



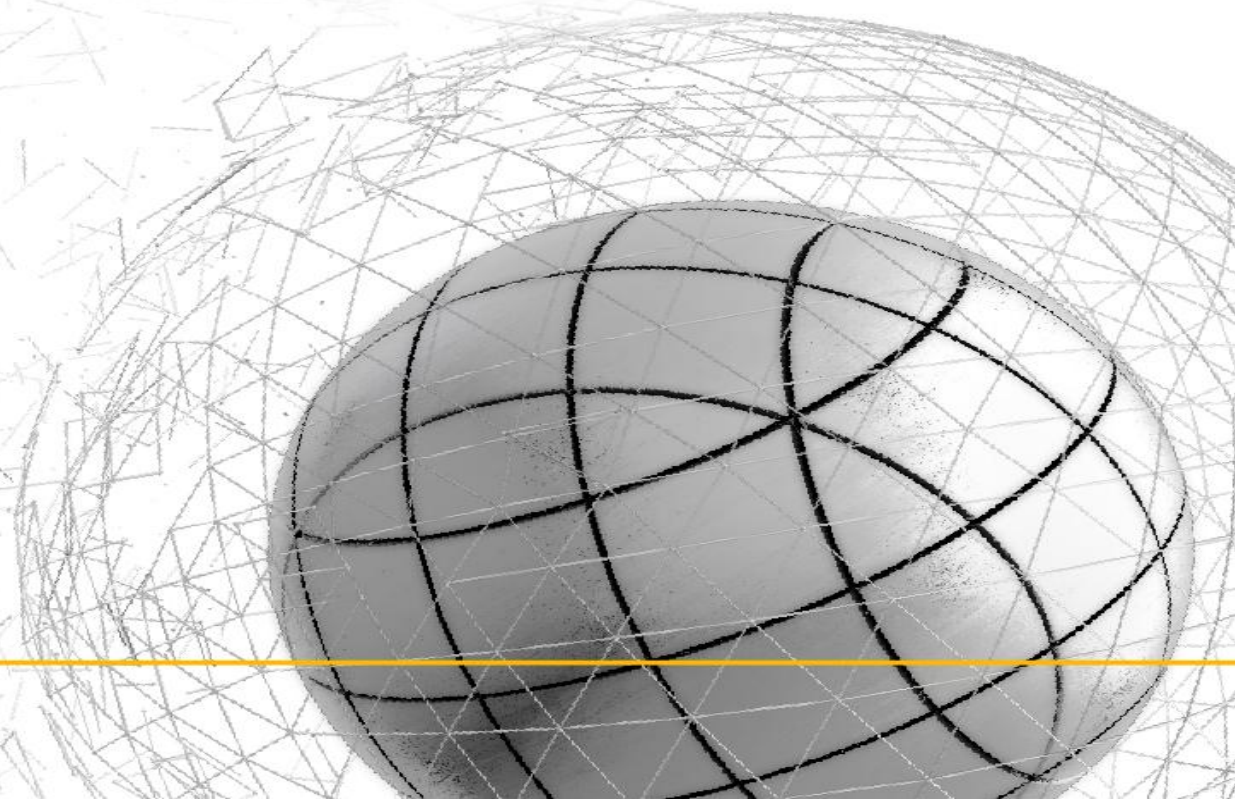
MIDAS

MESH FREE

沈約翰

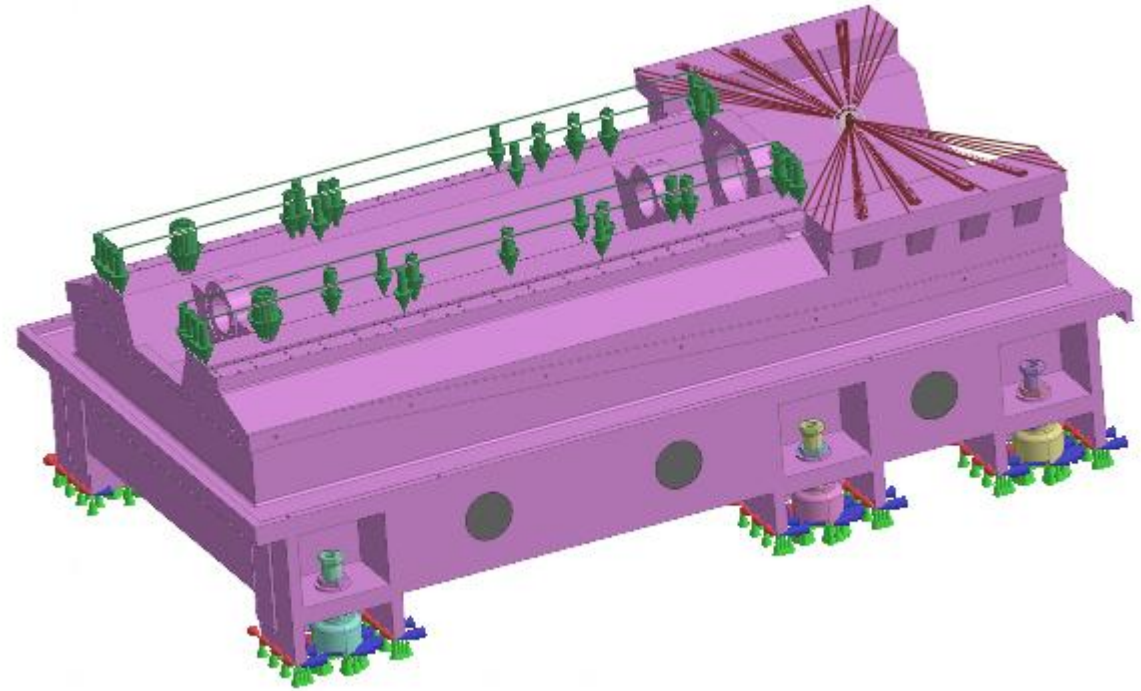
support@midasuser.com.tw

Simple, but Everything.

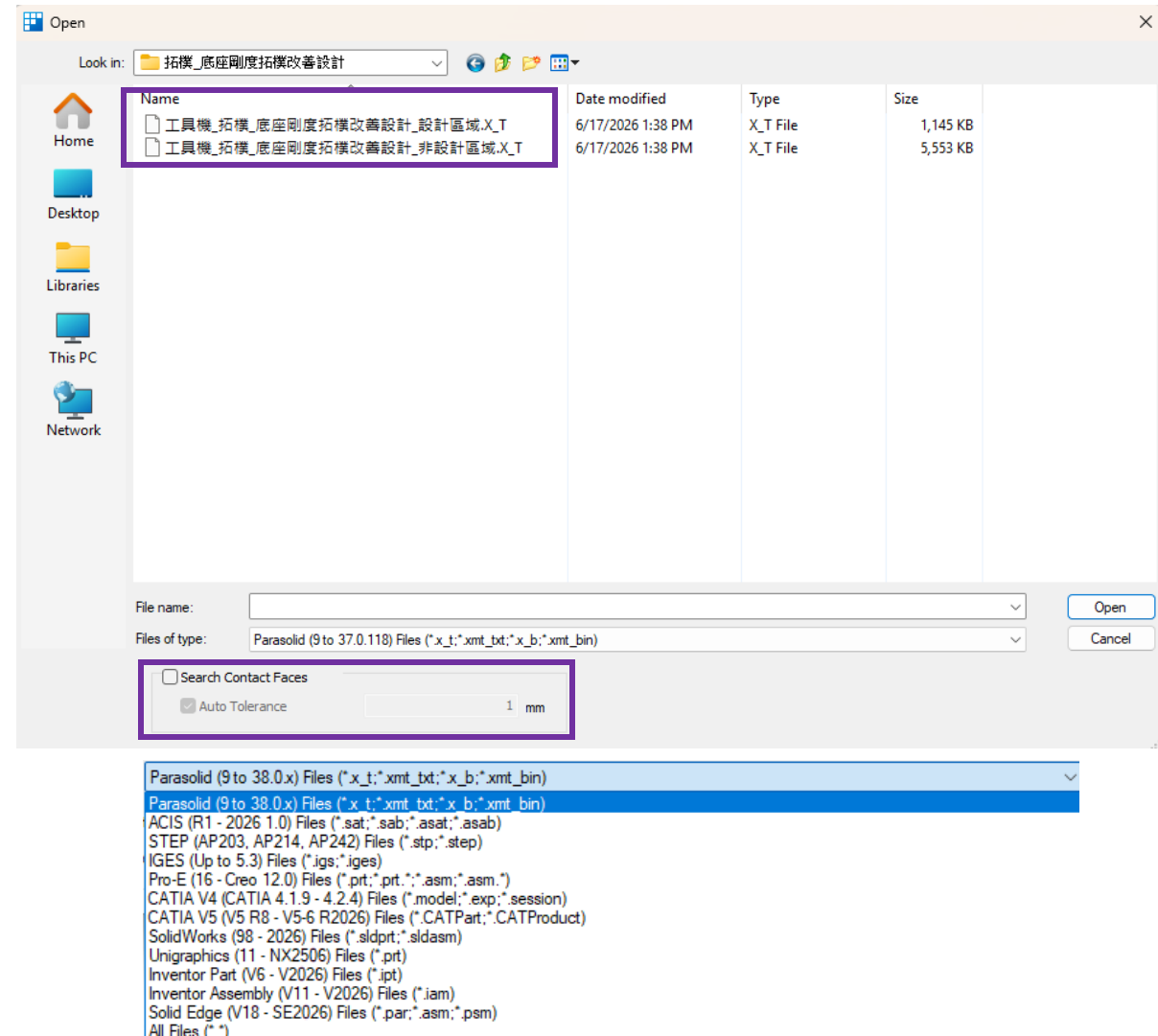
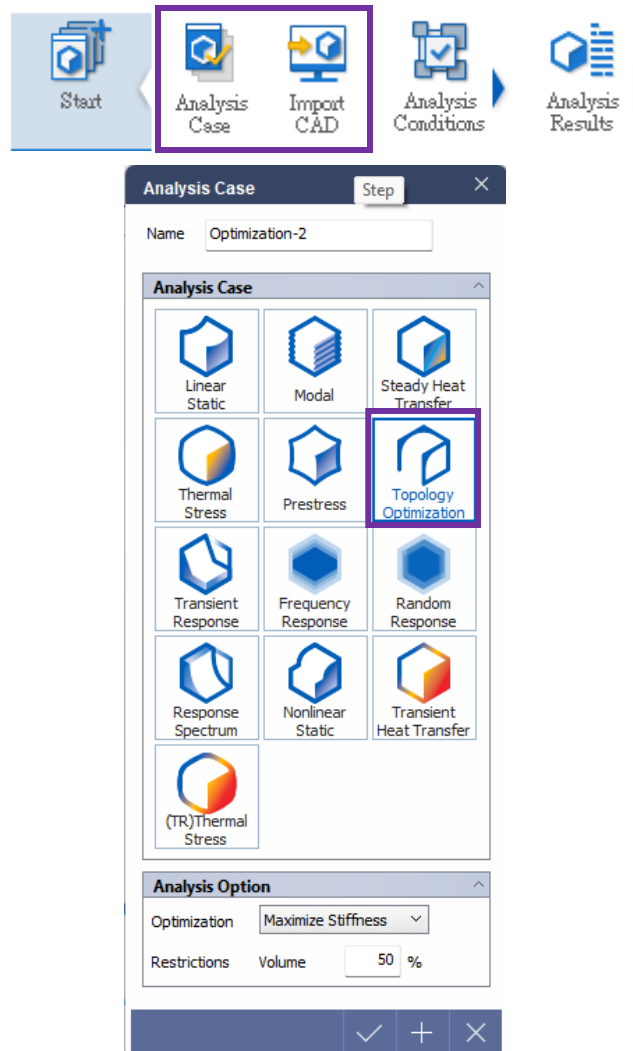


CASE 5: TOPOLOGY

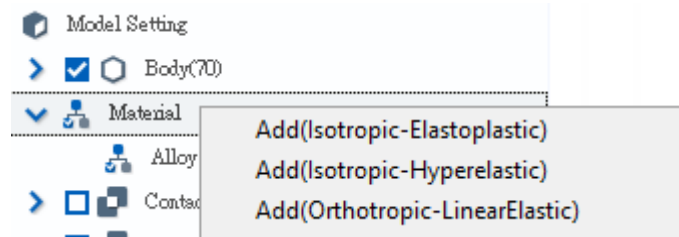
Analysis Case: Topology
Material: Alloy Steel
Contact: Welded
Constraint: Fixed at the bottom
Load: 500kg Concentrated mass
20 MPa Pressure



CASE 5: TOPOLOGY



GEOMETRY: MATERIAL



Define Material

All
Name Alloy Steel
Color
Coord. Sys. None

Elastoplastic Thermal

Structural
Elastic Modulus 210000 N/mm²
Poisson's Ratio 0.28
Mass Density 7.7e-06 kg/mm³
Thermal Expansion
Expansion 1.3e-05
Ref. Temperature 0 [°C]

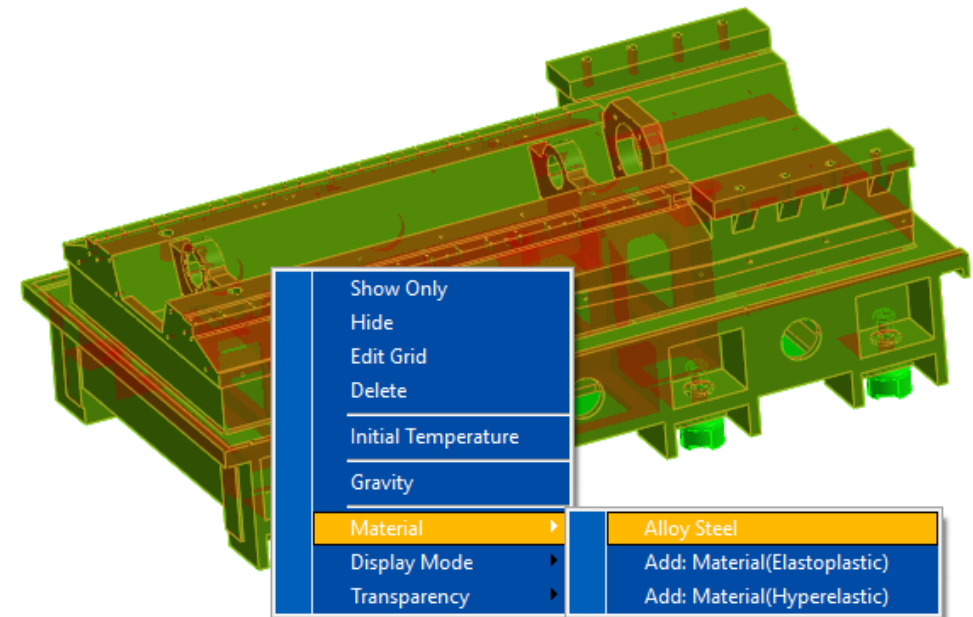
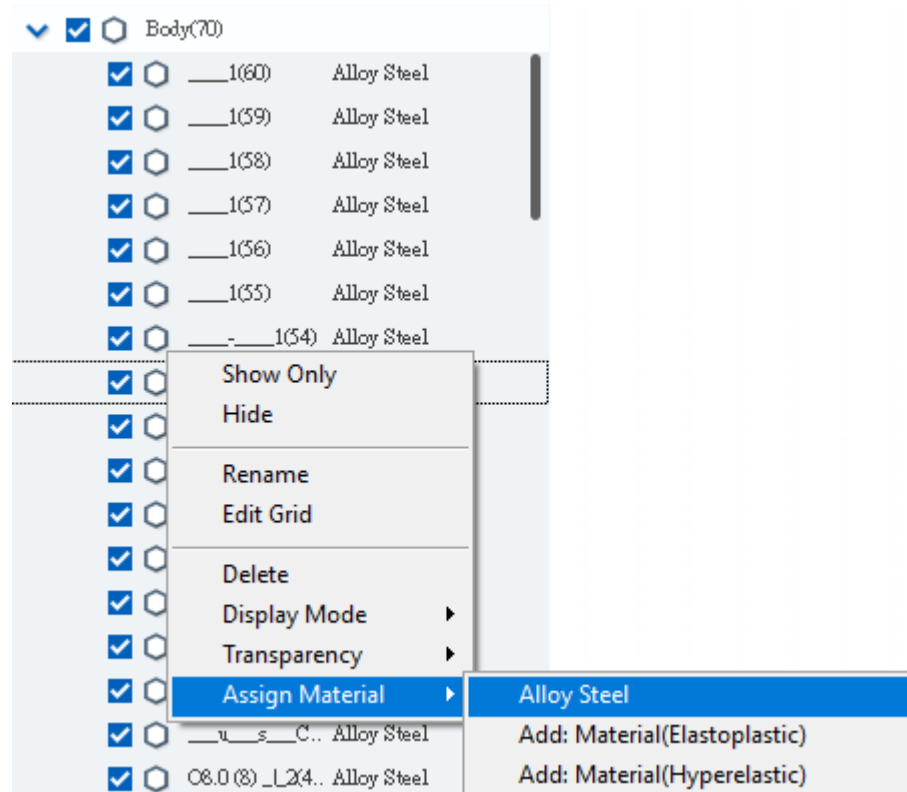
Factor of Safety Calculation
Failure Theory None
Tension 0 N/mm² Compression 0 N/mm²

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

GEOMETRY: MATERIAL



ANALYSIS CONDITION: CONSTRAINT



Define Boundary Condition

Name

Select

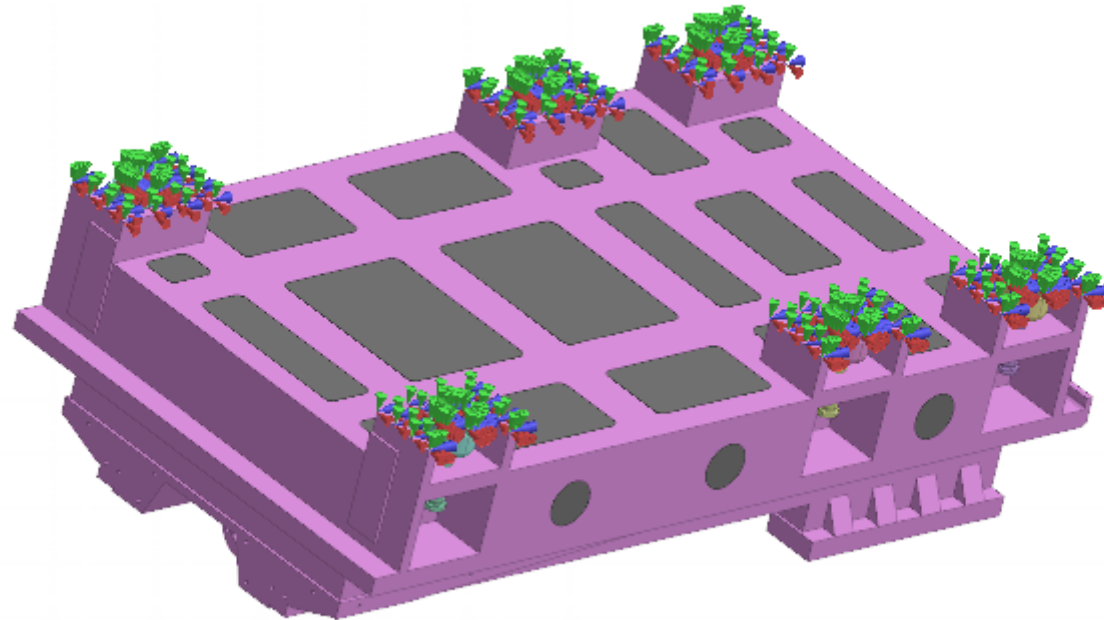
Face

Reference Object

Symmetry Condition

DOF

☒ Tx
☒ Ty
☒ Tz



ANALYSIS CONDITION: RIGID LINK



Define Rigid Link




Name Rigid Link Property-1

Link

Master

☒ Geometry ☒ Selected 1 Objec...

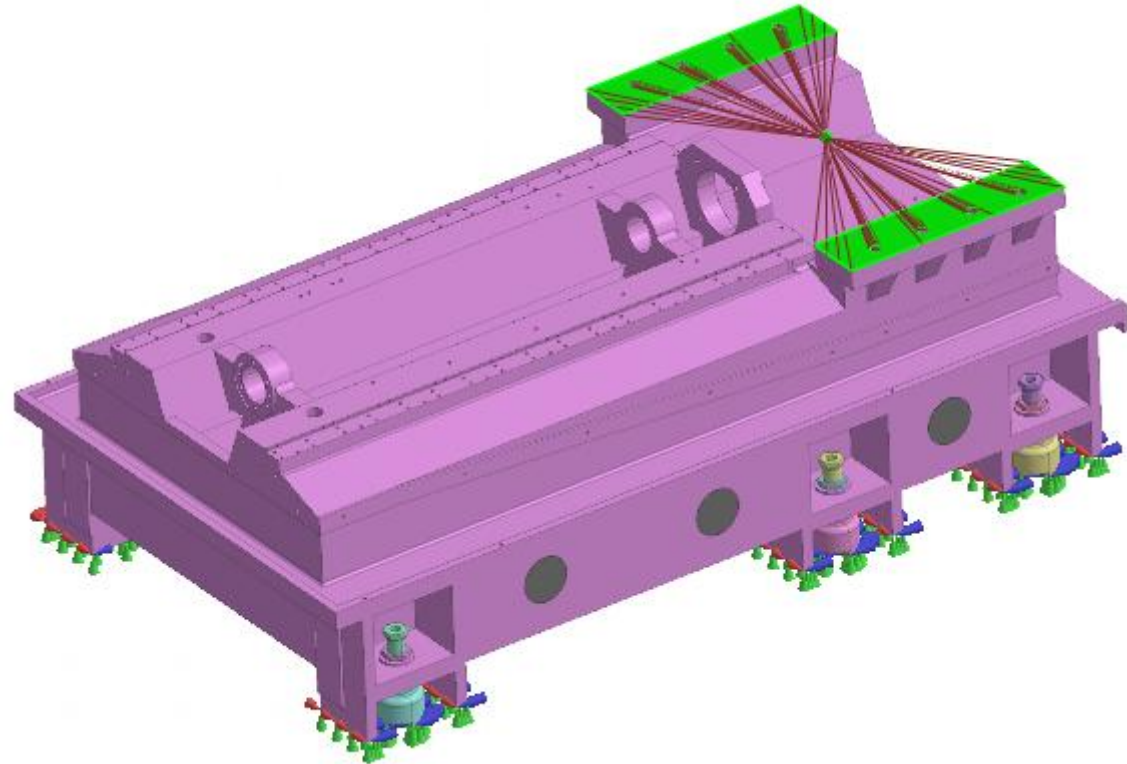
☐ Position 0, 0, 0

Dependent

☒ Selected 2 Object(s)





ANALYSIS CONDITION: LOAD



Define Concentrated Mass




Name
Concentrated Mass-1

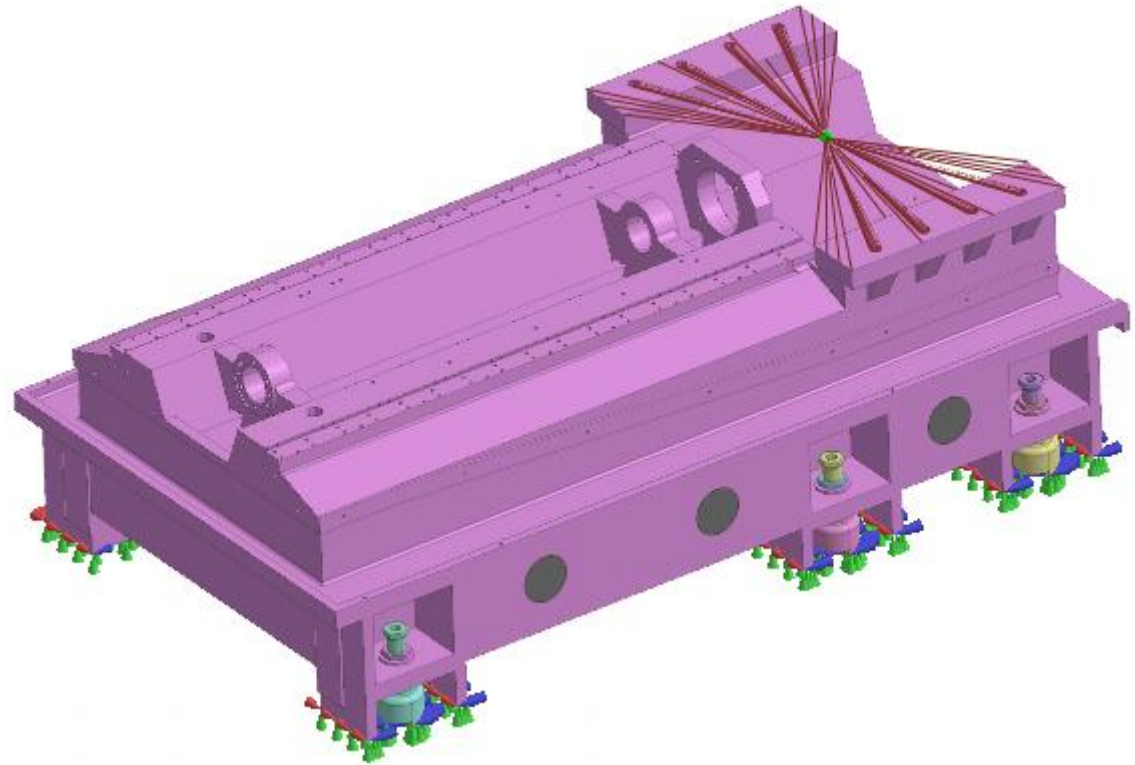
Concentrated mass (point)


Selected 1 Object(s)

Mass
500
kg





ANALYSIS CONDITION: LOAD



Define Pressure

Name

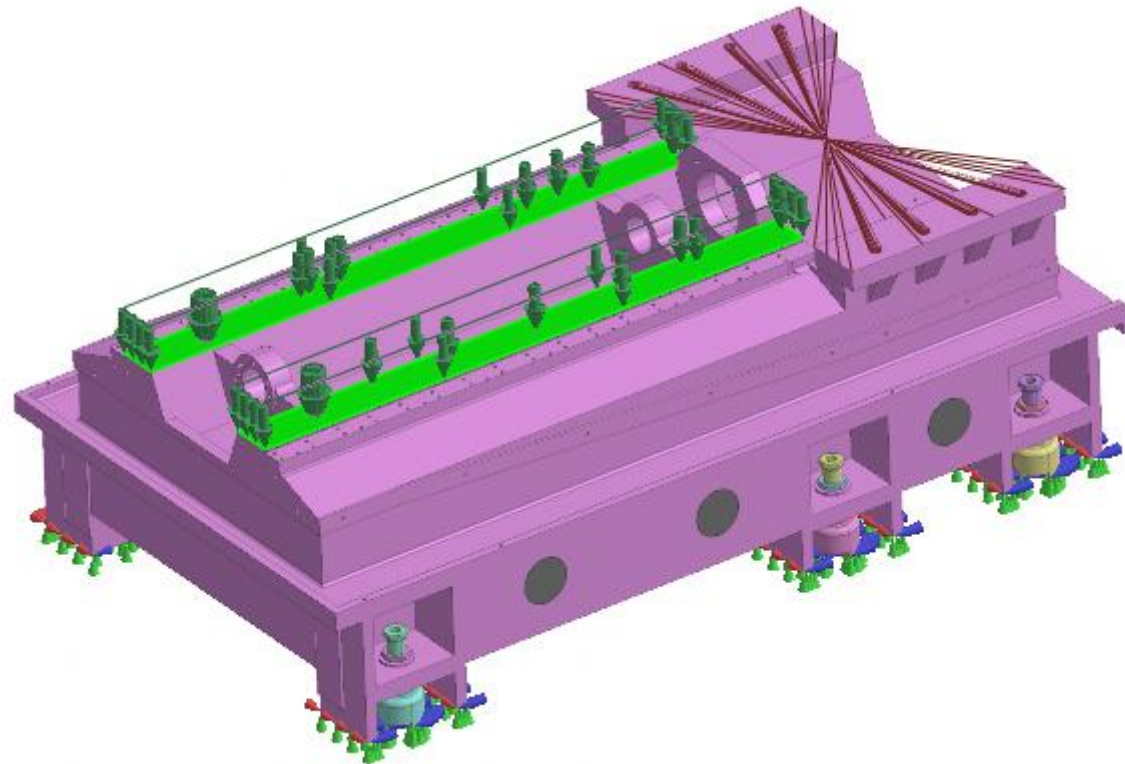
Direction

Pressure

P N/mm²

Follower Force

☒ Use Follower Force in Geometrically Nonlinear Analysis



ANALYSIS CONDITION: LOAD

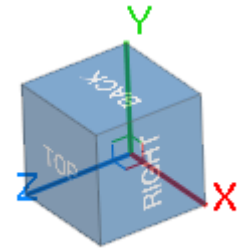
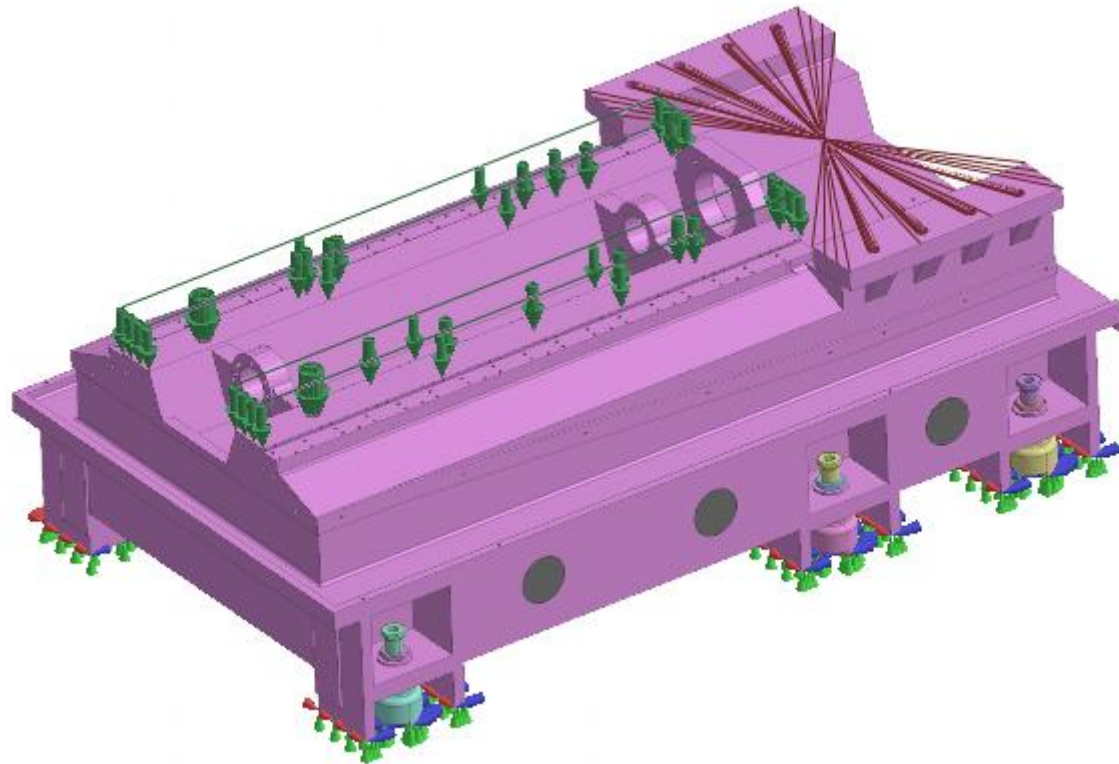


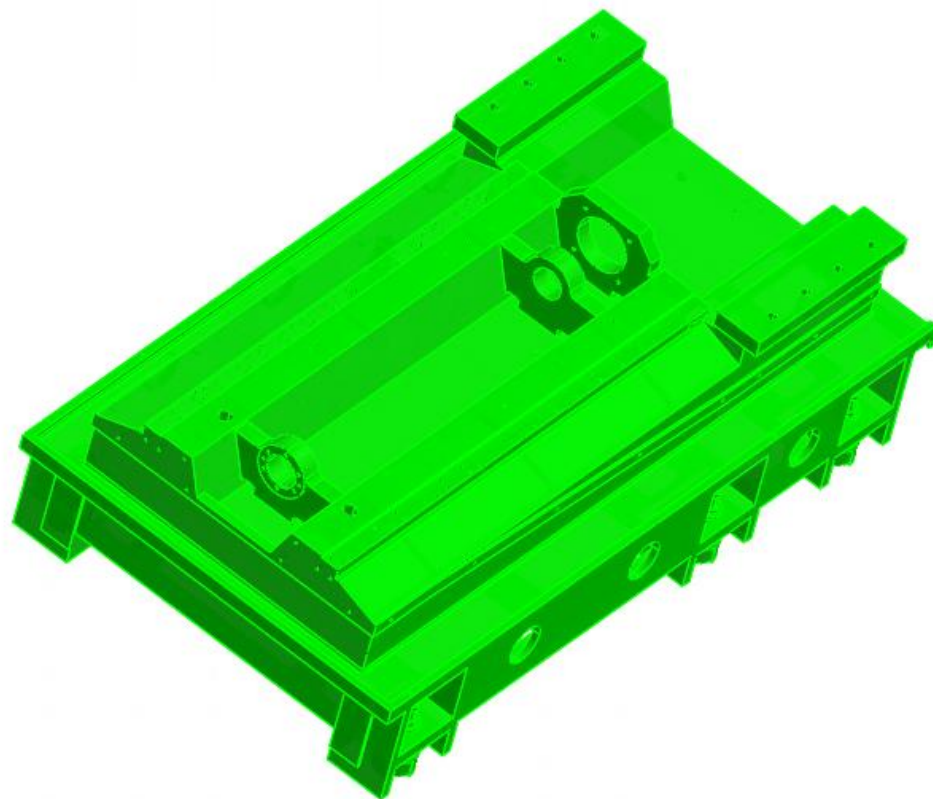
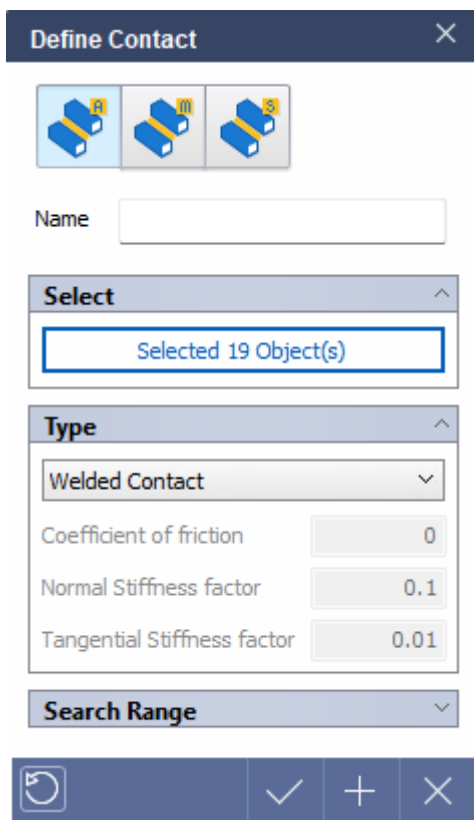
Define Gravity

Name Gravity-1

Value

Gx	0	mm/sec ²
Gy	-9806	mm/sec ²
Gz	0	mm/sec ²



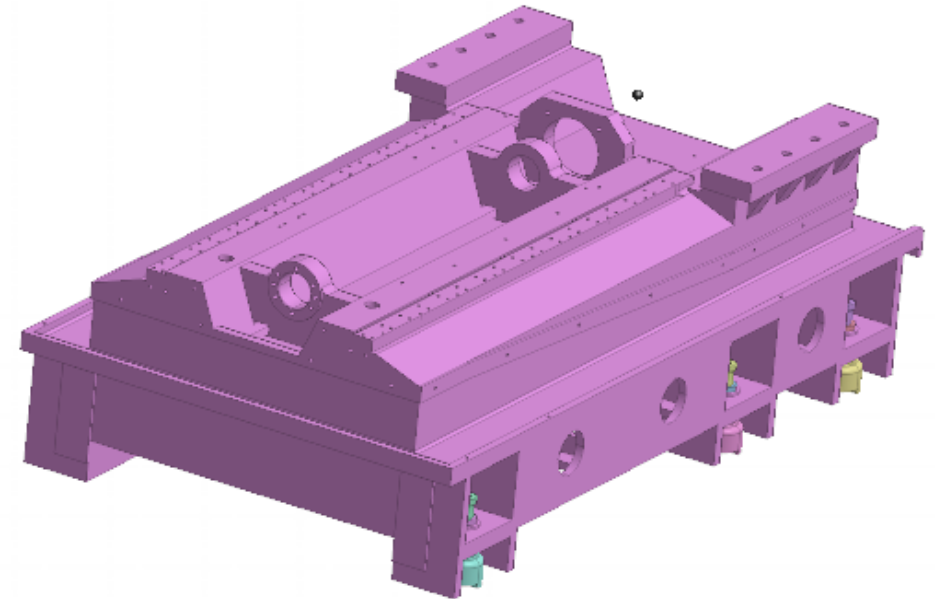
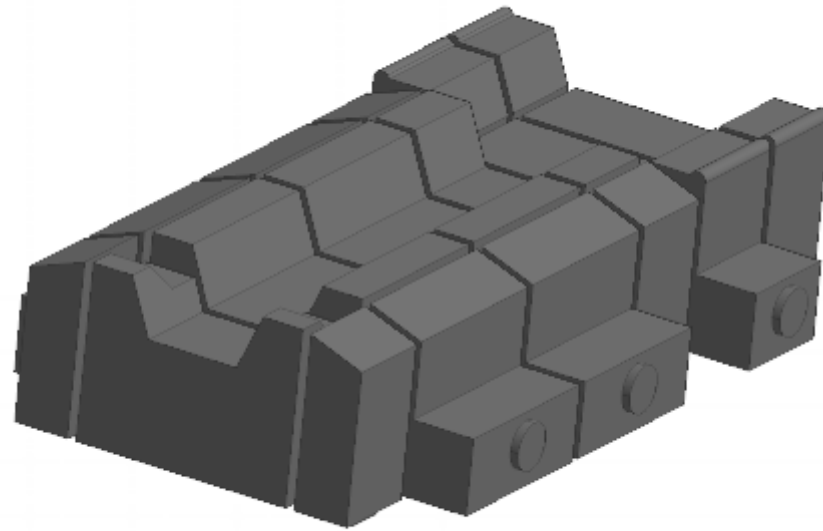
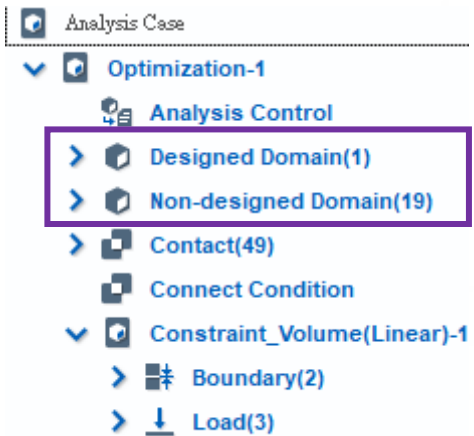


- ✓   Contact(25)
-   M6x1.0_13-3.. Welded
 -   M6x1.0_13-___ Welded
 -   M6x1.0_13-___ Welded
 -   M6x1.0_13-___ Welded
 -   M6x1.0_13-___ Welded
 -   M6x1.0_13-___ Welded
 -   M6x1.0_13-___ Welded
 -   M6x1.0_13-___ Welded
 -   M6x1.0_13-___ Welded
 -   M6x1.0_13-___ Welded
 -   M6x1.0_13-___ Welded
 -   M6x1.0_13-___ Welded
 -   _____s_C.. Welded

ANALYSIS CASE

DESIGNED DOMAIN

NON-DESIGNED DOMAIN



ANALYSIS CASE

×

Checkerboard Reduction

Middle

Design Constraints

Target Volume (%)

20

☐ Include non-design set for volume calculation

Manufacturing condition

☒ Molding Direction

Type

Thru All

Select Direction

Y

☒ Repetition condition

Origin

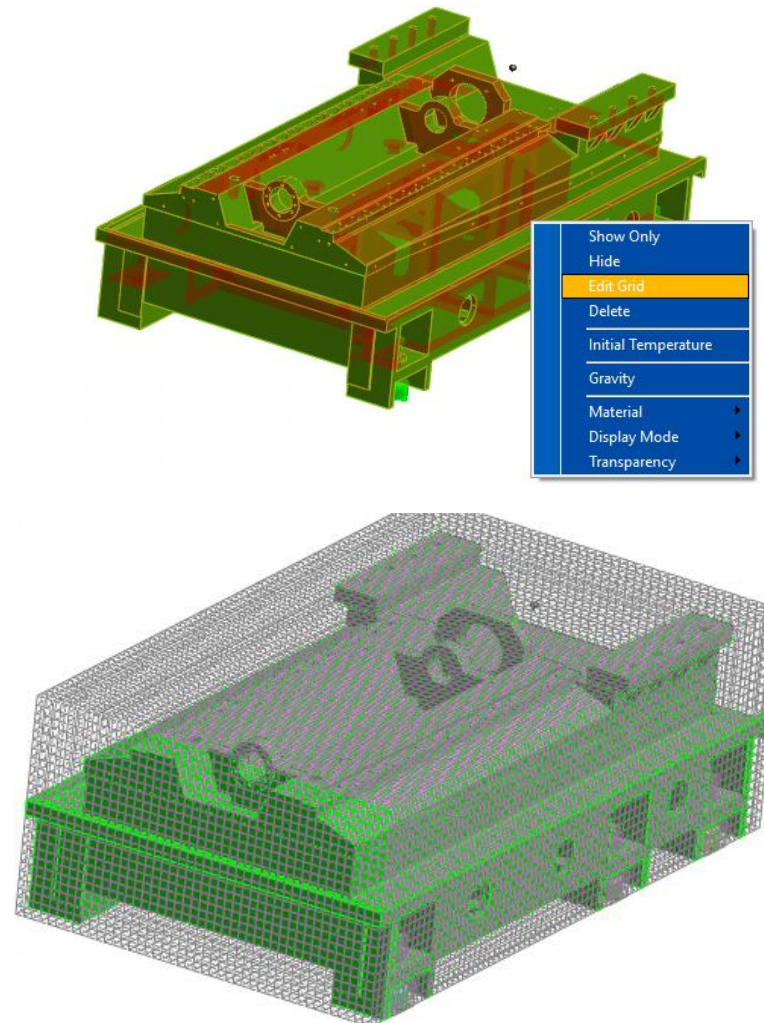
0, 0, 0

Plane Symmetry

☐ XY
 ☒ YZ
 ☐ XZ

✓

×



×

Define Grid

Geometry

2(11)

Value

☐ Automatic - Relative Grid Density

☐ High
 ☐ Medium
 ☐ Low

☐ User Defined (Number of Divisions)

X

1

Y

3

Z

1

☒ User Defined (Grid Size)

Length

20

mm

☐ Relative Geometric Feature Size
(0.1 : Refined, 10. : Rough)
(0.1~10)

1

☐ Stabilization for Hyperelastic material
(0.001 : Accurate, 3. : Robust)
(0.001 ~ 3.)

0.003

☐ Adapt Grid Orientation to Shape

☐ Increased Integration Accuracy

🔍

✓

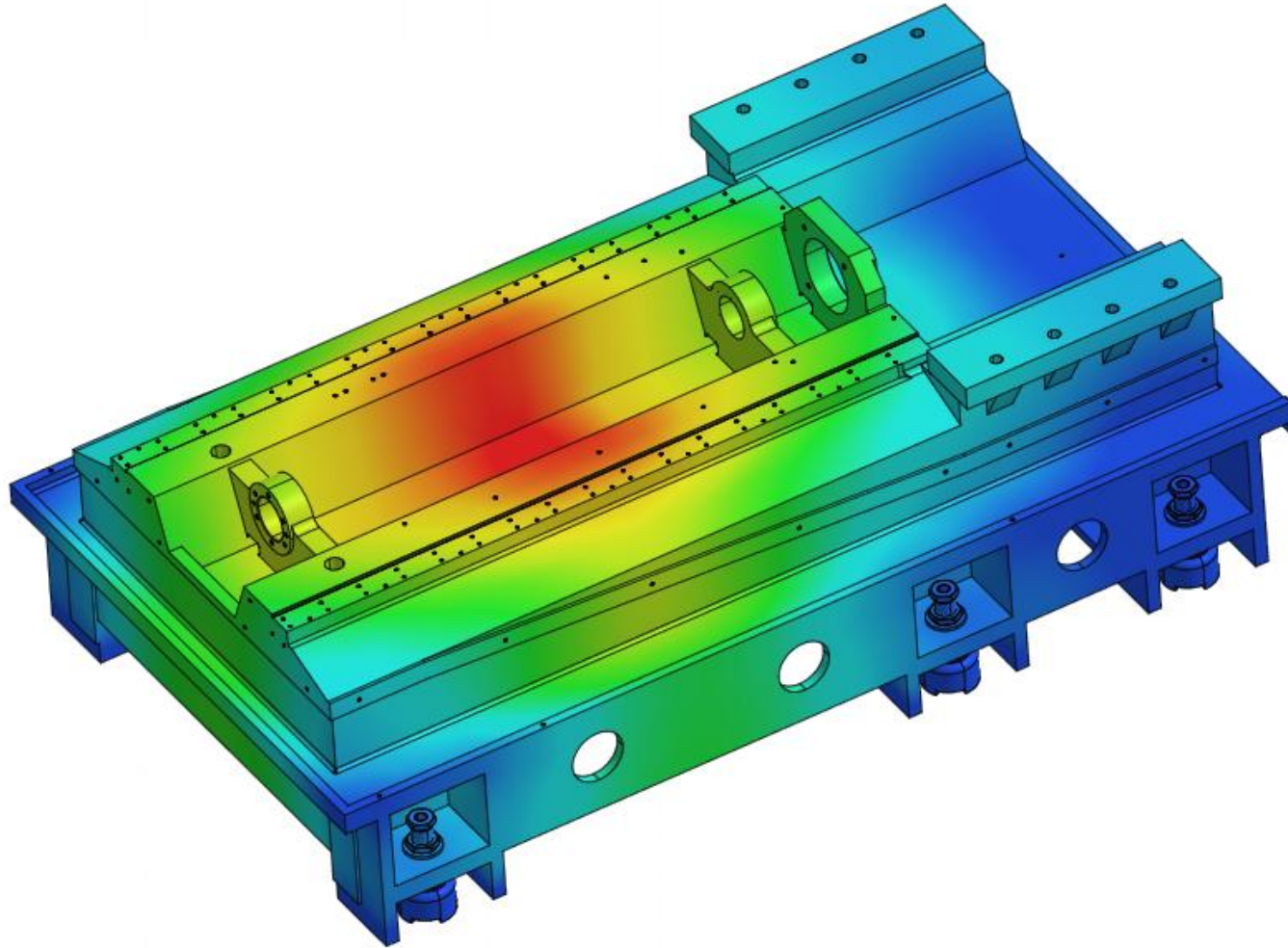
+

×

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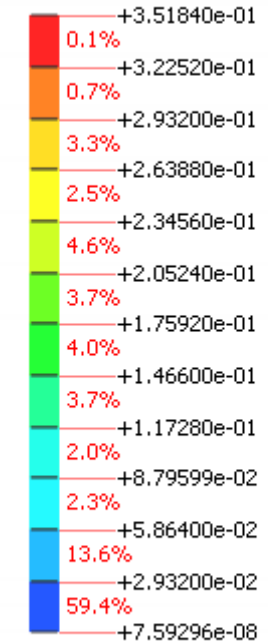
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RESULT: DISPLACEMENT



Deformations

DISPLACEMENT-XYZ



Optimization-1

Volume Case(Linear)-1

ITER= 13 (OBJ=3.366e+05)

Unit : mm

RESULT: TOPOLOGY

Analysis Control

Analysis Set
Optimization-1

Step
ITER = 13 (OBJ=3.251e+05)

Material Density

0

0.5

1

Volume Calculation

Calculation

Volume before optimization

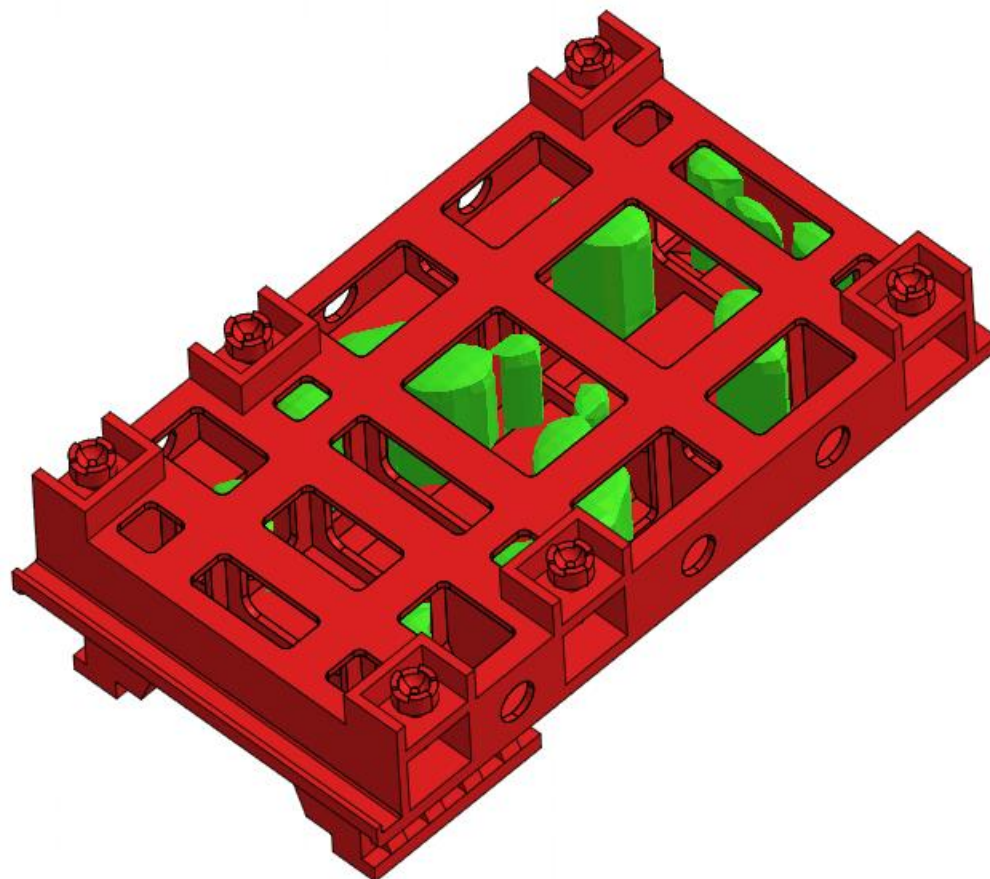
625285598.4157 mm³

Volume after optimization

346107280.4655 mm³

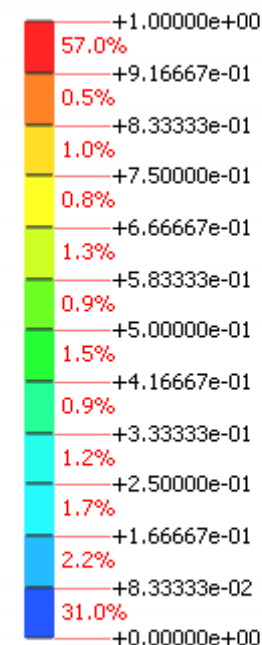
Reduction rate

44.65 %



Optimization

MATERIAL DENSITY



Optimization-1
 TOPOLOGY_RESULT
 ITER= 13 (OBJ=3.251e+05)
 Unit : None