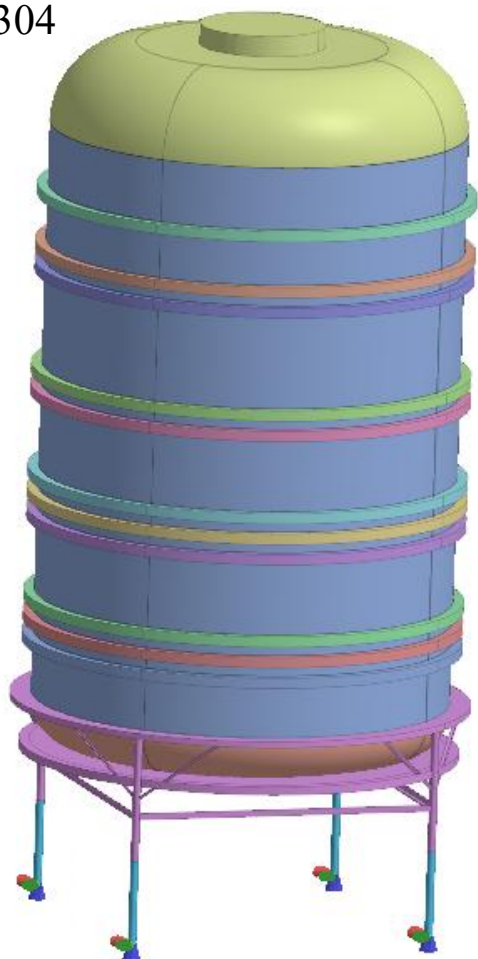


水塔案例分析



水塔材料: SUS304

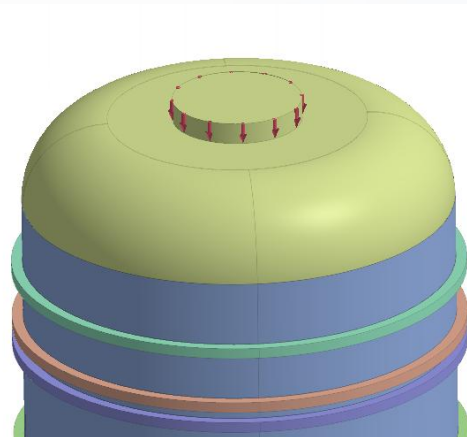
水箱內容物: 水



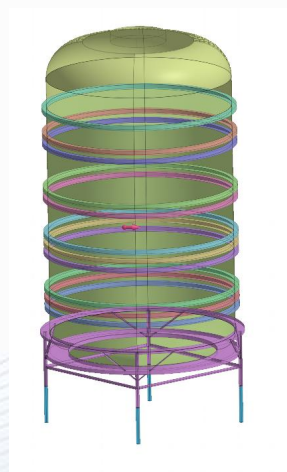
腳架材質: SUS304

邊界條件: 固定端約束

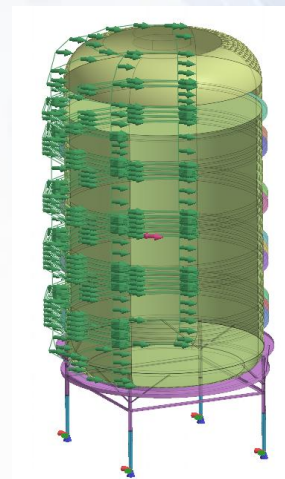
活載重



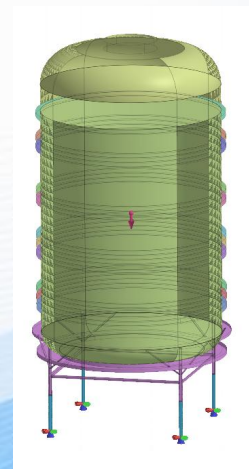
地震載重



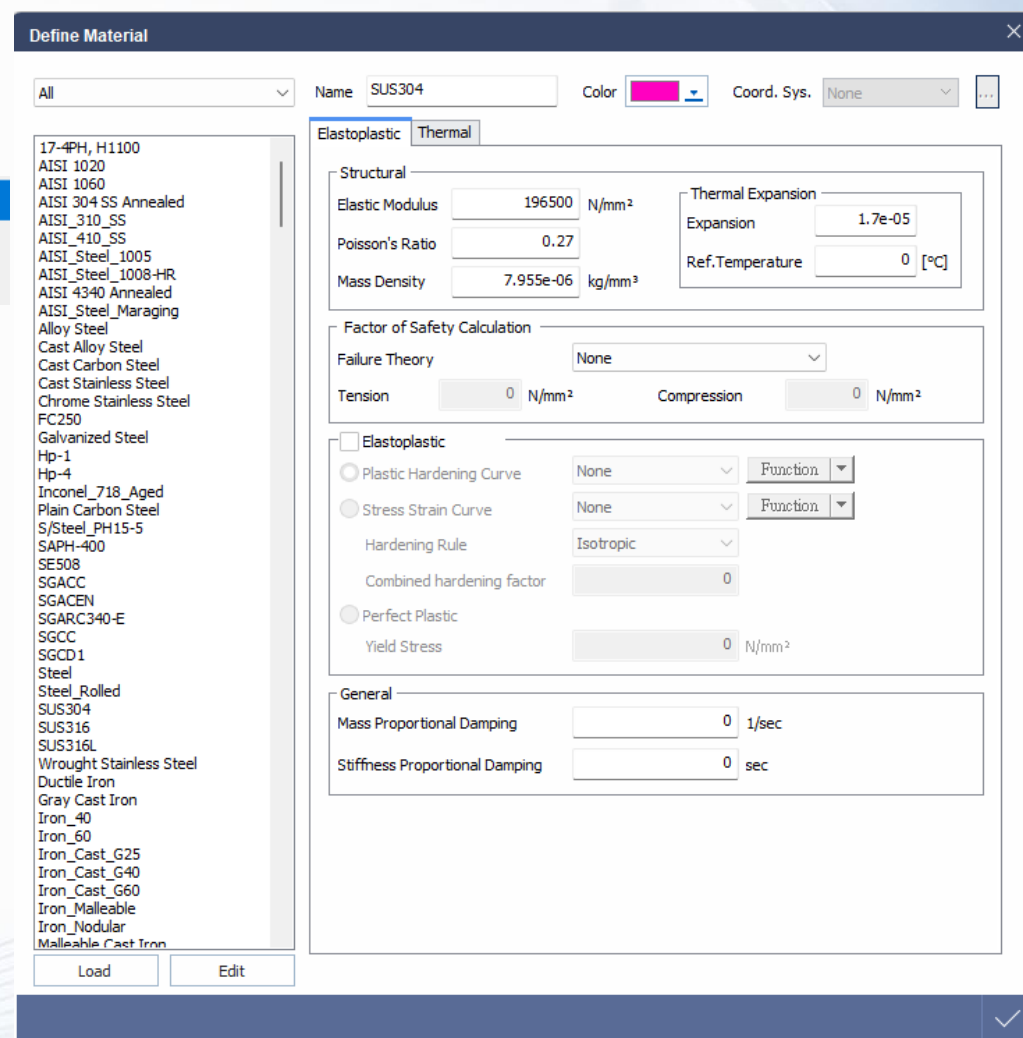
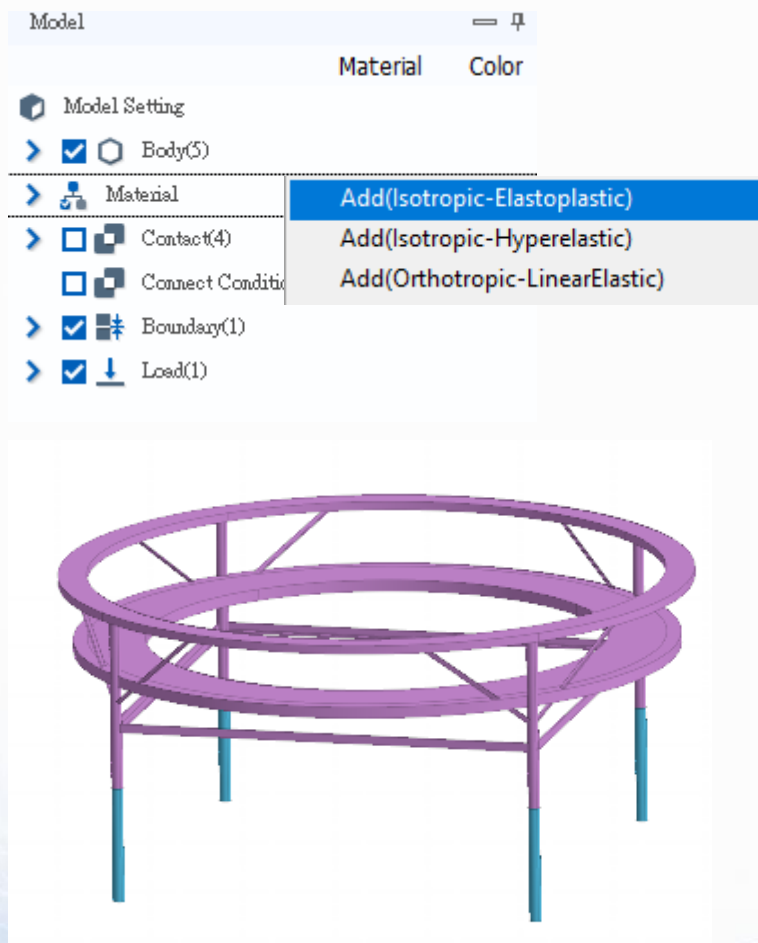
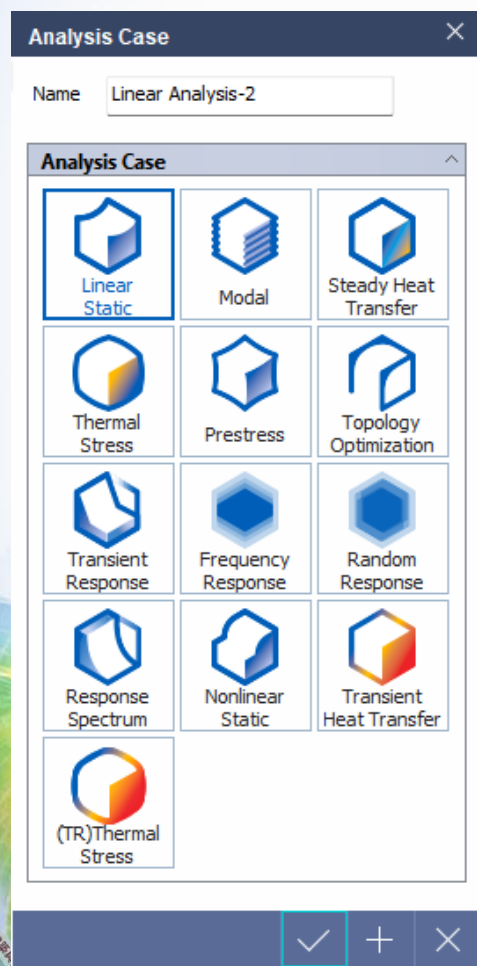
風載重



重力載重



幾何模型 – 分析案例與材料 (SUS304)



幾何模型 – 分析案例與材料 (SUS304)

Define Material

All Name SUS304 Color Coord. Sys. None

17-4PH, H1100
AISI 1020
AISI 1060
AISI 304 SS Annealed
AISI_310_SS
AISI_410_SS
AISI_Steel_1005
AISI_Steel_1008-HR
AISI 4340 Annealed
AISI_Steel_Maraging
Alloy Steel
Cast Alloy Steel
Cast Carbon Steel
Cast Stainless Steel
Chrome Stainless Steel
FC250
Galvanized Steel
Hp-1
Hp-4
Inconel_718_Aged
Plain Carbon Steel
S/Steel_PH15-5
SAPH-400
SE508
SGACC
SGACEN
SGARC340-E
SGCC
SGCD1
Steel
Steel_Rolled
SUS304
SUS316
SUS316L
Wrought Stainless Steel
Ductile Iron
Gray Cast Iron
Iron_40
Iron_60
Iron_Cast_G25
Iron_Cast_G40
Iron_Cast_G60
Iron_Malleable
Iron_Nodular
Malleable Cast Iron

Elastoplastic Thermal

Structural

Elastic Modulus 196500 N/mm²

Poisson's Ratio 0.27

Mass Density 7.955e-06 kg/mm³

Thermal Expansion

Expansion 1.7e-05

Ref. Temperature 0 [°C]

Factor of Safety Calculation

Failure Theory None

Tension 0 N/mm² Compression 0 N/mm²

Elastoplastic

Plastic Hardening Curve None Function

Stress Strain Curve None Function

Hardening Rule Isotropic

Combined hardening factor 0

Perfect Plastic

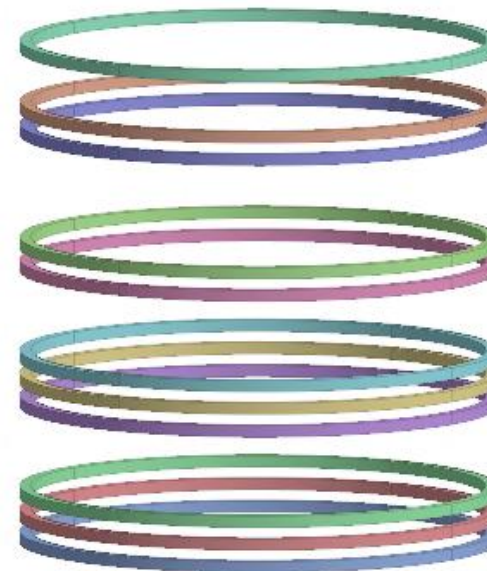
Yield Stress 0 N/mm²

General

Mass Proportional Damping 0 1/sec

Stiffness Proportional Damping 0 sec

Load Edit



幾何模型 – 分析案例與材料 (水)

Define Material

All Name Water Color Coord. Sys. None

17-4PH, H1100
AISI 1020
AISI 1060
AISI 304 SS Annealed
AISI_310_SS
AISI_410_SS
AISI_Steel_1005
AISI_Steel_1008-HR
AISI 4340 Annealed
AISI_Steel_Maraging
Alloy Steel
Cast Alloy Steel
Cast Carbon Steel
Cast Stainless Steel
Chrome Stainless Steel
FC250
Galvanized Steel
Hp-1
Hp-4
Inconel_718_Aged
Plain Carbon Steel
S/Steel_PH15-5
SAPH-400
SE508
SGACC
SGACEN
SGARC340-E
SGCC
SGCD1
Steel
Steel_Rolled
SUS304
SUS316
SUS316L
Wrought Stainless Steel
Ductile Iron
Gray Cast Iron
Iron_40
Iron_60
Iron_Cast_G25
Iron_Cast_G40
Iron_Cast_G60
Iron_Malleable
Iron_Nodular
Malleable Cast Iron

Elastoplastic Thermal

Structural

Elastic Modulus 10 N/mm²

Poisson's Ratio 0.45

Mass Density 1e-06 kg/mm³

Thermal Expansion

Expansion 0

Ref. Temperature 0 [°C]

Factor of Safety Calculation

Failure Theory None

Tension 0 N/mm² Compression 0 N/mm²

Elastoplastic

Plastic Hardening Curve None Function

Stress Strain Curve None Function

Hardening Rule Isotropic

Combined hardening factor 0

Perfect Plastic

Yield Stress 0 N/mm²

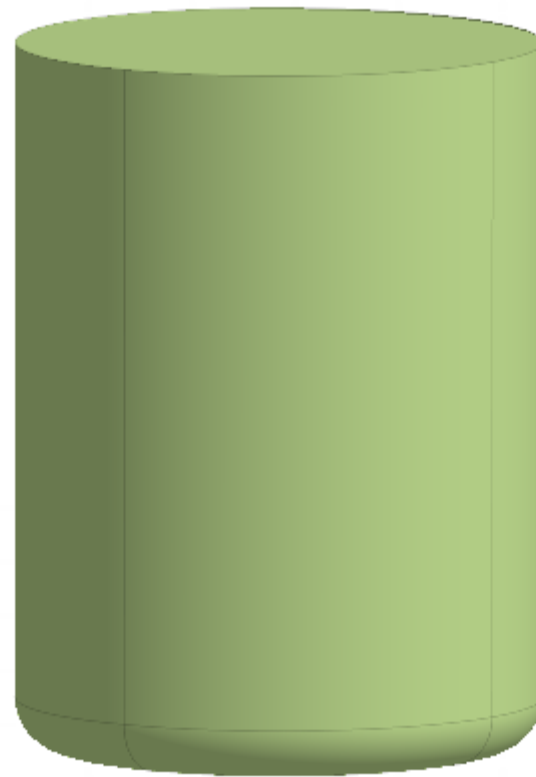
General

Mass Proportional Damping 0 1/sec

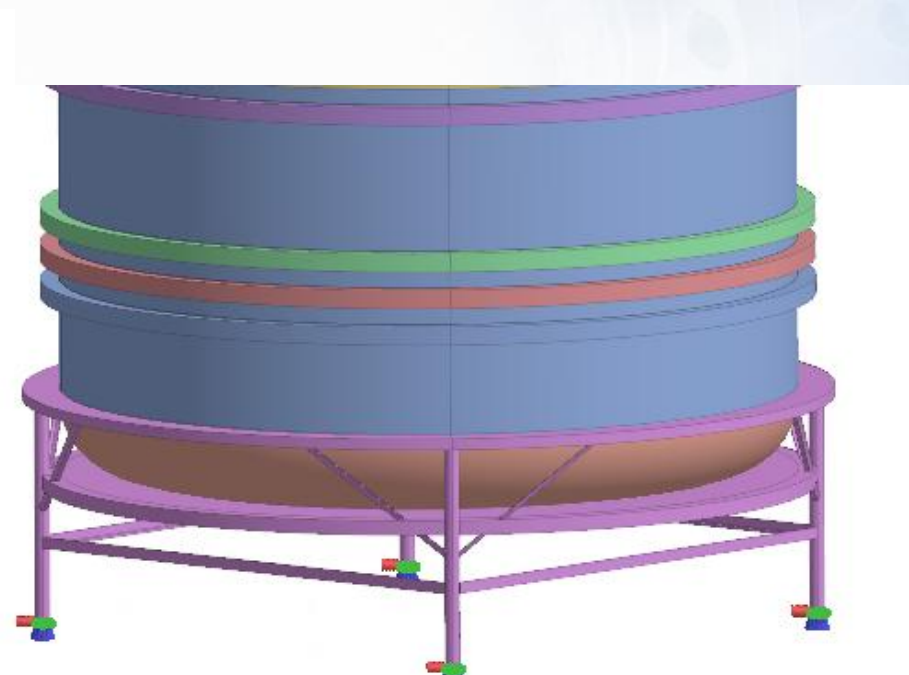
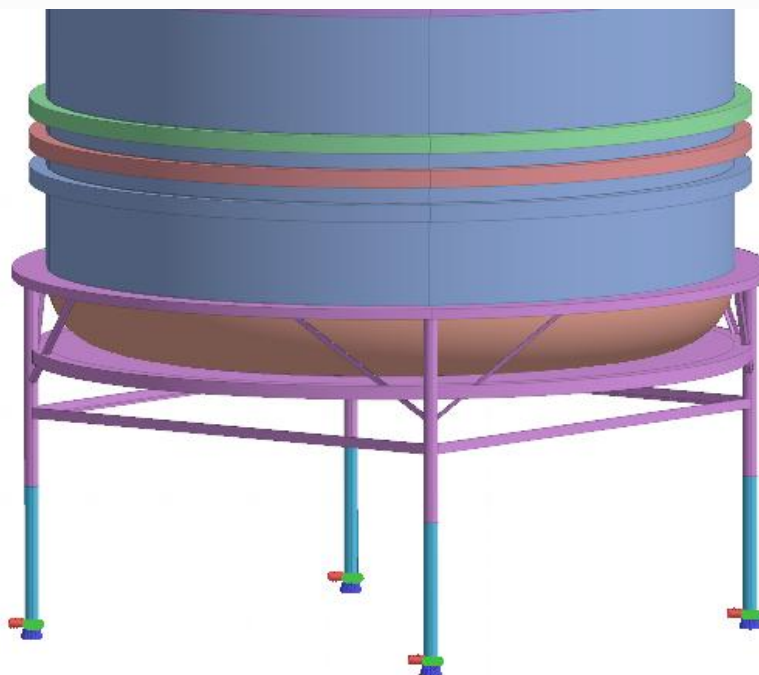
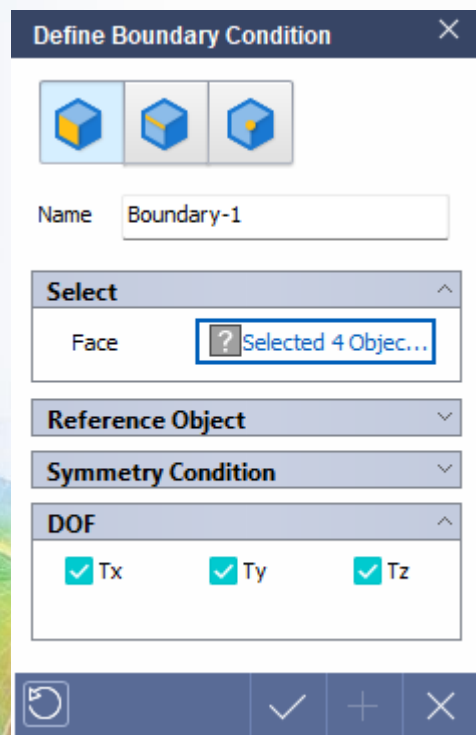
Stiffness Proportional Damping 0 sec

Load Edit

Manual Input



分析工況 | 約束條件



分析工況 | 活載重



Define Force

Name

Force-1

Load Category

Load Type

Force

?

Selected 1 Object(s)

Reference Object

Type

Global Coordinate System

Direction

X

0

N

Y

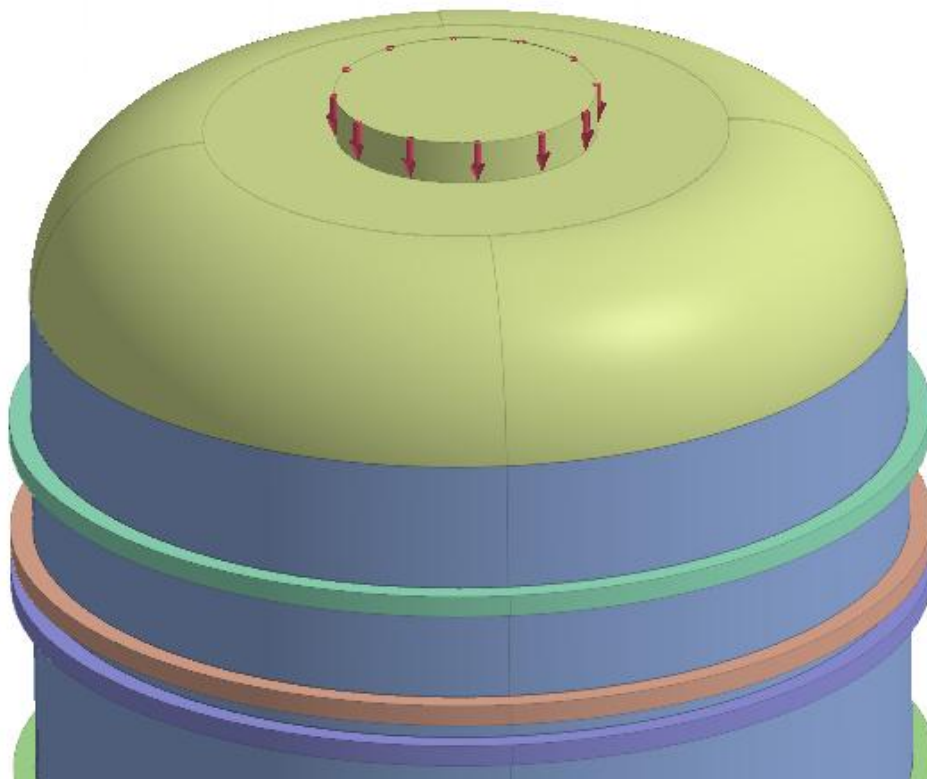
0

N

Z

-4000

N



Conservative force of a human weight and tools to maintain the tank.



分析工況 | 重力載重



Start



Analysis
Conditions



Material



Contact



Constraint
Condition



Rigid
Link



Spring



Weld



Bolt



Gravity



Force



Concentrated
Mass



Pressure



Torque



Rotational
Force



Enforced
Displacement



Initial
Temperature



Temperature

Define Gravity

Name

Gravity-1

Value

Gx

0

mm/sec²

Gy

0

mm/sec²

Gz

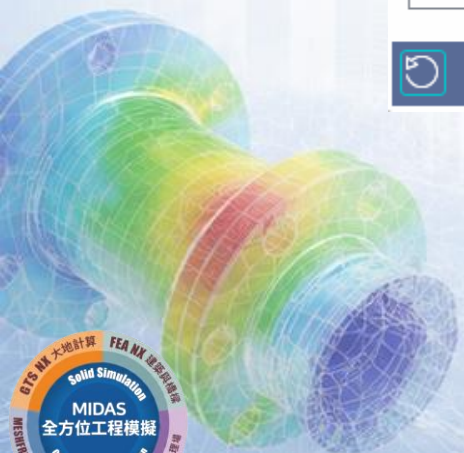
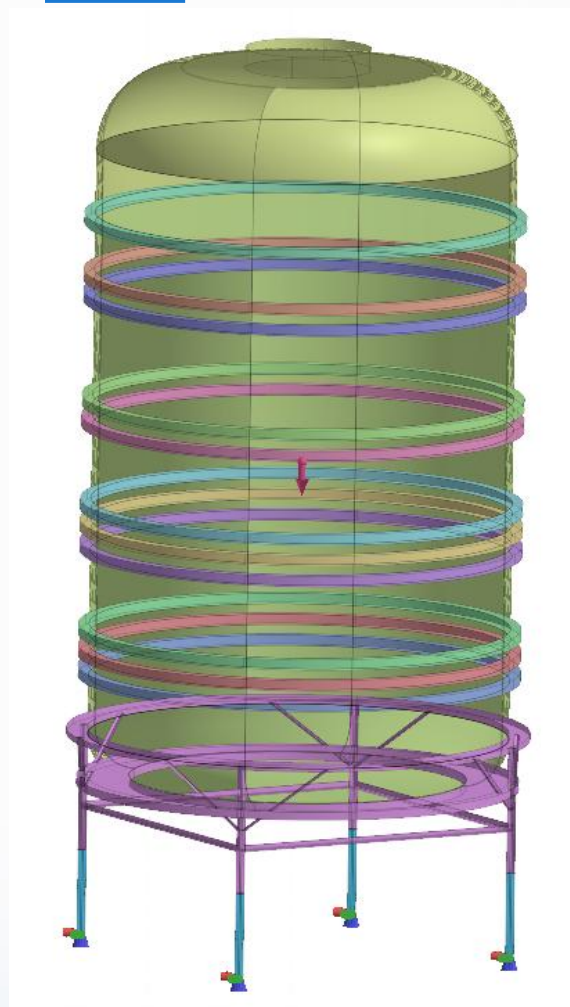
-9806

mm/sec²

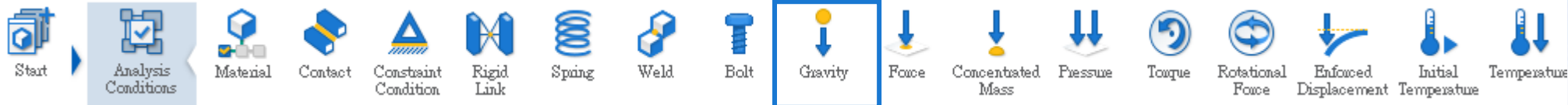
✓

+

×



分析工況 | 地震載重



Define Gravity

Name

EQx

Value

Gx

-9806*0.3

mm/sec²

Gy

0

mm/sec²

Gz

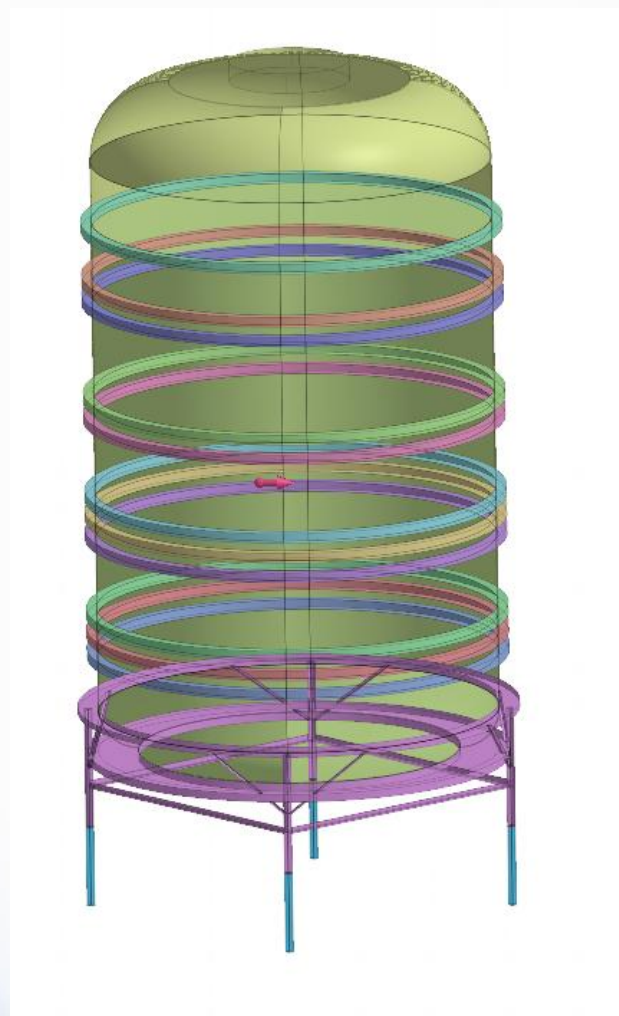
0

mm/sec²

✓

+

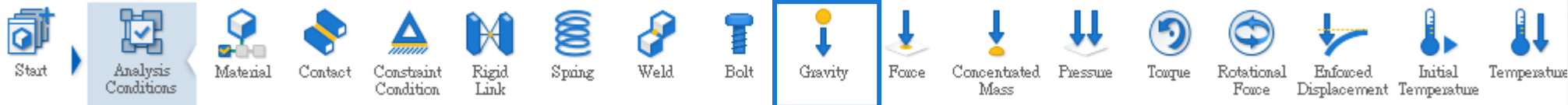
×



Simplified earthquake load using the weight of the tank system



分析工況 | 重力載重



Define Gravity

Name

EQz

Value

Gx

0

mm/sec²

Gy

0

mm/sec²

Gz

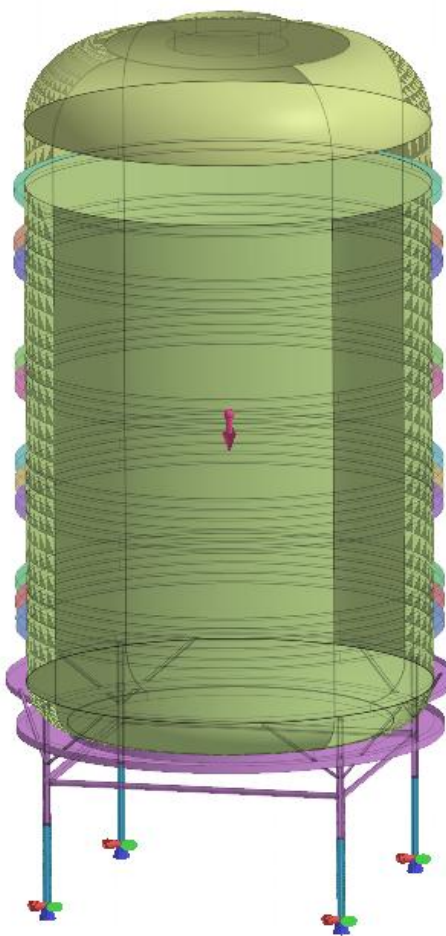
$-806 * 0.15$

mm/sec²

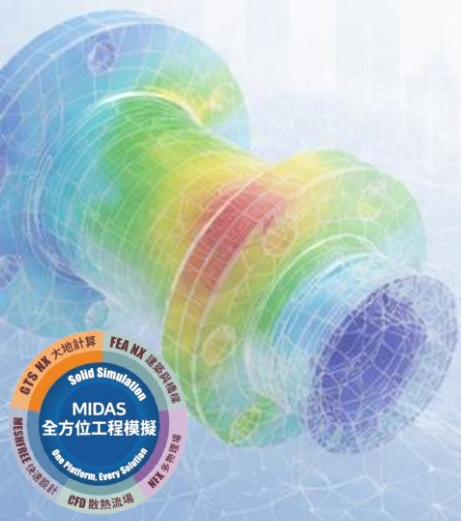
✓

+

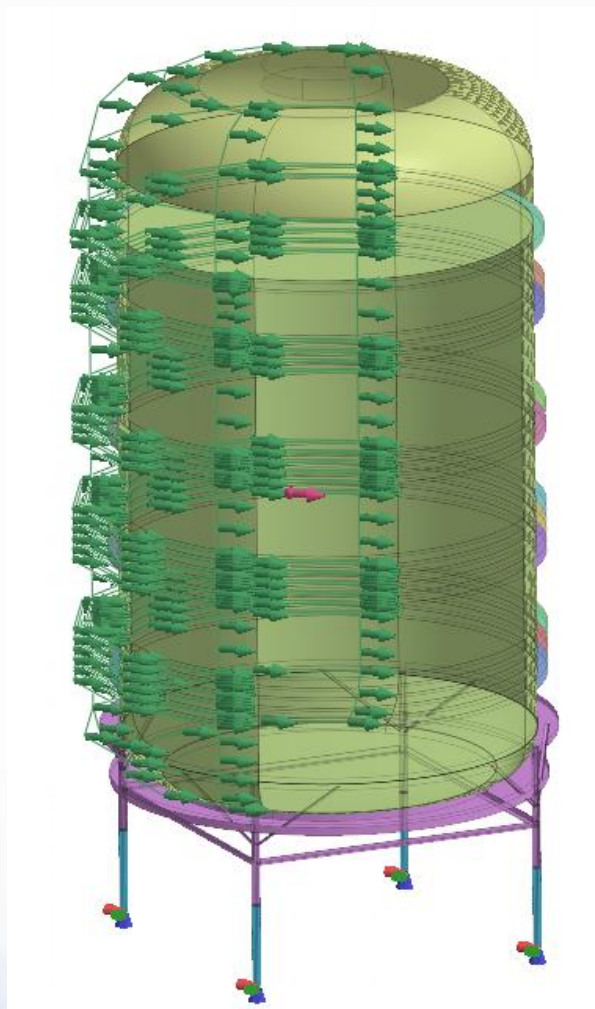
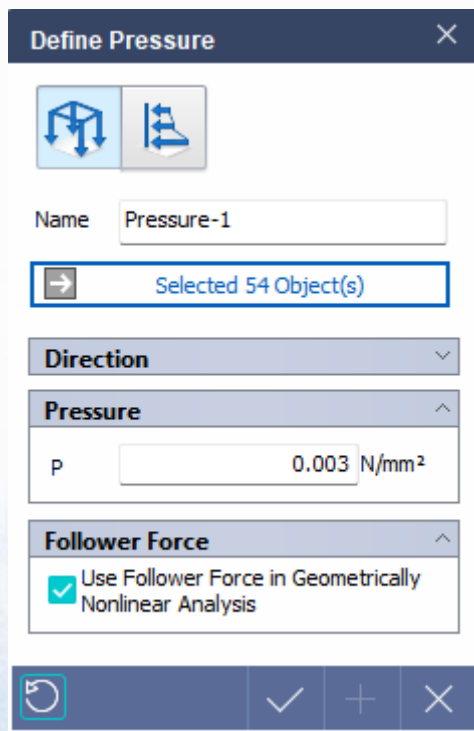
×



Simplified earthquake load using the weight of the tank system

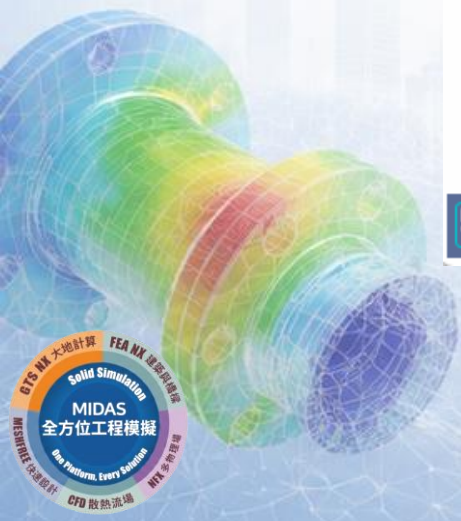


分析工況 | 風載重



Wind Load:

1. Computed from a mid-to-high-rise roof.
2. Tank is not big enough to produce a varying wind load based on height.
3. To analyze the most critical combination, wind load direction should align with the EQx.



分析工況 | 接觸條件



Start



Analysis
Conditions



Material



Contact



Constraint
Condition



Rigid
Link



Spring



Weld



Bolt



Gravity



Force



Concentrated
Mass



Pressure



Torque



Rotational
Force



Enforced
Displacement



Initial
Temperature



Temperature

Define Contact

Name

Select

Selected 14 Object(s)

Type

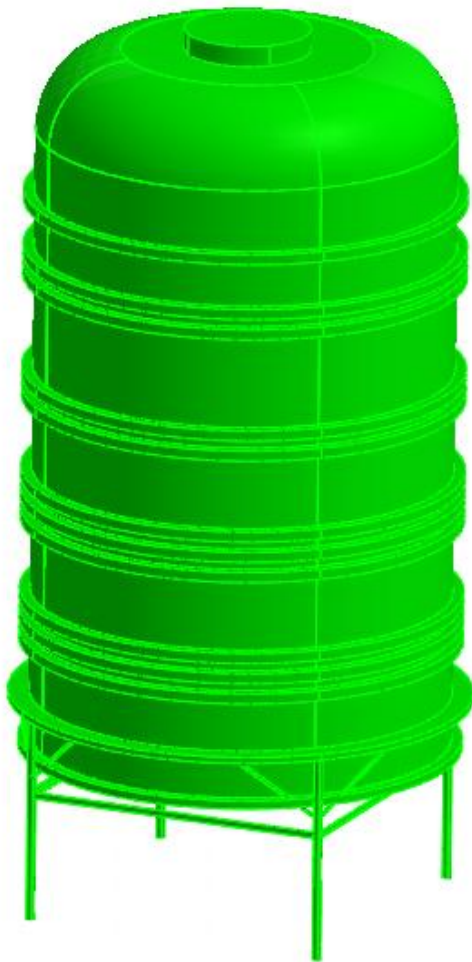
Welded Contact

Coefficient of friction

Normal Stiffness factor

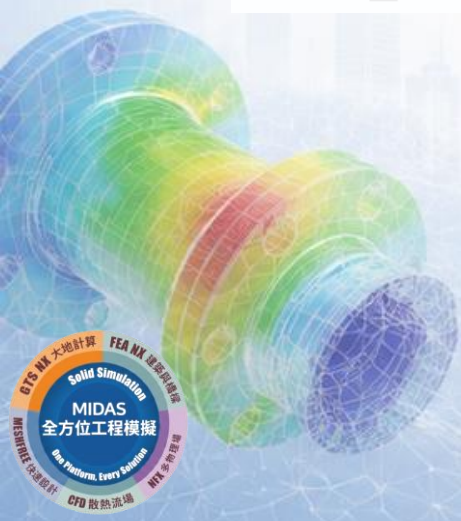
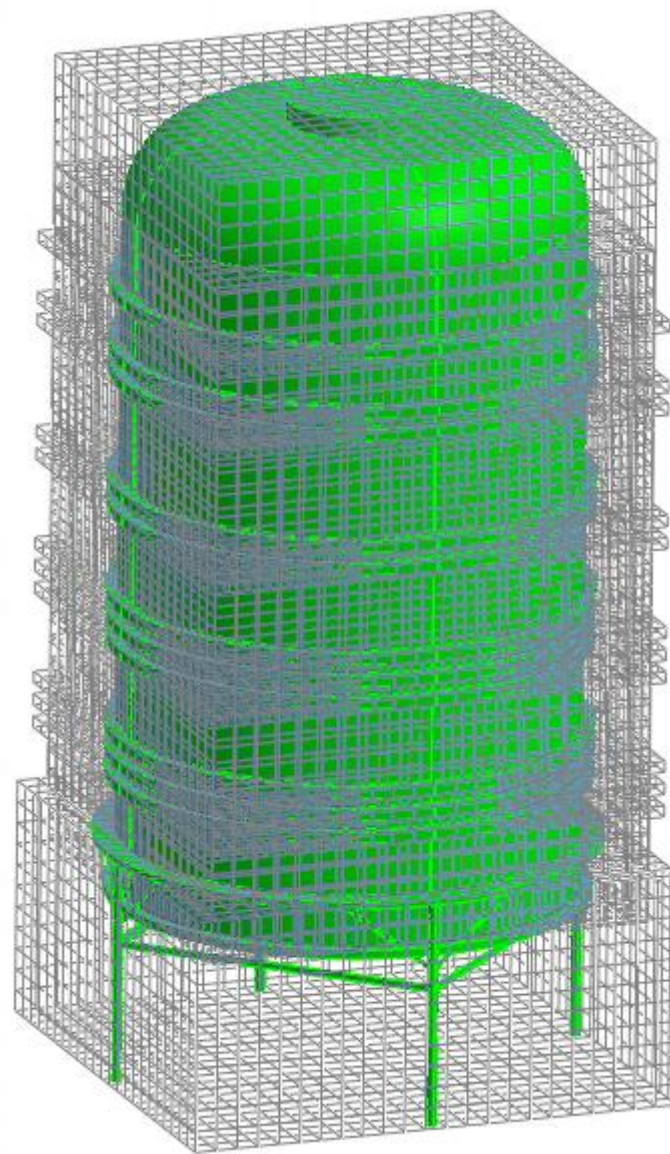
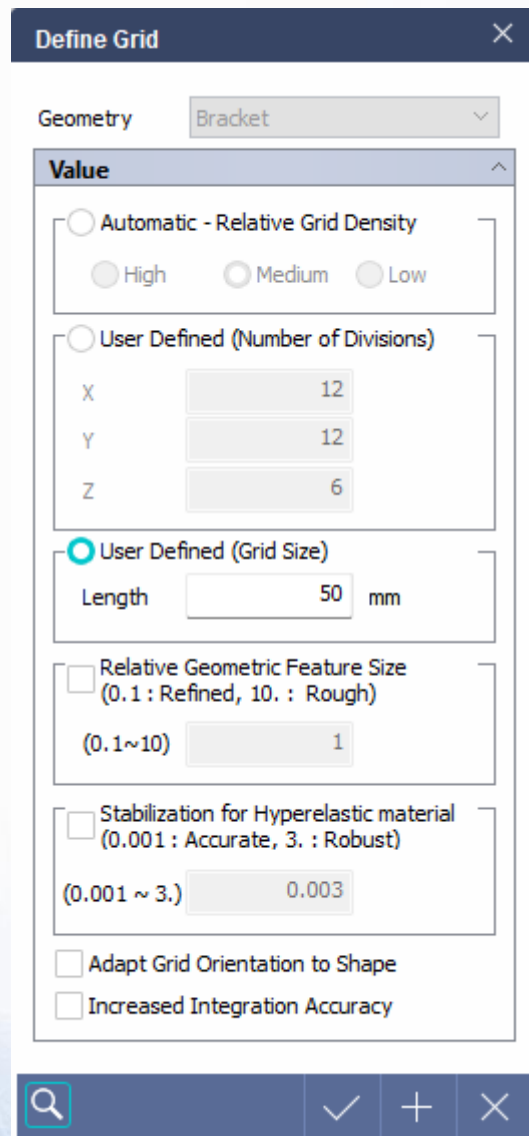
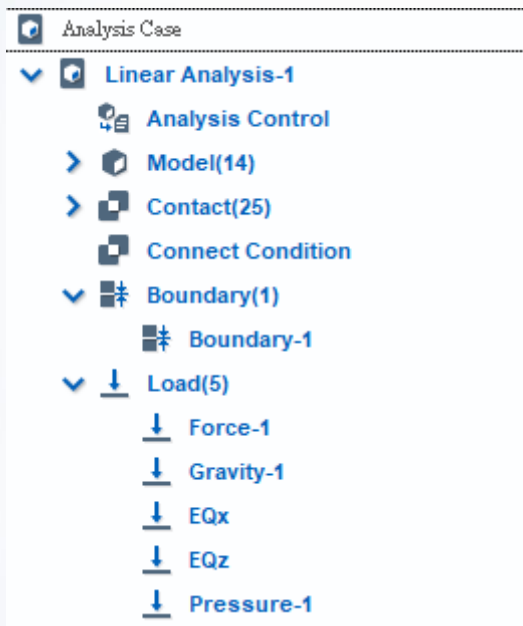
Tangential Stiffness factor

Search Range



▼		Contact(33)
☐		bucket-leg 1 Welded
☐		bucket-leg 2 Welded
☐		bucket-leg 3 Welded
☐		bucket-leg 4 Welded
☐		bucket-tank 2 Welded
☐		water-bucket Welded
☐		water-Revolve Welded
☐		water-Revolve-. Welded
☐		water-Revolve-. Welded
☐		water-Revolve-. Welded
☐		water-Revolve-. Welded
☐		water-Revolve-. Welded
☐		water-Revolve-. Welded
☐		water-Revolve-. Welded
☐		water-Revolve-. Welded
☐		water-Revolve-. Welded
☐		water-Revolve-. Welded

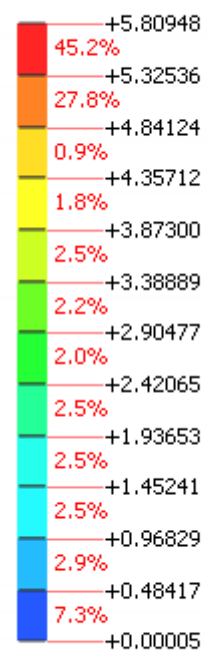
分析工況



分析結果 | 變形

Deformations

DISPLACEMENT-XYZ



Linear Analysis-1

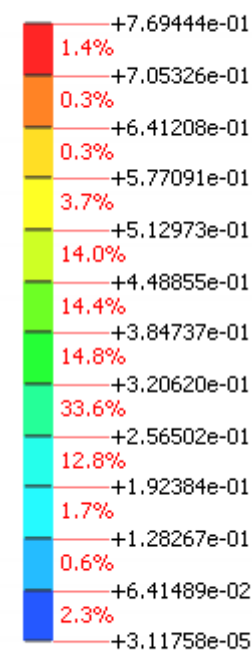
Linear Static

Unit : mm



Deformations

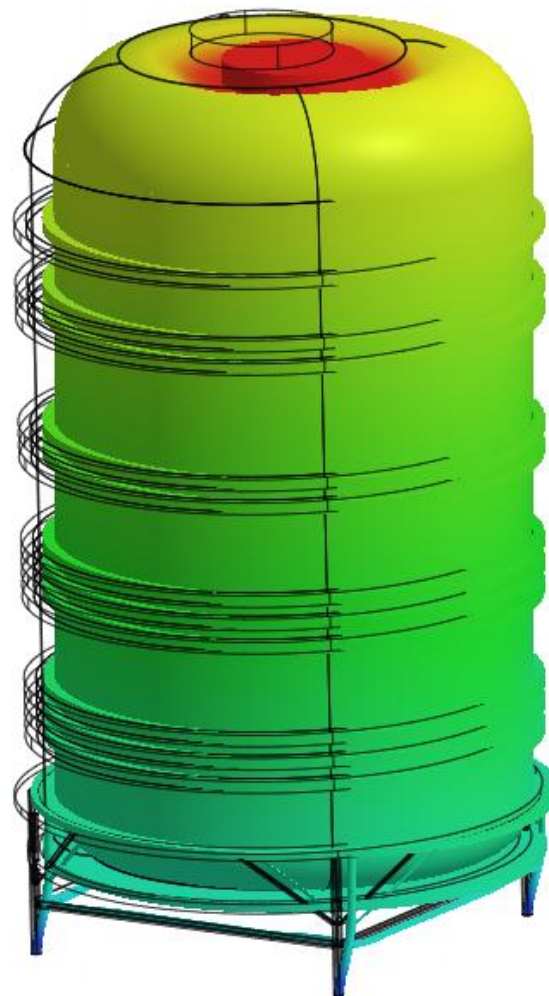
DISPLACEMENT-XYZ



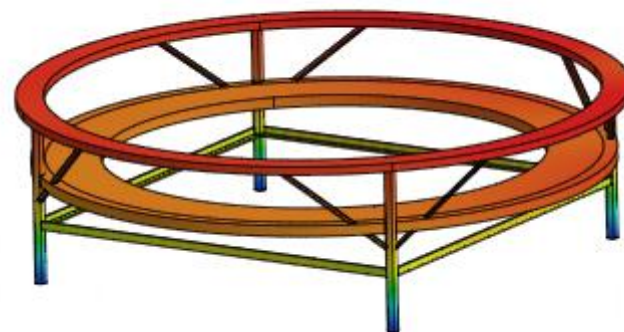
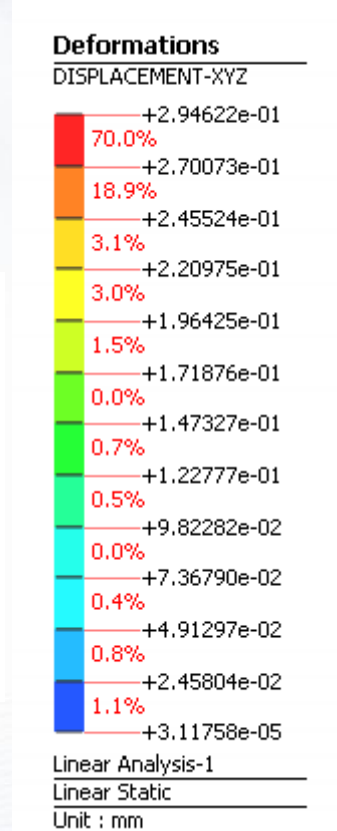
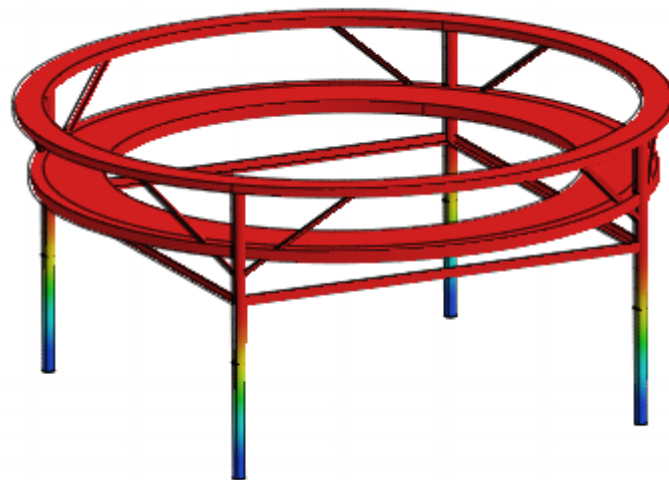
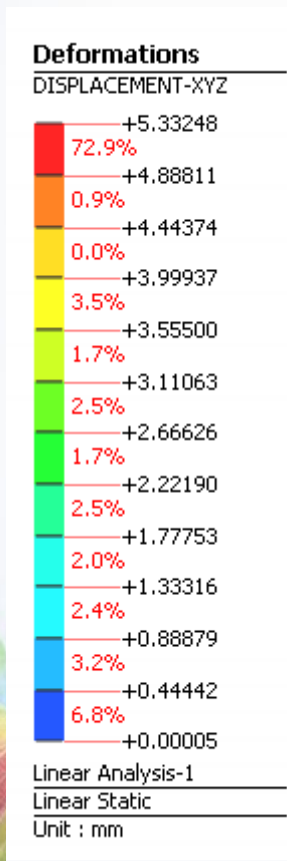
Linear Analysis-1

Linear Static

Unit : mm



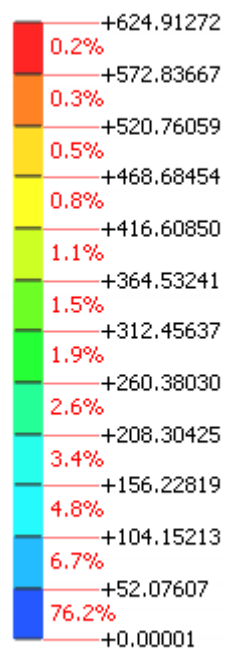
分析結果 | 變形



分析結果 | STRESS VON MISES

Stress

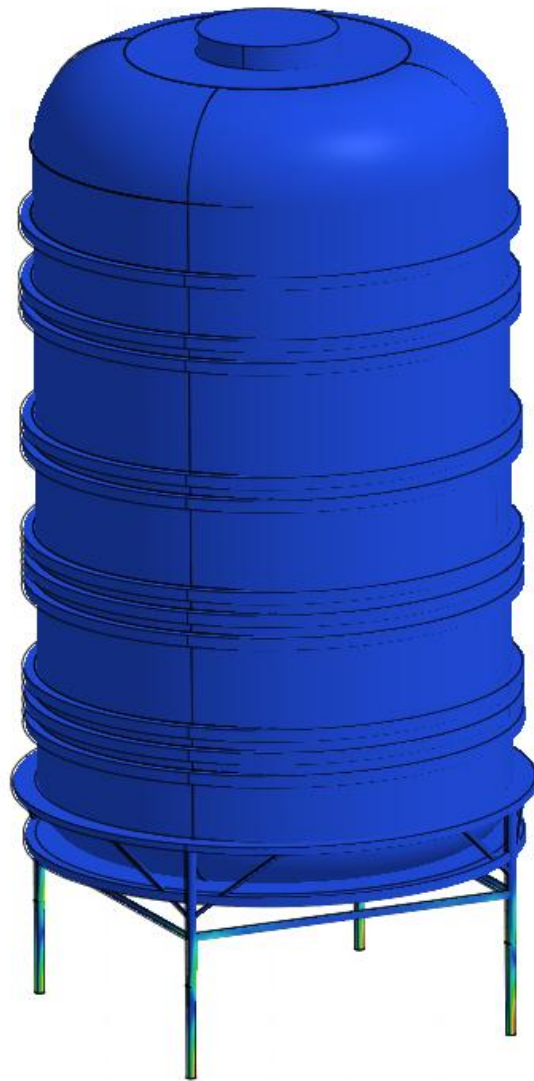
STRESS VON MISES



Linear Analysis-1

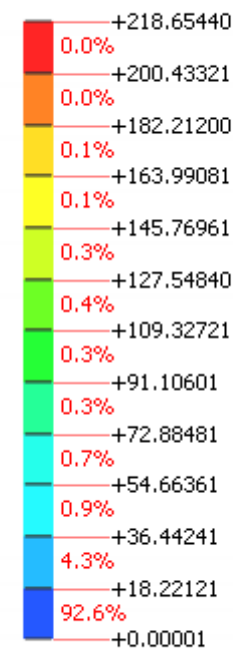
Linear Static

Unit : N/mm²



Stress

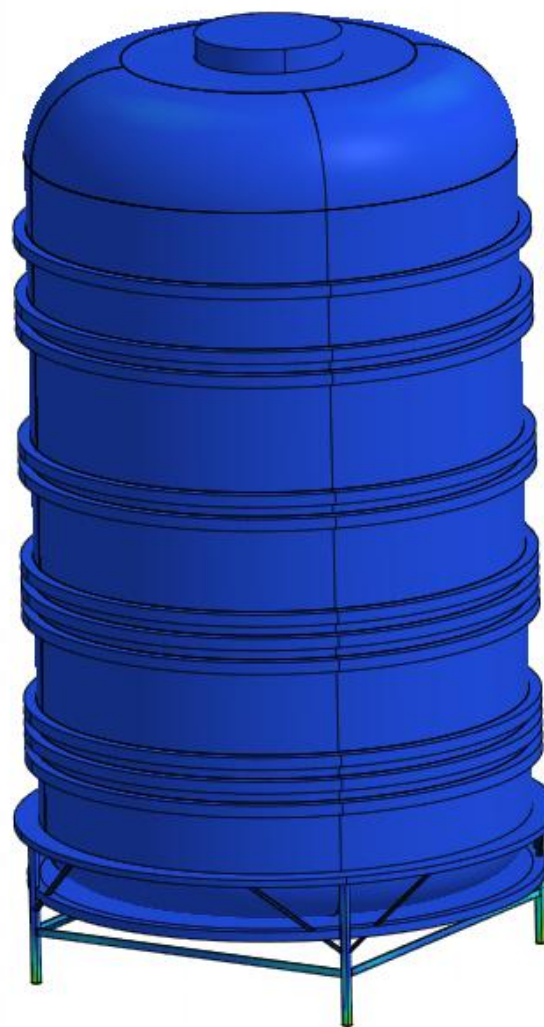
STRESS VON MISES



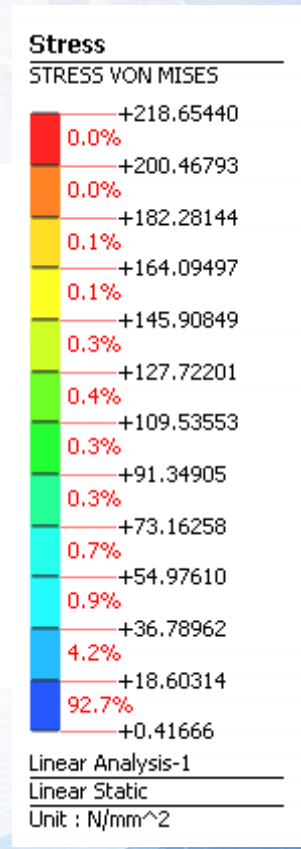
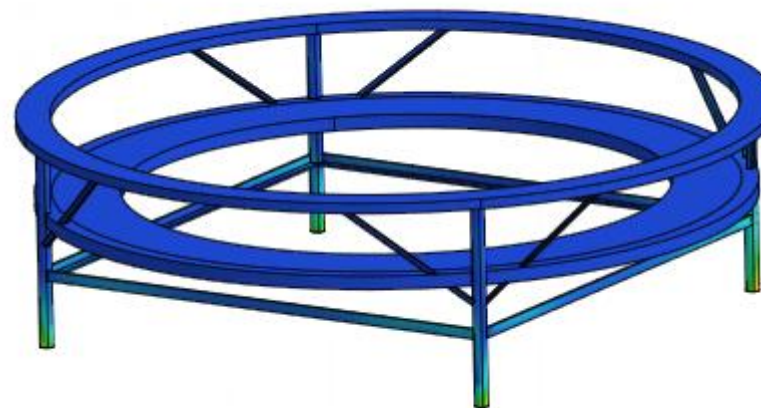
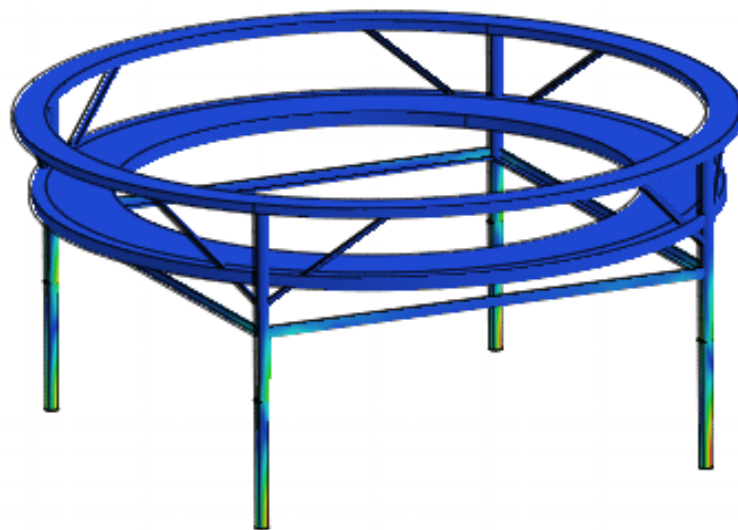
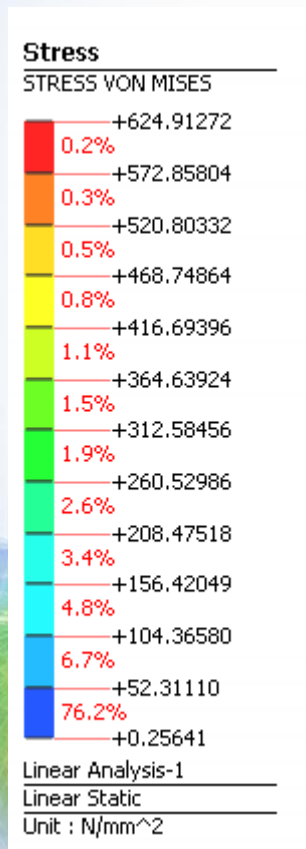
Linear Analysis-1

Linear Static

Unit : N/mm²

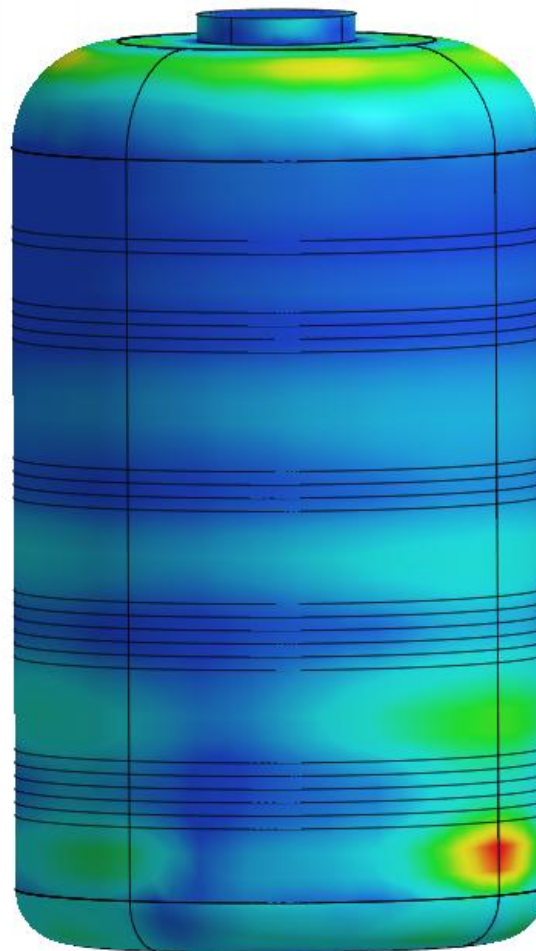
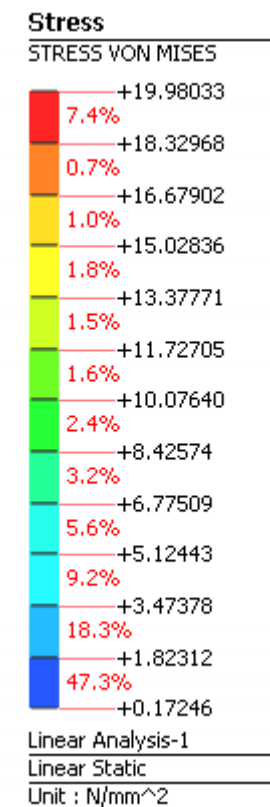
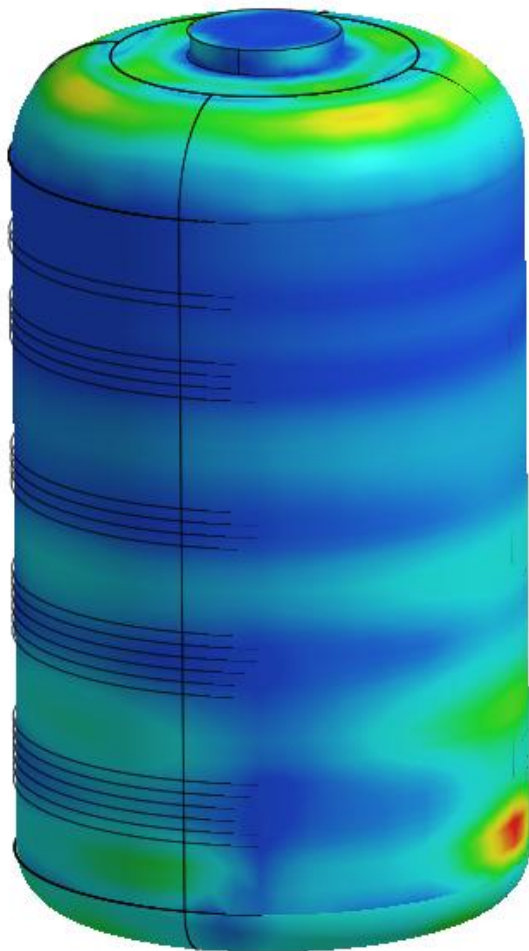
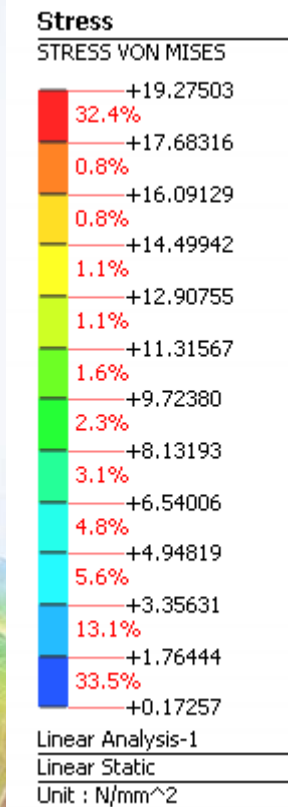


分析結果 | STRESS VON MISES

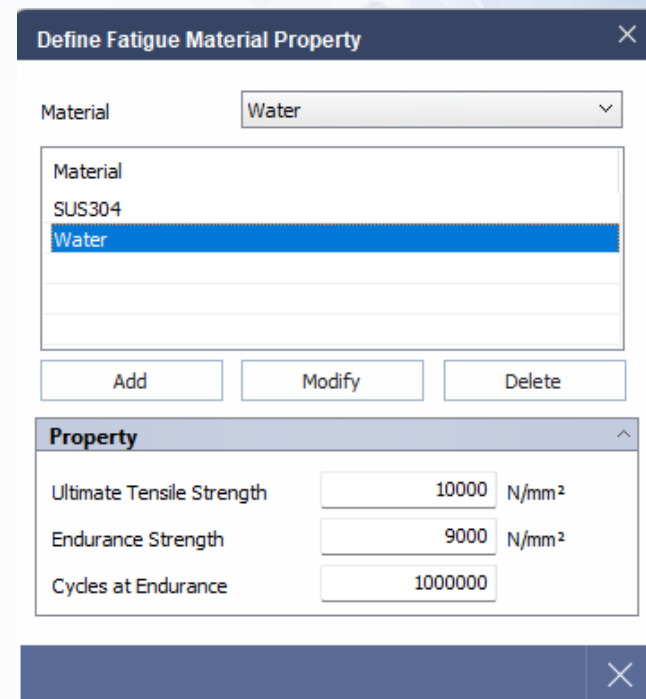
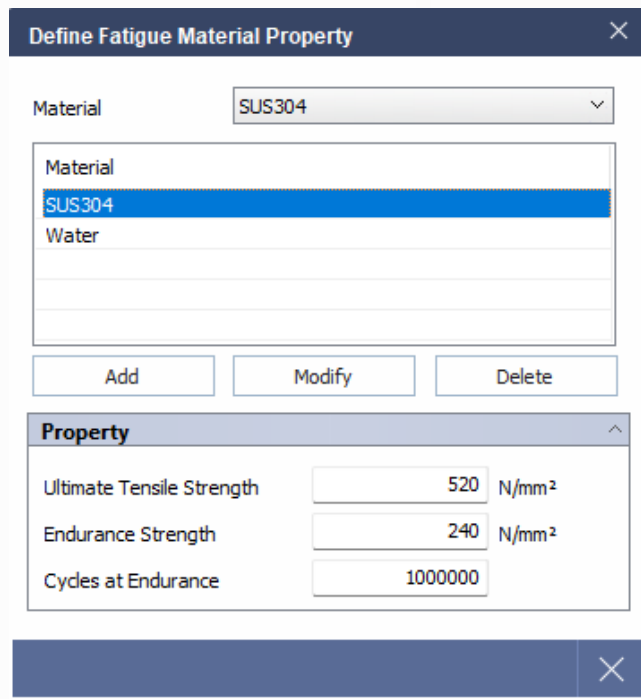
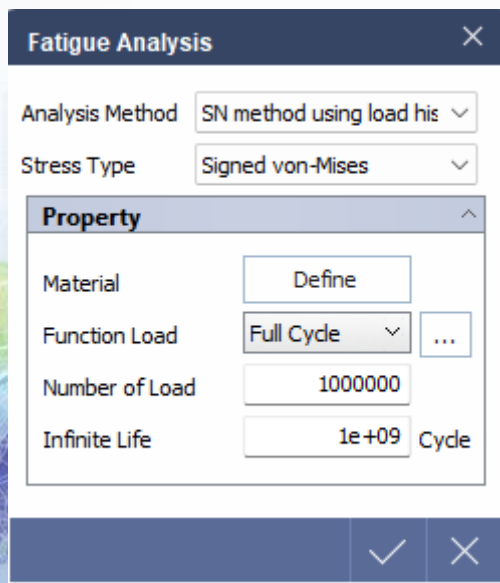
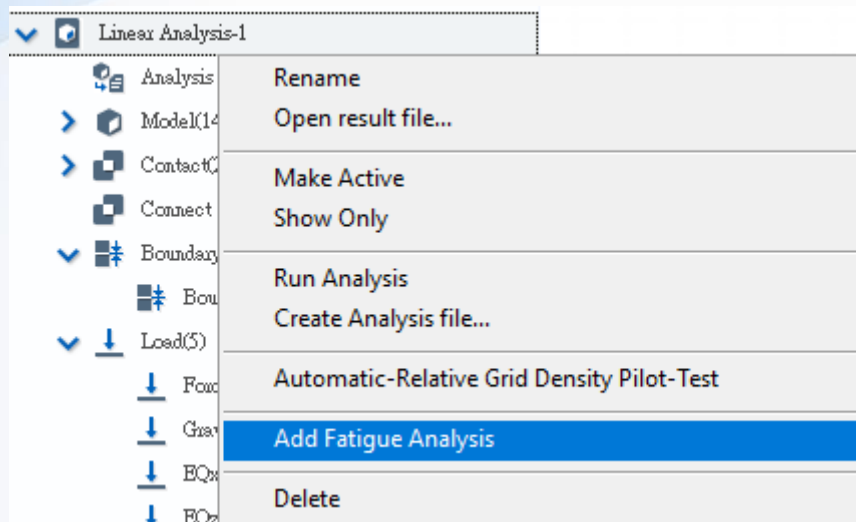


Bracket legs are experiencing a high stress due to its slenderness. Redesigning through making it shorter (geometrically) or changing the material is a possibility to solve the problem.

分析結果 | STRESS VON MISES



疲勞分析

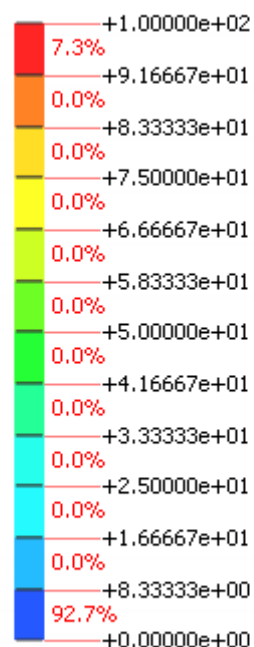


Note: Water parameters are dummy parameters.

疲勞分析

Misc.

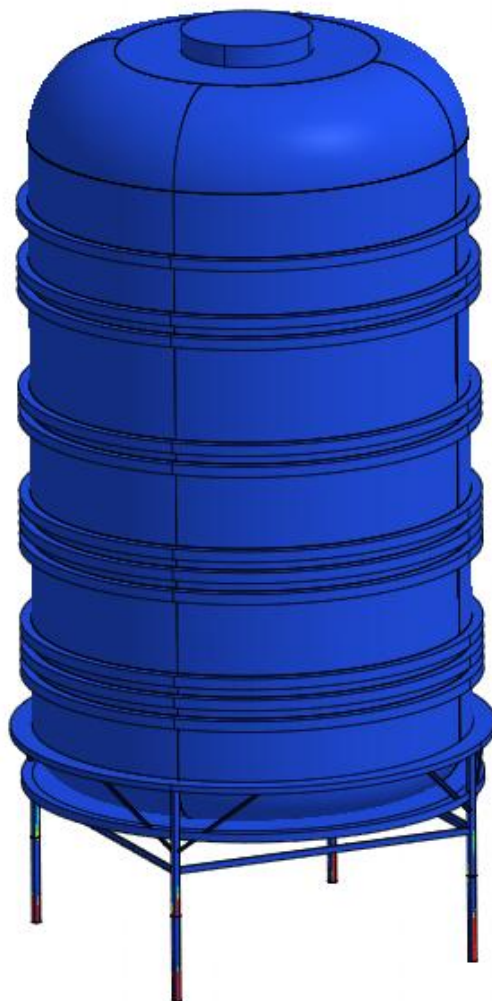
DAMAGE



Linear Analysis-1_Fatigue Result-1

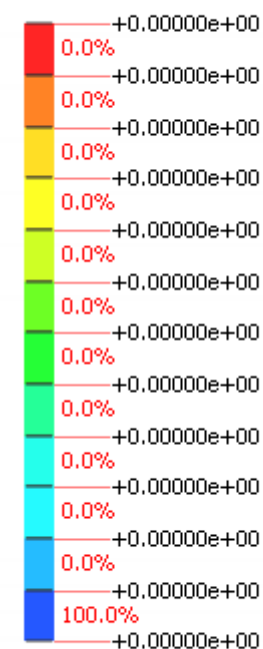
Linear Static

Unit : None



Misc.

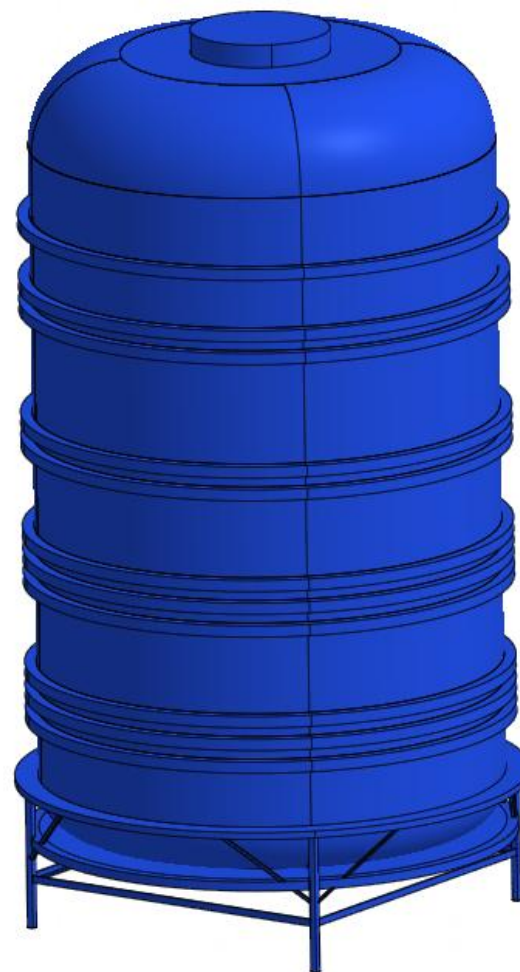
DAMAGE



Linear Analysis-1_Fatigue Result-1

Linear Static

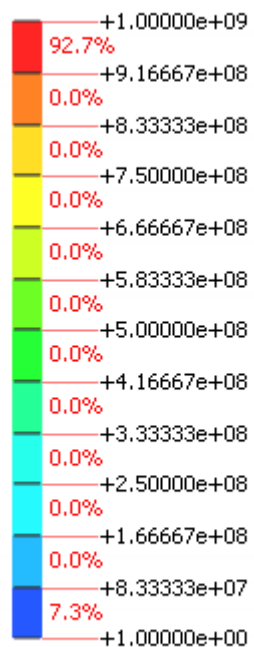
Unit : None



疲勞分析

Misc.

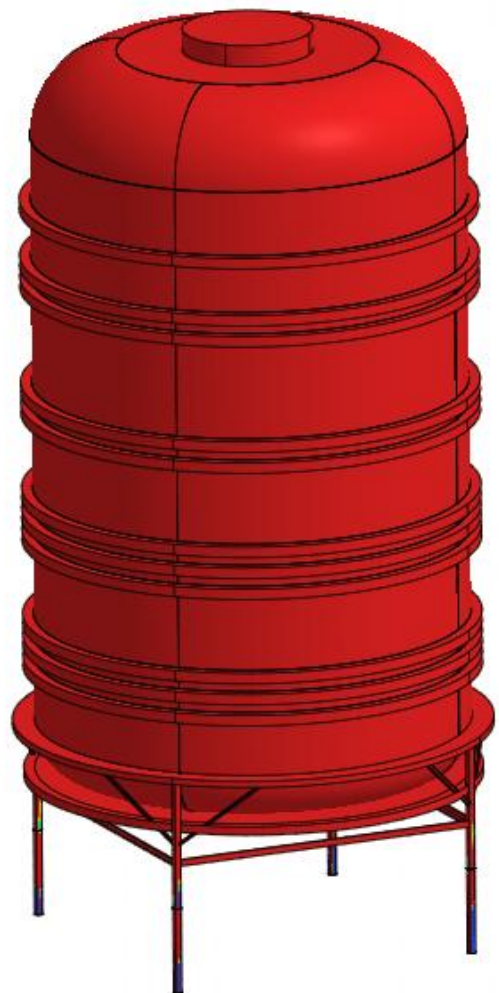
LIFE CYCLE



Linear Analysis-1_Fatigue Result-1

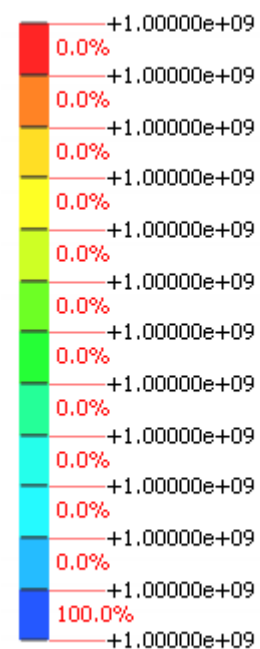
Linear Static

Unit : None



Misc.

LIFE CYCLE



Linear Analysis-1_Fatigue Result-1

Linear Static

Unit : None

