

## Overview

### ▪ 3-D Linear Static Analysis

#### ▪ Model

- Unit : N, m
- Isotropic Elastic Material
- Plate Elements

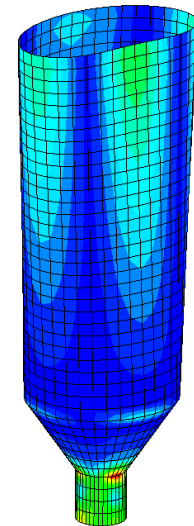
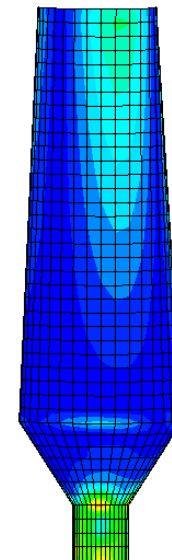
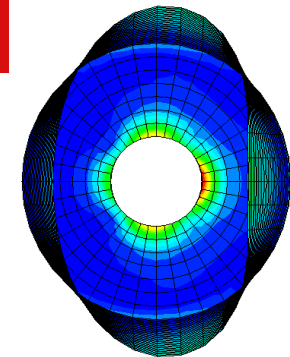
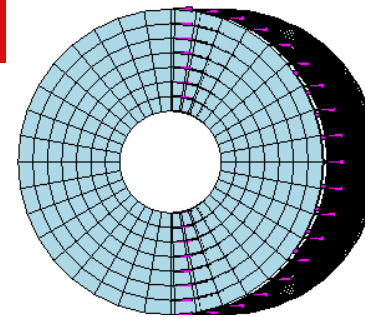
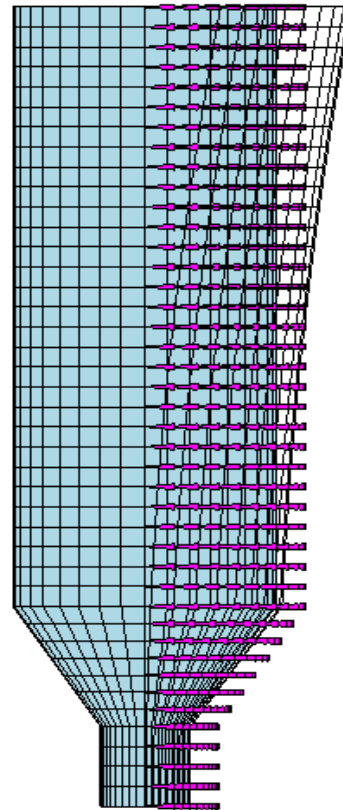
#### ▪ Load & Boundary Condition

- Self Weight
- Face Pressure
- Constraint

#### ▪ Result Evaluation

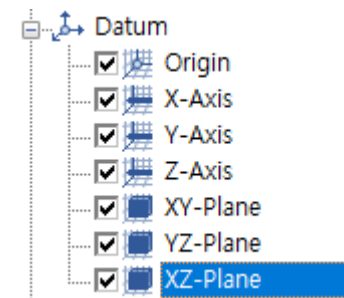
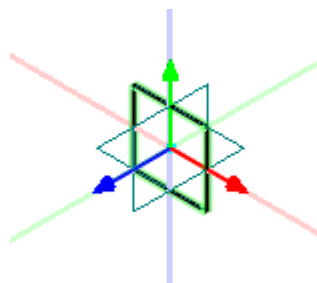
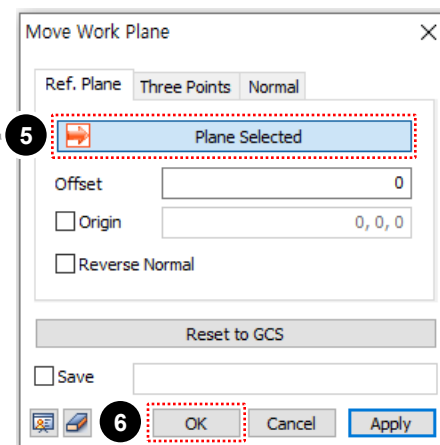
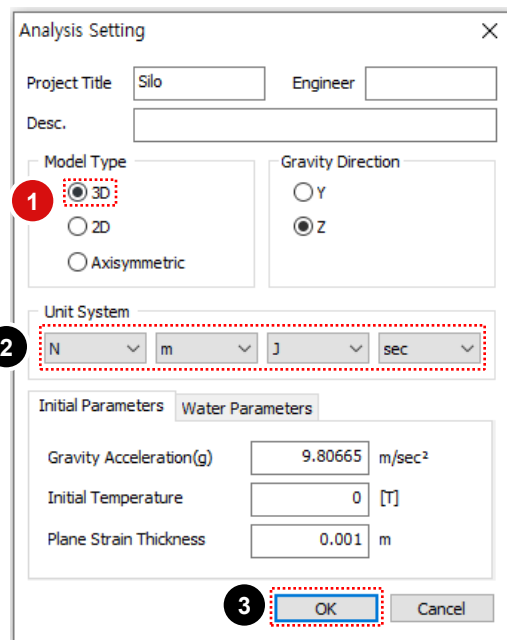
- Deformation
- Maximum Shear Stress  
at Element Mid-Plane

# Silo



## Procedure

- 1 Model Type : [3D]
- 2 Unit System : [N , m]
- 3 Click [OK] Button
- 4 Click [Move Work Plane]
- 5 Select [XZ-Plane]
- 6 Click [OK] Button
- 7 Click [Normal View]

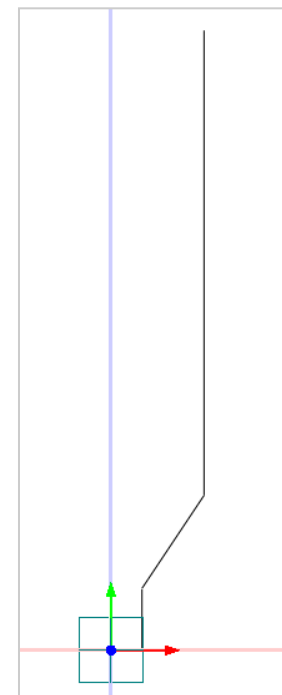
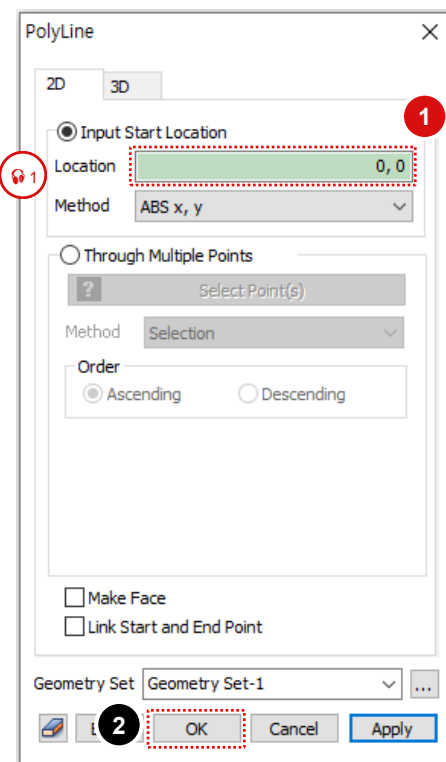


Select "XZ-Plane" in Work Window or Model




**Procedure**

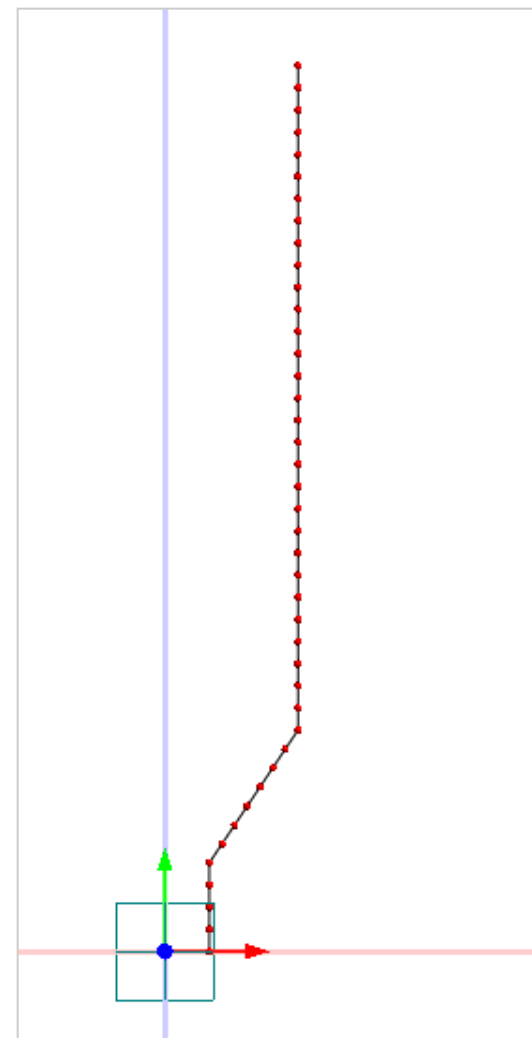
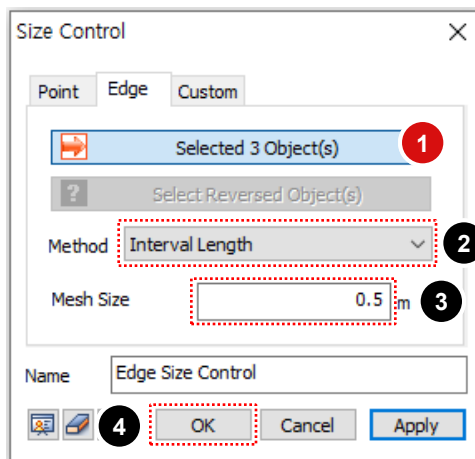
- 1 Location : “(1) , <0, 2> , <2, 3> , <0, 15>”
- 2 Click [OK] Button
- 3 Click [Zoom All]




- 1 ( ): “ABS x, y”, < >: “REL dx, dy”  
 (1) same as (1, 0)

**Procedure**

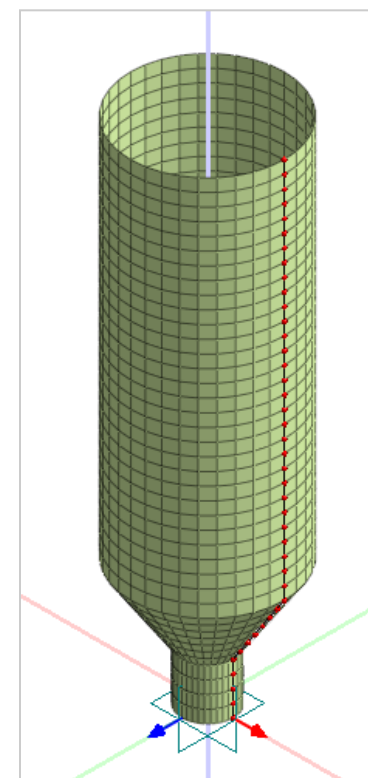
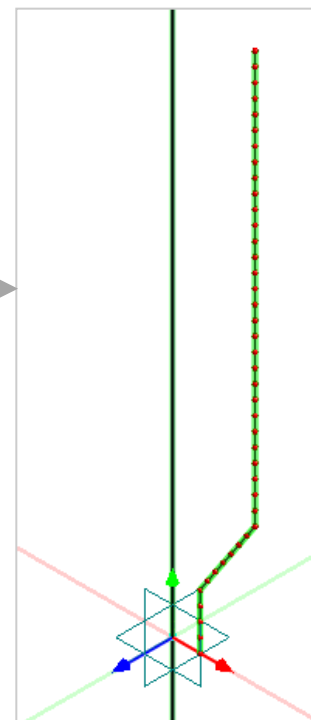
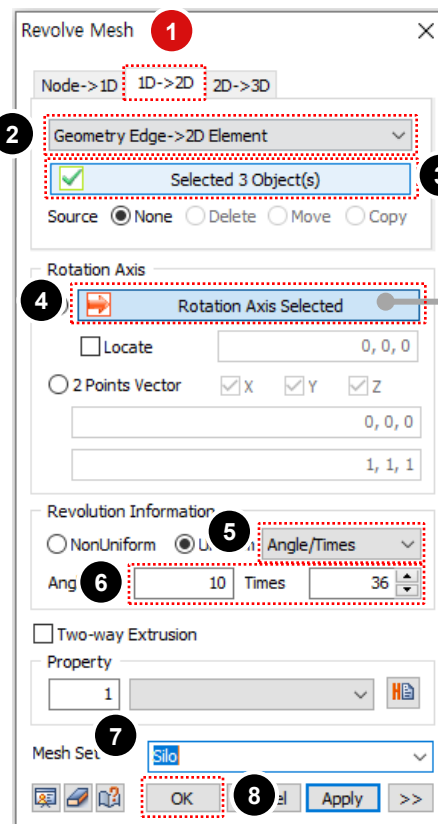
- 1 Select [  ] Select All
- 2 Method : [Interval Length]
- 3 Mesh Size : "0.5"
- 4 Click [OK] Button




 "Ctrl+A" as shortcut for  
"Select Displayed"

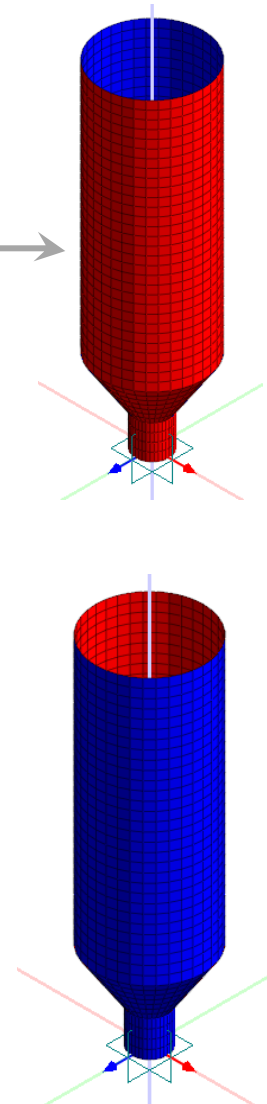
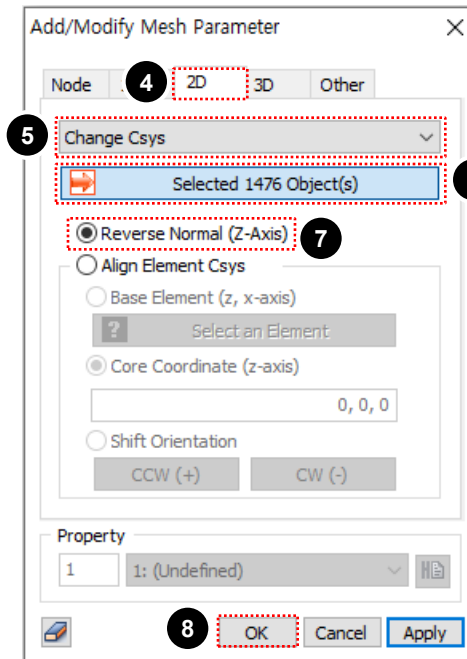
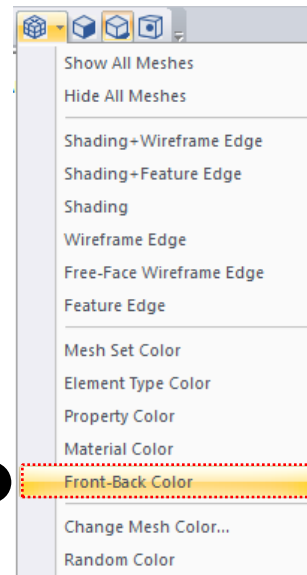
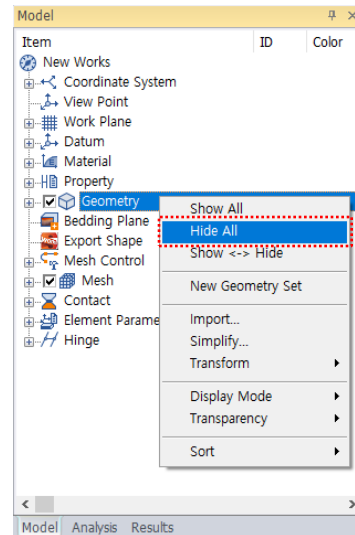
**Procedure**

- 1 Select [1D → 2D] tab
- 2 Select [Geometry Edge → 2D Element]
- 3 Select [Select All]
- 4 Rotation Axis : [Z Axis]
- 5 Select [Angle/Times]
- 6 Angle : "10", Number of Times : "36"
- 7 Mesh Set : [Silo]
- 8 Click [OK] Button



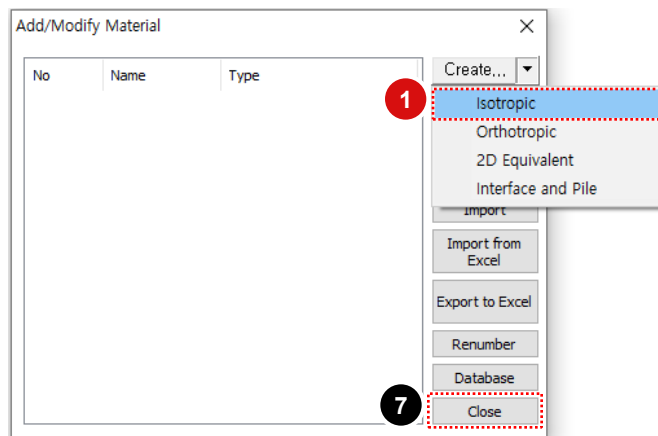
**Procedure**

- 1 Click Right Mouse Button and Select **[Hide All]**
- 2 Click **[Front-Back Color]**
- 3 Mesh > Element > **Parameters**
- 4 Select **[2D]** tab
- 5 Select **[Change Csys]**
- 6 Select [  ] Select All
- 7 Select **[Reverse Normal]** Option
- 8 Click **[OK]** Button



## Procedure

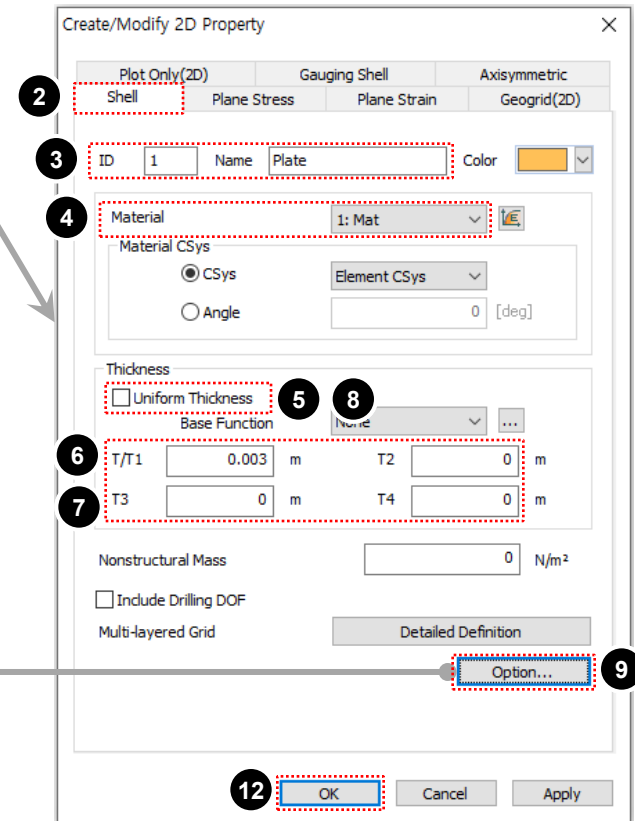
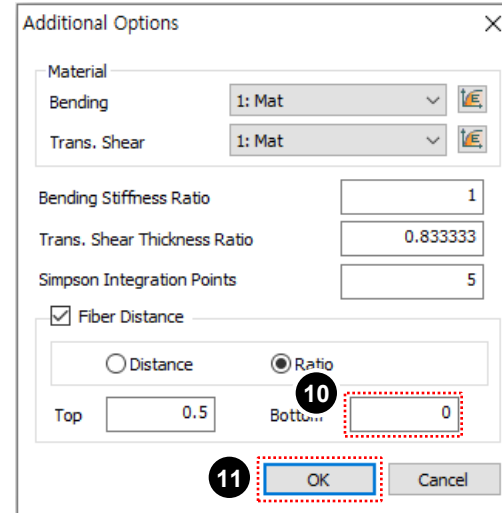
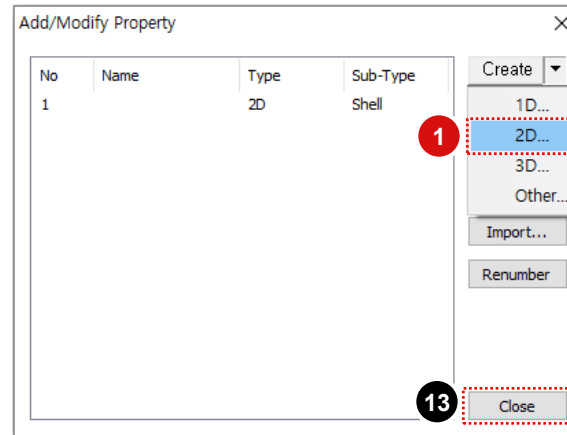
- 1 Click **[Create Isotropic]** Button
- 2 ID : “1”, Name : “Mat”
- 3 Elastic Modulus : “2e11” N/m<sup>2</sup>
- 4 Poisson’s Ratio : “0.32”
- 5 Weight Density : “802\*9.80665” N/m<sup>3</sup>
- 6 Click **[OK]** Button
- 7 Click **[Close]** Button



# 07 Property

## Procedure

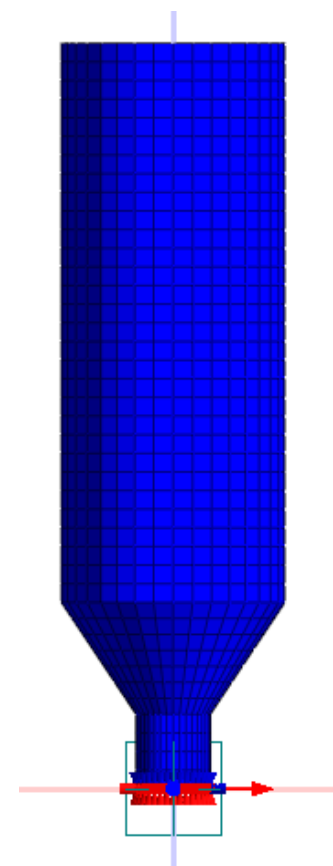
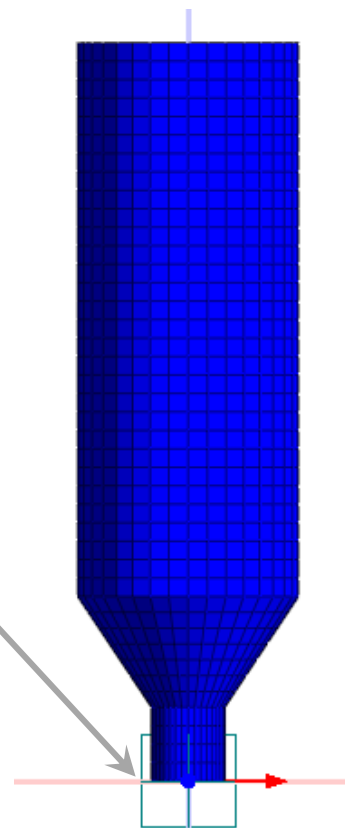
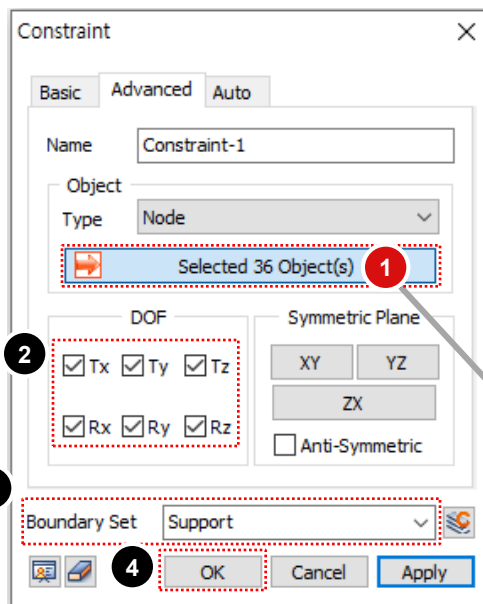
- 1 Create [2D...]
- 2 Select [Shell] tab
- 3 ID : "1", Name : "Plate"
- 4 Material : [1: Mat]
- 5 Check off [Uniform Thickness]
- 6 T or T1 : "0.003"
- 7 T2, T3, T4 : "0"
- 8 Check on [Uniform Thickness]
- 9 Click [Option...] Button
- 10 Fiber Distance – Bottom : "0"
- 11 Click [OK] Button
- 12 Click [OK] Button
- 13 Click [Close] Button





**Procedure**

- 1 Select **[36 Bottom]** Nodes  
(See Figure)
- 2 Click all Buttons
- 3 Boundary Set : **[Support]**
- 4 Click **[OK]** Button

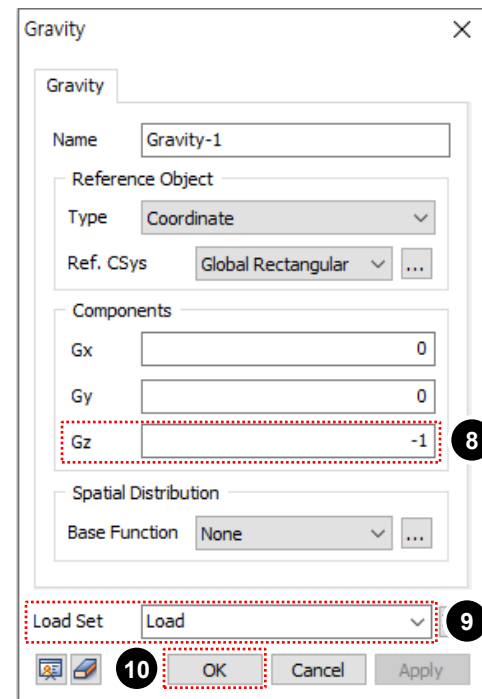
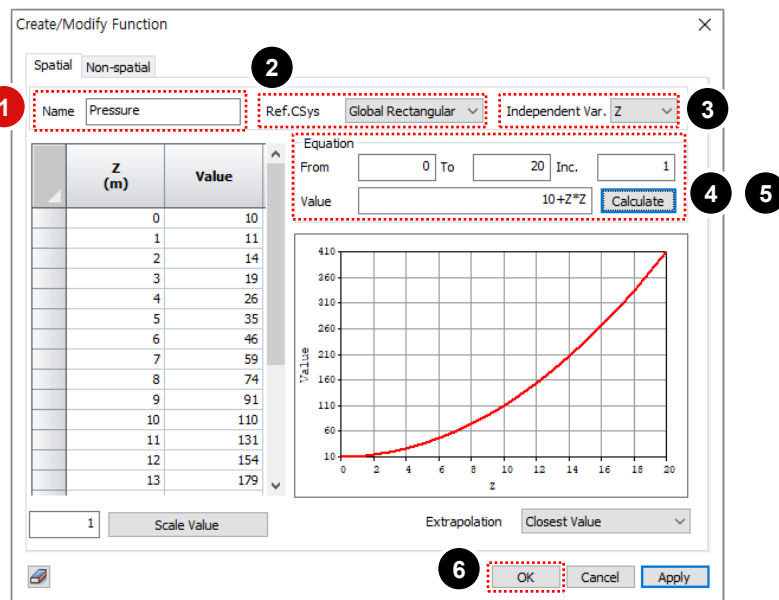


**Procedure**

- 1 Name : **"Pressure"**
- 2 Ref. CSys : **[Global Rectangular]**
- 3 Independent Var. : **"Z"**
- 4 From : **"0"** , To : **"20"** , Inc. : **"1"**  
Value : **"10+Z\*Z"**
- 5 Click **[Calculate]** Button
- 6 Click **[OK]** Button
- 7 Static Analysis > Static Load > **self**

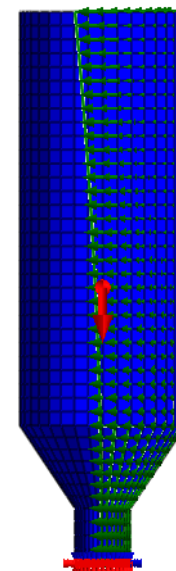
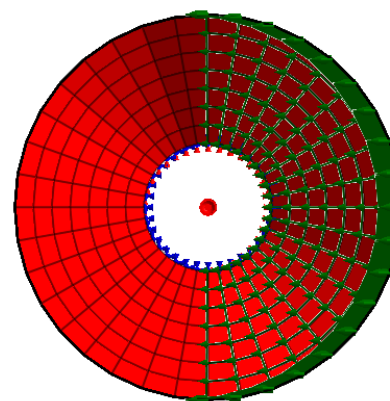
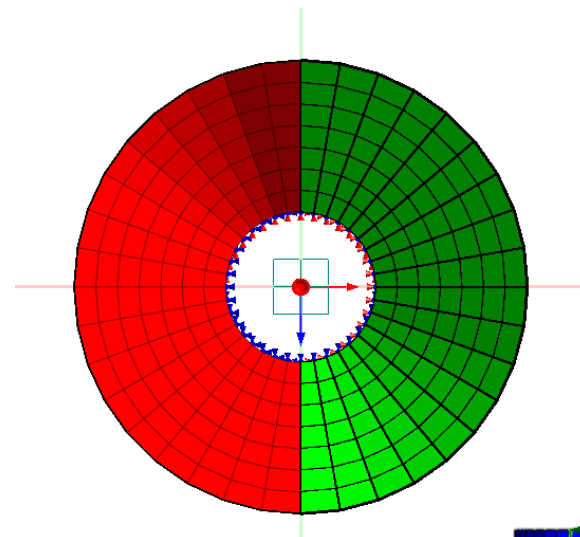
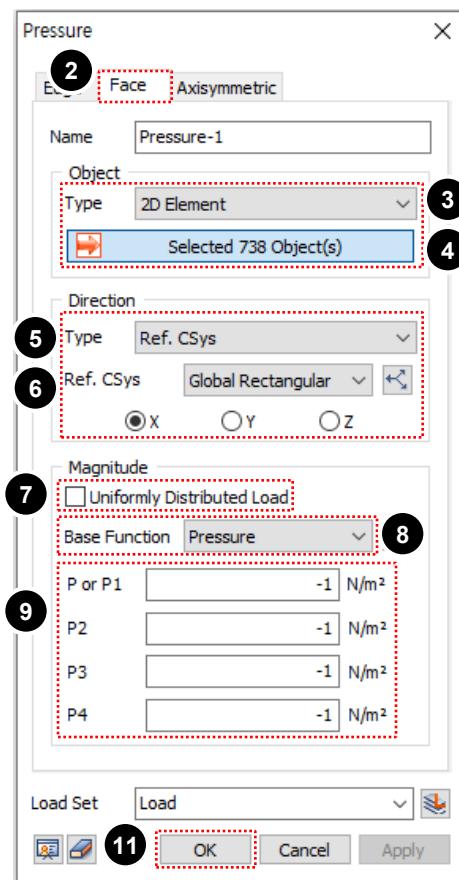
**Weight**

- 8 Gz : **"-1"**
- 9 Load Set : **[Load]**
- 10 Click **[OK]** Button



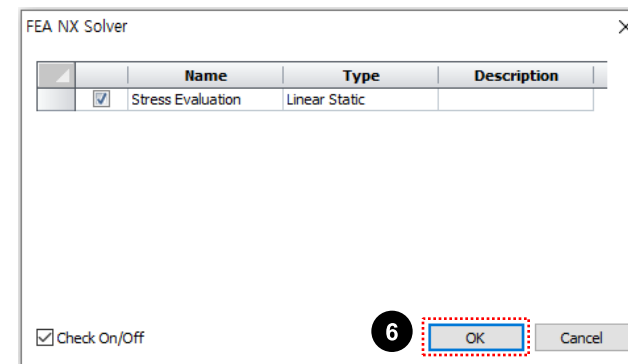
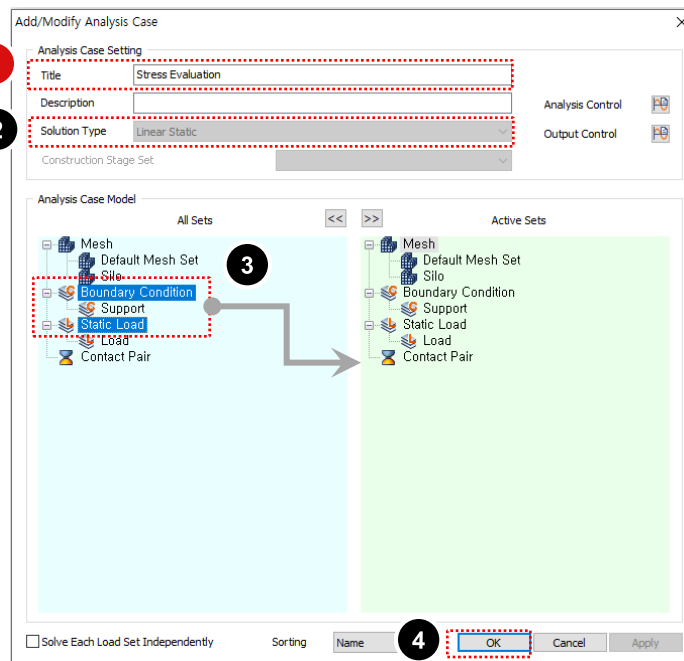
**Procedure**

- 1 Click **[Top]** view
- 2 Click **[Face]** tab
- 3 Object Type : **[2D Element]**
- 4 Select **[738 Right Elements]**
- 5 Direction Type : **[Ref. CSys]**
- 6 Ref. CSys : **[Global Rectangular X]**
- 7 Check off  
**[Uniformly Distributed Load]**
- 8 Base Function : **[Pressure]**
- 9 P1~P4 : **"-1"**
- 10 Load Set : **[Load]**
- 11 Click **[OK]** Button



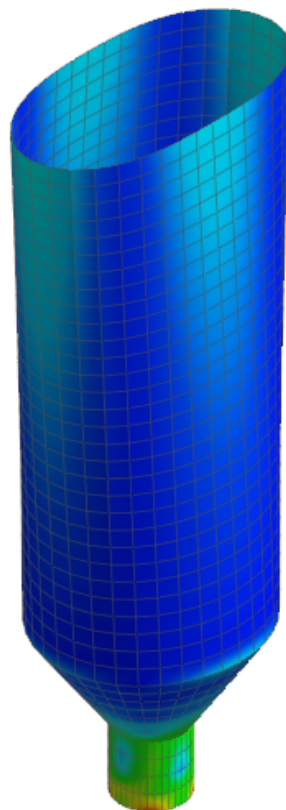
**Procedure**

- 1 Title : **"Stress Evaluation"**
- 2 Solution Type : **[Linear Static]**
- 3 Drag & Drop **[Static Load]** and **[Boundary Condition]** to **[Active Sets]** Window
- 4 Click **[OK]** Button
- 5 Analysis > **Perform**
- 6 Click **[OK]** Button



**Procedure**

- 1 Double Click **[S-MAX SHEAR TOP]**
- 2 Select **[Deformed]** for Mesh Shape at **[Result]** Tab



SHELL STRESS  
S-MAX SHEAR TOP, N/m<sup>2</sup>

0.5%	+1.27538e+008
1.0%	+1.17073e+008
1.4%	+1.06608e+008
3.0%	+9.61423e+007
4.1%	+8.56770e+007
4.7%	+7.52117e+007
4.7%	+6.47464e+007
5.3%	+5.42811e+007
6.3%	+4.38158e+007
13.0%	+3.33505e+007
24.9%	+2.28852e+007
31.1%	+1.24199e+007
	+1.95459e+006

