BUCKLING ANALYSIS OF CYLINDRICAL SHELL

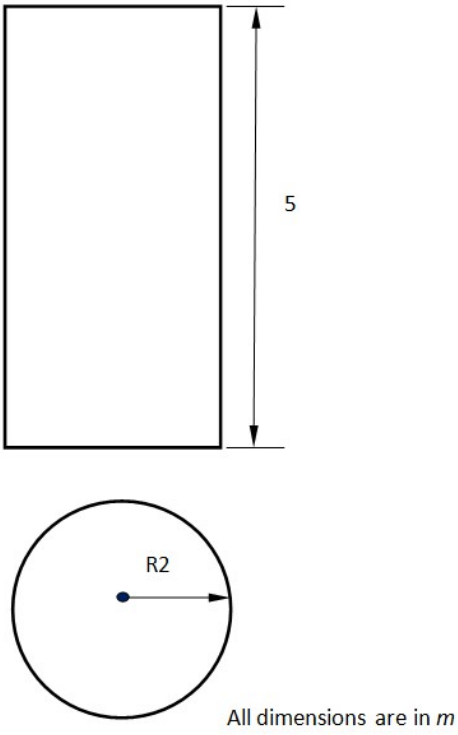


Figure 1

Objective: Extract 10 critical load factors for the cylindrical model shown in Figure **1**

Geometric Properties

Radius=2*m*
Height=5*m*
Thickness=0.005m

Boundary condition

Fixed at bottom surface
Ux=Uy=0 at top surface

Material properties

E=7e+10 N/m^2
v=0.3

Loading condition

Force=-50KN/m on top edge of the cylinder

PROCEDURE

STEP

1. Create a Cylindrical surface

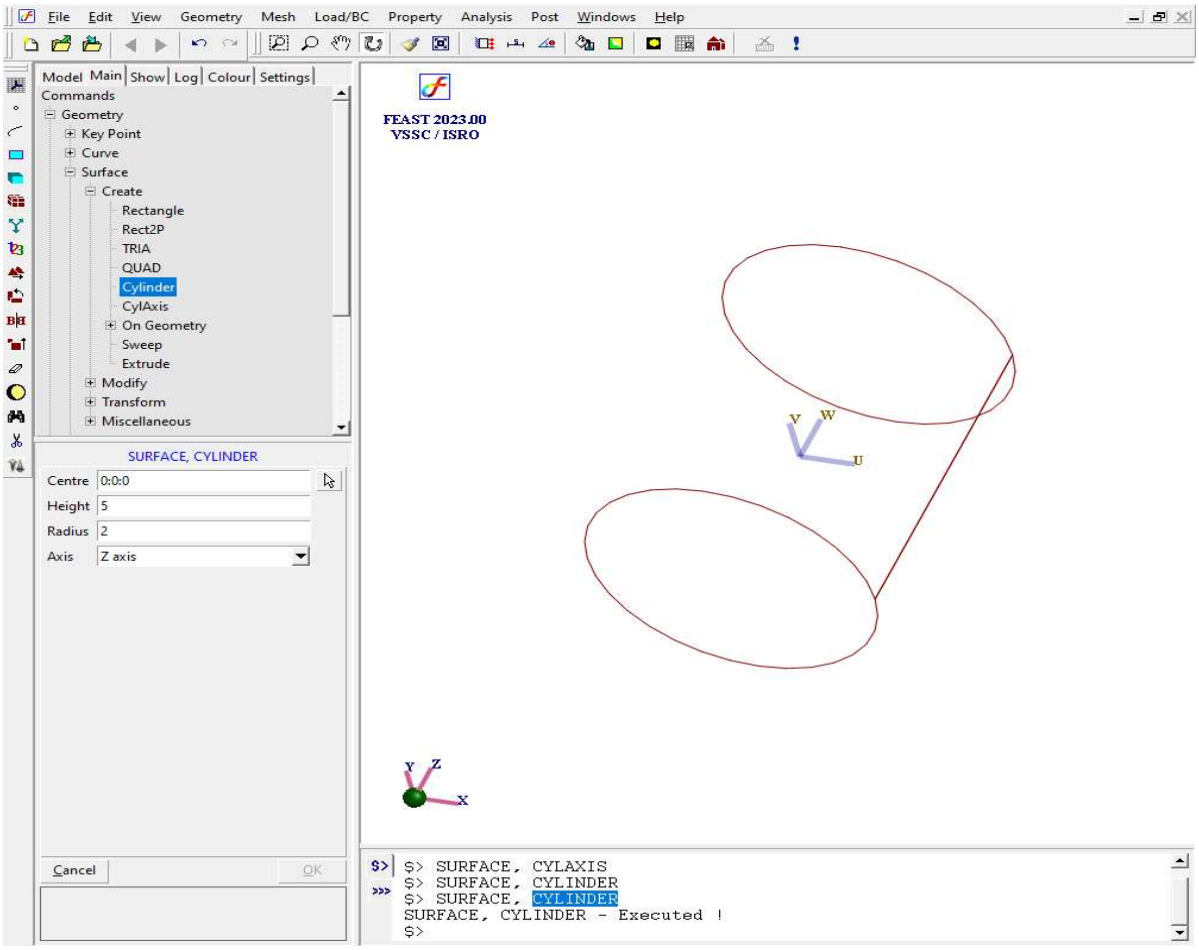
Command : SURFACE, CYLINDER

Menu : Geometry → Surface →Create→Cylinder

Parameters :

Centre	C0:0:0:0(Select the origin/ create point at [0,0,0])
Height	5
Radius	2
Axis	Z axis

At the end of the above operations, your screen should look like this.



*Now change to bottom view

2. Meshing the surface using quadilateral elements

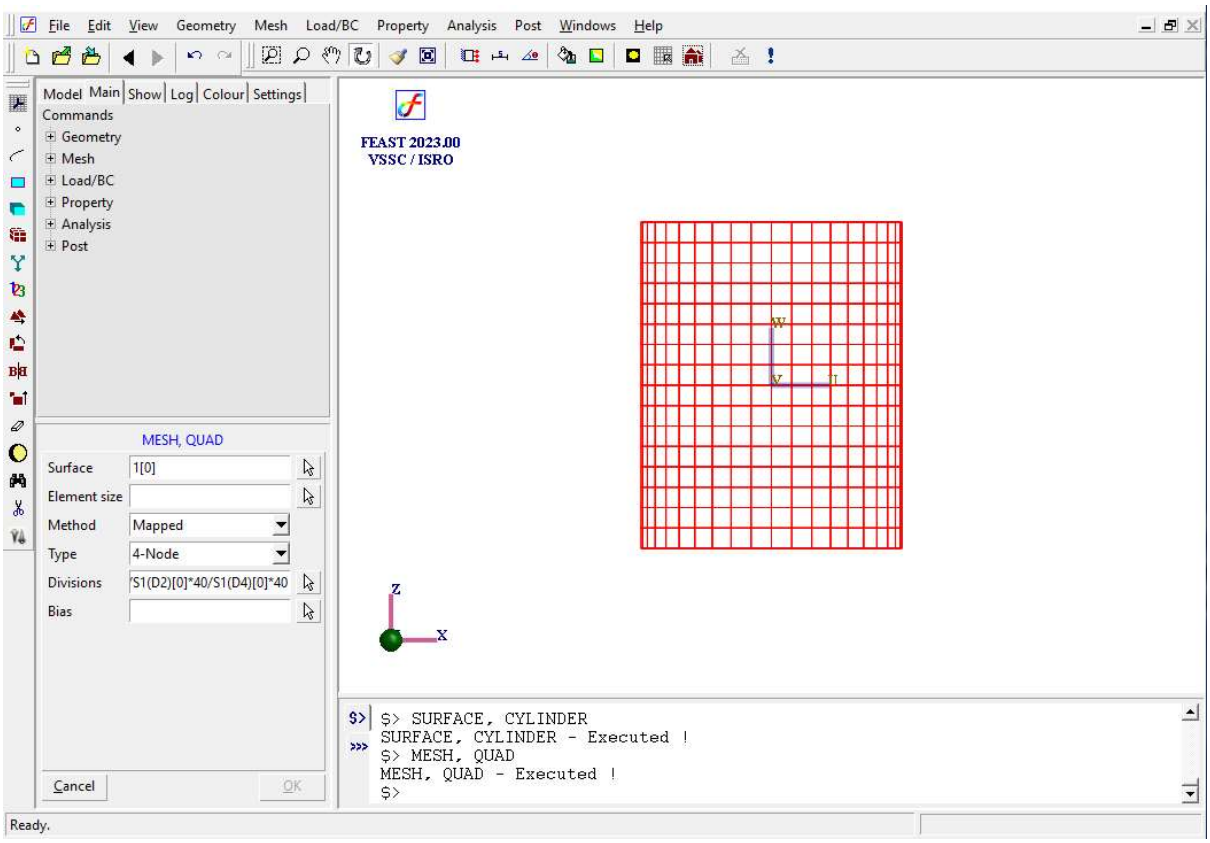
Command : MESH, QUAD

Menu : Mesh →MeshGen→QUAD

Parameters :

Surface	1
Initial Size	0.224282
Method	Mapped
Type	4 Node
Divisons	

At the end of the above operations, your screen should look like this.



3. Delete surfaces

Command : SURFACE, DELETE

Parameters :

List of surfaces	1

4. Specify material properties

Command : MATERIAL, ISOTROPIC

Menu : Property → Material→Structural → Isotropic

Parameters :

Elements	All
Young's Modulus	7e+10
Nu	0.3
Density	
Alpha	
Label	User defined name(Ex: MAT1)

5. Specify thickness

Command : THICKNESS, ADD

Menu : Property → Physical → Thickness

Parameters :

Elements	All
Thickness	0.005
Label	User defined name (Ex: T1)

6. Specify Displacement Boundary Conditions

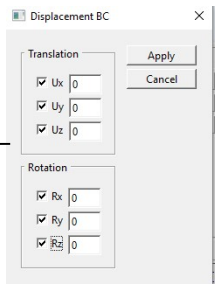
a. Specify boundary conditions at bottom edges

Command : DISPBC, ADD

Menu : Load/BC→Structural→DispBC

Parameters :

Nodes	Select the bottom circumference nodes
DispBC	0/0/0/0/0/0
LCS ID	0

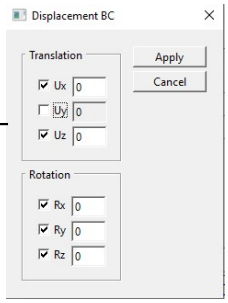


Label	User Defined name (Ex:SPC1)

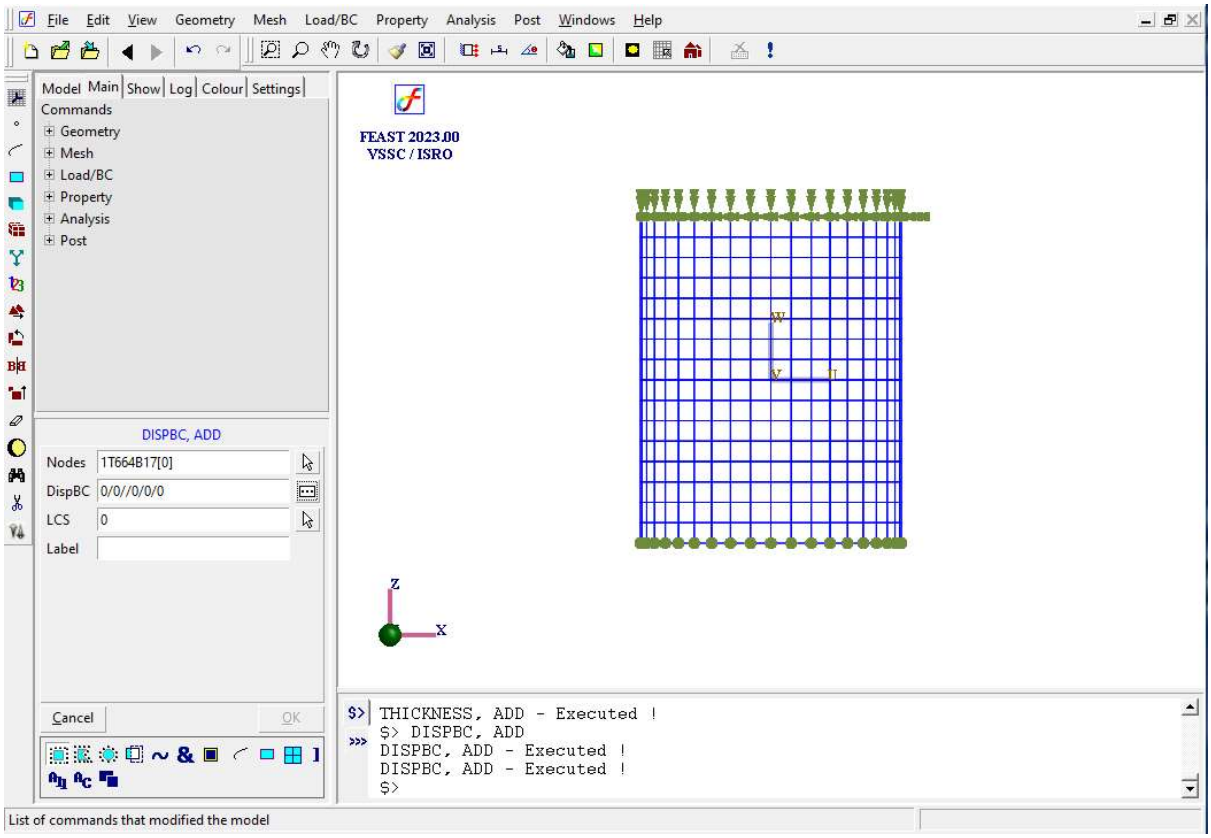
b. Specify boundary conditions at top edges

Parameters :

Node IDs	Select the top circumference nodes
BC value	0/0//0/0/0
LCS ID	0
Label	User defined name (Ex: SPC2)



At the end of the above operations, your screen should look like this.



7. Specify Point load along top circumference of cylinder

Command : POINTLOAD, ADD

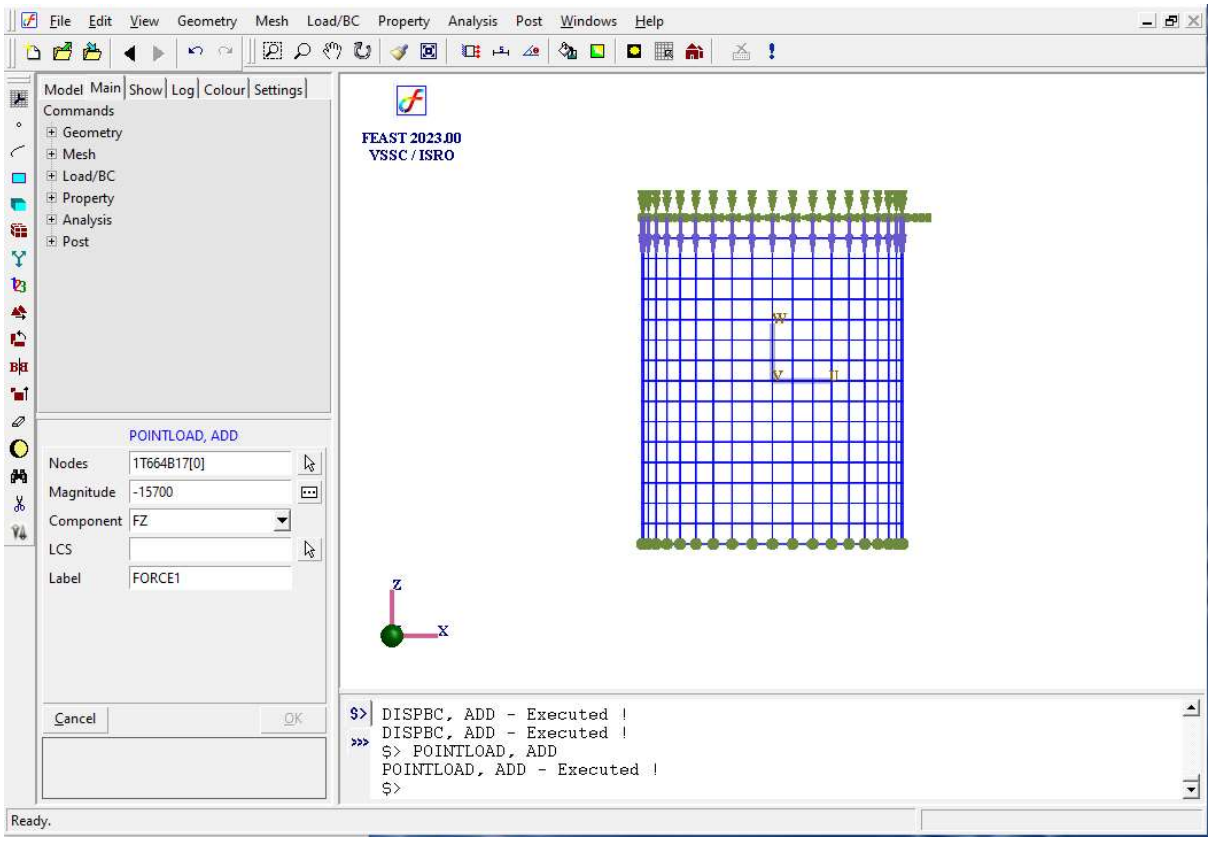
Menu : Load/BC→Structural →Point Load

Nodes	Select top circumference nodes

Parameters :

	1T647B17
Magnitude	-15700(Total load/no. of top circumferential nodes)
Component	Fz
LCS	0
Label	User defined name (Ex: FORCE1)

At the end of the above operations, your screen should look like this.



8. Set the analysis type

Command : ANTYPE, ADD

Menu : Analysis →AnalysisType

Parameters :

Analysis Types	Buckling

9. Specify Static generate data

Command : BUCKLINGGEN, ADD

Menu : Analysis →Buckling→General

Parameters :

Number of mdoes	10
Stress Output	Yes

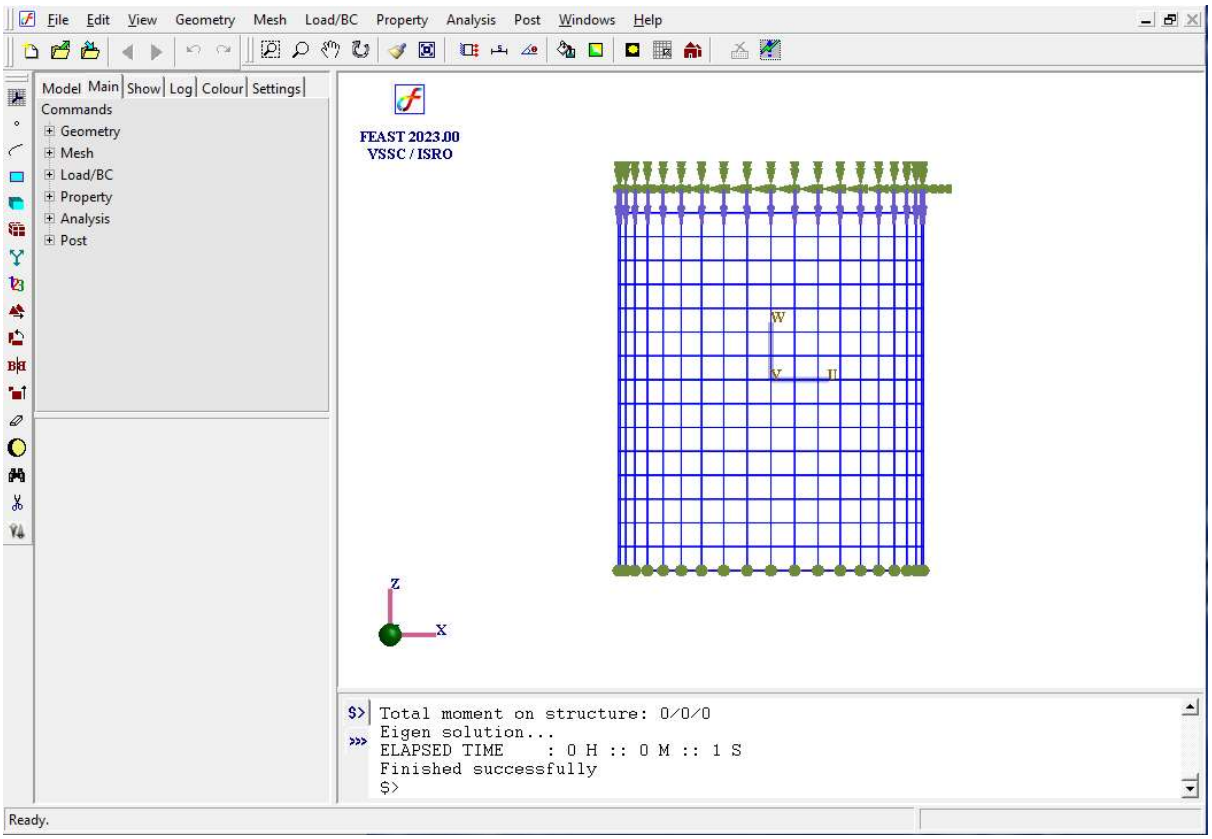
10.Save the project model

Menu : File → Save

11.Activate FEAST solver

Click *Run Solver* button

At the end of the above operations, your message box should look like this.



After the solution gets completed,*"Finished successfully"*message appears in the message box.

12.Perform post processing

a. Critical Load factor

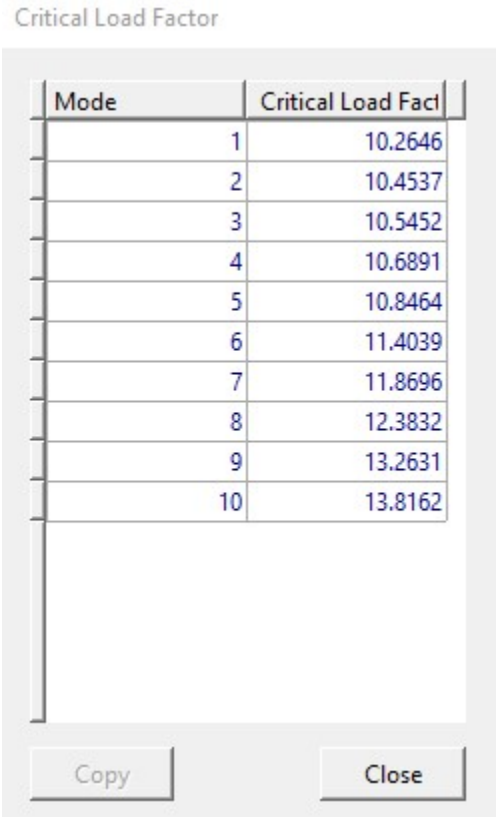
Command :POST,TABLEVIEW

Menu : Post → View table

Parameters :

Item	Critical Load Factor

At the end of the above operations a table as shown below appears.



b. Buckling Mode Shape

Command :POST,DEFLECTION

Menu : Post →Deflection

Parameters :

Item	Buckling Mode
Modes	1 : 10.2646
Scale	1

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