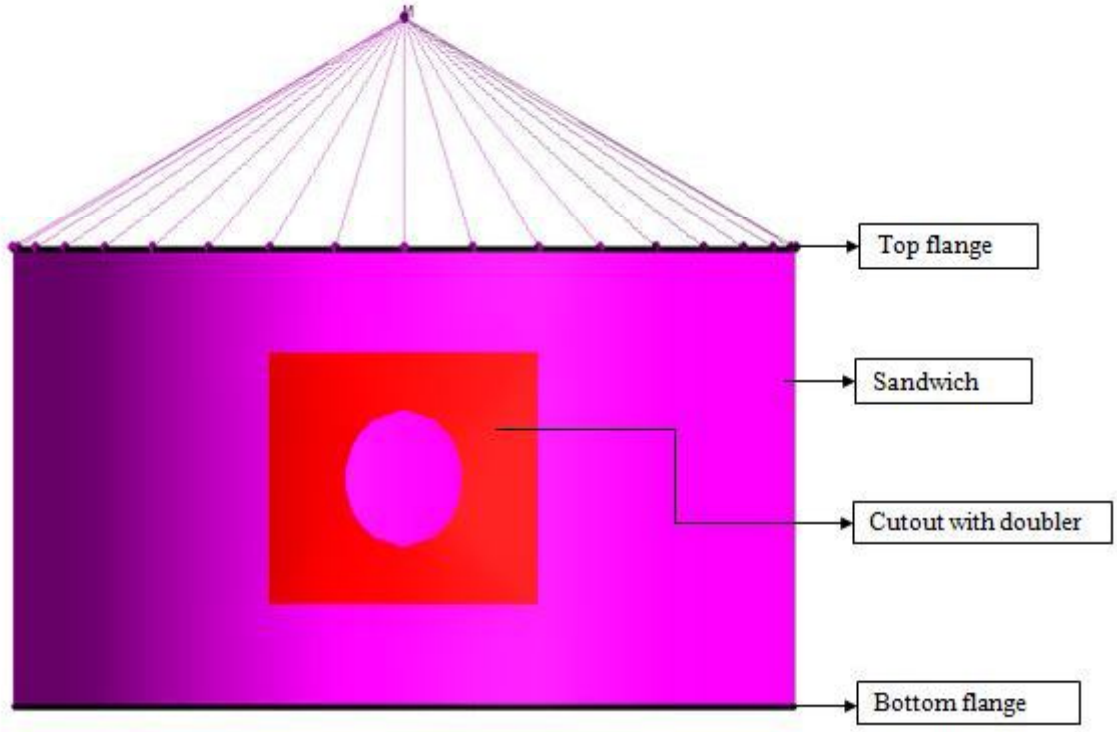
Random response analysis of honeycomb core cylinder with base excitation



Cylinder has 2*m* of radius and height, it consist of top and bottom aluminum flanges and sandwich structure. Both flanges are 0.02*m* height and thickness of 5*mm*, sandwich structure comprises of aluminum facet, core and aluminum facet. Aluminum facet has 0.5*mm* thickness and core is 10*mm*. Circular Cutout with doubler is introduced at sandwich structure of radius 0.3m, which comprises of aluminum facet 0.3*mm* thickness and core is 10*mm*. Mass of 235kg is placed at distance of 3m from origin and it is connected with top flange nodes with rigid links. Base excitation of 1g is applied at bottom flange in X direction. PSD input value 0.0004 g^2/Hz is applied to structure.

PROCEDURE

STEP 1 TO 12

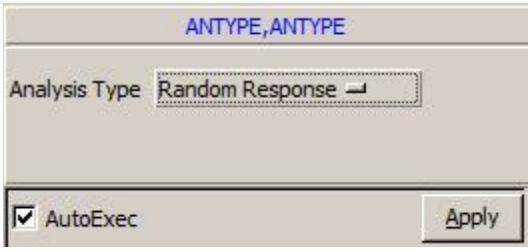
Geometry and meshing details follow the same steps from 1 to 12 as mentioned in free vibration problem

13. Set analysis type

Command : ANTYPE, ANTYPE

Menu : Analysis → Analysis Type→Random Response

Parameters:



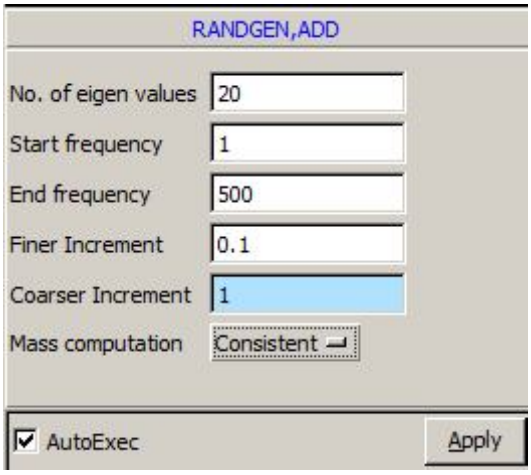
*Click Apply.

14. Set Random Response General Data

Command : RANDGEN, ADD

Menu : Analysis → Random Response → General →Add

Parameters:



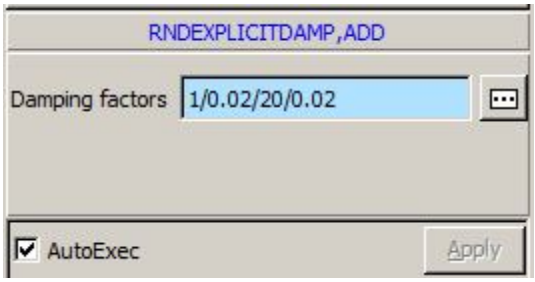
*Click apply

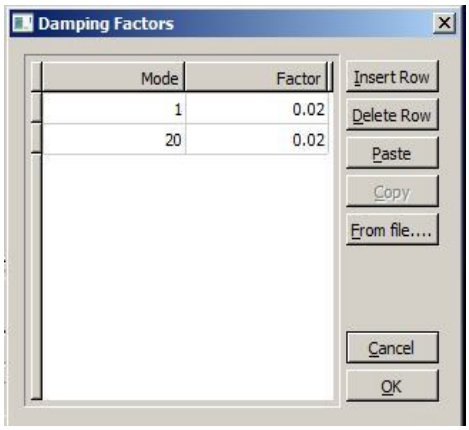
15.Create Damping Data

Command : RNDEXPLICITDAMP,ADD

Menu : Analysis → Random Response → Damping→Add

Parameters:





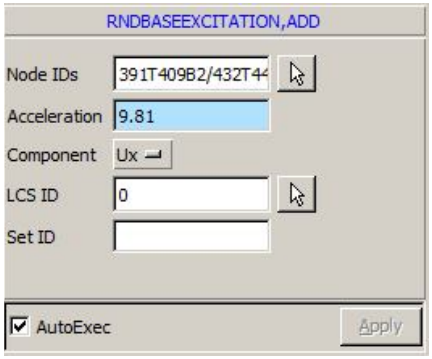
*Enter Damping factor is 0.02 for 1st and 20th Mode.

16.Set Base excitation data

Command : RNDBASEEXCITATION, ADD

Menu : Analysis → Random Response → Base Excitation→Add

Parameters:



*Select the bottom flange nodes and enter 9.81 in U*x* direction.

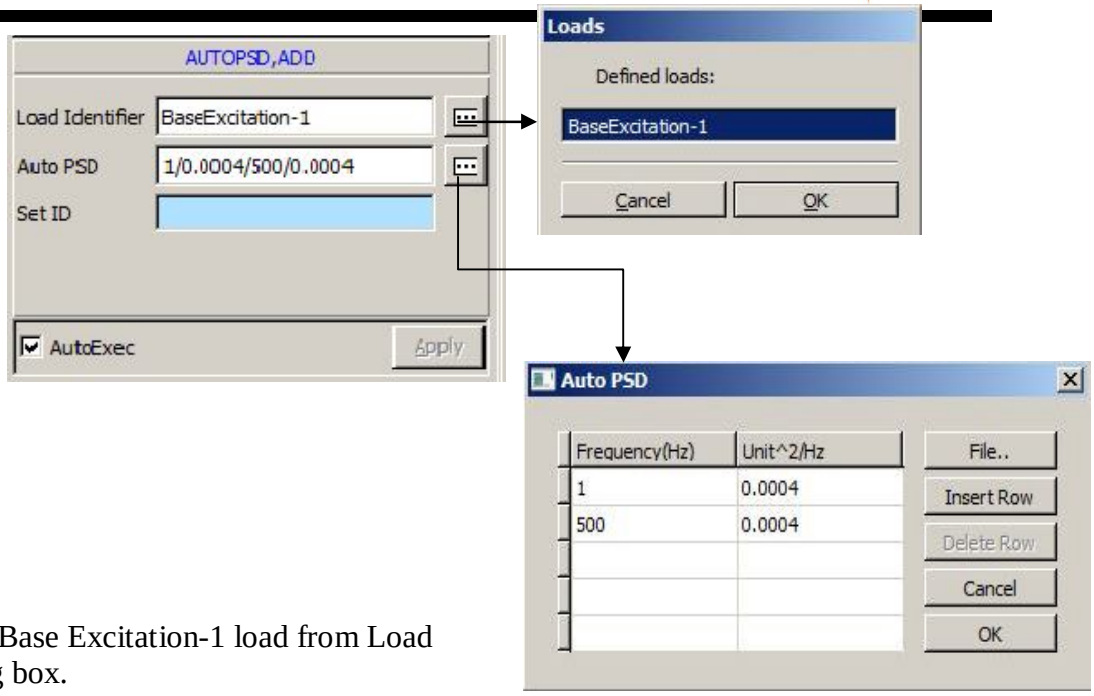
*Click Apply.

17.Create Auto PSD

Command : AUTOPSD, ADD

Menu : Analysis → Random Response → Auto PSD→Add

Parameters:



*Select Base Excitation-1 load from Load identifier dialog box.

*Enter PSD value in Auto PSD dialog box and click ok.

*Once created the Auto PSD data, save the project file using following method

Menu : File →Save

18. Submit the job into FEAST^{SMT}

*After saving the *.prj file, will have to submit the model into solver.

Menu: Analysis → Run Solver

After the solution is completed the message *"successfully completed"* appears in the message box.

19. Perform post processing

a. Frequency vs. Acceleration plot

Command : POST, RANDACCEL

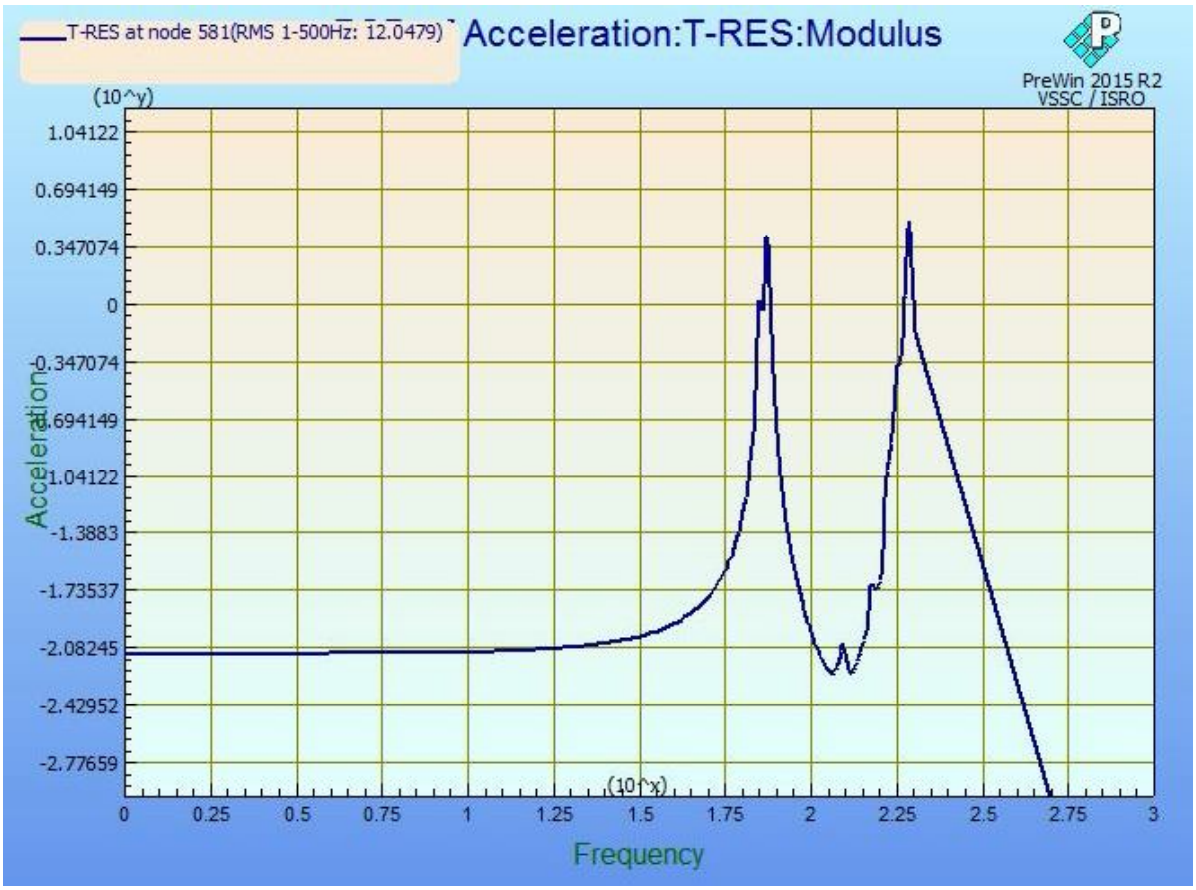
Menu : Post→ History plot → Acceleration

Parameters :

Item	Acceleration
Component	T-RES
Nodes	581

*Select the Node of Mass element and apply.

At the end of the above operations, your graph plot should look like this



*Likewise you can plot graph for Frequency vs displacement and Frequency vs velocity.

b. Output can be seen in *.OUT file.