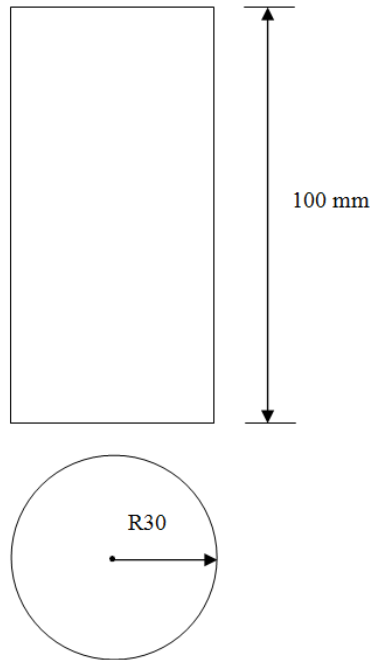


## FREQUENCY RESPONSE ANALYSIS OF A BASE EXCITED CYLLINDRICAL COLUMN



### PROCEDURE

#### 1. Create Keypoints

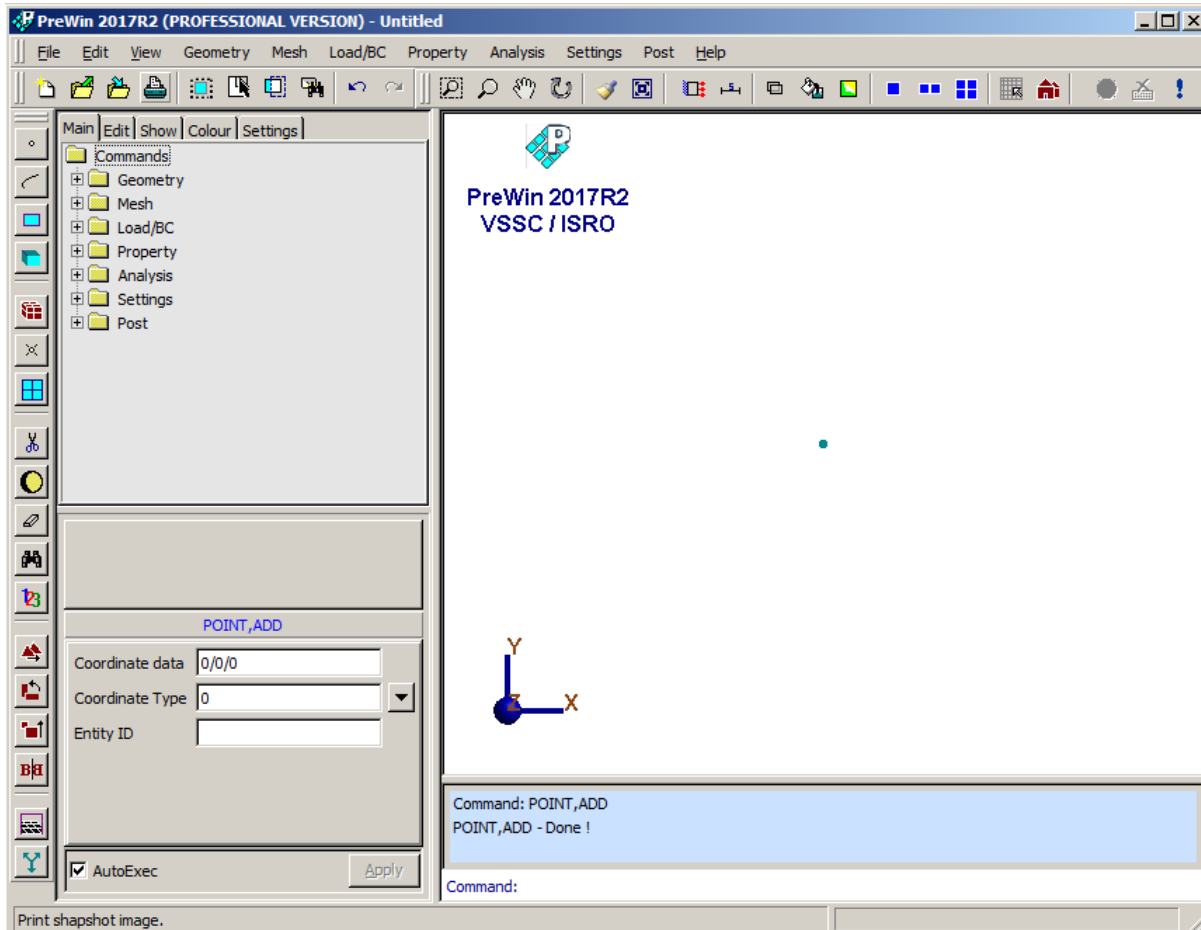
Command : POINT,ADD

Menu : Geometry → Keypoint → Create → By X/Y/Z

Parameters :

POINT,ADD	
Coordinate data	0/0/0
Coordinate Type	0
Entity ID	

At the end of the operation your screen should look like this.



Similarly create key points at (0/100/0) and (30/0/0)

## 2. Create Cylindrical Volume

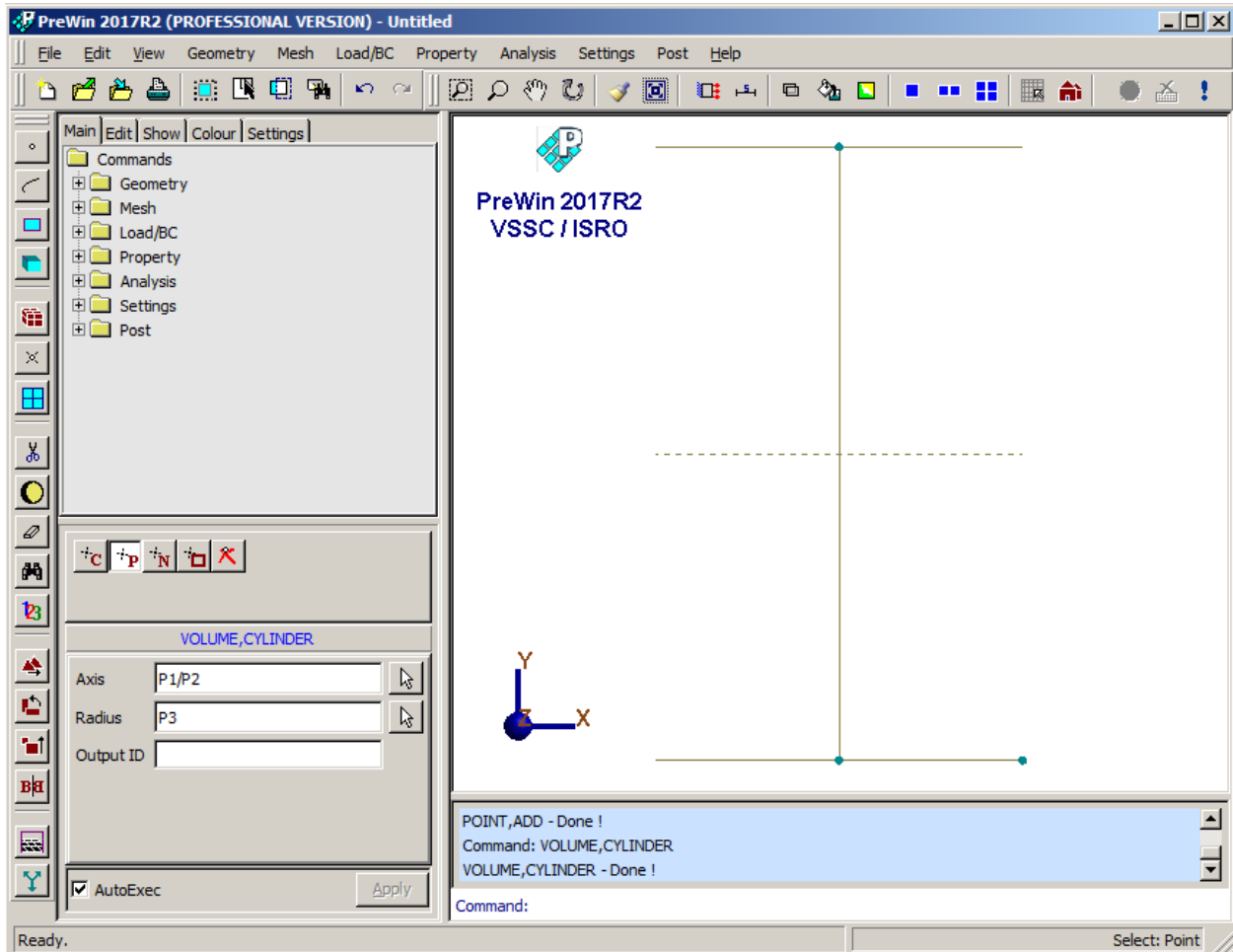
Command : VOLUME,CYLINDER

Menu : Geometry → Volume → Create → Cylinder

Parameters :

VOLUME,CYLINDER	
Axis	P1/P2
Radius	P3
Output ID	

At the end of the operation your screen should look like this.

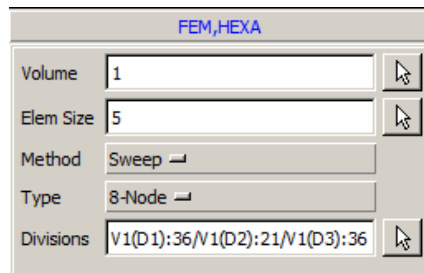


### 3. Generate mesh

Command : FEM, HEXASWEPT

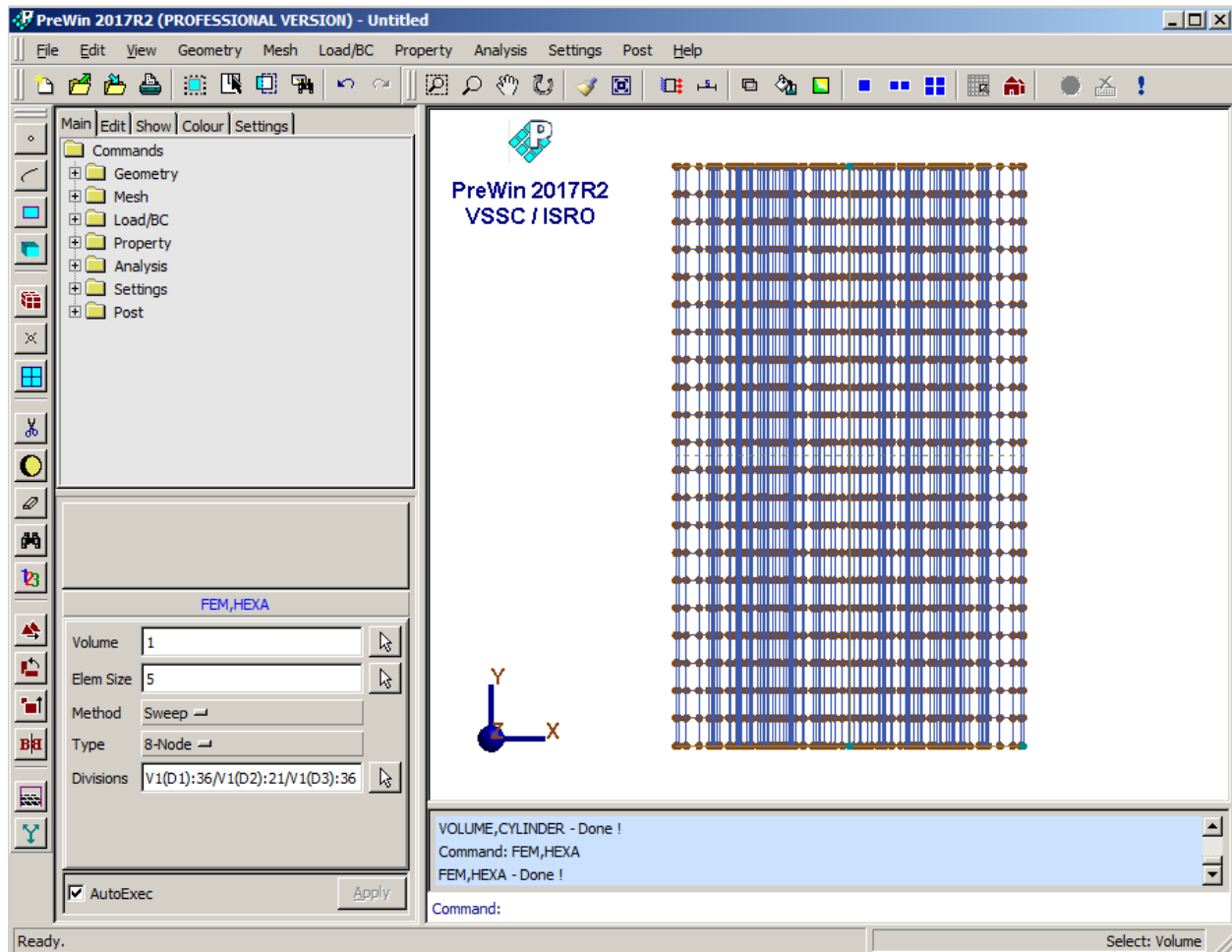
Menu : Mesh → FE Mesh → HEXASwept

Parameters :



Element size can be entered manually or by clicking two points on the geometry edge. Then click on the 'Divisions' command box, so that node divisions will be displayed on the geometry. You can increase or decrease the number of divisions by left clicking or right clicking respectively.

At the end of the operation your screen should look like this.

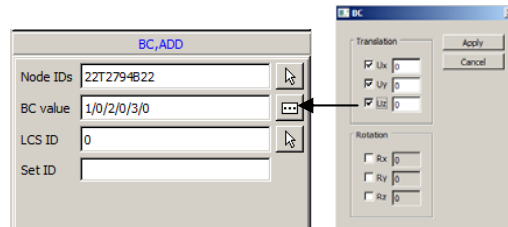


#### 4. Apply Boundary Condition

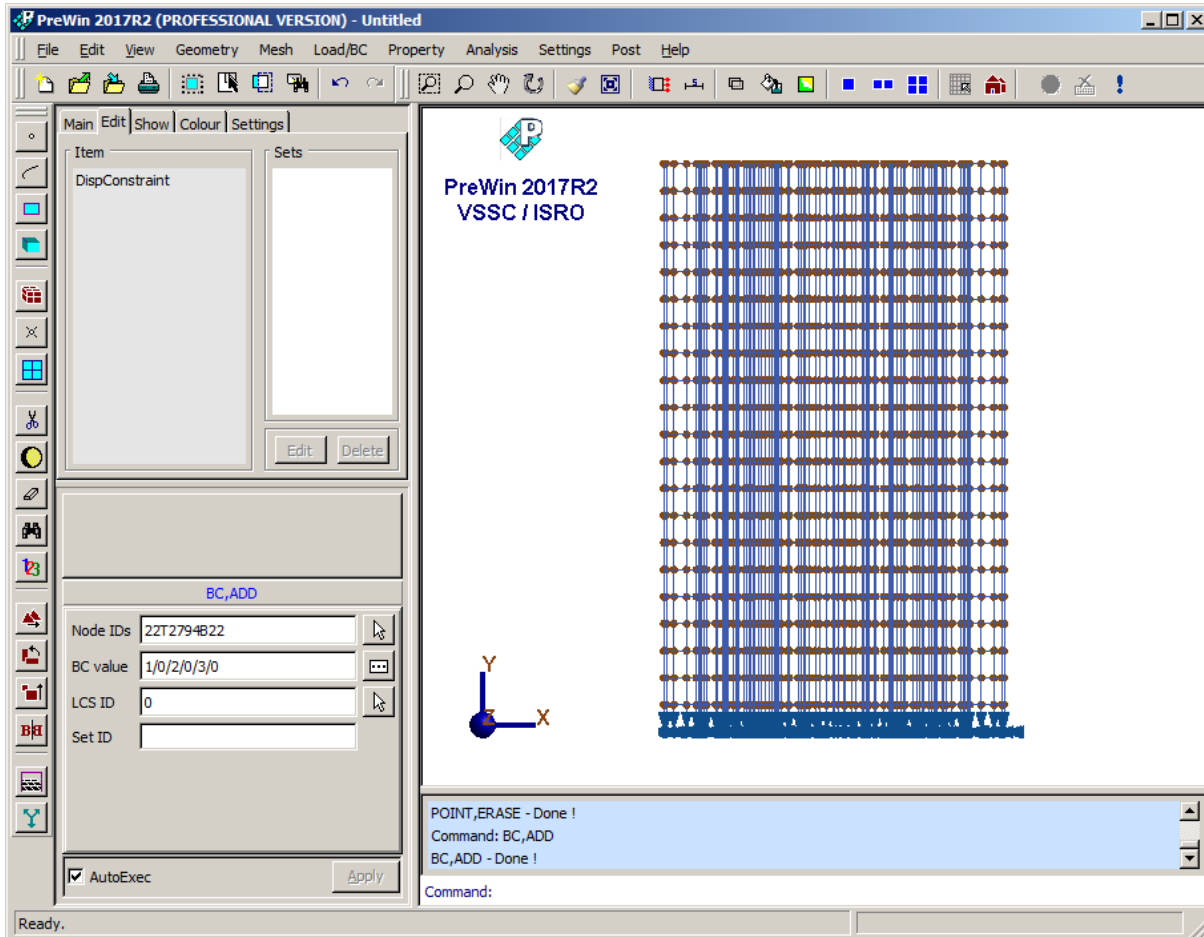
Command : BC,ADD

Menu : Load/BC → Displacement BC → Add

Parameters :



At the end of the operation your screen should look like this.

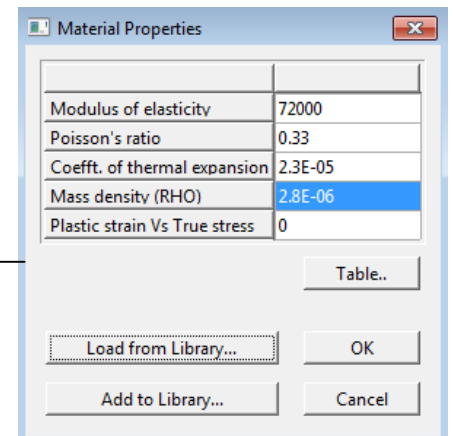
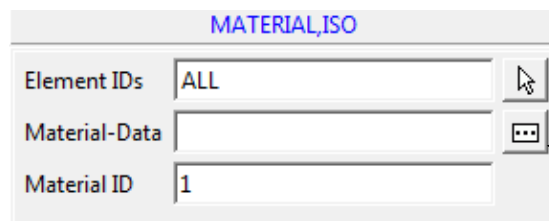


## 5. Apply Material Property

Command : MATERIAL,ISO

Menu : Property → Material → Isotropic → Add

Parameters :



You can enter the material data from 'Load from Library' option or you can manually type in the required data.

## 6. Set Analysis Type

Command : ANTYPE,SET

Menu : Analysis → Analysis Type

Parameters :


ANTYPE,SET	
Analysis Type	Frequency Response ▾

## 7. Set Frequency Response General Data

Command : FREQGEN,ADD

Menu : Analysis → Frequency Response → General → Add

Parameters :


FREQGEN,ADD	
Response Extraction	Auto ▾
No. of modes	20
Node List	All 
Start Frequency	1
Maximum Frequency	500
Finer Increment	0.1
Coarser Increment	1
Mass Option	Consistent ▾
Stress Option	Yes ▾

## 8. Create Damping Data

Command : EXPFRDAMP,ADD

Menu : Analysis → Frequency Response → Damping → Add

Parameters :

EXPFRDAMP,ADD	
Damping factors	

Frequency(Hz)	Factor
1	0.02
2	0.02

## 9. Set Base Excitation Data

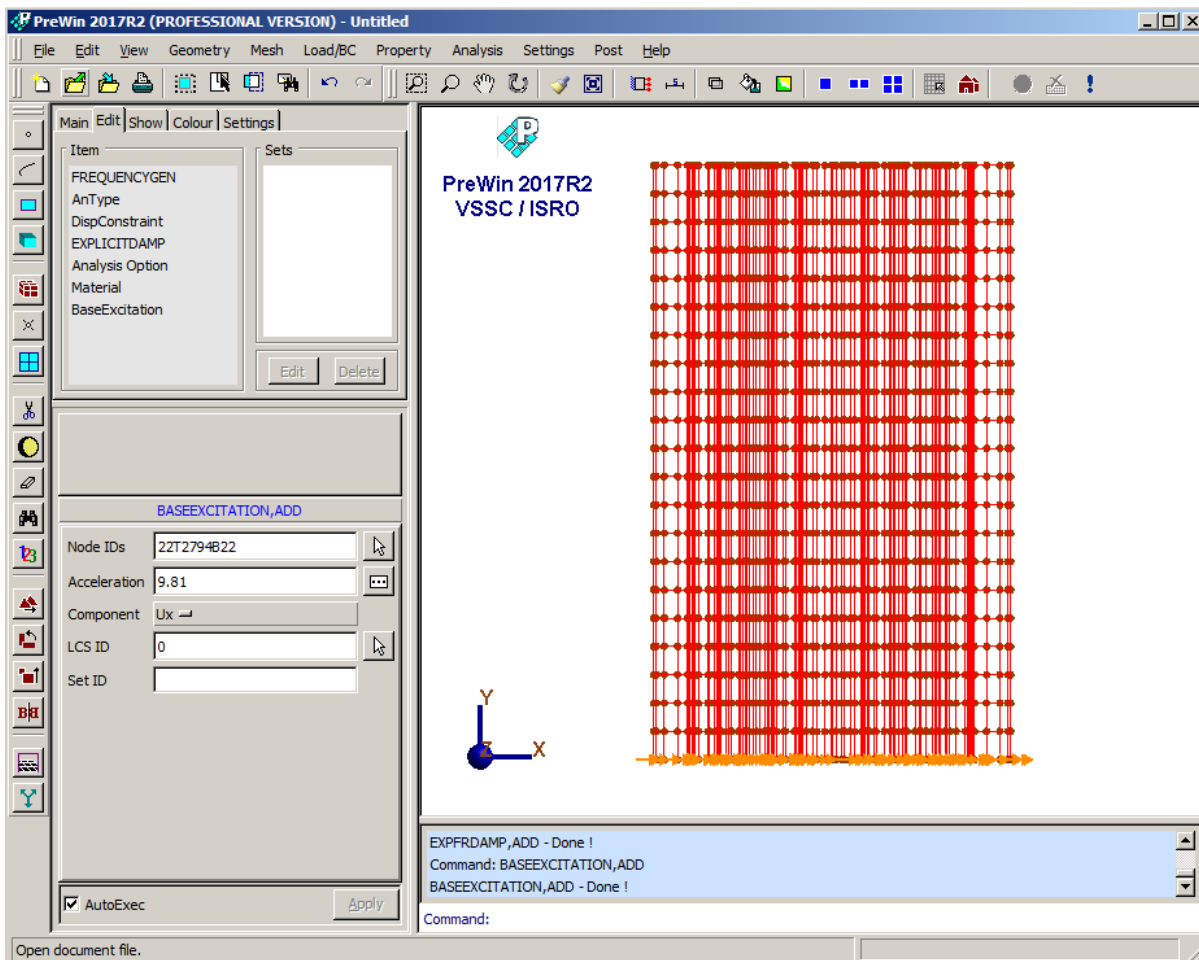
Command : BASEEXCITATION,ADD

Menu : Analysis → Frequency Response → Base Excitation → Add

Parameters :

BASEEXCITATION,ADD	
Node IDs	22T2794B22
Acceleration	9.81
Component	Ux
LCS ID	0
Set ID	

At the end of the operation your screen should look like this.



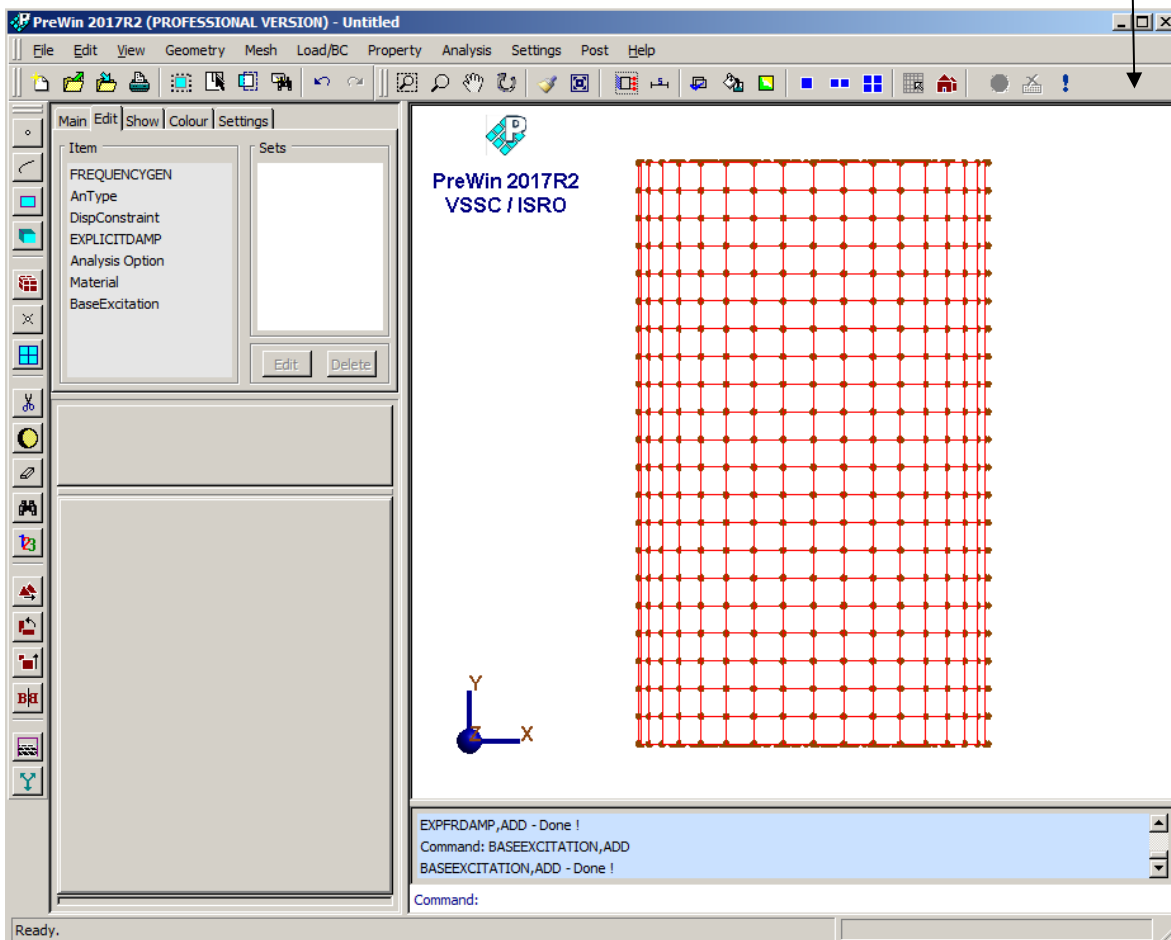
## 10. Save the project model

Menu : File → Save

## 11. Submit the job in to FEAST

Menu: Analysis → Run Solver

Click Here



## 12. Perform Post Processing

### i) Graph plots for displacement/ velocity/ acceleration

Command : POST,HISTORYPLOT

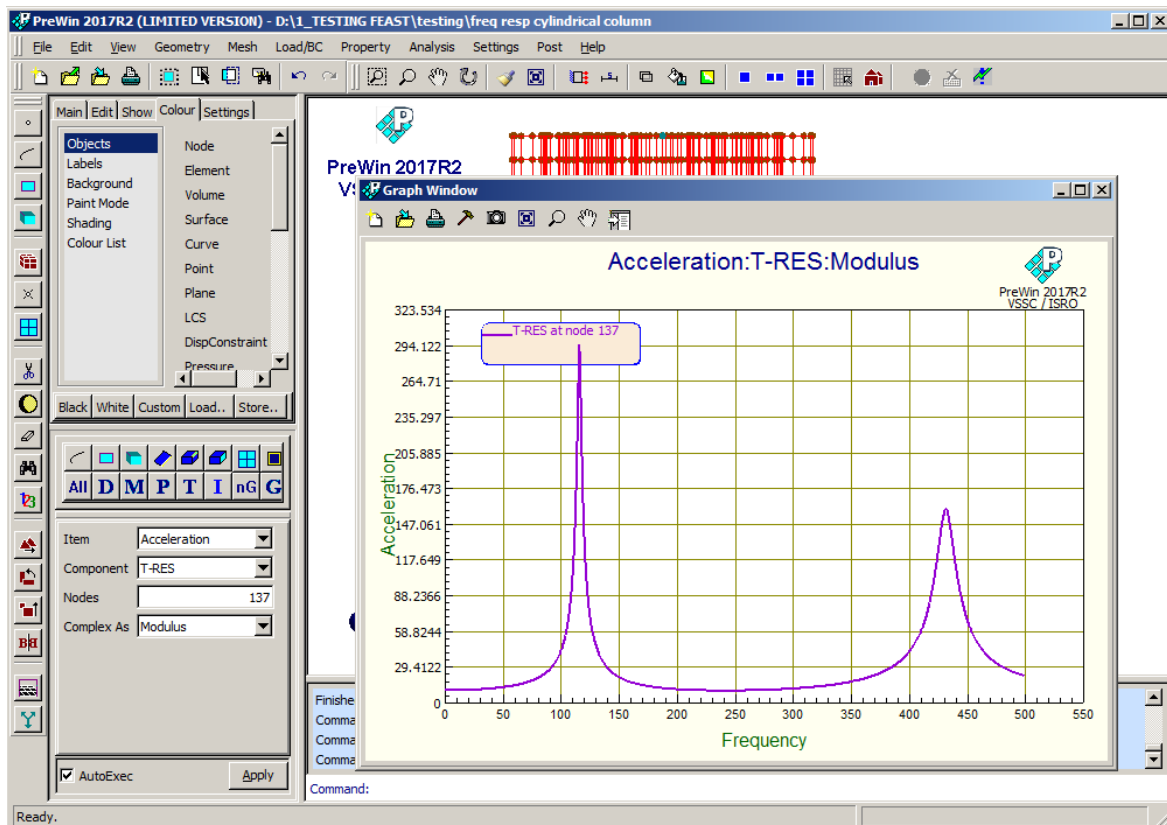
Menu : Post → History Plot



Parameters:

Item	Acceleration
Component	T-RES
Nodes	137
Complex As	Modulus

At the end of the operation your screen should look like this.



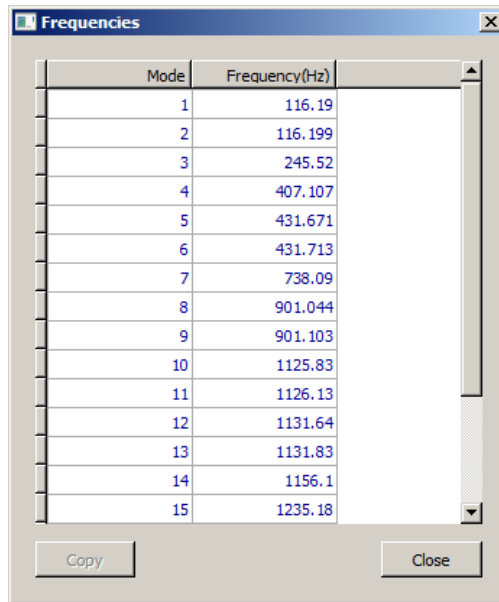
## ii) To check natural frequencies

Command : POST,VIEWRESULT

Menu : Post → View Result

Parameters:

Item	Frequencies
------	-------------



The screenshot shows a window titled "Frequencies" with a table containing 15 rows. The table has two columns: "Mode" and "Frequency(Hz)". The data is as follows:

Mode	Frequency(Hz)
1	116.19
2	116.199
3	245.52
4	407.107
5	431.671
6	431.713
7	738.09
8	901.044
9	901.103
10	1125.83
11	1126.13
12	1131.64
13	1131.83
14	1156.1
15	1235.18

At the bottom of the window, there are two buttons: "Copy" and "Close".

iii) Output can be seen in \*.OUT file