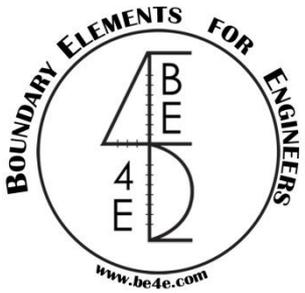


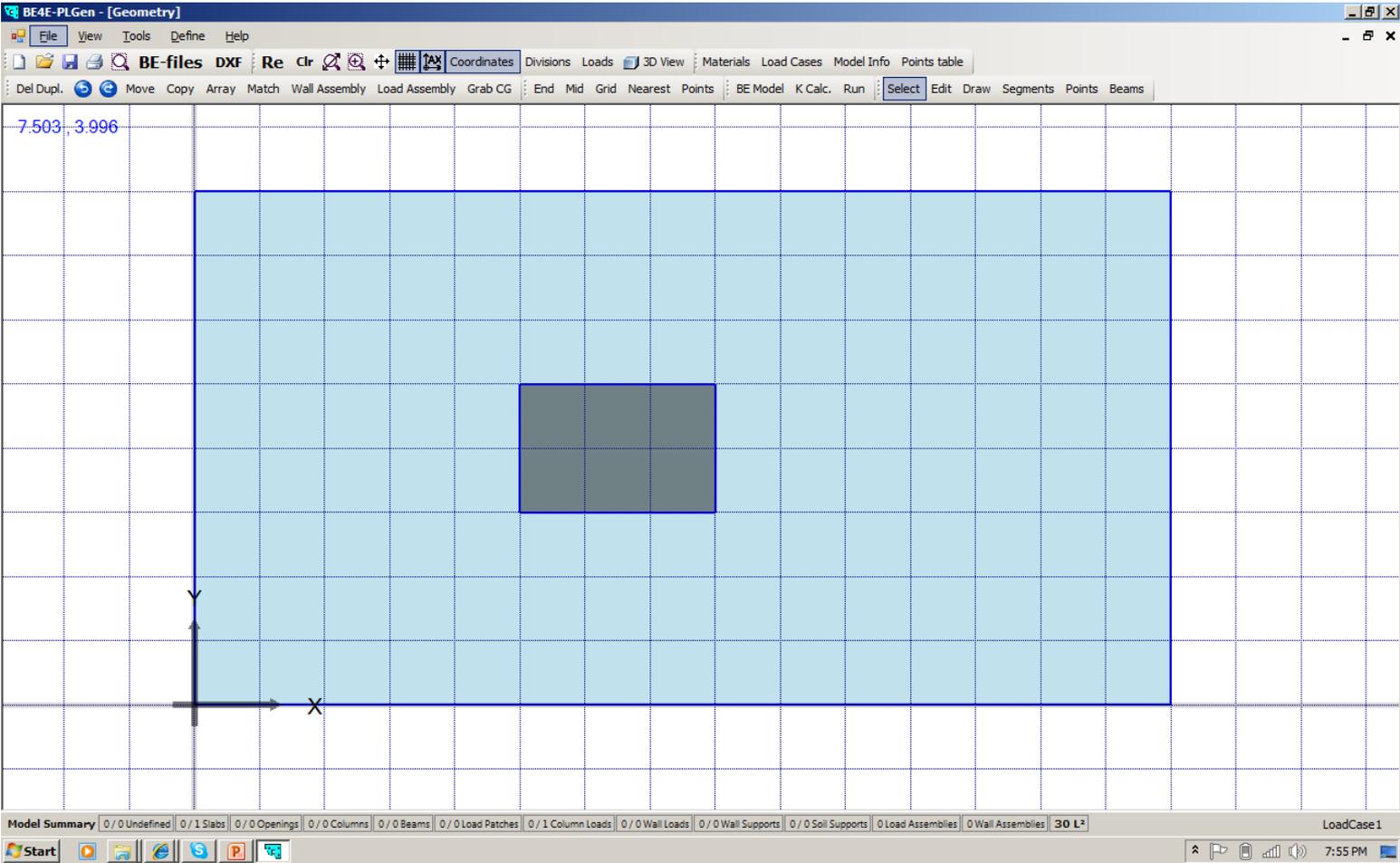
# PLPAK applications

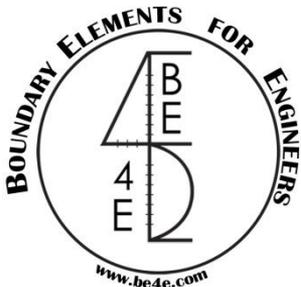
Examples: Raft on Elastic half space using the  
PLPAK-EHSPAK...

Direct solution, no iterations between two programs



Our problem is 7.5X4 m raft with one centered column on two layered elastic half space. The first step is to model the raft on the PLGen as shown below.

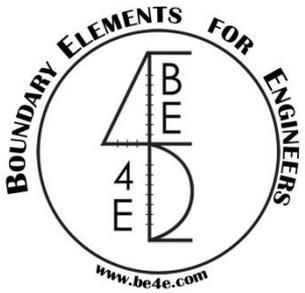




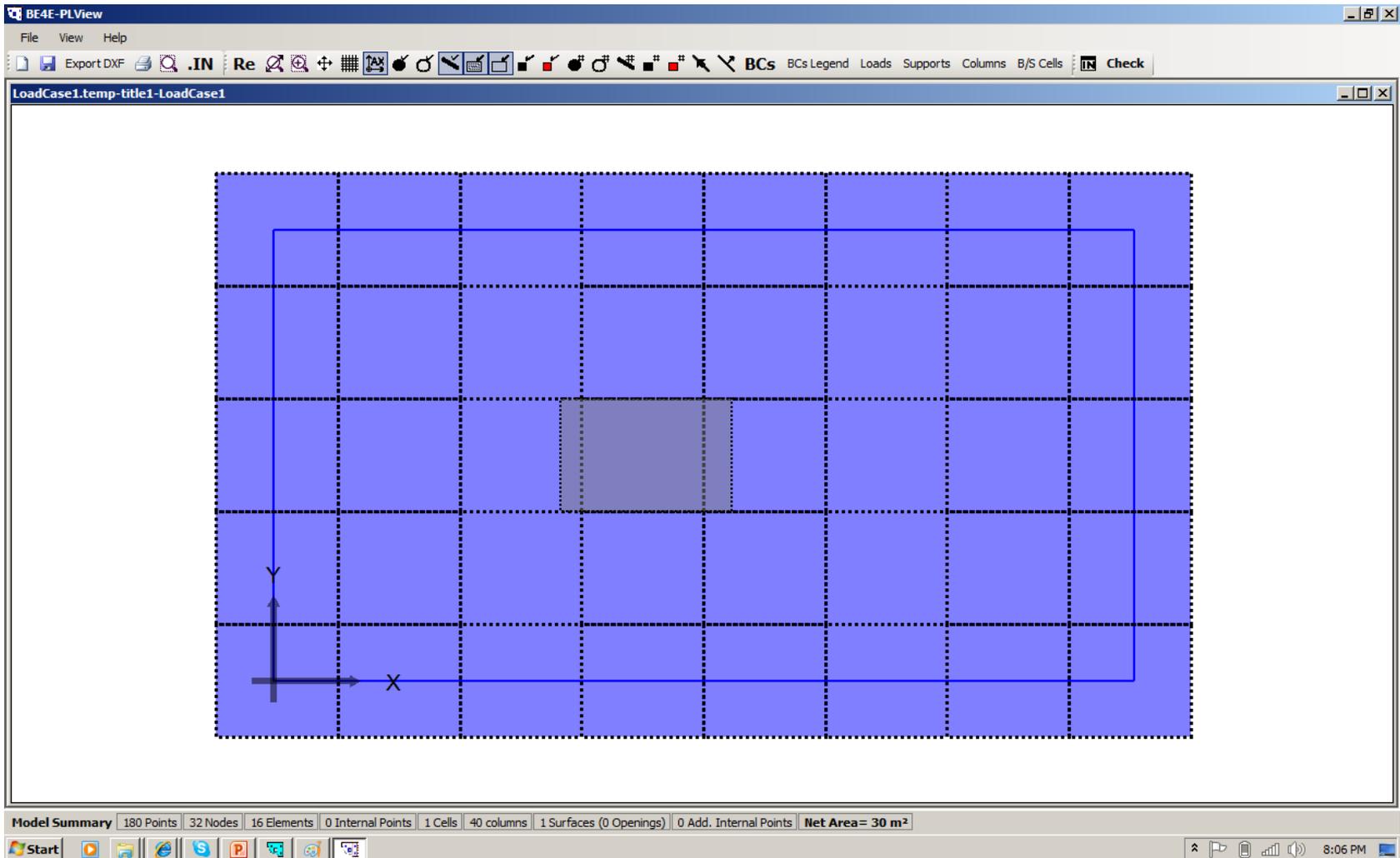
The second step is to draw a soil support around the raft; it should:

- 1) Contain all the raft
- 2) Rectangle
- 3) Start drawing from point A → B → C → D
- 4) Divide it to any numbers and assign Ks to any –ve value between -10 to -60 (here we used -17)

The screenshot shows the BE4E-PLGen software interface. The main window displays a grid with a blue rectangular soil support area. The corners of the support are labeled A, B, C, and D. A 'Properties\_dialog' window is open, showing 'Soil Support properties' with 'Ks: -17', 'Na: 5', and 'Nb: 8'. The software interface includes a menu bar, a toolbar, and a status bar at the bottom.

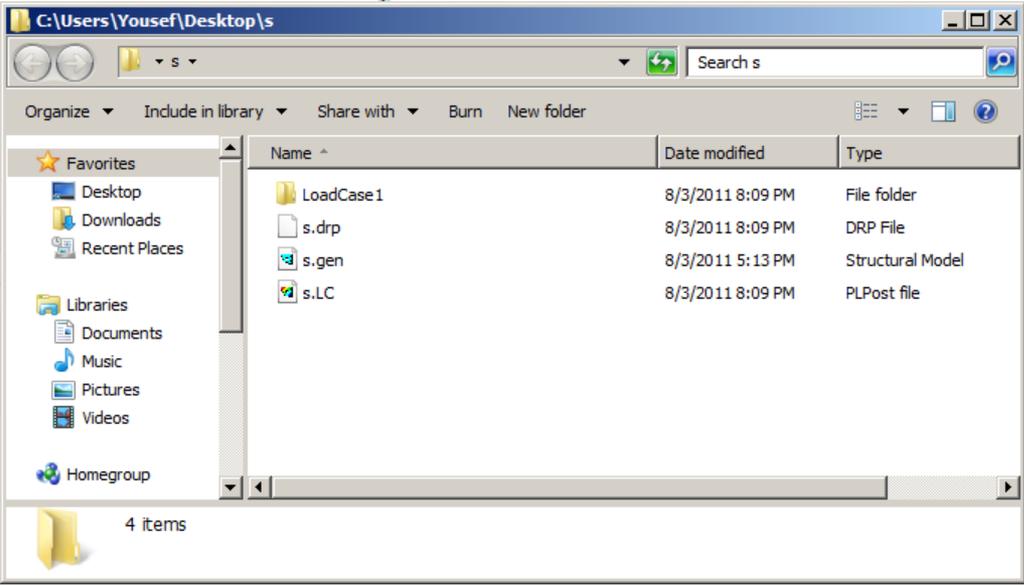
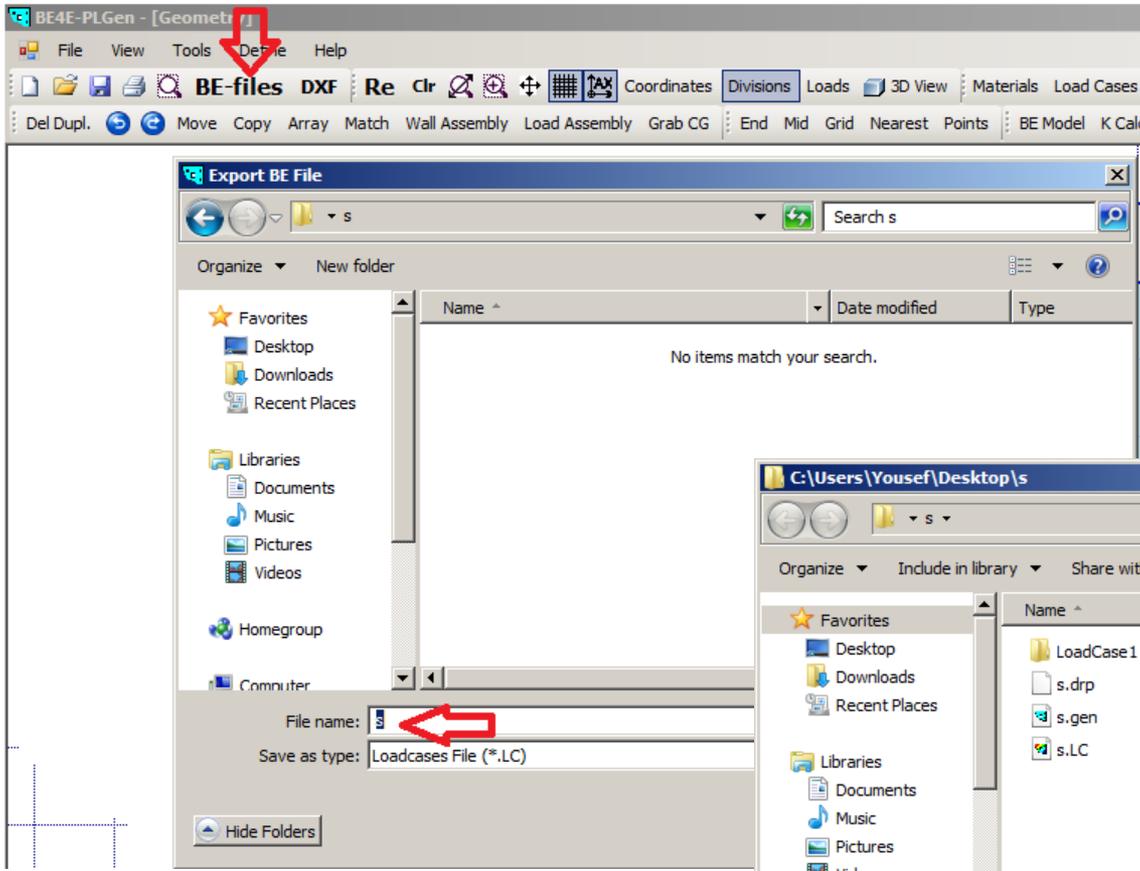


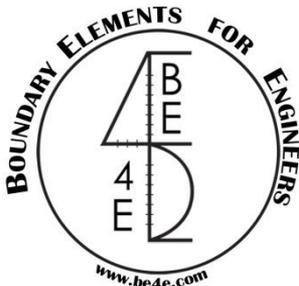
The BE model in the PLView should look like:  
(please note the blue color; as still the PLPAK recognize the soil as individual not connected supports as the case of Winkler model)





The 3<sup>rd</sup> step is: from the PLGen generate the BE-files. Save them in any folder, we will save them in folder called “s” on the desktop and we will call the problem by “s.LC” as demonstrated below:





The 4<sup>th</sup> step is: to run the EHSPAK as shown:

The screenshot shows the BE4E - EHSPAK software interface. A red arrow points to the 'EHSPAK' folder in the Windows Explorer. The main window displays a grid with a complex shape, and various settings for land plot properties, solution mode, and layers.

**Land plot properties**

XL=  Na=   
YL=  Nb=   
Value of K3 ===> defined in PLGen

**Solution mode**

Theory:

**Layers:**

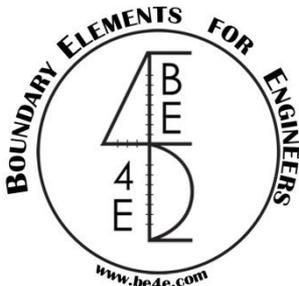
- Single layer
- Multi layer - Stavridis method
- Multi layer - Bowle's method
- Multi layer - Equivalent spring method

**Open (\*.LC) file**

**Run Analysis**

Show text Font size:

|    | Depth | Poisson's ratio | Young's modulus |
|----|-------|-----------------|-----------------|
| ▶* |       |                 |                 |



The 5<sup>th</sup> step is: Define your soil model. Please note that you can save the soil profile and reload it using the Open/Save buttons. Also you can use many soil models as shown below.

These numbers should be matched with the ones in the PLGen model

The screenshot shows the BE4E - EHSPAK software interface. On the left, a grid-based soil model is displayed with dimensions XL and Na for the horizontal axis, and YL and Nb for the vertical axis. A table below the grid lists soil properties for different depths.

| Depth | Poisson's ratio | Young's modulus |
|-------|-----------------|-----------------|
| 3     | 0.2             | 1000            |
| 4     | 0.3             | 600             |
| ▶*    |                 |                 |

In the center, the 'Land plot properties' section is highlighted with a red box. It contains the following values:

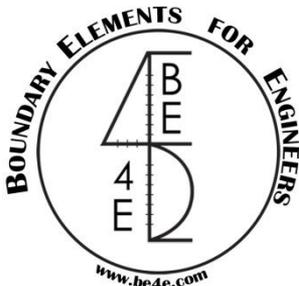
- XL = 8.5, Na = 8
- YL = 5, Nb = 5
- Value of K3 ===> defined in PLGen: -17

Below this, the 'Solution mode' section shows 'Theory: Steinbrenner model' and 'Layers: Multi layer - Stavridis method' selected.

On the right, the soil profile is shown with two layers:

- Layer no.1 - Depth=3,  $\nu=0.2$ ,  $E=1000$
- Layer no.2 - Depth=4,  $\nu=0.3$ ,  $E=600$

At the bottom, there are buttons for 'Open (\*.LC) file', 'Run Analysis', 'Open', 'Save', and 'Close', along with a 'Show text' checkbox and a 'Font size' dropdown set to 10.



The 6<sup>th</sup> step is: once you are happy of the soil model, select the Open (\*.LC) file button and load the “s.LC” of you model

|    | Depth | Poisson's ratio | Young's modulus |
|----|-------|-----------------|-----------------|
|    | 3     | 0.2             | 1000            |
|    | 4     | 0.3             | 600             |
| ▶* |       |                 |                 |

Land plot properties  
XL= 8.5 Na= 8  
YL= 5 Nb= 5  
Value of K3 ==> defined in PLGen -17

Solution mode  
Theory: Steinbrenner model  
Layers:  
 Single layer  
 Multi layer - Stavridis method  
 Multi layer - Bowle's method  
 Multi layer - Equivalent spring method

Layer no.1 - Depth=3  
v=0.2  
E=1000

Layer no.2 - Depth=4  
v=0.3  
E=600

Open (\*.LC) file  
Run Analysis  
Show text [checked] Font size: 10  
Open Save Close



The 7<sup>th</sup> step is: select Run Analysis button, and get the log screen that tells you that “Run ended successfully”

The screenshot shows the BE4E - EHSPAK software interface. On the left, a grid plot displays a land plot with dimensions XL and YL, and grid counts Na and Nb. Below the plot is a table with the following data:

| Depth | Poisson's ratio | Young's modulus |
|-------|-----------------|-----------------|
| 3     | 0.2             | 1000            |
| 4     | 0.3             | 600             |
| ▶*    |                 |                 |

On the right, the 'Land plot properties' section contains the following values:

- XL = 8.5, Na = 8
- YL = 5, Nb = 5
- Value of K3 ===> defined in PLGen: -17

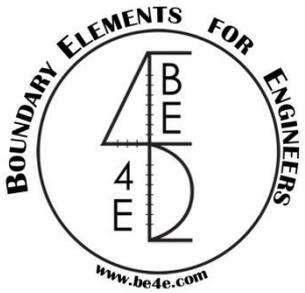
The 'Solution mode' section shows 'Theory: Steinbrenner model' and 'Layers: Multi layer - Stavridis method' selected.

At the bottom, the 'Run Analysis' button is highlighted with a red arrow.

The 'EHSPAK run log' window displays the following text:

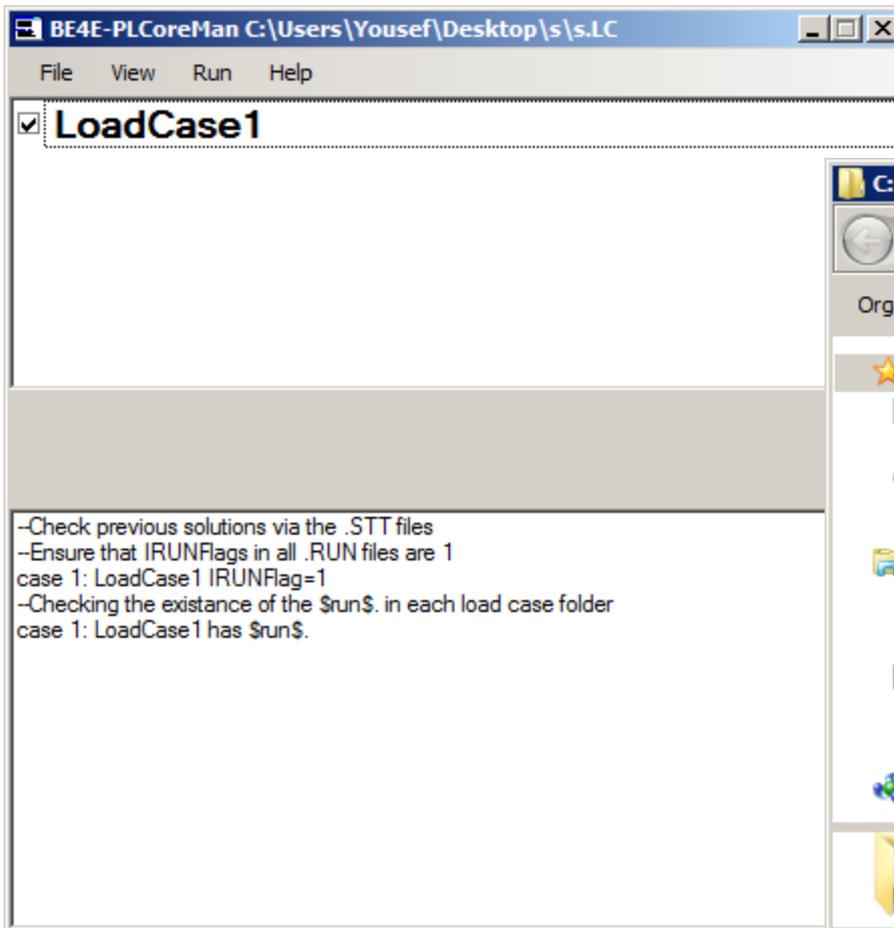
```
Starting run
$Soil$ file saved
EHS.exe run succesfully
Starting LoadCase1 1/1
LoadCase1 - $Current$.in created succesfully
LoadCase1 - $vrvv$ created succesfully
LoadCase1 - PR.exe run succesfully
LoadCase1 - PL$MATK$.4 copied succesfully
Run ended succesfully
```

Buttons for 'Show', 'Open', and 'Close' are visible at the bottom of the log window.

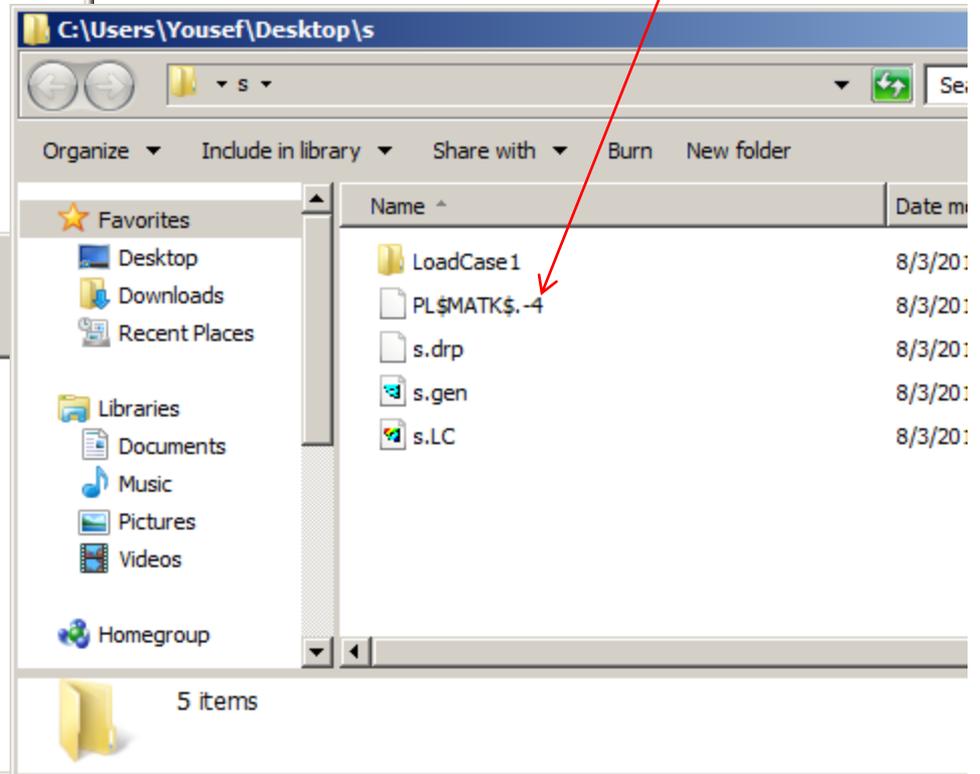


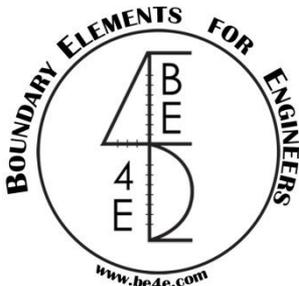
The final step is run the PLCoreMan and load the s.LC, your file is now ready to be treated as any problem solved using the PLPAK.

Now run your PL.EXE and see results on PLPost.

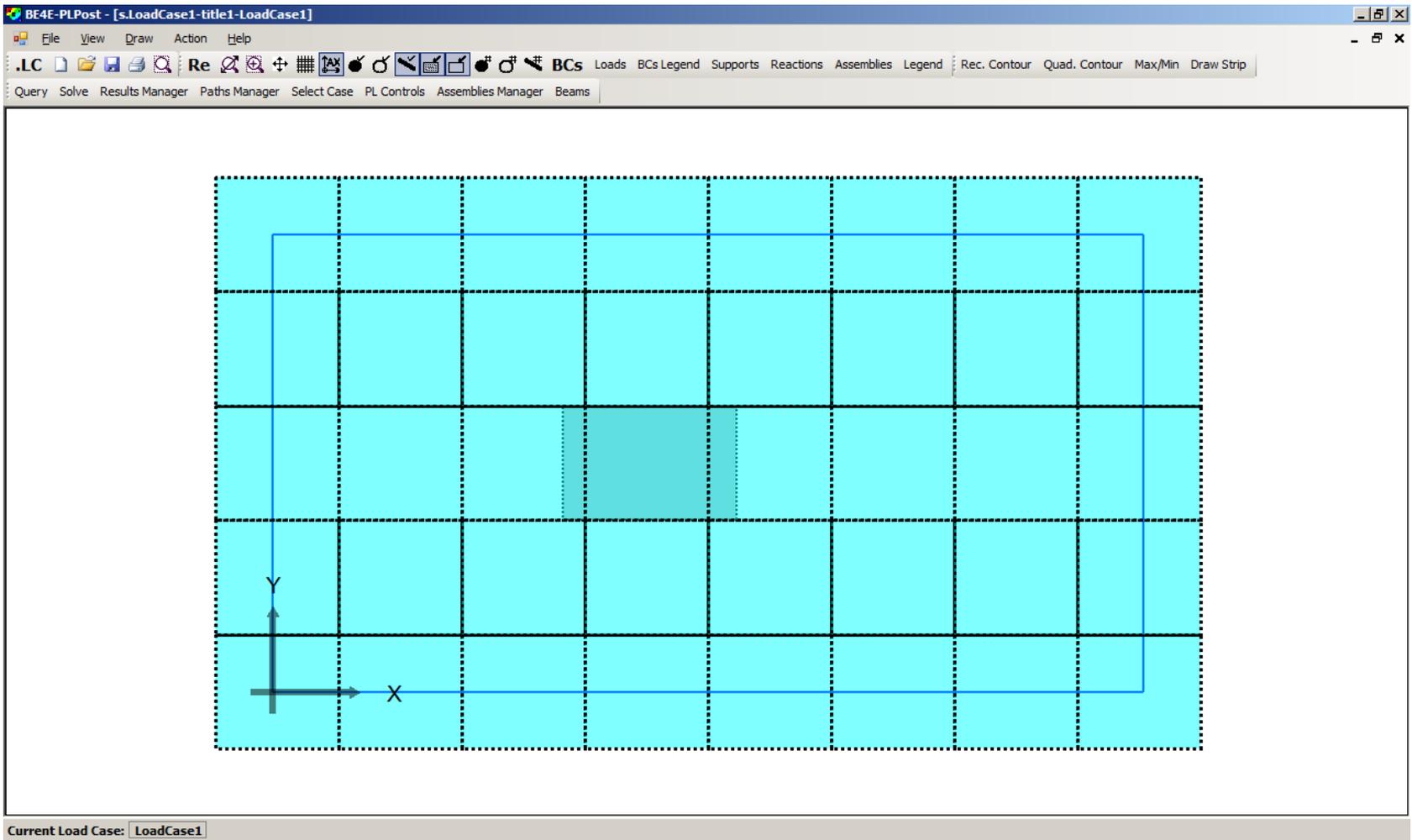


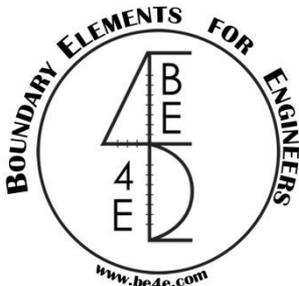
Please note: the following stiffness file is appeared



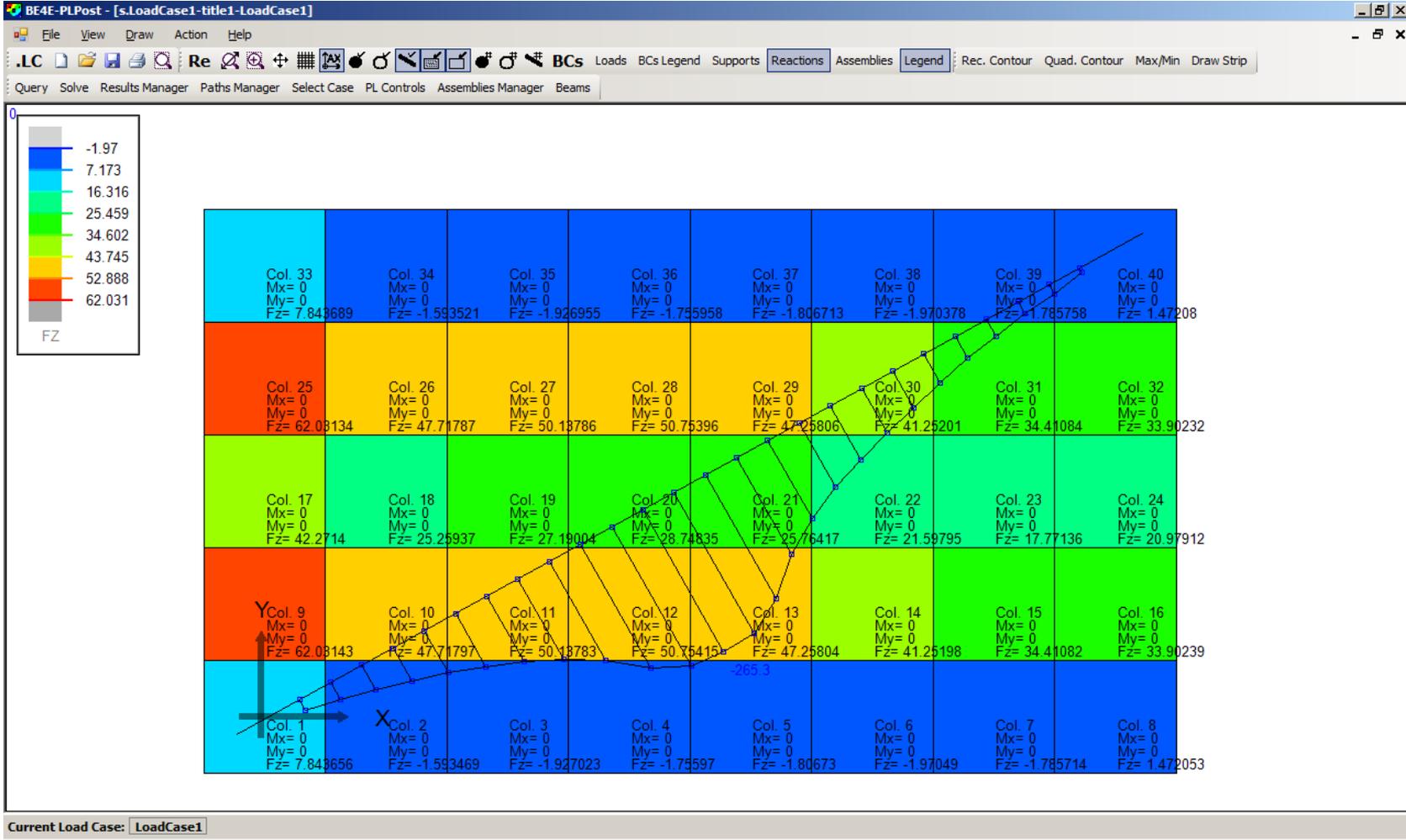


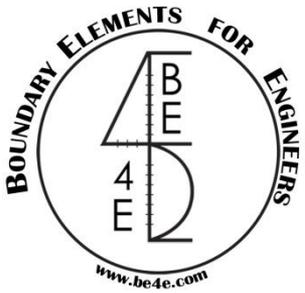
Once you loaded the PLPost you will see that the soil supports appear as beam (or stiffness) cells.



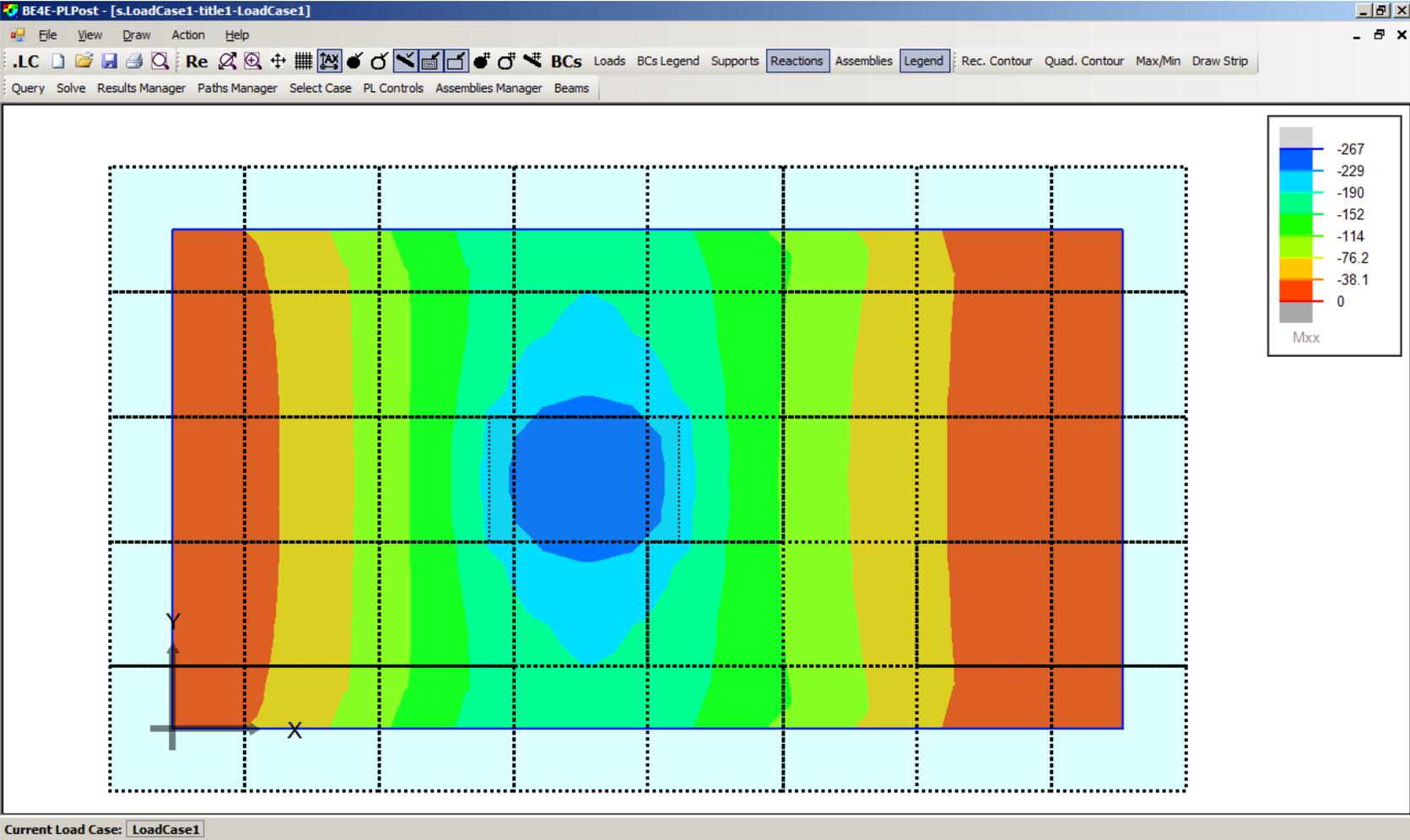


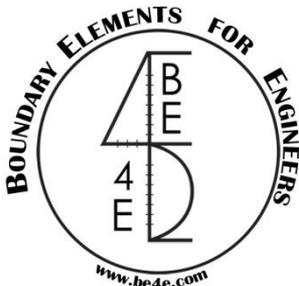
See your results in normal way.





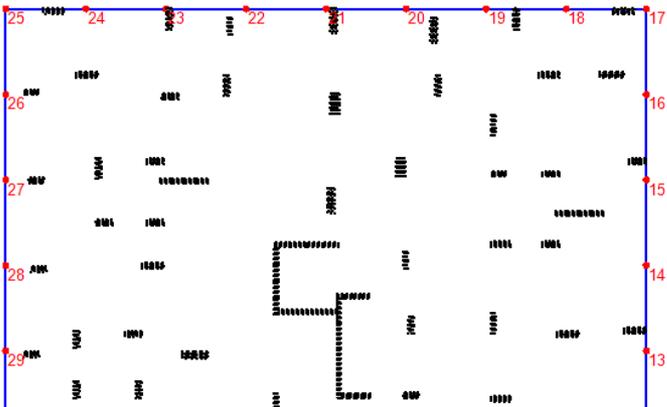
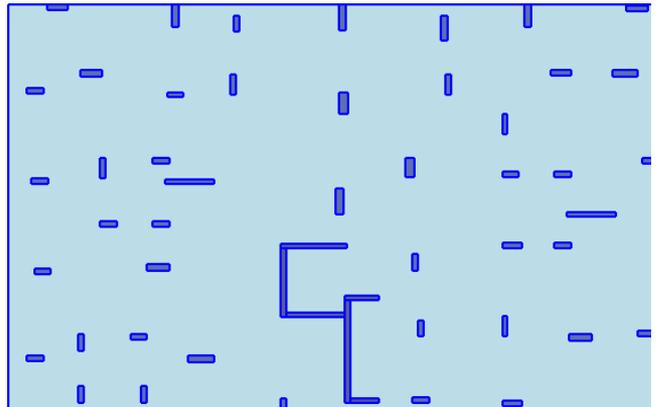
Or as contour lines





# Using PLPAK – EHSPAK for practical raft in one step.

1-Create the analysis model using PLGen



2-Check the BE model

BE4E - EHSPAK

Land plot properties  
XL= 100 Na= 100  
YL= 30 Nb= 30  
Value of K3 ==> defined in PLGen -17

Solution mode  
Theory: Steinbrenner model

Layers:  
 Single layer  
 Multi layer - Stavridis method  
 Multi layer - Bowle's method  
 Multi layer - Equivalent spring method

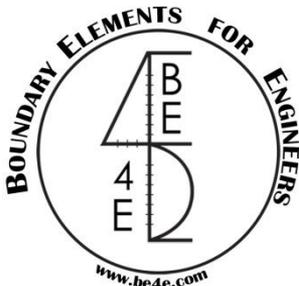
| Depth | Poisson's ratio | Young's modulus |
|-------|-----------------|-----------------|
| 2     | 0.2             | 3000            |
| *     |                 |                 |

Open (\*.LC) file  
Run Analysis

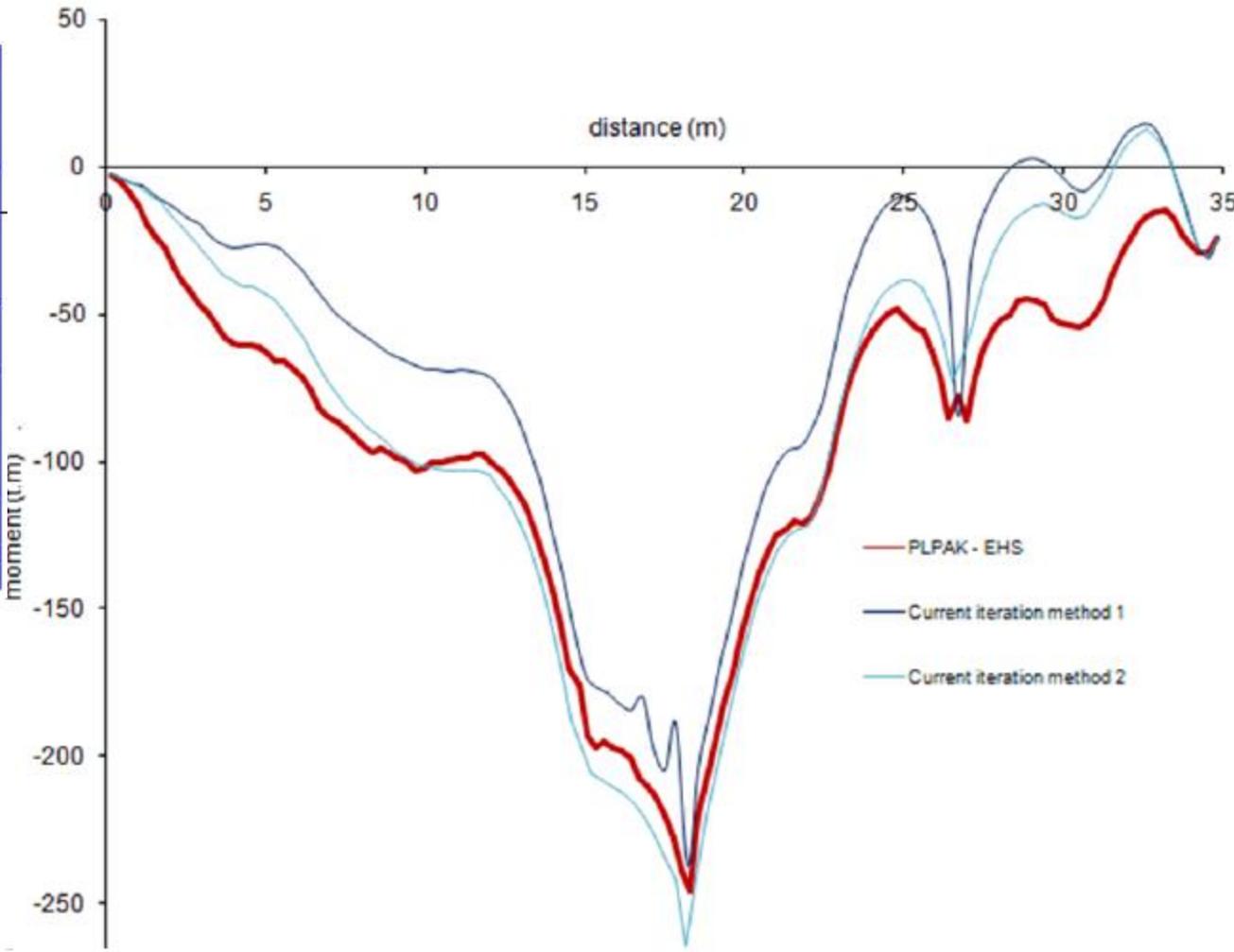
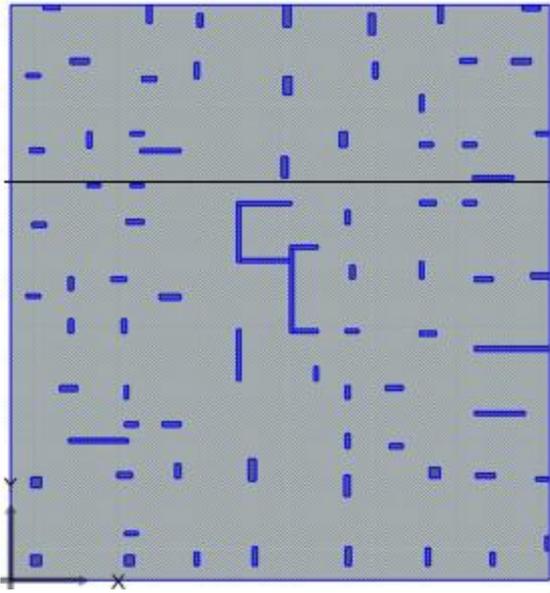
Layer no.1 - Depth=2  
v=0.2  
E=3000

Show text Font size: 10  
Open Save Close

3-Use EHSPAK to input soil profile and include soil structure interaction in a single step.



# PLPAK- EHSPAK results



Get the accuracy of second iteration in a single step using the PLPAK



Enjoy the PLPAK and EHSPAK ...

<http://www.be4e.com>