BE4E – PLPAK

Towards more realistic structural modeling

PLPost & Practical Examples

Table of content for lecture 2

- Pre-Processing file (PLPost).
  - files needed to be exported before using PLPost.
  - Slab design.
  - Beam design.
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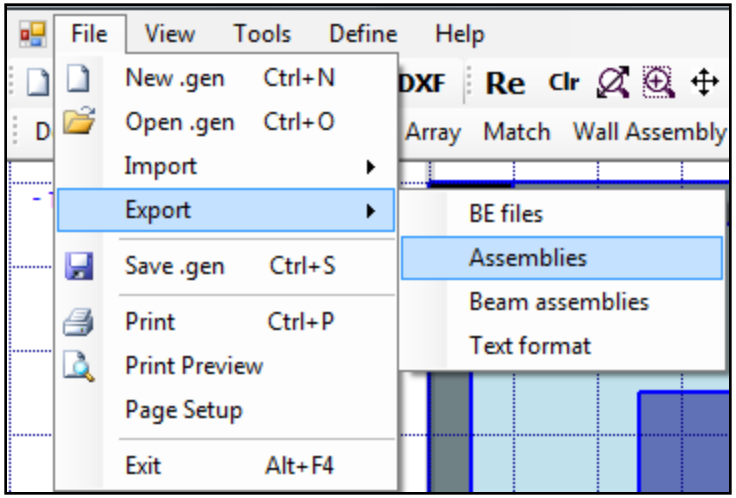
Files need to be exported before using PLPost

Before going through PLPost, we should know if there are files need from PLGen in PLPost.

There are cases that user have to export file from PLGen before using PLPost:

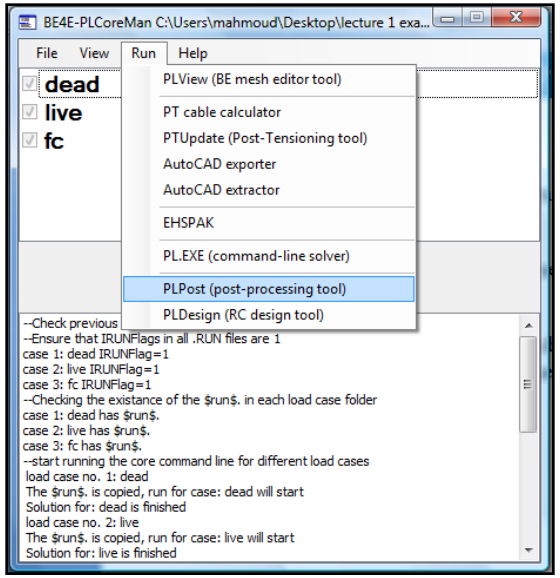


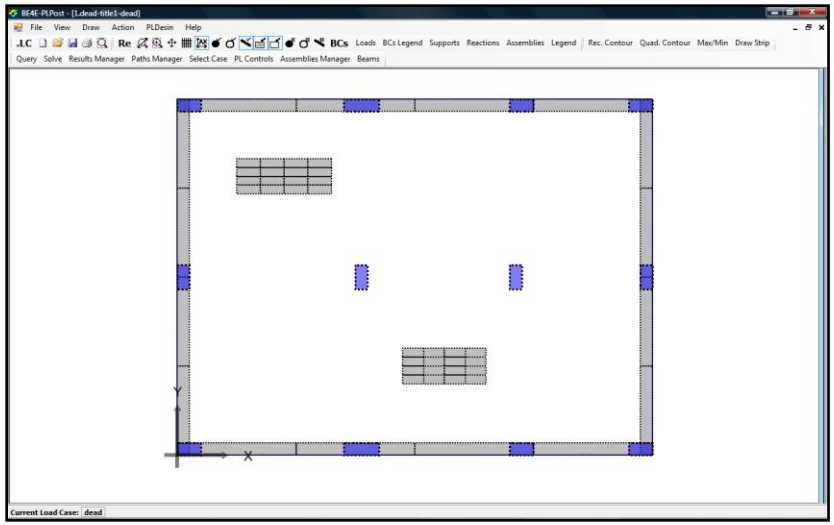
This case is used to show the total loads on columns, shear walls and cores.

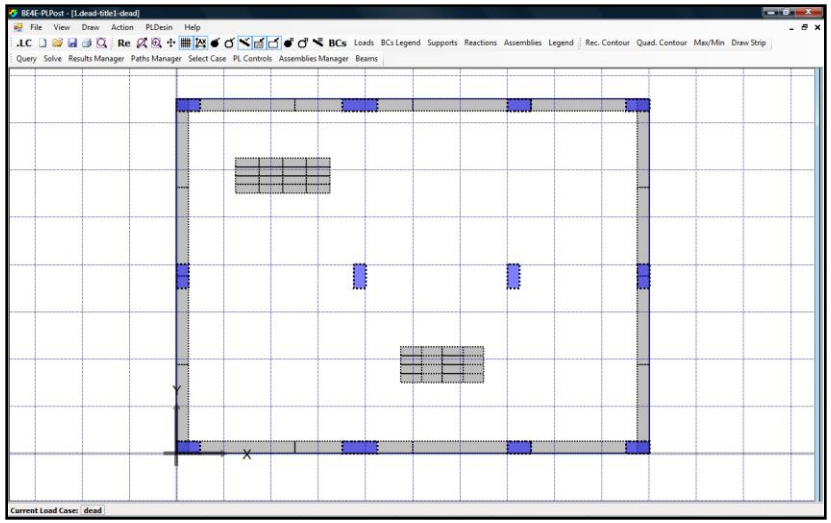
After saving Assemblies we will learn how to restore it in the PLPost.

PLPost Introduction

After running the model from PLCoreMan, open the PLPost from run menu.



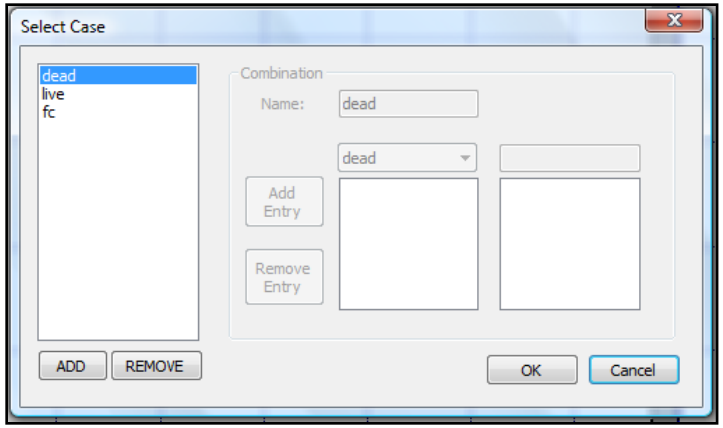


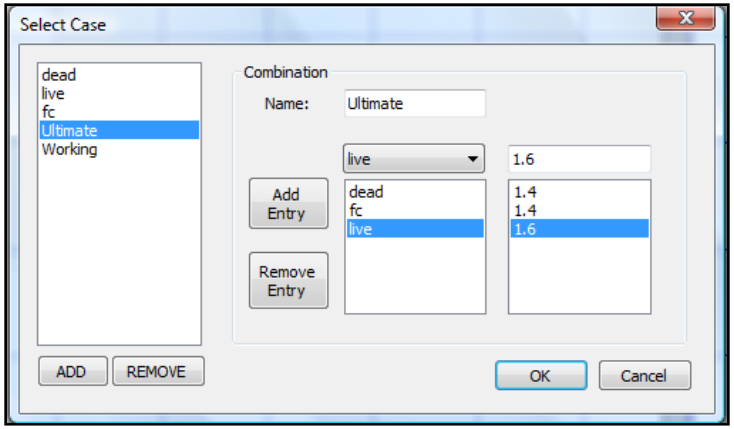


Load Combinations

The lower tabs of the PLPost contain by default current load case is dead

If the user press double click on dead Load Combinations window will open.





The user can add cases like ultimate, Working cases, each case contains combination between Load cases inserted from PLGen.

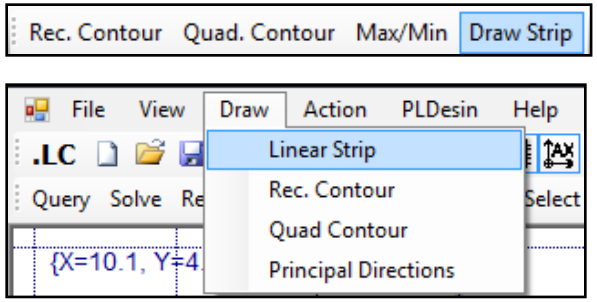
Showing slab results

From PLPost the user can see the straining actions for slab, columns and beams.

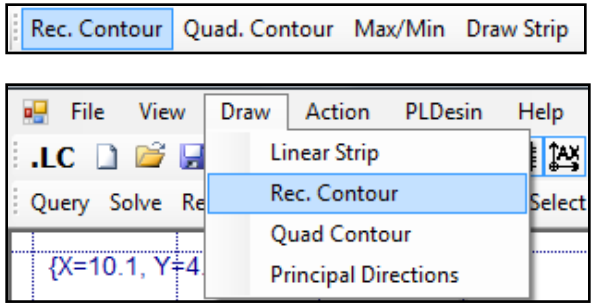
First straining actions for slab:

There are 3 types for showing results in slab:

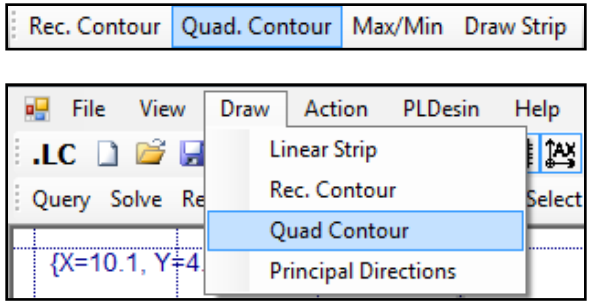
Draw Strip



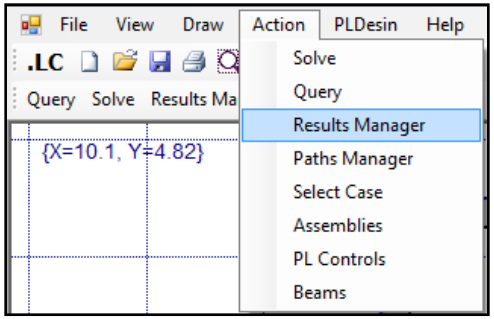
Draw Rectangular contour



Draw Quadratic contour



The user can also see the straining action for Main Contour by using the result manager.



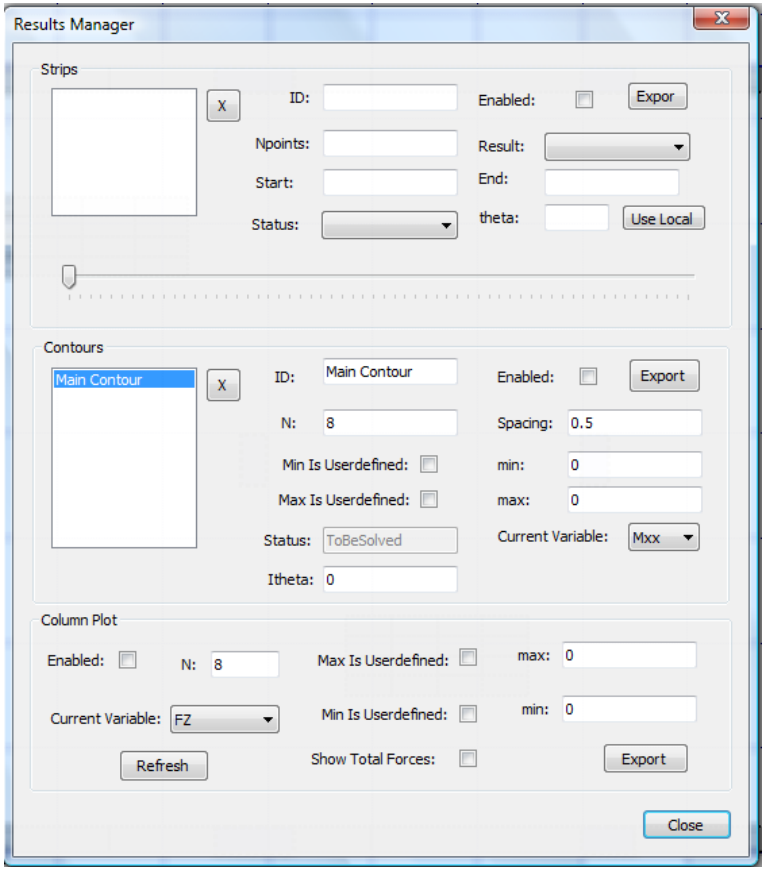
OR

Showing the straining action of a point using Query.

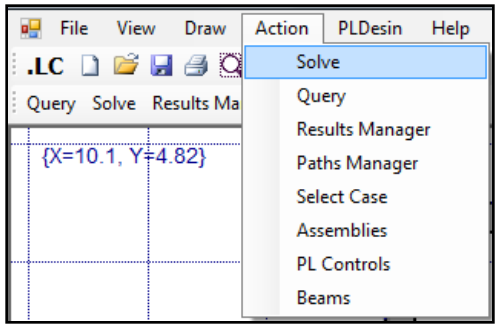
Result Manager

Now we are going to talk about each type and it's relation with Result Manger.

1- Straining action for Main Contour using result manager.



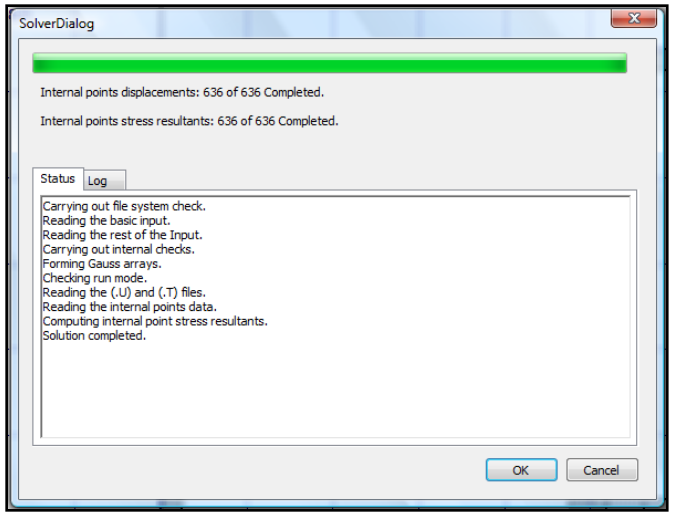
- The result manager consists of three parts at the middle part (Contours) we have the Main Contour.
- Mark on the check box (Enabled).
- Insert the spacing between grids.
- Insert number of colors (N).
- Choose the Current Variable
- Insert if there is min/max value for user define.
- Press on Close.

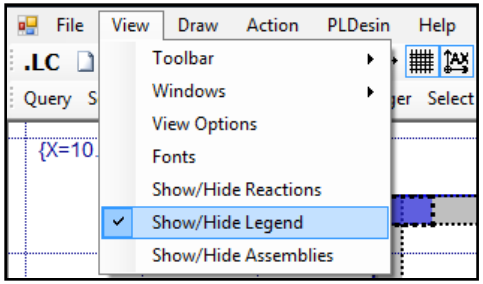


OR

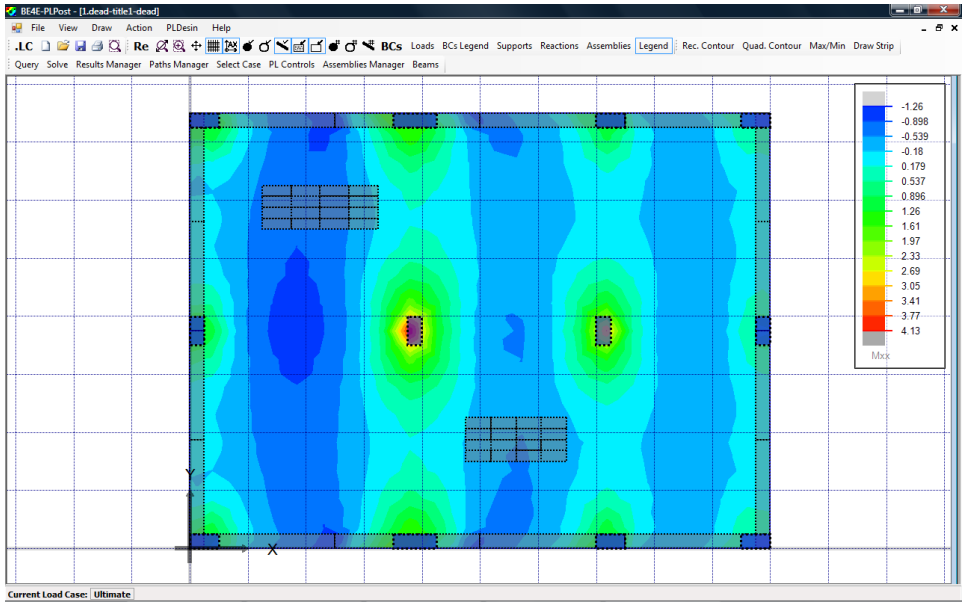
Solving Main Contour

After solving press on (F3) or refresh, then the user can show the Legend.





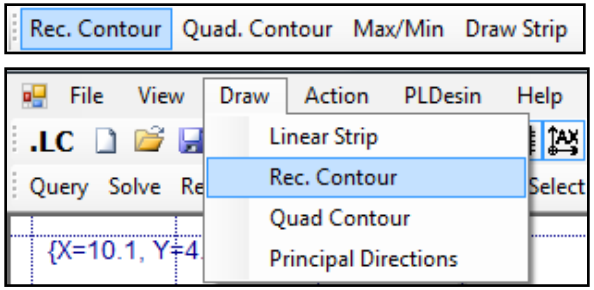
OR

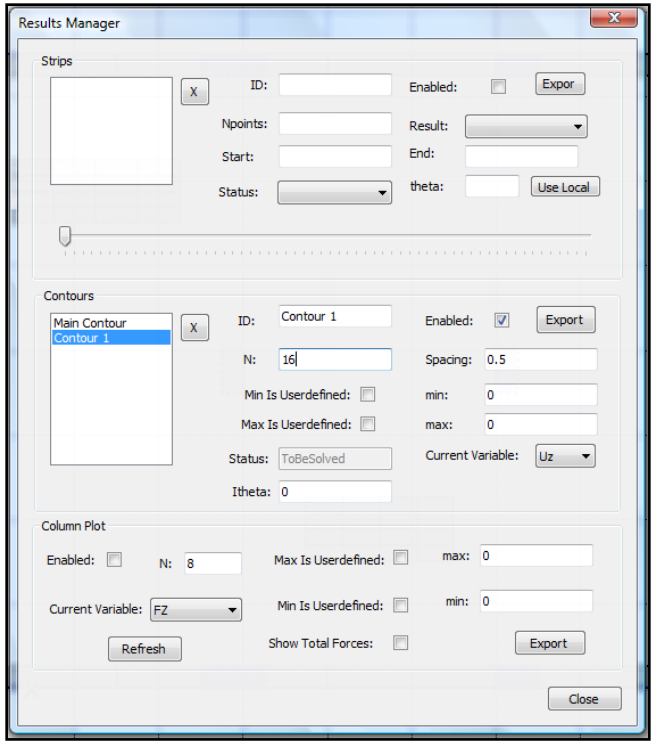


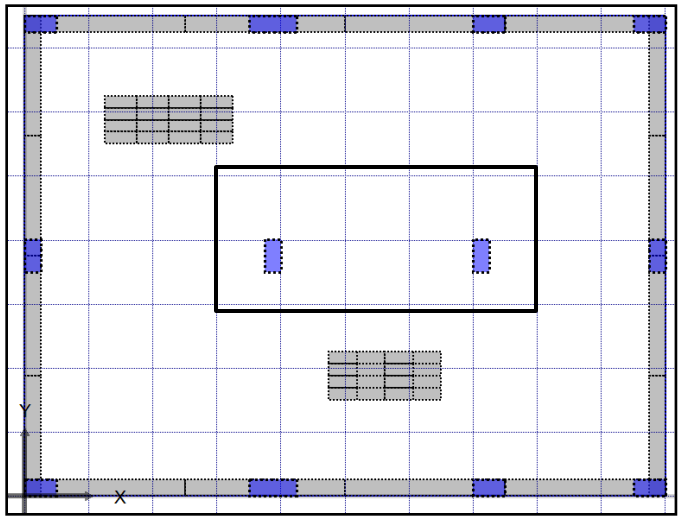
The user can see the straining actions in slab in any direction, only by changing the current variable on Result Manager.

Rectangular Contour

2- Draw the rectangular area which need to be solved in PLPost.





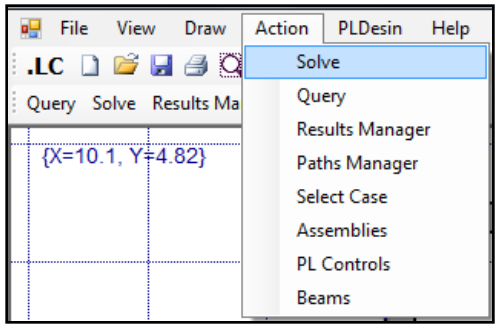


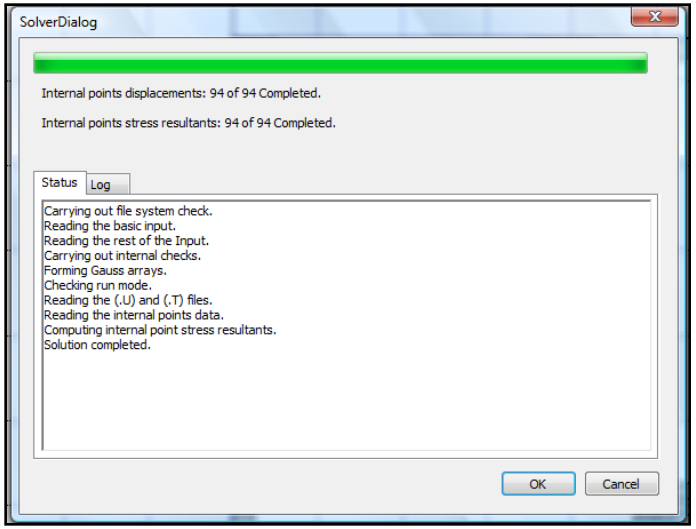
After drawing the area, move to Result Manager.

Contour 1 is created in the middle window and it's automatically enabled, similarly to the Main Contour the user should insert the spacing, number of colors & choose the current variable.

Rectangular Contour

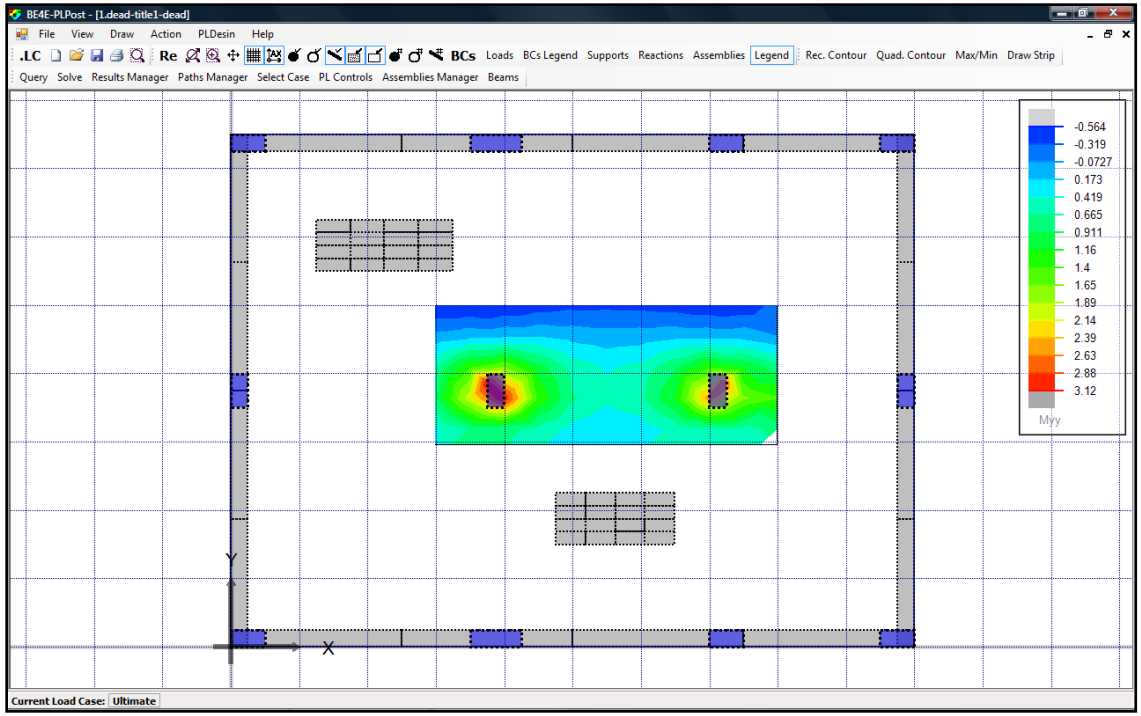
This is time for solving and viewing the results.





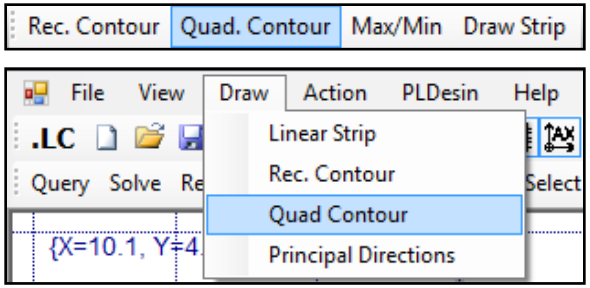
After solving press on (F3) or refresh, then the user can show the Legend.

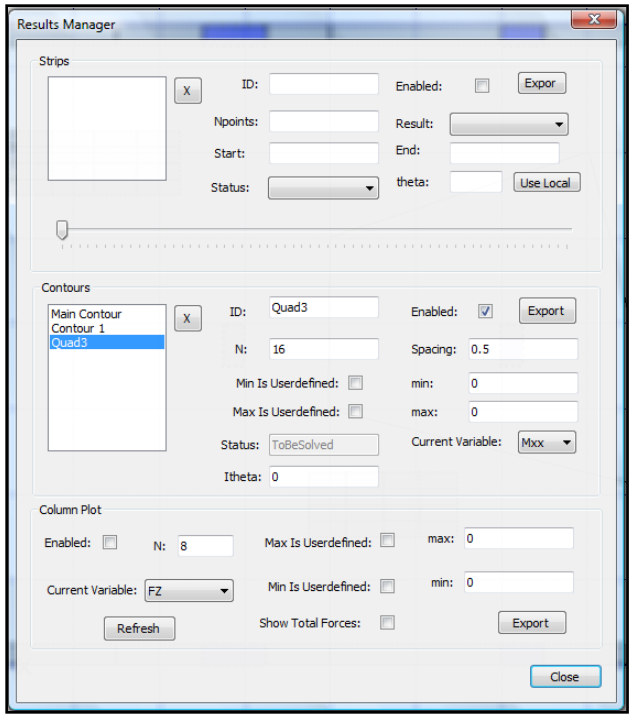
The user can see the straining actions in rectangular contour slab in any direction, only by changing the current variable on Result Manager.

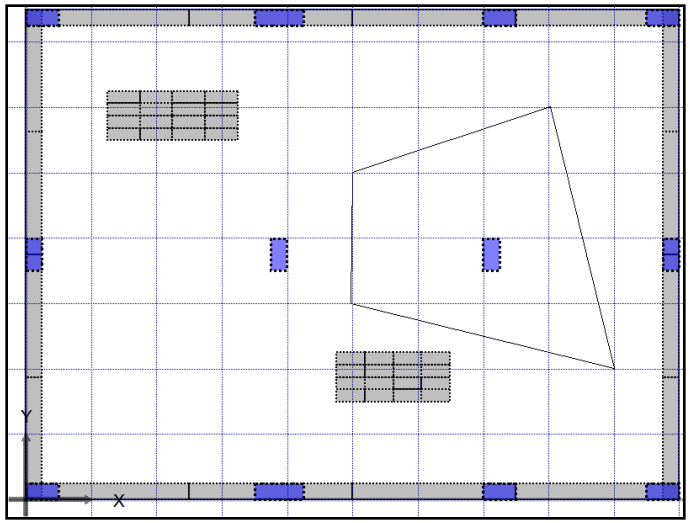


Quadratic Contour

3- Draw any quadratic area which need to be solved in PLPost.





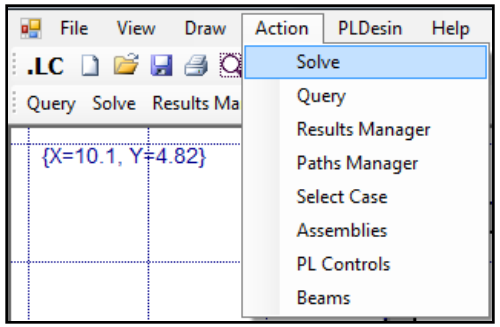


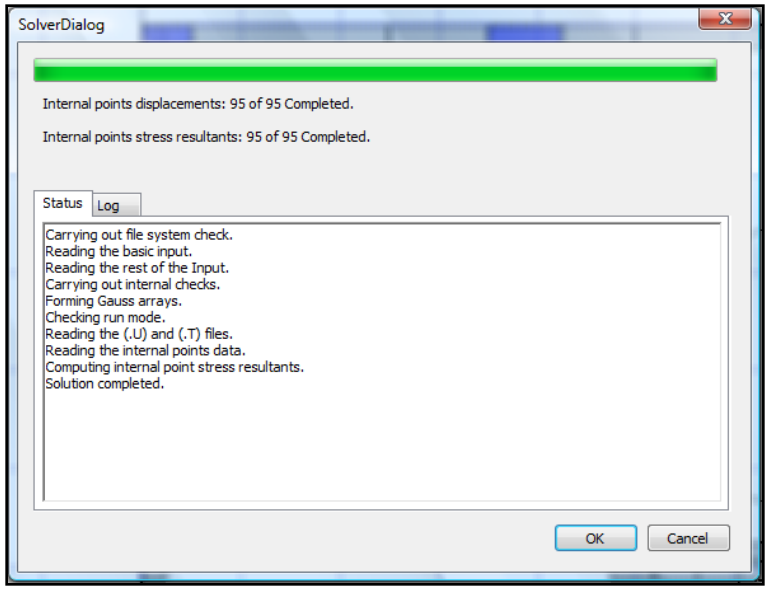
After drawing the area, move to Result Manager.

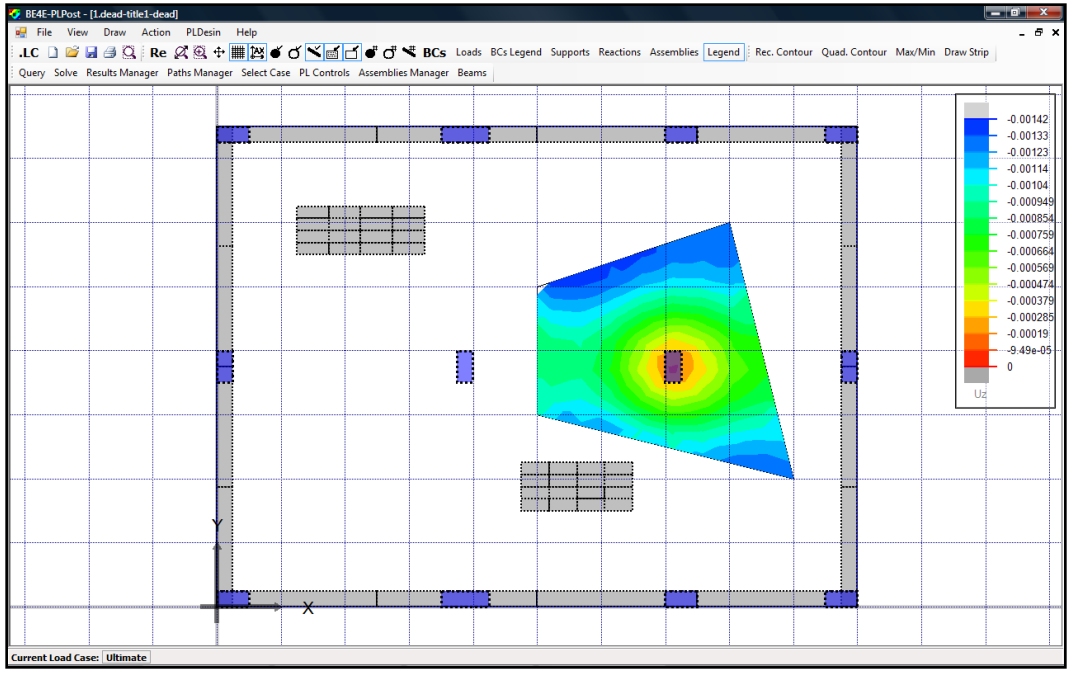
Quad 3 is created in the middle window and it's automatically enabled, similarly to the Main Contour the user should insert the spacing, number of colors & choose the current variable.

Quadratic Contour

As same as rectangular contour.



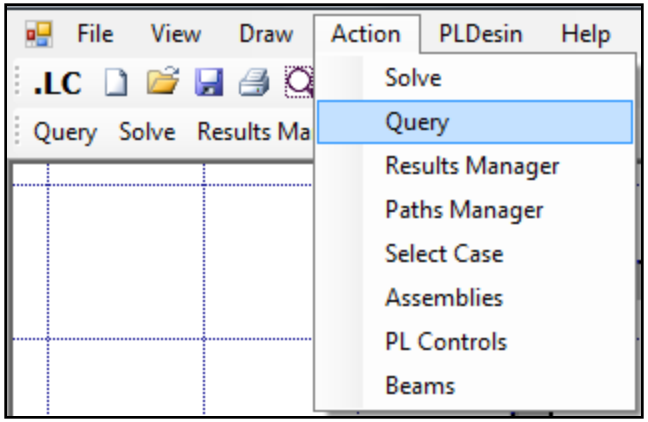




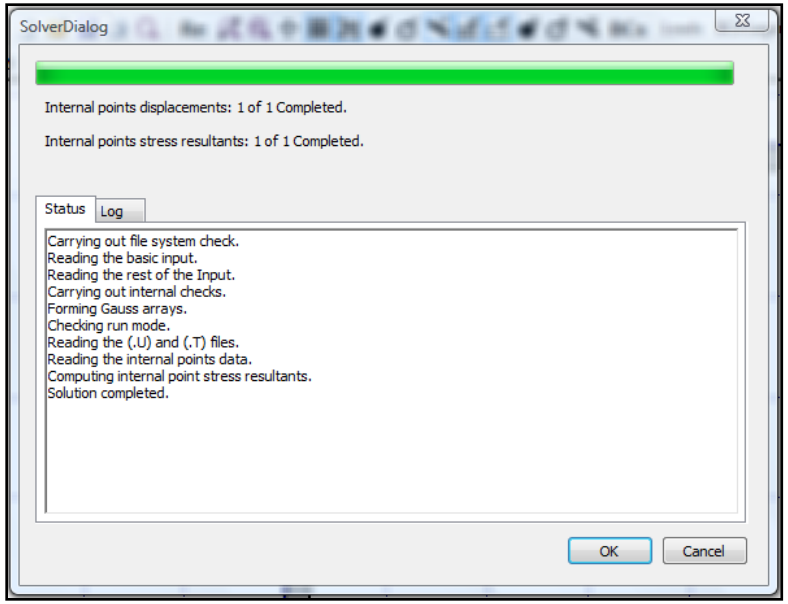
Straining action at a point

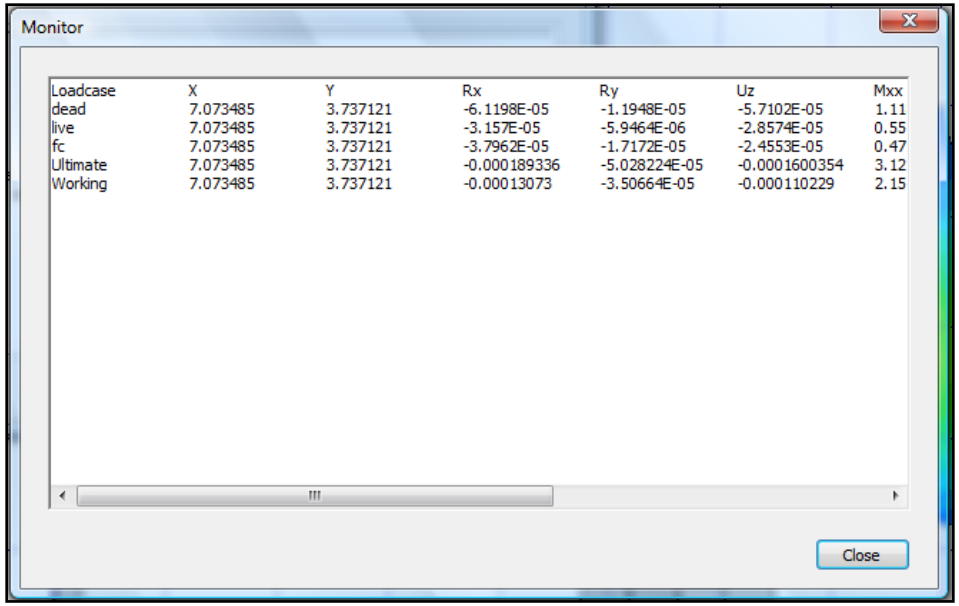
4- The user can see the straining action at any point by using Query tab.

After pressing on Query, choose any point to view its straining actions in all cases & their combinations.



The user doesn't need to go to Result Manager as any previous Contour.

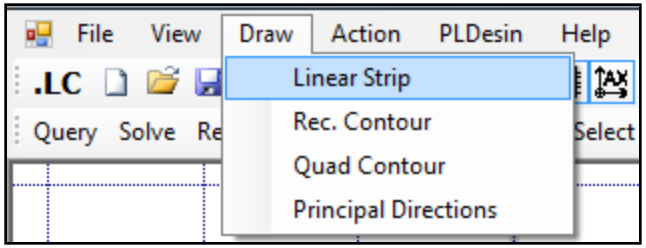




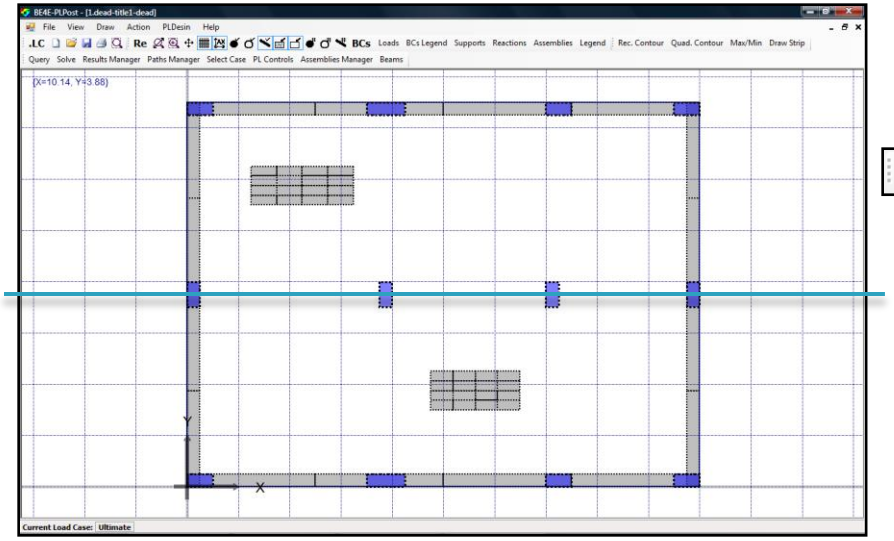
Loadcase	X	Y	Rx	Ry	Uz	Mxx
dead	7.073485	3.737121	-6.1198E-05	-1.1948E-05	-5.7102E-05	1.11
live	7.073485	3.737121	-3.157E-05	-5.9464E-06	-2.8574E-05	0.55
fc	7.073485	3.737121	-3.7962E-05	-1.7172E-05	-2.4553E-05	0.47
Ultimate	7.073485	3.737121	-0.000189336	-5.028224E-05	-0.0001600354	3.12
Working	7.073485	3.737121	-0.00013073	-3.50664E-05	-0.000110229	2.15

Draw Strip

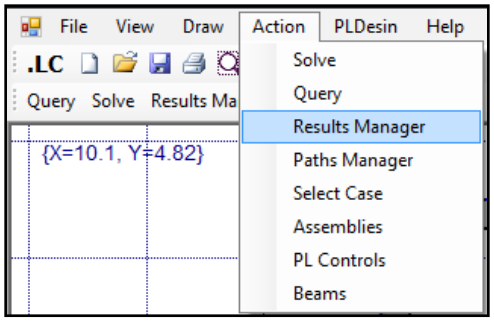
5- Drawing a Strip is another type for showing Straining action.



The user can draw straight line by pressing <u>shift</u> during drawing.

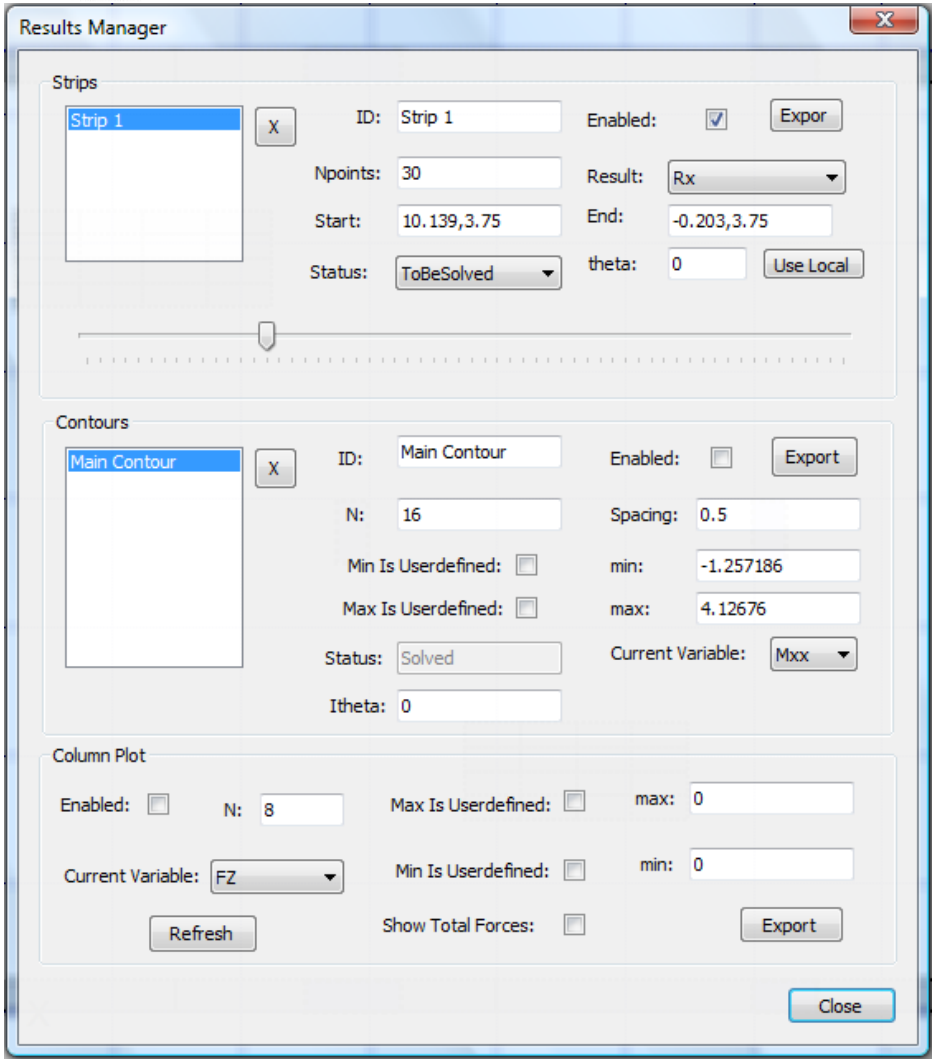


Then open the result manager to modify the strip.

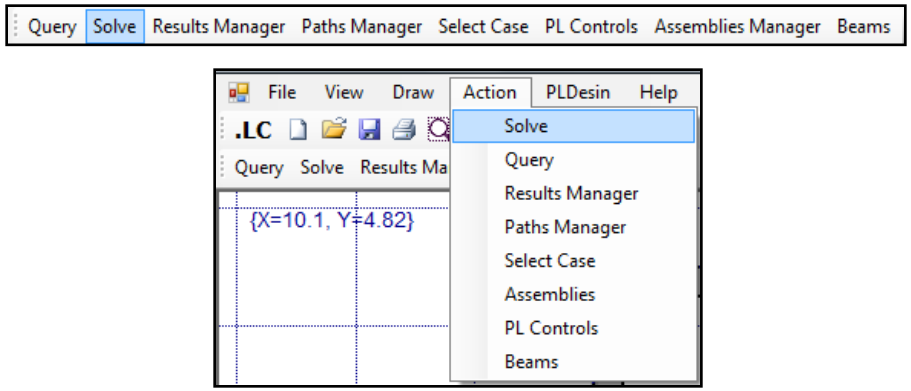


Draw Strip

Opening the Result Manager the first part is called Strips



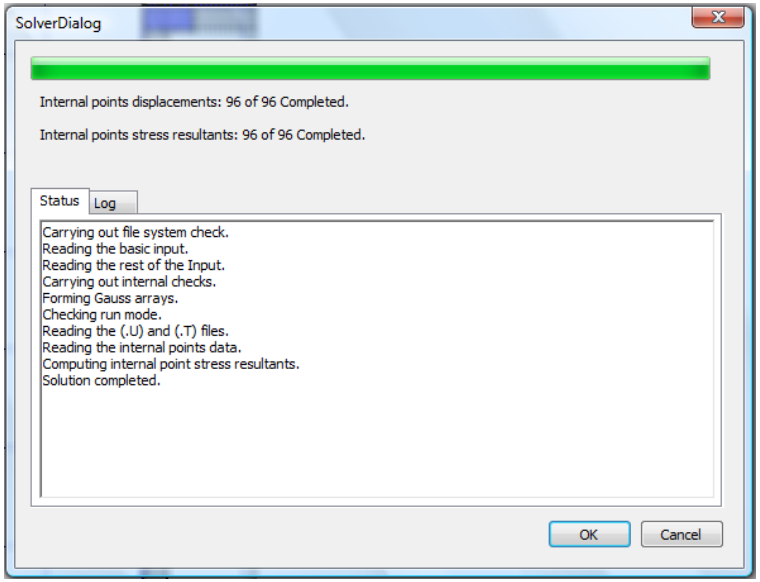
- The user can insert number of points.
- If we want a certain strip, the user can change the Start & the End points of the strip.
- Choose the result need to be shown in the strip.
- The user can export the result on text file after running the analysis.

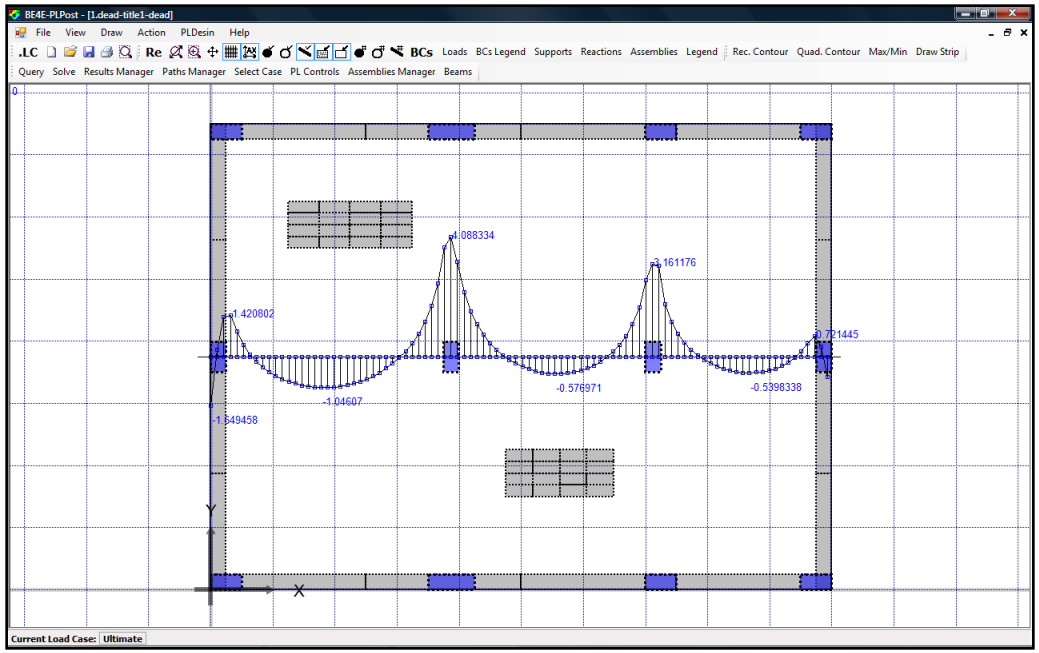


Press solve to run the analysis

Strip Analysis

After solving, press refresh or (F3) to show results.





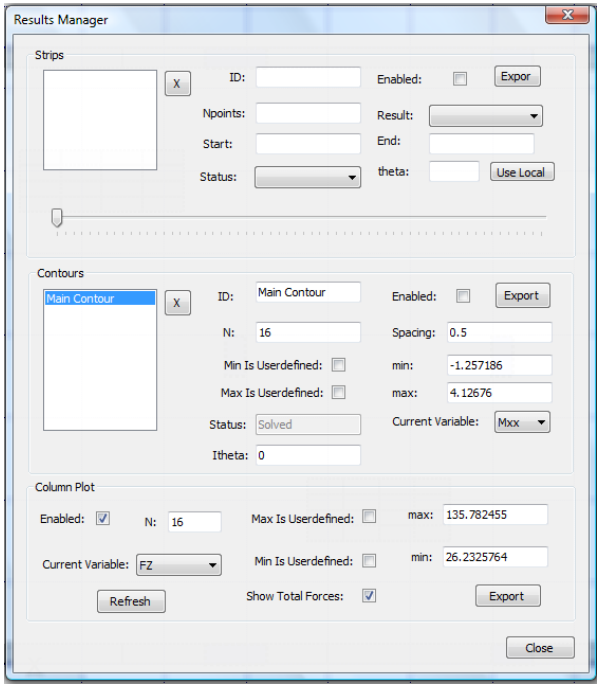
The user can change the Straining action need to be shown on strip by changing results in Result Manager.

Second: the Straining action for columns.

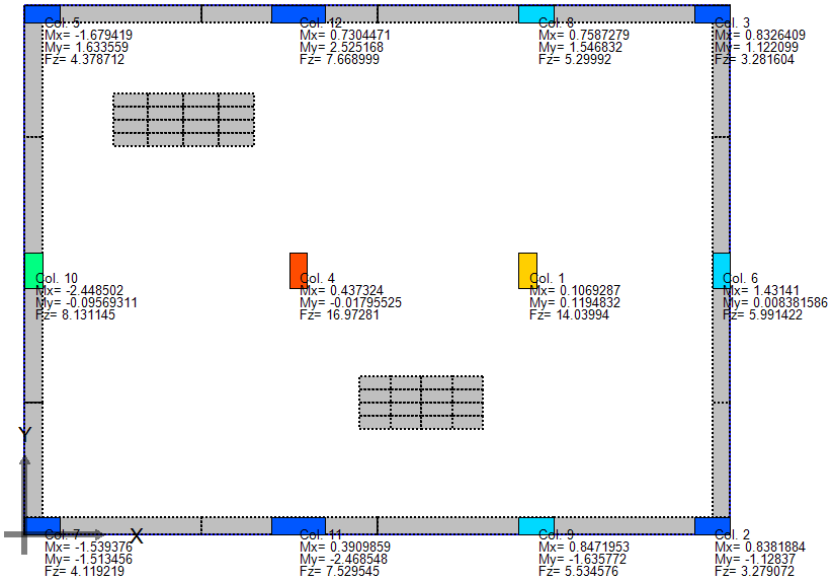
The user can show column analysis by two ways according to the type of model.

<u>In case of quadratic columns and without shear walls or beams.</u>

Open the Result Manager, the last part in the Result Manager is for column plot.



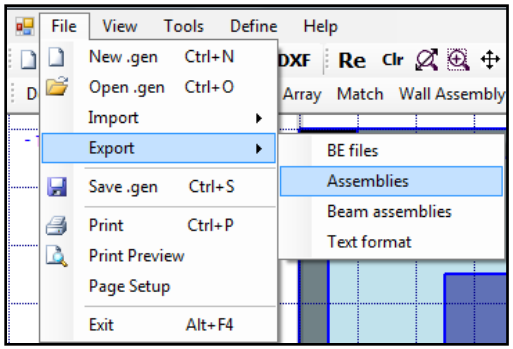
- The user mark on the check box (Enable).
- Mark on the check box (Show Total Force).
- Choose the Current Variable.
- The user can export the column straining action on text file.



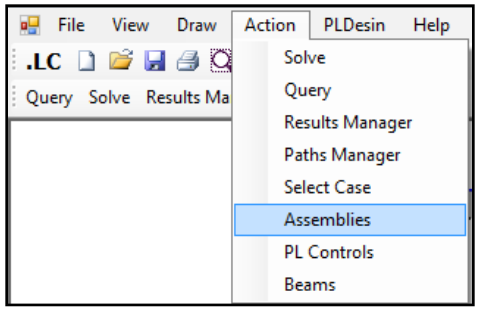
Unlike slabs, the columns don't have to run.

In case of columns more than four sides or slab with shear walls or beams.

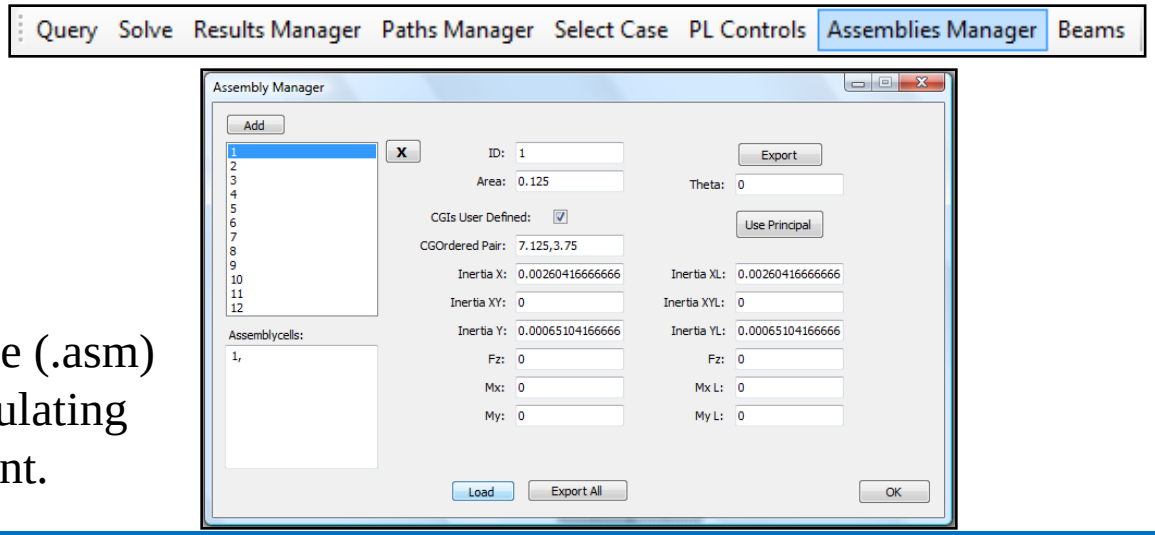
In this case the user should export Assembly file from generator file.



Then loading the assembly file from Assemblies Manager tab.



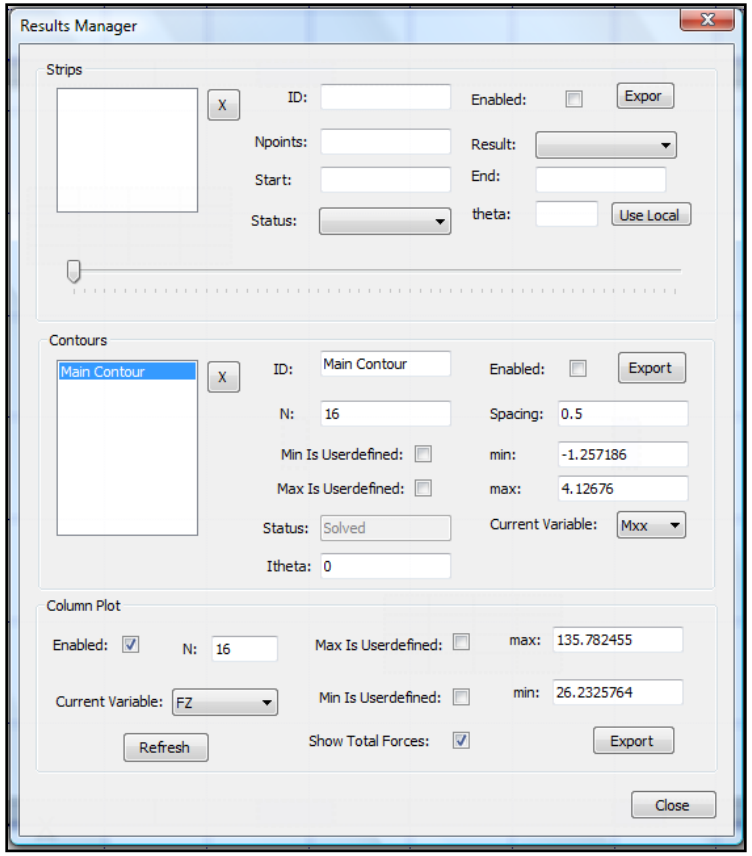
OR



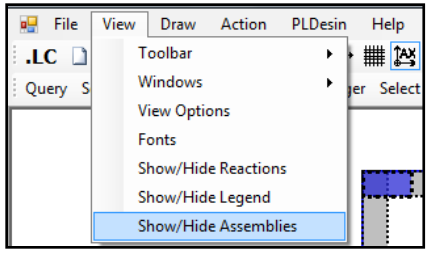
From load tab select the assembly file (.asm) for loading all support elements calculating all geometric properties of the element.

Column Analysis

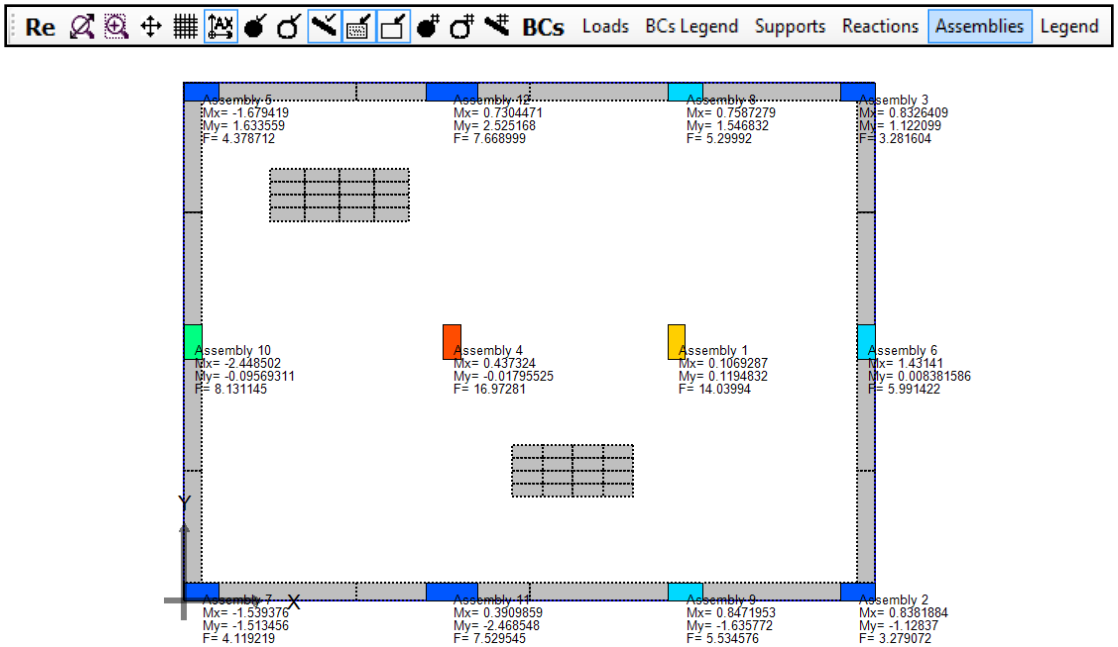
Open the Result Manager then check mark on (Enable) box and check mark on (Show Total Force) box.



From Show/Hide Assemblies then refresh, the user can show the straining actions on columns or shear walls.

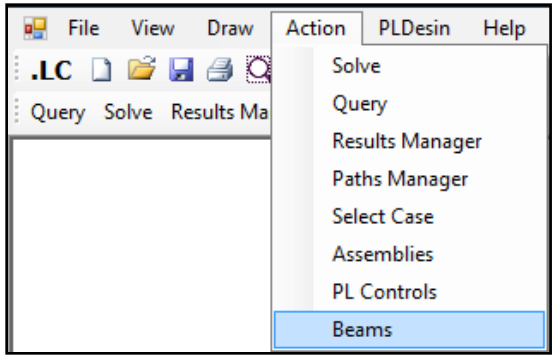


OR

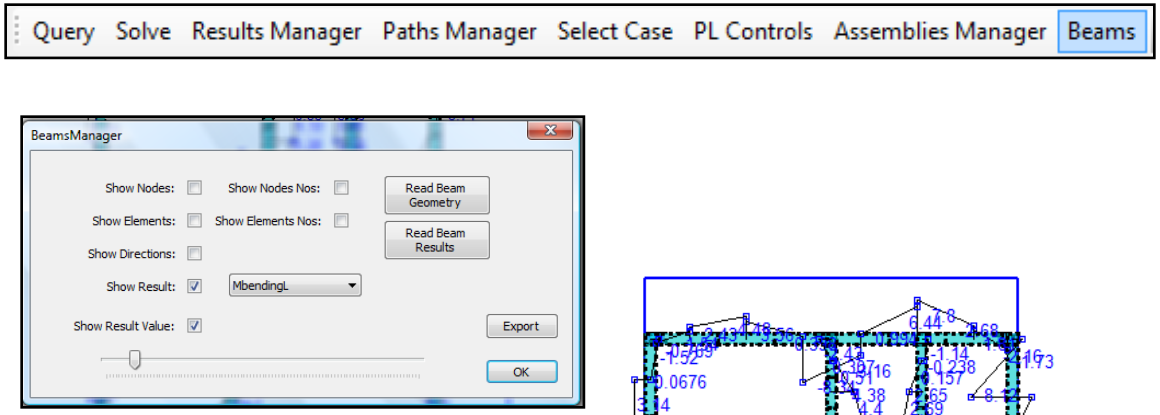


Beam Analysis

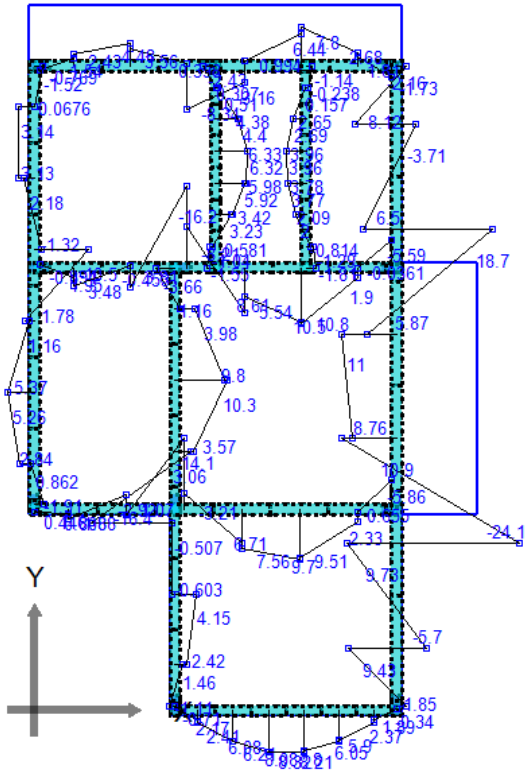
Beams analysis is very simple just open Beams Manager tab



OR



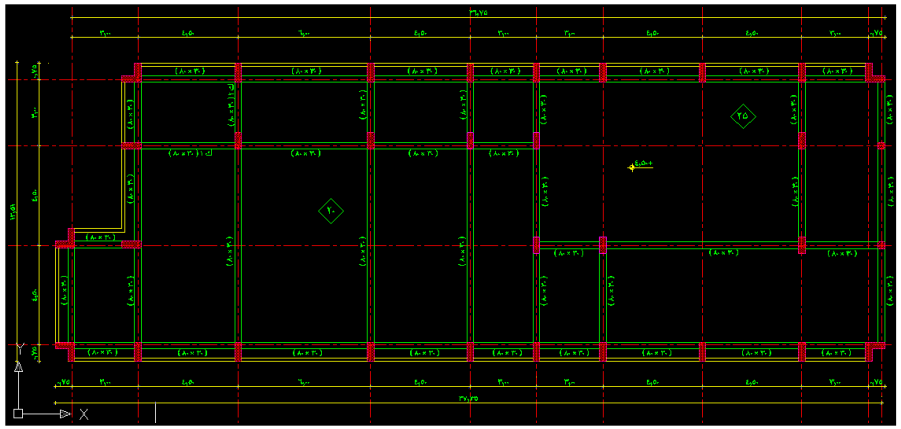
- Press on Read Beam Geometry.
- Press on Read Beams Results.
- Check mark on Show Result box.
- Check mark on Result Value box.
- Choose the Straining action need to be shown.

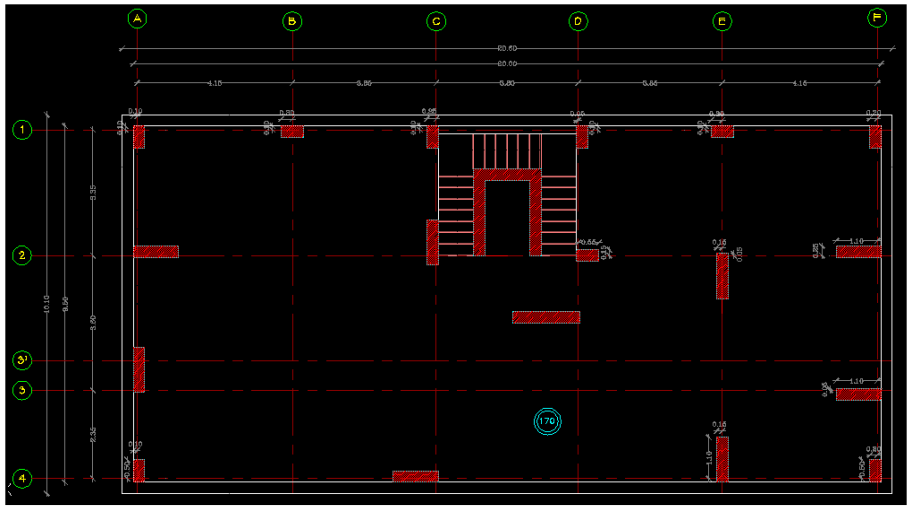


Like column analysis, beams don't need to run

Practical Examples Introduction

After finishing the Main Package (PLPAK), we are going to model 2 examples one of them is slabs and beams and the other one is raft on columns & shear walls loads.

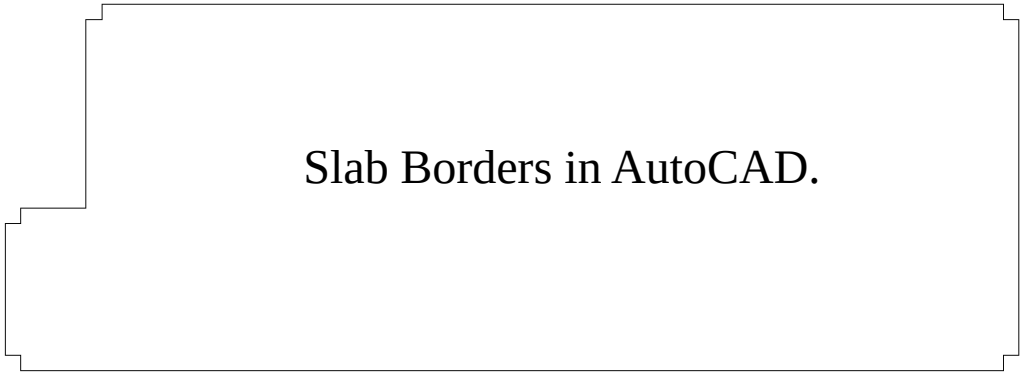


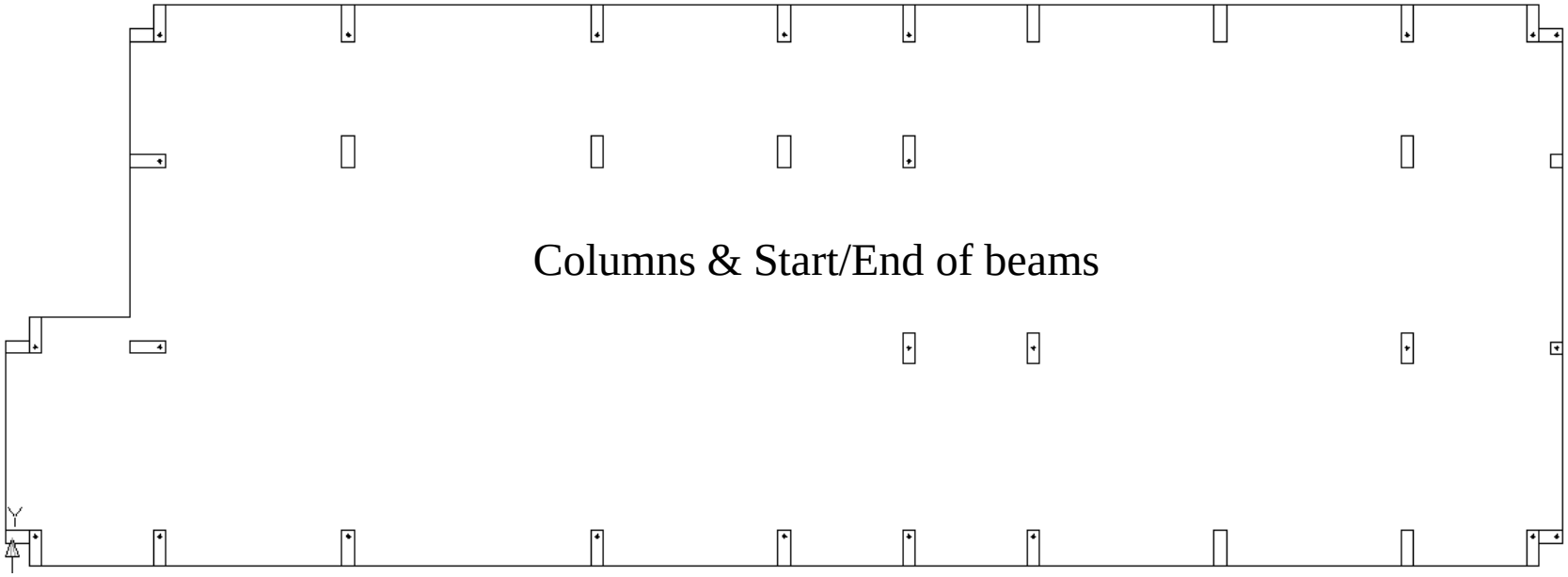


In this model we will practice on using PLPAK in Multi-thickness slab, L-shape columns & beam modeling.

In this model we will practice on using PLPAK in Winkler model, Load Assemblies.

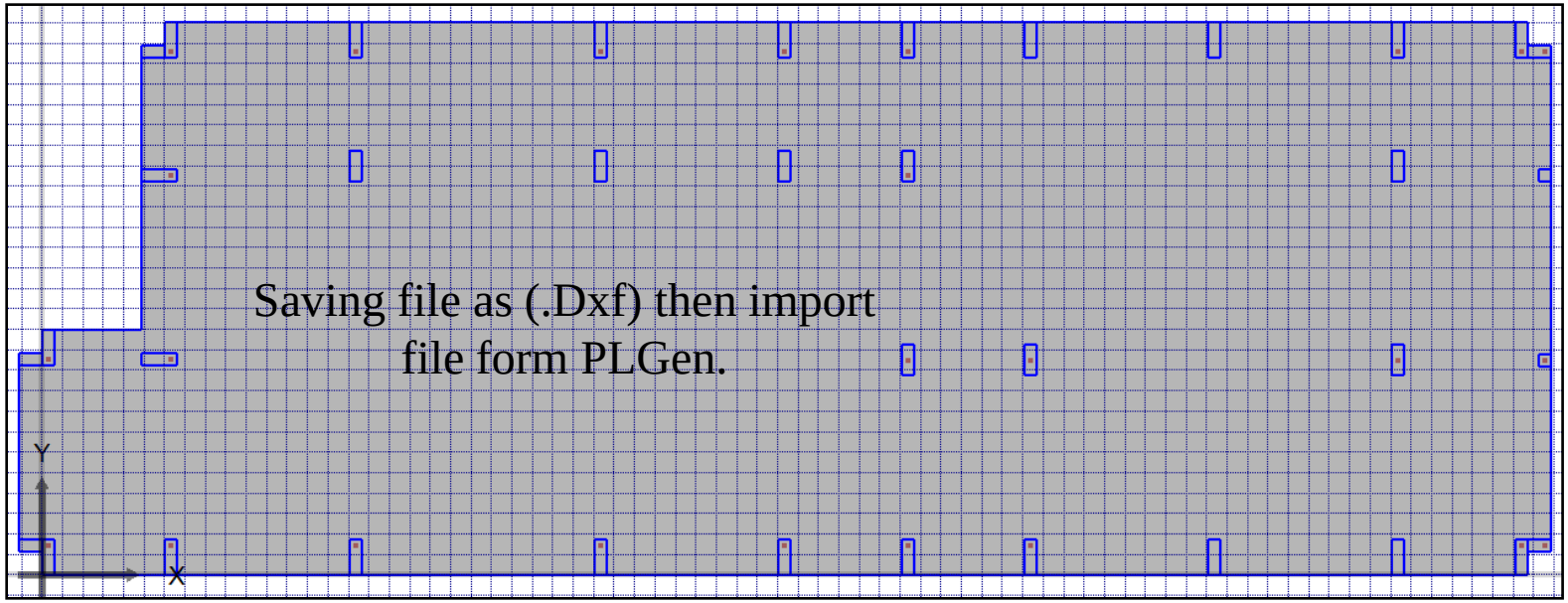
Practical Example 1

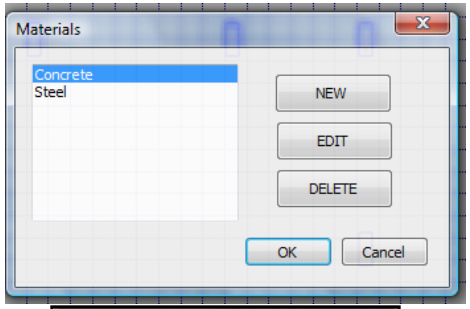


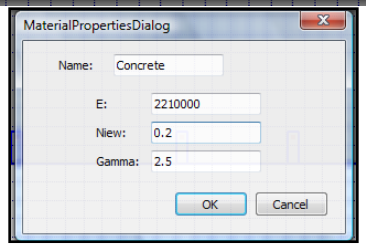


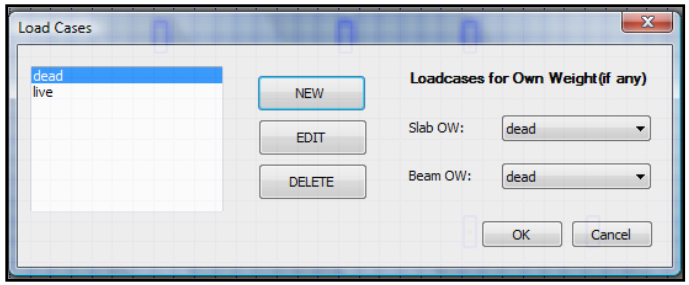
Note: The L-shapes columns are drawn as two rectangular columns.

Practical Example 1

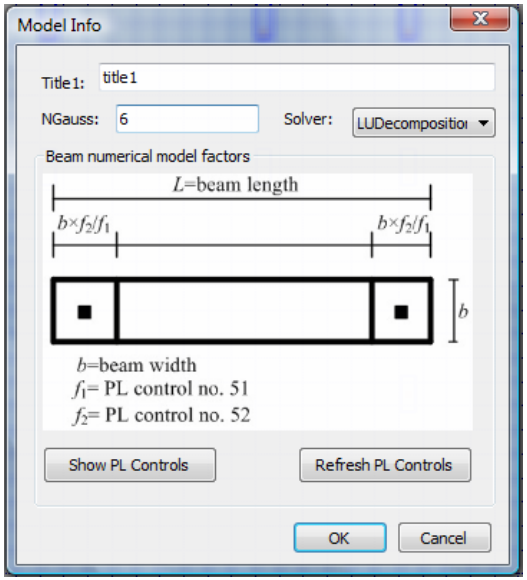




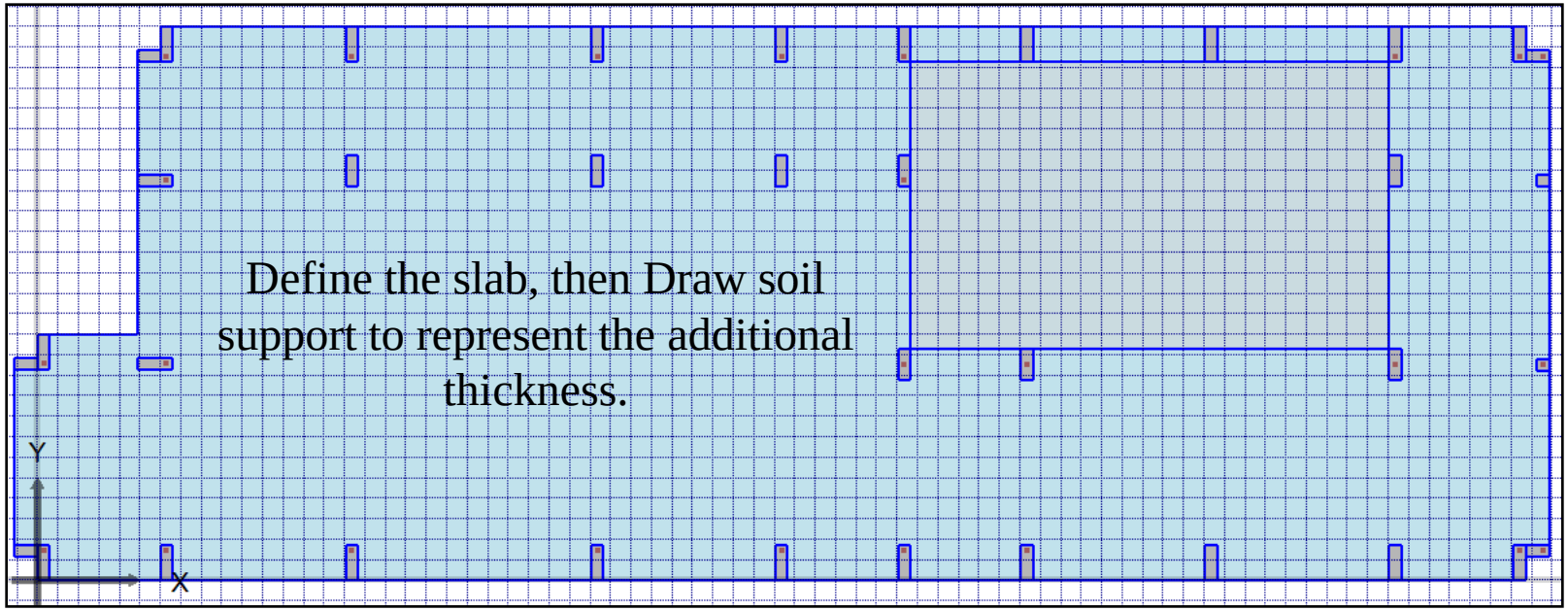


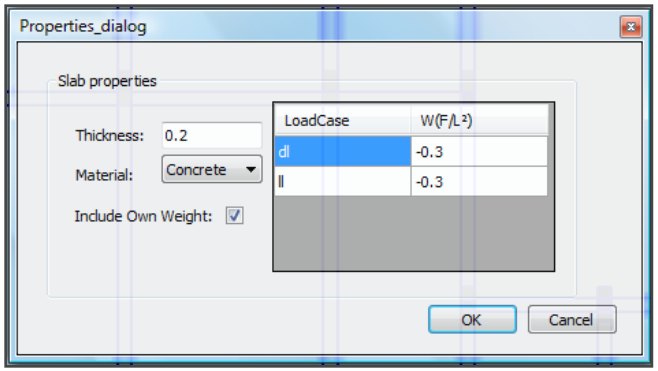


Adjusting Material properties, Load cases & Model information.

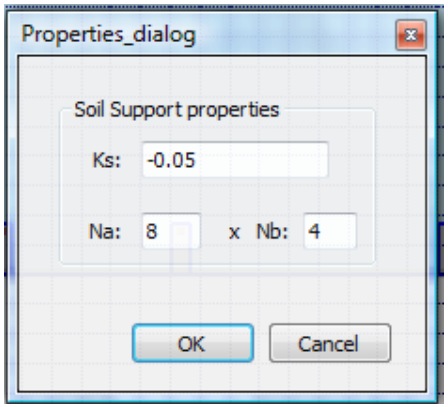


Practical Example 1



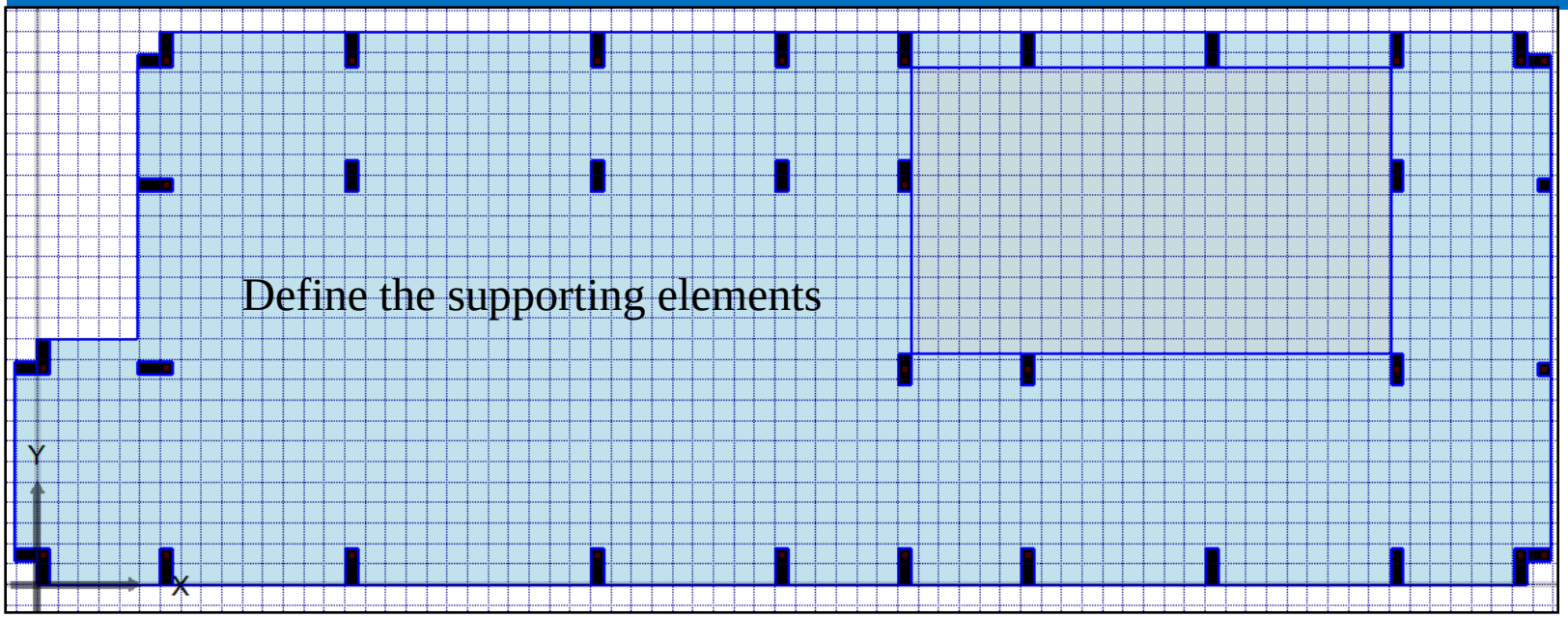


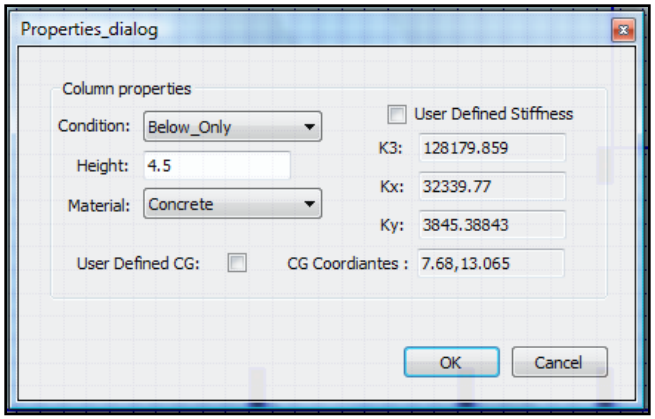
Define Slab Properties



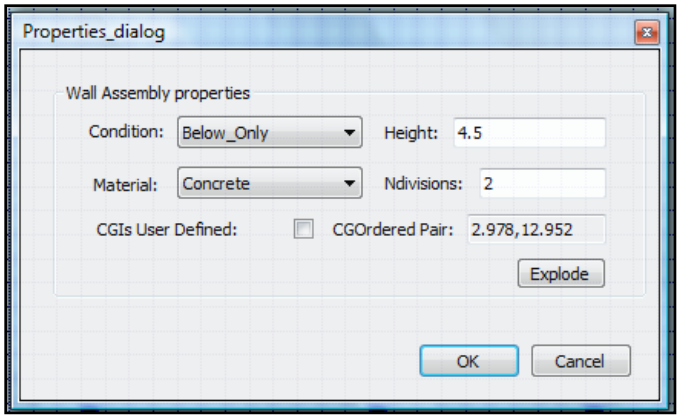
Define the additional thickness.

Practical Example 1



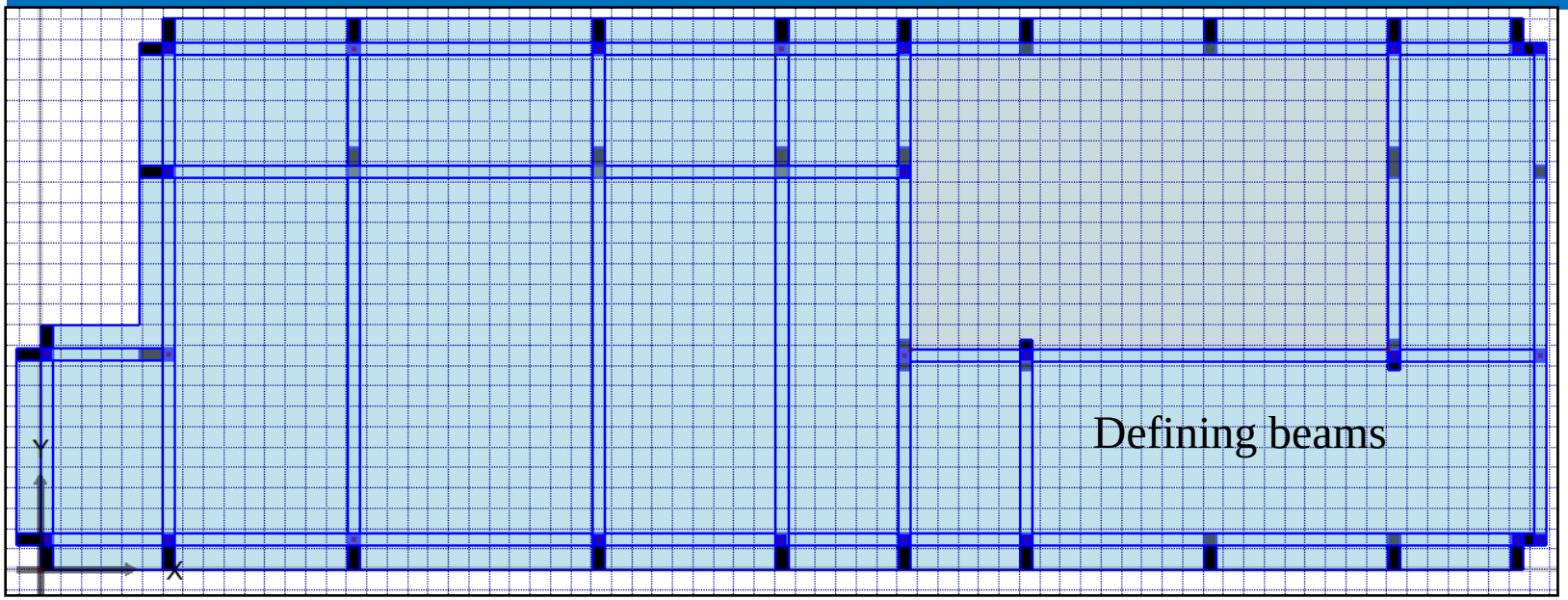


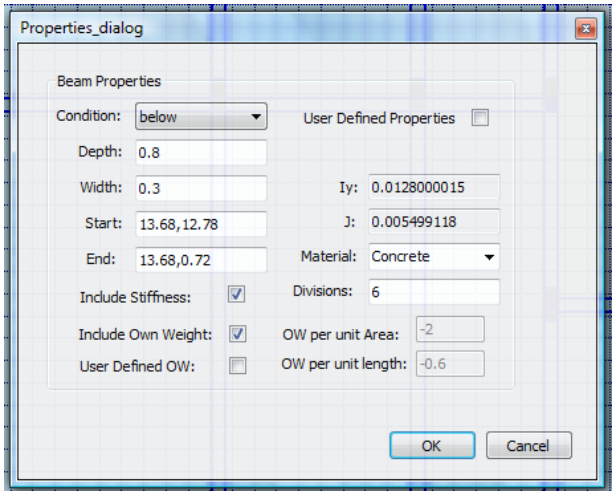
Define Columns Properties



Define the Properties of L-shaped column

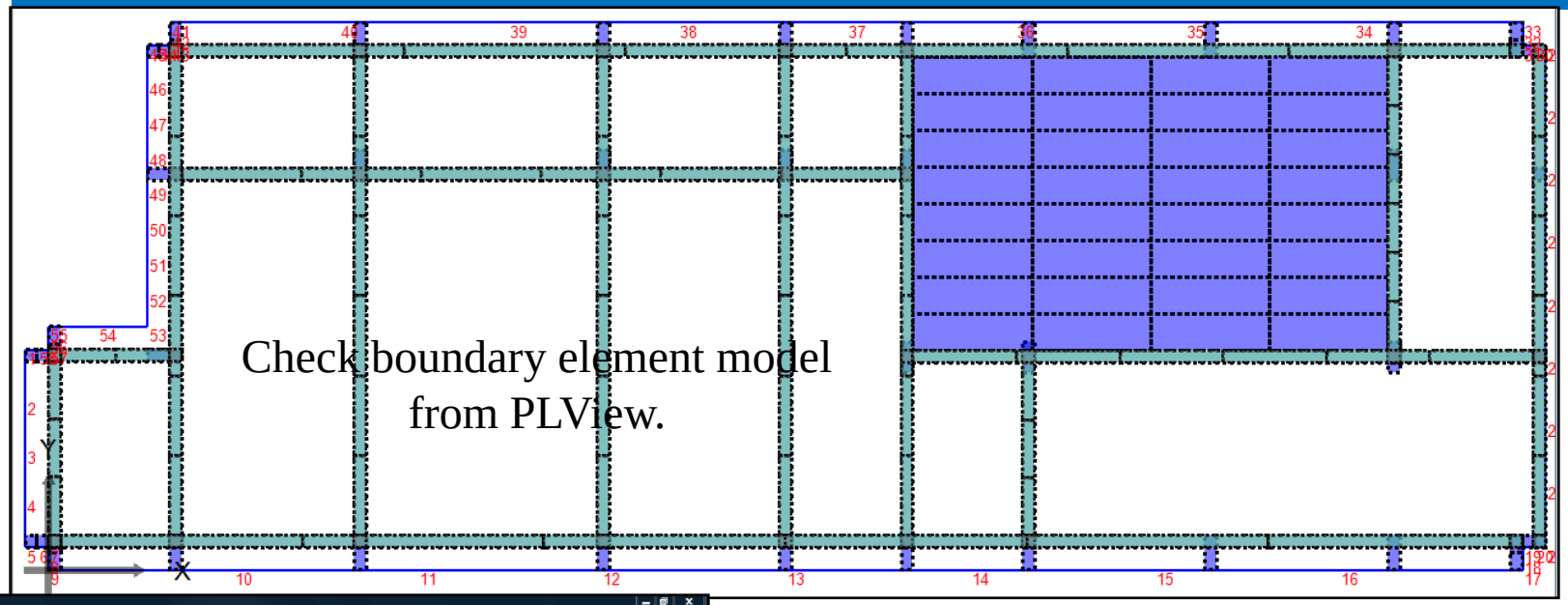
Practical Example 1

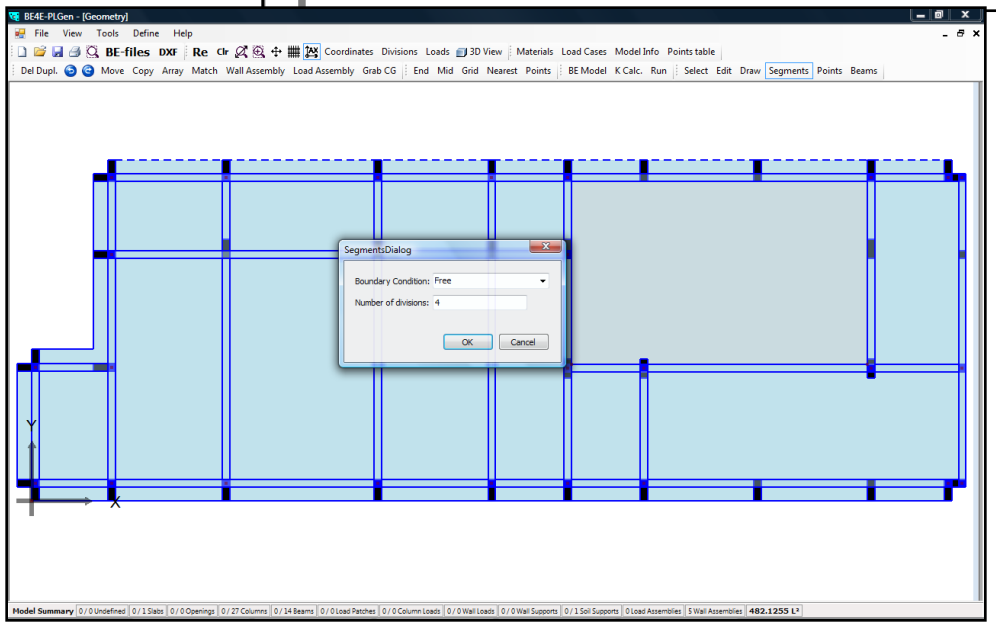




Define Beam Properties

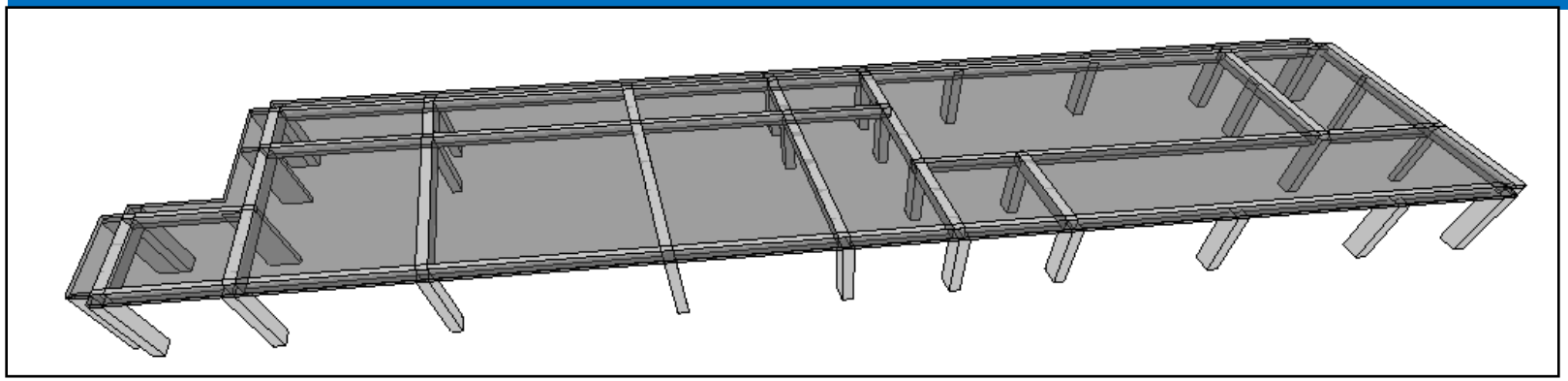
Practical Example 1



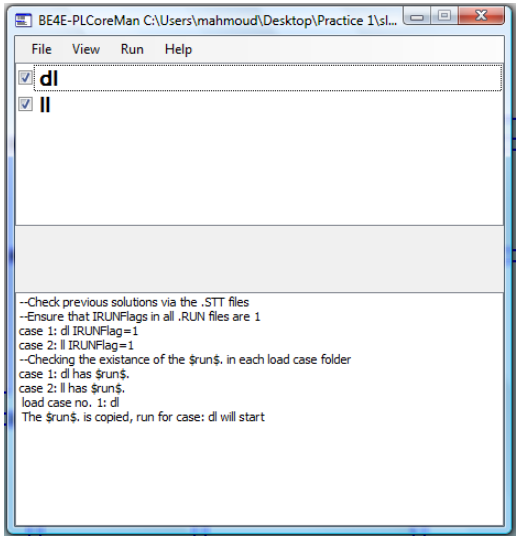


Adjusting number of segments in PLGen & Export assembly file.

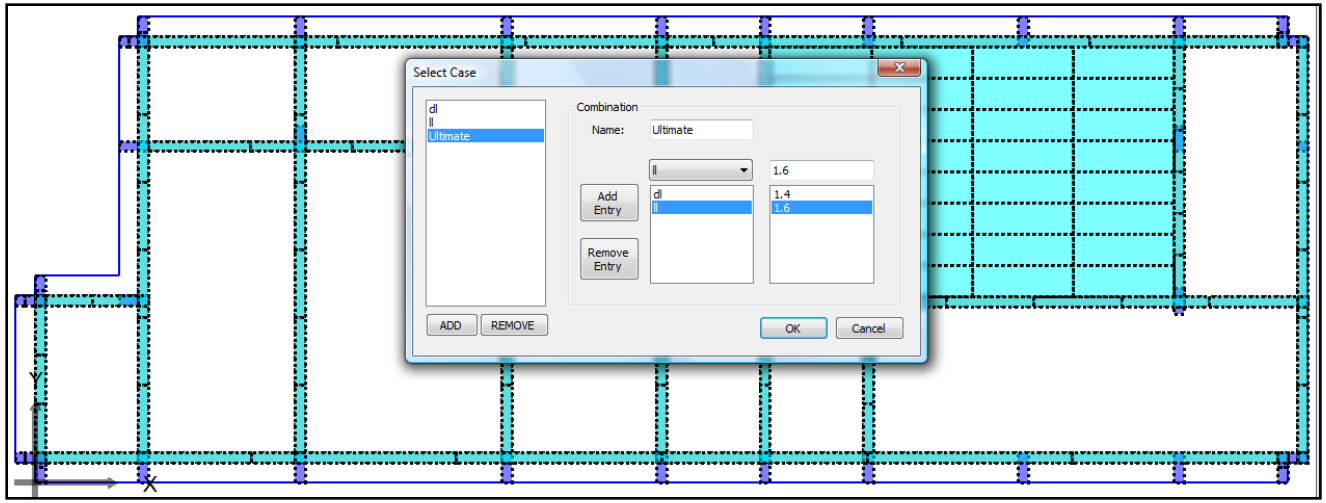
Practical Example 1



Showing 3D view

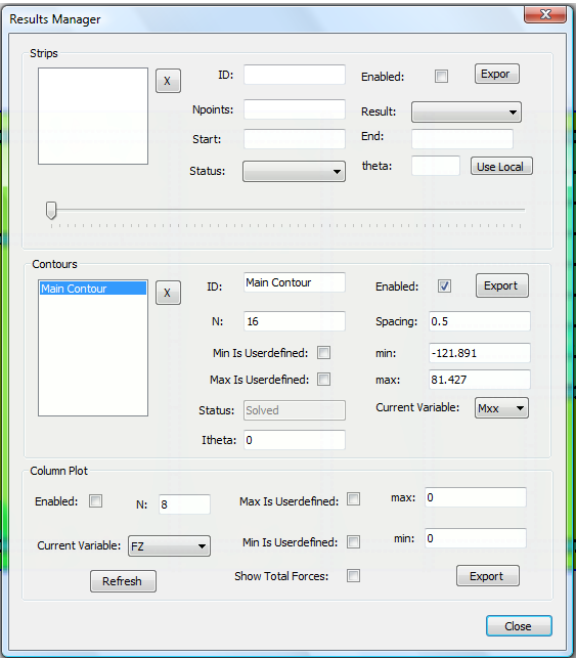


Modify the PLControls
Then run the model.

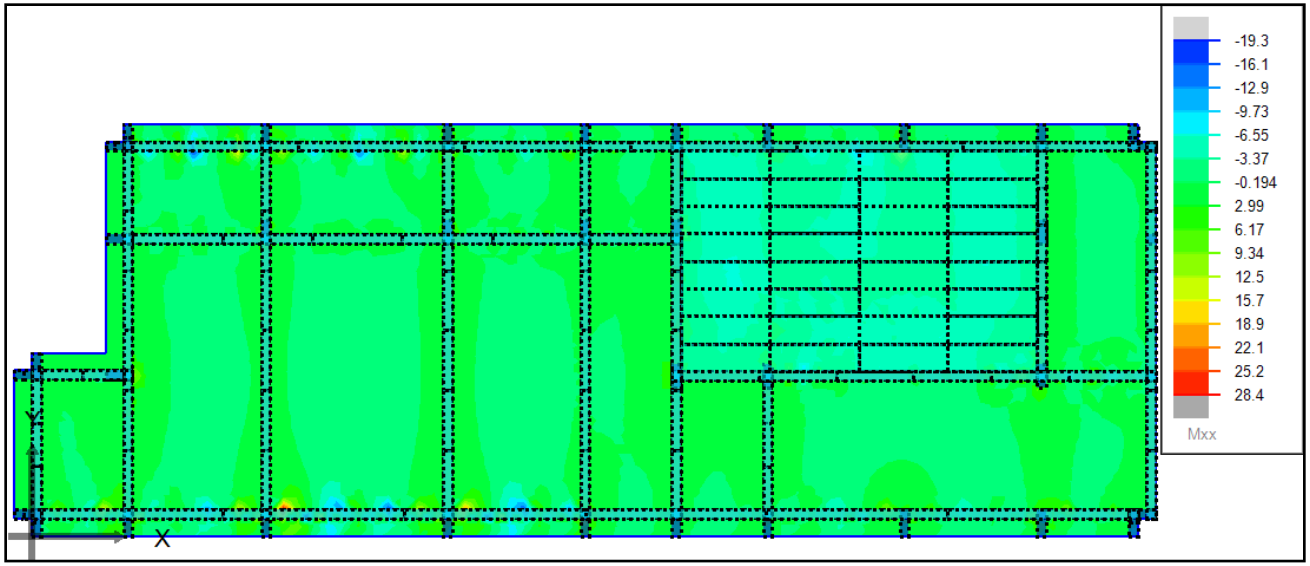


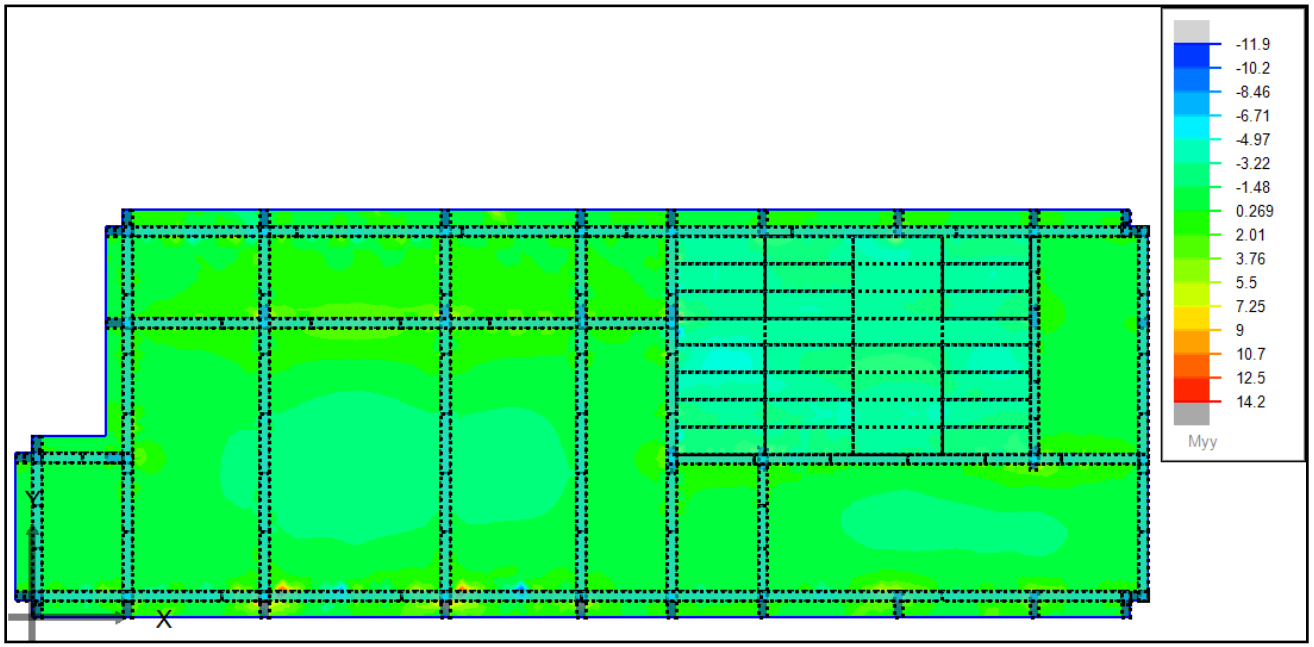
Open PLPost then add Load Combination

Practical Example 1



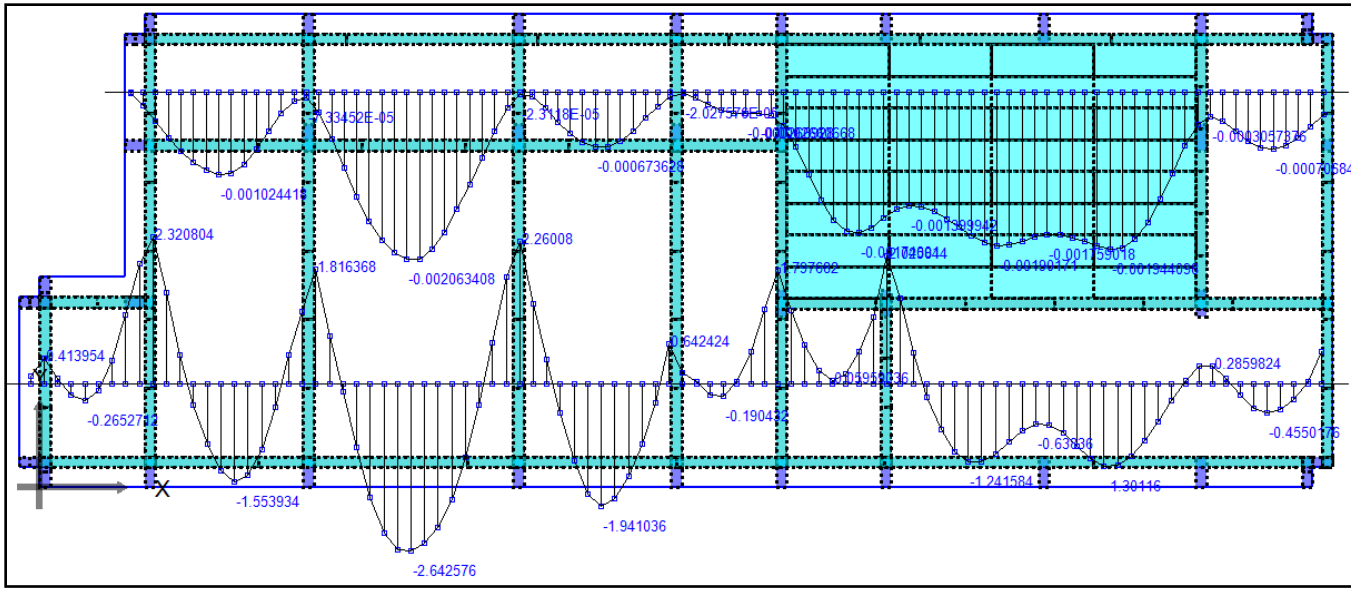
Show the contour lines for the slab

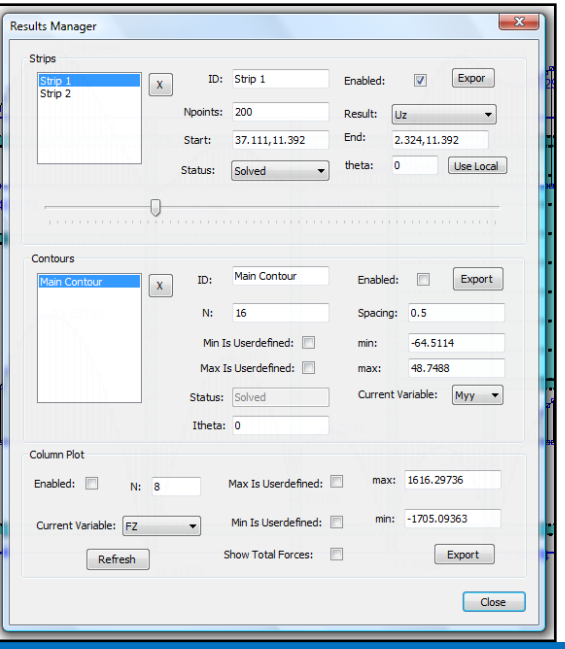




Practical Example 1

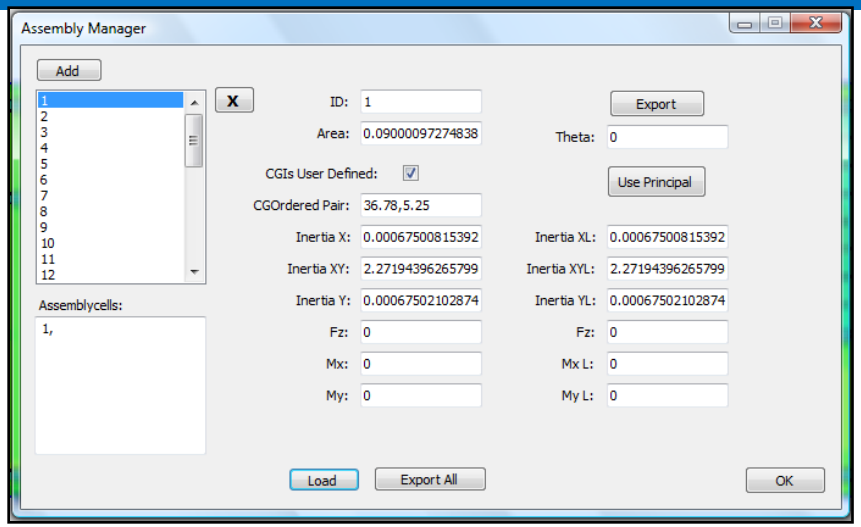
Draw strip & Show analysis.

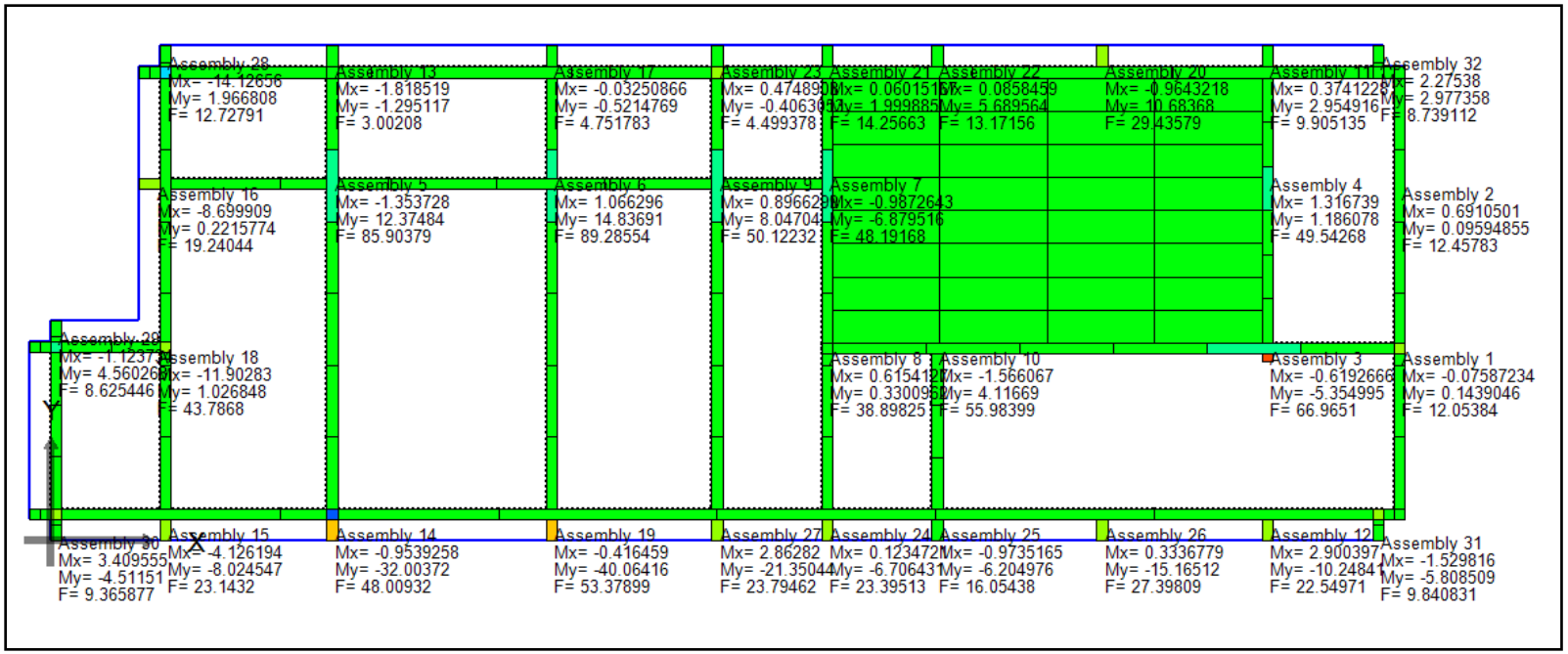




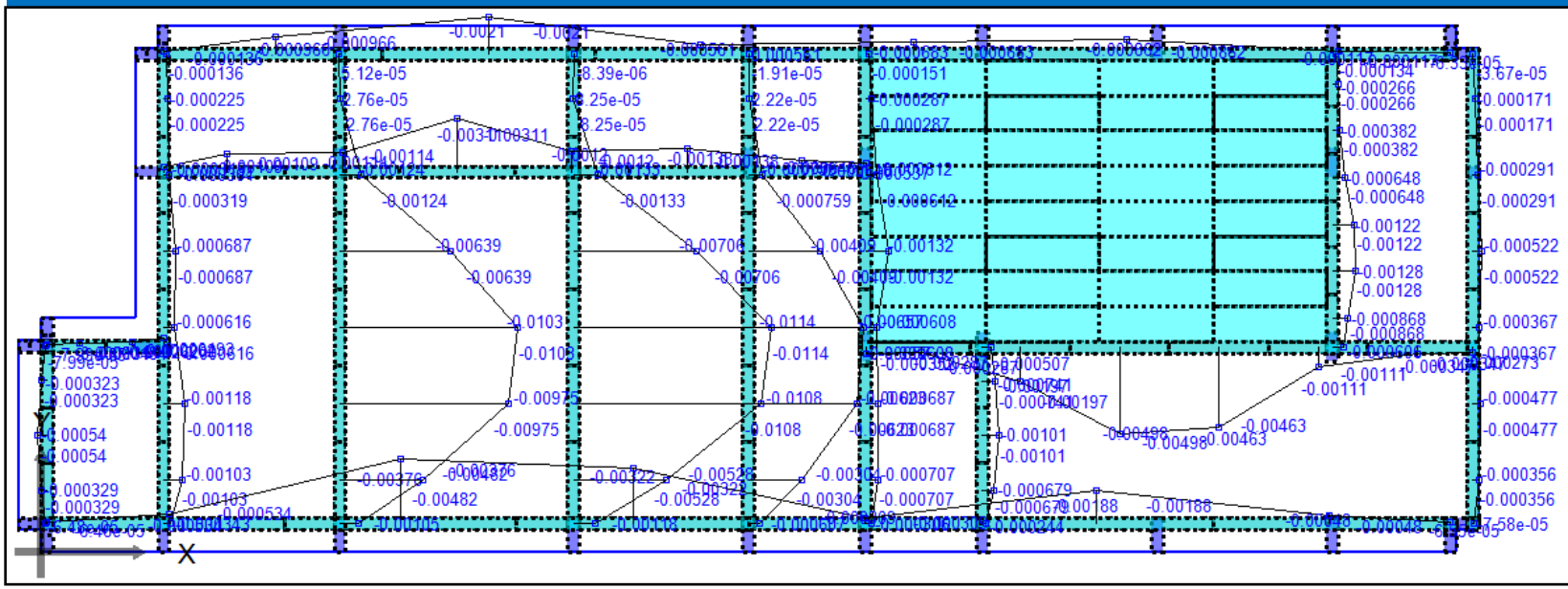
Practical Example 1

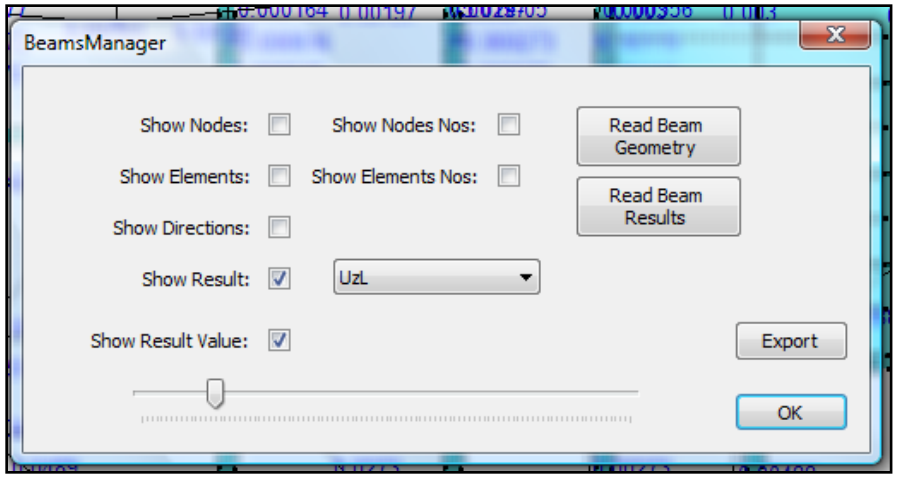
Load Assembly file (.asm)





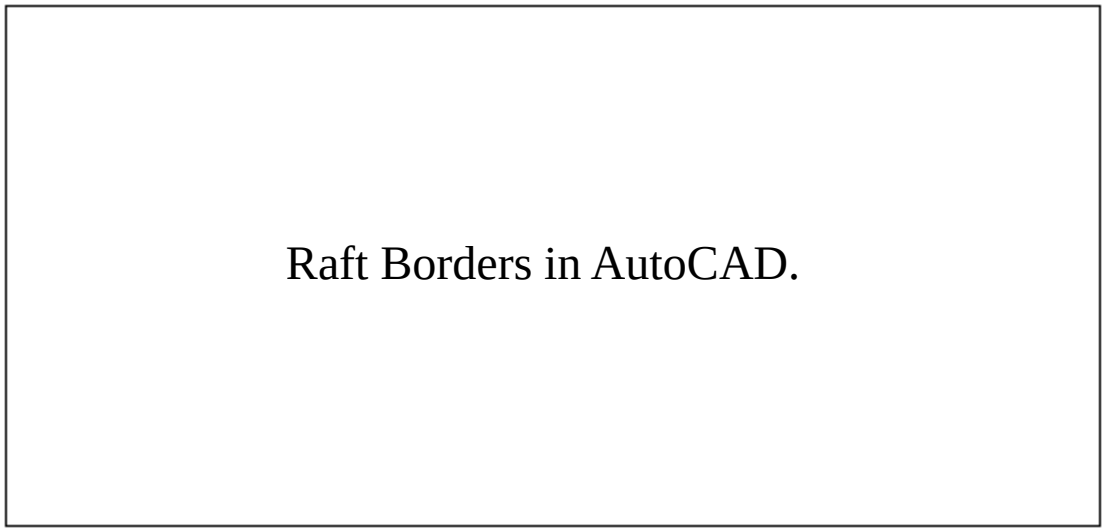
Practical Example 1

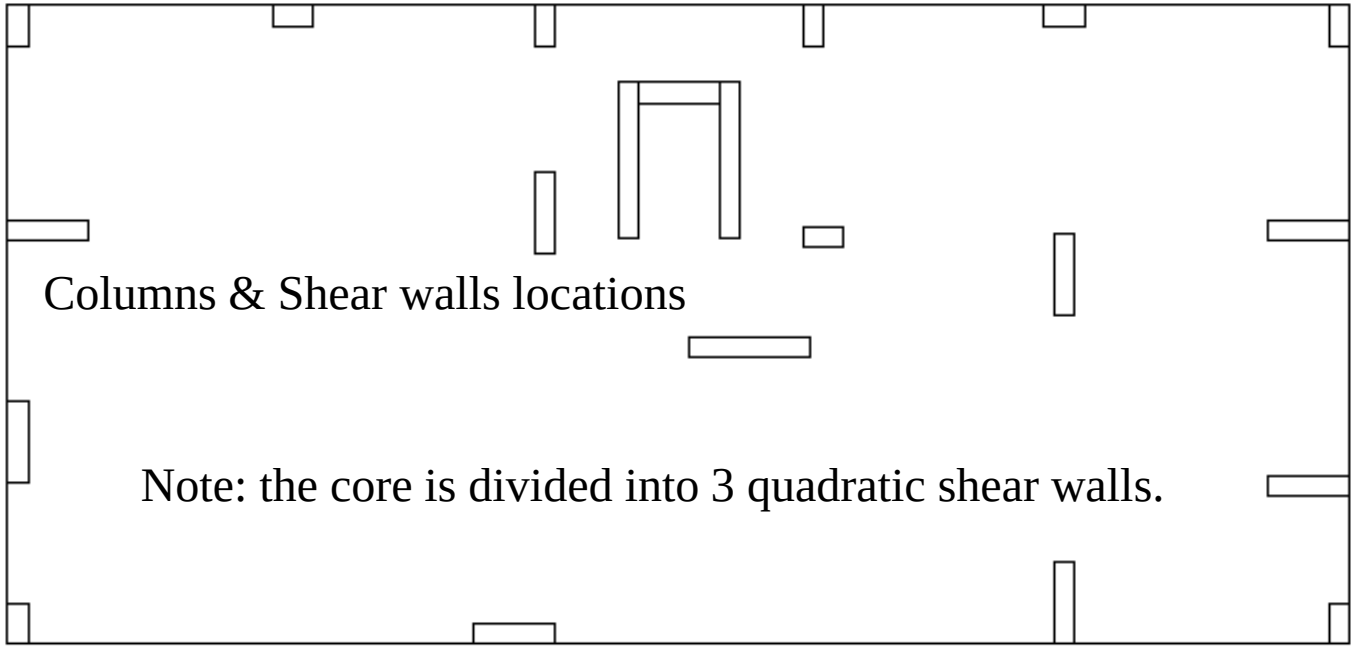




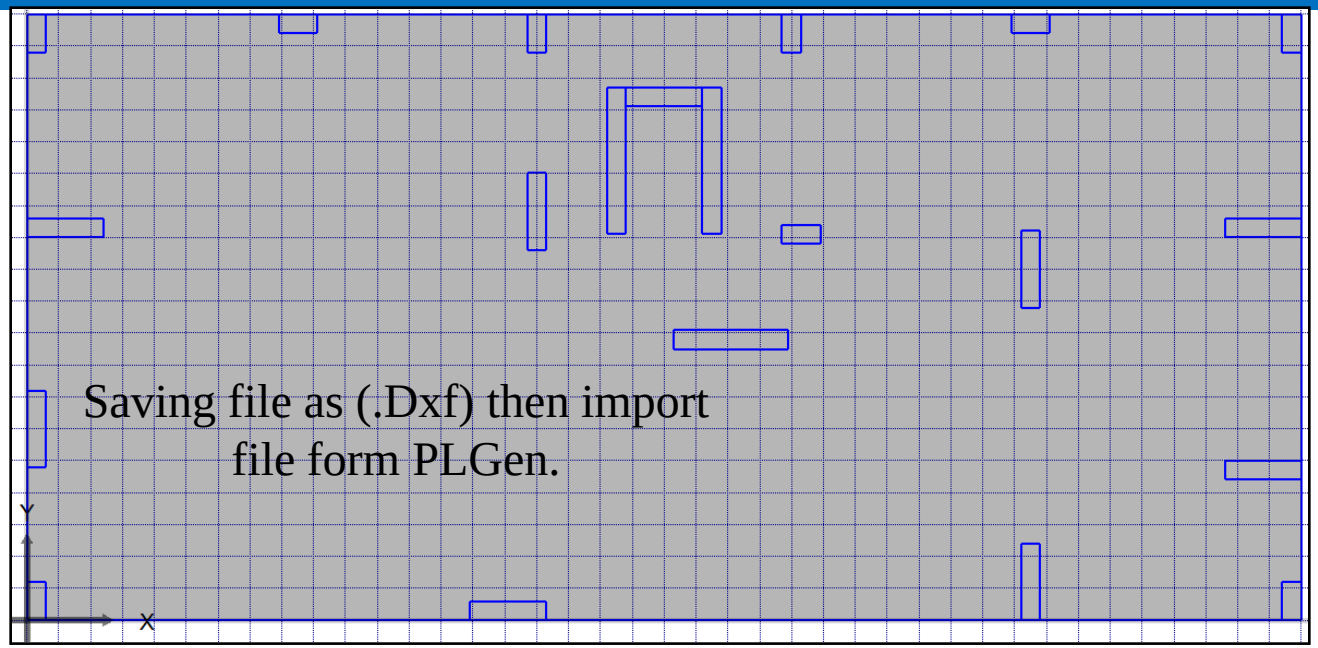
Display beam analysis.

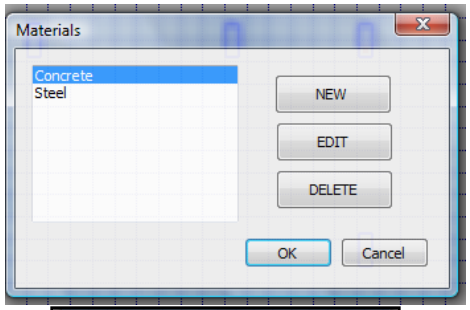
Practical Example 2

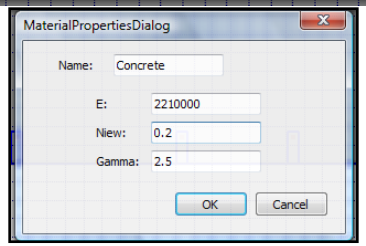


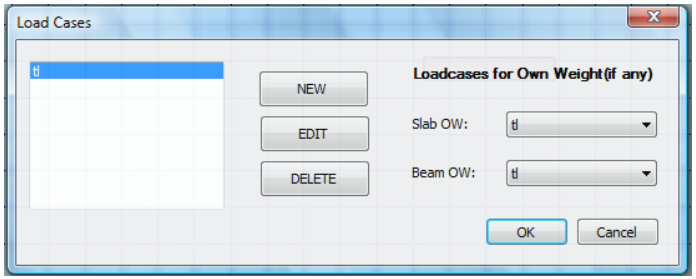


Practical Example 2

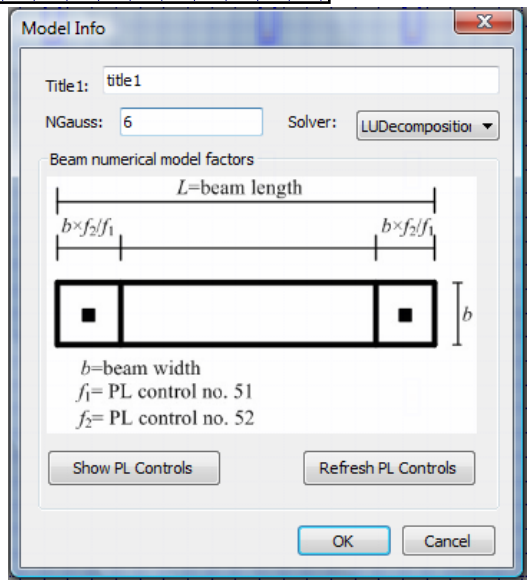




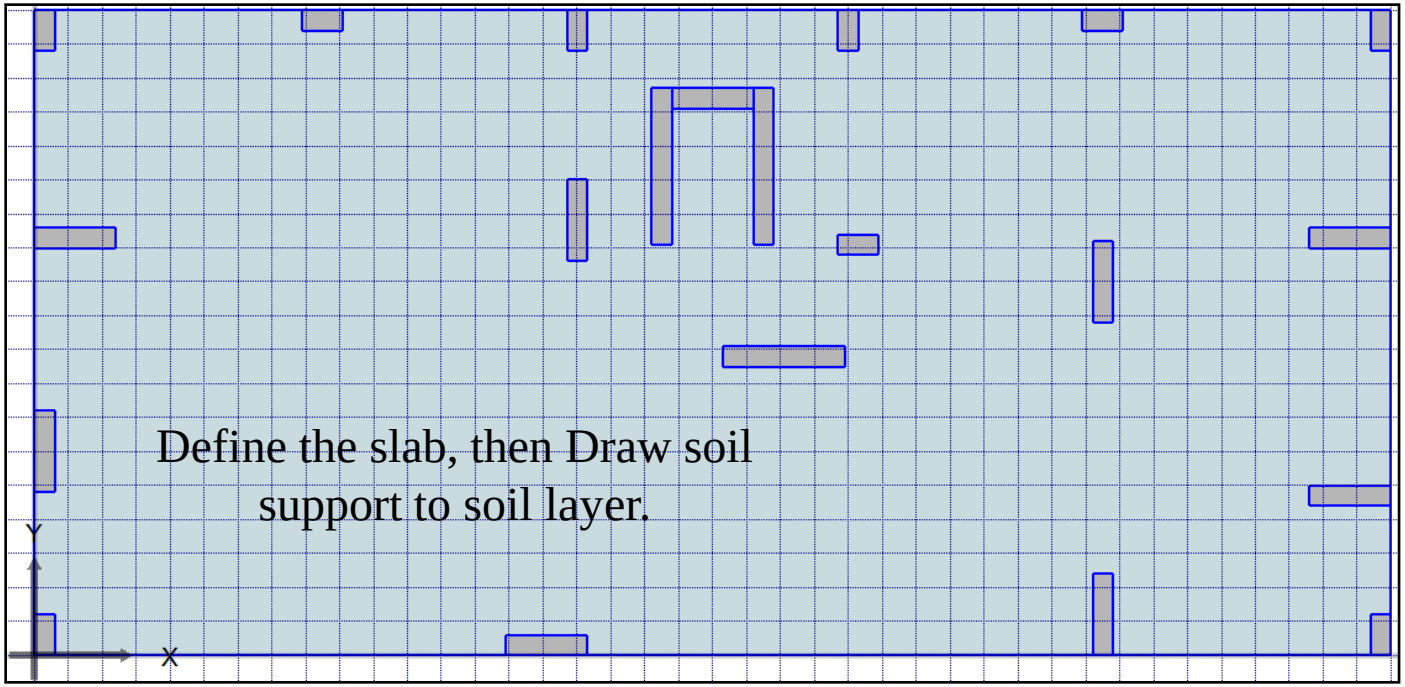


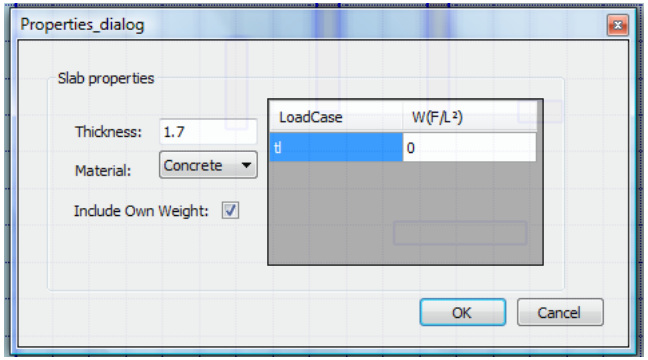


Adjusting Material properties, Load cases & Model information.

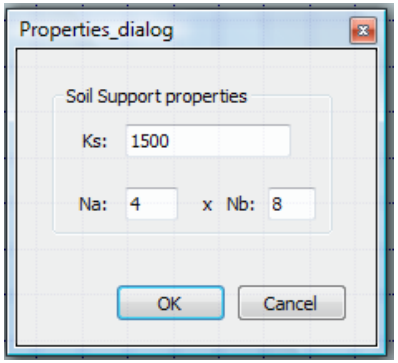


Practical Example 2



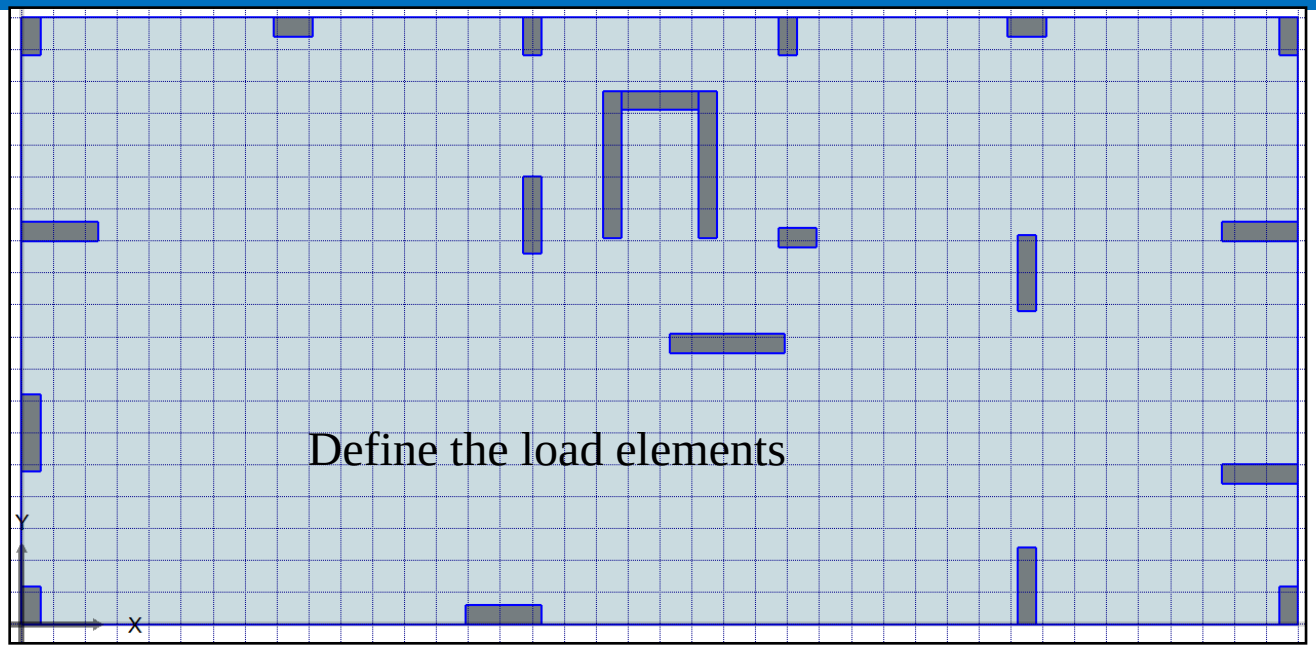


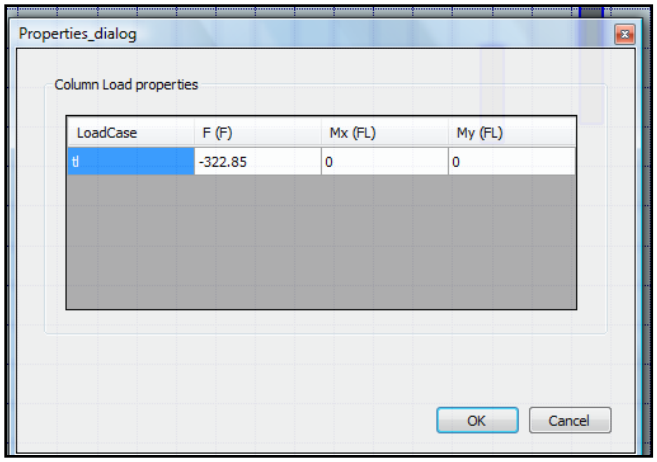
Define Slab Properties



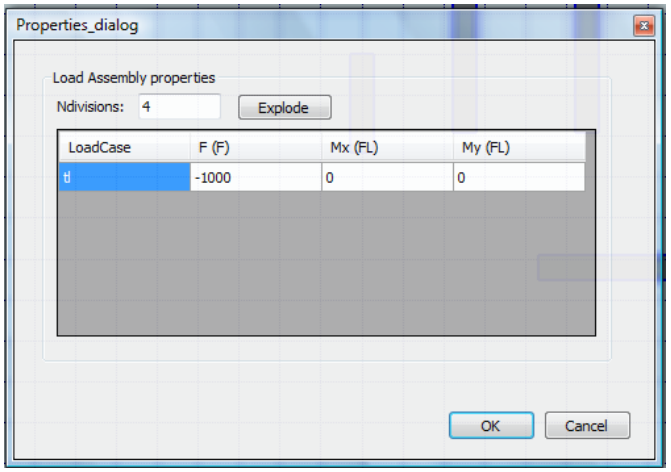
Define the Winkler stiffness.

Practical Example 2

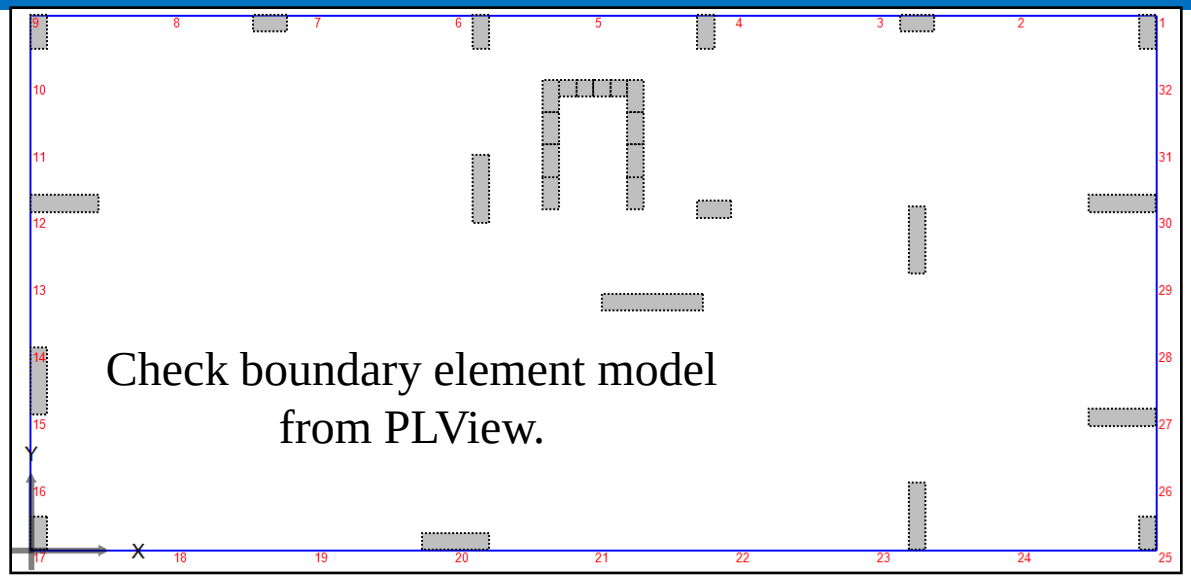


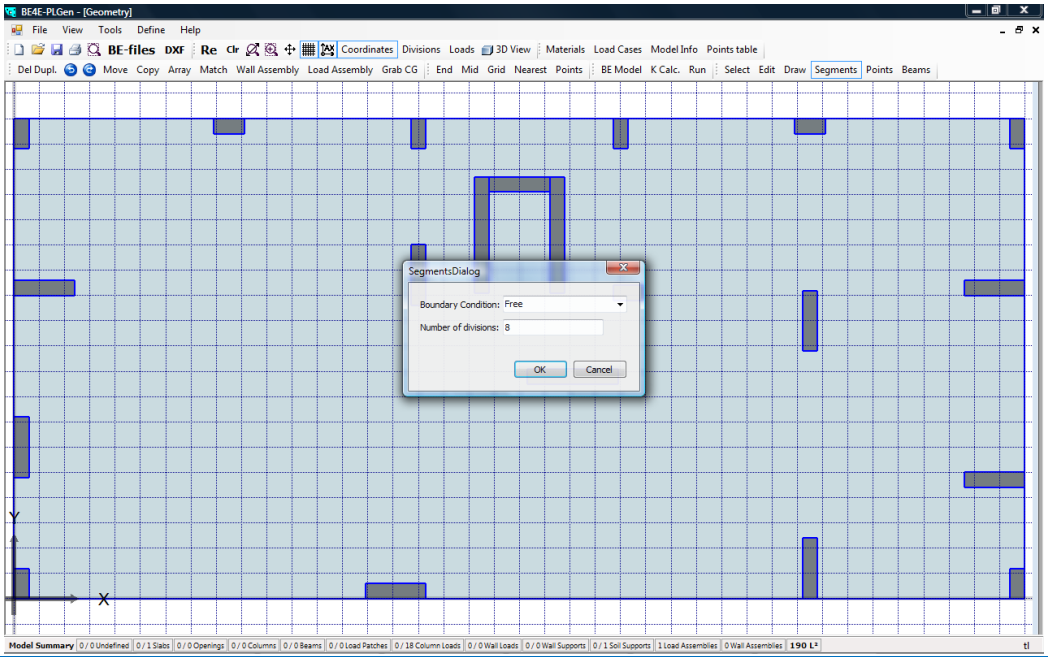


Define Column, Shear walls & Core loads.



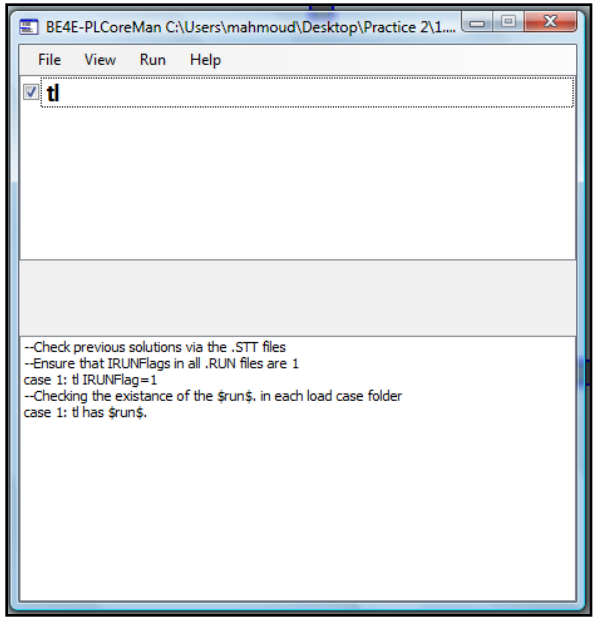
Practical Example 2



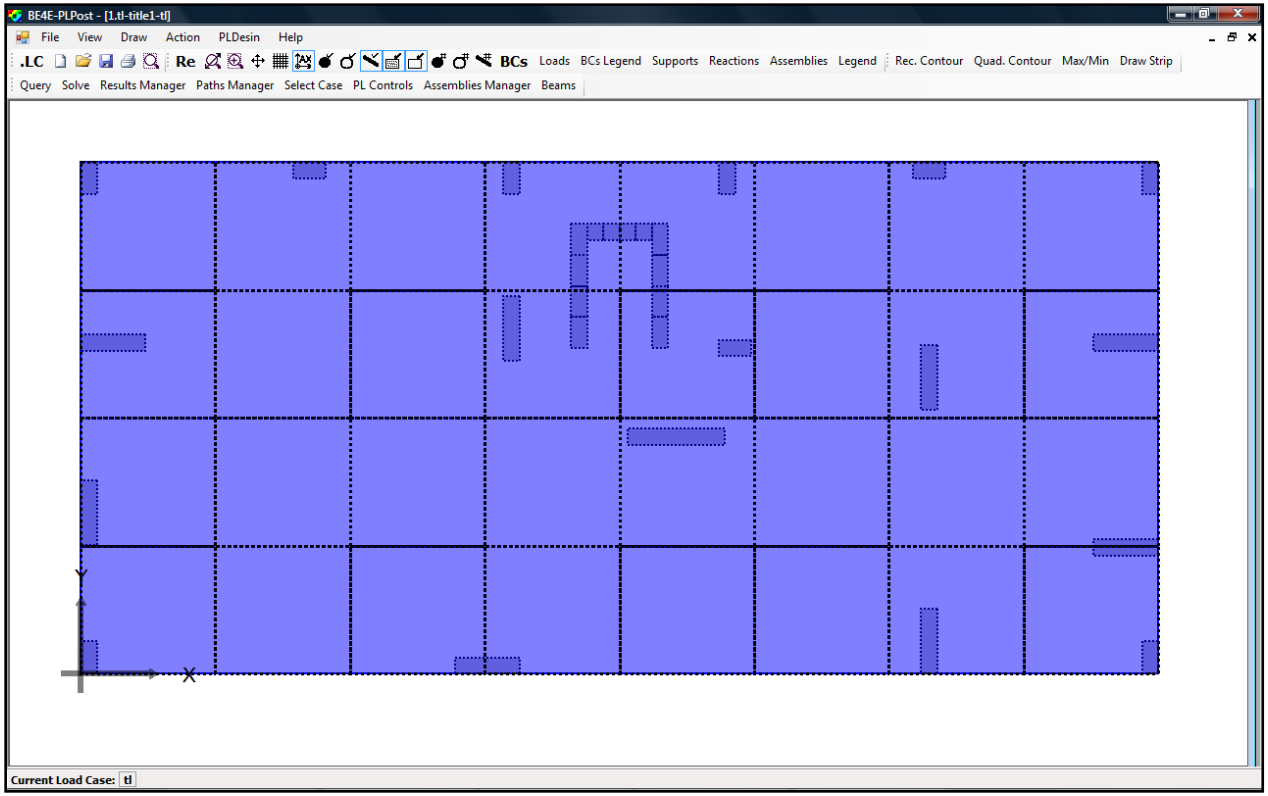


Adjusting number of segments in PLGen & Export assembly file.

Practical Example 2

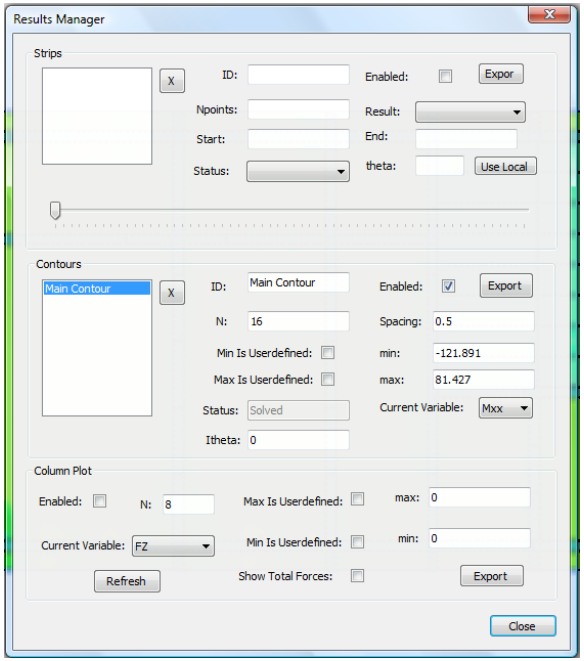


Run the raft model.

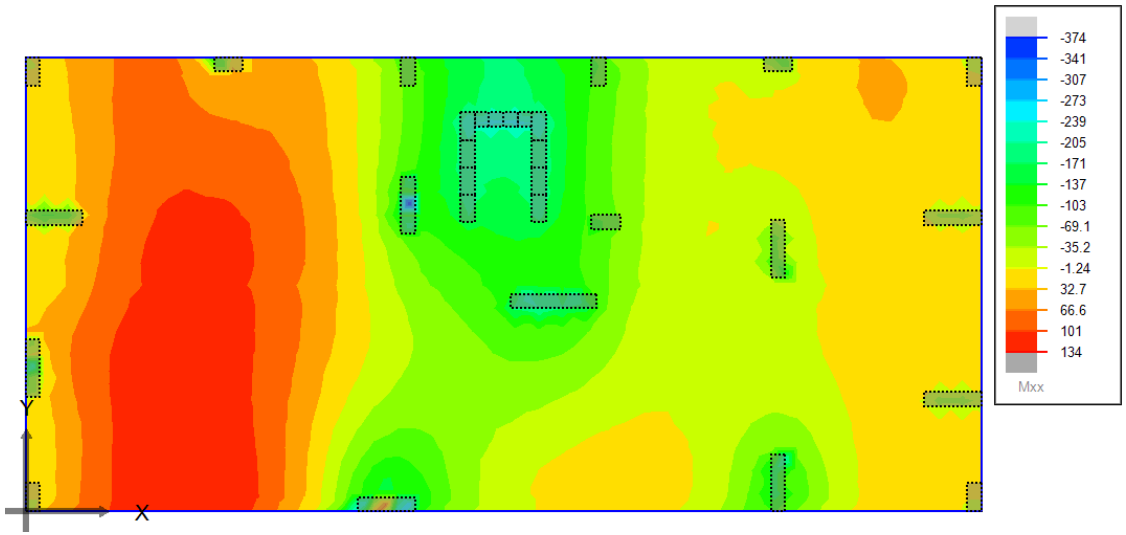


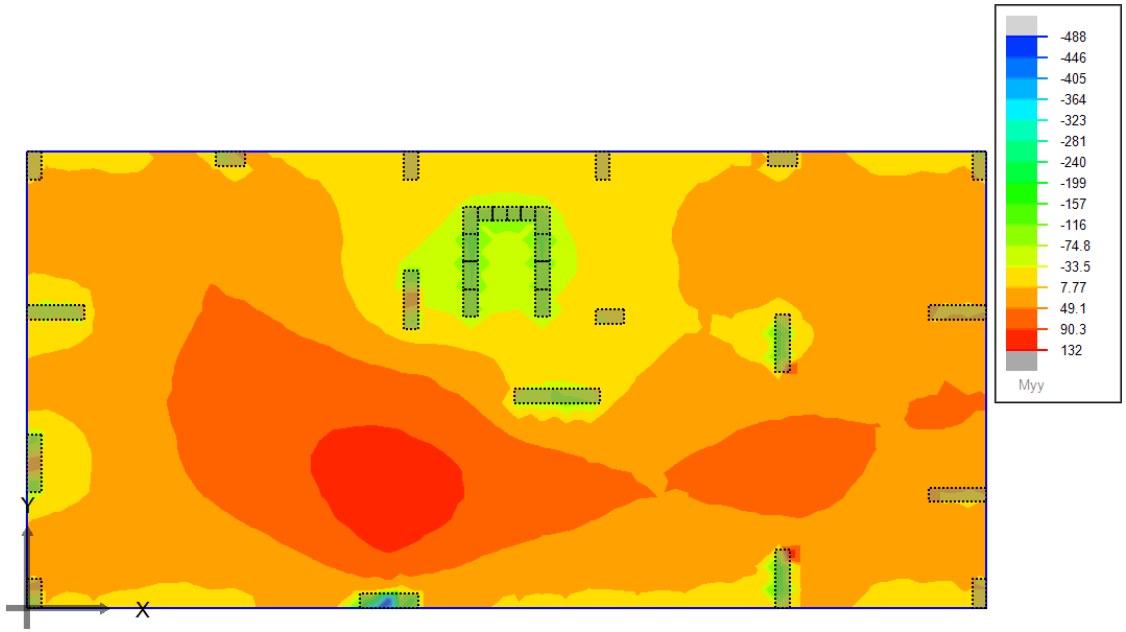
Open PLPost then click on show/hide columns to show the slab only.

Practical Example 2



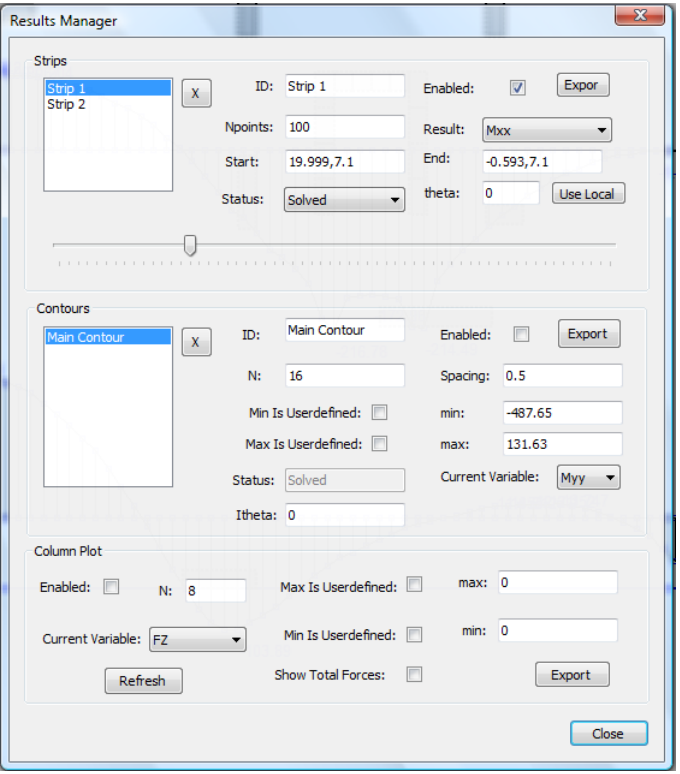
Show the contour lines for the slab

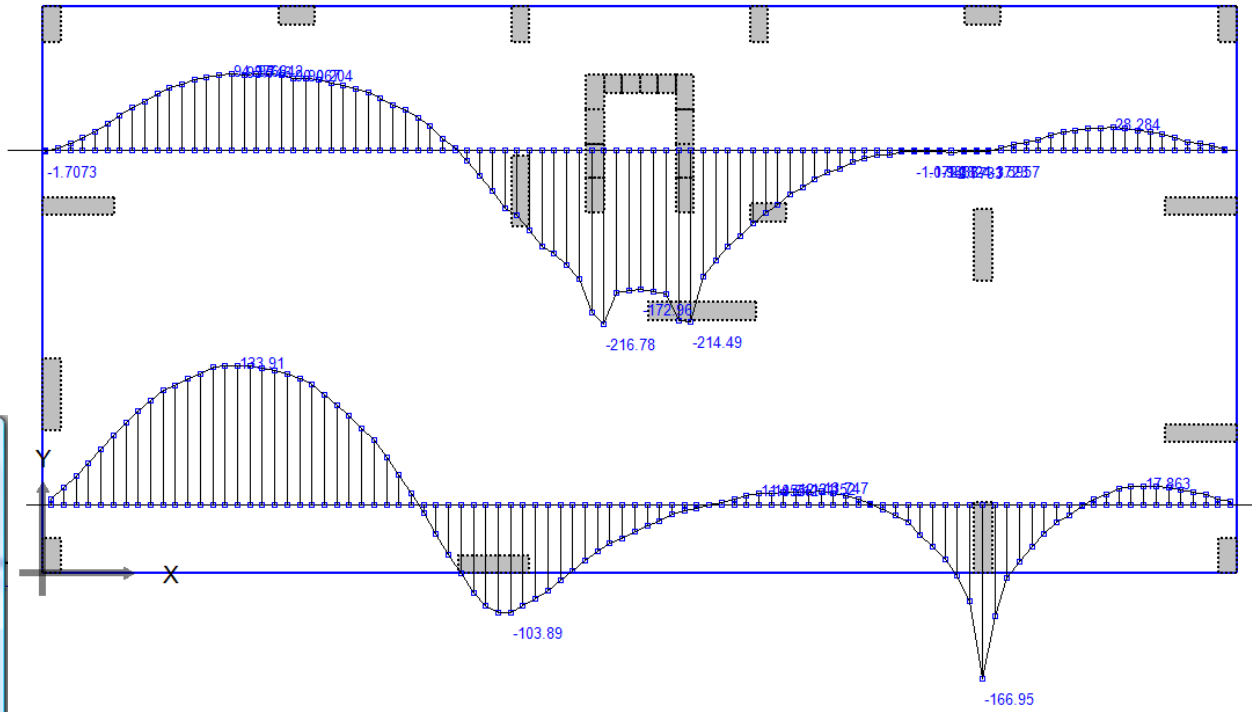




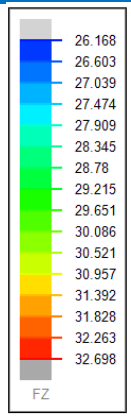
Practical Example 2

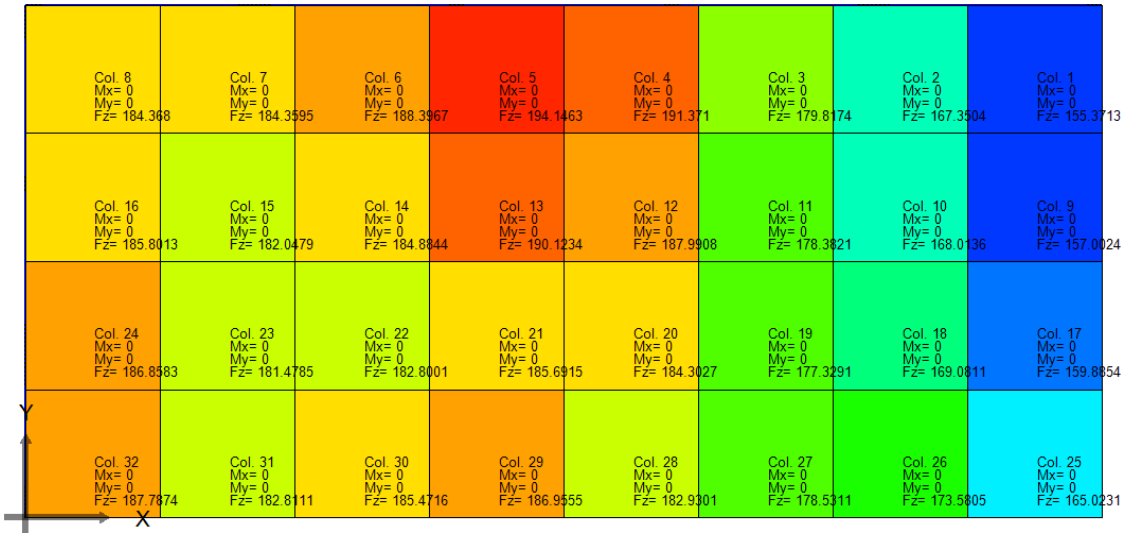
Draw strip & Show analysis.

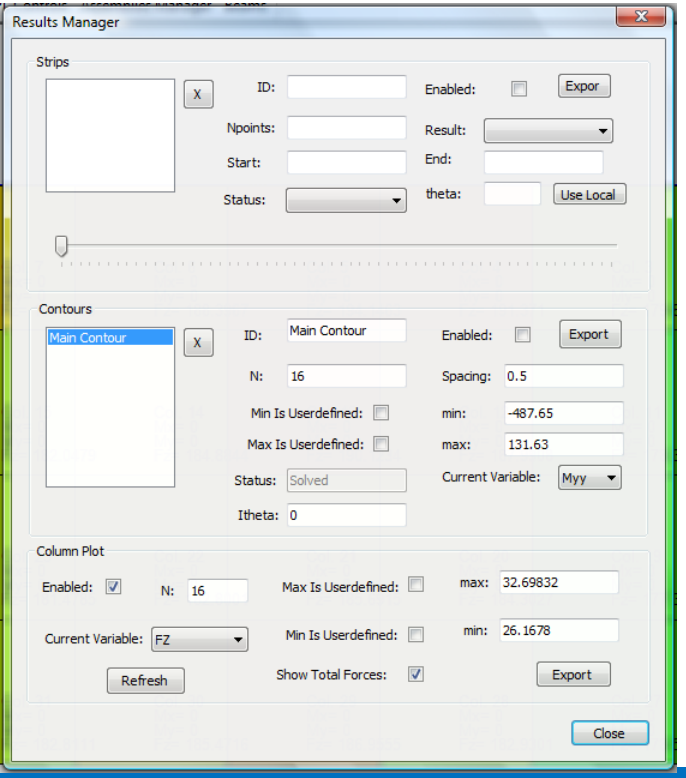




Practical Example 2







Showing soil reactions