ANEJO Nº 8. ESTRUCTURAS

ÍNDICE

1. INTRODUCCIÓN.

1.1. OBJETO.

El objeto del presente anejo de cálculo será la descripción de las tipologías estructurales empleadas para resolver las alternativas presentadas en el Estudio Informativo de Integración del ferrocarril en Sant Feliu de Llobregat, respaldada cada una de ellas por los cálculos necesarios para el dimensionamiento de los distintos elementos que las constituirán.

Los principales condicionantes estructurales para el diseño serán:

1. Mantener la permeabilidad de la población durante los trabajos, para lo cual será necesario mantener, en lo posible, el tráfico de los viales afectados.
2. Mantener el servicio de la línea ferroviaria actual durante la ejecución de los trabajos.
3. Accesibilidad a la estación soterrada.

1.2. DESCRIPCIÓN DE LAS SOLUCIONES ADOPTADAS.

En base a los criterios citados anteriormente en el Estudio Informativo se presentan dos alternativas que permiten la integración del ferrocarril en Sant Feliu de Llobregat, según se describe a continuación.

- Alternativa 1: Soterramiento bajo la calle Sansón. En este caso se adopta la ejecución de una solución mediante túnel entre pantalla hasta alcanzar la cota necesaria para ejecutar el túnel en mina (PK 88+394 a 88+950) con la finalidad de evitar actuaciones provisionales en el parque público.

  En la alternativa se han distinguido los siguientes tramos:

  - Desde el origen del Estudio Informativo (PK. 87+365) hasta pozo de ataque (PK. 88+394). En este tramo se incluyen las actuaciones preliminares en la calle agricultura, comercio y el tramo en falso túnel hasta alcanzar la cota necesaria para ejecutar el túnel en mina.
  - Tramo de túnel en mina. Se ejecutará por el método belga con una longitud total 556 m, para dotar de continuidad con los tramos anterior y posterior se ejecutarán sendos pozos de pozo de ataque.
  - Tramo desde Final de la estación hasta el PK 90+320 (fin del estudio). Todo el tramo se ejecutara en falso túnel, según gana cota la rasante se pasará a secciones de pantalla en voladizo para finalmente terminar con una en cajón (altura inferior a 3,0 m).

- Alternativa 2: Soterramiento sobre la calle Sansón. En este caso se ha propuesto un trazado más elevado lo que permitirá la ejecución en su totalidad entre pantallas, siendo posible pasar sobre la calle Sansón.

  En esta segunda alternativa se pueden distinguir los siguientes tramos:

  - Tramo desde origen de proyecto a la riera de la Salut. Se corresponde con la zona en la que el trazado comenzará a descender (perder cota) hasta que finalmente se pueda emplear la tipología de túnel entre pantallas completamente cerrado.
  - Tramo desde la riera de la Salut al PK 89+550. En este tramo el trazado seguirá descendiendo hasta el acuerdo cóncavo donde finaliza, se ejecuta en su totalidad en túnel entre pantallas (cerrado); en él se engloba la estación soterrada localizada entre PK 89+020 y 89+220.
  - Tramo desde el PK 89+550 hasta final de proyecto (PK 90+364). El trazado comienza a ganar cota siendo necesario ir adaptando la tipología estructural, pasando de túnel entre pantallas (cerrado) a pantallas en voladizo y finalmente sección cajón. En este tramo se engloba la actuación singular de la riera Pahissa.

2. TIPOLOGÍAS ESTRUCTURALES.

En el presente apartado se describirán las diferentes tipologías estructurales y secciones tipo empleadas para resolver el presente Estudio Informativo, posteriormente se describe su empleo en cada una de las alternativas propuestas.

2.1. SECCIONES TIPO.

La tipología estructural empleada en ambas alternativas ha sido similar, siendo la diferencia principal la longitud afectada, que es función de la rasante.

Las tipologías estructurales empleadas han sido:

- Sección cajón para tramos en los que se requiere una altura de muro de 3,0 m como máximo.

- Sección entre pantallas en voladizo donde no se tiene el gálibo vertical suficiente para poder ejecutar una losa superior.

- Sección de túnel entre pantallas en las zonas con gálibo vertical suficiente para ejecutar una losa superior (cerrar la sección) e incluso en algún caso requiere la disposición de estampidores o losas intermedias.

- Sección en túnel, empelada únicamente en la alternativa 1 y que se ha tratado en un anejo independiente.

La totalidad de pantallas propuestas en el Estudio Informativo se ejecutarán mediante pilotes, por los siguientes motivos:

1. En la campaña geotécnica no se ha detectado nivel freático a las profundidades de trabajo.
2. Las pantallas entre pilotes resulta más sencillas y en consecuencia se consigue un mayor rendimiento de ejecución que las continuas, lo que supone una importante repercusión en plazo.
3. La tipología de pantallas con pilotes también resulta más económica que la continua.

A continuación se describirá cada una de las secciones tipo propuestas en el Estudio Informativo de Integración del Ferrocarril en Sant Feliu de Llobregat.

2.1.1. Muro pantalla tipo 1.

Muro pantalla ejecutado únicamente en la margen izquierda del trazado con la finalidad de contener los empujes del terreno del actual terraplén del ferrocarril. Estas pantallas tendrán una función provisional, ya que en el momento de retirar la línea actual del servicio se podrá desmontar ya que dejaría de cumplir su cometido.

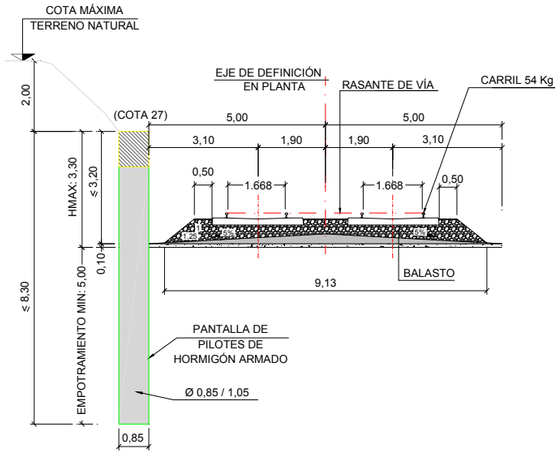
Las características de la sección son:

- Ancho de plataforma de 10 m constante a lo largo de todo el trazado.

- La pantalla del margen izquierdo se localizará a 5 m del eje de la plataforma ferroviaria.

- Pantalla de pilotes de hormigón armado de diámetro 0,85 m y separados 1,05m entre sí.

- La longitud de los pilotes será de 8,30 m como máximo, con un empotramiento mínimo de 5,0 m. La cota superior de la viga de coronación será la 27, quedando un voladizo máximo de 3,30 m.

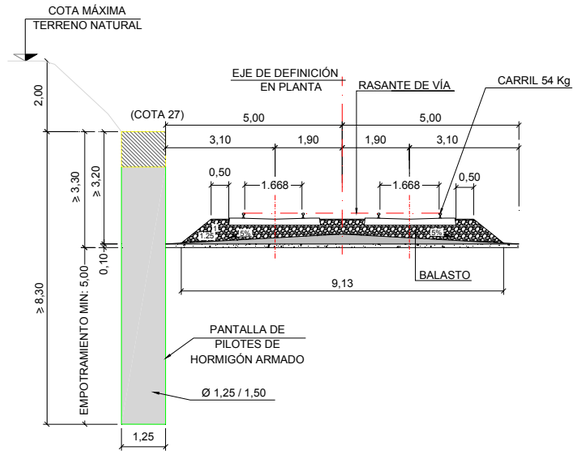


2.1.2. Muro pantalla tipo 2.

Al igual que la sección anterior se empleará para la contención del terraplén de la actual línea férrea en la margen izquierda del trazado, la diferencia será que requiere una mayor altura y por tanto necesita mas rigidez conseguida incrementando el diámetro de los pilotes.

Las características de la sección son:

- La pantalla se localizará a 5 m del eje de la plataforma ferroviaria (anchura total 10 m).
- Los pilotes empleados en las pantallas serán de diámetro 1,25 m separados 1,50m.
- La longitud mínima de los pilotes será 8,30 m, con un empotramiento mínimo de 5,00 m. La viga de coronación se localizará a la cota 27 lo que darán lugar a voladizos > 3,30 m.

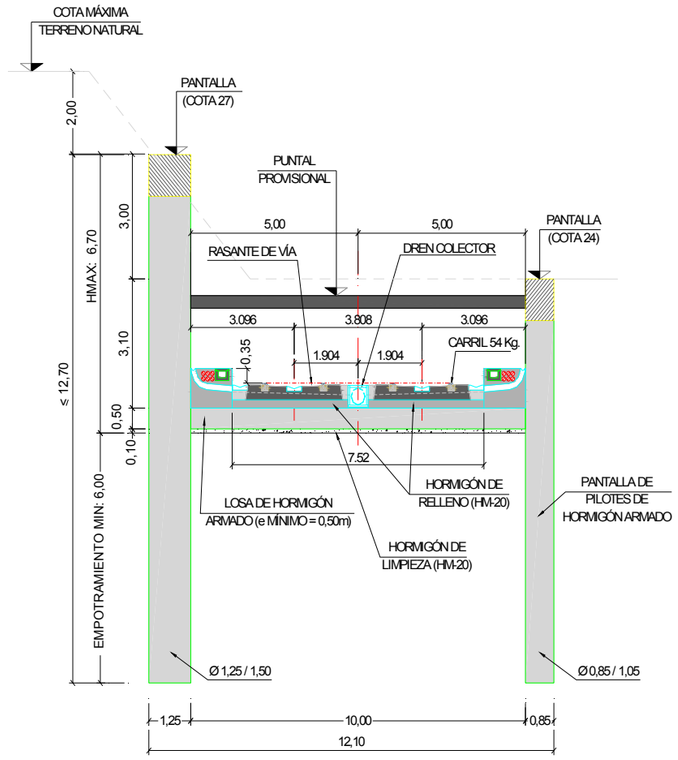


2.1.3. Sección 1.

Esta sección se empleará en las zonas donde se requiera ejecución de pantallas en voladizo en ambos márgenes, ya que la rasante comienza a deprimirse respecto del terreno natural.

Las características de la sección son:

- Pantalla del margen izquierdo ejecutada con pilotes de 1,25 m de diámetro y separados 1,50 m. La longitud máxima de los pilotes será de 12,70 m con un empotramiento mínimo de 6,0 m y voladizo < 6,70 m. Cota de la viga de coronación 27.
- Pantalla del margen derecho ejecutada con pilotes de 0,85 m de diámetro y separados 1,05 m. Cota de la viga de coronación será 23, por lo que la longitud total será como máximo 9,70 m.
- Losa inferior de hormigón armado de 0,50 m de espesor.
- La ejecución de la sección requerirá la disposición de un puntal o estampidor provisional para permitir la limitación del desplazamiento en cabeza hasta que se ejecute la losa inferior.



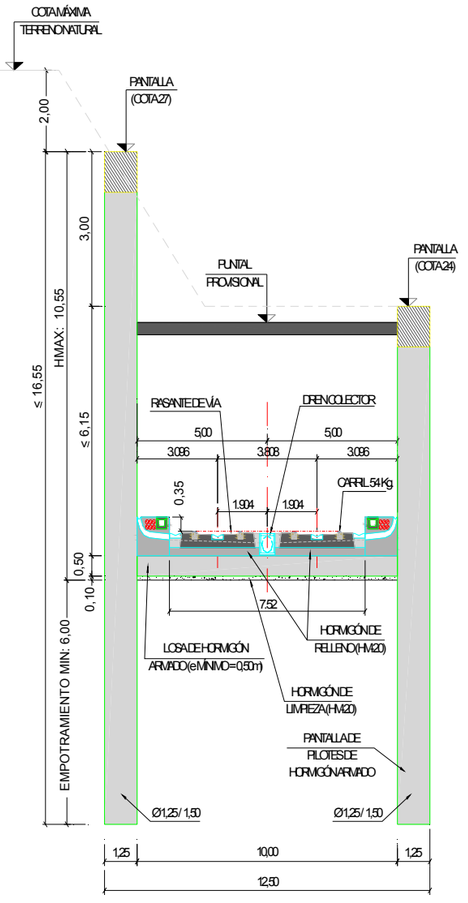
2.1.4. Sección 2.

Al igual que la sección 1 se trata será una sección que empleará pantallas en voladizo ya que la rasante no alcanza la cota necesaria para poder disponer la una losa superior.

El voladizo en ambas márgenes será considerable por lo que se requiere el recurrir a los mimos diámetros para la pantalla de pilotes (igual rigidez).

Las características de la sección son:

- Pantalla de pilotes ejecutada con pilotes de 1,25 m de diámetro y separados 1,50 m.
- La longitud máxima de los pilotes será de 16,55 m con un empotramiento mínimo de 6,0 m y voladizo < 10,55 m.
- La diferencia de cotas entre las vigas de coronación de ambos márgenes será de 3,0 m (cota 27 izquierdo y 24 derecho).
- Losa inferior de hormigón armado de 0,50 m de espesor.
- Al igual que en el caso anterior la ejecución de la sección requerirá la disposición de un puntal o estampidor provisional con la finalidad de limitar las deformaciones en cabeza.



2.1.5. Sección 3.

Esta sección se empleará en las zonas en las que el trazado haya alcanzado cota suficiente para permitir disponer losa superior.

Las características de los elementos que constituyen la sección son:

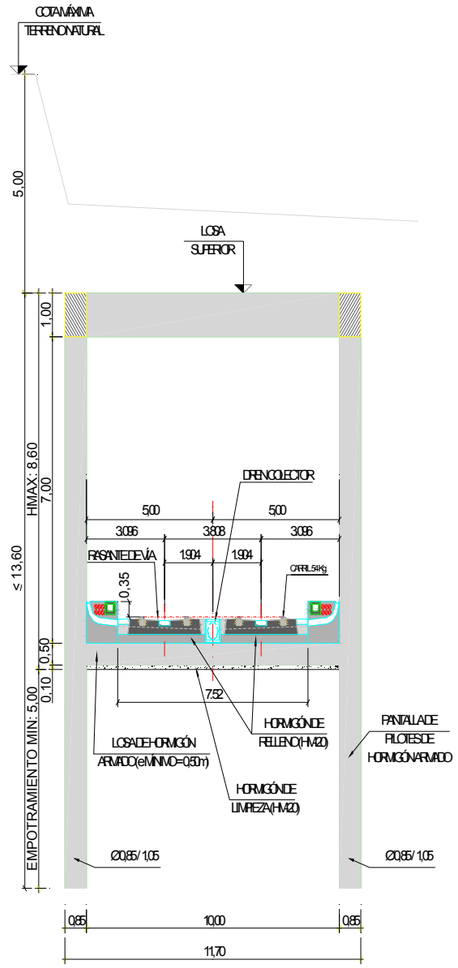
- Losa superior de hormigón armado de 1,0 m de canto. Se ejecutará el relleno de terreno necesario sobre la losa para permitir el encaje de los servicios.

- Pantallas con pilotes de diámetro 0,85 m y separación 1,05 m. Longitud mínima de 13,60 m.

- Losa inferior o solera de hormigón armado de 0,50 m de espesor.

- Los gálibos libres que dejará la obra civil serán:

    - Gálibo vertical 7,0 m.
    - Gálibo horizontal 10,0 m



2.1.6. Sección 4.

Esta sección será necesario emplearla en las zonas en las que el trazado alcanza una cota en la que será necesario acortar el gálibo vertical libre disponiendo una losa intermedia o estampidor para disminuirle.

Las características de la sección son las siguientes:

- Losa superior de hormigón armado de 1,0 m de canto. Se dejará 1,50 m como máximo de relleno sobre la losa para permitir el encaje de los servicios necesarios.

- Pantallas ejecutadas con pilotes de 1,0 m de diámetro y separados 1,25 m. Longitud mínima de 21,90 m.

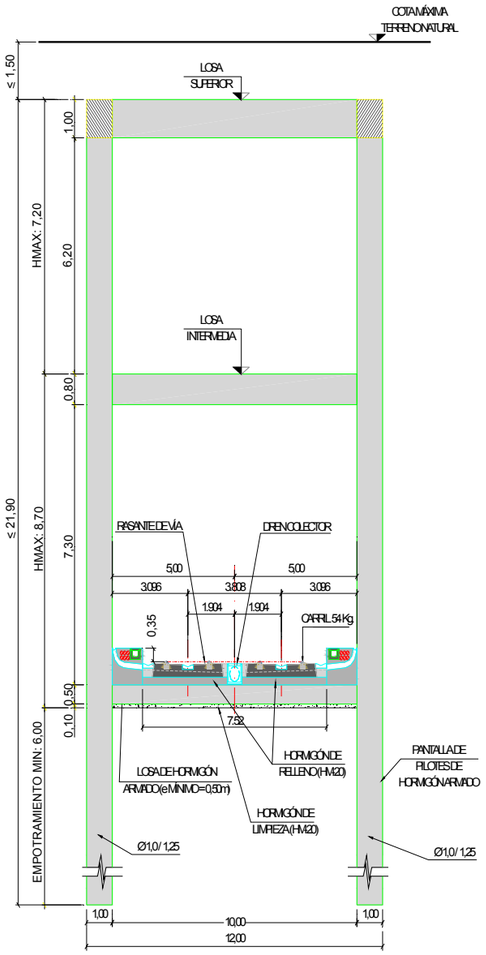
- Losa intermedia de 0,80 m de canto.

- Losa inferior de hormigón armado de 0,50 m de espesor.

- Los gálibos libres que dejará la obra civil serán:

    - Gálibo vertical 7,30 m.
    - Gálibo horizontal 10,0 m.

Esta sección se empleara en pozos de ataque, cuando sea necesario, en estos casos el gálibo horizontal serán de 17,0 m.



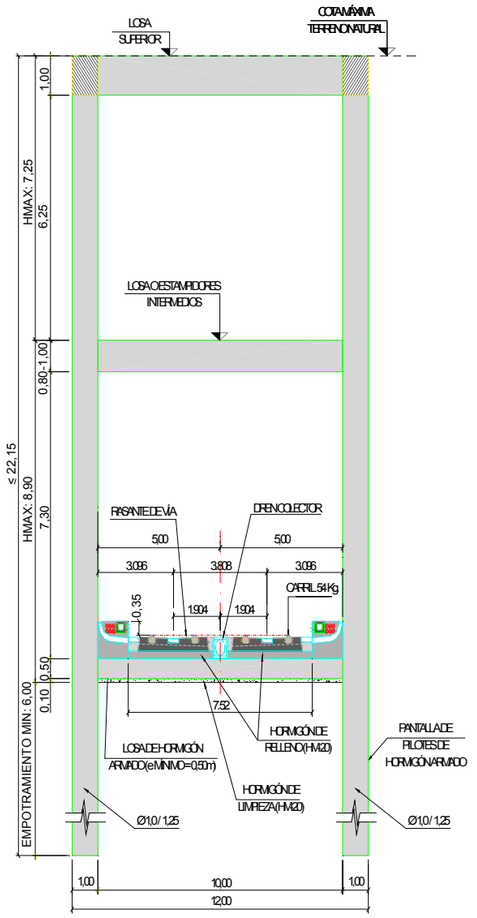
2.1.7. Sección 5.

Se tratará de una tipología muy parecida a la anterior, con la diferencia que la losa superior quedará, en este caso, enrasada con el terreno natural.

Características de los distintos elementos que constituyen la sección son:

- Losa superior de hormigón armado de 1,0 m de canto.
- Pantallas ejecutadas con pilotes de 1,0 m de diámetro y separados 1,25 m. Longitud mínima de 22,15 m.
- Losa intermedia de 0,80 m de canto. En el caso de emplearse estampidores definitivos de hormigón armado estos serán de 1,0 m de canto.
- Losa inferior de hormigón armado de 0,50 m de espesor.
- Los gálibos libres que dejará la obra civil serán:
    - Gálibo vertical 7,30 m.
    - Gálibo horizontal 10,0 m.

Al igual que la sección 4 ésta también se empleara en pozos de ataque, cuando sea necesario, requiriendo en estos casos un gálibo horizontal de 17,0 m.

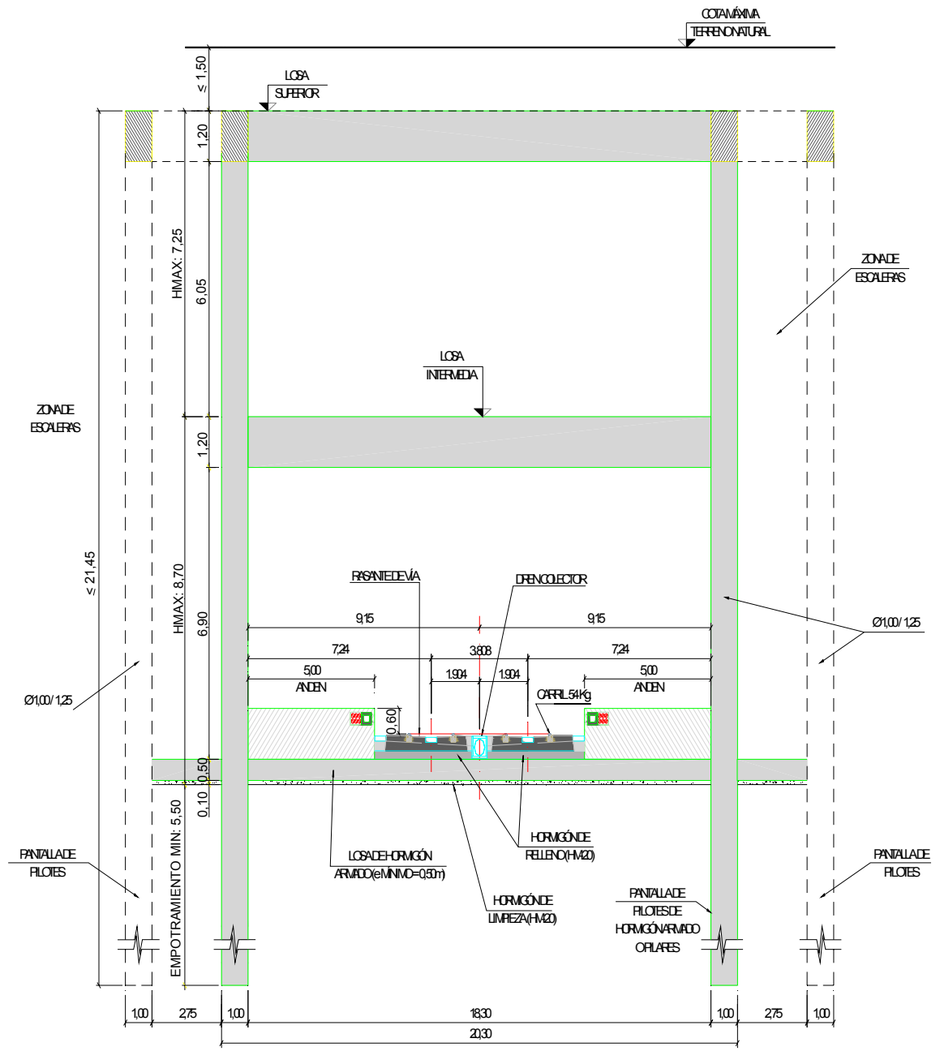


2.1.8. Sección 6 estación.

Esta sección se empleará en la zona de estación donde se requiere una mayor anchura (entre 18,30 y 25,80 m). En este caso la máxima cobertura sobre la losa superior será de 1,50 m.

Elementos que forman parte de la sección son:

- Losa superior de hormigón armado de 1,2 m de canto (Anchos de 18,30 y 25,80 m).
- Pantallas ejecutadas con pilotes de 1,0 m de diámetro y separados 1,25 m. Longitud mínima de 21,45 m.
- Pilas en la zona de sobreancho bajo la losa intermedia.
- Losa intermedia de 1.20 m de canto en la zona de mayor anchura pasando a ser estampidores del mismo canto en el resto.
- Losa inferior de hormigón armado de 0,50 m de espesor.
- Los gálibos libres que dejará la obra civil serán:
    - Gálibo vertical zona de andenes 6,90 m.
    - Gálibo vertical zona de andenes máximo de 6,05 m.
    - Gálibo horizontal 25,80 m en zona central y 18,30 m en el resto.

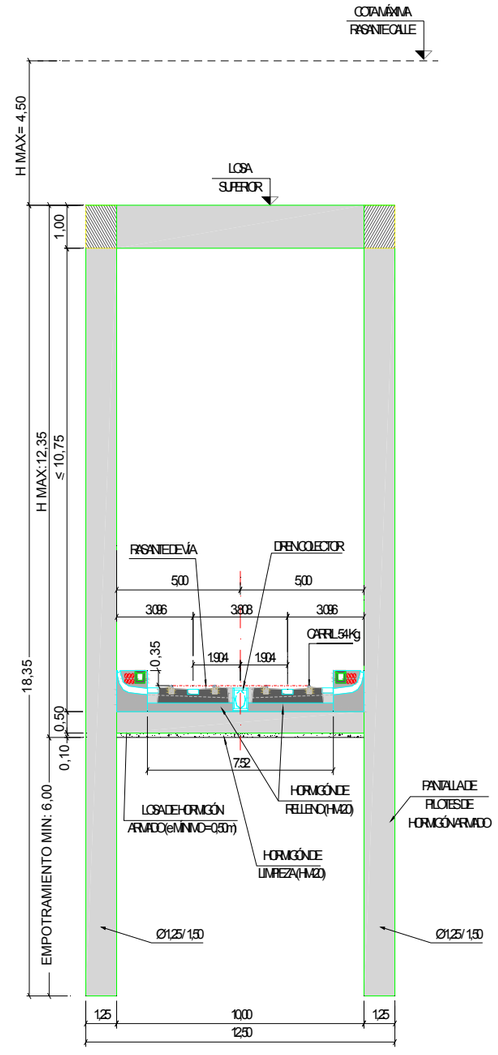


2.1.9. Sección 7.

Esta sección será muy similar a la 3, con la diferencia de que la altura de tierras sobre la losa superior será mayor, llegándose a un máximo de 4,50 m.

Geometría de los distintos elementos de la sección:

- Losa superior de hormigón armado de 1,0 m de canto.
- Pantallas ejecutadas con pilotes de 1,25 m de diámetro y separados 1,50 m. Longitud mínima de 18,35 m.
- Losa inferior de hormigón armado de 0,50 m de espesor.
- Los gálibos libres que dejará la obra civil serán:
    - Gálibo vertical máximo 10,75 m.
    - Gálibo horizontal 10,0 m.



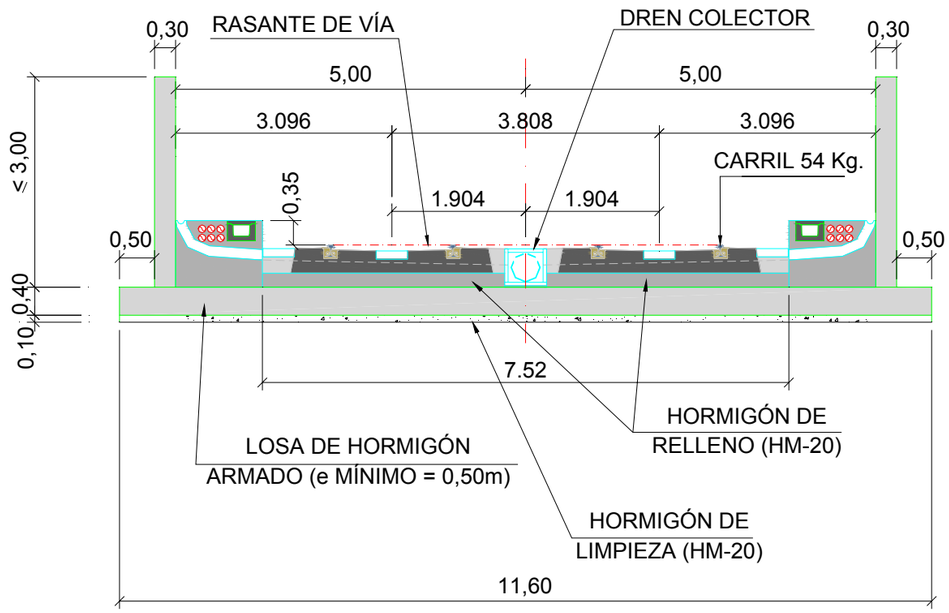
2.1.10. Sección en cajón.

En el caso de que la diferencia entre rasante y terreno sea inferior a 3,0 m se podrá emplear la tipología cajón, siempre y cuando sea posible realizar la excavación.

La sección se dividirá en los siguientes elementos con la geometría descrita a continuación:

- Muros de 0,30 m de espesor y altura máxima de 3,0 m.

- Losa inferior de 0,40 m de espesor y 11,60 m de anchura, lo que permitirá dejar unos tacones laterales de 0,50 m con la finalidad de minimizar las tensiones en punta.



2.1.11. Actuaciones Singulares.

Además de las secciones descritas anteriormente el Estudio Informativo requiere la realización de otras estructuras englobadas como Actuaciones Singulares que se citan a continuación:

- Ampliación del tablero en la calle Agricultura, se mantendrá la tipología de tablero existente, ampliándola hacia el margen derecho. Esta actuación requerirá complementarse con muros de contención de tipología en L.

- Paso inferior en la calle comercio (PK 87+900), ejecutado mediante un cajón bicelular para independizar tráficos, con dimensiones interiores de 3,50 x 4,80 m y 8,0 x 4,80 m.

  - Losa superior de 0,80 m de canto.
  - Losa inferior de 0,90 m
  - Muros de 0,80 m.
  - Muro central de 0,60 m.

- Salidas de emergencia que consistirán en un recinto se ejecutará mediante pantallas de pilotes de hormigón armado con diámetro 1.25 m y separados 1,50 m. La estructura se termina con losa superior, intermedia e inferior o solera de espesor medio 1,0 m. Además de los elementos mencionados la obra civil incluirá el resto de elementos auxiliares como son las escaleras, muros, etc necesarios para la prestación de servicio.

- Pasarelas metálicas, elementos provisionales para el mantenimiento del tráfico peatonal, con una longitud máxima de 40,0 m.

- Pozos de ventilación, se localizarán adosados a la estación ejecutados con pantallas de pilotes de 1,0 m de diámetro y una separación de 1,25 m, a los que se añadirá una losa superior y una inferior. La terminación de la obra civil requerirá la ejecución de accesos, escaleras y muros interiores.

- Pozos de bombeo recinto ejecutado con pantalla de pilotes de 1,0 m de diámetro y separados, la estructura se termina con las respectivas losas superior, intermedia e inferior, además de otras estructuras complementarias como muros interiores, escaleras, etc.

- Reposición del acceso desde la Avd de Sol a Laureá Miró, englobada dentro de la actuación de la riera Pahissa para permitir dotar de continuidad a la obra hidráulica existen. La reposición mencionada consiste en ejecutar dos estribos de pilotes con sus respectivos cargaderos sobre los que apoyará un tablero de vigas prefabricadas.

2.2. TIPOLOGÍAS EMPLEADAS.

A continuación se describe las tipologías empleadas en cada una de las alternativas presentadas, así como su localización:

2.2.1. Alternativa 1.

- Muro pantalla tipo 1 entre los PP.KK. 87+950 y 88+060 (longitud 110).
- Muro pantalla tipo 2 entre los PP.KK 88+060 y 88+090 (longitud 30 m).
- Sección 1 entre los PP.KK. 88+090 a 88+165,8, lo que supone una longitud de 75,80 m.
- Sección 2 se encuentra en dos zonas del trazado, una entre los PP.KK. 88+165,8 a 88+295 y la siguiente entre PP.KK. 89+839 a 90+050 lo que supone una longitud de 340,20 m.
- Sección 3 entre los PP.KK. 88+295 y 88+330 (longitud 35,00 m).
- Sección 4 entre los PP.KK. 88+330 y 88+394 (longitud 64,00 m). En este tramo se englobará el pozo de ataque (PP.KK. 88+379 a 88+394).
- Sección 5 en el conjunto del trazado se emplea en dos tramos, el primero entre los PP.KK. 88+950 y 89+067 y el segundo entre los PP.KK. 89+551 y 89+760 (longitud 314,30 m). En el primero de los tramos se encajará otro de los pozos de taque.
- Sección 6 estación, localizada entre los PP.KK. 89+067 y 89+267 (longitud 200,8 m).
- Sección 7 se encontrará en dos tramos, estando el primero entre los PP.KK. 89+267 y 89+551 y el segundo entre PP.KK. 89+760 y 89+839 (longitud 351,7 m).
- Sección cajón al final del trazado entre los PP.KK 90+050-90+090,80 (longitud 40,80 m) al final del trazado.

Las actuaciones singulares que se engloban en la alternativa 1 son:

- Ampliación del tablero en calle agricultura (PP.KK. 87+540 a 87+600).
- Paso inferior calle comercio (PK. 87+900).
- Pozos de ventilación (2) una a cada lado de la estación.
- Salidas de emergencia (3) dos en zona de estación y centrado en el trazado del túnel en mina.
- Pozos de bombeo, dos en zona de estación y PK 89+492.
- Cuatro pasarelas metálicas para dotar de permeabilidad a la población durante la ejecución de las obras.
- Reposición del acceso desde la Avd. del Sol a Laureá Miró (Riera Pahissa).

2.2.2. Alternativa 2.

- Sección cajón al comienzo y final del trazado, de los PP.KK. 88+370 a 88+480 y de PP.KK. 90+050 a 90+090,80. Longitud total de 150,80 m.
- Sección 2 entre PP.KK. 89+839 y 90+050 lo que supone una longitud de 211,00 m.

- Sección 3 entre los PP.KK. 88+480 y 88+680 (longitud 200,00 m).
- Sección 5 entre los PP.KK. 89+551 y 89+760 (longitud 209,00 m).
- Sección 6 estación, localizada entre los PP.KK. 89+020 y 89+220 (longitud 200,00 m).
- Sección 7 se encontrará en tres tramos:
    - El primero entre los PP.KK. 88+680 y 89+020 (longitud 340,00 m).
    - Segundo entre PP.KK. 89+220 y 89+551 (longitud 331,00 m).
    - Tercero entre PP.KK. 89+760 a 89+839 (longitud 79,00 m).

Las actuaciones singulares que se engloban en la alternativa 2 son:

- Pozos de ventilación, dos localizados una a cada lado de la estación.
- Salidas de emergencia (2) en zona de estación.
- Pozos de bombeo, (3) en PK 88+500, PK 88+800 y PK 89+500.
- Cuatro pasarelas metálicas para dotar de permeabilidad a la población durante la ejecución de las obras.
- Reposición del acceso desde la Avd. del Sol a Laureá Miró (Riera Pahissa).

3. BASES DE CÁLCULO

3.1. NORMATIVA DE APLICACIÓN.

- EHE. “Instrucción de Hormigón estructural”
- EA-95 “Instrucción de acero estructural. Borrador de Noviembre de 2004”
- IAP “Instrucción de acciones a considerar en el proyecto de puentes de carretera marzo 1998”
- IAPF “Instrucción sobre acciones de puentes de ferrocarril de diciembre de 2007”
- NCSE-07 "Norma de construcción sismorresistente: parte de puentes".(Marzo de 2006).

3.2. CONTROL DE CALIDAD.

Se han adoptado los siguientes niveles de control según el artículo 95.5 de la EHE:

- Acero de armar B-500S…….Normal
- Hormigón……..Estadístico
- Control de ejecución……..Intenso.

3.3. MATERIALES.

3.3.1. Hormigones.

Se han considerado los hormigones que a continuación se detallan (Las resistencias a compresión simple están expresadas en N/mm²).

CUADRO DE CARACTERÍSTICAS SEGÚN EHE				
ELEMENTO	**LOCALIZACIÓN**	**TIPO**	**NIVEL DE CONTROL**	**COEFICIENTE DE MAYORACION**
HORMIGÓN	LOSAS	HA-30 / B / 20 / IIa	ESTADISTICO	γc = 1,50
	ESTRIBOS Y PANTALLAS	HA-30 / F / 20 / IIa		
	LIMPIEZA Y NIVELACION	----	----	
	RELLENOS ESTRUCTURALES	HA-30 / B / 20 / IIa	----	----
ACERO PARA ARMAR	ARMADURAS PASIVAS	B500-SD	NORMAL	γs = 1,15
EJECUCION	ESTRUCTURA DE HORMIGON	----	INTENSO	Permanente: γg =1,35
				Pretensado: γp = 1,00
				Variable: γq = 1,50

El valor del módulo de elasticidad considerado se ha obtenido de la fórmula:

$$Ec, j = 8500 \cdot \sqrt[3]{(fck+8)}.$$

Con fck en N/mm².

3.3.1.1. Clase general de exposición.

Estructura: Clase general IIa (Tabla 8.2.2. EHE) ya que se trata de elementos enterrados.

3.3.1.2. Dosificación de los hormigones.

ELEMENTO	**Ambiente.**	**TABLA 37.3.2 EHE**		**Hormigón.**
		a/c	**Mínimo contenido en cemento kg/m³**	
Pantallas.	IIa	0,60	275	HA-30
Resto de estructuras.	IIa	0.60	275	HA-30

3.3.1.3. Recubrimientos.

$r_{nom}=r_{min}+\Delta r$

Control intenso: Δr = 5 mm

ELEMENTO	Ambiente.	r_{min} (mm)	r_{nom} (mm)
Pantallas	IIa	25	50
Resto de estructuras	IIa	25	30

3.3.1.4. Control de fisuración.

Se seguirá lo indicado en el artículo 49.2.4; tabla 49.2.4 de la EHE.

ELEMENTO	Ambiente.	W_{max} (mm)
Estructura.	IIa	0,30

3.3.2. *Acero* pasivo.

Se utilizará B500SD en la totalidad de la obra. El modulo de elasticidad del material empleado será:

Es = 2,10 ·10E+05 N/mm².

3.4. COEFICIENTE PARCIALES DE SEGURIDAD.

3.4.1. Coeficientes de minoración para los materiales.

- Coeficiente de minoración de resistencia del hormigón γ_c = 1.50
- Coeficiente de minoración de resistencia del acero de armar γ_s = 1.15
- Coeficiente de minoración de resistencia del acero estructural* γ_s = 1.00
- (Aceros con límite elástico garantizado).

3.4.2. Coeficiente de mayoración de acciones.

Con carácter general serán de aplicación los criterios marcados por la normativa en vigor (EHE).

3.4.2.1. Estados Límite Últimos (E.L.U.).

Para los coeficientes parciales de seguridad se tomarán los siguientes valores:

Concepto (EHE)	Situaciones persistentes o transitorias	
	Efecto favorable	Efecto desfavorable
Acciones permanentes	γ_G = 1.00	γ_G = 1.35
Acciones variables	γ_Q = 0.00	γ_Q = 1.50

3.4.2.2. Estados Límite de Servicio (E.L.S).

Para los coeficientes parciales de seguridad se tomarán los siguientes valores:

Concepto (EHE)	Situaciones persistentes o transitorias	
	Efecto favorable	Efecto desfavorable
Acciones permanentes	γ_G = 1.00	γ_G = 1.00
Acciones variables	γ_Q = 0.00	γ_Q = 1.00

3.4.3. Combinación de acciones

Se han emplearán las combinaciones de acciones recogidas en el Artículo 13 de la EHE, y los coeficientes de combinación ψ del Anexo 2 de la EHE, tabla A.4.

4. CÁLCULOS ESTRUCTURALES.

4.1. ACCIONES CONSIDERADAS.

4.1.1. Valores característicos de las acciones.

4.1.1.1. Acciones permanentes.

Se refiere a los pesos de los elementos que constituirán la estructura, y se supone que actuarán en todo momento, siendo constante en magnitud y posición. En este grupo se englobará el peso propio y la carga muerta.

4.1.1.1.1. Peso propio.

La carga se deduce de la geometría teórica de la estructura, considerando para la densidad del hormigón el valor de 25,0 kN/m^3.

4.1.1.1.2. Carga muerta.

Serán las cargas de los elementos que gravitan sobre las cimentaciones, tableros y losas, soleras, hormigones para la vía hormigonada, aceras, etc.

Serán las debidas a elementos no resistentes, siendo las más habituales las siguientes:

- Hormigones de relleno 24,0 kN/m^3.
- Barrera metálica simple 2,5 kN/ m
- Vía en placa 2,5 kN/m^3
- Carriles 1,2 kN/m por vía
- Traviesas 5,2 kN/m por vía
- Capa de subalasto 20,0 kN/m^3

4.1.1.2. Acciones permanentes de valor no constante.

4.1.1.2.1. Acciones debidas al terreno.

En este apartado se consideran las acciones originadas por el terreno natural o de relleno, sobre los elementos estructurales.

La acción del terreno sobre las estructuras será doble: peso sobre elementos horizontales y empuje sobre elementos verticales.

El peso se determinará aplicando al volumen de terreno que gravita sobre la proyección horizontal del elemento el peso específico del relleno vertido y compactado. Se considera un peso específico de 20,0 kN/m^3 atendiendo al informe geotécnico y según su localización.

El empuje es función de las características del terreno y de la interacción terreno-estructura, de acuerdo con la formulación que se describe más adelante. En ningún caso, en que su actuación sea desfavorable para el efecto estudiado, el valor del empuje será inferior al equivalente empuje hidrostático de un fluido de peso específico igual a 5,0 kN/m^3.

En el caso en que exista una incertidumbre sobre la posible actuación del empuje de tierras, deberá no considerarse en los casos en que su actuación sea favorable para el efecto en estudio.

Empuje activo.

A efectos del cálculo de estabilidad y tensiones en el terreno, se considera una ley triangular, actuando sobre un plano vertical desde la parte final del talón. La ley de empujes es efectiva desde la superficie del terreno. Los coeficientes de empuje considerados han sido los que proporciona el Estado de Rankine:

$$\lambda_h = \cos^2\beta \frac{\cos\beta - \sqrt{\cos^2\beta - \cos^2\varphi}}{\cos\beta + \sqrt{\cos^2\beta - \cos^2\varphi}} \Rightarrow \text{Coef . de empuje horizontal}$$

$$\lambda_v = \text{sen}\,\beta\cos\beta \frac{\cos\beta - \sqrt{\cos^2\beta - \cos^2\varphi}}{\cos\beta + \sqrt{\cos^2\beta - \cos^2\varphi}} \Rightarrow \text{Coef . de empuje vertical}$$

Siendo:

- φ Ángulo de rozamiento interno del relleno.
- β Ángulo que forma el talud de coronación con la horizontal.

A efectos del cálculo estructural del elemento de contención de terreno, se considera una ley triangular actuando desde la sección inferior del mismo hasta su coronación. Se admite que el relleno del trasdós es de la suficiente calidad como para suponer que el empuje es el correspondiente al Estado de Coulomb, con un ángulo de rozamiento tierras-muro de δ.

$$\lambda_h = \frac{\text{sen}^2(\alpha+\varphi)}{\text{sen}^2\alpha\left[1+\sqrt{\frac{\text{sen}(\varphi+\delta)\,\text{sen}(\varphi-\beta)}{\text{sen}(\alpha+\delta)\,\text{sen}(\alpha-\beta)}}\right]^2} \Rightarrow \text{Coef . de empuje horizontal}$$

Siendo:

- δ Ángulo de rozamiento tierras-muro
- α Ángulo que forma el trasdós con la horizontal

Empuje pasivo.

Para la evaluación del empuje pasivo se supone una ley triangular actuando desde la parte superior de la puntera, sin tener en cuenta, por tanto, el relleno situado sobre la misma.

$$\lambda_h = 0{,}5\frac{1+\text{sen}\,\varphi}{1-\text{sen}\,\varphi} \Rightarrow \text{Coef . de empuje horizontal}$$

Se considera un coeficiente parcial de seguridad de 0,5 en la formulación de Rankine, para tener en cuenta la incertidumbre en el valor de esta acción.

Empuje al reposo

Dada la sensibilidad de la respuesta de la estructura al valor del empuje lateral al reposo E_0 se han considerado dos valores $E_{0,sup}$ y $E_{0,inf}$. Para deducirlos se ha considerado una variación de +5º en el valor del coeficiente de rozamiento del material de relleno respecto al valor nominal, lo cual arroja dos valores del coeficiente de empuje al reposo:

$$K_{0,\text{inf}} = 1 - sen(35) = 0{,}43$$

$$K_{0,\text{sup}} = 1 - sen(30) = 0{,}5$$

No se considera necesario admitir una variación al alza del empuje al reposo ya que la solicitación de los empujes es en general antagonista de la de peso propio de las tierras y por tanto favorable para los esfuerzos. Por otro lado, una posible compactación deficiente en ciertas zonas del relleno daría siempre como resultado menores empujes (valores entre el reposo y el activo).

Empuje sísmico

Para el caso del empuje sísmico sobre los muros, la I.A.P.F. introduce las expresiones de Mononobe-Okabe para una primera aproximación de los empujes activos y pasivos.

Las expresiones de Mononobe-Okabe se indican a continuación:

$$E_a = \frac{1}{2}\cdot\gamma\cdot h^2\cdot(1-K_v)\cdot\frac{\cos^2(\phi-\beta-\theta)}{\cos\theta\cdot\cos^2\beta\cdot\cos(\delta+\beta+\theta)\cdot\left[1-\sqrt{\left(\frac{\operatorname{sen}(\phi+\delta)\cdot\operatorname{sen}(\phi-i-\theta)}{\cos(\delta+\beta+\theta)\cdot\cos(i-\beta)}\right)}\right]^2}$$

$$E_a = \frac{1}{2}\cdot\gamma\cdot h^2\cdot(1-K_v)\cdot\frac{\cos^2(\phi+\beta-\theta)}{\cos\theta\cdot\cos^2\beta\cdot\cos(\delta-\beta+\theta)\cdot\left[1-\sqrt{\left(\frac{\operatorname{sen}(\phi+\delta)\cdot\operatorname{sen}(\phi+i-\theta)}{\cos(\delta-\beta+\theta)\cdot\cos(i-\beta)}\right)}\right]^2}$$

Donde:

γ Peso específico del terreno

H altura del estribo o muro

$$\theta = arctg\frac{K_h}{1-K_v}$$

δ Ángulo de rozamiento entre terreno y estructura, signo positivo en sentido horario.

β Inclinación del paramento de la estructura en relación con la vertical.

i Inclinación del terreno respecto de la horizontal.

ϕ ángulo de rozamiento interno

K_v coeficiente de aceleración vertical, que, como primera aproximación, puede tomarse como 0

K_h coeficiente de aceleración horizontal cuyo valor será $a_c/2g$

Lo que finalmente se calcula es un incremento del empuje activo de las tierras debido a la acción del sismo. Dicho incremento se modela como una carga puntual en los elementos verticales ubicada a una altura de 3/5 H.

4.1.1.2.2. Sobrecarga de uso.

Tren de cargas: Está compuesto por la acción simultánea de:

- Una sobrecarga uniforme de 5 kN/m² extendida a toda la superficie de las aceras o a parte de ella, según sea más desfavorable para el elemento en estudio.

- El tren tipo de la Instrucción (artículo 2.3.2.1. de IAPF).

Frenado y arranque: Se estima en una fuerza horizontal siguiendo las indicaciones de la IAPF.

Otras sobrecargas de uso empleadas en el cálculo han sido:

- Tráfico en trasdós 10,0 kN/m^2 en toda la zona accesible al tránsito de vehículos.
- Tráfico ferroviario en trasdós 30,0 kN/m^2.
- 50,0 kN/m^2 maquinaría de obra (movimiento de tierras y compactadores). En particular se considera la posible actuación asimétrica de las cargas.

4.1.1.2.3. Acción del viento.

Al tratarse de estructuras enterradas no será de aplicación, únicamente se verán afectadas las estructuras superficiales englobadas en apartado de actuaciones singulares.

Para el cálculo de la acción del viento se empleará el método simplificado propuesto en la IAPF obteniéndose como resultado un valor del empuje de 2,17 KN/m^2 sobre el tablero y 2,35 KN/m^2 sobre pilas.

Dicho valor es el resultado de considerar:

- Entorno tipo III (zona suburbana, forestal o industrial).
- Velocidad de referencia de 28 m/s obtenida de la figura 2.21 mapa de isotacas para la obtención de la velocidad de referencia del viento de la IAPF.

4.1.1.2.4. Acciones térmicas.

Se aplicará el artículo 2.3.12.1 de la IAPF. La zona de proyecto se localiza en la provincia de Barcelona.

De acuerdo con la IAPF se considera una variación uniforme de temperatura ΔT, deducida de la expresión:

$$\Delta T = K \cdot z^a \cdot h^b \cdot s^c$$

El gradiente térmico entre la cara superior e inferior de la estructura seguirá lo prescrito en el artículo 2.3.12.1.2 de la IAPF.

4.1.1.3. Acciones accidentales.

4.1.1.3.1. Choques de vehículos.

Será de aplicación para las estructuras que las pilas puedan sufrir impacto de vehículos, no será considerado para los pasos inferiores.

4.1.1.3.2. Acciones sísmicas.

La localizada en la que se localizará la actuación será San Feliu del Llobregat, según el anejo 1 de la NCSE la aceleración básica en esta población será de 0,04 y el coeficiente de distribución 1.

Por tanto será necesaria la consideración de acciones sísmicas en el cálculo.

La obtención del valor de la aceleración de cálculo requiere el conocimiento adecuado del terreno, datos que a nivel de estudio informativo no se disponen y que requerirá su desarrollo en proyectos posteriores.

4.1.2. Valores representativos de las acciones.

Con carácter general se han seguido los criterios especificados en la instrucción relativa a las Acciones a considerar en el Proyecto de Puentes de Ferrocarril (IAPF-07). Las acciones se definen, en su magnitud, por sus valores representativos.

Una misma acción puede tener un único o varios valores representativos, según se indica a continuación, en función del tipo de acción.

4.1.2.1. Acciones permanentes (G).

Para las acciones permanentes se considerará un único valor representativo, coincidente con el valor característico G_k.

4.1.2.2. Acciones permanentes de valor no constante (G*).

Acciones del terreno: para el peso del terreno, que gravita sobre elementos de la estructura, se considerará un único valor representativo, coincidente con el valor característico. Para el empuje del terreno, se considerarán dos valores de empuje al reposo (uno inferior y otro medio) el valor representativo de acuerdo con lo expuesto en 3.1.5.2.

4.1.2.3. Acciones variables (Q).

Cada una de las acciones variables puede considerarse con los siguientes valores representativos:

- Valor característico Q_k: valor de la acción cuando actúa aisladamente.
- Valor de combinación $\psi_0 Q_k$: valor de la acción cuando actúa en compañía de alguna otra acción variable.
- Valor frecuente $\psi_1 Q_k$: valor de la acción que es sobrepasado durante un período de corta duración respecto a la vida útil del puente.
- Valor casi-permanente $\psi_2 Q_k$: valor de la acción que es sobrepasado durante una gran parte de la vida útil del puente.

Los valores de los coeficientes ψ son los siguientes:

ψ_0	ψ_1	ψ_2
0,60	0,50	0,20

4.1.2.4. Acciones accidentales (A).

Para las acciones accidentales se considerará un único valor coincidente con el valor característico A_k.

4.1.3. Valores de cálculo de las acciones.

Con carácter general se han seguido los criterios especificados en la instrucción actualizada (borrador), IAPF, relativos a las Acciones a considerar en el Proyecto de Puentes de Ferrocarril.

Los valores de cálculo de las diferentes acciones son los obtenidos aplicando el correspondiente coeficiente parcial de seguridad γ a los valores representativos de las acciones, definidos en el apartado anterior.

4.1.3.1. Estados Límite Últimos (E.L.U.).

Para los coeficientes parciales de seguridad γ se tomarán los siguientes valores básicos:

Concepto		Situaciones persistentes y transitorias		Situaciones accidentales	
		Efecto favorable	Efecto desfavorable	Efecto favorable	Efecto desfavorable
Acciones permanentes.		γ_G = 1,0	γ_G = 1,35	γ_G = 1,0	γ_G = 1,0
Acciones permanentes	Reológicas	γ_{G^*} = 1,0	γ_{G^*} = 1,35	γ_{G^*} = 1,0	γ_{G^*} = 1,0
De valor no constante	Acciones del terreno	γ_{G^*} = 1,0	γ_{G^*} = 1,50	γ_{G^*} = 1,0	γ_{G^*} = 1,0
Acciones variables		γ_Q = 0,0	γ_Q = 1,5	γ_Q = 0,0	γ_Q = 1,0
Acciones accidentales		--	--	γ_A = 1,0	γ_A = 1,0

NOTAS.-

(1) Los coeficientes γ_G = 1,0 y γ_G = 1,35, se aplicarán a la totalidad de la acción, según su efecto sea favorable o desfavorable.

Cuando el comportamiento de la estructura pueda ser muy sensible a variaciones de las acciones permanentes de una a otra parte de la estructura, las partes favorables y desfavorables de la misma acción serán consideradas como acciones separadas, aplicándose unos coeficientes γ_G distintos y específicos para cada una de ellas. Los valores de estos coeficientes serán:

Para la parte favorable de la acción γ_{G1} = 0,9

Para la parte desfavorable de la acción γ_{G2} = 1,1

La estructura objeto de este Anejo de Cálculo, es poco sensible a variaciones de la carga permanente de una parte a otra de la estructura terminada, dado que los vanos contiguos están compensados y tienen luces similares, localizándose los mayores esfuerzos en la sección de apoyos. Por este motivo no es necesario tener en cuenta los dos criterios antes mencionados y, por tanto, se aplica γ_G a la totalidad de la acción en las situaciones persistentes.

(2) En el caso de la carga de pavimento, se considerará para la totalidad de la acción:

El valor representativo inferior $G_{k,inf}$, ponderado por γ_G = 1,00, cuando su efecto sea favorable.

El valor representativo superior $G_{k,sup}$, ponderado por γ_G = 1,35, cuando su efecto sea desfavorable.

Cuando el comportamiento de la estructura pueda ser muy sensible a variaciones de las acciones permanentes de una a otra parte de la estructura, se considerará:

Para la parte favorable de la acción $G_{k,inf} \times \gamma_{G1}$, con γ_{G1} = 0,9

Para la parte desfavorable de la acción $G_{k,sup} \times \gamma_{G2}$, con γ_{G2} = 1,1

Con una justificación análoga a la indicada con anterioridad, se ha considerado una única hipótesis de carga tomando el valor representativo superior $G_{k,sup}$ y γ_G = 1,35.

4.1.3.2. Estados Límite de Servicio (E.L.S.).

Para los coeficientes parciales de seguridad γ se tomarán los siguientes valores:

Concepto		Situaciones persistentes y transitorias	
		Efecto favorable	Efecto desfavorable
Acciones permanentes		γ_G = 1,0	γ_G = 1,00
Acciones permanentes de valor no constante	Reológicas	γ_G* = 1,0	γ_G* = 1,0
	Acciones del terreno	γ_G* = 1,0	γ_G* = 1,0
Acciones variables		γ_Q = 0	γ_Q = 1,0

4.1.4. Combinación de acciones.

Con carácter general se han seguido los criterios especificados en la Instrucción de Hormigón Estructural (EHE) para estructuras de hormigón armado y del Eurocódigo, Código Técnico de la Edificación y/o Instrucción de Acero Estructuras (EAE) para estructuras de acero.

Las hipótesis de carga a considerar se formarán combinando los valores de cálculo de las acciones cuya actuación pueda ser simultánea, según los criterios generales que se indican a continuación.

4.1.4.1. Estados Límite Último (E.L.U.).

4.1.4.1.1. Situaciones persistentes y transitorias.

Las combinaciones de las distintas acciones consideradas en estas situaciones, se realizará de acuerdo con el siguiente criterio:

$$\sum_{j\geq 1}\gamma_{G,j}\,G_{k,j}+\sum_{j\geq 1}\gamma_{G*,j}\,G*_{k,j}+\gamma_{Q,1}\,Q_{k,1}+\sum_{i>1}\gamma_{Q,i}\,\psi_{0,i}\,Q_{k,i}$$

donde:

$G_{k,j}$ valor representativo de cada acción permanente

$G^*_{k,i}$ valor representativo de cada acción permanente de valor no constante

$Q_{k,1}$ valor representativo (valor característico) de la acción variable dominante

$\psi_{0,i}\,Q_{k,i}$ valores representativos (valores de combinación) de las acciones variables concomitantes con la acción variable dominante.

4.1.4.1.2. Situaciones accidentales.

Las combinaciones de las distintas acciones consideradas en estas situaciones, se realizarán de acuerdo con el siguiente criterio:

$$\sum_{j\geq 1}\gamma_{G,j}\,G_{k,j}+\sum_{j\geq 1}\gamma_{G*,i}\,G*_{k,i}+\gamma_{Q,1}\,\psi_{1,1}\,Q_{k,1}+\sum_{i>1}\gamma_{Q,i}\,\psi_{2,i}\,Q_{k,i}+\gamma_A\,A_k$$

donde:

$G_{k,j}$; $G^*_{k,i}$ valores representativos definidos en 3.6.

$\psi_{1,1}\,Q_{k,1}$ valor representativo (valor frecuente) de la acción variable dominante.

$\psi_{2,1}\,Q_{k,j}$ valores representativos (valores casi-permanentes) de las acciones variables concomitantes con la acción variable dominante y la acción accidental.

A_k valor representativo (valor característico) de la acción accidental

4.1.4.1.3. Estados Límite de Servicio (E.L.S.)

Para estos estados se consideran únicamente las situaciones persistentes y transitorias, excluyéndose las accidentales.

Las combinaciones de las distintas acciones consideradas en estas situaciones, se realizará de acuerdo con el siguiente criterio:

Combinación característica (poco probable o rara):

$$\sum_{j\geq 1}\gamma_{G,j}\,G_{k,j}+\sum_{j\geq 1}\gamma_{G*,i}\,G*_{k,i}+\gamma_{Q,1}\,Q_{k,1}+\sum_{i>1}\gamma_{Q,1}\,\psi_{0,i}\,Q_{k,i}$$

Combinación frecuente:

$$\sum_{j\geq 1}\gamma_{G,j}\,G_{k,j}+\sum_{j\geq 1}\gamma_{G*,i}\,G*_{k,i}+\gamma_{Q,1}\,\psi_{1,1}\,Q_{k,1}+\sum_{i>1}\gamma_{Q,i}\,\psi_{2,i}\,Q_{k,i}$$

Combinación casi-permanente:

$$\sum_{j\geq 1}\gamma_{G,j}\,G_{k,j}+\sum_{j\geq 1}\gamma_{G*,i}\,G*_{k,i}+\sum_{i>1}\gamma_{Q,i}\,\psi_{2,i}\,Q_{k,i}$$

4.2. PROGRAMAS DE CÁLCULO EMPLEADOS.

Los programas empleados en los cálculos realizados para los tanteos estructurales han sido los descritos a continuación.

4.2.1. Sap2000.

Programa de elementos finitos y matricial empleado para el cálculo de los modelos realizados. En la mayoría de los casos los modelos se generan mediante programas de creación propia.

El programa SAP se empleará como procesador para calcular los esfuerzos que posteriormente serán empleados para dimensionar las estructuras.

4.2.2. Prontuario informático del hormigón armado 3.0.

Se trata de una herramienta informática generalizada en el cálculo hormigón armado. Permite diseñar secciones a cualquier estado límite, además de comprobar otros temas como durabilidad, sistemas constructivos, etc.

En este caso será empleada para la modelización y armado de elementos muy concretos.

4.2.3. Rido.

Programa para cálculo de pantallas (ya sean continuas o con pilotes) que permite considerar la no linealidad del terreno, variación de empuje del agua por zonas, disposición de anclajes y estampidores así como el cálculo por fases.

4.2.4. Hojas de cálculo.

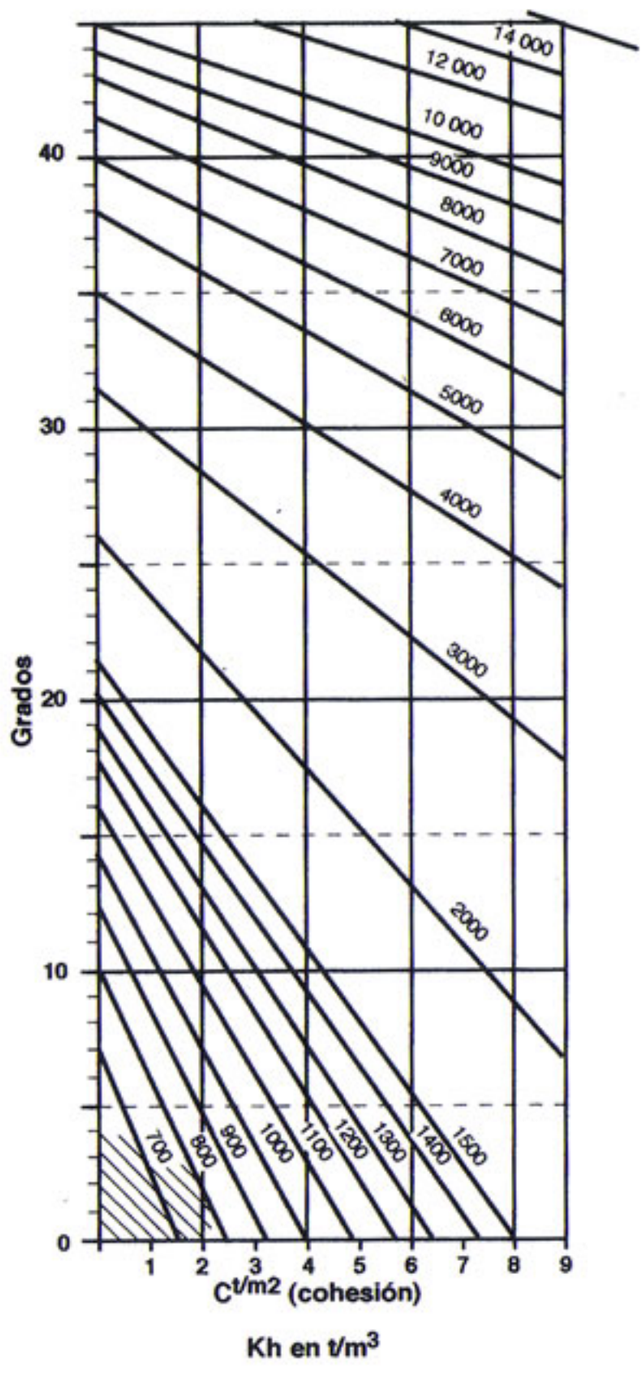
Se trata de hojas de cálculo de creación propia, generalmente en EXCEL, empleadas para preprocesos y posprocesos de programas específicos.

5. GEOTECNIA EMPLEADA.

A partir de los datos geotécnicos disponibles, y dado que los cálculos efectuados constituyen un predimensionamiento de las estructuras, que permita su correcta valoración, se cuenta con información suficiente para efectuar los cálculos correspondientes.

La litología y parámetros geotécnicos finalmente empleados en el cálculo son:

Terreno	C (tn/m³)	φ (º)	Kh (tn/m³)
Rellenos	0,00	28	1500
Arenas y gravas	0,90	34,50	4000
Arenas arc.limosas	9,00	34,50	4000
Gravas con arcillas	0,20	37,00	4800
Arcillas con limos	1,30	32,30	3800



Apéndice 1: Cálculos.

1. APÉNDICE Nº 1 CÁLCULOS

En el presente apéndice se recogen todos los cálculos realizados para el dimensionamiento de las pantallas del “Estudio Informativo de Integración del Ferrocarril de sant Feliu de Llobregat”

A continuación se expone un listado con las secciones tipo necesarias para el estudio, presentnandose un cálculo indeopendizado para cada una de ellas.

PANTALLA TIPO 1-A

Proyecto: INTEGRACION DEL FERROCARRIL EN SANT FELIU
Tipo: PANTALLAS DE PILOTES
Tramo: PANTALLA TIPO 1A
Fecha: 27/10/2008

CARACTERIZACIÓN DE ESTRATOS

Estratos	Potencia (m)	ϕ	Cohesión (kN/m²)	Densidad (kN/m³)	Kh (kN/m²)
Rellenos	1.80	28	0	18	15,000
Ar.arc.y limosas	3.70	34.5	9	20.5	40,000
Arcillas y limos	---	32.3	13	19.5	38,000

(*) Al no tener perfil de este tramo se ha tomado el del tramo mas cercano (Pantalla tipo 2)

Cota nivel freatico: --- m

SOBRECARGAS

Rellenos y tráfico

Rellenos:	2.000	m
SC Rellenos(*):	40.00	kN/m²
SC Tráfico:	30.00	kN/m²
Sobrecarga 1:	70.00	kN/m²
Ambito de actuación:	0-12	m

(*) Supuesta una densidad de 20 KN/m³

Edificación

nº de plantas	0.000	m
Carga por planta:	10.00	kN/m²
SC edficación:	0.00	kN/m²
Sobrecarga 2:	0.00	kN/m²
Ambito de actuación:	---	m

(*) Supuesta una carga de 10KN/m²·planta

CARACT.MECANICAS Y GOEMETRICAS DE LA PANTALLA DE PILOTES (RIGIDEZ)

DATOS			
Diametro (m):	0.85	Área (m²):	0.5675
Separación (m):	1.05	Inercia (m⁴):	0.0256
Resistencia Hormigón (N/mm²):	30	Rigidez (kNm²):	732,249
Ambiente:	IIa	Módulo Defor. Hormigón (kN/m²):	28,576,791

(*) Se ha considerado un valor Ej=8.500·∛fcm,j

HOJA PREPARADA PARA INTRODUCIR EL COMANDO "COE" (RIDO)

COTAS DE LA PANTALLA

Cota Superior Pantalla:	100.000	m
Cota Excavación:	96.700	m
Cota Fondo de Excavación:	96.700	m
Cota Pie de Pantalla:	91.700	m
Longitud Pilote:	8.300	m

RESULTADOS

Desplazamiento:	11.06	mm
Empuje Pasivo Movilizado:	32.97	%

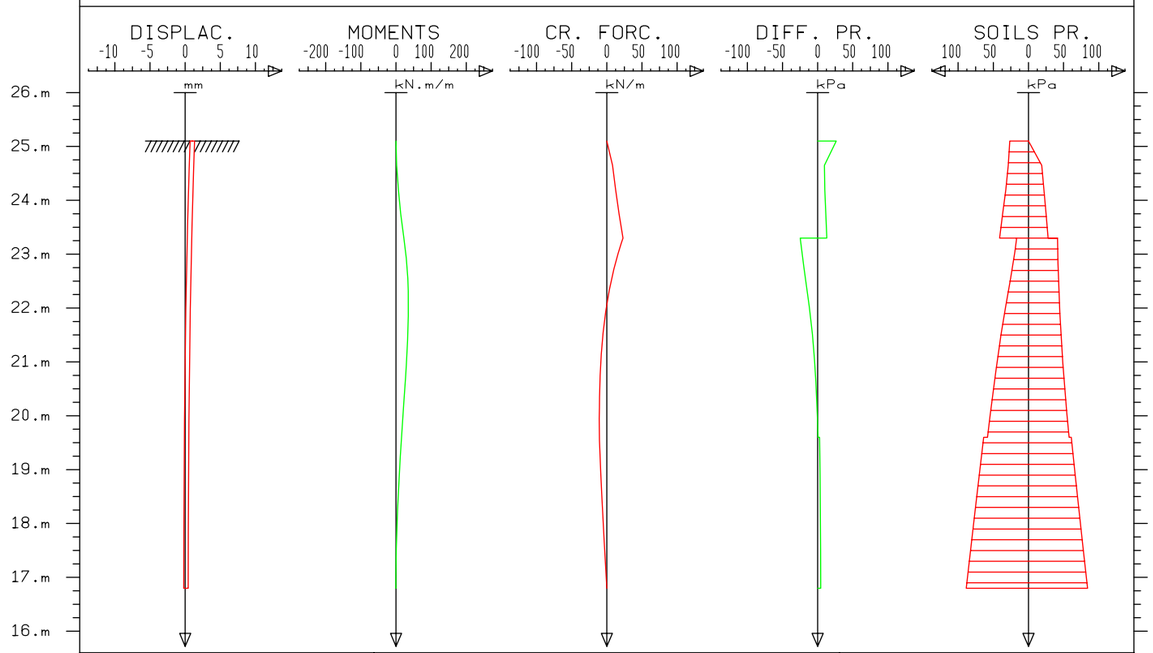
PROCESO CONSTRUCTIVO

1º Ejecución de pantalla de pilotes.
2º Excavación hasta cota de trabajo.
3º Ejecución de solera (sin funcion estructural)

GRÁFICOS

PANTALLA DE PILOTES TIPO 1A(RAMPA) SOTERRAMIENTO SANT FELIU

GRAPHS OF THE PHASE Nb 1



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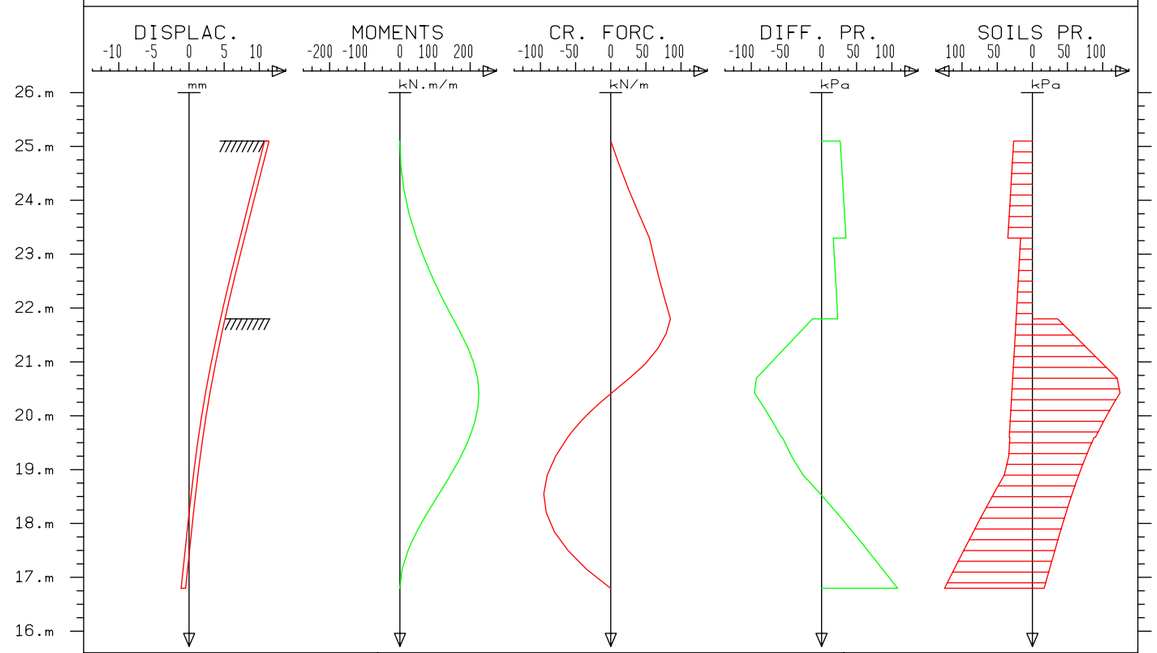
PANTALLA DE PILOTES TIPO 1A(RAMPA) SOTERRAMIENTO SANT FELIU

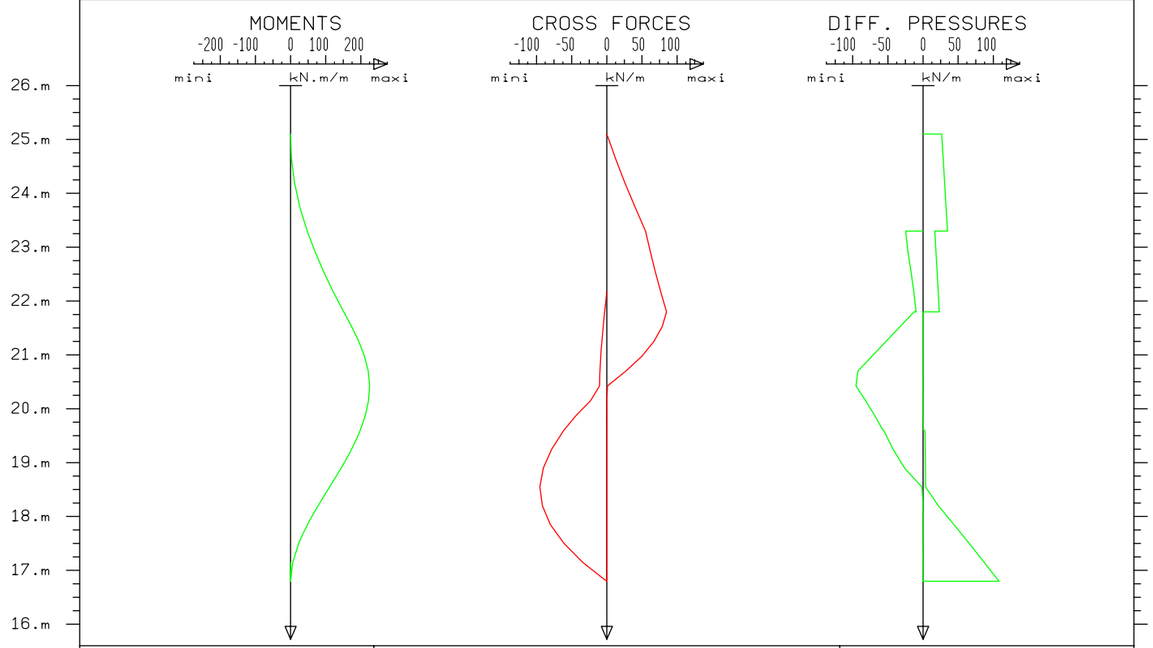
GRAPHS OF THE PHASE Nb 2



RIDO 4.02 (C) R.F.L	MADRID	10-27-08 SFELIU-1

PANTALLA DE PILOTES TIPO 1A(RAMPA) SOTERRAMIENTO SANT FELIU

ENVELOPES FROM PHASE 1 TO PHASE 2



RIDO 4.02 (C) R.F.L	MADRID	10-27-08 SFELIU-1

LISTADO

```
E &l8D &k2S &a4L      ***** DATA FILE NAME : SFELIU-1A.RIO

       PANTALLA DE PILOTES TIPO 1A(RAMPA) SOTERRAMIENTO SANT FELIU      *101L  U:NN*
       *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
       #EMP=5.00
       #DIAMETRO=0.85
       #SEPARACION=1.05
       #fck=30
       #E=8500*((fck+8)^(1/3))*1000
       #I=3.14/(64)*(DIAMETRO)^4
       #RIGIDEZ=E*I
       *COTAS DE LA PANTALLA
       #CSUP=25.10
       #CEXC=25.10-3.3
       *Nota: "CEXC" es la cota maxima de excavacion
       #CPIE=CEXC-EMP
       #NF=CSUP-20.00
       *CABEZA DE PANTALLA
       : CSUP
 1 ...  25.1
       *PANTALLA 0.85/1.05
       : CPIE RIGIDEZ
 2 ...  16.8 731878.2
       *COTA MAXIMA DE TERRENO
       : CSUP
 3 ...  25.1
       *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)
       : 25.10-1.80 18.00 9.00 0 0 0 0 28 0 0 15000
 4 ...  23.3 18 9 0.3610335 0.5305284 2.769826 0 28 0 0 15000
       : 25.10-1.80-3.70 20.30 10.30 0 0 0 9 34.50 0 0 40000
 5 ...  19.6 20.3 10.3 0.276808 0.4335938 3.612612 9 34.5 0 0 40000
       : 25.10-25.00 19.50 9.50 0 0 0 0 13 32.3 0 0 38000
 6 ...  0.1 19.5 9.5 0.3034816 0.4656477 3.295093 13 32.3 0 0 38000
       *NIVEL FREATICO
       : NF 0.50
 7 ...  5.1 0.5
       *REAJUSTE POR ANCHO
       : COE CSUP CSUP-25.00 SEPARACION
 8 ... COE 25.1 0.1 1.05
       *SOBRECARGA 70 KN/M2 (PASO DE FERROCARRIL+RELLENOS)
       : SUB(1) CSUP 0 15 70
 9 ... SUB(1)  25.1 0 15 70
       : CAL(2)
10 ... CAL(2)
       *EXCAVACION HASTA COTA DE SOLERA
       : EXC(2) CEXC
11 ... EXC(2)  21.8
       : CAL(2)
12 ... CAL(2)
       : END
13 ... END
       : STA
14 ... STA
       : EVP
15 ... EVP
```


** MADRID ** ** 10-27-08 **

*CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
*COTAS DE LA PANTALLA
*Nota: "CEXC" es la cota maxima de excavacion
*CABEZA DE PANTALLA
*PANTALLA 0.85/1.05

** STARTING DATA **

* BOUSSINESQ SURCHARGES FUNCTION OF STATE OF SOIL

*** WALL DESCRIPTION :

	INERTIA PRODUCT EI	CYLINDRICAL RIGIDITY
SECTION NB 1 FROM 25.100 m TO 16.800 m :	731878. kN.m2/m	0. kPa/m

*COTA MAXIMA DE TERRENO

*** SOIL DESCRIPTION :

*DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)

LAYER NB 1 FROM 25.100 m TO 23.300 m :

SATURATED UNIT WEIGHT	GH	=	18.000 kN/m3
SUBMERGED UNIT WEIGHT	GD	=	9.000 kN/m3
HOR. ACTIVE PRESSURE COEFFICIENT	KA	=	0.361
HOR. AT REST PRESSURE COEFFICIENT	K0	=	0.531
HOR. PASSIVE PRESSURE COEFFICIENT	KP	=	2.770
COHESION	C	=	0.000 kPa
ANGLE OF INTERNAL FRICTION	PHI	=	28.000 DEGREES
FOR ACTIVE PRESS. DELTA/PHI		=	0.000
FOR PASSIVE PRESS. DELTA/PHI		=	0.000
ELASTIC REACTION COEFFICIENT (AT P=0)		=	15000.000 kPa/m
INCR. OF THIS COEFF. WITH PRESSURE		=	0.000 1/m

LAYER NB 2 FROM 23.300 m TO 19.600 m :

SATURATED UNIT WEIGHT	GH	=	20.300 kN/m3
SUBMERGED UNIT WEIGHT	GD	=	10.300 kN/m3
HOR. ACTIVE PRESSURE COEFFICIENT	KA	=	0.277
HOR. AT REST PRESSURE COEFFICIENT	K0	=	0.434
HOR. PASSIVE PRESSURE COEFFICIENT	KP	=	3.613
COHESION	C	=	9.000 kPa
ANGLE OF INTERNAL FRICTION	PHI	=	34.500 DEGREES
FOR ACTIVE PRESS. DELTA/PHI		=	0.000
FOR PASSIVE PRESS. DELTA/PHI		=	0.000
ELASTIC REACTION COEFFICIENT (AT P=0)		=	40000.000 kPa/m
INCR. OF THIS COEFF. WITH PRESSURE		=	0.000 1/m

LAYER NB 3 FROM 19.600 m TO 0.100 m :

SATURATED UNIT WEIGHT	GH	=	19.500 kN/m3
SUBMERGED UNIT WEIGHT	GD	=	9.500 kN/m3
HOR. ACTIVE PRESSURE COEFFICIENT	KA	=	0.303
HOR. AT REST PRESSURE COEFFICIENT	K0	=	0.466
HOR. PASSIVE PRESSURE COEFFICIENT	KP	=	3.295
COHESION	C	=	13.000 kPa
ANGLE OF INTERNAL FRICTION	PHI	=	32.300 DEGREES
FOR ACTIVE PRESS. DELTA/PHI		=	0.000
FOR PASSIVE PRESS. DELTA/PHI		=	0.000
ELASTIC REACTION COEFFICIENT (AT P=0)		=	38000.000 kPa/m
INCR. OF THIS COEFF. WITH PRESSURE		=	0.000 1/m

*NIVEL FREATICO

** PHASE Nb 1 **

*REAJUSTE POR ANCHO

* FROM 25.100 m TO 0.100 m COEFFICIENT APPLIED TO PRESSURES = 1.050
ADDITIONAL COEFF. ON PASSIVE PRESSURE = 1.000

*SOBRECARGA 70 KN/M2 (PASO DE FERROCARRIL+RELLENOS)

* CANCELLATION BOUSSINESQ SURCHARGE ON SOIL 1

* ADDING A BOUSSINESQ SURCHARGE ON SOIL 1
LEV. = 25.100 m A = 0.000 m B = 15.000 m Q = 70.000 kPa

PHASE 1

| | WALL | SOIL 1 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | SOIL 2 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	1.012	-0.214	0.00	0.00		1	26.54	26.54	15750	3	0.00		15750		
24.650	0.916	-0.213	2.12	8.14		1	28.59	25.52	15750	2	18.94		15750		
24.200	0.821	-0.211	6.78	12.60		2	32.12	25.98	15750	2	21.95		15750		
23.750	0.727	-0.205	13.52	17.51		2	36.63	27.42	15750	2	24.99		15750		
23.300	0.637	-0.194	22.63	23.05		2	41.10	28.82	15750	2	28.09		15750		
						1	16.74	16.74	42000	2	41.52		42000		
22.925	0.567	-0.180	29.61	14.36		2	20.46	18.77	42000	2	42.04		42000		
22.550	0.503	-0.164	33.58	7.10		2	25.67	21.77	42000	2	42.80		42000		
22.175	0.445	-0.146	35.13	1.41		2	30.62	24.15	42000	2	43.83		42000		
21.800	0.393	-0.128	34.81	-2.91		2	35.31	23.22	42000	2	45.13		42000		
21.525	0.360	-0.115	33.66	-5.31		2	38.59	22.55	42000	2	46.27		42000		
21.250	0.330	-0.103	31.93	-7.17		2	41.73	21.89	42000	2	47.55		42000		
20.975	0.303	-0.091	29.76	-8.55		2	44.74	21.24	42000	2	48.98		42000		
20.700	0.280	-0.080	27.27	-9.53		2	47.63	20.60	42000	2	50.53		42000		
20.425	0.259	-0.071	24.55	-10.18		2	50.42	19.98	42000	2	52.20		42000		
20.150	0.241	-0.062	21.70	-10.54		2	53.12	19.36	42000	2	53.97		42000		
19.875	0.225	-0.054	18.77	-10.67		2	55.73	18.77	42000	2	55.84		42000		
19.600	0.211	-0.048	15.84	-10.62		2	58.28	18.18	42000	2	57.79		42000		
						2	63.69	19.53	39900	2	60.97		39900		
19.250	0.195	-0.041	12.30	-9.58		2	66.87	18.75	39900	2	63.68		39900		
18.900	0.182	-0.036	9.15	-8.41		2	69.99	17.99	39900	2	66.48		39900		
18.550	0.170	-0.032	6.43	-7.15		2	73.07	17.26	39900	2	69.34		39900		
18.200	0.159	-0.030	4.16	-5.81		2	76.14	16.56	39900	2	72.25		39900		
17.850	0.149	-0.028	2.36	-4.43		2	79.20	15.88	39900	2	75.18		39900		
17.500	0.139	-0.028	1.06	-3.00		2	82.27	15.22	39900	2	78.12		39900		
17.150	0.129	-0.027	0.27	-1.52		2	85.36	14.59	39900	2	81.08		39900		
16.800	0.120	-0.027	0.00	0.00		2	88.47	13.98	39900	2	84.04		39900		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 1.01 mm
MAXIMUM MOMENT = 35.13 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR., 2 = ELASTIC, 3 = PASSIVE PR.
CODIFICATION OF SOIL :

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 171.67 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.104
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.157

** PHASE Nb 2 **

*EXCAVACION HASTA COTA DE SOLERA

* EXCAVATION IN SOIL 2 TO LEVEL = 21.800 m

PHASE 2

	WALL	SOIL 1 (EXCAVATION: 25.10 m, WATER LEVEL: 5.10 m, CAQUOT SURC.: 0.00 kPa)	SOIL 2 (EXCAVATION: 21.80 m, WATER LEVEL: 5.10 m, CAQUOT SURC.: 0.00 kPa)	
LEVEL	DISPLAC. ROTATION MOMENT CR.FO. SH LOAD	STATE PRE. SURCH. ELAST.	STATE PRE. SURCH. ELAST.	NB LOAD
25.100	11.065 -1.958 0.00 0.00	1 26.54 26.54 15750	0	
24.650	10.184 -1.958 2.76 12.40	1 28.59 25.52 15750	0	
24.200	9.304 -1.954 11.30 25.74	1 30.65 24.51 15750	0	
23.750	8.427 -1.942 26.06 40.00	1 32.72 23.51 15750	0	
23.300	7.557 -1.920 47.44 55.19	1 34.80 22.52 15750	0	
		1 16.74 16.74 42000	0	
22.925	6.842 -1.890 69.35 61.76	1 18.33 16.64 42000	0	
22.550	6.141 -1.849 93.84 68.94	1 19.92 16.02 42000	0	
22.175	5.457 -1.794 121.12 76.71	1 21.53 15.42 42000	0	
21.800	4.797 -1.724 151.44 85.08	1 23.15 14.82 42000	0	
		1 23.15 14.82 42000	3 35.92 42000	
21.525	4.331 -1.663 174.10 78.82	1 24.34 14.39 42000	3 57.10 42000	
21.250	3.884 -1.593 194.29 67.07	1 25.54 13.97 42000	3 78.27 42000	
20.975	3.456 -1.517 210.49 49.82	1 26.75 13.56 42000	3 99.45 42000	
20.700	3.050 -1.436 221.19 27.08	1 27.97 13.15 42000	3 120.63 42000	
20.425	2.666 -1.352 225.10 1.21	1 29.19 12.75 42000	2 124.69 42000	
20.150	2.306 -1.268 221.99 -23.15	1 30.42 12.36 42000	2 112.10 42000	
19.875	1.969 -1.186 212.70 -43.84	1 31.66 11.98 42000	2 100.48 42000	
19.600	1.653 -1.109 198.19 -61.12	1 32.91 11.61 42000	2 89.77 42000	
		1 31.94 12.73 39900	2 87.80 39900	
19.250	1.281 -1.019 173.65 -78.37	1 33.61 12.22 39900	2 76.30 39900	
18.900	0.938 -0.943 143.94 -90.41	2 39.80 16.23 39900	2 65.95 39900	
18.550	0.619 -0.882 111.20 -95.24	2 55.13 17.26 39900	2 56.55 39900	
18.200	0.319 -0.837 78.25 -91.67	2 69.75 16.56 39900	2 47.91 39900	
17.850	0.032 -0.807 47.96 -80.13	2 83.87 15.88 39900	2 39.78 39900	
17.500	-0.248 -0.790 23.06 -60.91	2 97.69 15.22 39900	2 31.98 39900	
17.150	-0.523 -0.784 6.20 -34.18	2 111.37 14.59 39900	2 24.34 39900	
16.800	-0.797 -0.783 0.00 0.00	2 125.03 13.98 39900	2 16.74 39900	
m	mm /1000 kN.m/m kN/m kPa	kPa kPa kPa/m	kPa kPa kPa/m	kN

MAXIMUM DISPLACEMENT = 11.06 mm
MAXIMUM MOMENT = 225.10 kN.m/m

CODIFICATION OF STATE OF SOIL :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 139.52 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.086
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.314

*** END OF CALCULUS

*** MAXIMUM DISPLACEMENT IN PHASE Nb 2 = 11.065 mm IN FINAL PHASE Nb 2 = 11.065 mm

*** MAXIMUM MOMENT IN PHASE Nb 2 = 225.096 kN.m/m IN FINAL PHASE Nb 2 = 225.096 kN.m/m

* ENVELOPE CURVES FROM PHASE 1 TO PHASE 2 *

LEVEL	MINI CRO.FO	MAXI CRO.FO
25.100	0.00	0.00
24.650	0.00	12.40
24.200	0.00	25.74
23.750	0.00	40.00
23.300	0.00	55.19
22.925	0.00	61.76
22.550	0.00	68.94
22.175	0.00	76.71
21.800	-2.91	85.08
21.525	-5.31	78.82
21.250	-7.17	67.07
20.975	-8.55	49.82
20.700	-9.53	27.08
20.425	-10.18	1.21
20.150	-23.15	0.00
19.875	-43.84	0.00
19.600	-61.12	0.00
19.250	-78.37	0.00
18.900	-90.41	0.00
18.550	-95.24	0.00
18.200	-91.67	0.00
17.850	-80.13	0.00
17.500	-60.91	0.00
17.150	-34.18	0.00
16.800	0.00	0.00
m	kN/m	kN/m

LEVEL	MINI MOMENT	MAXI MOMENT
25.100	0.00	0.00
24.650	0.00	2.76
24.200	0.00	11.30
23.750	0.00	26.06
23.300	0.00	47.44
22.925	0.00	69.35
22.550	0.00	93.84
22.175	0.00	121.12
21.800	0.00	151.44
21.525	0.00	174.10
21.250	0.00	194.29
20.975	0.00	210.49
20.700	0.00	221.19
20.425	0.00	225.10
20.150	0.00	221.99
19.875	0.00	212.70
19.600	0.00	198.19
19.250	0.00	173.65
18.900	0.00	143.94
18.550	0.00	111.20
18.200	0.00	78.25
17.850	0.00	47.96
17.500	0.00	23.06
17.150	0.00	6.20
16.800	0.00	0.00
m	kN.m/m	kN.m/m

PANTALLA TIPO 1-B

Proyecto: INTEGRACION DEL FERROCARRIL EN SANT FELIU
Tipo: PANTALLAS DE PILOTES
Tramo: PANTALLA TIPO 1B
Fecha: 27/10/2008

CARACTERIZACIÓN DE ESTRATOS

Estratos	Potencia (m)	ϕ	Cohesión (kN/m²)	Densidad (kN/m³)	Kh (kN/m²)
Rellenos	1.80	28	0	18	15,000
Ar.arc.y limosas	3.70	34.5	9	20.5	40,000
Arcillas y limos	---	32.3	13	19.5	38,000

(*) Al no tener perfil de este tramo se ha tomado el del tramo mas cercano (Pantalla tipo 2)

Cota nivel freatico: --- m

SOBRECARGAS

Rellenos y tráfico

Rellenos:	2.000	m
SC Rellenos(*):	40.00	kN/m²
SC Tráfico:	30.00	kN/m²
Sobrecarga 1:	70.00	kN/m²
Ambito de actuación:	0-12	m

(*) Supuesta una densidad de 20 KN/m³

Edificación

nº de plantas	0.000	m
Carga por planta:	10.00	kN/m²
SC edficación:	0.00	kN/m²
Sobrecarga 2:	0.00	kN/m²
Ambito de actuación:	---	m

(*) Supuesta una carga de 10KN/m²·planta

CARACT.MECANICAS Y GOEMETRICAS DE LA PANTALLA DE PILOTES (RIGIDEZ)

DATOS			
Diametro (m):	1.25	Área (m²):	1.2272
Separación (m):	1.50	Inercia (m⁴):	0.1198
Resistencia Hormigón (N/mm²):	30	Rigidez (kNm²):	3,424,707
Ambiente:	IIa	Módulo Defor. Hormigón (kN/m²):	28,576,791

(*) Se ha considerado un valor Ej=8.500·∛fcm,j

HOJA PREPARADA PARA INTRODUCIR EL COMANDO "COE" (RIDO)

COTAS DE LA PANTALLA

Cota Superior Pantalla:	100.000	m
Cota Excavación:	95.200	m
Cota Fondo de Excavación:	95.200	m
Cota Pie de Pantalla:	90.200	m
Longitud Pilote:	9.800	m

RESULTADOS

Desplazamiento:	18.33	mm
Empuje Pasivo Movilizado:	33.80	%

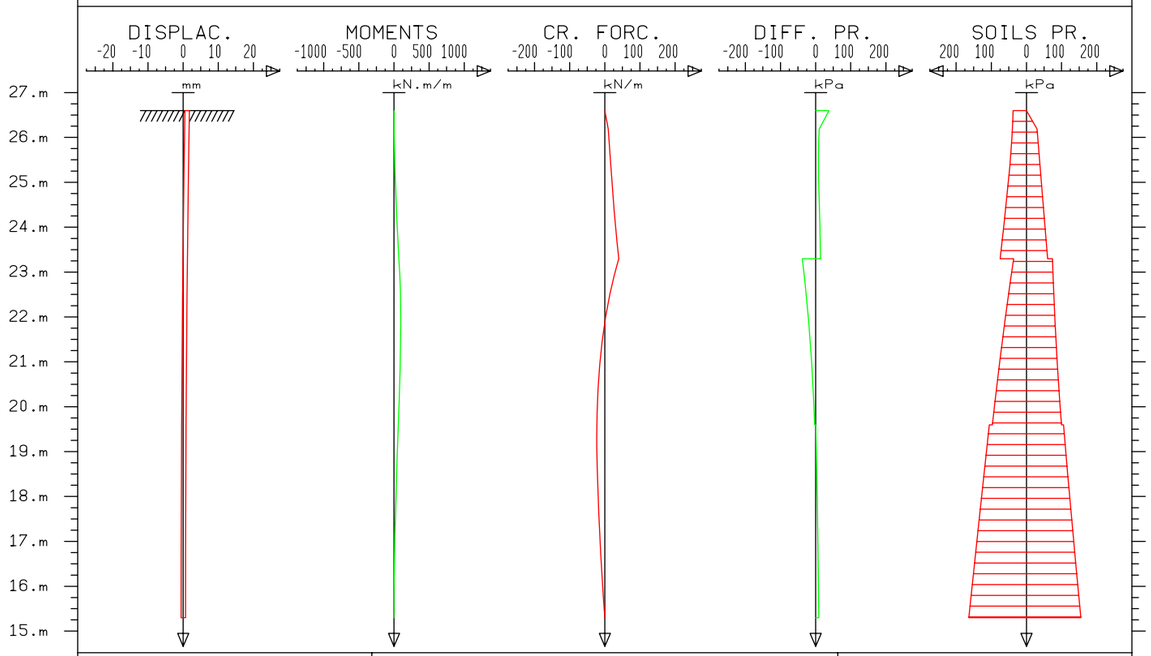
PROCESO CONSTRUCTIVO

1º Ejecución de pantalla de pilotes.
2º Excavación hasta cota de trabajo.
3º Ejecución de solera (sin funcion estructural)

GRÁFICOS

PANTALLA DE PILOTES TIPO 1B(RAMPA) SOTERRAMIENTO SANT FELIU

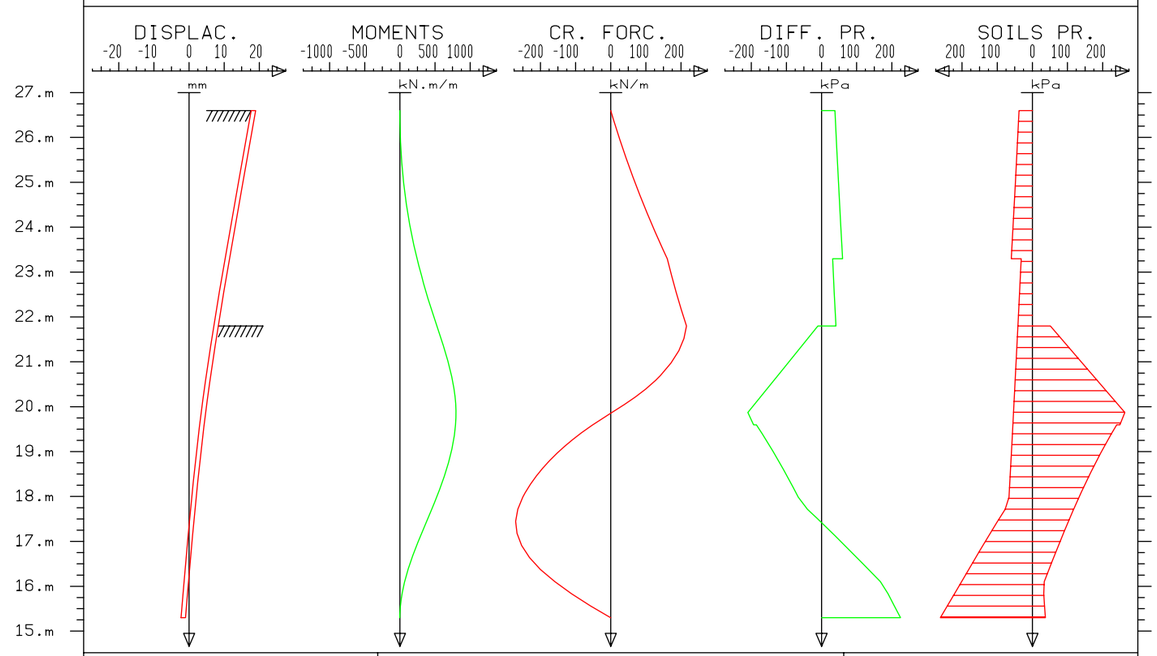
GRAPHS OF THE PHASE Nb 1



RIDO 4.02 (C) R.F.L	MADRID	10-27-08 SFELIU-1

PANTALLA DE PILOTES TIPO 1B(RAMPA) SOTERRAMIENTO SANT FELIU

GRAPHS OF THE PHASE Nb 2



RIDO 4.02 (C) R.F.L	MADRID	10-27-08 SFELIU-1

PANTALLA DE PILOTES TIPO 1B(RAMPA) SOTERRAMIENTO SANT FELIU

ENVELOPES FROM PHASE 1 TO PHASE 2

RIDO 4.02 (C) R.F.L	MADRID	10-27-08 SFELIU-1

LISTADO

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E &l8D &k2S &a4L      ***** DATA FILE NAME : SFELIU-1B.RIO

       PANTALLA DE PILOTES TIPO 1B(RAMPA) SOTERRAMIENTO SANT FELIU      *101L  U:NN*
       *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
       #EMP=6.50
       #DIAMETRO=1.25
       #SEPARACION=1.50
       #fck=30
       #E=8500*((fck+8)^(1/3))*1000
       #I=3.14/(64)*(DIAMETRO)^4
       #RIGIDEZ=E*I
       *COTAS DE LA PANTALLA
       #CSUP=25.10+1.50
       #CEXC=25.10-3.30
       *Nota: "CEXC" es la cota maxima de excavacion
       #CPIE=CEXC-EMP
       #NF=CSUP-20.00
       *CABEZA DE PANTALLA
       : CSUP
  1 ...  26.6
       *PANTALLA 1.25/1.50
       : CPIE RIGIDEZ
  2 ...  15.3 3422971
       *COTA MAXIMA DE TERRENO
       : CSUP
  3 ...  26.6
       *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)
       : 25.10-1.80 18.00 9.00 0 0 0 0 28 0 0 15000
  4 ...  23.3 18 9 0.3610335 0.5305284 2.769826 0 28 0 0 15000
       : 25.10-1.80-3.70 20.30 10.30 0 0 0 9 34.50 0 0 40000
  5 ...  19.6 20.3 10.3 0.276808 0.4335938 3.612612 9 34.5 0 0 40000
       : 25.10-25.00 19.50 9.50 0 0 0 0 13 32.3 0 0 38000
  6 ...  0.1 19.5 9.5 0.3034816 0.4656477 3.295093 13 32.3 0 0 38000
       *NIVEL FREATICO
       : NF 0.50
  7 ...  6.6 0.5
       *REAJUSTE POR ANCHO
       : COE CSUP CSUP-25.00 SEPARACION
  8 ... COE 26.6 1.6 1.5
       *SOBRECARGA 70 KN/M2 (PASO DE FERROCARRIL+RELLENOS)
       : SUB(1) CSUP 0 15 70
  9 ... SUB(1)  26.6 0 15 70
       : CAL(2)
 10 ... CAL(2)
       *EXCAVACION HASTA COTA DE SOLERA
       : EXC(2) CEXC
 11 ... EXC(2)  21.8
       : CAL(2)
 12 ... CAL(2)
       : END
 13 ... END
       : STA
 14 ... STA
       : EVP
 15 ... EVP
```


*CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
*COTAS DE LA PANTALLA
*Nota: "CEXC" es la cota maxima de excavacion
*CABEZA DE PANTALLA
*PANTALLA 1.25/1.50

** STARTING DATA **

* BOUSSINESQ SURCHARGES FUNCTION OF STATE OF SOIL

*** WALL DESCRIPTION :

	INERTIA PRODUCT EI	CYLINDRICAL RIGIDITY
SECTION NB 1 FROM 26.600 m TO 15.300 m :	3422971. kN.m2/m	0. kPa/m

*COTA MAXIMA DE TERRENO

*** SOIL DESCRIPTION :

*DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)

LAYER NB 1 FROM 26.600 m TO 23.300 m :

SATURATED UNIT WEIGHT	GH	=	18.000 kN/m3
SUBMERGED UNIT WEIGHT	GD	=	9.000 kN/m3
HOR. ACTIVE PRESSURE COEFFICIENT	KA	=	0.361
HOR. AT REST PRESSURE COEFFICIENT	K0	=	0.531
HOR. PASSIVE PRESSURE COEFFICIENT	KP	=	2.770
COHESION	C	=	0.000 kPa
ANGLE OF INTERNAL FRICTION	PHI	=	28.000 DEGREES
FOR ACTIVE PRESS. DELTA/PHI		=	0.000
FOR PASSIVE PRESS. DELTA/PHI		=	0.000
ELASTIC REACTION COEFFICIENT (AT P=0)		=	15000.000 kPa/m
INCR. OF THIS COEFF. WITH PRESSURE		=	0.000 1/m

LAYER NB 2 FROM 23.300 m TO 19.600 m :

SATURATED UNIT WEIGHT	GH	=	20.300 kN/m3
SUBMERGED UNIT WEIGHT	GD	=	10.300 kN/m3
HOR. ACTIVE PRESSURE COEFFICIENT	KA	=	0.277
HOR. AT REST PRESSURE COEFFICIENT	K0	=	0.434
HOR. PASSIVE PRESSURE COEFFICIENT	KP	=	3.613
COHESION	C	=	9.000 kPa
ANGLE OF INTERNAL FRICTION	PHI	=	34.500 DEGREES
FOR ACTIVE PRESS. DELTA/PHI		=	0.000
FOR PASSIVE PRESS. DELTA/PHI		=	0.000
ELASTIC REACTION COEFFICIENT (AT P=0)		=	40000.000 kPa/m
INCR. OF THIS COEFF. WITH PRESSURE		=	0.000 1/m

LAYER NB 3 FROM 19.600 m TO 0.100 m :

SATURATED UNIT WEIGHT	GH	=	19.500 kN/m3
SUBMERGED UNIT WEIGHT	GD	=	9.500 kN/m3
HOR. ACTIVE PRESSURE COEFFICIENT	KA	=	0.303
HOR. AT REST PRESSURE COEFFICIENT	K0	=	0.466
HOR. PASSIVE PRESSURE COEFFICIENT	KP	=	3.295
COHESION	C	=	13.000 kPa
ANGLE OF INTERNAL FRICTION	PHI	=	32.300 DEGREES
FOR ACTIVE PRESS. DELTA/PHI		=	0.000
FOR PASSIVE PRESS. DELTA/PHI		=	0.000
ELASTIC REACTION COEFFICIENT (AT P=0)		=	38000.000 kPa/m
INCR. OF THIS COEFF. WITH PRESSURE		=	0.000 1/m

*NIVEL FREATICO

** PHASE Nb 1 **

*REAJUSTE POR ANCHO

* FROM 26.600 m TO 1.600 m COEFFICIENT APPLIED TO PRESSURES = 1.500
ADDITIONAL COEFF. ON PASSIVE PRESSURE = 1.000

*SOBRECARGA 70 KN/M2 (PASO DE FERROCARRIL+RELLENOS)

* CANCELLATION BOUSSINESQ SURCHARGE ON SOIL 1

* ADDING A BOUSSINESQ SURCHARGE ON SOIL 1
LEV. = 26.600 m A = 0.000 m B = 15.000 m Q = 70.000 kPa

PHASE 1

	WALL	SOIL 1 EXCAVATION: 26.60 m WATER LEVEL: 6.60 m CAQUOT SURC.: 0.00 kPa				SOIL 2 EXCAVATION: 26.60 m WATER LEVEL: 6.60 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC. ROTATION MOMENT CR.FO. SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
26.600	1.153 -0.177 0.00 0.00	1	37.91	37.91	22500	3	0.00		22500		
26.188	1.080 -0.177 2.44 9.96	1	40.60	36.58	22500	2	30.21		22500		
25.775	1.007 -0.177 7.39 13.92	1	43.30	35.26	22500	2	34.48		22500		
25.362	0.935 -0.175 13.86 17.36	2	46.58	34.51	22500	2	38.76		22500		
24.950	0.863 -0.173 21.72 20.86	2	52.19	36.11	22500	2	43.05		22500		
24.538	0.792 -0.170 31.14 24.89	2	57.80	37.69	22500	2	47.36		22500		
24.125	0.723 -0.166 42.33 29.46	2	63.40	39.28	22500	2	51.71		22500		
23.712	0.656 -0.160 55.51 34.52	2	68.99	40.84	22500	2	56.11		22500		
23.300	0.591 -0.152 70.88 40.06	2	74.55	40.58	22500	2	60.57		22500		
		2	36.33	25.87	60000	2	74.11		60000		
22.925	0.536 -0.144 83.37 26.90	2	43.30	29.68	60000	2	75.73		60000		
22.550	0.484 -0.134 91.30 15.67	2	50.10	30.59	60000	2	77.56		60000		
22.175	0.435 -0.124 95.35 6.23	2	56.71	29.35	60000	2	79.61		60000		
21.800	0.391 -0.113 96.18 -1.58	2	63.12	28.14	60000	2	81.89		60000		
21.525	0.361 -0.105 95.07 -6.37	2	67.69	27.27	60000	2	83.72		60000		
21.250	0.333 -0.098 92.74 -10.43	2	72.15	26.43	60000	2	85.67		60000		
20.975	0.307 -0.091 89.39 -13.83	2	76.51	25.60	60000	2	87.75		60000		
20.700	0.283 -0.084 85.19 -16.64	2	80.77	24.79	60000	2	89.94		60000		
20.425	0.261 -0.077 80.29 -18.91	2	84.94	24.01	60000	2	92.25		60000		
20.150	0.241 -0.071 74.83 -20.69	2	89.02	23.24	60000	2	94.66		60000		
19.875	0.222 -0.065 68.95 -22.03	2	93.02	22.49	60000	2	97.17		60000		
19.600	0.205 -0.060 62.75 -22.99	2	96.96	21.77	60000	2	99.78		60000		
		2	105.65	23.37	57000	2	105.63		57000		
19.331	0.190 -0.055 56.58 -22.85	2	109.44	22.63	57000	2	108.41		57000		
19.062	0.175 -0.051 50.49 -22.45	2	113.19	21.91	57000	2	111.27		57000		
18.794	0.162 -0.047 44.54 -21.83	2	116.90	21.21	57000	2	114.18		57000		
18.525	0.150 -0.044 38.78 -21.00	2	120.57	20.53	57000	2	117.14		57000		
18.256	0.139 -0.041 33.26 -20.00	2	124.22	19.87	57000	2	120.16		57000		
17.988	0.128 -0.039 28.04 -18.83	2	127.85	19.23	57000	2	123.21		57000		
17.719	0.118 -0.037 23.16 -17.51	2	131.46	18.61	57000	2	126.29		57000		
17.450	0.108 -0.035 18.64 -16.05	2	135.07	18.01	57000	2	129.41		57000		
17.181	0.099 -0.034 14.54 -14.47	2	138.67	17.42	57000	2	132.54		57000		
16.913	0.090 -0.033 10.88 -12.76	2	142.27	16.86	57000	2	135.70		57000		
16.644	0.082 -0.032 7.69 -10.94	2	145.88	16.31	57000	2	138.86		57000		
16.375	0.073 -0.031 5.01 -8.99	2	149.50	15.78	57000	2	142.04		57000		
16.106	0.065 -0.031 2.87 -6.93	2	153.12	15.27	57000	2	145.22		57000		
15.837	0.056 -0.031 1.30 -4.74	2	156.76	14.78	57000	2	148.41		57000		
15.569	0.048 -0.031 0.33 -2.44	2	160.42	14.30	57000	2	151.60		57000		
15.300	0.040 -0.031 0.00 0.00	2	164.09	13.84	57000	2	154.78		57000		
m	mm /1000 kN.m/m kN/m kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 1.15 mm
MAXIMUM MOMENT = 96.18 kN.m/m

CODIFICATION OF STATE OF SOIL :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 300.25 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.115
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.153

** PHASE Nb 2 **

*EXCAVACION HASTA COTA DE SOLERA

* EXCAVATION IN SOIL 2 TO LEVEL = 21.800 m

PHASE 2

	WALL					SOIL 1 EXCAVATION: 26.60 m WATER LEVEL: 6.60 m CAQUOT SURC.: 0.00 kPa				SOIL 2 EXCAVATION: 21.80 m WATER LEVEL: 6.60 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
26.600	18.328	-2.278	0.00	0.00		1	37.91	37.91	22500	0					
26.188	17.388	-2.278	3.30	16.19		1	40.60	36.58	22500	0					
25.775	16.449	-2.277	13.51	33.50		1	43.30	35.26	22500	0					
25.362	15.510	-2.274	31.09	51.92		1	46.01	33.94	22500	0					
24.950	14.573	-2.269	56.50	71.46		1	48.73	32.64	22500	0					
24.538	13.639	-2.260	90.20	92.12		1	51.46	31.35	22500	0					
24.125	12.709	-2.247	132.65	113.91		1	54.21	30.09	22500	0					
23.712	11.786	-2.228	184.33	136.85		1	56.99	28.84	22500	0					
23.300	10.872	-2.202	245.71	160.93		1	59.79	27.62	22500	0					
						1	31.63	21.18	60000	0					
22.925	10.052	-2.172	308.34	173.23		1	33.96	20.34	60000	0					
22.550	9.244	-2.134	375.75	186.41		1	36.31	19.53	60000	0					
22.175	8.452	-2.089	448.26	200.47		1	38.68	18.74	60000	0					
21.800	7.678	-2.036	526.21	215.42		1	41.06	17.96	60000	0					
						1	41.06	17.96	60000	3	51.32		60000		
21.525	7.125	-1.991	584.70	208.68		1	42.83	17.41	60000	3	81.57		60000		
21.250	6.584	-1.942	640.27	194.11		1	44.61	16.87	60000	3	111.82		60000		
20.975	6.057	-1.888	690.75	171.72		1	46.40	16.34	60000	3	142.07		60000		
20.700	5.545	-1.831	733.99	141.50		1	48.20	15.83	60000	3	172.32		60000		
20.425	5.050	-1.771	767.85	103.45		1	50.02	15.33	60000	3	202.57		60000		
20.150	4.572	-1.708	790.18	57.59		1	51.84	14.84	60000	3	232.83		60000		
19.875	4.111	-1.644	798.81	3.91		1	53.69	14.36	60000	3	263.08		60000		
19.600	3.667	-1.580	792.17	-51.49		1	55.54	13.90	60000	2	249.09		60000		
						1	54.98	15.23	57000	2	240.24		57000		
19.331	3.251	-1.519	771.91	-98.32		1	56.88	14.75	57000	2	220.16		57000		
19.062	2.851	-1.459	739.84	-139.37		1	58.80	14.28	57000	2	201.02		57000		
18.794	2.466	-1.403	697.49	-174.88		1	60.73	13.82	57000	2	182.76		57000		
18.525	2.097	-1.350	646.32	-205.08		1	62.67	13.38	57000	2	165.34		57000		
18.256	1.740	-1.301	587.72	-230.17		1	64.63	12.95	57000	2	148.70		57000		
17.988	1.397	-1.258	523.04	-250.36		1	66.59	12.53	57000	2	132.76		57000		
17.719	1.064	-1.219	453.68	-264.61		2	77.54	18.61	57000	2	117.46		57000		
17.450	0.741	-1.187	381.56	-270.47		2	99.02	18.01	57000	2	102.69		57000		
17.181	0.425	-1.160	309.16	-266.71		2	120.07	17.42	57000	2	88.39		57000		
16.913	0.117	-1.138	239.05	-253.54		2	140.75	16.86	57000	2	74.46		57000		
16.644	-0.187	-1.122	173.71	-231.15		2	161.17	16.31	57000	2	60.82		57000		
16.375	-0.487	-1.111	115.62	-199.66		2	181.40	15.78	57000	2	47.38		57000		
16.106	-0.784	-1.103	67.20	-159.15		2	201.50	15.27	57000	2	34.09		57000		
15.837	-1.080	-1.100	30.74	-111.22		2	221.54	14.78	57000	1	32.24		57000		
15.569	-1.375	-1.098	7.90	-57.98		2	241.55	14.30	57000	1	34.63		57000		
15.300	-1.670	-1.098	0.00	0.00		2	261.57	13.84	57000	1	37.02		57000		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa			kPa/m	kN	

MAXIMUM DISPLACEMENT = 18.33 mm

MAXIMUM MOMENT = 798.81 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR.
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(5 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 237.54 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.097
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.338

*** END OF CALCULUS

*** MAXIMUM DISPLACEMENT IN PHASE Nb 2 = 18.328 mm IN FINAL PHASE Nb 2 = 18.328 mm

*** MAXIMUM MOMENT IN PHASE Nb 2 = 798.811 kN.m/m IN FINAL PHASE Nb 2 = 798.811 kN.m/m

* ENVELOPE CURVES FROM PHASE 1 TO PHASE 2 *

LEVEL	MINI CRO.FO	MAXI CRO.FO
26.600	0.00	0.00
26.188	0.00	16.19
25.775	0.00	33.50
25.362	0.00	51.92
24.950	0.00	71.46
24.538	0.00	92.12
24.125	0.00	113.91
23.712	0.00	136.85
23.300	0.00	160.93
22.925	0.00	173.23
22.550	0.00	186.41
22.175	0.00	200.47
21.800	-1.58	215.42
21.525	-6.37	208.68
21.250	-10.43	194.11
20.975	-13.83	171.72
20.700	-16.64	141.50
20.425	-18.91	103.45
20.150	-20.69	57.59
19.875	-22.03	3.91
19.600	-51.49	0.00
19.331	-98.32	0.00
19.062	-139.37	0.00
18.794	-174.88	0.00
18.525	-205.08	0.00
18.256	-230.17	0.00
17.988	-250.36	0.00
17.719	-264.61	0.00
17.450	-270.47	0.00
17.181	-266.71	0.00
16.913	-253.54	0.00
16.644	-231.15	0.00
16.375	-199.66	0.00
16.106	-159.15	0.00
15.837	-111.22	0.00
15.569	-57.98	0.00
15.300	0.00	0.00
m	kN/m	kN/m

LEVEL	MINI MOMENT	MAXI MOMENT
26.600	0.00	0.00
26.188	0.00	3.30
25.775	0.00	13.51
25.362	0.00	31.09
24.950	0.00	56.50
24.538	0.00	90.20
24.125	0.00	132.65
23.712	0.00	184.33
23.300	0.00	245.71
22.925	0.00	308.34
22.550	0.00	375.75
22.175	0.00	448.26
21.800	0.00	526.21
21.525	0.00	584.70
21.250	0.00	640.27
20.975	0.00	690.75
20.700	0.00	733.99
20.425	0.00	767.85
20.150	0.00	790.18
19.875	0.00	798.81
19.600	0.00	792.17
19.331	0.00	771.91
19.062	0.00	739.84
18.794	0.00	697.49
18.525	0.00	646.32
18.256	0.00	587.72
17.988	0.00	523.04
17.719	0.00	453.68
17.450	0.00	381.56
17.181	0.00	309.16
16.913	0.00	239.05
16.644	0.00	173.71
16.375	0.00	115.62
16.106	0.00	67.20
15.837	0.00	30.74
15.569	0.00	7.90
15.300	0.00	0.00
m	kN.m/m	kN.m/m

PANTALLA TIPO 2-A

Proyecto: INTEGRACION DEL FERROCARRIL EN SANT FELIU
Tipo: PANTALLAS DE PILOTES
Tramo: PANTALLA TIPO 2A
Fecha: 05/09/2008

CARACTERIZACIÓN DE ESTRATOS

Estratos	Potencia (m)	ϕ	Cohesión (kN/m²)	Densidad (kN/m³)	Kh (kN/m²)
Rellenos	1,80	28	0	18	15.000
Ar.arc.y limosas	3,20	34,5	9	20,5	40.000
Arcillas y limos	---	32,3	13	19,5	38.000

(*) Al no tener perfil de este tramo se ha tomado el del tramo mas cercano (Pantalla tipo 2)

Cota nivel freatico: --- m

SOBRECARGAS

Rellenos y tráfico

Rellenos:	2,000	m
SC Rellenos(*):	40,00	kN/m²
SC Tráfico:	30,00	kN/m²
Sobrecarga 1:	70,00	kN/m²
Ambito de actuación:	0-12	m

(*) Supuesta una densidad de 20 KN/m³

Edificación

nº de plantas	0,000	m
Carga por planta:	10,00	kN/m²
SC edficación:	0,00	kN/m²
Sobrecarga 2:	0,00	kN/m²
Ambito de actuación:	---	m

(*) Supuesta una carga de 10KN/m²·planta

CARACT.MECANICAS Y GOEMETRICAS DE LA PANTALLA DE PILOTES (RIGIDEZ)

DATOS			
Diametro (m):	1,25	Área (m²):	1,2272
Separación (m):	1,50	Inercia (m⁴):	0,1198
Resistencia Hormigón (N/mm²):	30	Rigidez (kNm²):	3.424.707
Ambiente:	IIa	Módulo Defor. Hormigón (kN/m²):	28.576.791

(*) Se ha considerado un valor Ej=8.500·∛fcm,j

HOJA PREPARADA PARA INTRODUCIR EL COMANDO "COE" (RIDO)

COTAS DE LA PANTALLA

Cota Superior Pantalla:	100,000	m
Cota Excavación:	92,250	m
Cota Fondo de Excavación:	92,250	m
Cota Pie de Pantalla:	87,250	m
Longitud Pilote:	12,750	m

RESULTADOS

Desplazamiento:	15,76	mm
Empuje Pasivo Movilizado:	33,30	%

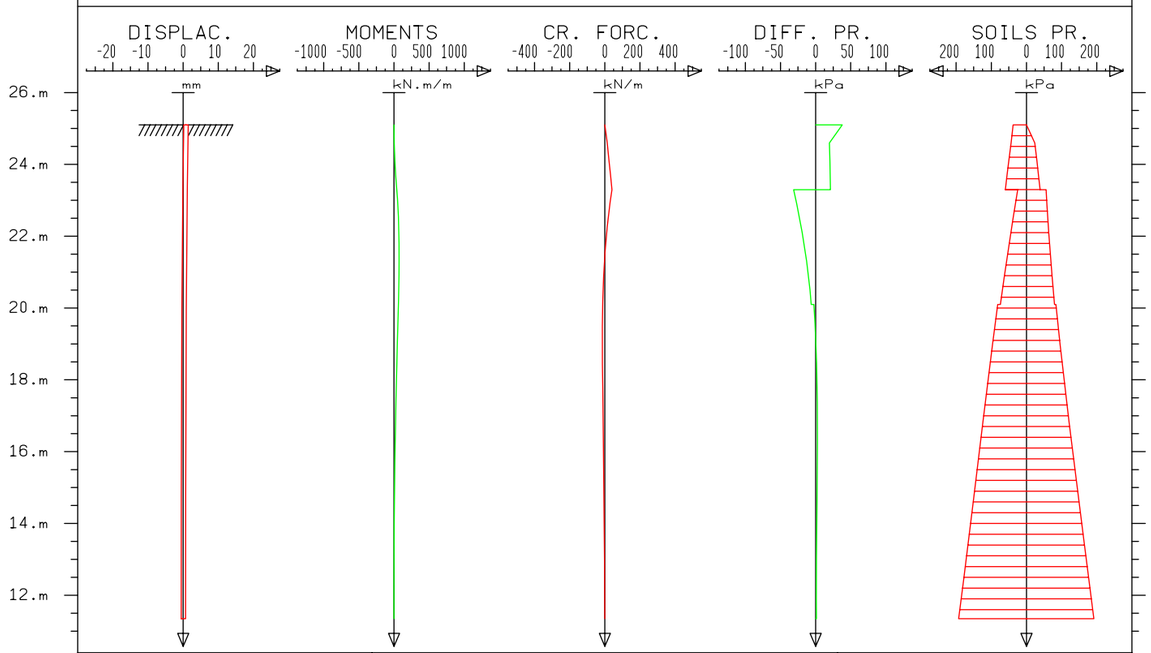
PROCESO CONSTRUCTIVO

1º Ejecución de pantalla de pilotes.
2º Excavación previa colocación de puntales
3º Colocacion de puntales provisionales
4º Excavación hasta cota de trabajo.
5º Ejecucion de solera y conexión de esta a pantalla.
6º Retirada de puntales provisionales.

GRÁFICOS

PANTALLA PILOTES TIPO 2 (RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

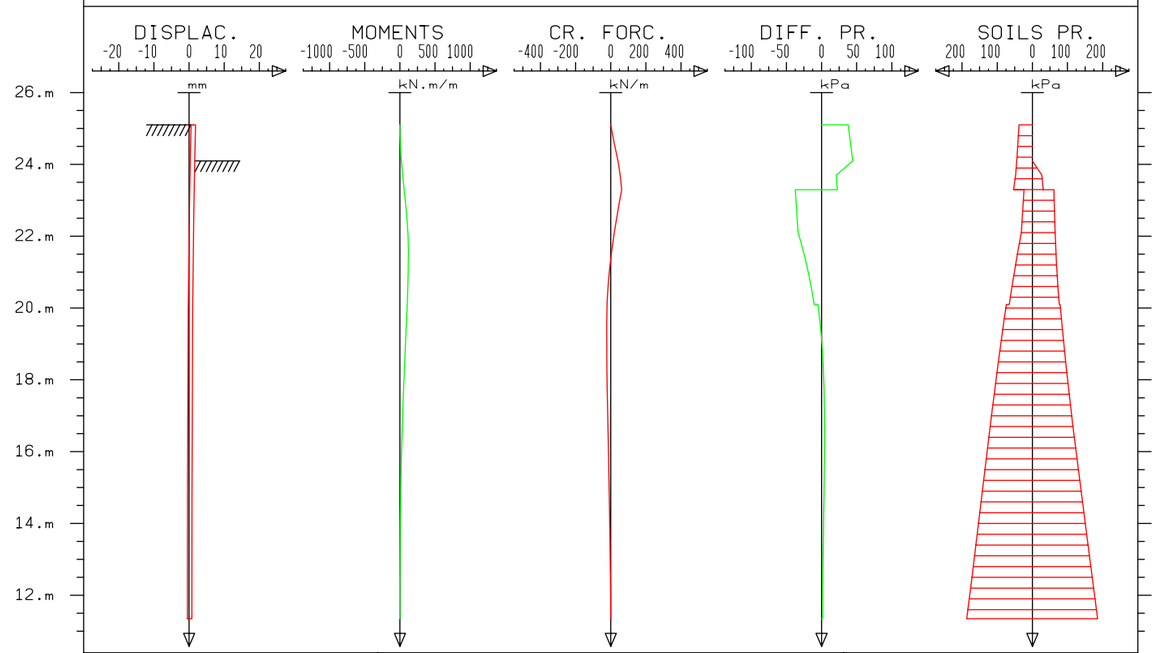
GRAPHS OF THE PHASE Nb 1



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

PANTALLA PILOTES TIPO 2 (RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

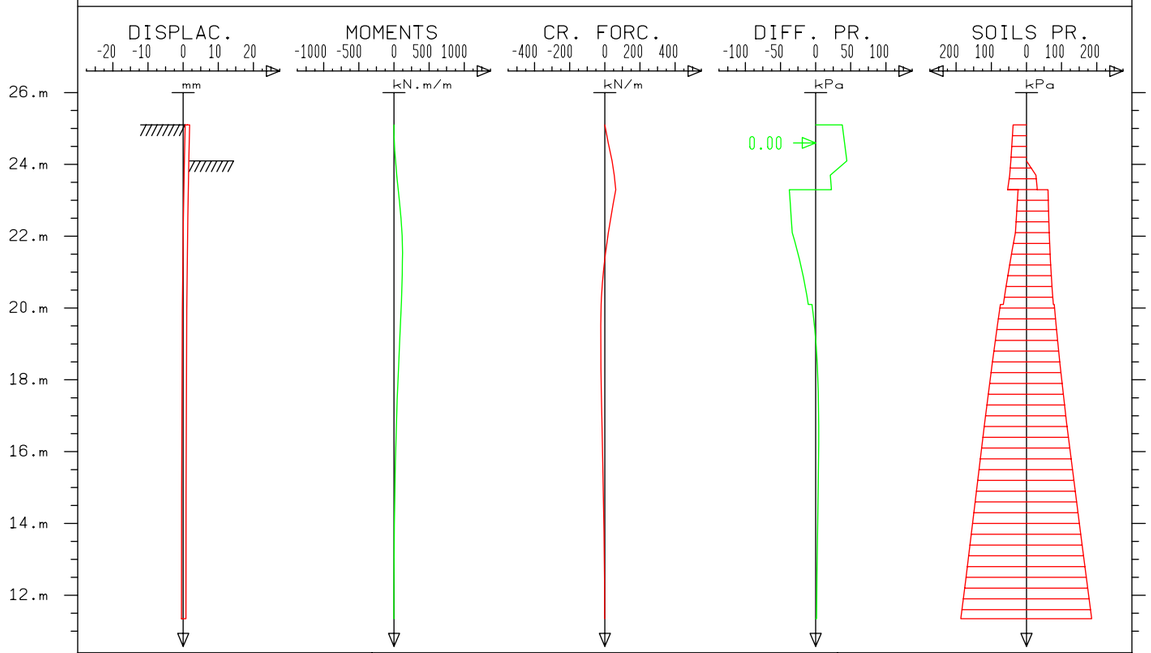
GRAPHS OF THE PHASE Nb 2



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

PANTALLA PILOTES TIPO 2 (RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

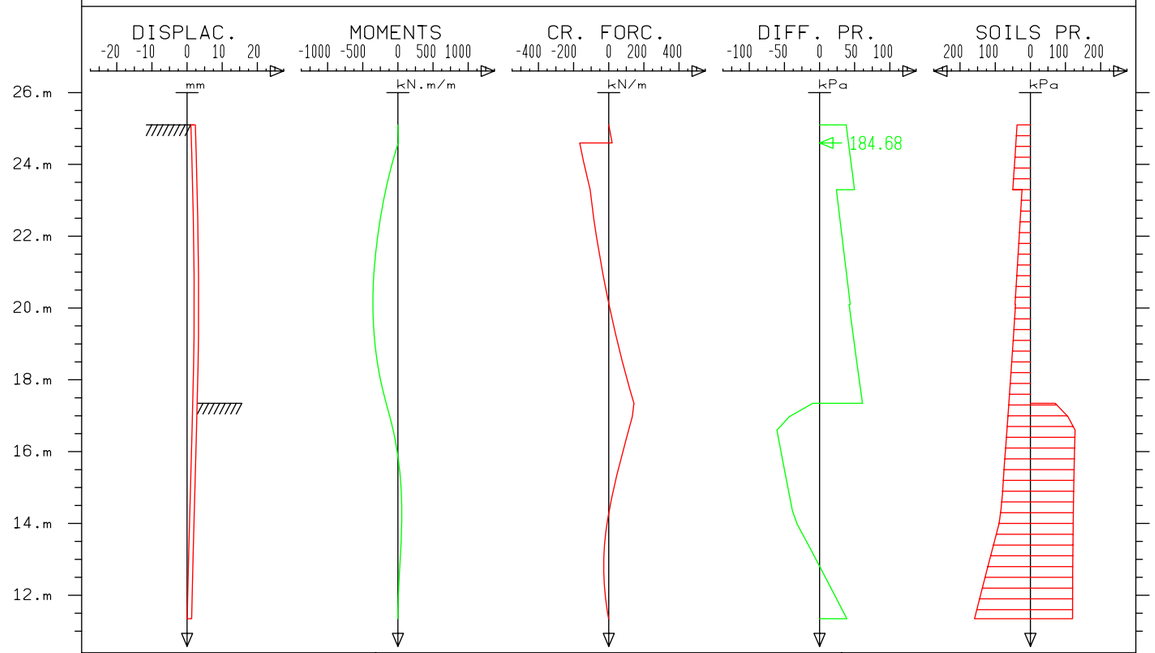
GRAPHS OF THE PHASE Nb 3



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

PANTALLA PILOTES TIPO 2 (RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

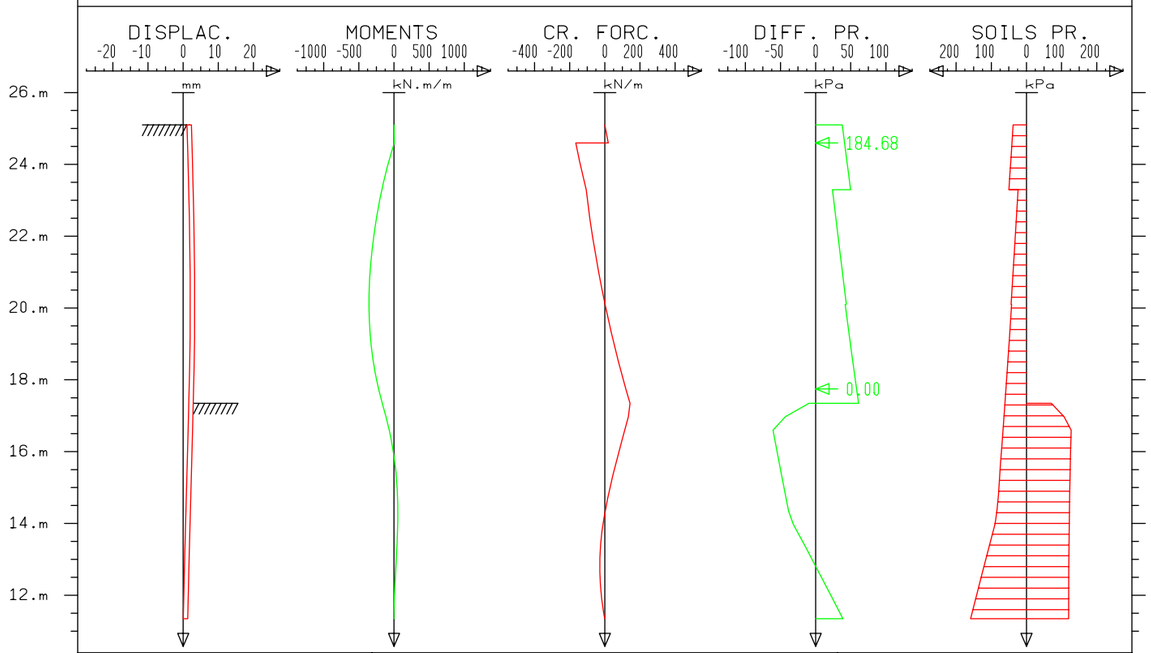
GRAPHS OF THE PHASE Nb 4



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

PANTALLA PILOTES TIPO 2 (RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

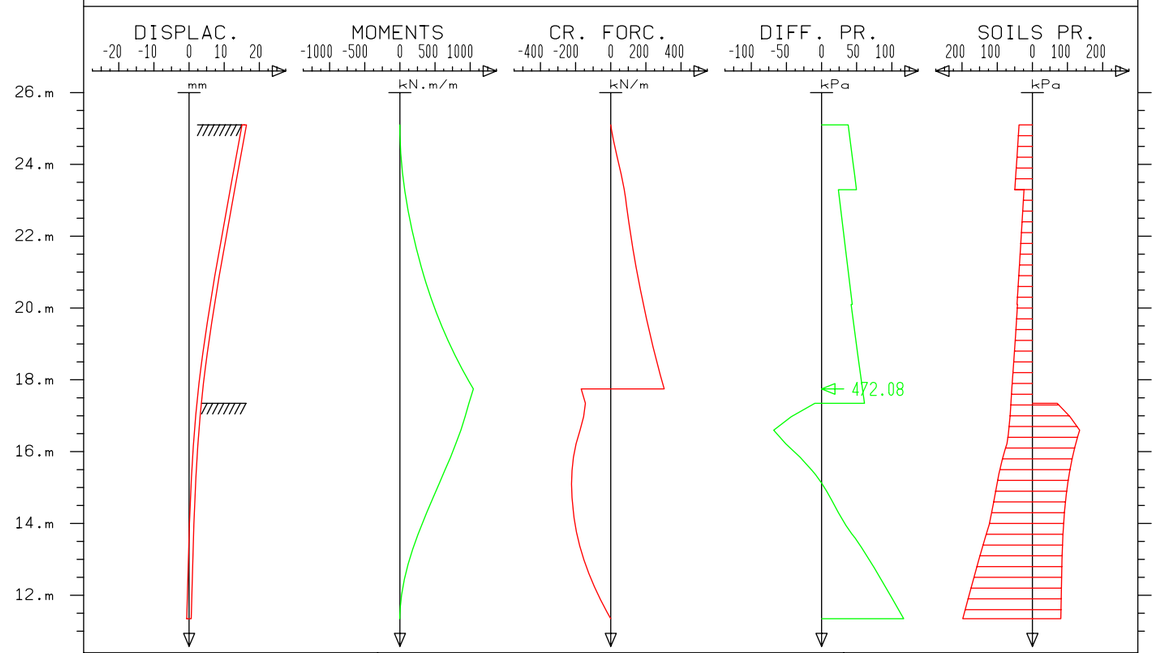
GRAPHS OF THE PHASE Nb 5



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

PANTALLA PILOTES TIPO 2 (RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

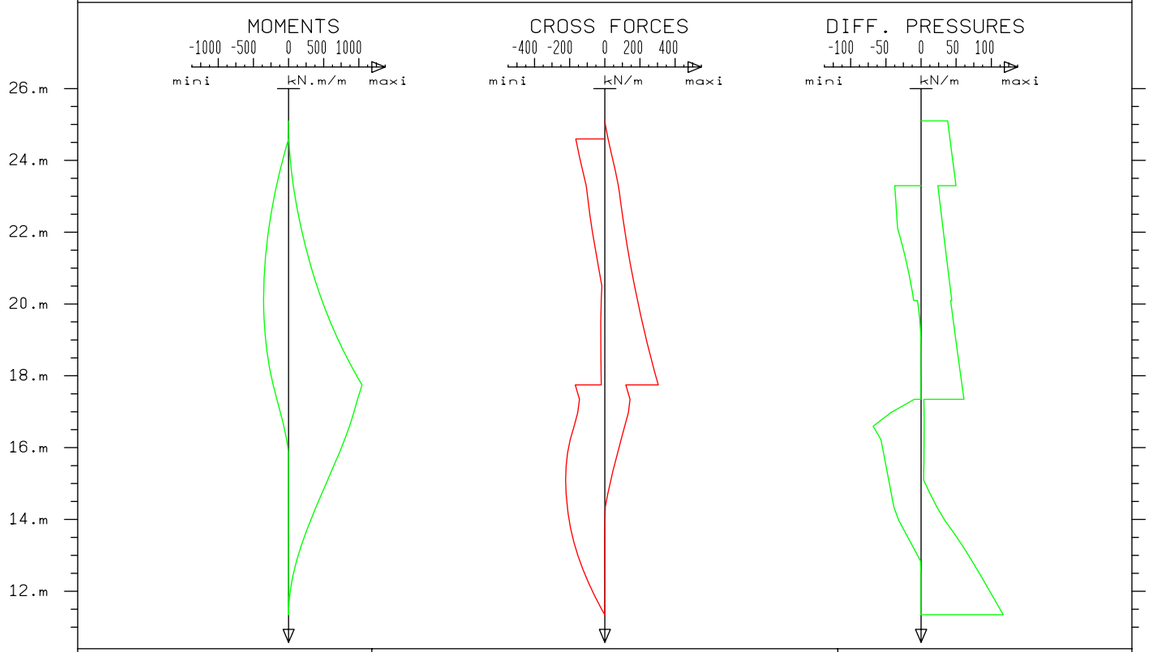
GRAPHS OF THE PHASE Nb 6



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

PANTALLA PILOTES TIPO 2 (RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

ENVELOPES FROM PHASE 1 TO PHASE 6



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

LISTADO

```
E &l8D &k2S &a4L      ***** DATA FILE NAME : SFELIU-2A.RIO

        PANTALLA PILOTES TIPO 2 (RAMPA C/PUNTAL)SOTERRAMIENTO SANT FELIU*101L  U:NN*
        *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
        #EMP=6
        #DIAMETRO=1.25
        #SEPARACION=1.50
        #fck=30
        #E=8500*((fck+8)^(1/3))*1000
        #I=3.14/(64)*(DIAMETRO)^4
        #RIGIDEZ=E*I
        *COTAS DE LA PANTALLA
        #CSUP=25.10
        #CEXC=25.10-7.75
        *Nota: "CEXC" es la cota maxima de excavacion
        #CPIE=CEXC-EMP
        #NF=CSUP-20.00
        *CABEZA DE PANTALLA
        : CSUP
  1 ...  25.1
        *PANTALLA 1.25/1.50
        : CPIE RIGIDEZ
  2 ...  11.35 3422971
        *COTA MAXIMA DE TERRENO
        : CSUP
  3 ...  25.1
        *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)
        : 25.10-1.80 18.00 9.00 0 0 0 0 28 0 0 15000
  4 ...  23.3 18 9 0.3610335 0.5305284 2.769826 0 28 0 0 15000
        : 25.10-1.80-3.20 20.30 10.30 0 0 0 9 34.50 0 0 40000
  5 ...  20.1 20.3 10.3 0.276808 0.4335938 3.612612 9 34.5 0 0 40000
        : 25.10-25.00 19.50 9.50 0 0 0 0 13 32.3 0 0 38000
  6 ...  0.1 19.5 9.5 0.3034816 0.4656477 3.295093 13 32.3 0 0 38000
        *NIVEL FREATICO
        : NF 0.50
  7 ...  5.1 0.5
        *FACTOR DE SEPARACION
        : COE CSUP CSUP-25.00 SEPARACION
  8 ... COE 25.1 0.1 1.5
        *SOBRECARGA 70 KN/M2 (PASO DE FERROCARRIL+RELLENOS)
        : SUB(1) CSUP 0 15 70
  9 ... SUB(1)  25.1 0 15 70
        : CAL(2)
 10 ... CAL(2)
        *EXCAVACION PREVIA A COLOCION DE PUNTALES PROVISIONALES
        : EXC(2) CSUP-1.00
 11 ... EXC(2)  24.1
        : CAL(2)
 12 ... CAL(2)
        *COLOCACION DE PUNTALES PROVISIONALES
        : STR CSUP-0.50 1 0 0 250000
 13 ... STR 24.6 1 0 0 250000
        : CAL(2)
 14 ... CAL(2)
        *EXCAVACION HASTA COTA DE SOLERA
        : EXC(2) CEXC
 15 ... EXC(2)  17.35
        : CAL(2)
 16 ... CAL(2)
        *EJECUCION DE SOLERA
        : STR CEXC+0.40 1 0 0 500000
 17 ... STR 17.75 1 0 0 500000
        : CAL(2)
 18 ... CAL(2)
        *RETIRAR PUNTALES PROVISIONALES
        : STR(0,1)
 19 ... STR(0,1)
        : CAL(2)
 20 ... CAL(2)
        : END
 21 ... END
        : STA
 22 ... STA
        : EVP
 23 ... EVP
```



```
        *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
        *COTAS DE LA PANTALLA
        *Nota: "CEXC" es la cota maxima de excavacion
        *CABEZA DE PANTALLA
        *PANTALLA 1.25/1.50

        ------------------------------------------------------------------------------

                                        ** STARTING DATA **
                                        --------------------


  * BOUSSINESQ SURCHARGES FUNCTION OF STATE OF SOIL


*** WALL DESCRIPTION :
                                                INERTIA PRODUCT EI      CYLINDRICAL RIGIDITY
    SECTION NB  1 FROM  25.100 m  TO  11.350 m  :         3422971. kN.m2/m           0. kPa/m

        *COTA MAXIMA DE TERRENO


*** SOIL DESCRIPTION :

        *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)

     LAYER NB  1 FROM  25.100 m  TO  23.300 m  :

        SATURATED UNIT WEIGHT              GH  =      18.000 kN/m3
        SUBMERGED UNIT WEIGHT              GD  =       9.000 kN/m3
        HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.361
        HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.531
        HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       2.770
        COHESION                            C  =       0.000 kPa
        ANGLE OF INTERNAL FRICTION        PHI  =      28.000 DEGREES
                FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
                FOR PASSIVE PRESS. DELTA/PHI  =       0.000
        ELASTIC REACTION COEFFICIENT (AT P=0)  =   15000.000 kPa/m
        INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

     LAYER NB  2 FROM  23.300 m  TO  20.100 m  :

        SATURATED UNIT WEIGHT              GH  =      20.300 kN/m3
        SUBMERGED UNIT WEIGHT              GD  =      10.300 kN/m3
        HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.277
        HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.434
        HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       3.613
        COHESION                            C  =       9.000 kPa
        ANGLE OF INTERNAL FRICTION        PHI  =      34.500 DEGREES
                FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
                FOR PASSIVE PRESS. DELTA/PHI  =       0.000
        ELASTIC REACTION COEFFICIENT (AT P=0)  =   40000.000 kPa/m
        INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

LAYER NB  3 FROM  20.100 m  TO   0.100 m  :

        SATURATED UNIT WEIGHT              GH  =      19.500 kN/m3
        SUBMERGED UNIT WEIGHT              GD  =       9.500 kN/m3
        HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.303
        HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.466
        HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       3.295
        COHESION                            C  =      13.000 kPa
        ANGLE OF INTERNAL FRICTION        PHI  =      32.300 DEGREES
                FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
                FOR PASSIVE PRESS. DELTA/PHI  =       0.000
        ELASTIC REACTION COEFFICIENT (AT P=0)  =   38000.000 kPa/m
        INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

        *NIVEL FREATICO
```

** PHASE Nb 1 **

*FACTOR DE SEPARACION

* FROM 25.100 m TO 0.100 m COEFFICIENT APPLIED TO PRESSURES = 1.500
ADDITIONAL COEFF. ON PASSIVE PRESSURE = 1.000

*SOBRECARGA 70 KN/M2 (PASO DE FERROCARRIL+RELLENOS)

* CANCELLATION BOUSSINESQ SURCHARGE ON SOIL 1

* ADDING A BOUSSINESQ SURCHARGE ON SOIL 1
LEV. = 25.100 m A = 0.000 m B = 15.000 m Q = 70.000 kPa

PHASE 1

| | WALL | SOIL 1 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | SOIL 2 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	0.813	-0.131	0.00	0.00		1	37.91	37.91	22500	3	0.00		22500		
24.600	0.748	-0.130	3.98	14.40		2	43.68	38.80	22500	2	23.99		22500		
24.100	0.683	-0.129	13.66	24.39		2	49.95	40.20	22500	2	29.69		22500		
23.700	0.632	-0.127	25.05	32.58		2	54.97	41.32	22500	2	34.27		22500		
23.300	0.582	-0.123	39.75	40.94		2	59.97	42.43	22500	2	38.87		22500		
						2	24.82	24.82	60000	2	55.96		60000		
22.900	0.533	-0.118	53.75	29.34		2	31.50	28.88	60000	2	58.35		60000		
22.500	0.488	-0.111	63.45	19.41		2	38.06	32.07	60000	2	60.89		60000		
22.100	0.445	-0.103	69.48	11.01		2	44.46	34.23	60000	2	63.60		60000		
21.700	0.405	-0.095	72.44	4.02		2	50.70	32.82	60000	2	66.51		60000		
21.300	0.369	-0.086	72.86	-1.71		2	56.77	31.44	60000	2	69.62		60000		
20.900	0.336	-0.078	71.22	-6.34		2	62.67	30.09	60000	2	72.94		60000		
20.500	0.307	-0.070	67.92	-10.00		2	68.41	28.78	60000	2	76.45		60000		
20.100	0.281	-0.062	63.33	-12.84		2	74.00	27.51	60000	2	80.16		60000		
						2	81.55	29.54	57000	2	83.99		57000		
19.806	0.263	-0.057	59.47	-13.41		2	85.57	28.56	57000	2	87.00		57000		
19.513	0.247	-0.052	55.48	-13.70		2	89.52	27.61	57000	2	90.10		57000		
19.219	0.233	-0.047	51.44	-13.76		2	93.42	26.68	57000	2	93.27		57000		
18.925	0.220	-0.043	47.42	-13.63		2	97.27	25.78	57000	2	96.52		57000		
18.631	0.208	-0.039	43.45	-13.34		2	101.08	24.90	57000	2	99.84		57000		
18.337	0.197	-0.035	39.59	-12.91		2	104.85	24.05	57000	2	103.21		57000		
18.044	0.187	-0.032	35.88	-12.39		2	108.59	23.22	57000	2	106.65		57000		
17.750	0.178	-0.029	32.32	-11.79		2	112.30	22.41	57000	2	110.14		57000		
17.350	0.167	-0.026	27.79	-10.88		2	117.31	21.36	57000	2	114.96		57000		
16.975	0.158	-0.023	23.87	-9.99		2	121.99	20.41	57000	2	119.55		57000		
16.600	0.149	-0.021	20.30	-9.07		2	126.65	19.49	57000	2	124.19		57000		
16.225	0.142	-0.018	17.07	-8.15		2	131.30	18.62	57000	2	128.88		57000		
15.850	0.136	-0.017	14.18	-7.26		2	135.95	17.79	57000	2	133.62		57000		
15.475	0.130	-0.015	11.62	-6.41		2	140.60	16.99	57000	2	138.38		57000		
15.100	0.124	-0.014	9.37	-5.60		2	145.26	16.22	57000	2	143.17		57000		
14.725	0.119	-0.013	7.41	-4.84		2	149.93	15.50	57000	2	147.99		57000		
14.350	0.114	-0.013	5.73	-4.14		2	154.62	14.80	57000	2	152.82		57000		
13.975	0.109	-0.012	4.30	-3.49		2	159.33	14.14	57000	2	157.67		57000		
13.600	0.105	-0.012	3.10	-2.90		2	164.05	13.50	57000	2	162.52		57000		
13.225	0.101	-0.011	2.12	-2.34		2	168.80	12.90	57000	2	167.38		57000		
12.850	0.097	-0.011	1.34	-1.83		2	173.58	12.33	57000	2	172.25		57000		
12.475	0.092	-0.011	0.75	-1.34		2	178.37	11.78	57000	2	177.12		57000		
12.100	0.088	-0.011	0.33	-0.88		2	183.20	11.26	57000	2	181.99		57000		
11.725	0.084	-0.011	0.08	-0.44		2	188.04	10.77	57000	2	186.87		57000		
11.350	0.080	-0.011	0.00	0.00		2	192.91	10.29	57000	2	191.74		57000		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa			kPa/m		kN

MAXIMUM DISPLACEMENT = 0.81 mm
MAXIMUM MOMENT = 72.86 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR.
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 330.14 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.117
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.146

** PHASE Nb 2 **

*EXCAVACION PREVIA A COLOCION DE PUNTALES PROVISIONALES

* EXCAVATION IN SOIL 2 TO LEVEL = 24.100 m

PHASE 2

	WALL					SOIL 1 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa				SOIL 2 EXCAVATION: 24.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	1.224	-0.200	0.00	0.00		1	37.91	37.91	22500	0					
24.600	1.124	-0.200	4.87	19.77		1	41.17	36.30	22500	0					
24.100	1.024	-0.198	20.04	41.18		1	44.45	34.70	22500	0					
23.700	0.945	-0.195	39.44	54.25		2	47.91	34.26	22500	2	27.00		22500		
23.300	0.869	-0.189	62.86	62.93		2	53.51	35.97	22500	2	31.00		22500		
						1	23.91	23.91	60000	2	61.48		60000		
22.900	0.795	-0.180	85.06	48.22		1	26.33	23.71	60000	2	62.33		60000		
22.500	0.725	-0.169	101.51	34.09		1	28.77	22.78	60000	2	63.42		60000		
22.100	0.660	-0.157	112.41	20.51		2	31.57	22.21	60000	2	64.78		60000		
21.700	0.600	-0.143	118.11	8.39		2	39.04	26.31	60000	2	66.47		60000		
21.300	0.545	-0.129	119.41	-1.55		2	46.21	30.10	60000	2	68.48		60000		
20.900	0.496	-0.115	117.13	-9.56		2	53.08	30.09	60000	2	70.83		60000		
20.500	0.453	-0.102	111.99	-15.88		2	59.65	28.78	60000	2	73.50		60000		
20.100	0.415	-0.089	104.62	-20.75		2	65.96	27.51	60000	2	76.49		60000		
						2	73.91	29.54	57000	2	79.06		57000		
19.806	0.390	-0.081	98.33	-21.99		2	78.36	28.56	57000	2	81.64		57000		
19.513	0.367	-0.072	91.75	-22.71		2	82.69	27.61	57000	2	84.36		57000		
19.219	0.347	-0.065	85.02	-23.00		2	86.91	26.68	57000	2	87.21		57000		
18.925	0.329	-0.058	78.27	-22.92		2	91.03	25.78	57000	2	90.19		57000		
18.631	0.313	-0.051	71.59	-22.54		2	95.07	24.90	57000	2	93.27		57000		
18.337	0.299	-0.046	65.06	-21.90		2	99.03	24.05	57000	2	96.46		57000		
18.044	0.286	-0.040	58.74	-21.05		2	102.92	23.22	57000	2	99.75		57000		
17.750	0.275	-0.035	52.70	-20.06		2	106.74	22.41	57000	2	103.12		57000		
17.350	0.262	-0.030	44.98	-18.52		2	111.88	21.36	57000	2	107.82		57000		
16.975	0.252	-0.025	38.33	-16.96		2	116.62	20.41	57000	2	112.35		57000		
16.600	0.243	-0.021	32.27	-15.34		2	121.31	19.49	57000	2	116.96		57000		
16.225	0.236	-0.018	26.82	-13.71		2	125.97	18.62	57000	2	121.64		57000		
15.850	0.229	-0.015	21.98	-12.11		2	130.60	17.79	57000	2	126.39		57000		
15.475	0.224	-0.013	17.73	-10.57		2	135.21	16.99	57000	2	131.20		57000		
15.100	0.219	-0.012	14.04	-9.11		2	139.82	16.22	57000	2	136.04		57000		
14.725	0.215	-0.010	10.89	-7.74		2	144.43	15.50	57000	2	140.92		57000		
14.350	0.212	-0.009	8.22	-6.48		2	149.05	14.80	57000	2	145.82		57000		
13.975	0.209	-0.008	6.02	-5.32		2	153.68	14.14	57000	2	150.74		57000		
13.600	0.205	-0.008	4.22	-4.27		2	158.33	13.50	57000	2	155.68		57000		
13.225	0.203	-0.007	2.80	-3.33		2	162.99	12.90	57000	2	160.62		57000		
12.850	0.200	-0.007	1.71	-2.49		2	167.68	12.33	57000	2	165.57		57000		
12.475	0.197	-0.007	0.92	-1.75		2	172.39	11.78	57000	2	170.53		57000		
12.100	0.195	-0.007	0.39	-1.09		2	177.13	11.26	57000	2	175.49		57000		
11.725	0.192	-0.007	0.09	-0.51		2	181.89	10.77	57000	2	180.45		57000		
11.350	0.189	-0.007	0.00	0.00		2	186.68	10.29	57000	2	185.41		57000		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 1.22 mm

MAXIMUM MOMENT = 119.41 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR., 2 = ELASTIC
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 308.38 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.110
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.156

** PHASE Nb 3 **

*COLOCACION DE PUNTALES PROVISIONALES

* INSTALLATION LEVEL OF STRUTS NO 1

LEVEL	=	24.600 m
SPACE	=	1.000 m
INCLINATION	=	0.000 DEGREES
PRELOAD	=	0.000 kN
STIFFNESS	=	250000.000 kN/m

BILATERAL CONNECTION

PHASE 3

WALL	SOIL 1 EXCAVATION: 25.10 m, WATER LEVEL: 5.10 m, CAQUOT SURC.: 0.00 kPa	SOIL 2 EXCAVATION: 24.10 m, WATER LEVEL: 5.10 m, CAQUOT SURC.: 0.00 kPa	STRUTS/ ANCHORS

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO. SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	1.224	-0.200	0.00	0.00	1	37.91	37.91	22500	0					
24.600	1.124	-0.200	4.87	19.77	1	41.17	36.30	22500	0					
					1	41.17	36.30	22500	0				1	0.00
24.100	1.024	-0.198	20.04	41.18	1	44.45	34.70	22500	0					
23.700	0.945	-0.195	39.44	54.25	2	47.91	34.26	22500	2	27.00		22500		
23.300	0.869	-0.189	62.86	62.93	2	53.51	35.97	22500	2	31.00		22500		
					1	23.91	23.91	60000	2	61.48		60000		
22.900	0.795	-0.180	85.06	48.22	1	26.33	23.71	60000	2	62.33		60000		
22.500	0.725	-0.169	101.51	34.09	1	28.77	22.78	60000	2	63.42		60000		
22.100	0.660	-0.157	112.41	20.51	2	31.57	22.21	60000	2	64.78		60000		
21.700	0.600	-0.143	118.11	8.39	2	39.04	26.31	60000	2	66.47		60000		
21.300	0.545	-0.129	119.41	-1.55	2	46.21	30.10	60000	2	68.48		60000		
20.900	0.496	-0.115	117.13	-9.56	2	53.08	30.09	60000	2	70.83		60000		
20.500	0.453	-0.102	111.99	-15.88	2	59.65	28.78	60000	2	73.50		60000		
20.100	0.415	-0.089	104.62	-20.75	2	65.96	27.51	60000	2	76.49		60000		
					2	73.91	29.54	57000	2	79.06		57000		
19.806	0.390	-0.081	98.33	-21.99	2	78.36	28.56	57000	2	81.64		57000		
19.513	0.367	-0.072	91.75	-22.71	2	82.69	27.61	57000	2	84.36		57000		
19.219	0.347	-0.065	85.02	-23.00	2	86.91	26.68	57000	2	87.21		57000		
18.925	0.329	-0.058	78.27	-22.92	2	91.03	25.78	57000	2	90.19		57000		
18.631	0.313	-0.051	71.59	-22.54	2	95.07	24.90	57000	2	93.27		57000		
18.337	0.299	-0.046	65.06	-21.90	2	99.03	24.05	57000	2	96.46		57000		
18.044	0.286	-0.040	58.74	-21.05	2	102.92	23.22	57000	2	99.75		57000		
17.750	0.275	-0.035	52.70	-20.06	2	106.74	22.41	57000	2	103.12		57000		
17.350	0.262	-0.030	44.98	-18.52	2	111.88	21.36	57000	2	107.82		57000		
16.975	0.252	-0.025	38.33	-16.96	2	116.62	20.41	57000	2	112.35		57000		
16.600	0.243	-0.021	32.27	-15.34	2	121.31	19.49	57000	2	116.96		57000		
16.225	0.236	-0.018	26.82	-13.71	2	125.97	18.62	57000	2	121.64		57000		
15.850	0.229	-0.015	21.98	-12.11	2	130.60	17.79	57000	2	126.39		57000		
15.475	0.224	-0.013	17.73	-10.57	2	135.21	16.99	57000	2	131.20		57000		
15.100	0.219	-0.012	14.04	-9.11	2	139.82	16.22	57000	2	136.04		57000		
14.725	0.215	-0.010	10.89	-7.74	2	144.43	15.50	57000	2	140.92		57000		
14.350	0.212	-0.009	8.22	-6.48	2	149.05	14.80	57000	2	145.82		57000		
13.975	0.209	-0.008	6.02	-5.32	2	153.68	14.14	57000	2	150.74		57000		
13.600	0.205	-0.008	4.22	-4.27	2	158.33	13.50	57000	2	155.68		57000		
13.225	0.203	-0.007	2.80	-3.33	2	162.99	12.90	57000	2	160.62		57000		
12.850	0.200	-0.007	1.71	-2.49	2	167.68	12.33	57000	2	165.57		57000		
12.475	0.197	-0.007	0.92	-1.75	2	172.39	11.78	57000	2	170.53		57000		
12.100	0.195	-0.007	0.39	-1.09	2	177.13	11.26	57000	2	175.49		57000		
11.725	0.192	-0.007	0.09	-0.51	2	181.89	10.77	57000	2	180.45		57000		
11.350	0.189	-0.007	0.00	0.00	2	186.68	10.29	57000	2	185.41		57000		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa	kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 1.22 mm

MAXIMUM MOMENT = 119.41 kN.m/m

CODIFICATION :
-1 = SEPARATION
OF STATE : 0 = EXCAVATION
1 = ACTIVE PR.
OF SOIL : 2 = ELASTIC
3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 308.38 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.110
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.156

** PHASE Nb 4 **

*EXCAVACION HASTA COTA DE SOLERA

* EXCAVATION IN SOIL 2 TO LEVEL = 17.350 m

PHASE 4

| | WALL | SOIL 1 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | SOIL 2 EXCAVATION: 17.35 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	1.717	0.291	0.00	0.00		1	37.91	37.91	22500	0					
24.600	1.863	0.291	4.87	19.77		1	41.17	36.30	22500	0					
				-164.91		1	41.17	36.30	22500	0				1	-184.68
24.100	2.007	0.286	-72.30	-143.51		1	44.45	34.70	22500	0					
23.700	2.120	0.275	-126.08	-125.20		1	47.08	33.43	22500	0					
23.300	2.226	0.257	-172.32	-105.84		1	49.72	32.17	22500	0					
						1	23.91	23.91	60000	0					
22.900	2.325	0.234	-212.68	-95.80		1	26.33	23.71	60000	0					
22.500	2.413	0.207	-248.83	-84.78		1	28.77	22.78	60000	0					
22.100	2.490	0.177	-280.37	-72.78		1	31.22	21.85	60000	0					
21.700	2.554	0.142	-306.92	-59.80		1	33.68	20.95	60000	0					
21.300	2.603	0.105	-328.08	-45.83		1	36.17	20.07	60000	0					
20.900	2.638	0.066	-343.45	-30.85		1	38.69	19.21	60000	0					
20.500	2.656	0.025	-352.63	-14.87		1	41.22	18.37	60000	0					
20.100	2.657	-0.016	-355.21	2.13		1	43.78	17.56	60000	0					
						1	42.09	19.25	57000	0					
19.806	2.648	-0.047	-352.74	14.78		1	44.06	18.62	57000	0					
19.513	2.630	-0.077	-346.47	28.01		1	46.05	18.00	57000	0					
19.219	2.603	-0.106	-336.23	41.83		1	48.05	17.39	57000	0					
18.925	2.568	-0.134	-321.84	56.25		1	50.07	16.80	57000	0					
18.631	2.524	-0.161	-303.12	71.25		1	52.10	16.23	57000	0					
18.337	2.473	-0.186	-279.92	86.86		1	54.15	15.67	57000	0					
18.044	2.415	-0.209	-252.04	103.07		1	56.22	15.13	57000	0					
17.750	2.350	-0.230	-219.30	119.89		1	58.30	14.61	57000	0					
17.350	2.254	-0.252	-166.61	143.78		1	61.17	13.92	57000	0					
						1	61.17	13.92	57000	3	70.79		57000		
16.975	2.156	-0.268	-114.15	133.90		1	63.88	13.30	57000	3	106.94		57000		
16.600	2.054	-0.277	-67.37	114.45		1	66.61	12.71	57000	2	127.29		57000		
16.225	1.949	-0.283	-28.64	92.38		1	69.37	12.14	57000	2	126.40		57000		
15.850	1.842	-0.284	2.09	71.70		1	72.15	11.59	57000	2	125.45		57000		
15.475	1.736	-0.282	25.31	52.42		1	74.96	11.07	57000	2	124.50		57000		
15.100	1.631	-0.279	41.57	34.54		1	77.79	10.57	57000	2	123.61		57000		
14.725	1.527	-0.274	51.39	18.04		1	80.65	10.10	57000	2	122.81		57000		
14.350	1.426	-0.268	55.27	2.90		1	83.52	9.65	57000	2	122.14		57000		
13.975	1.327	-0.262	53.81	-10.28		2	89.94	12.74	57000	2	121.59		57000		
13.600	1.230	-0.256	47.97	-20.19		2	99.95	13.50	57000	2	121.17		57000		
13.225	1.135	-0.251	39.15	-26.23		2	109.87	12.90	57000	2	120.85		57000		
12.850	1.041	-0.247	28.78	-28.45		2	119.73	12.33	57000	2	120.63		57000		
12.475	0.949	-0.245	18.28	-26.92		2	129.55	11.78	57000	2	120.48		57000		
12.100	0.857	-0.243	9.05	-21.66		2	139.36	11.26	57000	2	120.37		57000		
11.725	0.766	-0.243	2.49	-12.69		2	149.17	10.77	57000	2	120.29		57000		
11.350	0.675	-0.243	0.00	0.00		2	158.99	10.29	57000	2	120.20		57000		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 2.66 mm

MAXIMUM MOMENT = -355.21 kN.m/m

CODIFICATION : -1 = SEPARATION
OF STATE : 0 = EXCAVATION
OF SOIL : 1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 246.11 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.073
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.333

** PHASE Nb 5 **

*EJECUCION DE SOLERA

* INSTALLATION LEVEL OF STRUTS NO 2

LEVEL = 17.750 m
SPACE = 1.000 m
INCLINATION = 0.000 DEGREES
PRELOAD = 0.000 kN
STIFFNESS = 500000.000 kN/m
BILATERAL CONNECTION

PHASE 5

| | WALL | SOIL 1 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | SOIL 2 EXCAVATION: 17.35 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	1.717	0.291	0.00	0.00		1	37.91	37.91	22500	0					
24.600	1.863	0.291	4.87	19.77		1	41.17	36.30	22500	0					
				-164.91		1	41.17	36.30	22500	0				1	-184.68
24.100	2.007	0.286	-72.30	-143.51		1	44.45	34.70	22500	0					
23.700	2.120	0.275	-126.08	-125.20		1	47.08	33.43	22500	0					
23.300	2.226	0.257	-172.32	-105.84		1	49.72	32.17	22500	0					
						1	23.91	23.91	60000	0					
22.900	2.325	0.234	-212.68	-95.80		1	26.33	23.71	60000	0					
22.500	2.413	0.207	-248.83	-84.78		1	28.77	22.78	60000	0					
22.100	2.490	0.177	-280.37	-72.78		1	31.22	21.85	60000	0					
21.700	2.554	0.142	-306.92	-59.80		1	33.68	20.95	60000	0					
21.300	2.603	0.105	-328.08	-45.83		1	36.17	20.07	60000	0					
20.900	2.638	0.066	-343.45	-30.85		1	38.69	19.21	60000	0					
20.500	2.656	0.025	-352.63	-14.87		1	41.22	18.37	60000	0					
20.100	2.657	-0.016	-355.21	2.13		1	43.78	17.56	60000	0					
						1	42.09	19.25	57000	0					
19.806	2.648	-0.047	-352.74	14.78		1	44.06	18.62	57000	0					
19.513	2.630	-0.077	-346.47	28.01		1	46.05	18.00	57000	0					
19.219	2.603	-0.106	-336.23	41.83		1	48.05	17.39	57000	0					
18.925	2.568	-0.134	-321.84	56.25		1	50.07	16.80	57000	0					
18.631	2.524	-0.161	-303.12	71.25		1	52.10	16.23	57000	0					
18.337	2.473	-0.186	-279.92	86.86		1	54.15	15.67	57000	0					
18.044	2.415	-0.209	-252.04	103.07		1	56.22	15.13	57000	0					
17.750	2.350	-0.230	-219.30	119.89		1	58.30	14.61	57000	0					
						1	58.30	14.61	57000	0				2	0.00
17.350	2.254	-0.252	-166.61	143.78		1	61.17	13.92	57000	0					
						1	61.17	13.92	57000	3	70.79		57000		
16.975	2.156	-0.268	-114.15	133.90		1	63.88	13.30	57000	3	106.94		57000		
16.600	2.054	-0.277	-67.38	114.45		1	66.61	12.71	57000	2	127.29		57000		
16.225	1.949	-0.283	-28.64	92.38		1	69.37	12.14	57000	2	126.40		57000		
15.850	1.842	-0.284	2.09	71.70		1	72.15	11.59	57000	2	125.45		57000		
15.475	1.736	-0.282	25.31	52.42		1	74.96	11.07	57000	2	124.50		57000		
15.100	1.631	-0.279	41.57	34.54		1	77.79	10.57	57000	2	123.61		57000		
14.725	1.527	-0.274	51.39	18.04		2	80.65	10.10	57000	2	122.81		57000		
14.350	1.426	-0.268	55.27	2.90		2	83.52	9.65	57000	2	122.14		57000		
13.975	1.327	-0.262	53.81	-10.28		2	89.94	12.74	57000	2	121.59		57000		
13.600	1.230	-0.256	47.97	-20.19		2	99.95	13.50	57000	2	121.17		57000		
13.225	1.135	-0.251	39.15	-26.23		2	109.87	12.90	57000	2	120.85		57000		
12.850	1.041	-0.247	28.78	-28.45		2	119.73	12.33	57000	2	120.63		57000		
12.475	0.949	-0.245	18.28	-26.92		2	129.55	11.78	57000	2	120.48		57000		
12.100	0.857	-0.243	9.05	-21.66		2	139.36	11.26	57000	2	120.37		57000		
11.725	0.766	-0.243	2.49	-12.69		2	149.17	10.77	57000	2	120.29		57000		
11.350	0.675	-0.243	0.00	0.00		2	158.99	10.29	57000	2	120.20		57000		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 2.66 mm
MAXIMUM MOMENT = -355.21 kN.m/m

CODIFICATION OF STATE OF SOIL :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 246.11 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.073
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.333

** PHASE Nb 6 **

*RETIRAR PUNTALES PROVISIONALES

* REMOVAL LEVEL OF STRUTS NO 1

PHASE 6

	WALL					SOIL 1 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa				SOIL 2 EXCAVATION: 17.35 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	15.707	-1.877	0.00	0.00		1	37.91	37.91	22500	0					
24.600	14.768	-1.877	4.87	19.77		1	41.17	36.30	22500	0					
24.100	13.830	-1.875	20.04	41.18		1	44.45	34.70	22500	0					
23.700	13.081	-1.872	40.14	59.48		1	47.08	33.43	22500	0					
23.300	12.333	-1.866	67.77	78.84		1	49.72	32.17	22500	0					
						1	23.91	23.91	60000	0					
22.900	11.589	-1.856	101.28	88.89		1	26.33	23.71	60000	0					
22.500	10.849	-1.842	139.01	99.91		1	28.77	22.78	60000	0					
22.100	10.116	-1.823	181.34	111.91		1	31.22	21.85	60000	0					
21.700	9.391	-1.799	228.67	124.89		1	33.68	20.95	60000	0					
21.300	8.677	-1.769	281.38	138.86		1	36.17	20.07	60000	0					
20.900	7.977	-1.733	339.89	153.83		1	38.69	19.21	60000	0					
20.500	7.292	-1.690	404.58	169.81		1	41.22	18.37	60000	0					
20.100	6.626	-1.638	475.87	186.81		1	43.78	17.56	60000	0					
						1	42.09	19.25	57000	0					
19.806	6.151	-1.595	532.59	199.46		1	44.06	18.62	57000	0					
19.513	5.689	-1.547	593.11	212.70		1	46.05	18.00	57000	0					
19.219	5.243	-1.493	657.61	226.52		1	48.05	17.39	57000	0					
18.925	4.813	-1.434	726.25	240.93		1	50.07	16.80	57000	0					
18.631	4.401	-1.368	799.21	255.94		1	52.10	16.23	57000	0					
18.337	4.009	-1.297	876.67	271.54		1	54.15	15.67	57000	0					
18.044	3.640	-1.218	958.80	287.75		1	56.22	15.13	57000	0					
17.750	3.295	-1.132	1045.79	304.57		1	58.30	14.61	57000	0					
				-167.51		1	58.30	14.61	57000	0				2	-472.08
17.350	2.866	-1.013	983.53	-143.61		1	61.17	13.92	57000	0					
						1	61.17	13.92	57000	3	70.79		57000		
16.975	2.506	-0.909	928.21	-153.49		1	63.88	13.30	57000	3	106.94		57000		
16.600	2.183	-0.810	867.04	-174.33		1	66.61	12.71	57000	2	134.67		57000		
16.225	1.897	-0.719	797.28	-196.68		2	72.32	15.09	57000	2	123.45		57000		
15.850	1.643	-0.636	720.41	-212.00		2	83.51	17.79	57000	2	114.10		57000		
15.475	1.419	-0.561	639.16	-220.24		2	93.04	16.99	57000	2	106.43		57000		
15.100	1.221	-0.496	555.96	-222.58		2	101.15	16.22	57000	2	100.25		57000		
14.725	1.046	-0.439	472.84	-220.03		2	108.08	15.50	57000	2	95.38		57000		
14.350	0.890	-0.392	391.44	-213.45		2	114.04	14.80	57000	2	91.62		57000		
13.975	0.751	-0.354	313.25	-202.87		2	122.76	14.14	57000	2	88.77		57000		
13.600	0.624	-0.323	239.89	-187.53		2	134.46	13.50	57000	2	86.66		57000		
13.225	0.507	-0.301	173.22	-167.22		2	145.62	12.90	57000	2	85.11		57000		
12.850	0.398	-0.285	115.05	-142.30		2	156.40	12.33	57000	2	83.97		57000		
12.475	0.293	-0.275	67.05	-112.99		2	166.94	11.78	57000	2	83.09		57000		
12.100	0.191	-0.270	30.83	-79.46		2	177.35	11.26	57000	2	82.38		57000		
11.725	0.090	-0.268	7.96	-41.79		2	187.70	10.77	57000	2	81.75		57000		
11.350	-0.010	-0.268	0.00	0.00		2	198.06	10.29	57000	2	81.13		57000		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 15.71 mm

MAXIMUM MOMENT = 1045.79 kN.m/m

CODIFICATION :
-1 = SEPARATION
0 = EXCAVATION
OF STATE : 1 = ACTIVE PR.
OF SOIL : 2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 258.36 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.084
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.267

*** END OF CALCULUS

*** MAXIMUM DISPLACEMENT IN PHASE Nb 6 = 15.707 mm IN FINAL PHASE Nb 6 = 15.707 mm

*** MAXIMUM MOMENT IN PHASE Nb 6 = 1045.787 kN.m/m IN FINAL PHASE Nb 6 = 1045.787 kN.m/m

STRUT/ANCHOR		PRELOAD		MAXIMUM		FINAL STATE	
NUMBER	LEVEL	PHASE	FORCE	PHASE	FORCE	PHASE	FORCE
1	24.60	3	0.00	4	-184.68	6	REMOVED
2	17.75	5	0.00	6	-472.08	6	-472.08
	m		kN		kN		kN

* ENVELOPE CURVES FROM PHASE 1 TO PHASE 6 *

LEVEL	MINI CRO.FO	MAXI CRO.FO
25.100	0.00	0.00
24.600	0.00	19.77
	-164.91	19.77
24.100	-143.51	41.18
23.700	-125.20	59.48
23.300	-105.84	78.84
22.900	-95.80	88.89
22.500	-84.78	99.91
22.100	-72.78	111.91
21.700	-59.80	124.89
21.300	-45.83	138.86
20.900	-30.85	153.83
20.500	-15.88	169.81
20.100	-20.75	186.81
19.806	-21.99	199.46
19.513	-22.71	212.70
19.219	-23.00	226.52
18.925	-22.92	240.93
18.631	-22.54	255.94
18.337	-21.90	271.54
18.044	-21.05	287.75
17.750	-20.06	304.57
	-167.51	119.89
17.350	-143.61	143.78
16.975	-153.49	133.90
16.600	-174.33	114.45
16.225	-196.68	92.38
15.850	-212.00	71.70
15.475	-220.24	52.42
15.100	-222.58	34.54
14.725	-220.03	18.04
14.350	-213.45	2.90
13.975	-202.87	0.00
13.600	-187.53	0.00
13.225	-167.22	0.00
12.850	-142.30	0.00
12.475	-112.99	0.00
12.100	-79.46	0.00
11.725	-41.79	0.00
11.350	0.00	0.00
m	kN/m	kN/m

LEVEL	MINI MOMENT	MAXI MOMENT
25.100	0.00	0.00
24.600	0.00	4.87
	0.00	4.87
24.100	-72.30	20.04
23.700	-126.08	40.14
23.300	-172.32	67.77
22.900	-212.68	101.28
22.500	-248.83	139.01
22.100	-280.37	181.34
21.700	-306.92	228.67
21.300	-328.08	281.38
20.900	-343.45	339.89
20.500	-352.63	404.58
20.100	-355.21	475.87
19.806	-352.74	532.59
19.513	-346.47	593.11
19.219	-336.23	657.61
18.925	-321.84	726.25
18.631	-303.12	799.21
18.337	-279.92	876.67
18.044	-252.04	958.80
17.750	-219.30	1045.79
	-219.30	1045.79
17.350	-166.61	983.53
16.975	-114.15	928.21
16.600	-67.38	867.04
16.225	-28.64	797.28
15.850	0.00	720.41
15.475	0.00	639.16
15.100	0.00	555.96
14.725	0.00	472.84
14.350	0.00	391.44
13.975	0.00	313.25
13.600	0.00	239.89
13.225	0.00	173.22
12.850	0.00	115.05
12.475	0.00	67.05
12.100	0.00	30.83
11.725	0.00	7.96
11.350	0.00	0.00
m	kN.m/m	kN.m/m

PANTALLA TIPO 2-B

Proyecto: INTEGRACION DEL FERROCARRIL EN SANT FELIU
Tipo: PANTALLAS DE PILOTES
Tramo: PANTALLA TIPO 2-B
Fecha: 05/09/2008

CARACTERIZACIÓN DE ESTRATOS

Estratos	Potencia (m)	ϕ	Cohesión (kN/m²)	Densidad (kN/m³)	Kh (kN/m²)
Rellenos	**1,80**	**28**	**0**	**18**	**15.000**
Ar.arc.y limosas	**3,20**	**34,5**	**9**	**20,5**	**40.000**
Arcillas y limos	**---**	**32,3**	**13**	**19,5**	**38.000**

(*) Al no tener perfil de este tramo se ha tomado el del tramo mas cercano (Pantalla tipo 2)

Cota nivel freatico: --- m

SOBRECARGAS

Rellenos y tráfico

Rellenos:	**0,000**	m
SC Rellenos(*):	0,00	kN/m²
SC Tráfico:	**10,00**	kN/m²
Sobrecarga 1:	10,00	kN/m²
Ambito de actuación:	0-12	m

(*) Supuesta una densidad de 20 KN/m³

Edificación

nº de plantas	**1,000**	m
Carga por planta:	20,00	kN/m²
SC edficación:	**20,00**	kN/m²
Sobrecarga 2:	20,00	kN/m²
Ambito de actuación:	---	m

(*) Supuesta una carga de 20KN/m² (Nave industrial)

CARACT.MECANICAS Y GOEMETRICAS DE LA PANTALLA DE PILOTES (RIGIDEZ)

DATOS			
Diametro (m):	**0,85**	Área (m²):	**0,5675**
Separación (m):	**1,05**	Inercia (m⁴):	**0,0256**
Resistencia Hormigón (N/mm²):	**30**	Rigidez (kNm²):	**732.249**
Ambiente:	IIa	Módulo Defor. Hormigón (kN/m²):	**28.576.791**

(*) Se ha considerado un valor Ej=8.500·∛fcm,j

HOJA PREPARADA PARA INTRODUCIR EL COMANDO "COE" (RIDO)

COTAS DE LA PANTALLA

Cota Superior Pantalla:	100,000	m
Cota Excavación:	92,250	m
Cota Fondo de Excavación:	92,250	m
Cota Pie de Pantalla:	87,250	m
Longitud Pilote:	12,750	m

RESULTADOS

Desplazamiento:	15,59	mm
Empuje Pasivo Movilizado:	30,40	%

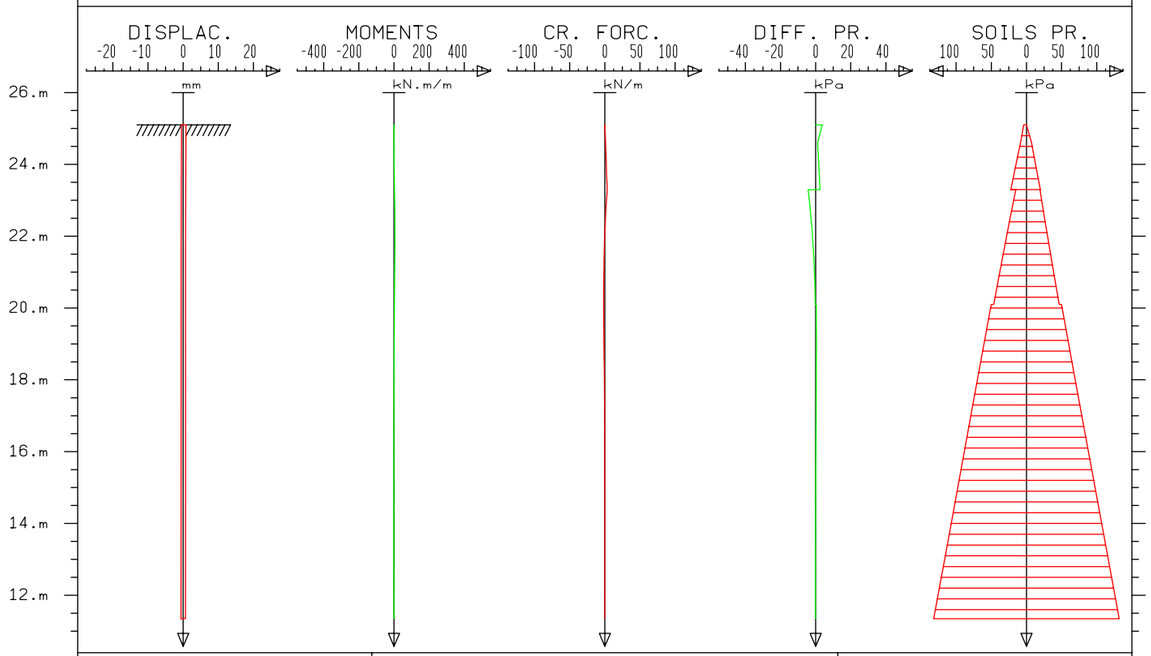
PROCESO CONSTRUCTIVO

1º Ejecución de pantalla de pilotes.
2º Excavación previa colocación de puntales
3º Colocacion de puntales provisionales
4º Excavación hasta cota de trabajo.
5º Ejecucion de solera y conexión de esta a pantalla.
6º Retirada de puntales provisionales.

GRÁFICOS

PANTALLA PILOTES TIPO 2B(RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

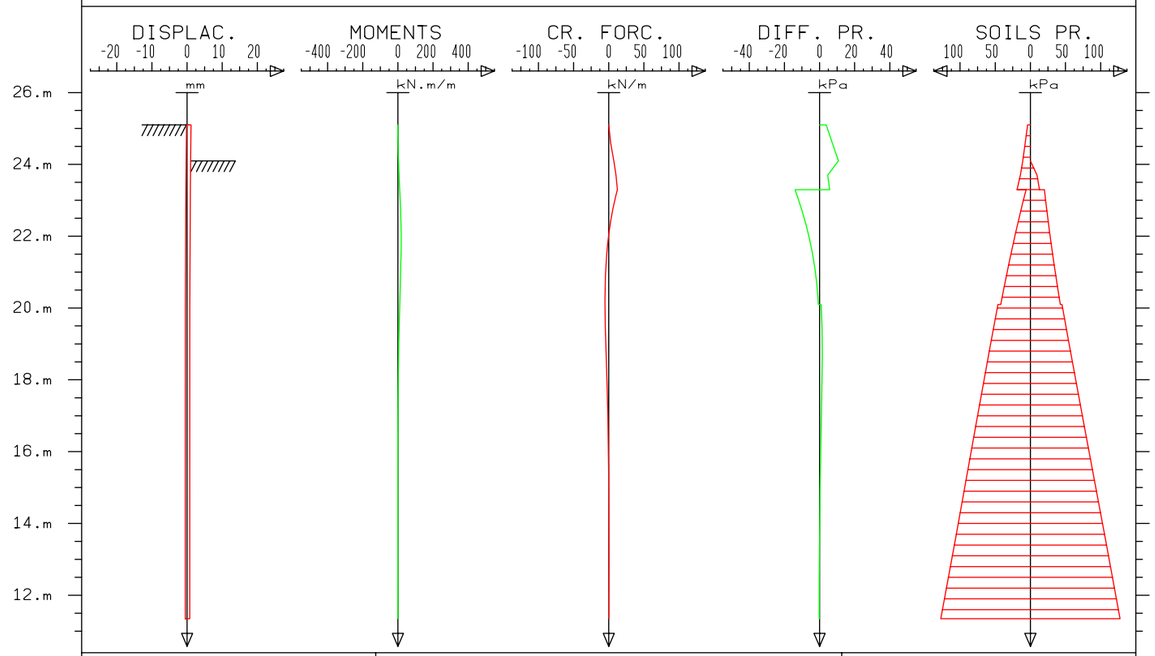
GRAPHS OF THE PHASE Nb 1



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

PANTALLA PILOTES TIPO 2B(RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

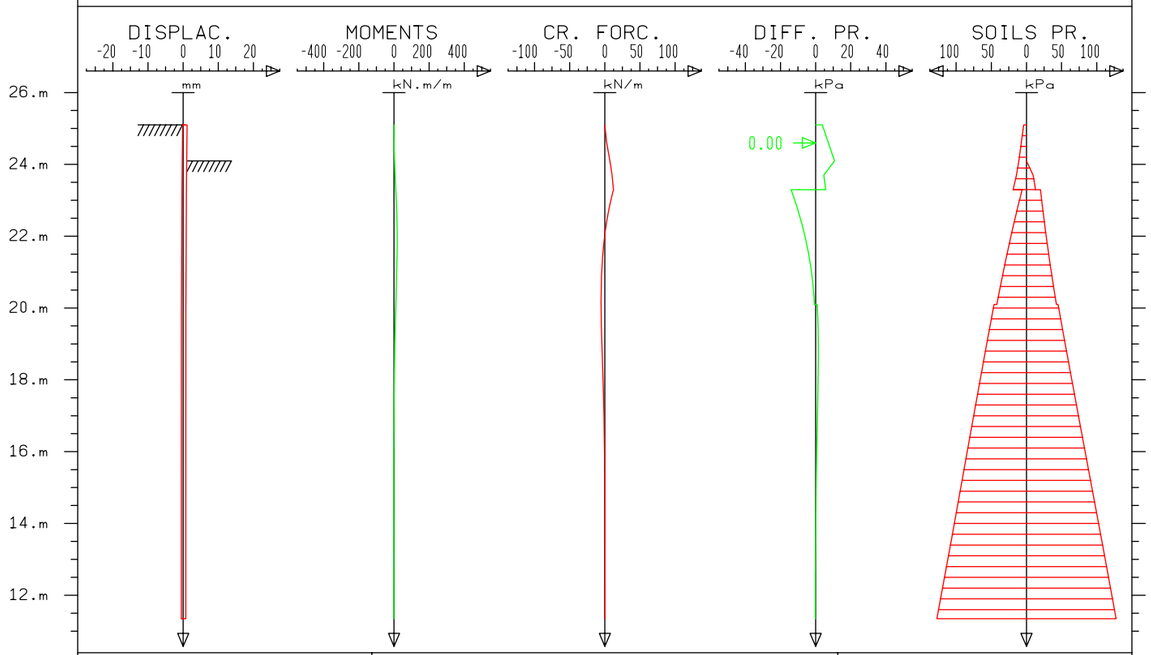
GRAPHS OF THE PHASE Nb 2



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

PANTALLA PILOTES TIPO 2B(RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

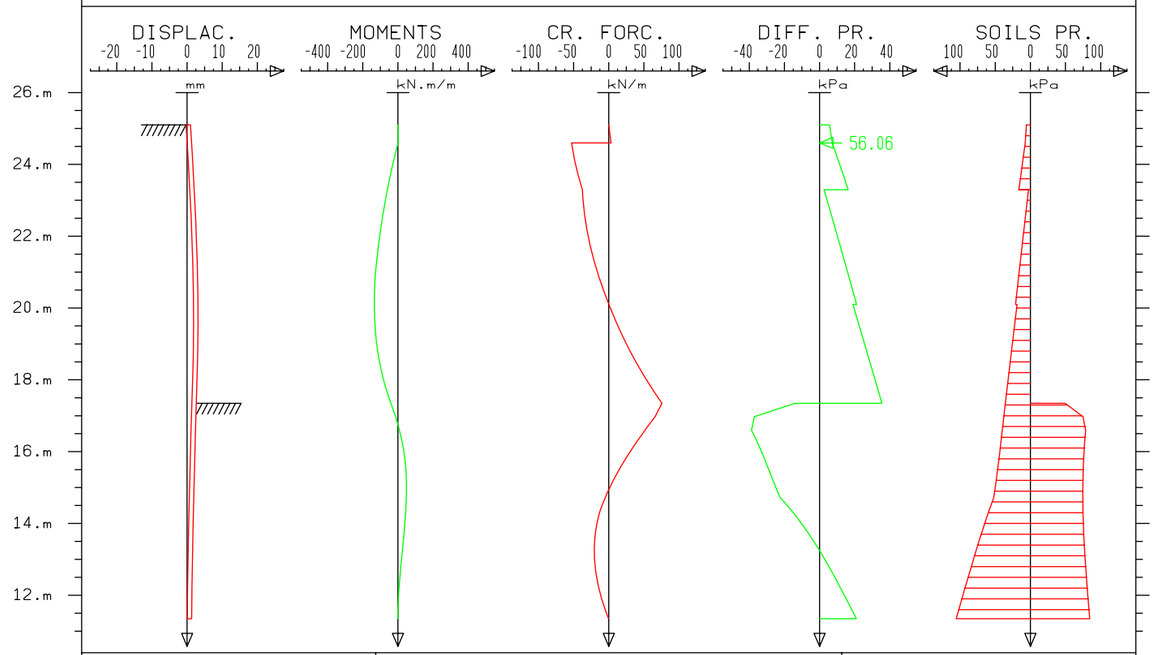
GRAPHS OF THE PHASE Nb 3



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

PANTALLA PILOTES TIPO 2B(RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

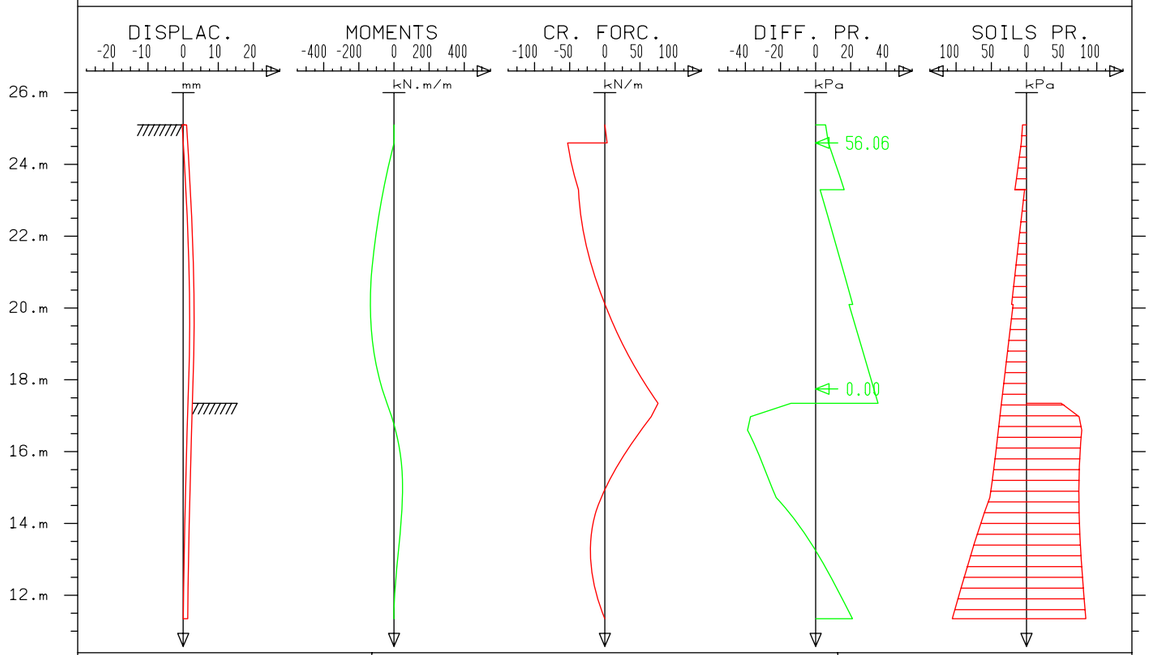
GRAPHS OF THE PHASE Nb 4



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

PANTALLA PILOTES TIPO 2B(RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

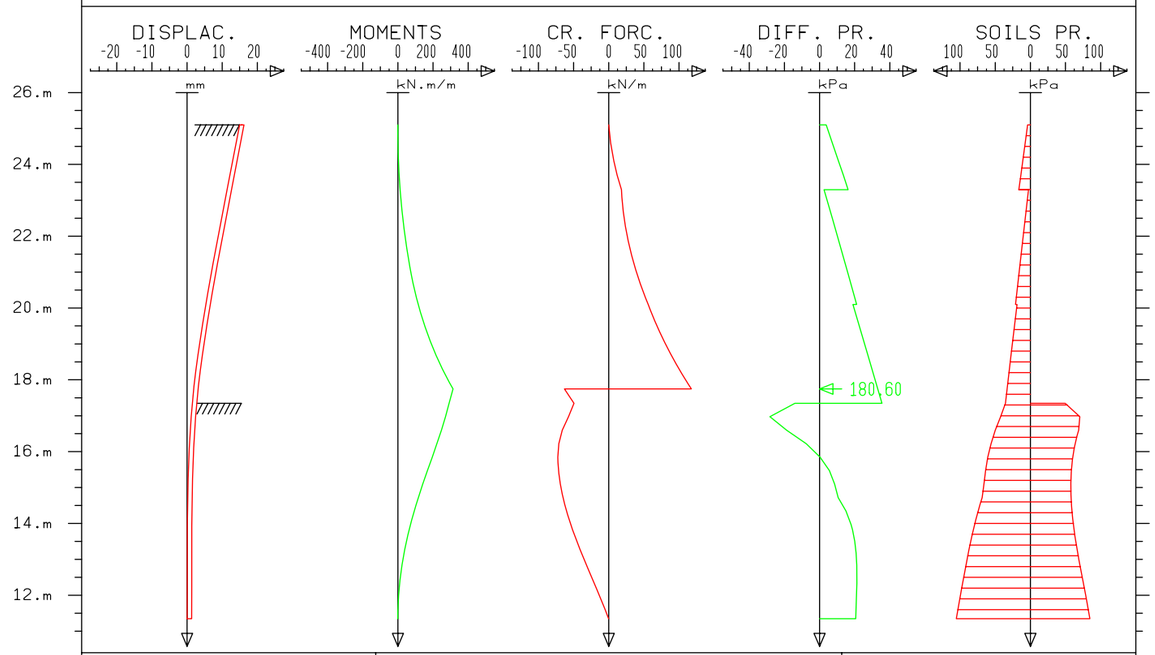
GRAPHS OF THE PHASE Nb 5



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

PANTALLA PILOTES TIPO 2B(RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

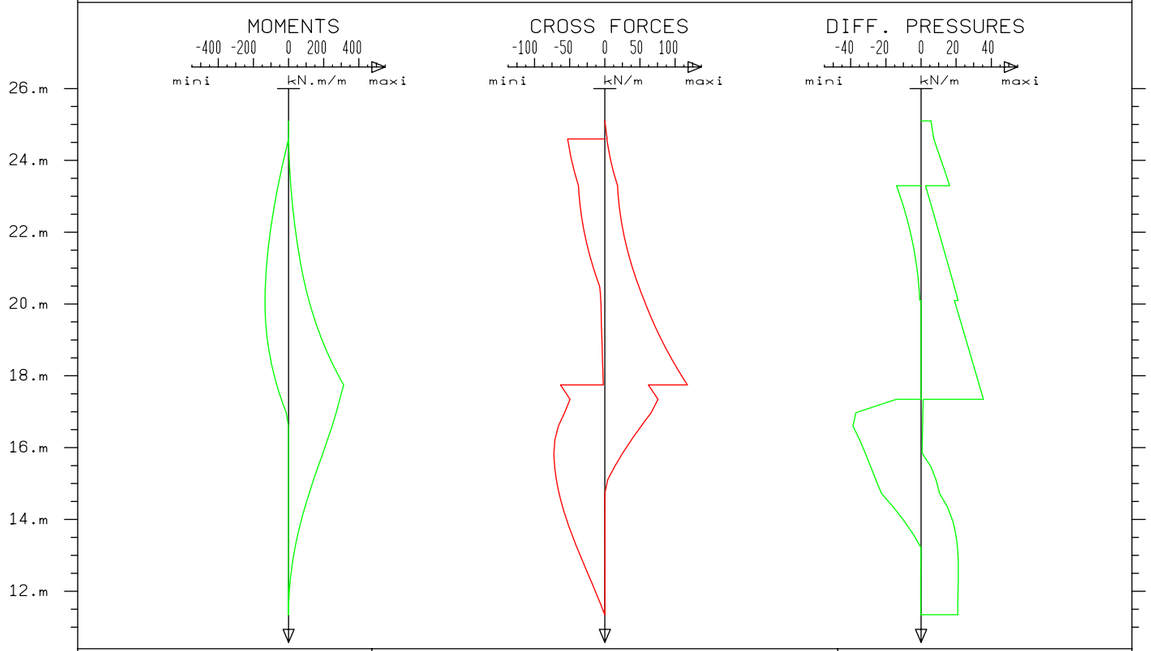
GRAPHS OF THE PHASE Nb 6



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

PANTALLA PILOTES TIPO 2B(RAMPA C/PUNTAL)SOTERRAMIENTO SANT F

ENVELOPES FROM PHASE 1 TO PHASE 6



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-2

LISTADO

```
E &l18D &k2S &a4L      ***** DATA FILE NAME : SFELIU-2B.RIO

        PANTALLA PILOTES TIPO 2B(RAMPA C/PUNTAL)SOTERRAMIENTO SANT FELIU*101L  U:NN*
        *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
        #EMP=6
        #DIAMETRO=0.85
        #SEPARACION=1.05
        #fck=30
        #E=8500*((fck+8)^(1/3))*1000
        #I=3.14/(64)*(DIAMETRO)^4
        #RIGIDEZ=E*I
        *COTAS DE LA PANTALLA
        #CSUP=25.10
        #CEXC=25.10-7.75
        *Nota: "CEXC" es la cota maxima de excavacion
        #CPIE=CEXC-EMP
        #NF=CSUP-20.00
        *CABEZA DE PANTALLA
        : CSUP
  1 ...  25.1
        *PANTALLA 0.85/1.05
        : CPIE RIGIDEZ
  2 ...  11.35 731878.2
        *COTA MAXIMA DE TERRENO
        : CSUP
  3 ...  25.1
        *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)
        : 25.10-1.80 18.00 9.00 0 0 0 0 28 0 0 15000
  4 ...  23.3 18 9 0.3610335 0.5305284 2.769826 0 28 0 0 15000
        : 25.10-1.80-3.20 20.30 10.30 0 0 0 9 34.50 0 0 40000
  5 ...  20.1 20.3 10.3 0.276808 0.4335938 3.612612 9 34.5 0 0 40000
        : 25.10-25.00 19.50 9.50 0 0 0 0 13 32.3 0 0 38000
  6 ...  0.1 19.5 9.5 0.3034816 0.4656477 3.295093 13 32.3 0 0 38000
        *NIVEL FREATICO
        : NF 0.50
  7 ...  5.1 0.5
        *FACTOR DE SEPARACION
        : COE CSUP CSUP-25.00 SEPARACION
  8 ... COE 25.1 0.1 1.05
        *SOBRECARGA 20 KN/M2 (NAVES INDUSTRIALES)
        : SUB(1) CSUP 0 6 10
  9 ... SUB(1)  25.1 0 6 10
        : SUB(1,1) CSUP 6 15 20
 10 ... SUB(1,1)  25.1 6 15 20
        : CAL(2)
 11 ... CAL(2)
        *EXCAVACION PREVIA A COLOCION DE PUNTALES PROVISIONALES
        : EXC(2) CSUP-1.00
 12 ... EXC(2)  24.1
        : CAL(2)
 13 ... CAL(2)
        *COLOCACION DE PUNTALES PROVISIONALES
        : STR CSUP-0.50 1 0 0 250000
 14 ... STR 24.6 1 0 0 250000
        : CAL(2)
 15 ... CAL(2)
        *EXCAVACION HASTA COTA DE SOLERA
        : EXC(2) CEXC
 16 ... EXC(2)  17.35
        : CAL(2)
 17 ... CAL(2)
        *EJECUCION DE SOLERA
        : STR CEXC+0.40 1 0 0 500000
 18 ... STR 17.75 1 0 0 500000
        : CAL(2)
 19 ... CAL(2)
        *RETIRAR PUNTALES PROVISIONALES
        : STR(0,1)
 20 ... STR(0,1)
        : CAL(2)
 21 ... CAL(2)
        : END
 22 ... END
        : STA
 23 ... STA
        : EVP
 24 ... EVP
```



```
                *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
                *COTAS DE LA PANTALLA
                *Nota: "CEXC" es la cota maxima de excavacion
                *CABEZA DE PANTALLA
                *PANTALLA 0.85/1.05

                ------------------------------------------------------------------------

                                                ** STARTING DATA **
                                                --------------------


  * BOUSSINESQ SURCHARGES FUNCTION OF STATE OF SOIL


*** WALL DESCRIPTION :
                                                INERTIA PRODUCT EI      CYLINDRICAL RIGIDITY
    SECTION NB  1 FROM  25.100 m  TO  11.350 m  :          731878. kN.m2/m           0. kPa/m

                *COTA MAXIMA DE TERRENO


*** SOIL DESCRIPTION :

                *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)

     LAYER NB  1 FROM  25.100 m  TO  23.300 m  :

                SATURATED UNIT WEIGHT              GH  =      18.000 kN/m3
                SUBMERGED UNIT WEIGHT              GD  =       9.000 kN/m3
                HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.361
                HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.531
                HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       2.770
                COHESION                            C  =       0.000 kPa
                ANGLE OF INTERNAL FRICTION        PHI  =      28.000 DEGREES
                        FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
                        FOR PASSIVE PRESS. DELTA/PHI  =       0.000
                ELASTIC REACTION COEFFICIENT (AT P=0)  =   15000.000 kPa/m
                INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

     LAYER NB  2 FROM  23.300 m  TO  20.100 m  :

                SATURATED UNIT WEIGHT              GH  =      20.300 kN/m3
                SUBMERGED UNIT WEIGHT              GD  =      10.300 kN/m3
                HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.277
                HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.434
                HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       3.613
                COHESION                            C  =       9.000 kPa
                ANGLE OF INTERNAL FRICTION        PHI  =      34.500 DEGREES
                        FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
                        FOR PASSIVE PRESS. DELTA/PHI  =       0.000
                ELASTIC REACTION COEFFICIENT (AT P=0)  =   40000.000 kPa/m
                INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

    LAYER NB  3 FROM  20.100 m  TO   0.100 m  :

                SATURATED UNIT WEIGHT              GH  =      19.500 kN/m3
                SUBMERGED UNIT WEIGHT              GD  =       9.500 kN/m3
                HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.303
                HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.466
                HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       3.295
                COHESION                            C  =      13.000 kPa
                ANGLE OF INTERNAL FRICTION        PHI  =      32.300 DEGREES
                        FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
                        FOR PASSIVE PRESS. DELTA/PHI  =       0.000
                ELASTIC REACTION COEFFICIENT (AT P=0)  =   38000.000 kPa/m
                INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

                *NIVEL FREATICO
```

** PHASE Nb 1 **

*FACTOR DE SEPARACION

* FROM 25.100 m TO 0.100 m COEFFICIENT APPLIED TO PRESSURES = 1.050
ADDITIONAL COEFF. ON PASSIVE PRESSURE = 1.000

*SOBRECARGA 20 KN/M2 (NAVES INDUSTRIALES)

* CANCELLATION BOUSSINESQ SURCHARGE ON SOIL 1

* ADDING A BOUSSINESQ SURCHARGE ON SOIL 1
LEV. = 25.100 m A = 0.000 m B = 6.000 m Q = 10.000 kPa

* ADDING A BOUSSINESQ SURCHARGE ON SOIL 1
LEV. = 25.100 m A = 6.000 m B = 15.000 m Q = 20.000 kPa

PHASE 1

| | WALL | SOIL 1 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | SOIL 2 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	0.160	-0.030	0.00	0.00		1	3.79	3.79	15750	3	0.00		15750		
24.600	0.145	-0.030	0.36	1.23		2	8.41	5.00	15750	2	7.30		15750		
24.100	0.130	-0.029	1.14	1.93		2	13.76	5.79	15750	2	12.08		15750		
23.700	0.119	-0.028	2.05	2.68		2	18.02	5.85	15750	2	15.91		15750		
23.300	0.108	-0.027	3.31	3.60		2	22.24	5.89	15750	2	19.75		15750		
						2	15.04	4.82	42000	2	19.28		42000		
22.900	0.097	-0.025	4.43	2.09		2	19.19	4.83	42000	2	22.54		42000		
22.500	0.088	-0.022	5.02	0.90		2	23.27	4.82	42000	2	25.84		42000		
22.100	0.080	-0.019	5.19	0.00		2	27.29	4.80	42000	2	29.19		42000		
21.700	0.073	-0.017	5.06	-0.65		2	31.24	4.75	42000	2	32.59		42000		
21.300	0.067	-0.014	4.70	-1.10		2	35.12	4.68	42000	2	36.03		42000		
20.900	0.062	-0.011	4.20	-1.40		2	38.94	4.60	42000	2	39.52		42000		
20.500	0.057	-0.009	3.60	-1.58		2	42.72	4.50	42000	2	43.04		42000		
20.100	0.054	-0.007	2.94	-1.67		2	46.44	4.39	42000	2	46.60		42000		
						2	50.16	4.71	39900	2	49.76		39900		
19.805	0.052	-0.006	2.47	-1.55		2	52.96	4.62	39900	2	52.49		39900		
19.548	0.051	-0.006	2.09	-1.42		2	55.38	4.53	39900	2	54.88		39900		
19.291	0.049	-0.005	1.74	-1.29		2	57.79	4.44	39900	2	57.28		39900		
19.034	0.048	-0.004	1.42	-1.16		2	60.20	4.35	39900	2	59.68		39900		
18.777	0.047	-0.004	1.14	-1.03		2	62.60	4.26	39900	2	62.08		39900		
18.521	0.046	-0.004	0.90	-0.90		2	64.99	4.16	39900	2	64.50		39900		
18.264	0.045	-0.003	0.68	-0.77		2	67.38	4.07	39900	2	66.91		39900		
18.007	0.044	-0.003	0.50	-0.66		2	69.76	3.97	39900	2	69.33		39900		
17.750	0.044	-0.003	0.34	-0.55		2	72.15	3.88	39900	2	71.74		39900		
17.350	0.042	-0.003	0.16	-0.40		2	75.86	3.73	39900	2	75.51		39900		
16.975	0.041	-0.003	0.03	-0.28		2	79.34	3.59	39900	2	79.05		39900		
16.600	0.040	-0.003	-0.06	-0.18		2	82.82	3.45	39900	2	82.58		39900		
16.225	0.039	-0.003	-0.11	-0.10		2	86.30	3.32	39900	2	86.11		39900		
15.850	0.038	-0.003	-0.13	-0.04		2	89.79	3.19	39900	2	89.65		39900		
15.475	0.037	-0.003	-0.14	0.00		2	93.28	3.06	39900	2	93.18		39900		
15.100	0.036	-0.003	-0.13	0.03		2	96.77	2.94	39900	2	96.71		39900		
14.725	0.035	-0.003	-0.12	0.05		2	100.27	2.82	39900	2	100.24		39900		
14.350	0.034	-0.003	-0.10	0.06		2	103.78	2.70	39900	2	103.77		39900		
13.975	0.033	-0.003	-0.07	0.06		2	107.29	2.59	39900	2	107.30		39900		
13.600	0.031	-0.003	-0.05	0.05		2	110.80	2.48	39900	2	110.82		39900		
13.225	0.030	-0.003	-0.03	0.04		2	114.32	2.38	39900	2	114.35		39900		
12.850	0.029	-0.003	-0.02	0.03		2	117.85	2.28	39900	2	117.88		39900		
12.475	0.028	-0.003	-0.01	0.02		2	121.38	2.18	39900	2	121.41		39900		
12.100	0.027	-0.003	0.00	0.01		2	124.91	2.09	39900	2	124.93		39900		
11.725	0.025	-0.003	0.00	0.00		2	128.44	2.00	39900	2	128.46		39900		
11.350	0.024	-0.003	0.00	0.00		2	131.98	1.92	39900	2	131.99		39900		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 0.16 mm
MAXIMUM MOMENT = 5.19 kN.m/m

CODIFICATION :
-1 = SEPARATION
0 = EXCAVATION
OF STATE : 1 = ACTIVE PR.
OF SOIL : 2 = ELASTIC
3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 52.70 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.125
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.132

** PHASE Nb 2 **

*EXCAVACION PREVIA A COLOCION DE PUNTALES PROVISIONALES

* EXCAVATION IN SOIL 2 TO LEVEL = 24.100 m

PHASE 2

| | WALL | SOIL 1 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | SOIL 2 EXCAVATION: 24.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	0.488	-0.095	0.00	0.00		1	3.79	3.79	15750	0					
24.600	0.441	-0.095	0.62	2.77		1	7.28	3.87	15750	0					
24.100	0.394	-0.094	3.06	7.28		1	10.76	3.94	15750	0					
23.700	0.357	-0.091	6.67	10.36		2	14.27	4.72	15750	2	9.63		15750		
23.300	0.321	-0.086	11.21	12.45		2	18.88	5.89	15750	2	13.08		15750		
						2	6.07	4.82	42000	2	20.05		42000		
22.900	0.288	-0.079	15.15	7.41		2	11.17	4.83	42000	2	22.36		42000		
22.500	0.258	-0.070	17.28	3.44		2	16.11	4.82	42000	2	24.80		42000		
22.100	0.232	-0.060	18.02	0.39		2	20.88	4.80	42000	2	27.41		42000		
21.700	0.210	-0.050	17.71	-1.86		2	25.45	4.75	42000	2	30.18		42000		
21.300	0.192	-0.041	16.62	-3.45		2	29.85	4.68	42000	2	33.10		42000		
20.900	0.177	-0.032	15.01	-4.52		2	34.08	4.60	42000	2	36.19		42000		
20.500	0.166	-0.025	13.06	-5.20		2	38.15	4.50	42000	2	39.41		42000		
20.100	0.157	-0.018	10.89	-5.58		2	42.10	4.39	42000	2	42.74		42000		
						2	46.03	4.71	39900	2	45.09		39900		
19.805	0.153	-0.014	9.29	-5.26		2	48.94	4.62	39900	2	47.71		39900		
19.548	0.150	-0.011	7.99	-4.92		2	51.43	4.53	39900	2	50.03		39900		
19.291	0.147	-0.008	6.77	-4.54		2	53.89	4.44	39900	2	52.38		39900		
19.034	0.145	-0.006	5.65	-4.15		2	56.32	4.35	39900	2	54.76		39900		
18.777	0.144	-0.004	4.64	-3.75		2	58.73	4.26	39900	2	57.15		39900		
18.521	0.143	-0.003	3.73	-3.34		2	61.12	4.16	39900	2	59.56		39900		
18.264	0.142	-0.002	2.92	-2.95		2	63.50	4.07	39900	2	61.98		39900		
18.007	0.142	-0.001	2.22	-2.56		2	65.87	3.97	39900	2	64.42		39900		
17.750	0.142	0.000	1.60	-2.20		2	68.23	3.88	39900	2	66.86		39900		
17.350	0.142	0.000	0.83	-1.69		2	71.89	3.73	39900	2	70.68		39900		
16.975	0.142	0.001	0.28	-1.26		2	75.32	3.59	39900	2	74.26		39900		
16.600	0.142	0.001	-0.13	-0.90		2	78.75	3.45	39900	2	77.85		39900		
16.225	0.143	0.001	-0.40	-0.59		2	82.18	3.32	39900	2	81.43		39900		
15.850	0.143	0.000	-0.57	-0.33		2	85.62	3.19	39900	2	85.01		39900		
15.475	0.143	0.000	-0.66	-0.13		2	89.06	3.06	39900	2	88.59		39900		
15.100	0.143	0.000	-0.68	0.02		2	92.52	2.94	39900	2	92.17		39900		
14.725	0.142	-0.001	-0.65	0.13		2	95.98	2.82	39900	2	95.73		39900		
14.350	0.142	-0.001	-0.58	0.21		2	99.45	2.70	39900	2	99.30		39900		
13.975	0.142	-0.001	-0.50	0.25		2	102.93	2.59	39900	2	102.85		39900		
13.600	0.141	-0.002	-0.40	0.27		2	106.42	2.48	39900	2	106.41		39900		
13.225	0.141	-0.002	-0.30	0.26		2	109.92	2.38	39900	2	109.96		39900		
12.850	0.140	-0.002	-0.20	0.24		2	113.42	2.28	39900	2	113.51		39900		
12.475	0.139	-0.002	-0.12	0.20		2	116.93	2.18	39900	2	117.06		39900		
12.100	0.139	-0.002	-0.06	0.14		2	120.44	2.09	39900	2	120.60		39900		
11.725	0.138	-0.002	-0.01	0.08		2	123.96	2.00	39900	2	124.15		39900		
11.350	0.137	-0.002	0.00	0.00		2	127.48	1.92	39900	2	127.69		39900		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 0.49 mm
MAXIMUM MOMENT = 18.02 kN.m/m

CODIFICATION :
OF STATE :
OF SOIL :

-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 50.85 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.117
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.140

** PHASE Nb 3 **

*COLOCACION DE PUNTALES PROVISIONALES

* INSTALLATION LEVEL OF STRUTS NO 1

LEVEL	=	24.600 m
SPACE	=	1.000 m
INCLINATION	=	0.000 DEGREES
PRELOAD	=	0.000 kN
STIFFNESS	=	250000.000 kN/m

BILATERAL CONNECTION

PHASE 3

	WALL					SOIL 1 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa				SOIL 2 EXCAVATION: 24.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	0.488	-0.095	0.00	0.00		1	3.79	3.79	15750	0					
24.600	0.441	-0.095	0.62	2.77		1	7.28	3.87	15750	0					
						1	7.28	3.87	15750	0				1	0.00
24.100	0.394	-0.094	3.06	7.28		1	10.76	3.94	15750	0					
23.700	0.357	-0.091	6.67	10.36		2	14.27	4.72	15750	2	9.63		15750		
23.300	0.321	-0.086	11.21	12.45		2	18.88	5.89	15750	2	13.08		15750		
						2	6.07	4.82	42000	2	20.05		42000		
22.900	0.288	-0.079	15.15	7.41		2	11.17	4.83	42000	2	22.36		42000		
22.500	0.258	-0.070	17.28	3.44		2	16.11	4.82	42000	2	24.80		42000		
22.100	0.232	-0.060	18.02	0.39		2	20.88	4.80	42000	2	27.41		42000		
21.700	0.210	-0.050	17.71	-1.86		2	25.45	4.75	42000	2	30.18		42000		
21.300	0.192	-0.041	16.62	-3.45		2	29.85	4.68	42000	2	33.10		42000		
20.900	0.177	-0.032	15.01	-4.52		2	34.08	4.60	42000	2	36.19		42000		
20.500	0.166	-0.025	13.06	-5.20		2	38.15	4.50	42000	2	39.41		42000		
20.100	0.157	-0.018	10.89	-5.58		2	42.10	4.39	42000	2	42.74		42000		
						2	46.03	4.71	39900	2	45.09		39900		
19.805	0.153	-0.014	9.29	-5.26		2	48.94	4.62	39900	2	47.71		39900		
19.548	0.150	-0.011	7.99	-4.92		2	51.43	4.53	39900	2	50.03		39900		
19.291	0.147	-0.008	6.77	-4.54		2	53.89	4.44	39900	2	52.38		39900		
19.034	0.145	-0.006	5.65	-4.15		2	56.32	4.35	39900	2	54.76		39900		
18.777	0.144	-0.004	4.64	-3.75		2	58.73	4.26	39900	2	57.15		39900		
18.521	0.143	-0.003	3.73	-3.34		2	61.12	4.16	39900	2	59.56		39900		
18.264	0.142	-0.002	2.92	-2.95		2	63.50	4.07	39900	2	61.98		39900		
18.007	0.142	-0.001	2.22	-2.56		2	65.87	3.97	39900	2	64.42		39900		
17.750	0.142	0.000	1.60	-2.20		2	68.23	3.88	39900	2	66.86		39900		
17.350	0.142	0.000	0.83	-1.69		2	71.89	3.73	39900	2	70.68		39900		
16.975	0.142	0.001	0.28	-1.26		2	75.32	3.59	39900	2	74.26		39900		
16.600	0.142	0.001	-0.13	-0.90		2	78.75	3.45	39900	2	77.85		39900		
16.225	0.143	0.001	-0.40	-0.59		2	82.18	3.32	39900	2	81.43		39900		
15.850	0.143	0.000	-0.57	-0.33		2	85.62	3.19	39900	2	85.01		39900		
15.475	0.143	0.000	-0.66	-0.13		2	89.06	3.06	39900	2	88.59		39900		
15.100	0.143	0.000	-0.68	0.02		2	92.52	2.94	39900	2	92.17		39900		
14.725	0.142	-0.001	-0.65	0.13		2	95.98	2.82	39900	2	95.73		39900		
14.350	0.142	-0.001	-0.58	0.21		2	99.45	2.70	39900	2	99.30		39900		
13.975	0.142	-0.001	-0.50	0.25		2	102.93	2.59	39900	2	102.85		39900		
13.600	0.141	-0.002	-0.40	0.27		2	106.42	2.48	39900	2	106.41		39900		
13.225	0.141	-0.002	-0.30	0.26		2	109.92	2.38	39900	2	109.96		39900		
12.850	0.140	-0.002	-0.20	0.24		2	113.42	2.28	39900	2	113.51		39900		
12.475	0.139	-0.002	-0.12	0.20		2	116.93	2.18	39900	2	117.06		39900		
12.100	0.139	-0.002	-0.06	0.14		2	120.44	2.09	39900	2	120.60		39900		
11.725	0.138	-0.002	-0.01	0.08		2	123.96	2.00	39900	2	124.15		39900		
11.350	0.137	-0.002	0.00	0.00		2	127.48	1.92	39900	2	127.69		39900		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 0.49 mm

MAXIMUM MOMENT = 18.02 kN.m/m

CODIFICATION OF STATE :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
CODIFICATION OF SOIL :
3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 50.85 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.117
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.140

** PHASE Nb 4 **

*EXCAVACION HASTA COTA DE SOLERA

* EXCAVATION IN SOIL 2 TO LEVEL = 17.350 m

PHASE 4

	WALL					SOIL 1 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa				SOIL 2 EXCAVATION: 17.35 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	0.370	0.591	0.00	0.00		2	5.66	5.66	15750	0					
24.600	0.665	0.591	0.78	3.24		1	7.28	3.87	15750	0					
				-52.83		1	7.28	3.87	15750	0				1	-56.06
24.100	0.960	0.583	-24.58	-48.32		1	10.76	3.94	15750	0					
23.700	1.189	0.564	-42.98	-43.46		1	13.54	3.98	15750	0					
23.300	1.410	0.536	-59.20	-37.49		1	16.29	4.01	15750	0					
						1	2.55	2.55	42000	0					
22.900	1.617	0.500	-73.93	-36.00		1	4.92	3.08	42000	0					
22.500	1.809	0.456	-87.88	-33.56		1	7.27	3.08	42000	0					
22.100	1.981	0.404	-100.66	-30.18		1	9.62	3.06	42000	0					
21.700	2.131	0.346	-111.90	-25.87		1	11.94	3.03	42000	0					
21.300	2.257	0.282	-121.23	-20.63		1	14.26	2.99	42000	0					
20.900	2.356	0.214	-128.28	-14.46		1	16.57	2.93	42000	0					
20.500	2.427	0.142	-132.68	-7.38		1	18.87	2.87	42000	0					
20.100	2.470	0.069	-134.06	0.63		1	21.15	2.80	42000	0					
						1	19.06	3.07	39900	0					
19.805	2.482	0.015	-133.02	6.51		1	20.83	3.01	39900	0					
19.548	2.480	-0.031	-130.64	12.06		1	22.37	2.95	39900	0					
19.291	2.466	-0.076	-126.79	18.00		1	23.91	2.90	39900	0					
19.034	2.441	-0.120	-121.36	24.34		1	25.44	2.84	39900	0					
18.777	2.405	-0.161	-114.25	31.07		1	26.98	2.78	39900	0					
18.521	2.359	-0.200	-105.36	38.20		1	28.51	2.71	39900	0					
18.264	2.303	-0.235	-94.59	45.72		1	30.05	2.65	39900	0					
18.007	2.239	-0.266	-81.84	53.64		1	31.58	2.59	39900	0					
17.750	2.167	-0.292	-67.01	61.94		1	33.11	2.53	39900	0					
17.350	2.044	-0.321	-39.52	75.67		1	35.50	2.43	39900	0					
						1	35.50	2.43	39900	3	49.56		39900		
16.975	1.920	-0.335	-12.67	66.07		1	37.74	2.34	39900	3	74.86		39900		
16.600	1.794	-0.335	9.46	51.85		1	39.98	2.25	39900	2	78.74		39900		
16.225	1.670	-0.326	26.26	37.99		1	42.23	2.16	39900	2	77.36		39900		
15.850	1.551	-0.309	38.12	25.46		1	44.47	2.08	39900	2	76.18		39900		
15.475	1.439	-0.288	45.51	14.16		1	46.72	1.99	39900	2	75.28		39900		
15.100	1.335	-0.263	48.88	3.97		1	48.97	1.91	39900	2	74.74		39900		
14.725	1.241	-0.238	48.64	-5.06		2	52.13	2.75	39900	2	74.56		39900		
14.350	1.157	-0.214	45.32	-12.23		2	58.97	2.70	39900	2	74.76		39900		
13.975	1.081	-0.192	39.76	-17.03		2	65.46	2.59	39900	2	75.30		39900		
13.600	1.012	-0.173	32.81	-19.72		2	71.66	2.48	39900	2	76.15		39900		
13.225	0.950	-0.158	25.21	-20.49		2	77.61	2.38	39900	2	77.25		39900		
12.850	0.893	-0.148	17.66	-19.52		2	83.37	2.28	39900	2	78.54		39900		
12.475	0.839	-0.140	10.77	-16.92		2	89.00	2.18	39900	2	79.96		39900		
12.100	0.787	-0.136	5.16	-12.77		2	94.55	2.09	39900	2	81.47		39900		
11.725	0.737	-0.135	1.38	-7.13		2	100.06	2.00	39900	2	83.02		39900		
11.350	0.686	-0.134	0.00	0.00		2	105.56	1.92	39900	2	84.59		39900		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 2.48 mm

MAXIMUM MOMENT = -134.06 kN.m/m

CODIFICATION OF STATE OF SOIL :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 38.23 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.070
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.304

** PHASE Nb 5 **

*EJECUCION DE SOLERA

* INSTALLATION LEVEL OF STRUTS NO 2

LEVEL = 17.750 m
SPACE = 1.000 m
INCLINATION = 0.000 DEGREES
PRELOAD = 0.000 kN
STIFFNESS = 500000.000 kN/m
BILATERAL CONNECTION

PHASE 5

	WALL					SOIL 1 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa				SOIL 2 EXCAVATION: 17.35 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	0.370	0.591	0.00	0.00		2	5.66	5.66	15750	0					
24.600	0.665	0.591	0.78	3.24		1	7.28	3.87	15750	0					
				-52.83		1	7.28	3.87	15750	0				1	-56.06
24.100	0.960	0.583	-24.58	-48.32		1	10.76	3.94	15750	0					
23.700	1.189	0.564	-42.98	-43.46		1	13.54	3.98	15750	0					
23.300	1.410	0.536	-59.20	-37.49		1	16.29	4.01	15750	0					
						1	2.55	2.55	42000	0					
22.900	1.617	0.500	-73.93	-36.00		1	4.92	3.08	42000	0					
22.500	1.809	0.456	-87.88	-33.56		1	7.27	3.08	42000	0					
22.100	1.981	0.404	-100.66	-30.18		1	9.62	3.06	42000	0					
21.700	2.131	0.346	-111.90	-25.87		1	11.94	3.03	42000	0					
21.300	2.257	0.282	-121.23	-20.63		1	14.26	2.99	42000	0					
20.900	2.356	0.214	-128.28	-14.46		1	16.57	2.93	42000	0					
20.500	2.427	0.142	-132.68	-7.38		1	18.87	2.87	42000	0					
20.100	2.470	0.069	-134.06	0.63		1	21.15	2.80	42000	0					
						1	19.06	3.07	39900	0					
19.805	2.482	0.015	-133.02	6.51		1	20.83	3.01	39900	0					
19.548	2.480	-0.031	-130.64	12.06		1	22.37	2.95	39900	0					
19.291	2.466	-0.076	-126.79	18.00		1	23.91	2.90	39900	0					
19.034	2.441	-0.120	-121.36	24.34		1	25.44	2.84	39900	0					
18.777	2.405	-0.161	-114.25	31.07		1	26.98	2.78	39900	0					
18.521	2.359	-0.200	-105.36	38.20		1	28.51	2.71	39900	0					
18.264	2.303	-0.235	-94.59	45.72		1	30.05	2.65	39900	0					
18.007	2.239	-0.266	-81.84	53.64		1	31.58	2.59	39900	0					
17.750	2.167	-0.292	-67.01	61.94		1	33.11	2.53	39900	0					
						1	33.11	2.53	39900	0				2	0.00
17.350	2.044	-0.321	-39.52	75.67		1	35.50	2.43	39900	0					
						1	35.50	2.43	39900	3	49.56		39900		
16.975	1.920	-0.335	-12.67	66.07		1	37.74	2.34	39900	3	74.86		39900		
16.600	1.794	-0.335	9.46	51.85		1	39.98	2.25	39900	2	78.74		39900		
16.225	1.670	-0.326	26.26	37.99		1	42.23	2.16	39900	2	77.36		39900		
15.850	1.551	-0.309	38.12	25.46		2	44.47	2.08	39900	2	76.18		39900		
15.475	1.439	-0.288	45.51	14.16		2	46.72	1.99	39900	2	75.28		39900		
15.100	1.335	-0.263	48.88	3.97		2	48.97	1.91	39900	2	74.74		39900		
14.725	1.241	-0.238	48.64	-5.06		2	52.13	2.75	39900	2	74.56		39900		
14.350	1.157	-0.214	45.32	-12.23		2	58.97	2.70	39900	2	74.76		39900		
13.975	1.081	-0.192	39.76	-17.03		2	65.46	2.59	39900	2	75.30		39900		
13.600	1.012	-0.173	32.81	-19.72		2	71.66	2.48	39900	2	76.15		39900		
13.225	0.950	-0.158	25.21	-20.49		2	77.61	2.38	39900	2	77.24		39900		
12.850	0.893	-0.148	17.66	-19.52		2	83.37	2.28	39900	2	78.54		39900		
12.475	0.839	-0.140	10.77	-16.92		2	89.00	2.18	39900	2	79.96		39900		
12.100	0.787	-0.136	5.16	-12.77		2	94.55	2.09	39900	2	81.47		39900		
11.725	0.737	-0.135	1.38	-7.13		2	100.06	2.00	39900	2	83.02		39900		
11.350	0.686	-0.134	0.00	0.00		2	105.56	1.92	39900	2	84.59		39900		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 2.48 mm

MAXIMUM MOMENT = -134.06 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR.
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 38.23 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.070
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.304

** PHASE Nb 6 **

*RETIRAR PUNTALES PROVISIONALES

* REMOVAL LEVEL OF STRUTS NO 1

PHASE 6

| | WALL | SOIL 1 EXCAVATION: 25.10 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | SOIL 2 EXCAVATION: 17.35 m WATER LEVEL: 5.10 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.100	15.591	-1.984	0.00	0.00		1	3.79	3.79	15750	0					
24.600	14.599	-1.984	0.62	2.77		1	7.28	3.87	15750	0					
24.100	13.608	-1.982	3.06	7.28		1	10.76	3.94	15750	0					
23.700	12.815	-1.980	6.91	12.14		1	13.54	3.98	15750	0					
23.300	12.024	-1.975	12.92	18.10		1	16.29	4.01	15750	0					
						1	2.55	2.55	42000	0					
22.900	11.236	-1.965	20.43	19.60		1	4.92	3.08	42000	0					
22.500	10.452	-1.952	28.72	22.04		1	7.27	3.08	42000	0					
22.100	9.675	-1.934	38.18	25.41		1	9.62	3.06	42000	0					
21.700	8.906	-1.910	49.18	29.73		1	11.94	3.03	42000	0					
21.300	8.148	-1.880	62.08	34.97		1	14.26	2.99	42000	0					
20.900	7.403	-1.842	77.27	41.13		1	16.57	2.93	42000	0					
20.500	6.676	-1.795	95.11	48.22		1	18.87	2.87	42000	0					
20.100	5.969	-1.737	115.97	56.22		1	21.15	2.80	42000	0					
						1	19.06	3.07	39900	0					
19.805	5.463	-1.687	133.42	62.11		1	20.83	3.01	39900	0					
19.548	5.036	-1.637	150.08	67.66		1	22.37	2.95	39900	0					
19.291	4.623	-1.581	168.22	73.60		1	23.91	2.90	39900	0					
19.034	4.224	-1.519	187.93	79.94		1	25.44	2.84	39900	0					
18.777	3.843	-1.449	209.31	86.67		1	26.98	2.78	39900	0					
18.521	3.480	-1.372	232.48	93.80		1	28.51	2.71	39900	0					
18.264	3.139	-1.286	257.53	101.32		1	30.05	2.65	39900	0					
18.007	2.821	-1.191	284.56	109.23		1	31.58	2.59	39900	0					
17.750	2.528	-1.086	313.68	117.54		1	33.11	2.53	39900	0					
				-63.06		1	33.11	2.53	39900	0				2	-180.60
17.350	2.127	-0.921	291.17	-49.34		1	35.50	2.43	39900	0					
						1	35.50	2.43	39900	3	49.56		39900		
16.975	1.809	-0.777	271.35	-57.27		2	42.18	3.59	39900	2	70.42		39900		
16.600	1.543	-0.644	248.11	-66.07		2	50.00	3.45	39900	2	68.72		39900		
16.225	1.325	-0.523	222.28	-71.00		2	56.00	3.32	39900	2	63.58		39900		
15.850	1.149	-0.416	195.30	-72.36		2	60.50	3.19	39900	2	60.15		39900		
15.475	1.011	-0.323	168.31	-71.25		2	63.78	3.06	39900	2	58.22		39900		
15.100	0.905	-0.243	142.06	-68.60		2	66.13	2.94	39900	2	57.57		39900		
14.725	0.827	-0.177	116.98	-65.00		2	68.67	2.82	39900	2	58.02		39900		
14.350	0.771	-0.123	93.46	-60.19		2	74.36	2.70	39900	2	59.37		39900		
13.975	0.733	-0.081	72.01	-54.02		2	79.34	2.59	39900	2	61.43		39900		
13.600	0.709	-0.049	53.05	-46.97		2	83.76	2.48	39900	2	64.04		39900		
13.225	0.695	-0.026	36.84	-39.39		2	87.79	2.38	39900	2	67.07		39900		
12.850	0.689	-0.011	23.54	-31.54		2	91.53	2.28	39900	2	70.38		39900		
12.475	0.686	-0.001	13.21	-23.59		2	95.09	2.18	39900	2	73.87		39900		
12.100	0.687	0.003	5.85	-15.65		2	98.56	2.09	39900	2	77.46		39900		
11.725	0.689	0.005	1.46	-7.78		2	101.98	2.00	39900	2	81.10		39900		
11.350	0.691	0.005	0.00	0.00		2	105.39	1.92	39900	2	84.76		39900		

m	mm	/1000	kN.m/m	kN/m	kPa	kPa	kPa	kPa/m	kPa	kPa	kPa/m	kN

MAXIMUM DISPLACEMENT = 15.59 mm

MAXIMUM MOMENT = 313.68 kN.m/m

CODIFICATION OF STATE OF SOIL :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 40.34 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.079
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.263

*** END OF CALCULUS

*** MAXIMUM DISPLACEMENT IN PHASE Nb 6 = 15.591 mm IN FINAL PHASE Nb 6 = 15.591 mm

*** MAXIMUM MOMENT IN PHASE Nb 6 = 313.680 kN.m/m IN FINAL PHASE Nb 6 = 313.680 kN.m/m

STRUT/ANCHOR		PRELOAD		MAXIMUM		FINAL STATE	
NUMBER	LEVEL	PHASE	FORCE	PHASE	FORCE	PHASE	FORCE
1	24.60	3	0.00	5	-56.06	6	REMOVED
2	17.75	5	0.00	6	-180.60	6	-180.60
	m		kN		kN		kN

* ENVELOPE CURVES FROM PHASE 1 TO PHASE 6 *

LEVEL	MINI CRO.FO	MAXI CRO.FO
25.100	0.00	0.00
24.600	0.00	3.24
	-52.83	2.77
24.100	-48.32	7.28
23.700	-43.46	12.14
23.300	-37.49	18.10
22.900	-36.00	19.60
22.500	-33.56	22.04
22.100	-30.18	25.41
21.700	-25.87	29.73
21.300	-20.63	34.97
20.900	-14.46	41.13
20.500	-7.38	48.22
20.100	-5.58	56.22
19.805	-5.26	62.11
19.548	-4.92	67.66
19.291	-4.54	73.60
19.034	-4.15	79.94
18.777	-3.75	86.67
18.521	-3.34	93.80
18.264	-2.95	101.32
18.007	-2.56	109.23
17.750	-2.20	117.54
	-63.06	61.94
17.350	-49.34	75.67
16.975	-57.27	66.07
16.600	-66.07	51.85
16.225	-71.00	37.99
15.850	-72.36	25.46
15.475	-71.25	14.16
15.100	-68.60	3.97
14.725	-65.00	0.13
14.350	-60.19	0.21
13.975	-54.02	0.25
13.600	-46.97	0.27
13.225	-39.39	0.26
12.850	-31.54	0.24
12.475	-23.59	0.20
12.100	-15.65	0.14
11.725	-7.78	0.08
11.350	0.00	0.00
m	kN/m	kN/m

LEVEL	MINI MOMENT	MAXI MOMENT
25.100	0.00	0.00
24.600	0.00	0.78
	0.00	0.78
24.100	-24.58	3.06
23.700	-42.98	6.91
23.300	-59.20	12.92
22.900	-73.93	20.43
22.500	-87.88	28.72
22.100	-100.66	38.18
21.700	-111.90	49.18
21.300	-121.23	62.08
20.900	-128.28	77.27
20.500	-132.68	95.11
20.100	-134.06	115.97
19.805	-133.02	133.42
19.548	-130.64	150.08
19.291	-126.79	168.22
19.034	-121.36	187.93
18.777	-114.25	209.31
18.521	-105.36	232.48
18.264	-94.59	257.53
18.007	-81.84	284.56
17.750	-67.01	313.68
	-67.01	313.68
17.350	-39.52	291.17
16.975	-12.67	271.35
16.600	-0.13	248.11
16.225	-0.40	222.28
15.850	-0.57	195.30
15.475	-0.66	168.31
15.100	-0.68	142.06
14.725	-0.65	116.98
14.350	-0.58	93.46
13.975	-0.50	72.01
13.600	-0.40	53.05
13.225	-0.30	36.84
12.850	-0.20	23.54
12.475	-0.12	13.21
12.100	-0.06	5.85
11.725	-0.01	1.46
11.350	0.00	0.00
m	kN.m/m	kN.m/m

PANTALLA TIPO 3

Proyecto: INTEGRACION DEL FERROCARRIL EN SANT FELIU
Tipo: PANTALLAS DE PILOTES
Tramo: PANTALLA TIPO 3
Fecha: 05/09/2008

CARACTERIZACIÓN DE ESTRATOS

Estratos	Potencia (m)	ϕ	Cohesión (kN/m²)	Densidad (kN/m³)	Kh (kN/m²)
Rellenos	1,80	28	0	18	15.000
Ar.arc.y limosas	3,20	34,5	9	20,5	40.000
Arcillas y limos	---	32,3	13	19,5	38.000

(*) Al no tener perfil de este tramo se ha tomado el del tramo mas cercano (Pantalla tipo 2)

Cota nivel freatico: --- m

SOBRECARGAS

Rellenos y tráfico

Rellenos:	5,000	m
SC Rellenos(*):	100,00	kN/m²
SC Tráfico:	30,00	kN/m²
Sobrecarga 1:	130,00	kN/m²
Ambito de actuación:	0-12	m

(*) Supuesta una densidad de 20 KN/m³

Edificación

nº de plantas	0,000	m
Carga por planta:	10,00	kN/m²
SC edficación:	0,00	kN/m²
Sobrecarga 2:	0,00	kN/m²
Ambito de actuación:	---	m

(*) Supuesta una carga de 10KN/m²·planta

CARACT.MECANICAS Y GOEMETRICAS DE LA PANTALLA DE PILOTES (RIGIDEZ)

DATOS			
Diametro (m):	0,85	Área (m²):	0,5675
Separación (m):	1,05	Inercia (m⁴):	0,0256
Resistencia Hormigón (N/mm²):	30	Rigidez (kNm²):	732.249
Ambiente:	IIa	Módulo Defor. Hormigón (kN/m²):	28.576.791

(*) Se ha considerado un valor Ej=8.500·∛fcm,j

HOJA PREPARADA PARA INTRODUCIR EL COMANDO "COE" (RIDO)

COTAS DE LA PANTALLA

Cota Superior Pantalla:	25,020	m
Cota Excavación:	23,920	m
Cota Fondo de Excavación:	16,520	m
Cota Pie de Pantalla:	11,520	m
Longitud Pilote:	13,500	m

RESULTADOS

Desplazamiento:	14,67	mm
Empuje Pasivo Movilizado:	65,00	%

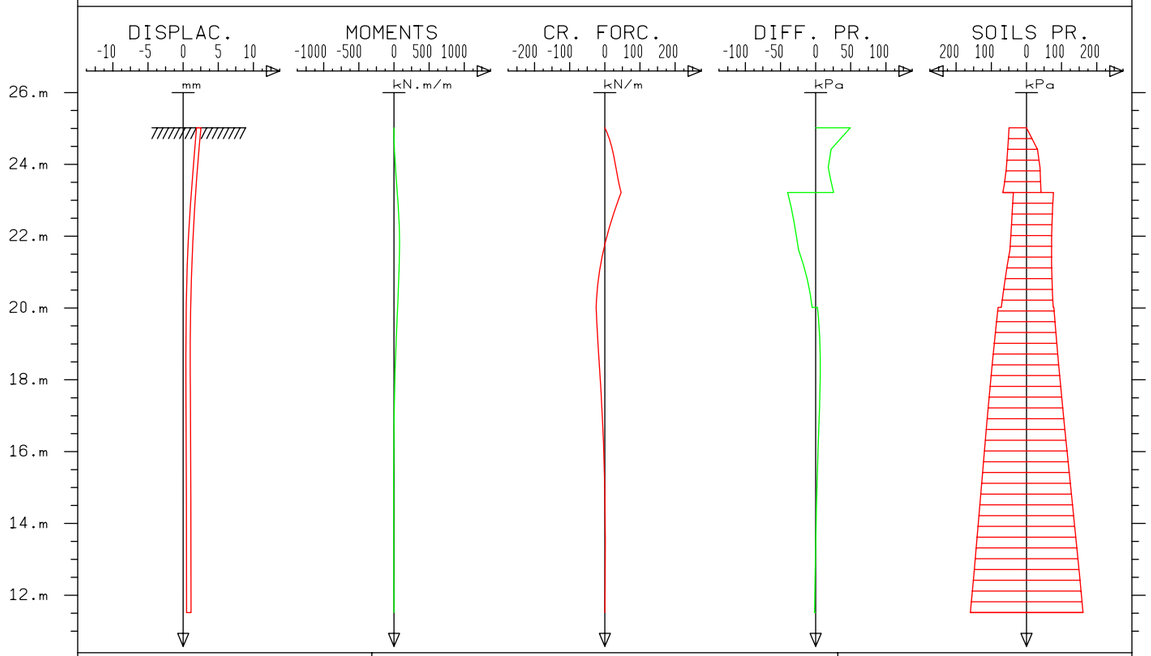
PROCESO CONSTRUCTIVO

1º Ejecución de pantalla de pilotes.
2º Excavacion previa a ejecucion de losa de cubierta.
3º Ejecución de losa de cubierta.
4º Excavación previa a ejecución de puntales intermedios.
5º Ejecución de puntales intermedios.
6º Excavación previa a ejecución de losa de solera.
7º Ejecucion de solera y conexión de esta a pantalla.
8º Retirada de puntales provisionales.

GRÁFICOS

PANTALLA PILOTES TIPO 3 (FALSO TUNEL) SOTERRAMIENTO SANT F

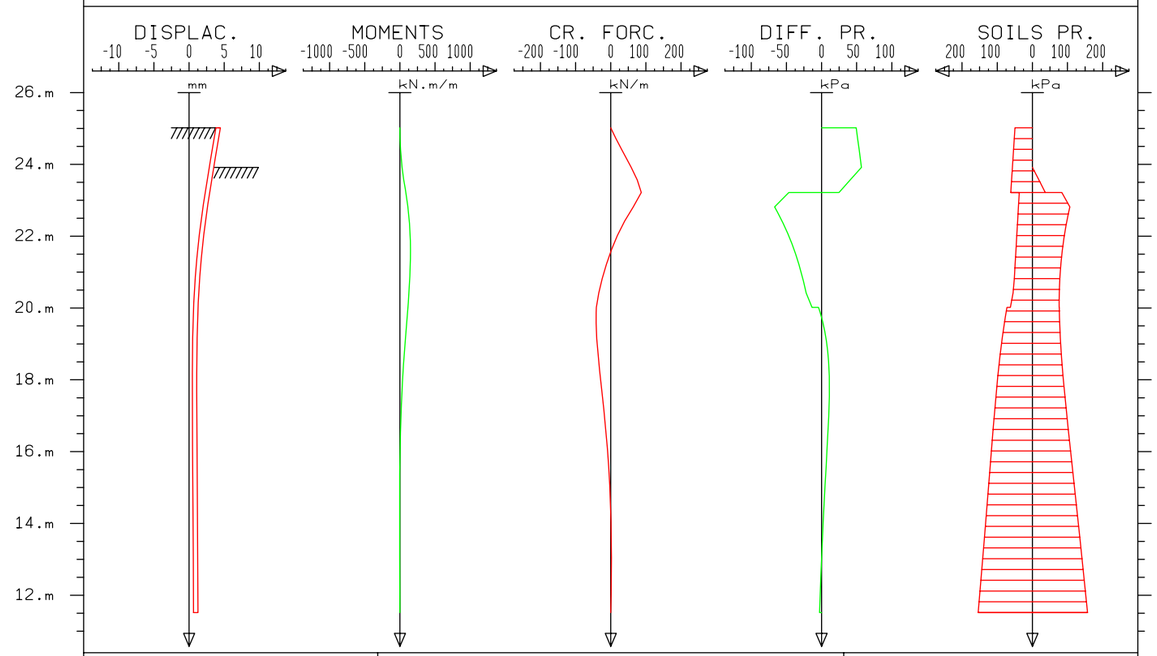
GRAPHS OF THE PHASE Nb 1



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-3

PANTALLA PILOTES TIPO 3 (FALSO TUNEL) SOTERRAMIENTO SANT F

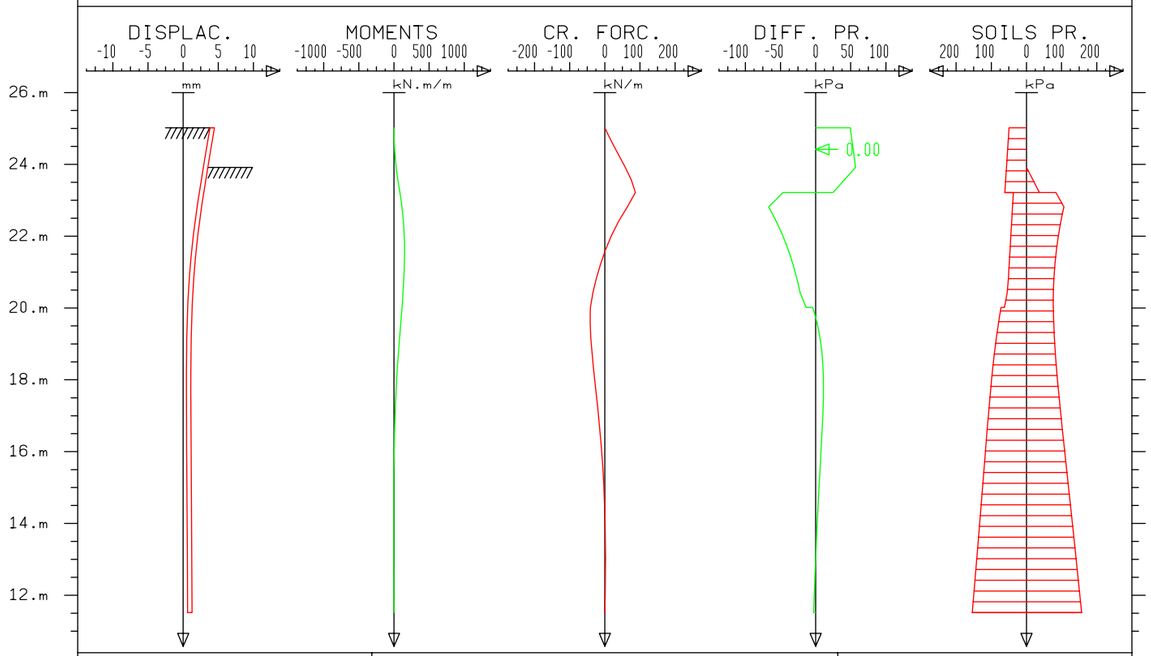
GRAPHS OF THE PHASE Nb 2



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-3

PANTALLA PILOTES TIPO 3 (FALSO TUNEL) SOTERRAMIENTO SANT F

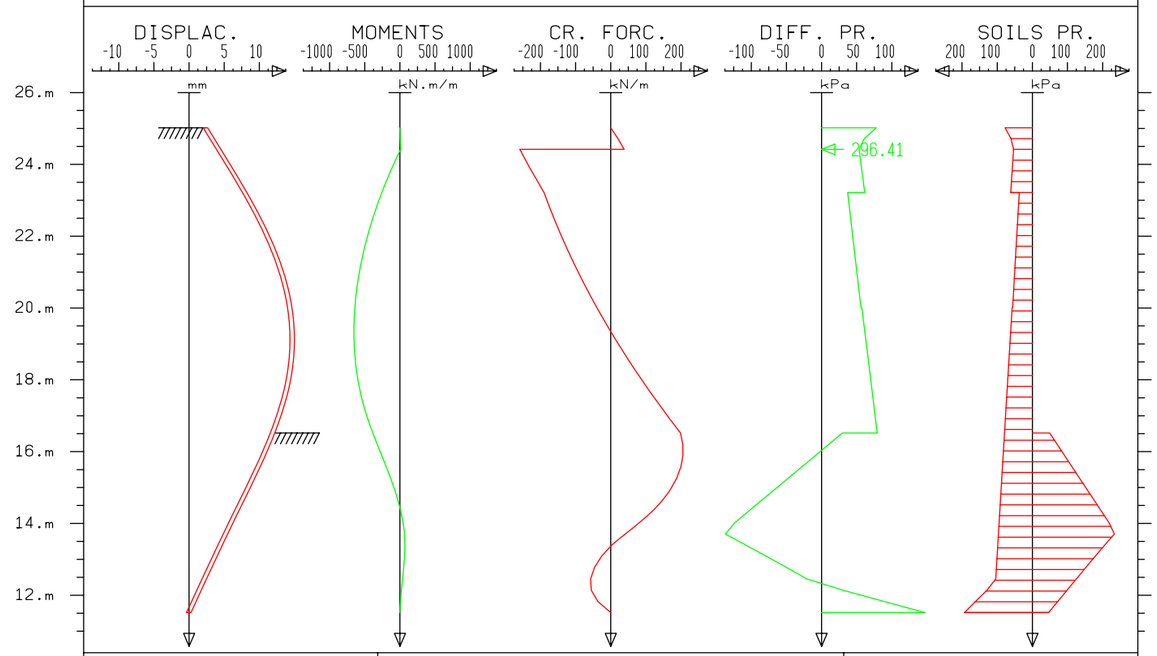
GRAPHS OF THE PHASE Nb 3



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-3

PANTALLA PILOTES TIPO 3 (FALSO TUNEL) SOTERRAMIENTO SANT F

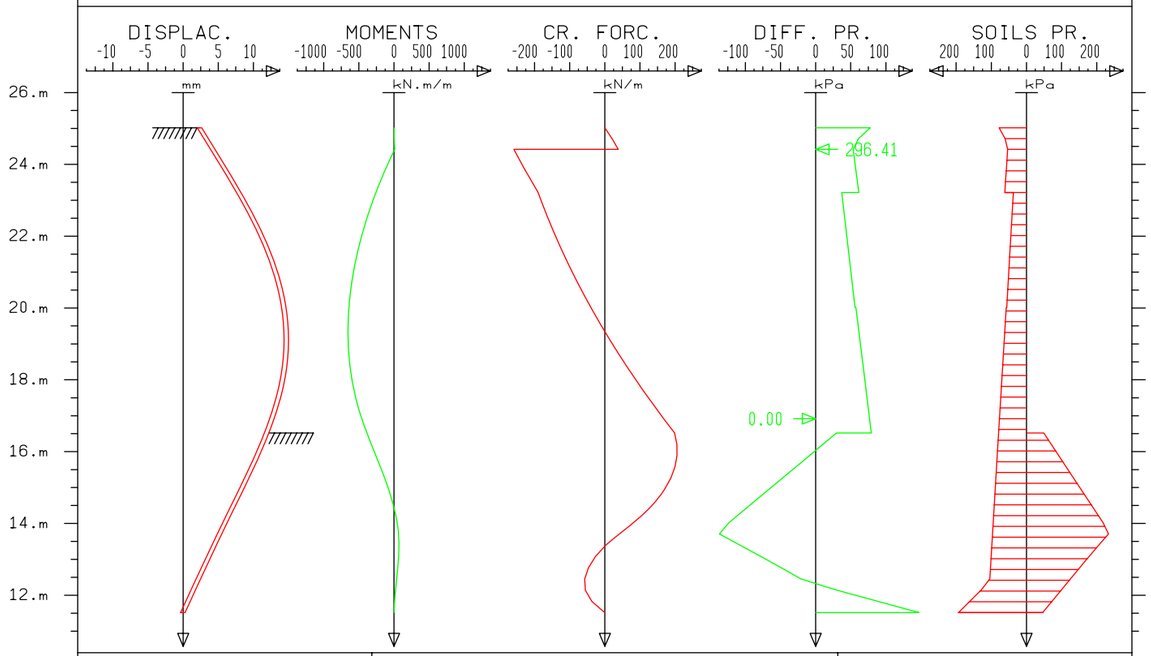
GRAPHS OF THE PHASE Nb 4



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-3

PANTALLA PILOTES TIPO 3 (FALSO TUNEL) SOTERRAMIENTO SANT F

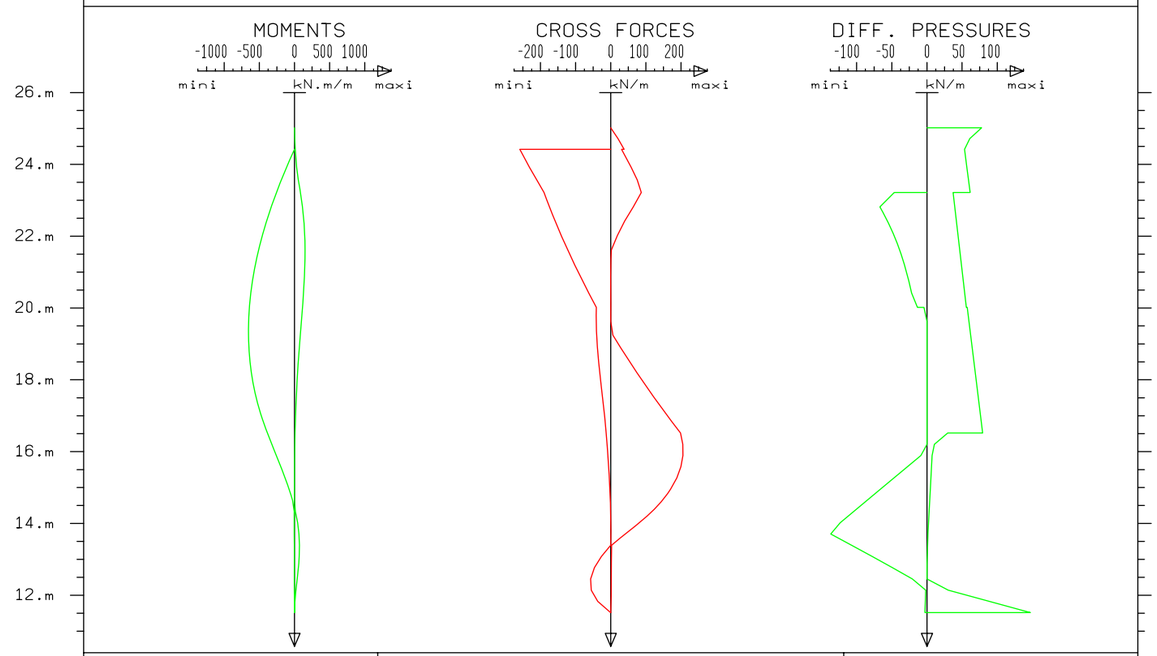
GRAPHS OF THE PHASE Nb 5



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-3

PANTALLA PILOTES TIPO 3 (FALSO TUNEL) SOTERRAMIENTO SANT F

ENVELOPES FROM PHASE 1 TO PHASE 5



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-3

LISTADO

```
E &l18D &k2S &a4L      ***** DATA FILE NAME : SFELIU-3.RIO

        PANTALLA PILOTES TIPO 3 (FALSO TUNEL)   SOTERRAMIENTO SANT FELIU*101L  U:NN*
        *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
        #EMP=5
        #DIAMETRO=0.85
        #SEPARACION=1.05
        #fck=30
        #E=8500*((fck+8)^(1/3))*1000
        #I=3.14/(64)*(DIAMETRO)^4
        #RIGIDEZ=E*I
        *COTAS DE LA PANTALLA
        #CSUP=25.02
        #CEXC=25.02-8.50
        *Nota: "CEXC" es la cota maxima de excavacion
        #CPIE=CEXC-EMP
        #NF=CSUP-20.00
        *CABEZA DE PANTALLA
        : CSUP
  1 ...  25.02
        *PANTALLA 0.85/1.05
        : CPIE RIGIDEZ
  2 ...  11.52 731878.2
        *COTA MAXIMA DE TERRENO
        : CSUP
  3 ...  25.02
        *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)
        : 25.02-1.80 18.00 9.00 0 0 0 0 28 0 0 15000
  4 ...  23.22 18 9 0.3610335 0.5305284 2.769826 0 28 0 0 15000
        : 25.02-1.80-3.20 20.30 10.30 0 0 0 9 34.50 0 0 40000
  5 ...  20.02 20.3 10.3 0.276808 0.4335938 3.612612 9 34.5 0 0 40000
        : 25.02-25.00 19.50 9.50 0 0 0 0 13 32.3 0 0 38000
  6 ...  0.02 19.5 9.5 0.3034816 0.4656477 3.295093 13 32.3 0 0 38000
        *NIVEL FREATICO
        : NF 0.50
  7 ...  5.02 0.5
        *FACTOR DE SEPARACION
        : COE CSUP CSUP-25.00 SEPARACION
  8 ... COE 25.02 0.02 1.05
        *SOBRECARGA 130 KN/M2 (PASO DE FERROCARRIL+ 5.00 MTS RELLENOS)
        : SUC(1) 130
  9 ... SUC(1)  130
        : CAL(2)
 10 ... CAL(2)
        *EXCAVACION PREVIA A EJECUCION DE LOSA SUPERIOR
        : EXC(2) CSUP-1.10
 11 ... EXC(2)  23.92
        : CAL(2)
 12 ... CAL(2)
        *EJECUCION DE LOSA DE CUBIERTA
        : STR CSUP-(0.50+0.10) 1 0 0 500000
 13 ... STR 24.42 1 0 0 500000
        : CAL(2)
 14 ... CAL(2)
        *EXCAVACION HASTA COTA DE SOLERA
        : EXC(2) CEXC
 15 ... EXC(2)  16.52
        : CAL(2)
 16 ... CAL(2)
        *EJECUCION DE SOLERA
        : STR CEXC+0.40 1 0 0 500000
 17 ... STR 16.92 1 0 0 500000
        : CAL(2)
 18 ... CAL(2)
        : END
 19 ... END
        : STA
 20 ... STA
        : EVP
 21 ... EVP
```



```
        *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
        *COTAS DE LA PANTALLA
        *Nota: "CEXC" es la cota maxima de excavacion
        *CABEZA DE PANTALLA
        *PANTALLA 0.85/1.05

        ------------------------------------------------------------------------------

                                        ** STARTING DATA **
                                        --------------------


  * BOUSSINESQ SURCHARGES FUNCTION OF STATE OF SOIL


*** WALL DESCRIPTION :
                                                 INERTIA PRODUCT EI      CYLINDRICAL RIGIDITY
    SECTION NB  1 FROM  25.020 m  TO  11.520 m  :          731878. kN.m2/m           0. kPa/m

        *COTA MAXIMA DE TERRENO


*** SOIL DESCRIPTION :

        *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)

     LAYER NB  1 FROM  25.020 m  TO  23.220 m  :

        SATURATED UNIT WEIGHT              GH  =      18.000 kN/m3
        SUBMERGED UNIT WEIGHT              GD  =       9.000 kN/m3
        HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.361
        HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.531
        HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       2.770
        COHESION                            C  =       0.000 kPa
        ANGLE OF INTERNAL FRICTION        PHI  =      28.000 DEGREES
                FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
                FOR PASSIVE PRESS. DELTA/PHI  =       0.000
        ELASTIC REACTION COEFFICIENT (AT P=0)  =   15000.000 kPa/m
        INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

     LAYER NB  2 FROM  23.220 m  TO  20.020 m  :

        SATURATED UNIT WEIGHT              GH  =      20.300 kN/m3
        SUBMERGED UNIT WEIGHT              GD  =      10.300 kN/m3
        HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.277
        HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.434
        HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       3.613
        COHESION                            C  =       9.000 kPa
        ANGLE OF INTERNAL FRICTION        PHI  =      34.500 DEGREES
                FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
                FOR PASSIVE PRESS. DELTA/PHI  =       0.000
        ELASTIC REACTION COEFFICIENT (AT P=0)  =   40000.000 kPa/m
        INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

     LAYER NB  3 FROM  20.020 m  TO   0.020 m  :

        SATURATED UNIT WEIGHT              GH  =      19.500 kN/m3
        SUBMERGED UNIT WEIGHT              GD  =       9.500 kN/m3
        HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.303
        HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.466
        HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       3.295
        COHESION                            C  =      13.000 kPa
        ANGLE OF INTERNAL FRICTION        PHI  =      32.300 DEGREES
                FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
                FOR PASSIVE PRESS. DELTA/PHI  =       0.000
        ELASTIC REACTION COEFFICIENT (AT P=0)  =   38000.000 kPa/m
        INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

        *NIVEL FREATICO
```

** PHASE Nb 1 **

*FACTOR DE SEPARACION

* FROM 25.020 m TO 0.020 m COEFFICIENT APPLIED TO PRESSURES = 1.050
ADDITIONAL COEFF. ON PASSIVE PRESSURE = 1.000

*SOBRECARGA 130 KN/M2 (PASO DE FERROCARRIL+ 5.00 MTS RELLENOS)

* CAQUOT SURCHARGE ON SOIL 1 = 130.000 kPa

PHASE 1

	WALL	SOIL 1 EXCAVATION: 25.02 m WATER LEVEL: 5.02 m CAQUOT SURC.: 130.00 kPa						SOIL 2 EXCAVATION: 25.02 m WATER LEVEL: 5.02 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.020	2.216	-0.419	0.00	0.00		1	49.28	49.28	15750	3	0.00		15750		
24.720	2.090	-0.419	2.01	12.74		1	51.33	49.28	15750	3	15.70		15750		
24.420	1.965	-0.417	7.23	21.37		1	53.38	49.28	15750	3	31.41		15750		
23.920	1.758	-0.408	20.50	31.38		1	56.79	49.28	15750	2	38.72		15750		
23.570	1.617	-0.395	32.66	38.30		2	61.48	51.59	15750	2	40.01		15750		
23.220	1.482	-0.376	47.47	46.56		2	67.12	54.84	15750	2	41.40		15750		
						1	37.26	37.26	42000	2	77.01		42000		
22.820	1.338	-0.345	63.04	31.61		1	39.62	37.78	42000	2	74.63		42000		
22.420	1.207	-0.308	72.99	18.43		1	41.98	37.78	42000	2	72.83		42000		
22.020	1.092	-0.267	77.99	6.79		1	44.34	37.78	42000	2	71.70		42000		
21.620	0.994	-0.224	78.60	-3.54		2	46.98	38.07	42000	2	71.28		42000		
21.220	0.913	-0.181	75.42	-11.90		2	54.08	42.81	42000	2	71.58		42000		
20.820	0.848	-0.142	69.40	-17.82		2	60.48	46.85	42000	2	72.56		42000		
20.420	0.799	-0.106	61.42	-21.82		2	66.25	50.26	42000	2	74.19		42000		
20.020	0.763	-0.075	52.14	-24.39		2	71.46	53.11	42000	2	76.38		42000		
						2	80.72	63.56	39900	2	78.05		39900		
19.632	0.739	-0.050	42.93	-22.99		2	85.37	63.56	39900	2	80.79		39900		
19.245	0.724	-0.029	34.40	-20.98		2	89.66	63.56	39900	2	83.88		39900		
18.858	0.716	-0.013	26.72	-18.61		2	93.68	63.56	39900	2	87.25		39900		
18.470	0.713	-0.001	19.99	-16.08		2	97.48	63.56	39900	2	90.85		39900		
18.083	0.715	0.008	14.26	-13.54		2	101.11	63.56	39900	2	94.60		39900		
17.695	0.719	0.015	9.49	-11.09		2	104.62	63.56	39900	2	98.48		39900		
17.307	0.726	0.019	5.64	-8.81		2	108.06	63.56	39900	2	102.43		39900		
16.920	0.734	0.021	2.64	-6.74		2	111.45	63.56	39900	2	106.43		39900		
16.520	0.742	0.021	0.32	-4.87		2	114.92	63.56	39900	2	110.58		39900		
16.208	0.749	0.021	-1.00	-3.60		2	117.64	63.56	39900	2	113.83		39900		
15.895	0.755	0.021	-1.94	-2.49		2	120.35	63.56	39900	2	117.07		39900		
15.583	0.762	0.020	-2.57	-1.54		2	123.08	63.56	39900	2	120.30		39900		
15.270	0.768	0.018	-2.92	-0.75		2	125.82	63.56	39900	2	123.52		39900		
14.958	0.773	0.017	-3.05	-0.09		2	128.58	63.56	39900	2	126.72		39900		
14.645	0.778	0.016	-3.00	0.42		2	131.35	63.56	39900	2	129.90		39900		
14.333	0.783	0.015	-2.80	0.82		2	134.14	63.56	39900	2	133.07		39900		
14.020	0.788	0.014	-2.50	1.09		2	136.95	63.56	39900	2	136.23		39900		
13.708	0.792	0.013	-2.13	1.27		2	139.76	63.56	39900	2	139.37		39900		
13.395	0.795	0.012	-1.72	1.34		2	142.59	63.56	39900	2	142.50		39900		
13.083	0.799	0.011	-1.30	1.33		2	145.43	63.56	39900	2	145.62		39900		
12.770	0.802	0.011	-0.90	1.22		2	148.27	63.56	39900	2	148.74		39900		
12.458	0.806	0.010	-0.54	1.04		2	151.12	63.56	39900	2	151.85		39900		
12.145	0.809	0.010	-0.26	0.77		2	153.97	63.56	39900	2	154.95		39900		
11.833	0.812	0.010	-0.07	0.42		2	156.83	63.56	39900	2	158.06		39900		
11.520	0.815	0.010	0.00	0.00		2	159.68	63.56	39900	2	161.16		39900		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 2.22 mm
MAXIMUM MOMENT = 78.60 kN.m/m

CODIFICATION :
-1 = SEPARATION
0 = EXCAVATION
OF STATE : 1 = ACTIVE PR.
OF SOIL : 2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 765.36 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.101
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.193

** PHASE Nb 2 **

*EXCAVACION PREVIA A EJECUCION DE LOSA SUPERIOR

* EXCAVATION IN SOIL 2 TO LEVEL = 23.920 m

PHASE 2

| | WALL | SOIL 1 EXCAVATION: 25.02 m WATER LEVEL: 5.02 m CAQUOT SURC.: 130.00 kPa | SOIL 2 EXCAVATION: 23.92 m WATER LEVEL: 5.02 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.020	4.149	-0.867	0.00	0.00		1	49.28	49.28	15750	0					
24.720	3.889	-0.867	2.25	15.09		1	51.33	49.28	15750	0					
24.420	3.629	-0.865	9.12	30.80		1	53.38	49.28	15750	0					
23.920	3.199	-0.852	31.33	58.34		1	56.79	49.28	15750	0					
23.570	2.905	-0.831	54.90	75.42		1	59.18	49.28	15750	3	18.32		15750		
23.220	2.619	-0.798	83.48	86.93		1	61.56	49.28	15750	3	36.64		15750		
						1	37.26	37.26	42000	3	83.72		42000		
22.820	2.310	-0.744	113.99	64.28		1	39.62	37.78	42000	2	106.45		42000		
22.420	2.026	-0.676	134.64	39.66		1	41.98	37.78	42000	2	98.21		42000		
22.020	1.771	-0.598	146.25	19.05		1	44.34	37.78	42000	2	91.19		42000		
21.620	1.547	-0.517	150.34	1.91		1	46.70	37.78	42000	2	85.52		42000		
21.220	1.357	-0.435	148.17	-12.29		1	49.06	37.78	42000	2	81.22		42000		
20.820	1.199	-0.356	140.83	-24.09		1	51.42	37.78	42000	2	78.27		42000		
20.420	1.071	-0.282	129.18	-33.82		2	54.81	38.82	42000	2	76.62		42000		
20.020	0.972	-0.216	114.13	-40.87		2	62.68	44.32	42000	2	76.14		42000		
						2	72.37	56.39	39900	2	76.71		39900		
19.632	0.900	-0.159	98.11	-41.43		2	78.95	60.56	39900	2	77.52		39900		
19.245	0.848	-0.112	82.27	-40.07		2	84.73	63.56	39900	2	79.13		39900		
18.858	0.812	-0.072	67.23	-37.35		2	89.84	63.56	39900	2	81.42		39900		
18.470	0.791	-0.040	53.43	-33.76		2	94.39	63.56	39900	2	84.25		39900		
18.083	0.780	-0.015	41.13	-29.67		2	98.50	63.56	39900	2	87.53		39900		
17.695	0.778	0.004	30.46	-25.38		2	102.28	63.56	39900	2	91.14		39900		
17.307	0.782	0.017	21.45	-21.13		2	105.81	63.56	39900	2	95.00		39900		
16.920	0.791	0.027	14.06	-17.08		2	109.15	63.56	39900	2	99.04		39900		
16.520	0.803	0.033	8.01	-13.23		2	112.49	63.56	39900	2	103.33		39900		
16.208	0.814	0.035	4.31	-10.50		2	115.05	63.56	39900	2	106.74		39900		
15.895	0.825	0.036	1.42	-8.04		2	117.58	63.56	39900	2	110.16		39900		
15.583	0.836	0.037	-0.75	-5.87		2	120.10	63.56	39900	2	113.60		39900		
15.270	0.848	0.036	-2.28	-3.98		2	122.63	63.56	39900	2	117.03		39900		
14.958	0.859	0.035	-3.26	-2.37		2	125.17	63.56	39900	2	120.45		39900		
14.645	0.869	0.033	-3.78	-1.02		2	127.72	63.56	39900	2	123.85		39900		
14.333	0.879	0.031	-3.93	0.06		2	130.30	63.56	39900	2	127.24		39900		
14.020	0.889	0.030	-3.77	0.90		2	132.90	63.56	39900	2	130.60		39900		
13.708	0.898	0.028	-3.39	1.50		2	135.51	63.56	39900	2	133.94		39900		
13.395	0.907	0.027	-2.85	1.89		2	138.15	63.56	39900	2	137.26		39900		
13.083	0.915	0.026	-2.23	2.06		2	140.80	63.56	39900	2	140.57		39900		
12.770	0.923	0.025	-1.59	2.03		2	143.46	63.56	39900	2	143.87		39900		
12.458	0.931	0.025	-0.98	1.81		2	146.13	63.56	39900	2	147.16		39900		
12.145	0.938	0.024	-0.48	1.40		2	148.81	63.56	39900	2	150.44		39900		
11.833	0.946	0.024	-0.13	0.79		2	151.49	63.56	39900	2	153.72		39900		
11.520	0.953	0.024	0.00	0.00		2	154.17	63.56	39900	2	157.00		39900		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 4.15 mm

MAXIMUM MOMENT = 150.34 kN.m/m

CODIFICATION : -1 = SEPARATION
OF STATE : 0 = EXCAVATION
OF SOIL : 1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 748.95 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.098
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.215

** PHASE Nb 3 **

*EJECUCION DE LOSA DE CUBIERTA

* INSTALLATION LEVEL OF STRUTS NO 1

LEVEL	=	24.420 m
SPACE	=	1.000 m
INCLINATION	=	0.000 DEGREES
PRELOAD	=	0.000 kN
STIFFNESS	=	500000.000 kN/m

BILATERAL CONNECTION

PHASE 3

WALL						SOIL 1 EXCAVATION: 25.02 m WATER LEVEL: 5.02 m CAQUOT SURC.: 130.00 kPa				SOIL 2 EXCAVATION: 23.92 m WATER LEVEL: 5.02 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.020	4.149	-0.867	0.00	0.00		1	49.28	49.28	15750	0					
24.720	3.889	-0.867	2.25	15.09		1	51.33	49.28	15750	0					
24.420	3.629	-0.865	9.12	30.80		1	53.38	49.28	15750	0					
						1	53.38	49.28	15750	0				1	0.00
23.920	3.199	-0.852	31.33	58.34		2	56.79	49.28	15750	0					
23.570	2.905	-0.831	54.90	75.42		2	59.18	49.28	15750	2	18.32		15750		
23.220	2.619	-0.798	83.48	86.93		2	61.56	49.28	15750	2	36.64		15750		
						2	37.26	37.26	42000	2	83.72		42000		
22.820	2.310	-0.744	113.99	64.28		2	39.62	37.78	42000	2	106.45		42000		
22.420	2.026	-0.676	134.64	39.66		2	41.98	37.78	42000	2	98.21		42000		
22.020	1.771	-0.598	146.25	19.05		2	44.34	37.78	42000	2	91.19		42000		
21.620	1.547	-0.517	150.34	1.91		2	46.70	37.78	42000	2	85.52		42000		
21.220	1.357	-0.435	148.17	-12.29		2	49.06	37.78	42000	2	81.22		42000		
20.820	1.199	-0.356	140.83	-24.09		2	51.42	37.78	42000	2	78.27		42000		
20.420	1.071	-0.282	129.18	-33.82		2	54.81	38.82	42000	2	76.62		42000		
20.020	0.972	-0.216	114.13	-40.87		2	62.68	44.32	42000	2	76.14		42000		
						2	72.37	56.39	39900	2	76.71		39900		
19.632	0.900	-0.159	98.11	-41.43		2	78.95	60.56	39900	2	77.52		39900		
19.245	0.848	-0.112	82.27	-40.07		2	84.73	63.56	39900	2	79.13		39900		
18.858	0.812	-0.072	67.23	-37.35		2	89.84	63.56	39900	2	81.42		39900		
18.470	0.791	-0.040	53.43	-33.76		2	94.39	63.56	39900	2	84.25		39900		
18.083	0.780	-0.015	41.13	-29.67		2	98.50	63.56	39900	2	87.53		39900		
17.695	0.778	0.004	30.46	-25.38		2	102.28	63.56	39900	2	91.14		39900		
17.307	0.782	0.017	21.45	-21.13		2	105.81	63.56	39900	2	95.00		39900		
16.920	0.791	0.027	14.06	-17.08		2	109.15	63.56	39900	2	99.04		39900		
16.520	0.803	0.033	8.01	-13.23		2	112.49	63.56	39900	2	103.33		39900		
16.208	0.814	0.035	4.31	-10.50		2	115.05	63.56	39900	2	106.74		39900		
15.895	0.825	0.036	1.42	-8.04		2	117.58	63.56	39900	2	110.16		39900		
15.583	0.836	0.037	-0.75	-5.87		2	120.10	63.56	39900	2	113.60		39900		
15.270	0.848	0.036	-2.28	-3.98		2	122.63	63.56	39900	2	117.03		39900		
14.958	0.859	0.035	-3.26	-2.36		2	125.17	63.56	39900	2	120.45		39900		
14.645	0.869	0.033	-3.78	-1.02		2	127.72	63.56	39900	2	123.85		39900		
14.333	0.879	0.031	-3.93	0.06		2	130.30	63.56	39900	2	127.24		39900		
14.020	0.889	0.030	-3.77	0.90		2	132.90	63.56	39900	2	130.60		39900		
13.708	0.898	0.028	-3.39	1.50		2	135.51	63.56	39900	2	133.94		39900		
13.395	0.907	0.027	-2.85	1.89		2	138.15	63.56	39900	2	137.26		39900		
13.083	0.915	0.026	-2.23	2.06		2	140.80	63.56	39900	2	140.57		39900		
12.770	0.923	0.025	-1.59	2.03		2	143.46	63.56	39900	2	143.87		39900		
12.458	0.931	0.025	-0.98	1.81		2	146.13	63.56	39900	2	147.16		39900		
12.145	0.938	0.024	-0.47	1.40		2	148.81	63.56	39900	2	150.44		39900		
11.833	0.946	0.024	-0.13	0.79		2	151.49	63.56	39900	2	153.72		39900		
11.520	0.953	0.024	0.00	0.00		2	154.17	63.56	39900	2	157.00		39900		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 4.15 mm

MAXIMUM MOMENT = 150.34 kN.m/m

CODIFICATION :
- OF STATE :
- OF SOIL :

-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(2 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 748.95 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.098
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.215

** PHASE Nb 4 **

*EXCAVACION HASTA COTA DE SOLERA

* EXCAVATION IN SOIL 2 TO LEVEL = 16.520 m

PHASE 4

| | WALL | SOIL 1 EXCAVATION: 25.02 m WATER LEVEL: 5.02 m CAQUOT SURC.: 130.00 kPa | SOIL 2 EXCAVATION: 16.52 m WATER LEVEL: 5.02 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.020	2.337	3.142	0.00	0.00		2	77.83	77.83	15750	0					
24.720	3.279	3.142	3.25	20.81		2	60.93	58.89	15750	0					
24.420	4.222	3.145	12.12	37.96		1	53.38	49.28	15750	0					
				-258.45		1	53.38	49.28	15750	0				1	-296.41
23.920	5.789	3.111	-110.29	-230.91		1	56.79	49.28	15750	0					
23.570	6.867	3.039	-187.58	-210.62		1	59.18	49.28	15750	0					
23.220	7.913	2.932	-257.63	-189.49		1	61.56	49.28	15750	0					
						1	37.26	37.26	42000	0					
22.820	9.055	2.771	-330.38	-174.11		1	39.62	37.78	42000	0					
22.420	10.125	2.572	-396.79	-157.80		1	41.98	37.78	42000	0					
22.020	11.108	2.339	-456.49	-140.53		1	44.34	37.78	42000	0					
21.620	11.992	2.075	-509.09	-122.33		1	46.70	37.78	42000	0					
21.220	12.765	1.784	-554.22	-103.17		1	49.06	37.78	42000	0					
20.820	13.416	1.470	-591.51	-83.08		1	51.42	37.78	42000	0					
20.420	13.938	1.139	-620.56	-62.04		1	53.78	37.78	42000	0					
20.020	14.325	0.794	-641.01	-40.06		1	56.14	37.78	42000	0					
						1	57.41	41.43	39900	0					
19.632	14.567	0.451	-652.16	-17.34		1	59.82	41.43	39900	0					
19.245	14.674	0.105	-654.33	6.30		1	62.23	41.43	39900	0					
18.858	14.648	-0.240	-647.16	30.88		1	64.63	41.43	39900	0					
18.470	14.489	-0.579	-630.28	56.39		1	67.04	41.43	39900	0					
18.083	14.201	-0.906	-603.33	82.84		1	69.45	41.43	39900	0					
17.695	13.789	-1.216	-565.96	110.22		1	71.86	41.43	39900	0					
17.307	13.261	-1.503	-517.79	138.53		1	74.27	41.43	39900	0					
16.920	12.628	-1.762	-458.48	167.77		1	76.67	41.43	39900	0					
16.520	11.875	-1.993	-385.17	198.94		1	79.16	41.43	39900	0					
						1	79.16	41.43	39900	3	49.56		39900		
16.208	11.228	-2.144	-321.87	205.20		1	81.10	41.43	39900	3	70.64		39900		
15.895	10.538	-2.268	-257.54	205.48		1	83.04	41.43	39900	3	91.72		39900		
15.583	9.813	-2.364	-194.07	199.77		1	84.98	41.43	39900	3	112.81		39900		
15.270	9.063	-2.434	-133.31	188.09		1	86.93	41.43	39900	3	133.89		39900		
14.958	8.294	-2.479	-77.14	170.42		1	88.87	41.43	39900	3	154.97		39900		
14.645	7.516	-2.501	-27.42	146.77		1	90.81	41.43	39900	3	176.06		39900		
14.333	6.733	-2.504	13.97	117.14		1	92.75	41.43	39900	3	197.14		39900		
14.020	5.953	-2.491	45.17	81.53		1	94.69	41.43	39900	3	218.22		39900		
13.708	5.178	-2.467	64.40	40.86		1	96.63	41.43	39900	2	233.41		39900		
13.395	4.411	-2.437	70.97	2.73		1	98.58	41.43	39900	2	205.81		39900		
13.083	3.654	-2.408	67.06	-26.22		1	100.52	41.43	39900	2	178.59		39900		
12.770	2.906	-2.381	55.52	-46.12		1	102.46	41.43	39900	2	151.72		39900		
12.458	2.166	-2.361	39.17	-57.05		1	104.40	41.43	39900	2	125.14		39900		
12.145	1.430	-2.348	21.16	-55.54		2	129.19	63.56	39900	2	98.77		39900		
11.833	0.697	-2.342	6.24	-36.90		2	161.40	63.56	39900	2	72.51		39900		
11.520	-0.034	-2.341	0.00	0.00		2	193.58	63.56	39900	2	46.30		39900		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 14.67 mm

MAXIMUM MOMENT = -654.33 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR.
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(5 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 586.08 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.079
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.650

** PHASE Nb 5 **

*EJECUCION DE SOLERA

* INSTALLATION LEVEL OF STRUTS NO 2

LEVEL = 16.920 m
SPACE = 1.000 m
INCLINATION = 0.000 DEGREES
PRELOAD = 0.000 kN
STIFFNESS = 500000.000 kN/m
BILATERAL CONNECTION

PHASE 5

| WALL | SOIL 1 EXCAVATION: 25.02 m, WATER LEVEL: 5.02 m, CAQUOT SURC.: 130.00 kPa | SOIL 2 EXCAVATION: 16.52 m, WATER LEVEL: 5.02 m, CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
25.020	2.337	3.142	0.00	0.00		2	77.83	77.83	15750	0					
24.720	3.279	3.142	3.25	20.81		2	60.93	58.89	15750	0					
24.420	4.222	3.145	12.12	37.96		1	53.38	49.28	15750	0					
				-258.45		1	53.38	49.28	15750	0				1	-296.41
23.920	5.789	3.111	-110.29	-230.91		1	56.79	49.28	15750	0					
23.570	6.867	3.039	-187.58	-210.62		2	59.18	49.28	15750	0					
23.220	7.913	2.932	-257.63	-189.49		2	61.56	49.28	15750	0					
						2	37.26	37.26	42000	0					
22.820	9.055	2.771	-330.38	-174.11		2	39.62	37.78	42000	0					
22.420	10.125	2.572	-396.79	-157.80		2	41.98	37.78	42000	0					
22.020	11.108	2.339	-456.49	-140.53		2	44.34	37.78	42000	0					
21.620	11.992	2.075	-509.09	-122.33		2	46.70	37.78	42000	0					
21.220	12.765	1.784	-554.22	-103.17		2	49.06	37.78	42000	0					
20.820	13.416	1.470	-591.51	-83.08		2	51.42	37.78	42000	0					
20.420	13.938	1.139	-620.56	-62.04		2	53.78	37.78	42000	0					
20.020	14.325	0.794	-641.01	-40.06		2	56.14	37.78	42000	0					
						2	57.41	41.43	39900	0					
19.632	14.567	0.451	-652.16	-17.34		2	59.82	41.43	39900	0					
19.245	14.674	0.105	-654.33	6.30		2	62.23	41.43	39900	0					
18.858	14.648	-0.240	-647.16	30.88		2	64.63	41.43	39900	0					
18.470	14.489	-0.579	-630.28	56.39		2	67.04	41.43	39900	0					
18.083	14.201	-0.906	-603.33	82.84		2	69.45	41.43	39900	0					
17.695	13.789	-1.216	-565.96	110.22		2	71.86	41.43	39900	0					
17.307	13.261	-1.503	-517.79	138.53		2	74.27	41.43	39900	0					
16.920	12.628	-1.762	-458.48	167.77		2	76.67	41.43	39900	0					
						2	76.67	41.43	39900	0				2	0.00
16.520	11.875	-1.993	-385.17	198.94		2	79.16	41.43	39900	0					
						2	79.16	41.43	39900	2	49.56		39900		
16.208	11.228	-2.144	-321.87	205.20		2	81.10	41.43	39900	2	70.64		39900		
15.895	10.538	-2.268	-257.54	205.48		2	83.04	41.43	39900	2	91.72		39900		
15.583	9.813	-2.364	-194.07	199.77		2	84.98	41.43	39900	2	112.81		39900		
15.270	9.063	-2.434	-133.31	188.09		1	86.93	41.43	39900	3	133.89		39900		
14.958	8.294	-2.479	-77.14	170.42		1	88.87	41.43	39900	3	154.97		39900		
14.645	7.516	-2.501	-27.42	146.77		1	90.81	41.43	39900	3	176.06		39900		
14.333	6.733	-2.504	13.97	117.14		1	92.75	41.43	39900	3	197.14		39900		
14.020	5.953	-2.491	45.17	81.53		1	94.69	41.43	39900	3	218.22		39900		
13.708	5.178	-2.467	64.40	40.86		1	96.63	41.43	39900	2	233.41		39900		
13.395	4.411	-2.437	70.97	2.73		1	98.58	41.43	39900	2	205.81		39900		
13.083	3.654	-2.408	67.06	-26.22		1	100.52	41.43	39900	2	178.59		39900		
12.770	2.906	-2.381	55.53	-46.12		1	102.46	41.43	39900	2	151.72		39900		
12.458	2.166	-2.361	39.17	-57.05		1	104.40	41.43	39900	2	125.14		39900		
12.145	1.430	-2.348	21.16	-55.54		2	129.19	63.56	39900	2	98.77		39900		
11.833	0.697	-2.342	6.24	-36.90		2	161.40	63.56	39900	2	72.52		39900		
11.520	-0.034	-2.341	0.00	0.00		2	193.58	63.56	39900	2	46.30		39900		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 14.67 mm

MAXIMUM MOMENT = -654.33 kN.m/m

CODIFICATION
OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR., 2 = ELASTIC
OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 586.08 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.079
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.650

*** END OF CALCULUS

*** MAXIMUM DISPLACEMENT IN PHASE Nb 4 = 14.674 mm IN FINAL PHASE Nb 5 = 14.674 mm

*** MAXIMUM MOMENT IN PHASE Nb 4 = -654.333 kN.m/m IN FINAL PHASE Nb 5 = -654.333 kN.m/m

STRUT/ANCHOR		PRELOAD		MAXIMUM		FINAL STATE	
NUMBER	LEVEL	PHASE	FORCE	PHASE	FORCE	PHASE	FORCE
	m		kN		kN		kN
1	24.42	3	0.00	5	-296.41	5	-296.41
2	16.92	5	0.00	5	0.00	5	0.00

* ENVELOPE CURVES FROM PHASE 1 TO PHASE 5 *

LEVEL	MINI CRO.FO	MAXI CRO.FO
m	kN/m	kN/m
25.020	0.00	0.00
24.720	0.00	20.81
24.420	0.00	37.96
	-258.45	30.80
23.920	-230.91	58.34
23.570	-210.62	75.42
23.220	-189.49	86.93
22.820	-174.11	64.28
22.420	-157.80	39.66
22.020	-140.53	19.05
21.620	-122.33	1.91
21.220	-103.17	0.00
20.820	-83.08	0.00
20.420	-62.04	0.00
20.020	-40.87	0.00
19.632	-41.43	0.00
19.245	-40.07	6.30
18.858	-37.35	30.88
18.470	-33.76	56.39
18.083	-29.67	82.84
17.695	-25.38	110.22
17.307	-21.13	138.53
16.920	-17.08	167.77
	-17.08	167.77
16.520	-13.23	198.94
16.208	-10.50	205.20
15.895	-8.04	205.48
15.583	-5.87	199.77
15.270	-3.98	188.09
14.958	-2.37	170.42
14.645	-1.02	146.77
14.333	0.00	117.14
14.020	0.00	81.53
13.708	0.00	40.86
13.395	0.00	2.73
13.083	-26.22	2.06
12.770	-46.12	2.03
12.458	-57.05	1.81
12.145	-55.54	1.40
11.833	-36.90	0.79
11.520	0.00	0.00

LEVEL	MINI MOMENT	MAXI MOMENT
m	kN.m/m	kN.m/m
25.020	0.00	0.00
24.720	0.00	3.25
24.420	0.00	12.12
	0.00	12.12
23.920	-110.29	31.33
23.570	-187.58	54.90
23.220	-257.63	83.48
22.820	-330.38	113.99
22.420	-396.79	134.64
22.020	-456.49	146.25
21.620	-509.09	150.34
21.220	-554.22	148.17
20.820	-591.51	140.83
20.420	-620.56	129.18
20.020	-641.01	114.13
19.632	-652.16	98.11
19.245	-654.33	82.27
18.858	-647.16	67.23
18.470	-630.28	53.43
18.083	-603.33	41.13
17.695	-565.96	30.46
17.307	-517.79	21.45
16.920	-458.48	14.06
	-458.48	14.06
16.520	-385.17	8.01
16.208	-321.87	4.31
15.895	-257.54	1.42
15.583	-194.07	0.00
15.270	-133.31	0.00
14.958	-77.14	0.00
14.645	-27.42	0.00
14.333	-3.93	13.97
14.020	-3.77	45.17
13.708	-3.39	64.40
13.395	-2.85	70.97
13.083	-2.23	67.06
12.770	-1.59	55.53
12.458	-0.98	39.17
12.145	-0.48	21.16
11.833	-0.13	6.24
11.520	0.00	0.00

PANTALLA TIPO 4

Proyecto: INTEGRACION DEL FERROCARRIL EN SANT FELIU
Tipo: PANTALLAS DE PILOTES
Tramo: PANTALLA TIPO 4
Fecha: 27/10/2008

CARACTERIZACIÓN DE ESTRATOS

Estratos	Potencia (m)	ϕ	Cohesión (kN/m²)	Densidad (kN/m³)	Kh (kN/m²)
Rellenos	**3.25**	**28**	**0**	**18**	**15,000**
Gravas con arcillas	**6.65**	**37**	**2**	**21**	**48,000**
Arcillas y limos	**---**	**32.3**	**13**	**19.5**	**38,000**

(*) Al no tener perfil de este tramo se ha tomado el del tramo mas cercano (Pantalla tipo 2)

Cota nivel freatico: --- m

SOBRECARGAS

Rellenos y tráfico

Rellenos:	**1.000**	m
SC Rellenos(*):	20.00	kN/m²
SC Tráfico:	**30.00**	kN/m²
Sobrecarga 1:	50.00	kN/m²
Ambito de actuación:	0-12	m

(*) Supuesta una densidad de 20 KN/m³

Edificación

nº de plantas	**0.000**	m
Carga por planta:	10.00	kN/m²
SC edficación:	**0.00**	kN/m²
Sobrecarga 2:	0.00	kN/m²
Ambito de actuación:	---	m

(*) Supuesta una carga de 10KN/m²·planta

CARACT.MECANICAS Y GOEMETRICAS DE LA PANTALLA DE PILOTES (RIGIDEZ)

DATOS			
Diametro (m):	**1.00**	Área (m²):	**0.7854**
Separación (m):	**1.25**	Inercia (m⁴):	**0.0491**
Resistencia Hormigón (N/mm²):	**30**	Rigidez (kNm²):	**1,402,760**
Ambiente:	IIa	Módulo Defor. Hormigón (kN/m²):	**28,576,791**

(*) Se ha considerado un valor Ej=8.500·∛fcm,j

HOJA PREPARADA PARA INTRODUCIR EL COMANDO "COE" (RIDO)

COTAS DE LA PANTALLA

Cota Superior Pantalla:	**30.800**	m
Cota Excavación:	29.800	m
Cota Fondo de Excavación:	15.000	m
Cota Pie de Pantalla:	**9.000**	m
Longitud Pilote:	21.800	m

RESULTADOS

Desplazamiento:	12.39	mm
Empuje Pasivo Movilizado:	63.20	%

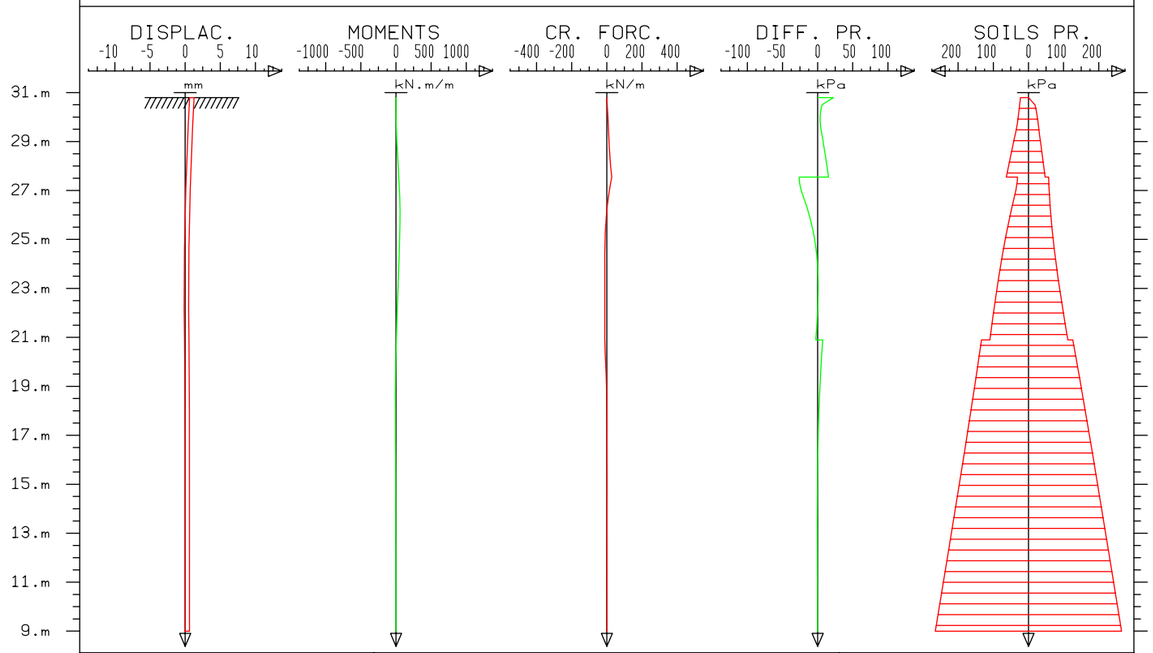
PROCESO CONSTRUCTIVO

1º Ejecución de pantalla de pilotes.
2º Excavacion previa a ejecucion de losa de cubierta.
3º Ejecución de losa de cubierta.
4º Excavación previa a ejecución de puntales intermedios.
5º Ejecución de puntales intermedios.
6º Excavación previa a ejecución de losa de solera.
7º Ejecucion de solera y conexión de esta a pantalla.
8º Retirada de puntales provisionales.

GRÁFICOS

PANTALLA PILOTES TIPO 4 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

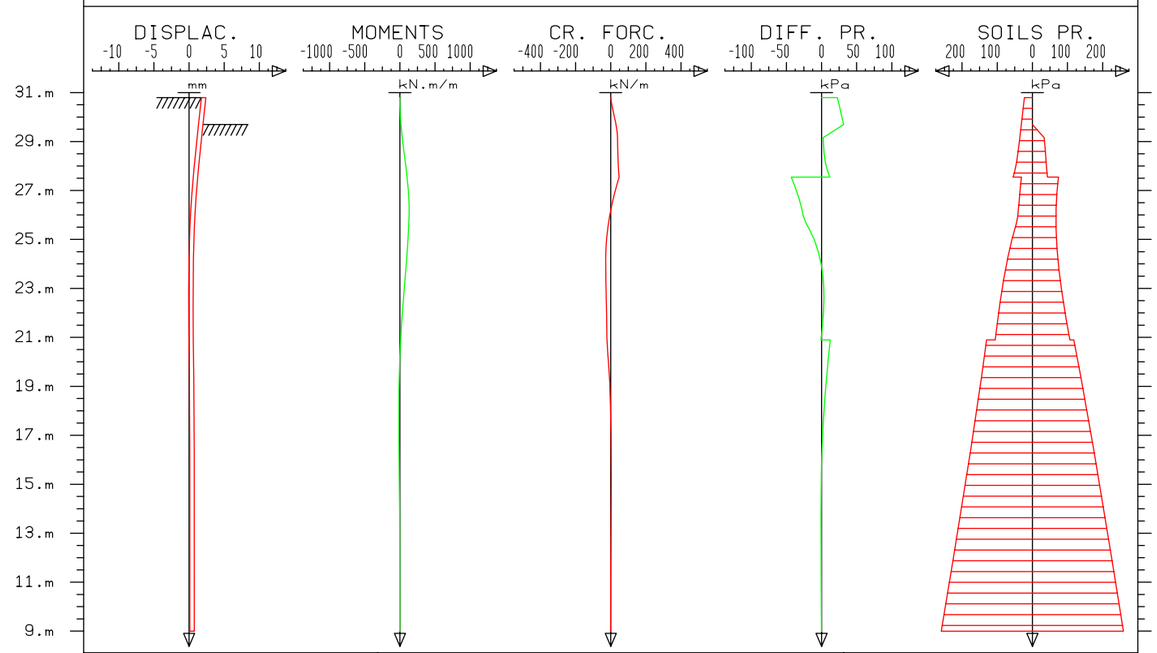
GRAPHS OF THE PHASE Nb 1



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-4

PANTALLA PILOTES TIPO 4 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

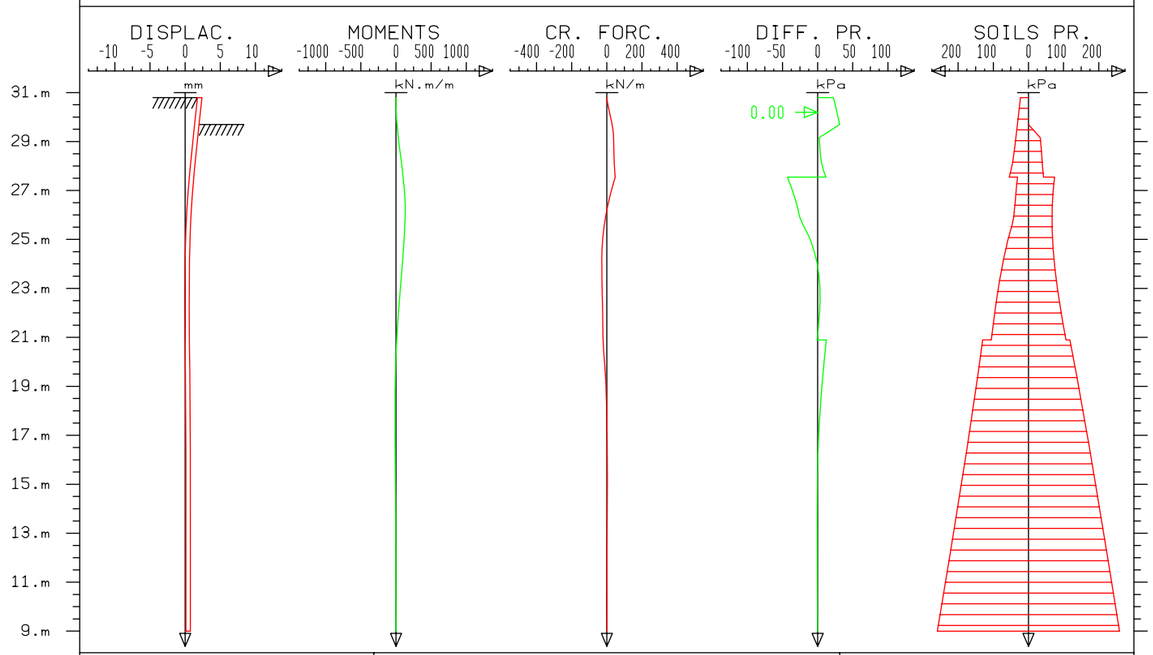
GRAPHS OF THE PHASE Nb 2



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-4

PANTALLA PILOTES TIPO 4 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

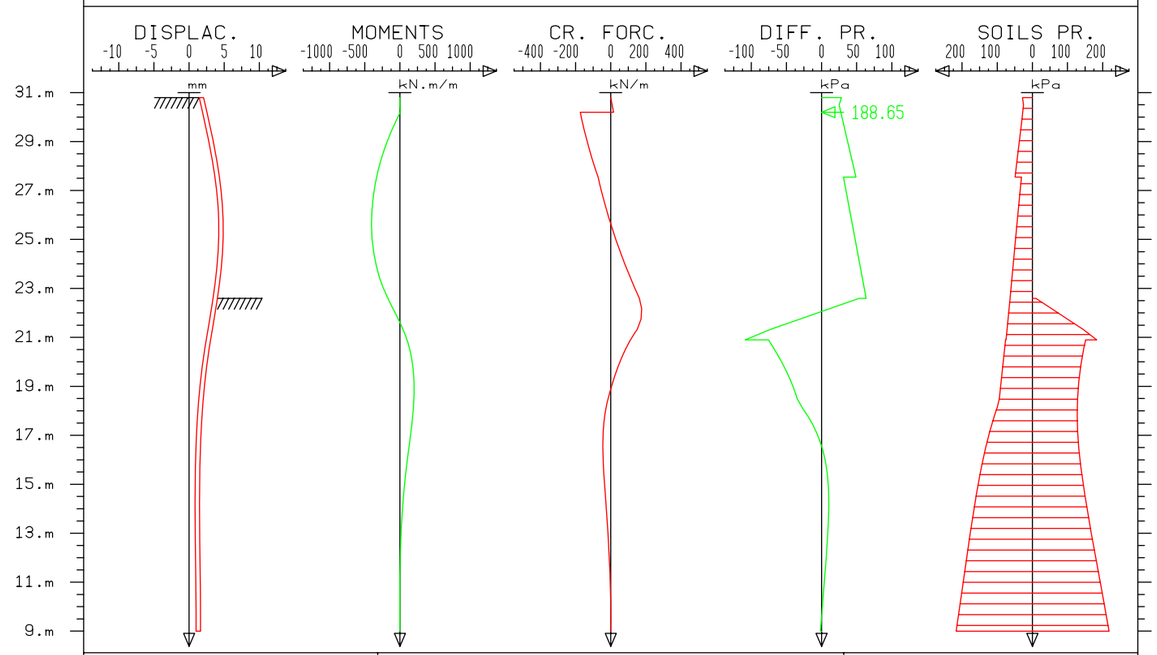
GRAPHS OF THE PHASE Nb 3



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-4

PANTALLA PILOTES TIPO 4 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

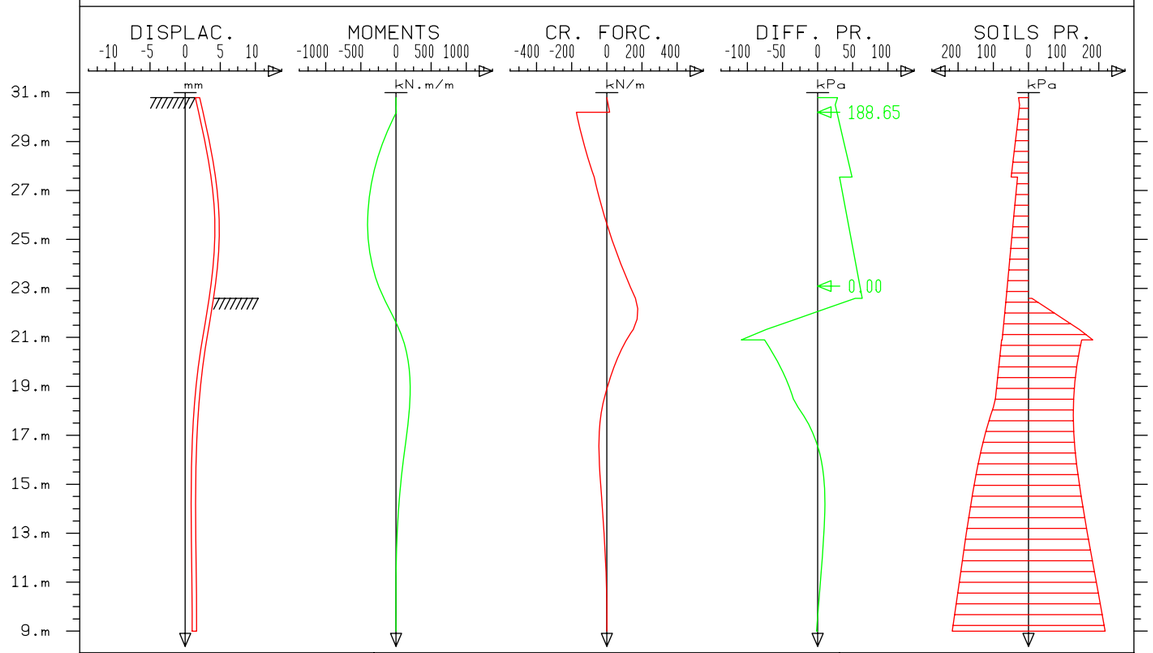
GRAPHS OF THE PHASE Nb 4



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-4

PANTALLA PILOTES TIPO 4 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

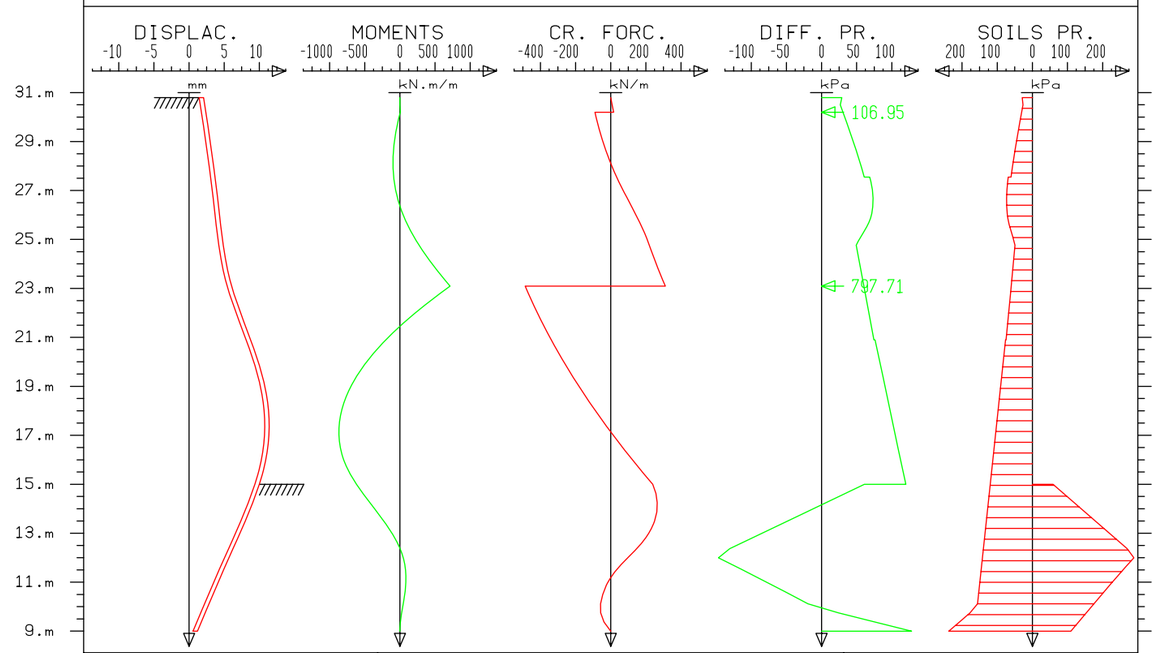
GRAPHS OF THE PHASE Nb 5



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-4

PANTALLA PILOTES TIPO 4 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

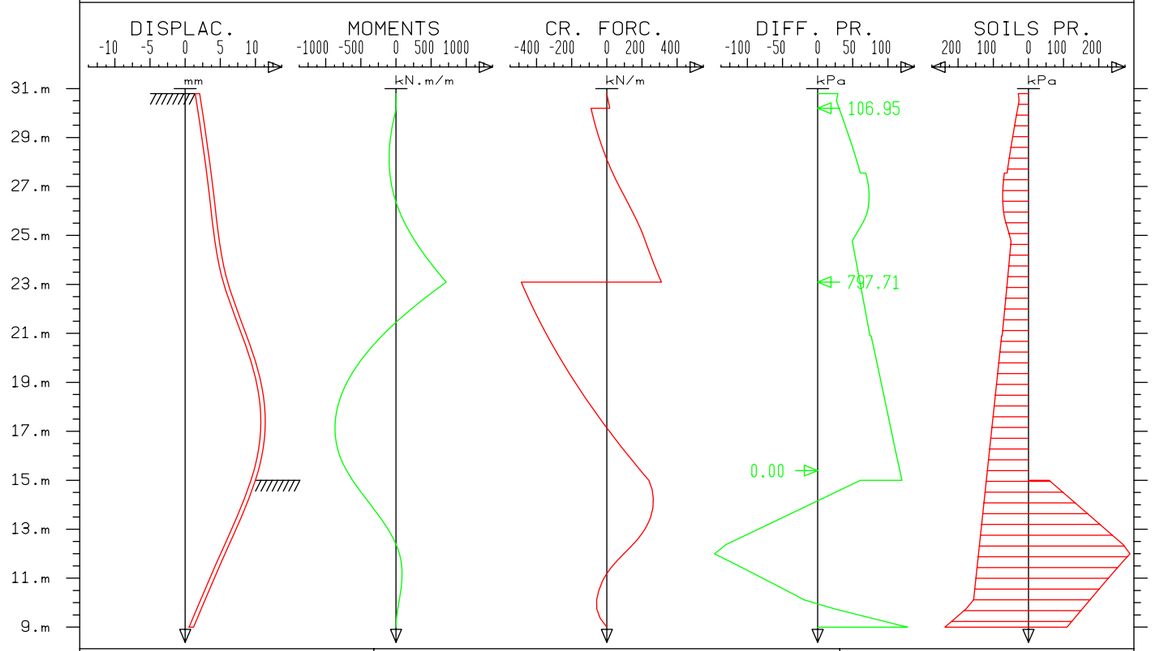
GRAPHS OF THE PHASE Nb 6



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-4

PANTALLA PILOTES TIPO 4 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

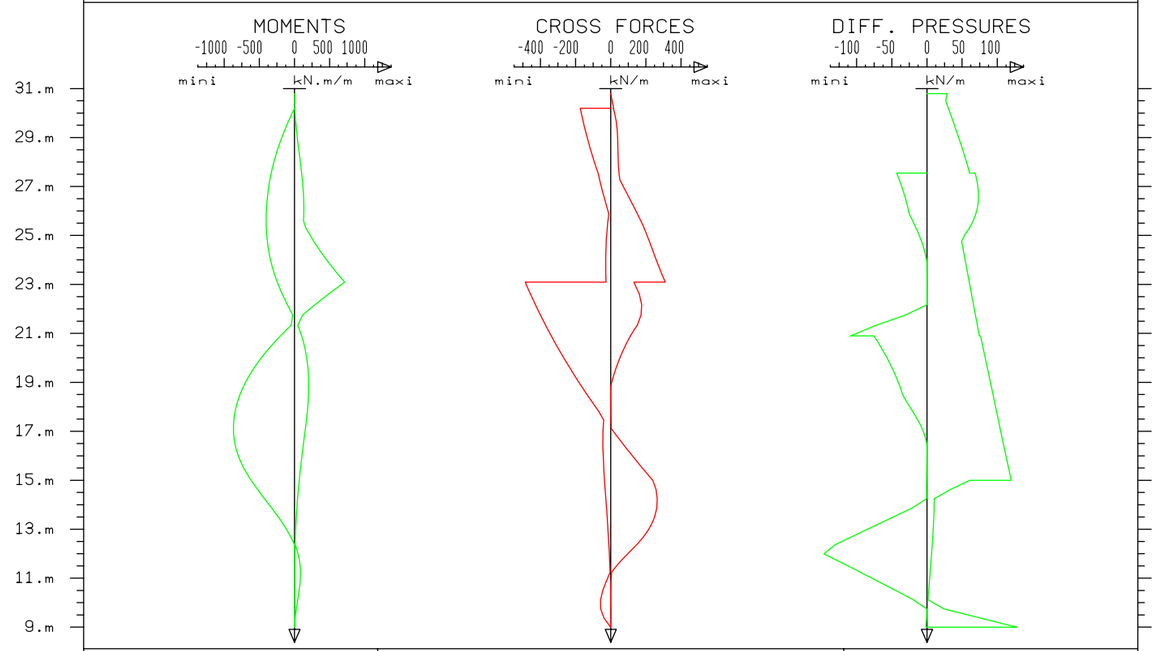
GRAPHS OF THE PHASE Nb 7



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-4

PANTALLA PILOTES TIPO 4 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

ENVELOPES FROM PHASE 1 TO PHASE 7



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-4

LISTADO

```
E &l8D &k2S &a4L      ***** DATA FILE NAME : SFELIU-4.RIO

        PANTALLA PILOTES TIPO 4 (FALSO TUNEL)SOTERRAMIENTO SANT FELIU*101L  U:NN*
        *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
        #EMP=6.00
        #DIAMETRO=1.00
        #SEPARACION=1.25
        #fck=30
        #E=8500*((fck+8)^(1/3))*1000
        #I=3.14/(64)*(DIAMETRO)^4
        #RIGIDEZ=E*I
        *COTAS DE LA PANTALLA
        #CSUP=30.80
        #CEXC=30.80-15.80
        *Nota: "CEXC" es la cota maxima de excavacion
        #CPIE=CEXC-EMP
        #NF=CSUP-24.00
        *CABEZA DE PANTALLA
        : CSUP
  1 ...  30.8
        *PANTALLA 1.00/1.25
        : CPIE RIGIDEZ
  2 ...  9 1402049
        *COTA MAXIMA DE TERRENO
        : CSUP
  3 ...  30.8
        *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)
        : 30.80-3.25 18.00 9.00 0 0 0 0 28 0 0 15000
  4 ...  27.55 18 9 0.3610335 0.5305284 2.769826 0 28 0 0 15000
        : 30.80-3.25-6.65 21.00 11.00 0 0 0 2 37 0 0 48000
  5 ...  20.9 21 11 0.2485836 0.398185 4.022791 2 37 0 0 48000
        : 30.80-25.00 19.50 9.50 0 0 0 0 13 32.3 0 0 38000
  6 ...  5.8 19.5 9.5 0.3034816 0.4656477 3.295093 13 32.3 0 0 38000
        *NIVEL FREATICO
        : NF 0.50
  7 ...  6.8 0.5
        *FACTOR DE SEPARACION
        : COE CSUP CSUP-25.00 SEPARACION
  8 ... COE 30.8 5.8 1.25
        *SOBRECARGA 50 KN/M2 (PASO DE FERROCARRIL+ 1.00 MTS RELLENOS)
        : SUC(1) 50
  9 ... SUC(1)  50
        : CAL(2)
 10 ... CAL(2)
        *EXCAVACION PREVIA A EJECUCION DE LOSA SUPERIOR
        : EXC(2) CSUP-1.10
 11 ... EXC(2)  29.7
        : CAL(2)
 12 ... CAL(2)
        *EJECUCION DE LOSA DE CUBIERTA
        : STR CSUP-(0.50+0.10) 1 0 0 500000
 13 ... STR 30.2 1 0 0 500000
        : CAL(2)
 14 ... CAL(2)
        *EXCAVACION PREVIA A EJECUCION DE PUNTAL INTERMEDIO
        : EXC(2) CSUP-8.20
 15 ... EXC(2)  22.6
        : CAL(2)
 16 ... CAL(2)
        *EJECUCION DE PUNTAL INTERMEDIO
        : STR CSUP-8.20+0.50 1 0 0 450000
 17 ... STR 23.1 1 0 0 450000
        : CAL(2)
 18 ... CAL(2)
        *EXCAVACION HASTA COTA DE SOLERA
        : EXC(2) CEXC
 19 ... EXC(2)  15
        : CAL(2)
 20 ... CAL(2)
        *EJECUCION DE SOLERA
        : STR CEXC+0.40 1 0 0 400000
 21 ... STR 15.4 1 0 0 400000
        : CAL(2)
 22 ... CAL(2)
        : END
 23 ... END
        : STA
 24 ... STA
        : EVP
 25 ... EVP
```



```
                *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
                *COTAS DE LA PANTALLA
                *Nota: "CEXC" es la cota maxima de excavacion
                *CABEZA DE PANTALLA
                *PANTALLA 1.00/1.25

                ------------------------------------------------------------------------------

                                                ** STARTING DATA **
                                                --------------------


  * BOUSSINESQ SURCHARGES FUNCTION OF STATE OF SOIL


*** WALL DESCRIPTION :
                                                INERTIA PRODUCT EI      CYLINDRICAL RIGIDITY
    SECTION NB  1 FROM  30.800 m  TO   9.000 m  :         1402049. kN.m2/m           0. kPa/m

                *COTA MAXIMA DE TERRENO


*** SOIL DESCRIPTION :

                *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)

     LAYER NB  1 FROM  30.800 m  TO  27.550 m  :

                SATURATED UNIT WEIGHT              GH  =      18.000 kN/m3
                SUBMERGED UNIT WEIGHT              GD  =       9.000 kN/m3
                HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.361
                HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.531
                HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       2.770
                COHESION                            C  =       0.000 kPa
                ANGLE OF INTERNAL FRICTION        PHI  =      28.000 DEGREES
                        FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
                        FOR PASSIVE PRESS. DELTA/PHI  =       0.000
                ELASTIC REACTION COEFFICIENT (AT P=0)  =   15000.000 kPa/m
                INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

     LAYER NB  2 FROM  27.550 m  TO  20.900 m  :

                SATURATED UNIT WEIGHT              GH  =      21.000 kN/m3
                SUBMERGED UNIT WEIGHT              GD  =      11.000 kN/m3
                HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.249
                HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.398
                HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       4.023
                COHESION                            C  =       2.000 kPa
                ANGLE OF INTERNAL FRICTION        PHI  =      37.000 DEGREES
                        FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
                        FOR PASSIVE PRESS. DELTA/PHI  =       0.000
                ELASTIC REACTION COEFFICIENT (AT P=0)  =   48000.000 kPa/m
                INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

    LAYER NB  3 FROM  20.900 m  TO   5.800 m  :

                SATURATED UNIT WEIGHT              GH  =      19.500 kN/m3
                SUBMERGED UNIT WEIGHT              GD  =       9.500 kN/m3
                HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.303
                HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.466
                HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       3.295
                COHESION                            C  =      13.000 kPa
                ANGLE OF INTERNAL FRICTION        PHI  =      32.300 DEGREES
                        FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
                        FOR PASSIVE PRESS. DELTA/PHI  =       0.000
                ELASTIC REACTION COEFFICIENT (AT P=0)  =   38000.000 kPa/m
                INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

                *NIVEL FREATICO
```

** PHASE Nb 1 **

*FACTOR DE SEPARACION

* FROM 30.800 m TO 5.800 m COEFFICIENT APPLIED TO PRESSURES = 1.250
ADDITIONAL COEFF. ON PASSIVE PRESSURE = 1.000

*SOBRECARGA 50 KN/M2 (PASO DE FERROCARRIL+ 1.00 MTS RELLENOS)

* CAQUOT SURCHARGE ON SOIL 1 = 50.000 kPa

PHASE 1

| | WALL | SOIL 1 EXCAVATION: 30.80 m WATER LEVEL: 6.80 m CAQUOT SURC.: 50.00 kPa | SOIL 2 EXCAVATION: 30.80 m WATER LEVEL: 6.80 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
30.800	0.995	-0.168	0.00	0.00		1	22.56	22.56	18750	3	0.00		18750		
30.500	0.945	-0.168	0.77	4.33		1	25.00	22.56	18750	3	18.70		18750		
30.200	0.894	-0.168	2.31	5.80		1	27.44	22.56	18750	2	23.93		18750		
29.700	0.811	-0.167	5.64	7.47		1	31.50	22.56	18750	2	28.33		18750		
29.431	0.766	-0.165	7.78	8.49		2	35.13	24.01	18750	2	30.70		18750		
29.163	0.722	-0.164	10.24	9.91		2	39.17	25.87	18750	2	33.08		18750		
28.894	0.678	-0.161	13.14	11.76		2	43.20	27.71	18750	2	35.47		18750		
28.625	0.635	-0.159	16.60	14.06		2	47.21	29.54	18750	2	37.87		18750		
28.356	0.593	-0.155	20.73	16.78		2	51.21	31.36	18750	2	40.29		18750		
28.087	0.552	-0.151	25.66	19.92		2	55.19	33.15	18750	2	42.73		18750		
27.819	0.512	-0.145	31.48	23.47		2	59.14	33.16	18750	2	45.19		18750		
27.550	0.474	-0.138	38.31	27.41		2	63.07	33.16	18750	2	47.68		18750		
						1	31.22	15.54	60000	2	57.56		60000		
27.272	0.437	-0.130	44.93	20.25		1	33.04	15.54	60000	2	58.22		60000		
26.994	0.402	-0.121	49.61	13.50		2	35.72	16.40	60000	2	59.03		60000		
26.716	0.370	-0.111	52.51	7.55		2	40.55	19.42	60000	2	60.01		60000		
26.438	0.340	-0.100	53.91	2.63		2	45.22	22.27	60000	2	61.16		60000		
26.159	0.314	-0.089	54.06	-1.36		2	49.70	24.89	60000	2	62.49		60000		
25.881	0.291	-0.079	53.23	-4.53		2	54.01	24.89	60000	2	63.99		60000		
25.603	0.270	-0.068	51.61	-6.96		2	58.14	24.89	60000	2	65.68		60000		
25.325	0.253	-0.058	49.41	-8.77		2	62.11	24.89	60000	2	67.53		60000		
25.047	0.238	-0.049	46.79	-10.03		2	65.90	24.89	60000	2	69.55		60000		
24.769	0.225	-0.040	43.88	-10.83		2	69.55	24.89	60000	2	71.72		60000		
24.491	0.216	-0.031	40.79	-11.27		2	73.04	24.89	60000	2	74.03		60000		
24.212	0.208	-0.023	37.63	-11.42		2	76.41	24.89	60000	2	76.48		60000		
23.934	0.203	-0.016	34.46	-11.35		2	79.64	24.89	60000	2	79.06		60000		
23.656	0.199	-0.010	31.33	-11.13		2	82.77	24.89	60000	2	81.75		60000		
23.378	0.197	-0.004	28.28	-10.82		2	85.79	24.89	60000	2	84.54		60000		
23.100	0.197	0.001	25.32	-10.46		2	88.71	24.89	60000	2	87.43		60000		
22.600	0.200	0.010	20.23	-9.91		2	93.77	24.89	60000	2	92.83		60000		
22.175	0.205	0.015	16.09	-9.64		2	97.90	24.89	60000	2	97.59		60000		
21.750	0.212	0.019	11.99	-9.70		2	101.90	24.89	60000	2	102.47		60000		
21.325	0.221	0.022	7.79	-10.17		2	105.81	24.89	60000	2	107.44		60000		
20.900	0.231	0.024	3.28	-11.11		2	109.66	24.89	60000	2	112.48		60000		
						2	133.47	29.10	47500	2	126.30		47500		
20.556	0.239	0.024	-0.13	-8.79		2	136.98	29.10	47500	2	130.60		47500		
20.212	0.248	0.024	-2.79	-6.73		2	140.48	29.10	47500	2	134.90		47500		
19.869	0.256	0.023	-4.79	-4.94		2	144.00	29.10	47500	2	139.18		47500		
19.525	0.263	0.022	-6.22	-3.42		2	147.53	29.10	47500	2	143.45		47500		
19.181	0.271	0.020	-7.16	-2.13		2	151.09	29.10	47500	2	147.69		47500		
18.837	0.277	0.018	-7.71	-1.07		2	154.68	29.10	47500	2	151.91		47500		
18.494	0.283	0.016	-7.92	-0.21		2	158.30	29.10	47500	2	156.09		47500		
18.150	0.288	0.014	-7.87	0.46		2	161.95	29.10	47500	2	160.24		47500		
17.806	0.293	0.012	-7.62	0.98		2	165.64	29.10	47500	2	164.36		47500		
17.462	0.297	0.011	-7.22	1.35		2	169.35	29.10	47500	2	168.45		47500		
17.119	0.300	0.009	-6.71	1.60		2	173.09	29.10	47500	2	172.52		47500		
16.775	0.303	0.007	-6.13	1.76		2	176.86	29.10	47500	2	176.55		47500		
16.431	0.305	0.006	-5.51	1.83		2	180.66	29.10	47500	2	180.56		47500		
16.087	0.307	0.005	-4.88	1.83		2	184.47	29.10	47500	2	184.55		47500		
15.744	0.309	0.004	-4.26	1.78		2	188.31	29.10	47500	2	188.51		47500		
15.400	0.310	0.003	-3.66	1.69		2	192.16	29.10	47500	2	192.47		47500		
15.000	0.310	0.002	-3.01	1.56		2	196.66	29.10	47500	2	197.04		47500		
14.625	0.311	0.001	-2.46	1.40		2	200.90	29.10	47500	2	201.32		47500		
14.250	0.311	0.000	-1.96	1.24		2	205.14	29.10	47500	2	205.59		47500		
13.875	0.311	0.000	-1.53	1.07		2	209.40	29.10	47500	2	209.85		47500		
13.500	0.311	-0.001	-1.16	0.91		2	213.66	29.10	47500	2	214.10		47500		
13.125	0.311	-0.001	-0.85	0.75		2	217.93	29.10	47500	2	218.34		47500		
12.750	0.310	-0.001	-0.59	0.60		2	222.20	29.10	47500	2	222.58		47500		
12.375	0.310	-0.001	-0.39	0.47		2	226.48	29.10	47500	2	226.82		47500		
12.000	0.309	-0.001	-0.24	0.35		2	230.75	29.10	47500	2	231.05		47500		
11.625	0.309	-0.001	-0.13	0.24		2	235.03	29.10	47500	2	235.29		47500		
11.250	0.309	-0.001	-0.06	0.16		2	239.31	29.10	47500	2	239.52		47500		
10.875	0.308	-0.001	-0.01	0.09		2	243.59	29.10	47500	2	243.75		47500		
10.500	0.308	-0.001	0.01	0.03		2	247.87	29.10	47500	2	247.99		47500		
10.125	0.307	-0.001	0.01	0.00		2	252.15	29.10	47500	2	252.22		47500		
9.750	0.307	-0.001	0.01	-0.02		2	256.43	29.10	47500	2	256.45		47500		
9.375	0.306	-0.001	0.00	-0.02		2	260.71	29.10	47500	2	260.69		47500		
9.000	0.306	-0.001	0.00	0.00		2	264.99	29.10	47500	2	264.92		47500		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 1.00 mm
MAXIMUM MOMENT = 54.06 kN.m/m

CODIFICATION OF STATE OF SOIL :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 590.67 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.117
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.143

** PHASE Nb 2 **

*EXCAVACION PREVIA A EJECUCION DE LOSA SUPERIOR

* EXCAVATION IN SOIL 2 TO LEVEL = 29.700 m

PHASE 2

| | WALL | SOIL 1 EXCAVATION: 30.80 m WATER LEVEL: 6.80 m CAQUOT SURC.: 50.00 kPa | SOIL 2 EXCAVATION: 29.70 m WATER LEVEL: 6.80 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
30.800	2.258	-0.427	0.00	0.00		1	22.56	22.56	18750	0					
30.500	2.130	-0.427	1.05	7.13		1	25.00	22.56	18750	0					
30.200	2.002	-0.427	4.35	15.00		1	27.44	22.56	18750	0					
29.700	1.789	-0.423	15.45	29.74		1	31.50	22.56	18750	0					
29.431	1.676	-0.420	24.41	36.24		1	33.68	22.56	18750	3	16.75		18750		
29.163	1.564	-0.414	34.58	38.84		1	35.87	22.56	18750	3	33.50		18750		
28.894	1.454	-0.406	45.09	39.31		1	38.05	22.56	18750	2	36.88		18750		
28.625	1.346	-0.397	55.71	39.76		1	40.23	22.56	18750	2	38.06		18750		
28.356	1.241	-0.385	66.49	40.47		1	42.42	22.56	18750	2	39.30		18750		
28.087	1.139	-0.371	77.49	41.43		1	44.60	22.56	18750	2	40.60		18750		
27.819	1.041	-0.355	88.81	42.94		2	49.22	25.00	18750	2	41.98		18750		
27.550	0.948	-0.337	100.65	45.35		2	54.18	27.78	18750	2	43.44		18750		
						1	31.22	15.54	60000	2	76.15		60000		
27.272	0.857	-0.316	111.58	33.47		1	33.04	15.54	60000	2	73.60		60000		
26.994	0.773	-0.293	119.37	22.74		1	34.85	15.54	60000	2	71.43		60000		
26.716	0.694	-0.269	124.33	13.07		1	36.67	15.54	60000	2	69.64		60000		
26.438	0.623	-0.244	126.73	4.34		1	38.48	15.54	60000	2	68.27		60000		
26.159	0.559	-0.219	126.82	-3.57		1	40.30	15.54	60000	2	67.32		60000		
25.881	0.501	-0.194	124.81	-10.76		1	42.11	15.54	60000	2	66.79		60000		
25.603	0.451	-0.169	120.93	-16.88		2	47.30	18.91	60000	2	66.67		60000		
25.325	0.407	-0.146	115.56	-21.54		2	52.83	22.63	60000	2	66.95		60000		
25.047	0.370	-0.124	109.08	-24.84		2	57.99	24.89	60000	2	67.61		60000		
24.769	0.338	-0.103	101.85	-26.99		2	62.78	24.89	60000	2	68.63		60000		
24.491	0.312	-0.083	94.16	-28.18		2	67.23	24.89	60000	2	69.99		60000		
24.212	0.292	-0.065	86.24	-28.61		2	71.38	24.89	60000	2	71.66		60000		
23.934	0.276	-0.049	78.30	-28.42		2	75.23	24.89	60000	2	73.62		60000		
23.656	0.264	-0.034	70.48	-27.78		2	78.83	24.89	60000	2	75.83		60000		
23.378	0.257	-0.021	62.88	-26.82		2	82.20	24.89	60000	2	78.28		60000		
23.100	0.253	-0.009	55.58	-25.66		2	85.36	24.89	60000	2	80.94		60000		
22.600	0.253	0.008	43.30	-23.45		2	90.58	24.89	60000	2	86.16		60000		
22.175	0.259	0.020	33.71	-21.72		2	94.66	24.89	60000	2	90.97		60000		
21.750	0.269	0.029	24.78	-20.43		2	98.47	24.89	60000	2	96.04		60000		
21.325	0.283	0.035	16.26	-19.74		2	102.09	24.89	60000	2	101.31		60000		
20.900	0.299	0.039	7.89	-19.81		2	105.59	24.89	60000	2	106.70		60000		
						2	130.25	29.10	47500	2	118.00		47500		
20.556	0.312	0.040	1.77	-15.82		2	133.50	29.10	47500	2	122.55		47500		
20.212	0.326	0.040	-3.04	-12.28		2	136.75	29.10	47500	2	127.10		47500		
19.869	0.340	0.039	-6.72	-9.18		2	140.02	29.10	47500	2	131.64		47500		
19.525	0.352	0.037	-9.41	-6.52		2	143.30	29.10	47500	2	136.16		47500		
19.181	0.365	0.034	-11.25	-4.26		2	146.63	29.10	47500	2	140.63		47500		
18.837	0.376	0.031	-12.38	-2.38		2	150.00	29.10	47500	2	145.07		47500		
18.494	0.386	0.028	-12.92	-0.85		2	153.42	29.10	47500	2	149.45		47500		
18.150	0.395	0.025	-12.99	0.37		2	156.89	29.10	47500	2	153.78		47500		
17.806	0.403	0.022	-12.70	1.31		2	160.41	29.10	47500	2	158.06		47500		
17.462	0.410	0.019	-12.12	2.00		2	163.99	29.10	47500	2	162.29		47500		
17.119	0.416	0.016	-11.35	2.49		2	167.61	29.10	47500	2	166.47		47500		
16.775	0.421	0.013	-10.43	2.80		2	171.28	29.10	47500	2	170.61		47500		
16.431	0.425	0.011	-9.44	2.96		2	174.99	29.10	47500	2	174.70		47500		
16.087	0.428	0.008	-8.41	3.01		2	178.74	29.10	47500	2	178.76		47500		
15.744	0.430	0.006	-7.38	2.96		2	182.52	29.10	47500	2	182.78		47500		
15.400	0.432	0.005	-6.38	2.84		2	186.33	29.10	47500	2	186.77		47500		
15.000	0.434	0.003	-5.28	2.63		2	190.79	29.10	47500	2	191.39		47500		
14.625	0.435	0.002	-4.34	2.39		2	195.01	29.10	47500	2	195.69		47500		
14.250	0.435	0.001	-3.49	2.13		2	199.24	29.10	47500	2	199.97		47500		
13.875	0.435	0.000	-2.75	1.85		2	203.49	29.10	47500	2	204.23		47500		
13.500	0.435	-0.001	-2.10	1.58		2	207.75	29.10	47500	2	208.48		47500		
13.125	0.435	-0.001	-1.56	1.31		2	212.03	29.10	47500	2	212.72		47500		
12.750	0.434	-0.002	-1.12	1.06		2	216.31	29.10	47500	2	216.95		47500		
12.375	0.434	-0.002	-0.76	0.84		2	220.59	29.10	47500	2	221.17		47500		
12.000	0.433	-0.002	-0.49	0.63		2	224.88	29.10	47500	2	225.40		47500		
11.625	0.432	-0.002	-0.29	0.45		2	229.18	29.10	47500	2	229.62		47500		
11.250	0.431	-0.002	-0.14	0.30		2	233.47	29.10	47500	2	233.84		47500		
10.875	0.431	-0.002	-0.06	0.18		2	237.77	29.10	47500	2	238.05		47500		
10.500	0.430	-0.002	-0.01	0.09		2	242.06	29.10	47500	2	242.27		47500		
10.125	0.429	-0.002	0.01	0.02		2	246.36	29.10	47500	2	246.49		47500		
9.750	0.428	-0.002	0.01	-0.01		2	250.65	29.10	47500	2	250.71		47500		
9.375	0.427	-0.002	0.00	-0.02		2	254.94	29.10	47500	2	254.93		47500		
9.000	0.427	-0.002	0.00	0.00		2	259.24	29.10	47500	2	259.14		47500		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 2.26 mm

MAXIMUM MOMENT = 126.82 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR.

CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 567.32 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.112
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.151

** PHASE Nb 3 **

*EJECUCION DE LOSA DE CUBIERTA

* INSTALLATION LEVEL OF STRUTS NO 1

LEVEL = 30.200 m
SPACE = 1.000 m
INCLINATION = 0.000 DEGREES
PRELOAD = 0.000 kN
STIFFNESS = 500000.000 kN/m
BILATERAL CONNECTION

PHASE 3

| | WALL | SOIL 1 EXCAVATION: 30.80 m, WATER LEVEL: 6.80 m, CAQUOT SURC.: 50.00 kPa | SOIL 2 EXCAVATION: 29.70 m, WATER LEVEL: 6.80 m, CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
30.800	2.258	-0.427	0.00	0.00		1	22.56	22.56	18750	0					
30.500	2.130	-0.427	1.05	7.13		1	25.00	22.56	18750	0					
30.200	2.002	-0.427	4.35	15.00		1	27.44	22.56	18750	0					
						1	27.44	22.56	18750	0				1	0.00
29.700	1.789	-0.423	15.45	29.74		2	31.50	22.56	18750	0					
29.431	1.676	-0.420	24.41	36.24		2	33.68	22.56	18750	2	16.75		18750		
29.163	1.564	-0.414	34.58	38.84		2	35.87	22.56	18750	2	33.50		18750		
28.894	1.454	-0.406	45.09	39.31		2	38.05	22.56	18750	2	36.88		18750		
28.625	1.346	-0.397	55.71	39.76		2	40.23	22.56	18750	2	38.06		18750		
28.356	1.241	-0.385	66.49	40.47		2	42.42	22.56	18750	2	39.30		18750		
28.087	1.139	-0.371	77.49	41.43		2	44.60	22.56	18750	2	40.60		18750		
27.819	1.041	-0.355	88.81	42.94		2	49.22	25.00	18750	2	41.98		18750		
27.550	0.948	-0.337	100.65	45.35		2	54.18	27.78	18750	2	43.44		18750		
						2	31.22	15.54	60000	2	76.15		60000		
27.272	0.857	-0.316	111.58	33.47		2	33.04	15.54	60000	2	73.60		60000		
26.994	0.773	-0.293	119.37	22.74		2	34.85	15.54	60000	2	71.43		60000		
26.716	0.694	-0.269	124.33	13.06		2	36.67	15.54	60000	2	69.64		60000		
26.438	0.623	-0.244	126.73	4.34		2	38.48	15.54	60000	2	68.27		60000		
26.159	0.559	-0.219	126.82	-3.57		2	40.30	15.54	60000	2	67.32		60000		
25.881	0.501	-0.194	124.81	-10.76		2	42.11	15.54	60000	2	66.79		60000		
25.603	0.451	-0.169	120.93	-16.88		2	47.30	18.91	60000	2	66.67		60000		
25.325	0.407	-0.146	115.56	-21.54		2	52.83	22.63	60000	2	66.95		60000		
25.047	0.370	-0.124	109.08	-24.84		2	57.99	24.89	60000	2	67.61		60000		
24.769	0.338	-0.103	101.85	-26.99		2	62.78	24.89	60000	2	68.63		60000		
24.491	0.312	-0.083	94.16	-28.18		2	67.23	24.89	60000	2	69.99		60000		
24.212	0.292	-0.065	86.24	-28.61		2	71.38	24.89	60000	2	71.66		60000		
23.934	0.276	-0.049	78.30	-28.42		2	75.23	24.89	60000	2	73.62		60000		
23.656	0.264	-0.034	70.48	-27.78		2	78.83	24.89	60000	2	75.83		60000		
23.378	0.257	-0.021	62.88	-26.82		2	82.20	24.89	60000	2	78.28		60000		
23.100	0.253	-0.009	55.58	-25.66		2	85.36	24.89	60000	2	80.94		60000		
22.600	0.253	0.008	43.30	-23.45		2	90.58	24.89	60000	2	86.16		60000		
22.175	0.259	0.020	33.71	-21.72		2	94.66	24.89	60000	2	90.97		60000		
21.750	0.269	0.029	24.78	-20.43		2	98.47	24.89	60000	2	96.04		60000		
21.325	0.283	0.035	16.26	-19.74		2	102.09	24.89	60000	2	101.31		60000		
20.900	0.299	0.039	7.89	-19.81		2	105.59	24.89	60000	2	106.70		60000		
						2	130.25	29.10	47500	2	118.00		47500		
20.556	0.312	0.040	1.78	-15.82		2	133.50	29.10	47500	2	122.55		47500		
20.212	0.326	0.040	-3.04	-12.28		2	136.75	29.10	47500	2	127.10		47500		
19.869	0.340	0.039	-6.72	-9.18		2	140.02	29.10	47500	2	131.64		47500		
19.525	0.352	0.037	-9.40	-6.51		2	143.30	29.10	47500	2	136.16		47500		
19.181	0.365	0.034	-11.24	-4.26		2	146.63	29.10	47500	2	140.63		47500		
18.837	0.376	0.031	-12.37	-2.38		2	150.00	29.10	47500	2	145.07		47500		
18.494	0.386	0.028	-12.92	-0.85		2	153.42	29.10	47500	2	149.45		47500		
18.150	0.395	0.025	-12.99	0.37		2	156.89	29.10	47500	2	153.78		47500		
17.806	0.403	0.022	-12.70	1.31		2	160.41	29.10	47500	2	158.06		47500		
17.462	0.410	0.019	-12.12	2.00		2	163.99	29.10	47500	2	162.29		47500		
17.119	0.416	0.016	-11.35	2.49		2	167.61	29.10	47500	2	166.47		47500		
16.775	0.421	0.013	-10.43	2.80		2	171.28	29.10	47500	2	170.61		47500		
16.431	0.425	0.011	-9.44	2.96		2	174.99	29.10	47500	2	174.70		47500		
16.087	0.428	0.008	-8.41	3.01		2	178.74	29.10	47500	2	178.76		47500		
15.744	0.430	0.006	-7.38	2.96		2	182.52	29.10	47500	2	182.78		47500		
15.400	0.432	0.005	-6.38	2.84		2	186.33	29.10	47500	2	186.77		47500		
15.000	0.434	0.003	-5.28	2.63		2	190.79	29.10	47500	2	191.39		47500		
14.625	0.435	0.002	-4.34	2.39		2	195.01	29.10	47500	2	195.69		47500		
14.250	0.435	0.001	-3.50	2.13		2	199.24	29.10	47500	2	199.97		47500		
13.875	0.435	0.000	-2.75	1.85		2	203.49	29.10	47500	2	204.23		47500		
13.500	0.435	-0.001	-2.11	1.58		2	207.75	29.10	47500	2	208.48		47500		
13.125	0.435	-0.001	-1.57	1.31		2	212.03	29.10	47500	2	212.72		47500		
12.750	0.434	-0.002	-1.12	1.06		2	216.31	29.10	47500	2	216.95		47500		
12.375	0.434	-0.002	-0.77	0.83		2	220.59	29.10	47500	2	221.17		47500		
12.000	0.433	-0.002	-0.49	0.63		2	224.88	29.10	47500	2	225.40		47500		
11.625	0.432	-0.002	-0.29	0.45		2	229.18	29.10	47500	2	229.62		47500		
11.250	0.432	-0.002	-0.15	0.30		2	233.47	29.10	47500	2	233.84		47500		
10.875	0.431	-0.002	-0.07	0.18		2	237.77	29.10	47500	2	238.05		47500		
10.500	0.430	-0.002	-0.02	0.08		2	242.06	29.10	47500	2	242.27		47500		
10.125	0.429	-0.002	0.00	0.02		2	246.36	29.10	47500	2	246.49		47500		
9.750	0.428	-0.002	0.00	-0.02		2	250.65	29.10	47500	2	250.71		47500		
9.375	0.427	-0.002	-0.01	-0.02		2	254.95	29.10	47500	2	254.92		47500		
9.000	0.427	-0.002	-0.02	0.00		2	259.24	29.10	47500	2	259.14		47500		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 2.26 mm
MAXIMUM MOMENT = 126.82 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR.
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(2 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 567.32 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.112
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.151

** PHASE Nb 4 **

*EXCAVACION PREVIA A EJECUCION DE PUNTAL INTERMEDIO

* EXCAVATION IN SOIL 2 TO LEVEL = 22.600 m

PHASE 4

| | WALL | SOIL 1 EXCAVATION: 30.80 m WATER LEVEL: 6.80 m CAQUOT SURC.: 50.00 kPa | SOIL 2 EXCAVATION: 22.60 m WATER LEVEL: 6.80 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
30.800	1.831	0.911	0.00	0.00		2	30.58	30.58	18750	0					
30.500	2.104	0.911	1.30	8.41		2	25.49	23.05	18750	0					
30.200	2.377	0.911	5.00	16.35		1	27.44	22.56	18750	0					
				-171.35		1	27.44	22.56	18750	0				1	-187.70
29.700	2.831	0.898	-77.08	-156.61		1	31.50	22.56	18750	0					
29.431	3.070	0.879	-118.00	-147.85		1	33.68	22.56	18750	0					
29.163	3.303	0.853	-156.50	-138.51		1	35.87	22.56	18750	0					
28.894	3.528	0.820	-192.40	-128.58		1	38.05	22.56	18750	0					
28.625	3.743	0.780	-225.55	-118.06		1	40.23	22.56	18750	0					
28.356	3.946	0.733	-255.80	-106.95		1	42.42	22.56	18750	0					
28.087	4.137	0.682	-282.99	-95.26		1	44.60	22.56	18750	0					
27.819	4.312	0.625	-306.95	-82.98		1	46.78	22.56	18750	0					
27.550	4.472	0.564	-327.53	-70.11		1	48.97	22.56	18750	0					
						1	31.22	15.54	60000	0					
27.272	4.620	0.497	-345.80	-61.18		1	33.04	15.54	60000	0					
26.994	4.749	0.427	-361.52	-51.74		1	34.85	15.54	60000	0					
26.716	4.857	0.354	-374.54	-41.79		1	36.67	15.54	60000	0					
26.438	4.945	0.279	-384.72	-31.34		1	38.48	15.54	60000	0					
26.159	5.012	0.202	-391.92	-20.39		1	40.30	15.54	60000	0					
25.881	5.057	0.123	-396.01	-8.93		1	42.11	15.54	60000	0					
25.603	5.081	0.045	-396.84	3.04		1	43.93	15.54	60000	0					
25.325	5.082	-0.034	-394.27	15.51		1	45.74	15.54	60000	0					
25.047	5.062	-0.111	-388.17	28.48		1	47.55	15.54	60000	0					
24.769	5.020	-0.187	-378.38	41.96		1	49.37	15.54	60000	0					
24.491	4.958	-0.261	-364.78	55.94		1	51.18	15.54	60000	0					
24.212	4.875	-0.332	-347.22	70.43		1	53.00	15.54	60000	0					
23.934	4.774	-0.399	-325.56	85.42		1	54.81	15.54	60000	0					
23.656	4.654	-0.461	-299.66	100.92		1	56.63	15.54	60000	0					
23.378	4.518	-0.517	-269.37	116.92		1	58.44	15.54	60000	0					
23.100	4.367	-0.567	-234.57	133.43		1	60.26	15.54	60000	0					
22.600	4.064	-0.638	-160.19	164.38		1	63.52	15.54	60000	0					
						1	63.52	15.54	60000	3	10.03		60000		
22.175	3.784	-0.676	-86.76	178.16		1	66.29	15.54	60000	3	54.91		60000		
21.750	3.493	-0.691	-11.28	174.05		1	69.07	15.54	60000	3	99.79		60000		
21.325	3.200	-0.683	58.65	152.05		1	71.84	15.54	60000	3	144.67		60000		
20.900	2.915	-0.656	115.42	112.15		1	74.61	15.54	60000	3	189.55		60000		
						1	76.23	18.97	47500	2	159.25		47500		
20.556	2.695	-0.624	149.25	85.18		1	78.78	18.97	47500	2	152.69		47500		
20.212	2.487	-0.584	174.33	61.24		1	81.32	18.97	47500	2	146.72		47500		
19.869	2.294	-0.539	191.67	40.10		1	83.86	18.97	47500	2	141.45		47500		
19.525	2.117	-0.491	202.19	21.51		1	86.40	18.97	47500	2	136.94		47500		
19.181	1.957	-0.440	206.73	5.21		1	88.95	18.97	47500	2	133.24		47500		
18.837	1.814	-0.390	206.01	-9.08		1	91.49	18.97	47500	2	130.37		47500		
18.494	1.689	-0.340	200.68	-21.66		1	94.03	18.97	47500	2	128.32		47500		
18.150	1.581	-0.292	191.36	-32.11		2	100.57	22.96	47500	2	127.07		47500		
17.806	1.488	-0.246	178.93	-39.71		2	108.86	28.71	47500	2	126.59		47500		
17.462	1.411	-0.204	164.38	-44.54		2	116.43	29.10	47500	2	126.82		47500		
17.119	1.348	-0.166	148.57	-47.08		2	123.34	29.10	47500	2	127.71		47500		
16.775	1.297	-0.131	132.23	-47.75		2	129.66	29.10	47500	2	129.20		47500		
16.431	1.257	-0.101	115.91	-46.94		2	135.45	29.10	47500	2	131.21		47500		
16.087	1.227	-0.074	100.08	-45.00		2	140.77	29.10	47500	2	133.69		47500		
15.744	1.206	-0.052	85.07	-42.21		2	145.70	29.10	47500	2	136.57		47500		
15.400	1.191	-0.032	71.13	-38.84		2	150.28	29.10	47500	2	139.79		47500		
15.000	1.182	-0.014	56.46	-34.47		2	155.26	29.10	47500	2	143.89		47500		
14.625	1.179	-0.001	44.34	-30.16		2	159.64	29.10	47500	2	148.02		47500		
14.250	1.181	0.010	33.84	-25.83		2	163.82	29.10	47500	2	152.36		47500		
13.875	1.186	0.017	24.95	-21.62		2	167.83	29.10	47500	2	156.86		47500		
13.500	1.194	0.023	17.60	-17.64		2	171.72	29.10	47500	2	161.48		47500		
13.125	1.203	0.027	11.68	-13.96		2	175.53	29.10	47500	2	166.18		47500		
12.750	1.214	0.029	7.08	-10.65		2	179.29	29.10	47500	2	170.94		47500		
12.375	1.225	0.031	3.65	-7.72		2	183.00	29.10	47500	2	175.73		47500		
12.000	1.237	0.031	1.24	-5.20		2	186.70	29.10	47500	2	180.55		47500		
11.625	1.249	0.032	-0.30	-3.10		2	190.40	29.10	47500	2	185.36		47500		
11.250	1.260	0.031	-1.14	-1.42		2	194.09	29.10	47500	2	190.18		47500		
10.875	1.272	0.031	-1.42	-0.17		2	197.79	29.10	47500	2	194.99		47500		
10.500	1.284	0.031	-1.31	0.68		2	201.50	29.10	47500	2	199.80		47500		
10.125	1.295	0.030	-0.97	1.11		2	205.22	29.10	47500	2	204.60		47500		
9.750	1.307	0.030	-0.53	1.14		2	208.93	29.10	47500	2	209.39		47500		
9.375	1.318	0.030	-0.16	0.77		2	212.65	29.10	47500	2	214.19		47500		
9.000	1.329	0.030	0.00	-0.01		2	216.37	29.10	47500	2	218.98		47500		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 5.08 mm

MAXIMUM MOMENT = -396.84 kN.m/m

CODIFICATION OF STATE :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC

CODIFICATION OF SOIL :
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 495.95 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.088
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.247

** PHASE Nb 5 **

*EJECUCION DE PUNTAL INTERMEDIO

* INSTALLATION LEVEL OF STRUTS NO 2

LEVEL = 23.100 m
SPACE = 1.000 m
INCLINATION = 0.000 DEGREES
PRELOAD = 0.000 kN
STIFFNESS = 450000.000 kN/m
BILATERAL CONNECTION

PHASE 5

	WALL					SOIL 1 EXCAVATION: 30.80 m WATER LEVEL: 6.80 m CAQUOT SURC.: 50.00 kPa				SOIL 2 EXCAVATION: 22.60 m WATER LEVEL: 6.80 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
30.800	1.831	0.911	0.00	0.00		2	30.58	30.58	18750	0					
30.500	2.104	0.911	1.30	8.41		2	25.49	23.05	18750	0					
30.200	2.377	0.911	5.00	16.35		1	27.44	22.56	18750	0					
				-171.35		1	27.44	22.56	18750	0				1	-187.70
29.700	2.831	0.898	-77.08	-156.61		2	31.50	22.56	18750	0					
29.431	3.070	0.879	-118.00	-147.85		2	33.68	22.56	18750	0					
29.163	3.303	0.853	-156.50	-138.51		2	35.87	22.56	18750	0					
28.894	3.528	0.820	-192.40	-128.58		2	38.05	22.56	18750	0					
28.625	3.743	0.780	-225.55	-118.06		2	40.23	22.56	18750	0					
28.356	3.946	0.733	-255.80	-106.95		2	42.42	22.56	18750	0					
28.087	4.137	0.682	-282.99	-95.26		2	44.60	22.56	18750	0					
27.819	4.312	0.625	-306.95	-82.98		2	46.78	22.56	18750	0					
27.550	4.472	0.564	-327.53	-70.11		2	48.97	22.56	18750	0					
						2	31.22	15.54	60000	0					
27.272	4.620	0.497	-345.80	-61.18		2	33.04	15.54	60000	0					
26.994	4.749	0.427	-361.52	-51.74		2	34.85	15.54	60000	0					
26.716	4.857	0.354	-374.54	-41.79		2	36.67	15.54	60000	0					
26.438	4.945	0.279	-384.72	-31.34		2	38.48	15.54	60000	0					
26.159	5.012	0.202	-391.92	-20.39		2	40.30	15.54	60000	0					
25.881	5.057	0.123	-396.01	-8.93		2	42.11	15.54	60000	0					
25.603	5.081	0.045	-396.84	3.04		2	43.93	15.54	60000	0					
25.325	5.082	-0.034	-394.27	15.51		2	45.74	15.54	60000	0					
25.047	5.062	-0.111	-388.17	28.48		2	47.55	15.54	60000	0					
24.769	5.020	-0.187	-378.38	41.96		2	49.37	15.54	60000	0					
24.491	4.958	-0.261	-364.78	55.94		2	51.18	15.54	60000	0					
24.212	4.875	-0.332	-347.22	70.43		2	53.00	15.54	60000	0					
23.934	4.774	-0.399	-325.56	85.42		2	54.81	15.54	60000	0					
23.656	4.654	-0.461	-299.66	100.92		2	56.63	15.54	60000	0					
23.378	4.518	-0.517	-269.37	116.92		2	58.44	15.54	60000	0					
23.100	4.367	-0.567	-234.57	133.43		2	60.26	15.54	60000	0					
						2	60.26	15.54	60000	0				2	0.00
22.600	4.064	-0.638	-160.19	164.38		2	63.52	15.54	60000	0					
						2	63.52	15.54	60000	2	10.03		60000		
22.175	3.784	-0.676	-86.76	178.16		2	66.29	15.54	60000	2	54.91		60000		
21.750	3.493	-0.691	-11.28	174.05		2	69.07	15.54	60000	2	99.79		60000		
21.325	3.200	-0.683	58.65	152.05		2	71.84	15.54	60000	2	144.67		60000		
20.900	2.915	-0.656	115.43	112.15		1	74.61	15.54	60000	3	189.55		60000		
						1	76.23	18.97	47500	2	159.25		47500		
20.556	2.695	-0.624	149.25	85.18		1	78.78	18.97	47500	2	152.69		47500		
20.212	2.487	-0.584	174.33	61.24		1	81.32	18.97	47500	2	146.72		47500		
19.869	2.294	-0.539	191.67	40.10		1	83.86	18.97	47500	2	141.45		47500		
19.525	2.117	-0.491	202.19	21.51		1	86.40	18.97	47500	2	136.94		47500		
19.181	1.957	-0.440	206.73	5.21		1	88.95	18.97	47500	2	133.24		47500		
18.837	1.814	-0.390	206.01	-9.08		1	91.49	18.97	47500	2	130.37		47500		
18.494	1.689	-0.340	200.68	-21.66		1	94.03	18.97	47500	2	128.32		47500		
18.150	1.581	-0.292	191.36	-32.11		2	100.57	22.96	47500	2	127.07		47500		
17.806	1.488	-0.246	178.93	-39.71		2	108.86	28.71	47500	2	126.59		47500		
17.462	1.411	-0.204	164.38	-44.54		2	116.43	29.10	47500	2	126.82		47500		
17.119	1.348	-0.166	148.57	-47.08		2	123.34	29.10	47500	2	127.71		47500		
16.775	1.297	-0.131	132.23	-47.75		2	129.66	29.10	47500	2	129.20		47500		
16.431	1.257	-0.101	115.91	-46.94		2	135.45	29.10	47500	2	131.21		47500		
16.087	1.227	-0.074	100.08	-45.00		2	140.77	29.10	47500	2	133.69		47500		
15.744	1.206	-0.052	85.07	-42.21		2	145.70	29.10	47500	2	136.57		47500		
15.400	1.191	-0.032	71.13	-38.84		2	150.28	29.10	47500	2	139.79		47500		
15.000	1.182	-0.014	56.46	-34.47		2	155.26	29.10	47500	2	143.89		47500		
14.625	1.179	-0.001	44.33	-30.16		2	159.64	29.10	47500	2	148.02		47500		
14.250	1.181	0.010	33.84	-25.83		2	163.82	29.10	47500	2	152.36		47500		
13.875	1.186	0.017	24.95	-21.62		2	167.83	29.10	47500	2	156.86		47500		
13.500	1.194	0.023	17.59	-17.64		2	171.72	29.10	47500	2	161.48		47500		
13.125	1.203	0.027	11.67	-13.97		2	175.53	29.10	47500	2	166.18		47500		
12.750	1.214	0.029	7.07	-10.65		2	179.28	29.10	47500	2	170.94		47500		
12.375	1.225	0.031	3.64	-7.72		2	183.00	29.10	47500	2	175.73		47500		
12.000	1.237	0.031	1.23	-5.21		2	186.70	29.10	47500	2	180.55		47500		
11.625	1.249	0.032	-0.32	-3.11		2	190.40	29.10	47500	2	185.36		47500		
11.250	1.260	0.031	-1.16	-1.43		2	194.09	29.10	47500	2	190.18		47500		
10.875	1.272	0.031	-1.45	-0.17		2	197.80	29.10	47500	2	194.99		47500		
10.500	1.284	0.031	-1.34	0.67		2	201.50	29.10	47500	2	199.80		47500		
10.125	1.295	0.030	-0.99	1.11		2	205.22	29.10	47500	2	204.60		47500		
9.750	1.306	0.030	-0.56	1.14		2	208.94	29.10	47500	2	209.39		47500		
9.375	1.318	0.030	-0.19	0.77		2	212.66	29.10	47500	2	214.18		47500		
9.000	1.329	0.030	-0.03	0.00		2	216.38	29.10	47500	2	218.97		47500		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 5.08 mm
MAXIMUM MOMENT = -396.84 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR., 2 = ELASTIC, 3 = PASSIVE PR.
CODIFICATION OF SOIL :

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 495.95 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.088

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.247

** PHASE Nb 6 **

*EXCAVACION HASTA COTA DE SOLERA

* EXCAVATION IN SOIL 2 TO LEVEL = 15.000 m

PHASE 6

| WALL | SOIL 1 EXCAVATION: 30.80 m, WATER LEVEL: 6.80 m, CAQUOT SURC.: 50.00 kPa | SOIL 2 EXCAVATION: 15.00 m, WATER LEVEL: 6.80 m, CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO. SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
30.800	1.864	0.620	0.00	0.00	2	29.96	29.96	18750	0					
30.500	2.050	0.621	1.30	8.47	2	26.50	24.07	18750	0					
30.200	2.236	0.621	5.08	16.96	2	30.09	25.21	18750	0					
				-100.14	2	30.09	25.21	18750	0				1	-117.09
29.700	2.546	0.615	-40.94	-83.40	2	36.85	27.91	18750	0					
29.431	2.710	0.605	-61.98	-73.02	2	40.44	29.32	18750	0					
29.163	2.870	0.591	-80.10	-61.67	2	43.98	30.68	18750	0					
28.894	3.027	0.574	-95.05	-49.39	2	47.44	31.96	18750	0					
28.625	3.179	0.555	-106.57	-36.19	2	50.81	33.14	18750	0					
28.356	3.325	0.533	-114.42	-22.09	2	54.07	33.16	18750	0					
28.087	3.465	0.511	-118.37	-7.15	2	57.18	33.16	18750	0					
27.819	3.600	0.488	-118.19	8.62	2	60.14	33.16	18750	0					
27.550	3.728	0.466	-113.66	25.16	2	62.92	33.16	18750	0					
					2	75.87	24.89	60000	0					
27.272	3.855	0.444	-103.69	46.69	2	78.96	24.89	60000	0					
26.994	3.975	0.425	-87.63	68.97	2	81.24	24.89	60000	0					
26.716	4.091	0.410	-65.28	91.75	2	82.61	24.89	60000	0					
26.438	4.204	0.400	-36.57	114.78	2	82.96	24.89	60000	0					
26.159	4.314	0.396	-1.45	137.74	2	82.15	24.89	60000	0					
25.881	4.425	0.400	40.01	160.29	2	80.06	24.89	60000	0					
25.603	4.538	0.412	87.64	182.07	2	76.51	24.89	60000	0					
25.325	4.655	0.435	141.17	202.63	2	71.37	24.89	60000	0					
25.047	4.781	0.469	200.20	221.52	2	64.44	24.89	60000	0					
24.769	4.917	0.515	264.19	238.21	2	55.58	21.74	60000	0					
24.491	5.068	0.574	332.53	253.05	1	51.18	15.54	60000	0					
24.212	5.237	0.647	404.92	267.54	1	53.00	15.54	60000	0					
23.934	5.429	0.735	481.40	282.53	1	54.81	15.54	60000	0					
23.656	5.648	0.838	562.12	298.03	1	56.63	15.54	60000	0					
23.378	5.897	0.958	647.23	314.03	1	58.44	15.54	60000	0					
23.100	6.182	1.095	736.85	330.54	1	60.26	15.54	60000	0					
				-486.29	1	60.26	15.54	60000	0				2	-816.83
22.600	6.788	1.316	501.38	-455.35	1	63.52	15.54	60000	0					
22.175	7.376	1.439	313.67	-427.76	1	66.29	15.54	60000	0					
21.750	8.003	1.507	137.95	-399.00	1	69.07	15.54	60000	0					
21.325	8.649	1.524	-25.31	-369.05	1	71.84	15.54	60000	0					
20.900	9.292	1.493	-175.58	-337.93	1	74.61	15.54	60000	0					
					1	76.23	18.97	47500	0					
20.556	9.796	1.436	-287.19	-311.29	1	78.78	18.97	47500	0					
20.212	10.276	1.353	-389.49	-283.77	1	81.32	18.97	47500	0					
19.869	10.723	1.246	-482.19	-255.38	1	83.86	18.97	47500	0					
19.525	11.130	1.117	-564.97	-226.12	1	86.40	18.97	47500	0					
19.181	11.489	0.970	-637.54	-195.98	1	88.95	18.97	47500	0					
18.837	11.795	0.805	-699.61	-164.97	1	91.49	18.97	47500	0					
18.494	12.041	0.627	-750.86	-133.08	1	94.03	18.97	47500	0					
18.150	12.225	0.438	-791.00	-100.32	1	96.57	18.97	47500	0					
17.806	12.341	0.240	-819.73	-66.69	1	99.12	18.97	47500	0					
17.462	12.389	0.037	-836.75	-32.18	1	101.66	18.97	47500	0					
17.119	12.367	-0.169	-841.75	3.21	1	104.20	18.97	47500	0					
16.775	12.273	-0.375	-834.44	39.46	1	106.75	18.97	47500	0					
16.431	12.109	-0.577	-814.52	76.59	1	109.29	18.97	47500	0					
16.087	11.877	-0.773	-781.69	114.60	1	111.83	18.97	47500	0					
15.744	11.579	-0.959	-735.63	153.48	1	114.37	18.97	47500	0					
15.400	11.219	-1.133	-676.07	193.23	1	116.92	18.97	47500	0					
15.000	10.729	-1.314	-589.34	240.59	1	119.88	18.97	47500	0					
					1	119.88	18.97	47500	3	59.00		47500		
14.625	10.209	-1.459	-495.48	258.29	1	122.65	18.97	47500	3	89.11		47500		
14.250	9.638	-1.578	-396.91	265.74	1	125.42	18.97	47500	3	119.23		47500		
13.875	9.028	-1.671	-297.46	262.94	1	128.20	18.97	47500	3	149.35		47500		
13.500	8.388	-1.738	-200.99	249.88	1	130.97	18.97	47500	3	179.47		47500		
13.125	7.728	-1.779	-111.33	226.56	1	133.75	18.97	47500	3	209.59		47500		
12.750	7.057	-1.798	-32.35	192.99	1	136.52	18.97	47500	3	239.71		47500		
12.375	6.382	-1.798	32.13	149.17	1	139.29	18.97	47500	3	269.83		47500		
12.000	5.710	-1.783	78.25	95.09	1	142.07	18.97	47500	3	299.95		47500		
11.625	5.046	-1.758	103.39	40.52	1	144.84	18.97	47500	2	278.01		47500		
11.250	4.393	-1.729	109.91	-3.87	1	147.62	18.97	47500	2	251.21		47500		
10.875	3.750	-1.700	101.86	-37.27	1	150.39	18.97	47500	2	224.93		47500		
10.500	3.117	-1.675	83.31	-59.86	1	153.16	18.97	47500	2	199.13		47500		
10.125	2.492	-1.656	58.29	-71.82	1	155.94	18.97	47500	2	173.72		47500		
9.750	1.874	-1.644	31.31	-68.89	2	181.99	29.10	47500	2	148.59		47500		
9.375	1.258	-1.639	9.19	-45.40	2	215.48	29.10	47500	2	123.61		47500		
9.000	0.644	-1.638	0.00	-0.01	2	248.92	29.10	47500	2	98.68		47500		
m	mm	/1000	kN.m/m	kN/m kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 12.39 mm

MAXIMUM MOMENT = -841.75 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR.
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(5 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 462.30 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.081

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.632

** PHASE Nb 7 **

*EJECUCION DE SOLERA

* INSTALLATION LEVEL OF STRUTS NO 3

LEVEL = 15.400 m
SPACE = 1.000 m
INCLINATION = 0.000 DEGREES
PRELOAD = 0.000 kN
STIFFNESS = 400000.000 kN/m
BILATERAL CONNECTION

PHASE 7

| WALL | SOIL 1 EXCAVATION: 30.80 m, WATER LEVEL: 6.80 m, CAQUOT SURC.: 50.00 kPa | SOIL 2 EXCAVATION: 15.00 m, WATER LEVEL: 6.80 m, CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO. SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
30.800	1.864	0.620	0.00	0.00	2	29.96	29.96	18750	0					
30.500	2.050	0.621	1.30	8.47	2	26.50	24.07	18750	0					
30.200	2.236	0.621	5.08	16.96	2	30.09	25.21	18750	0					
				-100.14	2	30.09	25.21	18750	0				1	-117.09
29.700	2.546	0.615	-40.94	-83.40	2	36.85	27.91	18750	0					
29.431	2.710	0.605	-61.98	-73.02	2	40.44	29.32	18750	0					
29.163	2.870	0.591	-80.10	-61.67	2	43.98	30.68	18750	0					
28.894	3.027	0.574	-95.05	-49.39	2	47.44	31.96	18750	0					
28.625	3.179	0.555	-106.57	-36.19	2	50.81	33.14	18750	0					
28.356	3.325	0.533	-114.42	-22.09	2	54.07	33.16	18750	0					
28.087	3.465	0.511	-118.37	-7.15	2	57.18	33.16	18750	0					
27.819	3.600	0.488	-118.19	8.62	2	60.14	33.16	18750	0					
27.550	3.728	0.466	-113.66	25.16	2	62.92	33.16	18750	0					
					2	75.87	24.89	60000	0					
27.272	3.855	0.444	-103.69	46.69	2	78.96	24.89	60000	0					
26.994	3.975	0.425	-87.63	68.97	2	81.24	24.89	60000	0					
26.716	4.091	0.410	-65.28	91.75	2	82.61	24.89	60000	0					
26.438	4.204	0.400	-36.57	114.78	2	82.96	24.89	60000	0					
26.159	4.314	0.396	-1.45	137.74	2	82.15	24.89	60000	0					
25.881	4.425	0.400	40.01	160.29	2	80.06	24.89	60000	0					
25.603	4.538	0.412	87.64	182.07	2	76.51	24.89	60000	0					
25.325	4.655	0.435	141.17	202.63	2	71.37	24.89	60000	0					
25.047	4.781	0.469	200.20	221.52	2	64.44	24.89	60000	0					
24.769	4.917	0.515	264.19	238.21	2	55.58	21.74	60000	0					
24.491	5.068	0.574	332.53	253.05	2	51.18	15.54	60000	0					
24.212	5.237	0.647	404.92	267.54	2	53.00	15.54	60000	0					
23.934	5.429	0.735	481.40	282.53	2	54.81	15.54	60000	0					
23.656	5.648	0.838	562.12	298.03	1	56.63	15.54	60000	0					
23.378	5.897	0.958	647.23	314.03	1	58.44	15.54	60000	0					
23.100	6.182	1.095	736.85	330.54	1	60.26	15.54	60000	0					
				-486.29	1	60.26	15.54	60000	0				2	-816.83
22.600	6.788	1.316	501.38	-455.35	1	63.52	15.54	60000	0					
22.175	7.376	1.439	313.67	-427.76	1	66.29	15.54	60000	0					
21.750	8.003	1.507	137.95	-399.00	1	69.07	15.54	60000	0					
21.325	8.649	1.524	-25.31	-369.05	1	71.84	15.54	60000	0					
20.900	9.292	1.493	-175.58	-337.93	1	74.61	15.54	60000	0					
					1	76.23	18.97	47500	0					
20.556	9.796	1.436	-287.19	-311.29	1	78.78	18.97	47500	0					
20.212	10.276	1.353	-389.49	-283.77	1	81.32	18.97	47500	0					
19.869	10.723	1.246	-482.19	-255.38	1	83.86	18.97	47500	0					
19.525	11.130	1.117	-564.97	-226.12	1	86.40	18.97	47500	0					
19.181	11.489	0.970	-637.54	-195.98	1	88.95	18.97	47500	0					
18.837	11.795	0.805	-699.61	-164.97	1	91.49	18.97	47500	0					
18.494	12.041	0.627	-750.86	-133.08	1	94.03	18.97	47500	0					
18.150	12.225	0.438	-791.00	-100.32	1	96.57	18.97	47500	0					
17.806	12.341	0.240	-819.73	-66.69	1	99.12	18.97	47500	0					
17.462	12.389	0.037	-836.75	-32.18	1	101.66	18.97	47500	0					
17.119	12.367	-0.169	-841.75	3.21	1	104.20	18.97	47500	0					
16.775	12.273	-0.375	-834.44	39.46	1	106.75	18.97	47500	0					
16.431	12.109	-0.577	-814.52	76.59	1	109.29	18.97	47500	0					
16.087	11.877	-0.773	-781.69	114.60	1	111.83	18.97	47500	0					
15.744	11.579	-0.959	-735.63	153.48	1	114.37	18.97	47500	0					
15.400	11.219	-1.133	-676.07	193.23	1	116.92	18.97	47500	0					
				193.23	1	116.92	18.97	47500	0				3	0.00
15.000	10.729	-1.314	-589.35	240.59	1	119.88	18.97	47500	0					
					1	119.88	18.97	47500	3	59.00		47500		
14.625	10.209	-1.459	-495.49	258.29	1	122.65	18.97	47500	3	89.11		47500		
14.250	9.638	-1.578	-396.91	265.74	1	125.42	18.97	47500	3	119.23		47500		
13.875	9.028	-1.671	-297.46	262.93	1	128.20	18.97	47500	3	149.35		47500		
13.500	8.388	-1.738	-200.99	249.87	1	130.97	18.97	47500	3	179.47		47500		
13.125	7.728	-1.779	-111.34	226.56	1	133.75	18.97	47500	3	209.59		47500		
12.750	7.057	-1.798	-32.36	192.99	1	136.52	18.97	47500	3	239.71		47500		
12.375	6.382	-1.798	32.12	149.17	1	139.29	18.97	47500	3	269.83		47500		
12.000	5.710	-1.783	78.24	95.09	1	142.07	18.97	47500	2	299.95		47500		
11.625	5.046	-1.758	103.37	40.52	2	144.84	18.97	47500	2	278.01		47500		
11.250	4.393	-1.729	109.90	-3.87	2	147.62	18.97	47500	2	251.21		47500		
10.875	3.750	-1.700	101.84	-37.27	2	150.39	18.97	47500	2	224.93		47500		
10.500	3.117	-1.675	83.29	-59.87	2	153.17	18.97	47500	2	199.13		47500		
10.125	2.492	-1.656	58.27	-71.82	2	155.94	18.97	47500	2	173.72		47500		
9.750	1.874	-1.644	31.29	-68.89	2	181.99	29.10	47500	2	148.59		47500		
9.375	1.258	-1.639	9.18	-45.40	2	215.48	29.10	47500	2	123.61		47500		
9.000	0.644	-1.638	-0.02	0.00	2	248.93	29.10	47500	2	98.68		47500		
m	mm	/1000	kN.m/m	kN/m kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 12.39 mm
MAXIMUM MOMENT = -841.75 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR., 2 = ELASTIC
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(5 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 462.30 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.081
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.632

*** END OF CALCULUS

*** MAXIMUM DISPLACEMENT IN PHASE Nb 7 = 12.389 mm IN FINAL PHASE Nb 7 = 12.389 mm

*** MAXIMUM MOMENT IN PHASE Nb 6 = -841.752 kN.m/m IN FINAL PHASE Nb 7 = -841.752 kN.m/m

STRUT/ANCHOR		PRELOAD		MAXIMUM		FINAL STATE	
NUMBER	LEVEL	PHASE	FORCE	PHASE	FORCE	PHASE	FORCE
	m		kN		kN		kN
1	30.20	3	0.00	4	-187.70	7	-117.09
2	23.10	5	0.00	7	-816.83	7	-816.83
3	15.40	7	0.00	7	0.00	7	0.00

* ENVELOPE CURVES FROM PHASE 1 TO PHASE 7 *

LEVEL	MINI CRO.FO	MAXI CRO.FO
m	kN/m	kN/m
30.800	0.00	0.00
30.500	0.00	8.47
30.200	0.00	16.96
	-171.35	15.00
29.700	-156.61	29.74
29.431	-147.85	36.24
29.163	-138.51	38.84
28.894	-128.58	39.31
28.625	-118.06	39.76
28.356	-106.95	40.47
28.087	-95.26	41.43
27.819	-82.98	42.94
27.550	-70.11	45.35
27.272	-61.18	46.69
26.994	-51.74	68.97
26.716	-41.79	91.75
26.438	-31.34	114.78
26.159	-20.39	137.74
25.881	-10.76	160.29
25.603	-16.88	182.07
25.325	-21.54	202.63
25.047	-24.84	221.52
24.769	-26.99	238.21
24.491	-28.18	253.05
24.212	-28.61	267.54
23.934	-28.42	282.53
23.656	-27.78	298.03
23.378	-26.82	314.03
23.100	-25.66	330.54
	-486.29	133.43
22.600	-455.35	164.38
22.175	-427.76	178.16
21.750	-399.00	174.05
21.325	-369.05	152.05
20.900	-337.93	112.15
20.556	-311.29	85.18
20.212	-283.77	61.24
19.869	-255.38	40.10
19.525	-226.12	21.51
19.181	-195.98	5.21
18.837	-164.97	0.00
18.494	-133.08	0.00
18.150	-100.32	0.46
17.806	-66.69	1.31
17.462	-44.54	2.00
17.119	-47.08	3.21
16.775	-47.75	39.46
16.431	-46.94	76.59
16.087	-45.00	114.60
15.744	-42.21	153.48
15.400	-38.84	193.23
15.000	-34.47	240.59
14.625	-30.16	258.29
14.250	-25.83	265.74
13.875	-21.62	262.94
13.500	-17.64	249.88
13.125	-13.97	226.56
12.750	-10.65	192.99
12.375	-7.72	149.17
12.000	-5.21	95.09
11.625	-3.11	40.52
11.250	-3.87	0.30
10.875	-37.27	0.18
10.500	-59.87	0.68
10.125	-71.82	1.11
9.750	-68.89	1.14
9.375	-45.40	0.77
9.000	-0.01	0.00

LEVEL	MINI MOMENT	MAXI MOMENT
m	kN.m/m	kN.m/m
30.800	0.00	0.00
30.500	0.00	1.30
30.200	0.00	5.08
	0.00	5.08
29.700	-77.08	15.45
29.431	-118.00	24.41
29.163	-156.50	34.58
28.894	-192.40	45.09
28.625	-225.55	55.71
28.356	-255.80	66.49
28.087	-282.99	77.49
27.819	-306.95	88.81
27.550	-327.53	100.65
27.272	-345.80	111.58
26.994	-361.52	119.37
26.716	-374.54	124.33
26.438	-384.72	126.73
26.159	-391.92	126.82
25.881	-396.01	124.81
25.603	-396.84	120.93
25.325	-394.27	141.17
25.047	-388.17	200.20
24.769	-378.38	264.19
24.491	-364.78	332.53
24.212	-347.22	404.92
23.934	-325.56	481.40
23.656	-299.66	562.12
23.378	-269.37	647.23
23.100	-234.57	736.85
	-234.57	736.85
22.600	-160.19	501.38
22.175	-86.76	313.67
21.750	-11.28	137.95
21.325	-25.31	58.65
20.900	-175.58	115.43
20.556	-287.19	149.25
20.212	-389.49	174.33
19.869	-482.19	191.67
19.525	-564.97	202.19
19.181	-637.54	206.73
18.837	-699.61	206.01
18.494	-750.86	200.68
18.150	-791.00	191.36
17.806	-819.73	178.93
17.462	-836.75	164.38
17.119	-841.75	148.57
16.775	-834.44	132.23
16.431	-814.52	115.91
16.087	-781.69	100.08
15.744	-735.63	85.07
15.400	-676.07	71.13
15.000	-589.35	56.46
14.625	-495.49	44.34
14.250	-396.91	33.84
13.875	-297.46	24.95
13.500	-200.99	17.60
13.125	-111.34	11.68
12.750	-32.36	7.08
12.375	-0.77	32.13
12.000	-0.49	78.25
11.625	-0.32	103.39
11.250	-1.16	109.91
10.875	-1.45	101.86
10.500	-1.34	83.31
10.125	-0.99	58.29
9.750	-0.56	31.31
9.375	-0.19	9.19
9.000	-0.03	0.00

PANTALLA TIPO 5

Proyecto: INTEGRACION DEL FERROCARRIL EN SANT FELIU
Tipo: PANTALLAS DE PILOTES
Tramo: PANTALLA TIPO 5
Fecha: 27/10/2008

CARACTERIZACIÓN DE ESTRATOS

Estratos	Potencia (m)	ϕ	Cohesión (kN/m²)	Densidad (kN/m³)	Kh (kN/m²)
Arcillas y limos	**---**	**32.3**	**13**	**19.5**	**38,000**

(*) Al no tener perfil de este tramo se ha tomado el del tramo mas cercano (Pantalla tipo 2)

Cota nivel freatico: --- m

SOBRECARGAS

Rellenos y tráfico

Rellenos:	**0.000**	m
SC Rellenos(*):	0.00	kN/m²
SC Tráfico:	**30.00**	kN/m²
Sobrecarga 1:	30.00	kN/m²
Ambito de actuación:	0-12	m

(*) Supuesta una densidad de 20 KN/m³

Edificación

n° de plantas	**0.000**	m
Carga por planta:	10.00	kN/m²
SC edficación:	**0.00**	kN/m²
Sobrecarga 2:	0.00	kN/m²
Ambito de actuación:	---	m

(*) Supuesta una carga de 10KN/m²·planta

CARACT.MECANICAS Y GOEMETRICAS DE LA PANTALLA DE PILOTES (RIGIDEZ)

DATOS			
Diametro (m):	**1.00**	Área (m²):	**0.7854**
Separación (m):	**1.25**	Inercia (m⁴):	**0.0491**
Resistencia Hormigón (N/mm²):	**30**	Rigidez (kNm²):	**1,402,760**
Ambiente:	IIa	Módulo Defor. Hormigón (kN/m²):	**28,576,791**

(*) Se ha considerado un valor Ej=8.500·∛fcm,j

HOJA PREPARADA PARA INTRODUCIR EL COMANDO "COE" (RIDO)

COTAS DE LA PANTALLA

Cota Superior Pantalla:	**33.100**	m
Cota Excavación:	32.100	m
Cota Fondo de Excavación:	**17.100**	m
Cota Pie de Pantalla:	11.600	m
Longitud Pilote:	21.500	m

RESULTADOS

Desplazamiento:	11.01	mm
Empuje Pasivo Movilizado:	65.70	%

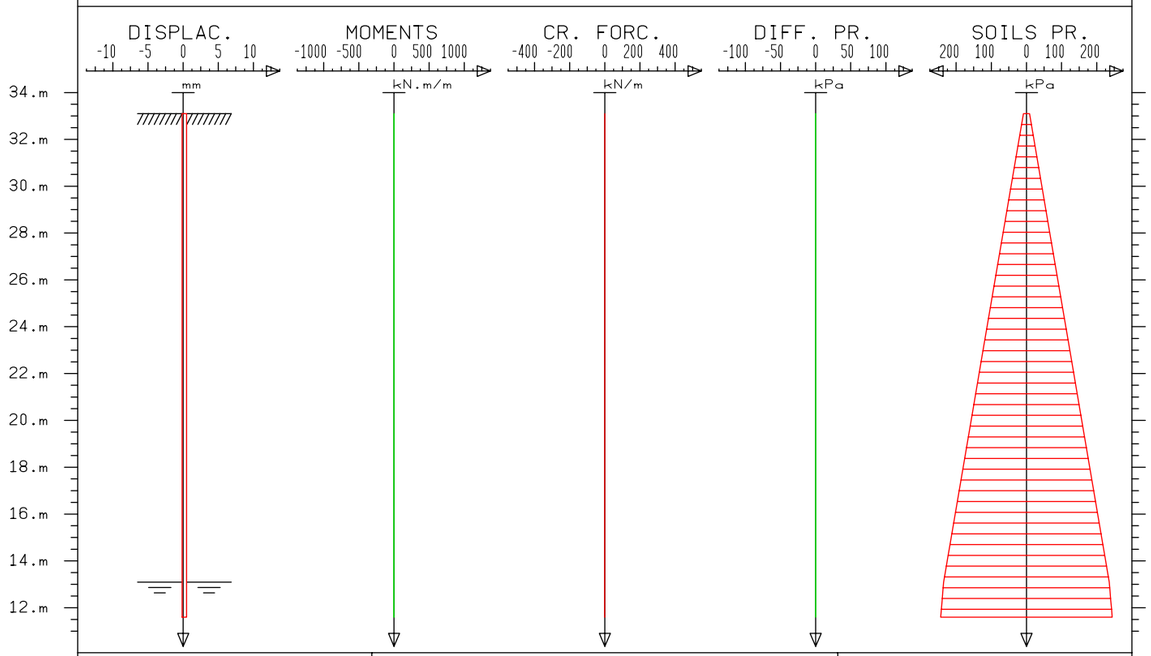
PROCESO CONSTRUCTIVO

1° Ejecución de pantalla de pilotes.
2° Excavacion previa a ejecucion de losa de cubierta.
3° Ejecución de losa de cubierta.
4° Excavación previa a ejecución de puntales intermedios.
5° Ejecución de puntales intermedios.
6° Excavación previa a ejecución de losa de solera.
7° Ejecucion de solera y conexión de esta a pantalla.

GRÁFICOS

PANTALLA PILOTES TIPO 5 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

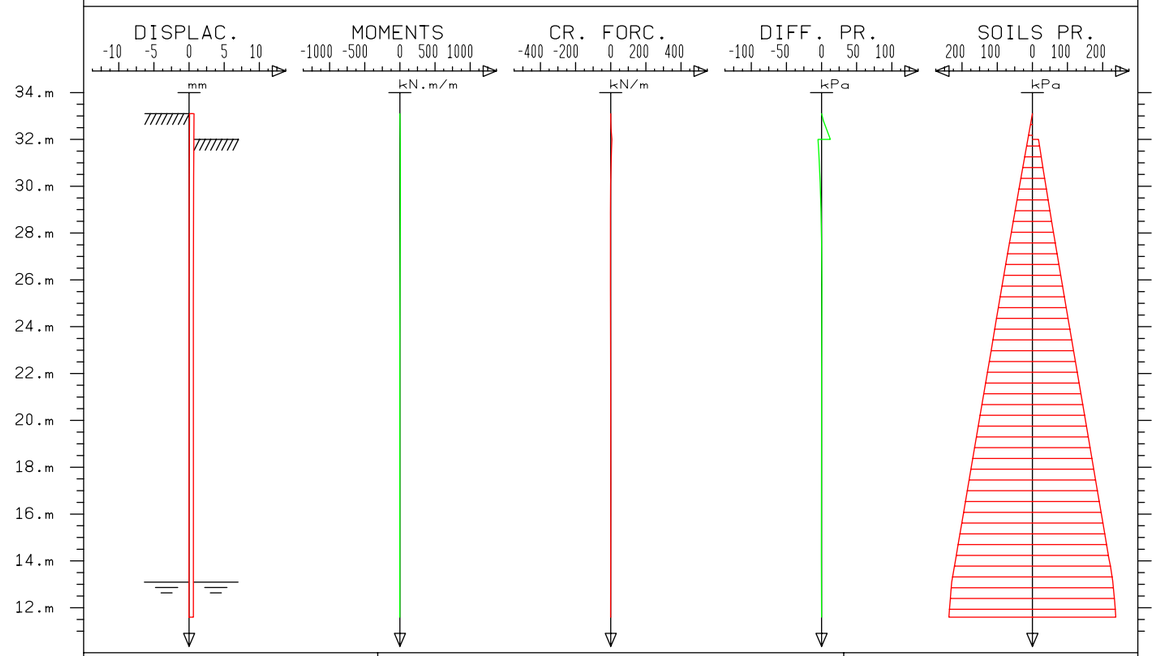
GRAPHS OF THE PHASE Nb 1



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-5

PANTALLA PILOTES TIPO 5 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

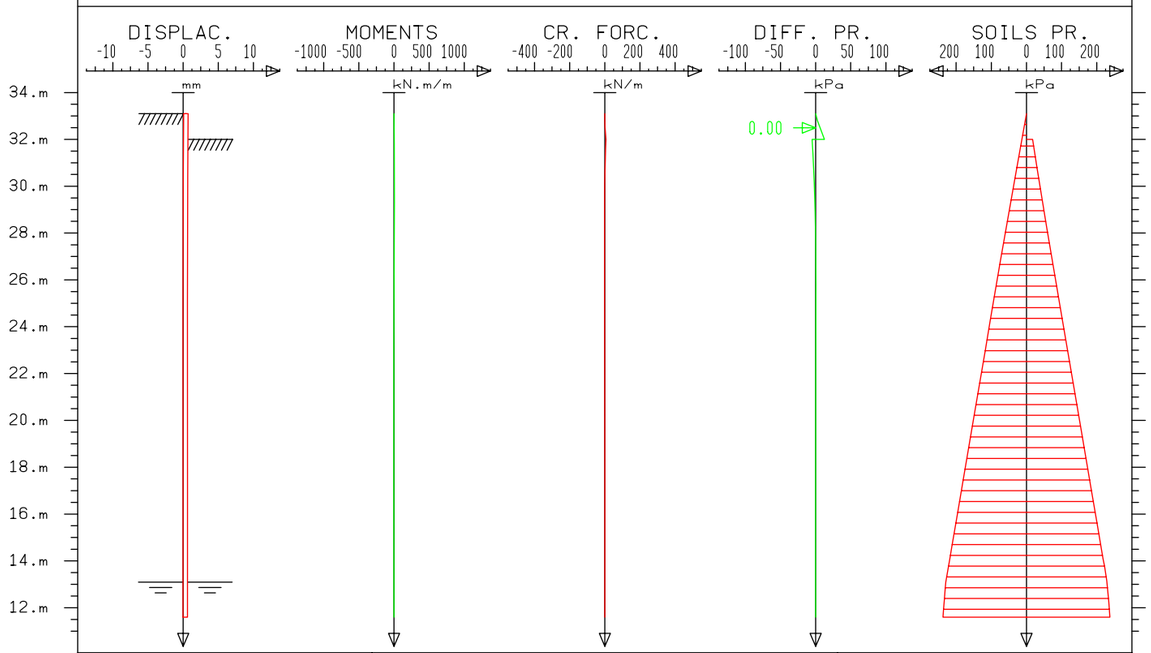
GRAPHS OF THE PHASE Nb 2



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-5

PANTALLA PILOTES TIPO 5 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

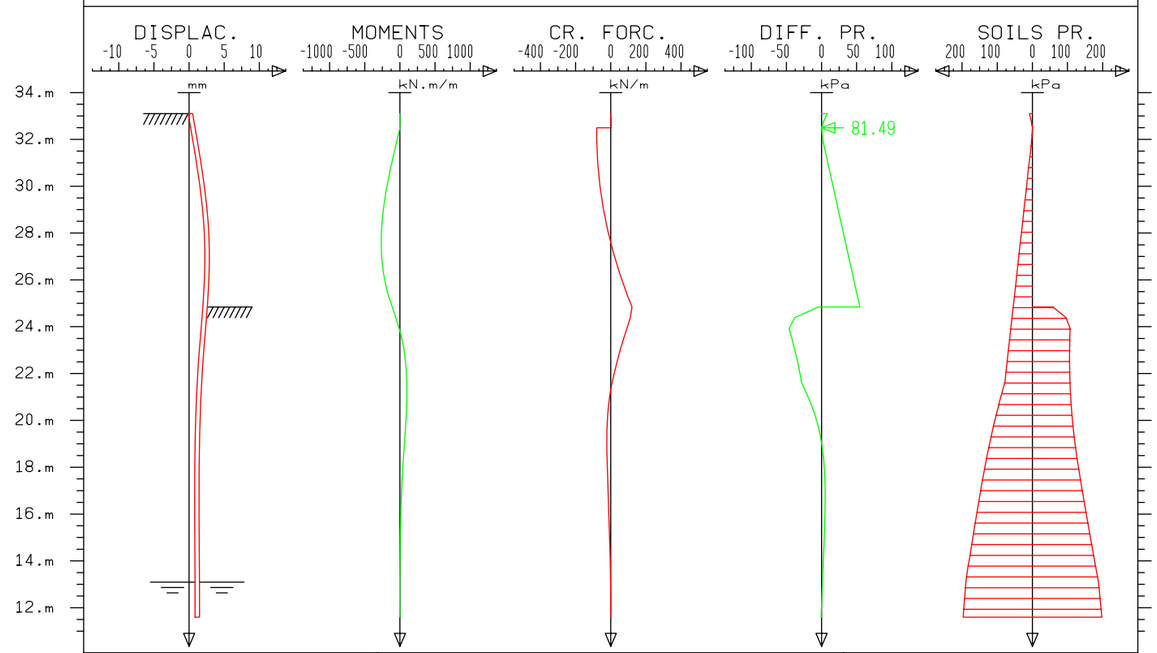
GRAPHS OF THE PHASE Nb 3



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-5

PANTALLA PILOTES TIPO 5 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

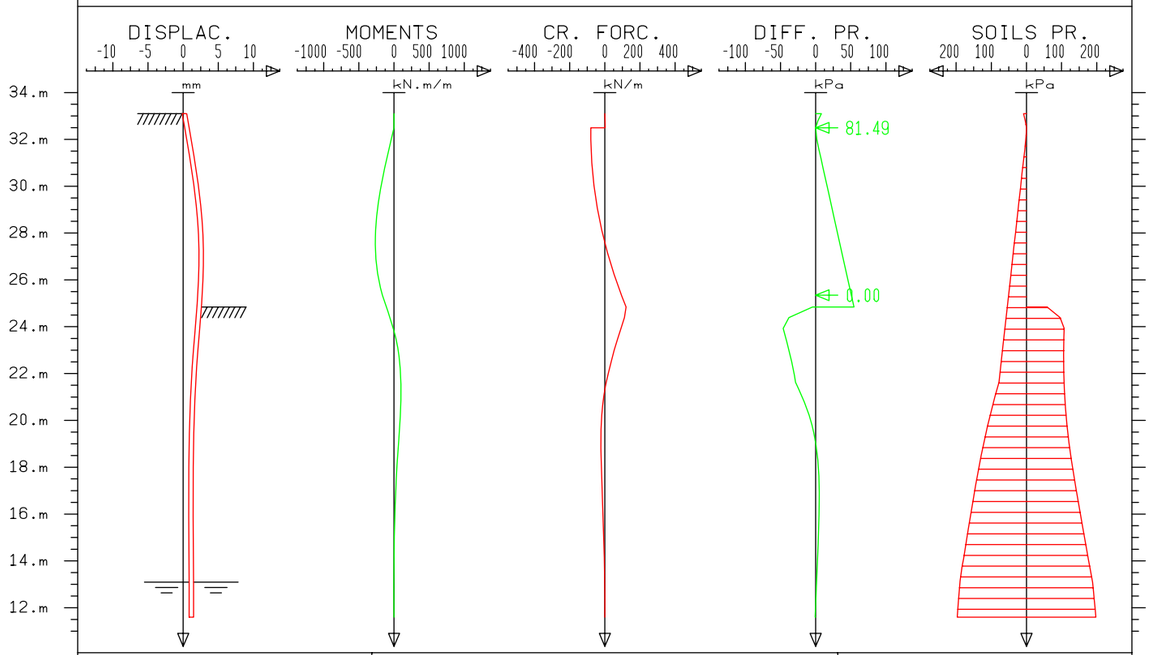
GRAPHS OF THE PHASE Nb 4



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-5

PANTALLA PILOTES TIPO 5 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

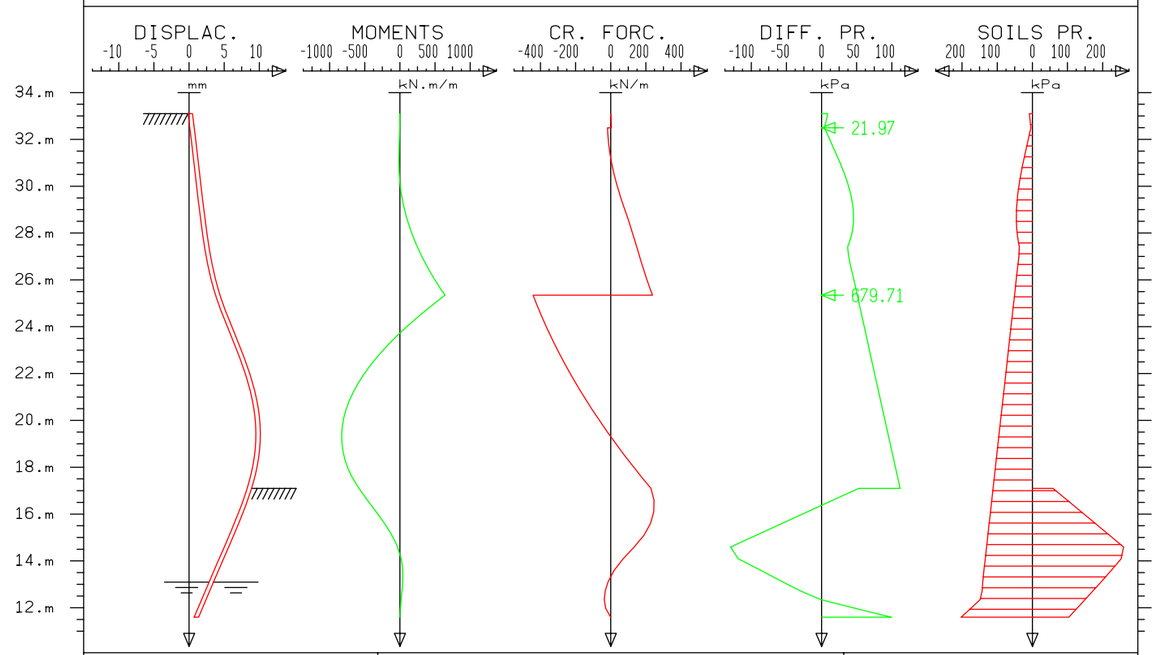
GRAPHS OF THE PHASE Nb 5



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-5

PANTALLA PILOTES TIPO 5 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

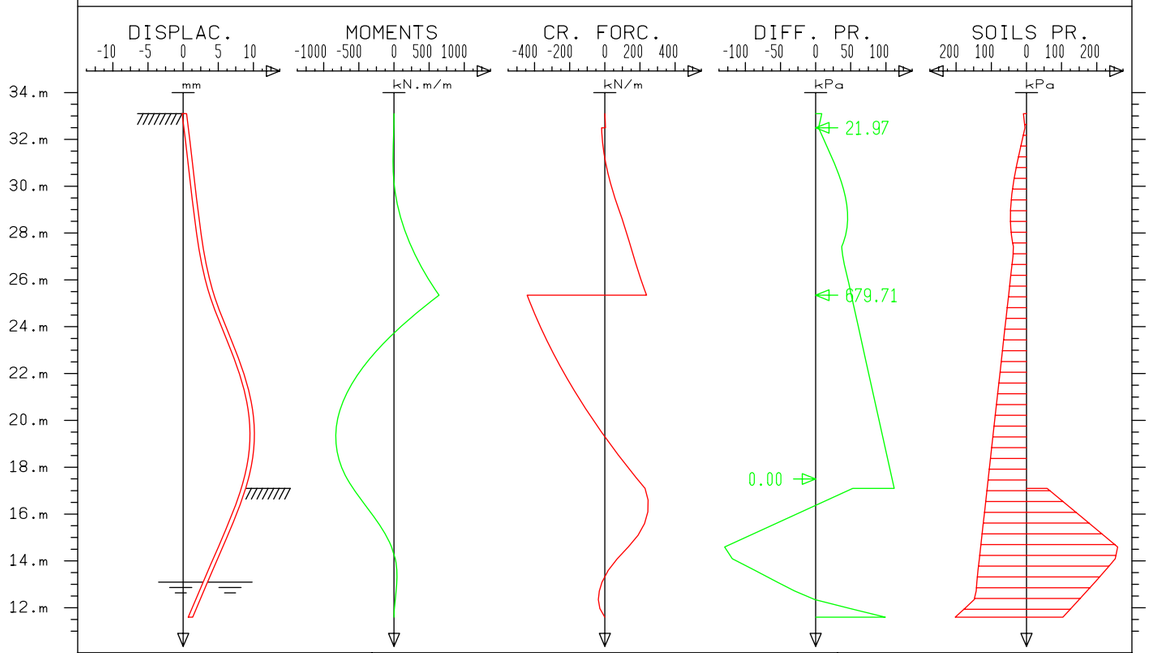
GRAPHS OF THE PHASE Nb 6



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-5

PANTALLA PILOTES TIPO 5 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

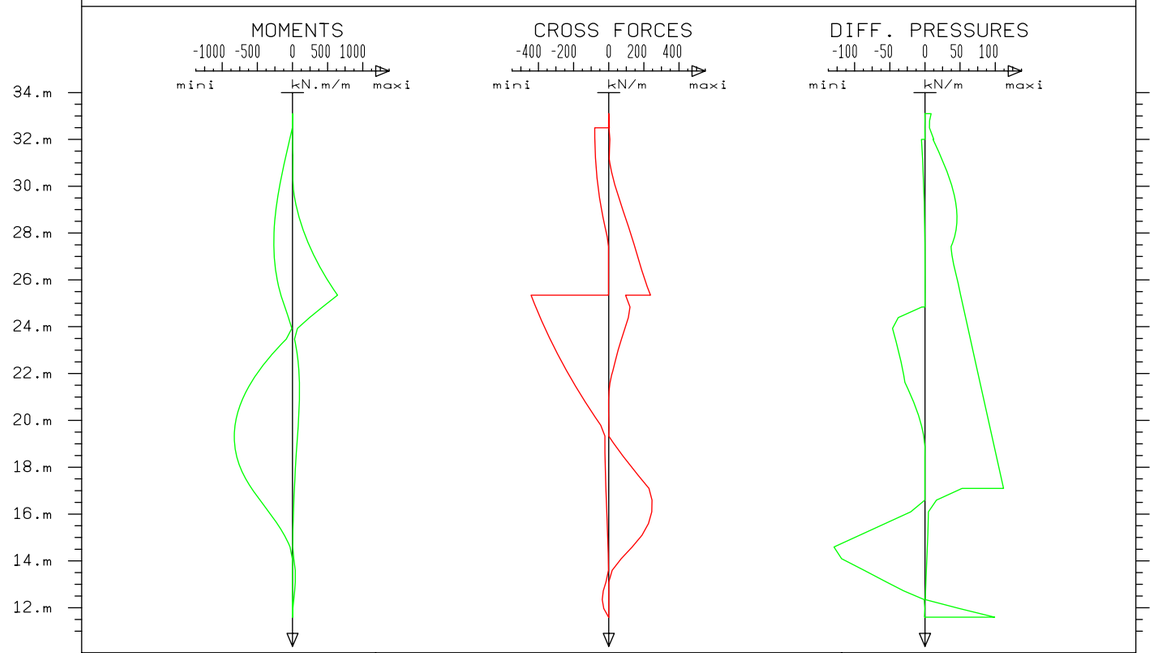
GRAPHS OF THE PHASE Nb 7



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-5

PANTALLA PILOTES TIPO 5 (FALSO TUNEL)SOTERRAMIENTO SANT FELI

ENVELOPES FROM PHASE 1 TO PHASE 7



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-5

LISTADO

```
E &l8D &k2S &a4L      ***** DATA FILE NAME : SFELIU-5.RIO

       PANTALLA PILOTES TIPO 5 (FALSO TUNEL)SOTERRAMIENTO SANT FELI    *101L  U:NN*
       *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
       #EMP=5.50
       #DIAMETRO=1.00
       #SEPARACION=1.25
       #fck=30
       #E=8500*((fck+8)^(1/3))*1000
       #I=3.14/(64)*(DIAMETRO)^4
       #RIGIDEZ=E*I
       *COTAS DE LA PANTALLA
       #CSUP=33.10
       #CEXC=CSUP-16.00
       *Nota: "CEXC" es la cota maxima de excavacion
       #CPIE=CEXC-EMP
       #NF=CSUP-20.00
       *CABEZA DE PANTALLA
       : CSUP
 1 ...  33.1
       *PANTALLA 1.00/1.25
       : CPIE RIGIDEZ
 2 ...  11.6 1402049
       *COTA MAXIMA DE TERRENO
       : CSUP
 3 ...  33.1
       *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)
       : 25.02-25.00 19.50 9.50 0 0 0 13 32.3 0 0 38000
 4 ...  0.02 19.5 9.5 0.3034816 0.4656477 3.295093 13 32.3 0 0 38000
       *NIVEL FREATICO
       : NF 0.50
 5 ...  13.1 0.5
       *FACTOR DE SEPARACION
       : COE CSUP CSUP-25.00 SEPARACION
 6 ... COE 33.1 8.1 1.25
       *SOBRECARGA 30 KN/M2 (PASO DE FERROCARRIL)
       : SUC(1) 30
 7 ... SUC(1)  30
       : CAL(2)
 8 ... CAL(2)
       *EXCAVACION PREVIA A EJECUCION DE LOSA SUPERIOR
       : EXC(2) CSUP-1.10
 9 ... EXC(2)  32
       : CAL(2)
10 ... CAL(2)
       *EJECUCION DE LOSA DE CUBIERTA
       : STR CSUP-(0.50+0.10) 1 0 0 500000
11 ... STR 32.5 1 0 0 500000
       : CAL(2)
12 ... CAL(2)
       *EXCAVACION PREVIA A EJECUCION DE PUNTALES INTERMEDIOS
       : EXC(2) 24.85
13 ... EXC(2)  24.85
       : CAL(2)
14 ... CAL(2)
       *EJECUCION DE PUNTALES INTERMEDIOS
       : STR 24.85+0.50 1 0 0 400000
15 ... STR 25.35 1 0 0 400000
       : CAL(2)
16 ... CAL(2)
       *EXCAVACION HASTA COTA DE SOLERA
       : EXC(2) CEXC
17 ... EXC(2)  17.1
       : CAL(2)
18 ... CAL(2)
       *EJECUCION DE SOLERA
       : STR CEXC+0.40 1 0 0 500000
19 ... STR 17.5 1 0 0 500000
       : CAL(2)
20 ... CAL(2)
       : END
21 ... END
       : STA
22 ... STA
       : EVP
23 ... EVP
```



```
       *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
       *COTAS DE LA PANTALLA
       *Nota: "CEXC" es la cota maxima de excavacion
       *CABEZA DE PANTALLA
       *PANTALLA 1.00/1.25

       ------------------------------------------------------------------------------

                                        ** STARTING DATA **
                                        --------------------


  * BOUSSINESQ SURCHARGES FUNCTION OF STATE OF SOIL


*** WALL DESCRIPTION :
                                                 INERTIA PRODUCT EI      CYLINDRICAL RIGIDITY
    SECTION NB  1 FROM  33.100 m  TO  11.600 m  :       1402049. kN.m2/m          0. kPa/m

       *COTA MAXIMA DE TERRENO


*** SOIL DESCRIPTION :

       *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)

     LAYER NB  1 FROM  33.100 m  TO   0.020 m  :

       SATURATED UNIT WEIGHT              GH  =     19.500 kN/m3
       SUBMERGED UNIT WEIGHT              GD  =      9.500 kN/m3
       HOR. ACTIVE PRESSURE COEFFICIENT   KA  =      0.303
       HOR. AT REST PRESSURE COEFFICIENT  K0  =      0.466
       HOR. PASSIVE PRESSURE COEFFICIENT  KP  =      3.295
       COHESION                            C  =     13.000 kPa
       ANGLE OF INTERNAL FRICTION        PHI  =     32.300 DEGREES
               FOR ACTIVE  PRESS. DELTA/PHI  =      0.000
               FOR PASSIVE PRESS. DELTA/PHI  =      0.000
       ELASTIC REACTION COEFFICIENT (AT P=0)  =  38000.000 kPa/m
       INCR. OF THIS COEFF. WITH PRESSURE     =      0.000 1/m

       *NIVEL FREATICO
```

** PHASE Nb 1 **

*FACTOR DE SEPARACION

* FROM 33.100 m TO 8.100 m COEFFICIENT APPLIED TO PRESSURES = 1.250
ADDITIONAL COEFF. ON PASSIVE PRESSURE = 1.000

*SOBRECARGA 30 KN/M2 (PASO DE FERROCARRIL)

* CAQUOT SURCHARGE ON SOIL 1 = 30.000 kPa

PHASE 1

| | WALL | SOIL 1 EXCAVATION: 33.10 m WATER LEVEL: 13.10 m CAQUOT SURC.: 30.00 kPa | SOIL 2 EXCAVATION: 33.10 m WATER LEVEL: 13.10 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	0.184	0.000	0.00	0.00		2	8.73	8.73	47500	2	8.73		47500		
32.800	0.184	0.000	0.00	0.00		2	12.14	12.14	47500	2	12.14		47500		
32.500	0.184	0.000	0.00	0.00		2	15.54	15.54	47500	2	15.54		47500		
32.000	0.184	0.000	0.00	0.00		2	21.22	17.46	47500	2	21.22		47500		
31.584	0.184	0.000	0.00	0.00		2	25.93	17.46	47500	2	25.93		47500		
31.169	0.184	0.000	0.00	0.00		2	30.65	17.46	47500	2	30.65		47500		
30.753	0.184	0.000	0.00	0.00		2	35.37	17.46	47500	2	35.37		47500		
30.337	0.184	0.000	0.00	0.00		2	40.09	17.46	47500	2	40.09		47500		
29.922	0.184	0.000	0.00	0.00		2	44.80	17.46	47500	2	44.80		47500		
29.506	0.184	0.000	0.00	0.00		2	49.52	17.46	47500	2	49.52		47500		
29.091	0.184	0.000	0.00	0.00		2	54.24	17.46	47500	2	54.24		47500		
28.675	0.184	0.000	0.00	0.00		2	58.96	17.46	47500	2	58.96		47500		
28.259	0.184	0.000	0.00	0.00		2	63.67	17.46	47500	2	63.67		47500		
27.844	0.184	0.000	0.00	0.00		2	68.39	17.46	47500	2	68.39		47500		
27.428	0.184	0.000	0.00	0.00		2	73.11	17.46	47500	2	73.11		47500		
27.013	0.184	0.000	0.00	0.00		2	77.82	17.46	47500	2	77.82		47500		
26.597	0.184	0.000	0.00	0.00		2	82.54	17.46	47500	2	82.54		47500		
26.181	0.184	0.000	0.00	0.00		2	87.26	17.46	47500	2	87.26		47500		
25.766	0.184	0.000	0.00	0.00		2	91.98	17.46	47500	2	91.98		47500		
25.350	0.184	0.000	0.00	0.00		2	96.69	17.46	47500	2	96.69		47500		
24.850	0.184	0.000	0.00	0.00		2	102.37	17.46	47500	2	102.37		47500		
24.391	0.184	0.000	0.00	0.00		2	107.58	17.46	47500	2	107.58		47500		
23.931	0.184	0.000	0.00	0.00		2	112.80	17.46	47500	2	112.80		47500		
23.472	0.184	0.000	0.00	0.00		2	118.01	17.46	47500	2	118.01		47500		
23.013	0.184	0.000	0.00	0.00		2	123.23	17.46	47500	2	123.23		47500		
22.553	0.184	0.000	0.00	0.00		2	128.44	17.46	47500	2	128.44		47500		
22.094	0.184	0.000	0.00	0.00		2	133.65	17.46	47500	2	133.65		47500		
21.634	0.184	0.000	0.00	0.00		2	138.87	17.46	47500	2	138.87		47500		
21.175	0.184	0.000	0.00	0.00		2	144.08	17.46	47500	2	144.08		47500		
20.716	0.184	0.000	0.00	0.00		2	149.30	17.46	47500	2	149.30		47500		
20.256	0.184	0.000	0.00	0.00		2	154.51	17.46	47500	2	154.51		47500		
19.797	0.184	0.000	0.00	0.00		2	159.72	17.46	47500	2	159.72		47500		
19.337	0.184	0.000	0.00	0.00		2	164.94	17.46	47500	2	164.94		47500		
18.878	0.184	0.000	0.00	0.00		2	170.15	17.46	47500	2	170.15		47500		
18.419	0.184	0.000	0.00	0.00		2	175.37	17.46	47500	2	175.37		47500		
17.959	0.184	0.000	0.00	0.00		2	180.58	17.46	47500	2	180.58		47500		
17.500	0.184	0.000	0.00	0.00		2	185.79	17.46	47500	2	185.79		47500		
17.100	0.184	0.000	0.00	0.00		2	190.33	17.46	47500	2	190.33		47500		
16.600	0.184	0.000	0.00	0.00		2	196.01	17.46	47500	2	196.01		47500		
16.100	0.184	0.000	0.00	0.00		2	201.68	17.46	47500	2	201.68		47500		
15.600	0.184	0.000	0.00	0.00		2	207.36	17.46	47500	2	207.36		47500		
15.100	0.184	0.000	0.00	0.00		2	213.03	17.46	47500	2	213.03		47500		
14.600	0.184	0.000	0.00	0.00		2	218.71	17.46	47500	2	218.71		47500		
14.100	0.184	0.000	0.00	0.00		2	224.38	17.46	47500	2	224.38		47500		
13.600	0.184	0.000	0.00	0.00		2	230.06	17.46	47500	2	230.06		47500		
13.100	0.184	0.000	0.00	0.00		2	235.73	17.46	47500	2	235.73		47500		
12.725	0.184	0.000	0.00	0.00		2	237.81	17.46	47500	2	237.81		47500		
12.350	0.184	0.000	0.00	0.00		2	239.88	17.46	47500	2	239.88		47500		
11.975	0.184	0.000	0.00	0.00		2	241.95	17.46	47500	2	241.95		47500		
11.600	0.184	0.000	0.00	0.00		2	244.03	17.46	47500	2	244.03		47500		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 0.18 mm
MAXIMUM MOMENT = 0.00 kN.m/m

CODIFICATION OF STATE OF SOIL :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(1 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 371.75 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.125
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.142

** PHASE Nb 2 **

*EXCAVACION PREVIA A EJECUCION DE LOSA SUPERIOR

* EXCAVATION IN SOIL 2 TO LEVEL = 32.000 m

PHASE 2

| | WALL | SOIL 1 EXCAVATION: 33.10 m WATER LEVEL: 13.10 m CAQUOT SURC.: 30.00 kPa | SOIL 2 EXCAVATION: 32.00 m WATER LEVEL: 13.10 m CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	0.393	-0.022	0.00	0.00		-1				0					
32.800	0.387	-0.022	0.04	0.37		2	2.49	2.49	47500	0					
32.500	0.380	-0.022	0.32	1.68		2	6.21	6.21	47500	0					
32.000	0.369	-0.022	2.19	6.33		2	12.41	12.41	47500	0					
						2	12.41	12.41	47500	2	17.54		47500		
31.584	0.360	-0.021	4.40	4.37		2	17.54	17.46	47500	2	21.84		47500		
31.169	0.352	-0.019	5.87	2.75		2	22.65	17.46	47500	2	26.16		47500		
30.753	0.345	-0.017	6.74	1.44		2	27.73	17.46	47500	2	30.52		47500		
30.337	0.338	-0.015	7.11	0.42		2	32.77	17.46	47500	2	34.92		47500		
29.922	0.332	-0.013	7.12	-0.36		2	37.77	17.46	47500	2	39.35		47500		
29.506	0.327	-0.011	6.85	-0.92		2	42.72	17.46	47500	2	43.83		47500		
29.091	0.323	-0.009	6.38	-1.30		2	47.64	17.46	47500	2	48.35		47500		
28.675	0.319	-0.007	5.79	-1.53		2	52.51	17.46	47500	2	52.91		47500		
28.259	0.317	-0.006	5.12	-1.64		2	57.36	17.46	47500	2	57.50		47500		
27.844	0.315	-0.004	4.43	-1.66		2	62.17	17.46	47500	2	62.12		47500		
27.428	0.313	-0.003	3.75	-1.61		2	66.96	17.46	47500	2	66.77		47500		
27.013	0.312	-0.002	3.10	-1.51		2	71.73	17.46	47500	2	71.44		47500		
26.597	0.312	-0.001	2.50	-1.38		2	76.47	17.46	47500	2	76.13		47500		
26.181	0.311	0.000	1.95	-1.23		2	81.21	17.46	47500	2	80.83		47500		
25.766	0.311	0.000	1.48	-1.07		2	85.93	17.46	47500	2	85.54		47500		
25.350	0.311	0.000	1.06	-0.91		2	90.64	17.46	47500	2	90.26		47500		
24.850	0.312	0.001	0.66	-0.73		2	96.30	17.46	47500	2	95.95		47500		
24.391	0.312	0.001	0.36	-0.57		2	101.50	17.46	47500	2	101.18		47500		
23.931	0.312	0.001	0.13	-0.43		2	106.70	17.46	47500	2	106.42		47500		
23.472	0.313	0.001	-0.04	-0.31		2	111.89	17.46	47500	2	111.65		47500		
23.013	0.313	0.001	-0.17	-0.21		2	117.08	17.46	47500	2	116.88		47500		
22.553	0.314	0.001	-0.24	-0.13		2	122.28	17.46	47500	2	122.12		47500		
22.094	0.314	0.001	-0.29	-0.07		2	127.47	17.46	47500	2	127.35		47500		
21.634	0.314	0.001	-0.31	-0.02		2	132.67	17.46	47500	2	132.58		47500		
21.175	0.315	0.001	-0.31	0.02		2	137.87	17.46	47500	2	137.81		47500		
20.716	0.315	0.000	-0.29	0.04		2	143.08	17.46	47500	2	143.03		47500		
20.256	0.315	0.000	-0.27	0.06		2	148.28	17.46	47500	2	148.25		47500		
19.797	0.315	0.000	-0.24	0.07		2	153.49	17.46	47500	2	153.47		47500		
19.337	0.315	0.000	-0.21	0.07		2	158.70	17.46	47500	2	158.69		47500		
18.878	0.315	0.000	-0.17	0.07		2	163.91	17.46	47500	2	163.91		47500		
18.419	0.315	0.000	-0.14	0.07		2	169.12	17.46	47500	2	169.13		47500		
17.959	0.315	0.000	-0.11	0.06		2	174.33	17.46	47500	2	174.34		47500		
17.500	0.315	0.000	-0.09	0.05		2	179.54	17.46	47500	2	179.56		47500		
17.100	0.315	0.000	-0.07	0.05		2	184.08	17.46	47500	2	184.10		47500		
16.600	0.315	0.000	-0.05	0.04		2	189.76	17.46	47500	2	189.77		47500		
16.100	0.315	0.000	-0.03	0.03		2	195.43	17.46	47500	2	195.45		47500		
15.600	0.315	0.000	-0.02	0.02		2	201.11	17.46	47500	2	201.12		47500		
15.100	0.315	0.000	-0.01	0.01		2	206.79	17.46	47500	2	206.80		47500		
14.600	0.315	0.000	0.00	0.01		2	212.46	17.46	47500	2	212.47		47500		
14.100	0.315	0.000	0.00	0.00		2	218.14	17.46	47500	2	218.15		47500		
13.600	0.315	0.000	0.00	0.00		2	223.81	17.46	47500	2	223.82		47500		
13.100	0.315	0.000	0.00	0.00		2	229.49	17.46	47500	2	229.49		47500		
12.725	0.315	0.000	0.00	0.00		2	231.56	17.46	47500	2	231.57		47500		
12.350	0.315	0.000	0.00	0.00		2	233.64	17.46	47500	2	233.64		47500		
11.975	0.315	0.000	0.00	0.00		2	235.71	17.46	47500	2	235.71		47500		
11.600	0.315	0.000	0.00	0.00		2	237.79	17.46	47500	2	237.78		47500		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 0.39 mm
MAXIMUM MOMENT = 7.12 kN.m/m

CODIFICATION OF STATE :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.
OF SOIL :

(2 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 361.50 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.119
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.149

** PHASE Nb 3 **

*EJECUCION DE LOSA DE CUBIERTA

* INSTALLATION LEVEL OF STRUTS NO 1

LEVEL	=	32.500 m
SPACE	=	1.000 m
INCLINATION	=	0.000 DEGREES
PRELOAD	=	0.000 kN
STIFFNESS	=	500000.000 kN/m

BILATERAL CONNECTION

PHASE 3

WALL					SOIL 1 EXCAVATION: 33.10 m WATER LEVEL: 13.10 m CAQUOT SURC.: 30.00 kPa				SOIL 2 EXCAVATION: 32.00 m WATER LEVEL: 13.10 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	0.393	-0.022	0.00	0.00		-1				0					
32.800	0.387	-0.022	0.04	0.37		2	2.49	2.49	47500	0					
32.500	0.380	-0.022	0.32	1.68		2	6.21	6.21	47500	0					
						2	6.21	6.21	47500	0				1	0.00
32.000	0.369	-0.022	2.19	6.33		2	12.41	12.41	47500	0					
						2	12.41	12.41	47500	2	17.54		47500		
31.584	0.360	-0.021	4.40	4.37		2	17.54	17.46	47500	2	21.84		47500		
31.169	0.352	-0.019	5.87	2.75		2	22.65	17.46	47500	2	26.16		47500		
30.753	0.345	-0.017	6.74	1.44		2	27.73	17.46	47500	2	30.52		47500		
30.337	0.338	-0.015	7.11	0.42		2	32.77	17.46	47500	2	34.92		47500		
29.922	0.332	-0.013	7.12	-0.36		2	37.77	17.46	47500	2	39.35		47500		
29.506	0.327	-0.011	6.85	-0.92		2	42.72	17.46	47500	2	43.83		47500		
29.091	0.323	-0.009	6.38	-1.30		2	47.64	17.46	47500	2	48.35		47500		
28.675	0.319	-0.007	5.79	-1.53		2	52.51	17.46	47500	2	52.91		47500		
28.259	0.317	-0.006	5.12	-1.64		2	57.36	17.46	47500	2	57.50		47500		
27.844	0.315	-0.004	4.43	-1.66		2	62.17	17.46	47500	2	62.12		47500		
27.428	0.313	-0.003	3.75	-1.61		2	66.96	17.46	47500	2	66.77		47500		
27.013	0.312	-0.002	3.10	-1.51		2	71.73	17.46	47500	2	71.44		47500		
26.597	0.312	-0.001	2.50	-1.38		2	76.47	17.46	47500	2	76.13		47500		
26.181	0.311	0.000	1.95	-1.23		2	81.21	17.46	47500	2	80.83		47500		
25.766	0.311	0.000	1.48	-1.07		2	85.93	17.46	47500	2	85.54		47500		
25.350	0.311	0.000	1.06	-0.91		2	90.64	17.46	47500	2	90.26		47500		
24.850	0.312	0.001	0.66	-0.73		2	96.30	17.46	47500	2	95.95		47500		
24.391	0.312	0.001	0.36	-0.57		2	101.50	17.46	47500	2	101.18		47500		
23.931	0.312	0.001	0.13	-0.43		2	106.70	17.46	47500	2	106.42		47500		
23.472	0.313	0.001	-0.04	-0.31		2	111.89	17.46	47500	2	111.65		47500		
23.013	0.313	0.001	-0.17	-0.21		2	117.08	17.46	47500	2	116.88		47500		
22.553	0.314	0.001	-0.24	-0.13		2	122.28	17.46	47500	2	122.12		47500		
22.094	0.314	0.001	-0.29	-0.07		2	127.47	17.46	47500	2	127.35		47500		
21.634	0.314	0.001	-0.31	-0.02		2	132.67	17.46	47500	2	132.58		47500		
21.175	0.315	0.001	-0.31	0.02		2	137.87	17.46	47500	2	137.81		47500		
20.716	0.315	0.000	-0.29	0.04		2	143.08	17.46	47500	2	143.03		47500		
20.256	0.315	0.000	-0.27	0.06		2	148.28	17.46	47500	2	148.25		47500		
19.797	0.315	0.000	-0.24	0.07		2	153.49	17.46	47500	2	153.48		47500		
19.337	0.315	0.000	-0.21	0.07		2	158.70	17.46	47500	2	158.69		47500		
18.878	0.315	0.000	-0.17	0.07		2	163.91	17.46	47500	2	163.91		47500		
18.419	0.315	0.000	-0.14	0.07		2	169.12	17.46	47500	2	169.13		47500		
17.959	0.315	0.000	-0.11	0.06		2	174.33	17.46	47500	2	174.34		47500		
17.500	0.315	0.000	-0.09	0.05		2	179.54	17.46	47500	2	179.56		47500		
17.100	0.315	0.000	-0.07	0.05		2	184.08	17.46	47500	2	184.10		47500		
16.600	0.315	0.000	-0.05	0.04		2	189.76	17.46	47500	2	189.77		47500		
16.100	0.315	0.000	-0.03	0.03		2	195.43	17.46	47500	2	195.45		47500		
15.600	0.315	0.000	-0.02	0.02		2	201.11	17.46	47500	2	201.12		47500		
15.100	0.315	0.000	-0.01	0.01		2	206.79	17.46	47500	2	206.80		47500		
14.600	0.315	0.000	-0.01	0.01		2	212.46	17.46	47500	2	212.47		47500		
14.100	0.315	0.000	0.00	0.00		2	218.14	17.46	47500	2	218.15		47500		
13.600	0.315	0.000	0.00	0.00		2	223.81	17.46	47500	2	223.82		47500		
13.100	0.315	0.000	0.00	0.00		2	229.49	17.46	47500	2	229.49		47500		
12.725	0.315	0.000	0.00	0.00		2	231.56	17.46	47500	2	231.57		47500		
12.350	0.315	0.000	-0.01	0.00		2	233.64	17.46	47500	2	233.64		47500		
11.975	0.315	0.000	-0.01	0.00		2	235.71	17.46	47500	2	235.71		47500		
11.600	0.315	0.000	-0.01	0.00		2	237.79	17.46	47500	2	237.78		47500		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 0.39 mm

MAXIMUM MOMENT = 7.12 kN.m/m

CODIFICATION OF STATE OF SOIL :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(2 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 361.50 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.119
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.149

** PHASE Nb 4 **

*EXCAVACION PREVIA A EJECUCION DE PUNTALES INTERMEDIOS

* EXCAVATION IN SOIL 2 TO LEVEL = 24.850 m

PHASE 4

	WALL					SOIL 1 EXCAVATION: 33.10 m WATER LEVEL: 13.10 m CAQUOT SURC.: 30.00 kPa				SOIL 2 EXCAVATION: 24.85 m WATER LEVEL: 13.10 m CAQUOT SURC.: 0.00 kPa			STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB LOAD
33.100	0.145	0.661	0.00	0.00		2	10.56	10.56	47500	0				
32.800	0.344	0.661	0.38	2.27		2	4.55	4.55	47500	0				
32.500	0.542	0.661	1.20	2.95		-1				0				
				-77.80		-1				0				1 -80.75
32.000	0.871	0.654	-37.63	-77.40		1	1.61	1.61	47500	0				
31.584	1.140	0.638	-69.58	-76.09		1	4.69	4.69	47500	0				
31.169	1.400	0.613	-100.71	-73.50		1	7.76	7.76	47500	0				
30.753	1.648	0.579	-130.50	-69.64		1	10.84	10.84	47500	0				
30.337	1.880	0.536	-158.42	-64.50		1	13.91	11.38	47500	0				
29.922	2.093	0.485	-183.93	-58.07		1	16.99	11.38	47500	0				
29.506	2.283	0.427	-206.52	-50.38		1	20.06	11.38	47500	0				
29.091	2.447	0.363	-225.63	-41.40		1	23.14	11.38	47500	0				
28.675	2.584	0.294	-240.75	-31.14		1	26.21	11.38	47500	0				
28.259	2.691	0.221	-251.34	-19.61		1	29.28	11.38	47500	0				
27.844	2.767	0.145	-256.88	-6.80		1	32.36	11.38	47500	0				
27.428	2.812	0.069	-256.82	7.29		1	35.43	11.38	47500	0				
27.013	2.824	-0.006	-250.64	22.65		1	38.51	11.38	47500	0				
26.597	2.807	-0.079	-237.81	39.30		1	41.58	11.38	47500	0				
26.181	2.760	-0.147	-217.80	57.22		1	44.66	11.38	47500	0				
25.766	2.686	-0.207	-190.08	76.42		1	47.73	11.38	47500	0				
25.350	2.589	-0.259	-154.10	96.89		1	50.81	11.38	47500	0				
24.850	2.447	-0.304	-99.15	123.22		1	54.50	11.38	47500	0				
						1	54.50	11.38	47500	3	59.00		47500	
24.391	2.301	-0.327	-44.20	113.47		1	57.90	11.38	47500	3	95.89		47500	
23.931	2.149	-0.334	3.45	92.98		1	61.30	11.38	47500	2	112.50		47500	
23.472	1.997	-0.326	40.95	70.71		1	64.70	11.38	47500	2	110.49		47500	
23.013	1.851	-0.308	68.78	50.85		1	68.10	11.38	47500	2	108.76		47500	
22.553	1.715	-0.282	88.01	33.23		1	71.50	11.38	47500	2	107.53		47500	
22.094	1.592	-0.251	99.62	17.60		1	74.89	11.38	47500	2	106.91		47500	
21.634	1.484	-0.218	104.44	3.65		1	78.29	11.38	47500	2	107.01		47500	
21.175	1.392	-0.183	103.36	-7.81		2	86.68	16.37	47500	2	107.85		47500	
20.716	1.316	-0.150	97.79	-15.86		2	95.53	17.46	47500	2	109.42		47500	
20.256	1.254	-0.120	89.25	-20.89		2	103.69	17.46	47500	2	111.70		47500	
19.797	1.205	-0.092	78.97	-23.51		2	111.20	17.46	47500	2	114.60		47500	
19.337	1.169	-0.068	67.93	-24.27		2	118.16	17.46	47500	2	118.08		47500	
18.878	1.142	-0.048	56.88	-23.66		2	124.63	17.46	47500	2	122.04		47500	
18.419	1.124	-0.031	46.34	-22.08		2	130.69	17.46	47500	2	126.40		47500	
17.959	1.114	-0.017	36.69	-19.88		2	136.42	17.46	47500	2	131.10		47500	
17.500	1.108	-0.007	28.13	-17.32		2	141.88	17.46	47500	2	136.06		47500	
17.100	1.107	0.001	21.67	-14.97		2	146.48	17.46	47500	2	140.55		47500	
16.600	1.109	0.007	14.92	-12.06		2	152.06	17.46	47500	2	146.32		47500	
16.100	1.114	0.011	9.59	-9.30		2	157.51	17.46	47500	2	152.22		47500	
15.600	1.120	0.014	5.58	-6.81		2	162.88	17.46	47500	2	158.20		47500	
15.100	1.128	0.015	2.73	-4.64		2	168.20	17.46	47500	2	164.23		47500	
14.600	1.136	0.016	0.87	-2.84		2	173.50	17.46	47500	2	170.28		47500	
14.100	1.144	0.016	-0.17	-1.42		2	178.79	17.46	47500	2	176.34		47500	
13.600	1.152	0.016	-0.61	-0.38		2	184.08	17.46	47500	2	182.40		47500	
13.100	1.160	0.016	-0.62	0.27		2	189.38	17.46	47500	2	188.45		47500	
12.725	1.166	0.016	-0.47	0.52		2	191.17	17.46	47500	2	190.80		47500	
12.350	1.171	0.016	-0.26	0.55		2	192.97	17.46	47500	2	193.15		47500	
11.975	1.177	0.016	-0.08	0.38		2	194.77	17.46	47500	2	195.51		47500	
11.600	1.183	0.016	0.00	0.00		2	196.56	17.46	47500	2	197.86		47500	
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN

MAXIMUM DISPLACEMENT = 2.82 mm

MAXIMUM MOMENT = -256.88 kN.m/m

CODIFICATION OF STATE OF SOIL :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 288.10 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.085
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.234

** PHASE Nb 5 **

*EJECUCION DE PUNTALES INTERMEDIOS

* INSTALLATION LEVEL OF STRUTS NO 2

LEVEL = 25.350 m
SPACE = 1.000 m
INCLINATION = 0.000 DEGREES
PRELOAD = 0.000 kN
STIFFNESS = 400000.000 kN/m
BILATERAL CONNECTION

PHASE 5

	WALL					SOIL 1 EXCAVATION: 33.10 m WATER LEVEL: 13.10 m CAQUOT SURC.: 30.00 kPa				SOIL 2 EXCAVATION: 24.85 m WATER LEVEL: 13.10 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	0.145	0.661	0.00	0.00		2	10.56	10.56	47500	0					
32.800	0.344	0.661	0.38	2.27		2	4.55	4.55	47500	0					
32.500	0.542	0.661	1.20	2.95		-1				0					
				-77.80		-1				0				1	-80.75
32.000	0.871	0.654	-37.63	-77.40		2	1.61	1.61	47500	0					
31.584	1.140	0.638	-69.58	-76.09		2	4.69	4.69	47500	0					
31.169	1.400	0.613	-100.71	-73.50		2	7.76	7.76	47500	0					
30.753	1.648	0.579	-130.50	-69.64		2	10.84	10.84	47500	0					
30.337	1.880	0.536	-158.42	-64.50		2	13.91	11.38	47500	0					
29.922	2.093	0.485	-183.93	-58.07		2	16.99	11.38	47500	0					
29.506	2.283	0.427	-206.52	-50.38		2	20.06	11.38	47500	0					
29.091	2.447	0.363	-225.63	-41.40		2	23.14	11.38	47500	0					
28.675	2.584	0.294	-240.75	-31.14		2	26.21	11.38	47500	0					
28.259	2.691	0.221	-251.34	-19.61		2	29.28	11.38	47500	0					
27.844	2.767	0.145	-256.88	-6.80		2	32.36	11.38	47500	0					
27.428	2.812	0.069	-256.82	7.29		2	35.43	11.38	47500	0					
27.013	2.824	-0.006	-250.64	22.65		2	38.51	11.38	47500	0					
26.597	2.807	-0.079	-237.81	39.30		2	41.58	11.38	47500	0					
26.181	2.760	-0.147	-217.80	57.22		2	44.66	11.38	47500	0					
25.766	2.686	-0.207	-190.08	76.42		1	47.73	11.38	47500	0					
25.350	2.589	-0.259	-154.10	96.89		1	50.81	11.38	47500	0					
						1	50.81	11.38	47500	0				2	0.00
24.850	2.447	-0.304	-99.15	123.22		1	54.50	11.38	47500	0					
						1	54.50	11.38	47500	2	59.00		47500		
24.391	2.301	-0.327	-44.20	113.47		1	57.90	11.38	47500	2	95.89		47500		
23.931	2.149	-0.334	3.45	92.98		1	61.30	11.38	47500	2	112.50		47500		
23.472	1.997	-0.326	40.95	70.71		1	64.70	11.38	47500	2	110.49		47500		
23.013	1.851	-0.308	68.78	50.85		1	68.10	11.38	47500	2	108.76		47500		
22.553	1.715	-0.282	88.01	33.23		1	71.50	11.38	47500	2	107.53		47500		
22.094	1.592	-0.251	99.62	17.60		1	74.89	11.38	47500	2	106.91		47500		
21.634	1.484	-0.218	104.44	3.65		1	78.29	11.38	47500	2	107.01		47500		
21.175	1.392	-0.183	103.36	-7.81		2	86.68	16.37	47500	2	107.85		47500		
20.716	1.316	-0.150	97.80	-15.86		2	95.53	17.46	47500	2	109.42		47500		
20.256	1.254	-0.120	89.25	-20.89		2	103.68	17.46	47500	2	111.70		47500		
19.797	1.205	-0.092	78.97	-23.51		2	111.20	17.46	47500	2	114.60		47500		
19.337	1.169	-0.068	67.93	-24.27		2	118.16	17.46	47500	2	118.08		47500		
18.878	1.142	-0.048	56.88	-23.66		2	124.63	17.46	47500	2	122.04		47500		
18.419	1.124	-0.031	46.34	-22.08		2	130.69	17.46	47500	2	126.40		47500		
17.959	1.114	-0.017	36.69	-19.88		2	136.42	17.46	47500	2	131.10		47500		
17.500	1.108	-0.007	28.13	-17.32		2	141.88	17.46	47500	2	136.06		47500		
17.100	1.107	0.001	21.67	-14.97		2	146.48	17.46	47500	2	140.55		47500		
16.600	1.109	0.007	14.92	-12.06		2	152.06	17.46	47500	2	146.32		47500		
16.100	1.114	0.011	9.59	-9.30		2	157.51	17.46	47500	2	152.22		47500		
15.600	1.120	0.014	5.57	-6.81		2	162.88	17.46	47500	2	158.20		47500		
15.100	1.128	0.015	2.72	-4.64		2	168.20	17.46	47500	2	164.23		47500		
14.600	1.136	0.016	0.87	-2.84		2	173.50	17.46	47500	2	170.28		47500		
14.100	1.144	0.016	-0.18	-1.42		2	178.79	17.46	47500	2	176.34		47500		
13.600	1.152	0.016	-0.62	-0.39		2	184.08	17.46	47500	2	182.39		47500		
13.100	1.160	0.016	-0.63	0.27		2	189.38	17.46	47500	2	188.45		47500		
12.725	1.166	0.016	-0.48	0.52		2	191.17	17.46	47500	2	190.80		47500		
12.350	1.171	0.016	-0.27	0.55		2	192.97	17.46	47500	2	193.15		47500		
11.975	1.177	0.016	-0.09	0.38		2	194.77	17.46	47500	2	195.50		47500		
11.600	1.183	0.016	-0.01	0.00		2	196.56	17.46	47500	2	197.85		47500		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 2.82 mm
MAXIMUM MOMENT = -256.88 kN.m/m

CODIFICATION OF STATE :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
CODIFICATION OF SOIL :
3 = PASSIVE PR.

(2 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 288.10 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.085
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.234

** PHASE Nb 6 **

*EXCAVACION HASTA COTA DE SOLERA

* EXCAVATION IN SOIL 2 TO LEVEL = 17.100 m

PHASE 6

| | WALL | SOIL 1 EXCAVATION: 33.10 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 30.00 kPa | SOIL 2 EXCAVATION: 17.10 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO. SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	0.183	0.431	0.00	0.00	2	8.76	8.76	47500	0					
32.800	0.313	0.431	0.35	2.22	2	6.02	6.02	47500	0					
32.500	0.442	0.432	1.25	3.61	2	3.28	3.28	47500	0					
				-27.29	2	3.28	3.28	47500	0				1	-30.90
32.000	0.658	0.430	-11.63	-23.53	2	11.76	11.76	47500	0					
31.584	0.835	0.425	-20.19	-17.10	2	19.17	17.46	47500	0					
31.169	1.010	0.418	-25.43	-7.66	2	26.29	17.46	47500	0					
30.753	1.183	0.410	-26.15	4.66	2	32.97	17.46	47500	0					
30.337	1.352	0.403	-21.20	19.62	2	39.03	17.46	47500	0					
29.922	1.518	0.398	-9.52	36.94	2	44.30	17.46	47500	0					
29.506	1.683	0.398	9.78	56.23	2	48.53	17.46	47500	0					
29.091	1.850	0.405	37.43	77.02	2	51.50	17.46	47500	0					
28.675	2.021	0.421	73.93	98.72	2	52.93	17.46	47500	0					
28.259	2.202	0.450	119.52	120.63	2	52.51	17.46	47500	0					
27.844	2.397	0.493	174.12	141.92	2	49.93	17.46	47500	0					
27.428	2.614	0.554	237.27	161.61	2	44.81	17.46	47500	0					
27.013	2.860	0.634	308.12	178.92	1	38.51	11.38	47500	0					
26.597	3.144	0.737	385.90	195.57	1	41.58	11.38	47500	0					
26.181	3.476	0.864	470.87	213.49	1	44.66	11.38	47500	0					
25.766	3.866	1.017	563.54	232.69	1	47.73	11.38	47500	0					
25.350	4.326	1.199	664.47	253.17	1	50.81	11.38	47500	0					
				-441.73	1	50.81	11.38	47500	0				2	-694.89
24.850	4.978	1.397	450.11	-415.40	1	54.50	11.38	47500	0					
24.391	5.649	1.514	265.16	-389.58	1	57.90	11.38	47500	0					
23.931	6.360	1.572	92.42	-362.20	1	61.30	11.38	47500	0					
23.472	7.085	1.576	-67.38	-333.26	1	64.70	11.38	47500	0					
23.013	7.800	1.530	-213.52	-302.76	1	68.10	11.38	47500	0					
22.553	8.484	1.438	-345.30	-270.69	1	71.50	11.38	47500	0					
22.094	9.115	1.305	-461.98	-237.07	1	74.89	11.38	47500	0					
21.634	9.677	1.137	-562.86	-201.89	1	78.29	11.38	47500	0					
21.175	10.155	0.938	-647.23	-165.14	1	81.69	11.38	47500	0					
20.716	10.535	0.714	-714.35	-126.83	1	85.09	11.38	47500	0					
20.256	10.808	0.472	-763.51	-86.96	1	88.49	11.38	47500	0					
19.797	10.967	0.216	-794.01	-45.54	1	91.88	11.38	47500	0					
19.337	11.006	-0.046	-805.11	-2.55	1	95.28	11.38	47500	0					
18.878	10.924	-0.309	-796.11	42.01	1	98.68	11.38	47500	0					
18.419	10.723	-0.566	-766.28	88.12	1	102.08	11.38	47500	0					
17.959	10.406	-0.809	-714.91	135.79	1	105.48	11.38	47500	0					
17.500	9.983	-1.032	-641.28	185.02	1	108.88	11.38	47500	0					
17.100	9.535	-1.203	-558.48	229.17	1	111.83	11.38	47500	0					
					1	111.83	11.38	47500	3	59.00		47500		
16.600	8.887	-1.381	-438.82	246.47	1	115.53	11.38	47500	3	99.15		47500		
16.100	8.161	-1.516	-315.05	245.55	1	119.23	11.38	47500	3	139.31		47500		
15.600	7.378	-1.607	-196.31	226.39	1	122.93	11.38	47500	3	179.47		47500		
15.100	6.561	-1.658	-91.70	189.00	1	126.63	11.38	47500	3	219.63		47500		
14.600	5.726	-1.675	-10.34	133.39	1	130.33	11.38	47500	3	259.79		47500		
14.100	4.890	-1.669	40.05	67.95	1	134.03	11.38	47500	2	266.31		47500		
13.600	4.060	-1.650	59.05	11.17	1	137.73	11.38	47500	2	232.56		47500		
13.100	3.240	-1.629	54.33	-27.00	1	141.42	11.38	47500	2	199.29		47500		
12.725	2.631	-1.616	40.79	-43.42	1	142.78	11.38	47500	2	172.46		47500		
12.350	2.027	-1.608	23.27	-47.77	2	152.33	17.46	47500	2	145.83		47500		
11.975	1.425	-1.604	7.16	-34.60	2	183.00	17.46	47500	2	119.30		47500		
11.600	0.824	-1.603	0.00	0.00	2	213.64	17.46	47500	2	92.82		47500		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa	kPa	kPa/m	kPa			kPa/m		kN

MAXIMUM DISPLACEMENT = 11.01 mm

MAXIMUM MOMENT = -805.11 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR., 2 = ELASTIC

CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 273.11 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.076
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.657

** PHASE Nb 7 **

*EJECUCION DE SOLERA

* INSTALLATION LEVEL OF STRUTS NO 3

LEVEL	=	17.500 m
SPACE	=	1.000 m
INCLINATION	=	0.000 DEGREES
PRELOAD	=	0.000 kN
STIFFNESS	=	500000.000 kN/m

BILATERAL CONNECTION

PHASE 7

	WALL					SOIL 1 EXCAVATION: 33.10 m WATER LEVEL: 13.10 m CAQUOT SURC.: 30.00 kPa				SOIL 2 EXCAVATION: 17.10 m WATER LEVEL: 13.10 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	0.183	0.431	0.00	0.00		2	8.76	8.76	47500	0					
32.800	0.313	0.431	0.35	2.22		2	6.02	6.02	47500	0					
32.500	0.442	0.432	1.25	3.61		2	3.28	3.28	47500	0					
				-27.29		2	3.28	3.28	47500	0				1	-30.90
32.000	0.658	0.430	-11.63	-23.53		2	11.76	11.76	47500	0					
31.584	0.835	0.425	-20.19	-17.10		2	19.17	17.46	47500	0					
31.169	1.010	0.418	-25.43	-7.66		2	26.29	17.46	47500	0					
30.753	1.183	0.410	-26.15	4.66		2	32.97	17.46	47500	0					
30.337	1.352	0.403	-21.20	19.62		2	39.03	17.46	47500	0					
29.922	1.518	0.398	-9.52	36.94		2	44.30	17.46	47500	0					
29.506	1.683	0.398	9.78	56.23		2	48.53	17.46	47500	0					
29.091	1.850	0.405	37.43	77.02		2	51.50	17.46	47500	0					
28.675	2.021	0.421	73.93	98.72		2	52.93	17.46	47500	0					
28.259	2.202	0.450	119.52	120.63		2	52.51	17.46	47500	0					
27.844	2.397	0.493	174.12	141.92		2	49.93	17.46	47500	0					
27.428	2.614	0.554	237.27	161.61		2	44.81	17.46	47500	0					
27.013	2.860	0.634	308.12	178.92		2	38.51	11.38	47500	0					
26.597	3.144	0.737	385.90	195.57		2	41.58	11.38	47500	0					
26.181	3.476	0.864	470.87	213.49		2	44.66	11.38	47500	0					
25.766	3.866	1.017	563.54	232.69		1	47.73	11.38	47500	0					
25.350	4.326	1.199	664.47	253.17		1	50.81	11.38	47500	0					
				-441.73		1	50.81	11.38	47500	0				2	-694.89
24.850	4.978	1.397	450.11	-415.40		1	54.50	11.38	47500	0					
24.391	5.649	1.514	265.16	-389.58		1	57.90	11.38	47500	0					
23.931	6.360	1.572	92.42	-362.20		1	61.30	11.38	47500	0					
23.472	7.085	1.576	-67.38	-333.26		1	64.70	11.38	47500	0					
23.013	7.800	1.530	-213.52	-302.76		1	68.10	11.38	47500	0					
22.553	8.484	1.438	-345.30	-270.69		1	71.50	11.38	47500	0					
22.094	9.115	1.305	-461.98	-237.07		1	74.89	11.38	47500	0					
21.634	9.677	1.137	-562.86	-201.89		1	78.29	11.38	47500	0					
21.175	10.155	0.938	-647.23	-165.14		1	81.69	11.38	47500	0					
20.716	10.535	0.714	-714.35	-126.83		1	85.09	11.38	47500	0					
20.256	10.808	0.472	-763.51	-86.96		1	88.49	11.38	47500	0					
19.797	10.967	0.216	-794.01	-45.54		1	91.88	11.38	47500	0					
19.337	11.006	-0.046	-805.11	-2.55		1	95.28	11.38	47500	0					
18.878	10.924	-0.309	-796.11	42.01		1	98.68	11.38	47500	0					
18.419	10.723	-0.566	-766.28	88.12		1	102.08	11.38	47500	0					
17.959	10.406	-0.809	-714.91	135.79		1	105.48	11.38	47500	0					
17.500	9.983	-1.032	-641.28	185.02		1	108.88	11.38	47500	0					
				185.02		1	108.88	11.38	47500	0				3	0.00
17.100	9.535	-1.203	-558.49	229.16		1	111.83	11.38	47500	0					
						1	111.83	11.38	47500	3	59.00		47500		
16.600	8.887	-1.381	-438.82	246.47		1	115.53	11.38	47500	3	99.15		47500		
16.100	8.161	-1.516	-315.06	245.54		1	119.23	11.38	47500	3	139.31		47500		
15.600	7.378	-1.607	-196.31	226.39		1	122.93	11.38	47500	3	179.47		47500		
15.100	6.561	-1.658	-91.71	189.00		1	126.63	11.38	47500	3	219.63		47500		
14.600	5.726	-1.675	-10.35	133.39		1	130.33	11.38	47500	3	259.79		47500		
14.100	4.890	-1.669	40.04	67.95		2	134.03	11.38	47500	2	266.31		47500		
13.600	4.060	-1.650	59.04	11.17		2	137.73	11.38	47500	2	232.56		47500		
13.100	3.240	-1.629	54.31	-27.00		2	141.42	11.38	47500	2	199.29		47500		
12.725	2.631	-1.617	40.78	-43.42		2	142.78	11.38	47500	2	172.46		47500		
12.350	2.027	-1.608	23.26	-47.77		2	152.33	17.46	47500	2	145.83		47500		
11.975	1.425	-1.604	7.14	-34.60		2	183.01	17.46	47500	2	119.30		47500		
11.600	0.824	-1.603	-0.01	0.00		2	213.64	17.46	47500	2	92.81		47500		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 11.01 mm

MAXIMUM MOMENT = -805.11 kN.m/m

CODIFICATION OF STATE :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.

CODIFICATION OF SOIL :
2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 273.12 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.076
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.657

*** END OF CALCULUS

*** MAXIMUM DISPLACEMENT IN PHASE Nb 7 = 11.006 mm IN FINAL PHASE Nb 7 = 11.006 mm

*** MAXIMUM MOMENT IN PHASE Nb 6 = -805.111 kN.m/m IN FINAL PHASE Nb 7 = -805.111 kN.m/m

STRUT/ANCHOR		PRELOAD		MAXIMUM		FINAL STATE	
NUMBER	LEVEL	PHASE	FORCE	PHASE	FORCE	PHASE	FORCE
1	32.50	3	0.00	4	-80.75	7	-30.90
2	25.35	5	0.00	7	-694.89	7	-694.89
3	17.50	7	0.00	7	0.00	7	0.00
	m		kN		kN		kN

* ENVELOPE CURVES FROM PHASE 1 TO PHASE 7 *

LEVEL	MINI CRO.FO	MAXI CRO.FO
33.100	0.00	0.00
32.800	0.00	2.27
32.500	0.00	3.61
	-77.80	1.68
32.000	-77.40	6.33
31.584	-76.09	4.37
31.169	-73.50	2.75
30.753	-69.64	4.66
30.337	-64.50	19.62
29.922	-58.07	36.94
29.506	-50.38	56.23
29.091	-41.40	77.02
28.675	-31.14	98.72
28.259	-19.61	120.63
27.844	-6.80	141.92
27.428	-1.61	161.61
27.013	-1.51	178.92
26.597	-1.38	195.57
26.181	-1.23	213.49
25.766	-1.07	232.69
25.350	-0.91	253.17
	-441.73	96.89
24.850	-415.40	123.22
24.391	-389.58	113.47
23.931	-362.20	92.98
23.472	-333.26	70.71
23.013	-302.76	50.85
22.553	-270.69	33.23
22.094	-237.07	17.60
21.634	-201.89	3.65
21.175	-165.14	0.02
20.716	-126.83	0.04
20.256	-86.96	0.06
19.797	-45.54	0.07
19.337	-24.27	0.07
18.878	-23.66	42.01
18.419	-22.08	88.12
17.959	-19.88	135.79
17.500	-17.32	185.02
17.100	-14.97	229.17
16.600	-12.06	246.47
16.100	-9.30	245.55
15.600	-6.81	226.39
15.100	-4.64	189.00
14.600	-2.84	133.39
14.100	-1.42	67.95
13.600	-0.39	11.17
13.100	-27.00	0.27
12.725	-43.42	0.52
12.350	-47.77	0.55
11.975	-34.60	0.38
11.600	0.00	0.00
m	kN/m	kN/m

LEVEL	MINI MOMENT	MAXI MOMENT
33.100	0.00	0.00
32.800	0.00	0.38
32.500	0.00	1.25
	0.00	1.25
32.000	-37.63	2.19
31.584	-69.58	4.40
31.169	-100.71	5.87
30.753	-130.50	6.74
30.337	-158.42	7.11
29.922	-183.93	7.12
29.506	-206.52	9.78
29.091	-225.63	37.43
28.675	-240.75	73.93
28.259	-251.34	119.52
27.844	-256.88	174.12
27.428	-256.82	237.27
27.013	-250.64	308.12
26.597	-237.81	385.90
26.181	-217.80	470.87
25.766	-190.08	563.54
25.350	-154.10	664.47
	-154.10	664.47
24.850	-99.15	450.11
24.391	-44.20	265.16
23.931	0.00	92.42
23.472	-67.38	40.95
23.013	-213.52	68.78
22.553	-345.30	88.01
22.094	-461.98	99.62
21.634	-562.86	104.44
21.175	-647.23	103.36
20.716	-714.35	97.80
20.256	-763.51	89.25
19.797	-794.01	78.97
19.337	-805.11	67.93
18.878	-796.11	56.88
18.419	-766.28	46.34
17.959	-714.91	36.69
17.500	-641.28	28.13
17.100	-558.49	21.67
16.600	-438.82	14.92
16.100	-315.06	9.59
15.600	-196.31	5.58
15.100	-91.71	2.73
14.600	-10.35	0.87
14.100	-0.18	40.05
13.600	-0.62	59.05
13.100	-0.63	54.33
12.725	-0.48	40.79
12.350	-0.27	23.27
11.975	-0.09	7.16
11.600	-0.01	0.00
m	kN.m/m	kN.m/m

PANTALLA TIPO 6

Proyecto: INTEGRACION DEL FERROCARRIL EN SANT FELIU
Tipo: PANTALLAS DE PILOTES
Tramo: PANTALLA TIPO 6 (ESTACION)
Fecha: 27/10/2008

CARACTERIZACIÓN DE ESTRATOS

Estratos	Potencia (m)	ϕ	Cohesión (kN/m²)	Densidad (kN/m³)	Kh (kN/m²)
Rellenos	**2.10**	**28**	**0**	**18**	**15,000**
Arcillas y limos	**---**	**32.3**	**13**	**19.5**	**38,000**

(*) Al no tener perfil de este tramo se ha tomado el del tramo mas cercano (Pantalla tipo 2)

Cota nivel freatico: --- m

SOBRECARGAS

Rellenos y tráfico

Rellenos:	**0.000**	m
SC Rellenos(*):	0.00	kN/m²
SC Tráfico:	**30.00**	kN/m²
Sobrecarga 1:	30.00	kN/m²
Ambito de actuación:	0-12	m

(*) Supuesta una densidad de 20 KN/m³

Edificación

n° de plantas	**0.000**	m
Carga por planta:	10.00	kN/m²
SC edficación:	**0.00**	kN/m²
Sobrecarga 2:	0.00	kN/m²
Ambito de actuación:	---	m

(*) Supuesta una carga de 10KN/m²·planta

CARACT.MECANICAS Y GOEMETRICAS DE LA PANTALLA DE PILOTES (RIGIDEZ)

DATOS			
Diametro (m):	**1.00**	Área (m²):	**0.7854**
Separación (m):	**1.25**	Inercia (m⁴):	**0.0491**
Resistencia Hormigón (N/mm²):	**30**	Rigidez (kNm²):	**1,402,760**
Ambiente:	IIa	Módulo Defor. Hormigón (kN/m²):	**28,576,791**

(*) Se ha considerado un valor Ej=8.500·∛fcm,j

HOJA PREPARADA PARA INTRODUCIR EL COMANDO "COE" (RIDO)

COTAS DE LA PANTALLA

Cota Superior Pantalla:	**33.100**	m
Cota Excavación:	32.100	m
Cota Fondo de Excavación:	**17.100**	m
Cota Pie de Pantalla:	14.300	m
Longitud Pilote:	18.800	m

RESULTADOS

Desplazamiento:	7.62	mm
Empuje Pasivo Movilizado:	60.10	%

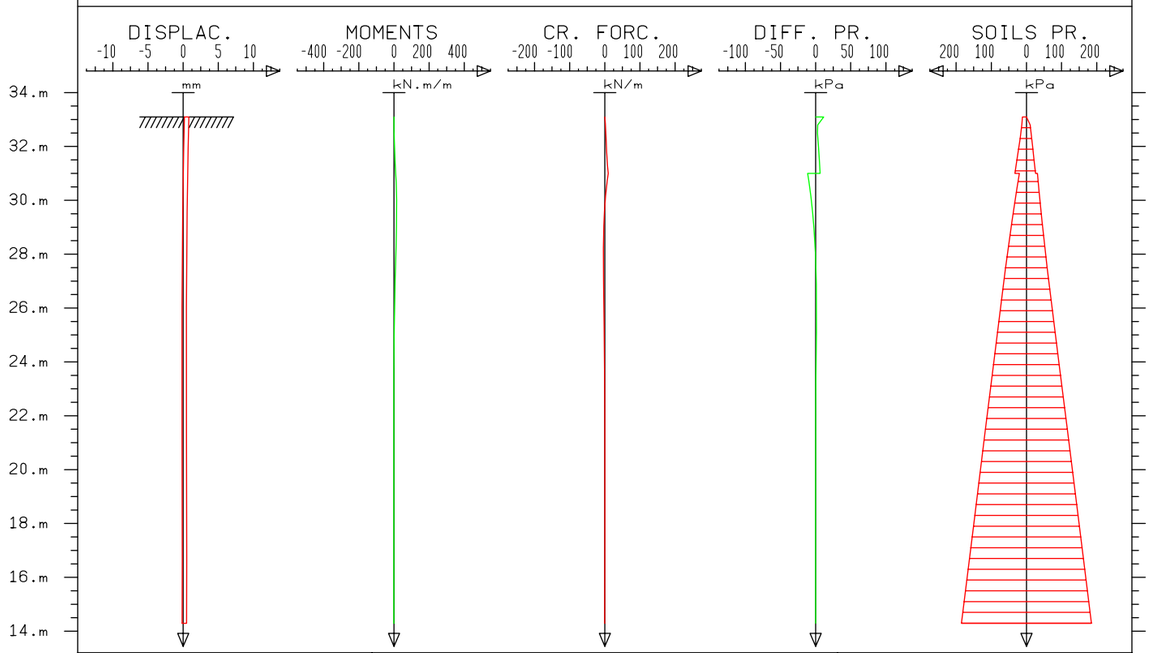
PROCESO CONSTRUCTIVO

1° Ejecución de pantalla de pilotes.
2° Excavacion previa a ejecucion de losa de cubierta.
3° Ejecución de losa de cubierta.
4° Excavación previa a ejecución de losa de vestibulo
5° Ejecución de losa de vestibulo.
6° Excavación previa a ejecución de losa de solera.
7° Ejecucion de solera y conexión de esta a pantalla.

GRÁFICOS

PANTALLA PILOTES TIPO 6 (ESTACION) SOTERRAMIENTO SANT FELI

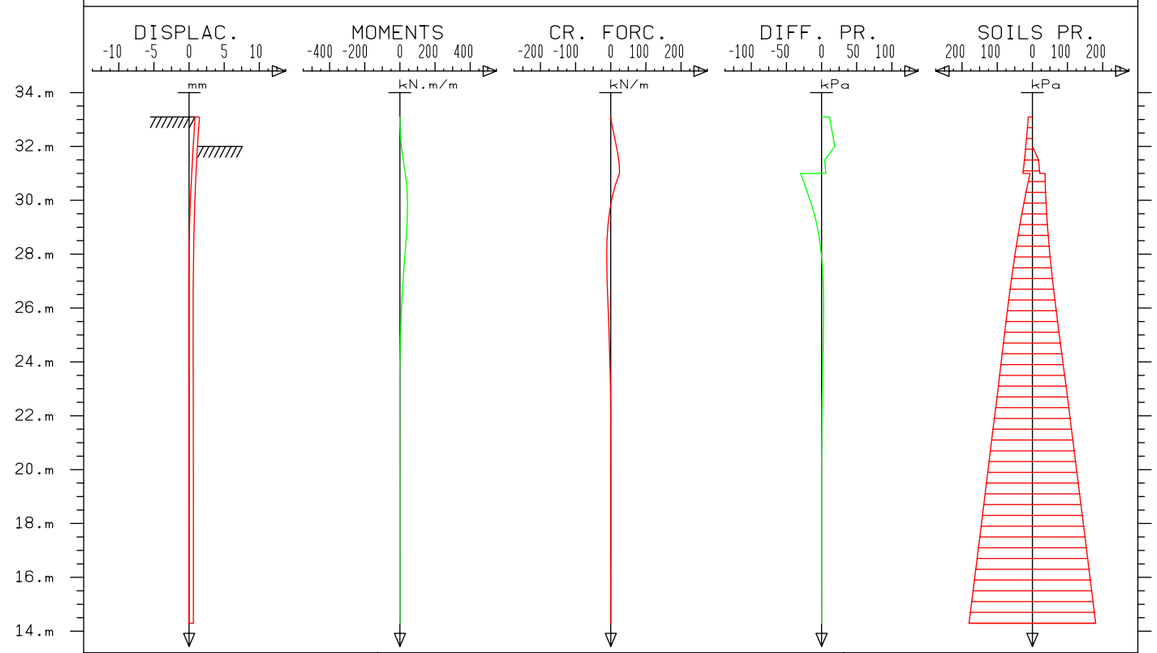
GRAPHS OF THE PHASE Nb 1



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-6

PANTALLA PILOTES TIPO 6 (ESTACION) SOTERRAMIENTO SANT FELI

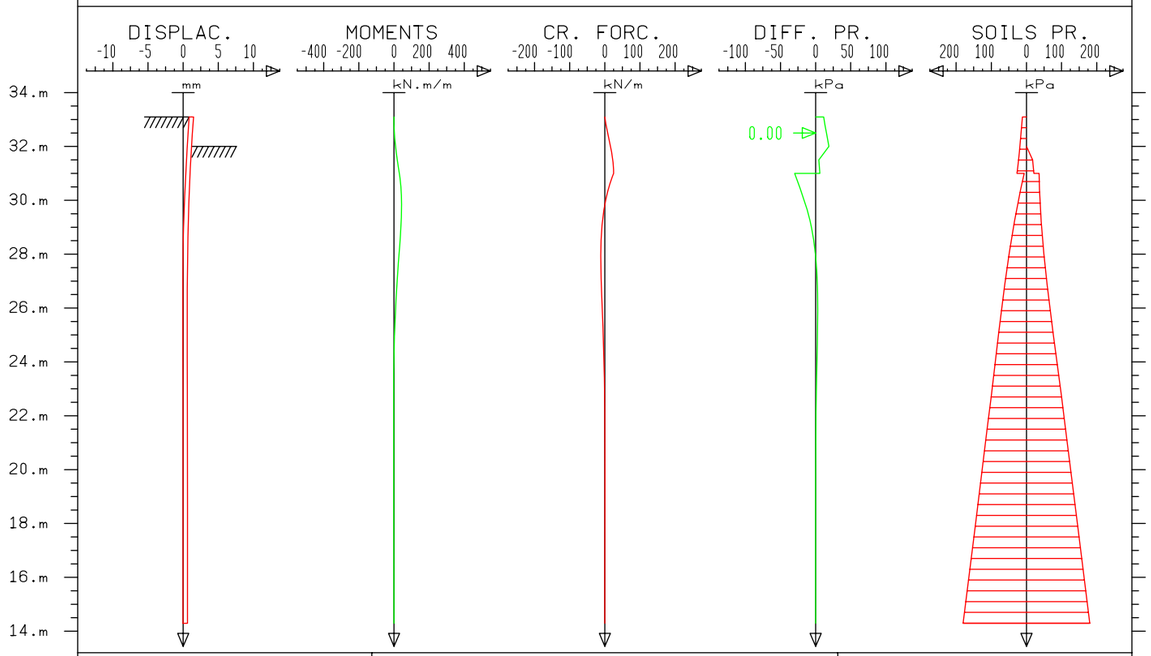
GRAPHS OF THE PHASE Nb 2



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-6

PANTALLA PILOTES TIPO 6 (ESTACION) SOTERRAMIENTO SANT FELI

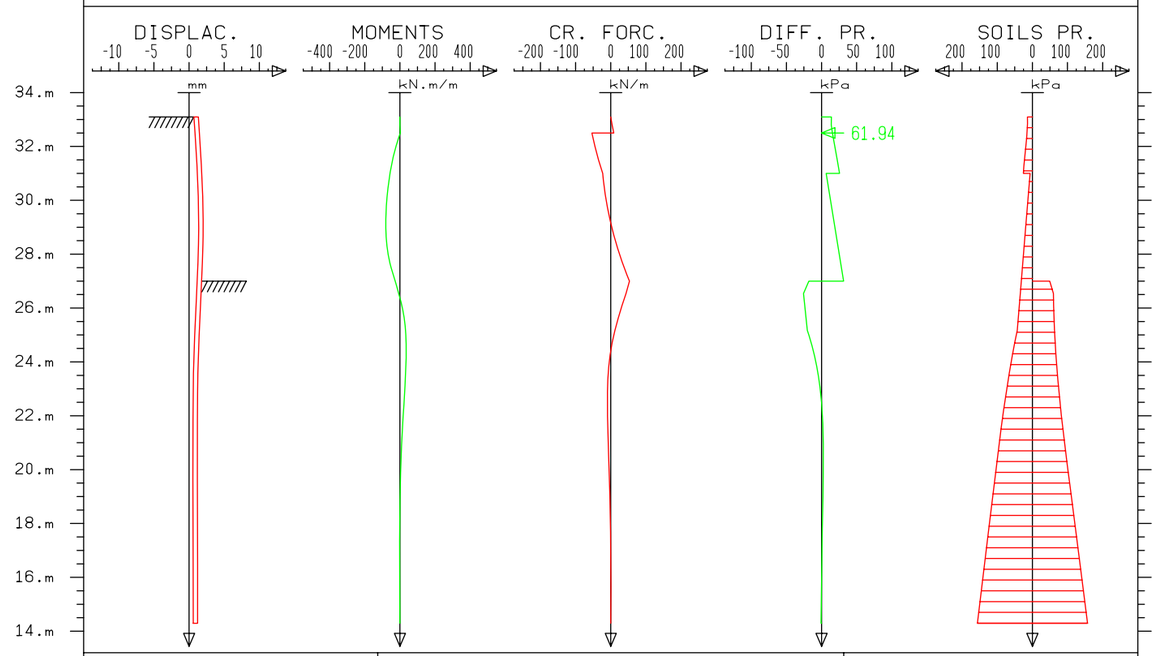
GRAPHS OF THE PHASE Nb 3



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-6

PANTALLA PILOTES TIPO 6 (ESTACION) SOTERRAMIENTO SANT FELI

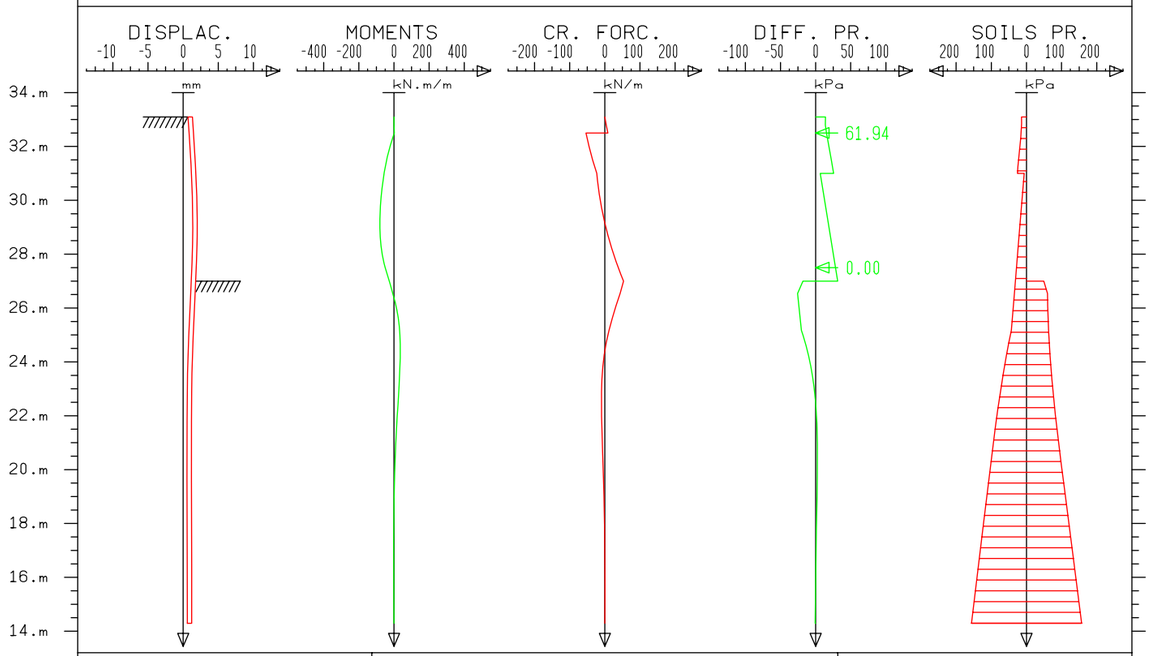
GRAPHS OF THE PHASE Nb 4



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-6

PANTALLA PILOTES TIPO 6 (ESTACION) SOTERRAMIENTO SANT FELI

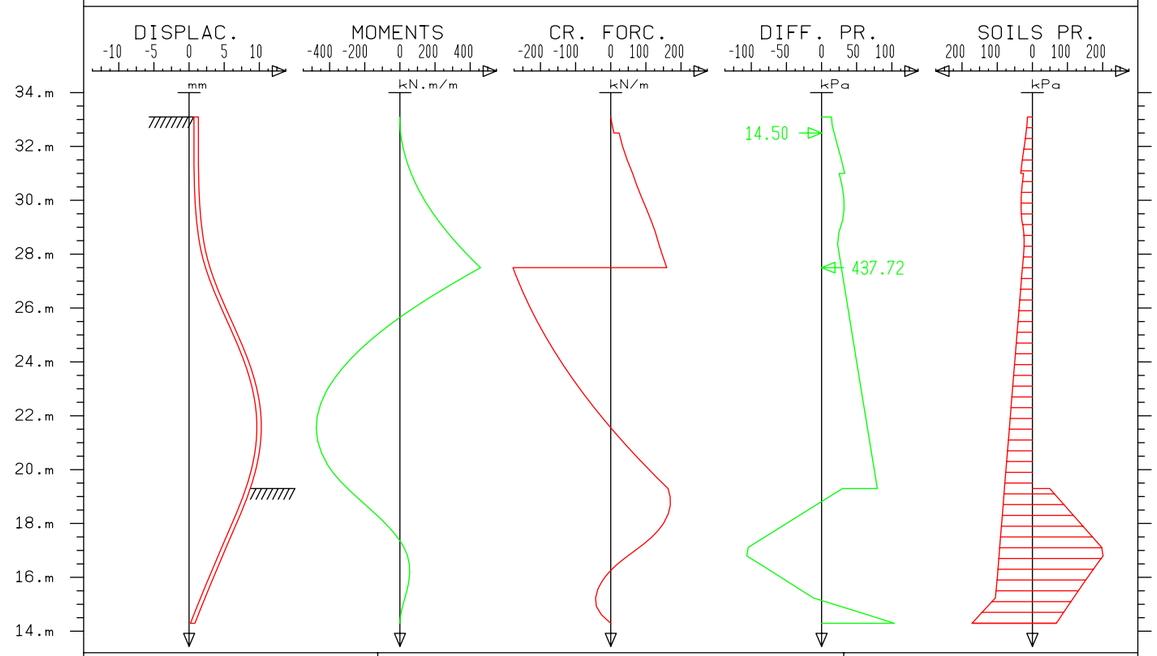
GRAPHS OF THE PHASE Nb 5



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-6

PANTALLA PILOTES TIPO 6 (ESTACION) SOTERRAMIENTO SANT FELI

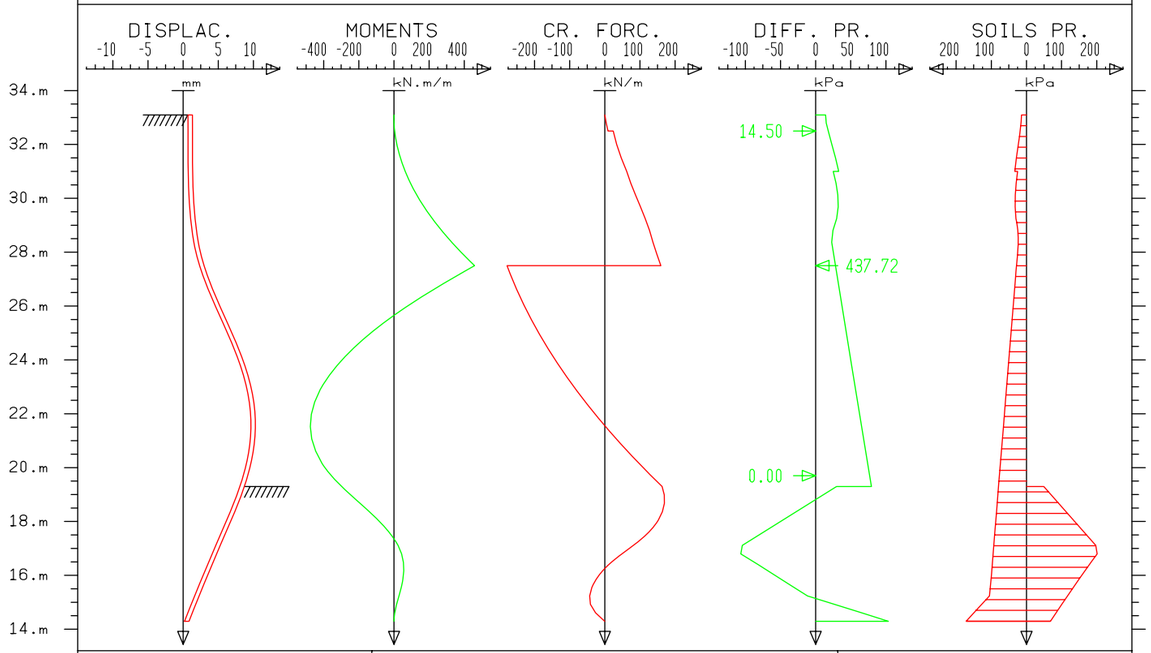
GRAPHS OF THE PHASE Nb 6



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-6

PANTALLA PILOTES TIPO 6 (ESTACION) SOTERRAMIENTO SANT FELI

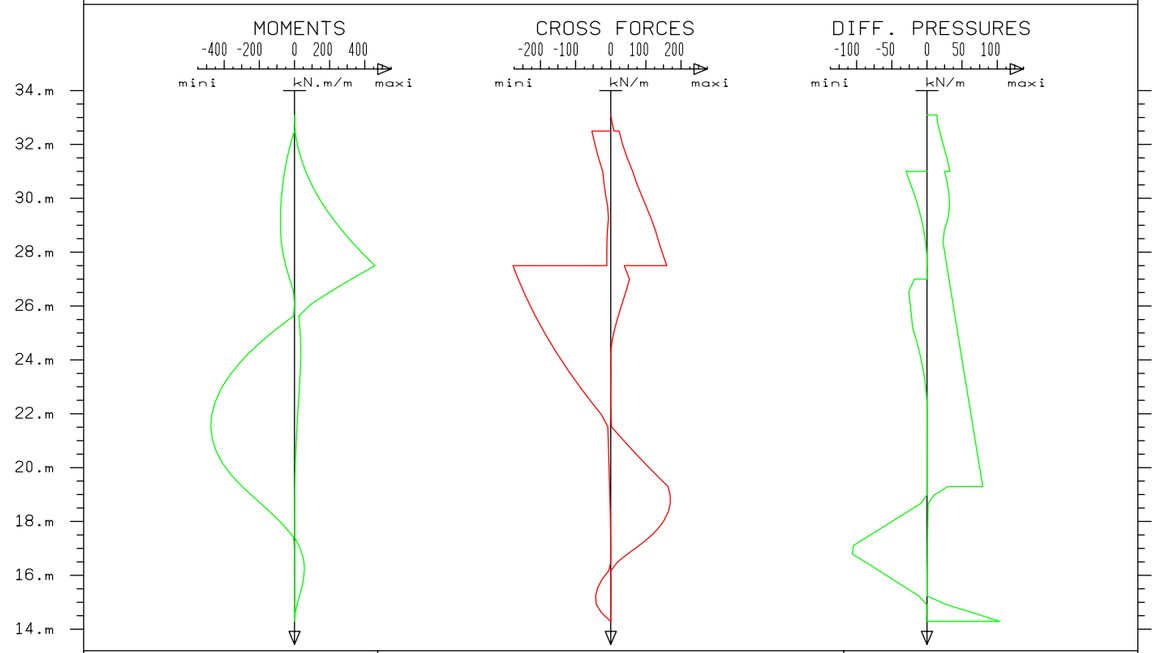
GRAPHS OF THE PHASE Nb 7



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-6

PANTALLA PILOTES TIPO 6 (ESTACION) SOTERRAMIENTO SANT FELI

ENVELOPES FROM PHASE 1 TO PHASE 7



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-6

LISTADO

```
E &l18D &k2S &a4L      ***** DATA FILE NAME : SFELIU-6.RIO

       PANTALLA PILOTES TIPO 6 (ESTACION)   SOTERRAMIENTO SANT FELIU    *101L  U:NN*
       *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
       #EMP=5.00
       #DIAMETRO=1.00
       #SEPARACION=1.25
       #fck=30
       #E=8500*((fck+8)^(1/3))*1000
       #I=3.14/(64)*(DIAMETRO)^4
       #RIGIDEZ=E*I
       *COTAS DE LA PANTALLA
       #CSUP=33.10
       #CEXC=CSUP-13.80
       *Nota: "CEXC" es la cota maxima de excavacion
       #CPIE=CEXC-EMP
       #NF=CSUP-20.00
       *CABEZA DE PANTALLA
       : CSUP
  1 ...  33.1
       *PANTALLA 1.00/1.25
       : CPIE RIGIDEZ
  2 ...  14.3 1402049
       *COTA MAXIMA DE TERRENO
       : CSUP
  3 ...  33.1
       *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)
       : CSUP-2.10 18.00 10.00 0 0 0 0 28 0 0 15000
  4 ...  31 18 10 0.3610335 0.5305284 2.769826 0 28 0 0 15000
       : CSUP-25.00 19.50 9.50 0 0 0 13 32.3 0 0 38000
  5 ...  8.1 19.5 9.5 0.3034816 0.4656477 3.295093 13 32.3 0 0 38000
       *NIVEL FREATICO
       : NF 0.50
  6 ...  13.1 0.5
       *FACTOR DE SEPARACION
       : COE CSUP CSUP-25.00 SEPARACION
  7 ... COE 33.1 8.1 1.25
       *SOBRECARGA 30 KN/M2 (PASO DE FERROCARRIL)
       : SUC(1) 30
  8 ... SUC(1)  30
       : CAL(2)
  9 ... CAL(2)
       *EXCAVACION PREVIA A EJECUCION DE LOSA SUPERIOR
       : EXC(2) CSUP-1.10
 10 ... EXC(2)  32
       : CAL(2)
 11 ... CAL(2)
       *EJECUCION DE LOSA DE CUBIERTA
       : STR CSUP-(0.50+0.10) 1 0 0 500000
 12 ... STR 32.5 1 0 0 500000
       : CAL(2)
 13 ... CAL(2)
       *EXCAVACION PREVIA A EJECUCION DE LOSA VESTIBULO
       : EXC(2) 27.00
 14 ... EXC(2)  27
       : CAL(2)
 15 ... CAL(2)
       *EJECUCION DE LOSA VESTIBULO
       : STR 27.00+0.50 1 0 0 400000
 16 ... STR 27.5 1 0 0 400000
       : CAL(2)
 17 ... CAL(2)
       *EXCAVACION HASTA COTA DE SOLERA
       : EXC(2) CEXC
 18 ... EXC(2)  19.3
       : CAL(2)
 19 ... CAL(2)
       *EJECUCION DE SOLERA
       : STR CEXC+0.40 1 0 0 500000
 20 ... STR 19.7 1 0 0 500000
       : CAL(2)
 21 ... CAL(2)
       : END
 22 ... END
       : STA
 23 ... STA
       : EVP
 24 ... EVP
```



```
       *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
       *COTAS DE LA PANTALLA
       *Nota: "CEXC" es la cota maxima de excavacion
       *CABEZA DE PANTALLA
       *PANTALLA 1.00/1.25

       ------------------------------------------------------------------------------

                                        ** STARTING DATA **
                                        --------------------


  * BOUSSINESQ SURCHARGES FUNCTION OF STATE OF SOIL


*** WALL DESCRIPTION :
                                                 INERTIA PRODUCT EI      CYLINDRICAL RIGIDITY
    SECTION NB  1 FROM  33.100 m  TO  14.300 m  :       1402049. kN.m2/m          0. kPa/m

       *COTA MAXIMA DE TERRENO


*** SOIL DESCRIPTION :

       *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)

     LAYER NB  1 FROM  33.100 m  TO  31.000 m  :

       SATURATED UNIT WEIGHT              GH  =      18.000 kN/m3
       SUBMERGED UNIT WEIGHT              GD  =      10.000 kN/m3
       HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.361
       HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.531
       HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       2.770
       COHESION                            C  =       0.000 kPa
       ANGLE OF INTERNAL FRICTION        PHI  =      28.000 DEGREES
              FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
              FOR PASSIVE PRESS. DELTA/PHI  =       0.000
       ELASTIC REACTION COEFFICIENT (AT P=0)  =   15000.000 kPa/m
       INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

     LAYER NB  2 FROM  31.000 m  TO   8.100 m  :

       SATURATED UNIT WEIGHT              GH  =      19.500 kN/m3
       SUBMERGED UNIT WEIGHT              GD  =       9.500 kN/m3
       HOR. ACTIVE PRESSURE COEFFICIENT   KA  =       0.303
       HOR. AT REST PRESSURE COEFFICIENT  K0  =       0.466
       HOR. PASSIVE PRESSURE COEFFICIENT  KP  =       3.295
       COHESION                            C  =      13.000 kPa
       ANGLE OF INTERNAL FRICTION        PHI  =      32.300 DEGREES
              FOR ACTIVE  PRESS. DELTA/PHI  =       0.000
              FOR PASSIVE PRESS. DELTA/PHI  =       0.000
       ELASTIC REACTION COEFFICIENT (AT P=0)  =   38000.000 kPa/m
       INCR. OF THIS COEFF. WITH PRESSURE     =       0.000 1/m

       *NIVEL FREATICO
```

** PHASE Nb 1 **

*FACTOR DE SEPARACION

* FROM 33.100 m TO 8.100 m COEFFICIENT APPLIED TO PRESSURES = 1.250
ADDITIONAL COEFF. ON PASSIVE PRESSURE = 1.000

*SOBRECARGA 30 KN/M2 (PASO DE FERROCARRIL)

* CAQUOT SURCHARGE ON SOIL 1 = 30.000 kPa

PHASE 1

| WALL | SOIL 1 EXCAVATION: 33.10 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 30.00 kPa | SOIL 2 EXCAVATION: 33.10 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	0.461	-0.069	0.00	0.00		1	13.54	13.54	18750	3	0.00		18750		
32.800	0.440	-0.069	0.47	2.65		1	15.98	13.54	18750	2	11.83		18750		
32.500	0.419	-0.069	1.45	3.90		2	19.20	14.32	18750	2	15.02		18750		
32.000	0.385	-0.068	3.98	6.31		2	25.81	16.87	18750	2	20.35		18750		
31.500	0.351	-0.066	7.87	9.36		2	32.41	19.41	18750	2	25.69		18750		
31.000	0.319	-0.062	13.44	13.02		2	38.98	19.89	18750	2	31.05		18750		
						2	24.30	17.46	47500	2	37.17		47500		
30.562	0.293	-0.057	17.98	7.93		2	30.51	17.46	47500	2	40.89		47500		
30.125	0.269	-0.051	20.53	3.89		2	36.60	17.46	47500	2	44.72		47500		
29.688	0.248	-0.045	21.51	0.77		2	42.56	17.46	47500	2	48.69		47500		
29.250	0.230	-0.038	21.32	-1.54		2	48.39	17.46	47500	2	52.80		47500		
28.812	0.215	-0.031	20.27	-3.16		2	54.07	17.46	47500	2	57.05		47500		
28.375	0.203	-0.025	18.64	-4.20		2	59.63	17.46	47500	2	61.43		47500		
27.938	0.193	-0.020	16.66	-4.79		2	65.06	17.46	47500	2	65.93		47500		
27.500	0.185	-0.015	14.50	-5.01		2	70.38	17.46	47500	2	70.53		47500		
27.000	0.179	-0.010	12.01	-4.93		2	76.36	17.46	47500	2	75.91		47500		
26.544	0.175	-0.007	9.81	-4.65		2	81.72	17.46	47500	2	80.91		47500		
26.087	0.173	-0.004	7.78	-4.23		2	87.01	17.46	47500	2	85.98		47500		
25.631	0.172	-0.002	5.97	-3.73		2	92.24	17.46	47500	2	91.10		47500		
25.175	0.171	0.000	4.38	-3.20		2	97.43	17.46	47500	2	96.26		47500		
24.719	0.172	0.001	3.04	-2.68		2	102.60	17.46	47500	2	101.46		47500		
24.263	0.173	0.002	1.94	-2.17		2	107.74	17.46	47500	2	106.67		47500		
23.806	0.174	0.003	1.05	-1.71		2	112.86	17.46	47500	2	111.90		47500		
23.350	0.175	0.003	0.37	-1.30		2	117.98	17.46	47500	2	117.14		47500		
22.894	0.176	0.003	-0.14	-0.94		2	123.10	17.46	47500	2	122.38		47500		
22.438	0.178	0.003	-0.50	-0.64		2	128.22	17.46	47500	2	127.62		47500		
21.981	0.179	0.003	-0.74	-0.40		2	133.34	17.46	47500	2	132.86		47500		
21.525	0.180	0.002	-0.87	-0.20		2	138.46	17.46	47500	2	138.09		47500		
21.069	0.181	0.002	-0.93	-0.05		2	143.60	17.46	47500	2	143.31		47500		
20.613	0.182	0.002	-0.92	0.06		2	148.73	17.46	47500	2	148.53		47500		
20.156	0.182	0.001	-0.88	0.14		2	153.88	17.46	47500	2	153.74		47500		
19.700	0.183	0.001	-0.80	0.19		2	159.03	17.46	47500	2	158.95		47500		
19.300	0.183	0.001	-0.72	0.21		2	163.55	17.46	47500	2	163.51		47500		
18.987	0.184	0.001	-0.65	0.22		2	167.09	17.46	47500	2	167.07		47500		
18.675	0.184	0.001	-0.58	0.23		2	170.62	17.46	47500	2	170.62		47500		
18.362	0.184	0.000	-0.51	0.22		2	174.16	17.46	47500	2	174.18		47500		
18.050	0.184	0.000	-0.44	0.22		2	177.70	17.46	47500	2	177.73		47500		
17.737	0.184	0.000	-0.37	0.21		2	181.24	17.46	47500	2	181.28		47500		
17.425	0.184	0.000	-0.31	0.19		2	184.79	17.46	47500	2	184.84		47500		
17.112	0.184	0.000	-0.25	0.18		2	188.33	17.46	47500	2	188.39		47500		
16.800	0.184	0.000	-0.20	0.16		2	191.88	17.46	47500	2	191.93		47500		
16.487	0.184	0.000	-0.15	0.14		2	195.42	17.46	47500	2	195.48		47500		
16.175	0.184	0.000	-0.11	0.12		2	198.97	17.46	47500	2	199.03		47500		
15.862	0.184	0.000	-0.08	0.10		2	202.51	17.46	47500	2	202.58		47500		
15.550	0.184	0.000	-0.05	0.08		2	206.06	17.46	47500	2	206.12		47500		
15.237	0.184	0.000	-0.03	0.06		2	209.61	17.46	47500	2	209.67		47500		
14.925	0.184	0.000	-0.01	0.04		2	213.15	17.46	47500	2	213.22		47500		
14.612	0.184	0.000	0.00	0.02		2	216.70	17.46	47500	2	216.77		47500		
14.300	0.184	0.000	0.00	0.00		2	220.25	17.46	47500	2	220.31		47500		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 0.46 mm
MAXIMUM MOMENT = 21.51 kN.m/m

CODIFICATION OF STATE :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
CODIFICATION OF SOIL :
3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 326.55 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.125
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.144

** PHASE Nb 2 **

*EXCAVACION PREVIA A EJECUCION DE LOSA SUPERIOR

* EXCAVATION IN SOIL 2 TO LEVEL = 32.000 m

PHASE 2

| | WALL | SOIL 1 EXCAVATION: 33.10 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 30.00 kPa | SOIL 2 EXCAVATION: 32.00 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	1.002	-0.176	0.00	0.00		1	13.54	13.54	18750	0					
32.800	0.949	-0.176	0.65	4.43		1	15.98	13.54	18750	0					
32.500	0.896	-0.176	2.73	9.59		1	18.41	13.54	18750	0					
32.000	0.809	-0.174	9.99	19.81		1	22.47	13.54	18750	0					
31.500	0.723	-0.168	22.06	27.18		1	26.54	13.54	18750	2	19.53		18750		
31.000	0.642	-0.158	36.61	31.17		2	32.93	15.87	18750	2	23.97		18750		
						2	8.99	8.99	47500	2	40.95		47500		
30.562	0.575	-0.144	47.39	18.57		2	17.10	17.10	47500	2	42.77		47500		
30.125	0.515	-0.129	53.24	8.58		2	24.91	17.46	47500	2	44.89		47500		
29.688	0.463	-0.112	55.24	0.93		2	32.37	17.46	47500	2	47.36		47500		
29.250	0.418	-0.094	54.35	-4.69		2	39.48	17.46	47500	2	50.19		47500		
28.812	0.380	-0.078	51.38	-8.59		2	46.24	17.46	47500	2	53.36		47500		
28.375	0.349	-0.063	47.03	-11.07		2	52.66	17.46	47500	2	56.87		47500		
27.938	0.325	-0.049	41.86	-12.41		2	58.78	17.46	47500	2	60.68		47500		
27.500	0.307	-0.036	36.31	-12.86		2	64.63	17.46	47500	2	64.77		47500		
27.000	0.291	-0.025	29.92	-12.57		2	71.02	17.46	47500	2	69.72		47500		
26.544	0.282	-0.016	24.35	-11.77		2	76.64	17.46	47500	2	74.46		47500		
26.087	0.277	-0.009	19.23	-10.66		2	82.08	17.46	47500	2	79.38		47500		
25.631	0.274	-0.003	14.65	-9.37		2	87.38	17.46	47500	2	84.43		47500		
25.175	0.273	0.001	10.69	-8.01		2	92.59	17.46	47500	2	89.58		47500		
24.719	0.275	0.004	7.34	-6.66		2	97.71	17.46	47500	2	94.81		47500		
24.263	0.277	0.006	4.59	-5.39		2	102.79	17.46	47500	2	100.10		47500		
23.806	0.280	0.007	2.41	-4.22		2	107.83	17.46	47500	2	105.41		47500		
23.350	0.283	0.007	0.72	-3.19		2	112.86	17.46	47500	2	110.74		47500		
22.894	0.286	0.007	-0.52	-2.29		2	117.88	17.46	47500	2	116.08		47500		
22.438	0.289	0.007	-1.39	-1.55		2	122.90	17.46	47500	2	121.41		47500		
21.981	0.293	0.006	-1.95	-0.94		2	127.93	17.46	47500	2	126.74		47500		
21.525	0.295	0.006	-2.26	-0.45		2	132.98	17.46	47500	2	132.05		47500		
21.069	0.298	0.005	-2.38	-0.08		2	138.04	17.46	47500	2	137.34		47500		
20.613	0.300	0.004	-2.35	0.19		2	143.12	17.46	47500	2	142.62		47500		
20.156	0.302	0.003	-2.22	0.38		2	148.21	17.46	47500	2	147.88		47500		
19.700	0.303	0.003	-2.02	0.50		2	153.32	17.46	47500	2	153.13		47500		
19.300	0.304	0.002	-1.81	0.56		2	157.82	17.46	47500	2	157.72		47500		
18.987	0.305	0.002	-1.63	0.58		2	161.33	17.46	47500	2	161.30		47500		
18.675	0.305	0.002	-1.45	0.58		2	164.86	17.46	47500	2	164.87		47500		
18.362	0.306	0.001	-1.27	0.57		2	168.38	17.46	47500	2	168.43		47500		
18.050	0.306	0.001	-1.09	0.55		2	171.91	17.46	47500	2	172.00		47500		
17.737	0.306	0.001	-0.93	0.52		2	175.45	17.46	47500	2	175.56		47500		
17.425	0.306	0.001	-0.77	0.48		2	178.99	17.46	47500	2	179.11		47500		
17.112	0.307	0.000	-0.63	0.44		2	182.53	17.46	47500	2	182.67		47500		
16.800	0.307	0.000	-0.50	0.39		2	186.07	17.46	47500	2	186.22		47500		
16.487	0.307	0.000	-0.38	0.35		2	189.61	17.46	47500	2	189.77		47500		
16.175	0.307	0.000	-0.28	0.30		2	193.16	17.46	47500	2	193.32		47500		
15.862	0.307	0.000	-0.19	0.25		2	196.70	17.46	47500	2	196.86		47500		
15.550	0.307	0.000	-0.12	0.20		2	200.25	17.46	47500	2	200.41		47500		
15.237	0.307	0.000	-0.07	0.15		2	203.80	17.46	47500	2	203.96		47500		
14.925	0.307	0.000	-0.03	0.10		2	207.34	17.46	47500	2	207.50		47500		
14.612	0.307	0.000	-0.01	0.05		2	210.89	17.46	47500	2	211.05		47500		
14.300	0.307	0.000	0.00	0.00		2	214.44	17.46	47500	2	214.60		47500		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 1.00 mm

MAXIMUM MOMENT = 55.24 kN.m/m

CODIFICATION :
OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR.
OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 318.62 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.118
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.151

** PHASE Nb 3 **

*EJECUCION DE LOSA DE CUBIERTA

* INSTALLATION LEVEL OF STRUTS NO 1

LEVEL = 32.500 m
SPACE = 1.000 m
INCLINATION = 0.000 DEGREES
PRELOAD = 0.000 kN
STIFFNESS = 500000.000 kN/m
BILATERAL CONNECTION

PHASE 3

| WALL | SOIL 1 EXCAVATION: 33.10 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 30.00 kPa | SOIL 2 EXCAVATION: 32.00 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	1.002	-0.176	0.00	0.00		1	13.54	13.54	18750	0					
32.800	0.949	-0.176	0.65	4.43		1	15.98	13.54	18750	0					
32.500	0.896	-0.176	2.73	9.59		1	18.41	13.54	18750	0					
						1	18.41	13.54	18750	0				1	0.00
32.000	0.809	-0.174	9.99	19.81		1	22.47	13.54	18750	0					
31.500	0.723	-0.168	22.06	27.18		1	26.54	13.54	18750	2	19.53		18750		
31.000	0.642	-0.158	36.61	31.17		2	32.93	15.87	18750	2	23.97		18750		
						2	8.99	8.99	47500	2	40.95		47500		
30.562	0.575	-0.144	47.39	18.57		2	17.10	17.10	47500	2	42.77		47500		
30.125	0.515	-0.129	53.24	8.58		2	24.91	17.46	47500	2	44.89		47500		
29.688	0.463	-0.112	55.24	0.93		2	32.37	17.46	47500	2	47.36		47500		
29.250	0.418	-0.094	54.35	-4.69		2	39.48	17.46	47500	2	50.19		47500		
28.812	0.380	-0.078	51.38	-8.59		2	46.24	17.46	47500	2	53.36		47500		
28.375	0.349	-0.063	47.03	-11.07		2	52.66	17.46	47500	2	56.87		47500		
27.938	0.325	-0.049	41.86	-12.41		2	58.78	17.46	47500	2	60.68		47500		
27.500	0.307	-0.036	36.31	-12.86		2	64.63	17.46	47500	2	64.77		47500		
27.000	0.291	-0.025	29.92	-12.57		2	71.02	17.46	47500	2	69.72		47500		
26.544	0.282	-0.016	24.35	-11.77		2	76.64	17.46	47500	2	74.46		47500		
26.087	0.277	-0.009	19.23	-10.66		2	82.08	17.46	47500	2	79.38		47500		
25.631	0.274	-0.003	14.65	-9.37		2	87.38	17.46	47500	2	84.43		47500		
25.175	0.273	0.001	10.69	-8.01		2	92.59	17.46	47500	2	89.58		47500		
24.719	0.275	0.004	7.34	-6.66		2	97.71	17.46	47500	2	94.81		47500		
24.263	0.277	0.006	4.59	-5.39		2	102.79	17.46	47500	2	100.10		47500		
23.806	0.280	0.007	2.41	-4.22		2	107.83	17.46	47500	2	105.41		47500		
23.350	0.283	0.007	0.72	-3.19		2	112.86	17.46	47500	2	110.74		47500		
22.894	0.286	0.007	-0.52	-2.29		2	117.88	17.46	47500	2	116.08		47500		
22.438	0.289	0.007	-1.39	-1.55		2	122.90	17.46	47500	2	121.41		47500		
21.981	0.293	0.006	-1.95	-0.94		2	127.93	17.46	47500	2	126.74		47500		
21.525	0.295	0.006	-2.26	-0.45		2	132.98	17.46	47500	2	132.05		47500		
21.069	0.298	0.005	-2.38	-0.08		2	138.04	17.46	47500	2	137.34		47500		
20.613	0.300	0.004	-2.35	0.19		2	143.12	17.46	47500	2	142.62		47500		
20.156	0.302	0.003	-2.22	0.38		2	148.21	17.46	47500	2	147.88		47500		
19.700	0.303	0.003	-2.02	0.50		2	153.32	17.46	47500	2	153.13		47500		
19.300	0.304	0.002	-1.81	0.56		2	157.82	17.46	47500	2	157.72		47500		
18.987	0.305	0.002	-1.63	0.58		2	161.33	17.46	47500	2	161.30		47500		
18.675	0.305	0.002	-1.45	0.58		2	164.86	17.46	47500	2	164.87		47500		
18.362	0.306	0.001	-1.27	0.57		2	168.38	17.46	47500	2	168.43		47500		
18.050	0.306	0.001	-1.09	0.55		2	171.91	17.46	47500	2	172.00		47500		
17.737	0.306	0.001	-0.93	0.52		2	175.45	17.46	47500	2	175.56		47500		
17.425	0.306	0.001	-0.77	0.48		2	178.99	17.46	47500	2	179.11		47500		
17.112	0.307	0.000	-0.63	0.44		2	182.53	17.46	47500	2	182.67		47500		
16.800	0.307	0.000	-0.50	0.40		2	186.07	17.46	47500	2	186.22		47500		
16.487	0.307	0.000	-0.38	0.35		2	189.61	17.46	47500	2	189.77		47500		
16.175	0.307	0.000	-0.28	0.30		2	193.16	17.46	47500	2	193.32		47500		
15.862	0.307	0.000	-0.19	0.25		2	196.70	17.46	47500	2	196.86		47500		
15.550	0.307	0.000	-0.12	0.20		2	200.25	17.46	47500	2	200.41		47500		
15.237	0.307	0.000	-0.07	0.15		2	203.80	17.46	47500	2	203.96		47500		
14.925	0.307	0.000	-0.03	0.10		2	207.35	17.46	47500	2	207.50		47500		
14.612	0.307	0.000	0.00	0.05		2	210.89	17.46	47500	2	211.05		47500		
14.300	0.307	0.000	0.00	0.00		2	214.44	17.46	47500	2	214.60		47500		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 1.00 mm
MAXIMUM MOMENT = 55.24 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR., 2 = ELASTIC, 3 = PASSIVE PR.
CODIFICATION OF SOIL :

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 318.62 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.118
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.151

** PHASE Nb 4 **

*EXCAVACION PREVIA A EJECUCION DE Llosa VESTIBULO

* EXCAVATION IN SOIL 2 TO LEVEL = 27.000 m

PHASE 4

	WALL					SOIL 1 EXCAVATION: 33.10 m WATER LEVEL: 13.10 m CAQUOT SURC.: 30.00 kPa				SOIL 2 EXCAVATION: 27.00 m WATER LEVEL: 13.10 m CAQUOT SURC.: 0.00 kPa				STRUTS/ ANCHORS	
LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	0.940	0.178	0.00	0.00		2	14.71	14.71	18750	0					
32.800	0.993	0.178	0.68	4.60		1	15.98	13.54	18750	0					
32.500	1.047	0.179	2.82	9.76		1	18.41	13.54	18750	0					
				-65.43		1	18.41	13.54	18750	0				1	-75.19
32.000	1.135	0.174	-27.43	-55.21		1	22.47	13.54	18750	0					
31.500	1.219	0.160	-52.06	-42.96		1	26.54	13.54	18750	0					
31.000	1.294	0.138	-70.05	-28.68		1	30.60	13.54	18750	0					
						1	7.82	7.82	47500	0					
30.562	1.349	0.114	-81.74	-24.55		1	11.05	11.05	47500	0					
30.125	1.393	0.087	-91.32	-19.01		1	14.29	11.38	47500	0					
29.688	1.425	0.057	-98.17	-12.05		1	17.53	11.38	47500	0					
29.250	1.443	0.026	-101.66	-3.67		1	20.76	11.38	47500	0					
28.812	1.448	-0.006	-101.17	6.12		1	24.00	11.38	47500	0					
28.375	1.438	-0.037	-96.10	17.33		1	27.23	11.38	47500	0					
27.938	1.416	-0.065	-85.80	29.95		1	30.47	11.38	47500	0					
27.500	1.382	-0.090	-69.68	43.99		1	33.71	11.38	47500	0					
27.000	1.332	-0.110	-43.32	61.77		1	37.41	11.38	47500	0					
						1	37.41	11.38	47500	3	59.00		47500		
26.544	1.279	-0.120	-17.51	51.10		1	40.78	11.38	47500	2	65.93		47500		
26.087	1.224	-0.122	3.22	39.82		1	44.16	11.38	47500	2	68.48		47500		
25.631	1.169	-0.118	18.88	28.90		1	47.53	11.38	47500	2	71.05		47500		
25.175	1.116	-0.110	29.70	18.70		2	52.55	13.02	47500	2	73.75		47500		
24.719	1.069	-0.099	36.19	10.07		2	60.00	17.10	47500	2	76.65		47500		
24.263	1.026	-0.087	39.19	3.39		2	67.20	17.46	47500	2	79.81		47500		
23.806	0.989	-0.074	39.54	-1.57		2	74.12	17.46	47500	2	83.24		47500		
23.350	0.958	-0.061	37.98	-5.06		2	80.77	17.46	47500	2	86.95		47500		
22.894	0.933	-0.049	35.11	-7.34		2	87.14	17.46	47500	2	90.93		47500		
22.438	0.913	-0.039	31.44	-8.63		2	93.28	17.46	47500	2	95.16		47500		
21.981	0.898	-0.029	27.35	-9.15		2	99.19	17.46	47500	2	99.61		47500		
21.525	0.886	-0.021	23.17	-9.10		2	104.90	17.46	47500	2	104.25		47500		
21.069	0.878	-0.014	19.11	-8.63		2	110.46	17.46	47500	2	109.05		47500		
20.613	0.873	-0.008	15.34	-7.88		2	115.88	17.46	47500	2	113.99		47500		
20.156	0.871	-0.004	11.95	-6.95		2	121.19	17.46	47500	2	119.03		47500		
19.700	0.870	-0.001	9.01	-5.95		2	126.41	17.46	47500	2	124.16		47500		
19.300	0.870	0.002	6.81	-5.06		2	130.94	17.46	47500	2	128.72		47500		
18.987	0.871	0.003	5.33	-4.37		2	134.45	17.46	47500	2	132.30		47500		
18.675	0.872	0.004	4.07	-3.72		2	137.95	17.46	47500	2	135.90		47500		
18.362	0.873	0.005	3.01	-3.10		2	141.43	17.46	47500	2	139.51		47500		
18.050	0.875	0.005	2.13	-2.52		2	144.90	17.46	47500	2	143.14		47500		
17.737	0.877	0.006	1.43	-2.00		2	148.36	17.46	47500	2	146.77		47500		
17.425	0.878	0.006	0.88	-1.53		2	151.82	17.46	47500	2	150.40		47500		
17.112	0.880	0.006	0.47	-1.11		2	155.27	17.46	47500	2	154.04		47500		
16.800	0.882	0.006	0.17	-0.76		2	158.73	17.46	47500	2	157.68		47500		
16.487	0.884	0.006	-0.01	-0.46		2	162.18	17.46	47500	2	161.32		47500		
16.175	0.886	0.006	-0.12	-0.22		2	165.63	17.46	47500	2	164.96		47500		
15.862	0.888	0.006	-0.16	-0.04		2	169.09	17.46	47500	2	168.60		47500		
15.550	0.890	0.006	-0.15	0.09		2	172.54	17.46	47500	2	172.24		47500		
15.237	0.892	0.006	-0.11	0.15		2	176.00	17.46	47500	2	175.88		47500		
14.925	0.894	0.006	-0.06	0.16		2	179.45	17.46	47500	2	179.52		47500		
14.612	0.896	0.006	-0.02	0.11		2	182.91	17.46	47500	2	183.16		47500		
14.300	0.898	0.006	0.00	0.00		2	186.36	17.46	47500	2	186.80		47500		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 1.45 mm

MAXIMUM MOMENT = -101.66 kN.m/m

CODIFICATION :
OF STATE :
OF SOIL :

-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 283.07 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.091
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.206

** PHASE Nb 5 **

*EJECUCION DE LOSA VESTIBULO

* INSTALLATION LEVEL OF STRUTS NO 2

LEVEL	=	27.500 m
SPACE	=	1.000 m
INCLINATION	=	0.000 DEGREES
PRELOAD	=	0.000 kN
STIFFNESS	=	400000.000 kN/m

BILATERAL CONNECTION

PHASE 5

	WALL	SOIL 1 EXCAVATION: 33.10 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 30.00 kPa	SOIL 2 EXCAVATION: 27.00 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 0.00 kPa	STRUTS/ ANCHORS

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	0.940	0.178	0.00	0.00		2	14.71	14.71	18750	0					
32.800	0.993	0.178	0.68	4.60		2	15.98	13.54	18750	0					
32.500	1.047	0.179	2.82	9.76		1	18.41	13.54	18750	0					
				-65.43		1	18.41	13.54	18750	0				1	-75.19
32.000	1.135	0.174	-27.43	-55.21		1	22.47	13.54	18750	0					
31.500	1.219	0.160	-52.06	-42.96		1	26.54	13.54	18750	0					
31.000	1.294	0.138	-70.05	-28.68		1	30.60	13.54	18750	0					
						1	7.82	7.82	47500	0					
30.562	1.349	0.114	-81.74	-24.55		1	11.05	11.05	47500	0					
30.125	1.393	0.087	-91.32	-19.01		1	14.29	11.38	47500	0					
29.688	1.425	0.057	-98.17	-12.05		1	17.53	11.38	47500	0					
29.250	1.443	0.026	-101.66	-3.67		1	20.76	11.38	47500	0					
28.812	1.448	-0.006	-101.17	6.12		1	24.00	11.38	47500	0					
28.375	1.438	-0.037	-96.10	17.33		1	27.23	11.38	47500	0					
27.938	1.416	-0.065	-85.80	29.95		1	30.47	11.38	47500	0					
27.500	1.382	-0.090	-69.68	43.99		1	33.71	11.38	47500	0					
						1	33.71	11.38	47500	0				2	0.00
27.000	1.332	-0.110	-43.32	61.77		1	37.41	11.38	47500	0					
						1	37.41	11.38	47500	3	59.00		47500		
26.544	1.279	-0.120	-17.51	51.10		1	40.78	11.38	47500	2	65.93		47500		
26.087	1.224	-0.122	3.22	39.82		1	44.16	11.38	47500	2	68.48		47500		
25.631	1.169	-0.118	18.88	28.90		1	47.53	11.38	47500	2	71.05		47500		
25.175	1.116	-0.110	29.70	18.70		2	52.55	13.02	47500	2	73.75		47500		
24.719	1.069	-0.099	36.19	10.07		2	60.00	17.10	47500	2	76.65		47500		
24.263	1.026	-0.087	39.19	3.39		2	67.20	17.46	47500	2	79.81		47500		
23.806	0.989	-0.074	39.54	-1.57		2	74.12	17.46	47500	2	83.24		47500		
23.350	0.958	-0.061	37.98	-5.06		2	80.77	17.46	47500	2	86.95		47500		
22.894	0.933	-0.049	35.11	-7.34		2	87.14	17.46	47500	2	90.93		47500		
22.438	0.913	-0.039	31.44	-8.63		2	93.28	17.46	47500	2	95.16		47500		
21.981	0.898	-0.029	27.35	-9.15		2	99.19	17.46	47500	2	99.61		47500		
21.525	0.886	-0.021	23.17	-9.10		2	104.90	17.46	47500	2	104.25		47500		
21.069	0.878	-0.014	19.11	-8.63		2	110.46	17.46	47500	2	109.05		47500		
20.613	0.873	-0.008	15.34	-7.88		2	115.88	17.46	47500	2	113.99		47500		
20.156	0.871	-0.004	11.95	-6.95		2	121.19	17.46	47500	2	119.03		47500		
19.700	0.870	-0.001	9.01	-5.95		2	126.41	17.46	47500	2	124.16		47500		
19.300	0.870	0.002	6.81	-5.06		2	130.94	17.46	47500	2	128.72		47500		
18.987	0.871	0.003	5.33	-4.37		2	134.45	17.46	47500	2	132.30		47500		
18.675	0.872	0.004	4.07	-3.71		2	137.95	17.46	47500	2	135.90		47500		
18.362	0.873	0.005	3.01	-3.10		2	141.43	17.46	47500	2	139.51		47500		
18.050	0.875	0.005	2.13	-2.52		2	144.90	17.46	47500	2	143.14		47500		
17.737	0.877	0.006	1.43	-2.00		2	148.36	17.46	47500	2	146.77		47500		
17.425	0.878	0.006	0.88	-1.53		2	151.82	17.46	47500	2	150.40		47500		
17.112	0.880	0.006	0.47	-1.11		2	155.27	17.46	47500	2	154.04		47500		
16.800	0.882	0.006	0.18	-0.76		2	158.73	17.46	47500	2	157.68		47500		
16.487	0.884	0.006	-0.01	-0.46		2	162.18	17.46	47500	2	161.32		47500		
16.175	0.886	0.006	-0.12	-0.22		2	165.63	17.46	47500	2	164.96		47500		
15.862	0.888	0.006	-0.15	-0.04		2	169.09	17.46	47500	2	168.60		47500		
15.550	0.890	0.006	-0.15	0.09		2	172.54	17.46	47500	2	172.24		47500		
15.237	0.892	0.006	-0.11	0.15		2	176.00	17.46	47500	2	175.88		47500		
14.925	0.894	0.006	-0.06	0.16		2	179.45	17.46	47500	2	179.52		47500		
14.612	0.896	0.006	-0.01	0.11		2	182.91	17.46	47500	2	183.16		47500		
14.300	0.898	0.006	0.01	0.00		2	186.36	17.46	47500	2	186.80		47500		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 1.45 mm

MAXIMUM MOMENT = -101.66 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR.
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 283.07 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.091
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.206

** PHASE Nb 6 **

*EXCAVACION HASTA COTA DE SOLERA

* EXCAVATION IN SOIL 2 TO LEVEL = 19.300 m

PHASE 6

| | WALL | SOIL 1 EXCAVATION: 33.10 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 30.00 kPa | SOIL 2 EXCAVATION: 19.30 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO. SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	0.759	0.136	0.00	0.00	2	18.10	18.10	18750	0					
32.800	0.800	0.136	0.84	5.66	2	19.61	17.17	18750	0					
32.500	0.840	0.136	3.46	11.94	2	22.28	17.41	18750	0					
				39.91	2	22.28	17.41	18750	0				1	27.97
32.000	0.910	0.142	26.38	52.16	2	26.71	17.77	18750	0					
31.500	0.984	0.156	55.98	66.57	2	30.95	17.96	18750	0					
31.000	1.068	0.182	93.30	83.02	2	34.84	17.78	18750	0					
					2	18.56	17.46	47500	0					
30.562	1.155	0.217	131.45	91.52	2	20.29	17.46	47500	0					
30.125	1.260	0.265	173.44	100.47	2	20.63	17.46	47500	0					
29.688	1.388	0.326	219.33	109.20	2	19.26	13.11	47500	0					
29.250	1.547	0.402	269.00	117.95	1	20.76	11.38	47500	0					
28.812	1.743	0.494	322.69	127.74	1	24.00	11.38	47500	0					
28.375	1.982	0.604	380.98	138.95	1	27.23	11.38	47500	0					
27.938	2.274	0.733	444.48	151.57	1	30.47	11.38	47500	0					
27.500	2.626	0.882	513.81	165.61	1	33.71	11.38	47500	0					
				-332.16	1	33.71	11.38	47500	0				2	-497.77
27.000	3.108	1.036	352.10	-314.38	1	37.41	11.38	47500	0					
26.544	3.604	1.128	212.67	-296.55	1	40.78	11.38	47500	0					
26.087	4.131	1.175	81.73	-277.17	1	44.16	11.38	47500	0					
25.631	4.670	1.182	-40.01	-256.26	1	47.53	11.38	47500	0					
25.175	5.204	1.151	-151.86	-233.80	1	50.91	11.38	47500	0					
24.719	5.715	1.084	-253.12	-209.80	1	54.28	11.38	47500	0					
24.263	6.188	0.987	-343.08	-184.27	1	57.66	11.38	47500	0					
23.806	6.611	0.862	-421.03	-157.19	1	61.03	11.38	47500	0					
23.350	6.972	0.714	-486.28	-128.58	1	64.41	11.38	47500	0					
22.894	7.260	0.547	-538.12	-98.42	1	67.78	11.38	47500	0					
22.438	7.469	0.366	-575.86	-66.73	1	71.16	11.38	47500	0					
21.981	7.592	0.174	-598.78	-33.49	1	74.53	11.38	47500	0					
21.525	7.627	-0.022	-606.18	1.28	1	77.91	11.38	47500	0					
21.069	7.572	-0.219	-597.37	37.60	1	81.28	11.38	47500	0					
20.613	7.428	-0.409	-571.64	75.45	1	84.66	11.38	47500	0					
20.156	7.200	-0.589	-528.29	114.85	1	88.03	11.38	47500	0					
19.700	6.894	-0.751	-466.61	155.78	1	91.41	11.38	47500	0					
19.300	6.568	-0.875	-396.91	192.93	1	94.37	11.38	47500	0					
					1	94.37	11.38	47500	3	59.00		47500		
18.987	6.281	-0.956	-335.26	200.43	1	96.68	11.38	47500	3	84.09		47500		
18.675	5.972	-1.024	-272.38	200.80	1	98.99	11.38	47500	3	109.19		47500		
18.362	5.643	-1.078	-210.50	194.05	1	101.30	11.38	47500	3	134.29		47500		
18.050	5.299	-1.118	-151.84	180.18	1	103.61	11.38	47500	3	159.39		47500		
17.737	4.945	-1.146	-98.63	159.19	1	105.92	11.38	47500	3	184.49		47500		
17.425	4.584	-1.163	-53.10	131.07	1	108.24	11.38	47500	3	209.59		47500		
17.112	4.220	-1.170	-17.30	97.31	1	110.55	11.38	47500	2	225.26		47500		
16.800	3.854	-1.171	7.77	63.99	1	112.86	11.38	47500	2	211.42		47500		
16.487	3.488	-1.168	23.22	35.70	1	115.17	11.38	47500	2	197.61		47500		
16.175	3.124	-1.161	30.61	12.45	1	117.48	11.38	47500	2	183.87		47500		
15.862	2.762	-1.154	31.52	-5.80	1	119.79	11.38	47500	2	170.23		47500		
15.550	2.403	-1.148	27.50	-19.09	1	122.11	11.38	47500	2	156.69		47500		
15.237	2.045	-1.142	20.10	-27.43	1	124.42	11.38	47500	2	143.24		47500		
14.925	1.688	-1.139	11.11	-28.52	2	141.72	17.46	47500	2	129.86		47500		
14.612	1.333	-1.137	3.33	-19.54	2	162.15	17.46	47500	2	116.51		47500		
14.300	0.977	-1.137	0.00	0.00	2	182.58	17.46	47500	2	103.18		47500		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa	kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 7.63 mm

MAXIMUM MOMENT = -606.18 kN.m/m

CODIFICATION OF STATE OF SOIL :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 239.35 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.073
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.601

** PHASE Nb 7 **

*EJECUCION DE SOLERA

* INSTALLATION LEVEL OF STRUTS NO 3

LEVEL = 19.700 m
SPACE = 1.000 m
INCLINATION = 0.000 DEGREES
PRELOAD = 0.000 kN
STIFFNESS = 500000.000 kN/m
BILATERAL CONNECTION

PHASE 7

| | WALL | SOIL 1 EXCAVATION: 33.10 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 30.00 kPa | SOIL 2 EXCAVATION: 19.30 m, WATER LEVEL: 13.10 m, CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO. SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
33.100	0.759	0.136	0.00	0.00	2	18.10	18.10	18750	0					
32.800	0.800	0.136	0.84	5.66	2	19.61	17.17	18750	0					
32.500	0.840	0.136	3.46	11.94	2	22.28	17.41	18750	0					
				39.91	2	22.28	17.41	18750	0				1	27.97
32.000	0.910	0.142	26.38	52.16	2	26.71	17.77	18750	0					
31.500	0.984	0.156	55.98	66.57	2	30.95	17.96	18750	0					
31.000	1.068	0.182	93.30	83.02	2	34.84	17.78	18750	0					
					2	18.56	17.46	47500	0					
30.562	1.155	0.217	131.45	91.52	2	20.29	17.46	47500	0					
30.125	1.260	0.265	173.44	100.47	2	20.63	17.46	47500	0					
29.688	1.388	0.326	219.33	109.20	2	19.26	13.11	47500	0					
29.250	1.547	0.402	269.00	117.95	1	20.76	11.38	47500	0					
28.812	1.743	0.494	322.69	127.74	1	24.00	11.38	47500	0					
28.375	1.982	0.604	380.98	138.95	1	27.23	11.38	47500	0					
27.938	2.274	0.733	444.48	151.57	1	30.47	11.38	47500	0					
27.500	2.626	0.882	513.81	165.61	1	33.71	11.38	47500	0					
				-332.16	1	33.71	11.38	47500	0				2	-497.77
27.000	3.108	1.036	352.10	-314.38	1	37.41	11.38	47500	0					
26.544	3.604	1.128	212.67	-296.55	1	40.78	11.38	47500	0					
26.087	4.131	1.175	81.73	-277.17	1	44.16	11.38	47500	0					
25.631	4.670	1.182	-40.01	-256.26	1	47.53	11.38	47500	0					
25.175	5.204	1.151	-151.86	-233.80	1	50.91	11.38	47500	0					
24.719	5.715	1.084	-253.12	-209.80	2	54.28	11.38	47500	0					
24.263	6.188	0.987	-343.08	-184.27	2	57.66	11.38	47500	0					
23.806	6.611	0.862	-421.03	-157.19	2	61.03	11.38	47500	0					
23.350	6.972	0.714	-486.28	-128.58	2	64.41	11.38	47500	0					
22.894	7.260	0.547	-538.12	-98.42	2	67.78	11.38	47500	0					
22.438	7.469	0.366	-575.86	-66.73	2	71.16	11.38	47500	0					
21.981	7.592	0.174	-598.78	-33.49	2	74.53	11.38	47500	0					
21.525	7.627	-0.022	-606.18	1.28	2	77.91	11.38	47500	0					
21.069	7.572	-0.219	-597.37	37.60	2	81.28	11.38	47500	0					
20.613	7.428	-0.409	-571.64	75.45	2	84.66	11.38	47500	0					
20.156	7.200	-0.589	-528.29	114.85	2	88.03	11.38	47500	0					
19.700	6.894	-0.751	-466.61	155.78	2	91.41	11.38	47500	0					
					2	91.41	11.38	47500	0				3	0.00
19.300	6.568	-0.875	-396.91	192.94	2	94.37	11.38	47500	0					
					2	94.37	11.38	47500	2	59.00		47500		
18.987	6.281	-0.956	-335.26	200.43	2	96.68	11.38	47500	2	84.09		47500		
18.675	5.972	-1.024	-272.38	200.80	2	98.99	11.38	47500	2	109.19		47500		
18.362	5.643	-1.078	-210.50	194.05	2	101.30	11.38	47500	2	134.29		47500		
18.050	5.299	-1.118	-151.84	180.18	2	103.61	11.38	47500	2	159.39		47500		
17.737	4.945	-1.146	-98.63	159.19	2	105.92	11.38	47500	2	184.49		47500		
17.425	4.584	-1.163	-53.09	131.07	2	108.24	11.38	47500	2	209.59		47500		
17.112	4.220	-1.170	-17.30	97.31	2	110.55	11.38	47500	2	225.26		47500		
16.800	3.854	-1.171	7.77	63.99	1	112.86	11.38	47500	2	211.42		47500		
16.487	3.488	-1.168	23.22	35.71	1	115.17	11.38	47500	2	197.61		47500		
16.175	3.124	-1.161	30.61	12.45	1	117.48	11.38	47500	2	183.87		47500		
15.862	2.762	-1.154	31.52	-5.80	1	119.79	11.38	47500	2	170.23		47500		
15.550	2.403	-1.148	27.50	-19.09	1	122.11	11.38	47500	2	156.69		47500		
15.237	2.045	-1.142	20.11	-27.43	1	124.42	11.38	47500	2	143.24		47500		
14.925	1.688	-1.139	11.12	-28.52	2	141.71	17.46	47500	2	129.86		47500		
14.612	1.333	-1.137	3.33	-19.54	2	162.15	17.46	47500	2	116.51		47500		
14.300	0.978	-1.137	0.00	0.00	2	182.58	17.46	47500	2	103.18		47500		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa	kPa	kPa/m	kPa			kPa/m	kN	

MAXIMUM DISPLACEMENT = 7.63 mm
MAXIMUM MOMENT = -606.18 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR., 2 = ELASTIC
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 239.35 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.073
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.601

*** END OF CALCULUS

*** MAXIMUM DISPLACEMENT IN PHASE Nb 6 = 7.627 mm IN FINAL PHASE Nb 7 = 7.627 mm

*** MAXIMUM MOMENT IN PHASE Nb 7 = -606.184 kN.m/m IN FINAL PHASE Nb 7 = -606.184 kN.m/m

STRUT/ANCHOR		PRELOAD		MAXIMUM		FINAL STATE	
NUMBER	LEVEL	PHASE	FORCE	PHASE	FORCE	PHASE	FORCE
	m		kN		kN		kN
1	32.50	3	0.00	5	-75.19	7	27.97
2	27.50	5	0.00	7	-497.77	7	-497.77
3	19.70	7	0.00	7	0.00	7	0.00

* ENVELOPE CURVES FROM PHASE 1 TO PHASE 7 *

LEVEL	MINI CRO.FO	MAXI CRO.FO
m	kN/m	kN/m
33.100	0.00	0.00
32.800	0.00	5.66
32.500	0.00	11.94
	-65.43	39.91
32.000	-55.21	52.16
31.500	-42.96	66.57
31.000	-28.68	83.02
30.562	-24.55	91.52
30.125	-19.01	100.47
29.688	-12.05	109.20
29.250	-4.69	117.95
28.812	-8.59	127.74
28.375	-11.07	138.95
27.938	-12.41	151.57
27.500	-12.86	165.61
	-332.16	43.99
27.000	-314.38	61.77
26.544	-296.55	51.10
26.087	-277.17	39.82
25.631	-256.26	28.90
25.175	-233.80	18.70
24.719	-209.80	10.07
24.263	-184.27	3.39
23.806	-157.19	0.00
23.350	-128.58	0.00
22.894	-98.42	0.00
22.438	-66.73	0.00
21.981	-33.49	0.00
21.525	-9.10	1.28
21.069	-8.63	37.60
20.613	-7.88	75.45
20.156	-6.95	114.85
19.700	-5.95	155.78
	-5.95	155.78
19.300	-5.06	192.94
18.987	-4.37	200.43
18.675	-3.72	200.80
18.362	-3.10	194.05
18.050	-2.52	180.18
17.737	-2.00	159.19
17.425	-1.53	131.07
17.112	-1.11	97.31
16.800	-0.76	63.99
16.487	-0.46	35.71
16.175	-0.22	12.45
15.862	-5.80	0.25
15.550	-19.09	0.20
15.237	-27.43	0.15
14.925	-28.52	0.16
14.612	-19.54	0.11
14.300	0.00	0.00

LEVEL	MINI MOMENT	MAXI MOMENT
m	kN.m/m	kN.m/m
33.100	0.00	0.00
32.800	0.00	0.84
32.500	0.00	3.46
	0.00	3.46
32.000	-27.43	26.38
31.500	-52.06	55.98
31.000	-70.05	93.30
30.562	-81.74	131.45
30.125	-91.32	173.44
29.688	-98.17	219.33
29.250	-101.66	269.00
28.812	-101.17	322.69
28.375	-96.10	380.98
27.938	-85.80	444.48
27.500	-69.68	513.81
	-69.68	513.81
27.000	-43.32	352.10
26.544	-17.51	212.67
26.087	0.00	81.73
25.631	-40.01	18.88
25.175	-151.86	29.70
24.719	-253.12	36.19
24.263	-343.08	39.19
23.806	-421.03	39.54
23.350	-486.28	37.98
22.894	-538.12	35.11
22.438	-575.86	31.44
21.981	-598.78	27.35
21.525	-606.18	23.17
21.069	-597.37	19.11
20.613	-571.64	15.34
20.156	-528.29	11.95
19.700	-466.61	9.01
	-466.61	9.01
19.300	-396.91	6.81
18.987	-335.26	5.33
18.675	-272.38	4.07
18.362	-210.50	3.01
18.050	-151.84	2.13
17.737	-98.63	1.43
17.425	-53.10	0.88
17.112	-17.30	0.47
16.800	-0.50	7.77
16.487	-0.38	23.22
16.175	-0.28	30.61
15.862	-0.19	31.52
15.550	-0.15	27.50
15.237	-0.11	20.11
14.925	-0.06	11.12
14.612	-0.02	3.33
14.300	0.00	0.01

PANTALLA TIPO 7

Proyecto: INTEGRACION DEL FERROCARRIL EN SANT FELIU
Tipo: PANTALLAS DE PILOTES
Tramo: PANTALLA TIPO 7
Fecha: 27/10/2008

CARACTERIZACIÓN DE ESTRATOS

Estratos	Potencia (m)	ϕ	Cohesión (kN/m²)	Densidad (kN/m³)	Kh (kN/m²)
Rellenos	0.50	28	0	18	15,000
Arcillas y limos	1.20	32.3	13	19.5	38,000
Arenas y gravas	2.70	34.5	9	20.5	40,000
Gavas con arcillas	2.80	37	2	21	48,000
Arenas y gravas	4.00	34.5	9	20.5	38,000
Arcillas y limos	1.50	32.3	13	19.5	38,000
Arenas y gravas	-----	34.5	9	20.5	38,000

(*) Al no tener perfil de este tramo se ha tomado el del tramo mas cercano (Pantalla tipo 2)

Cota nivel freatico: --- m

SOBRECARGAS

Rellenos y tráfico

Rellenos:	7.000	m
SC Rellenos(*):	140.00	kN/m²
SC Tráfico:	30.00	kN/m²
Sobrecarga 1:	170.00	kN/m²
Ambito de actuación:	0-12	m

(*) Supuesta una densidad de 20 KN/m³

Edificación

n° de plantas	0.000	m
Carga por planta:	10.00	kN/m²
SC edficación:	0.00	kN/m²
Sobrecarga 2:	0.00	kN/m²
Ambito de actuación:	---	m

(*) Supuesta una carga de 10KN/m²·planta

CARACT.MECANICAS Y GOEMETRICAS DE LA PANTALLA DE PILOTES (RIGIDEZ)

DATOS			
Diametro (m):	1.25	Área (m²):	1.2272
Separación (m):	1.50	Inercia (m⁴):	0.1198
Resistencia Hormigón (N/mm²):	30	Rigidez (kNm²):	3,424,707
Ambiente:	IIa	Módulo Defor. Hormigón (kN/m²):	28,576,791

(*) Se ha considerado un valor Ej=8.500·∛fcm,j

HOJA PREPARADA PARA INTRODUCIR EL COMANDO "COE" (RIDO)

COTAS DE LA PANTALLA

Cota Superior Pantalla:	28.570	m
Cota Excavación:	27.570	m
Cota Fondo de Excavación:	19.900	m
Cota Pie de Pantalla:	14.400	m
Longitud Pilote:	14.170	m

RESULTADOS

Desplazamiento:	10.20	mm
Empuje Pasivo Movilizado:	61.20	%

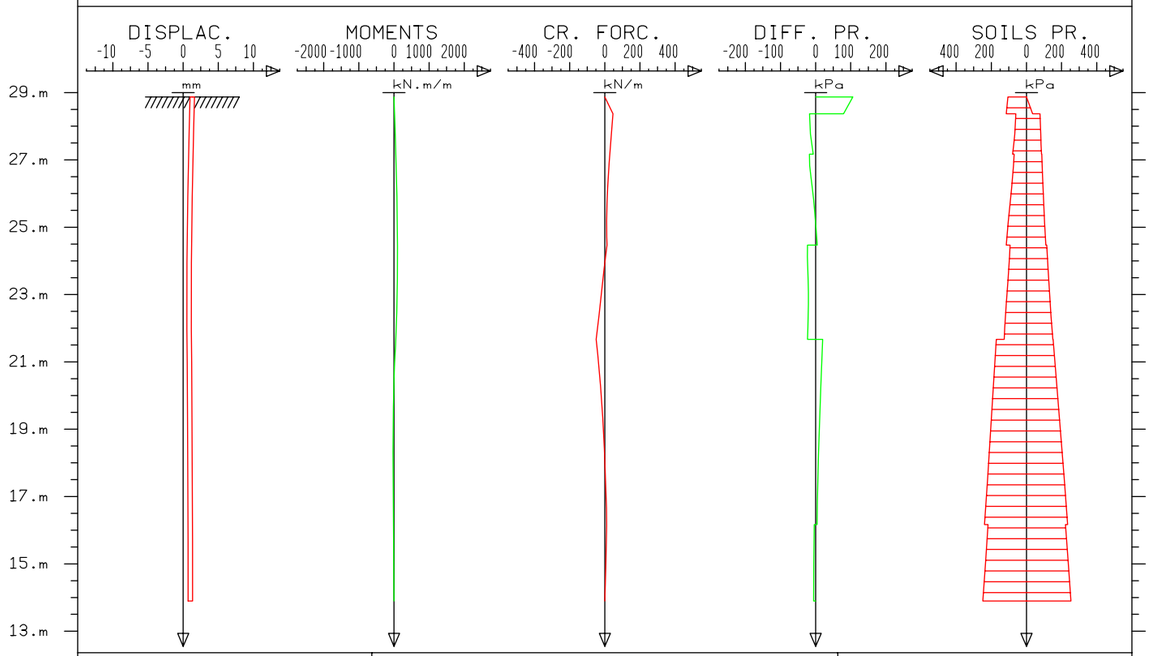
PROCESO CONSTRUCTIVO

1° Ejecución de pantalla de pilotes.
2° Excavacion previa a ejecucion de losa de cubierta.
3° Ejecución de losa de cubierta.
4° Excavación previa a ejecución de losa de solera.
5° Ejecucion de solera y conexión de esta a pantalla.

GRÁFICOS

PANTALLA PILOTES TIPO 7 (FALSO TUNEL) SOTERRAMIENTO SANT F

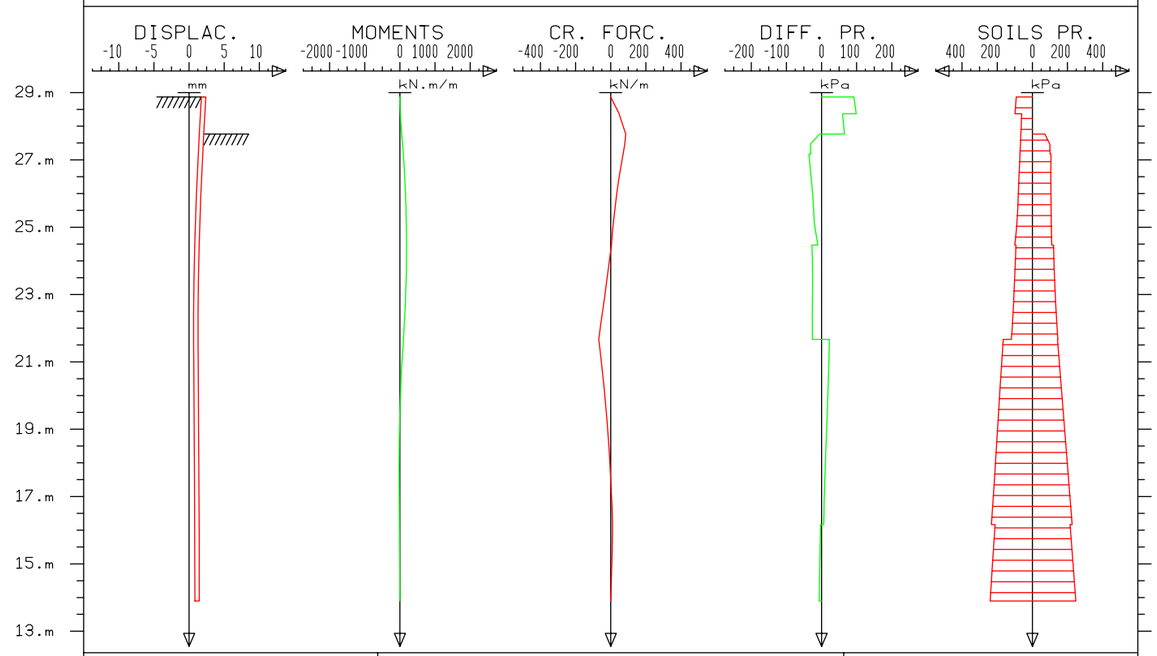
GRAPHS OF THE PHASE Nb 1



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-7

PANTALLA PILOTES TIPO 7 (FALSO TUNEL) SOTERRAMIENTO SANT F

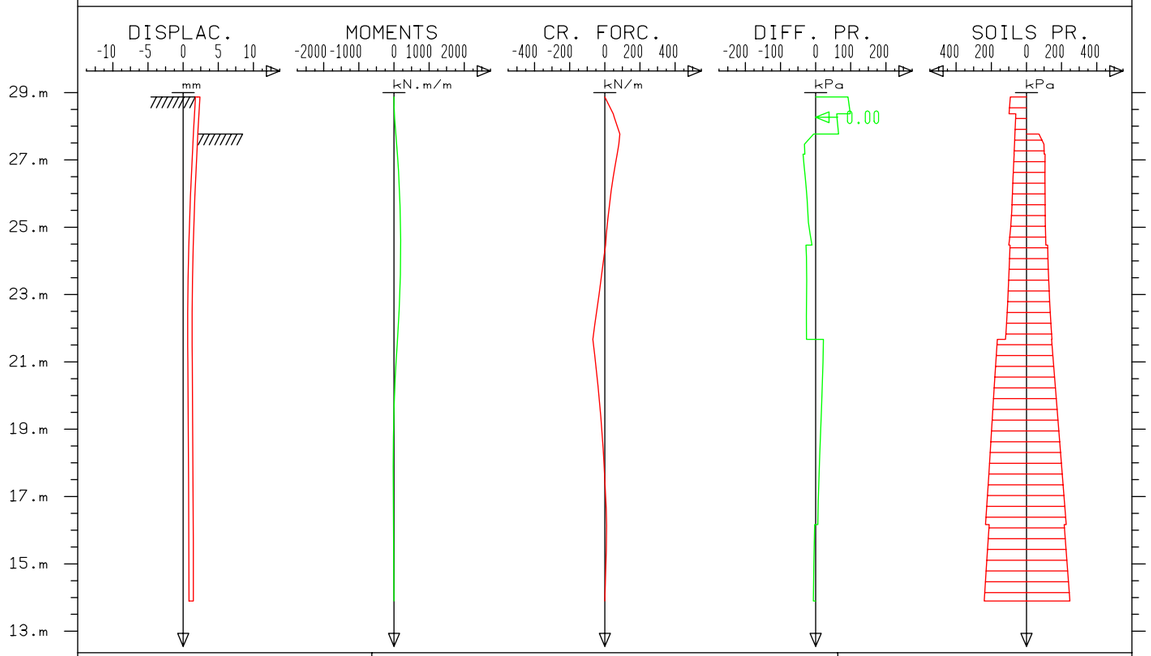
GRAPHS OF THE PHASE Nb 2



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-7

PANTALLA PILOTES TIPO 7 (FALSO TUNEL) SOTERRAMIENTO SANT F

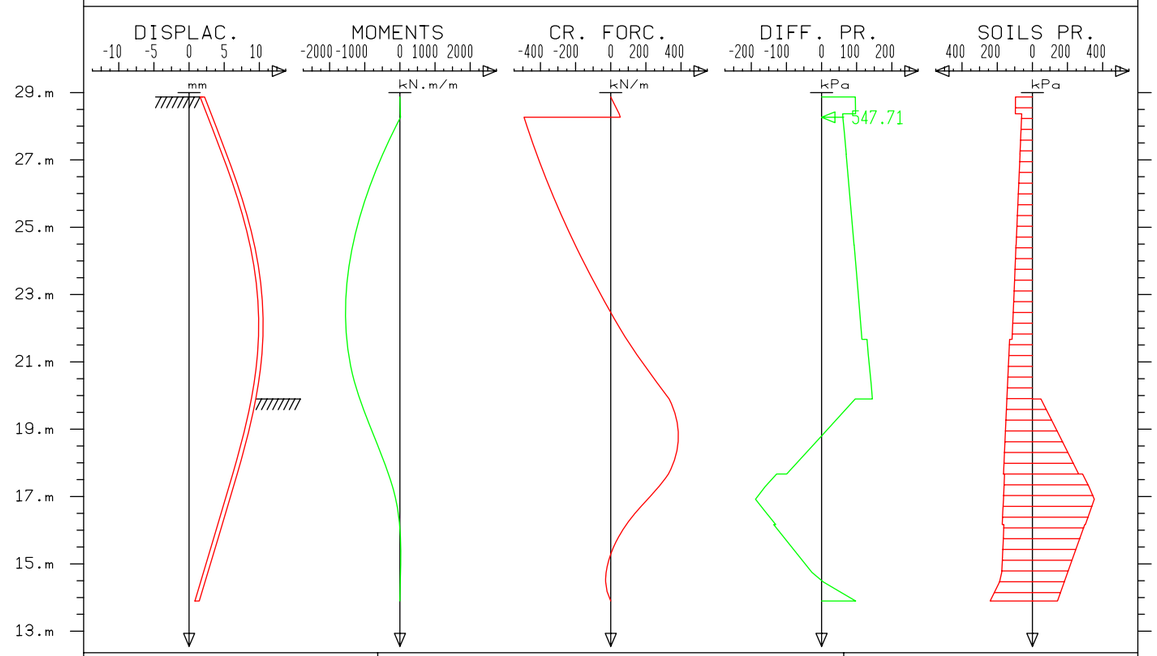
GRAPHS OF THE PHASE Nb 3



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-7

PANTALLA PILOTES TIPO 7 (FALSO TUNEL) SOTERRAMIENTO SANT F

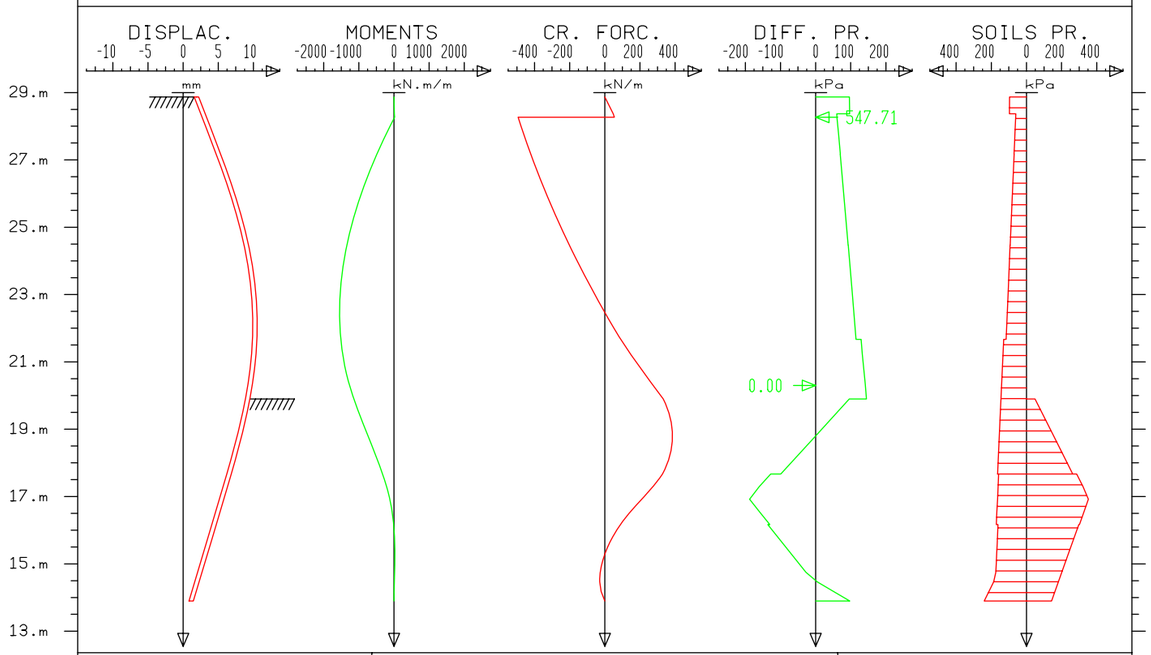
GRAPHS OF THE PHASE Nb 4



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-7

PANTALLA PILOTES TIPO 7 (FALSO TUNEL) SOTERRAMIENTO SANT F

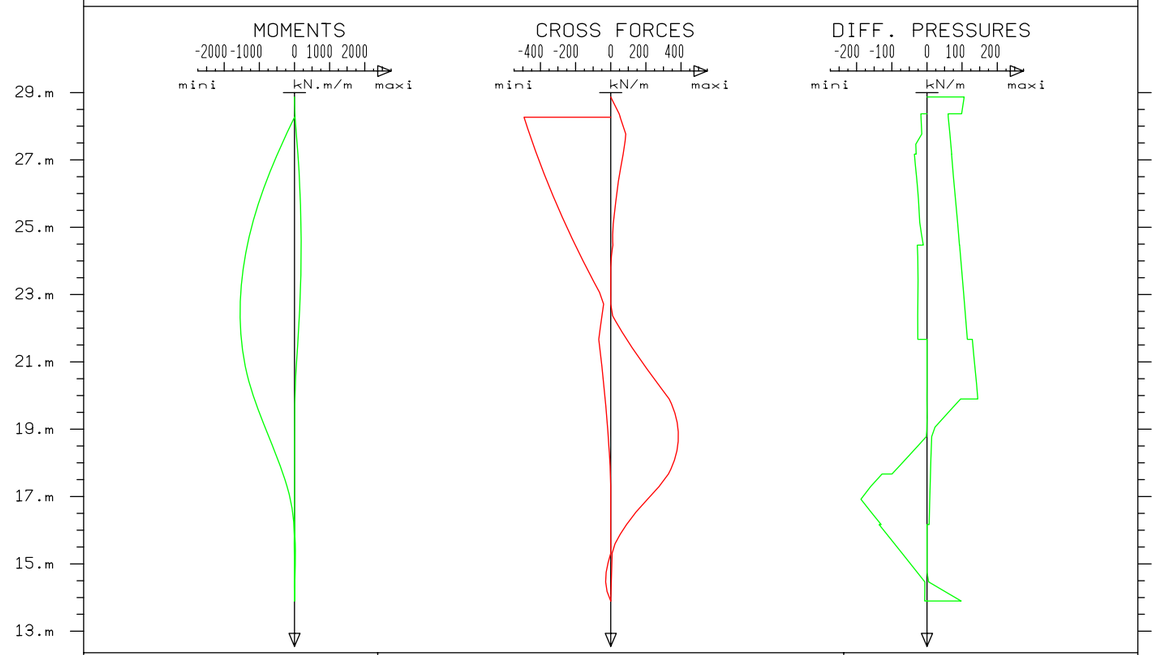
GRAPHS OF THE PHASE Nb 5



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-7

PANTALLA PILOTES TIPO 7 (FALSO TUNEL) SOTERRAMIENTO SANT F

ENVELOPES FROM PHASE 1 TO PHASE 5



RIDO 4.02 (C) R.F.L	MADRID	09-05-08 SFELIU-7

LISTADO

```
E &l8D &k2S &a4L      ***** DATA FILE NAME : SFELIU-7.RIO

        PANTALLA PILOTES TIPO 7 (FALSO TUNEL)   SOTERRAMIENTO SANT FELIU*101L  U:NN*
        *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
        #EMP=6.00
        #DIAMETRO=1.25
        #SEPARACION=1.50
        #fck=30
        #E=8500*((fck+8)^(1/3))*1000
        #I=3.14/(64)*(DIAMETRO)^4
        #RIGIDEZ=E*I
        *COTAS DE LA PANTALLA
        #CSUP=28.87
        #CEXC=28.57-8.67
        *Nota: "CEXC" es la cota maxima de excavacion
        #CPIE=CEXC-EMP
        #NF=CSUP-20.00
        *CABEZA DE PANTALLA
        : CSUP
  1 ...  28.87
        *PANTALLA 1.25/1.50
        : CPIE RIGIDEZ
  2 ...  13.9 3422971
        *COTA MAXIMA DE TERRENO
        : CSUP
  3 ...  28.87
        *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)
        : CSUP-0.50 18.00 9.00 0 0 0 0 28 0 0 15000
  4 ...  28.37 18 9 0.3610335 0.5305284 2.769826 0 28 0 0 15000
        : CSUP-0.50-1.20 19.50 9.50 0 0 0 13 32.30 0 0 38000
  5 ...  27.17 19.5 9.5 0.3034816 0.4656477 3.295093 13 32.3 0 0 38000
        : CSUP-1.70-2.70 20.50 10.50 0 0 0 0 9 34.50 0 0 40000
  6 ...  24.47 20.5 10.5 0.276808 0.4335938 3.612612 9 34.5 0 0 40000
        : CSUP-4.40-2.80 21.00 11.00 0 0 0 2 37.00 0 0 48000
  7 ...  21.67 21 11 0.2485836 0.398185 4.022791 2 37 0 0 48000
        : CSUP-7.20-4.00 19.50 9.50 0 0 0 0 9 32.30 0 0 38000
  8 ...  17.67 19.5 9.5 0.3034816 0.4656477 3.295093 9 32.3 0 0 38000
        : CSUP-11.20-1.50 19.50 9.50 0 0 0 13 32.30 0 0 38000
  9 ...  16.17 19.5 9.5 0.3034816 0.4656477 3.295093 13 32.3 0 0 38000
        : CSUP-12.70-9.00 20.50 10.50 0 0 0 9 34.50 0 0 38000
 10 ...  7.17 20.5 10.5 0.276808 0.4335938 3.612612 9 34.5 0 0 38000
        *NIVEL FREATICO
        : NF 0.50
 11 ...  8.87 0.5
        *FACTOR DE SEPARACION
        : COE CSUP CSUP-25.00 SEPARACION
 12 ... COE 28.87 3.87 1.5
        *SOBRECARGA 130 KN/M2 (PASO DE FERROCARRIL+ 7.00 MTS RELLENOS)
        : SUC(1) 170
 13 ... SUC(1)  170
        : CAL(2)
 14 ... CAL(2)
        *EXCAVACION PREVIA A EJECUCION DE LOSA SUPERIOR
        : EXC(2) CSUP-1.10
 15 ... EXC(2)  27.77
        : CAL(2)
 16 ... CAL(2)
        *EJECUCION DE LOSA DE CUBIERTA
        : STR CSUP-(0.50+0.10) 1 0 0 500000
 17 ... STR 28.27 1 0 0 500000
        : CAL(2)
 18 ... CAL(2)
        *EXCAVACION HASTA COTA DE SOLERA
        : EXC(2) CEXC
 19 ... EXC(2)  19.9
        : CAL(2)
 20 ... CAL(2)
        *EJECUCION DE SOLERA
        : STR CEXC+0.40 1 0 0 500000
 21 ... STR 20.3 1 0 0 500000
        : CAL(2)
 22 ... CAL(2)
        : END
 23 ... END
        : STA
 24 ... STA
        : EVP
 25 ... EVP
```



```
        *CARACTERISTICAS GEOMETRICAS DE LA PANTALLA
        *COTAS DE LA PANTALLA
        *Nota: "CEXC" es la cota maxima de excavacion
        *CABEZA DE PANTALLA
        *PANTALLA 1.25/1.50

        ------------------------------------------------------------------------

                                        ** STARTING DATA **
                                        --------------------


  * BOUSSINESQ SURCHARGES FUNCTION OF STATE OF SOIL


*** WALL DESCRIPTION :
                                                 INERTIA PRODUCT EI      CYLINDRICAL RIGIDITY
    SECTION NB  1 FROM  28.870 m  TO  13.900 m  :       3422971. kN.m2/m          0. kPa/m

        *COTA MAXIMA DE TERRENO


*** SOIL DESCRIPTION :

        *DEFINICION DE ESTRATOS(SUPUESTOS RELLENOS)

     LAYER NB  1 FROM  28.870 m  TO  28.370 m  :

        SATURATED UNIT WEIGHT              GH  =     18.000 kN/m3
        SUBMERGED UNIT WEIGHT              GD  =      9.000 kN/m3
        HOR. ACTIVE PRESSURE COEFFICIENT   KA  =      0.361
        HOR. AT REST PRESSURE COEFFICIENT  K0  =      0.531
        HOR. PASSIVE PRESSURE COEFFICIENT  KP  =      2.770
        COHESION                            C  =      0.000 kPa
        ANGLE OF INTERNAL FRICTION        PHI  =     28.000 DEGREES
                FOR ACTIVE  PRESS. DELTA/PHI  =      0.000
                FOR PASSIVE PRESS. DELTA/PHI  =      0.000
        ELASTIC REACTION COEFFICIENT (AT P=0)  =  15000.000 kPa/m
        INCR. OF THIS COEFF. WITH PRESSURE     =      0.000 1/m

     LAYER NB  2 FROM  28.370 m  TO  27.170 m  :

        SATURATED UNIT WEIGHT              GH  =     19.500 kN/m3
        SUBMERGED UNIT WEIGHT              GD  =      9.500 kN/m3
        HOR. ACTIVE PRESSURE COEFFICIENT   KA  =      0.303
        HOR. AT REST PRESSURE COEFFICIENT  K0  =      0.466
        HOR. PASSIVE PRESSURE COEFFICIENT  KP  =      3.295
        COHESION                            C  =     13.000 kPa
        ANGLE OF INTERNAL FRICTION        PHI  =     32.300 DEGREES
                FOR ACTIVE  PRESS. DELTA/PHI  =      0.000
                FOR PASSIVE PRESS. DELTA/PHI  =      0.000
        ELASTIC REACTION COEFFICIENT (AT P=0)  =  38000.000 kPa/m
        INCR. OF THIS COEFF. WITH PRESSURE     =      0.000 1/m

     LAYER NB  3 FROM  27.170 m  TO  24.470 m  :

        SATURATED UNIT WEIGHT              GH  =     20.500 kN/m3
        SUBMERGED UNIT WEIGHT              GD  =     10.500 kN/m3
        HOR. ACTIVE PRESSURE COEFFICIENT   KA  =      0.277
        HOR. AT REST PRESSURE COEFFICIENT  K0  =      0.434
        HOR. PASSIVE PRESSURE COEFFICIENT  KP  =      3.613
        COHESION                            C  =      9.000 kPa
        ANGLE OF INTERNAL FRICTION        PHI  =     34.500 DEGREES
                FOR ACTIVE  PRESS. DELTA/PHI  =      0.000
                FOR PASSIVE PRESS. DELTA/PHI  =      0.000
        ELASTIC REACTION COEFFICIENT (AT P=0)  =  40000.000 kPa/m
        INCR. OF THIS COEFF. WITH PRESSURE     =      0.000 1/m

     LAYER NB  4 FROM  24.470 m  TO  21.670 m  :

        SATURATED UNIT WEIGHT              GH  =     21.000 kN/m3
        SUBMERGED UNIT WEIGHT              GD  =     11.000 kN/m3
        HOR. ACTIVE PRESSURE COEFFICIENT   KA  =      0.249
        HOR. AT REST PRESSURE COEFFICIENT  K0  =      0.398
        HOR. PASSIVE PRESSURE COEFFICIENT  KP  =      4.023
        COHESION                            C  =      2.000 kPa
        ANGLE OF INTERNAL FRICTION        PHI  =     37.000 DEGREES
                FOR ACTIVE  PRESS. DELTA/PHI  =      0.000
                FOR PASSIVE PRESS. DELTA/PHI  =      0.000
        ELASTIC REACTION COEFFICIENT (AT P=0)  =  48000.000 kPa/m
        INCR. OF THIS COEFF. WITH PRESSURE     =      0.000 1/m

     LAYER NB  5 FROM  21.670 m  TO  17.670 m  :

        SATURATED UNIT WEIGHT              GH  =     19.500 kN/m3
        SUBMERGED UNIT WEIGHT              GD  =      9.500 kN/m3
        HOR. ACTIVE PRESSURE COEFFICIENT   KA  =      0.303
        HOR. AT REST PRESSURE COEFFICIENT  K0  =      0.466
        HOR. PASSIVE PRESSURE COEFFICIENT  KP  =      3.295
        COHESION                            C  =      9.000 kPa
        ANGLE OF INTERNAL FRICTION        PHI  =     32.300 DEGREES
                FOR ACTIVE  PRESS. DELTA/PHI  =      0.000
                FOR PASSIVE PRESS. DELTA/PHI  =      0.000
        ELASTIC REACTION COEFFICIENT (AT P=0)  =  38000.000 kPa/m
        INCR. OF THIS COEFF. WITH PRESSURE     =      0.000 1/m
```

LAYER NB 6 FROM 17.670 m TO 16.170 m :

SATURATED UNIT WEIGHT	GH	=	19.500 kN/m3
SUBMERGED UNIT WEIGHT	GD	=	9.500 kN/m3
HOR. ACTIVE PRESSURE COEFFICIENT	KA	=	0.303
HOR. AT REST PRESSURE COEFFICIENT	K0	=	0.466
HOR. PASSIVE PRESSURE COEFFICIENT	KP	=	3.295
COHESION	C	=	13.000 kPa
ANGLE OF INTERNAL FRICTION	PHI	=	32.300 DEGREES
FOR ACTIVE PRESS. DELTA/PHI		=	0.000
FOR PASSIVE PRESS. DELTA/PHI		=	0.000
ELASTIC REACTION COEFFICIENT (AT P=0)		=	38000.000 kPa/m
INCR. OF THIS COEFF. WITH PRESSURE		=	0.000 1/m

LAYER NB 7 FROM 16.170 m TO 7.170 m :

SATURATED UNIT WEIGHT	GH	=	20.500 kN/m3
SUBMERGED UNIT WEIGHT	GD	=	10.500 kN/m3
HOR. ACTIVE PRESSURE COEFFICIENT	KA	=	0.277
HOR. AT REST PRESSURE COEFFICIENT	K0	=	0.434
HOR. PASSIVE PRESSURE COEFFICIENT	KP	=	3.613
COHESION	C	=	9.000 kPa
ANGLE OF INTERNAL FRICTION	PHI	=	34.500 DEGREES
FOR ACTIVE PRESS. DELTA/PHI		=	0.000
FOR PASSIVE PRESS. DELTA/PHI		=	0.000
ELASTIC REACTION COEFFICIENT (AT P=0)		=	38000.000 kPa/m
INCR. OF THIS COEFF. WITH PRESSURE		=	0.000 1/m

*NIVEL FREATICO

** PHASE Nb 1 **

*FACTOR DE SEPARACION

* FROM 28.870 m TO 3.870 m COEFFICIENT APPLIED TO PRESSURES = 1.500
ADDITIONAL COEFF. ON PASSIVE PRESSURE = 1.000

*SOBRECARGA 130 KN/M2 (PASO DE FERROCARRIL+ 7.00 MTS RELLENOS)

* CAQUOT SURCHARGE ON SOIL 1 = 170.000 kPa

PHASE 1

WALL	SOIL 1	SOIL 2	
	EXCAVATION: 28.87 m	EXCAVATION: 28.87 m	STRUTS/
	WATER LEVEL: 8.87 m	WATER LEVEL: 8.87 m	ANCHORS
	CAQUOT SURC.: 170.00 kPa	CAQUOT SURC.: 0.00 kPa	

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
28.870	1.306	-0.124	0.00	0.00		2	105.90	105.90	22500	3	0.00		22500		
28.370	1.244	-0.123	12.13	46.30		2	114.45	109.58	22500	2	35.16		22500		
						1	60.00	60.00	57000	2	77.20		57000		
28.270	1.232	-0.123	16.67	44.59		1	60.89	60.89	57000	2	77.86		57000		
27.770	1.171	-0.119	36.94	36.65		2	66.43	66.43	57000	2	81.22		57000		
27.470	1.136	-0.115	47.33	32.81		2	72.52	72.52	57000	2	83.31		57000		
27.170	1.102	-0.111	56.74	30.15		2	78.54	78.54	57000	2	85.47		57000		
						1	69.83	69.83	60000	2	87.21		60000		
26.833	1.066	-0.104	65.94	24.38		1	72.71	70.59	60000	2	89.54		60000		
26.495	1.032	-0.098	73.28	19.30		2	78.72	73.73	60000	2	91.99		60000		
26.157	1.000	-0.090	79.11	15.47		2	85.12	77.26	60000	2	94.59		60000		
25.820	0.971	-0.082	83.86	12.86		2	91.36	80.63	60000	2	97.35		60000		
25.483	0.945	-0.074	87.92	11.37		2	97.44	83.83	60000	2	100.27		60000		
25.145	0.922	-0.065	91.65	10.89		2	103.34	86.86	60000	2	103.37		60000		
24.807	0.901	-0.055	95.36	11.29		2	109.06	89.70	60000	2	106.65		60000		
24.470	0.884	-0.046	99.35	12.45		2	114.58	92.35	60000	2	110.13		60000		
						1	93.12	63.39	72000	2	116.08		72000		
24.120	0.870	-0.036	102.29	4.30		1	95.86	63.39	72000	2	119.44		72000		
23.770	0.859	-0.025	102.38	-3.71		2	100.85	65.64	72000	2	123.07		72000		
23.420	0.852	-0.015	99.73	-11.32		2	105.74	67.79	72000	2	126.96		72000		
23.070	0.849	-0.005	94.48	-18.66		2	110.38	69.68	72000	2	131.10		72000		
22.720	0.849	0.005	86.69	-25.91		2	114.77	71.33	72000	2	135.49		72000		
22.370	0.852	0.013	76.34	-33.24		2	118.93	72.76	72000	2	140.11		72000		
22.020	0.858	0.020	63.39	-40.80		2	122.91	73.99	72000	2	144.91		72000		
21.670	0.866	0.026	47.74	-48.71		2	126.71	75.06	72000	2	149.88		72000		
						2	171.74	118.74	57000	2	151.72		57000		
21.327	0.876	0.030	32.21	-42.04		2	175.86	118.74	57000	2	156.93		57000		
20.985	0.886	0.032	18.90	-35.77		2	179.92	118.74	57000	2	162.21		57000		
20.642	0.898	0.034	7.66	-29.92		2	183.93	118.74	57000	2	167.52		57000		
20.300	0.909	0.034	-1.65	-24.52		2	187.94	118.74	57000	2	172.84		57000		
19.900	0.923	0.033	-10.29	-18.79		2	192.62	118.74	57000	2	179.06		57000		
19.621	0.932	0.032	-15.02	-15.16		2	195.90	118.74	57000	2	183.37		57000		
19.342	0.940	0.031	-18.77	-11.80		2	199.19	118.74	57000	2	187.67		57000		
19.064	0.949	0.029	-21.62	-8.72		2	202.52	118.74	57000	2	191.94		57000		
18.785	0.957	0.027	-23.66	-5.90		2	205.86	118.74	57000	2	196.19		57000		
18.506	0.964	0.025	-24.94	-3.32		2	209.24	118.74	57000	2	200.40		57000		
18.228	0.971	0.023	-25.53	-0.96		2	212.66	118.74	57000	2	204.58		57000		
17.949	0.977	0.021	-25.49	1.19		2	216.10	118.74	57000	2	208.73		57000		
17.670	0.983	0.019	-24.88	3.16		2	219.58	118.74	57000	2	212.85		57000		
17.295	0.989	0.016	-23.24	5.54		2	224.31	118.74	57000	2	218.33		57000		
16.920	0.995	0.014	-20.76	7.65		2	229.09	118.74	57000	2	223.77		57000		
16.545	1.000	0.012	-17.53	9.55		2	233.92	118.74	57000	2	229.15		57000		
16.170	1.004	0.010	-13.63	11.25		2	238.79	118.74	57000	2	234.49		57000		
						2	218.41	110.57	57000	2	222.29		57000		
15.886	1.007	0.009	-10.59	10.10		2	222.04	110.57	57000	2	226.23		57000		
15.602	1.009	0.008	-7.90	8.87		2	225.68	110.57	57000	2	230.16		57000		
15.319	1.011	0.008	-5.57	7.57		2	229.33	110.57	57000	2	234.07		57000		
15.035	1.014	0.007	-3.61	6.19		2	232.99	110.57	57000	2	237.98		57000		
14.751	1.016	0.007	-2.06	4.74		2	236.66	110.57	57000	2	241.88		57000		
14.467	1.018	0.007	-0.93	3.23		2	240.32	110.57	57000	2	245.78		57000		
14.184	1.020	0.007	-0.24	1.65		2	243.99	110.57	57000	2	249.68		57000		
13.900	1.022	0.007	0.00	0.00		2	247.66	110.57	57000	2	253.58		57000		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 1.31 mm

MAXIMUM MOMENT = 102.38 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR.
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(3 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 1450.38 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.090
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.187

** PHASE Nb 2 **

*EXCAVACION PREVIA A EJECUCION DE LOSA SUPERIOR

* EXCAVATION IN SOIL 2 TO LEVEL = 27.770 m

PHASE 2

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	SOIL 1 STATE	PRE.	SURCH.	ELAST.	SOIL 2 STATE	PRE.	SURCH.	ELAST.	NB	LOAD
28.870	2.080	-0.267	0.00	0.00		1	92.06	92.06	22500	0					
28.370	1.946	-0.266	11.78	47.68		2	98.66	93.78	22500	0					
						1	60.00	60.00	57000	0					
28.270	1.920	-0.266	16.85	53.72		1	60.89	60.89	57000	0					
27.770	1.788	-0.261	51.51	85.28		1	65.33	65.33	57000	0					
						1	65.33	65.33	57000	3	70.79		57000		
27.470	1.710	-0.256	76.45	79.70		1	67.99	67.99	57000	3	99.71		57000		
27.170	1.635	-0.248	98.95	70.34		1	70.65	70.65	57000	2	101.34		57000		
						1	69.83	69.83	60000	2	105.68		60000		
26.833	1.553	-0.237	120.71	58.79		1	72.71	70.59	60000	2	105.27		60000		
26.495	1.475	-0.224	138.76	48.32		1	75.58	70.59	60000	2	105.10		60000		
26.157	1.402	-0.210	153.44	38.82		1	78.45	70.59	60000	2	105.21		60000		
25.820	1.333	-0.194	165.06	30.21		1	81.32	70.59	60000	2	105.62		60000		
25.483	1.271	-0.177	173.91	22.37		1	84.20	70.59	60000	2	106.36		60000		
25.145	1.214	-0.160	180.23	15.19		1	87.07	70.59	60000	2	107.44		60000		
24.807	1.163	-0.142	184.29	9.13		2	93.36	74.00	60000	2	108.89		60000		
24.470	1.118	-0.123	186.59	4.80		2	100.54	78.31	60000	2	110.70		60000		
						1	93.12	63.39	72000	2	120.56		72000		
24.120	1.078	-0.104	186.61	-4.60		1	95.86	63.39	72000	2	122.08		72000		
23.770	1.045	-0.085	183.41	-13.64		1	98.60	63.39	72000	2	124.08		72000		
23.420	1.019	-0.067	177.08	-22.51		1	101.34	63.39	72000	2	126.55		72000		
23.070	0.998	-0.049	167.65	-31.37		1	104.08	63.39	72000	2	129.48		72000		
22.720	0.984	-0.033	155.11	-40.37		1	106.82	63.39	72000	2	132.84		72000		
22.370	0.975	-0.018	139.37	-49.56		2	110.08	63.91	72000	2	136.59		72000		
22.020	0.971	-0.004	120.42	-58.74		2	114.75	65.83	72000	2	140.71		72000		
21.670	0.972	0.007	98.26	-67.84		2	119.10	67.45	72000	2	145.13		72000		
						2	165.71	113.87	57000	2	143.29		57000		
21.327	0.976	0.016	76.34	-60.24		2	170.15	115.28	57000	2	148.18		57000		
20.985	0.982	0.022	56.98	-52.84		2	174.45	116.53	57000	2	153.22		57000		
20.642	0.991	0.027	40.11	-45.73		2	178.63	117.67	57000	2	158.36		57000		
20.300	1.000	0.030	25.61	-38.98		2	182.73	118.73	57000	2	163.59		57000		
19.900	1.013	0.032	11.51	-31.61		2	187.46	118.74	57000	2	169.76		57000		
19.621	1.022	0.033	3.37	-26.82		2	190.74	118.74	57000	2	174.07		57000		
19.342	1.031	0.033	-3.47	-22.32		2	194.01	118.74	57000	2	178.40		57000		
19.064	1.041	0.032	-9.10	-18.12		2	197.29	118.74	57000	2	182.71		57000		
18.785	1.050	0.032	-13.60	-14.19		2	200.57	118.74	57000	2	187.02		57000		
18.506	1.058	0.030	-17.04	-10.55		2	203.88	118.74	57000	2	191.31		57000		
18.228	1.066	0.029	-19.51	-7.18		2	207.21	118.74	57000	2	195.57		57000		
17.949	1.074	0.027	-21.07	-4.06		2	210.56	118.74	57000	2	199.81		57000		
17.670	1.081	0.025	-21.79	-1.18		2	213.94	118.74	57000	2	204.03		57000		
17.295	1.091	0.023	-21.56	2.34		2	218.53	118.74	57000	2	209.65		57000		
16.920	1.099	0.021	-20.08	5.49		2	223.17	118.74	57000	2	215.23		57000		
16.545	1.106	0.019	-17.49	8.31		2	227.85	118.74	57000	2	220.76		57000		
16.170	1.113	0.017	-13.89	10.83		2	232.58	118.74	57000	2	226.24		57000		
						2	212.21	110.57	57000	2	215.04		57000		
15.886	1.117	0.016	-10.94	9.95		2	215.72	110.57	57000	2	219.08		57000		
15.602	1.122	0.015	-8.25	8.93		2	219.26	110.57	57000	2	223.12		57000		
15.319	1.126	0.015	-5.88	7.76		2	222.80	110.57	57000	2	227.14		57000		
15.035	1.130	0.014	-3.86	6.47		2	226.35	110.57	57000	2	231.15		57000		
14.751	1.134	0.014	-2.23	5.04		2	229.91	110.57	57000	2	235.16		57000		
14.467	1.138	0.014	-1.01	3.49		2	233.47	110.57	57000	2	239.17		57000		
14.184	1.142	0.014	-0.26	1.81		2	237.03	110.57	57000	2	243.18		57000		
13.900	1.146	0.014	0.00	0.00		2	240.59	110.57	57000	2	247.18		57000		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 2.08 mm

MAXIMUM MOMENT = 186.61 kN.m/m

CODIFICATION OF STATE OF SOIL :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 1397.91 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.087
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.207

** PHASE Nb 3 **

*EJECUCION DE LOSA DE CUBIERTA

* INSTALLATION LEVEL OF STRUTS NO 1

LEVEL = 28.270 m
SPACE = 1.000 m
INCLINATION = 0.000 DEGREES
PRELOAD = 0.000 kN
STIFFNESS = 500000.000 kN/m
BILATERAL CONNECTION

PHASE 3

WALL	SOIL 1	SOIL 2	
	EXCAVATION: 28.87 m	EXCAVATION: 27.77 m	STRUTS/
	WATER LEVEL: 8.87 m	WATER LEVEL: 8.87 m	ANCHORS
	CAQUOT SURC.: 170.00 kPa	CAQUOT SURC.: 0.00 kPa	

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
28.870	2.080	-0.267	0.00	0.00		1	92.06	92.06	22500	0					
28.370	1.946	-0.266	11.78	47.68		2	98.66	93.78	22500	0					
						1	60.00	60.00	57000	0					
28.270	1.920	-0.266	16.85	53.72		1	60.89	60.89	57000	0					
						1	60.89	60.89	57000	0				1	0.00
27.770	1.788	-0.261	51.51	85.28		2	65.33	65.33	57000	0					
						2	65.33	65.33	57000	2	70.79		57000		
27.470	1.710	-0.256	76.45	79.70		2	67.99	67.99	57000	2	99.71		57000		
27.170	1.635	-0.248	98.95	70.34		2	70.65	70.65	57000	2	101.34		57000		
						2	69.83	69.83	60000	2	105.68		60000		
26.833	1.553	-0.237	120.71	58.79		2	72.71	70.59	60000	2	105.27		60000		
26.495	1.475	-0.224	138.76	48.32		2	75.58	70.59	60000	2	105.10		60000		
26.157	1.402	-0.210	153.43	38.82		2	78.45	70.59	60000	2	105.21		60000		
25.820	1.333	-0.194	165.06	30.21		2	81.32	70.59	60000	2	105.62		60000		
25.483	1.271	-0.177	173.91	22.37		2	84.20	70.59	60000	2	106.36		60000		
25.145	1.214	-0.160	180.23	15.19		2	87.07	70.59	60000	2	107.44		60000		
24.807	1.163	-0.142	184.29	9.13		2	93.36	74.00	60000	2	108.89		60000		
24.470	1.118	-0.123	186.59	4.80		2	100.54	78.31	60000	2	110.70		60000		
						2	93.12	63.39	72000	2	120.56		72000		
24.120	1.078	-0.104	186.61	-4.60		2	95.86	63.39	72000	2	122.08		72000		
23.770	1.045	-0.085	183.41	-13.64		2	98.60	63.39	72000	2	124.08		72000		
23.420	1.019	-0.067	177.08	-22.51		2	101.34	63.39	72000	2	126.55		72000		
23.070	0.998	-0.049	167.65	-31.37		2	104.08	63.39	72000	2	129.48		72000		
22.720	0.984	-0.033	155.11	-40.37		2	106.82	63.39	72000	2	132.84		72000		
22.370	0.975	-0.018	139.37	-49.56		2	110.08	63.91	72000	2	136.59		72000		
22.020	0.971	-0.004	120.42	-58.74		2	114.75	65.83	72000	2	140.71		72000		
21.670	0.972	0.007	98.26	-67.84		2	119.10	67.45	72000	2	145.13		72000		
						2	165.71	113.87	57000	2	143.29		57000		
21.327	0.976	0.016	76.34	-60.24		2	170.15	115.28	57000	2	148.18		57000		
20.985	0.982	0.022	56.98	-52.84		2	174.45	116.53	57000	2	153.22		57000		
20.642	0.991	0.027	40.11	-45.73		2	178.63	117.67	57000	2	158.36		57000		
20.300	1.000	0.030	25.61	-38.98		2	182.73	118.73	57000	2	163.59		57000		
19.900	1.013	0.032	11.51	-31.61		2	187.46	118.74	57000	2	169.76		57000		
19.621	1.022	0.033	3.37	-26.82		2	190.74	118.74	57000	2	174.07		57000		
19.342	1.031	0.033	-3.47	-22.32		2	194.01	118.74	57000	2	178.40		57000		
19.064	1.041	0.032	-9.10	-18.12		2	197.29	118.74	57000	2	182.71		57000		
18.785	1.049	0.032	-13.60	-14.19		2	200.57	118.74	57000	2	187.02		57000		
18.506	1.058	0.030	-17.04	-10.55		2	203.88	118.74	57000	2	191.31		57000		
18.228	1.066	0.029	-19.50	-7.18		2	207.21	118.74	57000	2	195.57		57000		
17.949	1.074	0.027	-21.07	-4.06		2	210.56	118.74	57000	2	199.81		57000		
17.670	1.081	0.025	-21.79	-1.18		2	213.94	118.74	57000	2	204.03		57000		
17.295	1.091	0.023	-21.56	2.34		2	218.53	118.74	57000	2	209.65		57000		
16.920	1.099	0.021	-20.08	5.49		2	223.17	118.74	57000	2	215.23		57000		
16.545	1.106	0.019	-17.49	8.31		2	227.85	118.74	57000	2	220.76		57000		
16.170	1.113	0.017	-13.89	10.83		2	232.58	118.74	57000	2	226.24		57000		
						2	212.21	110.57	57000	2	215.04		57000		
15.886	1.117	0.016	-10.94	9.95		2	215.72	110.57	57000	2	219.08		57000		
15.602	1.122	0.015	-8.25	8.93		2	219.26	110.57	57000	2	223.12		57000		
15.319	1.126	0.015	-5.88	7.76		2	222.80	110.57	57000	2	227.14		57000		
15.035	1.130	0.014	-3.86	6.47		2	226.35	110.57	57000	2	231.15		57000		
14.751	1.134	0.014	-2.22	5.04		2	229.91	110.57	57000	2	235.16		57000		
14.467	1.138	0.014	-1.01	3.49		2	233.47	110.57	57000	2	239.17		57000		
14.184	1.142	0.014	-0.26	1.81		2	237.03	110.57	57000	2	243.18		57000		
13.900	1.146	0.014	0.00	0.00		2	240.59	110.57	57000	2	247.18		57000		
m	mm	/1000	kN.m/m	kN/m	kPa		kPa	kPa	kPa/m		kPa	kPa	kPa/m		kN

MAXIMUM DISPLACEMENT = 2.08 mm

MAXIMUM MOMENT = 186.61 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR.
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(2 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 1397.91 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.087
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.207

** PHASE Nb 4 **

*EXCAVACION HASTA COTA DE SOLERA

* EXCAVATION IN SOIL 2 TO LEVEL = 19.900 m

PHASE 4

| WALL | SOIL 1 EXCAVATION: 28.87 m, WATER LEVEL: 8.87 m, CAQUOT SURC.: 170.00 kPa | SOIL 2 EXCAVATION: 19.90 m, WATER LEVEL: 8.87 m, CAQUOT SURC.: 0.00 kPa | STRUTS/ ANCHORS |

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
28.870	1.898	1.862	0.00	0.00		2	96.15	96.15	22500	0					
28.370	2.829	1.862	12.05	48.27		1	96.94	92.06	22500	0					
						1	60.00	60.00	57000	0					
28.270	3.015	1.863	17.18	54.32		1	60.89	60.89	57000	0					
				-493.40		1	60.89	60.89	57000	0				1	-547.71
27.770	3.944	1.848	-221.72	-461.84		1	65.33	65.33	57000	0					
27.470	4.495	1.822	-357.30	-441.85		1	67.99	67.99	57000	0					
27.170	5.036	1.785	-486.75	-421.05		1	70.65	70.65	57000	0					
						1	69.83	69.83	60000	0					
26.833	5.630	1.730	-624.82	-397.00		1	72.71	70.59	60000	0					
26.495	6.203	1.662	-754.61	-371.97		1	75.58	70.59	60000	0					
26.157	6.750	1.582	-875.80	-345.98		1	78.45	70.59	60000	0					
25.820	7.269	1.490	-988.04	-319.02		1	81.32	70.59	60000	0					
25.483	7.755	1.387	-1091.02	-291.09		1	84.20	70.59	60000	0					
25.145	8.204	1.275	-1184.42	-262.18		1	87.07	70.59	60000	0					
24.807	8.614	1.154	-1267.89	-232.31		1	89.94	70.59	60000	0					
24.470	8.982	1.025	-1341.12	-201.47		1	92.82	70.59	60000	0					
						1	93.12	63.39	72000	0					
24.120	9.317	0.885	-1405.87	-168.40		1	95.86	63.39	72000	0					
23.770	9.601	0.738	-1458.89	-134.37		1	98.60	63.39	72000	0					
23.420	9.833	0.587	-1499.82	-99.38		1	101.34	63.39	72000	0					
23.070	10.011	0.432	-1528.35	-63.44		1	104.08	63.39	72000	0					
22.720	10.135	0.275	-1544.12	-26.53		1	106.82	63.39	72000	0					
22.370	10.203	0.116	-1546.80	11.34		1	109.56	63.39	72000	0					
22.020	10.216	-0.041	-1536.07	50.16		1	112.30	63.39	72000	0					
21.670	10.175	-0.197	-1511.58	89.95		1	115.04	63.39	72000	0					
						1	129.23	77.39	57000	0					
21.327	10.081	-0.347	-1473.13	134.73		1	132.27	77.39	57000	0					
20.985	9.938	-0.491	-1419.17	180.55		1	135.31	77.39	57000	0					
20.642	9.745	-0.630	-1349.33	227.42		1	138.35	77.39	57000	0					
20.300	9.507	-0.761	-1263.27	275.32		1	141.39	77.39	57000	0					
19.900	9.174	-0.902	-1141.73	332.59		1	144.94	77.39	57000	0					
						1	144.94	77.39	57000	3	49.01		57000		
19.621	8.910	-0.991	-1045.62	355.93		1	147.41	77.39	57000	3	75.88		57000		
19.342	8.622	-1.072	-943.94	372.47		1	149.89	77.39	57000	3	102.74		57000		
19.064	8.313	-1.144	-838.60	382.21		1	152.36	77.39	57000	3	129.61		57000		
18.785	7.985	-1.208	-731.49	385.15		1	154.84	77.39	57000	3	156.48		57000		
18.506	7.640	-1.264	-624.51	381.29		1	157.31	77.39	57000	3	183.34		57000		
18.228	7.281	-1.310	-519.55	370.64		1	159.79	77.39	57000	3	210.21		57000		
17.949	6.911	-1.348	-418.51	353.18		1	162.26	77.39	57000	3	237.08		57000		
17.670	6.531	-1.378	-323.28	328.93		1	164.73	77.39	57000	3	263.94		57000		
						1	158.12	77.39	57000	3	285.72		57000		
17.295	6.008	-1.407	-209.68	274.92		1	161.45	77.39	57000	3	321.87		57000		
16.920	5.476	-1.425	-118.50	209.60		1	164.78	77.39	57000	2	352.74		57000		
16.545	4.940	-1.434	-52.44	144.52		1	168.11	77.39	57000	2	327.27		57000		
16.170	4.401	-1.438	-8.76	90.26		1	171.44	77.39	57000	2	301.68		57000		
						1	161.76	70.59	57000	2	298.18		57000		
15.886	3.993	-1.437	11.65	54.65		1	164.18	70.59	57000	2	278.71		57000		
15.602	3.586	-1.436	22.84	25.26		1	166.59	70.59	57000	2	259.26		57000		
15.319	3.179	-1.434	26.57	2.06		1	169.01	70.59	57000	2	239.84		57000		
15.035	2.772	-1.432	24.60	-14.95		1	171.42	70.59	57000	2	220.45		57000		
14.751	2.366	-1.430	18.67	-25.77		1	173.84	70.59	57000	2	201.09		57000		
14.467	1.961	-1.429	10.69	-28.95		2	186.58	80.91	57000	2	181.76		57000		
14.184	1.555	-1.428	3.29	-21.03		2	213.46	105.38	57000	2	162.44		57000		
13.900	1.150	-1.428	0.00	0.00		2	240.34	110.57	57000	2	143.13		57000		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 10.22 mm

MAXIMUM MOMENT =-1546.80 kN.m/m

CODIFICATION OF STATE OF SOIL :
-1 = SEPARATION
0 = EXCAVATION
1 = ACTIVE PR.
2 = ELASTIC
3 = PASSIVE PR.

(4 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 1097.73 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.073
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.612

** PHASE Nb 5 **

*EJECUCION DE SOLERA

* INSTALLATION LEVEL OF STRUTS NO 2

LEVEL = 20.300 m
SPACE = 1.000 m
INCLINATION = 0.000 DEGREES
PRELOAD = 0.000 kN
STIFFNESS = 500000.000 kN/m
BILATERAL CONNECTION

PHASE 5

WALL	SOIL 1	SOIL 2	
	EXCAVATION: 28.87 m	EXCAVATION: 19.90 m	STRUTS/
	WATER LEVEL: 8.87 m	WATER LEVEL: 8.87 m	ANCHORS
	CAQUOT SURC.: 170.00 kPa	CAQUOT SURC.: 0.00 kPa	

LEVEL	DISPLAC.	ROTATION	MOMENT	CR.FO.	SH LOAD	STATE	PRE.	SURCH.	ELAST.	STATE	PRE.	SURCH.	ELAST.	NB	LOAD
28.870	1.898	1.862	0.00	0.00		2	96.15	96.15	22500	0					
28.370	2.829	1.862	12.05	48.27		1	96.94	92.06	22500	0					
						1	60.00	60.00	57000	0					
28.270	3.015	1.863	17.18	54.32		1	60.89	60.89	57000	0					
				-493.40		1	60.89	60.89	57000	0				1	-547.71
27.770	3.944	1.848	-221.72	-461.84		1	65.33	65.33	57000	0					
27.470	4.495	1.822	-357.30	-441.85		2	67.99	67.99	57000	0					
27.170	5.036	1.785	-486.75	-421.05		2	70.65	70.65	57000	0					
						2	69.83	69.83	60000	0					
26.833	5.630	1.730	-624.82	-397.00		2	72.71	70.59	60000	0					
26.495	6.203	1.662	-754.61	-371.97		2	75.58	70.59	60000	0					
26.157	6.750	1.582	-875.80	-345.98		2	78.45	70.59	60000	0					
25.820	7.269	1.490	-988.04	-319.02		2	81.32	70.59	60000	0					
25.483	7.755	1.387	-1091.02	-291.09		2	84.20	70.59	60000	0					
25.145	8.204	1.275	-1184.42	-262.18		2	87.07	70.59	60000	0					
24.807	8.614	1.154	-1267.89	-232.31		2	89.94	70.59	60000	0					
24.470	8.982	1.025	-1341.12	-201.47		2	92.82	70.59	60000	0					
						2	93.12	63.39	72000	0					
24.120	9.317	0.885	-1405.87	-168.40		2	95.86	63.39	72000	0					
23.770	9.601	0.738	-1458.89	-134.37		2	98.60	63.39	72000	0					
23.420	9.833	0.587	-1499.82	-99.38		2	101.34	63.39	72000	0					
23.070	10.011	0.432	-1528.35	-63.44		2	104.08	63.39	72000	0					
22.720	10.135	0.275	-1544.12	-26.53		2	106.82	63.39	72000	0					
22.370	10.203	0.116	-1546.80	11.34		2	109.56	63.39	72000	0					
22.020	10.216	-0.041	-1536.07	50.16		2	112.30	63.39	72000	0					
21.670	10.175	-0.197	-1511.58	89.95		2	115.04	63.39	72000	0					
						2	129.23	77.39	57000	0					
21.327	10.081	-0.347	-1473.13	134.73		2	132.27	77.39	57000	0					
20.985	9.938	-0.491	-1419.17	180.55		2	135.31	77.39	57000	0					
20.642	9.745	-0.630	-1349.33	227.42		2	138.35	77.39	57000	0					
20.300	9.507	-0.761	-1263.27	275.32		2	141.39	77.39	57000	0					
						2	141.39	77.39	57000	0				2	0.00
19.900	9.174	-0.902	-1141.73	332.59		2	144.94	77.39	57000	0					
						2	144.94	77.39	57000	2	49.01		57000		
19.621	8.910	-0.991	-1045.62	355.93		2	147.41	77.39	57000	2	75.88		57000		
19.342	8.622	-1.072	-943.94	372.47		2	149.89	77.39	57000	2	102.74		57000		
19.064	8.313	-1.144	-838.60	382.21		2	152.36	77.39	57000	2	129.61		57000		
18.785	7.985	-1.208	-731.49	385.15		2	154.84	77.39	57000	2	156.48		57000		
18.506	7.640	-1.264	-624.51	381.29		2	157.31	77.39	57000	2	183.34		57000		
18.228	7.281	-1.310	-519.55	370.64		2	159.79	77.39	57000	2	210.21		57000		
17.949	6.911	-1.348	-418.51	353.18		1	162.26	77.39	57000	3	237.08		57000		
17.670	6.531	-1.378	-323.28	328.93		1	164.73	77.39	57000	3	263.94		57000		
						1	158.12	77.39	57000	3	285.72		57000		
17.295	6.008	-1.407	-209.67	274.92		1	161.45	77.39	57000	3	321.87		57000		
16.920	5.476	-1.425	-118.50	209.60		1	164.78	77.39	57000	2	352.74		57000		
16.545	4.940	-1.434	-52.44	144.52		1	168.11	77.39	57000	2	327.27		57000		
16.170	4.401	-1.438	-8.76	90.26		1	171.44	77.39	57000	2	301.68		57000		
						1	161.76	70.59	57000	2	298.18		57000		
15.886	3.993	-1.437	11.65	54.65		1	164.18	70.59	57000	2	278.71		57000		
15.602	3.586	-1.436	22.84	25.26		1	166.59	70.59	57000	2	259.26		57000		
15.319	3.179	-1.434	26.57	2.06		1	169.01	70.59	57000	2	239.84		57000		
15.035	2.772	-1.432	24.60	-14.95		1	171.42	70.59	57000	2	220.45		57000		
14.751	2.366	-1.430	18.67	-25.77		1	173.84	70.59	57000	2	201.09		57000		
14.467	1.961	-1.429	10.70	-28.95		2	186.58	80.91	57000	2	181.76		57000		
14.184	1.555	-1.428	3.30	-21.03		2	213.46	105.38	57000	2	162.45		57000		
13.900	1.150	-1.428	0.00	0.00		2	240.34	110.57	57000	2	143.13		57000		
m	mm	/1000	kN.m/m	kN/m	kPa	kPa		kPa	kPa/m	kPa		kPa	kPa/m	kN	

MAXIMUM DISPLACEMENT = 10.22 mm

MAXIMUM MOMENT =-1546.80 kN.m/m

CODIFICATION OF STATE : -1 = SEPARATION, 0 = EXCAVATION, 1 = ACTIVE PR.
CODIFICATION OF SOIL : 2 = ELASTIC, 3 = PASSIVE PR.

(5 IT.)

INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 1 = 1097.73 kN/m
INTEGRATED HORIZONTAL EFFECT OF SURCHARGES ON THE SOIL 2 = 0.00 kN/m

MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 1 = 0.073
MOBILIZED PRESSURE TO PASSIVE PRESSURE RATIO FOR SOIL NB 2 = 0.612

*** END OF CALCULUS

*** MAXIMUM DISPLACEMENT IN PHASE Nb 4 = 10.216 mm IN FINAL PHASE Nb 5 = 10.216 mm

*** MAXIMUM MOMENT IN PHASE Nb 4 = -1546.803 kN.m/m IN FINAL PHASE Nb 5 = -1546.803 kN.m/m

STRUT/ANCHOR		PRELOAD		MAXIMUM		FINAL STATE	
NUMBER	LEVEL	PHASE	FORCE	PHASE	FORCE	PHASE	FORCE
1	28.27	3	0.00	5	-547.71	5	-547.71
2	20.30	5	0.00	5	0.00	5	0.00
	m		kN		kN		kN

* ENVELOPE CURVES FROM PHASE 1 TO PHASE 5 *

LEVEL	MINI CRO.FO	MAXI CRO.FO
28.870	0.00	0.00
28.370	0.00	48.27
28.270	0.00	54.32
	-493.40	53.72
27.770	-461.84	85.28
27.470	-441.85	79.70
27.170	-421.05	70.34
26.833	-397.00	58.79
26.495	-371.97	48.32
26.157	-345.98	38.82
25.820	-319.02	30.21
25.483	-291.09	22.37
25.145	-262.18	15.19
24.807	-232.31	11.29
24.470	-201.47	12.45
24.120	-168.40	4.30
23.770	-134.37	0.00
23.420	-99.38	0.00
23.070	-63.44	0.00
22.720	-40.37	0.00
22.370	-49.56	11.34
22.020	-58.74	50.16
21.670	-67.84	89.95
21.327	-60.24	134.73
20.985	-52.84	180.55
20.642	-45.73	227.42
20.300	-38.98	275.32
	-38.98	275.32
19.900	-31.61	332.59
19.621	-26.82	355.93
19.342	-22.32	372.47
19.064	-18.12	382.21
18.785	-14.19	385.15
18.506	-10.55	381.29
18.228	-7.18	370.64
17.949	-4.06	353.18
17.670	-1.18	328.93
17.295	0.00	274.92
16.920	0.00	209.60
16.545	0.00	144.52
16.170	0.00	90.26
15.886	0.00	54.65
15.602	0.00	25.26
15.319	0.00	7.76
15.035	-14.95	6.47
14.751	-25.77	5.04
14.467	-28.95	3.49
14.184	-21.03	1.81
13.900	0.00	0.00
m	kN/m	kN/m

LEVEL	MINI MOMENT	MAXI MOMENT
28.870	0.00	0.00
28.370	0.00	12.13
28.270	0.00	17.18
	0.00	17.18
27.770	-221.72	51.51
27.470	-357.30	76.45
27.170	-486.75	98.95
26.833	-624.82	120.71
26.495	-754.61	138.76
26.157	-875.80	153.44
25.820	-988.04	165.06
25.483	-1091.02	173.91
25.145	-1184.42	180.23
24.807	-1267.89	184.29
24.470	-1341.12	186.59
24.120	-1405.87	186.61
23.770	-1458.89	183.41
23.420	-1499.82	177.08
23.070	-1528.35	167.65
22.720	-1544.12	155.11
22.370	-1546.80	139.37
22.020	-1536.07	120.42
21.670	-1511.58	98.26
21.327	-1473.13	76.34
20.985	-1419.17	56.98
20.642	-1349.33	40.11
20.300	-1263.27	25.61
	-1263.27	25.61
19.900	-1141.73	11.51
19.621	-1045.62	3.37
19.342	-943.94	0.00
19.064	-838.60	0.00
18.785	-731.49	0.00
18.506	-624.51	0.00
18.228	-519.55	0.00
17.949	-418.51	0.00
17.670	-323.28	0.00
17.295	-209.68	0.00
16.920	-118.50	0.00
16.545	-52.44	0.00
16.170	-13.89	0.00
15.886	-10.94	11.65
15.602	-8.25	22.84
15.319	-5.88	26.57
15.035	-3.86	24.60
14.751	-2.23	18.67
14.467	-1.01	10.70
14.184	-0.26	3.30
13.900	0.00	0.00
m	kN.m/m	kN.m/m

E