

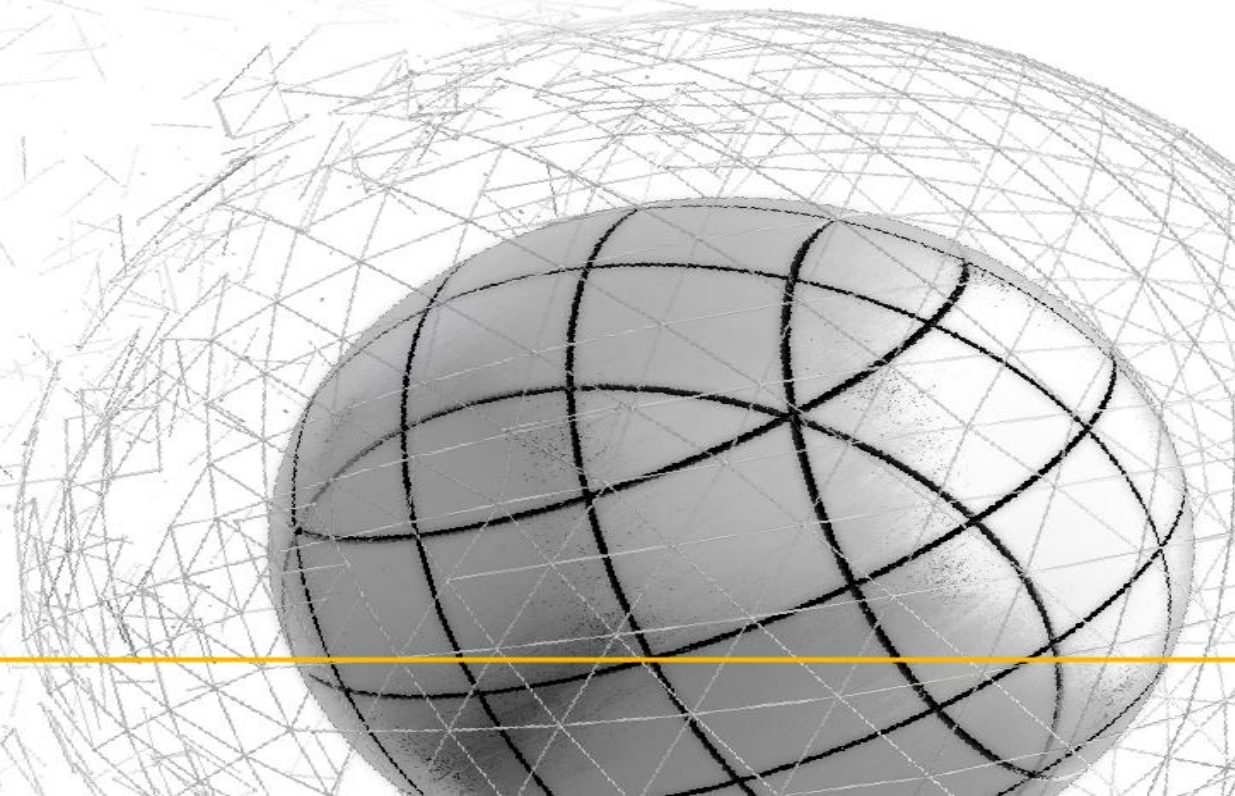


MIDAS MESH FREE

沈約翰

support@midasuser.com.tw

Simple, but Everything.



CASE 4 : SOLAR PANEL

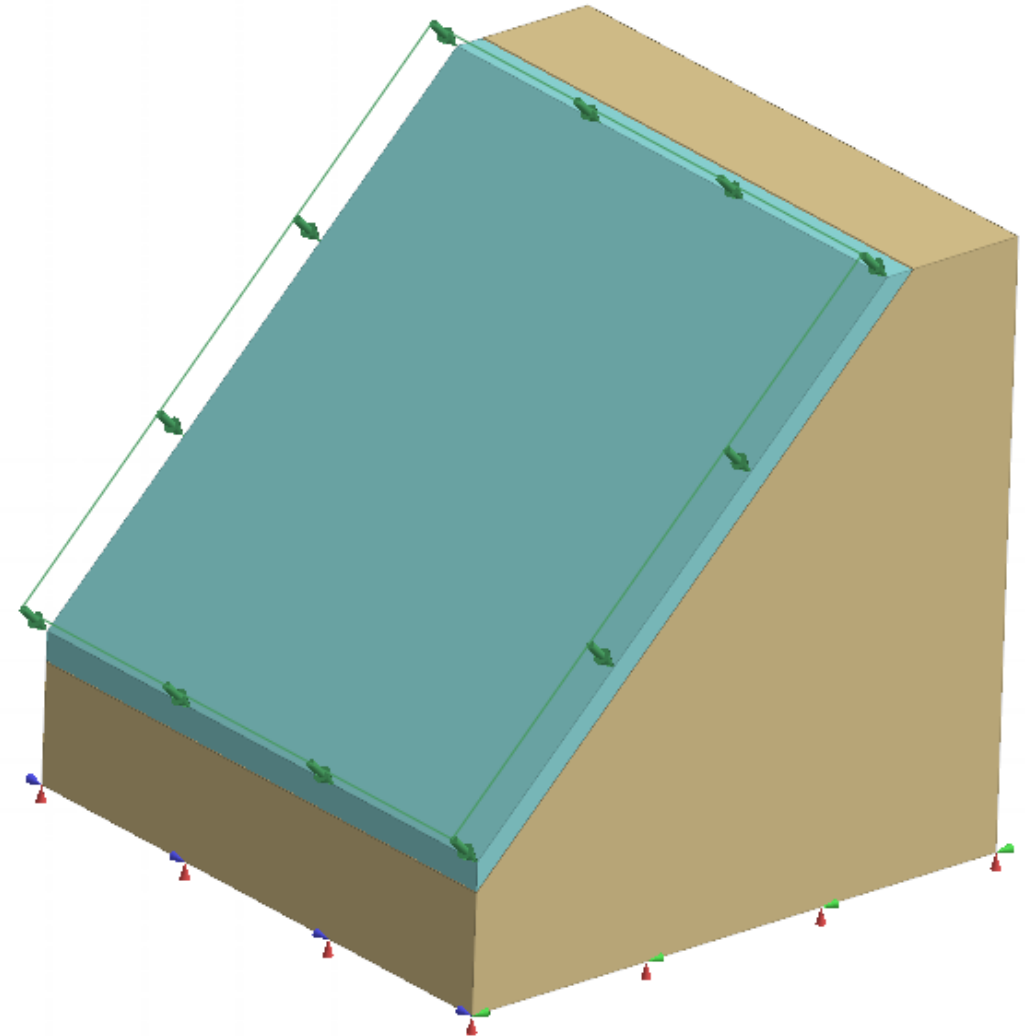
Analysis Case: Topology Optimization

Material: Aluminum 6063 and Glass

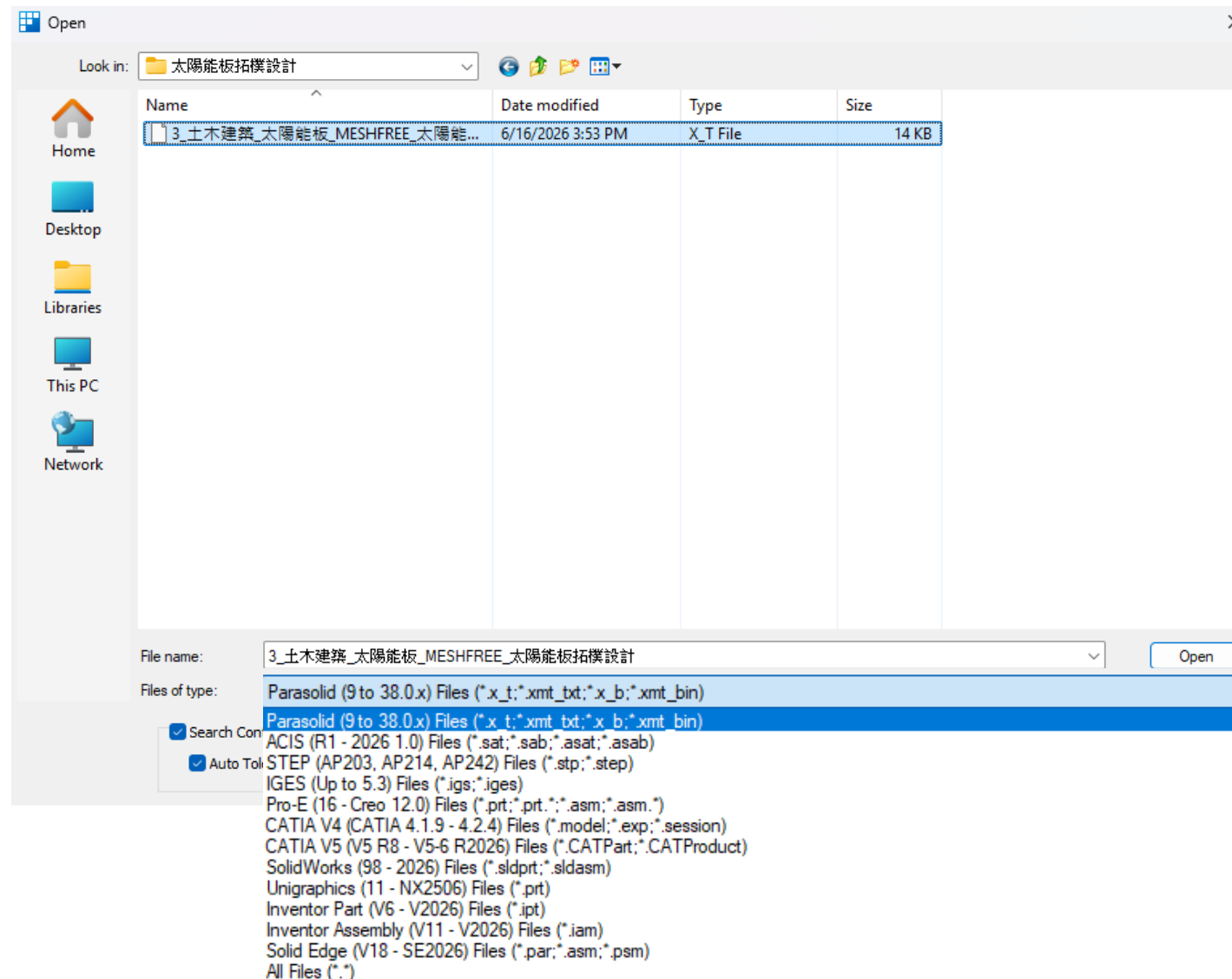
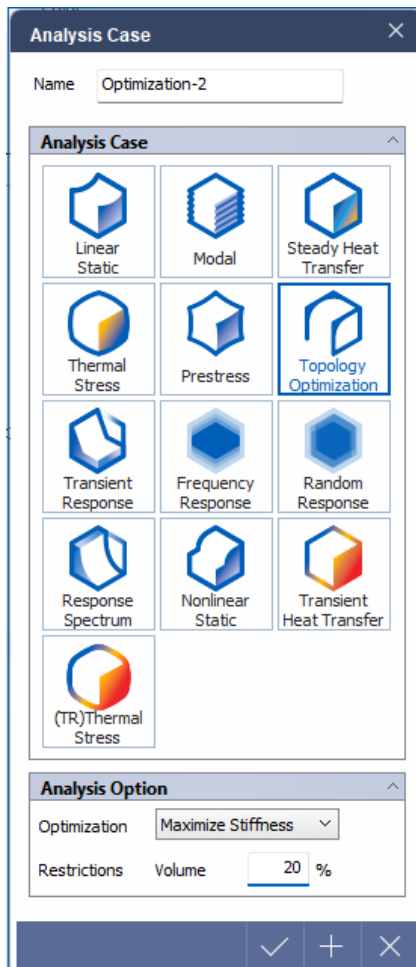
Boundary Condition: Fixed support at the bottom

Load: 0.5 N/mm^2 at the glass

Contact: Weld at all contact points



GEOMETRY - IMPORT



GEOMETRY - MATERIAL

Define Material

Aluminum Alloys

Name

Al 6063

Color

Coord. Sys.

None

1060 Alloy

1345 Alloy

1350 Alloy

2014 Alloy

2018 Alloy

2024 Alloy

3003 Alloy

3003 Alloy

6061 Alloy

6061 Alloy

7049 Alloy

7079 Alloy

Al 6061-T6

Al 6063

ALDC 12

Aluminum_5085

Aluminum_A356

Elastoplastic

Thermal

Structural

Elastic Modulus

71250 N/mm²

Poisson's Ratio

0.33

Mass Density

2.69e-06 kg/mm³

Thermal Expansion

Expansion

2.35e-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

Stress Strain Curve

None

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

Define Material

All

Name

Glass

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

SGCD 1

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

70000 N/mm²

Poisson's Ratio

0.215

Mass Density

2.5e-06 kg/mm³

Thermal Expansion

Expansion

9.1e-06

Ref. Temperature

0 [°C]

Factor of Safety Calculation

Failure Theory

None

Tension

0 N/mm²

Compression

0 N/mm²

Elastoplastic

Plastic Hardening Curve

None

Stress Strain Curve

None

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

ANALYSIS CONDITIONS | CONSTRAINT



Define Boundary Condition

Name
Boundary-1

Select

Face
? Selected 1 Objec...

Reference Object

Type
Global Coordinate System

Symmetry Condition

DOF

☒ Tx

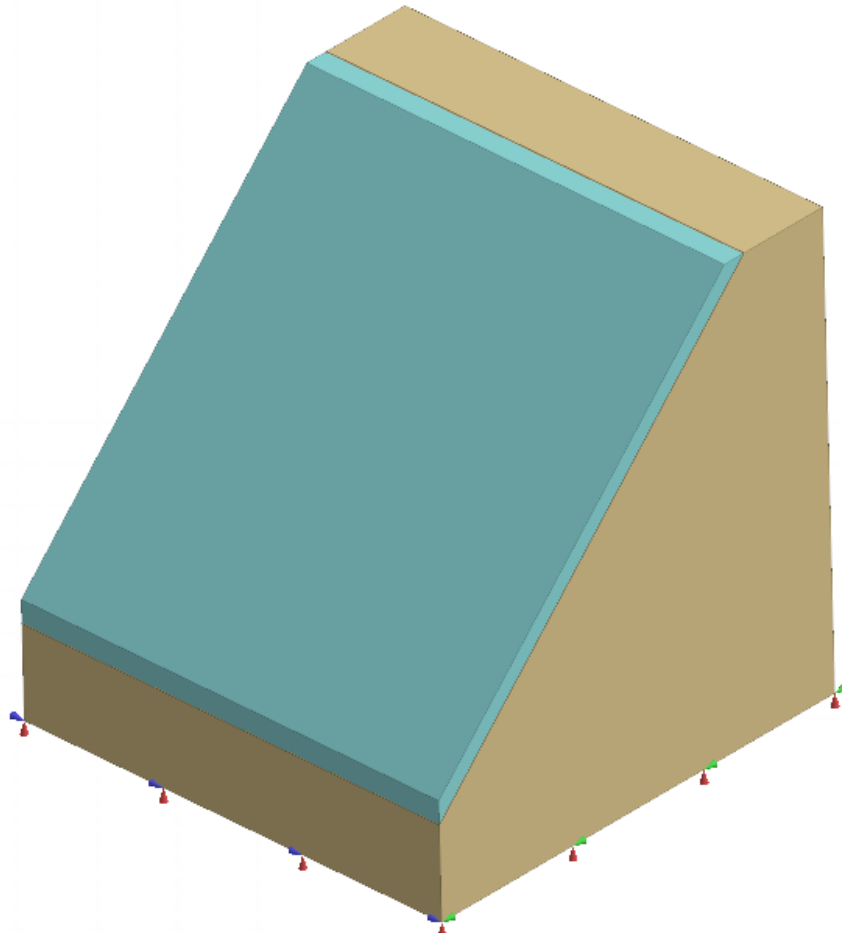
☒ Ty

☒ Tz

✓

+



×




ANALYSIS CONDITIONS | LOAD



Define Pressure

Name
Pressure-1


Selected 1 Object(s)





Direction

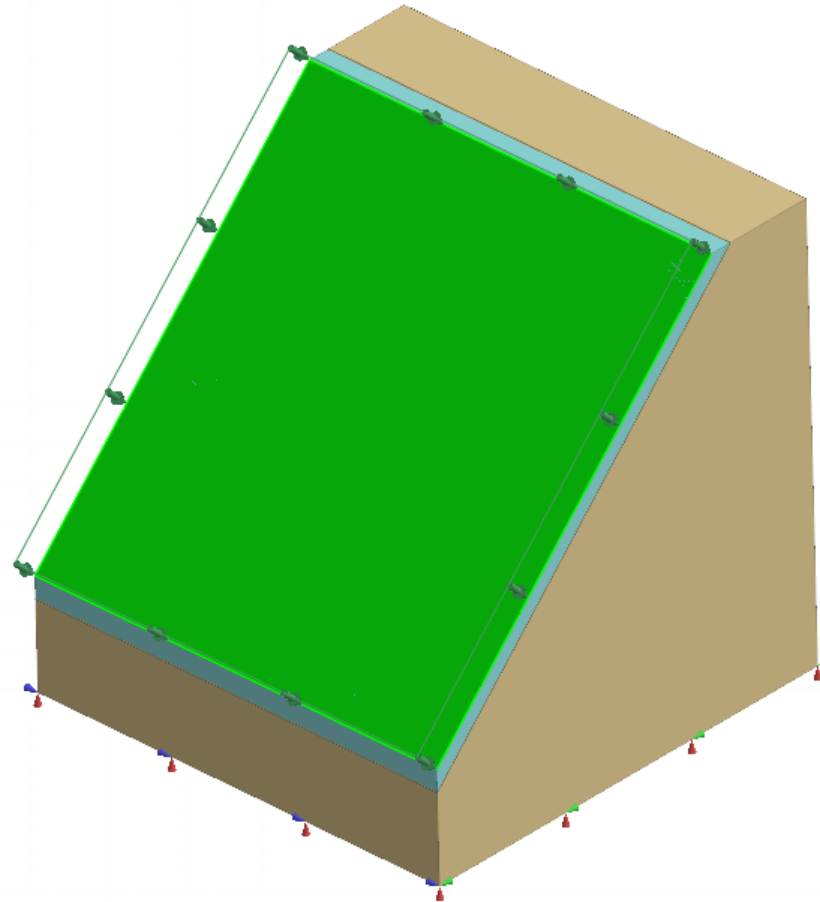
Pressure

P
0.5 N/mm²

Follower Force

☒ Use Follower Force in Geometrically Nonlinear Analysis



ANALYSIS CONDITIONS | CONTACT



Define Contact

Name

Select

Selected 2 Object(s)

Type

Welded Contact

Coefficient of friction

0

Normal Stiffness factor

0.1

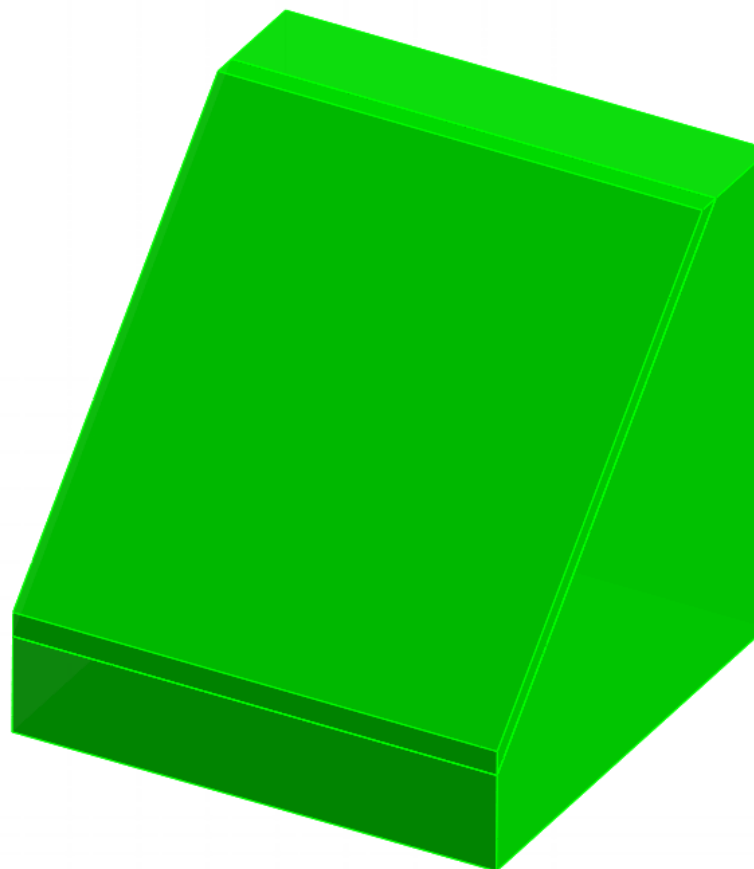
Tangential Stiffness factor

0.01

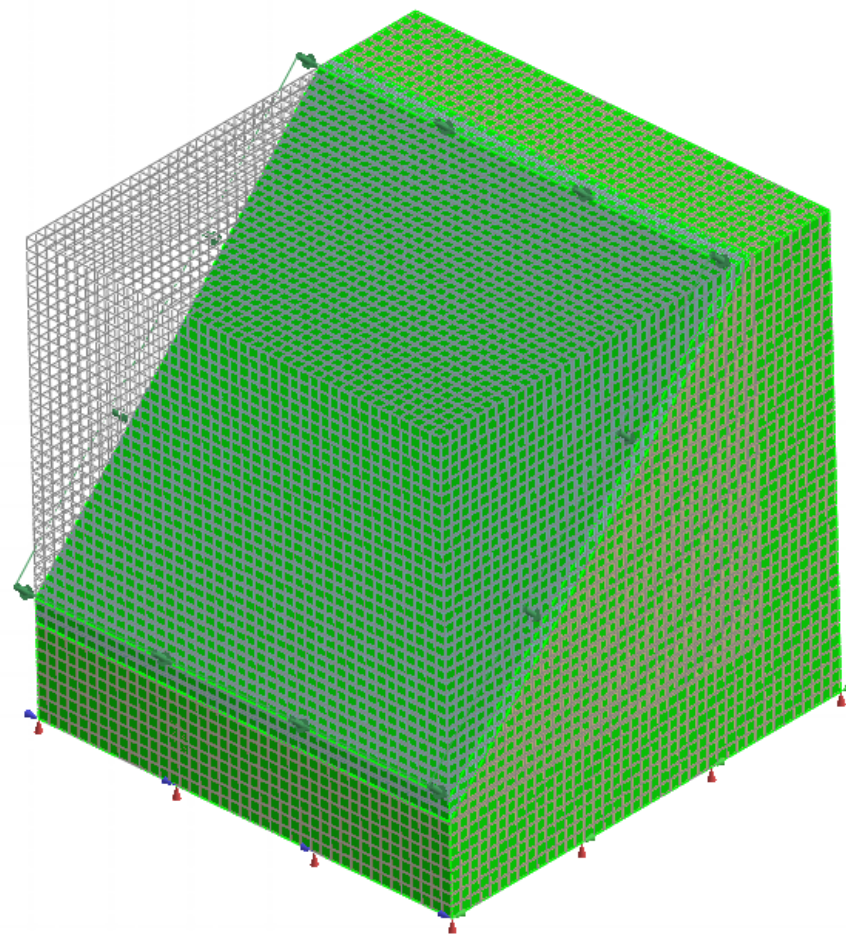
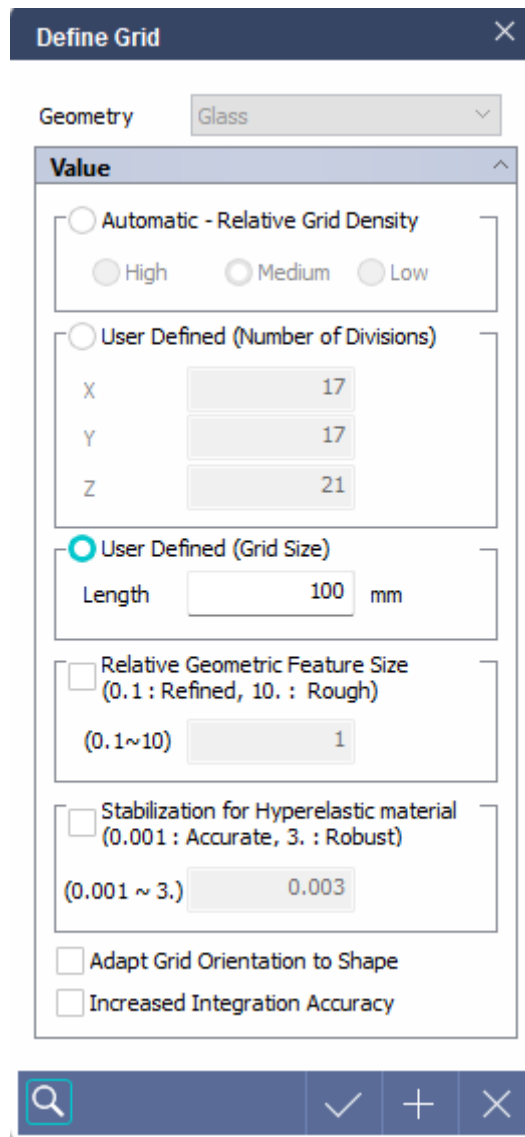
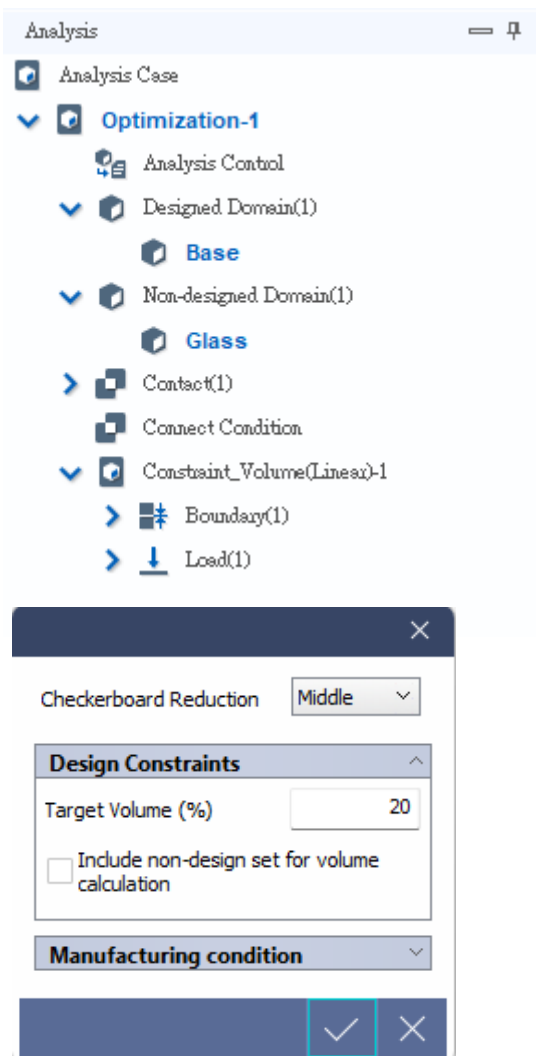
Search Range

☒ Auto

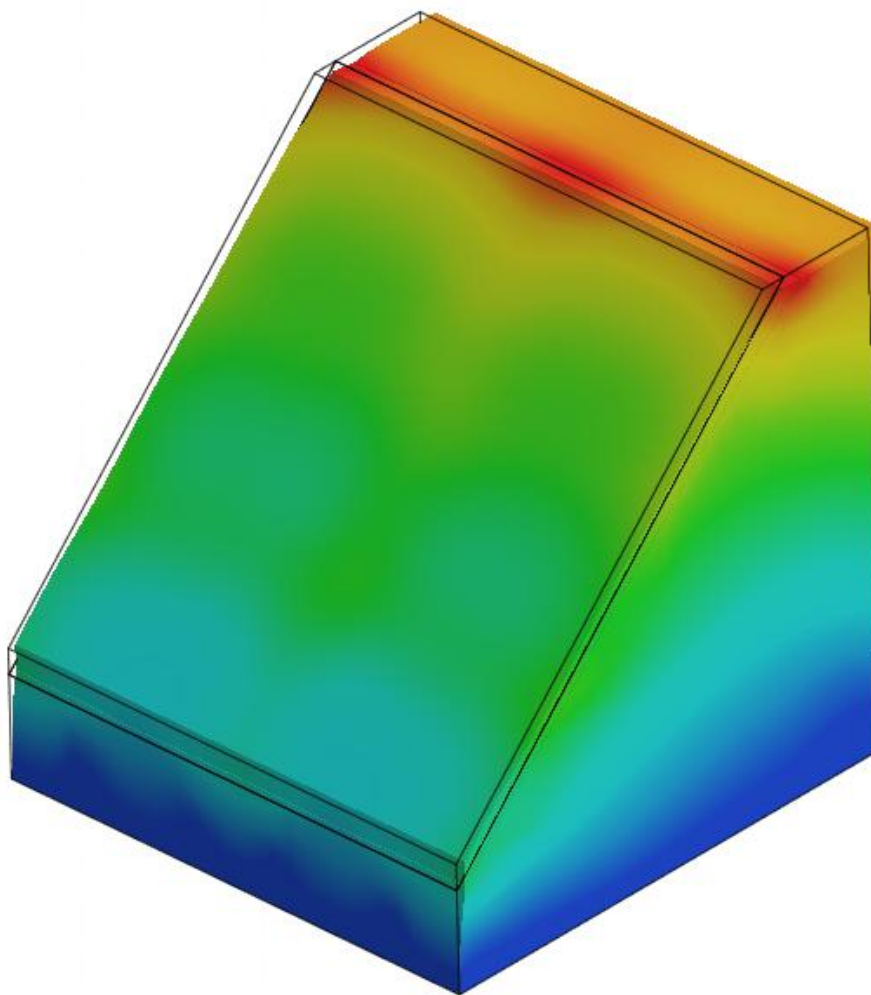
6.9282 mm



ANALYSIS CONDITIONS

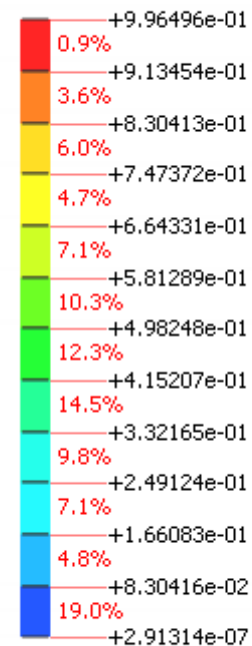


RESULT – DEFORMATION



Deformations

DISPLACEMENT-XYZ



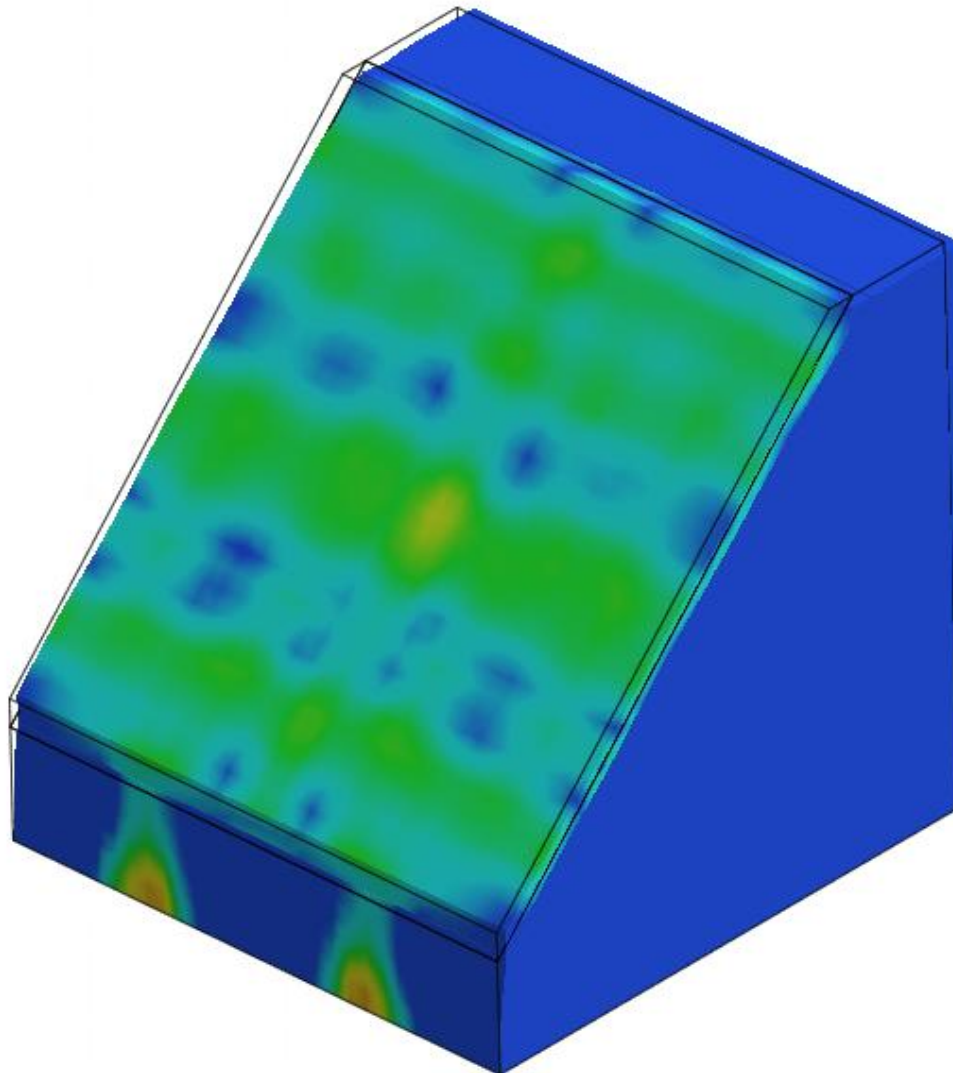
Optimization-1

Volume Case(Linear)-1

ITER= 32 (OBJ=1.596e+06)

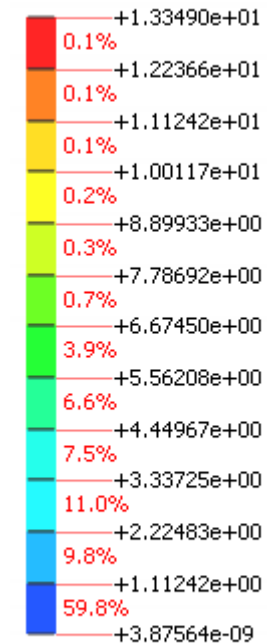
Unit : mm

RESULT – STRESS VON MISES



Stress

STRESS VON MISES



Optimization-1

Volume Case(Linear)-1

ITER= 32 (OBJ=1.596e+06)

Unit : N/mm²

RESULT – OPTIMIZED MODEL



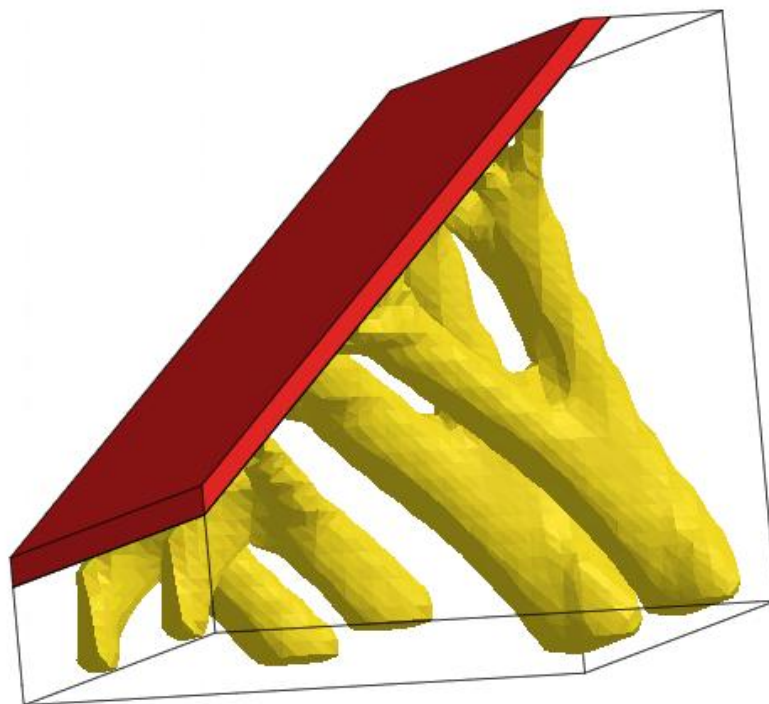
Analysis Control

Analysis Set Optimization-1
Step ITER= 32 (OBJ=1.596e+06)

Material Density
0 0.775 1

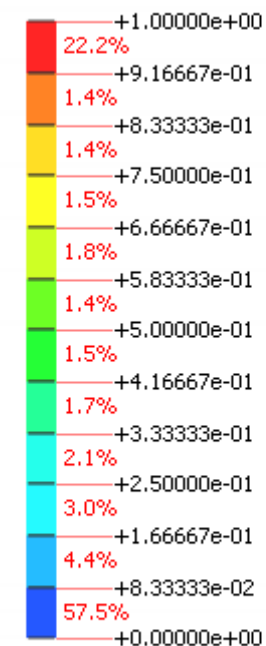
Volume Calculation

Calculation	
Volume before optimization	54605788813.2190 mm ³
Volume after optimization	0.0000 mm ³
Reduction rate	0.00 %



Optimization

MATERIAL DENSITY



Optimization-1
 TOPOLOGY_RESULT
 ITER= 32 (OBJ=1.596e+06)
 Unit : None