 3    | 1    | 0,5 m VANO 2           | -0,20 (NODO 4578)      |
|      |      | CENTRO DE VANO         | -6,91 (NODO 2962)      |
|      | 2    | 0,5 m VANO 2           | -0,25 (NODO 4575)      |
|      |      | CENTRO DE VANO         | -9,64 (NODO 3760)      |
| 4    | 1    | 0,5 m VANO 3           | -0,19 (NODO 4595)      |
|      |      | CENTRO DE VANO         | -6,89 (NODO 2998)      |
|      | 2    | 0,5 m VANO 3           | -0,24 (NODO 4592)      |
|      |      | CENTRO DE VANO         | -9,62 (NODO 3796)      |
| 5    | 1    | 0,5 m VANO 4           | -0,19 (NODO 4612)      |
|      |      | CENTRO DE VANO         | -6,88 (NODO 3030)      |
|      | 2    | 0,5 m VANO 4           | -0,24 (NODO 4609)      |
|      |      | CENTRO DE VANO         | -9,80 (NODO 3562)      |
|      |      |                        | -9,65 (NODO 4094)      |
| 6    | 1    | CENTRO DE VANO         | -6,89 (NODO 3109)      |
|      |      | 0,5 m VANO 7           | -0,19 (NODO 4629)      |
|      | 2    | CENTRO DE VANO         | -9,65 (NODO 3907)      |
|      |      | 0,5 m VANO 7           | -0,25 (NODO 4626)      |

## DINÁMICA 21, 22, 23 Y 24 (cont.)

(Tractor UTE y 5 tolvas G.I.F. en vía 2)

| VANO | VIGA | POSICIÓN             | FLECHA (mm)       |
|------|------|----------------------|-------------------|
| 7    | 1    | CENTRO DE VANO       | -6,96 (NODO 3063) |
|      |      | 0,5 m VANO 8         | -0,19 (NODO 4646) |
|      | 2    | CENTRO DE VANO       | -9,89 (NODO 3595) |
|      |      |                      | -9,75 (NODO 4127) |
|      |      | 0,5 m VANO 8         | -0,25 (NODO 4643) |
| 8    | 1    | CENTRO DE VANO       | -6,24 (NODO 2819) |
|      |      |                      | -7,22 (NODO 3351) |
|      |      | 0,5 m VANO 9         | -0,19 (NODO 3190) |
|      | 2    | CENTRO DE VANO       | -9,40 (NODO 3883) |
|      |      | CENTRO DE VANO (ALA) | -8,65 (NODO 4415) |
|      |      | 0,5 m VANO 9         | -0,26 (NODO 3988) |
| 9    | 1    | CENTRO DE VANO (ALA) | -2,29 (NODO 4692) |
|      |      | 0,5 m ESTRIBO 2      | -0,18 (NODO 4662) |
|      |      |                      | -0,19 (NODO 4664) |
|      | 2    | CENTRO DE VANO (ALA) | -4,71 (NODO 4691) |
|      |      | 0,5 m ESTRIBO 2      | -0,38 (NODO 4661) |

## DINÁMICA 01

(locomotora GIF y 5 tolvas G.I.F. en vía 1-Tractor UTE y 5 tolvas GIF en vía 2)

| VANO | VIGA | POSICIÓN               | FLECHA (mm) Envolvente |
|------|------|------------------------|------------------------|
| 1    | 1    | 0,45* LUZ              | -10,06 (NODO 4533)     |
|      | 2    | 0,5 m ESTRIBO ZARAGOZA | -0,51 (NODO 4524)      |
|      |      | 0,45* LUZ              | -9,96 (NODO 4530)      |
| 2    | 1    | 0,5 m VANO 1           | -0,47 (NODO 4561)      |
|      |      | CENTRO DE VANO         | -16,13 (NODO 2691)     |
|      |      |                        | -17,21 (NODO 3223)     |
|      | 2    | 0,5 m VANO 1           | -0,46 (NODO 4558)      |
|      |      | CENTRO DE VANO         | -16,52 (NODO 3755)     |
| 3    | 1    | 0,5 m VANO 2           | -0,46 (NODO 4578)      |
|      |      | CENTRO DE VANO         | -16,84 (NODO 2962)     |
|      | 2    | 0,5 m VANO 2           | -0,46 (NODO 4575)      |
|      |      | CENTRO DE VANO         | -16,74 (NODO 3760)     |
| 4    | 1    | 0,5 m VANO 3           | -0,44 (NODO 4595)      |
|      |      | CENTRO DE VANO         | -16,71 (NODO 2998)     |
|      | 2    | 0,5 m VANO 3           | -0,43 (NODO 4592)      |
|      |      | CENTRO DE VANO         | -16,67 (NODO 3796)     |
| 5    | 1    | 0,5 m VANO 4           | -0,44 (NODO 4612)      |
|      |      | CENTRO DE VANO         | -16,68 (NODO 3030)     |
|      | 2    | 0,5 m VANO 4           | -0,44 (NODO 4609)      |
|      |      | CENTRO DE VANO         | -17,29 (NODO 3562)     |
|      |      |                        | -16,16 (NODO 4094)     |
| 6    | 1    | CENTRO DE VANO         | -16,73 (NODO 3109)     |
|      |      | 0,5 m VANO 7           | -0,45 (NODO 4629)      |
|      | 2    | CENTRO DE VANO         | -16,67 (NODO 3907)     |
|      |      | 0,5 m VANO 7           | -0,45 (NODO 4626)      |



### DINÁMICA 01 (cont.)

(locomotora GIF y 5 tolvas G.I.F. en vía 1-Tractor UTE y 5 tolvas GIF en vía 2)

| VANO | VIGA | POSICIÓN             | FLECHA (mm)        |
|------|------|----------------------|--------------------|
| 7    | 1    | CENTRO DE VANO       | -16,87 (NODO 3063) |
|      |      | 0,5 m VANO 8         | -0,45 (NODO 4646)  |
|      | 2    | CENTRO DE VANO       | -17,47 (NODO 3595) |
|      |      |                      | -16,33 (NODO 4127) |
|      |      | 0,5 m VANO 8         | -0,45 (NODO 4643)  |
| 8    | 1    | CENTRO DE VANO       | -15,90 (NODO 2819) |
|      |      |                      | -16,89 (NODO 3351) |
|      |      | 0,5 m VANO 9         | -0,46 (NODO 3190)  |
|      | 2    | CENTRO DE VANO       | -16,29 (NODO 3883) |
|      |      | CENTRO DE VANO (ALA) | -14,17 (NODO 4415) |
|      |      | 0,5 m VANO 9         | -0,46 (NODO 3988)  |
| 9    | 1    | CENTRO DE VANO (ALA) | -7,13 (NODO 4692)  |
|      |      | 0,5 m ESTRIBO 2      | -0,55 (NODO 4662)  |
|      |      |                      | -0,57 (NODO 4664)  |
|      | 2    | CENTRO DE VANO (ALA) | -7,05 (NODO 4691)  |
|      |      | 0,5 m ESTRIBO 2      | -0,56 (NODO 4661)  |
|      |      |                      |                    |

El valor estimado para la frecuencia fundamental de flexión del tablero es de 2,23 Hz.

Madrid, julio de 2001

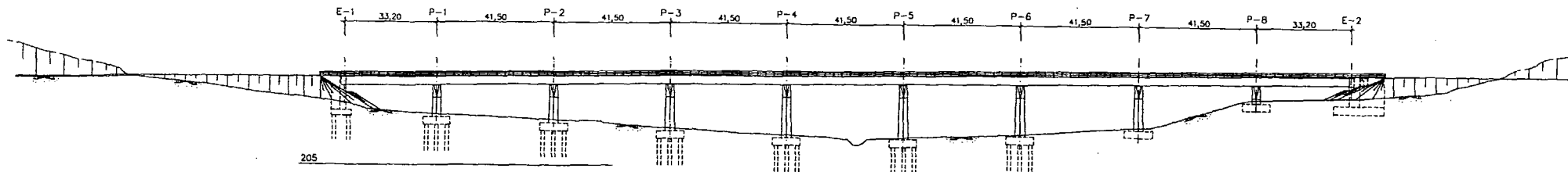
EL JEFE DE ESTRUCTURAS  
DE HORMIGÓN Y FÁBRICA

INGENIERO DEL DPTO DE  
ESTRUCTURAS DE HORMIGÓN Y  
FÁBRICA

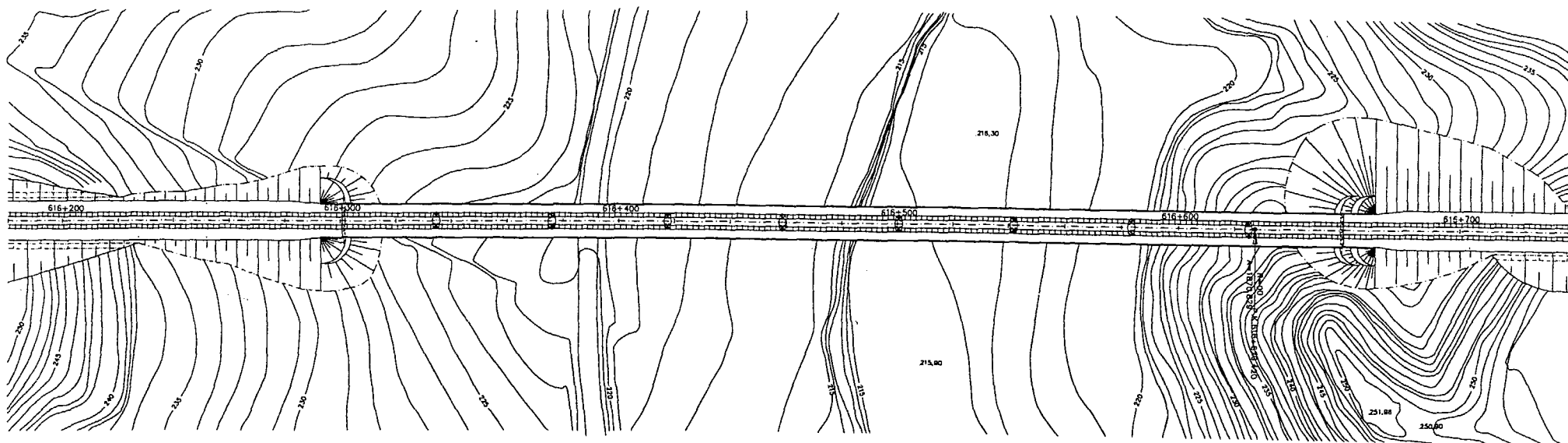
Fdo.: Luis Salas López de Lerma

Fdo.: Luis Miguel Pombo Blanco

## **ANEJO 2A: DOCUMENTACIÓN GRÁFICA UTILIZADA**

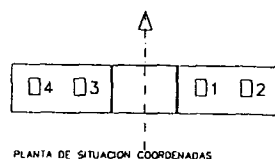


ALZADO FRONTAL  
ESCALA 1:1500



PLANTA  
ESCALA 1:1500

|      | E-1         | P-1         | P-2         | P-3         | P-4         | P-5         | P-6         | P-7         | P-8         | E-2         |
|------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| P.K. | 616301,8    | 616335      | 616378,5    | 616418      | 616459,5    | 616501      | 616542,5    | 616584      | 616625,5    | 616658,7    |
| Z.   | 233,389     | 233,628     | 233,952     | 234,320     | 234,730     | 235,184     | 235,681     | 236,221     | 236,803     | 237,301     |
| X-1  | 784107,110  | 784140,107  | 784181,367  | 784222,643  | 784263,929  | 784305,228  | 784346,533  | 784387,844  | 784429,159  | 784461,508  |
| Y-1  | 4613846,793 | 4613850,364 | 4613854,702 | 4613858,915 | 4613863,025 | 4613867,052 | 4613871,016 | 4613874,939 | 4613878,839 | 4613882,422 |
| X-2  | 784107,187  | 784140,182  | 784181,439  | 784222,713  | 784263,998  | 784305,295  | 784346,600  | 784387,910  | 784429,225  | 784461,442  |
| Y-2  | 4613846,098 | 4613849,668 | 4613854,006 | 4613858,218 | 4613862,328 | 4613866,356 | 4613870,319 | 4613874,242 | 4613878,142 | 4613882,119 |
| X-3  | 784106,292  | 784139,311  | 784180,585  | 784221,891  | 784263,195  | 784304,506  | 784345,821  | 784387,138  | 784428,455  | 784462,212  |
| Y-3  | 4613854,249 | 4613857,822 | 4613862,162 | 4613866,377 | 4613870,489 | 4613874,518 | 4613878,482 | 4613882,405 | 4613886,305 | 4613891,956 |
| X-4  | 784106,215  | 784139,236  | 784181,523  | 784221,821  | 784263,126  | 784304,439  | 784345,755  | 784387,010  | 784428,389  | 784462,278  |
| Y-4  | 4613854,944 | 4613858,318 | 4613862,858 | 4613867,074 | 4613871,186 | 4613875,214 | 4613879,179 | 4613874,242 | 4613887,002 | 4613891,259 |



PLANTA DE SITUACIÓN COORDENADAS



TÍTULO

MODIFICADO N° 1  
AL PROYECTO DE LA LINEA DE ALTA VELOCIDAD  
MADRID - BARCELONA - FRONTERA FRANCESA  
TRAMO: ZARAGOZA - LLEIDA  
SUBTRAMO - VI

CONFORME EL CONTRATO

J. E. AZAIDIN - ZAIDIN

Proyectos

EL GERENTE, J. A. Alonso, Legión de Honor

EL AUTOR DEL MODIFICADO  
Luis M. Perez Fabregat

ING. DE CAMINOS CANALES Y PUERTOS

ESCALA ORIGINAL

1:1500

DIN A-3

NUMÉRICA

GRÁFICA

FECHA

MAYO-1998

N° DE PLANO

5.28

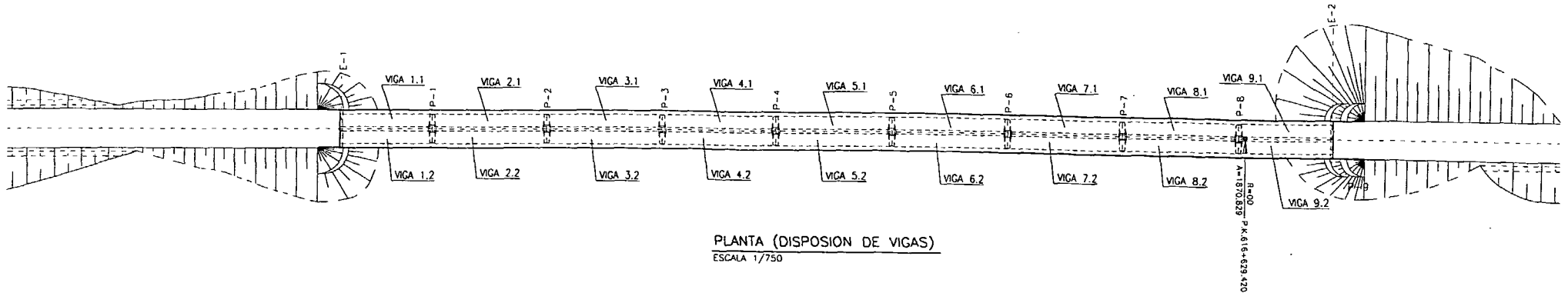
N° DE HOJA

HOJA 1 DE 18

TÍTULO DEL PLANO

O.F. 616-3  
VIADUCTO DEL VALL DEL GALLO  
PLANTA Y ALZADO

Hoja 1 de 22



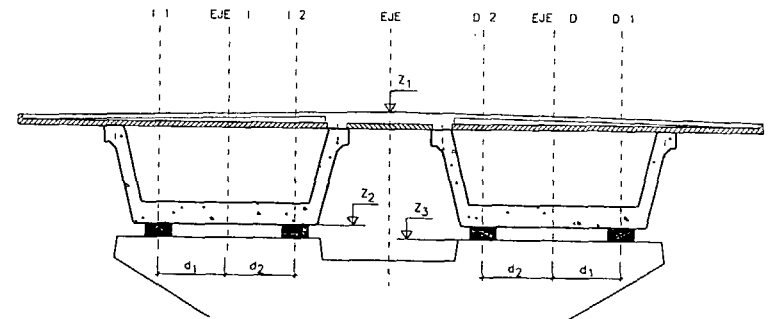
PLANTA (DISPOSICION DE VIGAS)  
ESCALA 1/750

CUADRO DE DEFINICION GEOMETRICA EN PLANTA

|    |                                       |             |               |                |                  |
|----|---------------------------------------|-------------|---------------|----------------|------------------|
| E1 | PK = 616.301.800<br>Azimut: 93.03918g |             |               | X: 784.106.702 | Y: 4.613.850.520 |
|    | PUNTO                                 | X           | Y             |                |                  |
|    | I1                                    | 784.105.276 | 4.613.854.850 |                |                  |
|    | I2                                    | 784.105.322 | 4.613.852.155 |                |                  |
|    | O1                                    | 784.107.177 | 4.613.846.190 |                |                  |
|    | O2                                    | 784.106.881 | 4.613.848.885 |                |                  |
|    | Eje I                                 | 784.106.374 | 4.613.853.502 |                |                  |
|    | Eje D                                 | 784.107.029 | 4.613.847.538 |                |                  |
| P1 | PK = 616.335.000<br>Azimut: 93.22700g |             |               | X: 784.139.709 | Y: 4.613.854.054 |
|    | PUNTO                                 | X           | Y             |                |                  |
|    | I1                                    | 784.139.252 | 4.613.858.334 |                |                  |
|    | I2                                    | 784.139.529 | 4.613.855.778 |                |                  |
|    | O1                                    | 784.140.166 | 4.613.849.813 |                |                  |
|    | O2                                    | 784.139.889 | 4.613.852.408 |                |                  |
|    | Eje I                                 | 784.139.390 | 4.613.857.077 |                |                  |
|    | Eje D                                 | 784.140.027 | 4.613.851.111 |                |                  |
| P2 | PK = 616.376.500<br>Azimut: 93.43358g |             |               | X: 784.180.981 | Y: 4.613.858.432 |
|    | PUNTO                                 | X           | Y             |                |                  |
|    | I1                                    | 784.180.538 | 4.613.862.714 |                |                  |
|    | I2                                    | 784.180.807 | 4.613.860.118 |                |                  |
|    | O1                                    | 784.181.425 | 4.613.854.150 |                |                  |
|    | O2                                    | 784.181.156 | 4.613.856.746 |                |                  |
|    | Eje I                                 | 784.180.672 | 4.613.861.415 |                |                  |
|    | Eje D                                 | 784.181.290 | 4.613.855.448 |                |                  |
| P3 | PK = 616.418.000<br>Azimut: 93.60883g |             |               | X: 784.222.267 | Y: 4.613.862.646 |
|    | PUNTO                                 | X           | Y             |                |                  |
|    | I1                                    | 784.221.835 | 4.613.866.930 |                |                  |
|    | I2                                    | 784.222.097 | 4.613.864.333 |                |                  |
|    | O1                                    | 784.227.696 | 4.613.858.363 |                |                  |
|    | O2                                    | 784.227.437 | 4.613.860.990 |                |                  |
|    | Eje I                                 | 784.221.966 | 4.613.863.611 |                |                  |
|    | Eje D                                 | 784.222.587 | 4.613.858.861 |                |                  |
| P4 | PK = 616.459.500<br>Azimut: 93.75276g |             |               | X: 784.263.563 | Y: 4.613.866.757 |
|    | PUNTO                                 | X           | Y             |                |                  |
|    | I1                                    | 784.263.141 | 4.613.871.041 |                |                  |
|    | I2                                    | 784.263.387 | 4.613.868.444 |                |                  |
|    | O1                                    | 784.263.884 | 4.613.862.413 |                |                  |
|    | O2                                    | 784.263.779 | 4.613.865.070 |                |                  |
|    | Eje I                                 | 784.263.269 | 4.613.869.743 |                |                  |
|    | Eje D                                 | 784.263.857 | 4.613.863.777 |                |                  |
| P5 | PK = 616.501.000<br>Azimut: 93.86536g |             |               | X: 784.304.867 | Y: 4.613.870.785 |
|    | PUNTO                                 | X           | Y             |                |                  |
|    | I1                                    | 784.304.452 | 4.613.875.070 |                |                  |
|    | I2                                    | 784.304.704 | 4.613.872.472 |                |                  |
|    | O1                                    | 784.305.281 | 4.613.866.500 |                |                  |
|    | O2                                    | 784.305.030 | 4.613.869.098 |                |                  |
|    | Eje I                                 | 784.304.578 | 4.613.873.311 |                |                  |
|    | Eje D                                 | 784.305.155 | 4.613.867.799 |                |                  |
| P6 | PK = 616.542.500<br>Azimut: 93.94663g |             |               | X: 784.346.177 | Y: 4.613.874.750 |
|    | PUNTO                                 | X           | Y             |                |                  |
|    | I1                                    | 784.345.768 | 4.613.879.035 |                |                  |
|    | I2                                    | 784.346.016 | 4.613.876.437 |                |                  |
|    | O1                                    | 784.346.586 | 4.613.870.464 |                |                  |
|    | O2                                    | 784.346.338 | 4.613.873.062 |                |                  |
|    | Eje I                                 | 784.345.892 | 4.613.877.736 |                |                  |
|    | Eje D                                 | 784.346.462 | 4.613.871.763 |                |                  |
| P7 | PK = 616.584.000<br>Azimut: 93.99550g |             |               | X: 784.387.491 | Y: 4.613.878.672 |
|    | PUNTO                                 | X           | Y             |                |                  |
|    | I1                                    | 784.387.086 | 4.613.882.958 |                |                  |
|    | I2                                    | 784.387.331 | 4.613.880.359 |                |                  |
|    | O1                                    | 784.387.896 | 4.613.874.386 |                |                  |
|    | O2                                    | 784.387.651 | 4.613.876.984 |                |                  |
|    | Eje I                                 | 784.387.209 | 4.613.881.659 |                |                  |
|    | Eje D                                 | 784.387.774 | 4.613.875.685 |                |                  |
| P8 | PK = 616.625.500<br>Azimut: 94.01520g |             |               | X: 784.428.807 | Y: 4.613.882.572 |
|    | PUNTO                                 | X           | Y             |                |                  |
|    | I1                                    | 784.428.403 | 4.613.886.858 |                |                  |
|    | I2                                    | 784.428.648 | 4.613.884.259 |                |                  |
|    | O1                                    | 784.429.212 | 4.613.878.286 |                |                  |
|    | O2                                    | 784.428.967 | 4.613.880.884 |                |                  |
|    | Eje I                                 | 784.428.526 | 4.613.883.559 |                |                  |
|    | Eje D                                 | 784.429.089 | 4.613.879.585 |                |                  |
| E2 | PK = 616.658.700<br>Azimut: 94.01534g |             |               | X: 784.461.861 | Y: 4.613.885.688 |
|    | PUNTO                                 | X           | Y             |                |                  |
|    | I1                                    | 784.461.457 | 4.613.889.969 |                |                  |
|    | I2                                    | 784.461.701 | 4.613.887.381 |                |                  |
|    | O1                                    | 784.462.264 | 4.613.881.407 |                |                  |
|    | O2                                    | 784.462.020 | 4.613.883.996 |                |                  |
|    | Eje I                                 | 784.461.579 | 4.613.886.675 |                |                  |
|    | Eje D                                 | 784.462.142 | 4.613.880.702 |                |                  |

DISTANCIAS EJE APOYO - EJE VIGA

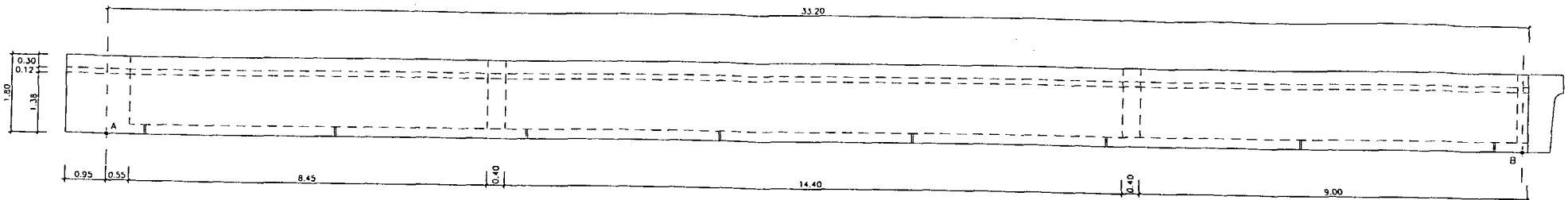
| PILAS | d1    | d2    |
|-------|-------|-------|
| E1    | 1.305 | 1.305 |
| E2    | 1.300 | 1.300 |



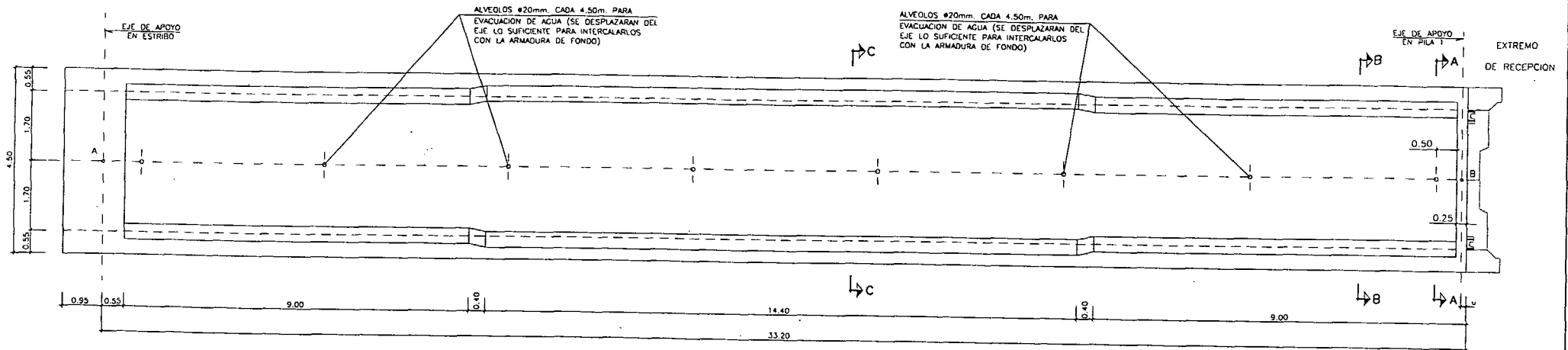
DEFINICION GEOMETRICA  
ESCALA 1/50

CUADRO DE DEFINICION GEOMETRICA EN ALZADO

|    | Z1      | Z2      | Z3      |
|----|---------|---------|---------|
| E1 | 235.474 | 233.354 | 233.104 |
| P1 | 235.703 | 233.583 | 233.333 |
| P2 | 236.027 | 233.907 | 233.657 |
| P3 | 236.395 | 234.275 | 234.025 |
| P4 | 236.805 | 234.685 | 234.435 |
| P5 | 237.259 | 235.139 | 234.889 |
| P6 | 237.756 | 235.636 | 235.386 |
| P7 | 238.296 | 236.176 | 235.926 |
| P8 | 238.878 | 236.758 | 236.508 |
| E2 | 239.376 | 237.256 | 237.006 |



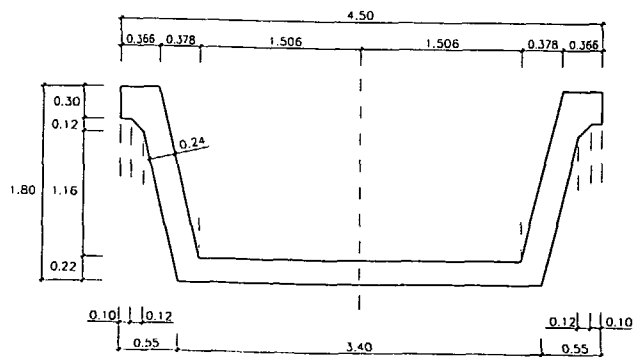
VIGAS 1.1 y 1.2 - ALZADO  
ESCALA 1/50



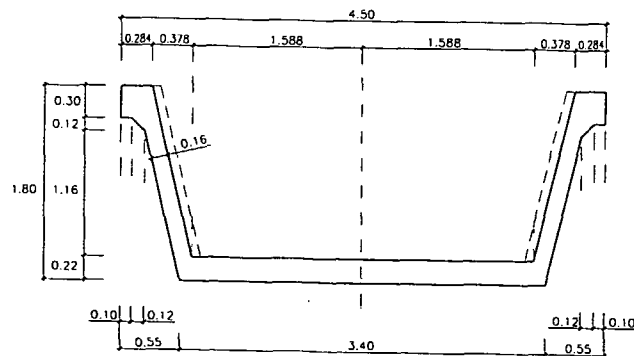
VIGAS 1.1 y 1.2 - PLANTA  
ESCALA 1/50

NOTA: LOS PUNTOS A y B SE DEFINEN POR LA INTERSECCION EN PLANTA DEL EJE DE VIGA CON EL EJE DE APOYO DE PILA

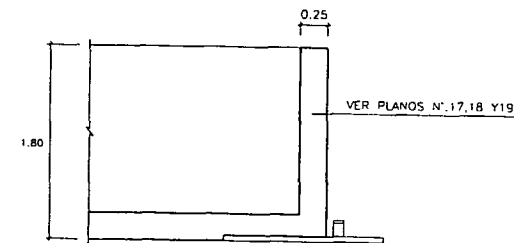
| VIGA | u (m.) |
|------|--------|
| 1.1  | -0.009 |
| 1.2  | +0.009 |



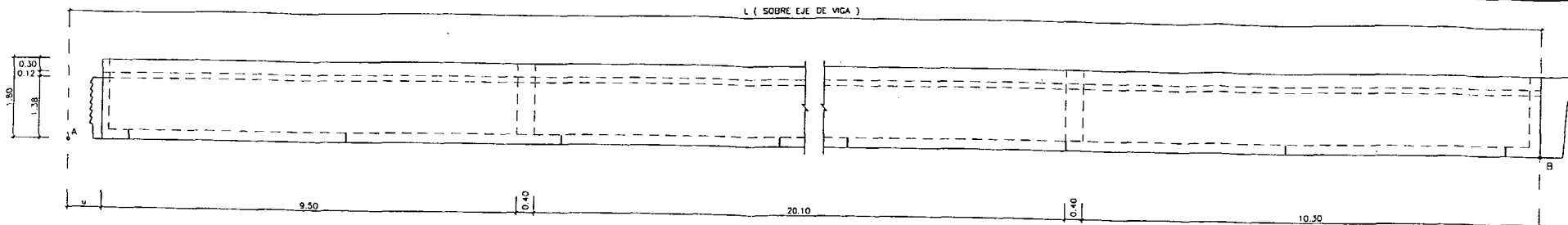
SECCION A - A y B - B  
ESCALA 1/25



SECCION C - C (EN CENTRO DE VANO)  
ESCALA 1/25

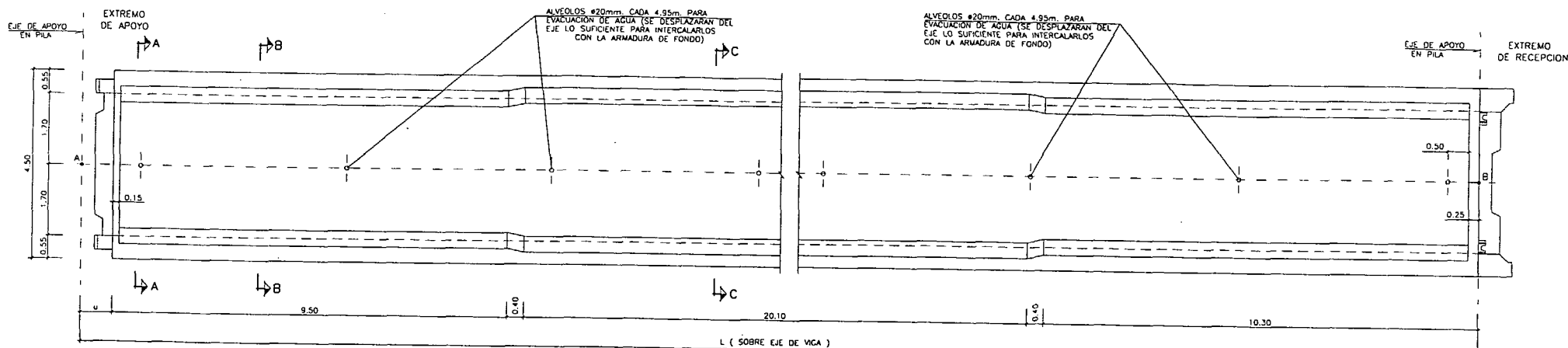


SECCION POR DIAFRAGMA EXTREMO DE RECEPCION  
ESCALA 1/25



VIGAS 2.1 a 8.1 y 2.2 a 8.2 - ALZADO

ESCALA 1/50

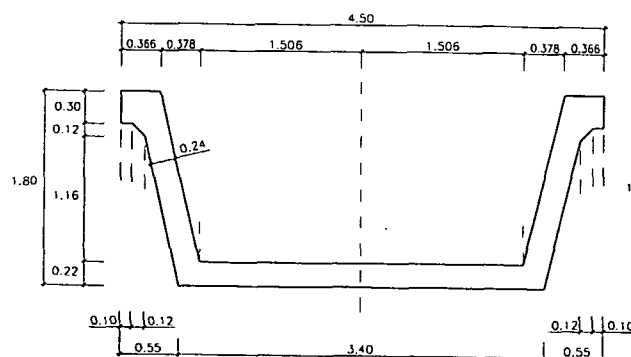


VIGAS 2.1 a 8.1 y 2.2 a 8.2 - PLANTA

ESCALA 1/50

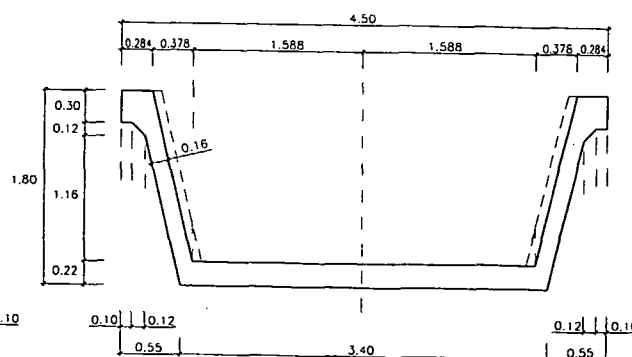
NOTA: LOS PUNTOS A Y B SE DEFINEN POR LA INTERSECCION EN PLANTA DEL EJE DE VIGA CON EL EJE DE APOYO DE PILA

| VIGA | u (m.) | L (m.) |
|------|--------|--------|
| 2.1  | 0.809  | 41.509 |
| 3.1  | 0.808  | 41.508 |
| 4.1  | 0.807  | 41.507 |
| 5.1  | 0.805  | 41.505 |
| 6.1  | 0.804  | 41.504 |
| 7.1  | 0.802  | 41.502 |
| 8.1  | 0.801  | 41.501 |
| 2.2  | 0.790  | 41.490 |
| 3.2  | 0.791  | 41.491 |
| 4.2  | 0.793  | 41.493 |
| 5.2  | 0.795  | 41.495 |
| 6.2  | 0.796  | 41.496 |
| 7.2  | 0.797  | 41.497 |
| 8.2  | 0.800  | 41.500 |



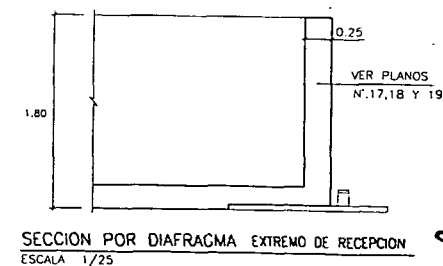
SECCION A - A y B - B

ESCALA 1/25



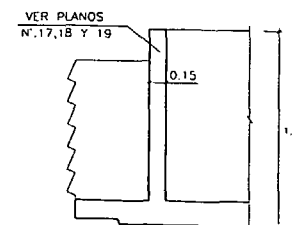
SECCION C-C (EN CENTRO DE VANO)

ESCALA 1/25



SECCION POR DIAFRAGMA EXTREMO DE RECEPCION

ESCALA 1/25



SECCION POR DIAFRAGMA EXTREMO DE APOYO

ESCALA 1/25

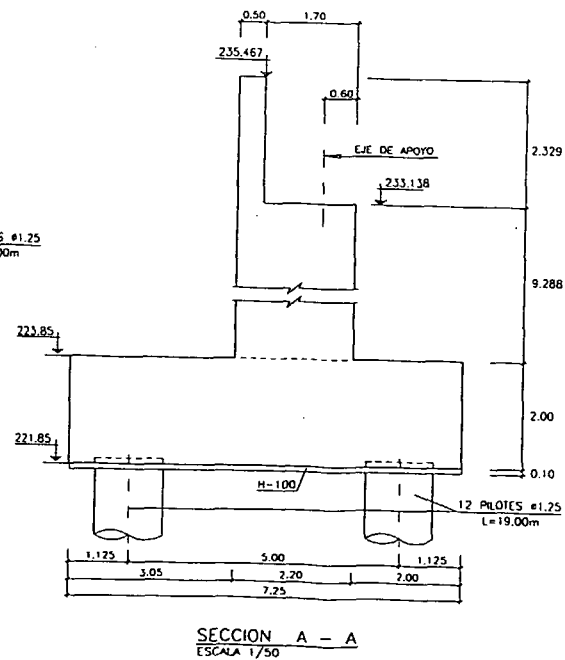
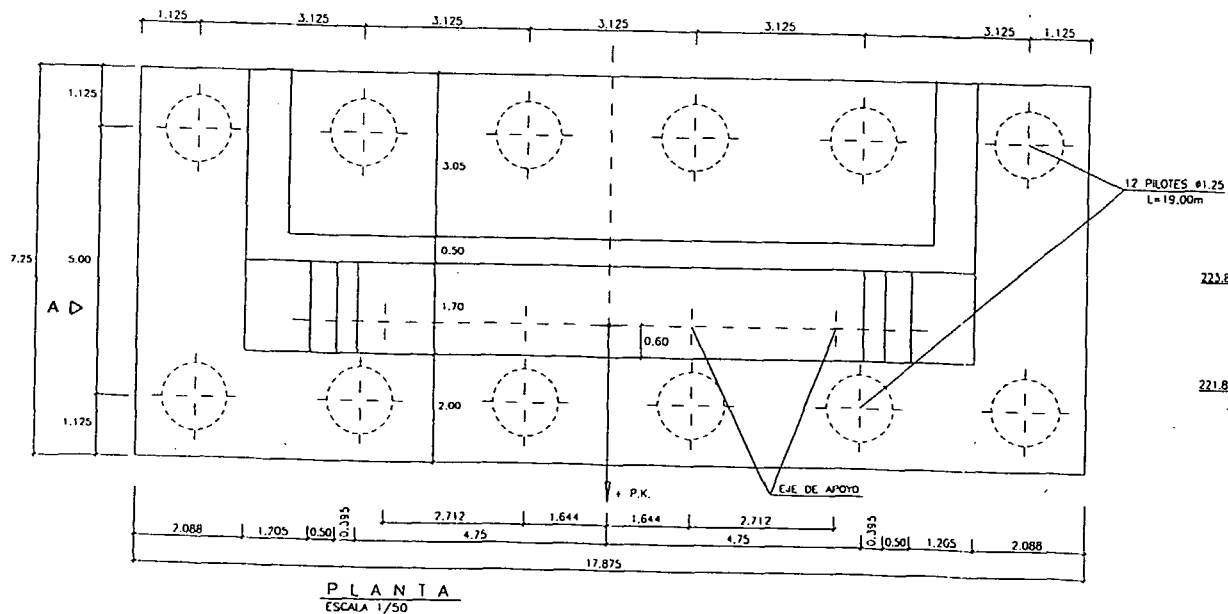
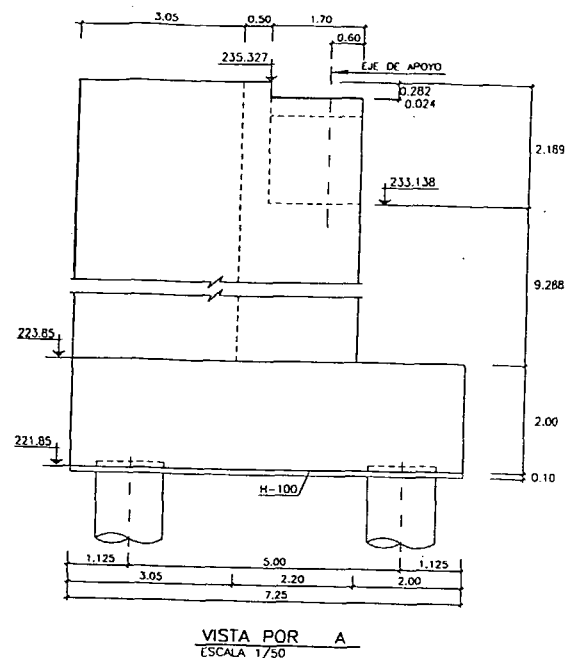
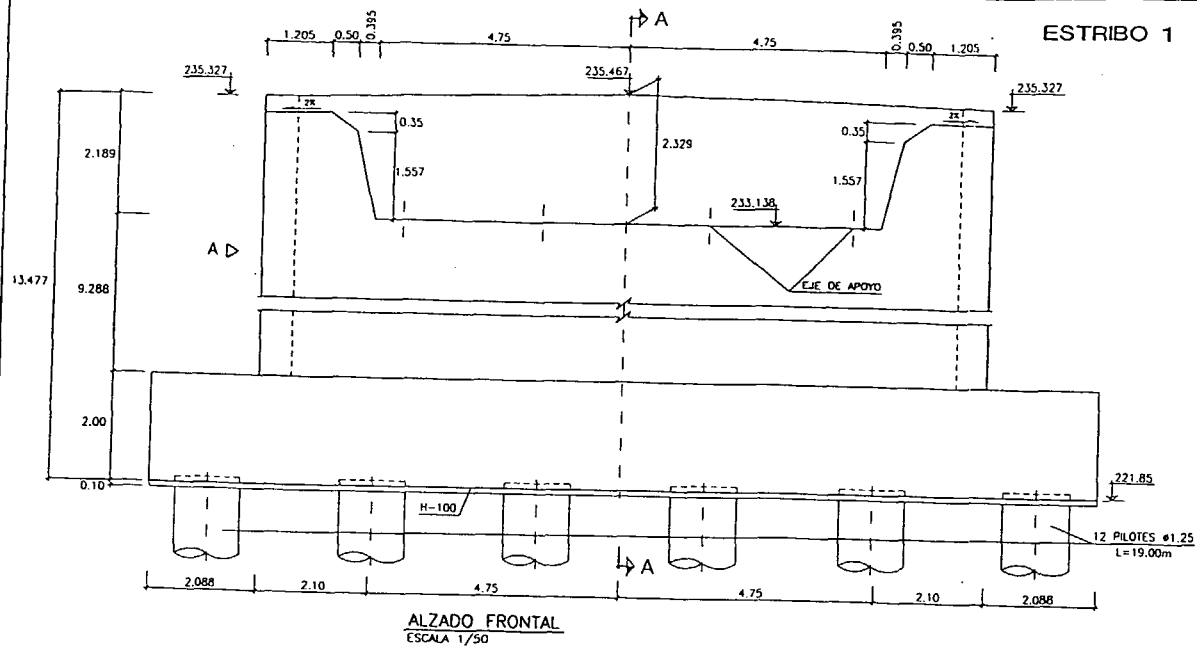
NOTA: LA ELECCION DEL EXTREMO DE APOYO Y DE RECEPCION SE HA EFECTUADO EN EL SENTIDO E1 - E2

L. A. V. - ZAIDIN  
Dragados  
UNION TEMPORAL DE EMPRESAS

VIADUCTO DEL VALLE DEL GALLO  
VIGAS 2.1 a 8.1 y 2.2 a 8.2 FORMAS

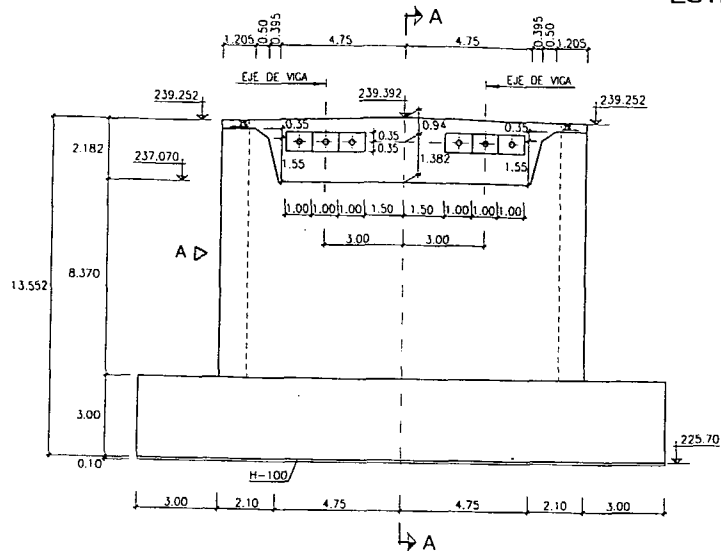
Hoja 4 de 22

# ESTRIBO 1

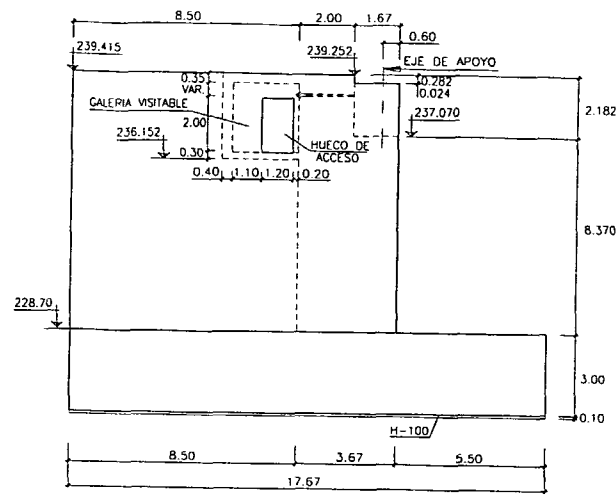




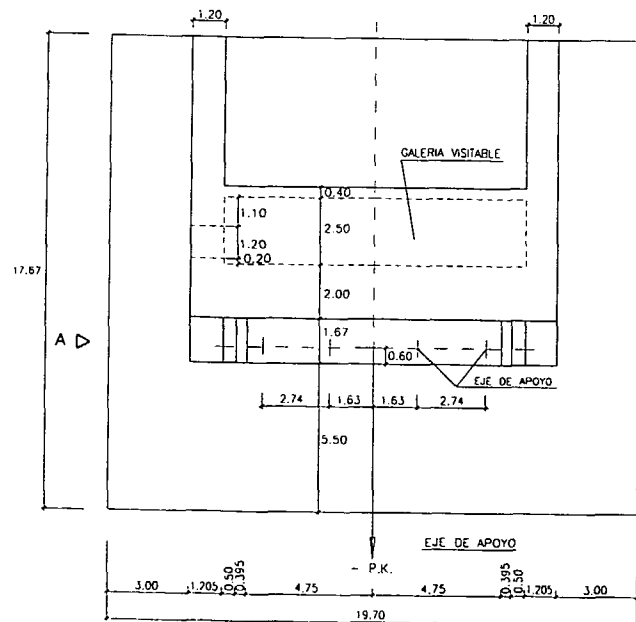
# ESTRIBO 2



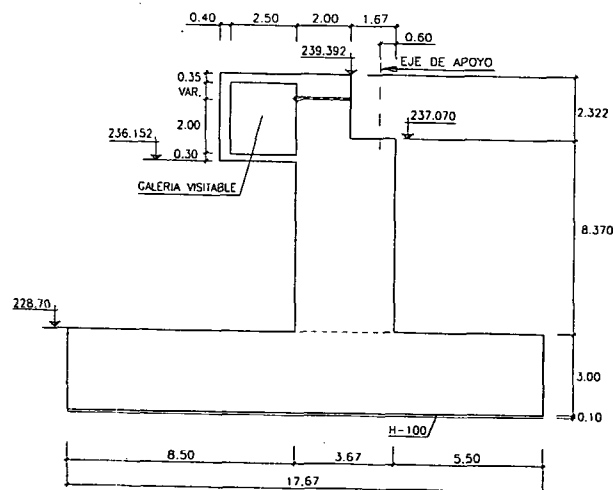
ALZADO FRONTAL  
ESCALA 1/100



VISTA POR A  
ESCALA 1/100



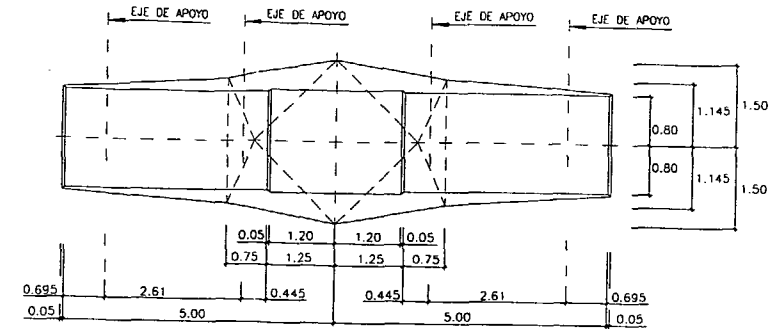
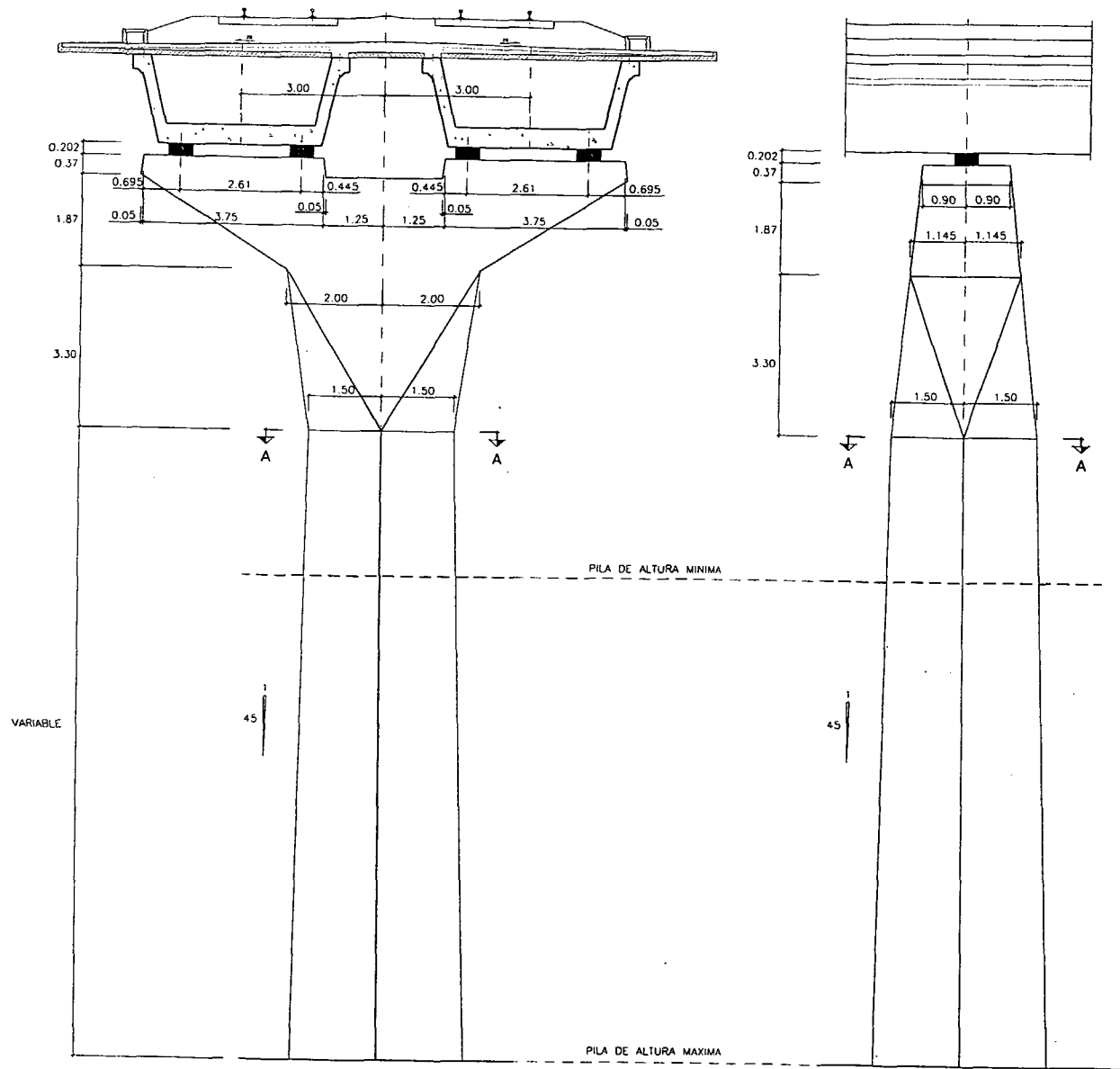
PLANTA  
ESCALA 1/100



SECCION A - A  
ESCALA 1/100

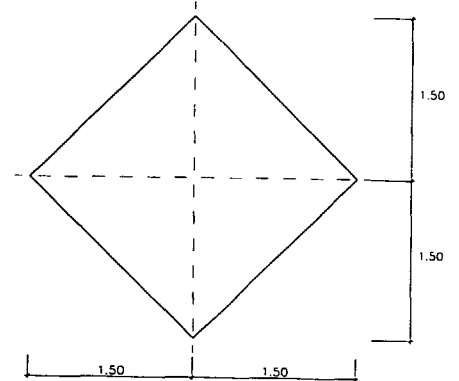
## CUADRO DE ESPECIFICACIONES

| MATERIALES                                        |                                 | RESISTENCIA                    | CONTROL | COEFICIENTE DE PONDERRACION |
|---------------------------------------------------|---------------------------------|--------------------------------|---------|-----------------------------|
| HORMICON                                          | ORIENTACION ESTRIBOS            | 1ex = 200 kg/cm <sup>2</sup>   | NORMAL  | γ <sub>c</sub> = 1.50       |
|                                                   | VIGAS PREFABRICADAS             | 1ex = 600 kg/cm <sup>2</sup>   | INTENSO | γ <sub>c</sub> = 1.40       |
|                                                   | LOSA "IN SITU" TABLERO          | 1ex = 300 kg/cm <sup>2</sup>   | NORMAL  | γ <sub>c</sub> = 1.50       |
|                                                   | PLAS Y CARTELES LOSA TRANSICION | 1ex = 300 kg/cm <sup>2</sup>   | NORMAL  | γ <sub>c</sub> = 1.50       |
| ARMADURAS PASAS AZHODON                           |                                 | 1ex = 500 kg/cm <sup>2</sup>   | NORMAL  | γ <sub>s</sub> = 1.15       |
| ACERO EN BARRAS PARA CONTINUIDAD DE VIGAS AED/105 |                                 | 1ex = 800 kg/cm <sup>2</sup>   | NORMAL  | γ <sub>s</sub> = 1.15       |
| ACERO EN ARMADURAS ACTIVAS EN VIGAS               |                                 | 1ex = 11000 kg/cm <sup>2</sup> | INTENSO | γ <sub>s</sub> = 1.40       |
| CONTROL DE EJECUCION                              |                                 | —                              | INTENSO | γ <sub>i</sub> = 1.50       |



| LÍNEA DE APOYOS | ORDO MÁXIMO (rot.) |
|-----------------|--------------------|
| E1              | 0.015              |
| P1              | 0.01               |
| P2              | 0.01               |
| P3              | 0.01               |
| P4              | 0.01               |
| P5              | 0.015              |
| P6              | 0.015              |
| P7              | 0.015              |
| P8              | 0.015              |
| P8              | 0.015              |

VALORES VÁLIDOS PARA EL SENTIDO DE MONTAJE DE VIGAS DESDE EL ESTRIBO 1 HACIA EL ESTRIBO 2



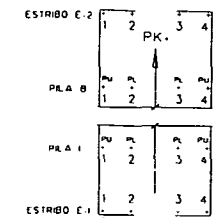
**REACCIONES CARACTERÍSTICAS Y RECORRIDOS MÁXIMOS POR APOYO**

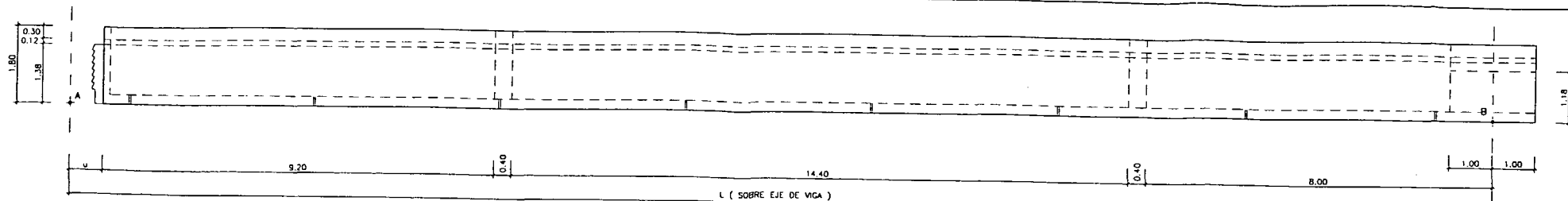
| PILA | APOYO UNIDIRECCIONAL (PU) |                     | APOYO LIBRE UNIDIRECCIONAL (PLI y PL) |           |
|------|---------------------------|---------------------|---------------------------------------|-----------|
|      | REACCIÓN VERTICAL         | REACCIÓN HORIZONTAL | REACCIÓN VERTICAL                     | RECORRIDO |
| E1   | 250                       | 105                 | 250                                   | 220       |
| P1   | 590                       | 70                  | 590                                   | 175       |
| P2   | 615                       | 90                  | 615                                   | 155       |
| P3   | 615                       | 90                  | 615                                   | 140       |
| P4   | 615                       | 75                  | 615                                   | 120       |
| P5   | 615                       | 75                  | 615                                   | 100       |
| P6   | 615                       | 70                  | 615                                   | 80        |
| P7   | 615                       | 70                  | 615                                   | 60        |
| P8   | 590                       | 90                  | 590                                   | 40        |

RECORRIDO : desplazamiento hacia cada sentido del movimiento (mm).  
ESTRIBO E-2: APOYO DE NEOPRENO ZUNCHADO 450x600x99 (66)

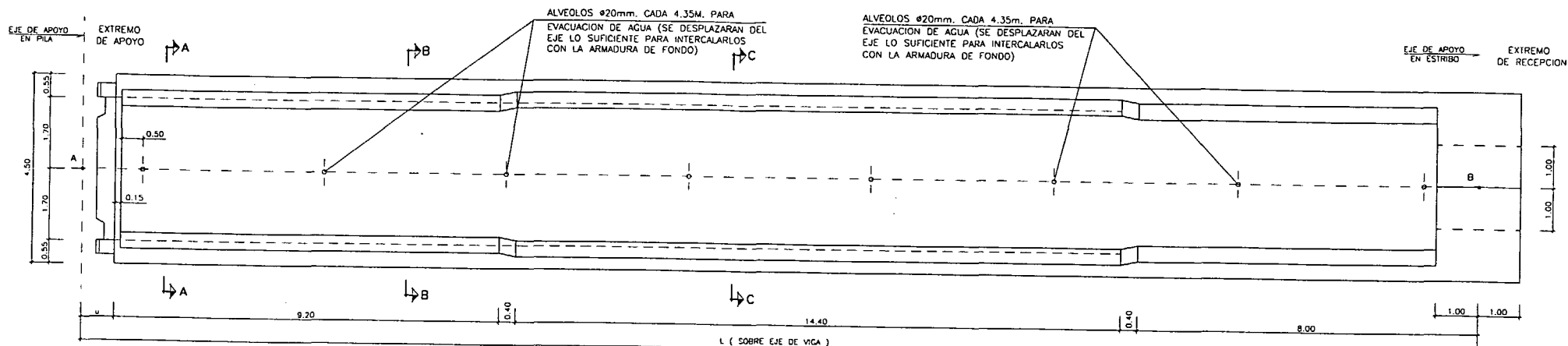


**ESQUEMA DE DISPOSICIÓN EN PLANTA DE LOS APOYOS**





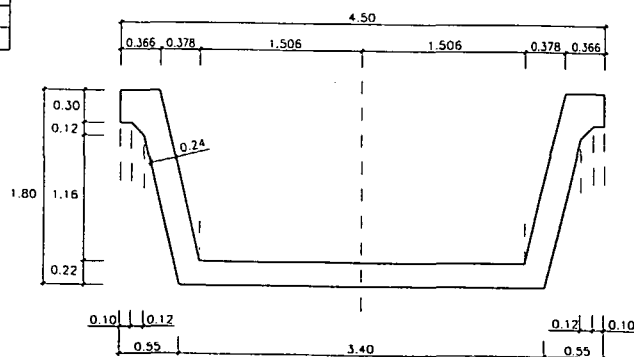
VIGAS 9.1 y 9.2 - ALZADO  
ESCALA 1/50



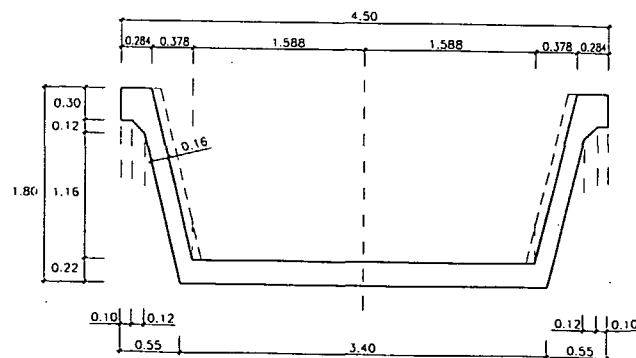
VIGAS 9.1 y 9.2 - PLANTA  
ESCALA 1/50

NOTA: LOS PUNTOS A y B SE DEFINEN POR LA INTERSECCION EN PLANTA DEL EJE DE VIGA CON EL EJE DE APOYO DE PILA

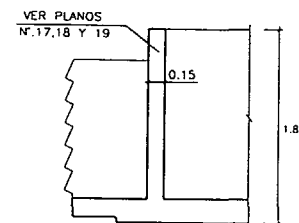
| VIGA | u (m.) | L (m.) |
|------|--------|--------|
| 9.1  | 0.800  | 33.200 |
| 9.2  | 0.789  | 33.199 |



SECCION A - A y B - B  
ESCALA 1/25



SECCION C - C (EN CENTRO DE VANO)  
ESCALA 1/25



SECCION POR DIAFRAGMA EXTREMO DE APOYO  
ESCALA 1/25

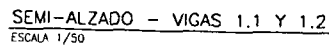
#### CUADRO DE ESPECIFICACIONES

| MATERIALES                                        | RESISTENCIA                    | CONTROL | COEFICIENTE DE Ponderacion |
|---------------------------------------------------|--------------------------------|---------|----------------------------|
| PIQUES                                            | res = 200 kg/cm <sup>2</sup>   | NORMAL  | 7% = 1.50                  |
| ENCAPADOS ESTRIBOS                                | res = 250 kg/cm <sup>2</sup>   | NORMAL  | 7% = 1.40                  |
| VIGAS PREFABRICADAS                               | res = 600 kg/cm <sup>2</sup>   | INTENSO | 7% = 1.50                  |
| LOSAS "IN SITU" TABLERO                           | res = 300 kg/cm <sup>2</sup>   | NORMAL  | 7% = 1.50                  |
| TRILAS Y CANTILLAS                                | res = 300 kg/cm <sup>2</sup>   | NORMAL  | 7% = 1.50                  |
| LOSAS TRANSICION                                  | res = 300 kg/cm <sup>2</sup>   | NORMAL  | 7% = 1.50                  |
| ARMADURAS PASIVAS RECHOSON                        | res = 500 kg/cm <sup>2</sup>   | NORMAL  | 7% = 1.15                  |
| ACERO EN BARRAS PARA CONTINUIDAD DE VIGAS AIS/105 | res = 600 kg/cm <sup>2</sup>   | NORMAL  | 7% = 1.15                  |
| ACERO EN ARMADURAS ACTIVAS EN VIGAS               | res = 21000 kg/cm <sup>2</sup> | INTENSO | 7% = 1.10                  |
| ACERO EN ARMADURAS ACTIVAS EN LOSAS               | res = 21000 kg/cm <sup>2</sup> | INTENSO | 7% = 1.10                  |
| CONTROL DE EJECUCION                              |                                | INTENSO | 7% = 1.50                  |

L.-A.-V.- ZAIDIN  
Dengados  
UNION TEMPORAL DE EMPRESAS

VIADUCTO DEL VALLE DEL GALLO  
VIGAS 9.1 y 9.2. FORMAS

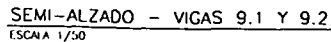
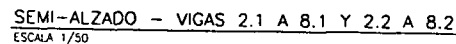
Hora 8 de 22



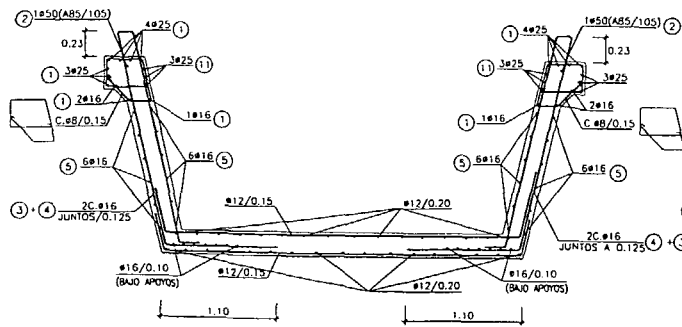
LOS CERDOS DE CONEXION CONSTITUYEN UNA ARMADURA ADICIONAL A LA ARMADURA TRANSVERSAL DOBLADA FUERA DE LA CABEZA SUPERIOR DE YICA Y SU CUANTIA ES UNA INDICACION GLOBAL, PUDIENDOSE DISPONER A DISTANCIAS DIFERENTES ENTRE ELLOS (CONDICIONADAS POR LAS POSICIONES DE LOS NERVIOS DE PLACA) SIEMPRE QUE LA CUANTIA GENERAL RESPETE LA CUANTIA POR METRO INDICADA.

- LA ARMADURA TRANSVERSAL QUE COINCIDA BAJO LOS NERMOS DE LAS PLACAS PREFABRICADAS SE DOBLARA EN EL ALA SUPERIOR DE VIGA (VER DETALLE DE DOBLADO DE ARMADURA TRANSVERSAL)

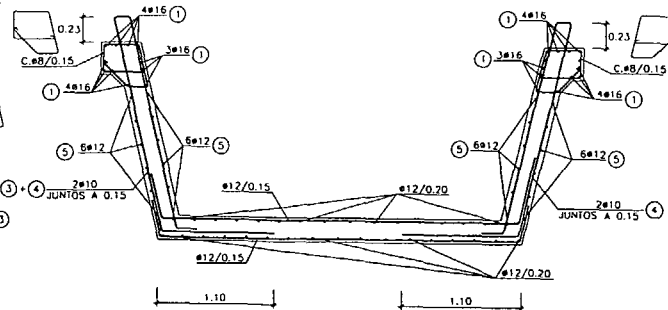
SALVO DONDE SE INDIQUE LO CONTRARIO,  
EL RECUBRIMIENTO SERA DE 3.0 cm.



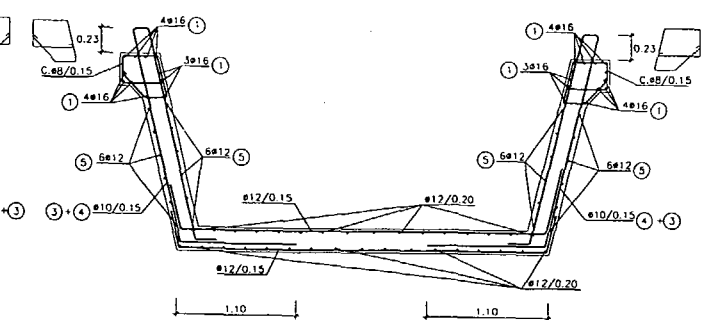
VIADUCTO DEL VALLE DEL GALLO  
VIGAS. ARMADURAS 1 (ALZADOS)



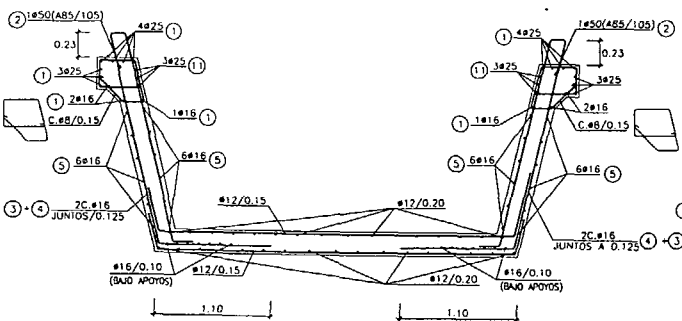
SECCION A-A ARMADURA PASIVA  
VIGAS 1.1, 1.2, 9.1 y 9.2  
ESCALA 1/25



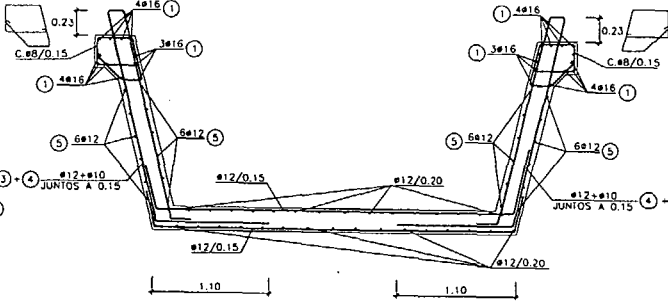
SECCION B-B ARMADURA PASIVA  
ARMADURA PASIVA. VIGAS 1.1, 1.2, 9.1 y 9.2  
ESCALA 1/25



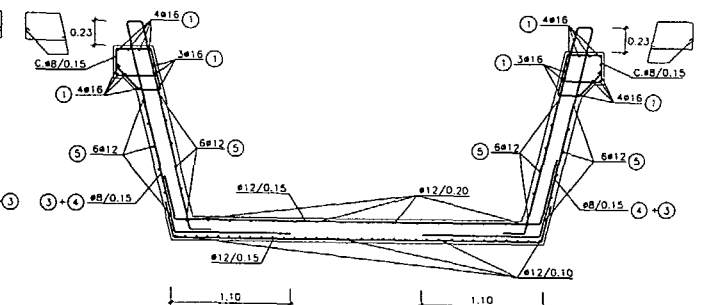
SECCION C-C (EN CENTRO DE VANO)  
ARMADURA PASIVA. VIGAS 1.1, 1.2, 9.1 y 9.2  
ESCALA 1/25



SECCION A-A ARMADURA PASIVA  
VIGAS 2.1 a 8.1 y 2.2 a 8.2  
ESCALA 1/25

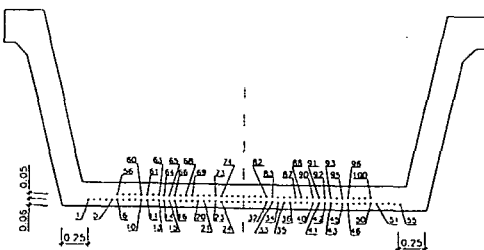


SECCION B-B ARMADURA PASIVA  
VIGAS 2.1 a 8.1 y 2.2 a 8.2  
ESCALA 1/25



SECCION C-C (EN CENTRO DE VANO)  
VIGAS 2.1 a 8.1 y 2.2 a 8.2  
ESCALA 1/25

NOTA:  
NO SE REPRESENTAN LOS CERCOS DE CONEXION ENTRE  
CABEZA SUPERIOR DE VIGA Y LOSA (VER PLANOS SIGUIENTES  
DE ARMADO DE VIGAS Y ARMADO DE LOSA DEL TABLERO).

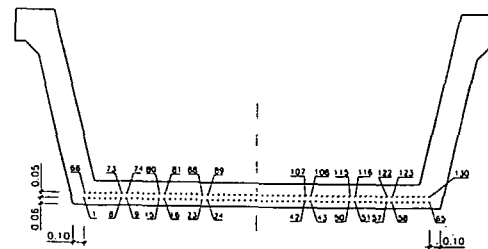


SECCION CENTRAL (DISPOSICION DE CABLES)  
VIGAS 1.1, 1.2, 9.1 y 9.2  
ESCALA 1/25

| EXTREMO EN ESTRIBO                                  | LONG. ENVAINADO |
|-----------------------------------------------------|-----------------|
| 15#CABLES (21) AL (35)                              | 8.50            |
| 10#CABLES (16) AL (20) Y (36) AL (40)               | 6.00            |
| 9#CABLES (74) AL (82)                               | 5.00            |
| 10#CABLES (11) AL (15) Y (41) AL (45)               | 4.00            |
| 10#CABLES (69) AL (73) Y (83) AL (87)               | 3.50            |
| 10#CABLES (64) AL (68) Y (88) AL (92)               | 1.50            |
| 36#CABLES (1) AL (10), (46) AL (63) Y (93) AL (100) | 0.00            |

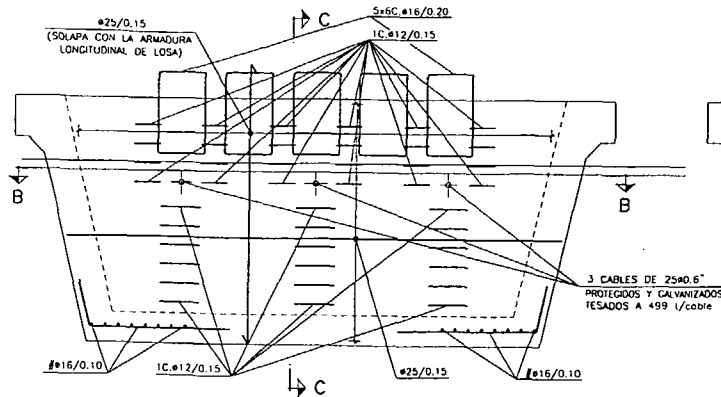
| EXTREMO EN PILA                                    | LONG. ENVAINADO |
|----------------------------------------------------|-----------------|
| 9#CABLES (24) AL (32)                              | 10.00           |
| 9#CABLES (74) AL (82)                              | 6.50            |
| 20#CABLES (14) AL (23) Y (33) AL (42)              | 5.00            |
| 16#CABLES (66) AL (73) Y (83) AL (90)              | 4.00            |
| 16#CABLES (6) AL (15) Y (43) AL (50)               | 3.00            |
| 10#CABLES (61) AL (65) Y (91) AL (95)              | 1.50            |
| 20#CABLES (1) AL (5), (51) AL (60) Y (96) AL (100) | 0.00            |



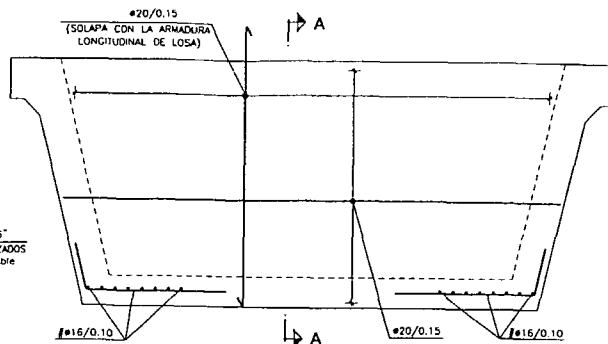
SECCION CENTRAL (DISPOSICION DE CABLES)  
VIGAS 2.1 a 8.1 y 2.2 a 8.2  
ESCALA 1/25

|                                                     | LONG. ENVAINADO |
|-----------------------------------------------------|-----------------|
| 19#CABLES (24) AL (42)                              | 9.50            |
| 16#CABLES (16) AL (23) Y (43) AL (50)               | 6.50            |
| 14#CABLES (9) AL (15) Y (51) AL (57)                | 4.00            |
| 19#CABLES (89) AL (107)                             | 7.50            |
| 16#CABLES (81) AL (88) Y (108) AL (115)             | 5.00            |
| 14#CABLES (74) AL (80) Y (116) AL (122)             | 1.50            |
| 32#CABLES (1) AL (8), (58) AL (73) Y (123) AL (130) | 0.00            |

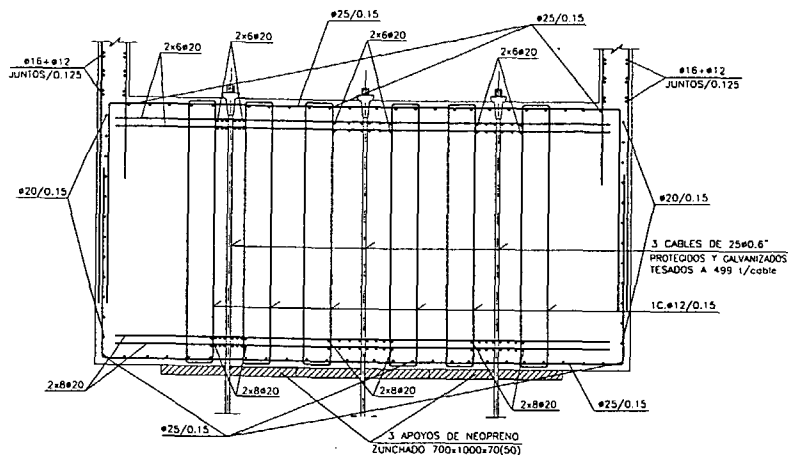
NOTA: SALVO DONDE SE INDIQUE LO CONTRARIO, EL  
RECUBRIMIENTO SERA DE 3.0 cm.



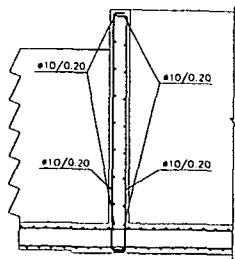
DIAFRAGMA EN ESTRIBO FIJO (E-2)  
ESCALA 1/20



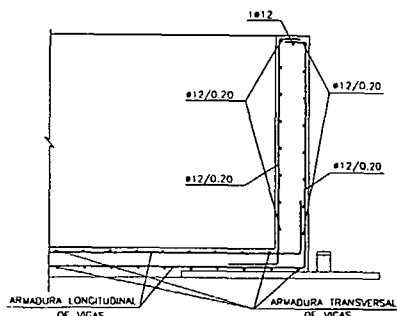
DIAFRAGMA EN ESTRIBO MOVIL (E-1)  
ESCALA 1/20



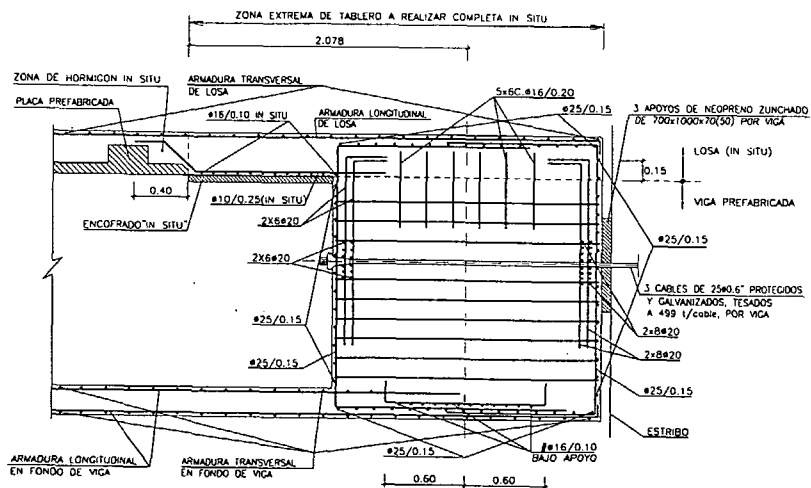
SECCION B - B  
ESCALA 1/20



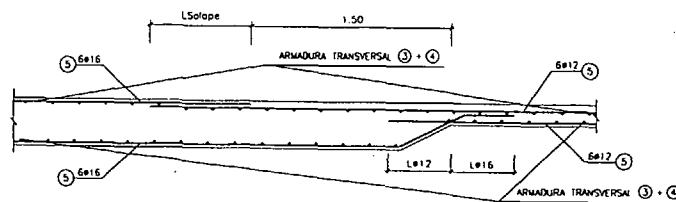
SECCION POR DIAFRAGMA  
EXTREMO DE APOYO  
ESCALA 1/20



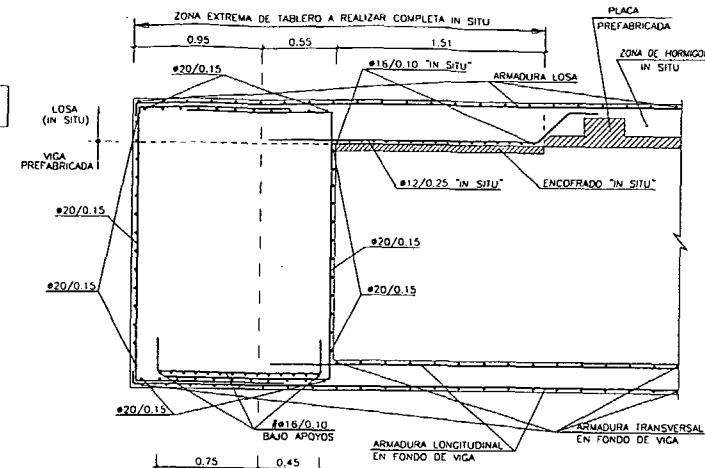
SECCION POR DIAFRAGMA  
EXTREMO DE RECEPCION  
ESCALA 1/20



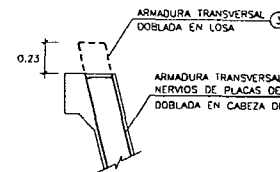
SECCION C - C  
ESCALA 1/20



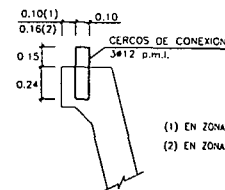
SECCION HORIZONTAL DEL ALMA POR CAMBIO DE ESPESOR  
VIGAS 1.1 A 9.1 Y 1.2 A 9.2  
ESCALA 1/20



SECCION A - A  
ESCALA 1/20



DETALLE DE DOBLADO DE ARMADURA TRANSVERSAL  
ESCALA 1/20

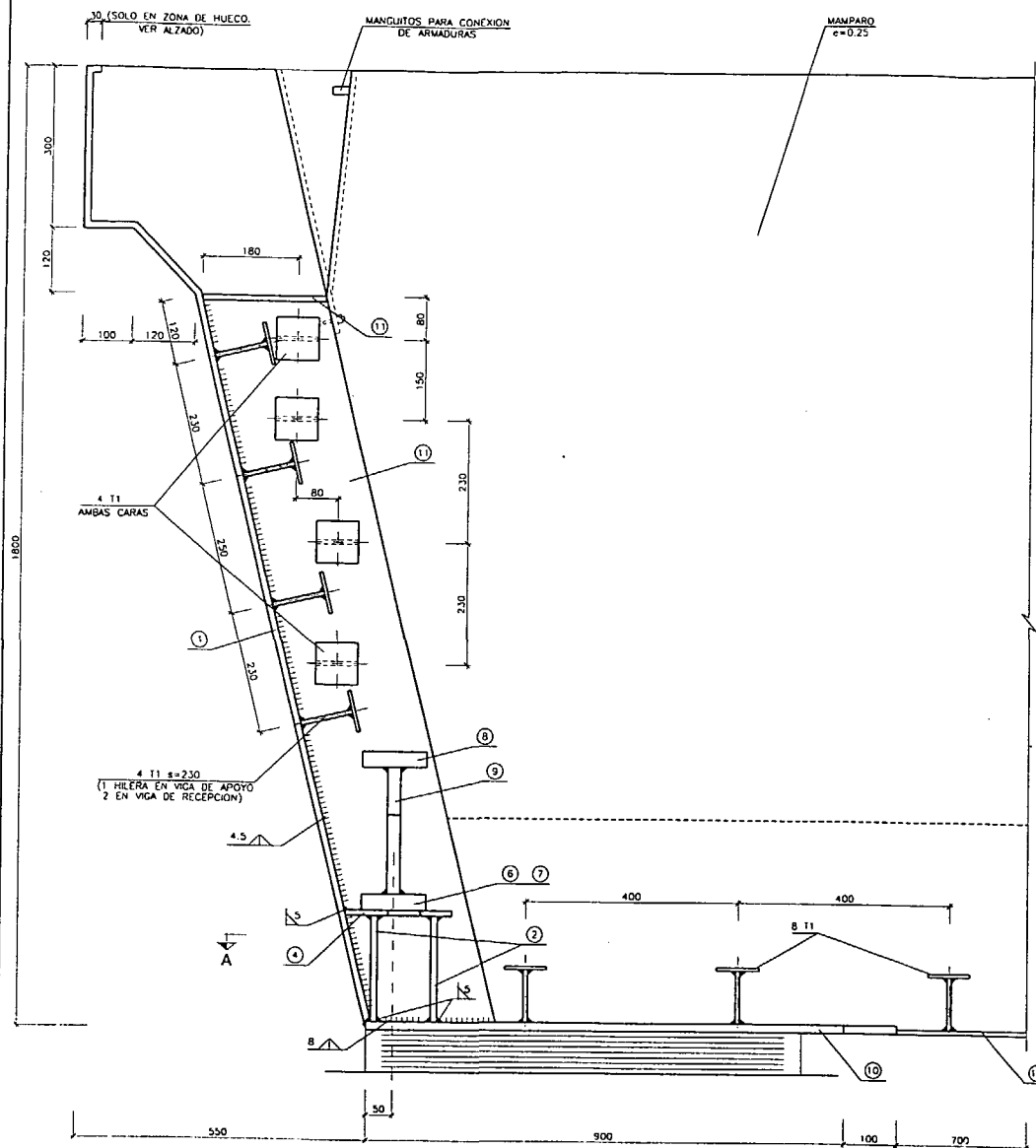


DETALLE DE DISPOSICION DE CERCOS DE CONEXION  
ESCALA 1/20

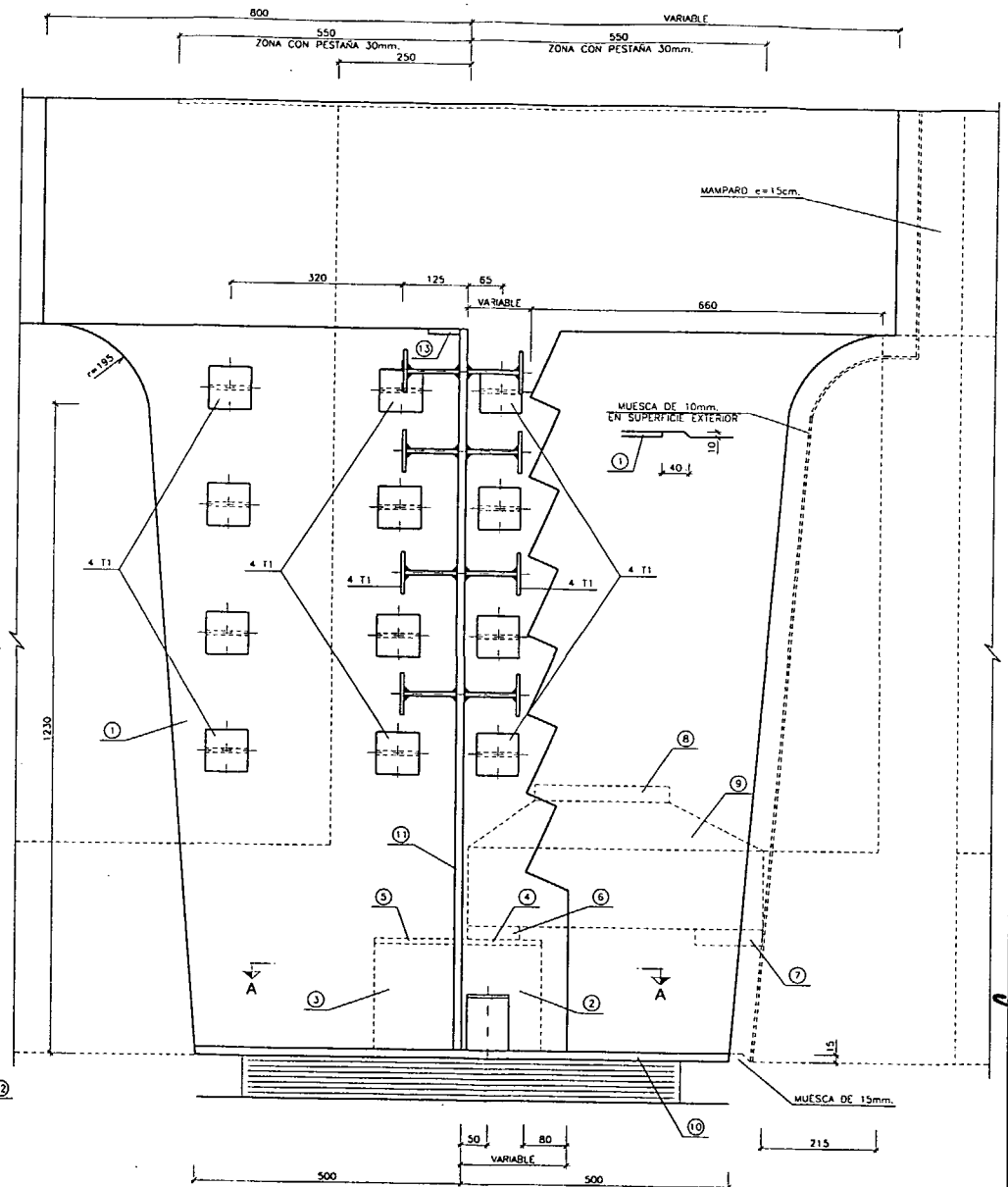
# CUADRO DE ESPECIFICACIONES

| MATERIALES | RESISTENCIA                   | CONTROL | COEFICIENTE DE PONDERACION |
|------------|-------------------------------|---------|----------------------------|
| ACEROS     | $f_{yk} = 200 \text{ N/mm}^2$ | NORMAL  | $\gamma_c = 1.50$          |
| ACEROS     | $f_{yk} = 200 \text{ N/mm}^2$ | NORMAL  | $\gamma_c = 1.50$          |
| ACEROS     | $f_{yk} = 200 \text{ N/mm}^2$ | NORMAL  | $\gamma_c = 1.50$          |
| ACEROS     | $f_{yk} = 200 \text{ N/mm}^2$ | NORMAL  | $\gamma_c = 1.50$          |
| ACEROS     | $f_{yk} = 200 \text{ N/mm}^2$ | NORMAL  | $\gamma_c = 1.50$          |
| ACEROS     | $f_{yk} = 200 \text{ N/mm}^2$ | NORMAL  | $\gamma_c = 1.50$          |
| ACEROS     | $f_{yk} = 200 \text{ N/mm}^2$ | NORMAL  | $\gamma_c = 1.50$          |
| ACEROS     | $f_{yk} = 200 \text{ N/mm}^2$ | NORMAL  | $\gamma_c = 1.50$          |
| ACEROS     | $f_{yk} = 200 \text{ N/mm}^2$ | NORMAL  | $\gamma_c = 1.50$          |
| ACEROS     | $f_{yk} = 200 \text{ N/mm}^2$ | NORMAL  | $\gamma_c = 1.50$          |

NOTA: SALVO DONDE SE INDIQUE LO CONTRARIO, EL RECURRIMIENTO SERA DE 3.0 cm.



DETALLE-1 : VISTA FRONTAL  
ESCALA 1/5



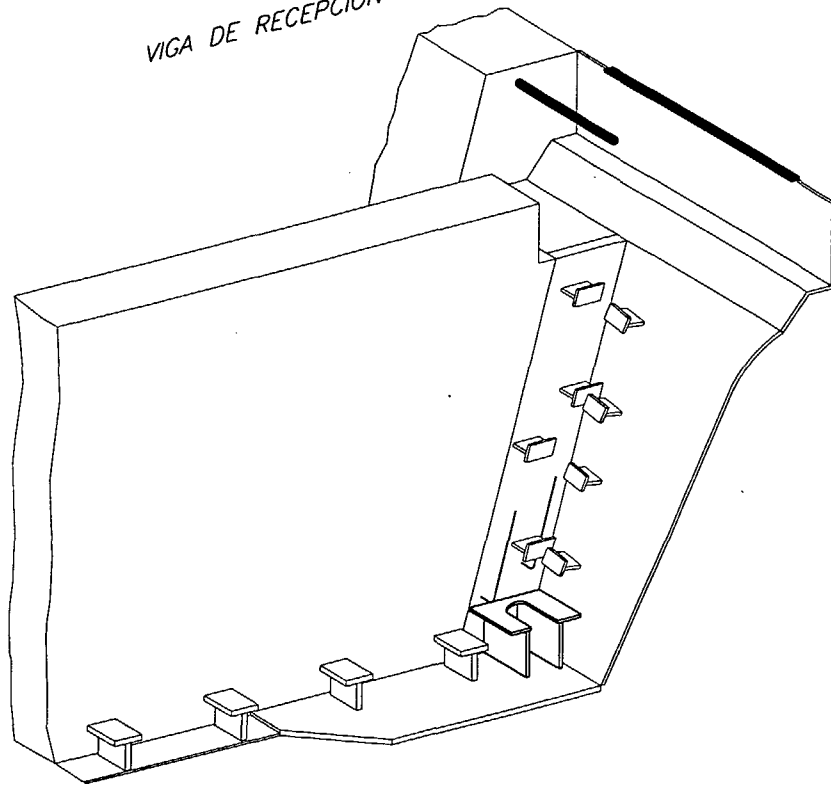
DETALLE-1 : VISTA LATERAL  
ESCALA 1/5

Hora 12 de 22

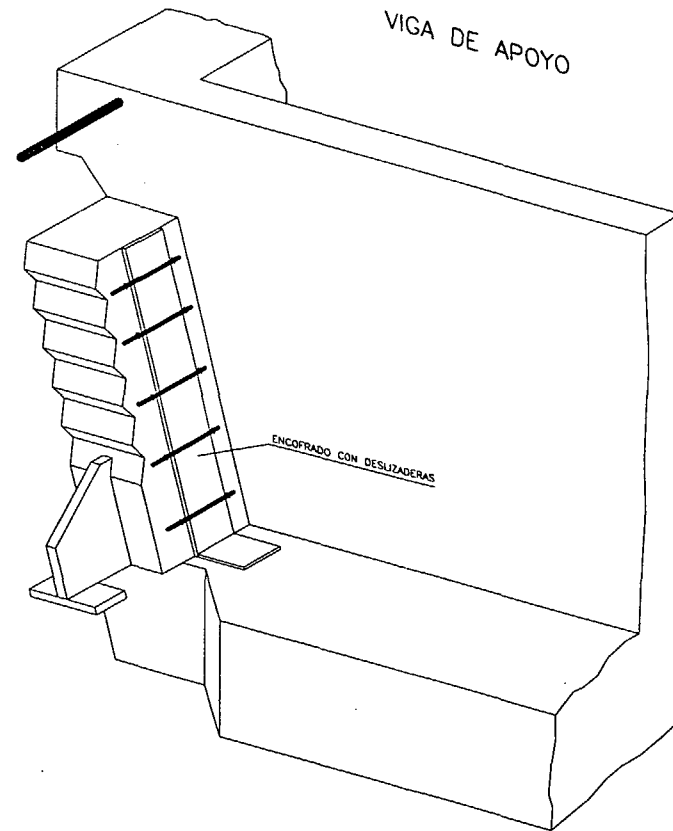




VIGA DE RECEPCION

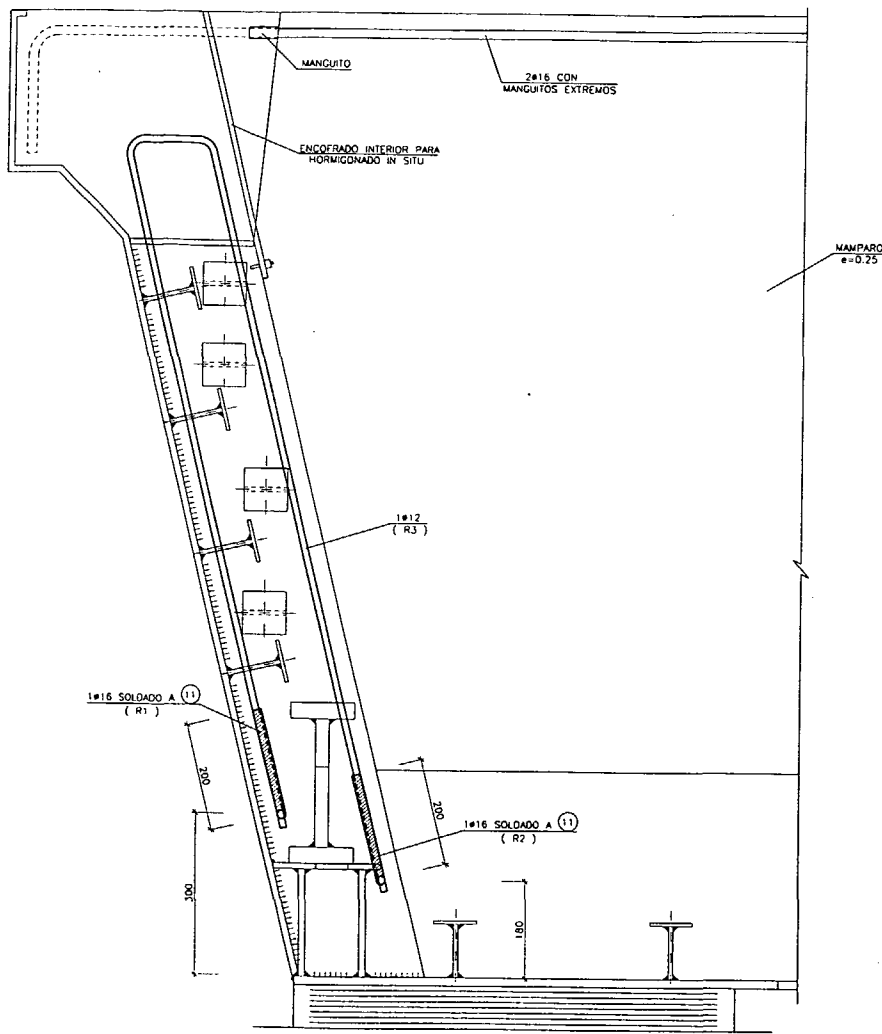


VIGA DE APOYO

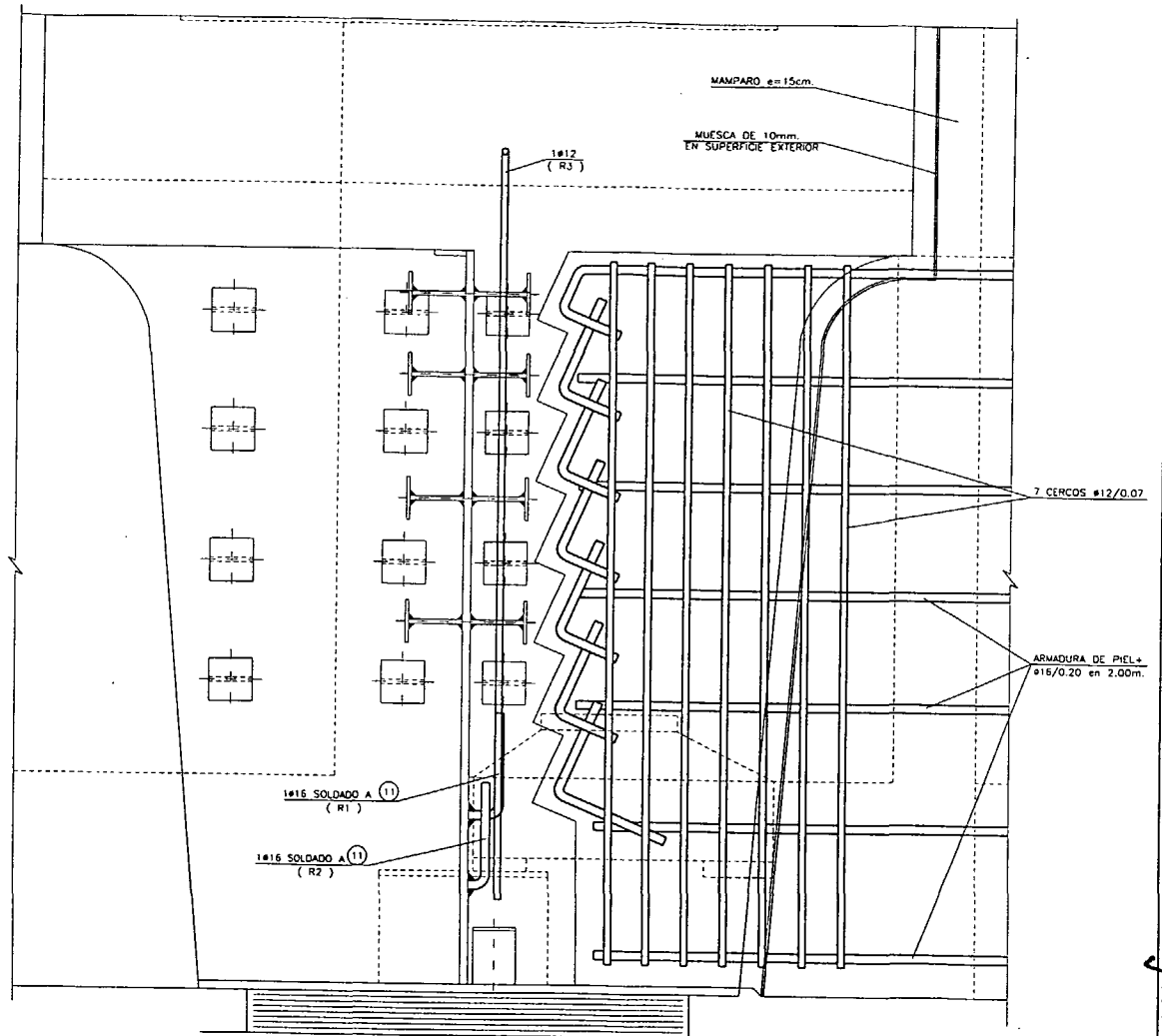


ENCOFRADO CON DESLIZADERAS

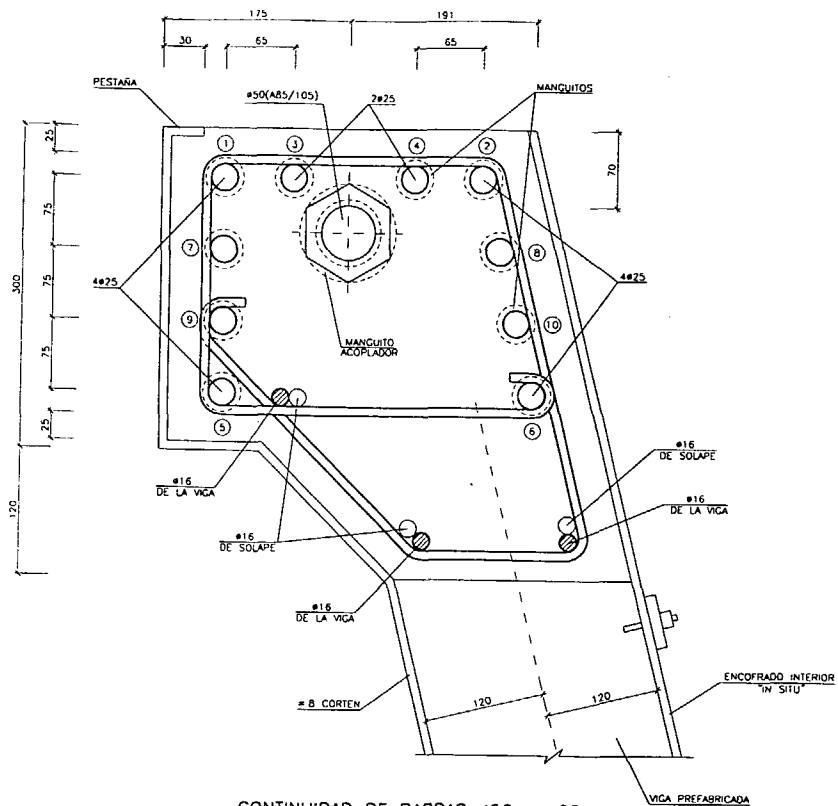
Hoja 14 de 22



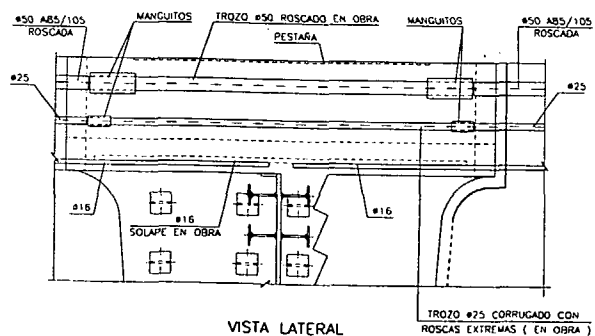
VISTA FRONTAL  
ESCALA 1/5



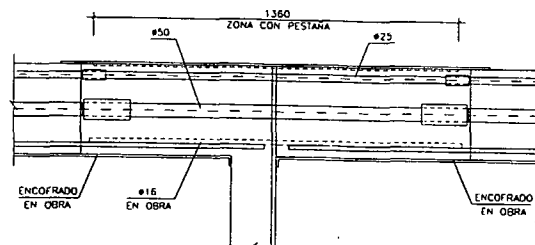
VISTA LATERAL  
ESCALA 1/5



CONTINUIDAD DE BARRAS  $\phi 50$  y  $\phi 25$   
SECCION TRANSVERSAL  
ESCALA 1 : 2.5

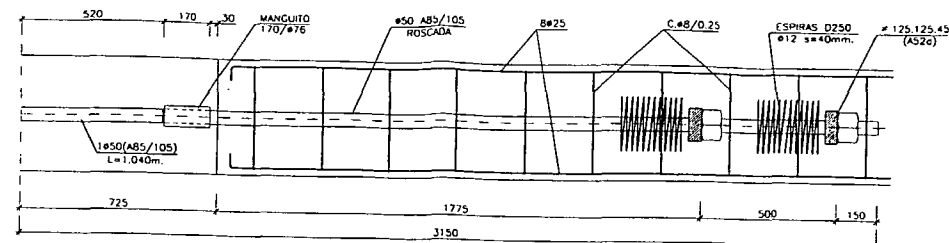


VISTA LATERAL

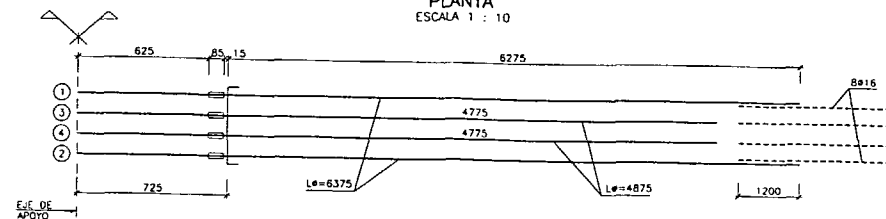


PLANTA

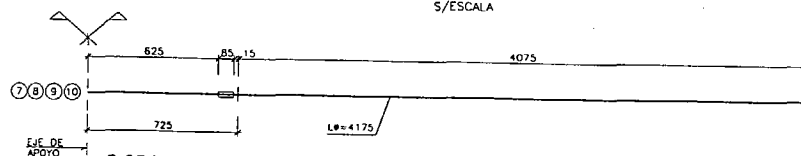
ESQUEMA DE CONTINUIDAD DE ARMADURAS SUPERIORES DE JUNTA  
ESCALA 1/10



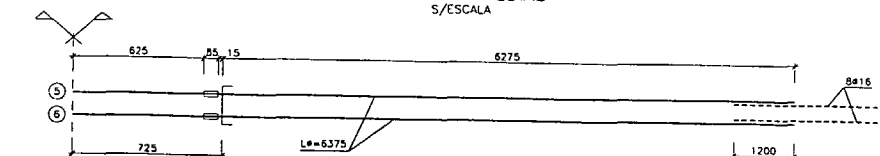
CONTINUIDAD DE BARRAS  $\phi 50$   
PLANTA  
ESCALA 1 : 10



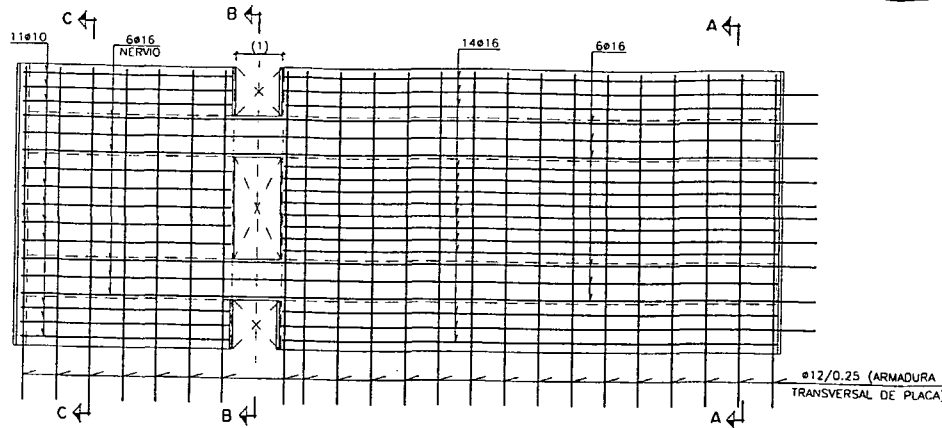
DISPOSICION DE LA ARMADURA PRINCIPAL DE LAS CABEZAS ( 10  $\phi$  25 )  
CAPA SUPERIOR  
S/ESCALA



DISPOSICION DE LA ARMADURA PRINCIPAL DE LAS CABEZAS ( 10  $\phi$  25 )  
CAPAS INTERMEDIAS  
S/ESCALA

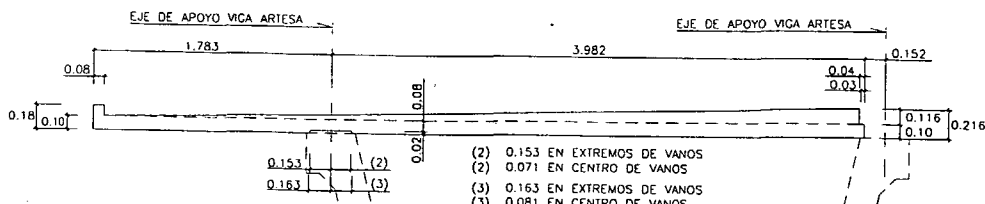


DISPOSICION DE LA ARMADURA PRINCIPAL DE LAS CABEZAS ( 10  $\phi$  25 )  
CAPA INFERIOR  
S/ESCALA

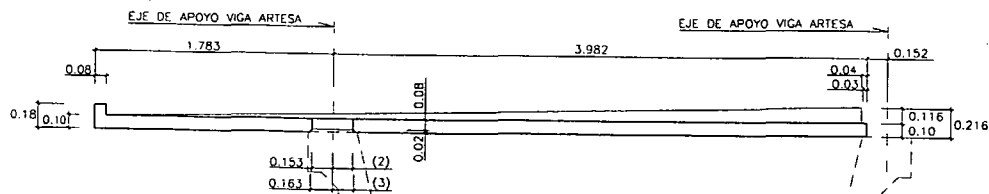


ARMADURAS DE PLACA  
ESCALA 1/20

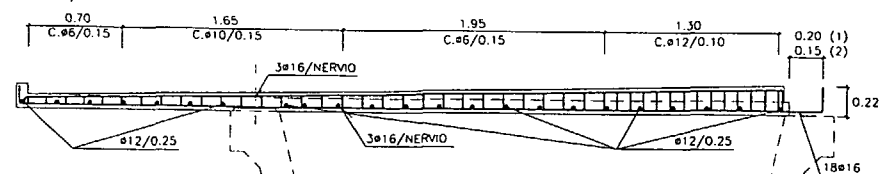
- (1) 0.306 EN EXTREMOS DE VANO  
(2) 0.224 EN CENTRO DE VANOS



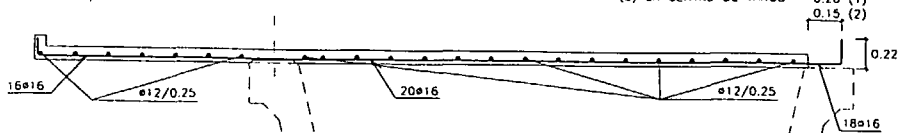
SECCION LONGITUDINAL EN ZONA DE NERVO (FORMAS)  
ESCALA 1/20



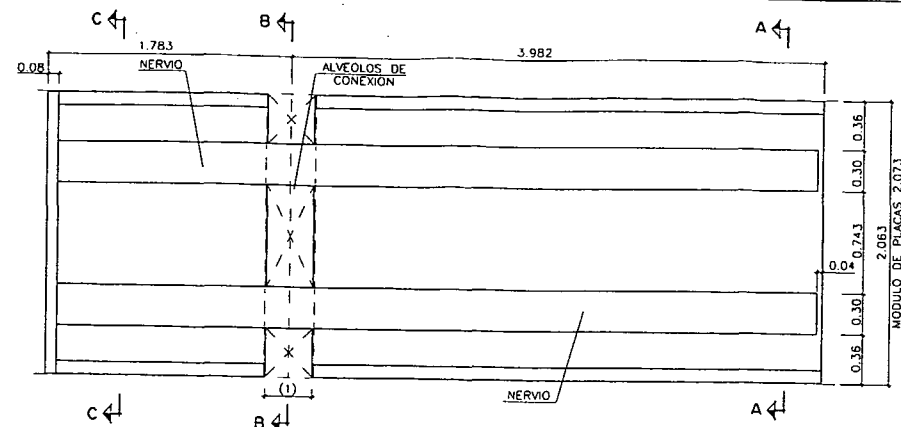
SECCION LONGITUDINAL EN ZONA DE ALVEOLO (FORMAS)  
ESCALA 1/20



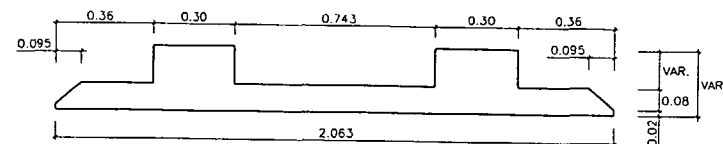
SECCION LONGITUDINAL EN ZONA DE NERVO (ARMADURAS)  
ESCALA 1/20



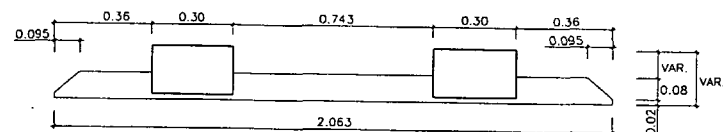
SECCION LONGITUDINAL EN ZONA DE ALVEOLO (ARMADURAS)  
ESCALA 1/20



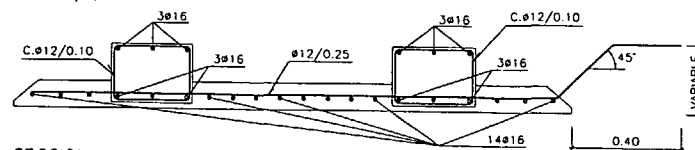
PLACA PREFABRICADA LATERAL (FORMAS)  
ESCALA 1/20



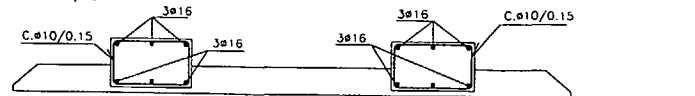
SECCION A - A Y C - C (FORMAS)  
ESCALA 1/10



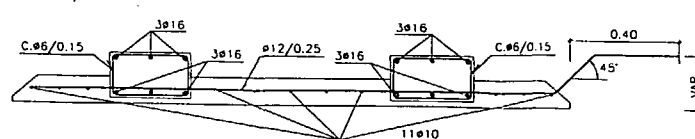
SECCION B - B (FORMAS)  
ESCALA 1/10



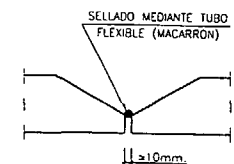
SECCION A - A (ARMADURAS)  
ESCALA 1/10



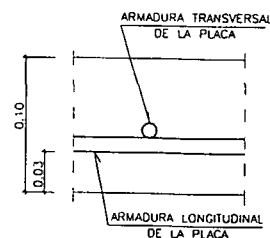
SECCION B - B (ARMADURAS)  
ESCALA 1/10



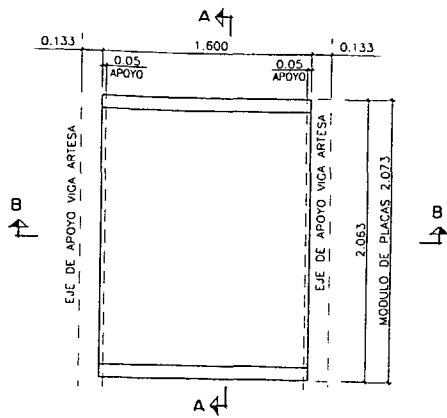
SECCION C - C (ARMADURAS)  
ESCALA 1/10



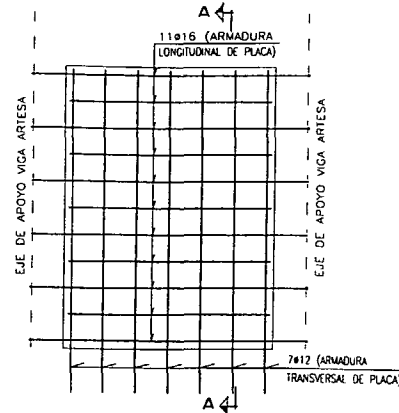
DETALLE DE SELLADO  
ENTRE PLACAS  
ESCALA 1/5



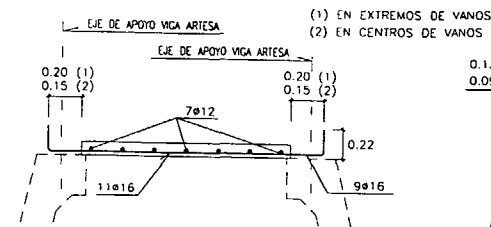
DETALLE DE RECUBRIMIENTO Y  
DISPOSICION DE BARRAS EN PLACA  
ESCALA 1/2



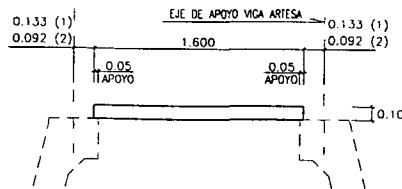
PLACA PREFABRICADA CENTRAL (FORMAS)  
ESCALA 1/20



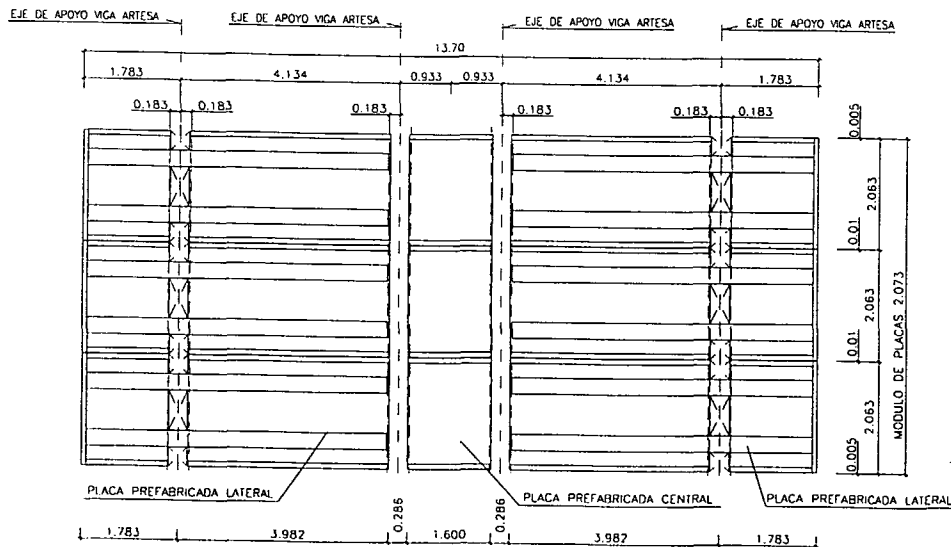
ARMADURAS DE PLACA  
ESCALA 1/20



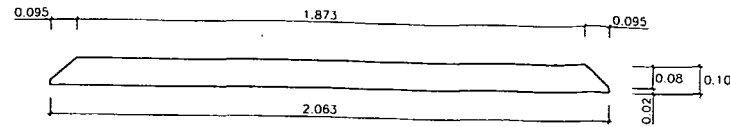
SECCION B - B (ARMADURAS)  
ESCALA 1/20



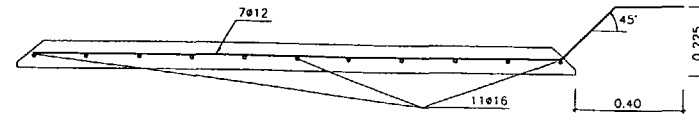
SECCION B - B (FORMAS)  
ESCALA 1/20



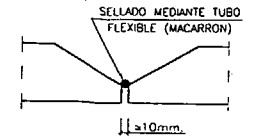
DISPOSICION DE PLACAS PREFABRICADAS EN TABLERO  
ESCALA 1/50



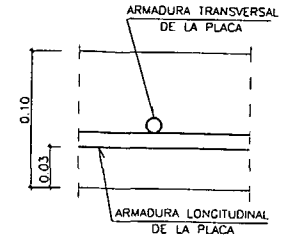
SECCION A - A (FORMAS)  
ESCALA 1/10



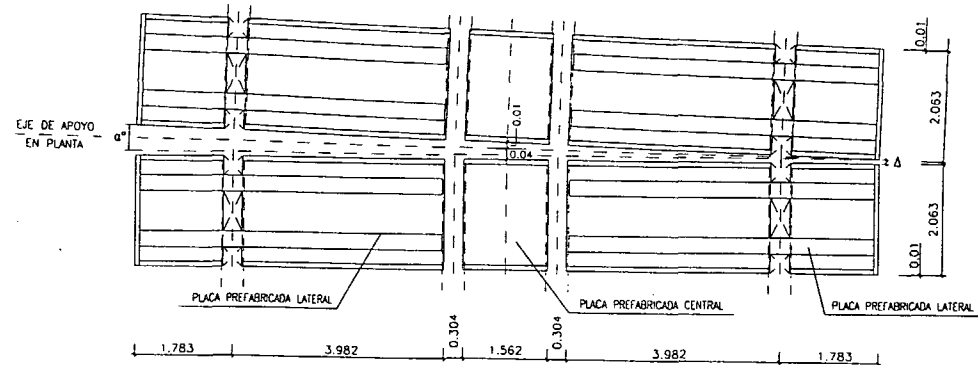
SECCION A - A (ARMADURAS)  
ESCALA 1/10



DETALLE DE SELLADO  
ENTRE PLACAS  
ESCALA 1/5



DETALLE DE RECUBRIMIENTO Y  
DISPOSICION DE BARRAS EN PLACA  
ESCALA 1/2



DETALLE DE HOLGURA ENTRE PLACAS EN APOYOS  
ESCALA 1/50

#### NOTA:

TODAS LAS PLACAS SE SITUARAN ORTOGONALMENTE A LOS EJES LONGITUDINALES DE LAS VIGAS, ABSORBIENDO LAS CURVATURAS CON LAS HOLGURAS INDICADAS EN LAS ZONAS DE APOYO.

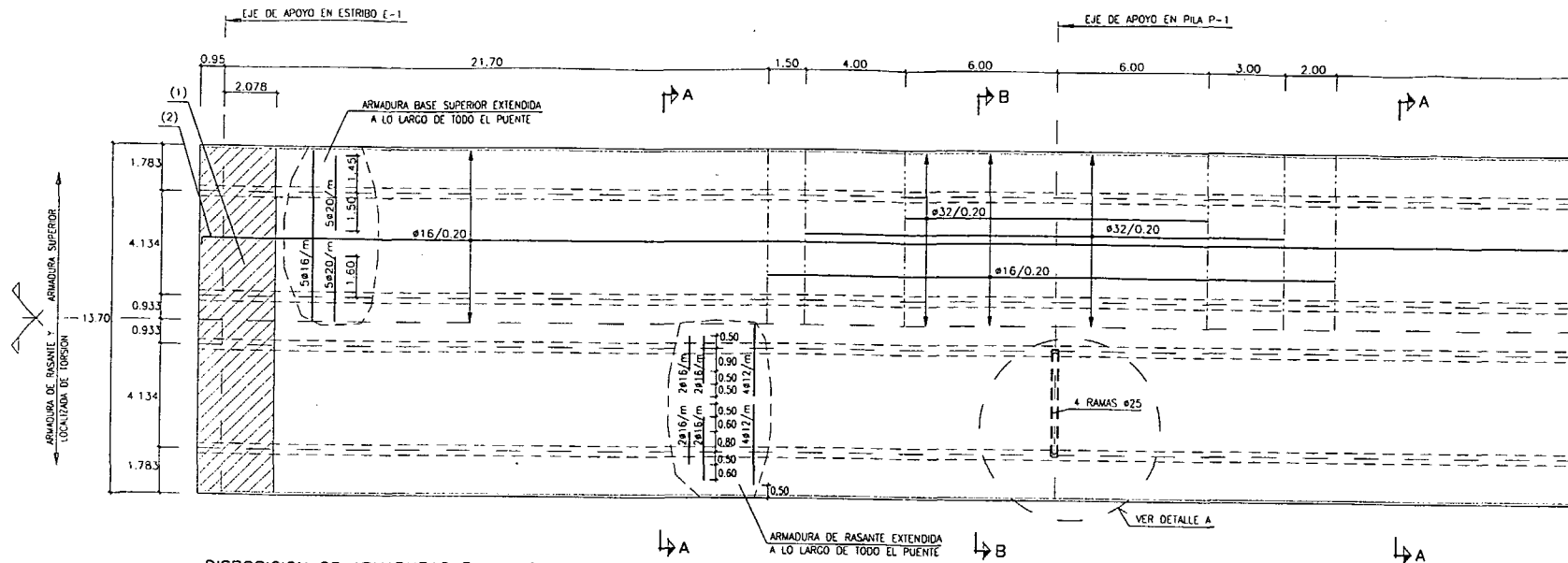
R RADIO DE LA ALINEACION EN APOYOS.

#### HOLGURA EN PLACAS PREFABRICADAS EN APOYOS

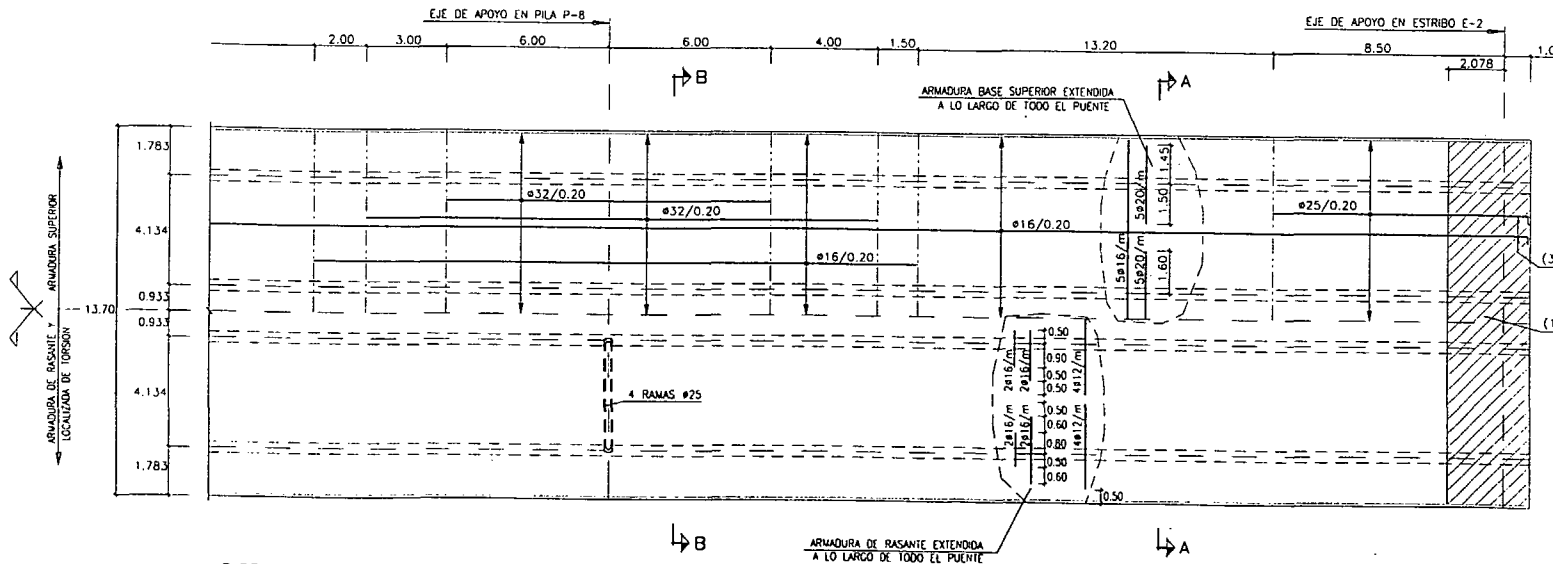
| APOYO | R (m) | $\alpha^\circ$ | $\Delta$ (m) |
|-------|-------|----------------|--------------|
| P1    | 11888 | 0.1797         | 0.024        |
| P2    | 13638 | 0.1723         | 0.029        |
| P3    | 16555 | 0.1429         | 0.033        |
| P4    | 20589 | 0.1151         | 0.036        |
| P5    | 27255 | 0.0874         | 0.040        |
| P6    | 40767 | 0.0586         | 0.043        |
| P7    | 77050 | 0.0305         | 0.046        |
| P8    | 89305 | 0.0071         | 0.049        |

#### CUADRO DE ESPECIFICACIONES

| MATERIALES                | RESISTENCIA                                         | CONTROL                             | COEFICIENTE DE PODERACION |
|---------------------------|-----------------------------------------------------|-------------------------------------|---------------------------|
| HORMICON                  | CONCRETO ESTRUCTURAL                                | $f_{ck} = 250 \text{ Kg/cm}^2$      | NORMAL $\gamma_c = 1.50$  |
|                           | VIGAS PREFABRICADAS                                 | $f_{ck} = 600 \text{ Kg/cm}^2$      | INTENSO $\gamma_c = 1.40$ |
|                           | LOSA "IN SITU" TABLERO                              | $f_{ck} = 350 \text{ Kg/cm}^2$      | NORMAL $\gamma_c = 1.50$  |
|                           | PLAS Y CORTILLOS                                    | $f_{ck} = 300 \text{ Kg/cm}^2$      | NORMAL $\gamma_c = 1.50$  |
| ARMADURAS PASIVAS A-50000 | ACERO EN BARRAS PARA CONTRAFUERZO DE VIGAS A-50/105 | $f_{yk} = 51000 \text{ Kg/cm}^2$    | NORMAL $\gamma_s = 1.15$  |
|                           | ACERO EN ARMADURAS ACTIVAS                          | $f_{yk} = 65000 \text{ Kg/cm}^2$    | NORMAL $\gamma_s = 1.15$  |
| CONTROL DE EJECUCION      | EN VIGAS                                            | $f_{pd} \geq 17000 \text{ Kg/cm}^2$ | INTENSO $\gamma_p = 1.10$ |
|                           | EN PLACAS                                           | $f_{pd} \geq 19000 \text{ Kg/cm}^2$ | INTENSO $\gamma_p = 1.50$ |



DISPOSICION DE ARMADURAS EN VANO 1  
ESCALA 1/100



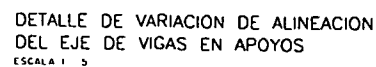
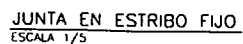
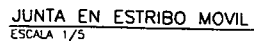
DISPOSICION DE ARMADURAS EN VANO 9  
ESCALA 1/100

NOTAS:

- EL RECUBRIMIENTO MINIMO SERA DE 3cm. SALVO INDICACION EXPRESA.
- (1) ZONA DE HORMIGONADO COMPLETO "IN SITU" DE LOSA
- (2) SOLAPADA CON ARMADURA VERTICAL DE DIAFRAGMA EN E-1
- (3) SOLAPADA CON ARMADURA VERTICAL DE DIAFRAGMA EN E-2

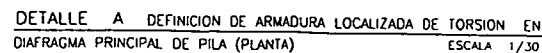
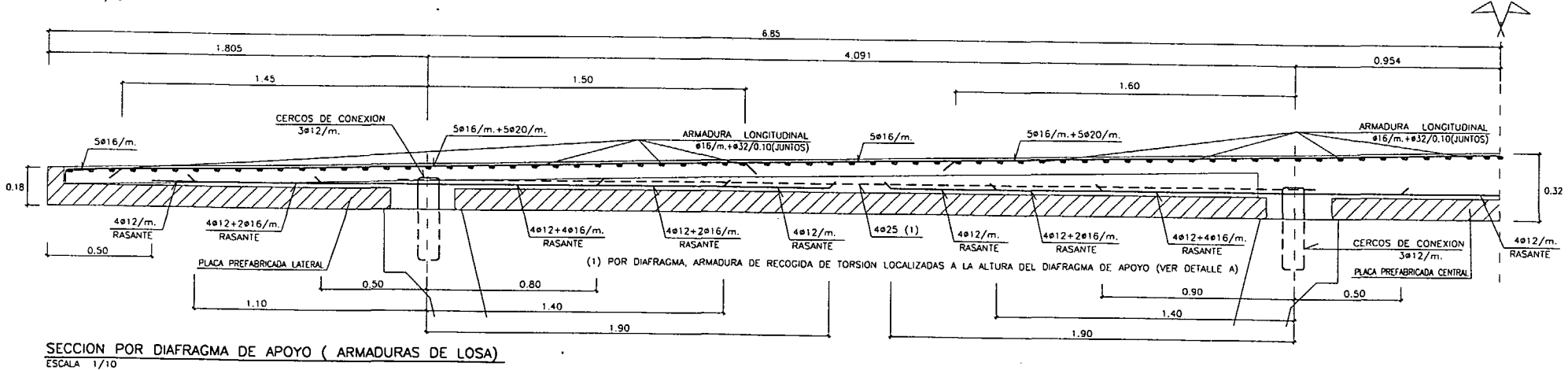
CUADRO DE ESPECIFICACIONES

| MATERIALES                                         | RESISTENCIA                      | CONTROL | COEFICIENTE DE PONDERACION |
|----------------------------------------------------|----------------------------------|---------|----------------------------|
| PILOTES                                            | $f_{ck} = 200 \text{ kg/cm}^2$   |         |                            |
| ENCAPADOS ESTRIBOS                                 | $f_{ck} = 250 \text{ kg/cm}^2$   | NORMAL  | $\gamma_c = 1.50$          |
| VIGAS PREFABRICADAS                                | $f_{ck} = 600 \text{ kg/cm}^2$   | INTENSO | $\gamma_c = 1.40$          |
| LOSA "IN SITU" TABLERO                             | $f_{ck} = 350 \text{ kg/cm}^2$   |         |                            |
| PILAS Y CAPITELES                                  | $f_{ck} = 300 \text{ kg/cm}^2$   | NORMAL  | $\gamma_c = 1.50$          |
| LOSA TRANSICION                                    |                                  |         |                            |
| ARMADURAS PASIVAS ALHODON                          | $f_{yk} = 5100 \text{ kg/cm}^2$  |         |                            |
| ACERO EN BARRAS PARA CONTINGENCIA DE VIGAS MED/105 | $f_{yk} = 8500 \text{ kg/cm}^2$  | NORMAL  | $\gamma_s = 1.15$          |
| ACERO EN ARMADURAS ACTIVAS                         | $f_{yk} = 17000 \text{ kg/cm}^2$ | INTENSO | $\gamma_s = 1.10$          |
| EN VIGAS                                           | $f_{yk} = 18000 \text{ kg/cm}^2$ |         |                            |
| CONTROL DE EJECUCION                               |                                  | INTENSO | $\gamma_i = 1.50$          |



| PILA | R (m)  | $\alpha$<br>(radianes) $10^{-3}$ | $\alpha^{\circ}$ | $\beta^{\circ}$ | $\Delta u(\text{mm.})$ | $u(\text{mm.})$ |
|------|--------|----------------------------------|------------------|-----------------|------------------------|-----------------|
| 1    | 11888  | 3.14                             | 0.1797           | 179.82          | 1.5                    | 9.5             |
| 2    | 13838  | 3.01                             | 0.1723           | 179.83          | 1.4                    | 9.4             |
| 3    | 16555  | 2.49                             | 0.1429           | 179.86          | 1.2                    | 9.2             |
| 4    | 20589  | 2.01                             | 0.1151           | 179.88          | 1.0                    | 9.0             |
| 5    | 27255  | 1.53                             | 0.0874           | 179.91          | 0.7                    | 8.7             |
| 6    | 40267  | 1.04                             | 0.0596           | 179.94          | 0.5                    | 8.5             |
| 7    | 77060  | 0.53                             | 0.0305           | 179.97          | 0.3                    | 8.3             |
| 8    | 893085 | 0.12                             | 0.0071           | 179.99          | 0.1                    | 8.1             |

| MATERIALES                                |                         | RESISTENCIA                      | CONTROL   | COEFICIENTE DE<br>REDUCCIÓN |
|-------------------------------------------|-------------------------|----------------------------------|-----------|-----------------------------|
| HORMIGÓN                                  | PILOTES                 | $f_{ch} = 200 \text{ kg/cm}^2$   |           |                             |
|                                           | ENCAPESADOS             | $f_{ch} = 250 \text{ kg/cm}^2$   | NORMAL    | $\gamma_c = 1.50$           |
|                                           | PLACAS PREFABRICADAS    | $f_{ch} = 400 \text{ kg/cm}^2$   | INTERSEJO | $\gamma_c = 1.40$           |
|                                           | LOSAS "IN SITU" TABLERO | $f_{ch} = 250 \text{ kg/cm}^2$   |           |                             |
|                                           | REJES Y CANTILLAS       | $f_{ch} = 300 \text{ kg/cm}^2$   | NORMAL    | $\gamma_c = 1.50$           |
|                                           | TRANSICIÓN              |                                  |           |                             |
| ARMADURAS PASIVAS                         | $A_{ch} = 5000$         | $f_{yk} = 5100 \text{ kg/cm}^2$  |           |                             |
| ACEPO EN BARRAS PARA CONTINUIDAD DE VIGAS | RES/150                 | $f_{yk} = 6000 \text{ kg/cm}^2$  | NORMAL    | $\gamma_s = 1.15$           |
| ACEPO EN BARRAS PARA CONTINUIDAD DE VIGAS | RES/150                 | $f_{yk} = 7000 \text{ kg/cm}^2$  | INTERSEJO | $\gamma_s = 1.10$           |
| ARMADURAS ACTIVAS                         | EN VIGAS                | $f_{yk} = 18000 \text{ kg/cm}^2$ |           |                             |
| CONTROL DE EJECUCIÓN                      |                         |                                  | INTERSEJO | $\gamma_p = 1.50$           |



EL RECUBRIMIENTO MINIMO SERA DE 3cm.  
SALVO INDICACION EXPRESA.

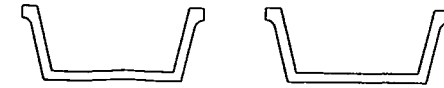
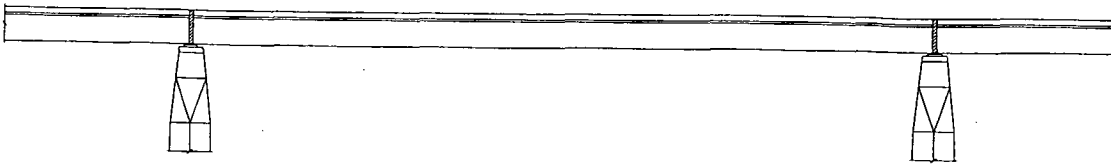
| MATERIALES                                         |                                    | RESISTENCIA                                                      | CONTROL | CONFORME DE APROBACION |
|----------------------------------------------------|------------------------------------|------------------------------------------------------------------|---------|------------------------|
| HORMIGON                                           | PILOTOS                            | 160 x 250 kg/cm <sup>2</sup>                                     |         |                        |
|                                                    | ENCAPESADOS ESTABLES               | 160 x 250 kg/cm <sup>2</sup>                                     | NORMAL  | 76 = 1.50              |
|                                                    | PLACAS PREFABRICADAS               | 160 x 600 kg/cm <sup>2</sup>                                     | INTENSO | 76 = 1.40              |
|                                                    | LOSAS "IN SITU" TABILLERO          | 160 x 350 kg/cm <sup>2</sup>                                     |         |                        |
|                                                    | PLAS T. CORTESLES LOSA TRANSACCION | 160 x 300 kg/cm <sup>2</sup>                                     | NORMAL  | 76 = 1.50              |
| ARMADURAS PASANAS AEROSON                          |                                    | 160 x 5100 kg/cm <sup>2</sup>                                    |         |                        |
| ACERO EN BARRAS PARA CONTINUIDAD DE VIGAS AEROS/05 |                                    | 160 x 8500 kg/cm <sup>2</sup>                                    | NORMAL  | 76 = 1.15              |
| ACERO EN ARMADURAS ACTIVAS                         | EN VIGAS                           | 160 x 21000 kg/cm <sup>2</sup><br>160 x 18000 kg/cm <sup>2</sup> | INTENSO | 76 = 1.50              |
| CONTROL DE EJECUCION                               |                                    | -----                                                            | INTENSO | 76 = 1.50              |



## FASES DE MONTAJE

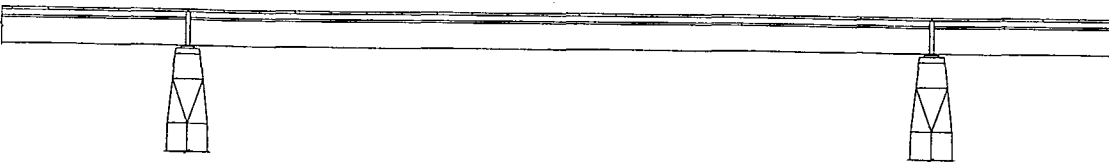
### 1.- MONTAJE DE VIGAS

- EJECUCION DE CIMENTACION, ESTRIBOS, PILAS, CARGADEROS Y MONTAJE DE VIGAS SECUENCIALMENTE (PARTE DORSAL APOYADA SOBRE VOLADIZO DE VIGA ANTERIOR Y PARTE FRONTAL APOYADA SOBRE CARGADERO)



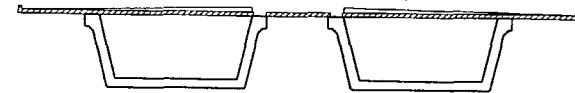
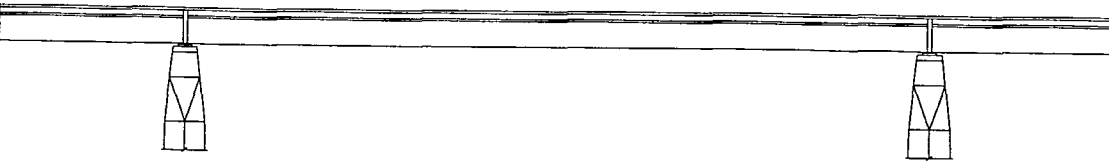
### 2.- UNIONES ENTRE VIGAS

- REALIZACION DE LA JUNTA DE CONTINUIDAD ENTRE VIGAS PROPORCIONANDO MONOLITISMO ENTRE VIGAS PARA EL RESTO DE CARGAS ACTUANTES.



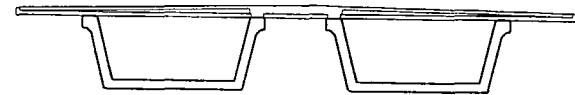
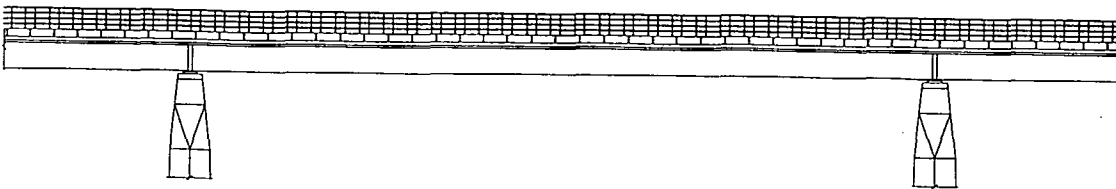
### 3.- MONTAJE DE PLACAS PREFABRICADAS

- COLOCACION DE LAS PLACAS (LATERALES Y CENTRAL) EN TODA LA LONGITUD DEL TABLERO.



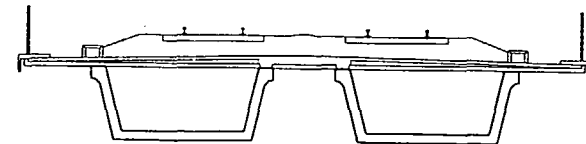
### 4.- HORMIGONADO DE LOSA

- HORMIGONADO DE LA LOSA EN TODA LA LONGITUD DEL TABLERO



### 5.- MONTAJE RESTO DE OBRA

- DISPOSICION DE CARGAS MUERTAS (SUPERESTRUCTURA, ACERAS, IMPOSTA Y BARANDILLA).



## **ANEJO 2B: EVALUACIÓN DE FLECHAS**

# ESTIMACIÓN DE PORCENTAJES DE CARGA PARA LA PRUEBA DE CARGA DEL VIADUCTO VALL DEL GALLO PERTENECIENTE AL TRAMO ZARAGOZA - LERIDA DE LA LÍNEA DE ALTA VELOCIDAD MADRID - BARCELONA - FRONTERA FRANCESA.

## CARACTERÍSTICAS DE LA VIGA

$$t := 1000 \cdot \text{kgf}$$

$$f_{ckviga} := 600 \cdot \frac{\text{kgf}}{\text{cm}^2}$$

Resistencia característica del hormigón de la viga

$$E := 19000 \cdot \sqrt{f_{ckviga} \cdot \frac{\text{kgf}}{\text{cm}^2}}$$

$$E = 465403.1 \frac{\text{kgf}}{\text{cm}^2}$$

Módulo de deformación del hormigón de la viga

Modelización de las vigas artesas mediante elementos "shell"

$$\text{espesor\_costeros} := 0.16\text{m}$$

$$\text{canto\_costeros} := 1.54\text{m}$$

$$\text{espesor\_carainf} := 0.22\text{m}$$

$$\text{ancho\_carainf} := 3.24\text{m}$$

$$S_{viga} := 2500 \frac{\text{kg}}{\text{m}^3} (\text{espesor\_carainf} \cdot \text{ancho\_carainf} + 2 \cdot \text{espesor\_costeros} \cdot \text{canto\_costeros})$$

$$S_{viga} = 3014 \frac{\text{kg}}{\text{m}}$$

$$S_{vigas} := 2 \cdot 3.014 \frac{\text{t}}{\text{m}}$$

Peso propio vigas

## CARACTERÍSTICAS DE LA LOSA

$$f_{cklosa} := 350 \cdot \frac{\text{kgf}}{\text{cm}^2}$$

Resistencia característica del hormigón de la losa

$$E_{losa} := 19000 \cdot \sqrt{f_{cklosa} \cdot \frac{\text{kgf}}{\text{cm}^2}}$$

$$E_{losa} = 355457.5 \frac{\text{kgf}}{\text{cm}^2}$$

Módulo de deformación del hormigón de la losa

### Características geométricas de la losa

$$\text{canto\_losa} := 0.26\text{m}$$

$$\text{ancho\_losa} := 10.216\text{m} \quad \text{espesor\_balasto} := 0.4\text{m}$$

$$\text{ancho\_total\_tablero} := 13.7\text{m}$$

$$\text{Carga muerta ( } q_{\text{travcarr}} \text{): Vías y Traviesas} \quad q_{\text{travcarr}} := \frac{1280 \frac{\text{kg}}{\text{m}}}{\text{ancho\_losa}}$$

$$\text{Carga muerta ( } q_{\text{pend}} \text{): Pendentado 2\%} \quad q_{\text{pend}} := \frac{1176 \frac{\text{kg}}{\text{m}}}{\text{ancho\_total\_tablero}}$$

$$\text{Carga muerta ( } q_{\text{bal}} \text{): Balasto} \quad q_{\text{bal}} := 1600 \frac{\text{kg}}{\text{m}^3} \cdot \text{espesor\_balasto}$$

$$m_{\text{losa}} := q_{\text{travcarr}} + q_{\text{pend}} + q_{\text{bal}}$$

$$\text{densidad\_losa} := \frac{2500 \cdot \left( \frac{\text{kg}}{\text{m}^3} \cdot \text{canto\_losa} \right) + m_{\text{losa}}}{\text{canto\_losa}}$$

$$\text{densidad\_losa} = 5774 \frac{\text{kg}}{\text{m}^3}$$

### Características geométricas de las losas de borde (en vuelo)

$$\text{canto\_losa\_alas} := 0.2\text{m}$$

$$\text{ancho\_losa\_alas} := 1.742\text{m}$$

$$\text{Carga muerta ( } q_{\text{alas}} \text{):} \quad \text{Murete guardabalasto} + \text{Imposta-Barandilla} + \text{Canaleta}$$

$$q_{\text{alas}} := \frac{250 \frac{\text{kg}}{\text{m}}}{\text{ancho\_losa\_alas}} + \frac{1000 \frac{\text{kg}}{\text{m}}}{\text{ancho\_losa\_alas}} + \frac{120 \frac{\text{kg}}{\text{m}}}{\text{ancho\_losa\_alas}}$$

$$\text{densidad\_losa\_alas} := \frac{2500 \cdot \frac{\text{kg}}{\text{m}^3} \cdot \text{canto\_losa\_alas} + q_{\text{alas}}}{\text{canto\_losa\_alas}}$$

$$\text{densidad\_losa\_alas} = 6432 \frac{\text{kg}}{\text{m}^3}$$

## 1.- PORCENTAJES DE CARGA

La carga total máxima de prueba sobre el vano es de:

$$C_T := 528 \text{ t}$$

La sobrecarga de diseño por vano, según el anejo de cálculo de la estructura es:

$$S_d := 24 \cdot \frac{\text{t}}{\text{m}} \cdot 30 \cdot \text{m} + 20 \cdot \frac{\text{t}}{\text{m}} \cdot 11.50 \cdot \text{m} + 0.96 \cdot \frac{\text{t}}{\text{m}} \cdot 41.50 \cdot \text{m} \quad S_d = 989.84 \text{ t}$$

Las cargas totales de proyecto por vano:

$$S_t := S_d + \text{densidad\_losa} \cdot \text{ancho\_losa} \cdot \text{canto\_losa} \cdot 41.5 \text{ m} \dots \\ + \text{densidad\_losa\_alas} \cdot \text{ancho\_losa\_alas} \cdot \text{canto\_losa\_alas} \cdot 41.5 \text{ m} + S_{\text{vigas}} \cdot 41.5 \text{ m}$$

$$S_t = 1969.5 \text{ t}$$

El porcentaje de carga es, por tanto:

Sobrecarga  
de diseño

$$\frac{C_T}{S_d} = 53 \%$$

Cargas  
totales

$$\frac{C_T}{S_t} = 27 \%$$

A continuación se indican los momentos positivos máximos debidos a la sobrecarga (sc) y momentos positivos totales de diseño (pp+cp+sc) obtenidos del anejo de cálculo de la estructura, así como los negativos correspondientes

$$M_{d\_pos} := 2641 \cdot t \cdot m$$

$$M_{d\_neg} := -4085 \cdot t \cdot m$$

Sobrecarga  
de diseño

$$M_{t\_pos} := 4629 \cdot t \cdot m$$

$$M_{t\_neg} := -7871 \cdot t \cdot m$$

Cargas totales

El momento positivo máximo y negativo mínimo obtenidos para la prueba son:

$$M_{p\_pos} := 1694.27 \cdot t \cdot m$$

$$M_{p\_neg} := -2289.74 \cdot t \cdot m$$

Los porcentajes de carga obtenidos son, por tanto:

Sobrecarga  
de diseño

$$\frac{M_{p\_pos}}{M_{d\_pos}} = 64 \%$$

$$\frac{M_{p\_neg}}{M_{d\_neg}} = 56 \%$$

Cargas  
totales

$$\frac{M_{p\_pos}}{M_{t\_pos}} = 37 \%$$

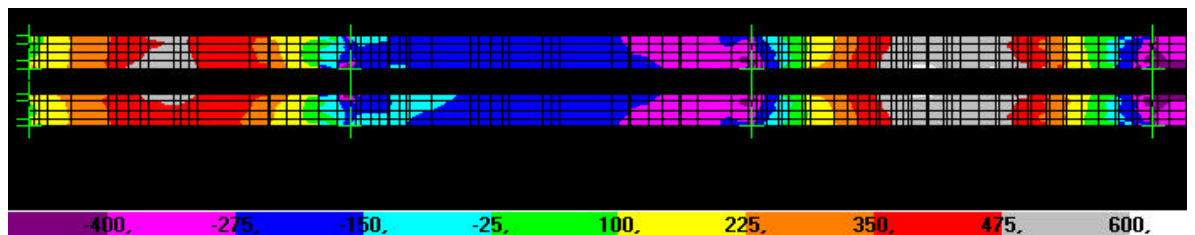
$$\frac{M_{p\_neg}}{M_{t\_neg}} = 29 \%$$

## 2.- DEFORMACIONES

Las deformadas de cada una de las dos vigas que forman el tablero, son las siguientes:

PRUEBA ESTATICA EST-1:

VANOS 1, 2 Y 3. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANOS 4, 5 Y 6. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANO 1

$$\sigma_{11\_cv1} := 486.76 \frac{t}{m^2}$$

$$\theta_{11\_cv1} := 467.58 \frac{t}{m^2}$$

Viga 1

$$\delta_{11\_cv1} := -10.4 \text{ mm} \quad (\text{nodo4533})$$

Viga 2

$$\beta_{11\_cv1} := -10.10 \text{ mm} \quad (\text{nodo4530})$$

$$\beta_{11\_1} := -0.56 \text{ mm} \quad (\text{nodo4524})$$

$$\epsilon_{11\_cv1} := \frac{\sigma_{11\_cv1}}{E}$$

$$\zeta_{11\_cv1} := \frac{\theta_{11\_cv1}}{E}$$

$$\epsilon_{11\_cv1} = 105 \cdot 10^{-6}$$

$$\zeta_{11\_cv1} = 100 \cdot 10^{-6}$$

VANO 2

$$\sigma_{12\_cv2} := -225.22 \frac{t}{m^2}$$

$$\theta_{12\_cv2} := -226.96 \cdot \frac{t}{m^2}$$

Viga 1

$$\delta_{12\_cv2} := 8.84 \cdot mm$$

(nodo2691)

$$\delta_{12\_cv2} := 8.49 \cdot mm$$

(nodo3223)

$$\delta_{12\_2} := 0.40 \cdot mm$$

(nodo4561)

$$\epsilon_{12\_cv2} := \frac{\sigma_{12\_cv2}}{E}$$

$$\epsilon_{12\_cv2} = -48 \cdot 10^{-6}$$

Viga 2

$$\beta_{12\_cv2} := 8.59 \cdot mm$$

(nodo3755)

$$\beta_{12\_2} := 0.38 \cdot mm$$

(nodo4558)

$$\zeta_{12\_cv2} := \frac{\theta_{12\_cv2}}{E}$$

$$\zeta_{12\_cv2} = -49 \cdot 10^{-6}$$

VANO 3

$$\sigma_{13\_cv3} := 563.65 \frac{t}{m^2}$$

$$\theta_{13\_cv3} := 563.87 \cdot \frac{t}{m^2}$$

Viga 1

$$\delta_{13\_cv3} := -17.40 \cdot mm$$

(nodo2962)

$$\delta_{13\_3} := -0.56 \cdot mm$$

(nodo4578)

$$\epsilon_{13\_cv3} := \frac{\sigma_{13\_cv3}}{E}$$

$$\epsilon_{13\_cv3} = 121 \cdot 10^{-6}$$

Viga 2

$$\beta_{13\_cv3} := -17.40 \cdot mm$$

(nodo3760)

$$\beta_{13\_3} := -0.56 \cdot mm$$

(nodo4575)

$$\zeta_{13\_cv3} := \frac{\theta_{13\_cv3}}{E}$$

$$\zeta_{13\_cv3} = 121 \cdot 10^{-6}$$



VANO 4

$$\sigma_{14\_cv4} := -160.68 \frac{t}{m^2}$$

$$\theta_{14\_cv4} := -160.81 \cdot \frac{t}{m^2}$$

Viga 1

$$\delta_{14\_cv4} := 5.86 \cdot mm \quad (nodo2998)$$

Viga 2

$$\beta_{14\_cv4} := 5.86 \cdot mm \quad (nodo3796)$$

$$\delta_{14\_4} := 0.46 \cdot mm \quad (nodo4595)$$

$$\beta_{14\_4} := 0.46 \cdot mm \quad (nodo4592)$$

$$\varepsilon_{14\_cv4} := \frac{\sigma_{14\_cv4}}{E}$$

$$\zeta_{14\_cv4} := \frac{\theta_{14\_cv4}}{E}$$

$$\varepsilon_{14\_cv4} = -35 \cdot 10^{-6}$$

$$\zeta_{14\_cv4} = -35 \cdot 10^{-6}$$

VANO 5

$$\sigma_{15\_cv5} := 38.57 \frac{t}{m^2}$$

$$\theta_{15\_cv5} := 38.50 \cdot \frac{t}{m^2}$$

Viga 1

$$\delta_{15\_cv5} := -1.49 \cdot mm \quad (nodo3030)$$

Viga 2

$$\beta_{15\_cv5} := -1.48 mm \quad (nodo3562)$$

$$\delta_{15\_5} := -0.11 \cdot mm \quad (nodo4612)$$

$$\beta_{15\_cv5} := -1.50 \cdot mm \quad (nodo4094)$$

$$\beta_{15\_5} := -0.11 \cdot mm \quad (nodo4609)$$

$$\varepsilon_{15\_cv5} := \frac{\sigma_{15\_cv5}}{E}$$

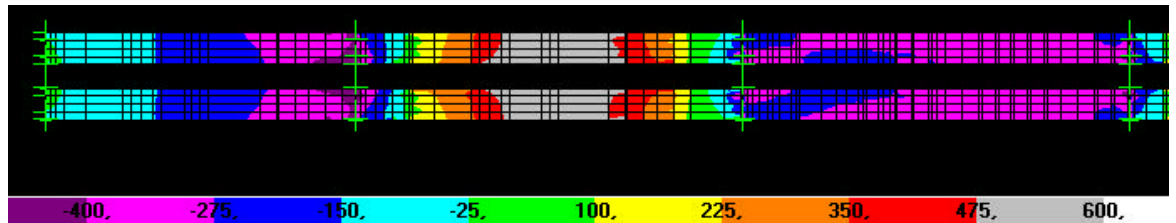
$$\zeta_{15\_cv5} := \frac{\theta_{15\_cv5}}{E}$$

$$\varepsilon_{15\_cv5} = 8 \cdot 10^{-6}$$

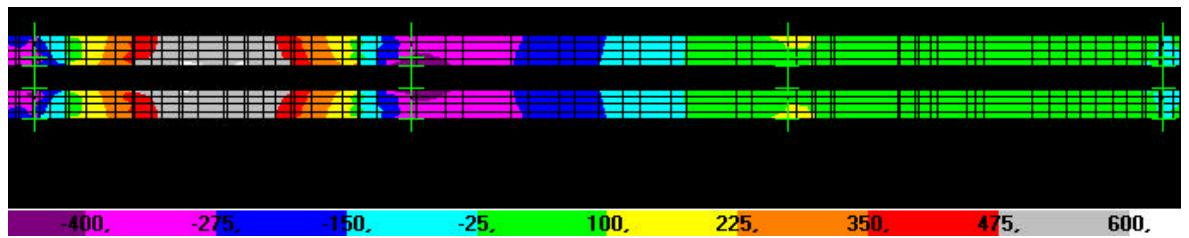
$$\zeta_{15\_cv5} = 8 \cdot 10^{-6}$$

## PRUEBA ESTATICA EST-2:

VANOS 1, 2 Y 3. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANOS 4, 5 Y 6. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANO 1

$$\sigma_{21\_cv1} := -180.03 \frac{t}{m^2}$$

$$\theta_{21\_cv1} := -179.01 \frac{t}{m^2}$$

Viga 1

$$\delta_{21\_cv1} := 4.93 \text{ mm}$$

(nodo4533)

Viga 2

$$\beta_{21\_cv1} := 4.89 \text{ mm}$$

(nodo4530)

$$\beta_{21\_1} := 0.22 \text{ mm}$$

(nodo4524)

$$\varepsilon_{21\_cv1} := \frac{\sigma_{21\_cv1}}{E}$$

$$\zeta_{21\_cv1} := \frac{\theta_{21\_cv1}}{E}$$

$$\varepsilon_{21\_cv1} = -39 \cdot 10^{-6}$$

$$\zeta_{21\_cv1} = -38 \cdot 10^{-6}$$

VANO 2

|        |                                                       |            |                                            |                                                 |
|--------|-------------------------------------------------------|------------|--------------------------------------------|-------------------------------------------------|
|        | $\sigma_{22\_cv2} := 558.14 \frac{t}{m^2}$            |            | $\theta_{22\_cv2} := 539.43 \frac{t}{m^2}$ |                                                 |
| Viga 1 | $\delta_{22\_cv2} := -16.70 \cdot mm$                 | (nodo2691) | Viga 2                                     | $\beta_{22\_cv2} := -16.80 \cdot mm$ (nodo3755) |
|        | $\delta_{22\_cv2} := -17.50 \cdot mm$                 | (nodo3223) |                                            | $\beta_{22\_2} := -0.49 \cdot mm$ (nodo4558)    |
|        | $\delta_{22\_2} := -0.49 \cdot mm$                    | (nodo4561) |                                            |                                                 |
|        | $\varepsilon_{22\_cv2} := \frac{\sigma_{22\_cv2}}{E}$ |            |                                            | $\zeta_{22\_cv2} := \frac{\theta_{22\_cv2}}{E}$ |
|        | $\varepsilon_{22\_cv2} = 120 \cdot 10^{-6}$           |            |                                            | $\zeta_{22\_cv2} = 116 \cdot 10^{-6}$           |

VANO 3

|        |                                                       |            |                                             |                                                 |
|--------|-------------------------------------------------------|------------|---------------------------------------------|-------------------------------------------------|
|        | $\sigma_{23\_cv3} := -283.82 \frac{t}{m^2}$           |            | $\theta_{23\_cv3} := -285.57 \frac{t}{m^2}$ |                                                 |
| Viga 1 | $\delta_{23\_cv3} := 10.90 mm$                        | (nodo2692) | Viga 2                                      | $\beta_{23\_cv3} := 10.90 \cdot mm$ (nodo3760)  |
|        | $\delta_{23\_3} := 0.56 \cdot mm$                     | (nodo4578) |                                             | $\beta_{23\_3} := 0.59 \cdot mm$ (nodo4575)     |
|        | $\varepsilon_{23\_cv3} := \frac{\sigma_{23\_cv3}}{E}$ |            |                                             | $\zeta_{23\_cv3} := \frac{\theta_{23\_cv3}}{E}$ |
|        | $\varepsilon_{23\_cv3} = -61 \cdot 10^{-6}$           |            |                                             | $\zeta_{23\_cv3} = -61 \cdot 10^{-6}$           |

VANO 4

|        |                                                    |        |                                                  |  |
|--------|----------------------------------------------------|--------|--------------------------------------------------|--|
|        | $\sigma_{24\_cv4} := 577.77 \frac{t}{m^2}$         |        | $\theta_{24\_cv4} := 577.76 \cdot \frac{t}{m^2}$ |  |
| Viga 1 | $\delta_{24\_cv4} := -17.90 \cdot mm$ (nodo2998)   | Viga 2 | $\beta_{24\_cv4} := -17.90 \cdot mm$ (nodo3796)  |  |
|        | $\delta_{24\_4} := -0.58 \cdot mm$ (nodo4595)      |        | $\beta_{24\_4} := -0.58 \cdot mm$ (nodo4592)     |  |
|        | $\epsilon_{24\_cv4} := \frac{\sigma_{24\_cv4}}{E}$ |        | $\zeta_{24\_cv4} := \frac{\theta_{24\_cv4}}{E}$  |  |
|        | $\epsilon_{24\_cv4} = 124 \cdot 10^{-6}$           |        | $\zeta_{24\_cv4} = 124 \cdot 10^{-6}$            |  |

VANO 5

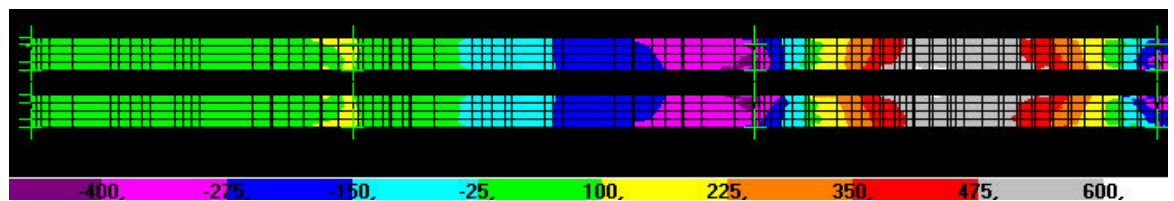
|        |                                                    |        |                                                   |  |
|--------|----------------------------------------------------|--------|---------------------------------------------------|--|
|        | $\sigma_{25\_cv5} := -156.10 \frac{t}{m^2}$        |        | $\theta_{25\_cv5} := -156.36 \cdot \frac{t}{m^2}$ |  |
| Viga 1 | $\delta_{25\_cv5} := 6.03 \cdot mm$ (nodo3030)     | Viga 2 | $\beta_{25\_cv5} := 5.95 mm$ (nodo3562)           |  |
|        | $\delta_{25\_5} := 0.45 \cdot mm$ (nodo4612)       |        | $\beta_{25\_cv5} := 6.11 \cdot mm$ (nodo4094)     |  |
|        |                                                    |        | $\beta_{25\_5} := 0.45 \cdot mm$ (nodo4609)       |  |
|        | $\epsilon_{25\_cv5} := \frac{\sigma_{25\_cv5}}{E}$ |        | $\zeta_{25\_cv5} := \frac{\theta_{25\_cv5}}{E}$   |  |
|        | $\epsilon_{25\_cv5} = -34 \cdot 10^{-6}$           |        | $\zeta_{25\_cv5} = -34 \cdot 10^{-6}$             |  |

## VANO 6

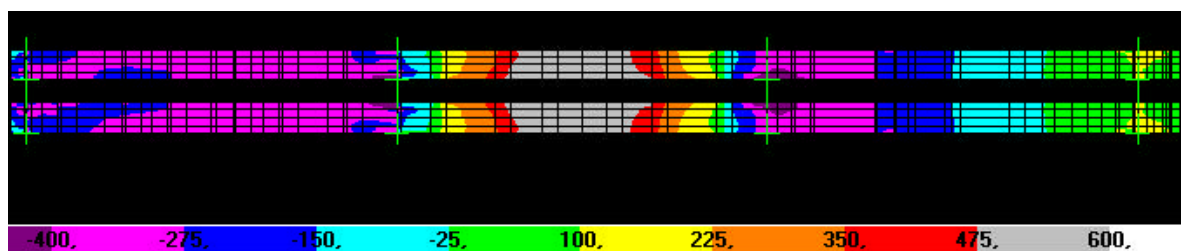
|        |                                                       |            |                                           |                                                  |
|--------|-------------------------------------------------------|------------|-------------------------------------------|--------------------------------------------------|
|        | $\sigma_{26\_cv6} := 39.63 \frac{t}{m^2}$             |            | $\theta_{26\_cv6} := 39.63 \frac{t}{m^2}$ |                                                  |
| Viga 1 | $\delta_{26\_cv6} := -1.54 \text{ mm}$                | (nodo3109) | Viga 2                                    | $\beta_{26\_cv6} := -1.54 \text{ mm}$ (nodo3907) |
|        | $\delta_{26\_6} := -0.03 \text{ mm}$                  | (nodo4629) |                                           | $\beta_{26\_6} := -0.03 \text{ mm}$ (nodo4626)   |
|        | $\varepsilon_{26\_cv6} := \frac{\sigma_{26\_cv6}}{E}$ |            |                                           | $\zeta_{26\_cv6} := \frac{\theta_{26\_cv6}}{E}$  |
|        | $\varepsilon_{26\_cv6} = 9 \cdot 10^{-6}$             |            |                                           | $\zeta_{26\_cv6} = 9 \cdot 10^{-6}$              |

## PRUEBA ESTATICA EST-3:

VANOS 1, 2 Y 3. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANOS 4, 5 Y 6. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANO 1

$$\sigma_{31\_cv1} := 45.48 \frac{t}{m^2}$$

$$\theta_{31\_cv1} := 45.58 \frac{t}{m^2}$$

Viga 1

$\delta_{31\_cv1} := -1.25\text{mm}$

(nodo4533)

Viga 2

$\beta_{31\_cv1} := -1.25\text{mm}$

(nodo4530)

$\beta_{31\_1} := -0.06\text{mm}$

(nodo4524)

$$\epsilon_{31\_cv1} := \frac{\sigma_{31\_cv1}}{E}$$

$$\zeta_{31\_cv1} := \frac{\theta_{31\_cv1}}{E}$$

$$\epsilon_{31\_cv1} = 10 \cdot 10^{-6}$$

$$\zeta_{31\_cv1} = 10 \cdot 10^{-6}$$

VANO 2

$$\sigma_{32\_cv2} := -148.20 \frac{t}{m^2}$$

$$\theta_{32\_cv2} := -147.35 \cdot \frac{t}{m^2}$$

Viga 1

$\delta_{32\_cv2} := 5.78 \cdot \text{mm}$

(nodo2691)

Viga 2

$\beta_{32\_cv2} := 5.66 \cdot \text{mm}$

(nodo3755)

$\delta_{32\_cv2} := 5.60 \cdot \text{mm}$

(nodo3223)

$\beta_{32\_2} := 0.12 \cdot \text{mm}$

(nodo4558)

$\delta_{32\_2} := 0.12 \cdot \text{mm}$

(nodo4561)

$$\epsilon_{32\_cv2} := \frac{\sigma_{32\_cv2}}{E}$$

$$\zeta_{32\_cv2} := \frac{\theta_{32\_cv2}}{E}$$

$$\epsilon_{32\_cv2} = -32 \cdot 10^{-6}$$

$$\zeta_{32\_cv2} = -32 \cdot 10^{-6}$$

VANO 3

|        |                                                    |        |                                                  |
|--------|----------------------------------------------------|--------|--------------------------------------------------|
|        | $\sigma_{33\_cv3} := 558.42 \frac{t}{m^2}$         |        | $\theta_{33\_cv3} := 544.21 \cdot \frac{t}{m^2}$ |
| Viga 1 | $\delta_{33\_cv3} := -17.30 mm$ (nodo2692)         | Viga 2 | $\beta_{33\_cv3} := -17.00 \cdot mm$ (nodo3760)  |
|        | $\delta_{33\_3} := -0.50 \cdot mm$ (nodo4578)      |        | $\beta_{33\_3} := -0.50 \cdot mm$ (nodo4575)     |
|        | $\epsilon_{33\_cv3} := \frac{\sigma_{33\_cv3}}{E}$ |        | $\zeta_{33\_cv3} := \frac{\theta_{33\_cv3}}{E}$  |
|        | $\epsilon_{33\_cv3} = 120 \cdot 10^{-6}$           |        | $\zeta_{33\_cv3} = 117 \cdot 10^{-6}$            |

VANO 4

|        |                                                    |        |                                                   |
|--------|----------------------------------------------------|--------|---------------------------------------------------|
|        | $\sigma_{34\_cv4} := -283.96 \frac{t}{m^2}$        |        | $\theta_{34\_cv4} := -285.45 \cdot \frac{t}{m^2}$ |
| Viga 1 | $\delta_{34\_cv4} := 11.00 \cdot mm$ (nodo2998)    | Viga 2 | $\beta_{34\_cv4} := 11.00 \cdot mm$ (nodo3796)    |
|        | $\delta_{34\_4} := 0.54 \cdot mm$ (nodo4595)       |        | $\beta_{34\_4} := 0.54 \cdot mm$ (nodo4592)       |
|        | $\epsilon_{34\_cv4} := \frac{\sigma_{34\_cv4}}{E}$ |        | $\zeta_{34\_cv4} := \frac{\theta_{34\_cv4}}{E}$   |
|        | $\epsilon_{34\_cv4} = -61 \cdot 10^{-6}$           |        | $\zeta_{34\_cv4} = -61 \cdot 10^{-6}$             |

VANO 5

|        |                                                    |            |                                            |                                                 |
|--------|----------------------------------------------------|------------|--------------------------------------------|-------------------------------------------------|
|        | $\sigma_{35\_cv5} := 573.96 \frac{t}{m^2}$         |            | $\theta_{35\_cv5} := 574.06 \frac{t}{m^2}$ |                                                 |
| Viga 1 | $\delta_{35\_cv5} := -17.80 \cdot mm$              | (nodo3030) | Viga 2                                     | $\beta_{35\_cv5} := -18.30 mm$ (nodo3562)       |
|        | $\delta_{35\_5} := -0.58 \cdot mm$                 | (nodo4612) |                                            | $\beta_{35\_cv5} := -17.40 \cdot mm$ (nodo4094) |
|        |                                                    |            |                                            | $\beta_{35\_5} := -0.58 \cdot mm$ (nodo4609)    |
|        | $\epsilon_{35\_cv5} := \frac{\sigma_{35\_cv5}}{E}$ |            |                                            | $\zeta_{35\_cv5} := \frac{\theta_{35\_cv5}}{E}$ |
|        | $\epsilon_{35\_cv5} = 123 \cdot 10^{-6}$           |            |                                            | $\zeta_{35\_cv5} = 123 \cdot 10^{-6}$           |

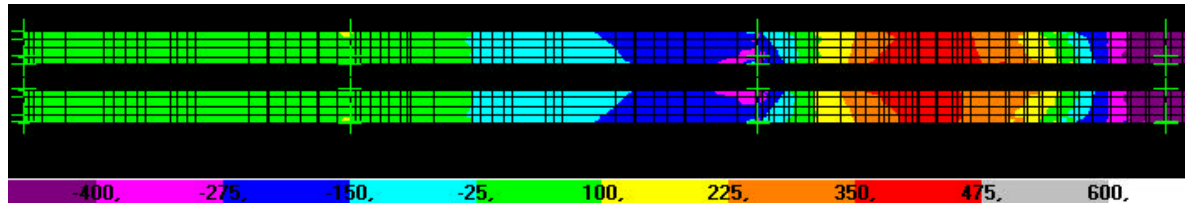
VANO 6

|        |                                                    |            |                                                |                                                 |
|--------|----------------------------------------------------|------------|------------------------------------------------|-------------------------------------------------|
|        | $\sigma_{36\_cv6} := -155.67 \frac{t}{m^2}$        |            | $\theta_{36\_cv6} := -156 \cdot \frac{t}{m^2}$ |                                                 |
| Viga 1 | $\delta_{36\_cv6} := 6.06 \cdot mm$                | (nodo3109) | Viga 2                                         | $\beta_{36\_cv6} := 6.06 \cdot mm$ (nodo3907)   |
|        | $\delta_{36\_6} := 0.13 \cdot mm$                  | (nodo4629) |                                                | $\beta_{36\_6} := 0.13 \cdot mm$ (nodo4626)     |
|        | $\epsilon_{36\_cv6} := \frac{\sigma_{36\_cv6}}{E}$ |            |                                                | $\zeta_{36\_cv6} := \frac{\theta_{36\_cv6}}{E}$ |
|        | $\epsilon_{36\_cv6} = -33 \cdot 10^{-6}$           |            |                                                | $\zeta_{36\_cv6} = -34 \cdot 10^{-6}$           |

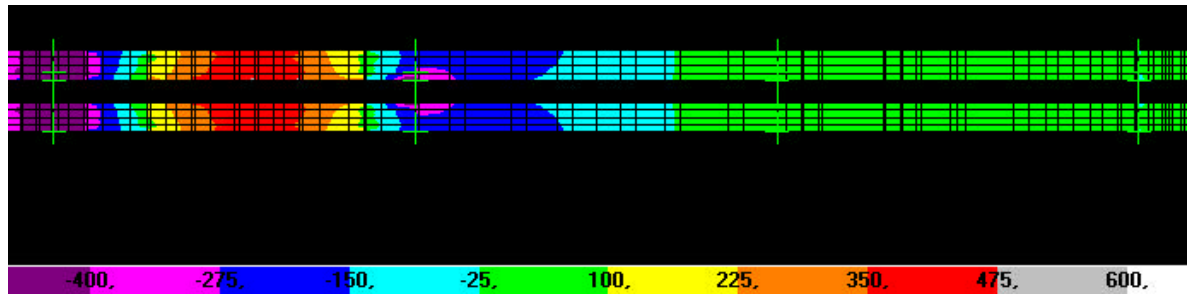


# PRUEBA ESTATICA EST-4:

VANOS 1, 2 Y 3. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANOS 4, 5 Y 6. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANO 1

$$\sigma_{41\_cv1} := 31.86 \frac{t}{m^2}$$

$$\theta_{41\_cv1} := 31.84 \frac{t}{m^2}$$

Viga 1

$$\delta_{41\_cv1} := -0.87mm$$

(nodo4533)

Viga 2

$$\beta_{41\_cv1} := -0.87mm$$

(nodo4530)

$$\beta_{41\_1} := -0.04mm$$

(nodo4524)

$$\epsilon_{41\_cv1} := \frac{\sigma_{41\_cv1}}{E}$$

$$\zeta_{41\_cv1} := \frac{\theta_{41\_cv1}}{E}$$

$$\epsilon_{41\_cv1} = 7 \cdot 10^{-6}$$

$$\zeta_{41\_cv1} = 7 \cdot 10^{-6}$$

VANO 2

$$\sigma_{42\_cv2} := -103.96 \frac{t}{m^2}$$

$$\theta_{42\_cv2} := -103.44 \cdot \frac{t}{m^2}$$

Viga 1

$\delta_{42\_cv2} := 4.07 \cdot mm$  (nodo2691)

$\delta_{42\_cv2} := 3.87 \cdot mm$  (nodo3223)

$\delta_{42\_2} := 0.08 \cdot mm$  (nodo4561)

Viga 2

$\beta_{42\_cv2} := 3.97 \cdot mm$  (nodo3755)

$\beta_{42\_2} := 0.08 \cdot mm$  (nodo4558)

$$\epsilon_{42\_cv2} := \frac{\sigma_{42\_cv2}}{E}$$

$$\zeta_{42\_cv2} := \frac{\theta_{42\_cv2}}{E}$$

$$\epsilon_{42\_cv2} = -22 \cdot 10^{-6}$$

$$\zeta_{42\_cv2} = -22 \cdot 10^{-6}$$

VANO 3

$$\sigma_{43\_cv3} := 375.85 \frac{t}{m^2}$$

$$\theta_{43\_cv3} := 353.62 \cdot \frac{t}{m^2}$$

Viga 1

$\delta_{43\_cv3} := -10.40 mm$  (nodo2692)

$\delta_{43\_3} := -0.35 \cdot mm$  (nodo4578)

Viga 2

$\beta_{43\_cv3} := -10.20 \cdot mm$  (nodo3760)

$\beta_{43\_3} := -0.35 \cdot mm$  (nodo4575)

$$\epsilon_{43\_cv3} := \frac{\sigma_{43\_cv3}}{E}$$

$$\zeta_{43\_cv3} := \frac{\theta_{43\_cv3}}{E}$$

$$\epsilon_{43\_cv3} = 81 \cdot 10^{-6}$$

$$\zeta_{43\_cv3} = 76 \cdot 10^{-6}$$

VANO 4

$$\sigma_{44\_cv4} := 382.02 \frac{t}{m^2}$$

$$\theta_{44\_cv4} := 381.52 \cdot \frac{t}{m^2}$$

Viga 1

$$\delta_{44\_cv4} := -10.90 \cdot mm \quad (\text{nodo2998})$$
$$\delta_{44\_4} := -0.03 \cdot mm \quad (\text{nodo4595})$$

Viga 2

$$\beta_{44\_cv4} := -10.90 \cdot mm \quad (\text{nodo3796})$$
$$\beta_{44\_4} := -0.04 \cdot mm \quad (\text{nodo4592})$$

$$\varepsilon_{44\_cv4} := \frac{\sigma_{44\_cv4}}{E}$$

$$\zeta_{44\_cv4} := \frac{\theta_{44\_cv4}}{E}$$

$$\varepsilon_{44\_cv4} = 82 \cdot 10^{-6}$$

$$\zeta_{44\_cv4} = 82 \cdot 10^{-6}$$

VANO 5

$$\sigma_{45\_cv5} := -106.75 \frac{t}{m^2}$$

$$\theta_{45\_cv5} := -106.82 \cdot \frac{t}{m^2}$$

Viga 1

$$\delta_{45\_cv5} := 4.11 \cdot mm \quad (\text{nodo3030})$$
$$\delta_{45\_5} := 0.31 \cdot mm \quad (\text{nodo4612})$$

Viga 2

$$\beta_{45\_cv5} := 4.02 mm \quad (\text{nodo3562})$$
$$\beta_{45\_cv5} := 4.21 mm \quad (\text{nodo4094})$$
$$\beta_{45\_5} := 0.31 \cdot mm \quad (\text{nodo4609})$$

$$\varepsilon_{45\_cv5} := \frac{\sigma_{45\_cv5}}{E}$$

$$\zeta_{45\_cv5} := \frac{\theta_{45\_cv5}}{E}$$

$$\varepsilon_{45\_cv5} = -23 \cdot 10^{-6}$$

$$\zeta_{45\_cv5} = -23 \cdot 10^{-6}$$

## VANO 6

$$\sigma_{46\_cv6} := 27.06 \frac{t}{m^2}$$

$$\theta_{46\_cv6} := 26.99 \frac{t}{m^2}$$

Viga 1

$$\delta_{46\_cv6} := -1.05 \cdot mm$$

(nodo3109)

Viga 2

$$\beta_{46\_cv6} := -1.05 \cdot mm$$

(nodo3907)

$$\delta_{46\_6} := -0.02 \cdot mm$$

(nodo4629)

$$\beta_{46\_6} := -0.02 \cdot mm$$

(nodo4626)

$$\varepsilon_{46\_cv6} := \frac{\sigma_{46\_cv6}}{E}$$

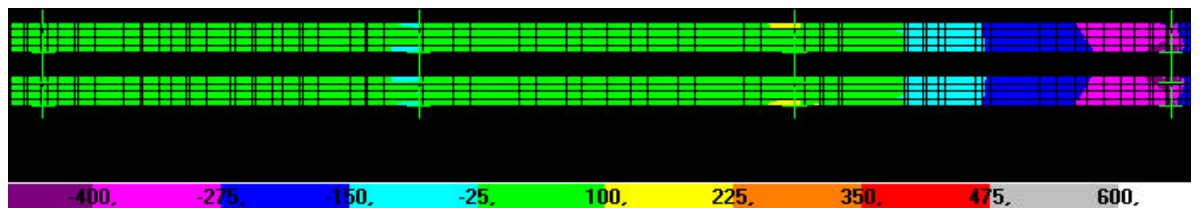
$$\zeta_{46\_cv6} := \frac{\theta_{46\_cv6}}{E}$$

$$\varepsilon_{46\_cv6} = 6 \cdot 10^{-6}$$

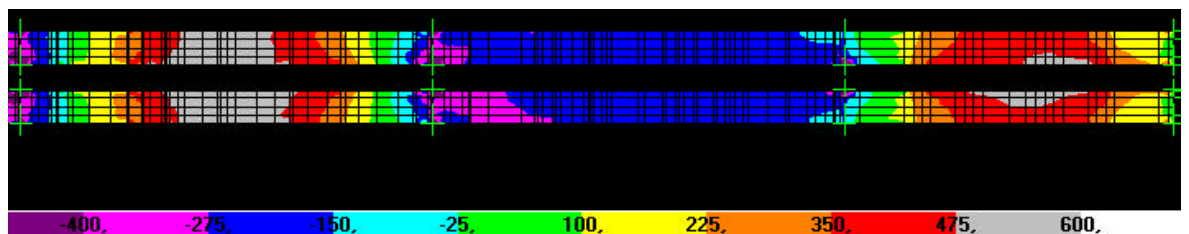
$$\zeta_{46\_cv6} = 6 \cdot 10^{-6}$$

## PRUEBA ESTATICA EST-5:

VANOS 4, 5 Y 6. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANOS 7, 8 Y 9. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANO 5

|        |                                                    |            |                                           |                                                 |
|--------|----------------------------------------------------|------------|-------------------------------------------|-------------------------------------------------|
|        | $\sigma_{55\_cv5} := 36.32 \frac{t}{m^2}$          |            | $\theta_{55\_cv5} := 36.35 \frac{t}{m^2}$ |                                                 |
| Viga 1 | $\delta_{55\_cv5} := -1.41 \cdot mm$               | (nodo3030) | Viga 2                                    | $\beta_{55\_cv5} := -1.43mm$ (nodo3562)         |
|        | $\delta_{55\_5} := -0.03 \cdot mm$                 | (nodo4612) |                                           | $\beta_{55\_cv5} := -1.39mm$ (nodo4094)         |
|        |                                                    |            |                                           | $\beta_{55\_5} := -0.03 \cdot mm$ (nodo4609)    |
|        | $\epsilon_{55\_cv5} := \frac{\sigma_{55\_cv5}}{E}$ |            |                                           | $\zeta_{55\_cv5} := \frac{\theta_{55\_cv5}}{E}$ |
|        | $\epsilon_{55\_cv5} = 8 \cdot 10^{-6}$             |            |                                           | $\zeta_{55\_cv5} = 8 \cdot 10^{-6}$             |

VANO 6

|        |                                                    |            |                                                   |                                                 |
|--------|----------------------------------------------------|------------|---------------------------------------------------|-------------------------------------------------|
|        | $\sigma_{56\_cv6} := -144.26 \frac{t}{m^2}$        |            | $\theta_{56\_cv6} := -143.67 \cdot \frac{t}{m^2}$ |                                                 |
| Viga 1 | $\delta_{56\_cv6} := 5.50 \cdot mm$                | (nodo3109) | Viga 2                                            | $\beta_{56\_cv6} := 5.49 \cdot mm$ (nodo3907)   |
|        | $\delta_{56\_6} := 0.43 \cdot mm$                  | (nodo4629) |                                                   | $\beta_{56\_6} := 0.43 \cdot mm$ (nodo4626)     |
|        | $\epsilon_{56\_cv6} := \frac{\sigma_{56\_cv6}}{E}$ |            |                                                   | $\zeta_{56\_cv6} := \frac{\theta_{56\_cv6}}{E}$ |
|        | $\epsilon_{56\_cv6} = -31 \cdot 10^{-6}$           |            |                                                   | $\zeta_{56\_cv6} = -31 \cdot 10^{-6}$           |

# VANO 7

$$\sigma_{57\_cv7} := 527.13 \frac{t}{m^2}$$

$$\theta_{57\_cv7} := 539.07 \cdot \frac{t}{m^2}$$

Viga 1

$$\delta_{57\_cv7} := -16.30 \cdot mm$$

(nodo3063)

Viga 2

$$\beta_{57\_cv7} := -17.10 \cdot mm$$

(nodo3595)

$$\delta_{57\_7} := -0.49 \cdot mm$$

(nodo4646)

$$\beta_{57\_cv7} := -16.20 \cdot mm$$

(nodo4127)

$$\beta_{57\_7} := -0.51 \cdot mm$$

(nodo4643)

$$\epsilon_{57\_cv7} := \frac{\sigma_{57\_cv7}}{E}$$

$$\zeta_{57\_cv7} := \frac{\theta_{57\_cv7}}{E}$$

$$\epsilon_{57\_cv7} = 113 \cdot 10^{-6}$$

$$\zeta_{57\_cv7} = 116 \cdot 10^{-6}$$

# VANO 8

$$\sigma_{58\_cv8} := 229.73 \frac{t}{m^2}$$

$$\theta_{58\_cv8} := 225.43 \cdot \frac{t}{m^2}$$

Viga 1

$$\delta_{58\_ala8} := 8.73 \cdot mm$$

(nodo2819)

Viga 2

$$\beta_{58\_ala8} := 9.62 \cdot mm$$

(nodo4415)

$$\delta_{58\_cv8} := 8.38 \cdot mm$$

(nodo3351)

$$\beta_{58\_cv8} := 8.68 \cdot mm$$

(nodo3883)

$$\delta_{58\_8} := 0.39 \cdot mm$$

(nodo3190)

$$\beta_{58\_8} := 0.40 \cdot mm$$

(nodo3988)

$$\epsilon_{58\_cv8} := \frac{\sigma_{58\_cv8}}{E}$$

$$\zeta_{58\_cv8} := \frac{\theta_{58\_cv8}}{E}$$

$$\epsilon_{58\_cv8} = 49 \cdot 10^{-6}$$

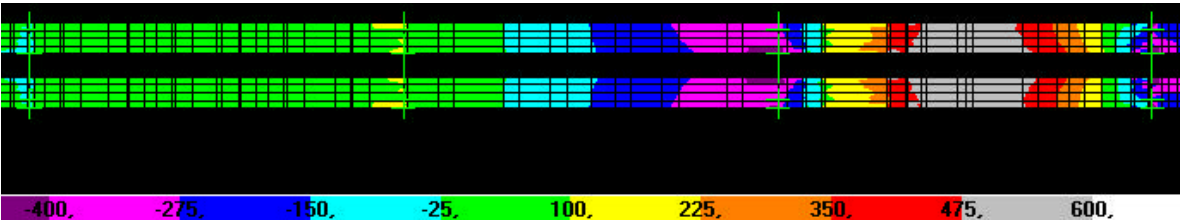
$$\zeta_{58\_cv8} = 48 \cdot 10^{-6}$$

VANO 9

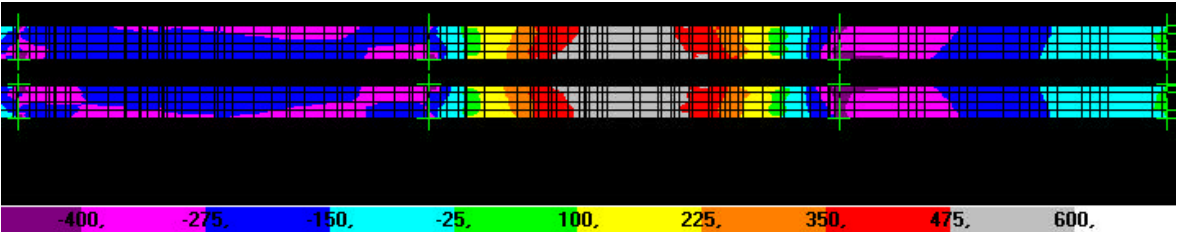
|        |                                              |            |        |                                             |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------------|------------|
|        | $\delta_{59\_ala9} := -8.14 \cdot \text{mm}$ | (nodo4692) |        | $\beta_{59\_ala9} := -8.35 \cdot \text{mm}$ | (nodo4691) |
| Viga 1 | $\delta_{59\_9} := -0.55 \cdot \text{mm}$    | (nodo4662) | Viga 2 | $\beta_{59\_9} := -0.57 \cdot \text{mm}$    | (nodo4661) |
|        | $\delta_{59\_9} := -0.59 \cdot \text{mm}$    | (nodo4664) |        |                                             |            |

PRUEBA ESTATICA EST-6:

VANOS 4, 5 Y 6. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANOS 7, 8 Y 9. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



# VANO 4

$$\sigma_{64\_cv4} := 35.20 \frac{t}{m^2}$$

$$\theta_{64\_cv4} := 35.27 \cdot \frac{t}{m^2}$$

Viga 1

$$\delta_{64\_cv4} := -1.45 \cdot mm \quad (\text{nodo2998})$$

Viga 2

$$\beta_{64\_cv4} := -1.45 \cdot mm \quad (\text{nodo3796})$$

$$\delta_{64\_4} := -0.03 \cdot mm \quad (\text{nodo4595})$$

$$\beta_{64\_4} := -0.03 \cdot mm \quad (\text{nodo4592})$$

$$\varepsilon_{64\_cv4} := \frac{\sigma_{64\_cv4}}{E}$$

$$\zeta_{64\_cv4} := \frac{\theta_{64\_cv4}}{E}$$

$$\varepsilon_{64\_cv4} = 8 \cdot 10^{-6}$$

$$\zeta_{64\_cv4} = 8 \cdot 10^{-6}$$

# VANO 5

$$\sigma_{65\_cv5} := -147.34 \frac{t}{m^2}$$

$$\theta_{65\_cv5} := -146.69 \cdot \frac{t}{m^2}$$

Viga 1

$$\delta_{65\_cv5} := 5.68 \cdot mm \quad (\text{nodo3030})$$

Viga 2

$$\beta_{65\_cv5} := 5.59 mm \quad (\text{nodo3562})$$

$$\delta_{65\_5} := 0.01 \cdot mm \quad (\text{nodo4612})$$

$$\beta_{65\_cv5} := 5.76 mm \quad (\text{nodo4094})$$

$$\beta_{65\_5} := 0.01 \cdot mm \quad (\text{nodo4609})$$

$$\varepsilon_{65\_cv5} := \frac{\sigma_{65\_cv5}}{E}$$

$$\zeta_{65\_cv5} := \frac{\theta_{65\_cv5}}{E}$$

$$\varepsilon_{65\_cv5} = -32 \cdot 10^{-6}$$

$$\zeta_{65\_cv5} = -32 \cdot 10^{-6}$$



VANO 6

|        |                                                       |            |        |                                                  |            |
|--------|-------------------------------------------------------|------------|--------|--------------------------------------------------|------------|
|        | $\sigma_{66\_cv6} := 540.48 \frac{t}{m^2}$            |            |        | $\theta_{66\_cv6} := 556.52 \cdot \frac{t}{m^2}$ |            |
| Viga 1 | $\delta_{66\_cv6} := -16.60 \cdot mm$                 | (nodo3109) | Viga 2 | $\beta_{66\_cv6} := -16.90 \cdot mm$             | (nodo3907) |
|        | $\delta_{66\_6} := -0.52 \cdot mm$                    | (nodo4629) |        | $\beta_{66\_6} := -0.54 \cdot mm$                | (nodo4626) |
|        | $\varepsilon_{66\_cv6} := \frac{\sigma_{66\_cv6}}{E}$ |            |        | $\zeta_{66\_cv6} := \frac{\theta_{66\_cv6}}{E}$  |            |
|        | $\varepsilon_{66\_cv6} = 116 \cdot 10^{-6}$           |            |        | $\zeta_{66\_cv6} = 120 \cdot 10^{-6}$            |            |

VANO 7

|        |                                                       |            |        |                                                   |            |
|--------|-------------------------------------------------------|------------|--------|---------------------------------------------------|------------|
|        | $\sigma_{67\_cv7} := -270.96 \frac{t}{m^2}$           |            |        | $\theta_{67\_cv7} := -266.85 \cdot \frac{t}{m^2}$ |            |
| Viga 1 | $\delta_{67\_cv7} := 10.30 \cdot mm$                  | (nodo3063) | Viga 2 | $\beta_{67\_cv7} := 10.20 \cdot mm$               | (nodo3595) |
|        | $\delta_{67\_7} := 0.51 \cdot mm$                     | (nodo4646) |        | $\beta_{67\_cv7} := 10.50 \cdot mm$               | (nodo4127) |
|        |                                                       |            |        | $\beta_{67\_7} := 0.52 \cdot mm$                  | (nodo4643) |
|        | $\varepsilon_{67\_cv7} := \frac{\sigma_{67\_cv7}}{E}$ |            |        | $\zeta_{67\_cv7} := \frac{\theta_{67\_cv7}}{E}$   |            |
|        | $\varepsilon_{67\_cv7} = -58 \cdot 10^{-6}$           |            |        | $\zeta_{67\_cv7} = -57 \cdot 10^{-6}$             |            |

VANO 8

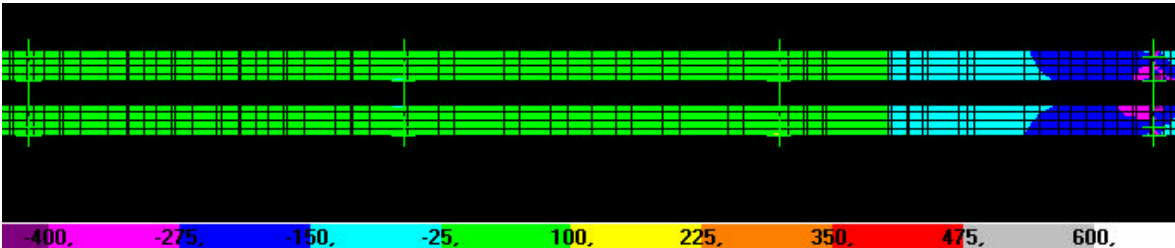
|        |                                                    |            |        |                                                  |            |
|--------|----------------------------------------------------|------------|--------|--------------------------------------------------|------------|
|        | $\sigma_{68\_cv8} := 522.97 \frac{t}{m^2}$         |            |        | $\theta_{68\_cv8} := 541.91 \cdot \frac{t}{m^2}$ |            |
|        | $\delta_{68\_ala8} := -16.00 \cdot mm$             | (nodo2819) |        | $\beta_{68\_ala8} := -15.10 \cdot mm$            | (nodo4415) |
| Viga 1 | $\delta_{68\_cv8} := -17.00 \cdot mm$              | (nodo3351) | Viga 2 | $\beta_{68\_cv8} := -16.80 \cdot mm$             | (nodo3883) |
|        | $\delta_{68\_8} := -0.46 \cdot mm$                 | (nodo3190) |        | $\beta_{68\_8} := -0.47 \cdot mm$                | (nodo3988) |
|        | $\epsilon_{68\_cv8} := \frac{\sigma_{68\_cv8}}{E}$ |            |        | $\zeta_{68\_cv8} := \frac{\theta_{68\_cv8}}{E}$  |            |
|        | $\epsilon_{68\_cv8} = 112 \cdot 10^{-6}$           |            |        | $\zeta_{68\_cv8} = 116 \cdot 10^{-6}$            |            |

VANO 9

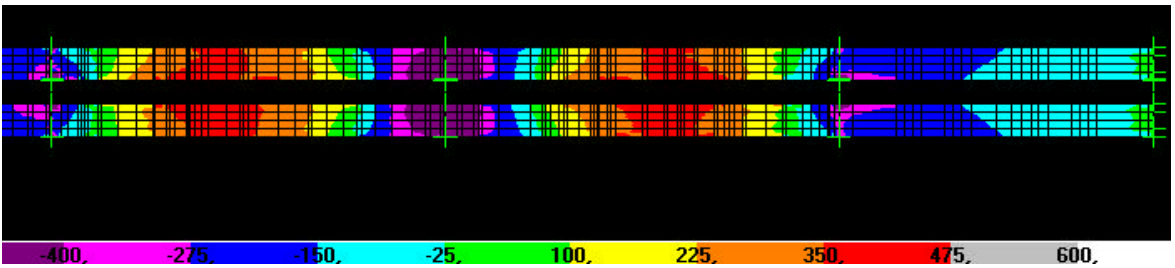
|        |                                      |            |        |                                     |            |
|--------|--------------------------------------|------------|--------|-------------------------------------|------------|
|        | $\delta_{59\_ala9} := 5.40 \cdot mm$ | (nodo4692) |        | $\beta_{59\_ala9} := 5.36 \cdot mm$ | (nodo4691) |
| Viga 1 | $\delta_{59\_9} := 0.22 \cdot mm$    | (nodo4662) | Viga 2 | $\beta_{59\_9} := 0.22 \cdot mm$    | (nodo4661) |
|        | $\delta_{59\_9} := 0.22 \cdot mm$    | (nodo4664) |        |                                     |            |

PRUEBA ESTATICA EST-7:

VANOS 4, 5 Y 6. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANOS 7, 8 Y 9. Tensión en la cara inferior de las vigas (t/m<sup>2</sup>).



VANO 5

|        |                                                    |            |                                                 |                                                 |
|--------|----------------------------------------------------|------------|-------------------------------------------------|-------------------------------------------------|
|        | $\sigma_{75\_cv5} := 23.58 \frac{t}{m^2}$          |            | $\theta_{75\_cv5} := 23.43 \cdot \frac{t}{m^2}$ |                                                 |
| Viga 1 | $\delta_{75\_cv5} := -0.90 \cdot mm$               | (nodo3030) | Viga 2                                          | $\beta_{75\_cv5} := -0.93 mm$ (nodo3562)        |
|        | $\delta_{75\_5} := -0.02 \cdot mm$                 | (nodo4612) |                                                 | $\beta_{75\_cv5} := -0.89 mm$ (nodo4094)        |
|        |                                                    |            |                                                 | $\beta_{75\_5} := -0.02 \cdot mm$ (nodo4609)    |
|        | $\epsilon_{75\_cv5} := \frac{\sigma_{75\_cv5}}{E}$ |            |                                                 | $\zeta_{75\_cv5} := \frac{\theta_{75\_cv5}}{E}$ |
|        | $\epsilon_{75\_cv5} = 5 \cdot 10^{-6}$             |            |                                                 | $\zeta_{75\_cv5} = 5 \cdot 10^{-6}$             |

VANO 6

|        |                                     |                                                       |        |                                  |                                                  |  |
|--------|-------------------------------------|-------------------------------------------------------|--------|----------------------------------|--------------------------------------------------|--|
|        |                                     | $\sigma_{76\_cv6} := -95.90 \frac{t}{m^2}$            |        |                                  | $\theta_{76\_cv6} := -92.67 \cdot \frac{t}{m^2}$ |  |
| Viga 1 | $\delta_{76\_cv6} := 3.51 \cdot mm$ | (nodo3109)                                            | Viga 2 | $\beta_{76\_cv6} := 3.59 mm$     | (nodo3907)                                       |  |
|        | $\delta_{76\_6} := 0.28 \cdot mm$   | (nodo4629)                                            |        | $\beta_{76\_6} := 0.30 \cdot mm$ | (nodo4626)                                       |  |
|        |                                     | $\varepsilon_{76\_cv6} := \frac{\sigma_{76\_cv6}}{E}$ |        |                                  | $\zeta_{76\_cv6} := \frac{\theta_{76\_cv6}}{E}$  |  |
|        |                                     | $\varepsilon_{76\_cv6} = -21 \cdot 10^{-6}$           |        |                                  | $\zeta_{76\_cv6} = -20 \cdot 10^{-6}$            |  |

VANO 7

|        |                                      |                                                       |        |                                      |                                                  |  |
|--------|--------------------------------------|-------------------------------------------------------|--------|--------------------------------------|--------------------------------------------------|--|
|        |                                      | $\sigma_{77\_cv7} := 351.76 \frac{t}{m^2}$            |        |                                      | $\theta_{77\_cv7} := 373.38 \cdot \frac{t}{m^2}$ |  |
| Viga 1 | $\delta_{77\_cv7} := -9.94 \cdot mm$ | (nodo3063)                                            | Viga 2 | $\beta_{77\_cv7} := -10.90 \cdot mm$ | (nodo3595)                                       |  |
|        | $\delta_{77\_7} := -0.03 \cdot mm$   | (nodo4646)                                            |        | $\beta_{77\_cv7} := -9.88 \cdot mm$  | (nodo4127)                                       |  |
|        |                                      |                                                       |        | $\beta_{77\_7} := -0.03 \cdot mm$    | (nodo4643)                                       |  |
|        |                                      | $\varepsilon_{77\_cv7} := \frac{\sigma_{77\_cv7}}{E}$ |        |                                      | $\zeta_{77\_cv7} := \frac{\theta_{77\_cv7}}{E}$  |  |
|        |                                      | $\varepsilon_{77\_cv7} = 76 \cdot 10^{-6}$            |        |                                      | $\zeta_{77\_cv7} = 80 \cdot 10^{-6}$             |  |

VANO 8

|        |                                                    |            |                                                  |                                                 |
|--------|----------------------------------------------------|------------|--------------------------------------------------|-------------------------------------------------|
|        | $\sigma_{78\_cv8} := 342.57 \frac{t}{m^2}$         |            | $\theta_{78\_cv8} := 358.70 \cdot \frac{t}{m^2}$ |                                                 |
|        | $\delta_{78\_ala8} := -9.35 \cdot mm$              | (nodo2819) | $\beta_{78\_ala8} := -8.07 \cdot mm$             | (nodo4415)                                      |
| Viga 1 | $\delta_{78\_cv8} := -10.40 \cdot mm$              | (nodo3351) | Viga 2                                           | $\beta_{78\_cv8} := -10.20 \cdot mm$ (nodo3883) |
|        | $\delta_{78\_8} := -0.31 \cdot mm$                 | (nodo3190) |                                                  | $\beta_{78\_8} := -0.33 \cdot mm$ (nodo3988)    |
|        | $\epsilon_{78\_cv8} := \frac{\sigma_{78\_cv8}}{E}$ |            | $\zeta_{78\_cv8} := \frac{\theta_{78\_cv8}}{E}$  |                                                 |
|        | $\epsilon_{68\_cv8} = 112 \cdot 10^{-6}$           |            | $\zeta_{68\_cv8} = 116 \cdot 10^{-6}$            |                                                 |

VANO 9

|        |                                      |            |                                     |                                             |
|--------|--------------------------------------|------------|-------------------------------------|---------------------------------------------|
|        | $\delta_{59\_ala9} := 3.95 \cdot mm$ | (nodo4692) | $\beta_{59\_ala9} := 3.86 \cdot mm$ | (nodo4691)                                  |
| Viga 1 | $\delta_{59\_9} := 0.15 \cdot mm$    | (nodo4662) | Viga 2                              | $\beta_{59\_9} := 0.15 \cdot mm$ (nodo4661) |
|        | $\delta_{59\_9} := 0.15 \cdot mm$    | (nodo4664) |                                     |                                             |

PRUEBA DINÁMICA 11, 12, 13 Y 14:

VANO 1

|        |                                              |            |        |                                       |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------|------------|
| Viga 1 | $\delta_{d11\_cv1} := -6.31 \cdot \text{mm}$ | (nodo4533) | Viga 2 | $\beta_{d11\_cv1} := -3.82 \text{mm}$ | (nodo4530) |
|        |                                              |            |        | $\beta_{d11\_1} := -0.18 \text{mm}$   | (nodo4524) |

VANO 2

|        |                                              |            |        |                                             |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------------|------------|
| Viga 1 | $\delta_{d12\_cv2} := -9.82 \cdot \text{mm}$ | (nodo2691) | Viga 2 | $\beta_{d12\_cv2} := -6.94 \cdot \text{mm}$ | (nodo3755) |
|        | $\delta_{d12\_cv2} := -9.92 \cdot \text{mm}$ | (nodo3223) |        | $\beta_{d12\_2} := -0.20 \cdot \text{mm}$   | (nodo4558) |
|        | $\delta_{d12\_2} := -0.27 \cdot \text{mm}$   | (nodo4561) |        |                                             |            |

VANO 3

|        |                                              |            |        |                                             |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------------|------------|
| Viga 1 | $\delta_{d13\_cv3} := -9.93 \cdot \text{mm}$ | (nodo2962) | Viga 2 | $\beta_{d13\_cv3} := -7.14 \cdot \text{mm}$ | (nodo3760) |
|        | $\delta_{d13\_3} := -0.26 \cdot \text{mm}$   | (nodo4578) |        | $\beta_{d13\_3} := -0.21 \cdot \text{mm}$   | (nodo4575) |

VANO 4

|        |                                              |            |        |                                             |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------------|------------|
| Viga 1 | $\delta_{d14\_cv4} := -9.82 \cdot \text{mm}$ | (nodo2998) | Viga 2 | $\beta_{d14\_cv4} := -7.05 \cdot \text{mm}$ | (nodo3796) |
|        | $\delta_{d14\_4} := -0.25 \cdot \text{mm}$   | (nodo4595) |        | $\beta_{d14\_4} := -0.19 \cdot \text{mm}$   | (nodo4592) |

VANO 5

|        |                                              |            |        |                                             |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------------|------------|
| Viga 1 | $\delta_{d15\_cv5} := -9.80 \cdot \text{mm}$ | (nodo3030) | Viga 2 | $\beta_{d15\_cv5} := -7.49 \text{mm}$       | (nodo3562) |
|        | $\delta_{d15\_5} := -0.25 \cdot \text{mm}$   | (nodo4612) |        | $\beta_{d15\_cv5} := -6.51 \cdot \text{mm}$ | (nodo4094) |
|        |                                              |            |        | $\beta_{d15\_5} := -0.20 \cdot \text{mm}$   | (nodo4609) |

## VANO 6

|        |                                              |            |        |                                           |            |
|--------|----------------------------------------------|------------|--------|-------------------------------------------|------------|
| Viga 1 | $\delta_{d16\_cv6} := -9.84 \cdot \text{mm}$ | (nodo3109) | Viga 2 | $\beta_{d16\_cv6} := -7.02 \text{mm}$     | (nodo3907) |
|        | $\delta_{d16\_6} := -0.26 \cdot \text{mm}$   | (nodo4629) |        | $\beta_{d16\_6} := -0.20 \cdot \text{mm}$ | (nodo4626) |

## VANO 7

|        |                                              |            |        |                                             |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------------|------------|
| Viga 1 | $\delta_{d17\_cv7} := -9.91 \cdot \text{mm}$ | (nodo3063) | Viga 2 | $\beta_{d17\_cv7} := -7.58 \cdot \text{mm}$ | (nodo3595) |
|        | $\delta_{d17\_7} := -0.26 \cdot \text{mm}$   | (nodo4646) |        | $\beta_{d17\_cv7} := -6.58 \cdot \text{mm}$ | (nodo4127) |
|        |                                              |            |        | $\beta_{d17\_7} := -0.20 \cdot \text{mm}$   | (nodo4643) |

## VANO 8

|        |                                               |            |        |                                              |            |
|--------|-----------------------------------------------|------------|--------|----------------------------------------------|------------|
|        | $\delta_{d18\_ala8} := -9.66 \cdot \text{mm}$ | (nodo2819) |        | $\beta_{d18\_ala8} := -5.52 \cdot \text{mm}$ | (nodo4415) |
| Viga 1 | $\delta_{d18\_cv8} := -9.57 \cdot \text{mm}$  | (nodo3351) | Viga 2 | $\beta_{d18\_cv8} := -6.89 \cdot \text{mm}$  | (nodo3883) |
|        | $\delta_{d18\_8} := -0.27 \cdot \text{mm}$    | (nodo3190) |        | $\beta_{d18\_8} := -0.20 \cdot \text{mm}$    | (nodo3988) |

## VANO 9

|        |                                               |            |        |                                              |            |
|--------|-----------------------------------------------|------------|--------|----------------------------------------------|------------|
|        | $\delta_{d19\_ala9} := -4.84 \cdot \text{mm}$ | (nodo4692) |        | $\beta_{d19\_ala9} := -2.34 \cdot \text{mm}$ | (nodo4691) |
| Viga 1 | $\delta_{d19\_9} := -0.37 \cdot \text{mm}$    | (nodo4662) | Viga 2 | $\beta_{d19\_9} := -0.18 \cdot \text{mm}$    | (nodo4661) |
|        | $\delta_{d19\_9} := -0.38 \cdot \text{mm}$    | (nodo4664) |        |                                              |            |

## PRUEBA DINÁMICA 21, 22, 23 Y 24:

### VANO 1

|        |                                              |            |        |                                       |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------|------------|
| Viga 1 | $\delta_{d21\_cv1} := -3.75 \cdot \text{mm}$ | (nodo4533) | Viga 2 | $\beta_{d21\_cv1} := -6.14 \text{mm}$ | (nodo4530) |
|        |                                              |            |        | $\beta_{d21\_1} := -0.33 \text{mm}$   | (nodo4524) |

### VANO 2

|        |                                              |            |        |                                             |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------------|------------|
| Viga 1 | $\delta_{d22\_cv2} := -6.31 \cdot \text{mm}$ | (nodo2691) | Viga 2 | $\beta_{d22\_cv2} := -9.58 \cdot \text{mm}$ | (nodo3755) |
|        | $\delta_{d22\_cv2} := -7.29 \cdot \text{mm}$ | (nodo3223) |        | $\beta_{d22\_2} := -0.26 \cdot \text{mm}$   | (nodo4558) |
|        | $\delta_{d22\_2} := -0.20 \cdot \text{mm}$   | (nodo4561) |        |                                             |            |

### VANO 3

|        |                                              |            |        |                                             |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------------|------------|
| Viga 1 | $\delta_{d23\_cv3} := -6.91 \cdot \text{mm}$ | (nodo2962) | Viga 2 | $\beta_{d23\_cv3} := -9.64 \cdot \text{mm}$ | (nodo3760) |
|        | $\delta_{d23\_3} := -0.20 \cdot \text{mm}$   | (nodo4578) |        | $\beta_{d23\_3} := -0.25 \cdot \text{mm}$   | (nodo4575) |

### VANO 4

|        |                                              |            |        |                                             |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------------|------------|
| Viga 1 | $\delta_{d24\_cv4} := -6.89 \cdot \text{mm}$ | (nodo2998) | Viga 2 | $\beta_{d24\_cv4} := -9.62 \cdot \text{mm}$ | (nodo3796) |
|        | $\delta_{d24\_4} := -0.19 \cdot \text{mm}$   | (nodo4595) |        | $\beta_{d24\_4} := -0.24 \cdot \text{mm}$   | (nodo4592) |

### VANO 5

|        |                                              |            |        |                                             |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------------|------------|
| Viga 1 | $\delta_{d25\_cv5} := -6.88 \cdot \text{mm}$ | (nodo3030) | Viga 2 | $\beta_{d25\_cv5} := -9.80 \text{mm}$       | (nodo3562) |
|        | $\delta_{d25\_5} := -0.19 \cdot \text{mm}$   | (nodo4612) |        | $\beta_{d25\_cv5} := -9.65 \cdot \text{mm}$ | (nodo4094) |
|        |                                              |            |        | $\beta_{d25\_5} := -0.24 \cdot \text{mm}$   | (nodo4609) |



VANO 6

|        |                                              |            |        |                                           |            |
|--------|----------------------------------------------|------------|--------|-------------------------------------------|------------|
| Viga 1 | $\delta_{d26\_cv6} := -6.89 \cdot \text{mm}$ | (nodo3109) | Viga 2 | $\beta_{d26\_cv6} := -9.65 \text{mm}$     | (nodo3907) |
|        | $\delta_{d26\_6} := -0.19 \cdot \text{mm}$   | (nodo4629) |        | $\beta_{d26\_6} := -0.25 \cdot \text{mm}$ | (nodo4626) |

VANO 7

|        |                                              |            |        |                                             |            |
|--------|----------------------------------------------|------------|--------|---------------------------------------------|------------|
| Viga 1 | $\delta_{d27\_cv7} := -6.96 \cdot \text{mm}$ | (nodo3063) | Viga 2 | $\beta_{d27\_cv7} := -9.89 \cdot \text{mm}$ | (nodo3595) |
|        | $\delta_{d27\_7} := -0.19 \cdot \text{mm}$   | (nodo4646) |        | $\beta_{d27\_cv7} := -9.75 \cdot \text{mm}$ | (nodo4127) |
|        |                                              |            |        | $\beta_{d27\_7} := -0.25 \cdot \text{mm}$   | (nodo4643) |

VANO 8

|        |                                               |            |        |                                              |            |
|--------|-----------------------------------------------|------------|--------|----------------------------------------------|------------|
| Viga 1 | $\delta_{d28\_ala8} := -6.24 \cdot \text{mm}$ | (nodo2819) | Viga 2 | $\beta_{d28\_ala8} := -8.65 \cdot \text{mm}$ | (nodo4415) |
|        | $\delta_{d28\_cv8} := -7.22 \cdot \text{mm}$  | (nodo3351) |        | $\beta_{d28\_cv8} := -9.40 \cdot \text{mm}$  | (nodo3883) |
|        | $\delta_{d28\_8} := -0.19 \cdot \text{mm}$    | (nodo3190) |        | $\beta_{d28\_8} := -0.26 \cdot \text{mm}$    | (nodo3988) |

VANO 9

|        |                                               |            |        |                                              |            |
|--------|-----------------------------------------------|------------|--------|----------------------------------------------|------------|
| Viga 1 | $\delta_{d29\_ala9} := -2.29 \cdot \text{mm}$ | (nodo4692) | Viga 2 | $\beta_{d29\_ala9} := -4.71 \cdot \text{mm}$ | (nodo4691) |
|        | $\delta_{d29\_9} := -0.18 \cdot \text{mm}$    | (nodo4662) |        | $\beta_{d29\_9} := -0.38 \cdot \text{mm}$    | (nodo4661) |
|        | $\delta_{d29\_9} := -0.19 \cdot \text{mm}$    | (nodo4664) |        |                                              |            |

## PRUEBA DINÁMICA 01:

### VANO 1

|        |                                               |            |        |                                       |            |
|--------|-----------------------------------------------|------------|--------|---------------------------------------|------------|
| Viga 1 | $\delta_{d01\_cv1} := -10.06 \cdot \text{mm}$ | (nodo4533) | Viga 2 | $\beta_{d01\_cv1} := -9.96 \text{mm}$ | (nodo4530) |
|        |                                               |            |        | $\beta_{d01\_1} := -0.51 \text{mm}$   | (nodo4524) |

### VANO 2

|        |                                               |            |        |                                              |            |
|--------|-----------------------------------------------|------------|--------|----------------------------------------------|------------|
| Viga 1 | $\delta_{d02\_cv2} := -16.13 \cdot \text{mm}$ | (nodo2691) | Viga 2 | $\beta_{d02\_cv2} := -16.52 \cdot \text{mm}$ | (nodo3755) |
|        | $\delta_{d02\_cv2} := -17.21 \cdot \text{mm}$ | (nodo3223) |        | $\beta_{d02\_2} := -0.46 \cdot \text{mm}$    | (nodo4558) |
|        | $\delta_{d02\_2} := -0.47 \cdot \text{mm}$    | (nodo4561) |        |                                              |            |

### VANO 3

|        |                                               |            |        |                                              |            |
|--------|-----------------------------------------------|------------|--------|----------------------------------------------|------------|
| Viga 1 | $\delta_{d03\_cv3} := -16.84 \cdot \text{mm}$ | (nodo2962) | Viga 2 | $\beta_{d03\_cv3} := -16.74 \cdot \text{mm}$ | (nodo3760) |
|        | $\delta_{d03\_3} := -0.46 \cdot \text{mm}$    | (nodo4578) |        | $\beta_{d03\_3} := -0.46 \cdot \text{mm}$    | (nodo4575) |

### VANO 4

|        |                                               |            |        |                                              |            |
|--------|-----------------------------------------------|------------|--------|----------------------------------------------|------------|
| Viga 1 | $\delta_{d04\_cv4} := -16.71 \cdot \text{mm}$ | (nodo2998) | Viga 2 | $\beta_{d04\_cv4} := -16.67 \cdot \text{mm}$ | (nodo3796) |
|        | $\delta_{d04\_4} := -0.44 \cdot \text{mm}$    | (nodo4595) |        | $\beta_{d04\_4} := -0.43 \cdot \text{mm}$    | (nodo4592) |

### VANO 5

|        |                                               |            |        |                                              |            |
|--------|-----------------------------------------------|------------|--------|----------------------------------------------|------------|
| Viga 1 | $\delta_{d05\_cv5} := -16.68 \cdot \text{mm}$ | (nodo3030) | Viga 2 | $\beta_{d05\_cv5} := -17.29 \text{mm}$       | (nodo3562) |
|        | $\delta_{d05\_5} := -0.44 \cdot \text{mm}$    | (nodo4612) |        | $\beta_{d05\_cv5} := -16.16 \cdot \text{mm}$ | (nodo4094) |
|        |                                               |            |        | $\beta_{d05\_5} := -0.44 \cdot \text{mm}$    | (nodo4609) |

VANO 6

|        |                                               |            |        |                                           |            |
|--------|-----------------------------------------------|------------|--------|-------------------------------------------|------------|
| Viga 1 | $\delta_{d06\_cv6} := -16.73 \cdot \text{mm}$ | (nodo3109) | Viga 2 | $\beta_{d06\_cv6} := -16.67 \text{mm}$    | (nodo3907) |
|        | $\delta_{d06\_6} := -0.45 \cdot \text{mm}$    | (nodo4629) |        | $\beta_{d06\_6} := -0.45 \cdot \text{mm}$ | (nodo4626) |

VANO 7

|        |                                               |            |        |                                              |            |
|--------|-----------------------------------------------|------------|--------|----------------------------------------------|------------|
| Viga 1 | $\delta_{d07\_cv7} := -16.87 \cdot \text{mm}$ | (nodo3063) | Viga 2 | $\beta_{d07\_cv7} := -17.47 \cdot \text{mm}$ | (nodo3595) |
|        | $\delta_{d07\_7} := -0.45 \cdot \text{mm}$    | (nodo4646) |        | $\beta_{d07\_cv7} := -16.33 \cdot \text{mm}$ | (nodo4127) |
|        |                                               |            |        | $\beta_{d07\_7} := -0.45 \cdot \text{mm}$    | (nodo4643) |

VANO 8

|        |                                                |            |        |                                               |            |
|--------|------------------------------------------------|------------|--------|-----------------------------------------------|------------|
| Viga 1 | $\delta_{d08\_ala8} := -15.90 \cdot \text{mm}$ | (nodo2819) | Viga 2 | $\beta_{d08\_ala8} := -14.17 \cdot \text{mm}$ | (nodo4415) |
|        | $\delta_{d08\_cv8} := -16.89 \cdot \text{mm}$  | (nodo3351) |        | $\beta_{d08\_cv8} := -16.29 \cdot \text{mm}$  | (nodo3883) |
|        | $\delta_{d08\_8} := -0.46 \cdot \text{mm}$     | (nodo3190) |        | $\beta_{d08\_8} := -0.46 \cdot \text{mm}$     | (nodo3988) |

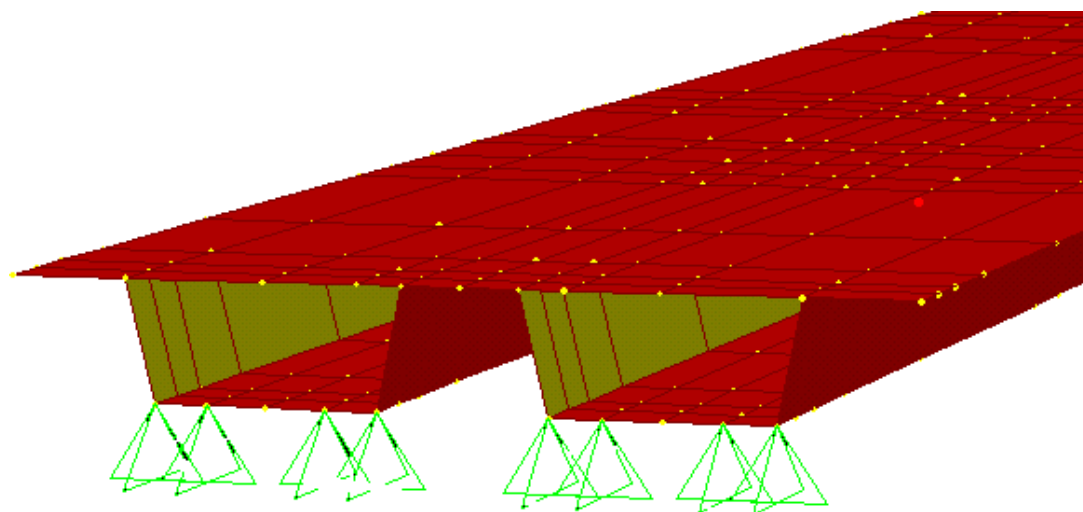
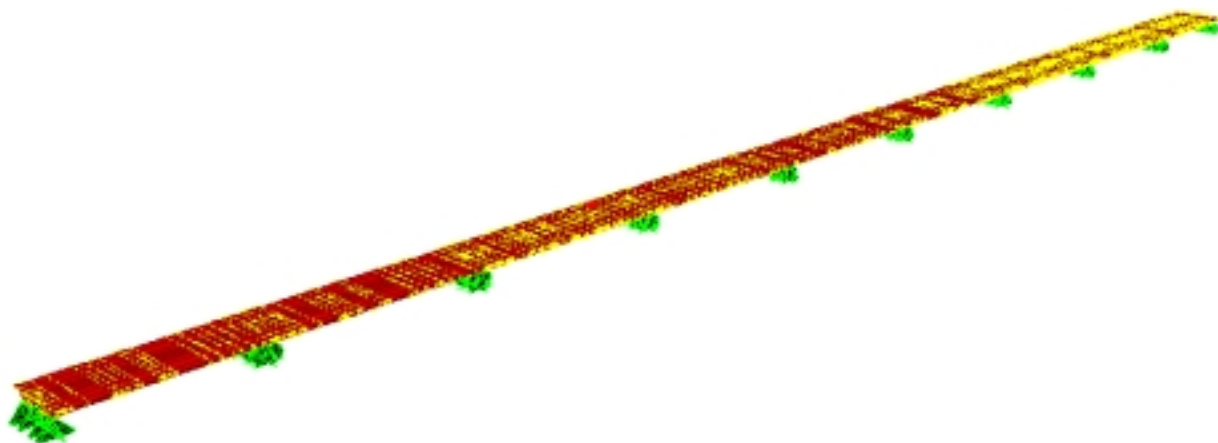
VANO 9

|        |                                               |            |        |                                              |            |
|--------|-----------------------------------------------|------------|--------|----------------------------------------------|------------|
| Viga 1 | $\delta_{d09\_ala9} := -7.13 \cdot \text{mm}$ | (nodo4692) | Viga 2 | $\beta_{d09\_ala9} := -7.05 \cdot \text{mm}$ | (nodo4691) |
|        | $\delta_{d09\_9} := -0.55 \cdot \text{mm}$    | (nodo4662) |        | $\beta_{d09\_9} := -0.56 \cdot \text{mm}$    | (nodo4661) |
|        | $\delta_{d09\_9} := -0.57 \cdot \text{mm}$    | (nodo4664) |        |                                              |            |

## **ANÁLISIS ESTÁTICO**

**SAP 2000**

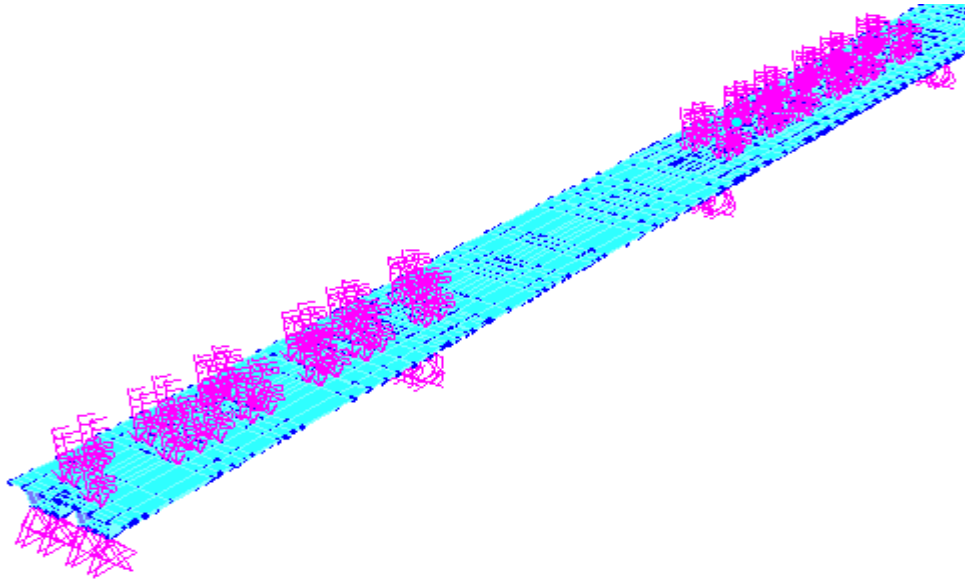
**VIADUCTO VALL DEL GALLO**



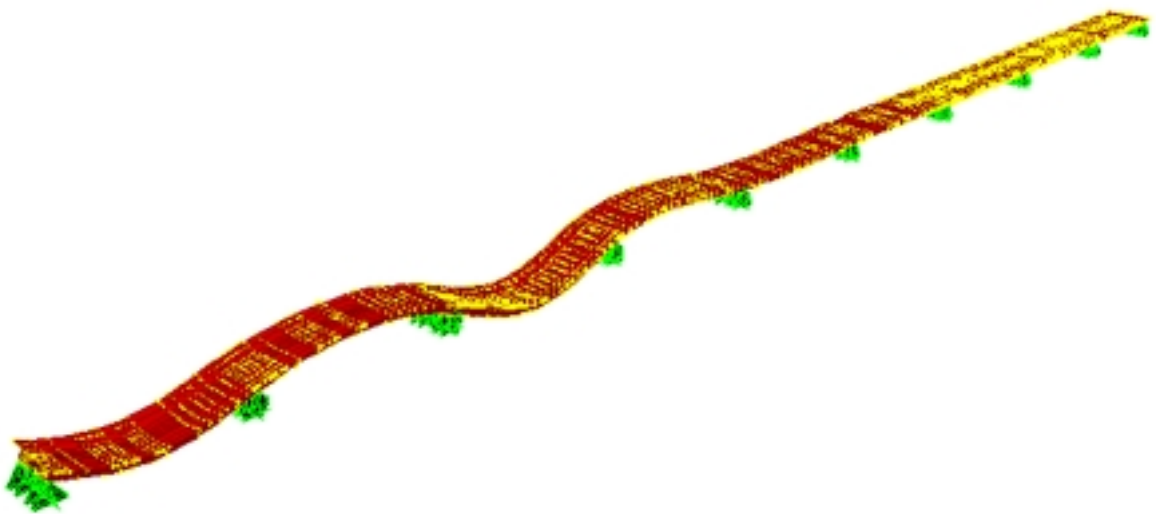
Modelo empleado.

## SAP 2000

### VIADUCTO VALL DEL GALLO



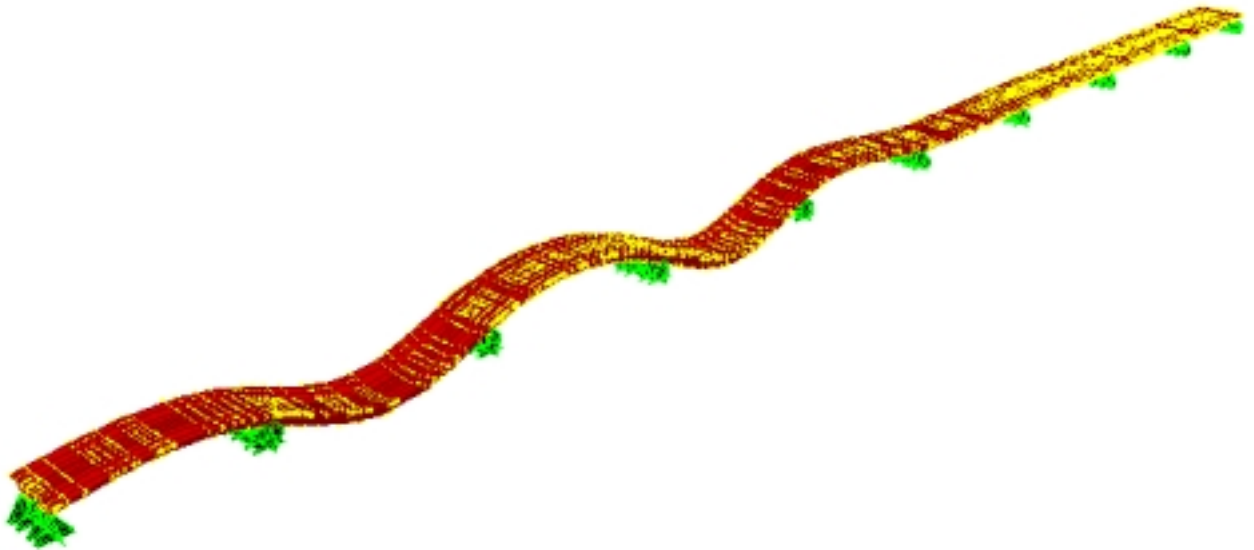
Tren de cargas en una hipótesis de cálculo, (Estática 1).



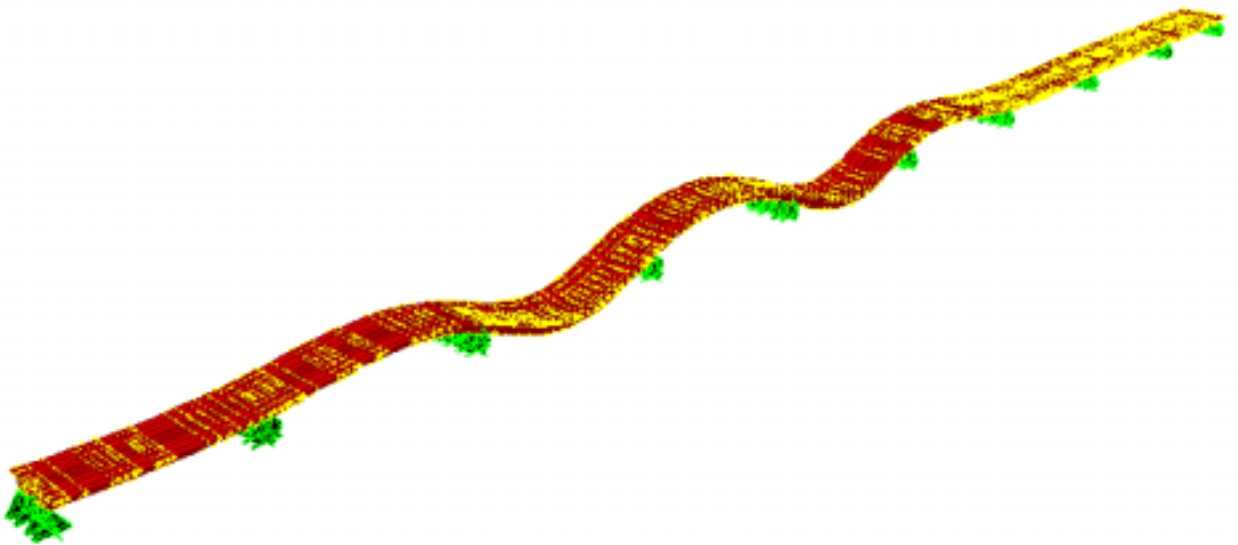
Deformada del tablero en la prueba estática 1.

**SAP 2000**

**VIADUCTO VALL DEL GALLO**



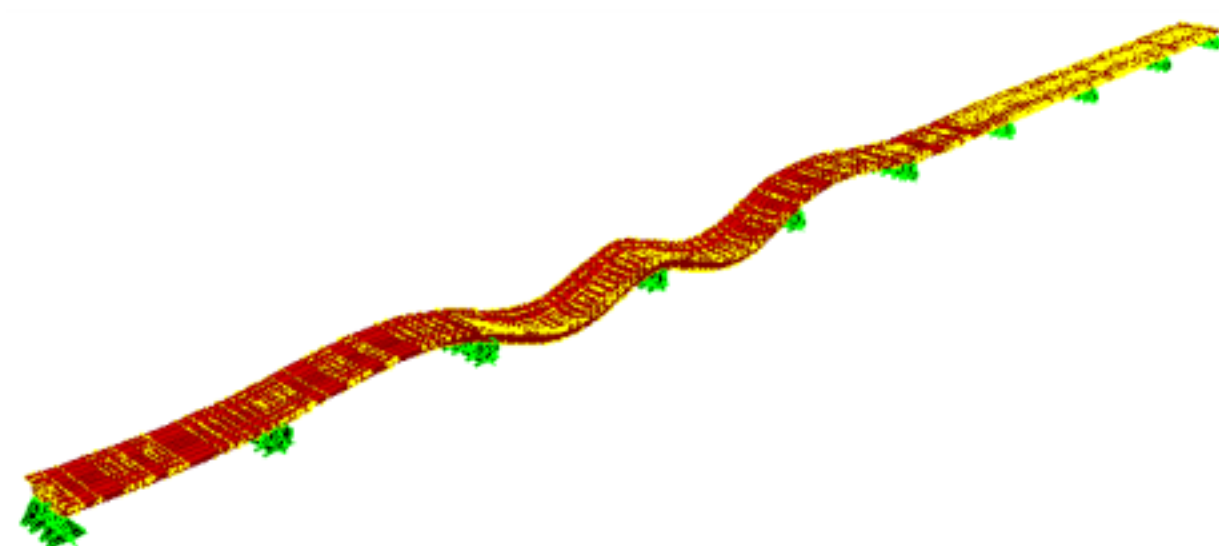
Deformada del tablero en la prueba estática 2.



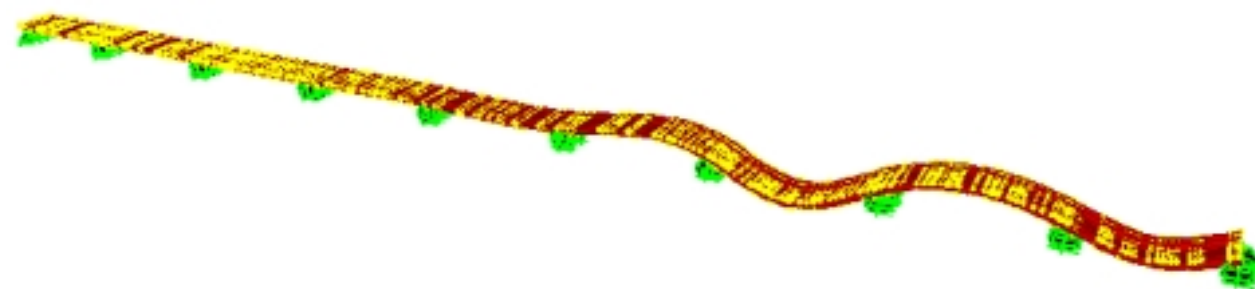
Deformada del tablero en la prueba estática 3.

**SAP 2000**

**VIADUCTO VALL DEL GALLO**



Deformada del tablero en la prueba estática 4.

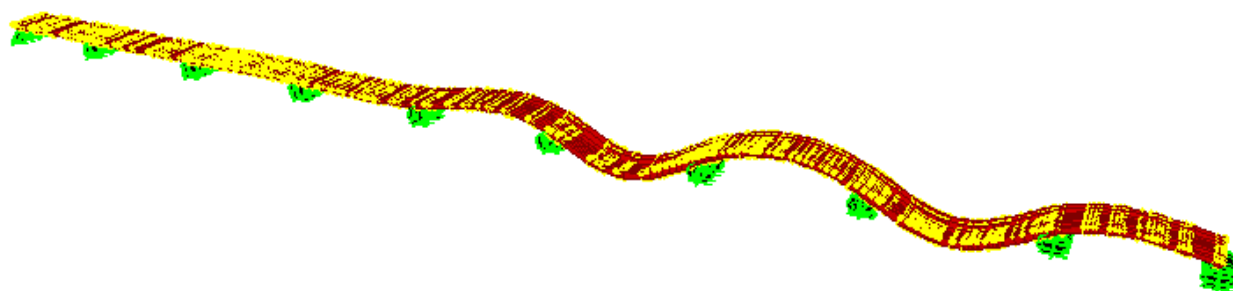


Deformada del tablero en la prueba estática 5.

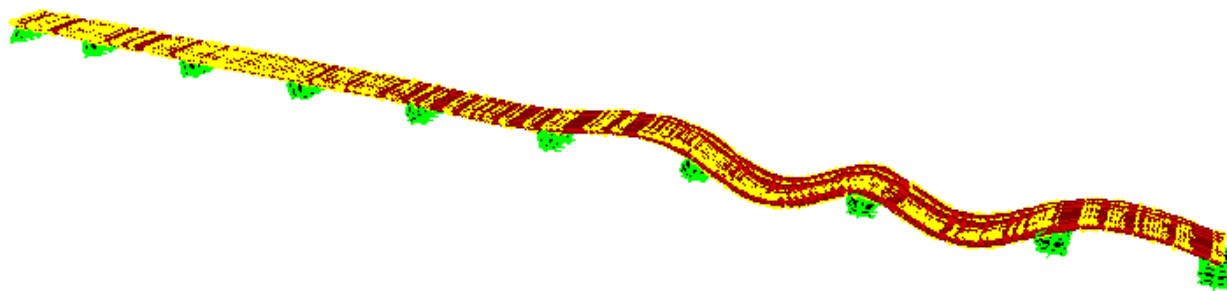


## SAP 2000

### VIADUCTO VALL DEL GALLO



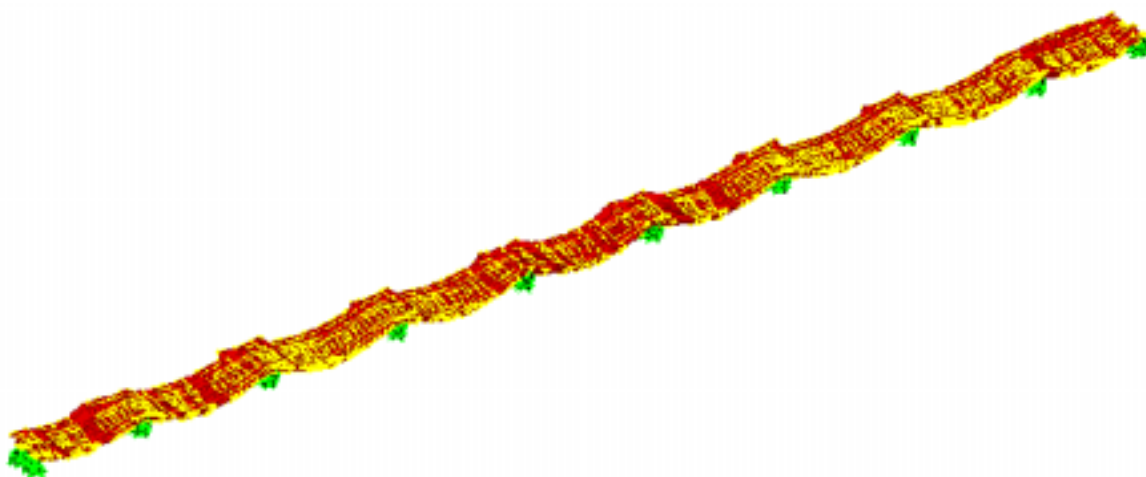
Deformada del tablero en la prueba estática 6.



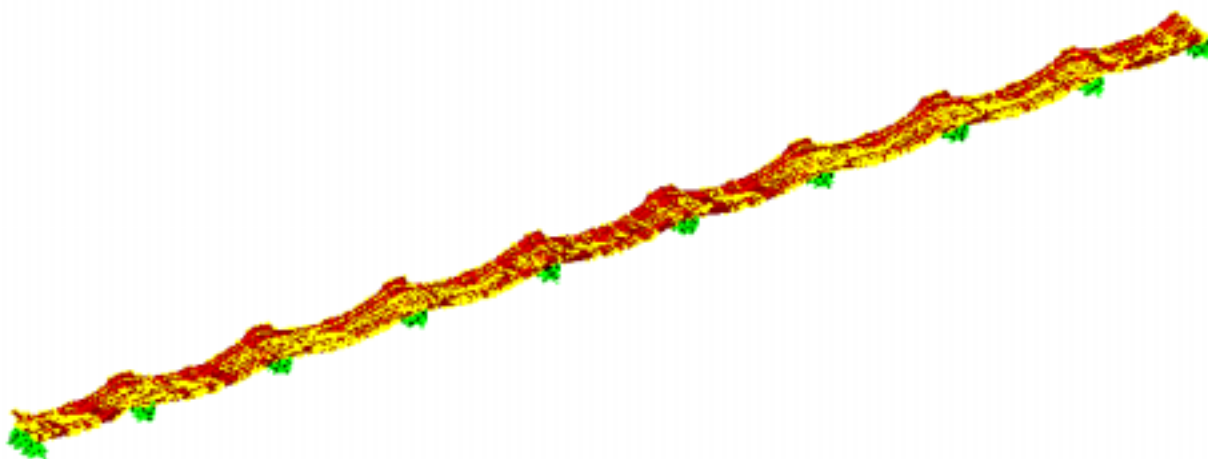
Deformada del tablero en la prueba estática 7.

## SAP 2000

### VIADUCTO VALL DEL GALLO



Deformada del tablero en la prueba dinámica 11, 12, 13 y 14.



Deformada del tablero en la prueba dinámica 21, 22, 23 y 24.

## **Listado Input**

; File C:\Informes\2001\01030-e3\del gallo\sap2000\29VI02-gallo3d.s2k saved 2/4/02  
16:30:17 in Ton-m

## SYSTEM

DOF=UX,UY,UZ,RX,RY,RZ LENGTH=m FORCE=Ton PAGE=SECTIONS

## JOINT

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1 X=0 Y=0 Z=0
2 X=33.2 Y=6.09854E-15 Z=0
3 X=74.7 Y=1.372171E-14 Z=0
4 X=-3.872205E-16 Y=2.108 Z=0
5 X=33.2 Y=2.108 Z=0
6 X=74.7 Y=2.108 Z=0
7 X=-6.50817E-16 Y=3.543 Z=0
8 X=33.2 Y=3.543 Z=0
9 X=74.7 Y=3.543 Z=0
10 X=-7.744411E-16 Y=4.216 Z=0
11 X=33.2 Y=4.216 Z=0
12 X=-9.382933E-16 Y=5.108 Z=0
13 X=33.2 Y=5.108 Z=0
14 X=-1.102146E-15 Y=6 Z=0
15 X=33.2 Y=6 Z=0
16 X=-1.489366E-15 Y=8.108 Z=0
17 X=33.2 Y=8.108 Z=0
18 X=0 Y=-1.742 Z=0
19 X=33.2 Y=-1.742 Z=0
20 X=-1.876587E-15 Y=10.216 Z=0
21 X=33.2 Y=10.216 Z=0
22 X=261.45 Y=1.372171E-14 Z=0
23 X=74.7 Y=4.216 Z=0
24 X=74.7 Y=5.108 Z=0
25 X=74.7 Y=6 Z=0
26 X=74.7 Y=8.108 Z=0
27 X=74.7 Y=-1.742 Z=0
28 X=261.45 Y=2.108 Z=0
29 X=261.45 Y=3.543 Z=0
30 X=74.7 Y=10.216 Z=0
31 X=323.7 Y=0 Z=0
32 X=356.9 Y=6.09854E-15 Z=0
33 X=323.7 Y=2.108 Z=0
34 X=356.9 Y=2.108 Z=0
35 X=323.7 Y=3.543 Z=0
36 X=356.9 Y=3.543 Z=0
37 X=323.7 Y=4.216 Z=0
38 X=356.9 Y=4.216 Z=0
39 X=323.7 Y=5.108 Z=0
40 X=356.9 Y=5.108 Z=0
41 X=323.7 Y=6 Z=0
42 X=356.9 Y=6 Z=0
43 X=323.7 Y=8.108 Z=0
44 X=356.9 Y=8.108 Z=0
45 X=323.7 Y=-1.742 Z=0
46 X=356.9 Y=-1.742 Z=0
47 X=323.7 Y=10.216 Z=0
48 X=356.9 Y=10.216 Z=0
49 X=116.2 Y=1.372171E-14 Z=0
50 X=116.2 Y=2.108 Z=0
51 X=116.2 Y=3.543 Z=0
52 X=116.2 Y=4.216 Z=0
53 X=116.2 Y=5.108 Z=0
54 X=116.2 Y=6 Z=0
55 X=116.2 Y=8.108 Z=0
56 X=116.2 Y=-1.742 Z=0
57 X=116.2 Y=10.216 Z=0
58 X=157.7 Y=1.372171E-14 Z=0
59 X=157.7 Y=2.108 Z=0
60 X=157.7 Y=3.543 Z=0
61 X=157.7 Y=4.216 Z=0
62 X=157.7 Y=5.108 Z=0
63 X=157.7 Y=6 Z=0
64 X=157.7 Y=8.108 Z=0
65 X=157.7 Y=-1.742 Z=0
66 X=157.7 Y=10.216 Z=0
67 X=199.2 Y=1.372171E-14 Z=0
68 X=199.2 Y=2.108 Z=0
69 X=199.2 Y=3.543 Z=0
70 X=199.2 Y=4.216 Z=0
71 X=199.2 Y=5.108 Z=0
72 X=199.2 Y=6 Z=0
73 X=199.2 Y=8.108 Z=0
74 X=199.2 Y=-1.742 Z=0
```

```
75 X=199.2 Y=10.216 Z=0
76 X=240.7 Y=1.372171E-14 Z=0
77 X=240.7 Y=2.108 Z=0
78 X=240.7 Y=3.543 Z=0
79 X=240.7 Y=4.216 Z=0
80 X=240.7 Y=5.108 Z=0
81 X=240.7 Y=6 Z=0
82 X=240.7 Y=8.108 Z=0
83 X=240.7 Y=-1.742 Z=0
84 X=240.7 Y=10.216 Z=0
85 X=282.2 Y=1.372171E-14 Z=0
86 X=282.2 Y=2.108 Z=0
87 X=282.2 Y=3.543 Z=0
88 X=282.2 Y=4.216 Z=0
89 X=282.2 Y=5.108 Z=0
90 X=282.2 Y=6 Z=0
91 X=282.2 Y=8.108 Z=0
92 X=282.2 Y=-1.742 Z=0
93 X=282.2 Y=10.216 Z=0
94 X=16.6 Y=3.04927E-15 Z=0
95 X=16.6 Y=2.108 Z=0
96 X=16.6 Y=3.543 Z=0
97 X=16.6 Y=4.216 Z=0
98 X=16.6 Y=5.108 Z=0
99 X=16.6 Y=6 Z=0
100 X=16.6 Y=8.108 Z=0
101 X=16.6 Y=-1.742 Z=0
102 X=16.6 Y=10.216 Z=0
103 X=1.02 Y=1.525E-15 Z=0
104 X=1.02 Y=2.108 Z=0
105 X=1.02 Y=3.543 Z=0
106 X=1.02 Y=4.216 Z=0
107 X=1.02 Y=5.108 Z=0
108 X=1.02 Y=6 Z=0
109 X=1.02 Y=8.108 Z=0
110 X=1.02 Y=-1.742 Z=0
111 X=1.02 Y=10.216 Z=0
112 X=1.935 Y=2.287135E-15 Z=0
113 X=1.935 Y=2.108 Z=0
114 X=1.935 Y=3.543 Z=0
115 X=1.935 Y=4.216 Z=0
116 X=1.935 Y=5.108 Z=0
117 X=1.935 Y=6 Z=0
118 X=1.935 Y=8.108 Z=0
119 X=1.935 Y=-1.742 Z=0
120 X=1.935 Y=10.216 Z=0
121 X=4.325 Y=2.668202E-15 Z=0
122 X=4.325 Y=2.108 Z=0
123 X=4.325 Y=3.543 Z=0
124 X=4.325 Y=4.216 Z=0
125 X=4.325 Y=5.108 Z=0
126 X=4.325 Y=6 Z=0
127 X=4.325 Y=8.108 Z=0
128 X=4.325 Y=-1.742 Z=0
129 X=4.325 Y=10.216 Z=0
130 X=8.23 Y=2.858736E-15 Z=0
131 X=8.23 Y=2.108 Z=0
132 X=8.23 Y=3.543 Z=0
133 X=8.23 Y=4.216 Z=0
134 X=8.23 Y=5.108 Z=0
135 X=8.23 Y=6 Z=0
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137 X=8.23 Y=-1.742 Z=0
138 X=8.23 Y=10.216 Z=0
139 X=9.135 Y=2.954003E-15 Z=0
140 X=9.135 Y=2.108 Z=0
141 X=9.135 Y=3.543 Z=0
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143 X=9.135 Y=5.108 Z=0
144 X=9.135 Y=6 Z=0
145 X=9.135 Y=8.108 Z=0
146 X=9.135 Y=-1.742 Z=0
147 X=9.135 Y=10.216 Z=0
148 X=10.29 Y=3.001636E-15 Z=0
149 X=10.29 Y=2.108 Z=0
150 X=10.29 Y=3.543 Z=0
151 X=10.29 Y=4.216 Z=0
152 X=10.29 Y=5.108 Z=0
153 X=10.29 Y=6 Z=0
154 X=10.29 Y=8.108 Z=0
155 X=10.29 Y=-1.742 Z=0
156 X=10.29 Y=10.216 Z=0
157 X=11.525 Y=3.025453E-15 Z=0
```

|     |          |                |     |
|-----|----------|----------------|-----|
| 158 | X=11.525 | Y=2.108        | Z=0 |
| 159 | X=11.525 | Y=3.543        | Z=0 |
| 160 | X=11.525 | Y=4.216        | Z=0 |
| 161 | X=11.525 | Y=5.108        | Z=0 |
| 162 | X=11.525 | Y=6            | Z=0 |
| 163 | X=11.525 | Y=8.108        | Z=0 |
| 164 | X=11.525 | Y=-1.742       | Z=0 |
| 165 | X=11.525 | Y=10.216       | Z=0 |
| 166 | X=12.35  | Y=3.037361E-15 | Z=0 |
| 167 | X=12.35  | Y=2.108        | Z=0 |
| 168 | X=12.35  | Y=3.543        | Z=0 |
| 169 | X=12.35  | Y=4.216        | Z=0 |
| 170 | X=12.35  | Y=5.108        | Z=0 |
| 171 | X=12.35  | Y=6            | Z=0 |
| 172 | X=12.35  | Y=8.108        | Z=0 |
| 173 | X=12.35  | Y=-1.742       | Z=0 |
| 174 | X=12.35  | Y=10.216       | Z=0 |
| 175 | X=15.7   | Y=3.043316E-15 | Z=0 |
| 176 | X=15.7   | Y=2.108        | Z=0 |
| 177 | X=15.7   | Y=3.543        | Z=0 |
| 178 | X=15.7   | Y=4.216        | Z=0 |
| 179 | X=15.7   | Y=5.108        | Z=0 |
| 180 | X=15.7   | Y=6            | Z=0 |
| 181 | X=15.7   | Y=8.108        | Z=0 |
| 182 | X=15.7   | Y=-1.742       | Z=0 |
| 183 | X=15.7   | Y=10.216       | Z=0 |
| 184 | X=17.5   | Y=4.573905E-15 | Z=0 |
| 185 | X=17.5   | Y=2.108        | Z=0 |
| 186 | X=17.5   | Y=3.543        | Z=0 |
| 187 | X=17.5   | Y=4.216        | Z=0 |
| 188 | X=17.5   | Y=5.108        | Z=0 |
| 189 | X=17.5   | Y=6            | Z=0 |
| 190 | X=17.5   | Y=8.108        | Z=0 |
| 191 | X=17.5   | Y=-1.742       | Z=0 |
| 192 | X=17.5   | Y=10.216       | Z=0 |
| 193 | X=22.9   | Y=5.336222E-15 | Z=0 |
| 194 | X=22.9   | Y=2.108        | Z=0 |
| 195 | X=22.9   | Y=3.543        | Z=0 |
| 196 | X=22.9   | Y=4.216        | Z=0 |
| 197 | X=22.9   | Y=5.108        | Z=0 |
| 198 | X=22.9   | Y=6            | Z=0 |
| 199 | X=22.9   | Y=8.108        | Z=0 |
| 200 | X=22.9   | Y=-1.742       | Z=0 |
| 201 | X=22.9   | Y=10.216       | Z=0 |
| 202 | X=24.7   | Y=5.717381E-15 | Z=0 |
| 203 | X=24.7   | Y=2.108        | Z=0 |
| 204 | X=24.7   | Y=3.543        | Z=0 |
| 205 | X=24.7   | Y=4.216        | Z=0 |
| 206 | X=24.7   | Y=5.108        | Z=0 |
| 207 | X=24.7   | Y=6            | Z=0 |
| 208 | X=24.7   | Y=8.108        | Z=0 |
| 209 | X=24.7   | Y=-1.742       | Z=0 |
| 210 | X=24.7   | Y=10.216       | Z=0 |
| 211 | X=24.9   | Y=5.90796E-15  | Z=0 |
| 212 | X=24.9   | Y=2.108        | Z=0 |
| 213 | X=24.9   | Y=3.543        | Z=0 |
| 214 | X=24.9   | Y=4.216        | Z=0 |
| 215 | X=24.9   | Y=5.108        | Z=0 |
| 216 | X=24.9   | Y=6            | Z=0 |
| 217 | X=24.9   | Y=8.108        | Z=0 |
| 218 | X=24.9   | Y=-1.742       | Z=0 |
| 219 | X=24.9   | Y=10.216       | Z=0 |
| 220 | X=26.7   | Y=6.00325E-15  | Z=0 |
| 221 | X=26.7   | Y=2.108        | Z=0 |
| 222 | X=26.7   | Y=3.543        | Z=0 |
| 223 | X=26.7   | Y=4.216        | Z=0 |
| 224 | X=26.7   | Y=5.108        | Z=0 |
| 225 | X=26.7   | Y=6            | Z=0 |
| 226 | X=26.7   | Y=8.108        | Z=0 |
| 227 | X=26.7   | Y=-1.742       | Z=0 |
| 228 | X=26.7   | Y=10.216       | Z=0 |
| 229 | X=28.1   | Y=6.050895E-15 | Z=0 |
| 230 | X=28.1   | Y=2.108        | Z=0 |
| 231 | X=28.1   | Y=3.543        | Z=0 |
| 232 | X=28.1   | Y=4.216        | Z=0 |
| 233 | X=28.1   | Y=5.108        | Z=0 |
| 234 | X=28.1   | Y=6            | Z=0 |
| 235 | X=28.1   | Y=8.108        | Z=0 |
| 236 | X=28.1   | Y=-1.742       | Z=0 |
| 237 | X=28.1   | Y=10.216       | Z=0 |
| 238 | X=29.9   | Y=6.074717E-15 | Z=0 |
| 239 | X=29.9   | Y=2.108        | Z=0 |
| 240 | X=29.9   | Y=3.543        | Z=0 |

|     |         |                |     |
|-----|---------|----------------|-----|
| 241 | X=29.9  | Y=4.216        | Z=0 |
| 242 | X=29.9  | Y=5.108        | Z=0 |
| 243 | X=29.9  | Y=6            | Z=0 |
| 244 | X=29.9  | Y=8.108        | Z=0 |
| 245 | X=29.9  | Y=-1.742       | Z=0 |
| 246 | X=29.9  | Y=10.216       | Z=0 |
| 247 | X=30.02 | Y=6.086628E-15 | Z=0 |
| 248 | X=30.02 | Y=2.108        | Z=0 |
| 249 | X=30.02 | Y=3.543        | Z=0 |
| 250 | X=30.02 | Y=4.216        | Z=0 |
| 251 | X=30.02 | Y=5.108        | Z=0 |
| 252 | X=30.02 | Y=6            | Z=0 |
| 253 | X=30.02 | Y=8.108        | Z=0 |
| 254 | X=30.02 | Y=-1.742       | Z=0 |
| 255 | X=30.02 | Y=10.216       | Z=0 |
| 256 | X=31.82 | Y=6.092584E-15 | Z=0 |
| 257 | X=31.82 | Y=2.108        | Z=0 |
| 258 | X=31.82 | Y=3.543        | Z=0 |
| 259 | X=31.82 | Y=4.216        | Z=0 |
| 260 | X=31.82 | Y=5.108        | Z=0 |
| 261 | X=31.82 | Y=6            | Z=0 |
| 262 | X=31.82 | Y=8.108        | Z=0 |
| 263 | X=31.82 | Y=-1.742       | Z=0 |
| 264 | X=31.82 | Y=10.216       | Z=0 |
| 265 | X=53.95 | Y=9.910127E-15 | Z=0 |
| 266 | X=53.95 | Y=2.108        | Z=0 |
| 267 | X=53.95 | Y=3.543        | Z=0 |
| 268 | X=53.95 | Y=4.216        | Z=0 |
| 269 | X=53.95 | Y=5.108        | Z=0 |
| 270 | X=53.95 | Y=6            | Z=0 |
| 271 | X=53.95 | Y=8.108        | Z=0 |
| 272 | X=53.95 | Y=-1.742       | Z=0 |
| 273 | X=53.95 | Y=10.216       | Z=0 |
| 274 | X=35.3  | Y=8.004333E-15 | Z=0 |
| 275 | X=35.3  | Y=2.108        | Z=0 |
| 276 | X=35.3  | Y=3.543        | Z=0 |
| 277 | X=35.3  | Y=4.216        | Z=0 |
| 278 | X=35.3  | Y=5.108        | Z=0 |
| 279 | X=35.3  | Y=6            | Z=0 |
| 280 | X=35.3  | Y=8.108        | Z=0 |
| 281 | X=35.3  | Y=-1.742       | Z=0 |
| 282 | X=35.3  | Y=10.216       | Z=0 |
| 283 | X=37.1  | Y=8.95723E-15  | Z=0 |
| 284 | X=37.1  | Y=2.108        | Z=0 |
| 285 | X=37.1  | Y=3.543        | Z=0 |
| 286 | X=37.1  | Y=4.216        | Z=0 |
| 287 | X=37.1  | Y=5.108        | Z=0 |
| 288 | X=37.1  | Y=6            | Z=0 |
| 289 | X=37.1  | Y=8.108        | Z=0 |
| 290 | X=37.1  | Y=-1.742       | Z=0 |
| 291 | X=37.1  | Y=10.216       | Z=0 |
| 292 | X=37.22 | Y=9.433679E-15 | Z=0 |
| 293 | X=37.22 | Y=2.108        | Z=0 |
| 294 | X=37.22 | Y=3.543        | Z=0 |
| 295 | X=37.22 | Y=4.216        | Z=0 |
| 296 | X=37.22 | Y=5.108        | Z=0 |
| 297 | X=37.22 | Y=6            | Z=0 |
| 298 | X=37.22 | Y=8.108        | Z=0 |
| 299 | X=37.22 | Y=-1.742       | Z=0 |
| 300 | X=37.22 | Y=10.216       | Z=0 |
| 301 | X=39.02 | Y=9.671902E-15 | Z=0 |
| 302 | X=39.02 | Y=2.108        | Z=0 |
| 303 | X=39.02 | Y=3.543        | Z=0 |
| 304 | X=39.02 | Y=4.216        | Z=0 |
| 305 | X=39.02 | Y=5.108        | Z=0 |
| 306 | X=39.02 | Y=6            | Z=0 |
| 307 | X=39.02 | Y=8.108        | Z=0 |
| 308 | X=39.02 | Y=-1.742       | Z=0 |
| 309 | X=39.02 | Y=10.216       | Z=0 |
| 310 | X=95.45 | Y=1.372171E-14 | Z=0 |
| 311 | X=95.45 | Y=2.108        | Z=0 |
| 312 | X=95.45 | Y=3.543        | Z=0 |
| 313 | X=95.45 | Y=4.216        | Z=0 |
| 314 | X=95.45 | Y=5.108        | Z=0 |
| 315 | X=95.45 | Y=6            | Z=0 |
| 316 | X=95.45 | Y=8.108        | Z=0 |
| 317 | X=95.45 | Y=-1.742       | Z=0 |
| 318 | X=95.45 | Y=10.216       | Z=0 |
| 319 | X=78.55 | Y=1.372171E-14 | Z=0 |
| 320 | X=78.55 | Y=2.108        | Z=0 |
| 321 | X=78.55 | Y=3.543        | Z=0 |
| 322 | X=78.55 | Y=4.216        | Z=0 |
| 323 | X=78.55 | Y=5.108        | Z=0 |

|     |          |                |     |  |
|-----|----------|----------------|-----|--|
| 324 | X=78.55  | Y=6            | Z=0 |  |
| 325 | X=78.55  | Y=8.108        | Z=0 |  |
| 326 | X=78.55  | Y=-1.742       | Z=0 |  |
| 327 | X=78.55  | Y=10.216       | Z=0 |  |
| 328 | X=80.35  | Y=1.372171E-14 | Z=0 |  |
| 329 | X=80.35  | Y=2.108        | Z=0 |  |
| 330 | X=80.35  | Y=3.543        | Z=0 |  |
| 331 | X=80.35  | Y=4.216        | Z=0 |  |
| 332 | X=80.35  | Y=5.108        | Z=0 |  |
| 333 | X=80.35  | Y=6            | Z=0 |  |
| 334 | X=80.35  | Y=8.108        | Z=0 |  |
| 335 | X=80.35  | Y=-1.742       | Z=0 |  |
| 336 | X=80.35  | Y=10.216       | Z=0 |  |
| 337 | X=85.75  | Y=1.372171E-14 | Z=0 |  |
| 338 | X=85.75  | Y=2.108        | Z=0 |  |
| 339 | X=85.75  | Y=3.543        | Z=0 |  |
| 340 | X=85.75  | Y=4.216        | Z=0 |  |
| 341 | X=85.75  | Y=5.108        | Z=0 |  |
| 342 | X=85.75  | Y=6            | Z=0 |  |
| 343 | X=85.75  | Y=8.108        | Z=0 |  |
| 344 | X=85.75  | Y=-1.742       | Z=0 |  |
| 345 | X=85.75  | Y=10.216       | Z=0 |  |
| 346 | X=87.55  | Y=1.372171E-14 | Z=0 |  |
| 347 | X=87.55  | Y=2.108        | Z=0 |  |
| 348 | X=87.55  | Y=3.543        | Z=0 |  |
| 349 | X=87.55  | Y=4.216        | Z=0 |  |
| 350 | X=87.55  | Y=5.108        | Z=0 |  |
| 351 | X=87.55  | Y=6            | Z=0 |  |
| 352 | X=87.55  | Y=8.108        | Z=0 |  |
| 353 | X=87.55  | Y=-1.742       | Z=0 |  |
| 354 | X=87.55  | Y=10.216       | Z=0 |  |
| 355 | X=90.95  | Y=1.372171E-14 | Z=0 |  |
| 356 | X=90.95  | Y=2.108        | Z=0 |  |
| 357 | X=90.95  | Y=3.543        | Z=0 |  |
| 358 | X=90.95  | Y=4.216        | Z=0 |  |
| 359 | X=90.95  | Y=5.108        | Z=0 |  |
| 360 | X=90.95  | Y=6            | Z=0 |  |
| 361 | X=90.95  | Y=8.108        | Z=0 |  |
| 362 | X=90.95  | Y=-1.742       | Z=0 |  |
| 363 | X=90.95  | Y=10.216       | Z=0 |  |
| 364 | X=92.75  | Y=1.372171E-14 | Z=0 |  |
| 365 | X=92.75  | Y=2.108        | Z=0 |  |
| 366 | X=92.75  | Y=3.543        | Z=0 |  |
| 367 | X=92.75  | Y=4.216        | Z=0 |  |
| 368 | X=92.75  | Y=5.108        | Z=0 |  |
| 369 | X=92.75  | Y=6            | Z=0 |  |
| 370 | X=92.75  | Y=8.108        | Z=0 |  |
| 371 | X=92.75  | Y=-1.742       | Z=0 |  |
| 372 | X=92.75  | Y=10.216       | Z=0 |  |
| 373 | X=98.15  | Y=1.372171E-14 | Z=0 |  |
| 374 | X=98.15  | Y=2.108        | Z=0 |  |
| 375 | X=98.15  | Y=3.543        | Z=0 |  |
| 376 | X=98.15  | Y=4.216        | Z=0 |  |
| 377 | X=98.15  | Y=5.108        | Z=0 |  |
| 378 | X=98.15  | Y=6            | Z=0 |  |
| 379 | X=98.15  | Y=8.108        | Z=0 |  |
| 380 | X=98.15  | Y=-1.742       | Z=0 |  |
| 381 | X=98.15  | Y=10.216       | Z=0 |  |
| 382 | X=99.95  | Y=1.372171E-14 | Z=0 |  |
| 383 | X=99.95  | Y=2.108        | Z=0 |  |
| 384 | X=99.95  | Y=3.543        | Z=0 |  |
| 385 | X=99.95  | Y=4.216        | Z=0 |  |
| 386 | X=99.95  | Y=5.108        | Z=0 |  |
| 387 | X=99.95  | Y=6            | Z=0 |  |
| 388 | X=99.95  | Y=8.108        | Z=0 |  |
| 389 | X=99.95  | Y=-1.742       | Z=0 |  |
| 390 | X=99.95  | Y=10.216       | Z=0 |  |
| 391 | X=103.35 | Y=1.372171E-14 | Z=0 |  |
| 392 | X=103.35 | Y=2.108        | Z=0 |  |
| 393 | X=103.35 | Y=3.543        | Z=0 |  |
| 394 | X=103.35 | Y=4.216        | Z=0 |  |
| 395 | X=103.35 | Y=5.108        | Z=0 |  |
| 396 | X=103.35 | Y=6            | Z=0 |  |
| 397 | X=103.35 | Y=8.108        | Z=0 |  |
| 398 | X=103.35 | Y=-1.742       | Z=0 |  |
| 399 | X=103.35 | Y=10.216       | Z=0 |  |
| 400 | X=105.15 | Y=1.372171E-14 | Z=0 |  |
| 401 | X=105.15 | Y=2.108        | Z=0 |  |
| 402 | X=105.15 | Y=3.543        | Z=0 |  |
| 403 | X=105.15 | Y=4.216        | Z=0 |  |
| 404 | X=105.15 | Y=5.108        | Z=0 |  |
| 405 | X=105.15 | Y=6            | Z=0 |  |
| 406 | X=105.15 | Y=8.108        | Z=0 |  |



|     |          |                |     |  |
|-----|----------|----------------|-----|--|
| 407 | X=105.15 | Y=-1.742       | Z=0 |  |
| 408 | X=105.15 | Y=10.216       | Z=0 |  |
| 409 | X=110.55 | Y=1.372171E-14 | Z=0 |  |
| 410 | X=110.55 | Y=2.108        | Z=0 |  |
| 411 | X=110.55 | Y=3.543        | Z=0 |  |
| 412 | X=110.55 | Y=4.216        | Z=0 |  |
| 413 | X=110.55 | Y=5.108        | Z=0 |  |
| 414 | X=110.55 | Y=6            | Z=0 |  |
| 415 | X=110.55 | Y=8.108        | Z=0 |  |
| 416 | X=110.55 | Y=-1.742       | Z=0 |  |
| 417 | X=110.55 | Y=10.216       | Z=0 |  |
| 418 | X=112.35 | Y=1.372171E-14 | Z=0 |  |
| 419 | X=112.35 | Y=2.108        | Z=0 |  |
| 420 | X=112.35 | Y=3.543        | Z=0 |  |
| 421 | X=112.35 | Y=4.216        | Z=0 |  |
| 422 | X=112.35 | Y=5.108        | Z=0 |  |
| 423 | X=112.35 | Y=6            | Z=0 |  |
| 424 | X=112.35 | Y=8.108        | Z=0 |  |
| 425 | X=112.35 | Y=-1.742       | Z=0 |  |
| 426 | X=112.35 | Y=10.216       | Z=0 |  |
| 427 | X=34.25  | Y=7.051437E-15 | Z=0 |  |
| 428 | X=34.25  | Y=2.108        | Z=0 |  |
| 429 | X=34.25  | Y=3.543        | Z=0 |  |
| 430 | X=34.25  | Y=4.216        | Z=0 |  |
| 431 | X=34.25  | Y=5.108        | Z=0 |  |
| 432 | X=34.25  | Y=6            | Z=0 |  |
| 433 | X=34.25  | Y=8.108        | Z=0 |  |
| 434 | X=34.25  | Y=-1.742       | Z=0 |  |
| 435 | X=34.25  | Y=10.216       | Z=0 |  |
| 436 | X=36.31  | Y=8.480782E-15 | Z=0 |  |
| 437 | X=36.31  | Y=2.108        | Z=0 |  |
| 438 | X=36.31  | Y=3.543        | Z=0 |  |
| 439 | X=36.31  | Y=4.216        | Z=0 |  |
| 440 | X=36.31  | Y=5.108        | Z=0 |  |
| 441 | X=36.31  | Y=6            | Z=0 |  |
| 442 | X=36.31  | Y=8.108        | Z=0 |  |
| 443 | X=36.31  | Y=-1.742       | Z=0 |  |
| 444 | X=36.31  | Y=10.216       | Z=0 |  |
| 445 | X=38.37  | Y=9.552791E-15 | Z=0 |  |
| 446 | X=38.37  | Y=2.108        | Z=0 |  |
| 447 | X=38.37  | Y=3.543        | Z=0 |  |
| 448 | X=38.37  | Y=4.216        | Z=0 |  |
| 449 | X=38.37  | Y=5.108        | Z=0 |  |
| 450 | X=38.37  | Y=6            | Z=0 |  |
| 451 | X=38.37  | Y=8.108        | Z=0 |  |
| 452 | X=38.37  | Y=-1.742       | Z=0 |  |
| 453 | X=38.37  | Y=10.216       | Z=0 |  |
| 454 | X=261.45 | Y=4.216        | Z=0 |  |
| 455 | X=261.45 | Y=5.108        | Z=0 |  |
| 456 | X=261.45 | Y=6            | Z=0 |  |
| 457 | X=261.45 | Y=8.108        | Z=0 |  |
| 458 | X=39.285 | Y=-1.742       | Z=0 |  |
| 459 | X=261.45 | Y=10.216       | Z=0 |  |
| 460 | X=241.77 | Y=1.372171E-14 | Z=0 |  |
| 461 | X=241.77 | Y=2.108        | Z=0 |  |
| 462 | X=241.77 | Y=3.543        | Z=0 |  |
| 463 | X=39.285 | Y=9.791015E-15 | Z=0 |  |
| 464 | X=39.285 | Y=2.108        | Z=0 |  |
| 465 | X=39.285 | Y=3.543        | Z=0 |  |
| 466 | X=39.285 | Y=4.216        | Z=0 |  |
| 467 | X=39.285 | Y=5.108        | Z=0 |  |
| 468 | X=39.285 | Y=6            | Z=0 |  |
| 469 | X=39.285 | Y=8.108        | Z=0 |  |
| 470 | X=41.675 | Y=-1.742       | Z=0 |  |
| 471 | X=39.285 | Y=10.216       | Z=0 |  |
| 472 | X=41.675 | Y=9.850571E-15 | Z=0 |  |
| 473 | X=41.675 | Y=2.108        | Z=0 |  |
| 474 | X=41.675 | Y=3.543        | Z=0 |  |
| 475 | X=41.675 | Y=4.216        | Z=0 |  |
| 476 | X=41.675 | Y=5.108        | Z=0 |  |
| 477 | X=41.675 | Y=6            | Z=0 |  |
| 478 | X=41.675 | Y=8.108        | Z=0 |  |
| 479 | X=45.58  | Y=-1.742       | Z=0 |  |
| 480 | X=41.675 | Y=10.216       | Z=0 |  |
| 481 | X=45.58  | Y=9.880349E-15 | Z=0 |  |
| 482 | X=45.58  | Y=2.108        | Z=0 |  |
| 483 | X=45.58  | Y=3.543        | Z=0 |  |
| 484 | X=45.58  | Y=4.216        | Z=0 |  |
| 485 | X=45.58  | Y=5.108        | Z=0 |  |
| 486 | X=45.58  | Y=6            | Z=0 |  |
| 487 | X=45.58  | Y=8.108        | Z=0 |  |
| 488 | X=46.485 | Y=-1.742       | Z=0 |  |
| 489 | X=45.58  | Y=10.216       | Z=0 |  |

490 X=46.485 Y=9.895238E-15 Z=0  
491 X=46.485 Y=2.108 Z=0  
492 X=46.485 Y=3.543 Z=0  
493 X=46.485 Y=4.216 Z=0  
494 X=46.485 Y=5.108 Z=0  
495 X=46.485 Y=6 Z=0  
496 X=46.485 Y=8.108 Z=0  
497 X=47.64 Y=-1.742 Z=0  
498 X=46.485 Y=10.216 Z=0  
499 X=47.64 Y=9.902683E-15 Z=0  
500 X=47.64 Y=2.108 Z=0  
501 X=47.64 Y=3.543 Z=0  
502 X=47.64 Y=4.216 Z=0  
503 X=47.64 Y=5.108 Z=0  
504 X=47.64 Y=6 Z=0  
505 X=47.64 Y=8.108 Z=0  
506 X=48.875 Y=-1.742 Z=0  
507 X=47.64 Y=10.216 Z=0  
508 X=48.875 Y=9.906404E-15 Z=0  
509 X=48.875 Y=2.108 Z=0  
510 X=48.875 Y=3.543 Z=0  
511 X=48.875 Y=4.216 Z=0  
512 X=48.875 Y=5.108 Z=0  
513 X=48.875 Y=6 Z=0  
514 X=48.875 Y=8.108 Z=0  
515 X=49.7 Y=-1.742 Z=0  
516 X=48.875 Y=10.216 Z=0  
517 X=49.7 Y=9.908266E-15 Z=0  
518 X=49.7 Y=2.108 Z=0  
519 X=49.7 Y=3.543 Z=0  
520 X=49.7 Y=4.216 Z=0  
521 X=49.7 Y=5.108 Z=0  
522 X=49.7 Y=6 Z=0  
523 X=49.7 Y=8.108 Z=0  
524 X=53.05 Y=-1.742 Z=0  
525 X=49.7 Y=10.216 Z=0  
526 X=53.05 Y=9.909196E-15 Z=0  
527 X=53.05 Y=2.108 Z=0  
528 X=53.05 Y=3.543 Z=0  
529 X=53.05 Y=4.216 Z=0  
530 X=53.05 Y=5.108 Z=0  
531 X=53.05 Y=6 Z=0  
532 X=53.05 Y=8.108 Z=0  
533 X=54.85 Y=-1.742 Z=0  
534 X=53.05 Y=10.216 Z=0  
535 X=54.85 Y=1.181592E-14 Z=0  
536 X=54.85 Y=2.108 Z=0  
537 X=54.85 Y=3.543 Z=0  
538 X=54.85 Y=4.216 Z=0  
539 X=54.85 Y=5.108 Z=0  
540 X=54.85 Y=6 Z=0  
541 X=54.85 Y=8.108 Z=0  
542 X=60.25 Y=-1.742 Z=0  
543 X=54.85 Y=10.216 Z=0  
544 X=60.25 Y=1.276882E-14 Z=0  
545 X=60.25 Y=2.108 Z=0  
546 X=60.25 Y=3.543 Z=0  
547 X=60.25 Y=4.216 Z=0  
548 X=60.25 Y=5.108 Z=0  
549 X=60.25 Y=6 Z=0  
550 X=60.25 Y=8.108 Z=0  
551 X=62.05 Y=-1.742 Z=0  
552 X=60.25 Y=10.216 Z=0  
553 X=62.05 Y=1.324527E-14 Z=0  
554 X=62.05 Y=2.108 Z=0  
555 X=62.05 Y=3.543 Z=0  
556 X=62.05 Y=4.216 Z=0  
557 X=62.05 Y=5.108 Z=0  
558 X=62.05 Y=6 Z=0  
559 X=62.05 Y=8.108 Z=0  
560 X=62.25 Y=-1.742 Z=0  
561 X=62.05 Y=10.216 Z=0  
562 X=62.25 Y=1.348349E-14 Z=0  
563 X=62.25 Y=2.108 Z=0  
564 X=62.25 Y=3.543 Z=0  
565 X=62.25 Y=4.216 Z=0  
566 X=62.25 Y=5.108 Z=0  
567 X=62.25 Y=6 Z=0  
568 X=62.25 Y=8.108 Z=0  
569 X=64.05 Y=-1.742 Z=0  
570 X=62.25 Y=10.216 Z=0  
571 X=64.05 Y=1.36026E-14 Z=0  
572 X=64.05 Y=2.108 Z=0

|     |          |                |     |  |
|-----|----------|----------------|-----|--|
| 573 | X=64.05  | Y=3.543        | Z=0 |  |
| 574 | X=64.05  | Y=4.216        | Z=0 |  |
| 575 | X=64.05  | Y=5.108        | Z=0 |  |
| 576 | X=64.05  | Y=6            | Z=0 |  |
| 577 | X=64.05  | Y=8.108        | Z=0 |  |
| 578 | X=65.45  | Y=-1.742       | Z=0 |  |
| 579 | X=64.05  | Y=10.216       | Z=0 |  |
| 580 | X=65.45  | Y=1.366216E-14 | Z=0 |  |
| 581 | X=65.45  | Y=2.108        | Z=0 |  |
| 582 | X=65.45  | Y=3.543        | Z=0 |  |
| 583 | X=65.45  | Y=4.216        | Z=0 |  |
| 584 | X=65.45  | Y=5.108        | Z=0 |  |
| 585 | X=65.45  | Y=6            | Z=0 |  |
| 586 | X=65.45  | Y=8.108        | Z=0 |  |
| 587 | X=67.25  | Y=-1.742       | Z=0 |  |
| 588 | X=65.45  | Y=10.216       | Z=0 |  |
| 589 | X=67.25  | Y=1.369194E-14 | Z=0 |  |
| 590 | X=67.25  | Y=2.108        | Z=0 |  |
| 591 | X=67.25  | Y=3.543        | Z=0 |  |
| 592 | X=67.25  | Y=4.216        | Z=0 |  |
| 593 | X=67.25  | Y=5.108        | Z=0 |  |
| 594 | X=67.25  | Y=6            | Z=0 |  |
| 595 | X=67.25  | Y=8.108        | Z=0 |  |
| 596 | X=67.37  | Y=-1.742       | Z=0 |  |
| 597 | X=67.25  | Y=10.216       | Z=0 |  |
| 598 | X=67.37  | Y=1.370683E-14 | Z=0 |  |
| 599 | X=67.37  | Y=2.108        | Z=0 |  |
| 600 | X=67.37  | Y=3.543        | Z=0 |  |
| 601 | X=67.37  | Y=4.216        | Z=0 |  |
| 602 | X=67.37  | Y=5.108        | Z=0 |  |
| 603 | X=67.37  | Y=6            | Z=0 |  |
| 604 | X=67.37  | Y=8.108        | Z=0 |  |
| 605 | X=69.17  | Y=-1.742       | Z=0 |  |
| 606 | X=67.37  | Y=10.216       | Z=0 |  |
| 607 | X=69.17  | Y=1.371427E-14 | Z=0 |  |
| 608 | X=69.17  | Y=2.108        | Z=0 |  |
| 609 | X=69.17  | Y=3.543        | Z=0 |  |
| 610 | X=69.17  | Y=4.216        | Z=0 |  |
| 611 | X=69.17  | Y=5.108        | Z=0 |  |
| 612 | X=69.17  | Y=6            | Z=0 |  |
| 613 | X=69.17  | Y=8.108        | Z=0 |  |
| 614 | X=72.65  | Y=-1.742       | Z=0 |  |
| 615 | X=69.17  | Y=10.216       | Z=0 |  |
| 616 | X=72.65  | Y=1.371799E-14 | Z=0 |  |
| 617 | X=72.65  | Y=2.108        | Z=0 |  |
| 618 | X=72.65  | Y=3.543        | Z=0 |  |
| 619 | X=72.65  | Y=4.216        | Z=0 |  |
| 620 | X=72.65  | Y=5.108        | Z=0 |  |
| 621 | X=72.65  | Y=6            | Z=0 |  |
| 622 | X=72.65  | Y=8.108        | Z=0 |  |
| 623 | X=74.45  | Y=-1.742       | Z=0 |  |
| 624 | X=72.65  | Y=10.216       | Z=0 |  |
| 625 | X=74.45  | Y=1.371985E-14 | Z=0 |  |
| 626 | X=74.45  | Y=2.108        | Z=0 |  |
| 627 | X=74.45  | Y=3.543        | Z=0 |  |
| 628 | X=74.45  | Y=4.216        | Z=0 |  |
| 629 | X=74.45  | Y=5.108        | Z=0 |  |
| 630 | X=74.45  | Y=6            | Z=0 |  |
| 631 | X=74.45  | Y=8.108        | Z=0 |  |
| 632 | X=76.37  | Y=-1.742       | Z=0 |  |
| 633 | X=74.45  | Y=10.216       | Z=0 |  |
| 634 | X=76.37  | Y=1.372171E-14 | Z=0 |  |
| 635 | X=76.37  | Y=2.108        | Z=0 |  |
| 636 | X=76.37  | Y=3.543        | Z=0 |  |
| 637 | X=76.37  | Y=4.216        | Z=0 |  |
| 638 | X=76.37  | Y=5.108        | Z=0 |  |
| 639 | X=76.37  | Y=6            | Z=0 |  |
| 640 | X=76.37  | Y=8.108        | Z=0 |  |
| 641 | X=136.95 | Y=-1.742       | Z=0 |  |
| 642 | X=76.37  | Y=10.216       | Z=0 |  |
| 643 | X=136.95 | Y=1.372171E-14 | Z=0 |  |
| 644 | X=136.95 | Y=2.108        | Z=0 |  |
| 645 | X=136.95 | Y=3.543        | Z=0 |  |
| 646 | X=136.95 | Y=4.216        | Z=0 |  |
| 647 | X=136.95 | Y=5.108        | Z=0 |  |
| 648 | X=136.95 | Y=6            | Z=0 |  |
| 649 | X=136.95 | Y=8.108        | Z=0 |  |
| 650 | X=120.05 | Y=-1.742       | Z=0 |  |
| 651 | X=136.95 | Y=10.216       | Z=0 |  |
| 652 | X=120.05 | Y=1.372171E-14 | Z=0 |  |
| 653 | X=120.05 | Y=2.108        | Z=0 |  |
| 654 | X=120.05 | Y=3.543        | Z=0 |  |
| 655 | X=120.05 | Y=4.216        | Z=0 |  |

|     |          |                |     |  |
|-----|----------|----------------|-----|--|
| 656 | X=120.05 | Y=5.108        | Z=0 |  |
| 657 | X=120.05 | Y=6            | Z=0 |  |
| 658 | X=120.05 | Y=8.108        | Z=0 |  |
| 659 | X=121.85 | Y=-1.742       | Z=0 |  |
| 660 | X=120.05 | Y=10.216       | Z=0 |  |
| 661 | X=121.85 | Y=1.372171E-14 | Z=0 |  |
| 662 | X=121.85 | Y=2.108        | Z=0 |  |
| 663 | X=121.85 | Y=3.543        | Z=0 |  |
| 664 | X=121.85 | Y=4.216        | Z=0 |  |
| 665 | X=121.85 | Y=5.108        | Z=0 |  |
| 666 | X=121.85 | Y=6            | Z=0 |  |
| 667 | X=121.85 | Y=8.108        | Z=0 |  |
| 668 | X=127.25 | Y=-1.742       | Z=0 |  |
| 669 | X=121.85 | Y=10.216       | Z=0 |  |
| 670 | X=127.25 | Y=1.372171E-14 | Z=0 |  |
| 671 | X=127.25 | Y=2.108        | Z=0 |  |
| 672 | X=127.25 | Y=3.543        | Z=0 |  |
| 673 | X=127.25 | Y=4.216        | Z=0 |  |
| 674 | X=127.25 | Y=5.108        | Z=0 |  |
| 675 | X=127.25 | Y=6            | Z=0 |  |
| 676 | X=127.25 | Y=8.108        | Z=0 |  |
| 677 | X=129.05 | Y=-1.742       | Z=0 |  |
| 678 | X=127.25 | Y=10.216       | Z=0 |  |
| 679 | X=129.05 | Y=1.372171E-14 | Z=0 |  |
| 680 | X=129.05 | Y=2.108        | Z=0 |  |
| 681 | X=129.05 | Y=3.543        | Z=0 |  |
| 682 | X=129.05 | Y=4.216        | Z=0 |  |
| 683 | X=129.05 | Y=5.108        | Z=0 |  |
| 684 | X=129.05 | Y=6            | Z=0 |  |
| 685 | X=129.05 | Y=8.108        | Z=0 |  |
| 686 | X=132.45 | Y=-1.742       | Z=0 |  |
| 687 | X=129.05 | Y=10.216       | Z=0 |  |
| 688 | X=132.45 | Y=1.372171E-14 | Z=0 |  |
| 689 | X=132.45 | Y=2.108        | Z=0 |  |
| 690 | X=132.45 | Y=3.543        | Z=0 |  |
| 691 | X=132.45 | Y=4.216        | Z=0 |  |
| 692 | X=132.45 | Y=5.108        | Z=0 |  |
| 693 | X=132.45 | Y=6            | Z=0 |  |
| 694 | X=132.45 | Y=8.108        | Z=0 |  |
| 695 | X=134.25 | Y=-1.742       | Z=0 |  |
| 696 | X=132.45 | Y=10.216       | Z=0 |  |
| 697 | X=134.25 | Y=1.372171E-14 | Z=0 |  |
| 698 | X=134.25 | Y=2.108        | Z=0 |  |
| 699 | X=134.25 | Y=3.543        | Z=0 |  |
| 700 | X=134.25 | Y=4.216        | Z=0 |  |
| 701 | X=134.25 | Y=5.108        | Z=0 |  |
| 702 | X=134.25 | Y=6            | Z=0 |  |
| 703 | X=134.25 | Y=8.108        | Z=0 |  |
| 704 | X=139.65 | Y=-1.742       | Z=0 |  |
| 705 | X=134.25 | Y=10.216       | Z=0 |  |
| 706 | X=139.65 | Y=1.372171E-14 | Z=0 |  |
| 707 | X=139.65 | Y=2.108        | Z=0 |  |
| 708 | X=139.65 | Y=3.543        | Z=0 |  |
| 709 | X=139.65 | Y=4.216        | Z=0 |  |
| 710 | X=139.65 | Y=5.108        | Z=0 |  |
| 711 | X=139.65 | Y=6            | Z=0 |  |
| 712 | X=139.65 | Y=8.108        | Z=0 |  |
| 713 | X=141.45 | Y=-1.742       | Z=0 |  |
| 714 | X=139.65 | Y=10.216       | Z=0 |  |
| 715 | X=141.45 | Y=1.372171E-14 | Z=0 |  |
| 716 | X=141.45 | Y=2.108        | Z=0 |  |
| 717 | X=141.45 | Y=3.543        | Z=0 |  |
| 718 | X=141.45 | Y=4.216        | Z=0 |  |
| 719 | X=141.45 | Y=5.108        | Z=0 |  |
| 720 | X=141.45 | Y=6            | Z=0 |  |
| 721 | X=141.45 | Y=8.108        | Z=0 |  |
| 722 | X=144.85 | Y=-1.742       | Z=0 |  |
| 723 | X=141.45 | Y=10.216       | Z=0 |  |
| 724 | X=144.85 | Y=1.372171E-14 | Z=0 |  |
| 725 | X=144.85 | Y=2.108        | Z=0 |  |
| 726 | X=144.85 | Y=3.543        | Z=0 |  |
| 727 | X=144.85 | Y=4.216        | Z=0 |  |
| 728 | X=144.85 | Y=5.108        | Z=0 |  |
| 729 | X=144.85 | Y=6            | Z=0 |  |
| 730 | X=144.85 | Y=8.108        | Z=0 |  |
| 731 | X=146.65 | Y=-1.742       | Z=0 |  |
| 732 | X=144.85 | Y=10.216       | Z=0 |  |
| 733 | X=146.65 | Y=1.372171E-14 | Z=0 |  |
| 734 | X=146.65 | Y=2.108        | Z=0 |  |
| 735 | X=146.65 | Y=3.543        | Z=0 |  |
| 736 | X=146.65 | Y=4.216        | Z=0 |  |
| 737 | X=146.65 | Y=5.108        | Z=0 |  |
| 738 | X=146.65 | Y=6            | Z=0 |  |

|     |          |                |     |  |
|-----|----------|----------------|-----|--|
| 739 | X=146.65 | Y=8.108        | Z=0 |  |
| 740 | X=152.05 | Y=-1.742       | Z=0 |  |
| 741 | X=146.65 | Y=10.216       | Z=0 |  |
| 742 | X=152.05 | Y=1.372171E-14 | Z=0 |  |
| 743 | X=152.05 | Y=2.108        | Z=0 |  |
| 744 | X=152.05 | Y=3.543        | Z=0 |  |
| 745 | X=152.05 | Y=4.216        | Z=0 |  |
| 746 | X=152.05 | Y=5.108        | Z=0 |  |
| 747 | X=152.05 | Y=6            | Z=0 |  |
| 748 | X=152.05 | Y=8.108        | Z=0 |  |
| 749 | X=153.85 | Y=-1.742       | Z=0 |  |
| 750 | X=152.05 | Y=10.216       | Z=0 |  |
| 751 | X=153.85 | Y=1.372171E-14 | Z=0 |  |
| 752 | X=153.85 | Y=2.108        | Z=0 |  |
| 753 | X=153.85 | Y=3.543        | Z=0 |  |
| 754 | X=153.85 | Y=4.216        | Z=0 |  |
| 755 | X=153.85 | Y=5.108        | Z=0 |  |
| 756 | X=153.85 | Y=6            | Z=0 |  |
| 757 | X=153.85 | Y=8.108        | Z=0 |  |
| 758 | X=75.75  | Y=-1.742       | Z=0 |  |
| 759 | X=153.85 | Y=10.216       | Z=0 |  |
| 760 | X=75.75  | Y=1.372171E-14 | Z=0 |  |
| 761 | X=75.75  | Y=2.108        | Z=0 |  |
| 762 | X=75.75  | Y=3.543        | Z=0 |  |
| 763 | X=75.75  | Y=4.216        | Z=0 |  |
| 764 | X=75.75  | Y=5.108        | Z=0 |  |
| 765 | X=75.75  | Y=6            | Z=0 |  |
| 766 | X=75.75  | Y=8.108        | Z=0 |  |
| 767 | X=77.81  | Y=-1.742       | Z=0 |  |
| 768 | X=75.75  | Y=10.216       | Z=0 |  |
| 769 | X=77.81  | Y=1.372171E-14 | Z=0 |  |
| 770 | X=77.81  | Y=2.108        | Z=0 |  |
| 771 | X=77.81  | Y=3.543        | Z=0 |  |
| 772 | X=77.81  | Y=4.216        | Z=0 |  |
| 773 | X=77.81  | Y=5.108        | Z=0 |  |
| 774 | X=77.81  | Y=6            | Z=0 |  |
| 775 | X=77.81  | Y=8.108        | Z=0 |  |
| 776 | X=79.87  | Y=-1.742       | Z=0 |  |
| 777 | X=77.81  | Y=10.216       | Z=0 |  |
| 778 | X=79.87  | Y=1.372171E-14 | Z=0 |  |
| 779 | X=79.87  | Y=2.108        | Z=0 |  |
| 780 | X=79.87  | Y=3.543        | Z=0 |  |
| 781 | X=79.87  | Y=4.216        | Z=0 |  |
| 782 | X=79.87  | Y=5.108        | Z=0 |  |
| 783 | X=79.87  | Y=6            | Z=0 |  |
| 784 | X=79.87  | Y=8.108        | Z=0 |  |
| 785 | X=80.785 | Y=-1.742       | Z=0 |  |
| 786 | X=79.87  | Y=10.216       | Z=0 |  |
| 787 | X=80.785 | Y=1.372171E-14 | Z=0 |  |
| 788 | X=80.785 | Y=2.108        | Z=0 |  |
| 789 | X=80.785 | Y=3.543        | Z=0 |  |
| 790 | X=80.785 | Y=4.216        | Z=0 |  |
| 791 | X=80.785 | Y=5.108        | Z=0 |  |
| 792 | X=80.785 | Y=6            | Z=0 |  |
| 793 | X=80.785 | Y=8.108        | Z=0 |  |
| 794 | X=83.175 | Y=-1.742       | Z=0 |  |
| 795 | X=80.785 | Y=10.216       | Z=0 |  |
| 796 | X=83.175 | Y=1.372171E-14 | Z=0 |  |
| 797 | X=83.175 | Y=2.108        | Z=0 |  |
| 798 | X=83.175 | Y=3.543        | Z=0 |  |
| 799 | X=83.175 | Y=4.216        | Z=0 |  |
| 800 | X=83.175 | Y=5.108        | Z=0 |  |
| 801 | X=83.175 | Y=6            | Z=0 |  |
| 802 | X=83.175 | Y=8.108        | Z=0 |  |
| 803 | X=86.98  | Y=-1.742       | Z=0 |  |
| 804 | X=83.175 | Y=10.216       | Z=0 |  |
| 805 | X=86.98  | Y=1.372171E-14 | Z=0 |  |
| 806 | X=86.98  | Y=2.108        | Z=0 |  |
| 807 | X=86.98  | Y=3.543        | Z=0 |  |
| 808 | X=86.98  | Y=4.216        | Z=0 |  |
| 809 | X=86.98  | Y=5.108        | Z=0 |  |
| 810 | X=86.98  | Y=6            | Z=0 |  |
| 811 | X=86.98  | Y=8.108        | Z=0 |  |
| 812 | X=87.985 | Y=-1.742       | Z=0 |  |
| 813 | X=86.98  | Y=10.216       | Z=0 |  |
| 814 | X=87.985 | Y=1.372171E-14 | Z=0 |  |
| 815 | X=87.985 | Y=2.108        | Z=0 |  |
| 816 | X=87.985 | Y=3.543        | Z=0 |  |
| 817 | X=87.985 | Y=4.216        | Z=0 |  |
| 818 | X=87.985 | Y=5.108        | Z=0 |  |
| 819 | X=87.985 | Y=6            | Z=0 |  |
| 820 | X=87.985 | Y=8.108        | Z=0 |  |
| 821 | X=89.12  | Y=-1.742       | Z=0 |  |

822 X=87.985 Y=10.216 Z=0  
823 X=89.12 Y=1.372171E-14 Z=0  
824 X=89.12 Y=2.108 Z=0  
825 X=89.12 Y=3.543 Z=0  
826 X=89.12 Y=4.216 Z=0  
827 X=89.12 Y=5.108 Z=0  
828 X=89.12 Y=6 Z=0  
829 X=89.12 Y=8.108 Z=0  
830 X=90.375 Y=-1.742 Z=0  
831 X=89.12 Y=10.216 Z=0  
832 X=90.375 Y=1.372171E-14 Z=0  
833 X=90.375 Y=2.108 Z=0  
834 X=90.375 Y=3.543 Z=0  
835 X=90.375 Y=4.216 Z=0  
836 X=90.375 Y=5.108 Z=0  
837 X=90.375 Y=6 Z=0  
838 X=90.375 Y=8.108 Z=0  
839 X=94.55 Y=-1.742 Z=0  
840 X=90.375 Y=10.216 Z=0  
841 X=94.55 Y=1.372171E-14 Z=0  
842 X=94.55 Y=2.108 Z=0  
843 X=94.55 Y=3.543 Z=0  
844 X=94.55 Y=4.216 Z=0  
845 X=94.55 Y=5.108 Z=0  
846 X=94.55 Y=6 Z=0  
847 X=94.55 Y=8.108 Z=0  
848 X=96.35 Y=-1.742 Z=0  
849 X=94.55 Y=10.216 Z=0  
850 X=96.35 Y=1.372171E-14 Z=0  
851 X=96.35 Y=2.108 Z=0  
852 X=96.35 Y=3.543 Z=0  
853 X=96.35 Y=4.216 Z=0  
854 X=96.35 Y=5.108 Z=0  
855 X=96.35 Y=6 Z=0  
856 X=96.35 Y=8.108 Z=0  
857 X=101.75 Y=-1.742 Z=0  
858 X=96.35 Y=10.216 Z=0  
859 X=101.75 Y=1.372171E-14 Z=0  
860 X=101.75 Y=2.108 Z=0  
861 X=101.75 Y=3.543 Z=0  
862 X=101.75 Y=4.216 Z=0  
863 X=101.75 Y=5.108 Z=0  
864 X=101.75 Y=6 Z=0  
865 X=101.75 Y=8.108 Z=0  
866 X=103.65 Y=-1.742 Z=0  
867 X=101.75 Y=10.216 Z=0  
868 X=103.65 Y=1.372171E-14 Z=0  
869 X=103.65 Y=2.108 Z=0  
870 X=103.65 Y=3.543 Z=0  
871 X=103.65 Y=4.216 Z=0  
872 X=103.65 Y=5.108 Z=0  
873 X=103.65 Y=6 Z=0  
874 X=103.65 Y=8.108 Z=0  
875 X=105.55 Y=-1.742 Z=0  
876 X=103.65 Y=10.216 Z=0  
877 X=105.55 Y=1.372171E-14 Z=0  
878 X=105.55 Y=2.108 Z=0  
879 X=105.55 Y=3.543 Z=0  
880 X=105.55 Y=4.216 Z=0  
881 X=105.55 Y=5.108 Z=0  
882 X=105.55 Y=6 Z=0  
883 X=105.55 Y=8.108 Z=0  
884 X=106.95 Y=-1.742 Z=0  
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1236 X=243.48 Y=2.108 Z=0

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| 1239 | X=243.48  | Y=5.108        | Z=0 |
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| 1241 | X=243.48  | Y=8.108        | Z=0 |
| 1242 | X=243.48  | Y=-1.742       | Z=0 |
| 1243 | X=243.48  | Y=10.216       | Z=0 |
| 1244 | X=243.81  | Y=1.372171E-14 | Z=0 |
| 1245 | X=243.81  | Y=2.108        | Z=0 |
| 1246 | X=243.81  | Y=3.543        | Z=0 |
| 1247 | X=243.81  | Y=4.216        | Z=0 |
| 1248 | X=243.81  | Y=5.108        | Z=0 |
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| 1250 | X=243.81  | Y=8.108        | Z=0 |
| 1251 | X=243.81  | Y=-1.742       | Z=0 |
| 1252 | X=243.81  | Y=10.216       | Z=0 |
| 1253 | X=245.5   | Y=1.372171E-14 | Z=0 |
| 1254 | X=245.5   | Y=2.108        | Z=0 |
| 1255 | X=245.5   | Y=3.543        | Z=0 |
| 1256 | X=245.5   | Y=4.216        | Z=0 |
| 1257 | X=245.5   | Y=5.108        | Z=0 |
| 1258 | X=245.5   | Y=6            | Z=0 |
| 1259 | X=245.5   | Y=8.108        | Z=0 |
| 1260 | X=245.5   | Y=-1.742       | Z=0 |
| 1261 | X=245.5   | Y=10.216       | Z=0 |
| 1262 | X=245.87  | Y=1.372171E-14 | Z=0 |
| 1263 | X=245.87  | Y=2.108        | Z=0 |
| 1264 | X=245.87  | Y=3.543        | Z=0 |
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| 1268 | X=245.87  | Y=8.108        | Z=0 |
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| 1270 | X=245.87  | Y=10.216       | Z=0 |
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| 1275 | X=253.08  | Y=5.108        | Z=0 |
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| 1311 | X=256.57  | Y=5.108        | Z=0 |
| 1312 | X=256.57  | Y=6            | Z=0 |
| 1313 | X=256.57  | Y=8.108        | Z=0 |
| 1314 | X=256.57  | Y=-1.742       | Z=0 |
| 1315 | X=256.57  | Y=10.216       | Z=0 |
| 1316 | X=257.2   | Y=1.372171E-14 | Z=0 |
| 1317 | X=257.2   | Y=2.108        | Z=0 |
| 1318 | X=257.2   | Y=3.543        | Z=0 |
| 1319 | X=257.2   | Y=4.216        | Z=0 |

|      |           |                |     |
|------|-----------|----------------|-----|
| 1320 | X=257.2   | Y=5.108        | Z=0 |
| 1321 | X=257.2   | Y=6            | Z=0 |
| 1322 | X=257.2   | Y=8.108        | Z=0 |
| 1323 | X=257.2   | Y=-1.742       | Z=0 |
| 1324 | X=257.2   | Y=10.216       | Z=0 |
| 1325 | X=260.55  | Y=1.372171E-14 | Z=0 |
| 1326 | X=260.55  | Y=2.108        | Z=0 |
| 1327 | X=260.55  | Y=3.543        | Z=0 |
| 1328 | X=260.55  | Y=4.216        | Z=0 |
| 1329 | X=260.55  | Y=5.108        | Z=0 |
| 1330 | X=260.55  | Y=6            | Z=0 |
| 1331 | X=260.55  | Y=8.108        | Z=0 |
| 1332 | X=260.55  | Y=-1.742       | Z=0 |
| 1333 | X=260.55  | Y=10.216       | Z=0 |
| 1334 | X=262.35  | Y=1.372171E-14 | Z=0 |
| 1335 | X=262.35  | Y=2.108        | Z=0 |
| 1336 | X=262.35  | Y=3.543        | Z=0 |
| 1337 | X=262.35  | Y=4.216        | Z=0 |
| 1338 | X=262.35  | Y=5.108        | Z=0 |
| 1339 | X=262.35  | Y=6            | Z=0 |
| 1340 | X=262.35  | Y=8.108        | Z=0 |
| 1341 | X=262.35  | Y=-1.742       | Z=0 |
| 1342 | X=262.35  | Y=10.216       | Z=0 |
| 1343 | X=267.75  | Y=1.372171E-14 | Z=0 |
| 1344 | X=267.75  | Y=2.108        | Z=0 |
| 1345 | X=267.75  | Y=3.543        | Z=0 |
| 1346 | X=267.75  | Y=4.216        | Z=0 |
| 1347 | X=267.75  | Y=5.108        | Z=0 |
| 1348 | X=267.75  | Y=6            | Z=0 |
| 1349 | X=267.75  | Y=8.108        | Z=0 |
| 1350 | X=267.75  | Y=-1.742       | Z=0 |
| 1351 | X=267.75  | Y=10.216       | Z=0 |
| 1352 | X=269.65  | Y=1.372171E-14 | Z=0 |
| 1353 | X=269.65  | Y=2.108        | Z=0 |
| 1354 | X=269.65  | Y=3.543        | Z=0 |
| 1355 | X=269.65  | Y=4.216        | Z=0 |
| 1356 | X=269.65  | Y=5.108        | Z=0 |
| 1357 | X=269.65  | Y=6            | Z=0 |
| 1358 | X=269.65  | Y=8.108        | Z=0 |
| 1359 | X=269.65  | Y=-1.742       | Z=0 |
| 1360 | X=269.65  | Y=10.216       | Z=0 |
| 1361 | X=271.55  | Y=1.372171E-14 | Z=0 |
| 1362 | X=271.55  | Y=2.108        | Z=0 |
| 1363 | X=271.55  | Y=3.543        | Z=0 |
| 1364 | X=271.55  | Y=4.216        | Z=0 |
| 1365 | X=271.55  | Y=5.108        | Z=0 |
| 1366 | X=271.55  | Y=6            | Z=0 |
| 1367 | X=271.55  | Y=8.108        | Z=0 |
| 1368 | X=271.55  | Y=-1.742       | Z=0 |
| 1369 | X=271.55  | Y=10.216       | Z=0 |
| 1370 | X=272.95  | Y=1.372171E-14 | Z=0 |
| 1371 | X=272.95  | Y=2.108        | Z=0 |
| 1372 | X=272.95  | Y=3.543        | Z=0 |
| 1373 | X=272.95  | Y=4.216        | Z=0 |
| 1374 | X=272.95  | Y=5.108        | Z=0 |
| 1375 | X=272.95  | Y=6            | Z=0 |
| 1376 | X=272.95  | Y=8.108        | Z=0 |
| 1377 | X=272.95  | Y=-1.742       | Z=0 |
| 1378 | X=272.95  | Y=10.216       | Z=0 |
| 1379 | X=274.77  | Y=1.372171E-14 | Z=0 |
| 1380 | X=274.77  | Y=2.108        | Z=0 |
| 1381 | X=274.77  | Y=3.543        | Z=0 |
| 1382 | X=274.77  | Y=4.216        | Z=0 |
| 1383 | X=274.77  | Y=5.108        | Z=0 |
| 1384 | X=274.77  | Y=6            | Z=0 |
| 1385 | X=274.77  | Y=8.108        | Z=0 |
| 1386 | X=274.77  | Y=-1.742       | Z=0 |
| 1387 | X=274.77  | Y=10.216       | Z=0 |
| 1388 | X=276.59  | Y=1.372171E-14 | Z=0 |
| 1389 | X=276.59  | Y=2.108        | Z=0 |
| 1390 | X=276.59  | Y=3.543        | Z=0 |
| 1391 | X=276.59  | Y=4.216        | Z=0 |
| 1392 | X=276.59  | Y=5.108        | Z=0 |
| 1393 | X=276.59  | Y=6            | Z=0 |
| 1394 | X=276.59  | Y=8.108        | Z=0 |
| 1395 | X=276.59  | Y=-1.742       | Z=0 |
| 1396 | X=276.59  | Y=10.216       | Z=0 |
| 1397 | X=280.147 | Y=1.372171E-14 | Z=0 |
| 1398 | X=280.147 | Y=2.108        | Z=0 |
| 1399 | X=280.147 | Y=3.543        | Z=0 |
| 1400 | X=280.147 | Y=4.216        | Z=0 |
| 1401 | X=280.147 | Y=5.108        | Z=0 |
| 1402 | X=280.147 | Y=6            | Z=0 |

|      |            |                |     |
|------|------------|----------------|-----|
| 1403 | X=280.147  | Y=8.108        | Z=0 |
| 1404 | X=280.147  | Y=-1.742       | Z=0 |
| 1405 | X=280.147  | Y=10.216       | Z=0 |
| 1406 | X=281.9735 | Y=1.372171E-14 | Z=0 |
| 1407 | X=281.9735 | Y=2.108        | Z=0 |
| 1408 | X=281.9735 | Y=3.543        | Z=0 |
| 1409 | X=281.9735 | Y=4.216        | Z=0 |
| 1410 | X=281.9735 | Y=5.108        | Z=0 |
| 1411 | X=281.9735 | Y=6            | Z=0 |
| 1412 | X=281.9735 | Y=8.108        | Z=0 |
| 1413 | X=281.9735 | Y=-1.742       | Z=0 |
| 1414 | X=281.9735 | Y=10.216       | Z=0 |
| 1415 | X=302.95   | Y=6.860857E-15 | Z=0 |
| 1416 | X=302.95   | Y=2.108        | Z=0 |
| 1417 | X=302.95   | Y=3.543        | Z=0 |
| 1418 | X=302.95   | Y=4.216        | Z=0 |
| 1419 | X=302.95   | Y=5.108        | Z=0 |
| 1420 | X=302.95   | Y=6            | Z=0 |
| 1421 | X=302.95   | Y=8.108        | Z=0 |
| 1422 | X=302.95   | Y=-1.742       | Z=0 |
| 1423 | X=302.95   | Y=10.216       | Z=0 |
| 1424 | X=283.99   | Y=1.029129E-14 | Z=0 |
| 1425 | X=283.99   | Y=2.108        | Z=0 |
| 1426 | X=283.99   | Y=3.543        | Z=0 |
| 1427 | X=283.99   | Y=4.216        | Z=0 |
| 1428 | X=283.99   | Y=5.108        | Z=0 |
| 1429 | X=283.99   | Y=6            | Z=0 |
| 1430 | X=283.99   | Y=8.108        | Z=0 |
| 1431 | X=283.99   | Y=-1.742       | Z=0 |
| 1432 | X=283.99   | Y=10.216       | Z=0 |
| 1433 | X=285.79   | Y=8.576071E-15 | Z=0 |
| 1434 | X=285.79   | Y=2.108        | Z=0 |
| 1435 | X=285.79   | Y=3.543        | Z=0 |
| 1436 | X=285.79   | Y=4.216        | Z=0 |
| 1437 | X=285.79   | Y=5.108        | Z=0 |
| 1438 | X=285.79   | Y=6            | Z=0 |
| 1439 | X=285.79   | Y=8.108        | Z=0 |
| 1440 | X=285.79   | Y=-1.742       | Z=0 |
| 1441 | X=285.79   | Y=10.216       | Z=0 |
| 1442 | X=340.3    | Y=3.04927E-15  | Z=0 |
| 1443 | X=340.3    | Y=2.108        | Z=0 |
| 1444 | X=340.3    | Y=3.543        | Z=0 |
| 1445 | X=340.3    | Y=4.216        | Z=0 |
| 1446 | X=340.3    | Y=5.108        | Z=0 |
| 1447 | X=340.3    | Y=6            | Z=0 |
| 1448 | X=340.3    | Y=8.108        | Z=0 |
| 1449 | X=340.3    | Y=-1.742       | Z=0 |
| 1450 | X=340.3    | Y=10.216       | Z=0 |
| 1451 | X=325.2    | Y=1.524635E-15 | Z=0 |
| 1452 | X=325.2    | Y=2.108        | Z=0 |
| 1453 | X=325.2    | Y=3.543        | Z=0 |
| 1454 | X=325.2    | Y=4.216        | Z=0 |
| 1455 | X=325.2    | Y=5.108        | Z=0 |
| 1456 | X=325.2    | Y=6            | Z=0 |
| 1457 | X=325.2    | Y=8.108        | Z=0 |
| 1458 | X=325.2    | Y=-1.742       | Z=0 |
| 1459 | X=325.2    | Y=10.216       | Z=0 |
| 1460 | X=320.76   | Y=3.430429E-15 | Z=0 |
| 1461 | X=320.76   | Y=2.108        | Z=0 |
| 1462 | X=320.76   | Y=3.543        | Z=0 |
| 1463 | X=320.76   | Y=4.216        | Z=0 |
| 1464 | X=320.76   | Y=5.108        | Z=0 |
| 1465 | X=320.76   | Y=6            | Z=0 |
| 1466 | X=320.76   | Y=8.108        | Z=0 |
| 1467 | X=320.76   | Y=-1.742       | Z=0 |
| 1468 | X=320.76   | Y=10.216       | Z=0 |
| 1469 | X=322.56   | Y=1.715214E-15 | Z=0 |
| 1470 | X=322.56   | Y=2.108        | Z=0 |
| 1471 | X=322.56   | Y=3.543        | Z=0 |
| 1472 | X=322.56   | Y=4.216        | Z=0 |
| 1473 | X=322.56   | Y=5.108        | Z=0 |
| 1474 | X=322.56   | Y=6            | Z=0 |
| 1475 | X=322.56   | Y=8.108        | Z=0 |
| 1476 | X=322.56   | Y=-1.742       | Z=0 |
| 1477 | X=322.56   | Y=10.216       | Z=0 |
| 1478 | X=329.76   | Y=2.286952E-15 | Z=0 |
| 1479 | X=329.76   | Y=2.108        | Z=0 |
| 1480 | X=329.76   | Y=3.543        | Z=0 |
| 1481 | X=329.76   | Y=4.216        | Z=0 |
| 1482 | X=329.76   | Y=5.108        | Z=0 |
| 1483 | X=329.76   | Y=6            | Z=0 |
| 1484 | X=329.76   | Y=8.108        | Z=0 |
| 1485 | X=329.76   | Y=-1.742       | Z=0 |

1486 X=329.76 Y=10.216 Z=0  
1487 X=330.6 Y=2.668111E-15 Z=0  
1488 X=330.6 Y=2.108 Z=0  
1489 X=330.6 Y=3.543 Z=0  
1490 X=330.6 Y=4.216 Z=0  
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1492 X=330.6 Y=6 Z=0  
1493 X=330.6 Y=8.108 Z=0  
1494 X=330.6 Y=-1.742 Z=0  
1495 X=330.6 Y=10.216 Z=0  
1496 X=331.56 Y=2.85869E-15 Z=0  
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1498 X=331.56 Y=3.543 Z=0  
1499 X=331.56 Y=4.216 Z=0  
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1501 X=331.56 Y=6 Z=0  
1502 X=331.56 Y=8.108 Z=0  
1503 X=331.56 Y=-1.742 Z=0  
1504 X=331.56 Y=10.216 Z=0  
1505 X=332.4 Y=2.95398E-15 Z=0  
1506 X=332.4 Y=2.108 Z=0  
1507 X=332.4 Y=3.543 Z=0  
1508 X=332.4 Y=4.216 Z=0  
1509 X=332.4 Y=5.108 Z=0  
1510 X=332.4 Y=6 Z=0  
1511 X=332.4 Y=8.108 Z=0  
1512 X=332.4 Y=-1.742 Z=0  
1513 X=332.4 Y=10.216 Z=0  
1514 X=334.8 Y=3.001625E-15 Z=0  
1515 X=334.8 Y=2.108 Z=0  
1516 X=334.8 Y=3.543 Z=0  
1517 X=334.8 Y=4.216 Z=0  
1518 X=334.8 Y=5.108 Z=0  
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1520 X=334.8 Y=8.108 Z=0  
1521 X=334.8 Y=-1.742 Z=0  
1522 X=334.8 Y=10.216 Z=0  
1523 X=335.8 Y=3.025447E-15 Z=0  
1524 X=335.8 Y=2.108 Z=0  
1525 X=335.8 Y=3.543 Z=0  
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1527 X=335.8 Y=5.108 Z=0  
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1530 X=335.8 Y=-1.742 Z=0  
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1533 X=336.6 Y=2.108 Z=0  
1534 X=336.6 Y=3.543 Z=0  
1535 X=336.6 Y=4.216 Z=0  
1536 X=336.6 Y=5.108 Z=0  
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1538 X=336.6 Y=8.108 Z=0  
1539 X=336.6 Y=-1.742 Z=0  
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1541 X=337.6 Y=3.043314E-15 Z=0  
1542 X=337.6 Y=2.108 Z=0  
1543 X=337.6 Y=3.543 Z=0  
1544 X=337.6 Y=4.216 Z=0  
1545 X=337.6 Y=5.108 Z=0  
1546 X=337.6 Y=6 Z=0  
1547 X=337.6 Y=8.108 Z=0  
1548 X=337.6 Y=-1.742 Z=0  
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1551 X=343 Y=2.108 Z=0  
1552 X=343 Y=3.543 Z=0  
1553 X=343 Y=4.216 Z=0  
1554 X=343 Y=5.108 Z=0  
1555 X=343 Y=6 Z=0  
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1561 X=344 Y=3.543 Z=0  
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1563 X=344 Y=5.108 Z=0  
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1565 X=344 Y=8.108 Z=0  
1566 X=344 Y=-1.742 Z=0  
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1568 X=344.8 Y=5.717381E-15 Z=0

```
1569 X=344.8 Y=2.108 Z=0
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1571 X=344.8 Y=4.216 Z=0
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1592 X=348.2 Y=8.108 Z=0
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1594 X=348.2 Y=10.216 Z=0
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1604 X=350 Y=6.074717E-15 Z=0
1605 X=350 Y=2.108 Z=0
1606 X=350 Y=3.543 Z=0
1607 X=350 Y=4.216 Z=0
1608 X=350 Y=5.108 Z=0
1609 X=350 Y=6 Z=0
1610 X=350 Y=8.108 Z=0
1611 X=350 Y=-1.742 Z=0
1612 X=350 Y=10.216 Z=0
1613 X=350.84 Y=6.086628E-15 Z=0
1614 X=350.84 Y=2.108 Z=0
1615 X=350.84 Y=3.543 Z=0
1616 X=350.84 Y=4.216 Z=0
1617 X=350.84 Y=5.108 Z=0
1618 X=350.84 Y=6 Z=0
1619 X=350.84 Y=8.108 Z=0
1620 X=350.84 Y=-1.742 Z=0
1621 X=350.84 Y=10.216 Z=0
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1623 X=355.4 Y=2.108 Z=0
1624 X=355.4 Y=3.543 Z=0
1625 X=355.4 Y=4.216 Z=0
1626 X=355.4 Y=5.108 Z=0
1627 X=355.4 Y=6 Z=0
1628 X=355.4 Y=8.108 Z=0
1629 X=355.4 Y=-1.742 Z=0
1630 X=355.4 Y=10.216 Z=0
1631 X=219.95 Y=1.372171E-14 Z=0
1632 X=219.95 Y=2.108 Z=0
1633 X=219.95 Y=3.543 Z=0
1634 X=219.95 Y=4.216 Z=0
1635 X=219.95 Y=5.108 Z=0
1636 X=219.95 Y=6 Z=0
1637 X=219.95 Y=8.108 Z=0
1638 X=219.95 Y=-1.742 Z=0
1639 X=219.95 Y=10.216 Z=0
1640 X=200.27 Y=1.372171E-14 Z=0
1641 X=200.27 Y=2.108 Z=0
1642 X=200.27 Y=3.543 Z=0
1643 X=200.27 Y=4.216 Z=0
1644 X=200.27 Y=5.108 Z=0
1645 X=200.27 Y=6 Z=0
1646 X=200.27 Y=8.108 Z=0
1647 X=200.27 Y=-1.742 Z=0
1648 X=200.27 Y=10.216 Z=0
1649 X=201.98 Y=1.372171E-14 Z=0
1650 X=201.98 Y=2.108 Z=0
1651 X=201.98 Y=3.543 Z=0
```

|      |          |                |     |
|------|----------|----------------|-----|
| 1652 | X=201.98 | Y=4.216        | Z=0 |
| 1653 | X=201.98 | Y=5.108        | Z=0 |
| 1654 | X=201.98 | Y=6            | Z=0 |
| 1655 | X=201.98 | Y=8.108        | Z=0 |
| 1656 | X=201.98 | Y=-1.742       | Z=0 |
| 1657 | X=201.98 | Y=10.216       | Z=0 |
| 1658 | X=202.31 | Y=1.372171E-14 | Z=0 |
| 1659 | X=202.31 | Y=2.108        | Z=0 |
| 1660 | X=202.31 | Y=3.543        | Z=0 |
| 1661 | X=202.31 | Y=4.216        | Z=0 |
| 1662 | X=202.31 | Y=5.108        | Z=0 |
| 1663 | X=202.31 | Y=6            | Z=0 |
| 1664 | X=202.31 | Y=8.108        | Z=0 |
| 1665 | X=202.31 | Y=-1.742       | Z=0 |
| 1666 | X=202.31 | Y=10.216       | Z=0 |
| 1667 | X=204    | Y=1.372171E-14 | Z=0 |
| 1668 | X=204    | Y=2.108        | Z=0 |
| 1669 | X=204    | Y=3.543        | Z=0 |
| 1670 | X=204    | Y=4.216        | Z=0 |
| 1671 | X=204    | Y=5.108        | Z=0 |
| 1672 | X=204    | Y=6            | Z=0 |
| 1673 | X=204    | Y=8.108        | Z=0 |
| 1674 | X=204    | Y=-1.742       | Z=0 |
| 1675 | X=204    | Y=10.216       | Z=0 |
| 1676 | X=204.37 | Y=1.372171E-14 | Z=0 |
| 1677 | X=204.37 | Y=2.108        | Z=0 |
| 1678 | X=204.37 | Y=3.543        | Z=0 |
| 1679 | X=204.37 | Y=4.216        | Z=0 |
| 1680 | X=204.37 | Y=5.108        | Z=0 |
| 1681 | X=204.37 | Y=6            | Z=0 |
| 1682 | X=204.37 | Y=8.108        | Z=0 |
| 1683 | X=204.37 | Y=-1.742       | Z=0 |
| 1684 | X=204.37 | Y=10.216       | Z=0 |
| 1685 | X=211.36 | Y=1.372171E-14 | Z=0 |
| 1686 | X=211.36 | Y=2.108        | Z=0 |
| 1687 | X=211.36 | Y=3.543        | Z=0 |
| 1688 | X=211.36 | Y=4.216        | Z=0 |
| 1689 | X=211.36 | Y=5.108        | Z=0 |
| 1690 | X=211.36 | Y=6            | Z=0 |
| 1691 | X=211.36 | Y=8.108        | Z=0 |
| 1692 | X=211.36 | Y=-1.742       | Z=0 |
| 1693 | X=211.36 | Y=10.216       | Z=0 |
| 1694 | X=211.58 | Y=1.372171E-14 | Z=0 |
| 1695 | X=211.58 | Y=2.108        | Z=0 |
| 1696 | X=211.58 | Y=3.543        | Z=0 |
| 1697 | X=211.58 | Y=4.216        | Z=0 |
| 1698 | X=211.58 | Y=5.108        | Z=0 |
| 1699 | X=211.58 | Y=6            | Z=0 |
| 1700 | X=211.58 | Y=8.108        | Z=0 |
| 1701 | X=211.58 | Y=-1.742       | Z=0 |
| 1702 | X=211.58 | Y=10.216       | Z=0 |
| 1703 | X=213.38 | Y=1.372171E-14 | Z=0 |
| 1704 | X=213.38 | Y=2.108        | Z=0 |
| 1705 | X=213.38 | Y=3.543        | Z=0 |
| 1706 | X=213.38 | Y=4.216        | Z=0 |
| 1707 | X=213.38 | Y=5.108        | Z=0 |
| 1708 | X=213.38 | Y=6            | Z=0 |
| 1709 | X=213.38 | Y=8.108        | Z=0 |
| 1710 | X=213.38 | Y=-1.742       | Z=0 |
| 1711 | X=213.38 | Y=10.216       | Z=0 |
| 1712 | X=213.64 | Y=1.372171E-14 | Z=0 |
| 1713 | X=213.64 | Y=2.108        | Z=0 |
| 1714 | X=213.64 | Y=3.543        | Z=0 |
| 1715 | X=213.64 | Y=4.216        | Z=0 |
| 1716 | X=213.64 | Y=5.108        | Z=0 |
| 1717 | X=213.64 | Y=6            | Z=0 |
| 1718 | X=213.64 | Y=8.108        | Z=0 |
| 1719 | X=213.64 | Y=-1.742       | Z=0 |
| 1720 | X=213.64 | Y=10.216       | Z=0 |
| 1721 | X=215.07 | Y=1.372171E-14 | Z=0 |
| 1722 | X=215.07 | Y=2.108        | Z=0 |
| 1723 | X=215.07 | Y=3.543        | Z=0 |
| 1724 | X=215.07 | Y=4.216        | Z=0 |
| 1725 | X=215.07 | Y=5.108        | Z=0 |
| 1726 | X=215.07 | Y=6            | Z=0 |
| 1727 | X=215.07 | Y=8.108        | Z=0 |
| 1728 | X=215.07 | Y=-1.742       | Z=0 |
| 1729 | X=215.07 | Y=10.216       | Z=0 |
| 1730 | X=215.7  | Y=1.372171E-14 | Z=0 |
| 1731 | X=215.7  | Y=2.108        | Z=0 |
| 1732 | X=215.7  | Y=3.543        | Z=0 |
| 1733 | X=215.7  | Y=4.216        | Z=0 |
| 1734 | X=215.7  | Y=5.108        | Z=0 |



|      |          |                |     |  |
|------|----------|----------------|-----|--|
| 1735 | X=215.7  | Y=6            | Z=0 |  |
| 1736 | X=215.7  | Y=8.108        | Z=0 |  |
| 1737 | X=215.7  | Y=-1.742       | Z=0 |  |
| 1738 | X=215.7  | Y=10.216       | Z=0 |  |
| 1739 | X=219.05 | Y=1.372171E-14 | Z=0 |  |
| 1740 | X=219.05 | Y=2.108        | Z=0 |  |
| 1741 | X=219.05 | Y=3.543        | Z=0 |  |
| 1742 | X=219.05 | Y=4.216        | Z=0 |  |
| 1743 | X=219.05 | Y=5.108        | Z=0 |  |
| 1744 | X=219.05 | Y=6            | Z=0 |  |
| 1745 | X=219.05 | Y=8.108        | Z=0 |  |
| 1746 | X=219.05 | Y=-1.742       | Z=0 |  |
| 1747 | X=219.05 | Y=10.216       | Z=0 |  |
| 1748 | X=220.85 | Y=1.372171E-14 | Z=0 |  |
| 1749 | X=220.85 | Y=2.108        | Z=0 |  |
| 1750 | X=220.85 | Y=3.543        | Z=0 |  |
| 1751 | X=220.85 | Y=4.216        | Z=0 |  |
| 1752 | X=220.85 | Y=5.108        | Z=0 |  |
| 1753 | X=220.85 | Y=6            | Z=0 |  |
| 1754 | X=220.85 | Y=8.108        | Z=0 |  |
| 1755 | X=220.85 | Y=-1.742       | Z=0 |  |
| 1756 | X=220.85 | Y=10.216       | Z=0 |  |
| 1757 | X=226.25 | Y=1.372171E-14 | Z=0 |  |
| 1758 | X=226.25 | Y=2.108        | Z=0 |  |
| 1759 | X=226.25 | Y=3.543        | Z=0 |  |
| 1760 | X=226.25 | Y=4.216        | Z=0 |  |
| 1761 | X=226.25 | Y=5.108        | Z=0 |  |
| 1762 | X=226.25 | Y=6            | Z=0 |  |
| 1763 | X=226.25 | Y=8.108        | Z=0 |  |
| 1764 | X=226.25 | Y=-1.742       | Z=0 |  |
| 1765 | X=226.25 | Y=10.216       | Z=0 |  |
| 1766 | X=228.1  | Y=1.372171E-14 | Z=0 |  |
| 1767 | X=228.1  | Y=2.108        | Z=0 |  |
| 1768 | X=228.1  | Y=3.543        | Z=0 |  |
| 1769 | X=228.1  | Y=4.216        | Z=0 |  |
| 1770 | X=228.1  | Y=5.108        | Z=0 |  |
| 1771 | X=228.1  | Y=6            | Z=0 |  |
| 1772 | X=228.1  | Y=8.108        | Z=0 |  |
| 1773 | X=228.1  | Y=-1.742       | Z=0 |  |
| 1774 | X=228.1  | Y=10.216       | Z=0 |  |
| 1775 | X=230.05 | Y=1.372171E-14 | Z=0 |  |
| 1776 | X=230.05 | Y=2.108        | Z=0 |  |
| 1777 | X=230.05 | Y=3.543        | Z=0 |  |
| 1778 | X=230.05 | Y=4.216        | Z=0 |  |
| 1779 | X=230.05 | Y=5.108        | Z=0 |  |
| 1780 | X=230.05 | Y=6            | Z=0 |  |
| 1781 | X=230.05 | Y=8.108        | Z=0 |  |
| 1782 | X=230.05 | Y=-1.742       | Z=0 |  |
| 1783 | X=230.05 | Y=10.216       | Z=0 |  |
| 1784 | X=231.45 | Y=1.372171E-14 | Z=0 |  |
| 1785 | X=231.45 | Y=2.108        | Z=0 |  |
| 1786 | X=231.45 | Y=3.543        | Z=0 |  |
| 1787 | X=231.45 | Y=4.216        | Z=0 |  |
| 1788 | X=231.45 | Y=5.108        | Z=0 |  |
| 1789 | X=231.45 | Y=6            | Z=0 |  |
| 1790 | X=231.45 | Y=8.108        | Z=0 |  |
| 1791 | X=231.45 | Y=-1.742       | Z=0 |  |
| 1792 | X=231.45 | Y=10.216       | Z=0 |  |
| 1793 | X=233.27 | Y=1.372171E-14 | Z=0 |  |
| 1794 | X=233.27 | Y=2.108        | Z=0 |  |
| 1795 | X=233.27 | Y=3.543        | Z=0 |  |
| 1796 | X=233.27 | Y=4.216        | Z=0 |  |
| 1797 | X=233.27 | Y=5.108        | Z=0 |  |
| 1798 | X=233.27 | Y=6            | Z=0 |  |
| 1799 | X=233.27 | Y=8.108        | Z=0 |  |
| 1800 | X=233.27 | Y=-1.742       | Z=0 |  |
| 1801 | X=233.27 | Y=10.216       | Z=0 |  |
| 1802 | X=235.09 | Y=1.372171E-14 | Z=0 |  |
| 1803 | X=235.09 | Y=2.108        | Z=0 |  |
| 1804 | X=235.09 | Y=3.543        | Z=0 |  |
| 1805 | X=235.09 | Y=4.216        | Z=0 |  |
| 1806 | X=235.09 | Y=5.108        | Z=0 |  |
| 1807 | X=235.09 | Y=6            | Z=0 |  |
| 1808 | X=235.09 | Y=8.108        | Z=0 |  |
| 1809 | X=235.09 | Y=-1.742       | Z=0 |  |
| 1810 | X=235.09 | Y=10.216       | Z=0 |  |
| 1811 | X=238.65 | Y=1.372171E-14 | Z=0 |  |
| 1812 | X=238.65 | Y=2.108        | Z=0 |  |
| 1813 | X=238.65 | Y=3.543        | Z=0 |  |
| 1814 | X=238.65 | Y=4.216        | Z=0 |  |
| 1815 | X=238.65 | Y=5.108        | Z=0 |  |
| 1816 | X=238.65 | Y=6            | Z=0 |  |
| 1817 | X=238.65 | Y=8.108        | Z=0 |  |

|      |           |                |     |  |
|------|-----------|----------------|-----|--|
| 1818 | X=238.65  | Y=-1.742       | Z=0 |  |
| 1819 | X=238.65  | Y=10.216       | Z=0 |  |
| 1820 | X=240.45  | Y=1.372171E-14 | Z=0 |  |
| 1821 | X=240.45  | Y=2.108        | Z=0 |  |
| 1822 | X=240.45  | Y=3.543        | Z=0 |  |
| 1823 | X=240.45  | Y=4.216        | Z=0 |  |
| 1824 | X=240.45  | Y=5.108        | Z=0 |  |
| 1825 | X=240.45  | Y=6            | Z=0 |  |
| 1826 | X=240.45  | Y=8.108        | Z=0 |  |
| 1827 | X=240.45  | Y=-1.742       | Z=0 |  |
| 1828 | X=240.45  | Y=10.216       | Z=0 |  |
| 1829 | X=242.49  | Y=1.372171E-14 | Z=0 |  |
| 1830 | X=242.49  | Y=2.108        | Z=0 |  |
| 1831 | X=242.49  | Y=3.543        | Z=0 |  |
| 1832 | X=242.49  | Y=4.216        | Z=0 |  |
| 1833 | X=242.49  | Y=5.108        | Z=0 |  |
| 1834 | X=242.49  | Y=6            | Z=0 |  |
| 1835 | X=242.49  | Y=8.108        | Z=0 |  |
| 1836 | X=242.49  | Y=-1.742       | Z=0 |  |
| 1837 | X=242.49  | Y=10.216       | Z=0 |  |
| 1838 | X=244.255 | Y=1.372171E-14 | Z=0 |  |
| 1839 | X=244.255 | Y=2.108        | Z=0 |  |
| 1840 | X=244.255 | Y=3.543        | Z=0 |  |
| 1841 | X=244.255 | Y=4.216        | Z=0 |  |
| 1842 | X=244.255 | Y=5.108        | Z=0 |  |
| 1843 | X=244.255 | Y=6            | Z=0 |  |
| 1844 | X=244.255 | Y=8.108        | Z=0 |  |
| 1845 | X=244.255 | Y=-1.742       | Z=0 |  |
| 1846 | X=244.255 | Y=10.216       | Z=0 |  |
| 1847 | X=283.395 | Y=1.20065E-14  | Z=0 |  |
| 1848 | X=283.395 | Y=2.108        | Z=0 |  |
| 1849 | X=283.395 | Y=3.543        | Z=0 |  |
| 1850 | X=283.395 | Y=4.216        | Z=0 |  |
| 1851 | X=283.395 | Y=5.108        | Z=0 |  |
| 1852 | X=283.395 | Y=6            | Z=0 |  |
| 1853 | X=283.395 | Y=8.108        | Z=0 |  |
| 1854 | X=283.395 | Y=-1.742       | Z=0 |  |
| 1855 | X=283.395 | Y=10.216       | Z=0 |  |
| 1856 | X=285.21  | Y=9.433679E-15 | Z=0 |  |
| 1857 | X=285.21  | Y=2.108        | Z=0 |  |
| 1858 | X=285.21  | Y=3.543        | Z=0 |  |
| 1859 | X=285.21  | Y=4.216        | Z=0 |  |
| 1860 | X=285.21  | Y=5.108        | Z=0 |  |
| 1861 | X=285.21  | Y=6            | Z=0 |  |
| 1862 | X=285.21  | Y=8.108        | Z=0 |  |
| 1863 | X=285.21  | Y=-1.742       | Z=0 |  |
| 1864 | X=285.21  | Y=10.216       | Z=0 |  |
| 1865 | X=287.85  | Y=7.718464E-15 | Z=0 |  |
| 1866 | X=287.85  | Y=2.108        | Z=0 |  |
| 1867 | X=287.85  | Y=3.543        | Z=0 |  |
| 1868 | X=287.85  | Y=4.216        | Z=0 |  |
| 1869 | X=287.85  | Y=5.108        | Z=0 |  |
| 1870 | X=287.85  | Y=6            | Z=0 |  |
| 1871 | X=287.85  | Y=8.108        | Z=0 |  |
| 1872 | X=287.85  | Y=-1.742       | Z=0 |  |
| 1873 | X=287.85  | Y=10.216       | Z=0 |  |
| 1874 | X=292.41  | Y=7.28966E-15  | Z=0 |  |
| 1875 | X=292.41  | Y=2.108        | Z=0 |  |
| 1876 | X=292.41  | Y=3.543        | Z=0 |  |
| 1877 | X=292.41  | Y=4.216        | Z=0 |  |
| 1878 | X=292.41  | Y=5.108        | Z=0 |  |
| 1879 | X=292.41  | Y=6            | Z=0 |  |
| 1880 | X=292.41  | Y=8.108        | Z=0 |  |
| 1881 | X=292.41  | Y=-1.742       | Z=0 |  |
| 1882 | X=292.41  | Y=10.216       | Z=0 |  |
| 1883 | X=293.25  | Y=7.075259E-15 | Z=0 |  |
| 1884 | X=293.25  | Y=2.108        | Z=0 |  |
| 1885 | X=293.25  | Y=3.543        | Z=0 |  |
| 1886 | X=293.25  | Y=4.216        | Z=0 |  |
| 1887 | X=293.25  | Y=5.108        | Z=0 |  |
| 1888 | X=293.25  | Y=6            | Z=0 |  |
| 1889 | X=293.25  | Y=8.108        | Z=0 |  |
| 1890 | X=293.25  | Y=-1.742       | Z=0 |  |
| 1891 | X=293.25  | Y=10.216       | Z=0 |  |
| 1892 | X=294.21  | Y=6.968058E-15 | Z=0 |  |
| 1893 | X=294.21  | Y=2.108        | Z=0 |  |
| 1894 | X=294.21  | Y=3.543        | Z=0 |  |
| 1895 | X=294.21  | Y=4.216        | Z=0 |  |
| 1896 | X=294.21  | Y=5.108        | Z=0 |  |
| 1897 | X=294.21  | Y=6            | Z=0 |  |
| 1898 | X=294.21  | Y=8.108        | Z=0 |  |
| 1899 | X=294.21  | Y=-1.742       | Z=0 |  |
| 1900 | X=294.21  | Y=10.216       | Z=0 |  |

|      |          |                |     |
|------|----------|----------------|-----|
| 1901 | X=295.05 | Y=6.914457E-15 | Z=0 |
| 1902 | X=295.05 | Y=2.108        | Z=0 |
| 1903 | X=295.05 | Y=3.543        | Z=0 |
| 1904 | X=295.05 | Y=4.216        | Z=0 |
| 1905 | X=295.05 | Y=5.108        | Z=0 |
| 1906 | X=295.05 | Y=6            | Z=0 |
| 1907 | X=295.05 | Y=8.108        | Z=0 |
| 1908 | X=295.05 | Y=-1.742       | Z=0 |
| 1909 | X=295.05 | Y=10.216       | Z=0 |
| 1910 | X=297.45 | Y=6.887657E-15 | Z=0 |
| 1911 | X=297.45 | Y=2.108        | Z=0 |
| 1912 | X=297.45 | Y=3.543        | Z=0 |
| 1913 | X=297.45 | Y=4.216        | Z=0 |
| 1914 | X=297.45 | Y=5.108        | Z=0 |
| 1915 | X=297.45 | Y=6            | Z=0 |
| 1916 | X=297.45 | Y=8.108        | Z=0 |
| 1917 | X=297.45 | Y=-1.742       | Z=0 |
| 1918 | X=297.45 | Y=10.216       | Z=0 |
| 1919 | X=298.45 | Y=6.874257E-15 | Z=0 |
| 1920 | X=298.45 | Y=2.108        | Z=0 |
| 1921 | X=298.45 | Y=3.543        | Z=0 |
| 1922 | X=298.45 | Y=4.216        | Z=0 |
| 1923 | X=298.45 | Y=5.108        | Z=0 |
| 1924 | X=298.45 | Y=6            | Z=0 |
| 1925 | X=298.45 | Y=8.108        | Z=0 |
| 1926 | X=298.45 | Y=-1.742       | Z=0 |
| 1927 | X=298.45 | Y=10.216       | Z=0 |
| 1928 | X=299.25 | Y=6.867557E-15 | Z=0 |
| 1929 | X=299.25 | Y=2.108        | Z=0 |
| 1930 | X=299.25 | Y=3.543        | Z=0 |
| 1931 | X=299.25 | Y=4.216        | Z=0 |
| 1932 | X=299.25 | Y=5.108        | Z=0 |
| 1933 | X=299.25 | Y=6            | Z=0 |
| 1934 | X=299.25 | Y=8.108        | Z=0 |
| 1935 | X=299.25 | Y=-1.742       | Z=0 |
| 1936 | X=299.25 | Y=10.216       | Z=0 |
| 1937 | X=300.25 | Y=6.864207E-15 | Z=0 |
| 1938 | X=300.25 | Y=2.108        | Z=0 |
| 1939 | X=300.25 | Y=3.543        | Z=0 |
| 1940 | X=300.25 | Y=4.216        | Z=0 |
| 1941 | X=300.25 | Y=5.108        | Z=0 |
| 1942 | X=300.25 | Y=6            | Z=0 |
| 1943 | X=300.25 | Y=8.108        | Z=0 |
| 1944 | X=300.25 | Y=-1.742       | Z=0 |
| 1945 | X=300.25 | Y=10.216       | Z=0 |
| 1946 | X=322.69 | Y=8.576071E-16 | Z=0 |
| 1947 | X=322.69 | Y=2.108        | Z=0 |
| 1948 | X=322.69 | Y=3.543        | Z=0 |
| 1949 | X=322.69 | Y=4.216        | Z=0 |
| 1950 | X=322.69 | Y=5.108        | Z=0 |
| 1951 | X=322.69 | Y=6            | Z=0 |
| 1952 | X=322.69 | Y=8.108        | Z=0 |
| 1953 | X=322.69 | Y=-1.742       | Z=0 |
| 1954 | X=322.69 | Y=10.216       | Z=0 |
| 1955 | X=318.05 | Y=5.145643E-15 | Z=0 |
| 1956 | X=318.05 | Y=2.108        | Z=0 |
| 1957 | X=318.05 | Y=3.543        | Z=0 |
| 1958 | X=318.05 | Y=4.216        | Z=0 |
| 1959 | X=318.05 | Y=5.108        | Z=0 |
| 1960 | X=318.05 | Y=6            | Z=0 |
| 1961 | X=318.05 | Y=8.108        | Z=0 |
| 1962 | X=318.05 | Y=-1.742       | Z=0 |
| 1963 | X=318.05 | Y=10.216       | Z=0 |
| 1964 | X=319.85 | Y=4.288036E-15 | Z=0 |
| 1965 | X=319.85 | Y=2.108        | Z=0 |
| 1966 | X=319.85 | Y=3.543        | Z=0 |
| 1967 | X=319.85 | Y=4.216        | Z=0 |
| 1968 | X=319.85 | Y=5.108        | Z=0 |
| 1969 | X=319.85 | Y=6            | Z=0 |
| 1970 | X=319.85 | Y=8.108        | Z=0 |
| 1971 | X=319.85 | Y=-1.742       | Z=0 |
| 1972 | X=319.85 | Y=10.216       | Z=0 |
| 1973 | X=313.49 | Y=6.00325E-15  | Z=0 |
| 1974 | X=313.49 | Y=2.108        | Z=0 |
| 1975 | X=313.49 | Y=3.543        | Z=0 |
| 1976 | X=313.49 | Y=4.216        | Z=0 |
| 1977 | X=313.49 | Y=5.108        | Z=0 |
| 1978 | X=313.49 | Y=6            | Z=0 |
| 1979 | X=313.49 | Y=8.108        | Z=0 |
| 1980 | X=313.49 | Y=-1.742       | Z=0 |
| 1981 | X=313.49 | Y=10.216       | Z=0 |
| 1982 | X=312.65 | Y=6.432054E-15 | Z=0 |
| 1983 | X=312.65 | Y=2.108        | Z=0 |

|      |            |                |     |
|------|------------|----------------|-----|
| 1984 | X=312.65   | Y=3.543        | Z=0 |
| 1985 | X=312.65   | Y=4.216        | Z=0 |
| 1986 | X=312.65   | Y=5.108        | Z=0 |
| 1987 | X=312.65   | Y=6            | Z=0 |
| 1988 | X=312.65   | Y=8.108        | Z=0 |
| 1989 | X=312.65   | Y=-1.742       | Z=0 |
| 1990 | X=312.65   | Y=10.216       | Z=0 |
| 1991 | X=311.69   | Y=6.646455E-15 | Z=0 |
| 1992 | X=311.69   | Y=2.108        | Z=0 |
| 1993 | X=311.69   | Y=3.543        | Z=0 |
| 1994 | X=311.69   | Y=4.216        | Z=0 |
| 1995 | X=311.69   | Y=5.108        | Z=0 |
| 1996 | X=311.69   | Y=6            | Z=0 |
| 1997 | X=311.69   | Y=8.108        | Z=0 |
| 1998 | X=311.69   | Y=-1.742       | Z=0 |
| 1999 | X=311.69   | Y=10.216       | Z=0 |
| 2000 | X=310.85   | Y=6.753656E-15 | Z=0 |
| 2001 | X=310.85   | Y=2.108        | Z=0 |
| 2002 | X=310.85   | Y=3.543        | Z=0 |
| 2003 | X=310.85   | Y=4.216        | Z=0 |
| 2004 | X=310.85   | Y=5.108        | Z=0 |
| 2005 | X=310.85   | Y=6            | Z=0 |
| 2006 | X=310.85   | Y=8.108        | Z=0 |
| 2007 | X=310.85   | Y=-1.742       | Z=0 |
| 2008 | X=310.85   | Y=10.216       | Z=0 |
| 2009 | X=308.45   | Y=6.807257E-15 | Z=0 |
| 2010 | X=308.45   | Y=2.108        | Z=0 |
| 2011 | X=308.45   | Y=3.543        | Z=0 |
| 2012 | X=308.45   | Y=4.216        | Z=0 |
| 2013 | X=308.45   | Y=5.108        | Z=0 |
| 2014 | X=308.45   | Y=6            | Z=0 |
| 2015 | X=308.45   | Y=8.108        | Z=0 |
| 2016 | X=308.45   | Y=-1.742       | Z=0 |
| 2017 | X=308.45   | Y=10.216       | Z=0 |
| 2018 | X=307.45   | Y=6.834057E-15 | Z=0 |
| 2019 | X=307.45   | Y=2.108        | Z=0 |
| 2020 | X=307.45   | Y=3.543        | Z=0 |
| 2021 | X=307.45   | Y=4.216        | Z=0 |
| 2022 | X=307.45   | Y=5.108        | Z=0 |
| 2023 | X=307.45   | Y=6            | Z=0 |
| 2024 | X=307.45   | Y=8.108        | Z=0 |
| 2025 | X=307.45   | Y=-1.742       | Z=0 |
| 2026 | X=307.45   | Y=10.216       | Z=0 |
| 2027 | X=306.65   | Y=6.847457E-15 | Z=0 |
| 2028 | X=306.65   | Y=2.108        | Z=0 |
| 2029 | X=306.65   | Y=3.543        | Z=0 |
| 2030 | X=306.65   | Y=4.216        | Z=0 |
| 2031 | X=306.65   | Y=5.108        | Z=0 |
| 2032 | X=306.65   | Y=6            | Z=0 |
| 2033 | X=306.65   | Y=8.108        | Z=0 |
| 2034 | X=306.65   | Y=-1.742       | Z=0 |
| 2035 | X=306.65   | Y=10.216       | Z=0 |
| 2036 | X=305.65   | Y=6.854157E-15 | Z=0 |
| 2037 | X=305.65   | Y=2.108        | Z=0 |
| 2038 | X=305.65   | Y=3.543        | Z=0 |
| 2039 | X=305.65   | Y=4.216        | Z=0 |
| 2040 | X=305.65   | Y=5.108        | Z=0 |
| 2041 | X=305.65   | Y=6            | Z=0 |
| 2042 | X=305.65   | Y=8.108        | Z=0 |
| 2043 | X=305.65   | Y=-1.742       | Z=0 |
| 2044 | X=305.65   | Y=10.216       | Z=0 |
| 2045 | X=236.58   | Y=1.372171E-14 | Z=0 |
| 2046 | X=236.58   | Y=2.108        | Z=0 |
| 2047 | X=236.58   | Y=3.543        | Z=0 |
| 2048 | X=236.58   | Y=4.216        | Z=0 |
| 2049 | X=236.58   | Y=5.108        | Z=0 |
| 2050 | X=236.58   | Y=6            | Z=0 |
| 2051 | X=236.58   | Y=8.108        | Z=0 |
| 2052 | X=236.58   | Y=-1.742       | Z=0 |
| 2053 | X=236.58   | Y=10.216       | Z=0 |
| 2054 | X=238.27   | Y=1.372171E-14 | Z=0 |
| 2055 | X=238.27   | Y=2.108        | Z=0 |
| 2056 | X=238.27   | Y=3.543        | Z=0 |
| 2057 | X=238.27   | Y=4.216        | Z=0 |
| 2058 | X=238.27   | Y=5.108        | Z=0 |
| 2059 | X=238.27   | Y=6            | Z=0 |
| 2060 | X=238.27   | Y=8.108        | Z=0 |
| 2061 | X=238.27   | Y=-1.742       | Z=0 |
| 2062 | X=238.27   | Y=10.216       | Z=0 |
| 2063 | X=244.4775 | Y=1.372171E-14 | Z=0 |
| 2064 | X=244.4775 | Y=2.108        | Z=0 |
| 2065 | X=244.4775 | Y=3.543        | Z=0 |
| 2066 | X=244.4775 | Y=4.216        | Z=0 |

2067 X=244.4775 Y=5.108 Z=0  
2068 X=244.4775 Y=6 Z=0  
2069 X=244.4775 Y=8.108 Z=0  
2070 X=244.4775 Y=-1.742 Z=0  
2071 X=244.4775 Y=10.216 Z=0  
2072 X=247.651 Y=1.372171E-14 Z=0  
2073 X=247.651 Y=2.108 Z=0  
2074 X=247.651 Y=3.543 Z=0  
2075 X=247.651 Y=4.216 Z=0  
2076 X=247.651 Y=5.108 Z=0  
2077 X=247.651 Y=6 Z=0  
2078 X=247.651 Y=8.108 Z=0  
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2082 X=249.67 Y=2.108 Z=0  
2083 X=249.67 Y=3.543 Z=0  
2084 X=249.67 Y=4.216 Z=0  
2085 X=249.67 Y=5.108 Z=0  
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2087 X=249.67 Y=8.108 Z=0  
2088 X=249.67 Y=-1.742 Z=0  
2089 X=249.67 Y=10.216 Z=0  
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2091 X=251.3655 Y=2.108 Z=0  
2092 X=251.3655 Y=3.543 Z=0  
2093 X=251.3655 Y=4.216 Z=0  
2094 X=251.3655 Y=5.108 Z=0  
2095 X=251.3655 Y=6 Z=0  
2096 X=251.3655 Y=8.108 Z=0  
2097 X=251.3655 Y=-1.742 Z=0  
2098 X=251.3655 Y=10.216 Z=0  
2099 X=251.6299 Y=1.372171E-14 Z=0  
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2101 X=251.6299 Y=3.543 Z=0  
2102 X=251.6299 Y=4.216 Z=0  
2103 X=251.6299 Y=5.108 Z=0  
2104 X=251.6299 Y=6 Z=0  
2105 X=251.6299 Y=8.108 Z=0  
2106 X=251.6299 Y=-1.742 Z=0  
2107 X=251.6299 Y=10.216 Z=0  
2108 X=253.68 Y=1.372171E-14 Z=0  
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2111 X=253.68 Y=4.216 Z=0  
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2113 X=253.68 Y=6 Z=0  
2114 X=253.68 Y=8.108 Z=0  
2115 X=253.68 Y=-1.742 Z=0  
2116 X=253.68 Y=10.216 Z=0  
2117 X=255.355 Y=1.372171E-14 Z=0  
2118 X=255.355 Y=2.108 Z=0  
2119 X=255.355 Y=3.543 Z=0  
2120 X=255.355 Y=4.216 Z=0  
2121 X=255.355 Y=5.108 Z=0  
2122 X=255.355 Y=6 Z=0  
2123 X=255.355 Y=8.108 Z=0  
2124 X=255.355 Y=-1.742 Z=0  
2125 X=255.355 Y=10.216 Z=0  
2126 X=255.7625 Y=1.372171E-14 Z=0  
2127 X=255.7625 Y=2.108 Z=0  
2128 X=255.7625 Y=3.543 Z=0  
2129 X=255.7625 Y=4.216 Z=0  
2130 X=255.7625 Y=5.108 Z=0  
2131 X=255.7625 Y=6 Z=0  
2132 X=255.7625 Y=8.108 Z=0  
2133 X=255.7625 Y=-1.742 Z=0  
2134 X=255.7625 Y=10.216 Z=0  
2135 X=259.1 Y=1.372171E-14 Z=0  
2136 X=259.1 Y=2.108 Z=0  
2137 X=259.1 Y=3.543 Z=0  
2138 X=259.1 Y=4.216 Z=0  
2139 X=259.1 Y=5.108 Z=0  
2140 X=259.1 Y=6 Z=0  
2141 X=259.1 Y=8.108 Z=0  
2142 X=259.1 Y=-1.742 Z=0  
2143 X=259.1 Y=10.216 Z=0  
2144 X=260.9 Y=1.372171E-14 Z=0  
2145 X=260.9 Y=2.108 Z=0  
2146 X=260.9 Y=3.543 Z=0  
2147 X=260.9 Y=4.216 Z=0  
2148 X=260.9 Y=5.108 Z=0  
2149 X=260.9 Y=6 Z=0

2150 X=260.9 Y=8.108 Z=0  
2151 X=260.9 Y=-1.742 Z=0  
2152 X=260.9 Y=10.216 Z=0  
2153 X=264.54 Y=1.372171E-14 Z=0  
2154 X=264.54 Y=2.108 Z=0  
2155 X=264.54 Y=3.543 Z=0  
2156 X=264.54 Y=4.216 Z=0  
2157 X=264.54 Y=5.108 Z=0  
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2163 X=266.345 Y=2.108 Z=0  
2164 X=266.345 Y=3.543 Z=0  
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2167 X=266.345 Y=6 Z=0  
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2171 X=268.1 Y=1.372171E-14 Z=0  
2172 X=268.1 Y=2.108 Z=0  
2173 X=268.1 Y=3.543 Z=0  
2174 X=268.1 Y=4.216 Z=0  
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2176 X=268.1 Y=6 Z=0  
2177 X=268.1 Y=8.108 Z=0  
2178 X=268.1 Y=-1.742 Z=0  
2179 X=268.1 Y=10.216 Z=0  
2180 X=273.36 Y=1.372171E-14 Z=0  
2181 X=273.36 Y=2.108 Z=0  
2182 X=273.36 Y=3.543 Z=0  
2183 X=273.36 Y=4.216 Z=0  
2184 X=273.36 Y=5.108 Z=0  
2185 X=273.36 Y=6 Z=0  
2186 X=273.36 Y=8.108 Z=0  
2187 X=273.36 Y=-1.742 Z=0  
2188 X=273.36 Y=10.216 Z=0  
2189 X=278.75 Y=1.372171E-14 Z=0  
2190 X=278.75 Y=2.108 Z=0  
2191 X=278.75 Y=3.543 Z=0  
2192 X=278.75 Y=4.216 Z=0  
2193 X=278.75 Y=5.108 Z=0  
2194 X=278.75 Y=6 Z=0  
2195 X=278.75 Y=8.108 Z=0  
2196 X=278.75 Y=-1.742 Z=0  
2197 X=278.75 Y=10.216 Z=0  
2198 X=280.5803 Y=1.372171E-14 Z=0  
2199 X=280.5803 Y=2.108 Z=0  
2200 X=280.5803 Y=3.543 Z=0  
2201 X=280.5803 Y=4.216 Z=0  
2202 X=280.5803 Y=5.108 Z=0  
2203 X=280.5803 Y=6 Z=0  
2204 X=280.5803 Y=8.108 Z=0  
2205 X=280.5803 Y=-1.742 Z=0  
2206 X=280.5803 Y=10.216 Z=0  
2207 X=291.1 Y=7.504062E-15 Z=0  
2208 X=291.1 Y=2.108 Z=0  
2209 X=291.1 Y=3.543 Z=0  
2210 X=291.1 Y=4.216 Z=0  
2211 X=291.1 Y=5.108 Z=0  
2212 X=291.1 Y=6 Z=0  
2213 X=291.1 Y=8.108 Z=0  
2214 X=291.1 Y=-1.742 Z=0  
2215 X=291.1 Y=10.216 Z=0  
2216 X=292.83 Y=7.18246E-15 Z=0  
2217 X=292.83 Y=2.108 Z=0  
2218 X=292.83 Y=3.543 Z=0  
2219 X=292.83 Y=4.216 Z=0  
2220 X=292.83 Y=5.108 Z=0  
2221 X=292.83 Y=6 Z=0  
2222 X=292.83 Y=8.108 Z=0  
2223 X=292.83 Y=-1.742 Z=0  
2224 X=292.83 Y=10.216 Z=0  
2225 X=294.63 Y=6.941258E-15 Z=0  
2226 X=294.63 Y=2.108 Z=0  
2227 X=294.63 Y=3.543 Z=0  
2228 X=294.63 Y=4.216 Z=0  
2229 X=294.63 Y=5.108 Z=0  
2230 X=294.63 Y=6 Z=0  
2231 X=294.63 Y=8.108 Z=0  
2232 X=294.63 Y=-1.742 Z=0

|      |          |                |     |  |
|------|----------|----------------|-----|--|
| 2233 | X=294.63 | Y=10.216       | Z=0 |  |
| 2234 | X=296.25 | Y=6.901057E-15 | Z=0 |  |
| 2235 | X=296.25 | Y=2.108        | Z=0 |  |
| 2236 | X=296.25 | Y=3.543        | Z=0 |  |
| 2237 | X=296.25 | Y=4.216        | Z=0 |  |
| 2238 | X=296.25 | Y=5.108        | Z=0 |  |
| 2239 | X=296.25 | Y=6            | Z=0 |  |
| 2240 | X=296.25 | Y=8.108        | Z=0 |  |
| 2241 | X=296.25 | Y=-1.742       | Z=0 |  |
| 2242 | X=296.25 | Y=10.216       | Z=0 |  |
| 2243 | X=297.85 | Y=6.880957E-15 | Z=0 |  |
| 2244 | X=297.85 | Y=2.108        | Z=0 |  |
| 2245 | X=297.85 | Y=3.543        | Z=0 |  |
| 2246 | X=297.85 | Y=4.216        | Z=0 |  |
| 2247 | X=297.85 | Y=5.108        | Z=0 |  |
| 2248 | X=297.85 | Y=6            | Z=0 |  |
| 2249 | X=297.85 | Y=8.108        | Z=0 |  |
| 2250 | X=297.85 | Y=-1.742       | Z=0 |  |
| 2251 | X=297.85 | Y=10.216       | Z=0 |  |
| 2252 | X=298.15 | Y=6.877607E-15 | Z=0 |  |
| 2253 | X=298.15 | Y=2.108        | Z=0 |  |
| 2254 | X=298.15 | Y=3.543        | Z=0 |  |
| 2255 | X=298.15 | Y=4.216        | Z=0 |  |
| 2256 | X=298.15 | Y=5.108        | Z=0 |  |
| 2257 | X=298.15 | Y=6            | Z=0 |  |
| 2258 | X=298.15 | Y=8.108        | Z=0 |  |
| 2259 | X=298.15 | Y=-1.742       | Z=0 |  |
| 2260 | X=298.15 | Y=10.216       | Z=0 |  |
| 2261 | X=299.65 | Y=6.865882E-15 | Z=0 |  |
| 2262 | X=299.65 | Y=2.108        | Z=0 |  |
| 2263 | X=299.65 | Y=3.543        | Z=0 |  |
| 2264 | X=299.65 | Y=4.216        | Z=0 |  |
| 2265 | X=299.65 | Y=5.108        | Z=0 |  |
| 2266 | X=299.65 | Y=6            | Z=0 |  |
| 2267 | X=299.65 | Y=8.108        | Z=0 |  |
| 2268 | X=299.65 | Y=-1.742       | Z=0 |  |
| 2269 | X=299.65 | Y=10.216       | Z=0 |  |
| 2270 | X=303.5  | Y=6.857507E-15 | Z=0 |  |
| 2271 | X=303.5  | Y=2.108        | Z=0 |  |
| 2272 | X=303.5  | Y=3.543        | Z=0 |  |
| 2273 | X=303.5  | Y=4.216        | Z=0 |  |
| 2274 | X=303.5  | Y=5.108        | Z=0 |  |
| 2275 | X=303.5  | Y=6            | Z=0 |  |
| 2276 | X=303.5  | Y=8.108        | Z=0 |  |
| 2277 | X=303.5  | Y=-1.742       | Z=0 |  |
| 2278 | X=303.5  | Y=10.216       | Z=0 |  |
| 2279 | X=305.3  | Y=6.855832E-15 | Z=0 |  |
| 2280 | X=305.3  | Y=2.108        | Z=0 |  |
| 2281 | X=305.3  | Y=3.543        | Z=0 |  |
| 2282 | X=305.3  | Y=4.216        | Z=0 |  |
| 2283 | X=305.3  | Y=5.108        | Z=0 |  |
| 2284 | X=305.3  | Y=6            | Z=0 |  |
| 2285 | X=305.3  | Y=8.108        | Z=0 |  |
| 2286 | X=305.3  | Y=-1.742       | Z=0 |  |
| 2287 | X=305.3  | Y=10.216       | Z=0 |  |
| 2288 | X=307.05 | Y=6.840757E-15 | Z=0 |  |
| 2289 | X=307.05 | Y=2.108        | Z=0 |  |
| 2290 | X=307.05 | Y=3.543        | Z=0 |  |
| 2291 | X=307.05 | Y=4.216        | Z=0 |  |
| 2292 | X=307.05 | Y=5.108        | Z=0 |  |
| 2293 | X=307.05 | Y=6            | Z=0 |  |
| 2294 | X=307.05 | Y=8.108        | Z=0 |  |
| 2295 | X=307.05 | Y=-1.742       | Z=0 |  |
| 2296 | X=307.05 | Y=10.216       | Z=0 |  |
| 2297 | X=308.8  | Y=6.780456E-15 | Z=0 |  |
| 2298 | X=308.8  | Y=2.108        | Z=0 |  |
| 2299 | X=308.8  | Y=3.543        | Z=0 |  |
| 2300 | X=308.8  | Y=4.216        | Z=0 |  |
| 2301 | X=308.8  | Y=5.108        | Z=0 |  |
| 2302 | X=308.8  | Y=6            | Z=0 |  |
| 2303 | X=308.8  | Y=8.108        | Z=0 |  |
| 2304 | X=308.8  | Y=-1.742       | Z=0 |  |
| 2305 | X=308.8  | Y=10.216       | Z=0 |  |
| 2306 | X=310.5  | Y=6.767056E-15 | Z=0 |  |
| 2307 | X=310.5  | Y=2.108        | Z=0 |  |
| 2308 | X=310.5  | Y=3.543        | Z=0 |  |
| 2309 | X=310.5  | Y=4.216        | Z=0 |  |
| 2310 | X=310.5  | Y=5.108        | Z=0 |  |
| 2311 | X=310.5  | Y=6            | Z=0 |  |
| 2312 | X=310.5  | Y=8.108        | Z=0 |  |
| 2313 | X=310.5  | Y=-1.742       | Z=0 |  |
| 2314 | X=310.5  | Y=10.216       | Z=0 |  |
| 2315 | X=312.17 | Y=6.539254E-15 | Z=0 |  |

|      |                 |                |     |
|------|-----------------|----------------|-----|
| 2316 | X=312.17        | Y=2.108        | Z=0 |
| 2317 | X=312.17        | Y=3.543        | Z=0 |
| 2318 | X=312.17        | Y=4.216        | Z=0 |
| 2319 | X=312.17        | Y=5.108        | Z=0 |
| 2320 | X=312.17        | Y=6            | Z=0 |
| 2321 | X=312.17        | Y=8.108        | Z=0 |
| 2322 | X=312.17        | Y=-1.742       | Z=0 |
| 2323 | X=312.17        | Y=10.216       | Z=0 |
| 2324 | X=313.9         | Y=5.574446E-15 | Z=0 |
| 2325 | X=313.9         | Y=2.108        | Z=0 |
| 2326 | X=313.9         | Y=3.543        | Z=0 |
| 2327 | X=313.9         | Y=4.216        | Z=0 |
| 2328 | X=313.9         | Y=5.108        | Z=0 |
| 2329 | X=313.9         | Y=6            | Z=0 |
| 2330 | X=313.9         | Y=8.108        | Z=0 |
| 2331 | X=313.9         | Y=-1.742       | Z=0 |
| 2332 | X=313.9         | Y=10.216       | Z=0 |
| 2333 | X=315.975       | Y=5.360044E-15 | Z=0 |
| 2334 | X=315.975       | Y=2.108        | Z=0 |
| 2335 | X=315.975       | Y=3.543        | Z=0 |
| 2336 | X=315.975       | Y=4.216        | Z=0 |
| 2337 | X=315.975       | Y=5.108        | Z=0 |
| 2338 | X=315.975       | Y=6            | Z=0 |
| 2339 | X=315.975       | Y=8.108        | Z=0 |
| 2340 | X=315.975       | Y=-1.742       | Z=0 |
| 2341 | X=315.975       | Y=10.216       | Z=0 |
| 2342 | X=317.7125      | Y=5.252844E-15 | Z=0 |
| 2343 | X=317.7125      | Y=2.108        | Z=0 |
| 2344 | X=317.7125      | Y=3.543        | Z=0 |
| 2345 | X=317.7125      | Y=4.216        | Z=0 |
| 2346 | X=317.7125      | Y=5.108        | Z=0 |
| 2347 | X=317.7125      | Y=6            | Z=0 |
| 2348 | X=317.7125      | Y=8.108        | Z=0 |
| 2349 | X=317.7125      | Y=-1.742       | Z=0 |
| 2350 | X=317.7125      | Y=10.216       | Z=0 |
| 2351 | X=321.66        | Y=2.572821E-15 | Z=0 |
| 2352 | X=321.66        | Y=2.108        | Z=0 |
| 2353 | X=321.66        | Y=3.543        | Z=0 |
| 2354 | X=321.66        | Y=4.216        | Z=0 |
| 2355 | X=321.66        | Y=5.108        | Z=0 |
| 2356 | X=321.66        | Y=6            | Z=0 |
| 2357 | X=321.66        | Y=8.108        | Z=0 |
| 2358 | X=321.66        | Y=-1.742       | Z=0 |
| 2359 | X=321.66        | Y=10.216       | Z=0 |
| 2360 | X=323.195       | Y=4.288036E-16 | Z=0 |
| 2361 | X=323.195       | Y=2.108        | Z=0 |
| 2362 | X=323.195       | Y=3.543        | Z=0 |
| 2363 | X=323.195       | Y=4.216        | Z=0 |
| 2364 | X=323.195       | Y=5.108        | Z=0 |
| 2365 | X=323.195       | Y=6            | Z=0 |
| 2366 | X=323.195       | Y=8.108        | Z=0 |
| 2367 | X=323.195       | Y=-1.742       | Z=0 |
| 2368 | X=323.195       | Y=10.216       | Z=0 |
| 2369 | X=-1.752963E-15 | Y=6.673        | Z=0 |
| 2370 | X=33.2          | Y=6.673        | Z=0 |
| 2371 | X=16.6          | Y=6.673        | Z=0 |
| 2372 | X=1.02          | Y=6.673        | Z=0 |
| 2373 | X=1.935         | Y=6.673        | Z=0 |
| 2374 | X=4.325         | Y=6.673        | Z=0 |
| 2375 | X=8.23          | Y=6.673        | Z=0 |
| 2376 | X=9.135         | Y=6.673        | Z=0 |
| 2377 | X=10.29         | Y=6.673        | Z=0 |
| 2378 | X=11.525        | Y=6.673        | Z=0 |
| 2379 | X=12.35         | Y=6.673        | Z=0 |
| 2380 | X=15.7          | Y=6.673        | Z=0 |
| 2381 | X=17.5          | Y=6.673        | Z=0 |
| 2382 | X=22.9          | Y=6.673        | Z=0 |
| 2383 | X=24.7          | Y=6.673        | Z=0 |
| 2384 | X=24.9          | Y=6.673        | Z=0 |
| 2385 | X=26.7          | Y=6.673        | Z=0 |
| 2386 | X=28.1          | Y=6.673        | Z=0 |
| 2387 | X=29.9          | Y=6.673        | Z=0 |
| 2388 | X=30.02         | Y=6.673        | Z=0 |
| 2389 | X=31.82         | Y=6.673        | Z=0 |
| 2390 | X=74.7          | Y=6.673        | Z=0 |
| 2391 | X=53.95         | Y=6.673        | Z=0 |
| 2392 | X=35.3          | Y=6.673        | Z=0 |
| 2393 | X=37.1          | Y=6.673        | Z=0 |
| 2394 | X=37.22         | Y=6.673        | Z=0 |
| 2395 | X=39.02         | Y=6.673        | Z=0 |
| 2396 | X=34.25         | Y=6.673        | Z=0 |
| 2397 | X=36.31         | Y=6.673        | Z=0 |
| 2398 | X=38.37         | Y=6.673        | Z=0 |



|      |           |         |     |
|------|-----------|---------|-----|
| 2399 | X=39.285  | Y=6.673 | Z=0 |
| 2400 | X=41.675  | Y=6.673 | Z=0 |
| 2401 | X=45.58   | Y=6.673 | Z=0 |
| 2402 | X=46.485  | Y=6.673 | Z=0 |
| 2403 | X=47.64   | Y=6.673 | Z=0 |
| 2404 | X=48.875  | Y=6.673 | Z=0 |
| 2405 | X=49.7    | Y=6.673 | Z=0 |
| 2406 | X=53.05   | Y=6.673 | Z=0 |
| 2407 | X=54.85   | Y=6.673 | Z=0 |
| 2408 | X=60.25   | Y=6.673 | Z=0 |
| 2409 | X=62.05   | Y=6.673 | Z=0 |
| 2410 | X=62.25   | Y=6.673 | Z=0 |
| 2411 | X=64.05   | Y=6.673 | Z=0 |
| 2412 | X=65.45   | Y=6.673 | Z=0 |
| 2413 | X=67.25   | Y=6.673 | Z=0 |
| 2414 | X=67.37   | Y=6.673 | Z=0 |
| 2415 | X=69.17   | Y=6.673 | Z=0 |
| 2416 | X=72.65   | Y=6.673 | Z=0 |
| 2417 | X=74.45   | Y=6.673 | Z=0 |
| 2418 | X=116.2   | Y=6.673 | Z=0 |
| 2419 | X=95.45   | Y=6.673 | Z=0 |
| 2420 | X=78.55   | Y=6.673 | Z=0 |
| 2421 | X=80.35   | Y=6.673 | Z=0 |
| 2422 | X=85.75   | Y=6.673 | Z=0 |
| 2423 | X=87.55   | Y=6.673 | Z=0 |
| 2424 | X=90.95   | Y=6.673 | Z=0 |
| 2425 | X=92.75   | Y=6.673 | Z=0 |
| 2426 | X=98.15   | Y=6.673 | Z=0 |
| 2427 | X=99.95   | Y=6.673 | Z=0 |
| 2428 | X=103.35  | Y=6.673 | Z=0 |
| 2429 | X=105.15  | Y=6.673 | Z=0 |
| 2430 | X=110.55  | Y=6.673 | Z=0 |
| 2431 | X=112.35  | Y=6.673 | Z=0 |
| 2432 | X=76.37   | Y=6.673 | Z=0 |
| 2433 | X=75.75   | Y=6.673 | Z=0 |
| 2434 | X=77.81   | Y=6.673 | Z=0 |
| 2435 | X=79.87   | Y=6.673 | Z=0 |
| 2436 | X=80.785  | Y=6.673 | Z=0 |
| 2437 | X=83.175  | Y=6.673 | Z=0 |
| 2438 | X=86.98   | Y=6.673 | Z=0 |
| 2439 | X=87.985  | Y=6.673 | Z=0 |
| 2440 | X=89.12   | Y=6.673 | Z=0 |
| 2441 | X=90.375  | Y=6.673 | Z=0 |
| 2442 | X=94.55   | Y=6.673 | Z=0 |
| 2443 | X=96.35   | Y=6.673 | Z=0 |
| 2444 | X=101.75  | Y=6.673 | Z=0 |
| 2445 | X=103.65  | Y=6.673 | Z=0 |
| 2446 | X=105.55  | Y=6.673 | Z=0 |
| 2447 | X=106.95  | Y=6.673 | Z=0 |
| 2448 | X=108.8   | Y=6.673 | Z=0 |
| 2449 | X=114.15  | Y=6.673 | Z=0 |
| 2450 | X=116     | Y=6.673 | Z=0 |
| 2451 | X=77.44   | Y=6.673 | Z=0 |
| 2452 | X=84.6425 | Y=6.673 | Z=0 |
| 2453 | X=89.6975 | Y=6.673 | Z=0 |
| 2454 | X=91.18   | Y=6.673 | Z=0 |
| 2455 | X=92.98   | Y=6.673 | Z=0 |
| 2456 | X=95      | Y=6.673 | Z=0 |
| 2457 | X=100.3   | Y=6.673 | Z=0 |
| 2458 | X=102.15  | Y=6.673 | Z=0 |
| 2459 | X=107.3   | Y=6.673 | Z=0 |
| 2460 | X=112.7   | Y=6.673 | Z=0 |
| 2461 | X=114.525 | Y=6.673 | Z=0 |
| 2462 | X=157.7   | Y=6.673 | Z=0 |
| 2463 | X=136.95  | Y=6.673 | Z=0 |
| 2464 | X=120.05  | Y=6.673 | Z=0 |
| 2465 | X=121.85  | Y=6.673 | Z=0 |
| 2466 | X=127.25  | Y=6.673 | Z=0 |
| 2467 | X=129.05  | Y=6.673 | Z=0 |
| 2468 | X=132.45  | Y=6.673 | Z=0 |
| 2469 | X=134.25  | Y=6.673 | Z=0 |
| 2470 | X=139.65  | Y=6.673 | Z=0 |
| 2471 | X=141.45  | Y=6.673 | Z=0 |
| 2472 | X=144.85  | Y=6.673 | Z=0 |
| 2473 | X=146.65  | Y=6.673 | Z=0 |
| 2474 | X=152.05  | Y=6.673 | Z=0 |
| 2475 | X=153.85  | Y=6.673 | Z=0 |
| 2476 | X=117.87  | Y=6.673 | Z=0 |
| 2477 | X=119.66  | Y=6.673 | Z=0 |
| 2478 | X=125.05  | Y=6.673 | Z=0 |
| 2479 | X=127     | Y=6.673 | Z=0 |
| 2480 | X=130.3   | Y=6.673 | Z=0 |
| 2481 | X=132.075 | Y=6.673 | Z=0 |

2482 X=137.5 Y=6.673 Z=0  
2483 X=139.375 Y=6.673 Z=0  
2484 X=142.7 Y=6.673 Z=0  
2485 X=144.475 Y=6.673 Z=0  
2486 X=150.05 Y=6.673 Z=0  
2487 X=151.75 Y=6.673 Z=0  
2488 X=199.2 Y=6.673 Z=0  
2489 X=178.45 Y=6.673 Z=0  
2490 X=161.55 Y=6.673 Z=0  
2491 X=163.35 Y=6.673 Z=0  
2492 X=168.75 Y=6.673 Z=0  
2493 X=170.55 Y=6.673 Z=0  
2494 X=175.75 Y=6.673 Z=0  
2495 X=181.15 Y=6.673 Z=0  
2496 X=186.35 Y=6.673 Z=0  
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2498 X=193.55 Y=6.673 Z=0  
2499 X=195.35 Y=6.673 Z=0  
2500 X=240.7 Y=6.673 Z=0  
2501 X=219.95 Y=6.673 Z=0  
2502 X=200.27 Y=6.673 Z=0  
2503 X=201.98 Y=6.673 Z=0  
2504 X=202.31 Y=6.673 Z=0  
2505 X=204 Y=6.673 Z=0  
2506 X=204.37 Y=6.673 Z=0  
2507 X=211.36 Y=6.673 Z=0  
2508 X=211.58 Y=6.673 Z=0  
2509 X=213.38 Y=6.673 Z=0  
2510 X=213.64 Y=6.673 Z=0  
2511 X=215.07 Y=6.673 Z=0  
2512 X=215.7 Y=6.673 Z=0  
2513 X=219.05 Y=6.673 Z=0  
2514 X=220.85 Y=6.673 Z=0  
2515 X=226.25 Y=6.673 Z=0  
2516 X=228.1 Y=6.673 Z=0  
2517 X=230.05 Y=6.673 Z=0  
2518 X=231.45 Y=6.673 Z=0  
2519 X=233.27 Y=6.673 Z=0  
2520 X=235.09 Y=6.673 Z=0  
2521 X=238.65 Y=6.673 Z=0  
2522 X=240.45 Y=6.673 Z=0  
2523 X=236.58 Y=6.673 Z=0  
2524 X=238.27 Y=6.673 Z=0  
2525 X=282.2 Y=6.673 Z=0  
2526 X=261.45 Y=6.673 Z=0  
2527 X=241.77 Y=6.673 Z=0  
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2529 X=243.81 Y=6.673 Z=0  
2530 X=245.5 Y=6.673 Z=0  
2531 X=245.87 Y=6.673 Z=0  
2532 X=253.08 Y=6.673 Z=0  
2533 X=254.88 Y=6.673 Z=0  
2534 X=252.861 Y=6.673 Z=0  
2535 X=255.14 Y=6.673 Z=0  
2536 X=256.57 Y=6.673 Z=0  
2537 X=257.2 Y=6.673 Z=0  
2538 X=260.55 Y=6.673 Z=0  
2539 X=262.35 Y=6.673 Z=0  
2540 X=267.75 Y=6.673 Z=0  
2541 X=269.65 Y=6.673 Z=0  
2542 X=271.55 Y=6.673 Z=0  
2543 X=272.95 Y=6.673 Z=0  
2544 X=274.77 Y=6.673 Z=0  
2545 X=276.59 Y=6.673 Z=0  
2546 X=280.147 Y=6.673 Z=0  
2547 X=281.9735 Y=6.673 Z=0  
2548 X=242.49 Y=6.673 Z=0  
2549 X=244.255 Y=6.673 Z=0  
2550 X=244.4775 Y=6.673 Z=0  
2551 X=247.651 Y=6.673 Z=0  
2552 X=249.67 Y=6.673 Z=0  
2553 X=251.3655 Y=6.673 Z=0  
2554 X=251.6299 Y=6.673 Z=0  
2555 X=253.68 Y=6.673 Z=0  
2556 X=255.355 Y=6.673 Z=0  
2557 X=255.7625 Y=6.673 Z=0  
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2560 X=264.54 Y=6.673 Z=0  
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2580 X=298.45 Y=6.673 Z=0  
2581 X=299.25 Y=6.673 Z=0  
2582 X=300.25 Y=6.673 Z=0  
2583 X=322.69 Y=6.673 Z=0  
2584 X=318.05 Y=6.673 Z=0  
2585 X=319.85 Y=6.673 Z=0  
2586 X=313.49 Y=6.673 Z=0  
2587 X=312.65 Y=6.673 Z=0  
2588 X=311.69 Y=6.673 Z=0  
2589 X=310.85 Y=6.673 Z=0  
2590 X=308.45 Y=6.673 Z=0  
2591 X=307.45 Y=6.673 Z=0  
2592 X=306.65 Y=6.673 Z=0  
2593 X=305.65 Y=6.673 Z=0  
2594 X=291.1 Y=6.673 Z=0  
2595 X=292.83 Y=6.673 Z=0  
2596 X=294.63 Y=6.673 Z=0  
2597 X=296.25 Y=6.673 Z=0  
2598 X=297.85 Y=6.673 Z=0  
2599 X=298.15 Y=6.673 Z=0  
2600 X=299.65 Y=6.673 Z=0  
2601 X=303.5 Y=6.673 Z=0  
2602 X=305.3 Y=6.673 Z=0  
2603 X=307.05 Y=6.673 Z=0  
2604 X=308.8 Y=6.673 Z=0  
2605 X=310.5 Y=6.673 Z=0  
2606 X=312.17 Y=6.673 Z=0  
2607 X=313.9 Y=6.673 Z=0  
2608 X=315.975 Y=6.673 Z=0  
2609 X=317.7125 Y=6.673 Z=0  
2610 X=321.66 Y=6.673 Z=0  
2611 X=323.195 Y=6.673 Z=0  
2612 X=356.9 Y=6.673 Z=0  
2613 X=340.3 Y=6.673 Z=0  
2614 X=325.2 Y=6.673 Z=0  
2615 X=329.76 Y=6.673 Z=0  
2616 X=330.6 Y=6.673 Z=0  
2617 X=331.56 Y=6.673 Z=0  
2618 X=332.4 Y=6.673 Z=0  
2619 X=334.8 Y=6.673 Z=0  
2620 X=335.8 Y=6.673 Z=0  
2621 X=336.6 Y=6.673 Z=0  
2622 X=337.6 Y=6.673 Z=0  
2623 X=343 Y=6.673 Z=0  
2624 X=344 Y=6.673 Z=0  
2625 X=344.8 Y=6.673 Z=0  
2626 X=345.8 Y=6.673 Z=0  
2627 X=348.2 Y=6.673 Z=0  
2628 X=349.04 Y=6.673 Z=0  
2629 X=350 Y=6.673 Z=0  
2630 X=350.84 Y=6.673 Z=0  
2631 X=355.4 Y=6.673 Z=0  
2632 X=173.95 Y=1.372171E-14 Z=0  
2633 X=173.95 Y=2.108 Z=0  
2634 X=173.95 Y=3.543 Z=0  
2635 X=173.95 Y=4.216 Z=0  
2636 X=173.95 Y=5.108 Z=0  
2637 X=173.95 Y=6 Z=0  
2638 X=173.95 Y=8.108 Z=0  
2639 X=173.95 Y=10.216 Z=0  
2640 X=173.95 Y=6.673 Z=0  
2641 X=182.95 Y=1.372171E-14 Z=0  
2642 X=182.95 Y=2.108 Z=0  
2643 X=182.95 Y=3.543 Z=0  
2644 X=182.95 Y=4.216 Z=0  
2645 X=182.95 Y=5.108 Z=0  
2646 X=182.95 Y=6 Z=0  
2647 X=182.95 Y=8.108 Z=0

|      |          |                |        |  |
|------|----------|----------------|--------|--|
| 2648 | X=182.95 | Y=10.216       | Z=0    |  |
| 2649 | X=182.95 | Y=6.673        | Z=0    |  |
| 2650 | X=173.95 | Y=-1.742       | Z=0    |  |
| 2651 | X=182.95 | Y=-1.742       | Z=0    |  |
| 2652 | X=286.02 | Y=-1.742       | Z=0    |  |
| 2653 | X=0      | Y=1.208        | Z=-1.8 |  |
| 2654 | X=33.2   | Y=1.208        | Z=-1.8 |  |
| 2655 | X=74.7   | Y=1.208        | Z=-1.8 |  |
| 2656 | X=323.7  | Y=1.208        | Z=-1.8 |  |
| 2657 | X=356.9  | Y=1.208        | Z=-1.8 |  |
| 2658 | X=116.2  | Y=1.208        | Z=-1.8 |  |
| 2659 | X=157.7  | Y=1.208        | Z=-1.8 |  |
| 2660 | X=199.2  | Y=1.208        | Z=-1.8 |  |
| 2661 | X=286.02 | Y=8.147268E-15 | Z=0    |  |
| 2662 | X=286.02 | Y=2.108        | Z=0    |  |
| 2663 | X=286.02 | Y=3.543        | Z=0    |  |
| 2664 | X=286.02 | Y=4.216        | Z=0    |  |
| 2665 | X=286.02 | Y=5.108        | Z=0    |  |
| 2666 | X=286.02 | Y=6            | Z=0    |  |
| 2667 | X=286.02 | Y=8.108        | Z=0    |  |
| 2668 | X=286.02 | Y=10.216       | Z=0    |  |
| 2669 | X=286.02 | Y=6.673        | Z=0    |  |
| 2670 | X=240.7  | Y=1.208        | Z=-1.8 |  |
| 2671 | X=282.2  | Y=1.208        | Z=-1.8 |  |
| 2672 | X=16.6   | Y=1.208        | Z=-1.8 |  |
| 2673 | X=1.02   | Y=1.208        | Z=-1.8 |  |
| 2674 | X=1.935  | Y=1.208        | Z=-1.8 |  |
| 2675 | X=4.325  | Y=1.208        | Z=-1.8 |  |
| 2676 | X=8.23   | Y=1.208        | Z=-1.8 |  |
| 2677 | X=9.135  | Y=1.208        | Z=-1.8 |  |
| 2678 | X=10.29  | Y=1.208        | Z=-1.8 |  |
| 2679 | X=11.525 | Y=1.208        | Z=-1.8 |  |
| 2680 | X=12.35  | Y=1.208        | Z=-1.8 |  |
| 2681 | X=15.7   | Y=1.208        | Z=-1.8 |  |
| 2682 | X=17.5   | Y=1.208        | Z=-1.8 |  |
| 2683 | X=22.9   | Y=1.208        | Z=-1.8 |  |
| 2684 | X=24.7   | Y=1.208        | Z=-1.8 |  |
| 2685 | X=24.9   | Y=1.208        | Z=-1.8 |  |
| 2686 | X=26.7   | Y=1.208        | Z=-1.8 |  |
| 2687 | X=28.1   | Y=1.208        | Z=-1.8 |  |
| 2688 | X=29.9   | Y=1.208        | Z=-1.8 |  |
| 2689 | X=30.02  | Y=1.208        | Z=-1.8 |  |
| 2690 | X=31.82  | Y=1.208        | Z=-1.8 |  |
| 2691 | X=53.95  | Y=1.208        | Z=-1.8 |  |
| 2692 | X=35.3   | Y=1.208        | Z=-1.8 |  |
| 2693 | X=37.1   | Y=1.208        | Z=-1.8 |  |
| 2694 | X=37.22  | Y=1.208        | Z=-1.8 |  |
| 2695 | X=39.02  | Y=1.208        | Z=-1.8 |  |
| 2696 | X=95.45  | Y=1.208        | Z=-1.8 |  |
| 2697 | X=78.55  | Y=1.208        | Z=-1.8 |  |
| 2698 | X=80.35  | Y=1.208        | Z=-1.8 |  |
| 2699 | X=85.75  | Y=1.208        | Z=-1.8 |  |
| 2700 | X=87.55  | Y=1.208        | Z=-1.8 |  |
| 2701 | X=90.95  | Y=1.208        | Z=-1.8 |  |
| 2702 | X=92.75  | Y=1.208        | Z=-1.8 |  |
| 2703 | X=98.15  | Y=1.208        | Z=-1.8 |  |
| 2704 | X=99.95  | Y=1.208        | Z=-1.8 |  |
| 2705 | X=103.35 | Y=1.208        | Z=-1.8 |  |
| 2706 | X=105.15 | Y=1.208        | Z=-1.8 |  |
| 2707 | X=110.55 | Y=1.208        | Z=-1.8 |  |
| 2708 | X=112.35 | Y=1.208        | Z=-1.8 |  |
| 2709 | X=34.25  | Y=1.208        | Z=-1.8 |  |
| 2710 | X=36.31  | Y=1.208        | Z=-1.8 |  |
| 2711 | X=38.37  | Y=1.208        | Z=-1.8 |  |
| 2712 | X=39.285 | Y=1.208        | Z=-1.8 |  |
| 2713 | X=41.675 | Y=1.208        | Z=-1.8 |  |
| 2714 | X=45.58  | Y=1.208        | Z=-1.8 |  |
| 2715 | X=46.485 | Y=1.208        | Z=-1.8 |  |
| 2716 | X=47.64  | Y=1.208        | Z=-1.8 |  |
| 2717 | X=48.875 | Y=1.208        | Z=-1.8 |  |
| 2718 | X=49.7   | Y=1.208        | Z=-1.8 |  |
| 2719 | X=53.05  | Y=1.208        | Z=-1.8 |  |
| 2720 | X=54.85  | Y=1.208        | Z=-1.8 |  |
| 2721 | X=60.25  | Y=1.208        | Z=-1.8 |  |
| 2722 | X=62.05  | Y=1.208        | Z=-1.8 |  |
| 2723 | X=62.25  | Y=1.208        | Z=-1.8 |  |
| 2724 | X=64.05  | Y=1.208        | Z=-1.8 |  |
| 2725 | X=65.45  | Y=1.208        | Z=-1.8 |  |
| 2726 | X=67.25  | Y=1.208        | Z=-1.8 |  |
| 2727 | X=67.37  | Y=1.208        | Z=-1.8 |  |
| 2728 | X=69.17  | Y=1.208        | Z=-1.8 |  |
| 2729 | X=72.65  | Y=1.208        | Z=-1.8 |  |
| 2730 | X=74.45  | Y=1.208        | Z=-1.8 |  |

|      |           |         |        |
|------|-----------|---------|--------|
| 2731 | X=76.37   | Y=1.208 | Z=-1.8 |
| 2732 | X=136.95  | Y=1.208 | Z=-1.8 |
| 2733 | X=120.05  | Y=1.208 | Z=-1.8 |
| 2734 | X=121.85  | Y=1.208 | Z=-1.8 |
| 2735 | X=127.25  | Y=1.208 | Z=-1.8 |
| 2736 | X=129.05  | Y=1.208 | Z=-1.8 |
| 2737 | X=132.45  | Y=1.208 | Z=-1.8 |
| 2738 | X=134.25  | Y=1.208 | Z=-1.8 |
| 2739 | X=139.65  | Y=1.208 | Z=-1.8 |
| 2740 | X=141.45  | Y=1.208 | Z=-1.8 |
| 2741 | X=144.85  | Y=1.208 | Z=-1.8 |
| 2742 | X=146.65  | Y=1.208 | Z=-1.8 |
| 2743 | X=152.05  | Y=1.208 | Z=-1.8 |
| 2744 | X=153.85  | Y=1.208 | Z=-1.8 |
| 2745 | X=75.75   | Y=1.208 | Z=-1.8 |
| 2746 | X=77.81   | Y=1.208 | Z=-1.8 |
| 2747 | X=79.87   | Y=1.208 | Z=-1.8 |
| 2748 | X=80.785  | Y=1.208 | Z=-1.8 |
| 2749 | X=83.175  | Y=1.208 | Z=-1.8 |
| 2750 | X=86.98   | Y=1.208 | Z=-1.8 |
| 2751 | X=87.985  | Y=1.208 | Z=-1.8 |
| 2752 | X=89.12   | Y=1.208 | Z=-1.8 |
| 2753 | X=90.375  | Y=1.208 | Z=-1.8 |
| 2754 | X=94.55   | Y=1.208 | Z=-1.8 |
| 2755 | X=96.35   | Y=1.208 | Z=-1.8 |
| 2756 | X=101.75  | Y=1.208 | Z=-1.8 |
| 2757 | X=103.65  | Y=1.208 | Z=-1.8 |
| 2758 | X=105.55  | Y=1.208 | Z=-1.8 |
| 2759 | X=106.95  | Y=1.208 | Z=-1.8 |
| 2760 | X=108.8   | Y=1.208 | Z=-1.8 |
| 2761 | X=114.15  | Y=1.208 | Z=-1.8 |
| 2762 | X=116     | Y=1.208 | Z=-1.8 |
| 2763 | X=117.87  | Y=1.208 | Z=-1.8 |
| 2764 | X=178.45  | Y=1.208 | Z=-1.8 |
| 2765 | X=161.55  | Y=1.208 | Z=-1.8 |
| 2766 | X=163.35  | Y=1.208 | Z=-1.8 |
| 2767 | X=168.75  | Y=1.208 | Z=-1.8 |
| 2768 | X=170.55  | Y=1.208 | Z=-1.8 |
| 2769 | X=175.75  | Y=1.208 | Z=-1.8 |
| 2770 | X=181.15  | Y=1.208 | Z=-1.8 |
| 2771 | X=186.35  | Y=1.208 | Z=-1.8 |
| 2772 | X=188.15  | Y=1.208 | Z=-1.8 |
| 2773 | X=193.55  | Y=1.208 | Z=-1.8 |
| 2774 | X=195.35  | Y=1.208 | Z=-1.8 |
| 2775 | X=77.44   | Y=1.208 | Z=-1.8 |
| 2776 | X=84.6425 | Y=1.208 | Z=-1.8 |
| 2777 | X=89.6975 | Y=1.208 | Z=-1.8 |
| 2778 | X=91.18   | Y=1.208 | Z=-1.8 |
| 2779 | X=92.98   | Y=1.208 | Z=-1.8 |
| 2780 | X=95      | Y=1.208 | Z=-1.8 |
| 2781 | X=100.3   | Y=1.208 | Z=-1.8 |
| 2782 | X=102.15  | Y=1.208 | Z=-1.8 |
| 2783 | X=107.3   | Y=1.208 | Z=-1.8 |
| 2784 | X=112.7   | Y=1.208 | Z=-1.8 |
| 2785 | X=114.525 | Y=1.208 | Z=-1.8 |
| 2786 | X=119.66  | Y=1.208 | Z=-1.8 |
| 2787 | X=125.05  | Y=1.208 | Z=-1.8 |
| 2788 | X=127     | Y=1.208 | Z=-1.8 |
| 2789 | X=130.3   | Y=1.208 | Z=-1.8 |
| 2790 | X=132.075 | Y=1.208 | Z=-1.8 |
| 2791 | X=137.5   | Y=1.208 | Z=-1.8 |
| 2792 | X=139.375 | Y=1.208 | Z=-1.8 |
| 2793 | X=142.7   | Y=1.208 | Z=-1.8 |
| 2794 | X=144.475 | Y=1.208 | Z=-1.8 |
| 2795 | X=150.05  | Y=1.208 | Z=-1.8 |
| 2796 | X=151.75  | Y=1.208 | Z=-1.8 |
| 2797 | X=261.45  | Y=1.208 | Z=-1.8 |
| 2798 | X=241.77  | Y=1.208 | Z=-1.8 |
| 2799 | X=243.48  | Y=1.208 | Z=-1.8 |
| 2800 | X=243.81  | Y=1.208 | Z=-1.8 |
| 2801 | X=245.5   | Y=1.208 | Z=-1.8 |
| 2802 | X=245.87  | Y=1.208 | Z=-1.8 |
| 2803 | X=253.08  | Y=1.208 | Z=-1.8 |
| 2804 | X=254.88  | Y=1.208 | Z=-1.8 |
| 2805 | X=252.861 | Y=1.208 | Z=-1.8 |
| 2806 | X=255.14  | Y=1.208 | Z=-1.8 |
| 2807 | X=256.57  | Y=1.208 | Z=-1.8 |
| 2808 | X=257.2   | Y=1.208 | Z=-1.8 |
| 2809 | X=260.55  | Y=1.208 | Z=-1.8 |
| 2810 | X=262.35  | Y=1.208 | Z=-1.8 |
| 2811 | X=267.75  | Y=1.208 | Z=-1.8 |
| 2812 | X=269.65  | Y=1.208 | Z=-1.8 |
| 2813 | X=271.55  | Y=1.208 | Z=-1.8 |

|      |            |         |        |
|------|------------|---------|--------|
| 2814 | X=272.95   | Y=1.208 | Z=-1.8 |
| 2815 | X=274.77   | Y=1.208 | Z=-1.8 |
| 2816 | X=276.59   | Y=1.208 | Z=-1.8 |
| 2817 | X=280.147  | Y=1.208 | Z=-1.8 |
| 2818 | X=281.9735 | Y=1.208 | Z=-1.8 |
| 2819 | X=302.95   | Y=1.208 | Z=-1.8 |
| 2820 | X=283.99   | Y=1.208 | Z=-1.8 |
| 2821 | X=285.79   | Y=1.208 | Z=-1.8 |
| 2822 | X=340.3    | Y=1.208 | Z=-1.8 |
| 2823 | X=325.2    | Y=1.208 | Z=-1.8 |
| 2824 | X=320.76   | Y=1.208 | Z=-1.8 |
| 2825 | X=322.56   | Y=1.208 | Z=-1.8 |
| 2826 | X=329.76   | Y=1.208 | Z=-1.8 |
| 2827 | X=330.6    | Y=1.208 | Z=-1.8 |
| 2828 | X=331.56   | Y=1.208 | Z=-1.8 |
| 2829 | X=332.4    | Y=1.208 | Z=-1.8 |
| 2830 | X=334.8    | Y=1.208 | Z=-1.8 |
| 2831 | X=335.8    | Y=1.208 | Z=-1.8 |
| 2832 | X=336.6    | Y=1.208 | Z=-1.8 |
| 2833 | X=337.6    | Y=1.208 | Z=-1.8 |
| 2834 | X=343      | Y=1.208 | Z=-1.8 |
| 2835 | X=344      | Y=1.208 | Z=-1.8 |
| 2836 | X=344.8    | Y=1.208 | Z=-1.8 |
| 2837 | X=345.8    | Y=1.208 | Z=-1.8 |
| 2838 | X=348.2    | Y=1.208 | Z=-1.8 |
| 2839 | X=349.04   | Y=1.208 | Z=-1.8 |
| 2840 | X=350      | Y=1.208 | Z=-1.8 |
| 2841 | X=350.84   | Y=1.208 | Z=-1.8 |
| 2842 | X=355.4    | Y=1.208 | Z=-1.8 |
| 2843 | X=219.95   | Y=1.208 | Z=-1.8 |
| 2844 | X=200.27   | Y=1.208 | Z=-1.8 |
| 2845 | X=201.98   | Y=1.208 | Z=-1.8 |
| 2846 | X=202.31   | Y=1.208 | Z=-1.8 |
| 2847 | X=204      | Y=1.208 | Z=-1.8 |
| 2848 | X=204.37   | Y=1.208 | Z=-1.8 |
| 2849 | X=211.36   | Y=1.208 | Z=-1.8 |
| 2850 | X=211.58   | Y=1.208 | Z=-1.8 |
| 2851 | X=213.38   | Y=1.208 | Z=-1.8 |
| 2852 | X=213.64   | Y=1.208 | Z=-1.8 |
| 2853 | X=215.07   | Y=1.208 | Z=-1.8 |
| 2854 | X=215.7    | Y=1.208 | Z=-1.8 |
| 2855 | X=219.05   | Y=1.208 | Z=-1.8 |
| 2856 | X=220.85   | Y=1.208 | Z=-1.8 |
| 2857 | X=226.25   | Y=1.208 | Z=-1.8 |
| 2858 | X=228.1    | Y=1.208 | Z=-1.8 |
| 2859 | X=230.05   | Y=1.208 | Z=-1.8 |
| 2860 | X=231.45   | Y=1.208 | Z=-1.8 |
| 2861 | X=233.27   | Y=1.208 | Z=-1.8 |
| 2862 | X=235.09   | Y=1.208 | Z=-1.8 |
| 2863 | X=238.65   | Y=1.208 | Z=-1.8 |
| 2864 | X=240.45   | Y=1.208 | Z=-1.8 |
| 2865 | X=242.49   | Y=1.208 | Z=-1.8 |
| 2866 | X=244.255  | Y=1.208 | Z=-1.8 |
| 2867 | X=283.395  | Y=1.208 | Z=-1.8 |
| 2868 | X=285.21   | Y=1.208 | Z=-1.8 |
| 2869 | X=287.85   | Y=1.208 | Z=-1.8 |
| 2870 | X=292.41   | Y=1.208 | Z=-1.8 |
| 2871 | X=293.25   | Y=1.208 | Z=-1.8 |
| 2872 | X=294.21   | Y=1.208 | Z=-1.8 |
| 2873 | X=295.05   | Y=1.208 | Z=-1.8 |
| 2874 | X=297.45   | Y=1.208 | Z=-1.8 |
| 2875 | X=298.45   | Y=1.208 | Z=-1.8 |
| 2876 | X=299.25   | Y=1.208 | Z=-1.8 |
| 2877 | X=300.25   | Y=1.208 | Z=-1.8 |
| 2878 | X=322.69   | Y=1.208 | Z=-1.8 |
| 2879 | X=318.05   | Y=1.208 | Z=-1.8 |
| 2880 | X=319.85   | Y=1.208 | Z=-1.8 |
| 2881 | X=313.49   | Y=1.208 | Z=-1.8 |
| 2882 | X=312.65   | Y=1.208 | Z=-1.8 |
| 2883 | X=311.69   | Y=1.208 | Z=-1.8 |
| 2884 | X=310.85   | Y=1.208 | Z=-1.8 |
| 2885 | X=308.45   | Y=1.208 | Z=-1.8 |
| 2886 | X=307.45   | Y=1.208 | Z=-1.8 |
| 2887 | X=306.65   | Y=1.208 | Z=-1.8 |
| 2888 | X=305.65   | Y=1.208 | Z=-1.8 |
| 2889 | X=236.58   | Y=1.208 | Z=-1.8 |
| 2890 | X=238.27   | Y=1.208 | Z=-1.8 |
| 2891 | X=244.4775 | Y=1.208 | Z=-1.8 |
| 2892 | X=247.651  | Y=1.208 | Z=-1.8 |
| 2893 | X=249.67   | Y=1.208 | Z=-1.8 |
| 2894 | X=251.3655 | Y=1.208 | Z=-1.8 |
| 2895 | X=251.6299 | Y=1.208 | Z=-1.8 |
| 2896 | X=253.68   | Y=1.208 | Z=-1.8 |

2897 X=255.355 Y=1.208 Z=-1.8  
2898 X=255.7625 Y=1.208 Z=-1.8  
2899 X=259.1 Y=1.208 Z=-1.8  
2900 X=260.9 Y=1.208 Z=-1.8  
2901 X=264.54 Y=1.208 Z=-1.8  
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2905 X=278.75 Y=1.208 Z=-1.8  
2906 X=280.5803 Y=1.208 Z=-1.8  
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2908 X=292.83 Y=1.208 Z=-1.8  
2909 X=294.63 Y=1.208 Z=-1.8  
2910 X=296.25 Y=1.208 Z=-1.8  
2911 X=297.85 Y=1.208 Z=-1.8  
2912 X=298.15 Y=1.208 Z=-1.8  
2913 X=299.65 Y=1.208 Z=-1.8  
2914 X=303.5 Y=1.208 Z=-1.8  
2915 X=305.3 Y=1.208 Z=-1.8  
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2919 X=312.17 Y=1.208 Z=-1.8  
2920 X=313.9 Y=1.208 Z=-1.8  
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2922 X=317.7125 Y=1.208 Z=-1.8  
2923 X=321.66 Y=1.208 Z=-1.8  
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2925 X=173.95 Y=1.208 Z=-1.8  
2926 X=182.95 Y=1.208 Z=-1.8  
2927 X=286.02 Y=1.208 Z=-1.8  
2928 X=0 Y=2.108 Z=-1.8  
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2930 X=74.7 Y=2.108 Z=-1.8  
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2940 X=1.935 Y=2.108 Z=-1.8  
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2943 X=9.135 Y=2.108 Z=-1.8  
2944 X=10.29 Y=2.108 Z=-1.8  
2945 X=11.525 Y=2.108 Z=-1.8  
2946 X=12.35 Y=2.108 Z=-1.8  
2947 X=15.7 Y=2.108 Z=-1.8  
2948 X=17.5 Y=2.108 Z=-1.8  
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2951 X=24.9 Y=2.108 Z=-1.8  
2952 X=26.7 Y=2.108 Z=-1.8  
2953 X=28.1 Y=2.108 Z=-1.8  
2954 X=29.9 Y=2.108 Z=-1.8  
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2957 X=53.95 Y=2.108 Z=-1.8  
2958 X=35.3 Y=2.108 Z=-1.8  
2959 X=37.1 Y=2.108 Z=-1.8  
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2961 X=39.02 Y=2.108 Z=-1.8  
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2967 X=90.95 Y=2.108 Z=-1.8  
2968 X=92.75 Y=2.108 Z=-1.8  
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2977 X=38.37 Y=2.108 Z=-1.8  
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2989 X=62.25 Y=2.108 Z=-1.8  
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3002 X=129.05 Y=2.108 Z=-1.8  
3003 X=132.45 Y=2.108 Z=-1.8  
3004 X=134.25 Y=2.108 Z=-1.8  
3005 X=139.65 Y=2.108 Z=-1.8  
3006 X=141.45 Y=2.108 Z=-1.8  
3007 X=144.85 Y=2.108 Z=-1.8  
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3009 X=152.05 Y=2.108 Z=-1.8  
3010 X=153.85 Y=2.108 Z=-1.8  
3011 X=75.75 Y=2.108 Z=-1.8  
3012 X=77.81 Y=2.108 Z=-1.8  
3013 X=79.87 Y=2.108 Z=-1.8  
3014 X=80.785 Y=2.108 Z=-1.8  
3015 X=83.175 Y=2.108 Z=-1.8  
3016 X=86.98 Y=2.108 Z=-1.8  
3017 X=87.985 Y=2.108 Z=-1.8  
3018 X=89.12 Y=2.108 Z=-1.8  
3019 X=90.375 Y=2.108 Z=-1.8  
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3021 X=96.35 Y=2.108 Z=-1.8  
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3026 X=108.8 Y=2.108 Z=-1.8  
3027 X=114.15 Y=2.108 Z=-1.8  
3028 X=116 Y=2.108 Z=-1.8  
3029 X=117.87 Y=2.108 Z=-1.8  
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3031 X=161.55 Y=2.108 Z=-1.8  
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3033 X=168.75 Y=2.108 Z=-1.8  
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3037 X=186.35 Y=2.108 Z=-1.8  
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3039 X=193.55 Y=2.108 Z=-1.8  
3040 X=195.35 Y=2.108 Z=-1.8  
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3042 X=84.6425 Y=2.108 Z=-1.8  
3043 X=89.6975 Y=2.108 Z=-1.8  
3044 X=91.18 Y=2.108 Z=-1.8  
3045 X=92.98 Y=2.108 Z=-1.8  
3046 X=95 Y=2.108 Z=-1.8  
3047 X=100.3 Y=2.108 Z=-1.8  
3048 X=102.15 Y=2.108 Z=-1.8  
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3051 X=114.525 Y=2.108 Z=-1.8  
3052 X=119.66 Y=2.108 Z=-1.8  
3053 X=125.05 Y=2.108 Z=-1.8  
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3057 X=137.5 Y=2.108 Z=-1.8  
3058 X=139.375 Y=2.108 Z=-1.8  
3059 X=142.7 Y=2.108 Z=-1.8  
3060 X=144.475 Y=2.108 Z=-1.8  
3061 X=150.05 Y=2.108 Z=-1.8  
3062 X=151.75 Y=2.108 Z=-1.8



|      |            |         |        |
|------|------------|---------|--------|
| 3063 | X=261.45   | Y=2.108 | Z=-1.8 |
| 3064 | X=241.77   | Y=2.108 | Z=-1.8 |
| 3065 | X=243.48   | Y=2.108 | Z=-1.8 |
| 3066 | X=243.81   | Y=2.108 | Z=-1.8 |
| 3067 | X=245.5    | Y=2.108 | Z=-1.8 |
| 3068 | X=245.87   | Y=2.108 | Z=-1.8 |
| 3069 | X=253.08   | Y=2.108 | Z=-1.8 |
| 3070 | X=254.88   | Y=2.108 | Z=-1.8 |
| 3071 | X=252.861  | Y=2.108 | Z=-1.8 |
| 3072 | X=255.14   | Y=2.108 | Z=-1.8 |
| 3073 | X=256.57   | Y=2.108 | Z=-1.8 |
| 3074 | X=257.2    | Y=2.108 | Z=-1.8 |
| 3075 | X=260.55   | Y=2.108 | Z=-1.8 |
| 3076 | X=262.35   | Y=2.108 | Z=-1.8 |
| 3077 | X=267.75   | Y=2.108 | Z=-1.8 |
| 3078 | X=269.65   | Y=2.108 | Z=-1.8 |
| 3079 | X=271.55   | Y=2.108 | Z=-1.8 |
| 3080 | X=272.95   | Y=2.108 | Z=-1.8 |
| 3081 | X=274.77   | Y=2.108 | Z=-1.8 |
| 3082 | X=276.59   | Y=2.108 | Z=-1.8 |
| 3083 | X=280.147  | Y=2.108 | Z=-1.8 |
| 3084 | X=281.9735 | Y=2.108 | Z=-1.8 |
| 3085 | X=302.95   | Y=2.108 | Z=-1.8 |
| 3086 | X=283.99   | Y=2.108 | Z=-1.8 |
| 3087 | X=285.79   | Y=2.108 | Z=-1.8 |
| 3088 | X=340.3    | Y=2.108 | Z=-1.8 |
| 3089 | X=325.2    | Y=2.108 | Z=-1.8 |
| 3090 | X=320.76   | Y=2.108 | Z=-1.8 |
| 3091 | X=322.56   | Y=2.108 | Z=-1.8 |
| 3092 | X=329.76   | Y=2.108 | Z=-1.8 |
| 3093 | X=330.6    | Y=2.108 | Z=-1.8 |
| 3094 | X=331.56   | Y=2.108 | Z=-1.8 |
| 3095 | X=332.4    | Y=2.108 | Z=-1.8 |
| 3096 | X=334.8    | Y=2.108 | Z=-1.8 |
| 3097 | X=335.8    | Y=2.108 | Z=-1.8 |
| 3098 | X=336.6    | Y=2.108 | Z=-1.8 |
| 3099 | X=337.6    | Y=2.108 | Z=-1.8 |
| 3100 | X=343      | Y=2.108 | Z=-1.8 |
| 3101 | X=344      | Y=2.108 | Z=-1.8 |
| 3102 | X=344.8    | Y=2.108 | Z=-1.8 |
| 3103 | X=345.8    | Y=2.108 | Z=-1.8 |
| 3104 | X=348.2    | Y=2.108 | Z=-1.8 |
| 3105 | X=349.04   | Y=2.108 | Z=-1.8 |
| 3106 | X=350      | Y=2.108 | Z=-1.8 |
| 3107 | X=350.84   | Y=2.108 | Z=-1.8 |
| 3108 | X=355.4    | Y=2.108 | Z=-1.8 |
| 3109 | X=219.95   | Y=2.108 | Z=-1.8 |
| 3110 | X=200.27   | Y=2.108 | Z=-1.8 |
| 3111 | X=201.98   | Y=2.108 | Z=-1.8 |
| 3112 | X=202.31   | Y=2.108 | Z=-1.8 |
| 3113 | X=204      | Y=2.108 | Z=-1.8 |
| 3114 | X=204.37   | Y=2.108 | Z=-1.8 |
| 3115 | X=211.36   | Y=2.108 | Z=-1.8 |
| 3116 | X=211.58   | Y=2.108 | Z=-1.8 |
| 3117 | X=213.38   | Y=2.108 | Z=-1.8 |
| 3118 | X=213.64   | Y=2.108 | Z=-1.8 |
| 3119 | X=215.07   | Y=2.108 | Z=-1.8 |
| 3120 | X=215.7    | Y=2.108 | Z=-1.8 |
| 3121 | X=219.05   | Y=2.108 | Z=-1.8 |
| 3122 | X=220.85   | Y=2.108 | Z=-1.8 |
| 3123 | X=226.25   | Y=2.108 | Z=-1.8 |
| 3124 | X=228.1    | Y=2.108 | Z=-1.8 |
| 3125 | X=230.05   | Y=2.108 | Z=-1.8 |
| 3126 | X=231.45   | Y=2.108 | Z=-1.8 |
| 3127 | X=233.27   | Y=2.108 | Z=-1.8 |
| 3128 | X=235.09   | Y=2.108 | Z=-1.8 |
| 3129 | X=238.65   | Y=2.108 | Z=-1.8 |
| 3130 | X=240.45   | Y=2.108 | Z=-1.8 |
| 3131 | X=242.49   | Y=2.108 | Z=-1.8 |
| 3132 | X=244.255  | Y=2.108 | Z=-1.8 |
| 3133 | X=283.395  | Y=2.108 | Z=-1.8 |
| 3134 | X=285.21   | Y=2.108 | Z=-1.8 |
| 3135 | X=287.85   | Y=2.108 | Z=-1.8 |
| 3136 | X=292.41   | Y=2.108 | Z=-1.8 |
| 3137 | X=293.25   | Y=2.108 | Z=-1.8 |
| 3138 | X=294.21   | Y=2.108 | Z=-1.8 |
| 3139 | X=295.05   | Y=2.108 | Z=-1.8 |
| 3140 | X=297.45   | Y=2.108 | Z=-1.8 |
| 3141 | X=298.45   | Y=2.108 | Z=-1.8 |
| 3142 | X=299.25   | Y=2.108 | Z=-1.8 |
| 3143 | X=300.25   | Y=2.108 | Z=-1.8 |
| 3144 | X=322.69   | Y=2.108 | Z=-1.8 |
| 3145 | X=318.05   | Y=2.108 | Z=-1.8 |

|      |            |         |        |
|------|------------|---------|--------|
| 3146 | X=319.85   | Y=2.108 | Z=-1.8 |
| 3147 | X=313.49   | Y=2.108 | Z=-1.8 |
| 3148 | X=312.65   | Y=2.108 | Z=-1.8 |
| 3149 | X=311.69   | Y=2.108 | Z=-1.8 |
| 3150 | X=310.85   | Y=2.108 | Z=-1.8 |
| 3151 | X=308.45   | Y=2.108 | Z=-1.8 |
| 3152 | X=307.45   | Y=2.108 | Z=-1.8 |
| 3153 | X=306.65   | Y=2.108 | Z=-1.8 |
| 3154 | X=305.65   | Y=2.108 | Z=-1.8 |
| 3155 | X=236.58   | Y=2.108 | Z=-1.8 |
| 3156 | X=238.27   | Y=2.108 | Z=-1.8 |
| 3157 | X=244.4775 | Y=2.108 | Z=-1.8 |
| 3158 | X=247.651  | Y=2.108 | Z=-1.8 |
| 3159 | X=249.67   | Y=2.108 | Z=-1.8 |
| 3160 | X=251.3655 | Y=2.108 | Z=-1.8 |
| 3161 | X=251.6299 | Y=2.108 | Z=-1.8 |
| 3162 | X=253.68   | Y=2.108 | Z=-1.8 |
| 3163 | X=255.355  | Y=2.108 | Z=-1.8 |
| 3164 | X=255.7625 | Y=2.108 | Z=-1.8 |
| 3165 | X=259.1    | Y=2.108 | Z=-1.8 |
| 3166 | X=260.9    | Y=2.108 | Z=-1.8 |
| 3167 | X=264.54   | Y=2.108 | Z=-1.8 |
| 3168 | X=266.345  | Y=2.108 | Z=-1.8 |
| 3169 | X=268.1    | Y=2.108 | Z=-1.8 |
| 3170 | X=273.36   | Y=2.108 | Z=-1.8 |
| 3171 | X=278.75   | Y=2.108 | Z=-1.8 |
| 3172 | X=280.5803 | Y=2.108 | Z=-1.8 |
| 3173 | X=291.1    | Y=2.108 | Z=-1.8 |
| 3174 | X=292.83   | Y=2.108 | Z=-1.8 |
| 3175 | X=294.63   | Y=2.108 | Z=-1.8 |
| 3176 | X=296.25   | Y=2.108 | Z=-1.8 |
| 3177 | X=297.85   | Y=2.108 | Z=-1.8 |
| 3178 | X=298.15   | Y=2.108 | Z=-1.8 |
| 3179 | X=299.65   | Y=2.108 | Z=-1.8 |
| 3180 | X=303.5    | Y=2.108 | Z=-1.8 |
| 3181 | X=305.3    | Y=2.108 | Z=-1.8 |
| 3182 | X=307.05   | Y=2.108 | Z=-1.8 |
| 3183 | X=308.8    | Y=2.108 | Z=-1.8 |
| 3184 | X=310.5    | Y=2.108 | Z=-1.8 |
| 3185 | X=312.17   | Y=2.108 | Z=-1.8 |
| 3186 | X=313.9    | Y=2.108 | Z=-1.8 |
| 3187 | X=315.975  | Y=2.108 | Z=-1.8 |
| 3188 | X=317.7125 | Y=2.108 | Z=-1.8 |
| 3189 | X=321.66   | Y=2.108 | Z=-1.8 |
| 3190 | X=323.195  | Y=2.108 | Z=-1.8 |
| 3191 | X=173.95   | Y=2.108 | Z=-1.8 |
| 3192 | X=182.95   | Y=2.108 | Z=-1.8 |
| 3193 | X=286.02   | Y=2.108 | Z=-1.8 |
| 3194 | X=0        | Y=3.008 | Z=-1.8 |
| 3195 | X=33.2     | Y=3.008 | Z=-1.8 |
| 3196 | X=74.7     | Y=3.008 | Z=-1.8 |
| 3197 | X=323.7    | Y=3.008 | Z=-1.8 |
| 3198 | X=356.9    | Y=3.008 | Z=-1.8 |
| 3199 | X=116.2    | Y=3.008 | Z=-1.8 |
| 3200 | X=157.7    | Y=3.008 | Z=-1.8 |
| 3201 | X=199.2    | Y=3.008 | Z=-1.8 |
| 3202 | X=240.7    | Y=3.008 | Z=-1.8 |
| 3203 | X=282.2    | Y=3.008 | Z=-1.8 |
| 3204 | X=16.6     | Y=3.008 | Z=-1.8 |
| 3205 | X=1.02     | Y=3.008 | Z=-1.8 |
| 3206 | X=1.935    | Y=3.008 | Z=-1.8 |
| 3207 | X=4.325    | Y=3.008 | Z=-1.8 |
| 3208 | X=8.23     | Y=3.008 | Z=-1.8 |
| 3209 | X=9.135    | Y=3.008 | Z=-1.8 |
| 3210 | X=10.29    | Y=3.008 | Z=-1.8 |
| 3211 | X=11.525   | Y=3.008 | Z=-1.8 |
| 3212 | X=12.35    | Y=3.008 | Z=-1.8 |
| 3213 | X=15.7     | Y=3.008 | Z=-1.8 |
| 3214 | X=17.5     | Y=3.008 | Z=-1.8 |
| 3215 | X=22.9     | Y=3.008 | Z=-1.8 |
| 3216 | X=24.7     | Y=3.008 | Z=-1.8 |
| 3217 | X=24.9     | Y=3.008 | Z=-1.8 |
| 3218 | X=26.7     | Y=3.008 | Z=-1.8 |
| 3219 | X=28.1     | Y=3.008 | Z=-1.8 |
| 3220 | X=29.9     | Y=3.008 | Z=-1.8 |
| 3221 | X=30.02    | Y=3.008 | Z=-1.8 |
| 3222 | X=31.82    | Y=3.008 | Z=-1.8 |
| 3223 | X=53.95    | Y=3.008 | Z=-1.8 |
| 3224 | X=35.3     | Y=3.008 | Z=-1.8 |
| 3225 | X=37.1     | Y=3.008 | Z=-1.8 |
| 3226 | X=37.22    | Y=3.008 | Z=-1.8 |
| 3227 | X=39.02    | Y=3.008 | Z=-1.8 |
| 3228 | X=95.45    | Y=3.008 | Z=-1.8 |

|      |           |         |        |
|------|-----------|---------|--------|
| 3229 | X=78.55   | Y=3.008 | Z=-1.8 |
| 3230 | X=80.35   | Y=3.008 | Z=-1.8 |
| 3231 | X=85.75   | Y=3.008 | Z=-1.8 |
| 3232 | X=87.55   | Y=3.008 | Z=-1.8 |
| 3233 | X=90.95   | Y=3.008 | Z=-1.8 |
| 3234 | X=92.75   | Y=3.008 | Z=-1.8 |
| 3235 | X=98.15   | Y=3.008 | Z=-1.8 |
| 3236 | X=99.95   | Y=3.008 | Z=-1.8 |
| 3237 | X=103.35  | Y=3.008 | Z=-1.8 |
| 3238 | X=105.15  | Y=3.008 | Z=-1.8 |
| 3239 | X=110.55  | Y=3.008 | Z=-1.8 |
| 3240 | X=112.35  | Y=3.008 | Z=-1.8 |
| 3241 | X=34.25   | Y=3.008 | Z=-1.8 |
| 3242 | X=36.31   | Y=3.008 | Z=-1.8 |
| 3243 | X=38.37   | Y=3.008 | Z=-1.8 |
| 3244 | X=39.285  | Y=3.008 | Z=-1.8 |
| 3245 | X=41.675  | Y=3.008 | Z=-1.8 |
| 3246 | X=45.58   | Y=3.008 | Z=-1.8 |
| 3247 | X=46.485  | Y=3.008 | Z=-1.8 |
| 3248 | X=47.64   | Y=3.008 | Z=-1.8 |
| 3249 | X=48.875  | Y=3.008 | Z=-1.8 |
| 3250 | X=49.7    | Y=3.008 | Z=-1.8 |
| 3251 | X=53.05   | Y=3.008 | Z=-1.8 |
| 3252 | X=54.85   | Y=3.008 | Z=-1.8 |
| 3253 | X=60.25   | Y=3.008 | Z=-1.8 |
| 3254 | X=62.05   | Y=3.008 | Z=-1.8 |
| 3255 | X=62.25   | Y=3.008 | Z=-1.8 |
| 3256 | X=64.05   | Y=3.008 | Z=-1.8 |
| 3257 | X=65.45   | Y=3.008 | Z=-1.8 |
| 3258 | X=67.25   | Y=3.008 | Z=-1.8 |
| 3259 | X=67.37   | Y=3.008 | Z=-1.8 |
| 3260 | X=69.17   | Y=3.008 | Z=-1.8 |
| 3261 | X=72.65   | Y=3.008 | Z=-1.8 |
| 3262 | X=74.45   | Y=3.008 | Z=-1.8 |
| 3263 | X=76.37   | Y=3.008 | Z=-1.8 |
| 3264 | X=136.95  | Y=3.008 | Z=-1.8 |
| 3265 | X=120.05  | Y=3.008 | Z=-1.8 |
| 3266 | X=121.85  | Y=3.008 | Z=-1.8 |
| 3267 | X=127.25  | Y=3.008 | Z=-1.8 |
| 3268 | X=129.05  | Y=3.008 | Z=-1.8 |
| 3269 | X=132.45  | Y=3.008 | Z=-1.8 |
| 3270 | X=134.25  | Y=3.008 | Z=-1.8 |
| 3271 | X=139.65  | Y=3.008 | Z=-1.8 |
| 3272 | X=141.45  | Y=3.008 | Z=-1.8 |
| 3273 | X=144.85  | Y=3.008 | Z=-1.8 |
| 3274 | X=146.65  | Y=3.008 | Z=-1.8 |
| 3275 | X=152.05  | Y=3.008 | Z=-1.8 |
| 3276 | X=153.85  | Y=3.008 | Z=-1.8 |
| 3277 | X=75.75   | Y=3.008 | Z=-1.8 |
| 3278 | X=77.81   | Y=3.008 | Z=-1.8 |
| 3279 | X=79.87   | Y=3.008 | Z=-1.8 |
| 3280 | X=80.785  | Y=3.008 | Z=-1.8 |
| 3281 | X=83.175  | Y=3.008 | Z=-1.8 |
| 3282 | X=86.98   | Y=3.008 | Z=-1.8 |
| 3283 | X=87.985  | Y=3.008 | Z=-1.8 |
| 3284 | X=89.12   | Y=3.008 | Z=-1.8 |
| 3285 | X=90.375  | Y=3.008 | Z=-1.8 |
| 3286 | X=94.55   | Y=3.008 | Z=-1.8 |
| 3287 | X=96.35   | Y=3.008 | Z=-1.8 |
| 3288 | X=101.75  | Y=3.008 | Z=-1.8 |
| 3289 | X=103.65  | Y=3.008 | Z=-1.8 |
| 3290 | X=105.55  | Y=3.008 | Z=-1.8 |
| 3291 | X=106.95  | Y=3.008 | Z=-1.8 |
| 3292 | X=108.8   | Y=3.008 | Z=-1.8 |
| 3293 | X=114.15  | Y=3.008 | Z=-1.8 |
| 3294 | X=116     | Y=3.008 | Z=-1.8 |
| 3295 | X=117.87  | Y=3.008 | Z=-1.8 |
| 3296 | X=178.45  | Y=3.008 | Z=-1.8 |
| 3297 | X=161.55  | Y=3.008 | Z=-1.8 |
| 3298 | X=163.35  | Y=3.008 | Z=-1.8 |
| 3299 | X=168.75  | Y=3.008 | Z=-1.8 |
| 3300 | X=170.55  | Y=3.008 | Z=-1.8 |
| 3301 | X=175.75  | Y=3.008 | Z=-1.8 |
| 3302 | X=181.15  | Y=3.008 | Z=-1.8 |
| 3303 | X=186.35  | Y=3.008 | Z=-1.8 |
| 3304 | X=188.15  | Y=3.008 | Z=-1.8 |
| 3305 | X=193.55  | Y=3.008 | Z=-1.8 |
| 3306 | X=195.35  | Y=3.008 | Z=-1.8 |
| 3307 | X=77.44   | Y=3.008 | Z=-1.8 |
| 3308 | X=84.6425 | Y=3.008 | Z=-1.8 |
| 3309 | X=89.6975 | Y=3.008 | Z=-1.8 |
| 3310 | X=91.18   | Y=3.008 | Z=-1.8 |
| 3311 | X=92.98   | Y=3.008 | Z=-1.8 |

3312 X=95 Y=3.008 Z=-1.8  
3313 X=100.3 Y=3.008 Z=-1.8  
3314 X=102.15 Y=3.008 Z=-1.8  
3315 X=107.3 Y=3.008 Z=-1.8  
3316 X=112.7 Y=3.008 Z=-1.8  
3317 X=114.525 Y=3.008 Z=-1.8  
3318 X=119.66 Y=3.008 Z=-1.8  
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3321 X=130.3 Y=3.008 Z=-1.8  
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3328 X=151.75 Y=3.008 Z=-1.8  
3329 X=261.45 Y=3.008 Z=-1.8  
3330 X=241.77 Y=3.008 Z=-1.8  
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3334 X=245.87 Y=3.008 Z=-1.8  
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3339 X=256.57 Y=3.008 Z=-1.8  
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3341 X=260.55 Y=3.008 Z=-1.8  
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3351 X=302.95 Y=3.008 Z=-1.8  
3352 X=283.99 Y=3.008 Z=-1.8  
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3355 X=325.2 Y=3.008 Z=-1.8  
3356 X=320.76 Y=3.008 Z=-1.8  
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3359 X=330.6 Y=3.008 Z=-1.8  
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3361 X=332.4 Y=3.008 Z=-1.8  
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3392 X=231.45 Y=3.008 Z=-1.8  
3393 X=233.27 Y=3.008 Z=-1.8  
3394 X=235.09 Y=3.008 Z=-1.8

3395 X=238.65 Y=3.008 Z=-1.8  
3396 X=240.45 Y=3.008 Z=-1.8  
3397 X=242.49 Y=3.008 Z=-1.8  
3398 X=244.255 Y=3.008 Z=-1.8  
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3401 X=287.85 Y=3.008 Z=-1.8  
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3410 X=322.69 Y=3.008 Z=-1.8  
3411 X=318.05 Y=3.008 Z=-1.8  
3412 X=319.85 Y=3.008 Z=-1.8  
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3417 X=308.45 Y=3.008 Z=-1.8  
3418 X=307.45 Y=3.008 Z=-1.8  
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3423 X=244.4775 Y=3.008 Z=-1.8  
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3425 X=249.67 Y=3.008 Z=-1.8  
3426 X=251.3655 Y=3.008 Z=-1.8  
3427 X=251.6299 Y=3.008 Z=-1.8  
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3431 X=259.1 Y=3.008 Z=-1.8  
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3458 X=182.95 Y=3.008 Z=-1.8  
3459 X=286.02 Y=3.008 Z=-1.8  
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3462 X=74.7 Y=7.208 Z=-1.8  
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3470 X=16.6 Y=7.208 Z=-1.8  
3471 X=1.02 Y=7.208 Z=-1.8  
3472 X=1.935 Y=7.208 Z=-1.8  
3473 X=4.325 Y=7.208 Z=-1.8  
3474 X=8.23 Y=7.208 Z=-1.8  
3475 X=9.135 Y=7.208 Z=-1.8  
3476 X=10.29 Y=7.208 Z=-1.8  
3477 X=11.525 Y=7.208 Z=-1.8

|      |          |         |        |
|------|----------|---------|--------|
| 3478 | X=12.35  | Y=7.208 | Z=-1.8 |
| 3479 | X=15.7   | Y=7.208 | Z=-1.8 |
| 3480 | X=17.5   | Y=7.208 | Z=-1.8 |
| 3481 | X=22.9   | Y=7.208 | Z=-1.8 |
| 3482 | X=24.7   | Y=7.208 | Z=-1.8 |
| 3483 | X=24.9   | Y=7.208 | Z=-1.8 |
| 3484 | X=26.7   | Y=7.208 | Z=-1.8 |
| 3485 | X=28.1   | Y=7.208 | Z=-1.8 |
| 3486 | X=29.9   | Y=7.208 | Z=-1.8 |
| 3487 | X=30.02  | Y=7.208 | Z=-1.8 |
| 3488 | X=31.82  | Y=7.208 | Z=-1.8 |
| 3489 | X=53.95  | Y=7.208 | Z=-1.8 |
| 3490 | X=35.3   | Y=7.208 | Z=-1.8 |
| 3491 | X=37.1   | Y=7.208 | Z=-1.8 |
| 3492 | X=37.22  | Y=7.208 | Z=-1.8 |
| 3493 | X=39.02  | Y=7.208 | Z=-1.8 |
| 3494 | X=95.45  | Y=7.208 | Z=-1.8 |
| 3495 | X=78.55  | Y=7.208 | Z=-1.8 |
| 3496 | X=80.35  | Y=7.208 | Z=-1.8 |
| 3497 | X=85.75  | Y=7.208 | Z=-1.8 |
| 3498 | X=87.55  | Y=7.208 | Z=-1.8 |
| 3499 | X=90.95  | Y=7.208 | Z=-1.8 |
| 3500 | X=92.75  | Y=7.208 | Z=-1.8 |
| 3501 | X=98.15  | Y=7.208 | Z=-1.8 |
| 3502 | X=99.95  | Y=7.208 | Z=-1.8 |
| 3503 | X=103.35 | Y=7.208 | Z=-1.8 |
| 3504 | X=105.15 | Y=7.208 | Z=-1.8 |
| 3505 | X=110.55 | Y=7.208 | Z=-1.8 |
| 3506 | X=112.35 | Y=7.208 | Z=-1.8 |
| 3507 | X=34.25  | Y=7.208 | Z=-1.8 |
| 3508 | X=36.31  | Y=7.208 | Z=-1.8 |
| 3509 | X=38.37  | Y=7.208 | Z=-1.8 |
| 3510 | X=39.285 | Y=7.208 | Z=-1.8 |
| 3511 | X=41.675 | Y=7.208 | Z=-1.8 |
| 3512 | X=45.58  | Y=7.208 | Z=-1.8 |
| 3513 | X=46.485 | Y=7.208 | Z=-1.8 |
| 3514 | X=47.64  | Y=7.208 | Z=-1.8 |
| 3515 | X=48.875 | Y=7.208 | Z=-1.8 |
| 3516 | X=49.7   | Y=7.208 | Z=-1.8 |
| 3517 | X=53.05  | Y=7.208 | Z=-1.8 |
| 3518 | X=54.85  | Y=7.208 | Z=-1.8 |
| 3519 | X=60.25  | Y=7.208 | Z=-1.8 |
| 3520 | X=62.05  | Y=7.208 | Z=-1.8 |
| 3521 | X=62.25  | Y=7.208 | Z=-1.8 |
| 3522 | X=64.05  | Y=7.208 | Z=-1.8 |
| 3523 | X=65.45  | Y=7.208 | Z=-1.8 |
| 3524 | X=67.25  | Y=7.208 | Z=-1.8 |
| 3525 | X=67.37  | Y=7.208 | Z=-1.8 |
| 3526 | X=69.17  | Y=7.208 | Z=-1.8 |
| 3527 | X=72.65  | Y=7.208 | Z=-1.8 |
| 3528 | X=74.45  | Y=7.208 | Z=-1.8 |
| 3529 | X=76.37  | Y=7.208 | Z=-1.8 |
| 3530 | X=136.95 | Y=7.208 | Z=-1.8 |
| 3531 | X=120.05 | Y=7.208 | Z=-1.8 |
| 3532 | X=121.85 | Y=7.208 | Z=-1.8 |
| 3533 | X=127.25 | Y=7.208 | Z=-1.8 |
| 3534 | X=129.05 | Y=7.208 | Z=-1.8 |
| 3535 | X=132.45 | Y=7.208 | Z=-1.8 |
| 3536 | X=134.25 | Y=7.208 | Z=-1.8 |
| 3537 | X=139.65 | Y=7.208 | Z=-1.8 |
| 3538 | X=141.45 | Y=7.208 | Z=-1.8 |
| 3539 | X=144.85 | Y=7.208 | Z=-1.8 |
| 3540 | X=146.65 | Y=7.208 | Z=-1.8 |
| 3541 | X=152.05 | Y=7.208 | Z=-1.8 |
| 3542 | X=153.85 | Y=7.208 | Z=-1.8 |
| 3543 | X=75.75  | Y=7.208 | Z=-1.8 |
| 3544 | X=77.81  | Y=7.208 | Z=-1.8 |
| 3545 | X=79.87  | Y=7.208 | Z=-1.8 |
| 3546 | X=80.785 | Y=7.208 | Z=-1.8 |
| 3547 | X=83.175 | Y=7.208 | Z=-1.8 |
| 3548 | X=86.98  | Y=7.208 | Z=-1.8 |
| 3549 | X=87.985 | Y=7.208 | Z=-1.8 |
| 3550 | X=89.12  | Y=7.208 | Z=-1.8 |
| 3551 | X=90.375 | Y=7.208 | Z=-1.8 |
| 3552 | X=94.55  | Y=7.208 | Z=-1.8 |
| 3553 | X=96.35  | Y=7.208 | Z=-1.8 |
| 3554 | X=101.75 | Y=7.208 | Z=-1.8 |
| 3555 | X=103.65 | Y=7.208 | Z=-1.8 |
| 3556 | X=105.55 | Y=7.208 | Z=-1.8 |
| 3557 | X=106.95 | Y=7.208 | Z=-1.8 |
| 3558 | X=108.8  | Y=7.208 | Z=-1.8 |
| 3559 | X=114.15 | Y=7.208 | Z=-1.8 |
| 3560 | X=116    | Y=7.208 | Z=-1.8 |

|      |            |         |        |
|------|------------|---------|--------|
| 3561 | X=117.87   | Y=7.208 | Z=-1.8 |
| 3562 | X=178.45   | Y=7.208 | Z=-1.8 |
| 3563 | X=161.55   | Y=7.208 | Z=-1.8 |
| 3564 | X=163.35   | Y=7.208 | Z=-1.8 |
| 3565 | X=168.75   | Y=7.208 | Z=-1.8 |
| 3566 | X=170.55   | Y=7.208 | Z=-1.8 |
| 3567 | X=175.75   | Y=7.208 | Z=-1.8 |
| 3568 | X=181.15   | Y=7.208 | Z=-1.8 |
| 3569 | X=186.35   | Y=7.208 | Z=-1.8 |
| 3570 | X=188.15   | Y=7.208 | Z=-1.8 |
| 3571 | X=193.55   | Y=7.208 | Z=-1.8 |
| 3572 | X=195.35   | Y=7.208 | Z=-1.8 |
| 3573 | X=77.44    | Y=7.208 | Z=-1.8 |
| 3574 | X=84.6425  | Y=7.208 | Z=-1.8 |
| 3575 | X=89.6975  | Y=7.208 | Z=-1.8 |
| 3576 | X=91.18    | Y=7.208 | Z=-1.8 |
| 3577 | X=92.98    | Y=7.208 | Z=-1.8 |
| 3578 | X=95       | Y=7.208 | Z=-1.8 |
| 3579 | X=100.3    | Y=7.208 | Z=-1.8 |
| 3580 | X=102.15   | Y=7.208 | Z=-1.8 |
| 3581 | X=107.3    | Y=7.208 | Z=-1.8 |
| 3582 | X=112.7    | Y=7.208 | Z=-1.8 |
| 3583 | X=114.525  | Y=7.208 | Z=-1.8 |
| 3584 | X=119.66   | Y=7.208 | Z=-1.8 |
| 3585 | X=125.05   | Y=7.208 | Z=-1.8 |
| 3586 | X=127      | Y=7.208 | Z=-1.8 |
| 3587 | X=130.3    | Y=7.208 | Z=-1.8 |
| 3588 | X=132.075  | Y=7.208 | Z=-1.8 |
| 3589 | X=137.5    | Y=7.208 | Z=-1.8 |
| 3590 | X=139.375  | Y=7.208 | Z=-1.8 |
| 3591 | X=142.7    | Y=7.208 | Z=-1.8 |
| 3592 | X=144.475  | Y=7.208 | Z=-1.8 |
| 3593 | X=150.05   | Y=7.208 | Z=-1.8 |
| 3594 | X=151.75   | Y=7.208 | Z=-1.8 |
| 3595 | X=261.45   | Y=7.208 | Z=-1.8 |
| 3596 | X=241.77   | Y=7.208 | Z=-1.8 |
| 3597 | X=243.48   | Y=7.208 | Z=-1.8 |
| 3598 | X=243.81   | Y=7.208 | Z=-1.8 |
| 3599 | X=245.5    | Y=7.208 | Z=-1.8 |
| 3600 | X=245.87   | Y=7.208 | Z=-1.8 |
| 3601 | X=253.08   | Y=7.208 | Z=-1.8 |
| 3602 | X=254.88   | Y=7.208 | Z=-1.8 |
| 3603 | X=252.861  | Y=7.208 | Z=-1.8 |
| 3604 | X=255.14   | Y=7.208 | Z=-1.8 |
| 3605 | X=256.57   | Y=7.208 | Z=-1.8 |
| 3606 | X=257.2    | Y=7.208 | Z=-1.8 |
| 3607 | X=260.55   | Y=7.208 | Z=-1.8 |
| 3608 | X=262.35   | Y=7.208 | Z=-1.8 |
| 3609 | X=267.75   | Y=7.208 | Z=-1.8 |
| 3610 | X=269.65   | Y=7.208 | Z=-1.8 |
| 3611 | X=271.55   | Y=7.208 | Z=-1.8 |
| 3612 | X=272.95   | Y=7.208 | Z=-1.8 |
| 3613 | X=274.77   | Y=7.208 | Z=-1.8 |
| 3614 | X=276.59   | Y=7.208 | Z=-1.8 |
| 3615 | X=280.147  | Y=7.208 | Z=-1.8 |
| 3616 | X=281.9735 | Y=7.208 | Z=-1.8 |
| 3617 | X=302.95   | Y=7.208 | Z=-1.8 |
| 3618 | X=283.99   | Y=7.208 | Z=-1.8 |
| 3619 | X=285.79   | Y=7.208 | Z=-1.8 |
| 3620 | X=340.3    | Y=7.208 | Z=-1.8 |
| 3621 | X=325.2    | Y=7.208 | Z=-1.8 |
| 3622 | X=320.76   | Y=7.208 | Z=-1.8 |
| 3623 | X=322.56   | Y=7.208 | Z=-1.8 |
| 3624 | X=329.76   | Y=7.208 | Z=-1.8 |
| 3625 | X=330.6    | Y=7.208 | Z=-1.8 |
| 3626 | X=331.56   | Y=7.208 | Z=-1.8 |
| 3627 | X=332.4    | Y=7.208 | Z=-1.8 |
| 3628 | X=334.8    | Y=7.208 | Z=-1.8 |
| 3629 | X=335.8    | Y=7.208 | Z=-1.8 |
| 3630 | X=336.6    | Y=7.208 | Z=-1.8 |
| 3631 | X=337.6    | Y=7.208 | Z=-1.8 |
| 3632 | X=343      | Y=7.208 | Z=-1.8 |
| 3633 | X=344      | Y=7.208 | Z=-1.8 |
| 3634 | X=344.8    | Y=7.208 | Z=-1.8 |
| 3635 | X=345.8    | Y=7.208 | Z=-1.8 |
| 3636 | X=348.2    | Y=7.208 | Z=-1.8 |
| 3637 | X=349.04   | Y=7.208 | Z=-1.8 |
| 3638 | X=350      | Y=7.208 | Z=-1.8 |
| 3639 | X=350.84   | Y=7.208 | Z=-1.8 |
| 3640 | X=355.4    | Y=7.208 | Z=-1.8 |
| 3641 | X=219.95   | Y=7.208 | Z=-1.8 |
| 3642 | X=200.27   | Y=7.208 | Z=-1.8 |
| 3643 | X=201.98   | Y=7.208 | Z=-1.8 |

3644 X=202.31 Y=7.208 Z=-1.8  
3645 X=204 Y=7.208 Z=-1.8  
3646 X=204.37 Y=7.208 Z=-1.8  
3647 X=211.36 Y=7.208 Z=-1.8  
3648 X=211.58 Y=7.208 Z=-1.8  
3649 X=213.38 Y=7.208 Z=-1.8  
3650 X=213.64 Y=7.208 Z=-1.8  
3651 X=215.07 Y=7.208 Z=-1.8  
3652 X=215.7 Y=7.208 Z=-1.8  
3653 X=219.05 Y=7.208 Z=-1.8  
3654 X=220.85 Y=7.208 Z=-1.8  
3655 X=226.25 Y=7.208 Z=-1.8  
3656 X=228.1 Y=7.208 Z=-1.8  
3657 X=230.05 Y=7.208 Z=-1.8  
3658 X=231.45 Y=7.208 Z=-1.8  
3659 X=233.27 Y=7.208 Z=-1.8  
3660 X=235.09 Y=7.208 Z=-1.8  
3661 X=238.65 Y=7.208 Z=-1.8  
3662 X=240.45 Y=7.208 Z=-1.8  
3663 X=242.49 Y=7.208 Z=-1.8  
3664 X=244.255 Y=7.208 Z=-1.8  
3665 X=283.395 Y=7.208 Z=-1.8  
3666 X=285.21 Y=7.208 Z=-1.8  
3667 X=287.85 Y=7.208 Z=-1.8  
3668 X=292.41 Y=7.208 Z=-1.8  
3669 X=293.25 Y=7.208 Z=-1.8  
3670 X=294.21 Y=7.208 Z=-1.8  
3671 X=295.05 Y=7.208 Z=-1.8  
3672 X=297.45 Y=7.208 Z=-1.8  
3673 X=298.45 Y=7.208 Z=-1.8  
3674 X=299.25 Y=7.208 Z=-1.8  
3675 X=300.25 Y=7.208 Z=-1.8  
3676 X=322.69 Y=7.208 Z=-1.8  
3677 X=318.05 Y=7.208 Z=-1.8  
3678 X=319.85 Y=7.208 Z=-1.8  
3679 X=313.49 Y=7.208 Z=-1.8  
3680 X=312.65 Y=7.208 Z=-1.8  
3681 X=311.69 Y=7.208 Z=-1.8  
3682 X=310.85 Y=7.208 Z=-1.8  
3683 X=308.45 Y=7.208 Z=-1.8  
3684 X=307.45 Y=7.208 Z=-1.8  
3685 X=306.65 Y=7.208 Z=-1.8  
3686 X=305.65 Y=7.208 Z=-1.8  
3687 X=236.58 Y=7.208 Z=-1.8  
3688 X=238.27 Y=7.208 Z=-1.8  
3689 X=244.4775 Y=7.208 Z=-1.8  
3690 X=247.651 Y=7.208 Z=-1.8  
3691 X=249.67 Y=7.208 Z=-1.8  
3692 X=251.3655 Y=7.208 Z=-1.8  
3693 X=251.6299 Y=7.208 Z=-1.8  
3694 X=253.68 Y=7.208 Z=-1.8  
3695 X=255.355 Y=7.208 Z=-1.8  
3696 X=255.7625 Y=7.208 Z=-1.8  
3697 X=259.1 Y=7.208 Z=-1.8  
3698 X=260.9 Y=7.208 Z=-1.8  
3699 X=264.54 Y=7.208 Z=-1.8  
3700 X=266.345 Y=7.208 Z=-1.8  
3701 X=268.1 Y=7.208 Z=-1.8  
3702 X=273.36 Y=7.208 Z=-1.8  
3703 X=278.75 Y=7.208 Z=-1.8  
3704 X=280.5803 Y=7.208 Z=-1.8  
3705 X=291.1 Y=7.208 Z=-1.8  
3706 X=292.83 Y=7.208 Z=-1.8  
3707 X=294.63 Y=7.208 Z=-1.8  
3708 X=296.25 Y=7.208 Z=-1.8  
3709 X=297.85 Y=7.208 Z=-1.8  
3710 X=298.15 Y=7.208 Z=-1.8  
3711 X=299.65 Y=7.208 Z=-1.8  
3712 X=303.5 Y=7.208 Z=-1.8  
3713 X=305.3 Y=7.208 Z=-1.8  
3714 X=307.05 Y=7.208 Z=-1.8  
3715 X=308.8 Y=7.208 Z=-1.8  
3716 X=310.5 Y=7.208 Z=-1.8  
3717 X=312.17 Y=7.208 Z=-1.8  
3718 X=313.9 Y=7.208 Z=-1.8  
3719 X=315.975 Y=7.208 Z=-1.8  
3720 X=317.7125 Y=7.208 Z=-1.8  
3721 X=321.66 Y=7.208 Z=-1.8  
3722 X=323.195 Y=7.208 Z=-1.8  
3723 X=173.95 Y=7.208 Z=-1.8  
3724 X=182.95 Y=7.208 Z=-1.8  
3725 X=286.02 Y=7.208 Z=-1.8  
3726 X=0 Y=8.108 Z=-1.8



|      |          |         |        |
|------|----------|---------|--------|
| 3727 | X=33.2   | Y=8.108 | Z=-1.8 |
| 3728 | X=74.7   | Y=8.108 | Z=-1.8 |
| 3729 | X=323.7  | Y=8.108 | Z=-1.8 |
| 3730 | X=356.9  | Y=8.108 | Z=-1.8 |
| 3731 | X=116.2  | Y=8.108 | Z=-1.8 |
| 3732 | X=157.7  | Y=8.108 | Z=-1.8 |
| 3733 | X=199.2  | Y=8.108 | Z=-1.8 |
| 3734 | X=240.7  | Y=8.108 | Z=-1.8 |
| 3735 | X=282.2  | Y=8.108 | Z=-1.8 |
| 3736 | X=16.6   | Y=8.108 | Z=-1.8 |
| 3737 | X=1.02   | Y=8.108 | Z=-1.8 |
| 3738 | X=1.935  | Y=8.108 | Z=-1.8 |
| 3739 | X=4.325  | Y=8.108 | Z=-1.8 |
| 3740 | X=8.23   | Y=8.108 | Z=-1.8 |
| 3741 | X=9.135  | Y=8.108 | Z=-1.8 |
| 3742 | X=10.29  | Y=8.108 | Z=-1.8 |
| 3743 | X=11.525 | Y=8.108 | Z=-1.8 |
| 3744 | X=12.35  | Y=8.108 | Z=-1.8 |
| 3745 | X=15.7   | Y=8.108 | Z=-1.8 |
| 3746 | X=17.5   | Y=8.108 | Z=-1.8 |
| 3747 | X=22.9   | Y=8.108 | Z=-1.8 |
| 3748 | X=24.7   | Y=8.108 | Z=-1.8 |
| 3749 | X=24.9   | Y=8.108 | Z=-1.8 |
| 3750 | X=26.7   | Y=8.108 | Z=-1.8 |
| 3751 | X=28.1   | Y=8.108 | Z=-1.8 |
| 3752 | X=29.9   | Y=8.108 | Z=-1.8 |
| 3753 | X=30.02  | Y=8.108 | Z=-1.8 |
| 3754 | X=31.82  | Y=8.108 | Z=-1.8 |
| 3755 | X=53.95  | Y=8.108 | Z=-1.8 |
| 3756 | X=35.3   | Y=8.108 | Z=-1.8 |
| 3757 | X=37.1   | Y=8.108 | Z=-1.8 |
| 3758 | X=37.22  | Y=8.108 | Z=-1.8 |
| 3759 | X=39.02  | Y=8.108 | Z=-1.8 |
| 3760 | X=95.45  | Y=8.108 | Z=-1.8 |
| 3761 | X=78.55  | Y=8.108 | Z=-1.8 |
| 3762 | X=80.35  | Y=8.108 | Z=-1.8 |
| 3763 | X=85.75  | Y=8.108 | Z=-1.8 |
| 3764 | X=87.55  | Y=8.108 | Z=-1.8 |
| 3765 | X=90.95  | Y=8.108 | Z=-1.8 |
| 3766 | X=92.75  | Y=8.108 | Z=-1.8 |
| 3767 | X=98.15  | Y=8.108 | Z=-1.8 |
| 3768 | X=99.95  | Y=8.108 | Z=-1.8 |
| 3769 | X=103.35 | Y=8.108 | Z=-1.8 |
| 3770 | X=105.15 | Y=8.108 | Z=-1.8 |
| 3771 | X=110.55 | Y=8.108 | Z=-1.8 |
| 3772 | X=112.35 | Y=8.108 | Z=-1.8 |
| 3773 | X=34.25  | Y=8.108 | Z=-1.8 |
| 3774 | X=36.31  | Y=8.108 | Z=-1.8 |
| 3775 | X=38.37  | Y=8.108 | Z=-1.8 |
| 3776 | X=39.285 | Y=8.108 | Z=-1.8 |
| 3777 | X=41.675 | Y=8.108 | Z=-1.8 |
| 3778 | X=45.58  | Y=8.108 | Z=-1.8 |
| 3779 | X=46.485 | Y=8.108 | Z=-1.8 |
| 3780 | X=47.64  | Y=8.108 | Z=-1.8 |
| 3781 | X=48.875 | Y=8.108 | Z=-1.8 |
| 3782 | X=49.7   | Y=8.108 | Z=-1.8 |
| 3783 | X=53.05  | Y=8.108 | Z=-1.8 |
| 3784 | X=54.85  | Y=8.108 | Z=-1.8 |
| 3785 | X=60.25  | Y=8.108 | Z=-1.8 |
| 3786 | X=62.05  | Y=8.108 | Z=-1.8 |
| 3787 | X=62.25  | Y=8.108 | Z=-1.8 |
| 3788 | X=64.05  | Y=8.108 | Z=-1.8 |
| 3789 | X=65.45  | Y=8.108 | Z=-1.8 |
| 3790 | X=67.25  | Y=8.108 | Z=-1.8 |
| 3791 | X=67.37  | Y=8.108 | Z=-1.8 |
| 3792 | X=69.17  | Y=8.108 | Z=-1.8 |
| 3793 | X=72.65  | Y=8.108 | Z=-1.8 |
| 3794 | X=74.45  | Y=8.108 | Z=-1.8 |
| 3795 | X=76.37  | Y=8.108 | Z=-1.8 |
| 3796 | X=136.95 | Y=8.108 | Z=-1.8 |
| 3797 | X=120.05 | Y=8.108 | Z=-1.8 |
| 3798 | X=121.85 | Y=8.108 | Z=-1.8 |
| 3799 | X=127.25 | Y=8.108 | Z=-1.8 |
| 3800 | X=129.05 | Y=8.108 | Z=-1.8 |
| 3801 | X=132.45 | Y=8.108 | Z=-1.8 |
| 3802 | X=134.25 | Y=8.108 | Z=-1.8 |
| 3803 | X=139.65 | Y=8.108 | Z=-1.8 |
| 3804 | X=141.45 | Y=8.108 | Z=-1.8 |
| 3805 | X=144.85 | Y=8.108 | Z=-1.8 |
| 3806 | X=146.65 | Y=8.108 | Z=-1.8 |
| 3807 | X=152.05 | Y=8.108 | Z=-1.8 |
| 3808 | X=153.85 | Y=8.108 | Z=-1.8 |
| 3809 | X=75.75  | Y=8.108 | Z=-1.8 |

3810 X=77.81 Y=8.108 Z=-1.8  
3811 X=79.87 Y=8.108 Z=-1.8  
3812 X=80.785 Y=8.108 Z=-1.8  
3813 X=83.175 Y=8.108 Z=-1.8  
3814 X=86.98 Y=8.108 Z=-1.8  
3815 X=87.985 Y=8.108 Z=-1.8  
3816 X=89.12 Y=8.108 Z=-1.8  
3817 X=90.375 Y=8.108 Z=-1.8  
3818 X=94.55 Y=8.108 Z=-1.8  
3819 X=96.35 Y=8.108 Z=-1.8  
3820 X=101.75 Y=8.108 Z=-1.8  
3821 X=103.65 Y=8.108 Z=-1.8  
3822 X=105.55 Y=8.108 Z=-1.8  
3823 X=106.95 Y=8.108 Z=-1.8  
3824 X=108.8 Y=8.108 Z=-1.8  
3825 X=114.15 Y=8.108 Z=-1.8  
3826 X=116 Y=8.108 Z=-1.8  
3827 X=117.87 Y=8.108 Z=-1.8  
3828 X=178.45 Y=8.108 Z=-1.8  
3829 X=161.55 Y=8.108 Z=-1.8  
3830 X=163.35 Y=8.108 Z=-1.8  
3831 X=168.75 Y=8.108 Z=-1.8  
3832 X=170.55 Y=8.108 Z=-1.8  
3833 X=175.75 Y=8.108 Z=-1.8  
3834 X=181.15 Y=8.108 Z=-1.8  
3835 X=186.35 Y=8.108 Z=-1.8  
3836 X=188.15 Y=8.108 Z=-1.8  
3837 X=193.55 Y=8.108 Z=-1.8  
3838 X=195.35 Y=8.108 Z=-1.8  
3839 X=77.44 Y=8.108 Z=-1.8  
3840 X=84.6425 Y=8.108 Z=-1.8  
3841 X=89.6975 Y=8.108 Z=-1.8  
3842 X=91.18 Y=8.108 Z=-1.8  
3843 X=92.98 Y=8.108 Z=-1.8  
3844 X=95 Y=8.108 Z=-1.8  
3845 X=100.3 Y=8.108 Z=-1.8  
3846 X=102.15 Y=8.108 Z=-1.8  
3847 X=107.3 Y=8.108 Z=-1.8  
3848 X=112.7 Y=8.108 Z=-1.8  
3849 X=114.525 Y=8.108 Z=-1.8  
3850 X=119.66 Y=8.108 Z=-1.8  
3851 X=125.05 Y=8.108 Z=-1.8  
3852 X=127 Y=8.108 Z=-1.8  
3853 X=130.3 Y=8.108 Z=-1.8  
3854 X=132.075 Y=8.108 Z=-1.8  
3855 X=137.5 Y=8.108 Z=-1.8  
3856 X=139.375 Y=8.108 Z=-1.8  
3857 X=142.7 Y=8.108 Z=-1.8  
3858 X=144.475 Y=8.108 Z=-1.8  
3859 X=150.05 Y=8.108 Z=-1.8  
3860 X=151.75 Y=8.108 Z=-1.8  
3861 X=261.45 Y=8.108 Z=-1.8  
3862 X=241.77 Y=8.108 Z=-1.8  
3863 X=243.48 Y=8.108 Z=-1.8  
3864 X=243.81 Y=8.108 Z=-1.8  
3865 X=245.5 Y=8.108 Z=-1.8  
3866 X=245.87 Y=8.108 Z=-1.8  
3867 X=253.08 Y=8.108 Z=-1.8  
3868 X=254.88 Y=8.108 Z=-1.8  
3869 X=252.861 Y=8.108 Z=-1.8  
3870 X=255.14 Y=8.108 Z=-1.8  
3871 X=256.57 Y=8.108 Z=-1.8  
3872 X=257.2 Y=8.108 Z=-1.8  
3873 X=260.55 Y=8.108 Z=-1.8  
3874 X=262.35 Y=8.108 Z=-1.8  
3875 X=267.75 Y=8.108 Z=-1.8  
3876 X=269.65 Y=8.108 Z=-1.8  
3877 X=271.55 Y=8.108 Z=-1.8  
3878 X=272.95 Y=8.108 Z=-1.8  
3879 X=274.77 Y=8.108 Z=-1.8  
3880 X=276.59 Y=8.108 Z=-1.8  
3881 X=280.147 Y=8.108 Z=-1.8  
3882 X=281.9735 Y=8.108 Z=-1.8  
3883 X=302.95 Y=8.108 Z=-1.8  
3884 X=283.99 Y=8.108 Z=-1.8  
3885 X=285.79 Y=8.108 Z=-1.8  
3886 X=340.3 Y=8.108 Z=-1.8  
3887 X=325.2 Y=8.108 Z=-1.8  
3888 X=320.76 Y=8.108 Z=-1.8  
3889 X=322.56 Y=8.108 Z=-1.8  
3890 X=329.76 Y=8.108 Z=-1.8  
3891 X=330.6 Y=8.108 Z=-1.8  
3892 X=331.56 Y=8.108 Z=-1.8

|      |            |         |        |
|------|------------|---------|--------|
| 3893 | X=332.4    | Y=8.108 | Z=-1.8 |
| 3894 | X=334.8    | Y=8.108 | Z=-1.8 |
| 3895 | X=335.8    | Y=8.108 | Z=-1.8 |
| 3896 | X=336.6    | Y=8.108 | Z=-1.8 |
| 3897 | X=337.6    | Y=8.108 | Z=-1.8 |
| 3898 | X=343      | Y=8.108 | Z=-1.8 |
| 3899 | X=344      | Y=8.108 | Z=-1.8 |
| 3900 | X=344.8    | Y=8.108 | Z=-1.8 |
| 3901 | X=345.8    | Y=8.108 | Z=-1.8 |
| 3902 | X=348.2    | Y=8.108 | Z=-1.8 |
| 3903 | X=349.04   | Y=8.108 | Z=-1.8 |
| 3904 | X=350      | Y=8.108 | Z=-1.8 |
| 3905 | X=350.84   | Y=8.108 | Z=-1.8 |
| 3906 | X=355.4    | Y=8.108 | Z=-1.8 |
| 3907 | X=219.95   | Y=8.108 | Z=-1.8 |
| 3908 | X=200.27   | Y=8.108 | Z=-1.8 |
| 3909 | X=201.98   | Y=8.108 | Z=-1.8 |
| 3910 | X=202.31   | Y=8.108 | Z=-1.8 |
| 3911 | X=204      | Y=8.108 | Z=-1.8 |
| 3912 | X=204.37   | Y=8.108 | Z=-1.8 |
| 3913 | X=211.36   | Y=8.108 | Z=-1.8 |
| 3914 | X=211.58   | Y=8.108 | Z=-1.8 |
| 3915 | X=213.38   | Y=8.108 | Z=-1.8 |
| 3916 | X=213.64   | Y=8.108 | Z=-1.8 |
| 3917 | X=215.07   | Y=8.108 | Z=-1.8 |
| 3918 | X=215.7    | Y=8.108 | Z=-1.8 |
| 3919 | X=219.05   | Y=8.108 | Z=-1.8 |
| 3920 | X=220.85   | Y=8.108 | Z=-1.8 |
| 3921 | X=226.25   | Y=8.108 | Z=-1.8 |
| 3922 | X=228.1    | Y=8.108 | Z=-1.8 |
| 3923 | X=230.05   | Y=8.108 | Z=-1.8 |
| 3924 | X=231.45   | Y=8.108 | Z=-1.8 |
| 3925 | X=233.27   | Y=8.108 | Z=-1.8 |
| 3926 | X=235.09   | Y=8.108 | Z=-1.8 |
| 3927 | X=238.65   | Y=8.108 | Z=-1.8 |
| 3928 | X=240.45   | Y=8.108 | Z=-1.8 |
| 3929 | X=242.49   | Y=8.108 | Z=-1.8 |
| 3930 | X=244.255  | Y=8.108 | Z=-1.8 |
| 3931 | X=283.395  | Y=8.108 | Z=-1.8 |
| 3932 | X=285.21   | Y=8.108 | Z=-1.8 |
| 3933 | X=287.85   | Y=8.108 | Z=-1.8 |
| 3934 | X=292.41   | Y=8.108 | Z=-1.8 |
| 3935 | X=293.25   | Y=8.108 | Z=-1.8 |
| 3936 | X=294.21   | Y=8.108 | Z=-1.8 |
| 3937 | X=295.05   | Y=8.108 | Z=-1.8 |
| 3938 | X=297.45   | Y=8.108 | Z=-1.8 |
| 3939 | X=298.45   | Y=8.108 | Z=-1.8 |
| 3940 | X=299.25   | Y=8.108 | Z=-1.8 |
| 3941 | X=300.25   | Y=8.108 | Z=-1.8 |
| 3942 | X=322.69   | Y=8.108 | Z=-1.8 |
| 3943 | X=318.05   | Y=8.108 | Z=-1.8 |
| 3944 | X=319.85   | Y=8.108 | Z=-1.8 |
| 3945 | X=313.49   | Y=8.108 | Z=-1.8 |
| 3946 | X=312.65   | Y=8.108 | Z=-1.8 |
| 3947 | X=311.69   | Y=8.108 | Z=-1.8 |
| 3948 | X=310.85   | Y=8.108 | Z=-1.8 |
| 3949 | X=308.45   | Y=8.108 | Z=-1.8 |
| 3950 | X=307.45   | Y=8.108 | Z=-1.8 |
| 3951 | X=306.65   | Y=8.108 | Z=-1.8 |
| 3952 | X=305.65   | Y=8.108 | Z=-1.8 |
| 3953 | X=236.58   | Y=8.108 | Z=-1.8 |
| 3954 | X=238.27   | Y=8.108 | Z=-1.8 |
| 3955 | X=244.4775 | Y=8.108 | Z=-1.8 |
| 3956 | X=247.651  | Y=8.108 | Z=-1.8 |
| 3957 | X=249.67   | Y=8.108 | Z=-1.8 |
| 3958 | X=251.3655 | Y=8.108 | Z=-1.8 |
| 3959 | X=251.6299 | Y=8.108 | Z=-1.8 |
| 3960 | X=253.68   | Y=8.108 | Z=-1.8 |
| 3961 | X=255.355  | Y=8.108 | Z=-1.8 |
| 3962 | X=255.7625 | Y=8.108 | Z=-1.8 |
| 3963 | X=259.1    | Y=8.108 | Z=-1.8 |
| 3964 | X=260.9    | Y=8.108 | Z=-1.8 |
| 3965 | X=264.54   | Y=8.108 | Z=-1.8 |
| 3966 | X=266.345  | Y=8.108 | Z=-1.8 |
| 3967 | X=268.1    | Y=8.108 | Z=-1.8 |
| 3968 | X=273.36   | Y=8.108 | Z=-1.8 |
| 3969 | X=278.75   | Y=8.108 | Z=-1.8 |
| 3970 | X=280.5803 | Y=8.108 | Z=-1.8 |
| 3971 | X=291.1    | Y=8.108 | Z=-1.8 |
| 3972 | X=292.83   | Y=8.108 | Z=-1.8 |
| 3973 | X=294.63   | Y=8.108 | Z=-1.8 |
| 3974 | X=296.25   | Y=8.108 | Z=-1.8 |
| 3975 | X=297.85   | Y=8.108 | Z=-1.8 |

3976 X=298.15 Y=8.108 Z=-1.8  
3977 X=299.65 Y=8.108 Z=-1.8  
3978 X=303.5 Y=8.108 Z=-1.8  
3979 X=305.3 Y=8.108 Z=-1.8  
3980 X=307.05 Y=8.108 Z=-1.8  
3981 X=308.8 Y=8.108 Z=-1.8  
3982 X=310.5 Y=8.108 Z=-1.8  
3983 X=312.17 Y=8.108 Z=-1.8  
3984 X=313.9 Y=8.108 Z=-1.8  
3985 X=315.975 Y=8.108 Z=-1.8  
3986 X=317.7125 Y=8.108 Z=-1.8  
3987 X=321.66 Y=8.108 Z=-1.8  
3988 X=323.195 Y=8.108 Z=-1.8  
3989 X=173.95 Y=8.108 Z=-1.8  
3990 X=182.95 Y=8.108 Z=-1.8  
3991 X=286.02 Y=8.108 Z=-1.8  
3992 X=0 Y=9.008 Z=-1.8  
3993 X=33.2 Y=9.008 Z=-1.8  
3994 X=74.7 Y=9.008 Z=-1.8  
3995 X=323.7 Y=9.008 Z=-1.8  
3996 X=356.9 Y=9.008 Z=-1.8  
3997 X=116.2 Y=9.008 Z=-1.8  
3998 X=157.7 Y=9.008 Z=-1.8  
3999 X=199.2 Y=9.008 Z=-1.8  
4000 X=240.7 Y=9.008 Z=-1.8  
4001 X=282.2 Y=9.008 Z=-1.8  
4002 X=16.6 Y=9.008 Z=-1.8  
4003 X=1.02 Y=9.008 Z=-1.8  
4004 X=1.935 Y=9.008 Z=-1.8  
4005 X=4.325 Y=9.008 Z=-1.8  
4006 X=8.23 Y=9.008 Z=-1.8  
4007 X=9.135 Y=9.008 Z=-1.8  
4008 X=10.29 Y=9.008 Z=-1.8  
4009 X=11.525 Y=9.008 Z=-1.8  
4010 X=12.35 Y=9.008 Z=-1.8  
4011 X=15.7 Y=9.008 Z=-1.8  
4012 X=17.5 Y=9.008 Z=-1.8  
4013 X=22.9 Y=9.008 Z=-1.8  
4014 X=24.7 Y=9.008 Z=-1.8  
4015 X=24.9 Y=9.008 Z=-1.8  
4016 X=26.7 Y=9.008 Z=-1.8  
4017 X=28.1 Y=9.008 Z=-1.8  
4018 X=29.9 Y=9.008 Z=-1.8  
4019 X=30.02 Y=9.008 Z=-1.8  
4020 X=31.82 Y=9.008 Z=-1.8  
4021 X=53.95 Y=9.008 Z=-1.8  
4022 X=35.3 Y=9.008 Z=-1.8  
4023 X=37.1 Y=9.008 Z=-1.8  
4024 X=37.22 Y=9.008 Z=-1.8  
4025 X=39.02 Y=9.008 Z=-1.8  
4026 X=95.45 Y=9.008 Z=-1.8  
4027 X=78.55 Y=9.008 Z=-1.8  
4028 X=80.35 Y=9.008 Z=-1.8  
4029 X=85.75 Y=9.008 Z=-1.8  
4030 X=87.55 Y=9.008 Z=-1.8  
4031 X=90.95 Y=9.008 Z=-1.8  
4032 X=92.75 Y=9.008 Z=-1.8  
4033 X=98.15 Y=9.008 Z=-1.8  
4034 X=99.95 Y=9.008 Z=-1.8  
4035 X=103.35 Y=9.008 Z=-1.8  
4036 X=105.15 Y=9.008 Z=-1.8  
4037 X=110.55 Y=9.008 Z=-1.8  
4038 X=112.35 Y=9.008 Z=-1.8  
4039 X=34.25 Y=9.008 Z=-1.8  
4040 X=36.31 Y=9.008 Z=-1.8  
4041 X=38.37 Y=9.008 Z=-1.8  
4042 X=39.285 Y=9.008 Z=-1.8  
4043 X=41.675 Y=9.008 Z=-1.8  
4044 X=45.58 Y=9.008 Z=-1.8  
4045 X=46.485 Y=9.008 Z=-1.8  
4046 X=47.64 Y=9.008 Z=-1.8  
4047 X=48.875 Y=9.008 Z=-1.8  
4048 X=49.7 Y=9.008 Z=-1.8  
4049 X=53.05 Y=9.008 Z=-1.8  
4050 X=54.85 Y=9.008 Z=-1.8  
4051 X=60.25 Y=9.008 Z=-1.8  
4052 X=62.05 Y=9.008 Z=-1.8  
4053 X=62.25 Y=9.008 Z=-1.8  
4054 X=64.05 Y=9.008 Z=-1.8  
4055 X=65.45 Y=9.008 Z=-1.8  
4056 X=67.25 Y=9.008 Z=-1.8  
4057 X=67.37 Y=9.008 Z=-1.8  
4058 X=69.17 Y=9.008 Z=-1.8

|      |           |         |        |
|------|-----------|---------|--------|
| 4059 | X=72.65   | Y=9.008 | Z=-1.8 |
| 4060 | X=74.45   | Y=9.008 | Z=-1.8 |
| 4061 | X=76.37   | Y=9.008 | Z=-1.8 |
| 4062 | X=136.95  | Y=9.008 | Z=-1.8 |
| 4063 | X=120.05  | Y=9.008 | Z=-1.8 |
| 4064 | X=121.85  | Y=9.008 | Z=-1.8 |
| 4065 | X=127.25  | Y=9.008 | Z=-1.8 |
| 4066 | X=129.05  | Y=9.008 | Z=-1.8 |
| 4067 | X=132.45  | Y=9.008 | Z=-1.8 |
| 4068 | X=134.25  | Y=9.008 | Z=-1.8 |
| 4069 | X=139.65  | Y=9.008 | Z=-1.8 |
| 4070 | X=141.45  | Y=9.008 | Z=-1.8 |
| 4071 | X=144.85  | Y=9.008 | Z=-1.8 |
| 4072 | X=146.65  | Y=9.008 | Z=-1.8 |
| 4073 | X=152.05  | Y=9.008 | Z=-1.8 |
| 4074 | X=153.85  | Y=9.008 | Z=-1.8 |
| 4075 | X=75.75   | Y=9.008 | Z=-1.8 |
| 4076 | X=77.81   | Y=9.008 | Z=-1.8 |
| 4077 | X=79.87   | Y=9.008 | Z=-1.8 |
| 4078 | X=80.785  | Y=9.008 | Z=-1.8 |
| 4079 | X=83.175  | Y=9.008 | Z=-1.8 |
| 4080 | X=86.98   | Y=9.008 | Z=-1.8 |
| 4081 | X=87.985  | Y=9.008 | Z=-1.8 |
| 4082 | X=89.12   | Y=9.008 | Z=-1.8 |
| 4083 | X=90.375  | Y=9.008 | Z=-1.8 |
| 4084 | X=94.55   | Y=9.008 | Z=-1.8 |
| 4085 | X=96.35   | Y=9.008 | Z=-1.8 |
| 4086 | X=101.75  | Y=9.008 | Z=-1.8 |
| 4087 | X=103.65  | Y=9.008 | Z=-1.8 |
| 4088 | X=105.55  | Y=9.008 | Z=-1.8 |
| 4089 | X=106.95  | Y=9.008 | Z=-1.8 |
| 4090 | X=108.8   | Y=9.008 | Z=-1.8 |
| 4091 | X=114.15  | Y=9.008 | Z=-1.8 |
| 4092 | X=116     | Y=9.008 | Z=-1.8 |
| 4093 | X=117.87  | Y=9.008 | Z=-1.8 |
| 4094 | X=178.45  | Y=9.008 | Z=-1.8 |
| 4095 | X=161.55  | Y=9.008 | Z=-1.8 |
| 4096 | X=163.35  | Y=9.008 | Z=-1.8 |
| 4097 | X=168.75  | Y=9.008 | Z=-1.8 |
| 4098 | X=170.55  | Y=9.008 | Z=-1.8 |
| 4099 | X=175.75  | Y=9.008 | Z=-1.8 |
| 4100 | X=181.15  | Y=9.008 | Z=-1.8 |
| 4101 | X=186.35  | Y=9.008 | Z=-1.8 |
| 4102 | X=188.15  | Y=9.008 | Z=-1.8 |
| 4103 | X=193.55  | Y=9.008 | Z=-1.8 |
| 4104 | X=195.35  | Y=9.008 | Z=-1.8 |
| 4105 | X=77.44   | Y=9.008 | Z=-1.8 |
| 4106 | X=84.6425 | Y=9.008 | Z=-1.8 |
| 4107 | X=89.6975 | Y=9.008 | Z=-1.8 |
| 4108 | X=91.18   | Y=9.008 | Z=-1.8 |
| 4109 | X=92.98   | Y=9.008 | Z=-1.8 |
| 4110 | X=95      | Y=9.008 | Z=-1.8 |
| 4111 | X=100.3   | Y=9.008 | Z=-1.8 |
| 4112 | X=102.15  | Y=9.008 | Z=-1.8 |
| 4113 | X=107.3   | Y=9.008 | Z=-1.8 |
| 4114 | X=112.7   | Y=9.008 | Z=-1.8 |
| 4115 | X=114.525 | Y=9.008 | Z=-1.8 |
| 4116 | X=119.66  | Y=9.008 | Z=-1.8 |
| 4117 | X=125.05  | Y=9.008 | Z=-1.8 |
| 4118 | X=127     | Y=9.008 | Z=-1.8 |
| 4119 | X=130.3   | Y=9.008 | Z=-1.8 |
| 4120 | X=132.075 | Y=9.008 | Z=-1.8 |
| 4121 | X=137.5   | Y=9.008 | Z=-1.8 |
| 4122 | X=139.375 | Y=9.008 | Z=-1.8 |
| 4123 | X=142.7   | Y=9.008 | Z=-1.8 |
| 4124 | X=144.475 | Y=9.008 | Z=-1.8 |
| 4125 | X=150.05  | Y=9.008 | Z=-1.8 |
| 4126 | X=151.75  | Y=9.008 | Z=-1.8 |
| 4127 | X=261.45  | Y=9.008 | Z=-1.8 |
| 4128 | X=241.77  | Y=9.008 | Z=-1.8 |
| 4129 | X=243.48  | Y=9.008 | Z=-1.8 |
| 4130 | X=243.81  | Y=9.008 | Z=-1.8 |
| 4131 | X=245.5   | Y=9.008 | Z=-1.8 |
| 4132 | X=245.87  | Y=9.008 | Z=-1.8 |
| 4133 | X=253.08  | Y=9.008 | Z=-1.8 |
| 4134 | X=254.88  | Y=9.008 | Z=-1.8 |
| 4135 | X=252.861 | Y=9.008 | Z=-1.8 |
| 4136 | X=255.14  | Y=9.008 | Z=-1.8 |
| 4137 | X=256.57  | Y=9.008 | Z=-1.8 |
| 4138 | X=257.2   | Y=9.008 | Z=-1.8 |
| 4139 | X=260.55  | Y=9.008 | Z=-1.8 |
| 4140 | X=262.35  | Y=9.008 | Z=-1.8 |
| 4141 | X=267.75  | Y=9.008 | Z=-1.8 |

|      |            |         |        |
|------|------------|---------|--------|
| 4142 | X=269.65   | Y=9.008 | Z=-1.8 |
| 4143 | X=271.55   | Y=9.008 | Z=-1.8 |
| 4144 | X=272.95   | Y=9.008 | Z=-1.8 |
| 4145 | X=274.77   | Y=9.008 | Z=-1.8 |
| 4146 | X=276.59   | Y=9.008 | Z=-1.8 |
| 4147 | X=280.147  | Y=9.008 | Z=-1.8 |
| 4148 | X=281.9735 | Y=9.008 | Z=-1.8 |
| 4149 | X=302.95   | Y=9.008 | Z=-1.8 |
| 4150 | X=283.99   | Y=9.008 | Z=-1.8 |
| 4151 | X=285.79   | Y=9.008 | Z=-1.8 |
| 4152 | X=340.3    | Y=9.008 | Z=-1.8 |
| 4153 | X=325.2    | Y=9.008 | Z=-1.8 |
| 4154 | X=320.76   | Y=9.008 | Z=-1.8 |
| 4155 | X=322.56   | Y=9.008 | Z=-1.8 |
| 4156 | X=329.76   | Y=9.008 | Z=-1.8 |
| 4157 | X=330.6    | Y=9.008 | Z=-1.8 |
| 4158 | X=331.56   | Y=9.008 | Z=-1.8 |
| 4159 | X=332.4    | Y=9.008 | Z=-1.8 |
| 4160 | X=334.8    | Y=9.008 | Z=-1.8 |
| 4161 | X=335.8    | Y=9.008 | Z=-1.8 |
| 4162 | X=336.6    | Y=9.008 | Z=-1.8 |
| 4163 | X=337.6    | Y=9.008 | Z=-1.8 |
| 4164 | X=343      | Y=9.008 | Z=-1.8 |
| 4165 | X=344      | Y=9.008 | Z=-1.8 |
| 4166 | X=344.8    | Y=9.008 | Z=-1.8 |
| 4167 | X=345.8    | Y=9.008 | Z=-1.8 |
| 4168 | X=348.2    | Y=9.008 | Z=-1.8 |
| 4169 | X=349.04   | Y=9.008 | Z=-1.8 |
| 4170 | X=350      | Y=9.008 | Z=-1.8 |
| 4171 | X=350.84   | Y=9.008 | Z=-1.8 |
| 4172 | X=355.4    | Y=9.008 | Z=-1.8 |
| 4173 | X=219.95   | Y=9.008 | Z=-1.8 |
| 4174 | X=200.27   | Y=9.008 | Z=-1.8 |
| 4175 | X=201.98   | Y=9.008 | Z=-1.8 |
| 4176 | X=202.31   | Y=9.008 | Z=-1.8 |
| 4177 | X=204      | Y=9.008 | Z=-1.8 |
| 4178 | X=204.37   | Y=9.008 | Z=-1.8 |
| 4179 | X=211.36   | Y=9.008 | Z=-1.8 |
| 4180 | X=211.58   | Y=9.008 | Z=-1.8 |
| 4181 | X=213.38   | Y=9.008 | Z=-1.8 |
| 4182 | X=213.64   | Y=9.008 | Z=-1.8 |
| 4183 | X=215.07   | Y=9.008 | Z=-1.8 |
| 4184 | X=215.7    | Y=9.008 | Z=-1.8 |
| 4185 | X=219.05   | Y=9.008 | Z=-1.8 |
| 4186 | X=220.85   | Y=9.008 | Z=-1.8 |
| 4187 | X=226.25   | Y=9.008 | Z=-1.8 |
| 4188 | X=228.1    | Y=9.008 | Z=-1.8 |
| 4189 | X=230.05   | Y=9.008 | Z=-1.8 |
| 4190 | X=231.45   | Y=9.008 | Z=-1.8 |
| 4191 | X=233.27   | Y=9.008 | Z=-1.8 |
| 4192 | X=235.09   | Y=9.008 | Z=-1.8 |
| 4193 | X=238.65   | Y=9.008 | Z=-1.8 |
| 4194 | X=240.45   | Y=9.008 | Z=-1.8 |
| 4195 | X=242.49   | Y=9.008 | Z=-1.8 |
| 4196 | X=244.255  | Y=9.008 | Z=-1.8 |
| 4197 | X=283.395  | Y=9.008 | Z=-1.8 |
| 4198 | X=285.21   | Y=9.008 | Z=-1.8 |
| 4199 | X=287.85   | Y=9.008 | Z=-1.8 |
| 4200 | X=292.41   | Y=9.008 | Z=-1.8 |
| 4201 | X=293.25   | Y=9.008 | Z=-1.8 |
| 4202 | X=294.21   | Y=9.008 | Z=-1.8 |
| 4203 | X=295.05   | Y=9.008 | Z=-1.8 |
| 4204 | X=297.45   | Y=9.008 | Z=-1.8 |
| 4205 | X=298.45   | Y=9.008 | Z=-1.8 |
| 4206 | X=299.25   | Y=9.008 | Z=-1.8 |
| 4207 | X=300.25   | Y=9.008 | Z=-1.8 |
| 4208 | X=322.69   | Y=9.008 | Z=-1.8 |
| 4209 | X=318.05   | Y=9.008 | Z=-1.8 |
| 4210 | X=319.85   | Y=9.008 | Z=-1.8 |
| 4211 | X=313.49   | Y=9.008 | Z=-1.8 |
| 4212 | X=312.65   | Y=9.008 | Z=-1.8 |
| 4213 | X=311.69   | Y=9.008 | Z=-1.8 |
| 4214 | X=310.85   | Y=9.008 | Z=-1.8 |
| 4215 | X=308.45   | Y=9.008 | Z=-1.8 |
| 4216 | X=307.45   | Y=9.008 | Z=-1.8 |
| 4217 | X=306.65   | Y=9.008 | Z=-1.8 |
| 4218 | X=305.65   | Y=9.008 | Z=-1.8 |
| 4219 | X=236.58   | Y=9.008 | Z=-1.8 |
| 4220 | X=238.27   | Y=9.008 | Z=-1.8 |
| 4221 | X=244.4775 | Y=9.008 | Z=-1.8 |
| 4222 | X=247.651  | Y=9.008 | Z=-1.8 |
| 4223 | X=249.67   | Y=9.008 | Z=-1.8 |
| 4224 | X=251.3655 | Y=9.008 | Z=-1.8 |

4225 X=251.6299 Y=9.008 Z=-1.8  
4226 X=253.68 Y=9.008 Z=-1.8  
4227 X=255.355 Y=9.008 Z=-1.8  
4228 X=255.7625 Y=9.008 Z=-1.8  
4229 X=259.1 Y=9.008 Z=-1.8  
4230 X=260.9 Y=9.008 Z=-1.8  
4231 X=264.54 Y=9.008 Z=-1.8  
4232 X=266.345 Y=9.008 Z=-1.8  
4233 X=268.1 Y=9.008 Z=-1.8  
4234 X=273.36 Y=9.008 Z=-1.8  
4235 X=278.75 Y=9.008 Z=-1.8  
4236 X=280.5803 Y=9.008 Z=-1.8  
4237 X=291.1 Y=9.008 Z=-1.8  
4238 X=292.83 Y=9.008 Z=-1.8  
4239 X=294.63 Y=9.008 Z=-1.8  
4240 X=296.25 Y=9.008 Z=-1.8  
4241 X=297.85 Y=9.008 Z=-1.8  
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4244 X=303.5 Y=9.008 Z=-1.8  
4245 X=305.3 Y=9.008 Z=-1.8  
4246 X=307.05 Y=9.008 Z=-1.8  
4247 X=308.8 Y=9.008 Z=-1.8  
4248 X=310.5 Y=9.008 Z=-1.8  
4249 X=312.17 Y=9.008 Z=-1.8  
4250 X=313.9 Y=9.008 Z=-1.8  
4251 X=315.975 Y=9.008 Z=-1.8  
4252 X=317.7125 Y=9.008 Z=-1.8  
4253 X=321.66 Y=9.008 Z=-1.8  
4254 X=323.195 Y=9.008 Z=-1.8  
4255 X=173.95 Y=9.008 Z=-1.8  
4256 X=182.95 Y=9.008 Z=-1.8  
4257 X=286.02 Y=9.008 Z=-1.8  
4258 X=0 Y=11.958 Z=0  
4259 X=33.2 Y=11.958 Z=0  
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4286 X=31.82 Y=11.958 Z=0  
4287 X=53.95 Y=11.958 Z=0  
4288 X=35.3 Y=11.958 Z=0  
4289 X=37.1 Y=11.958 Z=0  
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4301 X=103.35 Y=11.958 Z=0  
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4304 X=112.35 Y=11.958 Z=0  
4305 X=34.25 Y=11.958 Z=0  
4306 X=36.31 Y=11.958 Z=0  
4307 X=38.37 Y=11.958 Z=0

|      |           |          |     |
|------|-----------|----------|-----|
| 4308 | X=39.285  | Y=11.958 | Z=0 |
| 4309 | X=41.675  | Y=11.958 | Z=0 |
| 4310 | X=45.58   | Y=11.958 | Z=0 |
| 4311 | X=46.485  | Y=11.958 | Z=0 |
| 4312 | X=47.64   | Y=11.958 | Z=0 |
| 4313 | X=48.875  | Y=11.958 | Z=0 |
| 4314 | X=49.7    | Y=11.958 | Z=0 |
| 4315 | X=53.05   | Y=11.958 | Z=0 |
| 4316 | X=54.85   | Y=11.958 | Z=0 |
| 4317 | X=60.25   | Y=11.958 | Z=0 |
| 4318 | X=62.05   | Y=11.958 | Z=0 |
| 4319 | X=62.25   | Y=11.958 | Z=0 |
| 4320 | X=64.05   | Y=11.958 | Z=0 |
| 4321 | X=65.45   | Y=11.958 | Z=0 |
| 4322 | X=67.25   | Y=11.958 | Z=0 |
| 4323 | X=67.37   | Y=11.958 | Z=0 |
| 4324 | X=69.17   | Y=11.958 | Z=0 |
| 4325 | X=72.65   | Y=11.958 | Z=0 |
| 4326 | X=74.45   | Y=11.958 | Z=0 |
| 4327 | X=76.37   | Y=11.958 | Z=0 |
| 4328 | X=136.95  | Y=11.958 | Z=0 |
| 4329 | X=120.05  | Y=11.958 | Z=0 |
| 4330 | X=121.85  | Y=11.958 | Z=0 |
| 4331 | X=127.25  | Y=11.958 | Z=0 |
| 4332 | X=129.05  | Y=11.958 | Z=0 |
| 4333 | X=132.45  | Y=11.958 | Z=0 |
| 4334 | X=134.25  | Y=11.958 | Z=0 |
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| 4337 | X=144.85  | Y=11.958 | Z=0 |
| 4338 | X=146.65  | Y=11.958 | Z=0 |
| 4339 | X=152.05  | Y=11.958 | Z=0 |
| 4340 | X=153.85  | Y=11.958 | Z=0 |
| 4341 | X=75.75   | Y=11.958 | Z=0 |
| 4342 | X=77.81   | Y=11.958 | Z=0 |
| 4343 | X=79.87   | Y=11.958 | Z=0 |
| 4344 | X=80.785  | Y=11.958 | Z=0 |
| 4345 | X=83.175  | Y=11.958 | Z=0 |
| 4346 | X=86.98   | Y=11.958 | Z=0 |
| 4347 | X=87.985  | Y=11.958 | Z=0 |
| 4348 | X=89.12   | Y=11.958 | Z=0 |
| 4349 | X=90.375  | Y=11.958 | Z=0 |
| 4350 | X=94.55   | Y=11.958 | Z=0 |
| 4351 | X=96.35   | Y=11.958 | Z=0 |
| 4352 | X=101.75  | Y=11.958 | Z=0 |
| 4353 | X=103.65  | Y=11.958 | Z=0 |
| 4354 | X=105.55  | Y=11.958 | Z=0 |
| 4355 | X=106.95  | Y=11.958 | Z=0 |
| 4356 | X=108.8   | Y=11.958 | Z=0 |
| 4357 | X=114.15  | Y=11.958 | Z=0 |
| 4358 | X=116     | Y=11.958 | Z=0 |
| 4359 | X=117.87  | Y=11.958 | Z=0 |
| 4360 | X=178.45  | Y=11.958 | Z=0 |
| 4361 | X=161.55  | Y=11.958 | Z=0 |
| 4362 | X=163.35  | Y=11.958 | Z=0 |
| 4363 | X=168.75  | Y=11.958 | Z=0 |
| 4364 | X=170.55  | Y=11.958 | Z=0 |
| 4365 | X=175.75  | Y=11.958 | Z=0 |
| 4366 | X=181.15  | Y=11.958 | Z=0 |
| 4367 | X=186.35  | Y=11.958 | Z=0 |
| 4368 | X=188.15  | Y=11.958 | Z=0 |
| 4369 | X=193.55  | Y=11.958 | Z=0 |
| 4370 | X=195.35  | Y=11.958 | Z=0 |
| 4371 | X=77.44   | Y=11.958 | Z=0 |
| 4372 | X=84.6425 | Y=11.958 | Z=0 |
| 4373 | X=89.6975 | Y=11.958 | Z=0 |
| 4374 | X=91.18   | Y=11.958 | Z=0 |
| 4375 | X=92.98   | Y=11.958 | Z=0 |
| 4376 | X=95      | Y=11.958 | Z=0 |
| 4377 | X=100.3   | Y=11.958 | Z=0 |
| 4378 | X=102.15  | Y=11.958 | Z=0 |
| 4379 | X=107.3   | Y=11.958 | Z=0 |
| 4380 | X=112.7   | Y=11.958 | Z=0 |
| 4381 | X=114.525 | Y=11.958 | Z=0 |
| 4382 | X=119.66  | Y=11.958 | Z=0 |
| 4383 | X=125.05  | Y=11.958 | Z=0 |
| 4384 | X=127     | Y=11.958 | Z=0 |
| 4385 | X=130.3   | Y=11.958 | Z=0 |
| 4386 | X=132.075 | Y=11.958 | Z=0 |
| 4387 | X=137.5   | Y=11.958 | Z=0 |
| 4388 | X=139.375 | Y=11.958 | Z=0 |
| 4389 | X=142.7   | Y=11.958 | Z=0 |
| 4390 | X=144.475 | Y=11.958 | Z=0 |



|      |            |          |     |
|------|------------|----------|-----|
| 4391 | X=150.05   | Y=11.958 | Z=0 |
| 4392 | X=151.75   | Y=11.958 | Z=0 |
| 4393 | X=261.45   | Y=11.958 | Z=0 |
| 4394 | X=241.77   | Y=11.958 | Z=0 |
| 4395 | X=243.48   | Y=11.958 | Z=0 |
| 4396 | X=243.81   | Y=11.958 | Z=0 |
| 4397 | X=245.5    | Y=11.958 | Z=0 |
| 4398 | X=245.87   | Y=11.958 | Z=0 |
| 4399 | X=253.08   | Y=11.958 | Z=0 |
| 4400 | X=254.88   | Y=11.958 | Z=0 |
| 4401 | X=252.861  | Y=11.958 | Z=0 |
| 4402 | X=255.14   | Y=11.958 | Z=0 |
| 4403 | X=256.57   | Y=11.958 | Z=0 |
| 4404 | X=257.2    | Y=11.958 | Z=0 |
| 4405 | X=260.55   | Y=11.958 | Z=0 |
| 4406 | X=262.35   | Y=11.958 | Z=0 |
| 4407 | X=267.75   | Y=11.958 | Z=0 |
| 4408 | X=269.65   | Y=11.958 | Z=0 |
| 4409 | X=271.55   | Y=11.958 | Z=0 |
| 4410 | X=272.95   | Y=11.958 | Z=0 |
| 4411 | X=274.77   | Y=11.958 | Z=0 |
| 4412 | X=276.59   | Y=11.958 | Z=0 |
| 4413 | X=280.147  | Y=11.958 | Z=0 |
| 4414 | X=281.9735 | Y=11.958 | Z=0 |
| 4415 | X=302.95   | Y=11.958 | Z=0 |
| 4416 | X=283.99   | Y=11.958 | Z=0 |
| 4417 | X=285.79   | Y=11.958 | Z=0 |
| 4418 | X=340.3    | Y=11.958 | Z=0 |
| 4419 | X=325.2    | Y=11.958 | Z=0 |
| 4420 | X=320.76   | Y=11.958 | Z=0 |
| 4421 | X=322.56   | Y=11.958 | Z=0 |
| 4422 | X=329.76   | Y=11.958 | Z=0 |
| 4423 | X=330.6    | Y=11.958 | Z=0 |
| 4424 | X=331.56   | Y=11.958 | Z=0 |
| 4425 | X=332.4    | Y=11.958 | Z=0 |
| 4426 | X=334.8    | Y=11.958 | Z=0 |
| 4427 | X=335.8    | Y=11.958 | Z=0 |
| 4428 | X=336.6    | Y=11.958 | Z=0 |
| 4429 | X=337.6    | Y=11.958 | Z=0 |
| 4430 | X=343      | Y=11.958 | Z=0 |
| 4431 | X=344      | Y=11.958 | Z=0 |
| 4432 | X=344.8    | Y=11.958 | Z=0 |
| 4433 | X=345.8    | Y=11.958 | Z=0 |
| 4434 | X=348.2    | Y=11.958 | Z=0 |
| 4435 | X=349.04   | Y=11.958 | Z=0 |
| 4436 | X=350      | Y=11.958 | Z=0 |
| 4437 | X=350.84   | Y=11.958 | Z=0 |
| 4438 | X=355.4    | Y=11.958 | Z=0 |
| 4439 | X=219.95   | Y=11.958 | Z=0 |
| 4440 | X=200.27   | Y=11.958 | Z=0 |
| 4441 | X=201.98   | Y=11.958 | Z=0 |
| 4442 | X=202.31   | Y=11.958 | Z=0 |
| 4443 | X=204      | Y=11.958 | Z=0 |
| 4444 | X=204.37   | Y=11.958 | Z=0 |
| 4445 | X=211.36   | Y=11.958 | Z=0 |
| 4446 | X=211.58   | Y=11.958 | Z=0 |
| 4447 | X=213.38   | Y=11.958 | Z=0 |
| 4448 | X=213.64   | Y=11.958 | Z=0 |
| 4449 | X=215.07   | Y=11.958 | Z=0 |
| 4450 | X=215.7    | Y=11.958 | Z=0 |
| 4451 | X=219.05   | Y=11.958 | Z=0 |
| 4452 | X=220.85   | Y=11.958 | Z=0 |
| 4453 | X=226.25   | Y=11.958 | Z=0 |
| 4454 | X=228.1    | Y=11.958 | Z=0 |
| 4455 | X=230.05   | Y=11.958 | Z=0 |
| 4456 | X=231.45   | Y=11.958 | Z=0 |
| 4457 | X=233.27   | Y=11.958 | Z=0 |
| 4458 | X=235.09   | Y=11.958 | Z=0 |
| 4459 | X=238.65   | Y=11.958 | Z=0 |
| 4460 | X=240.45   | Y=11.958 | Z=0 |
| 4461 | X=242.49   | Y=11.958 | Z=0 |
| 4462 | X=244.255  | Y=11.958 | Z=0 |
| 4463 | X=283.395  | Y=11.958 | Z=0 |
| 4464 | X=285.21   | Y=11.958 | Z=0 |
| 4465 | X=287.85   | Y=11.958 | Z=0 |
| 4466 | X=292.41   | Y=11.958 | Z=0 |
| 4467 | X=293.25   | Y=11.958 | Z=0 |
| 4468 | X=294.21   | Y=11.958 | Z=0 |
| 4469 | X=295.05   | Y=11.958 | Z=0 |
| 4470 | X=297.45   | Y=11.958 | Z=0 |
| 4471 | X=298.45   | Y=11.958 | Z=0 |
| 4472 | X=299.25   | Y=11.958 | Z=0 |
| 4473 | X=300.25   | Y=11.958 | Z=0 |

|      |            |             |        |
|------|------------|-------------|--------|
| 4474 | X=322.69   | Y=11.958    | Z=0    |
| 4475 | X=318.05   | Y=11.958    | Z=0    |
| 4476 | X=319.85   | Y=11.958    | Z=0    |
| 4477 | X=313.49   | Y=11.958    | Z=0    |
| 4478 | X=312.65   | Y=11.958    | Z=0    |
| 4479 | X=311.69   | Y=11.958    | Z=0    |
| 4480 | X=310.85   | Y=11.958    | Z=0    |
| 4481 | X=308.45   | Y=11.958    | Z=0    |
| 4482 | X=307.45   | Y=11.958    | Z=0    |
| 4483 | X=306.65   | Y=11.958    | Z=0    |
| 4484 | X=305.65   | Y=11.958    | Z=0    |
| 4485 | X=236.58   | Y=11.958    | Z=0    |
| 4486 | X=238.27   | Y=11.958    | Z=0    |
| 4487 | X=244.4775 | Y=11.958    | Z=0    |
| 4488 | X=247.651  | Y=11.958    | Z=0    |
| 4489 | X=249.67   | Y=11.958    | Z=0    |
| 4490 | X=251.3655 | Y=11.958    | Z=0    |
| 4491 | X=251.6299 | Y=11.958    | Z=0    |
| 4492 | X=253.68   | Y=11.958    | Z=0    |
| 4493 | X=255.355  | Y=11.958    | Z=0    |
| 4494 | X=255.7625 | Y=11.958    | Z=0    |
| 4495 | X=259.1    | Y=11.958    | Z=0    |
| 4496 | X=260.9    | Y=11.958    | Z=0    |
| 4497 | X=264.54   | Y=11.958    | Z=0    |
| 4498 | X=266.345  | Y=11.958    | Z=0    |
| 4499 | X=268.1    | Y=11.958    | Z=0    |
| 4500 | X=273.36   | Y=11.958    | Z=0    |
| 4501 | X=278.75   | Y=11.958    | Z=0    |
| 4502 | X=280.5803 | Y=11.958    | Z=0    |
| 4503 | X=291.1    | Y=11.958    | Z=0    |
| 4504 | X=292.83   | Y=11.958    | Z=0    |
| 4505 | X=294.63   | Y=11.958    | Z=0    |
| 4506 | X=296.25   | Y=11.958    | Z=0    |
| 4507 | X=297.85   | Y=11.958    | Z=0    |
| 4508 | X=298.15   | Y=11.958    | Z=0    |
| 4509 | X=299.65   | Y=11.958    | Z=0    |
| 4510 | X=303.5    | Y=11.958    | Z=0    |
| 4511 | X=305.3    | Y=11.958    | Z=0    |
| 4512 | X=307.05   | Y=11.958    | Z=0    |
| 4513 | X=308.8    | Y=11.958    | Z=0    |
| 4514 | X=310.5    | Y=11.958    | Z=0    |
| 4515 | X=312.17   | Y=11.958    | Z=0    |
| 4516 | X=313.9    | Y=11.958    | Z=0    |
| 4517 | X=315.975  | Y=11.958    | Z=0    |
| 4518 | X=317.7125 | Y=11.958    | Z=0    |
| 4519 | X=321.66   | Y=11.958    | Z=0    |
| 4520 | X=323.195  | Y=11.958    | Z=0    |
| 4521 | X=173.95   | Y=11.958    | Z=0    |
| 4522 | X=182.95   | Y=11.958    | Z=0    |
| 4523 | X=286.02   | Y=11.958    | Z=0    |
| 4524 | X=.51      | Y=8.108     | Z=-1.8 |
| 4525 | X=.51      | Y=9.008     | Z=-1.8 |
| 4526 | X=.51      | Y=1.208     | Z=-1.8 |
| 4527 | X=.51      | Y=2.108     | Z=-1.8 |
| 4528 | X=.51      | Y=3.008     | Z=-1.8 |
| 4529 | X=14.94    | Y=7.208     | Z=-1.8 |
| 4530 | X=14.94    | Y=8.108     | Z=-1.8 |
| 4531 | X=14.94    | Y=9.008     | Z=-1.8 |
| 4532 | X=14.94    | Y=1.208     | Z=-1.8 |
| 4533 | X=14.94    | Y=2.108     | Z=-1.8 |
| 4534 | X=14.94    | Y=3.008     | Z=-1.8 |
| 4535 | X=.51      | Y=7.625E-16 | Z=0    |
| 4536 | X=.51      | Y=2.108     | Z=0    |
| 4537 | X=.51      | Y=3.543     | Z=0    |
| 4538 | X=.51      | Y=4.216     | Z=0    |
| 4539 | X=.51      | Y=5.108     | Z=0    |
| 4540 | X=.51      | Y=6         | Z=0    |
| 4541 | X=.51      | Y=6.673     | Z=0    |
| 4542 | X=.51      | Y=8.108     | Z=0    |
| 4543 | X=.51      | Y=10.216    | Z=0    |
| 4544 | X=.51      | Y=11.958    | Z=0    |
| 4545 | X=.51      | Y=-1.742    | Z=0    |
| 4546 | X=14.94    | Y=3.04E-15  | Z=0    |
| 4547 | X=14.94    | Y=2.108     | Z=0    |
| 4548 | X=14.94    | Y=3.543     | Z=0    |
| 4549 | X=14.94    | Y=4.216     | Z=0    |
| 4550 | X=14.94    | Y=5.108     | Z=0    |
| 4551 | X=14.94    | Y=6         | Z=0    |
| 4552 | X=14.94    | Y=6.673     | Z=0    |
| 4553 | X=14.94    | Y=8.108     | Z=0    |
| 4554 | X=14.94    | Y=10.216    | Z=0    |
| 4555 | X=14.94    | Y=11.958    | Z=0    |
| 4556 | X=14.94    | Y=-1.742    | Z=0    |

|      |          |                |        |
|------|----------|----------------|--------|
| 4557 | X=33.725 | Y=7.208        | Z=-1.8 |
| 4558 | X=33.725 | Y=8.108        | Z=-1.8 |
| 4559 | X=33.725 | Y=9.008        | Z=-1.8 |
| 4560 | X=33.725 | Y=1.208        | Z=-1.8 |
| 4561 | X=33.725 | Y=2.108        | Z=-1.8 |
| 4562 | X=33.725 | Y=3.008        | Z=-1.8 |
| 4563 | X=33.725 | Y=6.574988E-15 | Z=0    |
| 4564 | X=33.725 | Y=2.108        | Z=0    |
| 4565 | X=33.725 | Y=3.543        | Z=0    |
| 4566 | X=33.725 | Y=4.216        | Z=0    |
| 4567 | X=33.725 | Y=5.108        | Z=0    |
| 4568 | X=33.725 | Y=6            | Z=0    |
| 4569 | X=33.725 | Y=6.673        | Z=0    |
| 4570 | X=33.725 | Y=8.108        | Z=0    |
| 4571 | X=33.725 | Y=10.216       | Z=0    |
| 4572 | X=33.725 | Y=11.958       | Z=0    |
| 4573 | X=33.725 | Y=-1.742       | Z=0    |
| 4574 | X=75.225 | Y=7.208        | Z=-1.8 |
| 4575 | X=75.225 | Y=8.108        | Z=-1.8 |
| 4576 | X=75.225 | Y=9.008        | Z=-1.8 |
| 4577 | X=75.225 | Y=1.208        | Z=-1.8 |
| 4578 | X=75.225 | Y=2.108        | Z=-1.8 |
| 4579 | X=75.225 | Y=3.008        | Z=-1.8 |
| 4580 | X=75.225 | Y=1.372171E-14 | Z=0    |
| 4581 | X=75.225 | Y=2.108        | Z=0    |
| 4582 | X=75.225 | Y=3.543        | Z=0    |
| 4583 | X=75.225 | Y=4.216        | Z=0    |
| 4584 | X=75.225 | Y=5.108        | Z=0    |
| 4585 | X=75.225 | Y=6            | Z=0    |
| 4586 | X=75.225 | Y=6.673        | Z=0    |
| 4587 | X=75.225 | Y=8.108        | Z=0    |
| 4588 | X=75.225 | Y=10.216       | Z=0    |
| 4589 | X=75.225 | Y=11.958       | Z=0    |
| 4590 | X=75.225 | Y=-1.742       | Z=0    |
| 4591 | X=116.7  | Y=7.208        | Z=-1.8 |
| 4592 | X=116.7  | Y=8.108        | Z=-1.8 |
| 4593 | X=116.7  | Y=9.008        | Z=-1.8 |
| 4594 | X=116.7  | Y=1.208        | Z=-1.8 |
| 4595 | X=116.7  | Y=2.108        | Z=-1.8 |
| 4596 | X=116.7  | Y=3.008        | Z=-1.8 |
| 4597 | X=116.7  | Y=1.372E-14    | Z=0    |
| 4598 | X=116.7  | Y=2.108        | Z=0    |
| 4599 | X=116.7  | Y=3.543        | Z=0    |
| 4600 | X=116.7  | Y=4.216        | Z=0    |
| 4601 | X=116.7  | Y=5.108        | Z=0    |
| 4602 | X=116.7  | Y=6            | Z=0    |
| 4603 | X=116.7  | Y=6.673        | Z=0    |
| 4604 | X=116.7  | Y=8.108        | Z=0    |
| 4605 | X=116.7  | Y=10.216       | Z=0    |
| 4606 | X=116.7  | Y=11.958       | Z=0    |
| 4607 | X=116.7  | Y=-1.742       | Z=0    |
| 4608 | X=158.2  | Y=7.208        | Z=-1.8 |
| 4609 | X=158.2  | Y=8.108        | Z=-1.8 |
| 4610 | X=158.2  | Y=9.008        | Z=-1.8 |
| 4611 | X=158.2  | Y=1.208        | Z=-1.8 |
| 4612 | X=158.2  | Y=2.108        | Z=-1.8 |
| 4613 | X=158.2  | Y=3.008        | Z=-1.8 |
| 4614 | X=158.2  | Y=1.372E-14    | Z=0    |
| 4615 | X=158.2  | Y=2.108        | Z=0    |
| 4616 | X=158.2  | Y=3.543        | Z=0    |
| 4617 | X=158.2  | Y=4.216        | Z=0    |
| 4618 | X=158.2  | Y=5.108        | Z=0    |
| 4619 | X=158.2  | Y=6            | Z=0    |
| 4620 | X=158.2  | Y=6.673        | Z=0    |
| 4621 | X=158.2  | Y=8.108        | Z=0    |
| 4622 | X=158.2  | Y=10.216       | Z=0    |
| 4623 | X=158.2  | Y=11.958       | Z=0    |
| 4624 | X=158.2  | Y=-1.742       | Z=0    |
| 4625 | X=240.2  | Y=7.208        | Z=-1.8 |
| 4626 | X=240.2  | Y=8.108        | Z=-1.8 |
| 4627 | X=240.2  | Y=9.008        | Z=-1.8 |
| 4628 | X=240.2  | Y=1.208        | Z=-1.8 |
| 4629 | X=240.2  | Y=2.108        | Z=-1.8 |
| 4630 | X=240.2  | Y=3.008        | Z=-1.8 |
| 4631 | X=240.2  | Y=1.372E-14    | Z=0    |
| 4632 | X=240.2  | Y=2.108        | Z=0    |
| 4633 | X=240.2  | Y=3.543        | Z=0    |
| 4634 | X=240.2  | Y=4.216        | Z=0    |
| 4635 | X=240.2  | Y=5.108        | Z=0    |
| 4636 | X=240.2  | Y=6            | Z=0    |
| 4637 | X=240.2  | Y=6.673        | Z=0    |
| 4638 | X=240.2  | Y=8.108        | Z=0    |
| 4639 | X=240.2  | Y=10.216       | Z=0    |

|      |              |             |        |
|------|--------------|-------------|--------|
| 4640 | X=240.2      | Y=11.958    | Z=0    |
| 4641 | X=240.2      | Y=-1.742    | Z=0    |
| 4642 | X=281.7      | Y=7.208     | Z=-1.8 |
| 4643 | X=281.7      | Y=8.108     | Z=-1.8 |
| 4644 | X=281.7      | Y=9.008     | Z=-1.8 |
| 4645 | X=281.7      | Y=1.208     | Z=-1.8 |
| 4646 | X=281.7      | Y=2.108     | Z=-1.8 |
| 4647 | X=281.7      | Y=3.008     | Z=-1.8 |
| 4648 | X=281.7      | Y=1.372E-14 | Z=0    |
| 4649 | X=281.7      | Y=2.108     | Z=0    |
| 4650 | X=281.7      | Y=3.543     | Z=0    |
| 4651 | X=281.7      | Y=4.216     | Z=0    |
| 4652 | X=281.7      | Y=5.108     | Z=0    |
| 4653 | X=281.7      | Y=6         | Z=0    |
| 4654 | X=281.7      | Y=6.673     | Z=0    |
| 4655 | X=281.7      | Y=8.108     | Z=0    |
| 4656 | X=281.7      | Y=10.216    | Z=0    |
| 4657 | X=281.7      | Y=11.958    | Z=0    |
| 4658 | X=281.7      | Y=-1.742    | Z=0    |
| 4659 | X=356.4      | Y=7.208     | Z=-1.8 |
| 4660 | X=356.4      | Y=8.108     | Z=-1.8 |
| 4661 | X=356.4      | Y=9.008     | Z=-1.8 |
| 4662 | X=356.4      | Y=1.208     | Z=-1.8 |
| 4663 | X=356.4      | Y=2.108     | Z=-1.8 |
| 4664 | X=356.4      | Y=3.008     | Z=-1.8 |
| 4665 | X=356.4      | Y=6.096E-15 | Z=0    |
| 4666 | X=356.4      | Y=2.108     | Z=0    |
| 4667 | X=356.4      | Y=3.543     | Z=0    |
| 4668 | X=356.4      | Y=4.216     | Z=0    |
| 4669 | X=356.4      | Y=5.108     | Z=0    |
| 4670 | X=356.4      | Y=6         | Z=0    |
| 4671 | X=356.4      | Y=6.673     | Z=0    |
| 4672 | X=356.4      | Y=8.108     | Z=0    |
| 4673 | X=356.4      | Y=10.216    | Z=0    |
| 4674 | X=356.4      | Y=11.958    | Z=0    |
| 4675 | X=356.4      | Y=-1.742    | Z=0    |
| 4676 | X=341.96     | Y=7.208     | Z=-1.8 |
| 4677 | X=341.96     | Y=8.108     | Z=-1.8 |
| 4678 | X=341.96     | Y=9.008     | Z=-1.8 |
| 4679 | X=341.96     | Y=1.208     | Z=-1.8 |
| 4680 | X=341.96     | Y=2.108     | Z=-1.8 |
| 4681 | X=341.96     | Y=3.008     | Z=-1.8 |
| 4682 | X=341.96     | Y=3.812E-15 | Z=0    |
| 4683 | X=341.96     | Y=2.108     | Z=0    |
| 4684 | X=341.96     | Y=3.543     | Z=0    |
| 4685 | X=341.96     | Y=4.216     | Z=0    |
| 4686 | X=341.96     | Y=5.108     | Z=0    |
| 4687 | X=341.96     | Y=6         | Z=0    |
| 4688 | X=341.96     | Y=6.673     | Z=0    |
| 4689 | X=341.96     | Y=8.108     | Z=0    |
| 4690 | X=341.96     | Y=10.216    | Z=0    |
| 4691 | X=341.96     | Y=11.958    | Z=0    |
| 4692 | X=341.96     | Y=-1.742    | Z=0    |
| 4711 | X=0          | Y=.408      | Z=-1.8 |
| 4712 | X=33.2       | Y=.408      | Z=-1.8 |
| 4713 | X=33.2       | Y=3.808     | Z=-1.8 |
| 4714 | X=-7.744E-16 | Y=3.808     | Z=-1.8 |
| 4715 | X=-1.344E-15 | Y=6.408     | Z=-1.8 |
| 4716 | X=33.2       | Y=6.408     | Z=-1.8 |
| 4717 | X=33.2       | Y=9.808     | Z=-1.8 |
| 4718 | X=-1.877E-15 | Y=9.808     | Z=-1.8 |
| 4719 | X=16.6       | Y=6.408     | Z=-1.8 |
| 4720 | X=1.02       | Y=6.408     | Z=-1.8 |
| 4721 | X=1.935      | Y=6.408     | Z=-1.8 |
| 4722 | X=4.325      | Y=6.408     | Z=-1.8 |
| 4723 | X=8.23       | Y=6.408     | Z=-1.8 |
| 4724 | X=9.135      | Y=6.408     | Z=-1.8 |
| 4725 | X=10.29      | Y=6.408     | Z=-1.8 |
| 4726 | X=11.525     | Y=6.408     | Z=-1.8 |
| 4727 | X=12.35      | Y=6.408     | Z=-1.8 |
| 4728 | X=15.7       | Y=6.408     | Z=-1.8 |
| 4729 | X=17.5       | Y=6.408     | Z=-1.8 |
| 4730 | X=22.9       | Y=6.408     | Z=-1.8 |
| 4731 | X=24.7       | Y=6.408     | Z=-1.8 |
| 4732 | X=24.9       | Y=6.408     | Z=-1.8 |
| 4733 | X=26.7       | Y=6.408     | Z=-1.8 |
| 4734 | X=28.1       | Y=6.408     | Z=-1.8 |
| 4735 | X=29.9       | Y=6.408     | Z=-1.8 |
| 4736 | X=30.02      | Y=6.408     | Z=-1.8 |
| 4737 | X=31.82      | Y=6.408     | Z=-1.8 |
| 4738 | X=.51        | Y=6.408     | Z=-1.8 |
| 4739 | X=14.94      | Y=6.408     | Z=-1.8 |
| 4740 | X=16.6       | Y=.408      | Z=-1.8 |

|      |          |         |        |
|------|----------|---------|--------|
| 4741 | X=1.02   | Y=.408  | Z=-1.8 |
| 4742 | X=1.935  | Y=.408  | Z=-1.8 |
| 4743 | X=4.325  | Y=.408  | Z=-1.8 |
| 4744 | X=8.23   | Y=.408  | Z=-1.8 |
| 4745 | X=9.135  | Y=.408  | Z=-1.8 |
| 4746 | X=10.29  | Y=.408  | Z=-1.8 |
| 4747 | X=11.525 | Y=.408  | Z=-1.8 |
| 4748 | X=12.35  | Y=.408  | Z=-1.8 |
| 4749 | X=15.7   | Y=.408  | Z=-1.8 |
| 4750 | X=17.5   | Y=.408  | Z=-1.8 |
| 4751 | X=22.9   | Y=.408  | Z=-1.8 |
| 4752 | X=24.7   | Y=.408  | Z=-1.8 |
| 4753 | X=24.9   | Y=.408  | Z=-1.8 |
| 4754 | X=26.7   | Y=.408  | Z=-1.8 |
| 4755 | X=28.1   | Y=.408  | Z=-1.8 |
| 4756 | X=29.9   | Y=.408  | Z=-1.8 |
| 4757 | X=30.02  | Y=.408  | Z=-1.8 |
| 4758 | X=31.82  | Y=.408  | Z=-1.8 |
| 4759 | X=.51    | Y=.408  | Z=-1.8 |
| 4760 | X=14.94  | Y=.408  | Z=-1.8 |
| 4761 | X=16.6   | Y=9.808 | Z=-1.8 |
| 4762 | X=1.02   | Y=9.808 | Z=-1.8 |
| 4763 | X=1.935  | Y=9.808 | Z=-1.8 |
| 4764 | X=4.325  | Y=9.808 | Z=-1.8 |
| 4765 | X=8.23   | Y=9.808 | Z=-1.8 |
| 4766 | X=9.135  | Y=9.808 | Z=-1.8 |
| 4767 | X=10.29  | Y=9.808 | Z=-1.8 |
| 4768 | X=11.525 | Y=9.808 | Z=-1.8 |
| 4769 | X=12.35  | Y=9.808 | Z=-1.8 |
| 4770 | X=15.7   | Y=9.808 | Z=-1.8 |
| 4771 | X=17.5   | Y=9.808 | Z=-1.8 |
| 4772 | X=22.9   | Y=9.808 | Z=-1.8 |
| 4773 | X=24.7   | Y=9.808 | Z=-1.8 |
| 4774 | X=24.9   | Y=9.808 | Z=-1.8 |
| 4775 | X=26.7   | Y=9.808 | Z=-1.8 |
| 4776 | X=28.1   | Y=9.808 | Z=-1.8 |
| 4777 | X=29.9   | Y=9.808 | Z=-1.8 |
| 4778 | X=30.02  | Y=9.808 | Z=-1.8 |
| 4779 | X=31.82  | Y=9.808 | Z=-1.8 |
| 4780 | X=.51    | Y=9.808 | Z=-1.8 |
| 4781 | X=14.94  | Y=9.808 | Z=-1.8 |
| 4782 | X=16.6   | Y=3.808 | Z=-1.8 |
| 4783 | X=1.02   | Y=3.808 | Z=-1.8 |
| 4784 | X=1.935  | Y=3.808 | Z=-1.8 |
| 4785 | X=4.325  | Y=3.808 | Z=-1.8 |
| 4786 | X=8.23   | Y=3.808 | Z=-1.8 |
| 4787 | X=9.135  | Y=3.808 | Z=-1.8 |
| 4788 | X=10.29  | Y=3.808 | Z=-1.8 |
| 4789 | X=11.525 | Y=3.808 | Z=-1.8 |
| 4790 | X=12.35  | Y=3.808 | Z=-1.8 |
| 4791 | X=15.7   | Y=3.808 | Z=-1.8 |
| 4792 | X=17.5   | Y=3.808 | Z=-1.8 |
| 4793 | X=22.9   | Y=3.808 | Z=-1.8 |
| 4794 | X=24.7   | Y=3.808 | Z=-1.8 |
| 4795 | X=24.9   | Y=3.808 | Z=-1.8 |
| 4796 | X=26.7   | Y=3.808 | Z=-1.8 |
| 4797 | X=28.1   | Y=3.808 | Z=-1.8 |
| 4798 | X=29.9   | Y=3.808 | Z=-1.8 |
| 4799 | X=30.02  | Y=3.808 | Z=-1.8 |
| 4800 | X=31.82  | Y=3.808 | Z=-1.8 |
| 4801 | X=.51    | Y=3.808 | Z=-1.8 |
| 4802 | X=14.94  | Y=3.808 | Z=-1.8 |
| 4804 | X=74.7   | Y=.408  | Z=-1.8 |
| 4805 | X=74.7   | Y=3.808 | Z=-1.8 |
| 4807 | X=74.7   | Y=6.408 | Z=-1.8 |
| 4808 | X=74.7   | Y=9.808 | Z=-1.8 |
| 4823 | X=157.7  | Y=.408  | Z=-1.8 |
| 4824 | X=136.95 | Y=.408  | Z=-1.8 |
| 4825 | X=120.05 | Y=.408  | Z=-1.8 |
| 4826 | X=121.85 | Y=.408  | Z=-1.8 |
| 4827 | X=127.25 | Y=.408  | Z=-1.8 |
| 4828 | X=129.05 | Y=.408  | Z=-1.8 |
| 4829 | X=132.45 | Y=.408  | Z=-1.8 |
| 4830 | X=134.25 | Y=.408  | Z=-1.8 |
| 4831 | X=139.65 | Y=.408  | Z=-1.8 |
| 4832 | X=141.45 | Y=.408  | Z=-1.8 |
| 4833 | X=144.85 | Y=.408  | Z=-1.8 |
| 4834 | X=146.65 | Y=.408  | Z=-1.8 |
| 4835 | X=152.05 | Y=.408  | Z=-1.8 |
| 4836 | X=153.85 | Y=.408  | Z=-1.8 |
| 4837 | X=117.87 | Y=.408  | Z=-1.8 |
| 4838 | X=119.66 | Y=.408  | Z=-1.8 |
| 4839 | X=53.95  | Y=.408  | Z=-1.8 |

|      |          |         |        |
|------|----------|---------|--------|
| 4840 | X=35.3   | Y=.408  | Z=-1.8 |
| 4841 | X=37.1   | Y=.408  | Z=-1.8 |
| 4842 | X=37.22  | Y=.408  | Z=-1.8 |
| 4843 | X=39.02  | Y=.408  | Z=-1.8 |
| 4844 | X=34.25  | Y=.408  | Z=-1.8 |
| 4845 | X=36.31  | Y=.408  | Z=-1.8 |
| 4846 | X=38.37  | Y=.408  | Z=-1.8 |
| 4847 | X=39.285 | Y=.408  | Z=-1.8 |
| 4848 | X=41.675 | Y=.408  | Z=-1.8 |
| 4849 | X=45.58  | Y=.408  | Z=-1.8 |
| 4850 | X=46.485 | Y=.408  | Z=-1.8 |
| 4851 | X=47.64  | Y=.408  | Z=-1.8 |
| 4852 | X=48.875 | Y=.408  | Z=-1.8 |
| 4853 | X=49.7   | Y=.408  | Z=-1.8 |
| 4854 | X=53.05  | Y=.408  | Z=-1.8 |
| 4855 | X=54.85  | Y=.408  | Z=-1.8 |
| 4856 | X=60.25  | Y=.408  | Z=-1.8 |
| 4857 | X=62.05  | Y=.408  | Z=-1.8 |
| 4858 | X=62.25  | Y=.408  | Z=-1.8 |
| 4859 | X=64.05  | Y=.408  | Z=-1.8 |
| 4860 | X=65.45  | Y=.408  | Z=-1.8 |
| 4861 | X=67.25  | Y=.408  | Z=-1.8 |
| 4862 | X=67.37  | Y=.408  | Z=-1.8 |
| 4863 | X=69.17  | Y=.408  | Z=-1.8 |
| 4864 | X=72.65  | Y=.408  | Z=-1.8 |
| 4865 | X=74.45  | Y=.408  | Z=-1.8 |
| 4866 | X=33.725 | Y=.408  | Z=-1.8 |
| 4867 | X=53.95  | Y=3.808 | Z=-1.8 |
| 4868 | X=35.3   | Y=3.808 | Z=-1.8 |
| 4869 | X=37.1   | Y=3.808 | Z=-1.8 |
| 4870 | X=37.22  | Y=3.808 | Z=-1.8 |
| 4871 | X=39.02  | Y=3.808 | Z=-1.8 |
| 4872 | X=34.25  | Y=3.808 | Z=-1.8 |
| 4873 | X=36.31  | Y=3.808 | Z=-1.8 |
| 4874 | X=38.37  | Y=3.808 | Z=-1.8 |
| 4875 | X=39.285 | Y=3.808 | Z=-1.8 |
| 4876 | X=41.675 | Y=3.808 | Z=-1.8 |
| 4877 | X=45.58  | Y=3.808 | Z=-1.8 |
| 4878 | X=46.485 | Y=3.808 | Z=-1.8 |
| 4879 | X=47.64  | Y=3.808 | Z=-1.8 |
| 4880 | X=48.875 | Y=3.808 | Z=-1.8 |
| 4881 | X=49.7   | Y=3.808 | Z=-1.8 |
| 4882 | X=53.05  | Y=3.808 | Z=-1.8 |
| 4883 | X=54.85  | Y=3.808 | Z=-1.8 |
| 4884 | X=60.25  | Y=3.808 | Z=-1.8 |
| 4885 | X=62.05  | Y=3.808 | Z=-1.8 |
| 4886 | X=62.25  | Y=3.808 | Z=-1.8 |
| 4887 | X=64.05  | Y=3.808 | Z=-1.8 |
| 4888 | X=65.45  | Y=3.808 | Z=-1.8 |
| 4889 | X=67.25  | Y=3.808 | Z=-1.8 |
| 4890 | X=67.37  | Y=3.808 | Z=-1.8 |
| 4891 | X=69.17  | Y=3.808 | Z=-1.8 |
| 4892 | X=72.65  | Y=3.808 | Z=-1.8 |
| 4893 | X=74.45  | Y=3.808 | Z=-1.8 |
| 4894 | X=33.725 | Y=3.808 | Z=-1.8 |
| 4895 | X=53.95  | Y=6.408 | Z=-1.8 |
| 4896 | X=35.3   | Y=6.408 | Z=-1.8 |
| 4897 | X=37.1   | Y=6.408 | Z=-1.8 |
| 4898 | X=37.22  | Y=6.408 | Z=-1.8 |
| 4899 | X=39.02  | Y=6.408 | Z=-1.8 |
| 4900 | X=34.25  | Y=6.408 | Z=-1.8 |
| 4901 | X=36.31  | Y=6.408 | Z=-1.8 |
| 4902 | X=38.37  | Y=6.408 | Z=-1.8 |
| 4903 | X=39.285 | Y=6.408 | Z=-1.8 |
| 4904 | X=41.675 | Y=6.408 | Z=-1.8 |
| 4905 | X=45.58  | Y=6.408 | Z=-1.8 |
| 4906 | X=46.485 | Y=6.408 | Z=-1.8 |
| 4907 | X=47.64  | Y=6.408 | Z=-1.8 |
| 4908 | X=48.875 | Y=6.408 | Z=-1.8 |
| 4909 | X=49.7   | Y=6.408 | Z=-1.8 |
| 4910 | X=53.05  | Y=6.408 | Z=-1.8 |
| 4911 | X=54.85  | Y=6.408 | Z=-1.8 |
| 4912 | X=60.25  | Y=6.408 | Z=-1.8 |
| 4913 | X=62.05  | Y=6.408 | Z=-1.8 |
| 4914 | X=62.25  | Y=6.408 | Z=-1.8 |
| 4915 | X=64.05  | Y=6.408 | Z=-1.8 |
| 4916 | X=65.45  | Y=6.408 | Z=-1.8 |
| 4917 | X=67.25  | Y=6.408 | Z=-1.8 |
| 4918 | X=67.37  | Y=6.408 | Z=-1.8 |
| 4919 | X=69.17  | Y=6.408 | Z=-1.8 |
| 4920 | X=72.65  | Y=6.408 | Z=-1.8 |
| 4921 | X=74.45  | Y=6.408 | Z=-1.8 |
| 4922 | X=33.725 | Y=6.408 | Z=-1.8 |

|      |           |         |        |
|------|-----------|---------|--------|
| 4923 | X=53.95   | Y=9.808 | Z=-1.8 |
| 4924 | X=35.3    | Y=9.808 | Z=-1.8 |
| 4925 | X=37.1    | Y=9.808 | Z=-1.8 |
| 4926 | X=37.22   | Y=9.808 | Z=-1.8 |
| 4927 | X=39.02   | Y=9.808 | Z=-1.8 |
| 4928 | X=34.25   | Y=9.808 | Z=-1.8 |
| 4929 | X=36.31   | Y=9.808 | Z=-1.8 |
| 4930 | X=38.37   | Y=9.808 | Z=-1.8 |
| 4931 | X=39.285  | Y=9.808 | Z=-1.8 |
| 4932 | X=41.675  | Y=9.808 | Z=-1.8 |
| 4933 | X=45.58   | Y=9.808 | Z=-1.8 |
| 4934 | X=46.485  | Y=9.808 | Z=-1.8 |
| 4935 | X=47.64   | Y=9.808 | Z=-1.8 |
| 4936 | X=48.875  | Y=9.808 | Z=-1.8 |
| 4937 | X=49.7    | Y=9.808 | Z=-1.8 |
| 4938 | X=53.05   | Y=9.808 | Z=-1.8 |
| 4939 | X=54.85   | Y=9.808 | Z=-1.8 |
| 4940 | X=60.25   | Y=9.808 | Z=-1.8 |
| 4941 | X=62.05   | Y=9.808 | Z=-1.8 |
| 4942 | X=62.25   | Y=9.808 | Z=-1.8 |
| 4943 | X=64.05   | Y=9.808 | Z=-1.8 |
| 4944 | X=65.45   | Y=9.808 | Z=-1.8 |
| 4945 | X=67.25   | Y=9.808 | Z=-1.8 |
| 4946 | X=67.37   | Y=9.808 | Z=-1.8 |
| 4947 | X=69.17   | Y=9.808 | Z=-1.8 |
| 4948 | X=72.65   | Y=9.808 | Z=-1.8 |
| 4949 | X=74.45   | Y=9.808 | Z=-1.8 |
| 4950 | X=33.725  | Y=9.808 | Z=-1.8 |
| 4951 | X=125.05  | Y=.408  | Z=-1.8 |
| 4952 | X=127     | Y=.408  | Z=-1.8 |
| 4953 | X=130.3   | Y=.408  | Z=-1.8 |
| 4954 | X=132.075 | Y=.408  | Z=-1.8 |
| 4955 | X=137.5   | Y=.408  | Z=-1.8 |
| 4956 | X=139.375 | Y=.408  | Z=-1.8 |
| 4957 | X=142.7   | Y=.408  | Z=-1.8 |
| 4958 | X=144.475 | Y=.408  | Z=-1.8 |
| 4959 | X=150.05  | Y=.408  | Z=-1.8 |
| 4960 | X=151.75  | Y=.408  | Z=-1.8 |
| 4961 | X=116.7   | Y=.408  | Z=-1.8 |
| 4962 | X=157.7   | Y=3.808 | Z=-1.8 |
| 4963 | X=136.95  | Y=3.808 | Z=-1.8 |
| 4964 | X=120.05  | Y=3.808 | Z=-1.8 |
| 4965 | X=121.85  | Y=3.808 | Z=-1.8 |
| 4966 | X=127.25  | Y=3.808 | Z=-1.8 |
| 4967 | X=129.05  | Y=3.808 | Z=-1.8 |
| 4968 | X=132.45  | Y=3.808 | Z=-1.8 |
| 4969 | X=134.25  | Y=3.808 | Z=-1.8 |
| 4970 | X=139.65  | Y=3.808 | Z=-1.8 |
| 4971 | X=141.45  | Y=3.808 | Z=-1.8 |
| 4972 | X=144.85  | Y=3.808 | Z=-1.8 |
| 4973 | X=146.65  | Y=3.808 | Z=-1.8 |
| 4974 | X=152.05  | Y=3.808 | Z=-1.8 |
| 4975 | X=153.85  | Y=3.808 | Z=-1.8 |
| 4976 | X=117.87  | Y=3.808 | Z=-1.8 |
| 4977 | X=119.66  | Y=3.808 | Z=-1.8 |
| 4978 | X=125.05  | Y=3.808 | Z=-1.8 |
| 4979 | X=127     | Y=3.808 | Z=-1.8 |
| 4980 | X=130.3   | Y=3.808 | Z=-1.8 |
| 4981 | X=132.075 | Y=3.808 | Z=-1.8 |
| 4982 | X=137.5   | Y=3.808 | Z=-1.8 |
| 4983 | X=139.375 | Y=3.808 | Z=-1.8 |
| 4984 | X=142.7   | Y=3.808 | Z=-1.8 |
| 4985 | X=144.475 | Y=3.808 | Z=-1.8 |
| 4986 | X=150.05  | Y=3.808 | Z=-1.8 |
| 4987 | X=151.75  | Y=3.808 | Z=-1.8 |
| 4988 | X=116.7   | Y=3.808 | Z=-1.8 |
| 4989 | X=157.7   | Y=6.408 | Z=-1.8 |
| 4990 | X=136.95  | Y=6.408 | Z=-1.8 |
| 4991 | X=120.05  | Y=6.408 | Z=-1.8 |
| 4992 | X=121.85  | Y=6.408 | Z=-1.8 |
| 4993 | X=127.25  | Y=6.408 | Z=-1.8 |
| 4994 | X=129.05  | Y=6.408 | Z=-1.8 |
| 4995 | X=132.45  | Y=6.408 | Z=-1.8 |
| 4996 | X=134.25  | Y=6.408 | Z=-1.8 |
| 4997 | X=139.65  | Y=6.408 | Z=-1.8 |
| 4998 | X=141.45  | Y=6.408 | Z=-1.8 |
| 4999 | X=144.85  | Y=6.408 | Z=-1.8 |
| 5000 | X=146.65  | Y=6.408 | Z=-1.8 |
| 5001 | X=152.05  | Y=6.408 | Z=-1.8 |
| 5002 | X=153.85  | Y=6.408 | Z=-1.8 |
| 5003 | X=117.87  | Y=6.408 | Z=-1.8 |
| 5004 | X=119.66  | Y=6.408 | Z=-1.8 |
| 5005 | X=125.05  | Y=6.408 | Z=-1.8 |

5006 X=127 Y=6.408 Z=-1.8  
5007 X=130.3 Y=6.408 Z=-1.8  
5008 X=132.075 Y=6.408 Z=-1.8  
5009 X=137.5 Y=6.408 Z=-1.8  
5010 X=139.375 Y=6.408 Z=-1.8  
5011 X=142.7 Y=6.408 Z=-1.8  
5012 X=144.475 Y=6.408 Z=-1.8  
5013 X=150.05 Y=6.408 Z=-1.8  
5014 X=151.75 Y=6.408 Z=-1.8  
5015 X=116.7 Y=6.408 Z=-1.8  
5016 X=157.7 Y=9.808 Z=-1.8  
5017 X=136.95 Y=9.808 Z=-1.8  
5018 X=120.05 Y=9.808 Z=-1.8  
5019 X=121.85 Y=9.808 Z=-1.8  
5020 X=127.25 Y=9.808 Z=-1.8  
5021 X=129.05 Y=9.808 Z=-1.8  
5022 X=132.45 Y=9.808 Z=-1.8  
5023 X=134.25 Y=9.808 Z=-1.8  
5024 X=139.65 Y=9.808 Z=-1.8  
5025 X=141.45 Y=9.808 Z=-1.8  
5026 X=144.85 Y=9.808 Z=-1.8  
5027 X=146.65 Y=9.808 Z=-1.8  
5028 X=152.05 Y=9.808 Z=-1.8  
5029 X=153.85 Y=9.808 Z=-1.8  
5030 X=117.87 Y=9.808 Z=-1.8  
5031 X=119.66 Y=9.808 Z=-1.8  
5032 X=125.05 Y=9.808 Z=-1.8  
5033 X=127 Y=9.808 Z=-1.8  
5034 X=130.3 Y=9.808 Z=-1.8  
5035 X=132.075 Y=9.808 Z=-1.8  
5036 X=137.5 Y=9.808 Z=-1.8  
5037 X=139.375 Y=9.808 Z=-1.8  
5038 X=142.7 Y=9.808 Z=-1.8  
5039 X=144.475 Y=9.808 Z=-1.8  
5040 X=150.05 Y=9.808 Z=-1.8  
5041 X=151.75 Y=9.808 Z=-1.8  
5042 X=116.7 Y=9.808 Z=-1.8  
5085 X=199.2 Y=.408 Z=-1.8  
5086 X=178.45 Y=.408 Z=-1.8  
5087 X=161.55 Y=.408 Z=-1.8  
5088 X=163.35 Y=.408 Z=-1.8  
5089 X=168.75 Y=.408 Z=-1.8  
5090 X=170.55 Y=.408 Z=-1.8  
5091 X=175.75 Y=.408 Z=-1.8  
5092 X=181.15 Y=.408 Z=-1.8  
5093 X=186.35 Y=.408 Z=-1.8  
5094 X=188.15 Y=.408 Z=-1.8  
5095 X=193.55 Y=.408 Z=-1.8  
5096 X=195.35 Y=.408 Z=-1.8  
5097 X=173.95 Y=.408 Z=-1.8  
5098 X=182.95 Y=.408 Z=-1.8  
5099 X=158.2 Y=.408 Z=-1.8  
5100 X=199.2 Y=3.808 Z=-1.8  
5101 X=178.45 Y=3.808 Z=-1.8  
5102 X=161.55 Y=3.808 Z=-1.8  
5103 X=163.35 Y=3.808 Z=-1.8  
5104 X=168.75 Y=3.808 Z=-1.8  
5105 X=170.55 Y=3.808 Z=-1.8  
5106 X=175.75 Y=3.808 Z=-1.8  
5107 X=181.15 Y=3.808 Z=-1.8  
5108 X=186.35 Y=3.808 Z=-1.8  
5109 X=188.15 Y=3.808 Z=-1.8  
5110 X=193.55 Y=3.808 Z=-1.8  
5111 X=195.35 Y=3.808 Z=-1.8  
5112 X=173.95 Y=3.808 Z=-1.8  
5113 X=116.2 Y=.408 Z=-1.8  
5114 X=95.45 Y=.408 Z=-1.8  
5115 X=78.55 Y=.408 Z=-1.8  
5116 X=80.35 Y=.408 Z=-1.8  
5117 X=85.75 Y=.408 Z=-1.8  
5118 X=87.55 Y=.408 Z=-1.8  
5119 X=90.95 Y=.408 Z=-1.8  
5120 X=92.75 Y=.408 Z=-1.8  
5121 X=98.15 Y=.408 Z=-1.8  
5122 X=99.95 Y=.408 Z=-1.8  
5123 X=103.35 Y=.408 Z=-1.8  
5124 X=105.15 Y=.408 Z=-1.8  
5125 X=110.55 Y=.408 Z=-1.8  
5126 X=112.35 Y=.408 Z=-1.8  
5127 X=76.37 Y=.408 Z=-1.8  
5128 X=75.75 Y=.408 Z=-1.8  
5129 X=77.81 Y=.408 Z=-1.8  
5130 X=79.87 Y=.408 Z=-1.8



|      |           |         |        |
|------|-----------|---------|--------|
| 5131 | X=80.785  | Y=-.408 | Z=-1.8 |
| 5132 | X=83.175  | Y=-.408 | Z=-1.8 |
| 5133 | X=86.98   | Y=-.408 | Z=-1.8 |
| 5134 | X=87.985  | Y=-.408 | Z=-1.8 |
| 5135 | X=89.12   | Y=-.408 | Z=-1.8 |
| 5136 | X=90.375  | Y=-.408 | Z=-1.8 |
| 5137 | X=94.55   | Y=-.408 | Z=-1.8 |
| 5138 | X=96.35   | Y=-.408 | Z=-1.8 |
| 5139 | X=101.75  | Y=-.408 | Z=-1.8 |
| 5140 | X=103.65  | Y=-.408 | Z=-1.8 |
| 5141 | X=105.55  | Y=-.408 | Z=-1.8 |
| 5142 | X=106.95  | Y=-.408 | Z=-1.8 |
| 5143 | X=108.8   | Y=-.408 | Z=-1.8 |
| 5144 | X=114.15  | Y=-.408 | Z=-1.8 |
| 5145 | X=116     | Y=-.408 | Z=-1.8 |
| 5146 | X=77.44   | Y=-.408 | Z=-1.8 |
| 5147 | X=84.6425 | Y=-.408 | Z=-1.8 |
| 5148 | X=89.6975 | Y=-.408 | Z=-1.8 |
| 5149 | X=91.18   | Y=-.408 | Z=-1.8 |
| 5150 | X=92.98   | Y=-.408 | Z=-1.8 |
| 5151 | X=95      | Y=-.408 | Z=-1.8 |
| 5152 | X=100.3   | Y=-.408 | Z=-1.8 |
| 5153 | X=102.15  | Y=-.408 | Z=-1.8 |
| 5154 | X=107.3   | Y=-.408 | Z=-1.8 |
| 5155 | X=112.7   | Y=-.408 | Z=-1.8 |
| 5156 | X=114.525 | Y=-.408 | Z=-1.8 |
| 5157 | X=75.225  | Y=-.408 | Z=-1.8 |
| 5158 | X=116.2   | Y=3.808 | Z=-1.8 |
| 5159 | X=95.45   | Y=3.808 | Z=-1.8 |
| 5160 | X=78.55   | Y=3.808 | Z=-1.8 |
| 5161 | X=80.35   | Y=3.808 | Z=-1.8 |
| 5162 | X=85.75   | Y=3.808 | Z=-1.8 |
| 5163 | X=87.55   | Y=3.808 | Z=-1.8 |
| 5164 | X=90.95   | Y=3.808 | Z=-1.8 |
| 5165 | X=92.75   | Y=3.808 | Z=-1.8 |
| 5166 | X=98.15   | Y=3.808 | Z=-1.8 |
| 5167 | X=99.95   | Y=3.808 | Z=-1.8 |
| 5168 | X=103.35  | Y=3.808 | Z=-1.8 |
| 5169 | X=105.15  | Y=3.808 | Z=-1.8 |
| 5170 | X=110.55  | Y=3.808 | Z=-1.8 |
| 5171 | X=112.35  | Y=3.808 | Z=-1.8 |
| 5172 | X=76.37   | Y=3.808 | Z=-1.8 |
| 5173 | X=75.75   | Y=3.808 | Z=-1.8 |
| 5174 | X=77.81   | Y=3.808 | Z=-1.8 |
| 5175 | X=79.87   | Y=3.808 | Z=-1.8 |
| 5176 | X=80.785  | Y=3.808 | Z=-1.8 |
| 5177 | X=83.175  | Y=3.808 | Z=-1.8 |
| 5178 | X=86.98   | Y=3.808 | Z=-1.8 |
| 5179 | X=87.985  | Y=3.808 | Z=-1.8 |
| 5180 | X=89.12   | Y=3.808 | Z=-1.8 |
| 5181 | X=90.375  | Y=3.808 | Z=-1.8 |
| 5182 | X=94.55   | Y=3.808 | Z=-1.8 |
| 5183 | X=96.35   | Y=3.808 | Z=-1.8 |
| 5184 | X=101.75  | Y=3.808 | Z=-1.8 |
| 5185 | X=103.65  | Y=3.808 | Z=-1.8 |
| 5186 | X=105.55  | Y=3.808 | Z=-1.8 |
| 5187 | X=106.95  | Y=3.808 | Z=-1.8 |
| 5188 | X=108.8   | Y=3.808 | Z=-1.8 |
| 5189 | X=114.15  | Y=3.808 | Z=-1.8 |
| 5190 | X=116     | Y=3.808 | Z=-1.8 |
| 5191 | X=77.44   | Y=3.808 | Z=-1.8 |
| 5192 | X=84.6425 | Y=3.808 | Z=-1.8 |
| 5193 | X=89.6975 | Y=3.808 | Z=-1.8 |
| 5194 | X=91.18   | Y=3.808 | Z=-1.8 |
| 5195 | X=92.98   | Y=3.808 | Z=-1.8 |
| 5196 | X=95      | Y=3.808 | Z=-1.8 |
| 5197 | X=100.3   | Y=3.808 | Z=-1.8 |
| 5198 | X=102.15  | Y=3.808 | Z=-1.8 |
| 5199 | X=107.3   | Y=3.808 | Z=-1.8 |
| 5200 | X=112.7   | Y=3.808 | Z=-1.8 |
| 5201 | X=114.525 | Y=3.808 | Z=-1.8 |
| 5202 | X=75.225  | Y=3.808 | Z=-1.8 |
| 5203 | X=116.2   | Y=6.408 | Z=-1.8 |
| 5204 | X=95.45   | Y=6.408 | Z=-1.8 |
| 5205 | X=78.55   | Y=6.408 | Z=-1.8 |
| 5206 | X=80.35   | Y=6.408 | Z=-1.8 |
| 5207 | X=85.75   | Y=6.408 | Z=-1.8 |
| 5208 | X=87.55   | Y=6.408 | Z=-1.8 |
| 5209 | X=90.95   | Y=6.408 | Z=-1.8 |
| 5210 | X=92.75   | Y=6.408 | Z=-1.8 |
| 5211 | X=98.15   | Y=6.408 | Z=-1.8 |
| 5212 | X=99.95   | Y=6.408 | Z=-1.8 |
| 5213 | X=103.35  | Y=6.408 | Z=-1.8 |

|      |           |         |        |
|------|-----------|---------|--------|
| 5214 | X=105.15  | Y=6.408 | Z=-1.8 |
| 5215 | X=110.55  | Y=6.408 | Z=-1.8 |
| 5216 | X=112.35  | Y=6.408 | Z=-1.8 |
| 5217 | X=76.37   | Y=6.408 | Z=-1.8 |
| 5218 | X=75.75   | Y=6.408 | Z=-1.8 |
| 5219 | X=77.81   | Y=6.408 | Z=-1.8 |
| 5220 | X=79.87   | Y=6.408 | Z=-1.8 |
| 5221 | X=80.785  | Y=6.408 | Z=-1.8 |
| 5222 | X=83.175  | Y=6.408 | Z=-1.8 |
| 5223 | X=86.98   | Y=6.408 | Z=-1.8 |
| 5224 | X=87.985  | Y=6.408 | Z=-1.8 |
| 5225 | X=89.12   | Y=6.408 | Z=-1.8 |
| 5226 | X=90.375  | Y=6.408 | Z=-1.8 |
| 5227 | X=94.55   | Y=6.408 | Z=-1.8 |
| 5228 | X=96.35   | Y=6.408 | Z=-1.8 |
| 5229 | X=101.75  | Y=6.408 | Z=-1.8 |
| 5230 | X=103.65  | Y=6.408 | Z=-1.8 |
| 5231 | X=105.55  | Y=6.408 | Z=-1.8 |
| 5232 | X=106.95  | Y=6.408 | Z=-1.8 |
| 5233 | X=108.8   | Y=6.408 | Z=-1.8 |
| 5234 | X=114.15  | Y=6.408 | Z=-1.8 |
| 5235 | X=116     | Y=6.408 | Z=-1.8 |
| 5236 | X=77.44   | Y=6.408 | Z=-1.8 |
| 5237 | X=84.6425 | Y=6.408 | Z=-1.8 |
| 5238 | X=89.6975 | Y=6.408 | Z=-1.8 |
| 5239 | X=91.18   | Y=6.408 | Z=-1.8 |
| 5240 | X=92.98   | Y=6.408 | Z=-1.8 |
| 5241 | X=95      | Y=6.408 | Z=-1.8 |
| 5242 | X=100.3   | Y=6.408 | Z=-1.8 |
| 5243 | X=102.15  | Y=6.408 | Z=-1.8 |
| 5244 | X=107.3   | Y=6.408 | Z=-1.8 |
| 5245 | X=112.7   | Y=6.408 | Z=-1.8 |
| 5246 | X=114.525 | Y=6.408 | Z=-1.8 |
| 5247 | X=75.225  | Y=6.408 | Z=-1.8 |
| 5248 | X=116.2   | Y=9.808 | Z=-1.8 |
| 5249 | X=95.45   | Y=9.808 | Z=-1.8 |
| 5250 | X=78.55   | Y=9.808 | Z=-1.8 |
| 5251 | X=80.35   | Y=9.808 | Z=-1.8 |
| 5252 | X=85.75   | Y=9.808 | Z=-1.8 |
| 5253 | X=87.55   | Y=9.808 | Z=-1.8 |
| 5254 | X=90.95   | Y=9.808 | Z=-1.8 |
| 5255 | X=92.75   | Y=9.808 | Z=-1.8 |
| 5256 | X=98.15   | Y=9.808 | Z=-1.8 |
| 5257 | X=99.95   | Y=9.808 | Z=-1.8 |
| 5258 | X=103.35  | Y=9.808 | Z=-1.8 |
| 5259 | X=105.15  | Y=9.808 | Z=-1.8 |
| 5260 | X=110.55  | Y=9.808 | Z=-1.8 |
| 5261 | X=112.35  | Y=9.808 | Z=-1.8 |
| 5262 | X=76.37   | Y=9.808 | Z=-1.8 |
| 5263 | X=75.75   | Y=9.808 | Z=-1.8 |
| 5264 | X=77.81   | Y=9.808 | Z=-1.8 |
| 5265 | X=79.87   | Y=9.808 | Z=-1.8 |
| 5266 | X=80.785  | Y=9.808 | Z=-1.8 |
| 5267 | X=83.175  | Y=9.808 | Z=-1.8 |
| 5268 | X=86.98   | Y=9.808 | Z=-1.8 |
| 5269 | X=87.985  | Y=9.808 | Z=-1.8 |
| 5270 | X=89.12   | Y=9.808 | Z=-1.8 |
| 5271 | X=90.375  | Y=9.808 | Z=-1.8 |
| 5272 | X=94.55   | Y=9.808 | Z=-1.8 |
| 5273 | X=96.35   | Y=9.808 | Z=-1.8 |
| 5274 | X=101.75  | Y=9.808 | Z=-1.8 |
| 5275 | X=103.65  | Y=9.808 | Z=-1.8 |
| 5276 | X=105.55  | Y=9.808 | Z=-1.8 |
| 5277 | X=106.95  | Y=9.808 | Z=-1.8 |
| 5278 | X=108.8   | Y=9.808 | Z=-1.8 |
| 5279 | X=114.15  | Y=9.808 | Z=-1.8 |
| 5280 | X=116     | Y=9.808 | Z=-1.8 |
| 5281 | X=77.44   | Y=9.808 | Z=-1.8 |
| 5282 | X=84.6425 | Y=9.808 | Z=-1.8 |
| 5283 | X=89.6975 | Y=9.808 | Z=-1.8 |
| 5284 | X=91.18   | Y=9.808 | Z=-1.8 |
| 5285 | X=92.98   | Y=9.808 | Z=-1.8 |
| 5286 | X=95      | Y=9.808 | Z=-1.8 |
| 5287 | X=100.3   | Y=9.808 | Z=-1.8 |
| 5288 | X=102.15  | Y=9.808 | Z=-1.8 |
| 5289 | X=107.3   | Y=9.808 | Z=-1.8 |
| 5290 | X=112.7   | Y=9.808 | Z=-1.8 |
| 5291 | X=114.525 | Y=9.808 | Z=-1.8 |
| 5292 | X=75.225  | Y=9.808 | Z=-1.8 |
| 5293 | X=182.95  | Y=3.808 | Z=-1.8 |
| 5294 | X=158.2   | Y=3.808 | Z=-1.8 |
| 5295 | X=199.2   | Y=6.408 | Z=-1.8 |
| 5296 | X=178.45  | Y=6.408 | Z=-1.8 |

|      |          |         |        |
|------|----------|---------|--------|
| 5297 | X=161.55 | Y=6.408 | Z=-1.8 |
| 5298 | X=163.35 | Y=6.408 | Z=-1.8 |
| 5299 | X=168.75 | Y=6.408 | Z=-1.8 |
| 5300 | X=170.55 | Y=6.408 | Z=-1.8 |
| 5301 | X=175.75 | Y=6.408 | Z=-1.8 |
| 5302 | X=181.15 | Y=6.408 | Z=-1.8 |
| 5303 | X=186.35 | Y=6.408 | Z=-1.8 |
| 5304 | X=188.15 | Y=6.408 | Z=-1.8 |
| 5305 | X=193.55 | Y=6.408 | Z=-1.8 |
| 5306 | X=195.35 | Y=6.408 | Z=-1.8 |
| 5307 | X=173.95 | Y=6.408 | Z=-1.8 |
| 5308 | X=182.95 | Y=6.408 | Z=-1.8 |
| 5309 | X=158.2  | Y=6.408 | Z=-1.8 |
| 5310 | X=199.2  | Y=9.808 | Z=-1.8 |
| 5311 | X=178.45 | Y=9.808 | Z=-1.8 |
| 5312 | X=161.55 | Y=9.808 | Z=-1.8 |
| 5313 | X=163.35 | Y=9.808 | Z=-1.8 |
| 5314 | X=168.75 | Y=9.808 | Z=-1.8 |
| 5315 | X=170.55 | Y=9.808 | Z=-1.8 |
| 5316 | X=175.75 | Y=9.808 | Z=-1.8 |
| 5317 | X=181.15 | Y=9.808 | Z=-1.8 |
| 5318 | X=186.35 | Y=9.808 | Z=-1.8 |
| 5319 | X=188.15 | Y=9.808 | Z=-1.8 |
| 5320 | X=193.55 | Y=9.808 | Z=-1.8 |
| 5321 | X=195.35 | Y=9.808 | Z=-1.8 |
| 5322 | X=173.95 | Y=9.808 | Z=-1.8 |
| 5323 | X=182.95 | Y=9.808 | Z=-1.8 |
| 5324 | X=158.2  | Y=9.808 | Z=-1.8 |
| 5360 | X=240.7  | Y=,408  | Z=-1.8 |
| 5361 | X=219.95 | Y=,408  | Z=-1.8 |
| 5362 | X=200.27 | Y=,408  | Z=-1.8 |
| 5363 | X=201.98 | Y=,408  | Z=-1.8 |
| 5364 | X=202.31 | Y=,408  | Z=-1.8 |
| 5365 | X=204    | Y=,408  | Z=-1.8 |
| 5366 | X=204.37 | Y=,408  | Z=-1.8 |
| 5367 | X=211.36 | Y=,408  | Z=-1.8 |
| 5368 | X=211.58 | Y=,408  | Z=-1.8 |
| 5369 | X=213.38 | Y=,408  | Z=-1.8 |
| 5370 | X=213.64 | Y=,408  | Z=-1.8 |
| 5371 | X=215.07 | Y=,408  | Z=-1.8 |
| 5372 | X=215.7  | Y=,408  | Z=-1.8 |
| 5373 | X=219.05 | Y=,408  | Z=-1.8 |
| 5374 | X=220.85 | Y=,408  | Z=-1.8 |
| 5375 | X=226.25 | Y=,408  | Z=-1.8 |
| 5376 | X=228.1  | Y=,408  | Z=-1.8 |
| 5377 | X=230.05 | Y=,408  | Z=-1.8 |
| 5378 | X=231.45 | Y=,408  | Z=-1.8 |
| 5379 | X=233.27 | Y=,408  | Z=-1.8 |
| 5380 | X=235.09 | Y=,408  | Z=-1.8 |
| 5381 | X=238.65 | Y=,408  | Z=-1.8 |
| 5382 | X=240.45 | Y=,408  | Z=-1.8 |
| 5383 | X=236.58 | Y=,408  | Z=-1.8 |
| 5384 | X=238.27 | Y=,408  | Z=-1.8 |
| 5385 | X=240.2  | Y=,408  | Z=-1.8 |
| 5386 | X=240.7  | Y=3.808 | Z=-1.8 |
| 5387 | X=219.95 | Y=3.808 | Z=-1.8 |
| 5388 | X=200.27 | Y=3.808 | Z=-1.8 |
| 5389 | X=201.98 | Y=3.808 | Z=-1.8 |
| 5390 | X=202.31 | Y=3.808 | Z=-1.8 |
| 5391 | X=204    | Y=3.808 | Z=-1.8 |
| 5392 | X=204.37 | Y=3.808 | Z=-1.8 |
| 5393 | X=211.36 | Y=3.808 | Z=-1.8 |
| 5394 | X=211.58 | Y=3.808 | Z=-1.8 |
| 5395 | X=213.38 | Y=3.808 | Z=-1.8 |
| 5396 | X=213.64 | Y=3.808 | Z=-1.8 |
| 5397 | X=215.07 | Y=3.808 | Z=-1.8 |
| 5398 | X=215.7  | Y=3.808 | Z=-1.8 |
| 5399 | X=219.05 | Y=3.808 | Z=-1.8 |
| 5400 | X=220.85 | Y=3.808 | Z=-1.8 |
| 5401 | X=226.25 | Y=3.808 | Z=-1.8 |
| 5402 | X=228.1  | Y=3.808 | Z=-1.8 |
| 5403 | X=230.05 | Y=3.808 | Z=-1.8 |
| 5404 | X=231.45 | Y=3.808 | Z=-1.8 |
| 5405 | X=233.27 | Y=3.808 | Z=-1.8 |
| 5406 | X=235.09 | Y=3.808 | Z=-1.8 |
| 5407 | X=238.65 | Y=3.808 | Z=-1.8 |
| 5408 | X=240.45 | Y=3.808 | Z=-1.8 |
| 5409 | X=236.58 | Y=3.808 | Z=-1.8 |
| 5410 | X=238.27 | Y=3.808 | Z=-1.8 |
| 5411 | X=240.2  | Y=3.808 | Z=-1.8 |
| 5412 | X=240.7  | Y=6.408 | Z=-1.8 |
| 5413 | X=219.95 | Y=6.408 | Z=-1.8 |
| 5414 | X=200.27 | Y=6.408 | Z=-1.8 |

|      |            |         |        |
|------|------------|---------|--------|
| 5415 | X=201.98   | Y=6.408 | Z=-1.8 |
| 5416 | X=202.31   | Y=6.408 | Z=-1.8 |
| 5417 | X=204      | Y=6.408 | Z=-1.8 |
| 5418 | X=204.37   | Y=6.408 | Z=-1.8 |
| 5419 | X=211.36   | Y=6.408 | Z=-1.8 |
| 5420 | X=211.58   | Y=6.408 | Z=-1.8 |
| 5421 | X=213.38   | Y=6.408 | Z=-1.8 |
| 5422 | X=213.64   | Y=6.408 | Z=-1.8 |
| 5423 | X=215.07   | Y=6.408 | Z=-1.8 |
| 5424 | X=215.7    | Y=6.408 | Z=-1.8 |
| 5425 | X=219.05   | Y=6.408 | Z=-1.8 |
| 5426 | X=220.85   | Y=6.408 | Z=-1.8 |
| 5427 | X=226.25   | Y=6.408 | Z=-1.8 |
| 5428 | X=228.1    | Y=6.408 | Z=-1.8 |
| 5429 | X=230.05   | Y=6.408 | Z=-1.8 |
| 5430 | X=231.45   | Y=6.408 | Z=-1.8 |
| 5431 | X=233.27   | Y=6.408 | Z=-1.8 |
| 5432 | X=235.09   | Y=6.408 | Z=-1.8 |
| 5433 | X=238.65   | Y=6.408 | Z=-1.8 |
| 5434 | X=240.45   | Y=6.408 | Z=-1.8 |
| 5435 | X=236.58   | Y=6.408 | Z=-1.8 |
| 5436 | X=238.27   | Y=6.408 | Z=-1.8 |
| 5437 | X=240.2    | Y=6.408 | Z=-1.8 |
| 5438 | X=240.7    | Y=9.808 | Z=-1.8 |
| 5439 | X=219.95   | Y=9.808 | Z=-1.8 |
| 5440 | X=200.27   | Y=9.808 | Z=-1.8 |
| 5441 | X=201.98   | Y=9.808 | Z=-1.8 |
| 5442 | X=202.31   | Y=9.808 | Z=-1.8 |
| 5443 | X=204      | Y=9.808 | Z=-1.8 |
| 5444 | X=204.37   | Y=9.808 | Z=-1.8 |
| 5445 | X=211.36   | Y=9.808 | Z=-1.8 |
| 5446 | X=211.58   | Y=9.808 | Z=-1.8 |
| 5447 | X=213.38   | Y=9.808 | Z=-1.8 |
| 5448 | X=213.64   | Y=9.808 | Z=-1.8 |
| 5449 | X=215.07   | Y=9.808 | Z=-1.8 |
| 5450 | X=215.7    | Y=9.808 | Z=-1.8 |
| 5451 | X=219.05   | Y=9.808 | Z=-1.8 |
| 5452 | X=220.85   | Y=9.808 | Z=-1.8 |
| 5453 | X=226.25   | Y=9.808 | Z=-1.8 |
| 5454 | X=228.1    | Y=9.808 | Z=-1.8 |
| 5455 | X=230.05   | Y=9.808 | Z=-1.8 |
| 5456 | X=231.45   | Y=9.808 | Z=-1.8 |
| 5457 | X=233.27   | Y=9.808 | Z=-1.8 |
| 5458 | X=235.09   | Y=9.808 | Z=-1.8 |
| 5459 | X=238.65   | Y=9.808 | Z=-1.8 |
| 5460 | X=240.45   | Y=9.808 | Z=-1.8 |
| 5461 | X=236.58   | Y=9.808 | Z=-1.8 |
| 5462 | X=238.27   | Y=9.808 | Z=-1.8 |
| 5463 | X=240.2    | Y=9.808 | Z=-1.8 |
| 5513 | X=282.2    | Y=.408  | Z=-1.8 |
| 5514 | X=261.45   | Y=.408  | Z=-1.8 |
| 5515 | X=241.77   | Y=.408  | Z=-1.8 |
| 5516 | X=243.48   | Y=.408  | Z=-1.8 |
| 5517 | X=243.81   | Y=.408  | Z=-1.8 |
| 5518 | X=245.5    | Y=.408  | Z=-1.8 |
| 5519 | X=245.87   | Y=.408  | Z=-1.8 |
| 5520 | X=253.08   | Y=.408  | Z=-1.8 |
| 5521 | X=254.88   | Y=.408  | Z=-1.8 |
| 5522 | X=252.861  | Y=.408  | Z=-1.8 |
| 5523 | X=255.14   | Y=.408  | Z=-1.8 |
| 5524 | X=256.57   | Y=.408  | Z=-1.8 |
| 5525 | X=257.2    | Y=.408  | Z=-1.8 |
| 5526 | X=260.55   | Y=.408  | Z=-1.8 |
| 5527 | X=262.35   | Y=.408  | Z=-1.8 |
| 5528 | X=267.75   | Y=.408  | Z=-1.8 |
| 5529 | X=269.65   | Y=.408  | Z=-1.8 |
| 5530 | X=271.55   | Y=.408  | Z=-1.8 |
| 5531 | X=272.95   | Y=.408  | Z=-1.8 |
| 5532 | X=274.77   | Y=.408  | Z=-1.8 |
| 5533 | X=276.59   | Y=.408  | Z=-1.8 |
| 5534 | X=280.147  | Y=.408  | Z=-1.8 |
| 5535 | X=281.9735 | Y=.408  | Z=-1.8 |
| 5536 | X=242.49   | Y=.408  | Z=-1.8 |
| 5537 | X=244.255  | Y=.408  | Z=-1.8 |
| 5538 | X=244.4775 | Y=.408  | Z=-1.8 |
| 5539 | X=247.651  | Y=.408  | Z=-1.8 |
| 5540 | X=249.67   | Y=.408  | Z=-1.8 |
| 5541 | X=251.3655 | Y=.408  | Z=-1.8 |
| 5542 | X=251.6299 | Y=.408  | Z=-1.8 |
| 5543 | X=253.68   | Y=.408  | Z=-1.8 |
| 5544 | X=255.355  | Y=.408  | Z=-1.8 |
| 5545 | X=255.7625 | Y=.408  | Z=-1.8 |
| 5546 | X=259.1    | Y=.408  | Z=-1.8 |

5547 X=260.9 Y=-.408 Z=-1.8  
5548 X=264.54 Y=-.408 Z=-1.8  
5549 X=266.345 Y=-.408 Z=-1.8  
5550 X=268.1 Y=-.408 Z=-1.8  
5551 X=273.36 Y=-.408 Z=-1.8  
5552 X=278.75 Y=-.408 Z=-1.8  
5553 X=280.5803 Y=-.408 Z=-1.8  
5554 X=281.7 Y=-.408 Z=-1.8  
5555 X=282.2 Y=3.808 Z=-1.8  
5556 X=261.45 Y=3.808 Z=-1.8  
5557 X=241.77 Y=3.808 Z=-1.8  
5558 X=243.48 Y=3.808 Z=-1.8  
5559 X=243.81 Y=3.808 Z=-1.8  
5560 X=245.5 Y=3.808 Z=-1.8  
5561 X=245.87 Y=3.808 Z=-1.8  
5562 X=253.08 Y=3.808 Z=-1.8  
5563 X=254.88 Y=3.808 Z=-1.8  
5564 X=252.861 Y=3.808 Z=-1.8  
5565 X=255.14 Y=3.808 Z=-1.8  
5566 X=256.57 Y=3.808 Z=-1.8  
5567 X=257.2 Y=3.808 Z=-1.8  
5568 X=260.55 Y=3.808 Z=-1.8  
5569 X=262.35 Y=3.808 Z=-1.8  
5570 X=267.75 Y=3.808 Z=-1.8  
5571 X=269.65 Y=3.808 Z=-1.8  
5572 X=271.55 Y=3.808 Z=-1.8  
5573 X=272.95 Y=3.808 Z=-1.8  
5574 X=274.77 Y=3.808 Z=-1.8  
5575 X=276.59 Y=3.808 Z=-1.8  
5576 X=280.147 Y=3.808 Z=-1.8  
5577 X=281.9735 Y=3.808 Z=-1.8  
5578 X=242.49 Y=3.808 Z=-1.8  
5579 X=244.255 Y=3.808 Z=-1.8  
5580 X=244.4775 Y=3.808 Z=-1.8  
5581 X=247.651 Y=3.808 Z=-1.8  
5582 X=249.67 Y=3.808 Z=-1.8  
5583 X=251.3655 Y=3.808 Z=-1.8  
5584 X=251.6299 Y=3.808 Z=-1.8  
5585 X=253.68 Y=3.808 Z=-1.8  
5586 X=255.355 Y=3.808 Z=-1.8  
5587 X=255.7625 Y=3.808 Z=-1.8  
5588 X=259.1 Y=3.808 Z=-1.8  
5589 X=260.9 Y=3.808 Z=-1.8  
5590 X=264.54 Y=3.808 Z=-1.8  
5591 X=266.345 Y=3.808 Z=-1.8  
5592 X=268.1 Y=3.808 Z=-1.8  
5593 X=273.36 Y=3.808 Z=-1.8  
5594 X=278.75 Y=3.808 Z=-1.8  
5595 X=280.5803 Y=3.808 Z=-1.8  
5596 X=281.7 Y=3.808 Z=-1.8  
5597 X=282.2 Y=6.408 Z=-1.8  
5598 X=261.45 Y=6.408 Z=-1.8  
5599 X=241.77 Y=6.408 Z=-1.8  
5600 X=243.48 Y=6.408 Z=-1.8  
5601 X=243.81 Y=6.408 Z=-1.8  
5602 X=245.5 Y=6.408 Z=-1.8  
5603 X=245.87 Y=6.408 Z=-1.8  
5604 X=253.08 Y=6.408 Z=-1.8  
5605 X=254.88 Y=6.408 Z=-1.8  
5606 X=252.861 Y=6.408 Z=-1.8  
5607 X=255.14 Y=6.408 Z=-1.8  
5608 X=256.57 Y=6.408 Z=-1.8  
5609 X=257.2 Y=6.408 Z=-1.8  
5610 X=260.55 Y=6.408 Z=-1.8  
5611 X=262.35 Y=6.408 Z=-1.8  
5612 X=267.75 Y=6.408 Z=-1.8  
5613 X=269.65 Y=6.408 Z=-1.8  
5614 X=271.55 Y=6.408 Z=-1.8  
5615 X=272.95 Y=6.408 Z=-1.8  
5616 X=274.77 Y=6.408 Z=-1.8  
5617 X=276.59 Y=6.408 Z=-1.8  
5618 X=280.147 Y=6.408 Z=-1.8  
5619 X=281.9735 Y=6.408 Z=-1.8  
5620 X=242.49 Y=6.408 Z=-1.8  
5621 X=244.255 Y=6.408 Z=-1.8  
5622 X=244.4775 Y=6.408 Z=-1.8  
5623 X=247.651 Y=6.408 Z=-1.8  
5624 X=249.67 Y=6.408 Z=-1.8  
5625 X=251.3655 Y=6.408 Z=-1.8  
5626 X=251.6299 Y=6.408 Z=-1.8  
5627 X=253.68 Y=6.408 Z=-1.8  
5628 X=255.355 Y=6.408 Z=-1.8  
5629 X=255.7625 Y=6.408 Z=-1.8

5630 X=259.1 Y=6.408 Z=-1.8  
5631 X=260.9 Y=6.408 Z=-1.8  
5632 X=264.54 Y=6.408 Z=-1.8  
5633 X=266.345 Y=6.408 Z=-1.8  
5634 X=268.1 Y=6.408 Z=-1.8  
5635 X=273.36 Y=6.408 Z=-1.8  
5636 X=278.75 Y=6.408 Z=-1.8  
5637 X=280.5803 Y=6.408 Z=-1.8  
5638 X=281.7 Y=6.408 Z=-1.8  
5639 X=282.2 Y=9.808 Z=-1.8  
5640 X=261.45 Y=9.808 Z=-1.8  
5641 X=241.77 Y=9.808 Z=-1.8  
5642 X=243.48 Y=9.808 Z=-1.8  
5643 X=243.81 Y=9.808 Z=-1.8  
5644 X=245.5 Y=9.808 Z=-1.8  
5645 X=245.87 Y=9.808 Z=-1.8  
5646 X=253.08 Y=9.808 Z=-1.8  
5647 X=254.88 Y=9.808 Z=-1.8  
5648 X=252.861 Y=9.808 Z=-1.8  
5649 X=255.14 Y=9.808 Z=-1.8  
5650 X=256.57 Y=9.808 Z=-1.8  
5651 X=257.2 Y=9.808 Z=-1.8  
5652 X=260.55 Y=9.808 Z=-1.8  
5653 X=262.35 Y=9.808 Z=-1.8  
5654 X=267.75 Y=9.808 Z=-1.8  
5655 X=269.65 Y=9.808 Z=-1.8  
5656 X=271.55 Y=9.808 Z=-1.8  
5657 X=272.95 Y=9.808 Z=-1.8  
5658 X=274.77 Y=9.808 Z=-1.8  
5659 X=276.59 Y=9.808 Z=-1.8  
5660 X=280.147 Y=9.808 Z=-1.8  
5661 X=281.9735 Y=9.808 Z=-1.8  
5662 X=242.49 Y=9.808 Z=-1.8  
5663 X=244.255 Y=9.808 Z=-1.8  
5664 X=244.4775 Y=9.808 Z=-1.8  
5665 X=247.651 Y=9.808 Z=-1.8  
5666 X=249.67 Y=9.808 Z=-1.8  
5667 X=251.3655 Y=9.808 Z=-1.8  
5668 X=251.6299 Y=9.808 Z=-1.8  
5669 X=253.68 Y=9.808 Z=-1.8  
5670 X=255.355 Y=9.808 Z=-1.8  
5671 X=255.7625 Y=9.808 Z=-1.8  
5672 X=259.1 Y=9.808 Z=-1.8  
5673 X=260.9 Y=9.808 Z=-1.8  
5674 X=264.54 Y=9.808 Z=-1.8  
5675 X=266.345 Y=9.808 Z=-1.8  
5676 X=268.1 Y=9.808 Z=-1.8  
5677 X=273.36 Y=9.808 Z=-1.8  
5678 X=278.75 Y=9.808 Z=-1.8  
5679 X=280.5803 Y=9.808 Z=-1.8  
5680 X=281.7 Y=9.808 Z=-1.8  
5737 X=323.7 Y=.408 Z=-1.8  
5738 X=302.95 Y=.408 Z=-1.8  
5739 X=283.99 Y=.408 Z=-1.8  
5740 X=285.79 Y=.408 Z=-1.8  
5741 X=320.76 Y=.408 Z=-1.8  
5742 X=322.56 Y=.408 Z=-1.8  
5743 X=283.395 Y=.408 Z=-1.8  
5744 X=285.21 Y=.408 Z=-1.8  
5745 X=287.85 Y=.408 Z=-1.8  
5746 X=292.41 Y=.408 Z=-1.8  
5747 X=293.25 Y=.408 Z=-1.8  
5748 X=294.21 Y=.408 Z=-1.8  
5749 X=295.05 Y=.408 Z=-1.8  
5750 X=297.45 Y=.408 Z=-1.8  
5751 X=298.45 Y=.408 Z=-1.8  
5752 X=299.25 Y=.408 Z=-1.8  
5753 X=300.25 Y=.408 Z=-1.8  
5754 X=322.69 Y=.408 Z=-1.8  
5755 X=318.05 Y=.408 Z=-1.8  
5756 X=319.85 Y=.408 Z=-1.8  
5757 X=313.49 Y=.408 Z=-1.8  
5758 X=312.65 Y=.408 Z=-1.8  
5759 X=311.69 Y=.408 Z=-1.8  
5760 X=310.85 Y=.408 Z=-1.8  
5761 X=308.45 Y=.408 Z=-1.8  
5762 X=307.45 Y=.408 Z=-1.8  
5763 X=306.65 Y=.408 Z=-1.8  
5764 X=305.65 Y=.408 Z=-1.8  
5765 X=291.1 Y=.408 Z=-1.8  
5766 X=292.83 Y=.408 Z=-1.8  
5767 X=294.63 Y=.408 Z=-1.8  
5768 X=296.25 Y=.408 Z=-1.8

|      |            |         |        |
|------|------------|---------|--------|
| 5769 | X=297.85   | Y=.408  | Z=-1.8 |
| 5770 | X=298.15   | Y=.408  | Z=-1.8 |
| 5771 | X=299.65   | Y=.408  | Z=-1.8 |
| 5772 | X=303.5    | Y=.408  | Z=-1.8 |
| 5773 | X=305.3    | Y=.408  | Z=-1.8 |
| 5774 | X=307.05   | Y=.408  | Z=-1.8 |
| 5775 | X=308.8    | Y=.408  | Z=-1.8 |
| 5776 | X=310.5    | Y=.408  | Z=-1.8 |
| 5777 | X=312.17   | Y=.408  | Z=-1.8 |
| 5778 | X=313.9    | Y=.408  | Z=-1.8 |
| 5779 | X=315.975  | Y=.408  | Z=-1.8 |
| 5780 | X=317.7125 | Y=.408  | Z=-1.8 |
| 5781 | X=321.66   | Y=.408  | Z=-1.8 |
| 5782 | X=323.195  | Y=.408  | Z=-1.8 |
| 5783 | X=286.02   | Y=.408  | Z=-1.8 |
| 5784 | X=323.7    | Y=3.808 | Z=-1.8 |
| 5785 | X=302.95   | Y=3.808 | Z=-1.8 |
| 5786 | X=283.99   | Y=3.808 | Z=-1.8 |
| 5787 | X=285.79   | Y=3.808 | Z=-1.8 |
| 5788 | X=320.76   | Y=3.808 | Z=-1.8 |
| 5789 | X=322.56   | Y=3.808 | Z=-1.8 |
| 5790 | X=283.395  | Y=3.808 | Z=-1.8 |
| 5791 | X=285.21   | Y=3.808 | Z=-1.8 |
| 5792 | X=287.85   | Y=3.808 | Z=-1.8 |
| 5793 | X=292.41   | Y=3.808 | Z=-1.8 |
| 5794 | X=293.25   | Y=3.808 | Z=-1.8 |
| 5795 | X=294.21   | Y=3.808 | Z=-1.8 |
| 5796 | X=295.05   | Y=3.808 | Z=-1.8 |
| 5797 | X=297.45   | Y=3.808 | Z=-1.8 |
| 5798 | X=298.45   | Y=3.808 | Z=-1.8 |
| 5799 | X=299.25   | Y=3.808 | Z=-1.8 |
| 5800 | X=300.25   | Y=3.808 | Z=-1.8 |
| 5801 | X=322.69   | Y=3.808 | Z=-1.8 |
| 5802 | X=318.05   | Y=3.808 | Z=-1.8 |
| 5803 | X=319.85   | Y=3.808 | Z=-1.8 |
| 5804 | X=313.49   | Y=3.808 | Z=-1.8 |
| 5805 | X=312.65   | Y=3.808 | Z=-1.8 |
| 5806 | X=311.69   | Y=3.808 | Z=-1.8 |
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| 5811 | X=305.65   | Y=3.808 | Z=-1.8 |
| 5812 | X=291.1    | Y=3.808 | Z=-1.8 |
| 5813 | X=292.83   | Y=3.808 | Z=-1.8 |
| 5814 | X=294.63   | Y=3.808 | Z=-1.8 |
| 5815 | X=296.25   | Y=3.808 | Z=-1.8 |
| 5816 | X=297.85   | Y=3.808 | Z=-1.8 |
| 5817 | X=298.15   | Y=3.808 | Z=-1.8 |
| 5818 | X=299.65   | Y=3.808 | Z=-1.8 |
| 5819 | X=303.5    | Y=3.808 | Z=-1.8 |
| 5820 | X=305.3    | Y=3.808 | Z=-1.8 |
| 5821 | X=307.05   | Y=3.808 | Z=-1.8 |
| 5822 | X=308.8    | Y=3.808 | Z=-1.8 |
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| 5824 | X=312.17   | Y=3.808 | Z=-1.8 |
| 5825 | X=313.9    | Y=3.808 | Z=-1.8 |
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| 5865 | X=299.65   | Y=6.408 | Z=-1.8 |
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| 5868 | X=307.05   | Y=6.408 | Z=-1.8 |
| 5869 | X=308.8    | Y=6.408 | Z=-1.8 |
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| 5873 | X=315.975  | Y=6.408 | Z=-1.8 |
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| 5875 | X=321.66   | Y=6.408 | Z=-1.8 |
| 5876 | X=323.195  | Y=6.408 | Z=-1.8 |
| 5877 | X=286.02   | Y=6.408 | Z=-1.8 |
| 5878 | X=323.7    | Y=9.808 | Z=-1.8 |
| 5879 | X=302.95   | Y=9.808 | Z=-1.8 |
| 5880 | X=283.99   | Y=9.808 | Z=-1.8 |
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| 5886 | X=287.85   | Y=9.808 | Z=-1.8 |
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| 5890 | X=295.05   | Y=9.808 | Z=-1.8 |
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| 5894 | X=300.25   | Y=9.808 | Z=-1.8 |
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| 5919 | X=313.9    | Y=9.808 | Z=-1.8 |
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| 5957 | X=340.3    | Y=.408  | Z=-1.8 |
| 5958 | X=325.2    | Y=.408  | Z=-1.8 |
| 5959 | X=329.76   | Y=.408  | Z=-1.8 |
| 5960 | X=330.6    | Y=.408  | Z=-1.8 |
| 5961 | X=331.56   | Y=.408  | Z=-1.8 |
| 5962 | X=332.4    | Y=.408  | Z=-1.8 |
| 5963 | X=334.8    | Y=.408  | Z=-1.8 |
| 5964 | X=335.8    | Y=.408  | Z=-1.8 |
| 5965 | X=336.6    | Y=.408  | Z=-1.8 |



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5972 X=349.04 Y=-.408 Z=-1.8  
5973 X=350 Y=-.408 Z=-1.8  
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5975 X=355.4 Y=-.408 Z=-1.8  
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5981 X=329.76 Y=3.808 Z=-1.8  
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6002 X=325.2 Y=6.408 Z=-1.8  
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6021 X=341.96 Y=6.408 Z=-1.8  
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6037 X=348.2 Y=9.808 Z=-1.8  
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6040 X=350.84 Y=9.808 Z=-1.8  
6041 X=355.4 Y=9.808 Z=-1.8  
6042 X=356.4 Y=9.808 Z=-1.8  
6043 X=341.96 Y=9.808 Z=-1.8

## RESTRAINT

ADD=2653 DOF=U1,U2,U3  
ADD=3194 DOF=U1,U2,U3  
ADD=3460 DOF=U1,U2,U3

ADD=3992 DOF=U1, U2, U3  
ADD=2654 DOF=U3  
ADD=3195 DOF=U3  
ADD=3461 DOF=U3  
ADD=3993 DOF=U3  
ADD=2655 DOF=U3  
ADD=3196 DOF=U3  
ADD=3462 DOF=U3  
ADD=3994 DOF=U3  
ADD=2658 DOF=U3  
ADD=3199 DOF=U3  
ADD=3465 DOF=U3  
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ADD=2659 DOF=U3  
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ADD=3201 DOF=U3  
ADD=3467 DOF=U3  
ADD=3999 DOF=U3  
ADD=2670 DOF=U3  
ADD=3202 DOF=U3  
ADD=3468 DOF=U3  
ADD=4000 DOF=U3  
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ADD=3197 DOF=U3  
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ADD=2657 DOF=U3  
ADD=3198 DOF=U3  
ADD=3464 DOF=U3  
ADD=3996 DOF=U3  
ADD=4711 DOF=U1, U2, U3  
ADD=4714 DOF=U1, U2, U3  
ADD=4715 DOF=U1, U2, U3  
ADD=4718 DOF=U1, U2, U3  
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ADD=4717 DOF=U3  
ADD=4804 DOF=U3  
ADD=4807 DOF=U3  
ADD=4808 DOF=U3  
ADD=5956 DOF=U3  
ADD=5978 DOF=U3  
ADD=6000 DOF=U3  
ADD=6022 DOF=U3  
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ADD=5878 DOF=U3  
ADD=5513 DOF=U3  
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ADD=5597 DOF=U3  
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ADD=5386 DOF=U3  
ADD=5412 DOF=U3  
ADD=5438 DOF=U3  
ADD=5085 DOF=U3  
ADD=5100 DOF=U3  
ADD=5295 DOF=U3  
ADD=5310 DOF=U3  
ADD=4823 DOF=U3  
ADD=4962 DOF=U3  
ADD=4989 DOF=U3  
ADD=5016 DOF=U3  
ADD=5113 DOF=U3  
ADD=5158 DOF=U3  
ADD=5203 DOF=U3  
ADD=5248 DOF=U3  
ADD=4805 DOF=U3

PATTERN  
NAME=DEFAULT

MATERIAL  
NAME=STEEL IDES=S M=.798142 W=7.833414

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NAME=CONC IDES=C M=.254929 W=2.498305
T=0 E=2780154 U=.2 A=.0000099
NAME=OTHER IDES=N M=.2448012 W=2.402616
T=0 E=2531051 U=.2 A=.0000099
NAME=VIGASB IDES=C M=.3839068 W=3.762284
T=0 E=4653985 U=.2 A=0
NAME=VIGASI IDES=C M=.254929 W=2.498305
T=0 E=4653985 U=.2 A=0
NAME=HLOSA IDES=C M=.5888 W=5.77
T=0 E=3554575 U=.2 A=0
NAME=VIGAS3D IDES=C M=.2549 W=2.498
T=0 E=4654031 U=.2 A=.0000117
NAME=LOSAALAS IDES=C M=.6559 W=6.428
T=0 E=3554575 U=.2 A=.0000117

FRAME SECTION
NAME=FSEC1 MAT=STEEL SH=R T=.5, .3 A=.15 J=2.817371E-03 I=.003125, .001125
AS=.125, .125
NAME=VIGAB MAT=VIGASB A=1.5059 J=0 I=.8772, 0 AS=.288, 0 T=.4572, .254
NAME=VIGAI MAT=VIGASI A=.6918 J=0 I=.8418, 0 AS=.288, 0 T=.4572, .254

SHELL SECTION
NAME=SSEC1 MAT=CONC TYPE=Shell, Thin TH=1
NAME=LOSA MAT=HLOSA TYPE=Shell, Thin TH=.26
NAME=LOSAALAS MAT=LOSAALAS TYPE=Shell, Thin TH=.2
NAME=COSTEROS MAT=VIGAS3D TYPE=Shell, Thin TH=.16
NAME=INFCAJON MAT=VIGAS3D TYPE=Shell, Thin TH=.22

SHELL
9 J=3620, 4676, 3886, 4677 SEC=INFCAJON
10 J=4676, 3632, 4677, 3898 SEC=INFCAJON
12 J=3886, 4677, 4152, 4678 SEC=INFCAJON
13 J=4677, 3898, 4678, 4164 SEC=INFCAJON
14 J=2822, 4679, 3088, 4680 SEC=INFCAJON
15 J=4679, 2834, 4680, 3100 SEC=INFCAJON
16 J=3088, 4680, 3354, 4681 SEC=INFCAJON
17 J=4680, 3100, 4681, 3366 SEC=INFCAJON
18 J=103, 112, 104, 113 SEC=LOSA
19 J=104, 113, 105, 114 SEC=LOSA
20 J=105, 114, 106, 115 SEC=LOSA
21 J=106, 115, 107, 116 SEC=LOSA
22 J=107, 116, 108, 117 SEC=LOSA
23 J=108, 117, 2372, 2373 SEC=LOSA
24 J=2372, 2373, 109, 118 SEC=LOSA
25 J=109, 118, 111, 120 SEC=LOSA
26 J=112, 121, 113, 122 SEC=LOSA
27 J=113, 122, 114, 123 SEC=LOSA
28 J=114, 123, 115, 124 SEC=LOSA
29 J=115, 124, 116, 125 SEC=LOSA
30 J=116, 125, 117, 126 SEC=LOSA
31 J=117, 126, 2373, 2374 SEC=LOSA
32 J=2373, 2374, 118, 127 SEC=LOSA
33 J=118, 127, 120, 129 SEC=LOSA
34 J=121, 130, 122, 131 SEC=LOSA
35 J=122, 131, 123, 132 SEC=LOSA
36 J=123, 132, 124, 133 SEC=LOSA
37 J=124, 133, 125, 134 SEC=LOSA
38 J=125, 134, 126, 135 SEC=LOSA
39 J=126, 135, 2374, 2375 SEC=LOSA
40 J=2374, 2375, 127, 136 SEC=LOSA
41 J=127, 136, 129, 138 SEC=LOSA
42 J=130, 139, 131, 140 SEC=LOSA
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44 J=132, 141, 133, 142 SEC=LOSA
45 J=133, 142, 134, 143 SEC=LOSA
46 J=134, 143, 135, 144 SEC=LOSA
47 J=135, 144, 2375, 2376 SEC=LOSA
48 J=2375, 2376, 136, 145 SEC=LOSA
49 J=136, 145, 138, 147 SEC=LOSA
50 J=139, 148, 140, 149 SEC=LOSA
51 J=140, 149, 141, 150 SEC=LOSA
52 J=141, 150, 142, 151 SEC=LOSA
53 J=142, 151, 143, 152 SEC=LOSA
54 J=143, 152, 144, 153 SEC=LOSA
55 J=144, 153, 2376, 2377 SEC=LOSA
56 J=2376, 2377, 145, 154 SEC=LOSA
57 J=145, 154, 147, 156 SEC=LOSA
58 J=148, 157, 149, 158 SEC=LOSA
59 J=149, 158, 150, 159 SEC=LOSA
60 J=150, 159, 151, 160 SEC=LOSA
61 J=151, 160, 152, 161 SEC=LOSA
62 J=152, 161, 153, 162 SEC=LOSA
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64 J=2377,2378,154,163 SEC=LOSA  
65 J=154,163,156,165 SEC=LOSA  
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| 1579 | J=3285,3233,5181,5164 | SEC=INFCAJON |
| 1580 | J=3233,3310,5164,5194 | SEC=INFCAJON |
| 1581 | J=3310,3234,5194,5165 | SEC=INFCAJON |
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| 1583 | J=4759,4741,4526,2673 | SEC=INFCAJON |
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| 1649 | J=1871,2213,1873,2215 | SEC=LOSA     |
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| 1665 | J=1880,2222,1882,2224 | SEC=L0SA |
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| 1708 | J=2236,1912,2237,1913 | SEC=L0SA |
| 1709 | J=2237,1913,2238,1914 | SEC=L0SA |
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| 1712 | J=2597,2579,2240,1916 | SEC=L0SA |
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| 1733 | J=2255,1922,2256,1923 | SEC=L0SA |



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| 1737 | J=2258, 1925, 2260, 1927 | SEC=L0SA |
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| 1743 | J=1924, 1933, 2580, 2581 | SEC=L0SA |
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| 1748 | J=1930, 2263, 1931, 2264 | SEC=L0SA |
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| 1752 | J=2581, 2600, 1934, 2267 | SEC=L0SA |
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| 1758 | J=2265, 1941, 2266, 1942 | SEC=L0SA |
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| 1760 | J=2600, 2582, 2267, 1943 | SEC=L0SA |
| 1761 | J=2267, 1943, 2269, 1945 | SEC=L0SA |
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| 1804 | J=2029, 2290, 2030, 2291 | SEC=L0SA |
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| 1806 | J=2031, 2292, 2032, 2293 | SEC=L0SA |
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| 1814 | J=2292, 2022, 2293, 2023 | SEC=L0SA |
| 1815 | J=2293, 2023, 2603, 2591 | SEC=L0SA |
| 1816 | J=2603, 2591, 2294, 2024 | SEC=L0SA |



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| 1832 | J=2590,2604,2015,2303 | SEC=LOSA |
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| 1838 | J=2301,2310,2302,2311 | SEC=LOSA |
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| 1842 | J=2306,2000,2307,2001 | SEC=LOSA |
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| 1848 | J=2605,2589,2312,2006 | SEC=LOSA |
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| 1856 | J=2589,2588,2006,1997 | SEC=LOSA |
| 1857 | J=2006,1997,2008,1999 | SEC=LOSA |
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| 1860 | J=1993,2317,1994,2318 | SEC=LOSA |
| 1861 | J=1994,2318,1995,2319 | SEC=LOSA |
| 1862 | J=1995,2319,1996,2320 | SEC=LOSA |
| 1863 | J=1996,2320,2588,2606 | SEC=LOSA |
| 1864 | J=2588,2606,1997,2321 | SEC=LOSA |
| 1865 | J=1997,2321,1999,2323 | SEC=LOSA |
| 1866 | J=2315,1982,2316,1983 | SEC=LOSA |
| 1867 | J=2316,1983,2317,1984 | SEC=LOSA |
| 1868 | J=2317,1984,2318,1985 | SEC=LOSA |
| 1869 | J=2318,1985,2319,1986 | SEC=LOSA |
| 1870 | J=2319,1986,2320,1987 | SEC=LOSA |
| 1871 | J=2320,1987,2606,2587 | SEC=LOSA |
| 1872 | J=2606,2587,2321,1988 | SEC=LOSA |
| 1873 | J=2321,1988,2323,1990 | SEC=LOSA |
| 1874 | J=1982,1973,1983,1974 | SEC=LOSA |
| 1875 | J=1983,1974,1984,1975 | SEC=LOSA |
| 1876 | J=1984,1975,1985,1976 | SEC=LOSA |
| 1877 | J=1985,1976,1986,1977 | SEC=LOSA |
| 1878 | J=1986,1977,1987,1978 | SEC=LOSA |
| 1879 | J=1987,1978,2587,2586 | SEC=LOSA |
| 1880 | J=2587,2586,1988,1979 | SEC=LOSA |
| 1881 | J=1988,1979,1990,1981 | SEC=LOSA |
| 1882 | J=1973,2324,1974,2325 | SEC=LOSA |
| 1883 | J=1974,2325,1975,2326 | SEC=LOSA |
| 1884 | J=1975,2326,1976,2327 | SEC=LOSA |
| 1885 | J=1976,2327,1977,2328 | SEC=LOSA |
| 1886 | J=1977,2328,1978,2329 | SEC=LOSA |
| 1887 | J=1978,2329,2586,2607 | SEC=LOSA |
| 1888 | J=2586,2607,1979,2330 | SEC=LOSA |
| 1889 | J=1979,2330,1981,2332 | SEC=LOSA |
| 1890 | J=2324,2333,2325,2334 | SEC=LOSA |
| 1891 | J=2325,2334,2326,2335 | SEC=LOSA |
| 1892 | J=2326,2335,2327,2336 | SEC=LOSA |
| 1893 | J=2327,2336,2328,2337 | SEC=LOSA |
| 1894 | J=2328,2337,2329,2338 | SEC=LOSA |
| 1895 | J=2329,2338,2607,2608 | SEC=LOSA |
| 1896 | J=2607,2608,2330,2339 | SEC=LOSA |
| 1897 | J=2330,2339,2332,2341 | SEC=LOSA |
| 1898 | J=2333,2342,2334,2343 | SEC=LOSA |
| 1899 | J=2334,2343,2335,2344 | SEC=LOSA |

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| 1900 | J=2335, 2344, 2336, 2345 | SEC=LOSA |
| 1901 | J=2336, 2345, 2337, 2346 | SEC=LOSA |
| 1902 | J=2337, 2346, 2338, 2347 | SEC=LOSA |
| 1903 | J=2338, 2347, 2608, 2609 | SEC=LOSA |
| 1904 | J=2608, 2609, 2339, 2348 | SEC=LOSA |
| 1905 | J=2339, 2348, 2341, 2350 | SEC=LOSA |
| 1906 | J=2342, 1955, 2343, 1956 | SEC=LOSA |
| 1907 | J=2343, 1956, 2344, 1957 | SEC=LOSA |
| 1908 | J=2344, 1957, 2345, 1958 | SEC=LOSA |
| 1909 | J=2345, 1958, 2346, 1959 | SEC=LOSA |
| 1910 | J=2346, 1959, 2347, 1960 | SEC=LOSA |
| 1911 | J=2347, 1960, 2609, 2584 | SEC=LOSA |
| 1912 | J=2609, 2584, 2348, 1961 | SEC=LOSA |
| 1913 | J=2348, 1961, 2350, 1963 | SEC=LOSA |
| 1914 | J=1955, 1964, 1956, 1965 | SEC=LOSA |
| 1915 | J=1956, 1965, 1957, 1966 | SEC=LOSA |
| 1916 | J=1957, 1966, 1958, 1967 | SEC=LOSA |
| 1917 | J=1958, 1967, 1959, 1968 | SEC=LOSA |
| 1918 | J=1959, 1968, 1960, 1969 | SEC=LOSA |
| 1919 | J=1960, 1969, 2584, 2585 | SEC=LOSA |
| 1920 | J=2584, 2585, 1961, 1970 | SEC=LOSA |
| 1921 | J=1961, 1970, 1963, 1972 | SEC=LOSA |
| 1922 | J=1964, 1460, 1965, 1461 | SEC=LOSA |
| 1923 | J=1965, 1461, 1966, 1462 | SEC=LOSA |
| 1924 | J=1966, 1462, 1967, 1463 | SEC=LOSA |
| 1925 | J=1967, 1463, 1968, 1464 | SEC=LOSA |
| 1926 | J=1968, 1464, 1969, 1465 | SEC=LOSA |
| 1927 | J=1969, 1465, 2585, 2570 | SEC=LOSA |
| 1928 | J=2585, 2570, 1970, 1466 | SEC=LOSA |
| 1929 | J=1970, 1466, 1972, 1468 | SEC=LOSA |
| 1930 | J=1460, 2351, 1461, 2352 | SEC=LOSA |
| 1931 | J=1461, 2352, 1462, 2353 | SEC=LOSA |
| 1932 | J=1462, 2353, 1463, 2354 | SEC=LOSA |
| 1933 | J=1463, 2354, 1464, 2355 | SEC=LOSA |
| 1934 | J=1464, 2355, 1465, 2356 | SEC=LOSA |
| 1935 | J=1465, 2356, 2570, 2610 | SEC=LOSA |
| 1936 | J=2570, 2610, 1466, 2357 | SEC=LOSA |
| 1937 | J=1466, 2357, 1468, 2359 | SEC=LOSA |
| 1938 | J=2351, 1469, 2352, 1470 | SEC=LOSA |
| 1939 | J=2352, 1470, 2353, 1471 | SEC=LOSA |
| 1940 | J=2353, 1471, 2354, 1472 | SEC=LOSA |
| 1941 | J=2354, 1472, 2355, 1473 | SEC=LOSA |
| 1942 | J=2355, 1473, 2356, 1474 | SEC=LOSA |
| 1943 | J=2356, 1474, 2610, 2571 | SEC=LOSA |
| 1944 | J=2610, 2571, 2357, 1475 | SEC=LOSA |
| 1945 | J=2357, 1475, 2359, 1477 | SEC=LOSA |
| 1946 | J=1469, 1946, 1470, 1947 | SEC=LOSA |
| 1947 | J=1470, 1947, 1471, 1948 | SEC=LOSA |
| 1948 | J=1471, 1948, 1472, 1949 | SEC=LOSA |
| 1949 | J=1472, 1949, 1473, 1950 | SEC=LOSA |
| 1950 | J=1473, 1950, 1474, 1951 | SEC=LOSA |
| 1951 | J=1474, 1951, 2571, 2583 | SEC=LOSA |
| 1952 | J=2571, 2583, 1475, 1952 | SEC=LOSA |
| 1953 | J=1475, 1952, 1477, 1954 | SEC=LOSA |
| 1954 | J=1946, 2360, 1947, 2361 | SEC=LOSA |
| 1955 | J=1947, 2361, 1948, 2362 | SEC=LOSA |
| 1956 | J=1948, 2362, 1949, 2363 | SEC=LOSA |
| 1957 | J=1949, 2363, 1950, 2364 | SEC=LOSA |
| 1958 | J=1950, 2364, 1951, 2365 | SEC=LOSA |
| 1959 | J=1951, 2365, 2583, 2611 | SEC=LOSA |
| 1960 | J=2583, 2611, 1952, 2366 | SEC=LOSA |
| 1961 | J=1952, 2366, 1954, 2368 | SEC=LOSA |
| 1962 | J=2360, 31, 2361, 33     | SEC=LOSA |
| 1963 | J=2361, 33, 2362, 35     | SEC=LOSA |
| 1964 | J=2362, 35, 2363, 37     | SEC=LOSA |
| 1965 | J=2363, 37, 2364, 39     | SEC=LOSA |
| 1966 | J=2364, 39, 2365, 41     | SEC=LOSA |
| 1967 | J=2365, 41, 2611, 2566   | SEC=LOSA |
| 1968 | J=2611, 2566, 2366, 43   | SEC=LOSA |
| 1969 | J=2366, 43, 2368, 47     | SEC=LOSA |
| 1970 | J=31, 1451, 33, 1452     | SEC=LOSA |
| 1971 | J=33, 1452, 35, 1453     | SEC=LOSA |
| 1972 | J=35, 1453, 37, 1454     | SEC=LOSA |
| 1973 | J=37, 1454, 39, 1455     | SEC=LOSA |
| 1974 | J=39, 1455, 41, 1456     | SEC=LOSA |
| 1975 | J=41, 1456, 2566, 2614   | SEC=LOSA |
| 1976 | J=2566, 2614, 43, 1457   | SEC=LOSA |
| 1977 | J=43, 1457, 47, 1459     | SEC=LOSA |
| 1978 | J=1451, 1478, 1452, 1479 | SEC=LOSA |
| 1979 | J=1452, 1479, 1453, 1480 | SEC=LOSA |
| 1980 | J=1453, 1480, 1454, 1481 | SEC=LOSA |
| 1981 | J=1454, 1481, 1455, 1482 | SEC=LOSA |
| 1982 | J=1455, 1482, 1456, 1483 | SEC=LOSA |

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| 1983 | J=1456,1483,2614,2615 | SEC=L0SA     |
| 1984 | J=2614,2615,1457,1484 | SEC=L0SA     |
| 1985 | J=1457,1484,1459,1486 | SEC=L0SA     |
| 1986 | J=1478,1487,1479,1488 | SEC=L0SA     |
| 1987 | J=1479,1488,1480,1489 | SEC=L0SA     |
| 1988 | J=1480,1489,1481,1490 | SEC=L0SA     |
| 1989 | J=1481,1490,1482,1491 | SEC=L0SA     |
| 1990 | J=1482,1491,1483,1492 | SEC=L0SA     |
| 1991 | J=1483,1492,2615,2616 | SEC=L0SA     |
| 1992 | J=2615,2616,1484,1493 | SEC=L0SA     |
| 1993 | J=1484,1493,1486,1495 | SEC=L0SA     |
| 1994 | J=1487,1496,1488,1497 | SEC=L0SA     |
| 1995 | J=1488,1497,1489,1498 | SEC=L0SA     |
| 1996 | J=1489,1498,1490,1499 | SEC=L0SA     |
| 1997 | J=1490,1499,1491,1500 | SEC=L0SA     |
| 1998 | J=1491,1500,1492,1501 | SEC=L0SA     |
| 1999 | J=1492,1501,2616,2617 | SEC=L0SA     |
| 2000 | J=2616,2617,1493,1502 | SEC=L0SA     |
| 2001 | J=1493,1502,1495,1504 | SEC=L0SA     |
| 2002 | J=1496,1505,1497,1506 | SEC=L0SA     |
| 2003 | J=1497,1506,1498,1507 | SEC=L0SA     |
| 2004 | J=1498,1507,1499,1508 | SEC=L0SA     |
| 2005 | J=1499,1508,1500,1509 | SEC=L0SA     |
| 2006 | J=1500,1509,1501,1510 | SEC=L0SA     |
| 2007 | J=1501,1510,2617,2618 | SEC=L0SA     |
| 2008 | J=2617,2618,1502,1511 | SEC=L0SA     |
| 2009 | J=1502,1511,1504,1513 | SEC=L0SA     |
| 2010 | J=1505,1514,1506,1515 | SEC=L0SA     |
| 2011 | J=1506,1515,1507,1516 | SEC=L0SA     |
| 2012 | J=1507,1516,1508,1517 | SEC=L0SA     |
| 2013 | J=1508,1517,1509,1518 | SEC=L0SA     |
| 2014 | J=1509,1518,1510,1519 | SEC=L0SA     |
| 2015 | J=1510,1519,2618,2619 | SEC=L0SA     |
| 2016 | J=2618,2619,1511,1520 | SEC=L0SA     |
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| 2018 | J=1514,1523,1515,1524 | SEC=L0SA     |
| 2019 | J=1515,1524,1516,1525 | SEC=L0SA     |
| 2020 | J=1516,1525,1517,1526 | SEC=L0SA     |
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| 2024 | J=2619,2620,1520,1529 | SEC=L0SA     |
| 2025 | J=1520,1529,1522,1531 | SEC=L0SA     |
| 2026 | J=1523,1532,1524,1533 | SEC=L0SA     |
| 2027 | J=1524,1533,1525,1534 | SEC=L0SA     |
| 2028 | J=1525,1534,1526,1535 | SEC=L0SA     |
| 2029 | J=1526,1535,1527,1536 | SEC=L0SA     |
| 2030 | J=1527,1536,1528,1537 | SEC=L0SA     |
| 2031 | J=1528,1537,2620,2621 | SEC=L0SA     |
| 2032 | J=2620,2621,1529,1538 | SEC=L0SA     |
| 2033 | J=1529,1538,1531,1540 | SEC=L0SA     |
| 2034 | J=1532,1541,1533,1542 | SEC=L0SA     |
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| 2063 | J=1555,1564,2623,2624 | SEC=L0SA     |
| 2064 | J=2623,2624,1556,1565 | SEC=L0SA     |
| 2065 | J=1556,1565,1558,1567 | SEC=L0SA     |

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| 2094 | J=1590,1599,1591,1600 | SEC=LOSA     |
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| 2096 | J=2627,2628,1592,1601 | SEC=LOSA     |
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| 2103 | J=1600,1609,2628,2629 | SEC=LOSA     |
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| 2125 | J=4752,4753,2684,2685 | SEC=INFCAJON |
| 2126 | J=4753,4754,2685,2686 | SEC=INFCAJON |
| 2127 | J=4754,4755,2686,2687 | SEC=INFCAJON |
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| 2140 | J=111,120,4269,4270   | SEC=LOSAALAS |
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| 2143 | J=138,147,4272,4273   | SEC=LOSAALAS |
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| 2147 | J=4758,4712,2690,2654 | SEC=INFCAJON |
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| 2149 | J=102,192,4268,4278   | SEC=LOSAALAS |
| 2150 | J=192,201,4278,4279   | SEC=LOSAALAS |
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| 2156 | J=246,255,4284,4285   | SEC=LOSAALAS |
| 2157 | J=255,264,4285,4286   | SEC=LOSAALAS |

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ADD=1221 UZ=-10  
ADD=1222 UZ=-10  
ADD=1226 UZ=-10



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ADD=2478 UZ=-10
ADD=2479 UZ=-10
ADD=2480 UZ=-10
ADD=2481 UZ=-10
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ADD=1480 UZ=-10
ADD=1493 UZ=-10
ADD=1497 UZ=-10
ADD=1498 UZ=-10
ADD=1511 UZ=-10
ADD=1515 UZ=-10
ADD=1516 UZ=-10
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ADD=1534 UZ=-10  
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ADD=2591 UZ=-10  
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ADD=2177 UZ=-10  
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ADD=2601 UZ=-10  
ADD=2602 UZ=-10  
ADD=2604 UZ=-10  
ADD=2605 UZ=-10  
ADD=2608 UZ=-10  
ADD=2609 UZ=-10

MODE  
TYPE=EIGEN N=10 TOL=.00001

OUTPUT  
; No Output Requested

END

; The following data is used for graphics, design and pushover analysis.  
; If changes are made to the analysis data above, then the following data  
; should be checked for consistency.

## SAP2000 V7.40 SUPPLEMENTAL DATA

```
GRID GLOBAL X "1" 0
GRID GLOBAL X "2" 33.2
GRID GLOBAL X "3" 74.7
GRID GLOBAL X "4" 116.2
GRID GLOBAL X "5" 157.7
GRID GLOBAL X "6" 199.2
GRID GLOBAL X "7" 240.7
GRID GLOBAL X "8" 282.2
GRID GLOBAL X "9" 323.7
GRID GLOBAL X "10" 356.9
GRID GLOBAL Y "11" 0
GRID GLOBAL Y "12" 2.108
GRID GLOBAL Y "13" 3.543
GRID GLOBAL Y "14" 4.216
GRID GLOBAL Y "15" 5.108
GRID GLOBAL Y "16" 6
GRID GLOBAL Y "17" 8.108
GRID GLOBAL Y "18" 9.543
GRID GLOBAL Y "19" 10.216
GRID GLOBAL Z "20" 0
GROUP "RESULTADOS" JOINT 1449
GROUP "RESULTADOS" JOINT 2691
GROUP "RESULTADOS" JOINT 2819
GROUP "RESULTADOS" JOINT 2962
GROUP "RESULTADOS" JOINT 2998
GROUP "RESULTADOS" JOINT 3030
GROUP "RESULTADOS" JOINT 3063
GROUP "RESULTADOS" JOINT 3109
GROUP "RESULTADOS" JOINT 3190
GROUP "RESULTADOS" JOINT 3223
GROUP "RESULTADOS" JOINT 3351
GROUP "RESULTADOS" JOINT 3562
GROUP "RESULTADOS" JOINT 3595
GROUP "RESULTADOS" JOINT 3755
GROUP "RESULTADOS" JOINT 3760
GROUP "RESULTADOS" JOINT 3796
GROUP "RESULTADOS" JOINT 3883
GROUP "RESULTADOS" JOINT 3907
GROUP "RESULTADOS" JOINT 3988
GROUP "RESULTADOS" JOINT 4094
GROUP "RESULTADOS" JOINT 4127
GROUP "RESULTADOS" JOINT 4415
GROUP "RESULTADOS" JOINT 4418
GROUP "RESULTADOS" JOINT 4524
GROUP "RESULTADOS" JOINT 4530
GROUP "RESULTADOS" JOINT 4533
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GROUP "RESULTADOS" JOINT 4578
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GROUP "RESULTADOS" JOINT 4595
GROUP "RESULTADOS" JOINT 4609
GROUP "RESULTADOS" JOINT 4612
GROUP "RESULTADOS" JOINT 4626
GROUP "RESULTADOS" JOINT 4629
GROUP "RESULTADOS" JOINT 4643
GROUP "RESULTADOS" JOINT 4646
GROUP "RESULTADOS" JOINT 4661
GROUP "RESULTADOS" JOINT 4662
GROUP "RESULTADOS" JOINT 4664
GROUP "RESULTADOS" JOINT 4691
GROUP "RESULTADOS" JOINT 4692
MATERIAL STEEL FY 25310.51
MATERIAL CONC FYREBAR 42185.66 FYSHEAR 28123.77 FC 2812.279 FCSHEAR 2812.279
MATERIAL VIGASB FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
MATERIAL VIGASI FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
MATERIAL HLOSA FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
MATERIAL VIGAS3D FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
MATERIAL LOSAALAS FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
STATICLOAD EST1 TYPE DEAD
STATICLOAD EST2 TYPE DEAD
STATICLOAD EST3 TYPE DEAD
STATICLOAD EST4 TYPE DEAD
STATICLOAD EST5 TYPE DEAD
STATICLOAD EST6 TYPE DEAD
STATICLOAD EST7 TYPE DEAD
END SUPPLEMENTAL DATA
```

## Listado Output

J O I N T D I S P L A C E M E N T S

| JOINT | LOAD | U1         | U2         | U3         | R1         | R2         | R3         |
|-------|------|------------|------------|------------|------------|------------|------------|
| 1449  | EST1 | 1,065E-03  | 6,952E-04  | -5,593E-06 | 0,0000     | 0,0000     | 2,186E-06  |
| 1449  | EST2 | -4,143E-04 | -1,581E-04 | 2,342E-05  | 0,0000     | 0,0000     | 0,0000     |
| 1449  | EST3 | 1,228E-04  | 1,042E-05  | -8,709E-05 | 0,0000     | -1,804E-06 | 0,0000     |
| 1449  | EST4 | 9,151E-05  | 2,340E-05  | 1,618E-05  | 0,0000     | 0,0000     | 0,0000     |
| 1449  | EST5 | 2,836E-05  | -9,225E-05 | -8,272E-03 | -5,743E-04 | 3,572E-05  | -1,641E-06 |
| 1449  | EST6 | 6,768E-05  | 3,683E-05  | 5,633E-03  | -1,737E-04 | 1,133E-04  | -5,685E-06 |
| 1449  | EST7 | 5,492E-05  | 2,851E-05  | 4,115E-03  | -1,862E-04 | 8,175E-05  | -4,332E-06 |
| 2691  | EST1 | 1,119E-03  | -2,163E-04 | 8,842E-03  | -1,938E-04 | -7,200E-05 | 2,950E-06  |
| 2691  | EST2 | -4,693E-04 | -4,563E-04 | -0,0167    | -3,634E-04 | 4,759E-05  | -2,581E-06 |
| 2691  | EST3 | 2,555E-04  | -1,450E-04 | 5,777E-03  | -9,956E-05 | -1,621E-04 | 0,0000     |
| 2691  | EST4 | 1,766E-04  | -1,693E-04 | 4,069E-03  | -1,100E-04 | -1,140E-04 | -2,589E-06 |
| 2691  | EST5 | 1,043E-06  | 0,0000     | 2,312E-05  | 0,0000     | 0,0000     | 0,0000     |
| 2691  | EST6 | -4,212E-06 | 0,0000     | -9,219E-05 | 0,0000     | 2,556E-06  | 0,0000     |
| 2691  | EST7 | 0,0000     | 0,0000     | 1,502E-05  | 0,0000     | 0,0000     | 0,0000     |
| 2819  | EST1 | 1,058E-03  | 6,137E-04  | 2,450E-05  | 0,0000     | 0,0000     | 2,168E-06  |
| 2819  | EST2 | -4,105E-04 | -1,412E-04 | -9,828E-05 | 0,0000     | -2,720E-06 | 0,0000     |
| 2819  | EST3 | 1,135E-04  | 5,263E-06  | 3,892E-04  | -3,057E-06 | 1,084E-05  | 0,0000     |
| 2819  | EST4 | 9,285E-05  | 1,899E-05  | -6,691E-05 | 0,0000     | -1,849E-06 | 0,0000     |
| 2819  | EST5 | -2,891E-05 | -3,227E-04 | 8,730E-03  | -1,923E-04 | 4,033E-05  | -1,115E-06 |
| 2819  | EST6 | 4,870E-05  | -5,387E-04 | -0,0160    | -4,554E-04 | -4,147E-05 | 0,0000     |
| 2819  | EST7 | -1,089E-04 | -6,420E-04 | -9,352E-03 | -5,257E-04 | 1,341E-04  | 0,0000     |
| 2962  | EST1 | 1,072E-03  | -3,465E-04 | -0,0174    | -5,253E-04 | -2,090E-05 | 3,478E-06  |
| 2962  | EST2 | -4,107E-04 | -3,199E-04 | 0,0109     | -1,931E-04 | -9,746E-06 | 0,0000     |
| 2962  | EST3 | 7,425E-05  | -4,672E-04 | -0,0173    | -4,900E-04 | 3,798E-05  | -2,934E-06 |
| 2962  | EST4 | 2,179E-04  | -5,828E-04 | -0,0104    | -5,685E-04 | -1,448E-04 | -4,721E-06 |
| 2962  | EST5 | -1,838E-06 | 0,0000     | -9,147E-05 | 0,0000     | 2,441E-06  | 0,0000     |
| 2962  | EST6 | 7,405E-06  | -3,666E-06 | 3,681E-04  | -2,820E-06 | -9,824E-06 | 0,0000     |
| 2962  | EST7 | -1,189E-06 | -1,128E-06 | -5,924E-05 | 0,0000     | 1,580E-06  | 0,0000     |
| 2998  | EST1 | 9,103E-04  | 1,150E-04  | 5,857E-03  | -9,525E-05 | 1,562E-04  | 5,100E-06  |
| 2998  | EST2 | -3,806E-04 | -5,665E-04 | -0,0179    | -5,259E-04 | -3,659E-05 | 0,0000     |
| 2998  | EST3 | 1,249E-04  | -2,741E-04 | 0,0110     | -1,930E-04 | -9,785E-06 | 0,0000     |
| 2998  | EST4 | -3,849E-05 | -5,981E-04 | -0,0109    | -6,027E-04 | 1,315E-04  | 3,810E-06  |
| 2998  | EST5 | 9,463E-06  | -3,720E-06 | 3,609E-04  | -2,890E-06 | -9,649E-06 | 0,0000     |
| 2998  | EST6 | -3,798E-05 | -2,881E-05 | -1,450E-03 | -1,640E-05 | 3,875E-05  | -1,048E-06 |
| 2998  | EST7 | 6,136E-06  | -5,111E-06 | 2,337E-04  | -3,602E-06 | -6,253E-06 | 0,0000     |
| 3030  | EST1 | 1,094E-03  | 3,136E-04  | -1,490E-03 | -1,653E-05 | -4,025E-05 | 3,265E-06  |
| 3030  | EST2 | -5,657E-04 | -2,108E-04 | 6,029E-03  | -9,409E-05 | 1,629E-04  | 2,326E-06  |
| 3030  | EST3 | 1,550E-04  | -4,976E-04 | -0,0178    | -5,242E-04 | -3,729E-05 | 1,594E-06  |
| 3030  | EST4 | -1,352E-05 | -1,405E-04 | 4,117E-03  | -1,035E-04 | 1,113E-04  | 3,696E-06  |
| 3030  | EST5 | -3,530E-05 | -2,940E-05 | -1,411E-03 | -1,715E-05 | 3,809E-05  | -1,002E-06 |
| 3030  | EST6 | 1,417E-04  | -1,367E-04 | 5,682E-03  | -9,718E-05 | -1,529E-04 | -2,634E-06 |
| 3030  | EST7 | -2,283E-05 | -3,415E-05 | -9,149E-04 | -2,094E-05 | 2,466E-05  | -1,011E-06 |
| 3063  | EST1 | 1,059E-03  | 5,223E-04  | -9,714E-05 | 0,0000     | -2,593E-06 | 2,225E-06  |
| 3063  | EST2 | -4,225E-04 | -1,239E-04 | 3,929E-04  | -2,756E-06 | 1,049E-05  | 0,0000     |
| 3063  | EST3 | 1,617E-04  | -2,171E-05 | -1,537E-03 | -1,611E-05 | -4,103E-05 | 1,098E-06  |
| 3063  | EST4 | 8,433E-05  | 1,197E-05  | 2,683E-04  | -3,040E-06 | 7,164E-06  | 0,0000     |
| 3063  | EST5 | -8,225E-06 | -5,560E-04 | -0,0163    | -5,702E-04 | 1,241E-05  | -4,783E-06 |
| 3063  | EST6 | 1,661E-05  | -2,877E-04 | 0,0103     | -1,848E-04 | -9,343E-06 | 0,0000     |
| 3063  | EST7 | 1,283E-04  | -6,724E-04 | -9,941E-03 | -6,231E-04 | -1,327E-04 | 0,0000     |
| 3109  | EST1 | 1,047E-03  | 4,293E-04  | 3,826E-04  | -2,828E-06 | 1,028E-05  | 2,199E-06  |
| 3109  | EST2 | -3,736E-04 | -1,284E-04 | -1,545E-03 | -1,607E-05 | -4,151E-05 | 0,0000     |
| 3109  | EST3 | -2,995E-05 | -1,239E-04 | 6,058E-03  | -9,444E-05 | 1,627E-04  | 2,600E-06  |
| 3109  | EST4 | 1,177E-04  | -1,687E-05 | -1,055E-03 | -1,771E-05 | -2,833E-05 | 1,048E-06  |
| 3109  | EST5 | 1,397E-04  | -1,441E-04 | 5,500E-03  | -1,003E-04 | -1,481E-04 | -3,013E-06 |
| 3109  | EST6 | -2,939E-05 | -5,479E-04 | -0,0166    | -5,673E-04 | 3,389E-05  | -4,864E-06 |
| 3109  | EST7 | 8,403E-05  | -1,801E-04 | 3,515E-03  | -1,102E-04 | -9,081E-05 | -4,305E-06 |
| 3190  | EST1 | 1,056E-03  | 6,578E-04  | 0,0000     | 0,0000     | 1,043E-06  | 2,180E-06  |
| 3190  | EST2 | -4,085E-04 | -1,504E-04 | -2,050E-06 | 0,0000     | -4,211E-06 | 0,0000     |
| 3190  | EST3 | 1,071E-04  | 6,656E-06  | 8,043E-06  | 0,0000     | 1,653E-05  | 0,0000     |
| 3190  | EST4 | 9,386E-05  | 2,129E-05  | -1,399E-06 | 0,0000     | -2,873E-06 | 0,0000     |
| 3190  | EST5 | -7,738E-04 | -6,896E-04 | 3,896E-04  | 1,529E-05  | 7,405E-04  | -8,723E-06 |
| 3190  | EST6 | 9,200E-04  | -5,584E-04 | -4,568E-04 | -3,830E-06 | -9,446E-04 | 4,123E-06  |
| 3190  | EST7 | 6,346E-04  | -6,401E-04 | -3,143E-04 | -2,234E-06 | -6,519E-04 | 5,955E-06  |
| 3223  | EST1 | 1,115E-03  | -2,002E-04 | 8,493E-03  | -1,902E-04 | -7,347E-05 | 1,480E-06  |
| 3223  | EST2 | -4,659E-04 | -4,924E-04 | -0,0175    | -5,505E-04 | 4,517E-05  | -2,887E-06 |
| 3223  | EST3 | 2,573E-04  | -1,343E-04 | 5,599E-03  | -9,585E-05 | -1,543E-04 | -4,498E-06 |
| 3223  | EST4 | 1,800E-04  | -1,618E-04 | 3,868E-03  | -1,117E-04 | -1,053E-04 | -5,103E-06 |
| 3223  | EST5 | 1,036E-06  | 0,0000     | 2,296E-05  | 0,0000     | 0,0000     | 0,0000     |
| 3223  | EST6 | -4,147E-06 | -1,065E-06 | -9,309E-05 | 0,0000     | 2,596E-06  | 0,0000     |
| 3223  | EST7 | 0,0000     | 0,0000     | 1,483E-05  | 0,0000     | 0,0000     | 0,0000     |
| 3351  | EST1 | 1,054E-03  | 6,137E-04  | 2,435E-05  | 0,0000     | 0,0000     | 2,187E-06  |
| 3351  | EST2 | -4,097E-04 | -1,414E-04 | -9,917E-05 | 0,0000     | -2,755E-06 | 0,0000     |
| 3351  | EST3 | 1,135E-04  | 5,975E-06  | 3,842E-04  | -2,524E-06 | 1,061E-05  | 0,0000     |
| 3351  | EST4 | 9,263E-05  | 1,887E-05  | -6,788E-05 | 0,0000     | -1,888E-06 | 0,0000     |
| 3351  | EST5 | -2,781E-05 | -3,066E-04 | 8,380E-03  | -1,969E-04 | 4,113E-05  | 0,0000     |
| 3351  | EST6 | 4,780E-05  | -5,746E-04 | -0,0170    | -5,543E-04 | -4,248E-05 | -1,051E-06 |
| 3351  | EST7 | -1,088E-04 | -6,656E-04 | -0,0104    | -6,213E-04 | 1,218E-04  | 0,0000     |
| 3562  | EST1 | 1,083E-03  | 3,723E-04  | -1,505E-03 | 1,852E-05  | -4,160E-05 | 1,714E-06  |
| 3562  | EST2 | -5,662E-04 | 4,431E-05  | 5,946E-03  | 9,074E-05  | 1,617E-04  | -4,609E-06 |
| 3562  | EST3 | 1,545E-04  | 5,235E-04  | -0,0183    | 5,605E-04  | -3,924E-05 | 0,0000     |
| 3562  | EST4 | -1,683E-05 | 1,546E-04  | 4,025E-03  | 1,026E-04  | 1,088E-04  | -4,175E-06 |

|      |      |            |            |            |            |            |            |
|------|------|------------|------------|------------|------------|------------|------------|
| 3562 | EST5 | -3,509E-05 | 3,035E-05  | -1,427E-03 | 1,887E-05  | 3,945E-05  | 0,0000     |
| 3562 | EST6 | 1,455E-04  | 1,272E-04  | 5,594E-03  | 9,225E-05  | -1,527E-04 | 4,497E-06  |
| 3562 | EST7 | -2,246E-05 | 3,675E-05  | -9,323E-04 | 2,374E-05  | 2,597E-05  | 0,0000     |
| 3595 | EST1 | 1,048E-03  | 5,243E-04  | -9,763E-05 | 0,0000     | -2,657E-06 | 2,167E-06  |
| 3595 | EST2 | -4,201E-04 | -1,172E-04 | 3,906E-04  | 2,453E-06  | 1,057E-05  | 0,0000     |
| 3595 | EST3 | 1,613E-04  | 3,757E-05  | -1,553E-03 | 1,824E-05  | -4,236E-05 | 0,0000     |
| 3595 | EST4 | 8,376E-05  | 2,020E-05  | 2,656E-04  | 2,874E-06  | 7,172E-06  | 0,0000     |
| 3595 | EST5 | -1,523E-05 | 4,823E-04  | -0,0171    | 5,555E-04  | 1,752E-05  | 2,588E-06  |
| 3595 | EST6 | 8,690E-06  | 2,797E-04  | 0,0102     | 1,981E-04  | -4,933E-06 | 0,0000     |
| 3595 | EST7 | 1,375E-04  | 5,729E-04  | -0,0109    | 6,044E-04  | -1,424E-04 | 8,727E-06  |
| 3755 | EST1 | 1,111E-03  | 3,361E-04  | 8,598E-03  | 1,724E-04  | -7,770E-05 | 1,710E-06  |
| 3755 | EST2 | -4,525E-04 | 5,099E-04  | -0,0168    | 5,474E-04  | 3,522E-05  | 4,604E-06  |
| 3755 | EST3 | 2,530E-04  | 1,268E-04  | 5,659E-03  | 8,983E-05  | -1,537E-04 | 2,284E-06  |
| 3755 | EST4 | 1,778E-04  | 1,666E-04  | 3,974E-03  | 1,142E-04  | -1,082E-04 | 3,535E-06  |
| 3755 | EST5 | 1,031E-06  | 0,0000     | 2,303E-05  | 0,0000     | 0,0000     | 0,0000     |
| 3755 | EST6 | -4,144E-06 | 0,0000     | -9,259E-05 | 0,0000     | 2,522E-06  | 0,0000     |
| 3755 | EST7 | 0,0000     | 0,0000     | 1,492E-05  | 0,0000     | 0,0000     | 0,0000     |
| 3760 | EST1 | 1,059E-03  | 6,676E-04  | -0,0174    | 5,243E-04  | -2,090E-05 | 0,0000     |
| 3760 | EST2 | -4,046E-04 | 2,401E-04  | 0,0109     | 1,891E-04  | -1,212E-05 | -1,120E-06 |
| 3760 | EST3 | 8,482E-05  | 5,360E-04  | -0,0170    | 5,477E-04  | 2,812E-05  | 4,951E-06  |
| 3760 | EST4 | 2,208E-04  | 6,616E-04  | -0,0102    | 6,056E-04  | -1,476E-04 | 4,405E-06  |
| 3760 | EST5 | -1,838E-06 | 0,0000     | -9,148E-05 | 0,0000     | 2,441E-06  | 0,0000     |
| 3760 | EST6 | 7,405E-06  | 3,640E-06  | 3,681E-04  | 2,804E-06  | -9,824E-06 | 0,0000     |
| 3760 | EST7 | -1,190E-06 | 1,140E-06  | -5,922E-05 | 0,0000     | 1,580E-06  | 0,0000     |
| 3796 | EST1 | 8,973E-04  | 3,885E-04  | 5,857E-03  | 9,517E-05  | 1,562E-04  | 0,0000     |
| 3796 | EST2 | -3,777E-04 | 4,452E-04  | -0,0179    | 5,259E-04  | -3,659E-05 | 0,0000     |
| 3796 | EST3 | 1,278E-04  | 2,774E-04  | 0,0110     | 1,885E-04  | -1,219E-05 | 0,0000     |
| 3796 | EST4 | -3,844E-05 | 6,121E-04  | -0,0109    | 6,044E-04  | 1,311E-04  | -3,903E-06 |
| 3796 | EST5 | 9,464E-06  | 3,695E-06  | 3,609E-04  | 2,874E-06  | -9,649E-06 | 0,0000     |
| 3796 | EST6 | -3,797E-05 | 2,850E-05  | -1,450E-03 | 1,621E-05  | 3,875E-05  | 1,035E-06  |
| 3796 | EST7 | 6,133E-06  | 5,252E-06  | 2,339E-04  | 3,691E-06  | -6,252E-06 | 0,0000     |
| 3883 | EST1 | 1,043E-03  | 6,138E-04  | 2,442E-05  | 0,0000     | 0,0000     | 2,183E-06  |
| 3883 | EST2 | -4,073E-04 | -1,393E-04 | -9,868E-05 | 0,0000     | -2,680E-06 | 0,0000     |
| 3883 | EST3 | 1,133E-04  | 1,287E-05  | 3,866E-04  | 2,829E-06  | 1,050E-05  | 0,0000     |
| 3883 | EST4 | 9,218E-05  | 2,094E-05  | -6,735E-05 | 0,0000     | -1,829E-06 | 0,0000     |
| 3883 | EST5 | -3,047E-05 | 3,383E-04  | 8,681E-03  | 2,366E-04  | 4,122E-05  | 0,0000     |
| 3883 | EST6 | 4,730E-05  | 4,434E-04  | -0,0168    | 4,616E-04  | -3,885E-05 | 0,0000     |
| 3883 | EST7 | -1,089E-04 | 5,480E-04  | -0,0102    | 5,448E-04  | 1,276E-04  | -3,945E-06 |
| 3907 | EST1 | 1,034E-03  | 4,362E-04  | 3,826E-04  | 2,827E-06  | 1,028E-05  | 2,162E-06  |
| 3907 | EST2 | -3,707E-04 | -7,254E-05 | -1,545E-03 | 1,607E-05  | -4,151E-05 | -1,493E-06 |
| 3907 | EST3 | -3,024E-05 | 1,343E-04  | 6,058E-03  | 9,444E-05  | 1,627E-04  | -2,503E-06 |
| 3907 | EST4 | 1,171E-04  | 4,184E-05  | -1,055E-03 | 1,773E-05  | -2,833E-05 | 0,0000     |
| 3907 | EST5 | 1,406E-04  | 1,393E-04  | 5,496E-03  | 9,851E-05  | -1,487E-04 | 2,715E-06  |
| 3907 | EST6 | -3,934E-05 | 4,529E-04  | -0,0169    | 4,853E-04  | 4,411E-05  | 1,577E-06  |
| 3907 | EST7 | 9,461E-05  | 1,960E-04  | 3,594E-03  | 1,382E-04  | -9,874E-05 | 3,907E-06  |
| 3988 | EST1 | 1,043E-03  | 6,580E-04  | 0,0000     | 0,0000     | 1,043E-06  | 2,181E-06  |
| 3988 | EST2 | -4,056E-04 | -1,497E-04 | -2,050E-06 | 0,0000     | -4,211E-06 | 0,0000     |
| 3988 | EST3 | 1,068E-04  | 1,380E-05  | 8,043E-06  | 0,0000     | 1,653E-05  | 0,0000     |
| 3988 | EST4 | 9,332E-05  | 2,222E-05  | -1,399E-06 | 0,0000     | -2,873E-06 | 0,0000     |
| 3988 | EST5 | -8,051E-04 | 6,823E-04  | 4,015E-04  | -1,791E-05 | 7,652E-04  | 0,0000     |
| 3988 | EST6 | 9,442E-04  | 4,760E-04  | -4,713E-04 | 2,811E-06  | -9,753E-04 | 0,0000     |
| 3988 | EST7 | 6,520E-04  | 5,533E-04  | -3,267E-04 | 0,0000     | -6,765E-04 | -3,323E-06 |
| 4094 | EST1 | 1,081E-03  | 3,696E-04  | -1,476E-03 | 1,426E-05  | -4,027E-05 | 0,0000     |
| 4094 | EST2 | -5,636E-04 | 5,530E-05  | 6,114E-03  | 9,460E-05  | 1,692E-04  | 0,0000     |
| 4094 | EST3 | 1,559E-04  | 4,846E-04  | -0,0174    | 4,160E-04  | -3,755E-05 | -1,116E-06 |
| 4094 | EST4 | -1,413E-05 | 1,621E-04  | 4,210E-03  | 1,020E-04  | 1,171E-04  | -1,422E-06 |
| 4094 | EST5 | -3,647E-05 | 2,782E-05  | -1,397E-03 | 1,472E-05  | 3,812E-05  | 1,534E-06  |
| 4094 | EST6 | 1,438E-04  | 1,375E-04  | 5,765E-03  | 9,569E-05  | -1,602E-04 | 0,0000     |
| 4094 | EST7 | -2,383E-05 | 3,512E-05  | -8,926E-04 | 2,013E-05  | 2,423E-05  | 1,451E-06  |
| 4127 | EST1 | 1,044E-03  | 5,242E-04  | -9,675E-05 | 0,0000     | -2,621E-06 | 2,104E-06  |
| 4127 | EST2 | -4,193E-04 | -1,165E-04 | 3,955E-04  | 2,985E-06  | 1,078E-05  | 0,0000     |
| 4127 | EST3 | 1,626E-04  | 3,480E-05  | -1,524E-03 | 1,387E-05  | -4,116E-05 | -1,519E-06 |
| 4127 | EST4 | 8,362E-05  | 2,069E-05  | 2,711E-04  | 3,139E-06  | 7,404E-06  | 0,0000     |
| 4127 | EST5 | -1,987E-05 | 4,483E-04  | -0,0162    | 3,611E-04  | 2,298E-05  | 2,892E-06  |
| 4127 | EST6 | 9,124E-06  | 2,986E-04  | 0,0105     | 2,041E-04  | -2,057E-06 | 0,0000     |
| 4127 | EST7 | 1,314E-04  | 5,497E-04  | -9,886E-03 | 4,337E-04  | -1,376E-04 | 2,015E-06  |
| 4415 | EST1 | 1,036E-03  | 6,136E-04  | 2,490E-05  | 0,0000     | 0,0000     | 2,198E-06  |
| 4415 | EST2 | -4,095E-04 | -1,399E-04 | -9,741E-05 | 0,0000     | -2,722E-06 | 0,0000     |
| 4415 | EST3 | 1,293E-04  | 7,433E-06  | 4,000E-04  | 4,239E-06  | 1,139E-05  | 0,0000     |
| 4415 | EST4 | 8,910E-05  | 2,024E-05  | -6,570E-05 | 0,0000     | -1,827E-06 | 0,0000     |
| 4415 | EST5 | 3,310E-05  | -3,993E-05 | 9,616E-03  | 2,649E-04  | 4,300E-05  | 0,0000     |
| 4415 | EST6 | -1,180E-05 | 8,850E-05  | -0,0151    | 6,094E-04  | -3,296E-05 | 0,0000     |
| 4415 | EST7 | 9,616E-05  | 6,217E-05  | -8,072E-03 | 7,347E-04  | 9,537E-05  | 5,186E-06  |
| 4418 | EST1 | 1,035E-03  | 6,952E-04  | -5,593E-06 | 0,0000     | 0,0000     | 2,175E-06  |
| 4418 | EST2 | -4,077E-04 | -1,584E-04 | 2,342E-05  | 0,0000     | 0,0000     | 0,0000     |
| 4418 | EST3 | 1,221E-04  | 1,169E-05  | -8,709E-05 | 0,0000     | -1,804E-06 | 0,0000     |
| 4418 | EST4 | 9,028E-05  | 2,318E-05  | 1,618E-05  | 0,0000     | 0,0000     | 0,0000     |
| 4418 | EST5 | 2,916E-05  | 7,291E-05  | -8,477E-03 | 6,836E-04  | 3,745E-05  | 0,0000     |
| 4418 | EST6 | 7,077E-05  | -3,684E-05 | 5,593E-03  | 1,601E-04  | 1,137E-04  | 4,874E-06  |
| 4418 | EST7 | 5,794E-05  | -2,241E-05 | 4,024E-03  | 1,663E-04  | 8,147E-05  | 3,267E-06  |
| 4524 | EST1 | 2,140E-05  | 1,180E-05  | -5,577E-04 | 3,957E-05  | 1,092E-03  | 2,825E-06  |
| 4524 | EST2 | -4,215E-06 | 3,550E-06  | 2,184E-04  | 6,173E-06  | -4,263E-04 | 0,0000     |
| 4524 | EST3 | 1,069E-06  | 0,0000     | -5,594E-05 | 1,202E-06  | 1,092E-04  | 0,0000     |
| 4524 | EST4 | 0,0000     | 0,0000     | -3,909E-05 | 1,395E-06  | 7,630E-05  | 0,0000     |
| 4524 | EST5 | 0,0000     | 0,0000     | 0,0000     | 0,0000     | 0,0000     | 0,0000     |
| 4524 | EST6 | 0,0000     | 0,0000     | 0,0000     | 0,0000     | -1,781E-06 | 0,0000     |
| 4524 | EST7 | 0,0000     | 0,0000     | 0,0000     | 0,0000     | 0,0000     | 0,0000     |



|      |      |            |            |            |            |            |            |
|------|------|------------|------------|------------|------------|------------|------------|
| 4530 | EST1 | 9,398E-04  | 2,686E-04  | -0,0101    | 4,114E-04  | 8,589E-05  | 1,240E-05  |
| 4530 | EST2 | -2,759E-04 | 9,112E-05  | 4,894E-03  | 6,854E-05  | -1,589E-04 | 4,998E-06  |
| 4530 | EST3 | 7,060E-05  | 2,386E-05  | -1,251E-03 | 1,314E-05  | 4,062E-05  | 1,530E-06  |
| 4530 | EST4 | 4,932E-05  | 2,703E-05  | -8,746E-04 | 1,606E-05  | 2,842E-05  | 1,703E-06  |
| 4530 | EST5 | 0,0000     | 0,0000     | -5,079E-06 | 0,0000     | 0,0000     | 0,0000     |
| 4530 | EST6 | -1,151E-06 | 0,0000     | 2,043E-05  | 0,0000     | 0,0000     | 0,0000     |
| 4530 | EST7 | 0,0000     | 0,0000     | -3,289E-06 | 0,0000     | 0,0000     | 0,0000     |
| 4533 | EST1 | 9,343E-04  | -2,076E-04 | -0,0104    | -3,464E-04 | 1,025E-04  | -7,087E-06 |
| 4533 | EST2 | -2,781E-04 | -1,040E-04 | 4,928E-03  | -7,982E-05 | -1,601E-04 | -6,271E-06 |
| 4533 | EST3 | 7,035E-05  | -2,485E-05 | -1,249E-03 | -1,379E-05 | 4,065E-05  | -1,646E-06 |
| 4533 | EST4 | 4,935E-05  | -2,690E-05 | -8,749E-04 | -1,597E-05 | 2,842E-05  | -1,689E-06 |
| 4533 | EST5 | 0,0000     | 0,0000     | -5,079E-06 | 0,0000     | 0,0000     | 0,0000     |
| 4533 | EST6 | -1,151E-06 | 0,0000     | 2,043E-05  | 0,0000     | 0,0000     | 0,0000     |
| 4533 | EST7 | 0,0000     | 0,0000     | -3,289E-06 | 0,0000     | 0,0000     | 0,0000     |
| 4558 | EST1 | 1,791E-03  | 5,485E-04  | 3,847E-04  | -1,239E-05 | -6,936E-04 | 0,0000     |
| 4558 | EST2 | -1,352E-03 | 4,575E-04  | -4,906E-04 | 1,959E-06  | 9,769E-04  | 4,604E-06  |
| 4558 | EST3 | 3,486E-04  | 9,517E-05  | 1,229E-04  | 0,0000     | -2,435E-04 | 1,431E-06  |
| 4558 | EST4 | 2,443E-04  | 1,137E-04  | 8,640E-05  | 0,0000     | -1,712E-04 | 2,105E-06  |
| 4558 | EST5 | 1,417E-06  | 0,0000     | 0,0000     | 0,0000     | 0,0000     | 0,0000     |
| 4558 | EST6 | -5,697E-06 | 0,0000     | -2,004E-06 | 0,0000     | 3,969E-06  | 0,0000     |
| 4558 | EST7 | 0,0000     | 0,0000     | 0,0000     | 0,0000     | 0,0000     | 0,0000     |
| 4561 | EST1 | 1,835E-03  | -4,580E-04 | 3,990E-04  | 5,850E-06  | -7,199E-04 | 3,780E-06  |
| 4561 | EST2 | -1,367E-03 | -4,757E-04 | -4,923E-04 | -7,596E-06 | 9,854E-04  | -1,551E-06 |
| 4561 | EST3 | 3,493E-04  | -1,017E-04 | 1,234E-04  | 0,0000     | -2,445E-04 | -1,662E-06 |
| 4561 | EST4 | 2,443E-04  | -1,129E-04 | 8,638E-05  | 0,0000     | -1,711E-04 | -2,070E-06 |
| 4561 | EST5 | 1,417E-06  | 0,0000     | 0,0000     | 0,0000     | 0,0000     | 0,0000     |
| 4561 | EST6 | -5,697E-06 | 0,0000     | -2,004E-06 | 0,0000     | 3,969E-06  | 0,0000     |
| 4561 | EST7 | 0,0000     | 0,0000     | 0,0000     | 0,0000     | 0,0000     | 0,0000     |
| 4575 | EST1 | -4,741E-05 | 6,973E-04  | -5,612E-04 | 3,525E-06  | 1,121E-03  | -2,126E-06 |
| 4575 | EST2 | 6,629E-04  | 5,963E-04  | 5,591E-04  | -1,616E-05 | -1,011E-03 | -1,007E-05 |
| 4575 | EST3 | -8,566E-04 | 4,966E-04  | -5,018E-04 | 2,544E-06  | 1,010E-03  | 1,445E-06  |
| 4575 | EST4 | -6,023E-04 | 6,118E-04  | -3,536E-04 | 5,719E-06  | 7,192E-04  | -2,725E-06 |
| 4575 | EST5 | -3,542E-06 | 0,0000     | -2,010E-06 | 0,0000     | 4,009E-06  | 0,0000     |
| 4575 | EST6 | 1,425E-05  | 3,412E-06  | 8,099E-06  | 0,0000     | -1,615E-05 | 0,0000     |
| 4575 | EST7 | -2,293E-06 | 0,0000     | -1,300E-06 | 0,0000     | 2,593E-06  | 0,0000     |
| 4578 | EST1 | -3,539E-05 | -4,708E-04 | -5,615E-04 | -3,188E-06 | 1,121E-03  | 6,827E-06  |
| 4578 | EST2 | 6,791E-04  | -6,203E-04 | 5,642E-04  | 1,698E-05  | -1,022E-03 | 4,468E-06  |
| 4578 | EST3 | -8,680E-04 | -4,981E-04 | -5,018E-04 | -7,097E-06 | 1,019E-03  | 3,717E-06  |
| 4578 | EST4 | -5,983E-04 | -6,051E-04 | -3,477E-04 | -4,850E-06 | 7,122E-04  | 0,0000     |
| 4578 | EST5 | -3,541E-06 | 0,0000     | -2,010E-06 | 0,0000     | 4,008E-06  | 0,0000     |
| 4578 | EST6 | 1,425E-05  | -3,424E-06 | 8,100E-06  | 0,0000     | -1,616E-05 | 0,0000     |
| 4578 | EST7 | -2,294E-06 | 0,0000     | -1,301E-06 | 0,0000     | 2,594E-06  | 0,0000     |
| 4592 | EST1 | 1,978E-03  | 7,038E-04  | 4,589E-04  | -1,791E-05 | -8,580E-04 | -9,614E-06 |
| 4592 | EST2 | -1,592E-03 | 5,430E-04  | -5,764E-04 | 2,423E-06  | 1,195E-03  | -8,845E-06 |
| 4592 | EST3 | 1,206E-03  | 6,292E-04  | 5,392E-04  | -1,613E-05 | -1,029E-03 | -1,515E-05 |
| 4592 | EST4 | -2,088E-06 | 1,016E-03  | -3,785E-05 | -1,365E-05 | 1,884E-04  | -1,745E-05 |
| 4592 | EST5 | 1,615E-05  | 3,429E-06  | 7,548E-06  | 0,0000     | -1,575E-05 | 0,0000     |
| 4592 | EST6 | -6,495E-05 | 1,391E-05  | -3,027E-05 | 0,0000     | 6,316E-05  | 0,0000     |
| 4592 | EST7 | 1,047E-05  | 4,031E-06  | 4,897E-06  | 0,0000     | -1,022E-05 | 0,0000     |
| 4595 | EST1 | 1,991E-03  | -2,891E-04 | 4,589E-04  | 1,794E-05  | -8,579E-04 | 1,400E-05  |
| 4595 | EST2 | -1,595E-03 | -6,447E-04 | -5,764E-04 | -2,441E-06 | 1,195E-03  | 7,906E-06  |
| 4595 | EST3 | 1,225E-03  | -5,926E-04 | 5,440E-04  | 1,709E-05  | -1,039E-03 | 1,006E-05  |
| 4595 | EST4 | 7,638E-06  | -9,758E-04 | -3,500E-05 | 1,164E-05  | 1,842E-04  | 1,635E-05  |
| 4595 | EST5 | 1,616E-05  | -3,441E-06 | 7,549E-06  | 0,0000     | -1,575E-05 | 0,0000     |
| 4595 | EST6 | -6,493E-05 | -1,405E-05 | -3,026E-05 | 0,0000     | 6,313E-05  | 0,0000     |
| 4595 | EST7 | 1,046E-05  | -3,966E-06 | 4,892E-06  | 0,0000     | -1,021E-05 | 0,0000     |
| 4609 | EST1 | 8,054E-04  | 3,993E-04  | -1,111E-04 | -3,934E-06 | 2,159E-04  | 0,0000     |
| 4609 | EST2 | 5,481E-04  | 4,194E-04  | 4,550E-04  | -2,592E-05 | -8,824E-04 | -8,501E-06 |
| 4609 | EST3 | -1,060E-03 | 5,909E-04  | -5,842E-04 | -6,725E-06 | 1,184E-03  | -4,188E-06 |
| 4609 | EST4 | 7,444E-04  | 5,619E-04  | 3,125E-04  | -2,728E-05 | -6,061E-04 | -1,136E-05 |
| 4609 | EST5 | -6,130E-05 | 1,442E-05  | -2,999E-05 | 0,0000     | 6,130E-05  | 0,0000     |
| 4609 | EST6 | 2,465E-04  | 1,019E-04  | 1,211E-04  | -2,316E-06 | -2,476E-04 | 1,075E-06  |
| 4609 | EST7 | -3,961E-05 | 2,008E-05  | -1,935E-05 | 0,0000     | 3,952E-05  | 0,0000     |
| 4612 | EST1 | 8,185E-04  | 1,970E-04  | -1,111E-04 | 3,938E-06  | 2,159E-04  | 4,576E-06  |
| 4612 | EST2 | 5,452E-04  | -5,610E-04 | 4,550E-04  | 2,592E-05  | -8,824E-04 | 7,541E-06  |
| 4612 | EST3 | -1,060E-03 | -5,867E-04 | -5,842E-04 | 6,729E-06  | 1,184E-03  | 4,319E-06  |
| 4612 | EST4 | 7,452E-04  | -5,464E-04 | 3,126E-04  | 2,716E-05  | -6,062E-04 | 1,149E-05  |
| 4612 | EST5 | -6,127E-05 | -1,457E-05 | -2,998E-05 | 0,0000     | 6,127E-05  | 0,0000     |
| 4612 | EST6 | 2,468E-04  | -1,037E-04 | 1,213E-04  | 2,370E-06  | -2,480E-04 | -1,122E-06 |
| 4612 | EST7 | -3,975E-05 | -1,026E-05 | -1,942E-05 | 0,0000     | 3,968E-05  | 0,0000     |
| 4626 | EST1 | 1,027E-03  | 4,803E-04  | 8,010E-06  | 0,0000     | 1,661E-05  | 2,186E-06  |
| 4626 | EST2 | -3,423E-04 | -9,678E-05 | -3,230E-05 | 0,0000     | -6,698E-05 | 0,0000     |
| 4626 | EST3 | -1,411E-04 | 1,078E-04  | 1,269E-04  | 0,0000     | 2,633E-04  | 0,0000     |
| 4626 | EST4 | 1,365E-04  | 3,010E-05  | -2,203E-05 | 0,0000     | -4,568E-05 | 0,0000     |
| 4626 | EST5 | -8,844E-04 | 4,895E-04  | 4,352E-04  | -1,844E-05 | 8,195E-04  | 1,105E-05  |
| 4626 | EST6 | 1,117E-03  | 6,067E-04  | -5,394E-04 | 0,0000     | -1,114E-03 | 1,101E-05  |
| 4626 | EST7 | -6,078E-04 | 6,152E-04  | 3,036E-04  | -1,945E-05 | 5,656E-04  | 1,333E-05  |
| 4629 | EST1 | 1,040E-03  | 4,736E-04  | 8,010E-06  | 0,0000     | 1,661E-05  | 2,175E-06  |
| 4629 | EST2 | -3,452E-04 | -1,236E-04 | -3,230E-05 | 0,0000     | -6,698E-05 | 0,0000     |
| 4629 | EST3 | -1,408E-04 | -9,538E-05 | 1,269E-04  | 0,0000     | 2,633E-04  | 0,0000     |
| 4629 | EST4 | 1,370E-04  | -1,493E-06 | -2,203E-05 | 0,0000     | -4,568E-05 | 0,0000     |
| 4629 | EST5 | -8,716E-04 | -5,341E-04 | 4,309E-04  | 2,104E-05  | 8,130E-04  | -1,337E-05 |
| 4629 | EST6 | 1,077E-03  | -6,456E-04 | -5,253E-04 | 4,894E-06  | -1,090E-03 | -3,140E-06 |
| 4629 | EST7 | -5,673E-04 | -6,342E-04 | 2,875E-04  | 1,451E-05  | 5,319E-04  | -2,596E-05 |
| 4643 | EST1 | 1,048E-03  | 5,678E-04  | -2,034E-06 | 0,0000     | -4,216E-06 | 2,167E-06  |
| 4643 | EST2 | -4,269E-04 | -1,267E-04 | 8,238E-06  | 0,0000     | 1,708E-05  | 0,0000     |
| 4643 | EST3 | 1,900E-04  | 2,203E-05  | -3,216E-05 | 0,0000     | -6,668E-05 | 0,0000     |
| 4643 | EST4 | 7,881E-05  | 2,152E-05  | 5,628E-06  | 0,0000     | 1,167E-05  | 0,0000     |

|      |      |            |            |            |            |            |            |
|------|------|------------|------------|------------|------------|------------|------------|
| 4643 | EST5 | 1,054E-03  | 6,314E-04  | -5,114E-04 | 0,0000     | -1,059E-03 | 1,148E-05  |
| 4643 | EST6 | -1,062E-03 | 5,524E-04  | 5,192E-04  | -1,722E-05 | 9,998E-04  | 7,959E-06  |
| 4643 | EST7 | 6,445E-05  | 9,215E-04  | -3,003E-05 | -1,329E-05 | -1,505E-04 | 1,495E-05  |
| 4646 | EST1 | 1,061E-03  | 5,671E-04  | -2,034E-06 | 0,0000     | -4,216E-06 | 2,194E-06  |
| 4646 | EST2 | -4,298E-04 | -1,335E-04 | 8,238E-06  | 0,0000     | 1,708E-05  | 0,0000     |
| 4646 | EST3 | 1,903E-04  | -5,599E-06 | -3,216E-05 | 0,0000     | -6,668E-05 | 0,0000     |
| 4646 | EST4 | 7,935E-05  | 1,454E-05  | 5,628E-06  | 0,0000     | 1,167E-05  | 0,0000     |
| 4646 | EST5 | 1,013E-03  | -6,594E-04 | -4,969E-04 | 4,481E-06  | -1,035E-03 | -2,858E-06 |
| 4646 | EST6 | -1,042E-03 | -6,188E-04 | 5,134E-04  | 2,062E-05  | 9,896E-04  | -1,188E-05 |
| 4646 | EST7 | 5,914E-05  | -1,025E-03 | -2,595E-05 | 1,610E-05  | -1,354E-04 | -1,538E-05 |
| 4661 | EST1 | 1,042E-03  | 7,303E-04  | 0,0000     | 0,0000     | 0,0000     | 2,173E-06  |
| 4661 | EST2 | -4,112E-04 | -1,657E-04 | 0,0000     | 0,0000     | 1,970E-06  | 0,0000     |
| 4661 | EST3 | 1,304E-04  | 1,295E-05  | -3,821E-06 | 0,0000     | -7,618E-06 | 0,0000     |
| 4661 | EST4 | 8,910E-05  | 2,507E-05  | 0,0000     | 0,0000     | 1,349E-06  | 0,0000     |
| 4661 | EST5 | 9,722E-04  | 1,015E-03  | -5,681E-04 | -2,405E-05 | -1,125E-03 | 5,533E-05  |
| 4661 | EST6 | -4,156E-04 | 2,768E-04  | 2,215E-04  | 1,623E-05  | 4,452E-04  | 2,612E-05  |
| 4661 | EST7 | -2,829E-04 | 3,008E-04  | 1,525E-04  | 1,348E-05  | 3,076E-04  | 2,515E-05  |
| 4662 | EST1 | 1,059E-03  | 7,303E-04  | 0,0000     | 0,0000     | 0,0000     | 2,187E-06  |
| 4662 | EST2 | -4,150E-04 | -1,663E-04 | 0,0000     | 0,0000     | 1,970E-06  | 0,0000     |
| 4662 | EST3 | 1,307E-04  | 1,073E-05  | -3,821E-06 | 0,0000     | -7,618E-06 | 0,0000     |
| 4662 | EST4 | 8,980E-05  | 2,441E-05  | 0,0000     | 0,0000     | 1,349E-06  | 0,0000     |
| 4662 | EST5 | 9,449E-04  | -1,074E-03 | -5,525E-04 | 1,461E-05  | -1,090E-03 | -6,256E-05 |
| 4662 | EST6 | -4,179E-04 | -2,961E-04 | 2,230E-04  | -1,655E-05 | 4,483E-04  | -2,700E-05 |
| 4662 | EST7 | -2,882E-04 | -3,270E-04 | 1,555E-04  | -1,405E-05 | 3,139E-04  | -2,677E-05 |
| 4664 | EST1 | 1,055E-03  | 7,303E-04  | 0,0000     | 0,0000     | 0,0000     | 2,174E-06  |
| 4664 | EST2 | -4,141E-04 | -1,663E-04 | 0,0000     | 0,0000     | 1,955E-06  | 0,0000     |
| 4664 | EST3 | 1,307E-04  | 1,057E-05  | -3,849E-06 | 0,0000     | -7,706E-06 | 0,0000     |
| 4664 | EST4 | 8,968E-05  | 2,444E-05  | 0,0000     | 0,0000     | 1,332E-06  | 0,0000     |
| 4664 | EST5 | 1,093E-03  | -1,112E-03 | -5,895E-04 | -8,328E-05 | -1,191E-03 | -1,150E-04 |
| 4664 | EST6 | -3,843E-04 | -2,869E-04 | 2,179E-04  | 2,309E-06  | 4,314E-04  | -1,442E-05 |
| 4664 | EST7 | -2,520E-04 | -3,206E-04 | 1,498E-04  | -1,915E-06 | 2,949E-04  | -1,798E-05 |
| 4691 | EST1 | 1,035E-03  | 6,989E-04  | -5,352E-06 | 0,0000     | 0,0000     | 2,176E-06  |
| 4691 | EST2 | -4,075E-04 | -1,592E-04 | 2,242E-05  | 0,0000     | 0,0000     | 0,0000     |
| 4691 | EST3 | 1,214E-04  | 1,171E-05  | -8,333E-05 | 0,0000     | -2,821E-06 | 0,0000     |
| 4691 | EST4 | 9,041E-05  | 2,334E-05  | 1,550E-05  | 0,0000     | 0,0000     | 0,0000     |
| 4691 | EST5 | -7,010E-05 | 7,436E-05  | -8,357E-03 | 6,991E-04  | -1,747E-04 | 0,0000     |
| 4691 | EST6 | 1,115E-04  | -3,370E-05 | 5,362E-03  | 1,546E-04  | 1,726E-04  | 3,410E-06  |
| 4691 | EST7 | 8,535E-05  | -2,054E-05 | 3,860E-03  | 1,607E-04  | 1,219E-04  | 2,233E-06  |
| 4692 | EST1 | 1,065E-03  | 6,988E-04  | -5,352E-06 | 0,0000     | 0,0000     | 2,185E-06  |
| 4692 | EST2 | -4,141E-04 | -1,589E-04 | 2,242E-05  | 0,0000     | 0,0000     | 0,0000     |
| 4692 | EST3 | 1,221E-04  | 1,057E-05  | -8,333E-05 | 0,0000     | -2,821E-06 | 0,0000     |
| 4692 | EST4 | 9,164E-05  | 2,354E-05  | 1,550E-05  | 0,0000     | 0,0000     | 0,0000     |
| 4692 | EST5 | -6,555E-05 | -9,311E-05 | -8,136E-03 | -6,122E-04 | -1,941E-04 | 0,0000     |
| 4692 | EST6 | 1,090E-04  | 3,256E-05  | 5,402E-03  | -1,665E-04 | 1,725E-04  | -3,993E-06 |
| 4692 | EST7 | 8,326E-05  | 2,540E-05  | 3,950E-03  | -1,789E-04 | 1,229E-04  | -2,739E-06 |

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# G R O U P   J O I N T   F O R C E   S U M M A T I O N

| GROUP                                                 | LOAD | F-X   | F-Y   | F-Z   | M-X   | M-Y   | M-Z   |
|-------------------------------------------------------|------|-------|-------|-------|-------|-------|-------|
| RESULTADOS (Sum at X=198,1407 Y=5,288232 Z=-1,590698) |      |       |       |       |       |       |       |
|                                                       | EST1 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |
|                                                       | EST2 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |
|                                                       | EST3 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |
|                                                       | EST4 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |
|                                                       | EST5 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |
|                                                       | EST6 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |
|                                                       | EST7 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

## **ANÁLISIS DINÁMICO**

J O I N T D I S P L A C E M E N T S

| JOINT | LOAD         | U1         | U2         | U3         | R1         | R2         | R3         |
|-------|--------------|------------|------------|------------|------------|------------|------------|
| 1449  | LOC5TGIF MAX | 8.717E-04  | 0.0173     | 3.056E-03  | 6.684E-06  | 1.577E-04  | 5.215E-05  |
| 1449  | LOC5TGIF MIN | -2.319E-04 | -1.535E-03 | -4.924E-03 | -9.746E-04 | -2.294E-04 | -1.444E-05 |
| 1449  | TRAC5TGI MAX | 1.968E-04  | 1.538E-03  | 2.764E-03  | 1.618E-06  | 6.055E-05  | 4.984E-06  |
| 1449  | TRAC5TGI MIN | -2.048E-04 | -0.0166    | -2.337E-03 | -3.216E-04 | -1.693E-05 | -5.006E-05 |
| 2691  | LOC5TGIF MAX | 6.622E-04  | 2.489E-03  | 3.297E-03  | 3.133E-04  | 1.531E-04  | 7.898E-05  |
| 2691  | LOC5TGIF MIN | -2.127E-04 | -2.118E-04 | -9.818E-03 | -2.288E-04 | -1.699E-04 | -3.495E-05 |
| 2691  | TRAC5TGI MAX | 2.839E-04  | 1.110E-04  | 2.813E-03  | 2.283E-05  | 6.950E-05  | 8.477E-06  |
| 2691  | TRAC5TGI MIN | -2.074E-04 | -2.716E-03 | -6.308E-03 | -5.755E-04 | -8.821E-05 | -5.065E-05 |
| 2819  | LOC5TGIF MAX | 7.229E-04  | 0.0153     | 3.278E-03  | 2.504E-04  | 1.949E-04  | 5.364E-05  |
| 2819  | LOC5TGIF MIN | -2.239E-04 | -1.360E-03 | -9.660E-03 | -2.204E-04 | -9.973E-05 | -5.676E-06 |
| 2819  | TRAC5TGI MAX | 3.281E-04  | 1.363E-03  | 2.839E-03  | 1.711E-05  | 9.696E-05  | 4.707E-06  |
| 2819  | TRAC5TGI MIN | -2.076E-04 | -0.0147    | -6.244E-03 | -5.821E-04 | -6.829E-05 | -5.006E-05 |
| 2962  | LOC5TGIF MAX | 6.908E-04  | 4.458E-03  | 3.345E-03  | 1.918E-04  | 1.894E-04  | 6.014E-05  |
| 2962  | LOC5TGIF MIN | -3.665E-04 | -4.155E-04 | -9.934E-03 | -3.279E-04 | -1.448E-04 | -2.579E-05 |
| 2962  | TRAC5TGI MAX | 3.819E-04  | 3.636E-04  | 2.821E-03  | 2.817E-05  | 9.984E-05  | 5.797E-06  |
| 2962  | TRAC5TGI MIN | -2.734E-04 | -4.349E-03 | -6.914E-03 | -5.858E-04 | -9.452E-05 | -4.883E-05 |
| 2998  | LOC5TGIF MAX | 6.743E-04  | 6.653E-03  | 3.355E-03  | 1.870E-04  | 1.873E-04  | 5.913E-05  |
| 2998  | LOC5TGIF MIN | -2.187E-04 | -5.830E-04 | -9.828E-03 | -3.350E-04 | -1.527E-04 | -2.160E-05 |
| 2998  | TRAC5TGI MAX | 3.655E-04  | 5.774E-04  | 2.853E-03  | 2.446E-05  | 1.003E-04  | 4.996E-06  |
| 2998  | TRAC5TGI MIN | -2.013E-04 | -6.404E-03 | -6.896E-03 | -5.878E-04 | -9.453E-05 | -4.981E-05 |
| 3030  | LOC5TGIF MAX | 6.785E-04  | 8.826E-03  | 3.369E-03  | 1.783E-04  | 1.594E-04  | 6.849E-05  |
| 3030  | LOC5TGIF MIN | -2.270E-04 | -7.749E-04 | -9.800E-03 | -3.557E-04 | -1.611E-04 | -5.612E-05 |
| 3030  | TRAC5TGI MAX | 3.697E-04  | 7.765E-04  | 2.855E-03  | 2.495E-05  | 9.274E-05  | 4.711E-06  |
| 3030  | TRAC5TGI MIN | -2.133E-04 | -8.476E-03 | -6.885E-03 | -5.859E-04 | -9.279E-05 | -5.005E-05 |
| 3063  | LOC5TGIF MAX | 6.777E-04  | 0.0132     | 3.336E-03  | 1.837E-04  | 1.499E-04  | 5.703E-05  |
| 3063  | LOC5TGIF MIN | -2.226E-04 | -1.165E-03 | -9.914E-03 | -3.568E-04 | -1.453E-04 | -3.866E-05 |
| 3063  | TRAC5TGI MAX | 3.689E-04  | 1.167E-03  | 2.838E-03  | 2.731E-05  | 9.276E-05  | 4.706E-06  |
| 3063  | TRAC5TGI MIN | -2.090E-04 | -0.0126    | -6.961E-03 | -5.921E-04 | -9.014E-05 | -5.006E-05 |
| 3109  | LOC5TGIF MAX | 6.774E-04  | 0.0110     | 3.370E-03  | 1.859E-04  | 1.364E-04  | 5.216E-05  |
| 3109  | LOC5TGIF MIN | -2.211E-04 | -9.697E-04 | -9.841E-03 | -3.580E-04 | -1.311E-04 | -2.745E-05 |
| 3109  | TRAC5TGI MAX | 3.686E-04  | 9.720E-04  | 2.865E-03  | 2.684E-05  | 9.128E-05  | 4.711E-06  |
| 3109  | TRAC5TGI MIN | -2.076E-04 | -0.0106    | -6.887E-03 | -5.909E-04 | -8.956E-05 | -5.005E-05 |
| 3190  | LOC5TGIF MAX | 6.776E-04  | 0.0164     | 1.905E-04  | 1.341E-05  | 3.476E-04  | 5.613E-05  |
| 3190  | LOC5TGIF MIN | -4.149E-04 | -1.455E-03 | -2.667E-04 | -1.609E-05 | -5.477E-04 | -3.055E-05 |
| 3190  | TRAC5TGI MAX | 3.892E-04  | 1.458E-03  | 1.321E-04  | 1.924E-05  | 2.564E-04  | 1.081E-05  |
| 3190  | TRAC5TGI MIN | -2.505E-04 | -0.0157    | -1.953E-04 | -1.455E-06 | -3.962E-04 | -5.006E-05 |
| 3223  | LOC5TGIF MAX | 5.771E-04  | 2.485E-03  | 3.140E-03  | 4.505E-05  | 1.731E-04  | 9.055E-05  |
| 3223  | LOC5TGIF MIN | -2.041E-04 | -2.136E-04 | -9.928E-03 | -4.160E-04 | -2.165E-04 | -5.985E-05 |
| 3223  | TRAC5TGI MAX | 3.641E-04  | 1.097E-04  | 2.785E-03  | 1.937E-05  | 7.512E-05  | 9.988E-06  |
| 3223  | TRAC5TGI MIN | -2.107E-04 | -2.727E-03 | -7.288E-03 | -4.980E-04 | -9.095E-05 | -4.998E-05 |
| 3351  | LOC5TGIF MAX | 6.324E-04  | 0.0153     | 3.121E-03  | 1.030E-04  | 2.407E-04  | 6.374E-05  |
| 3351  | LOC5TGIF MIN | -2.214E-04 | -1.360E-03 | -9.669E-03 | -3.281E-04 | -7.333E-05 | -4.698E-06 |
| 3351  | TRAC5TGI MAX | 4.106E-04  | 1.363E-03  | 2.795E-03  | 1.425E-05  | 1.144E-04  | 4.706E-06  |
| 3351  | TRAC5TGI MIN | -2.098E-04 | -0.0147    | -7.220E-03 | -5.110E-04 | -7.958E-05 | -5.006E-05 |
| 3562  | LOC5TGIF MAX | 4.234E-04  | 8.827E-03  | 3.072E-03  | 5.049E-04  | 9.932E-05  | 5.212E-05  |
| 3562  | LOC5TGIF MIN | -2.201E-04 | -7.743E-04 | -7.489E-03 | -2.145E-05 | -9.978E-05 | -5.350E-06 |
| 3562  | TRAC5TGI MAX | 6.129E-04  | 7.774E-04  | 2.935E-03  | 4.255E-04  | 1.648E-04  | 1.544E-05  |
| 3562  | TRAC5TGI MIN | -2.200E-04 | -8.474E-03 | -9.797E-03 | -1.805E-05 | -1.674E-04 | -5.010E-05 |
| 3595  | LOC5TGIF MAX | 4.226E-04  | 0.0132     | 3.014E-03  | 5.138E-04  | 9.870E-05  | 5.215E-05  |
| 3595  | LOC5TGIF MIN | -2.156E-04 | -1.165E-03 | -7.583E-03 | -2.313E-05 | -9.692E-05 | -5.973E-06 |
| 3595  | TRAC5TGI MAX | 6.121E-04  | 1.167E-03  | 2.901E-03  | 4.343E-04  | 2.217E-04  | 3.780E-05  |
| 3595  | TRAC5TGI MIN | -2.156E-04 | -0.0126    | -9.892E-03 | -4.286E-05 | -1.958E-04 | -5.852E-05 |
| 3755  | LOC5TGIF MAX | 3.337E-04  | 2.839E-03  | 2.961E-03  | 5.974E-04  | 7.329E-05  | 5.152E-05  |
| 3755  | LOC5TGIF MIN | -2.143E-04 | -1.056E-04 | -6.943E-03 | -2.219E-05 | -9.228E-05 | -6.529E-06 |
| 3755  | TRAC5TGI MAX | 5.967E-04  | 1.989E-04  | 2.943E-03  | 3.412E-04  | 1.199E-04  | 4.285E-05  |
| 3755  | TRAC5TGI MIN | -2.055E-04 | -2.380E-03 | -9.582E-03 | -1.847E-04 | -1.375E-04 | -7.820E-05 |
| 3760  | LOC5TGIF MAX | 3.913E-04  | 4.528E-03  | 3.020E-03  | 6.025E-04  | 1.025E-04  | 5.091E-05  |
| 3760  | LOC5TGIF MIN | -2.808E-04 | -3.663E-04 | -7.139E-03 | -2.896E-05 | -9.319E-05 | -6.600E-06 |
| 3760  | TRAC5TGI MAX | 6.684E-04  | 4.133E-04  | 2.963E-03  | 3.309E-04  | 1.871E-04  | 2.933E-05  |
| 3760  | TRAC5TGI MIN | -3.588E-04 | -4.275E-03 | -9.644E-03 | -1.842E-04 | -1.509E-04 | -5.194E-05 |
| 3796  | LOC5TGIF MAX | 3.742E-04  | 6.669E-03  | 3.066E-03  | 5.975E-04  | 1.028E-04  | 5.191E-05  |
| 3796  | LOC5TGIF MIN | -2.056E-04 | -5.765E-04 | -7.051E-03 | -2.538E-05 | -9.625E-05 | -5.137E-06 |
| 3796  | TRAC5TGI MAX | 6.521E-04  | 5.854E-04  | 2.983E-03  | 3.287E-04  | 1.842E-04  | 2.079E-05  |
| 3796  | TRAC5TGI MIN | -2.157E-04 | -6.388E-03 | -9.625E-03 | -1.841E-04 | -1.497E-04 | -5.655E-05 |
| 3883  | LOC5TGIF MAX | 3.775E-04  | 0.0153     | 2.963E-03  | 6.050E-04  | 1.078E-04  | 5.215E-05  |
| 3883  | LOC5TGIF MIN | -2.141E-04 | -1.360E-03 | -6.897E-03 | -1.758E-05 | -7.474E-05 | -4.698E-06 |
| 3883  | TRAC5TGI MAX | 6.554E-04  | 1.363E-03  | 2.921E-03  | 2.905E-04  | 1.947E-04  | 4.706E-06  |
| 3883  | TRAC5TGI MIN | -2.175E-04 | -0.0147    | -9.398E-03 | -1.925E-04 | -9.083E-05 | -5.595E-05 |
| 3907  | LOC5TGIF MAX | 3.773E-04  | 0.0110     | 3.049E-03  | 5.975E-04  | 9.347E-05  | 5.214E-05  |
| 3907  | LOC5TGIF MIN | -2.129E-04 | -9.695E-04 | -7.020E-03 | -2.807E-05 | -9.182E-05 | -4.702E-06 |
| 3907  | TRAC5TGI MAX | 6.552E-04  | 9.723E-04  | 3.003E-03  | 3.510E-04  | 1.329E-04  | 2.594E-05  |
| 3907  | TRAC5TGI MIN | -2.164E-04 | -0.0106    | -9.650E-03 | -1.834E-04 | -1.282E-04 | -5.007E-05 |
| 3988  | LOC5TGIF MAX | 3.986E-04  | 0.0164     | 1.408E-04  | 1.594E-06  | 2.743E-04  | 5.215E-05  |
| 3988  | LOC5TGIF MIN | -2.675E-04 | -1.455E-03 | -1.996E-04 | -1.986E-05 | -4.052E-04 | -1.113E-05 |

|      |          |     |            |            |            |            |            |            |
|------|----------|-----|------------|------------|------------|------------|------------|------------|
| 3988 | TRAC5TGI | MAX | 6.554E-04  | 1.458E-03  | 1.808E-04  | 1.506E-05  | 3.274E-04  | 2.838E-05  |
| 3988 | TRAC5TGI | MIN | -3.967E-04 | -0.0157    | -2.595E-04 | -1.330E-05 | -5.332E-04 | -5.338E-05 |
| 4094 | LOC5TGIF | MAX | 3.342E-04  | 8.828E-03  | 3.065E-03  | 5.802E-04  | 9.318E-05  | 5.218E-05  |
| 4094 | LOC5TGIF | MIN | -2.180E-04 | -7.742E-04 | -6.507E-03 | -2.493E-05 | -9.251E-05 | -4.687E-06 |
| 4094 | TRAC5TGI | MAX | 6.999E-04  | 7.775E-04  | 3.040E-03  | 2.262E-04  | 1.757E-04  | 3.802E-05  |
| 4094 | TRAC5TGI | MIN | -2.251E-04 | -8.473E-03 | -9.649E-03 | -3.133E-04 | -1.781E-04 | -5.004E-05 |
| 4127 | LOC5TGIF | MAX | 3.333E-04  | 0.0132     | 3.006E-03  | 5.894E-04  | 9.338E-05  | 5.215E-05  |
| 4127 | LOC5TGIF | MIN | -2.135E-04 | -1.165E-03 | -6.585E-03 | -2.700E-05 | -8.958E-05 | -4.697E-06 |
| 4127 | TRAC5TGI | MAX | 6.990E-04  | 1.167E-03  | 3.016E-03  | 2.326E-04  | 1.758E-04  | 3.067E-05  |
| 4127 | TRAC5TGI | MIN | -2.207E-04 | -0.0126    | -9.750E-03 | -3.124E-04 | -1.770E-04 | -5.006E-05 |
| 4415 | LOC5TGIF | MAX | 2.005E-04  | 0.0153     | 3.089E-03  | 2.602E-04  | 1.098E-04  | 5.215E-05  |
| 4415 | LOC5TGIF | MIN | -2.103E-04 | -1.360E-03 | -5.519E-03 | -2.331E-06 | -7.657E-05 | -4.699E-06 |
| 4415 | TRAC5TGI | MAX | 8.422E-04  | 1.363E-03  | 3.113E-03  | 7.813E-04  | 1.772E-04  | 7.508E-06  |
| 4415 | TRAC5TGI | MIN | -2.297E-04 | -0.0147    | -8.647E-03 | -7.979E-05 | -4.625E-04 | -5.006E-05 |
| 4418 | LOC5TGIF | MAX | 2.004E-04  | 0.0173     | 2.828E-03  | 3.335E-04  | 6.089E-05  | 5.215E-05  |
| 4418 | LOC5TGIF | MIN | -2.102E-04 | -1.535E-03 | -2.395E-03 | -1.537E-06 | -1.854E-05 | -5.075E-06 |
| 4418 | TRAC5TGI | MAX | 8.422E-04  | 1.538E-03  | 3.034E-03  | 9.591E-04  | 1.501E-04  | 1.367E-05  |
| 4418 | TRAC5TGI | MIN | -2.297E-04 | -0.0166    | -4.777E-03 | -6.443E-06 | -2.138E-04 | -5.006E-05 |
| 4524 | LOC5TGIF | MAX | 1.096E-05  | 9.818E-06  | 1.114E-04  | 1.955E-05  | 3.680E-04  | 1.070E-05  |
| 4524 | LOC5TGIF | MIN | -2.393E-06 | 0.0000     | -1.873E-04 | -1.160E-06 | -2.175E-04 | 0.0000     |
| 4524 | TRAC5TGI | MAX | 2.061E-05  | 4.737E-06  | 1.159E-04  | 1.787E-05  | 6.630E-04  | 9.178E-06  |
| 4524 | TRAC5TGI | MIN | -1.956E-06 | -2.756E-06 | -3.357E-04 | -1.265E-05 | -2.244E-04 | -9.445E-06 |
| 4530 | LOC5TGIF | MAX | 3.416E-04  | 7.629E-04  | 2.473E-03  | 4.959E-04  | 4.493E-05  | 6.027E-05  |
| 4530 | LOC5TGIF | MIN | -1.471E-04 | -2.560E-05 | -3.823E-03 | -3.201E-05 | -7.711E-05 | -3.157E-06 |
| 4530 | TRAC5TGI | MAX | 5.782E-04  | 8.775E-05  | 2.579E-03  | 2.003E-04  | 9.451E-05  | 7.681E-06  |
| 4530 | TRAC5TGI | MIN | -1.388E-04 | -5.648E-04 | -6.139E-03 | -2.041E-04 | -1.155E-04 | -6.495E-05 |
| 4533 | LOC5TGIF | MAX | 6.016E-04  | 5.900E-04  | 2.651E-03  | 2.099E-04  | 1.003E-04  | 6.833E-05  |
| 4533 | LOC5TGIF | MIN | -1.399E-04 | -9.005E-05 | -6.310E-03 | -2.044E-04 | -1.177E-04 | -7.659E-06 |
| 4533 | TRAC5TGI | MAX | 3.330E-04  | 2.513E-05  | 2.411E-03  | 3.125E-05  | 4.184E-05  | 3.205E-06  |
| 4533 | TRAC5TGI | MIN | -1.433E-04 | -7.364E-04 | -3.750E-03 | -4.828E-04 | -7.619E-05 | -5.805E-05 |
| 4558 | LOC5TGIF | MAX | 6.378E-04  | 1.898E-03  | 1.485E-04  | 1.315E-06  | 3.988E-04  | 5.108E-05  |
| 4558 | LOC5TGIF | MIN | -6.029E-04 | -4.744E-05 | -2.041E-04 | -1.889E-05 | -2.777E-04 | -2.694E-06 |
| 4558 | TRAC5TGI | MAX | 1.047E-03  | 2.802E-04  | 1.901E-04  | 2.207E-05  | 5.193E-04  | 2.982E-05  |
| 4558 | TRAC5TGI | MIN | -7.591E-04 | -1.327E-03 | -2.619E-04 | -8.495E-06 | -3.315E-04 | -7.180E-05 |
| 4561 | LOC5TGIF | MAX | 1.077E-03  | 1.389E-03  | 2.007E-04  | 9.164E-06  | 5.322E-04  | 7.364E-05  |
| 4561 | LOC5TGIF | MIN | -7.785E-04 | -2.932E-04 | -2.687E-04 | -2.326E-05 | -3.526E-04 | -3.113E-05 |
| 4561 | TRAC5TGI | MAX | 6.211E-04  | 5.055E-05  | 1.395E-04  | 1.836E-05  | 3.902E-04  | 2.778E-06  |
| 4561 | TRAC5TGI | MIN | -5.886E-04 | -1.830E-03 | -1.998E-04 | -1.255E-06 | -2.594E-04 | -4.879E-05 |
| 4575 | LOC5TGIF | MAX | 4.476E-04  | 3.731E-03  | 2.010E-04  | 1.365E-06  | 4.103E-04  | 5.015E-05  |
| 4575 | LOC5TGIF | MIN | -3.463E-04 | -2.211E-04 | -2.097E-04 | -1.543E-05 | -3.726E-04 | -1.923E-05 |
| 4575 | TRAC5TGI | MAX | 8.554E-04  | 4.800E-04  | 2.475E-04  | 1.851E-05  | 5.116E-04  | 3.012E-05  |
| 4575 | TRAC5TGI | MIN | -4.939E-04 | -3.299E-03 | -2.523E-04 | -1.284E-05 | -4.268E-04 | -6.827E-05 |
| 4578 | LOC5TGIF | MAX | 8.913E-04  | 3.446E-03  | 2.538E-04  | 1.400E-05  | 5.355E-04  | 7.063E-05  |
| 4578 | LOC5TGIF | MIN | -5.122E-04 | -4.960E-04 | -2.631E-04 | -1.699E-05 | -4.370E-04 | -3.191E-05 |
| 4578 | TRAC5TGI | MAX | 4.372E-04  | 2.259E-04  | 1.972E-04  | 1.540E-05  | 3.948E-04  | 1.934E-05  |
| 4578 | TRAC5TGI | MIN | -3.341E-04 | -3.582E-03 | -2.019E-04 | -1.026E-06 | -3.652E-04 | -4.805E-05 |
| 4592 | LOC5TGIF | MAX | 4.499E-04  | 5.630E-03  | 1.989E-04  | 1.070E-06  | 4.040E-04  | 5.174E-05  |
| 4592 | LOC5TGIF | MIN | -4.137E-04 | -4.727E-04 | -1.974E-04 | -1.687E-05 | -3.859E-04 | -1.951E-05 |
| 4592 | TRAC5TGI | MAX | 6.766E-04  | 5.026E-04  | 2.437E-04  | 1.591E-05  | 5.040E-04  | 2.653E-05  |
| 4592 | TRAC5TGI | MIN | -5.622E-04 | -5.349E-03 | -2.408E-04 | -8.609E-06 | -4.437E-04 | -6.999E-05 |
| 4595 | LOC5TGIF | MAX | 7.051E-04  | 5.573E-03  | 2.500E-04  | 9.254E-06  | 5.170E-04  | 7.185E-05  |
| 4595 | LOC5TGIF | MIN | -5.798E-04 | -5.264E-04 | -2.470E-04 | -1.643E-05 | -4.556E-04 | -2.847E-05 |
| 4595 | TRAC5TGI | MAX | 4.362E-04  | 4.714E-04  | 1.932E-04  | 1.662E-05  | 3.943E-04  | 1.878E-05  |
| 4595 | TRAC5TGI | MIN | -4.035E-04 | -5.406E-03 | -1.925E-04 | -1.013E-06 | -3.747E-04 | -4.962E-05 |
| 4609 | LOC5TGIF | MAX | 3.905E-04  | 7.774E-03  | 1.981E-04  | 0.0000     | 4.105E-04  | 5.202E-05  |
| 4609 | LOC5TGIF | MIN | -4.011E-04 | -6.780E-04 | -2.026E-04 | -3.316E-05 | -3.893E-04 | -1.395E-05 |
| 4609 | TRAC5TGI | MAX | 6.501E-04  | 6.835E-04  | 2.256E-04  | 1.814E-05  | 4.951E-04  | 3.807E-05  |
| 4609 | TRAC5TGI | MIN | -5.497E-04 | -7.456E-03 | -2.439E-04 | -1.046E-05 | -4.496E-04 | -5.974E-05 |
| 4612 | LOC5TGIF | MAX | 6.722E-04  | 7.766E-03  | 2.311E-04  | 1.100E-05  | 5.054E-04  | 6.129E-05  |
| 4612 | LOC5TGIF | MIN | -5.624E-04 | -6.804E-04 | -2.485E-04 | -1.874E-05 | -4.597E-04 | -4.015E-05 |
| 4612 | TRAC5TGI | MAX | 3.803E-04  | 6.796E-04  | 1.930E-04  | 3.272E-05  | 4.023E-04  | 1.363E-05  |
| 4612 | TRAC5TGI | MIN | -3.930E-04 | -7.464E-03 | -1.985E-04 | 0.0000     | -3.792E-04 | -4.992E-05 |
| 4626 | LOC5TGIF | MAX | 4.066E-04  | 0.0120     | 1.939E-04  | 1.160E-06  | 3.781E-04  | 5.215E-05  |
| 4626 | LOC5TGIF | MIN | -3.828E-04 | -1.065E-03 | -2.023E-04 | -1.797E-05 | -4.137E-04 | -1.026E-05 |
| 4626 | TRAC5TGI | MAX | 6.551E-04  | 1.067E-03  | 2.427E-04  | 1.370E-05  | 4.533E-04  | 2.400E-05  |
| 4626 | TRAC5TGI | MIN | -5.223E-04 | -0.0116    | -2.504E-04 | -1.277E-05 | -5.254E-04 | -5.006E-05 |
| 4629 | LOC5TGIF | MAX | 6.772E-04  | 0.0120     | 2.492E-04  | 1.357E-05  | 4.653E-04  | 5.215E-05  |
| 4629 | LOC5TGIF | MIN | -5.368E-04 | -1.065E-03 | -2.571E-04 | -1.447E-05 | -5.386E-04 | -2.522E-05 |
| 4629 | TRAC5TGI | MAX | 3.979E-04  | 1.067E-03  | 1.900E-04  | 1.777E-05  | 3.704E-04  | 9.795E-06  |
| 4629 | TRAC5TGI | MIN | -3.752E-04 | -0.0116    | -1.980E-04 | -1.077E-06 | -4.048E-04 | -5.005E-05 |
| 4643 | LOC5TGIF | MAX | 4.089E-04  | 0.0142     | 1.868E-04  | 1.057E-06  | 3.657E-04  | 5.215E-05  |
| 4643 | LOC5TGIF | MIN | -3.715E-04 | -1.260E-03 | -2.031E-04 | -1.594E-05 | -4.159E-04 | -1.074E-05 |
| 4643 | TRAC5TGI | MAX | 6.555E-04  | 1.263E-03  | 2.368E-04  | 1.305E-05  | 4.435E-04  | 3.744E-05  |
| 4643 | TRAC5TGI | MIN | -5.138E-04 | -0.0136    | -2.553E-04 | -1.814E-05 | -5.427E-04 | -5.519E-05 |
| 4646 | LOC5TGIF | MAX | 6.777E-04  | 0.0142     | 2.431E-04  | 1.914E-05  | 4.560E-04  | 5.728E-05  |
| 4646 | LOC5TGIF | MIN | -5.315E-04 | -1.260E-03 | -2.624E-04 | -1.599E-05 | -5.619E-04 | -3.319E-05 |
| 4646 | TRAC5TGI | MAX | 3.995E-04  | 1.263E-03  | 1.817E-04  | 1.579E-05  | 3.557E-04  | 1.018E-05  |
| 4646 | TRAC5TGI | MIN | -3.610E-04 | -0.0136    | -1.983E-04 | 0.0000     | -4.055E-04 | -5.006E-05 |
| 4661 | LOC5TGIF | MAX | 3.333E-04  | 0.0181     | 1.151E-04  | 1.746E-05  | 2.309E-04  | 7.571E-05  |
| 4661 | LOC5TGIF | MIN | -2.192E-04 | -1.611E-03 | -1.828E-04 | -1.601E-06 | -3.540E-04 | -4.698E-06 |

|      |          |     |            |            |            |            |            |            |
|------|----------|-----|------------|------------|------------|------------|------------|------------|
| 4661 | TRAC5TGI | MAX | 6.990E-04  | 1.614E-03  | 1.162E-04  | 8.704E-06  | 2.337E-04  | 3.693E-05  |
| 4661 | TRAC5TGI | MIN | -2.280E-04 | -0.0174    | -3.794E-04 | -8.743E-05 | -7.704E-04 | -5.006E-05 |
| 4662 | LOC5TGIF | MAX | 7.229E-04  | 0.0181     | 1.191E-04  | 6.305E-05  | 2.395E-04  | 6.593E-05  |
| 4662 | LOC5TGIF | MIN | -2.303E-04 | -1.611E-03 | -3.726E-04 | -8.844E-06 | -7.070E-04 | -3.658E-05 |
| 4662 | TRAC5TGI | MAX | 3.281E-04  | 1.614E-03  | 1.122E-04  | 1.581E-06  | 2.253E-04  | 4.706E-06  |
| 4662 | TRAC5TGI | MIN | -2.138E-04 | -0.0174    | -1.778E-04 | -1.680E-05 | -3.446E-04 | -7.340E-05 |
| 4664 | LOC5TGIF | MAX | 7.174E-04  | 0.0181     | 1.167E-04  | 6.514E-06  | 2.310E-04  | 5.215E-05  |
| 4664 | LOC5TGIF | MIN | -2.210E-04 | -1.611E-03 | -3.846E-04 | -9.419E-05 | -7.961E-04 | -7.849E-05 |
| 4664 | TRAC5TGI | MAX | 4.106E-04  | 1.614E-03  | 1.115E-04  | 8.259E-06  | 2.206E-04  | 4.706E-06  |
| 4664 | TRAC5TGI | MIN | -2.099E-04 | -0.0174    | -1.940E-04 | -3.679E-05 | -4.026E-04 | -7.831E-05 |
| 4691 | LOC5TGIF | MAX | 2.004E-04  | 0.0174     | 2.715E-03  | 3.346E-04  | 8.525E-05  | 5.215E-05  |
| 4691 | LOC5TGIF | MIN | -2.102E-04 | -1.543E-03 | -2.344E-03 | -2.113E-06 | -5.779E-05 | -4.811E-06 |
| 4691 | TRAC5TGI | MAX | 8.422E-04  | 1.546E-03  | 2.914E-03  | 9.237E-04  | 2.823E-04  | 1.963E-05  |
| 4691 | TRAC5TGI | MIN | -2.297E-04 | -0.0167    | -4.707E-03 | -5.021E-06 | -1.479E-04 | -5.006E-05 |
| 4692 | LOC5TGIF | MAX | 8.717E-04  | 0.0174     | 2.930E-03  | 5.198E-06  | 2.976E-04  | 5.215E-05  |
| 4692 | LOC5TGIF | MIN | -2.319E-04 | -1.543E-03 | -4.839E-03 | -9.350E-04 | -1.531E-04 | -2.088E-05 |
| 4692 | TRAC5TGI | MAX | 1.968E-04  | 1.546E-03  | 2.653E-03  | 2.168E-06  | 8.330E-05  | 4.706E-06  |
| 4692 | TRAC5TGI | MIN | -2.048E-04 | -0.0167    | -2.294E-03 | -3.228E-04 | -5.438E-05 | -5.006E-05 |

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G R O U P J O I N T F O R C E S U M M A T I O N

| GROUP                                                 | LOAD | F-X | F-Y | F-Z | M-X | M-Y | M-Z |
|-------------------------------------------------------|------|-----|-----|-----|-----|-----|-----|
| RESULTADOS (Sum at X=198.1407 Y=5.288232 Z=-1.590698) |      |     |     |     |     |     |     |

## **ANÁLISIS MODAL**

S A P 2 0 0 0 (R)

Structural Analysis Programs

Nonlinear Version 7.40

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21 Jan 2002 12:52:17



## D I S P L A C E M E N T   D E G R E E S   O F   F R E E D O M

(A) = Active DOF, equilibrium equation  
 (-) = Restrained DOF, reaction computed  
 (+) = Constrained DOF  
 (>) = External substructure DOF  
 ( ) = Null DOF

| JOINTS  |      |  | UX | UY | UZ | RX | RY | RZ |
|---------|------|--|----|----|----|----|----|----|
| 1 TO    | 2652 |  | A  | A  | A  | A  | A  | A  |
| 2653    |      |  | -  | -  | -  | A  | A  | A  |
| 2654 TO | 2660 |  | A  | A  | -  | A  | A  | A  |
| 2661 TO | 2669 |  | A  | A  | A  | A  | A  | A  |
| 2670 TO | 2671 |  | A  | A  | -  | A  | A  | A  |
| 2672 TO | 3193 |  | A  | A  | A  | A  | A  | A  |
| 3194    |      |  | -  | -  | -  | A  | A  | A  |
| 3195 TO | 3203 |  | A  | A  | -  | A  | A  | A  |
| 3204 TO | 3459 |  | A  | A  | A  | A  | A  | A  |
| 3460    |      |  | -  | -  | -  | A  | A  | A  |
| 3461 TO | 3469 |  | A  | A  | -  | A  | A  | A  |
| 3470 TO | 3991 |  | A  | A  | A  | A  | A  | A  |
| 3992    |      |  | -  | -  | -  | A  | A  | A  |
| 3993 TO | 4001 |  | A  | A  | -  | A  | A  | A  |
| 4002 TO | 4692 |  | A  | A  | A  | A  | A  | A  |
| 4711    |      |  | -  | -  | -  | A  | A  | A  |
| 4712 TO | 4713 |  | A  | A  | -  | A  | A  | A  |
| 4714 TO | 4715 |  | -  | -  | -  | A  | A  | A  |
| 4716 TO | 4717 |  | A  | A  | -  | A  | A  | A  |
| 4718    |      |  | -  | -  | -  | A  | A  | A  |
| 4719 TO | 4802 |  | A  | A  | A  | A  | A  | A  |
| 4804 TO | 4823 |  | A  | A  | -  | A  | A  | A  |
| 4824 TO | 4961 |  | A  | A  | A  | A  | A  | A  |
| 4962    |      |  | A  | A  | -  | A  | A  | A  |
| 4963 TO | 4988 |  | A  | A  | A  | A  | A  | A  |
| 4989    |      |  | A  | A  | -  | A  | A  | A  |
| 4990 TO | 5015 |  | A  | A  | A  | A  | A  | A  |
| 5016    |      |  | A  | A  | -  | A  | A  | A  |
| 5017 TO | 5042 |  | A  | A  | A  | A  | A  | A  |
| 5085    |      |  | A  | A  | -  | A  | A  | A  |
| 5086 TO | 5099 |  | A  | A  | A  | A  | A  | A  |
| 5100    |      |  | A  | A  | -  | A  | A  | A  |
| 5101 TO | 5112 |  | A  | A  | A  | A  | A  | A  |
| 5113    |      |  | A  | A  | -  | A  | A  | A  |
| 5114 TO | 5157 |  | A  | A  | A  | A  | A  | A  |
| 5158    |      |  | A  | A  | -  | A  | A  | A  |
| 5159 TO | 5202 |  | A  | A  | A  | A  | A  | A  |
| 5203    |      |  | A  | A  | -  | A  | A  | A  |
| 5204 TO | 5247 |  | A  | A  | A  | A  | A  | A  |
| 5248    |      |  | A  | A  | -  | A  | A  | A  |
| 5249 TO | 5294 |  | A  | A  | A  | A  | A  | A  |
| 5295    |      |  | A  | A  | -  | A  | A  | A  |
| 5296 TO | 5309 |  | A  | A  | A  | A  | A  | A  |
| 5310    |      |  | A  | A  | -  | A  | A  | A  |
| 5311 TO | 5324 |  | A  | A  | A  | A  | A  | A  |
| 5360    |      |  | A  | A  | -  | A  | A  | A  |
| 5361 TO | 5385 |  | A  | A  | A  | A  | A  | A  |
| 5386    |      |  | A  | A  | -  | A  | A  | A  |
| 5387 TO | 5411 |  | A  | A  | A  | A  | A  | A  |
| 5412    |      |  | A  | A  | -  | A  | A  | A  |
| 5413 TO | 5437 |  | A  | A  | A  | A  | A  | A  |
| 5438    |      |  | A  | A  | -  | A  | A  | A  |
| 5439 TO | 5463 |  | A  | A  | A  | A  | A  | A  |
| 5513    |      |  | A  | A  | -  | A  | A  | A  |
| 5514 TO | 5554 |  | A  | A  | A  | A  | A  | A  |
| 5555    |      |  | A  | A  | -  | A  | A  | A  |
| 5556 TO | 5596 |  | A  | A  | A  | A  | A  | A  |
| 5597    |      |  | A  | A  | -  | A  | A  | A  |
| 5598 TO | 5638 |  | A  | A  | A  | A  | A  | A  |
| 5639    |      |  | A  | A  | -  | A  | A  | A  |
| 5640 TO | 5680 |  | A  | A  | A  | A  | A  | A  |
| 5737    |      |  | A  | A  | -  | A  | A  | A  |
| 5738 TO | 5783 |  | A  | A  | A  | A  | A  | A  |
| 5784    |      |  | A  | A  | -  | A  | A  | A  |
| 5785 TO | 5830 |  | A  | A  | A  | A  | A  | A  |
| 5831    |      |  | A  | A  | -  | A  | A  | A  |
| 5832 TO | 5877 |  | A  | A  | A  | A  | A  | A  |
| 5878    |      |  | A  | A  | -  | A  | A  | A  |
| 5879 TO | 5924 |  | A  | A  | A  | A  | A  | A  |
| 5956    |      |  | A  | A  | -  | A  | A  | A  |
| 5957 TO | 5977 |  | A  | A  | A  | A  | A  | A  |
| 5978    |      |  | A  | A  | -  | A  | A  | A  |
| 5979 TO | 5999 |  | A  | A  | A  | A  | A  | A  |
| 6000    |      |  | A  | A  | -  | A  | A  | A  |
| 6001 TO | 6021 |  | A  | A  | A  | A  | A  | A  |
| 6022    |      |  | A  | A  | -  | A  | A  | A  |
| 6023 TO | 6043 |  | A  | A  | A  | A  | A  | A  |

## T O T A L   A S S E M B L E D   J O I N T   M A S S E S

## IN GLOBAL COORDINATES

|       | UX         | UY         | UZ         | RX      | RY      | RZ      |
|-------|------------|------------|------------|---------|---------|---------|
| TOTAL | 964.844266 | 964.844266 | 964.844266 | .000000 | .000000 | .000000 |

# TOTAL ACCELERATED MASS AND LOCATION

TOTAL MASS ACTIVATED BY ACCELERATION LOADS, IN GLOBAL COORDINATES

|       | UX         | UY         | UZ         |
|-------|------------|------------|------------|
| MASS  | 964.734377 | 964.734377 | 960.878246 |
| X-LOC | 178.470327 | 178.470327 | 178.420795 |
| Y-LOC | 5.108000   | 5.108000   | 5.108000   |
| Z-LOC | -0.353974  | -0.353974  | -0.348171  |

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## MODAL PERIODS AND FREQUENCIES

| MODE | PERIOD<br>(TIME) | FREQUENCY<br>(CYC/TIME) | FREQUENCY<br>(RAD/TIME) | EIGENVALUE<br>(RAD/TIME)**2 |
|------|------------------|-------------------------|-------------------------|-----------------------------|
| 1    | 23.179373        | 0.043142                | 0.271068                | 0.073478                    |
| 2    | 3.664747         | 0.272870                | 1.714493                | 2.939488                    |
| 3    | 1.310771         | 0.762910                | 4.793505                | 22.977692                   |
| 4    | 0.675419         | 1.480562                | 9.302646                | 86.539214                   |
| 5    | 0.507095         | 1.972017                | 12.390550               | 153.525730                  |
| 6    | 0.447609         | 2.234093                | 14.037218               | 197.043503                  |
| 7    | 0.415583         | 2.406260                | 15.118980               | 228.583564                  |
| 8    | 0.411804         | 2.428341                | 15.257718               | 232.797962                  |
| 9    | 0.368129         | 2.716441                | 17.067903               | 291.313301                  |
| 10   | 0.325478         | 3.072405                | 19.304492               | 372.663398                  |

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## MODAL PARTICIPATION FACTORS

FOR UNIT ACCELERATION LOADS IN GLOBAL COORDINATES

| MODE | PERIOD    | UX         | UY         | UZ        |
|------|-----------|------------|------------|-----------|
| 1    | 23.179373 | 5.58E-11   | -24.759664 | -3.98E-11 |
| 2    | 3.664747  | -0.000110  | -13.537659 | 4.49E-06  |
| 3    | 1.310771  | 8.21E-06   | -7.803957  | 2.38E-05  |
| 4    | 0.675419  | 0.000376   | 5.552346   | -0.004704 |
| 5    | 0.507095  | -27.988036 | -8.62E-05  | 0.713570  |
| 6    | 0.447609  | -2.737563  | 0.002671   | 0.233842  |
| 7    | 0.415583  | -0.010550  | -4.367581  | 0.005522  |
| 8    | 0.411804  | 2.838927   | -0.016332  | -0.125494 |
| 9    | 0.368129  | -2.262257  | -0.007468  | 0.681201  |
| 10   | 0.325478  | 1.542923   | -0.006884  | -0.032181 |

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## MODAL PARTICIPATING MASS RATIOS

| MODE | PERIOD    | INDIVIDUAL<br>UX | MODE (PERCENT)<br>UY | UZ     | CUMULATIVE<br>UX | SUM (PERCENT)<br>UY | UZ     |
|------|-----------|------------------|----------------------|--------|------------------|---------------------|--------|
| 1    | 23.179373 | 0.0000           | 63.5450              | 0.0000 | 0.0000           | 63.5450             | 0.0000 |
| 2    | 3.664747  | 0.0000           | 18.9968              | 0.0000 | 0.0000           | 82.5418             | 0.0000 |
| 3    | 1.310771  | 0.0000           | 6.3128               | 0.0000 | 0.0000           | 88.8546             | 0.0000 |
| 4    | 0.675419  | 0.0000           | 3.1955               | 0.0000 | 0.0000           | 92.0502             | 0.0000 |
| 5    | 0.507095  | 81.1965          | 0.0000               | 0.0530 | 81.1965          | 92.0502             | 0.0530 |
| 6    | 0.447609  | 0.7768           | 0.0000               | 0.0057 | 81.9733          | 92.0502             | 0.0587 |
| 7    | 0.415583  | 0.0000           | 1.9773               | 0.0000 | 81.9733          | 94.0275             | 0.0587 |
| 8    | 0.411804  | 0.8354           | 0.0000               | 0.0016 | 82.8087          | 94.0275             | 0.0603 |
| 9    | 0.368129  | 0.5305           | 0.0000               | 0.0483 | 83.3392          | 94.0275             | 0.1086 |
| 10   | 0.325478  | 0.2468           | 0.0000               | 0.0001 | 83.5860          | 94.0275             | 0.1087 |

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## MODAL LOAD PARTICIPATION RATIOS

| LOAD, ACC, OR NLLINK/DEF<br>(TYPE) | STATIC<br>(NAME) | STATIC<br>(PERCENT) | DYNAMIC<br>(PERCENT) | EFFECTIVE<br>PERIOD |
|------------------------------------|------------------|---------------------|----------------------|---------------------|
| LOAD                               | EST1             | 64.7823             | 2.5533               | 0.361322            |
| LOAD                               | EST2             | 73.0578             | 5.2060               | 0.383777            |
| LOAD                               | EST3             | 72.5321             | 5.0847               | 0.388276            |
| LOAD                               | EST4             | 30.1083             | 1.3773               | 0.276274            |
| LOAD                               | EST5             | 63.5604             | 2.2610               | 0.351935            |
| LOAD                               | EST6             | 72.1945             | 3.1388               | 0.380731            |
| LOAD                               | EST7             | 27.5079             | 0.9203               | 0.268062            |
| ACC                                | UX               | 98.7453             | 83.5860              | 0.502671            |
| ACC                                | UY               | 99.9993             | 94.0275              | 23.091097           |
| ACC                                | UZ               | 0.6008              | 0.1087               | 0.222289            |
| ACC                                | RX               | 0.0000              | 0.0000               | -INFINITY-          |
| ACC                                | RY               | 0.0000              | 0.0000               | -INFINITY-          |
| ACC                                | RZ               | 0.0000              | 0.0000               | -INFINITY-          |

(\*) NOTE: DYNAMIC LOAD PARTICIPATION RATIO EXCLUDES LOAD APPLIED TO NON-MASS DEGREES OF FREEDOM

## GLOBAL FORCE BALANCE

TOTAL FORCE AND MOMENT AT THE ORIGIN, IN GLOBAL COORDINATES

## LOAD EST1 -----

|         | FX        | FY       | FZ          | MX        | MY         | MZ       |
|---------|-----------|----------|-------------|-----------|------------|----------|
| APPLIED | .000000   | .000000  | -968.000000 | -4962.804 | 55727.640  | .000000  |
| INERTIA | .000000   | .000000  | .000000     | .000000   | .000000    | .000000  |
| REACTNS | -2.18E-10 | 2.59E-11 | 968.000000  | 4962.804  | -55727.640 | 5.02E-09 |
| TOTAL   | -2.18E-10 | 2.59E-11 | 6.62E-10    | 2.70E-09  | -5.19E-08  | 5.02E-09 |

## LOAD EST2 -----

|         | FX       | FY        | FZ        | MX        | MY         | MZ        |
|---------|----------|-----------|-----------|-----------|------------|-----------|
| APPLIED | .000000  | .000000   | -1008.000 | -5075.824 | 95283.240  | .000000   |
| INERTIA | .000000  | .000000   | .000000   | .000000   | .000000    | .000000   |
| REACTNS | 1.11E-10 | -5.02E-11 | 1008.000  | 5075.824  | -95283.240 | -4.65E-09 |
| TOTAL   | 1.11E-10 | -5.02E-11 | -6.57E-10 | -2.98E-09 | 5.72E-08   | -4.65E-09 |

## LOAD EST3 -----

|         | FX        | FY        | FZ        | MX        | MY          | MZ       |
|---------|-----------|-----------|-----------|-----------|-------------|----------|
| APPLIED | .000000   | .000000   | -1008.000 | -5075.824 | 137111.640  | .000000  |
| INERTIA | .000000   | .000000   | .000000   | .000000   | .000000     | .000000  |
| REACTNS | -5.15E-11 | -6.73E-12 | 1008.000  | 5075.824  | -137111.640 | 2.14E-10 |
| TOTAL   | -5.15E-11 | -6.73E-12 | 6.72E-10  | 1.63E-09  | -6.38E-08   | 2.14E-10 |

## LOAD EST4 -----

|         | FX        | FY        | FZ        | MX        | MY          | MZ        |
|---------|-----------|-----------|-----------|-----------|-------------|-----------|
| APPLIED | .000000   | .000000   | -1008.000 | -5075.824 | 114939.865  | .000000   |
| INERTIA | .000000   | .000000   | .000000   | .000000   | .000000     | .000000   |
| REACTNS | -2.14E-11 | -1.01E-11 | 1008.000  | 5075.824  | -114939.865 | -5.32E-10 |
| TOTAL   | -2.14E-11 | -1.01E-11 | 4.83E-10  | 1.82E-09  | -3.84E-08   | -5.32E-10 |

## LOAD EST5 -----

|         | FX        | FY       | FZ          | MX        | MY          | MZ       |
|---------|-----------|----------|-------------|-----------|-------------|----------|
| APPLIED | .000000   | .000000  | -972.002000 | -5028.892 | 286791.614  | .000000  |
| INERTIA | .000000   | .000000  | .000000     | .000000   | .000000     | .000000  |
| REACTNS | -8.35E-12 | 3.01E-11 | 972.002000  | 5028.892  | -286791.614 | 9.18E-09 |
| TOTAL   | -8.35E-12 | 3.01E-11 | 4.18E-10    | 2.27E-09  | -1.09E-07   | 9.18E-09 |

## LOAD EST6 -----

|         | FX       | FY       | FZ        | MX        | MY          | MZ       |
|---------|----------|----------|-----------|-----------|-------------|----------|
| APPLIED | .000000  | .000000  | -1032.002 | -5289.722 | 267462.602  | .000000  |
| INERTIA | .000000  | .000000  | .000000   | .000000   | .000000     | .000000  |
| REACTNS | 7.96E-12 | 1.32E-12 | 1032.002  | 5289.722  | -267462.602 | 1.41E-10 |
| TOTAL   | 7.96E-12 | 1.32E-12 | -5.93E-10 | -2.64E-09 | 1.61E-07    | 1.41E-10 |

## LOAD EST7 -----

|         | FX        | FY       | FZ        | MX        | MY          | MZ       |
|---------|-----------|----------|-----------|-----------|-------------|----------|
| APPLIED | .000000   | .000000  | -1032.002 | -5289.722 | 288179.396  | .000000  |
| INERTIA | .000000   | .000000  | .000000   | .000000   | .000000     | .000000  |
| REACTNS | -5.81E-12 | 1.18E-11 | 1032.002  | 5289.722  | -288179.396 | 3.51E-09 |
| TOTAL   | -5.81E-12 | 1.18E-11 | 3.71E-11  | -3.85E-10 | 1.75E-09    | 3.51E-09 |

## MODE 1 -----

|         | FX        | FY        | FZ        | MX        | MY        | MZ          |
|---------|-----------|-----------|-----------|-----------|-----------|-------------|
| APPLIED | .000000   | .000000   | .000000   | .000000   | .000000   | .000000     |
| INERTIA | 4.10E-12  | -1.819287 | -2.93E-12 | -0.648749 | 4.39E-10  | -465.427421 |
| REACTNS | -1.66E-08 | 1.819287  | 2.09E-08  | 0.648749  | -3.25E-06 | 465.427421  |
| TOTAL   | -1.66E-08 | -1.16E-08 | 2.09E-08  | 7.85E-08  | -3.25E-06 | 2.92E-07    |

## MODE 2 -----

|         | FX        | FY         | FZ        | MX         | MY        | MZ        |
|---------|-----------|------------|-----------|------------|-----------|-----------|
| APPLIED | .000000   | .000000    | .000000   | .000000    | .000000   | .000000   |
| INERTIA | -0.000324 | -39.793782 | 1.32E-05  | -14.859622 | -0.000159 | -2556.535 |
| REACTNS | 0.017614  | 39.794138  | -0.000965 | 14.856972  | -0.033789 | 2556.454  |
| TOTAL   | 0.017290  | 0.000357   | -0.000952 | -0.002650  | -0.033949 | -0.080741 |

## MODE 3 -----

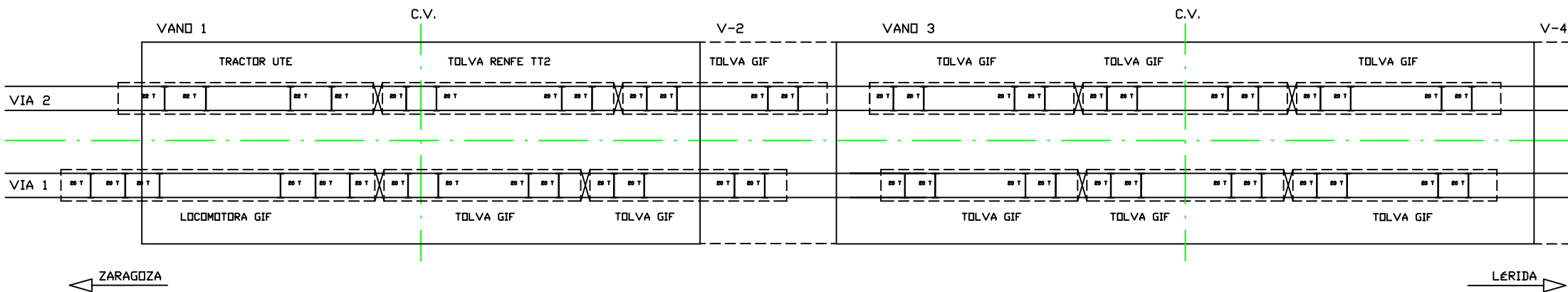
|         | FX       | FY          | FZ        | MX         | MY        | MZ        |
|---------|----------|-------------|-----------|------------|-----------|-----------|
| APPLIED | .000000  | .000000     | .000000   | .000000    | .000000   | .000000   |
| INERTIA | 0.000189 | -179.316921 | 0.000547  | -76.383550 | -0.093647 | -6361.769 |
| REACTNS | 0.003201 | 179.326065  | -0.015414 | 76.298730  | 2.671370  | 6361.909  |
| TOTAL   | 0.003389 | 0.009144    | -0.014868 | -0.084821  | 2.577723  | 0.140594  |

## MODE 4 -----

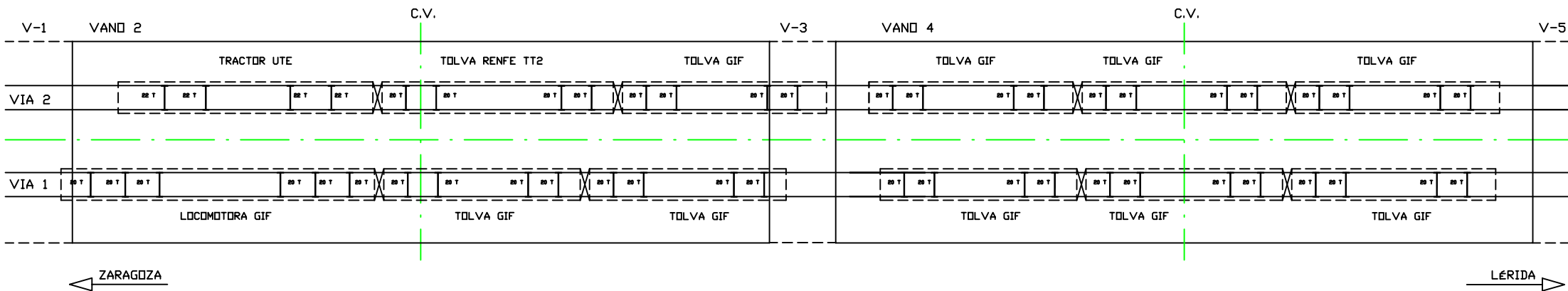
|         |             |             |             |             |             |            |
|---------|-------------|-------------|-------------|-------------|-------------|------------|
|         | FX          | FY          | FZ          | MX          | MY          | MZ         |
| APPLIED | .000000     | .000000     | .000000     | .000000     | .000000     | .000000    |
| INERTIA | 0.032560    | 480.495664  | -0.407097   | 228.313708  | 71.858380   | 11060.038  |
| REACTNS | 0.102055    | -480.577523 | 3.864318    | -211.263108 | -686.560801 | -11063.367 |
| TOTAL   | 0.134616    | -0.081859   | 3.457221    | 17.050600   | -614.702421 | -3.329002  |
| MODE    | 5           | -----       |             |             |             |            |
|         | FX          | FY          | FZ          | MX          | MY          | MZ         |
| APPLIED | .000000     | .000000     | .000000     | .000000     | .000000     | .000000    |
| INERTIA | -4296.884   | -0.013231   | 109.551286  | 559.635017  | 2061.710    | 21948.105  |
| REACTNS | 4296.787    | -0.032084   | -106.481173 | -544.307733 | -2613.322   | -21948.352 |
| TOTAL   | -0.096887   | -0.045316   | 3.070113    | 15.327284   | -551.612593 | -0.246805  |
| MODE    | 6           | -----       |             |             |             |            |
|         | FX          | FY          | FZ          | MX          | MY          | MZ         |
| APPLIED | .000000     | .000000     | .000000     | .000000     | .000000     | .000000    |
| INERTIA | -539.419090 | 0.526273    | 46.076953   | 235.553271  | -4734.795   | 2764.796   |
| REACTNS | 540.911337  | -0.521199   | -46.181555  | -235.735278 | 4813.262    | -2772.111  |
| TOTAL   | 1.492247    | 0.005074    | -0.104603   | -0.182008   | 78.467027   | -7.314742  |
| MODE    | 7           | -----       |             |             |             |            |
|         | FX          | FY          | FZ          | MX          | MY          | MZ         |
| APPLIED | .000000     | .000000     | .000000     | .000000     | .000000     | .000000    |
| INERTIA | -2.411463   | -998.357196 | 1.262267    | -479.067088 | -160.007786 | -16186.733 |
| REACTNS | 9.263273    | 999.964768  | 7.996937    | 527.252120  | -1321.078   | 16164.588  |
| TOTAL   | 6.851810    | 1.607572    | 9.259204    | 48.185032   | -1481.085   | -22.145111 |
| MODE    | 8           | -----       |             |             |             |            |
|         | FX          | FY          | FZ          | MX          | MY          | MZ         |
| APPLIED | .000000     | .000000     | .000000     | .000000     | .000000     | .000000    |
| INERTIA | 660.896367  | -3.802141   | -29.214723  | -150.867016 | -6494.620   | -3444.129  |
| REACTNS | -662.376938 | 2.860085    | 31.259276   | 159.902684  | 5862.758    | 3435.176   |
| TOTAL   | -1.480571   | -0.942056   | 2.044553    | 9.035667    | -631.862302 | -8.952387  |
| MODE    | 9           | -----       |             |             |             |            |
|         | FX          | FY          | FZ          | MX          | MY          | MZ         |
| APPLIED | .000000     | .000000     | .000000     | .000000     | .000000     | .000000    |
| INERTIA | -659.025693 | -2.175434   | 198.442912  | 1010.994    | -28890.007  | 3330.084   |
| REACTNS | 652.740788  | 1.035733    | -198.757177 | -1009.127   | 28738.919   | -3310.759  |
| TOTAL   | -6.284905   | -1.139700   | -0.314265   | 1.866625    | -151.088243 | 19.325333  |
| MODE    | 10          | -----       |             |             |             |            |
|         | FX          | FY          | FZ          | MX          | MY          | MZ         |
| APPLIED | .000000     | .000000     | .000000     | .000000     | .000000     | .000000    |
| INERTIA | 574.991007  | -2.565303   | -11.992724  | -66.018002  | -38954.916  | -2979.924  |
| REACTNS | -569.430050 | 1.487559    | 11.491236   | 70.010790   | 39031.629   | 2932.059   |
| TOTAL   | 5.560958    | -1.077744   | -0.501488   | 3.992788    | 76.713774   | -47.864982 |

**ANEJO 2C: TREN DE CARGAS Y SITUACIÓN DE LOS  
APARATOS DE MEDIDA**

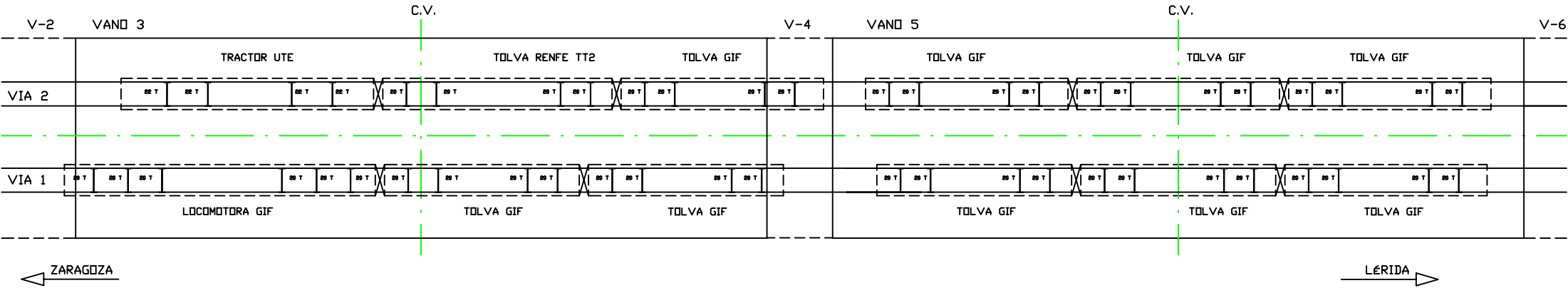
VIADUCTO VALL DEL GALLO (O.F. 616-3). SUBTRAMO VI DEL TRAMO ZARAGOZA-LÉRIDA  
LINEA ALTA VELOCIDAD MADRID - BARCELONA - F. FRANCESA  
DISPOSICION DEL TREN DE CARGAS. ENSAYO ESTATICO 1.



VIADUCTO VALL DEL GALLO (O.F. 616-3). SUBTRAMO VI DEL TRAMO ZARAGOZA-LÉRIDA  
LINEA ALTA VELOCIDAD MADRID - BARCELONA - F. FRANCESA  
DISPOSICION DEL TREN DE CARGAS. ENSAYO ESTATICO 2.

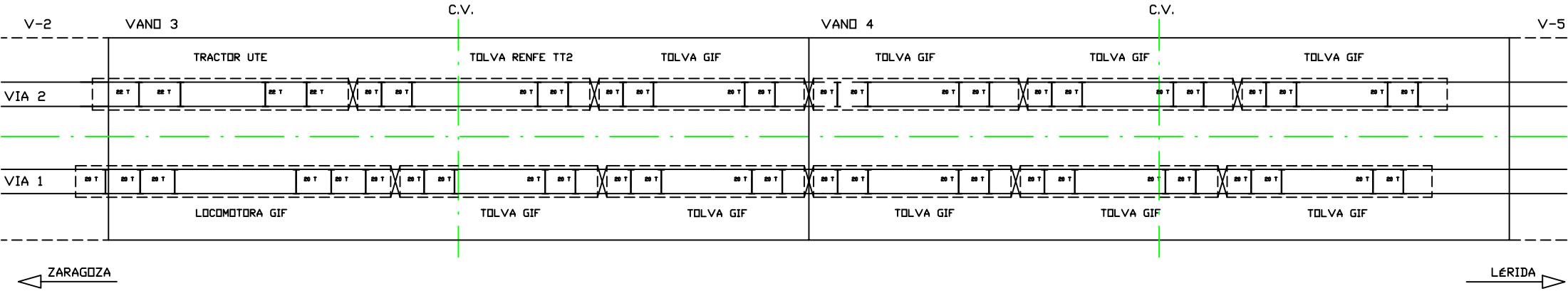


VIADUCTO VALL DEL GALLO (O.F. 616-3). SUBTRAMO VI DEL TRAMO ZARAGOZA-LÉRIDA  
LINEA ALTA VELOCIDAD MADRID - BARCELONA - F. FRANCESA  
DISPOSICION DEL TREN DE CARGAS. ENSAYO ESTATICO 3.





VIADUCTO VALL DEL GALLO (O.F. 616-3). SUBTRAMO VI DEL TRAMO ZARAGOZA-LÉRIDA  
LINEA ALTA VELOCIDAD MADRID - BARCELONA - F. FRANCESA  
DISPOSICION DEL TREN DE CARGAS. ENSAYO ESTATICO 4.



VIADUCTO VALL DEL GALLO (O.F. 616-3). SUBTRAMO VI DEL TRAMO ZARAGOZA-LÉRIDA  
LINEA ALTA VELOCIDAD MADRID - BARCELONA - F. FRANCESA  
DISPOSICION DEL TREN DE CARGAS. ENSAYO ESTATICO 5

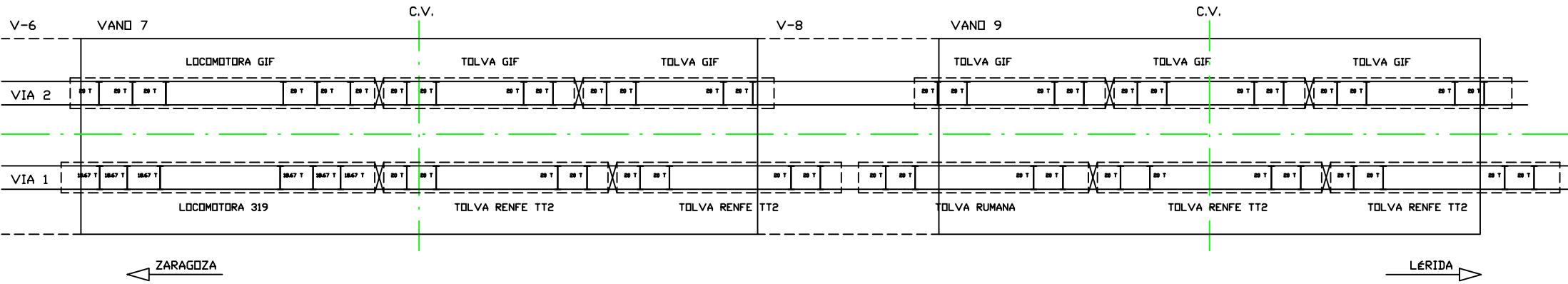
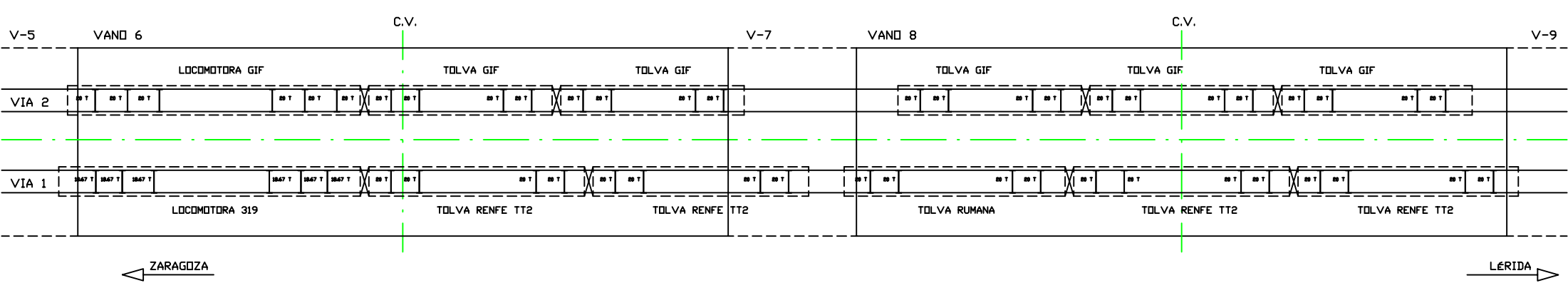
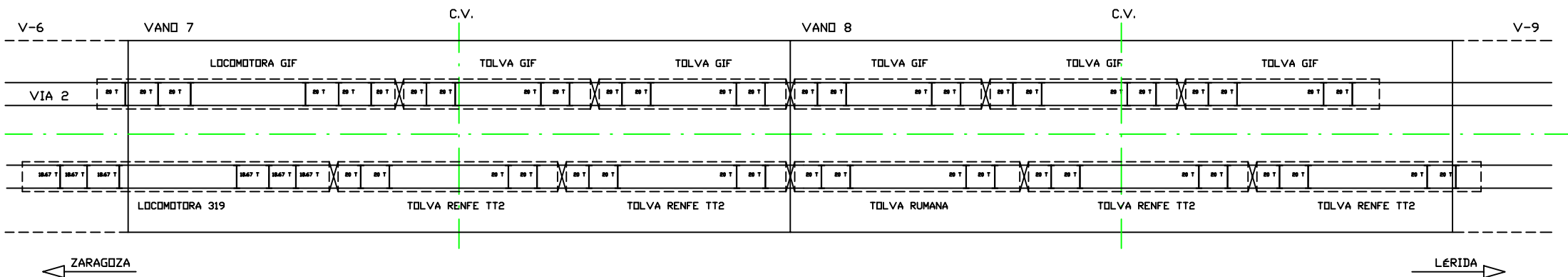


Diagrama de la configuración de vías y trenes en la estación de Llerida. Se muestran las vías V-5, V-6, V-7, V-8 y V-9, con los trenes Locomotora GIF, Tolva GIF, Locomotora 319, Tolva Renfe TT2 y Tolva Rumana. Se indican las direcciones Zaragoza y Llerida.



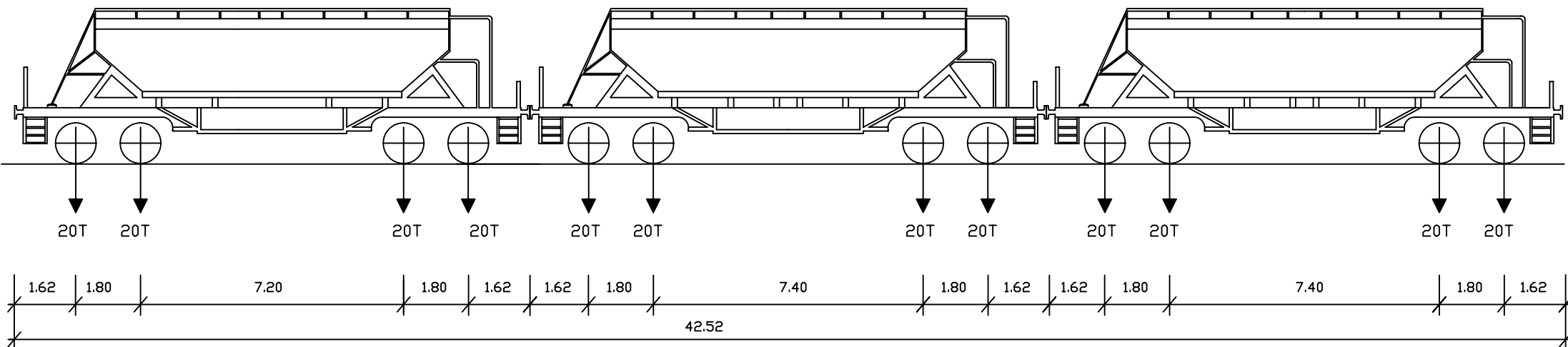
VIADUCTO VALL DEL GALLO (O.F. 616-3). SUBTRAMO VI DEL TRAMO ZARAGOZA-LÉRIDA  
LINEA ALTA VELOCIDAD MADRID - BARCELONA - F. FRANCESA  
DISPOSICION DEL TREN DE CARGAS. ENSAYO ESTATICO 7.



TOLVA RUMANA

TOLVA RENFE TT2

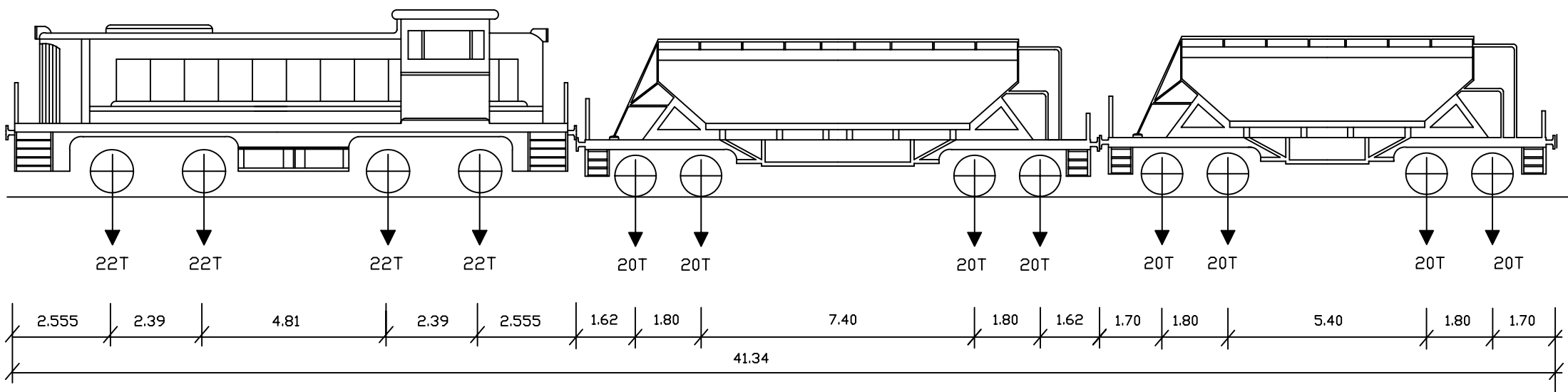
TOLVA RENFE TT2



TRACTOR U.T.E.

TOLVA RENFE TT2

TOLVA GIF

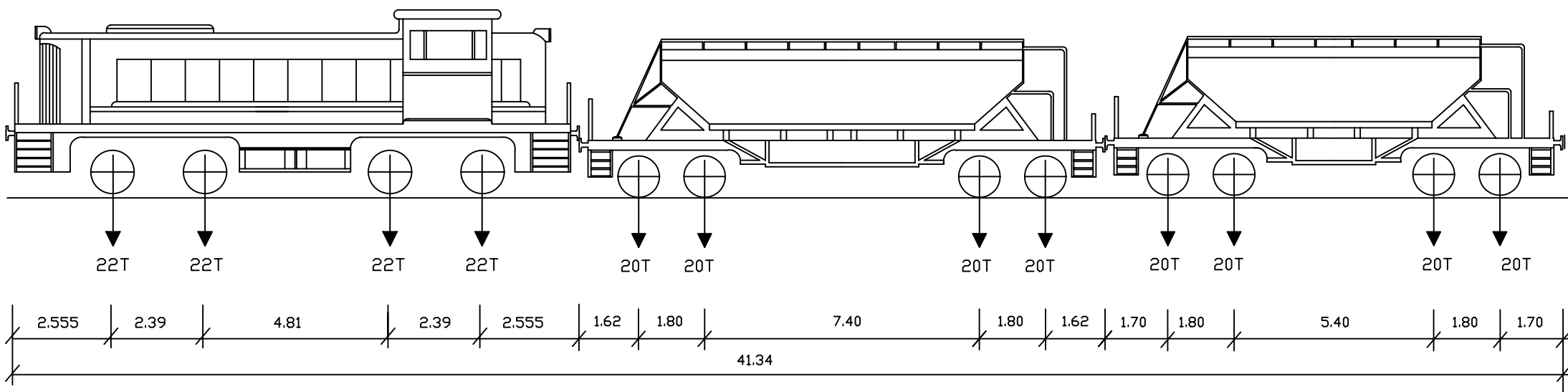


\* Longitudes en metros

TRACTOR U.T.E.

TOLVA RENFE TT2

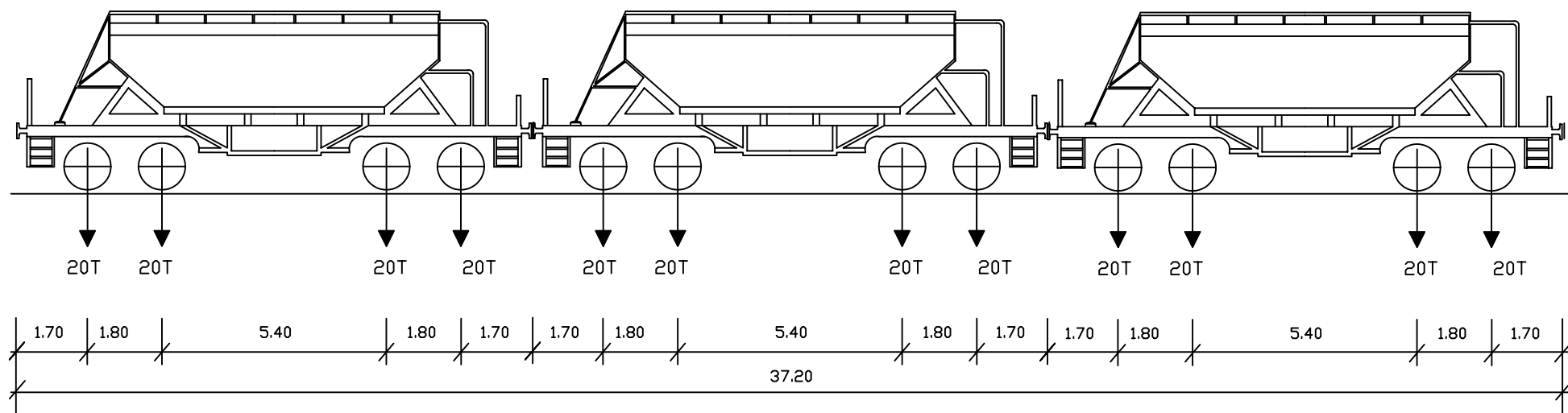
TOLVA GIF



TOLVA GIF

TOLVA GIF

TOLVA GIF

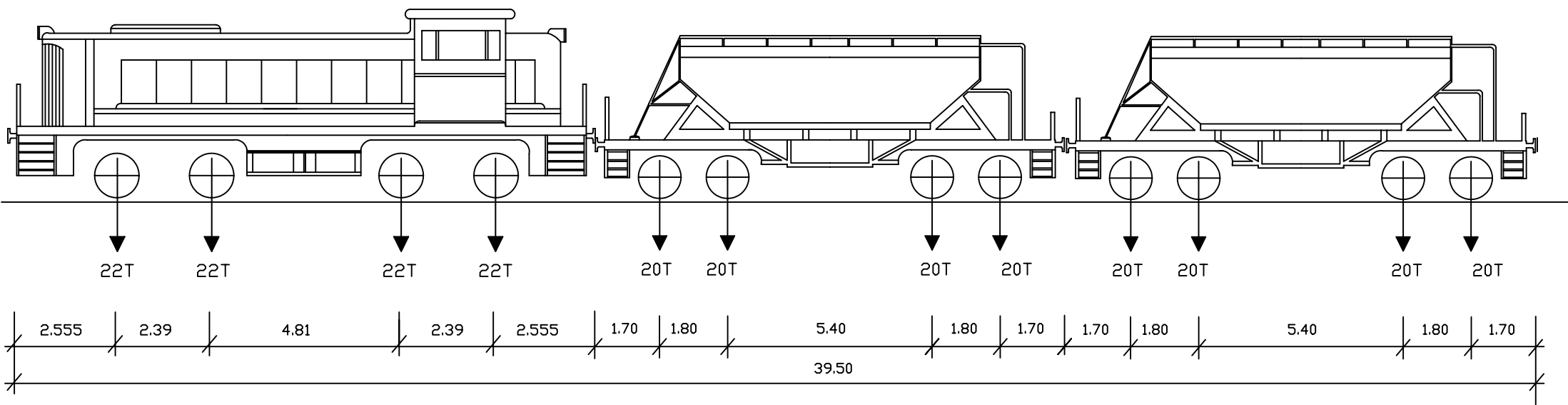


\* Longitudes en metros

TRACTOR U.T.E.

TOLVA GIF

TOLVA GIF



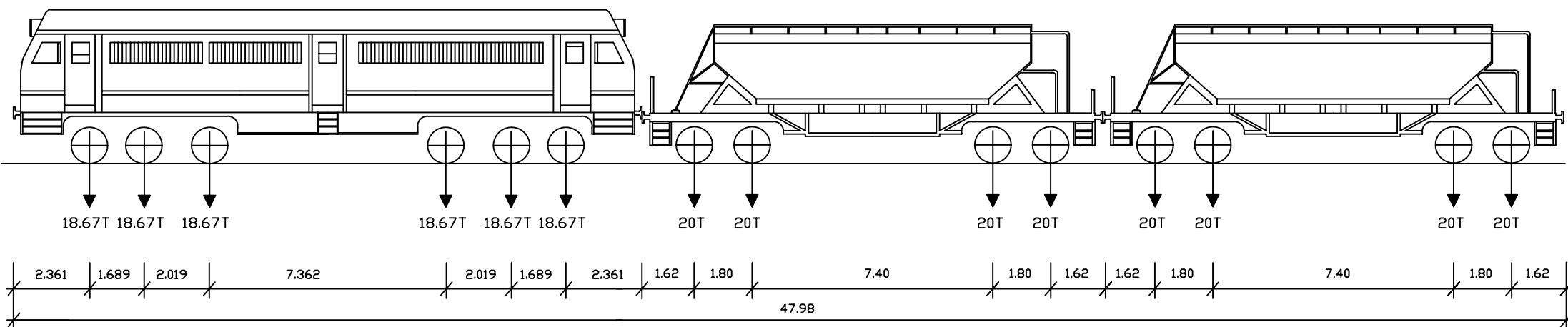
\* Longitudes en metros



LOCOMOTORA 319

TOLVA RENFE TT2

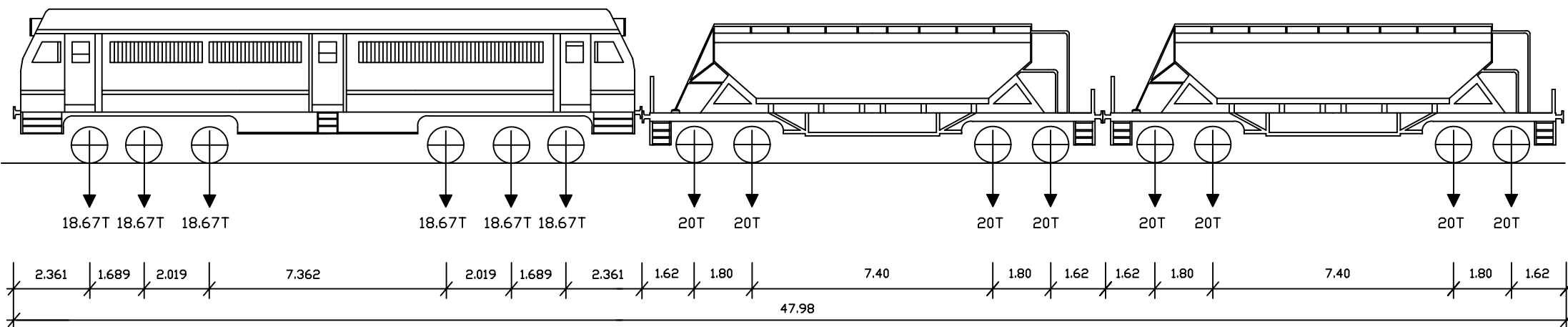
TOLVA RENFE TT2



LOCOMOTORA 319

TOLVA RENFE TT2

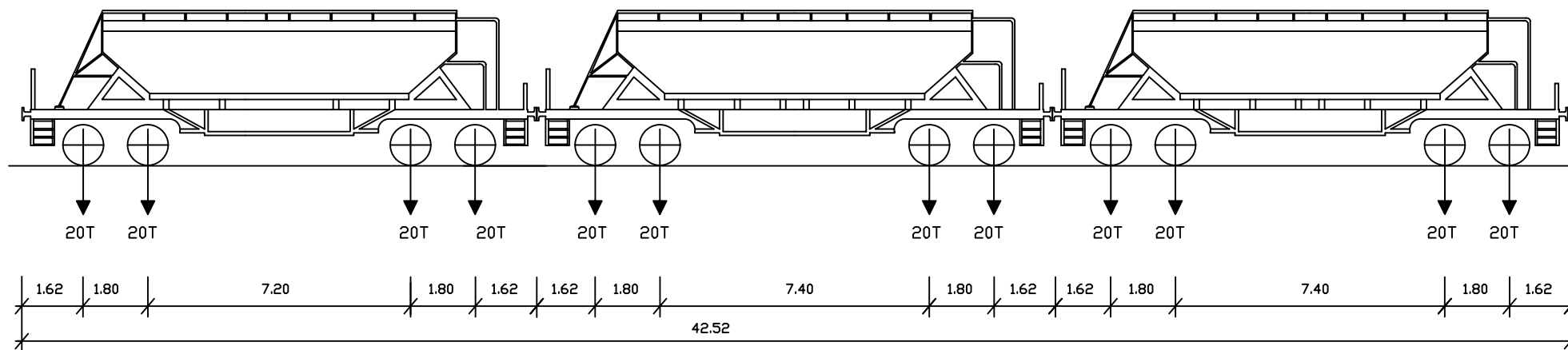
TOLVA RENFE TT2



TOLVA RUMANA

TOLVA RENFE TT2

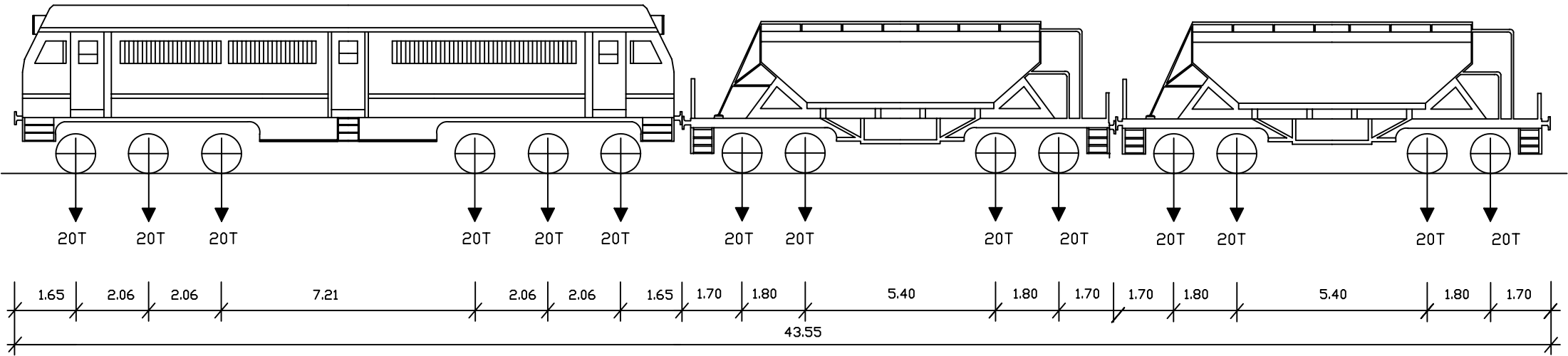
TOLVA RENFE TT2



LOCOMOTORA GIF

TOLVA GIF

TOLVA GIF

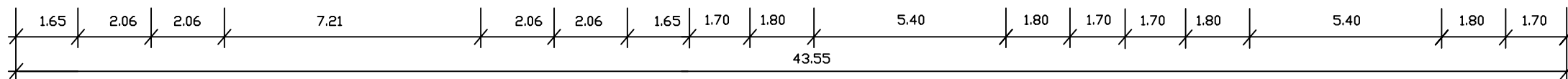


\* Longitudes en metros

A side-view diagram of a double-decker train. The train has two levels. The lower level has three sets of wheels, and the upper level has three sets of wheels. Below each set of wheels, there is a downward-pointing arrow and the text '20T', indicating the axle load for each of the six axles.

Diagram illustrating a truck chassis with four wheels. Each wheel is represented by a circle with a cross inside. Below each wheel is a downward-pointing arrow and the label "20T", indicating a 20-ton load per wheel.

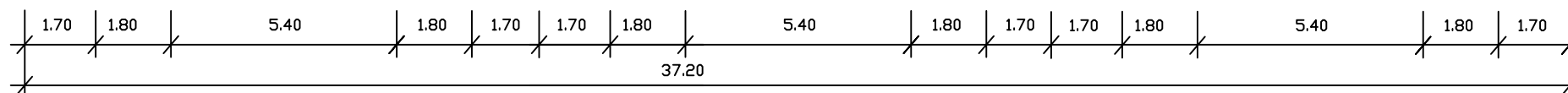
A side-view schematic of a four-axle rail wagon. The wagon has a large, rectangular body with a slightly tapered roof. It is supported by four wheels, each represented by a circle with a crosshair. Below each wheel, a downward-pointing arrow is labeled '20T', indicating the load capacity per axle. The wagon is shown on a horizontal track line. At each end of the wagon, there are small rectangular structures representing couplers or buffers.



A diagram of a truck chassis from a top-down perspective. It shows a central rectangular body with various structural components. Below the chassis, four wheels are represented by circles with a crosshair. Each wheel has a downward-pointing arrow and the label '20T' underneath it, indicating a load of 20 tons per wheel.

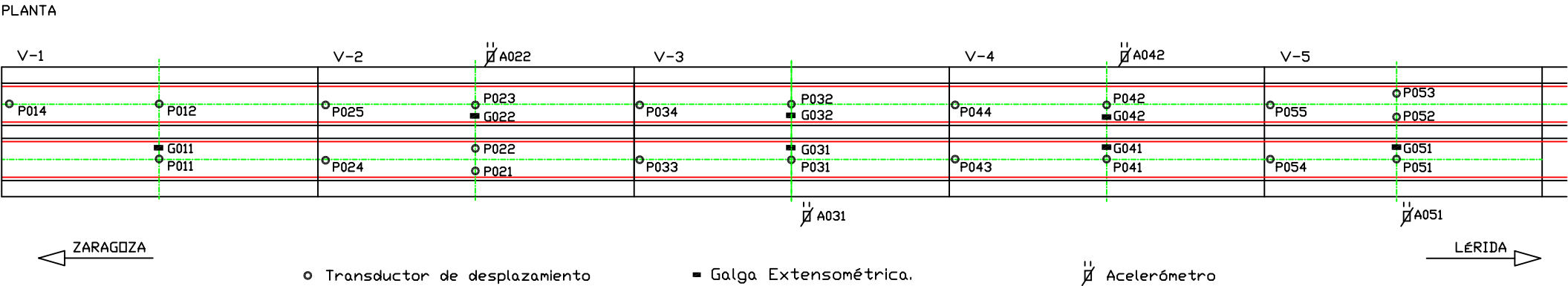
Diagram illustrating a truck chassis with four wheels. Each wheel is represented by a circle with a crosshair. Below each wheel is a downward-pointing arrow and the label "20T", indicating a 20-ton load per wheel.

A side-view schematic of a truck. The truck has a large rectangular body. Below the body, there are four circular wheels. The first wheel on the left is labeled '20T' with a downward arrow. The second wheel is labeled '20T' with a downward arrow. The third wheel is labeled '20T' with a downward arrow. The fourth wheel on the right is labeled '20T' with a downward arrow. The truck body is labeled '20T' on the left side and '20T' on the right side. The truck is shown from a side profile.

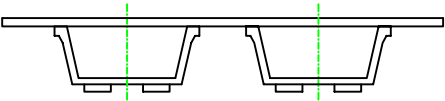


\* Longitudes en metros

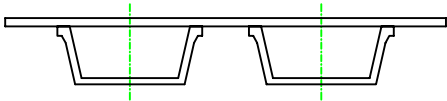
VIADUCTO VALL DEL GALLO (O.F. 616-3). SUBTRAMO VI DEL TRAMO ZARAGOZA-LÉRIDA  
LINEA ALTA VELOCIDAD MADRID - BARCELONA - F. FRANCESA  
DISPOSICION DE LA INSTRUMENTACION, VANOS : 1 - 2 - 3 - 4 - 5



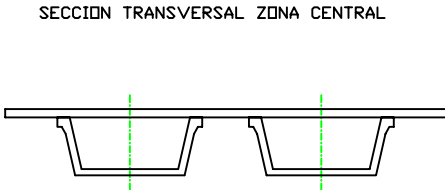
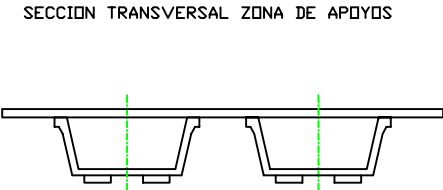
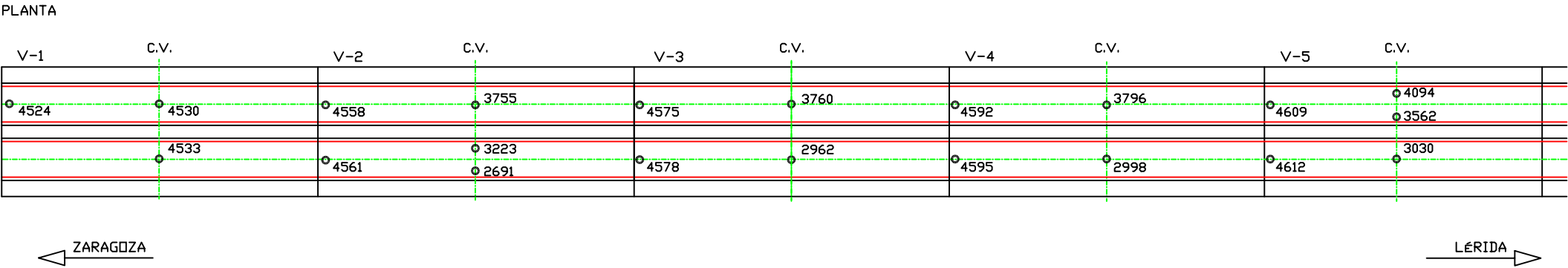
SECCION TRANSVERSAL ZONA DE APOYOS



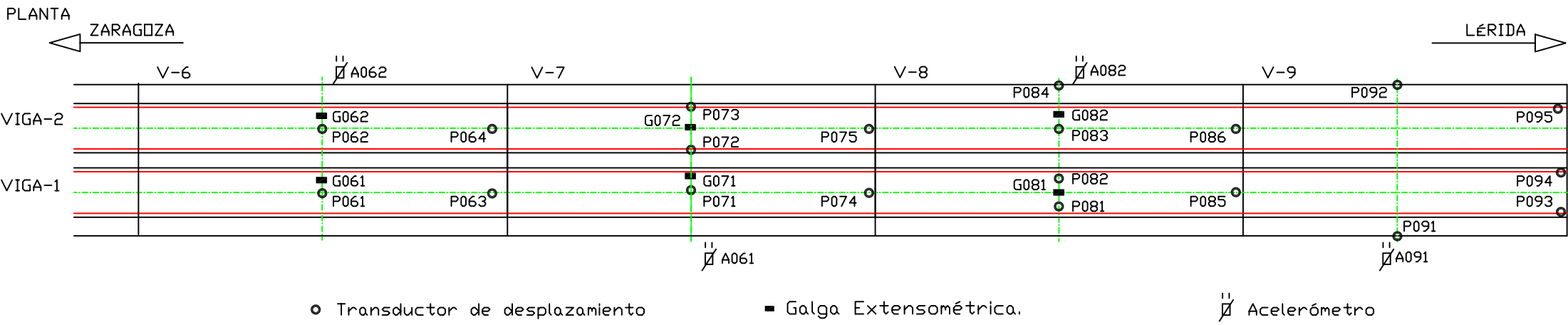
SECCION TRANSVERSAL ZONA CENTRAL



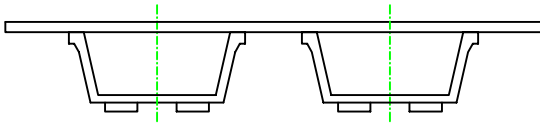
VIADUCTO VALL DEL GALLO (O.F. 616-3). SUBTRAMO VI DEL TRAMO ZARAGOZA-LÉRIDA  
LINEA ALTA VELOCIDAD MADRID - BARCELONA - F. FRANCESA  
NODOS DEL MODELO SAP-2000 CORRESPONDIENTES A LA INSTRUMENTACION DISPUESTA  
VANOS : 1 - 2 - 3 - 4 - 5



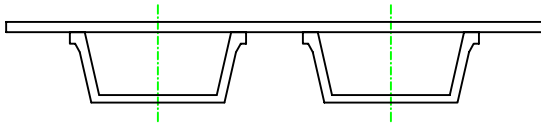
VIADUCTO VALL DEL GALLO (O.F. 616-3). SUBTRAMO VI DEL TRAMO ZARAGOZA-LÉRIDA  
LINEA ALTA VELOCIDAD MADRID - BARCELONA - F. FRANCESA  
DISPOSICION DE LA INSTRUMENTACION, VANDOS : 6 - 7 - 8 - 9



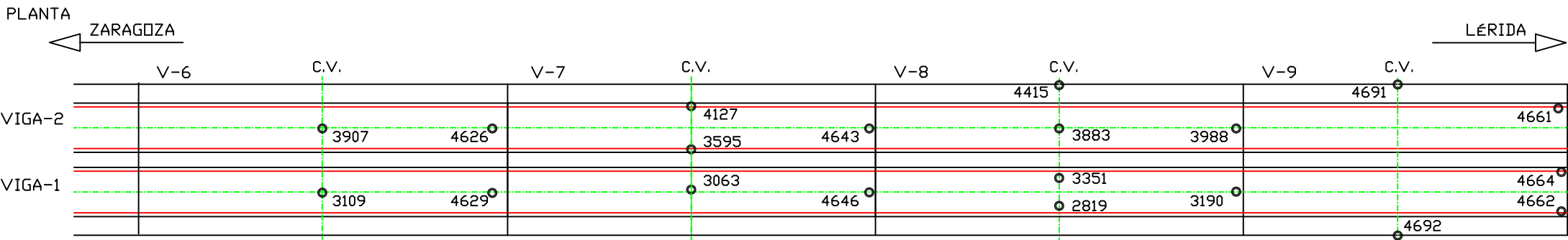
SECCION TRANSVERSAL ZONA DE APOYOS



SECCION TRANSVERSAL ZONA CENTRAL

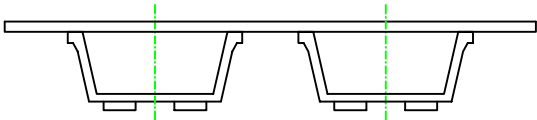


# VIADUCTO VALL DEL GALLO (O.F. 616-3). SUBTRAMO VI DEL TRAMO ZARAGOZA-LÉRIDA LINEA ALTA VELOCIDAD MADRID - BARCELONA - F. FRANCESA NODOS DEL MODELO SAP - 2000 CORRESPONDIENTES A LA INSTRUMENTACION DISPUESTA VANDOS : 6 - 7 - 8 - 9

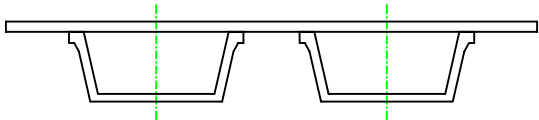


● Numero de Nodo correspondiente al modelo realizado en SAP - 2000

SECCION TRANSVERSAL ZONA DE APOYOS



SECCION TRANSVERSAL ZONA CENTRAL

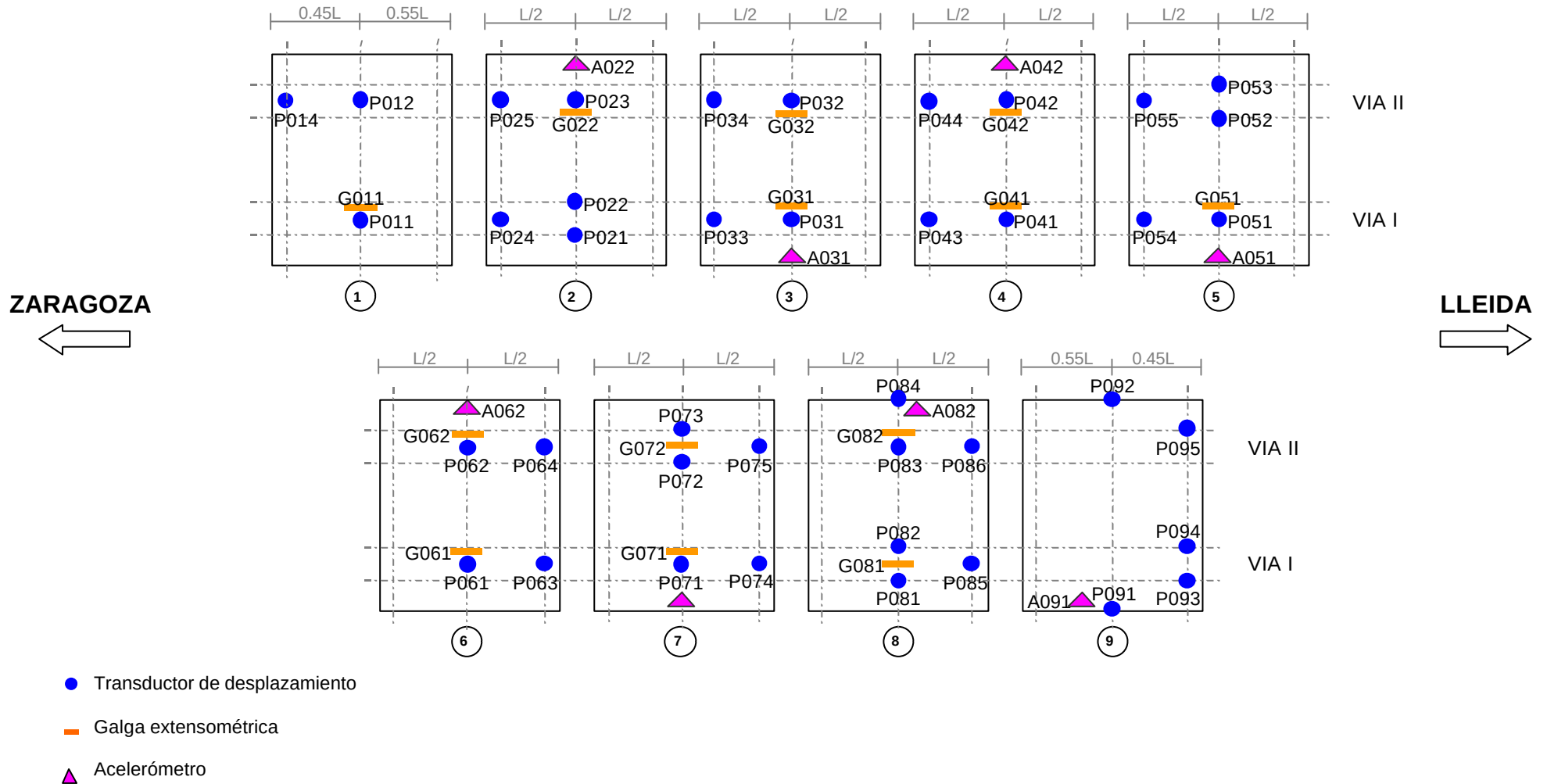




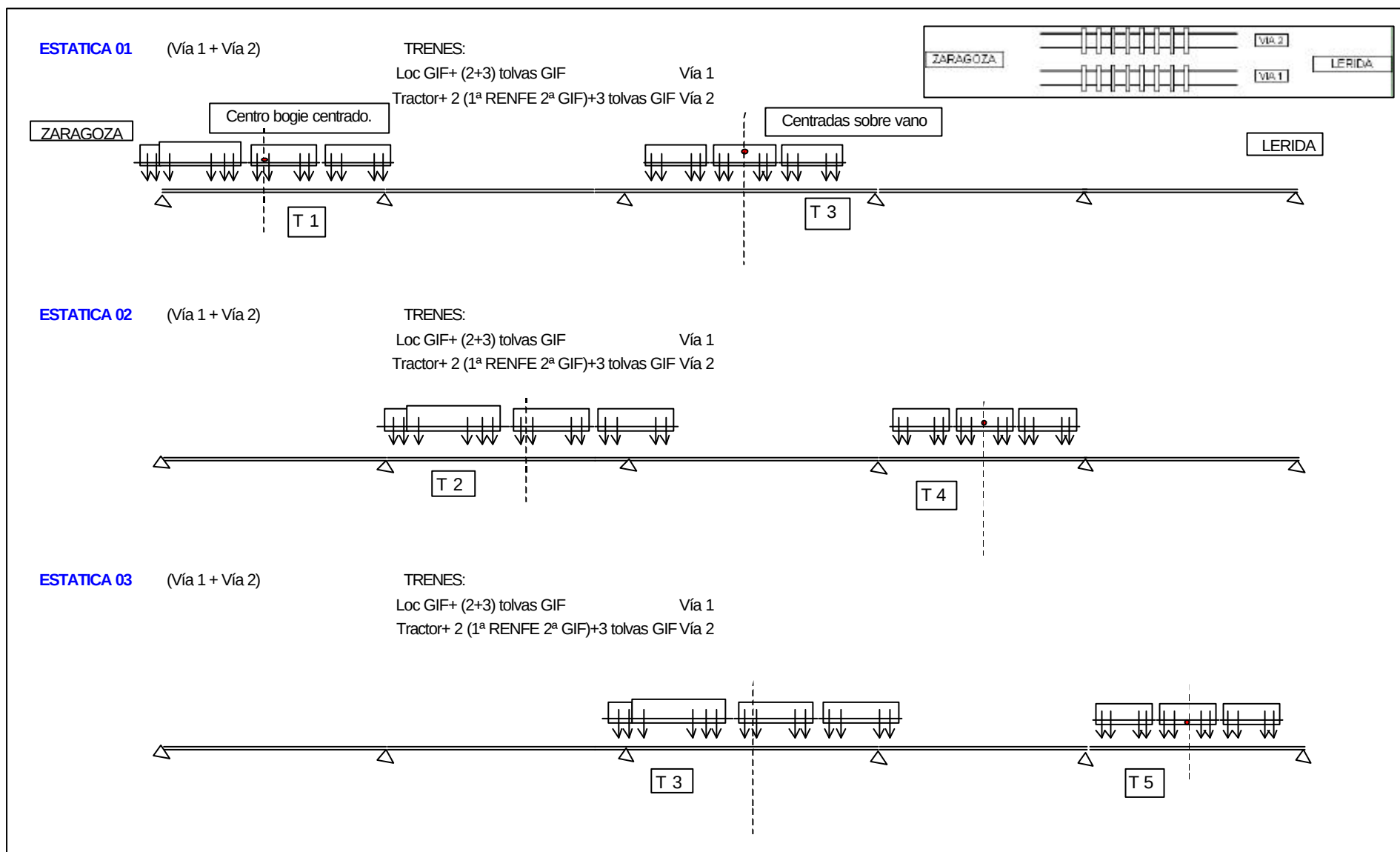
## **ANEJO 3: ESQUEMA DE INSTRUMENTACIÓN Y TREN DE CARGA**

Madrid, Octubre de 2001

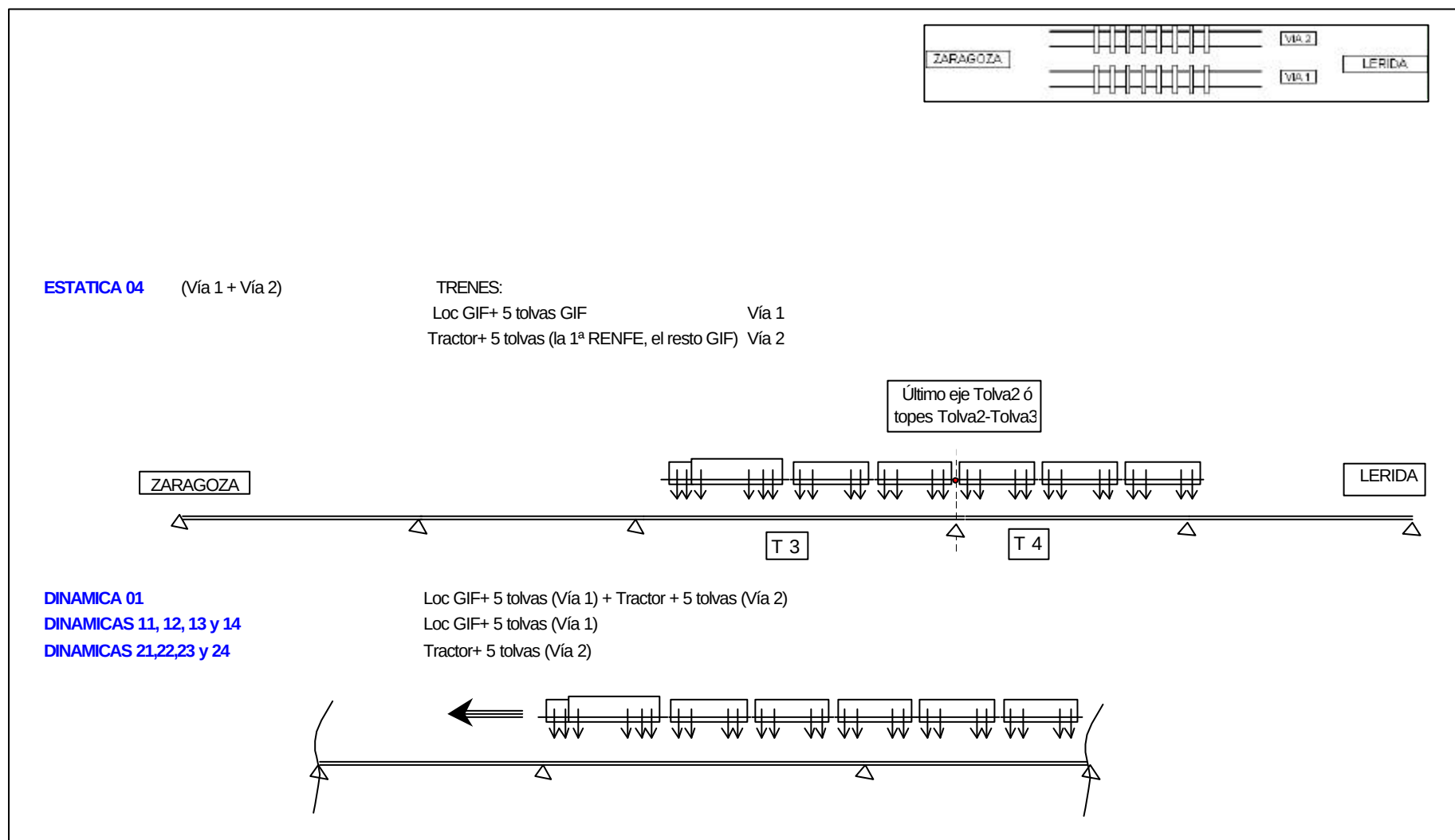
# VIADUCTO DEL GALLO REF: 29VI02 (P.K. 81/580)



# Croquis de la disposición de cargas en vanos 1-2-3-4-5



# Croquis de la disposición de cargas en vanos 1-2-3-4-5 (continuación)



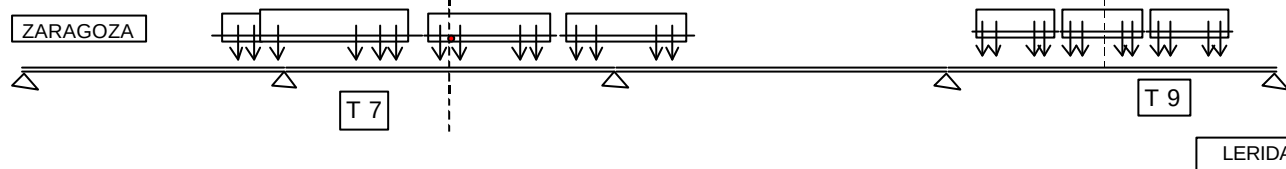
# Croquis de la disposición de cargas en vanos 6-7-8-9

## ESTATICA 01

(Vía 1 + Vía 2)

Centro bogie centrado.

Centradas sobre vano



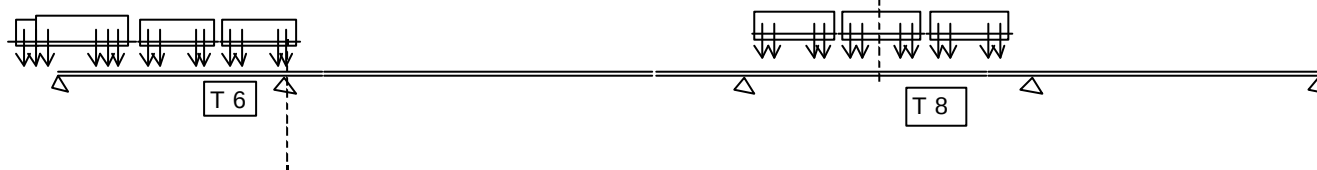
TRENES:

Loc 319+ 2 (RENFE)+3 (1ª rumana, resto RENFE) tolvas Vía 1  
Loc GIF+ (2+3) tolvas GIF Vía 2

## ESTATICA 02

(Vía 1 + Vía 2)

Último eje sobre pila.



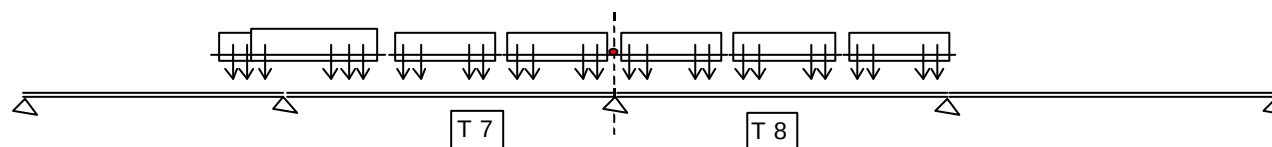
TRENES:

Loc 319+ 2 (RENFE)+3 (1ª rumana, resto RENFE) tolvas Vía 1  
Loc GIF+ (2+3) tolvas GIF Vía 2

## ESTATICA 03

(Vía 1 + Vía 2)

Último eje tolva2 ó topes Tolva2-Tolva3



TRENES:

Loc 319+ 5 tolvas (la 3ª rumana, resto RENFE) Vía 1  
Loc GIF+ 5 tolvas GIF Vía 2

## DINAMICA 01

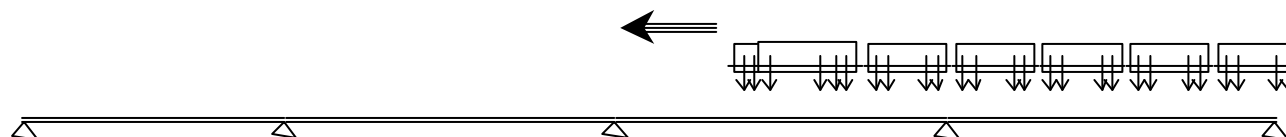
## DINAMICAS 11, 12, 13 y 14

## DINAMICAS 21,22,23 y 24

Loc GIF+ 5 tolvas (Vía 1) + Tractor + 5 tolvas (Vía 2)

Loc GIF+ 5 tolvas (Vía 1)

Tractor+ 5 tolvas (Vía 2)



## **ANEJO 4: REGISTRO DE MEDIDAS**

Madrid, Octubre de 2001

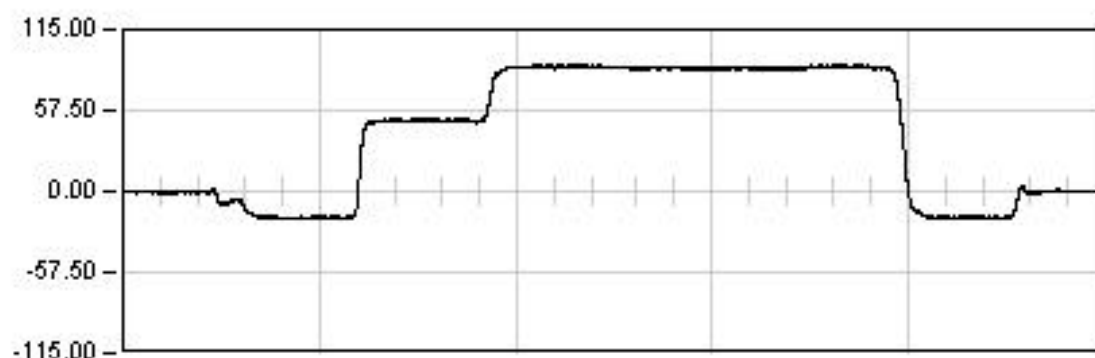
## **REGISTRO MEDIDAS VANOS 1-5**

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G011

Canal : 00

Unidades :  $\mu E$ **ESTATICA 01**

1809.0 Seg

Est: 88.41

Max: 89.69

Min: -19.85

Rem: 0.02

**ESTATICA 02**

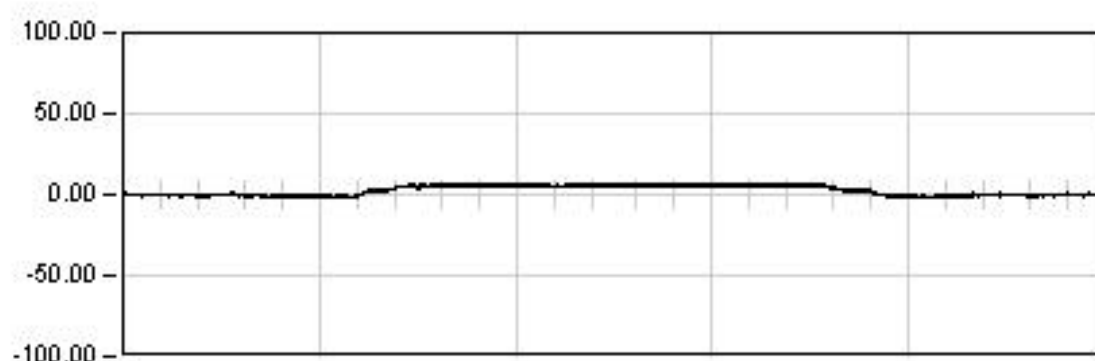
1690.0 Seg

Est: -25.36

Max: -26.77

Min: 5.06

Rem: 0.17

**ESTATICA 03**

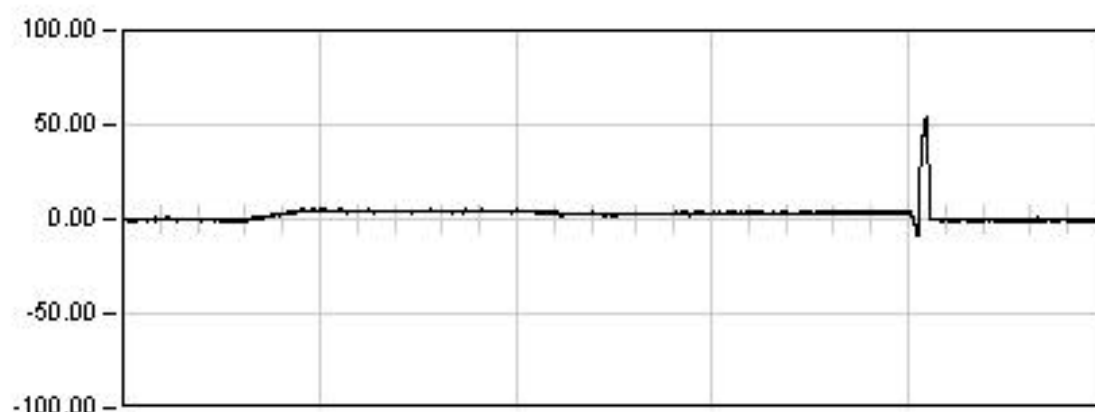
1519.0 Seg

Est: 5.85

Max: 7.13

Min: -2.45

Rem: 0.14

**ESTATICA 04**

1254.0 Seg

Est: 3.30

Max: 54.07

Min: -8.79

Rem: -0.45



## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G011

Canal : 00

Unidades :  $\mu E$ **DYNAMICA 11**

127.5 Seg

Max: 52.50

Min: -12.00

Rem: -0.86

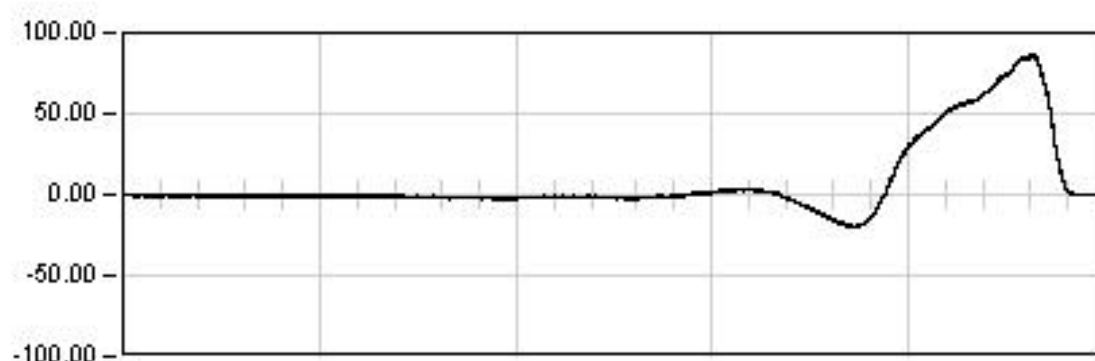
**DYNAMICA 21**

207.5 Seg

Max: 33.19

Min: -10.24

Rem: 0.09

**DYNAMICA 01**

234.0 Seg

Max: 86.48

Min: -20.25

Rem: -0.58

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G011

Canal : 00

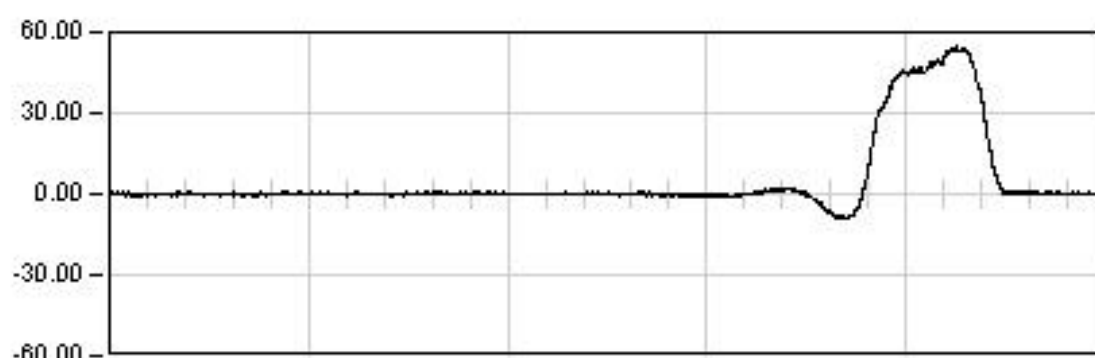
Unidades :  $\mu E$ **DINAMICA 11**

127.5 Seg

Max: 52.50

Min: -12.00

Rem: -0.86

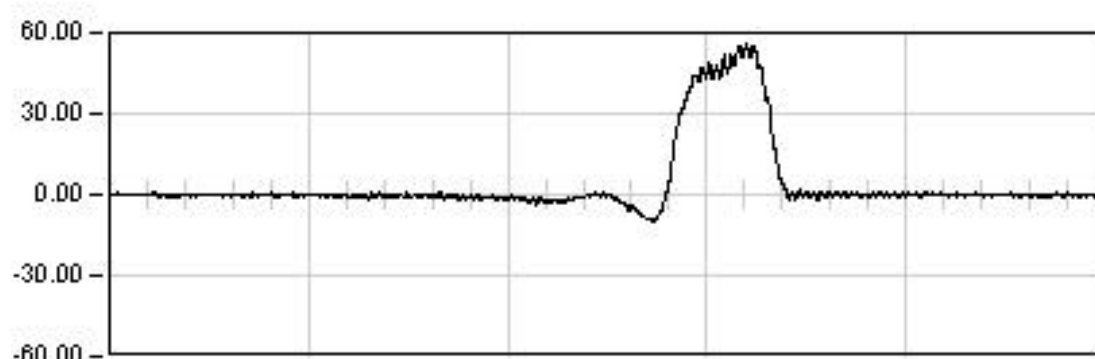
**DINAMICA 12**

52.5 Seg

Max: 54.56

Min: -9.50

Rem: 0.07

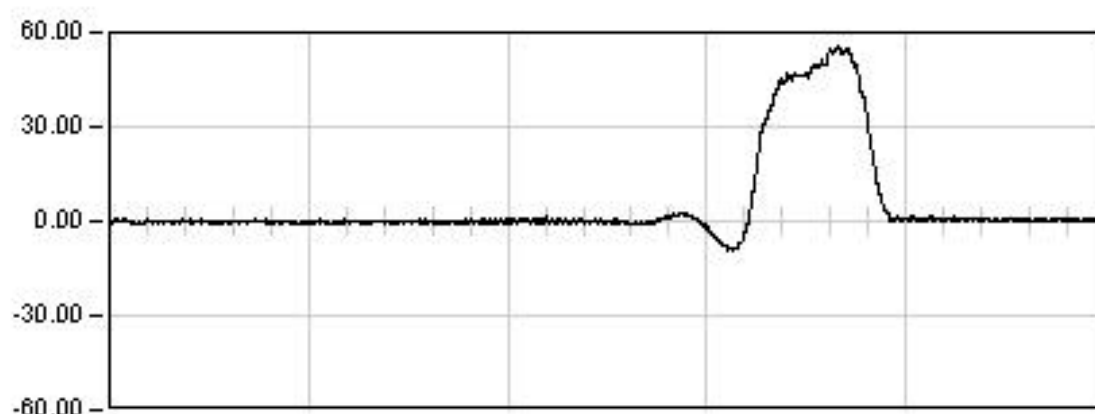
**DINAMICA 13**

37.5 Seg

Max: 55.69

Min: -9.88

Rem: -0.10

**DINAMICA 14**

41.5 Seg

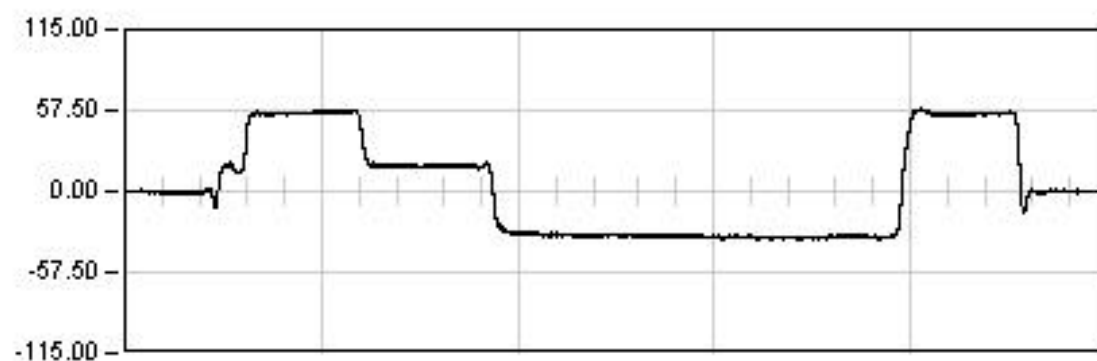
Max: 55.72

Min: -9.18

Rem: 0.33

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G022      Canal : 01      Unidades :  $\mu E$ **ESTATICA 01**

1809.0    Seg

Est:    -31.76

Max:    58.88

Min:    -34.18

Rem:    0.03

**ESTATICA 02**

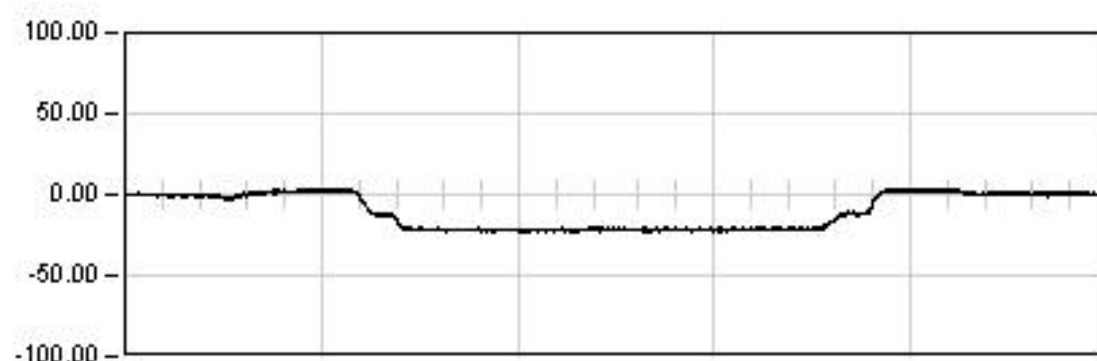
1690.0    Seg

Est:    83.94

Max:    85.66

Min:    -17.88

Rem:    -0.07

**ESTATICA 03**

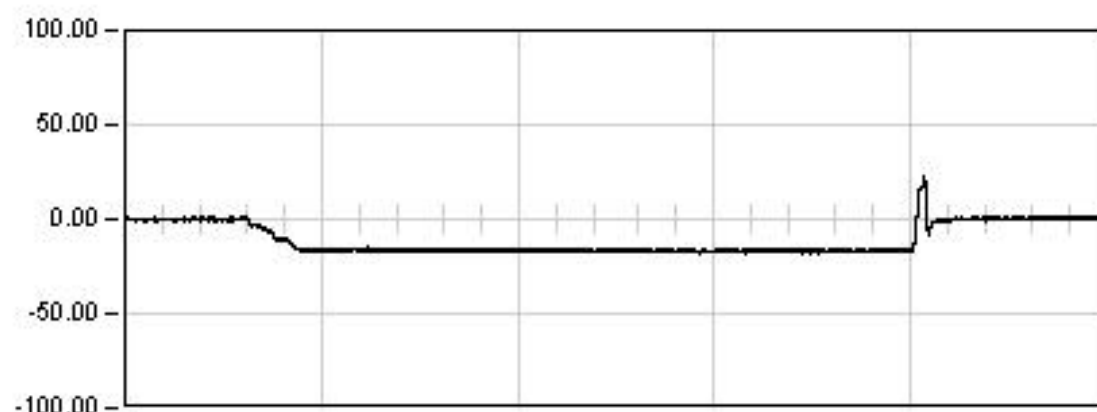
1519.0    Seg

Est:    -21.49

Max:    -23.72

Min:    3.78

Rem:    0.42

**ESTATICA 04**

1254.0    Seg

Est:    -16.90

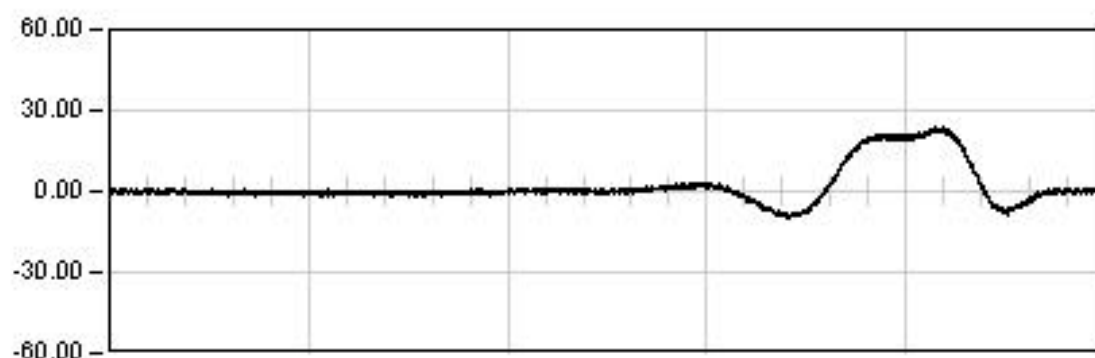
Max:    22.21

Min:    -17.94

Rem:    0.50

## VIADUCTO DEL GALLO

P.K. 81/580

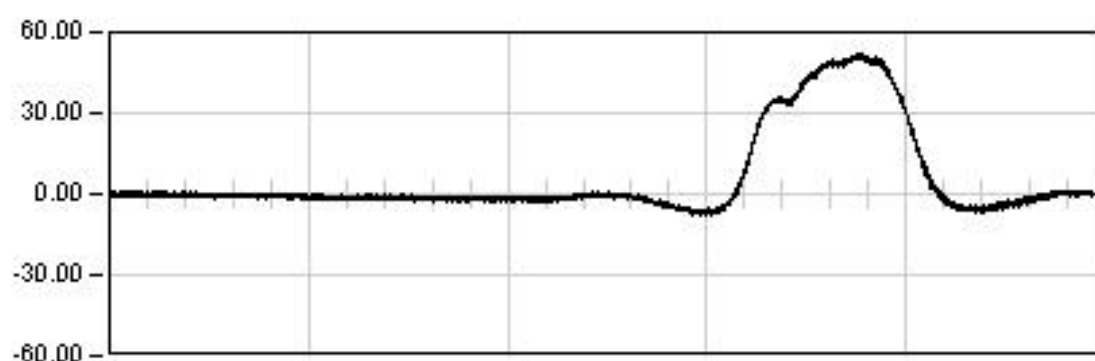
Punto : G022      Canal : 01      Unidades :  $\mu E$ **DYNAMICA 11**

127.5    Seg

Max:    23.72

Min:    -10.10

Rem:    0.04

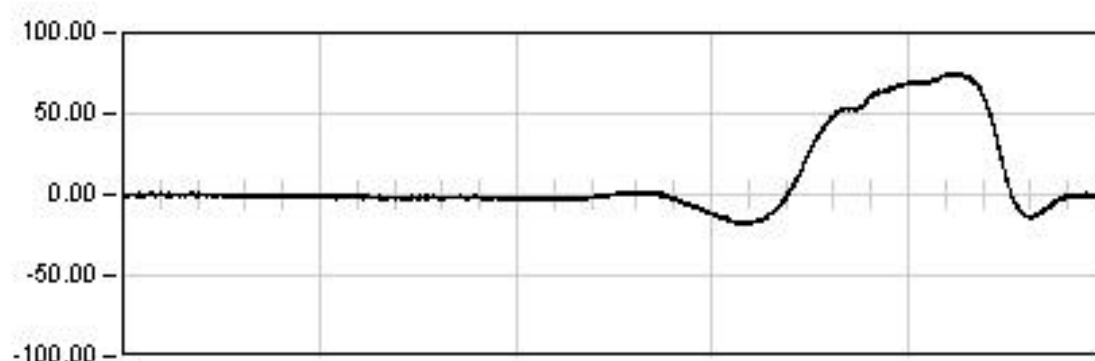
**DYNAMICA 21**

207.5    Seg

Max:    52.44

Min:    -7.83

Rem:    0.28

**DYNAMICA 01**

234.0    Seg

Max:    75.21

Min:    -18.73

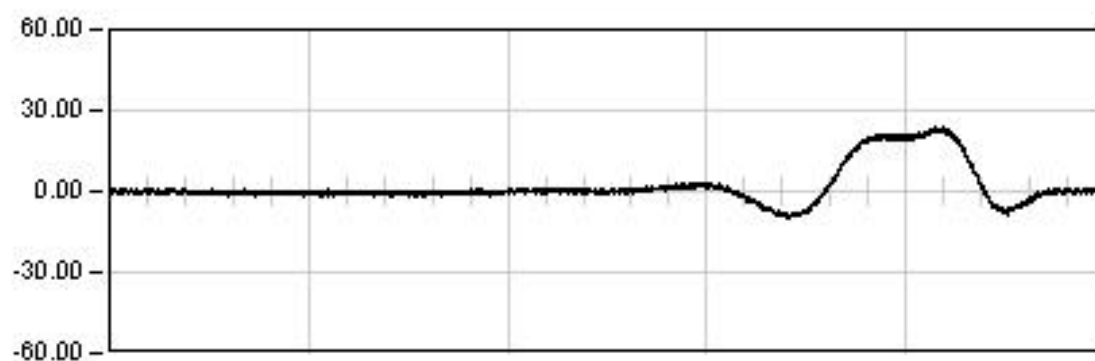
Rem:    0.42

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G022

Canal : 01

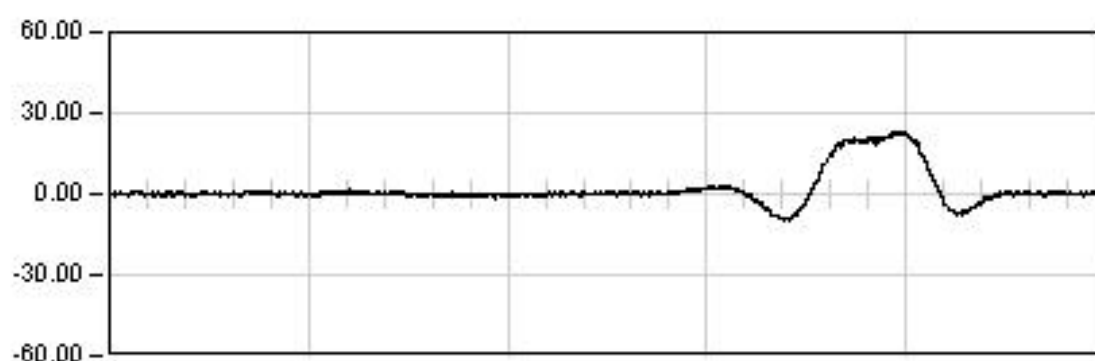
Unidades :  $\mu E$ **DINAMICA 11**

127.5 Seg

Max: 23.72

Min: -10.10

Rem: 0.04

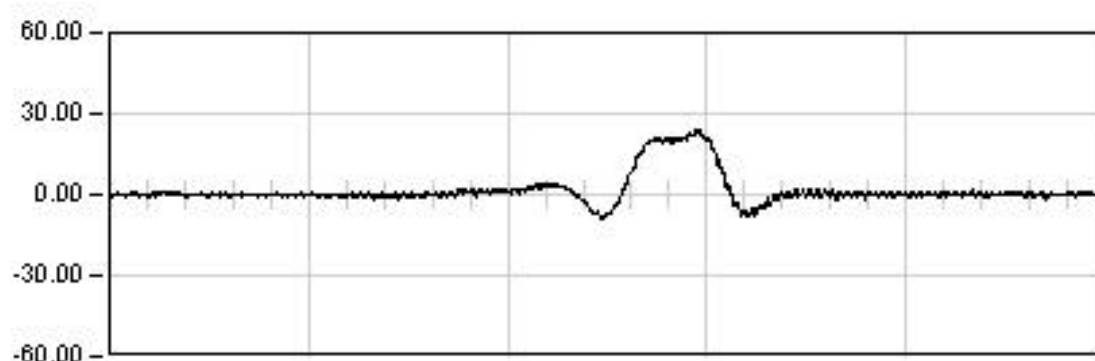
**DINAMICA 12**

52.5 Seg

Max: 23.21

Min: -9.70

Rem: 0.25

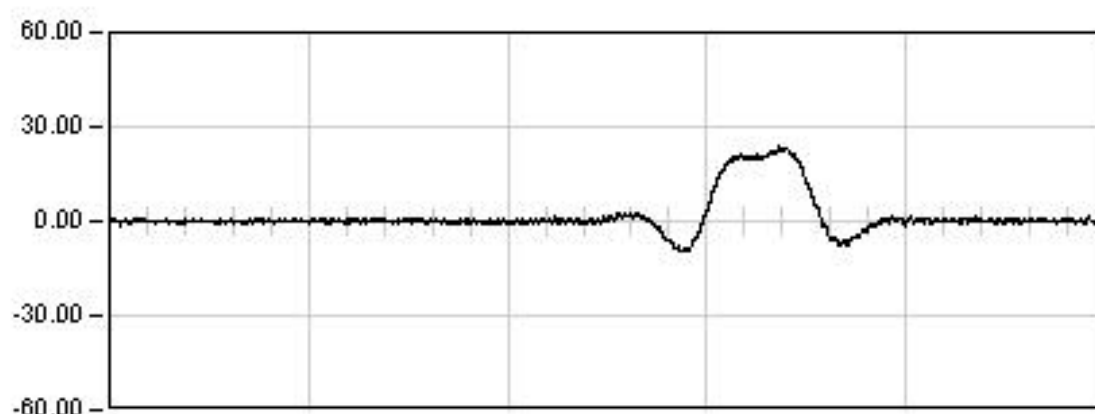
**DINAMICA 13**

37.5 Seg

Max: 23.98

Min: -9.00

Rem: 0.27

**DINAMICA 14**

41.5 Seg

Max: 23.68

Min: -9.84

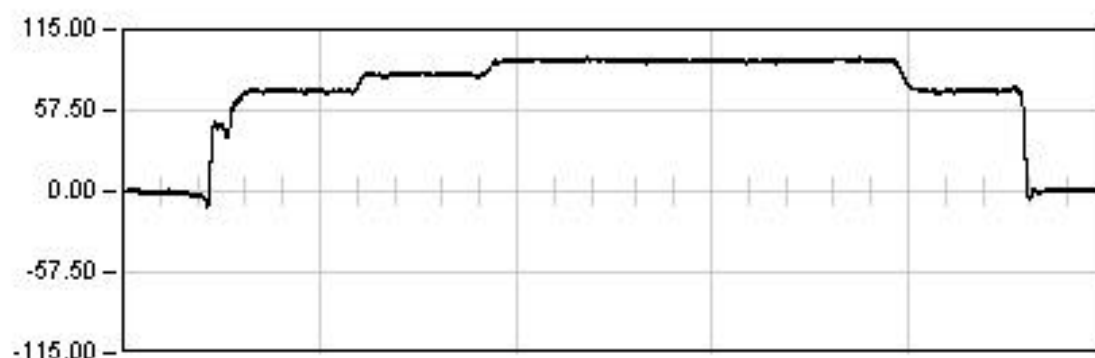
Rem: 0.14

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G031

Canal : 02

Unidades :  $\mu E$ **ESTATICA 01**

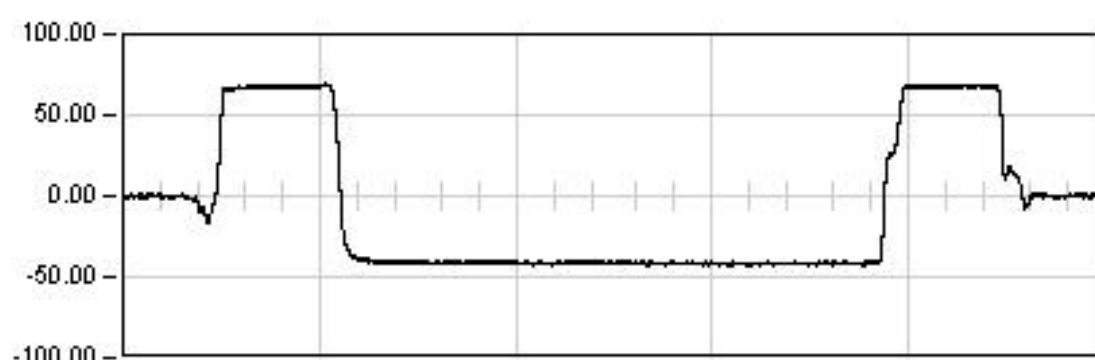
1809.0 Seg

Est: 93.31

Max: 94.99

Min: -11.53

Rem: 0.67

**ESTATICA 02**

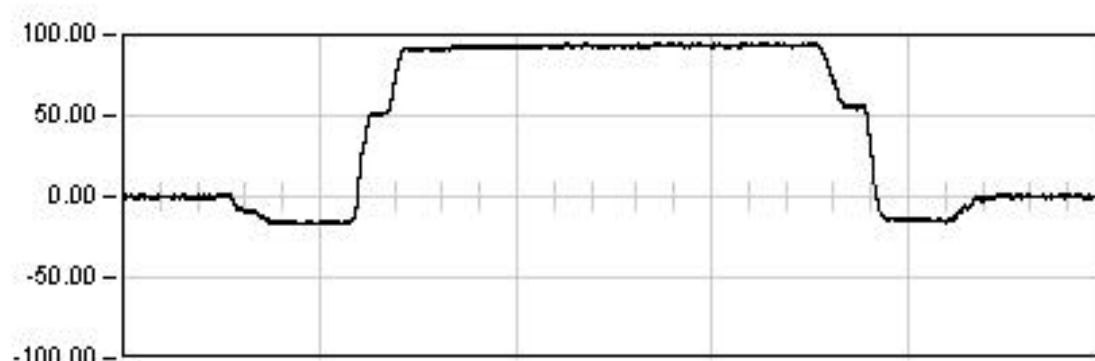
1690.0 Seg

Est: -41.59

Max: 69.65

Min: -42.83

Rem: 0.07

**ESTATICA 03**

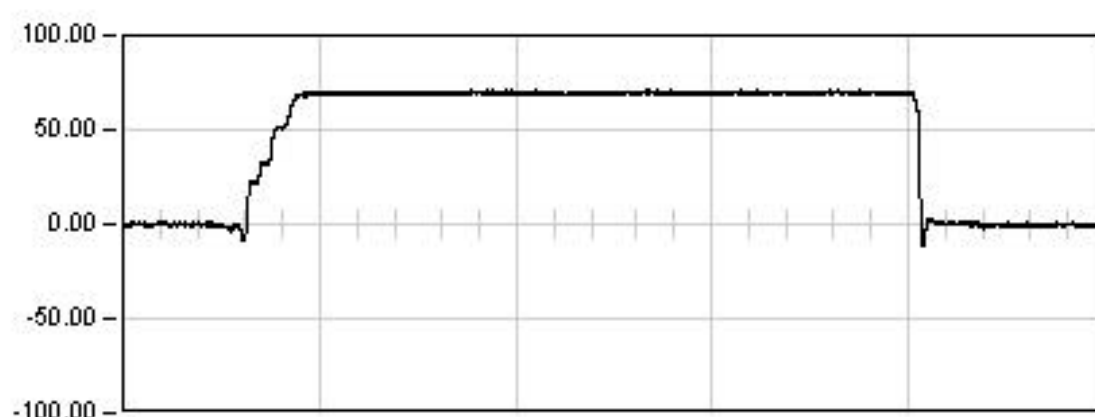
1519.0 Seg

Est: 93.44

Max: 94.86

Min: -17.48

Rem: 0.12

**ESTATICA 04**

1254.0 Seg

Est: 69.77

Max: 71.89

Min: -11.04

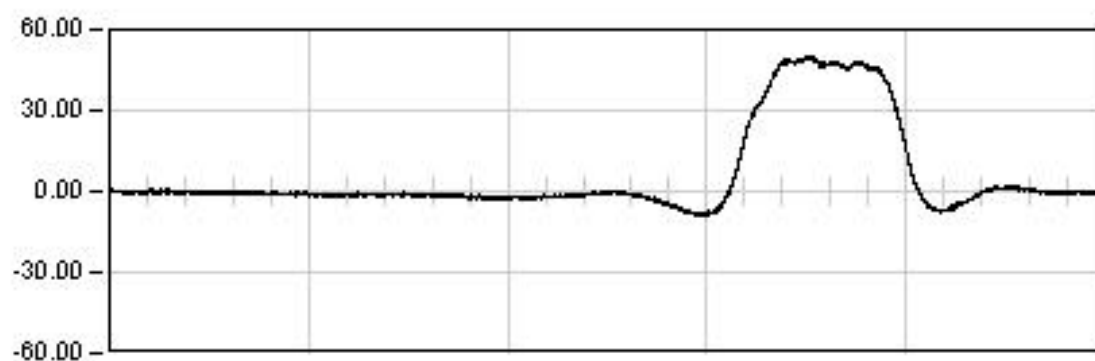
Rem: -0.35

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G031

Canal : 02

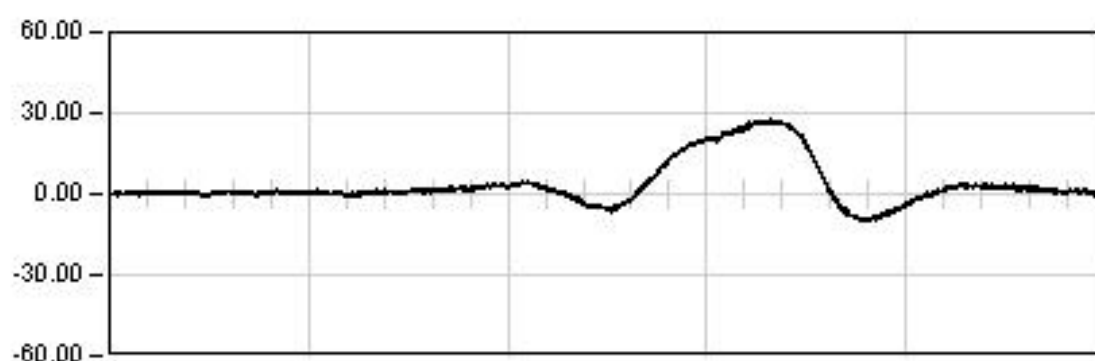
Unidades :  $\mu E$ **DINAMICA 11**

127.5 Seg

Max: 50.03

Min: -9.16

Rem: -0.30

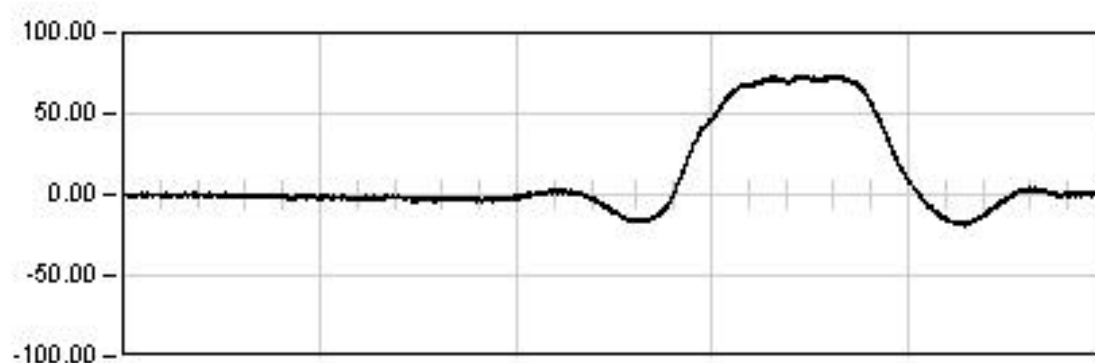
**DINAMICA 21**

207.5 Seg

Max: 27.74

Min: -10.26

Rem: 0.28

**DINAMICA 01**

234.0 Seg

Max: 73.87

Min: -19.34

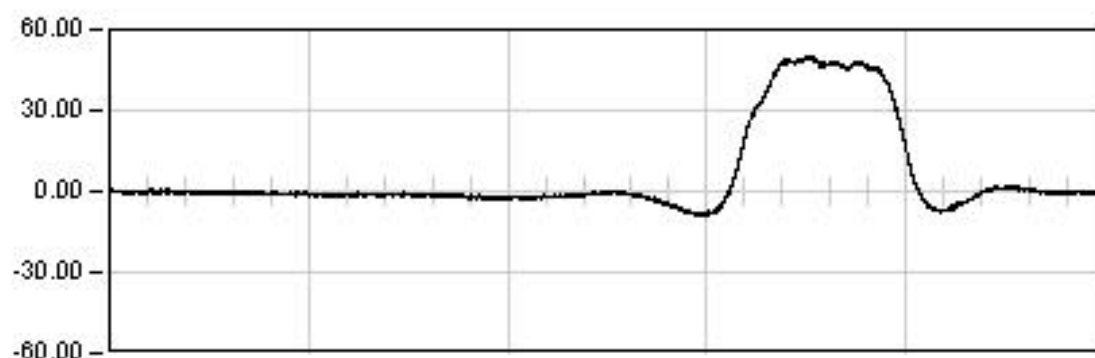
Rem: -0.53

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G031

Canal : 02

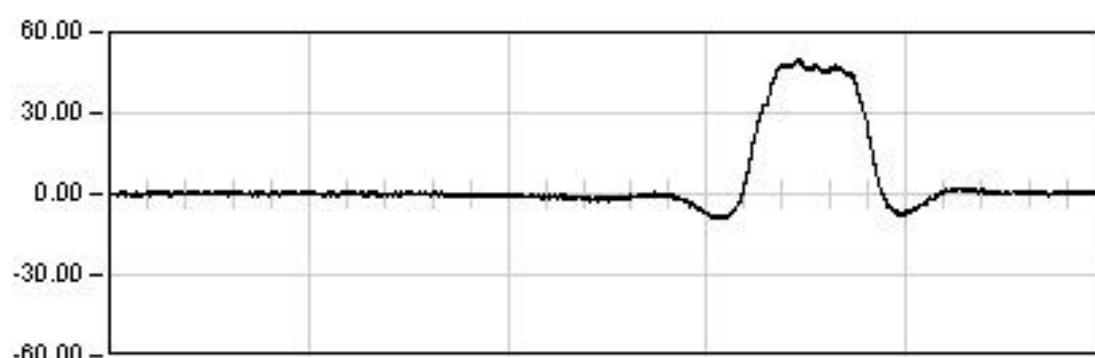
Unidades :  $\mu E$ **DINAMICA 11**

127.5 Seg

Max: 50.03

Min: -9.16

Rem: -0.30

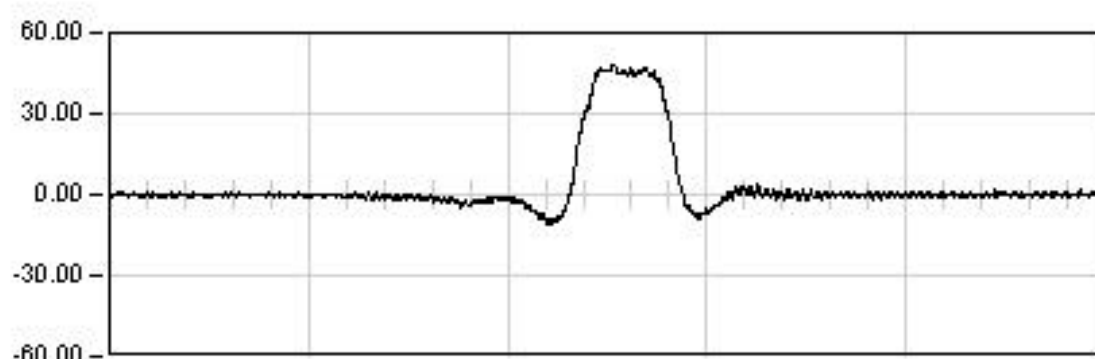
**DINAMICA 12**

52.5 Seg

Max: 49.72

Min: -9.30

Rem: 0.46

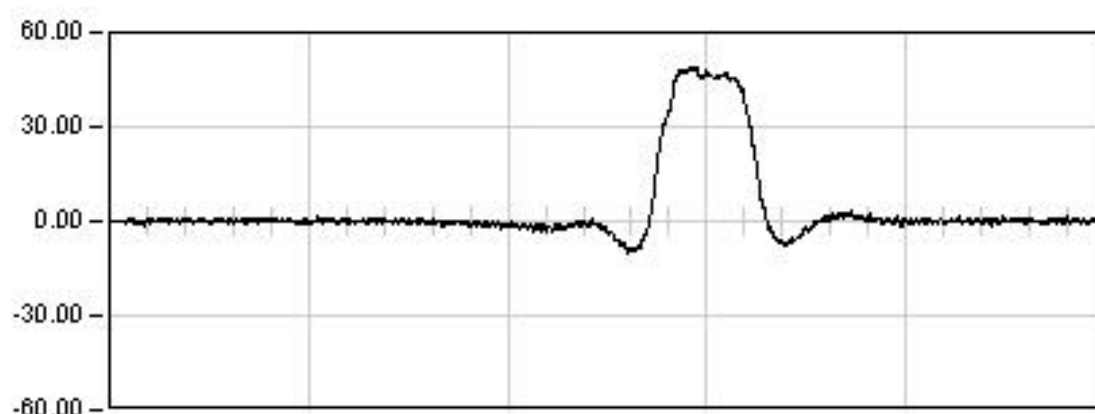
**DINAMICA 13**

37.5 Seg

Max: 48.25

Min: -10.95

Rem: 0.11

**DINAMICA 14**

41.5 Seg

Max: 49.22

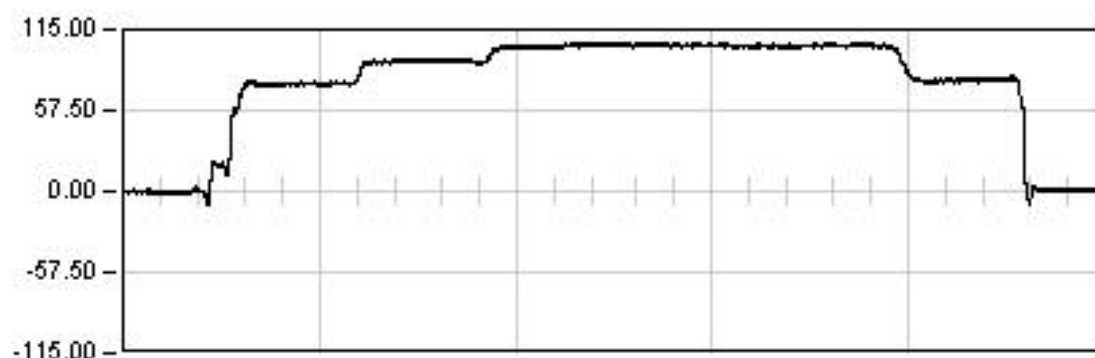
Min: -10.00

Rem: 0.18



## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G032    Canal : 03    Unidades :  $\mu E$ **ESTATICA 01**

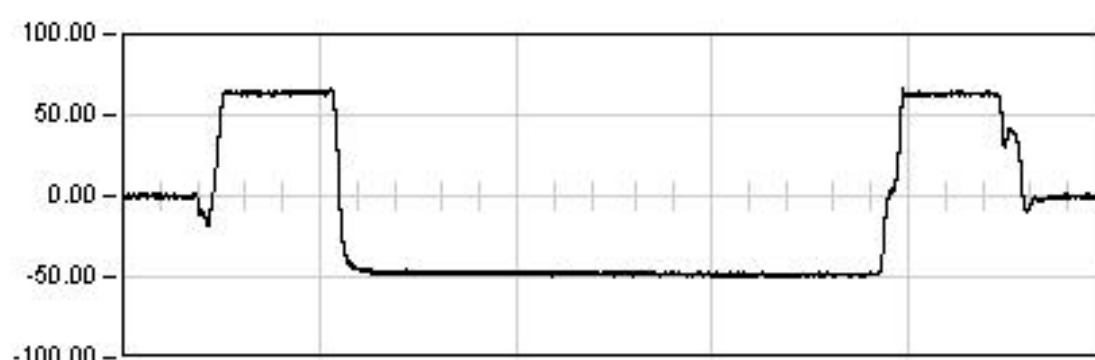
1809.0 Seg

Est: 103.64

Max: 105.57

Min: -10.37

Rem: 0.70

**ESTATICA 02**

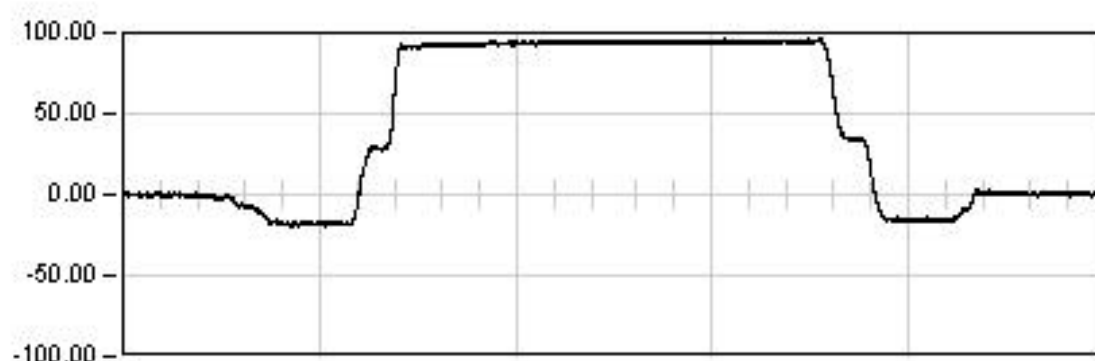
1690.0 Seg

Est: -48.36

Max: 67.10

Min: -49.86

Rem: -0.32

**ESTATICA 03**

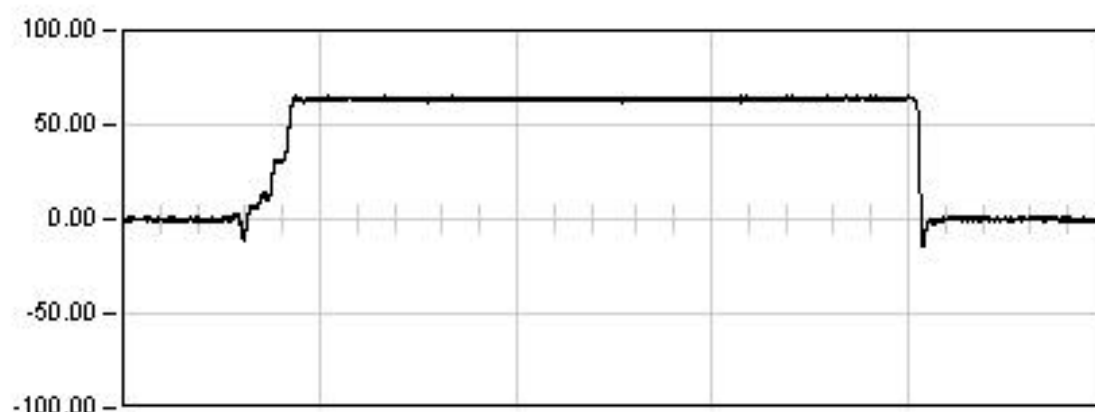
1519.0 Seg

Est: 94.54

Max: 96.44

Min: -19.42

Rem: 0.33

**ESTATICA 04**

1254.0 Seg

Est: 63.82

Max: 65.62

Min: -14.96

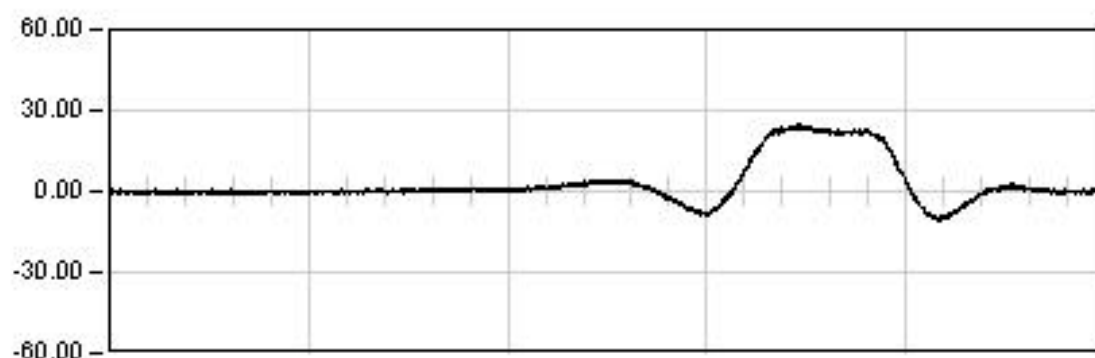
Rem: -0.12

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G032

Canal : 03

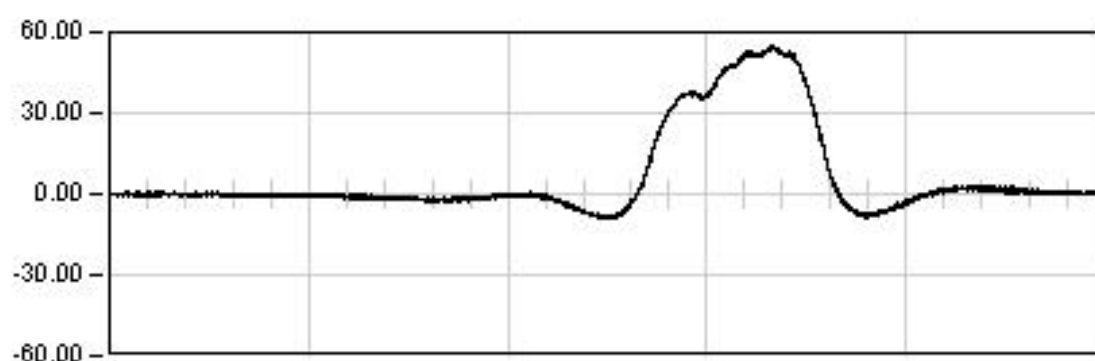
Unidades :  $\mu E$ **DYNAMICA 11**

127.5 Seg

Max: 24.70

Min: -10.90

Rem: 0.00

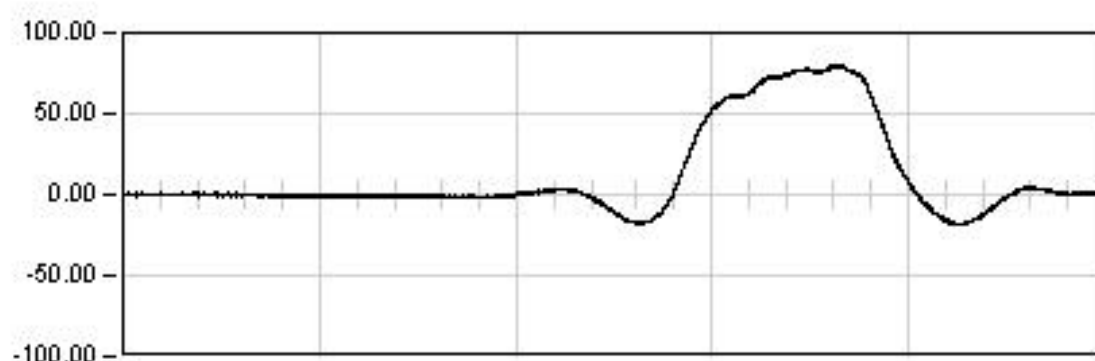
**DYNAMICA 21**

207.5 Seg

Max: 54.85

Min: -9.22

Rem: 0.52

**DYNAMICA 01**

234.0 Seg

Max: 79.71

Min: -18.65

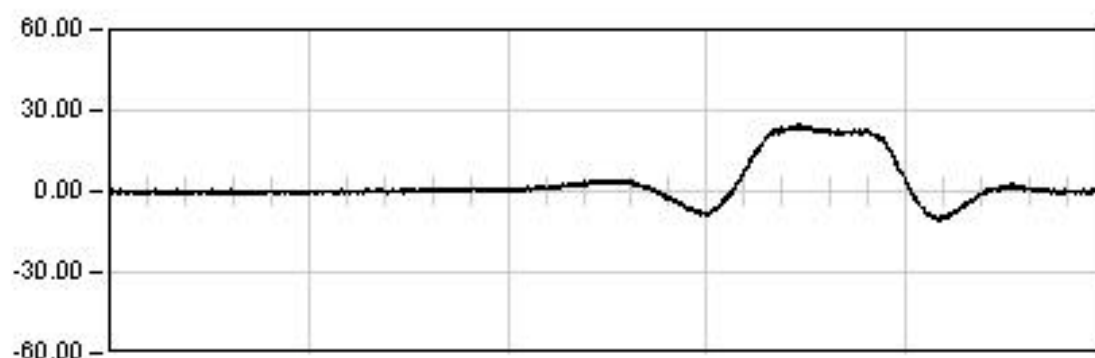
Rem: 0.27

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G032

Canal : 03

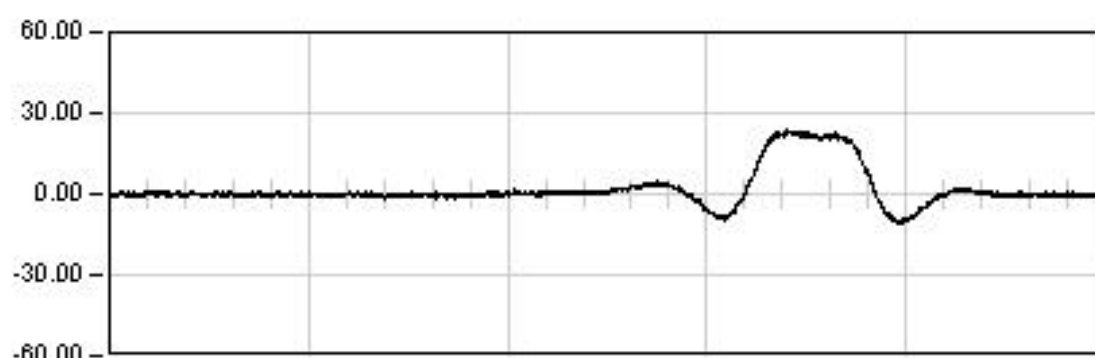
Unidades :  $\mu E$ **DYNAMICA 11**

127.5 Seg

Max: 24.70

Min: -10.90

Rem: 0.00

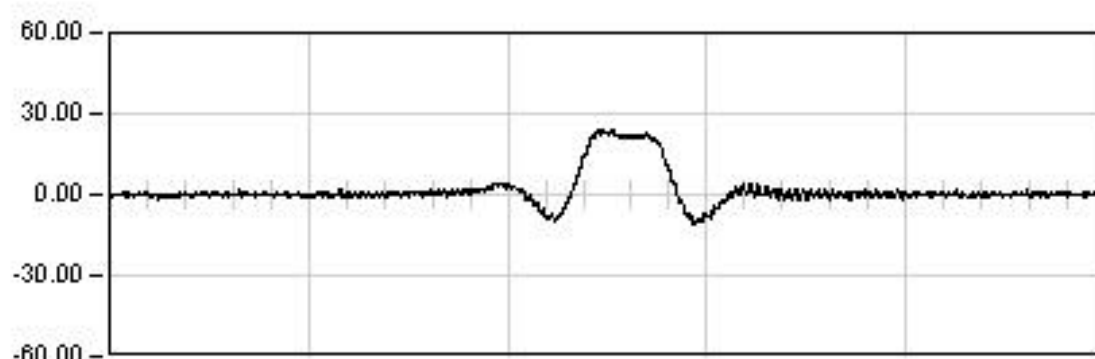
**DYNAMICA 12**

52.5 Seg

Max: 23.65

Min: -10.97

Rem: -0.36

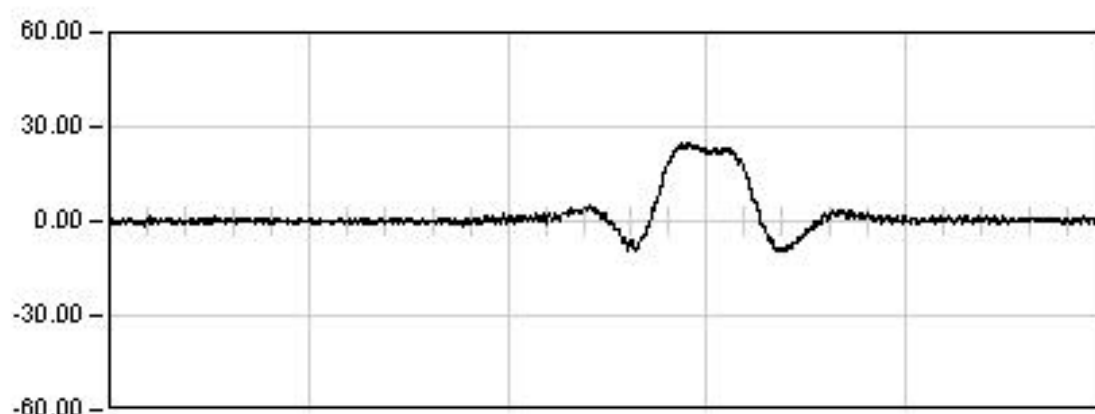
**DYNAMICA 13**

37.5 Seg

Max: 24.41

Min: -11.03

Rem: 0.19

**DYNAMICA 14**

41.5 Seg

Max: 24.99

Min: -9.63

Rem: 0.40

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G041      Canal : 04      Unidades :  $\mu E$ **ESTATICA 01**

1809.0    Seg

Est:    -21.82

Max:    69.47

Min:    -25.82

Rem:    0.08

**ESTATICA 02**

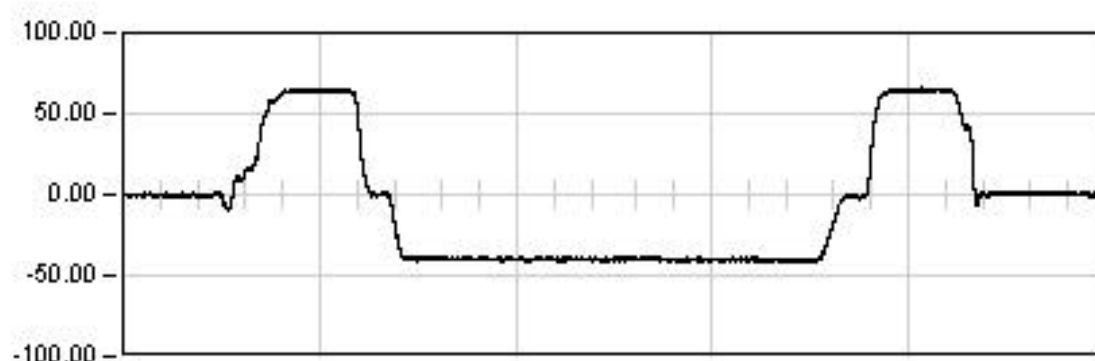
1690.0    Seg

Est:    90.96

Max:    92.81

Min:    -8.37

Rem:    0.35

**ESTATICA 03**

1519.0    Seg

Est:    -40.34

Max:    66.41

Min:    -42.24

Rem:    0.26

**ESTATICA 04**

1254.0    Seg

Est:    68.01

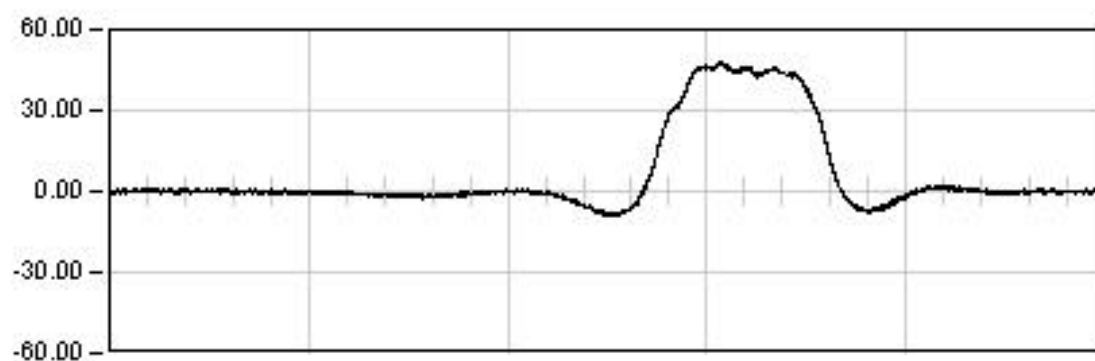
Max:    69.81

Min:    -9.69

Rem:    0.23

## VIADUCTO DEL GALLO

P.K. 81/580

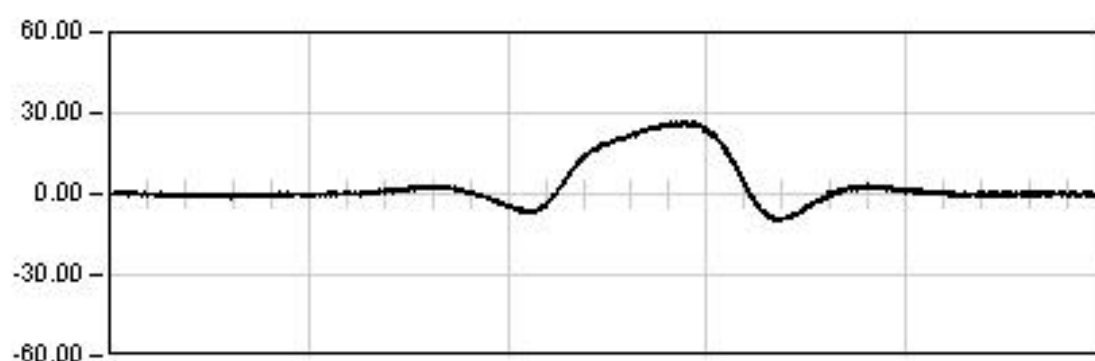
Punto : G041      Canal : 04      Unidades :  $\mu E$ **DYNAMICA 11**

127.5    Seg

Max:    47.89

Min:    -8.94

Rem:    0.06

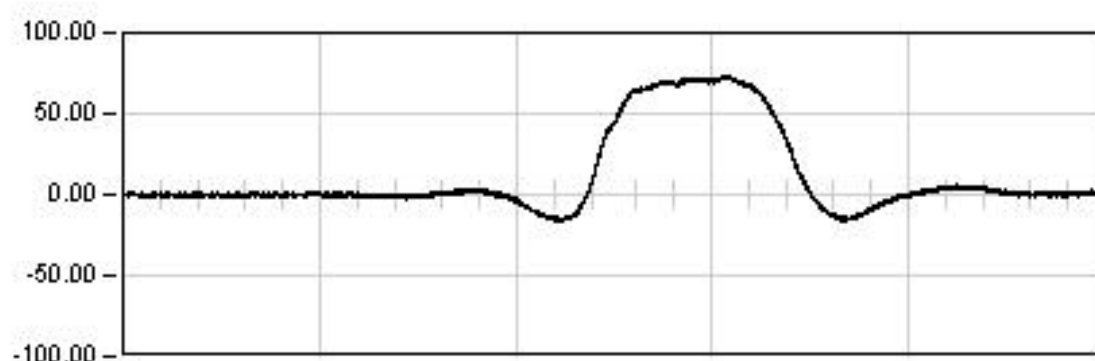
**DYNAMICA 21**

207.5    Seg

Max:    26.93

Min:    -9.95

Rem:    -0.07

**DYNAMICA 01**

234.0    Seg

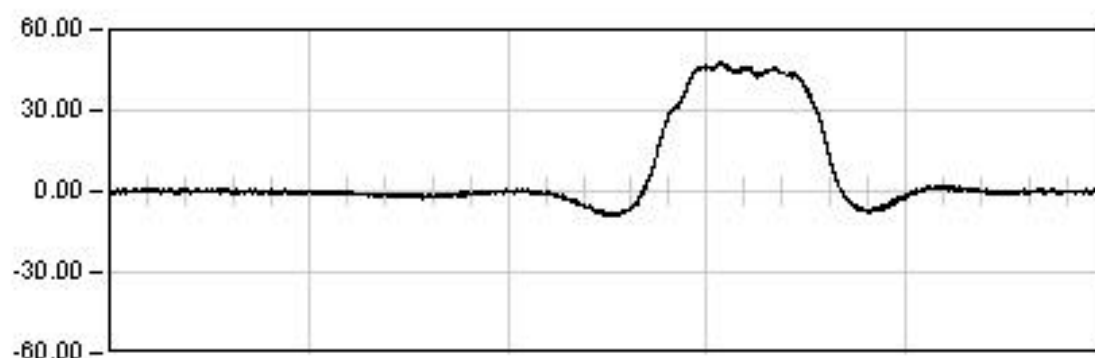
Max:    73.31

Min:    -16.52

Rem:    -0.54

## VIADUCTO DEL GALLO

P.K. 81/580

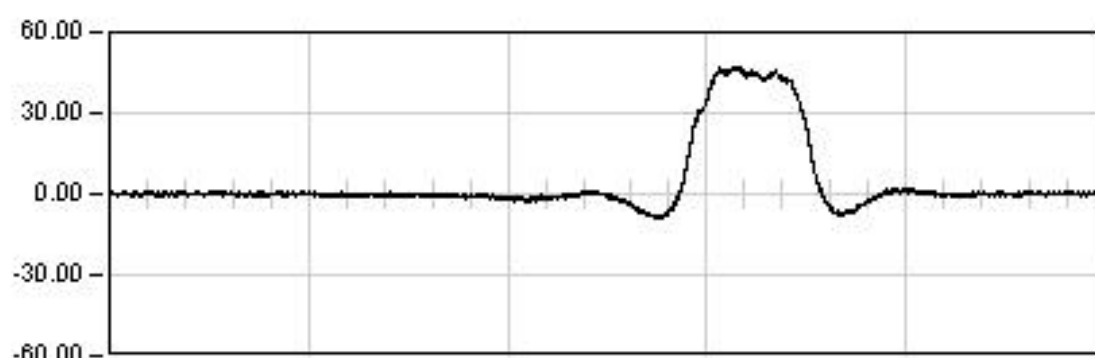
Punto : G041    Canal : 04    Unidades :  $\mu E$ **DYNAMICA 11**

127.5    Seg

Max: 47.89

Min: -8.94

Rem: 0.06

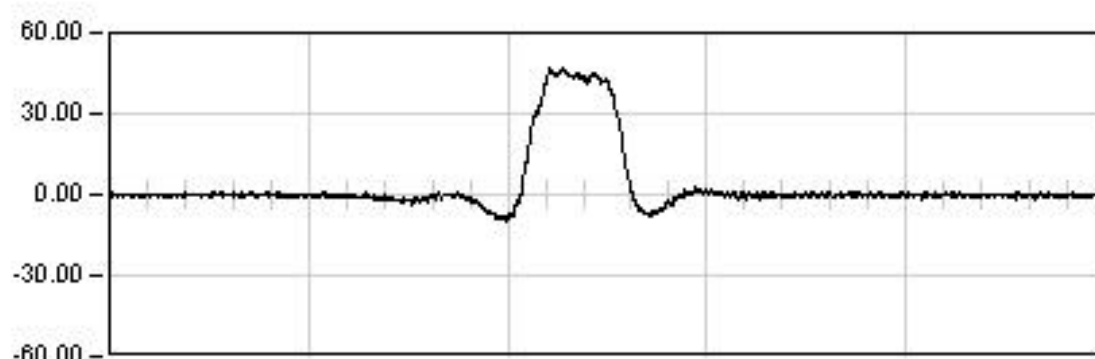
**DYNAMICA 12**

52.5    Seg

Max: 47.37

Min: -9.17

Rem: 0.03

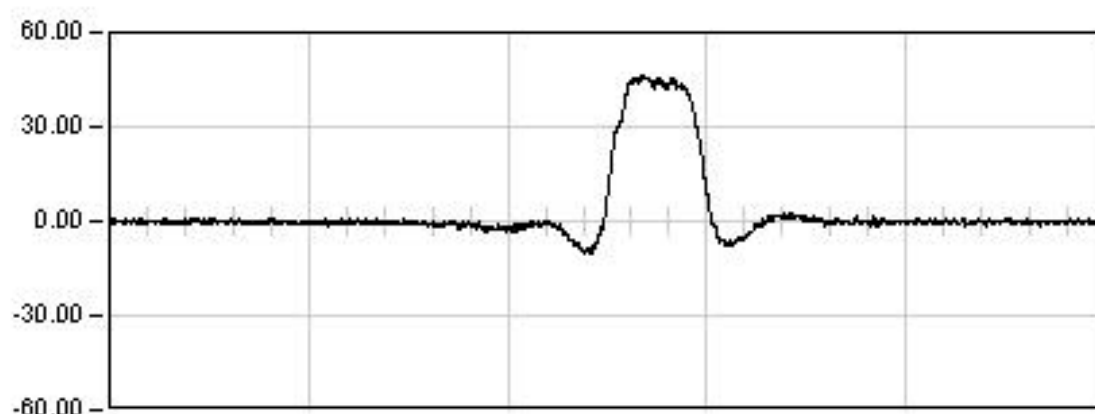
**DYNAMICA 13**

37.5    Seg

Max: 46.55

Min: -9.85

Rem: -0.21

**DYNAMICA 14**

41.5    Seg

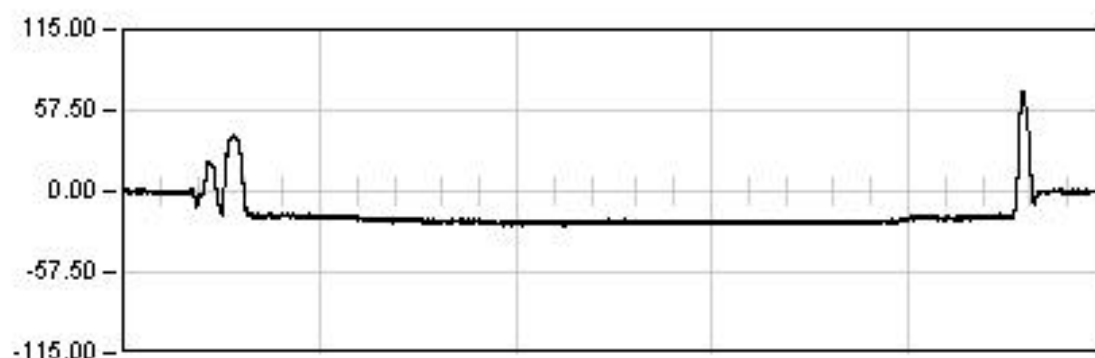
Max: 46.35

Min: -10.59

Rem: -0.30

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G042      Canal : 05      Unidades :  $\mu E$ **ESTATICA 01**

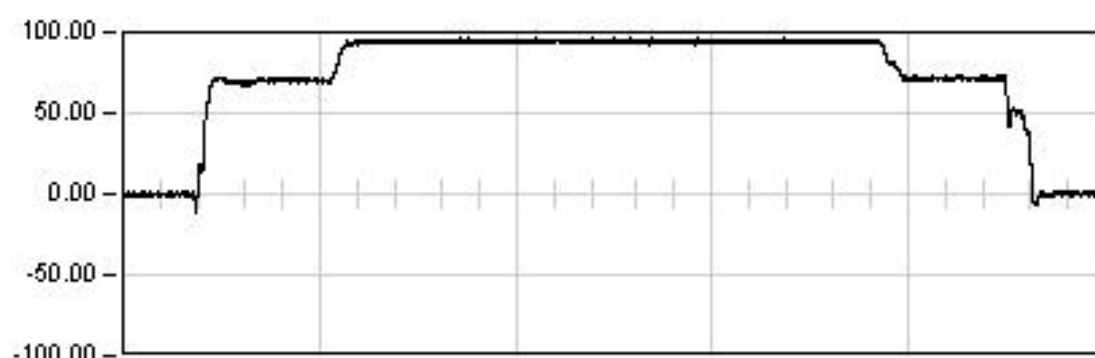
1809.0 Seg

Est: -21.86

Max: 70.20

Min: -24.64

Rem: -0.21

**ESTATICA 02**

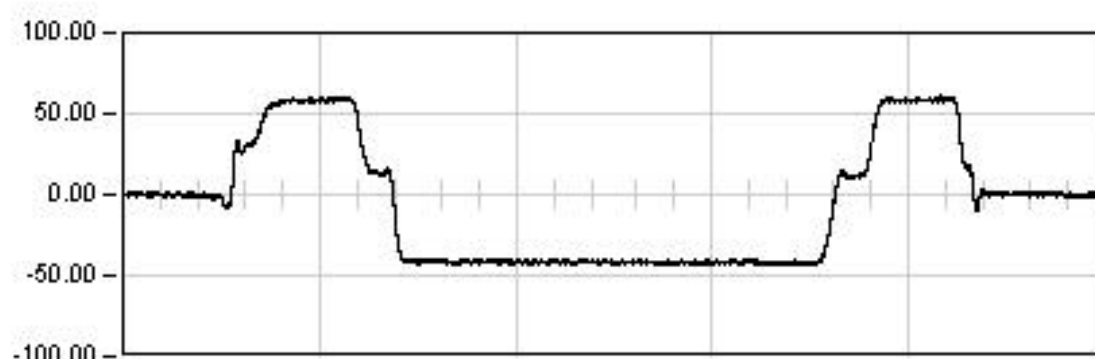
1690.0 Seg

Est: 94.10

Max: 96.41

Min: -11.14

Rem: 0.03

**ESTATICA 03**

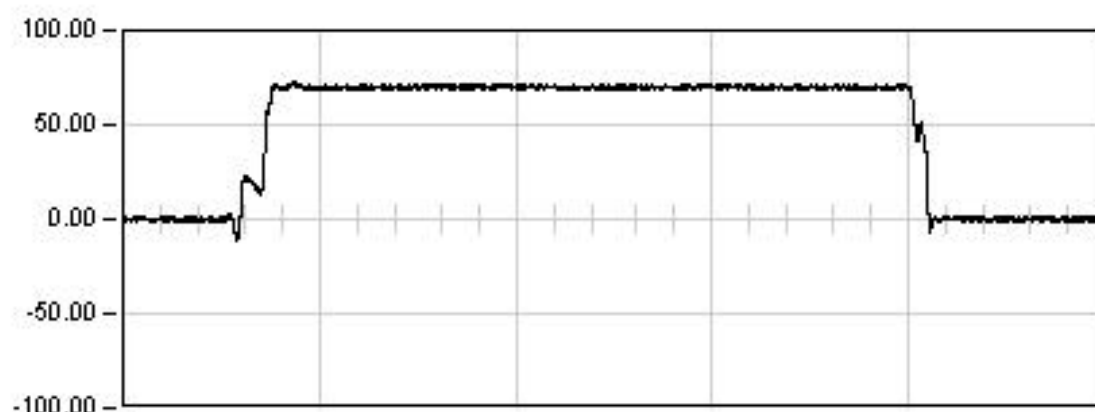
1519.0 Seg

Est: -41.73

Max: 61.44

Min: -43.87

Rem: -0.16

**ESTATICA 04**

1254.0 Seg

Est: 69.72

Max: 72.91

Min: -11.86

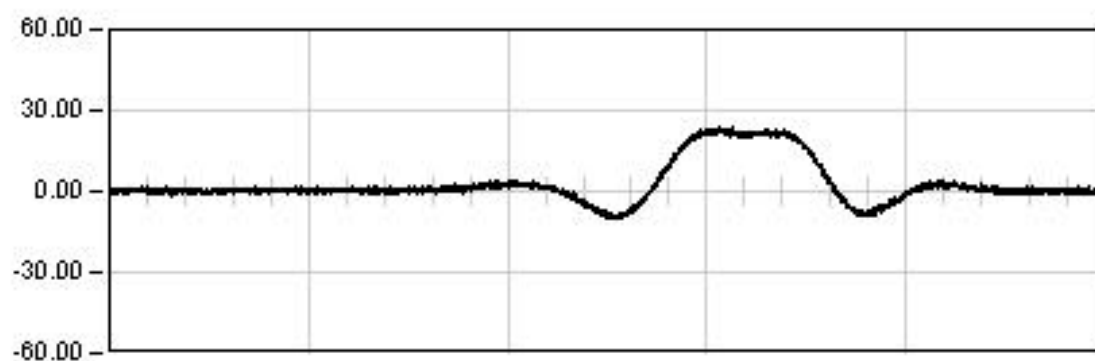
Rem: -0.16

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G042

Canal : 05

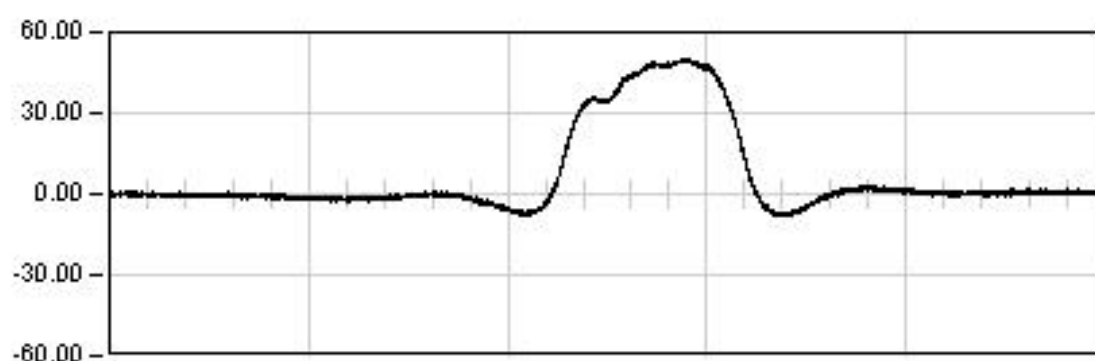
Unidades :  $\mu E$ **DYNAMICA 11**

127.5 Seg

Max: 23.59

Min: -10.46

Rem: 0.06

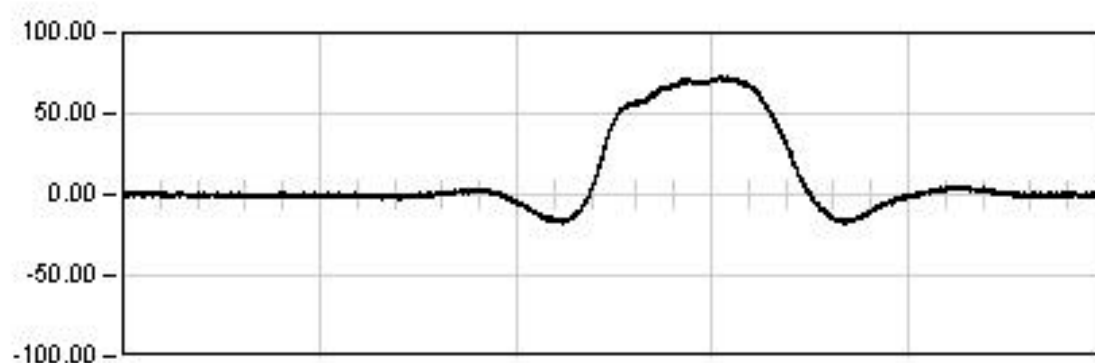
**DYNAMICA 21**

207.5 Seg

Max: 50.15

Min: -8.33

Rem: 0.76

**DYNAMICA 01**

234.0 Seg

Max: 73.17

Min: -18.26

Rem: -1.19

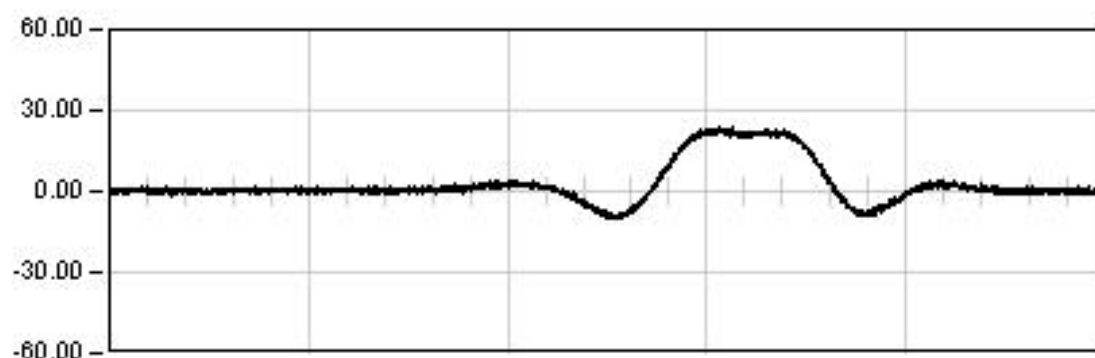


## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G042

Canal : 05

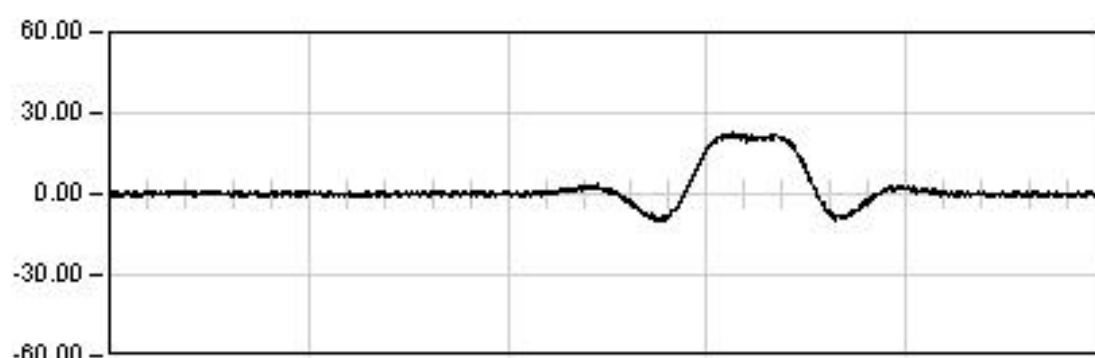
Unidades :  $\mu E$ **DYNAMICA 11**

127.5 Seg

Max: 23.59

Min: -10.46

Rem: 0.06

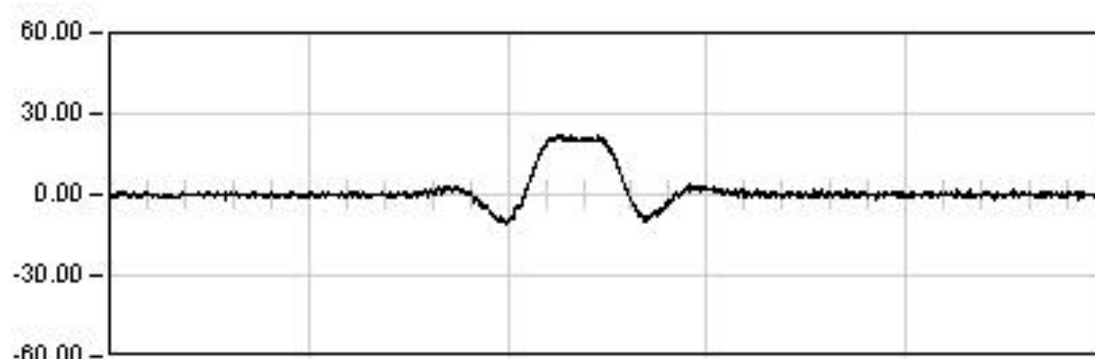
**DYNAMICA 12**

52.5 Seg

Max: 22.90

Min: -10.40

Rem: 0.04

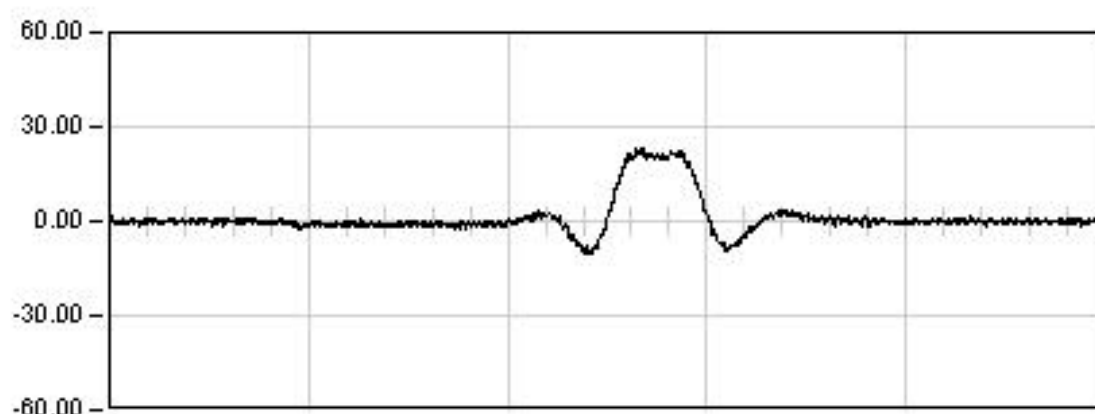
**DYNAMICA 13**

37.5 Seg

Max: 22.29

Min: -11.14

Rem: -0.03

**DYNAMICA 14**

41.5 Seg

Max: 22.95

Min: -10.42

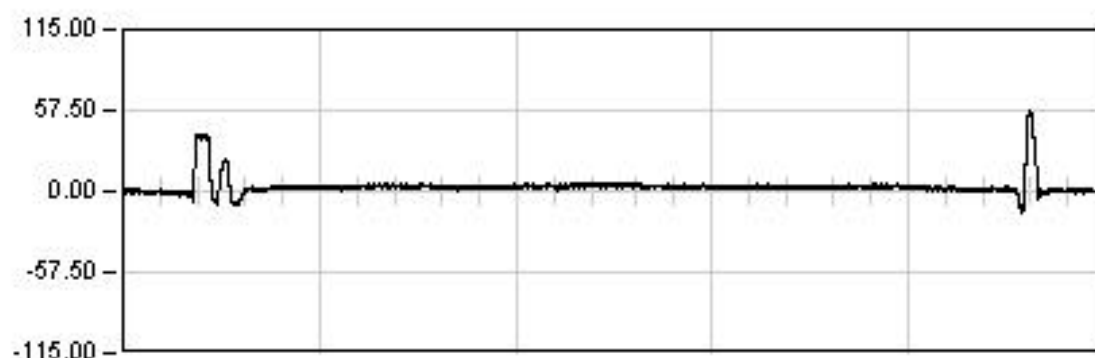
Rem: -0.14

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G051

Canal : 06

Unidades :  $\mu E$ **ESTATICA 01**

1809.0 Seg

Est: 3.49

Max: 58.12

Min: -15.60

Rem: 0.17

**ESTATICA 02**

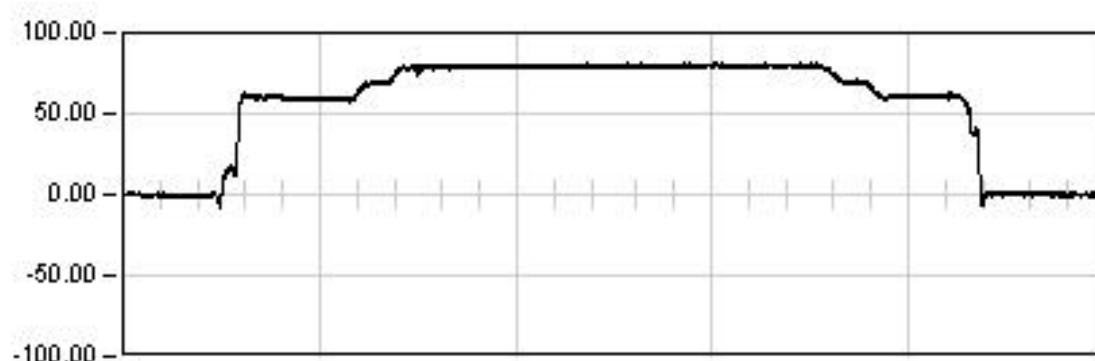
1690.0 Seg

Est: -19.57

Max: 62.17

Min: -21.40

Rem: 0.09

**ESTATICA 03**

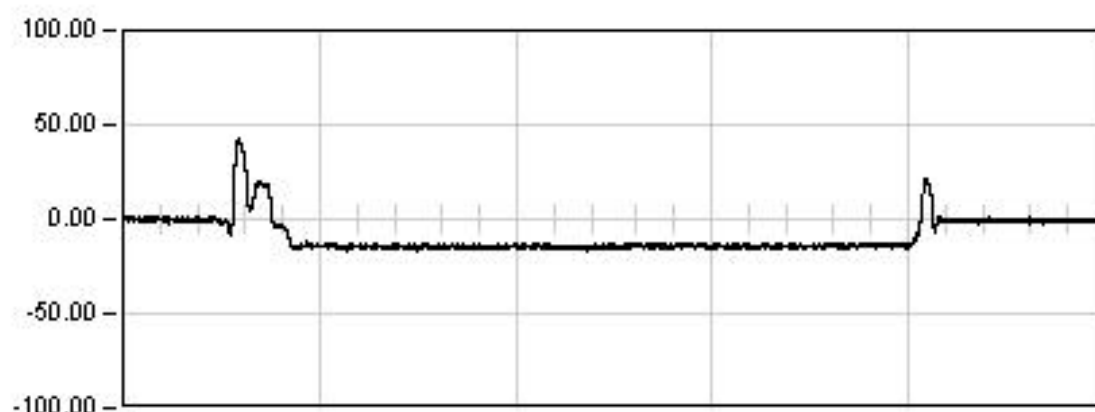
1519.0 Seg

Est: 79.82

Max: 81.59

Min: -7.55

Rem: -0.08

**ESTATICA 04**

1254.0 Seg

Est: -14.11

Max: 43.19

Min: -17.43

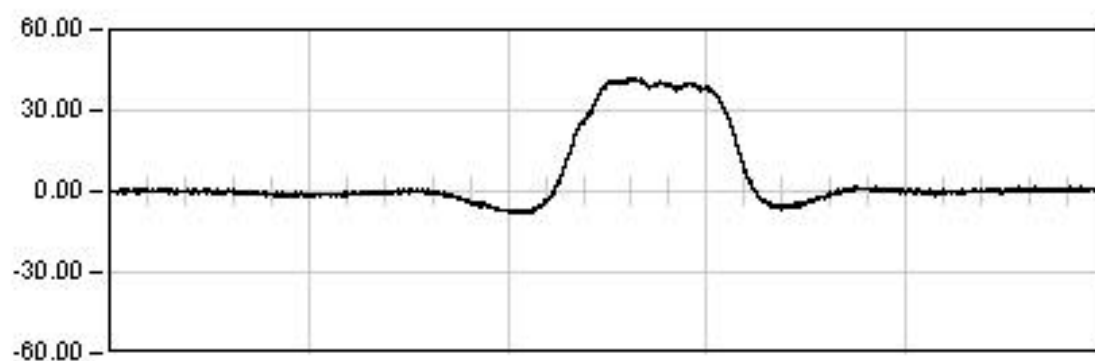
Rem: -0.70

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G051

Canal : 06

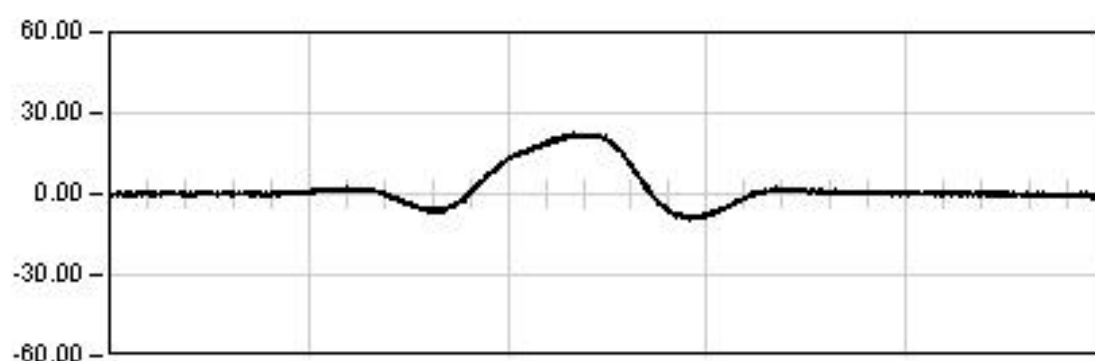
Unidades :  $\mu E$ **DYNAMICA 11**

127.5 Seg

Max: 41.77

Min: -7.98

Rem: 0.60

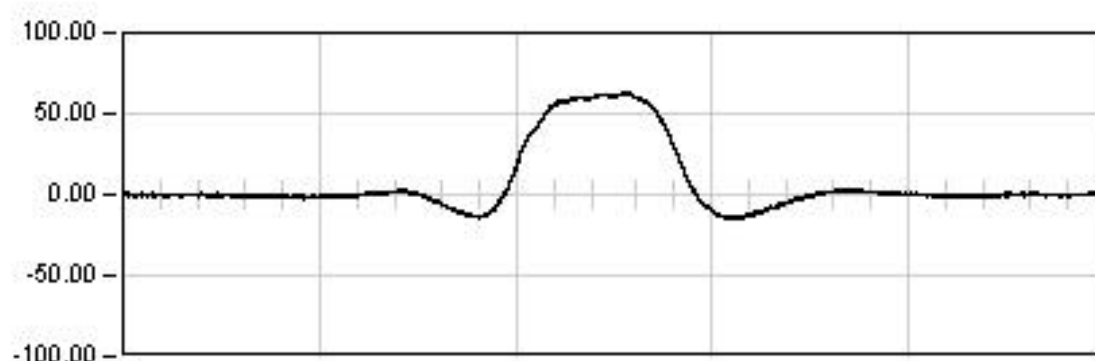
**DYNAMICA 21**

207.5 Seg

Max: 22.52

Min: -9.58

Rem: -0.26

**DYNAMICA 01**

234.0 Seg

Max: 63.41

Min: -15.03

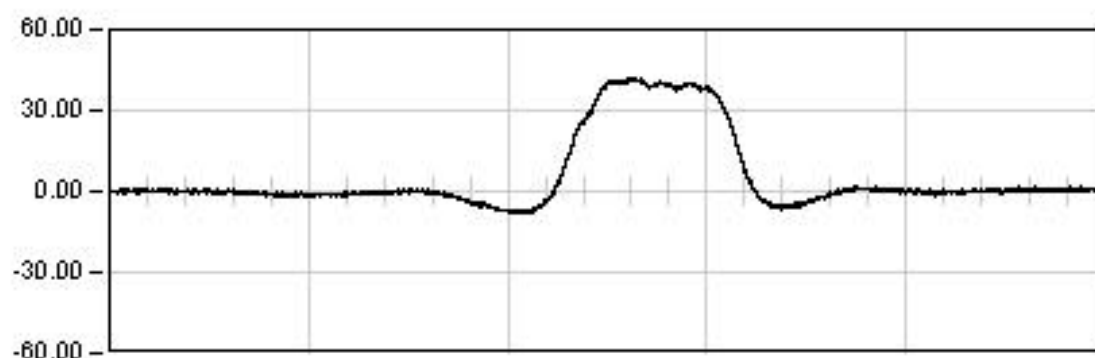
Rem: 0.12

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G051

Canal : 06

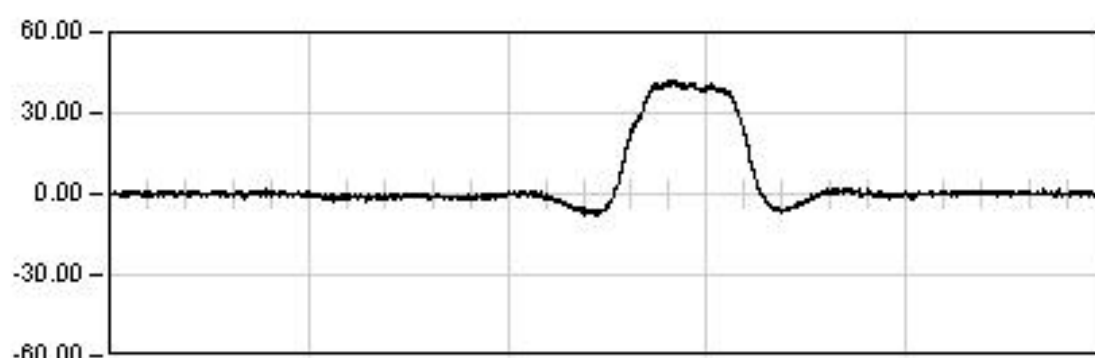
Unidades :  $\mu E$ **DYNAMICA 11**

127.5 Seg

Max: 41.77

Min: -7.98

Rem: 0.60

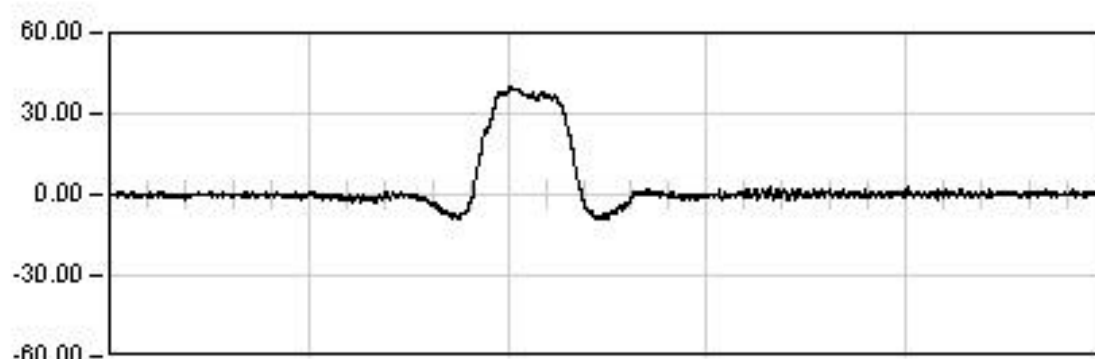
**DYNAMICA 12**

52.5 Seg

Max: 42.47

Min: -8.00

Rem: 0.03

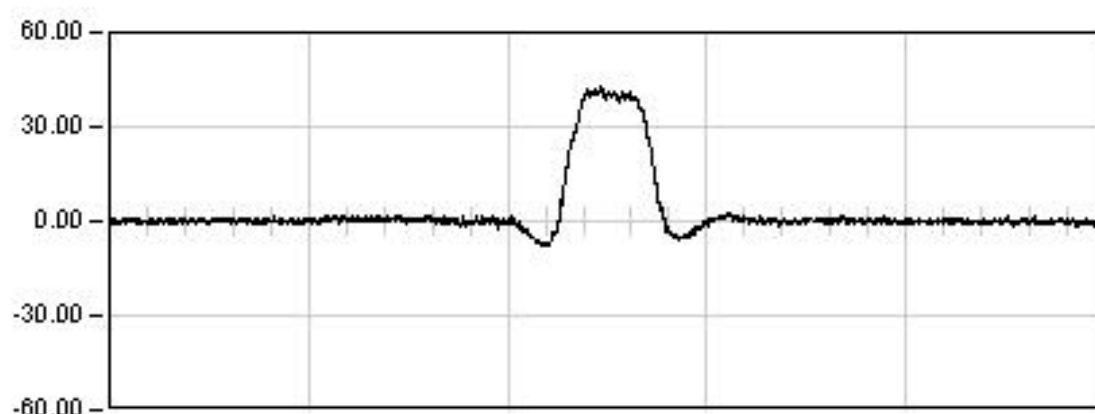
**DYNAMICA 13**

37.5 Seg

Max: 39.99

Min: -8.99

Rem: 0.24

**DYNAMICA 14**

41.5 Seg

Max: 42.72

Min: -8.11

Rem: -0.27

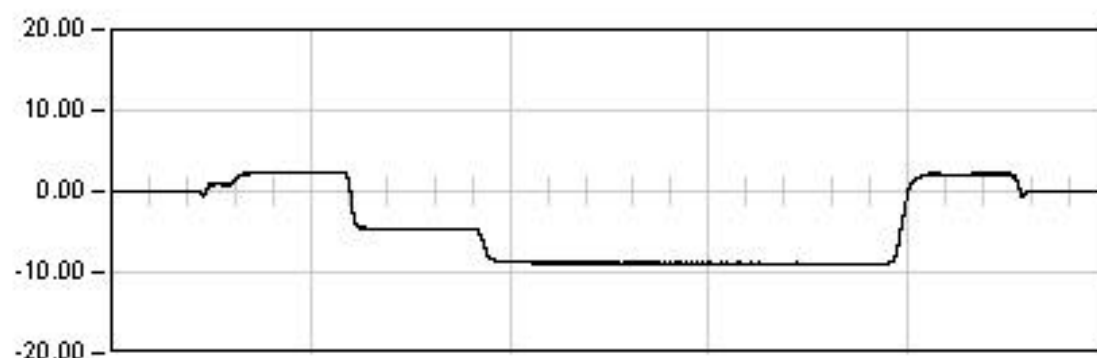
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P011

Canal : 50

Unidades : mm

**ESTATICA 01**

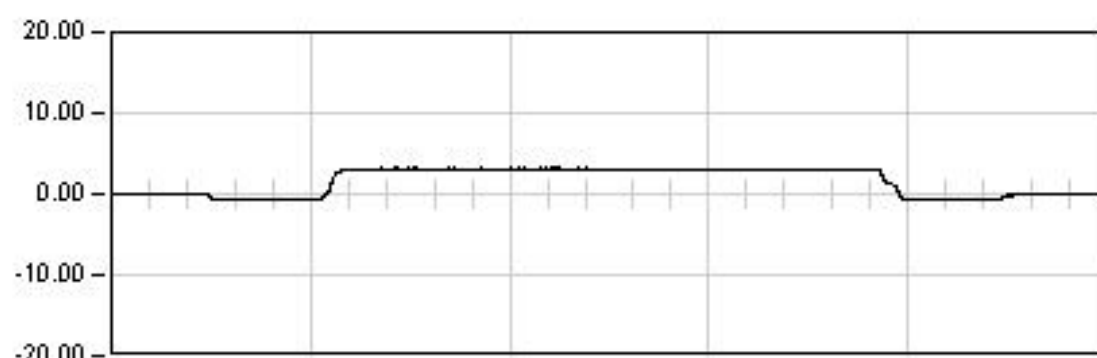
1809.0 Seg

Est: -8.91

Max: -9.00

Min: 2.39

Rem: -0.00

**ESTATICA 02**

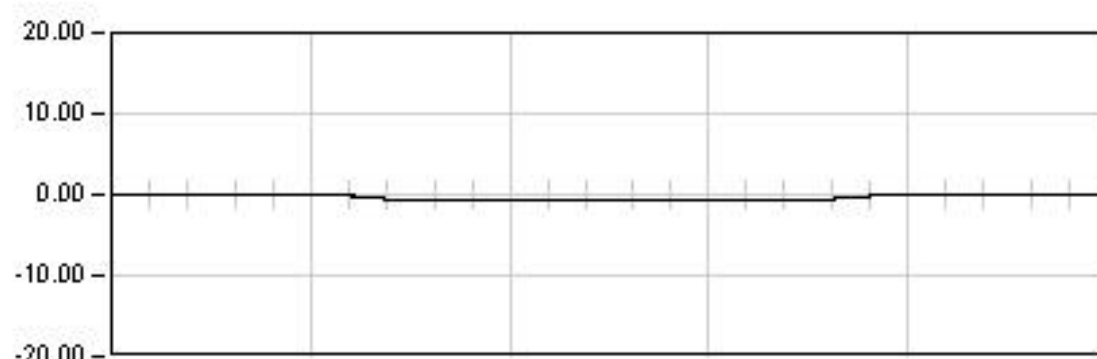
1690.0 Seg

Est: 3.14

Max: 3.17

Min: -0.67

Rem: -0.07

**ESTATICA 03**

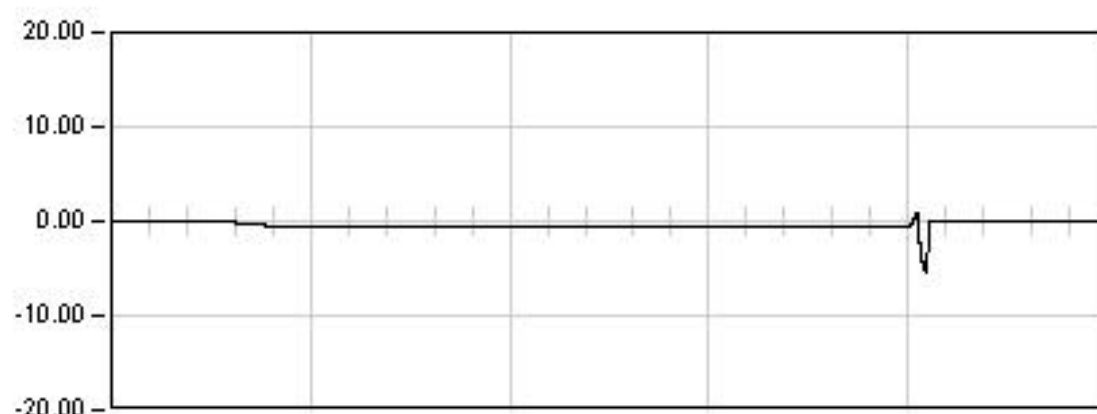
1519.0 Seg

Est: -0.73

Max: -0.77

Min: 0.14

Rem: 0.07

**ESTATICA 04**

1254.0 Seg

Est: -0.57

Max: -5.33

Min: 0.92

Rem: -0.06

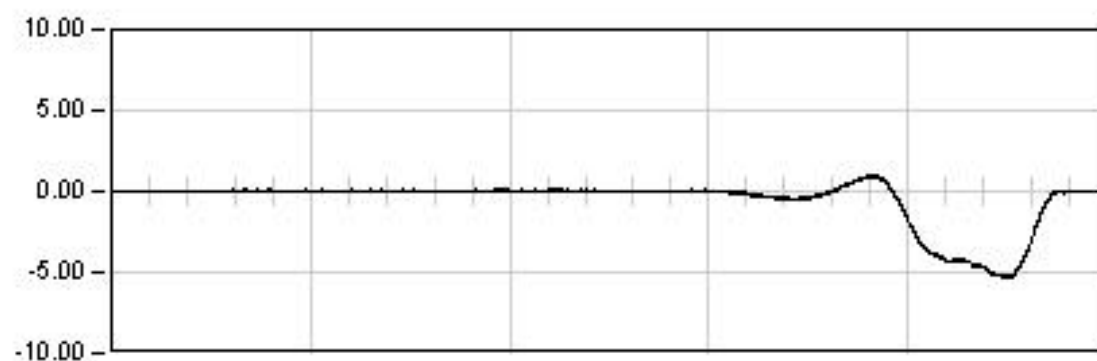
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P011

Canal : 38

Unidades : mm

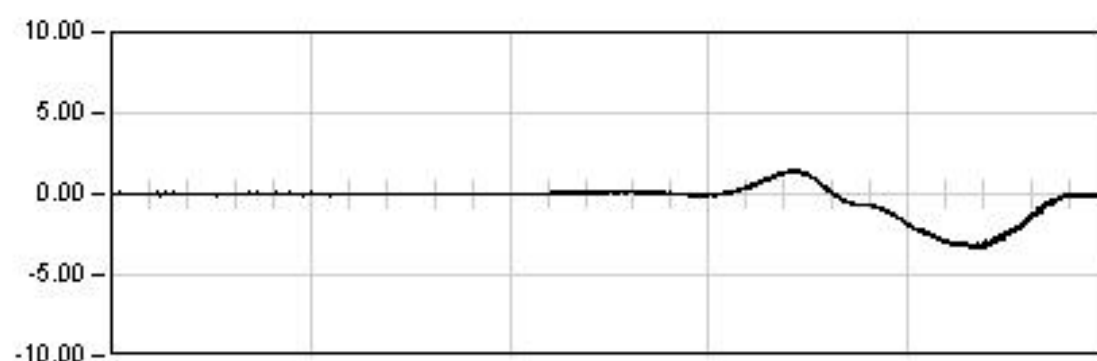
**DYNAMICA 11**

127.5 Seg

Max: -5.34

Min: 0.98

Rem: -0.01

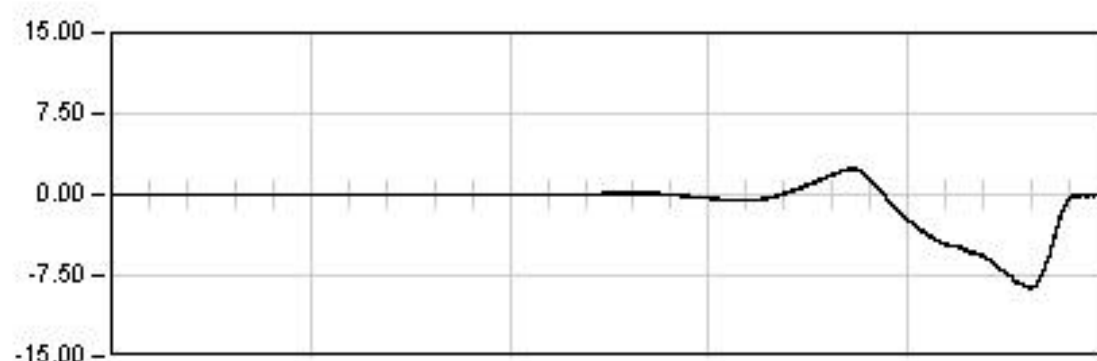
**DYNAMICA 21**

207.5 Seg

Max: -3.38

Min: 1.47

Rem: -0.03

**DYNAMICA 01**

234.0 Seg

Max: -8.68

Min: 2.42

Rem: -0.06

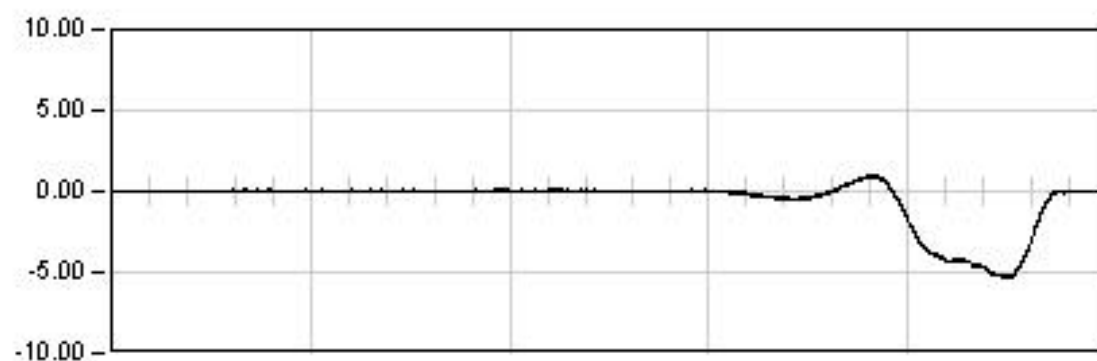
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P011

Canal : 38

Unidades : mm

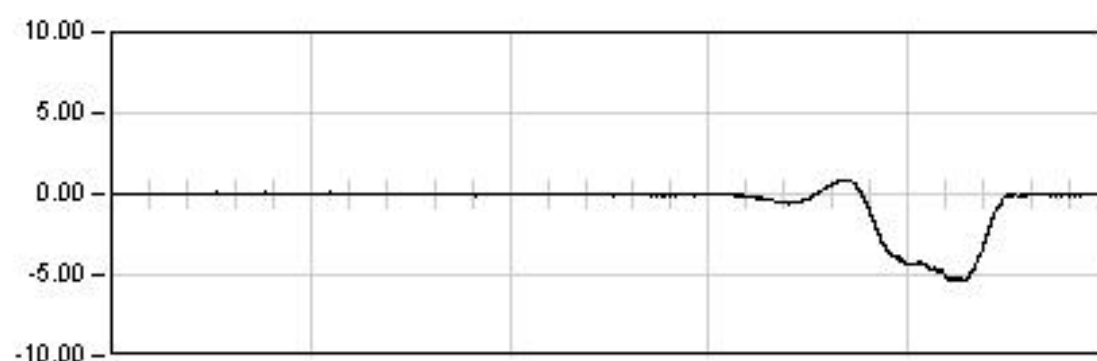
**DYNAMICA 11**

127.5 Seg

Max: -5.34

Min: 0.98

Rem: -0.01

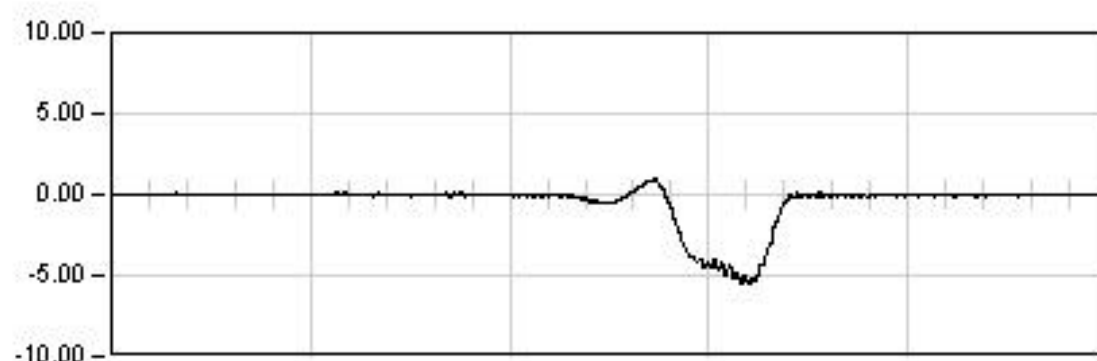
**DYNAMICA 12**

52.5 Seg

Max: -5.39

Min: 0.90

Rem: -0.04

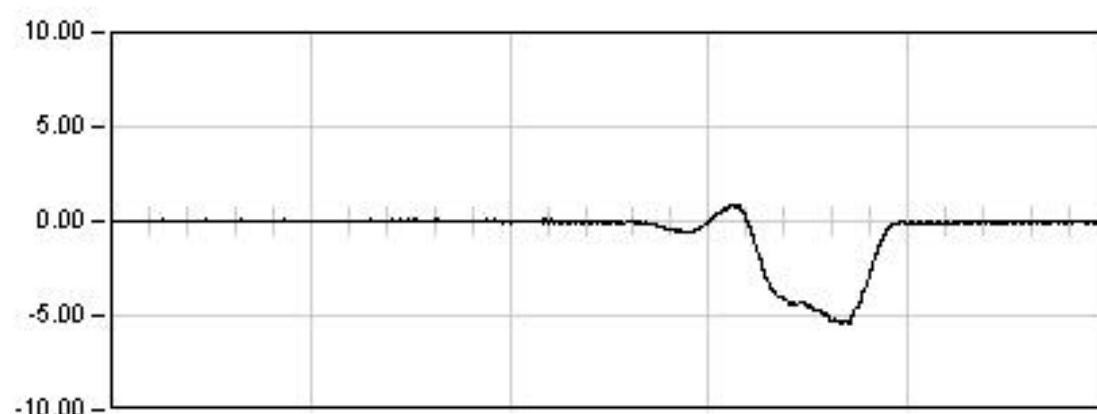
**DYNAMICA 13**

37.5 Seg

Max: -5.53

Min: 0.93

Rem: -0.02

**DYNAMICA 14**

41.5 Seg

Max: -5.45

Min: 0.87

Rem: -0.04

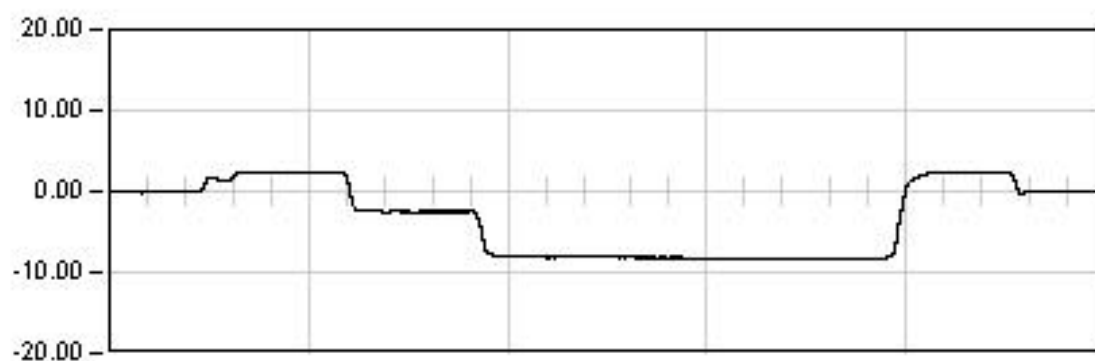
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P012

Canal : 39

Unidades : mm

**ESTATICA 01**

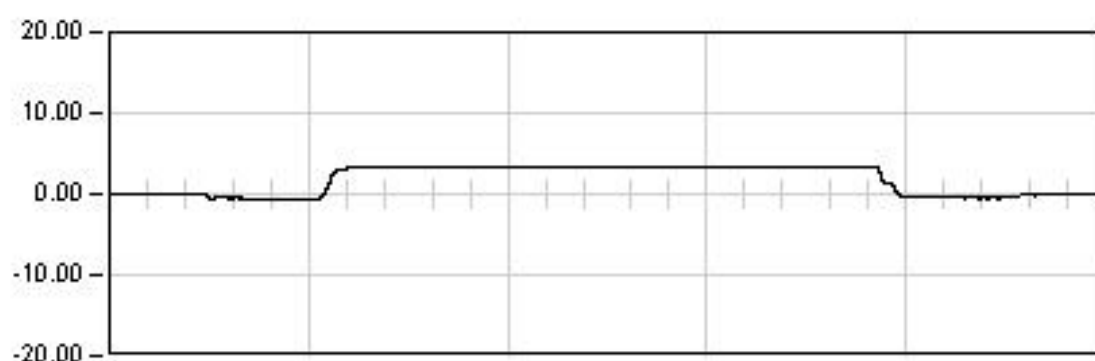
1809.0 Seg

Est: -8.24

Max: -8.40

Min: 2.46

Rem: -0.02

**ESTATICA 02**

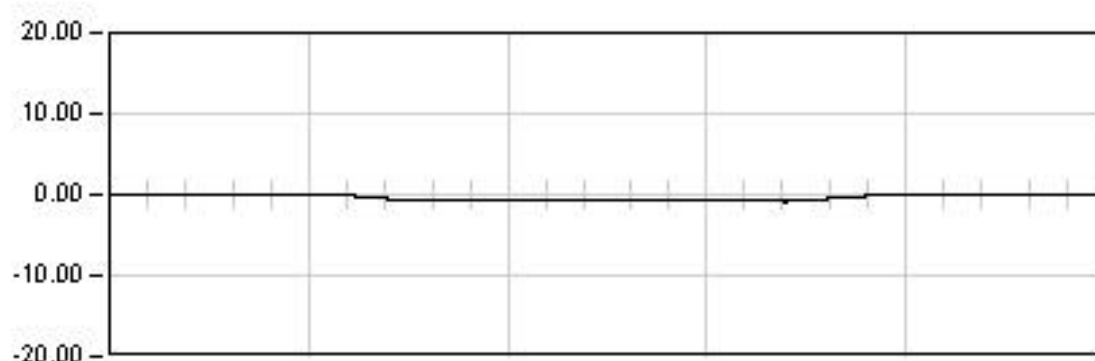
1690.0 Seg

Est: 3.33

Max: 3.35

Min: -0.56

Rem: 0.03

**ESTATICA 03**

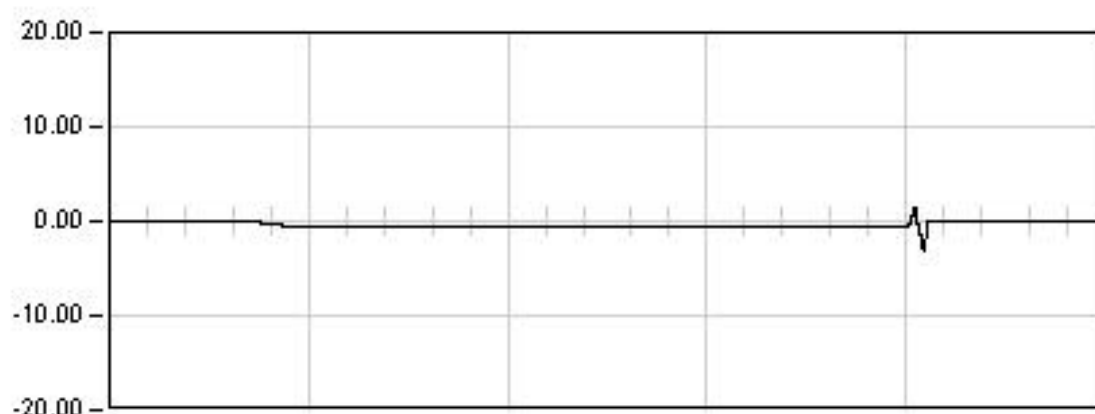
1519.0 Seg

Est: -0.73

Max: -0.96

Min: 0.13

Rem: 0.02

**ESTATICA 04**

1254.0 Seg

Est: -0.51

Max: -3.09

Min: 1.40

Rem: 0.01



## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P012

Canal : 39

Unidades : mm

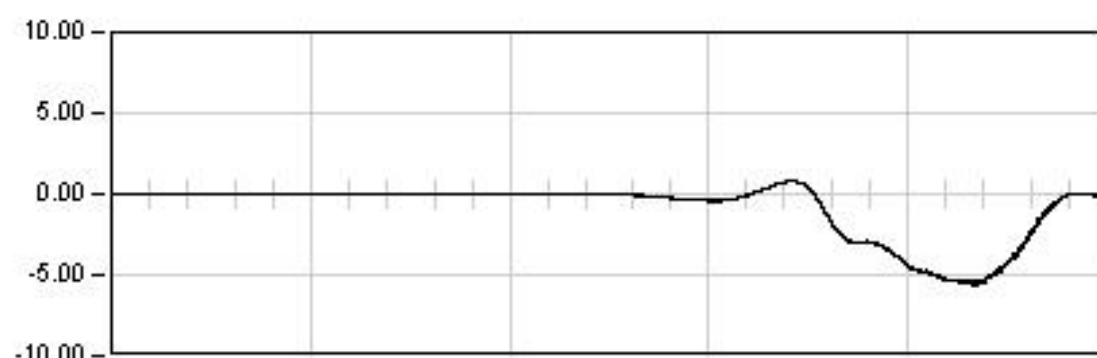
**DYNAMICA 11**

127.5 Seg

Max: -3.03

Min: 1.65

Rem: -0.01

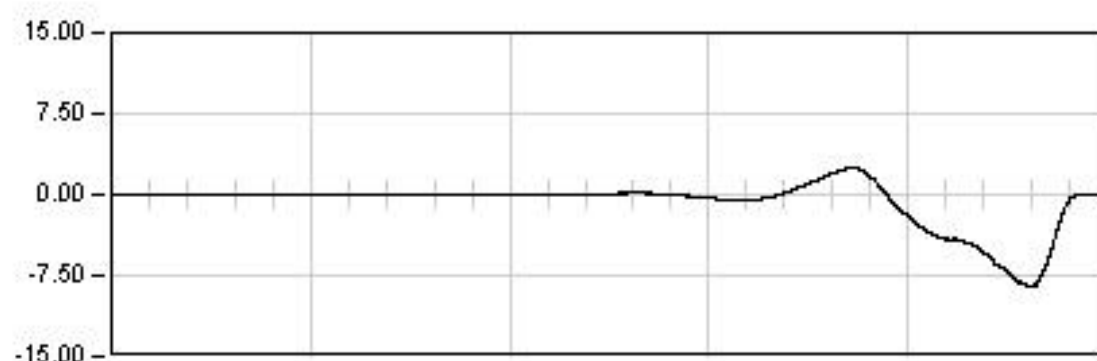
**DYNAMICA 21**

207.5 Seg

Max: -5.64

Min: 0.81

Rem: -0.04

**DYNAMICA 01**

234.0 Seg

Max: -8.57

Min: 2.50

Rem: -0.14

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P012

Canal : 39

Unidades : mm

**DYNAMICA 11**

127.5 Seg

Max: -3.03

Min: 1.65

Rem: -0.01

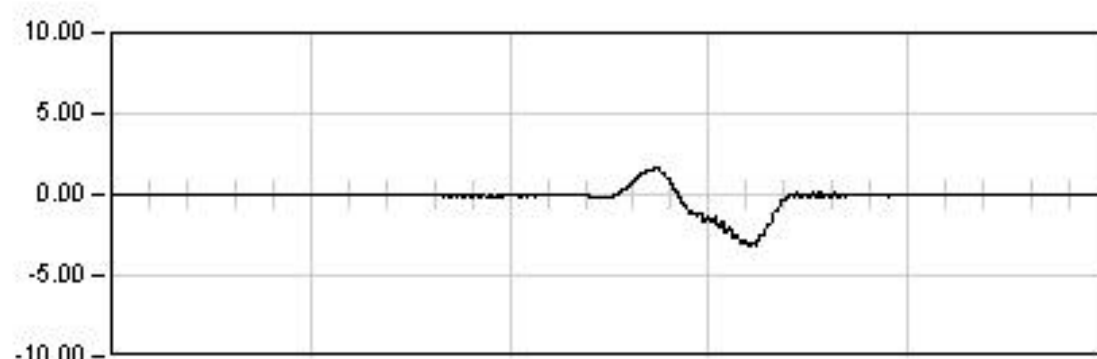
**DYNAMICA 12**

52.5 Seg

Max: -3.05

Min: 1.63

Rem: -0.01

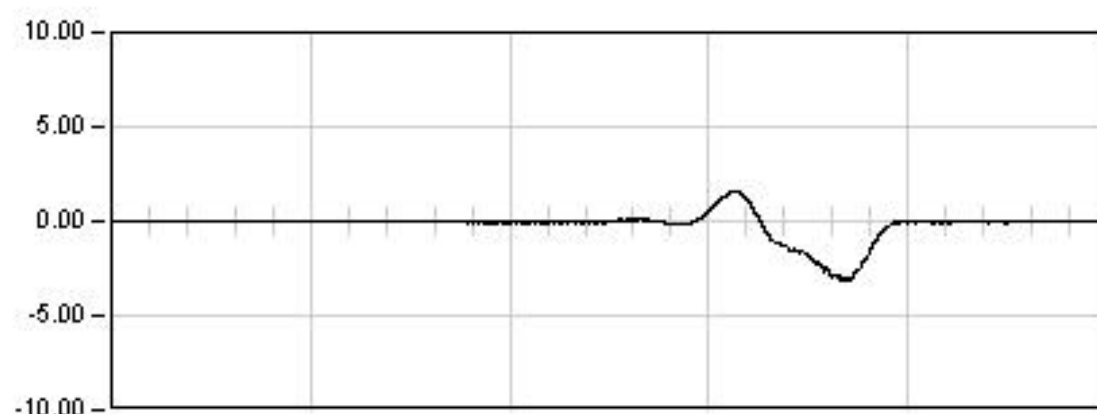
**DYNAMICA 13**

37.5 Seg

Max: -3.25

Min: 1.65

Rem: 0.00

**DYNAMICA 14**

41.5 Seg

Max: -3.16

Min: 1.56

Rem: -0.05

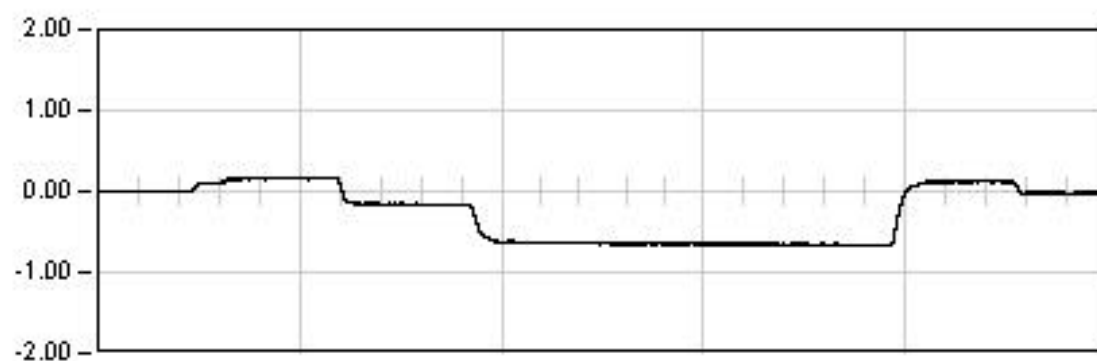
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P014

Canal : 51

Unidades : mm

**ESTÁTICA 01**

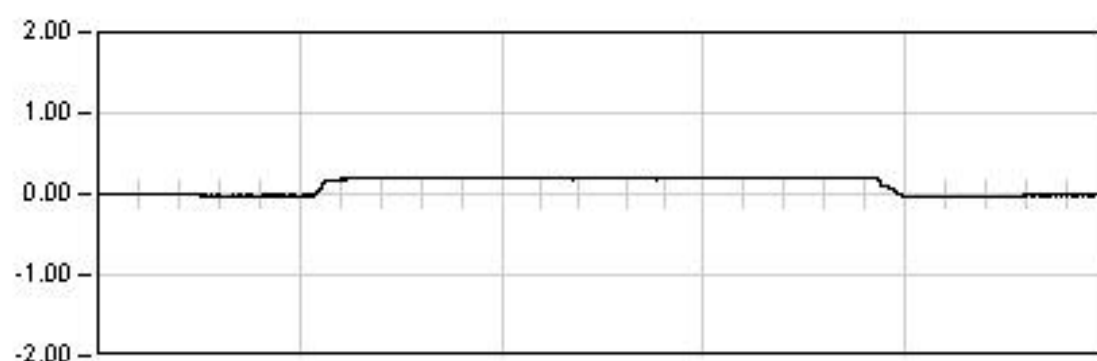
1809.0 Seg

Est: -0.66

Max: -0.68

Min: 0.17

Rem: -0.02

**ESTÁTICA 02**

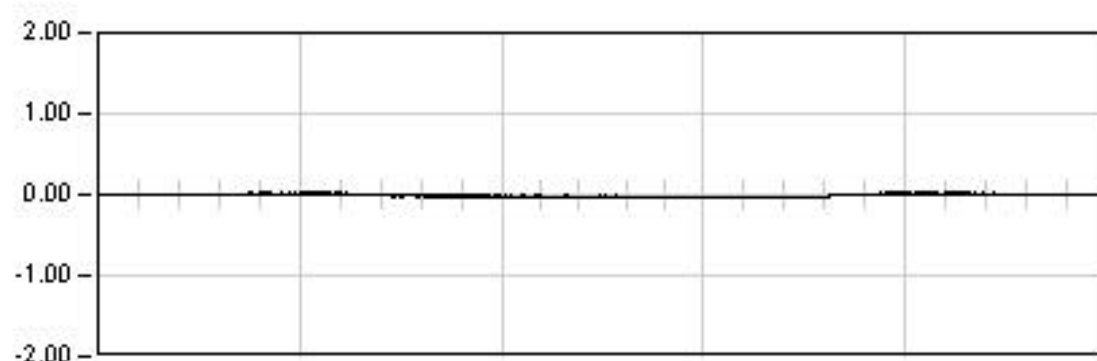
1690.0 Seg

Est: 0.20

Max: 0.21

Min: -0.04

Rem: -0.01

**ESTÁTICA 03**

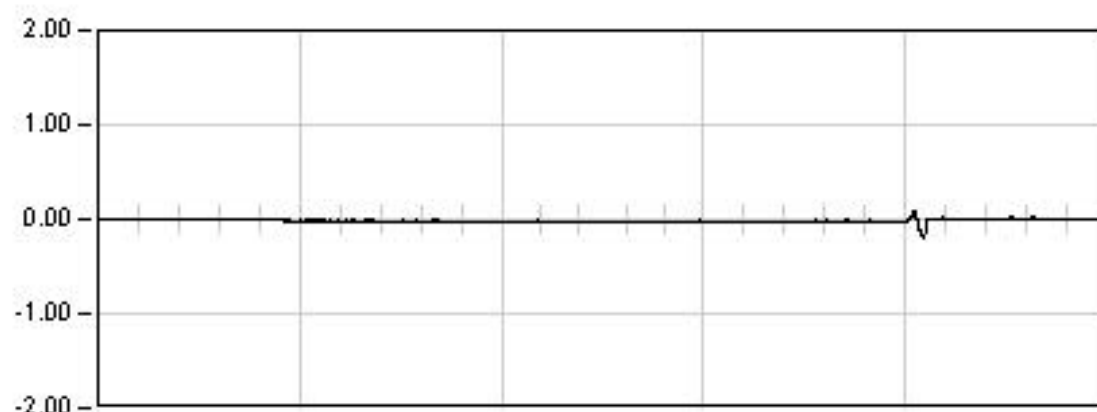
1519.0 Seg

Est: -0.03

Max: -0.04

Min: 0.02

Rem: 0.00

**ESTÁTICA 04**

1254.0 Seg

Est: -0.02

Max: -0.19

Min: 0.09

Rem: 0.00

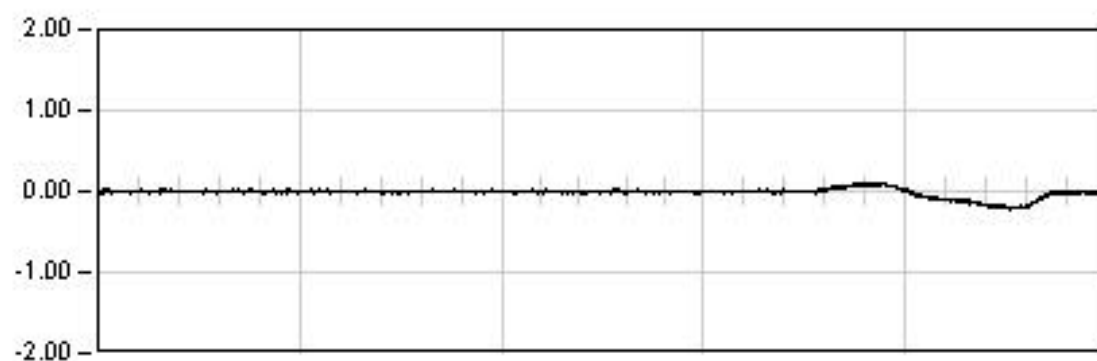
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P014

Canal : 51

Unidades : mm

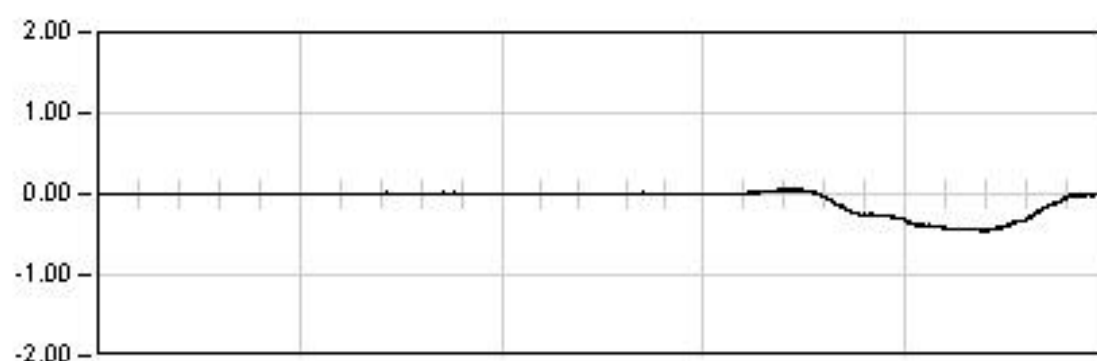
**DYNAMICA 11**

127.5 Seg

Max: -0.22

Min: 0.11

Rem: -0.02

**DYNAMICA 21**

207.5 Seg

Max: -0.46

Min: 0.07

Rem: -0.01

**DYNAMICA 01**

234.0 Seg

Max: -0.69

Min: 0.15

Rem: -0.02

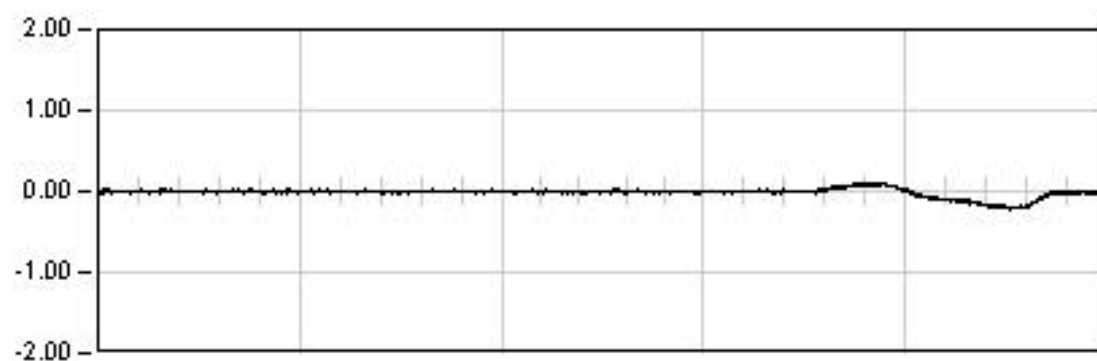
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P014

Canal : 51

Unidades : mm

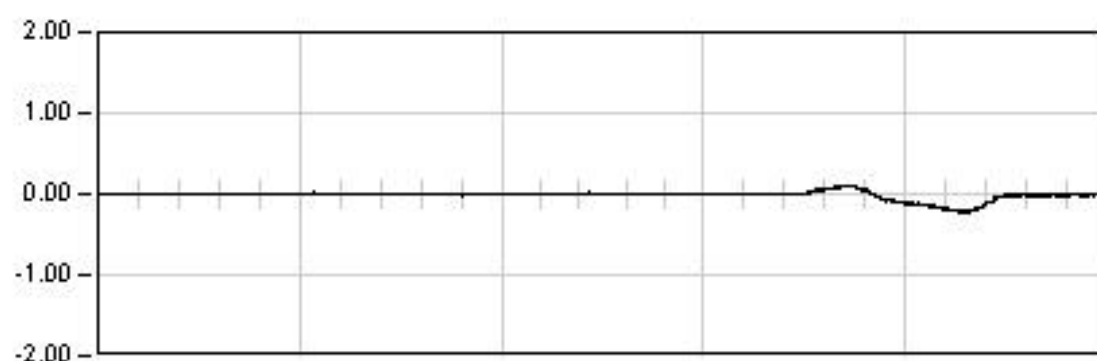
**DINAMICA 11**

127.5 Seg

Max: -0.22

Min: 0.11

Rem: -0.02

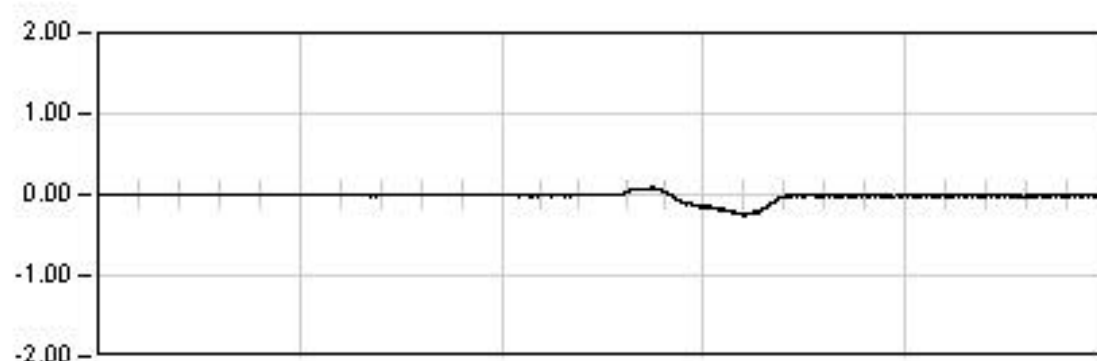
**DINAMICA 12**

52.5 Seg

Max: -0.23

Min: 0.10

Rem: -0.01

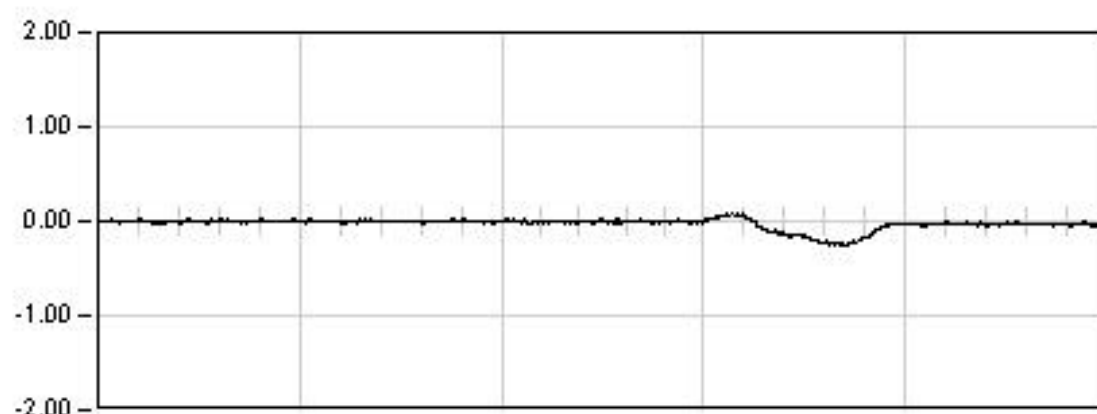
**DINAMICA 13**

37.5 Seg

Max: -0.26

Min: 0.09

Rem: -0.01

**DINAMICA 14**

41.5 Seg

Max: -0.26

Min: 0.08

Rem: -0.03

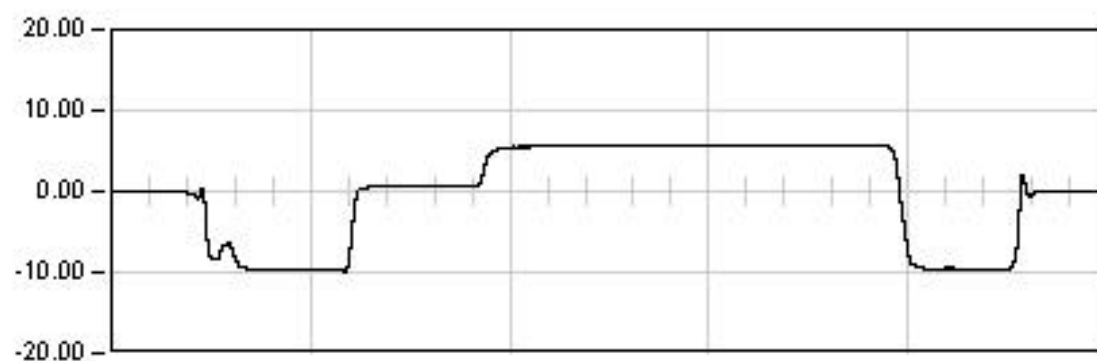
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P021

Canal : 40

Unidades : mm

**ESTATICA 01**

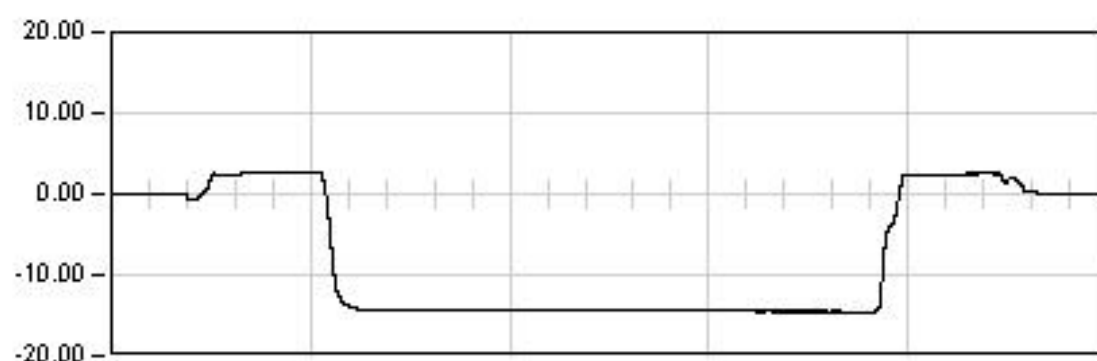
1809.0 Seg

Est: 5.74

Max: -9.87

Min: 5.79

Rem: -0.01

**ESTATICA 02**

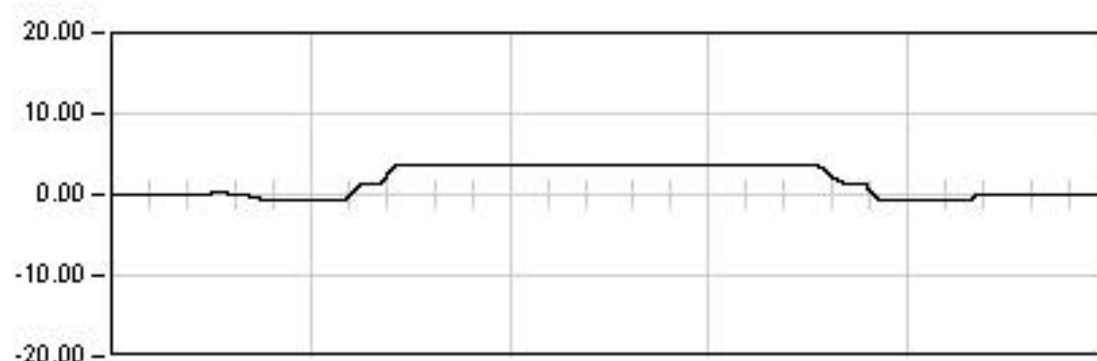
1690.0 Seg

Est: -14.50

Max: -14.54

Min: 2.71

Rem: 0.00

**ESTATICA 03**

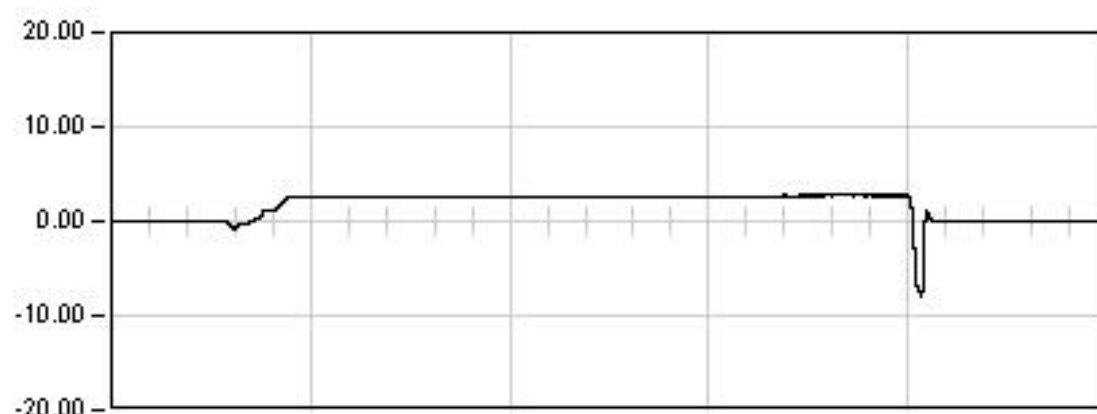
1519.0 Seg

Est: 3.65

Max: 3.69

Min: -0.65

Rem: -0.00

**ESTATICA 04**

1254.0 Seg

Est: 2.72

Max: -8.03

Min: 2.74

Rem: -0.03

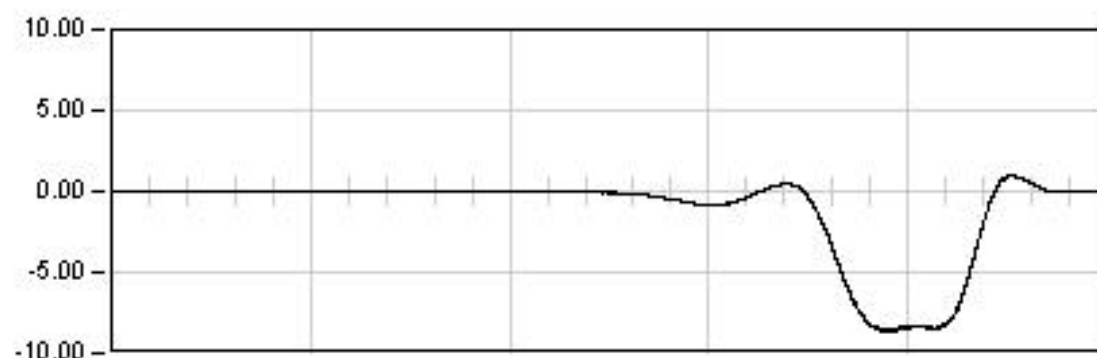
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P021

Canal : 40

Unidades : mm

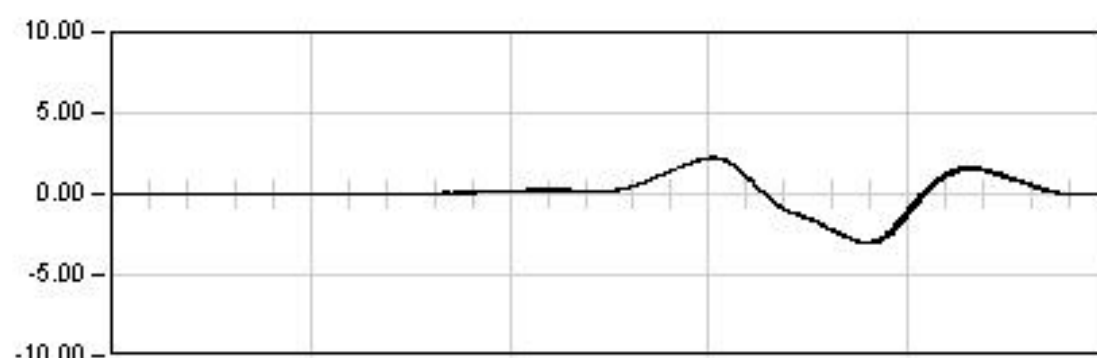
**DYNAMICA 11**

127.5 Seg

Max: -8.70

Min: 0.97

Rem: -0.04

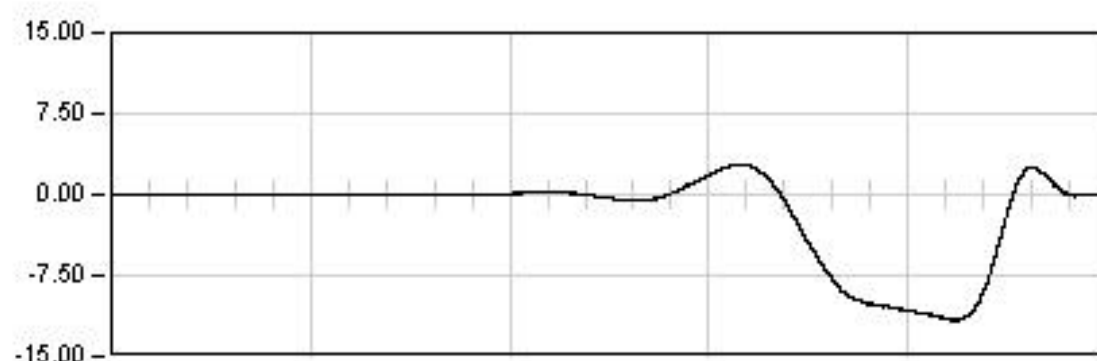
**DYNAMICA 21**

207.5 Seg

Max: -3.08

Min: 2.27

Rem: -0.01

**DYNAMICA 01**

234.0 Seg

Max: -11.69

Min: 2.76

Rem: -0.09

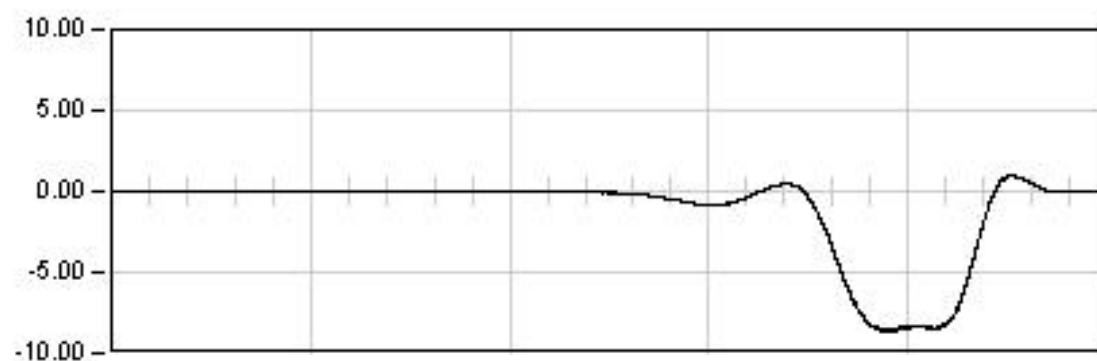
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P021

Canal : 40

Unidades : mm

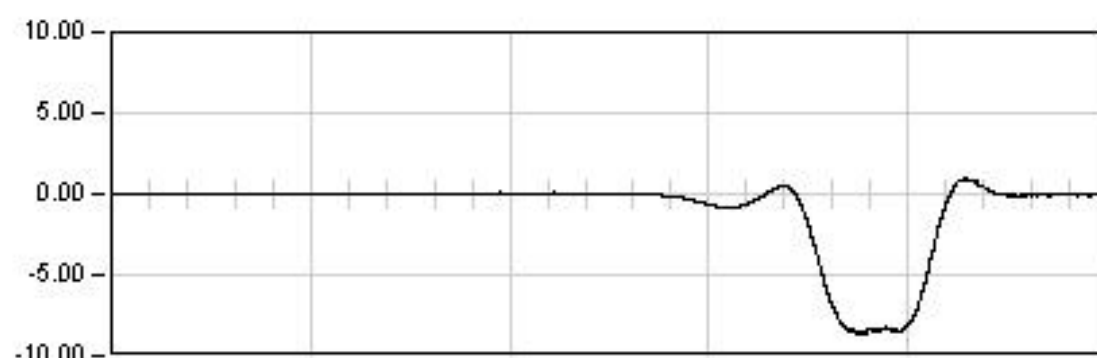
**DYNAMICA 11**

127.5 Seg

Max: -8.70

Min: 0.97

Rem: -0.04

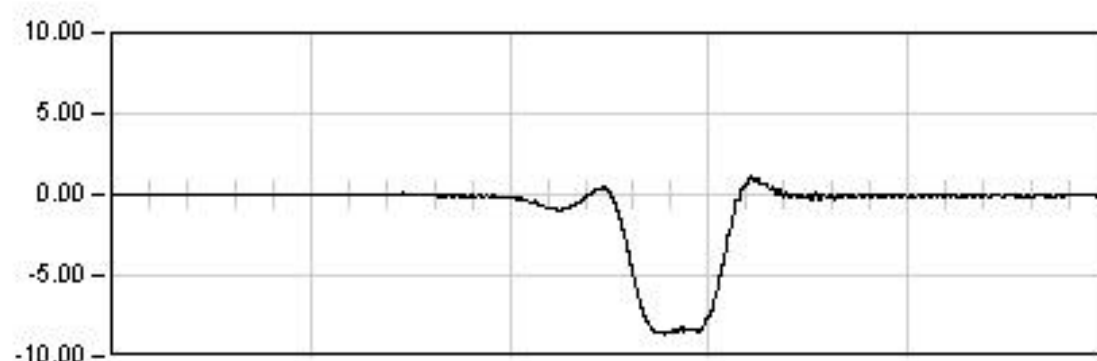
**DYNAMICA 12**

52.5 Seg

Max: -8.65

Min: 0.93

Rem: -0.06

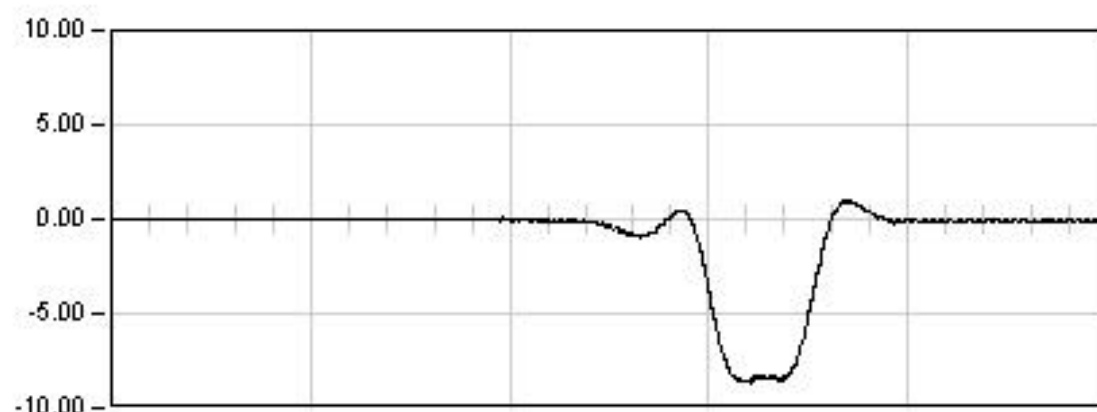
**DYNAMICA 13**

37.5 Seg

Max: -8.60

Min: 1.11

Rem: -0.07

**DYNAMICA 14**

41.5 Seg

Max: -8.65

Min: 1.01

Rem: -0.07



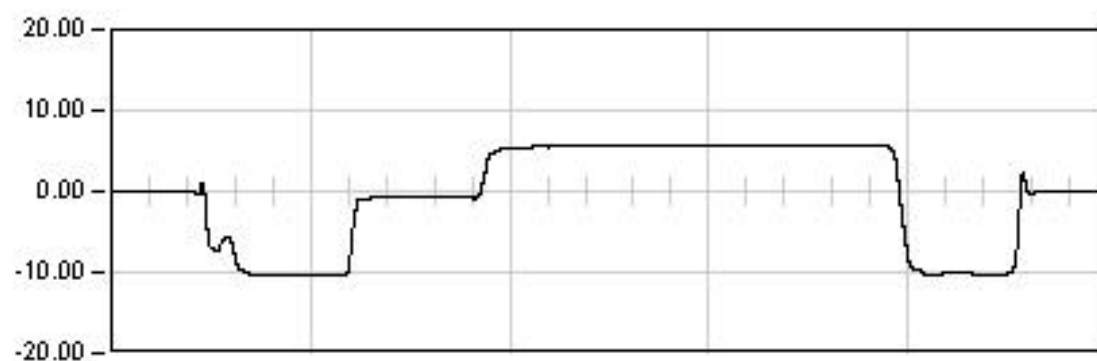
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P022

Canal : 41

Unidades : mm

**ESTATICA 01**

1809.0 Seg

Est: 5.73

Max: -10.41

Min: 5.76

Rem: 0.02

**ESTATICA 02**

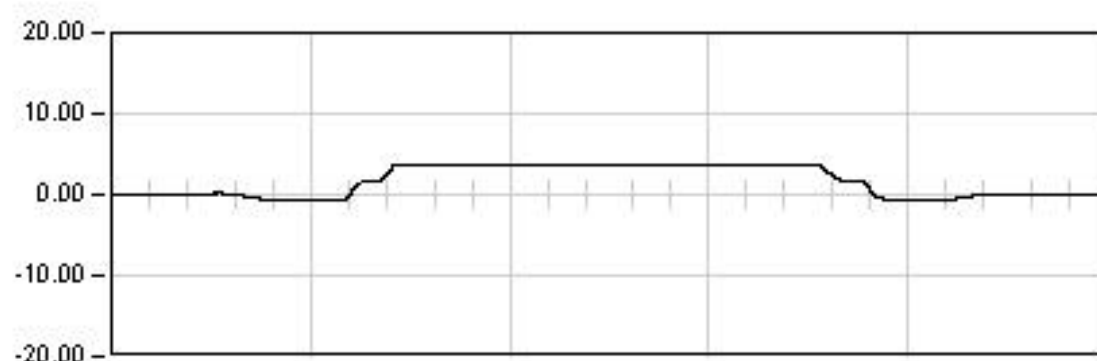
1690.0 Seg

Est: -15.08

Max: -15.12

Min: 2.82

Rem: -0.00

**ESTATICA 03**

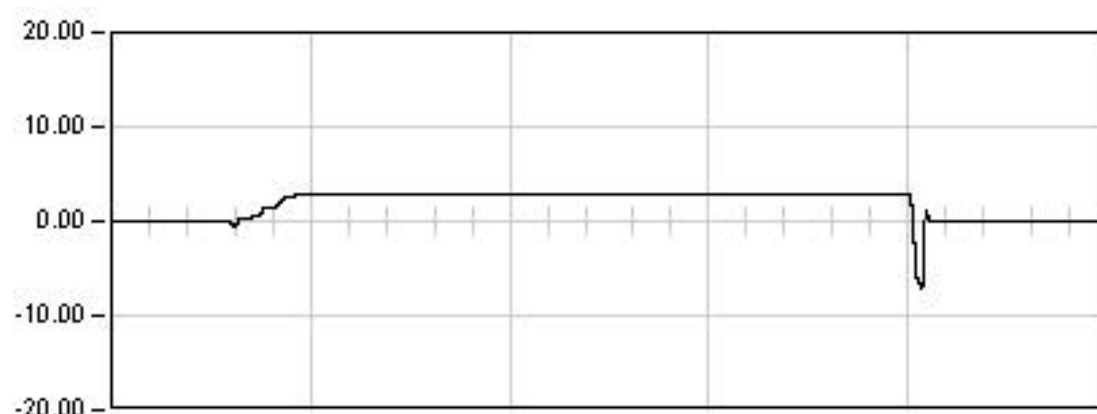
1519.0 Seg

Est: 3.74

Max: 3.77

Min: -0.59

Rem: 0.02

**ESTATICA 04**

1254.0 Seg

Est: 2.81

Max: -7.28

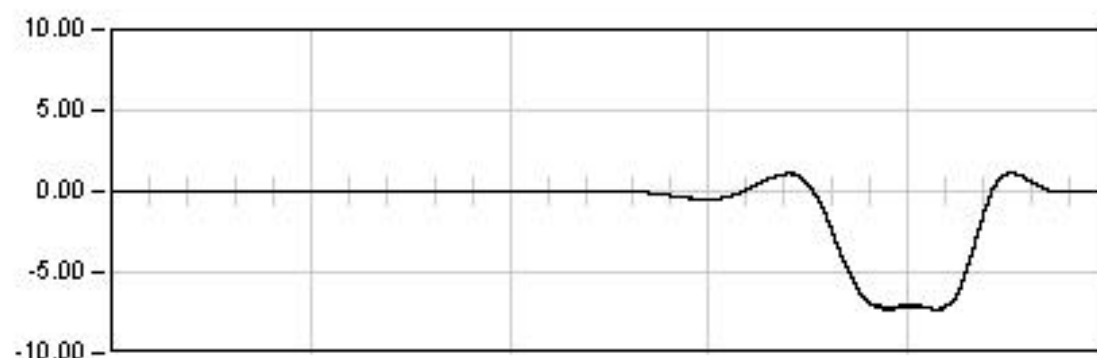
Min: 2.85

Rem: 0.00

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P022    Canal : 41    Unidades : mm

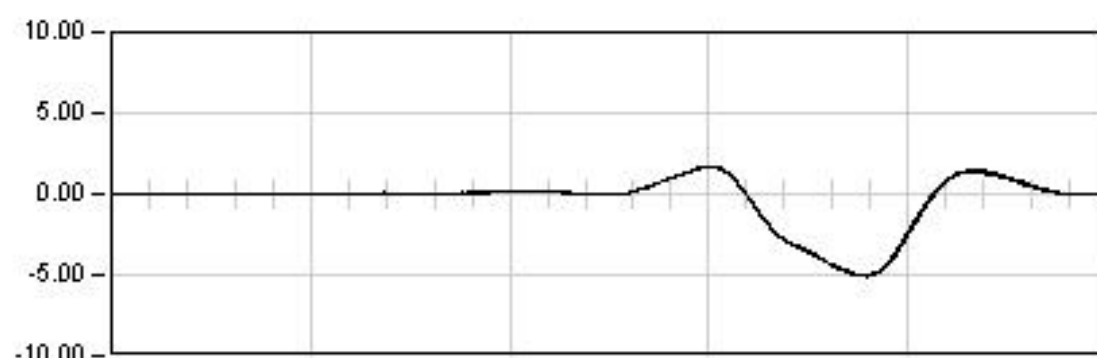
**DYNAMICA 11**

127.5    Seg

Max:    -7.33

Min:    1.14

Rem:    -0.02

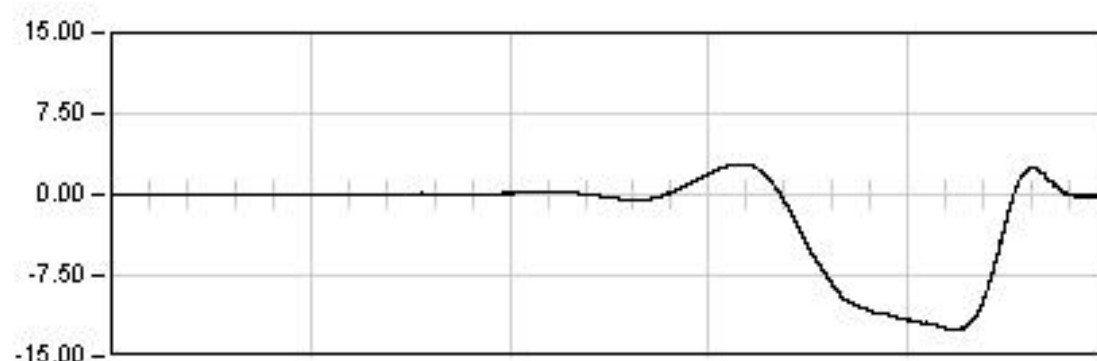
**DYNAMICA 21**

207.5    Seg

Max:    -5.09

Min:    1.70

Rem:    -0.00

**DYNAMICA 01**

234.0    Seg

Max:    -12.57

Min:    2.87

Rem:    -0.11

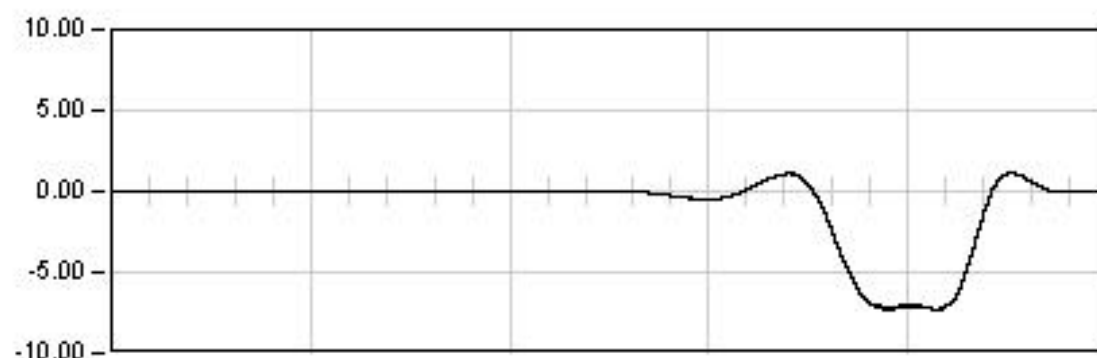
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P022

Canal : 41

Unidades : mm

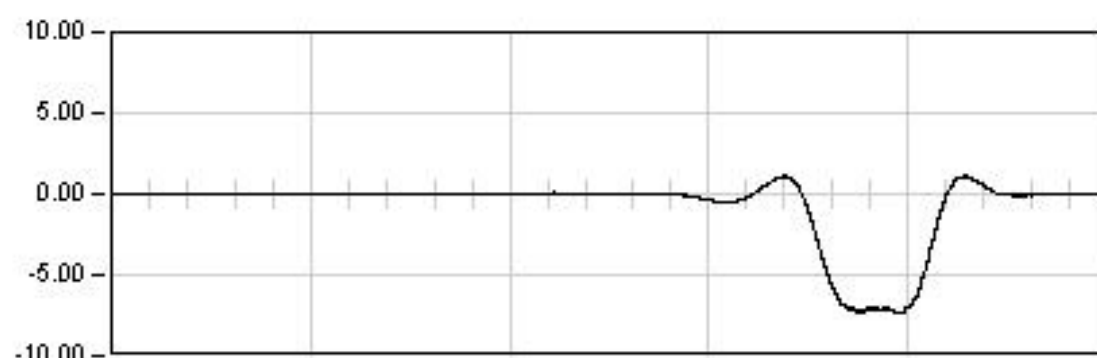
**DYNAMICA 11**

127.5 Seg

Max: -7.33

Min: 1.14

Rem: -0.02

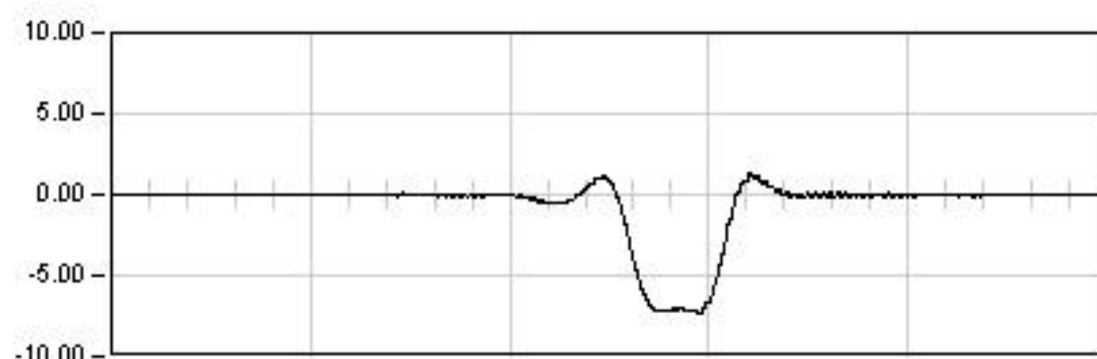
**DYNAMICA 12**

52.5 Seg

Max: -7.37

Min: 1.10

Rem: -0.06

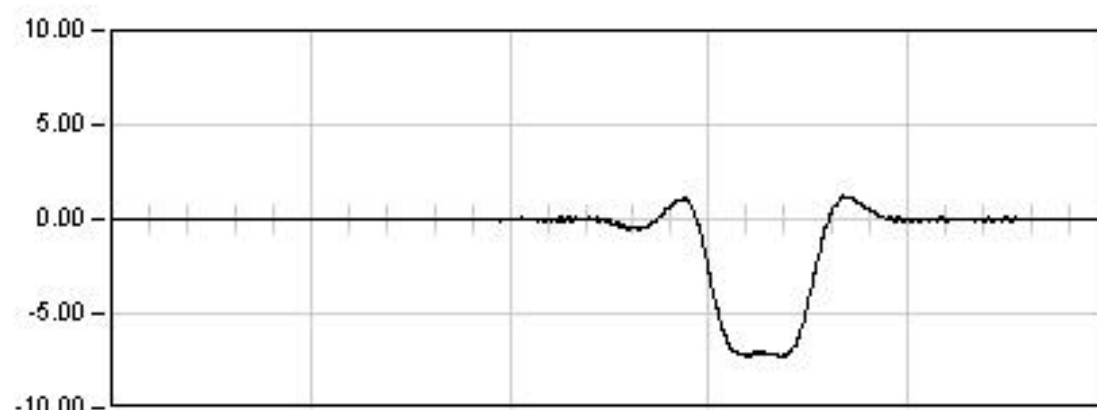
**DYNAMICA 13**

37.5 Seg

Max: -7.36

Min: 1.33

Rem: -0.03

**DYNAMICA 14**

41.5 Seg

Max: -7.35

Min: 1.22

Rem: 0.00

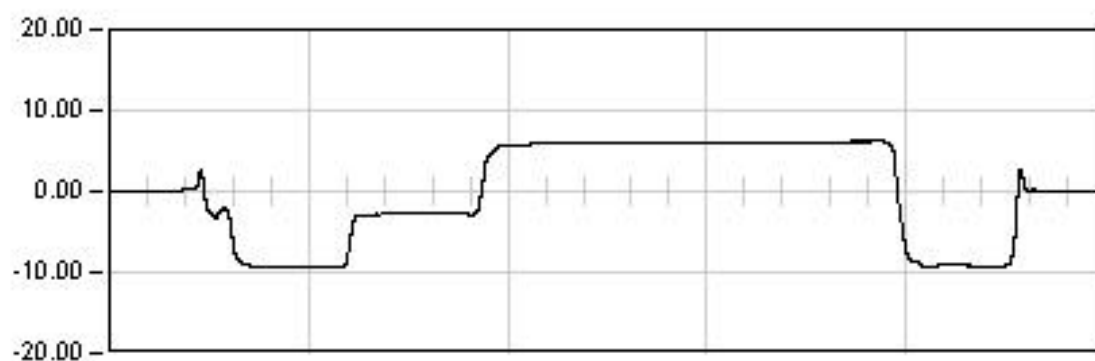
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P023

Canal : 42

Unidades : mm

**ESTATICA 01**

1809.0 Seg

Est: 6.15

Max: -9.41

Min: 6.22

Rem: 0.02

**ESTATICA 02**

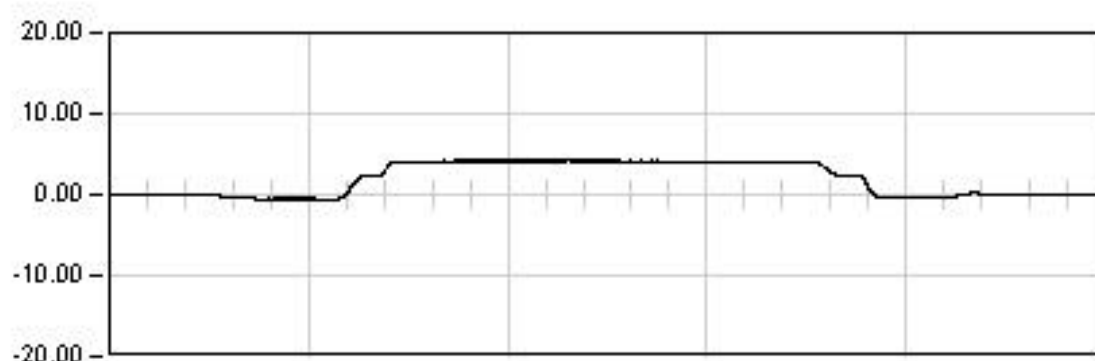
1690.0 Seg

Est: -14.57

Max: -14.62

Min: 3.27

Rem: -0.03

**ESTATICA 03**

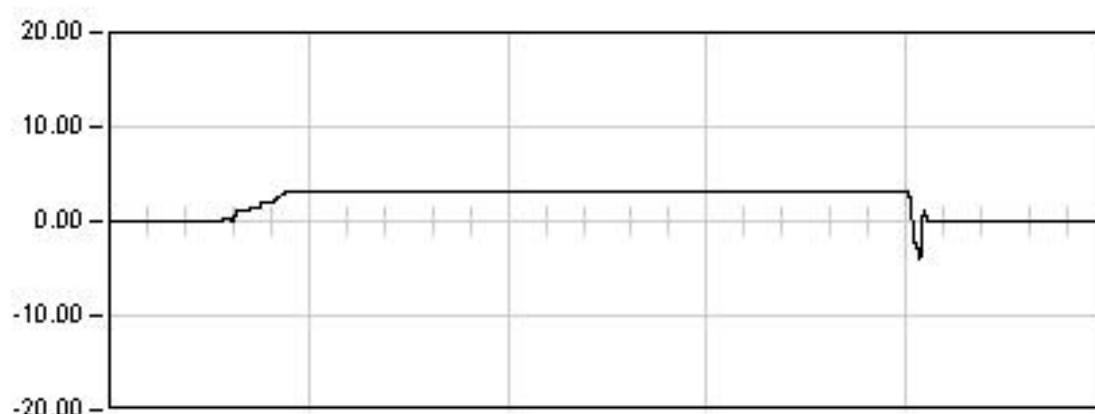
1519.0 Seg

Est: 4.14

Max: 4.19

Min: -0.54

Rem: -0.02

**ESTATICA 04**

1254.0 Seg

Est: 3.13

Max: -3.91

Min: 3.16

Rem: -0.01

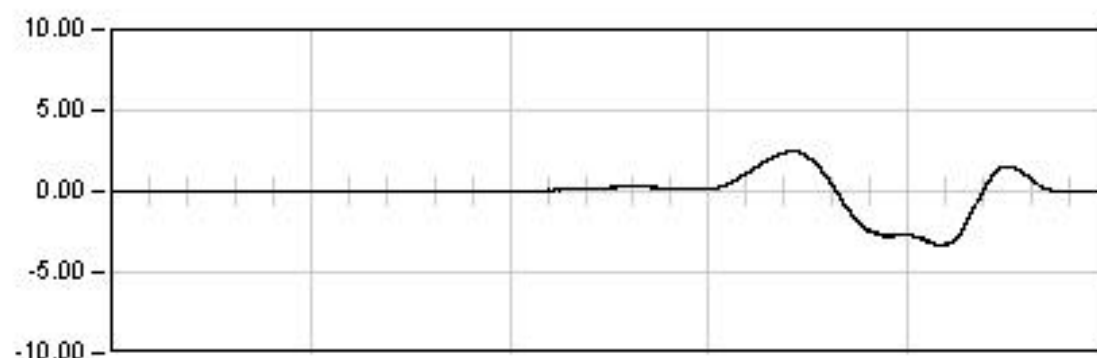
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P023

Canal : 42

Unidades : mm

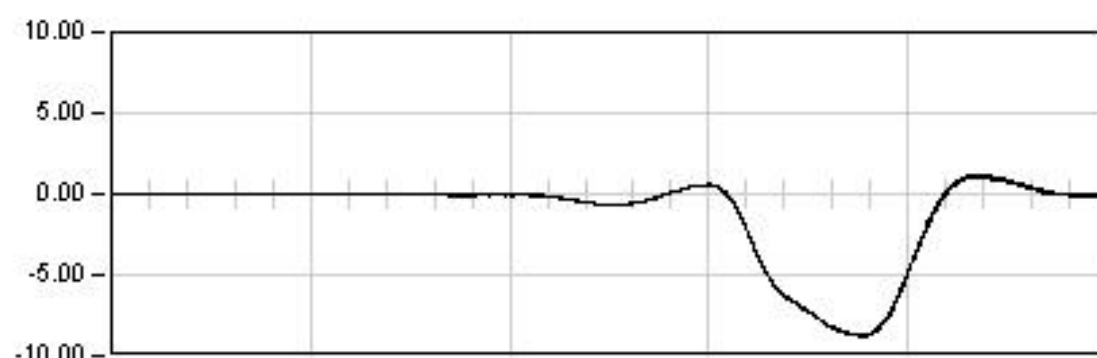
**DYNAMICA 11**

127.5 Seg

Max: -3.36

Min: 2.51

Rem: -0.00

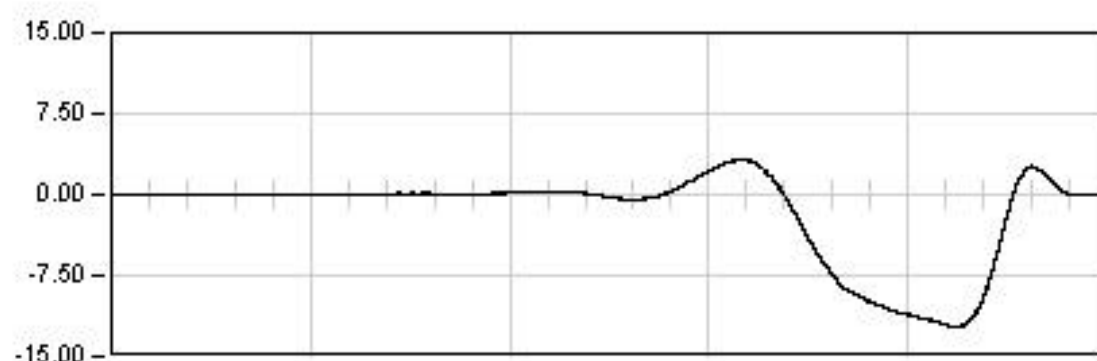
**DYNAMICA 21**

207.5 Seg

Max: -8.79

Min: 1.24

Rem: -0.08

**DYNAMICA 01**

234.0 Seg

Max: -12.36

Min: 3.25

Rem: -0.09

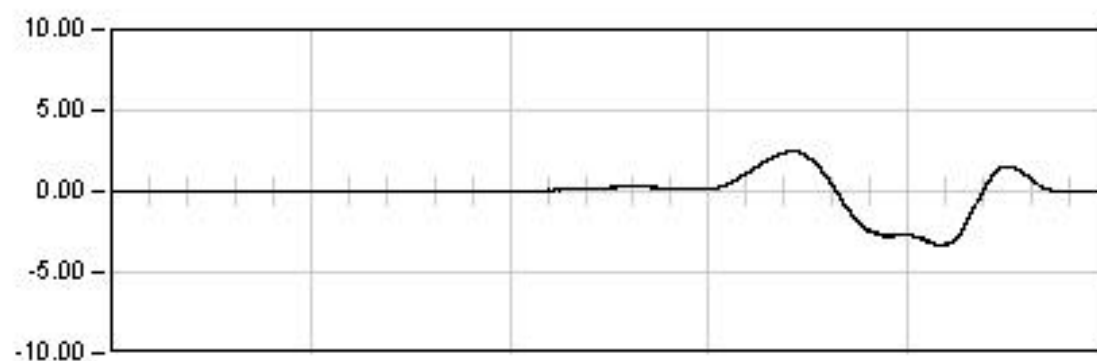
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P023

Canal : 42

Unidades : mm

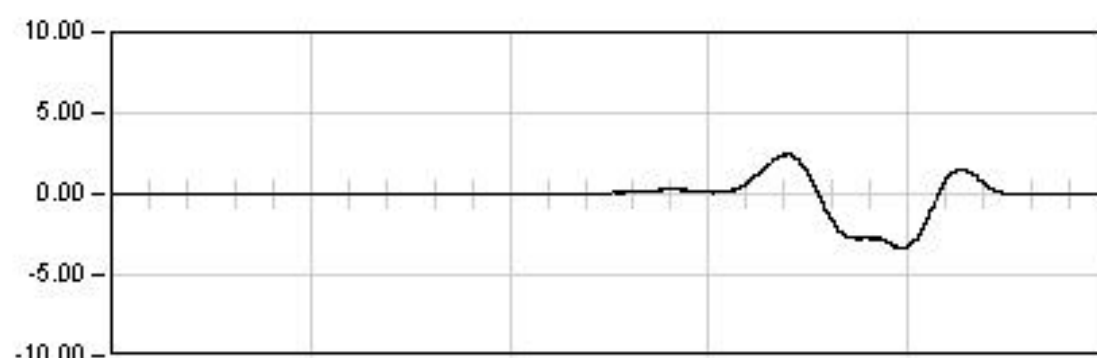
**DYNAMICA 11**

127.5 Seg

Max: -3.36

Min: 2.51

Rem: -0.00

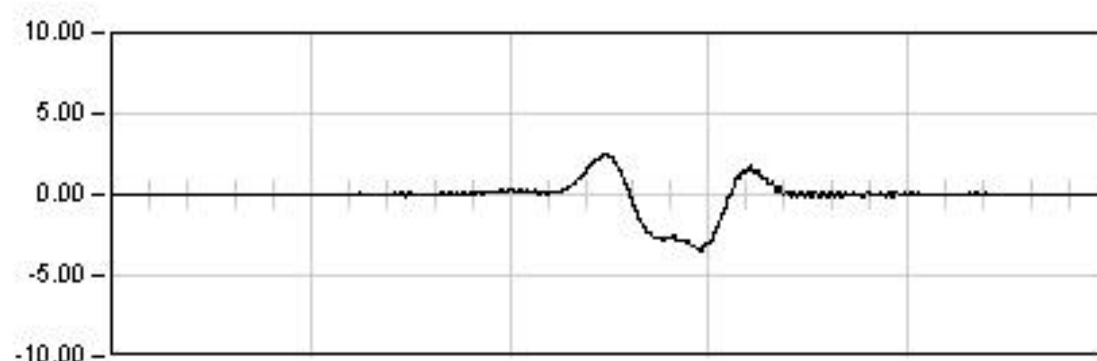
**DYNAMICA 12**

52.5 Seg

Max: -3.41

Min: 2.47

Rem: -0.00

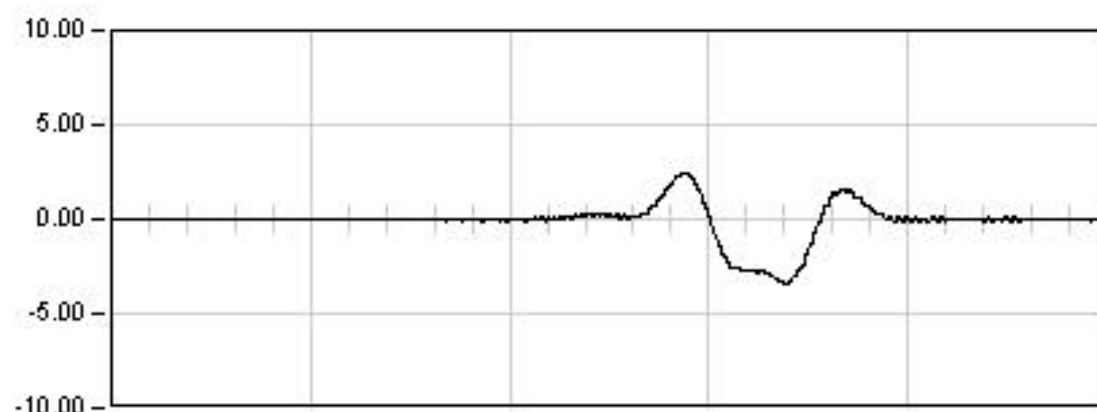
**DYNAMICA 13**

37.5 Seg

Max: -3.46

Min: 2.53

Rem: 0.01

**DYNAMICA 14**

41.5 Seg

Max: -3.42

Min: 2.48

Rem: -0.00

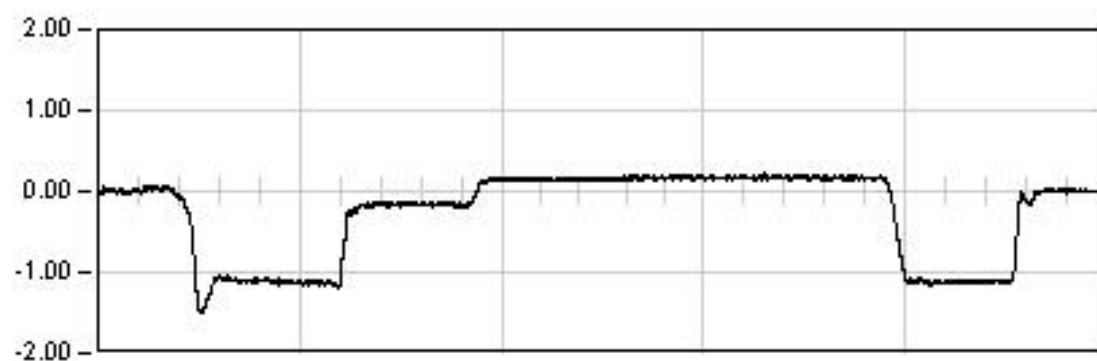
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P024

Canal : 52

Unidades : mm

**ESTATICA 01**

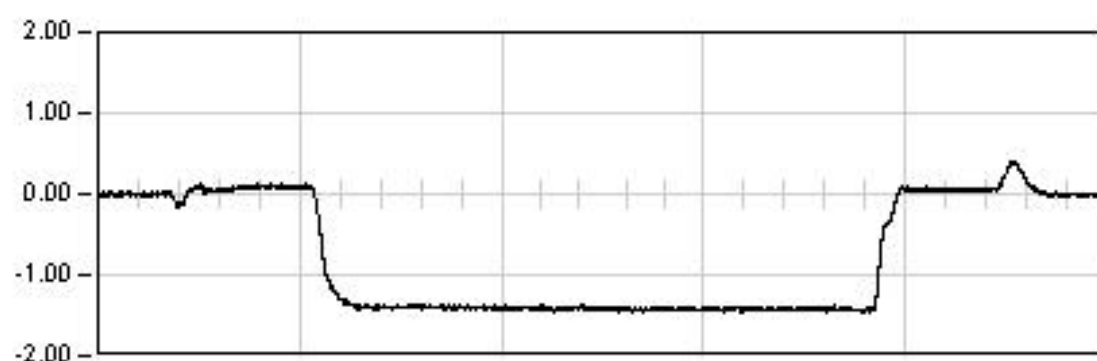
1809.0 Seg

Est: 0.16

Max: -1.50

Min: 0.22

Rem: 0.00

**ESTATICA 02**

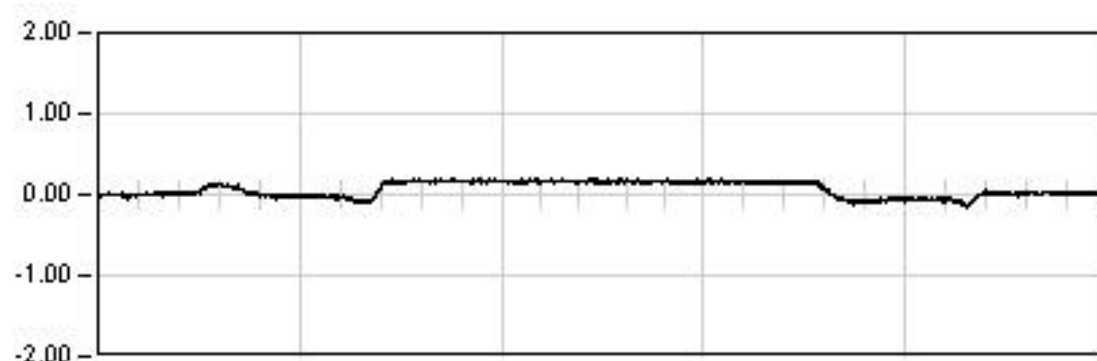
1690.0 Seg

Est: -1.41

Max: -1.47

Min: 0.40

Rem: -0.01

**ESTATICA 03**

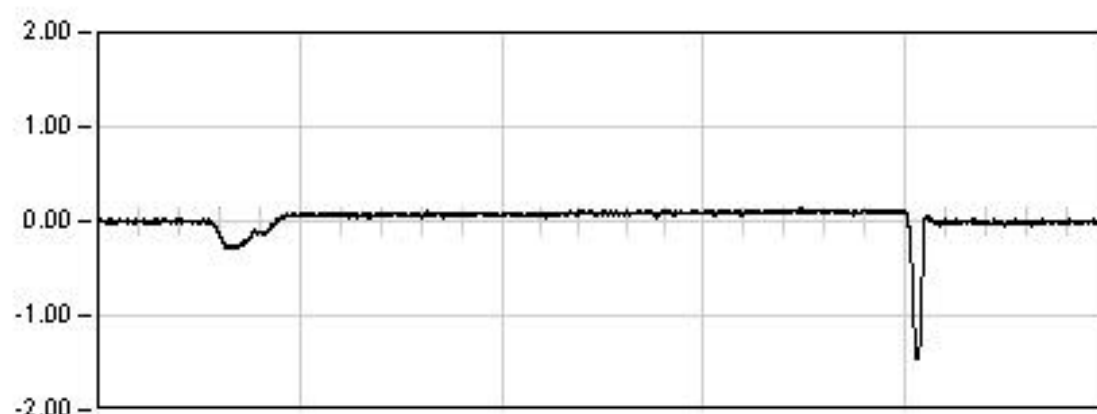
1519.0 Seg

Est: 0.16

Max: 0.20

Min: -0.16

Rem: 0.01

**ESTATICA 04**

1254.0 Seg

Est: 0.10

Max: -1.46

Min: 0.13

Rem: -0.01

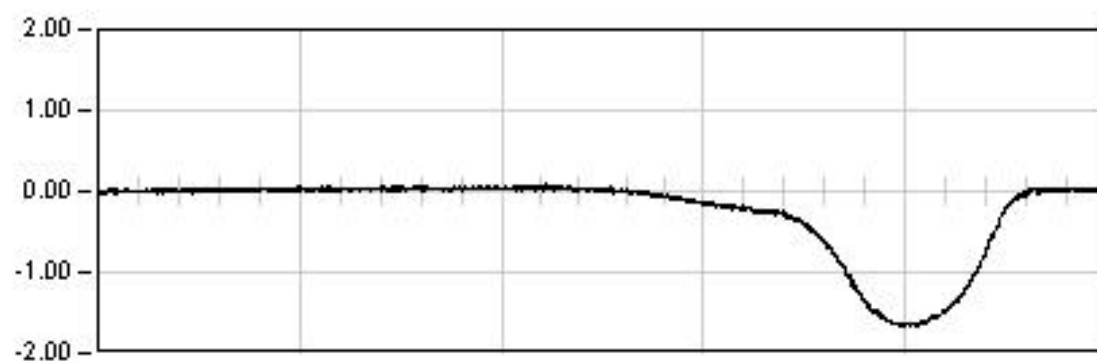
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P024

Canal : 52

Unidades : mm

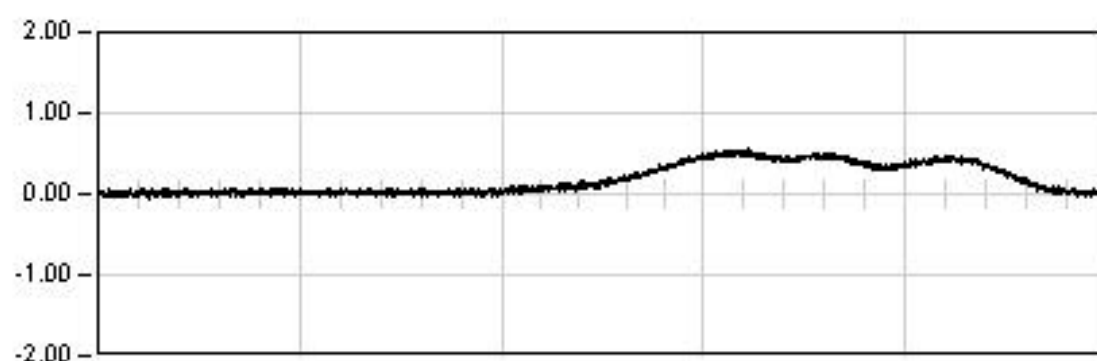
**DYNAMICA 11**

127.5 Seg

Max: -1.67

Min: 0.09

Rem: 0.01

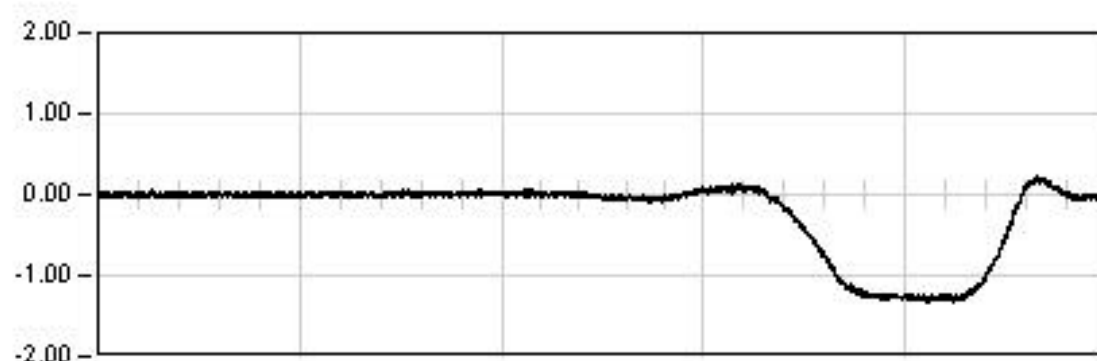
**DYNAMICA 21**

207.5 Seg

Max: 0.55

Min: -0.06

Rem: 0.01

**DYNAMICA 01**

234.0 Seg

Max: -1.32

Min: 0.22

Rem: -0.03



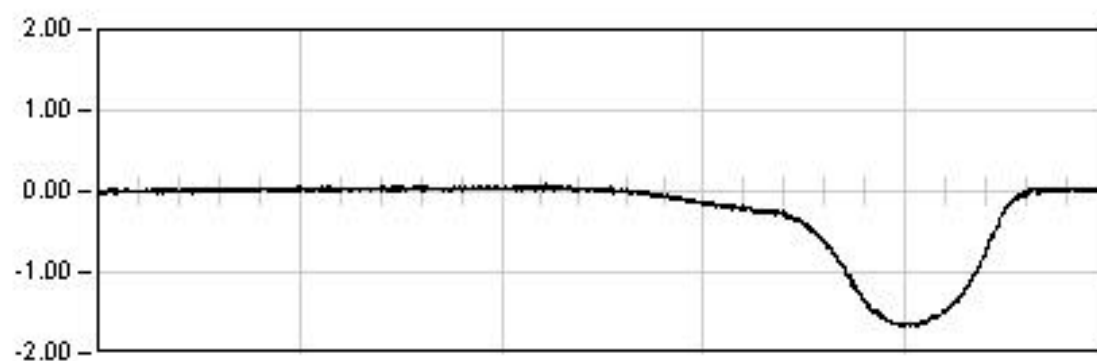
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P024

Canal : 52

Unidades : mm

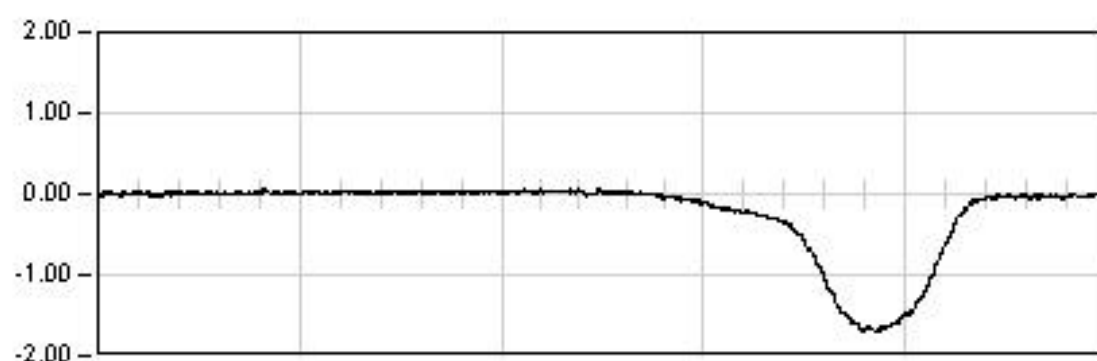
**DYNAMICA 11**

127.5 Seg

Max: -1.67

Min: 0.09

Rem: 0.01

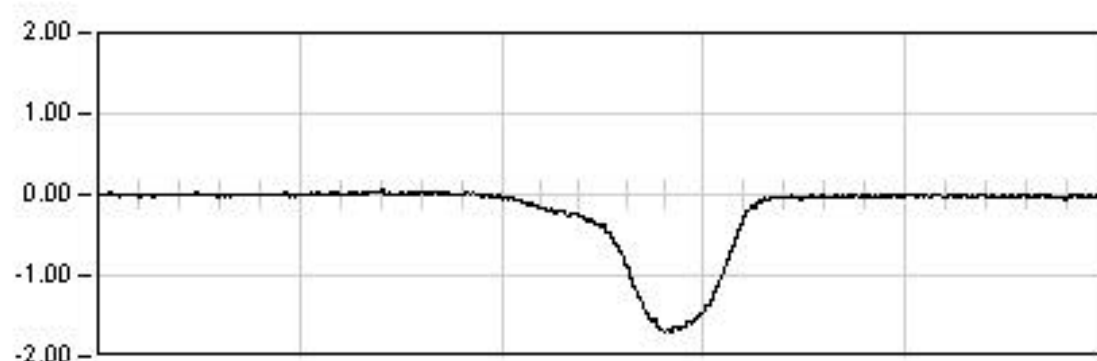
**DYNAMICA 12**

52.5 Seg

Max: -1.70

Min: 0.06

Rem: -0.01

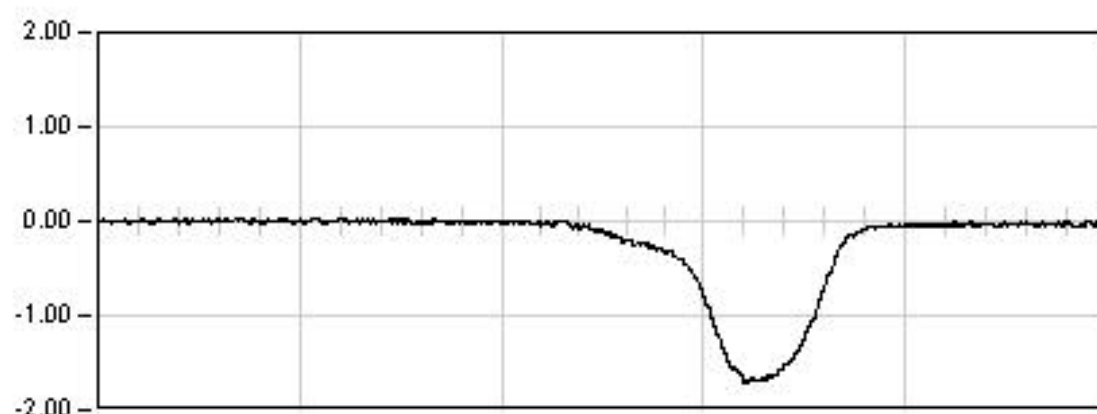
**DYNAMICA 13**

37.5 Seg

Max: -1.70

Min: 0.05

Rem: -0.02

**DYNAMICA 14**

41.5 Seg

Max: -1.71

Min: 0.03

Rem: -0.03

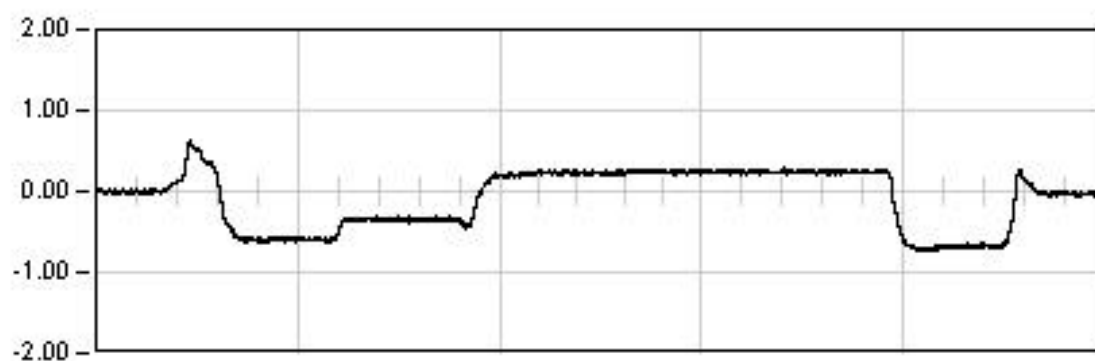
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P025

Canal : 53

Unidades : mm

**ESTATICA 01**

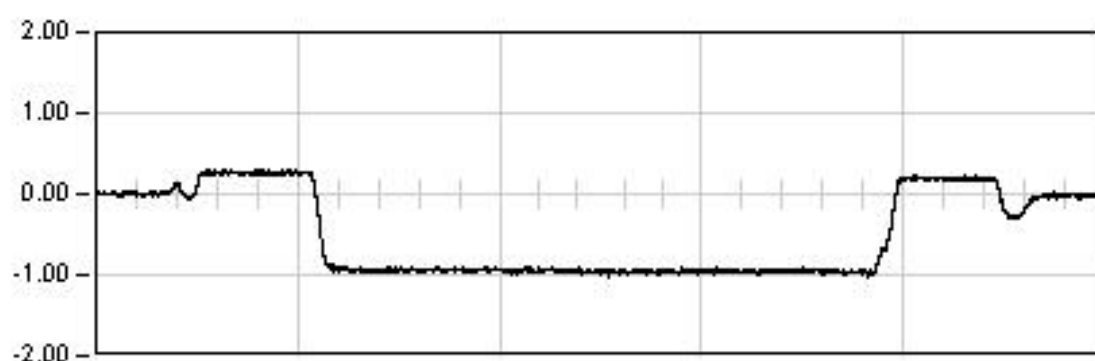
1809.0 Seg

Est: 0.25

Max: -0.75

Min: 0.62

Rem: -0.03

**ESTATICA 02**

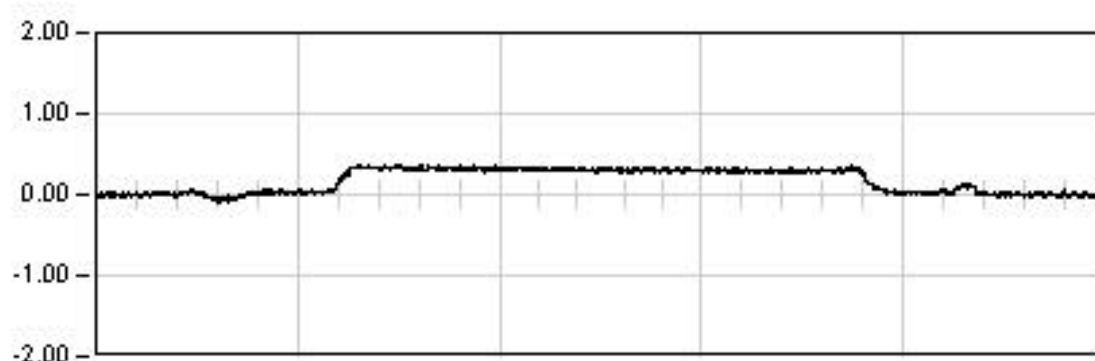
1690.0 Seg

Est: -0.95

Max: -1.02

Min: 0.30

Rem: -0.01

**ESTATICA 03**

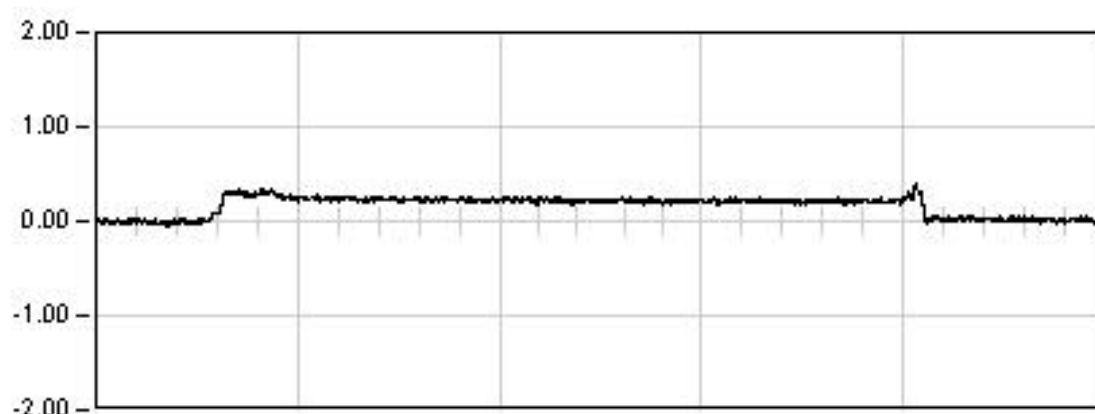
1519.0 Seg

Est: 0.29

Max: 0.37

Min: -0.10

Rem: -0.00

**ESTATICA 04**

1254.0 Seg

Est: 0.22

Max: 0.40

Min: -0.04

Rem: 0.01

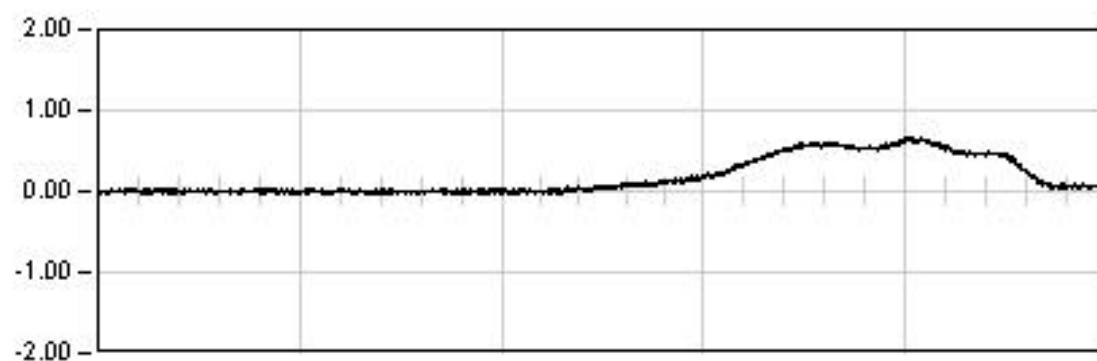
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P025

Canal : 53

Unidades : mm

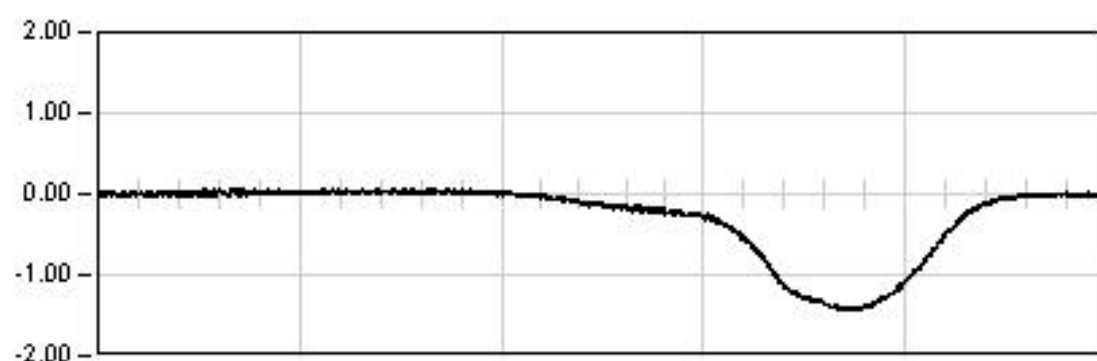
**DYNAMICA 11**

127.5 Seg

Max: 0.67

Min: -0.05

Rem: 0.06

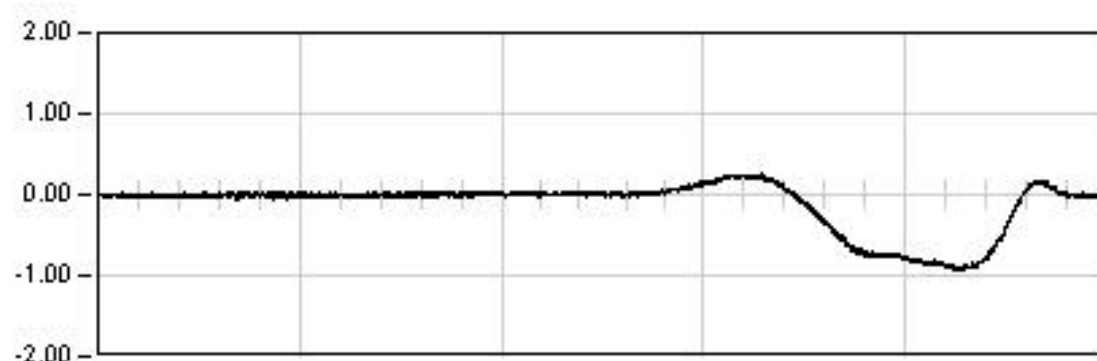
**DYNAMICA 21**

207.5 Seg

Max: -1.44

Min: 0.07

Rem: -0.01

**DYNAMICA 01**

234.0 Seg

Max: -0.94

Min: 0.25

Rem: -0.00

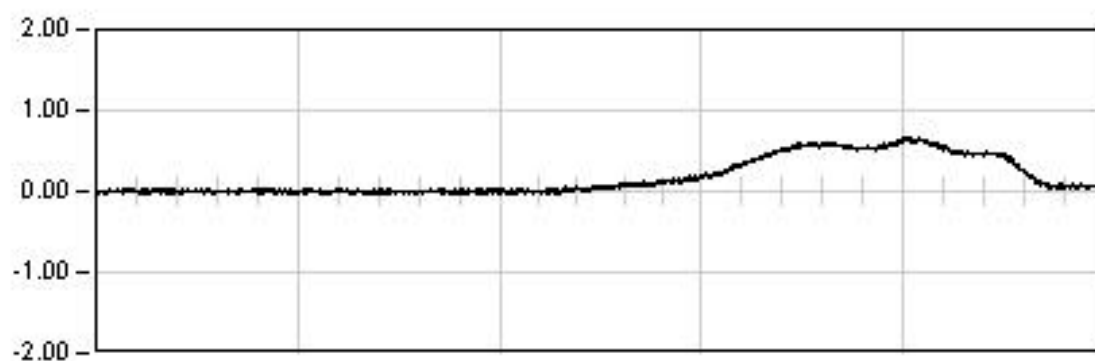
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P025

Canal : 53

Unidades : mm

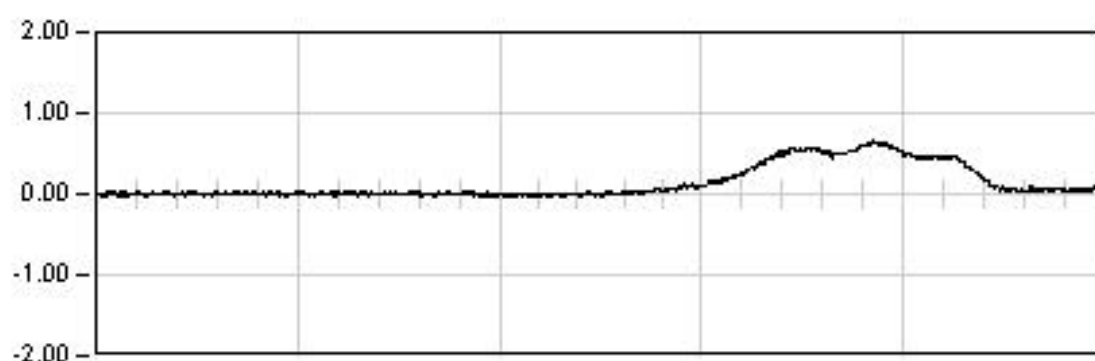
**DYNAMICA 11**

127.5 Seg

Max: 0.67

Min: -0.05

Rem: 0.06

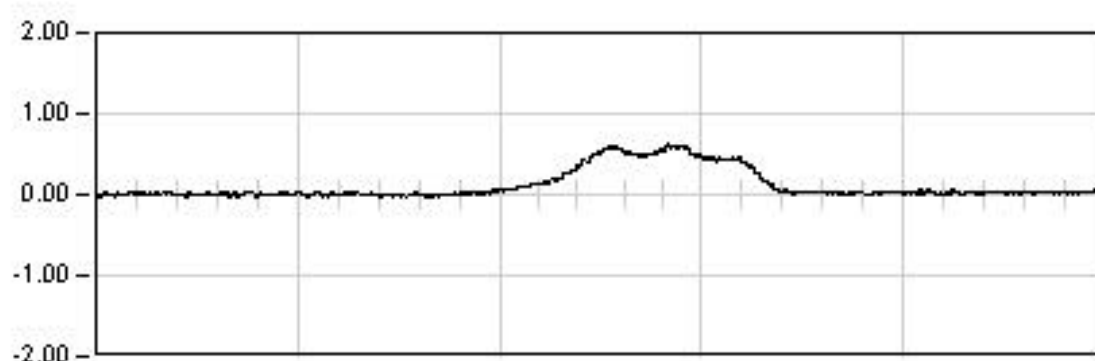
**DYNAMICA 12**

52.5 Seg

Max: 0.65

Min: -0.04

Rem: 0.06

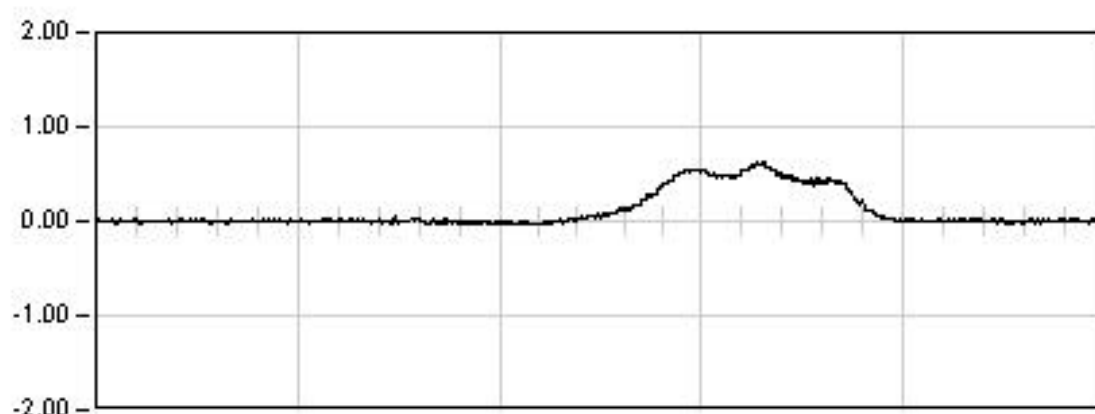
**DYNAMICA 13**

37.5 Seg

Max: 0.62

Min: -0.03

Rem: 0.03

**DYNAMICA 14**

41.5 Seg

Max: 0.63

Min: -0.04

Rem: 0.00

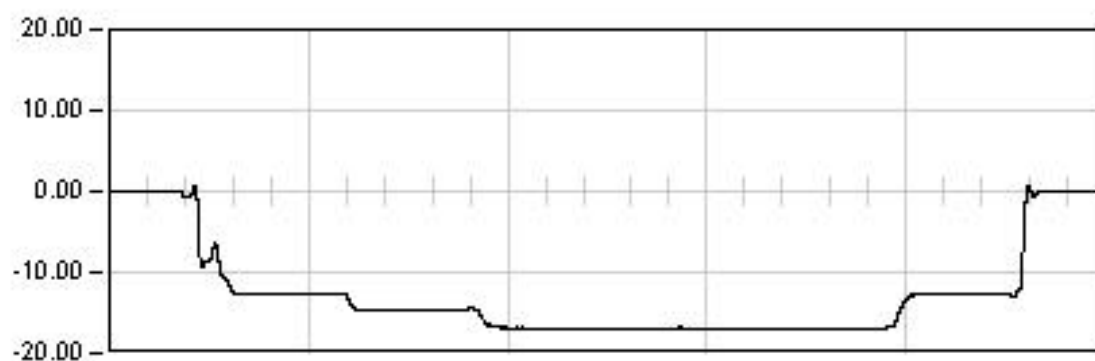
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P031

Canal : 43

Unidades : mm

**ESTATICA 01**

1809.0 Seg

Est: -16.89

Max: -17.04

Min: 0.80

Rem: 0.00

**ESTATICA 02**

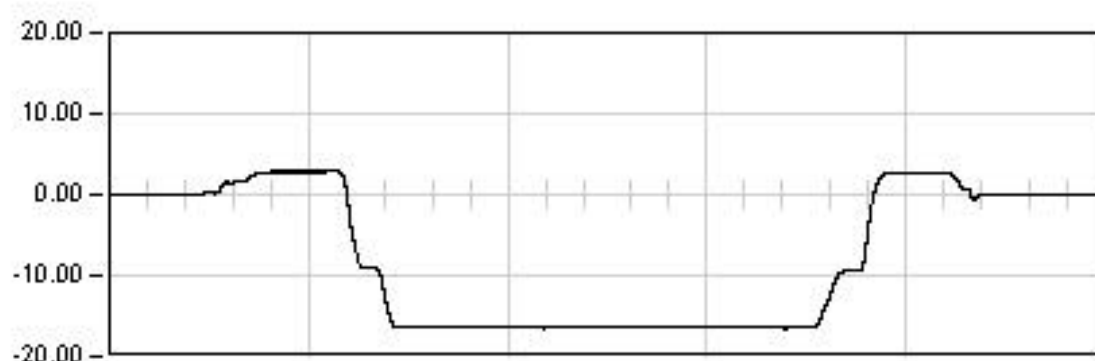
1690.0 Seg

Est: 7.97

Max: -11.60

Min: 7.99

Rem: 0.01

**ESTATICA 03**

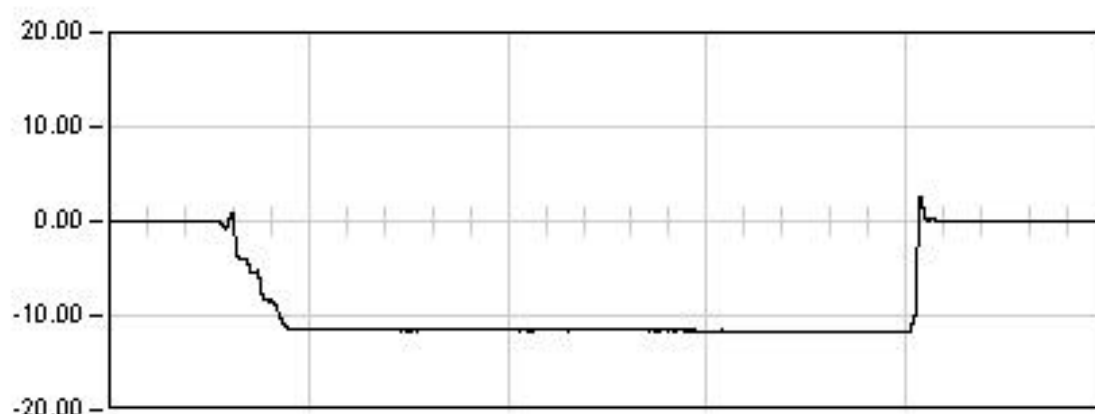
1519.0 Seg

Est: -16.41

Max: -16.55

Min: 2.86

Rem: 0.02

**ESTATICA 04**

1254.0 Seg

Est: -11.63

Max: -11.76

Min: 2.64

Rem: 0.02

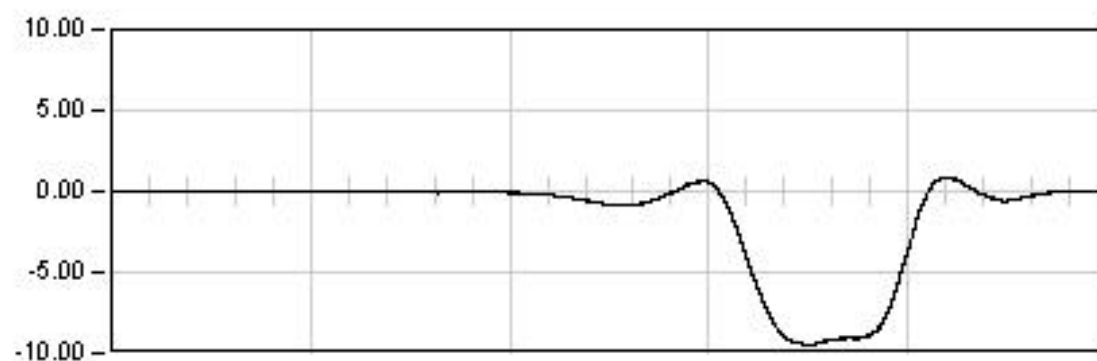
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P031

Canal : 43

Unidades : mm

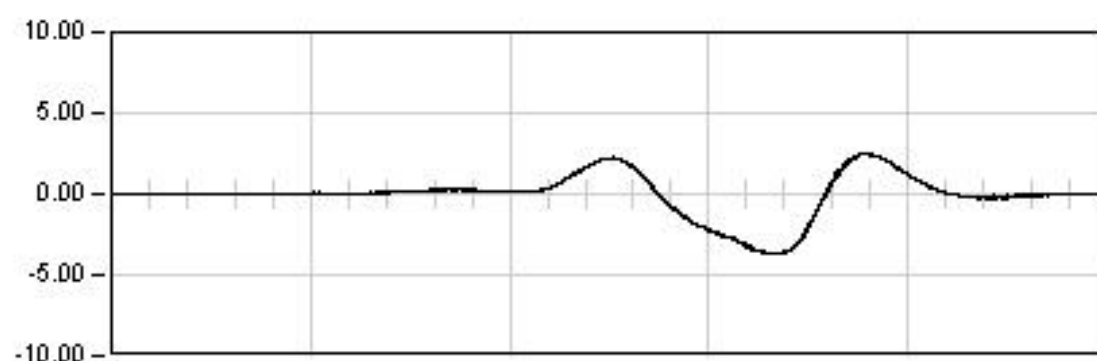
**DYNAMICA 11**

127.5 Seg

Max: -9.52

Min: 0.89

Rem: -0.05

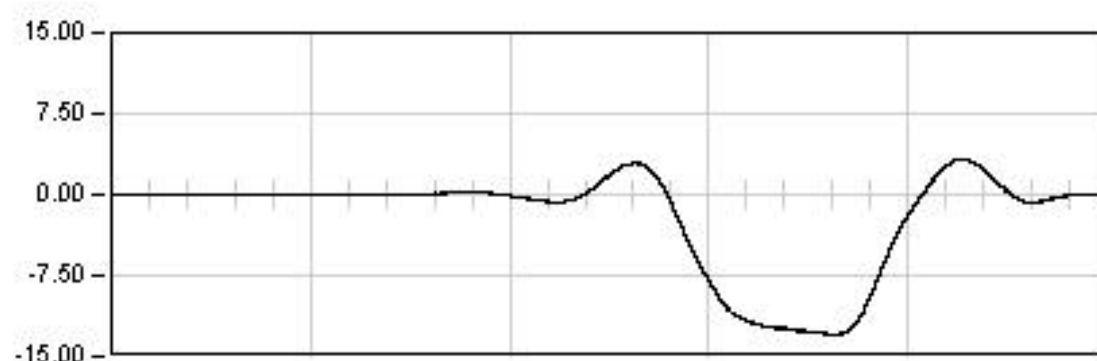
**DYNAMICA 21**

207.5 Seg

Max: -3.72

Min: 2.49

Rem: -0.00

**DYNAMICA 01**

234.0 Seg

Max: -12.97

Min: 3.28

Rem: -0.12

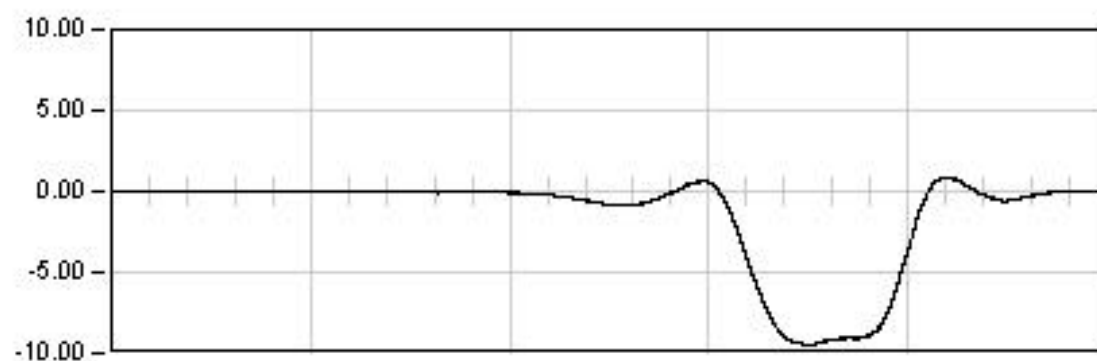
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P031

Canal : 43

Unidades : mm

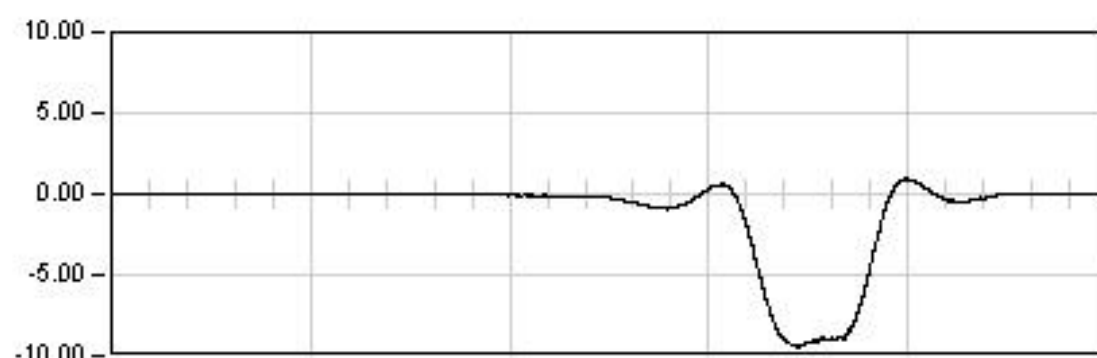
**DYNAMICA 11**

127.5 Seg

Max: -9.52

Min: 0.89

Rem: -0.05

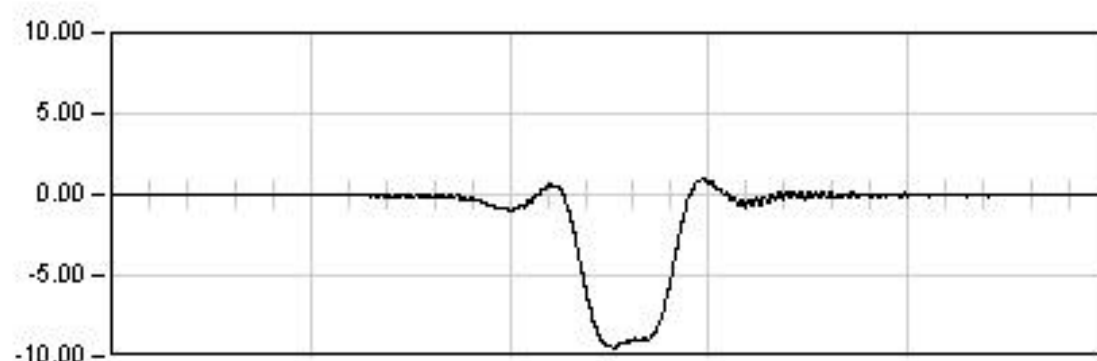
**DYNAMICA 12**

52.5 Seg

Max: -9.45

Min: 0.93

Rem: -0.01

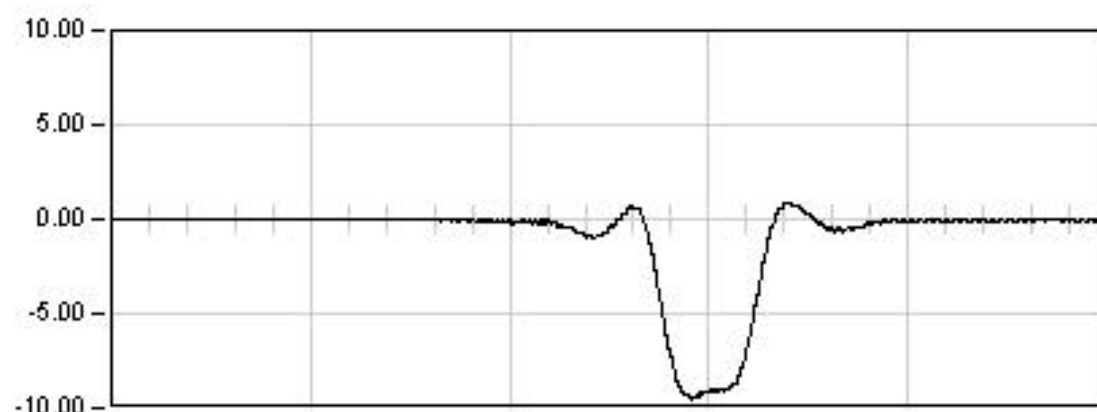
**DYNAMICA 13**

37.5 Seg

Max: -9.51

Min: 0.96

Rem: -0.02

**DYNAMICA 14**

41.5 Seg

Max: -9.51

Min: 0.90

Rem: -0.06

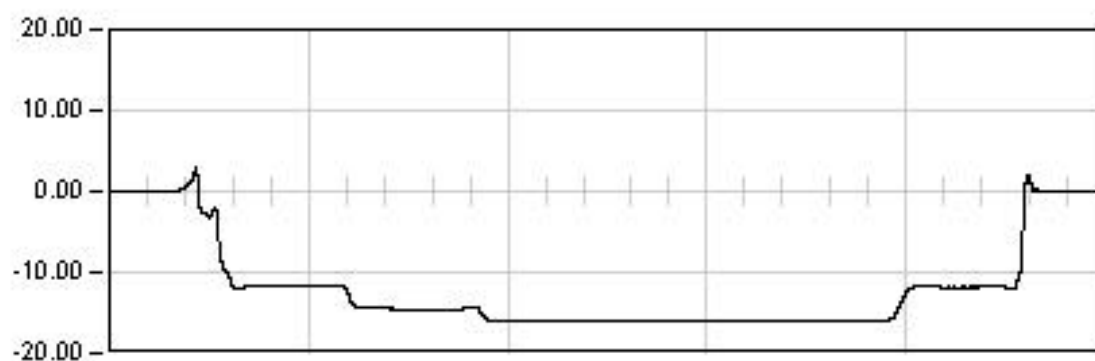
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P032

Canal : 44

Unidades : mm

**ESTATICA 01**

1809.0 Seg

Est: -16.06

Max: -16.10

Min: 2.84

Rem: 0.03

**ESTATICA 02**

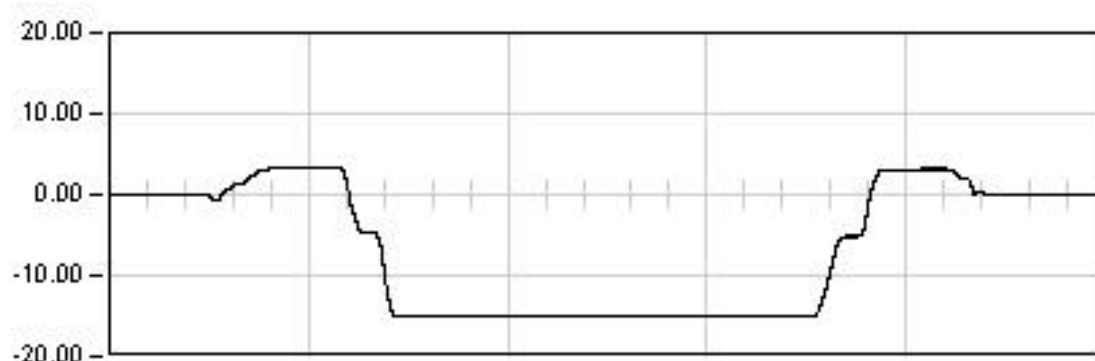
1690.0 Seg

Est: 8.48

Max: -10.14

Min: 8.50

Rem: 0.00

**ESTATICA 03**

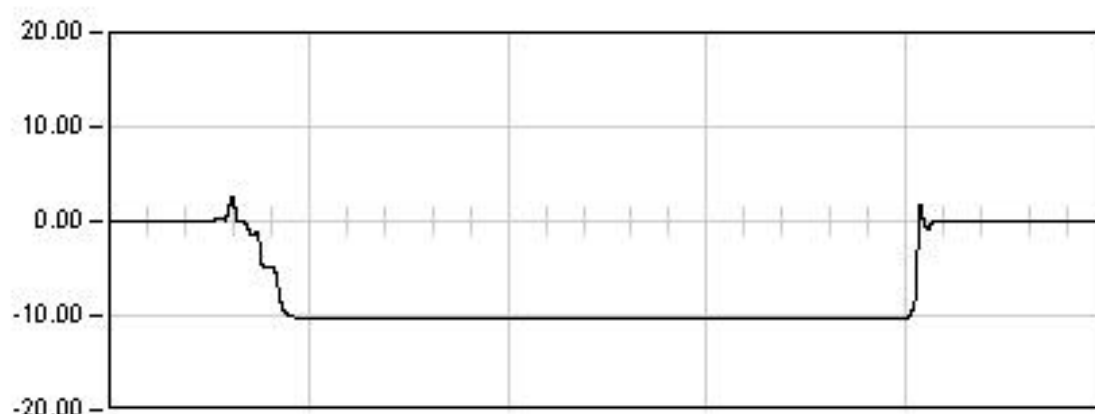
1519.0 Seg

Est: -15.11

Max: -15.14

Min: 3.34

Rem: 0.01

**ESTATICA 04**

1254.0 Seg

Est: -10.21

Max: -10.24

Min: 2.68

Rem: -0.00



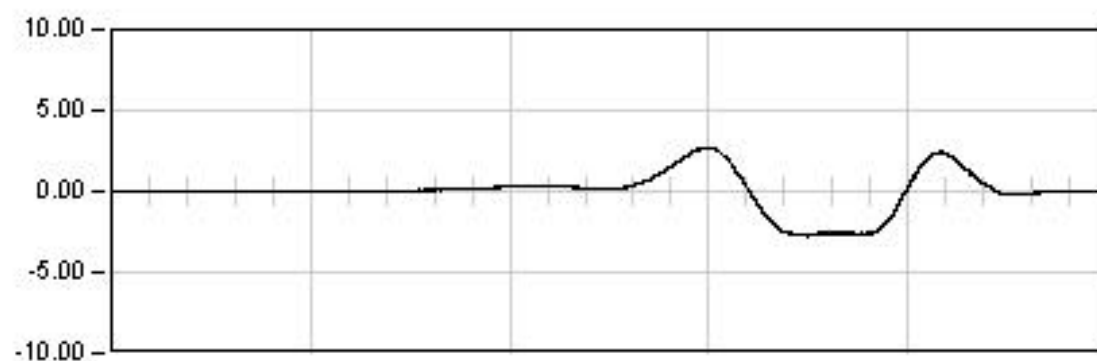
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P032

Canal : 44

Unidades : mm

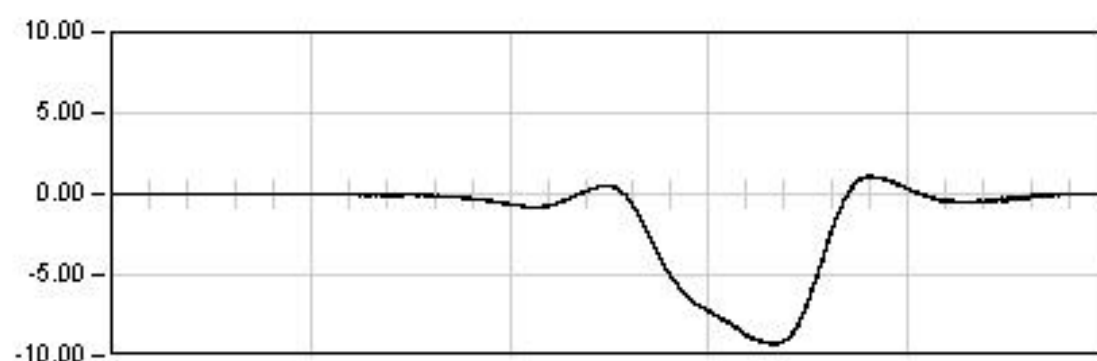
**DYNAMICA 11**

127.5 Seg

Max: -2.76

Min: 2.72

Rem: -0.02

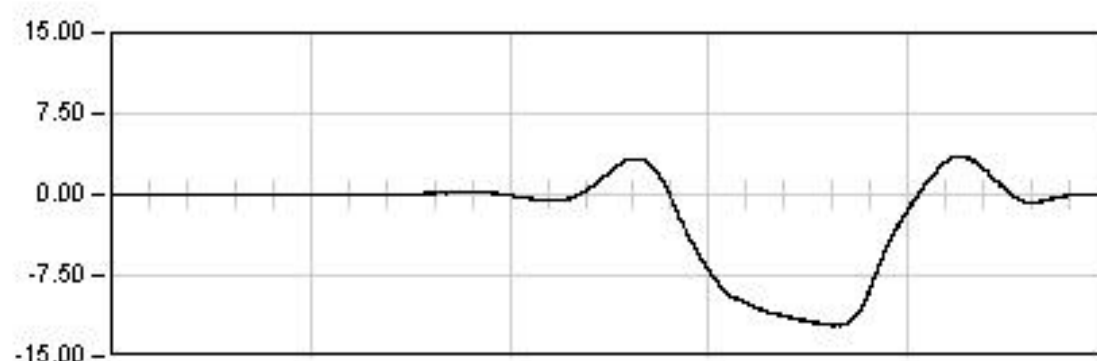
**DYNAMICA 21**

207.5 Seg

Max: -9.30

Min: 1.13

Rem: -0.02

**DYNAMICA 01**

234.0 Seg

Max: -12.15

Min: 3.55

Rem: -0.07

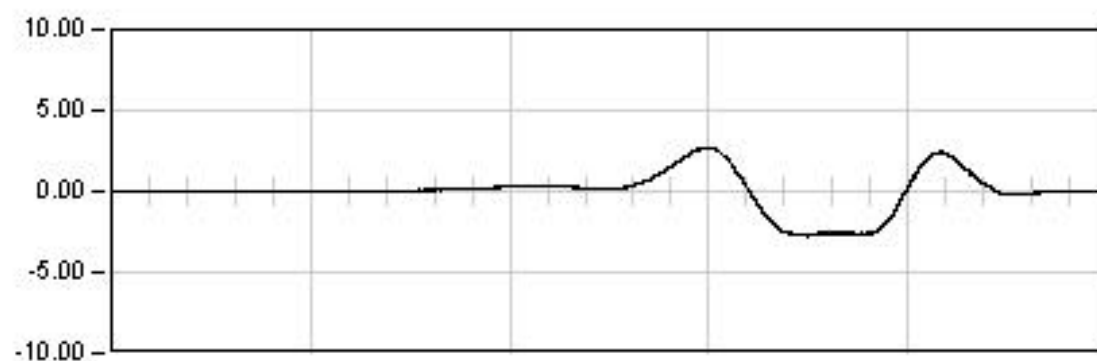
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P032

Canal : 44

Unidades : mm

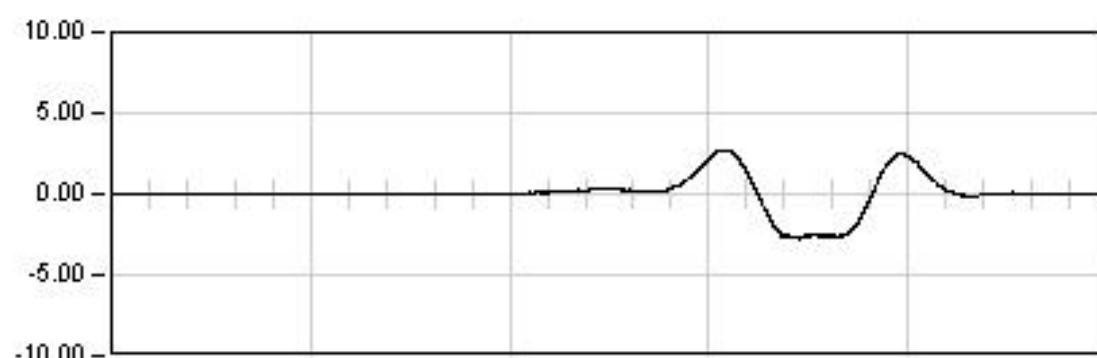
**DYNAMICA 11**

127.5 Seg

Max: -2.76

Min: 2.72

Rem: -0.02

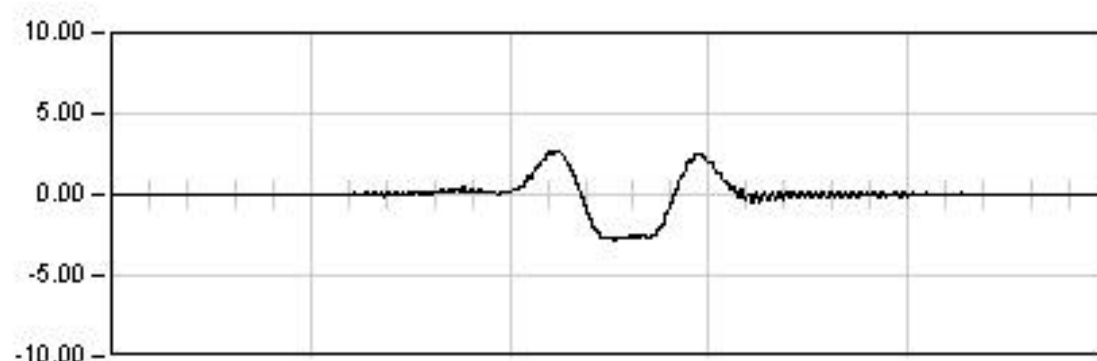
**DYNAMICA 12**

52.5 Seg

Max: -2.78

Min: 2.72

Rem: 0.06

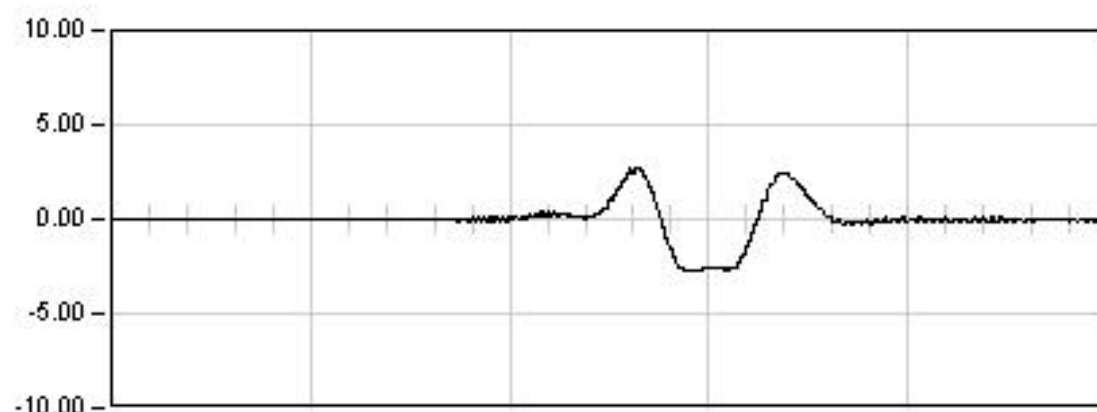
**DYNAMICA 13**

37.5 Seg

Max: -2.82

Min: 2.74

Rem: -0.00

**DYNAMICA 14**

41.5 Seg

Max: -2.78

Min: 2.74

Rem: -0.04

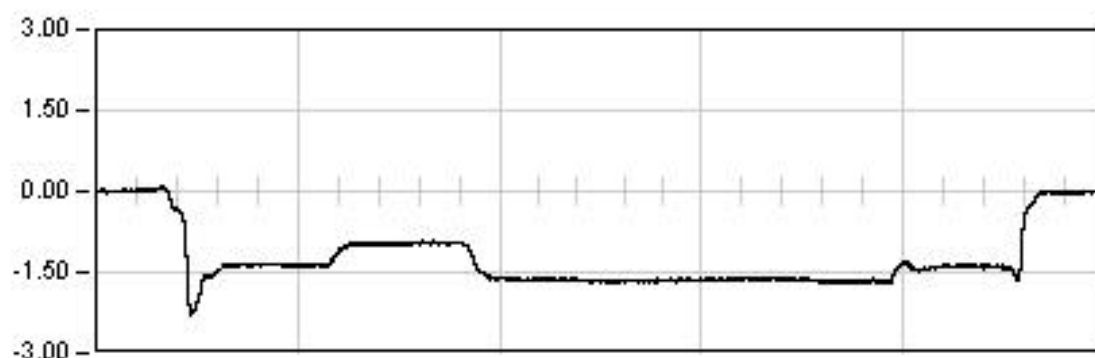
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P033

Canal : 54

Unidades : mm

**ESTATICA 01**

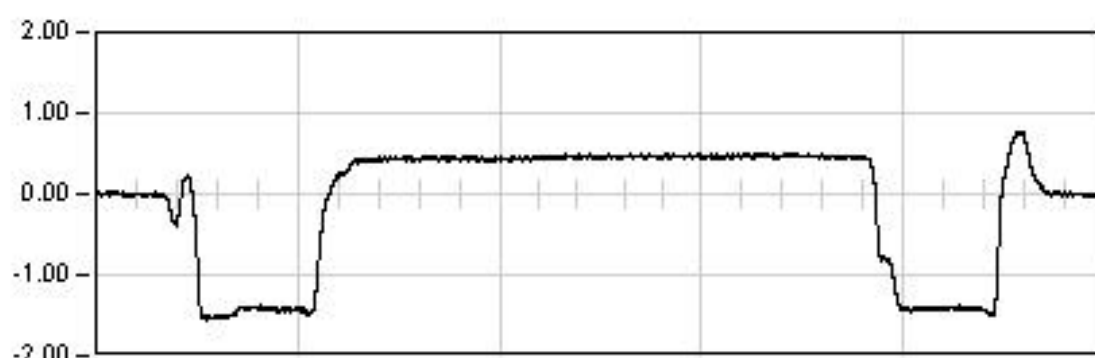
1809.0 Seg

Est: -1.67

Max: -2.29

Min: 0.09

Rem: -0.01

**ESTATICA 02**

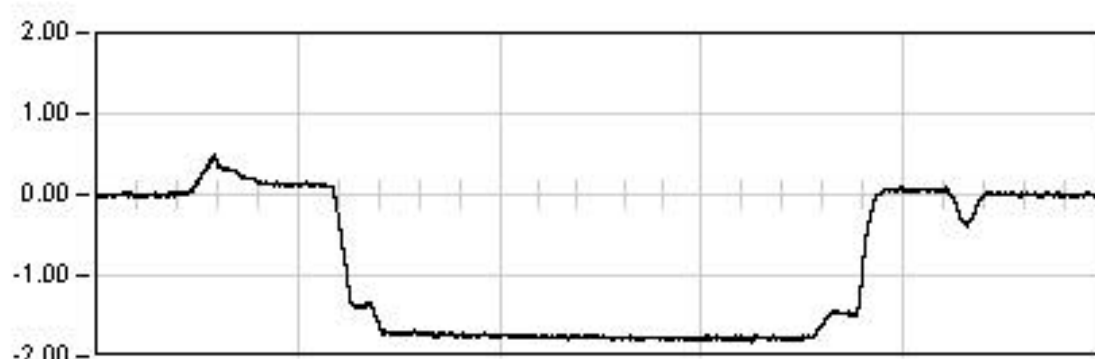
1690.0 Seg

Est: 0.48

Max: -1.55

Min: 0.78

Rem: -0.00

**ESTATICA 03**

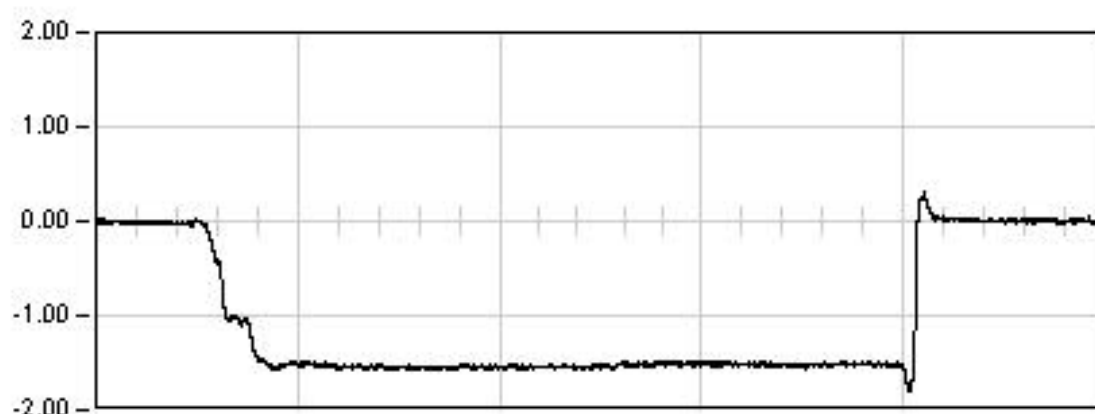
1519.0 Seg

Est: -1.77

Max: -1.83

Min: 0.49

Rem: 0.00

**ESTATICA 04**

1254.0 Seg

Est: -1.52

Max: -1.81

Min: 0.31

Rem: 0.00

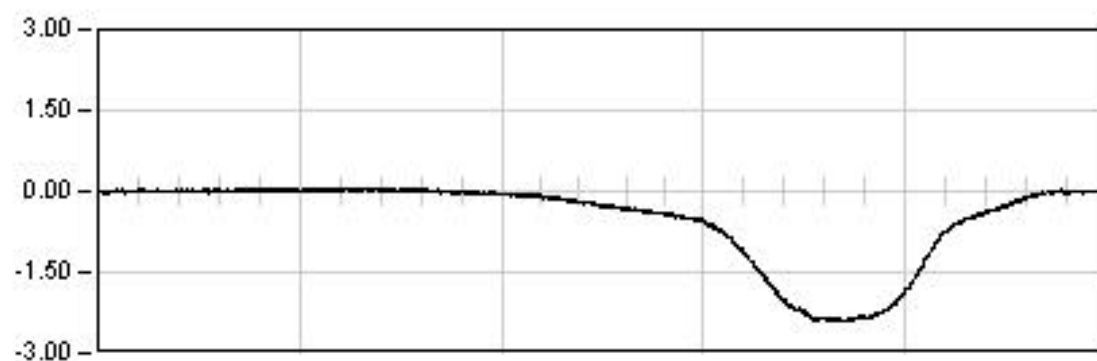
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P033

Canal : 54

Unidades : mm

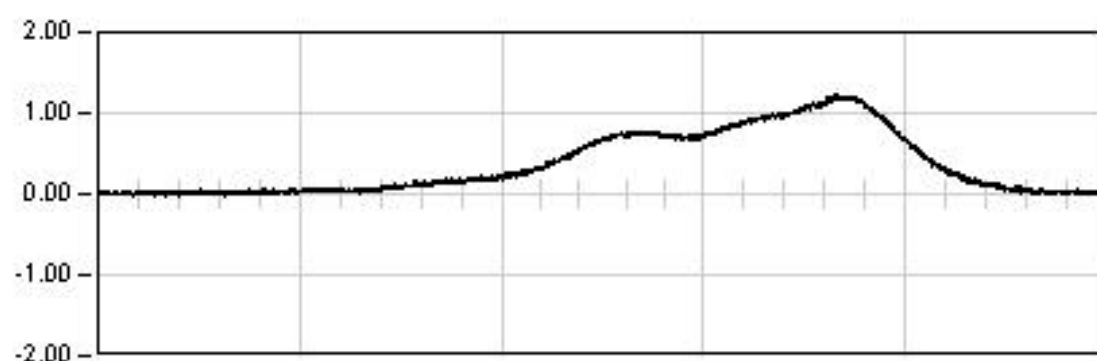
**DYNAMICA 11**

127.5 Seg

Max: -2.41

Min: 0.07

Rem: -0.01

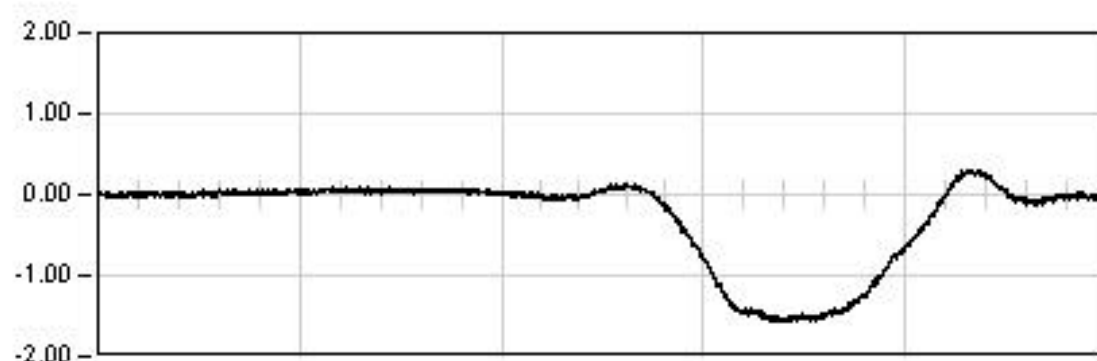
**DYNAMICA 21**

207.5 Seg

Max: 1.22

Min: -0.03

Rem: 0.02

**DYNAMICA 01**

234.0 Seg

Max: -1.57

Min: 0.30

Rem: -0.01

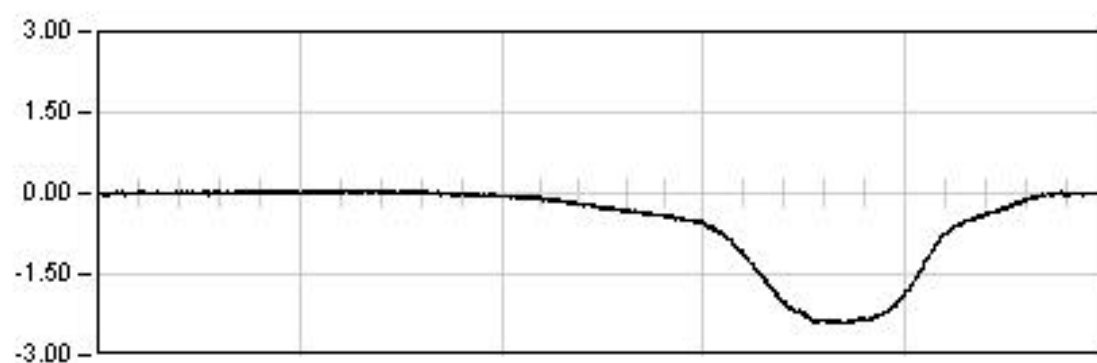
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P033

Canal : 54

Unidades : mm

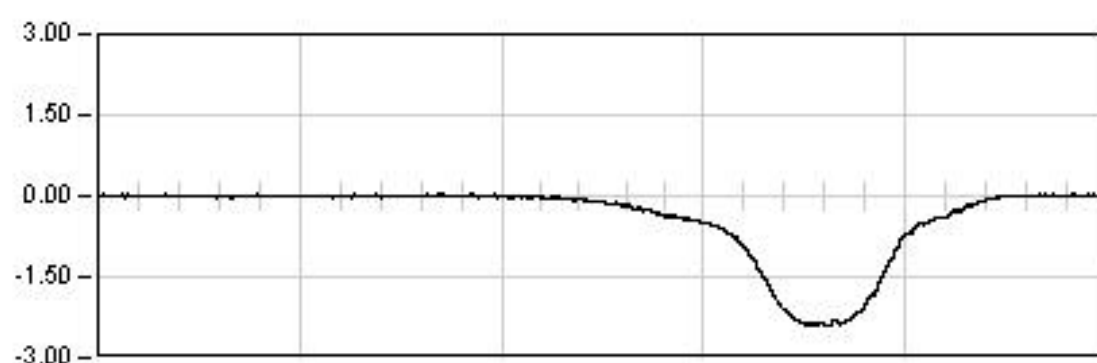
**DYNAMICA 11**

127.5 Seg

Max: -2.41

Min: 0.07

Rem: -0.01

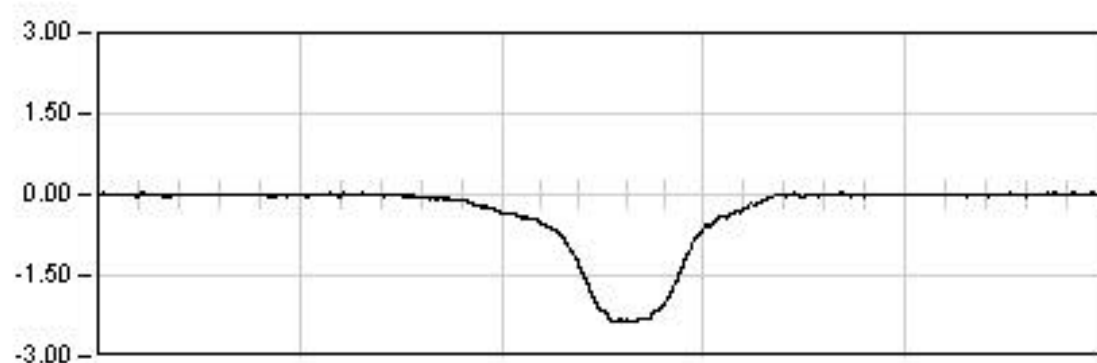
**DYNAMICA 12**

52.5 Seg

Max: -2.42

Min: 0.04

Rem: 0.01

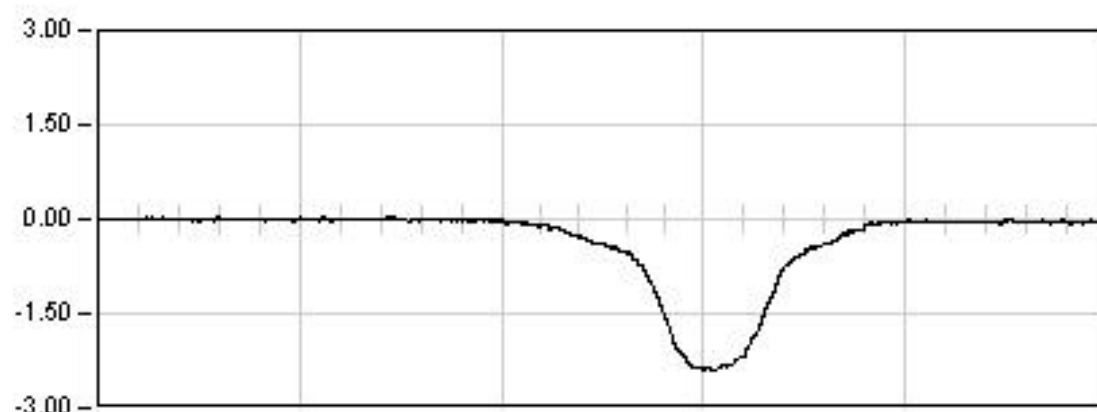
**DYNAMICA 13**

37.5 Seg

Max: -2.36

Min: 0.04

Rem: 0.01

**DYNAMICA 14**

41.5 Seg

Max: -2.42

Min: 0.03

Rem: -0.04

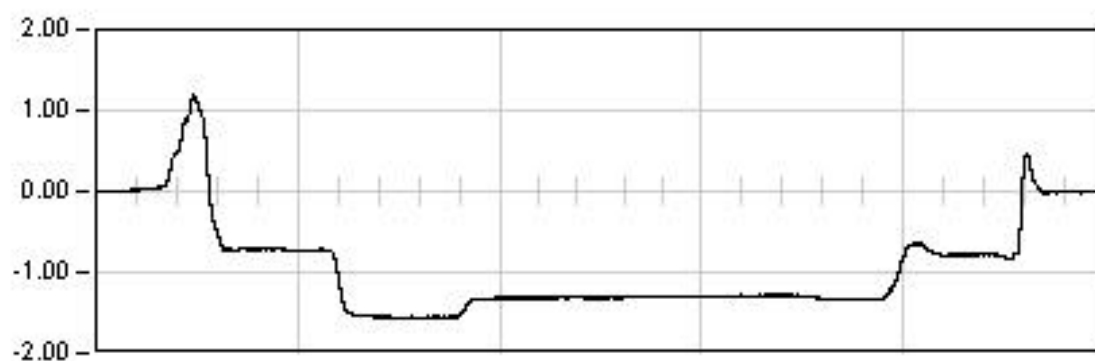
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P034

Canal : 55

Unidades : mm

**ESTATICA 01**

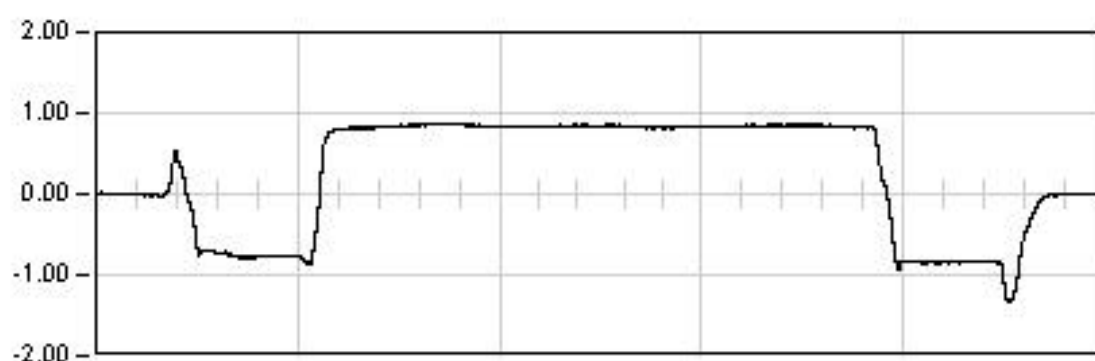
1809.0 Seg

Est: -1.34

Max: -1.57

Min: 1.20

Rem: -0.01

**ESTATICA 02**

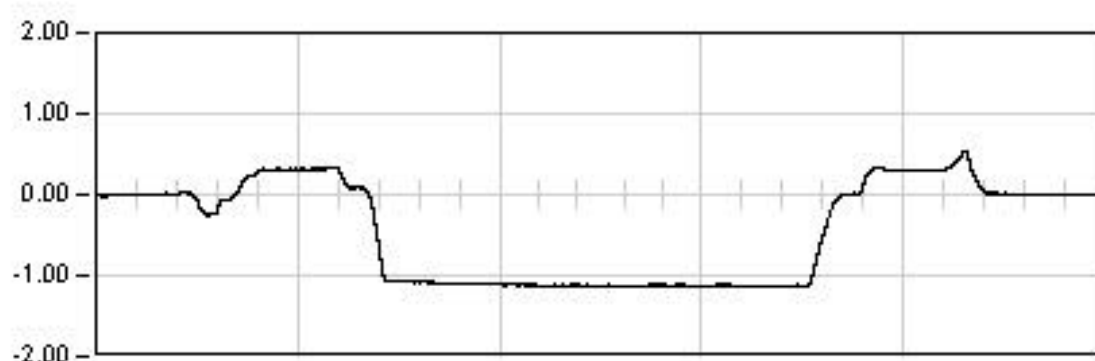
1690.0 Seg

Est: 0.85

Max: -1.34

Min: 0.87

Rem: -0.00

**ESTATICA 03**

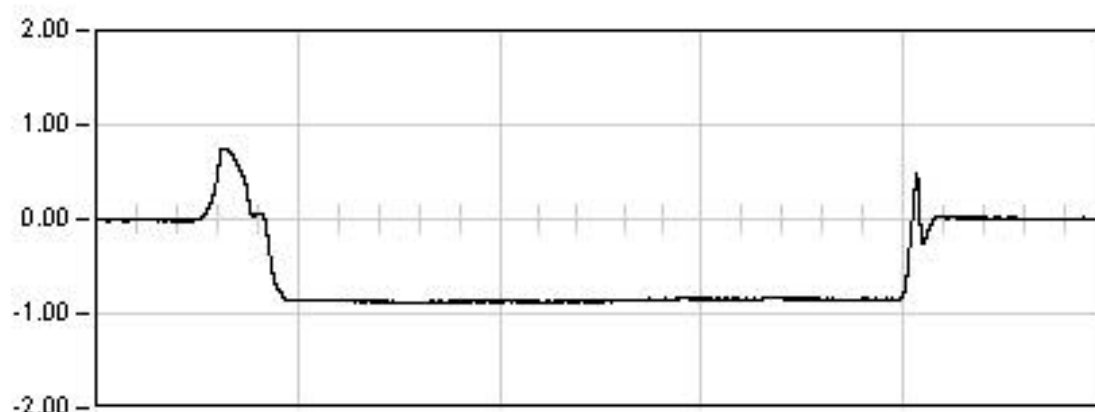
1519.0 Seg

Est: -1.13

Max: -1.14

Min: 0.54

Rem: 0.00

**ESTATICA 04**

1254.0 Seg

Est: -0.85

Max: -0.89

Min: 0.76

Rem: 0.00

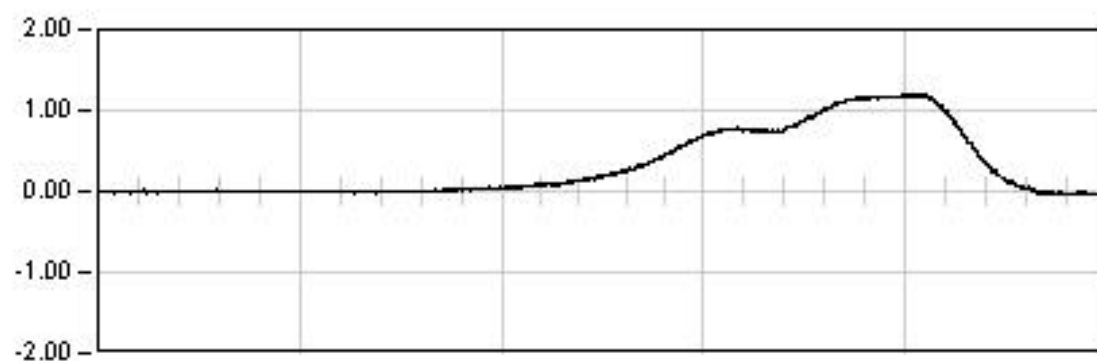
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P034

Canal : 55

Unidades : mm

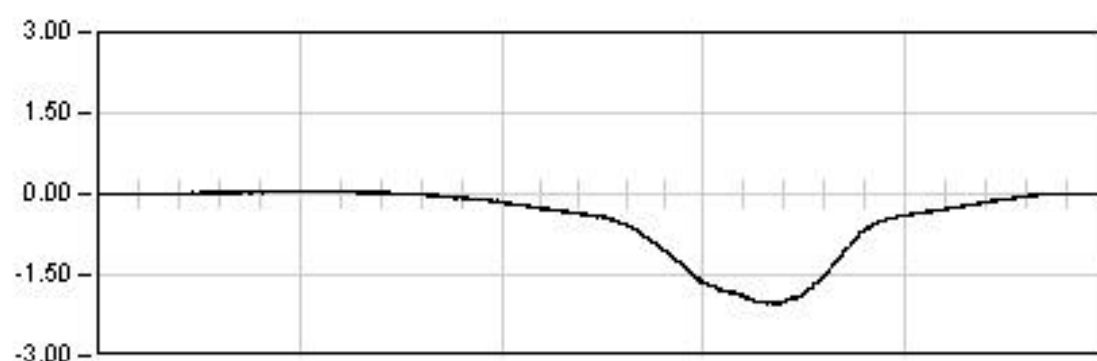
**DYNAMICA 11**

127.5 Seg

Max: 1.20

Min: -0.04

Rem: -0.03

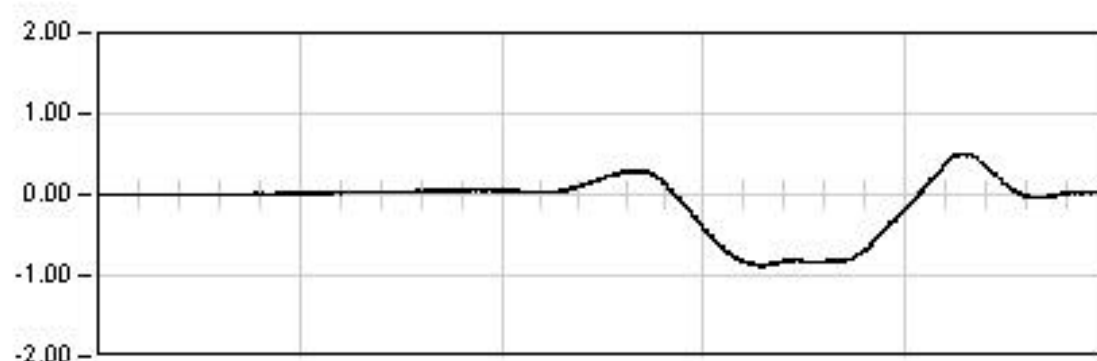
**DYNAMICA 21**

207.5 Seg

Max: -2.04

Min: 0.06

Rem: 0.01

**DYNAMICA 01**

234.0 Seg

Max: -0.89

Min: 0.51

Rem: 0.03

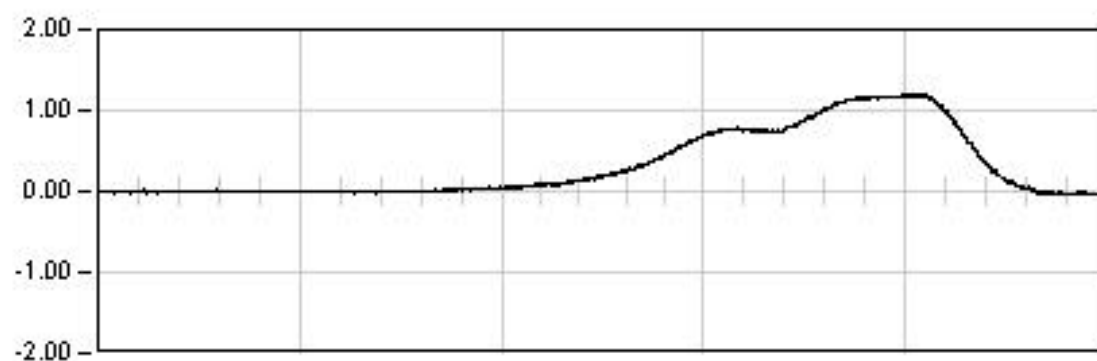
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P034

Canal : 55

Unidades : mm

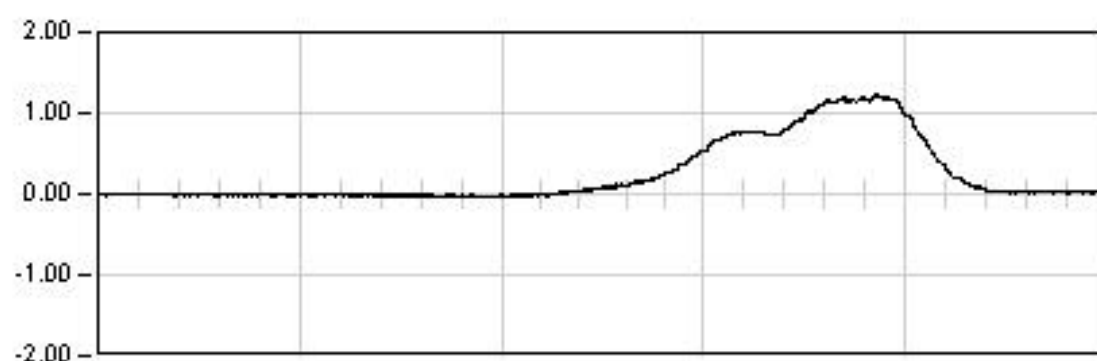
**DYNAMICA 11**

127.5 Seg

Max: 1.20

Min: -0.04

Rem: -0.03

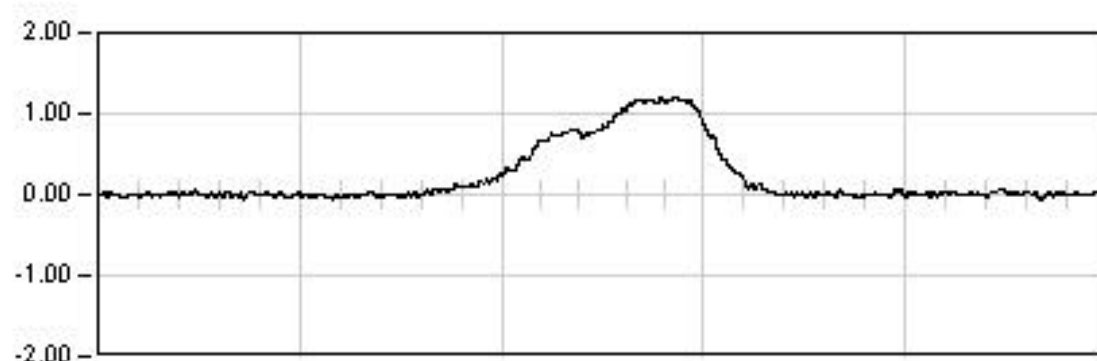
**DYNAMICA 12**

52.5 Seg

Max: 1.23

Min: -0.05

Rem: 0.02

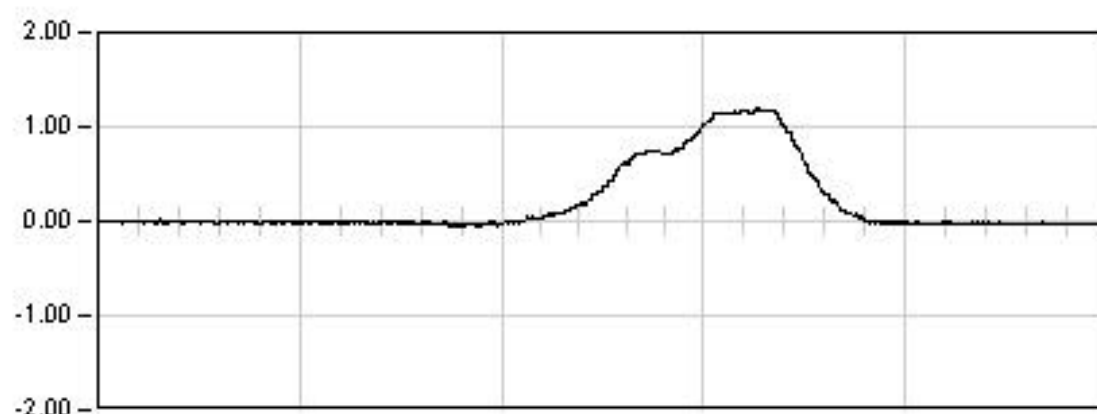
**DYNAMICA 13**

37.5 Seg

Max: 1.22

Min: -0.06

Rem: 0.01

**DYNAMICA 14**

41.5 Seg

Max: 1.19

Min: -0.05

Rem: -0.03



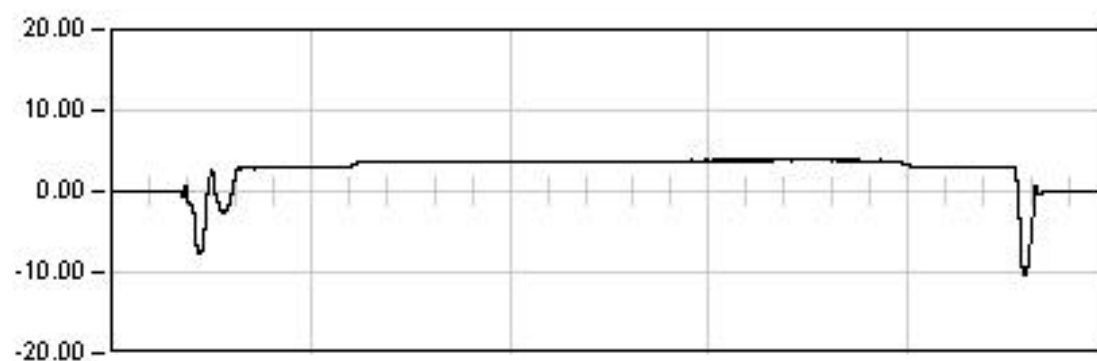
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P041

Canal : 45

Unidades : mm

**ESTATICA 01**

1809.0 Seg

Est: 3.83

Max: -10.42

Min: 3.87

Rem: 0.01

**ESTATICA 02**

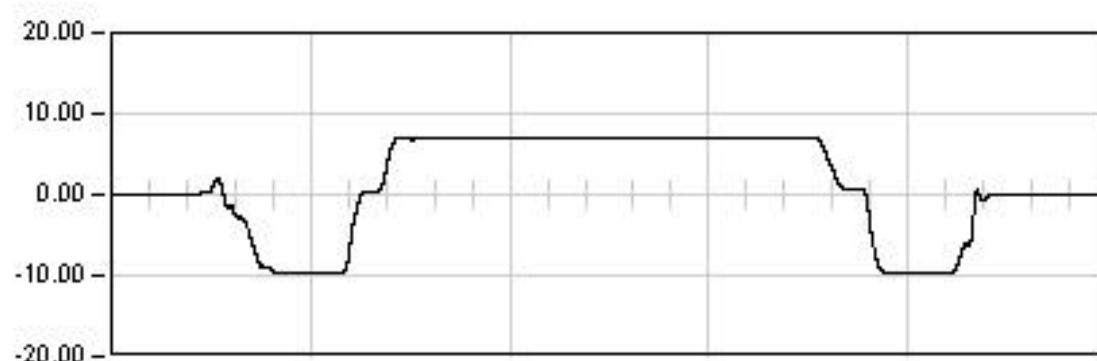
1690.0 Seg

Est: -14.55

Max: -14.61

Min: 1.90

Rem: 0.00

**ESTATICA 03**

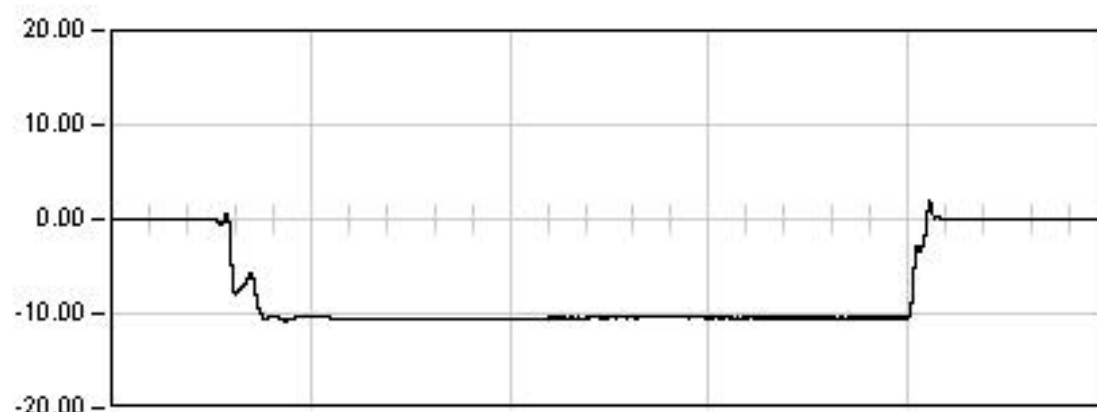
1519.0 Seg

Est: 6.94

Max: -9.71

Min: 6.95

Rem: -0.03

**ESTATICA 04**

1254.0 Seg

Est: -10.43

Max: -10.74

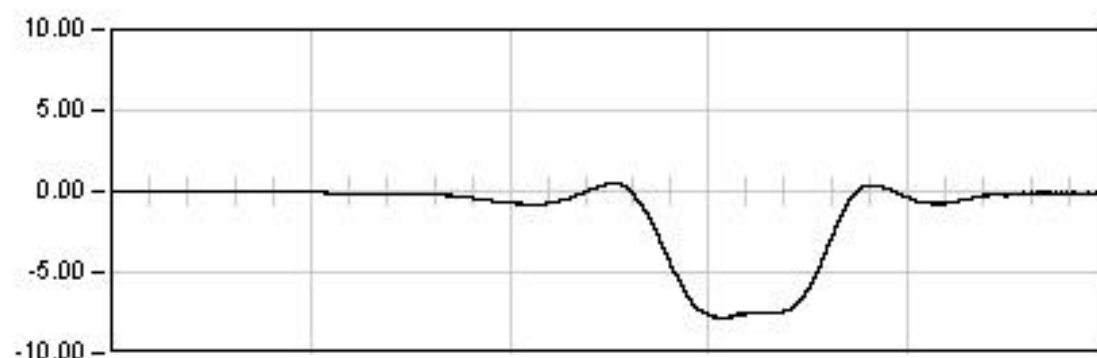
Min: 1.86

Rem: -0.02

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P041    Canal : 45    Unidades : mm

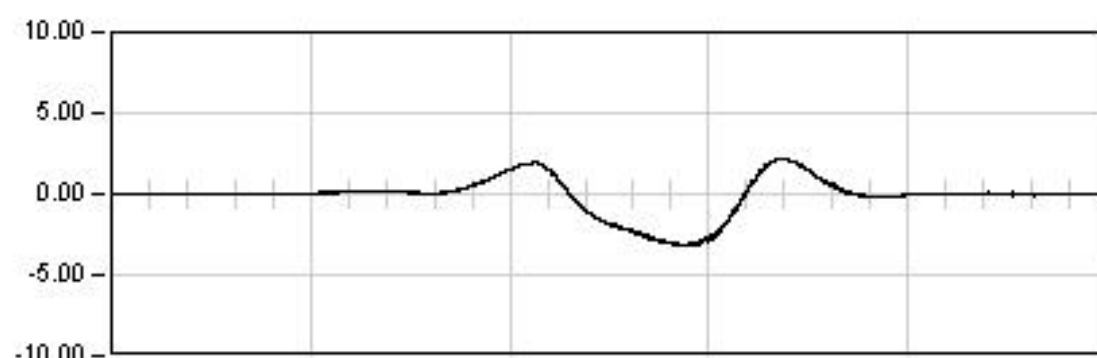
**DYNAMICA 11**

127.5    Seg

Max:    -7.87

Min:    0.49

Rem:    -0.09

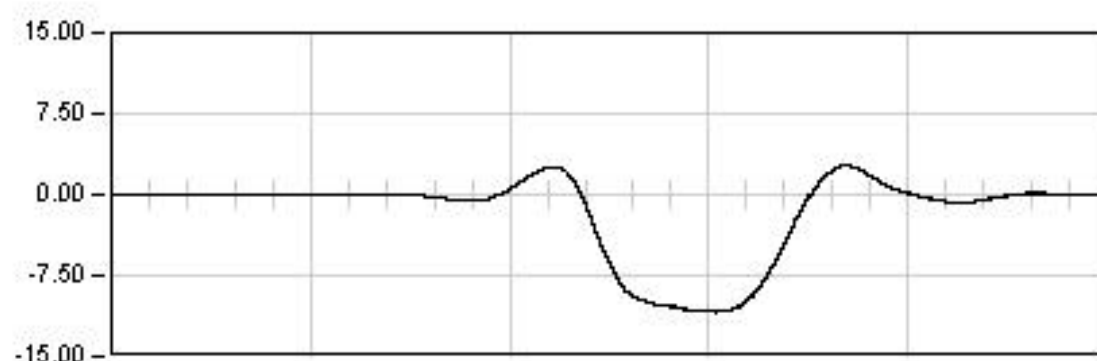
**DYNAMICA 21**

207.5    Seg

Max:    -3.19

Min:    2.18

Rem:    -0.03

**DYNAMICA 01**

234.0    Seg

Max:    -10.88

Min:    2.71

Rem:    0.01

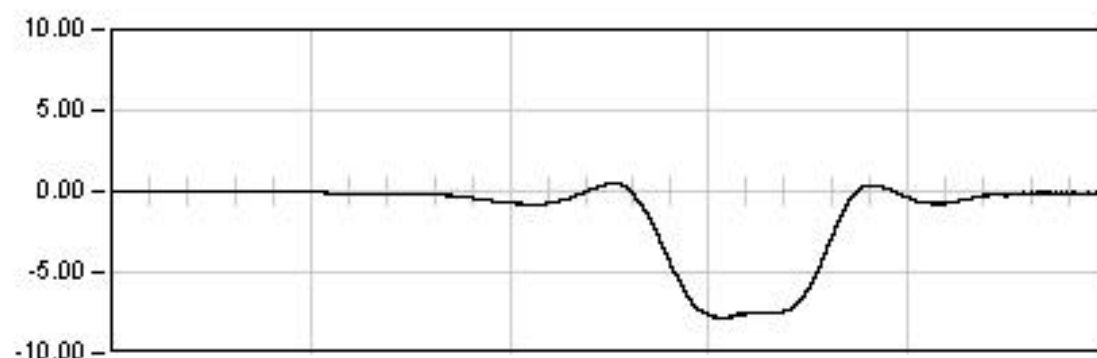
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P041

Canal : 45

Unidades : mm

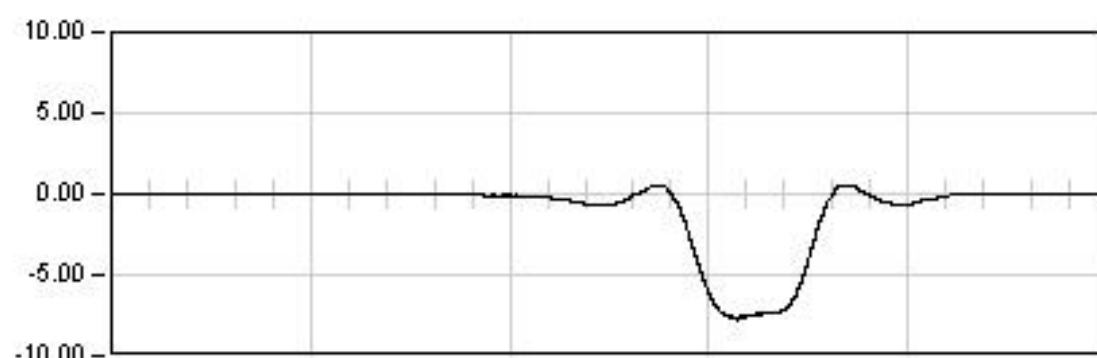
**DYNAMICA 11**

127.5 Seg

Max: -7.87

Min: 0.49

Rem: -0.09

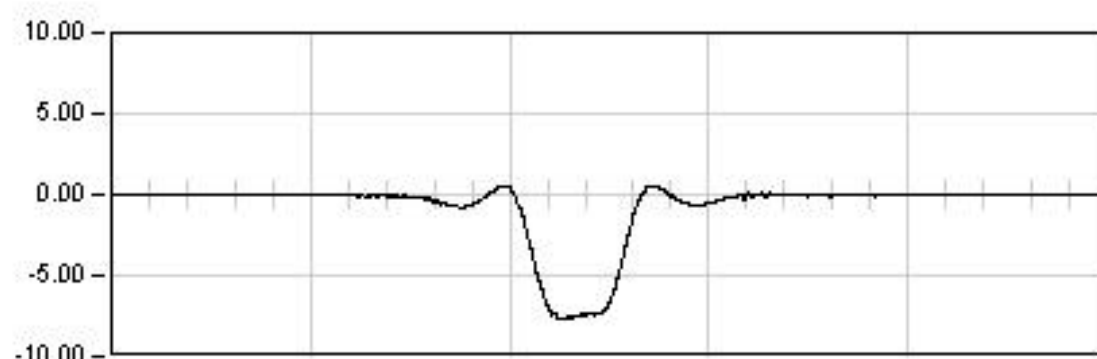
**DYNAMICA 12**

52.5 Seg

Max: -7.76

Min: 0.57

Rem: -0.00

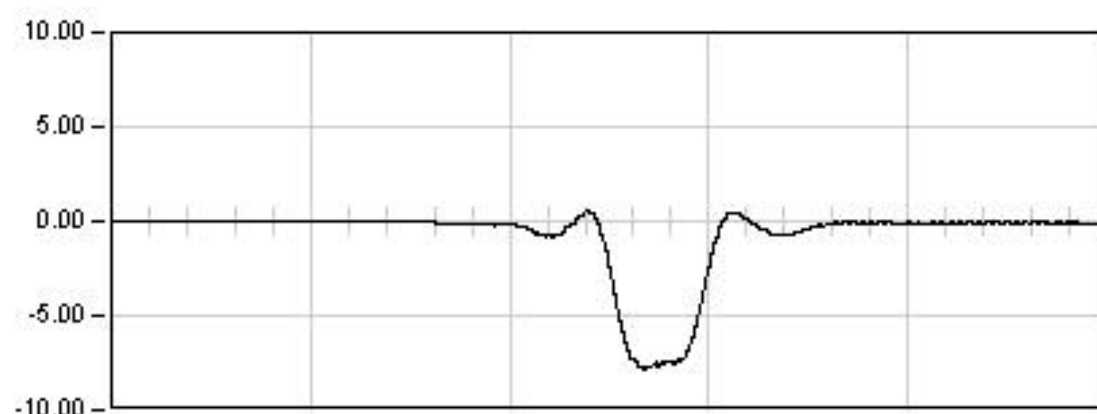
**DYNAMICA 13**

37.5 Seg

Max: -7.74

Min: 0.57

Rem: -0.02

**DYNAMICA 14**

41.5 Seg

Max: -7.82

Min: 0.54

Rem: -0.09

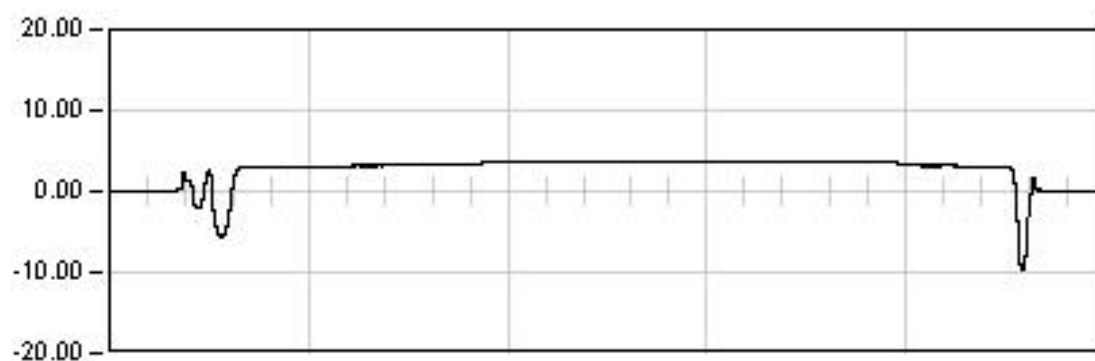
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P042

Canal : 46

Unidades : mm

**ESTATICA 01**

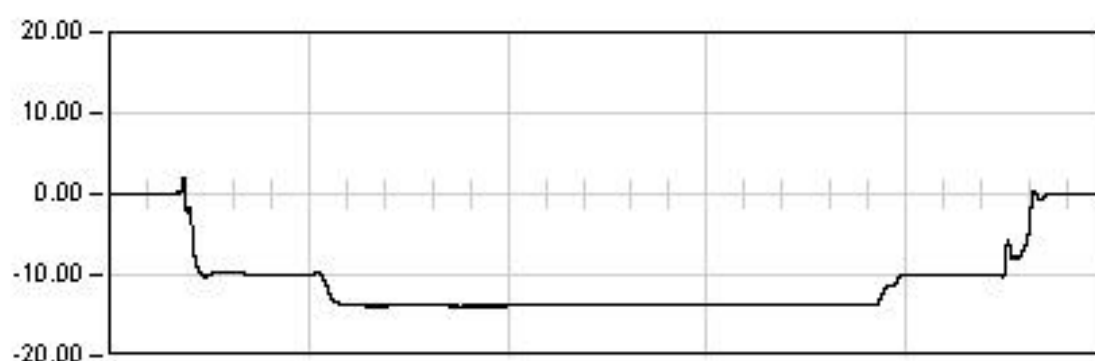
1809.0 Seg

Est: 3.72

Max: -9.77

Min: 3.80

Rem: -0.00

**ESTATICA 02**

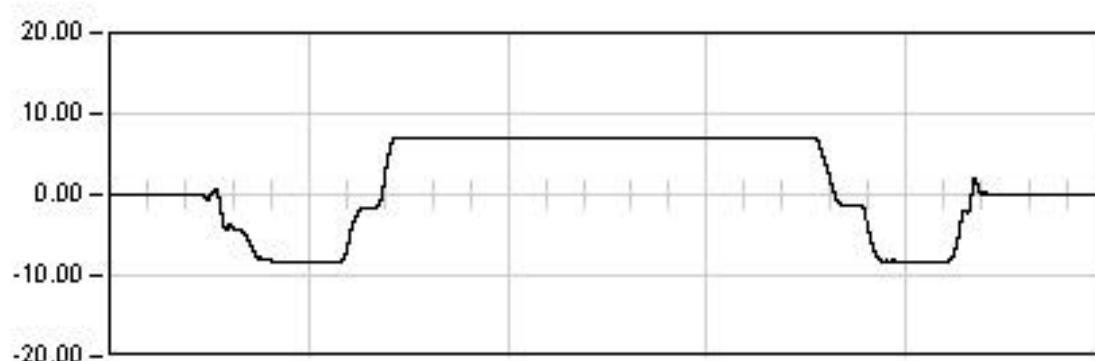
1690.0 Seg

Est: -13.77

Max: -13.85

Min: 1.98

Rem: 0.03

**ESTATICA 03**

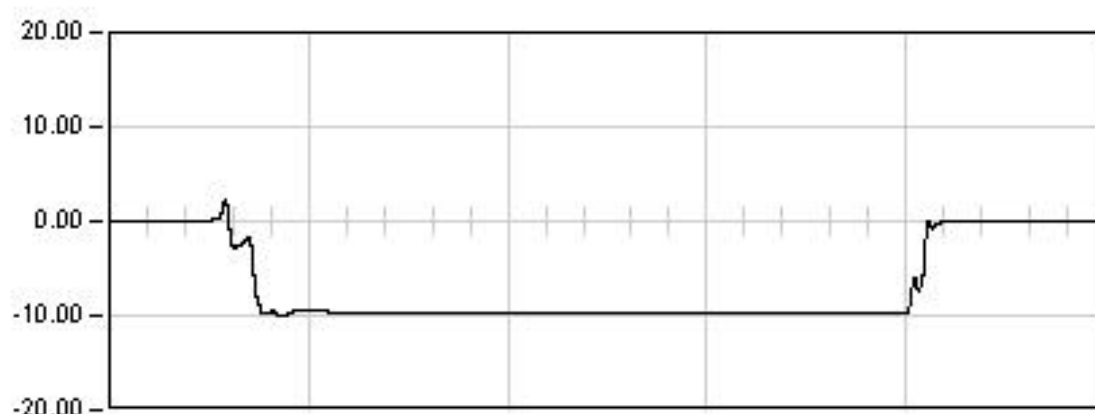
1519.0 Seg

Est: 7.07

Max: -8.34

Min: 7.12

Rem: 0.02

**ESTATICA 04**

1254.0 Seg

Est: -9.64

Max: -10.07

Min: 2.31

Rem: -0.04

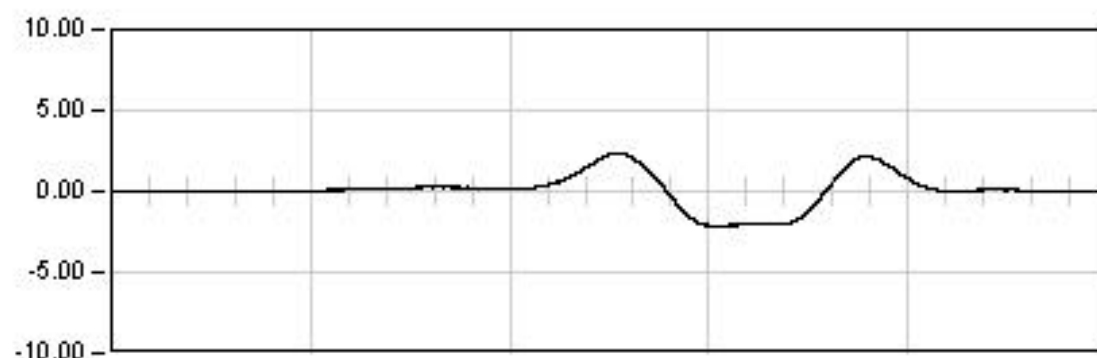
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P042

Canal : 46

Unidades : mm

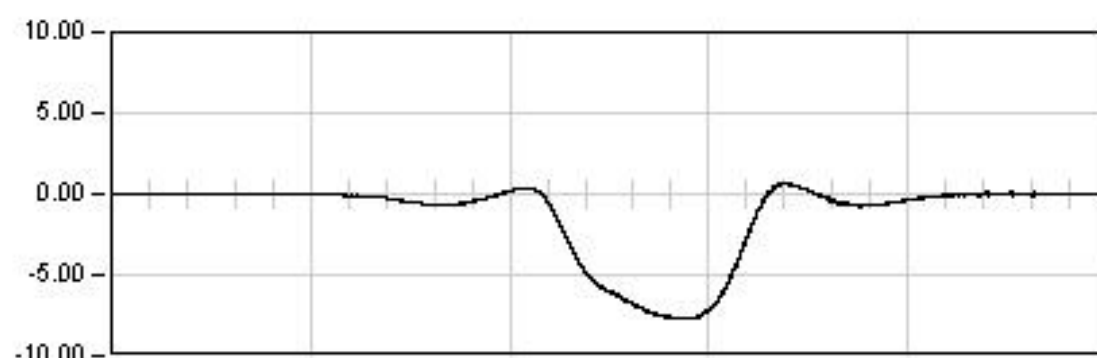
**DYNAMICA 11**

127.5 Seg

Max: 2.37

Min: -2.19

Rem: -0.00

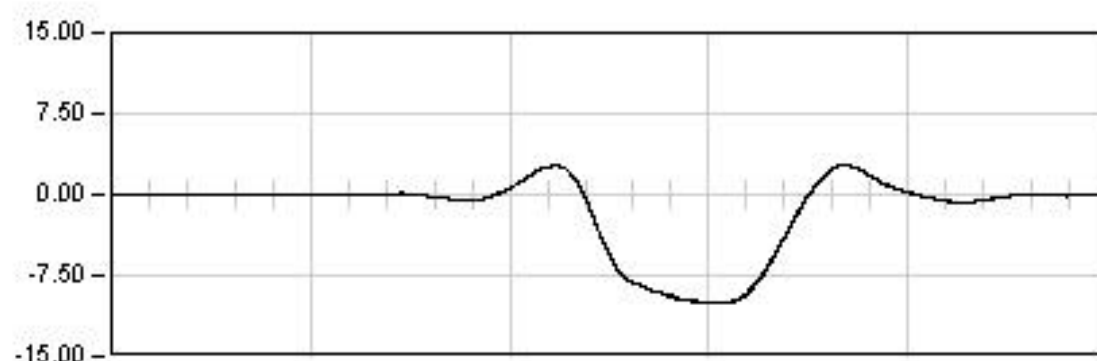
**DYNAMICA 21**

207.5 Seg

Max: -7.72

Min: 0.67

Rem: -0.01

**DYNAMICA 01**

234.0 Seg

Max: -10.12

Min: 2.74

Rem: -0.11

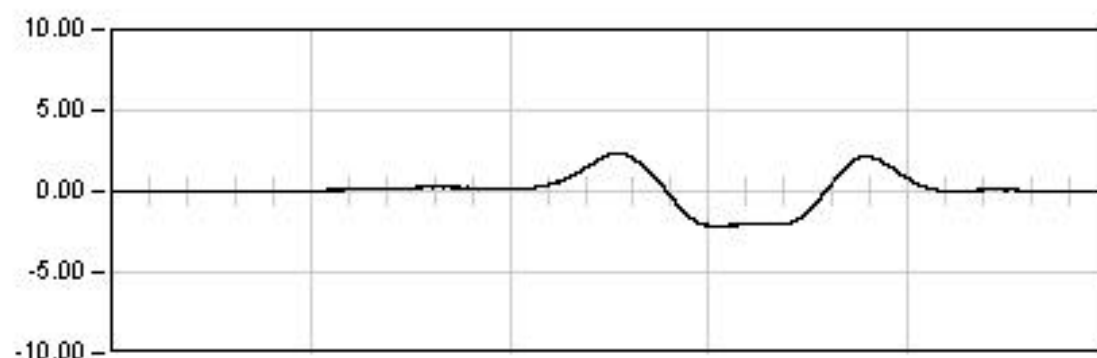
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P042

Canal : 46

Unidades : mm

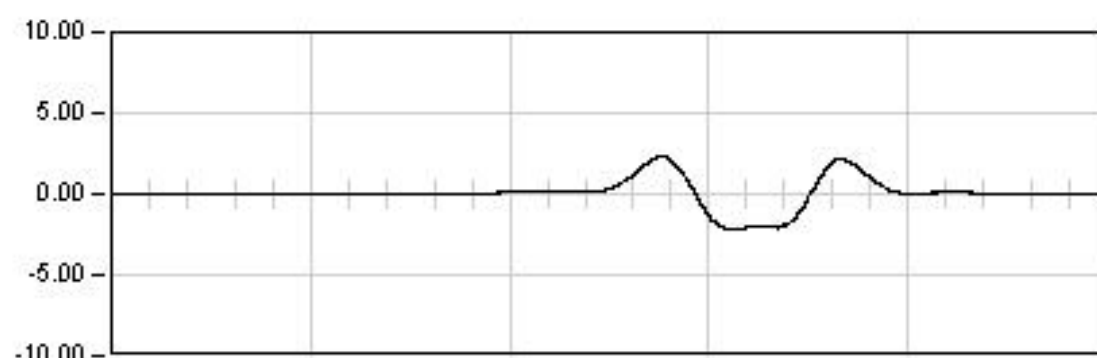
**DYNAMICA 11**

127.5 Seg

Max: 2.37

Min: -2.19

Rem: -0.00

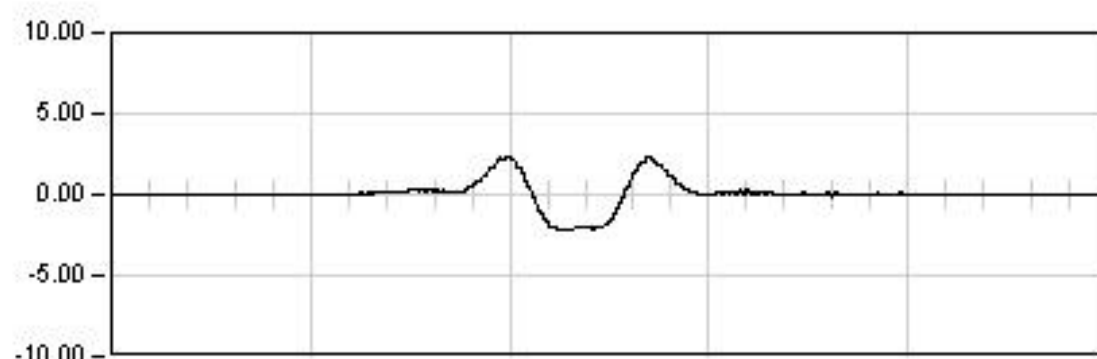
**DYNAMICA 12**

52.5 Seg

Max: 2.31

Min: -2.22

Rem: 0.01

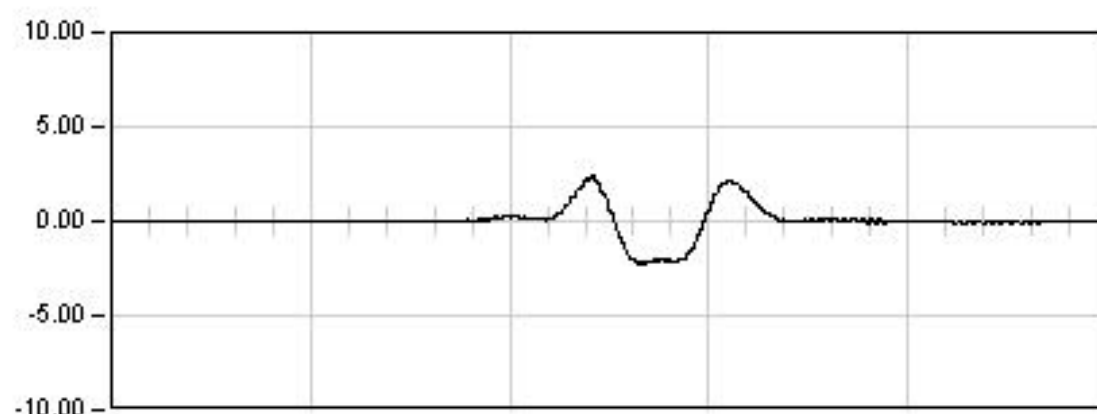
**DYNAMICA 13**

37.5 Seg

Max: 2.40

Min: -2.21

Rem: 0.02

**DYNAMICA 14**

41.5 Seg

Max: 2.36

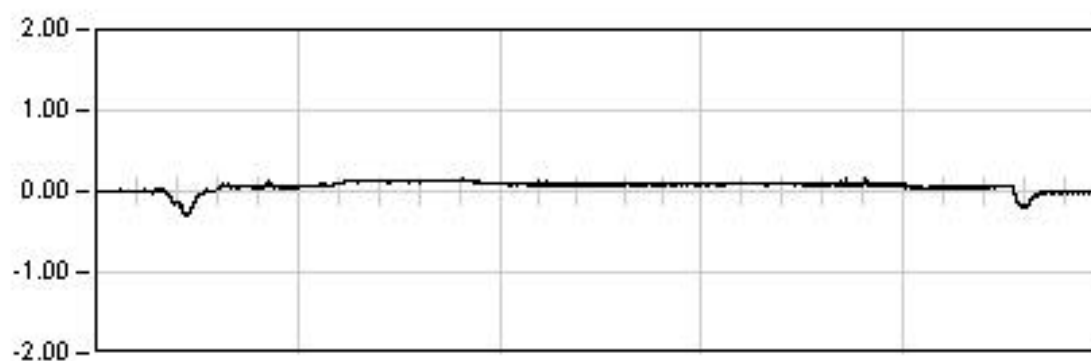
Min: -2.27

Rem: -0.04

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P043    Canal : 07    Unidades : mm



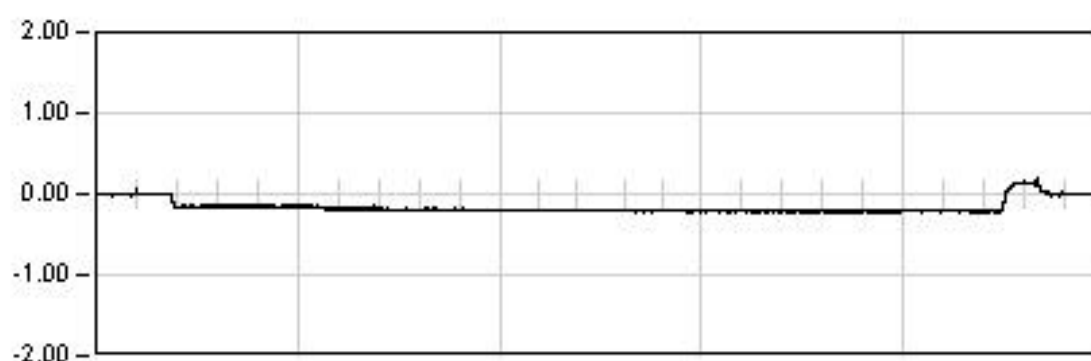
1809.0    Seg

Est:    0.09

Max:    -0.29

Min:    0.16

Rem:    -0.01



1690.0    Seg

Est:    -0.21

Max:    -0.23

Min:    0.19

Rem:    -0.00



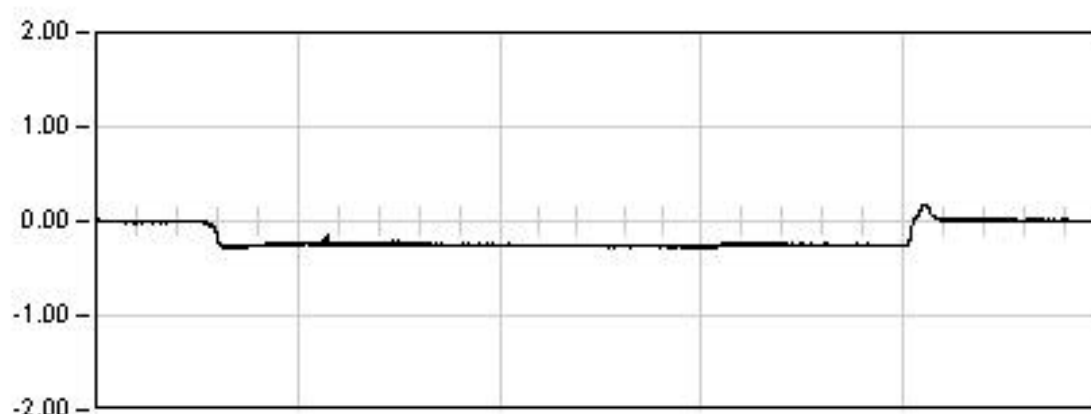
1519.0    Seg

Est:    0.08

Max:    -0.21

Min:    0.17

Rem:    -0.01



1254.0    Seg

Est:    -0.25

Max:    -0.29

Min:    0.17

Rem:    0.00

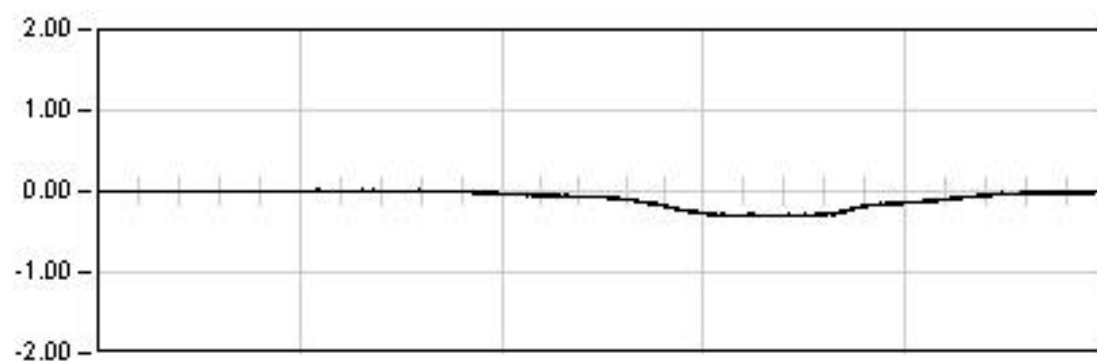
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P043

Canal : 07

Unidades : mm

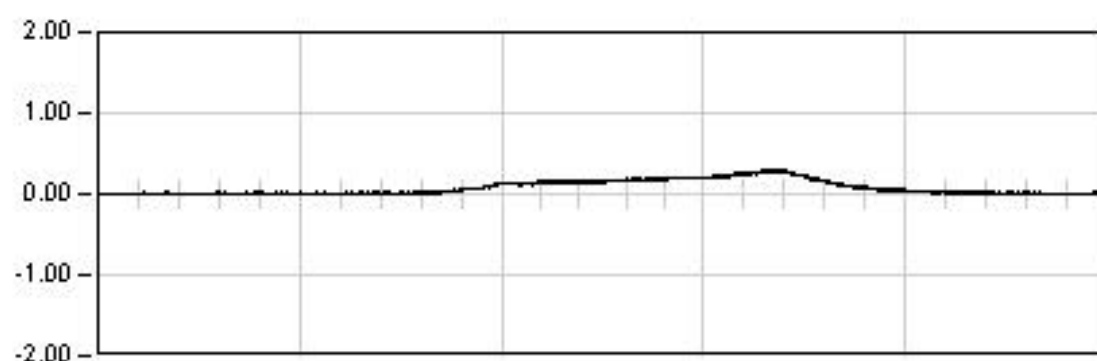
**DINAMICA 11**

127.5 Seg

Max: -0.31

Min: 0.02

Rem: -0.01

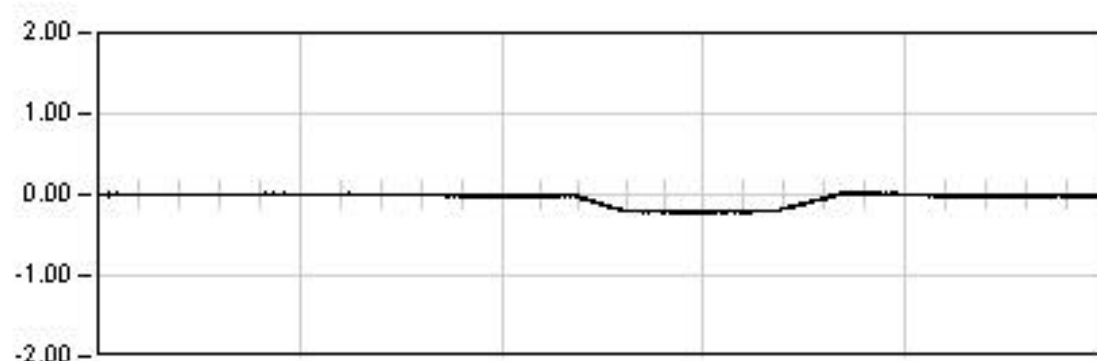
**DINAMICA 21**

207.5 Seg

Max: 0.30

Min: -0.01

Rem: 0.00

**DINAMICA 01**

234.0 Seg

Max: -0.22

Min: 0.02

Rem: -0.00



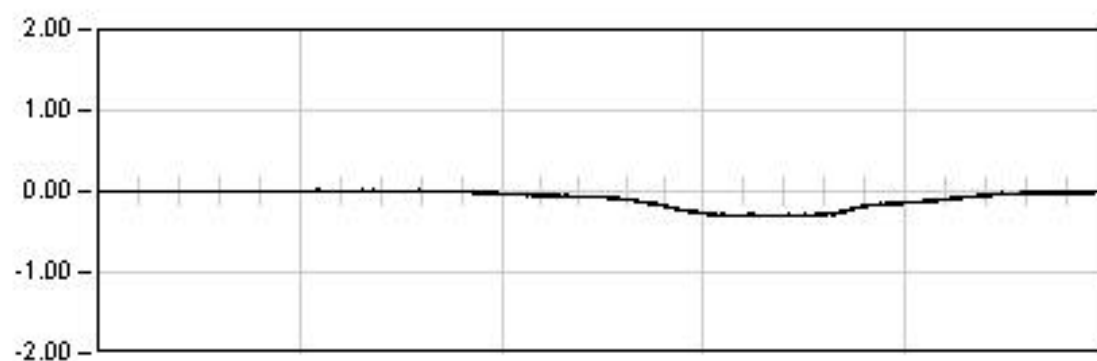
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P043

Canal : 07

Unidades : mm

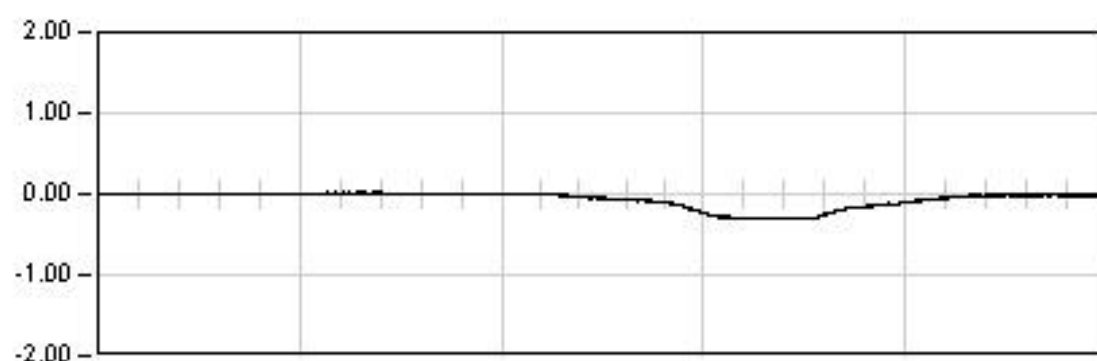
**DINAMICA 11**

127.5 Seg

Max: -0.31

Min: 0.02

Rem: -0.01

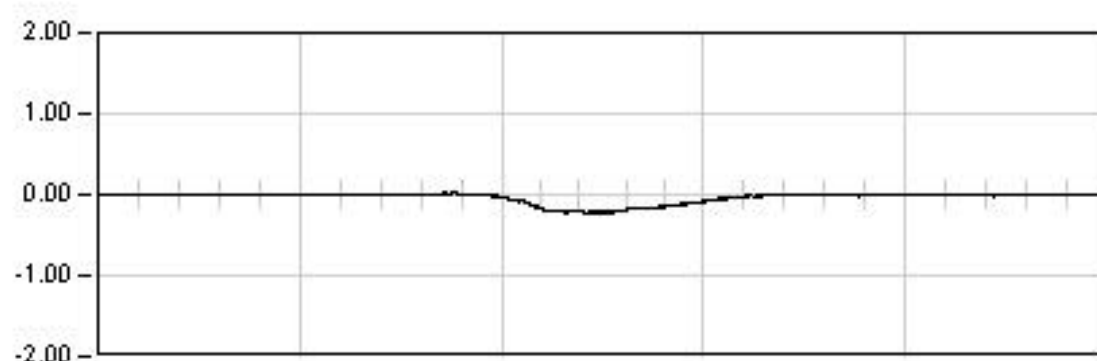
**DINAMICA 12**

52.5 Seg

Max: -0.32

Min: 0.02

Rem: -0.01

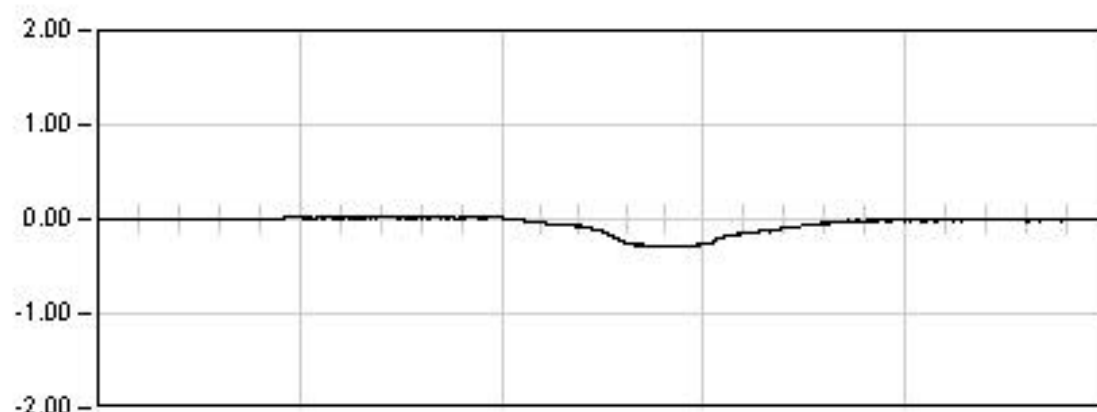
**DINAMICA 13**

37.5 Seg

Max: -0.23

Min: 0.02

Rem: -0.00

**DINAMICA 14**

41.5 Seg

Max: -0.29

Min: 0.04

Rem: -0.01

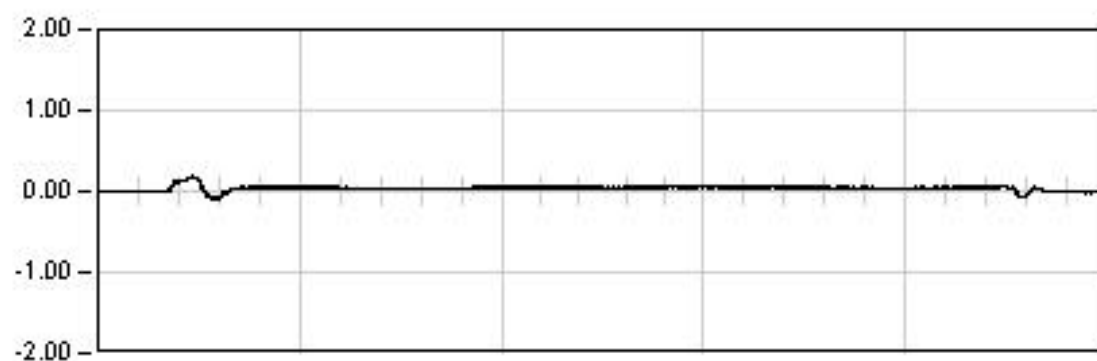
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P044

Canal : 08

Unidades : mm

**ESTATICA 01**

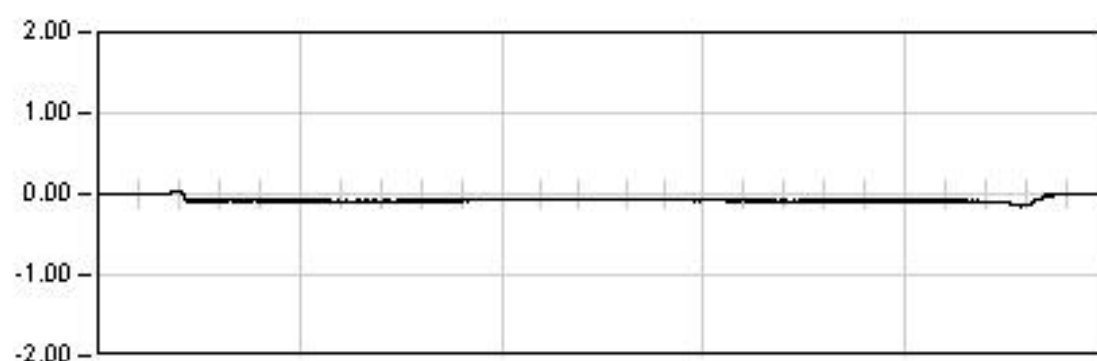
1809.0 Seg

Est: 0.04

Max: 0.19

Min: -0.09

Rem: -0.01

**ESTATICA 02**

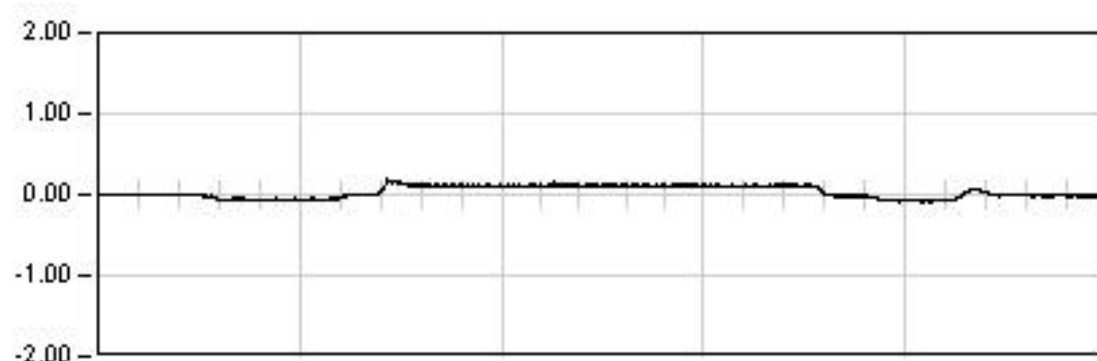
1690.0 Seg

Est: -0.09

Max: -0.15

Min: 0.05

Rem: 0.00

**ESTATICA 03**

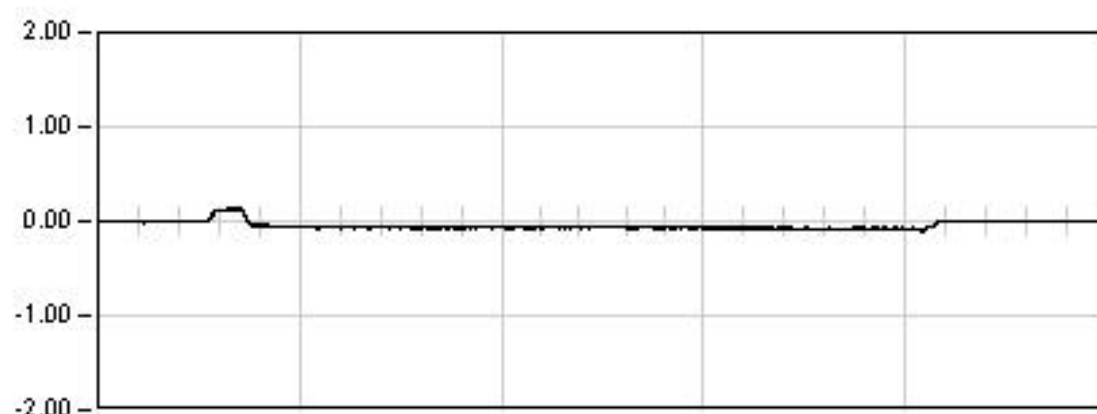
1519.0 Seg

Est: 0.11

Max: 0.21

Min: -0.09

Rem: -0.01

**ESTATICA 04**

1254.0 Seg

Est: -0.08

Max: 0.14

Min: -0.11

Rem: -0.00

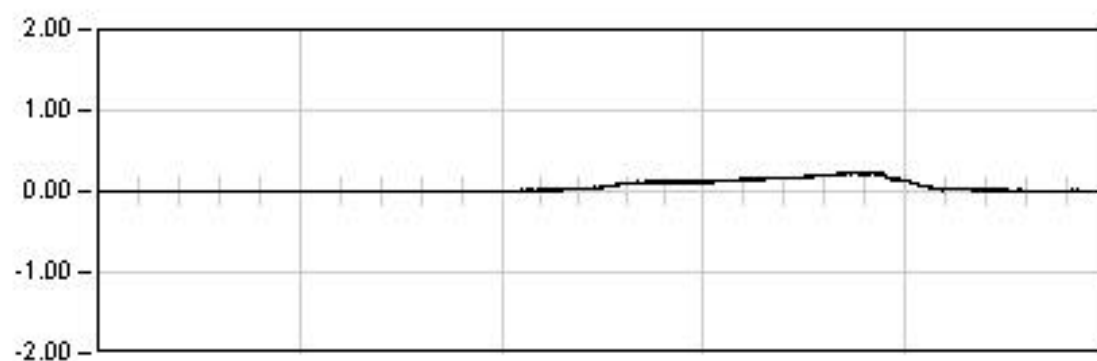
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P044

Canal : 08

Unidades : mm

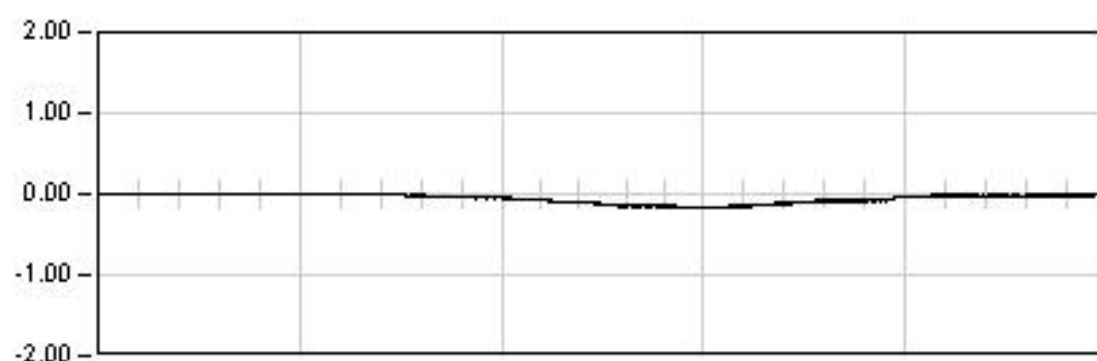
**DYNAMICA 11**

127.5 Seg

Max: 0.23

Min: -0.01

Rem: 0.01

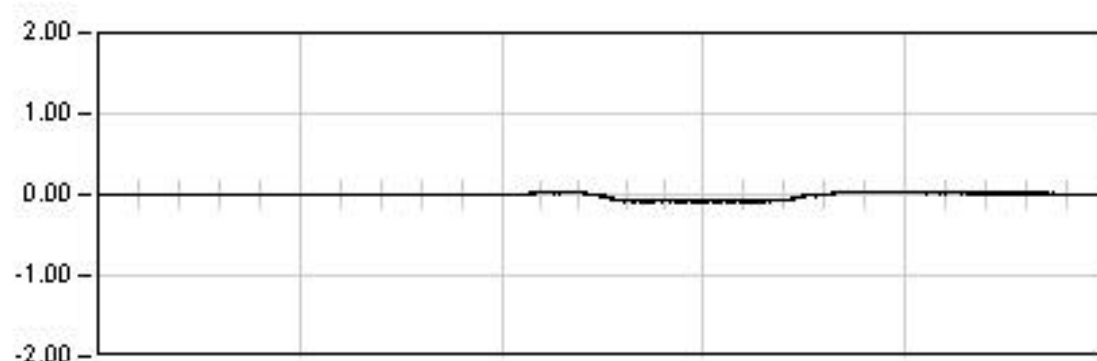
**DYNAMICA 21**

207.5 Seg

Max: -0.17

Min: 0.01

Rem: -0.01

**DYNAMICA 01**

234.0 Seg

Max: -0.09

Min: 0.05

Rem: 0.00

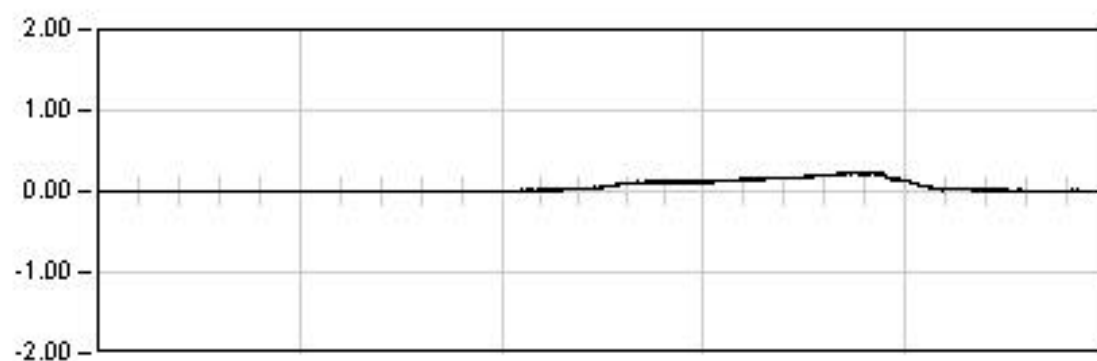
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P044

Canal : 08

Unidades : mm

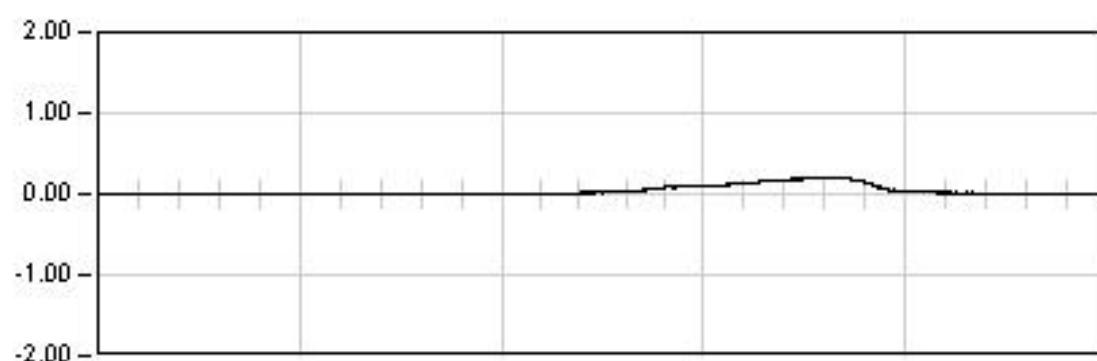
**DYNAMICA 11**

127.5 Seg

Max: 0.23

Min: -0.01

Rem: 0.01

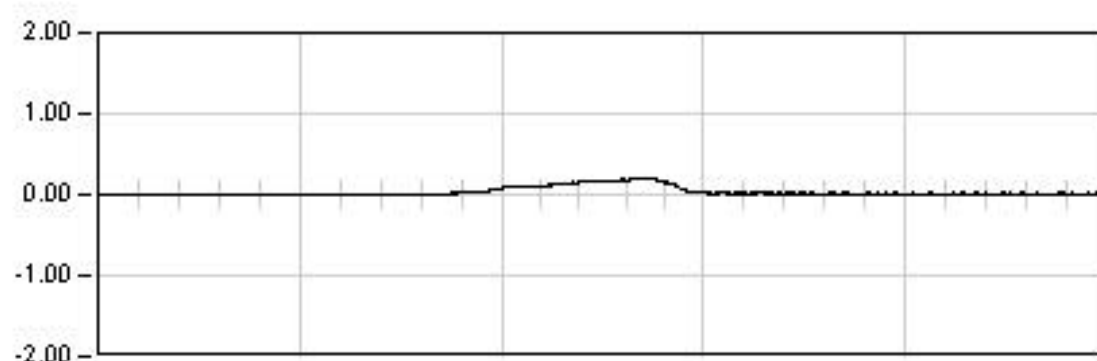
**DYNAMICA 12**

52.5 Seg

Max: 0.21

Min: -0.01

Rem: 0.00

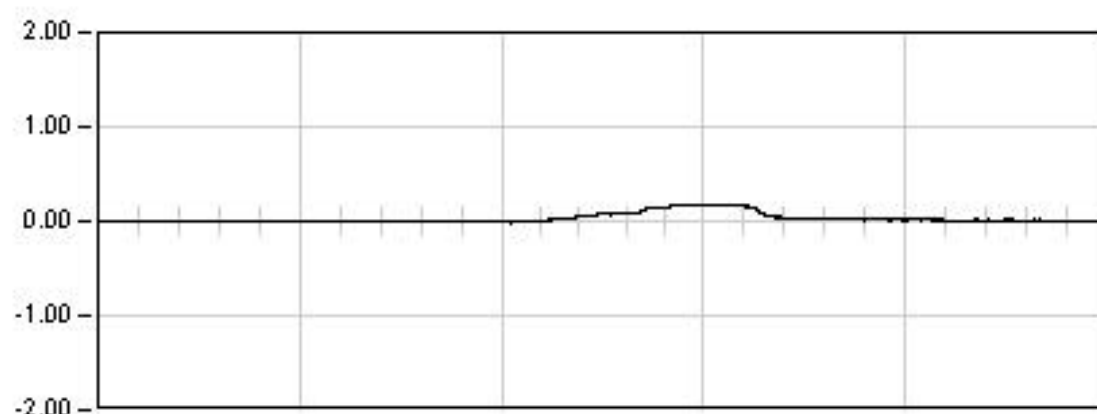
**DYNAMICA 13**

37.5 Seg

Max: 0.20

Min: -0.01

Rem: 0.01

**DYNAMICA 14**

41.5 Seg

Max: 0.18

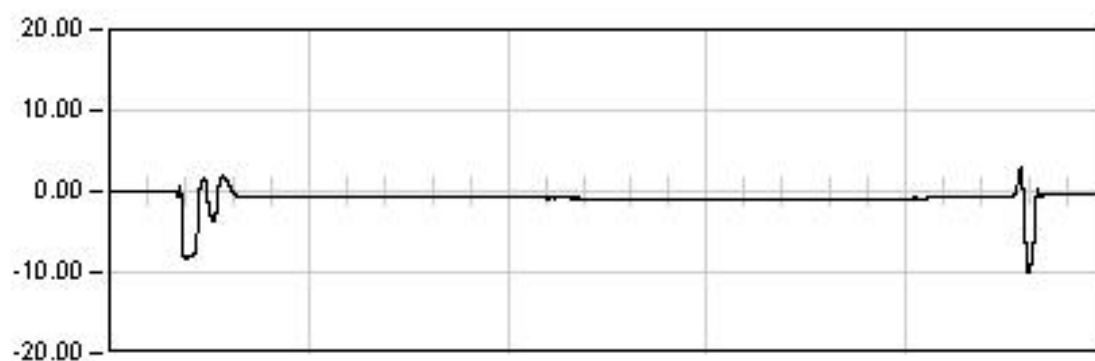
Min: -0.02

Rem: 0.01

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P051      Canal : 47      Unidades : mm

**ESTATICA 01**

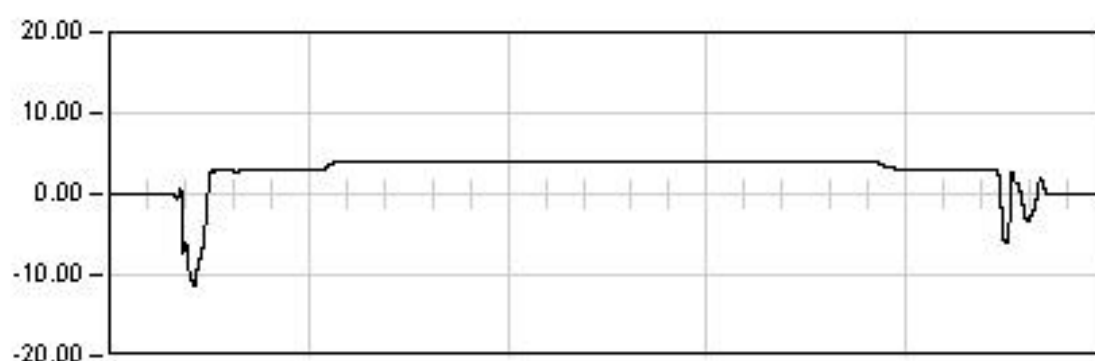
1809.0    Seg

Est:    -0.94

Max:   -10.13

Min:    2.92

Rem:   -0.20

**ESTATICA 02**

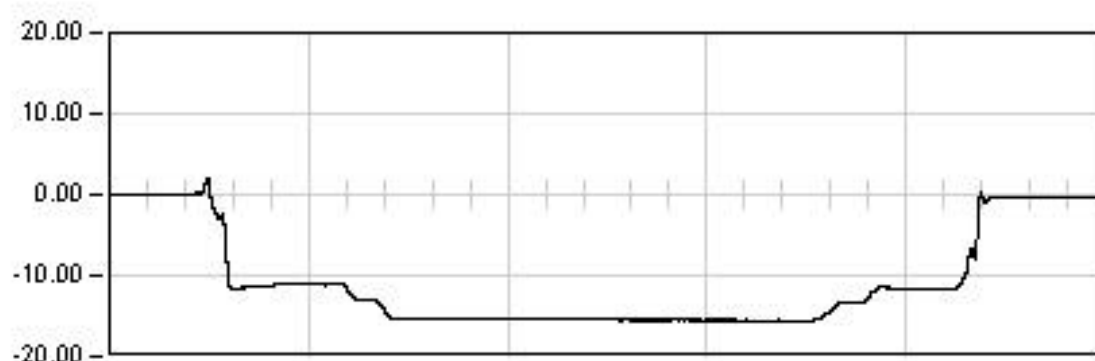
1690.0    Seg

Est:    3.97

Max:   -11.19

Min:    4.03

Rem:   -0.08

**ESTATICA 03**

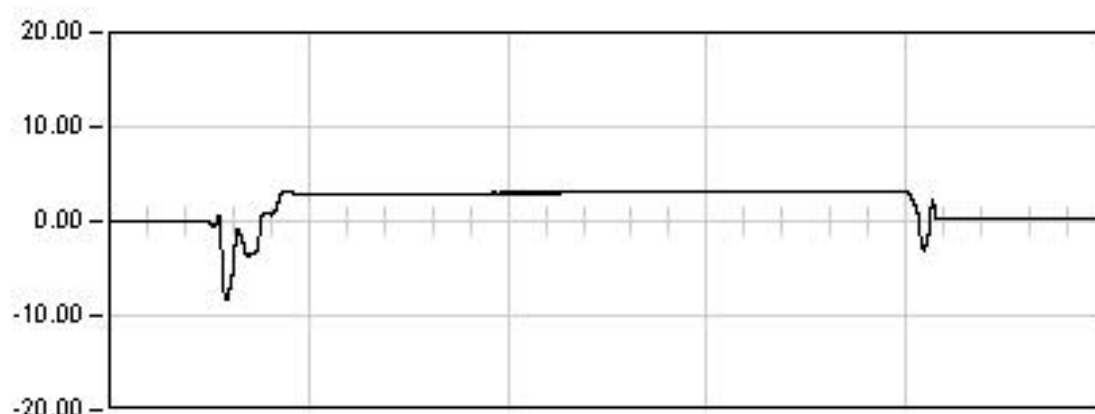
1519.0    Seg

Est:    -15.52

Max:   -15.54

Min:    2.09

Rem:   -0.25

**ESTATICA 04**

1254.0    Seg

Est:    3.05

Max:   -8.30

Min:    3.09

Rem:   0.23

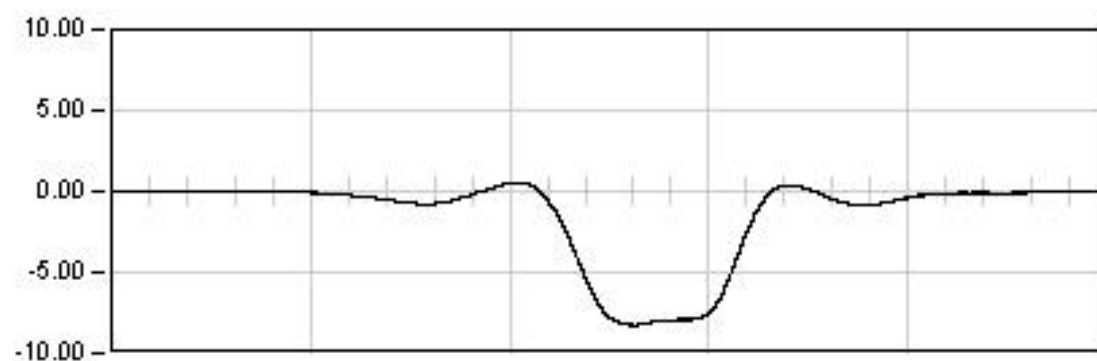
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P051

Canal : 47

Unidades : mm

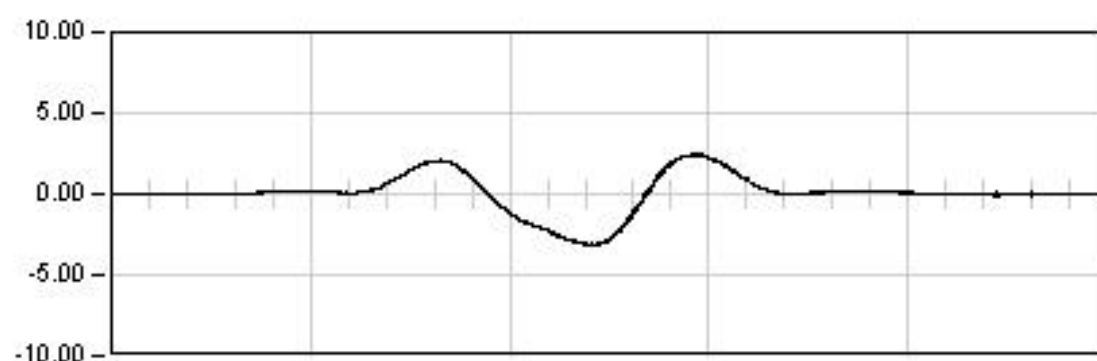
**DINAMICA 11**

127.5 Seg

Max: -8.30

Min: 0.53

Rem: -0.05

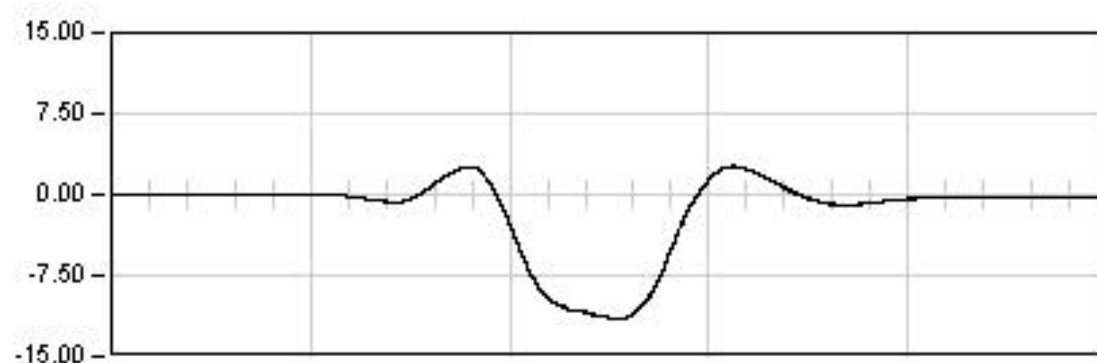
**DINAMICA 21**

207.5 Seg

Max: -3.14

Min: 2.46

Rem: 0.03

**DINAMICA 01**

234.0 Seg

Max: -11.49

Min: 2.66

Rem: -0.29

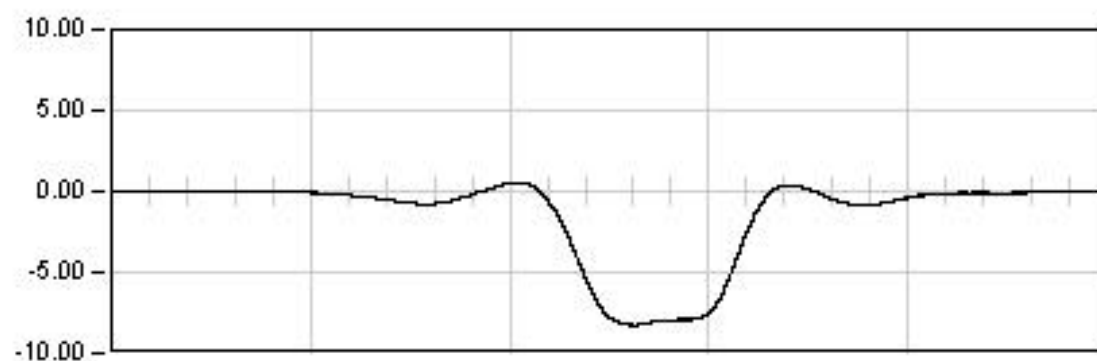
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P051

Canal : 47

Unidades : mm

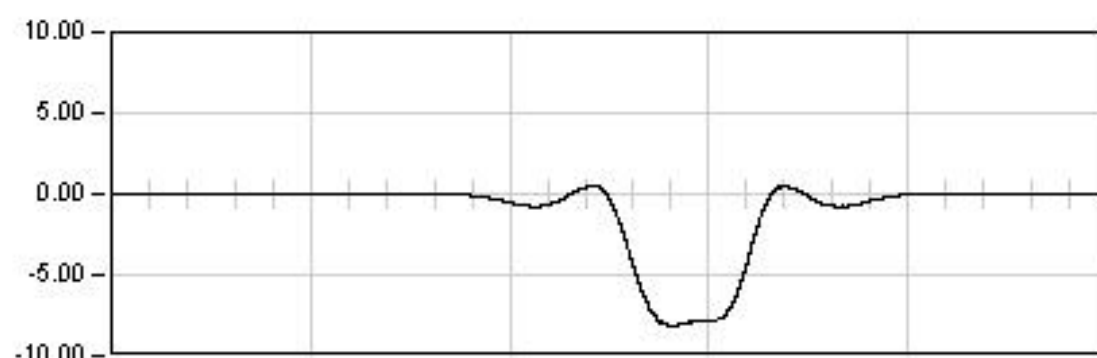
**DYNAMICA 11**

127.5 Seg

Max: -8.30

Min: 0.53

Rem: -0.05

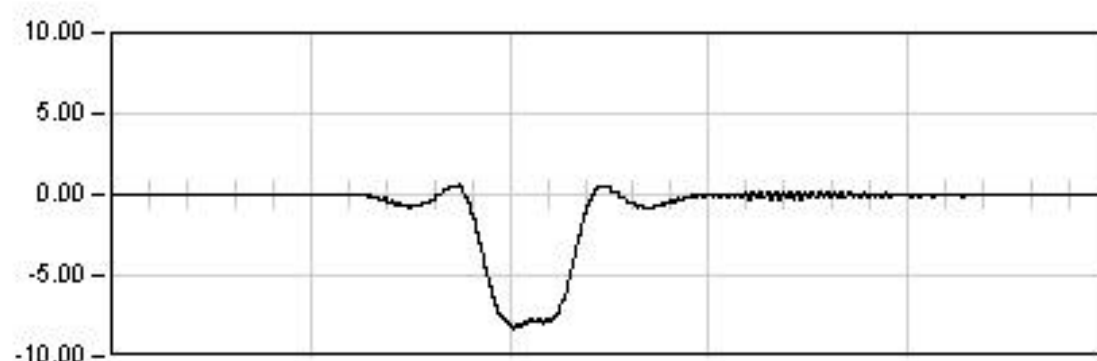
**DYNAMICA 12**

52.5 Seg

Max: -8.17

Min: 0.53

Rem: 0.01

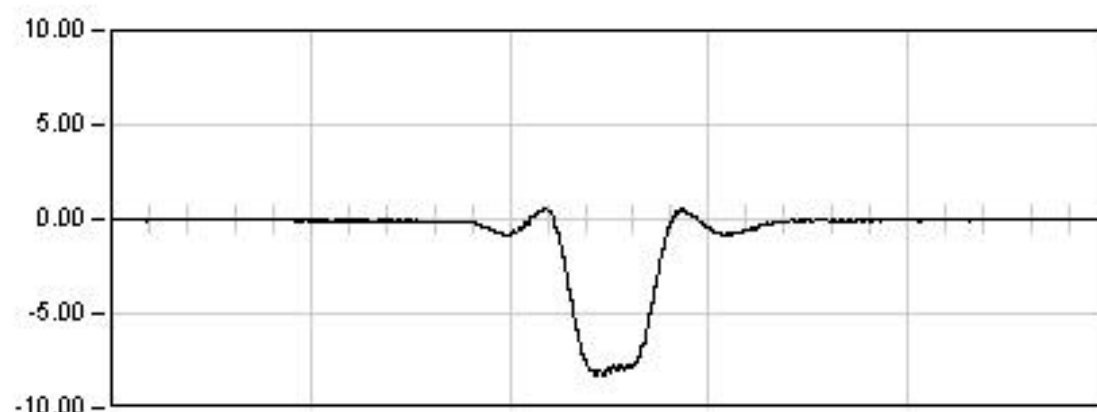
**DYNAMICA 13**

37.5 Seg

Max: -8.26

Min: 0.59

Rem: -0.04

**DYNAMICA 14**

41.5 Seg

Max: -8.29

Min: 0.61

Rem: -0.02

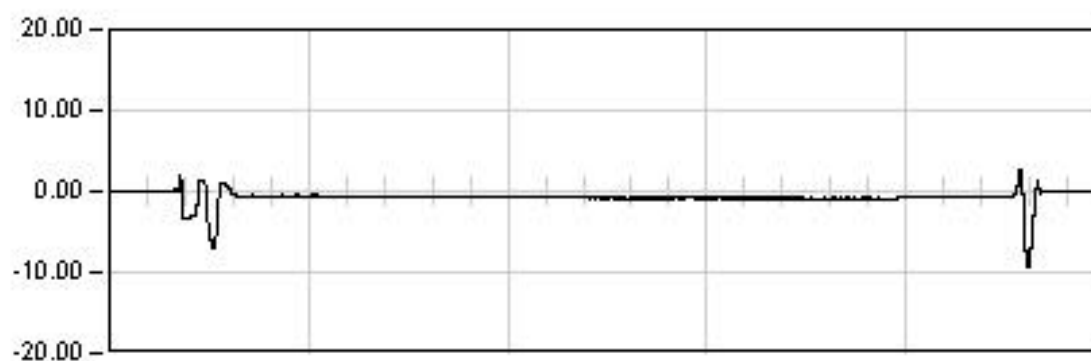
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P052

Canal : 48

Unidades : mm

**ESTATICA 01**

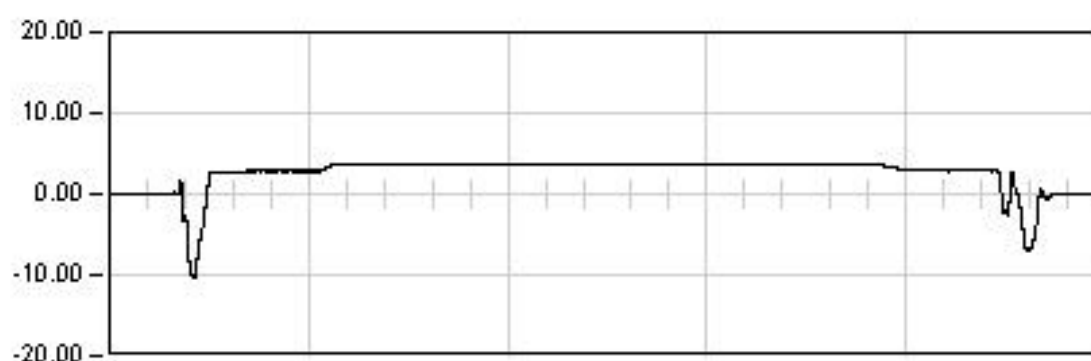
1809.0 Seg

Est: -0.84

Max: -9.35

Min: 2.68

Rem: -0.10

**ESTATICA 02**

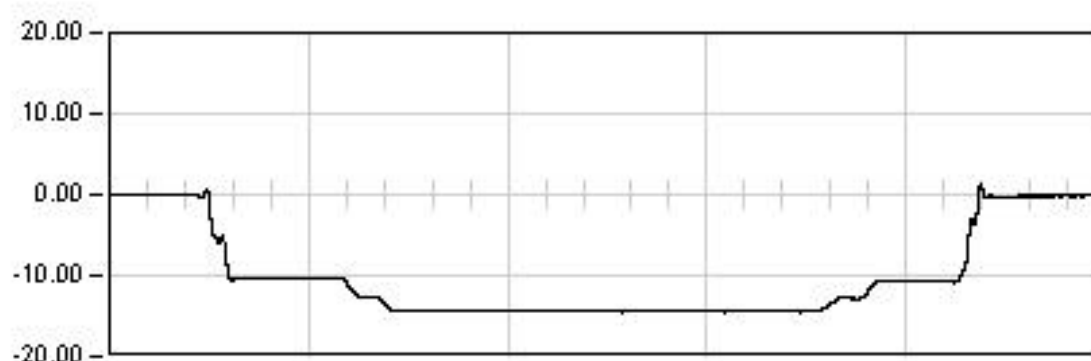
1690.0 Seg

Est: 3.73

Max: -10.48

Min: 3.79

Rem: -0.09

**ESTATICA 03**

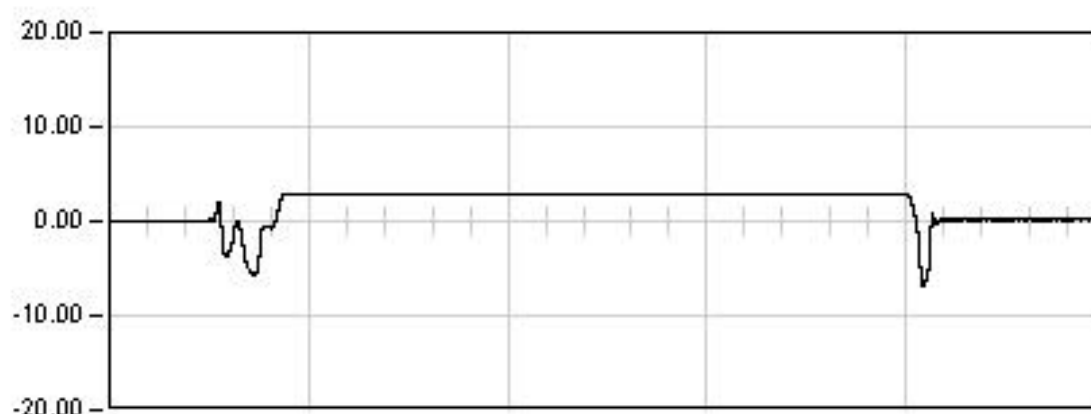
1519.0 Seg

Est: -14.45

Max: -14.51

Min: 1.39

Rem: -0.14

**ESTATICA 04**

1254.0 Seg

Est: 2.93

Max: -6.93

Min: 2.97

Rem: 0.17



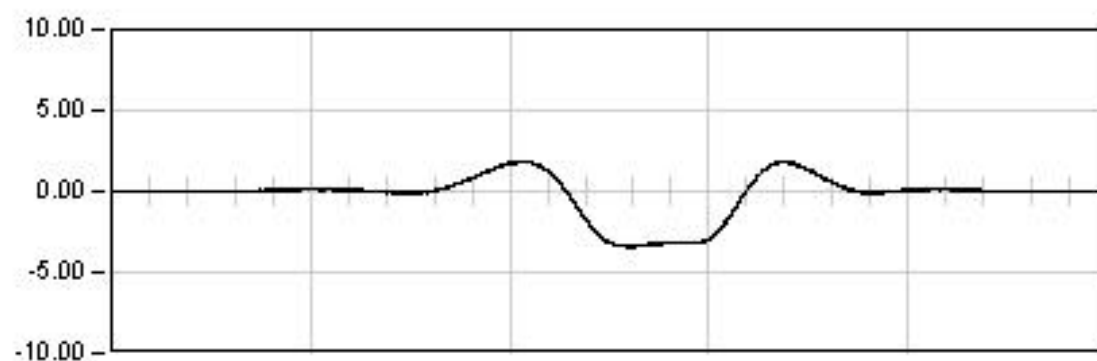
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P052

Canal : 48

Unidades : mm

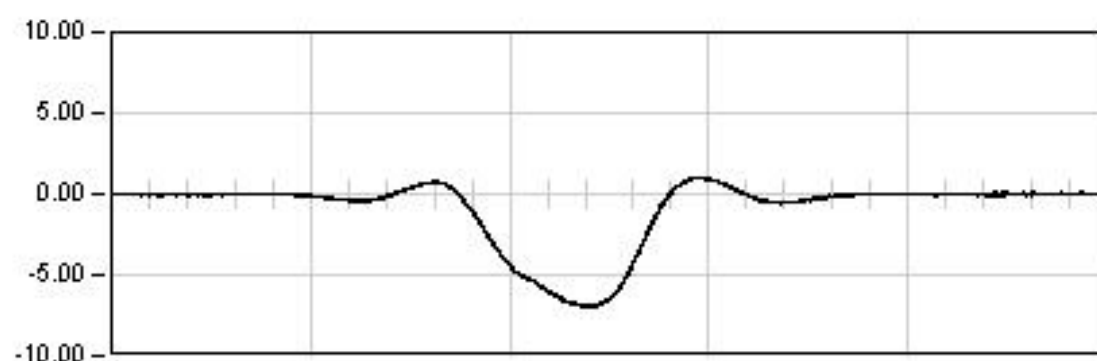
**DYNAMICA 11**

127.5 Seg

Max: -3.45

Min: 1.88

Rem: -0.01

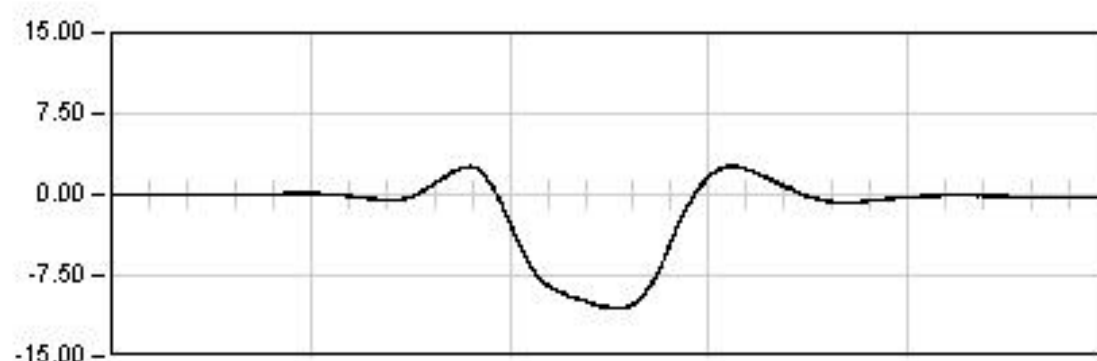
**DYNAMICA 21**

207.5 Seg

Max: -6.98

Min: 1.04

Rem: 0.02

**DYNAMICA 01**

234.0 Seg

Max: -10.59

Min: 2.69

Rem: -0.19

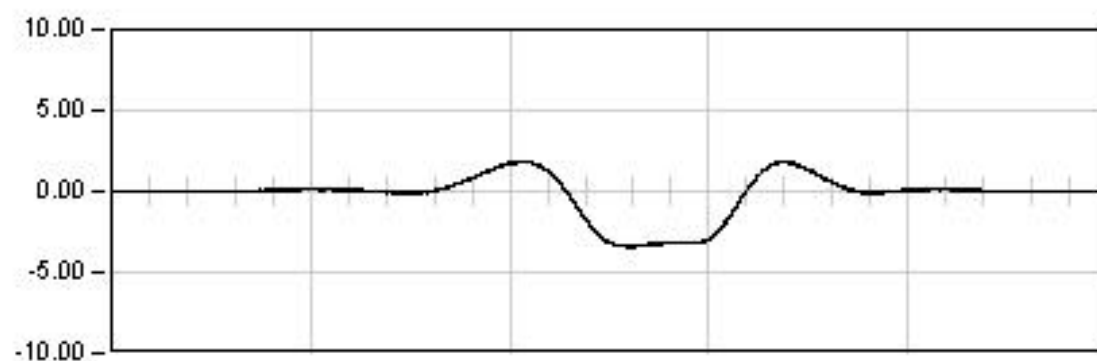
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P052

Canal : 48

Unidades : mm

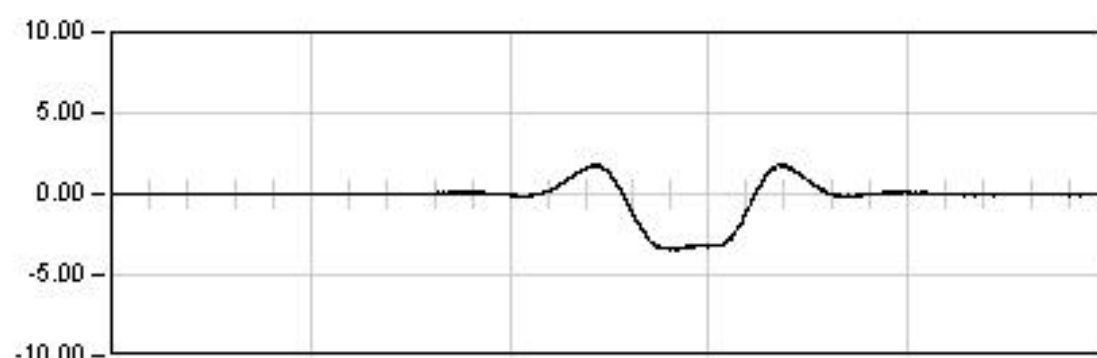
**DYNAMICA 11**

127.5 Seg

Max: -3.45

Min: 1.88

Rem: -0.01

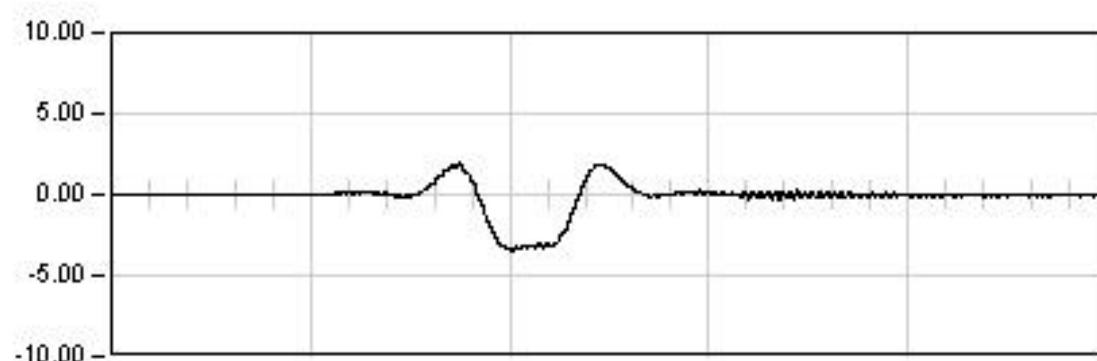
**DYNAMICA 12**

52.5 Seg

Max: -3.46

Min: 1.80

Rem: -0.04

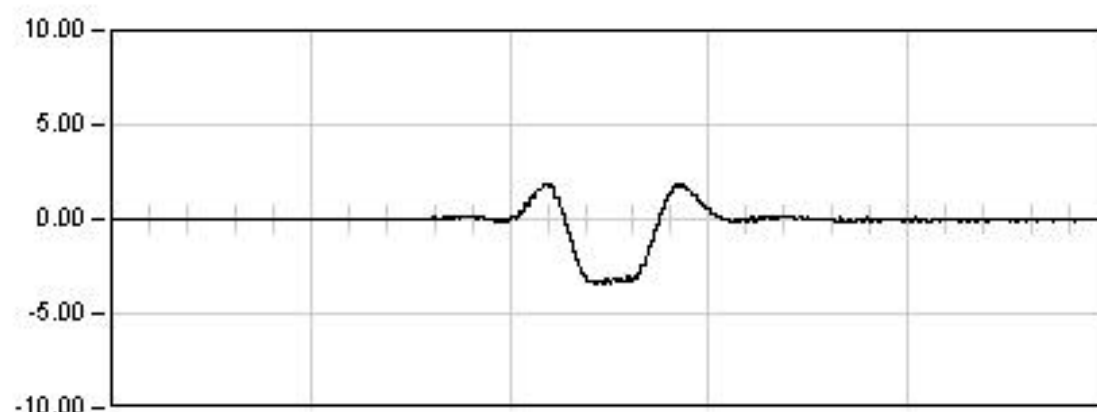
**DYNAMICA 13**

37.5 Seg

Max: -3.51

Min: 1.95

Rem: -0.04

**DYNAMICA 14**

41.5 Seg

Max: -3.50

Min: 1.88

Rem: -0.03

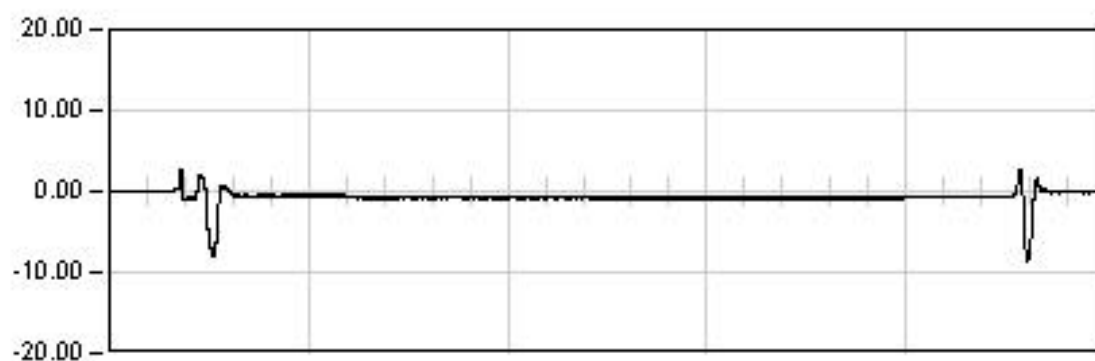
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P053

Canal : 49

Unidades : mm

**ESTATICA 01**

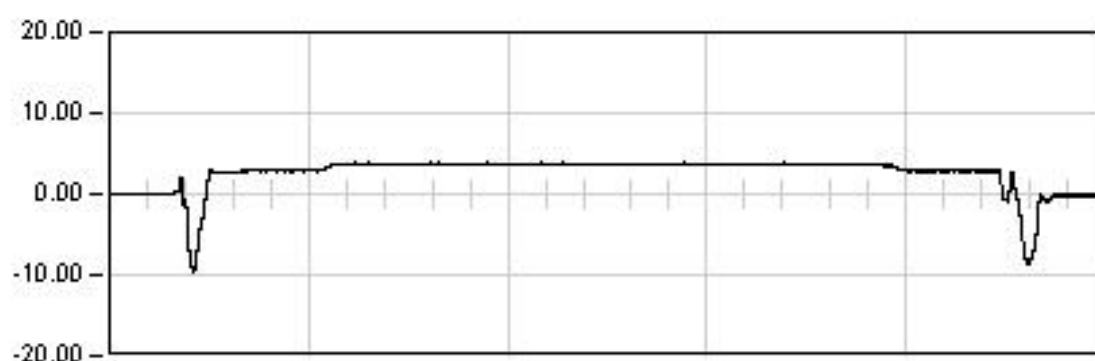
1809.0 Seg

Est: -0.85

Max: -8.51

Min: 2.66

Rem: -0.09

**ESTATICA 02**

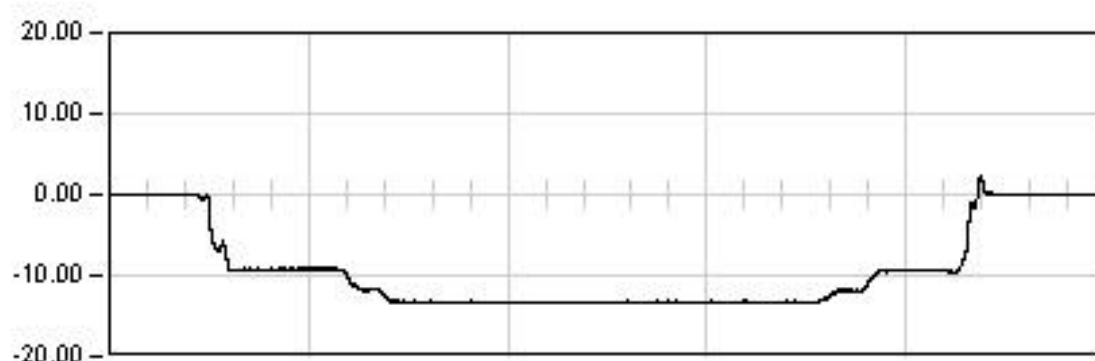
1690.0 Seg

Est: 3.70

Max: -9.50

Min: 3.86

Rem: -0.20

**ESTATICA 03**

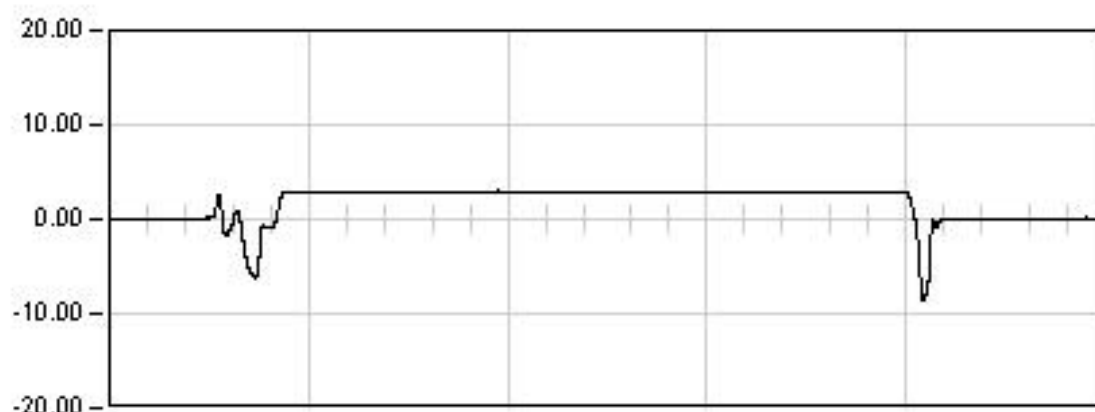
1519.0 Seg

Est: -13.25

Max: -13.40

Min: 2.31

Rem: -0.01

**ESTATICA 04**

1254.0 Seg

Est: 2.86

Max: -8.49

Min: 3.01

Rem: 0.02

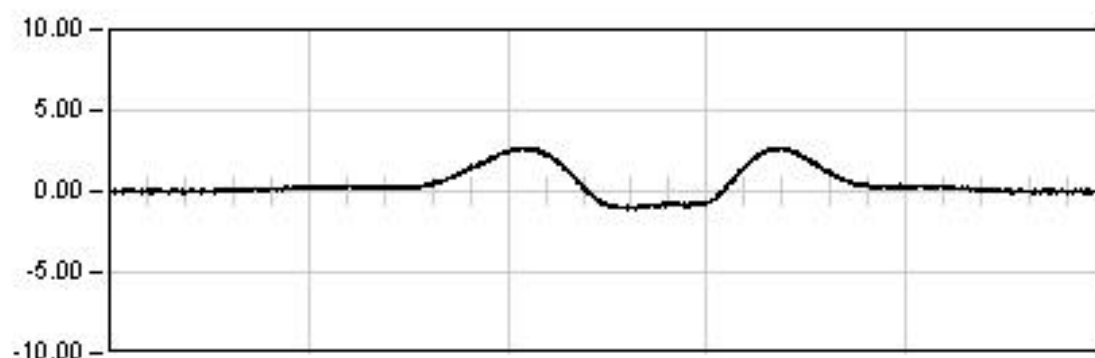
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P053

Canal : 49

Unidades : mm

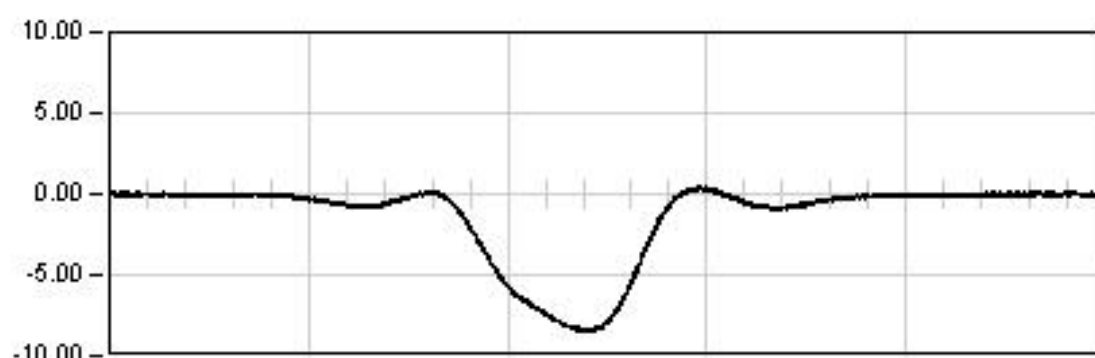
**DYNAMICA 11**

127.5 Seg

Max: 2.74

Min: -1.11

Rem: -0.00

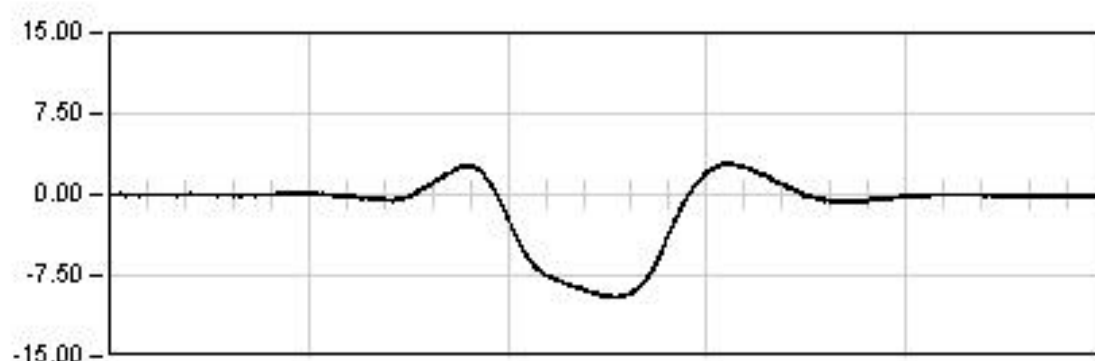
**DYNAMICA 21**

207.5 Seg

Max: -8.52

Min: 0.46

Rem: -0.01

**DYNAMICA 01**

234.0 Seg

Max: -9.59

Min: 2.93

Rem: -0.16

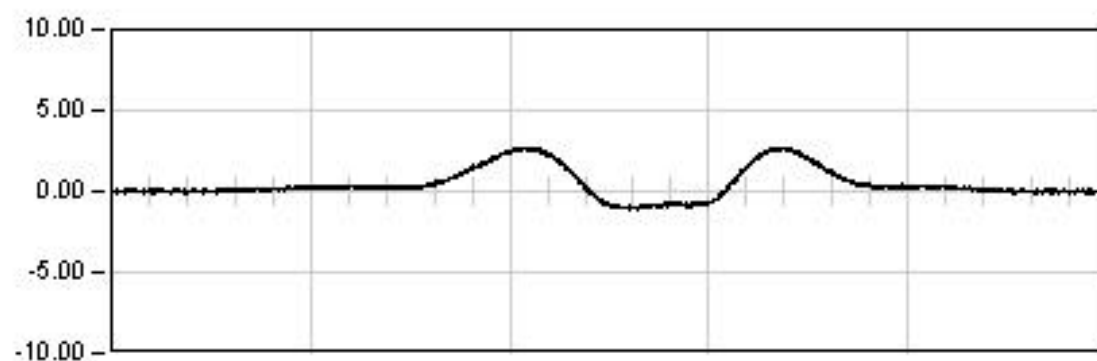
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P053

Canal : 49

Unidades : mm

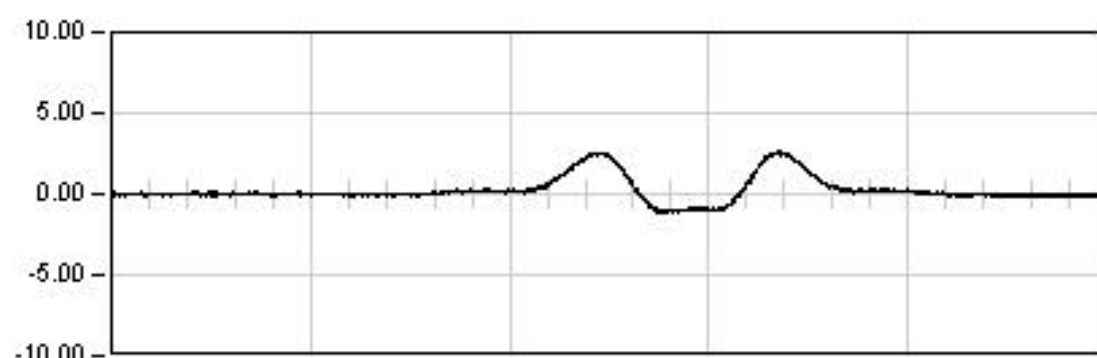
**DYNAMICA 11**

127.5 Seg

Max: 2.74

Min: -1.11

Rem: -0.00

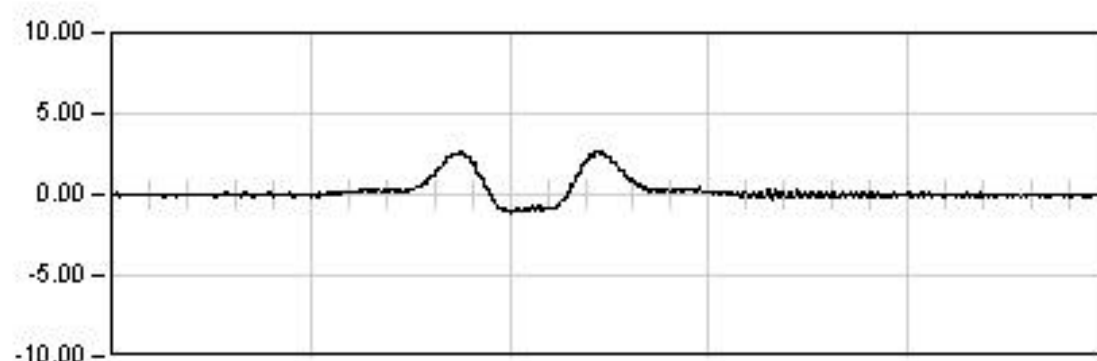
**DYNAMICA 12**

52.5 Seg

Max: 2.65

Min: -1.16

Rem: -0.08

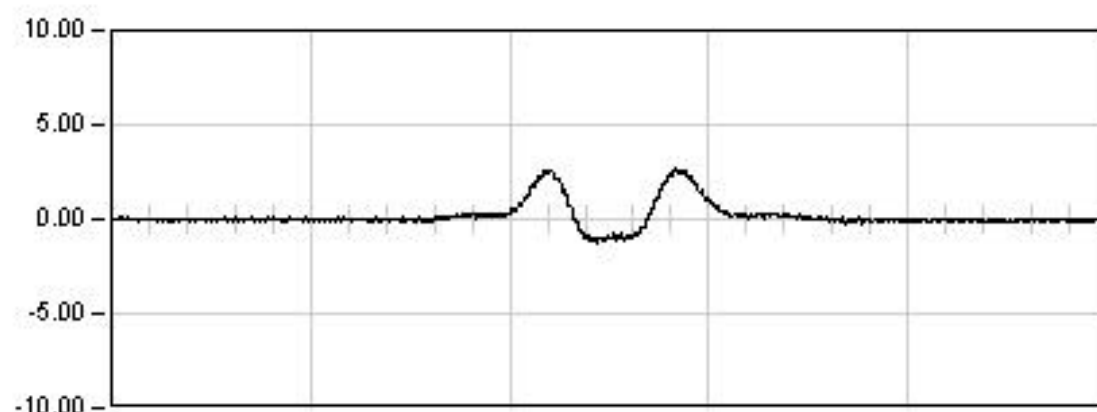
**DYNAMICA 13**

37.5 Seg

Max: 2.75

Min: -1.09

Rem: -0.04

**DYNAMICA 14**

41.5 Seg

Max: 2.66

Min: -1.23

Rem: -0.06

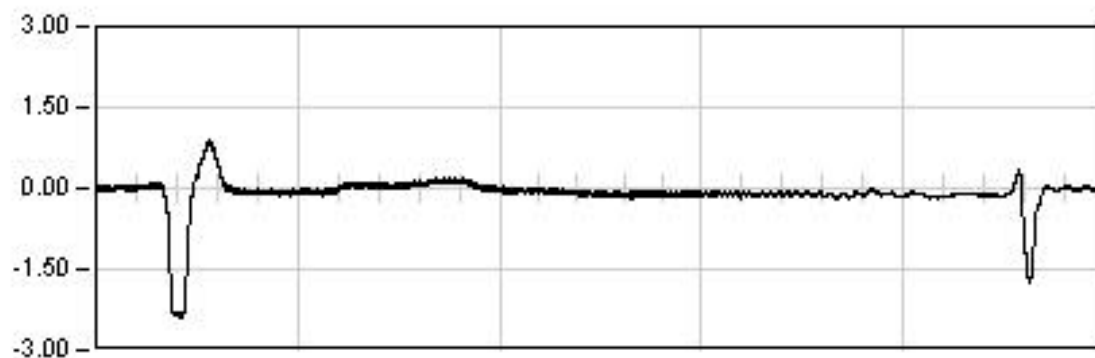
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P054

Canal : 56

Unidades : mm

**ESTATICA 01**

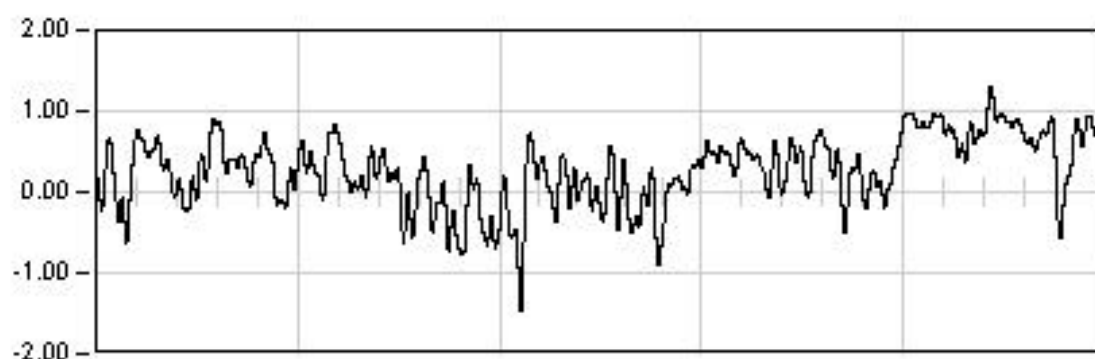
1809.0 Seg

Est: -0.10

Max: -2.40

Min: 0.89

Rem: -0.00

**ESTATICA 02**

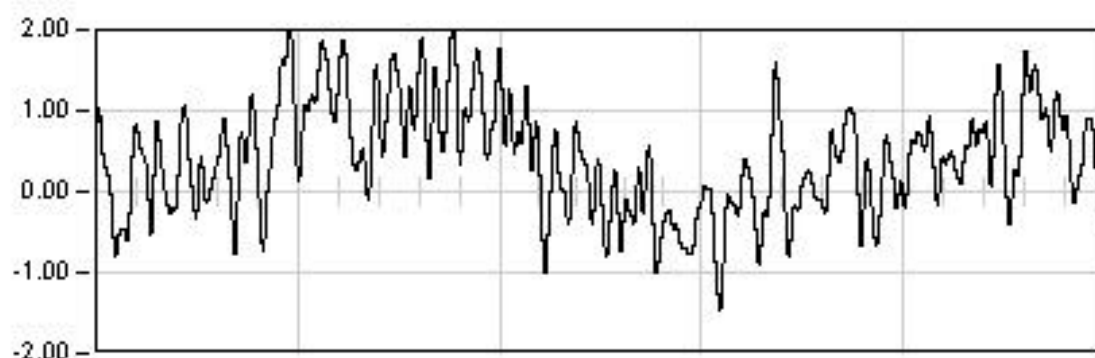
1690.0 Seg

Est: -0.03

Max: -1.48

Min: 1.32

Rem: 0.73

**ESTATICA 03**

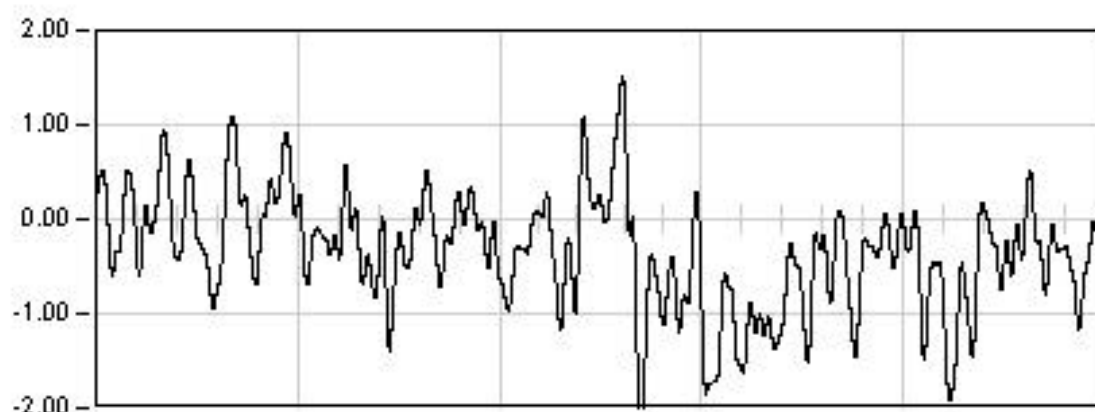
1519.0 Seg

Est: -0.77

Max: 2.21

Min: -1.46

Rem: 0.35

**ESTATICA 04**

1254.0 Seg

Est: -0.73

Max: -2.43

Min: 1.51

Rem: -0.41

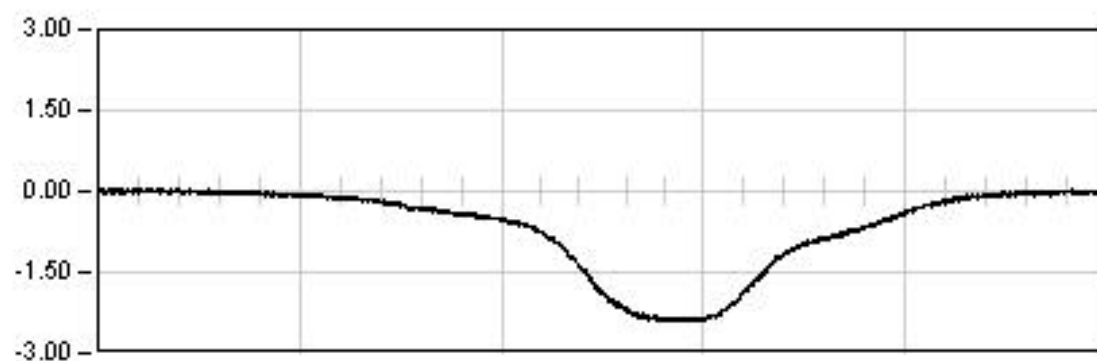
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P054

Canal : 56

Unidades : mm

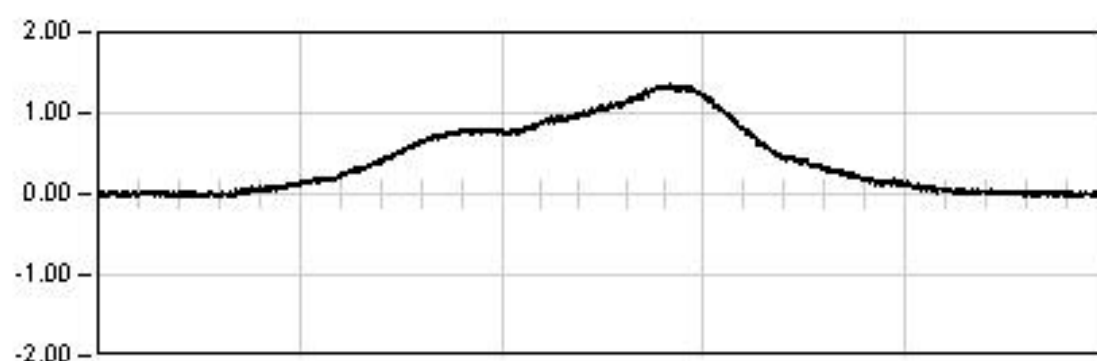
**DYNAMICA 11**

127.5 Seg

Max: -2.42

Min: 0.05

Rem: -0.01

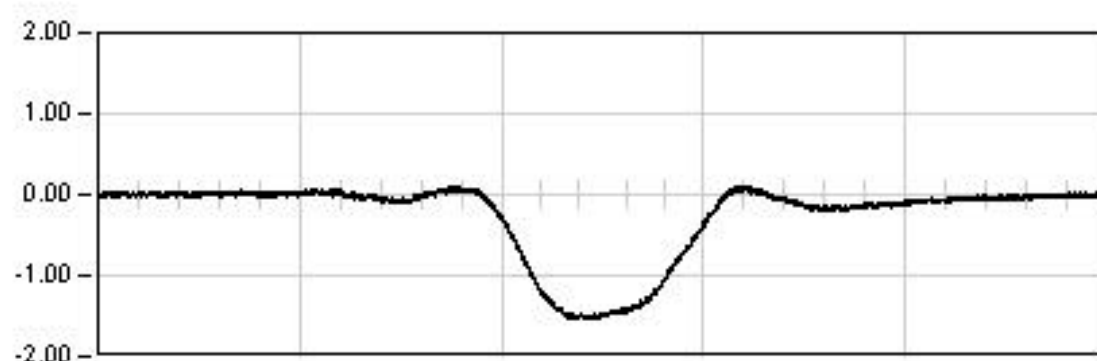
**DYNAMICA 21**

207.5 Seg

Max: 1.35

Min: -0.04

Rem: 0.00

**DYNAMICA 01**

234.0 Seg

Max: -1.55

Min: 0.11

Rem: 0.00

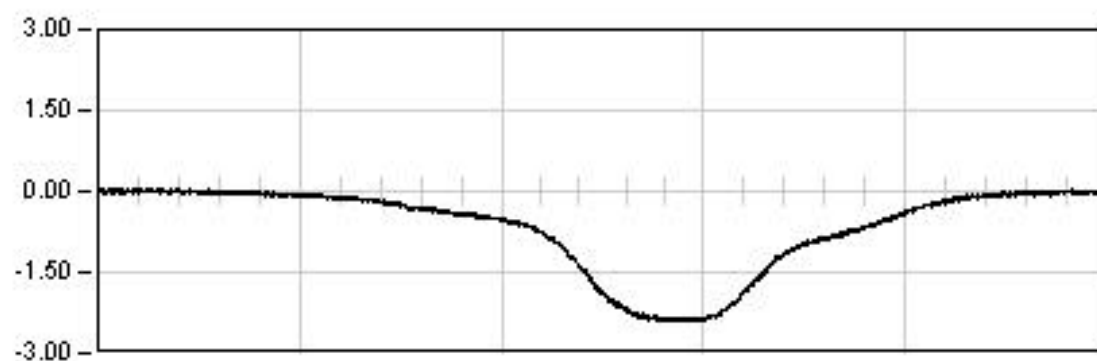
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P054

Canal : 56

Unidades : mm

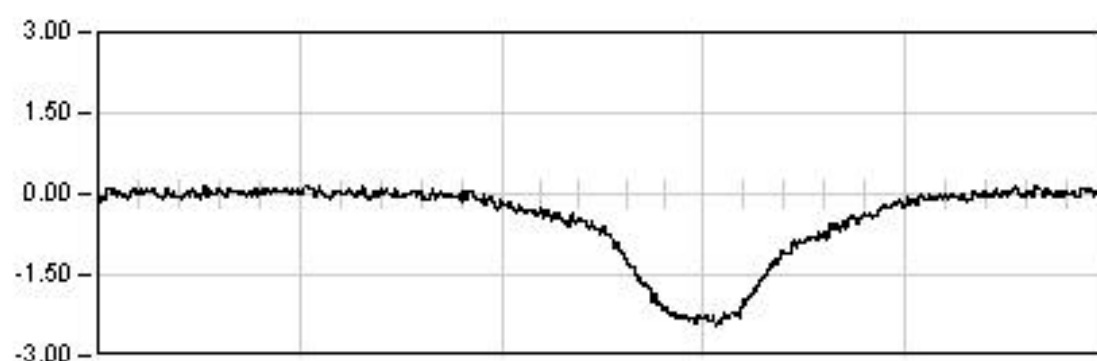
**DYNAMICA 11**

127.5 Seg

Max: -2.42

Min: 0.05

Rem: -0.01

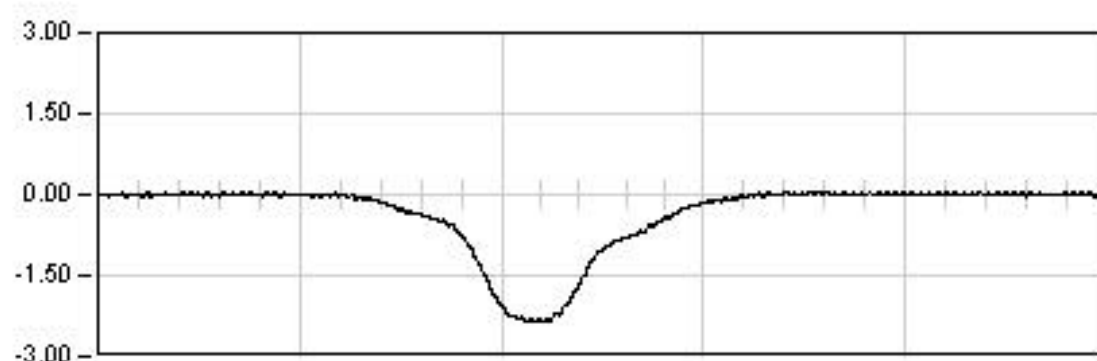
**DYNAMICA 12**

52.5 Seg

Max: -2.46

Min: 0.16

Rem: 0.01

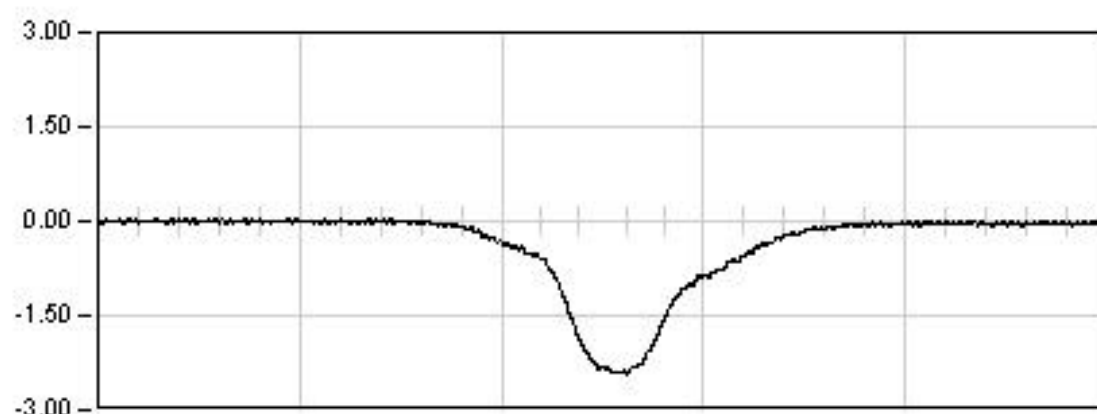
**DYNAMICA 13**

37.5 Seg

Max: -2.37

Min: 0.05

Rem: 0.01

**DYNAMICA 14**

41.5 Seg

Max: -2.43

Min: 0.04

Rem: -0.03



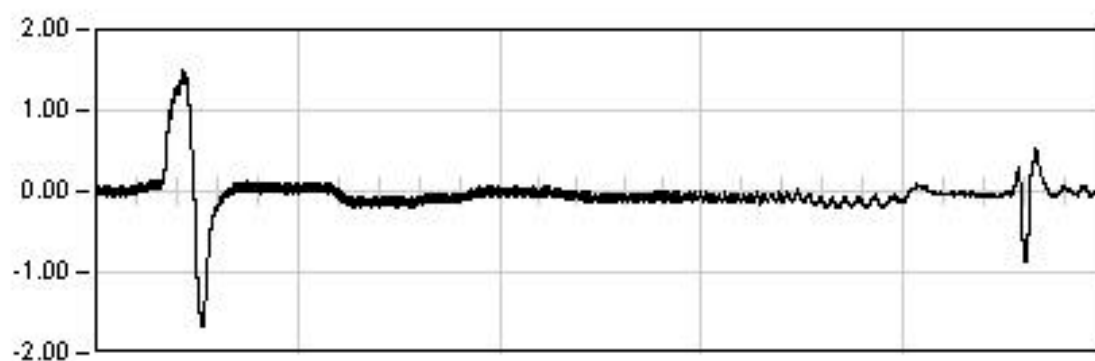
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P055

Canal : 57

Unidades : mm

**ESTATICA 01**

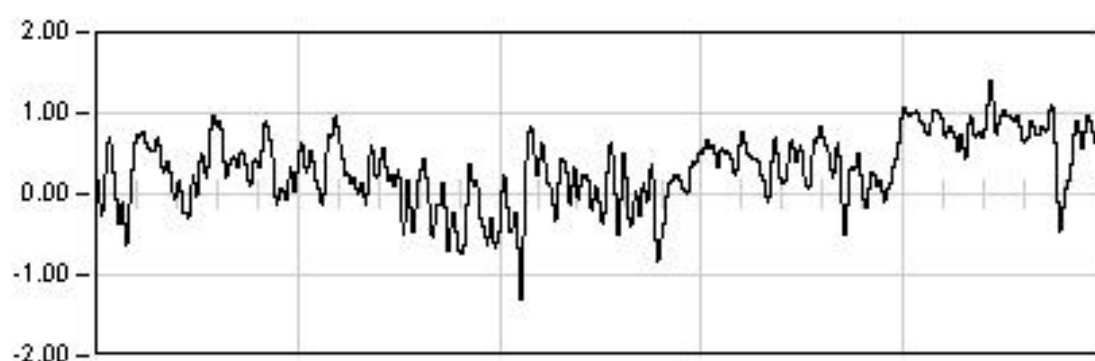
1809.0 Seg

Est: -0.10

Max: -1.68

Min: 1.50

Rem: -0.01

**ESTATICA 02**

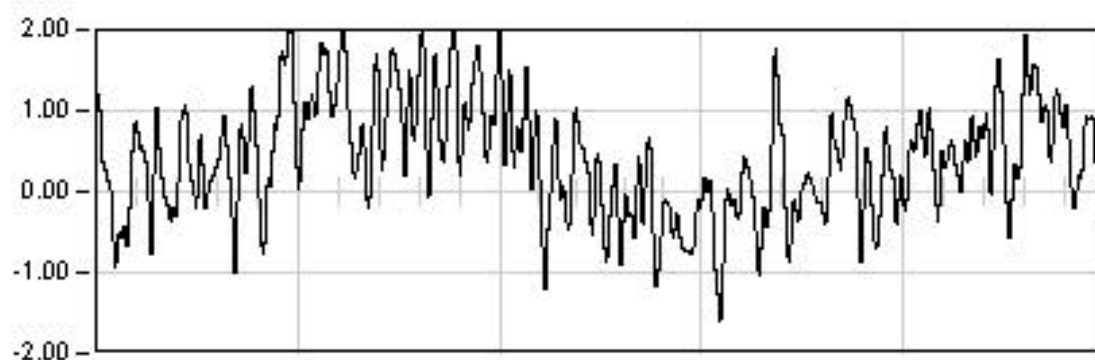
1690.0 Seg

Est: 0.10

Max: 1.39

Min: -1.31

Rem: 0.73

**ESTATICA 03**

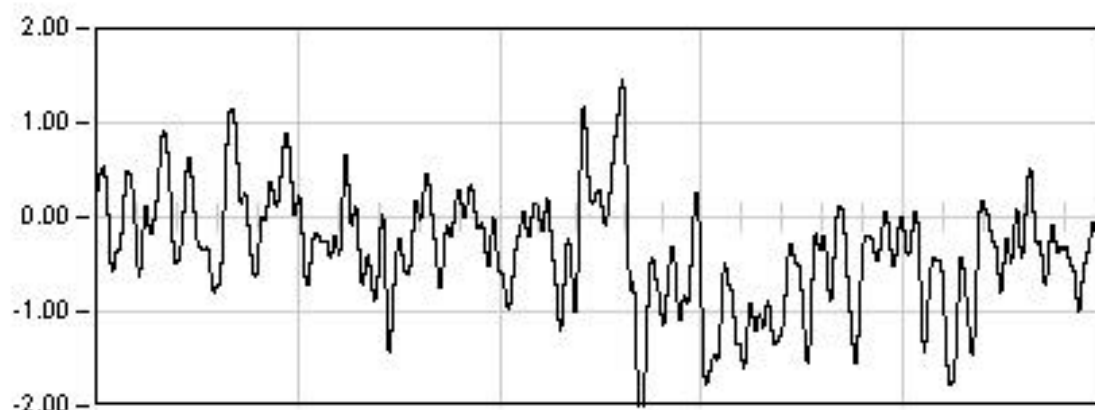
1519.0 Seg

Est: -0.85

Max: 2.33

Min: -1.58

Rem: 0.34

**ESTATICA 04**

1254.0 Seg

Est: -0.75

Max: -2.45

Min: 1.45

Rem: -0.38

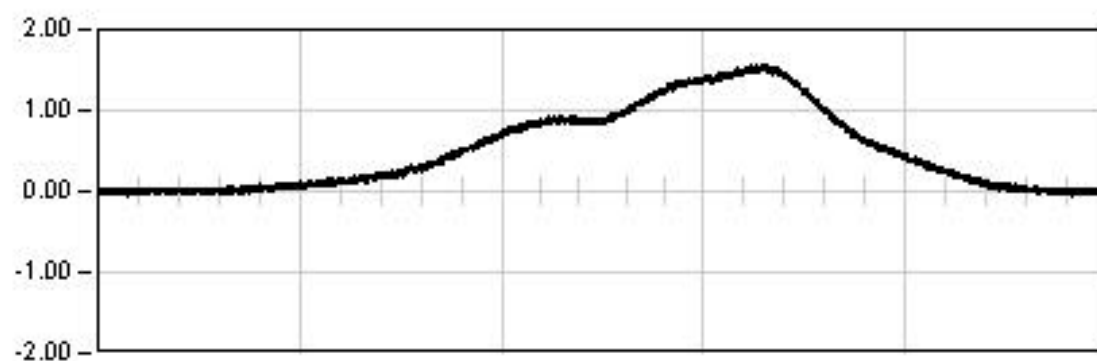
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P055

Canal : 57

Unidades : mm

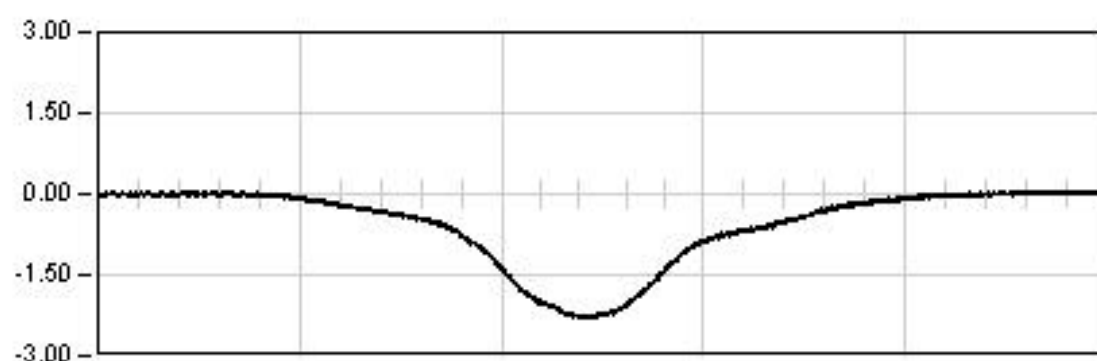
**DYNAMICA 11**

127.5 Seg

Max: 1.56

Min: -0.05

Rem: -0.00

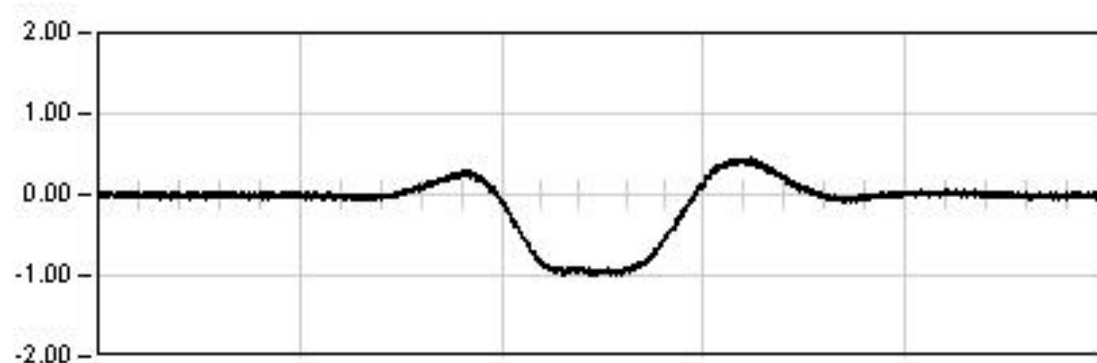
**DYNAMICA 21**

207.5 Seg

Max: -2.30

Min: 0.07

Rem: 0.02

**DYNAMICA 01**

234.0 Seg

Max: -1.01

Min: 0.45

Rem: -0.01

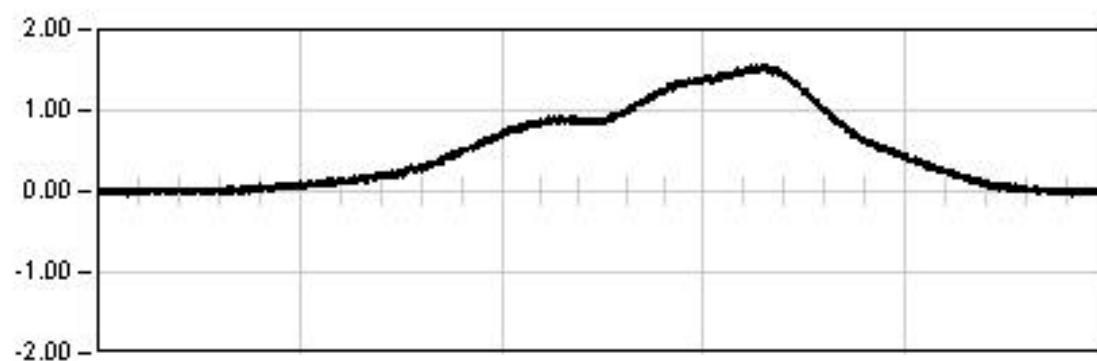
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P055

Canal : 57

Unidades : mm

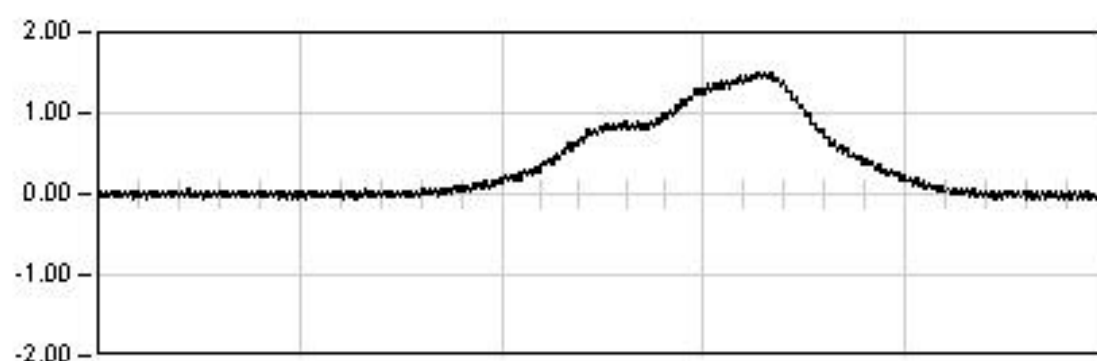
**DINAMICA 11**

127.5 Seg

Max: 1.56

Min: -0.05

Rem: -0.00

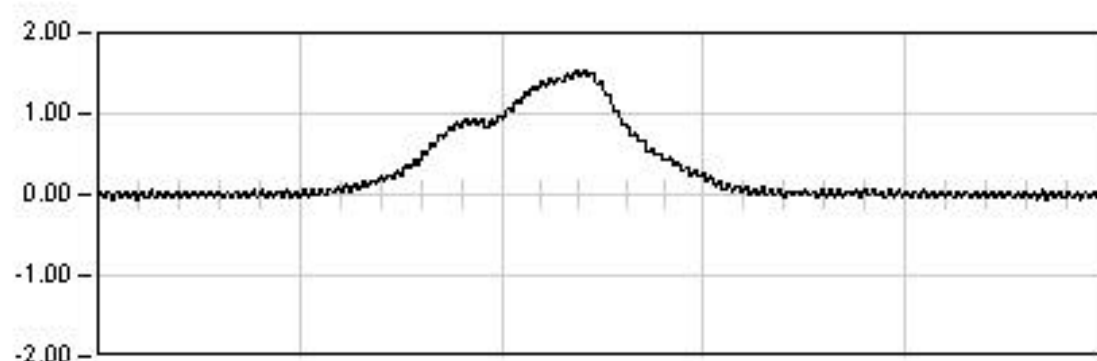
**DINAMICA 12**

52.5 Seg

Max: 1.52

Min: -0.07

Rem: -0.02

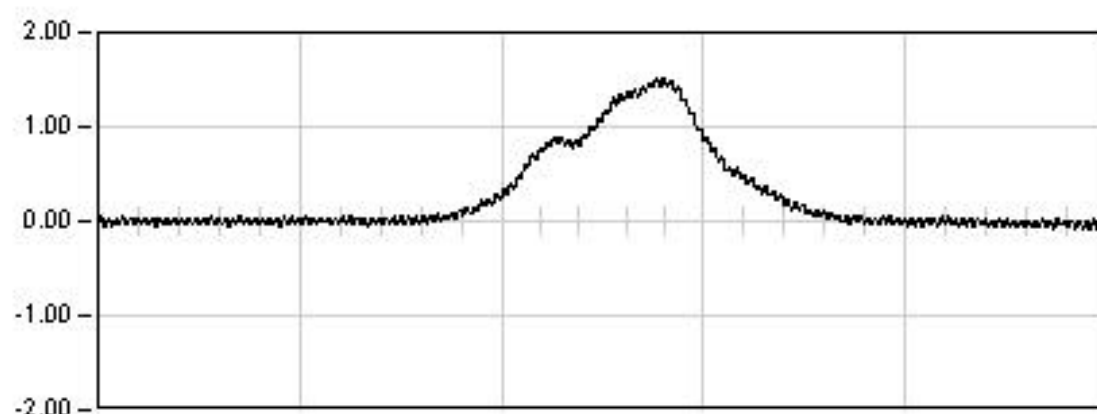
**DINAMICA 13**

37.5 Seg

Max: 1.54

Min: -0.06

Rem: -0.01

**DINAMICA 14**

41.5 Seg

Max: 1.51

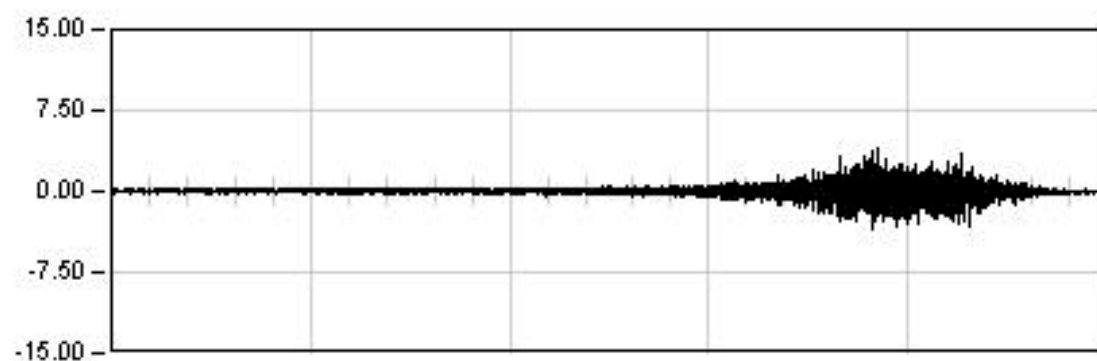
Min: -0.08

Rem: -0.04

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A022    Canal : 34    Unidades : G's/100

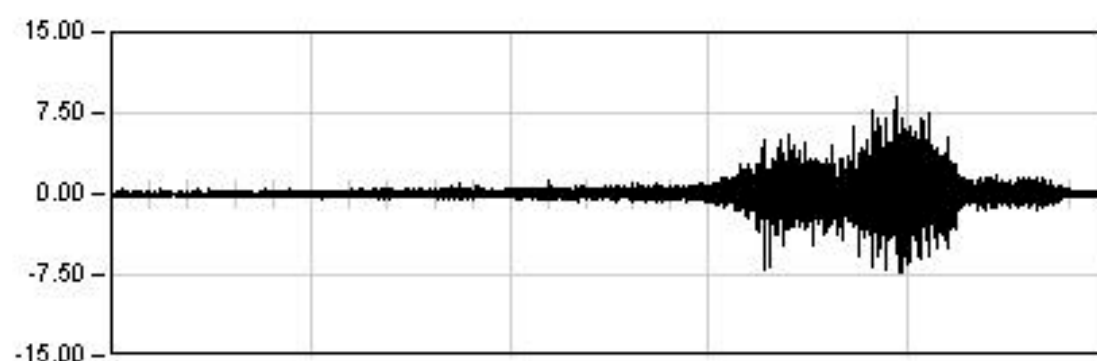
**DINAMICA 11**

127.5    Seg

Max:    4.05

Min:    -3.42

Rem:    -0.05

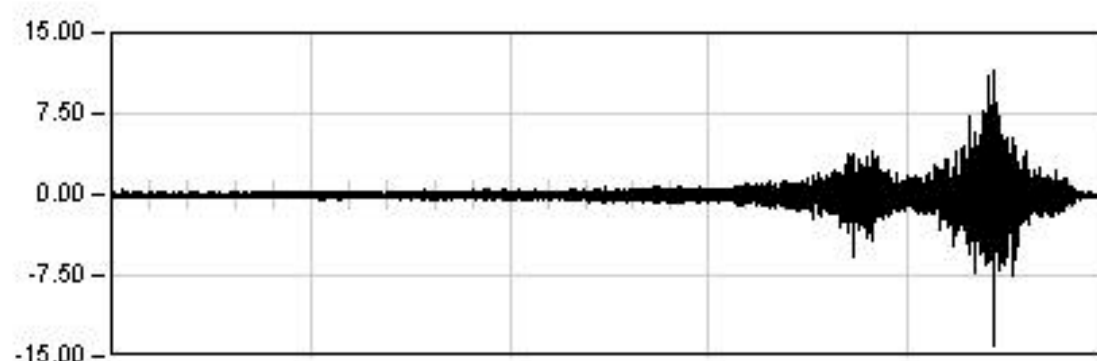
**DINAMICA 21**

207.5    Seg

Max:    9.04

Min:    -7.24

Rem:    -0.01

**DINAMICA 01**

234.0    Seg

Max:    -14.08

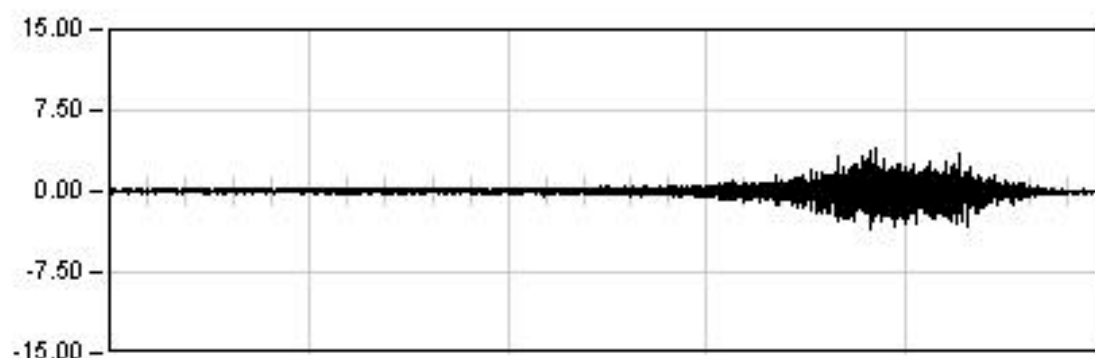
Min:    11.62

Rem:    -0.10

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A022    Canal : 34    Unidades : G's/100

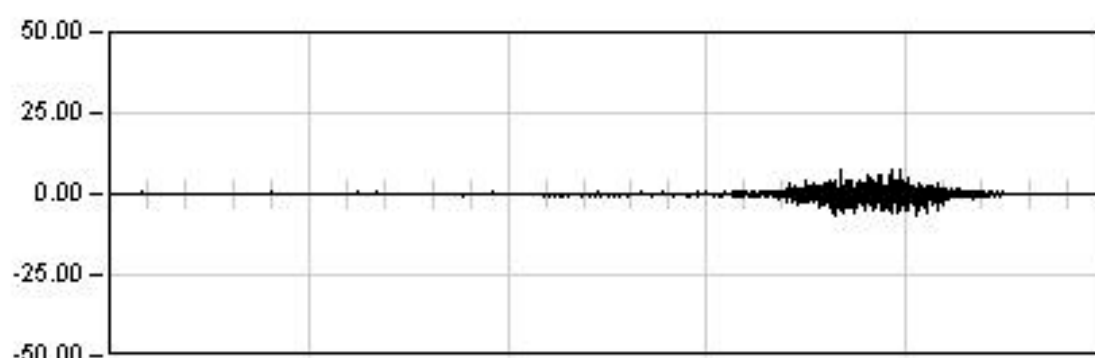
**DINAMICA 11**

127.5    Seg

Max:    4.05

Min:    -3.42

Rem:    -0.05

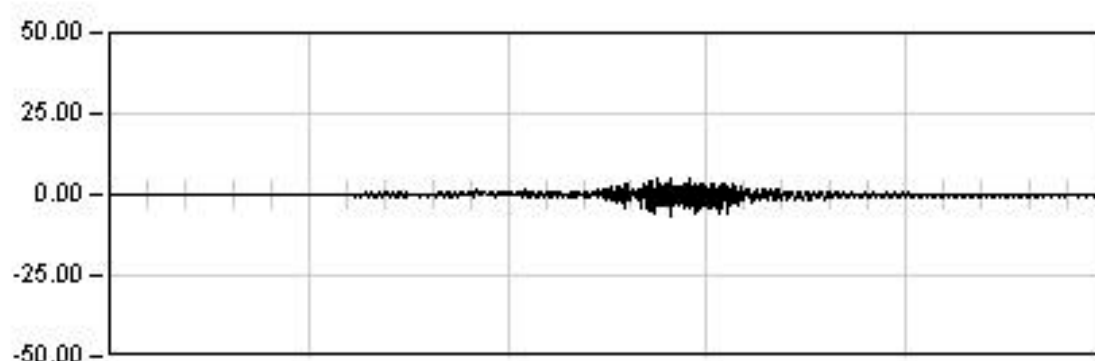
**DINAMICA 12**

52.5    Seg

Max:    7.61

Min:    -6.35

Rem:    0.01

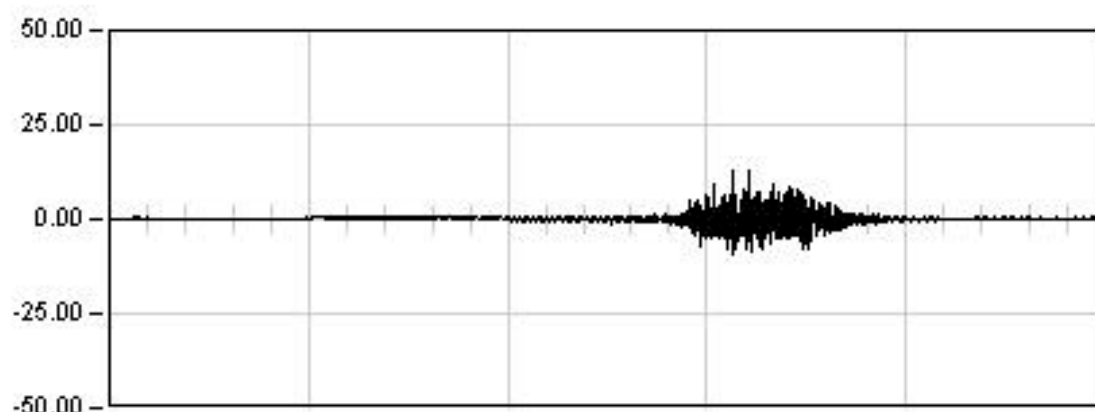
**DINAMICA 13**

37.5    Seg

Max:    -6.97

Min:    5.02

Rem:    -0.24

**DINAMICA 14**

41.5    Seg

Max:    12.82

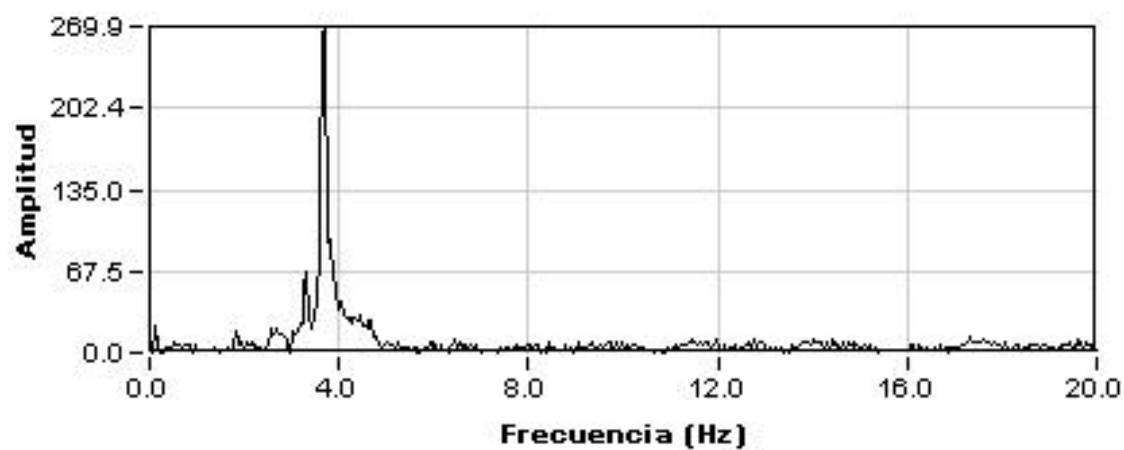
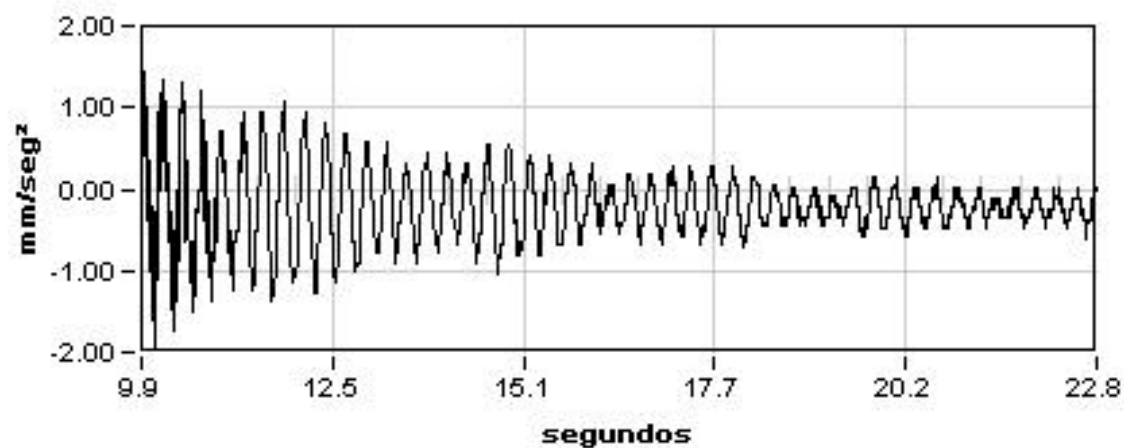
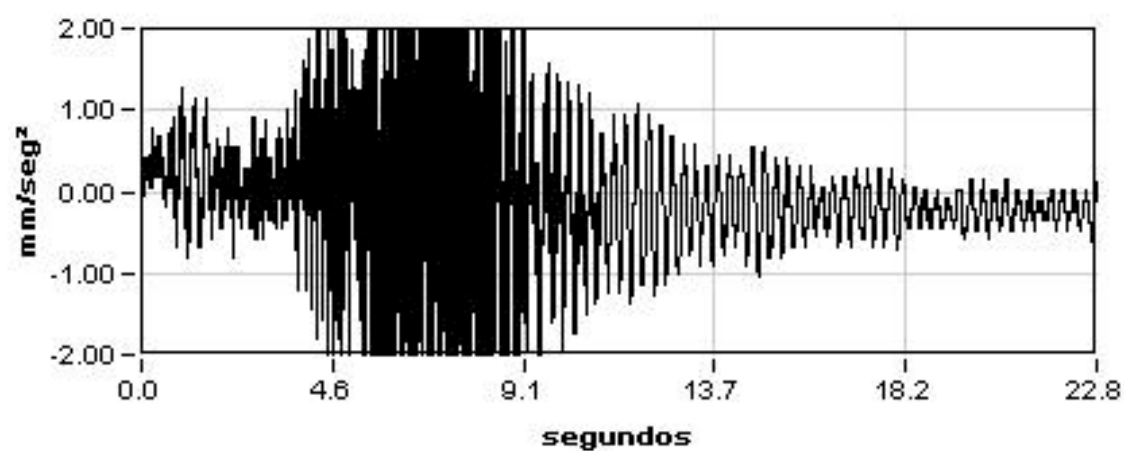
Min:    -9.45

Rem:    0.09

# VIADUCTO DEL GALLO (29VI02)

P.K. 81/580

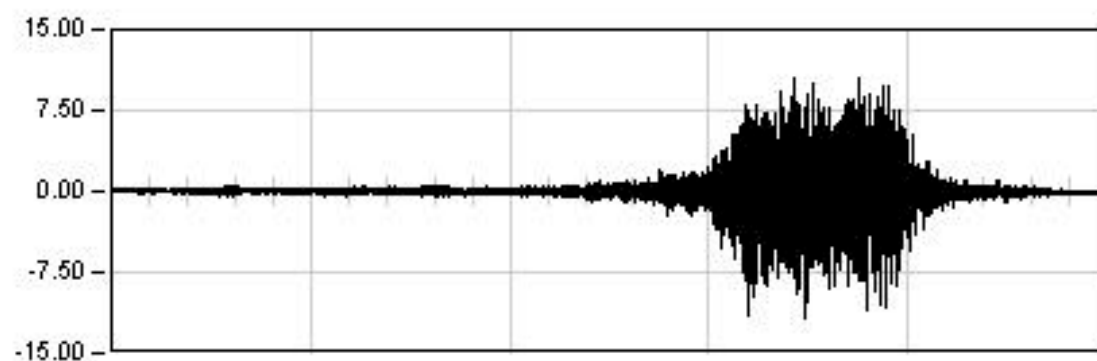
Prueba: din13 Punto: A022 Canal: 34



## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A031    Canal : 35    Unidades : G's/100

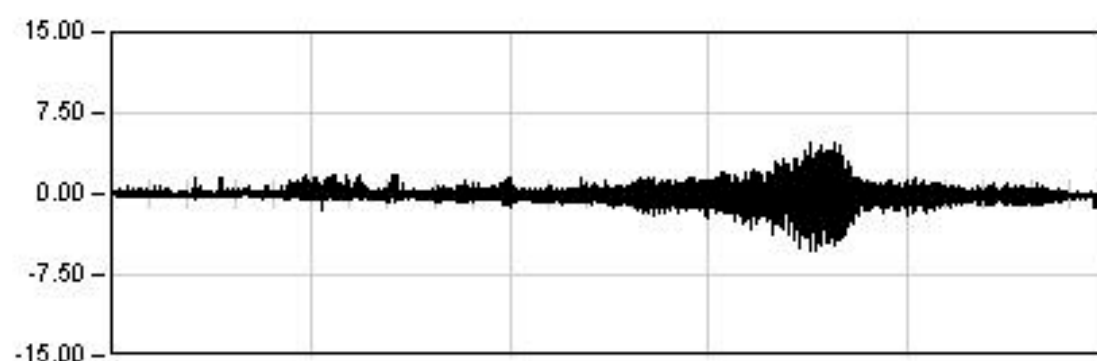
**DINAMICA 11**

127.5    Seg

Max: -11.69

Min: 10.59

Rem: -0.07

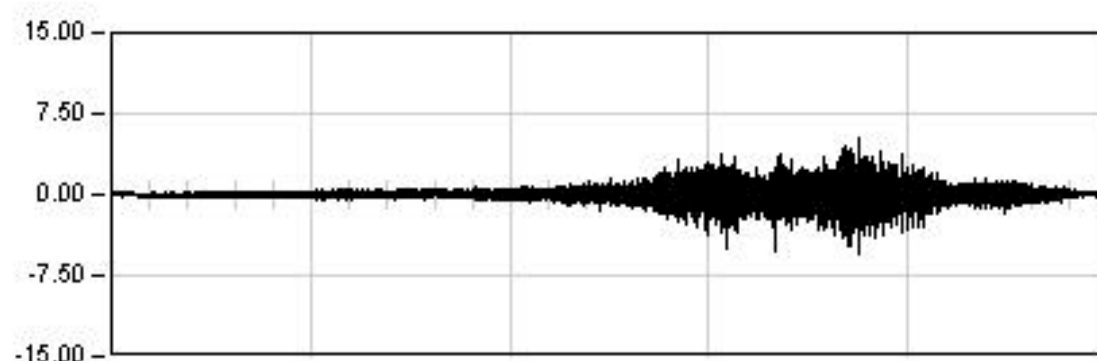
**DINAMICA 21**

207.5    Seg

Max: -5.26

Min: 4.76

Rem: -0.21

**DINAMICA 01**

234.0    Seg

Max: -5.60

Min: 5.29

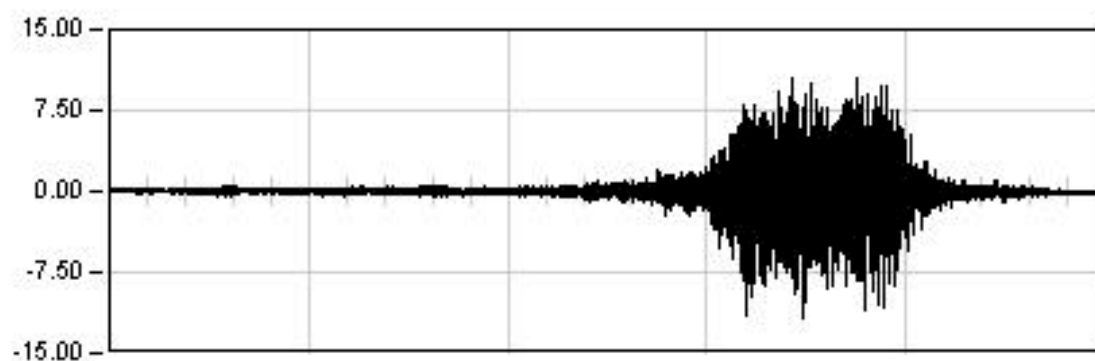
Rem: 0.03



## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A031    Canal : 35    Unidades : G's/100

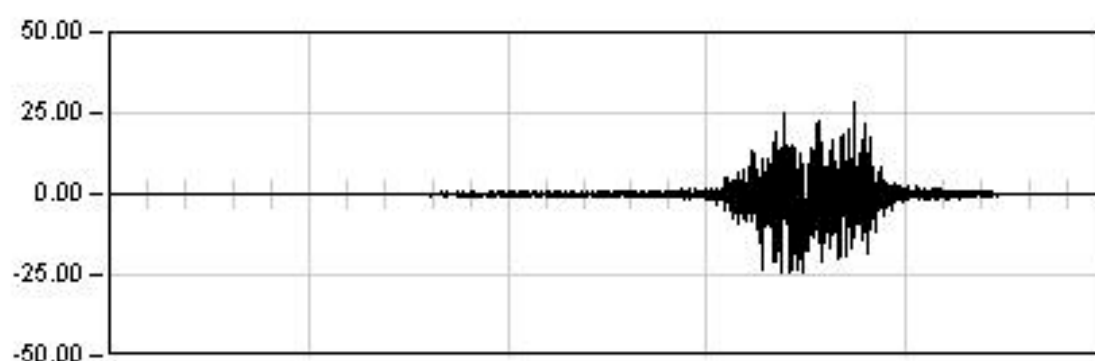
**DINAMICA 11**

127.5    Seg

Max: -11.69

Min: 10.59

Rem: -0.07

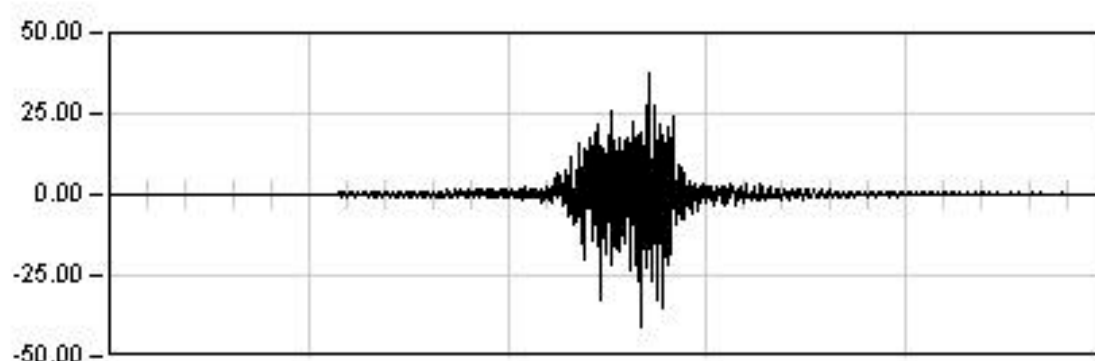
**DINAMICA 12**

52.5    Seg

Max: 28.06

Min: -24.29

Rem: -0.05

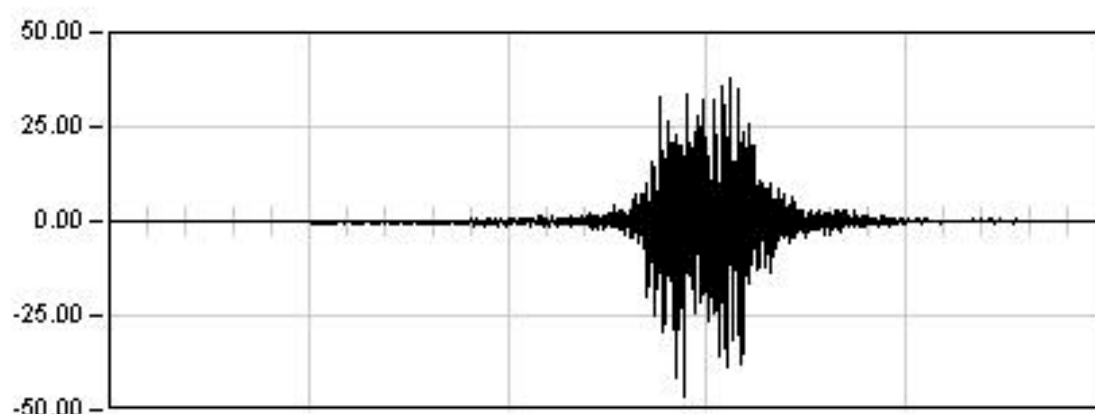
**DINAMICA 13**

37.5    Seg

Max: -40.84

Min: 37.65

Rem: 0.22

**DINAMICA 14**

41.5    Seg

Max: -46.50

Min: 37.68

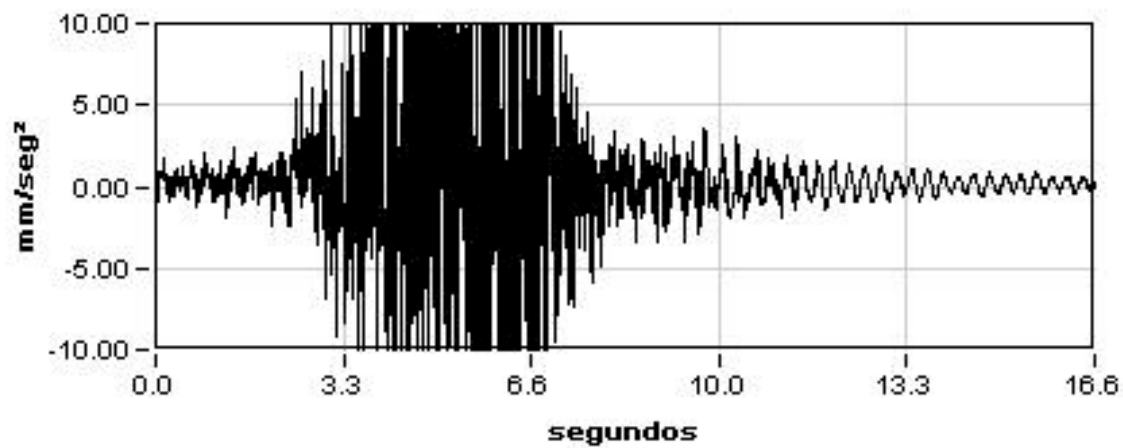
Rem: 0.01



# VIADUCTO DEL GALLO (29VI02)

P.K. 81/580

Prueba: din13    Punto: A031    Canal: 35

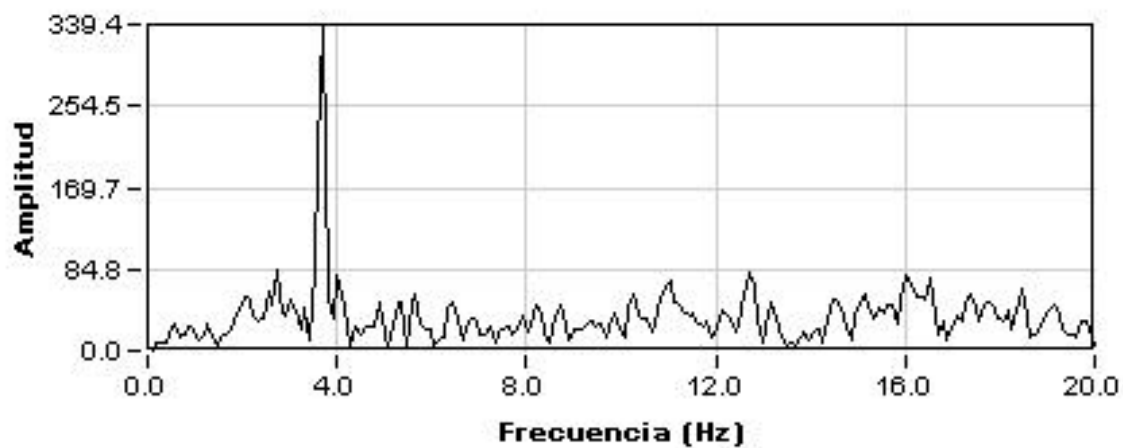
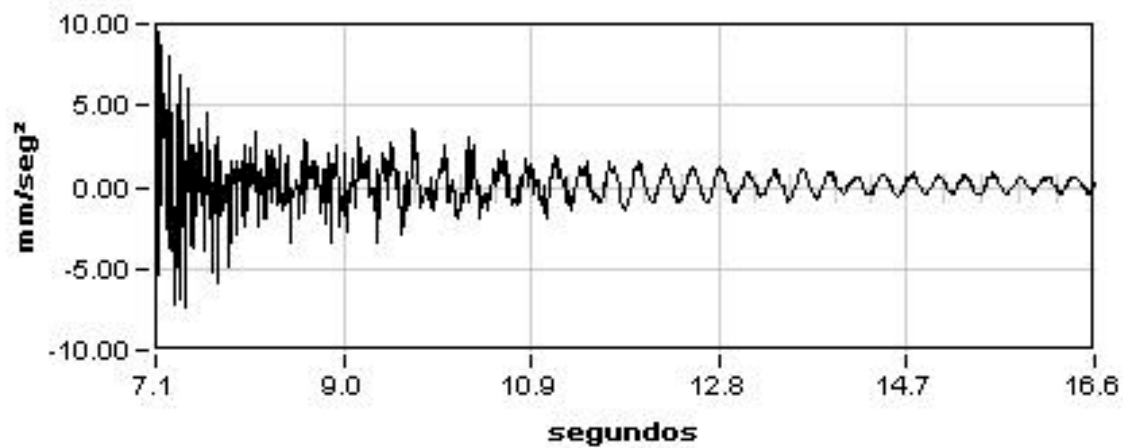


**Máximo**

-40.84

**Mínimo**

37.65



**Amplitud**

339.38

**Frecuencia**

3.70

**Dec.Logarit.**

0.09

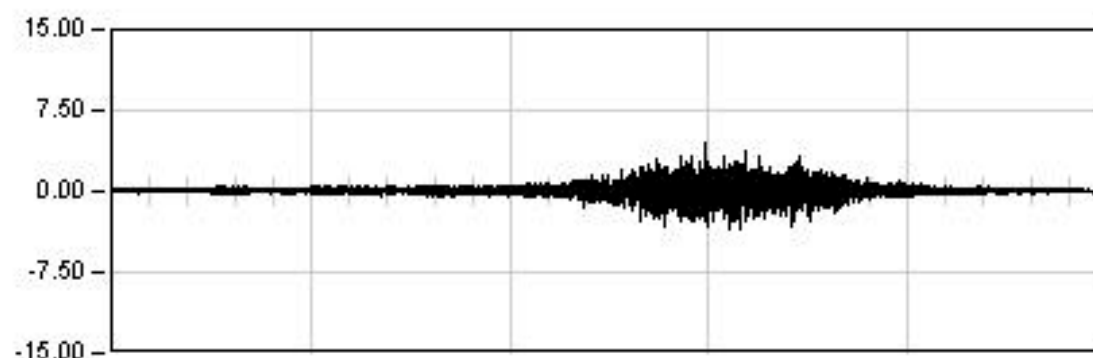
**Amortiguac.**

1.47 %

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A042    Canal : 36    Unidades : G's/100

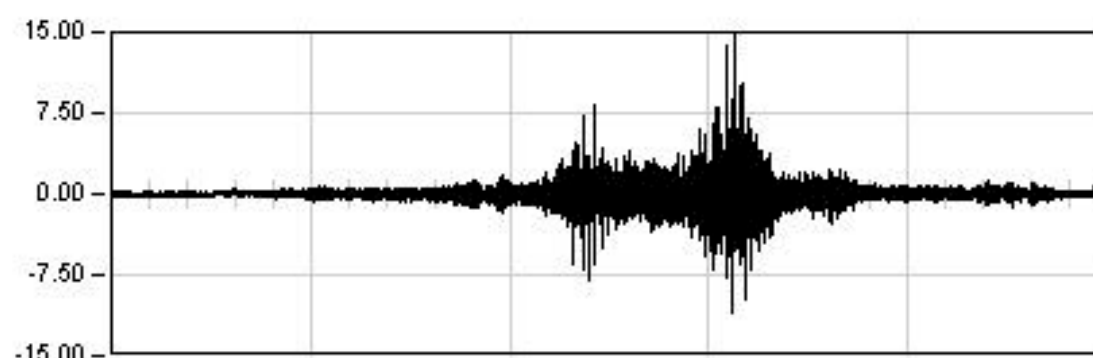
**DINAMICA 11**

127.5    Seg

Max:    4.49

Min:    -3.61

Rem:    0.04

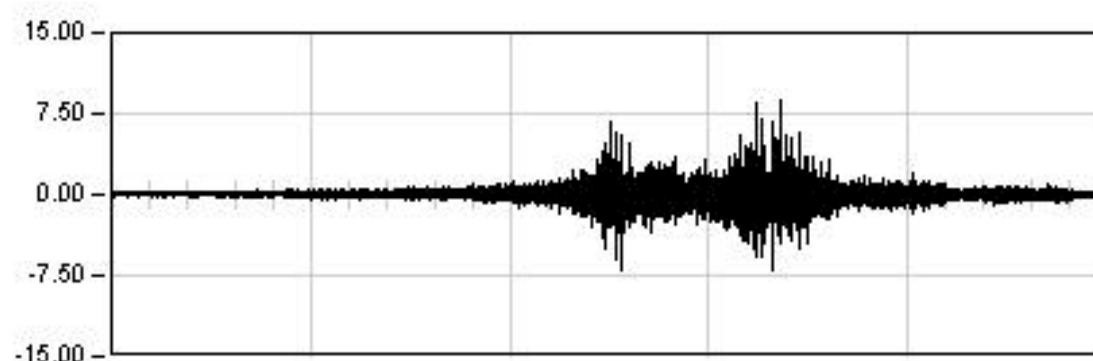
**DINAMICA 21**

207.5    Seg

Max:    14.92

Min:    -11.00

Rem:    0.03

**DINAMICA 01**

234.0    Seg

Max:    8.73

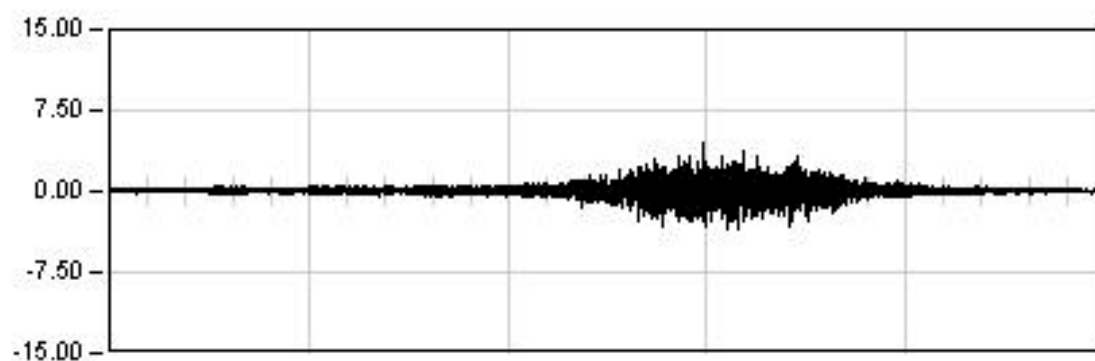
Min:    -7.10

Rem:    -0.01

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A042    Canal : 36    Unidades : G's/100

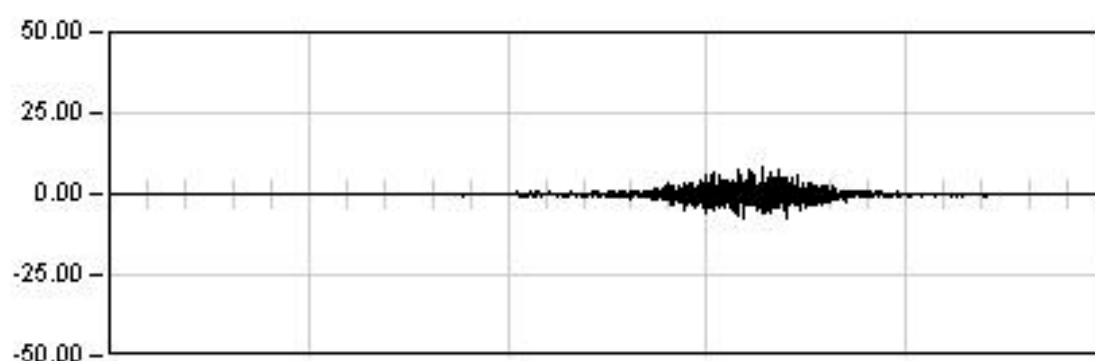
**DINAMICA 11**

127.5    Seg

Max:    4.49

Min:    -3.61

Rem:    0.04

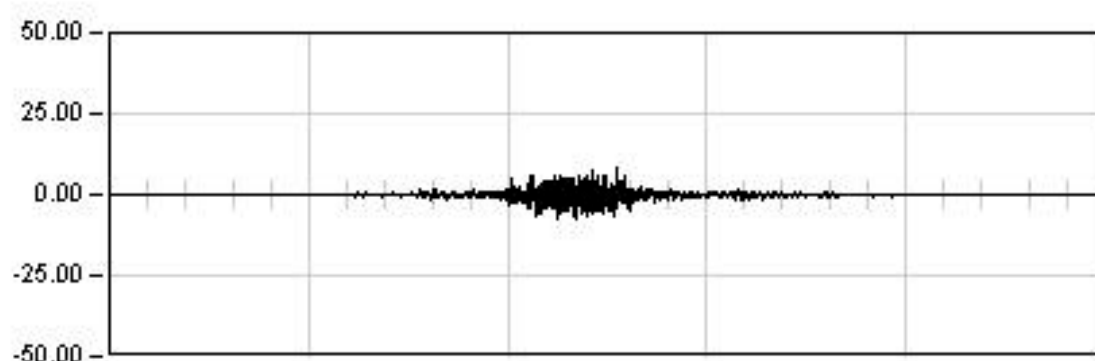
**DINAMICA 12**

52.5    Seg

Max:    8.34

Min:    -7.49

Rem:    -0.03

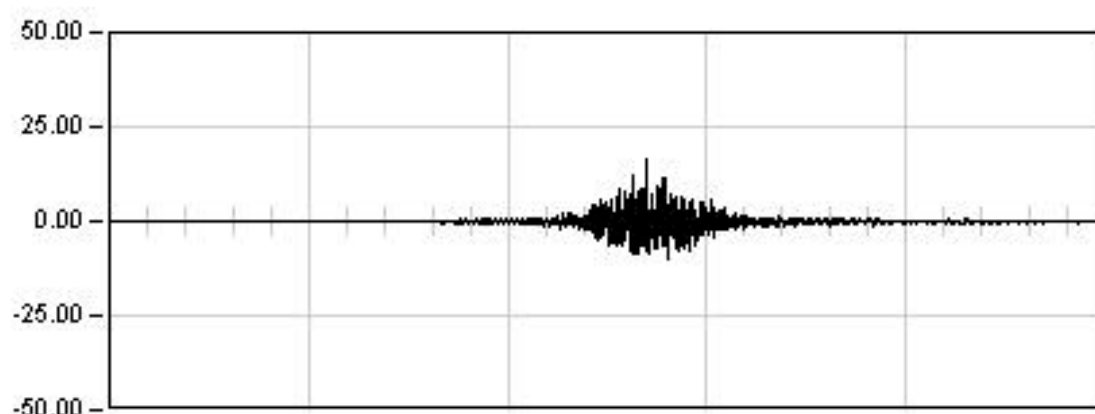
**DINAMICA 13**

37.5    Seg

Max:    8.57

Min:    -7.50

Rem:    -0.10

**DINAMICA 14**

41.5    Seg

Max:    16.49

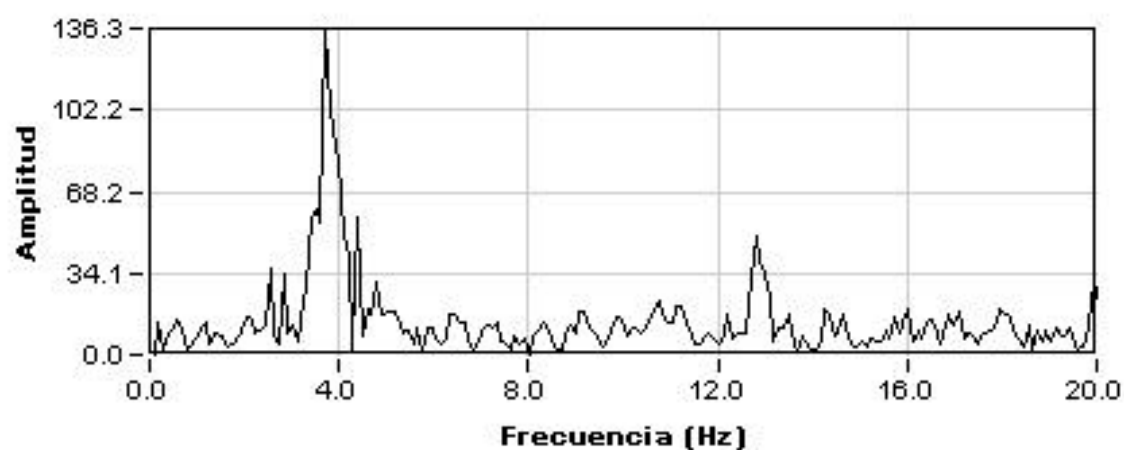
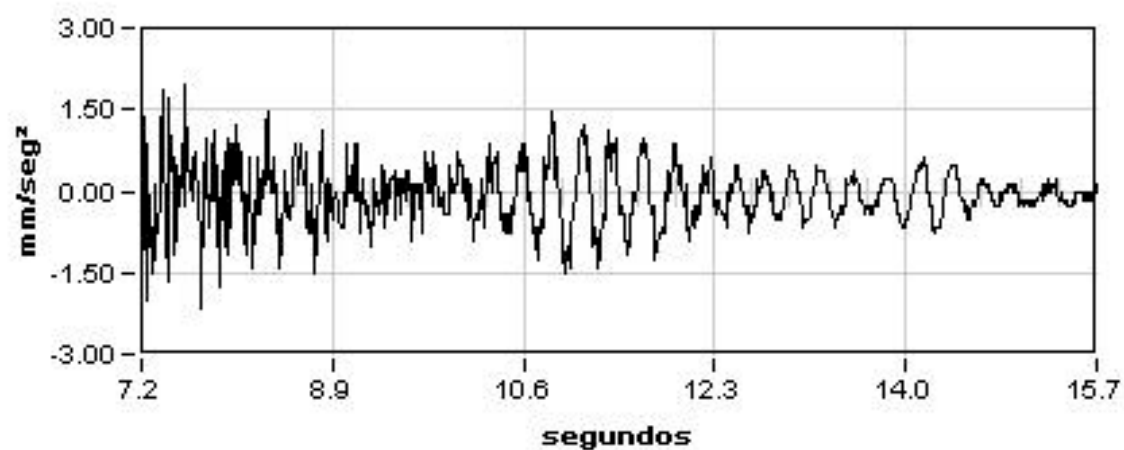
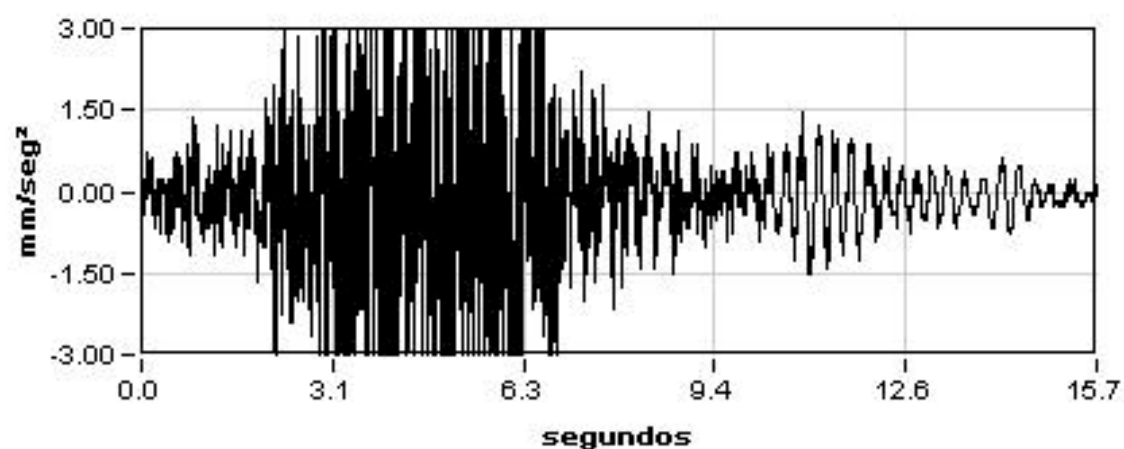
Min:    -10.06

Rem:    -0.12

# VIADUCTO DEL GALLO (29VI02)

P.K. 81/580

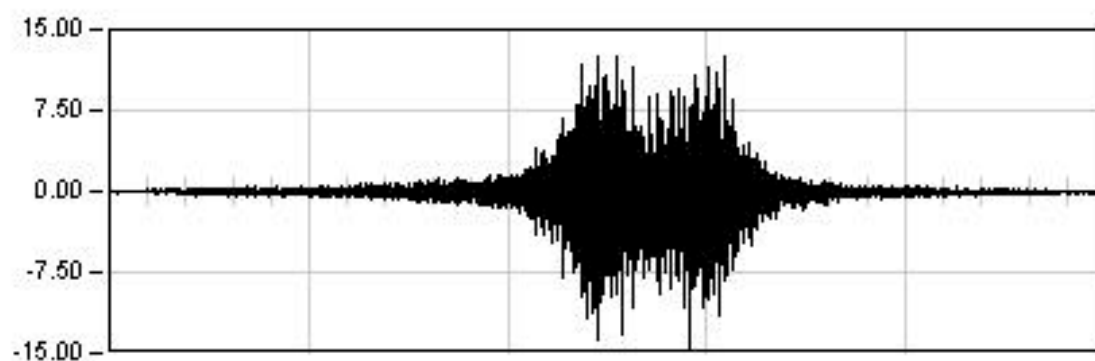
Prueba: din13    Punto: A042    Canal: 36



## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A051    Canal : 37    Unidades : G's/100

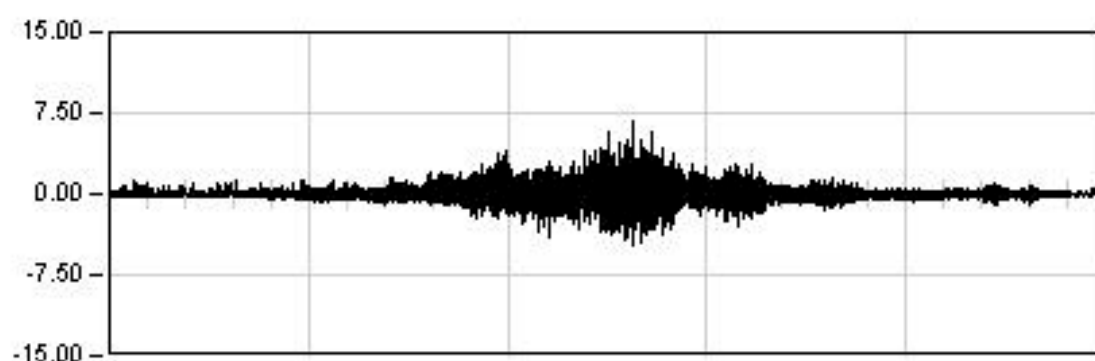
**DINAMICA 11**

127.5    Seg

Max:    -14.66

Min:    12.58

Rem:    -0.05

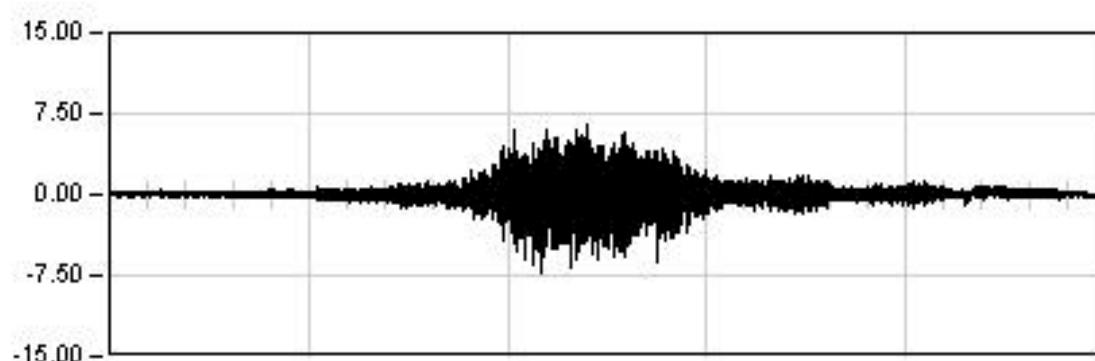
**DINAMICA 21**

207.5    Seg

Max:    6.82

Min:    -4.67

Rem:    -0.01

**DINAMICA 01**

234.0    Seg

Max:    -7.13

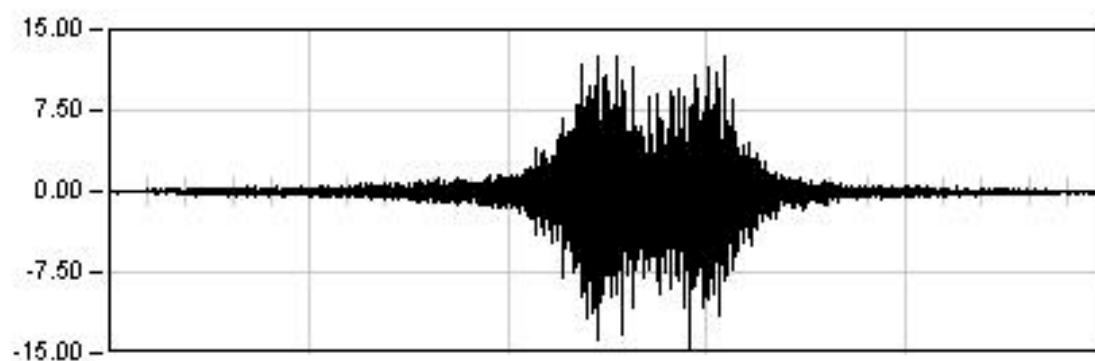
Min:    6.43

Rem:    -0.18

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A051    Canal : 37    Unidades : G's/100

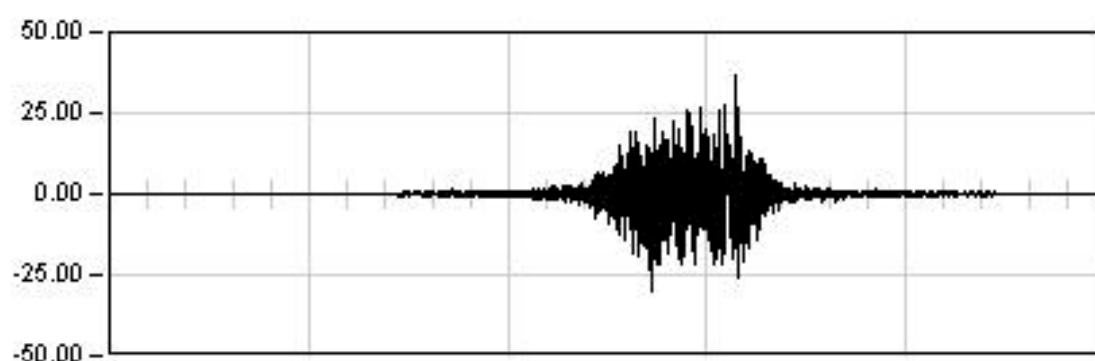
**DINAMICA 11**

127.5    Seg

Max: -14.66

Min: 12.58

Rem: -0.05

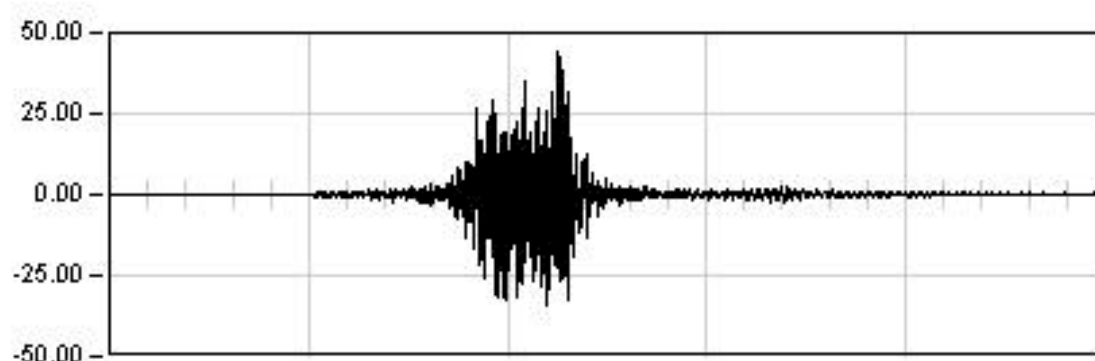
**DINAMICA 12**

52.5    Seg

Max: 36.33

Min: -29.88

Rem: 0.03

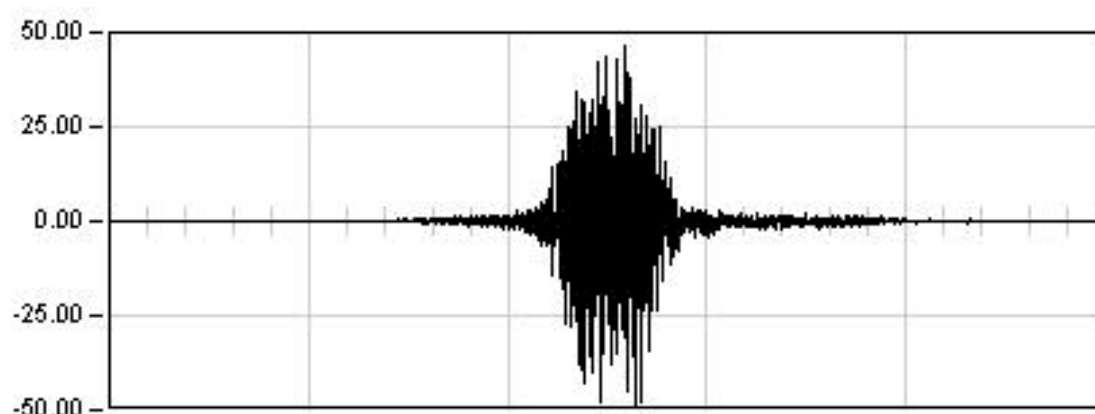
**DINAMICA 13**

37.5    Seg

Max: 44.21

Min: -34.47

Rem: 0.13

**DINAMICA 14**

41.5    Seg

Max: -49.17

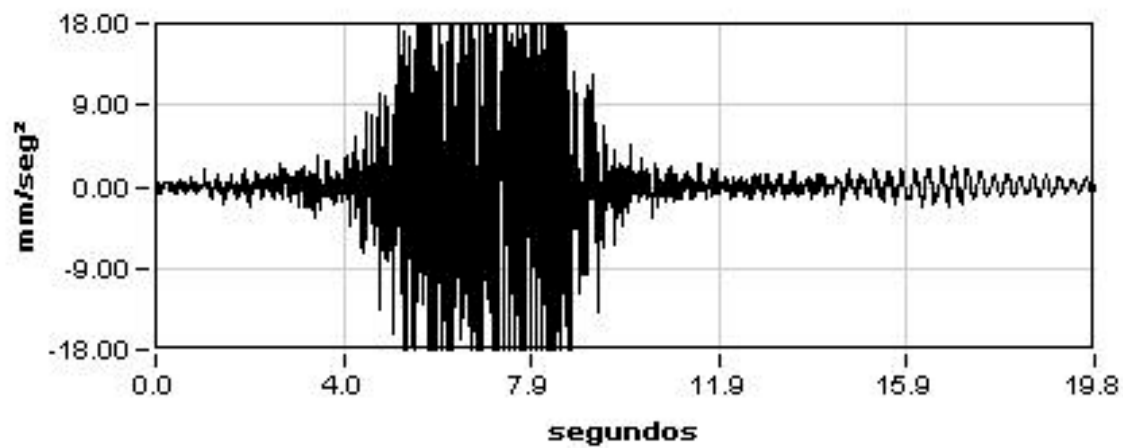
Min: 46.49

Rem: 0.05

# VIADUCTO DEL GALLO (29VI02)

P.K. 81/580

Prueba: din13    Punto: A051    Canal: 37

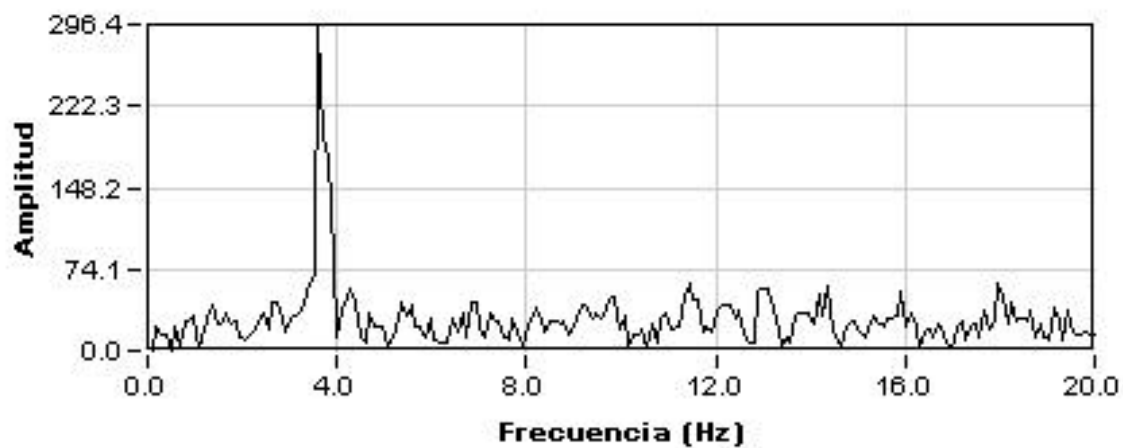
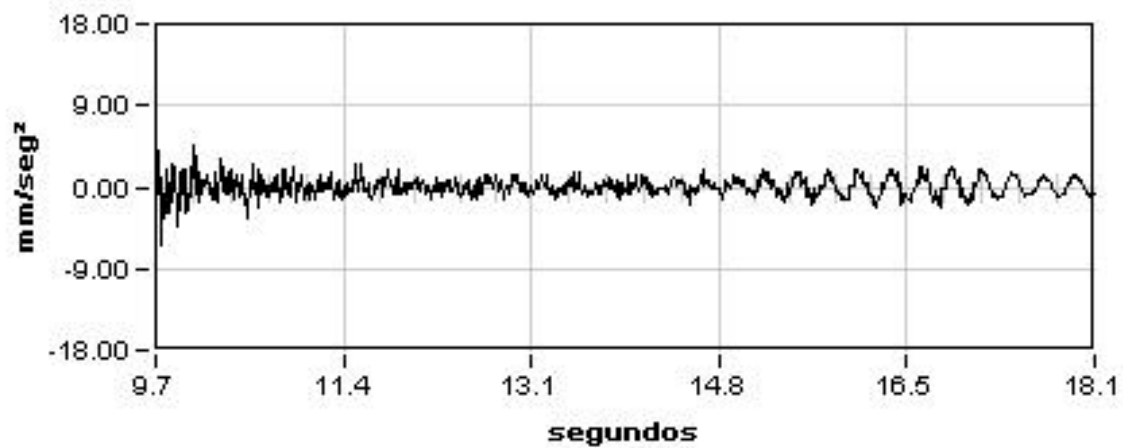


**Máximo**

44.21

**Mínimo**

-34.47



**Amplitud**

296.43

**Frecuencia**

3.61

**Dec.Logarit.**

0.10

**Amortiguac.**

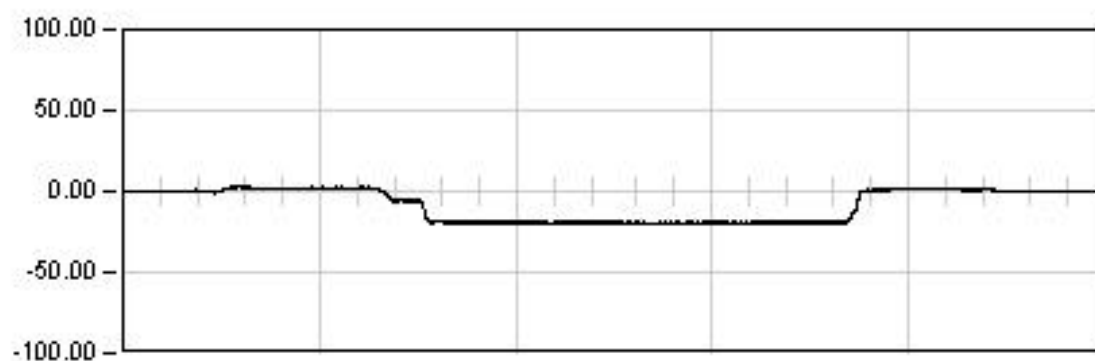
1.65 %

## **REGISTRO MEDIDAS VANOS 6-9**



## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G061      Canal : 00      Unidades :  $\mu E$ **ESTATICA 01**

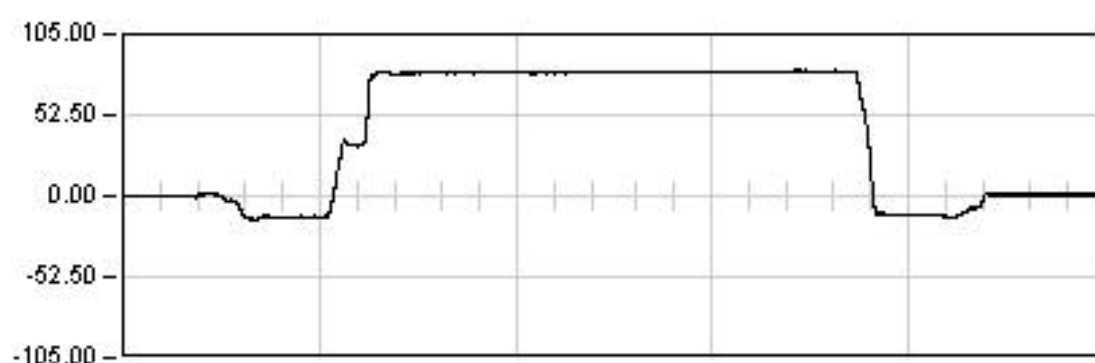
1729.0    Seg

Est:    -19.19

Max:    -20.38

Min:    3.32

Rem:    0.16

**ESTATICA 02**

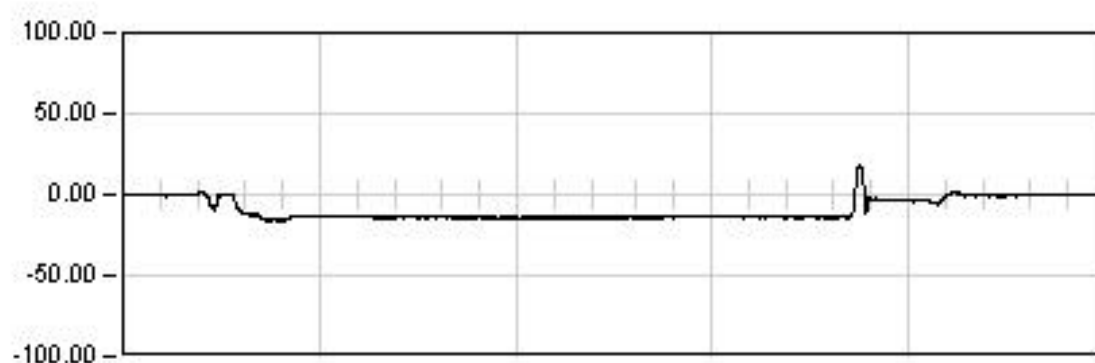
1647.0    Seg

Est:    80.78

Max:    81.68

Min:    -15.66

Rem:    0.78

**ESTATICA 03**

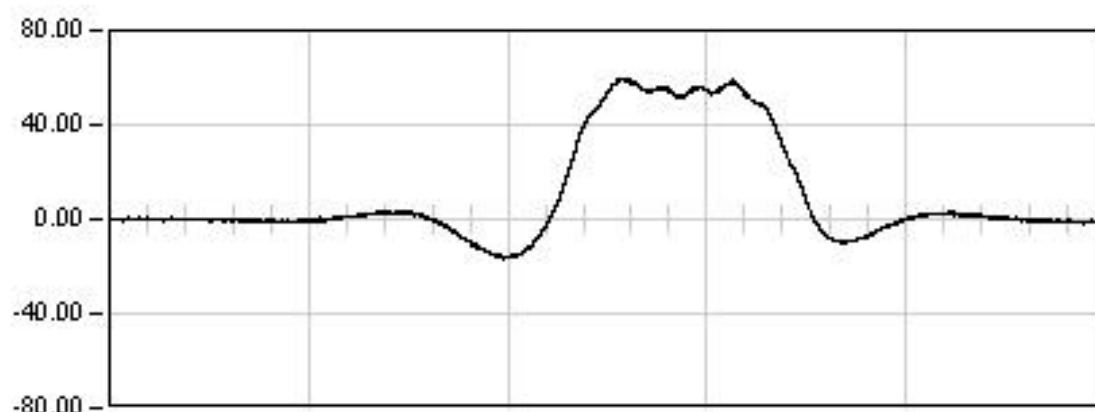
1400.0    Seg

Est:    -13.86

Max:    17.53

Min:    -16.10

Rem:    0.02

**DINAMICA 01**

85.0    Seg

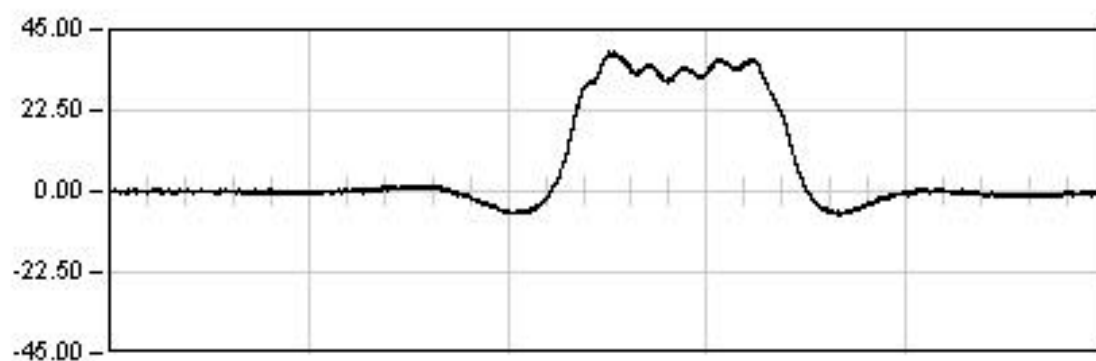
Max:    59.65

Min:    -16.95

Rem:    0.17

## VIADUCTO DEL GALLO

P.K. 81/580

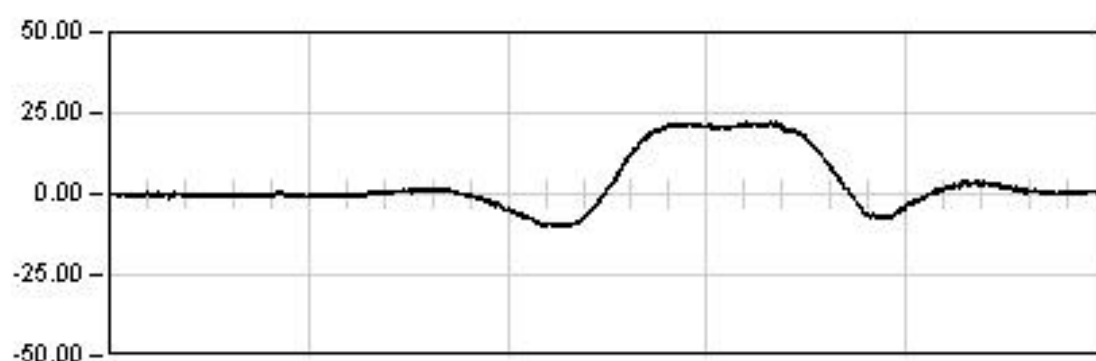
Punto : G061    Canal : 00    Unidades :  $\mu E$ **DINAMICA 11**

125.0    Seg

Max:    38.71

Min:    -6.48

Rem:    0.35

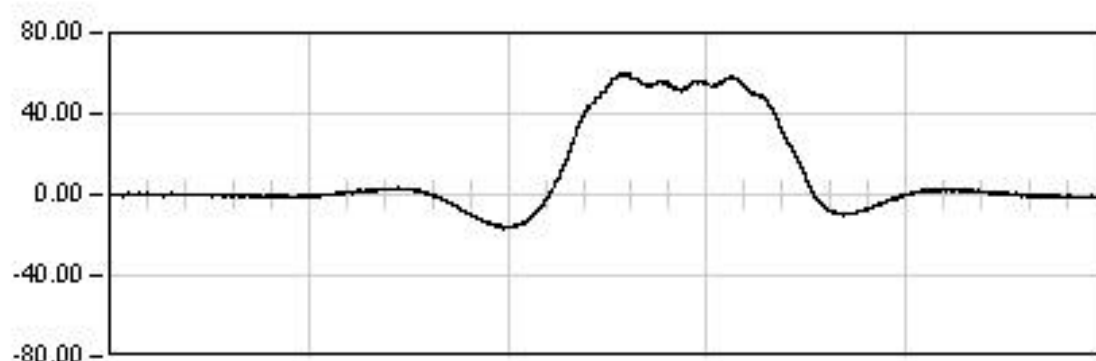
**DINAMICA 21**

130.0    Seg

Max:    22.20

Min:    -10.34

Rem:    -0.02

**DINAMICA 01**

85.0    Seg

Max:    59.65

Min:    -16.95

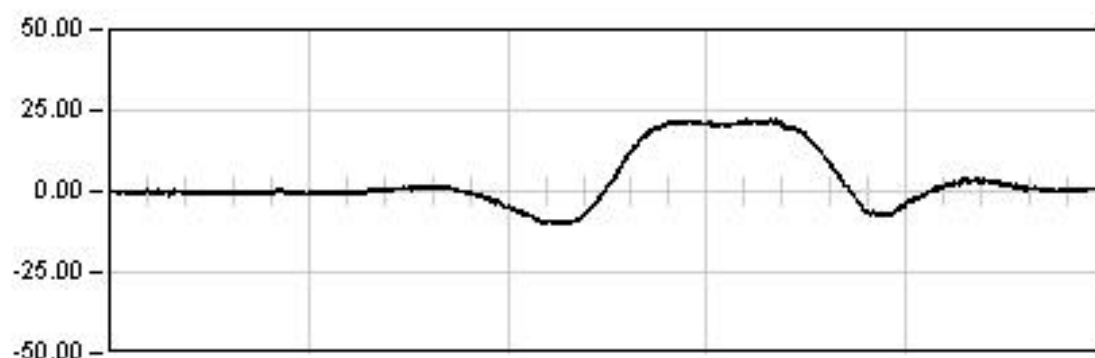
Rem:    0.17

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G061

Canal : 00

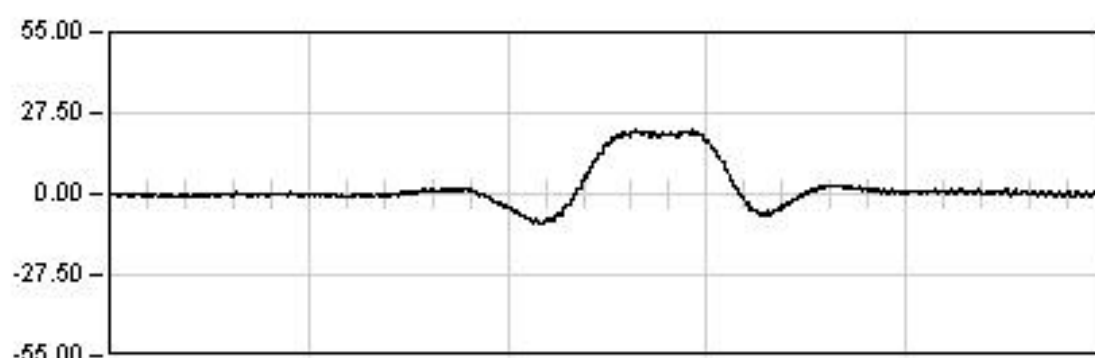
Unidades :  $\mu E$ **DYNAMICA 21**

130.0 Seg

Max: 22.20

Min: -10.34

Rem: -0.02

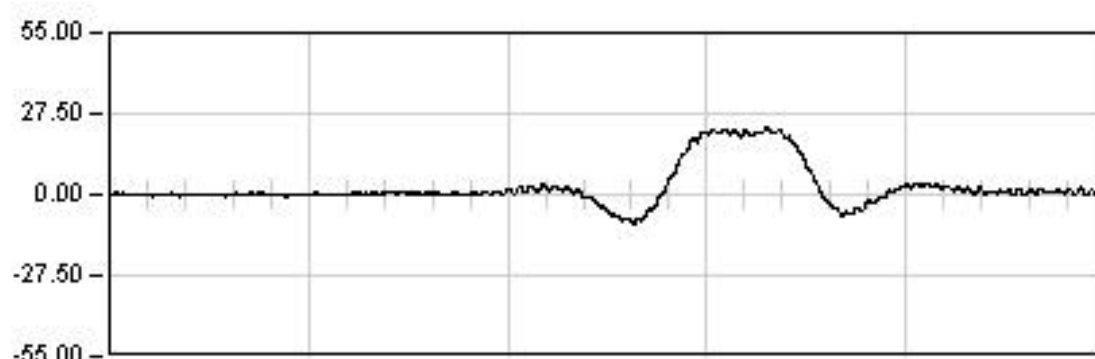
**DYNAMICA 22**

45.0 Seg

Max: 21.76

Min: -10.31

Rem: -0.37

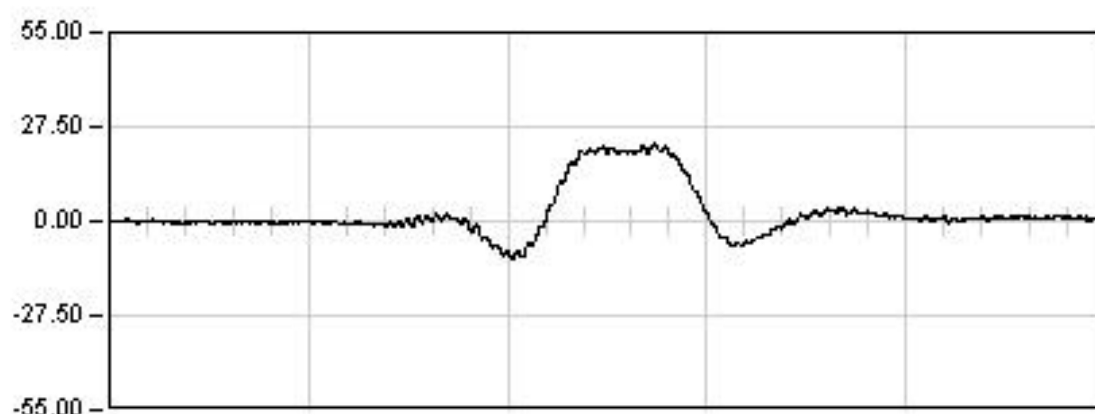
**DYNAMICA 23**

25.0 Seg

Max: 22.50

Min: -10.02

Rem: 0.47

**DYNAMICA 24**

30.0 Seg

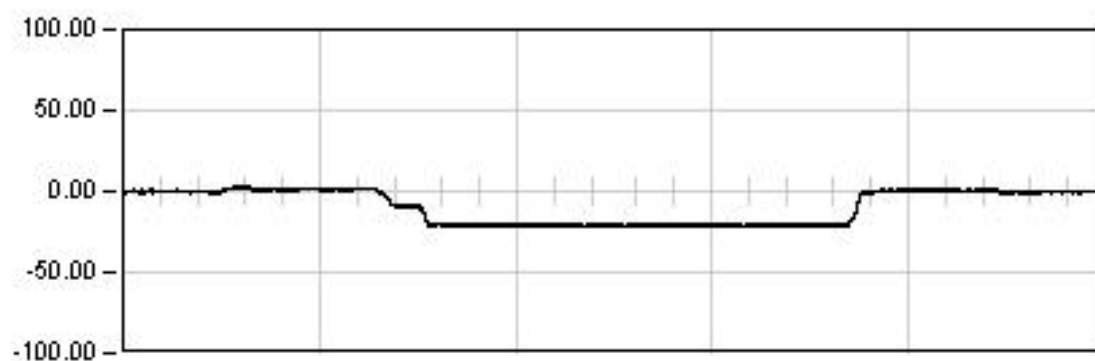
Max: 22.47

Min: -10.97

Rem: 0.04

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G062      Canal : 01      Unidades :  $\mu E$ **ESTATICA 01**

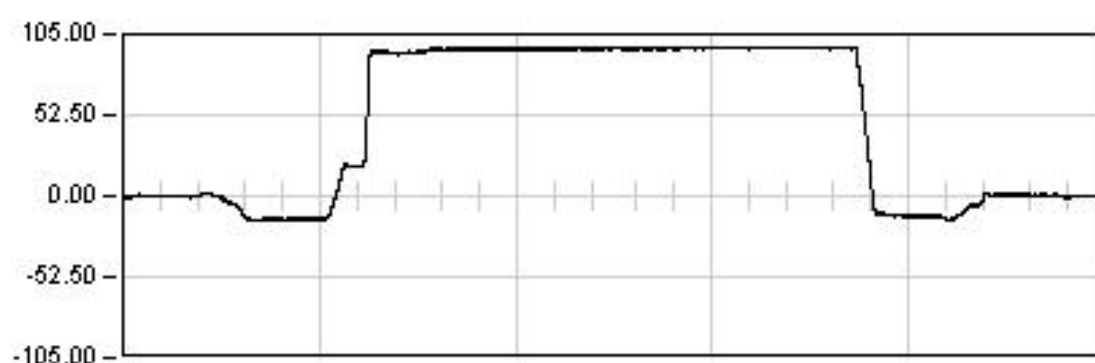
1729.0    Seg

Est:    -20.83

Max:    -22.36

Min:    3.31

Rem:    -0.23

**ESTATICA 02**

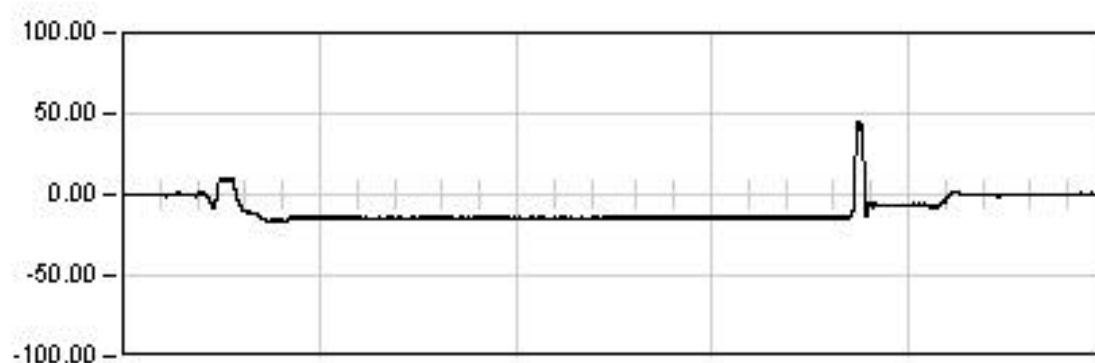
1647.0    Seg

Est:    95.79

Max:    96.90

Min:    -16.52

Rem:    0.12

**ESTATICA 03**

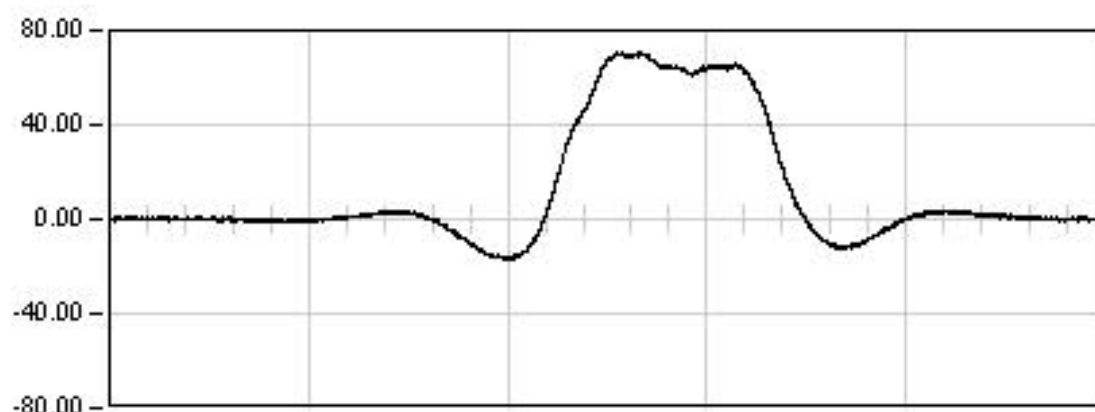
1400.0    Seg

Est:    -14.36

Max:    44.88

Min:    -16.91

Rem:    0.13

**DINAMICA 01**

85.0    Seg

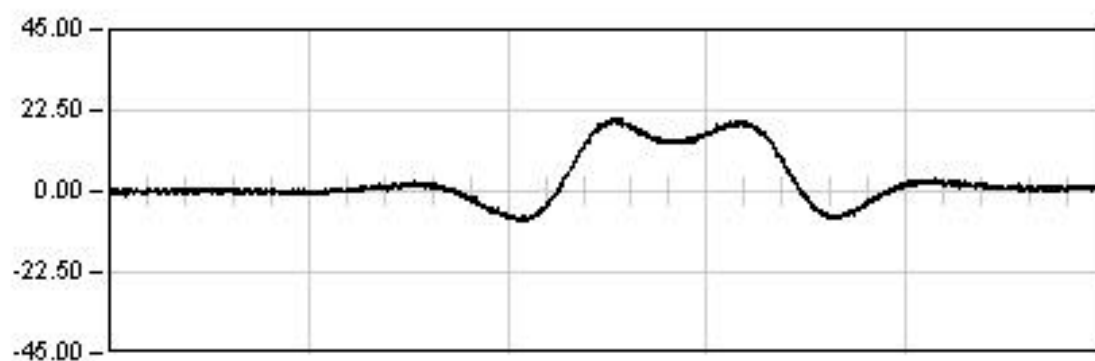
Max:    71.10

Min:    -17.33

Rem:    0.65

## VIADUCTO DEL GALLO

P.K. 81/580

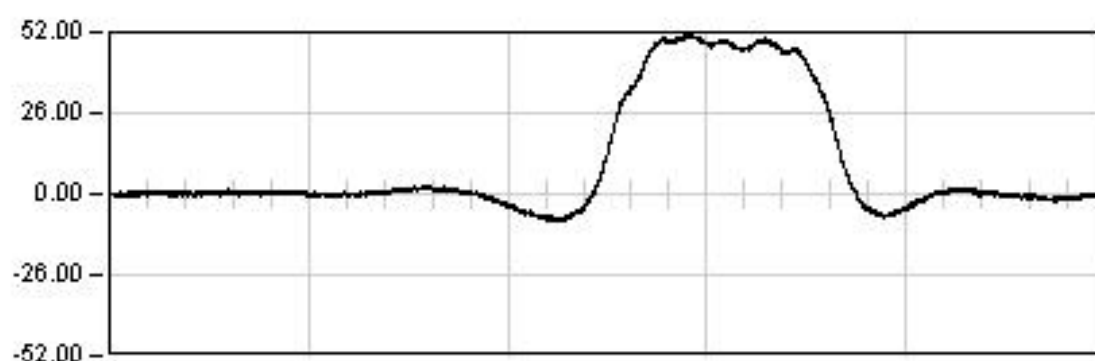
Punto : G062      Canal : 01      Unidades :  $\mu E$ **DYNAMICA 11**

125.0    Seg

Max:    20.23

Min:    -8.24

Rem:    0.91

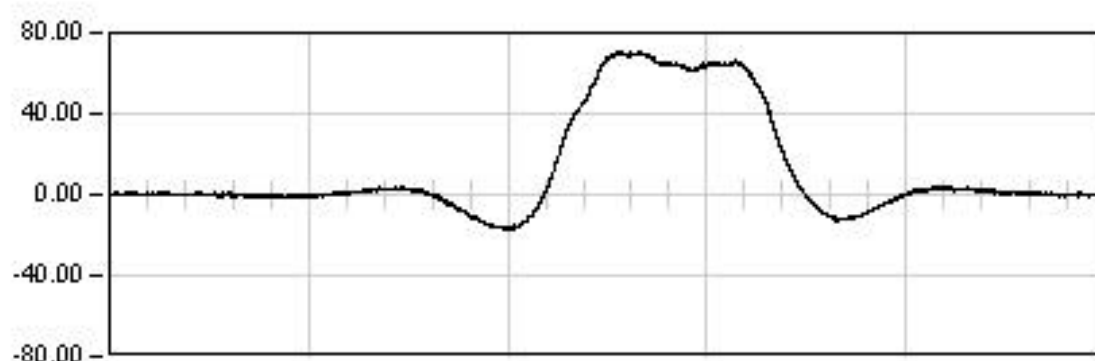
**DYNAMICA 21**

130.0    Seg

Max:    51.20

Min:    -8.63

Rem:    0.32

**DYNAMICA 01**

85.0    Seg

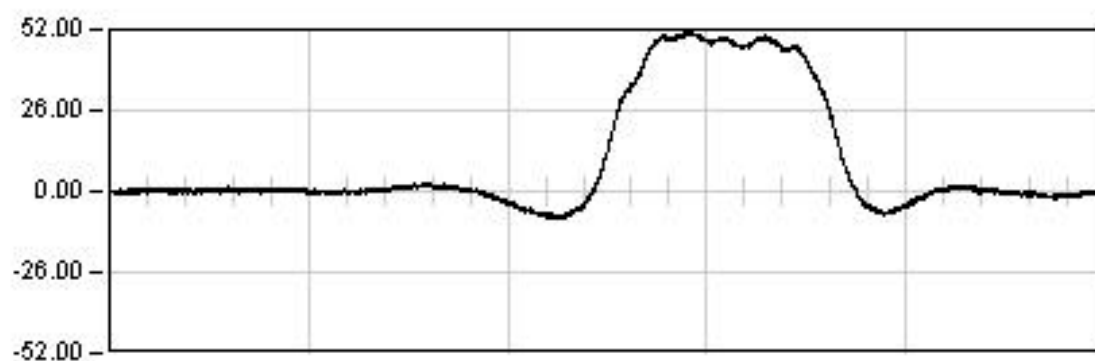
Max:    71.10

Min:    -17.33

Rem:    0.65

## VIADUCTO DEL GALLO

P.K. 81/580

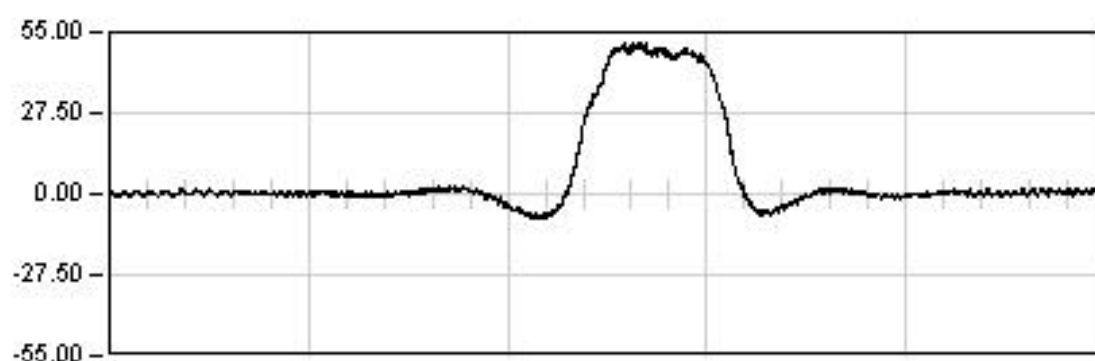
Punto : G062    Canal : 01    Unidades :  $\mu E$ **DINAMICA 21**

130.0    Seg

Max: 51.20

Min: -8.63

Rem: 0.32

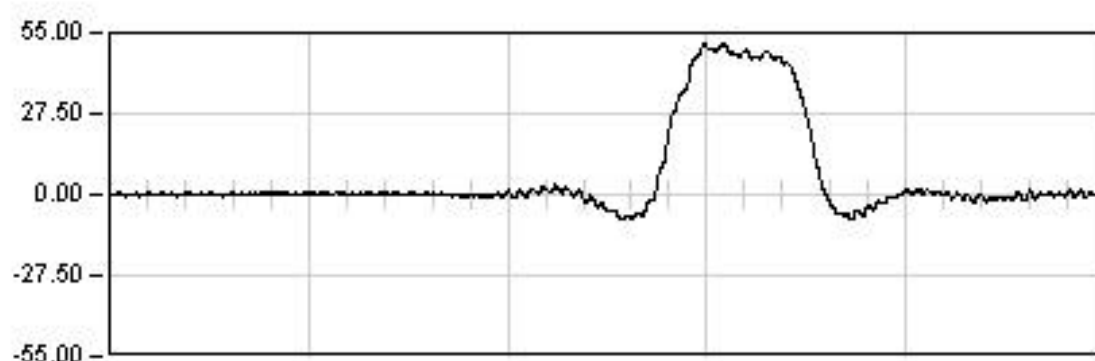
**DINAMICA 22**

45.0    Seg

Max: 51.22

Min: -8.36

Rem: 0.28

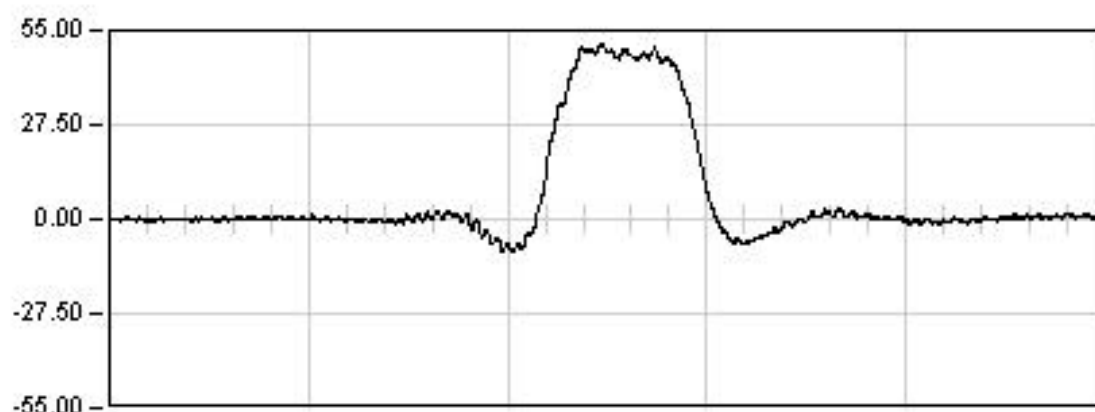
**DINAMICA 23**

25.0    Seg

Max: 51.72

Min: -8.33

Rem: 0.69

**DINAMICA 24**

30.0    Seg

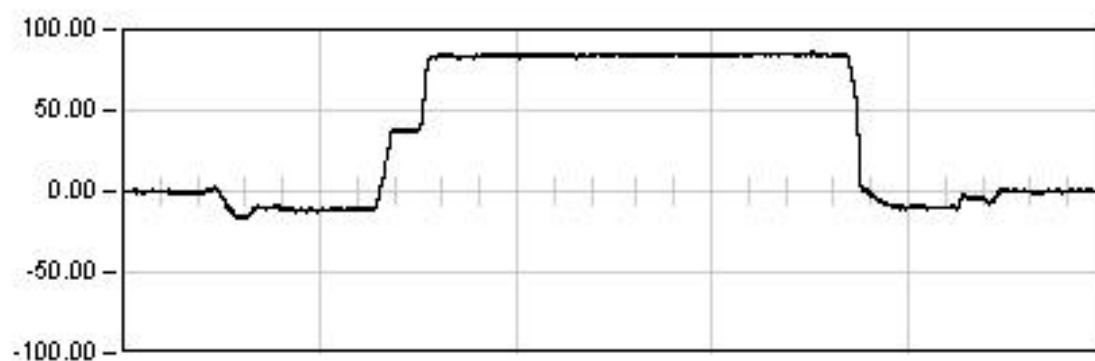
Max: 51.38

Min: -9.51

Rem: 0.32

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G071      Canal : 02      Unidades :  $\mu E$ **ESTATICA 01**

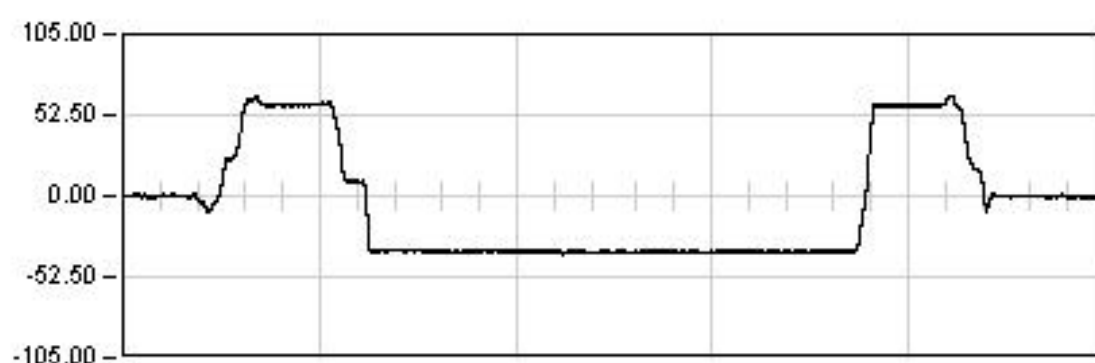
1729.0    Seg

Est: 85.35

Max: 86.18

Min: -16.47

Rem: 0.26

**ESTATICA 02**

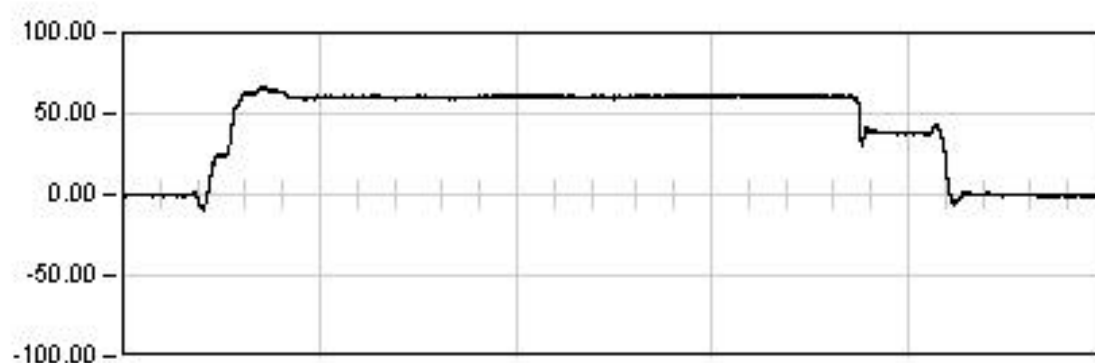
1647.0    Seg

Est: -35.77

Max: 65.59

Min: -37.63

Rem: -0.35

**ESTATICA 03**

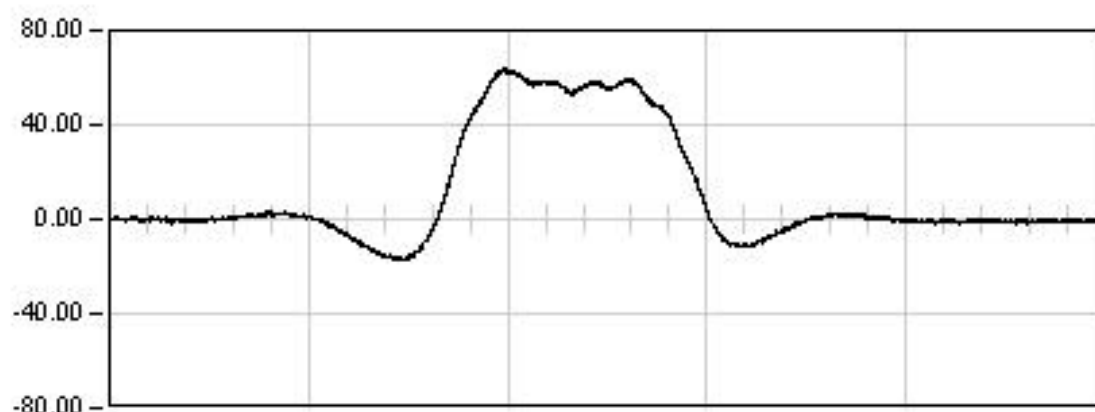
1400.0    Seg

Est: 60.99

Max: 66.48

Min: -9.27

Rem: -0.35

**DINAMICA 01**

85.0    Seg

Max: 63.83

Min: -17.58

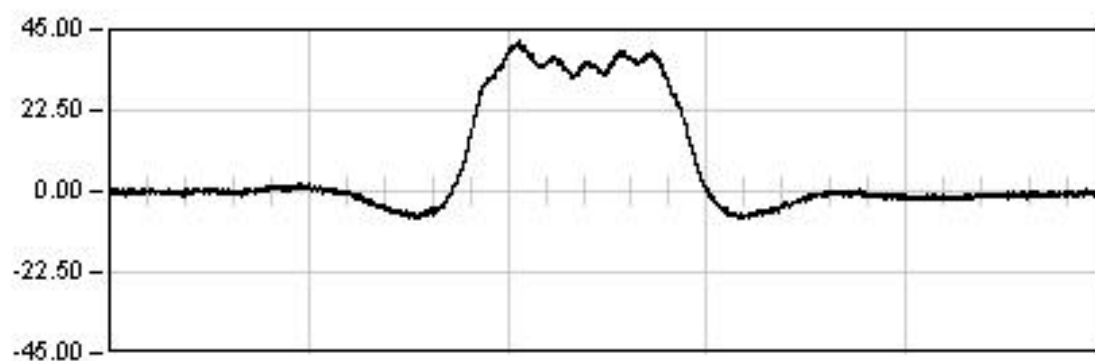
Rem: 0.11

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G071

Canal : 02

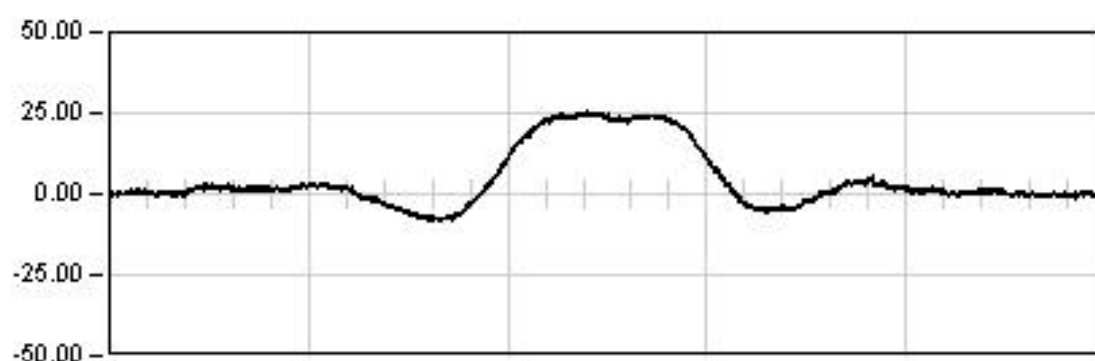
Unidades :  $\mu E$ **DYNAMICA 11**

125.0 Seg

Max: 41.67

Min: -7.54

Rem: 0.21

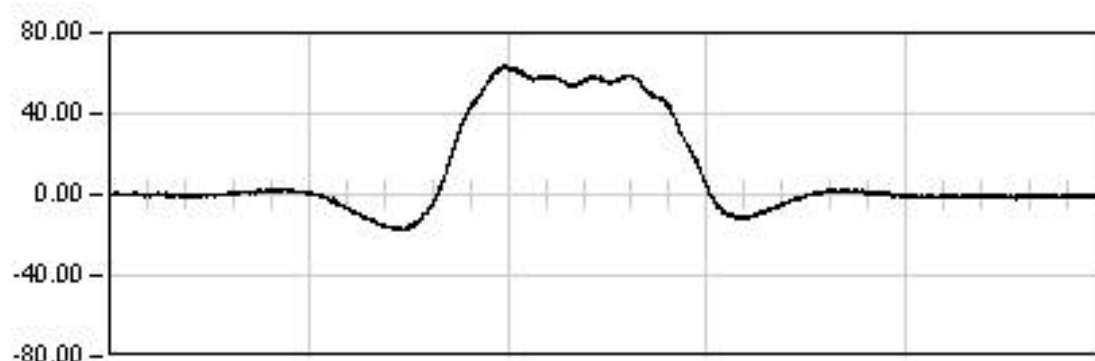
**DYNAMICA 21**

130.0 Seg

Max: 25.48

Min: -8.15

Rem: -2.34

**DYNAMICA 01**

85.0 Seg

Max: 63.83

Min: -17.58

Rem: 0.11

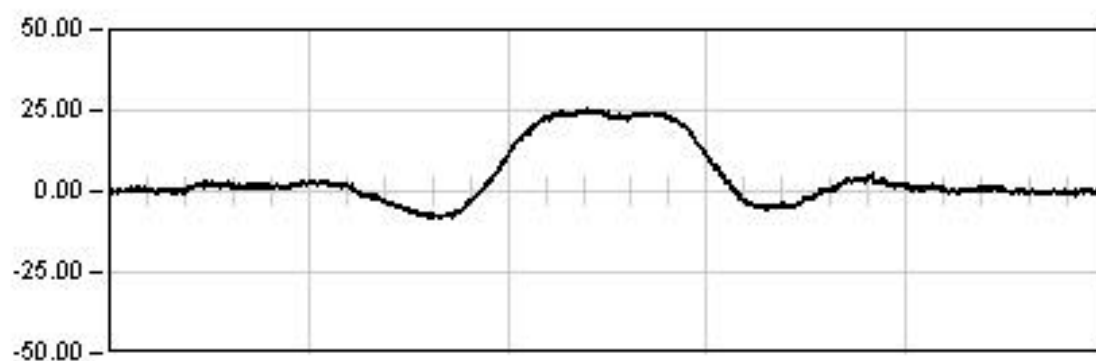


## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G071

Canal : 02

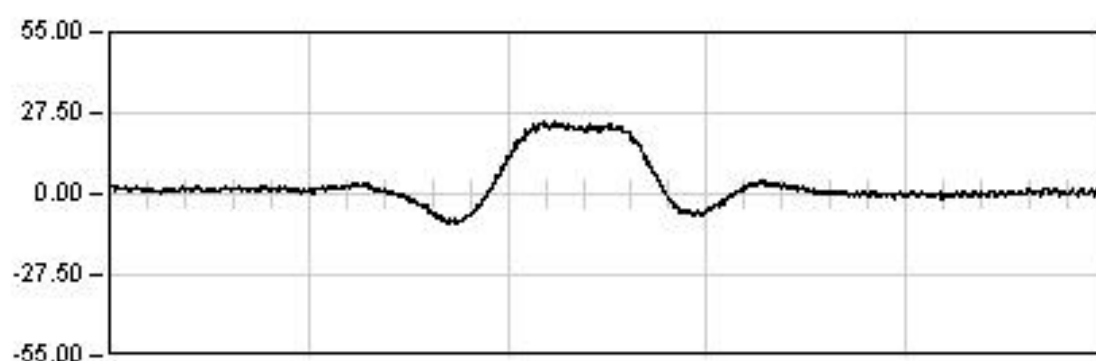
Unidades :  $\mu E$ **DYNAMICA 21**

130.0 Seg

Max: 25.48

Min: -8.15

Rem: -2.34

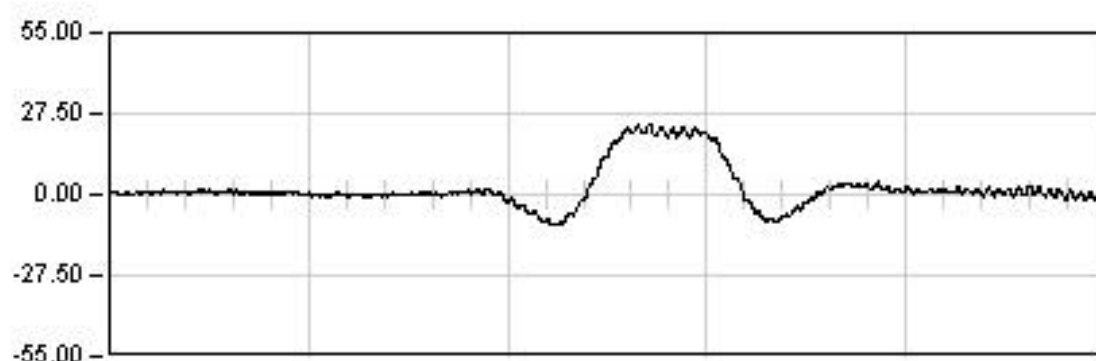
**DYNAMICA 22**

45.0 Seg

Max: 24.39

Min: -10.06

Rem: 0.55

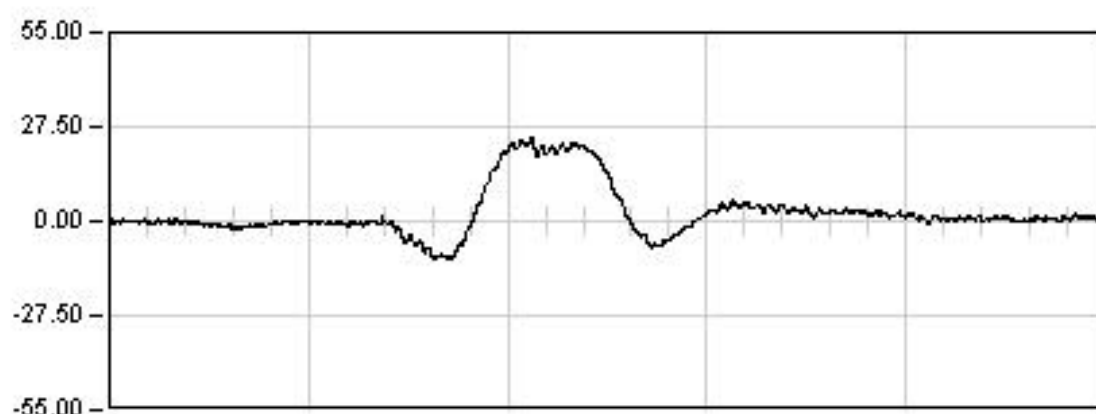
**DYNAMICA 23**

25.0 Seg

Max: 23.83

Min: -10.34

Rem: -0.18

**DYNAMICA 24**

30.0 Seg

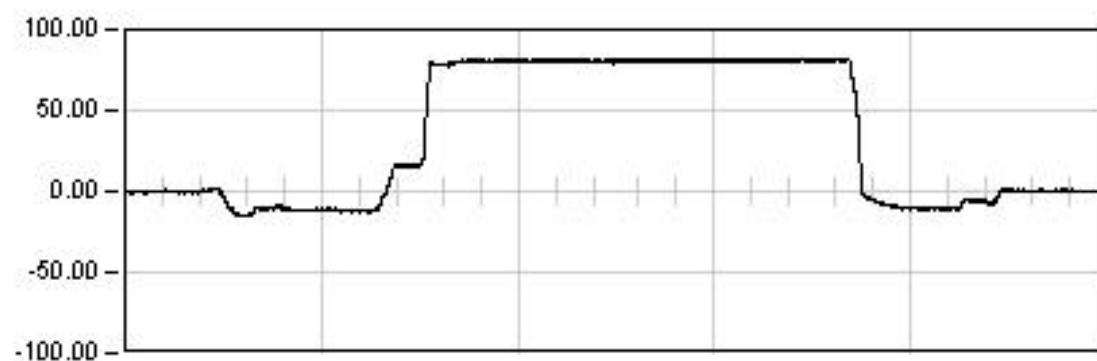
Max: 24.36

Min: -10.94

Rem: -0.54

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G072      Canal : 03      Unidades :  $\mu E$ **ESTATICA 01**

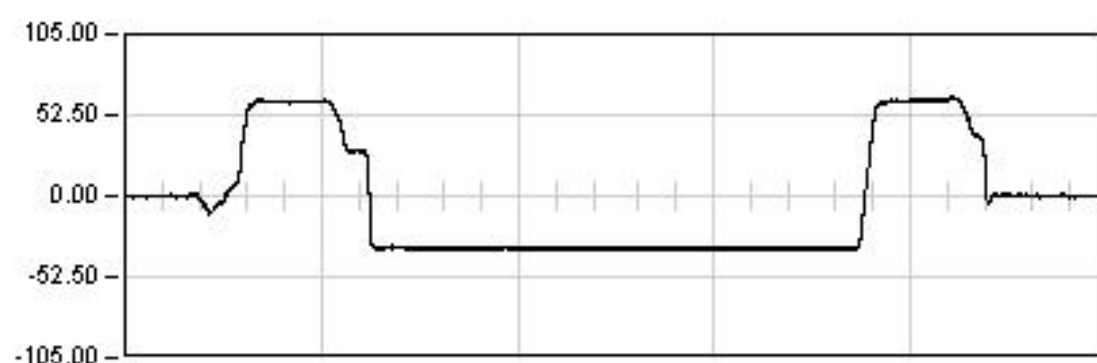
1729.0 Seg

Est: 81.05

Max: 82.35

Min: -15.79

Rem: 0.08

**ESTATICA 02**

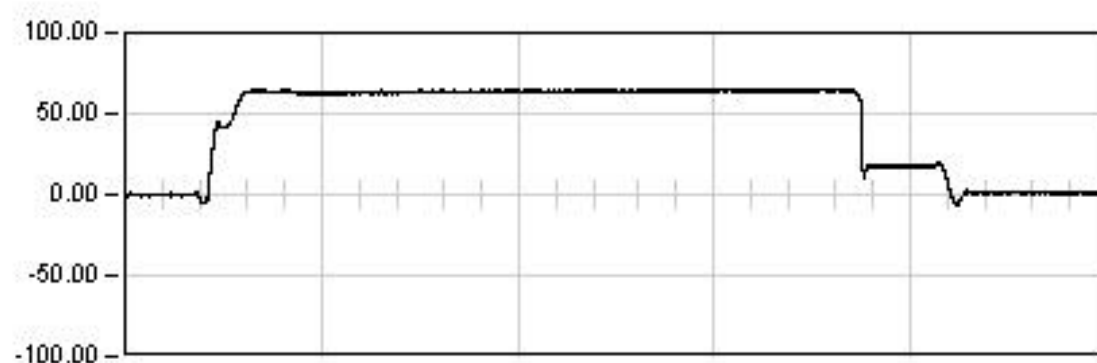
1647.0 Seg

Est: -33.93

Max: 64.40

Min: -35.75

Rem: -0.03

**ESTATICA 03**

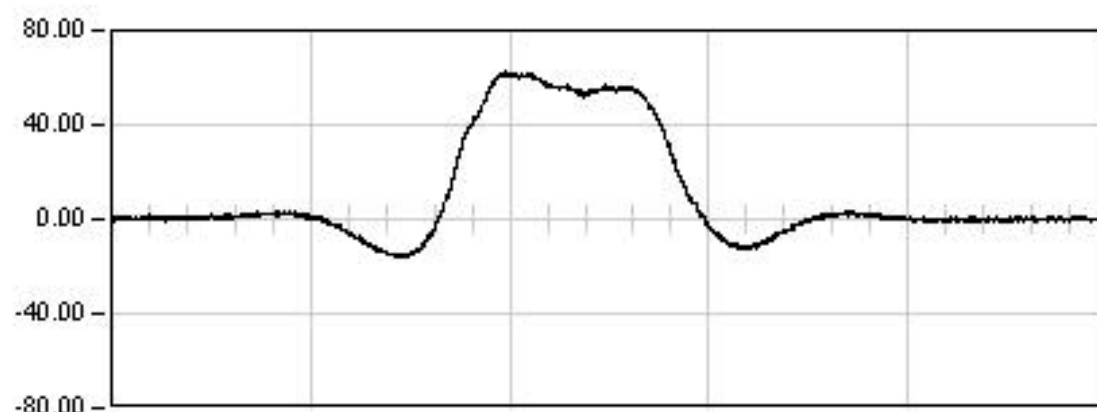
1400.0 Seg

Est: 64.68

Max: 65.31

Min: -6.91

Rem: 1.16

**DINAMICA 01**

85.0 Seg

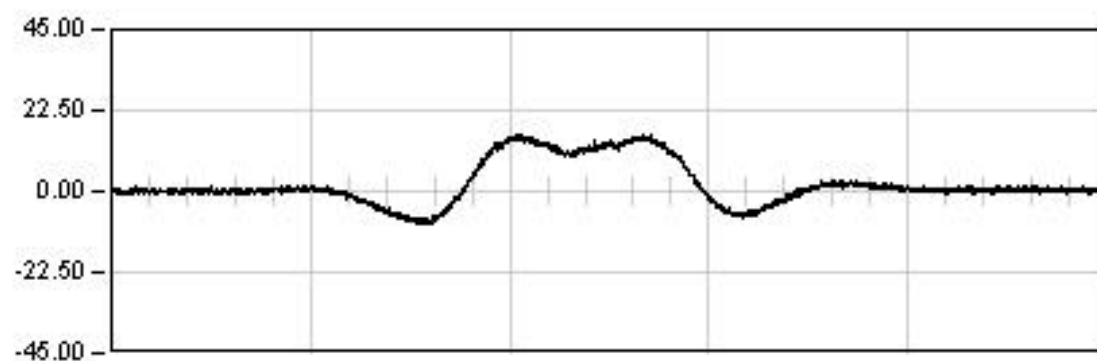
Max: 62.65

Min: -16.19

Rem: 0.13

## VIADUCTO DEL GALLO

P.K. 81/580

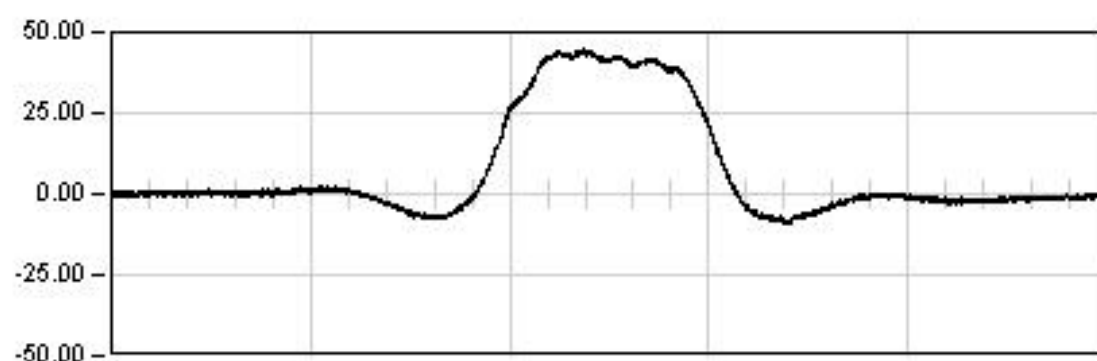
Punto : G072      Canal : 03      Unidades :  $\mu E$ **DYNAMICA 11**

125.0 Seg

Max: 15.62

Min: -9.00

Rem: 0.35

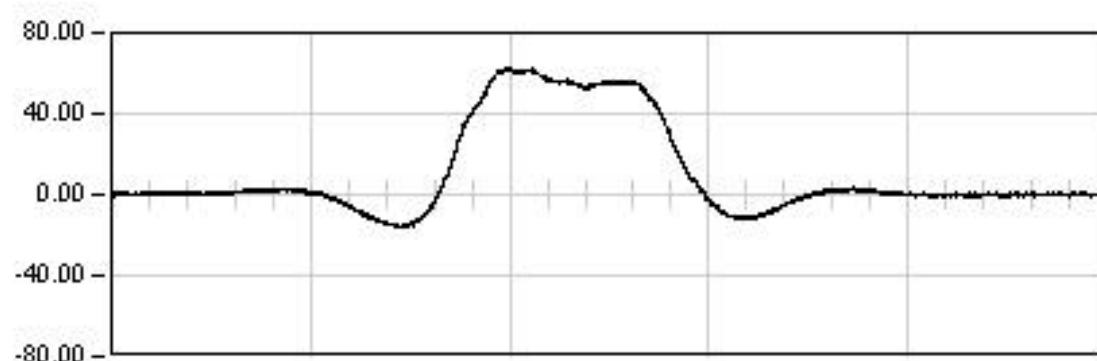
**DYNAMICA 21**

130.0 Seg

Max: 44.61

Min: -9.16

Rem: -0.38

**DYNAMICA 01**

85.0 Seg

Max: 62.65

Min: -16.19

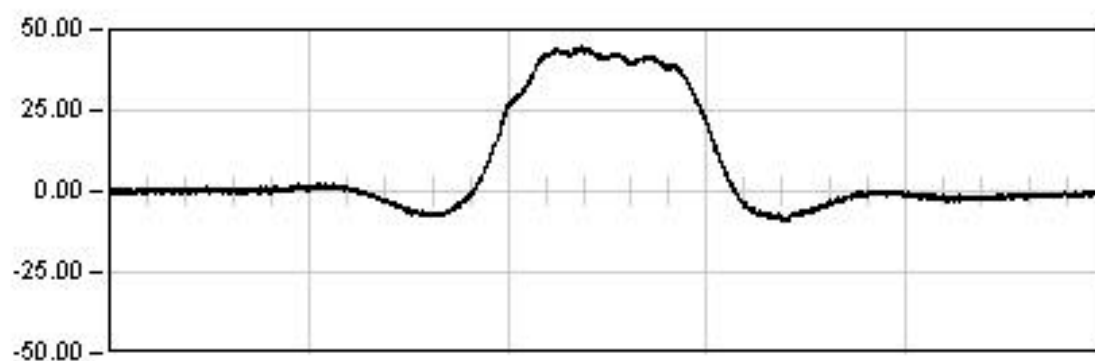
Rem: 0.13

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G072

Canal : 03

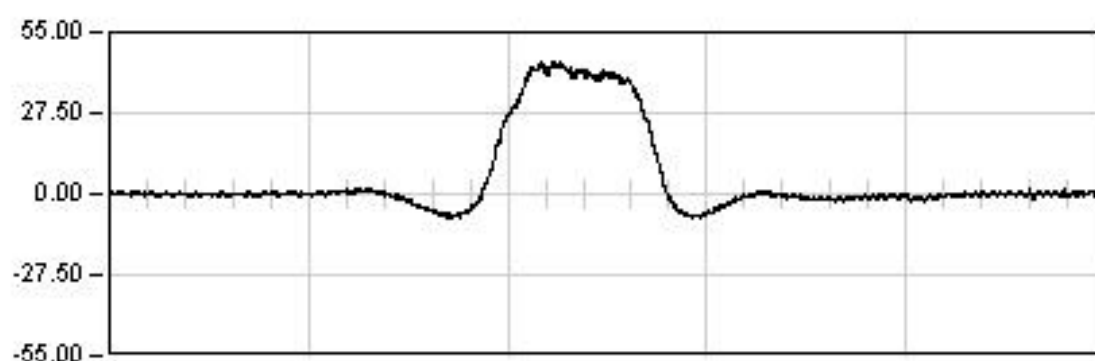
Unidades :  $\mu E$ **DYNAMICA 21**

130.0 Seg

Max: 44.61

Min: -9.16

Rem: -0.38

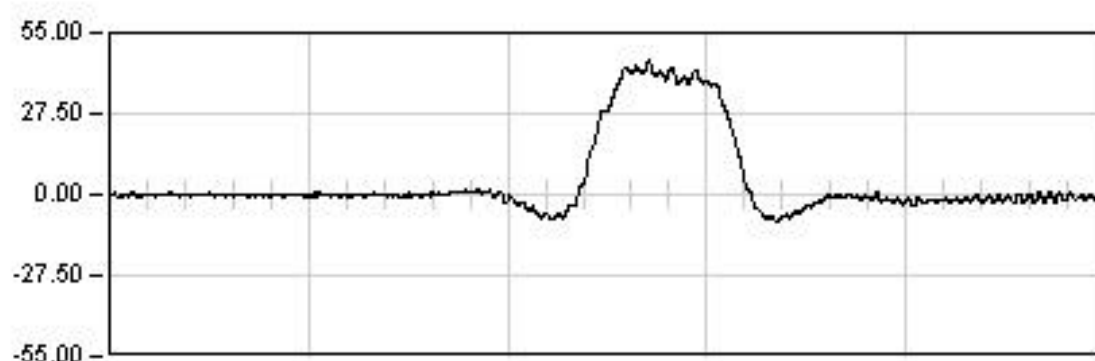
**DYNAMICA 22**

45.0 Seg

Max: 44.66

Min: -8.17

Rem: 0.09

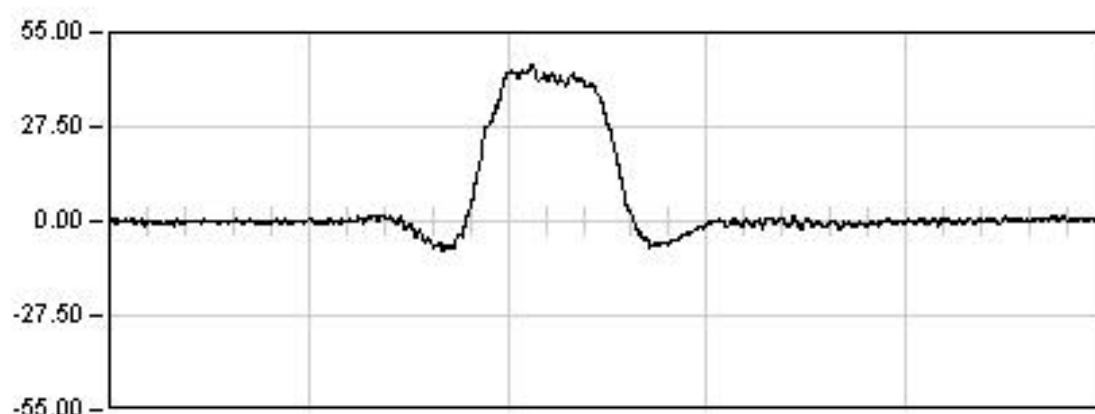
**DYNAMICA 23**

25.0 Seg

Max: 46.10

Min: -9.26

Rem: -0.79

**DYNAMICA 24**

30.0 Seg

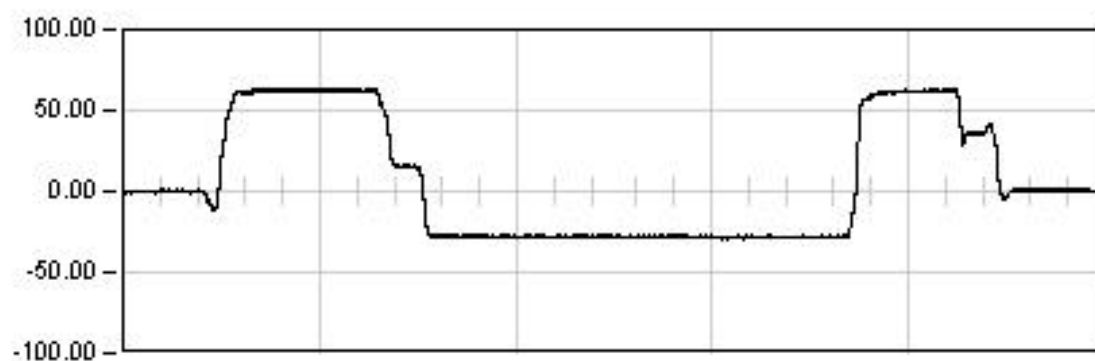
Max: 45.32

Min: -8.28

Rem: 0.06

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G081      Canal : 04      Unidades :  $\mu E$ **ESTATICA 01**

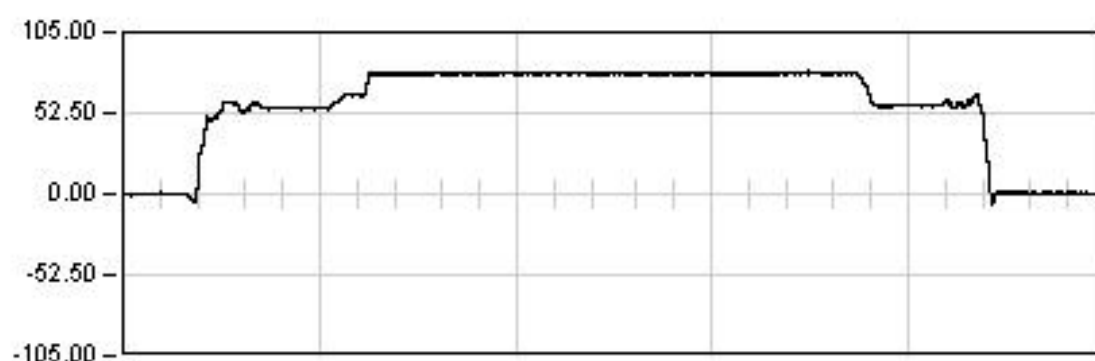
1729.0 Seg

Est: -28.25

Max: 63.63

Min: -30.33

Rem: 0.40

**ESTATICA 02**

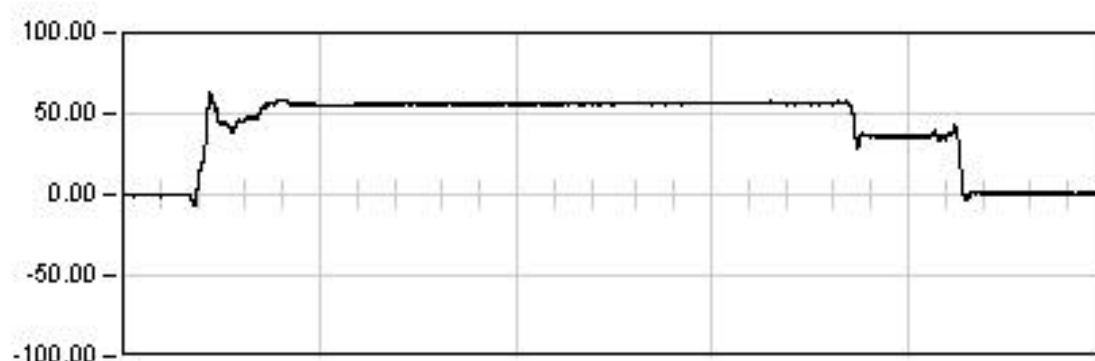
1647.0 Seg

Est: 78.35

Max: 79.77

Min: -7.40

Rem: 0.18

**ESTATICA 03**

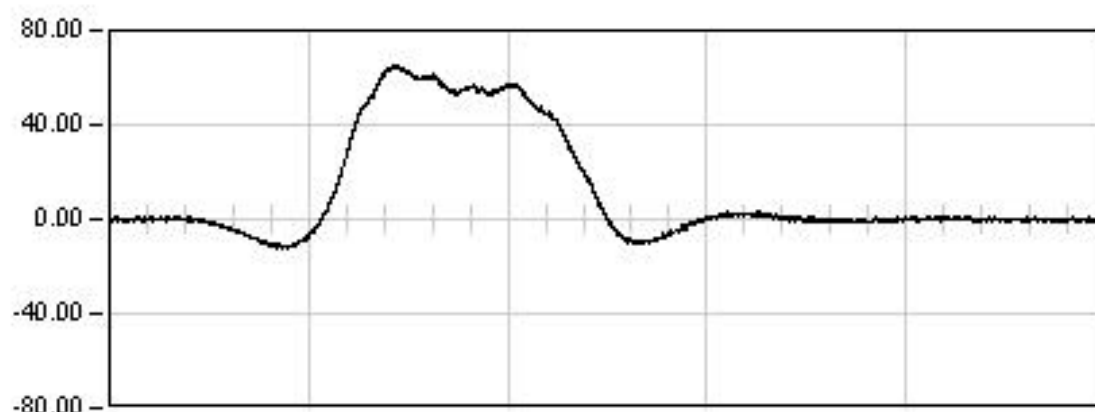
1400.0 Seg

Est: 56.58

Max: 62.79

Min: -6.83

Rem: 0.65

**DINAMICA 01**

85.0 Seg

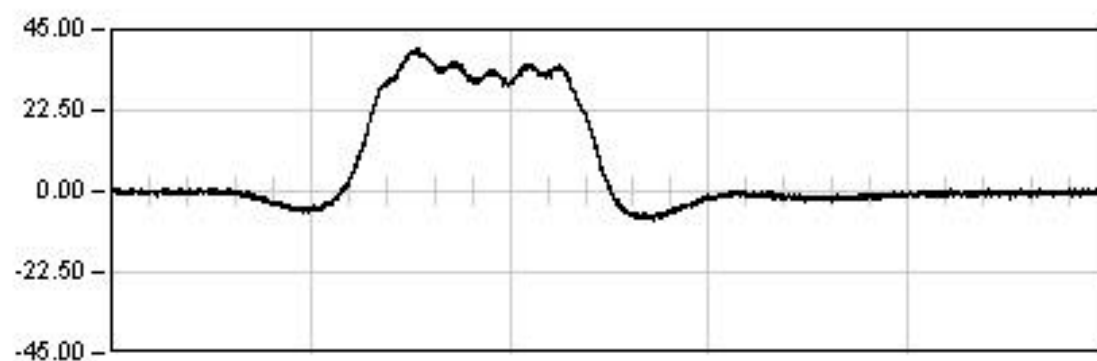
Max: 65.11

Min: -12.36

Rem: 0.47

## VIADUCTO DEL GALLO

P.K. 81/580

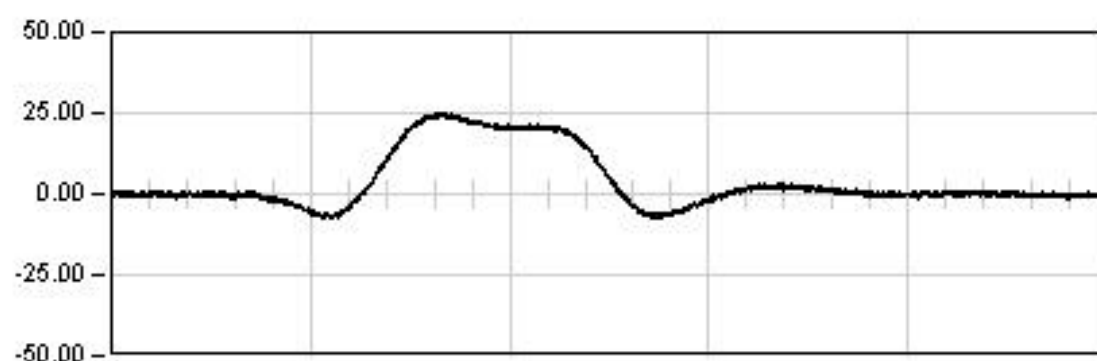
Punto : G081    Canal : 04    Unidades :  $\mu E$ **DYNAMICA 11**

125.0    Seg

Max: 39.43

Min: -8.10

Rem: -0.37

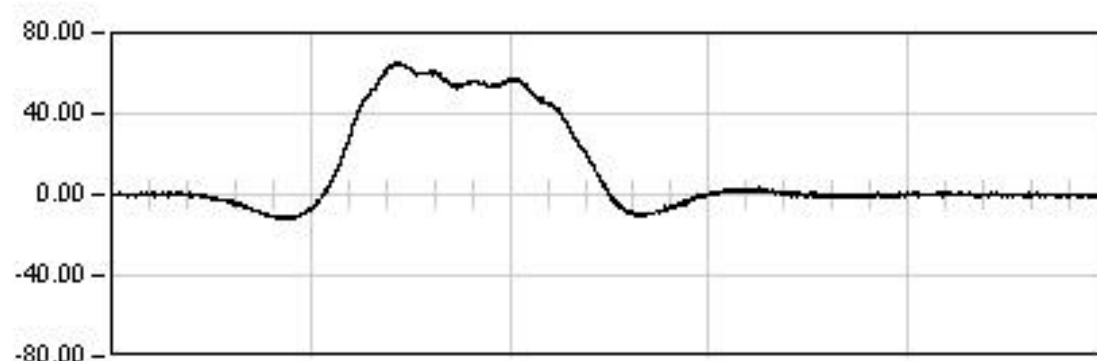
**DYNAMICA 21**

130.0    Seg

Max: 25.08

Min: -7.65

Rem: -0.55

**DYNAMICA 01**

85.0    Seg

Max: 65.11

Min: -12.36

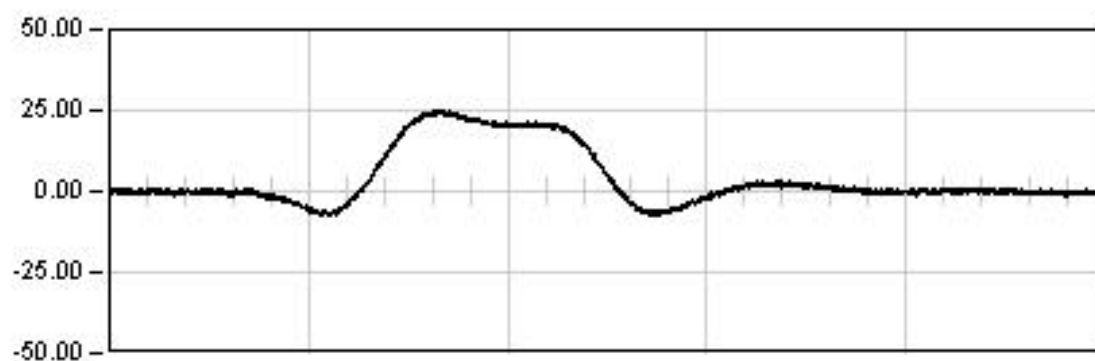
Rem: 0.47

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G081

Canal : 04

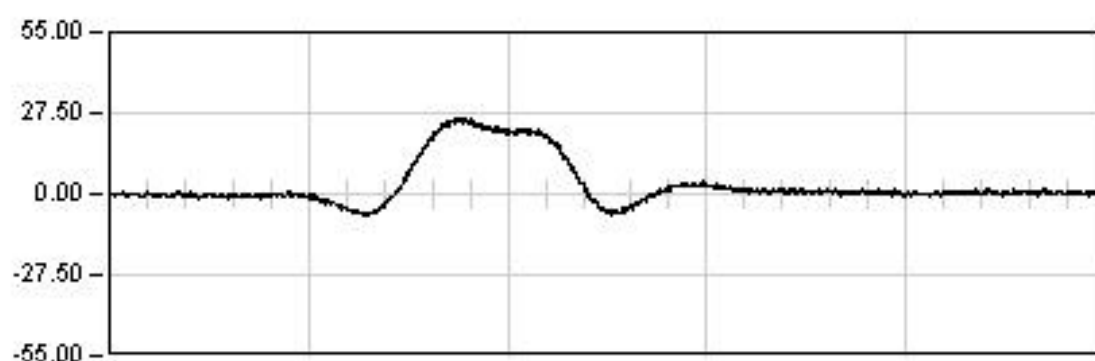
Unidades :  $\mu E$ **DINAMICA 21**

130.0 Seg

Max: 25.08

Min: -7.65

Rem: -0.55

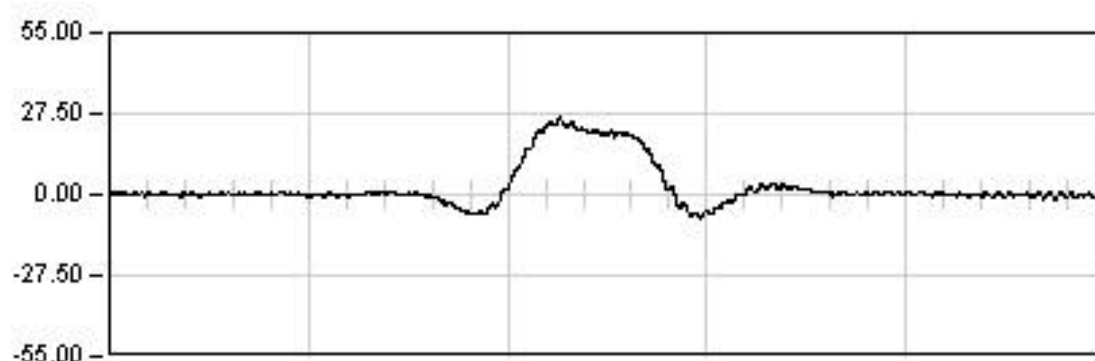
**DINAMICA 22**

45.0 Seg

Max: 25.92

Min: -7.36

Rem: -0.07

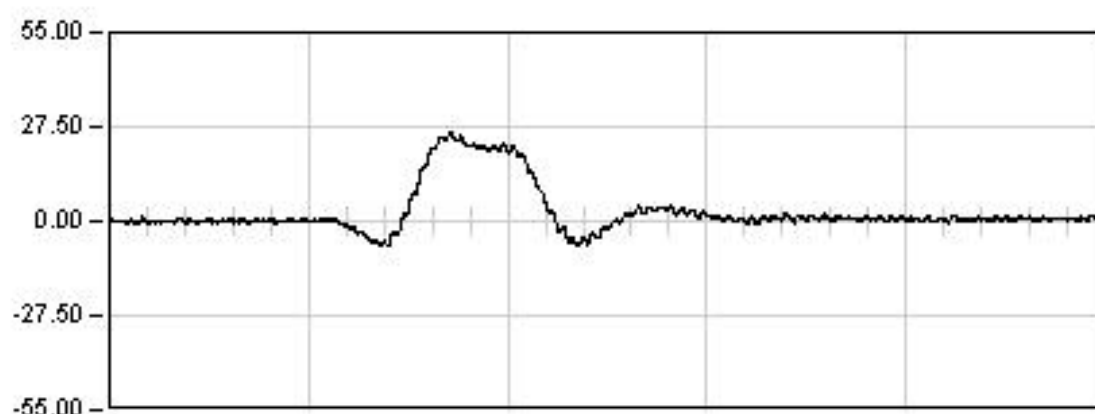
**DINAMICA 23**

25.0 Seg

Max: 26.16

Min: -7.97

Rem: -0.14

**DINAMICA 24**

30.0 Seg

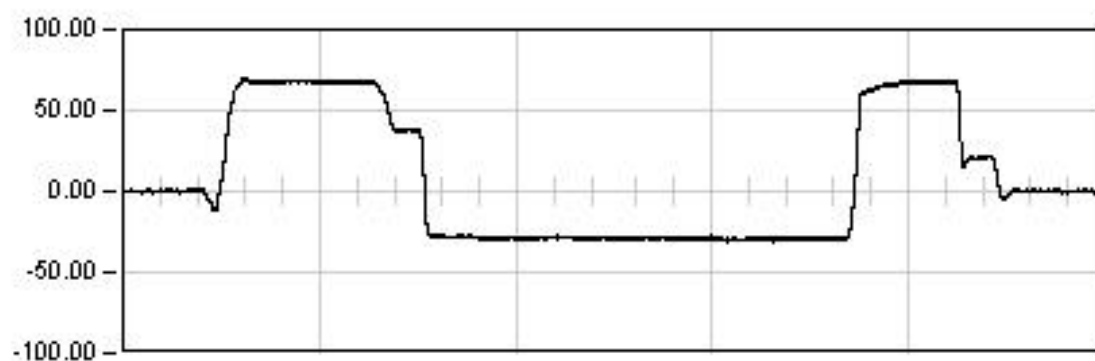
Max: 25.66

Min: -7.23

Rem: 0.08

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G082      Canal : 05      Unidades :  $\mu E$ **ESTATICA 01**

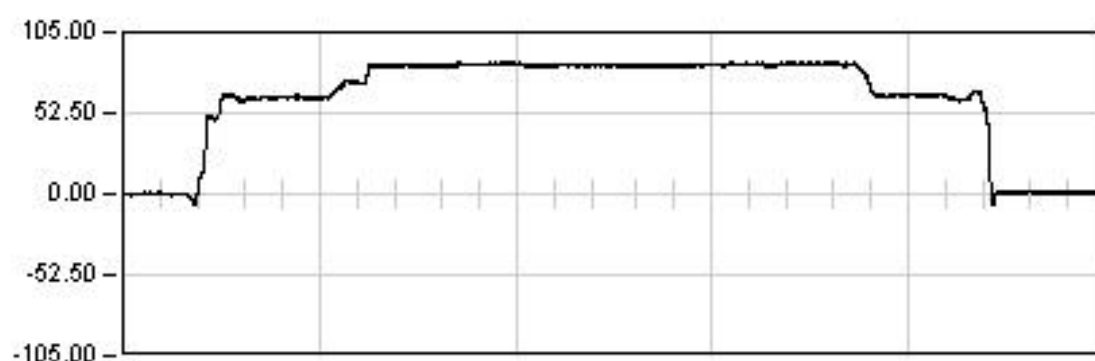
1729.0    Seg

Est:    -29.31

Max:    69.85

Min:    -31.12

Rem:    0.02

**ESTATICA 02**

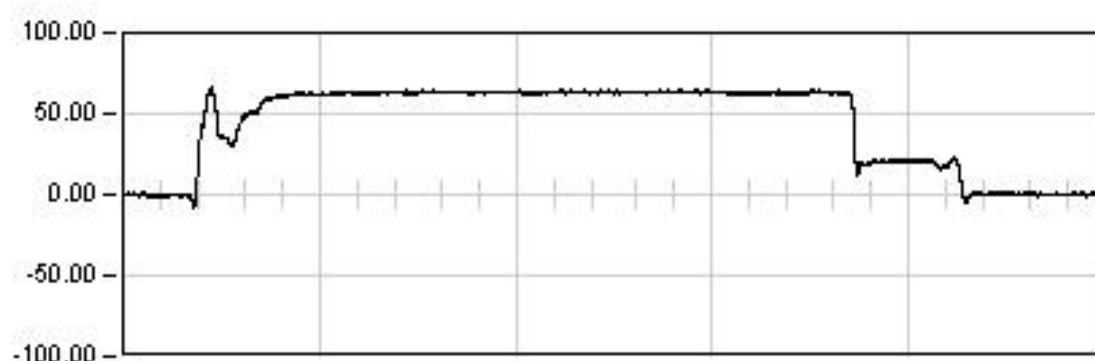
1647.0    Seg

Est:    84.14

Max:    85.31

Min:    -7.20

Rem:    0.51

**ESTATICA 03**

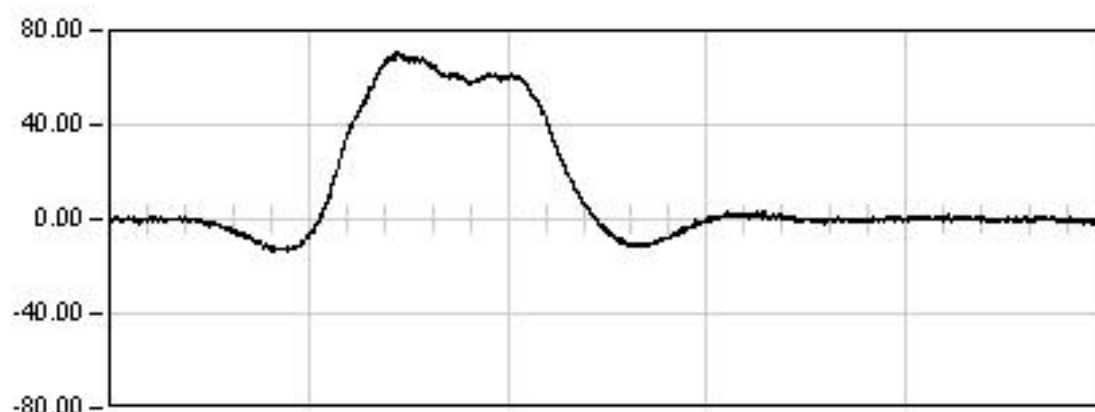
1400.0    Seg

Est:    63.04

Max:    66.00

Min:    -7.58

Rem:    0.08

**DINAMICA 01**

85.0    Seg

Max:    70.50

Min:    -13.30

Rem:    0.53

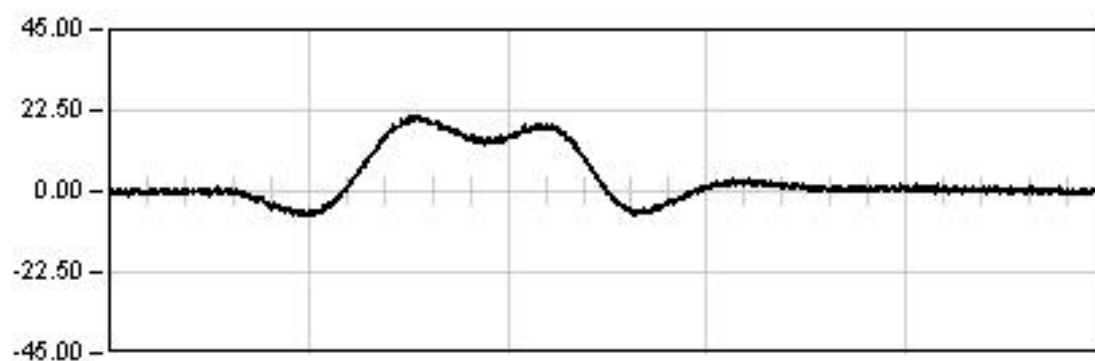


## VIADUCTO DEL GALLO

P.K. 81/580

Punto : G082

Canal : 05

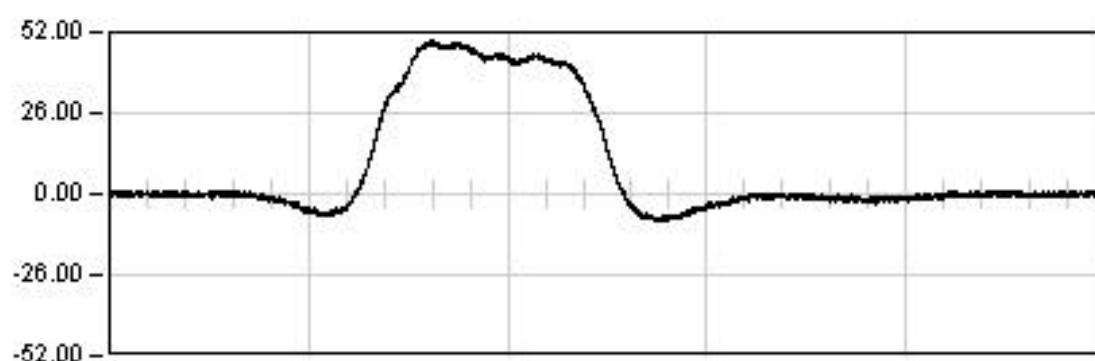
Unidades :  $\mu E$ **DINAMICA 11**

125.0 Seg

Max: 20.95

Min: -7.01

Rem: -0.07

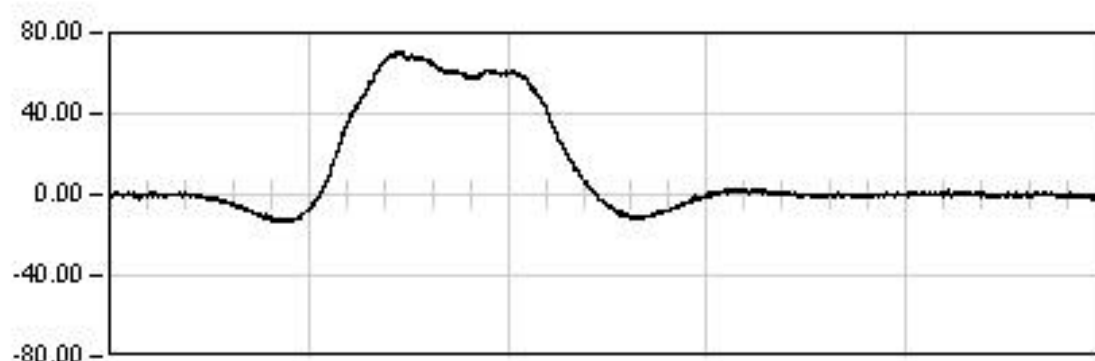
**DINAMICA 21**

130.0 Seg

Max: 49.11

Min: -8.87

Rem: 0.22

**DINAMICA 01**

85.0 Seg

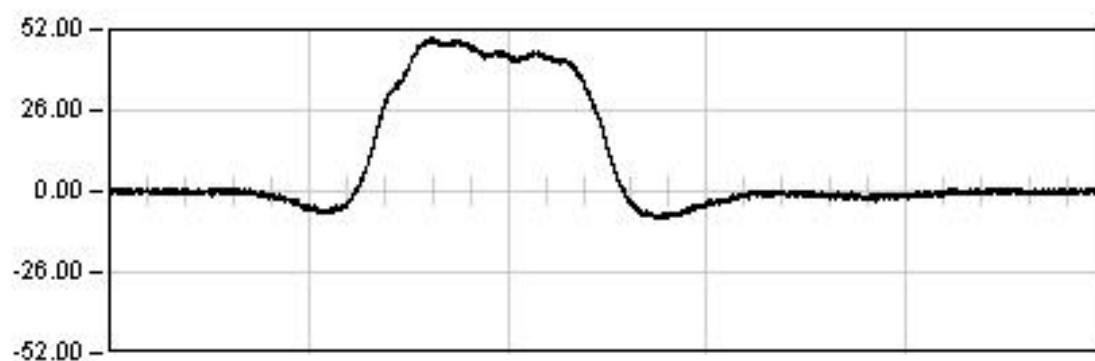
Max: 70.50

Min: -13.30

Rem: 0.53

## VIADUCTO DEL GALLO

P.K. 81/580

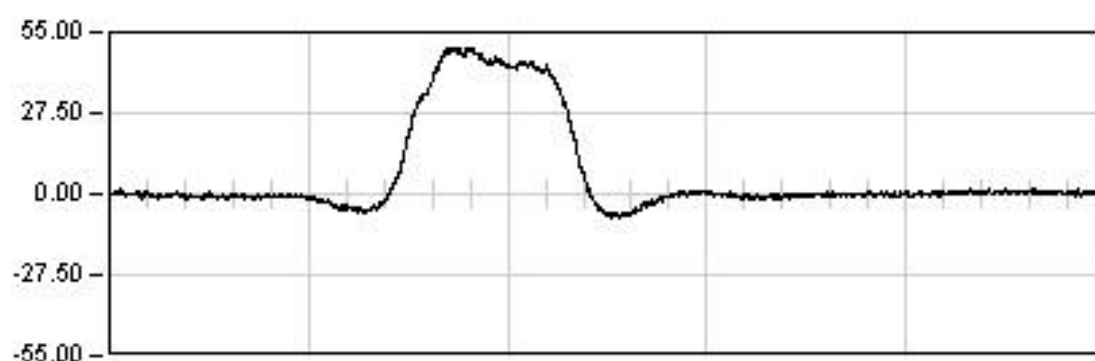
Punto : G082    Canal : 05    Unidades :  $\mu E$ **DYNAMICA 21**

130.0    Seg

Max: 49.11

Min: -8.87

Rem: 0.22

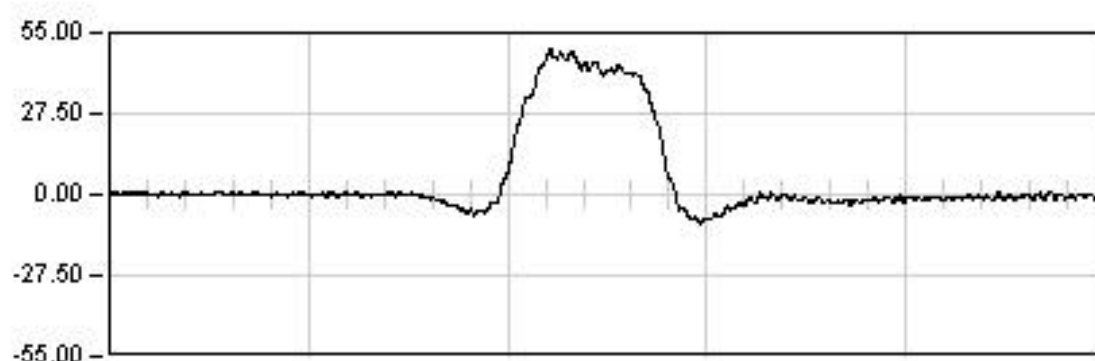
**DYNAMICA 22**

45.0    Seg

Max: 49.86

Min: -8.10

Rem: 0.04

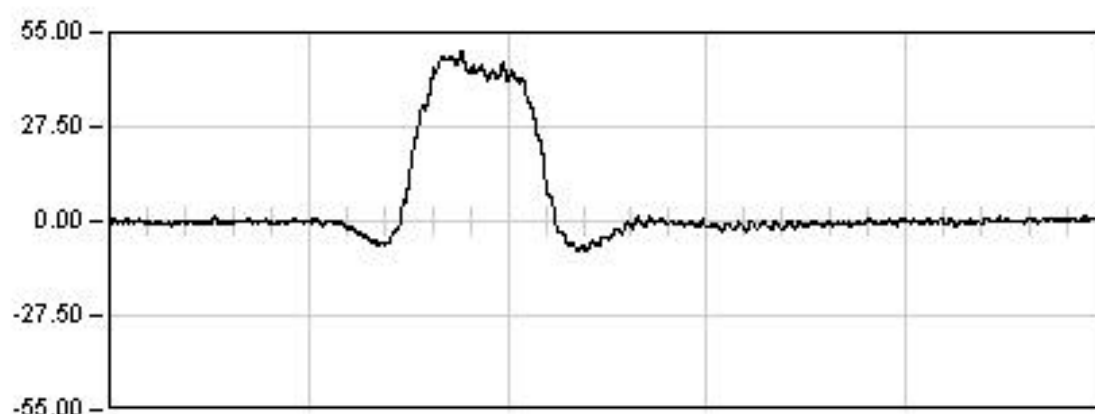
**DYNAMICA 23**

25.0    Seg

Max: 49.45

Min: -9.65

Rem: -0.29

**DYNAMICA 24**

30.0    Seg

Max: 49.54

Min: -8.57

Rem: -0.23

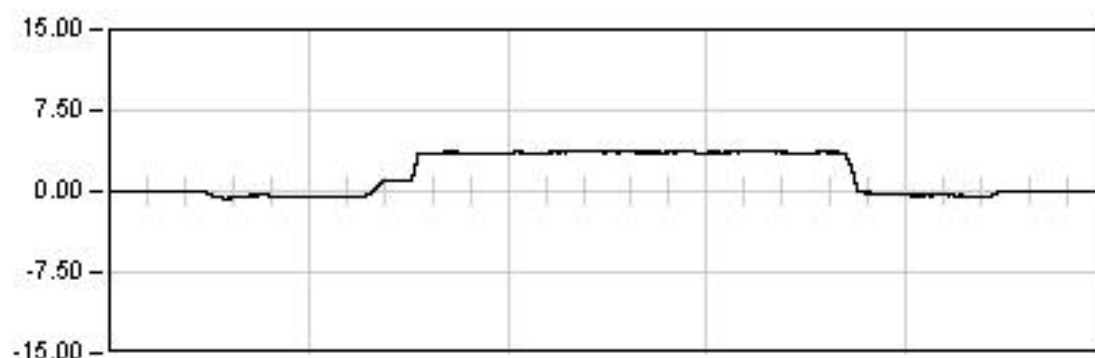
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P061

Canal : 38

Unidades : mm

**ESTATICA 01**

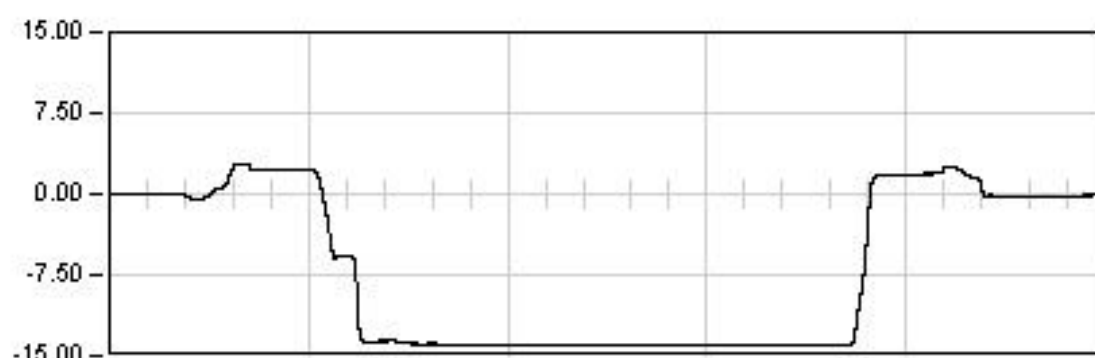
1729.0 Seg

Est: 3.61

Max: 3.67

Min: -0.66

Rem: 0.03

**ESTATICA 02**

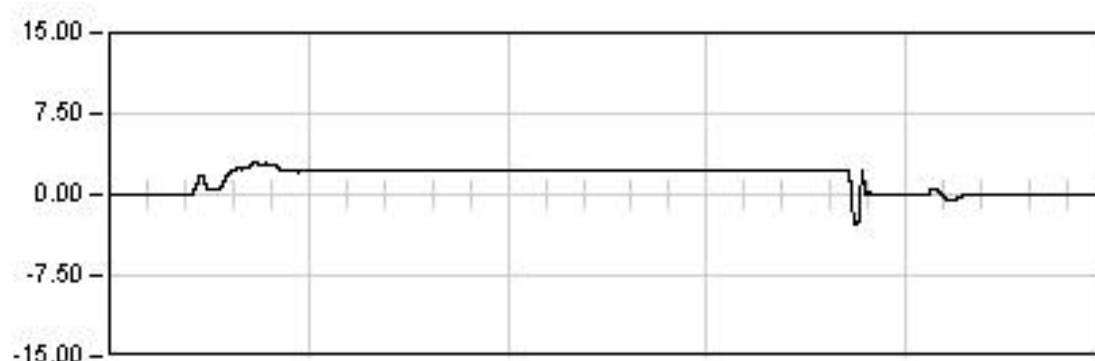
1647.0 Seg

Est: -14.02

Max: -14.04

Min: 2.87

Rem: -0.13

**ESTATICA 03**

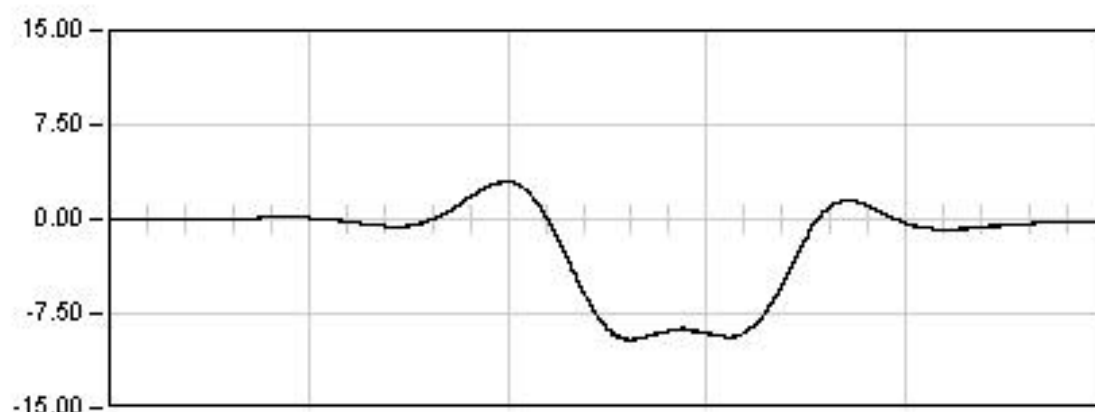
1400.0 Seg

Est: 2.21

Max: 2.91

Min: -2.76

Rem: -0.04

**DINAMICA 01**

85.0 Seg

Max: -9.62

Min: 3.01

Rem: -0.18

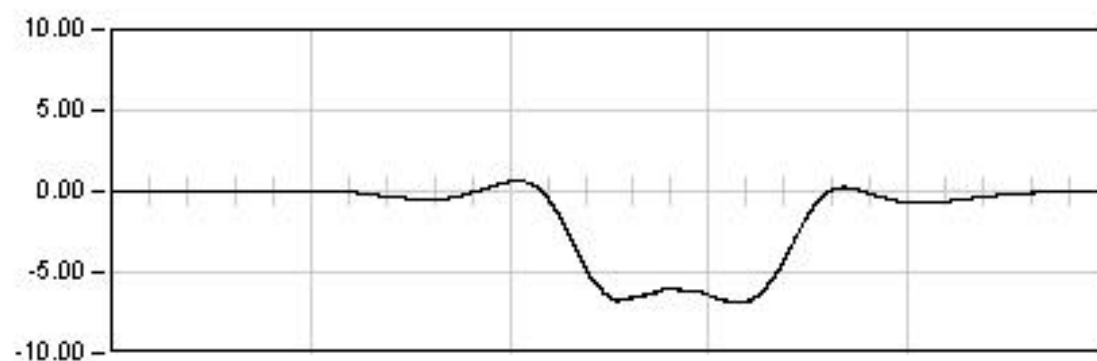
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P061

Canal : 38

Unidades : mm

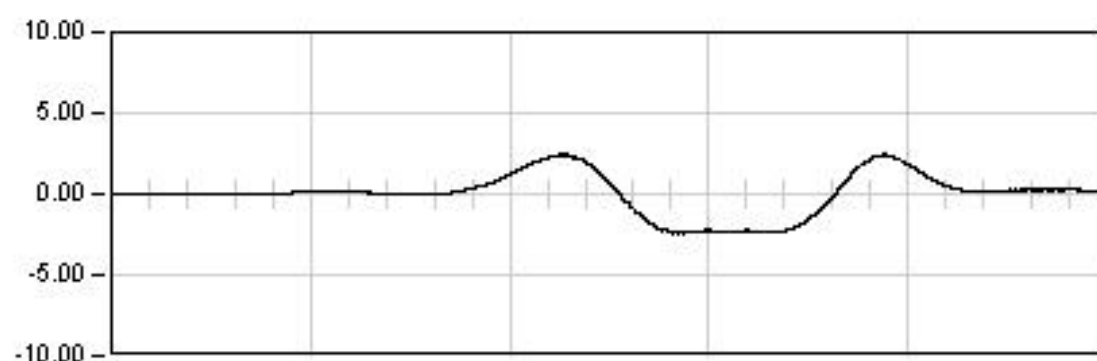
**DYNAMICA 11**

125.0 Seg

Max: -6.83

Min: 0.65

Rem: -0.00

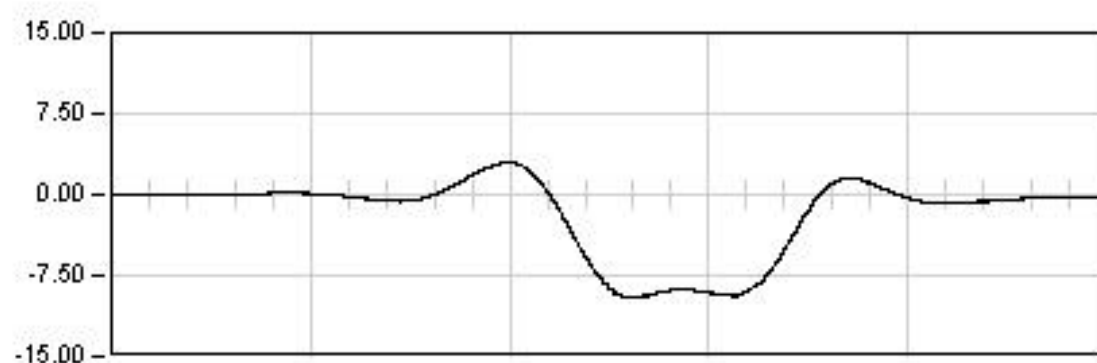
**DYNAMICA 21**

130.0 Seg

Max: 2.48

Min: -2.44

Rem: 0.03

**DYNAMICA 01**

85.0 Seg

Max: -9.62

Min: 3.01

Rem: -0.18

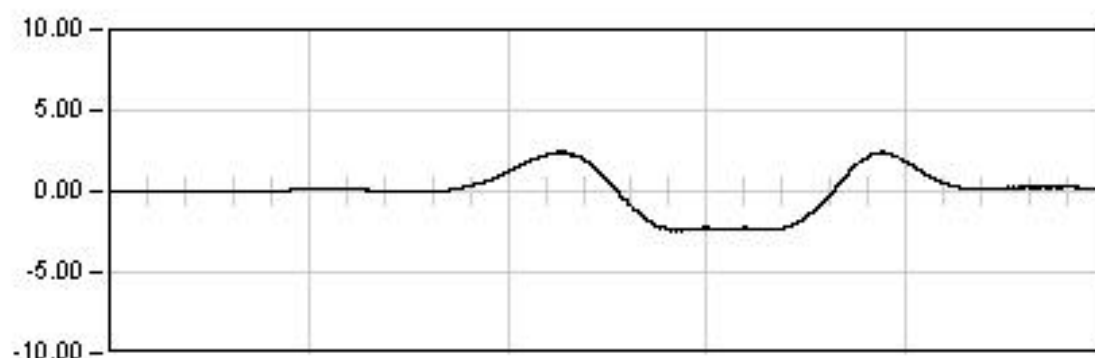
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P061

Canal : 38

Unidades : mm

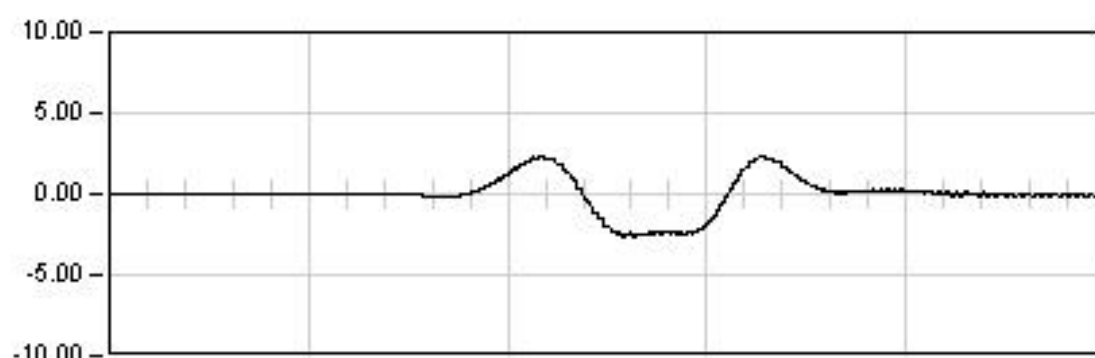
**DYNAMICA 21**

130.0 Seg

Max: 2.48

Min: -2.44

Rem: 0.03

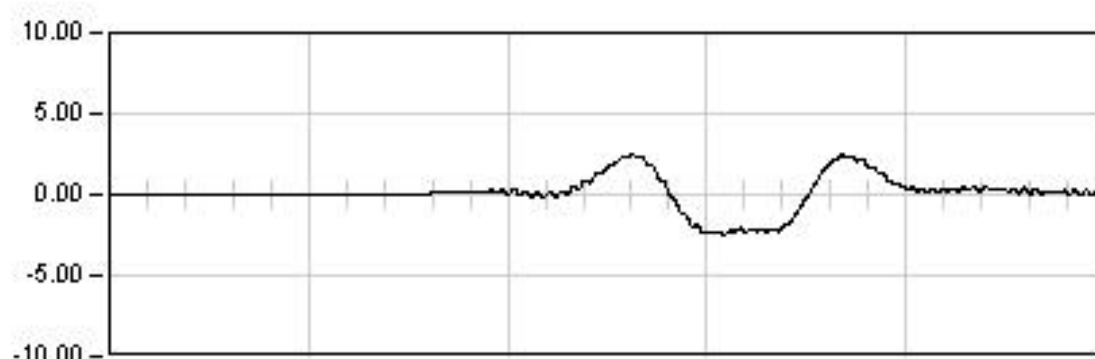
**DYNAMICA 22**

45.0 Seg

Max: -2.69

Min: 2.38

Rem: -0.11

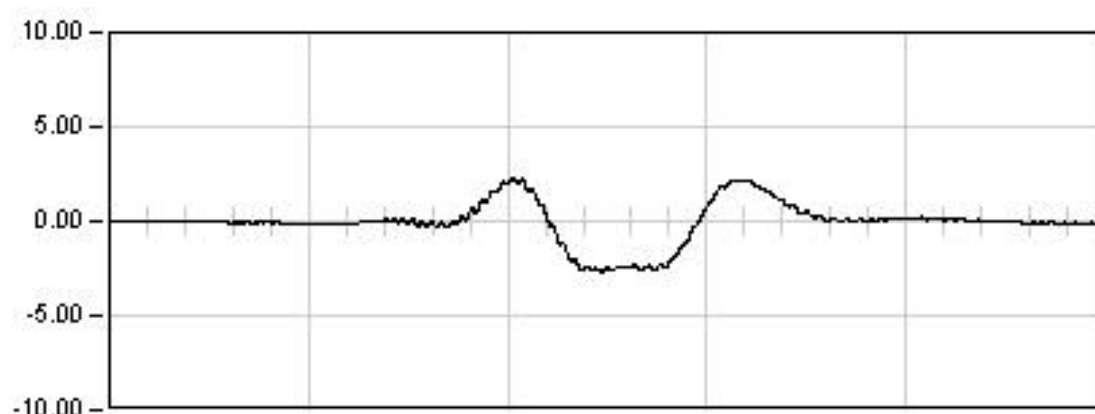
**DYNAMICA 23**

25.0 Seg

Max: 2.47

Min: -2.47

Rem: 0.06

**DYNAMICA 24**

30.0 Seg

Max: -2.67

Min: 2.33

Rem: 0.01

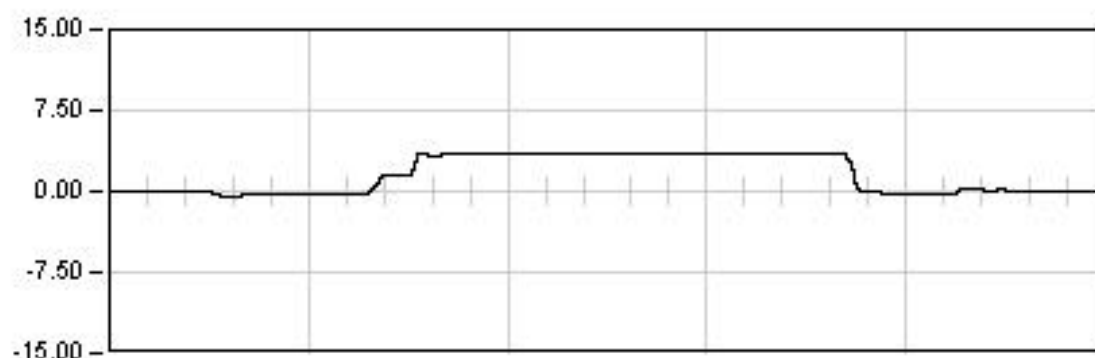
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P062

Canal : 39

Unidades : mm

**ESTATICA 01**

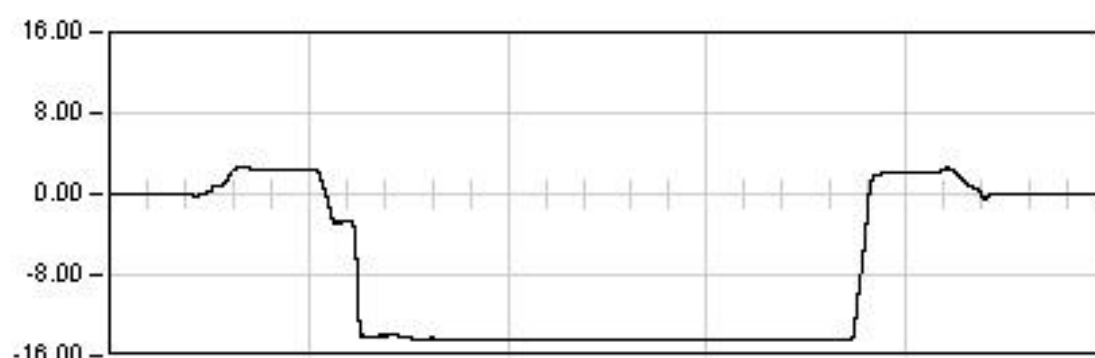
1729.0 Seg

Est: 3.56

Max: 3.59

Min: -0.56

Rem: 0.04

**ESTATICA 02**

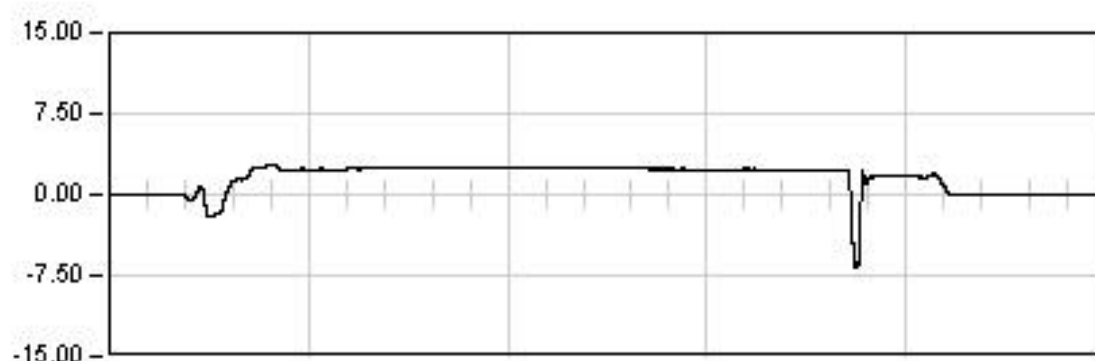
1647.0 Seg

Est: -14.42

Max: -14.44

Min: 2.75

Rem: -0.01

**ESTATICA 03**

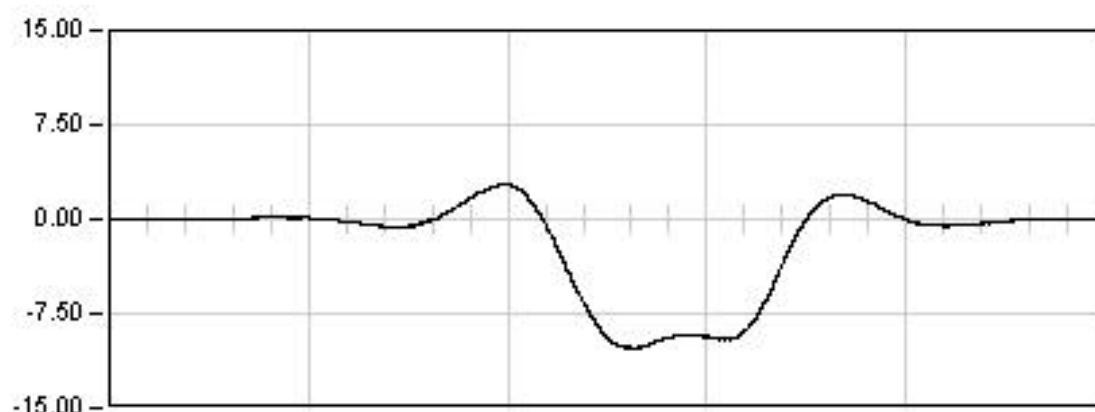
1400.0 Seg

Est: 2.35

Max: -6.69

Min: 2.71

Rem: 0.01

**DINAMICA 01**

85.0 Seg

Max: -10.26

Min: 2.79

Rem: -0.05

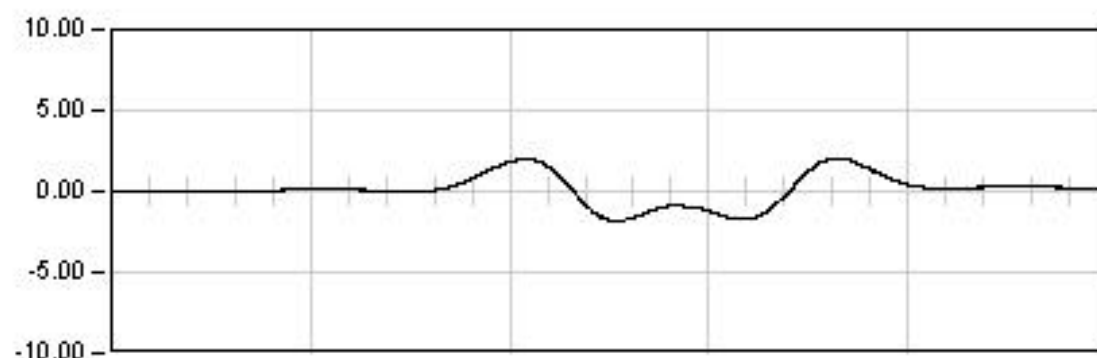
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P062

Canal : 39

Unidades : mm

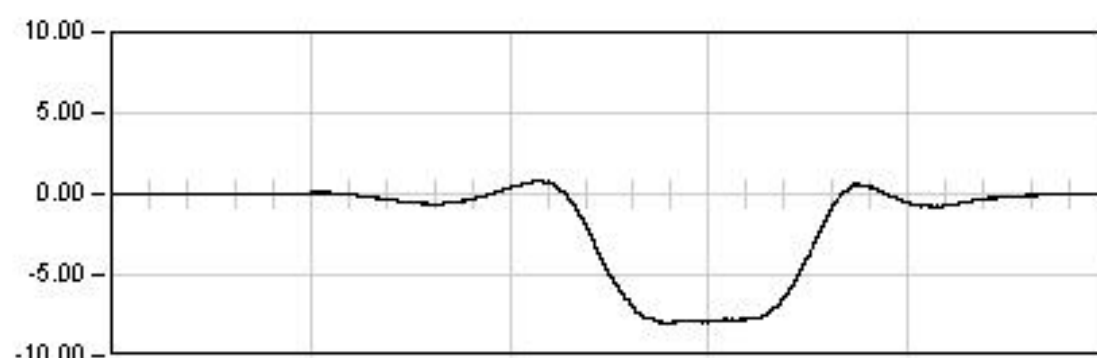
**DYNAMICA 11**

125.0 Seg

Max: 2.07

Min: -1.86

Rem: 0.00

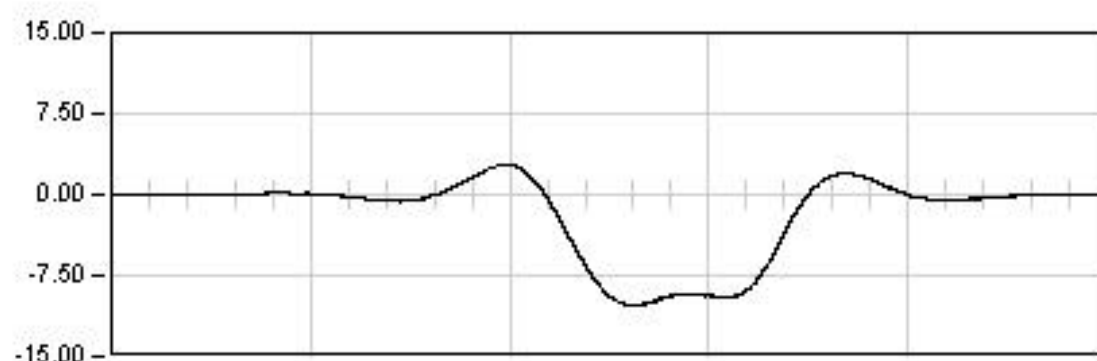
**DYNAMICA 21**

135.0 Seg

Max: -8.00

Min: 0.82

Rem: 0.03

**DYNAMICA 01**

85.0 Seg

Max: -10.26

Min: 2.79

Rem: -0.05

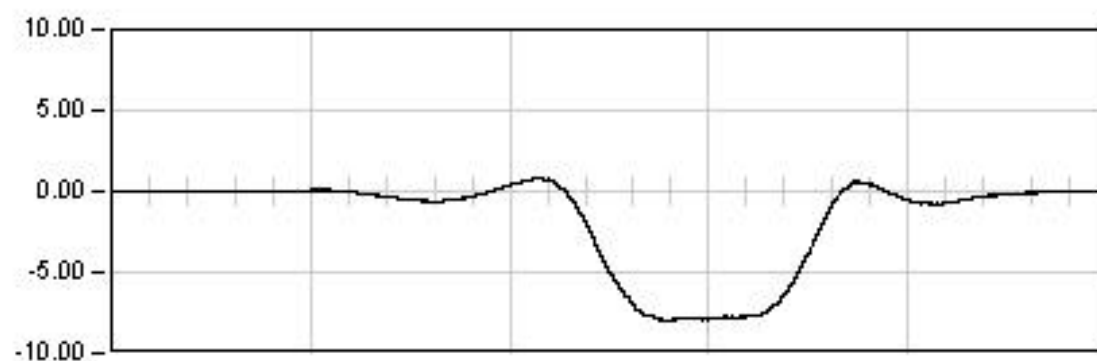
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P062

Canal : 39

Unidades : mm

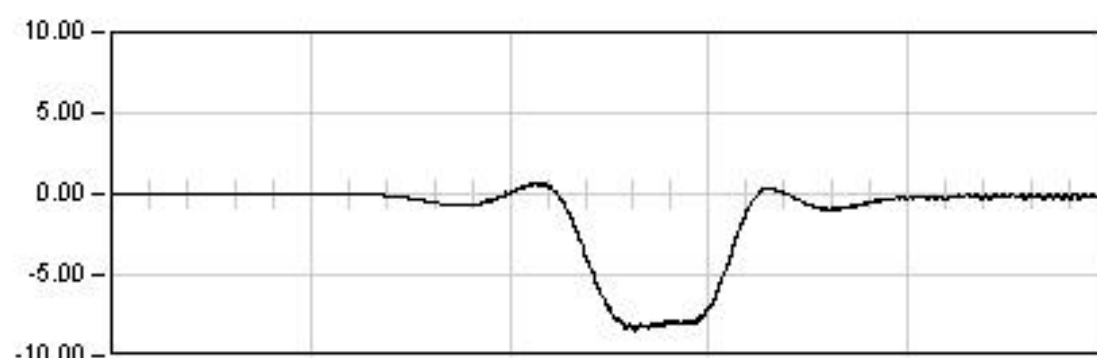
**DYNAMICA 21**

135.0 Seg

Max: -8.00

Min: 0.82

Rem: 0.03

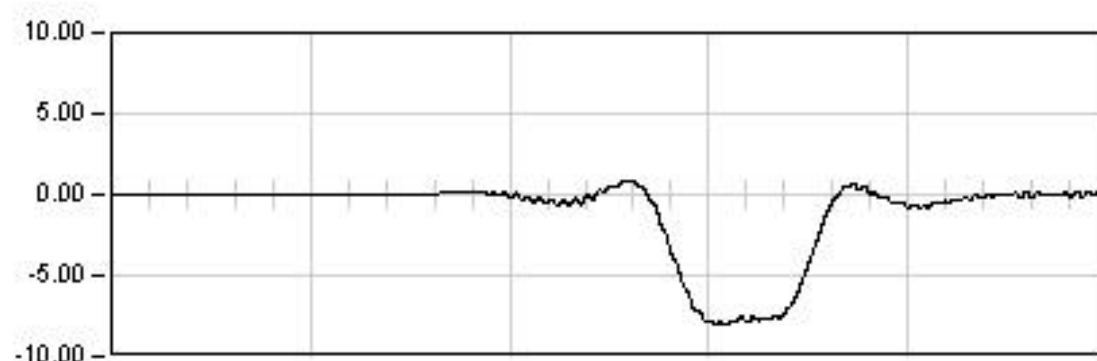
**DYNAMICA 22**

45.0 Seg

Max: -8.47

Min: 0.70

Rem: -0.20

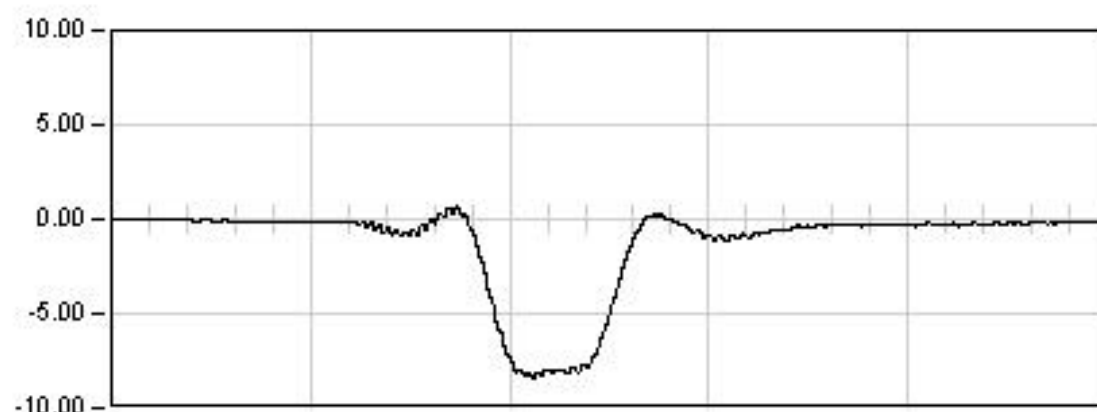
**DYNAMICA 23**

25.0 Seg

Max: -8.08

Min: 0.87

Rem: 0.06

**DYNAMICA 24**

35.0 Seg

Max: -8.47

Min: 0.66

Rem: -0.07



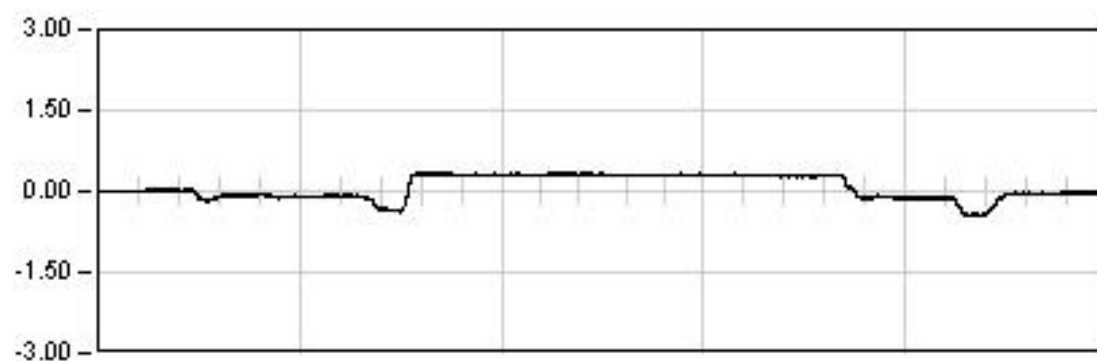
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P063

Canal : 48

Unidades : mm

**ESTATICA 01**

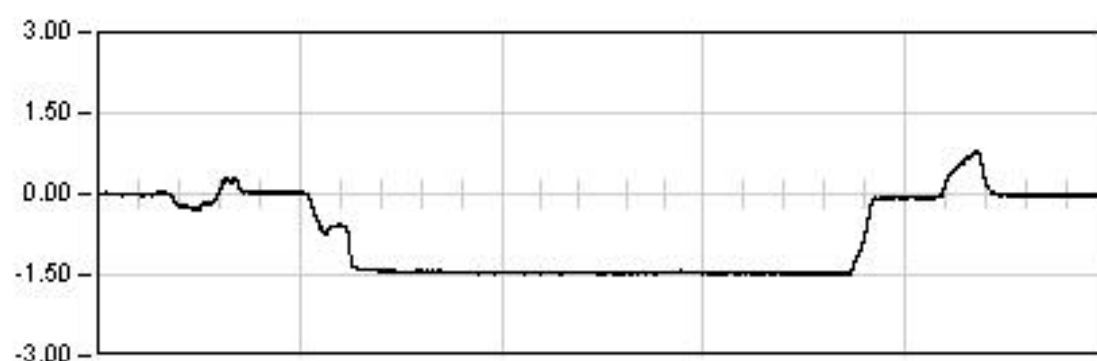
1729.0 Seg

Est: 0.29

Max: -0.46

Min: 0.34

Rem: -0.03

**ESTATICA 02**

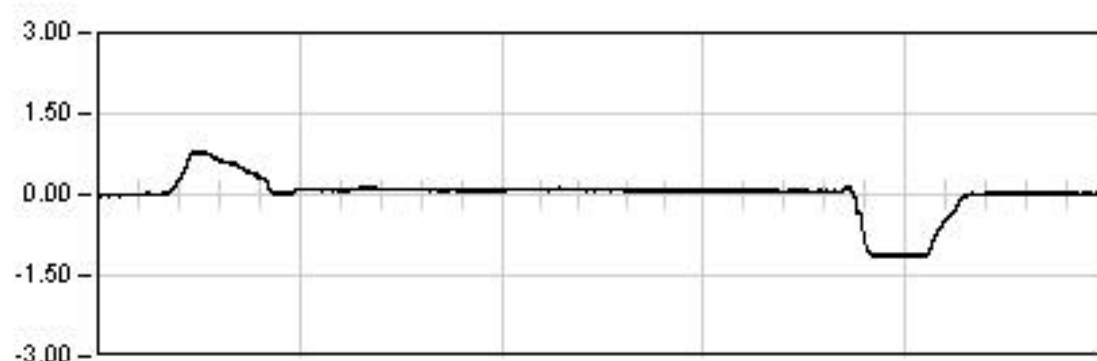
1647.0 Seg

Est: -1.47

Max: -1.50

Min: 0.81

Rem: -0.02

**ESTATICA 03**

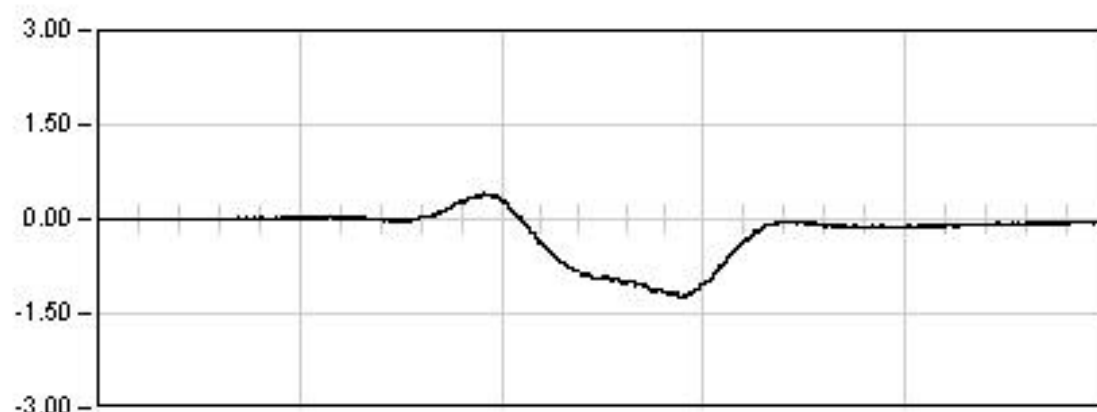
1400.0 Seg

Est: 0.06

Max: -1.16

Min: 0.79

Rem: 0.02

**DINAMICA 01**

100.0 Seg

Max: -1.25

Min: 0.41

Rem: -0.02

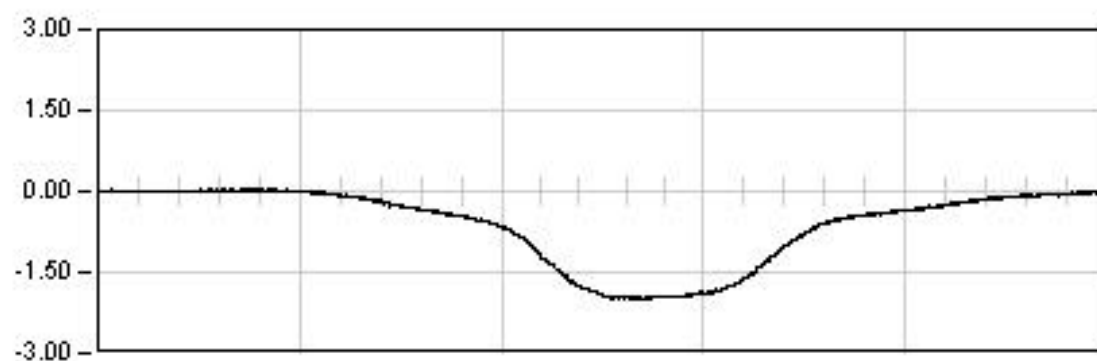
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P063

Canal : 48

Unidades : mm

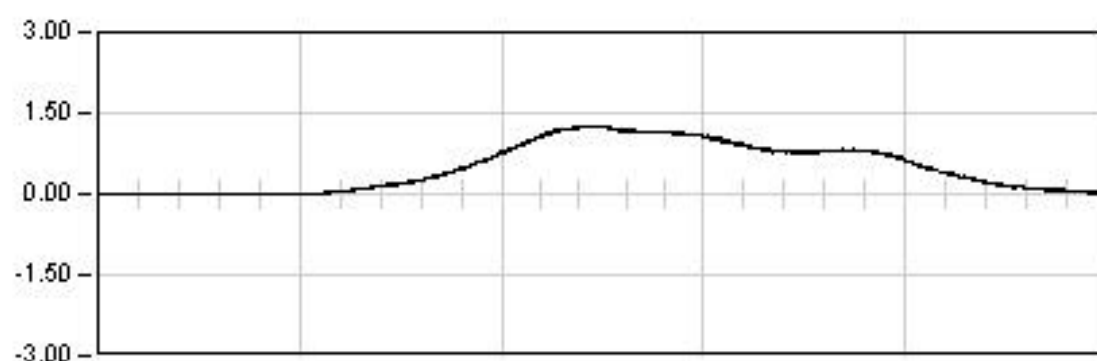
**DYNAMICA 11**

125.0 Seg

Max: -2.00

Min: 0.05

Rem: 0.01

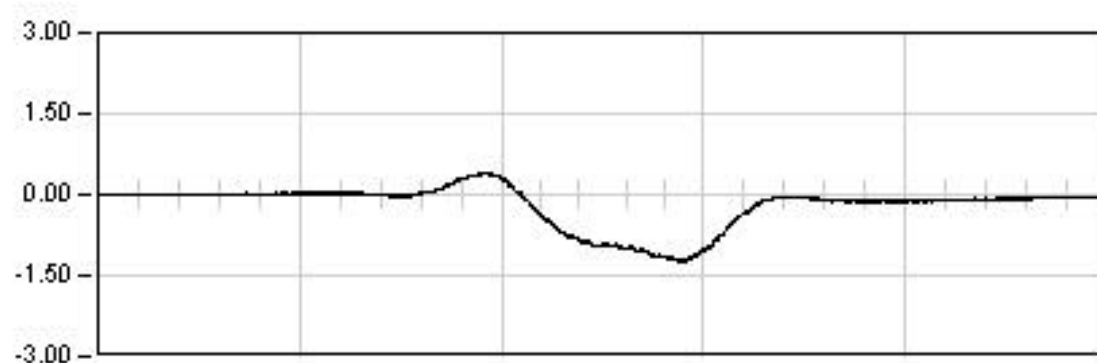
**DYNAMICA 21**

130.0 Seg

Max: 1.27

Min: -0.05

Rem: -0.01

**DYNAMICA 01**

100.0 Seg

Max: -1.25

Min: 0.41

Rem: -0.02

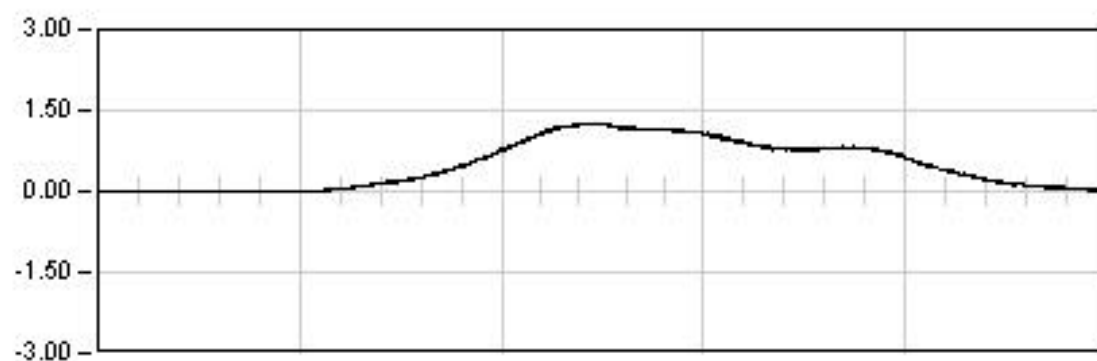
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P063

Canal : 48

Unidades : mm

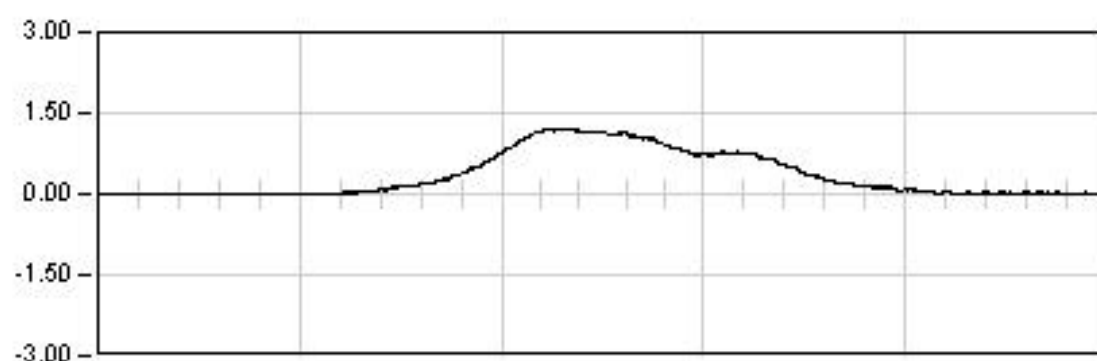
**DYNAMICA 21**

130.0 Seg

Max: 1.27

Min: -0.05

Rem: -0.01

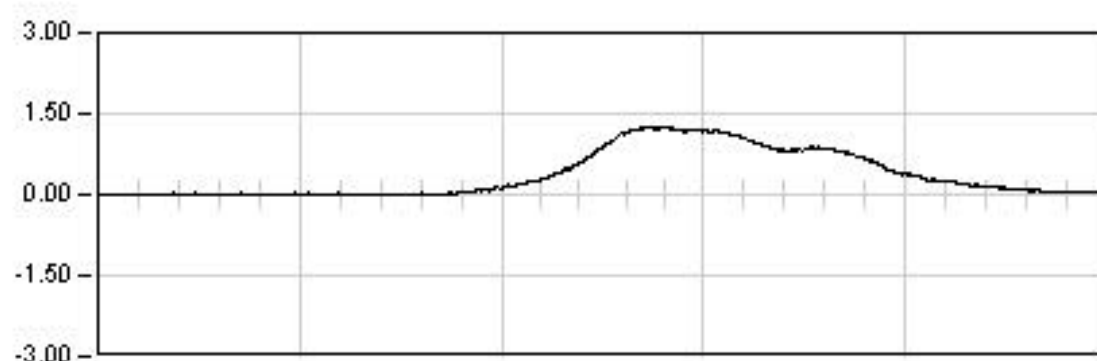
**DYNAMICA 22**

45.0 Seg

Max: 1.21

Min: -0.03

Rem: -0.00

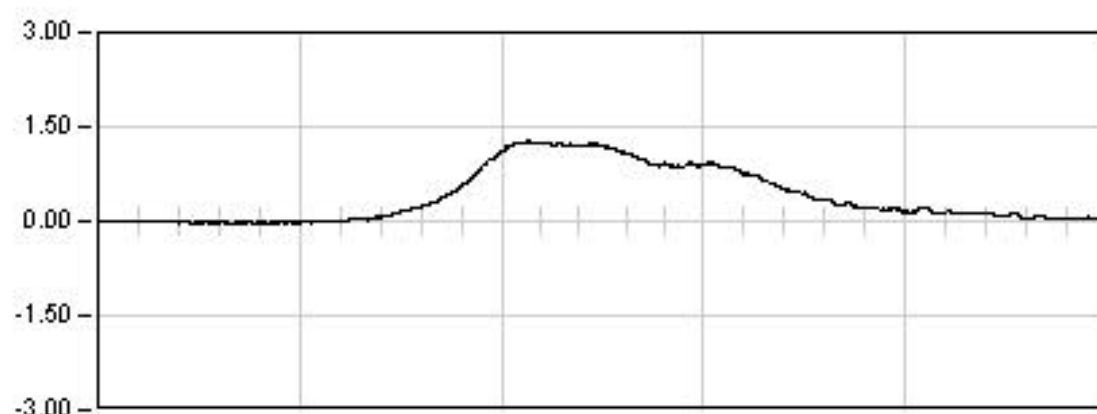
**DYNAMICA 23**

25.0 Seg

Max: 1.26

Min: -0.01

Rem: 0.02

**DYNAMICA 24**

30.0 Seg

Max: 1.27

Min: -0.04

Rem: 0.00

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P064

Canal : 49

Unidades : mm

**ESTATICA 01**

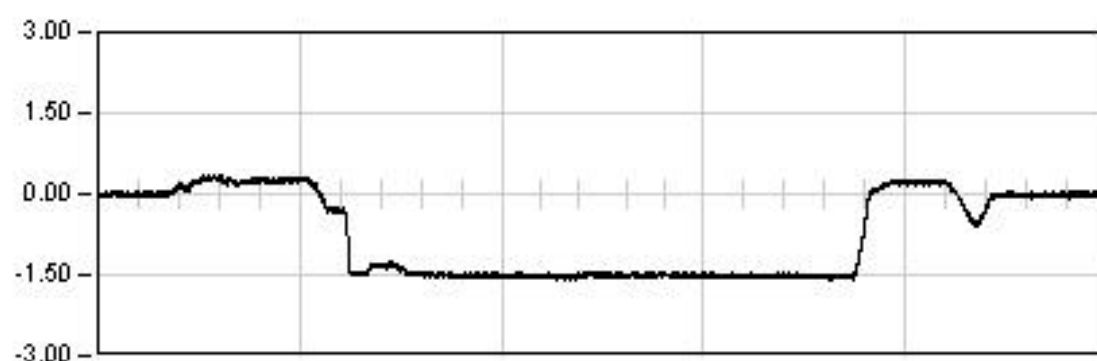
1729.0 Seg

Est: 0.33

Max: 0.60

Min: -0.09

Rem: -0.01

**ESTATICA 02**

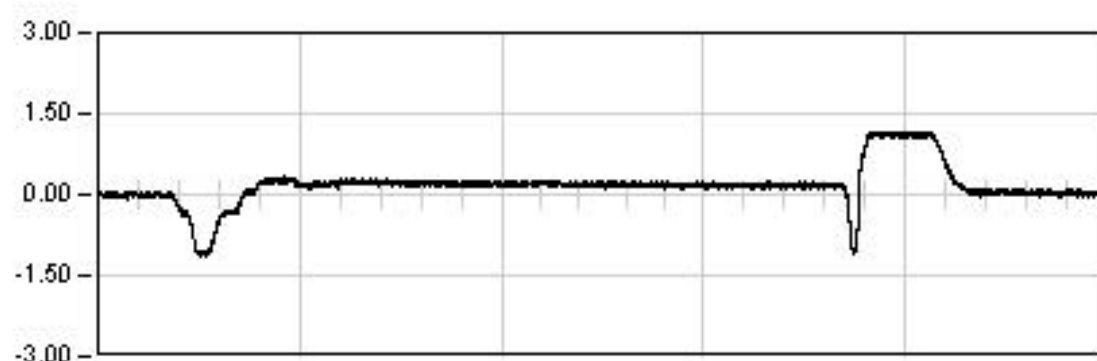
1647.0 Seg

Est: -1.52

Max: -1.60

Min: 0.34

Rem: -0.01

**ESTATICA 03**

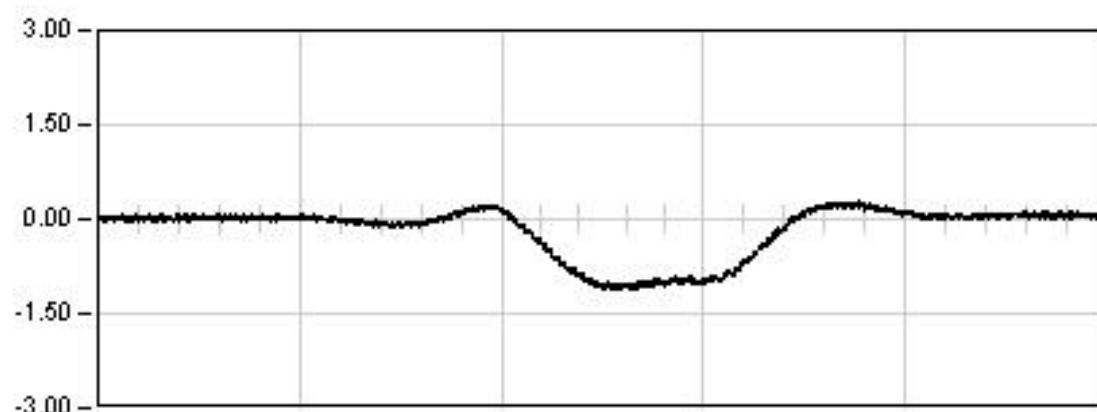
1400.0 Seg

Est: 0.16

Max: 1.17

Min: -1.13

Rem: 0.03

**DINAMICA 01**

85.0 Seg

Max: -1.13

Min: 0.29

Rem: 0.01

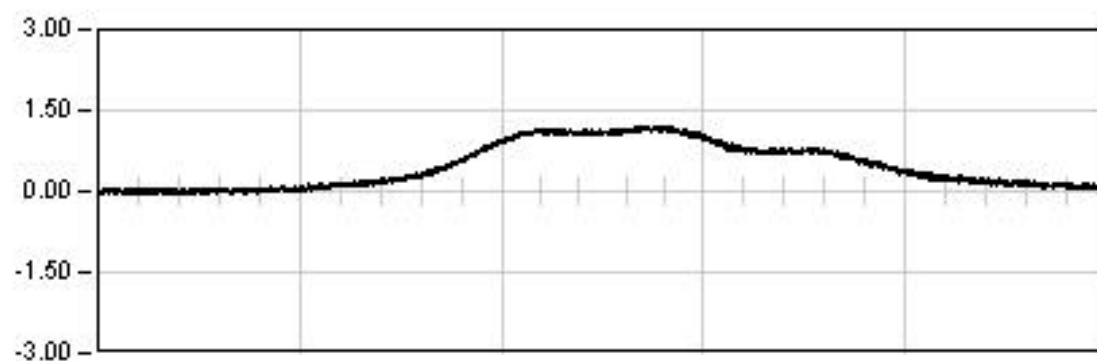
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P064

Canal : 49

Unidades : mm

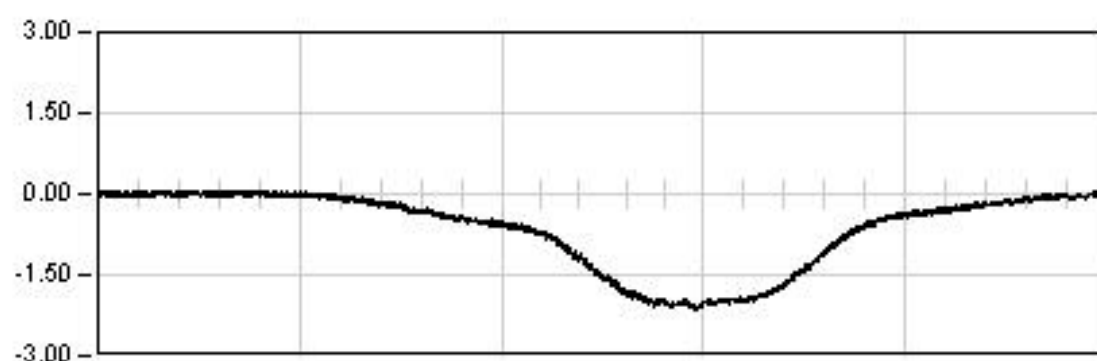
**DYNAMICA 11**

125.0 Seg

Max: 1.20

Min: -0.05

Rem: 0.03

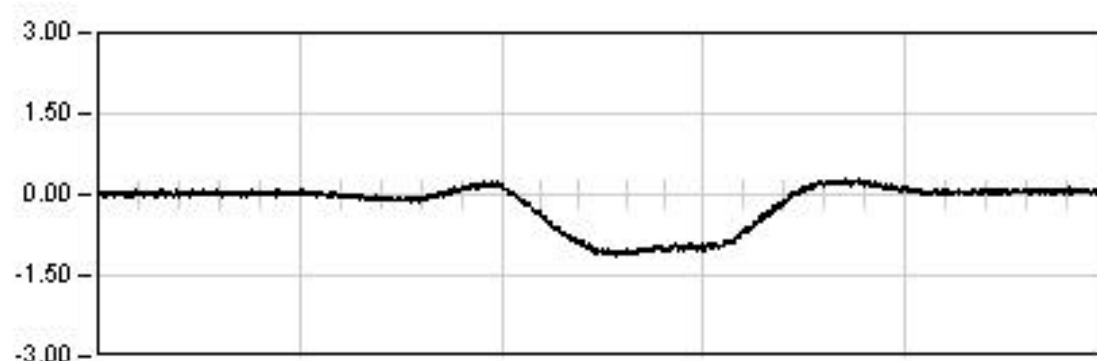
**DYNAMICA 21**

130.0 Seg

Max: -2.13

Min: 0.12

Rem: 0.04

**DYNAMICA 01**

85.0 Seg

Max: -1.13

Min: 0.29

Rem: 0.01

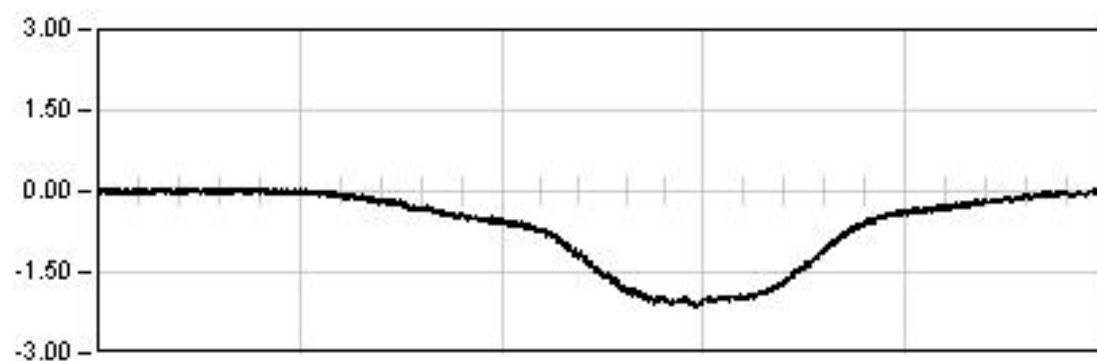
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P064

Canal : 49

Unidades : mm

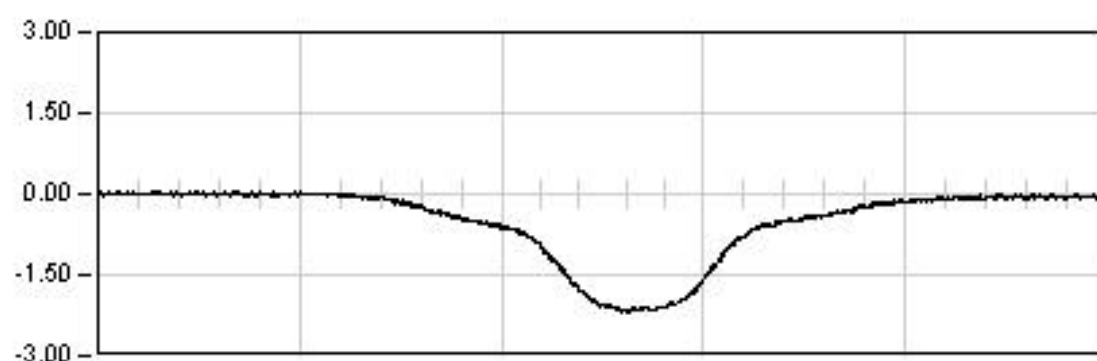
**DINAMICA 21**

130.0 Seg

Max: -2.13

Min: 0.12

Rem: 0.04

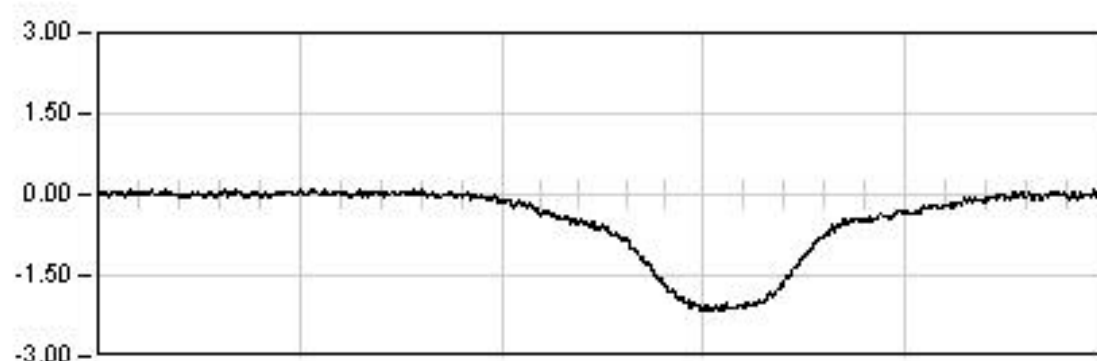
**DINAMICA 22**

45.0 Seg

Max: -2.19

Min: 0.05

Rem: -0.04

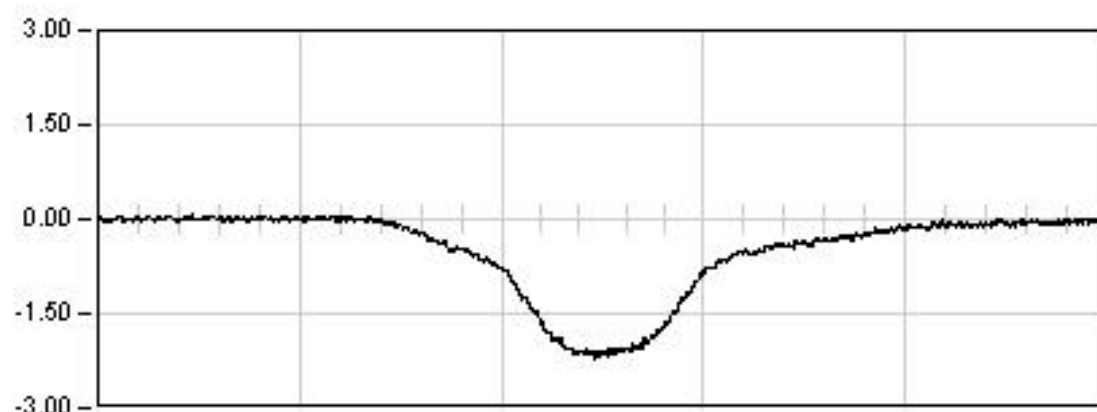
**DINAMICA 23**

25.0 Seg

Max: -2.17

Min: 0.10

Rem: 0.00

**DINAMICA 24**

30.0 Seg

Max: -2.21

Min: 0.06

Rem: -0.02

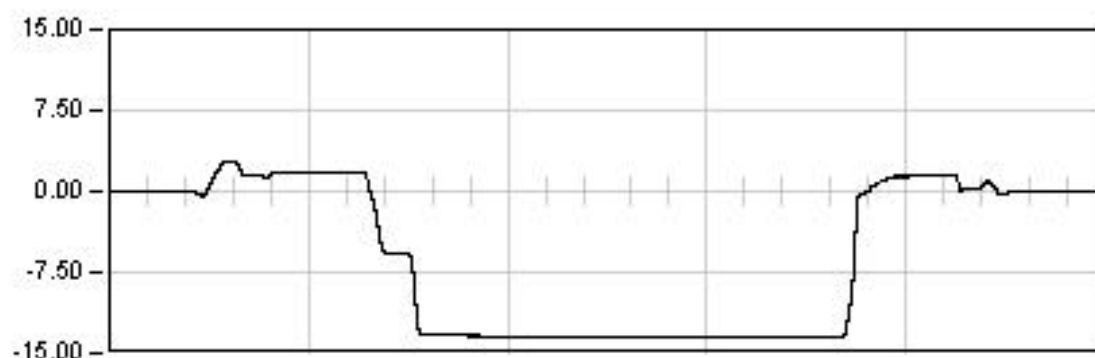
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P071

Canal : 40

Unidades : mm

**ESTATICA 01**

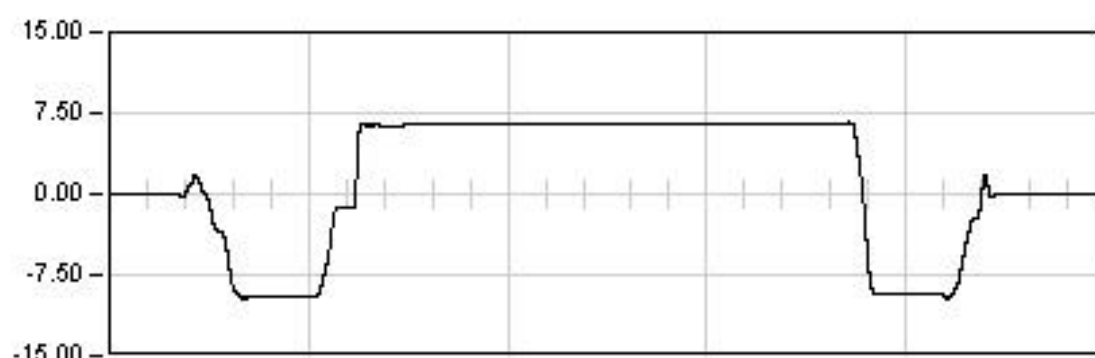
1729.0 Seg

Est: -13.48

Max: -13.51

Min: 2.80

Rem: 0.01

**ESTATICA 02**

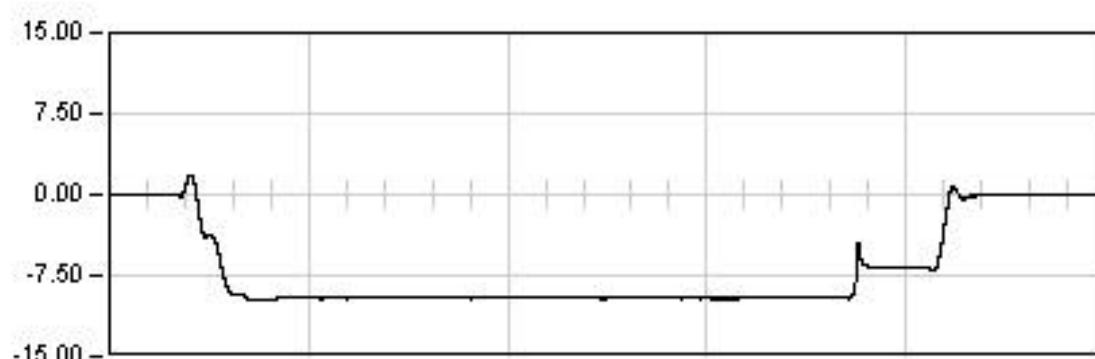
1647.0 Seg

Est: 6.61

Max: -9.70

Min: 6.63

Rem: -0.02

**ESTATICA 03**

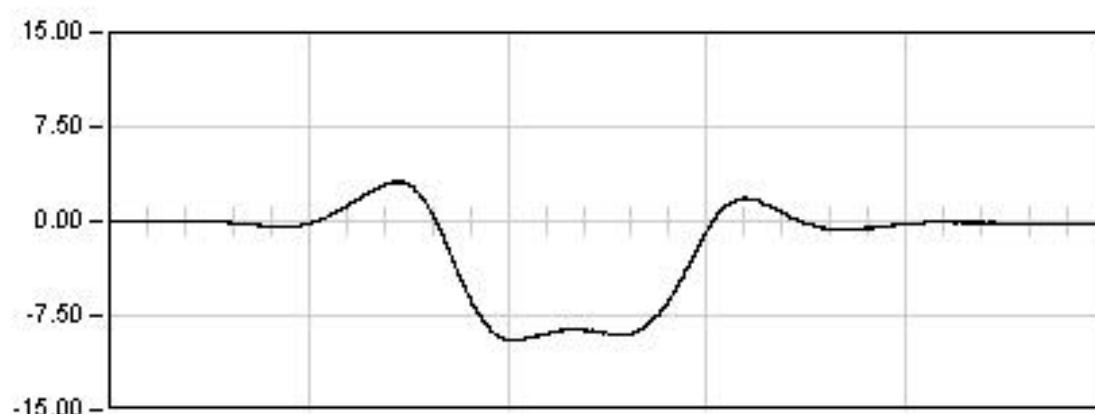
1400.0 Seg

Est: -9.58

Max: -9.78

Min: 1.82

Rem: -0.06

**DINAMICA 01**

85.0 Seg

Max: -9.50

Min: 3.13

Rem: -0.06

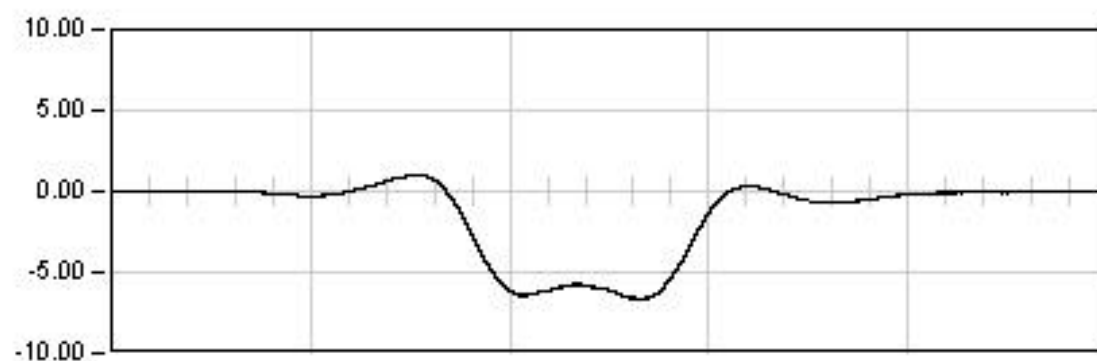
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P071

Canal : 40

Unidades : mm

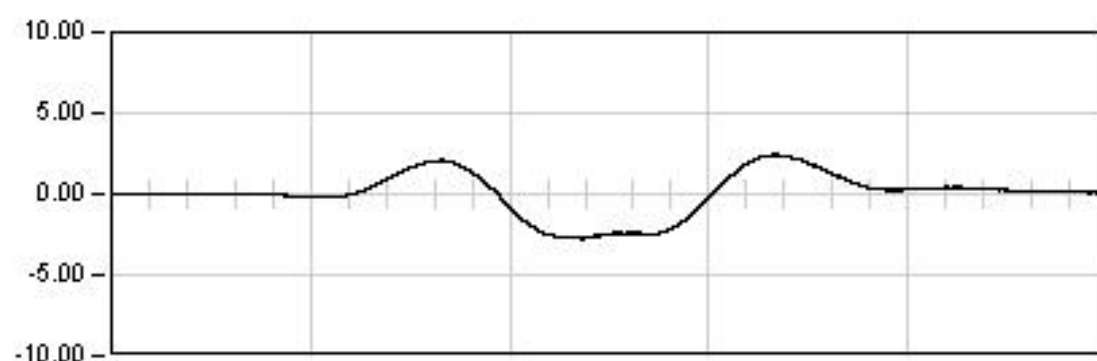
**DYNAMICA 11**

125.0 Seg

Max: -6.63

Min: 1.00

Rem: 0.00

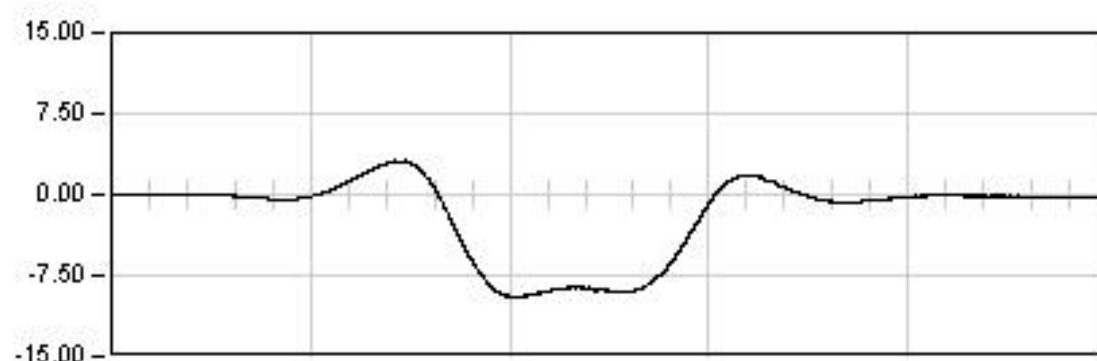
**DYNAMICA 21**

130.0 Seg

Max: -2.79

Min: 2.43

Rem: 0.04

**DYNAMICA 01**

85.0 Seg

Max: -9.50

Min: 3.13

Rem: -0.06



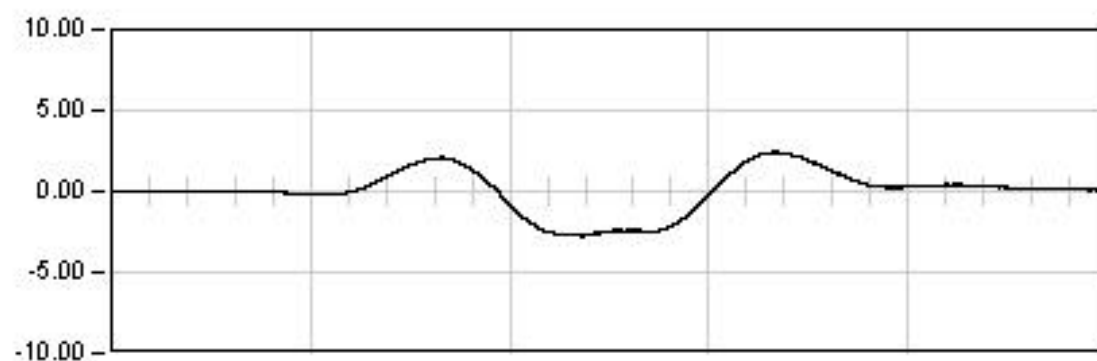
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P071

Canal : 40

Unidades : mm

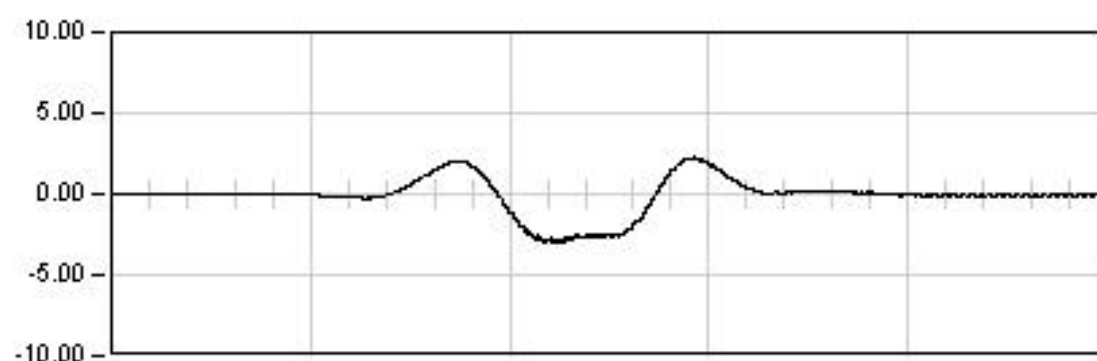
**DYNAMICA 21**

130.0 Seg

Max: -2.79

Min: 2.43

Rem: 0.04

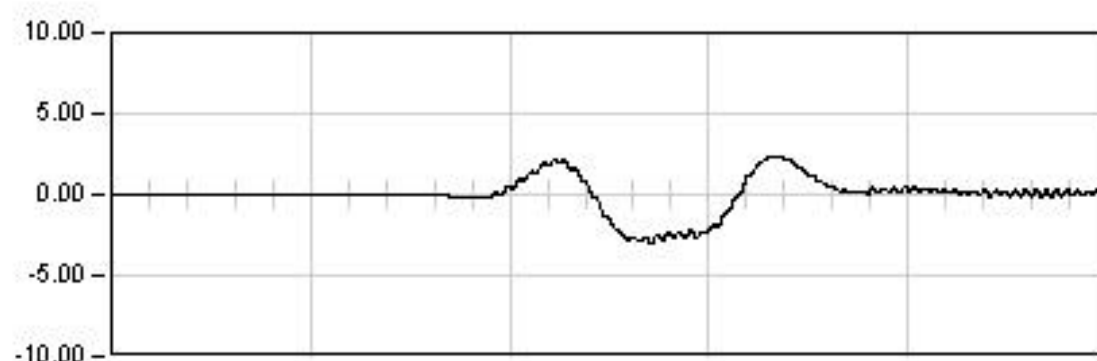
**DYNAMICA 22**

45.0 Seg

Max: -3.01

Min: 2.26

Rem: -0.01

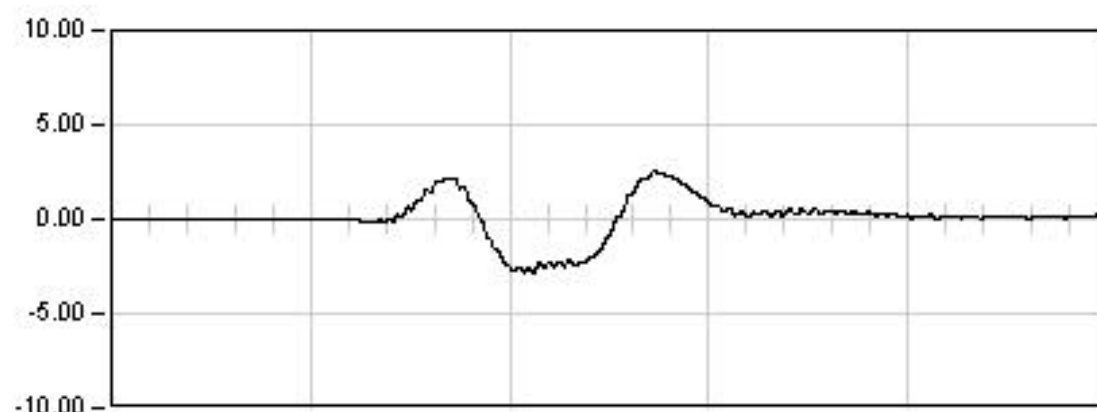
**DYNAMICA 23**

25.0 Seg

Max: -3.01

Min: 2.40

Rem: 0.08

**DYNAMICA 24**

30.0 Seg

Max: -2.85

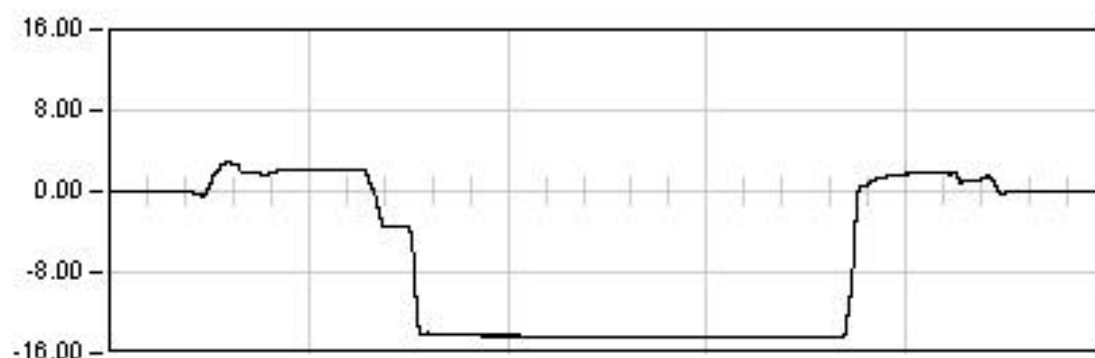
Min: 2.51

Rem: 0.12

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P072    Canal : 41    Unidades : mm

**ESTATICA 01**

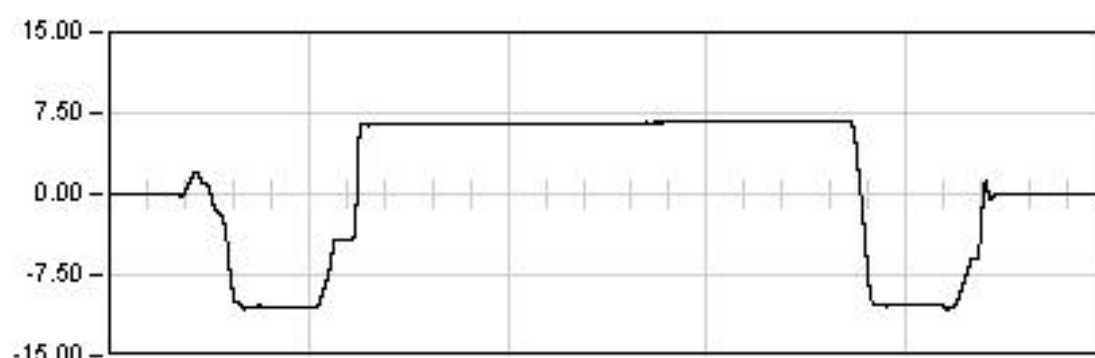
1729.0    Seg

Est: -14.37

Max: -14.42

Min: 2.86

Rem: 0.01

**ESTATICA 02**

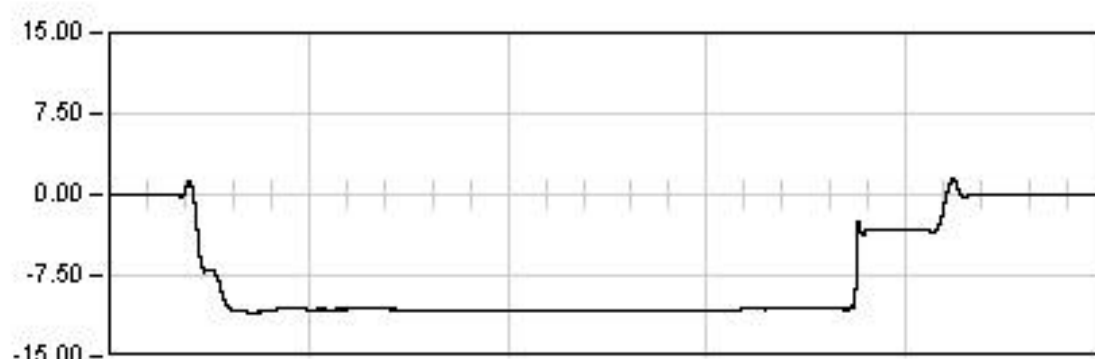
1647.0    Seg

Est: 6.67

Max: -10.67

Min: 6.69

Rem: -0.05

**ESTATICA 03**

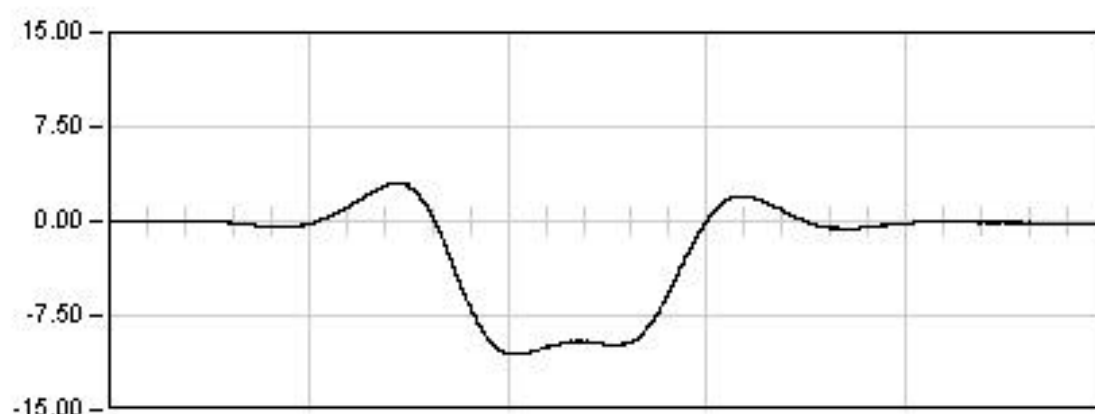
1400.0    Seg

Est: -10.61

Max: -10.98

Min: 1.43

Rem: 0.01

**DINAMICA 01**

85.0    Seg

Max: -10.56

Min: 3.04

Rem: -0.08

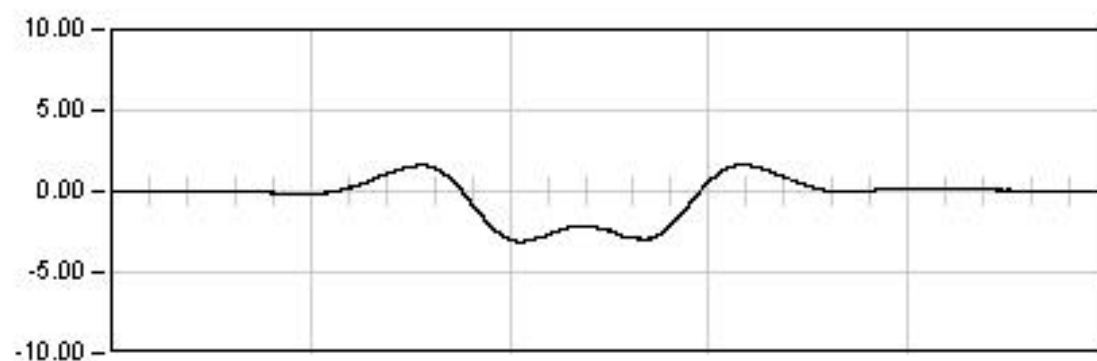
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P072

Canal : 41

Unidades : mm

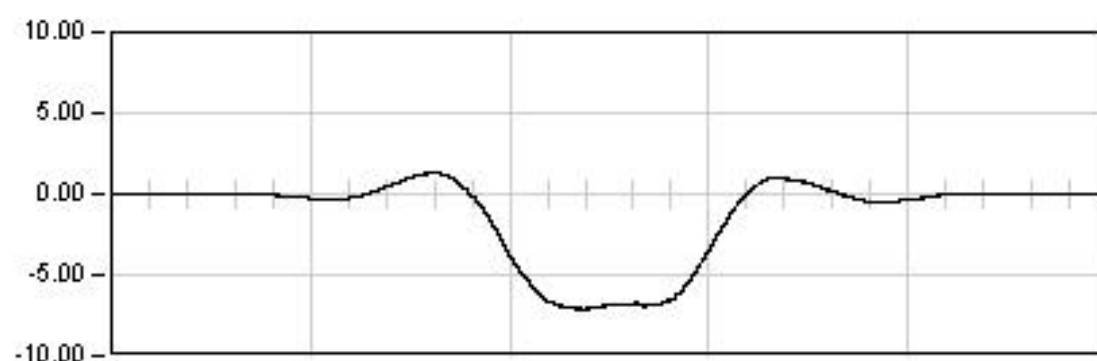
**DYNAMICA 11**

125.0 Seg

Max: -3.11

Min: 1.64

Rem: 0.01

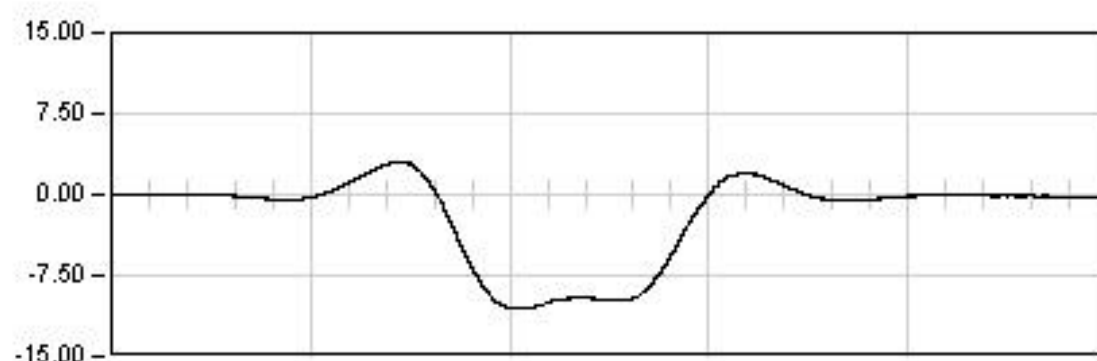
**DYNAMICA 21**

130.0 Seg

Max: -7.20

Min: 1.28

Rem: 0.02

**DYNAMICA 01**

85.0 Seg

Max: -10.56

Min: 3.04

Rem: -0.08

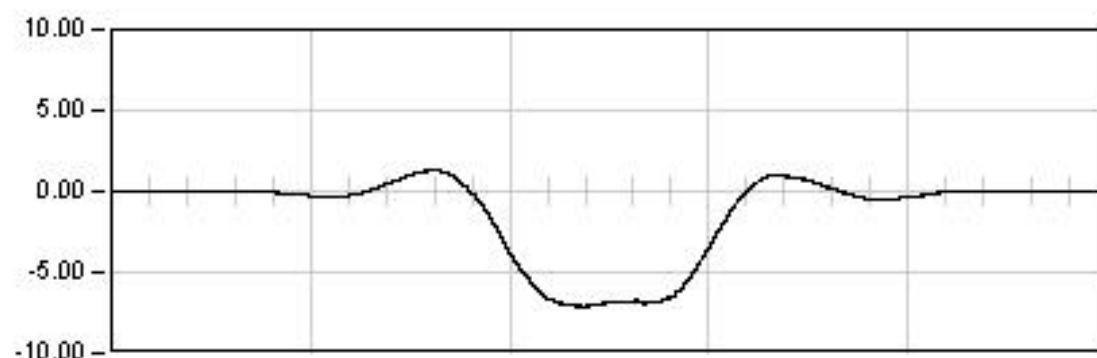
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P072

Canal : 41

Unidades : mm

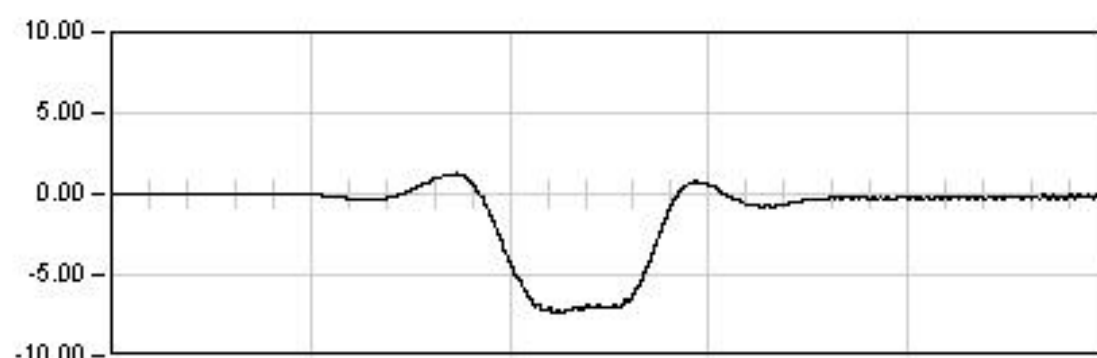
**DYNAMICA 21**

130.0 Seg

Max: -7.20

Min: 1.28

Rem: 0.02

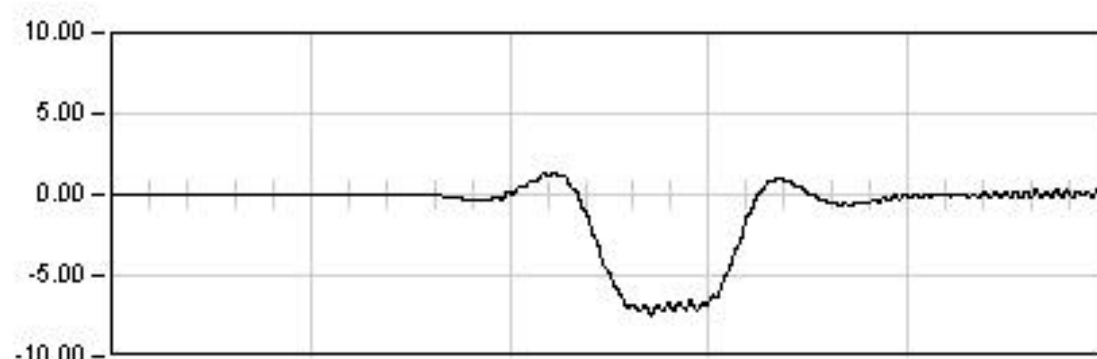
**DYNAMICA 22**

45.0 Seg

Max: -7.42

Min: 1.28

Rem: -0.11

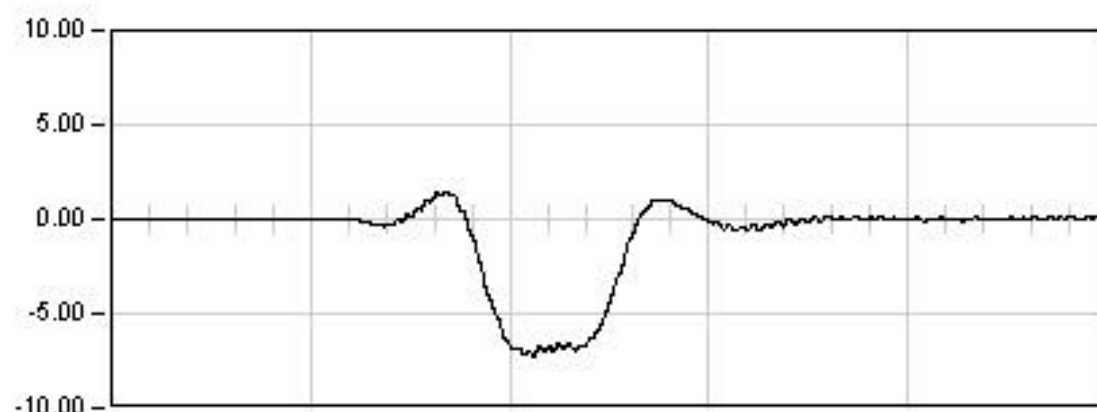
**DYNAMICA 23**

25.0 Seg

Max: -7.49

Min: 1.40

Rem: 0.07

**DYNAMICA 24**

30.0 Seg

Max: -7.24

Min: 1.42

Rem: 0.07

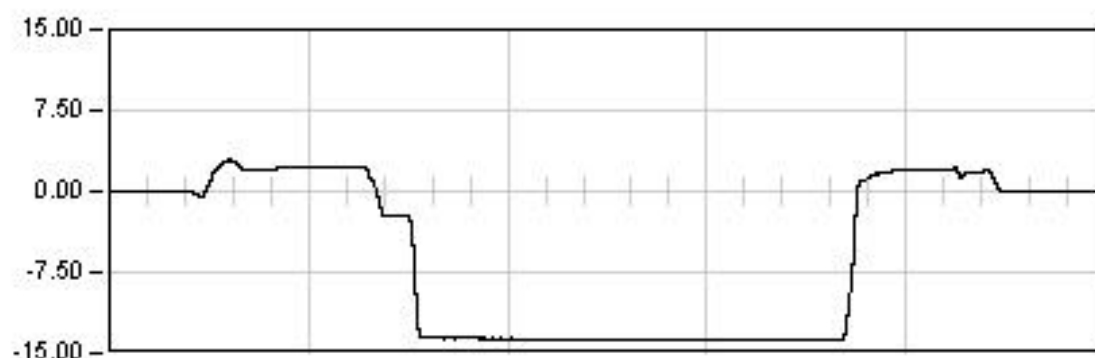
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P073

Canal : 42

Unidades : mm

**ESTATICA 01**

1729.0 Seg

Est: -13.74

Max: -13.77

Min: 2.89

Rem: 0.04

**ESTATICA 02**

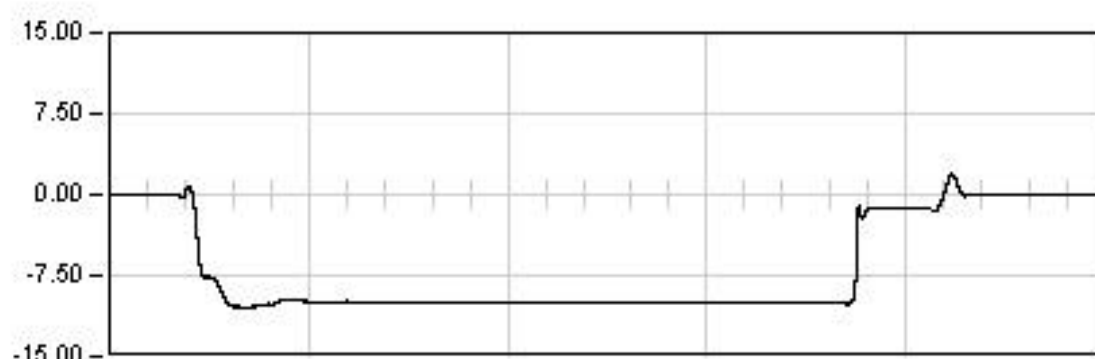
1647.0 Seg

Est: 6.79

Max: -10.08

Min: 6.82

Rem: -0.09

**ESTATICA 03**

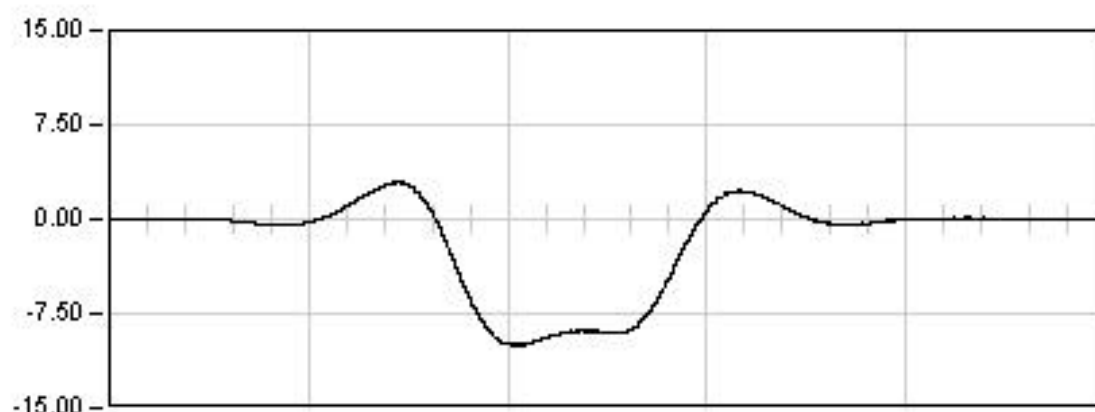
1400.0 Seg

Est: -9.97

Max: -10.50

Min: 1.89

Rem: 0.02

**DINAMICA 01**

85.0 Seg

Max: -10.04

Min: 2.95

Rem: -0.04

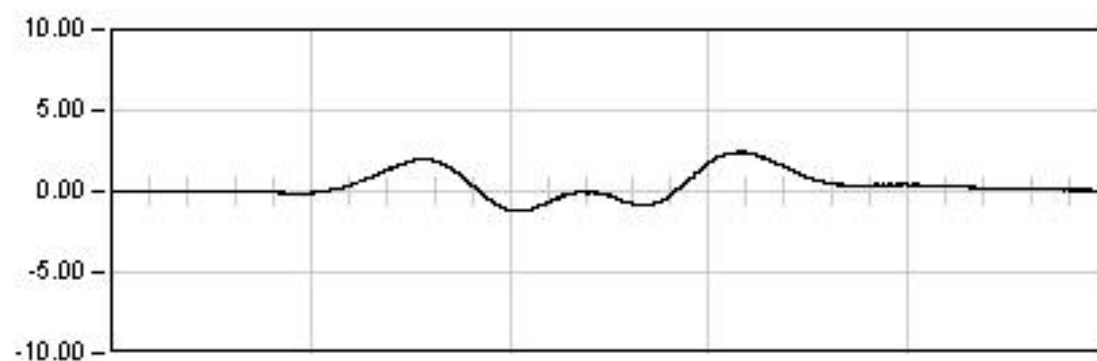
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P073

Canal : 42

Unidades : mm

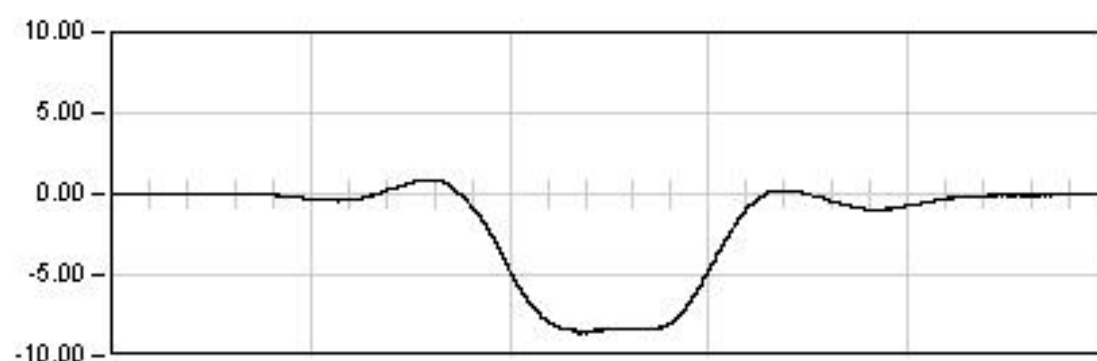
**DYNAMICA 11**

125.0 Seg

Max: 2.46

Min: -1.25

Rem: 0.02

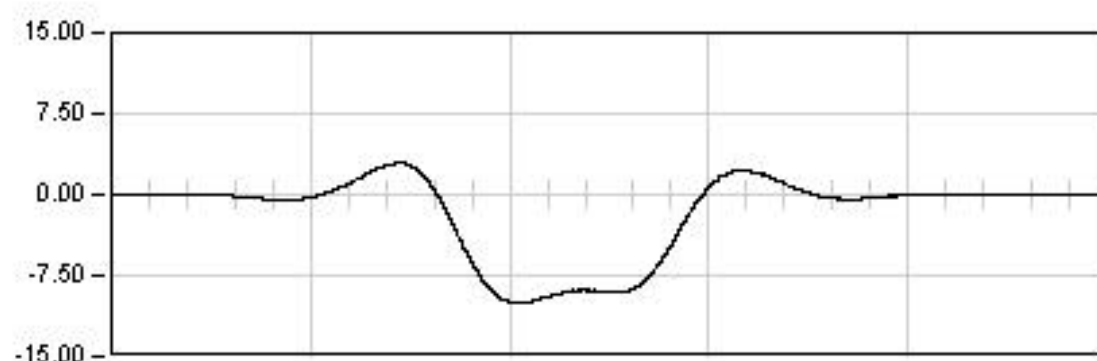
**DYNAMICA 21**

130.0 Seg

Max: -8.59

Min: 0.87

Rem: 0.02

**DYNAMICA 01**

85.0 Seg

Max: -10.04

Min: 2.95

Rem: -0.04

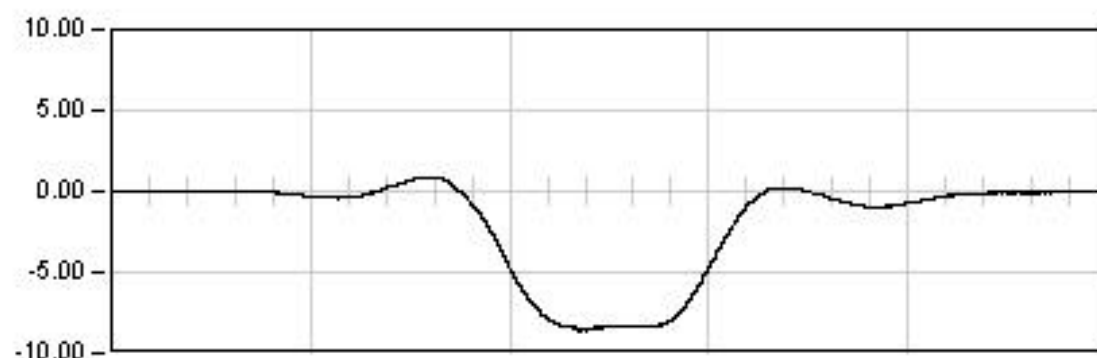
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P073

Canal : 42

Unidades : mm

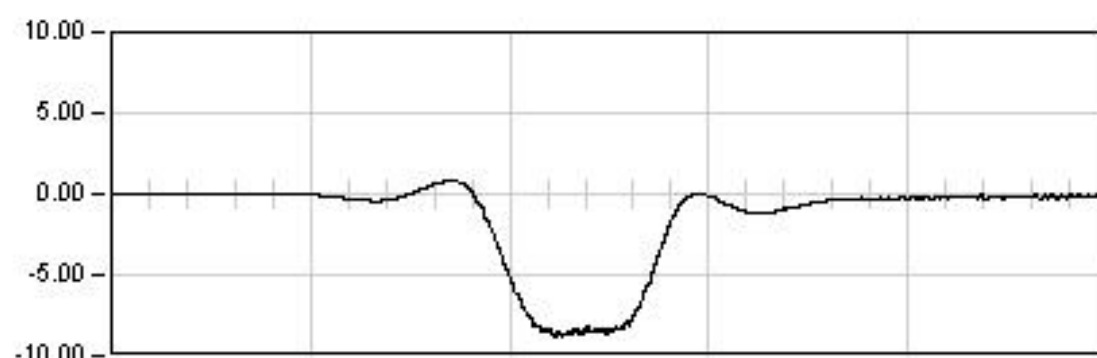
**DYNAMICA 21**

130.0 Seg

Max: -8.59

Min: 0.87

Rem: 0.02

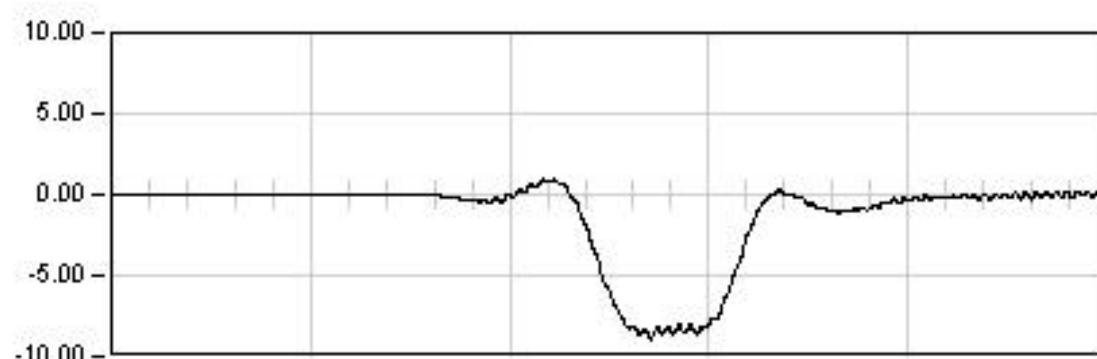
**DYNAMICA 22**

45.0 Seg

Max: -8.88

Min: 0.89

Rem: -0.11

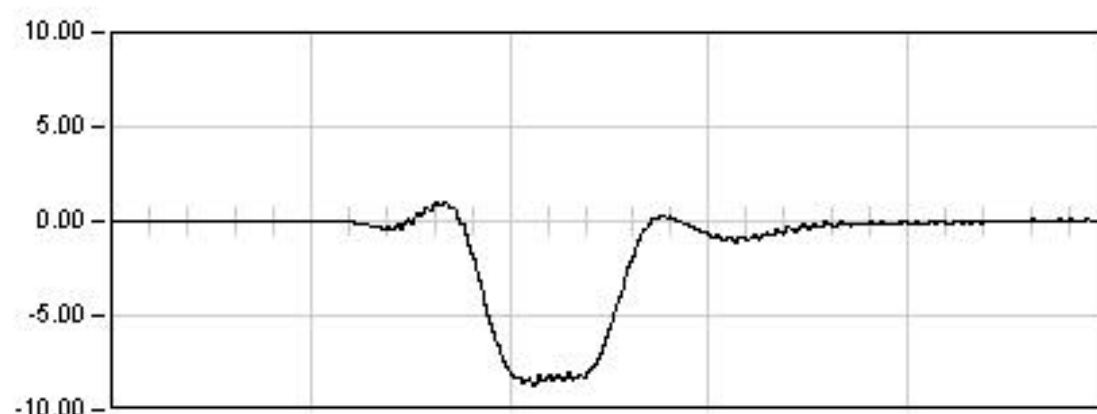
**DYNAMICA 23**

25.0 Seg

Max: -8.93

Min: 0.93

Rem: 0.04

**DYNAMICA 24**

30.0 Seg

Max: -8.70

Min: 0.99

Rem: 0.06

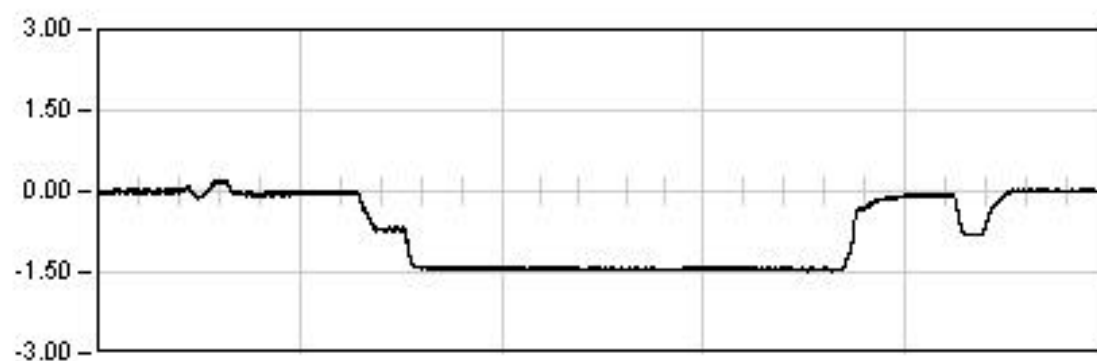
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P074

Canal : 50

Unidades : mm

**ESTATICA 01**

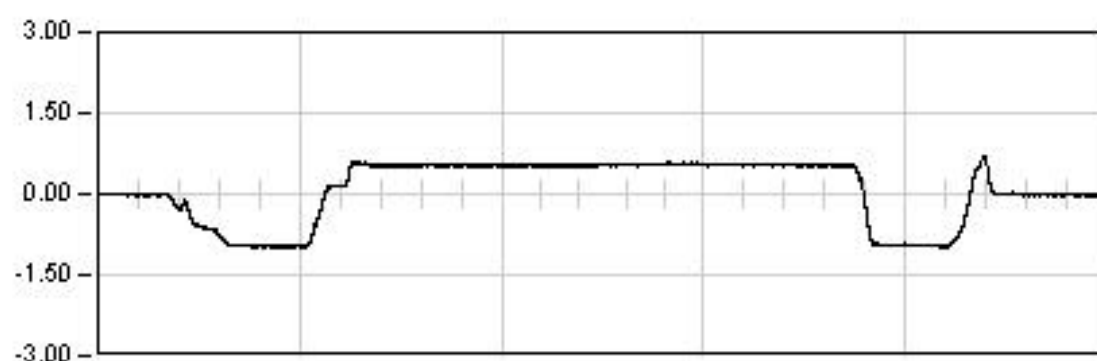
1729.0 Seg

Est: -1.45

Max: -1.48

Min: 0.22

Rem: 0.01

**ESTATICA 02**

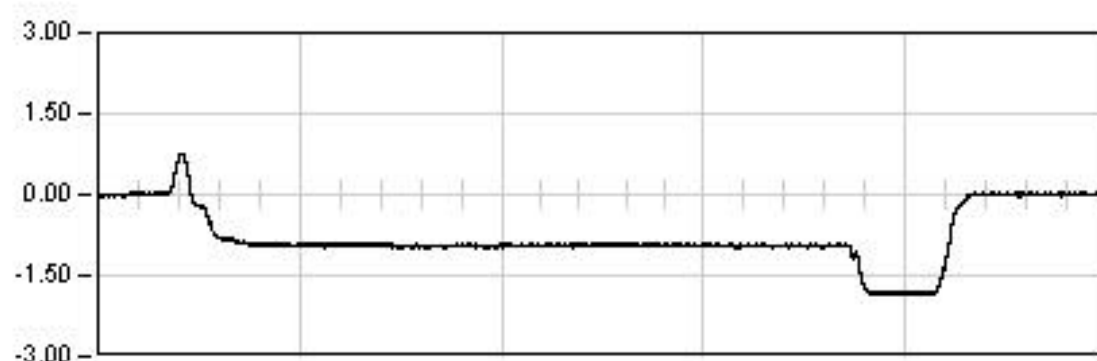
1647.0 Seg

Est: 0.54

Max: -0.99

Min: 0.70

Rem: -0.02

**ESTATICA 03**

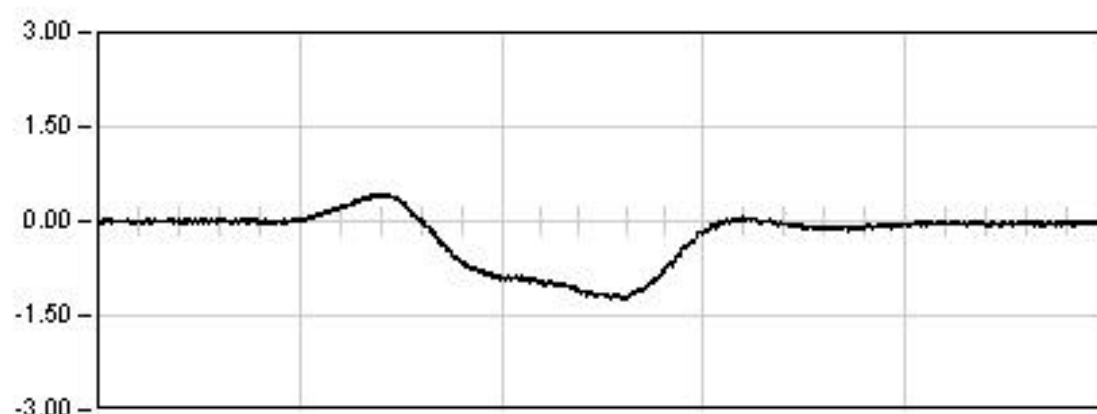
1400.0 Seg

Est: -0.95

Max: -1.86

Min: 0.76

Rem: 0.01

**DINAMICA 01**

85.0 Seg

Max: -1.25

Min: 0.43

Rem: -0.02



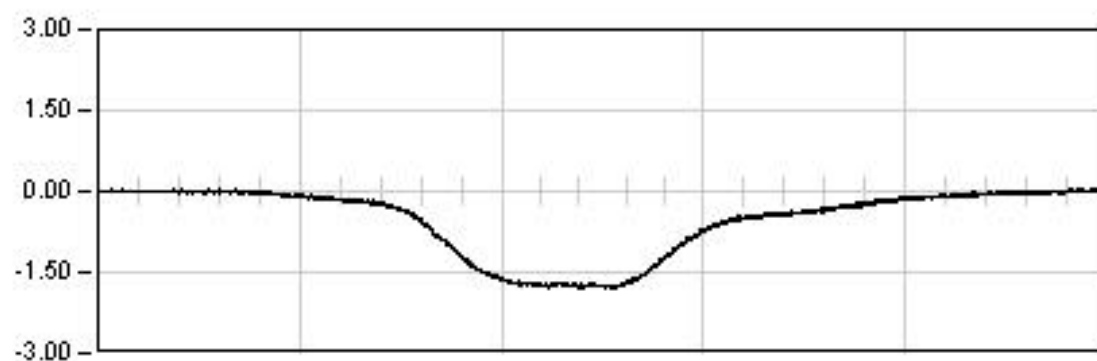
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P074

Canal : 50

Unidades : mm

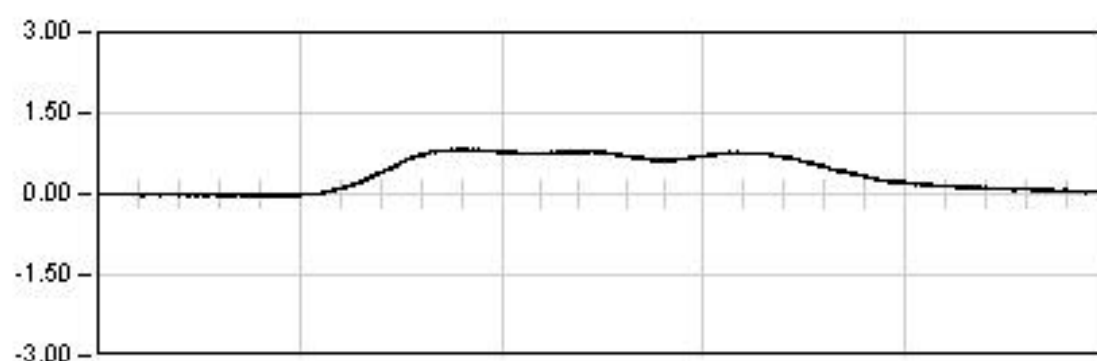
**DYNAMICA 11**

125.0 Seg

Max: -1.79

Min: 0.06

Rem: 0.01

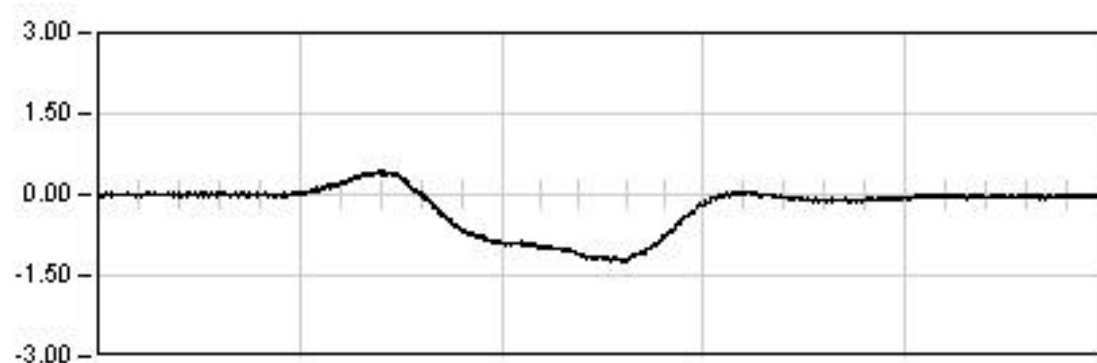
**DYNAMICA 21**

130.0 Seg

Max: 0.83

Min: -0.04

Rem: 0.02

**DYNAMICA 01**

85.0 Seg

Max: -1.25

Min: 0.43

Rem: -0.02

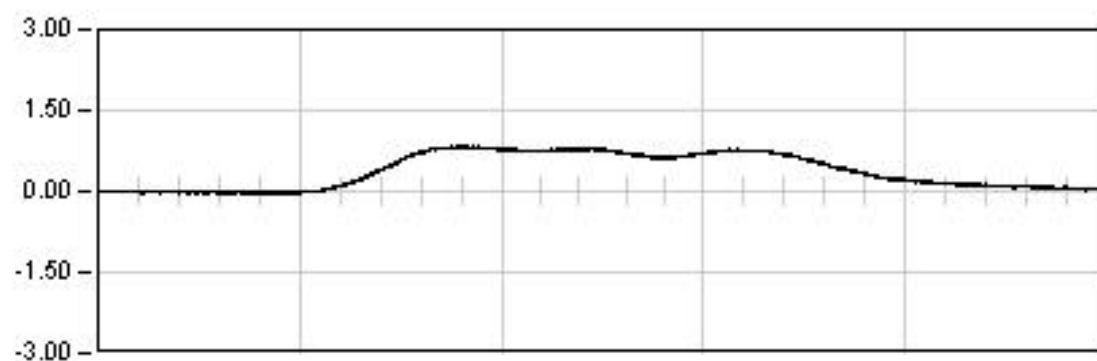
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P074

Canal : 50

Unidades : mm

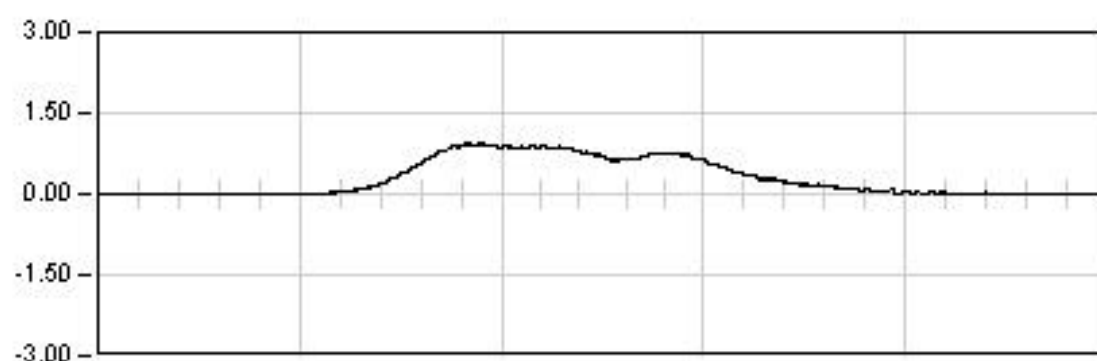
**DINAMICA 21**

130.0 Seg

Max: 0.83

Min: -0.04

Rem: 0.02

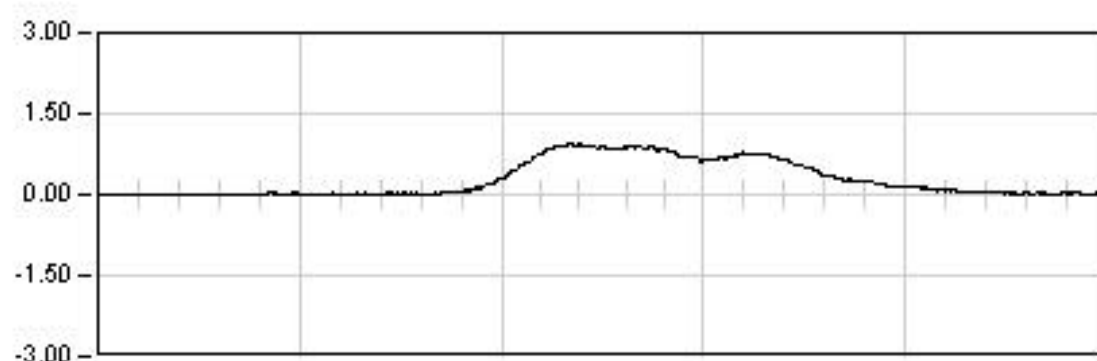
**DINAMICA 22**

45.0 Seg

Max: 0.94

Min: -0.04

Rem: -0.02

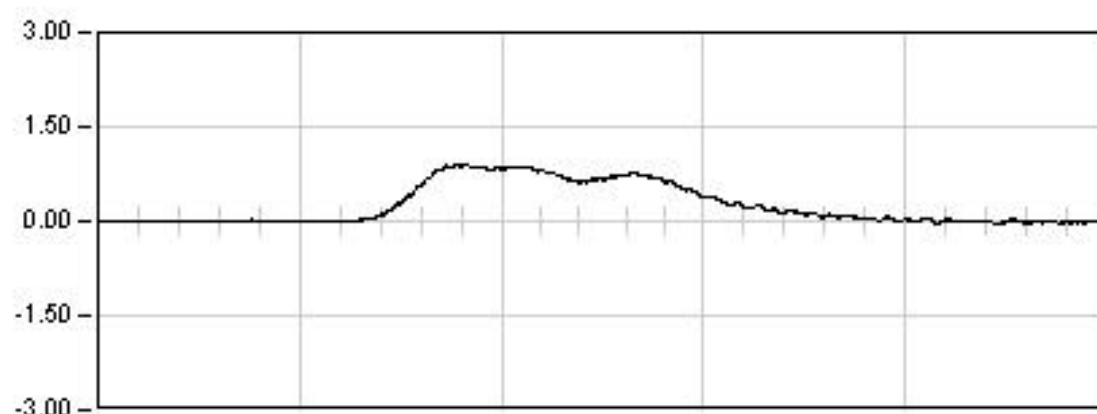
**DINAMICA 23**

25.0 Seg

Max: 0.94

Min: -0.02

Rem: 0.03

**DINAMICA 24**

30.0 Seg

Max: 0.91

Min: -0.04

Rem: 0.01

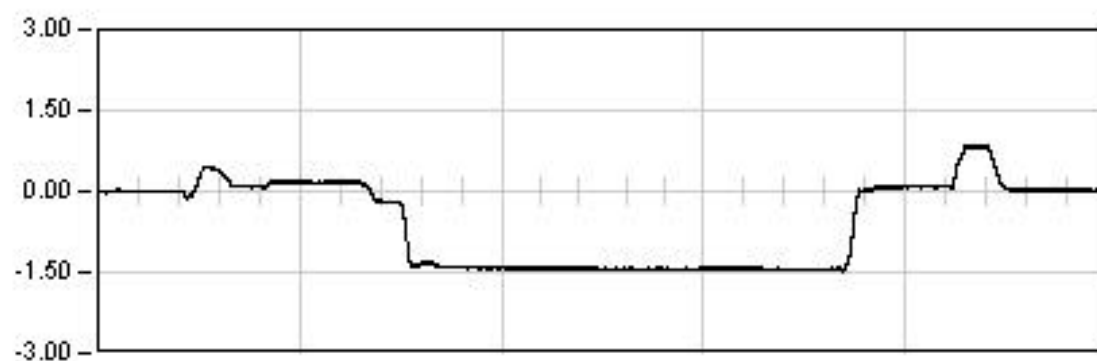
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P075

Canal : 51

Unidades : mm

**ESTATICA 01**

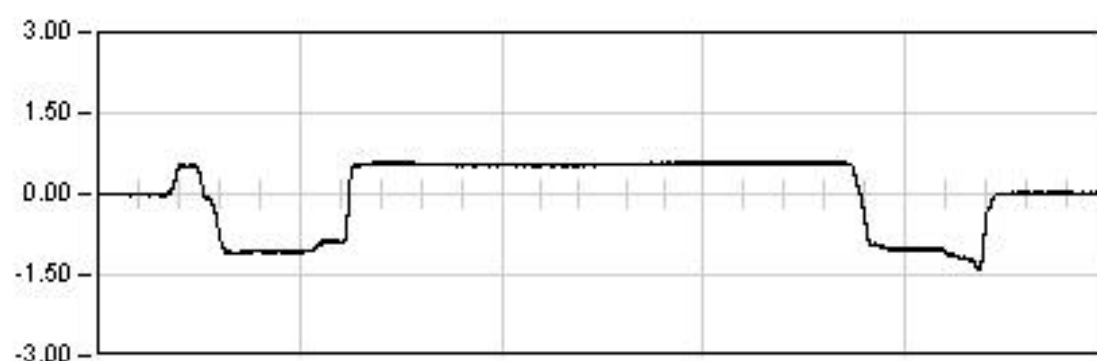
1729.0 Seg

Est: -1.45

Max: -1.48

Min: 0.85

Rem: 0.01

**ESTATICA 02**

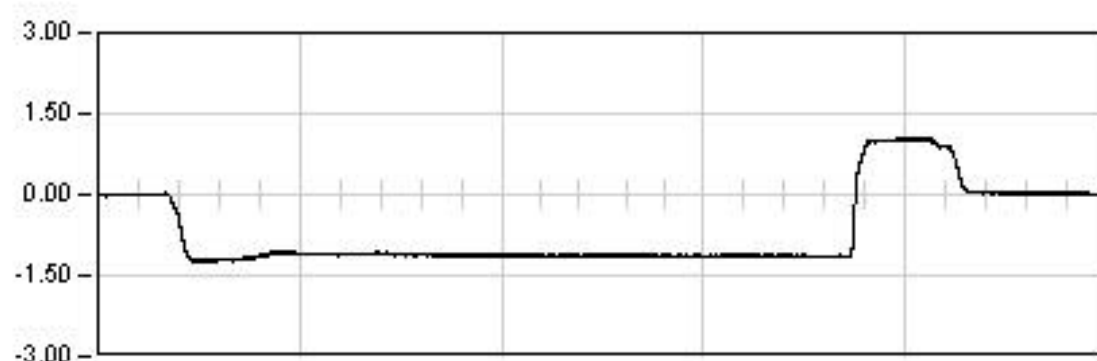
1647.0 Seg

Est: 0.57

Max: -1.42

Min: 0.60

Rem: 0.01

**ESTATICA 03**

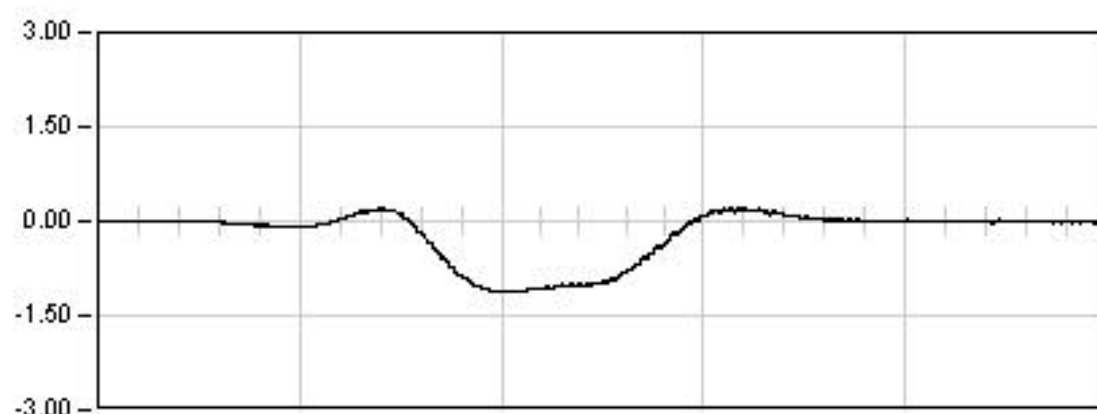
1400.0 Seg

Est: -1.14

Max: -1.25

Min: 1.04

Rem: 0.01

**DINAMICA 01**

85.0 Seg

Max: -1.13

Min: 0.22

Rem: -0.02

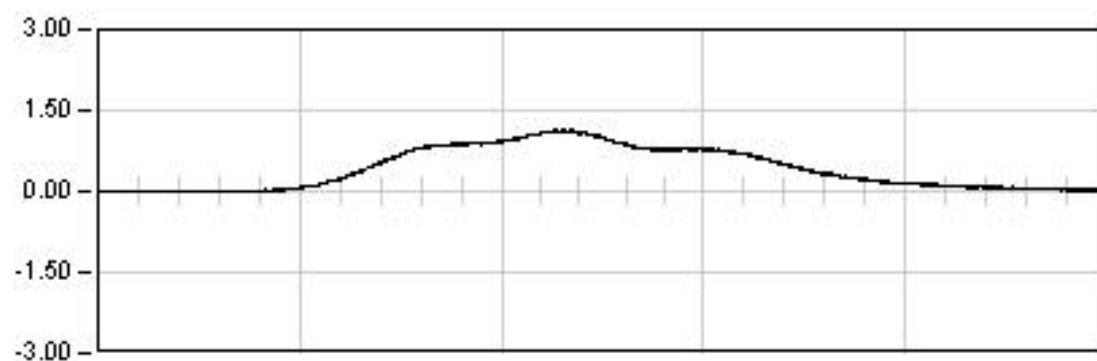
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P075

Canal : 51

Unidades : mm

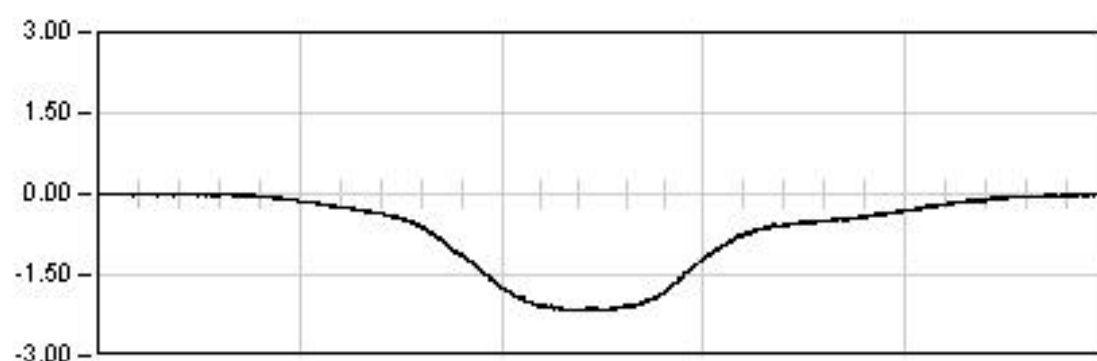
**DYNAMICA 11**

125.0 Seg

Max: 1.14

Min: -0.02

Rem: 0.02

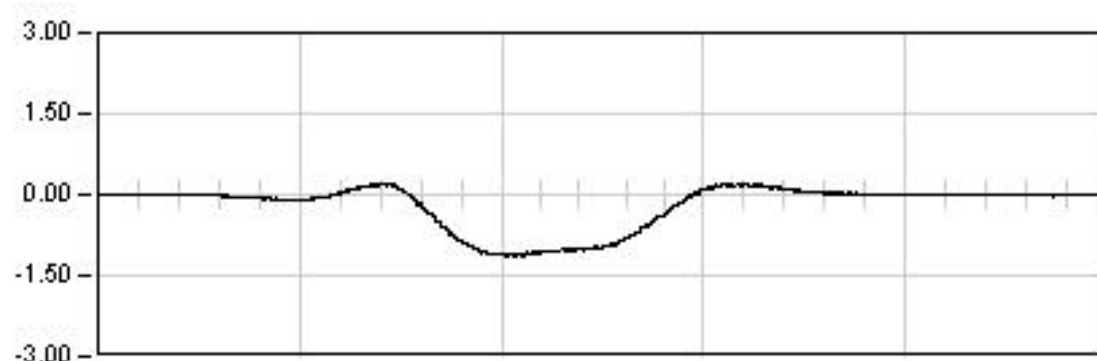
**DYNAMICA 21**

130.0 Seg

Max: -2.17

Min: 0.06

Rem: 0.00

**DYNAMICA 01**

85.0 Seg

Max: -1.13

Min: 0.22

Rem: -0.02

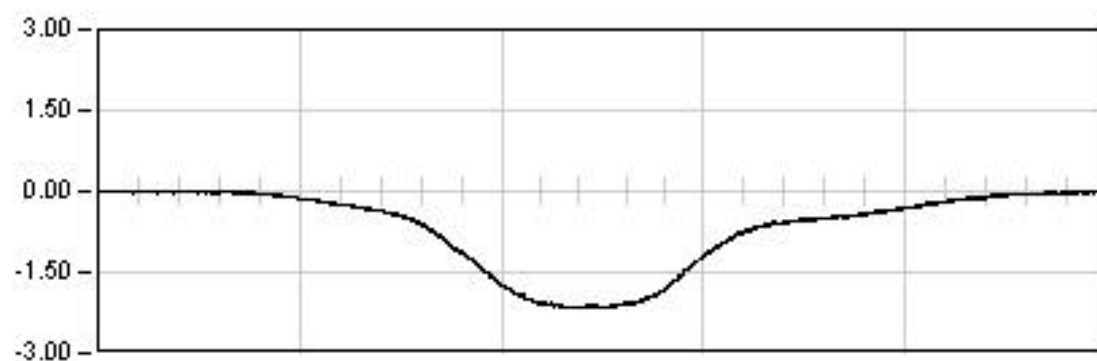
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P075

Canal : 51

Unidades : mm

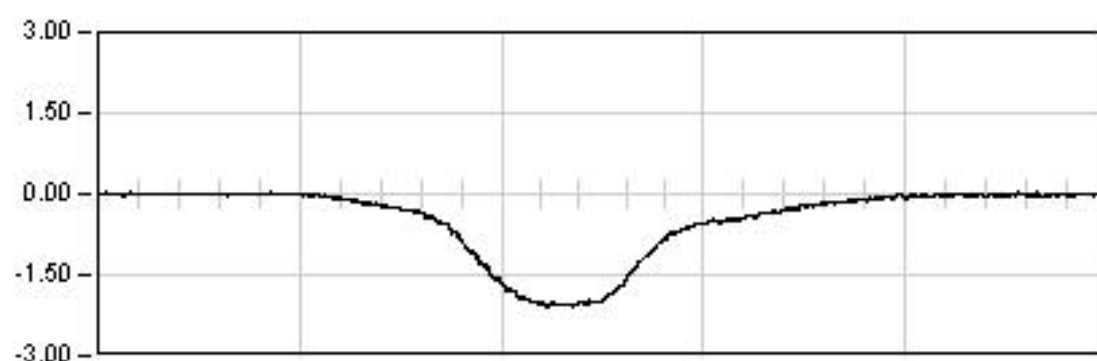
**DINAMICA 21**

130.0 Seg

Max: -2.17

Min: 0.06

Rem: 0.00

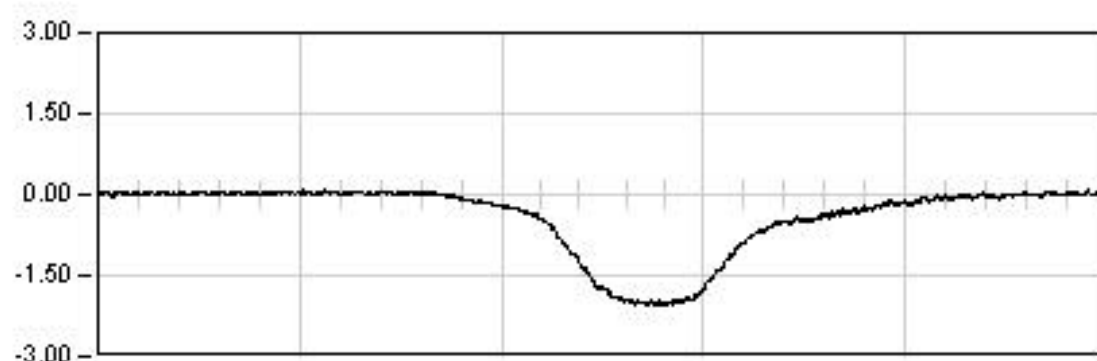
**DINAMICA 22**

45.0 Seg

Max: -2.08

Min: 0.04

Rem: -0.00

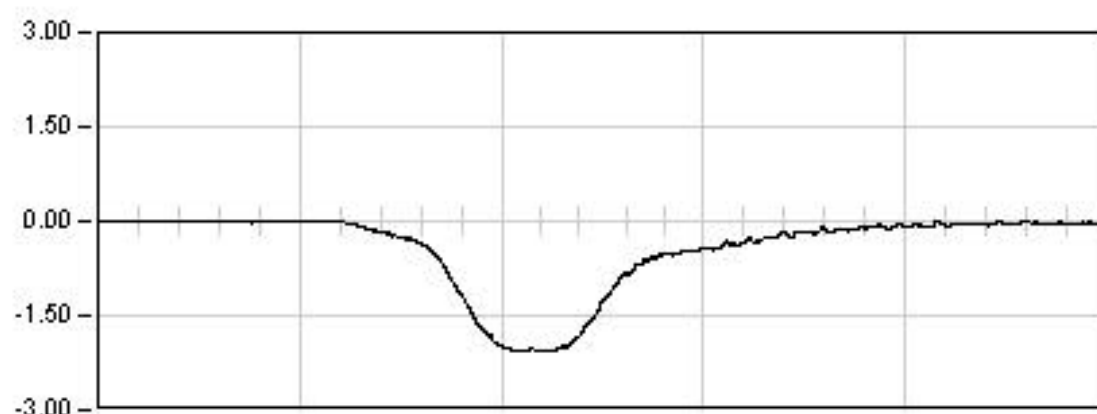
**DINAMICA 23**

25.0 Seg

Max: -2.07

Min: 0.09

Rem: -0.00

**DINAMICA 24**

30.0 Seg

Max: -2.07

Min: 0.02

Rem: -0.02

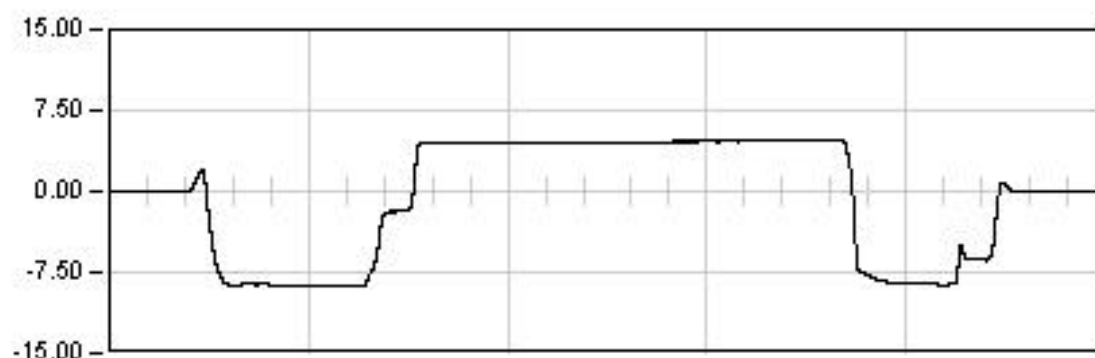
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P081

Canal : 43

Unidades : mm

**ESTATICA 01**

1729.0 Seg

Est: 4.67

Max: -8.85

Min: 4.68

Rem: -0.01

**ESTATICA 02**

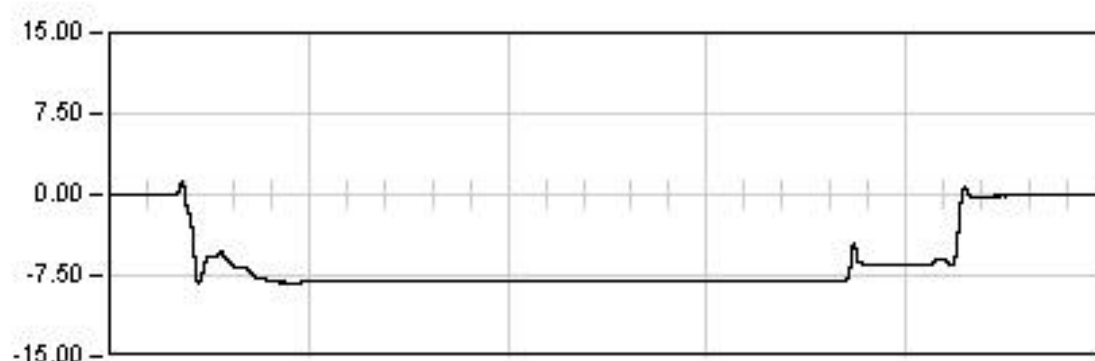
1647.0 Seg

Est: -11.67

Max: -11.69

Min: 1.40

Rem: -0.09

**ESTATICA 03**

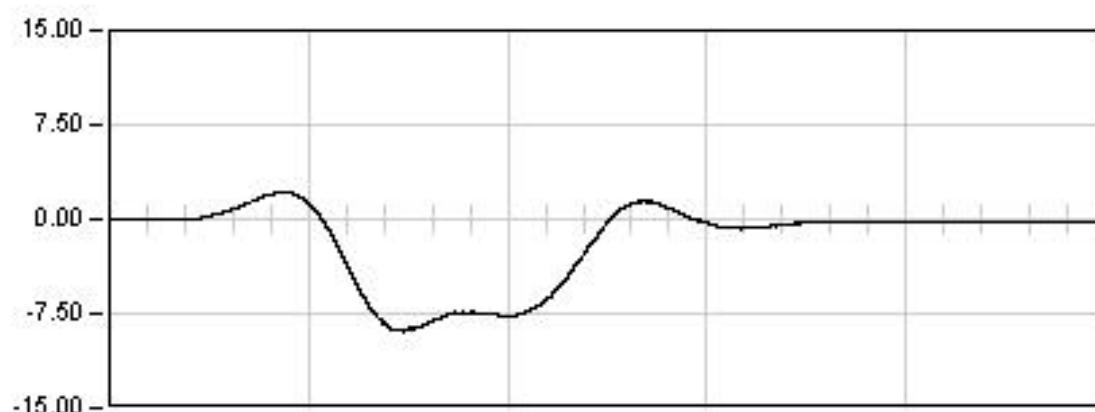
1400.0 Seg

Est: -8.07

Max: -8.22

Min: 1.28

Rem: -0.07

**DINAMICA 01**

85.0 Seg

Max: -8.93

Min: 2.14

Rem: -0.11

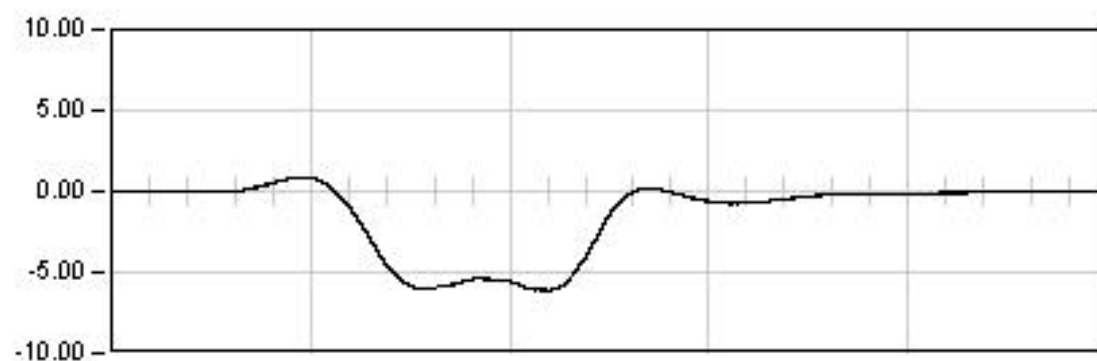
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P081

Canal : 43

Unidades : mm

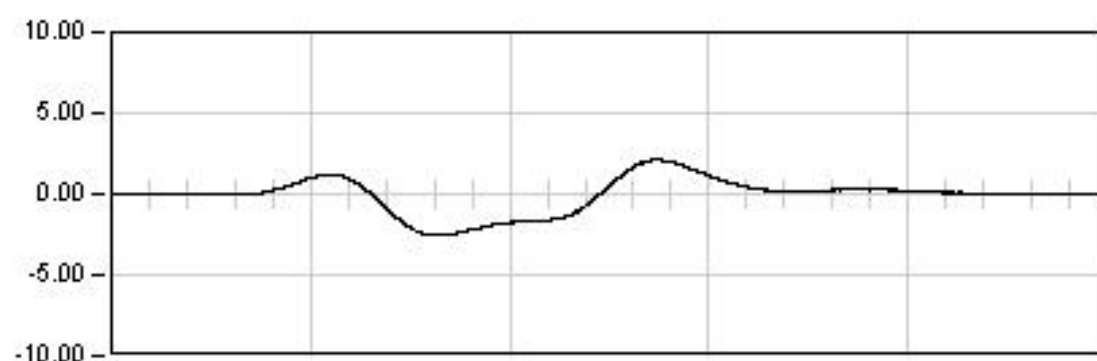
**DYNAMICA 11**

125.0 Seg

Max: -6.12

Min: 0.87

Rem: -0.02

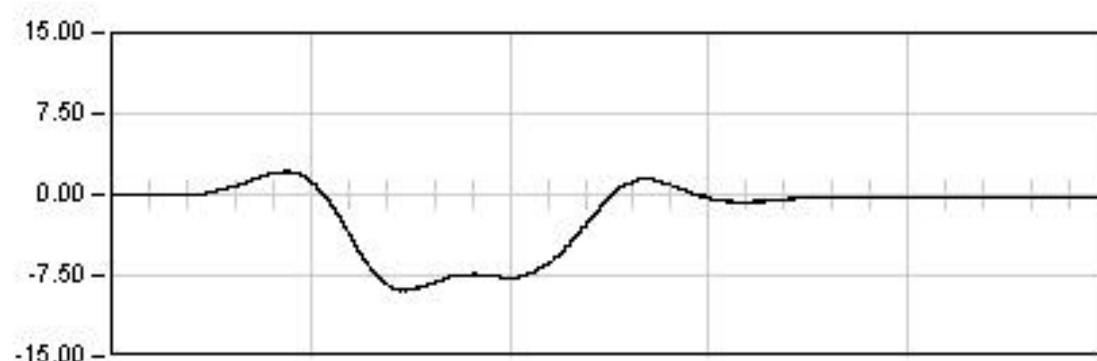
**DYNAMICA 21**

130.0 Seg

Max: -2.56

Min: 2.11

Rem: -0.02

**DYNAMICA 01**

85.0 Seg

Max: -8.93

Min: 2.14

Rem: -0.11

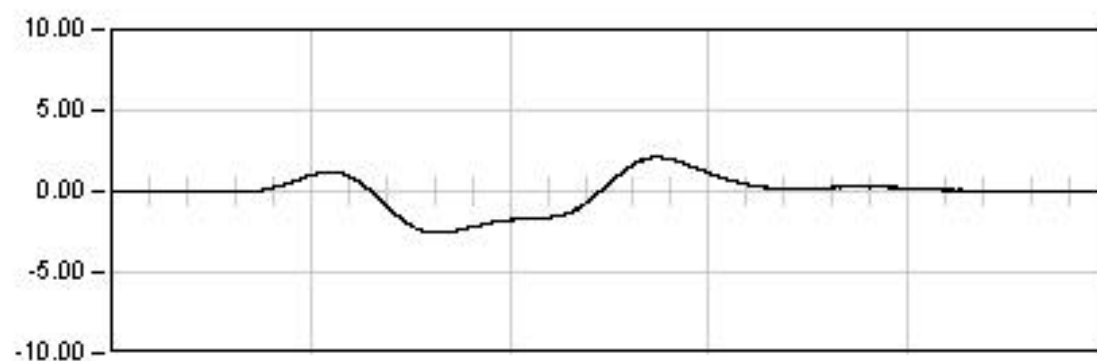
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P081

Canal : 43

Unidades : mm

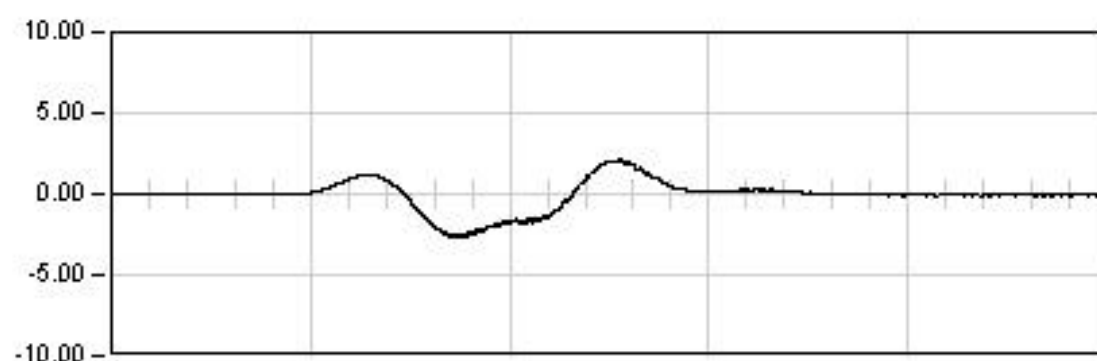
**DYNAMICA 21**

130.0 Seg

Max: -2.56

Min: 2.11

Rem: -0.02

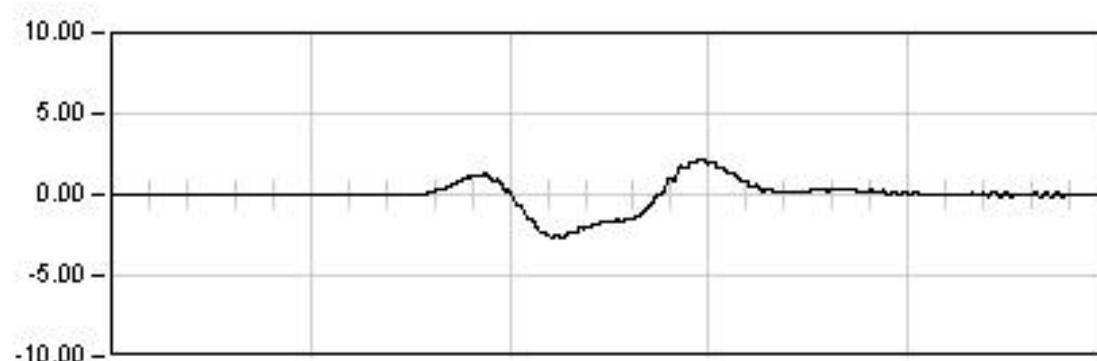
**DYNAMICA 22**

45.0 Seg

Max: -2.74

Min: 2.09

Rem: -0.06

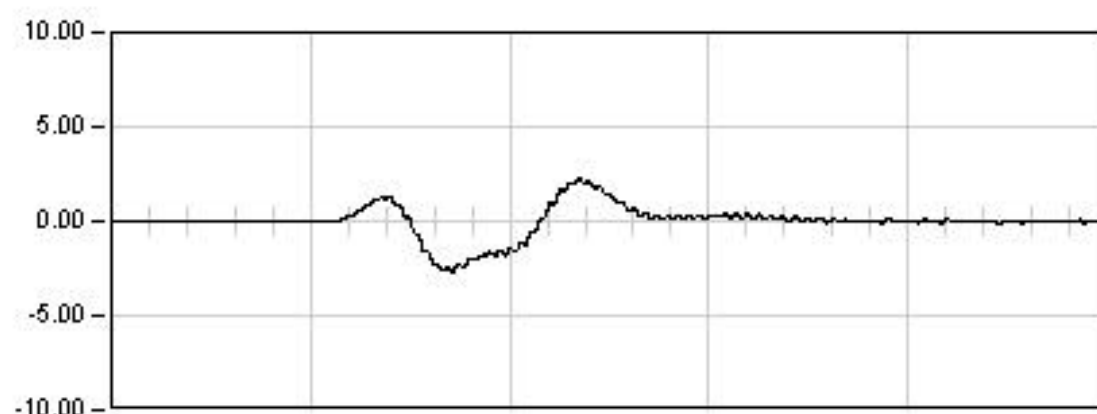
**DYNAMICA 23**

25.0 Seg

Max: -2.72

Min: 2.25

Rem: -0.01

**DYNAMICA 24**

30.0 Seg

Max: -2.69

Min: 2.26

Rem: 0.00



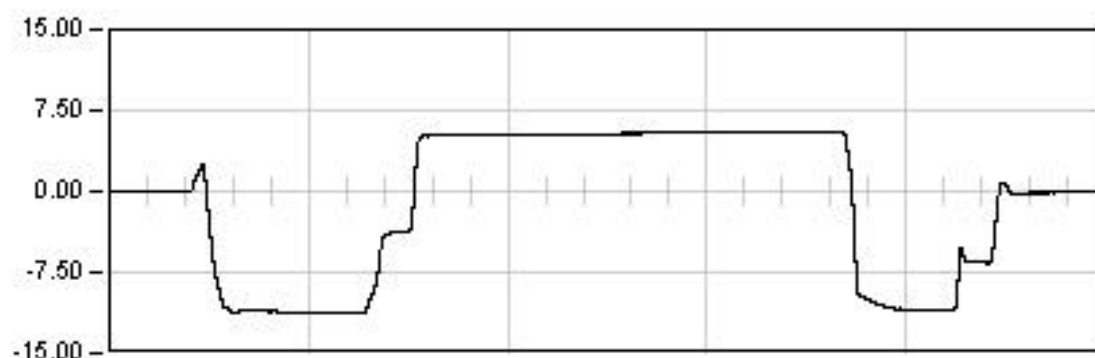
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P082

Canal : 44

Unidades : mm

**ESTATICA 01**

1729.0 Seg

Est: 5.46

Max: -11.27

Min: 5.47

Rem: -0.09

**ESTATICA 02**

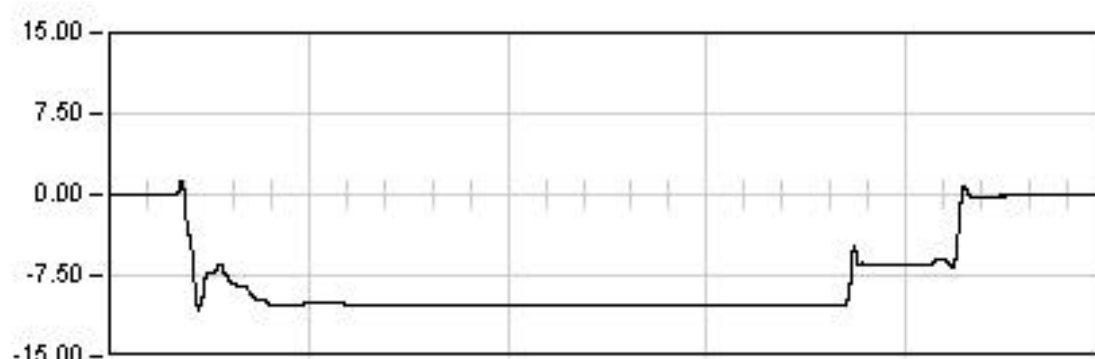
1647.0 Seg

Est: -14.67

Max: -14.69

Min: 1.36

Rem: -0.14

**ESTATICA 03**

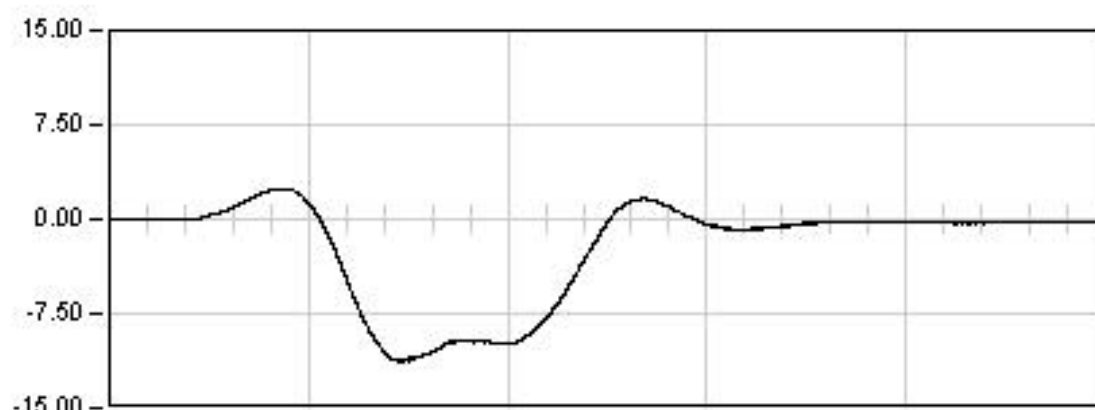
1400.0 Seg

Est: -10.21

Max: -10.67

Min: 1.37

Rem: -0.05

**DINAMICA 01**

85.0 Seg

Max: -11.33

Min: 2.46

Rem: -0.17

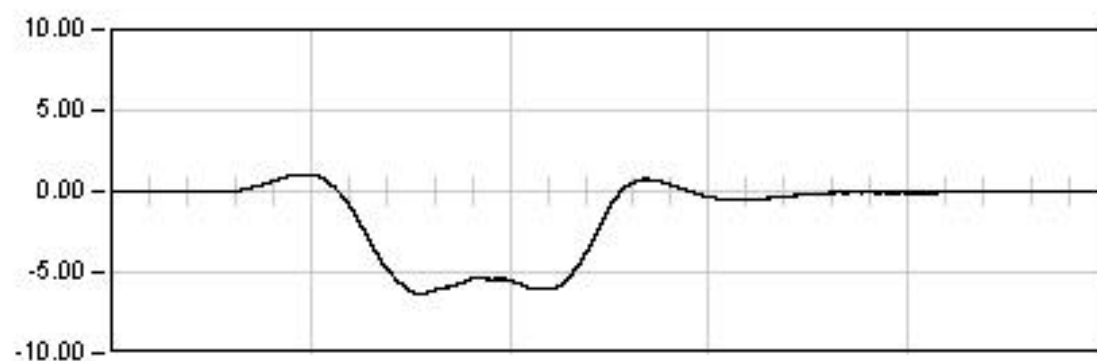
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P082

Canal : 44

Unidades : mm

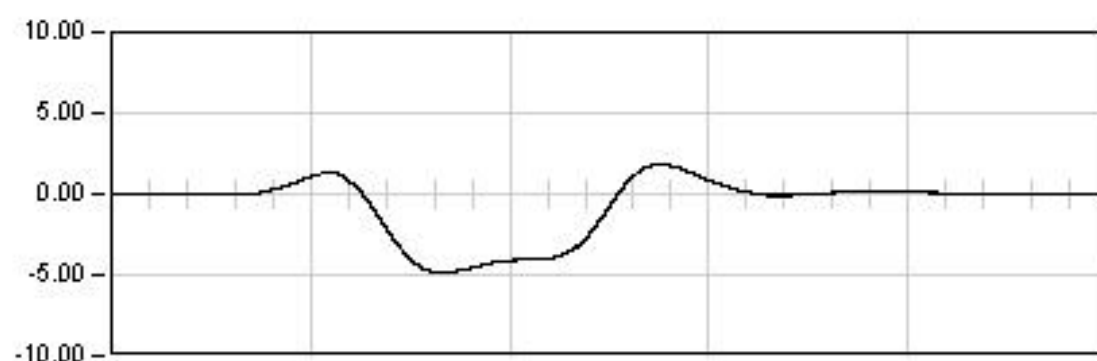
**DYNAMICA 11**

125.0 Seg

Max: -6.32

Min: 1.06

Rem: -0.01

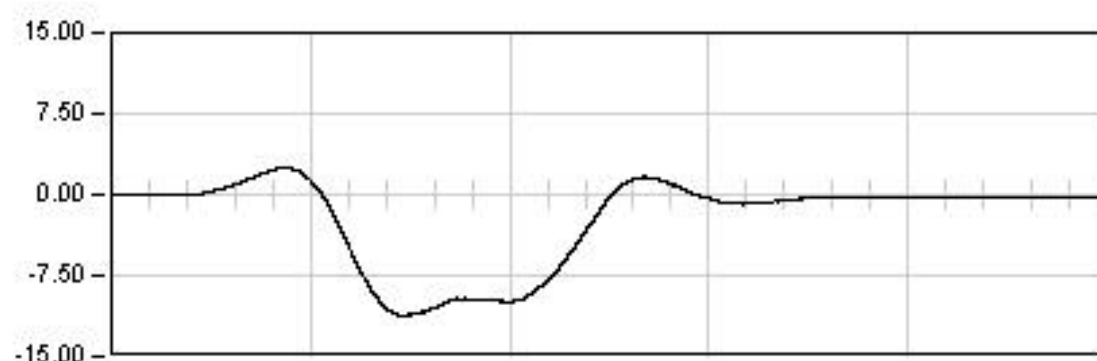
**DYNAMICA 21**

130.0 Seg

Max: -4.84

Min: 1.84

Rem: -0.01

**DYNAMICA 01**

85.0 Seg

Max: -11.33

Min: 2.46

Rem: -0.17

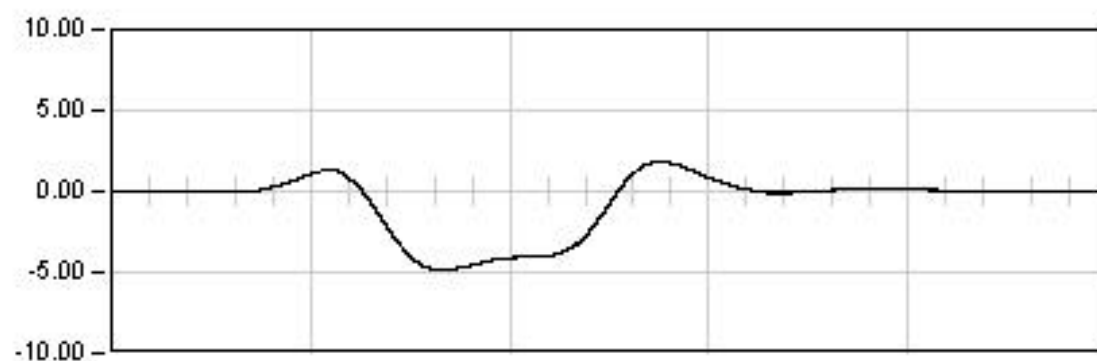
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P082

Canal : 44

Unidades : mm

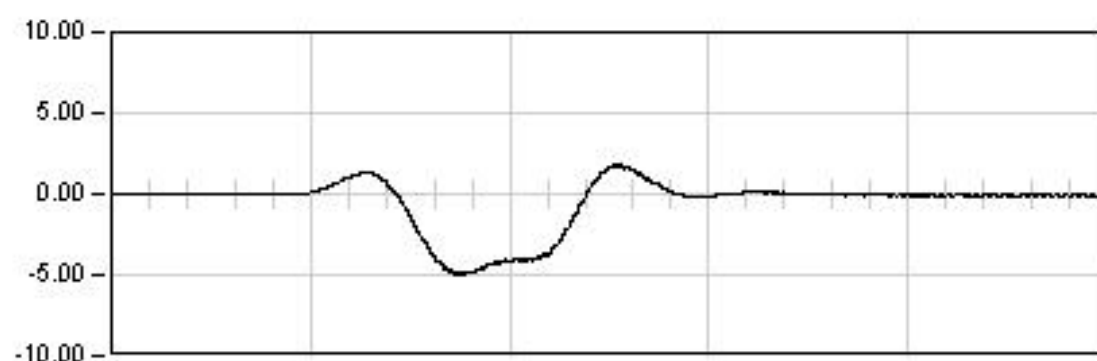
**DYNAMICA 21**

130.0 Seg

Max: -4.84

Min: 1.84

Rem: -0.01

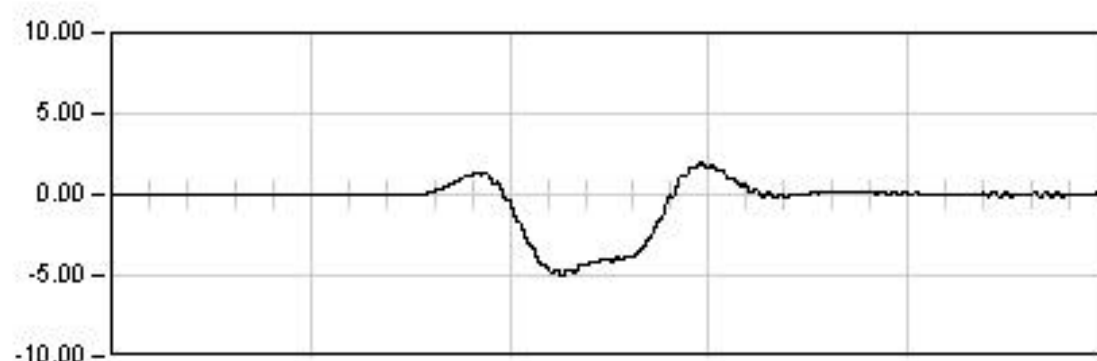
**DYNAMICA 22**

45.0 Seg

Max: -4.95

Min: 1.81

Rem: -0.08

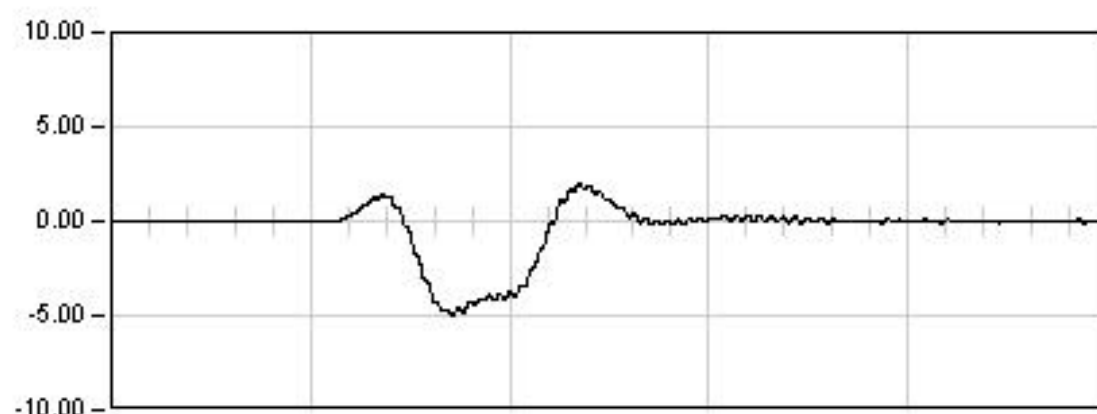
**DYNAMICA 23**

25.0 Seg

Max: -5.03

Min: 1.99

Rem: 0.00

**DYNAMICA 24**

30.0 Seg

Max: -5.00

Min: 2.00

Rem: 0.02

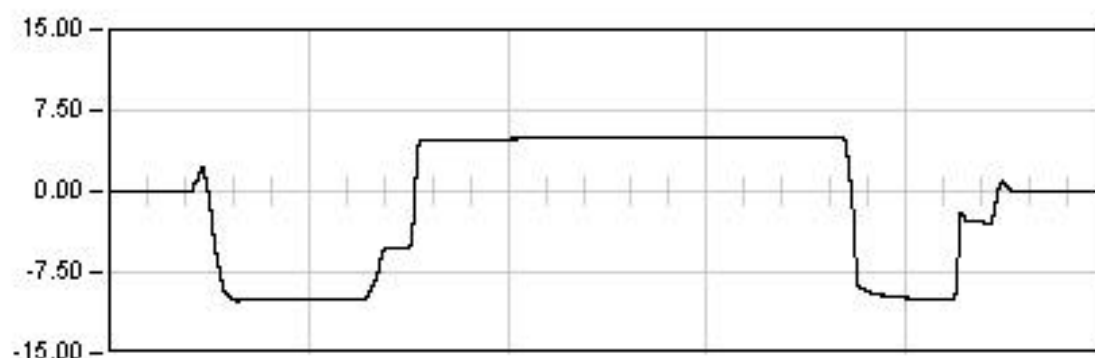
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P083

Canal : 45

Unidades : mm

**ESTATICA 01**

1729.0 Seg

Est: 5.02

Max: -10.16

Min: 5.04

Rem: -0.05

**ESTATICA 02**

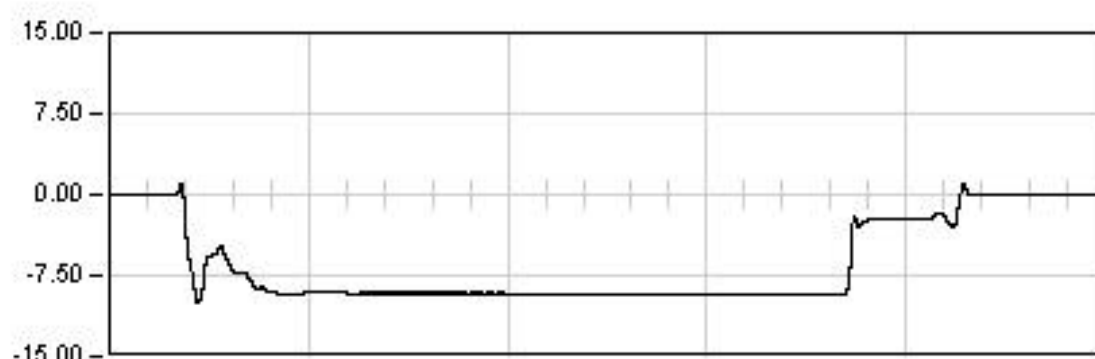
1647.0 Seg

Est: -12.98

Max: -13.01

Min: 1.07

Rem: -0.11

**ESTATICA 03**

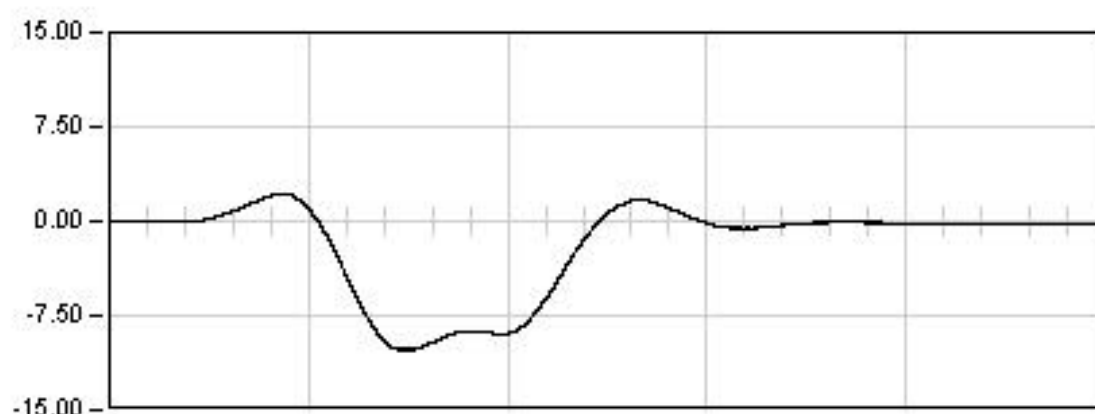
1400.0 Seg

Est: -9.18

Max: -10.07

Min: 1.00

Rem: 0.02

**DINAMICA 01**

85.0 Seg

Max: -10.29

Min: 2.17

Rem: -0.13

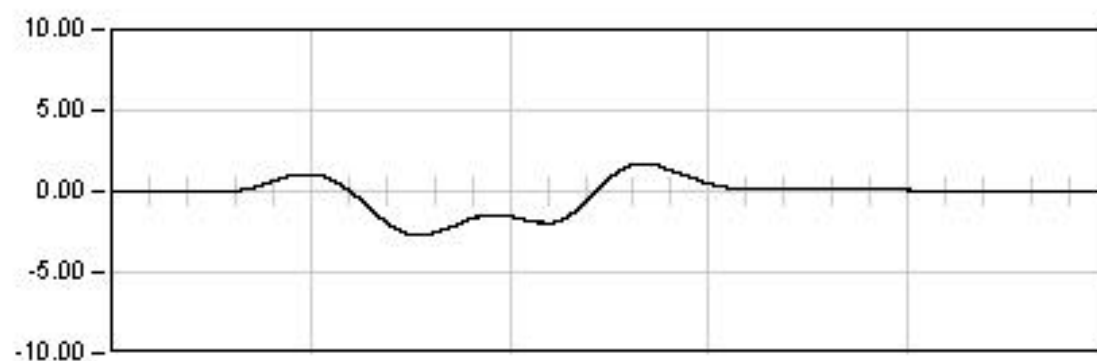
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P083

Canal : 45

Unidades : mm

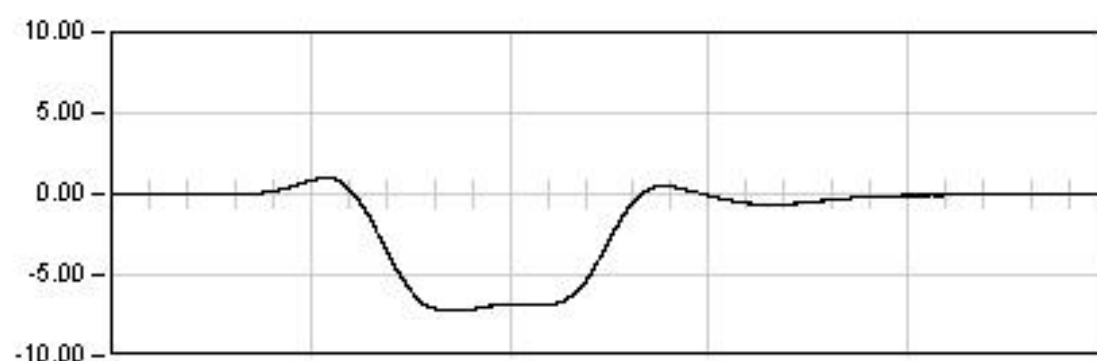
**DYNAMICA 11**

125.0 Seg

Max: -2.73

Min: 1.74

Rem: 0.01

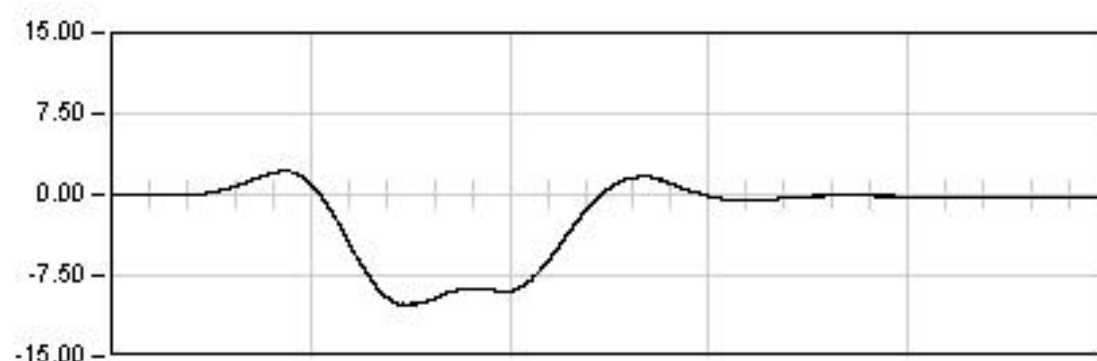
**DYNAMICA 21**

130.0 Seg

Max: -7.25

Min: 1.00

Rem: 0.02

**DYNAMICA 01**

85.0 Seg

Max: -10.29

Min: 2.17

Rem: -0.13

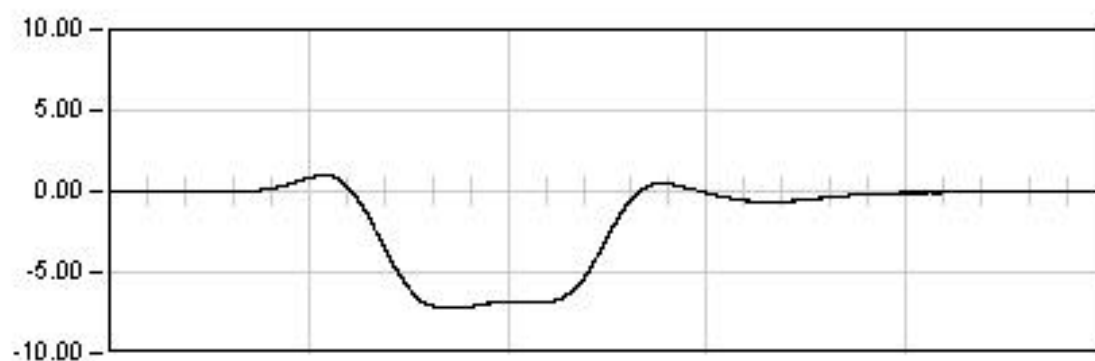
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P083

Canal : 45

Unidades : mm

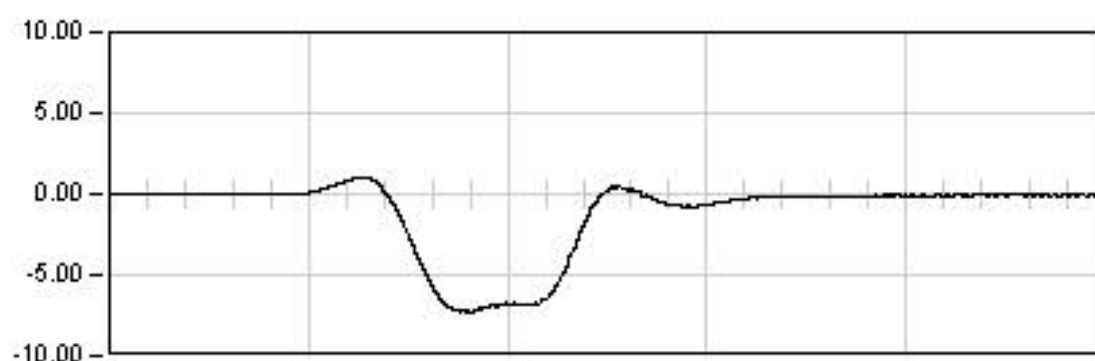
**DYNAMICA 21**

130.0 Seg

Max: -7.25

Min: 1.00

Rem: 0.02

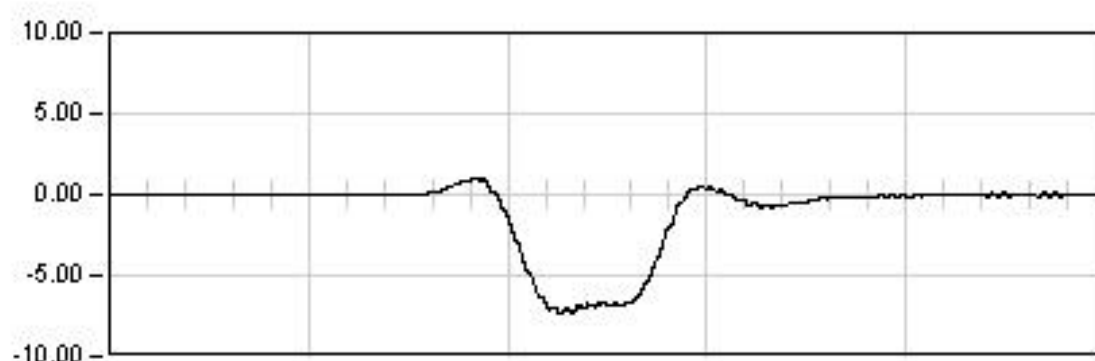
**DYNAMICA 22**

45.0 Seg

Max: -7.38

Min: 1.01

Rem: -0.04

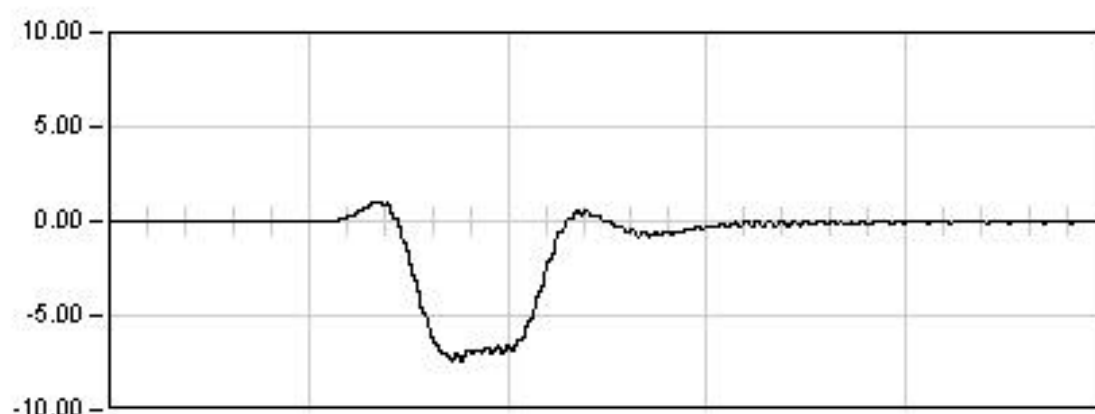
**DYNAMICA 23**

25.0 Seg

Max: -7.36

Min: 1.02

Rem: -0.02

**DYNAMICA 24**

30.0 Seg

Max: -7.40

Min: 1.06

Rem: 0.00

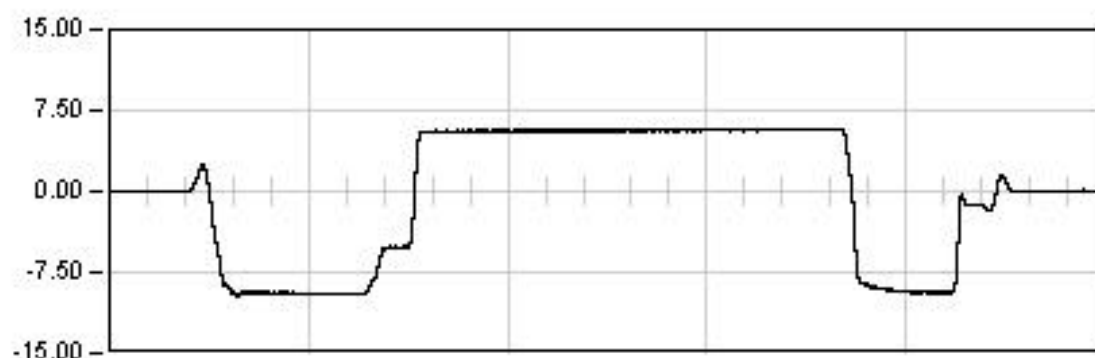
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P084

Canal : 54

Unidades : mm

**ESTATICA 01**

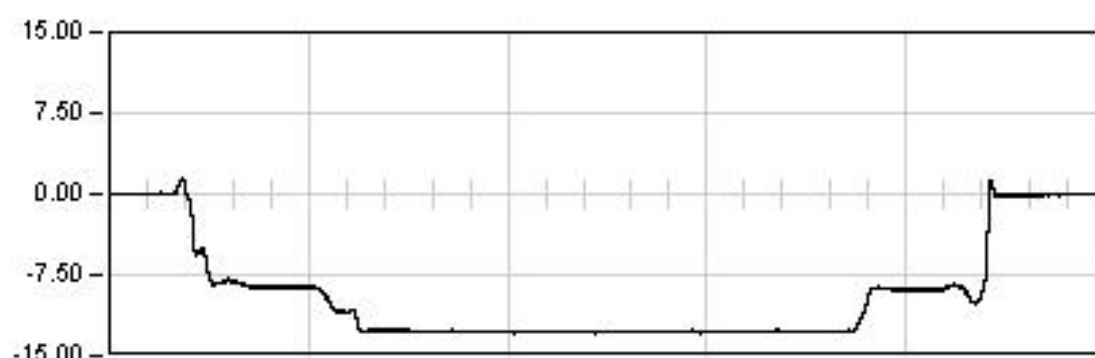
1729.0 Seg

Est: 5.74

Max: -9.71

Min: 5.85

Rem: 0.03

**ESTATICA 02**

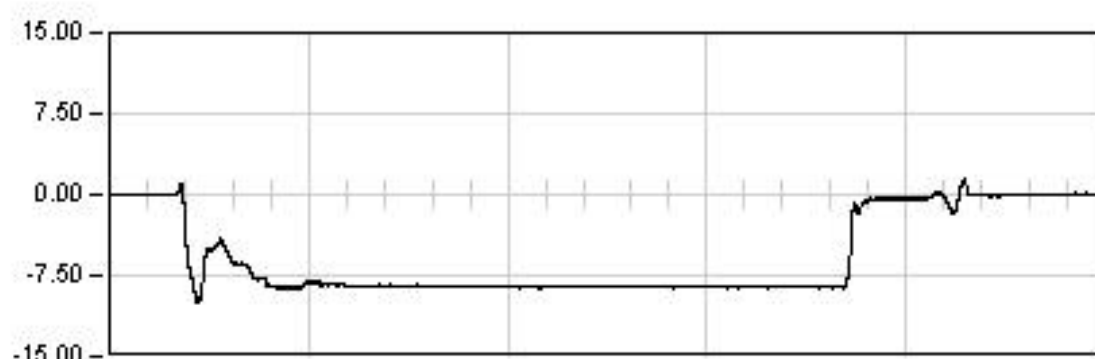
1647.0 Seg

Est: -12.73

Max: -12.88

Min: 1.52

Rem: 0.00

**ESTATICA 03**

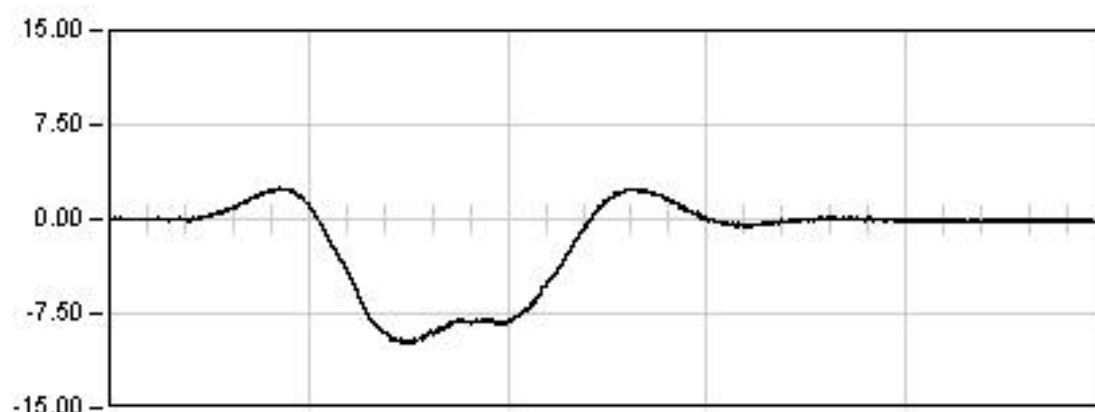
1400.0 Seg

Est: -8.52

Max: -10.07

Min: 1.38

Rem: 0.03

**DINAMICA 01**

85.0 Seg

Max: -9.91

Min: 2.48

Rem: -0.13

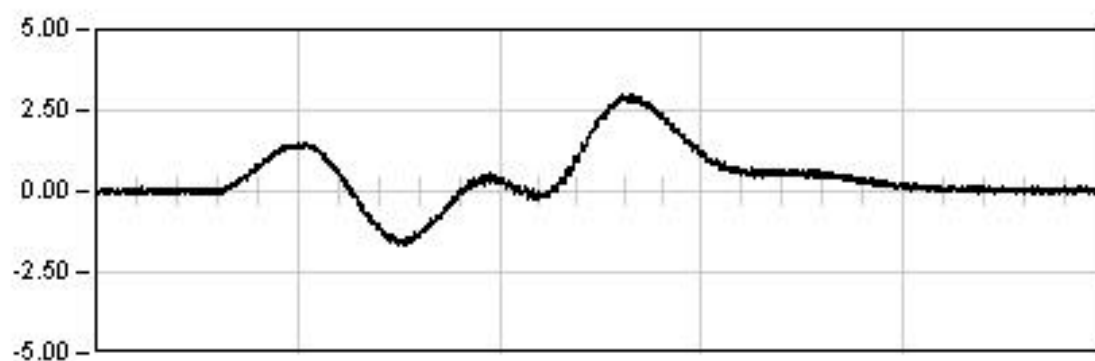
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P084

Canal : 54

Unidades : mm

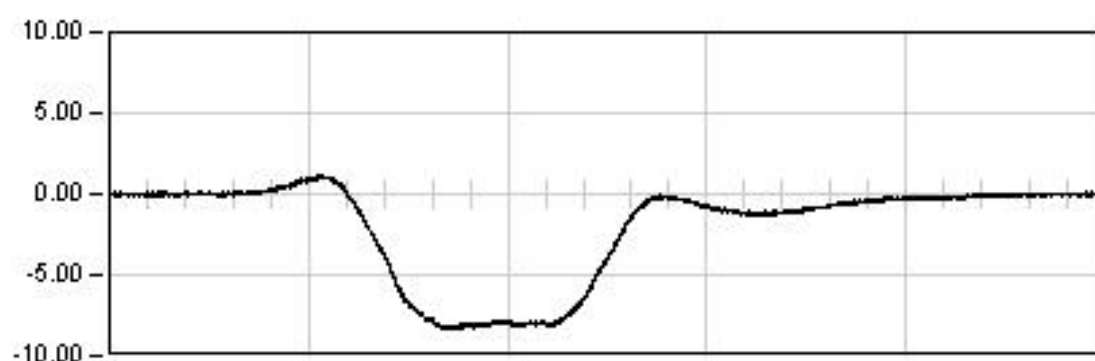
**DYNAMICA 11**

125.0 Seg

Max: 2.98

Min: -1.65

Rem: 0.01

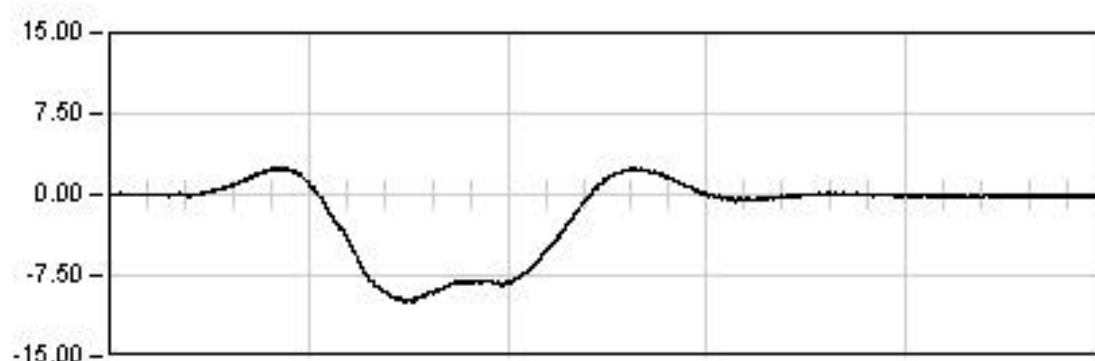
**DYNAMICA 21**

130.0 Seg

Max: -8.39

Min: 1.14

Rem: 0.02

**DYNAMICA 01**

85.0 Seg

Max: -9.91

Min: 2.48

Rem: -0.13



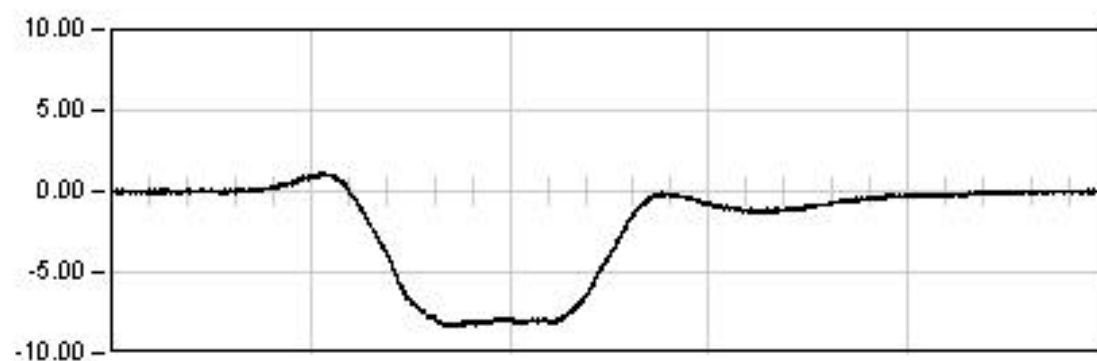
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P084

Canal : 54

Unidades : mm

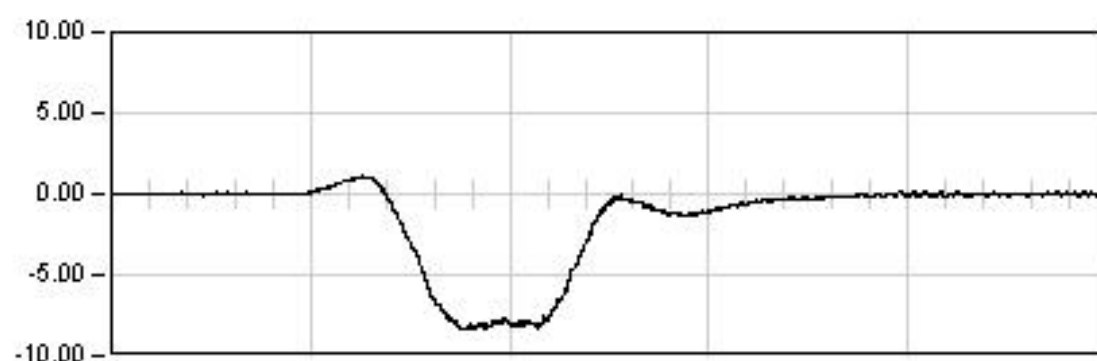
**DYNAMICA 21**

130.0 Seg

Max: -8.39

Min: 1.14

Rem: 0.02

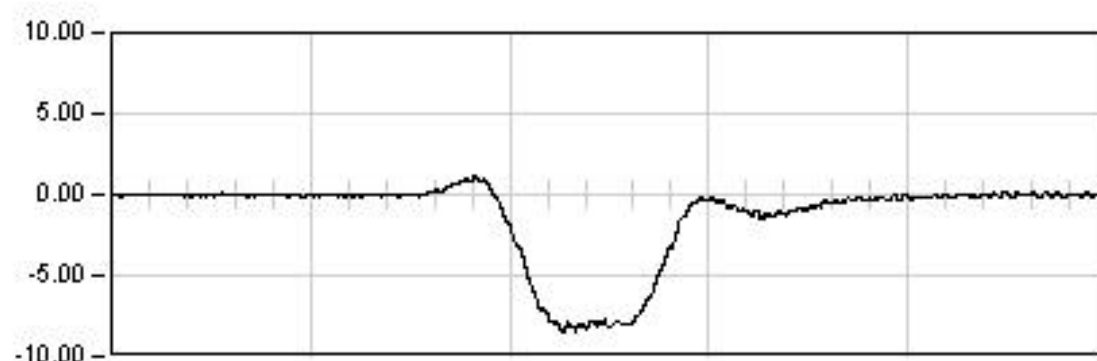
**DYNAMICA 22**

45.0 Seg

Max: -8.40

Min: 1.09

Rem: -0.00

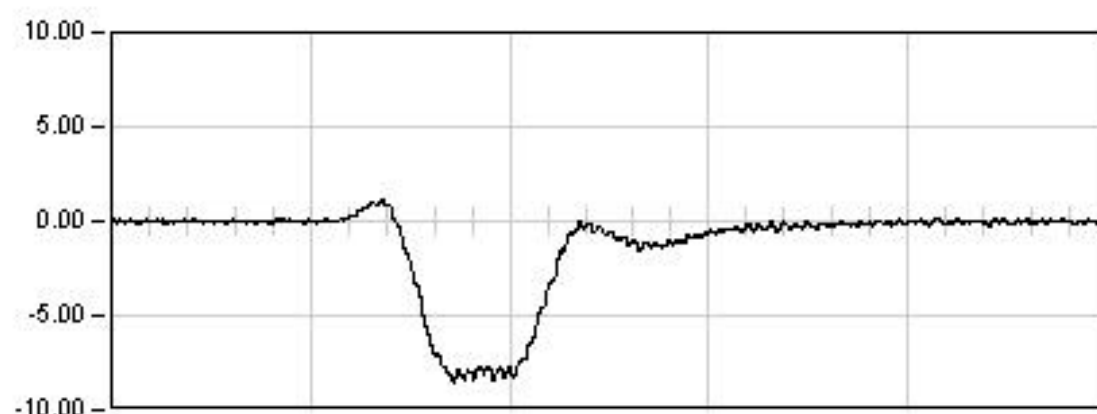
**DYNAMICA 23**

25.0 Seg

Max: -8.52

Min: 1.10

Rem: -0.02

**DYNAMICA 24**

30.0 Seg

Max: -8.57

Min: 1.13

Rem: 0.03

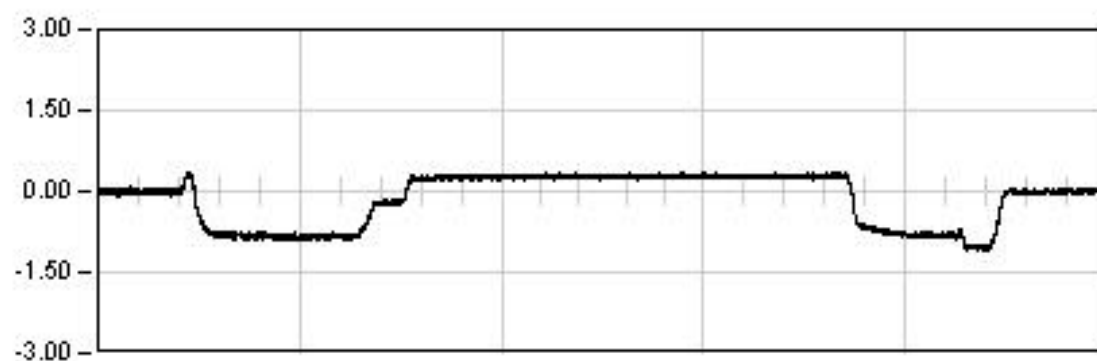
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P085

Canal : 52

Unidades : mm

**ESTATICA 01**

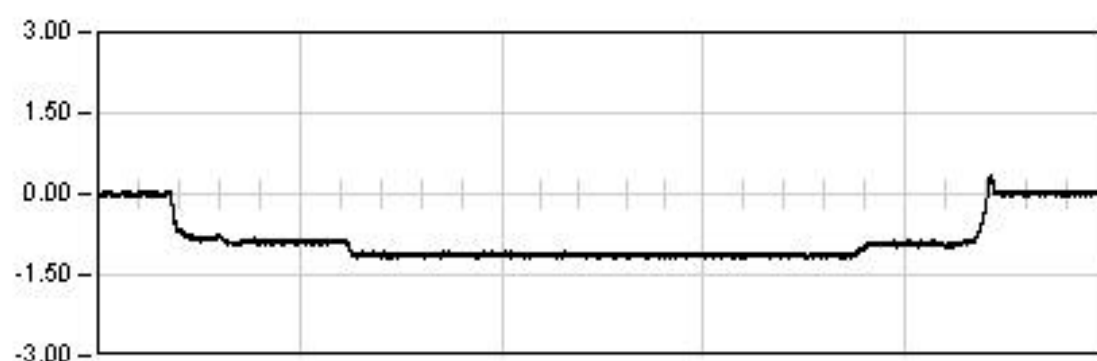
1729.0 Seg

Est: 0.29

Max: -1.09

Min: 0.34

Rem: -0.00

**ESTATICA 02**

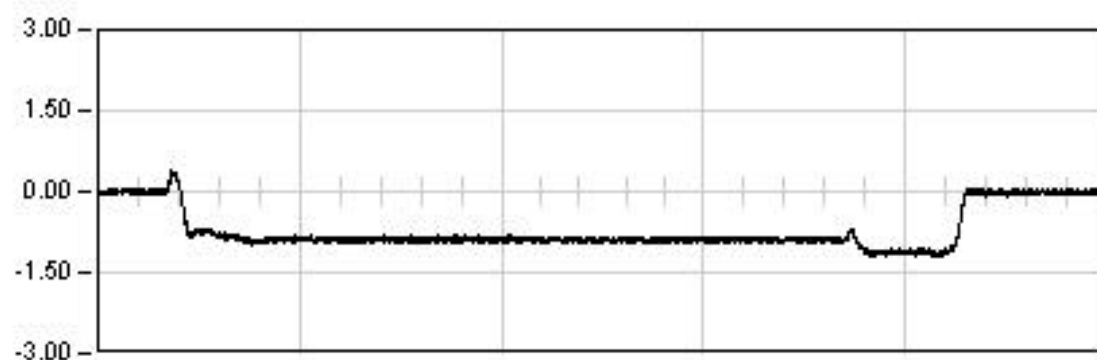
1647.0 Seg

Est: -1.14

Max: -1.21

Min: 0.36

Rem: 0.01

**ESTATICA 03**

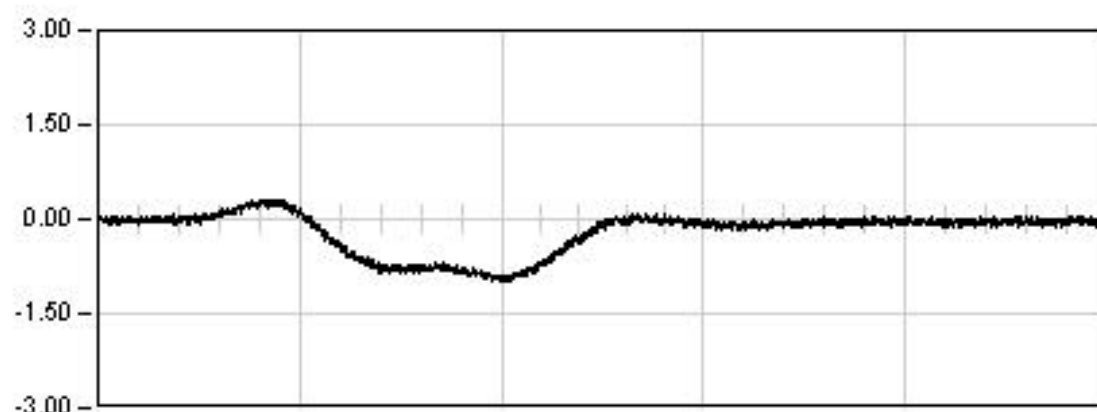
1400.0 Seg

Est: -0.89

Max: -1.20

Min: 0.38

Rem: -0.00

**DINAMICA 01**

85.0 Seg

Max: -1.00

Min: 0.32

Rem: -0.02

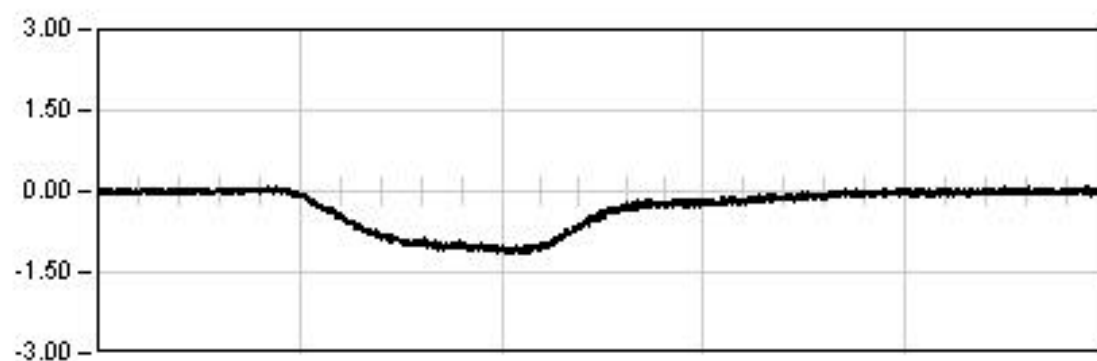
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P085

Canal : 52

Unidades : mm

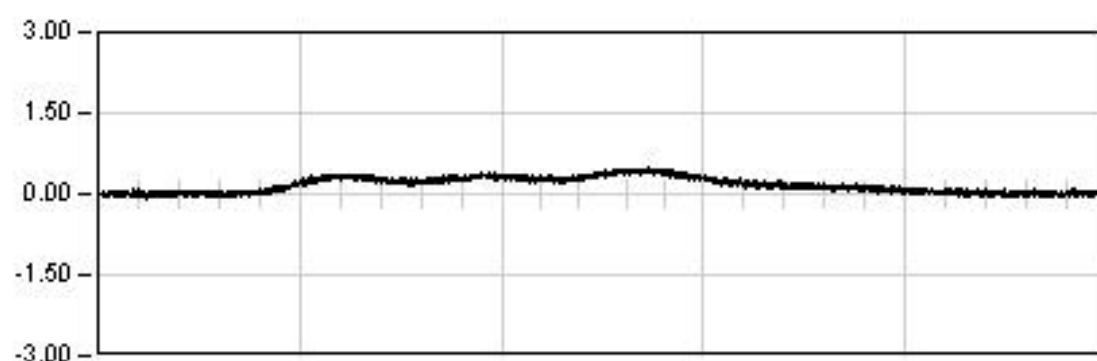
**DYNAMICA 11**

125.0 Seg

Max: -1.17

Min: -0.11

Rem: 0.02

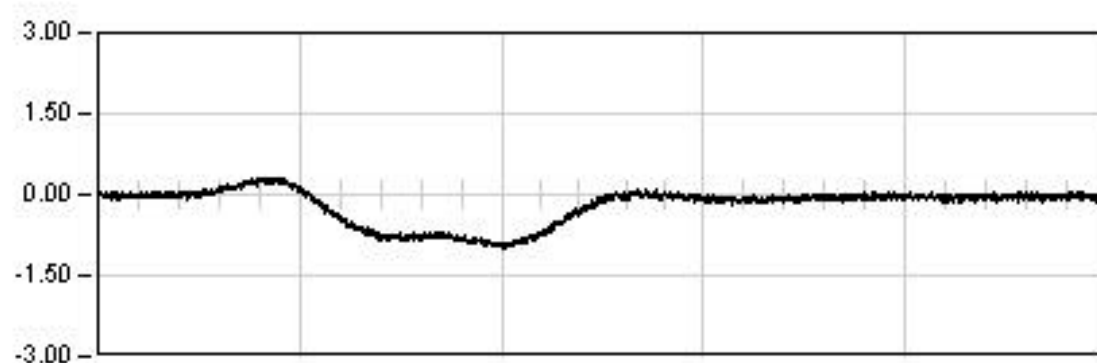
**DYNAMICA 21**

130.0 Seg

Max: 0.48

Min: -0.08

Rem: 0.01

**DYNAMICA 01**

85.0 Seg

Max: -1.00

Min: 0.32

Rem: -0.02

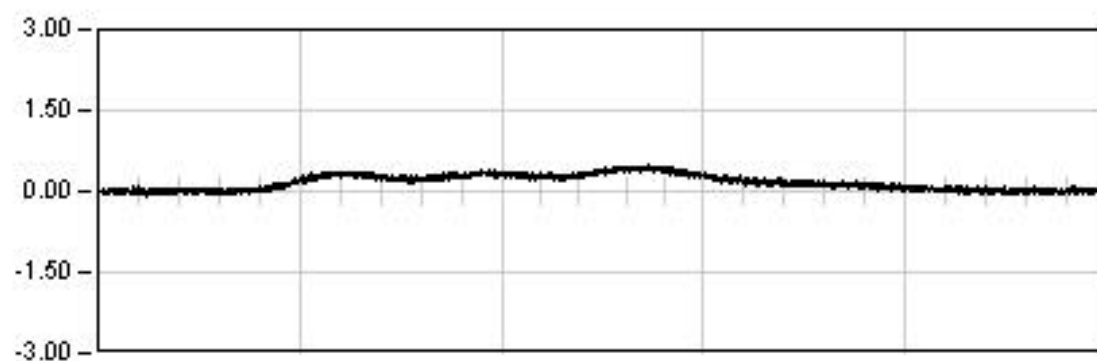
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P085

Canal : 52

Unidades : mm

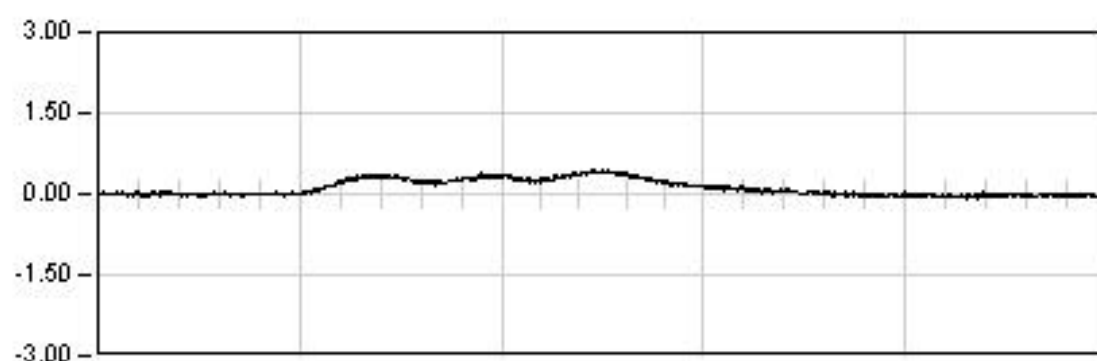
**DYNAMICA 21**

130.0 Seg

Max: 0.48

Min: -0.08

Rem: 0.01

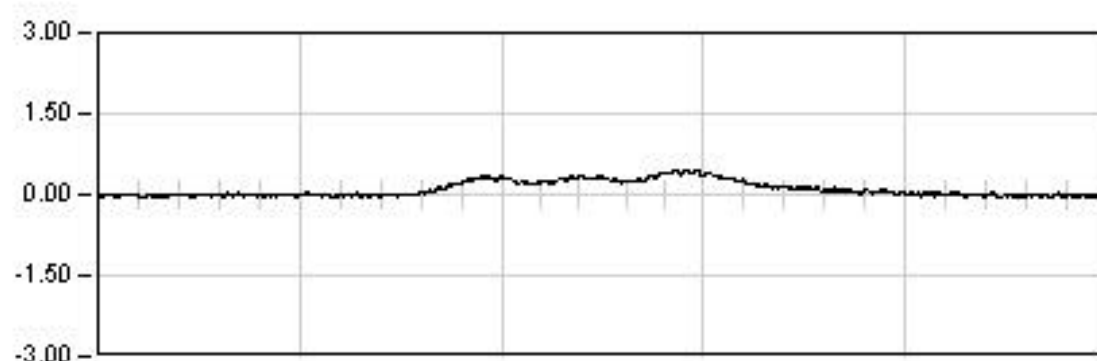
**DYNAMICA 22**

45.0 Seg

Max: 0.44

Min: -0.09

Rem: -0.04

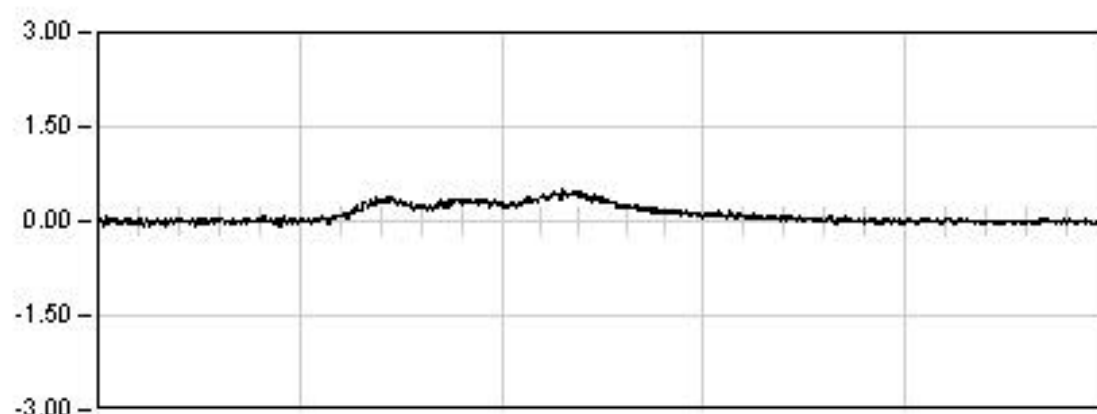
**DYNAMICA 23**

25.0 Seg

Max: 0.47

Min: -0.07

Rem: -0.02

**DYNAMICA 24**

30.0 Seg

Max: 0.51

Min: -0.09

Rem: -0.00

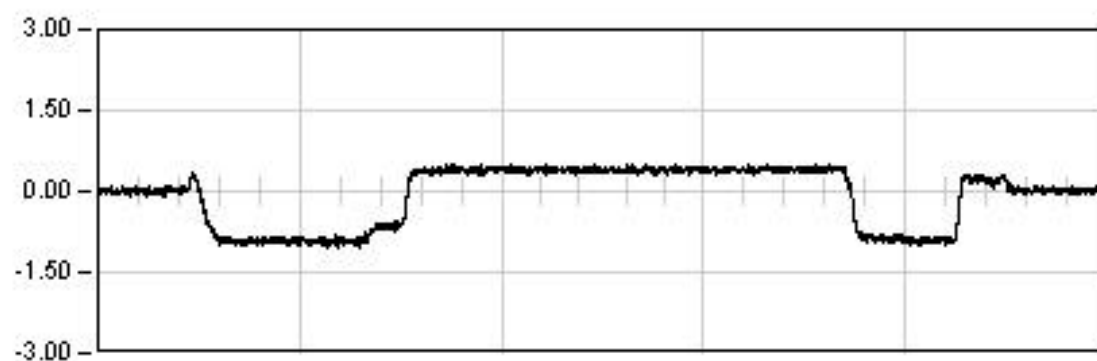
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P086

Canal : 53

Unidades : mm

**ESTATICA 01**

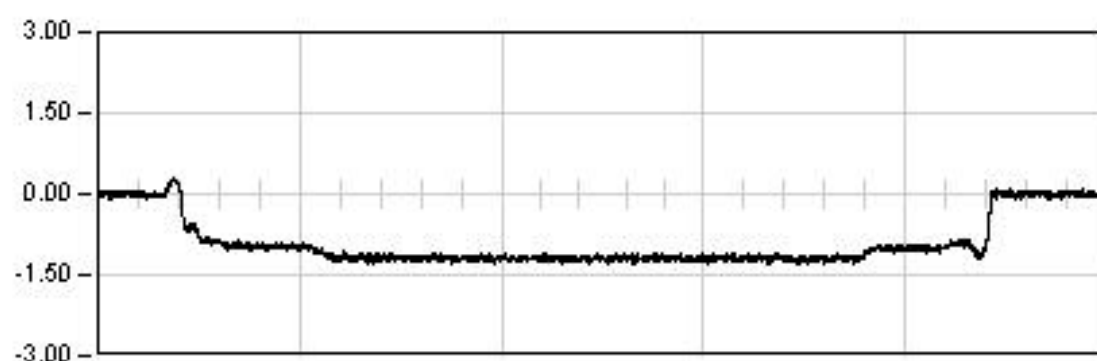
1729.0 Seg

Est: 0.41

Max: -1.04

Min: 0.52

Rem: 0.02

**ESTATICA 02**

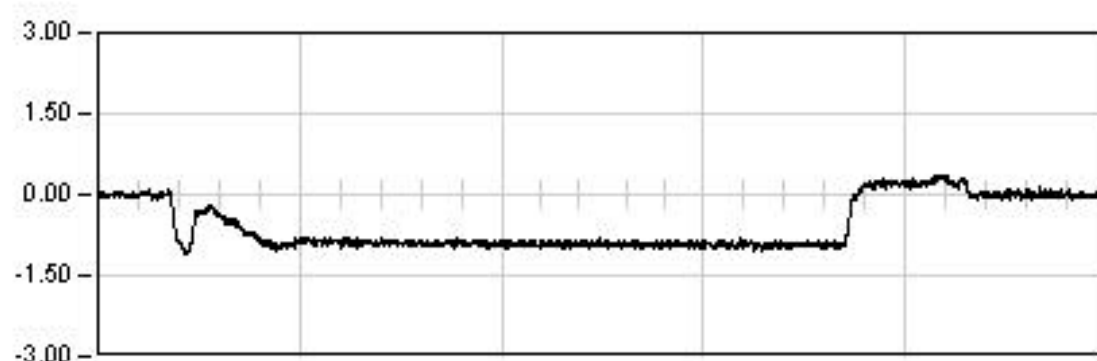
1647.0 Seg

Est: -1.19

Max: -1.32

Min: 0.30

Rem: 0.01

**ESTATICA 03**

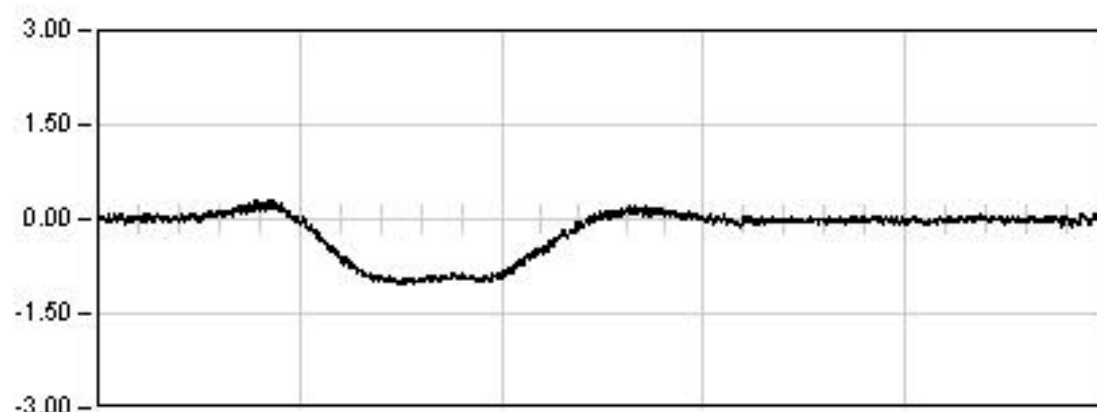
1400.0 Seg

Est: -0.93

Max: -1.11

Min: 0.36

Rem: -0.01

**DINAMICA 01**

85.0 Seg

Max: -1.04

Min: 0.29

Rem: -0.00

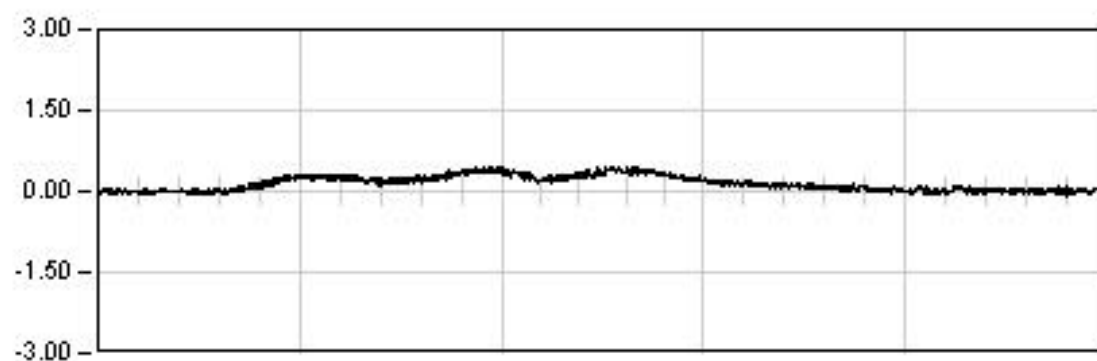
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P086

Canal : 53

Unidades : mm

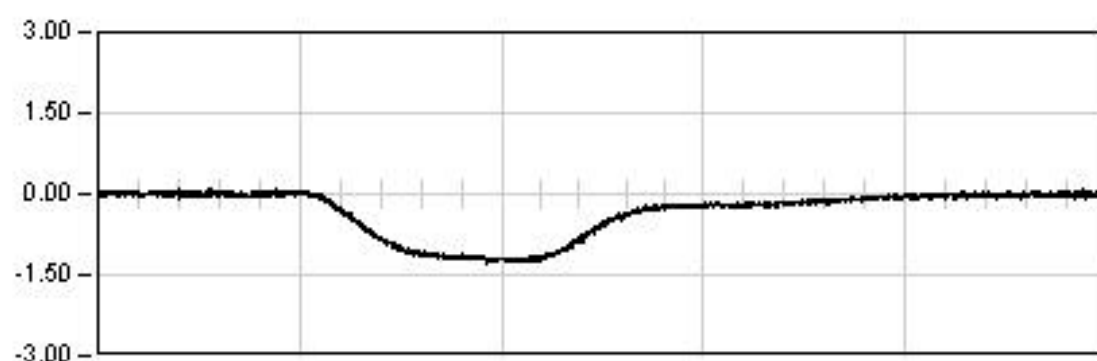
**DYNAMICA 11**

125.0 Seg

Max: 0.47

Min: -0.08

Rem: 0.00

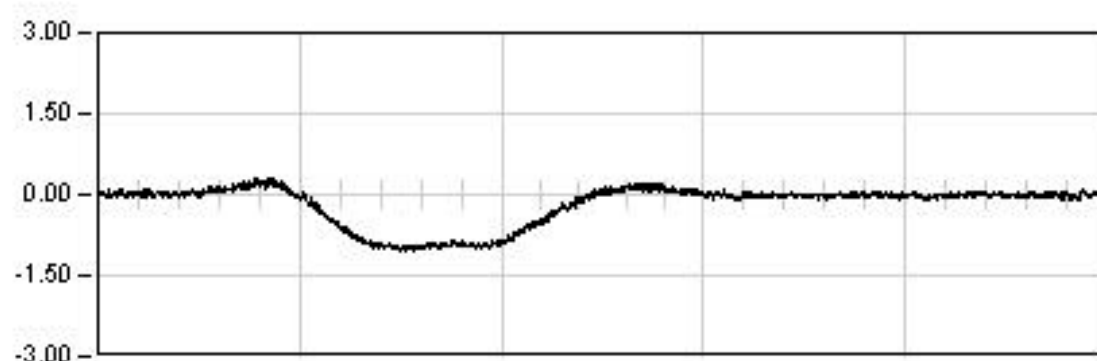
**DYNAMICA 21**

130.0 Seg

Max: -1.28

Min: 0.10

Rem: -0.00

**DYNAMICA 01**

85.0 Seg

Max: -1.04

Min: 0.29

Rem: -0.00

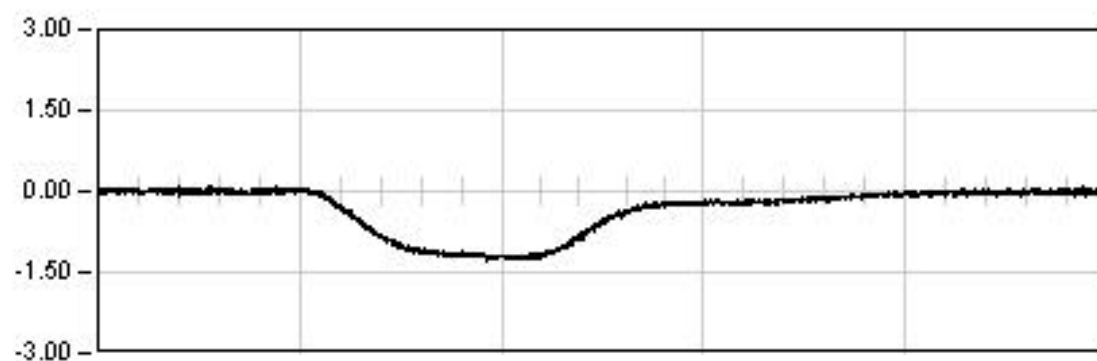
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P086

Canal : 53

Unidades : mm

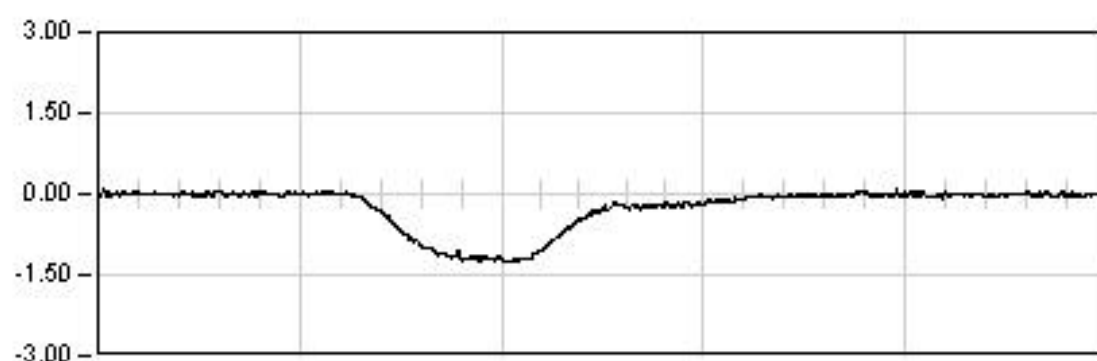
**DYNAMICA 21**

130.0 Seg

Max: -1.28

Min: 0.10

Rem: -0.00

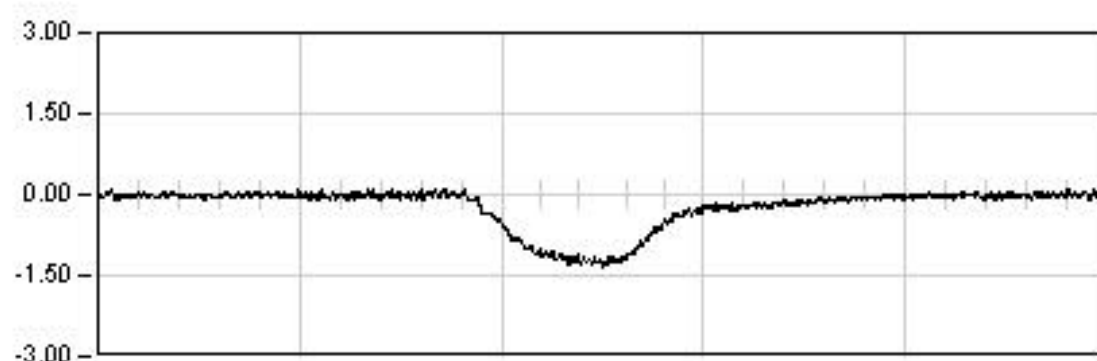
**DYNAMICA 22**

45.0 Seg

Max: -1.26

Min: 0.08

Rem: -0.01

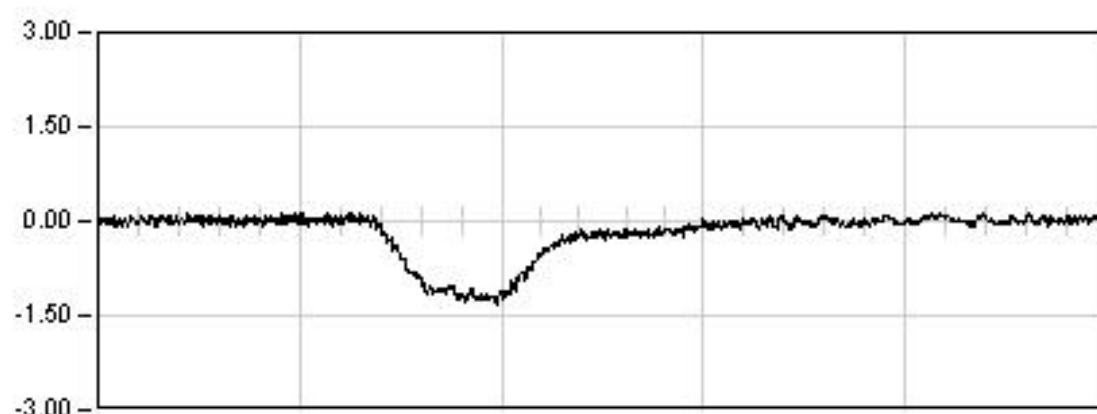
**DYNAMICA 23**

25.0 Seg

Max: -1.33

Min: 0.11

Rem: -0.01

**DYNAMICA 24**

30.0 Seg

Max: -1.33

Min: 0.14

Rem: -0.00

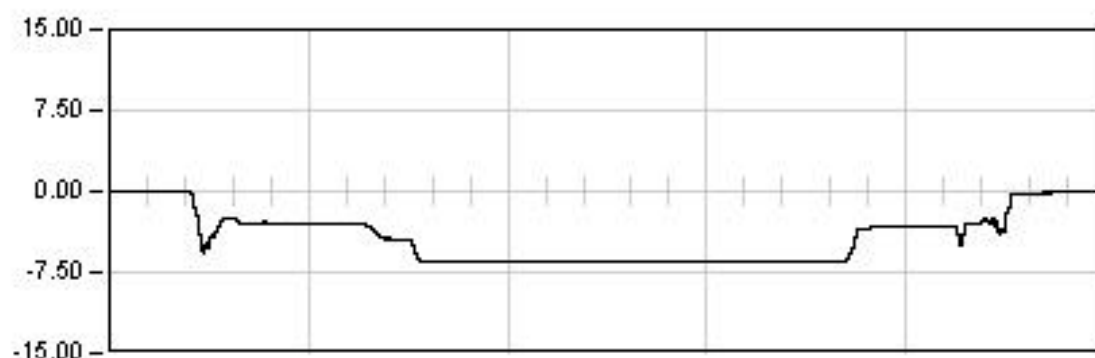
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P091

Canal : 46

Unidades : mm

**ESTATICA 01**

1729.0 Seg

Est: -6.48

Max: -6.50

Min: 0.01

Rem: -0.07

**ESTATICA 02**

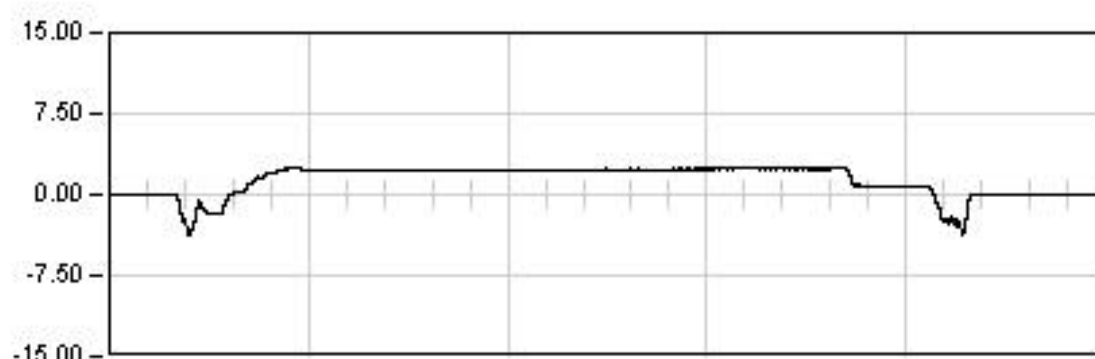
1647.0 Seg

Est: 3.14

Max: -4.94

Min: 3.16

Rem: -0.02

**ESTATICA 03**

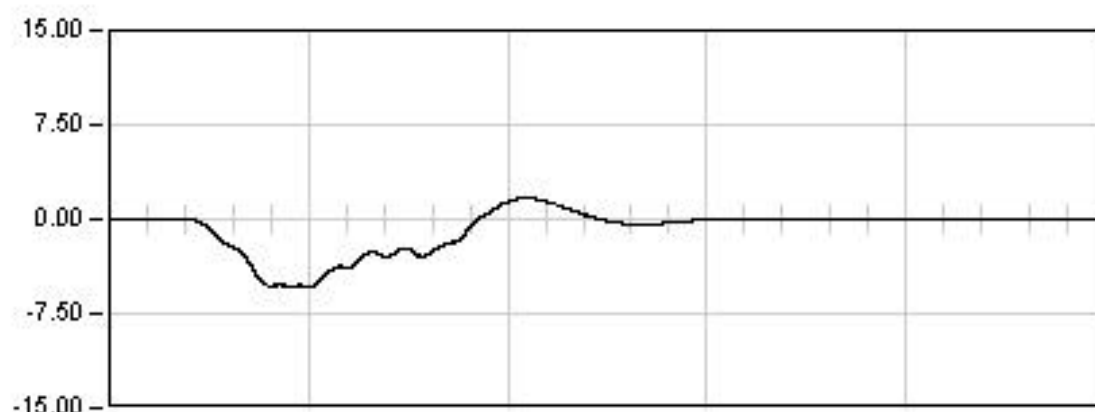
1400.0 Seg

Est: 2.38

Max: -3.72

Min: 2.40

Rem: 0.06

**DINAMICA 01**

85.0 Seg

Max: -5.41

Min: 1.75

Rem: 0.03



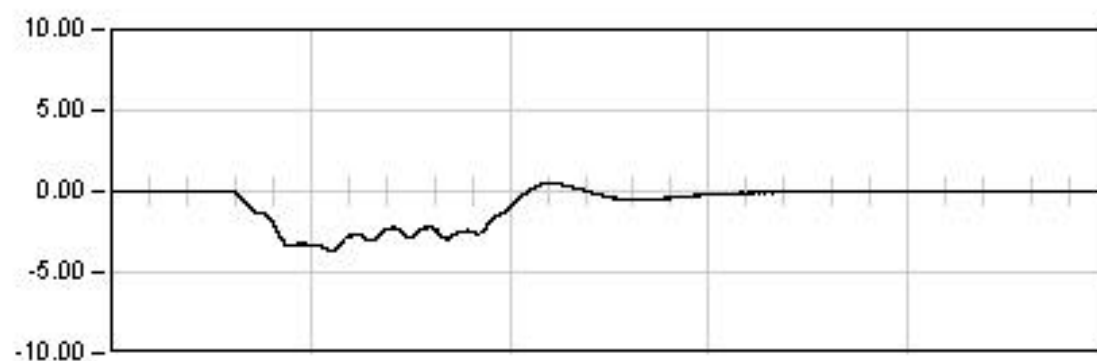
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P091

Canal : 46

Unidades : mm

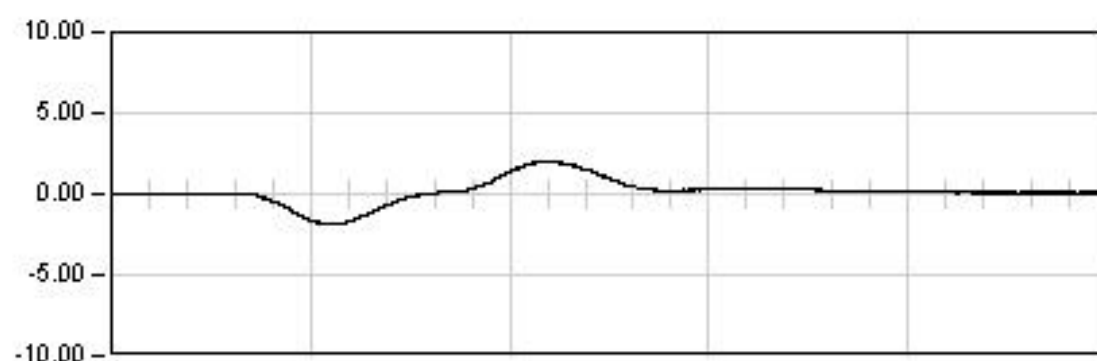
**DYNAMICA 11**

125.0 Seg

Max: -3.68

Min: 0.50

Rem: 0.03

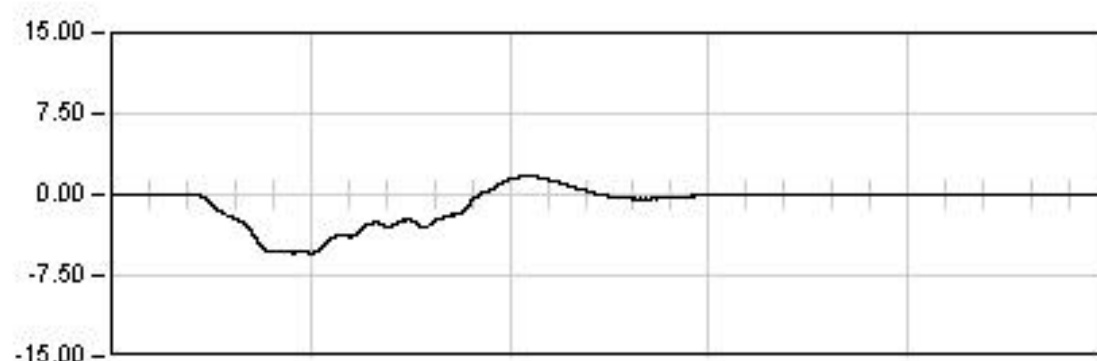
**DYNAMICA 21**

130.0 Seg

Max: 2.02

Min: -1.91

Rem: 0.10

**DYNAMICA 01**

85.0 Seg

Max: -5.41

Min: 1.75

Rem: 0.03

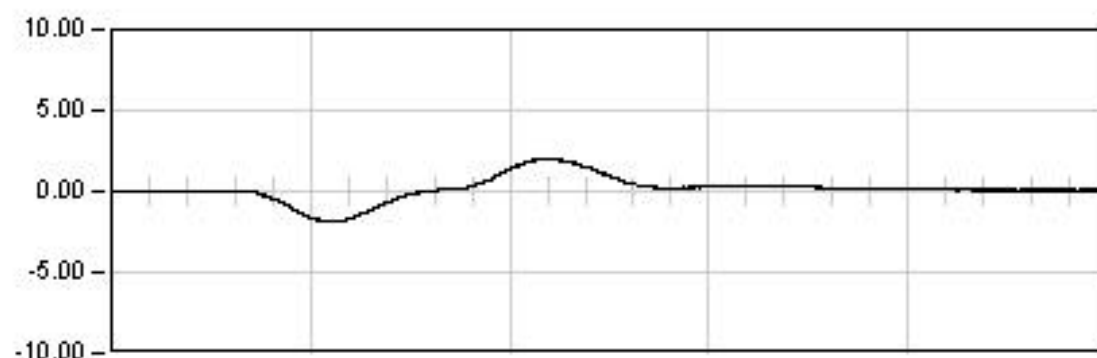
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P091

Canal : 46

Unidades : mm

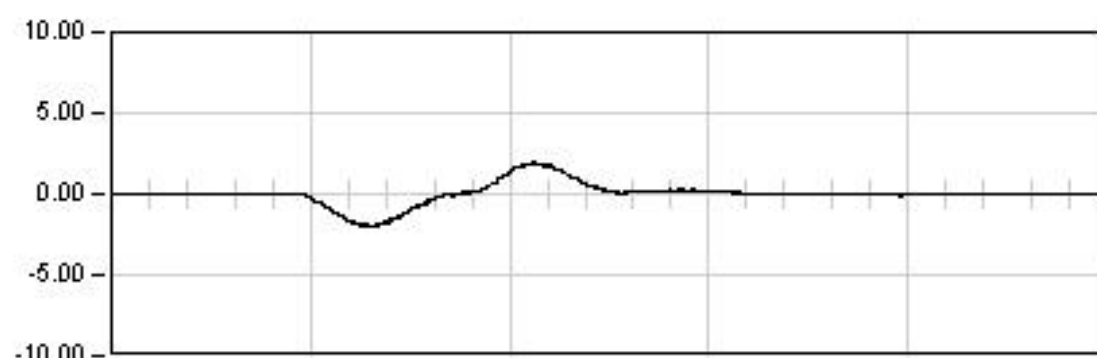
**DYNAMICA 21**

130.0 Seg

Max: 2.02

Min: -1.91

Rem: 0.10

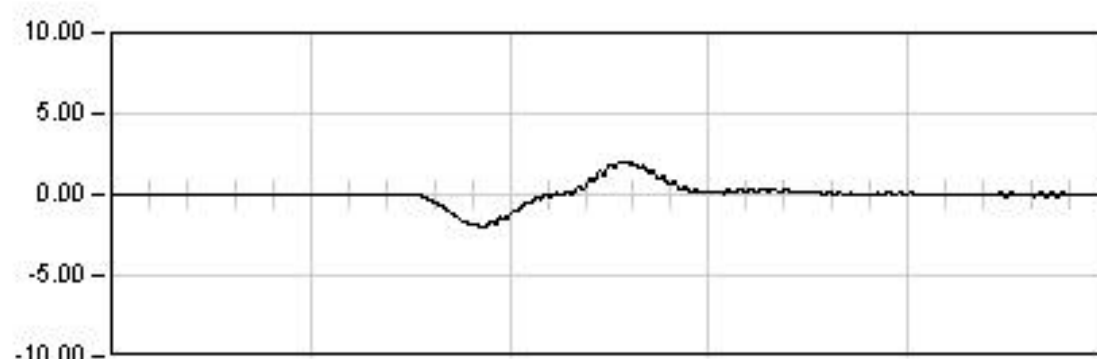
**DYNAMICA 22**

45.0 Seg

Max: -2.04

Min: 1.93

Rem: -0.01

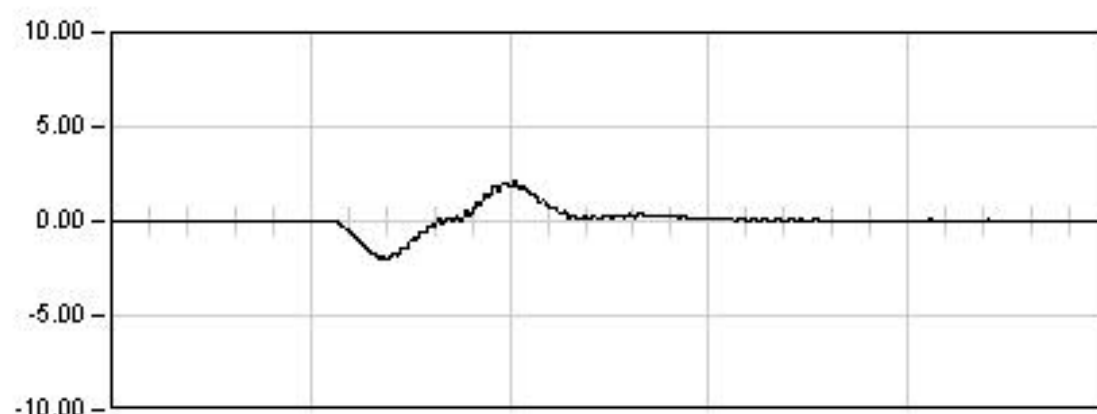
**DYNAMICA 23**

25.0 Seg

Max: -2.05

Min: 1.97

Rem: 0.00

**DYNAMICA 24**

30.0 Seg

Max: 2.09

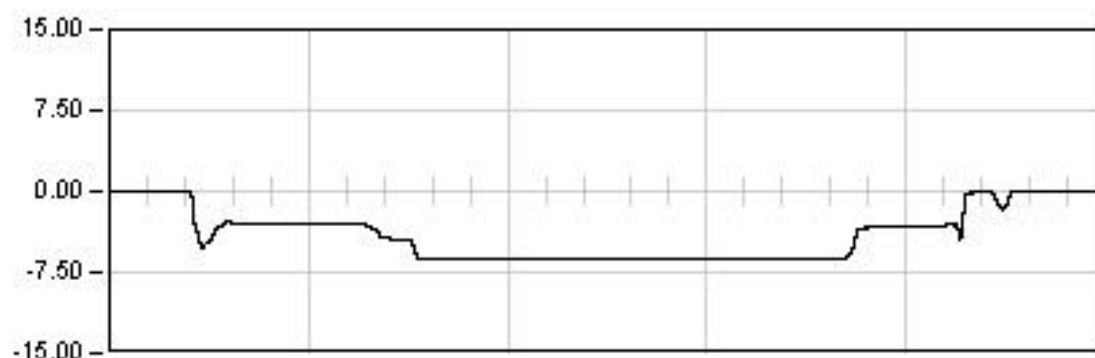
Min: -1.99

Rem: -0.00

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P092      Canal : 47      Unidades : mm

**ESTATICA 01**

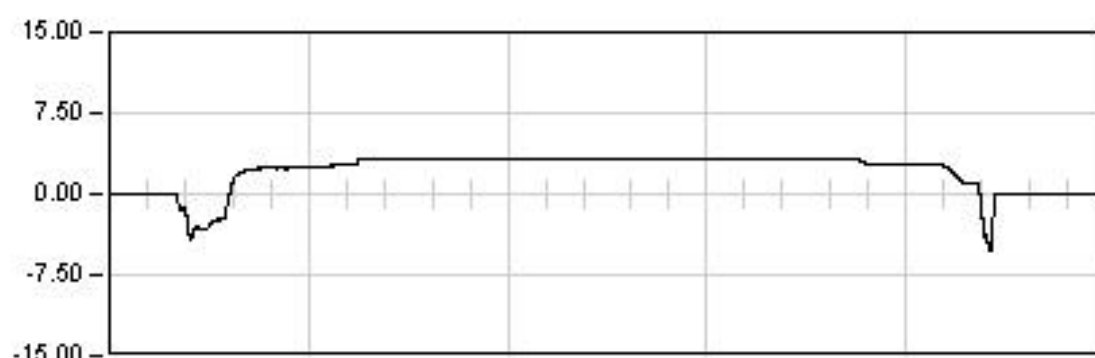
1729.0    Seg

Est:    -6.32

Max:    -6.34

Min:    0.05

Rem:    0.02

**ESTATICA 02**

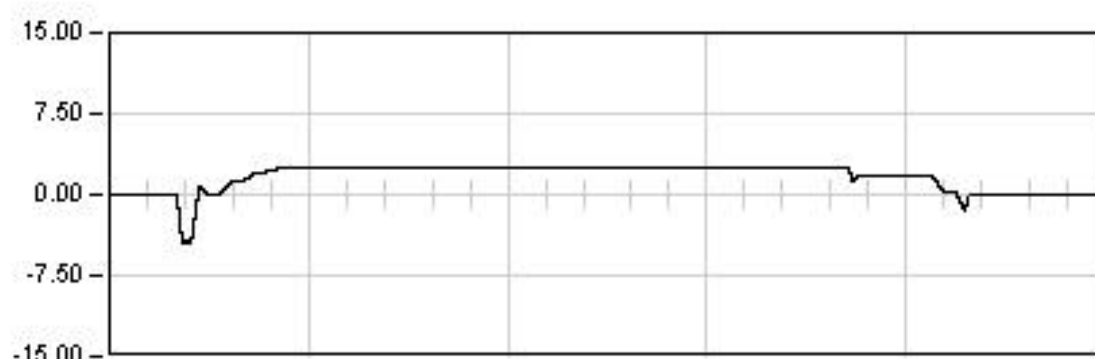
1647.0    Seg

Est:    3.27

Max:    -5.34

Min:    3.29

Rem:    0.09

**ESTATICA 03**

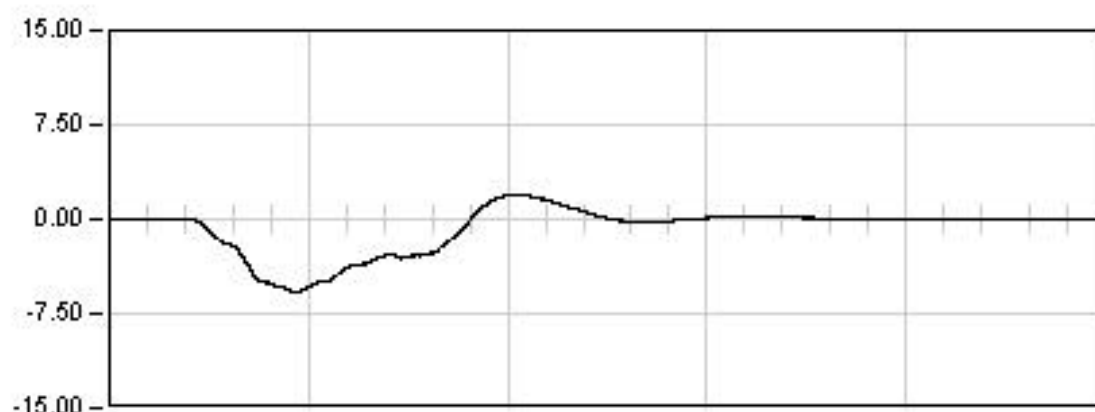
1400.0    Seg

Est:    2.45

Max:    -4.54

Min:    2.49

Rem:    0.09

**DINAMICA 01**

85.0    Seg

Max:    -5.80

Min:    1.95

Rem:    0.05

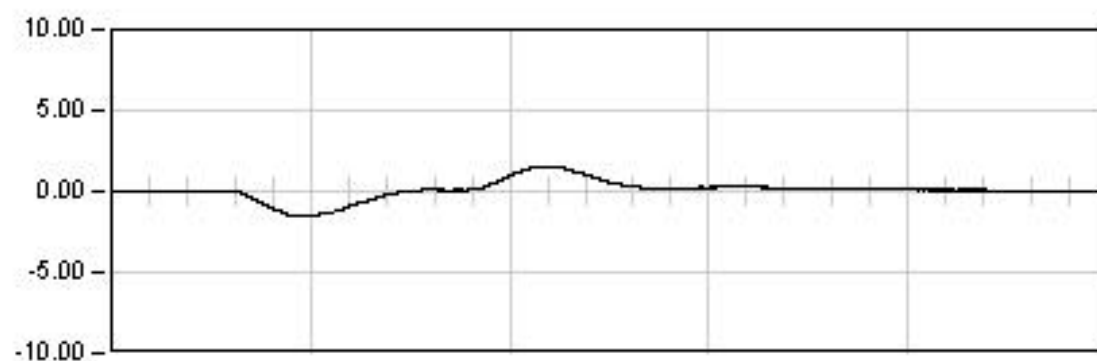
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P092

Canal : 47

Unidades : mm

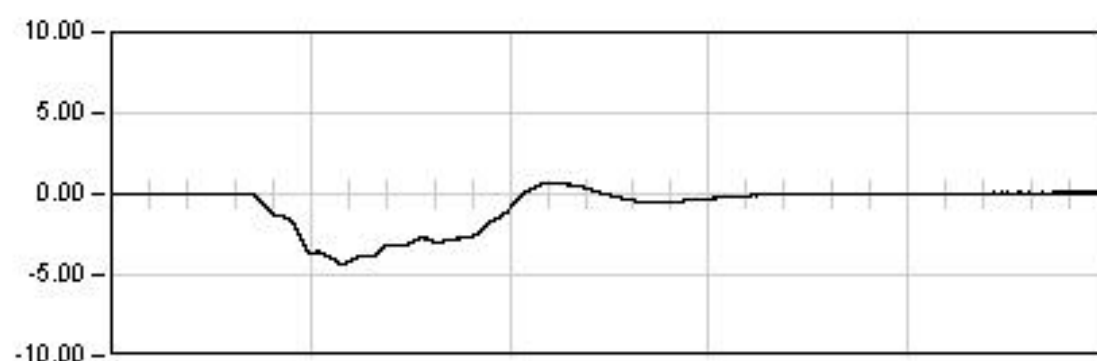
**DINAMICA 11**

125.0 Seg

Max: -1.56

Min: 1.56

Rem: 0.04

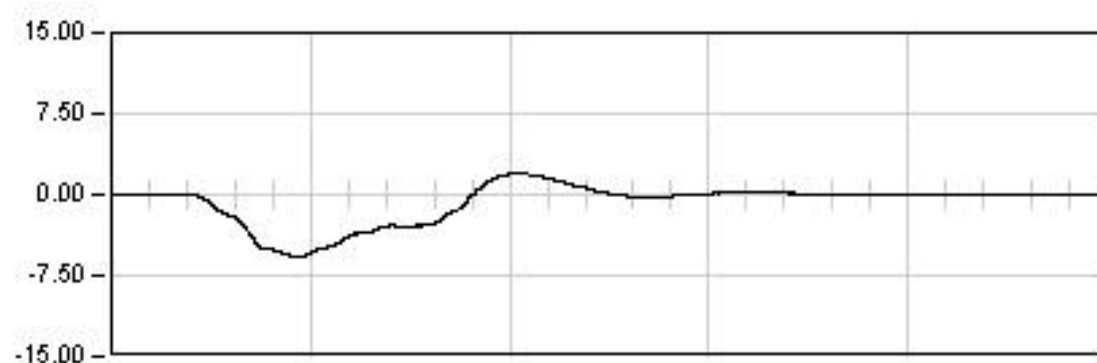
**DINAMICA 21**

130.0 Seg

Max: -4.36

Min: 0.72

Rem: 0.08

**DINAMICA 01**

85.0 Seg

Max: -5.80

Min: 1.95

Rem: 0.05

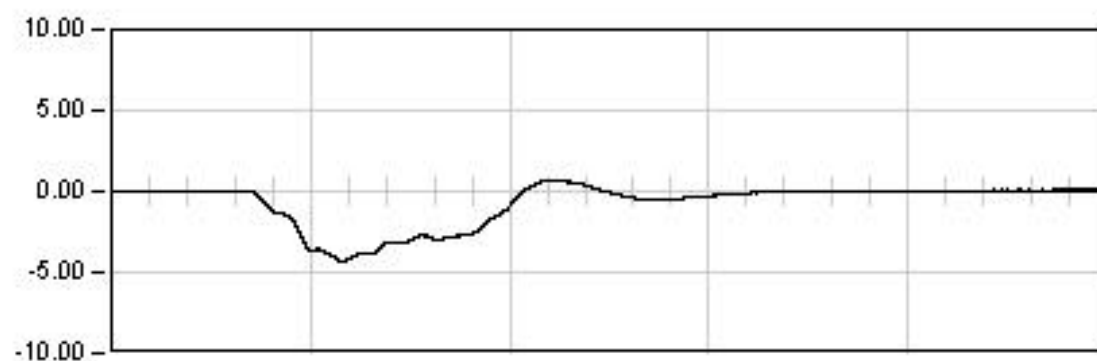
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P092

Canal : 47

Unidades : mm

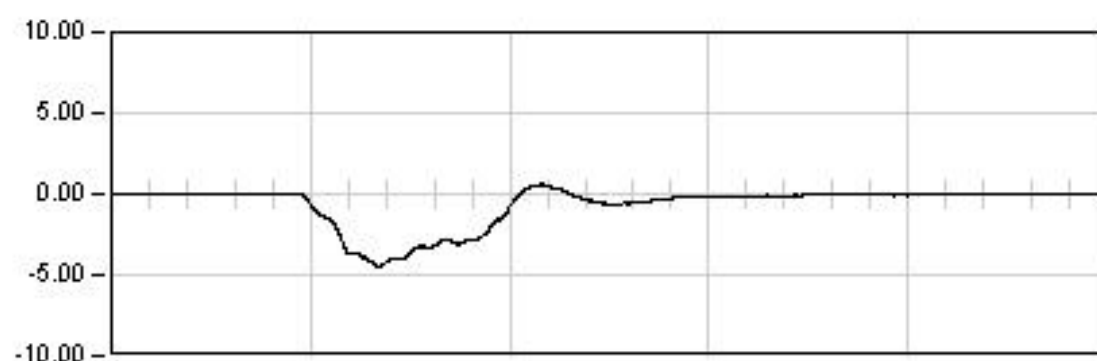
**DYNAMICA 21**

130.0 Seg

Max: -4.36

Min: 0.72

Rem: 0.08

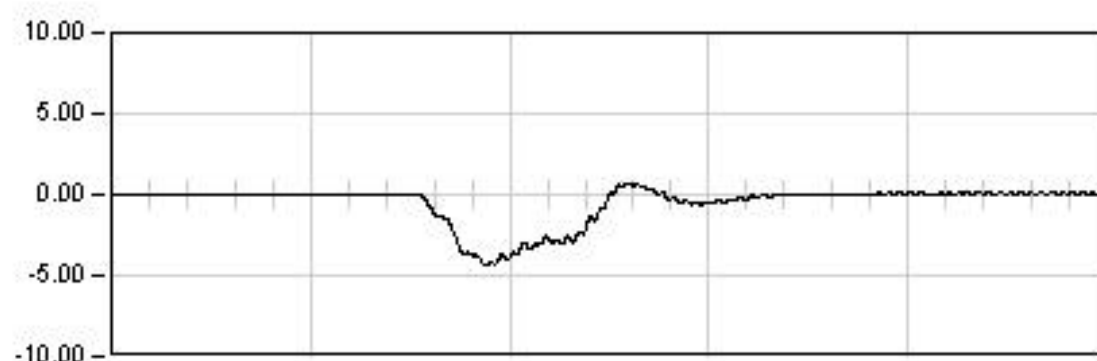
**DYNAMICA 22**

45.0 Seg

Max: -4.47

Min: 0.60

Rem: -0.03

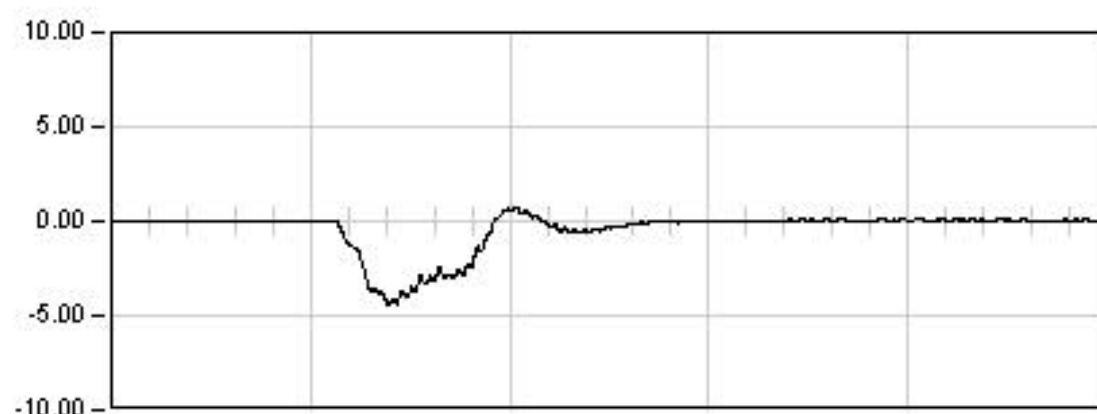
**DYNAMICA 23**

25.0 Seg

Max: -4.40

Min: 0.72

Rem: 0.07

**DYNAMICA 24**

30.0 Seg

Max: -4.38

Min: 0.74

Rem: 0.05

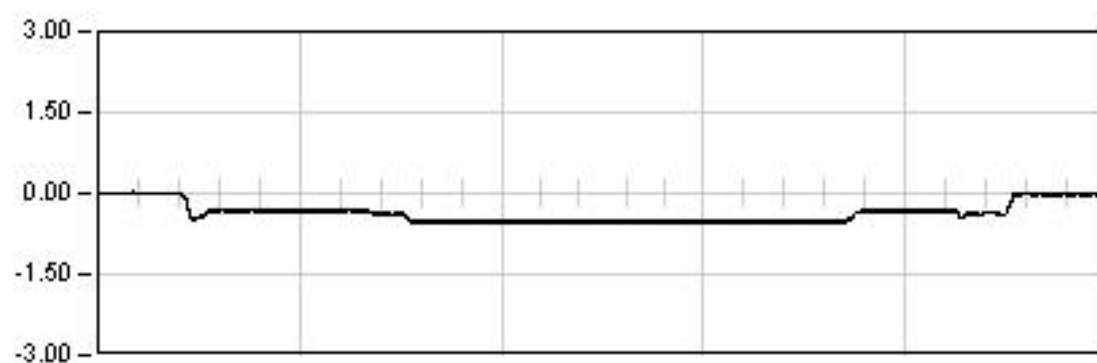
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P093

Canal : 55

Unidades : mm

**ESTATICA 01**

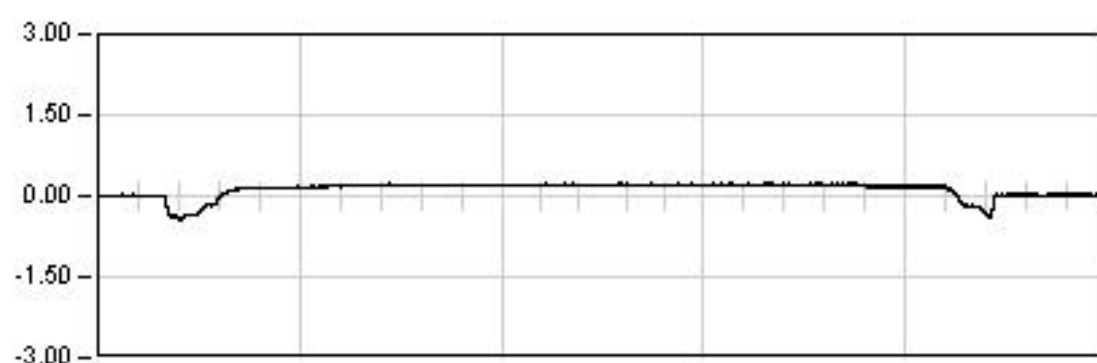
1729.0 Seg

Est: -0.52

Max: -0.55

Min: 0.03

Rem: -0.01

**ESTATICA 02**

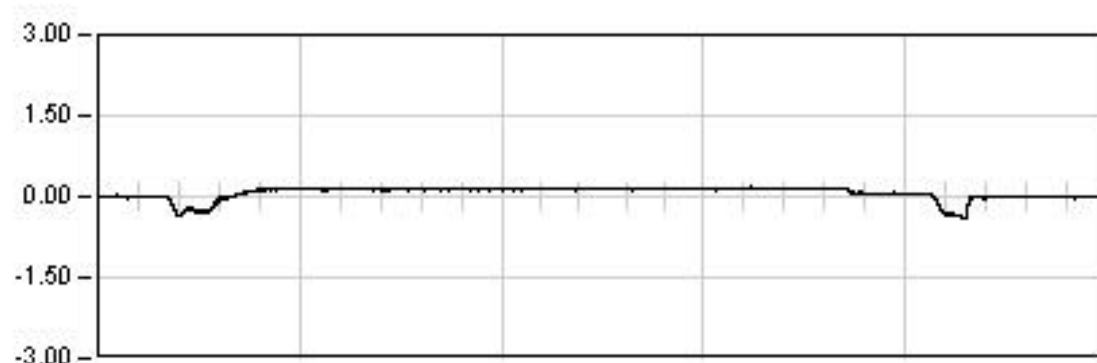
1647.0 Seg

Est: 0.21

Max: -0.45

Min: 0.23

Rem: 0.01

**ESTATICA 03**

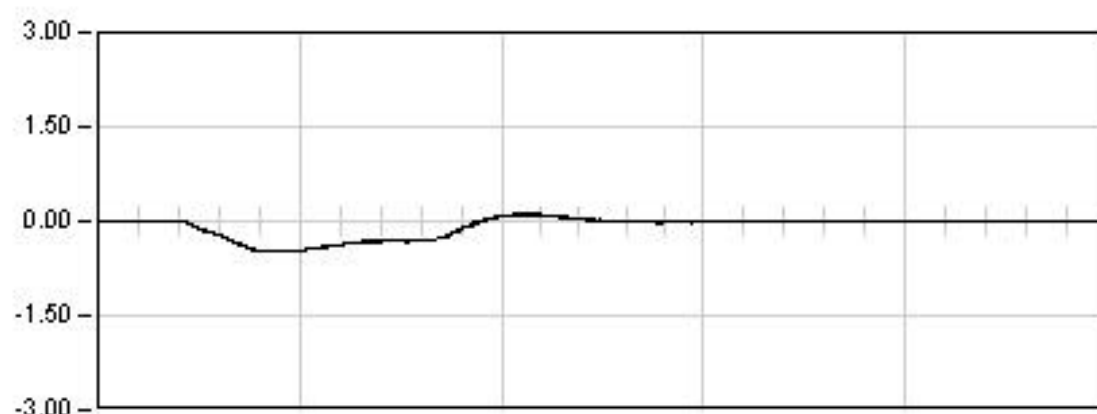
1400.0 Seg

Est: 0.16

Max: -0.41

Min: 0.18

Rem: -0.00

**DINAMICA 01**

85.0 Seg

Max: -0.49

Min: 0.12

Rem: 0.00

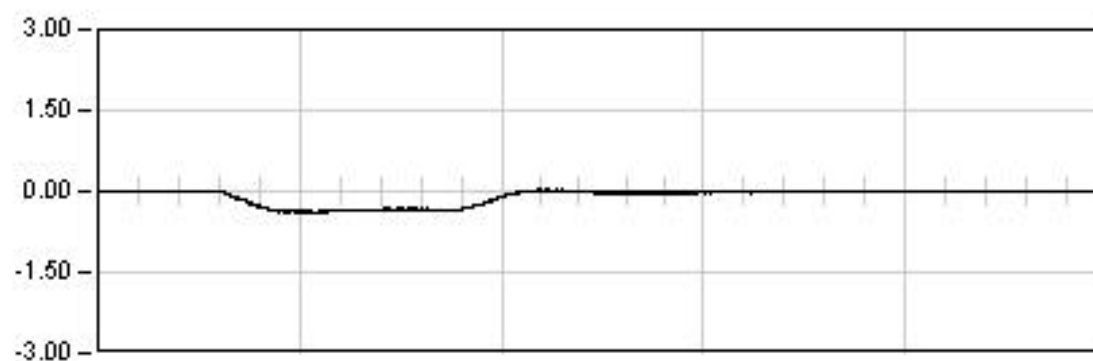
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P093

Canal : 55

Unidades : mm

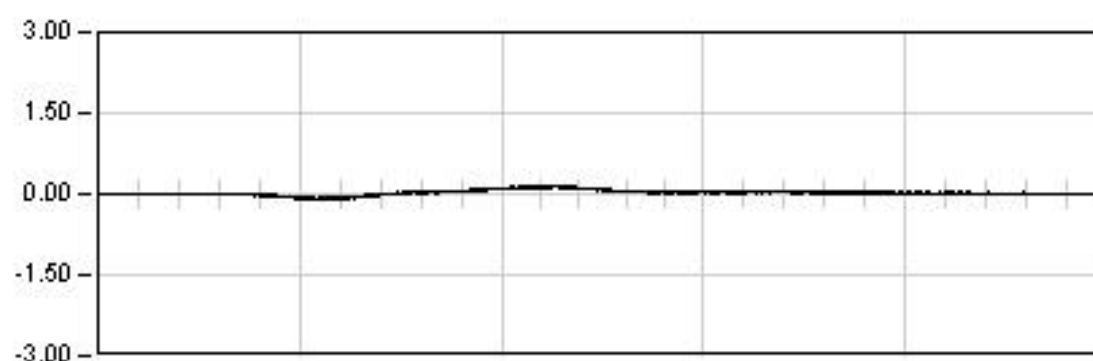
**DYNAMICA 11**

125.0 Seg

Max: -0.40

Min: 0.03

Rem: 0.01

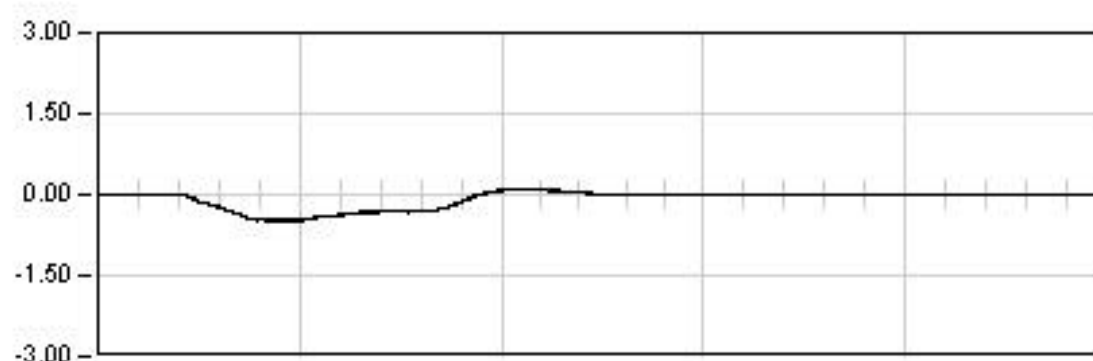
**DYNAMICA 21**

130.0 Seg

Max: 0.15

Min: -0.10

Rem: 0.01

**DYNAMICA 01**

85.0 Seg

Max: -0.49

Min: 0.12

Rem: 0.00

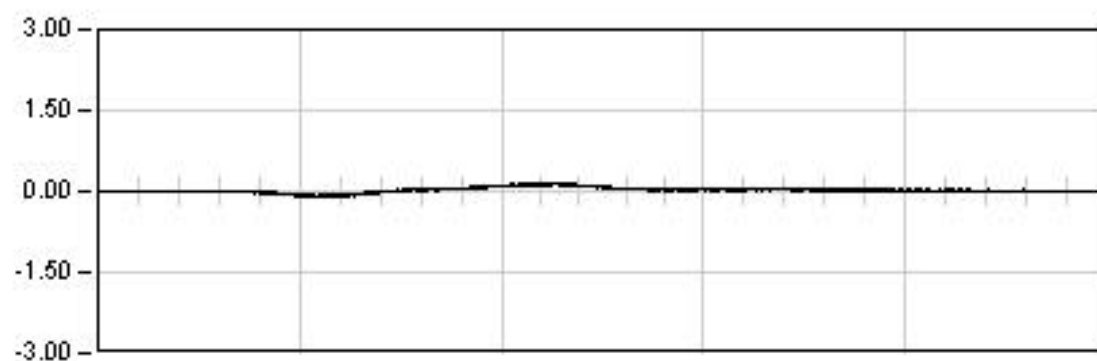
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P093

Canal : 55

Unidades : mm

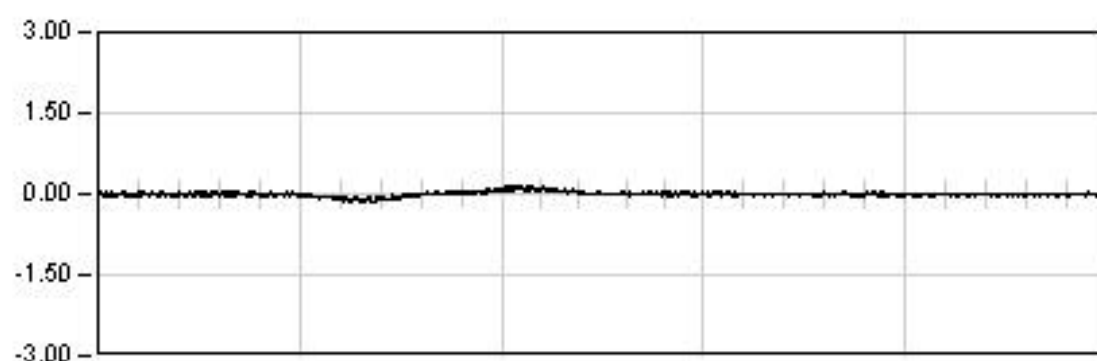
**DYNAMICA 21**

130.0 Seg

Max: 0.15

Min: -0.10

Rem: 0.01

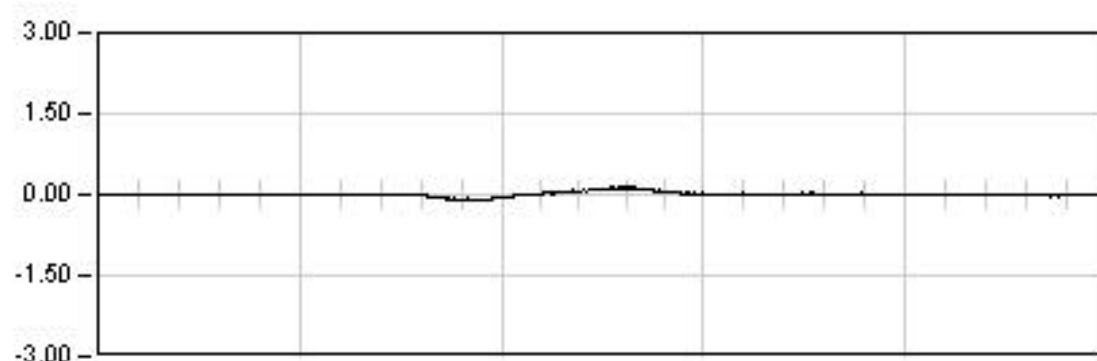
**DYNAMICA 22**

45.0 Seg

Max: -0.17

Min: 0.15

Rem: -0.02

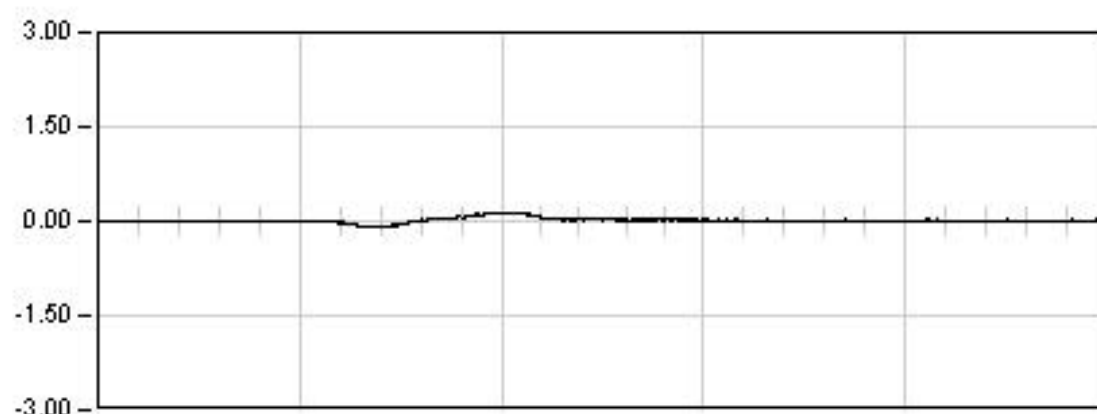
**DYNAMICA 23**

25.0 Seg

Max: 0.13

Min: -0.11

Rem: -0.01

**DYNAMICA 24**

30.0 Seg

Max: 0.14

Min: -0.10

Rem: 0.01



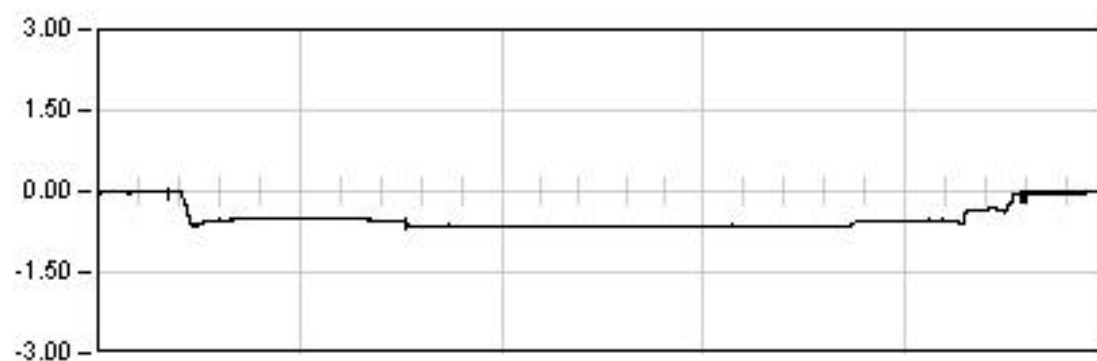
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P094

Canal : 06

Unidades : mm

**ESTATICA 01**

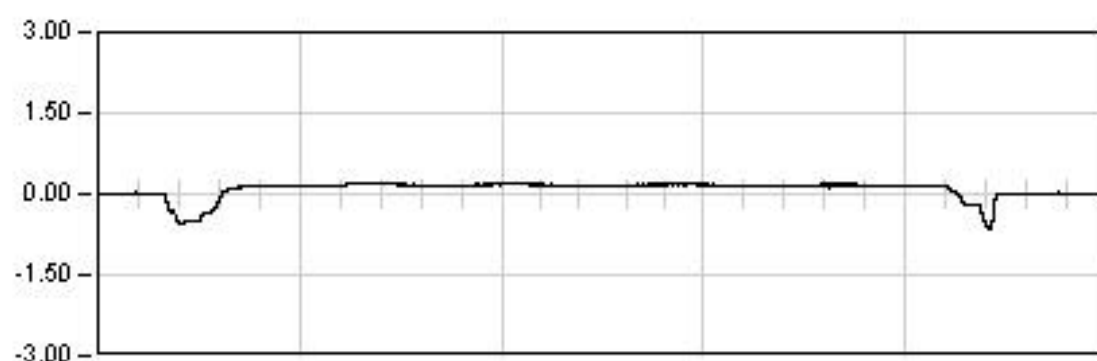
1729.0 Seg

Est: -0.66

Max: -0.69

Min: 0.03

Rem: -0.02

**ESTATICA 02**

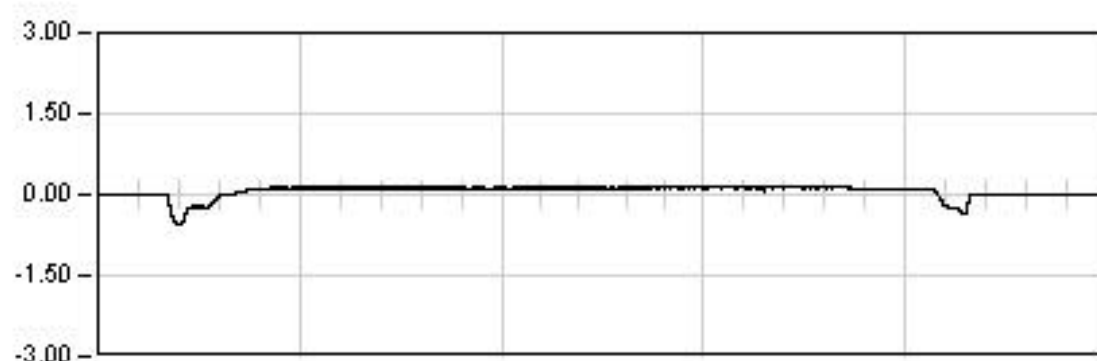
1647.0 Seg

Est: 0.17

Max: -0.63

Min: 0.21

Rem: 0.00

**ESTATICA 03**

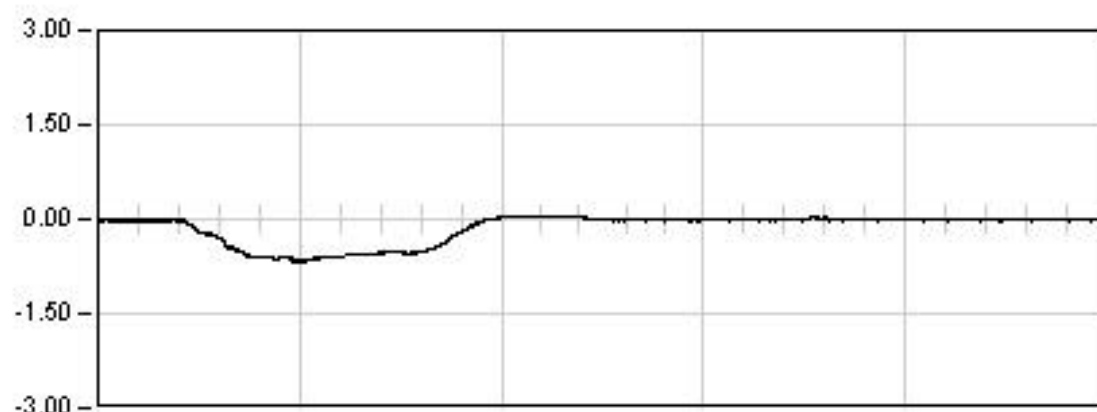
1400.0 Seg

Est: -0.13

Max: -0.57

Min: 0.14

Rem: 0.01

**DINAMICA 01**

85.0 Seg

Max: -0.67

Min: 0.06

Rem: -0.01

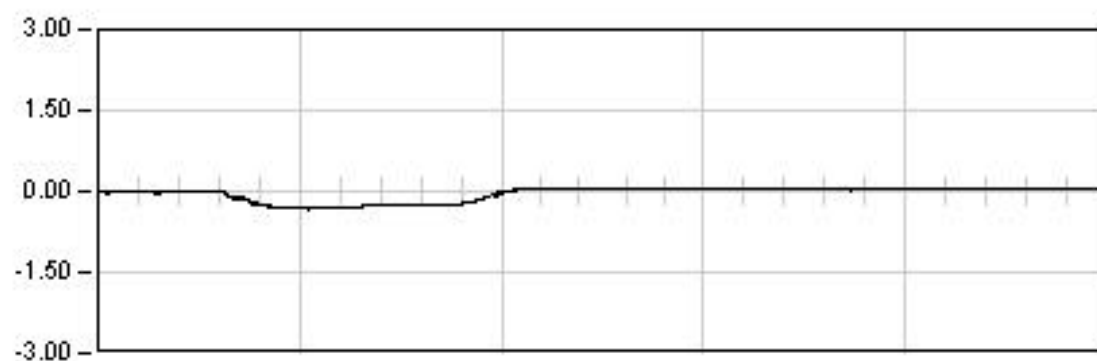
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P094

Canal : 06

Unidades : mm

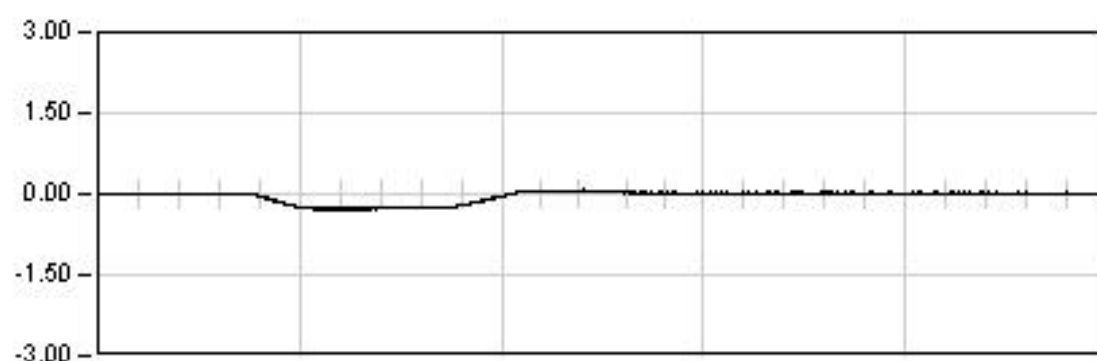
**DYNAMICA 11**

125.0 Seg

Max: -0.33

Min: 0.07

Rem: 0.05

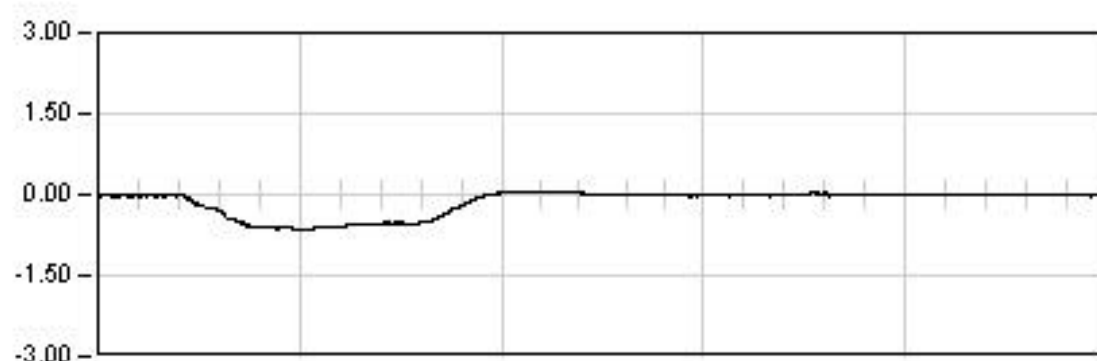
**DYNAMICA 21**

130.0 Seg

Max: -0.28

Min: 0.08

Rem: 0.01

**DYNAMICA 01**

85.0 Seg

Max: -0.67

Min: 0.06

Rem: -0.01

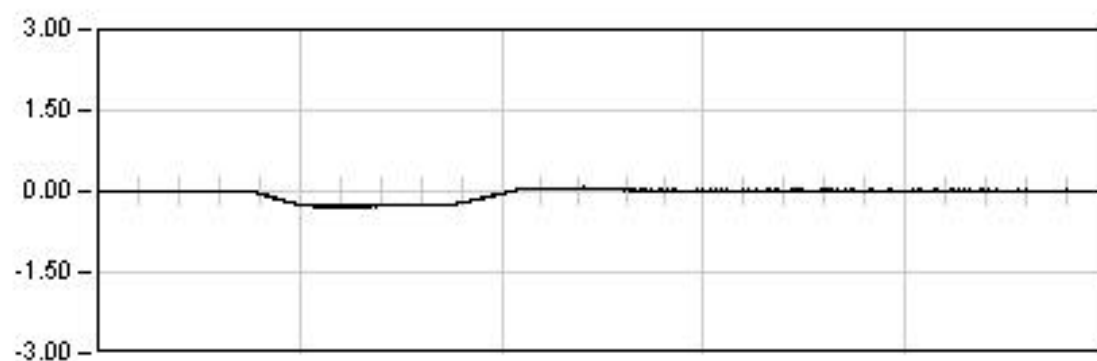
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P094

Canal : 06

Unidades : mm

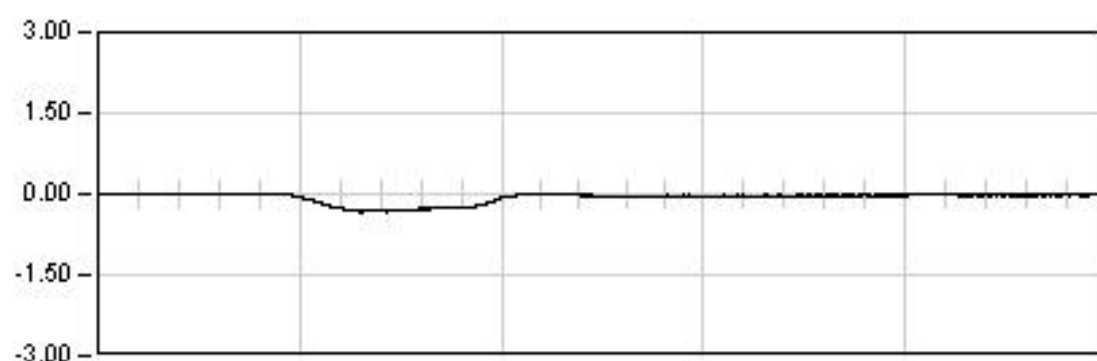
**DYNAMICA 21**

130.0 Seg

Max: -0.28

Min: 0.08

Rem: 0.01

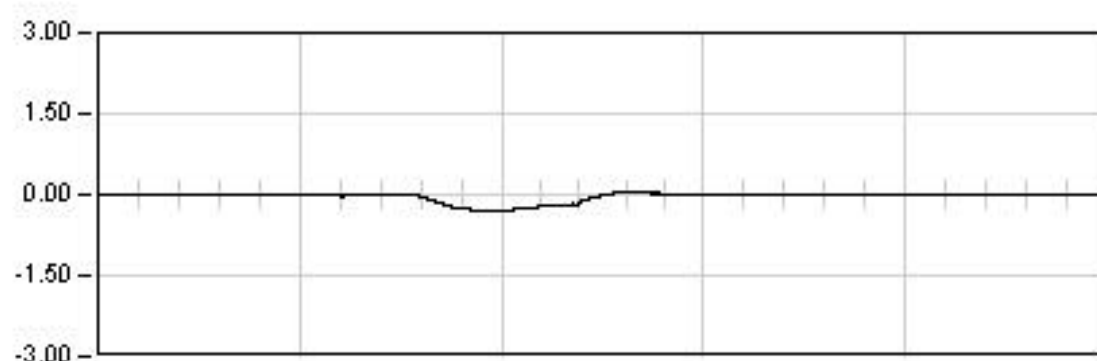
**DYNAMICA 22**

45.0 Seg

Max: -0.33

Min: 0.02

Rem: -0.02

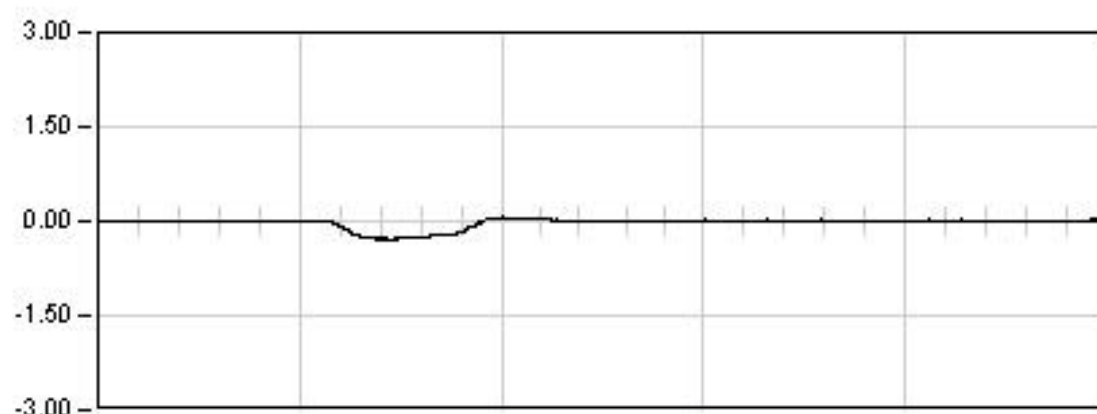
**DYNAMICA 23**

25.0 Seg

Max: -0.31

Min: 0.04

Rem: 0.01

**DYNAMICA 24**

30.0 Seg

Max: -0.29

Min: 0.07

Rem: 0.01

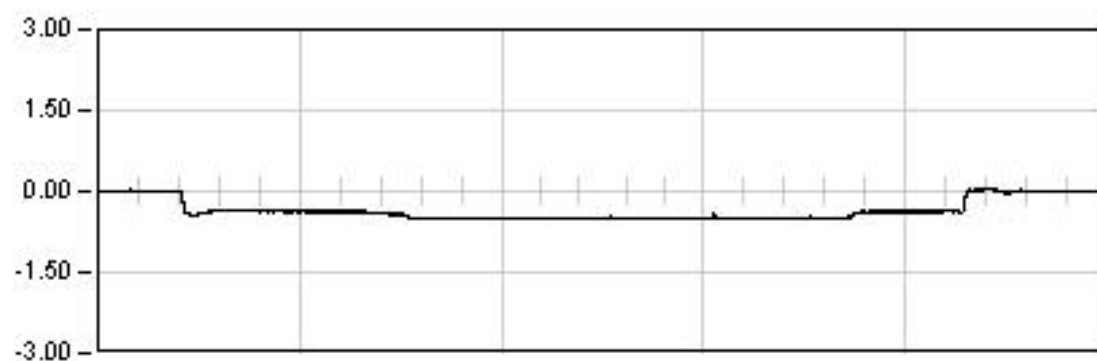
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P095

Canal : 07

Unidades : mm

**ESTATICA 01**

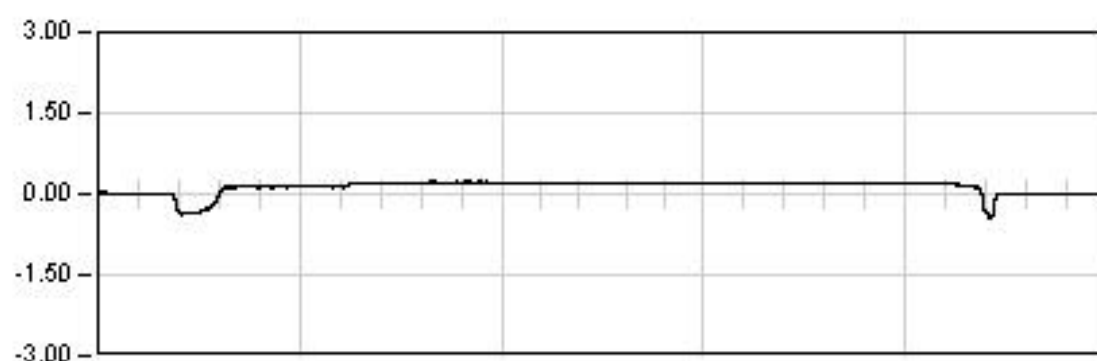
1729.0 Seg

Est: -0.49

Max: -0.52

Min: 0.05

Rem: -0.01

**ESTATICA 02**

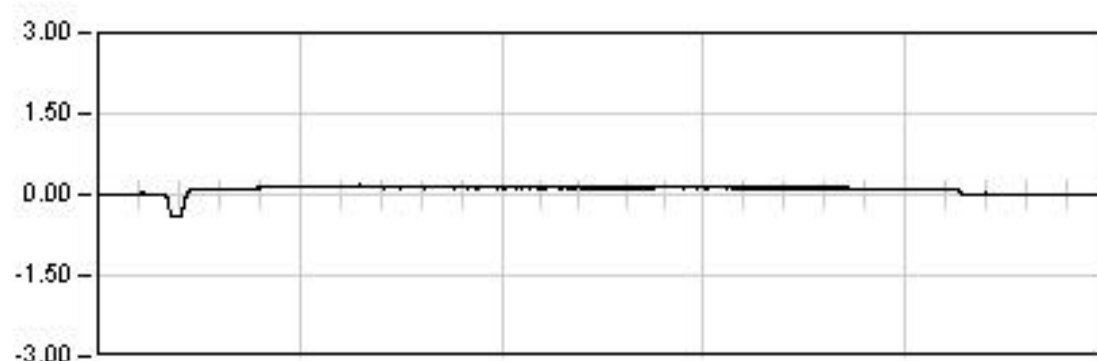
1647.0 Seg

Est: 0.21

Max: -0.44

Min: 0.27

Rem: 0.00

**ESTATICA 03**

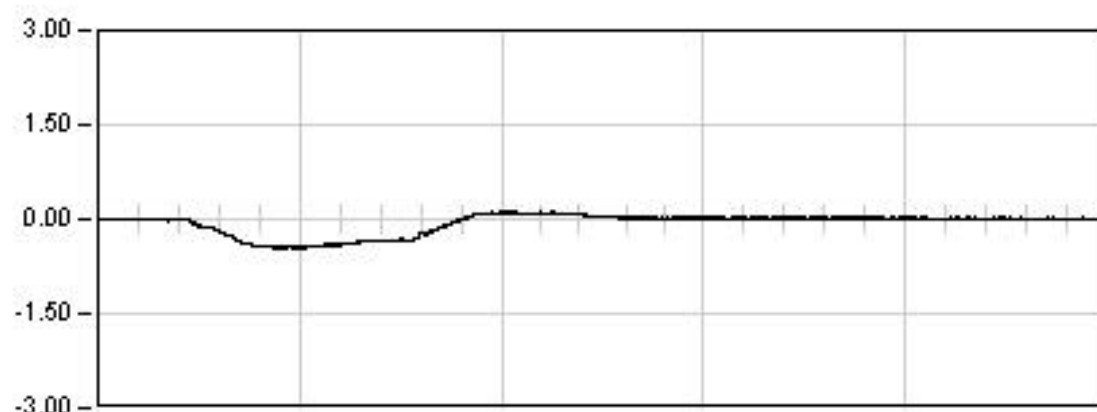
1400.0 Seg

Est: -0.13

Max: -0.42

Min: 0.18

Rem: 0.01

**DINAMICA 01**

85.0 Seg

Max: -0.46

Min: 0.13

Rem: 0.01

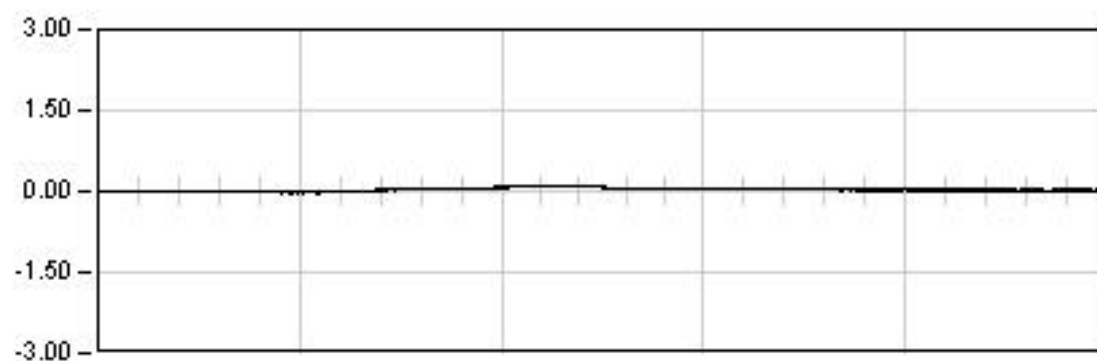
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P095

Canal : 07

Unidades : mm

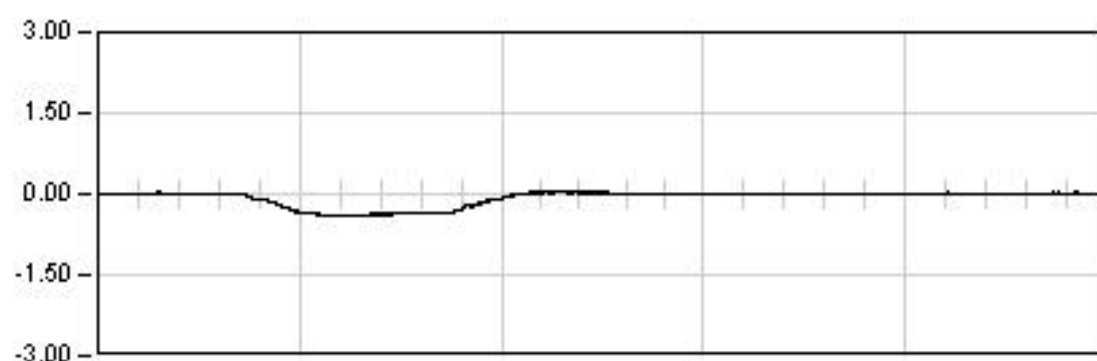
**DYNAMICA 11**

125.0 Seg

Max: 0.12

Min: -0.03

Rem: 0.02

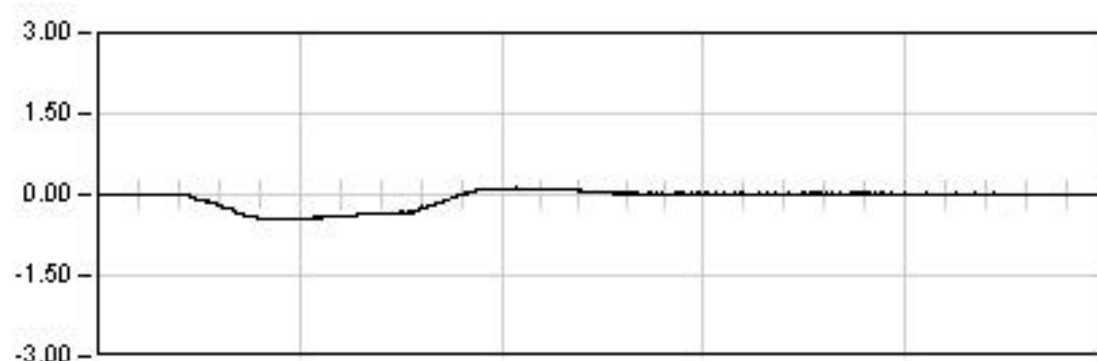
**DYNAMICA 21**

130.0 Seg

Max: -0.41

Min: 0.04

Rem: 0.00

**DYNAMICA 01**

85.0 Seg

Max: -0.46

Min: 0.13

Rem: 0.01

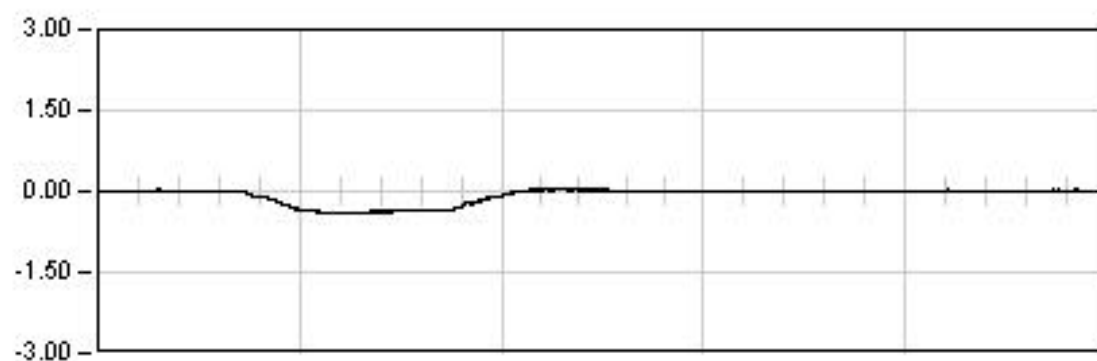
## VIADUCTO DEL GALLO

P.K. 81/580

Punto : P095

Canal : 07

Unidades : mm

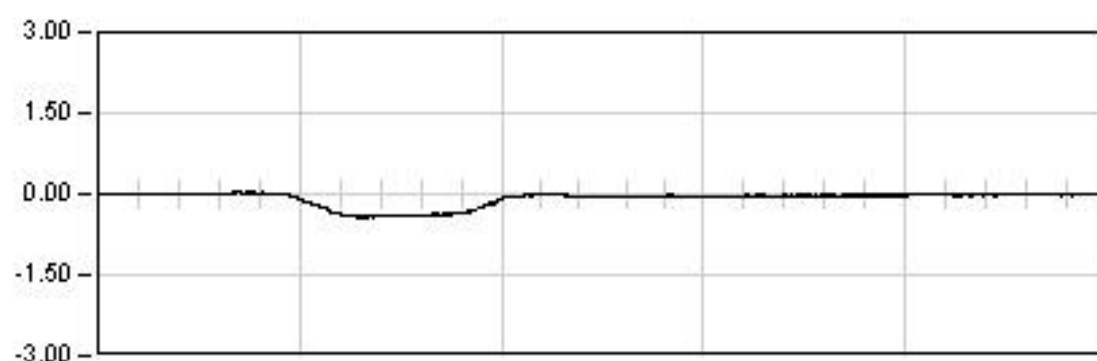
**DYNAMICA 21**

130.0 Seg

Max: -0.41

Min: 0.04

Rem: 0.00

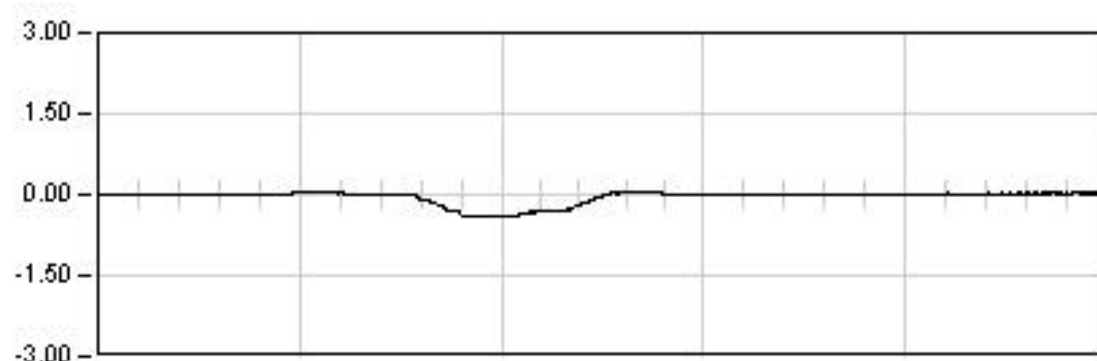
**DYNAMICA 22**

45.0 Seg

Max: -0.43

Min: 0.04

Rem: -0.01

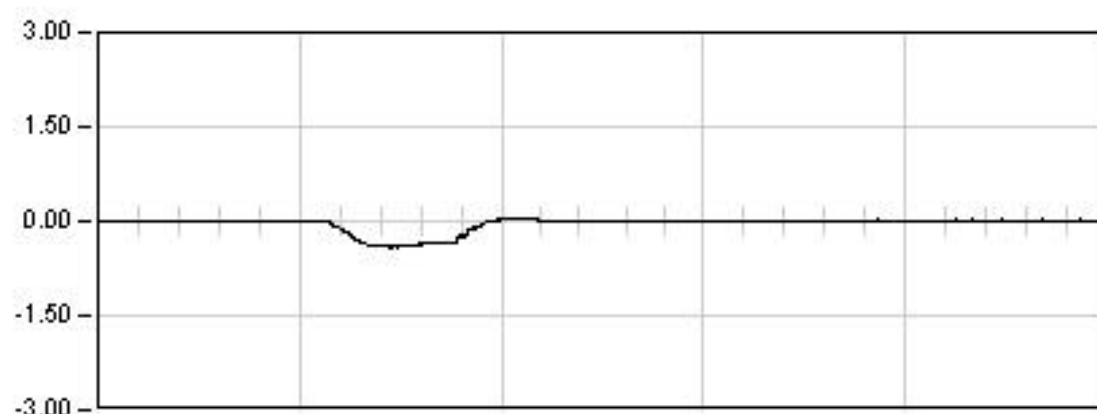
**DYNAMICA 23**

25.0 Seg

Max: -0.42

Min: 0.05

Rem: 0.03

**DYNAMICA 24**

30.0 Seg

Max: -0.41

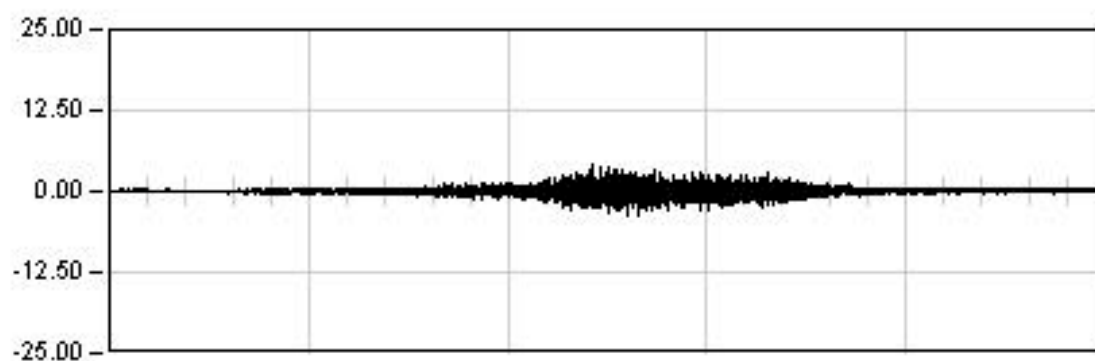
Min: 0.04

Rem: 0.01

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A062    Canal : 34    Unidades : G's/100

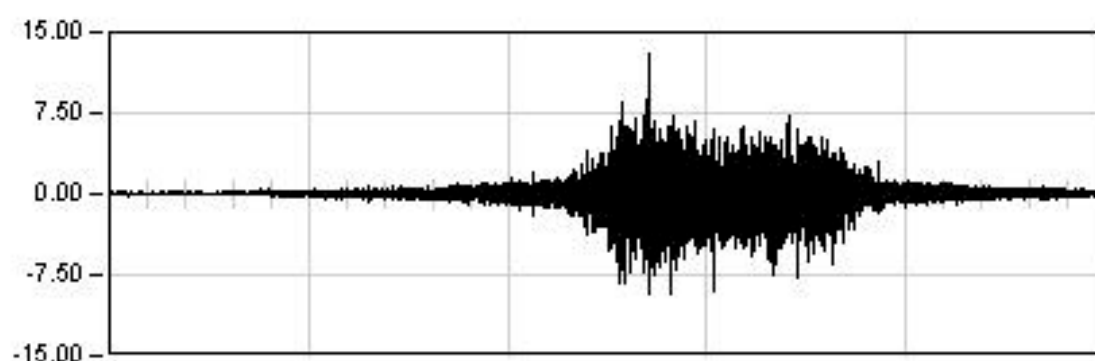
**DINAMICA 11**

125.0    Seg

Max:    3.99

Min:    -3.92

Rem:    0.06

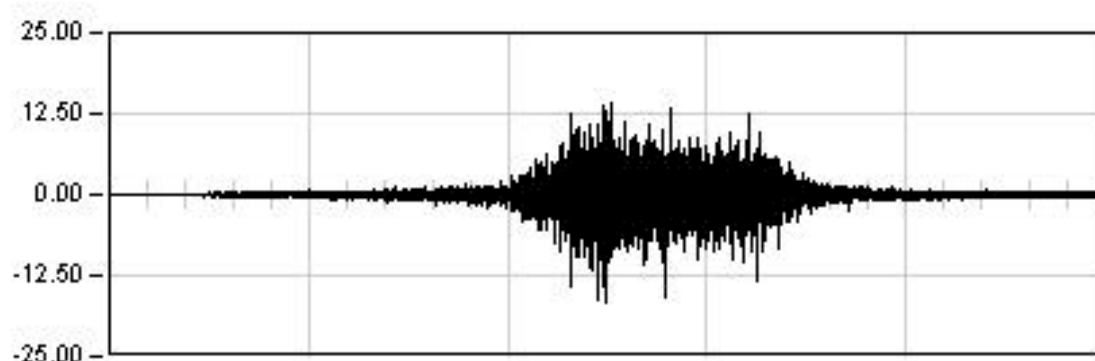
**DINAMICA 21**

130.0    Seg

Max:    13.03

Min:    -9.34

Rem:    0.03

**DINAMICA 01**

85.0    Seg

Max:    -16.56

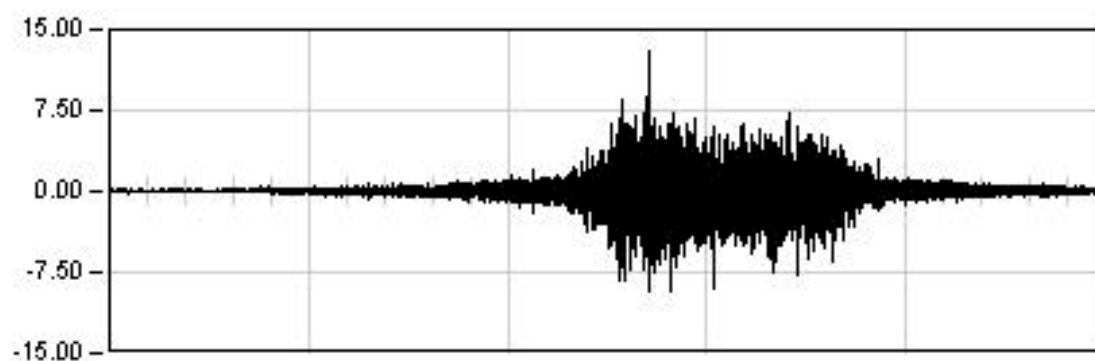
Min:    14.20

Rem:    -0.02

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A062    Canal : 34    Unidades : G's/100

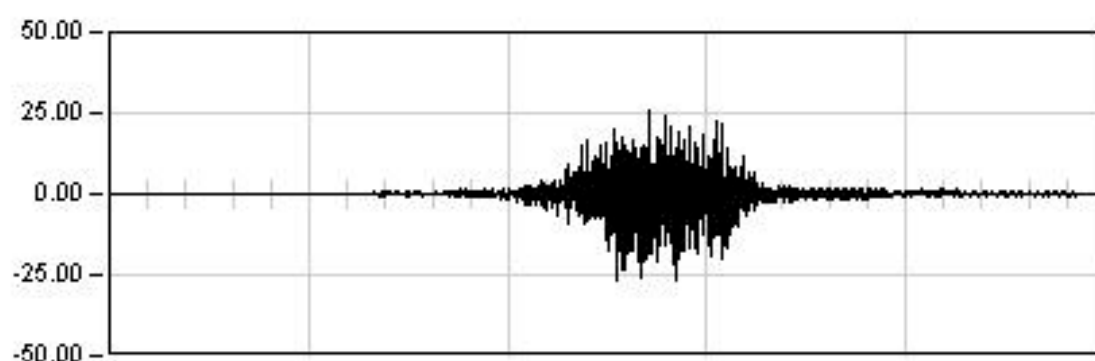
**DINAMICA 21**

130.0    Seg

Max:    13.03

Min:    -9.34

Rem:    0.03

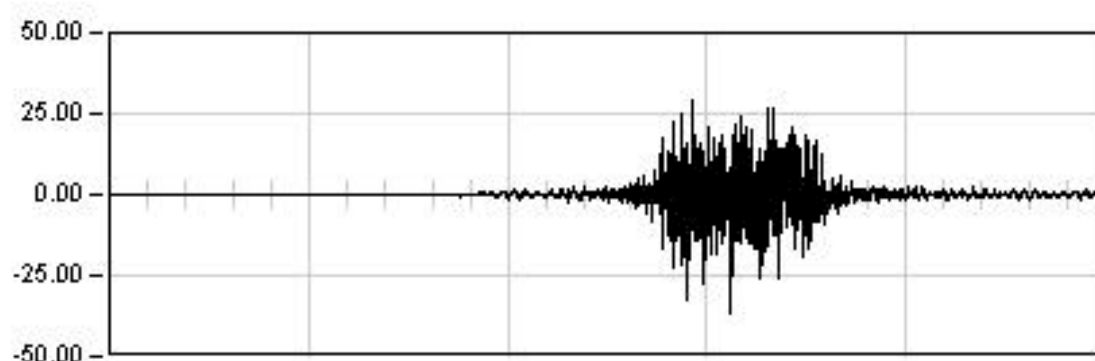
**DINAMICA 22**

45.0    Seg

Max:    -27.01

Min:    25.75

Rem:    0.05

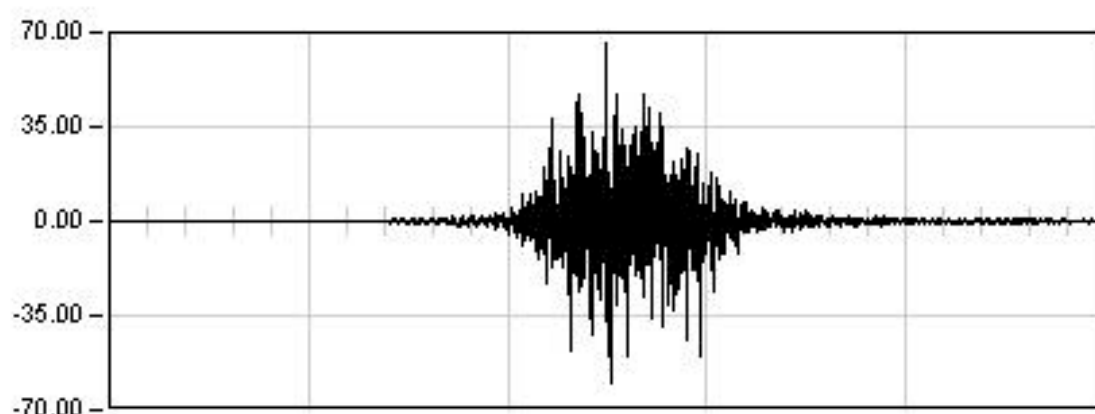
**DINAMICA 23**

25.0    Seg

Max:    -36.38

Min:    29.27

Rem:    0.00

**DINAMICA 24**

30.0    Seg

Max:    66.45

Min:    -60.24

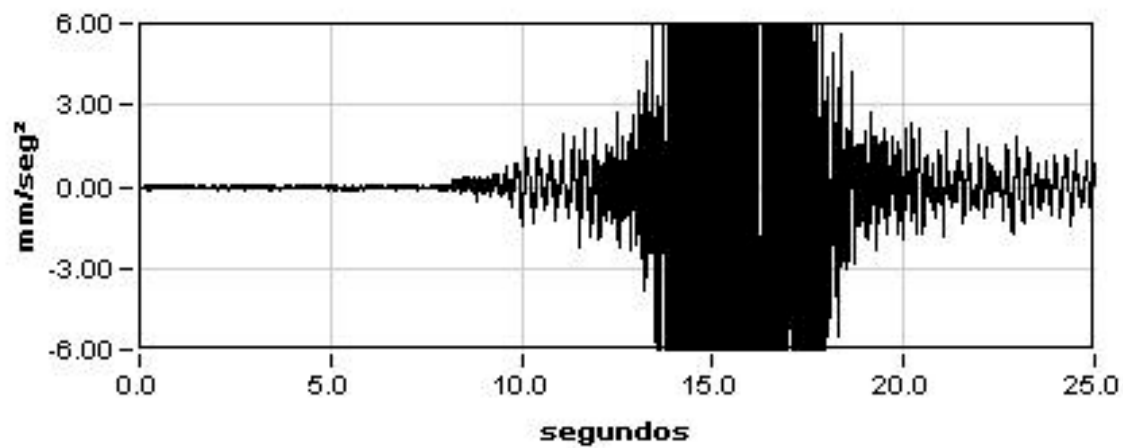
Rem:    0.05



# VIADUCTO DEL GALLO (29VI02)

P.K. 81/580

Prueba: din23 Punto: A062 Canal: 34

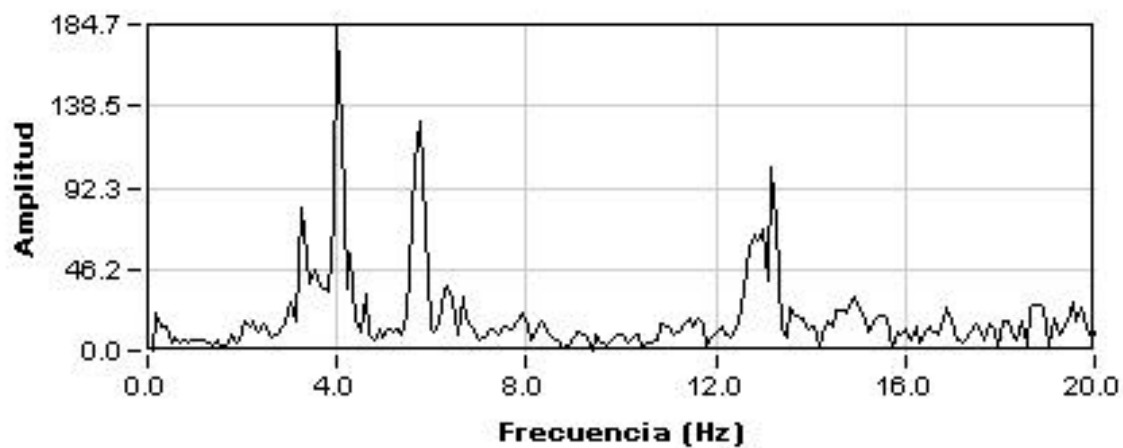
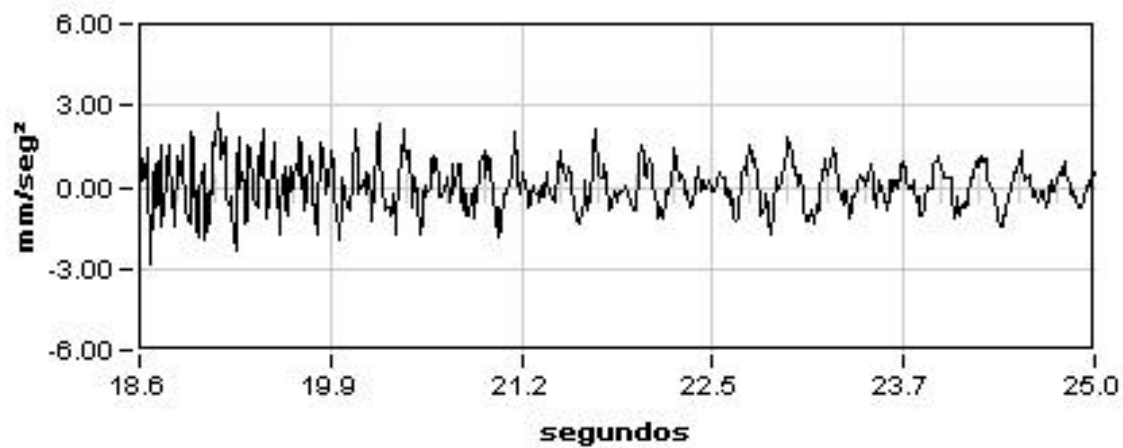


**Máximo**

-36.38

**Mínimo**

29.27



**Amplitud**

184.66

**Frecuencia**

4.02

**Dec.Logarit.**

0.11

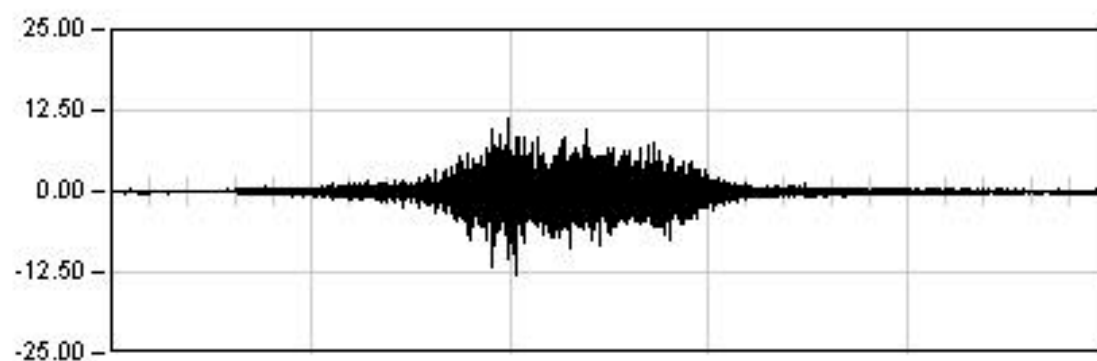
**Amortiguac.**

1.72 %

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A071    Canal : 35    Unidades : G's/100

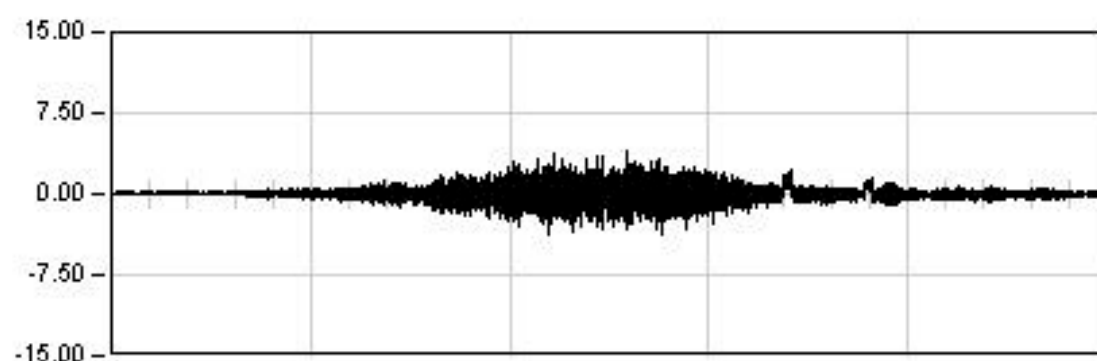
**DINAMICA 11**

125.0    Seg

Max:    -13.05

Min:    11.34

Rem:    -0.09

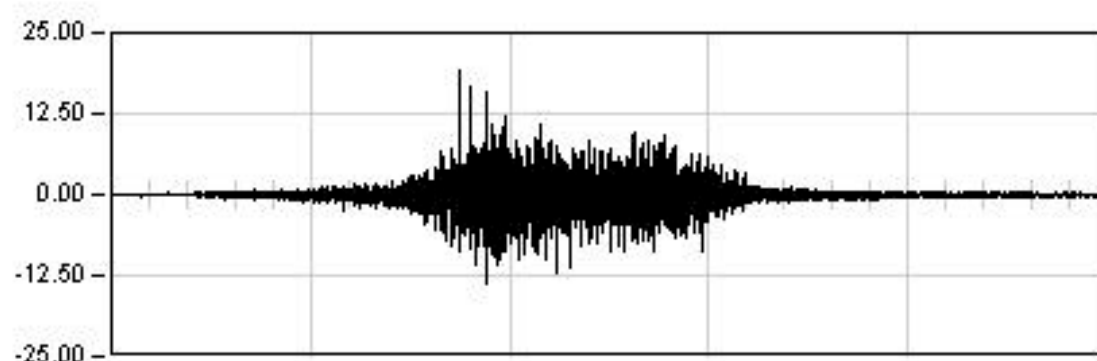
**DINAMICA 21**

130.0    Seg

Max:    4.09

Min:    -3.85

Rem:    0.06

**DINAMICA 01**

85.0    Seg

Max:    18.99

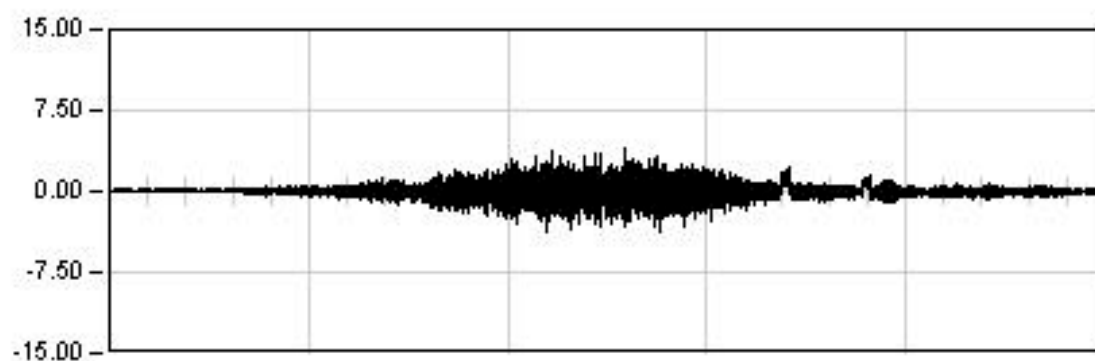
Min:    -13.81

Rem:    -0.08

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A071    Canal : 35    Unidades : G's/100

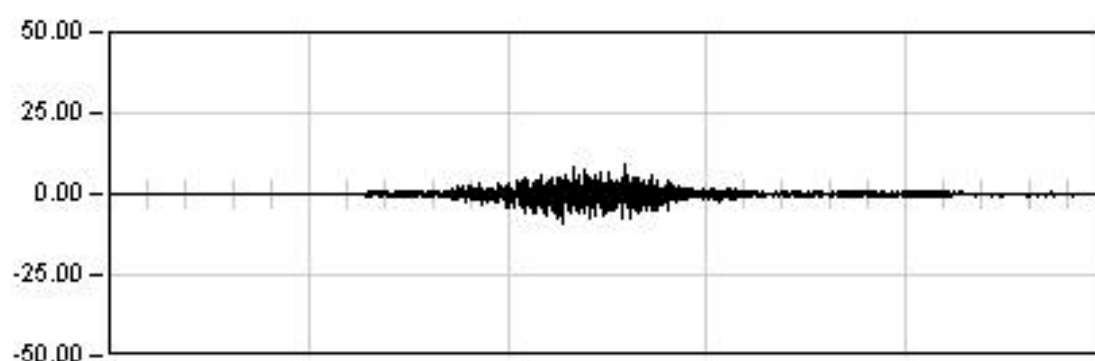
**DINAMICA 21**

130.0    Seg

Max:    4.09

Min:    -3.85

Rem:    0.06

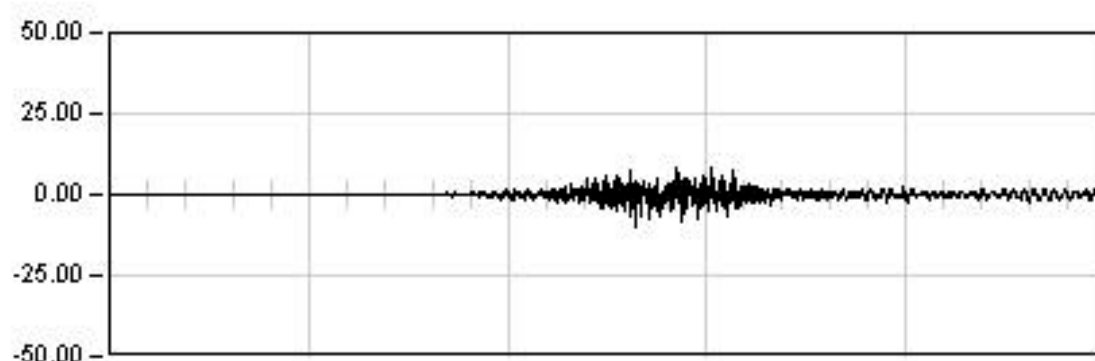
**DINAMICA 22**

45.0    Seg

Max:    -8.90

Min:    8.78

Rem:    -0.04

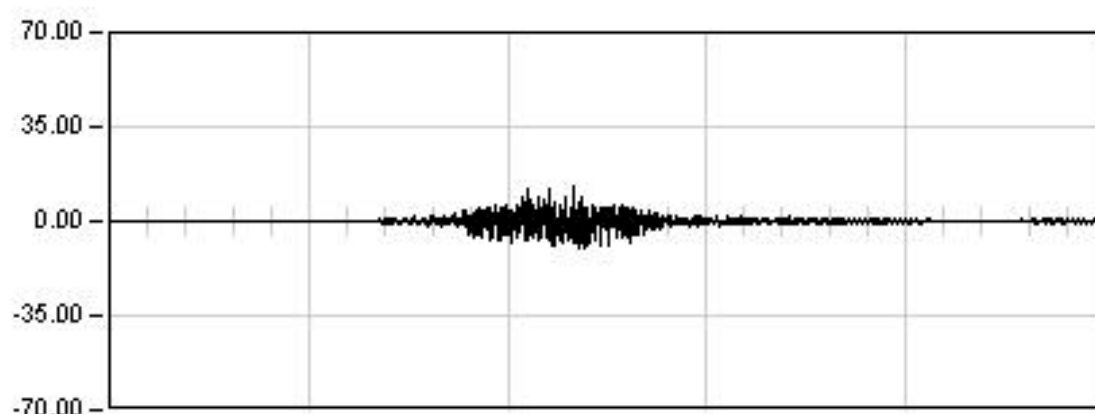
**DINAMICA 23**

25.0    Seg

Max:    -10.04

Min:    8.62

Rem:    0.04

**DINAMICA 24**

30.0    Seg

Max:    13.16

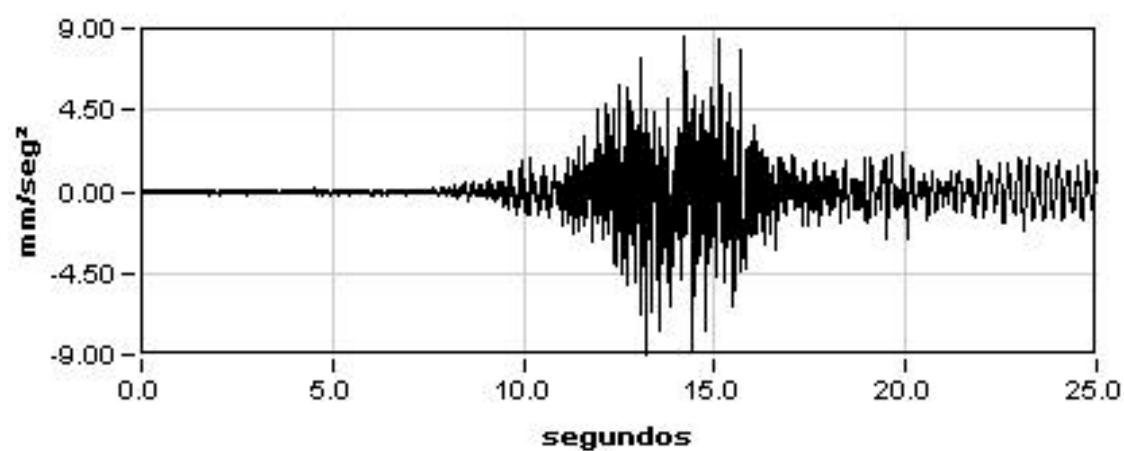
Min:    -10.01

Rem:    0.01

# VIADUCTO DEL GALLO (29VI02)

P.K. 81/580

Prueba: din23 Punto: A071 Canal: 35

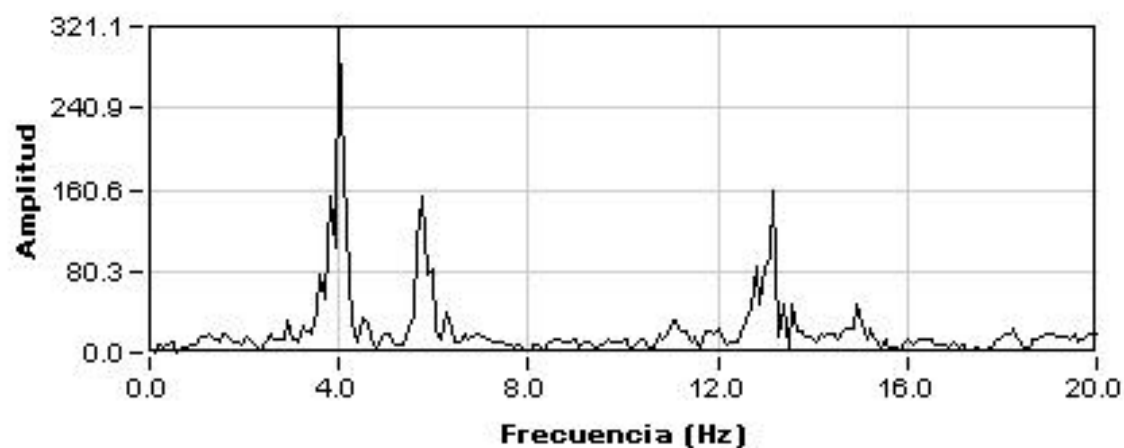
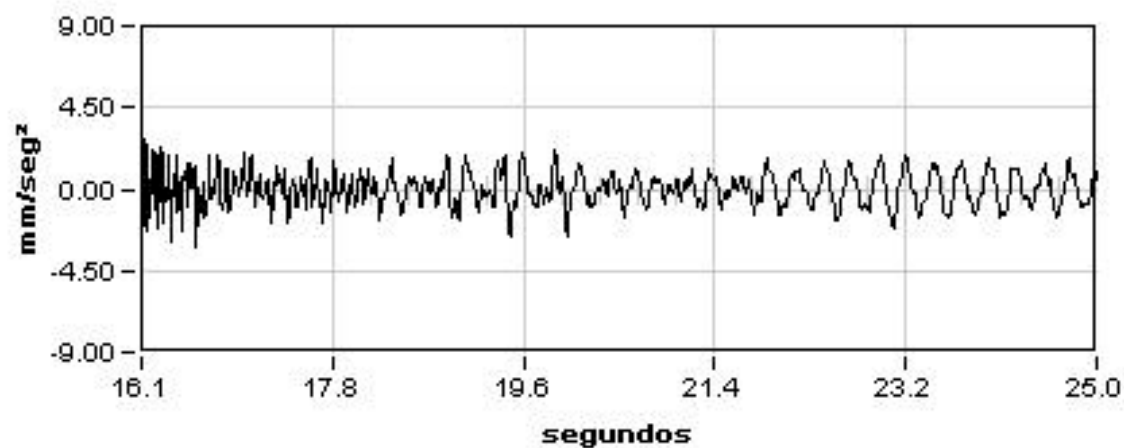


**Máximo**

-10.04

**Mínimo**

8.62



**Amplitud**

321.15

**Frecuencia**

4.02

**Dec.Logarit.**

0.08

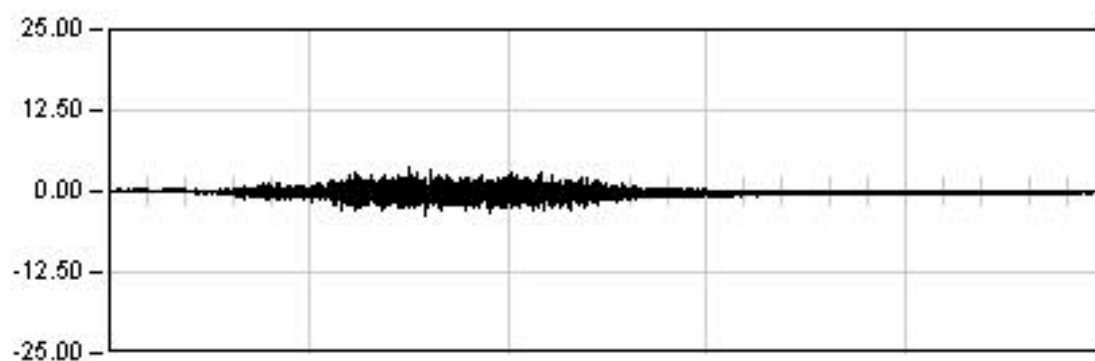
**Amortiguac.**

1.32 %

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A082    Canal : 36    Unidades : G's/100

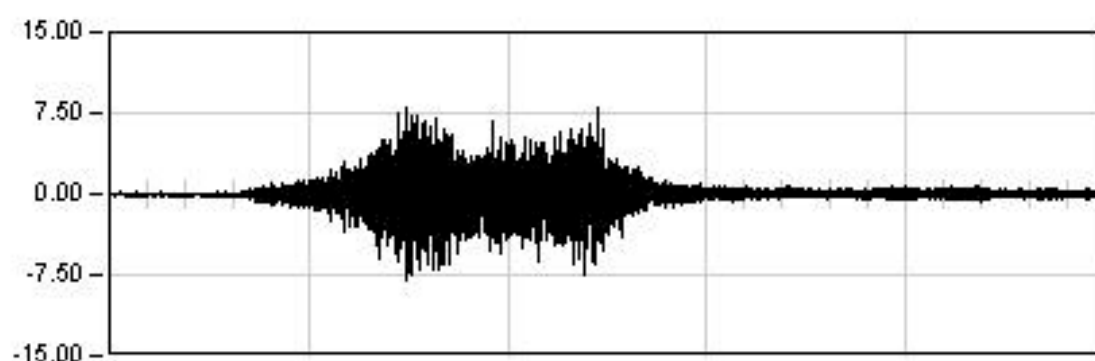
**DINAMICA 11**

125.0    Seg

Max:    -3.64

Min:    3.57

Rem:    -0.10

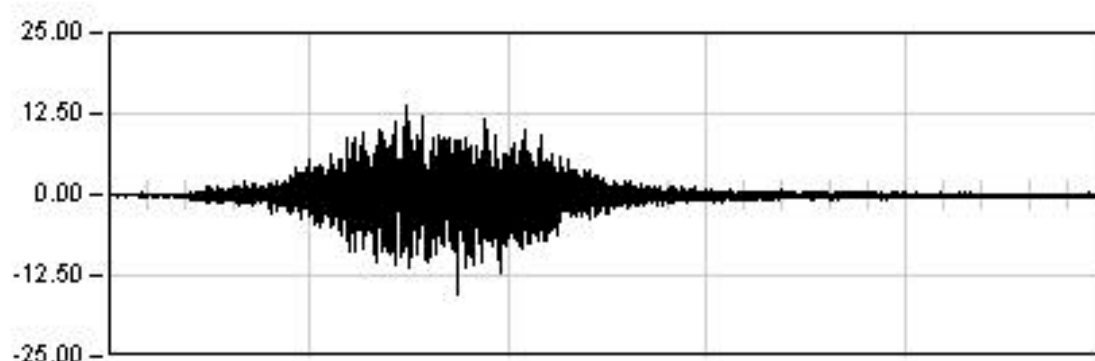
**DINAMICA 21**

130.0    Seg

Max:    -8.02

Min:    7.89

Rem:    -0.02

**DINAMICA 01**

85.0    Seg

Max:    -15.42

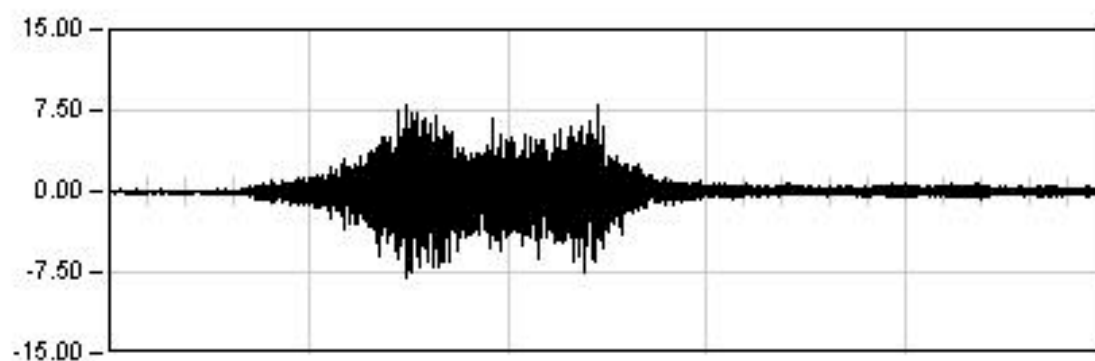
Min:    13.79

Rem:    -0.22

## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A082    Canal : 36    Unidades : G's/100

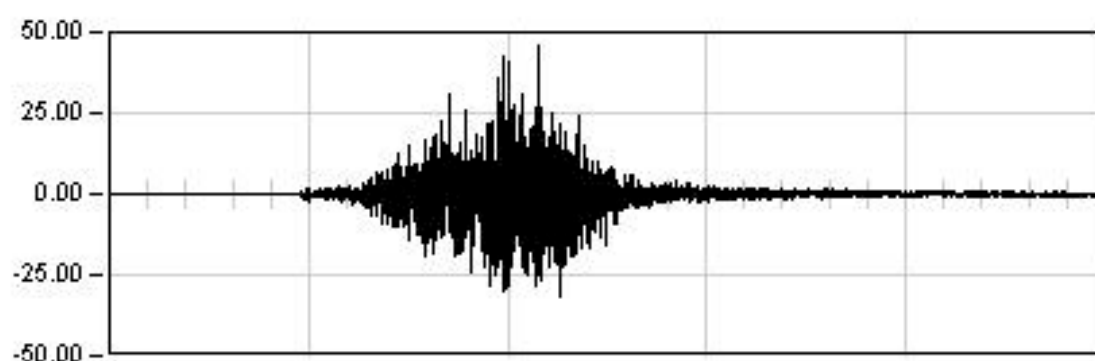
**DINAMICA 21**

130.0    Seg

Max:    -8.02

Min:    7.89

Rem:    -0.02

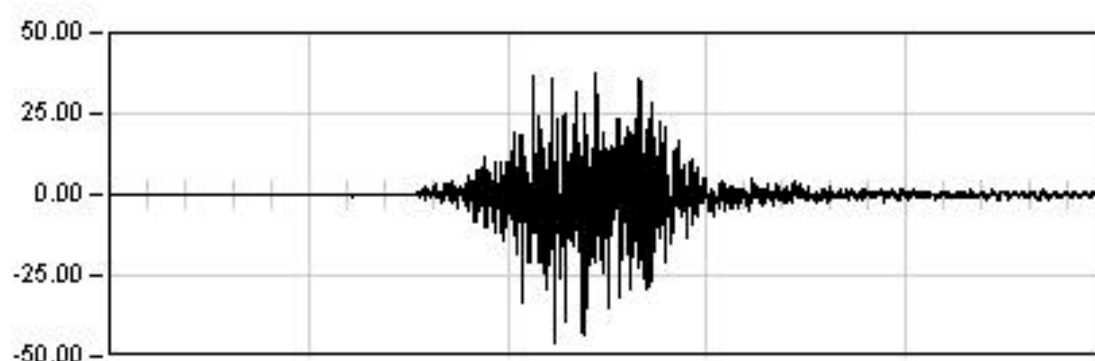
**DINAMICA 22**

45.0    Seg

Max:    45.83

Min:    -31.61

Rem:    -0.52

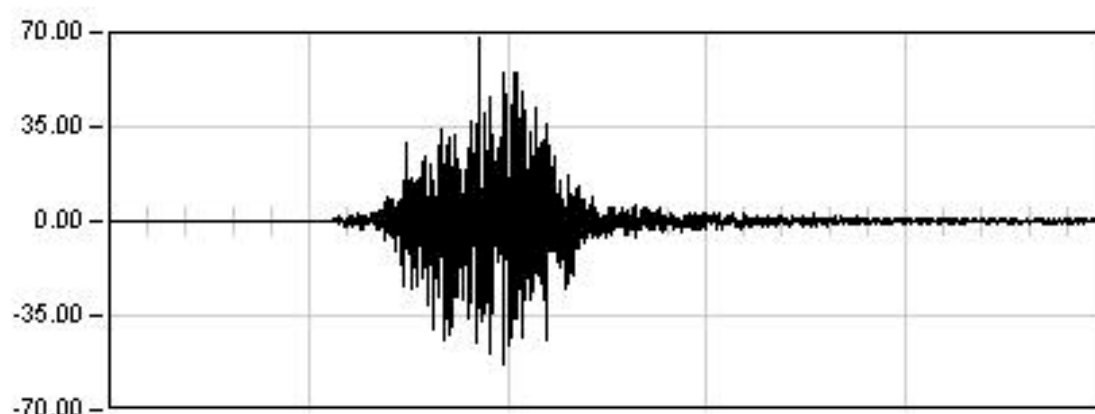
**DINAMICA 23**

25.0    Seg

Max:    -46.17

Min:    37.24

Rem:    -0.02

**DINAMICA 24**

30.0    Seg

Max:    67.94

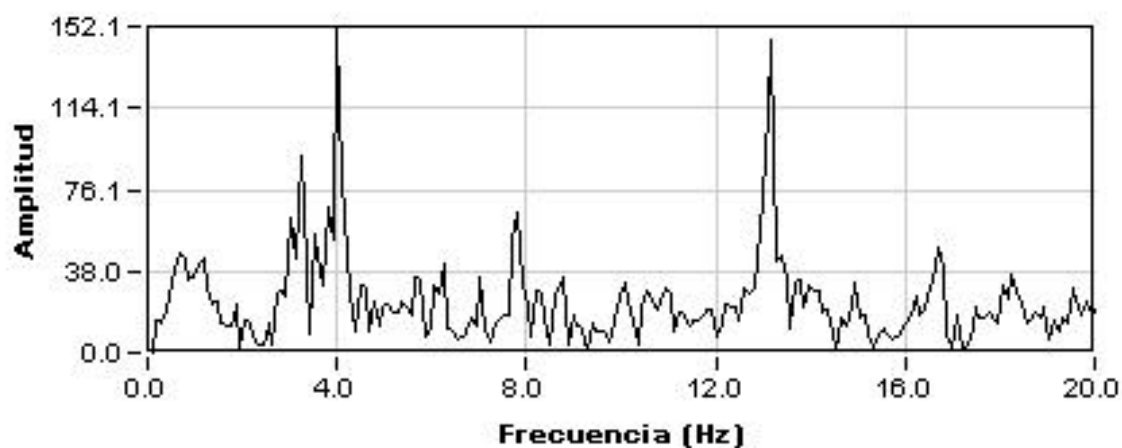
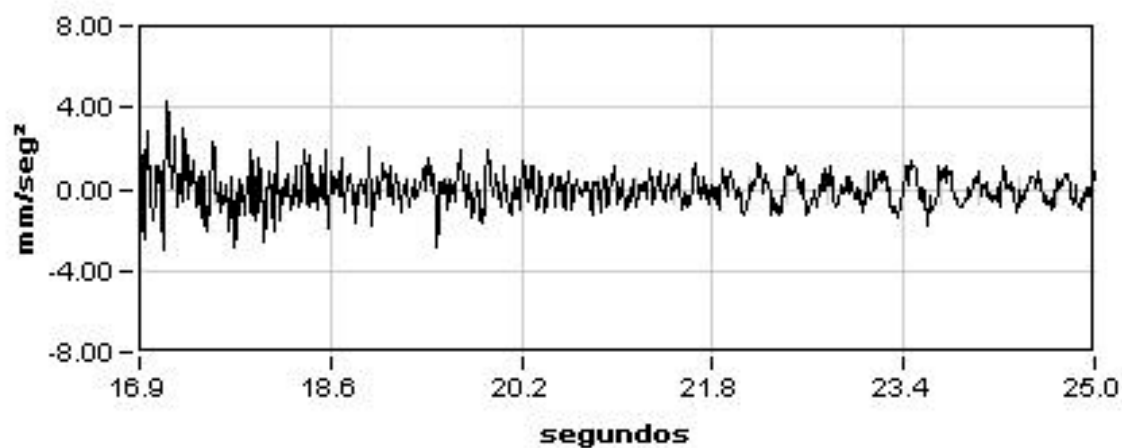
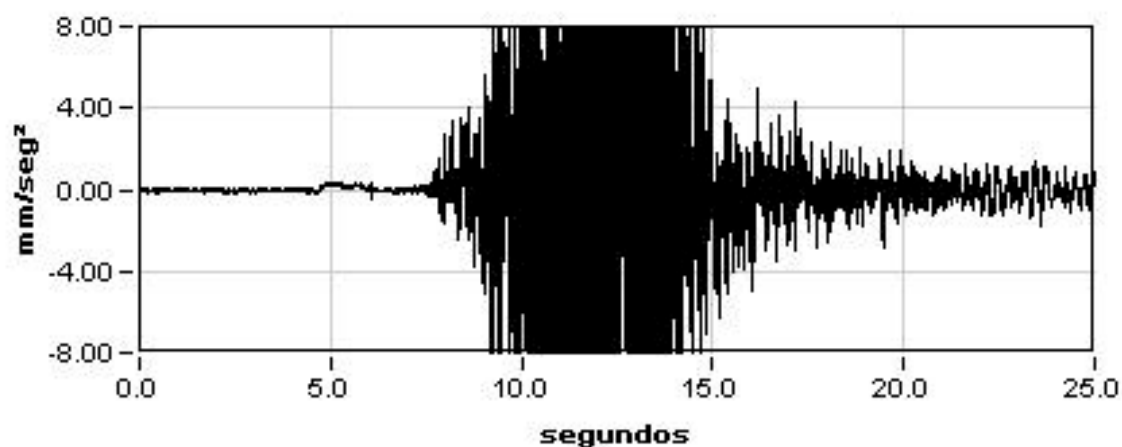
Min:    -52.88

Rem:    0.13

# VIADUCTO DEL GALLO (29VI02)

P.K. 81/580

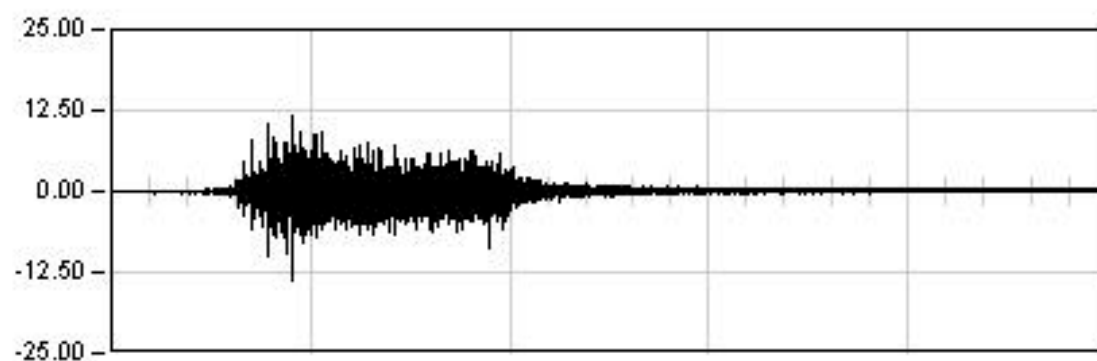
Prueba: din23 Punto: A082 Canal: 36



## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A091    Canal : 37    Unidades : G's/100

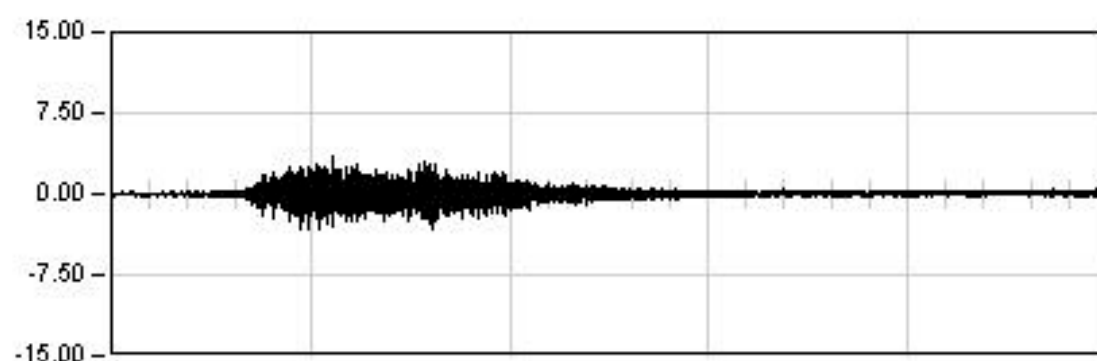
**DINAMICA 11**

125.0    Seg

Max:    -13.89

Min:    11.46

Rem:    0.11

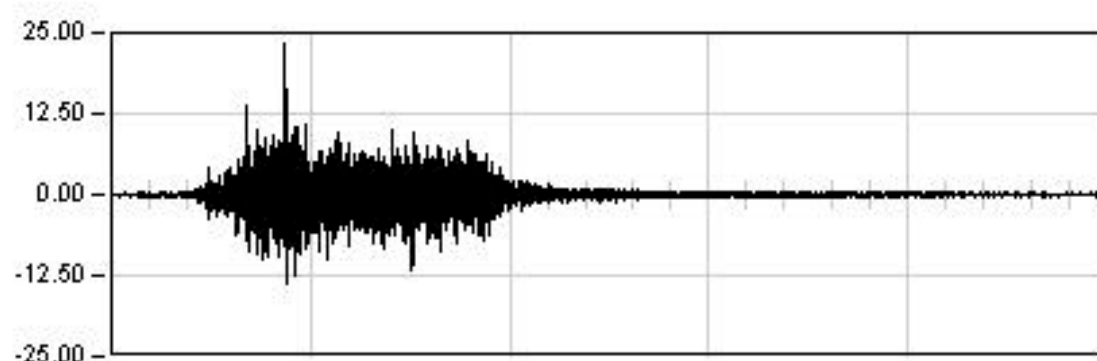
**DINAMICA 21**

130.0    Seg

Max:    3.61

Min:    -3.30

Rem:    0.06

**DINAMICA 01**

85.0    Seg

Max:    23.42

Min:    -13.75

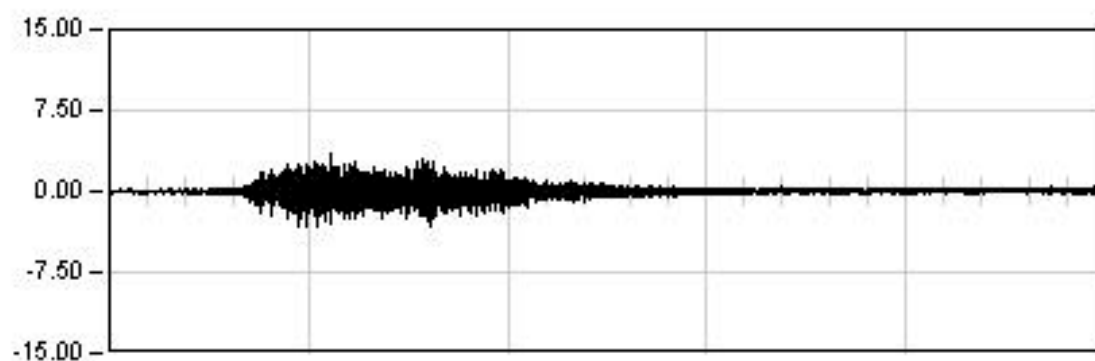
Rem:    0.07



## VIADUCTO DEL GALLO

P.K. 81/580

Punto : A091    Canal : 37    Unidades : G's/100

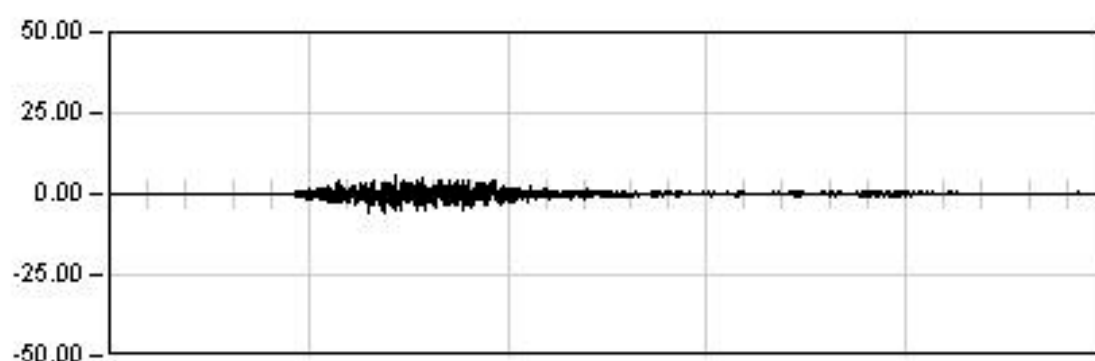
**DINAMICA 21**

130.0    Seg

Max:    3.61

Min:    -3.30

Rem:    0.06

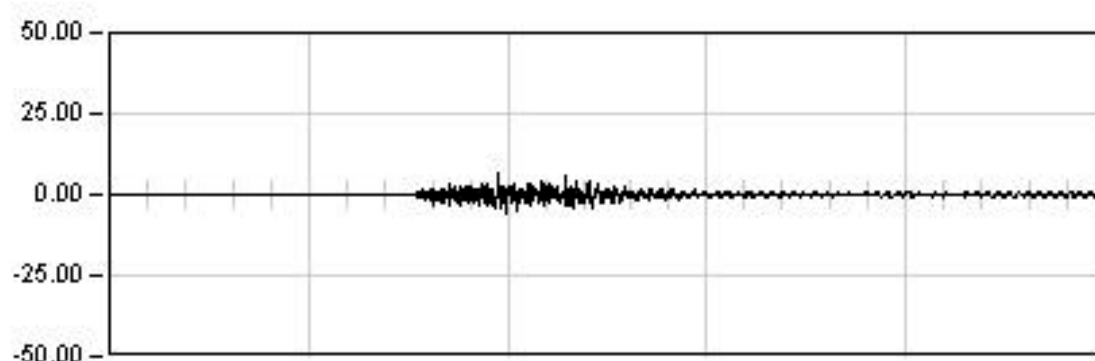
**DINAMICA 22**

45.0    Seg

Max:    -5.70

Min:    5.63

Rem:    0.03

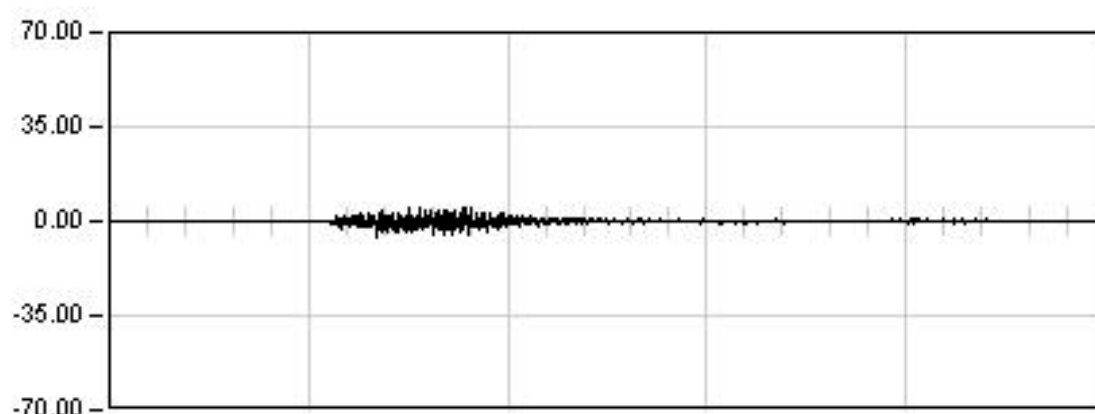
**DINAMICA 23**

25.0    Seg

Max:    6.70

Min:    -6.22

Rem:    0.01

**DINAMICA 24**

30.0    Seg

Max:    -6.23

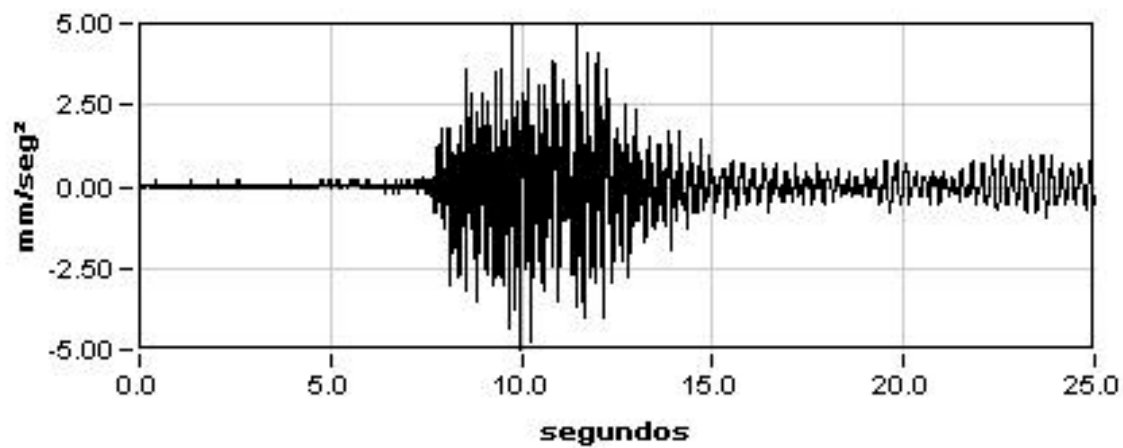
Min:    5.34

Rem:    -0.01

# VIADUCTO DEL GALLO (29VI02)

P.K. 81/580

Prueba: din23 Punto: A091 Canal: 37

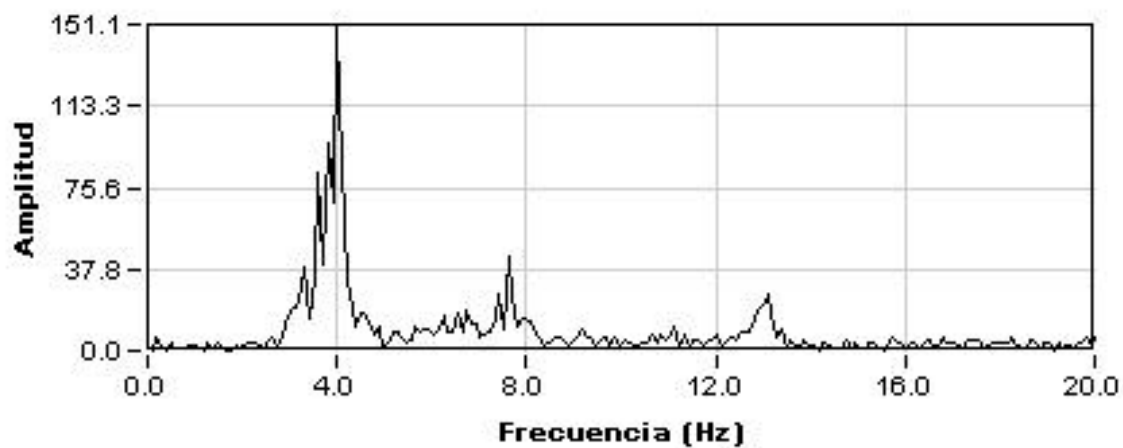
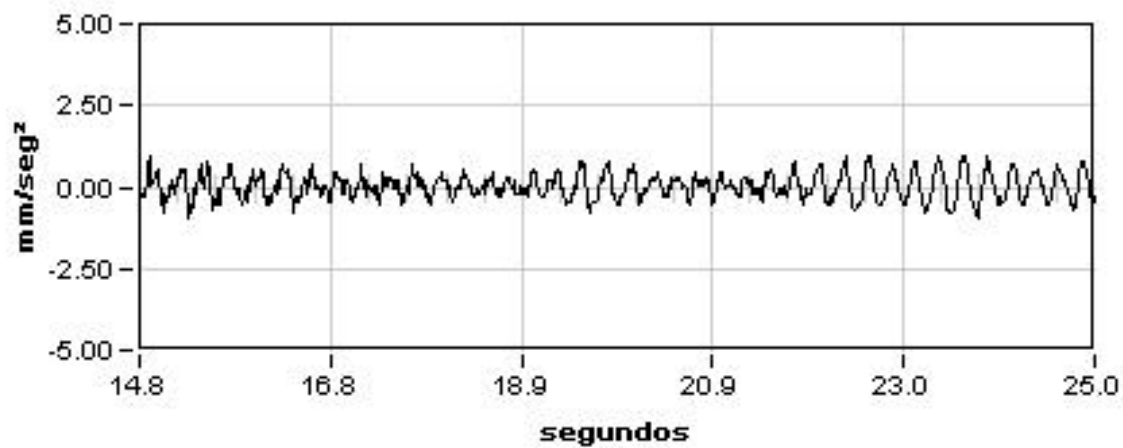


**Máximo**

6.70

**Mínimo**

-6.22



**Amplitud**

151.13

**Frecuencia**

4.02

**Dec.Logarit.**

0.09

**Amortiguac.**

1.48 %

## **ANEJO 5: REPORTAJE FOTOGRÁFICO**

**Madrid, Octubre de 2001**



**FOTOGRAFÍA 1: Vista general del puente**



**FOTOGRAFÍA 2: Vista superior del tablero**



**FOTOGRAFÍA 3: Vista inferior del tablero**



**FOTOGRAFÍA 4: Vista de estribo**





**FOTOGRAFÍA 5: Detalle apoyo de neopreno**



**FOTOGRAFÍA 6: Transductor de desplazamientos en estribo**



**FOTOGRAFÍA 7: Transductor de desplazamiento en zona de apoyos**



**FOTOGRAFÍA 8: Detalle de transductor de desplazamiento**



**FOTOGRAFÍA 9: instrumentación en centro de vano**



**FOTOGRAFÍA 10: Detalle de instrumentación en Estribo Lleida**





**FOTOGRAFÍA 11: Estática vanos 2-4**



**FOTOGRAFÍA 12: Estática vanos 1-3 (Vano 3)**



**FOTOGRAFÍA 13: Estática vanos 1-3 (Vano 1)**



**FOTOGRAFÍA 14: Estática vanos 3-4**



**FOTOGRAFÍA 15: Estática vanos 3-4**



**FOTOGRAFÍA 16: Dinámica por vía 2**





**FOTOGRAFÍA 17: Posición estática EST04 en vanos 1-2-3-4**



**FOTOGRAFÍA 18: Posición estática EST03 en vanos 1-2-3-4**

**ANEJO 6: ACTA DE LA PRUEBA DE CARGA**

Madrid, Octubre de 2001

## ACTA DE LA PRUEBA DE CARGA

| <b>IDENTIFICACIÓN ESTRUCTURA</b> |                                                                                                                                                                                                                                                                                                           |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LÍNEA DE ALTA VELOCIDAD</b>   | MADRID - BARCELONA - FRONTERA FRANCESA                                                                                                                                                                                                                                                                    |
| <b>TRAMO</b>                     | PUENTE DE EBRO - LLEIDA                                                                                                                                                                                                                                                                                   |
| <b>P.K.</b>                      | 81+ 580                                                                                                                                                                                                                                                                                                   |
| <b>IDENTIFICACIÓN INVENTARIO</b> | 29VI02                                                                                                                                                                                                                                                                                                    |
| <b>NOMBRE</b>                    | Viaducto del Gallo                                                                                                                                                                                                                                                                                        |
| <b>DESCRIPCIÓN ESTRUCTURA</b>    | Puente continuo de hormigón pretensado de once vanos: con 33,2 m de luz entre ejes de apoyos para vanos laterales y 41,50 m para el vano central. Tablero de 14,0 m de ancho formado por dos vigas artesas de 1,80 m. de canto separadas una 6,00 m entre ejes. La losa superior tiene un canto de 0,32m. |

| <b>ASISTENTES</b>                |                          |
|----------------------------------|--------------------------|
| D. JOSÉ MANUEL GALINDO ESCRIBANO | <b>ORGANISMO EMPRESA</b> |
| D. JUSTO CARRETERO PÉREZ         | G.I.F.                   |
|                                  | T.I.F.S.A.               |

| <b>CONDICIONES ATMOSFÉRICAS</b>                                                          |                                 |
|------------------------------------------------------------------------------------------|---------------------------------|
| <b>Temperatura</b>                                                                       | 31,5-34,5 °C                    |
| <b>Humedad relativa</b>                                                                  | 31-34,6 %                       |
| <b>INSTRUMENTACIÓN INSTALADA</b><br>(según Informe de Prueba de Carga para la Recepción) |                                 |
|                                                                                          | UNIDADES                        |
| <b>CONTROL DE FLECHAS</b>                                                                | EQUIPO ÓPTICO LASER             |
|                                                                                          | TRANSDUCTORES DE DESPLAZAMIENTO |
| <b>GRADO TENSIONAL DE LAS VIGAS</b>                                                      | GALGAS EXTENSOMÉTRICAS          |
| <b>REGISTRO DE VIBRACIONES</b>                                                           | ACELERÓMETROS                   |

| TRENES DE CARGA UTILIZADOS                                            |            |        |                 |                   |                |
|-----------------------------------------------------------------------|------------|--------|-----------------|-------------------|----------------|
|                                                                       | VEHÍCULO   | NÚMERO | TIPO            | PESO UNITARIO (t) | PESO TOTAL (t) |
| C1: COMPOSICIÓN UTILIZADA EN VÍA 1<br>(CIRCULACIÓN LLEIDA - ZARAGOZA) | LOCOMOTORA | 1      | GIF             | 120,0             | 520,0          |
|                                                                       | TOLVAS     | 5      | GIF             | 80,0              |                |
| C2: COMPOSICIÓN UTILIZADA EN VÍA 2<br>(CIRCULACIÓN LLEIDA - ZARAGOZA) | LOCOMOTORA | 1      | TRACTOR         | 88,0              | 488,0          |
|                                                                       | TOLVAS     | 5      | GIF             | 80,0              |                |
| SENTIDO CIRCULACIÓN PARA PRUEBAS DIÁMICAS                             |            |        | LLEIDA-ZARAGOZA |                   |                |

| <b>PRUEBAS DE CARGA REALIZADAS</b>               |           |                             |            |                             |            |               |            |
|--------------------------------------------------|-----------|-----------------------------|------------|-----------------------------|------------|---------------|------------|
|                                                  | VELOCIDAD | COMPOSICIÓN UTILIZADA VÍA 1 |            | COMPOSICIÓN UTILIZADA VÍA 2 |            | HORA COMIENZO | HORA FINAL |
|                                                  |           | HORA COMIENZO               | HORA FINAL | HORA COMIENZO               | HORA FINAL |               |            |
| Prueba estática ESTÁTICA 01                      |           | C1                          | 17:54      | 18:24                       | C2         | 17:54         | 18:24      |
| Prueba estática ESTÁTICA 02                      |           | C1                          | 19:28      | 19:56                       | C2         | 19:28         | 19:56      |
| Prueba estática ESTÁTICA 03                      |           | C1                          | 20:57      | 21:22                       | C2         | 20:57         | 21:22      |
| Prueba estática ESTÁTICA 04                      |           | C1                          | 21:24      | 21:44                       | C2         | 21:24         | 21:44      |
| Prueba cuasi-estática DINÁMICA 01                | 5 km/h    | C1                          | 17:39      | 17:43                       | C2         | 17:39         | 17:43      |
| Prueba cuasi-estática DINÁMICA 11                | 5 km/h    | C1                          | 15:24      | 15:27                       | C2         | -             | -          |
| Prueba cuasi-estática DINÁMICA 21                | 5 km/h    | C1                          | -          | -                           | C2         | 17:28         | 17:32      |
| Prueba a velocidad media DINÁMICA 12             | 40 km/h   | C1                          | 15:02      | 15:04                       | C2         | -             | -          |
| Prueba a máxima velocidad DINÁMICA 13            | 80 km/h   | C1                          | 15:09      | 15:11                       | C2         | -             | -          |
| Prueba de frenado a máxima velocidad DINÁMICA 14 | 80 km/h   | C1                          | 15:18      | 15:20                       | C2         | -             | -          |

| <b>RESULTADOS BÁSICOS ALCANZADOS EN LA ESTRUCTURA</b>                        |                                                                                              |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>Resultados prueba</b>                                                     | Acordes con los teóricos previstos en el Proyecto de Prueba de Carga                         |
| <b>Recuperaciones</b>                                                        | Superiores al 95 % en todos los casos. Comportamiento de la estructura: Elástico             |
| <b>Anomalías detectadas en la inspección visual previa</b>                   | En elementos estructurales solamente existen algunos defectos con incidencia en la estética. |
| <b>Anomalías detectadas durante el proceso de carga y al final del mismo</b> | Ninguna en particular                                                                        |
| <b>Otros datos de interés</b>                                                | Prueba de carga desarrollada en días distintos para diferentes conjuntos de vanos.           |
| <b>Comportamiento resistente de la estructura</b>                            | Correcto durante la realización de las pruebas de carga                                      |
| <b>Observaciones</b>                                                         | Estos datos corresponde a las pruebas de carga en los vanos 1-2-3-4-5                        |

## ACTA DE LA PRUEBA DE CARGA

| <b>IDENTIFICACIÓN ESTRUCTURA</b> |                                                                                                                                                                                                                                                                                                           |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LÍNEA DE ALTA VELOCIDAD          | MADRID - BARCELONA - FRONTERA FRANCESA                                                                                                                                                                                                                                                                    |
| TRAMO                            | PUENTE DE EBRO - LLEIDA                                                                                                                                                                                                                                                                                   |
| P.K.                             | 81+ 580                                                                                                                                                                                                                                                                                                   |
| IDENTIFICACIÓN INVENTARIO        | 29VI02                                                                                                                                                                                                                                                                                                    |
| NOMBRE                           | Viaducto del Gallo                                                                                                                                                                                                                                                                                        |
| DESCRIPCIÓN ESTRUCTURA           | Puente continuo de hormigón pretensado de once vanos: con 33,2 m de luz entre ejes de apoyos para vanos laterales y 41,50 m para el vano central. Tablero de 14,0 m de ancho formado por dos vigas artesas de 1,80 m. de canto separadas una 6,00 m entre ejes. La losa superior tiene un canto de 0,32m. |

| <b>ASISTENTES</b>                                            |                                           |
|--------------------------------------------------------------|-------------------------------------------|
| D. JOSÉ MANUEL GALINDO ESCRIBANO<br>D. JUSTO CARRETERO PÉREZ | ORGANISMO EMPRESA<br>G.I.F.<br>T.I.F.S.A. |

| <b>CONDICIONES ATMOSFÉRICAS</b>                                                          |                                 |
|------------------------------------------------------------------------------------------|---------------------------------|
| Temperatura                                                                              | 30-38,5 °C                      |
| Humedad relativa                                                                         | 25-30 %                         |
| <b>INSTRUMENTACIÓN INSTALADA</b><br>(según Informe de Prueba de Carga para la Recepción) |                                 |
|                                                                                          | UNIDADES                        |
| CONTROL DE FLECHAS                                                                       | EQUIPO ÓPTICO LASER             |
|                                                                                          | TRANSDUCTORES DE DESPLAZAMIENTO |
| GRADO TENSIONAL DE LAS VIGAS                                                             | GALGAS EXTENSOMÉTRICAS          |
| REGISTRO DE VIBRACIONES                                                                  | ACELERÓMETROS                   |

| TRENES DE CARGA UTILIZADOS                                            |            |                 |         |                   |                |
|-----------------------------------------------------------------------|------------|-----------------|---------|-------------------|----------------|
|                                                                       | VEHÍCULO   | NÚMERO          | TIPO    | PESO UNITARIO (t) | PESO TOTAL (t) |
| C1: COMPOSICIÓN UTILIZADA EN VÍA 1<br>(CIRCULACIÓN LLEIDA - ZARAGOZA) | LOCOMOTORA | 1               | GIF     | 120,0             | 520,0          |
|                                                                       | TOLVAS     | 5               | GIF     | 80,0              |                |
| C2: COMPOSICIÓN UTILIZADA EN VÍA 2<br>(CIRCULACIÓN LLEIDA - ZARAGOZA) | LOCOMOTORA | 1               | TRACTOR | 88,0              | 488,0          |
|                                                                       | TOLVAS     | 5               | GIF     | 80,0              |                |
| SENTIDO CIRCULACIÓN PARA PRUEBAS DIÁMICAS                             |            | LLEIDA-ZARAGOZA |         |                   |                |

| <b>PRUEBAS DE CARGA REALIZADAS</b>               |           |                             |            |                             |            |  |
|--------------------------------------------------|-----------|-----------------------------|------------|-----------------------------|------------|--|
|                                                  | VELOCIDAD | COMPOSICIÓN UTILIZADA VÍA 1 |            | COMPOSICIÓN UTILIZADA VÍA 2 |            |  |
|                                                  |           | HORA COMIENZO               | HORA FINAL | HORA COMIENZO               | HORA FINAL |  |
| Prueba estática ESTÁTICA 01                      |           | C1 19:51                    | 20:19      | C2 19:51                    | 20:19      |  |
| Prueba estática ESTÁTICA 02                      |           | C1 20:23                    | 20:43      | C2 20:23                    | 20:43      |  |
| Prueba estática ESTÁTICA 03                      |           | C1 20:54                    | 21:17      | C2 20:54                    | 21:17      |  |
| Prueba cuasi-estática DINÁMICA 01                | 5 km/h    | C1 19:33                    | 19:35      | C2 19:33                    | 19:35      |  |
| Prueba cuasi-estática DINÁMICA 11                | 5 km/h    | C1 19:23                    | 19:26      | C2 -                        | -          |  |
| Prueba cuasi-estática DINÁMICA 21                | 5 km/h    | C1 -                        | -          | C2 18:15                    | 18:18      |  |
| Prueba a velocidad media DINÁMICA 22             | 40 km/h   | C1 -                        | -          | C2 17:08                    | 17:10      |  |
| Prueba a máxima velocidad DINÁMICA 23            | 80 km/h   | C1 -                        | -          | C2 17:26                    | 17:28      |  |
| Prueba de frenado a máxima velocidad DINÁMICA 24 | 80 km/h   | C1 -                        | -          | C2 18:09                    | 18:11      |  |

| <b>RESULTADOS BÁSICOS ALCANZADOS EN LA ESTRUCTURA</b>                 |                                                                                                                                                   |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Resultados prueba                                                     | Acordes con los teóricos previstos en el Proyecto de Prueba de Carga                                                                              |
| Recuperaciones                                                        | Superiores al 95 % en todos los casos. Comportamiento de la estructura: Elástico                                                                  |
| Anomalías detectadas en la inspección visual previa                   | En elementos estructurales solamente existen algunos defectos con incidencia en la estética. Algún riesgo de evolución patológica en barandillas. |
| Anomalías detectadas durante el proceso de carga y al final del mismo | Ninguna en particular                                                                                                                             |
| Otros datos de Interés                                                | Prueba de carga desarrollada en días distintos para diferentes conjuntos de vanos.                                                                |
| Comportamiento resistente de la estructura                            | Correcto durante la realización de las pruebas de carga                                                                                           |
| Observaciones                                                         | Estos datos corresponden a las pruebas de carga en los vanos 5-6-7-8-9                                                                            |

## **ANEJO 7: FICHA DE SEGUIMIENTO**

Madrid, Octubre de 2001



**CONTRATO DE CONSULTORÍA Y ASISTENCIA  
PARA LA REALIZACIÓN DE PRUEBAS DE CARGA  
PARA LA RECEPCIÓN DE PUENTES DE LA  
LÍNEA DE ALTA VELOCIDAD  
MADRID-ZARAGOZA-BARCELONA-FRONTERA FRANCESA.  
TRAMO: PUENTE DE EBRO-LLEIDA.  
BASE DE MONTAGUT.**



**FICHA DE SEGUIMIENTO (REVISIÓN 0)**

**SUBTRAMO VI  
Viaducto del Gallo  
29VI02**

**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTA FRANCESA**

**IDENTIFICACIÓN**

|                                         |                             |   |
|-----------------------------------------|-----------------------------|---|
| ID (Identificador de la estructura)     | 29VI02                      |   |
| P.K. INICIAL (sentido Madrid-Barcelona) | 81+588                      |   |
| P.K. FINAL (sentido Madrid-Barcelona)   | 81+945                      |   |
| TIPO                                    | Puente (10 m < luz <= 50 m) | ▼ |
| SUBTRAMO                                | ZARAGOZA-LLEIDA: VI         | ▼ |
| FECHA DE LA INSPECCIÓN                  | 17/07/01                    |   |
| OBSERVACIONES                           |                             |   |

**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTA FRANCESA**

ID (Identificador de la estructura)  
FECHA DE LA INSPECCIÓN

29VI02  
17/07/01

**DATOS GENERALES**

|                         |                                                |
|-------------------------|------------------------------------------------|
| NOMBRE                  | VIADUCTO DEL GALLO                             |
| TIPOLOGÍA GENERAL       | TABLERO EN CAJÓN ▼                             |
| TIPOLOGÍA ESTRUCTURAL   | ESTRUCTURA CONTINUA ▼                          |
| Nº DE VÍAS              | 2                                              |
| VELOCIDAD MÁXIMA (km/h) | 350                                            |
| TIPO DE ACCESO          | VEHÍCULO AUTOMOVIL ▼                           |
| OBSTÁCULO SALVADO       | CAMINO, VÍA PECUARIA O PASO DE FAUNA Y VALLE ▼ |
| OBSERVACIONES           |                                                |

**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTERA FRANCESA**

**ID (Identificador de la estructura)**  
**FECHA DE LA INSPECCIÓN**

**29VI02**  
**17/07/01**

**PARÁMETROS GEOMÉTRICOS**

|                                                              |                                                                  |                           |
|--------------------------------------------------------------|------------------------------------------------------------------|---------------------------|
| LONGITUD TOTAL (m)                                           | 357,00                                                           |                           |
| Nº DE VANOS                                                  | 9                                                                |                           |
| LONGITUD MEDIA DEL VANO (m)                                  | 39,70                                                            |                           |
| LUZ DE CADA VANO (m)                                         | 33,20+7*41,50+33,20                                              |                           |
| ALTURA MÁXIMA DE ESTRIBOS (m)                                | 6,30                                                             |                           |
| ANCHURA MÁXIMA DE ESTRIBOS (m)                               | 13,70                                                            |                           |
| ALTURA MÁXIMA DE PILAS (m)                                   | 9,00                                                             |                           |
| ANCHURA MÁXIMA DE PILAS (m)                                  | 3,60                                                             |                           |
| ESPESOR MÁXIMO DE PILAS (m)                                  | 3,60                                                             |                           |
| GÁLIBO INFERIOR (m)                                          | 9,00                                                             |                           |
| ANCHURA MÁXIMA DE TRAMOS (m)                                 | 13,70                                                            |                           |
| CANTO MÁXIMO DE TRAMOS EN CENTRO DE VANOS (m)                | 3,18                                                             |                           |
| Nº DE ELEMENTOS PRINCIPALES EN EL TRAMO                      | 2                                                                |                           |
| SEPARACIÓN ENTRE ELEMENTOS PRINCIPALES (m)                   | 6,00                                                             |                           |
| CANTO DE ELEMENTOS PRINCIPALES                               | CONSTANTE                                                        | ▼                         |
| CANTO MÁXIMO DE ELEMENTOS PRINCIPALES EN CENTRO DE VANOS (m) |                                                                  |                           |
| GÁLIBO IZQUIERDO (m)                                         |                                                                  |                           |
| GÁLIBO DERECHO (m)                                           |                                                                  |                           |
| ENTREVÍA (m)                                                 |                                                                  |                           |
| TRAZADO DE VÍA EN PLANTA (m)                                 |                                                                  | +m (curva a la derecha) ▼ |
| PERALTE DE VÍA DE ENTRADA (m)                                | -                                                                |                           |
| PERALTE DE VÍA DE CENTRO (m)                                 |                                                                  |                           |
| PERALTE DE VÍA DE SALIDA (m)                                 |                                                                  |                           |
| OBSERVACIONES                                                | EL DÍA DE LA INSPECCIÓN EL MONTAJE DE LA VÍA ESTABA SIN REPASAR. |                           |

**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTERA FRANCESA**

**ID (Identificador de la estructura)**  
**FECHA DE LA INSPECCIÓN**

**29VI02**  
**17/07/01**

**MATERIALES**

MATERIAL CONSTITUYENTE

HORMIGÓN PRETENSADO

**TRAMOS**

TIPOLOGÍA DE TRAMOS

TABLERO EN CAJÓN

TIPOLOGÍA ESTRUCTURAL DE TRAMOS

ESTRUCTURA CONTINUA

MATERIAL EN TRAMOS

HORMIGÓN PRETENSADO

IMPERMEABILIZACIÓN DE ESTRUCTURA DE TRAMOS

SI

ELEMENTOS DE DRENAJE EN TRAMOS

LONGITUDINALES

**ESTRIBOS**

TIPOLOGÍA DE ESTRIBOS

MUROS FRONTAL Y EN VUELTAS

MATERIAL BASE EN ESTRIBOS

HORMIGÓN ARMADO O EN MASA

PROTECCIÓN EN PIE DE ESTRIBOS

NO EXISTE

TIPOLOGÍA DE CIMENTACIÓN EN ESTRIBOS

CIMENTACIÓN DIRECTA

MATERIAL BASE EN CIMENTACIÓN DE ESTRIBOS

HORMIGÓN ARMADO O EN MASA

**PILAS**

TIPOLOGÍA DE PILAS

FUSTES

SECCIÓN DE PILAS

VARIABLE

TAJAMARES

NO

MATERIAL BASE EN PILAS

HORMIGÓN ARMADO O EN MASA

TIPOLOGÍA DE CIMENTACIÓN EN PILAS

ENCEPADO Y PILOTES

MATERIAL BASE EN CIMENTACIÓN DE PILAS

HORMIGÓN ARMADO O EN MASA

**APARATOS Y JUNTAS DE DILATACIÓN**

APARATOS DE APOYO

NEOPRENO E2 - TIPO POT E1 Y PILAS

JUNTAS DE DILATACIÓN

AMBOS ESTRIBOS

TIPOLOGÍA DE JUNTAS DE DILATACIÓN

MURETES GUARDABALASTO Y CUBREJUNTAS

APARATOS DE DILATACIÓN DE CARRILES

NO EXISTEN

**VARIOS**

PASEOS DE SERVICIO

AMBOS LADOS

OBSERVACIONES

EL ESTRIBO E-1 TIENE UNA CIMENTACIÓN CON PILOTES. LAS PILAS SON DE FUSTE UNICO.

## INSPECCIONES ESTRUCTURAS

### L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTA FRANCESA

**ID (Identificador de la estructura)**  
**FECHA DE LA INSPECCIÓN**

**29VI02**  
**17/07/01**

#### ESTADO ACTUAL ESTRIBOS

|                                           |                                           |   |
|-------------------------------------------|-------------------------------------------|---|
| Punzonado bajo apoyos                     | 0: No existen daños                       | ▼ |
| Daños en unión frente y laterales         | 0: No existen daños                       | ▼ |
| Juntas degradadas                         | 0: No existen daños                       | ▼ |
| Golpes y roturas                          | 1: Defectos con incidencia en la estética | ▼ |
| Fisuras y grietas                         | 0: No existen daños                       | ▼ |
| Coqueras y nidos de grava                 | 0: No existen daños                       | ▼ |
| Meteorización y degradación               | 0: No existen daños                       | ▼ |
| Desprendimientos                          | 0: No existen daños                       | ▼ |
| Carbonatación y desagregación             | 0: No existen daños                       | ▼ |
| Armaduras vistas someras                  | 0: No existen daños                       | ▼ |
| Corrosión y disgregación                  | 0: No existen daños                       | ▼ |
| Humedades y filtraciones                  | 0: No existen daños                       | ▼ |
| Incrustaciones calcáreas y eflorescencias | 0: No existen daños                       | ▼ |
| Desagüe de mechinales                     | 0: No existen daños                       | ▼ |
| Abombamientos                             | 0: No existen daños                       | ▼ |
| Desplomes o basculamientos                | 0: No existen daños                       | ▼ |
| Asentamientos                             | 0: No existen daños                       | ▼ |
| Descalces                                 | 0: No existen daños                       | ▼ |
| Socavaciones                              | 0: No existen daños                       | ▼ |
| Depósitos en coronación                   | 1: Defectos con incidencia en la estética | ▼ |
| Daños en coronación                       | 0: No existen daños                       | ▼ |
| Daños en espaldón                         | 0: No existen daños                       | ▼ |
| Balasto encastrado                        | 0: No existen daños                       | ▼ |
| Daños en protección de pie de estribos    | 0: No existen daños                       | ▼ |
| Daños en cimentaciones vistas             | 0: No existen daños                       | ▼ |
| Vegetación aflorando                      | 0: No existen daños                       | ▼ |
| Vegetación adosada                        | 0: No existen daños                       | ▼ |

#### OBSERVACIONES ESTRIBOS

**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTA FRANCESA**

**ID (Identificador de la estructura)**  
**FECHA DE LA INSPECCIÓN**

**29VI02**  
**17/07/01**

**ESTADO ACTUAL PILAS**

|                                           |                                           |   |
|-------------------------------------------|-------------------------------------------|---|
| Punzonado bajo apoyos                     | 0: No existen daños                       | ▼ |
| Daños en unión frente y laterales         | 0: No existen daños                       | ▼ |
| Juntas degradadas                         | 0: No existen daños                       | ▼ |
| Golpes y roturas                          | 0: No existen daños                       | ▼ |
| Fisuras y grietas                         | 0: No existen daños                       | ▼ |
| Coqueras y nidos de grava                 | 0: No existen daños                       | ▼ |
| Meteorización y degradación               | 1: Defectos con incidencia en la estética | ▼ |
| Desprendimientos                          | 0: No existen daños                       | ▼ |
| Carbonatación y desagregación             | 0: No existen daños                       | ▼ |
| Armaduras vistas someras                  | 0: No existen daños                       | ▼ |
| Corrosión y disgregación                  | 0: No existen daños                       | ▼ |
| Humedades y filtraciones                  | 1: Defectos con incidencia en la estética | ▼ |
| Incrustaciones calcáreas y eflorescencias | 0: No existen daños                       | ▼ |
| Abombamientos                             | 0: No existen daños                       | ▼ |
| Desplomes o basculamientos                | 0: No existen daños                       | ▼ |
| Asentamientos                             | 0: No existen daños                       | ▼ |
| Descalces                                 | 0: No existen daños                       | ▼ |
| Socavaciones                              | 0: No existen daños                       | ▼ |
| Depósitos en coronación                   | 0: No existen daños                       | ▼ |
| Daños en coronación                       | 0: No existen daños                       | ▼ |
| Daños en cimentaciones vistas             | 0: No existen daños                       | ▼ |
| Vegetación aflorando                      | 0: No existen daños                       | ▼ |
| Vegetación adosada                        | 0: No existen daños                       | ▼ |

**OBSERVACIONES PILAS**

**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTIERA FRANCESA**

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**FECHA DE LA INSPECCIÓN**

**29VI02**  
**17/07/01**

**ESTADO ACTUAL APARATOS DE APOYO**

|                                |                                           |   |
|--------------------------------|-------------------------------------------|---|
| Envejecimiento                 | 0: No existen daños                       | ▼ |
| Corrosión                      | 0: No existen daños                       | ▼ |
| Suciedad y aterramiento        | 0: No existen daños                       | ▼ |
| Bloqueo o encastramiento       | 0: No existen daños                       | ▼ |
| Desplazamiento o deslizamiento | 1: Defectos con incidencia en la estética | ▼ |
| Aplastamiento                  | 0: No existen daños                       | ▼ |
| Reglaje incorrecto             | 0: No existen daños                       | ▼ |
| Desnivelaciones                | 0: No existen daños                       | ▼ |
| Falta de contacto              | 0: No existen daños                       | ▼ |
| Cunas de apoyo deterioradas    | 0: No existen daños                       | ▼ |
| Vegetación adosada             | 0: No existen daños                       | ▼ |

OBSERVACIONES APARATOS DE APOYO



**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTIERA FRANCESA**

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**29VI02**  
**17/07/01**

**ESTADO ACTUAL ESTRUCTURA DE TRAMOS**

|                                               |                                           |   |
|-----------------------------------------------|-------------------------------------------|---|
| Pintura envejecida y desprendida              |                                           | ▼ |
| Oxidación superficial                         |                                           | ▼ |
| Corrosiones locales activas                   |                                           | ▼ |
| Entalladuras y pérdidas de sección            |                                           | ▼ |
| Elementos metálicos deformados o rotos        |                                           | ▼ |
| Tornillos flojos o faltan                     |                                           | ▼ |
| Soldaduras fisuradas                          |                                           | ▼ |
| Fisuras y grietas longitudinales bóvedas      |                                           | ▼ |
| Fisuras y grietas transversales clave         |                                           | ▼ |
| Fisuras y grietas transversales riñones       |                                           | ▼ |
| Fisuras y grietas transversales arranques     |                                           | ▼ |
| Fisuras y grietas longitudinales tímpanos     |                                           | ▼ |
| Fisuras y grietas verticales tímpanos         |                                           | ▼ |
| Separación y filtraciones tímpano-bóveda      |                                           | ▼ |
| Fisuras y grietas longitudinales losas        | 0: No existen daños                       | ▼ |
| Fisuras y grietas transversales losas         | 0: No existen daños                       | ▼ |
| Fisuras y grietas verticales losas            | 0: No existen daños                       | ▼ |
| Fisuras y grietas alas superiores vigas       | 0: No existen daños                       | ▼ |
| Fisuras y grietas longitudinales alas-alma    | 0: No existen daños                       | ▼ |
| Fisuras y grietas transversales alma vigas    | 0: No existen daños                       | ▼ |
| Fisuras y grietas inclinadas alma vigas       | 0: No existen daños                       | ▼ |
| Fisuras y grietas longitudinales ala inferior | 0: No existen daños                       | ▼ |
| Fisuras y grietas transversales ala inferior  | 0: No existen daños                       | ▼ |
| Fisuras y daños en testeros                   | 0: No existen daños                       | ▼ |
| Golpes y roturas                              | 0: No existen daños                       | ▼ |
| Coqueras y nidos de grava                     | 0: No existen daños                       | ▼ |
| Meteorización y degradación                   | 1: Defectos con incidencia en la estética | ▼ |
| Desprendimientos                              | 0: No existen daños                       | ▼ |
| Carbonatación y desagregación                 | 0: No existen daños                       | ▼ |
| Armaduras vistas someras                      | 0: No existen daños                       | ▼ |
| Corrosión y disgregación                      | 0: No existen daños                       | ▼ |
| Humedades y filtraciones                      | 1: Defectos con incidencia en la estética | ▼ |
| Desagües obturados                            | 0: No existen daños                       | ▼ |
| Incrustaciones calcáreas y eflorescencias     | 0: No existen daños                       | ▼ |
| Abombamientos                                 | 0: No existen daños                       | ▼ |
| Asentamientos y desnivelaciones               | 0: No existen daños                       | ▼ |
| Juntas transversales degradadas               | 1: Defectos con incidencia en la estética | ▼ |
| Vegetación aflorando                          | 0: No existen daños                       | ▼ |
| Vegetación adosada                            | 0: No existen daños                       | ▼ |

OBSERVACIONES ESTRUCTURA DE TRAMOS

**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTIERA FRANCESA**

**ID (Identificador de la estructura)**  
**FECHA DE LA INSPECCIÓN**

**29VI02**  
**17/07/01**

**ESTADO ACTUAL RESTO DE ELEMENTOS**

|                          |                                                |   |
|--------------------------|------------------------------------------------|---|
| Impermeabilización       | 1: Defectos con incidencia en la estética      | ▼ |
| Drenaje longitudinal     | 0: No existen daños                            | ▼ |
| Drenaje transversal      |                                                | ▼ |
| Muretes guardabalasto    | 0: No existen daños                            | ▼ |
| Juntas de dilatación     | 1: Defectos con incidencia en la estética      | ▼ |
| Conducciones y canaletas | 1: Defectos con incidencia en la estética      | ▼ |
| Barandillas              | 2: Defectos con riesgo de evolución patológica | ▼ |

OBSERVACIONES RESTO DE ELEMENTOS

**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTA FRANCESA**

**ID (Identificador de la estructura)**  
**FECHA DE LA INSPECCIÓN**

**29VI02**  
**17/07/01**

**ESTADO ACTUAL**

**ESTADO GENERAL**

ESTADO GENERAL ESTRIBOS

ESTADO GENERAL PILAS

ESTADO GENERAL APARATOS DE APOYO

ESTADO GENERAL ESTRUCTURA DE TRAMOS

ESTADO GENERAL RESTO DE ELEMENTOS

1: Defectos con incidencia en la estética

1: Defectos con incidencia en la estética

1: Defectos con incidencia en la estética

1: Defectos con incidencia en la estética

1: Defectos con incidencia en la estética

1: Defectos con incidencia en la estética

OBSERVACIONES

BARANDILLA ENTRADA S/E1 AMBOS LADOS  
FUERA JUNTA DESLIZANTE

**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTA FRANCESA**

**ID (Identificador de la estructura)**
**29VI02**
**FECHA DE LA INSPECCIÓN**
**17/07/01**
**IDENTIFICACIÓN ARCHIVOS FOTOGRÁFICOS**
**NOMBRE ARCHIVO**

|                  |                                               |   |              |
|------------------|-----------------------------------------------|---|--------------|
| FOTOGRAFÍA Nº 1  | ALZADO DERECHO                                | ▼ | 29VI0201.JPG |
| FOTOGRAFÍA Nº 2  | ALZADO IZQUIERDO                              | ▼ | 29VI0202.JPG |
| FOTOGRAFÍA Nº 3  | VISTA SUPERIOR DESDE ENTRADA                  | ▼ | 29VI0203.JPG |
| FOTOGRAFÍA Nº 4  | VISTA SUPERIOR DESDE SALIDA                   | ▼ | 29VI0204.JPG |
| FOTOGRAFÍA Nº 5  | ESTRIBO DE ENTRADA                            | ▼ | 29VI0205.JPG |
| FOTOGRAFÍA Nº 6  | ESTRIBO DE SALIDA                             | ▼ | 29VI0206.JPG |
| FOTOGRAFÍA Nº 7  | VISTA INFERIOR Y PILA 1                       | ▼ | 29VI0207.JPG |
| FOTOGRAFÍA Nº 8  | DETALLE APOYO IZQUIERDO SOBRE ESTRIBO ENTRADA | ▼ | 29VI0208.JPG |
| FOTOGRAFÍA Nº 9  | DETALLE CUBREJUNTAS EN ESTRIBO ENTRADA        | ▼ | 29VI0209.JPG |
| FOTOGRAFÍA Nº 10 | PASEO LD                                      | ▼ | 29VI0210.JPG |
| FOTOGRAFÍA Nº 11 | PASEO LI DERRAME                              | ▼ | 29VI0211.JPG |
| FOTOGRAFÍA Nº 12 | INTERIOR ESTRIBO SALIDA                       | ▼ | 29VI0212.JPG |
| FOTOGRAFÍA Nº 13 | LATERAL DERECHO DESDE LA SALIDA               | ▼ | 29VI0213.JPG |
| FOTOGRAFÍA Nº 14 | DETALLE APOYO 2 SOBRE ESTRIBO DE SALIDA       | ▼ | 29VI0214.JPG |
| FOTOGRAFÍA Nº 15 | CANAleta DESAGÜE LD SALIDA                    | ▼ | 29VI0215.JPG |
| FOTOGRAFÍA Nº 16 | VISTA INFERIOR DESDE ESTRIBO ENTRADA          | ▼ | 29VI0216.JPG |

**OBSERVACIONES**

**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTA FRANCESA**



FOTOGRAFÍA Nº 1: ALZADO DERECHO



FOTOGRAFÍA Nº 2: ALZADO IZQUIERDO



**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTERA FRANCESA**



FOTOGRAFÍA Nº 3: VISTA SUPERIOR DESDE ENTRADA



FOTOGRAFÍA Nº 4: VISTA SUPERIOR DESDE SALIDA



**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTIERA FRANCESA**



FOTOGRAFÍA Nº 5: ESTRIBO DE ENTRADA DESDE P1



FOTOGRAFÍA Nº 6: ESTRIBO DE SALIDA

**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTA FRANCESA**



FOTOGRAFÍA N° 7: VISTA INFERIOR



FOTOGRAFÍA N° 8: DETALLE APOYO IZQUIERDO ESTRIBO DE ENTRADA



**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTA FRANCESA**



FOTOGRAFÍA Nº 9: DETALLE CUBREJUNTAS EN ESTRIBO ENTRADA LD



FOTOGRAFÍA Nº 10: PASEO LD



**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTERA FRANCESA**



FOTOGRAFÍA Nº 11: PASEO LI DERRAME

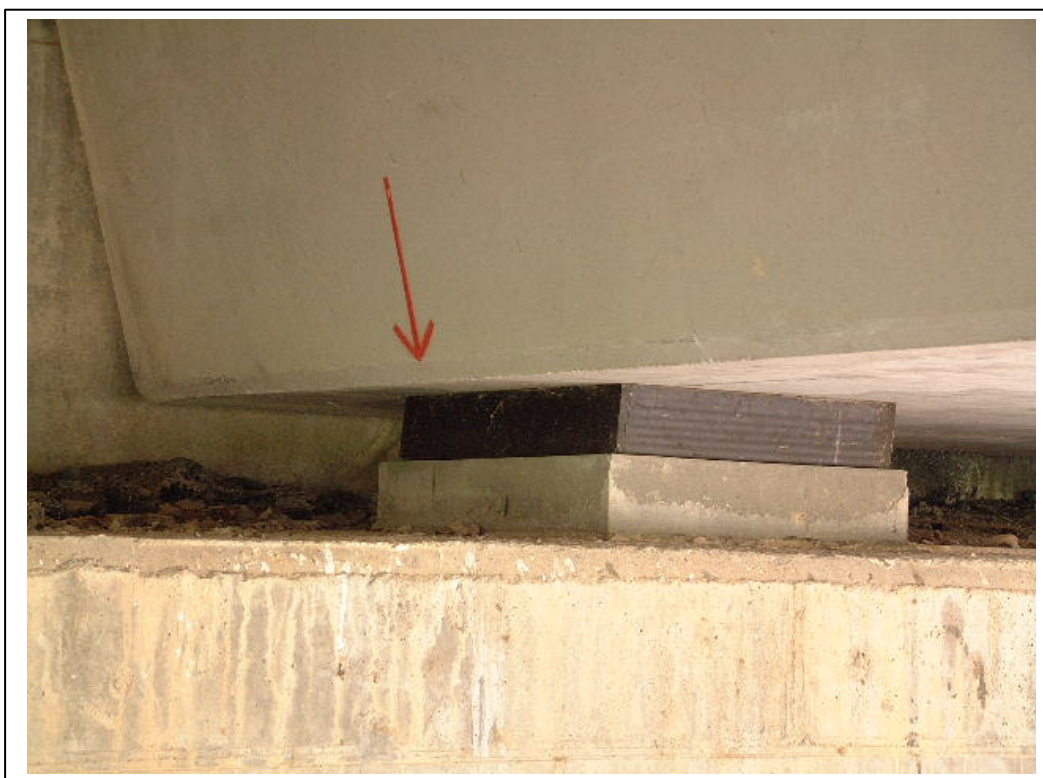


FOTOGRAFÍA Nº 12: INTERIOR ESTRIBO SALIDA

**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTA FRANCESA**



FOTOGRAFÍA Nº 13: LATERAL LD DESDE SALIDA



FOTOGRAFÍA Nº 14: DETALLE APOYO 2 ESTRIBO SALIDA



**INSPECCIONES ESTRUCTURAS**  
**L.A.V. MADRID-ZARAGOZA-BARCELONA-FRONTIERA FRANCESA**



FOTOGRAFÍA Nº 15: CANALETA DESAGÜE LD SALIDA



FOTOGRAFÍA Nº 16: VISTA INFERIOR DESDE ESTRIBO ENTRADA