MANUAL PLAXIS 2D

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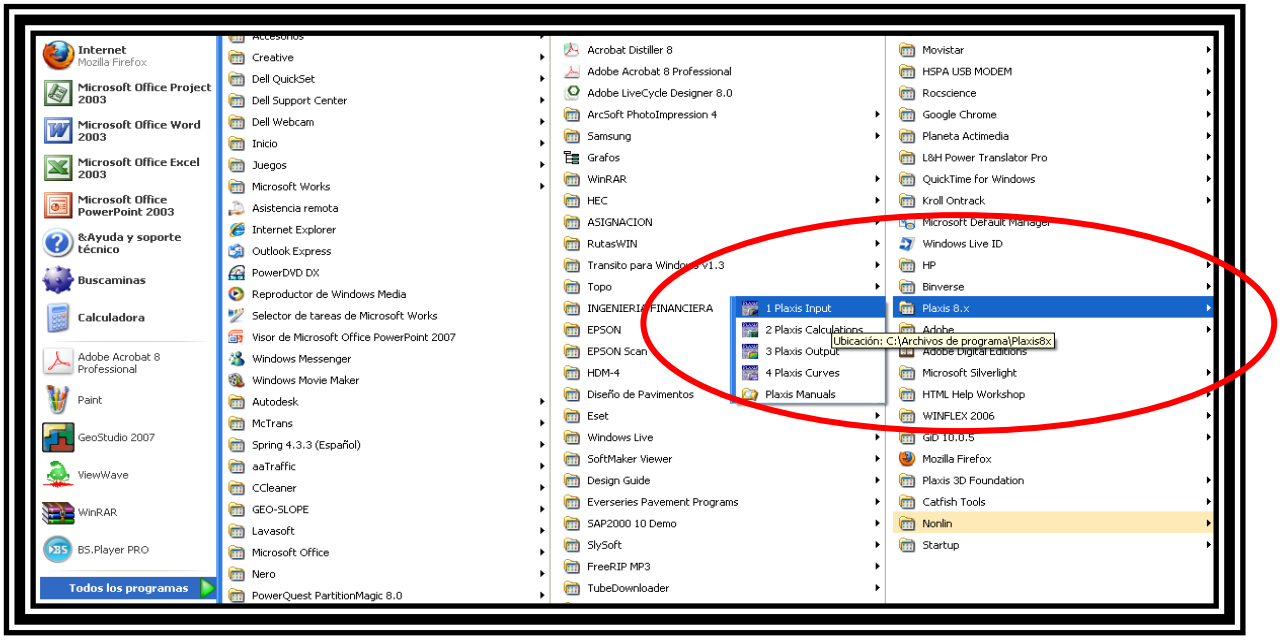
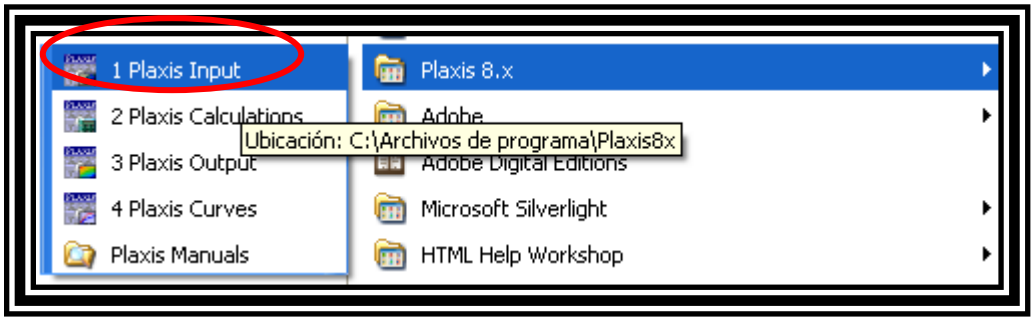
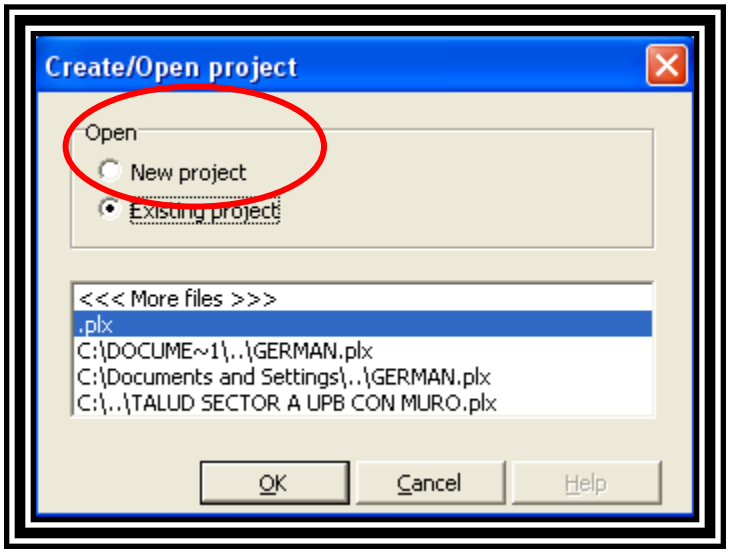
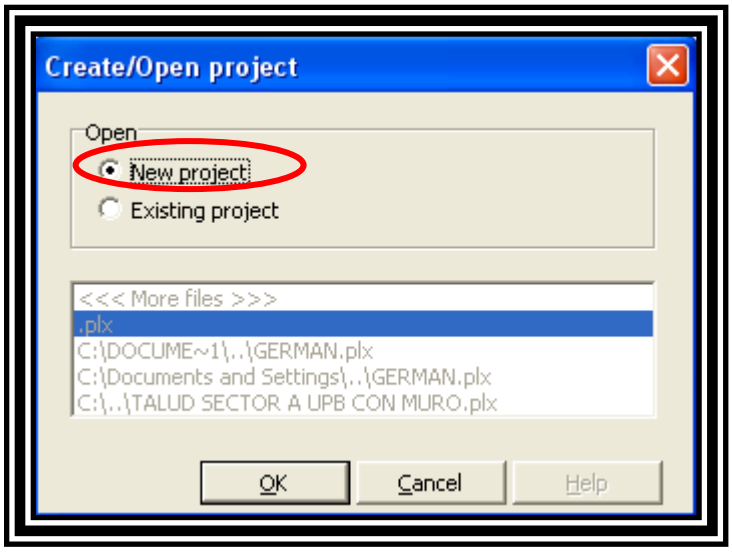
Para arrancar el programa se procede a hacer click en ***inicio – programas – Plaxis 8.x – 1 Plaxis Input*** y aparecerá la siguiente figura:



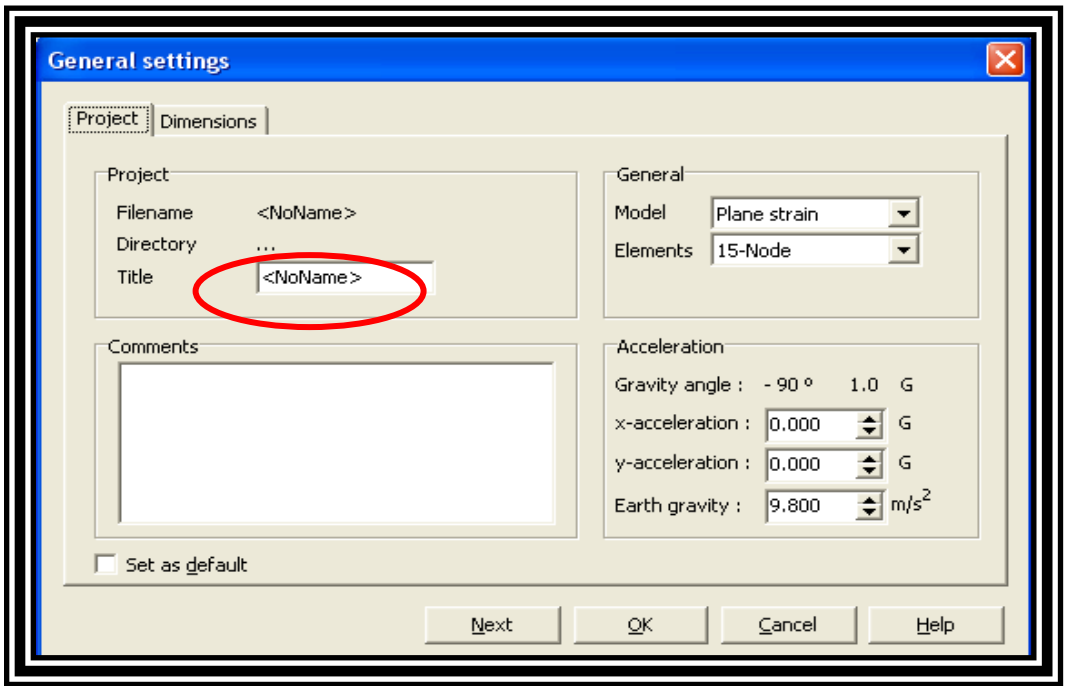


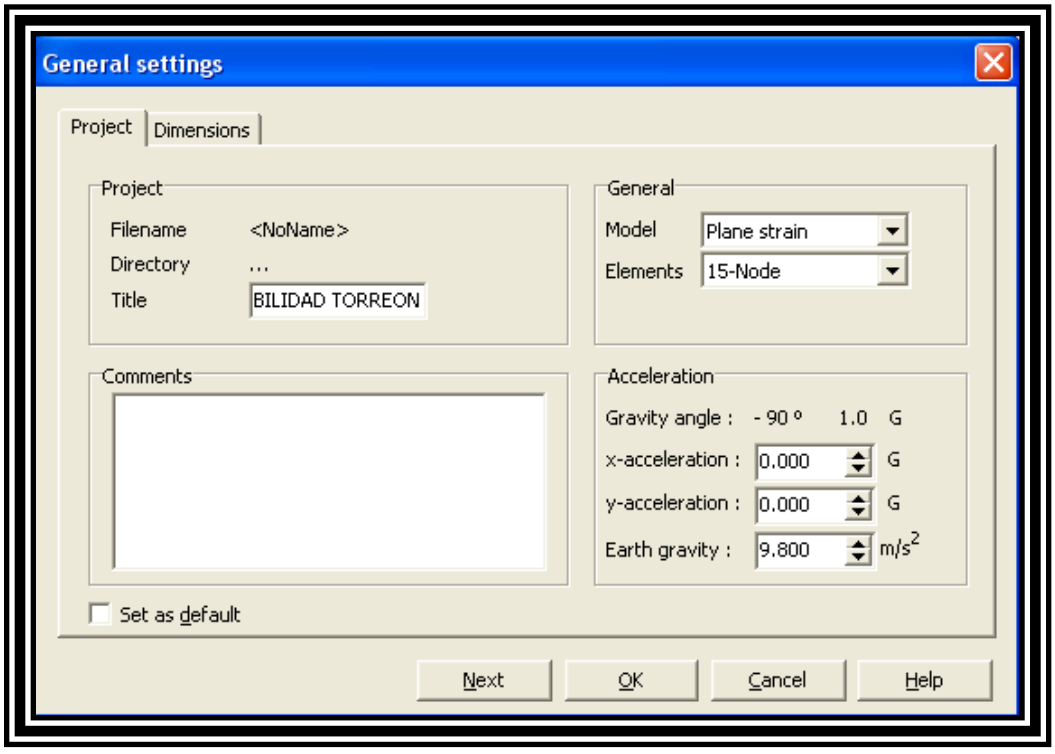
Para crear un nuevo proyecto dar click en ***Open – New project – ok***



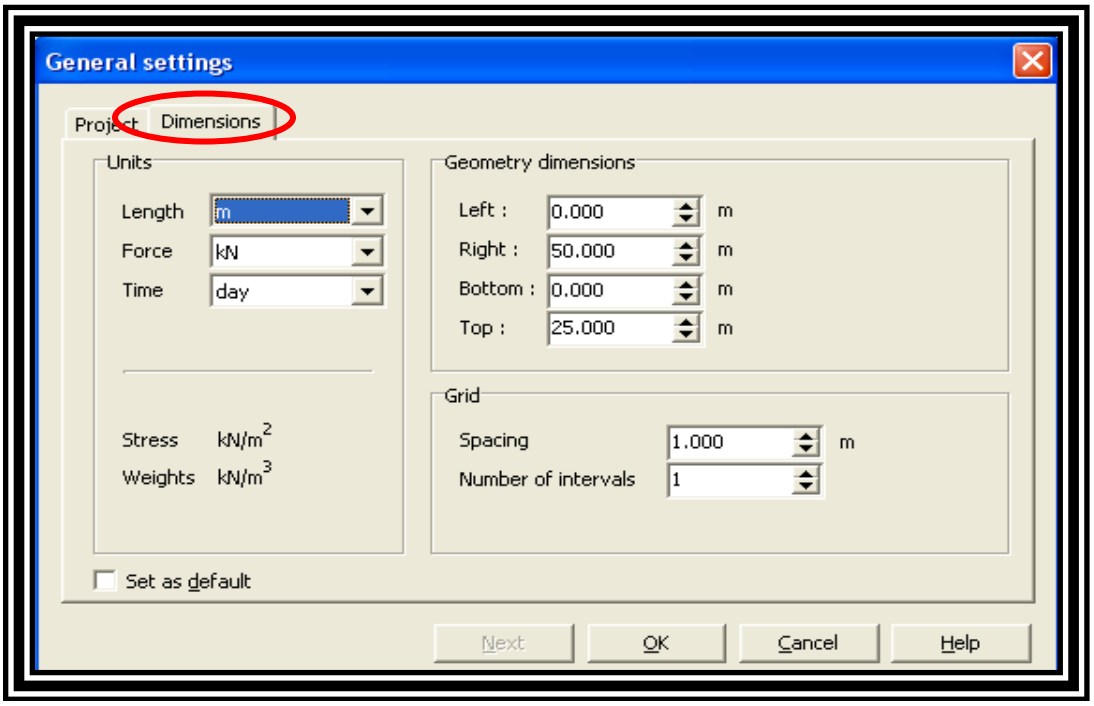


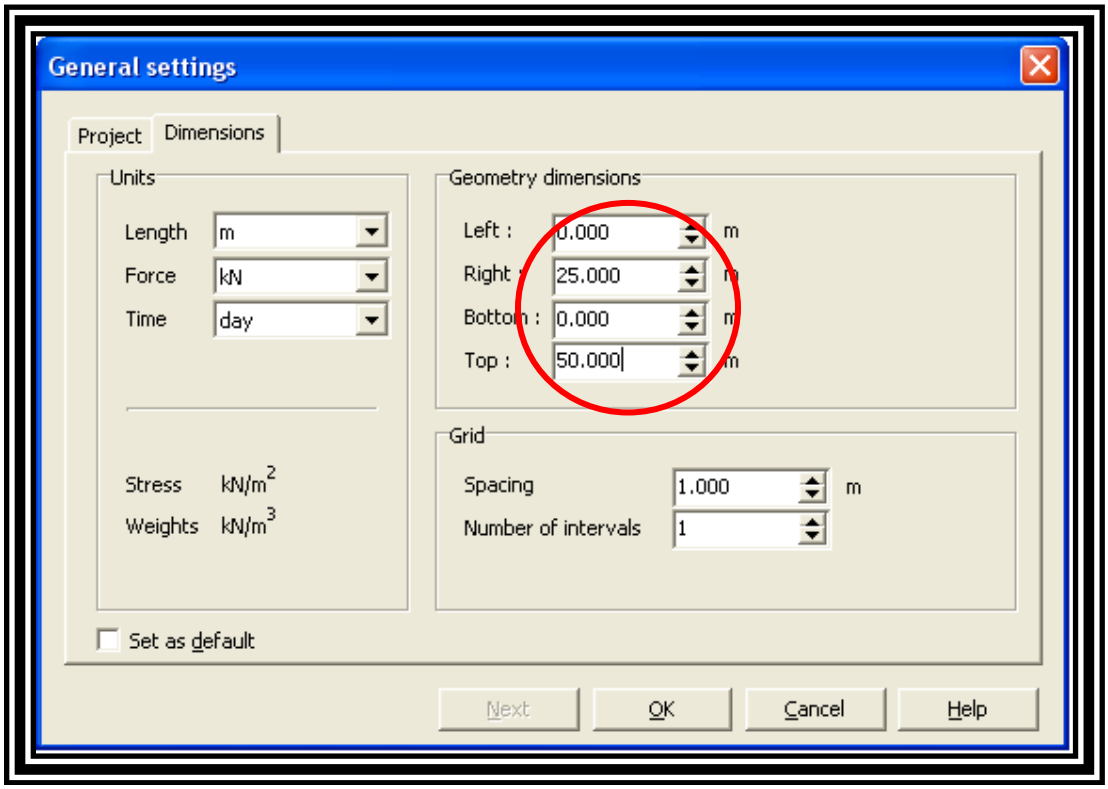
En la ventana de **General settings** y activando la pestaña de **Project,** colocar el nombre del proyecto.



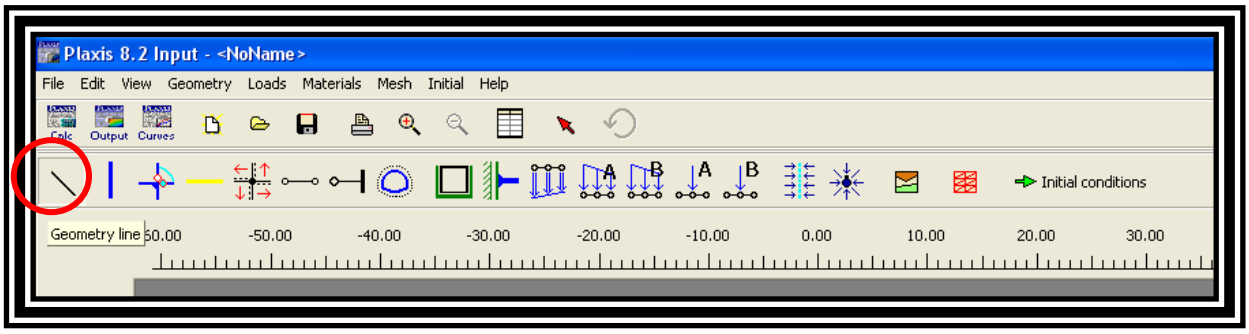


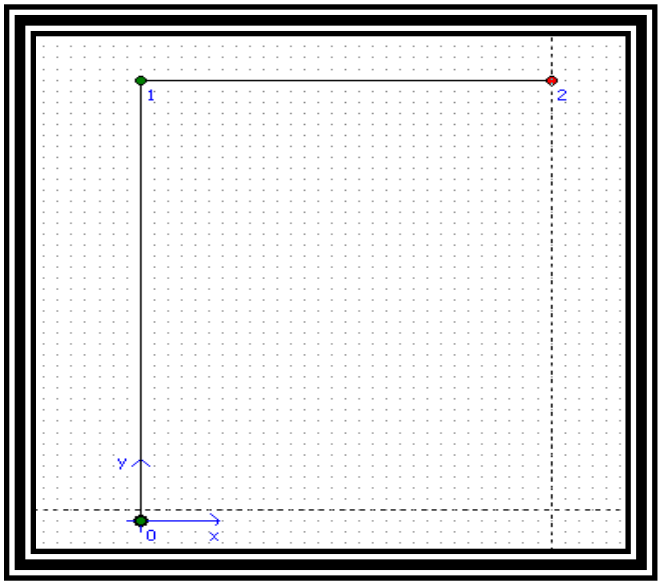
En la ventana de **Dimensions** llenar las opciones de Unidades – dimensiones de la geometría y parámetros de la grilla, tal como aparecen en la imagen.

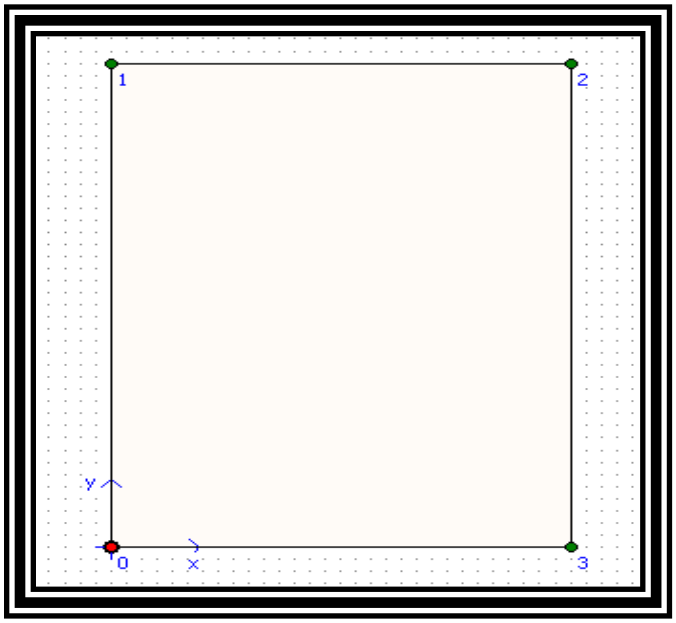




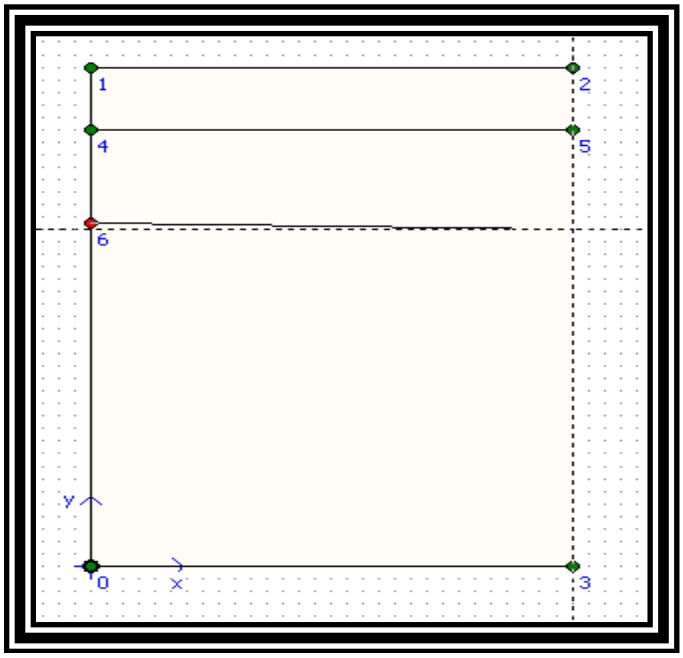
Para iniciar a realizar la geometría del talud y la pantalla hacer click en ***geometry line*** e iniciar a dibujar el talud

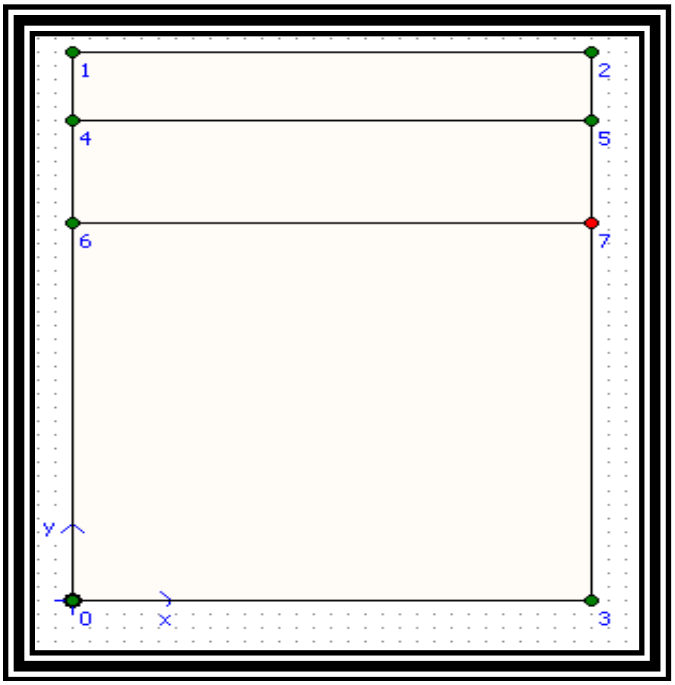




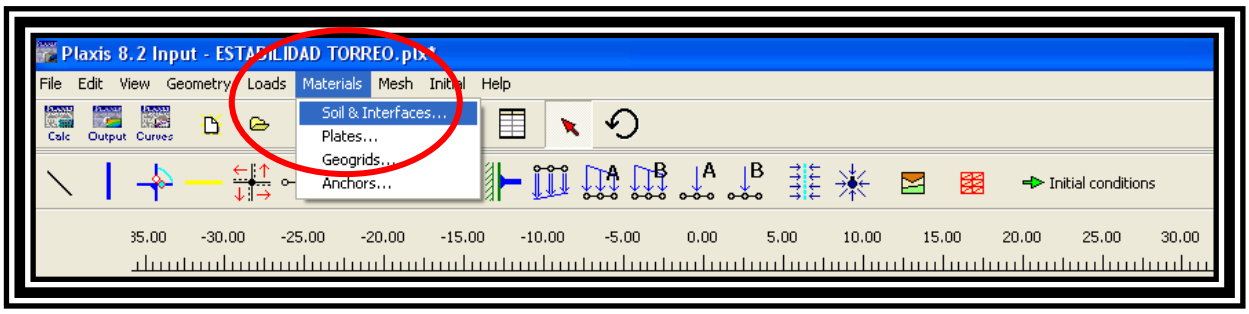


Dibujar las etapas de la excavación.

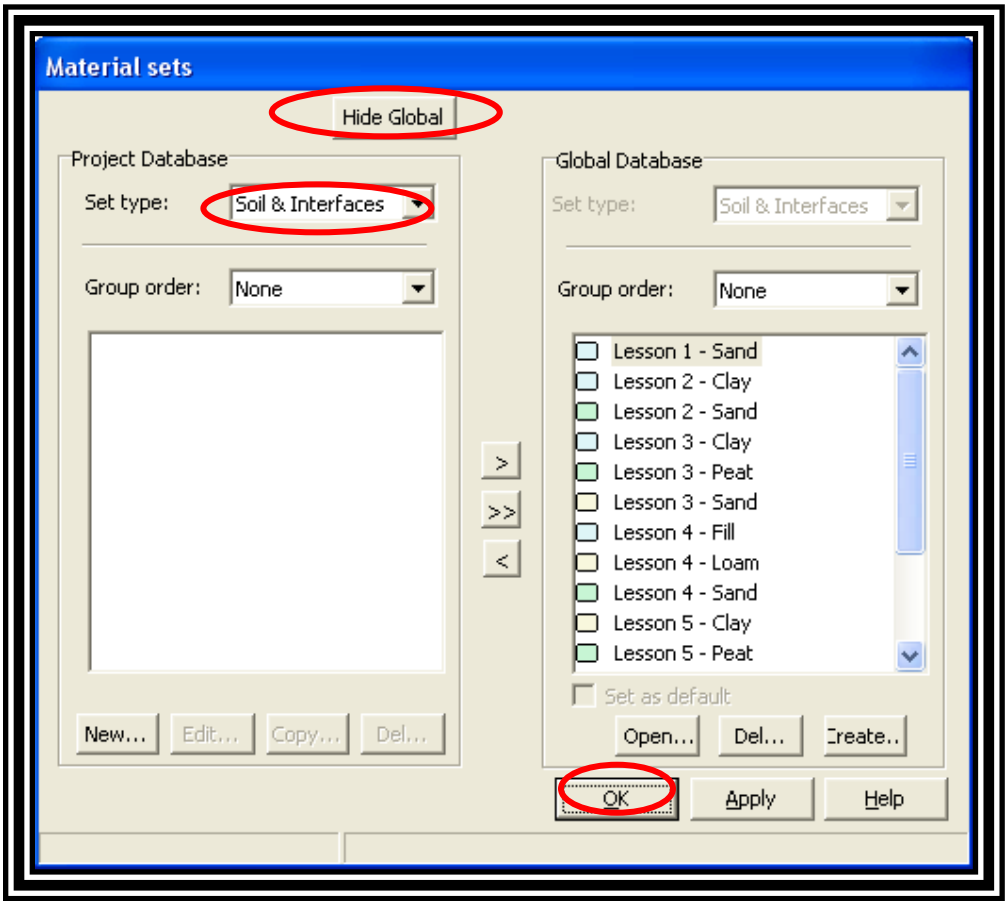




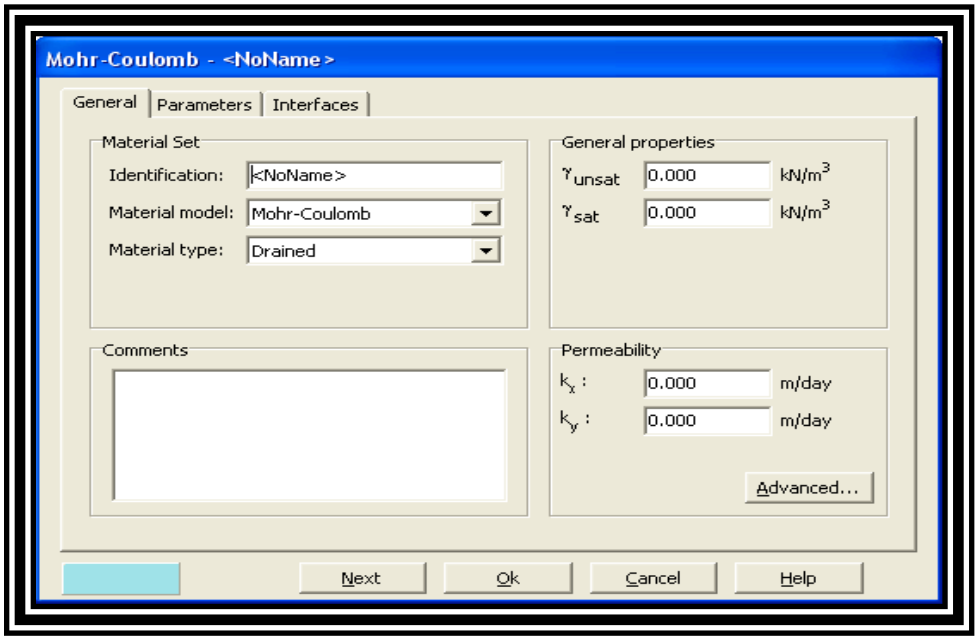
Para incluir las propiedades de los materiales hacer click en ***Materials- Soil & Interfaces***



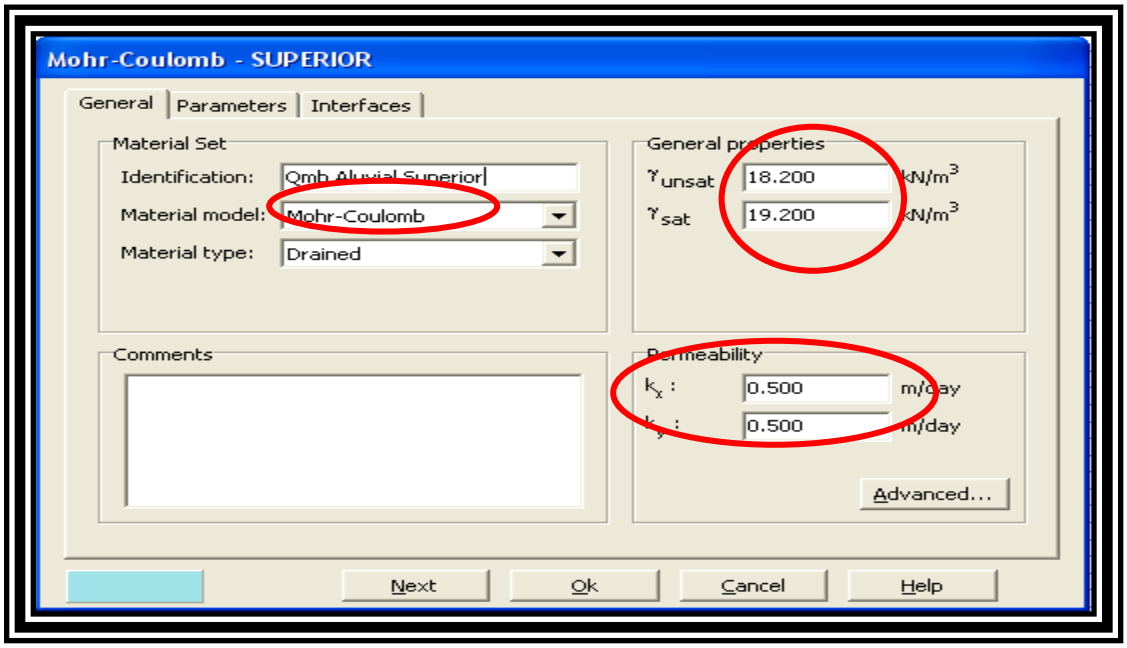
Dar click en Hide Global – desplegar en la ventana de Set Type la opción de Soils & Interfaces y dar click en Ok



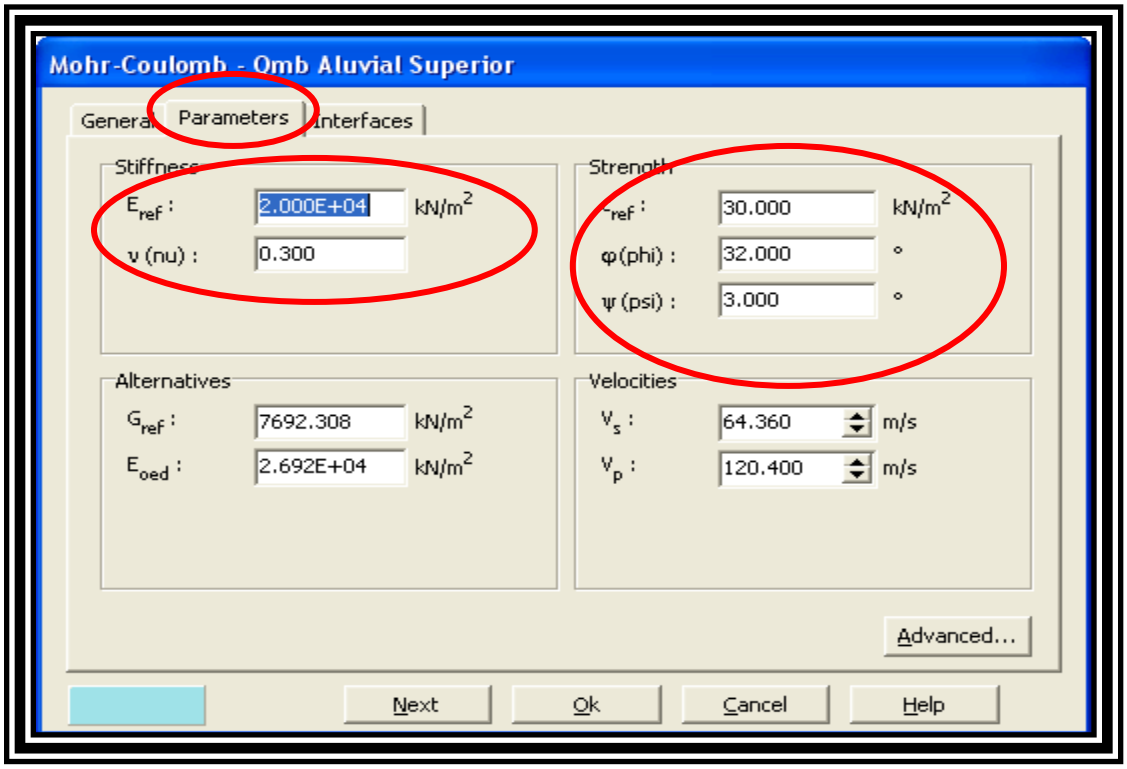
En la ventana de ***General*** escoger el modelo del material a utilizar escogiendo la opción de ***Mohr-Coulomb*** y dar click en ***Next.***

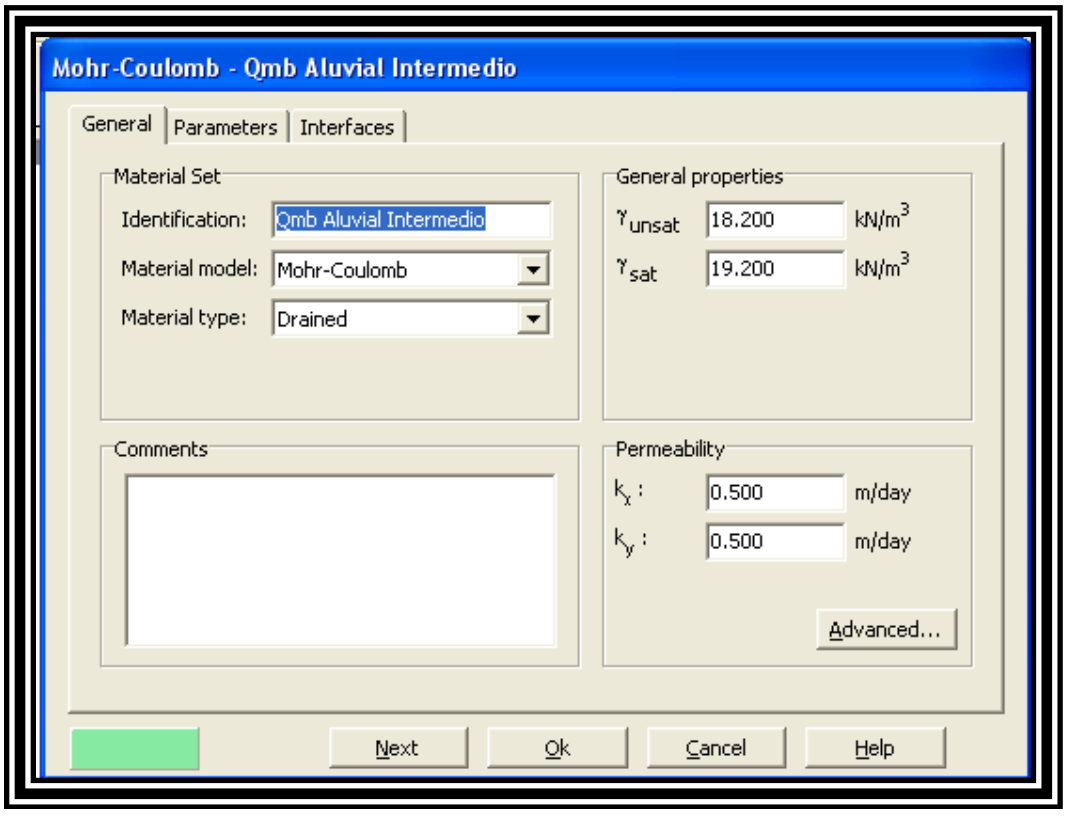


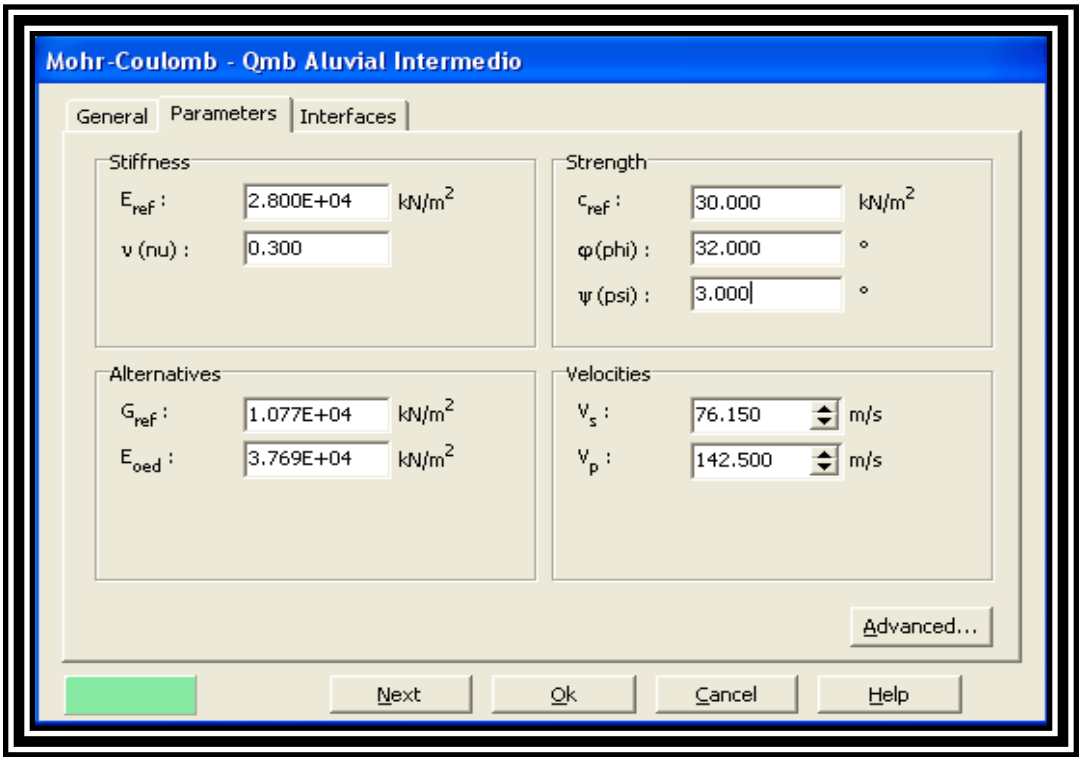
Identificar la muestra y el modelo – adicionar las propiedades generales del suelo tales como el peso unitario y la permeabilidad.

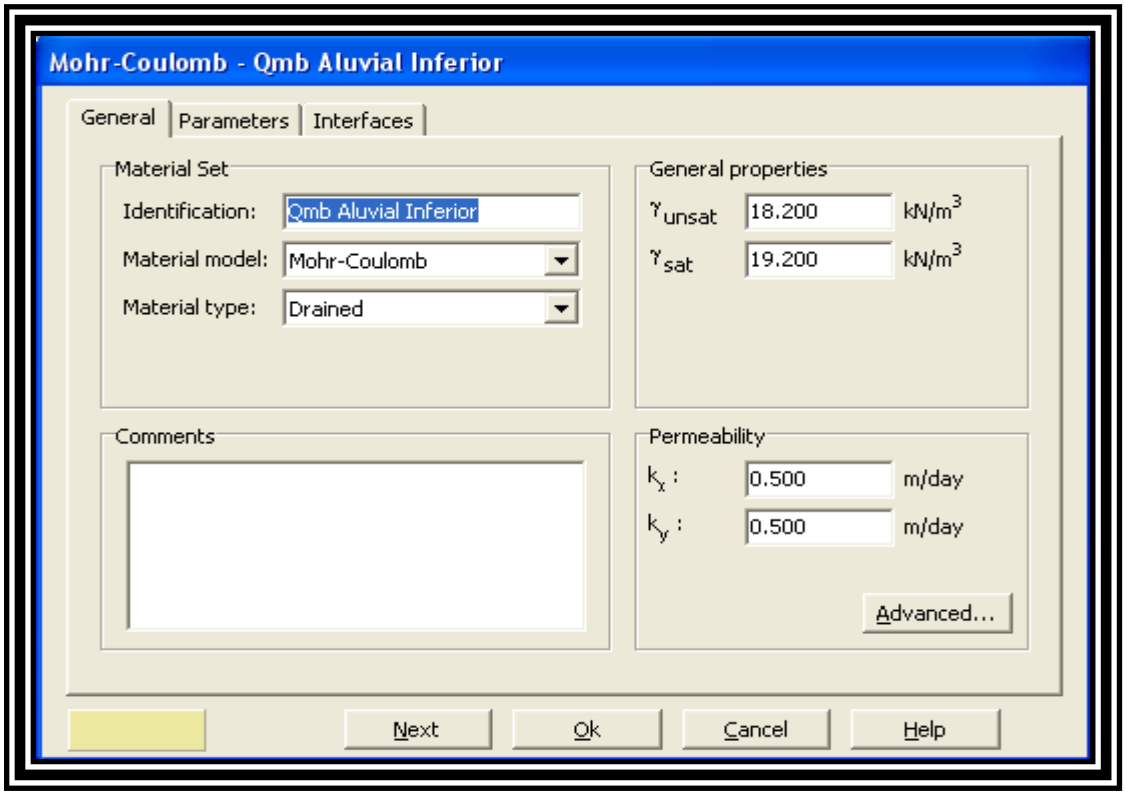


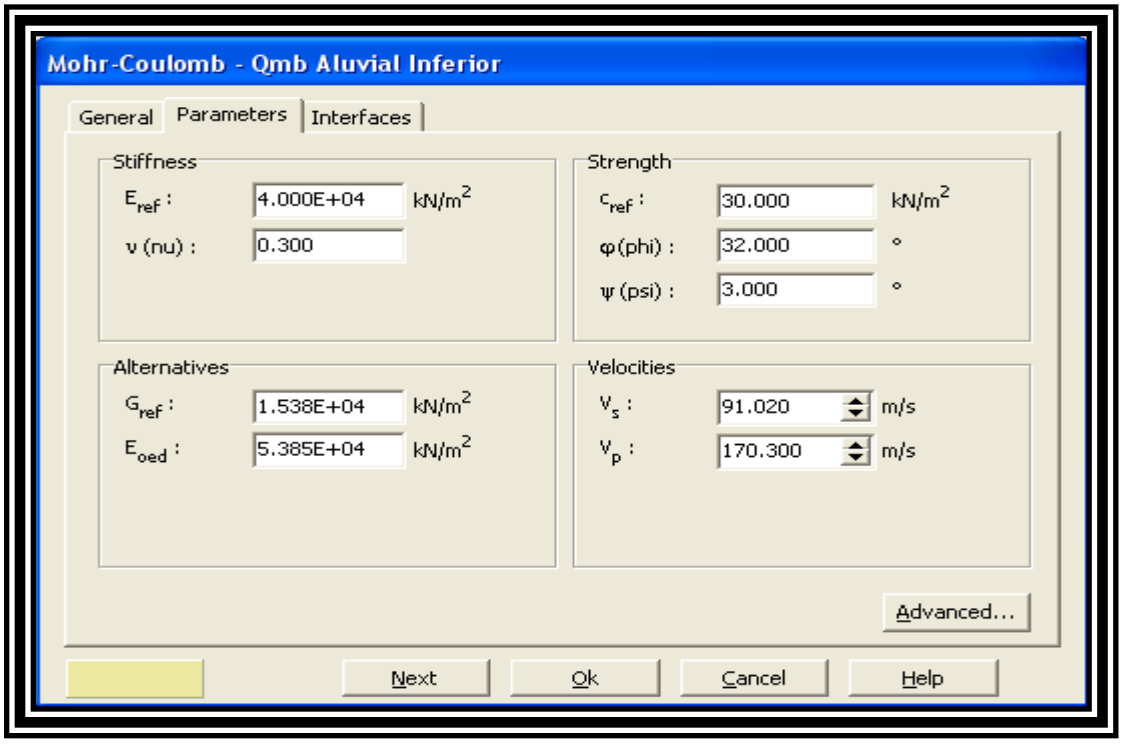
En la ventana de ***Parameters*** colocar los parámetros de todos los materiales

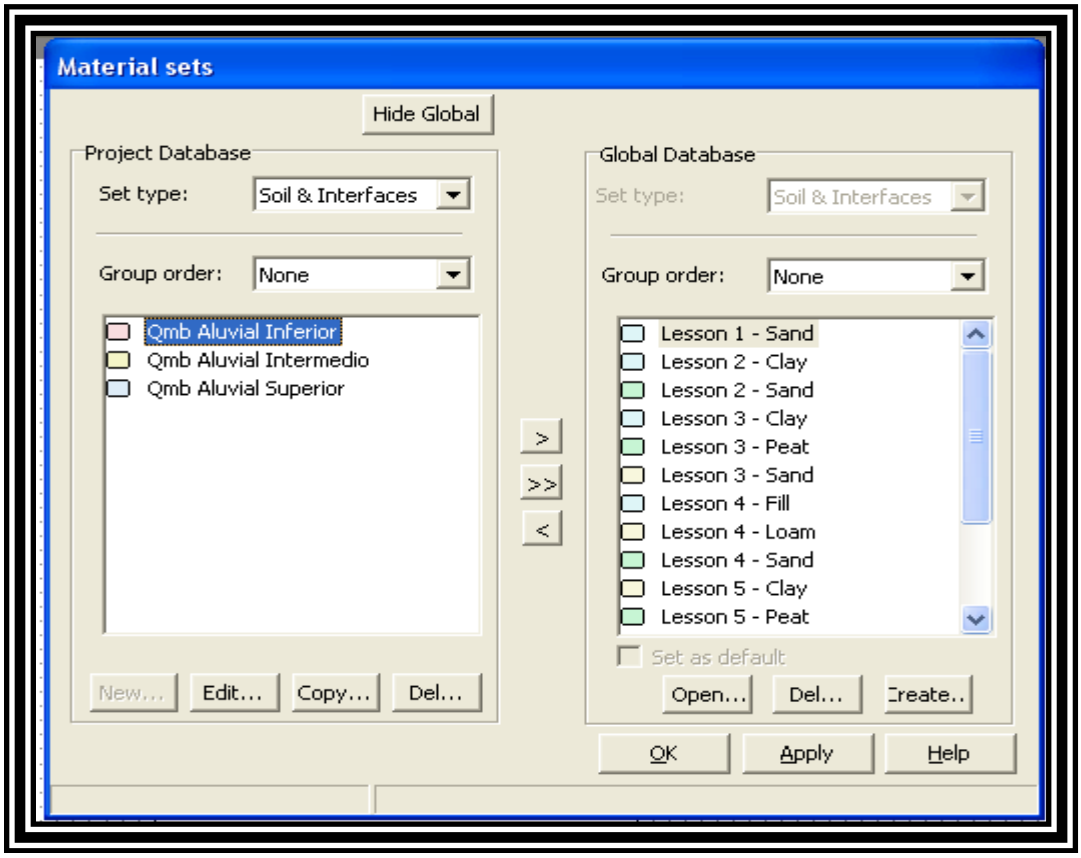

Mohr-Coulomb - Qmb Aluvial Superior
General
Parameters
Interfaces
Stiffness
E ref : 2.000E+04 kN/m2
ν (nu) : 0.300
Strength
σ ref : 30.000 kN/m2
φ (phi) : 32.000 °
ψ (psi) : 3.000 °
Alternatives
G ref : 7692.308 kN/m2
E oed : 2.692E+04 kN/m2
Velocities
V s : 64.360 m/s
V p : 120.400 m/s
Advanced...
Next
Ok
Cancel
Help


Mohr-Coulomb - Qmb Aluvial Intermedio
General
Parameters
Interfaces
Material Set
Identification: Qmb Aluvial Intermedio
Material model: Mohr-Coulomb
Material type: Drained
General properties
γ unsat 18.200 kN/m3
γ sat 19.200 kN/m3
Comments
Permeability
k x : 0.500 m/day
k y : 0.500 m/day
Advanced...
Next
Ok
Cancel
Help

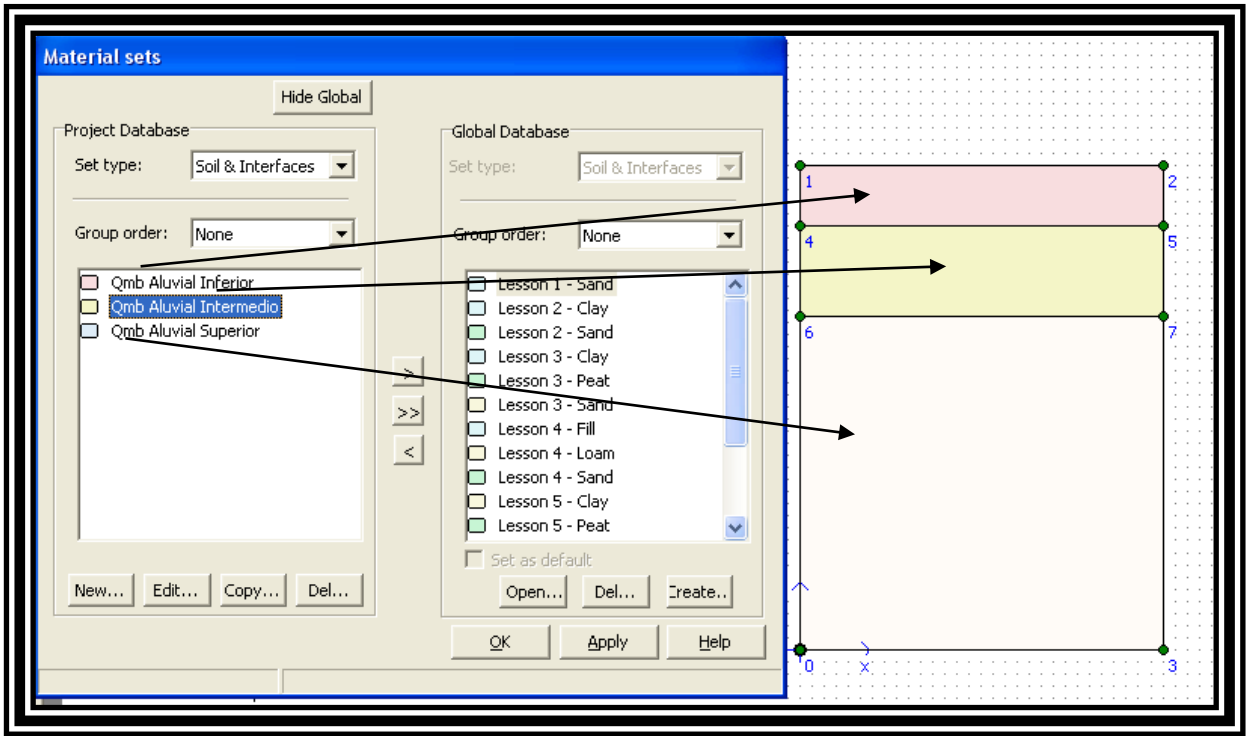

Mohr-Coulomb - Qmb Aluvial Intermedio
General
Parameters
Interfaces
Stiffness
E ref : 2.800E+04 kN/m2
ν (nu) : 0.300
Strength
c ref : 30.000 kN/m2
φ (phi) : 32.000 °
ψ (psi) : 3.000 °
Alternatives
G ref : 1.077E+04 kN/m2
E oed : 3.769E+04 kN/m2
Velocities
V s : 76.150 m/s
V p : 142.500 m/s
Advanced...
Next
Ok
Cancel
Help

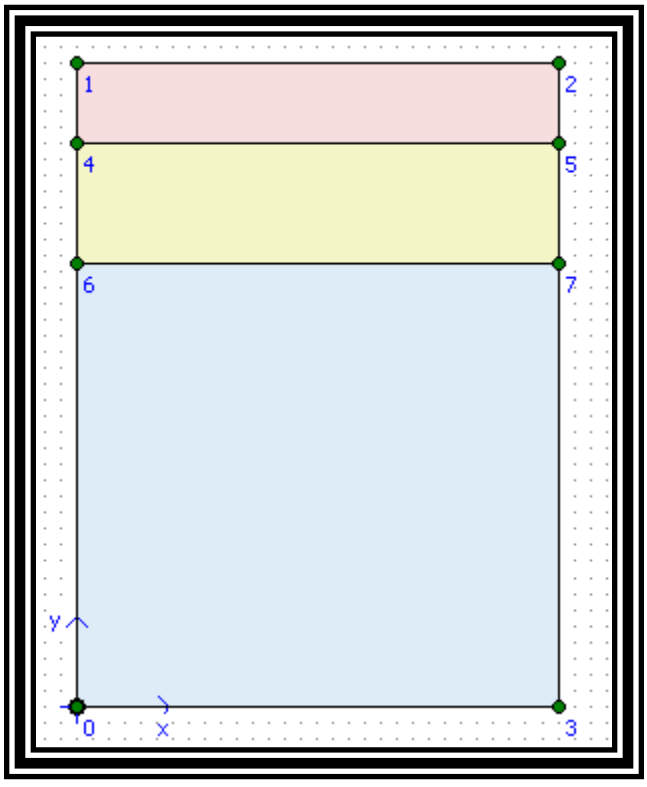

Mohr-Coulomb - Qmb Aluvial Inferior
General
Parameters
Interfaces
Material Set
Identification: Qmb Aluvial Inferior
Material model: Mohr-Coulomb
Material type: Drained
General properties
γ unsat 18.200 kN/m3
γ sat 19.200 kN/m3
Comments
Permeability
k x : 0.500 m/day
k y : 0.500 m/day
Advanced...
Next
Ok
Cancel
Help


Mohr-Coulomb - Qmb Aluvial Inferior
General
Parameters
Interfaces
Stiffness
E ref : 4.000E+04 kN/m2
ν (nu) : 0.300
Strength
c ref : 30.000 kN/m2
φ (phi) : 32.000 °
ψ (psi) : 3.000 °
Alternatives
G ref : 1.538E+04 kN/m2
E oed : 5.385E+04 kN/m2
Velocities
V s : 91.020 m/s
V p : 170.300 m/s
Advanced...
Next
Ok
Cancel
Help

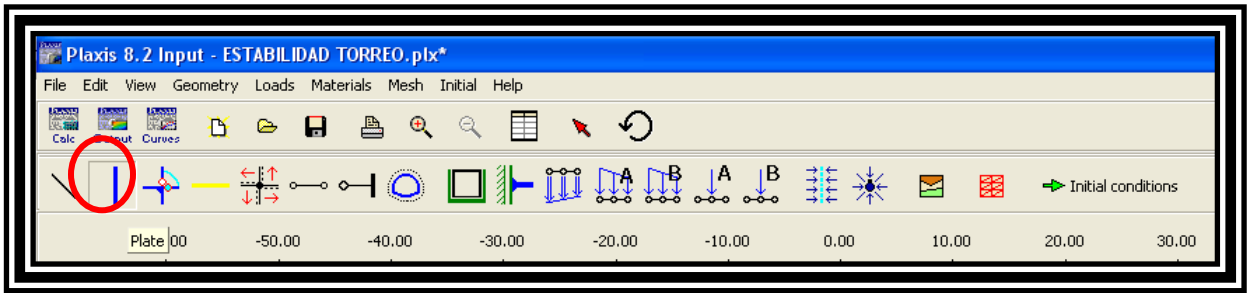

Material sets
Hide Global
Project Database
Set type: Soil & Interfaces
Group order: None
Qmb Aluvial Inferior
Qmb Aluvial Intermedio
Qmb Aluvial Superior
New...
Edit...
Copy...
Del...
>
>>
<
Global Database
Set type: Soil & Interfaces
Group order: None
Lesson 1 - Sand
Lesson 2 - Clay
Lesson 2 - Sand
Lesson 3 - Clay
Lesson 3 - Peat
Lesson 3 - Sand
Lesson 4 - Fill
Lesson 4 - Loam
Lesson 4 - Sand
Lesson 5 - Clay
Lesson 5 - Peat
Set as default
Open...
Del...
Create...
OK
Apply
Help

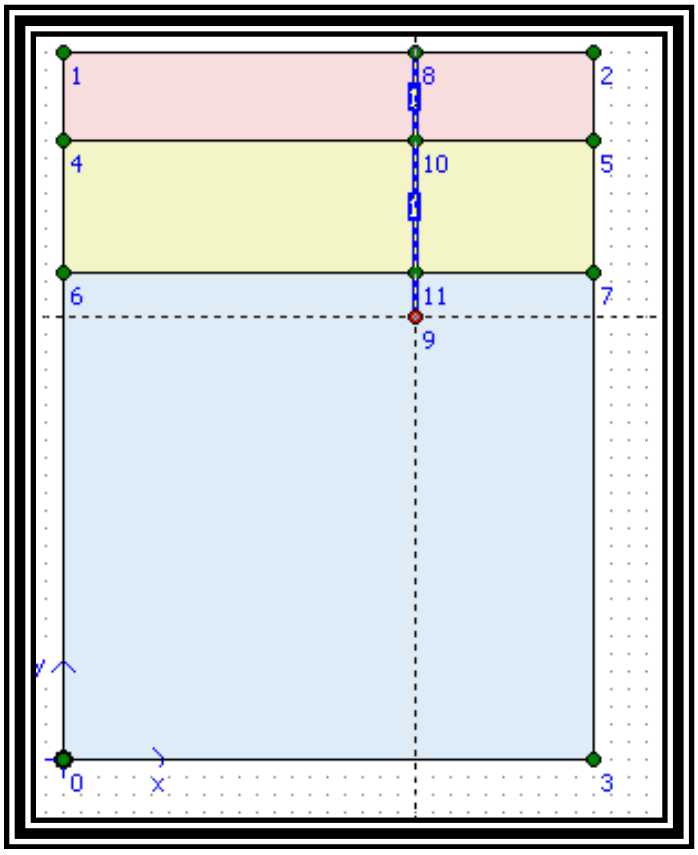
Una vez introducidos todos los parámetros hacer click sobre ellos y asignarlos.

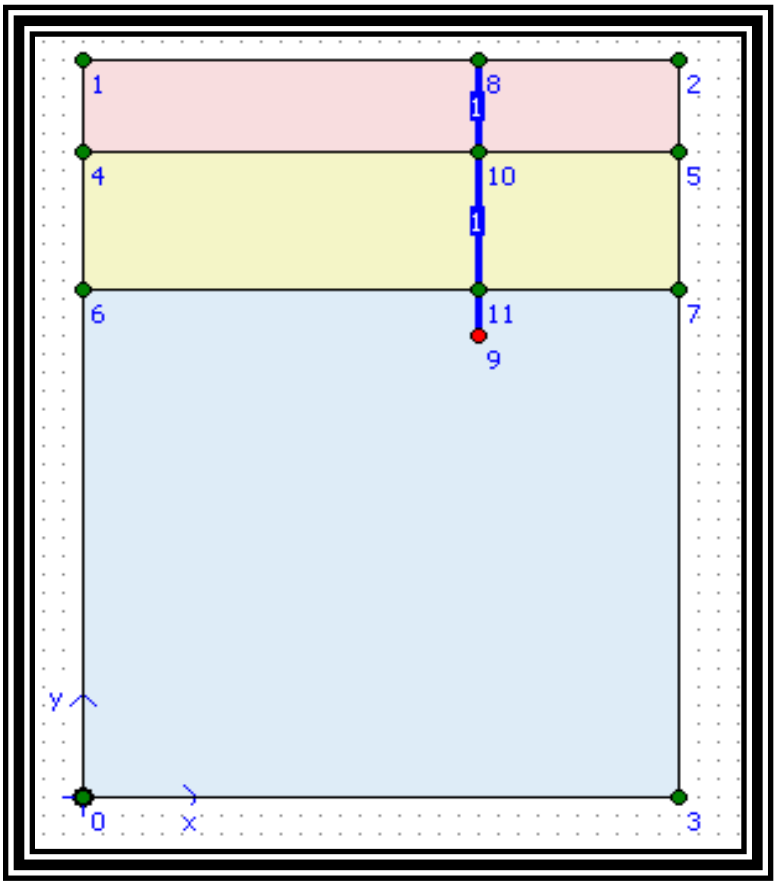




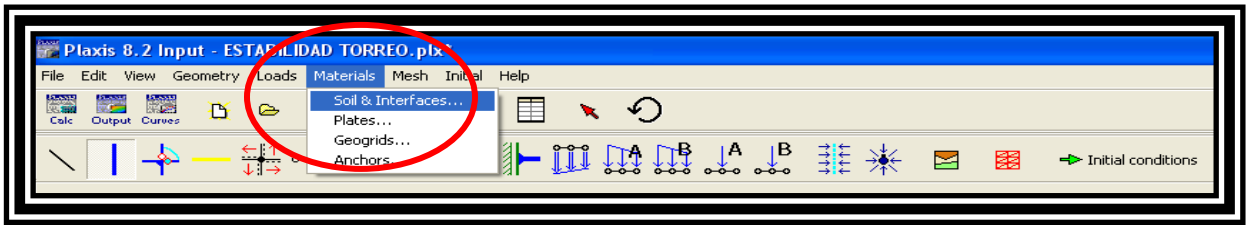
Haciendo click en Plate se proceder a dibujar la pantalla.



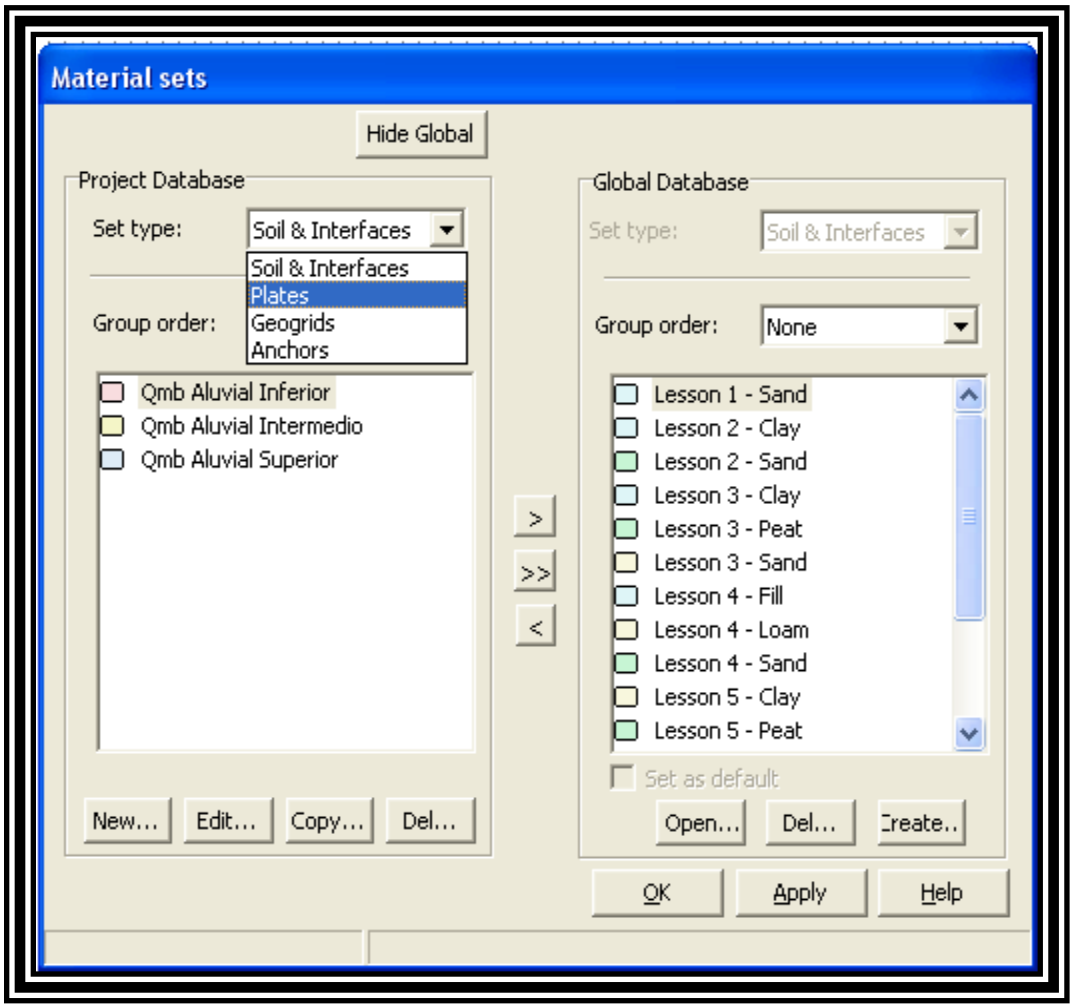




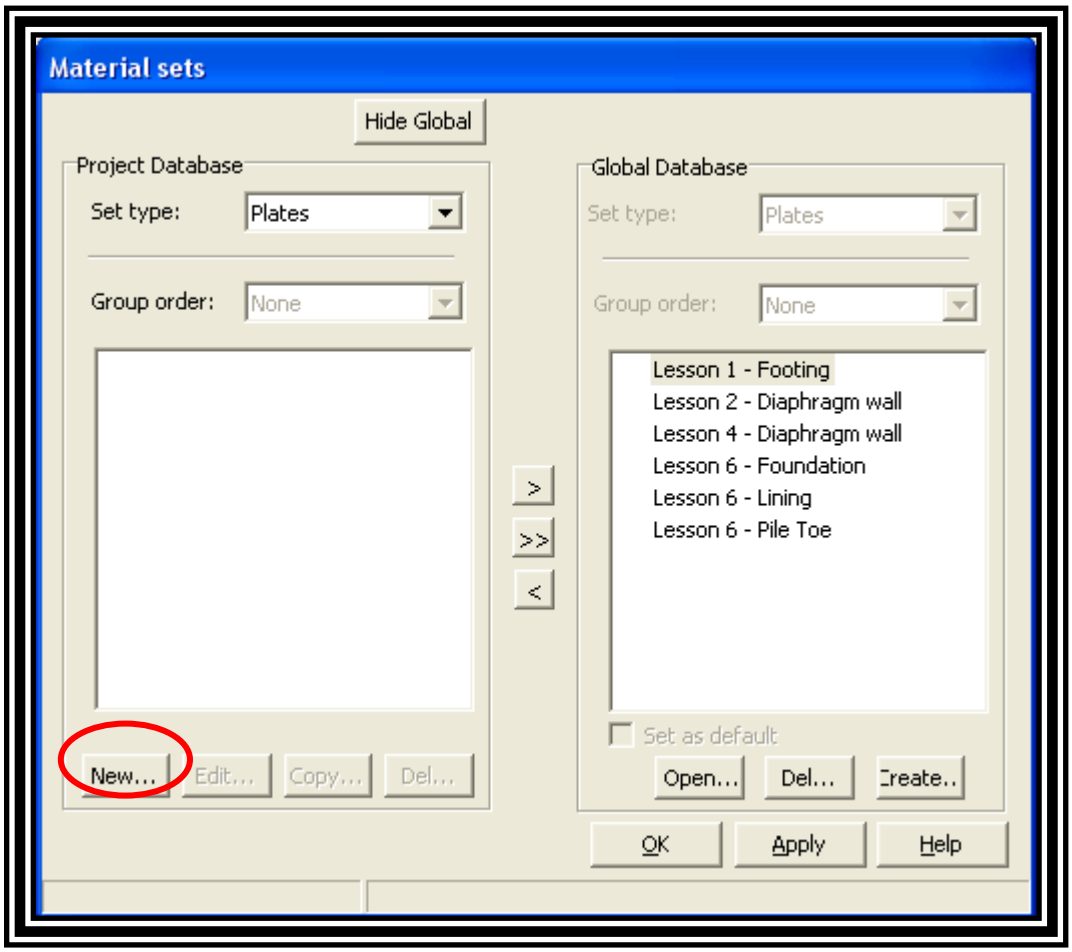
Incluir las propiedades de las pantallas haciendo click en ***Materials*** – ***soils interfaces***



En la ventana desplegable escoger la opción de ***Plate*** – ***ok***



En la ventana que se despliega dar click en ***New***



Introducir las propiedades de la pantalla y dar click en ***Ok*** y ***Apply***

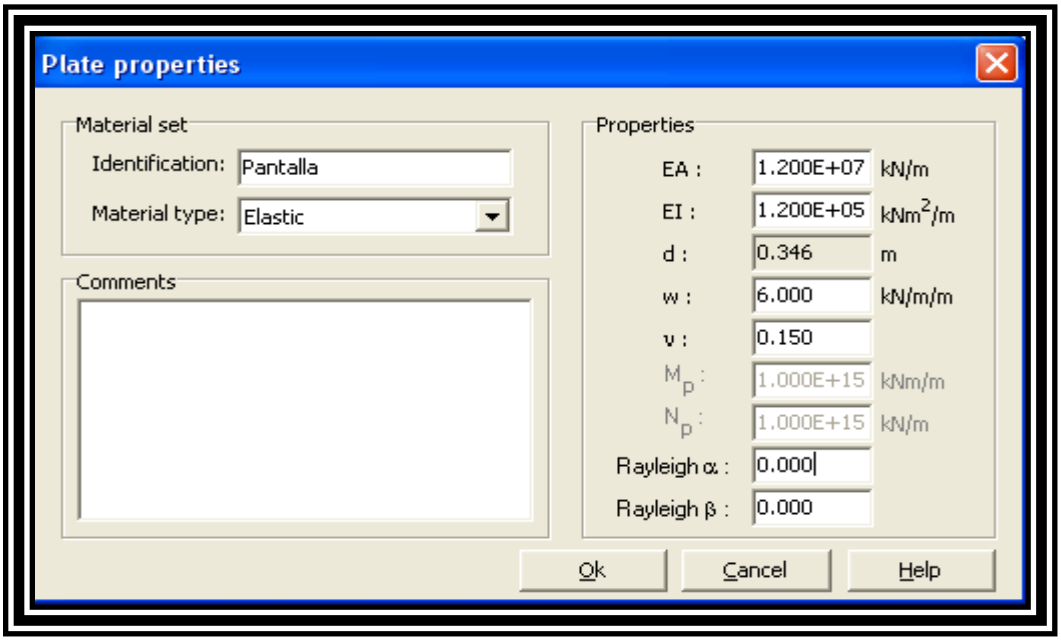
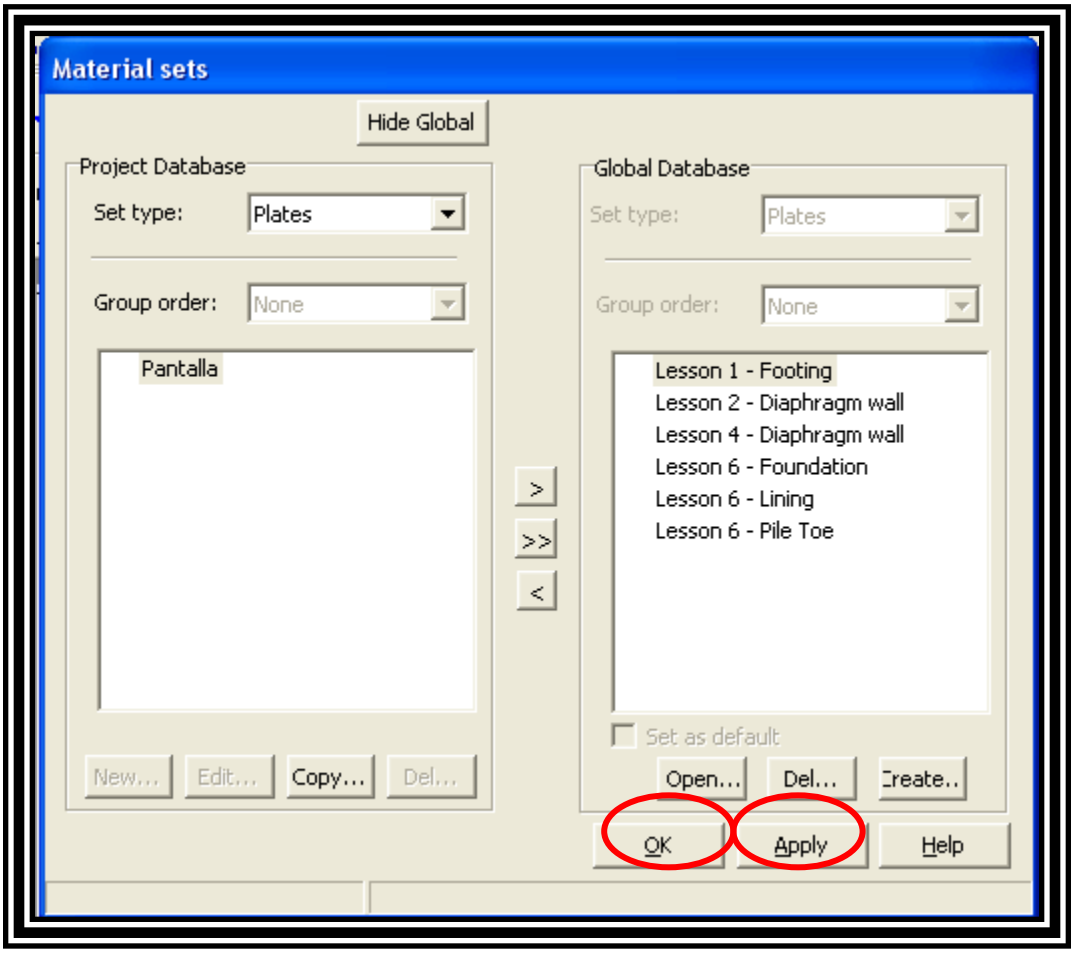
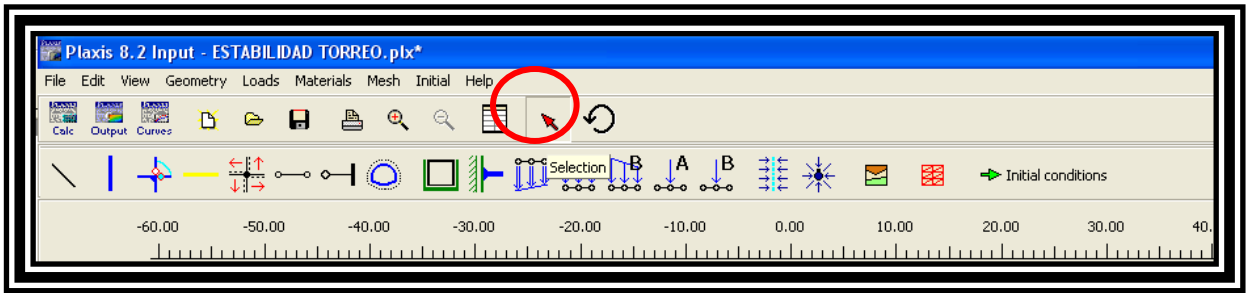
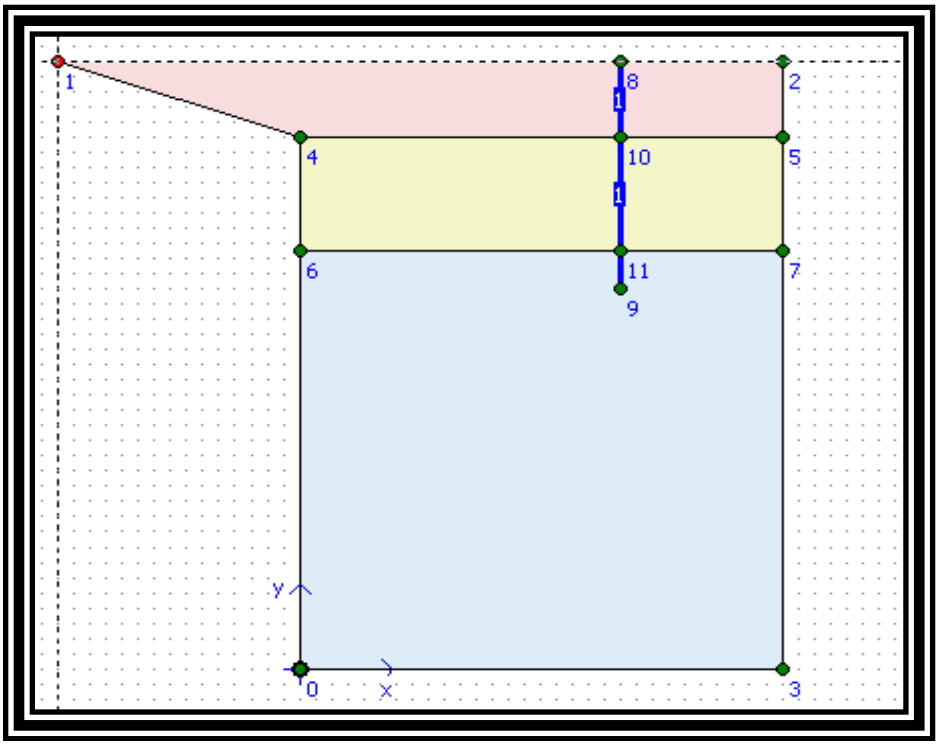


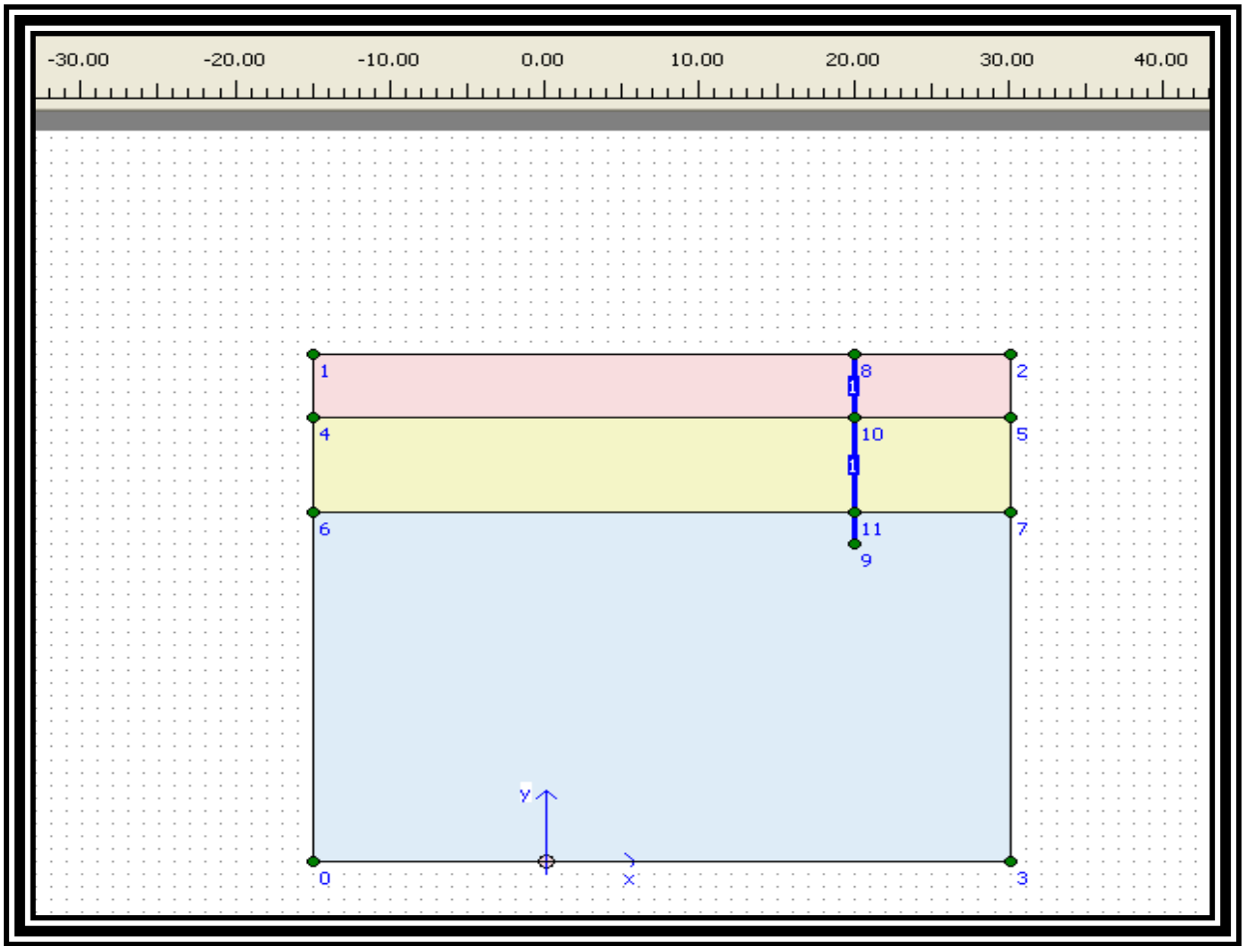
Plate properties
Material set
Identification: Pantalla
Material type: Elastic
Comments
Properties
EA : 1.200E+07 kN/m
EI : 1.200E+05 kNm²/m
d : 0.346 m
w : 6.000 kN/m/m
ν : 0.150
Mp : 1.000E+15 kNm/m
Np : 1.000E+15 kN/m
Rayleigh α : 0.000
Rayleigh β : 0.000
Ok
Cancel
Help


Material sets
Hide Global
Project Database
Set type: Plates
Group order: None
Pantalla
New...
Edit...
Copy...
Del...
Global Database
Set type: Plates
Group order: None
Lesson 1 - Footing
Lesson 2 - Diaphragm wall
Lesson 4 - Diaphragm wall
Lesson 6 - Foundation
Lesson 6 - Lining
Lesson 6 - Pile Toe
>
>>
<
Set as default
Open...
Del...
Create..
OK
Apply
Help

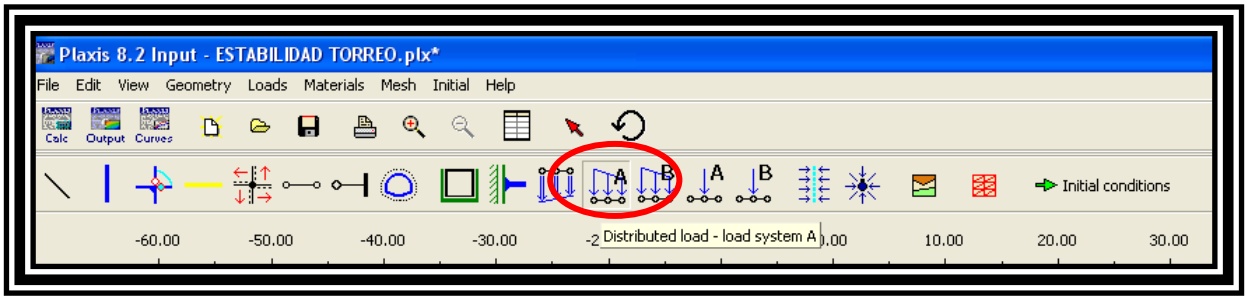
Se hace click en el icono de selection y con ello se puede desplazar los puntos hasta la posición deseada.

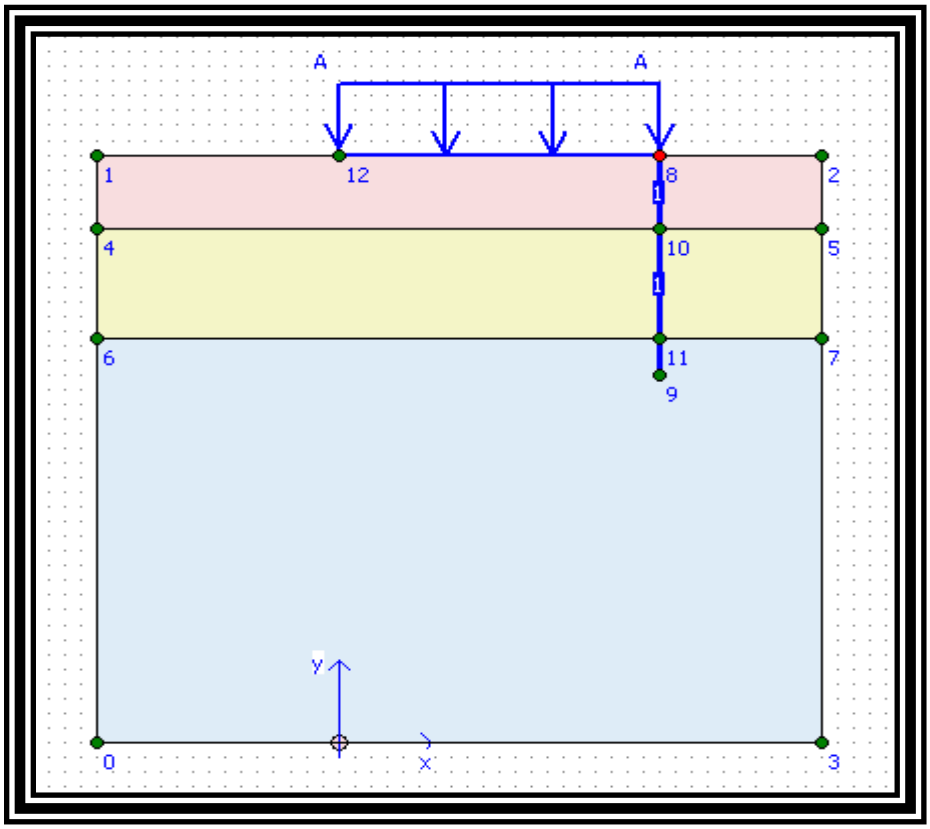


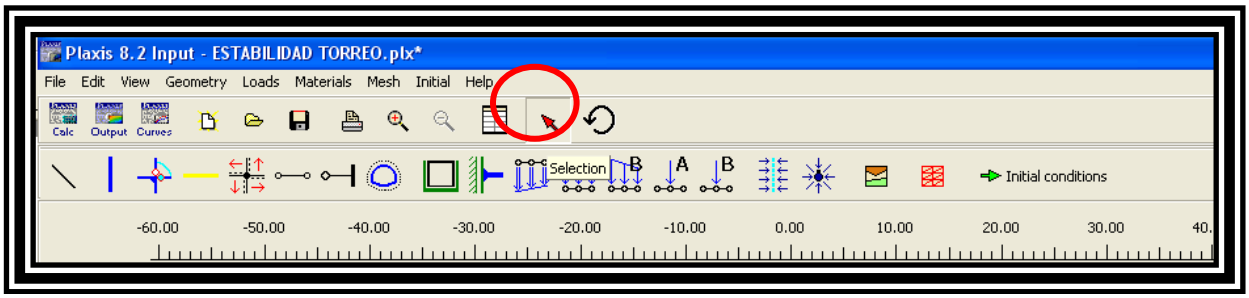




Hacer click en el icono que se muestra en la figura y dibujar las cargas distribuidas.

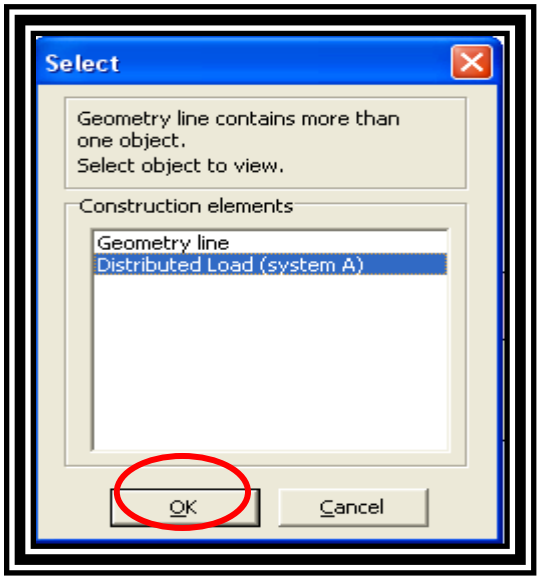


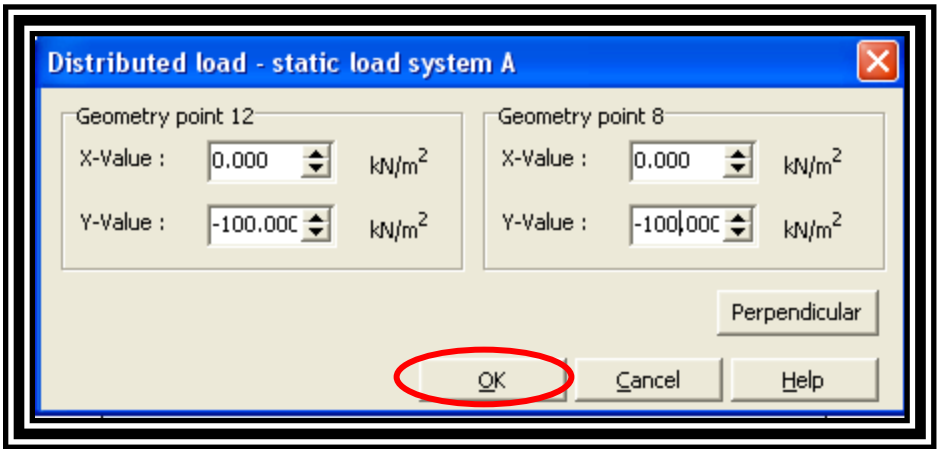




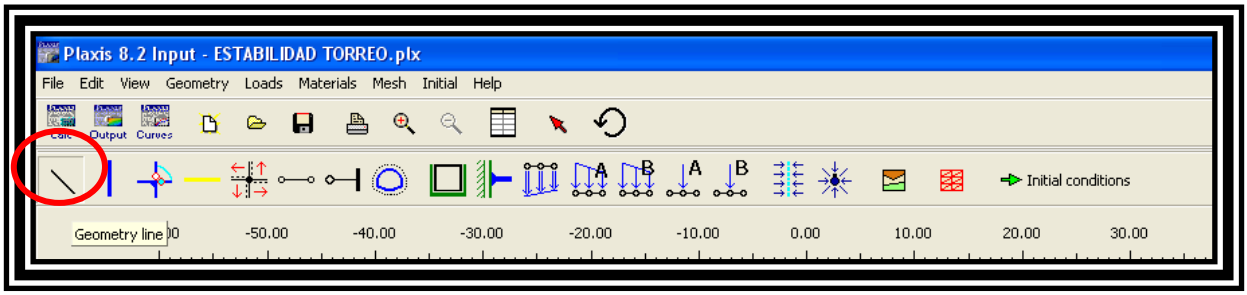
Dar click en el icono de selection y luego dar doble click sobre la base de la carga distribuida.

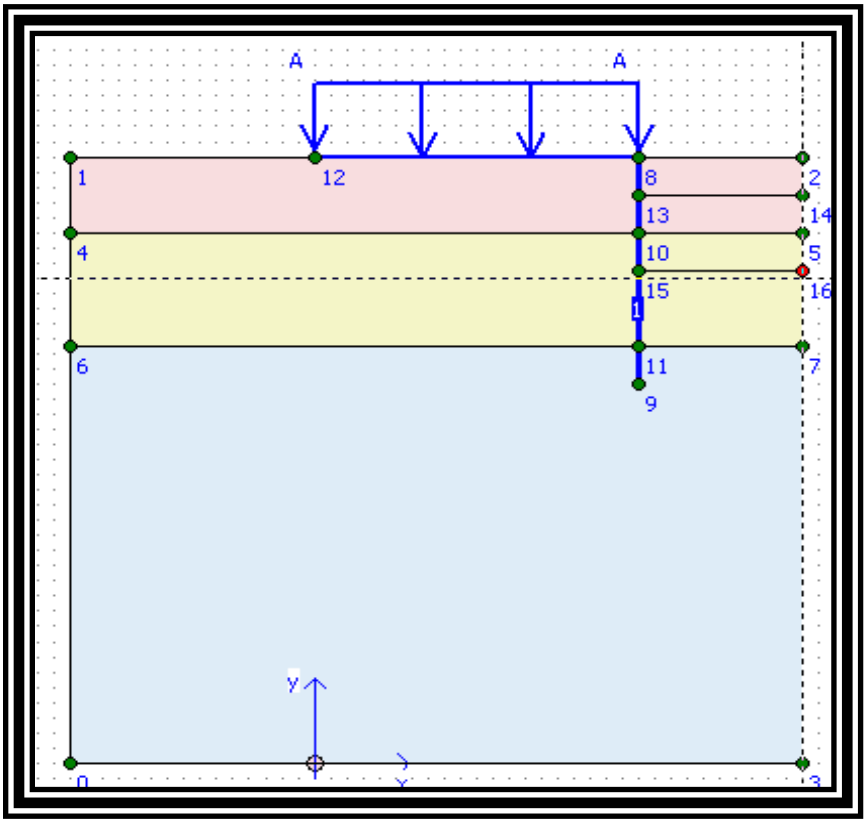
Posteriormente se abrirá la siguiente ventana y se da click en ok.

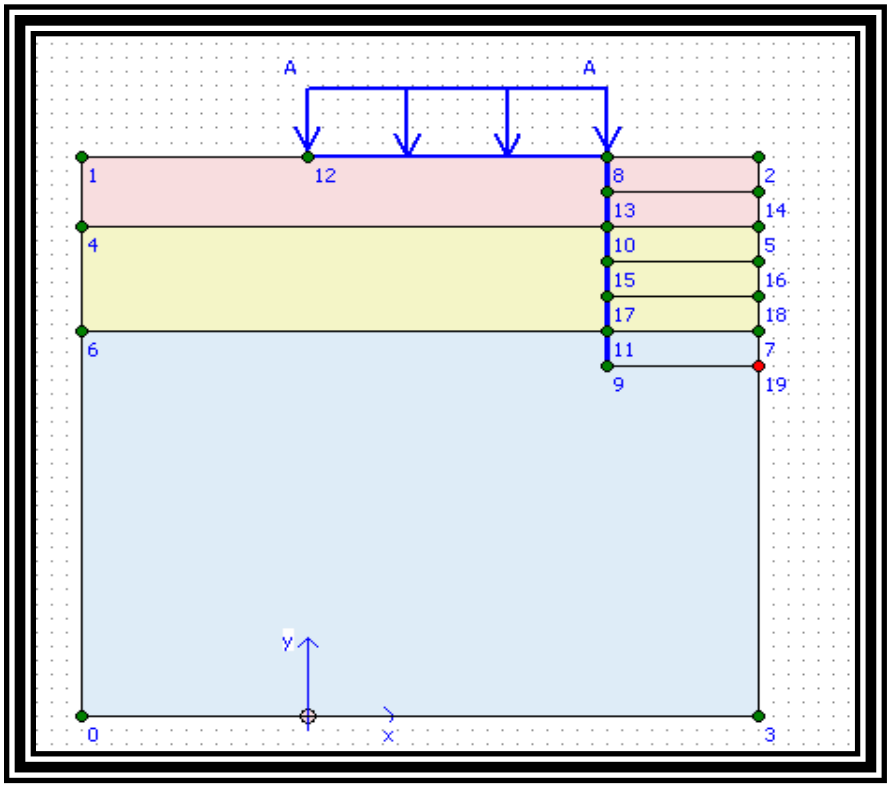

Select
Geometry line contains more than one object.
Select object to view.
Construction elements
Geometry line
Distributed Load (system A)
OK
Cancel


Distributed load - static load system A
Geometry point 12
X-Value : 0.000 kN/m²
Y-Value : -100.00C kN/m²
Geometry point 8
X-Value : 0.000 kN/m²
Y-Value : -100.00C kN/m²
Perpendicular
OK
Cancel
Help

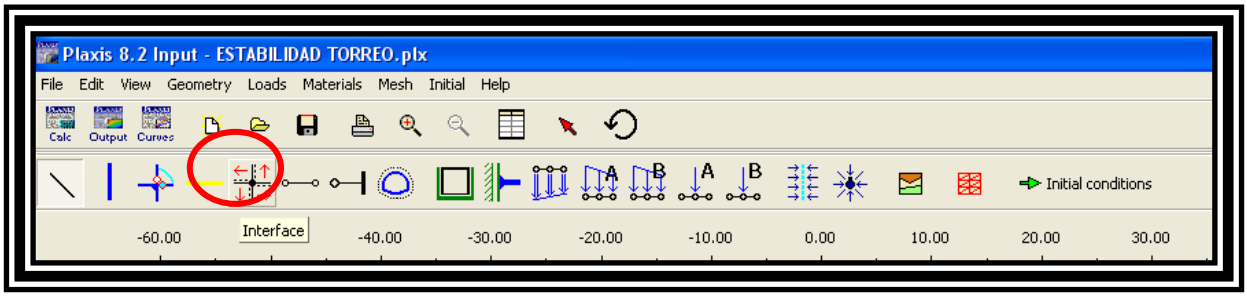
Se da click en el icono Geometry Line, para separar cada segmento de excavación para luego en cada fase del análisis señalarlo.

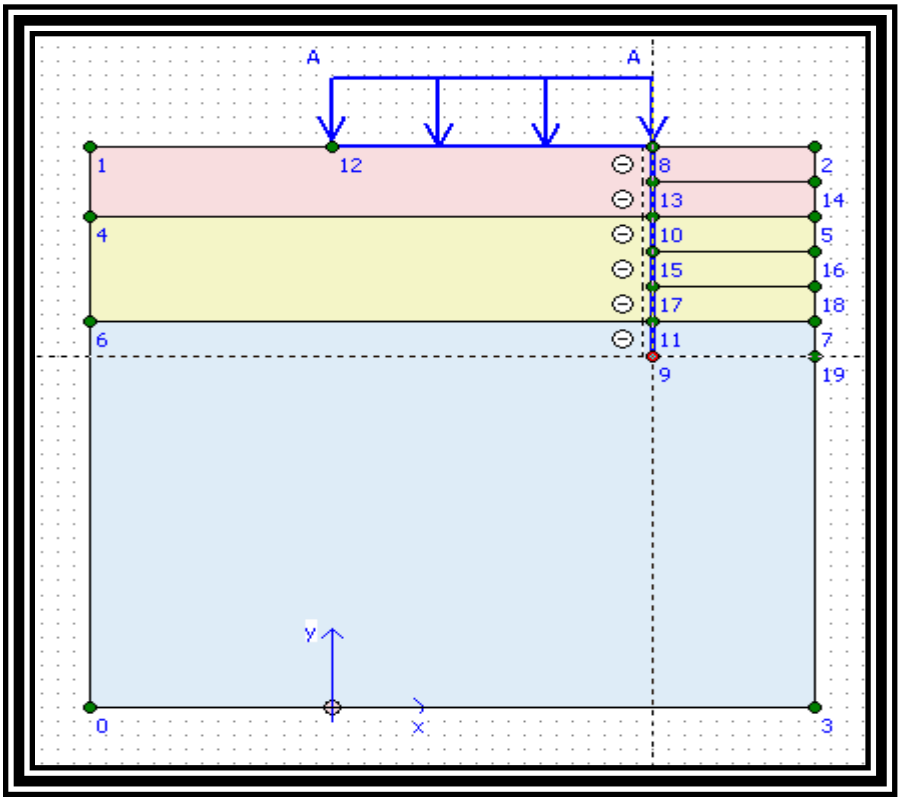


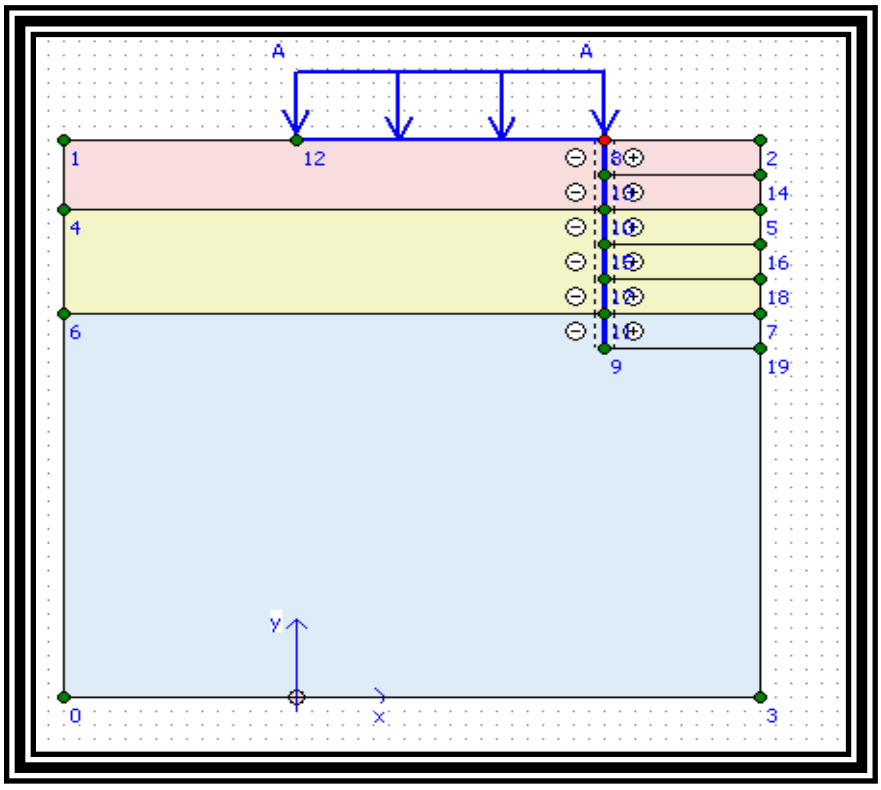




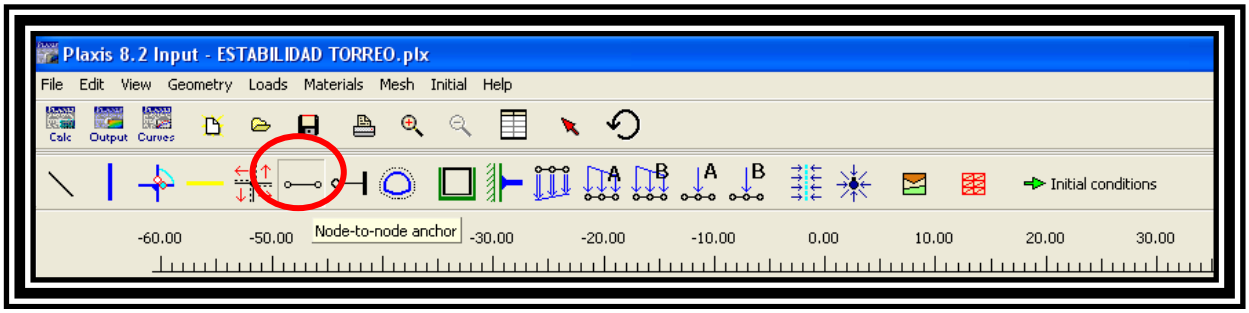
Dibujar las interfaces en los lados de las pantallas haciendo click en ***interface***

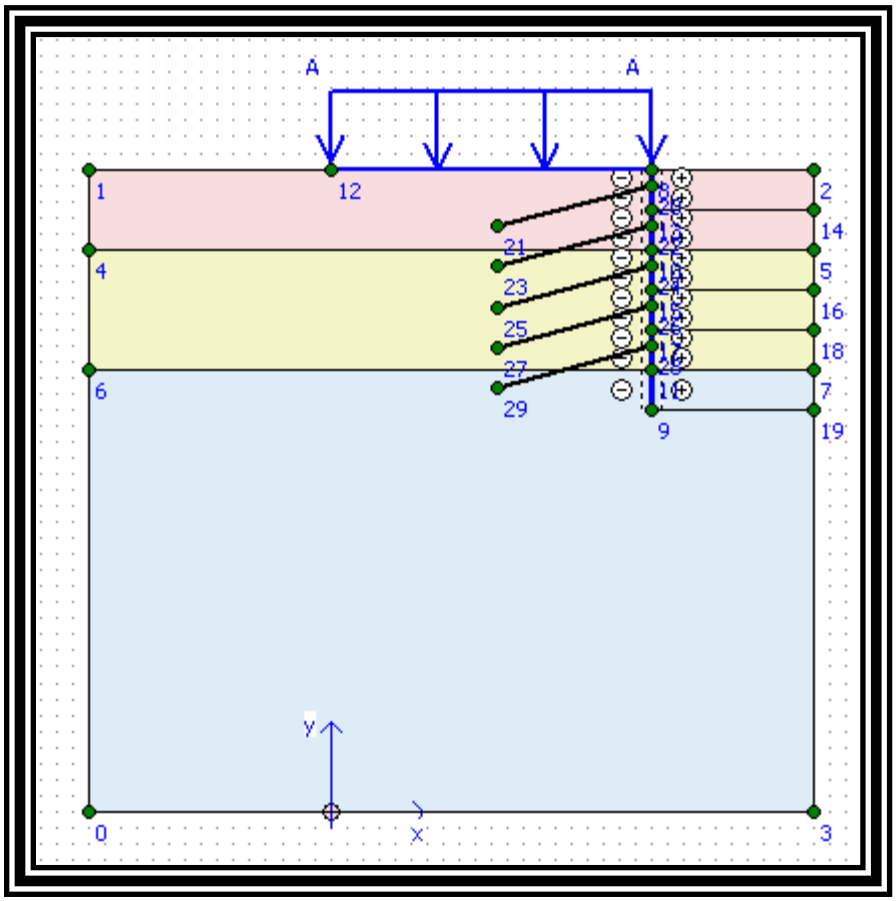



A
A
1
12
8
2
13
14
4
10
5
15
16
17
18
6
11
7
9
19
y
x
0
3

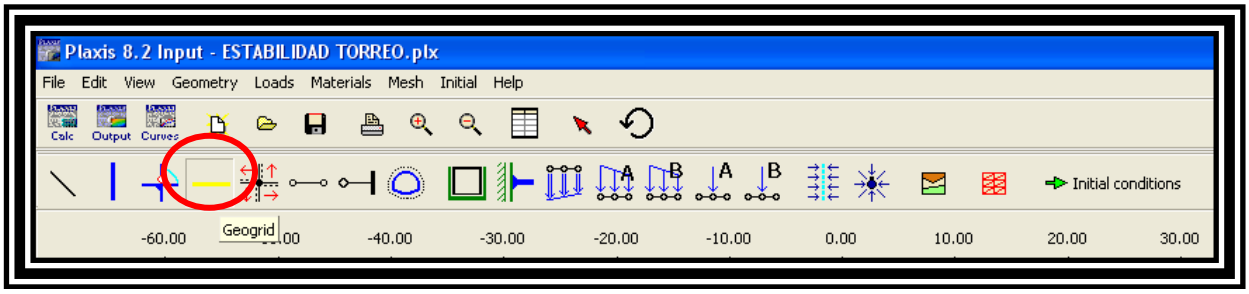

A
A
1
12
8
2
14
4
5
16
18
6
7
9
19
y
x
0
3

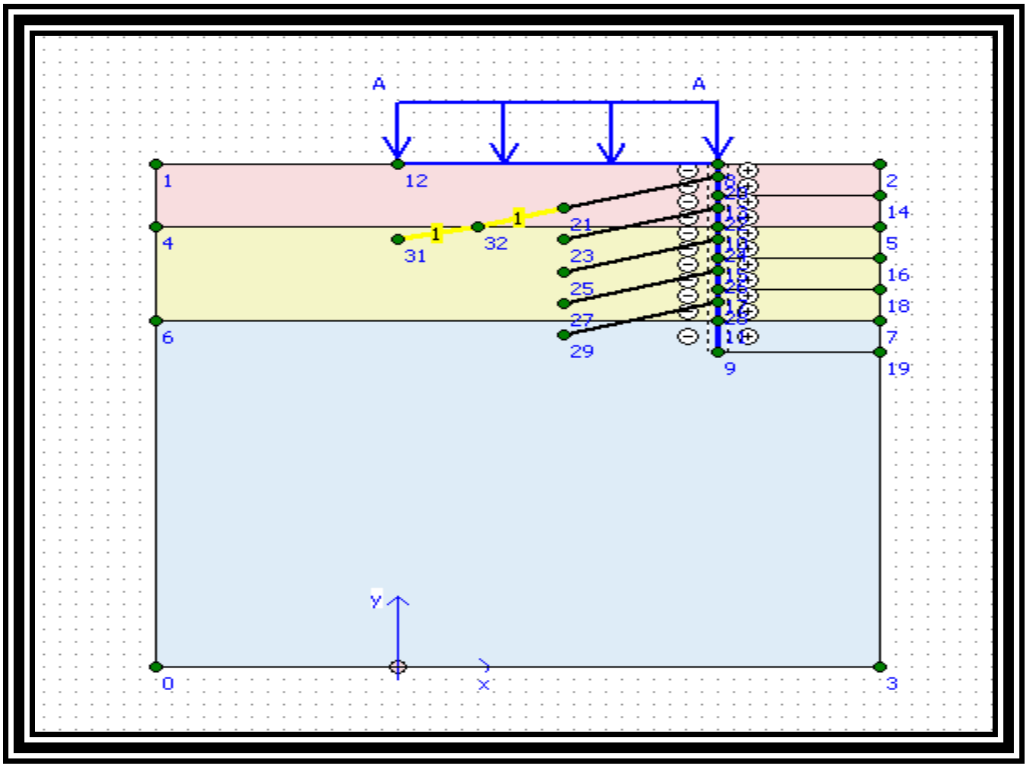
Para dibujar los anclajes dar click en ***node-to node anchor*** y dibujarlos

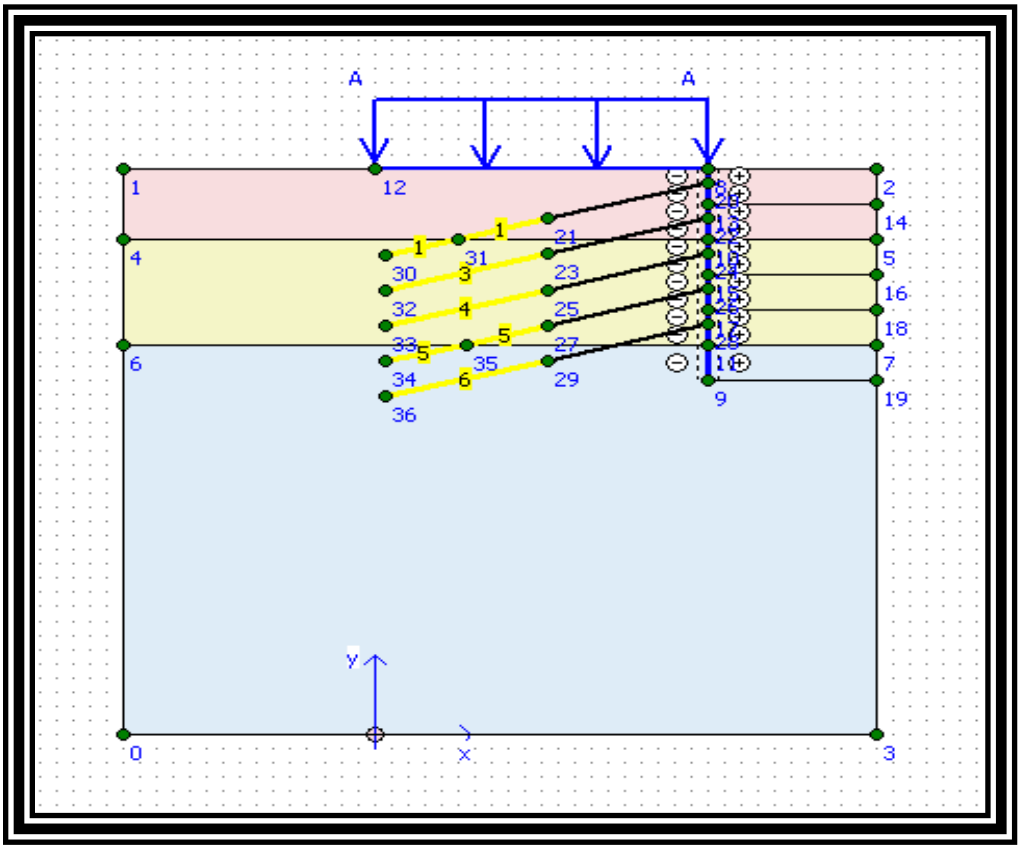




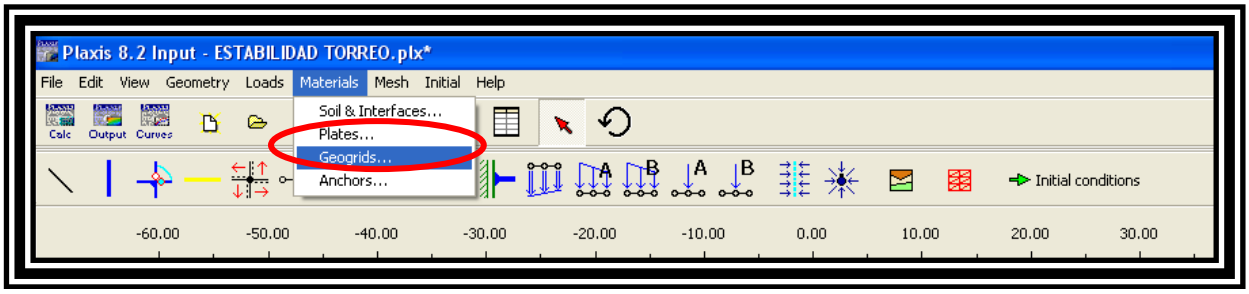
Dar click en ***geogrid*** y se dibujan los bulbos

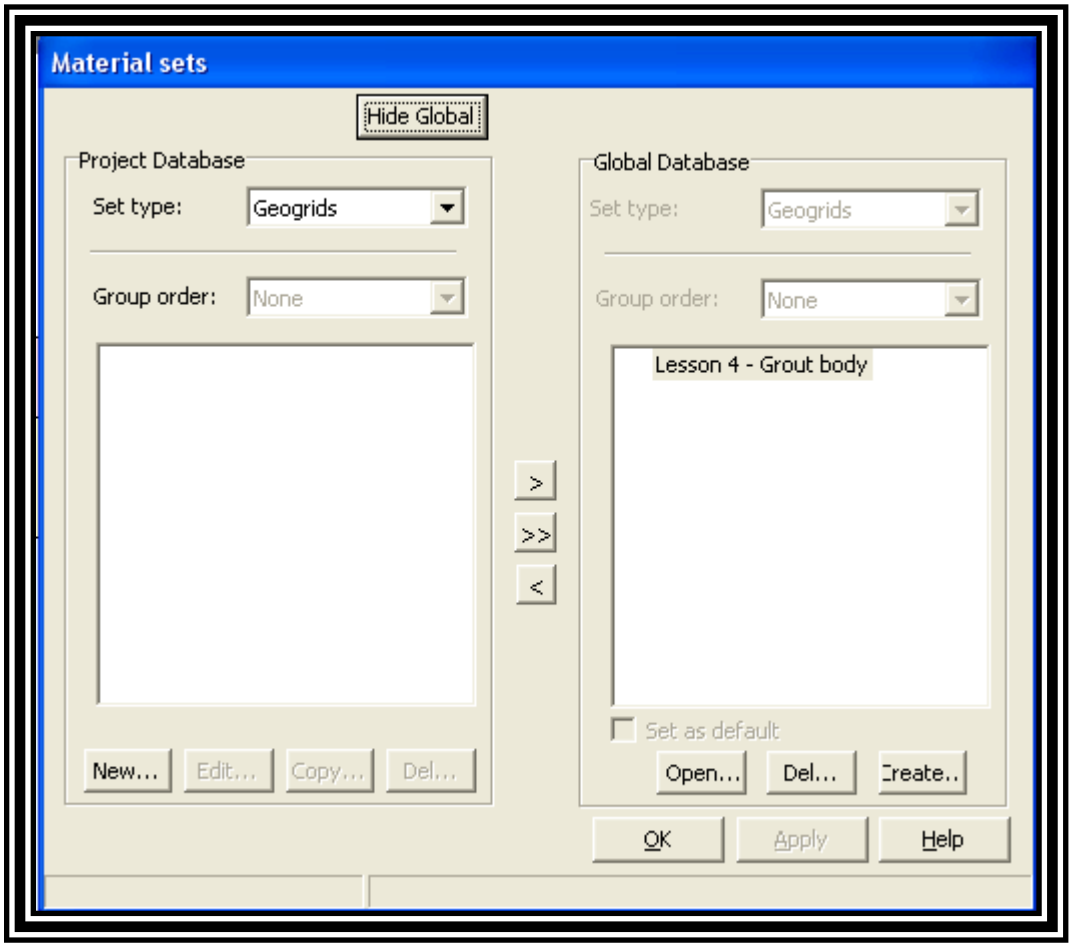




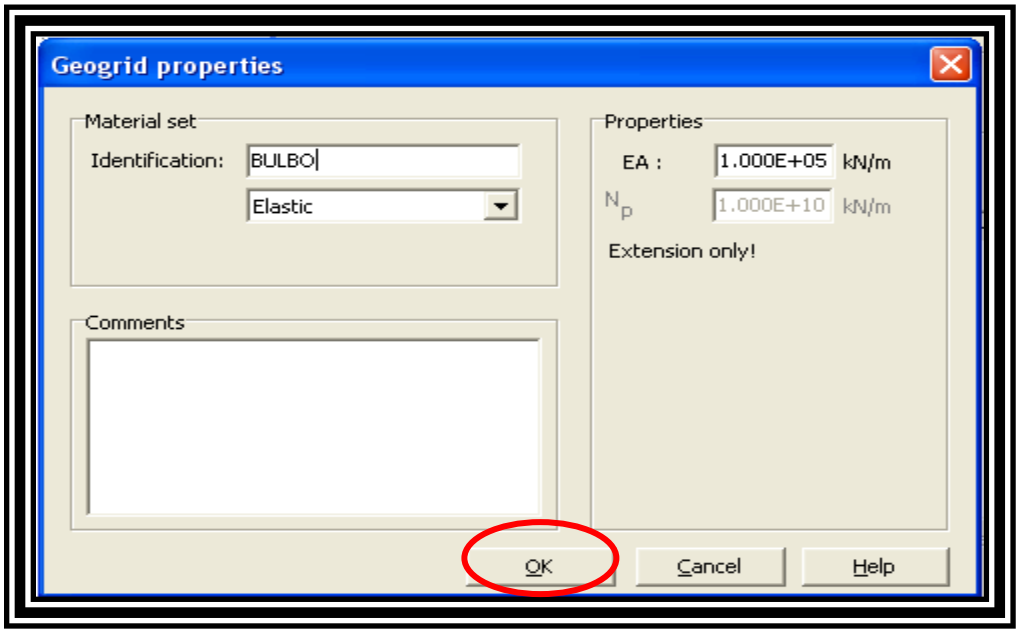


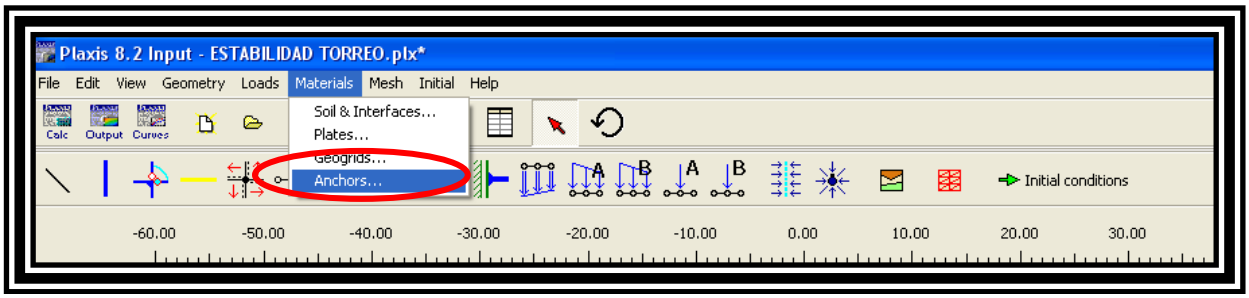
Asignar los materiales

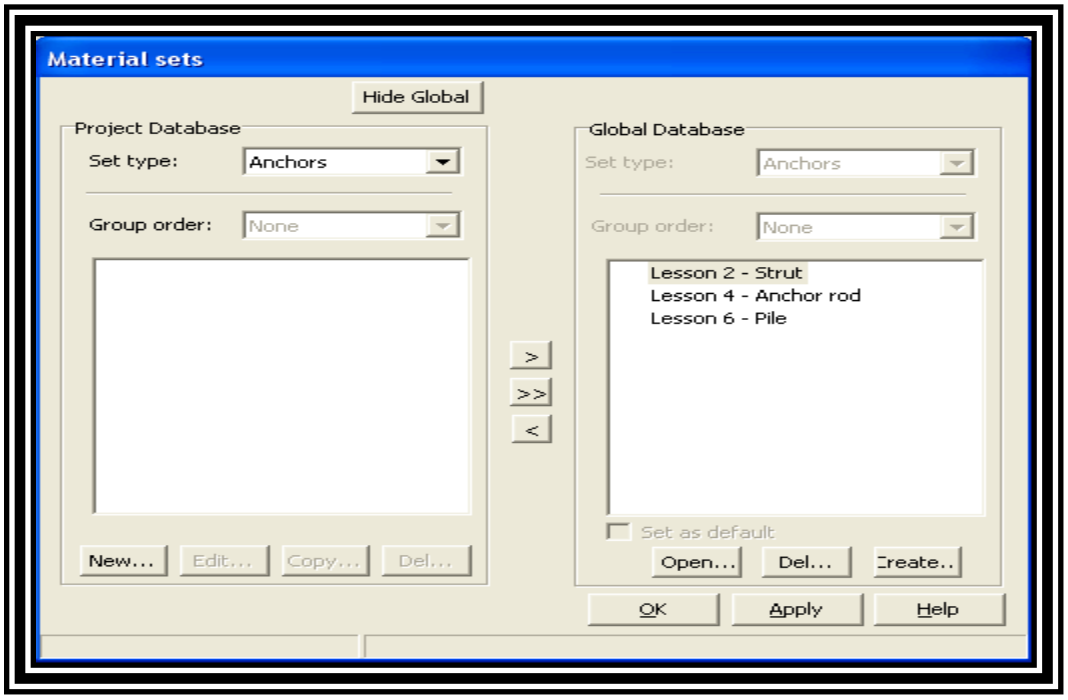


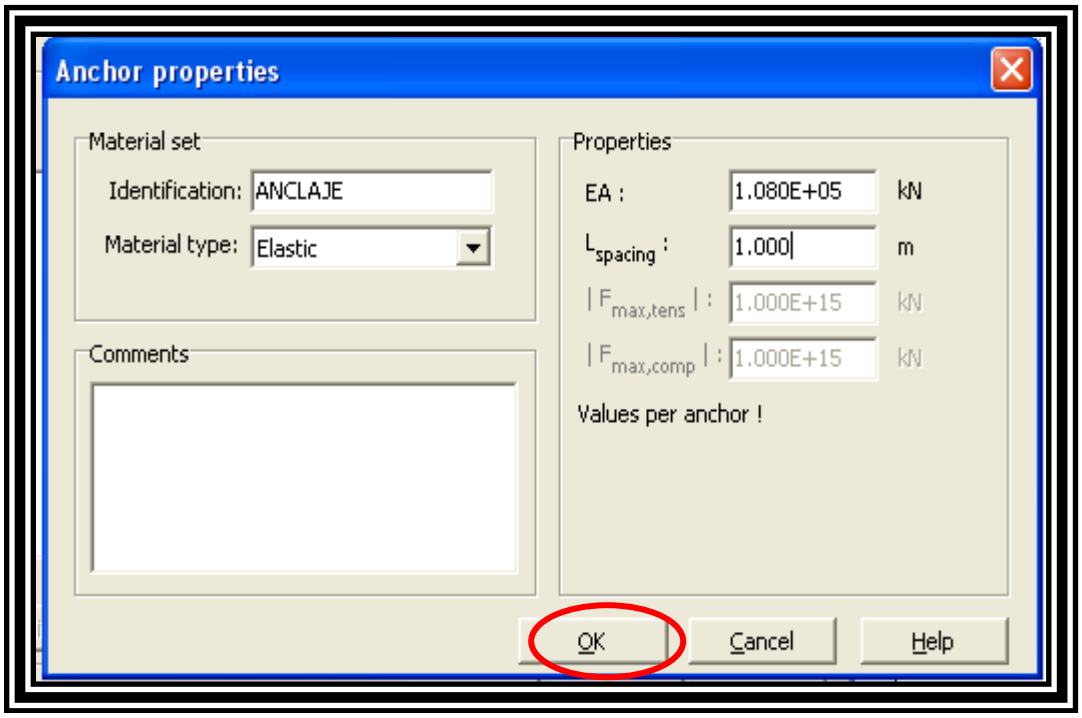

Material sets
Hide Global
Project Database
Set type:
Geogrids
Group order:
None
New...
Edit...
Copy...
Del...
>
>>
<
Global Database
Set type:
Geogrids
Group order:
None
Lesson 4 - Grout body
Set as default
Open...
Del...
Create..
OK
Apply
Help

Identificar las propiedades de los materiales del bulbo

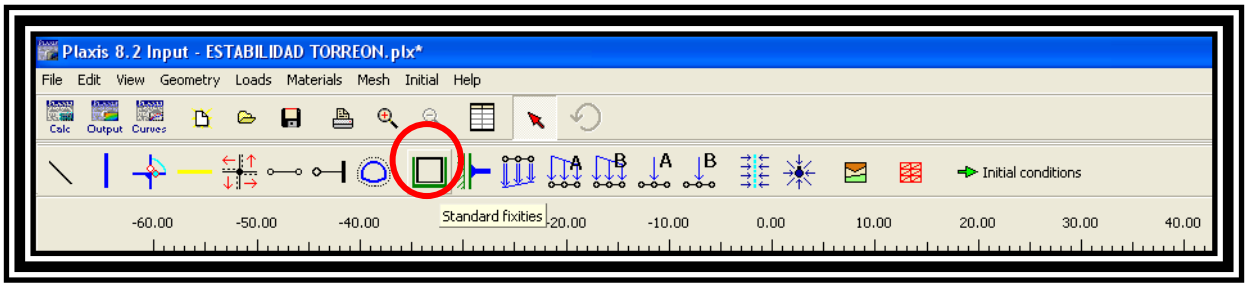


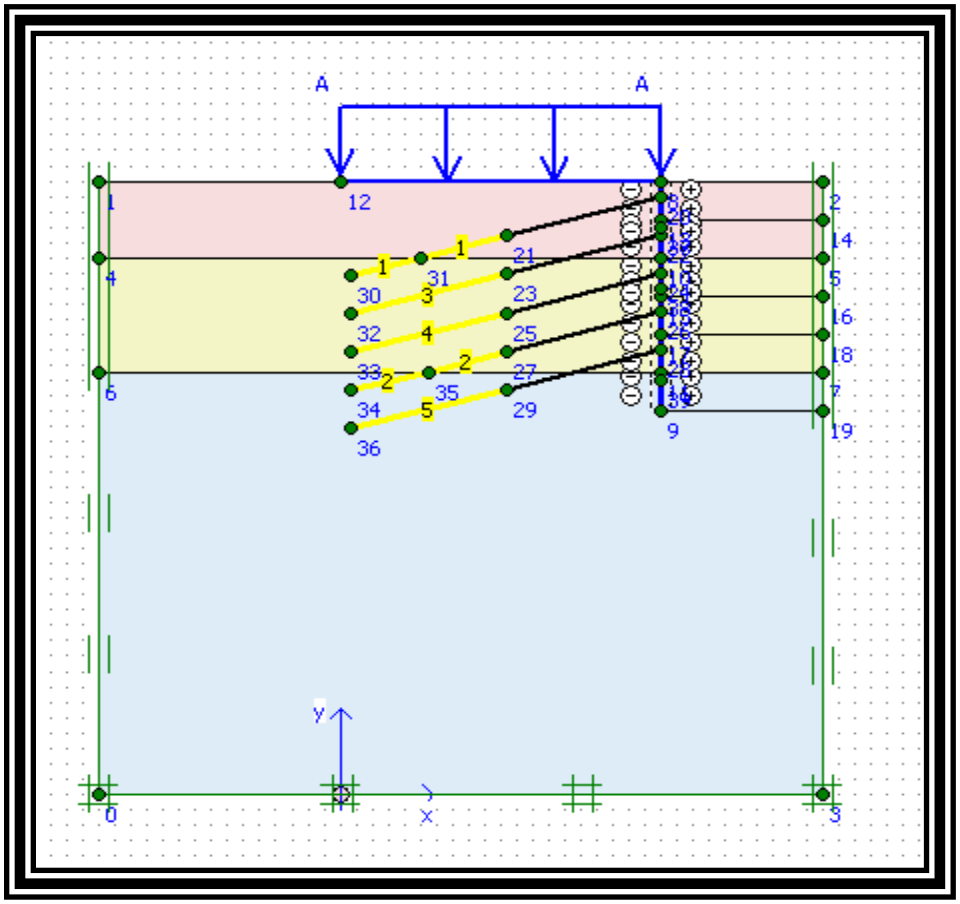



Material sets
Hide Global
Project Database
Set type:
Anchors
Group order:
None
New...
Edit...
Copy...
Del...
>
>>
<
Global Database
Set type:
Anchors
Group order:
None
Lesson 2 - Strut
Lesson 4 - Anchor rod
Lesson 6 - Pile
Set as default
Open...
Del...
Create..
OK
Apply
Help

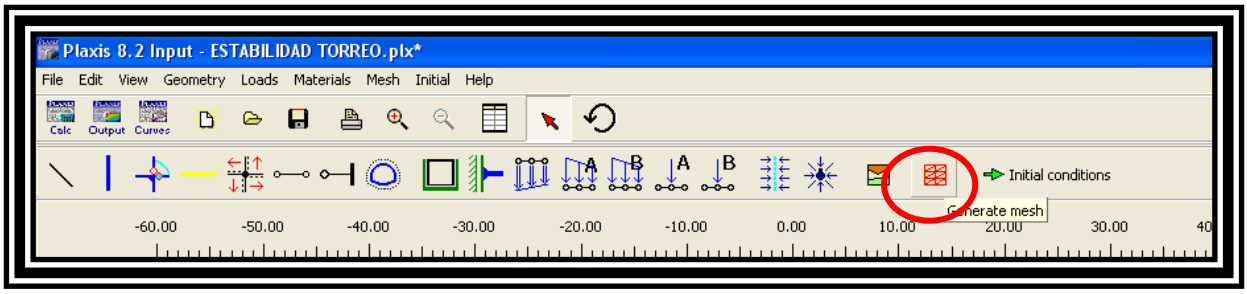

Anchor properties
Material set
Identification:
ANCLAJE
Material type:
Elastic
Comments
Properties
EA :
1.080E+05
kN
L spacing :
1.000
m
| F max,tens | :
1.000E+15
kN
| F max,comp | :
1.000E+15
kN
Values per anchor !
OK
Cancel
Help

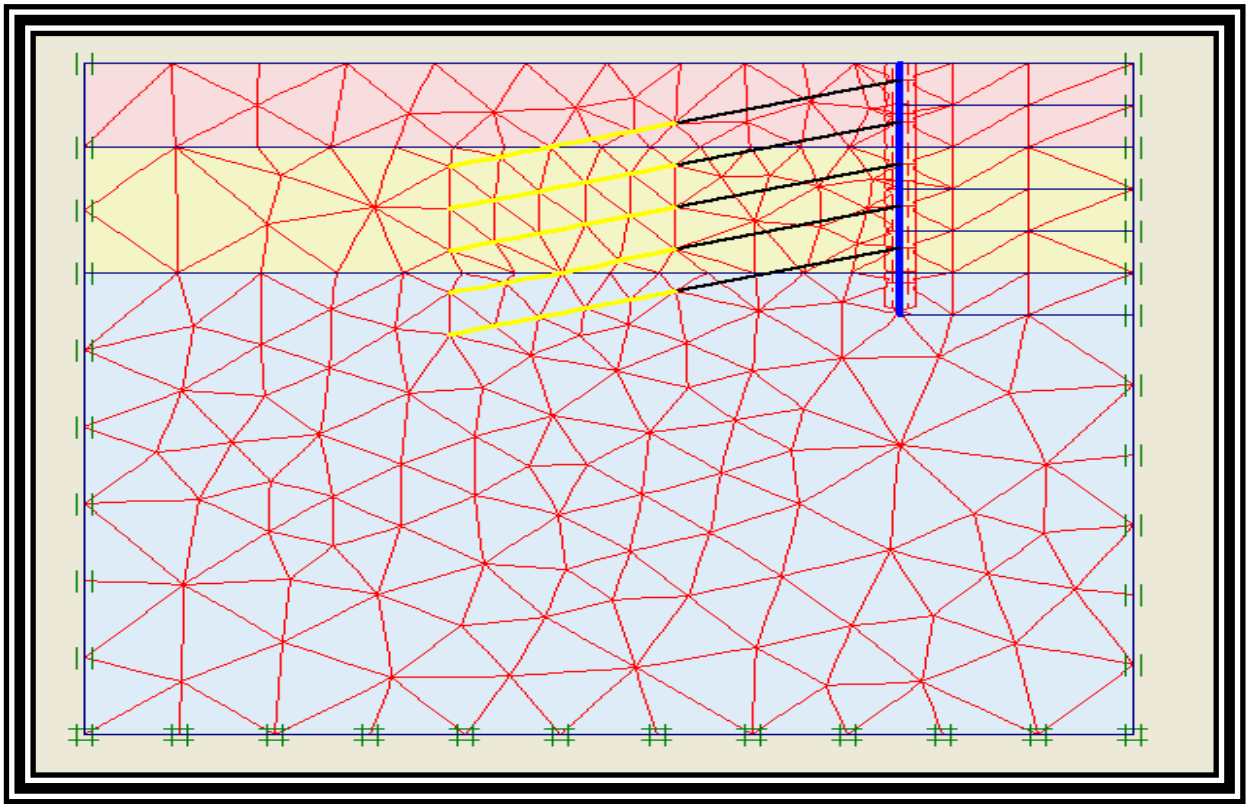
Hacer click en Standard fixties para incluir las condiciones de frontera



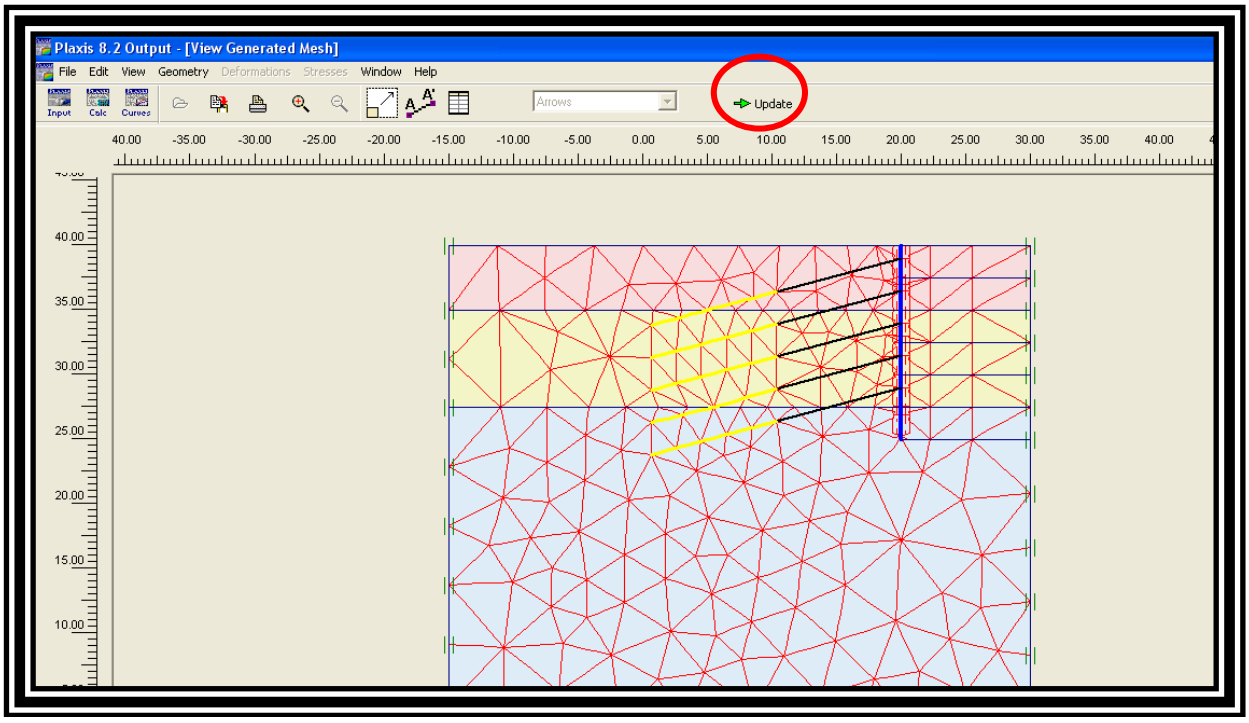


Generar la malla haciendo click en ***Generate mesh***

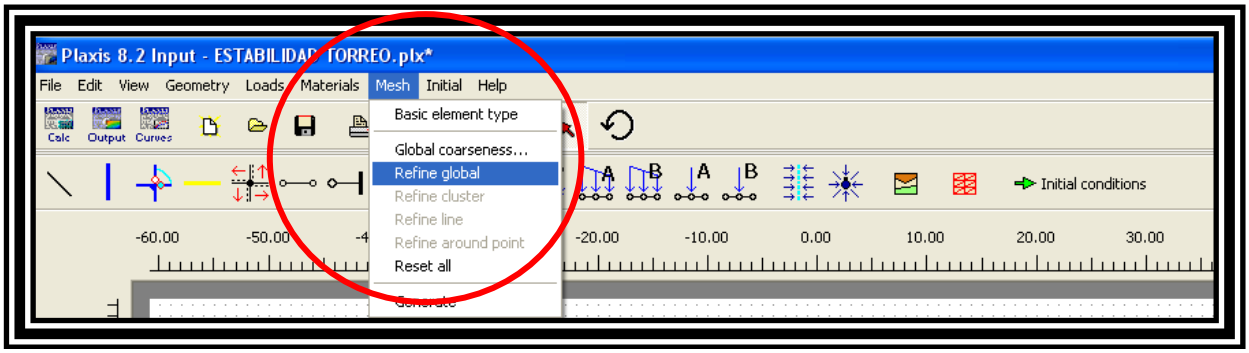


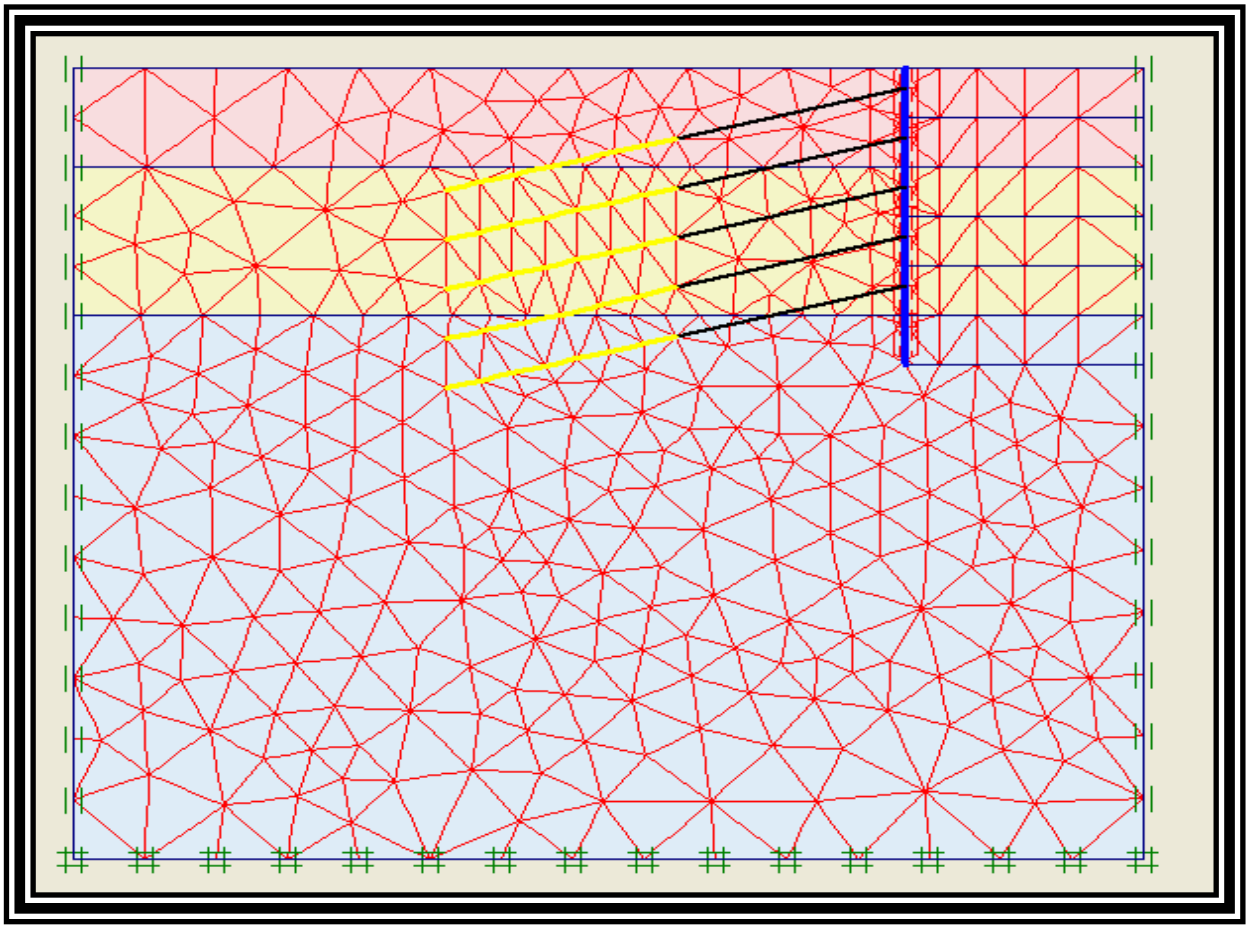


Dar click en Update

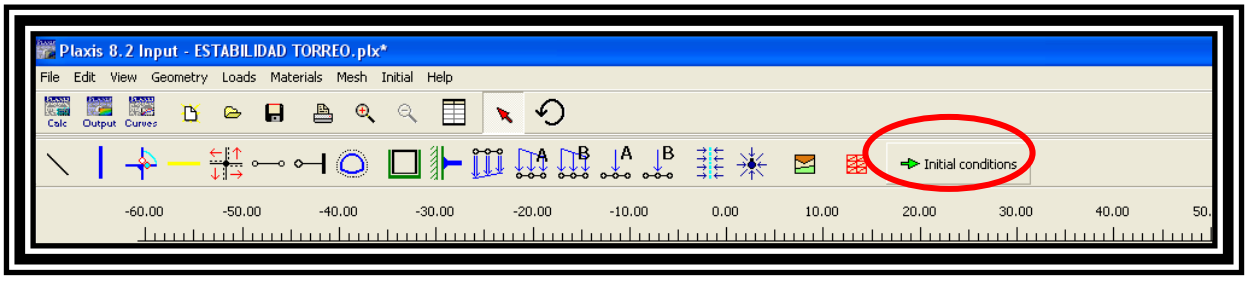


Para refinar la malla se hace clik en ***Mesh – Refine Global***

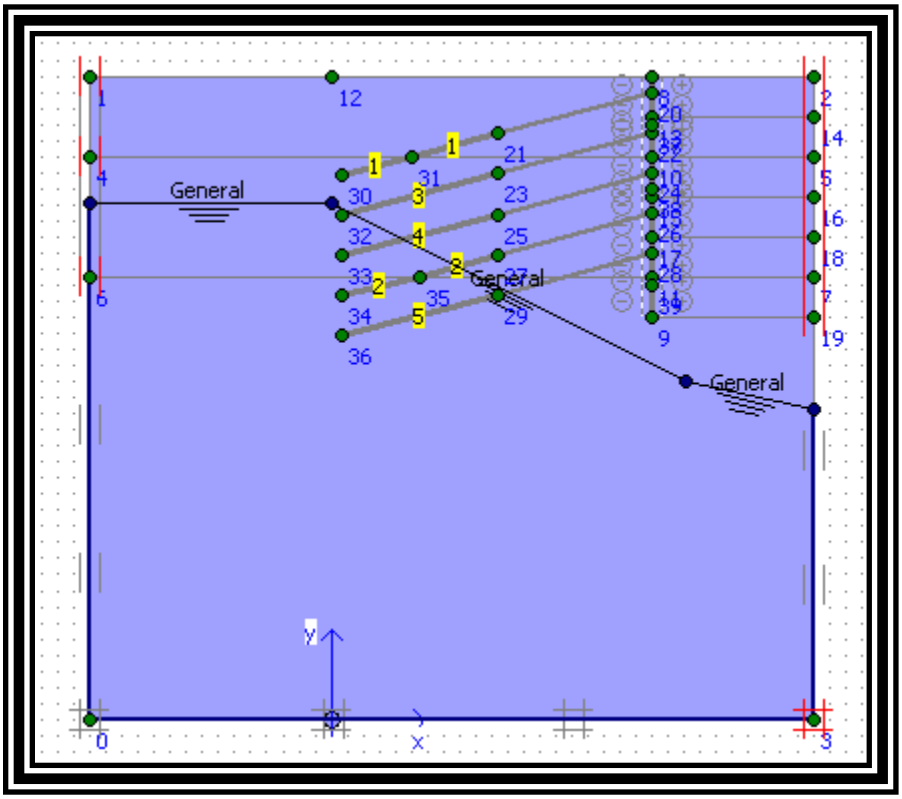




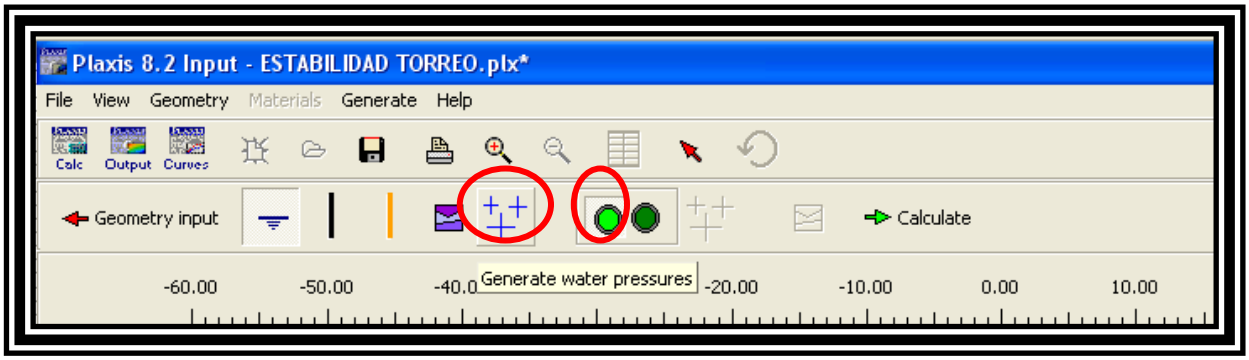
Volver a las condiciones iniciales para incluir la presión de poros e introducir el γ del agua.

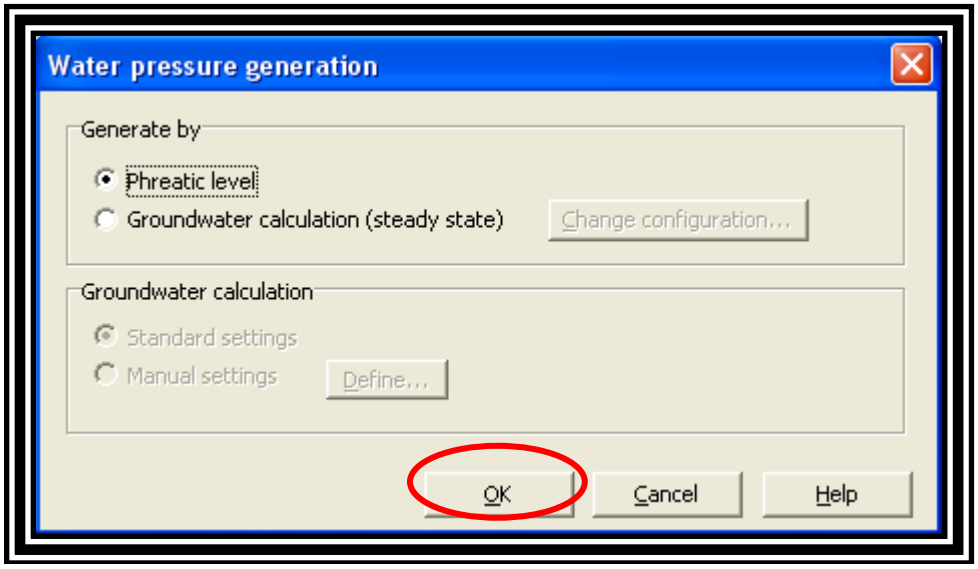


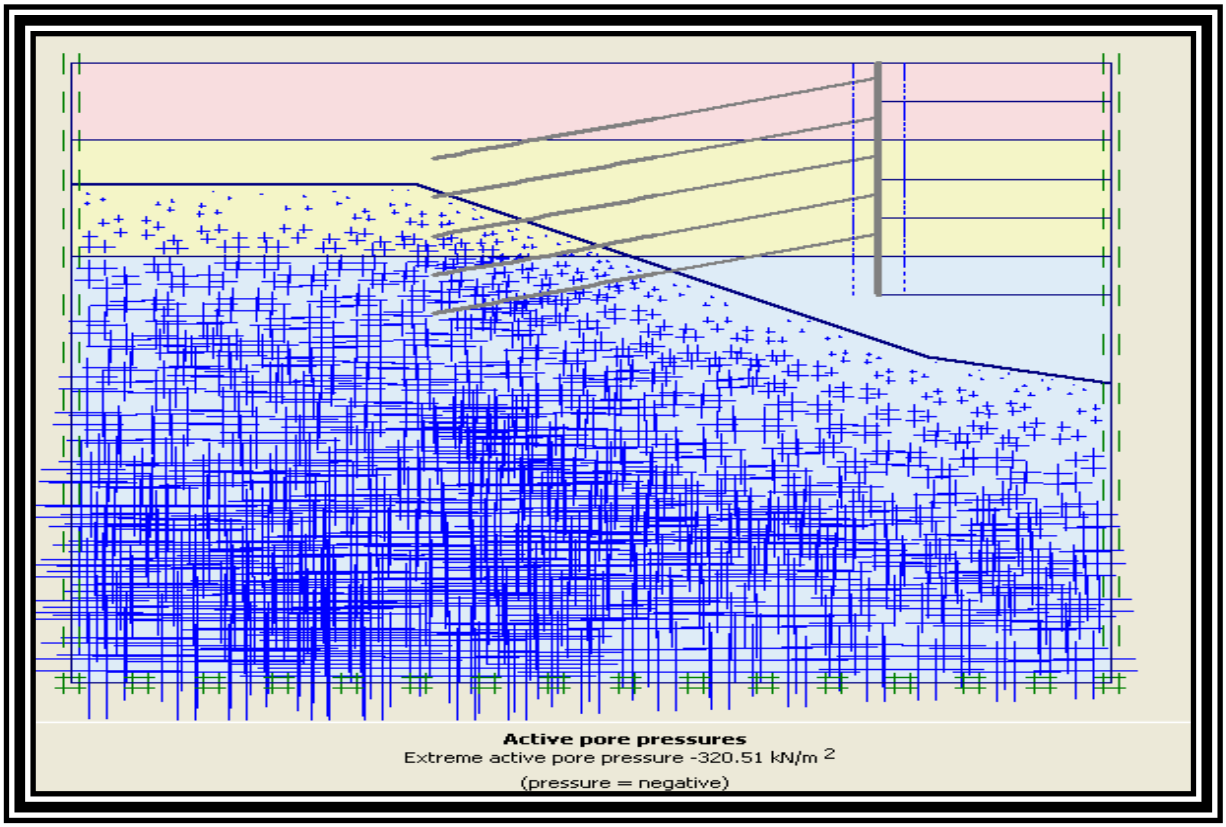
Marcar las líneas de presión de poros.

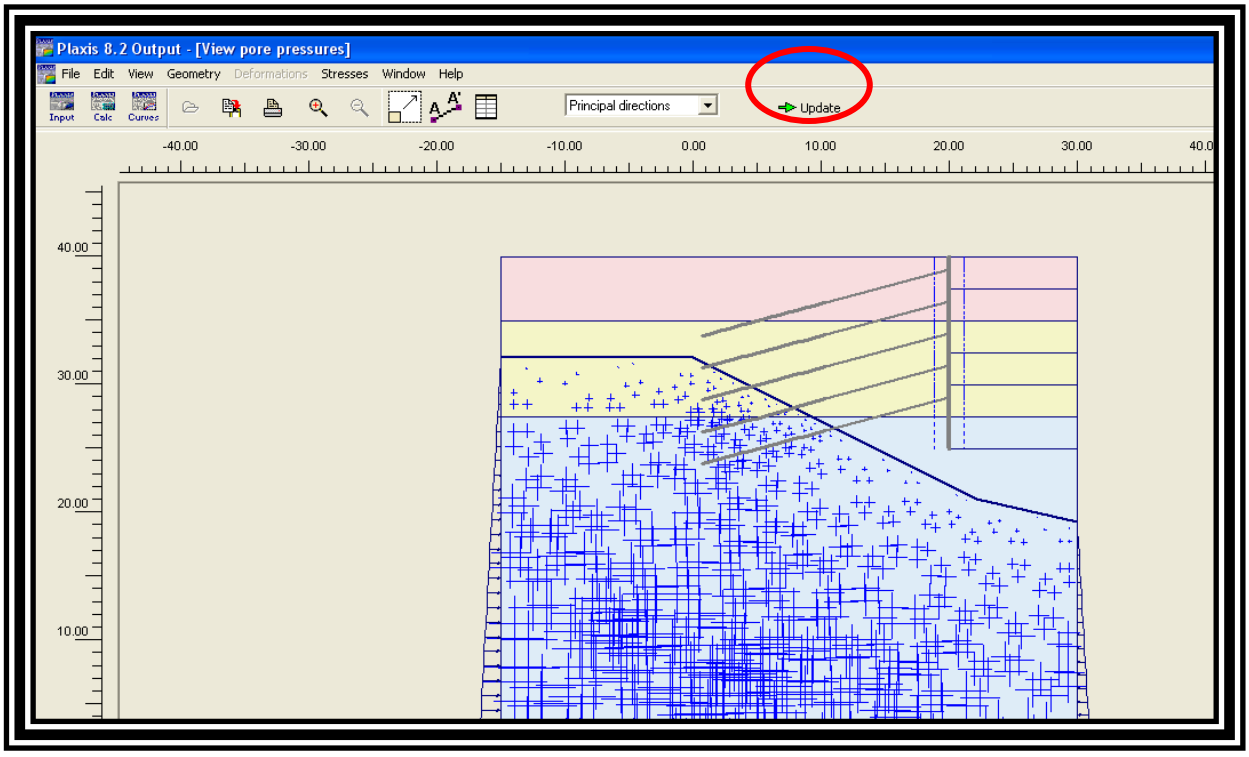


Dar click en Generate water pressures y generar el nivel freático.

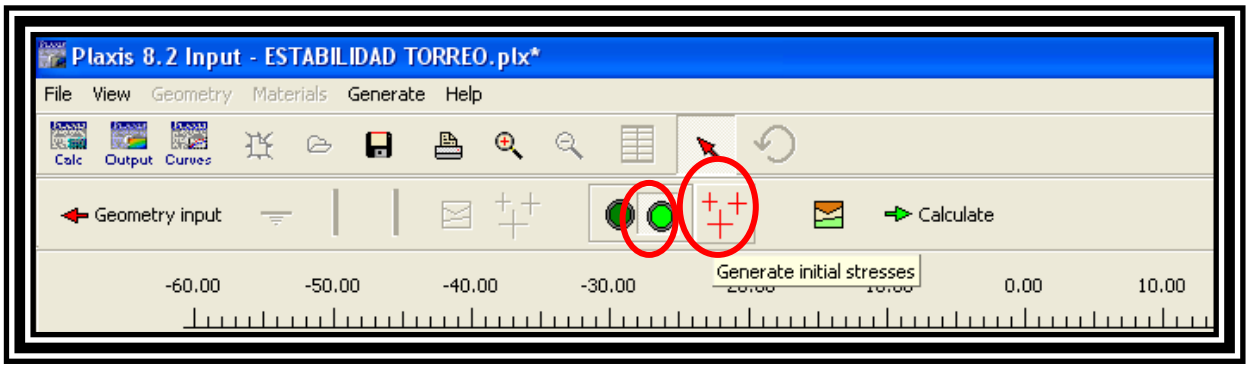


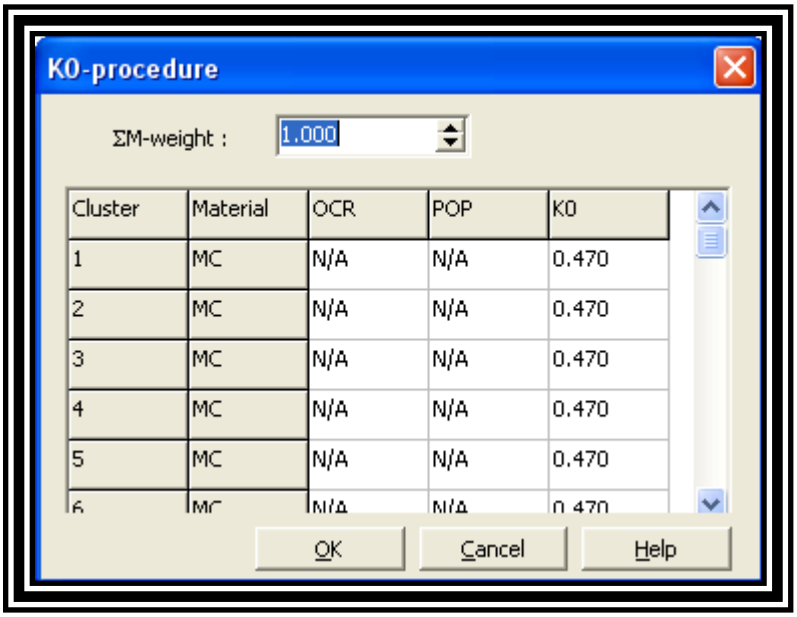


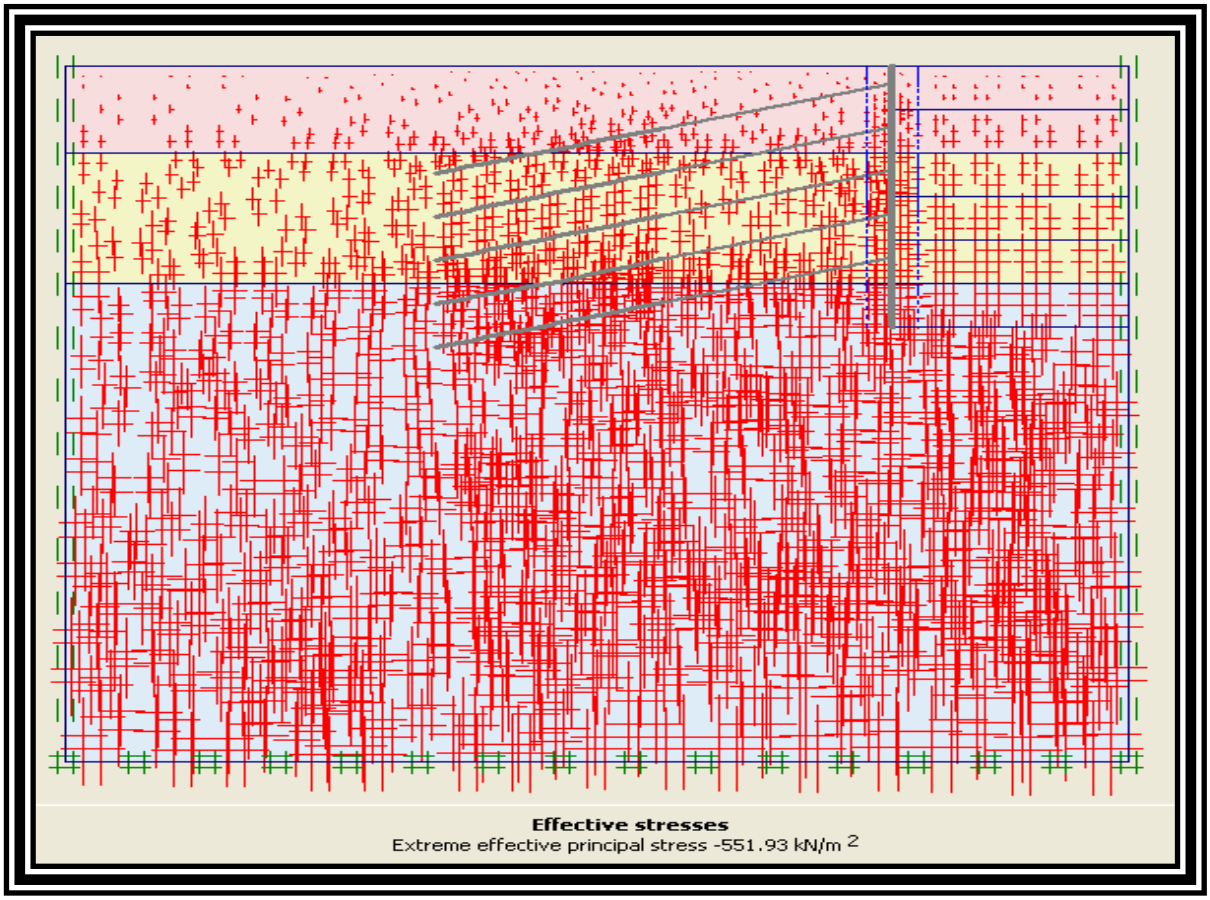

Active pore pressures
Extreme active pore pressure -320.51 kN/m 2
(pressure = negative)

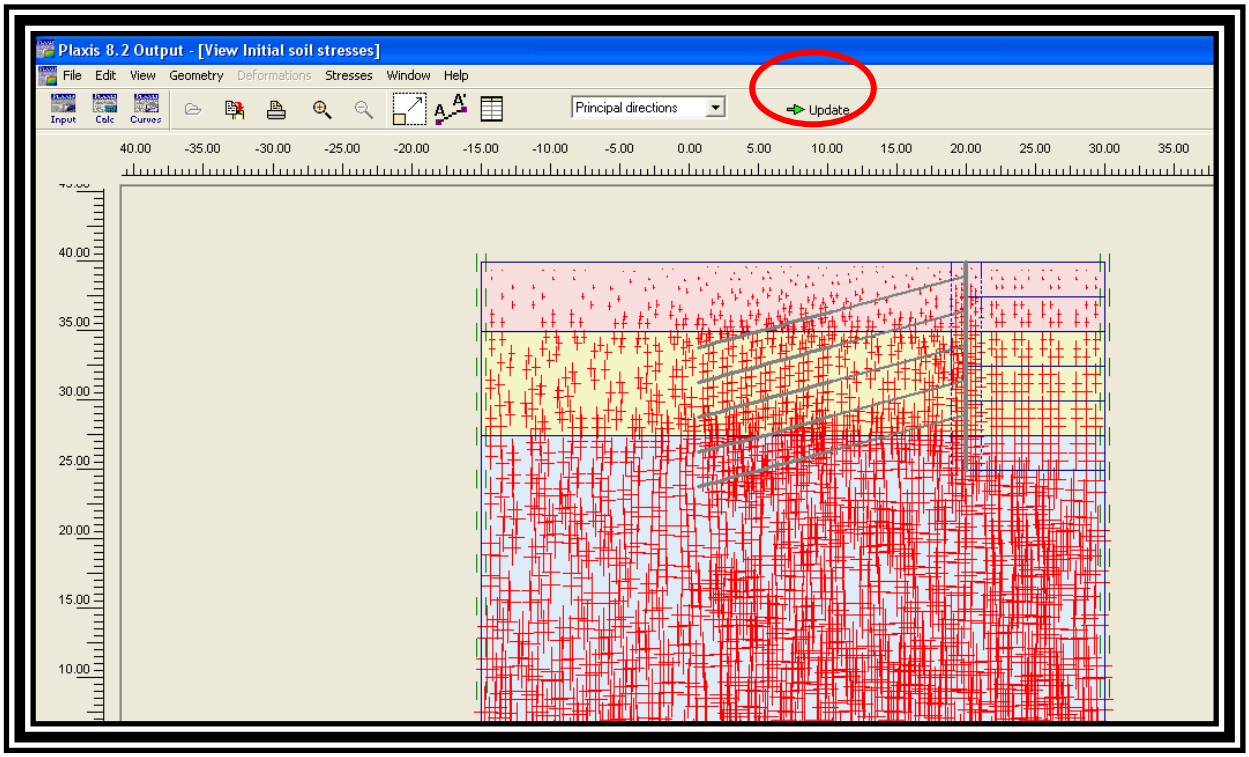


Hacer click en ***generate initial stresses*** para generar los esfuerzos efectivos iniciales.

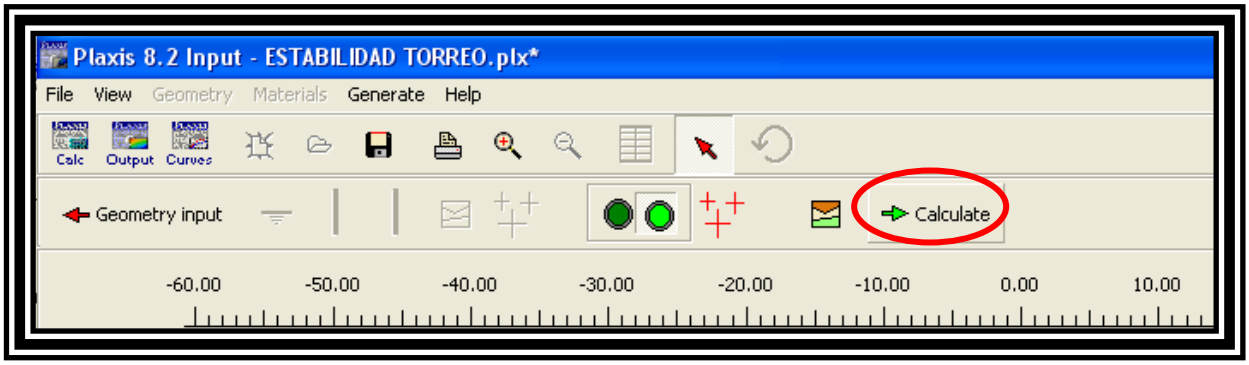


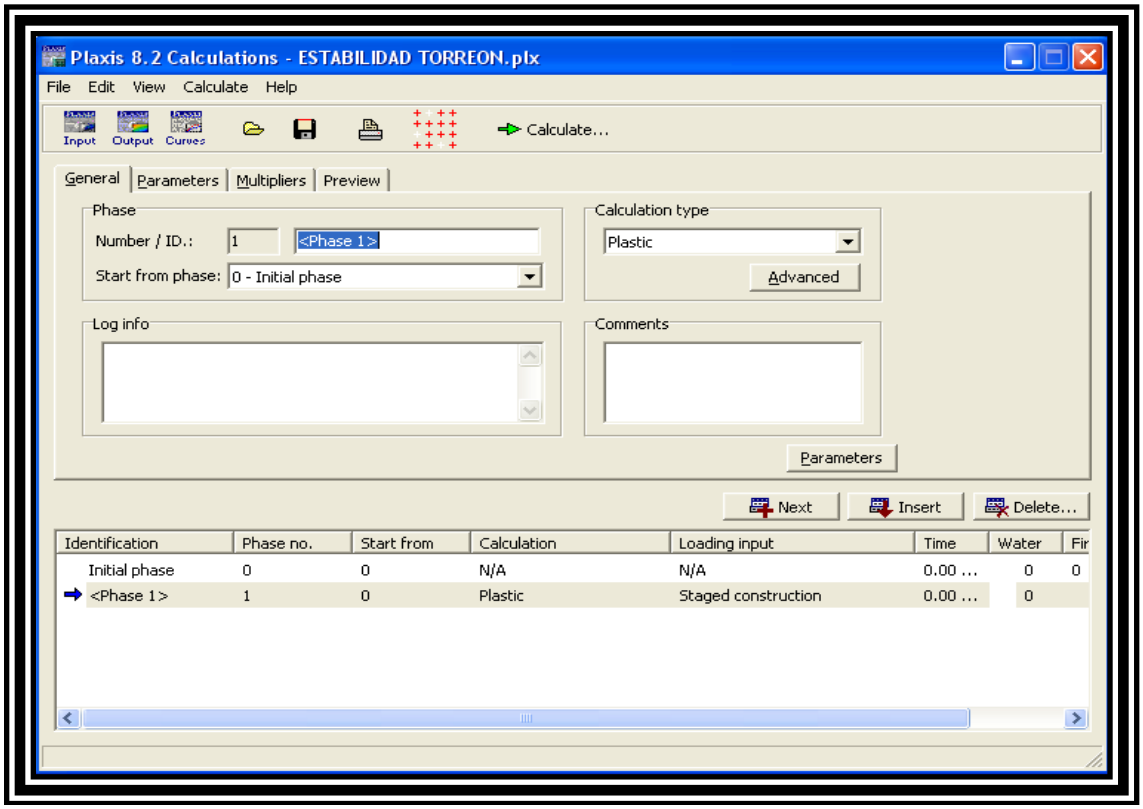

K0-procedure
ΣM-weight :
1.000
Cluster
Material
OCR
POP
K0
1
MC
N/A
N/A
0.470
2
MC
N/A
N/A
0.470
3
MC
N/A
N/A
0.470
4
MC
N/A
N/A
0.470
5
MC
N/A
N/A
0.470
OK
Cancel
Help

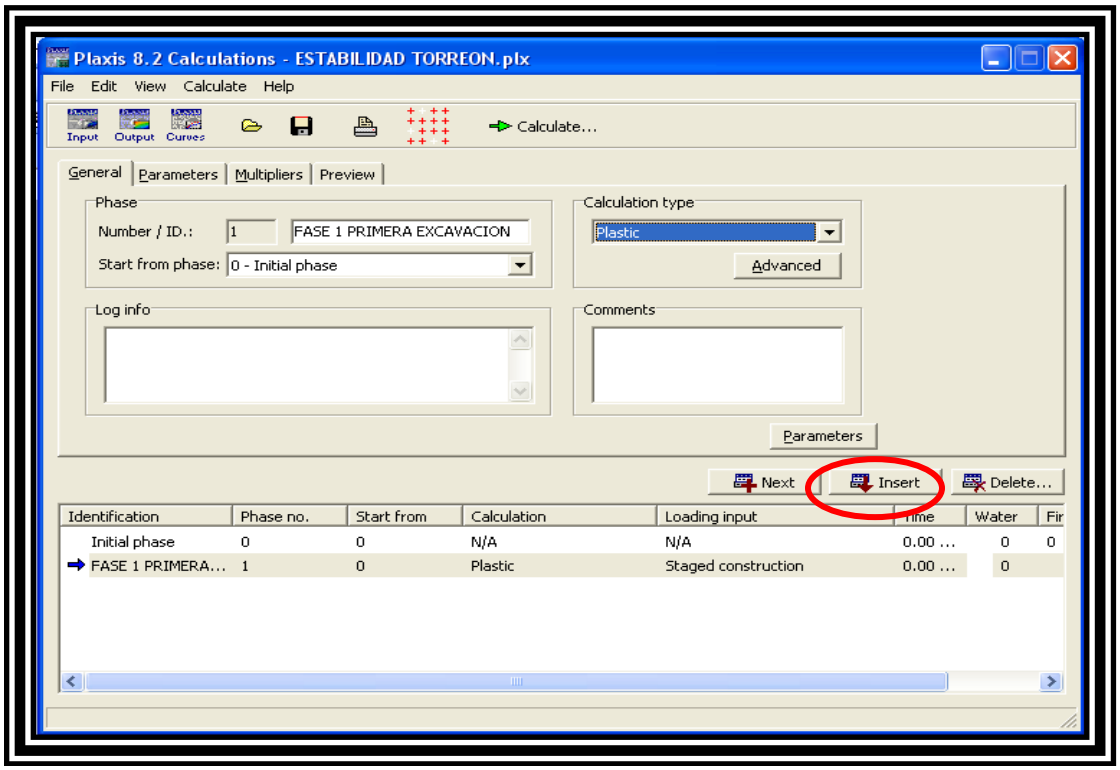

Effective stresses
Extreme effective principal stress -551.93 kN/m 2

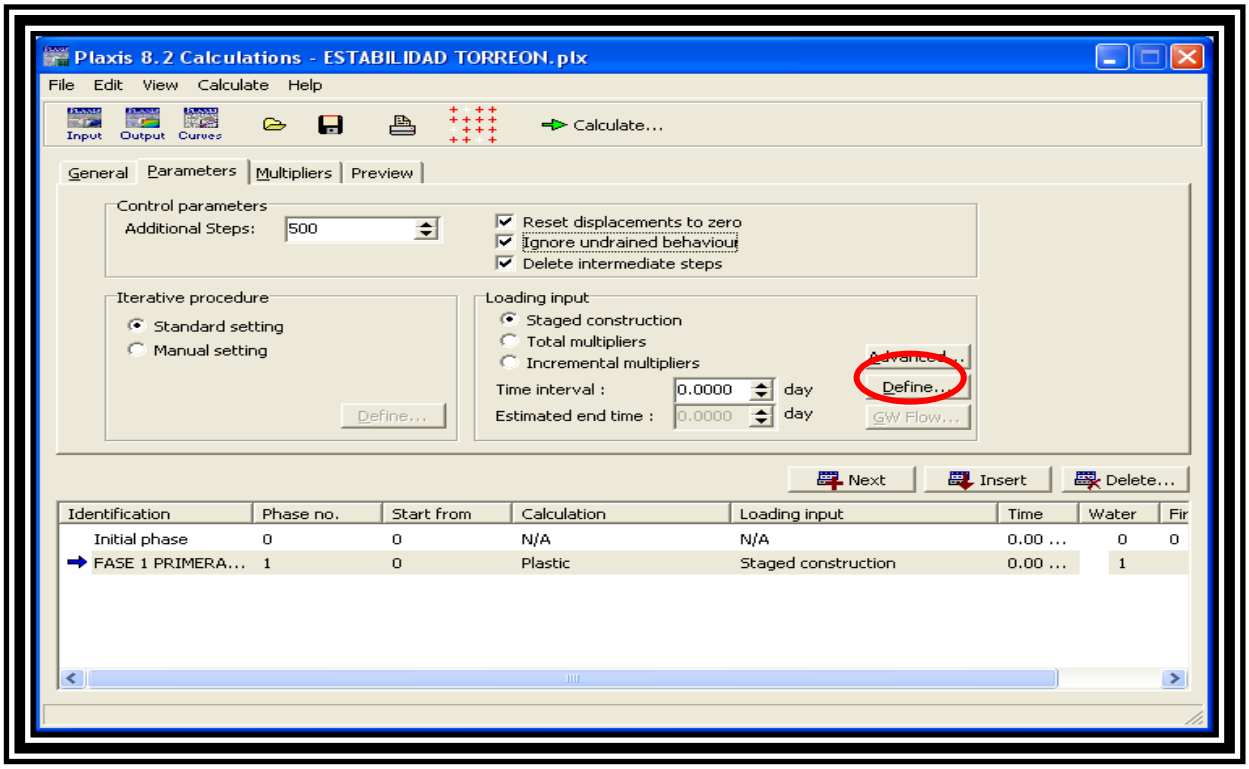


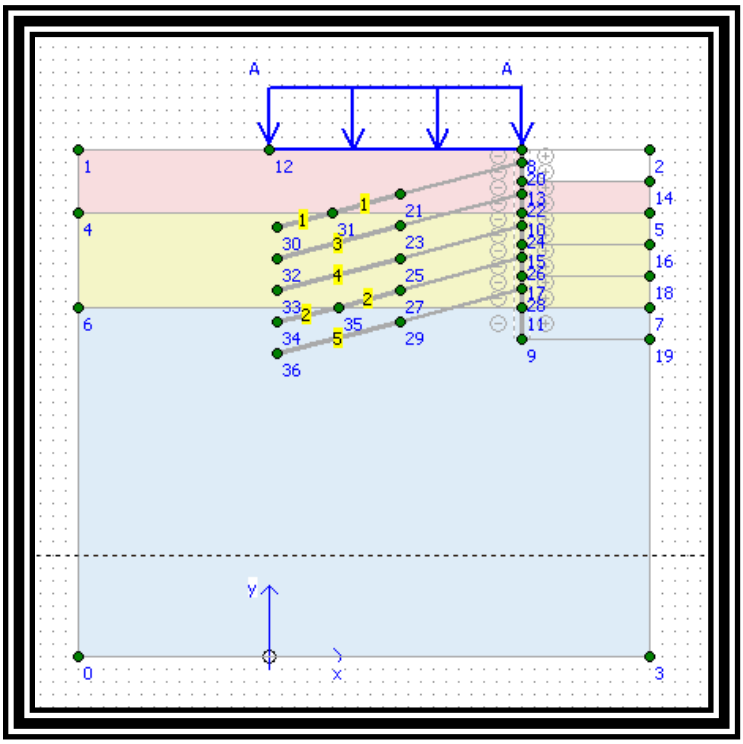
Haciendo click en ***calculate*** se procederá a realiza los cálculos y definir los elementos que van a estar activos en cada fase.

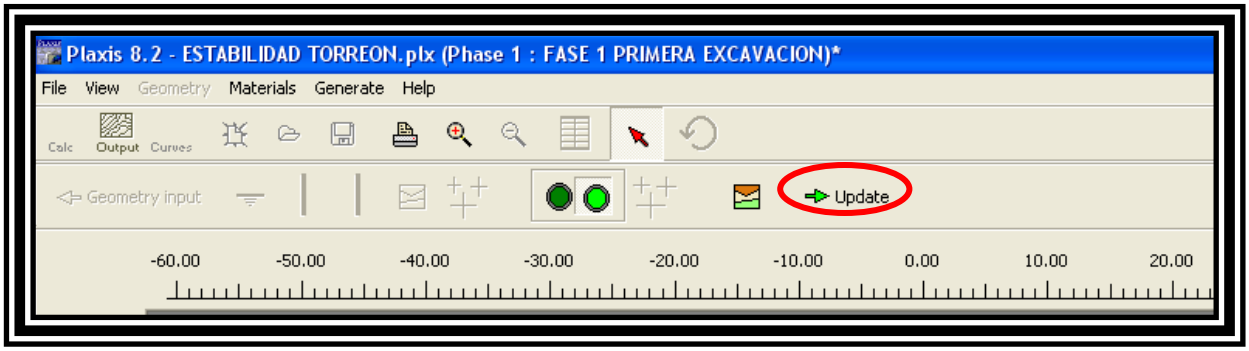


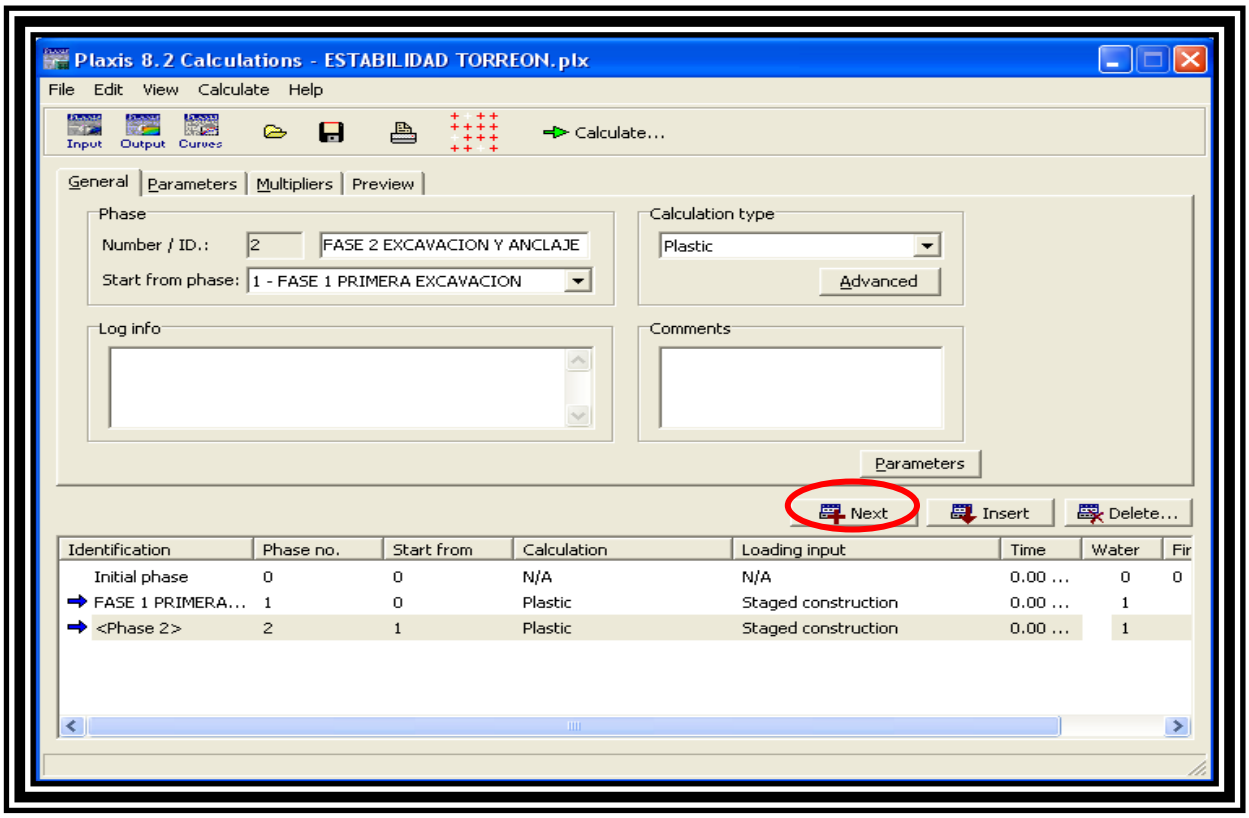

Plaxis 8.2 Calculations - ESTABILIDAD TORREON.plx
File Edit View Calculate Help
Input Output Curves
Calculate...
General Parameters Multipliers Preview
Phase
Number / ID.: 1 <Phase 1>
Start from phase: 0 - Initial phase
Calculation type
Plastic
Advanced
Log info
Comments
Parameters
Next Insert Delete...
Identification Phase no. Start from Calculation Loading input Time Water
Initial phase 0 0 N/A N/A 0.00 ... 0
<Phase 1> 1 0 Plastic Staged construction 0.00 ... 0

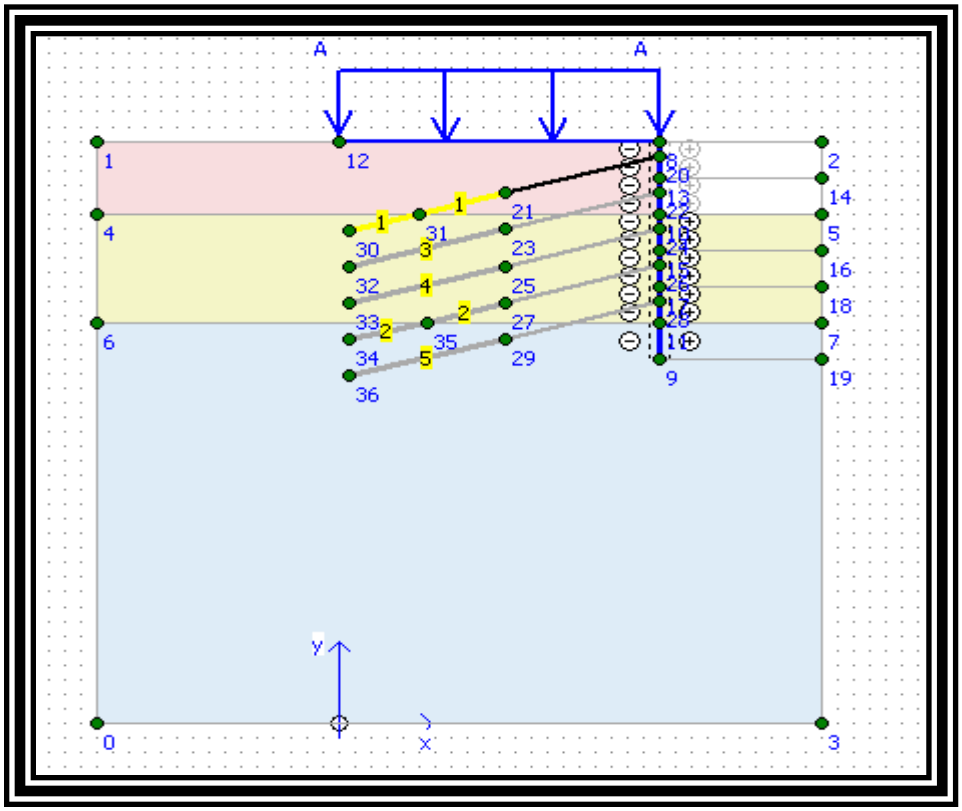

Plaxis 8.2 Calculations - ESTABILIDAD TORREON.plx
File Edit View Calculate Help
Input Output Curves
Calculate...
General Parameters Multipliers Preview
Phase
Number / ID.: 1 FASE 1 PRIMERA EXCAVACION
Start from phase: 0 - Initial phase
Calculation type
Plastic
Advanced
Log info
Comments
Parameters
Next Insert Delete...
Identification Phase no. Start from Calculation Loading input Time Water
Initial phase 0 0 N/A N/A 0.00 ... 0
FASE 1 PRIMERA... 1 0 Plastic Staged construction 0.00 ... 0

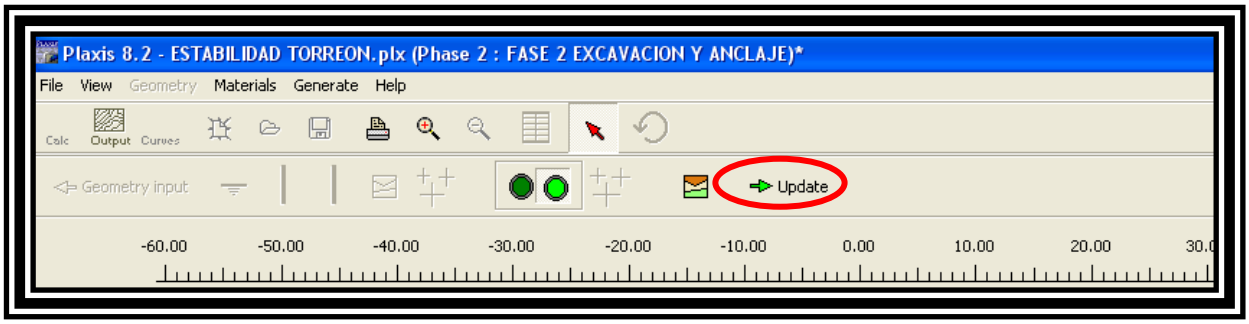

Plaxis 8.2 Calculations - ESTABILIDAD TORREON.plx
File Edit View Calculate Help
Input Output Curves
Calculate...
General Parameters Multipliers Preview
Control parameters
Additional Steps: 500
Reset displacements to zero
Ignore undrained behaviour
Delete intermediate steps
Iterative procedure
Standard setting
Manual setting
Define...
Loading input
Staged construction
Total multipliers
Incremental multipliers
Time interval : 0.0000 day
Estimated end time : 0.0000 day
Define...
GW Flow...
Next Insert Delete...
Identification Phase no. Start from Calculation Loading input Time Water
Initial phase 0 0 N/A N/A 0.00 ... 0 0
FASE 1 PRIMERA... 1 0 Plastic Staged construction 0.00 ... 1

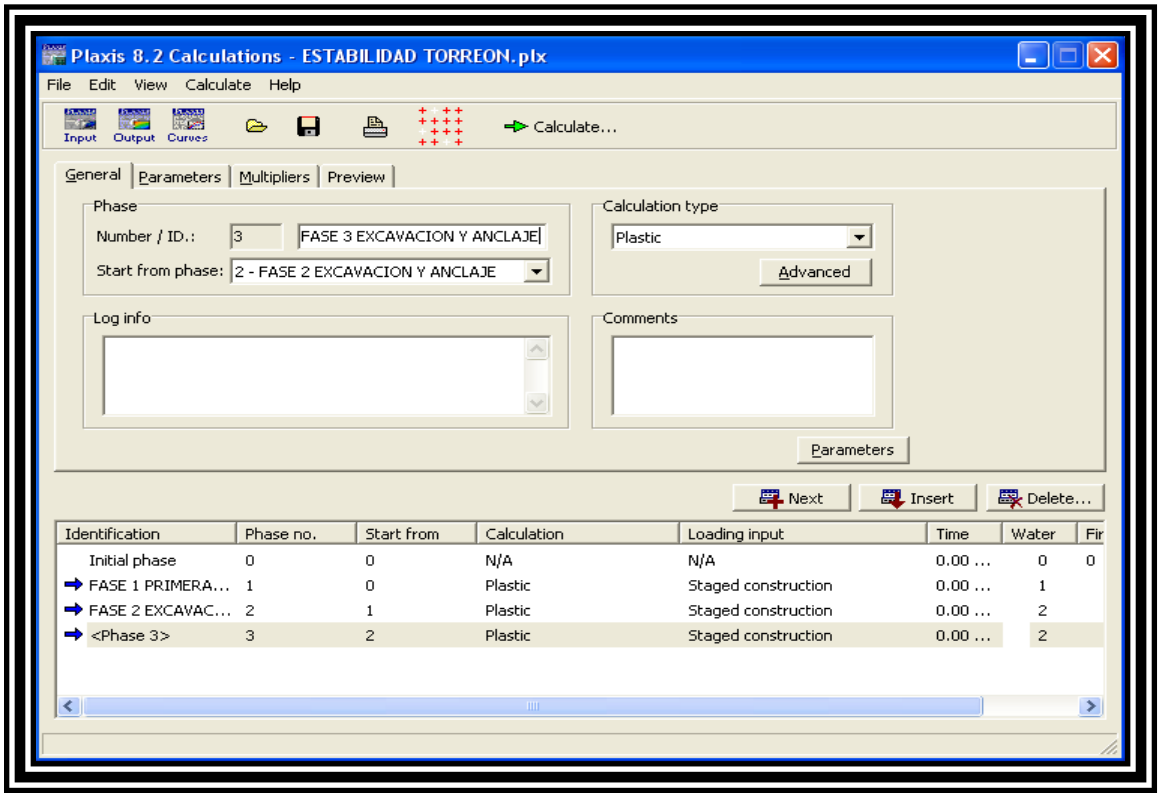

A
A
y
x

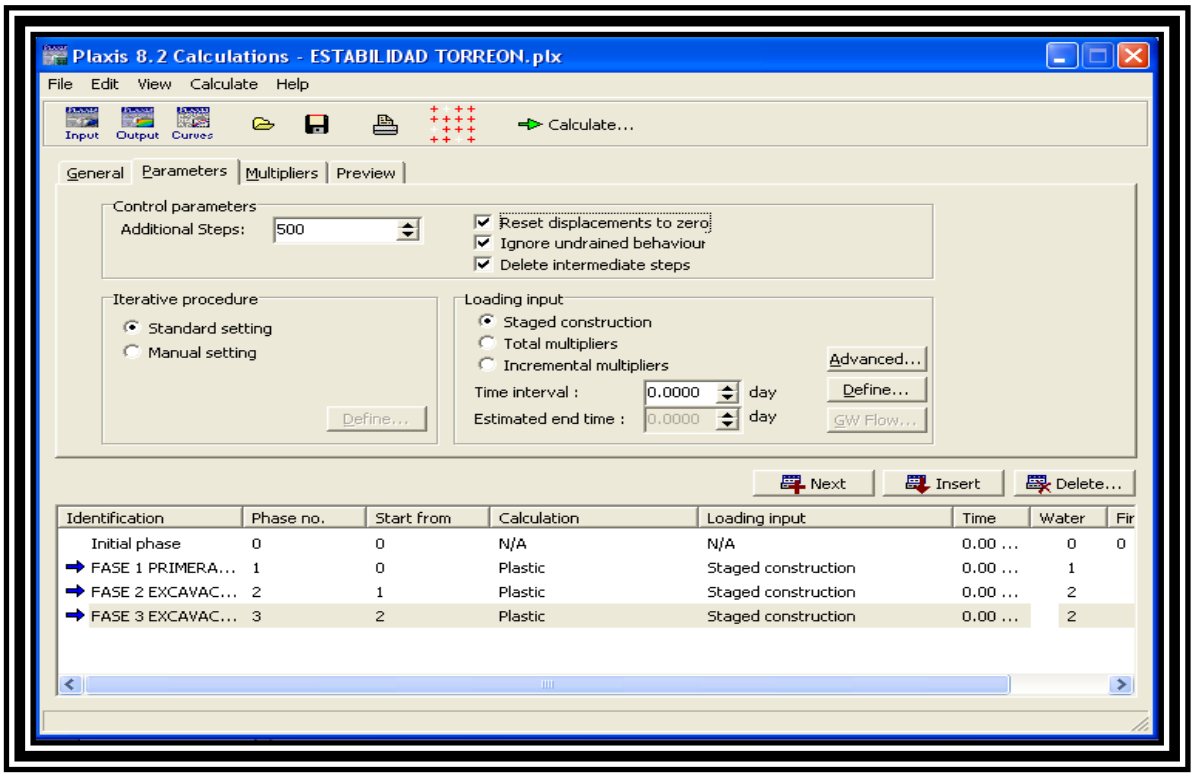

Plaxis 8.2 - ESTABILIDAD TORREON.plx (Phase 1 : FASE 1 PRIMERA EXCAVACION)*
File View Geometry Materials Generate Help
Calc Output Curves
Geometry input
Update
-60.00 -50.00 -40.00 -30.00 -20.00 -10.00 0.00 10.00 20.00

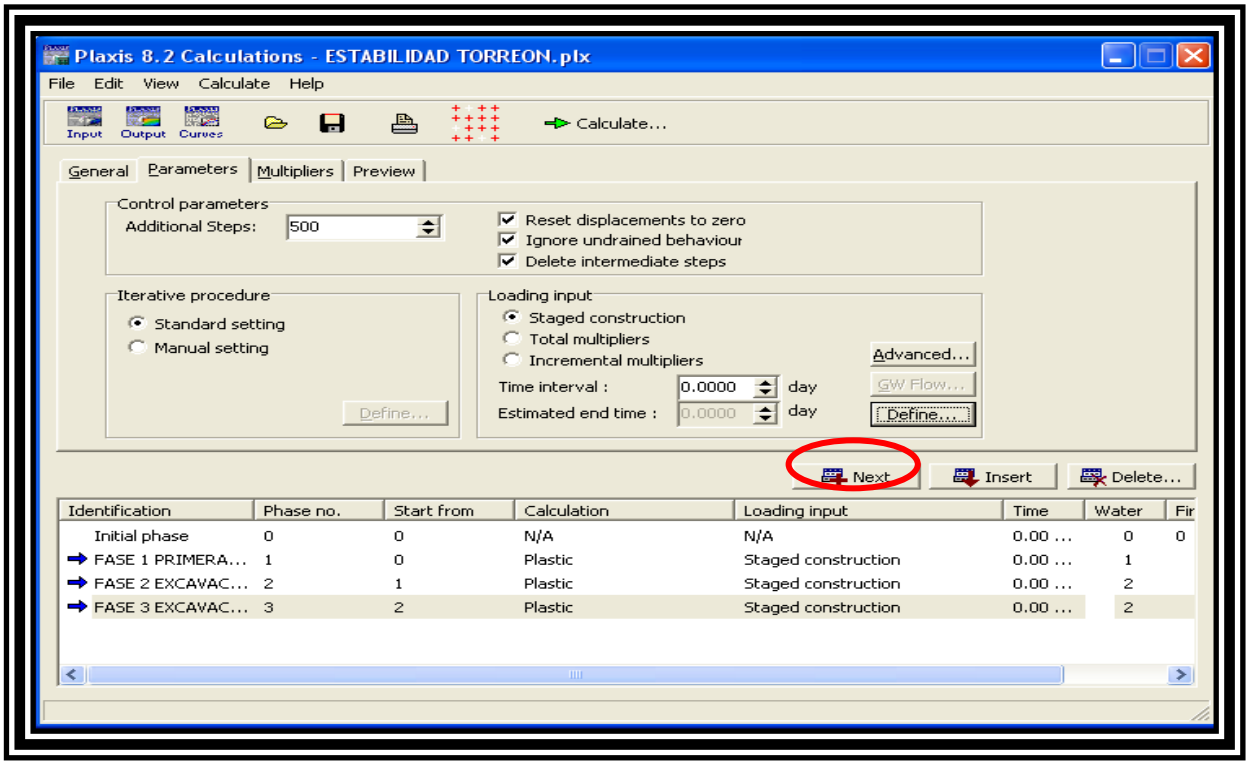

Plaxis 8.2 Calculations - ESTABILIDAD TORREON.plx
File Edit View Calculate Help
Input Output Curves
Calculate...
General Parameters Multipliers Preview
Phase
Number / ID.: 2 FASE 2 EXCAVACION Y ANCLAJE
Start from phase: 1 - FASE 1 PRIMERA EXCAVACION
Calculation type
Plastic
Advanced
Log info
Comments
Parameters
Next Insert Delete...
Identification Phase no. Start from Calculation Loading input Time Water Fir
Initial phase 0 0 N/A N/A 0.00 ... 0 0
FASE 1 PRIMERA... 1 0 Plastic Staged construction 0.00 ... 1
<Phase 2> 2 1 Plastic Staged construction 0.00 ... 1

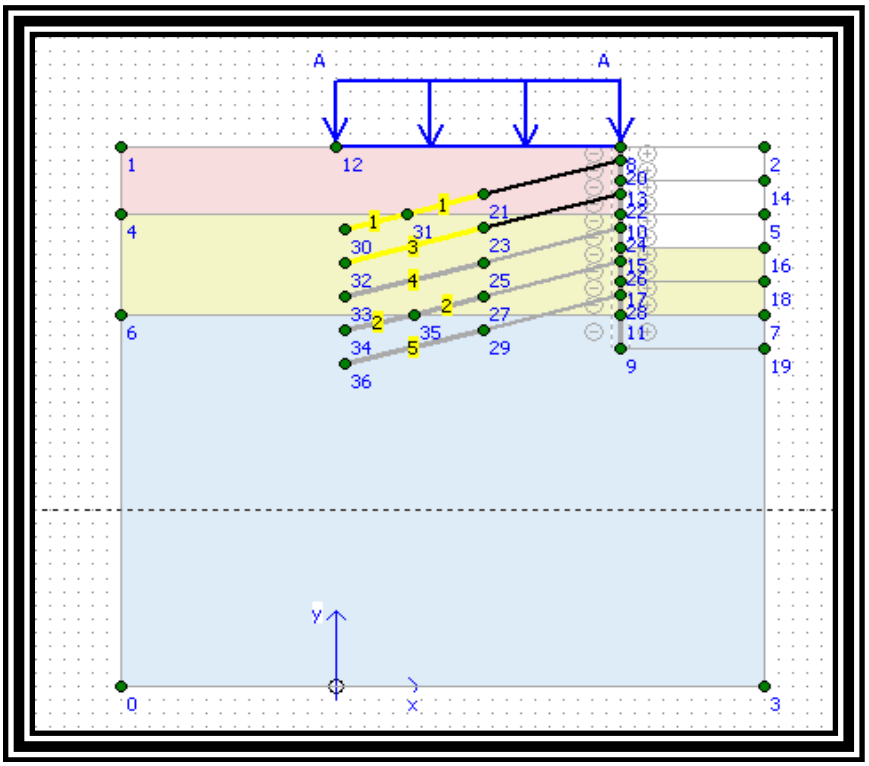

A
A
1
12
2
14
4
5
16
18
6
7
19
9
0
3
y
x


Plaxis 8.2 - ESTABILIDAD TORREON.plx (Phase 2 : FASE 2 EXCAVACION Y ANCLAJE)*
File View Geometry Materials Generate Help
Calc Output Curves
Geometry input
Update
-60.00 -50.00 -40.00 -30.00 -20.00 -10.00 0.00 10.00 20.00

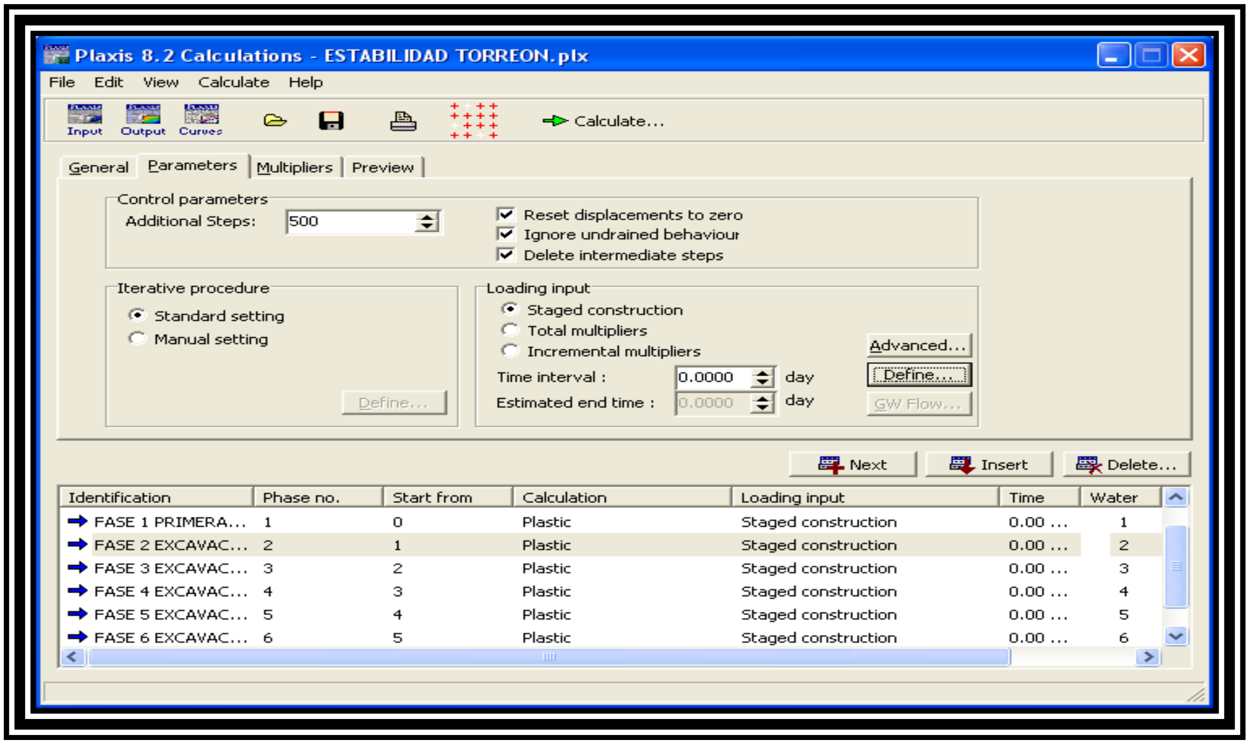

Plaxis 8.2 Calculations - ESTABILIDAD TORREON.plx
File Edit View Calculate Help
Input Output Curves
Calculate...
General Parameters Multipliers Preview
Phase
Number / ID.: 3 FASE 3 EXCAVACION Y ANCLAJE
Start from phase: 2 - FASE 2 EXCAVACION Y ANCLAJE
Calculation type
Plastic
Advanced
Log info
Comments
Parameters
Next Insert Delete...
Identification Phase no. Start from Calculation Loading input Time Water Fir
Initial phase 0 0 N/A N/A 0.00 ... 0 0
FASE 1 PRIMERA... 1 0 Plastic Staged construction 0.00 ... 1
FASE 2 EXCAVAC... 2 1 Plastic Staged construction 0.00 ... 2
<Phase 3> 3 2 Plastic Staged construction 0.00 ... 2

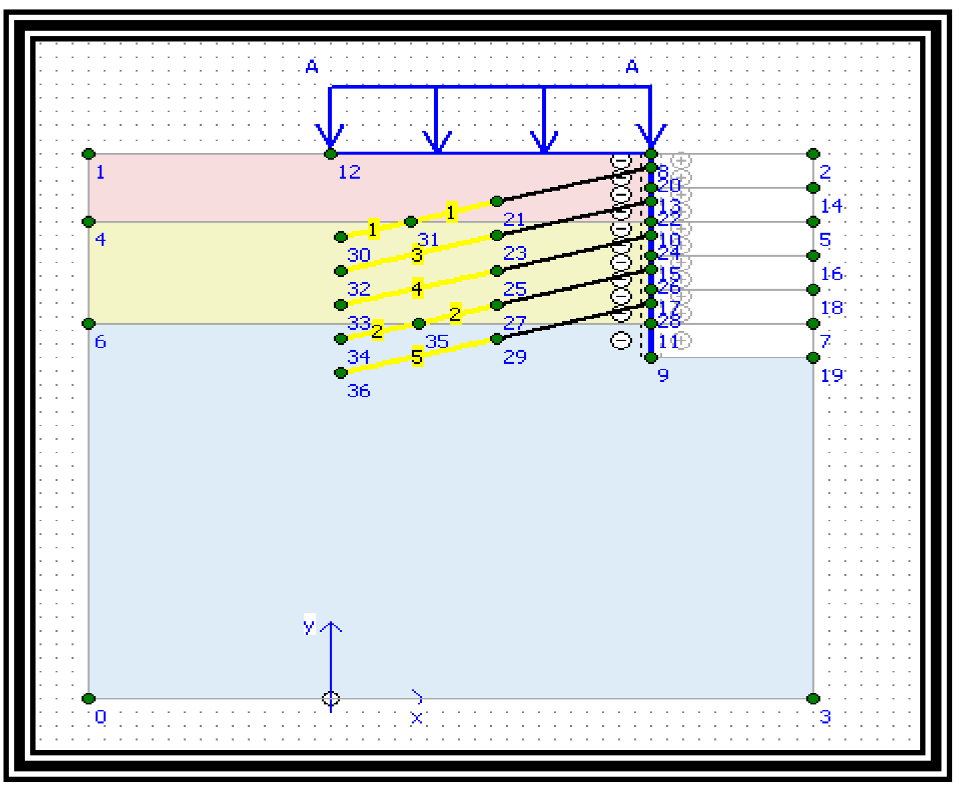

Plaxis 8.2 Calculations - ESTABILIDAD TORREON.plx
File Edit View Calculate Help
Input Output Curves
Calculate...
General Parameters Multipliers Preview
Control parameters
Additional Steps: 500
Reset displacements to zero
Ignore undrained behaviour
Delete intermediate steps
Iterative procedure
Standard setting
Manual setting
Define...
Loading input
Staged construction
Total multipliers
Incremental multipliers
Advanced...
Time interval : 0.0000 day
Define...
Estimated end time : 0.0000 day
GW Flow...
Next Insert Delete...
Identification Phase no. Start from Calculation Loading input Time Water Fir
Initial phase 0 0 N/A N/A 0.00 ... 0 0
FASE 1 PRIMERA... 1 0 Plastic Staged construction 0.00 ... 1
FASE 2 EXCAVAC... 2 1 Plastic Staged construction 0.00 ... 2
FASE 3 EXCAVAC... 3 2 Plastic Staged construction 0.00 ... 2



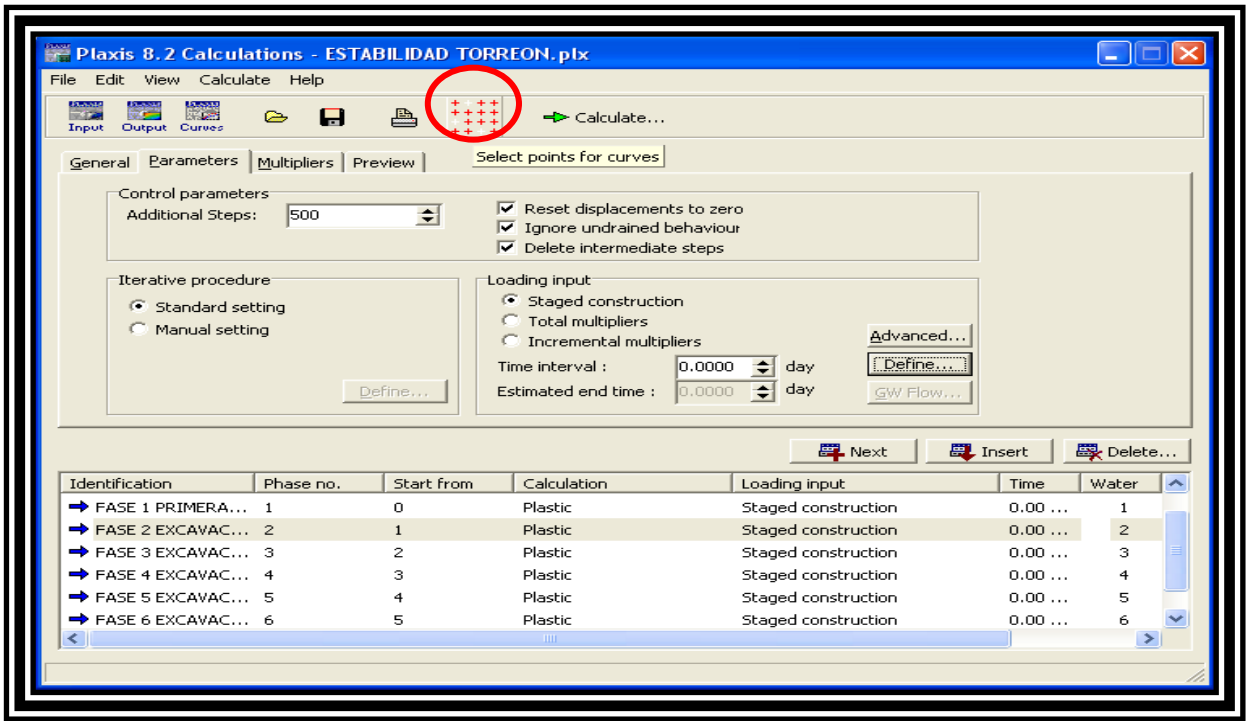


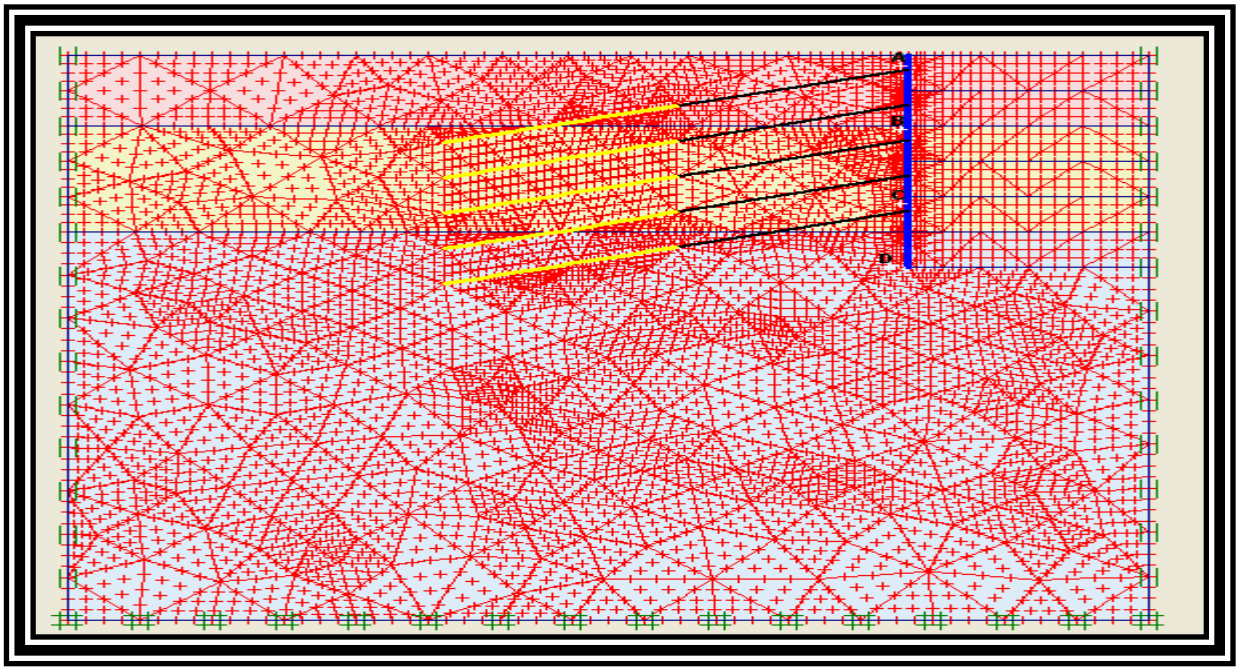
Se continúa con el mismo procedimiento, hasta completar cada fase.

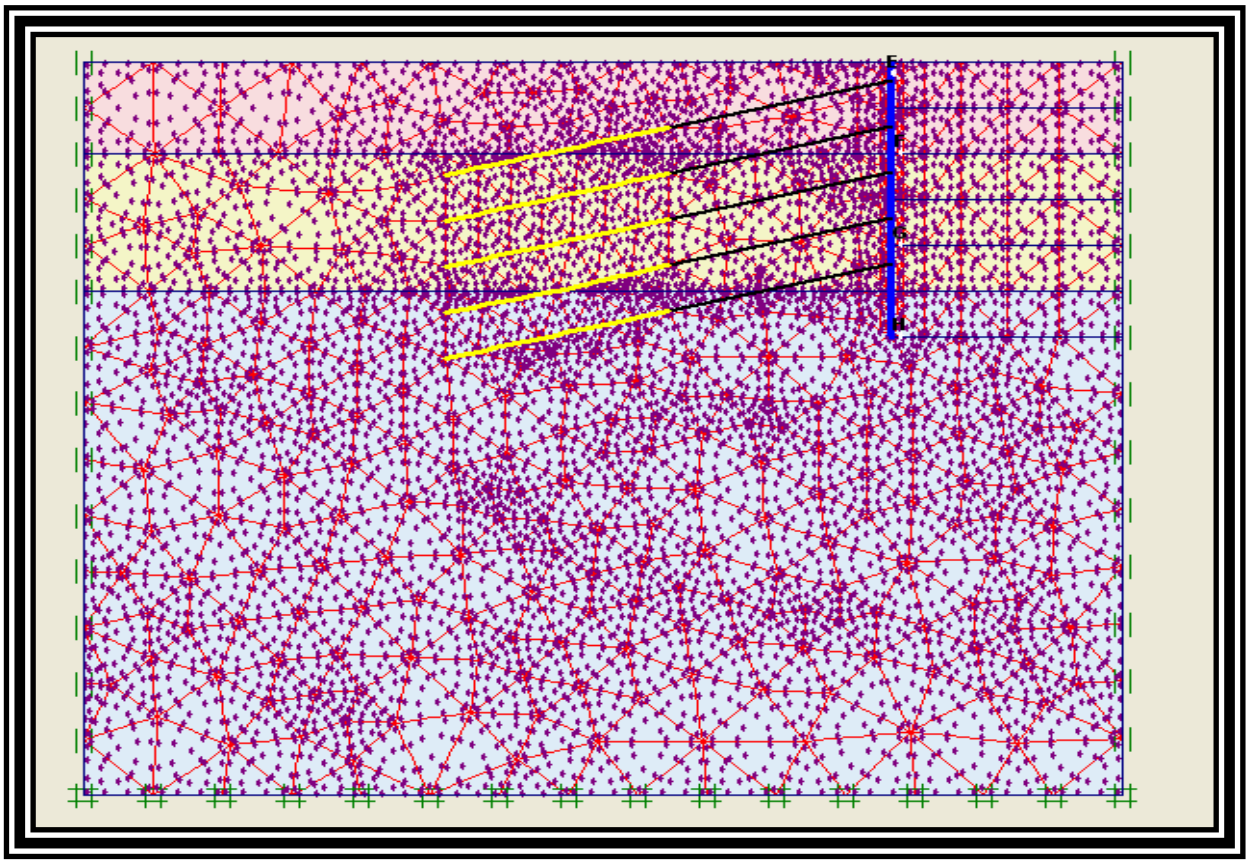

Plaxis 8.2 Calculations - ESTABILIDAD TORREON.plx
File Edit View Calculate Help
Input Output Curves
Calculate...
General Parameters Multipliers Preview
Control parameters
Additional Steps: 500
Reset displacements to zero
Ignore undrained behaviour
Delete intermediate steps
Iterative procedure
Standard setting
Manual setting
Define...
Loading input
Staged construction
Total multipliers
Incremental multipliers
Advanced...
Time interval : 0.0000 day
Define...
Estimated end time : 0.0000 day
GW Flow...
Next Insert Delete...
Identification Phase no. Start from Calculation Loading input Time Water
FASE 1 PRIMERA... 1 0 Plastic Staged construction 0.00 ... 1
FASE 2 EXCAVAC... 2 1 Plastic Staged construction 0.00 ... 2
FASE 3 EXCAVAC... 3 2 Plastic Staged construction 0.00 ... 3
FASE 4 EXCAVAC... 4 3 Plastic Staged construction 0.00 ... 4
FASE 5 EXCAVAC... 5 4 Plastic Staged construction 0.00 ... 5
FASE 6 EXCAVAC... 6 5 Plastic Staged construction 0.00 ... 6

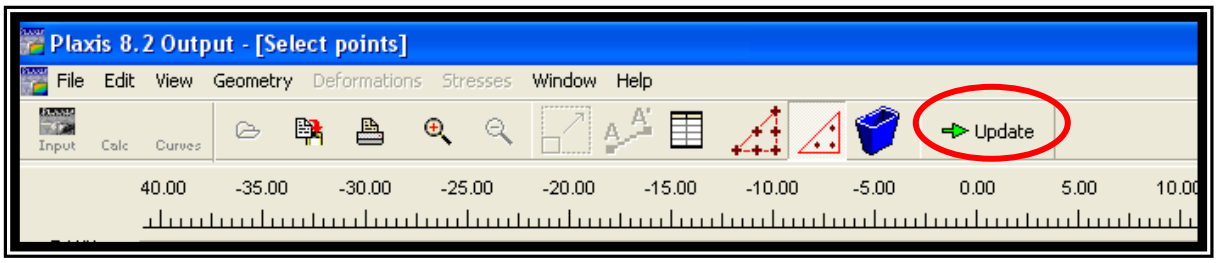

A
A
y
x

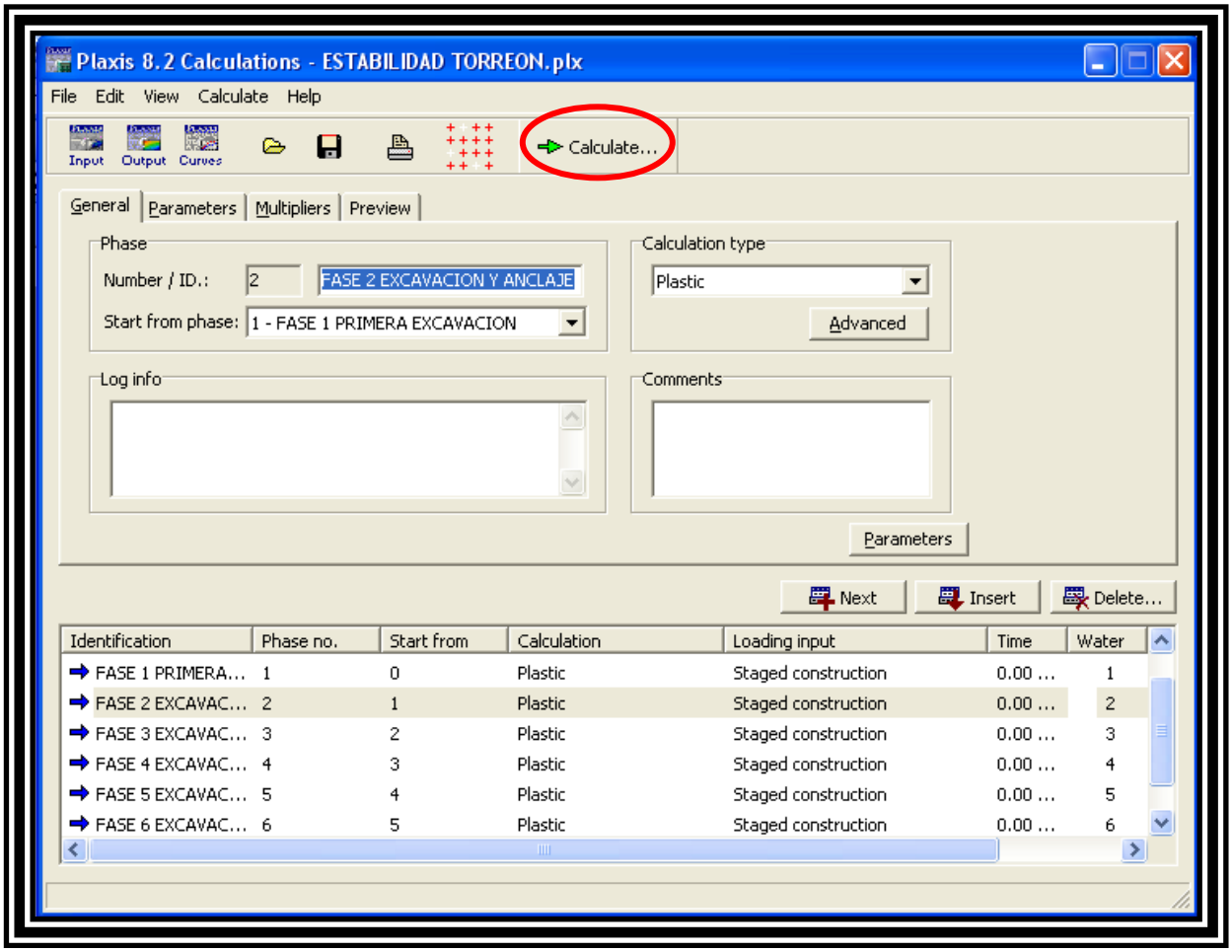
Se selecciona el icono **Select Point for curves** y ubicar los puntos donde se realizaran los análisis

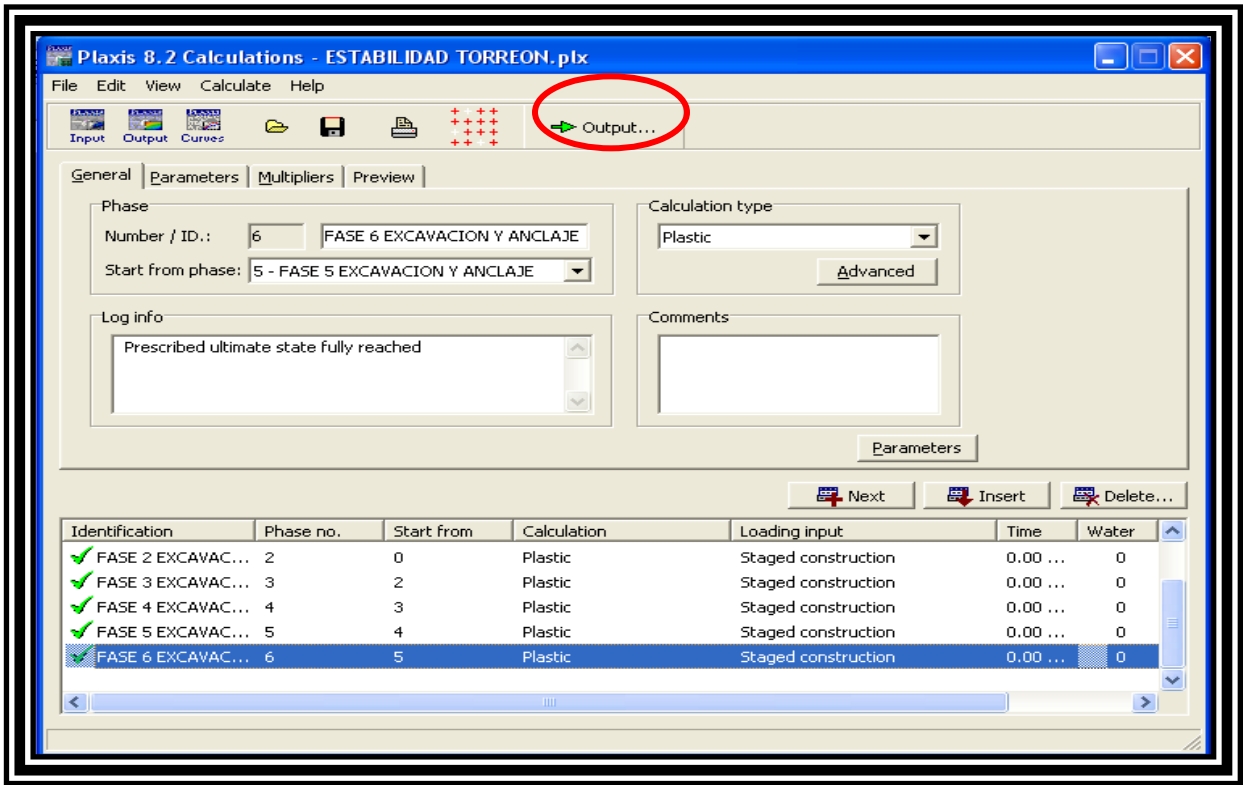


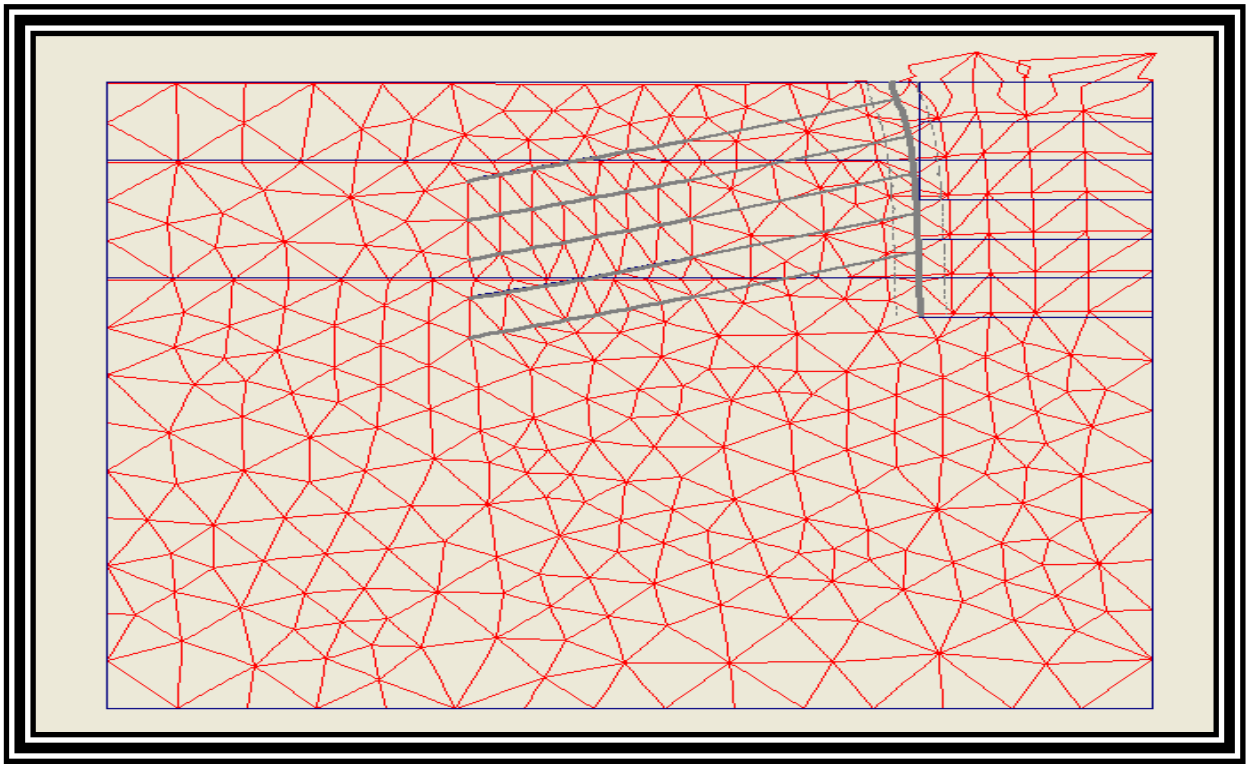


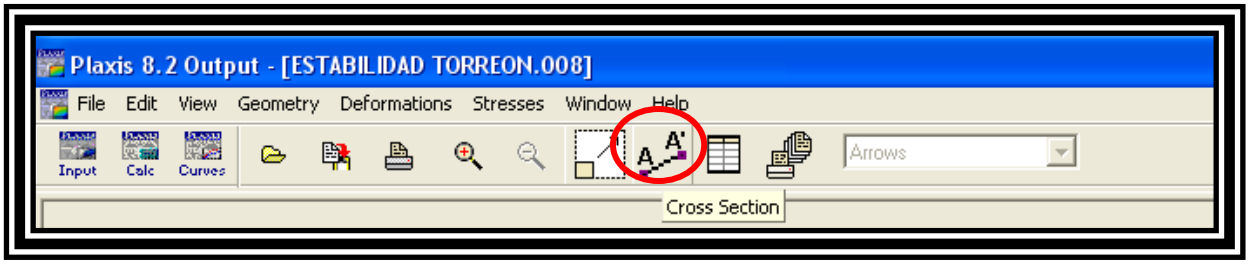


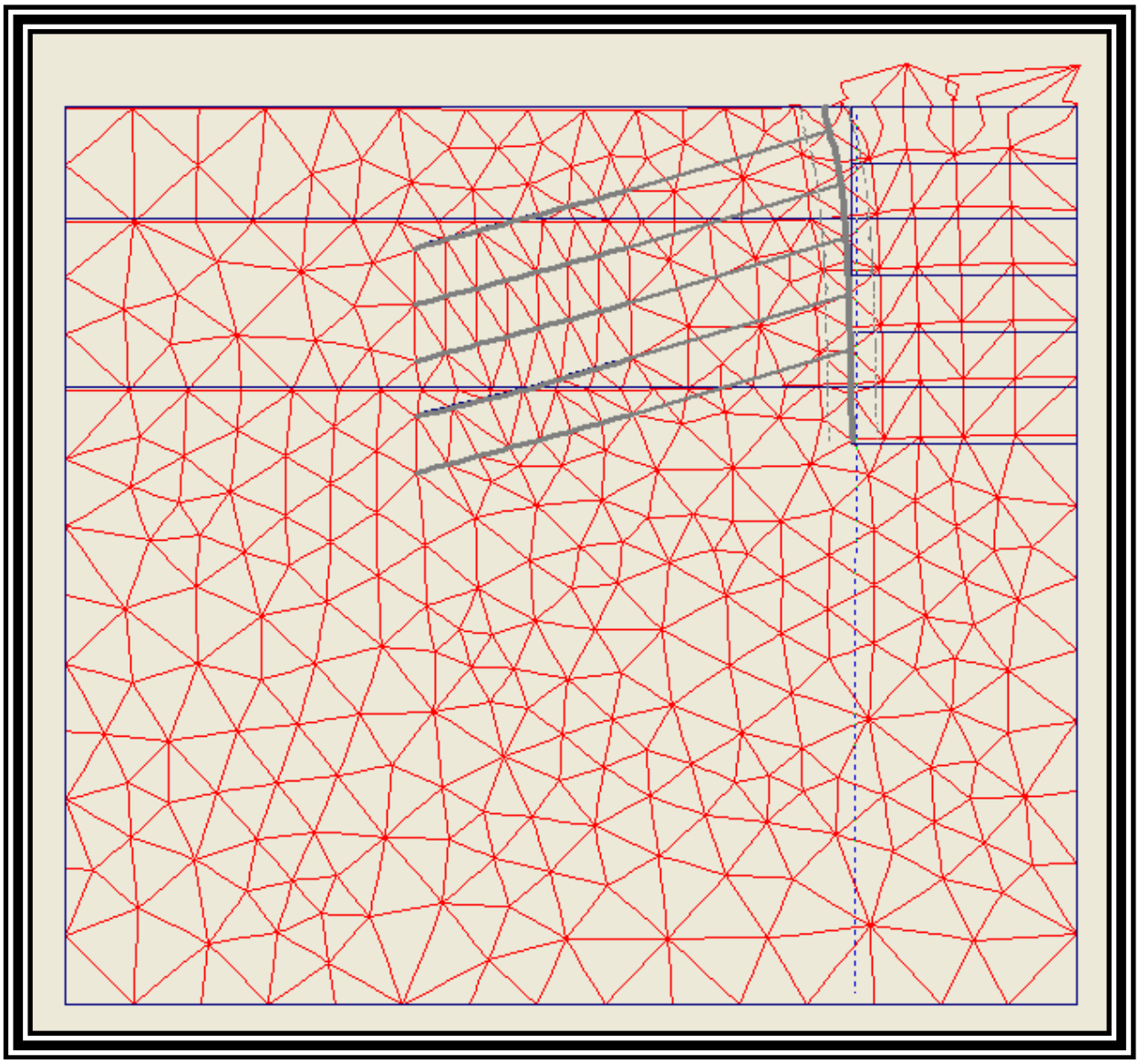

Plaxis 8.2 Output - [Select points]
File
Edit
View
Geometry
Deformations
Stresses
Window
Help
Input
Calc
Curves
Update
40.00
-35.00
-30.00
-25.00
-20.00
-15.00
-10.00
-5.00
0.00
5.00


Plaxis 8.2 Calculations - ESTABILIDAD TORREON.plx
File Edit View Calculate Help
Input Output Curves
Calculate...
General Parameters Multipliers Preview
Phase
Number / ID.: 2 FASE 2 EXCAVACION Y ANCLAJE
Start from phase: 1 - FASE 1 PRIMERA EXCAVACION
Calculation type
Plastic
Advanced
Log info
Comments
Parameters
Next Insert Delete...
Identification Phase no. Start from Calculation Loading input Time Water
FASE 1 PRIMERA... 1 0 Plastic Staged construction 0.00 ... 1
FASE 2 EXCAVAC... 2 1 Plastic Staged construction 0.00 ... 2
FASE 3 EXCAVAC... 3 2 Plastic Staged construction 0.00 ... 3
FASE 4 EXCAVAC... 4 3 Plastic Staged construction 0.00 ... 4
FASE 5 EXCAVAC... 5 4 Plastic Staged construction 0.00 ... 5
FASE 6 EXCAVAC... 6 5 Plastic Staged construction 0.00 ... 6

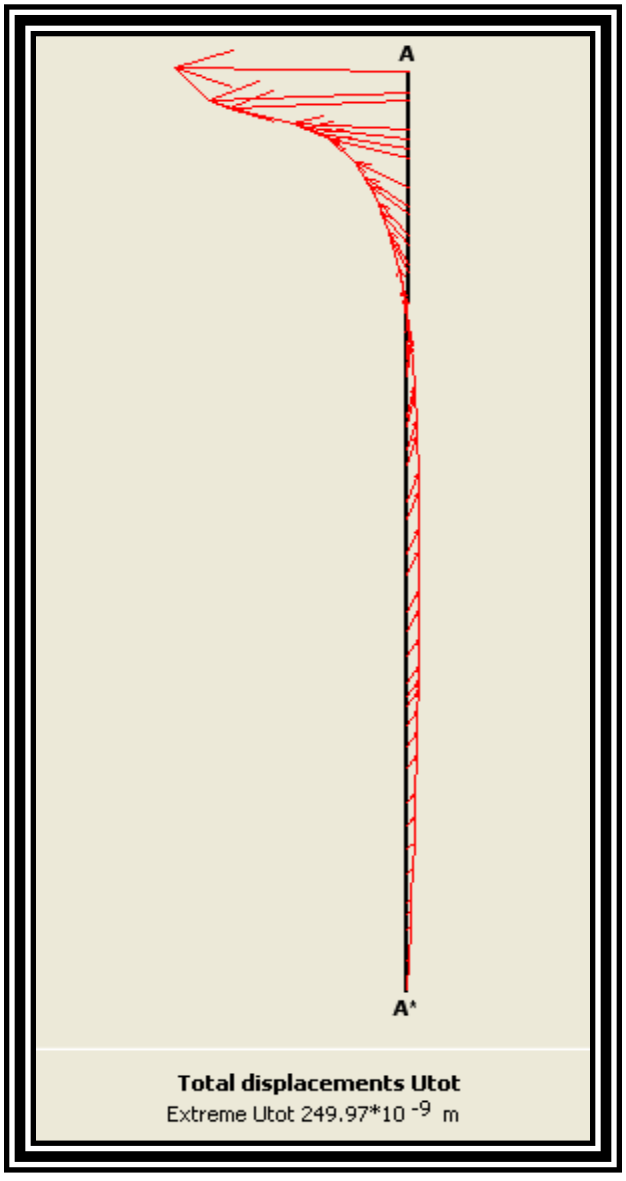

Plaxis 8.2 Calculations - ESTABILIDAD TORREON.plx
File Edit View Calculate Help
Input Output Curves
Output...
General Parameters Multipliers Preview
Phase
Number / ID.: 6 FASE 6 EXCAVACION Y ANCLAJE
Start from phase: 5 - FASE 5 EXCAVACION Y ANCLAJE
Calculation type
Plastic
Advanced
Log info
Prescribed ultimate state fully reached
Comments
Parameters
Next Insert Delete...
Identification Phase no. Start from Calculation Loading input Time Water
FASE 2 EXCAVAC... 2 0 Plastic Staged construction 0.00 ... 0
FASE 3 EXCAVAC... 3 2 Plastic Staged construction 0.00 ... 0
FASE 4 EXCAVAC... 4 3 Plastic Staged construction 0.00 ... 0
FASE 5 EXCAVAC... 5 4 Plastic Staged construction 0.00 ... 0
FASE 6 EXCAVAC... 6 5 Plastic Staged construction 0.00 ... 0



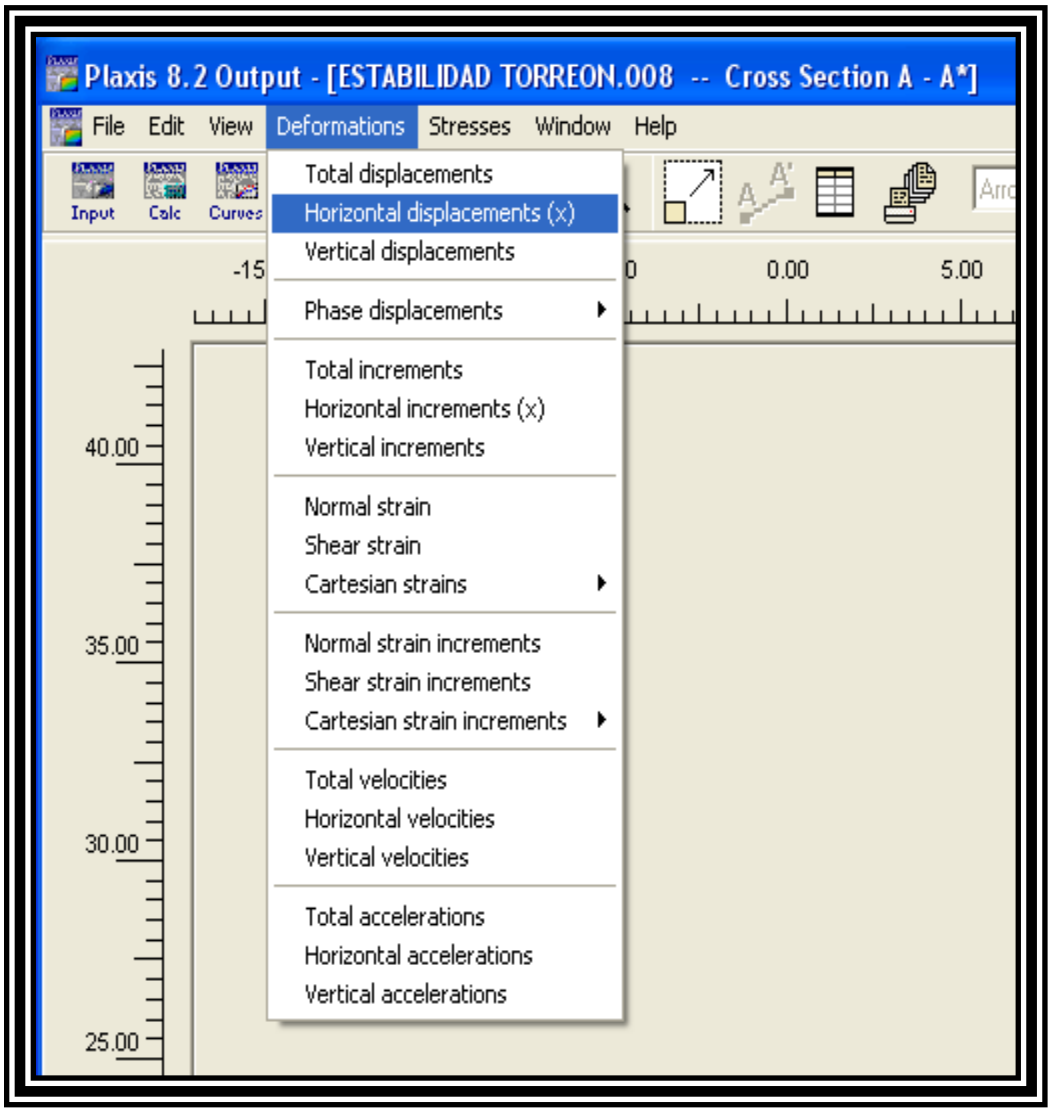

Plaxis 8.2 Output - [ESTABILIDAD TORREON.008]
File Edit View Geometry Deformations Stresses Window Help
Input Calc Curves
A A'
Arrows
Cross Section



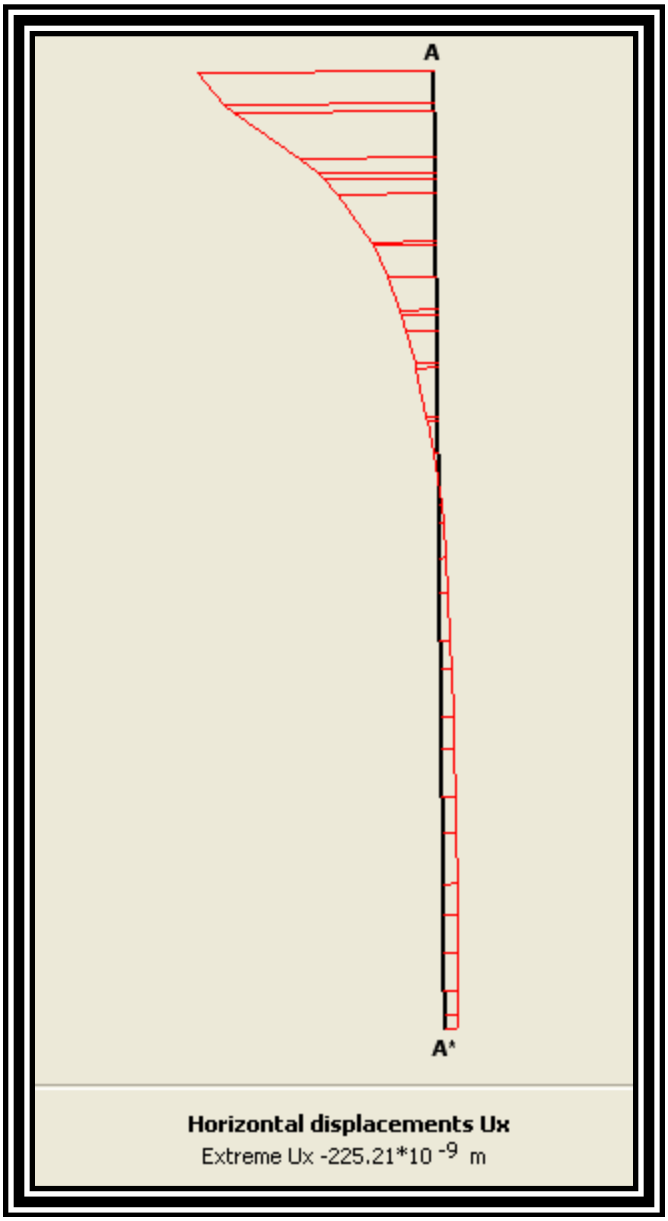
Gráfica de desplazamientos Totales



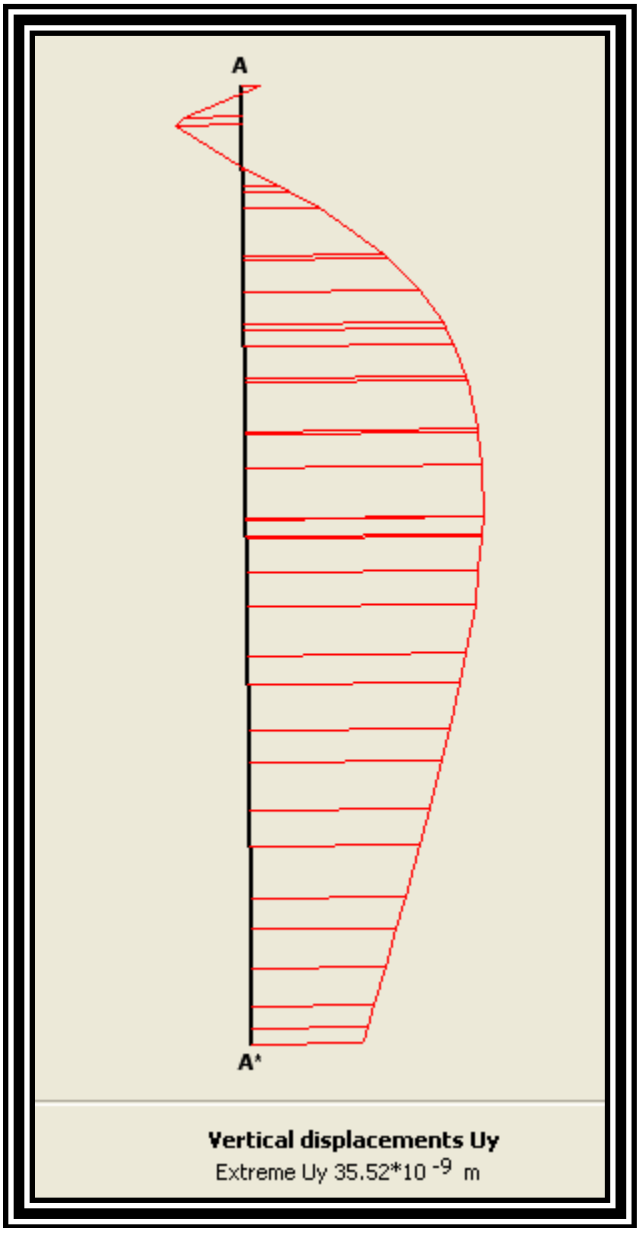
Haciendo click en ***Deformations – Horizontal displacements*** se muestra la grafica generada por el programa sobre los desplazamientos horizontales generados.



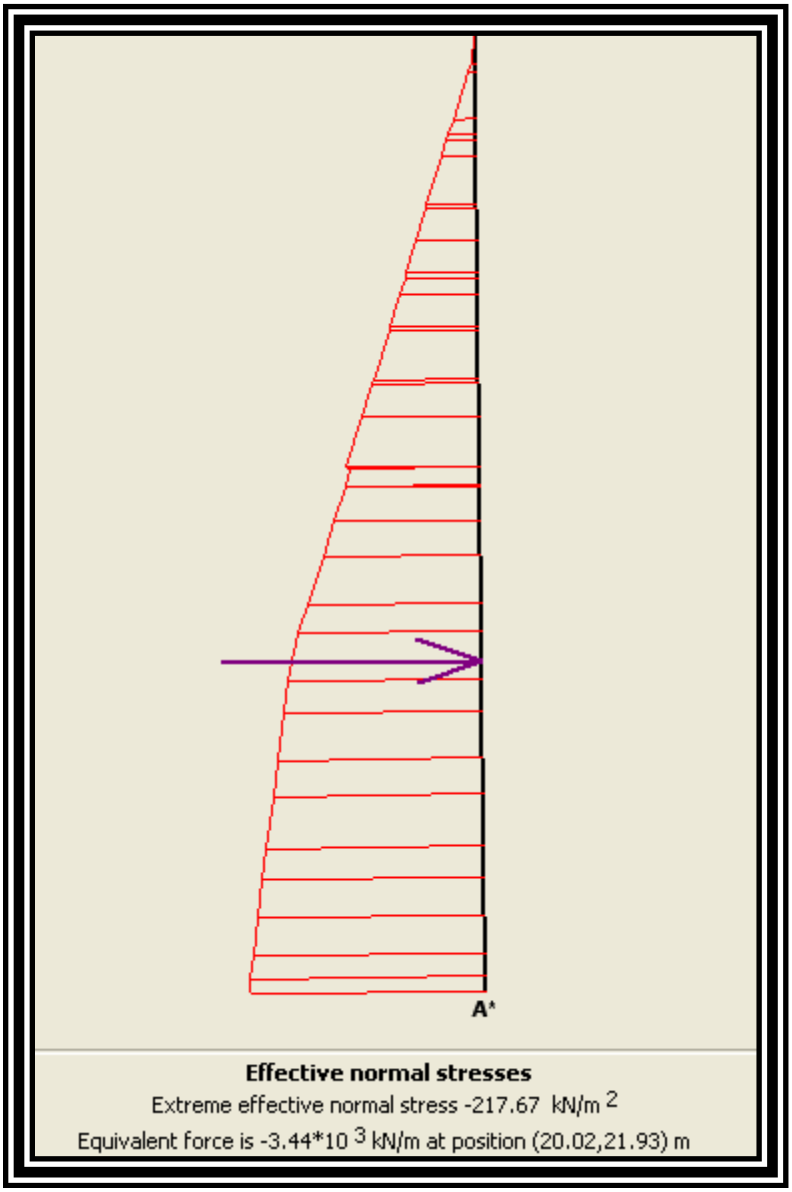
Gráfica de desplazamientos Horizontales



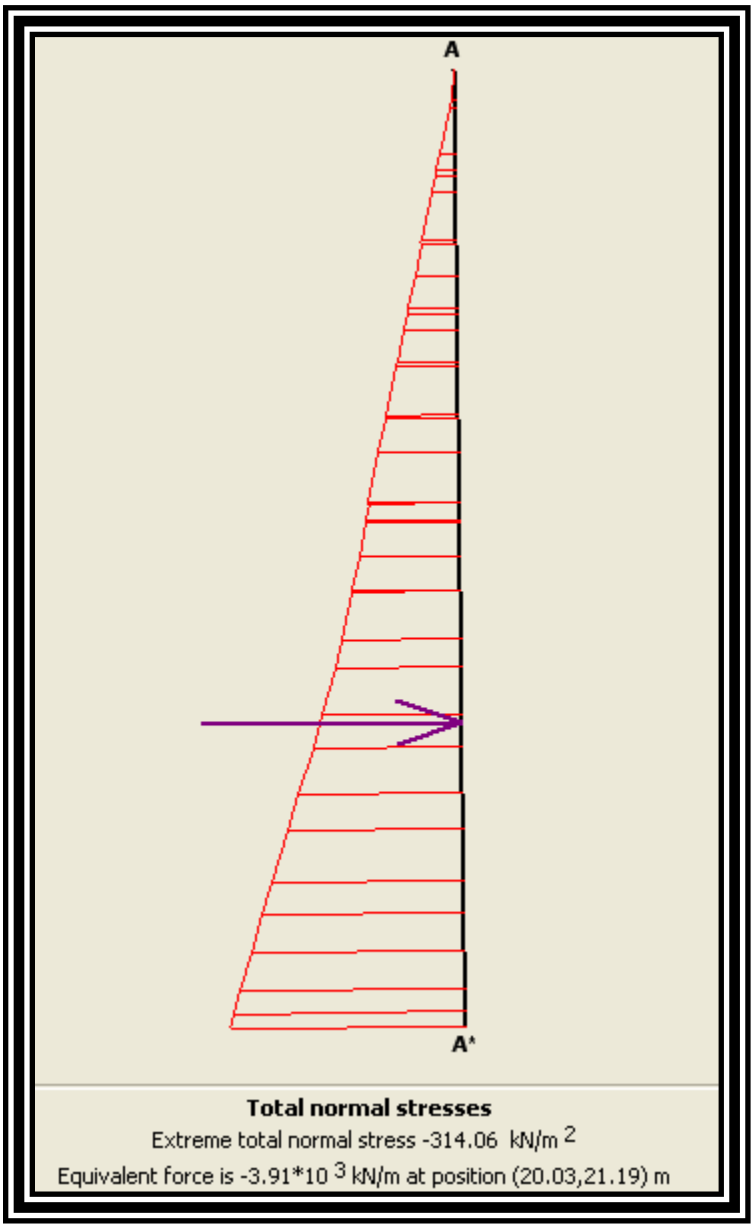
Gráfica de desplazamientos Verticales



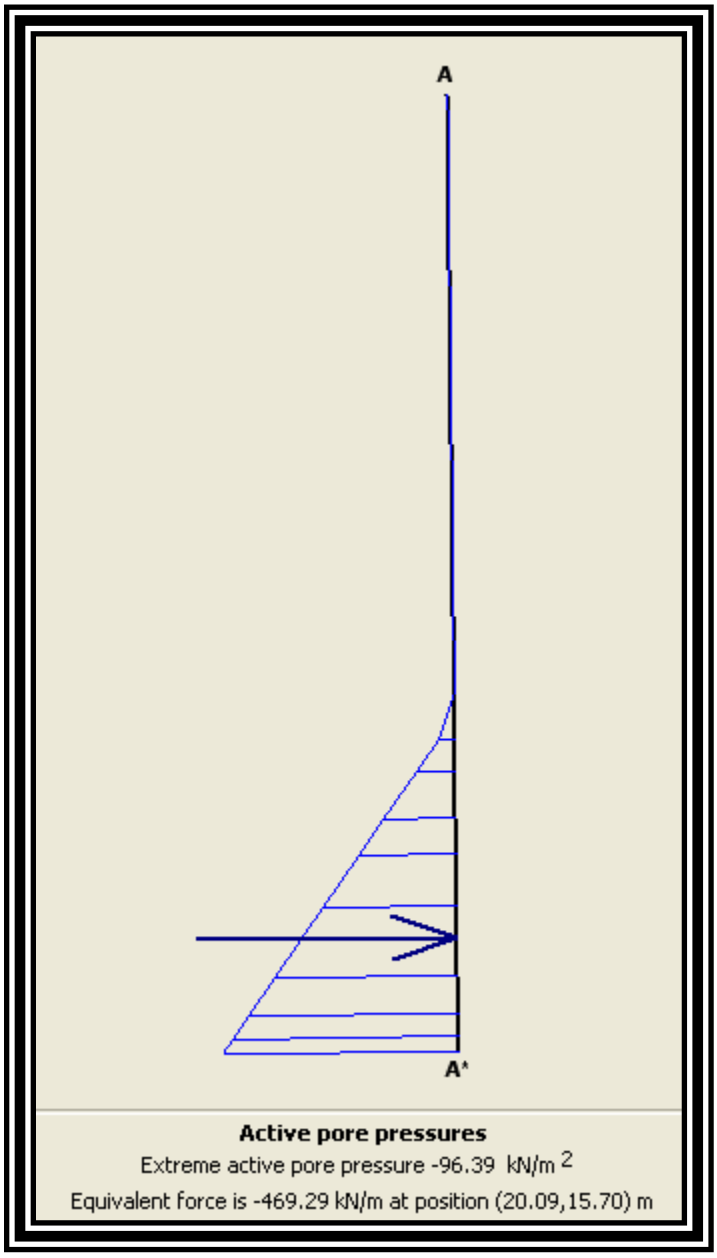
Gráfica de esfuerzos efectivos Verticales



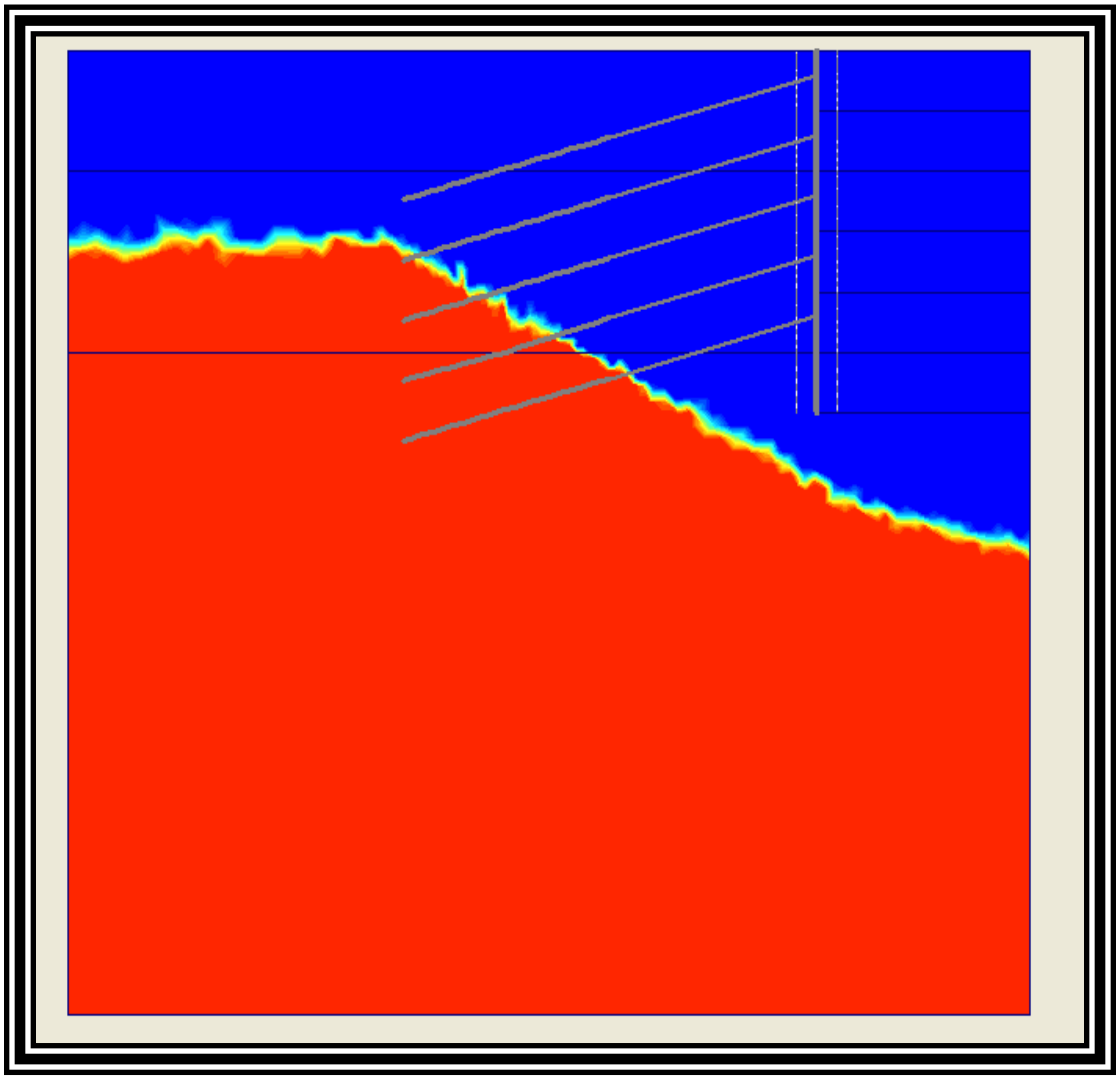
Gráfica de esfuerzos normales totales



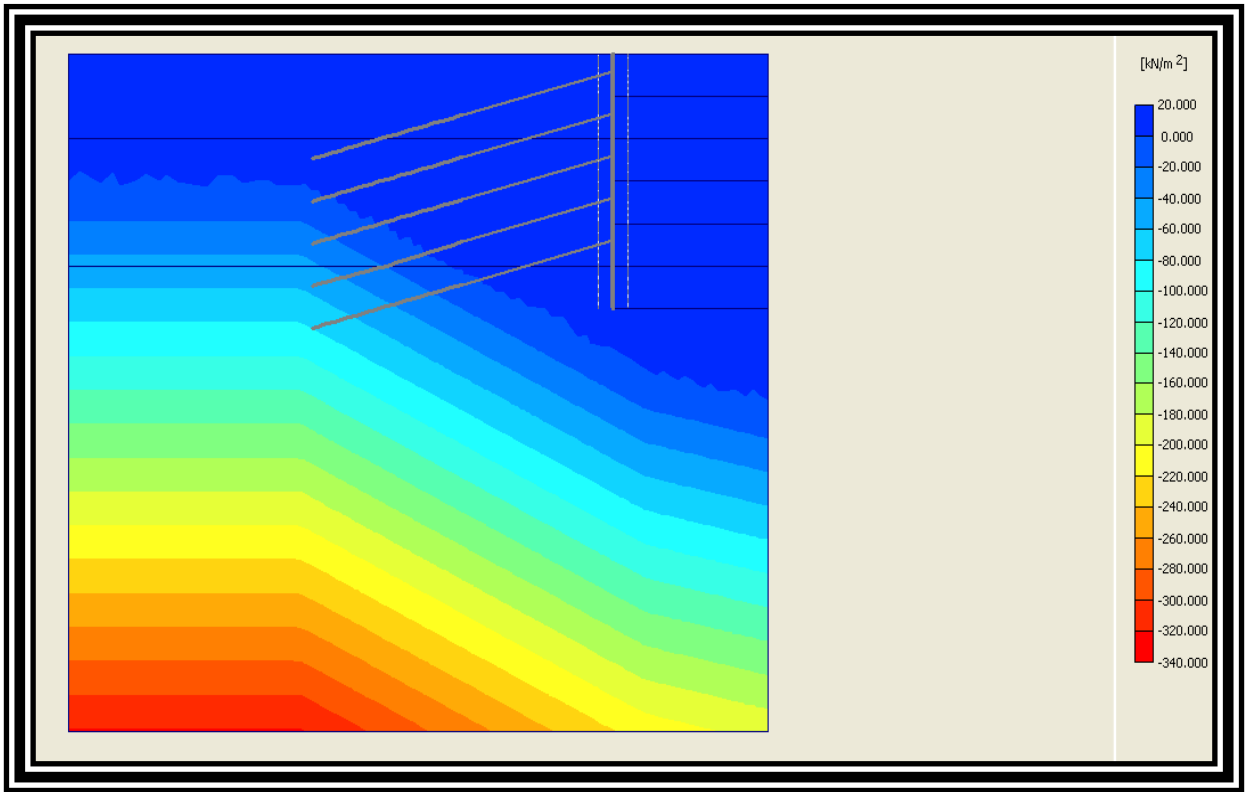
Gráfica de presión de poros



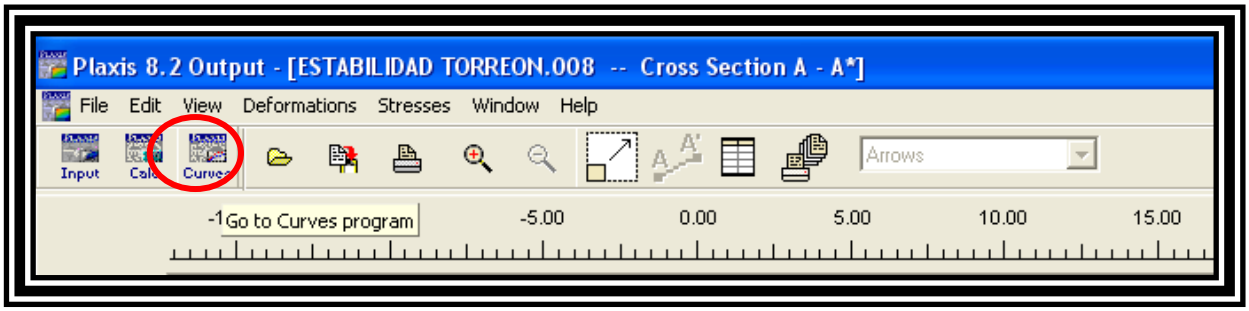
Gráfica de Grado de Saturación



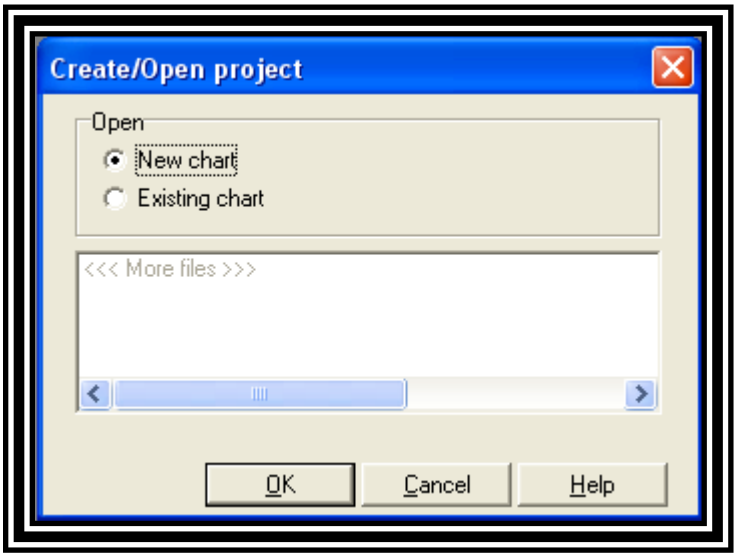
Gráfica de presión de poros



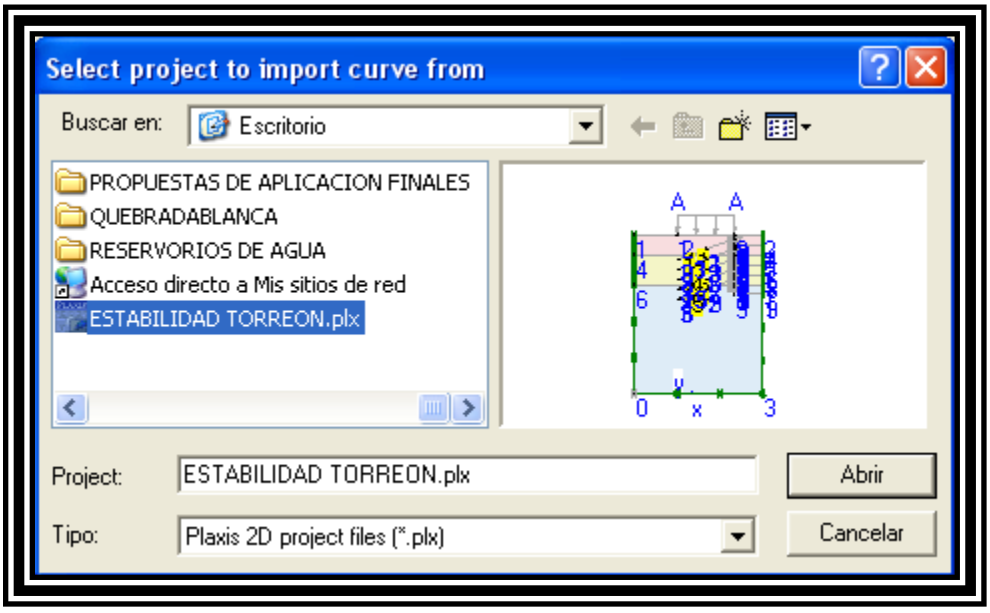
Para generar los gráficos o curvas de programa dar click en ***Curves***



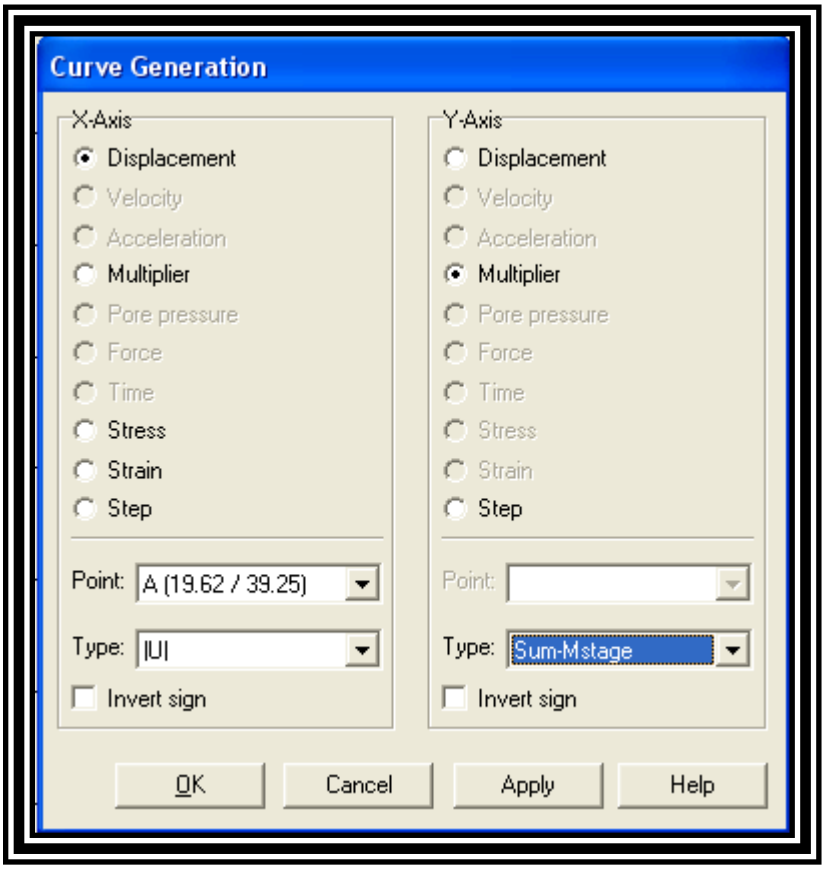
Crear un nuevo proyecto



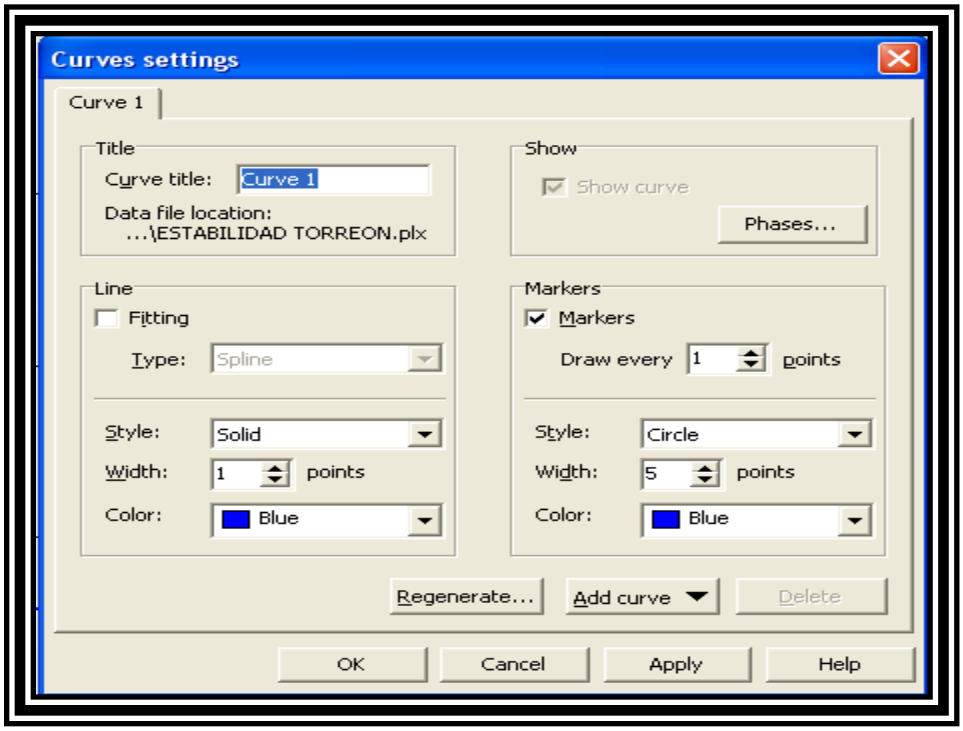
Seleccionar el archivo y dar click sobre el.

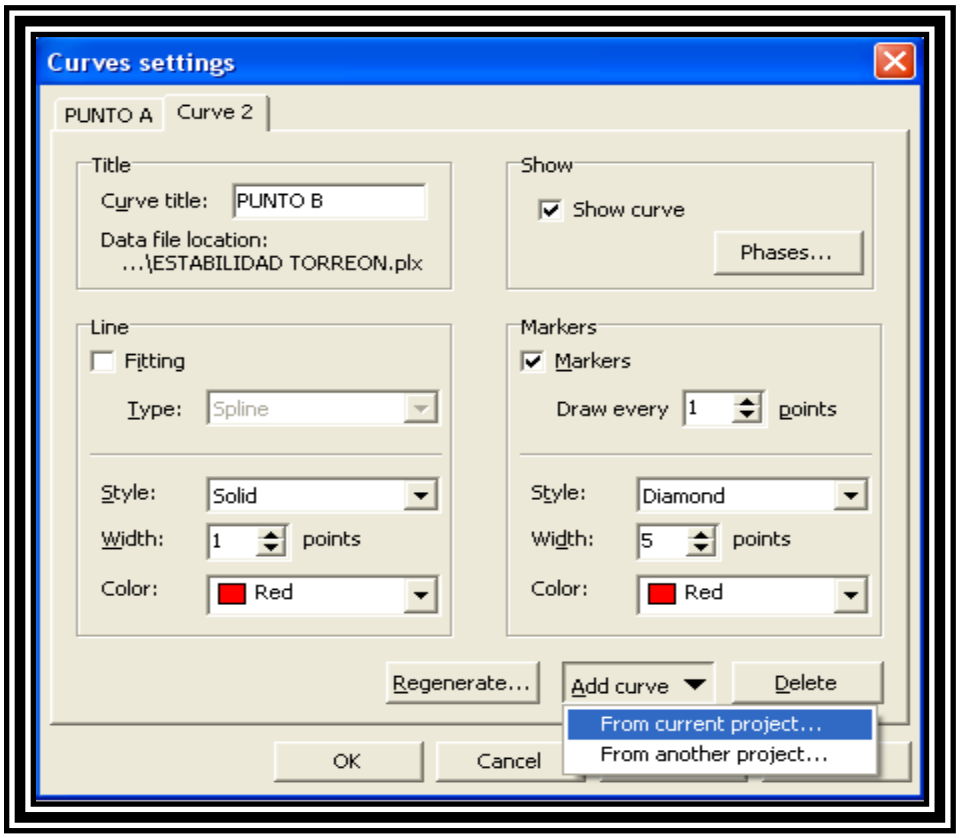


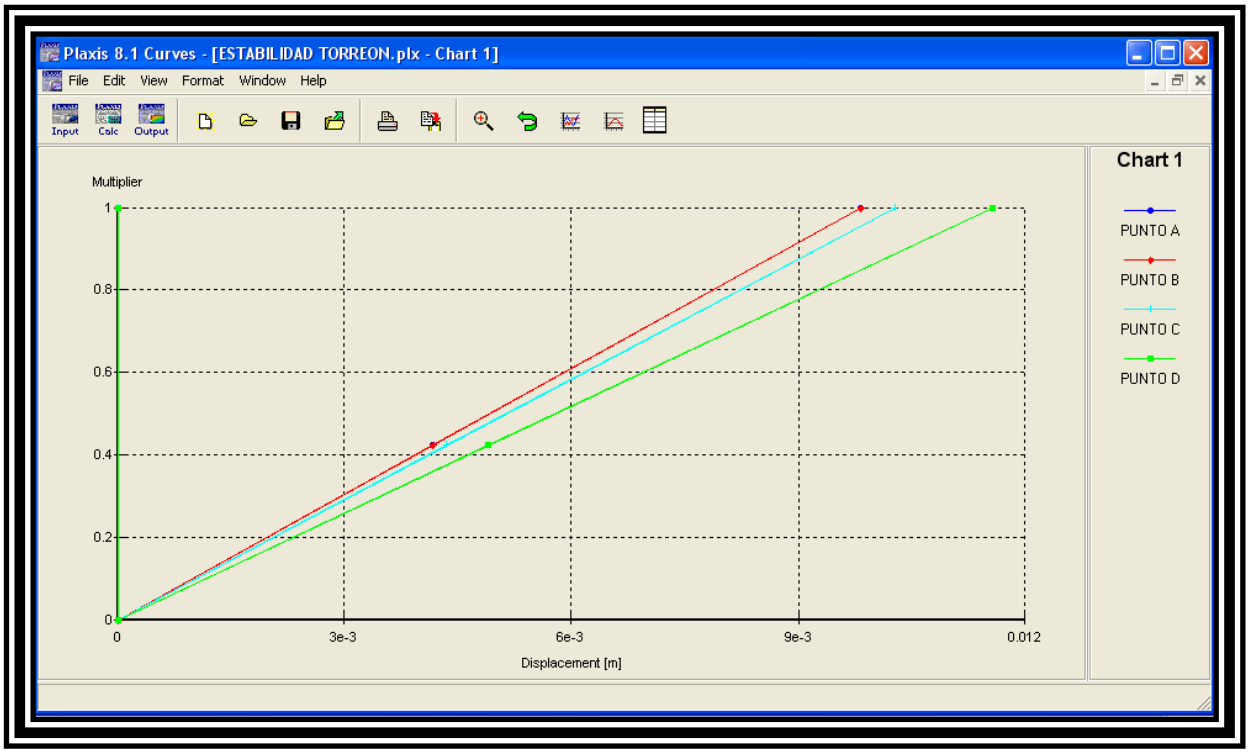
Se indican las opciones de la curva que se desea generar.



Dar las opciones o propiedades de esas curvas.


Curves settings
Curve 1
Title
Curve title: Curve 1
Data file location:
...\ESTABILIDAD TORREON.plx
Show
Show curve
Phases...
Line
Fitting
Type: Spline
Style: Solid
Width: 1 points
Color: Blue
Markers
Markers
Draw every 1 points
Style: Circle
Width: 5 points
Color: Blue
Regenerate...
Add curve
Delete
OK
Cancel
Apply
Help


Curves settings
PUNTO A
Curve 2
Title
Curve title: PUNTO B
Data file location:
...\ESTABILIDAD TORREON.plx
Show
Show curve
Phases...
Line
Fitting
Type: Spline
Style: Solid
Width: 1 points
Color: Red
Markers
Markers
Draw every 1 points
Style: Diamond
Width: 5 points
Color: Red
Regenerate...
Add curve
Delete
From current project...
From another project...
OK
Cancel


Plaxis 8.1 Curves - [ESTABILIDAD TORREON.plx - Chart 1]
File Edit View Format Window Help
Input Calc Output
Chart 1
Multiplier
1
0.8
0.6
0.4
0.2
0
0
3e-3
6e-3
9e-3
0.012
Displacement [m]
PUNTO A
PUNTO B
PUNTO C
PUNTO D